

University of
Salford
MANCHESTER

**Archaeological
Test Pitting**

Worsley Delph
Workshops,
Worsley, Salford

Client: Salford
City Council

**Technical
Report:**
Rachael Reader

Report No:
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Summary

The Centre for Applied Archaeology (CfAA) was commissioned by Salford City Council to undertake archaeological test pitting and a 3D Laser Scan Survey at the former workshops under the Worsley Road bridge arches, Worsley Delph, Salford (centred on SD 7482 0050). This report represents the results of the programme of archaeological test pitting. The programme of archaeological work comprised of nine test pits located across three workshop areas. This was carried out to establish the character of the floors within each compartment, as well as explore relationships between dividing compartment and canal side walls.

Worsley Road Bridge spans over two branches of the Bridgewater Canal which was constructed *c.*1757 and the workshops lie beneath the area of the eastern arches. The bridge is designated as a nationally important, Grade II listed structure (English Heritage National Heritage List: 1287408). The easternmost of the two arches once included a narrow channel (now silted) that led directly to the corn mill, which once stood at the northern side of the road and a series of workshops.

The test pits revealed that varying levels of silt had built up in the compartments over time, however the floor surfaces beneath were still well preserved. The differing character of the floor surfaces across the three separate areas were revealed and also showed that the arch walls were constructed from the bedrock upwards. The workshops themselves appear to have been altered over time with walls modified and new ones built to split the eastern area beneath the bridge into three.



1. Introduction

1.1 Background

The Centre for Applied Archaeology was commissioned by Salford City Council to undertake archaeological test pitting and a 3D Laser Scan Survey at the former workshops beneath the Worsley Road Bridge arches, Worsley Delph, Salford (centred on SD 7482 0050). Salford City Council have recently promoted a scheme to improve access and provide interpretation of the remains of the Worsley Delph canal basin. Since Worsley Civic Trust undertook landscaping and interpreting works in the 1960s and 1970s, the basin has considerably silted, parts have become overgrown. Planning permission has been obtained for a programme of landscaping, improved access and interpretation scheme. An integral part of study involved a cultural heritage assessment to understand the potential heritage assets within the area (Frost 2011). Following on from this report two key areas have been identified for an archaeological mitigation strategy: the Worsley Delph (north of Worsley Road) and the former workshops beneath Worsley Road, the latter of which is under consideration in this report.

A total of nine test pits were excavated in order to establish the character of the floors within each of the compartments and the construction techniques employed. This will in turn inform future Heritage Lottery proposals and subsequent applications. The test pitting was undertaken over four days, between 2nd-5th September inclusive and the 3D Laser Scan was carried out on 5th September.

The work was carried out in accordance with a Written Scheme of Investigation compiled by Adam Thompson of CfAA and submitted May 2013 (see Appendix 1).

1.2 Location, Topography and Current Land Use

The excavation area is located within the metropolitan borough of Salford and the town of Worsley. The area lies beneath the Worsley Road Bridge, which is a Grade II listed structure (English Heritage National Heritage List: 1287408) and in turn lies within the Worsley Conservation Area. The road bridge is also just to the south of the Worsley Delph which forms the start of the Bridgewater canal and was the terminus for 47 miles worth of tunnels from the coal mines in the Walkden and Farnworth areas to the north-west. This is also a Scheduled Ancient Monument. The former workshops are not currently accessible to the public and can only be accessed via a private driveway. The Worsley Road Bridge spans over two arms of the Bridgewater canal, with the easternmost being the earlier of the two. The Bridgewater canal was constructed c.1760 with the western archways opened up in 1771.

The former workshops are located under the eastern half of the road bridge, which consists of two brick arch spans with piers and abutments of natural rock, brick and ashlar. The easternmost of the arches is a later construction and the remnants of two earlier arches can be seen within the front workshop (see fig. 19). The easternmost of these earlier arches was once the tailrace tunnel from the old corn mill which once stood to the north of the road bridge but is now silted and blocked. A brick screen wall separates the front workshop from the middle one and has a gap for a door, as well as a window with a single

stone mullion. The middle workshop has a substantial ashlar built wedge plan abutment as the eastern wall. At the centre of the workshop, in the soffit of the arch, a vertical shaft leads to the road above. Now blocked, it is currently used as a roost for bats. A final room, the rear workshop is also separated through a screen wall with a doorway. All three rooms have a narrow restrictive access to the adjacent canal towpath which passes under the westernmost of the arches (Fitzgerald and Clarke 2002, 26-27).

The workshops have considerably silted, mostly due to dredged material placed here during the landscaping and interpretation works carried out by Worsley Civic Trust during the 1960s and 1970s and the study area is currently derelict. The study area is approximately 35m AOD and the underlying solid geology comprises of middle coal measures of the carboniferous period, which run NW-SE, interspersed with bands of sandstone. The coal measures are overlain by glacial boulder clays (www.bgs.ac.uk; Frost 2011, 14).

1.3 Personnel

The project was conducted by professional archaeologists from CfAA. On-site excavations were carried out by Rachael Reader and Andrew McGuire. This report was compiled and written by Rachael Reader and illustrated by Andrew McGuire. The project was managed by Adam Thompson

1.4 Monitoring

Norman Redhead, the County Archaeologist for Greater Manchester (Greater Manchester Archaeological Advisory Service) also monitored the archaeological works.



2. Historical Background

2.1 Introduction

The former workshops beneath the road bridge are currently not in use, however they were once part of the Bridgewater Canal corridor, arguably the first commercial canal developed in Britain. It began at the Worsley Delph, just to the north of the study area, which is a Scheduled Ancient Monument. The Delph formed the terminus of a series of underground tunnels which originally provided drainage for the coal mine but were then modified to transport coal from the mines in the Walkden and Farnworth areas. The study area is situated below the Worsley Road Bridge, which itself is a Grade II listed structure and includes the workshops below. The Bridgewater Canal also forms part of the Worsley Conservation Area. The following Historical Background is detailed in Fitzgerald and Clarke (2002) and Frost (2011).

2.2 Historical Background

Coal extraction was an essential income generator for the Bridgewater Estate and modern techniques were introduced by Scroop Edgerton, the first Duke of Bridgewater in 1720. However it was Francis Egerton, the third Duke who actively promoted the exploitation and management of the Estate's coal deposits. John Gilbert, the Estate Manager along with his brother Thomas, trained as an Engineer with Matthew Boulton Sr and remained friends with his son, Matthew Boulton Jr. He recognised that the rising transport costs, due to the turnpiking of road access to the Worsley pits, facilitated the need to exploit other alternatives.

In 1757, Egerton and Gilbert lobbied parliament to pass a bill to create a canal linking Worsley to Manchester and this gained Parliamentary assent in 1759. James Brindley was brought in to oversee the construction of the canal and the Bridgewater canal was thus born.

The idea to use the coal workings drainage into the Worsley Delph as a navigable system appears to have been conceived at the time the Bridgewater Canal was constructed. The water draining from the mines fed the canal system with the physical connection between the mine and the canal at the foot of a quarry face at Worsley; the Worsley Delph. This quarry had existed for at least a century prior to becoming a focus for the underground navigable system.

The eastern half of the Worsley Road Bridge is the earlier construction and consists of two brick arch spans with piers and abutments of natural rock, brick and ashlar. The western portal to the Delph, at the other side of the Nailmaker's Cottage, was opened up in 1771

Coal transportation from the underground network ceased in 1887 but the network still functioned as a drainage system. In 1974 freight transportation ceased along this stretch of the canal and it was developed as a leisure facility. In 1974/75, the Delph was dredged to make it accessible for boats again, with some of the dredged material ending up under the road bridge and within the workshops.

2.3 Archaeological Background

Structural Perspectives carried out a survey of the Worsley Delph as well as trial excavation on the island sitting between the two entrances to the underground network. GMAU also carried out a watching brief during trial trenching in 2003/4. The workshops were also briefly surveyed during the former programme of works, however no measured drawings were produced, although there is a survey drawing of the front workshop, produced for Salford City Council in 2002 (Frost 2011, 33-35). Recently, Salford City Council has put forward proposals to improve access to the Worsley Delph and provide interpretation of the remains. Planning permission has been obtained for a programme of landscaping, improved access, restoration of heritage assets and the creation of an interpretive space in one of the arches under the Worsley Road Bridge. In light of this new proposal, a Cultural Heritage Assessment was prepared by Castlering Archaeology in 2011. This was designed to provide an understanding of the location, character and relative significance of the heritage assets associated with the Worsley Delph.

Following consultation with Norman Redhead at GMAAS, it was recommended that eleven test pits measuring 1 x 1m would be excavated, spread across the three compartments beneath the bridge. Three in the rear workshop, three in the middle workshop and five across the front (see fig. 14). However due to waterlogging in the front workshop, two test pits could not be excavated and instead, one within the middle of the area was extended to 2 x 1m. Each test pit was located to determine the depth of silting and the preservation of floor surfaces, with the 2 x 1m trench within the front workshop located to find the course of the narrow channel which once ran to the corn mill to the north. In addition, test pits 1, 4, 5, 7 and 8 were placed to reveal the character and depth of the wall foundations in these areas.



3. Methodology

3.1 Excavation Methodology

The test pits were excavated by hand between 2nd – 5th September, with the excavation and backfilling of test pits 1-3 monitored by a bat environmental professional to ensure minimum disruption to roosting bats.

Excavated spoil was placed at an appropriate distance away from the test pits and also entrances within the compartments.

3.2 Recording Methodology

Separate contexts were recorded individually on Centre for Applied Archaeology (CfAA) pro-forma context sheets (Appendix 1 – Context List), plans and sections were recorded on CfAA pro-forma drawing sheets at an appropriate scale (1:10, 1:20, 1:50) depending on the complexity of the data and features encountered. All drawings were individually identified and cross referenced, contexts enumerated and principal layers and features annotated with OD level information.

Photography of all relevant phases and features were undertaken with digital formats. General working photographs were taken during the archaeological works, to provide illustrative material covering the wider aspects of the archaeological work undertaken (Appendix 3 – Photographic Archive).

All fieldwork and recording of archaeological features, deposits and artefacts were carried out to acceptable archaeological standards. All archaeological works carried out by the CfAA are carried out to the standards set out in the Code of Conduct of the Institute for Archaeologists.



4. Archaeological Descriptions

4.1 Introduction

A total of nine test pits were excavated within the former workshops and this section describes the archaeology encountered within these. In this report, all fills, layers and structural features are in rounded brackets (***) and cuts are in square brackets [***]. Features will be named and denoted by their principal cut number (see appendix 1 for a list of contexts). All test pits measured 1 x 1m, unless specified.

4.2 Middle Workshop

4.2.1 Test Pit 1 (fig.1)

Test Pit 1 was located at the north-west corner of the middle workshop and was excavated to a maximum depth of 0.25m.

This area was sealed with **(001)**, a fairly compact dark brownish black clayey silt with no inclusions, reaching a depth of c0.05m. This sealed **(002)**, which was a handmade brick floor, with bricks measuring 235 x 115 x 75mm although there was a slight variation in size. The bricks were laid on bed and at its maximum width, covered an area measuring 0.70m, however the surface was damaged and truncated here. **(002)** was in turn above **(003)**, a fairly compact mid orangish brown clayey sand, with no inclusions noted and measuring 0.02m in depth and was observed covering an area measuring 0.40 x 0.20m. This in turn lay above **(004)**, which was a very compact mid orangish brown sandy clay with no inclusions observed. This deposit was only excavated to a maximum depth of 0.02m at the western edge of the test pit due to space confinements but was observed covering an area measuring 0.90 x 0.60m at the widest points. At the western edge of the test pit, **(004)** lay above **(033)**, which was the natural sandstone bedrock, of which the western canal side wall appeared to be built up from. This was the lowest observable deposit within test pit 1.

