



A49 Goose Green to Westwood Park Link Road, Wigan, Greater Manchester

**Archaeological Trial
Trenching, Earthwork
Survey and
Photographic Survey**



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SUMMARY

Wigan Council has obtained planning permission to construct the A49 Goose Green to Westwood Park Link Road (Planning Ref A/07/67989). A condition of the planning consent requires a programme of archaeological work on those sites that will be impacted by the proposed development. Four areas of archaeology or potential archaeology were described as being of low or medium value in a desk-based assessment undertaken by the University of Manchester Archaeology Unit (UMAU), as part of an environmental statement for the development (Hyder Consulting 2006).

Jacobs were subsequently commissioned by Wigan Council to manage the programme of archaeological evaluation and mitigation works. The areas under investigation include: the projected line of the Roman road from Warrington to Wigan, which is located across the route of the proposed link road, at the site of former allotment gardens at Goose Green (SD 5677 0395); the former Winstanley Colliery Railway (SD 5688 0391); the Smithy Brook mill race (SD 5681 0380); and the Leeds and Liverpool Canal, where it was formerly bridged by the Pemberton Loop railway (SD 5749 0398). Oxford Archaeology North (OA North) was commissioned to undertake the archaeological investigation of these four sites which comprised: trial trenching of the allotment gardens to assess the presence or absence of the Roman road; an earthwork survey of the remains of the former Winstanley Colliery Railway; excavation of a section through the former Winstanley Colliery Railway; and a photographic survey of sections of the Smithy Brook mill race and the Leeds and Liverpool Canal. Only the trial trenching, earthwork survey and photographic survey were undertaken within this phase of work, by OA North in October 2009. The excavation of a section through the former Winstanley Colliery Railway will be undertaken at a later date, due to access constraints.

Two 75m long and 2m wide trenches were excavated in the area of the allotment gardens. No remains of the Roman road were evident in either trench. A post-medieval hedged and ditched field boundary was located at the westernmost end of Trench 2, positioned on the south side of the allotments. A number of features were also recorded that were associated with the former allotment gardens in both trenches.

The earthwork survey has revealed that some remaining features pertaining to the former Winstanley Colliery Railway are still extant. The remains have obviously degraded over time. The curving embankment seems to follow the line of the railway illustrated on the First Edition Ordnance Survey map (1845-6), and is more visible at the south end of the section surveyed. This is probably due to the nature of the ground, which slopes away to Smithy Brook, requiring building up of the embankment. Limited evidence for other features was visible, owing to the dense vegetation. However, a possible quarry was recorded at south end of the embankment. A larger railway embankment from the former Lancashire and Yorkshire (LY) Railway Pemberton Loop truncates the northern end of the colliery railway earthwork.

The photographic survey of the Smithy Brook mill race recorded a short section of a rock-faced sandstone culvert, with a modern concrete footbridge. Beneath the bridge was evidence of former bridge abutments, either for a predecessor footbridge over the mill race or belonging to a larger railway bridge, as the LY Railway would have crossed the mill race in this area. The photographic survey of the Leigh Branch of the

Leeds and Liverpool Canal recorded evidence of the LY Railway having once bridged the canal in the form of the high railway embankments to the side, but no actual trace of the bridge was visible. The canal banks have been modernised and rebuilt and, as such, contain no features of interest; there is, however, an original lock to the north.

The earthwork and photographic surveys recorded features of local or possible regional significance. The trial trenching did not find anything of archaeological significance.

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OA North would like to thank Rob McNaught of Jacobs and Sue Mathews at Wigan Council for commissioning the project and their logistical help.

The archaeological evaluation excavations were undertaken by Andy Bates, Ged Callaghan, Ric Buckle and Tim Christian. The earthwork and photographic surveys were undertaken by Karl Taylor and Pete Schofield. The report was compiled by Andy Bates and Karl Taylor. The finds were assessed by Chris Howard-Davis, and the drawings were produced by Alix Sperr. The project was managed by Emily Mercer, who also edited the report.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF PROJECT

1.1.1 Wigan Metropolitan Borough Council has obtained planning permission to construct the A49 Goose Green to Westwood Park Link Road (Planning Ref A/07/67989). A desk-based assessment undertaken by the University of Manchester Archaeology Unit (UMAU), as part of an environmental statement produced by Hyder Consulting for Wigan Metropolitan Borough Council, highlighted four areas of archaeology or potential archaeology that were described as of low or medium value (Hyder Consulting 2006). Consequently, one of the conditions to the planning consent, Condition 16, stated that;

No development shall take place within the site until the applicant has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the Local Planning Authority.

1.1.2 Jacobs was commissioned by Wigan Council to manage the programme of archaeological evaluation and mitigation works in order to discharge this planning condition.

1.1.3 Four areas of impact on potential archaeological remains were outlined: the projected line of the Roman road from Warrington to Wigan, which is crossed by the route of the proposed link road, at the site of former allotment gardens at Goose Green (SD 5677 0395); to the east of the former allotments ran the former Winstanley Colliery Railway in a north/south direction (SD 5688 0391); the Smithy Brook mill race (SD 5681 0380); and the Leeds and Liverpool Canal, where it was formerly bridged by the Lancashire and Yorkshire (LY) Pemberton Loop railway (SD 5749 0398). Oxford Archaeology North (OA North) was commissioned to undertake the archaeological investigations as follows:

- trial trenching where the proposed link road crosses the projected route of the Roman road between Wigan and Warrington;
- earthwork survey of the remains of the former Winstanley Colliery Railway;
- excavation to record a section through the former Winstanley Colliery Railway;
- photographic survey of sections of the Smithy Brook mill race, and the Leeds and Liverpool Canal where they are crossed by the proposed link road.

1.1.4 The trial trenching, earthwork survey and photographic survey were carried out in October 2009. The results of each are set out in the following

document. It was not possible to excavate the proposed section through the Winstanley Colliery Railway due to access constraints. This work will be carried out at a later date when the footpath can be diverted.

1.2 LOCATION AND GEOLOGY

- 1.2.1 The areas under investigation lie to the south of the centre of Wigan, on the Lancashire Coal Measures (Fig 1). The character of the area is dominated by its industrial heritage of the eighteenth and nineteenth centuries. This has given rise to a landscape comprising a complex mosaic of degraded farmland, scattered urban centres, active mineral sites, derelict or reclaimed workings, and ‘flashes’ (Countryside Commission 1998, 127). Wigan Flashes are lakes that formed as a result of mining subsidence, but with large-scale reclamation works and natural recolonisation they have become wetland reserves (lancswt.org.uk/Our Reserves/wigan_flashes)
- 1.2.2 The Lancashire Coal Measures date to the Westphalian period (310-300 million years ago) of the Upper Carboniferous, and are covered by a mantle of glacial drift deposits. Underlying the coal measures is Millstone Grit, also of the Upper Carboniferous, formed in the Namurian period (327-310 million years ago (Edwards and Trotter 1954)).

1.3 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

- 1.3.1 **Introduction:** a desk-based assessment of the entire road corridor was initially undertaken by UMAU (Hyder Consulting 2006). This section is intended only as a brief summary of the archaeological development of the area, drawn from the desk-based assessment, together with more recent work completed on Roman Wigan, to provide a context to the results.
- 1.3.2 **Prehistoric Period (up to AD 43):** no prehistoric finds or sites have been located in the development area. A handful of prehistoric finds or sites is recorded in the general vicinity, including a Neolithic polished stone axe and a bronze double-looped socketed spearhead found at Leigh; a Neolithic/Bronze Age thumbnail scraper found in a medieval ditch at Gadbury Fold; a Bronze Age axe hammer found at Bottling Wood; a Late Neolithic polished stone axe from Gidlow; a Neolithic axe hammer discovered in Wigan; and a bronze spearhead believed to have been found at Bryn Moss (GMAU 1993; Hall *et al* 1995).
- 1.3.3 **Roman Period (AD 43 - 410):** the Roman road leading from Wigan to Warrington is projected to cross the former allotment gardens under investigation, on a north/south orientation.
- 1.3.4 A number of isolated finds of pottery and coins, most notably a gold aurus of the Emperor Vitellius (AD 69) from Mesnes, have been used to suggest a long Roman occupation at Wigan (Hannavy 1990, 8). More recently, work at The Wiend and the Grand Arcade on Millgate, Wigan, has provided evidence of the Late Flavian (AD 85-95) to early Trajanic (AD 100-105) barracks and a Hadrianic (AD 117-160) bathhouse respectively (Zant and Miller

forthcoming). The earlier turf and timber fort appears to have been demolished in the late Trajanic period, with the later bathhouse presumably serving an as yet undiscovered Hadrianic fort. The bathhouse was demolished at some point in the Antonine period (AD 138-161) before c AD 160. The abandonment of the earlier fort may relate to the Dacian War (AD 105), when several forts in the North, including Carlisle, Corbridge, Vindolanda, Lancaster, and perhaps Ribchester, were abandoned briefly (*ibid*). The abandonment of the bathhouse, and postulated Hadrianic fort, may have been part of the Antonine advance into southern Scotland. The construction of the Antonine Wall in the early AD 140s resulted in the abandonment of many Northern forts and of Hadrian's Wall. Unlike the majority of these, however, Wigan does not seem to have been subsequently rebuilt (*ibid*).

- 1.3.5 ***Early Medieval Period (AD 410 - 1066)***: there are no known sites or finds from within the investigated area. A number of ancient townships are known within the vicinity, with place names of British or Old English origin, suggesting the existence of Anglo-Saxon settlements in the surrounding area (Hyder Consulting 2006).
- 1.3.6 ***Medieval Period (1066 - 1540)***: there are no known sites or finds from the investigated area. However, the medieval period saw the development of Wigan as a local market town. One year after the town had been granted permission to hold a market in 1245, its rector James Maunsell persuaded Henry III to grant a charter to raise the town to the status of a Borough (Tupling 1936). The known sites of the surrounding hinterland of Wigan include halls, the residences of manorial lords and wealthy freeholders (*ibid*).
- 1.3.7 The coal measures within the area were being mined during the medieval period. A second local trade was nail making, which continued as a cottage industry into the nineteenth century (Ashmore 1982).
- 1.3.8 Of particular relevance during the medieval period is the Smithy Brook flour mill, now demolished, that was situated on Smithy Brook, to the west of the southern end of the earthwork survey (Fig 1). The mill was first recorded on Yates map of the 1770s, and is believed to be medieval in origin (Hyder Consulting 2006). The site remains derelict, with the mill pond to the west and the mill race to the east still evident flowing into Smithy Brook. The eastern end of the mill race will be crossed by the proposed link road (Section 5.2).
- 1.3.9 ***Post-medieval Period (1540 to the mid- to late eighteenth century)***: the post-medieval period saw the small-scale local industries of the medieval period gaining in significance. Coal mining is particularly well attested in the Smithy Brook area, where the Bankes family of Winstanley appears to have been exploiting the local coal measures since at least the 1590s (Bankes 1940). Among the most common sites within the region that can be dated to the post-medieval period are those of rural dwellings. These include both the halls of the gentry and the farmhouses of the yeomanry (Hyder Consulting 2006).

- 1.3.10 **Industrial period (mid- to late 18th century to 20th century):** the eighteenth century onwards saw the increasing industrialisation of the area. Colliery workings of the area increased in number, or were expanded. This led to improvements in the transport networks, including the Leeds and Liverpool Canal, the Leigh section of which was opened in 1819-20 (*ibid*), the construction of horse-drawn colliery tramroads, followed by locomotion railways, comprising both main lines and private colliery railways.
- 1.3.11 The Lancashire and Yorkshire (LY) Railway Pemberton Loop opened in 1889, and runs immediately to the north of the trial trenching area and at the northern end of the earthwork survey (*Section 4*, Fig 13). It continued eastwards, crossing the Smithy Brook mill race and Leigh section of the Leeds and Liverpool Canal (Figs 14 and 15), both of which are the focus of the photographic surveys (*Section 5*). The railway enabled trains to run from Liverpool to Manchester, whilst bypassing Wigan (*ibid*). It has now been dismantled but survives as a low broad embankment in varying degrees for much of its length (*ibid*).
- 1.3.12 Winstanley Colliery Railway, or tramroad, is shown on the First Edition Ordnance Survey (OS) (1845-6), leading from Winstanley Colliery to the Leeds and Liverpool Canal in Wigan. The northern section of this tramroad was built in 1822-3 by Thomas Claughton who obtained a lease in 1822 to mine neighbouring properties. However, the section of line crossed by the corridor was part of the line's 3.5 miles long southward extension constructed in the mid-1840s to serve collieries in Winstanley. It had been laid with wrought-iron rails on stone sleeper blocks, and was horse-drawn until 1882 when a locomotive was adopted; the line was converted from narrow to standard gauge in 1886-7. The Winstanley pits closed in 1900, but by that date the railway was serving a new pit at Leyland Green, and continued in use until the abandonment of that colliery in 1927 (*ibid*). At the canal in Wigan, the railway terminated at the coal tip known as Wigan Pier (*ibid*). It is crossed by the proposed link road, to the north of Smithy Brook, where the line of the railway survives as an embankment, c 6-8m wide and c 0.5-1m high, and to the north of this as a shallow cutting (*ibid*).
- 1.3.13 Among the earliest industrial sites identified within the vicinity of the development is a smithy, positioned c 100m to the south of the former allotment gardens at Goose Green (SD 5671 0383), adjacent to the A49 in the historical hamlet of Smithy Brook, where it was recorded by Dr Kuerden in c 1695 (*ibid*).

2. METHODOLOGY

2.1 PROPOSED WORKS METHODOLOGY

- 2.1.1 The work was carried out in accordance with a written scheme of investigation (WSI) prepared by Jacobs (*Appendix 1*), and approved by Dr Andrew Myers Assistant County Archaeologist, Greater Manchester Archaeological Unit (GMAU). The fieldwork methodology was adhered to, excluding the excavation of a section of the Winstanley Colliery Railway, which will be excavated at a later date. The work was consistent with the relevant standards and guidance of the Institute for Archaeologists (IfA).

2.2 TRIAL TRENCHES

- 2.2.1 Two trial trenches were excavated, measuring 75m in length and 2m wide. Archaeological excavation was carried out following the methodology described in Section 6 of the WSI (Jacobs 2009a).

2.3 FINDS

- 2.3.1 Finds' recovery and sampling was carried out following the methodology described in Section 6 of the WSI (*ibid*) in accordance with best practice following current Institute for Archaeologists guidelines (2008a).

2.4 ENVIRONMENTAL ASSESSMENT

- 2.4.1 In accordance with the WSI (Jacobs 2009a), and in consultation with in-house palaeoenvironmental specialist advice, no samples were retrieved for environmental assessment based on the inferred date, suitability of the features, and objectives of the evaluation.

2.5 EARTHWORK SURVEY

- 2.5.1 The earthwork survey was carried out following the methodology described in Section 6 of the WSI (*ibid*) and to English Heritage Level 2 as defined in *Understanding the Archaeology of Landscapes: A guide to good recording practice* (2007).

2.6 PHOTOGRAPHIC SURVEY

- 2.6.1 The photographic survey was carried out following the methodology described in Section 6 of the WSI (*ibid*) and in line with the guidance published by English Heritage in *Understanding Historic Buildings: A guide to good recording practice* (2006).

2.7 ARCHIVE

- 2.7.1 A full professional archive has been compiled in accordance with current IfA (2008b) and English Heritage guidelines (1991). The paper and digital archive will be provided in the English Heritage Centre for Archaeology format and will be submitted to the Greater Manchester Record Office on completion of the project. Copies of the report will also be submitted to the Historic Environment Record. The report will be made available to the wider research community by submitting a copy to the *Online Access to Index of Archaeological Investigations* (OASIS) Project, maintained by the Arts and Humanities Data Service (AHDS).

3. TRIAL TRENCHING

3.1 INTRODUCTION

3.1.1 Two 75m long trenches were excavated within the former allotment gardens (Fig 2). Topsoil and subsoil were removed in each trench to reveal the underlying glacial till. A number of post-medieval or modern features were located. No archaeological features were recorded relating to activity on, or occupation of, the site prior to the post-medieval period. The earliest feature on the site comprised a post-medieval field boundary located in Trench 2. A full list of excavated contexts is listed in *Appendix 2*. The finds are discussed in *Section 3.4* and listed in *Appendix 3*. A complete matrix for each trench has been included in *Appendix 4*.

3.2 TRENCH 1

3.2.1 Trench 1 was excavated on a north-east/south-west orientation to a maximum depth of 0.65m (Fig 3; Plate 1). Topsoil and subsoil, deposits **102** and **103**, were removed by the mechanical excavator to reveal glacial till, **104**, at a depth of 0.44m (Fig 4). A single modern pit, **101**, was located in the western half of the trench (Figs 3 and 5; Plate 2). Its fill contained modern plastic, and the feature was most likely associated with the former allotment gardens. A sondage was excavated at the easternmost end of the trench to test the depth of the natural glacial till (Figs 3 and 4).

3.3 TRENCH 2

3.3.1 Trench 2 was excavated on a north-east/south-west orientation to a maximum depth of 1.2m (Fig 6; Plate 3). Topsoil and subsoil, deposits **200** and **217**, were removed to reveal glacial till, **233** (Fig 7). Overlying the topsoil, in the western 12m of the trench, layers **216** and **215** were thought to relate to when the land adjacent to the A49 was used as a works compound used during recent road improvement works (Fig 7). On an east/west orientation, at the westernmost end of Trench 2, a post-medieval hedged, bank and ditch field boundary was located (Fig 6), which comprised ditch **228**, with a parallel line of root action, **226**, truncating the glacial till (Fig 8). Root action **226** continues eastward, and is recorded as linear feature **214** to the east of cut **224** (see 3.3.2, below; Fig 6). The fills of the ditch **228**, **229**, and root action, **226**, **227**, were indistinguishable in section (Fig 8; Plate 4).

3.3.2 Construction cut **224** truncated the former field boundary, within which a drain or sump was observed comprising stone and brick sides, **213** and **221**, and a sandstone floor, **232** (Fig 6 and 9; Plate 5). Redeposited fill material **218**, **219**, and **220**, comprising a varying mixture of topsoil, subsoil, and natural deposits, were used to backfill the void between the construction cut and the masonry elements of the structure. The central area of the structure had been backfilled with a dark grey sandy-silty-clay, **223**, which lay beneath redeposited topsoil **222**, presumably after it went out of use.

- 3.3.3 A number of modern discrete features were located associated with the former allotment gardens. These include pits **202**, **212** and **230**, and post-holes **205** and **208** (Figs 10 and 11; Plates 6 to 8). All of these features had very similar fills and are thought to be of the same date, although the finds were either not closely datable, post-medieval or nineteenth century onwards. Pit **230**, at the eastern end of the trench, contained copious quantities of glass and some plastic, including crisp packets (Plate 8).
- 3.3.4 A short linear feature, **210**, located in the western half of the trench (Fig 12; Plate 9), was thought most likely to be either an allotment feature or where a plough had removed a stone from the glacial till, but its date could not be ascertained.

