ARCHAEOLOGICAL INVESTIGATIONS AT FORTH BANKS/POTTERY LANE, NEWCASTLE UPON TYNE, TYNE AND WEAR

POST-EXCAVATION ASSESSMENT REPORT

SEPTEMBER 2017

PRE-CONSTRUCT ARCHAEOLOGY

Archaeological Investigations at Forth Banks/Pottery Lane, Newcastle upon Tyne, Tyne and Wear

Post Excavation Assessment Report

Central National Grid Reference: NZ 24598 63505

Site Code: FBP 16

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1. NON-TECHNICAL SUMMARY

1.1 A phased programme of archaeological mitigation was undertaken prior to the construction of a residential development comprising three blocks of 280 apartments, a retail unit and associated car parking at Forth Banks/Pottery Lane, Newcastle upon Tyne. The site comprised a sub-square block of land at NGR NZ 24598 63505 and covers an area of approximately 0.52 ha. The site is bisected by Cookson's Lane, with Pottery Lane bordering the development to the north-west; Forth Banks to the north-east; waste ground and an office block to the south-east and the Cemex plant to the south-west.

1.2 The first phase of work comprised a desk-based assessment of the site which considered the archaeology within the proposed development, the surrounding area and the historical elements of the landscape. A photographic record of buildings on the north-east portion of the site was undertaken prior to their demolition (Phoenix Consulting Archaeology Limited 2015).

1.3 The desk-based assessment identified that the proposed development was the location of the Skinnerburn Iron Works, which occupied the north-eastern half of the site, and the Skinnerburn/Newcastle Pottery on south-western half of the site.

1.4 Panacea Property Developments were granted planning permission for development in November 2015 in accordance to a number of conditions (Conditions 35, 36, & 37) relating to the historic environment (Planning Ref. 2015/0315/01/DET). Condition 35 stated that no groundworks or development should commence until a programme of archaeological fieldwork was undertaken which included an archaeological evaluation and where appropriate mitigation excavation.

1.5 Pre-Construct Archaeology Limited were commissioned to undertake an evaluation of the site in September 2016 comprising the investigation of three trenches. Trench 1 was located to the north-east of Cookson's Lane to target the Skinnerburn Iron Works and Trenches 2 and 3 were located to the south-west of Cookson's Lane to locate the remains of Newcastle Pottery. The evaluation revealed limited remains of the Skinnerburn Iron Works within Trench 1 however well-preserved structural remains of the Skinnerburn/Newcastle Pottery were recorded in Trenches 2 and 3, including a mixing ark in the pottery slip house, remnants of a pottery kiln and various walls and floor surfaces. Finds included a substantial amount of pottery sherds, wasters and kiln furniture. Ditches of probable medieval date were also recorded below post-medieval deposits in Trenches 2 and 3. No further archaeological work was required on the former site of the iron works (north-east of Cookson's Lane), but further archaeological excavation was required on the site of the pottery (south-west of Cookson's Lane).

1.6 The excavation phase of the work was undertaken in November/December 2016 across an area that measured 28.8m NE-SW and 74.40m (maximum) NW-SE and at its maximum depth was over 2m deep at the south-eastern extent.

1.7 The structural remains excavated at the site represent elements of the latest U-shaped incarnation of the pottery in this area which the historic map sequence demonstrates was built between 1805 and by 1827, with modifications occurring throughout the 19th century. Widespread demolition of the pottery had evidently taken place at various times; the pottery was closed in 1893 with most structures being demolished prior to 1896. Several buildings were constructed upon the former site of the pottery, including a stable, slaughterhouse and a stone mason's yard, truncating some remaining elements of the pottery. It is evident from the excavated remains and from the map evidence that some former pottery workshop structures along the eastern boundary of the site and structures in the eastern corner had been retained.

1.8 All structures at the site were demolished in the mid-20th century, which further impacted the structural remains of the pottery. Survival of the pottery was therefore variable across the site and in some areas no traces remained. Not surprisingly, the best-preserved elements comprised subterranean features such as coal stores and tanks for mixing slip and floor surfaces which were lower than the ground level of the pottery. Many elements of the structures only survived as the bases of wall foundations and only fragmentary evidence of most of the circular kilns survived. As the 1862 Ordnance Survey map of the site is so detailed, overlay of the excavated features onto the historic map has in some cases enabled interpretation of these fragmentary remains. Notable features recorded during the excavation phase included the structural remains of the slip house, which included a mixing ark, storage bays and a slip kiln as well as coal stores, walls, surfaces, a muffle kiln and the remains of five updraught pottery kilns.

1.9 The investigations also produced a substantial assemblage of pottery, comprising 'wasters' which had been subject to a variety of pre- and post-firing defects and kiln furniture. The assemblage recovered from the site demonstrates that the Newcastle Pottery was producing highly decorated table wares and earthenware items for domestic use. The high number of transfer decorated sherds indicates this was the primary technique for decoration and by far the most popular within this period. Sponge decorated designs were applied to sturdy domestic wares such as jugs and cylindrical jars which were also popular in the 18th and 19th century. The large quantity of redwares also shows that the site was producing more utilitarian items for domestic use as most forms were identified as deep or deep flared bowls, likely used in everyday food preparation by the consumer. The kiln furniture included large fragments of saggars (or fire boxes); these large pottery containers protected the vessels in the kiln during the first firing and also during glaze or glost firing. A large number of smaller kiln furniture was also recovered with a wide variety of forms for very specific functions within the kiln. These included handmade coils, several different forms of handmade separators and ridged separators with saggar wall attachments. These pieces served a specific purpose with the ridged separators made to stop vessels and furniture affixing in the kiln during the glost firing of more delicate plates and dishes. Kiln stilts with wedged or 'fishtail' feet were also very frequent and the different forms and sizes

represent specific requirements for different firings, with bigger examples made for holding larger serving dishes or plates in the kiln and smaller examples and cockspurs used for separating several smaller plates or saucers within a saggar.

1.10 The structural remains and artefactual assemblages are considered to be of high regional significance. Despite the fact that a number of important pottery industries existed in the North-East in the post-medieval period, archaeological excavation of pottery works has been very limited, with none on the scale of the work at the Forth Banks/Pottery Lane site. The significance of the remains is enhanced by documentary evidence and the historic map sequence which has allowed interpretation of some of the more fragmentary remains and preliminary phasing of the structural sequence remains. The assemblage of wasters is also of considerable significance as it has allowed the identification of the range of wares produced by the pottery during the 19th century, as is the kiln furniture which provides details of manufacturing techniques.

1.11 This assessment report contains the combined results of both the archaeological evaluation as well as the subsequent phase of excavation. The results of Trench 1 (targeted over the Skinnerburn Iron works) are discussed separately, however, the remains observed within Trenches 2 and 3 have been combined with the excavation data.

1.12 The assessment begins with an introduction to the site, describing its location, geology and topography, as well as summarising the planning and archaeological background to the project. The aims and objectives of the work are then set out, followed by full descriptions of the archaeological methodologies employed during both the fieldwork and the subsequent post-excavation analysis. This part concludes with an illustrated summary of the archaeological remains.

1.13 The data assessment, quantifies the written, graphic and photographic elements of the site archive. All archaeological remains are then discussed before summarising the potential for further analysis of all elements of the collected project data. The context index is contained within the appendices, along with the figures, photographs, stratigraphic matrix, specialist reports and specification for the work.

2. INTRODUCTION

2.1 General Background

2.1.1 This report details the methodology and results of a programme of archaeological investigations undertaken by Pre-Construct Archaeology Limited (PCA) between 26th September and 28th December 2016, at Forth Banks/Pottery Lane, Newcastle upon Tyne. The central National Grid Reference for the site is NZ 24598 63505 (Figure 1).

2.1.2 The archaeological investigation was commissioned by Marcus Worthington & Co. Ltd on behalf of Panacea Property Development (the Client) with work being carried out ahead of the development of the site. The archaeological project was undertaken as a condition of planning permission (Ref. 2015/0315/01/DET) on the recommendation of Jennifer Morrison, Archaeology Officer at Newcastle City Council who provides archaeological advice to the Local Planning Authority (LPA).

2.1.3 The archaeological potential of the site was established by an archaeological desk-based assessment produced by Phoenix Consulting (2015). The assessment identified that prior to the industrial period (from the mid-18th century), the site remained largely undeveloped.

2.1.4 Before the industrialisation of this area of Newcastle the site remained as open land bordering the Skinner Burn *c.* 290m to the south-west of the medieval town walls. In the 18th century a pottery was established within the confines of the site (noted on Bourne's survey of 1736). The building shown on Thompson's 1746 map may represent the original Skinnerburn Pottery established in this location that was noted in Bourne's survey of 1736 (Bourne 1736, 145). In 1758 the pottery was destroyed by fire and rebuilt in the 1770s, at least 12 years later (Phoenix Consulting 2015, 22). The pottery is next shown in Kidd's plan of 1802 and in greater detail in Wood's plan of 1827.

2.1.5 The pottery was closed in 1893 with the majority of structures being demolished prior to 1896. Several later buildings were built upon the site of the former pottery, including a slaughterhouse and a stone mason. These were in turn demolished in the mid-20th century (Phoenix Consulting 2015)

2.1.6 The iron foundry (later labelled as the Skinnerburn Foundry or Iron Works) was in operation from at least 1830. In 1899 the buildings were largely rebuilt for Robert Henzell's Northern Oil Company, where oil was stored, blended and distributed. Part of the site was taken over by the Co-operative Wholesale Society Ltd who used it for the storage of cattle. The eastern side of the warehouse was converted into offices sometime after 1927 and were again later converted for residential accommodation. The warehouses on the iron works site were recorded during the desk-based assessment prior to demolition (Phoenix Consulting 2015).

2.1.7 The archaeological field evaluation was carried out according to a Specification issued by the Tyne and Wear Archaeology Officer (NCC 2016a) with a subsequent Specification issued for the excavation stage of the fieldwork (NCC 2016b).

2.1.8 The aim of the archaeological evaluation was to determine the absence/presence of below ground remains, specifically pertaining to the Skinnerburn/Newcastle Pottery and the Skinnerburn Iron Works site. Three trenches were excavated to evaluate any below ground remains, Trench 1 north-east of Cookson's Lane and Trenches 2 and 3 south-west of the lane.

2.1.9 Trench 1 identified limited remains of the Skinnerburn Iron Works however, considerable remains of the Skinnerburn/Newcastle Pottery were recorded in Trenches 2 and 3, including a mixing ark and slip kiln in the slip house, and numerous remains of pottery kilns. Finds included a substantial amount of pottery sherds, wasters and kiln furniture. Beneath the post-medieval deposits were several medieval ditches.

2.1.10 The archaeological remains relating to Newcastle Pottery recorded in Trenches 2 and 3 were deemed to be of such significance that further archaeological work was required. Accordingly, further archaeological work in the form of Strip and Record Archaeological Excavation of an area to the south-west of Cookson's Lane was requested. To this end the majority of the south-western and central extent of the site was excavated however, the north-western end of the site was left *in situ* due to the presence of live services and the extent of modern truncation in that location. No further archaeological work was required on the site of the iron works (north-east of Cookson's Lane).

2.1.11 The archaeological project herein described was designed according to the guidelines set out in Management of Research Projects in the Historic Environment (MoRPHE) (English Heritage 2006). In line with MoRPHE guidelines, this Assessment Report sets out a formal review of the data collected during the fieldwork.

2.1.12 At the time of writing, the Site Archive, comprising written, drawn, and photographic records is housed at the Northern Office of PCA, Unit N19a Tursdale Business Park, Durham, DH6 5PG. When complete, the Site Archive will be deposited at the Great North Museum, Newcastle upon Tyne, under the site code FBP 16. The Online Access to the Index of Archaeological Investigations (OASIS) reference number for the project is: preconst1-275153.

2.1.13 A range of appendices are included in this assessment which comprise the Figures (Appendix 1), the Context Index (Appendix 2), the Stratigraphic Matrix (Appendix 3), Photographic and Historic Plates (Appendix 4), Pottery Assessment (Appendix 5), Clay Tobacco Pipe Assessment (Appendix 6), Brick Assessment (Appendix 7) and copies of the Specifications (Appendix 8).

2.2 Site Location and Description

2.2.1 The site is located to the south-west of the centre of Newcastle upon Tyne central NGR 24598 63505 and comprises a sub-square block of land covering 0.52ha at the junction of Forth Banks and Pottery Lane (Figure 1). The site lies within a part of Newcastle upon Tyne known as Forth Banks, which has recently been rebranded as the Stephenson Quarter. The area of Forth Banks lies outside the Medieval town walls, in a suburb formerly referred to as *without Close-Gate* (Phoenix Consulting 2015, 12).

2.2.2 The site is bounded by Forth Banks to the north-east, Pottery Lane to the north-west, the Cemex concrete plant to the south-west and a steep overgrown grassed area sloping down to Skinnerburn Road to the south-east. The development area is bisected by Cookson's Lane which is noted on maps as far back as 1830.

2.2.3 Until recently, the north-eastern area of the site was occupied by derelict warehouses with these demolished prior to the archaeological evaluation. The south-western extent of the site comprised an overgrown area of hardstanding.

2.2.4 No structures relating to the pottery were evident prior to the evaluation taking place. The brick wall at the south-eastern boundary of the site likely relates to either a late addition to the Plate Glass Works seen on the first edition Ordnance Survey of 1862 or the cattle pens noted in the 20th-century map sequence.

2.3 Geology and Topography

2.3.1 The bedrock geology of the site is comprised of sandstone of the Pennine Middle Coal Measure Formation. The sedimentary bedrock was formed approximately 309 to 312 million years ago in the Carboniferous period when the local environment was dominated by swamps, estuaries and deltas. In terms of superficial geology, Newcastle is generally known for Devensian-Diamicton till, formed up to two million years ago in the Quaternary Period (British Geological Survey website) and comprises material known generally as boulder clay.

2.3.2 Seventeenth-century maps of the area (Speed 1610 & Beckman 1684) show the landscape to be dominated by steep and undulating hills running along the course of the Skinner Burn to the bank of the River Tyne (*c.* 105m to the south-east of the site). The desk-based assessment notes that the burn is one of several post-glacial streams flowing into the Tyne (Phoenix Consulting 2015, 11). These streams cut deep, narrow gorges through the clay till and into the bedrock below (*ibid.*).

2.3.3 Forth Banks broadly follows the former course of the Skinner Burn, a stream which once divided the counties of Northumberland and Newcastle, as well as the city with the township of Elswick. The burn was reportedly backfilled with domestic waste (or perhaps even waste from the pottery), culverted sometime in the late 18th century and is noted as the western boundary of the corporation of Newcastle (Brand 1789, 412).

2.3.4 Forth Banks road rises at least 5m along the north-eastern boundary of the site from the south-eastern corner to the junction with Pottery Lane and westwards from the junction a further 3m to the westernmost extent of the site (Phoenix Consulting 2015, 10). On the former site of Newcastle Pottery, the ground rises from 21.12m AOD at the site entrance on Pottery Lane to 23.86m at the south-easternmost extent and 24.75m at the south-westernmost extent of the site.

2.3.5 Prior to the trenches being excavated, the north-eastern part of the site was covered with demolition rubble from the former Henzell Oil Company warehouses (recorded during the desk-based assessment; Phoenix Consulting 2015). The site of the former pottery contained dumped demolition rubble with areas of concrete hard standing.

2.4 Planning Background

2.4.1 Panacea Property Developments has been granted planning permission for the erection of a seven- and nine-storey residential development comprising three blocks of 280 apartments, a retail unit and associated car parking at the site (Ref. 2015/0315/01/DET). The planning permission included a condition requiring archaeological work, specifically to evaluate through trial trenching, the survival of the Skinnerburn Iron Works and Skinnerburn/Newcastle Pottery shown on early historic mapping.

2.4.2 Condition 35 stated that:

> *No groundwork or development shall commence until a programme of archaeological fieldwork (to include evaluation and where appropriate mitigation excavation) has been completed. This shall be carried out in accordance with a specification provided by the Local Planning Authority.*
>
> ***Reason:*** *The site is located within an area identified as being of potential archaeological interest. The investigation is required to ensure that any archaeological remains on the site can be preserved wherever possible and recorded, in accordance with the National Planning Policy Framework and saved Policies C4.2, C4.3 and C4.4 of the Unitary Development Plan and CS15 of the Core Strategy and Urban Core Plan.*

2.4.3 Two additional conditions were also attached to the planning permission relating to the report and publication of the results:

> **Condition 36**
>
> *The development shall not be brought into use until the final report of the results of the archaeological fieldwork undertaken in pursuance of Condition 35 has been submitted to and approved in writing by the Local Planning Authority.*
>
> ***Condition 37***

> *The buildings shall not be occupied/brought into use until a report detailing the results of the archaeological fieldwork undertaken has been produced in a form suitable for publication in a suitable and agreed journal and has been submitted to and approved in writing by the Local Planning Authority prior to submission to the editor of the journal.*
>
> ***Reason:** The site is located within an area identified in the Unitary Development Plan as being of potential archaeological interest and the publication of the results will enhance understanding of and will allow public access to the work undertaken in accordance with paragraph 141 of the NPPF, Core Strategy Policies CS15 and UC14 and saved UDP Policies C4.2 and C4.3.*

2.4.4 Justification for the planning conditions was to comply with paragraph 141 of the National Planning Policy Framework (NPPF 2012):

> *Local planning authorities should make information about the significance of the historic environment gathered as part of plan-making or development management publicly accessible. They should also require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.*

2.4.5 A Specification was issued by Jennifer Morrison, Tyne and Wear Archaeology Officer at Newcastle City Council for both the archaeological evaluation (NCC 2016a) and the excavation phase (NCC 2016b).

2.5 Archaeological and Historical Background

Information in this section is largely extracted from the desk-based assessment (Phoenix Consulting 2015) and the North East Regional Research Framework (Petts & Gerrard 2006). The research and writing of those responsible is acknowledged. Supplementary information has been added from various sources and is acknowledged within the text. Sites within the Tyne and Wear Historic Environment Record are followed by the HER number.

2.5.1 In the early medieval period the area around the site of the Roman fort at Newcastle, located approximately 570m to the north-east of the site was known as *Monkchester*, after a small community of monks who settled there. The modern name of Newcastle did not come into existence until Norman times when Robert Curthose, eldest son of William the Conqueror built a castle (HER 101) on the former site of the Roman fort on his return from a raid into Scotland.

2.5.2 The medieval walled town grew around the new castle, which became an important stronghold in the northern defences against the Scots. Its military importance stimulated trade and commerce and soon the expanding town developed into a major sea port. The medieval expansion centered on the port, but was also shaped by the various burns

running into the Tyne. Skinner Burn was far to the west (*c.*186m), outside of the town walls, in an area referred to as *without close gate*.

2.5.3 The area to the north-east of Forth Banks was known as *the Forth* and was open land owned by the Hospital of St Mary the Virgin, established in the 12th century (Phoenix Consulting 2015, 17). In the 13th century the town began to expand with the formal incorporation of the Village of Pandon and the reclamation of the land on the north side of the river, where the Close, the Quayside and Sandhill now stand. The Close (the street adjacent to the Tyne riverbank) existed from as early as the late 13th century. Ground raising dumps of material would have certainly been used to reclaim land from the river and when completed, The Close led only to open ground at the Skinner Burn with no medieval suburb having developed outside Close Gate. Reverd. Bourne writing in 1736 reports that *out of the Close Gate there is a way to the Forth, a place of pleasure and recreation* (HER 6635).

2.5.4 By the 16th century the waterfront at Newcastle was lined with houses and warehouses belonging to the merchant classes. During the 17th century the focus of the English glass trade shifted from the Weald to Tyneside, although the land at Forth Banks still remained undeveloped. Although early maps do not show the land outside the town walls in great detail, some development can be seen along the principal routes leading from the town to the west.

2.5.5 The land on the western bank of the Skinner Burn, in the area of Forth Banks, remained undeveloped with Speed's plan of 1610 (Figure 3) showing the area as undulating open land. A square fenced off area is depicted on the plan, however, it is unknown what this may relate to.

2.5.6 A rectangular structure is noted in Beckman's map of 1684 (not reproduced here) located in the area that would later become Forth Banks. The exact location and function of this isolated building is unfortunately not known but it does not appear on Buck's engraving of 1723 (Figure 4), Corbridge's Survey of 1723 (Figure 5) or Bourne's Survey of 1736 (not reproduced here). It is worth noting, however, that there had been some development outside the town walls leading from the Close Gate, although the area to the west of the Skinner Burn is still shown as undulating uninhabited hills running from north to south along the course of the Burn towards the confluence with the River Tyne.

2.5.7 Although no structures are noted on Bourne's map of 1736 (which appears to be largely based on Corbridge's Survey of 1723), he does make reference to the area in *The History of Newcastle upon Tyne: or The Ancient and Present State of that Town* (1736, 145):

> "*Without the Close-Gate is a pretty long Street with Houses on each Side; Which goes as far as a Dike called Skinner-Bourne, where are of late Years a Factory belonging to Mr. Thomlinson, a Pot-House to Mr. Joseph Blenkinsop and Ralph Harl, and a Glass-House to Mr. Dagney…*"

2.5.8 It is likely that the Pot-house referred to by Bourne is the original Skinner Burn Pottery that was in the hands of Joseph Blenkinsop and Ralph Harle for some years before 1736 (*ibid.*). The first appearance of a potential site for the Skinner Burn Pottery can be seen in Thompson's Plan of 1746 (Figure 6) along the western bank of the Skinner Burn. This plan depicts individual rectangular buildings running along the course of the Burn in an area labelled Forth Banks (present day B1600 road known as Forth Banks). Although unlabelled, it is highly likely that one of these structures represent the Skinner Burn Pottery that would have been located on the north-eastern side of the proposed development (HER 4885).

2.5.9 In 1748 Mr Blenkinsop was still noted as being in possession of the site although the pottery had been advertised to let in the *Newcastle Journal* (11th June 1748). Blenkinsop is still noted to be residing in a house *without the Closegate* in 1749 (*Newcastle Journal* 10th June 1749) and is still with the pottery manufacturing business as on the 23rd June 1753 the *Newcastle Journal* advertises a sale of one to two thirds share of a pot house in Sunderland.

2.5.10 In 1758, under unknown ownership, the pottery was destroyed by fire (*Newcastle Journal 16th September*):

> *"On Wednesday night the Pot-house at the Skinner-Burn was burnt down; and but for the timely assistance of the glassmen in all likelihood many of the adjacent buildings would have been consumed"*

2.5.11 Buckley (1926, 70) notes that it is not known whether a pottery was rebuilt on the same site or at a different location. The desk-based assessment states that it was rebuilt sometime in the 1770s, at least 12 years later (Phoenix Consulting 2015, 22).

2.5.12 Hutton's Plan of 1772 (the survey was completed in 1770) shows a string of properties along the western side of the Skinner Burn (Figure 7). Although not labelled, and there being no reference in the contemporary records of when the Skinner Burn pottery was rebuilt, it is possible that the long L-shaped structure that is partially within the north-eastern area of the proposed development may be the new Skinner Burn Pottery. Two additional smaller structures are also noted in the area that would later become the Skinnerburn Iron Works.

2.5.13 On Beilby's Plan of Newcastle and Gateshead in 1788 (not reproduced here) and Cole & Roper's Map of Newcastle and Gateshead dated 1801 (Figure 8) the same structure is observed along with the two smaller square buildings. Therefore, it is likely that this long structure must be the rebuilt Skinner Burn Pottery. A pottery is certainly in existence within Forth Banks in 1787 as there are two references to a pottery in the area; the first in a directory that list Spearman & Co as the owners of the Skinnerburn Pottery, Forth Banks and the second reference in the *Courant* newspaper on 23rd June (referring to a hired

servant, Mr. Wilson who did absent himself from the service of Mr. George Spearman and Co.).

2.5.14 In 1790 the pottery passed to Addison, Falconer & Co. (Bell & Gill 1973, 7; Buckley 1926, 70; Gill 1976; 154) and was depicted on Kidd's Plan of 1802 (Figure 9). The pottery can be seen to have expanded to the south-west of the long structure first observed in Hutton's survey of 1772 (Figure 7). This south-western extension would have been located within the centre of the proposed development, straddling both the north-eastern and south-western areas across what would later become Cookson's Lane.

2.5.15 Alexander Falconer died in 1804 (*Newcastle Courant* 8th September 1804; Gill 1976, 154) but the family retained an interest in the company. In 1821, seventeen years after his death, an advertisement was placed in the *Courant* for a share of the business (*Newcastle Courant* 7th July 1821):

> *"To be sold… A small Share in the old established Pottery, in full Work, most eligibly situated at the Skinner Burn Newcastle, to which is attached a Water Flint Mill. Apply to Mr Falconer, Murton House, near North Shields, who will treat for the sale"*

2.5.16 Interestingly the article from the *Courant* above references an attached water flint mill to the Skinner Burn; it is not known whether it is referring to a flint mill within the pottery or a mill situated next to the Burn as there is no evidence for such a structure on historic maps. If it was attached to the pottery it would have likely been attached to the long structure observed on Kidd's Plan of 1802 (Figure 9) facing onto Forth Bank or within one of the cluster of buildings shown on Wood's survey of 1827 (Figure 10).

2.5.17 The pottery was put up for sale again three years later in 1824 (*Newcastle Courant* 31st July 1824; Gill 1976, 154-155):

> *"To be sold…The Whole of the Moiety of the Newcastle Pottery, carried on under the Firm of Addison & Co, Skinner Burn… This Work is most eligibly situated and well calculated for the Manufacture and Sale of Earthenware; and requires only a moderate Capital, combined with Skill and Diligence to be made to answer a beneficial Purpose; and is, therefore, well worth the Notice of a Capitalist …"*

2.5.18 It is clear from the records that Addison, Falconer & Co. had some financial difficulties as a separate notice was placed in the *Courant* in September of 1824 (*Newcastle Courant* 18th September 1824*)*:

> "*All Persons who stand indebted to the late firm of Addison, Falconar [*sic*], & Co, Manufacturers of Earthenware, at the Skinner Burn, Newcastle, are required to pay their Debts immediately to MR Dawson, Solicitor…, or they will be proceeded against for the recovery thereof, without any further Notice*"

2.5.19 Unfortunately for Addison, Falconer, & Co. the pottery didn't appear to sell and the site was put up for auction in 1825 (*Newcastle Courant* 19th February 1825):

> *"To be sold by public Auction… on 9th Day of March, 1825, upon the Premises, Forth Banks, Newcastle upon Tyne, All the Machinery, Utensils, Materials, and Stock of Earthenware, of the Newcastle Pottery, including every Requisite for carrying on an Earthenware Manufactory upon an extensive scale…"*

2.5.20 By 1827 the pottery was managed by Taylor & Son (Parson & White 1827, 108; Pigot's Directory 1828, 602). Wood's plan of 1827 (Figure 10) illustrates the pottery in greater detail than any of the earlier maps and shows the works to be rectangular in plan with a central courtyard. The earlier pottery had been demolished and a new factory solely on the south-western half of the site had been built. What would later become Pottery Lane is shown clearly on the map and a large Glass Works is noted to border the site to the south-west. Moreover, the Skinner Burn has been culverted to the north-east of the site although stretches of the Burn can still be seen exposed to the north.

2.5.21 Taylor & Son sold the pottery three years later when in 1830 Armstrong, Redhead & Co took control (*Newcastle Courant 18th December 1830*):

> *"Skinner Burn Pottery. Messrs Armstrong, Redhead & Co respectfully announce to their Friends and the Public in general, that they have entered on the above Establishment, where their constant Attention will be directed to the Quality and judicious Assortment of their Earthenware…."*

2.5.22 The most detailed plan of this area of Newcastle from the first half of the 19th century is that surveyed by Thomas Oliver in 1830 (Figure 11). This is the first map to show the detailed layout of the site, together with information about the structures represented. It also shows that a considerable amount of building had taken place across this part of Newcastle, clearly associated with several different types of industry. The establishment of a quay and port at Skinner Burn ensured that this area became a significant industrial zone for glass works, steam flour mills, potteries, breweries, engine works, foundries, timber yards and a lead shot factory.

2.5.23 Oliver's Plan also shows the development site to be occupied by two specific industries, an iron foundry at the junction of Forth Banks and Pottery Lane and the pottery to the south-west of Cookson's Lane. A small L shaped structure is also depicted to the north-west of the foundry. Other industrial sites in the immediate vicinity include the Plate Glass Works to the west (first seen on Wood's plan of 1827), a Brewery to the north, and lime kilns, timber yard, flour mill and flint glass works to the south.

2.5.24 Newcastle Pottery (labelled as *Pottery* on the map) still appears as a group of buildings around a central courtyard with four circular kilns at the southern end of the structure. At this date, the pottery would have been under the ownership of Taylor & Son (Parson & White 1827, 108; Pigot's Directory 1828, 602) or Armstrong, Wilson and Co. (*Newcastle Courant* 18th December 1830). By 1833 the pottery was in the ownership of Redhead, Wilson & Co, but by 1838 it had passed to T. Wallace and Son, and then two years later to

James Wallace & Co before finally being renamed as Wallace & Co in 1858 (Bell & Gill, 1973, 7).

2.5.25 John Storey's watercolour of *Newcastle upon Tyne in the Reign of Queen Victoria* 1862 (not reproduced here) shows the site of Pottery Lane and Forth Banks. Newcastle Pottery is clearly visible in the painting but only one chimney from the kilns can be seen. It is likely that this depiction is highly stylised and not an accurate representation of the pottery site.

2.5.26 The most detailed survey of the site is the Ordnance Survey map of 1862 (Figure 12). In this edition, various functioning elements are noted within the pottery including four circular kilns, a rectangular room labelled kiln, three stoves, a slip house, a throwing shop, a dipping house and a workshop. As the kilns are shown on the map it is likely they would have risen through the roof; a type known as the stack kiln variant.

2.5.27 By this date there had been restructuring within the pottery as the easternmost kiln shown on Oliver's plan of 1830 has been removed and the south-eastern corner of the site had been squared off and replaced by a dipping house. From the map regression, it is evident that the pottery grounds expanded to the north-west to forming a walled yard. This newly created yard would have stored the raw material such as stone, flint, chert, clay, gypsum, marl and coal before moving to their required destination (Bell & Gill 1973, 5). When local sources of raw material had been exhausted material would have been brought in from the rest of the United Kingdom; flints came from the south in the ballast of ships, fine clays arrived from Dorset and Cornwall, with the coarse clays likely being sourced locally.

2.5.28 Apart from a rectangular kiln shown adjacent to the workshop, the four stack kilns and three stoves are shown in close proximity to each other at the south-west corner of the pottery (Figure 12). The siting of a kiln in a pottery site was based on ease of access in relation to the workshops, warehouses and fuel stores and the logical progression of the raw materials through the various stages of pottery production within the factory (Baker 1991, 107).

2.5.29 The pottery was closed in 1893 (Bell & Gill, 1973, 7; Morgan 2007, 22) with the majority of structures being demolished prior to 1896 (shown on the Ordnance Survey of 1898; Figure 13). Several buildings were constructed upon the former site of the pottery, including a stable, slaughterhouse and a stone masons yard. These were demolished in the mid-20th century.

2.5.30 After the Newcastle Pottery had expanded west, the area to the north-east of Cookson's Lane was redeveloped. Oliver's map of 1830 (Figure 11) shows an iron foundry (HER 4886) at the junction of Forth Banks and Pottery Lane. The foundry was occupied by Robson, Riddle & Co (later referred to as the Skinnerburn Iron Works) and is depicted as a large rectangular building with a yard and additional smaller buildings to the rear. The Ordnance Survey of 1862 (Figure 12) labels the various rooms of the iron works that includes a forge, the iron store house, a moulding house, a smith's shop and a cleaning

shop. Like the pottery, the configuration of the iron works had changed since Oliver's map 32 years earlier.

2.5.31 The Skinnerburn Iron Works was still in existence by 1896 although the Ordnance Survey map shows that the site had been slightly reconfigured and reduced in size (Figure 13). In 1899 the remains of the iron works were largely rebuilt and reconfigured for Robert Henzell who operated the Henzell Northern Oil Company established in 1881 (Phoenix Consulting 2015, 29). Henzell's main factory was at Old Mansion House Close, but success had necessitated expansion, and the Company decided to take over the old iron works at Forth Banks to build new storage, blending and distribution facility. The warehouses occupied the site to the north-east of Cookson's Lane until they were demolished between 2015 to 2016.

2.5.32 The Skinner Burn area has been associated with industry since the mid-18th century with various enterprises being located in the area such as the Flint Glass Works (HER 4888), a large brewery (HER 4895), a plate glass works (HER 4881), lime kilns (HER 4884), rope manufacturers (HER 4882), a steam flour mill (HER 4887), a timber yard with saw mill (HER 4889), and the engineering works of Robert Stephenson to the east (HER 4347 & 9253).

2.5.33 The establishment of the railway and Central Station (HER 4130) for the Newcastle & Carlisle Railway brought major change to the area in the mid-19th century. The station was designed by John Dobson and built mainly in 1850. The railway line extending from the station to the south-west was known as the Newcastle Branch Line which ran from the original line over the Tyne into Newcastle and was laid out to Forth Banks in 1847 and into Central Station in January 1851. Once Central Station had been completed the area around Forth Banks was given over to goods traffic and the Newcastle and Carlisle Goods Shed was built on the northern side of Pottery Lane, which opened in June 1854 (HER 4321) and the Forth Banks Goods Station to the west of this from 1866 (HER 4321). From the 1870s all of Newcastle's goods traffic was handled on this site and the building was reputed to be one of the largest of its kind in the world. Re-developments within the area culminated in the construction of the 1902-6 King Edward VII Railway Bridge (HER 1010), the construction of the Goods Station Main Offices at King's House in 1904, and in 1907 the construction of the Good's Station Warehouse (HER 8917). These structures, located opposite the pottery site, have recently been redeveloped as a police headquarters building and a programme of building recording and archaeological monitoring was undertaken in association with this work (Fawcett & Morrison 2016).

3. PROJECT AIMS AND RESEARCH OBJECTIVES

3.1 Project Aims

3.1.1 From the outset, the aim of the work was set out in the Specification for Preliminary Archaeological Evaluation at Forth Banks/Pottery Lane (NCC 2016a). In general, the purpose of the archaeological evaluation was to determine and understand the nature, function, and character of the site in its cultural setting. Moreover, the evaluation was undertaken to ensure that all archaeological remains were identified, and, if required, a suitable strategy set in place to mitigate the impact of the development on the historic environment.

3.1.2 The trenching revealed limited remains of the Skinnerburn Iron Works within Trench 1 and the well-preserved remains of the Skinnerburn/Newcastle Pottery in Trenches 2 and 3.

3.1.3 No further archaeological work was required on the site of the iron works (north-east of Cookson's Lane), however further archaeological excavation was required on the site of Newcastle Pottery (south-west of Cookson's Lane). Accordingly, a Specification for Strip and Record Archaeological Excavation was issued (NCC 2016b) with the aim of stripping the site of modern overburden deposits, hand cleaning the archaeological horizons, and creating a measured survey of the structural elements present across the site prior to the site being developed.

3.1.4 The broad aim of the project was to record the heritage assets within the development site prior to their destruction. Additional aims of the project were:

- to compile a Site Archive consisting of all site and project documentary and photographic records, as well as all artefactual and palaeoenvironmental material recovered;
- to compile a report that contains an assessment of the nature and significance of all data categories, stratigraphic, artefactual, etc.

3.2 Research Objectives

3.2.1 Given the findings of the archaeological desk-based assessment (Phoenix Consulting 2015), the project was considered to have little or no potential to contribute to existing knowledge of prehistoric, Roman, or medieval periods in Newcastle. The archaeological potential the site was considered to be for the post-medieval industrial period specifically associated with Skinnerburn/Newcastle Pottery and the Skinnerburn Ironworks.

3.2.2 Preservation *in situ* of important archaeological remains is almost always the preferred option in any development scheme. In most cases, however, this is not possible, with the result that appropriate and satisfactory provision for the recording of archaeological remains is usually implemented, followed by post-excavation analysis and publication of results. Therefore, the principal research objective of the archaeological investigations herein described was to further expose, record and excavate any remains relating to the

pottery and the ironworks site, to gather information on construction techniques, phases of development and refurbishment associated with the historically important buildings.

3.2.3 The archaeological investigations had the potential to make a significant contribution to archaeological knowledge of the post-medieval era. *Shared Visions: The North-East Regional Research Framework for the Historic Environment (NERRF),* highlights the importance of research as a vital element of development led archaeological work in the north-east of England (Petts & Gerrard 2006).

3.2.4 The post-medieval period in the north-east was one of radical and deep-rooted change and saw a transition from an agricultural to an industrial economy; a shift from a primarily rural population to an urban one and a move from horse power to, first, water power, then steam power. As such, the period saw a massive increase in industry, reflecting and causing technological changes, new patterns in social organisation and an increased demand for consumer goods.

3.2.5 Within the North East, one of the most significant manufacturing industries was iron and steel working. The Skinnerburn Iron Foundry is noted on the development site north-east of Cookson's Lane and was in operation from at least 1830. The NERRF notes that by the 19th century foundries were common in urban areas, however, the archaeology of the foundry trade has received little attention nationally and virtually none within the region (Petts and Gerrard 2006, 97).

3.2.6 Key research questions to be addressed from the NERRF in regard to the Skinnerburn Ironworks are detailed below:

Post-Medieval Research Agenda

- *PMii. Industrialisation:*

Industry and Transport: Archaeometallurgy

- *ID9. The recovery of archaeological material indicative of metal working*
- *ID11. A type series of slag and other metallurgical residues should be developed.*

3.2.7 Several important pottery industries existed in the North-East in the post-medieval period, with over 100 firms being documented to have produced ceramics in the Tyneside region alone between 1730 and the mid-20th century (Bell and Gill 1973, cited in Petts and Gerrard 2006, 98).

3.2.8 Within the NERRF (2006, 178) it is noted that the ceramics industry is poorly understood and, despite the presence of major industries in the region, there has been little accompanying archaeological work.

3.2.9 Historic England's (2015) *Archaeological and Historic Pottery Production Site: Guidelines for Best Practice* provides advice on how to investigate sites where pottery production has

taken place. The document also provides guidance on the available methods and strategies for examining, recording and sampling features and finds of various types at each stage of the work.

3.2.10 When excavating a pottery production site, it is essential to develop site specific research questions, which will maximise the potential for understanding the site and its products, as well as more general aspects of technology, chronology and distribution. Historic England's guidelines (2015, 4) suggest key areas to prioritise research when excavating pottery production sites. The research questions to be addressed at the Skinnerburn/Newcastle Pottery are listed below and are adapted from Historic England's guidelines (*ibid.*):

Organisation

- When was pottery made at the site?
- What is the extent and layout of the production site?
- Are there features associated with clay extraction and preparation, such as clay pits, levigation systems, mixing floors or placements for blungers or mills?
- Is there evidence for processing other raw materials, including glazes, pigments or tempering materials, for example features or finds associated with milling, fritting or drying?
- Where were the raw materials, including fuel, tools and equipment, stored?
- Is there evidence to indicate where different production processes took place, for example potting, drying, dipping and printing?
- How many and what types of kilns were in use and for how long? Were they contemporaneous or did they have different functions?

Technologies

- What types of pottery were made at the site and how were they manufactured? Were they coil-built slab-built, turned, wheel-thrown, moulded or slip-cast? Are there any surviving tools, moulds or associated features?
- How were the kilns constructed, how did they operate and how were they fuelled?
- How was the pottery stacked in the kilns; were props, spacers, trivets or saggars used?
- Were the vessels fired once or more? How closely was the atmosphere controlled?
- What clay sources were used and how was the clay modified, for example mixing clays, adding temper or colourants, making a slip for casting or decoration?

- How were the vessels decorated? Do raw materials, tools or equipment used for decorating the surfaces survive?

Economic and Wider Context

- What were the level, scale and longevity of production?
- How do the products from the site relate to pottery recovered from consumer sites? How was the pottery transported, distributed and used?

4. ARCHAEOLOGICAL METHODOLOGIES

4.1 Fieldwork

4.1.1 The Specification issued by the Archaeology Officer at Newcastle City Council for both the archaeological evaluation and the excavation (NCC 2016a & b respectively) set out the research aims and objectives of the project and, in a series of detailed method statements for project execution, described the techniques and approaches to be employed to achieve those aims and objectives.

4.1.2 The first phase of the archaeological investigations at the site were undertaken by Phoenix Consulting Archaeology Ltd (2015) in the form of a desk-based assessment and photographic record of the warehouses that occupied the land to the north-east of Cookson's Lane.

4.1.3 Pre-Construct Archaeology Limited were commissioned to undertake an archaeological trial trenching evaluation of the site in September 2016. The trenches were required to inform the Local Planning Authority of the character, nature, date, depth, and degree of survival of archaeological deposits on the site. The evaluation was undertaken from 19th September to 8th October 2016. Modern overburden and deposits of limited archaeological significance were excavated using a 30-tonne tracked excavator with a toothless ditching bucket under archaeological supervision.

4.1.4 Trench 1 was located north-east of Cookson's Lane and was positioned north-west/south-east to evaluate the survival of the 19th-century Skinnerburn Iron Works. The trench was originally planned to be 2m x 30m, however, due to the substantial thickness of modern overburden at the north-western extent of the site the trench could only be excavated to a maximum length of 9.2m with the north-western end of the trench shortened due to health and safety constraints. Trench 1 was excavated to a maximum depth of 1.86m; the remains of a brick structure were observed that are perhaps related to the warehouses of the Henzell Oil Company that occupied the site.

4.1.5 Trenches 2 and 3 were both located to the south-west of Cookson's Lane and were targeted over the site of Newcastle Pottery (in particular the pottery kilns shown on the Ordnance Survey of 1862) and were both aligned north-west/south-east. The dimensions of Trenches 2 and 3 were 2m x 30m and 2m x 40m respectively, and were excavated to a maximum depth of 2.03m (Trench 3, south-western extent).