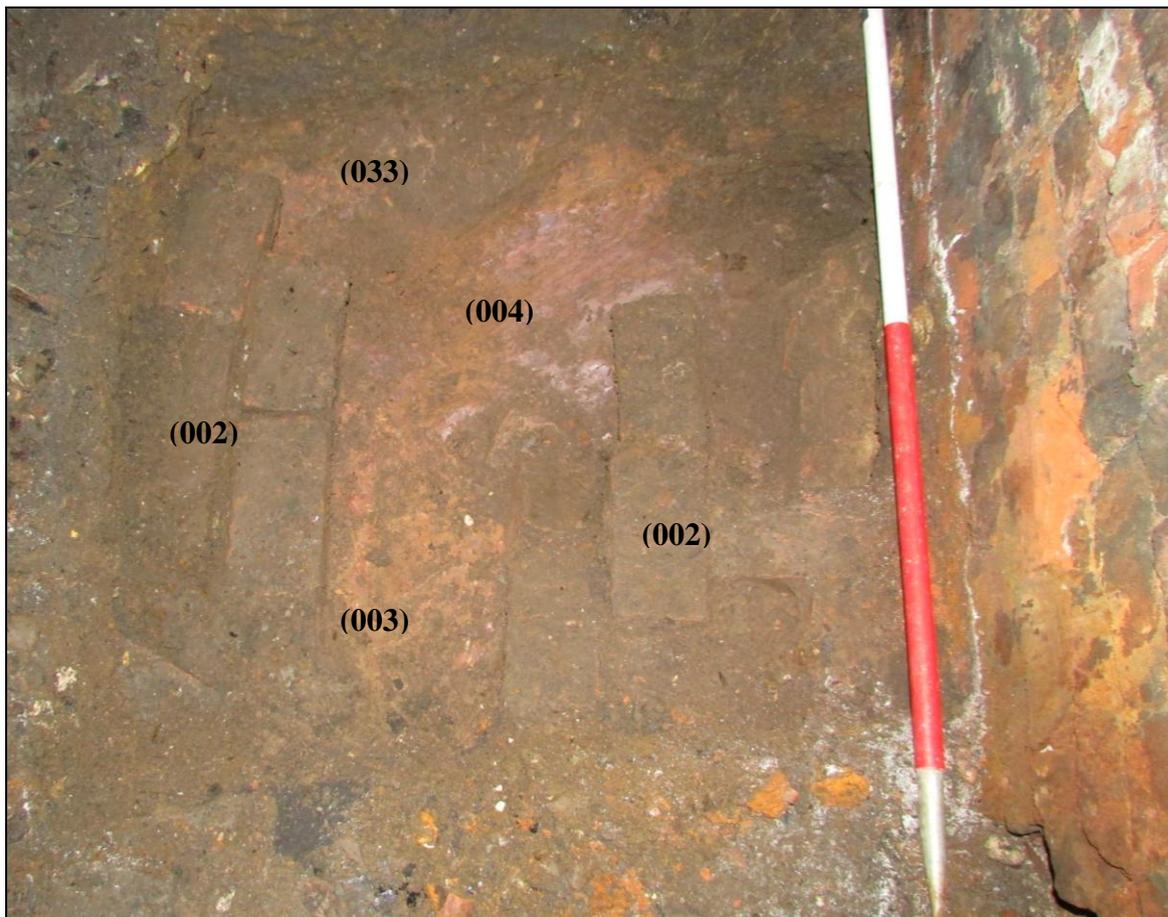


Fig. 1 Test Pit 1

4.2.2 Test Pit 2 (fig. 2)

Test Pit 2 was located along the eastern edge of the middle workshop, where the wall changes direction and was excavated to a maximum depth of 0.10m.

As test pit 1, the uppermost deposit was (001), which measured no more than 0.02m in depth. This in turn lay above (005), which was a very compact dark brown, possibly bitumen or slag by-product, which measured a maximum 0.20m in width and ran along the north and east edge of the test pit. This lay above (006), which was natural light yellowish brown sandstone which appeared to have been shaped to form a floor surface, which in turn also formed the natural base for the sandstone footings of the eastern workshop wall. (006) was abutted to north by (008), which measured 0.20m in width and spanned the length of the test pit. This was also sealed by (005) and was also part of the natural sandstone bedrock which appeared to have been shaped into a raised area and also had three handmade bricks placed within it to the north-west. (008) and (006) were abutted to the south and west respectively by (007), which was a handmade brick floor, laid on bed with bricks measuring 220 x 100 x 80mm. The coursing was laid west-east and sat flush against the sandstone (006) and (008). This was the lowest observable deposit within this test pit.



Fig. 2 Test Pit 2

4.2.3 Test Pit 3 (fig. 3)

Test Pit 3 was located towards the southern end of the middle workshop and was excavated to a maximum depth of 0.05m.

The uppermost deposit was (001), which measured 0.05m in depth within this test pit. This sealed **(009)**, which was a handmade brick floor with the bricks laid on bed east-west, in stretcher bond. The bricks appeared to vary slightly in size however on average, they measured 220 x 110mm. The depth of the bricks was not recorded as (009) was the lowest observable deposit within test pit 3.



Fig. 3 Test Pit 3

4.3 Rear Workshop

4.3.1 Test Pit 4 (fig.4)

Test Pit 4 was located by the southern entrance to the rear workshop and was excavated to a maximum depth of 0.25m.

The uppermost deposit was (001) and measured 0.05m in depth. This sealed (014), which was a fairly loose mid brownish grey clayey silt with infrequent small angular stones and brick fragments. The depth was not fully excavated however it was excavated to a depth of 0.20m and measured 0.20m in width, spanning the length of the test pit. This was stratigraphically above [013], which was a broadly linear cut running E-W of which (014) was the infill. This appeared to be the construction cut for the dividing workshop wall and truncated surface (010). [013] was stratigraphically later than (011) which was a loose light orangish brown silty sand with no inclusions and measuring 0.02m in depth. This was observed in between the cobbles of surface (010), which lay stratigraphically below (011). (010) was a cobbled surface with medium-large sized cobbles measuring 0.10-0.15m and was observed at maximum dimensions 1 x 0.80m, being truncated at its southern end by [013]. This in turn lay stratigraphically above (012), a fairly loose light greyish brown silty clay which was only partially observed where [013] truncated surface (010). The cobbled surface (010) appeared to be set into this material and this was the

lowest observed deposit within test pit 4.



Fig. 4 Test Pit 4

4.3.2 Test Pit 5 (fig. 5)

Test Pit 5 was located at the west side of the rear workshop, partially within the entrance from the canal and was excavated to a maximum depth of 0.30m.

(001) was the uppermost deposit within this test pit and measured 0.30m deep at its maximum. This was sealing (015), which was a cobbled surface with cobbles measuring 0.10-0.15m in length. This was observed across the whole area of the test pit, however set within the cobbles at the south end of the test pit was (017), which was a dark grey stone flag measuring 0.28 x 0.18m. Also abutting surface (015) was (016), which was a handmade brick surface which ran along the width of the northern edge of the doorway to the canal. The bricks were laid on their side, measured 220 x 60mm and were three courses wide and although terminated at the edge of the doorway, it appeared to continue into the baulk. There are no clear stratigraphic relationships between these surfaces and they were the lowermost deposits observed within this test pit.



Fig. 5 Test Pit 5

4.3.3 Test Pit 6 (fig. 6)

Test Pit 6 was located within the centre of the rear workshop and was excavated to a maximum depth of 0.15m.

(001) was the uppermost deposit within this test pit and measured 0.05m in depth and lay stratigraphically above (018), which was a cobbled surface with cobbles measuring 0.1-0.2m. The surface within this test pit appeared to slope gently from the north and south ends to form a V-shape. This in turn sealed (019), which was a very loose light brownish grey clayey silt. This was observed covering a broadly oval area and appeared to be the bedding material for (018). It is unclear whether this area was deliberately placed within the cobbled area or whether it was later truncation. (019) was the lowest observed deposit within this area.

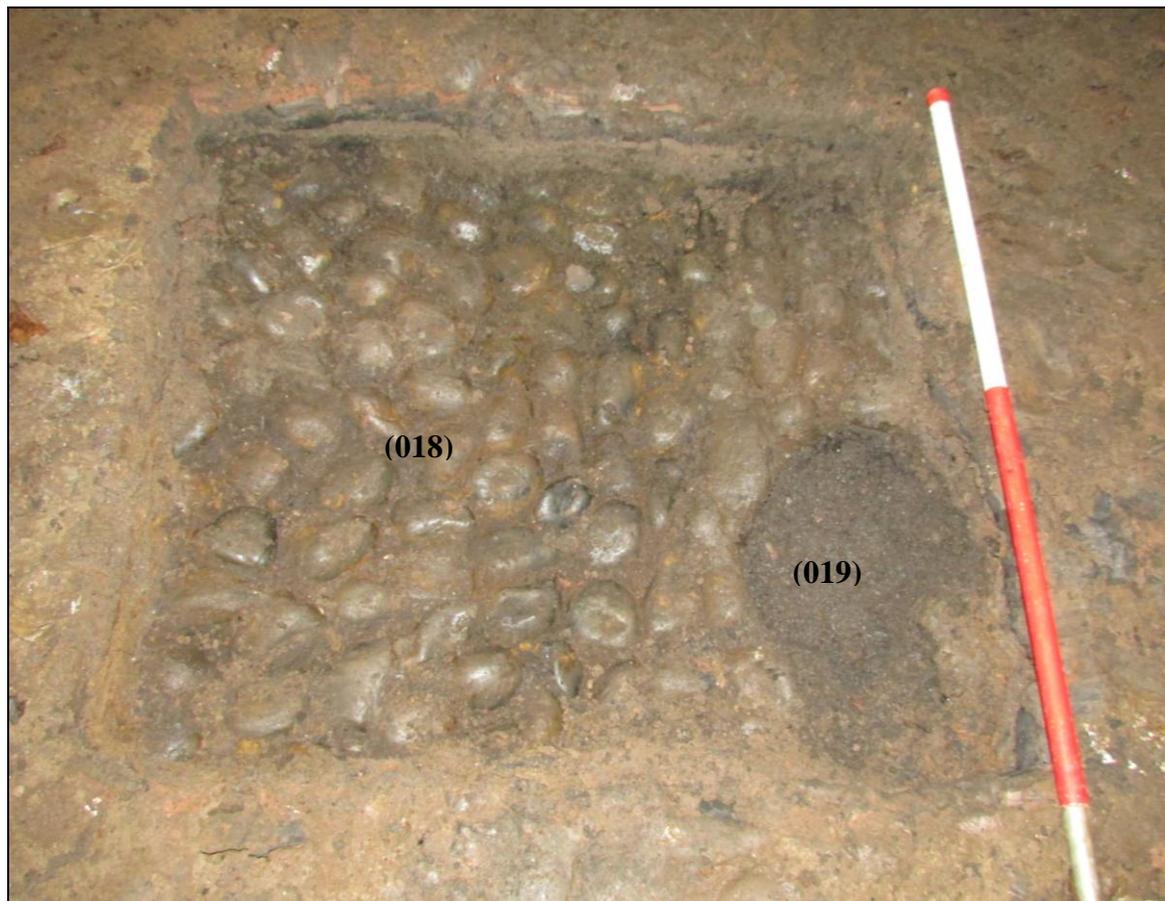


Fig. 6 Test Pit 6

4.4 Front Workshop

4.4.1 Test Pit 7 (fig. 7)

Test Pit 7 was located at the south-west corner of the front workshop, alongside the canal side wall and measured 0.80 x 0.80m and reached a maximum depth of 0.25m.

(001) was the uppermost deposit within this test pit and measured 0.02m in depth, stratigraphically above (020), which was a very compact mid yellowish orange silty clay across the area of the test pit and measuring 0.10m in depth. No inclusions were observed however the deposit was heavily affected by rooting. Stratigraphically below (020) was (021), a fairly compact dark brownish black silty clay, with no observed inclusions but was once again heavily affected by rooting and also gave off a strong smell of rotting plant matter. This measured 0.05m in depth and lay stratigraphically above (022), which was a very compact mid reddish brown clayey silt with inclusions of small crushed brick fragments. This again was observed across the test pit and measured 0.02m in depth. This in turn lay stratigraphically above (023), which was a very compact dark greyish black clayey silt. No inclusions were observed as this layer could not be excavated due to the compactness of it. This deposit did not extend across the whole test pit and formed a broadly curvilinear shape measuring 0.70 x 0.35 x 0.03m, continuing into section to the north. This in turn sealed (024), which was a very loose light yellowish brown clayey sand with occasional very small rounded pebbles. This only measured 0.01m in depth was

observed in isolated pockets across deposit **(025)**, which consisted of large cobbles and a large sandstone slab. The cobbles measured < 0.30m in length and the sandstone slab measured 0.75m in length and a minimum 0.25m in width. This was the lowest observable deposit within this test pit. The sandstone slab did not physically related to the canal-side wall and due to waterlogging and the lack of space, the character of the wall foundations could not be determined.

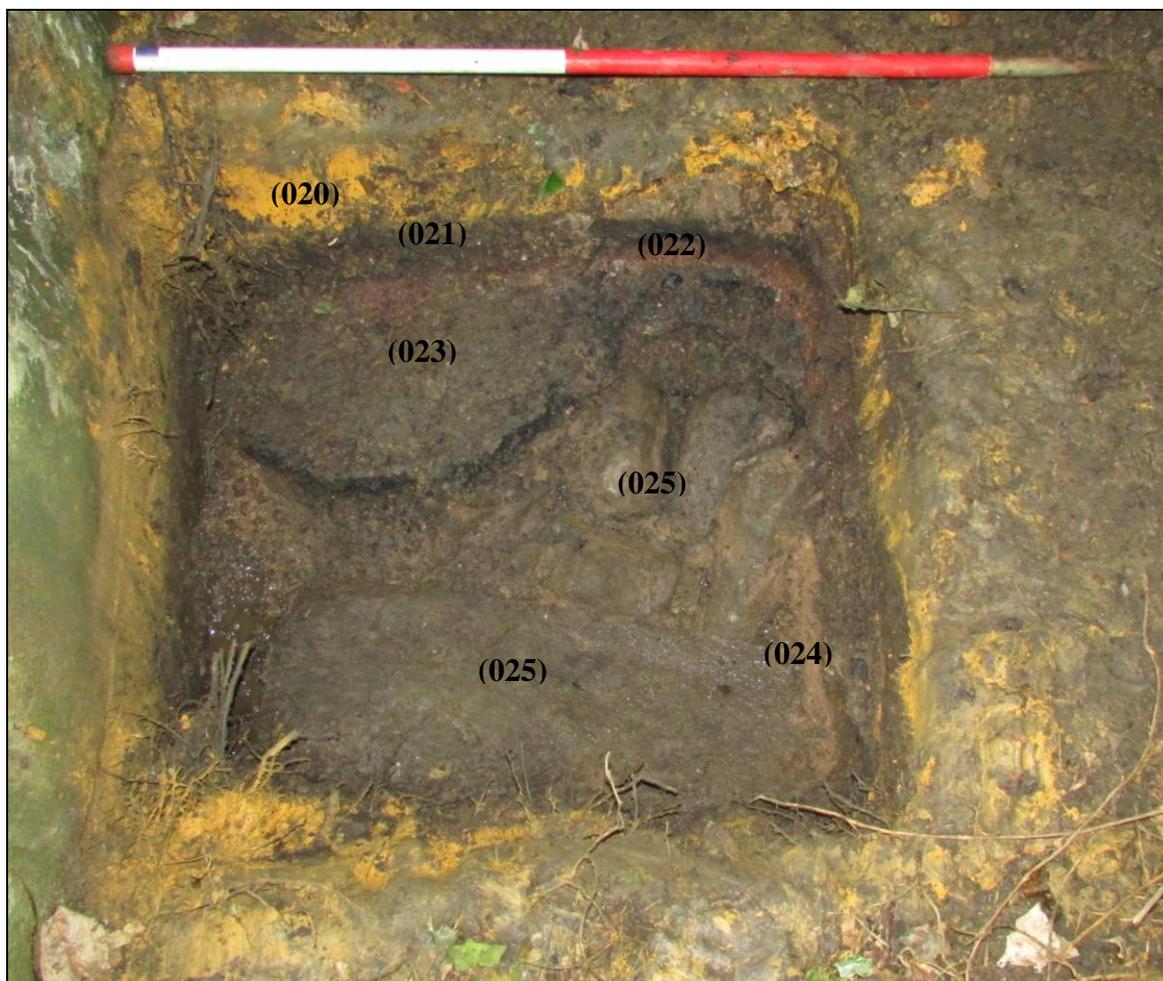


Fig. 7 Test Pit 7

4.4.2 Test Pit 8 (fig. 8)

Test Pit 8 was located at the north west corner of the front workshop, measured 1 x 0.80m and was excavated to a maximum depth of 0.35m.