3.4 FINDS

- 3.4.1 In all, 47 finds were recovered during the investigation, coming from fills **201**, **206**, **223**, **225**, **227**, and **229**, and including the masonry **213** within cut **214**. The majority of the material recovered comprised pottery (32 fragments) with, in addition, one fragment of clay tobacco pipe, one fragment of stone, two fragments of iron, four of ceramic building material, and seven of glass. Their distribution is shown below in tabular form (Table 1).

| | POTTERY | GLASS VESSELS | OTHER GLASS | IRONWORK /COPPER ALLOY | CERAMIC BUILDING MATERIAL | CERAMIC TOBACCO PIPE | STONE |
|---------------|---------|---------------|-------------|------------------------|---------------------------|----------------------|-------|
| 201 | | | | 1 | 1 | | |
| 206 | 3 | | | | | | |
| 213 | | | | | 1 | | |
| 223 | 8 | 6 | | 1 | 1 | | |
| 225 | | | | | 1 | | |
| 227 | 10 | | | | | 1 | 1 |
| 229 | 10 | | 2 | | | | |
| <i>Totals</i> | 32 | 6 | 1 | 2 | 4 | 1 | 1 |

Table 1: Distribution of material groups

- 3.4.2 The pottery fragments were in good condition and unabraded, and several fragments of the same vessel survived within fill **229** of ditch **228**. The earliest material was represented by the small group of late seventeenth-century vessels from fill **229**, which included a small black-glazed tyg similar to those seen amongst the seventeenth-century assemblage from Norton Priory (Howard-Davis 2008, 346), and likely to be of similar date. A small handle, from a dish, or porringer, in Midlands yellow ware, is of similar date, as are small fragments of slip-decorated ware and manganese-speckled ware. Hard-fired blackwares were also present in the material from fill **227** from the field

boundary, and include the rim of an upright storage vessel and of a possible chamber pot. Its association with white salt-glazed stoneware, however, within the same group suggests a later date, perhaps mid-eighteenth century. The groups from post-hole fill **206** and sump fill **223** are later, with a small fragment of underglaze transfer-printed earthenware from **206** suggesting an early nineteenth century or more recent date. In the case of fill **223**, this is supported by the presence of glass vessels of late nineteenth or early twentieth century date.

- 3.4.3 The small fragment of clay tobacco pipe stem (fill **227**) is post-medieval, but cannot be more closely dated. Similarly, the fragment of iron from fill **201** of pit **202**, and of copper alloy from fill **223** cannot be securely dated. A fragment of ironstone from the same context cannot be further identified.
- 3.4.4 Most of the small group of finds is of recent date and can, therefore, be recommended for discard. Only the early post-medieval pottery and glass (22 sherds) from the fills of the field boundary hedge and associated ditch, **227** and **229**, is of any archaeological interest, and it is recommended that this small group be deposited with an appropriate museum.
- 3.4.5 The potential for further study is extremely limited. The material is now fully recorded, and it is recommended that approximately 53% could be discarded with no significant loss to the archaeological record. The only possible contribution to any further analysis that would be afforded by the early post-medieval pottery and glass recommended for retention and deposition, would be as a comparator for material from other excavations in the vicinity.
- 3.4.6 The finds are currently stable and appropriately packed in an archivally stable cardboard container. They are subdivided by material type and within material groups, by context, and each bagged separately. With the proviso that they are stored in an appropriately managed environment, they should have no obvious future requirements for conservation, although this should be monitored.

4. EARTHWORK SURVEY

4.1 RESULTS

- 4.1.1 The earthwork survey was carried out over the surviving remains of the Winstanley Colliery Railway, observed on the First Edition OS (1845-6), and recorded extant features that may relate to the former railway. Other features were recorded which are of twentieth century date. The results of the survey are illustrated in Figure 13. Much of the area was obscured by dense vegetation resulting in some areas not being surveyed in detail (Plate 10).
- 4.1.2 The most obvious feature surveyed was a long, slightly curving, embankment running north/south through the centre of the survey area that appeared to be the remains of the colliery railway embankment, although no direct evidence, such as rails, were visible. The embankment terminates at the north end where it is truncated by a much larger east/west aligned embankment of the former Lancashire and Yorkshire (LY) Railway Pemberton Loop (Fig 13). At the southern end, the ground slopes down towards Smithy Brook and the embankment peters out. A wooden bridge is observed on the First Edition OS (1845-6) that would have carried the colliery railway over the Smithy Brook. This has now been replaced with a small modern footbridge carrying the footpath that runs the whole length of the survey area.
- 4.1.3 The embankment is most visible toward the south end where it has steeply-sloping sides, although masked by brambles on the east side (Plate 11). At the south-west end of the embankment, an area has been quarried out and there is a notable ‘scoop’ where material has been removed. This has revealed the core of the embankment, which is of cinder and clinker. For the most part, the embankment is flat-topped and carries a modern tarmac footpath for around half of its length, before deviating slightly to the west at the northern edge of the site (Fig 13). It appears that the embankment has been modified during the construction of the footpath, and where there is no footpath, the embankment is noticeably narrower.
- 4.1.4 There is a short section of curved wall foundation to the west of the embankment at the north end of the site. This appeared to be of stone construction and may be a former field boundary (Fig 13).

5. PHOTOGRAPHIC SURVEY

5.1 INTRODUCTION

- 5.1.1 The photographic survey was carried out at two locations, and examined the Smithy Brook mill race (Fig 14) and the Leeds and Liverpool Canal, near Scotsman's Flash (Fig 15). A description of both locations follows below.

5.2 SMITHY BROOK MILL RACE

- 5.2.1 The mill race is a culverted section of the Smithy Brook and was also examined by the earthwork survey to the south-west (*Section 4, Fig 13*). Within the photographic survey area it consists of the mill race, which is on a north/south alignment, crossed by a footbridge of modern construction (Plate 12), which is itself on the line of the former LY Railway. At the northern end of the survey area a culvert carries the stream below Worsley Mesnes Drive.
- 5.2.2 The mill race is an artificial watercourse lined with rock-faced sandstone of random sizes (Plate 13), forming a canalised course of the Smithy Brook. The walls were mostly obscured by vegetation prohibiting detailed examination, and although the stream bed was visible it is likely that this was natural sediment rather than the true bottom. There were no obvious coping or capstones and the wall appeared to be constructed in this manner throughout the survey area. The mill race was between 1m and 1.5m deep.
- 5.2.3 The modern concrete bridge had tubular steel handrails, but it was apparent, however, that a predecessor footbridge over the mill race may have existed, as the remains of two probable abutments were visible below the current bridge (Plate 14). No other evidence of any former structures was visible at the time of the survey, although further removal of dense vegetation may reveal such evidence.

5.3 LEEDS AND LIVERPOOL CANAL

- 5.3.1 The Leeds and Liverpool Canal photographic survey area was positioned c 700m east of the Smithy Brook Mill Race. At this point, the Leeds and Liverpool Canal is aligned north/south (Plate 15). It was previously crossed here by the LY Railway, carried by a bridge that had been demolished by 1993 leaving only its abutments, which have also been removed. It is likely that this occurred at the same time as modernisation of the canal walls (Plates 17 and 18), which were replaced by steel piles and concrete coping (Hyder Consulting 2006).
- 5.3.2 The tow path on the west bank was also of modern construction. Approximately 100m to the north of this area is a lock (Plate 19). Dense woodland is present on the west embankment. To the south-west lies Scotsman's Flash, to the south-east is Pearson's Flash, and to the north-east is an unnamed pond.

6. CONCLUSIONS

6.1 DISCUSSION

- 6.1.1 The work carried out as part of the archaeological assessment and mitigation of the A49 Goose Green to Westwood Park Link Road scheme includes the excavation of two trial trenches to assess the presence or absence of archaeological remains of the Roman road from Warrington to Wigan, an earthwork survey of the former Winstanley Colliery Railway, and a photographic survey of sections of the Smithy Brook mill race and the Leeds and Liverpool Canal.
- 6.1.2 The excavation of the of the two trial trenches at the site of the former allotments at Goose Green, Wigan, produced no evidence of a Roman road between Wigan and Warrington. The road may, therefore, be located elsewhere. A single post-medieval field boundary was located at the westernmost end of Trench 2.
- 6.1.3 The earthwork survey revealed that some remaining features pertaining to the former Winstanley Colliery Railway are still extant. More detailed investigation was prevented by dense vegetation. However, the curving embankment seems to follow the line of the railway illustrated on the First Edition OS map (1845-6), and is more visible at the south end where the ground slopes down to the Smithy Brook. This is probably due to the nature of the ground, which required building up of the embankment. The small quarry of material at the south end of the railway embankment may have been used in order to level out the current footpath, but this is pure conjecture.
- 6.1.4 Few other features were discovered during the survey and although additional more detailed survey following removal of the dense vegetation may reveal further features, they are unlikely to add any more information.
- 6.1.5 Both of the photographic survey areas were positioned on the alignment of the former LY Railway, which also crossed the northern end of the earthwork survey area. The Smithy Brook mill race was revealed to be a short section of rock-faced sandstone culvert with a modern concrete footbridge. From evidence of former bridge abutments also recorded, it is likely that a former bridge once existed, and it may even be remnants of the LY Railway bridge. The Leigh section of the Leeds and Liverpool Canal area was, similarly, once bridged by the railway, but other than the high railway embankments, no trace of the bridge was visible. The canal banks have been modernised and rebuilt and, as such, contain no features of interest, although there is a lock to the north.

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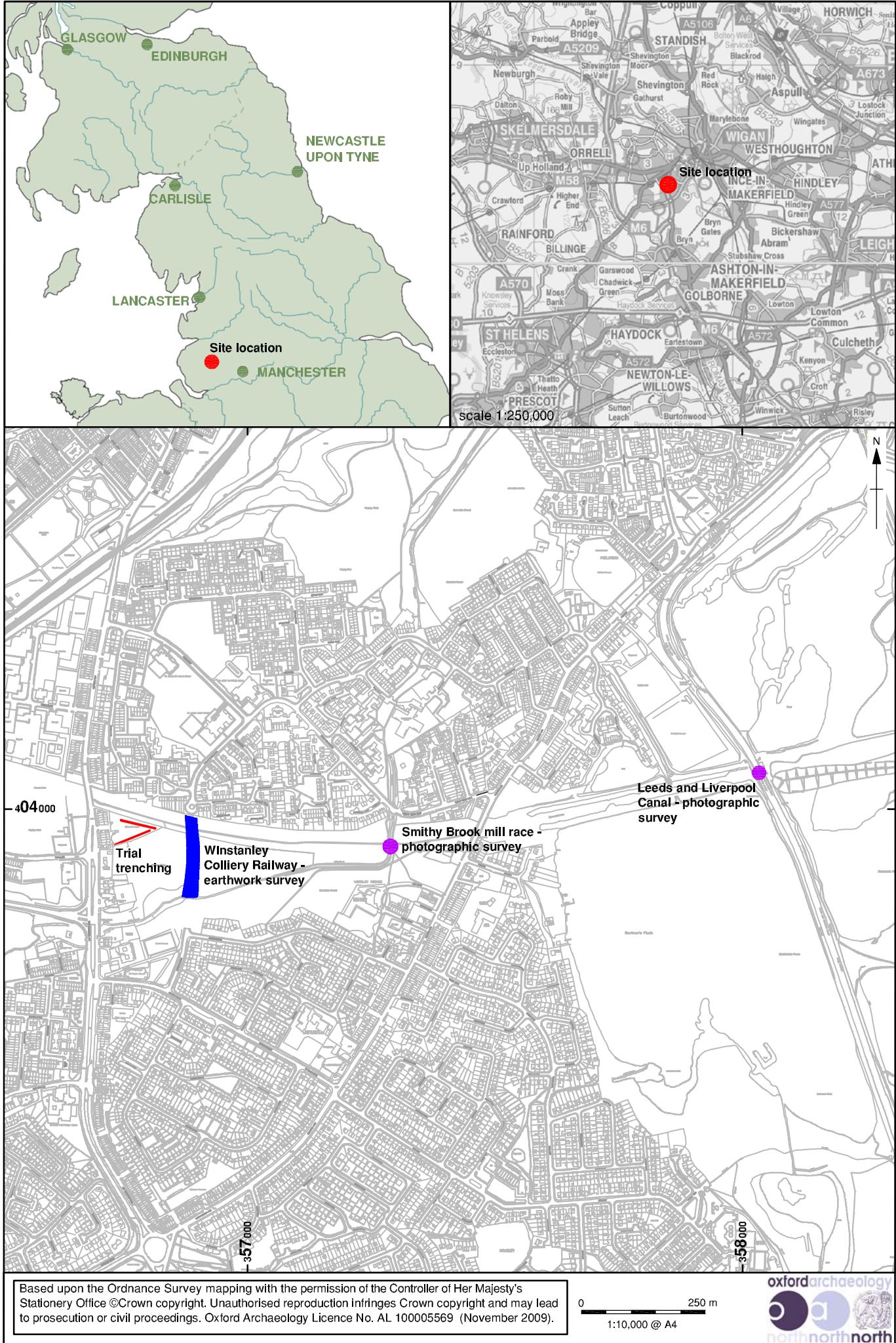


Figure 1: Site location

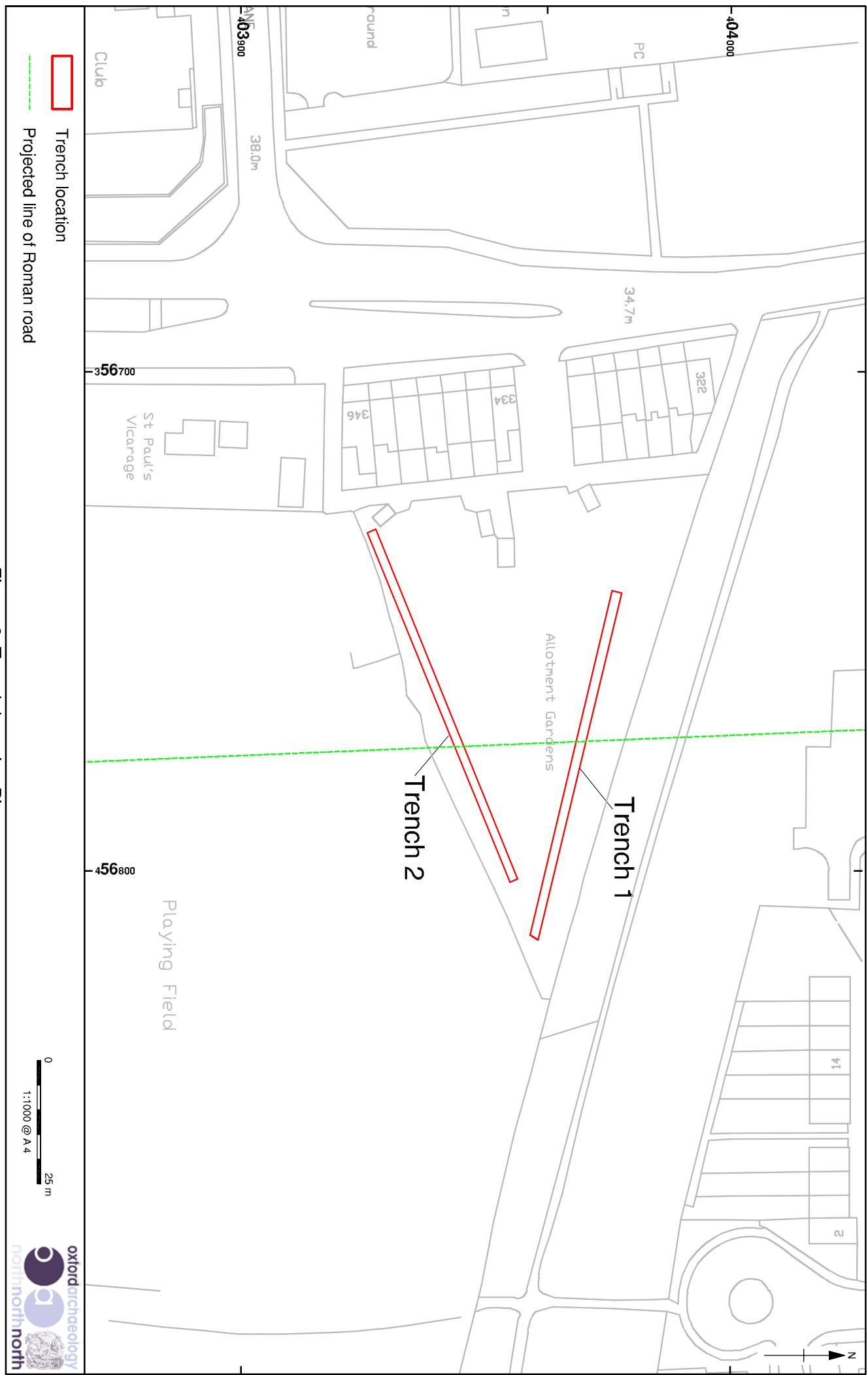
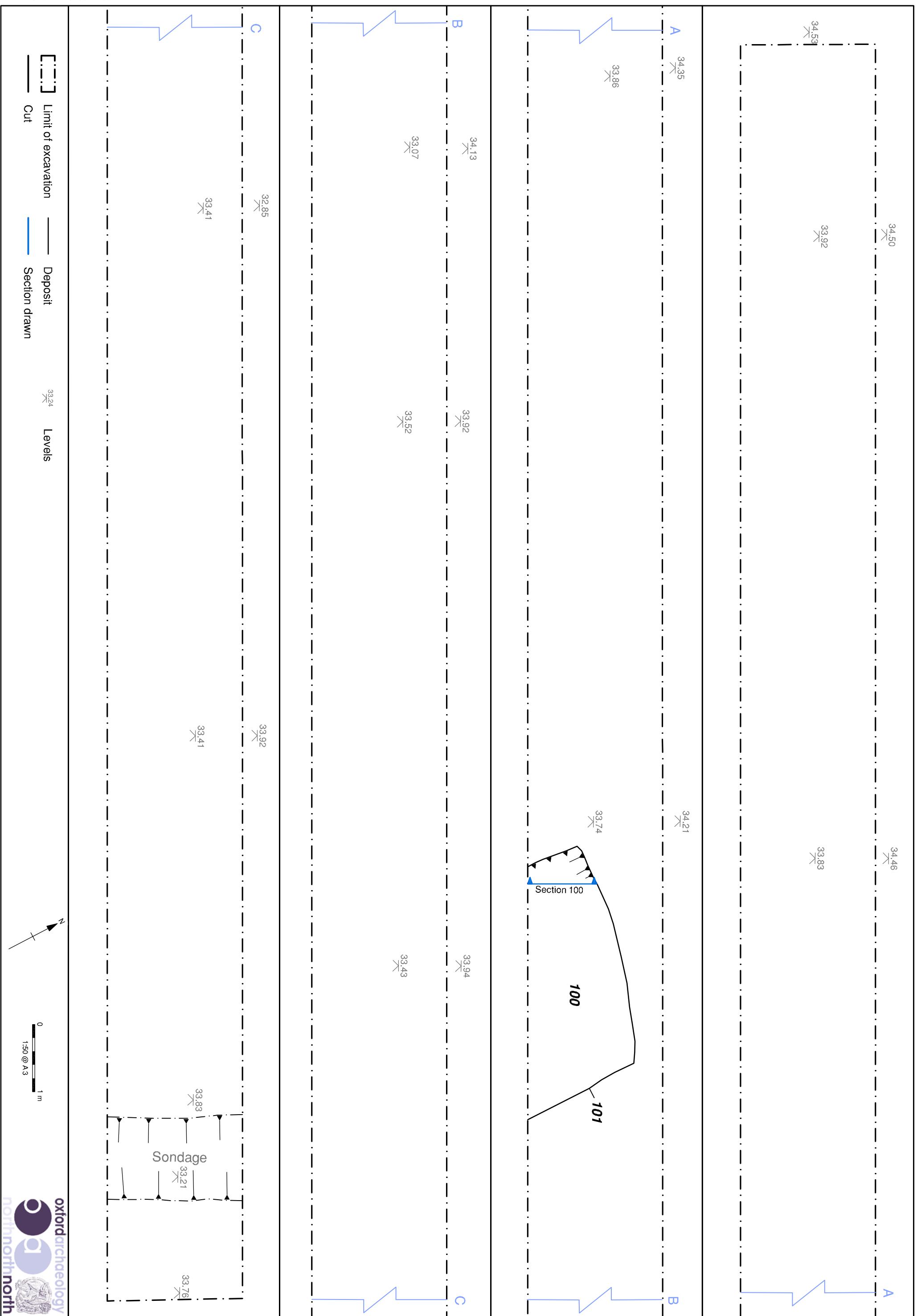