4.1.6 Trenches 2 and 3 uncovered significant remains of the Newcastle Pottery including the remains of the slip house, pottery kilns and various other structures relating to the production of pottery.

4.1.7 No further archaeological work was required on the site of the Skinnerburn Iron Works (north-east of Cookson's Lane), however, following the identification of significant remains of Newcastle Pottery within Trenches 2 and 3, the site south-west of Cookson's Lane was

planned to be excavated in its entirety (NCC 2016b). The north-western extent of the site was not excavated due to the scale of modern truncation in this area and the presence of a live service.

4.1.8 All fieldwork was undertaken in accordance with the relevant standard and guidance documents of the Chartered Institute for Archaeologists (CIfA) (CIfA 2014a & b). PCA is a CIfA-Registered Organisation. Furthermore, the fieldwork and post-excavation analysis was carried out in accordance with the *Yorkshire, the Humber & The North East: Regional Statement of Good practice for Archaeology in the Development Process* (SYAS 2011). Historic England's (2015) *Archaeological and Historic Pottery Production Sites- Guidelines for Best Practice* was also consulted.

4.1.9 The excavation area measured 28.8m NE-SW and 74.40m (maximum) NW-SE and at its maximum depth was over 2m deep at the south-eastern extent.

4.1.10 Investigation of archaeological levels was undertaken by hand, with cleaning, examination and recording both in plan and section, where appropriate. Cleaning was restricted to portions of probable and certain archaeological features identified during machine removal of overburden. Investigations followed the normal principals of stratigraphic excavation and were conducted in accordance with the methodology set out in PCA's site manual (PCA 2009).

4.1.11 An overall plan of all archaeological features was compiled using a mixture of GPS survey and hand drawn plans. Plans were drawn at 1:20 from both baselines and grids. The elevations of structures were located using the site grid or GPS and recorded as appropriate, using a single context recording system utilising pro forma context recording sheets. Plans were drawn at 1:20 and sections at 1:10 & 1:20.

4.1.12 A photographic record of the investigations was compiled using a digital SLR camera illustrating in both detail and general context the principal features and finds discovered. The photographic record also included 'working shots' to illustrate more generally the nature of the archaeological operation mounted. All record photographs included a legible graduated metric scale.

4.1.13 A survey grade GPS was used to establish Temporary Bench Marks (TBMs) on the site. The height of all principal strata and features were calculated relative to Ordnance Datum using the TBM and indicated on the appropriate plans and sections.

4.2 Post-excavation

4.2.1 The stratigraphic data generated by the project is represented by the written, drawn and photographic records. A total of 386 archaeological contexts were defined during the course of the archaeological investigations (Appendix 2). The contents of the paper and photographic elements of the site archive are quantified in Section 6. Post-excavation work involved checking and collating site records, grouping contexts and phasing the stratigraphic data (Appendix 3).

4.2.2 The archaeological features recorded during the archaeological investigation have been placed within eight phases of activity: Phase 1, the superficial geology of the area; Phase 2, medieval field boundaries; Phase 3, developed soil; Phase 4.1, Skinnerburn/Newcastle Pottery; Phase 4.2, a clay extraction pit; Phase 4.3, later additions to Newcastle Pottery *c.* 1862 to 1893; Phase 5.1, demolition and landscaping of the pottery site post 1893; and Phase 5.2, late post-medieval (post 1896) to modern. A written summary of the archaeological sequence was then compiled, as described in Section 5.

4.2.3 Artefactual material from the investigations comprised a substantial assemblage of pottery including many 'wasters', a large quantity of kiln furniture including saggars and kiln stilts, clay tobacco pipes and brick samples. For each category of material, an assessment report has been produced including a basic quantification of the material, and a statement of its potential for further analysis. The reports are contained in Appendix 5, 6, and 7 (pottery, clay tobacco pipe and brick assessments respectively).

4.2.4 The complete Site Archive, in this case comprising the written, drawn and photographic records (including all material generated electronically during post-excavation) an d retained elements of the artefactual assemblage, will be packaged for long term curation.

4.2.5 In preparing the Site Archive for deposition, all relevant standards and guideline documents referenced in the Archaeological Archives Forum guidelines document (Brown 2007) will be adhered to, in particular a well-established United Kingdom Institute for Conservation (UKIC) document (Walker, UKIC 1990) and an CIfA publication (CIfA 2014c). The depositional requirements of the body to which the Site Archive will be ultimately transferred will be met in full.

4.2.6 At the time of writing the Site Archive is housed at the Northern Office of PCA, Unit N19a Tursdale Business Park, Durham, DH6 5PG. When complete, the Site Archive will be deposited with the Great North Museum, Newcastle upon Tyne, under the site code FBP16. The Online Access to the Index of Archaeological Investigations (OASIS) reference number for the project is: preconst1-275153.

5. RESULTS: THE ARCHAEOLOGICAL SEQUENCE

5.1 General

5.1.1 The archaeological fieldwork has been split into two sections; the evaluation and the excavation phase of the investigation. Only Trench 1 will be discussed in the evaluation section and the remains in Trenches 2 & 3 have been amalgamated with the excavation phase of work.

5.1.2 During the investigations, separate stratigraphic entities were assigned unique and individual 'context' numbers, which are indicated in the following text as, for example, [100]. Contexts from Trench 1 begin at [100], while contexts from the excavation (including the stratigraphic sequence from Trenches 2 and 3) are numbered from [1000] onwards.

5.1.3 The archaeological sequence is described by placing stratigraphic sequences within broad phases, assigned on a site-wide basis in this case. The archaeological features recorded during the archaeological investigation have been placed within eight phases of activity: Phase 1, the superficial geology of the area; Phase 2, medieval field boundaries; Phase 3, developed soil; Phase 4.1, Skinnerburn/Newcastle Pottery; Phase 4.2, a clay extraction pit; Phase 4.3, later additions to Newcastle Pottery *c.* 1862 to 1893; Phase 5.1, demolition and landscaping of the pottery site post 1893; and Phase 5.2, late post-medieval (post 1896) to modern.

5.1.4 An attempt has been made to add interpretation to the data, and correlate these phases with recognised geological and historical periods.

5.1.5 Plan, sections and elevations of the archaeological phases are within the Appendix 1. The locations of sections and elevations are shown on Figure 15. The various specialist reports can be found in the Appendices (Appendix 5: Pottery Assessment, Appendix 6: Clay Tobacco Pipes Assessment and Appendix 7: Brick Assessment).

5.2 The Archaeological Evaluation: Trench 1

Phase 5.2

5.2.1 Trench 1 (Figure 14) was excavated to a maximum depth of 1.86m at 10.77m AOD. No geological material was observed in the trench and due to health and safety constraints the trench could not be excavated to a greater depth.

5.2.2 Numerous deposits were observed at the south-eastern extent of the trench for a distance of *c.* 2.18m NW/SE, continuing beyond the limits of excavation. Tip lines were observed and the deposits sloped down from the NW to the SE to a maximum depth of 0.88m. The deposits consisted of light grey crushed rubble [109] as the basal deposit overlain by a light yellowish grey crushed stone layer [108], dark greyish brown coarse sand/gravel [107], light grey demolition rubble [106], black coarse sand [105], dark brownish grey coarse sand [104], mid reddish grey demolition rubble [103], black silty sand [102] and light yellowish grey sandy clay [101]. The deposits represent ground raising dumps.

5.2.3 A brick wall [111] was observed at 12.24m AOD within the north-east facing section of Trench 1; this was brick built with occasional sandstone blocks and measured 1.32m NW/SE in section, 0.40m NE/SW, and 0.48m high (Plate 1). The bricks measured 225mm x 110mm x 65mm and were bonded with a light grey lime mortar. The function of the brick structure remains unknown due to the level of truncation, but it may relate to the restructuring by the Henzell Oil Company on the site of the Skinnerburn Iron Works.

5.2.4 Both the deposits noted in the south-eastern extent of the trench and brick structure [111] were truncated by a demolition cut [110] which measured over 2.65m NE/SW, *c.* 0.9m wide, and was excavated to a depth of 0.85m. The demolition cut was filled by a dark greyish brown sandy clay [112].

5.2.5 Running across the trench for a distance of 9.2m WNW/ESE was a linear cut [113], filled with dark grey silty sand [114], and excavated to a maximum depth of *c.* 1.80m deep to the limit of excavation at the base of the trench. Observed within backfill [114] was a large section of iron piping that was likely truncated during the demolition of the former Henzell Oil Company warehouses and was perhaps used to transport the oil.

5.2.6 The uppermost deposit noted within the trench comprised brick/concrete rubble [100] *c.* 1.87m thick, derived from the demolition of the warehouses that previously occupied the site.

5.3 The Archaeological Excavation

Phase 1: Geological Sub Stratum

5.3.1 The natural sub-stratum exposed intermittently across the entire excavation area comprised mid-brownish yellow boulder clay [1002]. This glacial till deposit was encountered at a maximum/minimum height of 22.13 and 20.11m above Ordnance Datum (AOD).

Phase 2: Agricultural Field Boundaries (medieval)

5.3.2 Phase 2 comprised four features cut into the natural sub-stratum; pit [1142] and elements of three ditches (Figure 15 and 16).

5.3.3 Part of a NE/SW aligned ditch [1101] was exposed for a maximum distance of 2.06m at the south-western extent of the site; this was up to 0.60m wide by 0.17m deep and had a U-shaped profile (Figures 15, 16; Section 104, Figure 17; Plate 2). The north-eastern end of the ditch was truncated by a 20th-century brick structure while the south-western end was truncated by a geotechnical pit. The ditch was filled by light greyish brown silty sand [1100] and likely represented an agricultural field boundary.

5.3.4 Located *c.* 7m to the north-east was a segment of another ditch (Group 1). This was recorded for a distance of *c.*3.70m NE-SW and had a rounded terminus at the north-eastern end with the south-western end of truncated by a modern intrusion, possibly a geotechnical pit (Figure 15, 16; Section 107 & 111, Figure 17; Plate 3). Two sections were

excavated across ditch Group 1, which had a U-shaped profile and was filled with mid reddish grey silty sand, representing the natural silting of the ditch. The dimensions are summarised below:

Slot No.	Phase 2: Ditch Group 1			
	Width	*Depth*	*mAOD*	
			Top	*Base*
1116	0.72m	0.20m	21.71	21.51
1131	0.67m	0.17m	28.70	28.53

Table 5.1: Ditch Group 1 dimensions

5.3.5 Ditch Group 3 ran NW-SE parallel to the north-eastern boundary of the site and was exposed for a distance of 43.59m (Figure 15 & 16). Four slots were excavated through the ditch (Sections 100, 101, 102 & 113, Figure 17;) although the full width of the ditch was not exposed due to the limit of excavation. The table below summarises the dimensions of each slot:

Slot No.	Phase 2: Ditch Group 3			
	Width	*Depth*	*mAOD*	
			Top	*Base*
1059	>0.90m	0.25m	20.08	19.81
1064	>2.10m	0.32m	20.60	20.27
1067	>2.85m	0.60m	20.37	19.69
1132	>1.36m	0.40m	19.95	19.52

Table 5.2: Ditch Group 3 dimension

5.3.6 The ditch was truncated in numerous places by structural elements of the 19th-century Newcastle Pottery, and also by late 20th-century structures and modern intrusions. Ditch Group 3 was filled by a single phase of natural silting up to a maximum thickness of 0.60m and comprised mid to dark greyish brown silty clay Group 4 (Plate 4):

5.3.7 Three sherds of reduced greenware medieval pottery of 13th to 14th century date were recovered from the lower fill [1063] of Group 3 ditch slot [1064].

5.3.8 The ditch was evidently a substantial feature; the maximum exposed width in slot [1067] was 2.85m and the profile indicates that it may have been up to double this width. The ditch was on the same alignment as the Skinnerburn which at this period would have flowed to the east of the site and it is possible that this formed a major boundary along the edge of the steep valley. The smaller ditches running at right angles to the south-west may have formed elements of field systems.

5.3.9 A small pit was observed truncating natural silting deposit within slot [1132] of ditch G3. The sub-circular pit [1142] measured 0.24m NE-SW and 0.20m NW-SE, with a depth of 0.35m. The ditch was filled with a light bluish brown silty clay [1143].

5.3.10 Bulk environmental samples were processed from Group 3 ditch fills [1063] & [1069] and Group 1 ditch fill [1130] from which no environmental or cultural remains were recovered.

Phase 3: Developed Soil (early post-medieval)

5.3.11 Phase 3 activity comprised a developed soil [1017] which overlay the medieval field boundary system. This extended across the extent of the excavated area, surviving intermittently where not truncated by the structural and other features (Figure 17, Sections 102 & 113; Figure 22, Section 103; Figure 23, Section 112; Figure 24, Sections 114 & 117; Figure 26, Section 126 & 130). The deposit comprised dark greyish brown clayey silt and its maximum thickness was 0.44m, observed at a maximum/minimum height of 22.01m and 19.99m AOD respectively. This part of Newcastle lay undeveloped prior to the early 18th century and the developed soil recorded overlying all Phase 2 ditch features probably represents the agricultural horizon that formed during this period (Figures 4 to 8).

Phase 4.1: Skinnerburn/Newcastle Pottery (early 19th century)

5.3.12 Cartographic and documentary evidence suggests that the earliest structural remains which survived at the site date from the 1820s. The factory appears to have been rebuilt between the time of Kidd's 1802 map (Figure 9) and Wood's 1827 map (Figure 10). Oliver's plan of 1830 (Figure 11) shows the works in greater detail, but it is evident that the layout is the same as that on Wood's plan; a U-shaped range of buildings with a central courtyard with access from Pottery Lane at the north-west end of the complex. Four circular kilns are situated in the southern end of the works, evidently internal to the pottery.

5.3.13 The 1962 Ordnance Survey map (Figure 12) shows that some modifications to the works had taken place by this date, particularly in the south-eastern corner, though much of the original layout remained. Features assigned to Phase 4.1 activity comprise structural remains which correlate with features seen on Wood's map of 1827 and Oliver's map of 1830 (Figure 10, 11, 15 and 18). These remains were largely confined to the south-eastern corner of the excavation area, with a few elements also surviving in the south-western corner. For the purpose of this assessment all other structural remains have been assigned to Phase 4.3, though it is evident that many external and internal walls may have been constructed in the early 19th century with the layout of some elements modified by the 1860s. The bricks used in the construction of the walls cannot be used to provide precise dating of each element. The dimensions of common or house bricks used to construct walls and other associated features suggest that none are earlier than the very late 18th century, and most belong to the first half of the 19th century (Appendix 7).

5.3.14 A *c.* 8.50m long length of the external wall of the pottery was observed cutting the developed soil along the north-eastern boundary of the site, in the eastern corner of the excavation area (Plate 5). This wall formed one side of a room within which one of the kilns was situated. The wall had sandstone foundations [1222] with brick upper courses [1006] and was evidently of substantial construction, the foundations were at least 0.63m wide and upper brick wall 0.38m wide, although the full width was not exposed within the excavation area.

Context	Type	Description	Interpretation
1012	Cut	Linear with steep sides; flat base; > 8.82m NW/SE x 0.54mNE/SW x >0.29m (not fully excavated).	Construction cut for wall [1006]
1222	Masonry	NW/SW aligned sandstone foundations for brick wall [1006]; roughly hewn; uneven courses >8.46m NW/SE x >0.63m NE/SW x >0.25m high.	Wall foundations
1006	Masonry	NW/SE aligned English Garden wall bonded brick wall >8.82m x 0.38m NE/SW x 1m high. (Plate 5).	Wall
1221	Fill	Soft mid reddish brown silty clay.	Fill of construction cut [1012]

Outer Wall of Skinner Burn/Newcastle Pottery

5.3.15 Elements of five updraught bottle kilns were also recorded, although with one exception only very fragmentary traces survived. Four kilns can be seen on Oliver's 1830 plan in the southern end of the pottery works as circular features internal to the buildings and the archaeological remains correlate well with the historic mapping. Two kilns were recorded in the eastern corner of excavation but their locations indicate they could not have been contemporary, with one evidently replacing another. The map sequence shows that by 1862 there was no kiln in this corner of the works, but the three others were retained.

5.3.16 In the southern corner of the excavation area, kiln foundation [1053] (Group 75) had been heavily truncated during demolition in the 20th century so only the heat-affected sandstone foundations of the structure survived (Plate 6). It was notable that the clay substratum around the foundations had also been heat-affected, providing further evidence for the location of a kiln in this area. This kiln remained in use on the 1862 map of the works.

Context	Type	Description	Interpretation
1053	Masonry	Roughly hewn sandstone wall surviving for one course. Bonded with mortar. Individual stone measurement varies from 400x330x95mm to 750x520x100mm. Sandstone wall shows evidence of heat. 3.36m NE/SW x 0.58m wide x 0.27m high. Truncated during 20th-C demolition work (Plate 6).	Kiln foundations
1214	Cut	Curvilinear with vertical sides; flat base; 3.36m NE/SW x 0.58m Wide x 0.27m deep.	Construction cut for kiln foundations 1053

Group 75 Kiln Construction

5.3.17 Fragmentary traces of a second kiln (Group 8) were located slightly further to the north-east, this comprised a small fragment of the sandstone and firebrick kiln wall and an ash pit [1073] and another small section of wall [1169] and ash pit [1166] (Figures 18 and 19; Plate 7). The ash pit would have been located at the very bottom of the firemouth of the kiln under the firebars and collected ash from the burnt coal during the firing process.

5.3.18 Small pottery assemblages recovered from fill [1193] and [1189] of fire pit [1073] were not closely datable; 1740-1900 and 1775-1900, respectively. The fragments of the Group 8 kiln wall were *c.* 4m apart. This kiln also remained in use on the 1862 Ordnance Survey map and the external diameter of the kiln on this map is *c.* 6m (Figure 12; Figure 28).

Context	Type	Description	Interpretation
1073	Masonry	Roughly hewn sandstone blocks with firebricks and fireblocks; one course survived. 3.2m NW/SE x 0.80m NE/SW x 0.08m high. Comprised of two ash pits. (Plate 7)	Kiln
1190	Cut	Curvilinear with vertical sides. Base not excavated. NW-SE, N-S alignment for two ash pits. 3.2m NW/SE x 0.80m NE/SW x 0.08m deep.	Construction cut for kiln remnant [1073]
1166	Masonry	Remnant of kiln comprising firebrick ash pit. 0.58m N/S x 0.38m E/W x 0.26m high.	Kiln
1168	Cut	Steep sides; flat base.	Construction cut for kiln remnant [1166]
1169	Masonry	Fireblock kiln remnant, rectangular, 300x300x70mm.	Kiln
1171	Cut	Linear, vertical sides, base flat. Truncated by [1074] and [1158].	Construction cut for kiln remnant [1169]
1167	Fill	Loose, pinkish white, degraded mortar and sand with occasional cbm fragments and pot. (Refer to Appendix 5). Thickness 0.10m	Fill of ash pit [1166]
1189	Fill	Loose, dark greyish black, ash with sand. Frequent pottery inclusions. Fill of two ash pits. N: 0.90mx0.88m. Thickness 0.08m S: 1.05x0.70m. Thickness 0.11m. Pottery recovered from fill (refer to Appendix 5).	Fill of ash pit [1073]
1193	Fill	Loose, medium pinkish grey, coarse sand. CBM fragments and pot inclusions (refer to Appendix 5).	Fill of ash pit [1073]

Group 8 Kiln Construction and associated features

5.3.19 Another heavily truncated kiln (Group 10) was recorded to the south-east of Group 8 close to the limit of excavation, only traces of the firebrick ash pit [1050] survived but the 1830 Oliver map demonstrates that this was the location of another circular kiln (Figure 18; Plate 8). This was also in use on the 1862 Ordnance survey map (Figure 12; Figure 28). One of the firebricks was stamped *M.T.& Co.* M. Thompson was making fire-bricks at Ouseburn in 1855, and at Delaval, Scotswood Road, in 1875 (Davison 1986, 67), indicating that the firepit was repaired during the use of the kiln.

Context	Type	Description	Interpretation
1050	Masonry	Firebrick ash pit bonded with dark grey lime mortar. One of the firebricks was stamped *M.T.& Co.* (refer to Appendix 7). (Plate 8)	Kiln
1300	Cut	Linear, vertical, sharp break of slope, flat base.	Construction cut for kiln [1050]

Group 10 Kiln Construction

5.3.20 The best-preserved kiln (Group 14) was located in the eastern corner of the excavation area, adjacent to the boundary wall of the pottery. The G14 kiln (Figure 19 & 24; Section 117; Plate 9) survived as 0.47m wide sandstone foundations [1038] with a common brick upper lining [1037] within construction cut [1039]. The internal diameter of the kiln was 3.29m, and external diameter was 4.42m. In the centre of the kiln was a circular cut [1271], *c.* 0.64m in diameter which contained a bedding layer [1151], fireblock layer [1150], and two backfill deposits [1149] and [1270]. The feature is perhaps the remains of a well hole within the kiln (Figure 19 & 24; Section 117; Plate 10). Well holes were central holes in the floor of the bottle kiln that connected all the underfloor flues. During firing a pipe bung or well hole pipe was placed over it to carry flames or hot gasses up the centre of the oven. Unfortunately, due to the extent of truncation, only the lower course of the central well survived with the underfloor flues being truncated in the 20th century during the demolition works at the site. The foundations were unusual as many pottery kilns are noted to be constructed on a cork (broken bricks filled in with waste pottery and then smoothed over with fired sand *c.* 3 to 4 feet thick) rather than sandstone foundation blocks. Pottery dated to 1805-1893 was recovered from fill [1149] of the well hole and a small pottery assemblage recovered from layer [1151] in the feature was not closely datable; 1740-1900.

Context	Type	Description	Interpretation
1037	Masonry	Brick kiln wall survived for two courses of header bond, bonded with light grey lime mortar. Individual brick measurements 220x110x60mm. Width 0.47m. Internal diameter 3.29m. External diameter 4.24m (Plate 9).	Kiln wall
1038	Masonry	Sandstone, roughly hewn, kiln foundations surviving for two courses in the east and one to the west due to topography, bonded by light grey lime mortar. Width 0.47m, Internal diameter 3.29m, External diameter 4.42m.	Sandstone kiln foundation
1039	Cut	Circular, vertical sides, flat base. External diameter 4.24m. Internal diameter 3.29m.	Construction cut for kiln foundations [1038]
1149	Fill	Soft, dark bluish grey, sandy clay/ash with frequent kiln furniture, occasional fragments of pottery and one fragment of saggar (refer to Appendix 5).	Backfill of kiln well hole
1270	Fill	Loose, light greyish red, coarse sand. Thickness 0.02m.	Backfill of kiln well hole.
1150	Masonry	Sandstone and fire clay blocks, roughly hewn, one course thick. Individual measurements 260x140x60mm (Plate 10).	Foundations for well hole
1151	Fill	Soft, dark bluish grey, silty clay with occasional pottery and kiln furniture. Thickness 0.08m. Pottery and kiln furniture recovered from fill (refer to Appendix 5).	Bedding for well hole foundations [1150]
1271	Cut	Circular, sharp break of slop at top and bottom, flat base. Diameter 0.64m. Depth 0.18m.	Construction cut for well hole

Group 14 Kiln Construction

5.3.21 A later alteration comprised the insertion of a 2.52m long and 0.5m wide brick and fire brick wall [1041] across the south-eastern side of the circular kiln foundation (Figure 19). The function of the alteration is not known but perhaps may relate to the base of a flue that would have carried the hot gases around the kiln during firing.

Context	Type	Description	Interpretation
1041	Masonry	Brick, firebrick and fireblock kiln feature, one course thick bonded with light grey lime mortar. Large circular fireblock slab in centre measuring 540x340x40mm truncated by pit [1274]. Individual brick measurements 220x110x60mm. Length 2.52m. Width 0.50m. Height 60mm.	Kiln alteration
1040	Cut	Linear, vertical sides, flat based construction cut running E-W. Truncates brick kiln lining [1037] and kiln foundation [1038]. Truncated by pit [1274]	Construction cut for [1041]

Kiln alteration

5.3.22 Another kiln (Group 11) was noted *c.* 1.28m to the west of the Group 14 kiln, only a small section of the 0.32m wide foundations of the firebrick kiln wall [1036] survived along with a brick floor surface [1034] (Figure 19). Due to the close proximity of kiln Groups 14 and 11 it is evident that they are not contemporary, however, as no direct stratigraphic relationship between the two structures existed, it was not possible to establish which kiln was constructed first. Given the better survival of the Group 14 kiln it is possible that it was the later kiln.

Context	Type	Description	Interpretation
1034	Masonry	Brick floor surface, one course set on edge bonded with dark grey brown fine sand. Individual brick measurements 240x110x65mm. 5.42m NW/SW x 1.34m NE/SW x 110mm thick.	Floor
1272	Layer	Compact, dark grey brown, fine sand. Thickness 30mm.	Bedding for floor surface [1034]
1036	Masonry	Firebrick kiln wall surviving for two courses of stretcher and half-bat bricks bonded with sand. Individual brick measurements 220x110x65mm. Length 1.38m. Width 0.32m. Height 0.15m.	Kiln wall
1289	Cut	Curvilinear, vertical sides and flat base.	Construction cut for wall [1036]

Group 11 Kiln

5.3.23 A sandstone, brick and firebrick surface [1035] partially overlay the remains of kiln Group 11. The surface is perhaps contemporary with kiln Group G14 as the surface overlies kiln Group 11. Pottery recovered from the bedding layer [1277] for the surface dates to 1840-1893.

Context	Type	Description	Interpretation
1035	Masonry	Sandstone, brick, firebrick and fire block;	Floor surface

		bonded with light grey sandy clay. Contemporary with [1036]. Individual brick measurements 230x110x60mm. Individual sandstone measurements 310x400x60mm. 4.52m NW/SE x 2.04m NE/SW.	
1277	Layer	Compact, dark grey brown, coarse sand. Pottery recovered from deposit (refer to Appendix 5).	Bedding for layer [1035]

5.3.24 Oliver's 1830 map (Figure 11) shows that the kiln in the eastern corner of the site was situated within a room and elements of three of the walls which formed the room and enclosed kiln Groups 11 and 14 were recorded (Group 12). The internal dimension of the room was *c.* 7m NE-SW; the north-western side did not survive but the room was at least 9m long. The south-western side of the room was defined by a 0.30m wide brick wall [1027] (Figure 19; Plate 11) and the north-eastern side by the external wall of the pottery [1006]. The south-eastern side of the room was defined by a *c.* 0.45m wide NE-SW brick wall [1282] with a brick culvert [1294] running adjacent to it. The eastern end of wall [1282] was truncated but the culvert turned to run NNE corresponding to the angular corner of the pottery works shown on the 1830 map.

Context	Type	Description	Interpretation
1027	Masonry	Brick wall of English garden wall coursing bonded with light grey lime mortar. Wall dog-legs at the southern extent. (Plate 11)	Partition wall within pottery
1028	Cut	Linear, vertical sides, base not exposed construction cut.	Construction cut for wall [1027]
1290	Cut	Sub-square, vertical sides, flat base.	Construction cut for column base [1031]
1292	Masonry	Brick wall only visible in plan bonded with light grey lime mortar. Individual brick measurements 220x110x65mm.	Wall
1293	Cut	Linear, vertical sides, flat base. NE-SW alignment. Truncated by culvert cut [1295] and column base but [1290].	Construction cut for wall [1292]
1296	Fill	Soft, light blue grey, sandy clay. Depth not excavated.	Fill of construction cut [1295]
1294	Masonry	Brick culvert drain bonded with dark grey sand. Two bricks turned on edge. Individual brick measurements 220x110x70mm.	Brick culvert in construction cut [1295]
1295	Cut	Linear, vertical sides, flat base. NE-SW alignment.	Construction cut for culvert [1294]

Group 12 Internal walls, room and culvert in eastern corner

5.3.25 At the north-western end of the site, two fragments of brick and sandstone walls [1284] and [309] (Group 17, Figure 20) survived truncation by a later slip house which appears on the Ordnance Survey map of 1862 (Figure 12). As so little survived the function of these structures is not known, but they presumably formed part of an earlier phase of the pottery;

the 1830 map shows pottery structures in this area. Pottery recovered from deposit [1310] infilling structure [1309] dates to 1805-1893.

Context	Type	Description	Interpretation
1310	Fill	Loose, mottled dark greyish brown coarse sandy clay. Occasional charcoal flecks. Pottery recovered from fill (refer to Appendix 5).	Fill of structure [1309]
1308	Fill	Loose, light greyish white, sandy clay. Thickness 0.19m	Fill of construction cut [1307]
1309	Masonry	Brick wall bonded with light grey lime mortar. Brick measurements 230x110x60mm. Wall structure is truncated by a Phase 4.3 construction cut [1298]. 0.82m NE/SW x 0.66m NW/SE x 0.16m high. (Plate 12)	Wall
1307	Cut	Sub-rectangular, vertical sides, irregular base. Truncated by cut [1298]. 1m NE/SW x 0.7m NW/SE x 0.16m deep.	Construction cut for brick structure [1309]
1284	Masonry	Brick and sandstone wall bonded with lime mortar. Individual brick measurement 225x110x70mm. Individual roughly hewn stone measurements 302x262x203mm. NE-SW alignment. Full height of wall unknown. 0.32m NW/SE X 1.54m NE/SW	Wall
1354	Cut	Construction cut for wall [1284]. 0.320 NW/SE X 1.54m NE/SW.	Construction cut for wall [1284]

Group 17 Structure

Phase 4.2: Clay Extraction Pit Backfilling

5.3.26 A very large pit [1238] was partially exposed in the north-westernmost extent of the excavation area (Figure 15, 18, 26; Section 128, and Figure 27; Section 134). This was exposed for a distance of 11m NW/SE and 2.26m NE/SW to the limit of excavation. It was excavated to a maximum depth of 1.77m (20.38m AOD) but due to health and safety constraints the bottom of the pit could not be reached.

5.3.27 Three backfills of pit [1238] were excavated; the base of the pit was not exposed so the full extent of the backfilling was not recorded. Very large quantities of pottery wasters and kiln furniture were recovered from the backfills of the pit (Appendix 5).

Context	Type	Description	Interpretation
1264	Fill	Loose mottled dark brownish grey matrix of sandy silt and waste pottery with a matrix of sand and silt. Frequent sherds of post-medieval pottery and kiln furniture (Refer to Appendix 5 for pottery assessment). at least 0.54m thick (base not reached within limits of excavation)	Backfill of clay extraction pit [1238]
1263	Fill	Loose mid brownish grey silty sand. Frequent inclusions of post-medieval pottery and kiln furniture (Refer to Appendix 5 for pottery assessment). 0.74m thick	Backfill of clay extraction pit [1238]
1237	Fill	Loose dark greyish brown silty sand with a high percentage of pottery sherds and kiln furniture (Refer to Appendix 5 for pottery assessment).	Backfill of clay extraction pit [1238]

		At least 1.24m thick (base not reached within limits of excavation)	

Backfill of extraction pit [1238]

5.3.28 This was presumably a clay extraction pit to obtain coarse clay as a raw material for the works. The large assemblage of pottery wasters recovered from all three fills in the pit is dated to 1840 to 1893 (refer to Appendix 5). However, 15 sherds bear the mark of Wallace & Co, demonstrating that the backfilling took place after 1858. The date at which the clay extraction took place is unknown; the pit does not appear on any of the historic maps and its position in relation to the structural remains of the pottery as recorded and as shown on historic maps indicate that the pit would have been situated in the fields beyond the pottery in the earlier phases of the works (e.g. Kidd 1802, Figure 9; Wood 1827, Figure 10; Oliver 1830, Figure 11). By 1862 the boundary of the pottery had expanded to the north-west to incorporate this area which is shown on the 1862 Ordnance Survey map as an open yard leading from the newly created street frontage of Pottery Lane to the pottery works (Figure 12). The artefactual and map evidence therefore provides a very close date for the infilling of the pit (1858-1862). The pottery works would have produced large quantities of pottery wasters and used kiln furniture and this pit would have therefore been an ideal place to dispose of some of this waste. On one of the sherds recovered from fill [1264] were numerical notations written on with a lead pencil (SF. 11; Appendix 5). The inscription read '*…..T. Plates, Cups 10, Saucers 14'* with a vertical line down the centre of the sherd. This was likely an order for production. A second sherd (SF. 10 Appendix 5) with pencil annotations was also recovered from the site with the inscription *Mollett (?) 64 42,* which is possibly a glaze recipe, unfortunately however, this sherd was unstratified.

Phase 4.3: Newcastle Pottery (*c.* 1862-1893)

5.3.29 Phase 4.3 activity comprises structural remains which correlate with features shown on the Ordnance Survey of 1862 (Figure 12) up until its demolition *c.*1896 (Figure 15, 18 & 20). It is likely however that most elements of the earlier pottery as shown on Wood's 1827 and Oliver's 1830 map were retained as the map sequence shows the layout of the works remained largely unchanged. Dimensions of common or house bricks used to construct walls and other associated features suggest that none are earlier than the very late 18th century, and most belong to the first half of the 19th century (Appendix 7). It therefore seems likely that most external walls and some internal divisions remained.

5.3.30 Reconfiguration evidently took place in the eastern corner of the pottery with the kiln in this area demolished and the triangular corner of the works replaced with a rectangular room labelled as a 'Dipping House'.

5.3.31 At the north-western end of the excavation area, a group of complex structural remains (Group 18) were encountered that measured *c.* 10m NE-SW x 10m NW-SE (Figures 18 and 20; Plates 13 & 14). These structural remains correspond to a group of interconnected rooms within the Newcastle Pottery factory on the 1862 map which covered a total area of

c. 15m x 15m with the southern room labelled as a 'Slip House' (Figure 12). Three main elements were identified in this area (Figure 15, 18 & 20); storage bays (Plate 13), a 'mixing ark' where the slip was mixed (Figure 27; Section 135; Plate 15 & 16) and a slip kiln (Plate 17).

5.3.32 The storage bays (Plate 13) were located at the north-east end of the slip house and would have housed the raw materials such as ball clay, flint, china clay, Cornish stone and oxides of cobalt to be mixed in the ark. The storage bays were of various sizes; all had stone flagged floors and were defined externally by firebrick wall [1126]. In the north were two interconnected storage bays aligned NE-SW which measured internally 1.28m NE-SW x 0.66m NW-SE and 1.50m x 0.90m. To the south were two interconnected bays which measured 2.40m NW-SE by 1m wide and 0.70m NW-SE by *c.* 1m; the floor and east wall of this bay did not survive. A later partition wall [1129] divided the longer bay into two areas, 0.80m and 1.20m long. A later sandstone floor surface [1125] had also been laid in the smaller bay created by this internal partition raising the floor level. One of the firebricks within the storage bay wall [1126] had the stamp *& Co. Blaydon* (Appendix 7). This possibly refers to J. Graham & Co., working at Blaydon Haugh in 1875 (Davison 1986, 131), although if this is the case then this must be a later repair as it post-dates the 1862 map.

5.3.33 A rectangular mixing ark [1182] (Figure 15, 18, 20, 27; Section 135) abutted the south-western side of the storage bays (Plate 15). The function of the ark was to mix the materials together with water after they had been ground down to a fine powder and had been weighed to the correct quantity. Arkmen would stir the mixture with large wooden paddles that had magnets attached to remove as much of the iron as possible. From here the mixture would either be passed through sieves to remove excess water or the slip would be reduced by heat in slip kilns to the desired consistency.

5.3.34 The mixing ark had internal measurements of 1.30m NW-SE x 5.40m NE-SW and external measurements of 1.92m x 5.54m NW/SE and was x 0.51m deep. It was built with brick and sandstone walls [1182] in a construction cut [1298] the backfill of which [1299] comprised silty clay that would have formed a waterproof lining to prevent any slip liquid leaching out of the mixing ark (Figure 27; Section 132). Internally, the mixing ark had a stone flagged surface [1184] at the north-eastern end that was separated from the rest of the ark by timber shuttering [1181] and [1249] (Figure 20; Plate 16). In the two bays that were separated by the timber planks, an indurated fine clay was observed at the base; whether this relates to slip that had been left in the ark that had dried or a deliberate floor surface is unknown. A complete saggar [1251] was cut into the floor surface [1246] of the mixing ark in the western corner is represented by Group 19 (Plate 17). This measured 0.33m x 0.30m and was 0.23m deep, its precise function is unknown but it was presumably associated with the mixing of the slip.

5.3.35 The mixing ark was backfilled with a mixture of clay and rubble (Figure 23; Section 108 & 109) discussed below in Phase 5.1.

5.3.36 A slip kiln [1210] (Figure 20) was situated at the north-western extent of the slip house. This comprised a rectangular firebrick structure at the south-western end which measured internally *c.* 1.50m NW-SW by 0.80m wide and 0.80m deep with an area measuring *c.*1.80m NW-SE x 1.30m NE-SW internally and 0.80 deep at the north-eastern extent defined by sandstone walls (Plate 18). The clayey soil around the firebrick part of the structure was red and had evidently been heat affected. The kiln would have reduced the slip mixture from the ark in an oven that was heated from below. Due to the scale of truncation only the lower section (that would have contained the fire) survived. A brick stamped with Cagey & Co. was noted on one of the bricks within slip kiln [1210] and refers to a company working at Low Elswick in 1869 (Appendix 7; Davison, 1986, 63 & 68). Two other brick stamps were noted in the slip kiln; E & M that most likely dates from between 1869-1934; and Stourbridge that refers to the trade-name of J. Snowball & sons dated 1875-1925 (Appendix 7).