Below (001), which measured 0.01m in depth, was **(026)** which was a very compact mid orangish brown clayey silt, with no natural inclusions. This layer contained large pieces of corroded metal as well as slag and industrial waste and was challenging to excavate. It measured 0.10m in depth and lay stratigraphically above **(027)**, which was a compact mid purplish black shale-like deposit, reaching a depth of 0.07m. This may have been an ashy/demolition-derived layer which has subsequently been hardened through waterlogging. This in turn lay above **(028)**, mid orangish yellow natural sandstone which appeared to have been shaped to form a natural step to the mid workshop, as well as forming the base for the stone footings of the canal-side wall. (009) was also visible

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sitting above the sandstone within this test pit area. (028) was the lowest observed deposit within this test pit.



Fig. 8 Test Pit 8

4.4.3 Test Pit 9 (fig. 9; fig. 10)

Test Pit 9 was located within the middle of the front workshop and measured 2 x 1m although it was originally 1m x 1m, the excavation was extended to locate the edge of the narrow channel, reaching a maximum depth of 0.20m.

Below the natural silt (001) was (035), a very loose dark greyish black clayey silt, excavated to a maximum width of 0.20m and length of 1.00m and was only observed towards the east of the test pit. This in turn lay stratigraphically above (029), a fairly compact mid reddish brown clayey silt with very small fragments of crushed brick,

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measuring 0.02m in depth and extended to a maximum length of 1.8m. This was similar to (022) however (029) was not as compact as (022) and may be due to this area being more waterlogged. Stratigraphically below (029) was (030), which was a fairly compact dark greyish black silty clay with frequent small angular stones, measuring 0.03m in depth and also extending to 1.8m in length. This in turn lay stratigraphically above (031), which was a fairly loose light greyish brown silty clay with occasional small rounded pebbles, extending to a maximum of 1.8m in length and measuring 0.03m in depth. (032) lay stratigraphically below (031), which was a very compact mid greyish black silty clay, with occasional small sub-angular stones. This only measured 0.01m in depth and was stratigraphically above [034], which was a vertical linear cut into the natural bedrock (033), which (032) also physically sealed. (033) was the lowest observed deposit within test pit 9.



Fig. 9 Test Pit 9

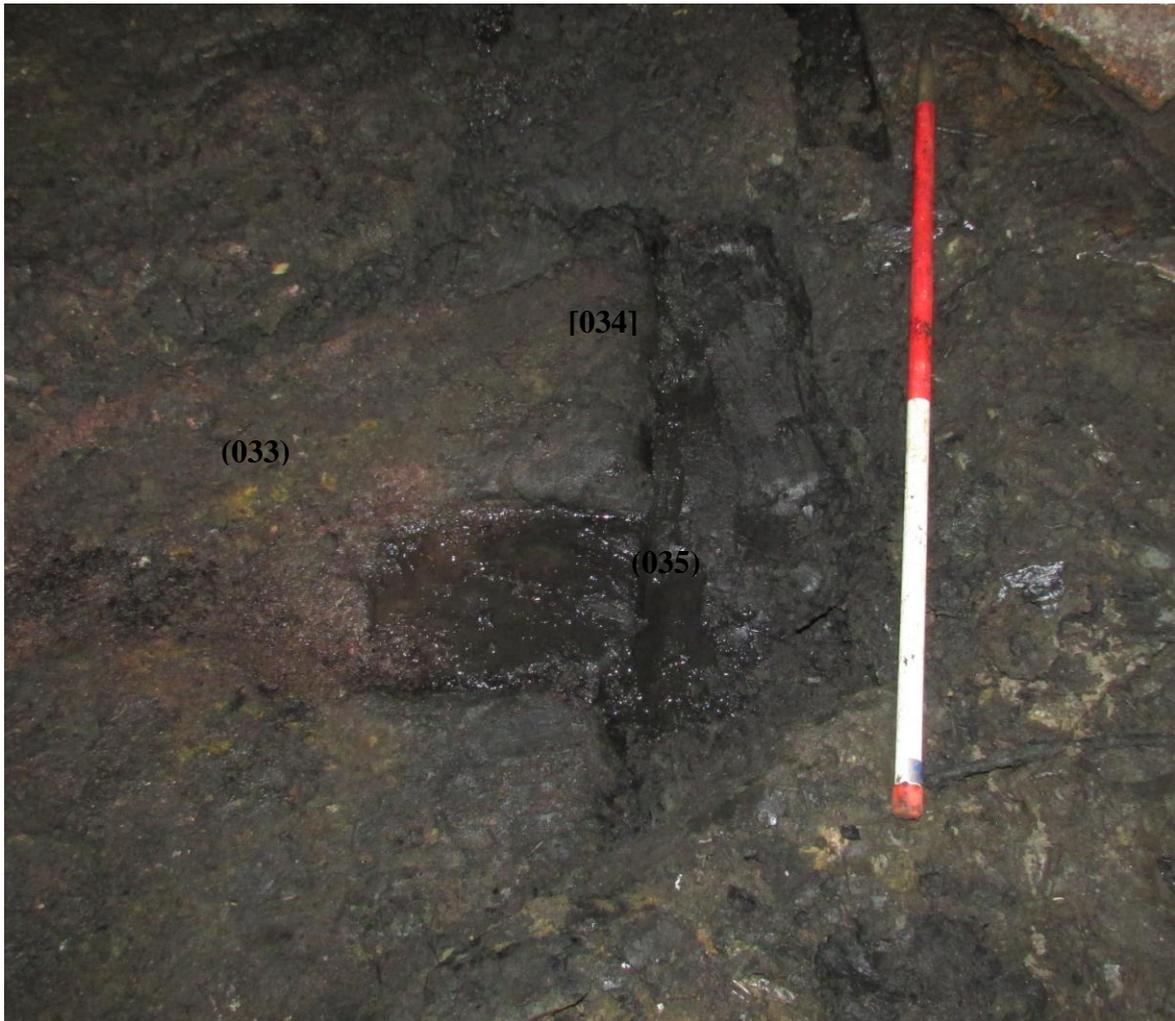


Fig. 10 Test Pit 9 extension showing edge of narrow canal [034]



5. Archaeological Results

5.1 Introduction

Despite extensive historical research and survey carried out on the Worsley Delph and brief surveys on the workshops themselves, little has been discussed on the development and use of the workshop area. The test pitting revealed the varying levels of silting across the workshops, as well as a glimpse into the relationships of the dividing walls and the canal-side wall. The floor surfaces were also positively identified within each workshop and their differing character reveals an insight into how the different spaces were used. The 3D Laser Scan Survey has also provided measurements and insights into the phasing and construction of the workshops.

5.2 Middle Workshop

Phase 1

The natural sandstone bedrock was revealed in test pit 1 and it appears that the lowest coursing of the stone canal side wall is shaped directly out of the bedrock.

Phase 2

The handmade brick flooring was observed within all three test pits in this area, however it was damaged within test pit 1. A bedding sandy mortar appears to have been used to cement the brick flooring to the bedrock, however in test pit 2, the bedrock is also shaped and used as flooring, showing that the bricks did not extend across the whole of the workshop. The bitumen like substance encountered in test pit 2 suggests that this area had an industrial use.

Phase 3

The workshops appear to have been sub-divided at a later date as the northern wall appears to be partially sat on the brick surface. The floor has not been heavily truncated by this later construction which suggests that the wall was constructed relatively quickly.

Phase 4

Once the workshop had gone out of use, the area appears to have silted up, due to a combination of human and natural factors. However the maximum depth of silting in this area was only 0.05m.

5.3 Rear Workshop

Phase 1

The natural sandstone bedrock was not observed within this area.

Phase 2

Within the rear workshop, a cobbled surface was positively identified within all of the test pits although the bedding material appeared to differ across test pits 4 and 6 (the cobbled surface was the lowest observed deposit within test pit 5). However the later disturbance in test pit 4 may have masked the original bedding material.

Phase 3

The cobbled surface within test pit 4 had been truncated, presumably by the construction of the northern dividing workshop wall. However as it did not truncate the brick flooring in the middle workshop to any extent, the cobbles may have been removed as opposed to being deliberately truncated for a construction cut. The foundations for the wall appear to be no deeper than 0.20m below the current silt level which further suggests that this wall was constructed relatively quickly.

Phase 4

Once the workshop had gone out of use, the area silted up due to human and natural factors. Once again, the depth did not exceed 0.05m within the workshop, however the depth reached 0.20m due to its close proximity to the entrance to the canal.

5.4 Front Workshop

Phase 1

The natural sandstone bedrock was observed within test pits 8 and 9 and within 8, once again the lowest coursing of stone for the canal-side wall had been hewn out of the bedrock. The surface was sandier and much more undulating within test pit 8 also, however this appears in part to be caused by waterlogging dissolving the sandstone in this area. Presumably contemporary with the construction of the canal-side wall is the cutting of the narrow channel, observed in test pit 9.

Phase 2

The natural bedrock formed the usable surface and deposit (032) appears to be trampled material deriving from the use of the area.

Phase 3

There appears to have been a brief hiatus of the use of this area as there is a natural build up of silt, observed as (024) in test pit 7 and (031) in test pit 9.

Phase 4

This area appears to have been consolidated and layers of made ground were observed in test pit 7. The narrow channel meanwhile over in test pit 9 appears to have been allowed to slowly silt over a relatively long period of time. A thin layer of silt, similar to that observed in the middle and rear workshops, was seen however different processes appear to have been at work within this area and the silting patterns are more complex.

6. *Conclusions*

The archaeological test pitting, combined with the documentary sources can begin to reveal the phasing and development of the Worsley Road Bridge workshops. However this programme of works has only provided a glimpse into the development of the canal and road bridge. The test pits have revealed that the base of the original bridge was carved out of the natural bedrock which is close to the current surface and then constructed upwards from ashlar blocks. The original construction is visible in the middle and the rear workshops; the canal side wall within the front workshop appears to be part of later road widening.

Originally there appears to have been three arches, the westernmost for the canal itself and associated towpaths, the middle one containing the workshop areas and the easternmost for the tailrace tunnel for the corn mill to the north (see fig. 19). The original western edge of the middle archway cannot be projected due to later modifications and further work could help determine the original course of the archway. The current dividing wall running N-S delineating the workshop areas may also have been original and the sudden change in direction of the wall from N-NE appears to run parallel with the original tail race. There is also the possibility of another entrance directly opposite the one to the canal within the middle workshop to an area which is now completely inaccessible due to later modifications of the road bridge.

At some stage, the front workshop wall was constructed although a gap was left to allow access to the workshops. However this wall blocked off the area between the tail race and the workshops and it is unclear whether there is any access today to this area. The N-S wall appears to then be truncated to create a wide rear workshop and traces of the original ashlar wall is clearly shown within the middle workshop north wall (see fig. 16). Instead, the wall is truncated and this may coincide with the creation of the dividing walls, including the blocking of the previous gap from the front workshop area. Gaps for doors and windows were also created which indicates that the workshops continued in use after these divisions (see fig. 16). There is a small archway within the front workshop wall, at the base and requires further investigation (see fig. 17).

The E-W walls delineate three separate workshop areas, as evidenced through their differing sandstone, brick and cobble surfaces however the current walls are clearly later and in places truncate the existing floor surface. Therefore the workshops appear to have originally only been separated through the difference in surfaces, rather than through any physical structures. However it is possible they were delineated with timber screenings of which any trace would have been obliterated by the walls. Further work would help establish the chronology and stratigraphy of the floor surfaces in relation to each other and the surrounding walls, particularly where the ashlar wall appears to be truncated within the rear workshop. To investigate the area around where the original archways are in the front workshop, the area will need to be cleared of waterlogged material and a watching brief maintained.