Figure 2: Trench Location Plan



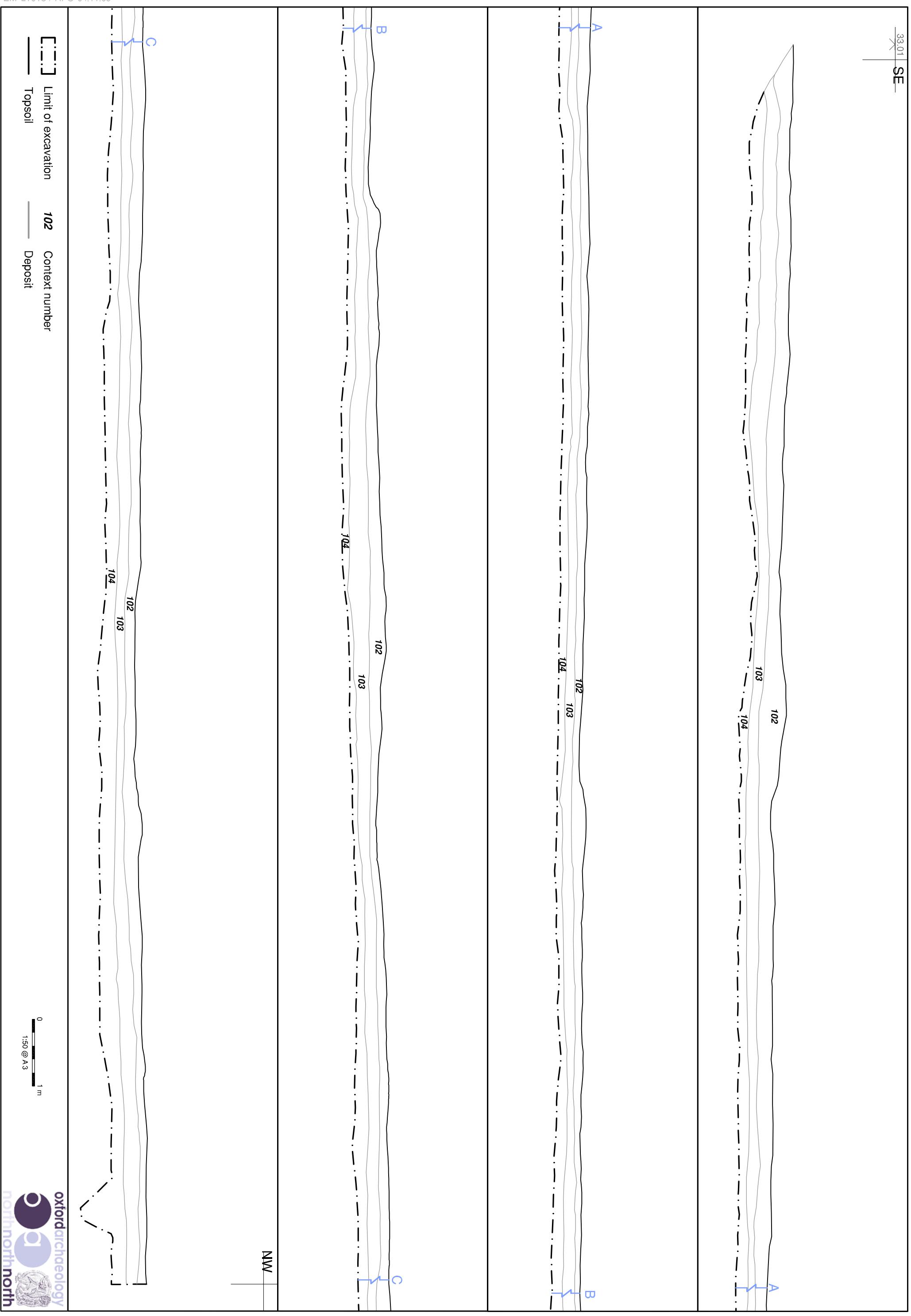


Figure 4: South-west-facing section of Trench 1

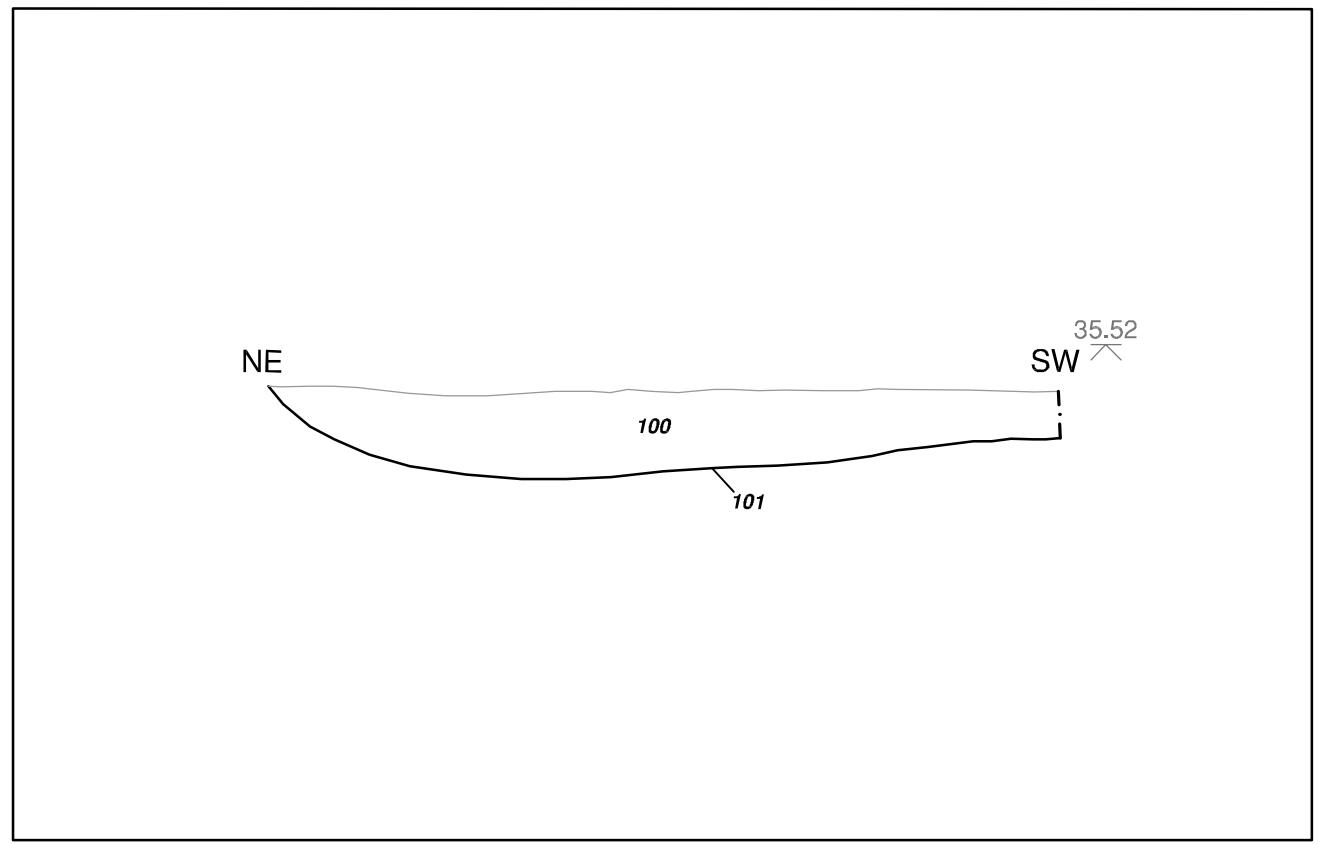
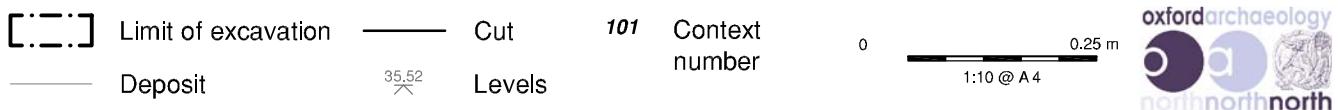


Figure 5: North-west-facing section (100) of pit **101**, Trench 1

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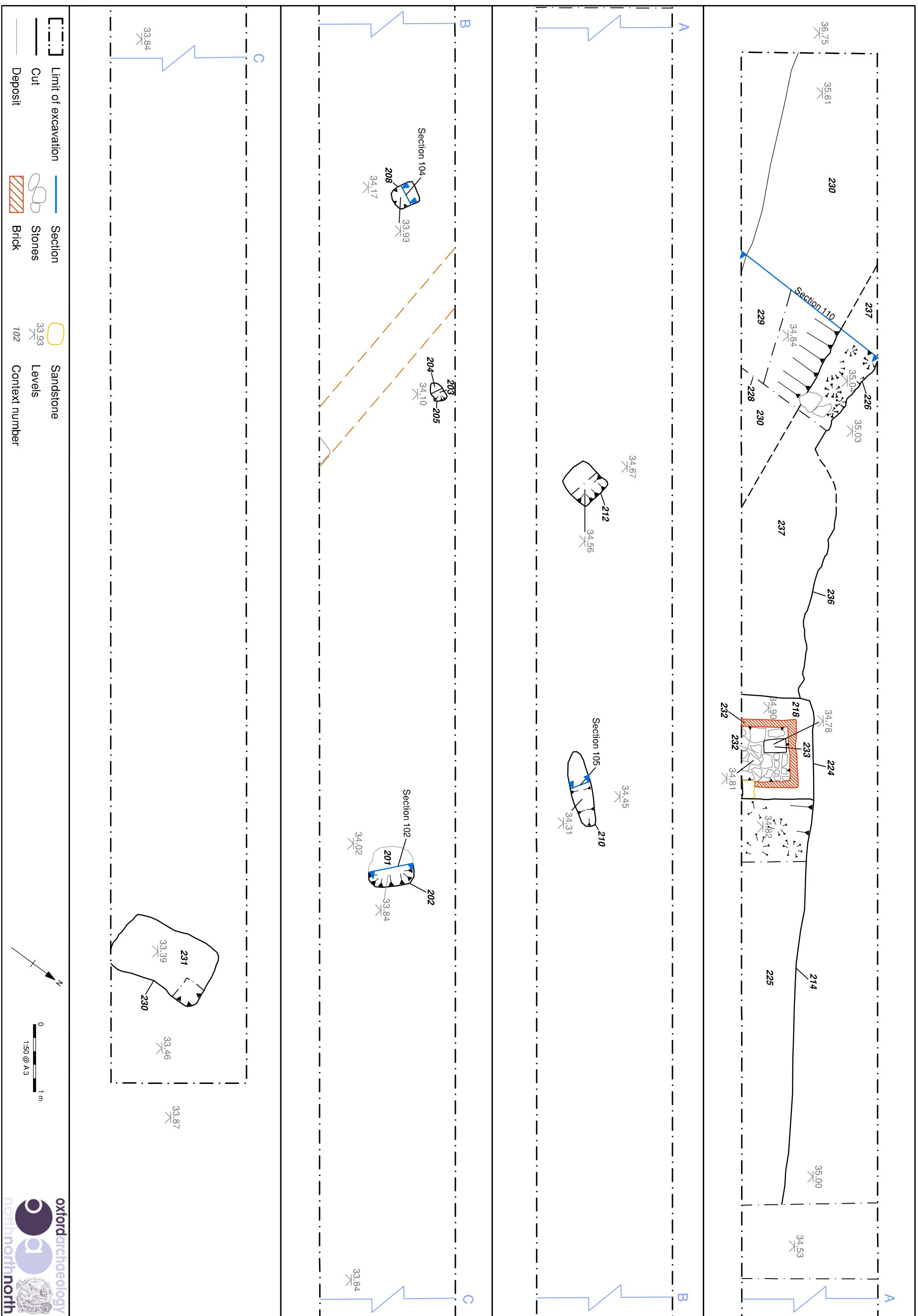


Figure 6: Plan of Trench 2

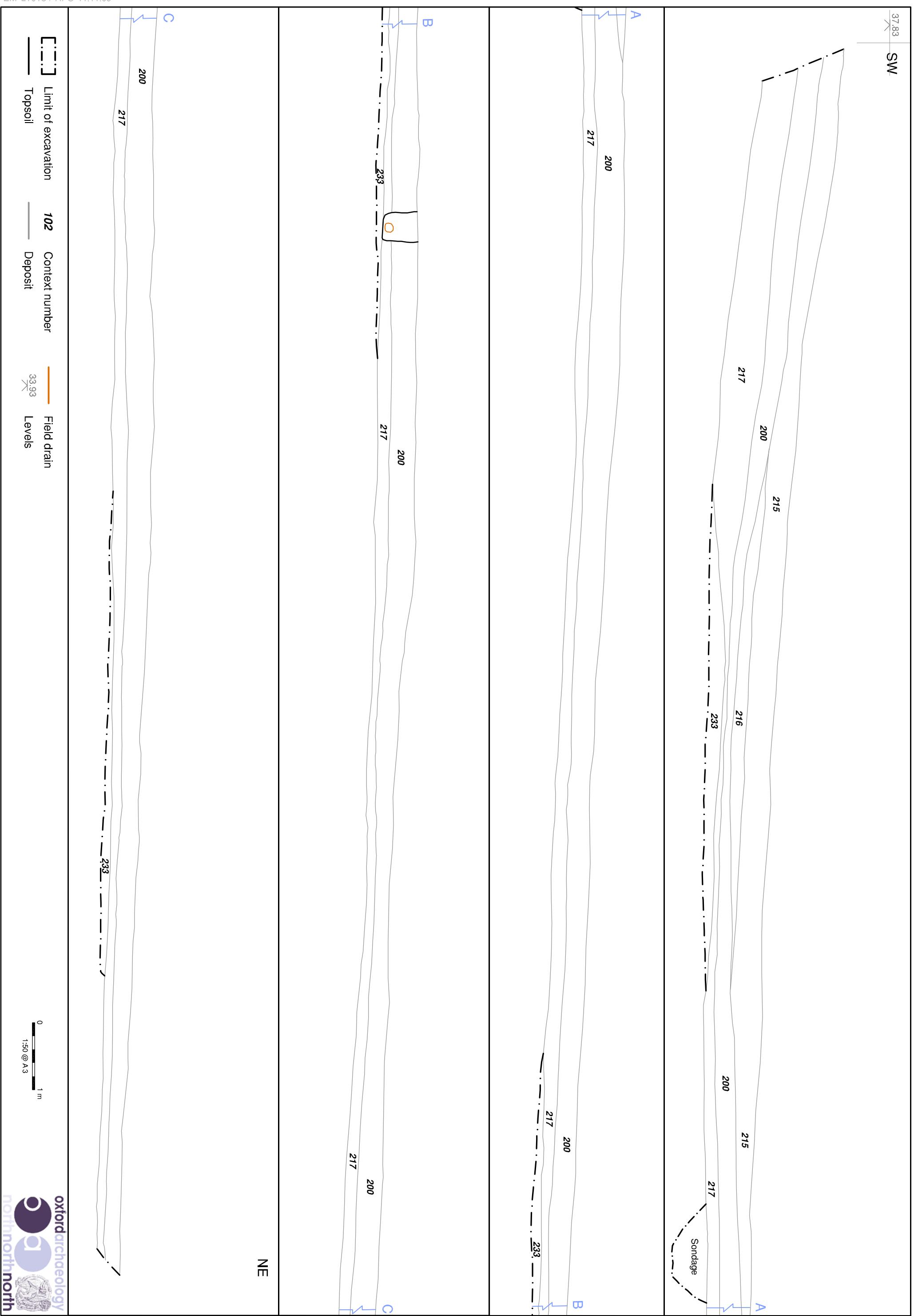


Figure 7: South-east-facing long section of Trench 2

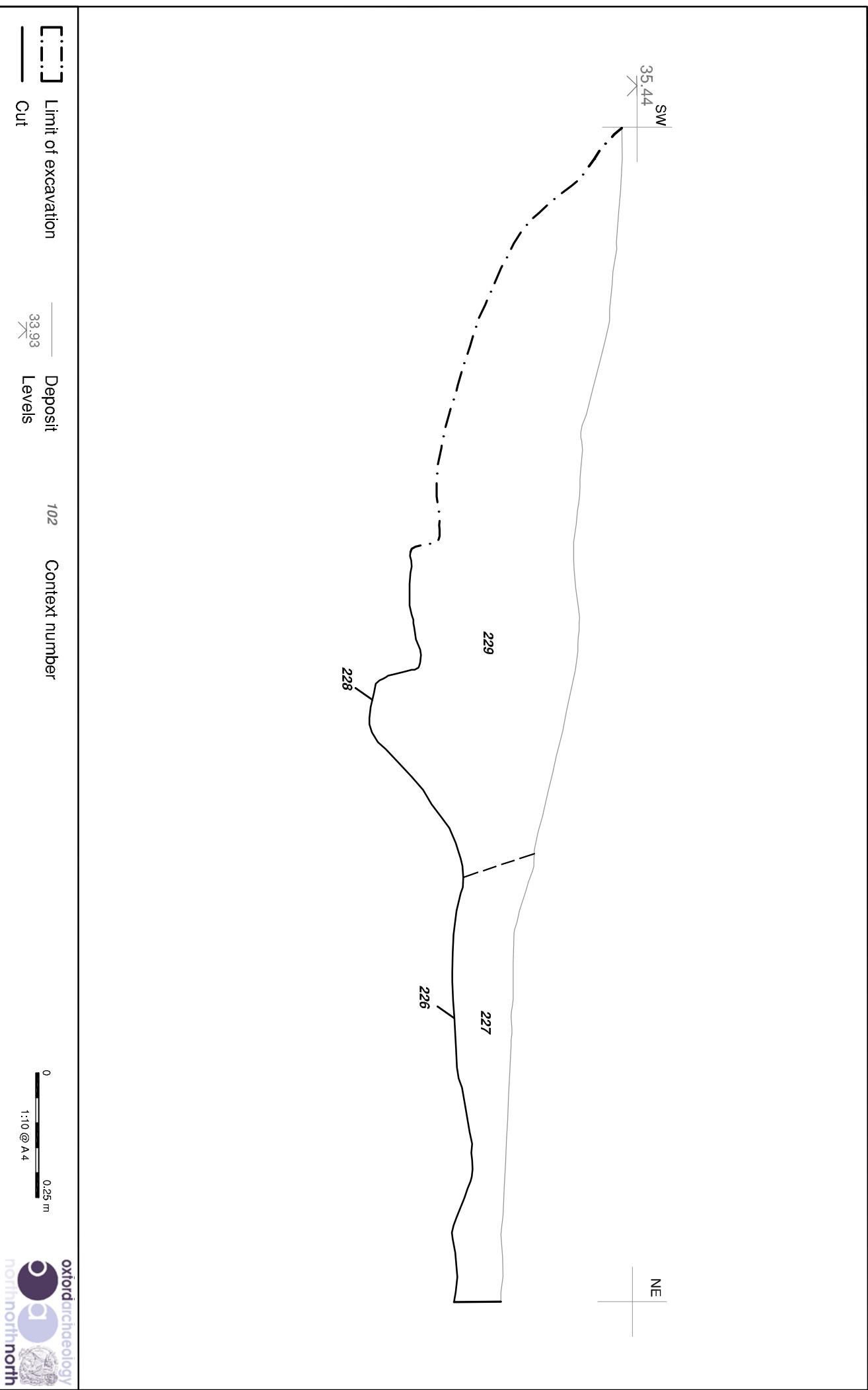


Figure 8: East-facing section of ditch 228 and linear 226 (Section 110) in Trench 2