Context	Type	Description	Interpretation
1126	Masonry	Firebrick English garden wall bonded light grey lime mortar. Brick dimensions 220x120x110mm. Depth not fully excavated. 5.86m NW/SE x 3.20m NE/SW x 0.72m wide. Height 0.29m to limit of excavation at base of excavation area. One of the bricks was stamped with *& Co. Blaydon (refer to Appendix 7). (*Plate 13*)*	Storage Bays within slip house.
1127	Masonry	Sandstone floor surface across two adjacent storage bays. Individual sandstone measurements vary from 160x210mm to 230x260mm. Thickness 60mm. Length 1.66m Width 1.02m.	Floor surface within storage bays of slip house
1128	Masonry	Sandstone and brick wall aligned NE-SW. Individual roughly hewn sandstone blocks 375x230x142mm. Brick 230x100x65mm. 1.28m NE/SW x 0.62m NW/SE x 0.28m high.	Ad-hoc partition wall within storage bays of slip house.
1181	Timber	Timber structure, NW-SE orientation, good condition, Iron fittings 240x60mm. Four uprights and one horizontal timber beam. Boards vary in size. Upright timbers: 170x80, 180x80x200mm, 230x30x120mm and 950x170. Horizontal beam measures 720x220x70mm. (Plate 15)	Structural – Upright timber. Partition within mixing ark in slip house?
1182	Masonry	Brick and sandstone wall survived up to seven courses bonded with light grey lime mortar. Individual brick measurements 220x110x60mm. Individual stone measurements 220x280x130mm. Internal measurements NW-SE 1.30m, NE-SW 5.40m External 5.54m NE/SW x 1.92m NW/SE x 0.51m high. (Plate 15)	Slip mixing ark
1184	Masonry	Sandstone flags, smooth upper surface, bonded with light grey firm clay. Stone	Flagged surface within

		measurements vary from 400x380x70mm to 620x460x70mm. 2.72m NE/SW x 1.28m NW/SE.	mixing ark of slip house
1185	Layer	Firm, light grey clay with occasional pieces of cbm and stone. 2.72m NE/SW X1.28m NW/SW x 0.14m thick.	Bedding for flagged floor surface [1184]
1188	Layer	Firm light grey fine clay.	Compact clay surface (Internal). Possibly remnant of clay slip in mixing ark
1209	Cut	T-shaped, vertical sides and flat/irregular base. Construction cut for slip kiln.	Construction Cut for slip kiln [1210]
1210	Masonry	Slip kiln comprised of fire brick at SW end and sandstone at NE end. Firebrick section in English garden wall. Bonded with light grey lime mortar. 4.36m NE/SW x 1.76m NW/SE x 0.88m high. Width of wall at SW end 0.72. Three stamps were noted on the firebricks; *Cargey & Co. Stourbridge* and *E & M* (refer to Appendix 7).	Slip kiln
1211	Layer	Loose, black, silty clay with ash and charcoal. Base not exposed. 3.12m NE/SW x 1.86m NW/SE.	Bedding for surface [1212]
1212	Masonry	Sandstone flag floor surface. Individual measurements varied from 220x60x60 to 640x280x60mm. Bonded with black silty clay. 3.12m NE/SW x 1.86m NW/SE.	Surface within slip kiln
1213	Fill	Loose/friable, mid-dark blackish brown, silty clay.	Fill of construction cut [1209]
1226	Cut	Rectangular, vertical sides, flat base. Base not fully excavated.1.06m NW/SE x 0.52m NW/SE x 0.14m deep.	Construction Cut for structure [1227]
1227	Masonry	Firebrick structure. One course high bonded with light bluish grey clay. Individual brick measurements vary from 140x100x80mm to 200x80x80mm. 1.02m, NE-SW x 0.46m NW-SE 0.46m.	Firebrick structure within slip house
1236	Masonry	Brick and stone floor surface. Individual brick measures 228x116x68mm. Individual roughly hewn stone measure 242x177x45mm.0.58m N/S X 0.72m E/W. 0.07m thick.	Surface
1246	Layer	Indurated light grey compact fine clay.	Compact clay surface (Internal). Possibly remnant of clay slip in mixing ark
1248	Timber	Timber post, squared and boxed. Vertical setting in moderate condition. 87mm N/S x 78mm E/W x >92mm high.	Structural – Upright. Part of shuttering
1249	Timber	Timber plank, horizontal on edge in poor condition. Tangentially faced. 804mm x 750mm x 20mm	Shuttering associated with post

			[1249] and floor surface [1246]
1256	Fill	Firm, mid dark grey brown, silty clay with frequent large rounded stones, moderate coal flecks and occasional cbm flecks. 2.62m NE/SW x 0.82m NW/SE x 0.41m thick.	Fill of construction cut [1260]
1258	Masonry	Brick and stone wall, aligned NE-SW bonded with lime mortar. Coursing unclear. Individual brick measurements 230x100x58mm. Individual stone measurements 280x400x31mm. 2.44m NE/SW x 0.38m NW/SE x 0.41m high.	Wall of storage bay
1259	Layer	Firm, dark greyish black, gravel and silt with occasional coal flecks and brick fragments. 2.3m NW/SE x 1.02m NE/SW.	Bedding layer for floor surface [1127]
1260	Cut	Linear, sharp break of slope at top, sides and base not excavated. 2.62m NE/SW x 0.82m NW/SE.	Construction Cut [1258]
1267	Masonry	Flagstone floor surface, squared. Individual flagstones measurements varied from 218x227mm to 237x318mm with a maximum depth of 38mm. 1.28m NE/SW x 0.66m NW/SE	Floor surface within storage area
1268	Masonry	Brick and flagstone floor surface, squared stones. Individual brick measurements 224x107x58mm. Individual flagstone measurements 458x293x63mm. 2.32m NE/SW x 1.44m NW/SE x 0.06m thick.	Floor surface within storage area
1279	Masonry	Brick wall, stretcher coursing bonded with lime mortar. Alignment NW-SE then turns SW-NE. NW-SE: 2.22m, NE-SW: 1.98m. Individual brick measurements 229x112x57mm. Wall 0.18m wide x 0.23m high.	Wall within storage area
1280	Masonry	Brick stretcher floor surface. Individual brick measurements 227x115x73mm. 0.73m N/S x 0.69m E/W x 0.07m thick.	Floor surface
1282	Layer	Firm, light whitish grey, mortar with occasional pea grit and very occasional coal and cbm flecks. 1.62m N/S x 2.38m E/W x 0.05m thick.	Bedding for floor surface [1283]
1283	Layer	Brick stretcher floor surface. Individual brick measurements 228x117x70mm. 1.52m NW/SE x 2.30m NE/SW x 0.07m thick.	Surface around slip kiln
1288	Masonry	Fireblock floor surface. Blocks measured 420x240x60mm. 0.88m NE/SW x 0.26m NW/SE x 0.06m thick.	Floor surface of structure [1242]
1298	Cut	Linear, sharp break of slope, flat base. NE-SW alignment. 5.54m NE/SW x 1.92m NW/SE x 0.51m deep.	Construction Cut for wall [1182]
1299	Fill	Firm, light reddish brown with occasional grey brown mottling, silty clay. Occasional sub-angular and rounded pebbles and coal flecks. Very occasional CBM flecks. 5.6m NW/SE x 9.00m NE/SW x 0.42m thick.	Clay fill of construction cut [1298]. Clay used to water proof the structure.
1314	Layer	Firm, mid greyish brown mottled with white, silty clay. Occasional coal flecks. 1.14m NW/SE x 1.88m NE/SW x 0.12m thick.	Ground raising dump/levelling
1353	Cut	Construction cut for wall [1126]. Sharp break	Construction

		of slope at top and base. Base not excavated. 3.20m NE/SW x 5.86m NW/SE.	Cut for [1126]
1355	Cut	Construction cut for wall [1279]. Sharp break of slope at top and base 2.22m NW/SE x 1.98m NE/SW x 0.23m deep.	Construction Cut for wall [1279]
1368	Layer	Compact, dark brown grey, clayey sand. 0.90m NW/SE x 0.62m NE/SW x 30mm thick.	Bedding deposit for brick surface [1280]
1369	Cut	Linear, vertical sides, flat base. NE-SW alignment. 1.28m NE/SW x 0.62m NW/SE x 0.28m deep.	Construction Cut for wall [1128]

Group 18 Slip house

Context	Type	Description	Interpretation
1250	Fill	Firm, light grey clay. Diameter 0.42m. Thickness 0.23m.	Fill of saggar [1251]
1251	Other	Light grey brown ceramic saggar. 0.33m x 0.30m. Depth 0.23m and 0.02m thick. Refer to Appendix 5 for kiln furniture assessment.	Buried saggar
1252	Fill	Firm, light greyish white clay with V. occasional small rounded pebbles and occasional coal flecks. 0.42m N/S x 0.42m E/W x 0.22m thick.	Backfill within cut [1253]
1253	Cut	Sub-squared, sharp break of slope at top, sloping sides, concave base. 0.42m N/S x 0.42m E/W x 0.22m deep.	Cut for saggar [1251]

Group 19 Buried saggar

Context	Type	Description	Interpretation
1125	Masonry	Sandstone setts one course thick bonded with mortar. Individual sandstone block measurements varied from 320x190x170mm to 670x310x220mm. 0.80m NW/SE x 0.70m NE/SW x c. 0.22m thick.	Floor within storage bay
1129	Masonry	Frogged brick wall bonded with sandy mortar. Individual brick measures 238x111x64mm. 1.02m NE/SW x 0.22m NW/SE x 0.23m high.	Wall

Group 20 Additional partition wall within storage bay, slip house

5.3.37 A layer of firm light greyish white clay [1231] was noted to the south of the mixing ark in the slip house. The deposit was observed for 2.20m NW/SE by 1.38m NE/SW. A second deposit of mottled white clay [1235] was noted to the west of the mixing ark overlying truncated surface [1236]. The layer measured 0.58m N/S by 0.72m E/W and was 0.10m thick. A small assemblage of pottery recovered from slip deposit [1235] was not closely datable (1775-1900, see Appendix 5). Both deposits represent remains of the dried clay slip that would have been prepared within the slip house.

5.3.38 A linear feature [1266] (Figure 20) truncating the backfill of the construction cut of the slip house was noted to the north of the mixing ark. This was filled with mottled white clay; the function of the cut is unknown but perhaps may have been for the deposition of waste material from the mixing ark and may have led to a nearby drain.

Context	Type	Description	Interpretation

1266	Cut	Sub-rectangular, sharp break of slope, slightly concave sides, flat base. 1.69m SE/NW x 0.68m NW/SE x 0.08m deep.	Ditch
1265	Fill	Firm, light grey with reddish brown mottling, silty clay. Moderate inclusions of brick rubble and occasional flecks of coal. Thickness 0.08m	Fill of ditch [1266]

Linear features and backfill associated with the slip house

5.3.39 Close to the north-west of the slip house was a spread of waste pottery [1370] dated to 1850 to 1893 (Appendix 5). The deposit survived for a distance of *c.* 0.92m NE/SW, 0.52m NW/SE and was 10mm thick (Figure 20).

5.3.40 A group of structural remains to the north-east of the slip house comprised the entirety of a square room defined by walls [1331], [1339], [1359] and [1327] with external and internal dimensions of *c.* 7m and *c.* 6m (Figure 18). An adjoining rectangular room defined by walls [1327], [1321], [1348] and [1176] had external and internal dimensions of 14m and 13m NW-SE and was at least 6m wide; the eastern wall was not exposed within the area of excavation. The rectangular room correlates to a room shown on the 1862 Ordnance Survey which shows that its full width was *c.* 8m. A fragment of an internal wall [1145] may represent an internal division. A small area of brick floor [1320] survived in the room adjoining the rectangular room to the south-east (Plate 40).

5.3.41 The 1962 map indicates that the north-western wall [1339] of the square room was an internal division as an irregular-shaped room adjoined it; no traces of the external walls of this room with an angled corner survived. In the eastern corner of the square room was another possible slip kiln [1326] (Group 35) (Figure 18; Plate 19). As with slip kiln [1210], this was in an ideal location for the distribution of the slip from the slip house to the west. Again, only the base of the structure survived. The external surviving measurements of the rectangular structure were 1.62m x 1.72m with a 0.74m deep rectangular internal feature with sandstone flag floor that measured 0.62m wide at least 0.96m long; it was overlain by a later floor surface to the west. Only part of the slip kiln was exposed as the remainder continued under the later floor surface. The walls were built with firebricks and fireblocks and the clay natural substratum around the structure was scorched red (Plate 19).

Context	Type	Description	Interpretation
1005	Masonry	Brick wall of English garden coursing bonded with light grey lime mortar, survived for 18 courses (max). Individual brick measurements 220x110x65mm. 4.24m NE/SW x 0.62m NW/SE x 0.28m wide x 1.5m high to limit of excavation at base. (Plate 33). Section 112, 25; Section 121	Wall
1010	Cut	Linear, vertical sides, base not exposed. NE-SW alignment.	Construction cut for [1005]
1018	Masonry	Sandstone wall of roughly hewn stone, random coursed, bonded with mid grey lime mortar of NE-SW alignment. 2.60m NW/SE x 0.48m wide x 1.32m high to limit of excavation at base. (Plate 32). Section 119	Wall

1019	Cut	Linear, vertical sides, base not exposed. NW-SE alignment truncated during demolition works.	Construction cut for wall [1018]
1133	Cut	Linear, sharp break of slope at top and base with flat/slightly concave base. NE/SW alignment. Survived for 2.26m NE/SW x 1m wide x 0.26m deep.	Construction cut for [1145]
1137	Fill	Friable, dark brownish grey, coarse sand with lenses of clay. Not fully excavated.	Fill of construction cut [1010]
1144	Fill	Firm, dark brownish black, clayish silt. 2m slot excavated. 2.26m NE/SW, 0.10m away from wall [1145] and 0.26m thick.	Fill of construction cut [1133]
1145	Masonry	Sandstone, roughly hewn blocks, survived for two courses bonded with lime mortar. Sandstone measurements varied from 160x250x80 to 250x500x190mm. 2.34m NE/SW x 0.68m wide x 0.40m high.	Wall
1176	Masonry	Sandstone wall, roughly hewn stone bonded by lime mortar. Individual stone measurements varied from 200x100x200mm to 290x150x200mm. NE/SW: 5.26m (internal)/5.84m (external); 5.30m NW/SE and 0.08m high to LOE at base.	Wall
1177	Cut	Linear, vertical sides, base unexcavated. NW-SE internal 5.26m, External 5.84m. NE/SE: 5.30m. Width: 0.76m.	Construction cut for [1176]
1318	Masonry	Brick wall bonded with light grey lime mortar. Bricks 244x104x63mm. 1.30m NW/SE x 0.28m wide x 0.65mm high. (Plate 40)	Partition wall
1319	Cut	Linear, vertical sides and a flat base.	Construction cut for wall [1318]
1320	Masonry	Brick floor surface bonded with a light grey lime mortar. 1.08m NW/SE x 1.26m NE/SW x 0.07m deep. (Plate 40)	Floor surface
1321	Masonry	Brick wall bonded with light grey lime mortar. Bricks 230x110x51mm. >7.88m NE/SW x 0.26m wide x >0.40m high (Plate 40).	Wall
1322	Cut	Linear, vertical sides and flat base. 7.88m NE/SW x 0.26m NW/SE x 0.40m deep.	Construction cut for wall [1321]
1327	Masonry	Sandstone wall of random coursing bonded with light grey lime mortar. Roughly hewn blocks varied from 90x89mm to 39x149x210mm. 7.58m NW/SE x 4.06m NE/SW x 0.60m wide x 0.40m high. (Plate 34).	Wall
1328	Cut	Linear, vertical sides, sharp break of slope, flat base. NW-SE alignment. Truncated by pipe trench [1330]. 7.58m NW/SE x 4.06m NE/SW x 0.60m wide x 0.40m deep.	Construction cut for [1327]
1331	Masonry	Sandstone wall, roughly hewn blocks bonded with a light grey lime mortar. 4.42m NW/SE x 5m NE/SW x 0.58m wide x 0.28m high. (Plate 31)	Wall
1332	Cut	Linear, vertical sides, flat base. 4.42m NW/SE x 5m NE/SW x 0.58m wide x 0.28m deep.	Construction cut for wall

1339	Masonry	Sandstone wall, roughly hewn. Bonded with grey lime mortar. 2.46m NE/SW x 0.62m wide x 0.38m high (Plate 30).	Wall
1340	Cut	Linear, vertical sides and flat base. 0.62m wide x 2.46m NE/SW.	Construction cut for [1339]
1348	Masonry	Sandstone wall. Material components ranged from 145x115x134mm to 143x124x134mm. Bonded with light grey lime mortar. 3.54m NW/SE x 0.54m wide x 0.18 high.	Wall
1349	Cut	Linear construction cut for sandstone wall [1348]. Vertical sides and flat base. Orientated NW/SE. Not fully excavated.	Construction cut for [1348]
1359	Masonry	Sandstone wall, one course surviving, bonded with light grey lime mortar. Individual measurements varied from 140x70x70mm to 320x160x110mm. 1.4m NE/SW x 0.48m wide x 0.20m high.	Wall
1363	Layer	Compact dark brownish grey coarse sand.	Bedding for surface [1320]
1364	Cut	Linear, vertical sides, flat base. NE-SW alignment. 1.4m NE/SW x 0.48m wide x 0.20m high.	Construction cut for [1359]

Context	Type	Description	Interpretation
1326	Masonry	Firebrick and fire-block construction. Bonded with a dark grey mortar. >1.60m NW/SE x 0.50m wide x 0.21m high. Not fully exposed. Potential base of slip kiln.	Eastern wall of slip kiln
1357	Cut	Rectangular cut with vertical sides and a flat base. >1.62m NW/SE x 1.72m NE/SW x >0.74m deep at base.	Construction cut for slip kiln [1326]
1358	Fill	Firm light greyish white sandy clay.	Fill of construction cut [1357]
1360	Masonry	Sandstone flagstone. Largest 340x40x22mm. >0.96m NE/SW x 0.62m wide x 40mm thick.	Floor
1362	Masonry	Brick wall within kiln in stretcher bond. Bonded with a light grey lime mortar. >1.42m NE/SW x 1.70 NW/SE x 0.72m wide x 0.76m high.	Inner wall of slip kiln

Group 35 slip kiln

5.3.42 Adjacent and external to the north-west corner of the square room was a small square structure [1337] of uncertain function (Figure 18; Plate 39).

Context	Type	Description	Interpretation
1337	Masonry	Brick and firebrick structure bonded with light grey lime mortar. 1.32m NW/SE x 1.10m NE/SW x .0.46m high. Unknown function. (Plate 39).	Structure
1338	Cut	Sub rectangular with vertical sides and a flat base. 1.32m NW/SE x 1.10m NE/SW x 0.46m deep.	Construction cut for structure [1337]

Structure of unknown purpose

5.3.43 The remnants of two coal stores [1097] (Group 22) [1217] (Group 23) were located south-east of this group of rooms and the slip house (Figure 15, 18, 20, 23; Section 110, & 26; Plates 27 and 28). The stores were vital to the firing of the pottery kilns and although only two were exposed during the excavation, there would have likely been numerous dotted around the works. An overlay of these remains onto the Ordnance Survey 1862 map shows that Group 23 [1217] was located at the south-western end of a room labelled as a kiln, facing onto an open yard area which would have allowed the coal to be easily delivered to the store. This was T-shaped, measuring externally 3.20m NE-SW and a maximum of 2.50m NW-SE, widest in the area adjacent to the yard. Internally the store measured 1.94m by 1.64m and was 1.05m deep. The walls of the coal store were built with brick, firebrick and stone and the floor was brick.

5.3.44 Coal store Group 22 [1097] appeared to be located partially within an enclosed yard area and partially within a room in the works that adjoined the room with the kiln. The coal store was also T-shaped and measured 4m NE-SW x 2.80m NW-SE externally and 3.75m internally and was 1.05m deep. The north-eastern end, which was internal to the room, had a flagstone floor and was 1m wide and the remainder was floored with brick. One of the bricks was stamped Walbottle Firebrick Works, which produced bricks between 1869-1906, indicating this floor was a later repair. A later wall had been inserted across the south-eastern side of the coal store in this area (Figure 5; Plate 27). A deposit of coal [1220] was noted at the base of the Group 23 store *c.* 2.02m NW/SE, 1.44m SW/NE and 0.16m thick. Two fragments of a Parsons type 13 clay tobacco pipe were recovered from deposit [1220] that were decorated with fluting/ribbing, and the stem fragment possibly had a Parson type-d makers mark dated to after 1840 but unfortunately none of the letters are visible. The bowl type originally dated to 1780-1840 by Parsons. Pottery dated to 1805-1893 was also recovered from the coal deposit (Appendix 5).

Context	Type	Description	Interpretation
Group 22			
1089	Masonry	Sandstone and brick floor surface bonded with sandy mortar. Individual brick measurements 250x75mm. Individual stone measurements varied from 80x80mm to 500x600mm. 3.75m x 1.56m Six large sandstone slabs at NE end. A brick stamped with *Walbottle* was noted within the structure (refer to Appendix 7).	Brick and stone floor in coal store [1097]
1097	Masonry	Stone and brick wall structure, of English garden wall coursing bonded with light brownish yellow sandy mortar. Individual brick measurements 235x110x70mm. Individual roughly hewn stone measurements varied from 70x100mm to 200x350mm. 4.14 NE/SW x 2.82m NW/SE x 1.05m high.	Coal store structure
1111	Cut	T-shaped, sides likely to be vertical, base not exposed, truncated during demolition. 4.14, NE/SW X 2.82m NW/SE and 1.05m deep.	Construction cut for [1097]

1229	Layer	Compact, black, coarse sand.	Bedding for surface [1089]
Group 23			
1217	Masonry	Brick, fire brick and stone wall structure of English garden wall coursing bonded with coarse light yellowish grey sandy mortar. Individual bricks measured 230x110x90mm. Individual stone measurements varies from 100x110x70mm to 330x130x220mm. Metal object found within wall. Walls measure: NW-SE 2.42m, NE-SW 3.26m.	Coal store structure
1218	Cut	T-shaped, vertical sides, base not excavated. Truncated by modern test pit. 2.44m NW/SE x 3.26m NE/SW x 0.38m deep.	Construction cut for coal stone [1217]
1224	Masonry	Brick floor surface bonded with clay. Individual brick measurements varied from 210x105mm to 235x100mm. 1.64m NW/SE x 1.94m NE/SW.	Brick floor in coal store
1301	Timber	Stake, squared and box quartered, upright vertical setting. Carved at one end to make a point. 375x80x60mm	Timber upright. Partition in coal store?

Coal stores Group 22 & 23

5.3.45 Located *c.* 4m to the south-east of the coal store was a possible slip storage tank [1065] (Group 21), this was located within the centre of the pottery complex in an open yard area (Figure 18; Figure 28; Plate 20). This would have been an ideal location for such a feature between the kilns, the slip house and the dipping house. A narrow linear NE-SW aligned wall can be seen on the 1862 Ordnance Survey map at the southern end of the tank although no trace of this structure was observed during the excavation. The slip tank had been largely demolished, only one course of the wall of the tank survived and this was built with a mixture of brick, firebrick and stone. The external dimensions were 3.54m NW-SE x 3.88m NE-SW and the internal dimensions were 3.06m x 1.32m. One firebrick was stamped E & M; this brick is likely to be product of W. Cochran-Carr, who took over Emerson and Milner's yard at Blaydon in 1850, then worked at Benwell 1869-1934, and 'inherited' their trademark (Davison 1986, 63, 83; see Appendix 7). The earliest floor of the tank comprised sandstone blocks; only a small area was exposed as it was overlain by a floor of fireblock slabs. The reason for the two floor surfaces within the structure is unknown but as the upper course comprised fireblocks this suggests that the upper course offered heat protection to the overall structure. A Victorian coin was recovered from slip [1057] however, due to heavy corrosion the date could not be identified. A small pottery assemblage recovered from [1057] dates to 1850-1893.

Context	Type	Description	Interpretation
1057	Fill	Firm, light greyish white, slip/clay with frequent sandy gravel lenses and demolition inclusions such as brick and wood. 2.44m NW/SE x 1.32m NE/SW x 0.21m thick. Pottery recovered from fill (refer to Appendix 5).	Fill of structure [1066]

1065	Masonry	Brick, firebrick and stone wall bonded with light grey lime mortar. One course survived. Individual brick measured 230x110x60mm. 3.56m NW/SE x 1.86m NE/SW x 0.34m high. One firebrick was stamped *E & M* (refer to Appendix 7).	Slip tank
1066	Masonry	Fireblock (refractory clay) floor surface bonded by light grey lime mortar. Individual fire blocks measurements varied from 580x240x80mm to 640x540x80mm. 3.06m NW/SE x 1.32m NE/SW x 80mm thick.	Upper surface within base of slip tank
1083	Cut	Rectangular, sides and base unexcavated. 3.54m NW/SE x 3.88m NE/SW.	Construction cut for [1066]
1084	Fill	Soft, dark brownish black, silty clay. 3.54m NW/SE x 3.88m NE/SW. 60mm away from structure.	Fill of construction cut [1083]
1085	Masonry	Sandstone floor surface bonded with light grey lime mortar. Surface covered by mortar and fireblocks [1066]. Individual slab measurements 300mm x 260mm. Only small area exposed but thought to extend whole extent of [1066].	Lower surface of slip tank

Group 21: Slip tank?

5.3.46 Structural remains surviving in the south-western extent of the pottery appear to represent parts of at least four rooms which can be seen on the 1862 Ordnance Survey map in the eastern corner of the complex. The western room (Group 43) was defined to the north-west by wall [1080] which was an external wall to the central courtyard, with a right-angled return which divided it internally from the adjoining room, to the south-west by internal wall [1081] (Section 106), and to the south-east by internal wall [1076] (Figure 18 & 19 Sections 105 and 106). The internal measurements of the room were 4.30m NE-SW x 3.40m NW-SE. The floor [1023] in the south-western side of the room was lower than the floor surface in the north-eastern part of a room, this sunken area measured 3.40m x 2.80m and a slate lining [1119] survived in patches round the edges of the sunken area (Plate 23) suggesting that the room had to be watertight. In the centre of the room was a feature which may have been a slip storage tank and this room may represent a storage/preparation area for the clay/slip (Plate 21). An alternative purpose of the room would be for waste slip/clay material that could then be recollected and sent back to the slip house for processing. The slip tank (Figure 19) measured 2m x 1.1m and 0.50m deep and had a slate cover [1303] and a timber hatch [1302]; removal of the hatch revealed two timber beams [1316] and [1317] (Figure 15, 19, 27; Section 131, & Figure 22; Section 105; Plate 21 & 22). The tank was filled with blueish grey clay slip [1305] from which pottery fragments dating to 1805-1840 were recovered.

5.3.47 The floor surface [1023] surrounding the slip tank was constructed with an assortment of bricks and included two stamped bricks of D & H Blaydon. This perhaps refers to the partnership of W. Dodds and W. Harriman, working at Blaydon 1847-57 (Appendix 7). A small patch of slip deposit [1121] overlay the brick floor; pottery recovered from this dated

to 1805-1893. The floor in the north-eastern part of the room [1077] was 0.80m higher than the brick floor [1023]. It was constructed with fireclay blocks and extended across an area that measured 1.58m x 0.68m; beyond this no surface survived so it is not possible to be certain if all of this part of the room was higher than the floor [1023].

5.3.48 A small area of a firebrick and fireblock floor surface [1078] survived to the north-east of the slip tank room across an area that measured 1.92m x 0.68m. This is shown as part of the external yard area on the 1862 map (Figure 28). A ground raising dump [1096] (Figure 22; Section 103) beneath the floor surface included fragments of saggar. Pottery recovered from the deposit was not closely datable (1736-1893). Beyond this, wall [1079] formed the north-west corner of a room along the eastern side of the pottery, only the corner survived.

Context	Type	Description	Interpretation
1023	Masonry	Brick and firebrick surface bonded with a dark grey sandy clay. Bricks dimensions: 220x110x60mm. Firebricks 225x110x60mm. 2.84m NE/SW x 6.66m NW/SE. Two bricks stamped with *D&H Blaydon* (refer to Appendix 7).	Surface of clay storage area
1075	Masonry	Brick wall bonded with light grey lime mortar. Bricks 220x110x60mm. 1.30m NW/SW 0.24m wide x 0.40m high to LOE at base. Forms part of steps with [1191] (Plate 41).	Steps?
1076	Masonry	Brick wall in construction cut [1315], bonded with light grey lime mortar. Only two courses survive with the bottom course set on edge. Bricks: 220x220x60mm. 2.80m NE/SW x 0.24m wide x 0.20m wide.	Wall
1077	Masonry	Fireclay block surface ranging from 300x180x80mm to 450x300x80mm. Bonded with a light bluish grey clay. 1.58m NE/SW x 0.68m NW/SE x 0.80m high.	Floor surface
1078	Masonry	Firebrick and fireblock surface with no bonding material. Largest block 300x280x50mm. 1.92m NE/SW x 0.68m NW/SE x 70mm thick.	Floor surface
1079	Masonry	English garden brick wall of pottery in construction cut [1095]. Bricks 225x115x60mm. 0.82m NW/SE x 0.54m NE/SW x 0.22m wide x 0.80m high.	Wall
1080	Masonry	Brick wall around possible slip tank in English Garden wall style and bonded with a light grey lime mortar. Nine courses observed. Bricks 225x115x60mm. NW/SE: Internal-0.56m External – 1.22m NE/SW: Internal-4.5m External – 4.78m. Width: 225mm.	Wall
1082	Masonry	English garden brick wall bonded with light grey lime mortar. Bricks 220x110x60mm. May be the continuation of [1080]. 1.30m NW/SE x 0.64m NE/SW x 0.22m wide x 0.70m high.	Wall
1091	Layer	Compact dark greyish brown clayey sand. 2.15m NE/SW x 1.18m NW/SE x 0.22m thick.	Bedding for floor surface [1078]
1081	Masonry	Sandstone spot repair to wall [1082].	Spot repair to

		Randomly coursed and composed of two sections on either side of [1082]. Bonded with light grey lime mortar. 3.80m NW/SE x 0.56m wide x 0.74m high.	wall [1082]
1118	Cut	Linear, straight vertical sides and a flat base. 3.80m NW/SE x 0.56m wide x 0.14m deep.	Construction cut for wall [1081]
1094	Fill	Compact dark brownish grey sandy clay. 60mm away from wall [1079]. 1.18m NW/SE x 0.24m thick.	Fill of construction cut [1095]
1095	Cut	Linear, vertical sides and a flat base. 2.18m NW/SE x 0.62m NE/SW x 0.24m deep.	Construction cut for wall [1079]
1096	Layer	Soft mid brownish red sandy clay with very occasional fragments of saggar. 1.58m NE/SW x 0.88m NW/SE (truncated) x 0.19m thick. Pottery recovered from fill (refer to Appendix 5).	Ground raising dump beneath floor [1078]
1119	Masonry	Slate lining, only three survive but presumed to continue around surface [1023]. 600x400x40mm.	Slate lining to room with slip tank.
1120	Layer	Compact dark bluish grey coarse sand with occasional fragments of mortar. 0.68m NW/SE x 1.56m NE/SW x 0.10m thick.	Levelling deposit for surface [1077]
1121	Layer	Soft mid bluish grey clay with frequent sherds of pottery. 0.78m NW/SE x 0.90m NE/SW x 0.16m thick. Overlaid surface [1023]. Pottery recovered from fill (refer to Appendix 5).	Slip/clay material
1122	Cut	Rectangular, vertical sides and a flat base. 3.66m NW/SE x 2.84m NE/SW x 0.34m deep.	Construction cut for brick surface [1023]
1123	Cut	Linear, vertical sides and a flat base. 1.30m NW/SE x 0.64m NE/SW x 0.22m wide x 0.70m deep.	Construction cut for wall [1082]
1191	Masonry	Irregular zig-zag shaped brick structure. Perhaps a step into another room? Brick bonded with a light grey lime mortar. Three courses high. Butting brick wall [1075]. 0.45m NW/SE x 1.02m NE/SW x 0.23m high.	Brick step?
1192	Fill	Loose dark brownish grey silty sand. 0.12m thick. Pottery recovered from fill (refer to Appendix 5).	Dump infill between wall [1075] and brick structure [1191]
1302	Timber	Horizontal timber tangentially faced. 1100x360x30mm. Iron handle on top c. 100x40mm.	Timber hatch?
1303	Masonry	Slate cover of slip tank comprising two large slabs of slate. 1260x1200x30mm.	Slate cover of slip tank.
1304	Masonry	Brick and firebrick tank in [1306] bonded with a light bluish grey clay. Bricks 210x110x60mm. Two courses visible. Set on top of natural [1001]. 0.80m x 1.16m x 0.30m high.	Brick tank
1305	Layer	Very soft mid bluish grey clay with occasional sherds of pottery. 2.06m NE/SW x 0.55m NW/SE x 0.44m thick. Pottery recovered from deposit (refer to Appendix 5).	Slip/clay material in [1306]
1306	Cut	Rectangular, vertical but stepped sides and	Construction

		an irregular concave base.	cut for brick tank [1304] and timber beams [1316] and [1317]
1313	Fill	Compact mid greyish brown clay. 0.82m NW/SE x >0.8m NE/SW x 0.12m thick.	Clay packing in [1306]
1315	Cut	Linear, vertical sides with sharp break of slope at top and base and a flat base. 2.80m NE/SW x 0.24m wide x 0.20m deep.	Construction cut for wall [1076]
1316	Timber	Timber beam box quartered. Iron fitting on top c. 100mm in diameter. Timber >380mm x 160x130mm.	Horizontal timber beam in [1306]
1317	Timber	Timber beam box quartered. >420mm x140x140mm.	Horizontal timber beam in [1306]

Group 43 Clay/slip storage/preparation area?

5.3.49 Adjoining the slip tank area to the south-east was a large room defined by walls [1076] [1018], [1024], [1027] and [1030] creating an area with internal dimensions of 6.50m NE-SW x 5m NW-SE. The wall along the south-eastern side of the room had been subject to various modifications and repair (Group 45 & 47: Figure 15, 18 & 25; Section 121). Wall [1024] perhaps represents an ad hoc addition to the original wall [1005]. A levelling deposit [1196] associated with its construction contained pottery dated to 1800-1840. A brick floor [1029] survived across a large part of the room (Plate 29) and this was overlain by an 80mm thick deposit of bluish grey clay [1223] which appeared to be waste slip and contained fragments of kiln furniture (stilts) and pottery dated to 1840-1893. A small area of firebrick floor [1197] also survived adjacent to wall [1005] (Section 121). In the south-western corner of the room were fragmentary remains of possible steps [1075]/[1191] leading up to the adjoining room (Plate 41) labelled as a 'Dipping House' on the 1862 map (Figure 11 and 28). A levelling deposit [1192] associated with the step structure produced pottery dating to 1780-1840. A small area of brick floor surface [1261] survived in the south-easternmost area which would have been internal to the Dipping House (Figure 15, 18, 27; Section 136; Plate 37).

Context	Type	Description	Interpretation
1029	Masonry	Brick surface bonded with soft yellow brown sand. Individual bricks 220x105x60m. 5.34m NW/SE x 6.80 NE/SW.	Internal brick floor surface. Clay/slip waste?
1134	Fill	Friable dark brownish grey silty sand.	Fill of construction cut [1135]
1135	Cut	Linear, vertical sides, not bottomed but presumed to be flat base. 0.28m NW/SE x 1.32m NE/SW x 0.40m deep to LOE at base.	Construction cut
1136	Layer	Compact mid yellow brown sand. 5.34m NW/SE x 6.6m NE/SW x 30mm thick.	Bedding for brick surface [1029]
1223	Layer	Soft mid bluish grey clay. Frequent sherds of pottery and occasional kiln furniture (stilts) (refer to Appendix 5). 5.34m NW/SE x 6.80m	Slip/clay material

		NE/SW x 80mm thick. Overlaid surface [1029].	
1197	Masonry	Fireblock floor surface bonded with sandy clay. Individual blocks 240x230x50mm. Surface 1.20m NE/SW x 0.38m NW/SE x 0.05m thick.	Floor surface.
1198	Layer	Loose mid yellowish-brown sand. 1.20m NE/SE x 0.38m NW/SE x 0.38m thick,	Levelling deposit for fire block surface [1197]
Group 45			
1024	Masonry	Brick, firebrick and fireblock ad hoc wall to the SE of surface [1029]. Built on top of levelling deposits [1195], [1196] and [1026]. Seven courses bonded with light grey lime mortar. 3.68m NE/SW x 0.12m wide x 0.60m high. One of the bricks was stamped *T.H…* (refer to Appendix 7). (Plate 24)	Ad Hoc wall
1026	Layer	Firm mid reddish brown sandy clay with occasional sherds of pottery. 1.14m NW/SE x 0.15m NE/SW x 0.16m thick.	Levelling for wall [1024]
1195	Layer	Loose mid brownish grey coarse sand with occasional inclusions of pot fragments, frequent patches of white clay and patches of light blue grey clay. 0.30m NW/SE x 3.80m NE/SW x 0.22m thick. Pottery recovered from fill (refer to Appendix 5).	Levelling for wall [1024]
1196	Layer	Soft dark brownish grey coarse sand with occasional inclusions of pottery sherds and occasional fragments of kiln furniture (refer to Appendix 5). 0.30m NW/SE x 2.70m NE/SW x 0.24m thick.	Levelling for wall [1024]
1261	Masonry	Brick surface bonded with dark grey sandy mortar. Potential surface within dipping house. Bricks 230x110x70mm. Surface 0.54m NW/SE x >0.62m NE/SW. (Plate 37).	Floor surface
1262	Layer	Compact light yellowish brown fine sand with occasional flecks of charcoal. 0.54m x >0.80m x 0.12m thick.	Levelling deposit for floor surface [1261]

Floor and structures associated with Group 43

5.3.50 A small pit [1147], *c.* 1.40m square, was located close to the north-west corner of the room with the slip tank, this would have been within the central courtyard area of the pottery works (Figure 19; Figure 28; Plate 29). The pit was filled with pottery wasters; 4473 sherds of black glazed redware of varying forms which suggests a misfiring on a large scale. The sherds display an array of firing faults from a matte glaze caused by thin glazing or under-firing to heavily bloated large sherds with black coring showing poor kiln reduction and over firing (Appendix 5).

Context	Type	Description	Interpretation
1146	Fill	Firm dark brownish grey clayey silt matrix with high percentage of waste pottery and misfires. 1.30m NE/SW x 1.50m NW/SE x 0.16m thick. Included a partially intact pot	Fill of pit [1147]

		(Appendix 5).	
1147	Cut	Square pit in plan with gradual break of slope at top and base. Base irregular as the centre was excavated deeper to accommodate a pot.1.40m square.	Waste pit

Small pottery waste pit [1147]

5.3.51 To the north-east of the slip tank room a brick surface with associated drain (Group 54) survived across an area that measured 3.72m x 6.76m (Figure 18). This formed part of the internal floor surface in the long rectangular structure labelled as a workshop and the dipping house shown on the Ordnance Survey of 1862 (Figure 12; Figure 28).

Context	Type	Description	Interpretation
1060	Masonry	Red brick and stone floor surface bonded by dark grey mortar. Individual roughly hewn stone measured from 130x40x80mm to 430x260x90mm. Individual bricks measured 230x120x80mm. 3.72m NE/SW x 6.76m NW/SE x 80mm thick. One of the bricks was stamped *M.T.& Co.* (refer to Appendix 7).	Floor surface
1061	Layer	Friable, black silty sand. 3.72m NE/SW x 6.76m NW/SE x 70mm thick.	Bedding/levelling deposit for floor [1060]
1099	Masonry	Roughly hewn sandstone bonded with dark grey sandy mortar. Individual stone measurements varied from 140x300x500mm to 50x390x400mm. 2.16m NE/SW x 0.50m wide.	Drain

Group 54: Surface and drain

5.3.52 Structural remains in the south-western corner of the excavation area comprised fragments of floor surfaces, walls and a possible muffle kiln. Stone and brick wall [1286] defined three sides of an area (Group 27) with internal measurements of 3.40m NE-SW and at least 2m NW-SE Figure 15, 18, 26; Section 130); the north-western side was truncated. Inside this area and adjacent to the south-western wall was a fireblock slab floor surface [1049] surviving across an area 1.32m x 1.88m (Plate 38). An area of sandstone flag floor surface [1285] also survived. An overlay of these remains onto the 1862 map (Figure 28) indicates that the south-western wall may represent the external wall of the large room containing the circular kiln with the wall to the north-east representing an internal partition within this large room.

Context	Type	Description	Interpretation
1049	Masonry	Fireclay slab floor surface bonded with a dark grey lime mortar. 1.32m NE/SW x 1.88m NW/SE x 60mm thick. (Plate 38).	Floor surface
1285	Surface	Sandstone floor surface bonded with a dark grey mortar (Figure 18).	Floor Surface
1286	Masonry	Brick and stone wall bonded with a dark grey mortar. 3.78m NE/SW x 0.76m NW/SE x 0.46m wide x 0.42m high. A brick stamped with *M.T.& Co.* was noted in the structure	Wall

		(refer to Appendix 7). (Plate 38).	
1297	Cut	Linear, vertical sides with a sharp break of slope at top and base. 3.78m NE/SW x 0.76m NW/SE x 0.46m wide.	Construction cut

Group 27 walls and floors

5.3.53 The surviving elements of a possible muffle kiln (Group 28) were recorded to the north-east of wall [1286]. It comprised an L-shaped firebrick structure [1046] 2m NW-SE x 1.94m NE-SW x 0.72m high with an internal fire brick walls dividing the structure into two bays with internal firebrick/block floor surfaces [1205] and [1206] either side (Figure 15, 18, 25; Section 118, 26; Section 126; Plate 25 & 26). Firebricks stamped with IHR & Co, T.Carr, E & M and Walbottle were recovered from muffle kiln [1026] (refer to Appendix 7). The IHR & Co brick stamp dates to between 1847 and 1858; the T. Carr stamp dates to 1828-81 or 1834-94; and the Walbottle stamp dates between 1869-1906. The E & M stamp are more likely to be products of W. Cochran-Carr, who took over Emerson and Milner's yard at Blaydon in 1850, worked at Benwell between 1869 to 1934 (Appendix 7). The range of bricks used indicates the kiln may have been repaired several times. An overlay onto the 1862 map (Figure 28) indicates that the kiln was situated within the room occupied by the large circular updraught kiln. Patches of a firebrick floor surface [1045] also survived in this area. Further to the north-east but still within the large room containing the circular kiln, part of a fireclay slab floor surface [1015] survived. Pottery recovered from the levelling deposit [1016] for this surface dates to 1770-1840; this deposit also contained kiln furniture.

5.3.54 Muffle kilns come in two main types within potteries; the enamel muffle kiln and the hardening-on muffle. The enamel muffle kiln was built in such a way that the flames and gases of combustion were kept away from the wares as the flames did not directly enter the firing chamber but were led around the perimeter of the chamber by a series of flues. By keeping the flames out of the chamber, the colours of the decorated ware were protected. The enamel kiln was much smaller than the up-draught ovens and reached a lower temperature than that needed of biscuit or glost firing of around 750-800ºC (Baker 1991, 112). The firing made the decorated colours permanent as without firing the colours would easily wash off.

5.3.55 Hardening-on muffle kilns were used when biscuit ware which has been decorated with an underglaze print or with hand painted patterns needed to be hardened on so that the decoration would not smudge during dipping in glaze. The kiln would have been fired at around 700ºC and was usually smaller than the enamel muffle kiln.

5.3.56 Both types of muffle kiln would have likely been used at Newcastle Pottery. The enamel kiln was used when biscuit ware was dipped in a glaze within the dipping house. A dipping house is noted on the Ordnance Survey of 1862 (Figure 12) where the ware would have been dipped before a second firing at a lower temperature in an enamel kiln. Evidence of hardening-on muffle kilns is indicated from the account book of the Beilby/Berwick

Workshop (cited in Gill 1976, 154) where numerous copper plates had been commissioned or requested to be repaired which is indicative of transfer printing. This method consisted of an engraved pattern or picture on a copper plate being inked before placed onto a piece of paper. The inked paper would have then been passed onto a cutter who removed unwanted margins and handed it to the transferrer. During under glazing, the transferrer would place the paper ink-side down onto the biscuit-ware which would transfer the design from paper onto the absorbent pottery which would then need dipping in glaze prior to firing in a hardening-on muffle kiln.

Context	Type	Description	Interpretation
1046	Masonry	Firebrick kiln structure bonded with a light grey mortar. 2m NW/SE x 1.94m NE/SW x 0.72m high. Several firebricks stamped with *IHR & Co, T. Carr, E & M or Walbottle (refer to Appendix 7)*.	Muffle kiln
1047	Cut	Linear, vertical sides with sharp break of slope at top and base, with a flat base. 2m NW/SE x 1.94m NE/SW x 0.72m deep.	Construction cut for muffle kiln [1046]
1205	Masonry	Firebrick/block floor surface of NW bay of muffle kiln bonded with a dark grey lime mortar. 0.72m NE/SW x 0.44m NW/SE x 0.17m thick.	NW surface within muffle kiln
1206	Masonry	Firebrick/block floor surface of NW bay of muffle kiln bonded with a dark grey lime mortar. 0.74m NE/SW to LOE x 0.40m NW/SE.	SE surface within muffle kiln

Group 28 muffle kiln

Context	Type	Description	Interpretation
1015	Masonry	Fireclay slab surface bonded with a dark bluish grey sandy mortar. Perhaps work surface around nearby kiln. Individual slabs 460x300x60mm	Floor surface
1016	Layer	Compact mid greyish brown silty sand. 4.4m NW/SE x 1.48m NE/SW x 80mm thick. Pottery and kiln furniture recovered from deposit (refer to Appendix 5).	Levelling deposit for floor surface [1015]
1045	Masonry	Common and firebrick floor surface bonded with dark grey sandy mortar. 3.08m NW/SE x 1.16m NE/SW x 0.07m thick	Floor surface
1204	Layer	Friable mid brownish yellow levelling deposit. 0.31m NW/SE x 3.08m NE/SW x 0.11m thick.	Bedding deposit for floor surface [1045]
1225	Layer	Friable dark greyish brown sandy silt with frequent fleck of charcoal. 0.38m wide x 0.08m thick. Only visible in section.	Ground raising dump

Floor surfaces in kiln room

5.3.57 A small area of brick and fireclay slab surface [1052] survived in the south-eastern corner of the excavation area for a distance of 1.40m x 2.24m (Figure 18; Plate 36). Overlay with the 1862 map (Figure 28) demonstrates that this was an internal floor surface inside a large room which contained two of the circular kilns.