Access through the rear workshop wall and the wall between this area and the middle

workshop was then blocked, presumably when the workshops went out of use. It is not clear if this coincided or was earlier than when the dredged material was placed in the workshop area. However the canal basin is shown as derelict on the 1950s map, therefore the blocking is likely to have been done prior to the dumping of the dredged material. A large amount appears to have been placed to the north of the rear workshop as a break in the wall reveals that the silt reaches the ceiling (see fig. 18). A watching brief would be appropriate should silt be removed from this area. The silting depth across the rear and middle workshops was no more than 0.10m deep although a combination of natural and manmade silting is evident within the front workshop area.

Dating the changes to the workshops is difficult as they are not depicted on maps and documentary sources referring to the workshops are scarce. However the current form of the two archways appears to have been constructed by 1900, based on a photograph taken around this time showing the canal basin. There appears to be no mention of the workshops within the trade directories however the cobbled surface suggests that the rear workshop functioned as a stable area. The rear workshop was probably accessible from the north side at the Delph however due to current access restrictions and the overgrown vegetation, this was not possible to investigate during the current fieldwork programme. The issue of access from the Delph needs to be explored further, especially with regards to the 'blank' area between the workshops and the old tail race. Further research into the use of the workshops, particularly their relationship with the old corn mill, needs conducting to try and build a chronology.



7. Archive

The archive comprises of annotated field drawings, site registers and digital photographs. This archive is currently held by the Centre for Applied Archaeology.

A copy of this report will be deposited with the Greater Manchester Sites and Monuments Record held by the Greater Manchester Archaeological Advisory Service (GMAAS)



8. Sources

Bibliography

Fitzgerald, R. and Clarke, M. 2002 *Report on the Worsley Delf Basin* Unpublished Structural Perspective Report

Frost, P. 2011 *Worsley Delf Environmental Restoration: Cultural Heritage Assessment* Unpublished Castlering Archaeology Report

Maps

Ordnance Survey Lancashire Sheet 103 1849

Ordnance Survey Lancashire Sheet 103 1896

Plans

Unpublished Survey Drawing of the Worsley Delf workshops, carried out for Salford City Council, 2002. Author unknown

Appendix 1: Context List

| Context | Test Pit | Description |
|---------|----------|---|
| (001) | Site | Fairly compact dark brownish black clayey silt with no inclusions, reaching a depth of c0.05m |
| (002) | 1 | Handmade brick floor, with bricks measuring on average 235 x 115 x 75mm |
| (003) | 1 | Fairly compact mid orangish brown clayey sand, with no inclusions and measuring 0.02m in depth |
| (004) | 1 | Very compact mid orangish brown sandy clay with no inclusions observed |
| (005) | 2 | Very compact dark brown, possibly bitumen or slag by-product, which measured a maximum 0.20m in width |
| (006) | 2 | Light yellowish brown sandstone which appeared to have been shaped to form a floor surface |
| (007) | 2 | Handmade brick floor, laid on bed with bricks measuring on average 220 x 100 x 80mm |
| (008) | 2 | Natural sandstone bedrock, shaped into a raised area and three handmade bricks placed within it |
| (009) | 3 | Handmade brick floor with the bricks laid on bed east-west |
| (010) | 4 | Cobbled surface with medium-large sized cobbles measuring 0.10-0.15m |
| (011) | 4 | Loose light orangish brown silty sand with no inclusions and measuring 0.02m in depth |
| (012) | 4 | Fairly loose light greyish brown silty clay; depth unknown |
| [013] | 4 | Broadly linear cut running E-W; infilled by (014) |
| (014) | 4 | Fairly loose mid brownish grey clayey silt with infrequent small angular stones and brick fragments |
| (015) | 5 | Cobbled surface with cobbles measuring 0.10-0.15m in length |
| (016) | 5 | Handmade brick surface which ran along the width of the northern edge of the doorway to the canal |
| (017) | 5 | Dark grey stone flag measuring 0.28 x 0.18m |
| (018) | 6 | Cobbled surface with cobbles measuring 0.1-0.2m |
| (019) | 6 | Very loose light brownish grey clayey silt |
| (020) | 7 | Very compact mid yellowish orange silty clay across the area of the test pit and measuring 0.10m in depth |
| (021) | 7 | Fairly compact dark brownish black silty clay, with no observed inclusions |
| (022) | 7 | Very compact mid reddish brown clayey silt with inclusions of small crushed brick fragments |
| (023) | 7 | Very compact dark greyish black clayey silt |
| (024) | 7 | Very loose light yellowish brown clayey sand with occasional very small rounded pebbles |

| | | |
|-------|---|---|
| (025) | 7 | Large cobbles and a large sandstone slab. Cobbles measured < 0.30m in length and sandstone slab measured 0.75m in length and a minimum 0.25m in width |
| (026) | 8 | Very compact mid orangish brown clayey silt, with no natural inclusions |
| (027) | 8 | Compact mid purplish black shale-like deposit, reaching a depth of 0.07m |
| (028) | 8 | Mid orangish yellow natural sandstone |
| (029) | 9 | Fairly compact mid reddish brown clayey silt with very small fragments of crushed brick, measuring 0.02m in depth |
| (030) | 9 | Fairly compact dark greyish black silty clay with frequent small angular stones, 0.03m in depth |
| (031) | 9 | Fairly loose light greyish brown silty clay with occasional small rounded pebbles, 0.03m in depth |
| (032) | 9 | Very compact mid greyish black silty clay, with occasional small sub-angular stones, 0.01m in depth |
| (033) | 9 | Natural bedrock |
| [034] | 9 | Vertical linear cut into the natural bedrock |
| (035) | 9 | Very loose dark greyish black clayey silt, excavated to a maximum width of 0.20m and length of 1.00m |

Appendix 2: Figures

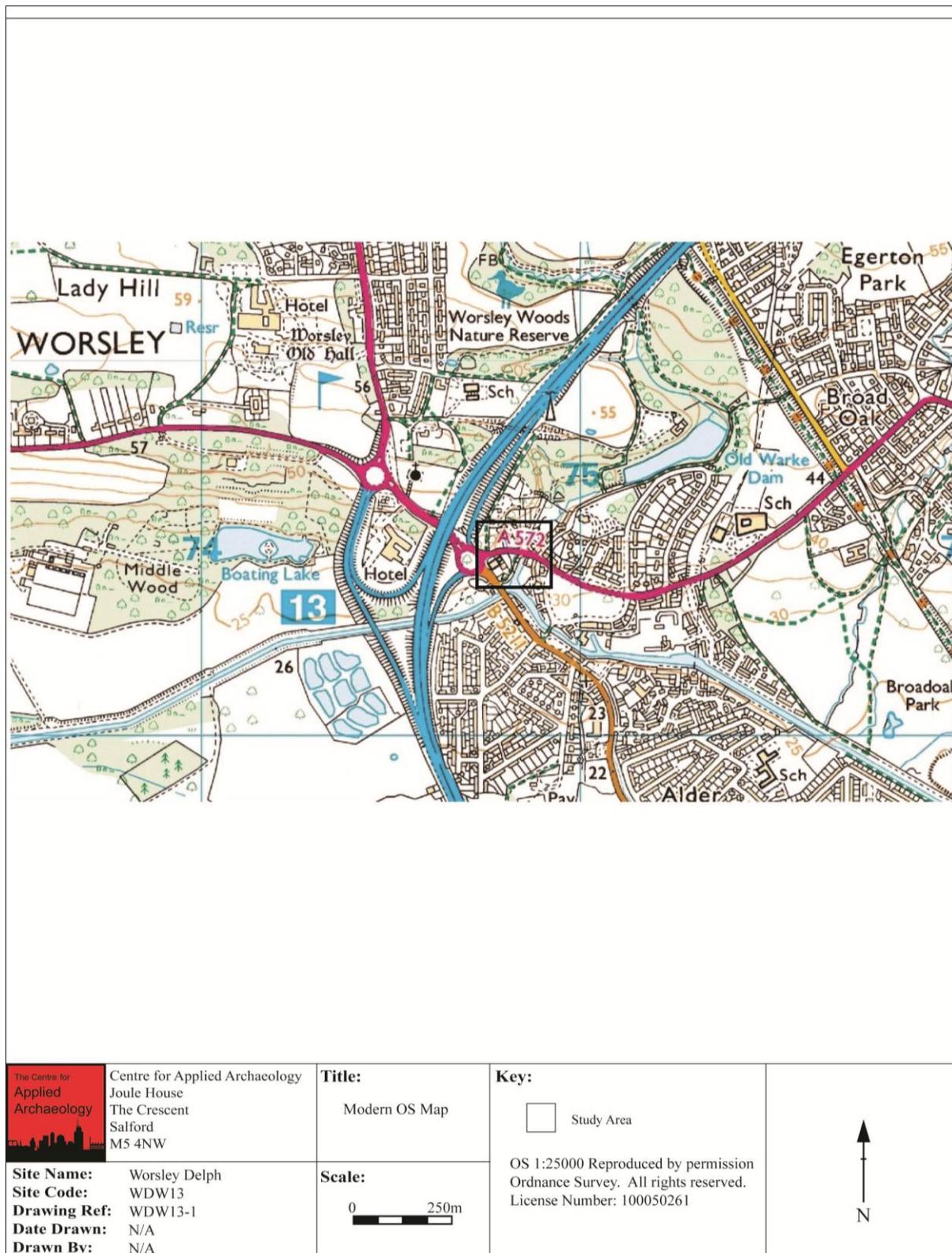
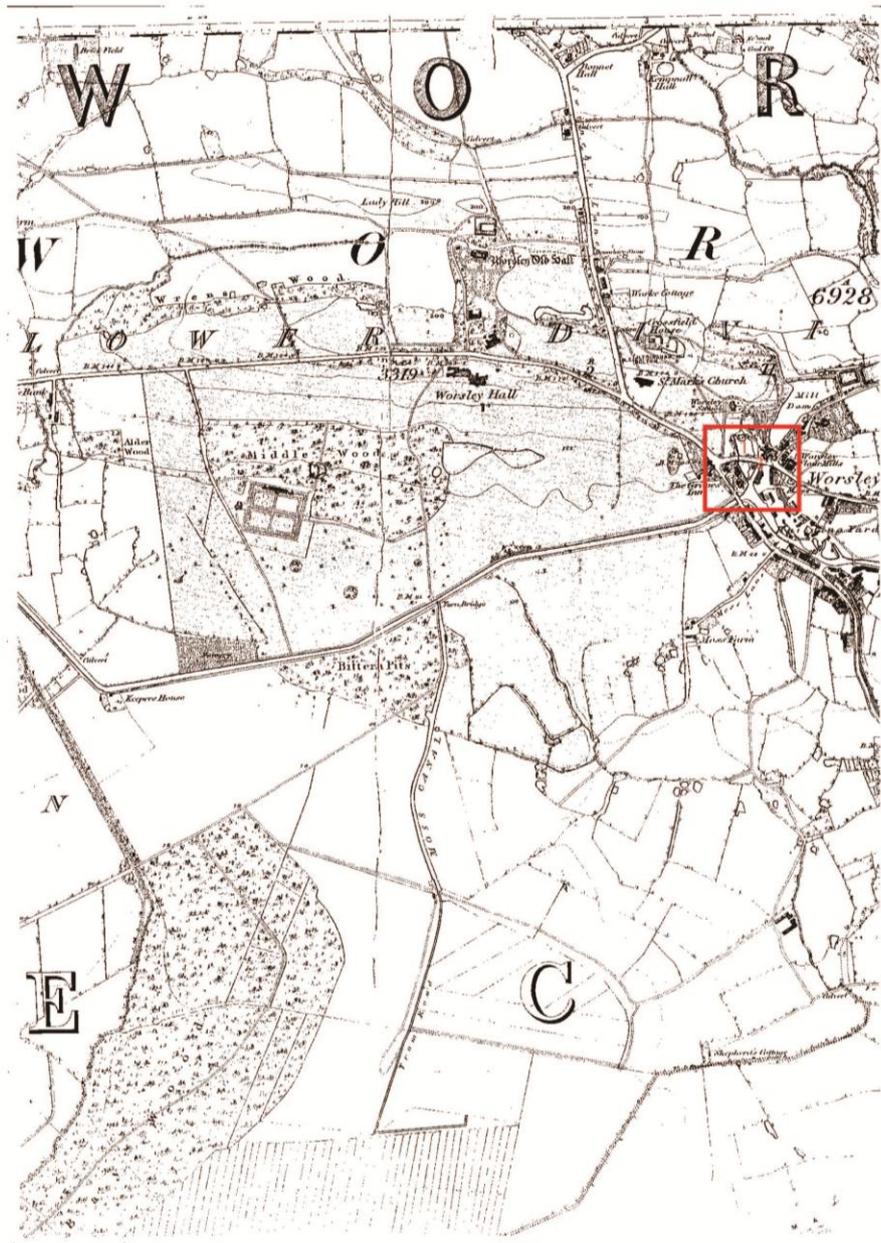
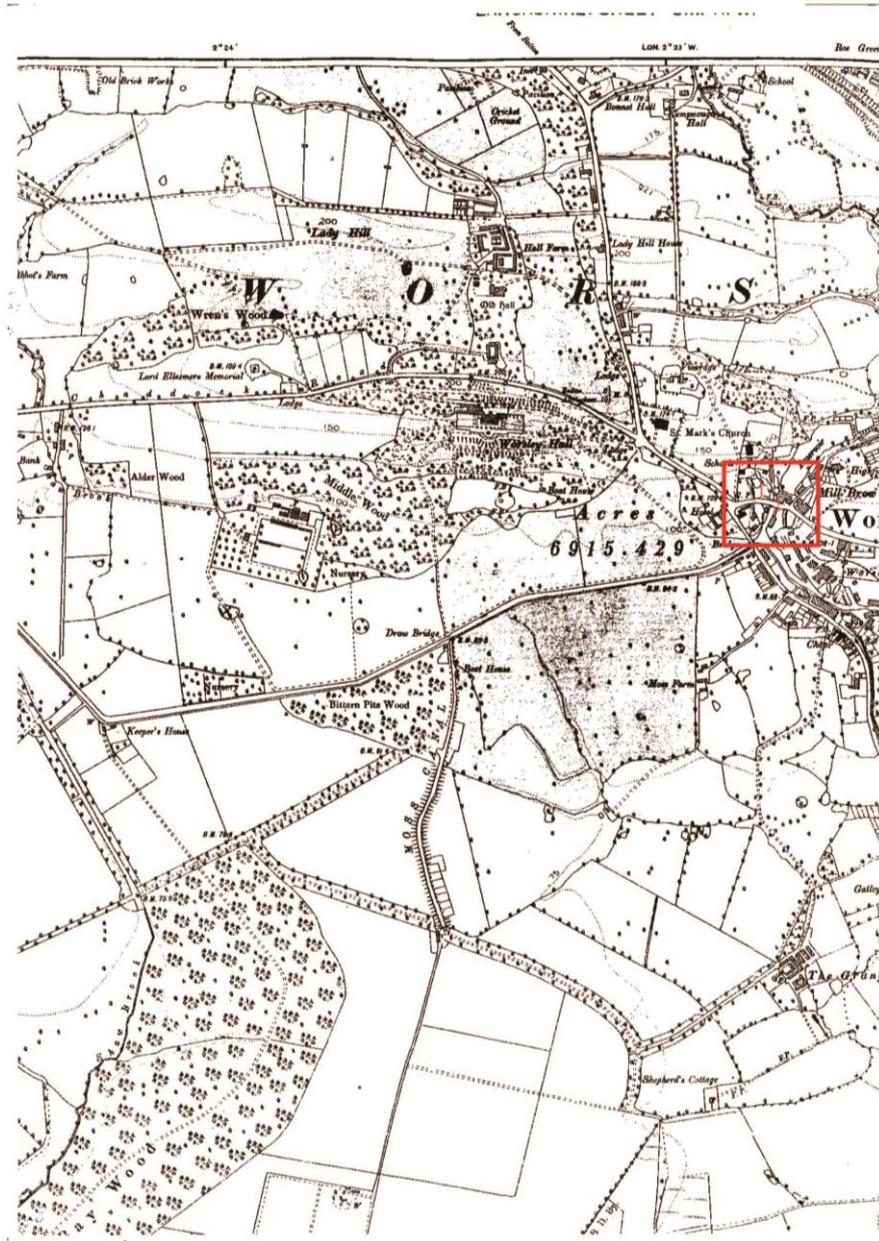