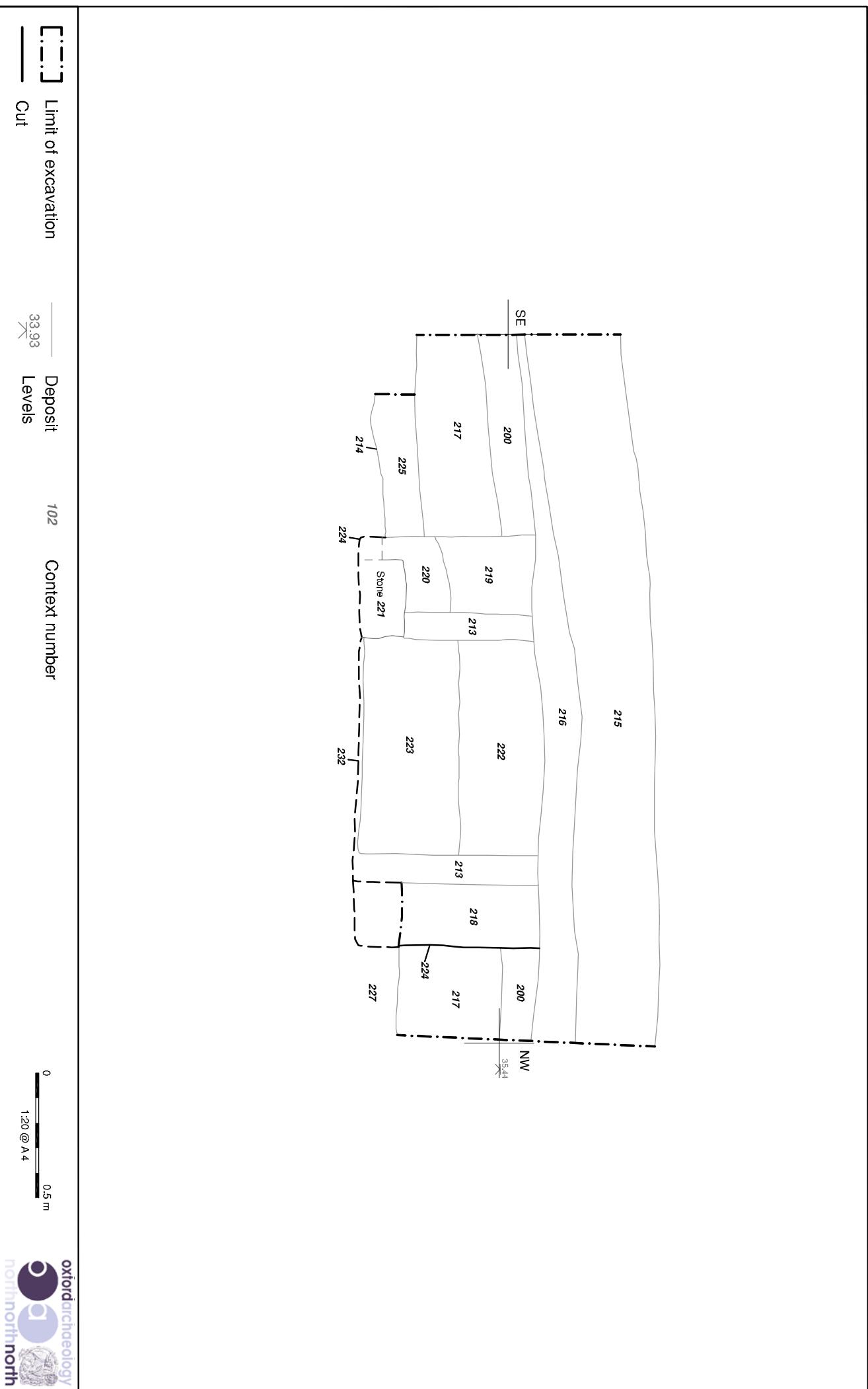


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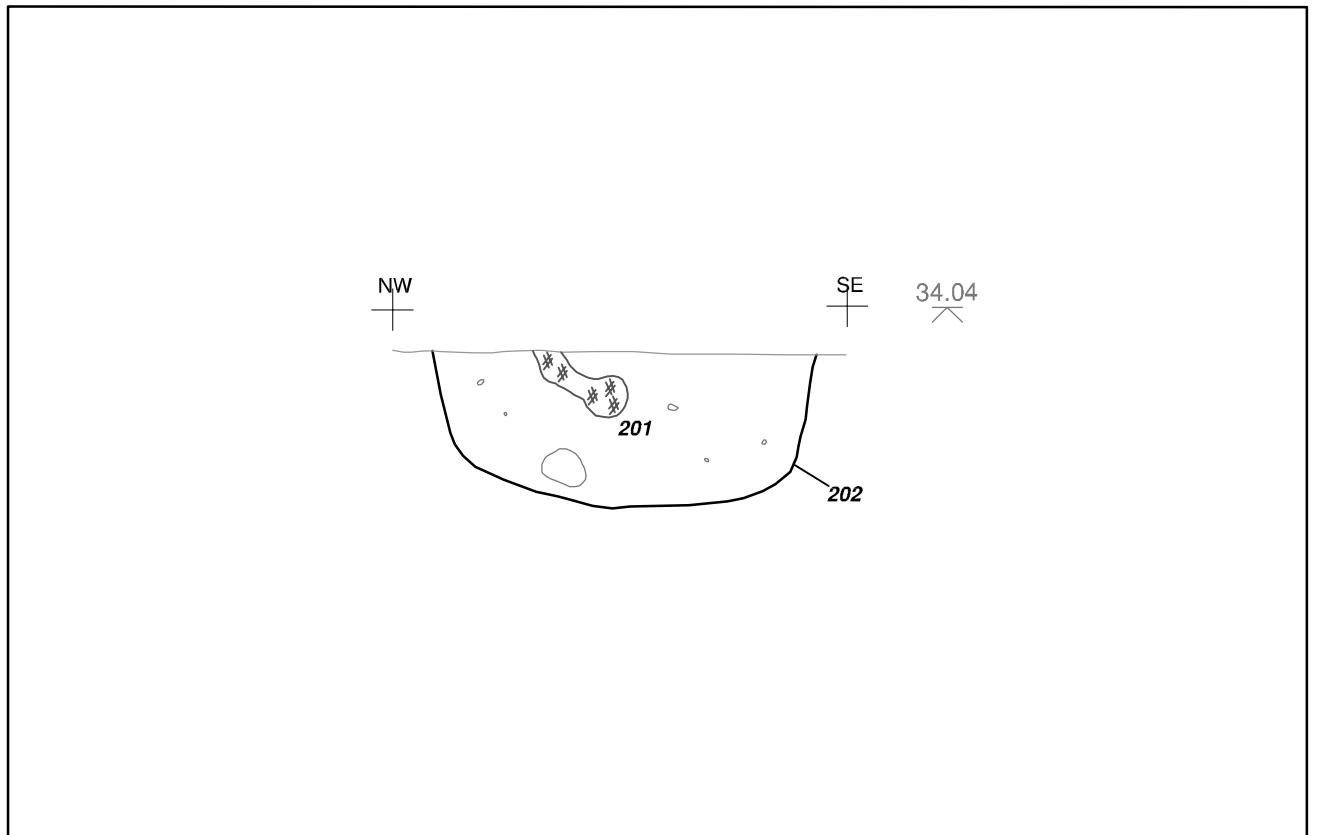