Context	Type	Description	Interpretation
1052	Masonry	Brick and fireclay slab surface bonded with a greyish white clay. Truncated surface that may relate to nearby kiln [1053]. Individual bricks 220x110x65mm. Fireclay slabs 320x310x35mm. Floor surface 1.40m N/S x 2.24m E/W. (Plate 36).	Floor surface
1207	Layer	Loose black coal. 1.5m N/S x >2.36m E/W x 30mm thick.	Levelling deposit for floor surface [1052]

5.3.58 A pottery dump and associated ground raising deposit was observed within the south-west facing section of the excavation area (Group 26). Both deposits were observed between walls [1176] and [1145] which would have been located within an unlabelled section of the pottery at the north-westernmost corner (Figure 28).

Context	Type	Description	Interpretation
Group 26			
1194	Layer	Loose dark brownish grey pottery waste. 3.77m NW/SE x 5.34m NE/SW x 0.54m thick. Pottery and clay tobacco pipe recovered (refer to Appendix 5 & 6 respectively).	Dump deposit of pottery waste
1208	Layer	Firm dark bluish grey silty clay. 3.77m NW/SE x 5.28m NE/SW x 0.17m thick.	Ground raising dump

5.3.59 An Atkins and Oswald type 33 variant clay pipe was recovered from layer [1194] dated to after 1840. The bowl bears an ink stamp facing the smoker, which reads *M. Hails/Albion Inn/Newgate ST/ Newcastle-on-Tyne* (Appendix 6). Ink stamps are very rare on clay pipes and normally occur after 1850 (Oswald 1975). Michael Hails is listed as the innkeeper of the Albion Inn in Ward's Directory of Newcastle-on-Tyne for 1898. Kelly's Directory for 1894 and Ward's Directory for 1910 lists different owners of the Albion Inn, therefore the pipe stamp cannot be earlier than 1894 or later than 1910. Due to its location within pottery waste it is likely that the pipe bowl is intrusive as Newcastle Pottery closed in 1893 (Phase 5.1).

5.3.60 A compact deposit was noted at the northern extent of the pottery adjacent to wall [1176] that was encountered for 9.20m NW/SE x 4.3m NE/SW. The deposit may represent a levelling deposit for truncated surface [1156] that survived for 1.90m NE/SW x 0.44m NW/SE.

Phase 5.1: Demolition of Newcastle Pottery and backfilling (post 1893)

5.3.61 Newcastle Pottery was closed in 1893 (Bell & Gill, 1973, 7; Morgan 2007, 22) with the majority of structures demolished prior to 1896. Phase 5.1 represents the demolition of the pottery; backfill, ground raising dumps and demolition deposits were recorded (Group 48):

Context	Type	Description	Interpretation
1098	Fill	Firm dark bluish grey, demolition rubble.	Infill of coal

		Occasional wood inclusions. 3.75m NE/SE x 1.56m NW/SE x 0.57m thick. Pottery recovered from deposit (refer to Appendix 5).	store [1097] Group 22
1117	Fill	Firm light greyish white clay with moderate inclusions of brick rubble.0.80m NW/SE x 1.06m wide x 0.27m thick. Pottery recovered from fill (refer to Appendix 5).	Infill within storage bays of slip house
1124	Fill	Firm dark greyish brown clayey silt. Frequent stone and brick rubble, occasional clay lenses, occasional small sub-rounded and angular pebbles. Moderate to occasional chalk flecks. 1.08m NE/SW x 1.30m NE/SE x 0.20m thick. Pottery recovered from fill (refer to Appendix 5).	Infill within storage bays of slip house
1139	Fill	Firm dark brownish grey clayey silt with moderate cbm and stone rubble. 1.24m NE/SW x 0.82m NW/SE x 0.25m thick. Pottery recovered from fill (refer to Appendix 5).	Infill within storage bays of slip house
1159	Fill	Compact dark reddish brown coarse sandy silt with occasional pottery waste. 0.74m NE/SW x 0.42m NW/SE x 0.17m thick. Pottery recovered from fill (refer to Appendix 5).	Infill of muffle kiln [1046]
1160	Fill	Compact dark reddish brown coarse sandy silt with small sub-angular stones. 0.74m NE/SW x 0.44m wide x 0.10m thick.	Infill of muffle kiln [1046]
1162	Fill	Loose mid greyish brown sandy silt with lenses of clay and demolition rubble. 3.12m NE/SW x 1.86m NW/SE x 0.48m thick. Pottery and clay pipe was recovered from this deposit (refer to Appendix 5 & 6 respectively).	Infill of slip kiln [1212]
1163	Fill	Loose mid greyish brown demolition rubble with a matrix of sandy silt. 3.12m NE/SW x 1.86m NW/SE x 0.42m thick. Pottery and a clay pipe bowl was recovered from deposit (refer to Appendix 5 & 6 respectively).	Infill of slip kiln [1212]
1178	Fill	Compact light grey firebrick within a sandy matrix, occasional red brick fragments. 2.52m NE/SW x 1.28m NW/SE x 0.52m thick.	Rubble infill of slip ark [1182] Group 18
1179	Fill	Firm light grey clay with small lenses of light pink clay. 0.69m NW/SE x 2.52m NE/SW x 0.39m thick.	Fill of slip ark [1182] Group 18
1180	Fill	Friable light grey clayey silt with occasional pieces of red brick fragments and fire brick. 0.67m NW/SE x 2.52m NE/SW x 70mm thick.	Fill of slip ark [1182] Group 18
1183	Fill	Friable mid greyish pink clayey sand. V occasional small fragments of cbm and occasional small patches of white light grey firm clay (slip). 2.77m NE/SW x 1.22m NW/SE x 0.26m thick. Pottery recovered from fill (refer to Appendix 5).	Fill of slip ark [1182] Group 18
1186	Fill	Soft, mid greyish white clay. Only visible in SW-facing section. 1.25m NW/SE x 0.11m thick.	Fill of slip ark [1182] Group 18
1187	Fill	Firm light brownish yellow clay. 1.24m NW/SE x 0.24m thick.	Fill of slip ark [1182] Group 18
1219	Fill	Compact, mixed reddish dark grey with light	Fill of coal

		brownish grey lenses, demolition rubble. 2.02m NW/SE x 2.68m NE/SW x 0.20m thick. Pottery and clay tobacco pipe was recovered from deposit as well as two stamped firebricks (refer to Appendix 5, 6, & 7 respectively).	store [1217] Group 23
1228	Fill	Firm light greyish white clay. 0.98m NE/SW x 0.26m NW/SE x 0.08m thick. Pottery recovered from fill (Refer to Appendix 5).	Fill of structure [1227] Group 18
1278	Fill	Firm very light greyish white clay. Base not excavated. Length: 1.06m NE/SW x 0.52m wide x 0.52m NW/SE x 0.05m thick.	Fill of structure [1227] Group 18
1361	Fill	Loose, mid yellowish grey, demolition rubble. 0.96m NE/SW to LOE x 0.62m wide x 0.67m thick. Pottery recovered from fill (refer to Appendix 5).	Fill of slip kiln [1362] Group 35
1365	Fill	Soft dark brownish grey, sandy clay. 0.72m NW/SE x 0.42m NE/SW x 0.60m thick. Pottery recovered from fill (refer to Appendix 5).	Fill of structure [1337]

Group 48 Demolition of the Newcastle Pottery

Phase 5.2: Late Post medieval to Modern activity

5.3.62 The Ordnance Survey map of 1898 (Figure 13) shows numerous structures facing onto Cookson's Lane. The majority of the former pottery works in the central and southern areas had been demolished but map regression and the excavated structures indicate that some parts of the workshops which had been situated along the eastern boundary of the works were retains along with structures in the eastern corner. Following the closure of the works, several new structures were built and the site was used for a variety of purposes, stable, slaughterhouse and a stone mason's yard. These were demolished in the mid-20th century. Features from this phase of activity included elements of numerous structures, walls, floors, services and ground raising/levelling deposits (Figure 21).

5.3.63 Towards the north-western end of the site were numerous stone sett floor surfaces [1333], [1323] and [1342] with associated drain [1350] and [1344]; door jambs [1346] and [1347] and doorsills [1345] and [1341]. The best-preserved floor surface was [1333] that was observed for 6.6m NW-SE and 3.6m NE-SW and was situated between Phase 4.3 walls [1327], [1339], [1331] and [1359]. Although the floor is within one of the former pottery buildings/rooms it is likely that this is a later addition after the demolition of the main section of the pottery to raise the floor level as it overlies slip kiln [1362]. The Ordnance Survey map of 1898 (Figure 13) shows that the sections of the pottery, such as the workshop, dipping rooms and surrounding areas along Cookson's Lane survived after the demolition of the kilns, stoves and slip house. Further evidence for a later date of the stone sett floor surfaces was a ceramic drain trap [1344] marked with the name *LAMBTON*. This is presumably the product of the Firebrick and Sanitary Works at Lambton D Pit in County Durham that was active around 1894 to 1947, though a Lambton Brick and Sanitary

Pipeworks was also operated at Bournmoor from 1902-1947 (Davis 1986, 186-188; Appendix 7). Two areas of repaired floor surface were also noted to floor surface [1333]; these comprised floor [1334] and [1336].

Context	Type	Description	Interpretation
1004	Masonry	Bricked up doorway bonded with a dark grey cementitous mortar. Bricks 240x110x75mm. Survived for four courses. 1.40m NW/SE x 0.24m wide x 0.36m high.	Bricked up doorway.
1020	Masonry	Bricked up doorway in stretcher coursing bonded with a light grey sandy mortar. 0.80m NW/SE x 0.11m wide x 0.66m high. (Figure 25; Section 119).	Bricked up doorway
1106	Masonry	Brick wall bonded with a cementitious mortar. 11.44m NE/SW x 10.10m NW/SE x 0.48m wide. A ceramic drain and sandstone manhole is noted along the northern wall return. Drain 0.89m NE/SW x 0.68m NW/SE.	Wall with drain and manhole along northern boundary
1107	Cut	Linear, vertical and flat construction cut for wall [1106].	Construction cut for wall [1106]
1241	Fill	Firm mid greyish brown clayey silt. 6.54m NE/SW x 0.66m wide x 0.11m deep.	Fill of service cut [1242]
1242	Cut	Cut for ceramic drain [1367]. Linear, steep sides with a sharp break of slope at top and base and a concave base.	Cut for ceramic drain [1367]
1254	Fill	Firm mid brownish grey silty clay.	Fill of construction cut [1107]
1367	Pipe	Ceramic drain pipe c. 100mm diameter.	Ceramic drain in [1242]
1086	Masonry	Brick stretcher coursing wall bonded with a dark grey cementitious mortar. Bricks 230x110x55mm. External measurements 5.20m NE/SW x 1.95m NW/SE. Internal 4.60m NE/SW x 1.20m NW/SE. Not excavated due to hydrocarbon contamination. (Plate 42).	Brick tank
1087	Fill	Soft dark greyish brown sandy clay. 20-50mm away from outside of structure [1086].	Fill of construction cut [1088]
1088	Cut	Rectangular, straight sides and flat base. 5.20m NE/SW x 1.95m NW/SE.	Construction cut for brick tank [1086]
1068	Cut	Linear, straight side and a flat base. 5.3m x 0.55m x 0.25m deep,	Construction cut for wall [1072]
1071	Fill	Firm dark brownish grey sandy clay.	Fill of construction cut [1068]
1072	Masonry	English garden wall bonded with dark grey cementitious mortar. Bricks 230x100x80mm. Wall extent 5.3m x 0.70m wide x 0.63m high.	Wall
1104	Masonry	Roughly hewn sandstone wall bonded with a light grey lime mortar. Only two courses survived. 6.5m NE/SW x 0.55m NW/SE x 0.35m high.	Wall
1105	Cut	Linear, vertical sides and a flat base.	Construction

			cut for wall [1104]
1102	Masonry	Sandstone wall running NW-SE, roughly hewn blocks bonded with reddish brown clay. Individual stone block measurements varied from 350x400x150mm to 200x150x150mm. 7.9m NW/SE x 0.70m wide x 0.55m high.	Wall
1103	Cut	Linear, steep sides, flat base. Truncated at the SE end.	Construction cut for wall [1102]
1074	Masonry	Brick wall and rectangular structure of irregular coursing survives for 4 courses. Individual brick measured 235x115x80mm. 7.10m NE/SW x 0.48m wide.	Wall
1157	Fill	Loose, dark greyish brown, silty sand. Base not excavated.	Fill of construction cut [1158]
1158	Cut	Rectangular, base and sides not excavated. Cut is roughly orientated NW-SE.	Construction cut for wall [1074]
1112	Masonry	Brick wall of English garden wall coursing, survives for 4 courses bonded with sandy mortar. Individual brick measurements 225x110x650mm. 3.06m NE/SW x 0.66m x 0.38m.	Wall
1113	Layer	Indurated concrete foundation of brick wall [1112].	Concrete foundation for wall [1112]
1114	Cut	Linear. Feature not excavated. NE-SW alignment. Truncated by machining to the SW and to the NE by demolition.	Construction cut for wall [1112]
1108	Masonry	Brick wall bonded in a dark grey cementitious mortar. 5.45m NE/SW x 0.65m NW/SE x 0.25m high.	Wall
1109	Cut	Linear, vertical sides and a flat base.	Construction cut for wall [1108]
1110	Layer	Indurated concrete foundation for wall [1108] 5.45m NE/SW x 0.65m NW/SE x 0.20m thick.	Concrete foundation for wall [1108]
1199	Masonry	Roughly hewn sandstone wall. 2.70m long x 0.46m wide x 0.33m high. Figure 15, 26; Section 128, 27; Section 134	Wall
1200	Cut	Linear, vertical sides, and a flat base.	Construction cut for wall [1199]
1173	Masonry	Sandstone, roughly hewn wall surviving for two courses of random bonding. 5.4m NE/SW x 0.80m wide.	Wall
1174	Cut	Linear, sharp sides, base unexcavated. SW-NE alignment. Truncated by culvert on the N extent.	Construction cut for wall [1173]
1051	Masonry	Roughly hewn sandstone wall bonded with a light grey lime mortar. >4.4m NW/SE x 0.82m wide x 0.80m high. Figure 15, 21, 25; Section 118, 26; Section 126	Wall
1201	Layer	Compact dark brownish grey sandy silt.	Levelling deposit
1215	Cut	Linear, vertical, flat base.	Construction

			cut for wall [1051]
1048	Masonry	Roughly hewn sandstone wall bonded with a light grey lime mortar. Only one course survived. 12.66m NE/SE x 0.64m to 1m wide x 0.41m high.	Wall
1216	Cut	Linear, vertical sides, flat base.	Construction cut for wall [1048]
1351	Masonry	Brick wall bonded with a light grey lime mortar in English garden wall style. Bricks 230x110x60mm. 12.38m NE/SE x 0.36m wide x 0.31m high.	Wall
1352	Cut	Linear, vertical sides and a flat base. NE/SW orientated.	Construction cut for wall [1351]
1007	Masonry	Sandstone wall running NW-SE, of roughly hewn stone (with chisel marks evident) of random coursing, bonded with light, yellowish grey sandy mortar. >7.16m NW/SW x 0.74m NE/SW x 0.70m high. (Plate 43). Figure 15, 21, 24; Section 114	Wall
1011	Cut	Linear, vertical, flat base.	Construction cut for wall [1007]
1013	Layer	Compact black coarse sand & clinker. >7.16m NE/SE x 0.74m wide x 0.17m thick.	Ground raising dump
1014	Layer	Compact mid yellowish brown coarse sand and rubble. >7.16m long x 0.74m wide x 0.26m thick. Pottery recovered from fill (refer to Appendix 5).	Ground raising dump
1044	Masonry	Brick structure mortared onto [1007].	Wall
1032	Masonry	Brick culvert bonded with a dark grey sandy mortar. 1.60m long x 0.35m wide x 0.13m high.	Culvert
1033	Cut	Linear, vertical sides and a flat base.	Construction cut for culvert [1032]
1003	Masonry	Sandstone wall bonded with a light grey lime mortar. 2.92m NW/SE x 0.60m wide x 0.90m wide. Figure 23; Section 112	Wall
1008	Wall	Linear, vertical sides and a flat base.	Construction cut for wall [1003]
1042	Masonry	Brick and firebrick structure. Six courses evident in header coursing bonded with a mid-grey cement mortar. 1.12m NE/SW x 1.10m NW/SE x 0.60m high.	Drain
1043	Cut	Rectangular, vertical sides and a flat base.	Construction cut for drain [1042]
1276	Fill	Compact dark brownish grey clayey sand.	Fill of construction cut [1043]
1329	Fill	Friable mid grey brown sandy silt. 0.30m thick.	Fill of drain cut [1330]
1330	Cut	Linear, vertical sides and a flat base. NW/SE branch 2.60m, NE/SW branch 8.40m, width 0.88m and depth 0.30m	Cut for drain [1356]

1356	Pipe	Ceramic drainage pipe. 185mm diameter.	Ceramic drain

Phase 5.2 Structures and walls

5.3.64 Raised floors are also recorded in the former dipping house in the form of stone sett surface [1002], as well as repaired areas [1055] and [1054]. These surfaces overlay the original Phase 4.3 floor surface of the dipping house [1261].

Context	Type	Description	Interpretation
1323	Masonry	Sandstone surface bonded with a dark grey lime mortar. 2.64m NE/SW x 0.96m NW/SE x 0.19m thick.	Floor surface
1324	Layer	Compact black silty sand. 2.90m NE/SW x 0.96m NW/SE x 20mm thick.	Bedding for stone surface [1323]
1325	Layer	Compact black silty sand. 4.80m NW/SE x 5.60m NE/SW x 0.02m thick.	Bedding for stone surface [1333]
1333	Masonry	Sandstone floor surface bonded with a dark grey mortar. 4.80m NW/SE x 5.60m NE/SW x 0.14m thick. (Plate 45).	Floor surface
1341	Masonry	Sandstone doorsill 0.64m NW/SE x 0.60m NE/SW x 80mm thick.	Doorsill
1342	Masonry	Sandstone floor surface bonded with a dark grey mortar. 4.40m NW/SE x 1.78m NE/SW x 0.18m thick.	Floor surface
1343	Layer	Compact black silty sand. 4.40m NW/SE x 1.78m NE/SW x 80mm thick.	Bedding for floor surface [1342]
1344	Masonry	Ceramic drain trap marked with LAMBTON.	Drain trap
1345	Masonry	Sandstone doorsill bonded with a dark grey mortar. 0.38m NW/SE x 0.30m NE/SW.	Doorsill
1346	Masonry	Sandstone doorjamb bonded with a dark grey mortar. 240x240x90mm. Small square hole on top 80x50mm and 20mm deep.	Doorjamb
1347	Masonry	Sandstone doorjamb bonded with a dark grey mortar. 360x300x150mm. Small hole on top 90x110mm and 40mm deep.	Doorjamb
1350	Masonry	Sandstone block with metal drain grate bonded with a dark grey mortar. 0.64x0.66x0.10m	Drain cover
1334	Masonry	Firebrick block floor surface bonded with a dark grey mortar. 1.90m NE/SE x 1.84m NW/SE x 70mm thick.	Floor surface
1335	Layer	Friable dark greyish brown sandy silt. 1.90m NE/SW x 1.84m NW/SE x 30mm thick.	Bedding for floor surface [1334]

Group 35 floor surfaces

Context	Type	Description	Interpretation
1002	Masonry	Sandstone surface with four column supports forming a square possibly supporting a tank. 3.24m NW/SE x 3.5m NE/SW x 0.15m thick. (Plate 45)	Floor surface
1239	Layer	Compact black coarse sand c. 90mm thick.	Bedding for surface [1002]

1240	Layer	Firm mid greyish brown sandy clay 4.48m NW/SW x 1.51m NE/SW x 0.15m thick.	Ground raising dump for surface [1002]
1054	Masonry	Limestone and granite floor surface bonded with a dark grey mortar. (Plate 44).	Floor surface. Repair of [1002]
1055	Layer	Indurated concrete. >1.54m NW/SE x 6.46m NE/SW x 0.12m thick.	Concrete floor surface
1138	Layer	Compact dark brownish grey coarse sand and rubble. 1.12m NW/SE x 0.16m thick. Only in section.	Ground raising dump/levelling for concrete [1055]

Phase 5.2 floor surfaces within former dipping house

5.3.65 Three modern pits were noted during the excavation:

Context	Type	Description	Interpretation
1164	Fill	Loose black coal fragments and ash. Pottery recovered from deposit (refer to Appendix 5).	Fill of pit [1165]
1165	Cut	Circular, gradual break of slope at top and base with shallow sides and a concave base. 0.48m diameter.	Pit
1202	Fill	Friable dark greyish brown sandy silt. 0.55m thick.	Fill of pit [1203]
1203	Cut	Sub-circular with vertical sides and a flat base. NW/SE 1.27m x 1.22m NE/SW x 0.55m deep.	Pit
1273	Fill	Loose mid brownish grey sandy clay. 0.42m thick. Pottery recovered from fill (refer to Appendix 5).	Fill of pit [1274]
1274	Cut	Square, vertical sides and an irregular base. Truncates kiln feature [1041]. 0.65m N/S x 0.70m E/W and 0.42m deep.	Pit

Phase 5.2 Pits

5.3.66 The remainder of the Phase 5.2 contexts comprised ground raising dumps and backfill deposits:

Context	Type	Description	Interpretation
1000	Layer	Compact demolition deposits noted across the site. Max thickness 2.30m in southern extent to c.0.20m at the northern extent. 28.62m NE/SW x 74.34m NW/SE.	Modern overburden covering the site
1090	Fill	Soft dark brownish grey sandy clay. 4.6m NE/SE x 1.20m NW/SE.	Fill of brick structure [1086]
1161	Fill	Compact black coarse sand and silt. 1.52m NE/SW x 0.92m NW/SE x 90mm thick. Pottery recovered from fill (refer to Appendix 5).	Fill of muffle kiln [1046]
1275	Fill	Loose dark brownish grey sandy silt fill within two bays of brick structure [1042]. Western bay 0.33m x 0.33m. Eastern bay 0.41x 0.27m.	Fill of brick structure [1042]

Phase 5.2: Ground raising dumps and backfill deposits

6. CONTENTS OF THE ARCHIVE

6.1 Paper Records

6.1.1 The paper element of the Site Archive is as follows:

Item	No.	Sheets
Context register	1	8
Context/Group Sheets	363	363
Section register	1	2
Section drawings	141	52
Plans	24	71

Table 6.1: Contents of the paper archive

6.2 Photographic Records

6.2.1 The photographic element of the Site Archive is as follows:

Item	No.	Sheets
Monochrome print registers	8	10
Monochrome prints	176	24
Monochrome Negatives	205	8
Digital photograph registers	2	23
Digital photographs	531	N/A

Table 6.2: Contents of the photographic archive

6.3 Artefactual Archive

Material	Number	Weight
Pottery	13,929	391kg
Saggars	691	244kg
Small kiln furniture	2438	1.8kg
Plaster of Paris moulds	3	920g
Clay tobacco pipe	9	52g
Stamped bricks	53	n/a
Common bricks	60	n/a
Sanitary ware	1	n/a

Table 6.3: Contents of the artefactual archive

6.4 Site Archive

6.4.1 The complete Site Archive, including the paper and photographic records and artefactual archive, is currently housed at the PCA Northern Regional Office.

6.4.2 The Site Archive will eventually be deposited with the Great North Museum, Newcastle upon Tyne, under the Site Code FBP16, for permanent storage and the detailed requirements of the repository will be met prior to deposition. Disposal of some elements of the artefactual archive will take place after the final stages of post-excavation analysis are complete, in line with specialists' recommendations for retention and disposal.

7. DISCUSSION OF THE ARCHAEOLOGICAL FINDINGS

7.1 Phase 1: Geological Substratum

7.1.1 Phase 1 comprises deposits representing the superficial geology of this part of Tyne and Wear. Devensian Diamicton till in this part of Newcastle formed up to two million years ago in the Quaternary Period (British Geological Survey) and comprises material known generally as boulder clay. The geological material was observed intermittently across the excavation area west of Cookson's Lane and recorded at maximum/minimum heights of 22.13 and 20.11m AOD, respectively.

7.1.2 Agricultural use of the land throughout the medieval and post-medieval periods likely resulted in horizontal truncation of the upper surface of the geological substratum though plough truncation.

7.2 Phase 2: Agricultural Field Boundaries (medieval)

7.2.1 Phase 2 comprises three medieval ditches cut into the geological substratum; two small NE/SW aligned ditches and a larger NW/SE ditch running adjacent to Cookson's Lane from which three sherds of 13th to 14th-century pottery were recovered. The large ditch was aligned parallel with the former course of the Skinner Burn and would have been situated at the top of the western side of the steep valley of the burn. During the medieval and early post-medieval periods, this area would have used for agricultural activity lying outside of the medieval walls of Newcastle between the and the ditch may have formed the eastern boundary of a system of fields and agricultural plots. The agricultural use of this land continued into the early post-medieval period when industrial activity was established in this area (Graves & Heslop 2013).

7.2.2 The medieval expansion at Newcastle was centered on the port, but was also shaped by the various burns running into the Tyne. The Skinner Burn (now culverted under Forth Banks road) lies approximately 186m outside the medieval town walls in an area referred to as *without close gate*. In the 13th century, Newcastle expanded and incorporated many of the suburban settlements such as Pandon and started to reclaim land on the north side of the River Tyne, where The Close, the Quayside and Sandhill now stand. The Close (the street adjacent to the Tyne riverbank) existed from as early as the late 13th century. Ground raising dumps of material would have certainly been used to reclaim land from the river when completed, The Close led only to open ground at the Skinner Burn with no medieval suburb having developed outside Close Gate.

7.2.3 Corbridge's Survey of 1723 (Figure 5) and Bourne's Survey of 1736 (not reproduced here) show some development outside the town walls leading from the Close Gate, although the area to the west of the Skinner Burn is still shown as undulating uninhabited hills running from north to south along the course of the Burn towards the confluence with the River Tyne.

7.3 Phase 3: Developed Soil (early post-medieval)

7.3.1 Developed soil extended across the majority of the excavation site, overlying the Phase 2 field boundaries, and likely represents plough soils.

7.3.2 Historic maps show that the excavation area lay within a large field from the mid-18th century until 1801(Thompson 1746, Figure 6; Hutton 1772, Figure 7; Cole and Roper 1801). This suggest that the earlier smaller medieval plots were subsumed into a larger parcel of land which was used for arable activity, resulting in the development of a plough soil horizon over the boundary ditches.

7.4 Phase 4: Skinnerburn/Newcastle Pottery

7.4.1 The earliest reference to a pottery within the area of the Skinnerburn dates from the 1730s and although no structures are noted on Bourne's map of 1736 (which appears to be largely based on Corbridge's Survey of 1723), he does refer to the area in *The History of Newcastle upon Tyne: or The Ancient and Present State of that Town* (1736, 145):

> *"Without the Close-Gate is a pretty long Street with Houses on each Side; Which goes as far as a Dike called Skinner-Bourne, where are of late Years a Factory belonging to Mr. Thomlinson, a Pot-House to Mr. Joseph Blenkinsop and Ralph Harl, and a Glass-House to Mr. Dagney…"*

7.4.2 This suggests that the original Skinnerburn Pottery, in the hands of Joseph Blenkinsop and Ralph Harle for some years before 1736, was situated along the western bank of the Skinner Burn and may be part of the group of buildings aligned along the western side of the valley on Thompson's Plan of 1746 (Figure 6). Following destruction by fire, the pottery was rebuilt in the late 1770s and can be seen on Hutton's map of 1772 (Figure 7) as a narrow linear structure aligned NW-SW along the burn with a complex of structures at the south-eastern end. This structure survived into the early 19th century and by 1802 structural expansion had occurred as shown on Kidd's Plan of 1802 (Figure 9) when the pottery complex expanded westwards into the development site, south-west of where Cookson's Lane would later be located. A large NE-SW range of buildings fronting what was to become Pottery Lane with two ranges at right-angles extending behind occupied the central part of the development area.

7.4.3 The pottery had evidently been completely rebuilt between the 1802 map and Wood's survey of 1827 (Figure 10) during which time it was under the ownership of Addison, Falconer & Co. The 1830 Oliver plan (Figure 11) shows the works in greater detail, but it is evident that the layout is the same as that on the Wood plan; a U-shaped range of buildings aligned NW-SE with a central courtyard and access from Pottery Lane at the north-west end of the complex leading onto Forth Banks road. Four circular kilns are situated in the southern end of the works, evidently internal to buildings. At this date, the pottery would have been under the ownership of Taylor & Son (Parson & White 1827, 108; Pigot's Directory 1828, 602) or Armstrong, Wilson and Co. (Newcastle Courant 18th

December 1830). By 1833 the pottery was in the ownership of Redhead, Wilson & Co, but by 1838 it had passed to T. Wallace and Son, and then two years later to James Wallace & Co before finally being renamed to Wallace & Co in 1858 (Bell & Gill, 1973, 7).

7.4.4 The 1862 Ordnance Survey map (Figure 12), which names the works as the Newcastle Pottery, shows that the layout remained largely unchanged although some modifications to the works had taken place by this date, particularly in the south-eastern corner where one of the original circular kilns was no longer in use and additional rooms had been added in the corner. Reconfiguration had also taken place at the front of the site with a large yard area added fronting Pottery Lane. This detailed map shows the internal divisions within the buildings and labels several rooms. Facing onto the front yard at the north-eastern end of the U-shaped range is a large rectangular room with irregular shaped room adjoining to the south-west with what appears to be a small enclosed area within the yard attached to the front of the large room. Behind this room is a long, narrow rectangular room along the north-eastern boundary of the site labelled as a workshop and adjacent to the north-western side is a small rectangular room, projecting into the central courtyard, labelled kiln. Additional rooms appear to have been added either side of the kiln room since the 1830 map as only a single room projecting into the courtyard from the workshop is shown on the earlier map. Very narrow linear features along the north-western side of the courtyard may represent additional walls. The new large rectangular room in the south-eastern corner is a Dipping House and the complex of rooms between this and the workshop, one of which was the former location of a circular kiln, are unlabelled. The three internal circular kilns in the south-western corner of the site remain and another has been built to the north-west situated between two rectangular rooms both labelled Stove. Three large rooms behind the stoves and kiln adjacent to the south-western boundary of the site are unlabelled. At the north-western end of the U-shaped range is a complex of rooms with a narrow room at the southern end labelled Slip House. The symbol shown on the structure which joins the two ends of the U-shaped range shows that this was a roofed passageway leading into the central courtyard.

7.4.5 During its existence, the pottery was managed under various owners where the name Skinner Burn/Newcastle Pottery became interchangeable within the contemporary accounts up to the mid-19th century. The table below summarises the various owners of the Skinner Burn/Newcastle Pottery:

Date	Ownership
c.1736 to c.1748	*Joseph Blenkinsop & Ralph Harl*
c.1748 to c.1758	*Joseph Blenkinsop (pottery burnt down 1758 and not rebuilt until 1770s)*
c.1772 to c. 1790	*George Spearman & Co*
c.1790 to c. 1824	*Addison, Falconer & Co*
c. 1824 to c. 1827	*Addison & Co.*

c. 1827 to c. 1829	*Taylor & Son*
c. 1830 to c. 1833	*Armstrong, Redhead & Co*
c. 1833 to c. 1838	*Redhead, Wilson & Co*
c. 1838 to c. 1840	*T. Wallace & Son*
c. 1840 to 1858 *1858 to 1893*	*James Wallace & Co before renaming Wallace & Co in 1858 (factory closed in 1893)*

The various owners of the Skinner Burn/Newcastle Pottery

7.4.6 The structural remains excavated at the site represent elements of the latest U-shaped incarnation of the pottery built by 1827 with modifications which would have occurred into the late 19th century. Widespread demolition of the pottery had evidently taken place at various times; the pottery was closed in 1893 with the majority of structures being demolished prior to 1896 (Ordnance Survey 1898; Figure 13). The Ordnance Survey of 1896 shows that all the kilns, stoves and the slip house had been demolished, however, the rooms fronting onto Cookson's Lane were retained that included the workshop and the Dipping House.

7.4.7 Several buildings were constructed upon the former site of the pottery, including a stable, slaughterhouse and a stone mason's yard, truncating some remaining elements of the pottery. These structures were demolished in the mid-20th century, which further impacted the structural remains of the pottery. Survival of the pottery was therefore variable across the site and in some areas no traces remained. Not surprisingly, the best-preserved elements comprised subterranean features such as coal stores and tanks for mixing slip and floor surfaces which were lower than the ground level of the pottery. Many elements of the structures only survived as the bases of wall foundations and only fragmentary evidence of most of the circular kilns survived. As the 1862 map is so detailed, overlay of the excavated features onto the historic map has in some cases enabled interpretation of these fragmentary remains (Figure 28).

7.4.8 Features assigned to Phase 4.1 activity comprise structural remains which correlate with features seen on the 1830 map. These remains were largely confined to the south-eastern corner of the excavation area, with a few elements also surviving in the south-western corner. For the purpose of this assessment, all other structural remains of the pottery have been assigned to Phase 4.3 which reflects the layout of the pottery as shown on the 1862 map, though it is evident that many external and internal walls may have been constructed in the early 19th century with the layout of some elements modified by the 1860s. The dimensions of common or house bricks used to construct walls and other associated features cannot be used to provide precise dating of each element; their size suggests that none are earlier than the very late 18th century, and most belong to the first half of the 19th century (Appendix 7). Stamped bricks and firebricks were used in structural features, and in some cases these can be closely dated. Most of the fire-bricks are post-1850 in date,

which possibly reflects the need to regularly renew the kiln linings. It is evident that many of the structures, particularly elements of the kilns but also internal walls and floors were repaired over time therefore the date of a particular stamped brick may not necessarily date the original construction of the feature. It was also evident that in some cases reuse of materials had occurred, further complicating the issue of dated material. Further analysis of the stratigraphic and artefactual evidence will focus of refining the sequence of construction, modification and repair.

7.4.9 At the southern end of the site, elements of five circular bottle kilns were recorded, although with one exception only very fragmentary traces survived along with patches of scorched earth indicating where the kilns had been located. Four kilns can be seen here on Oliver's 1830 plan as circular features internal to buildings and the archaeological remains correlate well with the historic mapping (Figure 28). Two kilns were recorded in the eastern corner of excavation but their locations indicate they could not have been contemporary, with one evidently replacing another. Elements of the walls of the room surrounding this kiln also survived with a few areas of floor surface. The map sequence shows that by 1862 there was no kiln in this corner of the works, but the three others were retained. The three kilns in the south-western corner only survived as small stretches of the of sandstone foundations or ash pits. Stamped bricks used in the ash pits demonstrate that repairs took place during the 19th century, repeated frequent repairs would be required due to the intense heat that these features would have been subjected to. The 1862 map demonstrates that the two kilns located adjacent to each other within one room (Group 8 and 75) measured *c.* 6m in dimeter; the kiln to the south-east (Group 10) was slightly larger at *c.* 6.40m. In the south-eastern corner of the pottery perhaps the earliest kiln (Group 11) appears to have been replaced by a smaller kiln (Group 14); the entire circumference of the base of the foundations of this kiln survived and it had an external dimeter of *c.* 4.25m and internal diameter of c. 3.30m.

7.4.10 The backfill of an extensive clay extraction pit was partially excavated at the north-westernmost corner of the site; due to its size and depth it was not possible to determine the full extent of this pit. The pit does not appear on any of the historic maps, but pottery within the backfill is dated to 1858 to 1893. Therefore, the pit is likely to have been excavated after 1830 (Figure 11) and backfilled before 1862 (Figure 12) as the boundary of the pottery expanded to the north-west between this period to create an open yard perhaps used for storage. The coarse local clay would have been used at the pottery with the pit providing an ideal opportunity to dispose of pottery and production waste close to the site. The contents of the pit and disposal of factory waste is discussed below.

7.4.11 Structural remains assigned to Phase 4.3 activity comprise features which correlate with the Ordnance Survey of 1862 (Figure 28) up until its demolition *c.*1896, reflecting the use of various areas in the later period of the pottery. It is likely however that most elements of the earlier pottery as shown on Wood's 1827 and Oliver's 1830 map were retained as the

map sequence shows the layout of the works remained largely unchanged. It therefore seems likely that most external walls and some internal divisions remained.

7.4.12 At the north-western end of the excavation area, a group of structural remains survived across an area that measured *c.* 10m NE-SW x 10m NW-SE corresponding to a group of interconnected rooms at the northern end of the U-shape range on the 1862 map with the southern room labelled as a 'Slip House' (Figure 28). Three main elements were identified in this area; storage bays which opened onto the central courtyard, the very well-preserved remains of a 'mixing ark' (a tank where the slip was mixed) with a saggar in the base and the base of a slip kiln.

7.4.13 Elements of the foundations of external walls of the rooms at the north-eastern end of the U-shaped range survived including the entire perimeter of a squared room, which would have been located adjacent to the covered passageway, and three sides of the adjoining large rectangular room. In the eastern corner of the square room were the remains of another possible slip kiln. Only a small area of internal floor surface of the long workshop survived.

7.4.14 Two well-preserved subterranean coal stores were located in the central part of the site, overlay with the 1862 map suggests that one of these was situated in the room labelled kiln, situated adjacent to the central yard, ideally located for coal deliveries and to fuel the kiln behind (Figure 28). The other appears to have straddled an enclosed part of the central yard and the room behind.

7.4.15 The base of another possible slip tank was located in the south-eastern part of the central yard, and it is possible that the complex of walls seen on the 1862 map in this area may be associated with this feature. To the south-east were the well-preserved structural remains of a room with subterranean floor and central tank, probably another mixing ark. The sides of the room were lined with slate demonstrating a need to waterproof the walls. The adjoining room to the south-east also had a large part of the internal brick floor surviving and remnants of steps led up from this room to the room labelled as a 'Dipping House' on the 1862 map. The wall dividing this room from the dipping house had been subject to several modifications. Part of the floor of the dipping house room was exposed under a later floor surface. A few structural elements survived in the south-western corner of the excavation area including internal walls and floor surfaces of the room containing circular kiln Group 10. Elements of a structure identified as a possible muffle kiln were also recorded in this area.

7.4.16 As well as the structural remains, the excavation also produced significant assemblages of waste pottery and used kiln furniture (Appendix 5). A very large assemblage of pottery was collected from the excavation amounting to a total of 13,929 sherds (391.5kg) with a total EVEs of 383.7 (Table 2); the vast majority of this comprised 'wasters' which had been subject to a variety of pre- and post-firing defects. A large assemblage of kiln furniture was also recovered. This comprised 691 saggar sherds (244kg) with a total EVES of 22.48 and

2438 items of small kiln furniture (1.8kg). Fragments of three plaster of Paris moulds (920g) were also recovered.

7.4.17 This material came from a variety of features, the largest quantity being from the infilled quarry pit at the front of the site near the street frontage. Kiln furniture and waste pottery had also been used in levelling and make-up deposits for structures, floor surfaces and backfills of construction cuts for walls. Some material was also recovered from the clayey fills in the slip tanks, which may have been deposited during the use of these features. A relatively large assemblage was recovered as unstratified material during the cleaning of the site after machine excavation; this material was presumably deposited across the site and inside structures following the demolition of the factory, but although it was not recovered from stratified deposits, was still able to provide valuable information about production at the site. A notable feature was a small pit containing waste pottery discovered in the central yard area, close to the subterranean room with the slip tank. The entire assemblage comprised black glazed redwares. The recovered assemblage from the excavation only represents a small fraction of the large quantities of waste pottery and used kiln furniture which would have been generated by the pottery over the course of more than a century.

7.4.18 A recently excavated site at Coquet Street, Byker, east of Newcastle city centre has provided evidence for the disposal of waste pottery from a nearby works (Williams in press). A worked-out clay pit associated with a brickworks had been infilled with manufacturing waste including waste pottery and kiln furniture. Most of the wasters derived from the C T Maling Ford Pottery, located to the east of the Ouseburn, which from the 1850s and up to the early 1880s, largely concentrated on the production refined white-earthenware of commercial wares, producing huge quantities of marmalade pots for James Keiller and Sons of Dundee. Evidence for disposal of waste material from the Malings Pottery, Ouseburn has also been recovered from the site itself, though not *in situ*.

7.4.19 Excavations in 2013 on the site of the pottery revealed little or no definitive evidence of the pottery works, the surviving structural remains being related to the Ouseburn Bottleworks which had subsequently occupied the site (Brightman and Scott 2015). A flue at the site had been backfilled with material that included unfinished pottery sherds and wasters and kiln furniture. Large quantities of wasters were also found during investigations at Clifford's Fort, North Shields. Embrasures at the fort had been infilled in the 1880s and the material used included waste pottery from the nearby Low Lights/Carrs Pottery which was in operation from 1814 to 1907 (HER 4588). It is likely that as with these other local factories, waste from the Skinnerburn/Newcastle pottery was exported from the works to be used as ground levelling and reclamation. In the case of this pottery the material may not have been transported far as it may well have been used to fill the valley of the Skinner Burn.

7.4.20 The assemblage recovered from the site demonstrates that the Newcastle Pottery was producing highly decorated table wares and earthenware items for domestic use. The high

number of transfer decorated sherds indicates this was the primary technique for decoration and by far the most popular within this period. Sponge decorated designs were applied to sturdy domestic wares such as jugs and cylindrical jars which were also popular in the 18th and 19th century. The large quantity of redwares also shows that the site was producing more utilitarian items for domestic use as most forms were identified as deep or deep flared bowls, likely used in everyday food preparation by the consumer.

7.4.21 Black glazed redwares were the most common fabric found within the entire assemblage; with most of this coming from the single pit in the courtyard. The second most common fabric were sherds in a biscuit fired state (unglazed pottery which has been fired once to give it sufficient strength to be glazed or decorated). The remainder of the assemblage considered to be products of the factories were identified by decoration or form. By comparing glazed sherds to those of identical form or decoration in a biscuit state, it was possible to identify if they were being made on site. The majority of these sherds are white glazed earthenwares decorated with transfer-printed designs or sponged decoration.