Fig. 11



| | | | | |
|---|--|--|---|--|
| <p>The Centre for Applied Archaeology</p> | <p>Centre for Applied Archaeology Joule House The Crescent Salford M5 4NW</p> | <p>Title: Lancashire Sheet 103 1849</p> | <p>Key:</p> <ul style="list-style-type: none"> Study Area 1 Delph Basin 2 Workshop Area | |
| | <p>Site Name: Worsley Delph Site Code: WDW13 Drawing Ref: WDW13-2 Date Drawn: N/A Drawn By: N/A</p> | <p>Scale: 6 inch to a mile</p> | | |

Fig. 12



| | | | | |
|---|--|--|---|--|
| <p>The Centre for Applied Archaeology</p> | <p>Centre for Applied Archaeology Joule House The Crescent Salford M5 4NW</p> | <p>Title: Lancashire Sheet 103 1896</p> | <p>Key:</p> <ul style="list-style-type: none"> Study Area 1 Delph Basin 2 Workshop Area | |
| | <p>Site Name: Worsley Delph Site Code: WDW13 Drawing Ref: WDW13-3 Date Drawn: N/A Drawn By: N/A</p> | <p>Scale: 6 inch to a mile</p> | | |

Fig. 13

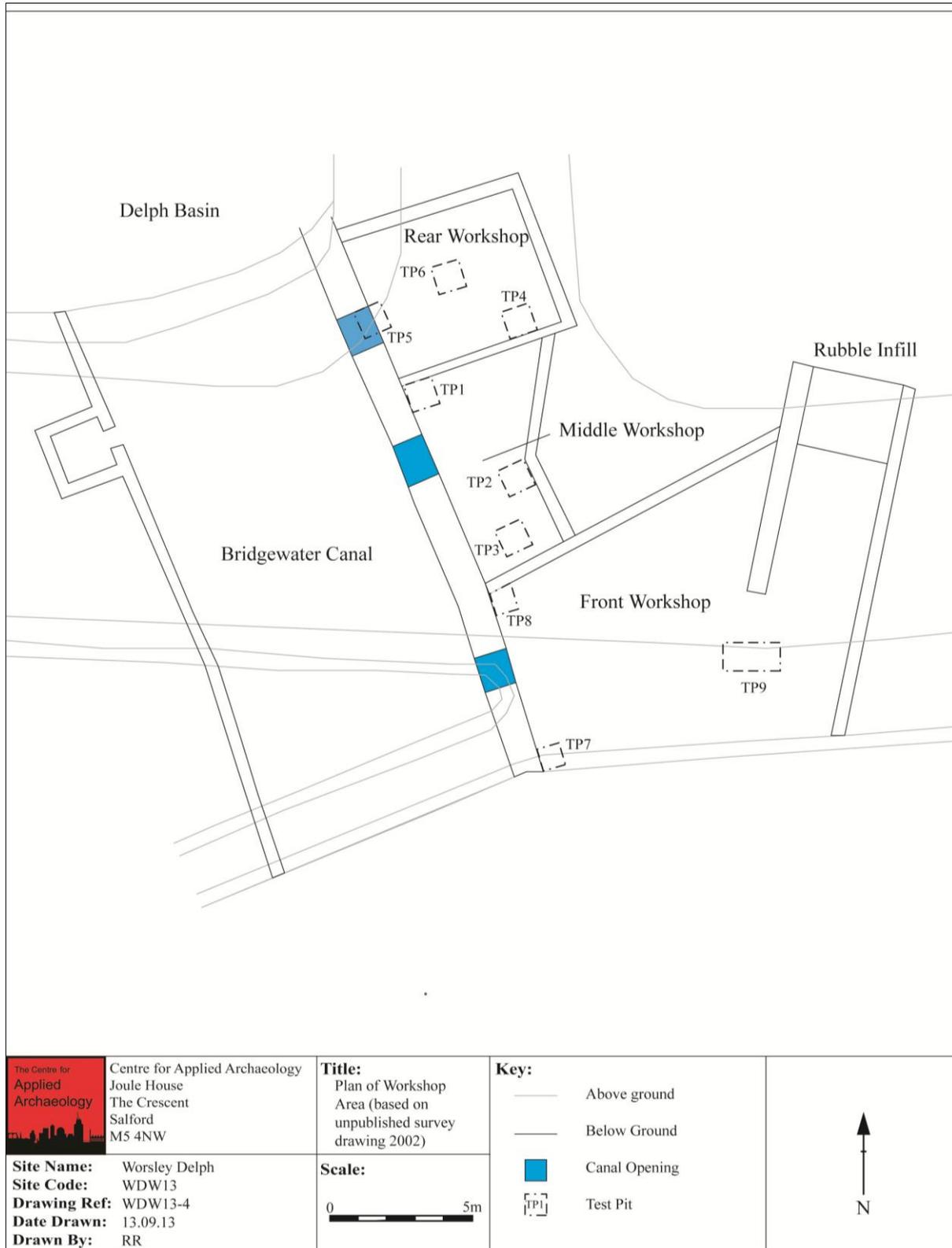
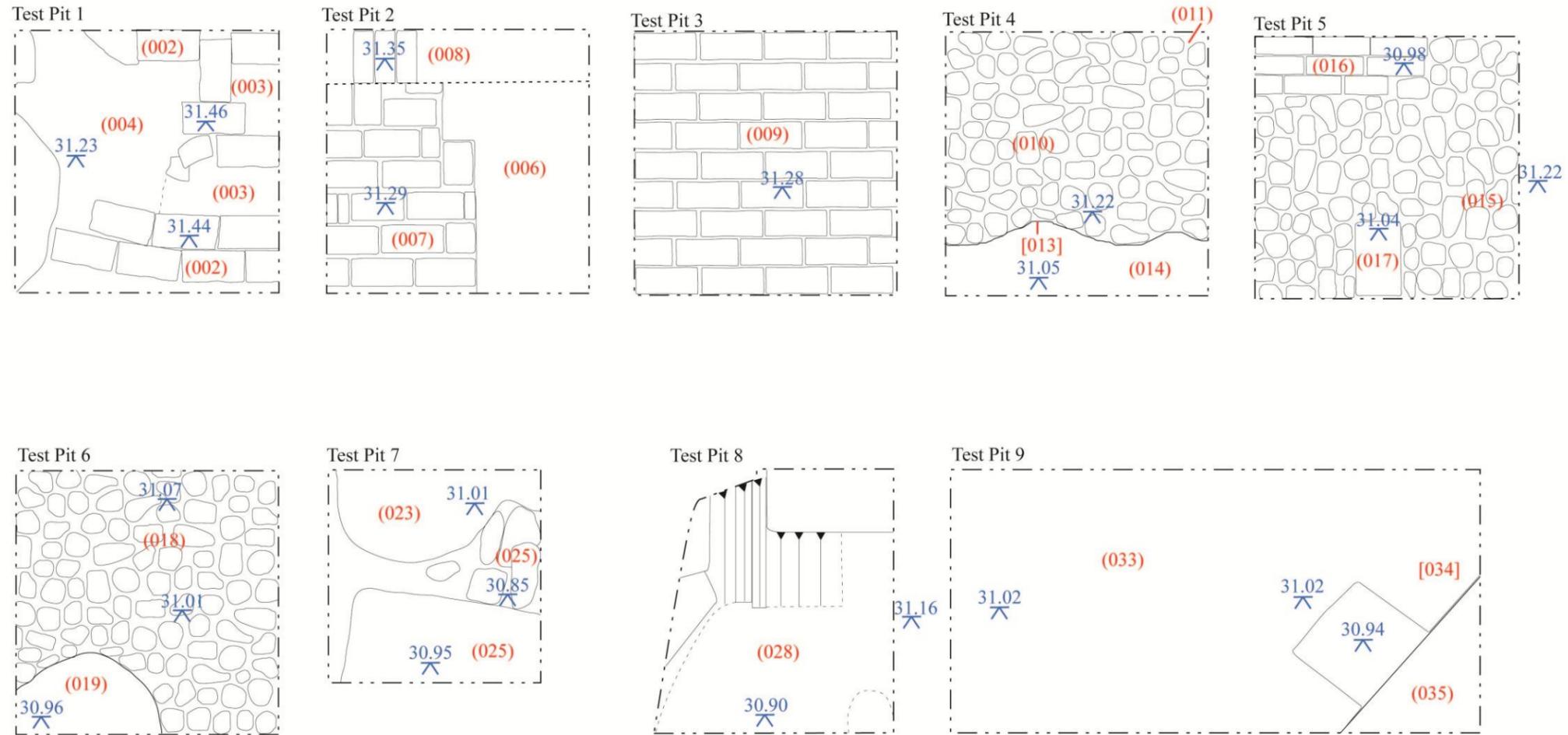


Fig. 14



| | | | | |
|--|---|---|--|--|
| <p>The Centre for Applied Archaeology</p> | <p>Centre for Applied Archaeology School of the Built Environment The Crescent Salford M5 4NW</p> | <p>Title: Test Pit Plans for WDW13</p> | <p>Key: - - - = Edge of Excavation (000) = Context (deposit) [000] = Context [cut] 00.00 = metres A.O.D</p> | |
| <p>Site Name: Worsley Delph, Worsley Site Code: WDW13 Drawing Ref: WDW13-5 Date Drawn: 05/09/13 Drawn By: A.M</p> | | <p>Scale: 0m ————— 0.5m</p> | | |

Fig. 15



Fig. 16 Wall between the middle and rear workshop. The brick appears to have been built around the ashlar wall which can be seen on the left. Note the door and window (subsequently blocked)



Fig. 17 Test Pit 8, by the entrance to the middle workshop. Behind the debris are the traces of a small archway



Fig. 18 The rear workshop wall, with dredged silt visible at the other side built up to the ceiling



Fig. 19 Remnants of two earlier arches, prior to road widening. The arch on the right was once the tail race to the corn mill