Figure 10: North-east-facing section (102) through pit 202, Trench 2

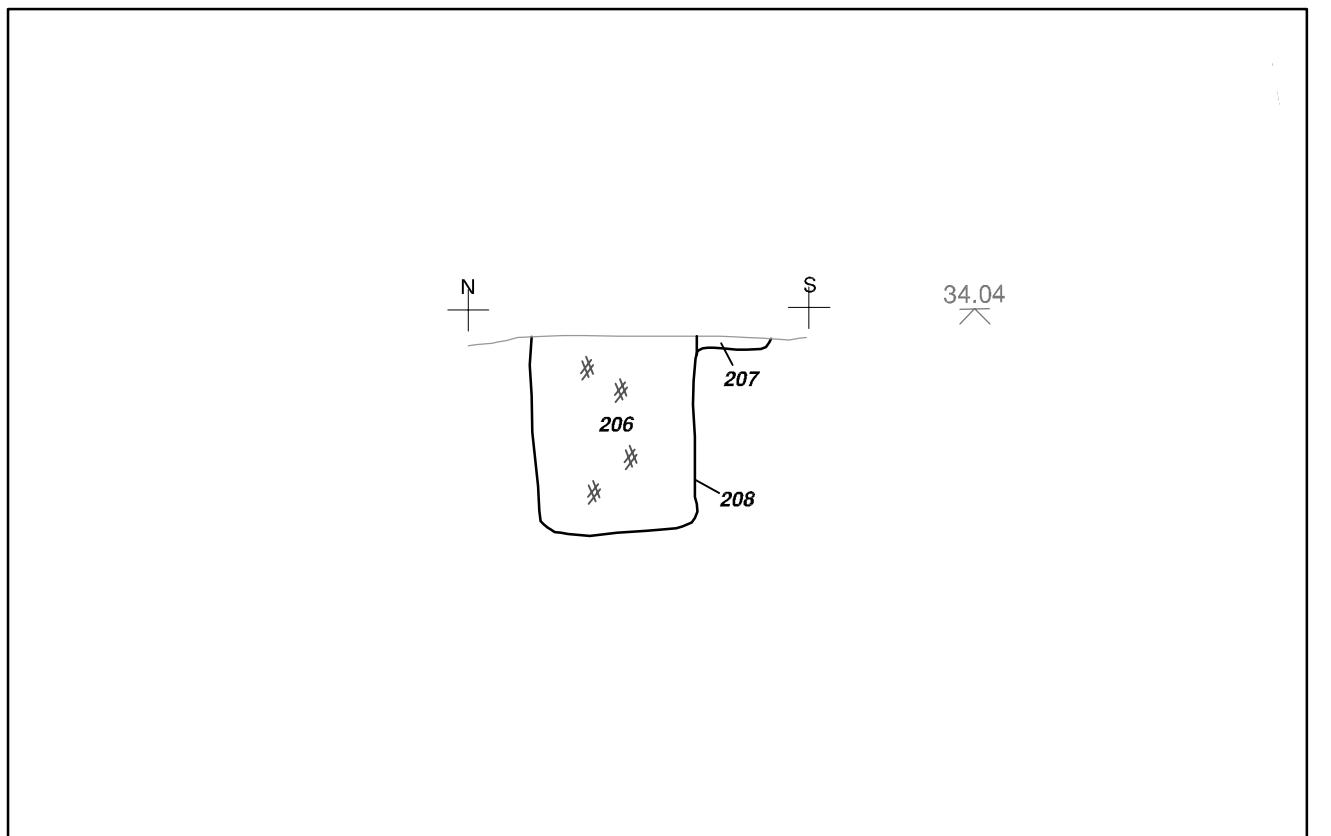


Figure 11: East-facing section (104) through pit 208, Trench 2

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Limit of excavation
— Cut

33.93

Deposit
Levels

Stones
 Charcoal

0 0.25 m
1:10 @ A4

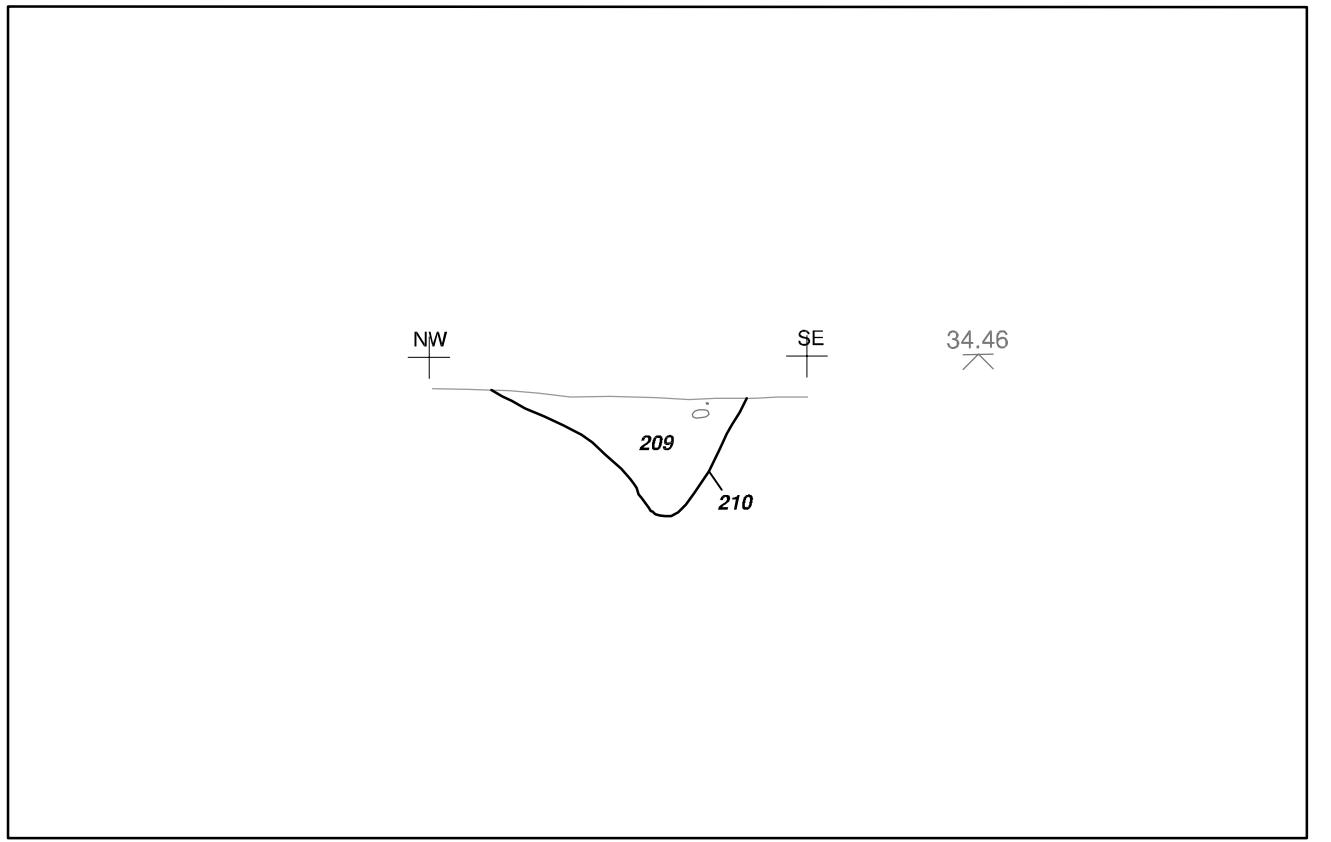


Figure 12: North-east-facing section (105) through linear **210**, Trench 2

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Limit of excavation



Cut



Deposit
Levels



Stones

0

1:10 @ A4

0.25 m

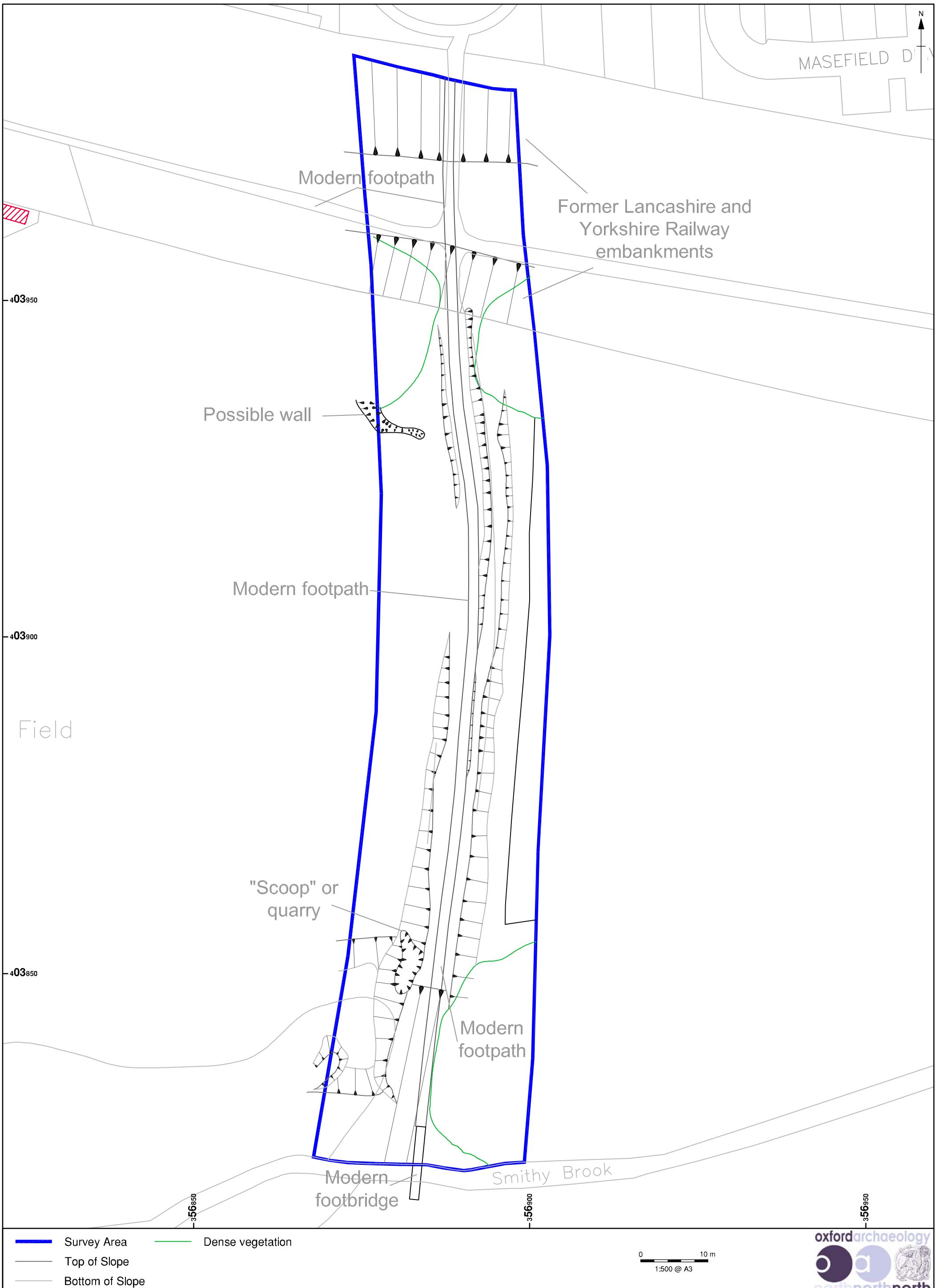


Figure 13: Topographic survey of the remains of the Winstanley Colliery Railway

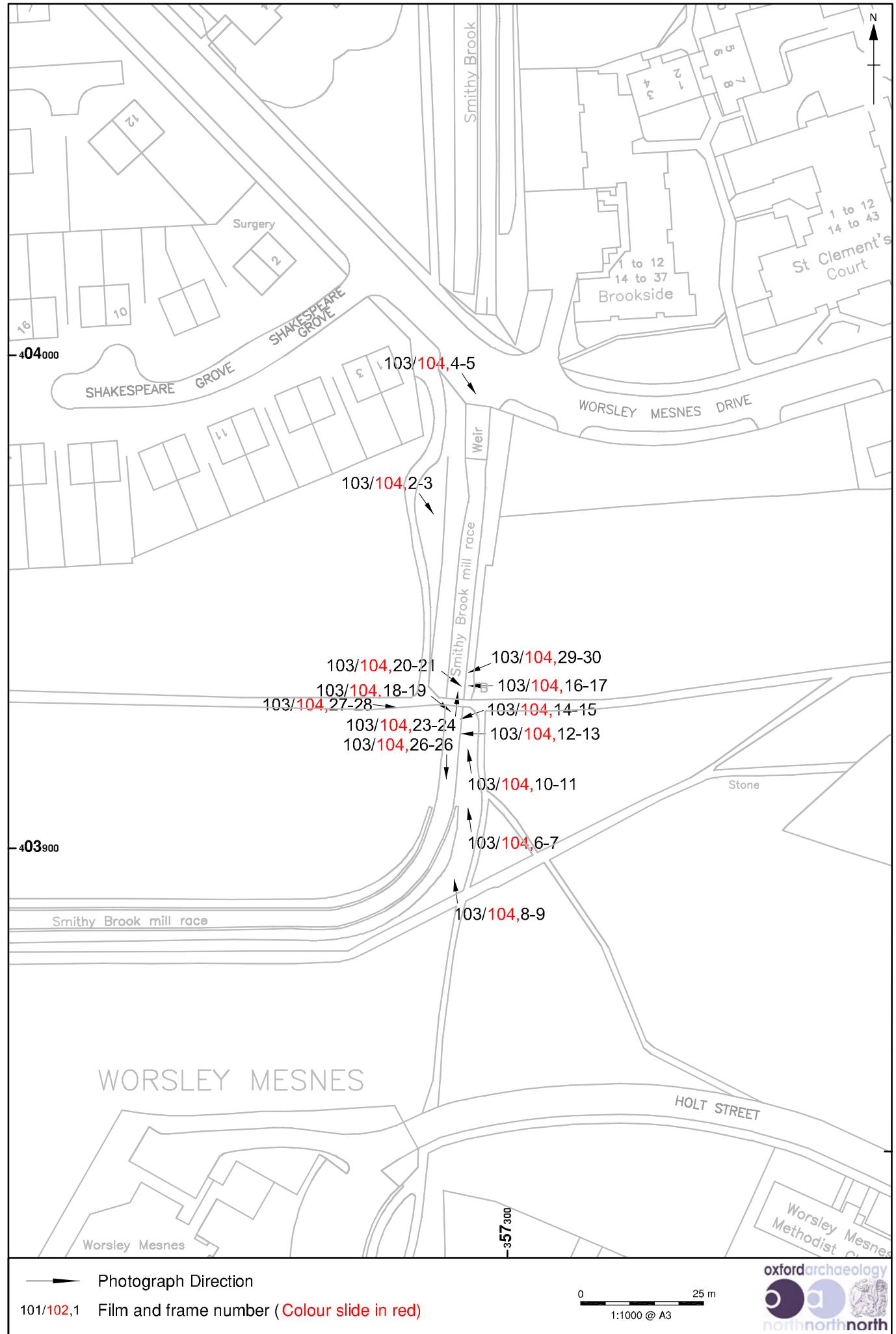


Figure 14: Photographic survey location plan of Smithy Brook mill race

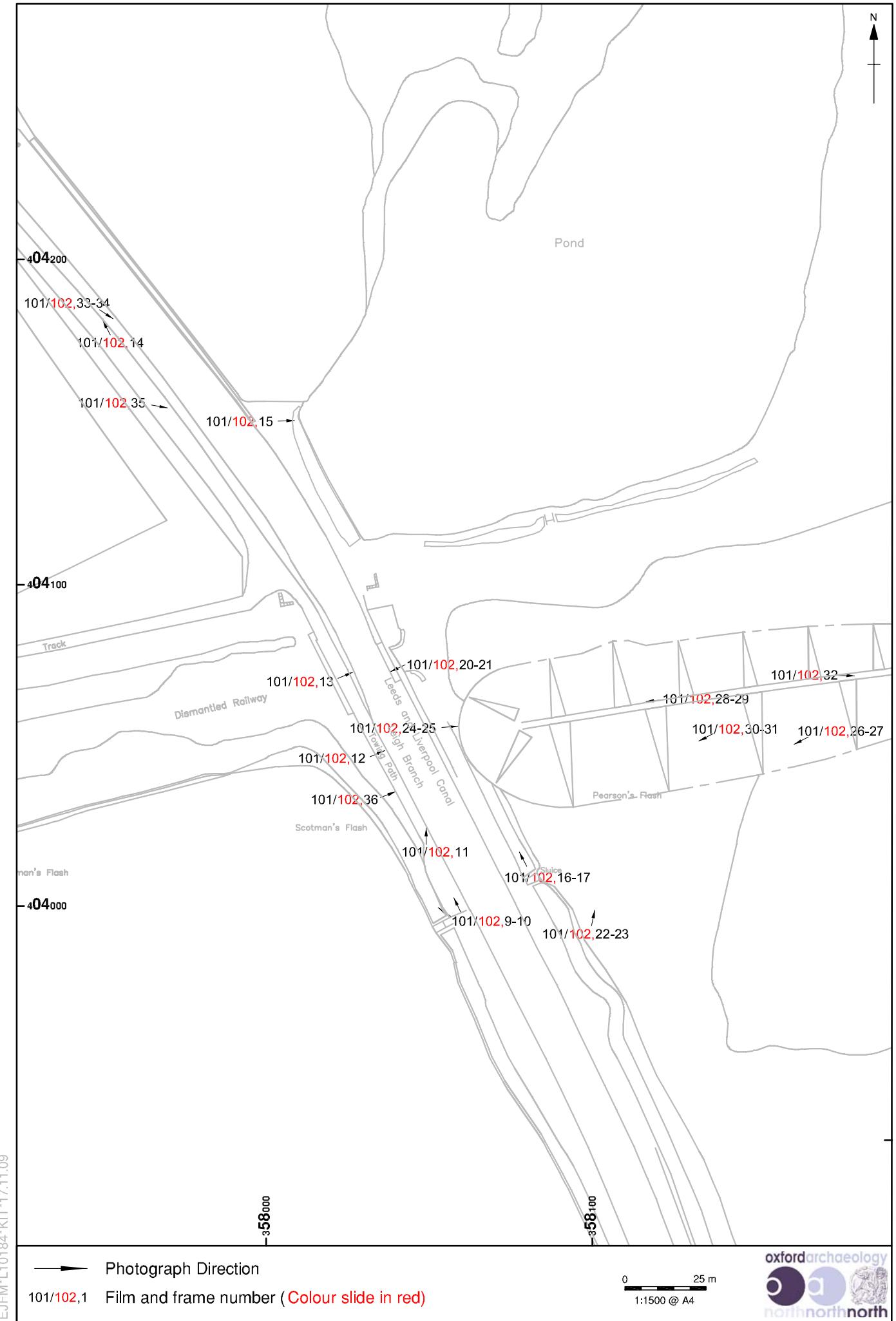


Figure 15: Photographic survey location plan of the Leeds and Liverpool Canal



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Plate 9: Linear **230** in Trench 2, looking south-west



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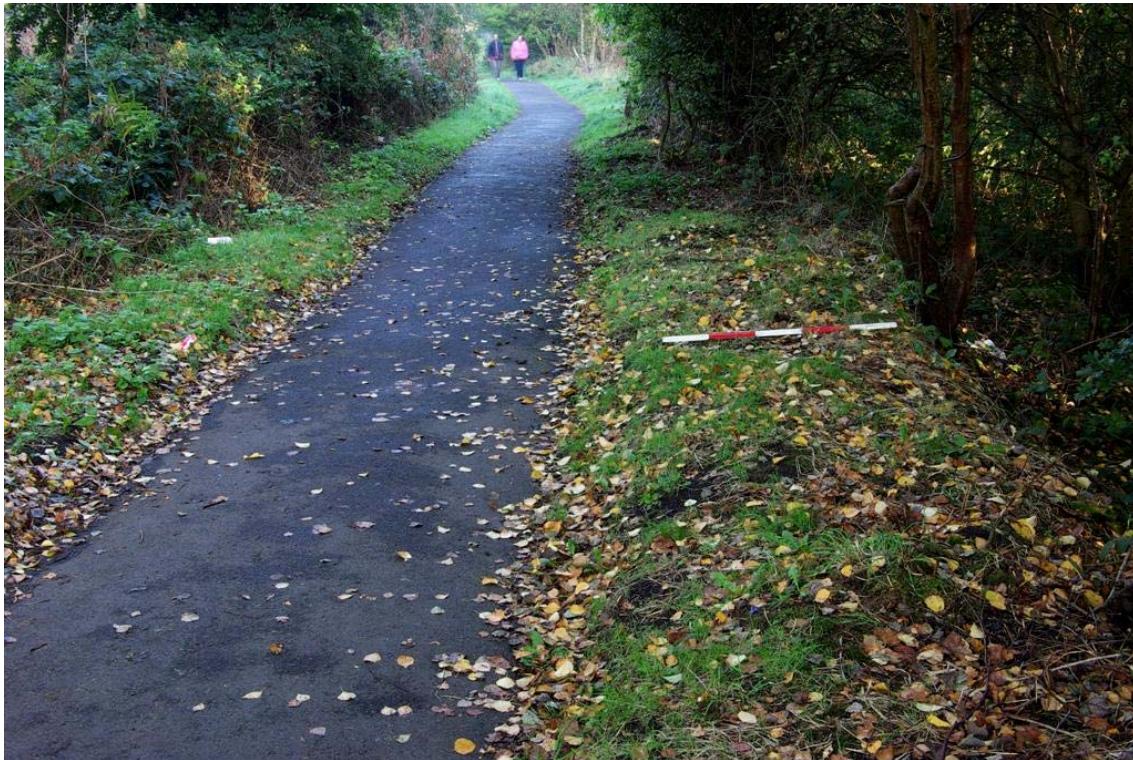


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APPENDIX 1: WRITTEN SCHEME OF INVESTIGATION

A49 Goose Green to Westwood Park Link Road

(Planning Ref. A/07/67989)

Archaeological Works

Written Scheme of Investigation

Volume 1: Specification

Tender Issue

Date: April 2009

A49 Goose Green to Westwood Park Link Road

Archaeological Works

Written Scheme of Investigation

Volume 1: Specification



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Project: A49 Goose Green to Westwood Park Link Road

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A49 Goose Green to Westwood Park Link Road

Archaeological Works

Written Scheme of Investigation

Volume 1: Specification



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A49 Goose Green to Westwood Park Link Road

Archaeological Works

Written Scheme of Investigation

Volume 1: Specification



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1 Introduction

1.1 Wigan Council has obtained planning permission for the A49 Goose Green to Westwood Park Link Road (Planning Ref. A/07/67989).

1.2 Wigan Council has attached a number of planning conditions to the scheme, including Condition 16 which states:

No development shall take place within the site until the applicant has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the Local Planning Authority.

1.3 Wigan Council have commissioned Jacobs to manage a programme of archaeological evaluation and mitigation works to discharge the planning condition.

1.4 This specification sets out the requirements for a programme of archaeological works to be undertaken before and during construction on areas defined on Figures 2 – 5. This specification constitutes the Written Scheme of Investigation (WSI) required in accordance with the planning conditions. The works comprise four elements:

- Trial Trenching where the scheme crosses the possible route of a Roman road;
- Earthwork Survey of remains of the former Winstanley Colliery Railway;
- Excavation of a section through the former Winstanley Colliery Railway; and
- Photographic Survey of the Smithy Brook Mill Race and Leeds and Liverpool Canal.

1.5 Should significant archaeological remains be encountered during the Trial Trenching, there may be a requirement for Mitigation Excavation. Any such works will be carried out following the methodology described in Appendix A and only upon receipt of written instruction from the Consultant and after agreement with the Curator.

1.6 The archaeological contractor will be appointed under the terms of the ICE Conditions of Contract for Archaeological Investigation (first edition, September 2004; ICE 2004a). Instructions for Tendering, the Conditions of Contract, Bill of Quantities and Form of Tender are included in Volume 2 (Tender Documents).

1.7 Although there will be only two parties to the Contract (the Employer and the Contractor), there are five key roles relevant to its operation, as set out below:

The Employer means Wigan Metropolitan Borough Council, (WMBC), who will appoint the Contractor;

The Consultant means a named individual appointed by Jacobs to fulfil this role on behalf of WMBC;

The Contractor means the archaeological organisation appointed by WMBC to carry out the work defined in the Specification (Volume 1);



The Curator means Andrew Myers the Assistant County Archaeologist for Greater Manchester or their representative(s) on this project;

The Earthworks Contractor means the main construction contractor or his subcontractor(s), who will undertake the road construction. Details will be provided once appointed.

- 1.8 The Consultant on this project will be Robert McNaught (Senior Archaeologist, Jacobs).
- 1.9 Further information about these roles is given in the Conditions of Contract and in their accompanying Guidance Notes (ICE 2004a and b).

2 Scheme Description

- 2.1 The A49 Goose Green to Westwood Park Link road is proposed to be constructed between The A49 Warrington road at Goose Green and the junction of the B5238 Poolstock Lane and Chapel Lane at Westwood Park. The scheme aims to mitigate traffic congestion by providing a new high capacity route into the town centre from the south of the Borough, improving access to the town centre and the motorway network. See Figure 1 for the general scheme location and layout.



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3 Archaeological and Historic Background

- 3.1 The following paragraphs are taken from the Cultural Heritage chapter of the, *A49 Goose Green to Westwood Park Link Road: Environmental Statement* prepared by Hyder Consulting (2006).
- 3.2 No prehistoric finds or sites are known from within the study corridor, and only a small number of prehistoric finds have been found within the general vicinity. They include a Neolithic polished stone axe and a bronze double looped socketed spearhead, found at Leigh; a Bronze Age axe hammer found at Bottling Wood; a Late Neolithic polished stone axe from Gidlow, a Neolithic axe hammer discovered in Wigan and a bronze spearhead believed to have been found at Bryn Moss (GMAU, 1993; Hall *et al*, 1995). Most recently, during excavation at Gadbury Fold c.1km to the north-east of the eastern end of the study corridor, a Neolithic/Bronze Age thumbnail scraper was found, redeposited in the fill of a medieval ditch.
- 3.3 Isolated finds of Roman pottery, coins (the most famous of which is a gold aureus of the Emperor Vitellius (AD 69) discovered near Mesnes in 1850) and other artefacts indicate Roman settlement in Wigan. Excavations carried out in 1982-4 by the Greater Manchester Archaeological Unit (GMAU) at the Wiend confirmed the existence of a Roman settlement at Wigan. At least four phases of occupation were uncovered, spanning the late 1st and 2nd centuries AD. No evidence of 3rd or 4th-century structures or activity was recovered at the Wiend, but occupation in these periods is indicated by finds from other parts of the town.
- 3.4 The Roman road leading from Wigan to Warrington crosses the Scheme in the area of Goose Green (Site 18). It is believed that the Roman road runs roughly north-south at an approximate distance of 50-100m east of Warrington Road (A49).
- 3.5 No archaeological evidence from the Anglo-Saxon period is known in the study corridor. However, a number of ancient townships whose place-names are of British or Old English origin, lie within the surrounding area. While the place-name evidence suggests the presence of a number of Anglo-Saxon settlements within the surrounding area, it does not enable any of these to be firmly located within the corridor itself.
- 3.6 In the medieval period, both historical and archaeological evidence within the region became more plentiful. This period saw the development of local urban centres, such as the market town of Wigan. In 1246, the rector James Maunsell persuaded Henry III to grant a charter elevating Wigan to the status of Borough, this occurring only a year after the town had been granted the right to hold a market (Tupling, 1936). Outside the town, the majority of other sites in the Wigan area which can be ascribed to this period comprise halls, the residences of manorial lords and wealthy freeholders.
- 3.7 Documentary sources show that the coal measures within the townships of the surrounding area were being dug in the medieval period. A second local industry which can be traced back to the medieval period was the production of nails, which continued as an important cottage industry in the Wigan area into the 19th century (Ashmore, 1982).
- 3.8 One specific site within the study area which may be of medieval origin, include the Smithy Brook Flour Mill (Site 19). This was demolished about a century ago, but

the site appears to have since remained unused, and traces of the elongated mill pond and tailrace are still visible (Site 20).

- 3.9 The term post-medieval is here applied to the period from 1540 to the mid to late 18th century, which is commonly seen as the beginning of industrial transformation known as the Industrial Revolution. The post-medieval period itself, however, saw the small-scale local industries of the medieval period gaining in significance. Coal mining in the post-medieval period is particularly well attested in the Smithy Brook area, where the Bankes family of Winstanley appears to have been exploiting the local Coal Measures from at least the 1590s (Bankes, 1940). Among the most common sites within the region which can be dated to the post-medieval period are those of rural dwellings. These include both the halls of the gentry and the farmhouses of the yeomanry. Among the earliest industrial sites identified within the study corridor may be the smithy at the hamlet of Smithy Brook (Site 16).
- 3.10 The period from the mid/late 18th century onwards saw increasing industrialisation within the study corridor and its locality. This was epitomised by the spread of colliery workings, and improvements in transport which saw first the arrival of the Leeds - Liverpool Canal and the construction of horse-drawn colliery tramroads (such as Site 21) and later the spread of locomotive railways comprising both main lines and private colliery routes.

4 Archaeological Works Required

4.1 The archaeological works shall be divided into four Sections as set out below:

Section A – Site Operations

Section B – Post-fieldwork Assessment

Section C – Post-fieldwork analysis and reporting

Section D – Archive deposition and publication of the results

4.2 **Section A: Site Operations**

4.2.1 The Site Operations comprise four elements:

- Trial Trenching where the scheme crosses the possible route of a Roman road;
- Earthwork Survey of the Winstanley Colliery Railway where it is crossed by the scheme;
- Excavation of a section through the Winstanley Colliery Railway to record a representative section; and
- Photographic Survey of the Smithy Brook Mill Race (Site 20) and Leeds and Liverpool Canal (where they are crossed by the route).

4.2.2 Should significant archaeological remains be encountered during the Trial Trenching, there may be a requirement for Mitigation Excavation. Any such works will be carried out following the methodology described in Appendix A and only upon receipt of written instruction from the Consultant and after agreement with the Curator. Such works will be costed using information provided by the Contractor in Appendix A and Appendix B of the Bill of Quantities (Volume 2).

4.2.3 The product of the Site Operations shall be a complete site archive in line with the principles set out in Appendix 3 of English Heritage's Management of Archaeological Projects, 2nd Edition (1991; MAP2).

4.3 **Section B: Post-fieldwork Assessment**

4.3.1 Following completion of the Site Operations a post-excavation assessment will be required in line with the principles set out in Chapter 6 of MAP2. The products of the post-excavation assessment will be an assessment report (Appendix 4 of MAP2) and an updated project design (Appendix 5 of MAP2) setting out the scope of works recommended by the Contractor for Section C.

4.3.2 Together with the post-excavation assessment report/updated project design, the Contractor shall submit a priced schedule of activities and resources required to complete the works recommended in the updated project design.