7.4.22 The sherds of black glazed redwares dumped in the pit in the courtyard display an array of firing faults from a matte glaze caused by thin glazing or under-firing to heavily bloated large sherds with black coring showing poor kiln reduction and over firing. Varying forms were present in the assemblage which suggests a misfiring on a large scale.

7.4.23 The biscuit wares included a wide variety of forms as well as varying transfer and sponged decorations which can be dated primarily after 1840. The most common forms are standard bowls and plates with the majority undecorated. A small number of sherds show the production of more intricate forms such as a single sherd of a jelly mould and a few breakfast and Bute style cups. The production of decorative teapots on site is also shown by floral moulded lids with pre-firing perforations, examples of which are also seen in the glost fired white-glazed earthenwares. Two examples of James Keiller Dundee Marmalade jars were also recovered. Both feature oak leaf, wreath and bow design and must date before 1830. From the 1870s onwards production of the Keiller style marmalade jars was common place at The Maling Factory in Ouseburn with the company producing millions of jars annually for Keiller. Furthermore, some of the marmalade jars that were recovered from the site had the print applied to the jar but no gloss firing. This indicates that these jars may also have been produced on site at Skinnerburn/Newcastle Pottery slightly earlier than those produced at the Maling Factory.

7.4.24 The glazed redwares were dominated by large utilitarian vessels with slip interior with the most commonly occurring forms being deep or deep flared bowls with ‘yellow’ slip interiors. These are typical domestic forms produced throughout the life of the pottery. Crude vessels in the form of cylindrical jars and storage jars are also present and are likely products made for food storage i.e. dripping containers. There was also a small number of ‘plant pot’ unglazed redwares, all of the same standard plant pot form with a lipped rim and one pre-firing perforation through the base. These may be earlier examples of the plant

pots later made by Wallace & Co at the Ouseburn pottery after their move from the Newcastle Pottery in 1893.

7.4.25 The white-glazed earthenwares, including those with transfer-printed decoration and sponged decoration, made up 13% of the production assemblage. Those with decoration can be dated more closely depending on the colour and decoration used, however standard blue willow pattern spans the entire production period at the site. Examples of green floral decoration on cups and saucers can be dated after 1840 and sherds with cut sponge decoration can be dated after 1850. As with the biscuit wares, a wide variety of white glazed earthenware forms were manufactured though bowls and plates (both decorated and undecorated) were the most common. Other dining forms such as tea cups and saucers are also frequent within the production assemblage indicating the earlier manufacturing of tea services on site. The most common decorations on the white glazed earthenwares are the standard blue willow pattern transfer designs, variations on floral or chinoiserie inspired transfers or sponged decorated designs of varying colours and prints. One prominent design was the 'Tyneside Albion' transfer-print seen on 221 sherds, meaning this particular design was commonly produced on site. Another transfer design of interest was the 'CONCH' design featuring a large conch shell surrounded by floral patterns with a Chinese fencing inspired interior border. This transfer is more crudely applied and where it is identified in the glazed sherds the transfer is often blurred; it is possible this transfer was being trialled.

7.4.26 Smaller quantities of pearlware, some with transfer-printed designs and yellow wares were also recovered. The majority of the yellow ware came from the material infilling the Slip House which was deposited when the pottery works were demolished. The forms and sizes of the vessels as well as their deposition on site indicate this pottery is probably from the later stages of production after 1850; firing faults such as fused sherds and heavy crazing were noted.

7.4.27 Kiln furniture was also recovered from the site including large fragments of saggars (or fire boxes). These were large pottery containers, usually made from fire clay, which protected the vessels in the kiln during the first firing and also during glaze or glost firing. The examples from the site were standardised in size and shape, all approximately 200mm deep with a diameter of *c*. 340mm. Several saggars had 'bitstone' applied to the base; this mixture of crushed quartz pebbles, sand and flint was used to prevent vessels fusing together in the kiln (Barker 1998, 320). A few examples had pre-firing perforations on the walls unstratified layers which were too large and inconsistent for the affixation of horizontal bars or pins for glost placing earthenwares (Barker 1998, 335) and are more likely perforations to allow heat to escape or transferral around the saggars during firings. The complete saggar buried in the base of the slip tank measured 335mm in diameter and 210mm deep and had a wall thickness of 20mm. The buried saggar was intact until

removal and was in very good condition, showing little or no use in the kiln by the colour of the fabric and the integrity of the bitstone surface.

7.4.28 A large number (2438 items) of smaller kiln furniture items were also recovered with a wide variety of forms for very specific functions within the kiln. These included handmade coils, several different forms of handmade separators and ridged separators with saggar wall attachments. The fabric used to make these was a mixture of clay scraps or off-cuts from the same clay used to make the products of the factories. Many of the coils have thumb or finger indentations showing how they were handmade for purpose when separating vessels within the kilns or saggars. These pieces had a specific purpose with ridged bodies made to stop vessels and furniture affixing in the kiln during the glost firing of more delicate plates and dishes. Kiln stilts with wedged or 'fishtail' feet were also very frequent and the varying forms and sizes represent specific requirements for different firings, with bigger examples made for holding larger serving dishes or plates in the kiln and smaller examples and cockspurs used for separating several smaller plates or saucers within a saggar. Machine-manufactured kiln furniture was also present in the assemblage; 70 examples of cockspurs embossed with 'C.F. Patent' and numerical sizing codes and some of the tripod stilts were also embossed. These were evidently mass manufactured and purchased for use in the factory.

7.4.29 Kiln-furniture recovered from the Malings site in Ouseburn also included handmade kiln rods, stilts and spurs with a few machine-made examples (Brightman and Scott 2005). These comprised stilts and spurs which were also embossed with the initials C. F. and the number 3. The infilled clay pit in Byker which contained refuse from the Malings Pottery also contained large fragments of saggars and kiln furniture including cockspurs, stilts and struts (Williams in press).

7.4.30 Also included in the pottery assemblage was a small group of sherds (136) identified as wares used by the workers at the factories and discarded as domestic waste. These range in date from the early 18th century to the 19th century. Only a very small number of clay tobacco pipes were recovered; the low number of pipes from the site is noteworthy as it might indicate an informal 'ban' on smoking within the pottery to reduce the risk of fire.

7.4.31 An unusual example was a bowl which appears to be a copy of an Irish pipe (dated 1840+). This bowl bears an ink stamp facing the smoker, which reads 'M. HAILS/ALBION INN/NEWGATE ST/NEWCASTLE-ON-TYNE'. Ink stamps are very rare on clay pipes and normally occur after 1850 (Oswald 1975). Michael Hails is listed as the innkeeper of the Albion Inn in Ward's Directory of Newcastle upon Tyne for 1898. Kelly's Directory for 1894 and Ward's Directory for 1910 lists different owners of the Albion Inn, therefore the pipe stamp cannot be earlier than 1894 or later than 1910. As the pipe was recovered from Phase 4.3 context [1194] between walls [1176] and [1145] the ink stamped pipe is likely intrusive. Spot dates of pottery recovered corroborate this theory as it gives the date range of 1840-1893 from deposit [1194].

7.4.32 Potteries were generally built to a common plan, and as far as reasonably possible, the products being brought into the pottery would follow a logical direction from the intake of raw materials to the slip house, clay making workshops, biscuit kilns and warehouse, dipping room, glost placing and firing, sorting and selection warehouse and then to the decorating departments and kiln (Bell and Gill 1973, 5; Palmer *et al* 2012,113). Furthermore, the aim was to have lighter activities undertaken on the first floors, with heavier work on the ground floor. Casting, dish pressing, plate making and decorating were mostly placed on the first floor while throwing and turning were on the ground floor (*ibid.*).

7.4.33 By 1862 the layout of Newcastle Pottery (Figure 12), is shown as an open courtyard facing onto Pottery Lane, with an alleyway running along the western side on the pottery to grant access to the slip house. The open area to the front of the pottery (north-west on Pottery Lane) would have stored the raw material such as stone, flint, chert, clay, gypsum, marl and coal before moving to their required destination (Bell & Gill 1973, 5). When a local source of raw material could not be found or when it had been exhausted material would have been brought in from the rest of the United Kingdom; flints came from the south in the ballast in ships, fine clays arrived from Dorset and Cornwall, with the coarse clays likely being sourced locally. The extraction pit is likely the quarrying of local clay for this purpose.

7.4.34 Once the raw material was at the pottery it would have needed to be processed to be used effectively. Although very different combinations of clay and other minerals/metallic oxides are employed in the manufacture of earthenware, it is alumine earth which allows the clay to be moulded into different forms. Alumine earth is so called from its forming the basis of common alum and although never found in its pure state, it forms a part of the finest clays (Anon 1820, 12). Clay consists of a hydrated silicate of alumina in combination with other substances, such as potash, soda, lime or iron acting as fluxes on the silicate. The reason why clay deposits are richer in alumine than the feldspathic rocks from which they are formed, is explained by the lightness of the substance when suspended in water which is carried away leaving the siliceous material to settle on its own (Sandeman 1901, 13). The other substances found within the clay modify the character of the substance depending on the quantity of the mineral that predominates. Sandeman (*ibid.*) notes that iron is one of the most injurious substances contained within clay owing to its colouring properties, and clay used in fine earthenware must be entirely free from it. The ingredients which most affect the character of clay are sand, iron, lime, and magnesia. Its plasticity diminishes in the proportion to the amount of any of these non-plastic substances that it contains.

7.4.35 The first step in processing the clay (ball clay) is to let it weather once it has been removed from the ground as the sun disintegrates the clay and the rain reconsolidates the material which diminishes the contraction of the clay when it is mixed and facilitates manipulation. The longer it is weathered, the better the clay is considered to be (Sandeman 1901, 15).

The central courtyard or the additional yard to the north-west (shown on the Ordnance Survey of 1862; Figure 12) may have been used for this purpose.

7.4.36 Ball clay is cut out in blocks and then selected for shipment. When dried, ball clay shrinks approximately 18% in weight and after firing in a biscuit oven a further 12%, which is a 30% loss between the raw material and the clay when fired (*ibid.,* 17). The clays function in the mixture is to give plasticity and facility in working.

7.4.37 The china clays that are utilised in pottery production are found in granite soils rich in feldspar that contain small amounts of mica and porphyry. The china clay is prepared by thoroughly washing the material as the clay must be dissolved in large quantities of water. This resulting liquid is then run through trenches, or flumes, over settling pits, into which the heavy refuse, composed of mica and undecomposed feldspar, sinks by its own weight to the bottom; the finer part, the china clay, overflows and is carried on through wet sieves into large central tanks where it accumulates. When the tanks are filled the washing process stops and the fine clay is allowed to settle and is removed in the slip state to wide shallow drying tanks or dried artificially on slip kilns. It remains drying until it is sufficiently stiff to be cut in squares and removed (Sandeman 1901, 18). The function of china clay is to make the body of the ceramics white and less liable to break under a heavy weight or sudden changes of temperature. Two slip kilns were uncovered during the excavation, both within close proximity to the mixing ark; slip kiln Group 18 was closest as it was built within the slip house.

7.4.38 The flint would have had to be fired in a calcining kiln interstratified with coal (Bell & Gill 1973, 5) and then while still hot thrown into cold water (Rees 1802-20, cited in Cossons 1972, 203). Writing in the early 1800s, Rees notes that this process lessens the flints aggregation, and makes it easier to produce a powder. The flint powder is produced by means of hammers that are worked by machinery (*ibid.*).

7.4.39 The other raw materials were ground separately into a fine powder in a wet state and mixed to form a liquid known as slip.

7.4.40 Sandeman (1901, 26) concludes that the required mixture should be sufficiently plastic to be easily workable, be sufficiently infusible to prevent collapse but also sufficiently fusible to become dense and sonorous as to have sufficient stability to resist excessive contraction. The table below summarises the ingredients as well as their properties within the mix:

Material	***Properties***
Ball Clay	*As the foundation and to give plasticity to the mixture.*
Flint	*To give whiteness and make the body less likely to break under a heavy weight or sudden changes of temperature. To counteract the want of plasticity in the flint.*

China Clay	*To give whiteness and make the body less likely to break under a heavy weight or sudden changes of temperature. To counteract the want of plasticity in flint.*
Cornish Stone	*To render the ware more compact, closer in texture, to bind it together and to give it a good ring.*
Oxide of Cobalt	*To improve colour of the finished article.*

Properties of the various ingredients in the composition of the clay body in ceramics (adapted from Sandeman 1901, 26).

7.4.41 The materials stated in the table above had to be mixed in such a manner as to combine artificially the alumine and silica in other and different proportions to that which they already existed in their raw form to create varied wares. The quantities of each material used in the mixture varied between each pottery but the methods used were likely similar and could be split into both dry and wet mixing.

7.4.42 Dry mixing consists of weighing the materials in a dry state, the advantage being that they could then be blunged or mixed in one blunger (tanks that are filled with water) and therefore less room and motive power are required; this being the cheaper method (Sandeman 1901, 28). The disadvantage of this process is that the materials absorb different quantities of water so by weighing out each ingredient the real quantity of dry material is unknown it would therefore be easy to make a mistake in the measurements of each material which would thereby upset the balance of the mixture (*ibid.*).

7.4.43 Wet mixing consists of each material blunged until the slip is of a specified weight per pint so the slip maker would know whether the mixture would need either water or material adding until the required weight was reached. For this purpose, it was necessary to keep scales and a pint pot in the slip house and before making a mixture, each material must have been weighed to ensure it was exactly right. The materials are mixed with the water in open tanks and blunged by hand with long wooden implements like hoes or rakes. In factories where machinery had been introduced, the materials were mixed in octagonal iron blungers, covered at the top with wooden covers in which there were trap doors for the admission of material while a pipe or trough is connected for adding water (Sandeman 1901, 29).

7.4.44 Blungers were sometimes placed on a floor above the mixing ark, although due to the quantities of material needed to load them were often placed on the ground floor, albeit one foot above the flooring with the mixing ark being built below the floor level (*ibid, 32*), which is evident from the slip house excavated at the site. The easiest way to get the material into the mixing ark was to have a trough carried along the front of the blungers, with it sloping slightly towards the ark with a series of sieves to catch any improperly blunged lumps.

7.4.45 Within the slip house (north-western corner of Newcastle Pottery; Figure 12; Figure 20) the different materials which had been ground down to a fine powder by the blunger, and have been weighed and found to be correct would have been mixed together with water in large open tanks or arks. Later examples are either bricked and cemented over or built with faced brick and cement and were round or octagonal in shape. Moreover, the later arks would have had large iron fans fixed in the centre that were attached to a spindle and shaft running overhead which could be thrown in or out of gear as required (Sandeman 1901, 33).

7.4.46 Large paddles with rows of magnets (to remove iron particles) were used to stir the mixture or slip (Historic Plate A) (Mora-Ottomano *et al 2008*). Sandeman (1901, 37) notes the importance of removing as much of the iron as possible as even if the iron does not cause little brown specks in the ware, it is sure to give it a yellowish tinge. The mixture was then passed through a series of sieves to remove any gritty particles (Historic Plate B).

7.4.47 A rectangular mixing ark was uncovered during the excavation (Figure 20; Plate 15) that comprised a brick tank with a stone flagged surface at the north-eastern end. Two timber partitions were noted at the south-western end as well as a buried saggar cut into the base of the mixing ark. The purpose of the buried saggar is unknown but may have been created for the rudimentary purpose of placing the wooden mixing paddle in so they didn't collapse into the slip.

7.4.48 After the slip had been mixed to the desired consistency and of good quality free from grittiness, the slip needed to be reduced to the desired consistency of which there were three ordinary methods of doing this (Sandeman 1901, 38-39). The first is by slip-casting the pottery whereby the slip is poured into plaster moulds which gradually absorbs the moisture from the clay; once the outer skin of pottery has dried the rest of the slip can be poured leaving a cast of the pot ready to be fired in the kilns. This method has its disadvantages however, firstly it is costly due to the large quantity of moulds required, secondly the process is slow and quite unsuited to the production of clay on a large scale.

7.4.49 The second method is to reduce the slip by heat; the clay mixture is poured into a slip kiln, a large flat open oven with a fire beneath to evaporate surplus water until the mixture was of the desired consistency. The chimney would be at one end, with a firehole at the other, and as the heat built up the moisture would evaporate from the slip. The disadvantage of using slip kilns is the expense of the fuel and the fact that the kiln can only be filled once and therefore limiting production of the slip to once a day. It is also a rather slow method of production. Two slip kilns were identified during the excavation; both of which were located within or close to the slip house.

7.4.50 The third method is the use of a filter press to dewater the slip (Historic Plate C). The press was invented by Needham and Kite in 1857 and comprised a series of wooden trays (cast iron trays in later examples) and press cloths to collect the clay. The principle of the press is filtration by pressure with the clay slip being pumped by force pumps through the stand

pipe into the cloths formed like bags in the chambers of the press. The bags retain the clay, as the cloth is too fine to allow it to pass, but the water filters through coming out perfectly clear leaving the material left in the clothes. When no more water will pass from the press the pumps are stopped and the press is disconnected, taken down, the cloths unfolded and the clay taken out (Sandeman 1901, 42). Mellor (1905, 67) notes that slip which has been dried in slip kilns furnishes more plastic materials than when it is dried in a press although Brongiart (1844) states that the opposite is true with hard porcelain.

7.4.51 Once the clay had been dewatered, it had to go through a process of *wedging* within the slip house that consisted of cutting the clay with wire and then dashing it down on itself on top of a specially prepared block faced with plaster. This was to ensure that all the clay had the same consistency and therefore ensured homogeneity (Sandeman 1901, 45). The introduction of the pug mill reduced the need for labour with pottery manufactories and consisted of a metal drum with knives rotating on the inside that are set at such an angle that while cutting the clay, they are continually pressing it forward. This process cuts the clay and squeezes it out at the other end of the pug mill and is noted as producing and better quality of clay than that which has been wedged by hand (*ibid, 46*).

7.4.52 The prepared clay was then transferred to the throwers workshops, which at the Newcastle Pottery was located further down from the slip house along the western alleyway (Figure 12). Within the throwers workshop the clay was shaped on a potter's wheel. This produced circular forms to which moulded handles or other additions could be attached using slip.

The clay could also be used to produce pressed-ware such as saucers, plates, and dishes. These were formed by placing wet clay on a plaster of Paris mould, which would give the general shape of the item to which the potter would use his hands or tools to form the piece (Bell & Gill 1973, 5-6). Complicated designs that could not be made in the throwing shop on the wheel or pressed were cast in moulds. Bell and Gill (1973, 6) note that the original model was sculptured in clay, and a mould made with plaster of Paris (sometimes in two or more pieces depending on the complexity). The liquid slip was then poured into the cast and left to stand; after which the slip in contact with the mould would have become solid and the remaining slip could be poured away leaving a hollow vessel. Three partial plaster slip moulds were recovered during the cleaning phase of the excavation; unfortunately however, they were all within the modern overburden of the site. The interior shape of one of the moulds suggests a mould for a 'sweet dish' with partitions and wavy edged-rim, *cf.* Bell 1971: 125.

7.4.53 Historic Plate D shows an example of a complete slip mould (Laing Art Gallery at Newcastle upon Tyne).

7.4.54 Once the pieces had been formed and shaped they required firing in one of the kilns/ovens. Ovens/kilns are noted as being the most important aspects of a pottery and it is on their effective management that the success of the business will largely depend as

more money was lost in this department than any other due to misfiring and defects within the ceramics.

7.4.55 There have been many different forms and shapes of ovens in use for the firing of earthenware, Sandeman (1901, 182) notes that the methods of working them can differ considerably. Strictly speaking, there is a difference between kilns and ovens when referring to the different types used when firing the pottery. The word oven usually meant the biscuit or glost firing and the word kiln historically referred to the enamel firing kiln, hardening-on kiln or calcining kiln. The usage of these terms varied from factory to factory so it is difficult to be know what precisely is being referred to.

7.4.56 The three main types used when firing the pottery are comprised of updraught, downdraught and muffle kilns. Downdraught ovens are irrelevant when discussing the Newcastle Pottery as they were not developed until the early 20th century. The updraught ovens can be further sub-divided into the updraught hovel, stack, hob-mouthed and skeleton oven, whilst the muffle kiln can be subdivided into the enamel muffle kiln and the hardening-on muffle kiln. A bottle oven was the standard pottery kiln used by the 18th century which had evolved from multi-flued circular updraught kilns of earlier periods (Baker 1991, 104; Palmer *et al* 2012, 144).

7.4.57 Updraught kilns usually had eight to eleven firemouths around the circumference depending on the size of the oven, with corresponding fireboxes inside (Baker 1991, 110). The heat would have been divided before entering the oven chamber, with part of the heat passing through flues under the floor of the kiln before issuing from the well-hole and pipe-bung made up of open-ended saggars in the centre of the kiln, and the remainder rising through small chimneys, known as bags, direct from the mouth into the oven chamber from all sides (Baker 1991, 101; Sandeman 1901, 183).

7.4.58 It has been suggested that both the increase in the number of firemouths and the addition of the well-hole were brought on by the transition from wood to coal firing. Baker (*ibid.*) notes that this was needed because coal produced a build-up of clinker in the firemouths which would obstruct the airflow into the oven and therefore the addition of more firemouths would alleviate this problem. Conversely, the greater number of firemouths produced a considerable difference in temperature between the periphery and centre of the oven and in turn led to the introduction of a central flue and well-hole to produce a more even spread of heat (Baker 1991, 110).

7.4.59 Kiln Group 14 within Phase 4.1 had a central well-hole which suggests the pottery had certainly shifted from wood to coal by 1830 as the kiln is depicted on Oliver's plan of Newcastle (Figure 11). No well-holes were noted in updraught kiln Groups 8, 10, 11, & 75 but this may be due to the level of truncation.

7.4.60 The entrance to an oven (*wicket*) was bounded by an iron frame and was shaped to allow access of the ovenmen with a saggar on their heads. It was sealed with bricks and clay (to

become the *clammins*) before firing and broken open at the end. To regulate the heat chain dampers were fitted and spy-holes to inspect the progress of the firing (*ibid.*). Moreover, iron bands, known as *bonts* would have run around the outside of the oven to strengthen it as it expands and contracts during firing.

7.4.61 KIlns can therefore be divided into three principal parts; the mouths, the flues and the firing chamber which are common to all earthenware kilns. However, it is variances within these aspects of earthenware ovens that give rise to the different types of updraught bottle kilns (hovel, stack, Hobb-mouthed and skeleton).

7.4.62 Hovel ovens consist of an inner chamber, the oven itself, with a domed roof known as the crown in which the pottery was placed and fired. The oven gets its name because it is enclosed by an outer chamber which helped to conserve heat loss and prevented damaging draughts through the oven. The hovel also acted as a chimney (*stack*) which would take away the smoke and provide protection to the pots when they were brought to the oven. The oven could reach temperatures of over 1200ºC and could be used for firing both biscuit and glost ware. Historic Plate E shows a cross-section of an early 19th century hovel oven.

7.4.63 The advantage of this type of oven are that the firemouths are protected from the wind, and it can be easily repaired as the oven stands detached in the centre of the hovel. The disadvantages are that the space around the oven is very confined for firing and Sandeman (1901, 183) mentions that the draught is sometimes rather defective.

7.4.64 When the oven and the stack are built together it is known as a stack oven and is often the form adopted when ovens are grouped together in a series or row, with the stacks rising through the roof of the pottery. The advantage of this type is that they are solid and compact. However, the disadvantage was that they took a long time to cool down and were more difficult to repair. Furthermore, Sandeman (*ibid.*) notes that the kilns had the inconvenience of filling the pottery with smoke and dirt as when the firemouths are first lighted there is no escape for the smoke backing out from the mouths.

7.4.65 Within Hobb-mouthed oven, the firemouths of the kilns projected from the sides approximately 18 to 24 inches, with the coal being fed into the kiln from the top by means of a square hole that could be covered with fireclay during the firing (Sandeman 1901, 183). This method had the advantage that cold air was prevented from being drawn into the oven flues during baiting (unlike a firemouth which allowed cold air to be sucked into the oven). Considered an older design of oven, it was largely superseded in the late 19th and early 20th centuries and was generally considered a subtype of the aforementioned updraught stack variant.

7.4.66 The skeleton oven became increasingly popular in the early 20th century and is regarded as combining all the best qualities of the different updraught ovens. It was simple in design, easy to repair, clean, and gave satisfactory results (*ibid. 186*).

7.4.67 Muffle kilns come in two main types; the enamel muffle kiln and the hardening-on muffle. The enamel muffle kiln was built in such a way that the flames and gases of combustion were kept away from the wares as the flames did not directly enter the firing chamber (as in updraught ovens) but were led around the perimeter of the chamber by a series of flues (Historic Plate F). By keeping the flames out of the chamber, the colours of the decorated ware were protected. The enamel kiln was much smaller than the updraughts and reached a lower temperature than that needed of biscuit or glost firing of around 750-800ºC (Baker 1991, 112). The firing made the decorated colours permanent as without firing the colours would easily wash off.

7.4.68 Hardening-on muffle kilns were used when biscuit ware which has been decorated with an underglaze print or with hand painted patterns needed to be hardened on so that the decoration would not smudge during dipping in glaze. The kiln would have been fired at around 700ºC and was usually smaller than the enamel muffle kiln (The Potteries Bottle oven website).

7.4.69 Oliver's map of 1830 (Figure 11) depicts four circular kilns within Newcastle Pottery and the Ordnance Survey of 1862 (Figure 12) illustrates the kilns as well as ovens that were scattered throughout the works. The four kilns likely represent updraught bottle kilns of the stack variant (as all four are shown within the structure itself; the chimneys would have protruded from the roof). This can be seen in John Storeys painting of Newcastle upon Tyne in the Reign of Queen Victoria in 1862 (not reproduced in the figures) as a chimney can be seen rising from the structures roof.

7.4.70 The rectangular room labelled as a kiln within Figure 12 was perhaps a glost kiln/muffle kiln and a further three rectangular rooms labelled as stoves could have been further muffle kilns. However, only one example of a muffle kiln was uncovered during the excavation and is shown (although unlabelled) as a square structure to the west of the southern-most kiln in the Ordnance Survey of 1862 (Figure 12).

7.4.71 Apart from a rectangular kiln shown adjacent to the workshop, the four stack kilns and three stoves are shown in close proximity to each other at the south-west corner of the pottery (Figure 12). The placing of a kiln in a pottery site came from the decision as to its ease of access in relation to the workshops, warehouses and fuel stores and the logical progression of the raw materials through the various stages of pottery production within the factory (Baker 1991, 107).

7.4.72 In terms of the number of kilns seen at Newcastle Pottery, it was generally considered in terms of space, financial outlay and cost of firing, that it was more desirable to have one or two very big kilns rather than small ones. The drawback was that the kilns took longer to fill and each firing risked a larger number of wasted pots. Baker (1991, 107) notes that only potters with sufficiently large sites and available money were able to build numerous smaller kilns that required, less pots, could be fired more quickly and used for whatever firing was required.

7.4.73 The first part of the firing stage at Newcastle Pottery, would have been to place the wares in saggars and then fire them in the stack kilns (*biscuit-kiln*) at approximately to 1200ºC to produce biscuit-ware. The biscuit ware is unglazed pottery which has been fired once to give it sufficient strength to be glazed or decorated. After the ware has been fired it was stored in the biscuit warehouse where it is sorted, selected and stored before being passed on for glazing or decorating (such as underglazing).

7.4.74 The next stage of the process was to dip the biscuit-ware in a glaze within the dipping house (known as the *glost house* in some potteries) that was located at the south-eastern corner of the pottery (Figure 12). The glaze was primarily used for decoration and to make the piece non-porous. It usually contained lead which is noted as being a frequent cause of ill-health among the workpeople (Bell & Gill 1973, 6). When the ware had been glazed, it was placed back in a kiln (*glost kiln or glaze-oven*) for a second firing at a lower temperature than in the biscuit kilns.

7.4.75 Wares to be coloured or gilded were taken in the glazed state to the painting room (not labelled on Figure 12) where decorators would have painted the pieces. These painted pieces would then be placed in an enamel muffle kiln where they were re-baked at a still lower temperature in a process known as overglazing (Bell & Gill 1973, 6).

7.4.76 Entries in the account books of the Beilby/Berwick Workshop (cited in Gill 1976, 154) referring to copper plates for transfer printing and other tool engraved or repaired document many items sent from Addison, Falconer & Company's Newcastle Pottery from 1790 to 1824:

Date		**Item**	**Cost**		
Year	*Month*		*£*	*s*	*d*
1796	May 31	Repairing a Plate with 8 Borders	-	10.	6
	Jun 4	Dº. Plate with 6 Bason Patterns	-	15	-
		Dº. 1 Dº. 4 Dº	1	-	-
1798	Jan 20	Repairing a Pottery Plate	-	7.	6
	Mar 3	Repairing a plate with 6 Designs large & 3 smaller	-	7.	6
	Jul 28	Engraving Jack on a Cruise	1.	1	-
	Aug 25	Repairing a plate of 8 Borders for Blue	-	12	-
	Nov 10	View Sunderland Bridge	2.	2	-
1799	Feb 9	Plate disconsolate Sailor returned	2.	2	-
		Plate Sunderland Bridge done over again & again returned	2	-	-
1818	Feb 5	Engraving a Vignette Landscape in Aquatint for China Saucers	1	-	-
	Feb 14	Device a Landscape in Aquatint for Tea Cups This Plate returned not answering the purpose	1	-	-

Summary of the account book of the Beilby/Bewick Workshop (adapted from Gill 1976, 154)

7.4.77 The method of transfer printing consisted an engraved pattern or picture on a copper plate which was then inked with a mixture of cobalt, flint, oil, tar and other substances and a print

was made by placing the inked plate onto a piece of paper. The inked paper was then passed onto a cutter who removed unwanted margins and handed it to the transferer. During underglazing, the transferer would place the paper ink-side down onto the biscuit-ware which would transfer the design from paper onto the absorbent pottery. The ware was then dipped in glaze and fired in the glost kiln. Transfer prints that were applied to the top of glazed ware (known as on-glaze) would also have to be refired.

7.4.78 The pottery was closed in 1893 (Bell & Gill, 1973, 7; Morgan 2007, 22) with the majority of structures being demolished prior to 1896 (shown on the Ordnance Survey of 1898; Figure 13).

7.5 Phase 5.1: Demolition of Newcastle Pottery (Post 1893)

7.5.1 Phase 5.1 represented the demolition of the pottery works including backfilling of subterranean structures and rooms with lower floor surfaces, ground raising dumps and demolition deposits. Many of the deposits dumped within the rooms and associated structures contained pottery wasters and production waste, kiln furniture, from the Newcastle Pottery; it is presumed that most of this was generated by the works during its final phases of activity towards the end of the 19th century.

7.6 Phase 5.2: Post 1896 to Modern Activity

7.6.1 The deposits and structures encountered within evaluation Trench 1 to the east of Cookson Lane on the site of the former Skinnerburn Ironworks have all been assigned to Phase 5.2 activity. Numerous ground raising dumps were observed across the majority of the trench as well as a brick structure. The function of the brick structure remains unknown due to the level of truncation but it may perhaps relate to restructuring works by the Henzell Oil Company premises on the remains of the Skinnerburn Iron Works; no structures are shown in this location on the 1862 Ordnance Survey map which show the iron works in great detail.

7.6.2 Phase 5.2 comprised late 19th and 20th century development at the site that occurred after the partial demolition of Newcastle Pottery. The structural remains recorded during the excavation demonstrated that elements of Newcastle Pottery such as the workshop and Dipping House along Cookson's Lane survived after the demolition of the kilns, stoves, and Slip House. This can be seen on the Ordnance Survey map of 1898 (Figure 13) which depicts some elements of the former pottery along Cookson's Lane and a few newly constructed buildings along the south-western edge of the site. Where parts of the former pottery were reused in later years, ground raising dumps and levelling deposits were noted along with the addition of a stone sett surface. This was seen in the former Dipping House at the south-eastern extent of the site and within a small square room at the north-western end of the site.

7.6.3 Numerous structures, walls, floors, services and ground raising/levelling deposits. These formed elements of the businesses and buildings which occupied the sit after the pottery works had closed; including a slaughterhouse, stone mason, garage and stables

8. SIGNIFICANCE OF DATA AND POTENTIAL FOR FURTHER ANALYSIS

8.1 The archaeological investigations at Forth Banks/Pottery Lane have demonstrated that below-ground remains of the Skinnerburn/Newcastle Pottery survived in an excellent state of preservation, despite the scale of truncation after the demolition of the pottery between 1893 to 1896. Remains of the former Skinnerburn Iron Works site did not survive.

8.2 The post-medieval period in the north-east was one of radical and deep-rooted change and saw the transition from an agricultural economy to an industrial one; the shift from a primarily rural population to an urban one and the move from horse power to first water, then steam. As such, the period saw a massive increase in industry reflecting and causing technological changes, new patterns in social organisation and an increased demand for consumer goods. Several important pottery industries existed in the North East in the post-medieval period, with over 100 firms being documented to have produced ceramics in the Tyneside region alone between 1730 and the mid-20th century (Bell & Gill 1973). Within the North East Regional Research Framework (NERRF) it is noted that the ceramics industry is poorly understood and, despite the presence of major industries in the region, there has been little accompanying archaeological work.

8.3 The structural remains of the pottery works and artefactual assemblages are considered to be of high regional significance. Despite the fact that a number of important pottery industries existed in the North-East in the post-medieval period, archaeological excavation of pottery works has been very limited, with none on the scale of the work at the Forth Banks/Pottery Lane site. The significance of the remains is enhanced by documentary evidence and the historic map sequence which has allowed interpretation of some of the more fragmentary remains and preliminary phasing of the structural sequence remains. The assemblage of wasters is also of considerable significance as it has allowed the identification of the range of wares produced by the pottery during the 19th century, as is the kiln furniture which provides details of manufacturing techniques.

8.4 The excavation of Newcastle Pottery has made a significant contribution to archaeological knowledge of the post medieval period. In terms of NERRF the research priorities for the post-medieval period (PM) considered to be relevant to the project in advance of the fieldwork it can be concluded that the excavation has contributed to PMii Industrialisation.

8.5 It is therefore considered that the findings on the Newcastle Pottery site require further analysis leading to the publication of a paper in an academic outlet. Further analytical work is considered necessary on the relevant archaeological and artefactual data, as discussed below, and the final paper is required to place the findings in a broader archaeological context.

8.6 Further analysis of the structural remains, including overlay onto all suitable historic maps, will be undertaken with the aim of refining the structural sequence and identifying retained and modified elements of the Newcastle Pottery, correlated with the ceramic data.

8.7 A very large assemblage of pottery was recovered from the excavation (13,929 sherds), the majority of which were wasters which displayed a range of faults which had occurred at various stages in the production process. A large quantity of kiln furniture was also recovered comprising saggars (691 sherds) and small kiln furniture (2438 items) used in the firing of the pottery. The lack of a typology for kiln furniture of North East transfer-printed designs gives this assemblage great significance and offers opportunity for further work. The regional significance of the investigations is high due to relatively minimal research produced on potteries of this scale in the Tyne and Wear region. Comparison with other potteries on the Newcastle Quayside and in the Ouseburn working during this period would allow for further analysis of the output and technologies used at the site and will be undertaken as part of the further research. Newcastle Pottery was producing highly decorated table wares and earthenware items for domestic use. The high number of transfer decorated sherds indicates this was the primary technique for decoration and by far the most popular within this period. Sponge decorated designs were applied to sturdy domestic wares such as jugs and cylindrical jars which were also popular for the 18th and 19th century. The high quantity of redwares also shows that the site was producing more utilitarian items for domestic use as most forms were identified as deep or deep flared bowls, likely used in everyday food preparation by the consumer. The redwares and yellow wares could indicate a shift in the market focus and the rising popularity for more uniform, simpler designs. However, the transfer-printed vessels remain the most popular and frequently produced of this period as seen in the waster ceramics, which correlates with the Victorian fashion for highly decorated ceramics.

8.8 Ideally further work for the pottery assemblage would include:

- Review of the database to consolidate typology forms and decoration types;
- Define which fabrics/forms were attributable to which period of ownership at Newcastle Pottery and formulate a sequence of production;
- Define the pottery types and decoration types to create a full typology for Newcastle Pottery products;
- Define how quickly the Pottery takes up changes in ceramic technology i.e. the introduction of new pottery types, processes and types of kiln furniture;
- Create a full typology of the kiln furniture manufactured and used at the site;
- Identify the socio-economic target audience of the products of the pottery;
- Identify firing faults and their causes/resolutions spanning the period of production on the site and whether these faults can be attributable to certain kiln technologies;
- Determine how the pottery was stacked in the kilns and how the various forms of kiln furniture both mass manufactured and handmade were used within the kilns;

- Define the range of makers stamps, pictorial marks and batch codes and their temporal significance;
- Define the output of James Keiller Dundee Marmalade jars in the Tyneside region during the period of production at Newcastle Pottery;
- Define any distribution patterns at Newcastle Pottery of ceramic types, forms, kiln furniture and domestic waste to see if it correlates or adds to the understanding of its layout and re-use over time/differing ownership;
- Illustrate sherds of intrinsic interest such as those with lead pencil notations.

8.9 The excavations yielded a very small assemblage of clay tobacco pipes, just nine fragments. The assemblage contains some interesting examples, but due to its small size it has little significance. The low number of pipes from the site, however, is noteworthy as it might indicate an informal ban on smoking within the pottery either due to the presence of combustible materials (two fragments were found in the coal store) or reduced productivity. Further research will be undertaken to explore this possibility. There are no recommendations for further work on the assemblage at this stage, but it is recommended that the ink-stamped pipe is illustrated for publication as it is a rare find.

8.10 No further analysis of the bricks and stamped bricks is recommended

8.11 Some correlation of documentary evidence with the remains as recorded during the investigations has been undertaken as part of this assessment. Further examination and analysis of documentary material in relation to the recorded evidence is required to refine the dating of various alterations and additions to the pottery. In addition, examination of data from other recorded contemporary examples of potteries elsewhere in the UK, including both published sources and grey literature, will inform further interpretation of the project results. Such documentary research can also aid interpretation of the function of various elements of the recorded structures and may allow the full range of activities carried out in various parts of Newcastle Pottery to be ascertained.

8.12 Historic England's guidelines (2015, 4) suggest key areas to prioritise research when excavating pottery production sites. The research questions to be addressed in the further analysis and publication of the Skinnerburn/Newcastle Pottery are listed below and are adapted from Historic England's guidelines:

Organisation

- When was pottery made at the site?
- What is the extent and layout of the production site?
- Are there features associated with clay extraction and preparation, such as clay pits, levigation systems, mixing floors or placements for blungers or mills?

- Is there evidence for processing other raw materials, including glazes, pigments or tempering materials, for example features or finds associated with milling, fritting or drying?
- Where were the raw materials, including fuel, tools and equipment, stored?
- Is there evidence to indicate where different production processes took place, for example potting, drying, dipping and printing?
- How many and what types of kilns were in use and for how long? Were they contemporaneous or did they have different functions?

Technologies

- What types of pottery were made at the site and how were they manufactured? Were they coil-built slab-built, turned, wheel-thrown, moulded or slip-cast? Are there any surviving tools, moulds or associated features?
- How were the kilns constructed, how did they operate and how were they fuelled?
- How was the pottery stacked in the kilns; were props, spacers, trivets or saggars used?
- Were the vessels fired once or more? How closely was the atmosphere controlled?
- What clay sources were used and how was the clay modified, for example mixing clays, adding temper or colourants, making a slip for casting or decoration?
- How were the vessels decorated? Do raw materials, tools or equipment used for decorating the surfaces survive?

Economic and Wider Context

- What were the level, scale and longevity of production?
- How do the products from the site relate to pottery recovered from consumer sites? How was the pottery transported, distributed and used?

8.13 The proposed academic outlet is *Archaeologia Aeliana*. The publication report/paper would, as a minimum, contain the following:

- ***Abstract***: an introductory paragraph summarising the publication, particularly the main archaeological periods represented and the main findings and their significance;
- ***Introduction***: including the site location, and setting out the overall background to the work and the main methodologies employed;
- ***Geological and topographical background***: detailing the geology and topography of the site;

- ***Archaeological background***: setting the results in local and regional context, with particular focus on pottery production within the North East;
- ***Excavated evidence***: core section of the paper detailing the project results and including a synthesised description of the recorded evidence, including the artefactual material recovered;
- ***Discussion***: proposing an interpretation of the archaeological remains based on the excavated features and the artefactual evidence;
- ***Illustrations***: including site location plan, location plan of the excavated areas, plans and elevation drawings, interpretative plans, historic maps, photographs, artefact illustrations

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8th September 1804

7th July 1821

31st July 1824

19th February 1825

18th December 1830

Cartographic Sources

Speed, 1610
Buck, 1723
Corbridge, 1723
Thompson, 1746
Hutton, 1772

Cole & Roper, 1801

Kidd, 1802

Wood, 1827

Oliver, 1830

Ordnance Survey, 1862

Ordnance Survey, 1896

Online Sources

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10. ACKNOWLEDGEMENTS AND CREDITS

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PCA Credits

Project management: Jennifer Proctor

Post-excavation management: Jennifer Proctor

Fieldwork: Scott Vance (Site Supervisor), Danni Parker (Assistant Supervisor), Richard Cramp, James Hopper, James Langthorne, Derek Moscrop, Brian Perks, Lucy Robinson, Robert Scott, and Amanda Wintcher.