Appendix 3: Photographic Register

| Frame | Fig. Number | Trench | Description | Direction Facing |
|-------|-------------|--------|--|------------------|
| 001 | 1 | 1 | Full exc shot of TP1 | N |
| 002 | | 1 | As 001 | W |
| 003 | 2 | 2 | Full exc shot of TP2 | N |
| 004 | 3 | 3 | Full exc shot of brick floor within TP3 | S |
| 005 | 4 | 4 | Full exc shot of TP4 | S |
| 006 | | 4 | As 005 | W |
| 007 | 5 | 5 | Full exc shot of TP5 | W |
| 008 | 6 | 6 | Full exc shot of TP6 | E |
| 009 | 7 | 7 | Full exc shot of TP7 | N |
| 010 | 8 | 8 | Full exc shot of TP8 | W |
| 011 | 17 | 8 | As 010 | N |
| 012 | 9 | 9 | Full exc shot of TP9 | W |
| 013 | | 9 | TP9 extension showing edge of silted canal channel | E |
| 014 | | 9 | As 013 | S |
| 015 | | 9 | As 013 | N |
| 016 | | 9 | As 013 | N |
| 017 | 10 | 9 | As 013 | N |
| 018 | | - | Nailmaker's Cottage, west of workshops | SW |
| 019 | | - | Bridgewater canal | SW |
| 020 | | - | Canal to west of workshops | S |
| 021 | | - | As 020 | S |
| 022 | | - | Looking towards the Delph | NW |
| 023 | | - | Entrance to canal, opposite workshops | W |
| 024 | 18 | - | Rear workshop wall | N |
| 025 | 16 | - | Middle workshop wall (from rear workshop) | S |
| 026 | | - | As 025 | S |
| 027 | | - | Canal opening within rear workshop | W |
| 028 | | - | As 023 | W |
| 029 | | - | Portal to the Delph | NW |
| 030 | | - | Canal to the south | S |
| 031 | | - | Entrance to workshop areas | N |
| 032 | | - | As 031 | N |
| 033 | | - | As 031 | N |

Appendix 4: Archaeological Brief

University of Salford
Centre for Applied Archaeology

Central Salford

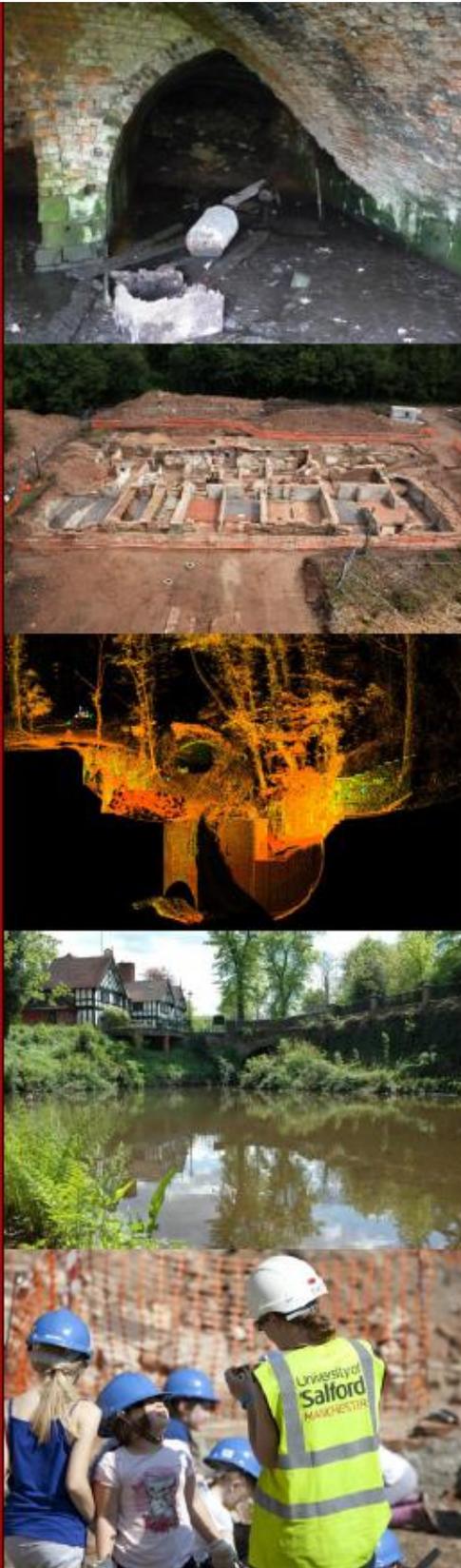
Written Scheme of Investigation
and costings for a proposed
scheme of archaeological survey
at the Worsley Road bridge
arches, Worsley Delph, Salford,
Greater Manchester.

Version: 1.0

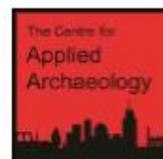
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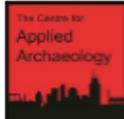
Reference: CfAA/047/2013

Adam J Thompson



University of
Salford
MANCHESTER





Summary

Site Location: Workshop areas beside the canal at Worsley Delph, Salford.

NGR: SD 7482 0050

Internal Ref: (CfAA/046/2013)

Proposal : Worsley Delph.

Planning Ref: N/A

Prepared for:

Document Title: Written Scheme of Investigation and costings for a proposed scheme of archaeological survey at the Worsley road bridge arches, Worsley Delph, Salford.

Document Type: Written Scheme of Investigation and Tender.

Version: Version 1.0

Author: Mr Adam J Thompson BA Hons, MA, MIFA
Position: Director of Archaeological Services
Date: May 2013

Approved By: Dr Michael Nevell
Position: Head of Archaeology
Date: May 2013

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Contact: Centre for Applied Archaeology, University of Salford, Joule House, 1 Acton Square, Crescent, Salford, Greater Manchester, M5 4DW
Telephone: 0161 295 3818 / 07805633328 Email: a.thompson@salford.ac.uk

Signed...

Signed...

Disclaimer:

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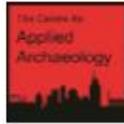
Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

- 1.1 The Centre for Applied Archaeology has been invited to provide a design and costings for a programme of archaeological works to inform future Heritage Lottery proposals and subsequent applications.
- 1.2 The Centre for Applied Archaeology (CfAA) provides this Written Scheme of Investigation for the programme of archaeological works. It has been prepared by Mr Adam Thompson, Director at the Centre for Applied Archaeology (CfAA) in accordance with advice and requirements provided by Mr Norman Redhead, Heritage Director (Archaeology) at the Greater Manchester Planning Advisory Service (GMAAS).
- 1.3 All work will be carried out in accordance with this Written Scheme of Investigation, and according to the principles of the Institute for Archaeology (IfA) Code of Conduct and all relevant standards and guidance.
- 1.4 This document covers several elements of work, primarily archaeological investigation through test pitting and a laser scan of the workshop areas.
- 1.5 This document has been prepared by the Centre for Applied Archaeology on behalf of the client. Copies or information relating to this document and the associated pricing of the programme of works should not be supplied to third parties without the prior written notification of the Centre for Applied Archaeology.
- 1.7 The archaeological test pitting of these areas has been informed by an Archaeological Desk Based Assessment (Castleryn Archaeology, January 2011).



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

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2. Introduction

2.1 The Centre for Applied Archaeology has been invited to provide a design and costings for a programme of archaeological works to inform future Heritage Lottery proposals and subsequent applications.

2.2 SITE DESCRIPTION

The site (Centred on SD 7482 0050) is located within the centre of Worsley, Salford to the immediate south of the Worsley Delph Basin.



Figure 1: Worsley Basin, photo from DBA.



Figure 2: Areas beneath the bridge.



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

The workshop areas listed form three separate areas, all of which are brick vaulted arches with stone bases. Currently the floors consist of soil and mud debris with rubbish piles across the area. The first arch is open to the elements and the second and third workshop areas towards the back remain assessable by open doorways, light is poor.

2.3 GEOLOGY AND TAPHONOMY

In the area selected for archaeological evaluation the underlying solid geology, as mapped by the OS Geological Survey, consists of Halesowen Formation mudstone, siltstone and sandstone, which is overlain by superficial deposits comprising of Diamicton till deposits.

2.4 PLANNING BACKGROUND

A consultation response from MR Norman Redhead (Historic Management Director, Greater Manchester Archaeological Advisory Service) has stated:

In determining the current proposal a considerable amount of consultation was undertaken with a wide range of interested stakeholders. This included the examination of impact, opportunities and mitigation relating to heritage assets. An archaeological desk based assessment was commissioned to identify and understand the location, character and significance of heritage assets within the scheme's boundary. This piece of work was undertaken by Castlering Archaeology who produced a comprehensive report: 'Worsley Delph Environmental Restoration Cultural Heritage Assessment' (January 2011). This is one of the supporting documents listed as Appendix T1. The report makes a number of recommendations which are set out below. As far as GMAAS are aware these have not yet been addressed. Some of these recommendations refer to further archaeological investigation that needs to be undertaken in support of the application, whilst others relate to mitigation during implementation of the scheme that could be secured through an appropriate archaeological planning condition.

Before moving on to specific recommendations, it is worth raising a few points which will need to be addressed. Firstly, the previous heritage assessment was undertaken under Planning Policy Statement No. 5; this has of course been replaced by the National Planning Policy Framework. Both the heritage assessment and other aspects of the scheme need to be reviewed so that they refer to and comply with policies set out in NPPF.

As set out in the Cultural Heritage Assessment, further archaeological investigations will need to be undertaken in certain areas before final plans can be approved (specific workshop recommendations only listed in the document):

Former workshops / compartments

Detailed survey of the former workshops / compartments below Worsley Road Bridge (Site 10) should be undertaken. While the compartments are documented in Aldred 1988, there are no known measured drawings of the features. The survey of the bridge undertaken in 2002 (Fig. 19) records the location of the arch that covers the features. The aim of the survey would be to provide a record of the features, prior to their further use, and to shed light on their construction, phasing, function and significance with the aim of informing final plans for this area. The survey should comprise measured plans and sections complimented by a photographic record and written description. The survey should include the excavation of



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

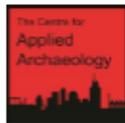
test pits within each compartment to establish the character of the floor. The floors are presently covered by silt and any removal of silt in this area should be monitored by an archaeological watching brief. The results of the survey would assist in the final interpretation of this area. Works in this area require Scheduled Monument Consent and Listed Building Consent.

- 2.5 The Greater Manchester Archaeological Advisory Service (GMASS) act as archaeological curators for the Greater Manchester Region and provide archaeological advice to Salford Metropolitan Borough Council and have been consulted for the present assessment.



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

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3. The Centre for Applied Archaeology

3.1 Centre for Applied Archaeology

The Centre for Applied Archaeology is based within the School of the Built Environment within the University of Salford. The aims of the centre can be split into three separate areas, firstly to conduct commercial archaeological projects, secondly to manage, conduct and promote community archaeology and thirdly to undertake teaching and research. In developing this holistic approach CfAA aim to provide the means by which these three individual sectors can interact and collaborate together.

Within the commercial archaeological area CfAA conduct and manage a multitude of archaeological projects including: watching briefs, evaluations, excavations, building surveys, field walking, 3D laser scanning, geophysical analysis, desk based assessments, Environmental Impact Assessments and other consultancy services. CfAA predominantly work across the Northwest and Midland regions.

Community archaeology comprises of managing and conducting evaluations, excavations, building surveys and all other types of archaeological projects; with volunteers of all ages and backgrounds, assisting local heritage and archaeological groups in funding applications, assisting with the Greater Manchester Archaeology Unit in supporting and running the Greater Manchester Federation of Archaeological Societies.

Teaching and Research includes publications, undergraduate and postgraduate teaching, extramural teaching, and providing workshops for the construction industry and assessing NVQ's in archaeological practice.

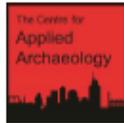
The Centre for Applied Archaeology currently consists of ten full time archaeologists, one training archaeologist and up to ten part time Supervising and Assisting archaeologists who are regularly employed through the Centre to complete commercial and community based archaeological programmes. The Centre is housed within the School of the Built Environment at the University of Salford and shares particular links and partnerships with the Centre for Construction Innovation. Senior Staff CV's and Management diagrams can be produced if required.

The Centre for Applied Archaeology is a Registered Archaeological Organisation (RAO) of the Institute for Archaeologists (IFA) and a member of the Federation of Archaeological Managers and Employers (FAME).



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

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4. Archaeological and Historical Background

A significant Desk Based Assessment of the area has been recently produced and is incorporated within the “Worsley Delph Environmental Restoration Cultural Heritage Assessment” produced by Castlering Archaeology in January 2011 and states:

“Worsley Delph is a site of high cultural heritage importance. The site lies within the village of Worsley, which in the late 18th century was transformed from a small settlement based on agriculture and cottage industries to an important industrial centre. In 1759 the first Bridgewater Canal Act was passed, enabling the Duke of Bridgewater to construct a navigable underground canal to drain his collieries sited on higher ground above Worsley. The canal had an entrance through the Delph, a former stone quarry, with the dual purpose of providing a drainage sough for the mines and transporting coal to the expanding markets in the centre of Manchester via the new canal.”

The entries for the workshops and the above bridge are listed below:

Worsley Road Bridge NGR: SD 7482 0049

HER 1681.1.0 Statutory Designation: Grade II Listed Building

Road Bridge over the two branches of the Bridgewater Canal at the Delph, carrying Worsley Road. Originally contemporary with the construction of the canal c.1757, when the road level was raised. The bridge has been successively rebuilt, repaired and widened in the 19th and 20th centuries. Upper face and parapet constructed in dressed stone with brick under arches. The east side of the bridge *below* comprises two semi-circular arches; one over the canal & the eastern blind brick arch. Two similar western arches can be seen west of the Nailmaker’s House; one over the canal and the second partly closed by the natural rock. There is evidence of the original towpaths on both sides of the main arches. The bridge and features associated with the bridge (Site 11) are of high cultural heritage interest for their association with the opening of the tunnels at the Delph.