4.3.3 Note that, in the event of only very minor/insignificant archaeological remains having been identified it is possible that Sections B and C may be combined on the instruction of the Consultant, who will consult the Curator where appropriate.

4.4 Section C: Post-fieldwork Analysis and Reporting

- 4.4.1 Complete any more detailed analysis as required, prepare a final report for publication or otherwise as recommended in the reports on Section B, and prepare a research archive (Appendix 6 of MAP2) for deposition.

4.5 Section D: Archive Deposition and Publication of Results

- 4.5.1 Following completion of all report(s) the Contractor shall deposit the research archive at the appropriate museum or other repository and shall deposit a copy of all reports with the GMAU Sites and Monuments Record. The Contractor shall procure the publication of the results in the format previously agreed during Sections B and C and complete any other dissemination tasks agreed at Sections B and C.
- 4.5.2 Procurement of publication shall be deemed to be complete when the journal or other publisher has provided written confirmation that the article has been accepted, that no modifications are required, no further payments are required to secure publication and the edition/volume in which the article is to be published has been confirmed, together with the expected date of publication.

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5 Aims and Objectives of Archaeological Works

5.1 General Aims

- 5.1.1 The general aims of the archaeological works is to mitigate the impact of the proposed road on the archaeological resource by ensuring that all known sites and features of archaeological interest are investigated and recorded and that unknown features that may be revealed are also recorded.

5.2 Trial Trenching

- 5.2.1 Archaeological Trial Trenching is required within the footprint of the proposed road to where it crosses the projected route of a Roman road between Wigan and Warrington (Hyder Consulting 2006, Vol. 2, Chapter 2, Site 18). The area of Trial Trenching is shown on Figure 2, and will comprise 3 trenches, each measuring 50m x 2m.

- 5.2.2 The general aim of the Trial Trenching is to gather sufficient information to establish the presence or absence of the Roman road. More specific aims and objectives are as follows:

- to establish the presence or absence, character, extent, date, integrity, state of preservation and quality of archaeological remains associated with the Roman road;
- assess the impact of the development;
- consider measures to mitigate the impact of the construction on archaeological deposits if necessary;
- to disseminate the results through deposition of an ordered archive at the local museum, the deposition of a detailed report at the Sites and Monuments Record, and publication at a level of detail appropriate to the significance of the results.

- 5.2.3 The Contractor is referred to Chapter 6 for specific methodologies to be employed during the Trial Trenching.

- 5.2.4 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set by English Heritage in their publication *Management of Archaeological Projects* (2nd edition) (MAP2) and by the Institute of Field Archaeologists in their Standard and Guidance for Archaeological Field Evaluation (IFA 1994a). The Standard defines an evaluation as:

"... a limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate."

5.3 Earthwork Survey

- 5.3.1 An earthwork survey of the remains of the Winstanley Colliery Railway is required, where it is crossed by the proposed road. The survey area is shown on Figure 3.
- 5.3.2 The general aim of the earthwork survey is to ensure that a record is made of the surviving earthworks connected with the railway and in so doing, mitigate the impact of the proposed road. More specific aims are:
- to record the form, construction, function and condition of the site;
 - to record the context of the site and its relationship with surrounding sites and landscape features; and
 - to disseminate the results through deposition of an ordered archive at the local museum, the deposition of a detailed report at the Sites and Monuments Record, and reporting at a level of detail appropriate to the significance of the results.
- 5.3.3 The Contractor is referred to Chapter 6 for specific methodologies to be employed during the Earthwork Survey.
- 5.3.4 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set out in MAP2. The Earthwork Survey shall also be carried out in line with the guidance provided by English Heritage in *Understanding the Archaeology of Landscapes: A guide to good recording practice* (2007) and *Metric Survey Specifications for English Heritage* (2000), which defines an earthwork or topographic survey as:

“The controlled measurement of natural and artificial landscape features represented in plan or as a 3-D data set reading as a plan.”

5.4 Archaeological Excavation

- 5.4.1 Archaeological Excavation is required to record a representative section through the Winstanley Colliery Railway, where it is crossed by the proposed road. The location of the Archaeological Excavation is shown on Figure 2, and will comprise one trench measuring 20m x 2m.
- 5.4.2 The Contractor is referred to Chapter 6 for specific methodologies to be employed during the Archaeological Excavation.
- 5.4.3 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set out in MAP2 and the requirements and standards set by the Institute of Field Archaeologists in their *Standard and Guidance for Archaeological Excavation* (IFA 1995). The Standard defines the purpose of an excavation as follows:

“to examine the archaeological resource within a given area or site within a framework of defined research objectives, to seek a better understanding of and compile a lasting record of that resource, to analyse and interpret the results, and disseminate them.”

5.5 Mitigation Excavation

- 5.5.1 Dependant upon the results of the Trial Trenching, there may be a requirement for Mitigation Excavation of any archaeological features or deposits identified. Any

such works will be carried out following the methodology described in Appendix A and only upon receipt of written instruction from the Consultant and after agreement with the Curator.

- 5.5.2 The Contractor is referred to Appendix A for specific methodologies to be employed during the Mitigation Excavation.
- 5.5.3 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set out in MAP2 and the requirements and standards set by the Institute of Field Archaeologists in their *Standard and Guidance for Archaeological Excavation* (IFA 1995).

5.6 Photographic Survey

- 5.6.1 The Photographic Survey is required to record the historic landscape around the Smithy Brook Mill Race (Site 20) and the Leeds and Liverpool Canal, at the points where they will be spanned by the proposed route. The Photographic Survey locations are shown on Figures 4 and 5.
- 5.6.2 The Contractor is referred to Chapter 6 for specific methodologies to be employed during the Photographic Survey.
- 5.6.3 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set out in MAP2 and the requirements and standards set by English Heritage in *Understanding Historic Buildings: A guide to good recording practice* (2006, 14). The Standard defines the purpose of a Photographic Survey as follows:

“A photographic survey differs from other surveys in that it provides a very full visual record, accompanied by a brief written account, but without an analytical or drawn survey at a comparable level of detail. A comprehensive photographic survey may be appropriate for a building which has complex and important decoration or historic furnishing but which is under no threat, and for which there is no immediate need for detailed analysis. It may also be appropriate for a building of a well-known type which is under threat but for which existing documentation is in other respects adequate.”

6 Methodology for Archaeological Works

6.1 General

- 6.1.1 The Contractor shall give two weeks' notice of the start of archaeological works to Curator so that monitoring meetings may be arranged. The Contractor shall liaise with the Consultant and/or Earthworks Contractor regarding access to the site.
- 6.1.2 The Contractor will be required to demonstrate at the tender stage that all staff appointed to direct, supervise and work on this project are qualified and experienced in all elements of the work that they will perform. Information on the composition of the proposed team shall be provided, including CVs for staff with managerial or supervisory responsibilities and specialists.
- 6.1.3 Except where modified by the terms of this Specification, all archaeological work shall be planned, managed and carried out in accordance with the requirements and standards set by English Heritage in their publication "Management of Archaeological Projects" (2nd edition) (MAP2), and by the appropriate Institute of Field Archaeologists' Standard and Guidance document (IFA 2001a, b and c).
- 6.1.4 A full list of archaeological standards, which shall be adhered to insofar as they are relevant, is included in the bibliography.

6.2 Condition Survey

- 6.2.1 The Contractor shall complete a condition survey before starting work on the site and shall update and complete the relevant records during the course of the site operations. The condition survey shall include as a minimum the following records:
 - photographs of the site to illustrate its condition before the start of the archaeological works, including any existing damage to the site, taken with a time and date recording camera;
 - similar photographs taken after completion of the site operations;
 - a written record or plan noting the location from which each photograph was taken and the orientation of the exposure;
 - a written pro-forma record of the condition of the site before the commencement of the archaeological works, setting out ground conditions, weather and any other relevant factors; and
 - a written record of any incidents resulting in damage to the site, including incidents caused by visitors i.e. vandalism, other scheme staff using the same access route, etc.
- 6.2.2 If, at the time of making the condition survey, the Contractor identifies any factors that may result in unavoidable damage, other than that within the footprint of any excavation, storage area, or approved access routes, they shall contact the Consultant to inform them of the risk of damage. The Contractor shall also identify any changes to the methodology that might be made to minimize the risk of damage. This should include any increases in cost that would occur.
- 6.2.3 The Contractor shall not commence work until instructed to do so by the Consultant.

- 6.2.4 Failure to maintain appropriate records or comply with the above conditions may result in the Contractor being held liable for any compensation claims arising from the archaeological works.
- 6.2.5 The Contractor shall supply the Consultant with two sets of photographs and two copies of all written records pertaining to the condition survey (one in a digital format on CD), within one week of the completion of the archaeological works. The Contractor is strongly advised to retain a copy of all records and photographs for their own purposes. A further set of documentation and photographs shall be supplied, if requested, to the Employer.

6.3 Trial Trenching

- 6.3.1 The three trial trenches required are tabulated below:

| Trench No. | Dimensions | Area (m ²) | Purpose |
|------------|------------|------------------------|--------------------------|
| 1 | 50m x 2m | 100 | Evaluation of Roman Road |
| 2 | 50m x 2m | 100 | Evaluation of Roman Road |
| 3 | 50m x 2m | 100 | Evaluation of Roman Road |

Trial Trenches

- 6.3.2 The Trial Trench locations are shown on Figure 2, and shall be accurately set out, surveyed as excavated and tied in to the Ordnance Survey National Grid and Ordnance Datum. The trenches shall be set out and tied in by the Contractor through instrument survey. In the event that physical obstacles or other factors prevent the excavation of a trench, the Contractor shall advise the Consultant. Changes to trench location will be undertaken only with written permission from the Consultant and the agreement of the Curator.
- 6.3.3 Digital copies of the drawings in AutoCAD format will be provided and it will be possible to obtain Ordnance Survey co-ordinates from them. However, Jacobs does not guarantee the accuracy of any co-ordinates obtained by this method and the Contractor shall be responsible for cross-checking by appropriate techniques.
- 6.3.4 The Contractor shall be responsible for identifying any buried or overhead services and taking any necessary precautions to avoid damage to such services in advance of the start of excavation work.
- 6.3.5 The Contractor shall supply all suitable plant for the excavation and backfilling of the archaeological trial trenches. All such plant shall operate under the direct and continuous supervision of the Contractor. Mechanical excavators shall only be operated by qualified drivers; all drivers shall be CITB/CTA approved and shall be CSCS cardholders.
- 6.3.6 Jacobs operate a permit to dig system. No trenching or other excavations shall be undertaken without this permit being in place.
- 6.3.7 All works associated with this WSI are located within publicly accessible areas and close to footpaths. All archaeological trenches will be securely fenced by the Contractor with Heras-type fencing or similar, with appropriate signage and hazard lighting.
- 6.3.8 Topsoil and any other overburden shall be removed using a 360° mechanical excavator or back-actor fitted with a toothless ditching bucket. Hard surfaces, if present, may be broken up by use of jack-hammers or peckers. All such

mechanical excavation shall be undertaken under the direct and continuous supervision and control of the Contractor.

- 6.3.9 Where trenches are located in landscaped areas, turf, topsoil and any subsoil materials shall be stripped and stockpiled separately. Turf shall be cut and removed carefully and appropriately stored to prevent damage and enable its reuse. Topsoil and subsoil shall be segregated in separate spoil heaps. Spoil from the excavation of archaeological or other features shall be stored on the subsoil heap, not the topsoil heap, prior to backfilling. After the completion of archaeological excavation these materials shall be replaced in reverse order of removal and, unless otherwise instructed by the Employer, in a series of layers no thicker than 250mm, each layer compacted as appropriate by the mechanical excavator prior to placement of the next layer. All surplus or deleterious material and rubbish arising from excavations shall be removed from site to a suitably authorised facility at the Contractor's cost. The Contractor shall grade the soil to a smooth, even profile, free from local mounds and depressions, and reinstate the turf covering.
- 6.3.10 Mechanical excavation shall cease when the first archaeologically significant horizon is encountered, or when the absence of any such horizon has been adequately demonstrated. Any further use of mechanical excavation, or any change to this methodology, shall not be undertaken without the specific permission of the Consultant in consultation with the Curator.
- 6.3.11 Should support be required the Contractor shall ensure adequate measures are taken to prevent ground collapse and maintain the safety of their staff.
- 6.3.12 Sufficient of the archaeological features and deposits encountered shall be excavated by hand to achieve the aims and objectives defined at Section 5.2 above. Care shall be taken not to compromise the integrity of archaeological features or deposits whose excavation is not required to achieve these objectives.
- 6.3.13 The depth and complexity of archaeological features and deposits across the whole site shall be evaluated. The stratigraphy of each trench shall be fully recorded and at least one long section of each trench shall be drawn even where no archaeological deposits have been recognised. More sections shall be drawn if necessary to properly record the deposits, and sufficient excavation shall be undertaken to ensure that all contexts shown on each section drawing can be related to a trench plan.
- 6.3.14 All excavated contexts shall be fully recorded by detailed written context records giving details of location, composition, shape, dimensions, relationships, finds, samples, cross-references to other elements of the record and other relevant contexts, etc.
- 6.3.15 All features and, where possible, all deposits shall be recorded on at least one plan, normally at 1:20 scale, and at least one section drawing, normally at 1:10 scale. A complete post-excavation plan of each trench at 1:20 or, where necessary, 1:50 scale shall be prepared. All drawings shall include such co-ordinate data as is necessary for the accurate location of the area planned or the section drawn and spot-heights related to the Ordnance Survey Datum and accurate to two decimal places.
- 6.3.16 All excavated features and deposits shall be recorded photographically using, as a minimum, both colour slide and black and white negative film, in a 35mm format. Additional illustrative photographs shall be taken as appropriate using colour slide and/or print film and/or digital photography.

- 6.3.17 All unexcavated archaeological features and deposits shall be recorded to the extent possible by the above methods.
- 6.3.18 All finds shall be recorded by context; individually significant finds (“special finds”) shall also be recorded three-dimensionally using a sequence of unique numbers. All artefacts recovered shall be retained and removed from site for conservation (if necessary) and specialist examination/analysis. This shall include X-raying of all metalwork where necessary. Cleaning may take place on site or after removal, as appropriate. All recording, cleaning, storage and conservation of finds shall be in accordance with the Institute of Field Archaeologists’ “Standard and Guidance for the collection, documentation, conservation and research of archaeological materials” (2001).
- 6.3.19 Pursuant to Clause 9.4 of the Conditions of Contract, the Contractor is expected to be familiar with the relevant legislation relating to items of potential Treasure Trove and to finds of Human Remains, and shall notify the relevant authorities and obtain any necessary licences should such items be identified. In the event of such discoveries being made, the Contractor shall immediately inform the Consultant and shall abide by any instructions that the Consultant may issue.

Mitigation Excavation

- 6.3.20 Depending upon the results of the Trial Trenching, there may be a requirement for Mitigation Excavation of any archaeological features or deposits identified. Such works, should they be required, will be carried out following the methodology described in Appendix A and only upon receipt of written instruction from the Consultant.

6.4 Excavation

- 6.4.1 The Excavation trench required is tabulated below.

| Trench No. | Dimensions | Area (m ²) | Purpose |
|------------|------------|------------------------|---|
| 4 | 20m x 2m | 40 | Section through Winstanley Colliery Railway |

Excavation Trenches

- 6.4.2 The Excavation trench location is shown on Figure 2, and shall be accurately set out, surveyed as excavated and tied in to the Ordnance Survey National Grid and Ordnance Datum. The trench shall be set out and tied in by the Contractor through instrument survey. In the event that physical obstacles or other factors prevent the excavation of the trench, the Contractor shall advise the Consultant. Changes to trench location will be undertaken only with written permission from the Consultant and the agreement of the Curator.
- 6.4.3 Digital copies of the drawings in AutoCAD format will be provided and it will be possible to obtain Ordnance Survey co-ordinates from them. However, Jacobs does not guarantee the accuracy of any co-ordinates obtained by this method and the Contractor shall be responsible for cross-checking by appropriate techniques.
- 6.4.4 The Contractor shall be responsible for identifying any buried or overhead services and taking any necessary precautions to avoid damage to such services in advance of the start of excavation work.
- 6.4.5 The Contractor shall supply all suitable plant for the excavation and backfilling of the archaeological trial trenches. All such plant shall operate under the direct and continuous supervision of the Contractor. Mechanical excavators shall only be

operated by qualified drivers; all drivers shall be CITB/CTA approved and shall be CSCS cardholders.

- 6.4.6 Jacobs operate a permit to dig system. No trenching or other excavations shall be undertaken without this permit being in place.
- 6.4.7 All works associated with this WSI are located within publicly accessible areas and close to footpaths. All archaeological trenches will be securely fenced by the Contractor with Heras-type fencing or similar, with appropriate signage and hazard lighting.
- 6.4.8 Topsoil and any other overburden shall be removed using a 360° mechanical excavator or back-actor fitted with a toothless ditching bucket. Hard surfaces, if present, may be broken up by use of jack-hammers or peckers. All such mechanical excavation shall be undertaken under the direct and continuous supervision and control of the Contractor.
- 6.4.9 Where trenches are located in landscaped areas, turf, topsoil and any subsoil materials shall be stripped and stockpiled separately. Turf shall be cut and removed carefully and appropriately stored to prevent damage and enable its reuse. Topsoil and subsoil shall be segregated in separate spoil heaps. Spoil from the excavation of archaeological or other features shall be stored on the subsoil heap, not the topsoil heap, prior to backfilling. After the completion of archaeological excavation these materials shall be replaced in reverse order of removal and, unless otherwise instructed by the Employer, in a series of layers no thicker than 250mm, each layer compacted as appropriate by the mechanical excavator prior to placement of the next layer. All surplus or deleterious material and rubbish arising from excavations shall be removed from site to a suitably authorised facility at the Contractor's cost. The Contractor shall grade the soil to a smooth, even profile, free from local mounds and depressions, and reinstate the turf covering.
- 6.4.10 Mechanical excavation shall cease when the first archaeologically significant horizon is encountered, or when the absence of any such horizon has been adequately demonstrated. Any further use of mechanical excavation, or any change to this methodology, shall not be undertaken without the specific permission of the Consultant in consultation with the Curator.
- 6.4.11 Should support be required the Contractor shall ensure adequate measures are taken to prevent ground collapse and maintain the safety of their staff.
- 6.4.12 The Contractor shall undertake archaeological excavation by hand of any archaeological remains identified in accordance with the following sampling strategy:
 - a 100% sample of all stake-holes;
 - a 50% sample of all post holes and pits with a diameter of up to 1.5m;
 - a minimum 25% sample of pits with a diameter over 1.5m, including a complete section across the pit;
 - a minimum 20% sample of all linear features up to 5m in length;
 - a minimum 10% sample of linear features over 5m in length; and
 - up to 25% of all other features unless otherwise agreed with the Consultant and the Curator.