Survey: Scott Vance

Archive consolidation: Scott Vance and Danni Parker

Report: Scott Vance

Illustrations: Charlotte Faiers & Ray Murphy

Clay Tobacco Pipes: Eniko Hudak

Post-medieval pottery and kiln furniture: Lucy Robinson with Jenny Vaughan (Northern Counties)

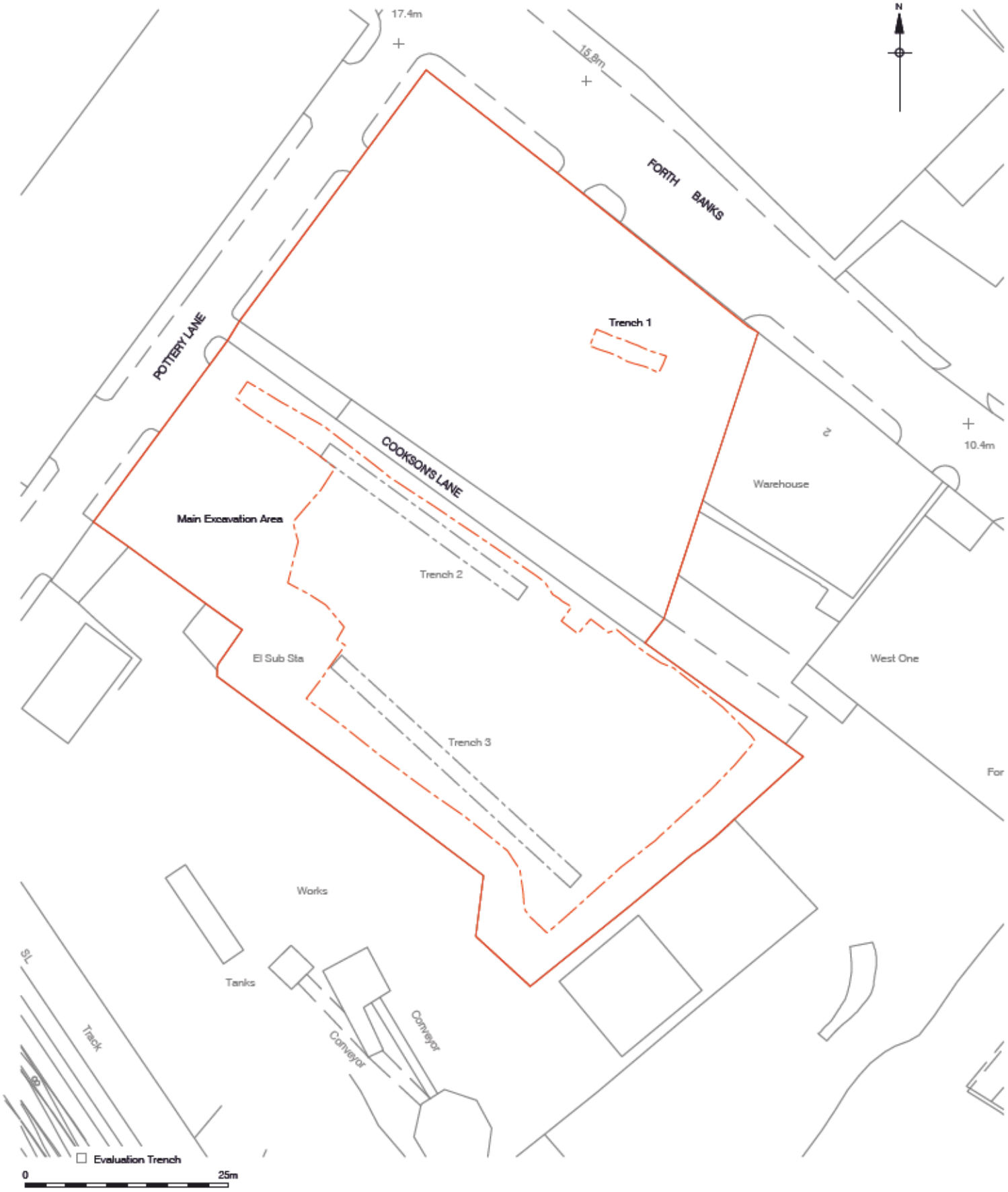
Other Credits

Bricks: John Nolan (NCAS)

APPENDIX 1: FIGURES

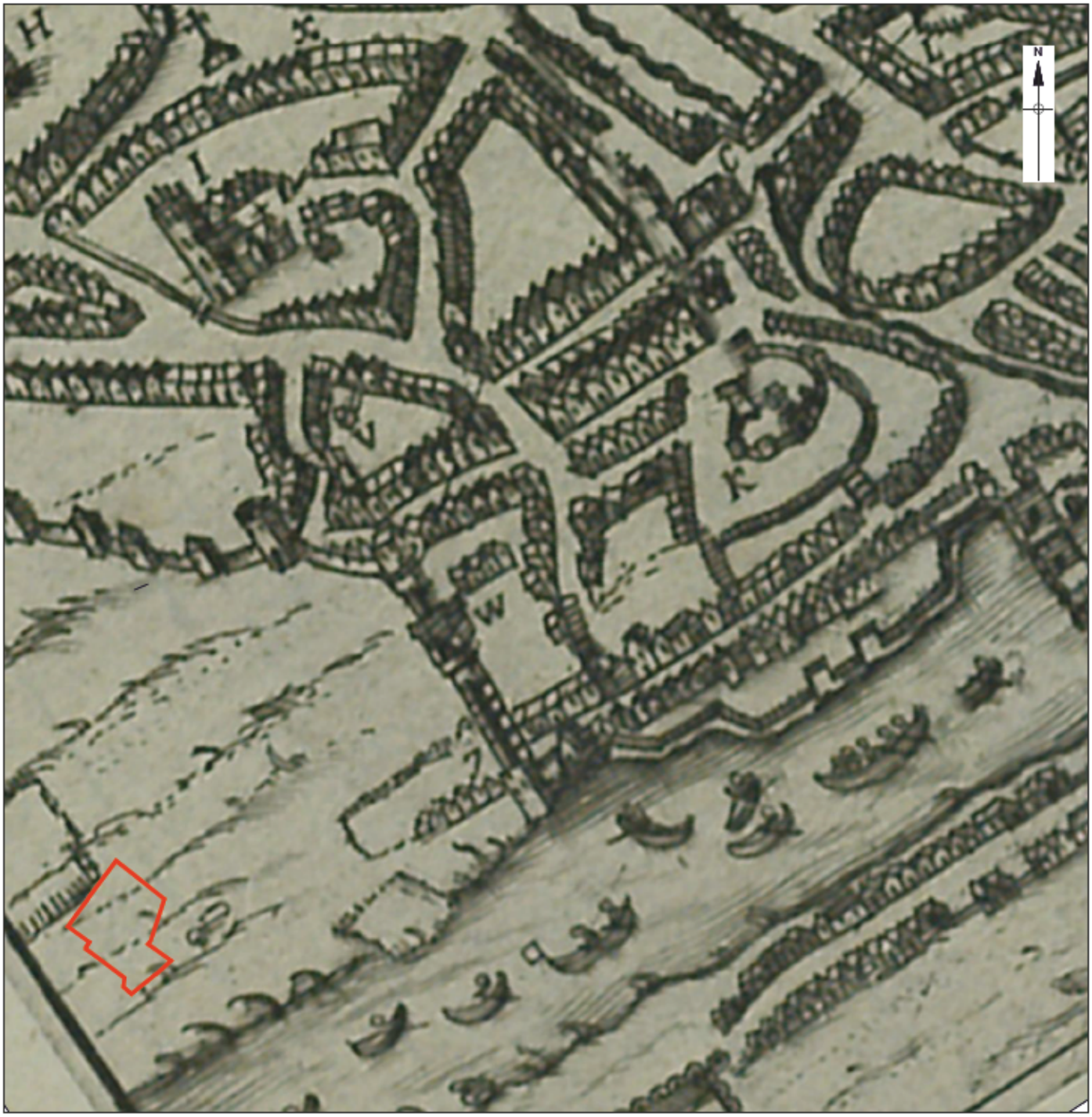
29/06/17 RM

Figure 1
Site Location
1:2,000,000 & 1:25,000 at A4



14/07/17 RM

Figure 2
Detailed Site Location
1:625 at A4

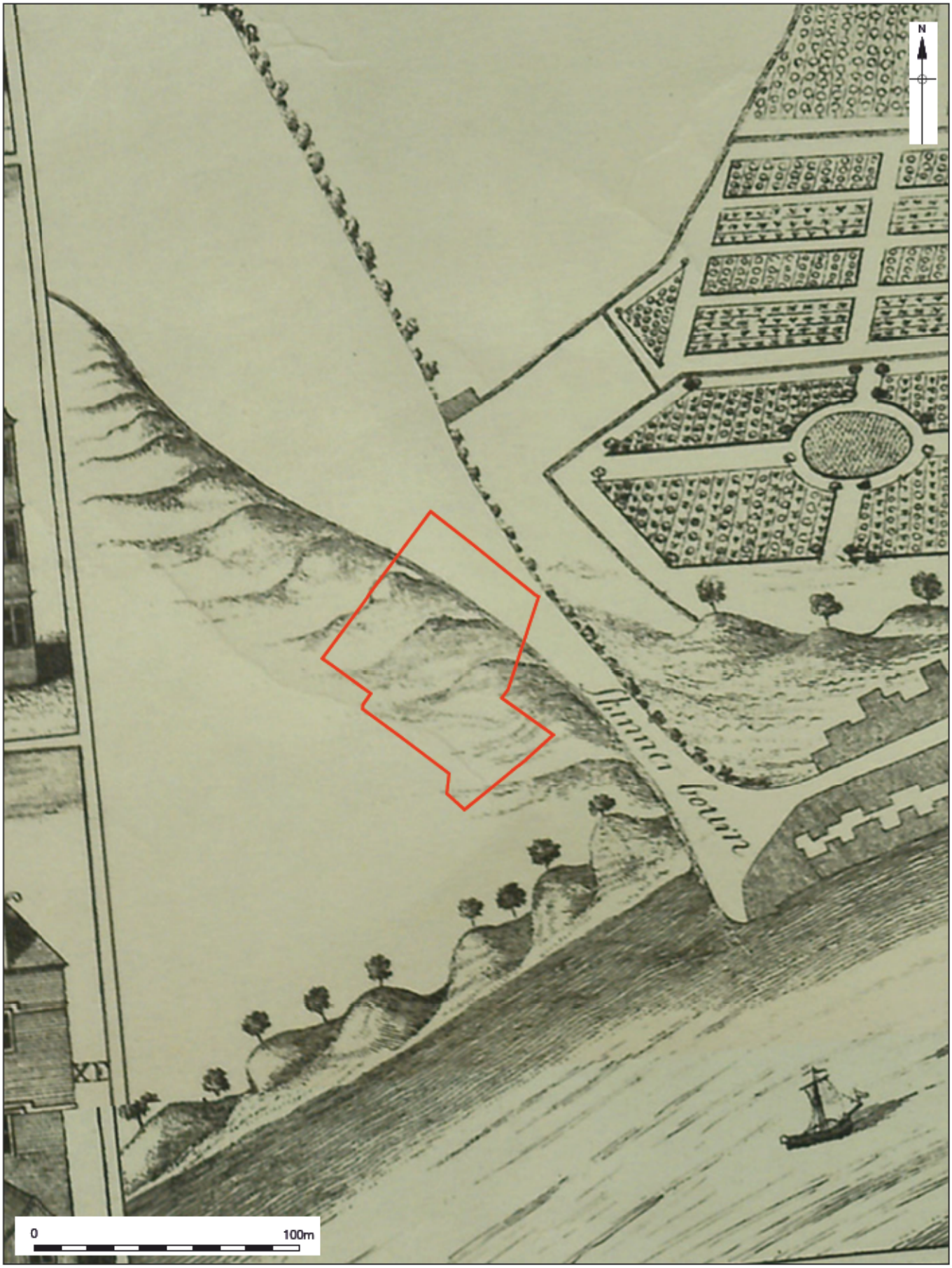


28/06/17 RM

Figure 3
Speed 1610
not to scale

31/07/17 RM

Figure 4
Buck 1723
not to scale



28/06/17 RM

Figure 5
Corbridge 1723
1:2,000 at A4

28/06/17 RM

Figure 6
Thompson 1746
1:2,000 at A4

28/06/17 RM

Figure 7
Hutton 1772
1:2,000 at A4

28/06/17 RM

Figure 8
Cole and Roper's Map of Newcastle and Gateshead 1801
1:5,000 at A4

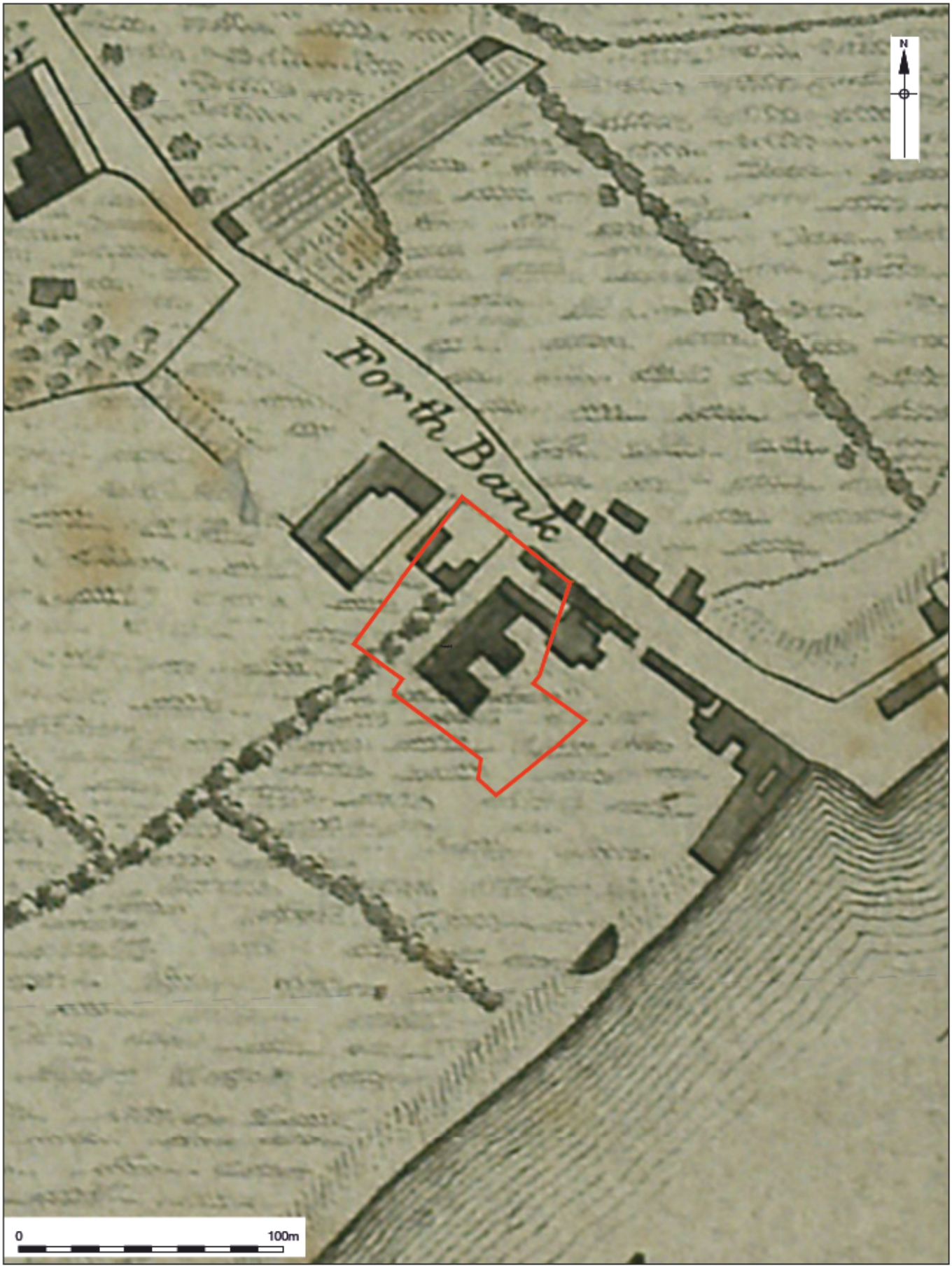


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Figure 9
Kidd 1802
1:2,000 at A4

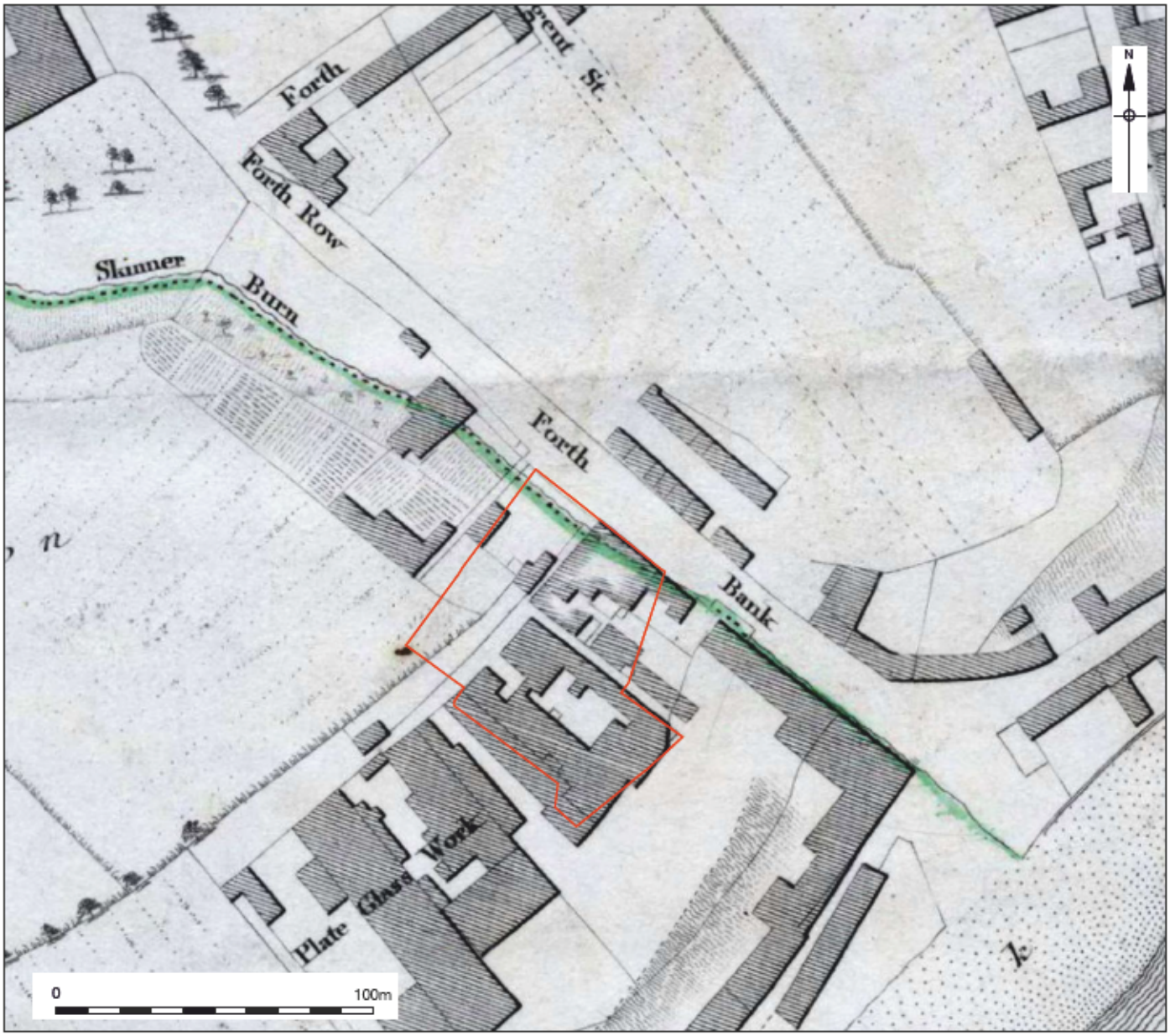

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Figure 10
Wood 1827
1:2,000 at A4

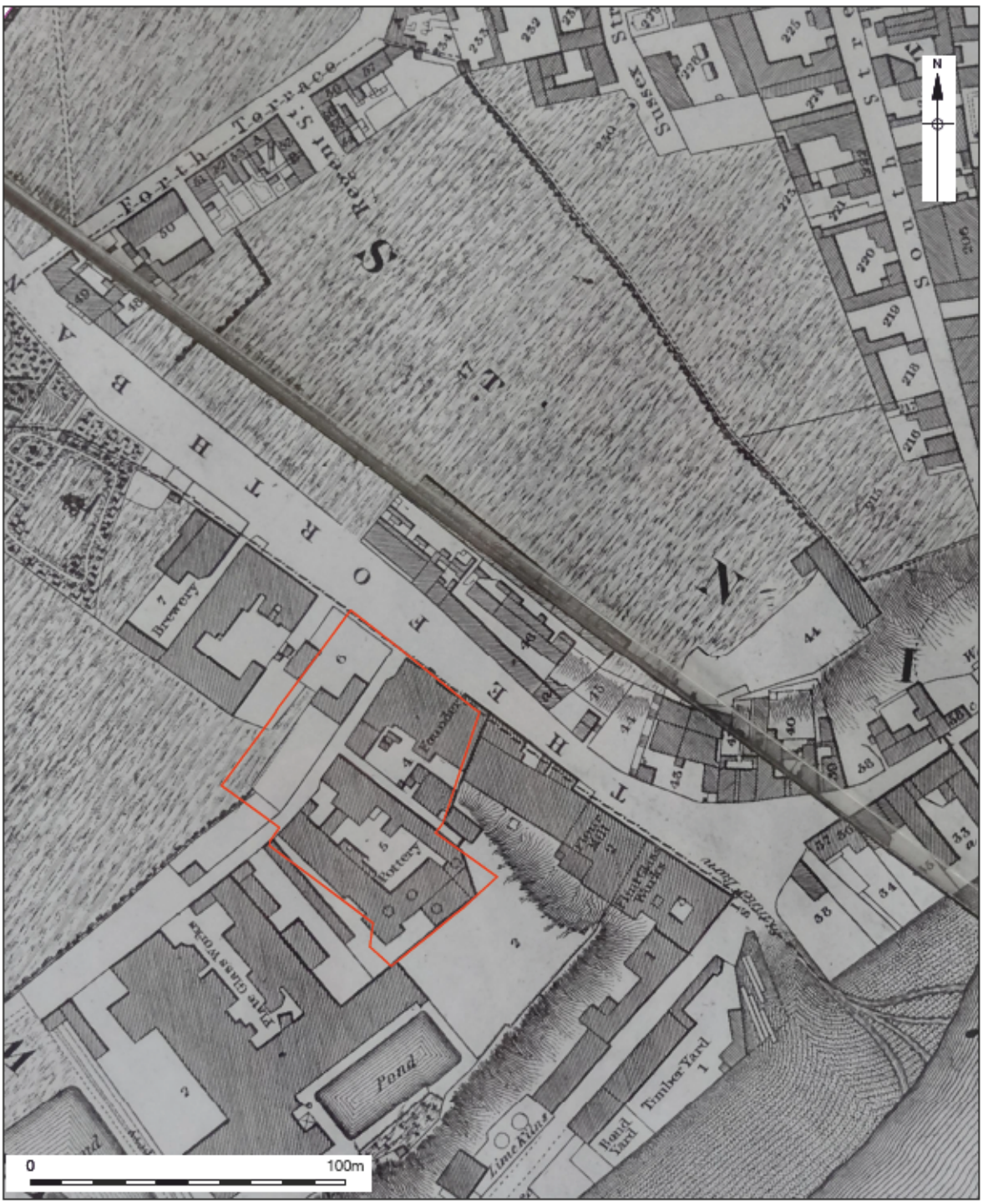

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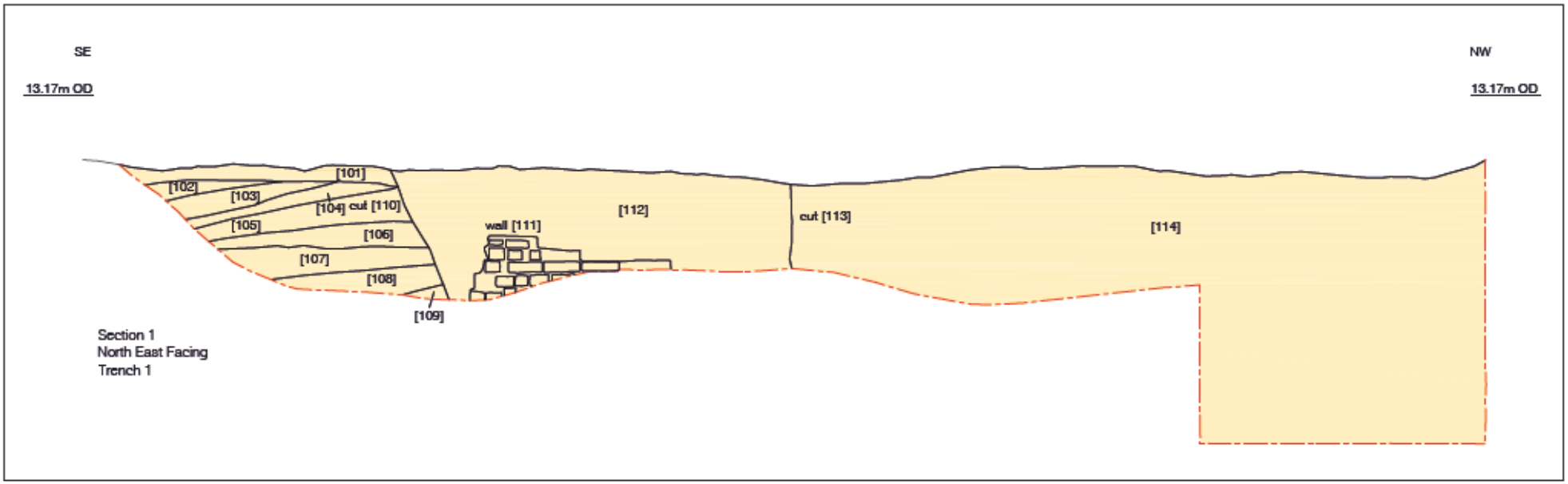
Figure 11
Oliver 1830
1:2,000 at A4

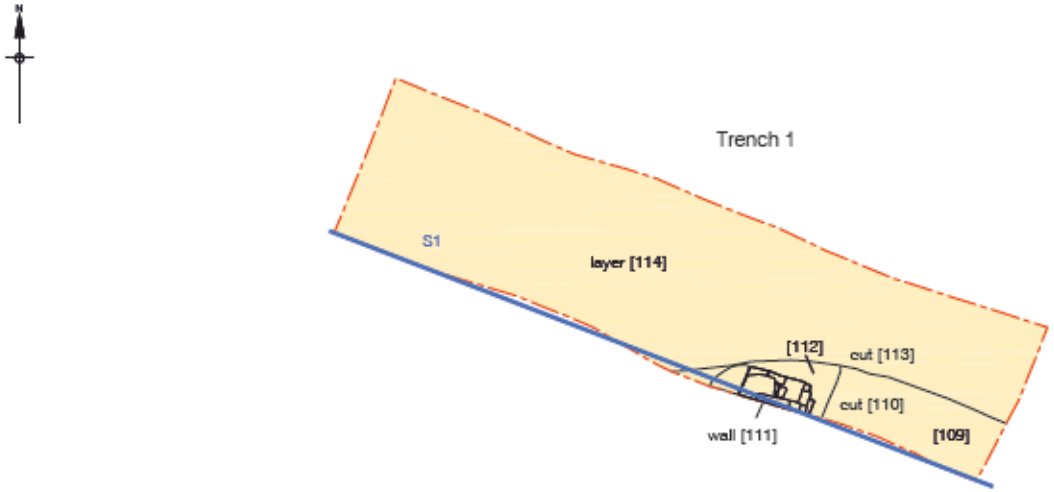
28/06/17 RM

Figure 12
Ordnance Survey 1862
1:500 at A4

28/06/17 RM

Figure 13
Ordnance Survey map, 1898
1:500 at A4





Phase 5 features

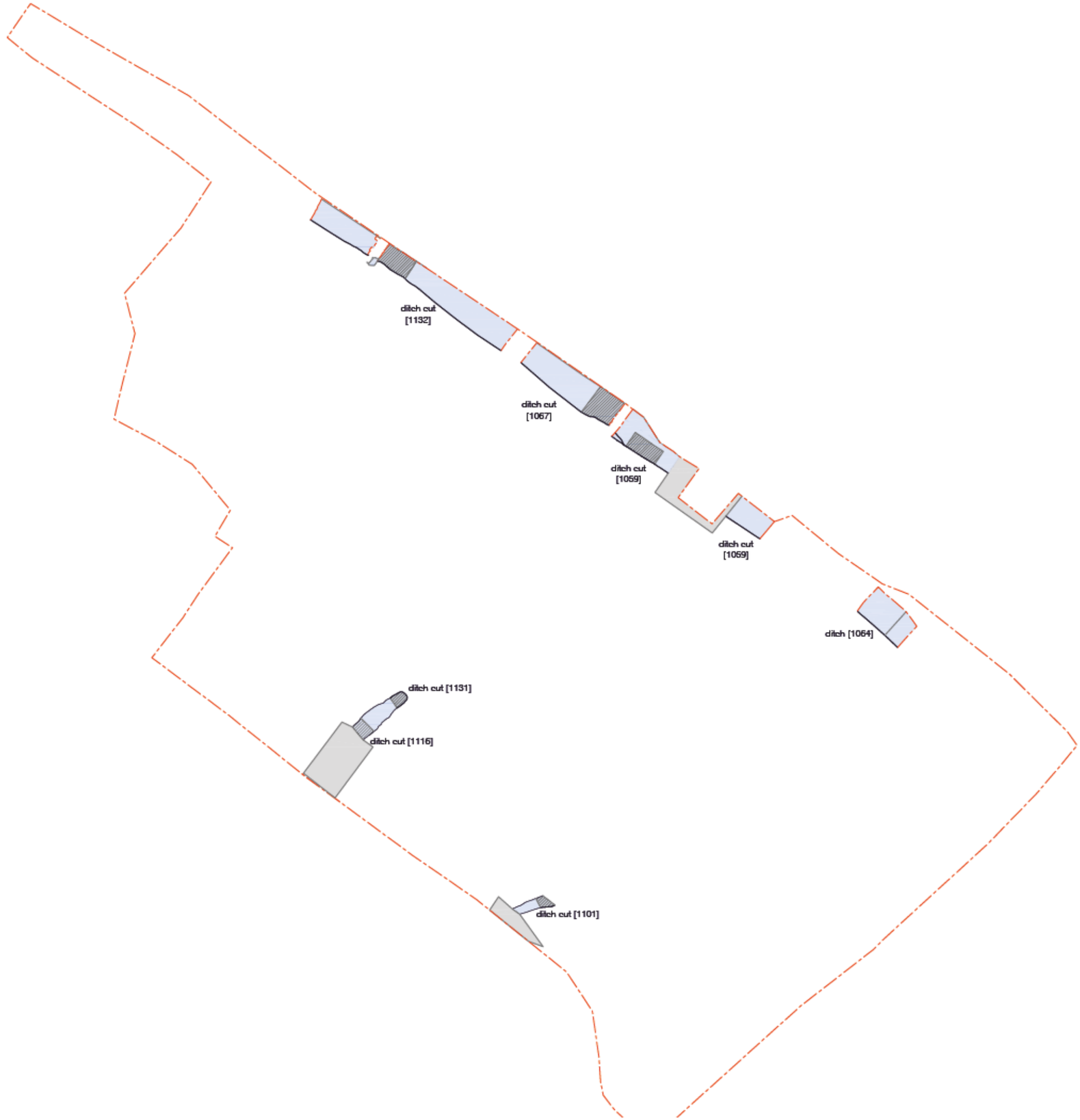
0 5m

31/07/17 CF

Figure 14
Trench 1 Plan and Section
1:100 and 1:40 at A4

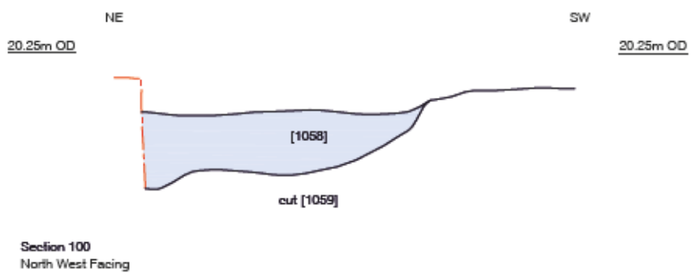
31/07/17 CF

Figure 15
All Phases of Archaeology
1:400 at A3

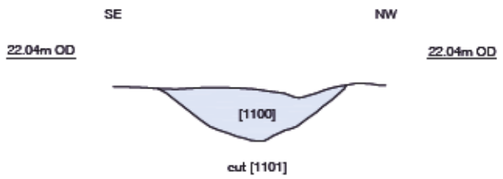


31/07/17 CF

Figure 16
Phase 2 Plan of Ditches
1:250 at A3



Section 100
North West Facing



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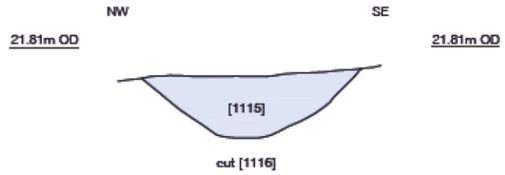

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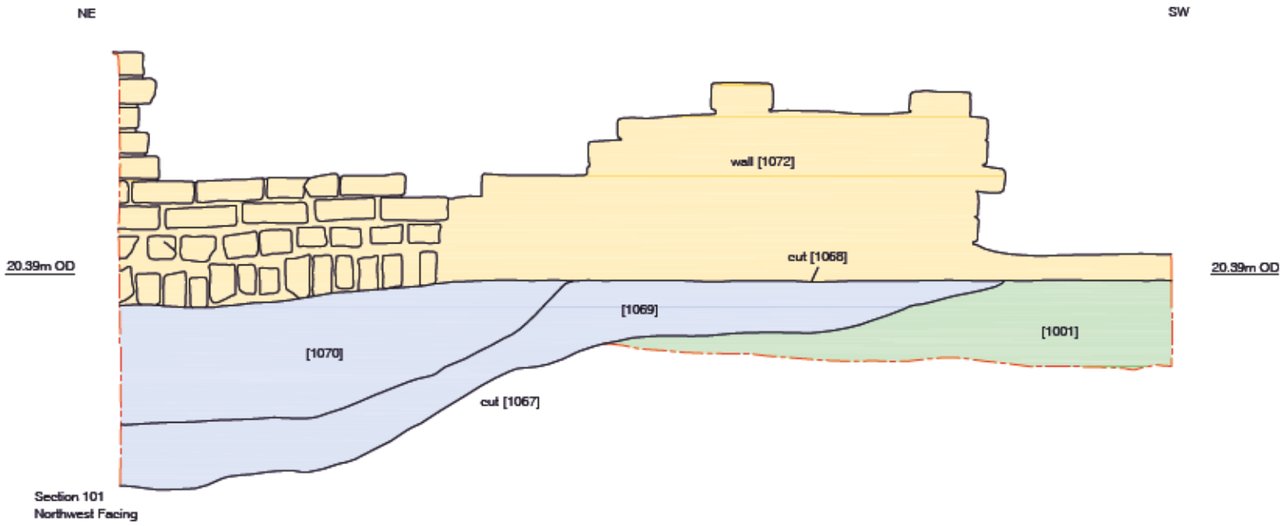
South West Facing



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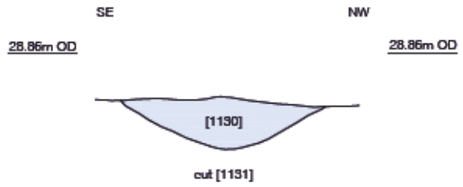
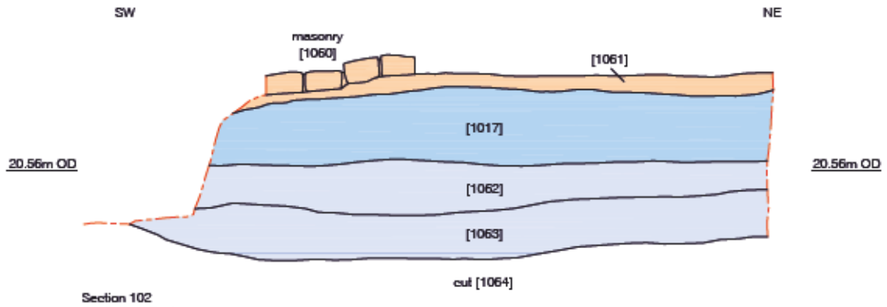
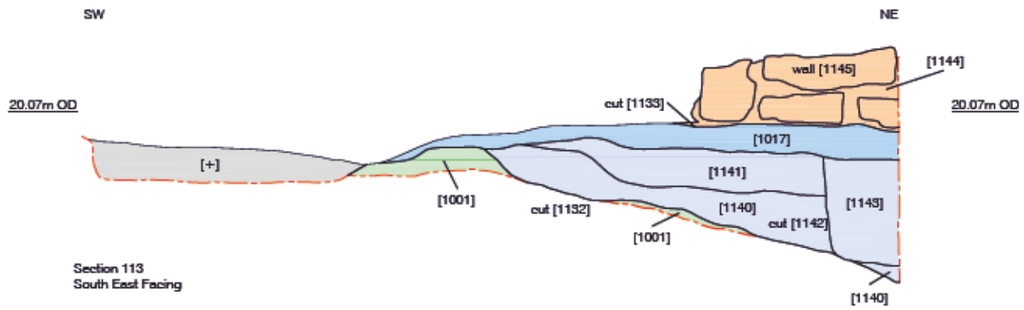
Northwest Facing



Section 111
North East Facing



Section 102
South East Facing



Section 113
South East Facing

Phase 1
Phase 2
Phase 3
Phase 4.1
Phase 4.2
Phase 4.3
Phase 5
Modern Intrusion/ Truncation

0 1m

10/07/17 TC and CF

Figure 17
Phase 2 sections
1:20 at A3

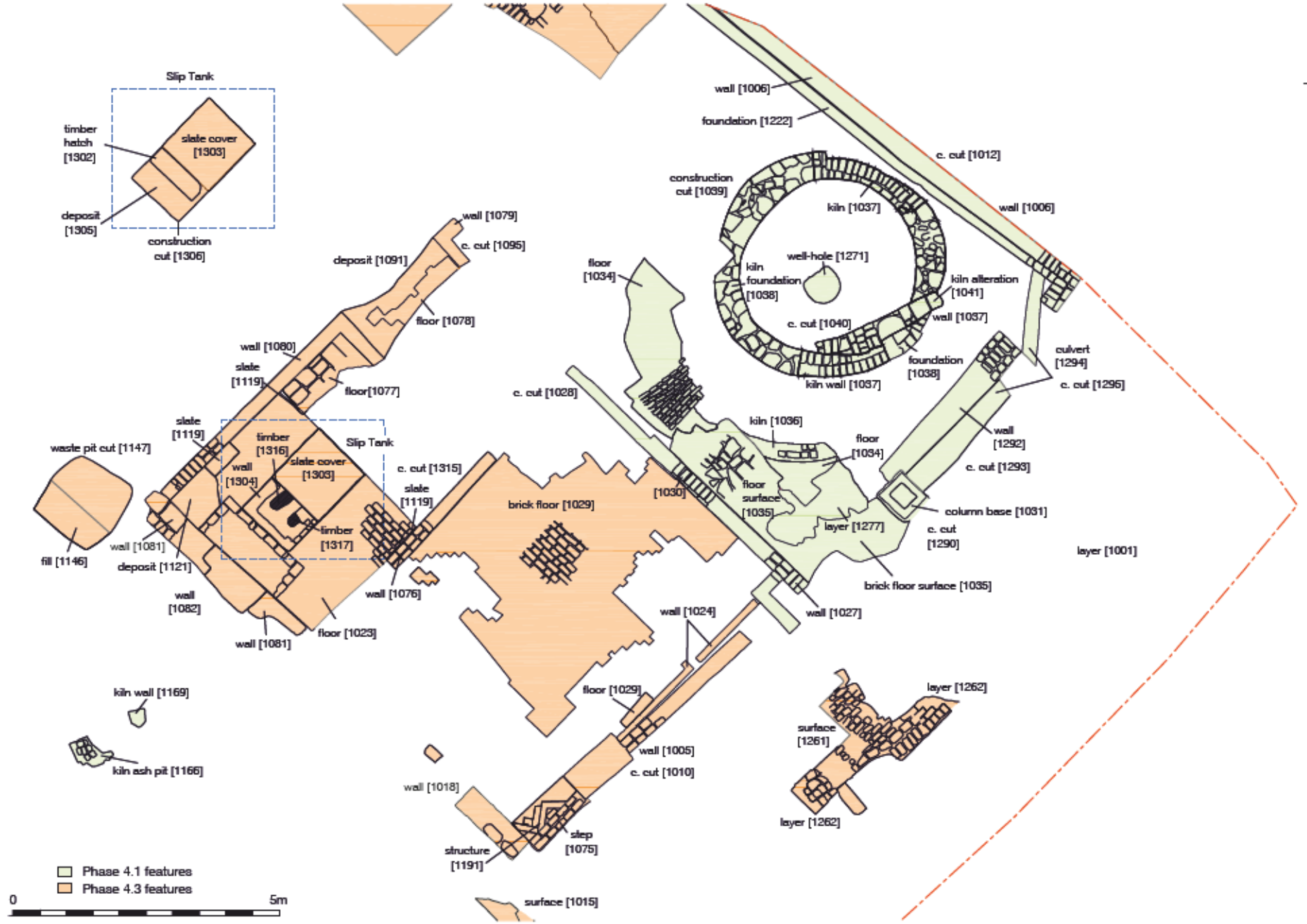
clay extraction pit [1238]
[1148]
[1156]
wall [1176]
[1208]
wall [1145]
wall [1348]
wall [1176]
wall [1327]
wall [1327]
wall [1318]
floor [1320]
Slip kiln [1326]
wall [1339]
Slip Kiln [1362]
wall [1321]
surface [1360]
wall [1359]
structure [1337]
wall [1331]
pottery spread [1370]
slip kiln [1210]
floor surface [1212]
wall [1284]
floor surface [1268]
wall [1279]
surface [1125]
wall [1129]
floor [1127]
wall [1128]
wall [1258]
surface [1283]
surface [1267]
floor [1280]
wall [1309]
[1314]
structure [1227]
floor surface [1288]
wall [1126]
surface [1184]
sagger [1251]
mixing ark [1182]
dried slip [1188]
floor surface [1224]
coal store [1217]
floor surface [1089]
coal store [1097]
See Figure 20
brick surface [1060]
drain [1099]
wall [1006]
foundation [1222]
kiln foundation [1039]
well [1271]
wall [1041]
culvert [1294]
Firebrick kiln
wall [1036]
structure [1292]
column base [1031]
brick floor surface [1035]
wall [1027]
wall [1024]
brick floor [1029]
wall [1079]
floor [1034]
wall [1080]
floor [1078]
wall [1304]
floor[1077]
Slip Tank
slip tank [1065]
surface [1066]
surface [1085]
waste pit cut [1147]
wall [1081]
wall [1082]
wall [1081]
wall [1076]
floor [1023]
kiln pit wall [1169]
kiln ash pit [1166]
wall [1018]
structure [1191]
step [1075]
wall [1005]
surface [1261]
surface [1015]
See Figure 19
kiln wall + ash pits [1073]
kiln foundation [1053]
kiln wall [1046]
floor [1205]
floor [1206]
kiln ash pit [1050]
floor surface [1049]
floor [1285]
floor [1045]
wall [1286]
wall[1286]
floor surface [1052]