Compartments / former Workshops below Worsley Road Bridge

NGR: SD 7482 0050

HER 1681.1.0 (*part of*) Statutory Designation: Grade II Listed Building

The area beneath the road bridge arch was inspected by Aldred in 1988 and more recently by TEP and GMAU. Aldred reported the extensive width of the eastern arch of the section of the bridge over the canal had once included a narrow channel (now silted up) that led directly to the corn mill (Plate 4 *previous*). The east side of the canal arch gives access through a narrow doorway to a series of compartments. Aldred measured the first room as 7.5m long and varying from 3 to 5m wide with a construction of natural sandstone and brick. The space has a c.1m diameter circular aperture (now blocked) at tow path level on the canal side and the floor level was c.0.15m above the level of the tow path in 1988.



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

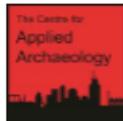
A doorway connects to a second compartment of similar dimensions on the north side; also with a low opening to the tow path. The floors appear to be made up of brick and natural sandstone and both ceilings are arched. The north room has a large blocked opening on the north side, which is most likely to have formed the main access. Aldred (1988) suggests the doorway could have been 3m high and c.1.2m wide, which would have allowed access for horses with stabling.

The site is of significant cultural heritage interest for its association with the Delph and industrial development in Worsley in the 18th / early 19th centuries.



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

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5. Reasons for the Project

5.1 RESEARCH DESIGN

The main aim of this programme of archaeological works must be to confirm if the archaeological resource, as indicated in the preliminary searches, survives and to what nature, extent and significance and to also record the present structure. The results of the programme of archaeological works will inform all parties of heritage issues and possible mitigation concerns prior to submission of the heritage lottery stage two application.

5.2 A brief synopsis of the importance of the site and the proposed impact of future restoration works was completed as part of the cultural heritage assessment and is listed below:

Worsley Delph is a site of high cultural heritage importance. The site lies within the village of Worsley, which in the late 18th century was transformed from a small settlement based on agriculture and cottage industries to an important industrial centre. In 1759 the first Bridgewater Canal Act was passed, enabling the Duke of Bridgewater to construct a navigable underground canal to drain his collieries sited on higher ground above Worsley. The canal had an entrance through the Delph, a former stone quarry, with the dual purpose of providing a drainage sough for the mines and transporting coal to the expanding markets in the centre of Manchester via the new canal.

Opinions in general are divided about which was the first true canal to be built in Britain. The definition of a canal is a built waterway that is independent of any existing natural watercourse, except that providing a source of water, and the Bridgewater Canal is the first to fit these criteria. The 18th century pioneering technology that contributed to the success of the underground canal system appears to have no world parallel. The canal paved the way for the network of canals that crossed Britain.

The restoration works will centre on two distinct areas; Worsley Delph with its adjoining section of canal and the existing car park off Barton Road; an area totalling c.1.25ha. The two underground drainage tunnel entrances and part of the Delph basin form Scheduled Ancient Monument No. GM 17 and the area of proposed works includes and borders on several statutory listed buildings and structures. The site and its environs contain a wealth of historic sites associated with the industrial development at the Delph, all of which lie within Worsley Village Conservation Area.

Proposals comprise the de-silting of the Delph basin and restoration and conservation of sites and structures associated with the navigation system. The aim of the project is to improve and manage public access and provide improved interpretation and educational resources within the site, which in turn forms one element of the Bridgewater Canal Corridor Masterplan.



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).

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The study area has drawn considerable attention since the opening of the Duke's underground canal system in 1757. The development of the canal and the lives of those involved in its construction, namely the third Duke of Bridgewater, John Gilbert and James Brindley, have been well-documented. Contemporary accounts of the 18th century tunnels have been reported on and added to by modern authors and early 19th century sketches have captured images of the area at this date. However, the archaeology of some of the existing sites has been less well-covered.

While no significant permanent negative impact on the built heritage or the historic landscape of the study area is predicted during or after the proposed restoration work, further archaeological assessment will be necessary before the project reaches the construction stage.

The past history of the site and its environs, its present appearance, the impact of the proposed works and proposed mitigation are discussed within this report.

The assessment concludes that the current proposals demonstrate the desirability of sustaining and enhancing the significance of heritage assets, for this and future generations, and of utilising their positive role in place-shaping. Providing the application recognises that further archaeological consultation and archaeological works will be necessary prior to the finalisation of design plans, the current proposals are seen as a positive contribution to a site of national and international cultural heritage significance.

- 5.1.2 A number of research topics and associated questions which will set the objectives of the fieldwork resources will be identified should significant archaeological deposits be identified and will be linked into those reflected in *An Archaeological Research Framework for North West England: Vol 2, Research Agenda and Strategy* (Bernard 2007).

5.2 PUBLICATION AND PRESENTATION

- 5.2.1 As part of the programme of archaeological works a technical report will be produced upon completion of the fieldwork and submitted to the client and the Greater Manchester Archaeological Advisory Service Historic Environment Record (HER).



Written Scheme of Investigation and costings for the proposed scheme of archaeological survey of Worsley road arches, Worsley Delph, Salford, Greater Manchester (CfAA/047/2013).



6. Methodology

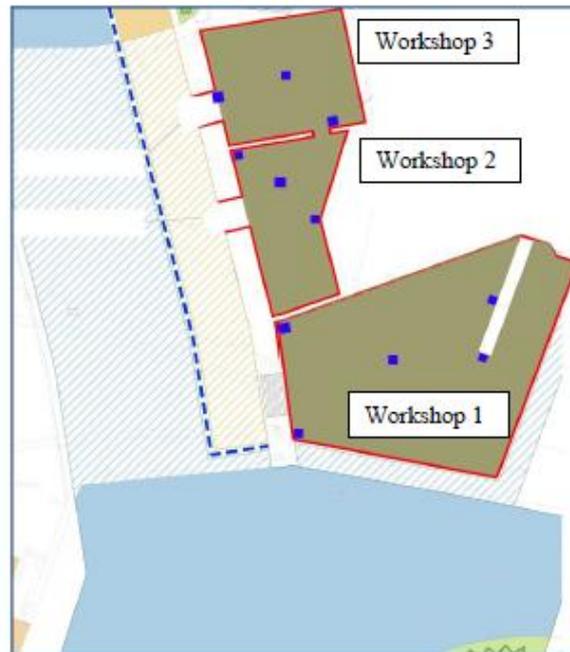
6. GENERAL

The programme of archaeological works will undertake the following components:

- 1) Archaeological Test pitting of the workshop areas
- 2) Internal laser scan recording the workshop structures.
- 3) Technical Report including phased and interpreted survey drawings.

6.1 TEST PITTING

A total of 11 test pits will be undertaken. Five within the first arched area, three in the middle workshop and three in the back workshop area. Each test pit will measure 1m by 1m, the depth is unknown but will stop at the first archaeological levels of interest, or natural geology. Test pitting also cease if there is a possibility of a health and safety risk, ie depth or unstable section edges. All test pits will be suitably recorded, photographed and locations surveyed. Test pit locations are identified below.



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The test pitting and survey will follow the IfA standard and guidance for undertaking archaeological fieldwork (*Institute for Archaeologists, Standard and Guidance for Archaeological Fieldwork* 1994, revised 2010), the conventions laid down in *Understanding Historic Building: A guide to good recording practice* (English Heritage 2006) and the *Institute of Field Archaeologists' Standard and Guidance for the archaeological investigation and recording of standing buildings or structures* (IfA, Revised Edition 2001).

6.1.1.1 General Excavation Methodology

All archaeological features selected (stratigraphical layers, cuts, fills, structures) to be evaluated by hand tools and recorded in plan at 1:20 or in section at 1:10 using standard single context recording methods with photographs to be taken as appropriate.

6.1.1.2 The opening of test pits and subsequent removal of modern overburden will be conducted by hand by professional archaeologists. Removed overburden will be stored on mounded spoil heaps located at to the side of the pit, an appropriate distance away from each edge.

6.1.1.3 Hand excavation will continue in 100mm spits until either natural geological deposits or archaeological deposits are identified.

6.1.1.4 During the excavation and until the programme of archaeological works is complete, the trenches and spoil heaps will be surrounded by barrier fencing, located not less than two metres away from the edges of either.

6.1.1.5 Following hand excavation all pits will be cleaned using appropriate hand tools and archaeological features recorded by photography and scaled plan.

6.1.1.6 During the test pitting process the appropriate archaeological curator may be consulted at regular intervals. If significant archaeological deposits are identified GMAAS may request mitigation measures for future works to be completed on all or part of the site.

6.1.2 Recording

6.1.2.1 A unique text-number site code should be created prior to the commencement of the programme of works.

6.1.2.2 Separate contexts should be recorded individually on pro-forma context sheets. Plans and sections recorded on drawing sheets at an appropriate scale of 1:10, 1:20, or 1:50, depending on the complexity of the data and features encountered. All drawings will be individually identified and cross referenced, contexts enumerated and principal layers and features annotated with OD level information.

6.1.2.3 A 'site location plan' indicating the site north and based on the current Ordnance Survey 1:1250 map (reproduced with the permission of the Controller of HMSO) will be prepared. This is to be supplemented by a trench plan at 1:200 (or 1:100), which will show the location



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of the areas investigated in relation to the investigation area and National Grid Reference. The location of the OS bench marks used and the site TBM will also be indicated.

- 6.1.2.4 The OD height of all principal strata and features will be calculated and indicated on the appropriate plans and sections.
- 6.1.2.5 Photography of all relevant phases and features should be undertaken with digital formats. General working photographs to be taken during the duration of the archaeological works, to provide illustrative material covering the wider aspects of the archaeological work undertaken. A copy of the digital photographs should be made available to GMAAS with the production of the technical archaeological report along with photographs generated by a range of aerial photographs.
- 6.1.2.6 All finds to be recorded by context. Significant "small finds" located within three dimensions to the nearest 10mm and bagged and labelled separately, numbered and a simple description made so that they can be identified within the assemblage.

6.2 3D Laser Scanning

A Leica ScanStation C10 high definition laser scanner will be used to conduct this scan of the internal structure of the workshops. This will provide a point cloud data set, and stills will be incorporated into the final technical report. The scanner is powered by two 14.8v Lithium Li-Ion batteries. The C10 has an onboard 80GB hard drive. The scanner is a self-contained instrument and does not require any external power or memory. The scanner is levelled by the user and contains a compensator to maintain stability whilst in use.

The scanner will be set up in up to 6 locations, both internally and externally of the structure. A number of static targets will be placed strategically on the inside of the workshop area and removed following completion of the survey. Targets on free standing tripods may also be utilised.

The survey will be confined to the internal workshop areas, described as areas 1, 2 and 3. The majority of the survey will be conducted at a medium resolution in order to maximise the number of individual surveys. A selection of surveys will be completed in high definition in order to pick out particular levels of detail. Once the onsite scanning is completed the individual surveys will be stitched together to provide a single point cloud model of the entire survey area.

CfAA will then use this base layer point cloud data to provide measured drawings including plans and elevations showing phasing and interpretation.

6.2.3 Safety and Access

- 6.2.3.1 Reasonable access to the site will be granted to representatives of the relevant archaeological curatorial body (GMAAS), who may wish to be satisfied, through regular site inspections, that the scope and practice of the archaeological works are being conducted according to professional standards and in accordance with any agreements made. Full and complete



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access will also be provided for the client and their agents and invited parties of guests (e.g. Students, councillors, planners, and museum staff).

- 6.2.3.2 All relevant health and Safety legislation, CDM, COSHH regulations and codes of practice will be respected. A risk assessment and method statement will be produced by the archaeological contractor and submitted to the Client prior to the commencement of any onsite archaeological works.
- 6.2.3.3 It is the duty of the Client to provide all information reasonably obtainable relating to any contamination or live services present on site prior to the commencement of the programme of archaeological works.
- 6.2.3.4 The open area archaeological excavations will be handed back to the client at the end of the programme of works. The area will not be backfilled by the contractor upon completion.
- 6.2.3.5 A risk assessment will be completed and submitted for approval prior to the start of the programme of fieldwork. All CfAA staff associated with the excavation will be given a copy of the project design and the risk assessment prior to the beginning of the works and will be required to read both documents.
- 6.2.3.6 Site procedures shall be in accordance with the guidelines set out in the Health and Safety Manual of the Federation of Archaeological Managers and Employers (FAME).
- 6.2.3.7 Where available service plans will be inspected prior to any ground disturbance and all areas identified for investigation will be scanned using a cable avoidance tool.
- 6.2.3.8 All staff will wear PPE at appropriate times dictated as by the Principal Archaeologist or the Senior Archaeologist on site.
- 6.2.3.9 A daily signing in and out book will be maintained during the duration of the works.
- 6.2.3.10 Where necessary all open area excavations will be fenced and identified with orange barrier fencing, herras fencing and warning signs. Test pit sections will be monitored daily. If required, trench sections will be stepped.
- 6.2.3.11 All spoil removed during the excavation will be stored separately, adjacent and at a safe distance from the excavation area.
- 6.2.3.12 The Institute of Field Archaeology (IFA) code of conduct will be applied at all times.
- 6.2.3.13 No visitors will be allowed onto the site without the permission of the senior CfAA member of staff and the client. All visitors will be required to adhere to site safety rules as verbally explained and will be required to sign in/out of the site on arrival/departure.

6.2.4 Sampling

- 6.2.4.1 A sampling strategy for the recovery and assessment of all samples will be in line with relevant English Heritage guidelines, such as those for environmental samples put forward in



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Environmental Archaeology: A Guide to the Theory and Practice of Methods from Sampling and Recovery to Post Excavation (English Heritage 2002).