- 6.4.13 The stratigraphy of each trench shall be fully recorded and at least one long section of each trench shall be drawn even where no archaeological deposits have been recognised. Trench sections will be recorded using a total station theodolite, augmented with measurements by hand, and the survey will be processed and checked on site. More sections shall be drawn if necessary to properly record the deposits, and sufficient excavation shall be undertaken to ensure that all contexts shown on each section drawing can be related to a trench plan.
- 6.4.14 All excavated contexts shall be fully recorded by detailed written context records giving details of location, composition, shape, dimensions, relationships, finds, samples, cross-references to other elements of the record and other relevant contexts, etc.
- 6.4.15 All features and, where possible, all deposits shall be recorded on at least one plan, normally at 1:20 scale, and at least one section drawing, normally at 1:10 scale. A complete post-excavation plan of each trench at 1:20 or, where necessary, 1:50 scale shall be prepared. All drawings shall include such coordinate data as is necessary for the accurate location of the area planned or the section drawn and spot-heights related to the Ordnance Survey Datum and accurate to two decimal places.
- 6.4.16 All excavated features and deposits shall be recorded photographically using, as a minimum, both colour slide and black and white negative film, in a 35mm format. Additional illustrative photographs shall be taken as appropriate using colour slide and/or print film and/or digital photography.
- 6.4.17 All unexcavated archaeological features and deposits shall be recorded to the extent possible by the above methods.
- 6.4.18 All finds shall be recorded by context; individually significant finds ("special finds") shall also be recorded three-dimensionally using a sequence of unique numbers. All artefacts recovered shall be retained and removed from site for conservation (if necessary) and specialist examination/analysis. This shall include X-raying of all metalwork where necessary. Cleaning may take place on site or after removal, as appropriate. All recording, cleaning, storage and conservation of finds shall be in accordance with the Institute of Field Archaeologists' *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (2001).
- 6.4.19 Pursuant to Clause 9.4 of the Conditions of Contract, the Contractor is expected to be familiar with the relevant legislation relating to items of potential Treasure Trove and to finds of Human Remains, and shall notify the relevant authorities and obtain any necessary licences should such items be identified. In the event of such discoveries being made, the Contractor shall immediately inform the Consultant and shall abide by any instructions that the Consultant may issue.
- 6.4.20 The methodology employed by the Contractor in the collection, selection, processing and assessment of palaeoenvironmental samples shall be such to meet the aims and objectives of the trial trenching outlined above. This methodology shall be based on specialist advice obtained by the Contractor on the selection of deposits to be sampled, the nature of the samples to be collected and the methods of processing/assessment to be applied. The specialist advisor(s) shall be identified in the tender documents, together with details of their qualifications and experience.

- 6.4.21 All aspects of the collection, selection, processing, assessment and reporting on the environmental archaeology component of the evaluation shall be undertaken in accordance with the principles set out in English Heritage's Centre for Archaeology Guidelines: *Environmental Archaeology – a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (2002) and with reference to the Association for Environmental Archaeology's Working Paper No. 2, *Environmental Archaeology and Archaeological Evaluations* (1995)
- 6.4.22 Should waterlogged remains be encountered within the trial trenches, recording, sampling, conservation and curation of waterlogged wood shall be undertaken in order to meet the aims and objectives of the trial trenching outlined above and in accordance with English Heritage's Guidelines (English Heritage 1996) and Guidelines for the care of waterlogged archaeological leather (English Heritage, 1995). The Contractor will also liaise with the English Heritage Regional Scientific Advisor on the treatment of waterlogged remains.
- 6.4.23 A provision for the emergency conservation/stabilisation and storage of waterlogged artefacts has been included under Section A5 of the Bill of Quantities.
- 6.4.24 The Contractor shall make provision within their excavation strategies, where necessary, for the use of pumps, shoring or artificial lighting (see Volume 2, Para 4.6 (xxi-xxiii)). Such strategies should also allow for sampling for radiocarbon, archaeomagnetic and/or dendrochronological determinations, as appropriate: where *in situ* timbers are found to survive in good condition, samples should be taken for dendrochronological assay (see Volume 2, Para 4.6 (xvii)).
- 6.4.25 Adequate resources shall be provided during fieldwork to ensure that all written drawn and photographic records are completed, checked and internally consistent. This shall be undertaken whilst on site.

6.5 **Earthwork Survey**

- 6.5.1 The Earthwork Survey shall be carried out to English Heritage Level 2 (2007, 23), and shall consist of a written description and metrically accurate, interpretative site plan. The Earthwork Survey shall provide as complete as possible a record and interpretation of upstanding earthworks visible at the surface. The location and extent of the Earthwork Survey area is shown on Figure 3. General requirements are as follows:
- The survey work shall be carried out using appropriate Total Station Theodolite/differential GPS and data-logger equipment and staff appropriately trained and experienced in topographic survey techniques.
 - The following shall be surveyed as a minimum; the inner and outer edges and the entrance positions for each wall, building or structure, the top, bottom and breaks of slope of any earthwork feature, and additional 3D points to generate an accurate contour survey or digital elevation models/digital terrain models.
 - The survey shall be accurately tied-in to the Ordnance Survey National Grid to a horizontal and vertical accuracy of ±10mm.
 - All existing features including fences, hedges, gates and trackways shall be accurately recorded as part of the survey. The minimum units for survey shall be whole portion of the area marked on Figure 3.
- 6.5.2 An engineering topographic survey of the site has already been carried out and permanent ground markers have been installed, surveyed and tied in to the

Ordnance Survey National Grid to a horizontal and vertical accuracy of ±10mm. A list of coordinates and details of marker locations will be supplied to the Contractor, however, the Consultant cannot guarantee their survival or accuracy.

- 6.5.3 The survey should be carried out through instrument survey although hand survey is acceptable. The equipment and methodology to be employed by the Contractor shall be discussed and agreed with the Consultant in advance of the start of fieldwork.

6.6 Photographic Survey

- 6.6.1 The Photographic Survey shall be carried out at the locations shown on Figures 4 and 5 to the standard described by English Heritage in “Understanding Historic Buildings: A guide to good recording practice” (2006, 14). Photographic Survey locations are shown on Figures 4 and 5. The following views and details should be recorded:

- General views of the sites in their wider setting
- Oblique and parallel shots of all external elevations
- Detail shots of structural and architectural features

- 6.6.2 Photography is to comprise Black and White prints and colour transparency and will include a metric scale. 35mm is to be employed and additional digital images may be captures as appropriate.

- 6.6.3 A summary report and a range of captioned photographs shall be included in the overall project report.

6.7 Site Archive

- 6.7.1 Prior to the start of fieldwork, the Contractor shall determine and liaise with the appropriate museum in order to:

- inform them of the intended work, including its nature, location, start date and intended duration;
- obtain the agreement in principle of the relevant museum to accept the archive for long-term storage and curation;
- identify any policies of the museum in respect of selection/retention of archive materials;
- identify any requirements of the museum in respect of the format, presentation and packaging of the archive records and materials;
- determine a policy for the selection, retention and disposal of excavated material by consultation with the museum prior to excavation.

- 6.7.2 Adequate resources shall be provided during fieldwork to ensure that all records are checked and internally consistent. Archive consolidation shall be completed immediately after the conclusion of fieldwork, to ensure that the site record has been checked, cross-referenced and indexed as necessary and that all retained finds have been cleaned, conserved, marked and packaged as appropriate. The Contractor shall be responsible for deposition and long-term storage of the archive (see also 8.2 below).

- 6.7.3 Immediately after completion of fieldwork, all retained soil samples shall be appropriately processed in accordance with the sampling strategy agreed prior to the start of fieldwork or otherwise agreed during fieldwork, and appropriate records shall be kept.
- 6.7.4 A Site Archive shall be prepared in accordance with the standards set out in Appendix 3 of MAP2.
- 6.7.5 The site archive shall contain all the data collected during the investigation, including records and excavated materials. It shall be quantified, ordered, indexed and internally consistent. Adequate resources shall be provided during fieldwork to ensure that records are checked and internally consistent.
- 6.7.6 Archive consolidation shall be undertaken immediately following the conclusion of fieldwork.
- 6.7.7 The site record shall be checked, cross-referenced and indexed as necessary.
- 6.7.8 All retained finds shall be cleaned, conserved, marked and packaged in accordance with the requirements of the recipient museum.
- 6.7.9 All retained finds shall be assessed and recorded using pro-forma recording sheets, by suitably qualified and experienced staff. Initial artefact dating shall be integrated with the site matrix.
- 6.7.10 The archive shall be assembled in accordance with the guidelines set out in English Heritage's Management of Archaeological Projects 2 (MAP2; paragraphs 4.9, 6.8 and 6.10 and Appendix 3). In addition to the site records, artefacts, ecofacts and other sample residues, the archive shall contain:
 - site matrices where appropriate;
 - a summary report synthesising the context records;
 - a summary of the artefact record;
 - a summary of any other records or materials recovered.
- 6.7.11 The integrity of the primary field records shall be preserved and the Contractor shall create security copies in digital, fiche or microfilm format of all primary field records.

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7 Post-Fieldwork Assessment, Analysis and Reporting

7.1 Post-Fieldwork Assessment

- 7.1.1 Following completion of the Site Operations a post-fieldwork assessment will be required in line with the principles set out in Chapter 6 of MAP2. The products of the post-fieldwork assessment shall be an assessment report (Appendix 4 of MAP2) and an updated project design (Appendix 5 of MAP2) setting out the scope of works recommended by the Contractor.
- 7.1.2 Each category of data and material recovered by the fieldwork (site records/stratigraphic data, each category of artefact or other find, each category of palaeoenvironmental/economic evidence, any other data) shall be examined, quantified, catalogued and assessed by suitably qualified and experienced archaeologists or specialists in line with the principles set out in Chapter 6 of MAP2.
- 7.1.3 If possible and necessary to achieve the aims and objectives of the evaluation, dating evidence shall be obtained by the application of radiocarbon, dendrochronological or other scientific dating techniques. Scientific dating shall be undertaken only after instruction from the Consultant, following agreement with the Curator.

7.2 Post-Fieldwork Assessment Reporting

- 7.2.1 The post-fieldwork assessment report on the works will be required within three months of the completion of the Site Operations. In preparing the report, the authors shall take account of the results of previous archaeological work by reference to published reports and unpublished material available from the Sites and Monuments Record or elsewhere.
- 7.2.2 The report shall be prepared in line with the principles set out in the Institute of Field Archaeologist's *Standard and Guidance for Archaeological Excavation* (2000).
- 7.2.3 The report shall clearly acknowledge the role of the Employer and the Consultant, and shall show the logos of The Employer and Jacobs. All reports shall be prepared in line with the principles set out in Appendix 4 of MAP2, and shall include as a minimum:
 - 1) A non technical summary;
 - 2) Site Code and/or Project number;
 - 3) Planning Reference number and SMR casework number;
 - 4) Dates when the fieldwork took place;
 - 5) A description of the background to and circumstances of the work;
 - 6) A brief description of the previously known archaeology of each site;
 - 7) An account of the methods and results of the works, describing both structural data and associated finds and/or environmental data recovered;
 - 8) A brief interpretation of the results of the fieldwork;

- 9) Interpretation, including phasing of the site sequence and spot-dating of ceramics. (Descriptive material should be clearly separated from interpretative statements);
 - 10) A specialist assessment of the artefacts recovered with a view to their potential for further study. Allowance should be made for preliminary conservation and stabilisation of all objects and an assessment of long-term conservation and storage needs;
 - 11) A specialist assessment of environmental samples taken, with a view to their potential for subsequent study. The preservation state, density and significance of material retrieved must be assessed, following methods presented in Environmental Archaeology: a Guide to the theory and practice of methods from sampling and recovery to post-excavation;
 - 12) Details of archive location and destination (with accession number, where known), together with a catalogue of what is contained in that archive;
 - 13) An assessment of the archaeological significance of the deposits identified, in relation to other sites in the region;
 - 14) A conclusion with recommendations for further post-excavation work, if required;
 - 15) General and detailed plans at appropriate scales, showing the location of each site or group of sites accurately positioned on an up-to-date Ordnance Survey base;
 - 16) Plans and sections of each site and at appropriate scales, with keys and north points;
 - 17) Detailed plans and sections of individual features where necessary, all scales used on any drawings should be standard scales such as would appear on a normal scale rule;
 - 18) Reports on the topographic survey shall include interpretative hachure plans at 1:500 or 1:1000 scale; contour plans at specified vertical intervals may also be required. Interpretative hachure plans at 1:1250 scale, accurately located on an Ordnance Survey base, will also be required;
 - 19) Complete matrix for each site;
 - 20) A copy of the specification and/or project design; and
 - 21) References and bibliography of all sources used.
- 7.2.4** The post-fieldwork assessment shall be prepared in line with the principles set out in Appendix 4 of MAP2, and shall include as a minimum:
- an assessment of each category of data (“statement of potential” in MAP2); and
 - a statement of the storage and curation requirements for each category of data.
- 7.2.5** The post-fieldwork assessment report shall set out the further analytical and reporting works, if any, required to achieve the potential identified during the post-fieldwork assessment. It will also identify appropriate chapter headings,

approximate numbers of figures and estimated word count for the report. The publication medium (e.g. journal, monograph etc.) should be identified at this stage, along with the publisher's requirements with regard to timetabling, formatting and costs.

- 7.2.6 As part of the post-fieldwork assessment process, an updated project design (UPD) should be produced, the purpose of which is to put forward proposals for the work to be carried out in the post-fieldwork analysis stage. These proposals will define the objectives of the post-fieldwork analysis stage and the strategies and resources required to achieve them.
- 7.2.7 The UPD should be presented in the same format as the original project design but with an additional section: a 'summary' or 'statement of Potential', that details those aspects selected for further analysis. The UPD may be submitted as a stand-alone document or as a separate chapter within the post-fieldwork assessment report.
- 7.2.8 One copy of a complete draft post-fieldwork assessment report shall be submitted in the first instance for review/checking by the Consultant. In finalising the report, the Contractor shall take into account any comments made by the Consultant and remedy any faults identified by the Consultant. The Contractor should note that six bound copies, one unbound copy and a digital copy (including drawings) of the post-fieldwork assessment report and UPD will be required. The finalised report shall be submitted to the Consultant within ten working days of receipt of the Consultant's comments on the draft report.
- 7.2.9 Together with the post-fieldwork assessment report/updated project design, the Contractor shall submit a priced schedule of activities and resources required to complete the works recommended in the updated project design.

7.3 **Monitoring**

- 7.3.1 The Contractor should allow for monitoring by the Consultant and the Curator during the post-fieldwork assessment stage. At least one meeting should be arranged at the beginning of the post-fieldwork assessment stage to discuss the aims, resources and timetable for the assessment. Subsequent meetings on a monthly basis should be planned to assess progress and any other matters arising from the ongoing assessment.

7.4 **Post-Fieldwork Analysis**

- 7.4.1 Where the conclusion of the post fieldwork assessment is that detailed analysis is required, it shall proceed in line with the principles set out in Chapter 7 of MAP2.
- 7.4.2 The post-fieldwork analysis shall only begin following approval of the updated project design by the Consultant in consultation with the Curator and the products will be a post-fieldwork analysis report (Appendix 7 of MAP2), a research archive (Appendix 6 of MAP2) and a report for publication which is likely to be the post-fieldwork analysis report.

7.5 **Post-Fieldwork Analysis Reporting**

- 7.5.1 The post-fieldwork analysis report will be required within six months of the completion of the post-fieldwork assessment.
- 7.5.2 The post-fieldwork analysis will consist of detailed work on the stratigraphy, artefacts and environmental data and will lead to the production of a fully synthetic

and integrated report text. The post-fieldwork analysis report shall include as a minimum the items covered in paragraph 7.2.3 above.

- 7.5.3 One copy of a complete draft post-fieldwork analysis report shall be submitted in the first instance for review/checking by the Consultant who will consult with the Curator. In finalising the report, the Contractor shall take into account any comments made by the Consultant and remedy any faults identified by the Consultant. The Contractor should note that six bound copies, one unbound copy and a digital copy (including drawings) of the final report will be required. The finalised post-fieldwork analysis report shall be submitted to the Consultant within ten working days of receipt of the Consultant's comments on the draft report.

7.6 Monitoring

- 7.6.1 The Contractor should allow for monitoring by the Consultant during the post-fieldwork analysis stage. At least one meeting should be arranged at the beginning of the post-fieldwork assessment stage to discuss the aims, resources and timetable for the assessment. Subsequent meetings on a monthly basis should be planned to assess progress and any other matters arising from the ongoing analysis.

7.7 Publication

- 7.7.1 Where publication of a report in an academic journal or as a monograph has been recommended in the post-fieldwork analysis report or UPD, and agreed with the Consultant and the Curator this should be accepted for publication within 12 months of the completion of the fieldwork.

8 Archive Deposition

- 8.1** Immediately upon completion of the reviewed post-fieldwork analysis report or acceptance by the chosen journal of the publication text, the report and any data or other documentation produced during the post-fieldwork assessment and analyses shall be integrated into the site archive. This additional material forms the research archive as defined in Chapter 7 and Appendix 6 of MAP2.
- 8.2** The Contractor shall store the archive in suitable conditions in a secure location until instructions are received from the Consultant for the implementation of further analysis/reporting works or for the deposition of the archive in the appropriate museum or other transfer.

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9 Additional Instructions

9.1 Timing of the Project

- 9.1.1 The Contractor shall start on site no later than 27th July 2009. Excavation and reporting on the archaeological works shall be completed by 29th January 2010. Taking cognisance of this The Contractor shall submit a detailed programme of works for approval by the Consultant a minimum of one week prior to starting works setting out the proposed sequence of setting out, excavations, recording and reporting on the excavation.
- 9.1.2 The Contractor shall inform the Curator of the commencement of the investigations at least two weeks prior to the start of the works.

9.2 Monitoring during Archaeological Works

- 9.2.1 The Curator will be informed prior to the start of on-site archaeological works.
- 9.2.2 During the fieldwork and post-fieldwork stages, monitoring may include visits to the site by representatives of the Consultant and/or the Curator, who will be given full access to any site records or other information recorded.
- 9.2.3 The Contractor shall supply brief weekly reports summarising progress and results to the Consultant by no later than midday on the Monday following each week's work. As a minimum, the weekly reports shall include the following:
 - a table setting out all staff and other resources used on the project during the relevant period;
 - staff time shall be broken down by staff grade/role and task on the project;
 - a short free text summary of archaeological tasks undertaken and archaeological results; and
 - a statement of progress towards completion of the works.
- 9.2.4 If requested by the Consultant, weekly reports may also include copies of plans (sketch or measured) or of digital photographs. Weekly reports should preferably be submitted by e-mail and shall be submitted no later than midday on Monday of each week. The Consultant will provide copies to the Curator as required.

- 9.2.5 Immediately after appointment, the Contractor shall provide the Consultant with copies of all pro-forma sheets and recording procedures and manuals which may be used as part of the fieldwork or the post-excavation work for the Consultant's approval.

- 9.2.6 Following completion of the fieldwork, all documentation produced shall be reviewed and the completed archive may be inspected by the Consultant at any time. The Contractor shall take into account any comments made by the Consultant and remedy any faults identified.

9.3 Health, Safety and Environment

- 9.3.1 The project will be carried out under the Construction (Design and Management) Regulations 2007 (CDM 2007). Task method statements, risk assessments and

safe plans of action are required to be submitted to and approved by the CDM Coordinator (CDMC) for the project, prior to the start of Site Operations.

- 9.3.2 Archaeological works do not fall under the definition of “construction work” for the CDM 2007 regulations. However, the Workplace (Health, Safety and Welfare) Regulations 1992 do apply to archaeological sites works and therefore the following welfare requirements (quoted below from the 1992 Regulations) should be met by the Contractor:

20. – (1) Suitable and Sufficient sanitary conveniences shall be provided at readily accessible places.
21. – (1) Suitable and sufficient washing facilities, including showers if required by the nature of the work for health reasons, shall be provided at readily accessible places.
22. – (1) An adequate supply of wholesome drinking water shall be provided for all persons at work in the workplace.
23. – (1) Suitable and sufficient accommodation shall be provided:
 - (a) for the clothing of any person at work which is not being worn during working hours; and
 - (b) for special clothing which is worn by any person at work but which is not taken home.
25. – (1) Suitable and sufficient rest facilities shall be provided at readily accessible places.