Phase 4.1 features
Phase 4.2 features
Phase 4.3 features

0 10m

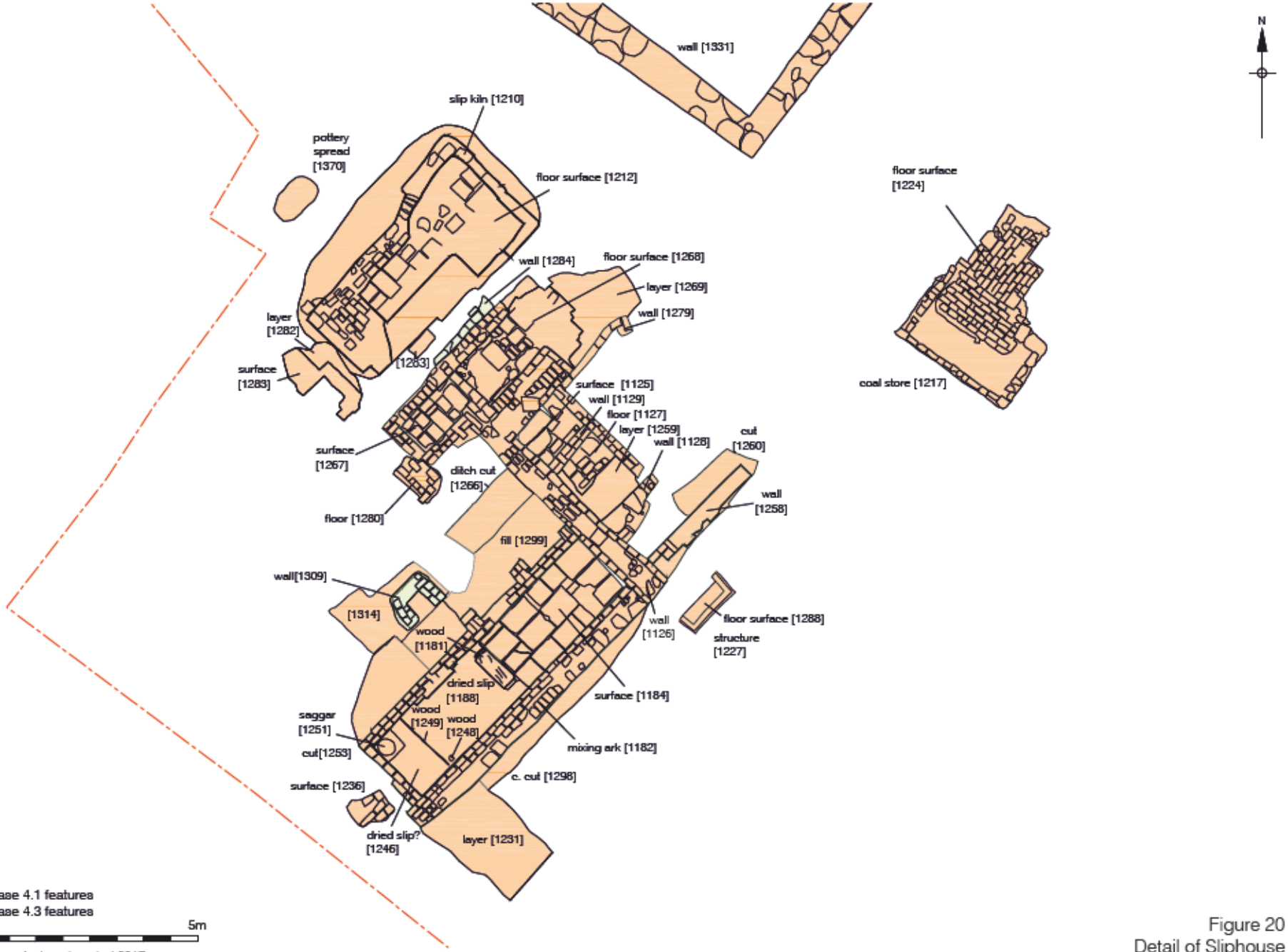
31/07/17 CF

Figure 18
Phase 4 Plan
1:250 at A3



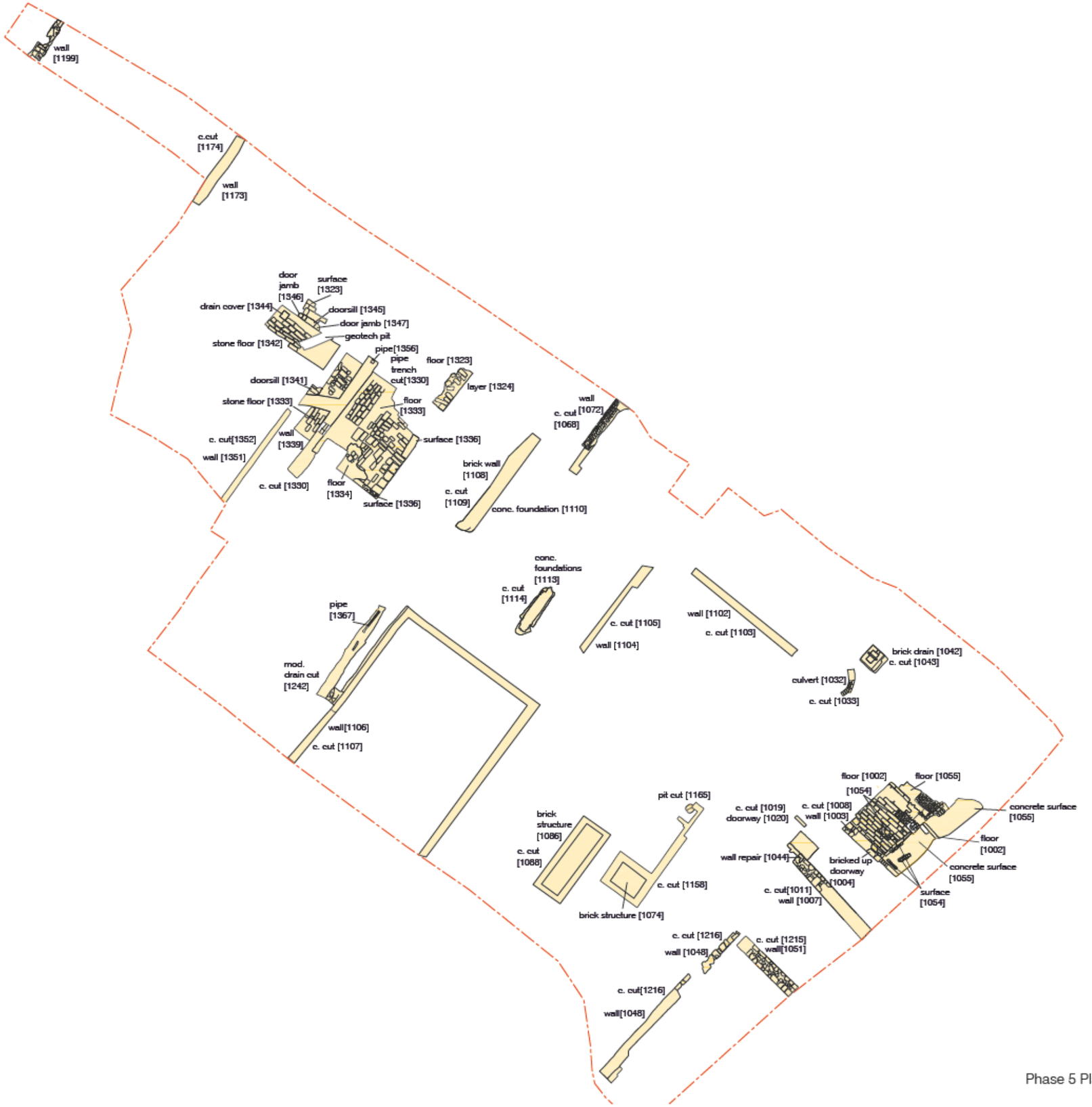
31/07/17 CF

Figure 19
South Eastern Corner of Pottery
1:100 at A4



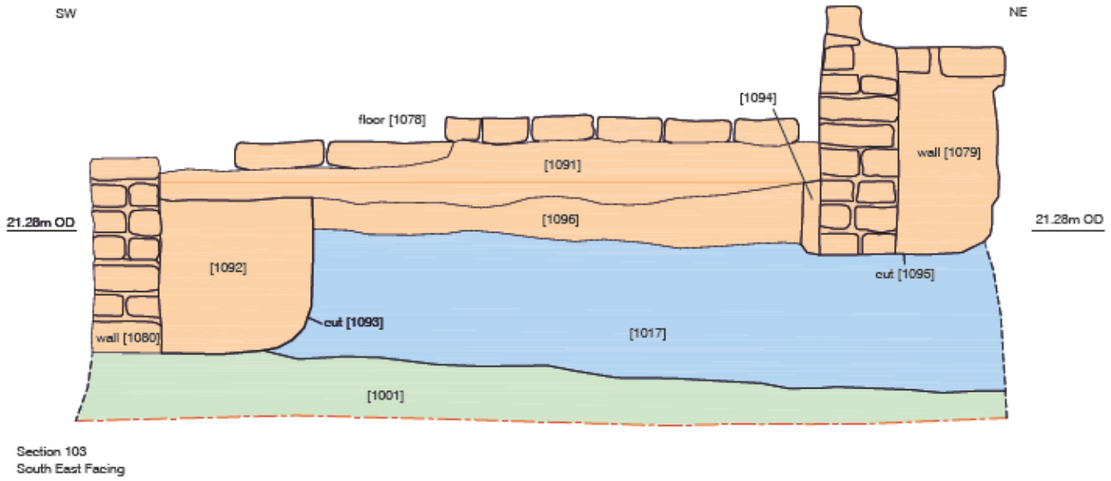
31/07/17 CF

Figure 20
Detail of Sliphouse
1:100 at A4

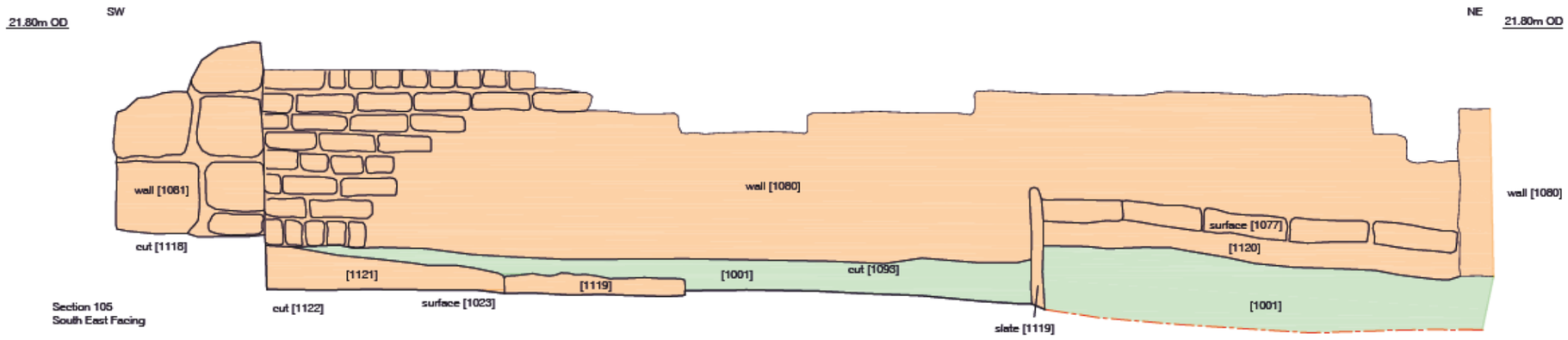


31/07/17 CF

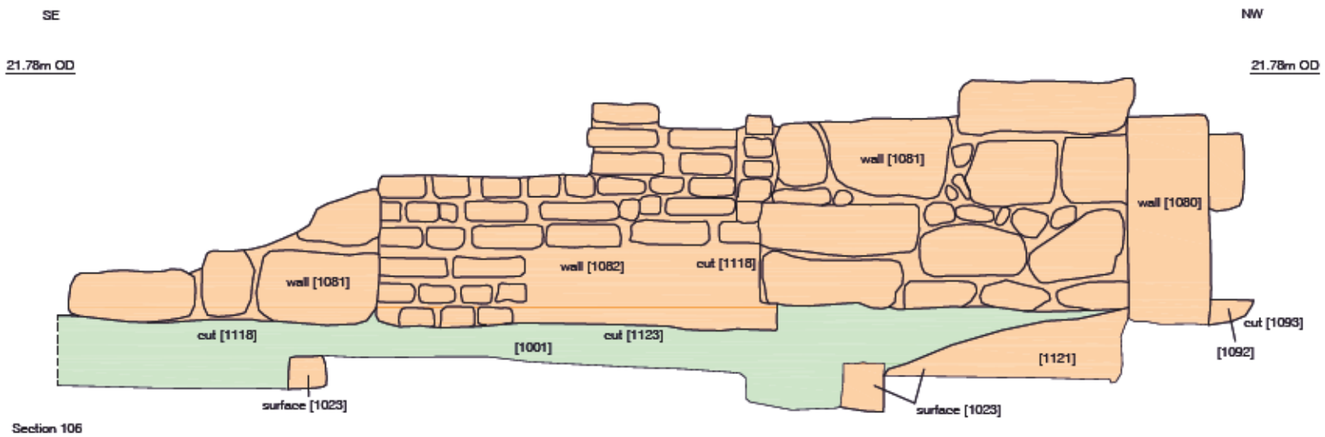
Figure 21
Phase 5 Plan of Main Excavation Area
1:250 at A3



Section 103
South East Facing



Section 105
South East Facing



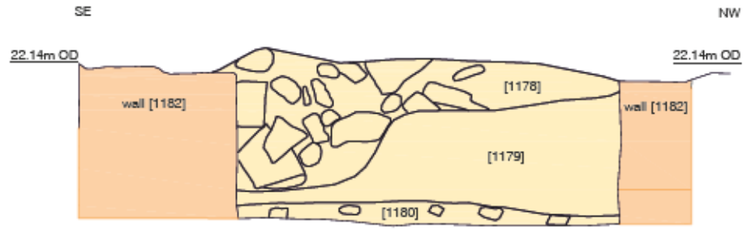
Section 106
North East Facing

Phase 1
Phase 2
Phase 3
Phase 4.1
Phase 4.2
Phase 4.3
Phase 5
Modern Intrusion/ Truncation

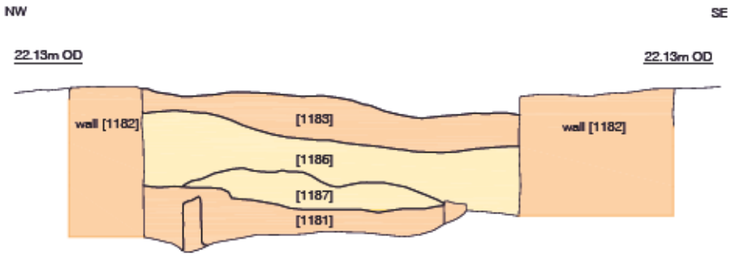
0 1m

31/07/17 TC and CF

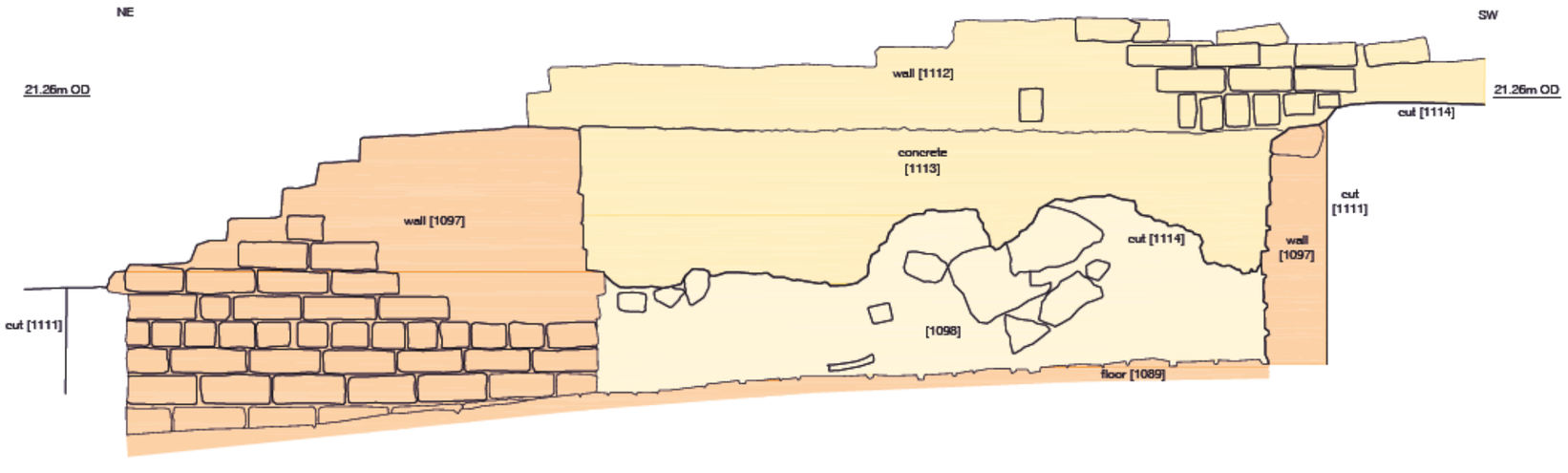
Figure 22
Sections 103,105,106
1:20 at A3



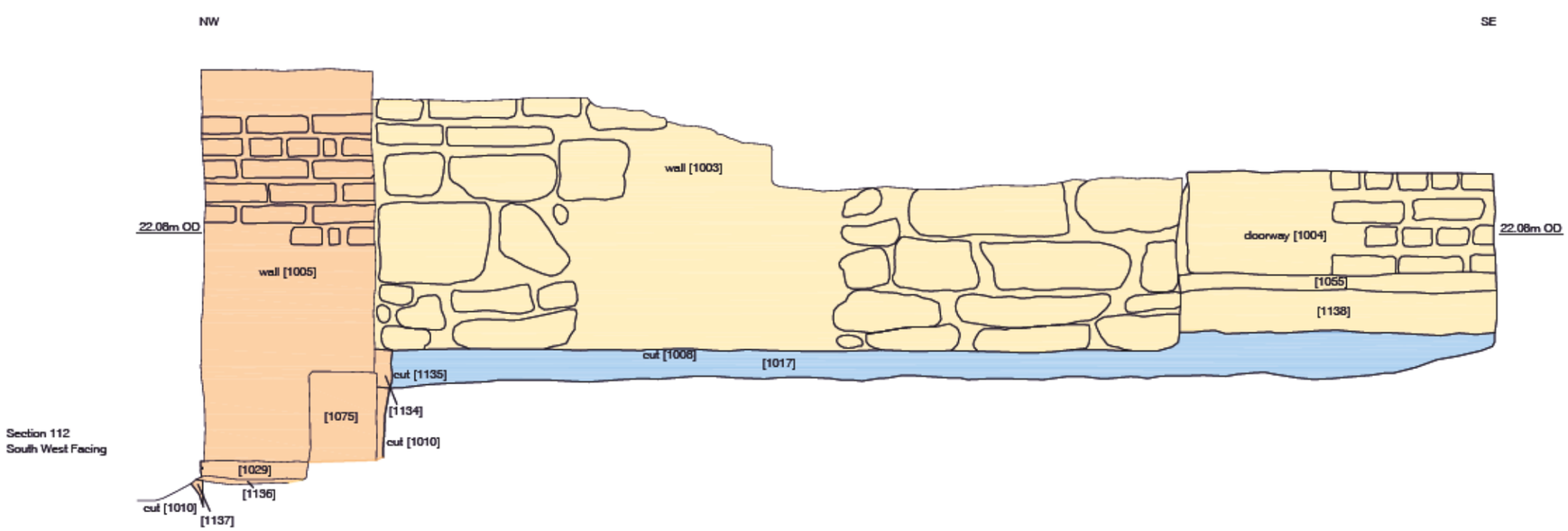
Section 108
North East Facing



Section 109
South West Facing



Section 110
North West Facing



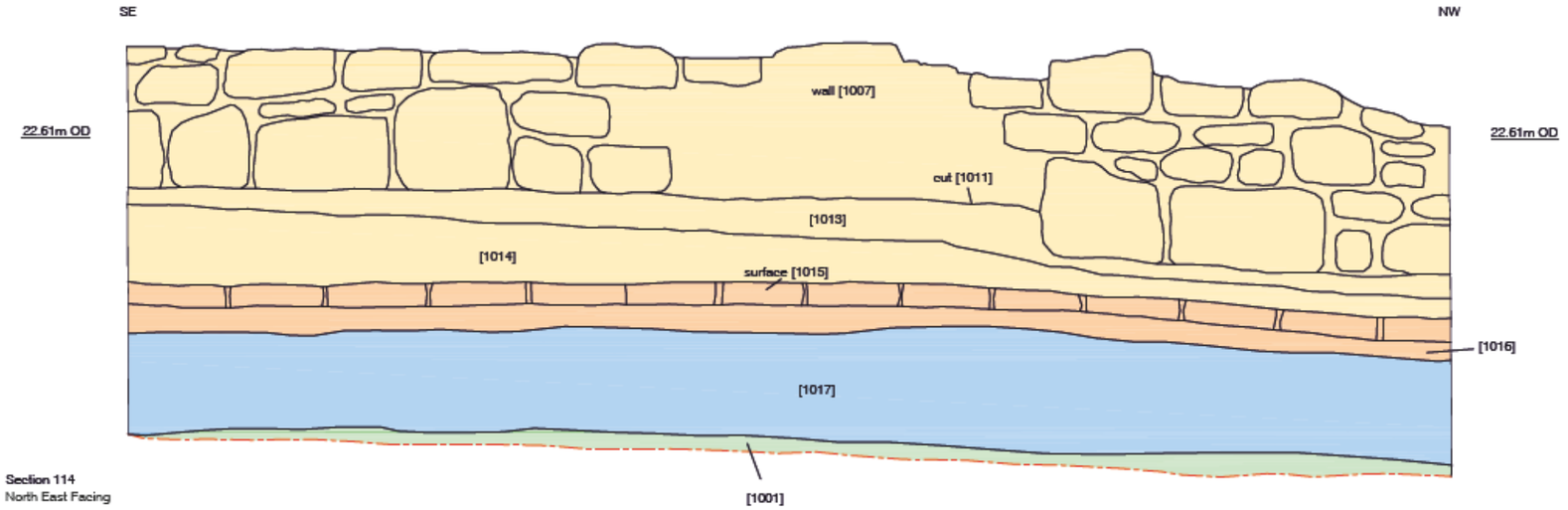
Section 112
South West Facing

Phase 1
Phase 2
Phase 3
Phase 4.1
Phase 4.2
Phase 4.3
Phase 5.1
Phase 5.2
Modern Intrusion/ Truncation

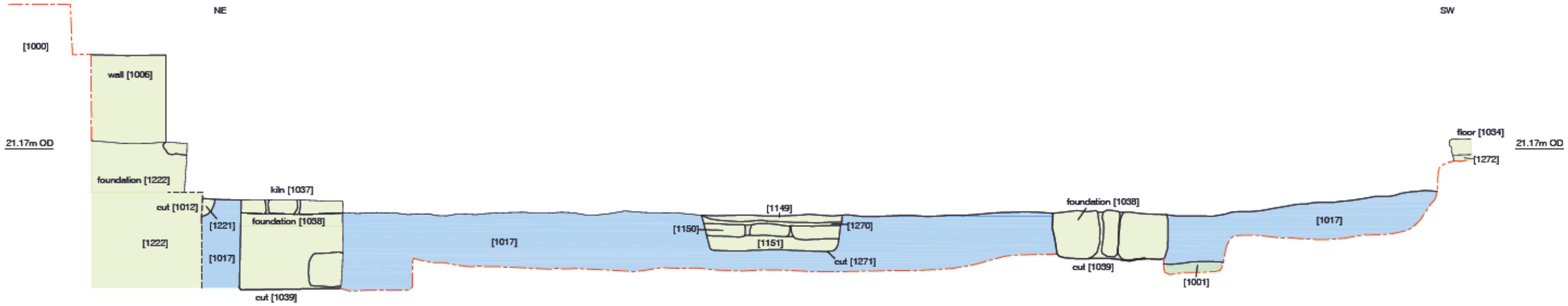
0 1m

31/07/17 TC and CF

Figure 23
Sections 107, 109, 110, 112
1:20 at A3



Section 114
North East Facing



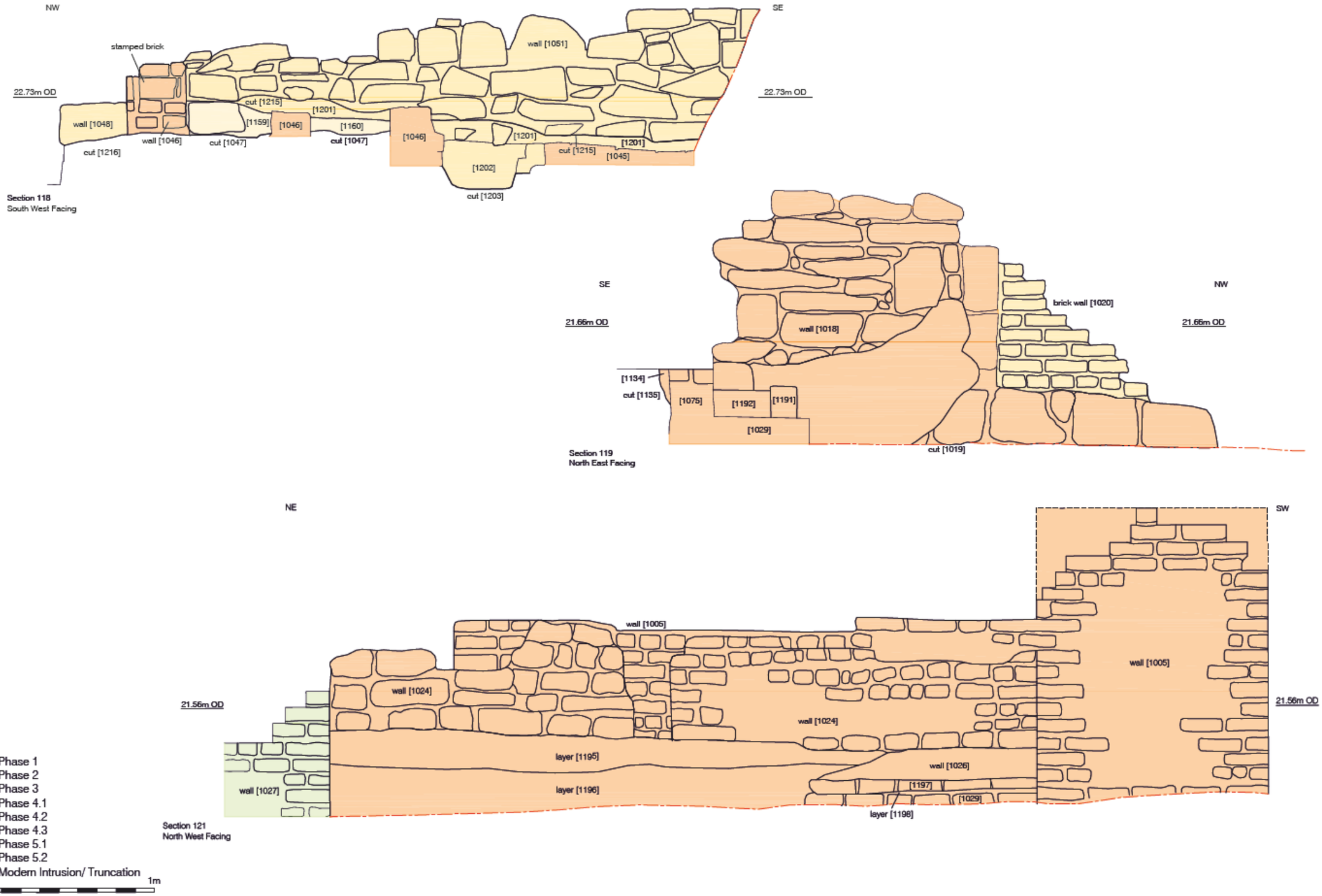
Section 117
North West Facing

- Phase 1
- Phase 2
- Phase 3
- Phase 4.1
- Phase 4.2
- Phase 4.3
- Phase 5.2
- Modern Intrusion/ Truncation

0 1m

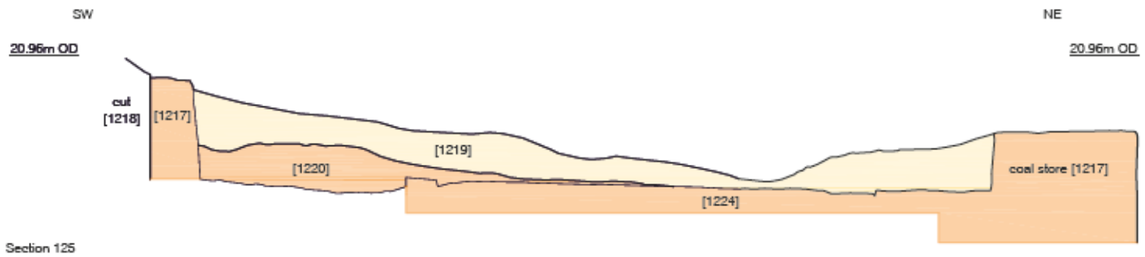
31/07/17 TC and CF

Figure 24
Sections 114 and 117
1:20 at A3

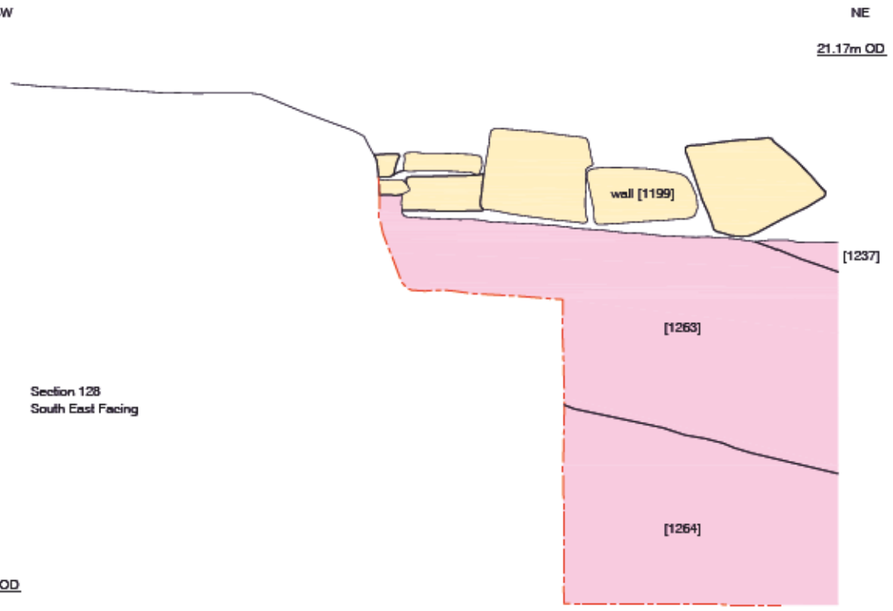


31/07/17 TC and CF

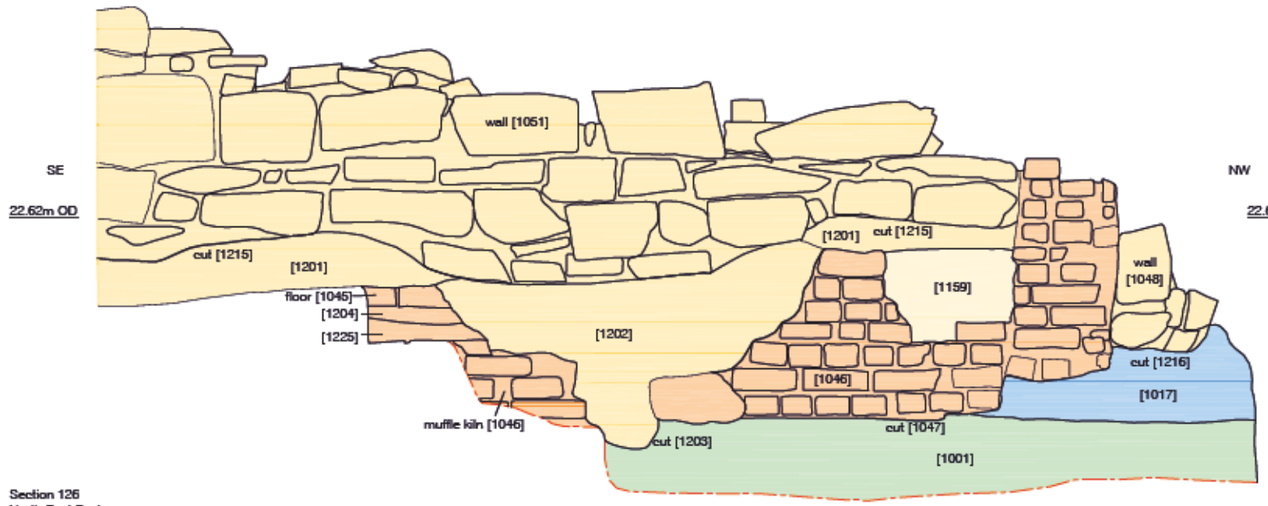
Figure 25
Sections 118, 119 and 121
1:20 at A3



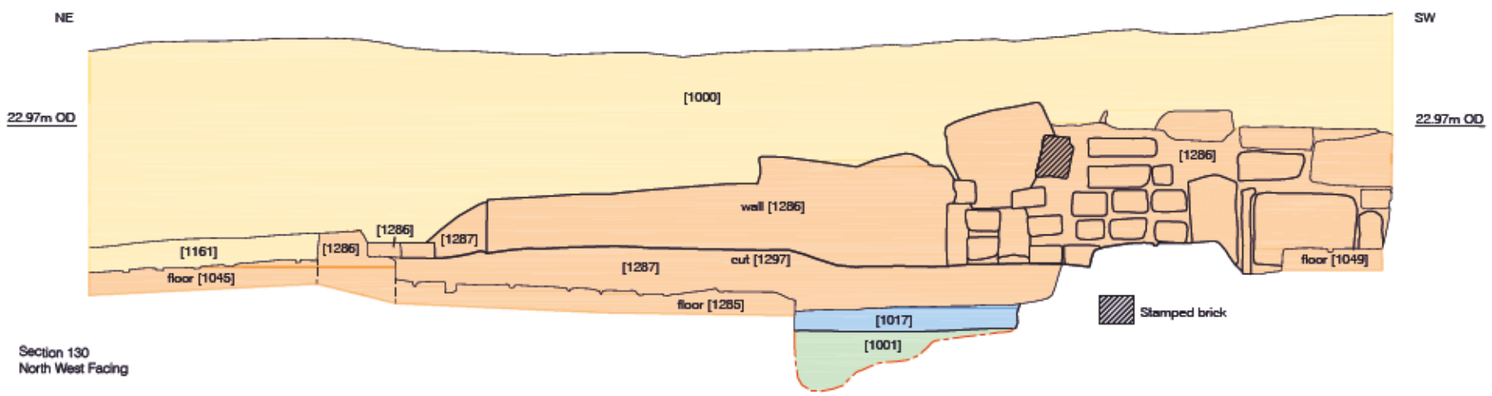
Section 125
South East Facing



Section 128
South East Facing



Section 126
North East Facing



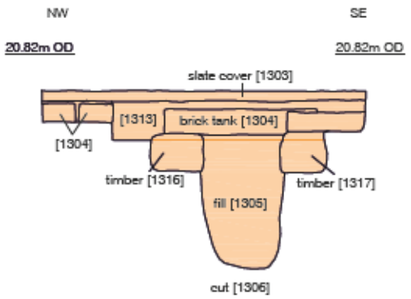
Section 130
North West Facing

- Phase 1
- Phase 2
- Phase 3
- Phase 4.1
- Phase 4.2
- Phase 4.3
- Phase 5.1
- Phase 5.2
- Modern Intrusion/ Truncation

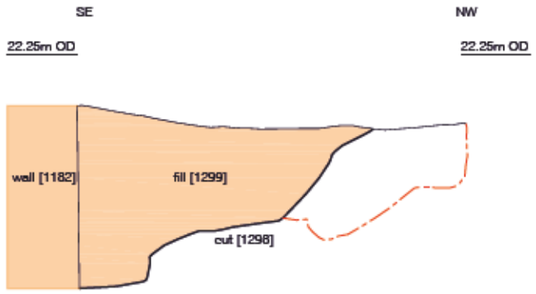
0 1m

31/07/17 TC and CF

Figure 26
Sections 125, 126, 128 and 130
1:20 at A3

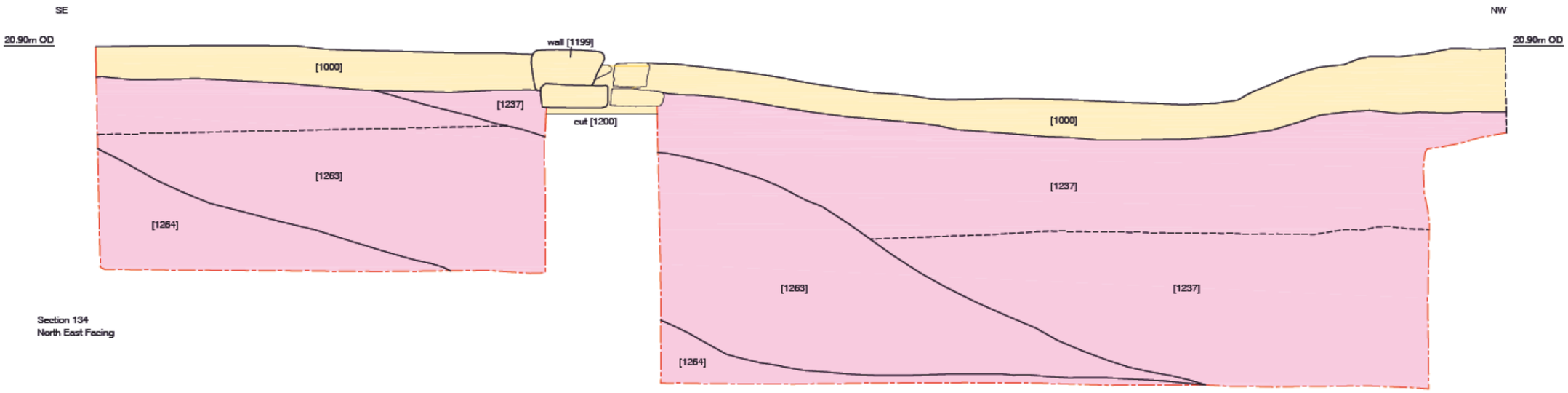


Section 131
South West Facing

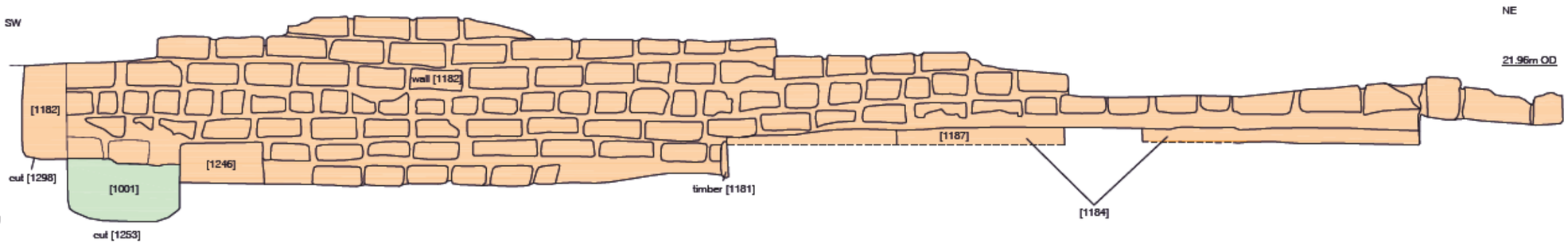


Section 132
North East Facing

Section 136
North West Facing



Section 134
North East Facing



Section 135
South East Facing

Phase 1
Phase 2
Phase 3
Phase 4.1
Phase 4.2
Phase 4.3
Phase 5.2
Modern Intrusion/ Truncation