- 6.2.4.2 Different sampling strategies may be employed according to the perceived importance of the deposit or feature under investigation in consultation with the curatorial body (GMAAS). Close attention should be given to sampling for date, structure and environment. Sample size should be taken into account the frequency with which material is likely to occur.
- 6.2.4.3 The strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, pollen, diatoms, animal bone and human burials) will be developed in consultation with GMAAS. Subsequent on site work and analysis of the processed samples and remains will be undertaken by specific specialists.
- 6.2.4.4 All finds will be collected and handled following the guidance set out in the IfA guidance for archaeological materials. Unstratified material will not be kept unless it is of exceptional intrinsic interest. Material discarded as a consequence of this policy will be described and quantified in the field.
- 6.2.4.5 Finds of particular interest or fragility will be retrieved as Small Finds, and located on plans. Other finds, finds within the topsoil, and dense/discrete deposits of finds will be collected as Bulk Finds, from discrete contexts, bagged by material type.
- 6.2.4.6 All artefacts and ecofacts will be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication *First Aid for Finds*, and recording systems must be compatible with the recipient museum. All finds that fall within the purview of the Treasure Act (1996) will be reported to HM Coroner according to the procedures outlined in the Act, after discussion with the client and the local authority.
- 6.2.4.7 A soil sampling programme will be undertaken for the recovery and identification of charred and waterlogged remains where suitable deposits are identified. The collection and processing of environmental samples will be undertaken in accordance with English Heritage guidelines (English Heritage 2002). Environmental and soil specialists will be consulted during the course of the evaluation with regard to the implementation of this sampling programme. Soil samples of approximately 30 litres for flotation (or 100% of the features if less than this volume) will be removed from selected contexts.
- 6.2.4.8 In the event of human remains being discovered during the evaluation these will be left *in situ*, covered and protected, in the first instance. The removal of human remains will only take place in compliance with environmental health regulations and following discussions with, and with the approval of, the Ministry of Justice. If human remains are identified, the Ministry of Justice and curator will be informed immediately. An osteoarchaeologist will be available to give advice on site.
- a) If **disarticulated** remains are encountered, these will be identified and quantified on site. If trenches are being immediately backfilled, the remains will be left in the ground. If the excavations will remain open for any length of time, disarticulated remains will be removed and boxed, for immediate reburial by the Church.
 - b) If **articulated** remains are encountered, these will be excavated in accordance with recognised guidelines (see 6.12) and retained for assessment.
 - c) Any grave goods or coffin furniture will be retained for further assessment.



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6.2.4.9 Where a licence is issued, all human skeletal remains must be properly removed in accordance with the terms of that licence. Where a licence is not issued, the treatment of human remains will be in accordance with the requirements of Civil Law, IfA Technical Paper 13 (1993) and English Heritage guidance (2005).

6.3 POST EXCAVATION ANALYSIS

6.3.1 Post Excavation analysis centres around the archaeological finds assessment which is a pivotal point in the execution of an archaeological project. Its purpose is to evaluate the potential of the data-collection to contribute to archaeological knowledge and to identify the further study necessary. Any work undertaken should be directed towards allowing decisions to be made about the potential of the data and the nature of the future programme; no detailed analytical study should be undertaken until the assessment phase has been completed. Considerable breadth of academic knowledge is needed to make the necessary judgements; the best available staff should be used for assessment. Alternative sources of expert advice should be sought if not available within the project team.

6.3.2 All finds work to be carried out in accordance with the IFA Guidelines for Finds Work. All identified finds and artefacts will be retained and where appropriate stabilised. A discard policy should be discussed and agreed between the County Archaeologist and archaeological contractor following the commencement of site work.

6.3.3 All finds to be appropriately cleaned and packaged in accordance with UKIC Archaeology Guidelines and First Aid for Finds. Guidelines established in the Museums and Galleries Commissions Standards in the Museum Care of Archaeological Collections (1991) will also be followed.

6.3.4 A finds assessment is to be carried out after the completion of the onsite works and should as a minimum include:

- 1) The provenance of material: this should include comments on provisional dating and evidence for contamination or residuality.
- 2) The range and variety of materials: this should include comment on any bias observed due to collection and sampling strategies.
- 3) The condition of material: this should include comments on the extent to which an assemblage is likely to be affected by preservation bias, and comment on its potential for long-term storage
- 4) The existence of primary sources or relevant documentation may enhance the study of site data.
- 5) The quantification and cataloguing of all material.

This will allow the formulation of a strategy of further post-excavation analysis if required, subject to discussions with the curatorial body.



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6.4 POST EXCAVATION TECHNICAL REPORT.

6.4.1 Upon completion of the archaeological fieldwork, CfAA will produce a written report detailing the results of the above programme of archaeological work, which will include the following as minimum:

Non-technical summary of background, objectives and conclusions

Site name

Name of Archaeologist(s) who undertook the excavation

Report author, report date, evaluation dates

Introductory statement

Archaeological and historical background

Aims and purpose of the project

Methodology

Statement of results

Analysis of the nature and significance of the archaeology

An objective summary statement of archaeological results

Interpretation of the archaeological results

Conclusion

Scaled Map Regression Sequence

Sections and illustrations at appropriate scales and showing levels

Site plans, at appropriate scales, identifying the location and reference for each trench.

An assessment of the potential of the finds assemblage for post-excavation analysis.

Selected drawings/photographs of retained artefacts suitably annotated, where appropriate.

Photographs, printed and suitably annotated to trench location, direction etc.

Index to archive and details of archive location and References

6.4.2 ARCHIVING

6.4.2.1 The initial result of the fieldwork stage will be the site archive, which will be prepared in accordance with the Management of Archaeological Projects. The site archive will be so organised as to be compatible with the other archaeological archives produced in the Greater Manchester area. All drawn records to be transferred to and stored in digital format, in systems which are easily accessible.

6.4.2.2 The integrity of the site archive will be maintained upon completion of the archaeological works with the archive ultimately being deposited to Salford City Museum.

6.4.2.3 The minimum acceptable standard for the site archive is defined in the 'Management of Archaeological Projects 5.4' and 'Appendix 3' as well as The Management of Research Projects in the Historic Environment (MoRPHE) – English Heritage, 2006. It will include the comprehensive records of all materials recovered and all written, drawn, and photographic records, including a copy of all reports relating to the investigations undertaken



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6.4.2.4 A summary of the results of the archaeological works, will be bound into the client report for submission to the Client, GMAAS and the Greater Manchester Historic Environment Record.

6.5 PUBLICATION

6.5.1.1 At this evaluation stage no formal publication is deemed necessary or appropriate.

6.6 PRE-START REQUIREMENTS

6.6.1 The archaeological contractor will be responsible for ensuring site access has been secured prior to the commencement of site works.

6.6.2 The client will be responsible for providing up to date service plans and will be responsible for ensuring services have been disconnected, where appropriate.

6.6.3 The client will be responsible for ensuring that any existing reports (e.g. ground investigation, borehole logs, contamination reports) are made available upon request to the archaeological contractor prior to the commencement of work on site.

6.7 REINSTATEMENT

6.7.1 Following excavation and recording the spoil from each test pit will be appropriately backfilled with the material removed from it and compacted by hand.

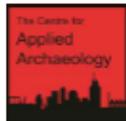
6.8 MONITORING

6.8.1 As a minimum requirement, the curator will be given a minimum of one week's notice of work commencing on site to GMAAS, and will be afforded the opportunity to visit the site during and prior to completion of the on-site works so that the general stratigraphy of the site can be assessed and to discuss the requirement any further phases of archaeological work

6.8.2 The Centre for Applied Archaeology will notify the curator of any discoveries of archaeological significance so that site visits can be made, as necessary. Any changes to this agreed WSI will only be made in consultation with the curator.



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7. Resources and Programming

- 7.1 STAFFING AND EQUIPMENT**
- 7.1.1** All archaeological works will be undertaken by professional archaeologists.
- 7.1.2** The team of archaeologists undertaking the fieldwork should comprise of at least one Archaeological Supervisor and One Archaeological Assistant. Further archaeological assistants will be allocated should this prove to be necessary.
- 7.1.3** The laser survey will be completed by a Archaeological Supervisor.
- 7.1.4** The Archaeological Project Supervisor will be responsible for all fieldwork, health and safety, post-excavation and publication in liaison with relevant specialists and under the overall direction of the designated project manager (Director – Adam Thompson)
- 7.1.5** A list of individual specialists who may be consulted as part of the post excavation analysis is supplied in Appendix 2. CfAA possess a strong established working arrangement with the York Archaeological Trust for post excavation analysis.
- 7.1.6** Other specialists may be consulted if necessary. These will be made known to the monitoring service office for approval prior to consultation, similarly any changes to the specialist list will be made known to the monitoring office for approval prior to consultation.
- 7.1.7** All office and welfare equipment will be provided by CfAA. (Should the client wish to provide these an appropriate reduction in the fee will occur).
- 7.1.8** Excavating machines and spoil moving equipment will be supplied by CfAA through an external supplier. (Should the client wish to provide these an appropriate reduction in the fee will occur).
- 7.1.9** All archaeological staff will possess appropriate SCSC Cards.



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7.1.10 Mr Adam Thompson BA, MA, MIFA, FSA (Director)

Mr Adam Thompson will be responsible for the overall management and delivery of the project. He is currently the Director at the Centre for Applied Archaeology at the University of Salford. A specialist in commercially led archaeological excavation, historic building recording, community archaeology and public dissemination, he has more than ten years experience of commercial archaeology. He gained both his BA¹ and MA² degrees at the University of Manchester, specialising in archaeological excavation and worked within the east midlands on developer funded archaeological projects before joining the University of Manchester Archaeological Unit where he undertook the delivery and management of a variety of commercial and community projects in Greater Manchester and throughout the northwest. Two of the long running community archaeology projects he has directed and supervised have received nationally recognised awards for community engagement.³

Under his current role he undertakes the day to day management and workload of the Centre. Particular projects that he currently manages include;

- Directing the archaeological programme of works at Mons Pool. A PPG 16 and Section 106 response to proposed 14 year, large scale gravel and sand extraction of an Iron Age and Romano British Landscape⁴.
- Managing the Dig Greater Manchester Archaeological Project aimed at providing community and educational access into archaeology within each Local Authority within Greater Manchester over the next five years.
- Provision of archaeological skills and legislation training to the construction industry⁵.

He undertakes pre and post planning archaeological consultancy and advice including Archaeological Desk Based Assessments and Environmental Impact Assessments and is currently a Member of the Institute for Archaeologists⁷, and sits on the IFA Community and Voluntary Archaeology Committee.

¹ Bachelor of Arts (Hons), Geography and Archaeology, University of Manchester, 2001.

² Master of Arts, Archaeology, University of Manchester, 2002.

³ Marsh Award for 'Best Community Archaeological Project'. Awarded by the Council for British Archaeology for excavations at The Old Vicarage, Mellor a multi-period site in Stockport and Royton Hall, Oldham, 2008.

⁴ On behalf of Lafarge Aggregates Ltd.

⁵ Funded by the Association of Greater Manchester Authorities.

⁶ In association with The Centre for Construction Innovation.

⁷ Awarded by the Institute for Archaeologists, 2010.

6.1.11 Other Staff

6.1.11 All other staff supplied by the Centre for Applied Archaeology hold a least an undergraduate and a masters level degree in archaeology or archaeological related specialism. Each staff member possesses at least five years professional archaeological experience of conducting archaeological excavations within Greater Manchester and the surrounding area.



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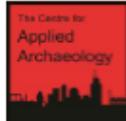
6.3 **TIMETABLE**

- 6.3.1.1 Following award of the contract, CfAA would commence the fieldwork at the clients earliest convenience. CfAA suggest a start date of Monday 10th June with all fieldwork and laser scanning completed in a 5 day period.
- 6.3.1.6 The technical report and associated finds assessments will be completed no later than three weeks after commencement of all onsite fieldwork.



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7. Costs

- 7.1 CfAA can undertake the programme of archaeological works, including production of a Written Scheme of Investigation, Test pitting, laser survey, and production of a technical report for the cost of [] This fixed cost includes all staff costs, transport, materials, equipment hire, reprographics, photography, health and safety and welfare costs and for on-site excavation and post-excavation reporting and archiving.
- 7.2 Should CfAA be successfully awarded the contract, a letter of conformation is required in email form followed by a written version. The letter of conformation must be on headed paper with the company logo, state the value of the project, the appointed contact person and details and the name and details of where the invoice should be addressed and be signed by the appropriate authorising personnel.

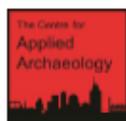
7.3 Contact

Adam Thompson BA (Hons), MA, MIFA, FSA
Director
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M5 4NW

Telephone: 0161 295 3818
Mobile: 07805633328
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10. Sources

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Institute of Field Archaeologists. 1994, revised 2010. Standard and Guidance for field evaluation 1994, revised 2010)

NPPF (National Planning Policy Framework), March 2012, Department for Communities and Local Government.

PPS5 (Planning Policy Statement 5: Planning for the Historic Environment, March 2010)

The City of Salford Unitary Development Plan 2004-2016 (adopted June 2006), policy CH5: Archaeology and Ancient Monuments

Brennand 2007, An archaeological Research Framework for North West England Volume II, Association of Local Government Officers Northwest and Council for British Archaeology North West.



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