- 9.3.3 A first aid kit shall be available on site at all times with an accompanying accident book.

- 9.3.4 All the Contractor's site staff shall wear appropriate Personal Protective Equipment (PPE), consisting of: high visibility coat/vest; safety boots; hard hat; gloves; and goggles/eye protection.

- 9.3.5 All the Contractor's site staff shall be Construction Skills Certification Scheme (CSCS) cardholders.

- 9.3.6 Further to the measures outlined at Section 9.6 (below), the Contractor shall take all possible steps to ensure the accurate location of underground services by scanning all trench locations before beginning excavation.

- 9.3.7 The Contractor shall be responsible for maintaining the safety of the public.

- 9.3.8 The project may attract interest from local people or the media. The Contractor shall refer any interested parties to the Employer or to the Consultant without making any unauthorised statements or comments.

9.4 Copyright

- 9.4.1 Copyright in any reports or other documentation produced by the Contractor as part of this contract shall remain with the Contractor.
- 9.4.2 The Contractor shall provide a licence to reproduce reports or other documentation produced by the Contractor as part of this contract to the Employer and the Consultant and, for the purposes of their official functions, to the Curator.

9.5 Staffing

- 9.5.1 Minimum qualifications and levels of experience for specific roles are described in Appendix A of the Bill of Quantities (Volume 2). The terminology used refers to functional roles, not to staff titles. All staff used in any role for any part of the investigations shall satisfy at least the requirements specified.

9.6 Privately and Publicly Owned Services or Suppliers

- 9.6.1 The Contractor shall liaise with the Earthworks Contractor with regard to the identification of all services prior to the commencement of Site Operations. The Contractor shall include in his rates and prices for this and also taking measures for the identification, avoidance, support and full protection of pipes, cables and other apparatus, during the progress of the Site Operations and for keeping the Consultant informed of all arrangements made with the owners of privately owned services, Statutory Undertakers and Public Authorities as appropriate.

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Appendix A - Methodology for Mitigation Excavation

10.1 General

- 10.1.1 Mitigation Excavation works shall be undertaken only after instruction from the Consultant. Prices should be provided through Appendix A and Appendix B to the Bill of Quantities (Volume 2).
- 10.1.2 Except where modified by the terms of this Specification, all work shall be planned, managed and carried out in accordance with the requirements and standards set out in MAP2 and by the Institute of Field Archaeologists' Standard and Guidance for Archaeological Excavation (1995).

10.2 Methodology

- 10.2.1 Topsoil and any other overburden shall be removed using a 360° mechanical excavator or back-actor fitted with a toothless ditching bucket. Hard surfaces, if present, may be broken up by use of jack-hammers or peckers. All such mechanical excavation shall be undertaken under the direct and continuous supervision and control of the Contractor.
- 10.2.2 Where trenches are located in landscaped areas, turf, topsoil and any subsoil materials shall be stripped and stockpiled separately. Turf shall be cut and removed carefully and appropriately stored to prevent damage and enable its reuse. Topsoil and subsoil shall be segregated in separate spoil heaps. Spoil from the excavation of archaeological or other features shall be stored on the subsoil heap, not the topsoil heap, prior to backfilling. After the completion of archaeological excavation these materials shall be replaced in reverse order of removal and, unless otherwise instructed by the Employer, in a series of layers no thicker than 250mm, each layer compacted as appropriate by the mechanical excavator prior to placement of the next layer. All surplus or deleterious material and rubbish arising from excavations shall be removed from site to a suitably authorised facility at the Contractor's cost. The Contractor shall grade the soil to a smooth, even profile, free from local mounds and depressions, and reinstate the turf covering.
- 10.2.3 Mechanical excavation shall cease when the first archaeologically significant horizon is encountered, or when the absence of any such horizon has been adequately demonstrated. Any further use of mechanical excavation, or any change to this methodology, shall not be undertaken without the specific permission of the Consultant in consultation with the Curator.
- 10.2.4 Should support be required the Contractor shall ensure adequate measures are taken to prevent ground collapse and maintain the safety of their staff.
- 10.2.5 The Contractor shall undertake archaeological excavation by hand of any archaeological remains identified in accordance with the following sampling strategy:
 - 100% of all positive features likely to obscure earlier archaeological features;
 - a 50% sample of all post holes and pits with a diameter of up to 1.5m;
 - a minimum 25% sample of pits with a diameter over 1.5m, including a complete section across the pit;

- a minimum 20% sample of all linear features up to 5m in length;
 - a minimum 10% sample of linear features over 5m in length; and
 - up to 25% of all other features unless otherwise agreed with the Consultant and the Curator.
- 10.2.6** The stratigraphy of each trench shall be fully recorded and at least one long section of each trench shall be drawn even where no archaeological deposits have been recognised. Trench sections will be recorded using a total station theodolite, augmented with measurements by hand, and the survey will be processed and checked on site. More sections shall be drawn if necessary to properly record the deposits, and sufficient excavation shall be undertaken to ensure that all contexts shown on each section drawing can be related to a trench plan.
- 10.2.7** All excavated contexts shall be fully recorded by detailed written context records giving details of location, composition, shape, dimensions, relationships, finds, samples, cross-references to other elements of the record and other relevant contexts, etc.
- 10.2.8** All features and, where possible, all deposits shall be recorded on at least one plan, normally at 1:20 scale, and at least one section drawing, normally at 1:10 scale. A complete post-excavation plan of each trench at 1:20 or, where necessary, 1:50 scale shall be prepared. All drawings shall include such coordinate data as is necessary for the accurate location of the area planned or the section drawn and spot-heights related to the Ordnance Survey Datum and accurate to two decimal places.
- 10.2.9** All excavated features and deposits shall be recorded photographically using, as a minimum, both colour slide and black and white negative film, in a 35mm format. Additional illustrative photographs shall be taken as appropriate using colour slide and/or print film and/or digital photography.
- 10.2.10** All unexcavated archaeological features and deposits shall be recorded to the extent possible by the above methods.
- 10.2.11** All finds shall be recorded by context; individually significant finds ("special finds") shall also be recorded three-dimensionally using a sequence of unique numbers. All artefacts recovered shall be retained and removed from site for conservation (if necessary) and specialist examination/analysis. This shall include X-raying of all metalwork where necessary. Cleaning may take place on site or after removal, as appropriate. All recording, cleaning, storage and conservation of finds shall be in accordance with the Institute of Field Archaeologists Standard and Guidance for the collection, documentation, conservation and research of archaeological materials (2001).
- 10.2.12** Pursuant to Clause 9.4 of the Conditions of Contract, the Contractor is expected to be familiar with the relevant legislation relating to items of potential Treasure Trove and to finds of Human Remains, and shall notify the relevant authorities and obtain any necessary licences should such items be identified. In the event of such discoveries being made, the Contractor shall immediately inform the Consultant and shall abide by any instructions that the Consultant may issue.
- 10.2.13** The methodology employed by the Contractor in the collection, selection, processing and assessment of palaeoenvironmental samples shall be such to meet the aims and objectives of the trial trenching outlined above. This

methodology shall be based on specialist advice obtained by the Contractor on the selection of deposits to be sampled, the nature of the samples to be collected and the methods of processing/assessment to be applied. The specialist advisor(s) shall be identified in the tender documents, together with details of their qualifications and experience.

- 10.2.14 All aspects of the collection, selection, processing, assessment and reporting on the environmental archaeology component of the evaluation shall be undertaken in accordance with the principles set out in English Heritage's Centre for Archaeology Guidelines: Environmental Archaeology – a guide to the theory and practice of methods, from sampling and recovery to post-excavation (2002) and with reference to the Association for Environmental Archaeology's Working Paper No. 2, Environmental Archaeology and Archaeological Evaluations (1995)
- 10.2.15 Should waterlogged remains be encountered within the trial trenches, recording, sampling, conservation and curation of waterlogged wood shall be undertaken in order to meet the aims and objectives of the trial trenching outlined above and in accordance with English Heritage's Guidelines (English Heritage 1996) and Guidelines for the care of waterlogged archaeological leather (English Heritage, 1995). The Contractor will also liaise with the English Heritage Regional Scientific Advisor on the treatment of waterlogged remains.
- 10.2.16 A provision for the emergency conservation/stabilisation and storage of waterlogged artefacts has been included under Section A5 of the Bill of Quantities.
- 10.2.17 The Contractor shall make provision within their excavation strategies, where necessary, for the use of pumps, shoring or artificial lighting (see Volume 2, Para 4.6 (xxi-xxiii)). Such strategies should also allow for sampling for radiocarbon, archaeomagnetic and/or dendrochronological determinations, as appropriate: where in situ timbers are found to survive in good condition, samples should be taken for dendrochronological assay (see Volume 2, Para 4.6 (xvii)).
- 10.2.18 Adequate resources shall be provided during fieldwork to ensure that all written drawn and photographic records are completed, checked and internally consistent. This shall be undertaken whilst on site.

10.3 Site Archive

- 10.3.1 The site archive arising from the Mitigation Excavation shall be dealt with under the methodology described in Section 6.7 above, and integrated with that of the other Archaeological Works prior to commencement of the post-fieldwork stage.

10.4 Post-Fieldwork Assessment, Analysis, Reporting and Archive Deposition

- 10.4.1 Post-Fieldwork Assessment, Analysis, Reporting and Archive Deposition shall be carried out following the methodologies in Chapters 7 and 8 above.

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Figures

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APPENDIX 2: TRENCH AND CONTEXT DESCRIPTIONS

| Trench 1 | Dimensions: 75m by 2m | Orientation: North-west/south-east |
|----------|--|------------------------------------|
| Context | Description | Thickness |
| 100 | Backfill of pit 101. A dark brown sandy-silt, containing plastic and modern debris. | 0.1m |
| 101 | Modern rubbish pit. A sub-rectangular cut measuring 2.8m long and 1.1m wide, with concave sides and base, continuing beyond the southern limit of excavation. | 0.1m |
| 102 | Topsoil. A dark grey brown, friable, sandy-clay. | 0.2m |
| 103 | Subsoil. A light grey brown, friable, sandy-clay | 0.4m |
| 104 | Natural till. A mid-orange brown sandy-clay. | Unknown |

| Trench 2 | Dimensions: 75m by 2m | Orientation: North-east/south-west |
|----------|--|------------------------------------|
| Context | Description | Thickness |
| 200 | Topsoil. A very dark brown-grey, fine sand-silt-clay. | 0.36m |
| 201 | Fill of pit 202. A mix of topsoil, clay, and other sediment backfilled into pit 202. A very dark grey, firm, medium sand-silty-clay with rare sub-rounded stone inclusions a maximum of 10mm by 10mm by 10mm in size. | 0.2m |
| 202 | Small pit, possibly a post-hole of the former allotment gardens. Sub-circular feature measuring 0.5m by 0.47m in size, with concave sides and base and a U-shaped profile. | 0.2m |
| 203 | Fill of post-hole 205. Redeposited topsoil in post-pipe after post removed. A very dark grey, firm, fine sand-silty-clay. | 0.09m |
| 204 | Fill of post-hole 205. Disturbed or redeposited natural clay, packed around the post. A mid-grey, firm, clay. | 0.07m |
| 205 | Post-hole of the former allotment gardens. A sub-circular cut 0.3m by 0.35m in size, with a U-shaped profile, straight sides, and a concave base. | 0.11m |
| 206 | Fill of post-hole 208. Redeposited topsoil in post-pipe after post removed. A very dark grey, firm, fine sand-silty-clay with rare sub-rounded stone inclusions, a maximum of 10mm by 10mm by 10mm in size. | 0.23m |

| | | |
|------------|--|-------|
| 207 | Fill of post-hole 208 . Re-deposited topsoil packed in around post. A mid-orange brown, firm, fine sand-silty-clay. | 0.01m |
| 208 | Post-hole of the former allotment gardens. A sub-rectangular cut, 0.5m by 0.22m in size, with a flat-bottomed U-shaped profile, straight vertical sides, and a flat base. | 0.23m |
| 209 | Fill of linear 210 . A mix of natural clay till and topsoil. A mid grey. Firm, clay with rare sub-rounded stone inclusions a maximum of 10mm by 10mm by 10mm in size. | 0.16m |
| 210 | Linear feature, most likely where a stone has been removed by a plough. A short linear, 1.1m in length and 0.32m wide, with concave side and base, and a V-shaped profile. | 0.16m |
| 211 | Fill of pit 212 . Redeposited topsoil. A very dark grey, firm, fine sand-silty-clay. | 0.08m |
| 212 | Shallow pit from former allotment gardens. A sub-round cut, 0.5m long and 0.4m wide, with concave sides and base and a U-shaped profile. | 0.08m |
| 213 | Masonry of 19th/20th century sump/drain, within cut 224 . Comprised red brick, measuring 235mm by 115mm by 70mm in size, laid as stretchers, bonded with a very dark grey medium sand. Overall, the structure measured 1.05m in length and at least 0.8m wide (continuing beyond the southern most limit of excavation). | 0.68m |
| 214 | Bioturbation, caused by root action of a hedged field boundary. A shallow linear feature, measuring a minimum of 7.1m in length and 0.84m in wide (continuing beyond the southern most limit of excavation), orientated on an east/west alignment, with irregular sides and base. | 0.12m |
| 215 | Levelling deposit. Layer recorded in section, located at the western most end of the trench. Comprised a dark grey, friable, fine sand-silty-clay with occasional sub-rounded stone inclusions a maximum of 20mm by 20mm by 20mm. | 0.32m |
| 216 | Levelling deposit. Layer recorded in section, located at the western most end of the trench. Comprised a mid-grey, firm, coarse sandy-clay with c 50% sub-rounded stone inclusions a maximum of 30mm by 20mm by 10mm in size. | 0.2m |
| 217 | Subsoil. A mid-orangey-grey, friable, fine sand-silty-clay. | 0.42m |
| 218 | Backfill of sump/drain, located between masonry 213 and construction cut 224 . A mix of redeposited topsoil and glacial till. A dark grey, friable, fine sand-silty-clay. | 0.52m |
| 219 | Backfill of sump/drain, located between masonry 213 and construction cut 224 . A mix of redeposited topsoil, subsoil and glacial till. A dark grey, friable, fine sand-silty-clay. | 0.32m |

| | | |
|------------|---|-------|
| 220 | Backfill of sump/drain, located between masonry 213 and construction cut 224 . Redeposited topsoil. A very dark grey, friable, fine sand-silty-clay. | 0.28m |
| 221 | Masonry of sump/drain within construction cut 224 . A single, roughly-squared sandstone block, measuring 0.37m by 0.18m set below brick 213 at the base of the structure. | 0.15m |
| 222 | Fill of sump/drain within construction cut 224 . Backfilled topsoil. A very dark grey, friable, fine sand-silty-clay with 1% to 5% small sub-rounded stone inclusions. | 0.37m |
| 223 | Fill of sump/drain within construction cut 224 . A very dark grey, loose, fine sand-silty-clay with c 10% small to medium sized sub-rounded stone inclusions. | 0.08m |
| 224 | Construction cut of 19th/20th century drain. Sub-square in shape measuring 1.65m in length and at least 1.05m wide (continuing beyond the southern most limit of excavation), with straight vertical sides and a flat base. | 0.75m |
| 225 | Fill of 214 . A dark orange brown, firm, fine sand-silty-clay | 0.12m |
| 226 | Bioturbation, caused by root action of hedged field boundary. A shallow linear feature, measuring a minimum of 9.75m in length and 9.75m in wide (continuing beyond the southern and western most limit of excavation), orientated on an east/west alignment, with irregular sides and base. | 0.14m |
| 227 | Fill of 226 . Effectively sub-soil 217 within an area of root action. A mid-brown grey, firm, fine sandy-silt. | 0.14m |
| 228 | Boundary ditch. A linear feature, a minimum of 9.75m in length and 1.02m wide, with irregular sides and base forming a U-shaped profile. | 0.39m |
| 229 | Fill of 228 . Accumulation of sediment eroded from surrounding soil horizons. A mid-grey brown, firm, fine sandy-silt. | 0.39m |
| 230 | Modern rubbish pit. A sub-rectangular cut measuring 1.27m by 0.7m in size. Deposit contained copious quantities of glass. It was decided for health and safety reasons, after limited excavation, not proceed with the excavation of this feature. | 0.25m |
| 231 | Fill of 230 . Redeposited topsoil containing copious quantities of modern rubbish (including sheet plastic and crisp packets), associated with the former allotment gardens. A very dark grey, friable, fine sand-silty-clay with abundant quantities of fragmented window glass. | 0.25m |
| 232 | Floor of drain/sump within construction cut 224 . Irregular sandstone slabs, with an occasional roughly squared slab, measuring a maximum of 0.2m by 0.18m by 0.01m. Overall, the dimensions of the floor measured 0.8m in length and a minimum of 0.57m wide (continuing beyond the southern most limit of | 0.01m |

| | | |
|-----|--|---------|
| | excavation). | |
| 233 | Glacial till. A mid-orangey grey, firm, clay. | unknown |

APPENDIX 3: FINDS CATALOGUE

Ctxt = Context number; MAT = Material; Cat = Category; No = Number of fragments

| CTX | MAT | CAT | NO | DESCRIPTION | PERIOD |
|------------|--------------|-------------------|-----------|--|---------------------------------------|
| 201 | Ceramic | Building material | 1 | Small undiagnostic fragment | Not closely dateable |
| 201 | Iron | Fragment | 1 | Small unidentifiable fragment | Not closely dateable |
| 206 | Ceramic | Vessel | 3 | Two body fragments of black-glazed redware; one body fragment of blue and white underglaze transfer-printed white earthenware | Nineteenth century onwards |
| 213 | Ceramic | Building material | 1 | Hand-made brick | Post-medieval |
| 223 | Ceramic | Building material | 1 | Hand-made brick | Post-medieval |
| 223 | Ceramic | Vessel | 8 | One base fragment of late stoneware; two body fragments of redware, white internal slip; three body fragments of black-glazed redware; one fragment of gardenware; one scrap | Late nineteenth-twentieth century |
| 223 | Glass | Vessel | 6 | One small colourless, complete machine-blown bottle; three colourless rim and body fragments of machine-blown bottles; one body and one base fragment of dark green machine-blown bottle | Late nineteenth-mid twentieth century |
| 223 | Copper alloy | Lid? | 1 | Perforated disc, possibly a lid | Not closely dateable |
| 225 | Ceramic | Building material | 1 | Small undiagnostic fragment | Not closely dateable |
| 227 | Ceramic | Tobacco pipe | 1 | Undiagnostic stem fragment | Post-medieval |
| 227 | Ceramic | Vessel | 10 | Seven fragments of hard-fired black-gazed redware; one fragment of self-glazed redware; two fragments of white salt-glazed stoneware | Eighteenth century? |
| 227 | Stone | Object | 1 | Unidentifiable fragment, possibly worked | Not closely dateable |
| 229 | Ceramic | Vessel | 10 | Five fragments of hard-fired black-gazed redware, including | Late seventeenth |

| | | | | | |
|------------|-------|--------|---|--|---------------------------|
| | | | | the base and part-body of a small tyg; one small handle (porrige?) yellow ware; one small fragment of slip-decorated ware; one small fragment of self-glazed redware; one small fragment of mottled ware cup; one small fragment of press-moulded dish, no glaze | century? |
| 229 | Glass | Object | 2 | Large lentoid object in dark green glass, either melted wine bottle base or, possibly, linen smoother. Small chip | Late seventeenth century? |

APPENDIX 4: MATRICES