0 1m

31/07/17 TC and CF

Figure 27
Sections 131, 132 and 134 -136
1:20 at A3

07/09/17 CF

Figure 28
Phase 4.3 with Ordnance Survey map of 1862 overlain
1:400 at A3

APPENDIX 2: CONTEXT INDEX

Context	Group	Phase	Type 1	Type 2	Fill of	Interpretation
Evaluation (Trench 1)						
100		5.2	Deposit	Layer		Demolition layer
101		5.2	Deposit	Layer		Sandy clay consolidation layer
102		5.2	Deposit	Layer		Silty sand consolidation layer
103		5.2	Deposit	Layer		Demolition rubble
104		5.2	Deposit	Layer		Demolition layer
105		5.2	Deposit	Layer		Demolition layer
106		5.2	Deposit	Layer		Demolition layer
107		5.2	Deposit	Layer		Demolition layer
108		5.2	Deposit	Layer		Consolidation layer
110		5.2	Cut	Linear		Demolition cut for wall [111]
111		5.2	Masonry	Structure		Brick wall [111]
112		5.2	Deposit	Layer	110	Fill of demolition cut [110]
113		5.2	Cut	Linear		Possible service trench
114		5.2	Deposit	Fill		Fill of service trench [113]
Excavation						
1000		5.2	Deposit	Layer		Modern overburden across site
1001		1	Deposit	Layer		Geological substrate
1002		5.2	Masonry	Surface		Cobbled floor surface
1003		5.2	Masonry	Structure		Sandstone wall
1004		5.2	Masonry	Structure		Bricked up doorway
1005		4.3	Masonry	Structure		Brick wall within pottery
1006		4.1	Masonry	Structure		External brick wall of Newcastle pottery?
1007		5.2	Masonry	Structure		Sandstone wall
1008		5.2	Cut	Linear		Construction cut for wall [1003]
1009	VOID					
1010		4.3	Cut	Linear		Construction cut for wall [1005]
1011		5.2	Cut	Linear		Construction cut for wall [1007]
1012		4.1	Cut	Linear		Construction cut for [1006]
1013		5.2	Deposit	Layer		Ground raising dump
1014		5.2	Deposit	Layer		Ground raising dump
1015		4.3	Masonry	Surface		Floor surface
1016		4.3	Deposit	Layer		Sub-base for floor surface [1015]
1017		3	Deposit	Layer		Developed soil/ subsoil
1018		4.3	Masonry	Structure		Sandstone wall
1019		4.3	Cut	Linear		Construction cut for wall [2018]
1020		5.2	Masonry	Structure		Bricked up doorway
1021	VOID					
1022	VOID					
1023	G43	4.3	Masonry	Surface		Floor surface
1024	G45	4.3	Masonry	Structure		Ad Hoc wall
1025	VOID					
1026	G45	4.3	Deposit	Layer		Levelling deposit for wall [1024]
1027	G12	4.1	Masonry	Structure		Brick wall
1028	G12	4.2	Cut	Linear		Construction cut for brick wall [1027]
1029	G43	4.3	Masonry	Surface		Brick floor surface

1030	G12	4.1	Masonry	Structure		Sandstone door jamb?
1031		4.1	Masonry	Structure		Column base?
1032		5.2	Masonry	Structure		Brick culvert
1033		5.2	Cut	Linear		Construction cut for culvert [1033]
1034	G11	4.1	Masonry	Surface		Brick floor surface around kiln
1035		4.1	Masonry	Surface		Brick floor surface around kiln
1036	G11	4.1	Masonry	Structure		Firebrick wall of kiln
1037	G14	4.1	Masonry	Structure		Brick kiln wall
1038	G14	4.1	Masonry	Structure		Wall foundations for brick wall [1037]
1039	G14	4.1	Cut	Linear		Construction cut for wall foundations [1038]
1040		4.1	Cut	Linear		Construction cut for wall [1041]
1041		4.1	Masonry	Structure		Kiln alteration/repair?
1042		5.2	Masonry	Structure		Brick drain
1043		5.2	Cut	Discrete		Construction cut for brick drain [1042]
1044		5.2	Masonry	Structure		Brick wall repair to [1002]?
1045		4.3	Masonry	Surface		Floor surface
1046	G28	4.3	Masonry	Structure		Kiln. Muffle type?
1047	G28	4.3	Cut	Linear		Construction cut for wall [1046]
1048		5.2	Masonry	Structure		Sandstone wall [1048]
1049		4.3	Masonry	Surface		Firebrick slab floor surface
1050		4.1	Masonry	Structure		Kiln ash pit
1051	G62	5.2	Masonry	Structure		Sandstone wall
1052	G30	4.3	Masonry	Structure		Brick floor surface
1053	G75	4.1	Masonry	Structure		Partial kiln base
1054		5.2	Masonry	Surface		Stone cobble surface
1055		5.2	Deposit	Surface		Concrete floor surface
1056	VOID					
1057	G21	4.3	Deposit	Layer	1065	Possible slip material within structure [1065]
1058	G4	2	Deposit	Fill	1059	Silting of ditch [1059]
1059	G3	2	Cut	Linear		Boundary ditch filled by [1058]
1060	G54	4.3	Masonry	Surface		Brick surface
1061	G54	4.3	Deposit	Layer		Subbase for brick surface [1060]
1062	G4	2	Deposit	Fill	1064	Silting of ditch [1064]
1063	G4	2	Deposit	Fill	1064	Silting of ditch [1064]
1064	G3	2	Cut	Linear		Boundary ditch filled by [1062] & [1063]
1065	G21	4.3	Masonry	Structure		Brick wall of potential slip tank
1066	G21	4.3	Masonry	Surface		Firebrick slab surface of potential slip tank
1067	G3	2	Cut	Linear		Boundary ditch filled by [1069] & [1070]
1068		5.2	Cut	Linear		Construction cut for brick wall [1072]
1069	G4	2	Deposit	Fill	1067	Silting of ditch [1067]
1070	G4	2	Deposit	Fill	1067	Silting of ditch [1067]
1071		5.2	Deposit	Fill	1068	Backfill of wall construction cut [1071]
1072		5.2	Masonry	Structure		Brick wall within construction cut [1068]
1073	G8	4.1	Masonry	Structure		Kiln remains
1074		5.2	Masonry	Structure		Brick structure
1075		4.3	Masonry	Structure		Brick structure. Step?
1076	G43	4.3	Masonry	Structure		Wall

1077	G43	4.3	Masonry	Surface		Firebrick slab floor surface
1078	G43	4.3	Masonry	Surface		Floor surface
1079	G43	4.3	Masonry	Structure		Brick wall
1080	G43	4.3	Masonry	Structure		Brick wall
1081		4.3	Masonry	Structure		Sandstone wall
1082	G43	4.3	Masonry	Structure		Brick wall
1083	G21	4.3	Cut	Discrete		Construction cut for potential slip tank
1084	G21	4.3	Deposit	Fill	1083	Backfill of construction cut [1083]
1085	G21	4.3	Masonry	Surface		Surface below [1066]
1086		5.2	Masonry	Structure		Brick structure
1087		5.2	Deposit	Fill	1086	Backfill of construction cut [1088]
1088		5.2	Cut	Linear		Construction cut for brick structure [1086]
1089	G22	4.3	Masonry	Surface		Floor surface
1090		5.2	Deposit	Fill	1086	Backfill of structure [1086]
1091	G43	4.3	Deposit	Layer		Levelling deposit for surface [1078]
1092	G43	4.3	Deposit	Fill	1093	Backfill of construction cut [1093]
1093	G43	4.3	Cut	Linear		Construction cut for wall [1080]
1094	G43	4.3	Deposit	Fill	1095	Backfill of construction cut [1095]
1095	G43	4.3	Cut	Linear		Construction cut for wall [1079]
1096	G43	4.3	Deposit	Layer		Made ground/ ground raising dump
1097	G22	4.3	Masonry	Structure		Coal Store
1098	G48	5.1	Deposit	Fill		Backfill of structure [1097]
1099	G54	4.3	Masonry	Structure		Stone drain within brick surface [1060]
1100		2	Deposit	Fill	1101	Silting of ditch [1101]
1101	G1	2	Cut	Linear		Boundary ditch filled by [1100]
1102		5.2	Masonry	Structure		Sandstone wall within construction cut [1103]
1103		5.2	Cut	Linear		Construction cut for wall [1102]
1104		5.2	Masonry	Structure		Wall within construction cut [1105]
1105		5.2	Cut	Linear		Construction cut for wall [1104]
1106		5.2	Masonry	Structure		Brick wall in construction cut [1107]
1107		5.2	Cut	Linear		Construction cut for brick wall [1106]
1108		5.2	Masonry	Structure		Brick wall in construction cut [1109]
1109		5.2	Cut	Linear		Construction cut for wall [1108]
1110		5.2	Deposit	Structure		Concrete foundation for [1108]
1111	G22	4.3	Cut	Linear		Construction cut for structure [1097]
1112		5.2	Masonry	Structure		Brick wall
1113		5.2	Deposit	Structure		Concrete foundations of brick wall [1112]
1114		5.2	Cut	Linear		Construction cut for [1112]
1115		2	Deposit	Fill	1116	Silting of ditch [1116]
1116	G1	2	Cut	Linear		Boundary ditch filled by [1115]
1117	G48	5.1	Deposit	Fill		Backfill of storage bay within slip house
1118		4.3	Cut	Linear		Construction cut for wall [1081]
1119	G43	4.3	Masonry	Structure		Slate within slip storage tank (south-eastern end of site)
1120	G43	4.3	Deposit	Layer		Levelling deposit for surface [1077]
1121		4.3	Deposit	Layer		Slip deposit?
1122	G43	4.3	Cut	Discrete		Construction cut for surface [1023]

1123	G43	4.3	Cut	Linear		Construction cut for brick wall [1082]
1124	G48	5.1	Deposit	Fill		Backfill of storage bay within slip house
1125	G20	4.3	Masonry	Surface?		Stones within slip house storage bay. Ad hoc floor surface?
1126	G18	4.3	Masonry	Structure		Wall of small storage bay
1127	G18	4.3	Masonry	Surface		Floor surface within storage bays
1128	G18	4.3	Masonry	Structure		Ad hoc partition storage bays
1129	G20	4.3	Masonry	Structure		Partition wall between storage bays
1130		2	Deposit	Fill	1131	Silting of ditch terminus [1131]
1131	G1	2	Cut	Linear		Boundary ditch terminus filled by [1130]
1132	G3	2	Cut	Linear		Boundary ditch
1133		4.3	Cut	Linear		Construction cut for wall [1145]
1134		4.3	Deposit	Fill		Backfill of construction cut [1135]
1135		4.3	Cut	Linear		Construction cut for wall [1075]
1136	G43	4.3	Deposit	Layer		Levelling deposit for surface [1029]
1137		4.3	Deposit	Fill		Fill of construction cut [1010]
1138		5.2	Deposit	Layer		Levelling deposit for concrete surface [1055]
1139	G48	5.1	Deposit	Fill		Backfill of storage bay to the north of slip tank
1140	G4	2	Deposit	Fill	1132	Silting of ditch [1132]
1141	G4	2	Deposit	Fill	1132	Silting of ditch [1132]
1142		2	Cut	Discrete		Pit
1143		2	Deposit	Fill	1142	Backfill of pit [1142]
1144		4.3	Deposit	Fill	1133	Backfill of construction cut [1133]
1145		4.3	Masonry	Structure		Sandstone wall
1146		4.3	Deposit	Fill	1147	Backfill of pottery waste into pit [1147]
1147		4.3	Cut	Discrete		Pit filled with pottery dump [1146]
1148		4.3	Deposit	Surface		Compact deposit
1149	G14	4.1	Deposit	Fill	1271	Backfill of pit [1271] within centre of kiln
1150	G14	4.1	Masonry	Surface	1271	Surface within pit.
1151	G14	4.1	Deposit	Fill	1271	Backfill of pit [1271] within centre of kiln
1152	VOID					
1153	VOID					
1154	VOID					
1155	VOID					
1156		4.3	Masonry	Surface		Floor surface
1157		5.2	Deposit	Fill	1158	Backfill of construction cut [1158]
1158		5.2	Cut	Linear		Construction cut for brick structure [1074]
1159	G48	5.1	Deposit	Fill	1046	Backfill of potential muffle kiln
1160	G48	5.1	Deposit	Fill	1046	Backfill of potential muffle kiln
1161		5.2	Deposit	Layer		Ground raising dump
1162	G48	5.1	Deposit	Fill		Backfill of storage bay within slip house
1163	G48	5.1	Deposit	Fill		Demolition backfill of storage bay
1164		5.2	Deposit	Fill	1165	Backfill of pit [1165]
1165		5.2	Cut	Discrete		Pit filled by [1164]
1166	G8	4.1	Masonry	Structure		Ash pit of kiln
1167		4.1	Deposit	Fill	1166	Fill of ash pit [1166]
1168	G8	4.1	Cut	Discrete		Construction cut for ash pit [1166]

1169	G8	4.1	Masonry	Structure		Ash pit of kiln
1170	VOID					
1171	G8	4.1	Cut	Discrete		Construction cut for wall ash pit [1169]
1172	VOID					
1173		5.2	Masonry	Structure		Wall in construction cut [1174]
1174		5.2	Cut	Linear		Construction cut for [1173]
1175	VOID					
1176		4.3	Masonry	Structure		Wall within construction cut [1177]
1177		4.3	Cut	Linear		Construction cut for wall [1176]
1178	G48	5.1	Deposit	Fill	1182	Rubble infill of slip tank [1182] within slip house
1179	G48	5.1	Deposit	Fill	1182	Fill of slip tank [1182] within slip house
1180	G48	5.1	Deposit	Fill	1182	Fill of slip tank [1182] within slip house
1181	G18	4.3	Timber	Upright & Horizontal	1182	Timber structure within slip tank [1182] in slip house
1182	G18	4.3	Masonry	Structure		Wall of slip tank within slip house
1183	G48	5.1	Deposit	Fill	1182	Fill of slip tank [1182] within slip house
1184	G18	4.3	Masonry	Surface	1182	Sandstone flag floor surface within slip tank [1182]
1185	G18	4.3	Deposit	Layer	1182	Subbase for sandstone floor surface [1184]
1186	G48	5.1	Deposit	Fill	1182	Fill of slip tank [1182] within slip house
1187	G48	5.1	Deposit	Fill	1182	Fill of slip tank [1182] within slip house
1188	G18	4.3	Deposit	Layer	1182	Clay surface? Dried remains of slip? Within slip tank [1182]
1189		4.1	Deposit	Fill	1073	Backfill of kiln ash pit [1073]
1190	G8	4.1	Cut	Discrete		Construction cut for kiln ash pit [1073]
1191	G43	4.3	Masonry	Structure		Brick structure. Potential step?
1192	G43	4.3	Deposit	Fill	1191	Infill behind brick structure [1191]
1193		4.1	Deposit	Fill	1073	Fill within kiln ash pit [1073]
1194	G26	4.3	Deposit	Layer		Pottery dump
1195	G45	4.3	Deposit	Layer		Levelling for wall [1024]?
1196	G45	4.3	Deposit	Layer		Levelling for wall [1024]?
1197		4.3	Masonry	Surface		Firebrick slab surface
1198		4.3	Deposit	Layer		Levelling for surface [1197]
1199		5.2	Masonry	Structure		Sandstone wall
1200		5.2	Cut	Linear		Construction cut for wall [1199]
1201		5.2	Deposit	Layer		Levelling deposit for wall [1051]
1202		5.2	Deposit	Fill	1203	Fill of pit [1203]
1203		5.2	Cut	Discrete		Pit filled by [1202]
1204		4.3	Deposit	Layer		Levelling deposit for floor surface [1045]
1205	G28	4.3	Masonry	Surface		Floor surface
1206	G28	4.3	Masonry	Surface		Floor surface
1207		4.3	Deposit	Layer		Levelling deposit for brick floor surface [1052]
1208	G26	4.3	Deposit	Layer		Made ground deposit between walls [1077] & [1133]
1209	G18	4.3	Cut	Discrete		Construction cut for kiln [1210]
1210	G18	4.3	Masonry	Structure		Potential kiln structure. Slip kiln?
1211	G18	4.3	Deposit	Layer		Levelling deposit for floor surface [1212] within potential slip kiln

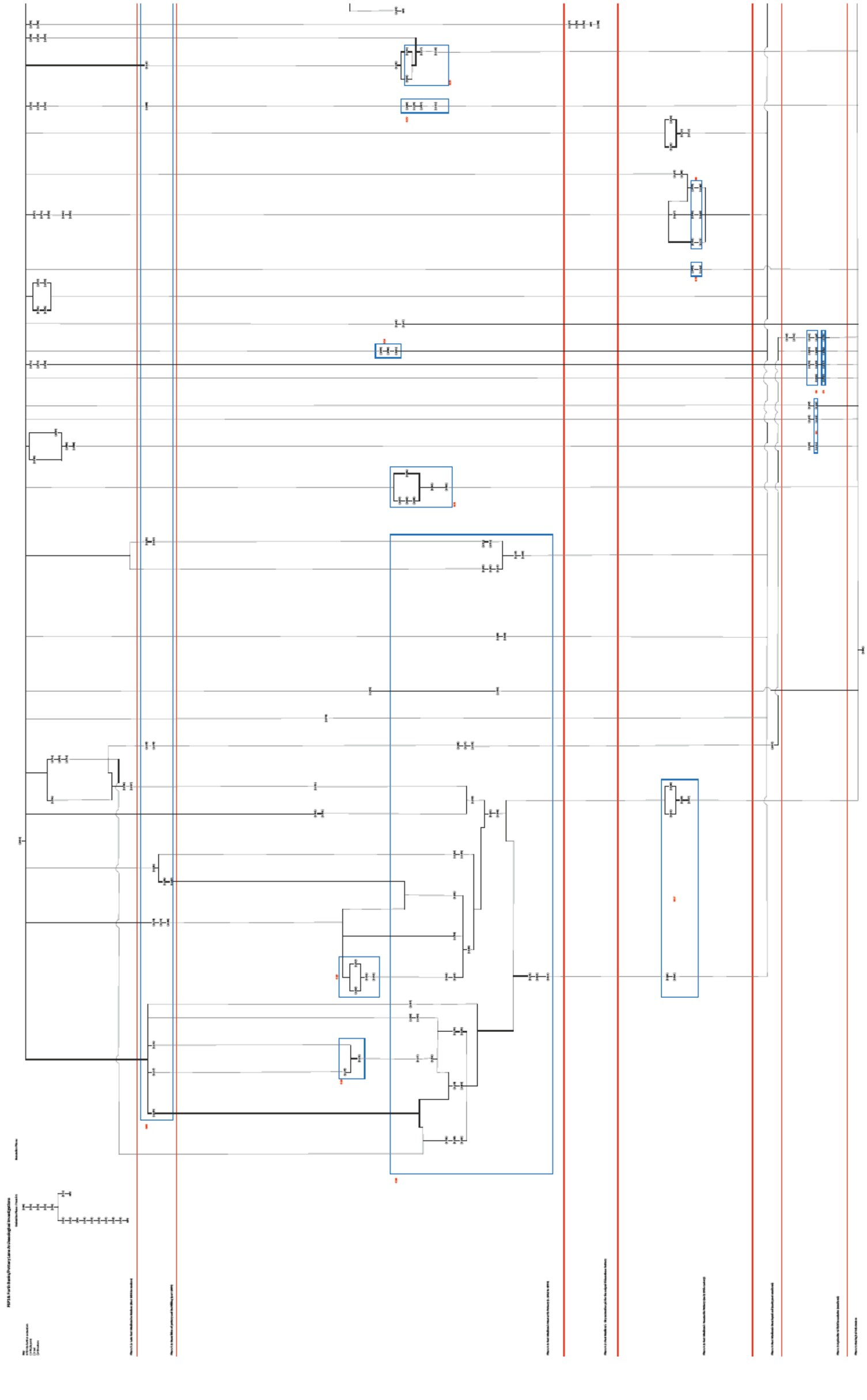
1212	G18	4.3	Masonry	Surface		Floor surface within potential slip kiln
1213	G18	4.3	Deposit	Fill	1209	Backfill of slip kiln construction cut [1209]
1214	G75	4.1	Cut	Discrete		Construction cut for kiln [1053]
1215		5.2	Cut	Linear		Construction cut for wall [1051]
1216		5.2	Cut	Linear		Construction cut for wall [1048]
1217	G23	4.3	Masonry	Structure		Coal store structure
1218	G23	4.3	Cut	Discrete		Construction cut for coal store [1217]
1219	G48	5.1	Deposit	Fill	1217	Backfill of coal store [1217]
1220		4.3	Deposit	Fill	1217	Coal layer fill of coal store [1217]
1221		4.1	Deposit	Fill	1012	Backfill of construction cut [1012]
1222		4.1	Masonry	Structure		Sandstone foundations of brick wall [1006]
1223		4.3	Deposit	Layer		Dump deposit of clay overlying brick surface [1029]
1224	G23	4.3	Masonry	Surface		Brick floor surface within coal store [1217]
1225		4.3	Deposit	Layer		Ground raising dump
1226	G18	4.3	Cut	Discrete		Construction cut for brick structure [1227]
1227	G18	4.3	Masonry	Structure		Brick structure within construction cut [1226]
1228	G48	5.1	Deposit	Fill	1227	Fill of brick structure [1227]
1229	G22	4.3	Deposit	Layer		Levelling deposit for surface [1089]
1230	VOID					
1231		4.3	Deposit	Layer		White clay deposit
1232	VOID					
1233	VOID					
1234	VOID					
1235		4.3	Deposit	Layer		Deposit overlying floor surface [1236]
1236	G18	4.3	Masonry	Surface		Fragment of floor surface
1237		4.2	Deposit	Fill	1238	Backfill of clay extraction pit [1238]
1238	G5	4.2	Cut	Discrete		Clay extraction pit at northernmost extent of site
1239		5.2	Deposit	Layer		Levelling for surface [1002]
1240		5.2	Deposit	Layer		Ground raising dump below [1239]
1241		5.2	Deposit	Fill	1242	Fill of modern drain [1242]
1242		5.2	Cut	Linear		Cut for modern drain
1243	VOID					
1244	VOID					
1245	VOID					
1246	G18	4.3	Deposit	Surface		Surface within base of mixing ark
1247	VOID					
1248	G18	4.3	Timber	Upright		Timber post
1249	G18	4.3	Timber	Horizontal		Possible shuttering
1250	G19	4.3	Deposit	Fill		Fill within saggar [1251] in cut [1253]
1251	G19	4.3	Other	Saggar		Saggar within [1253]
1252	G19	4.3	Deposit	Fill		Backfill around saggar [1251] within [1253]
1253	G19	4.3	Cut	Discrete		Construction cut for saggar [1251]
1254		5.2	Deposit	Fill	1107	Backfill within construction cut [1107]

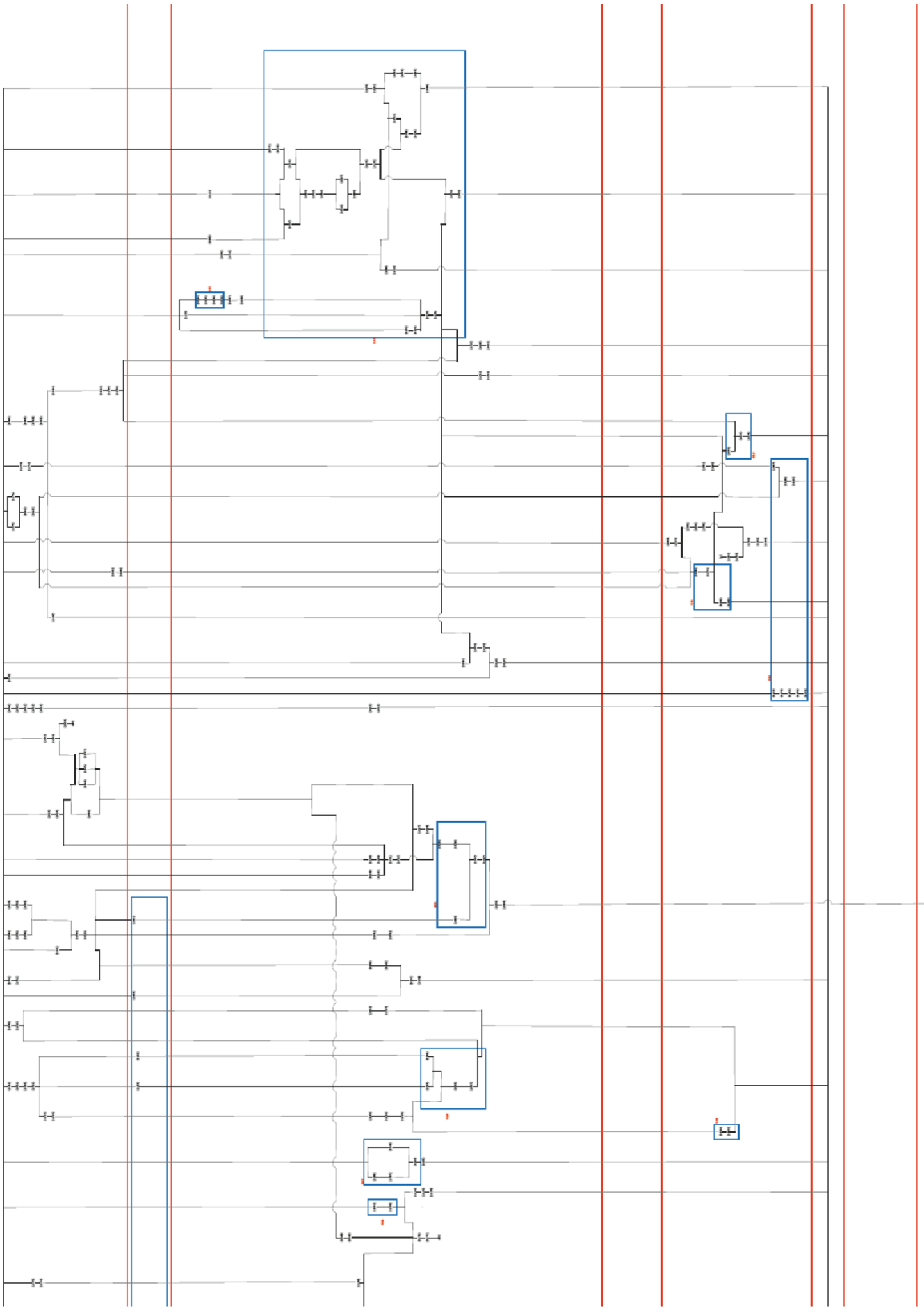
1255	VOID					
1256	G18	4.3	Deposit	Fill		Backfill within construction cut [1260]
1257	VOID					
1258	G18	4.3	Masonry	Structure		Wall to east of [1126]
1259	G18	4.3	Deposit	Layer		Bedding layer for floor surface [1127]
1260	G18	4.3	Cut	Linear		Construction cut for wall [1258]
1261		4.3	Masonry	Surface		Brick floor surface
1262		4.3	Deposit	Layer		Levelling for surface [1261]
1263		4.2	Deposit	Fill	1238	Backfill of clay extraction pit [1283]
1264		4.2	Deposit	Fill		Backfill of clay extraction pit [1283]
1265		4.3	Deposit	Fill	1266	Fill of linear ditch [1266]
1266		4.3	Cut	Linear		Linear ditch filled by [1265]
1267	G18	4.3	Masonry	Surface		Stone floor surface
1268	G18	4.3	Masonry	Surface		Stone floor surface
1269	G18	4.3	Deposit	Layer		Subbase for surface [1268]
1270	G14	4.1	Deposit	Fill	1271	Fill of feature [1271]
1271	G14	4.1	Cut	Discrete		Cut within centre of kiln
1272	G11	4.1	Deposit	Layer		Levelling for surface [1034]
1273		5.2	Deposit	Fill	1274	Fill of pit [1274]
1274		5.2	Cut	Discrete		Pit
1275		5.2	Deposit	Fill	1042	Backfill of structure [1042]
1276		5.2	Deposit	Fill	1043	Backfill of construction cut [1043] for brick drain [1042]
1277		4.1	Deposit	Layer		Levelling for surface [1035]
1278	G48	5.1	Deposit	Fill		Fill of construction cut [1226]
1279	G18	4.3	Masonry	Structure		Wall in storage bay
1280	G18	4.3	Masonry	Surface		Fragment of floor surface
1281	VOID					
1282	G18	4.3	Deposit	Layer		Bedding layer for surface [1283]
1283	G18	4.3	Deposit	Layer		Fragment of floor surface
1284	G17	4.1	Masonry	Structure		Wall fragment
1285		4.3	Masonry	Surface		Floor surface
1286	G27	4.3	Masonry	Structure		Brick & sandstone wall
1287	G27	4.3	Deposit	Layer		Ground raising dump
1288	G18	4.3	Masonry	Surface		Floor surface
1289	G11	4.1	Cut	Penannular		Construction cut for kiln wall [1036]
1290		4.1	Cut	Discrete		Construction cut for column base [1031]
1291		4.1	Deposit	Fill	1290	Fill of construction cut [1290]
1292		4.1	Masonry	Structure		Brick structure
1293		4.1	Cut	Discrete		Construction cut for brick structure [1292]
1294		4.1	Masonry	Structure		Culvert in construction cut [1295]
1295		4.1	Cut	Linear		Construction cut for culvert [1294]
1296		4.1	Deposit	Fill		Fill of construction cut [1293]
1297	G27	4.3	Cut	Linear		Construction cut for brick/stonewall [1286]
1298	G18	4.3	Cut	Discrete		Construction cut for slip tank [1182]
1299	G18	4.3	Deposit	Fill		Fill of construction cut of slip tank [1182]
1300	G10	4.1	Cut	Discrete		Construction cut for kiln ash pit [1050]

1301	G23	4.3	Timber	Upright		Timber upright within coal store [1217]
1302	G43	4.3	Timber	Horizontal		Timber hatch in [1306]
1303	G43	4.3	Masonry	Surface/ Structure		Slate cover within construction cut [1306]
1304	G43	4.3	Masonry	Structure		Brick tank in [1306]
1305		4.3	Deposit	Fill	1306	Slip in [1306]
1306	G43	4.3	Cut	Discrete		Construction cut for brick tank [1304]
1307	G17	4.1	Cut	Discrete		Construction cut for brick structure [1309]
1308	G17	4.1	Deposit	Fill	1307	Backfill of construction cut [1307]
1309	G17	4.1	Masonry	Structure		Truncated brick structure
1310	G17	4.1	Deposit	Fill	1309	Fill of brick structure [1309]
1311	VOID					
1312	VOID					
1313	G43	4.3	Deposit	Fill	1306	Clay packing in [1306]
1314	G18	4.3	Deposit	Layer		Dump deposit
1315	G43	4.3	Cut	Linear		Construction cut for wall [1076]
1316	G43	4.3	Timber	Horizontal	1306	Timber beam within [1306]
1317	G43	4.3	Timber	Horizontal	1306	Timber beam within [1306]
1318		4.3	Masonry	Structure		Wall structure
1319		4.3	Cut	Linear		Construction cut for wall [1218]
1320		4.3	Masonry	Surface		Floor surface
1321		4.3	Masonry	Linear		Brick wall
1322		4.3	Cut	Linear		Construction cut for brick wall [1321]
1323		5.2	Masonry	Surface		Stone floor surface
1324		5.2	Deposit	Layer		Subbase for stone surface [1323]
1325		5.2	Deposit	Layer		Subbase for stone surface [1333]
1326	G35	4.3	Masonry	Structure		Slip kiln
1327		4.3	Masonry	Structure		Wall
1328		4.3	Cut	Linear		Construction cut for wall [1327]
1329		5.2	Deposit	Fill	1330	Fill of pipe trench [1330]
1330		5.2	Cut	Linear		Pipe trench filled by [1329]
1331		4.3	Masonry	Structure		Wall
1332		4.3	Cut	Linear		Construction cut for wall [1331]
1333		5.2	Masonry	Surface		Stone floor surface
1334	G35	5.2	Masonry	Surface		Stone floor surface
1335	G35	5.2	Deposit	Layer		Levelling deposit for floor surface [1334]
1336		5.2	Masonry	Surface		Stone/brick floor surface
1337		4.3	Masonry	Surface		Stone/ brick structure
1338		4.3	Cut	Discrete		Construction cut for structure [1337]
1339		4.3	Masonry	Structure		Wall
1340		4.3	Cut	Linear		Construction cut for wall [1339]
1341		5.2	Masonry	Structure		Doorsill?
1342		5.2	Masonry	Surface		Stone floor surface
1343		5.2	Deposit	Layer		subbase for floor surface [1342]
1344		5.2	Masonry	Structure		Ceramic drain cover stamped LAMBTON
1345		5.2	Masonry	Structure		Doorsill/ Threshold
1346		5.2	Masonry	Structure		NW door jamb
1347		5.2	Masonry	Structure		SE door jamb

1348		4.3	Masonry	Structure		Sandstone wall
1349		4.3	Cut	Linear		Construction cut for sandstone wall [1348]
1350		5.2	Masonry	Structure		Drain cover
1351		5.2	Masonry	Structure		Brick wall
1352		5.2	Cut	Linear		Construction cut for brick wall [1351]
1353	G18	4.3	Cut	Linear		Construction cut for storage bay wall [1126]
1354	G17	4.1	Cut	Linear		Construction cut for storage bay wall [1284]
1355	G18	4.3	Cut	Linear		Construction cut for storage bay wall [1279]
1356		5.2	Other	Pipe	1330	Pipe within [1330]
1357	G35	4.3	Cut	Discrete		Construction cut for kiln structure [1362]
1358	G35	4.3	Deposit	Fill	1358	Backfill of construction cut [1357] for kiln structure [1362]
1359		4.3	Masonry	Structure		Wall in construction cut [1364]
1360	G35	4.3	Masonry	Surface		Stone surface of kiln structure
1361	G48	5.1	Deposit	Fill		Backfill of kiln structure [1362]
1362	G35	4.3	Masonry	Structure		Wall of kiln within construction cut [1357]
1363	G36	4.3	Deposit	Layer		Subbase for brick floor surface [1320]
1364		4.3	Cut	Linear		Construction cut for wall [1359]
1365	G48	5.1	Deposit	Fill		Fill of structure [1337]
1366	VOID					
1367		5.2	Other	Pipe	1242	Pipe in [1242]
1368	G18	4.3	Deposit	Layer		Levelling for surface [1280]
1369	G18	4.3	Cut	Linear		Cut for wall [1128]
1370		4.3	Deposit	Layer		Pottery spread

APPENDIX 3: STRATIGRAPHIC MATRIX





APPENDIX 4: PHOTOGRAPHIC & HISTORIC PLATES

Photographic Plates

Plate 1: Trench 1 evaluation, structure [111]: view south-west. 2m scale

Plate 2: Ditch [1101]: view south-west. 0.5m scale

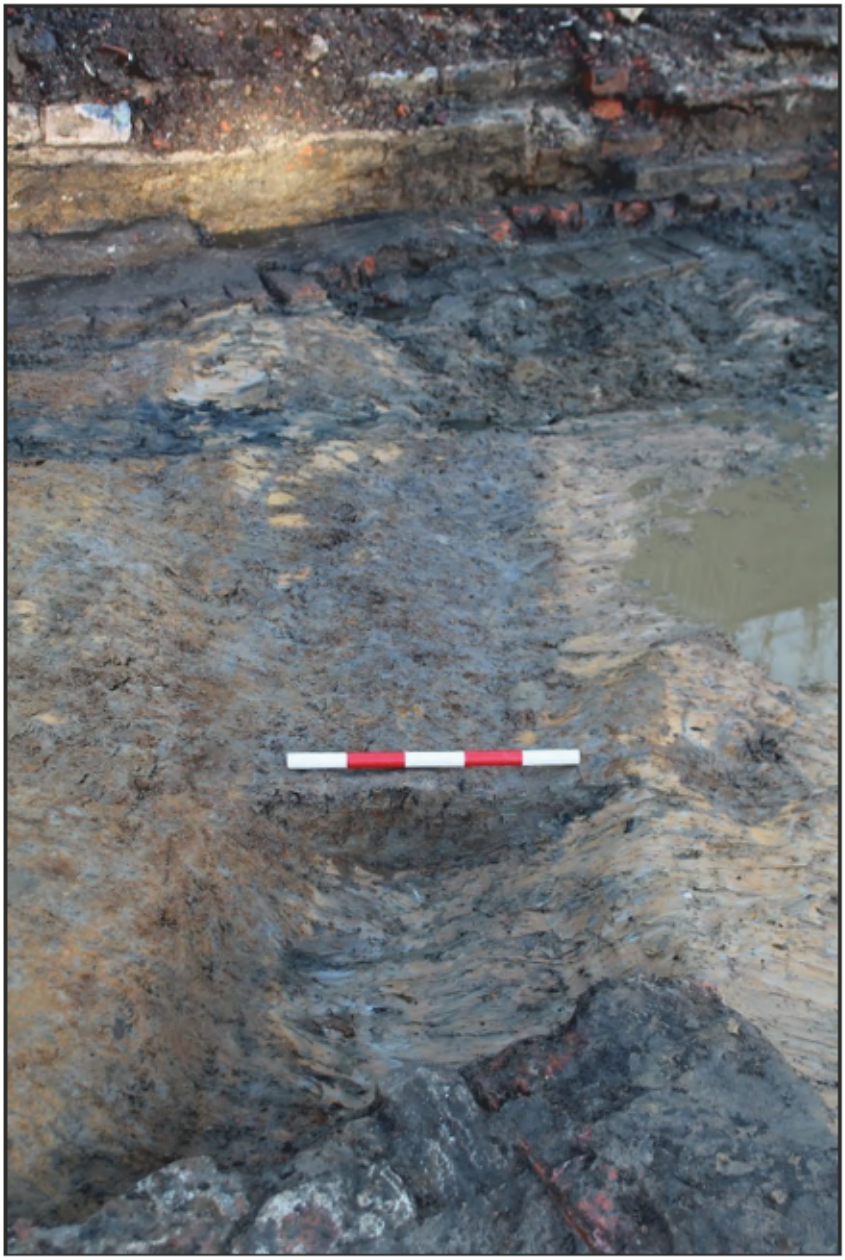


Plate 3: Ditch Group 1: view south-west. 0.5m scale

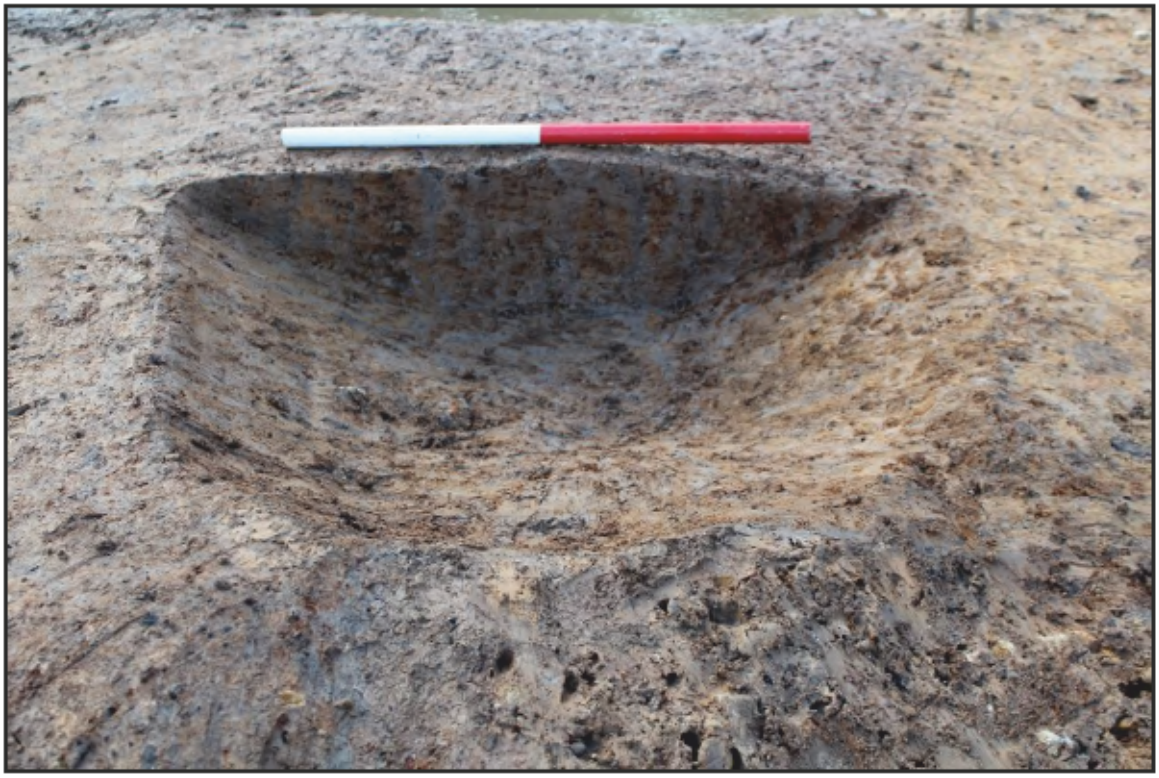


Plate 4: Ditch Group 3: view south-east. 2m scale

Plate 5: External wall [1006] of the pottery: view north-east. 2m scale

Plate 6: Kiln [1053]: view north-east. 2m scale

Plate 7: Kiln [1073]: view south-east. 2m scale

Plate 8: Kiln ashpit [1050]: view north-west. 0.5m scale

Plate 9: Kiln Group 14: view north-east. 1m scale

Plate 10: Kiln well hole [1150] Kiln Group 14: view south-east. 0.5m scale

Plate 11: Partition wall [1027] and door jamb [1030] with kiln Group 14 in background: view north-east. 2m scale

Plate 12: Structure [1309]: view north-west. 1m scale

Plate 13: Overview of slip house (Group 18) with storage bays in foreground: view south-west. 2m scale

Plate 14: Slip house (Group 18): view south-east. 2m scale

Plate 15: Mixing ark within slip house (Group 18): view north-east. 2x1m scales

Plate 16: Timber in mixing ark in slip house (Group 18): view north-east. 0.5m scale

Plate 17: Saggar (Group 19) cut into mixing ark floor in slip house (Group 18): view south-west. 0.5m scale

Plate 18: Slip kiln [1210] in slip house (Group 18): view south-west. 1m scale

Plate 19: Slip kiln (Group 35): view north-east. 1m scale

Plate 20: Slip storage tank (Group 21): view south-east. 2m scale

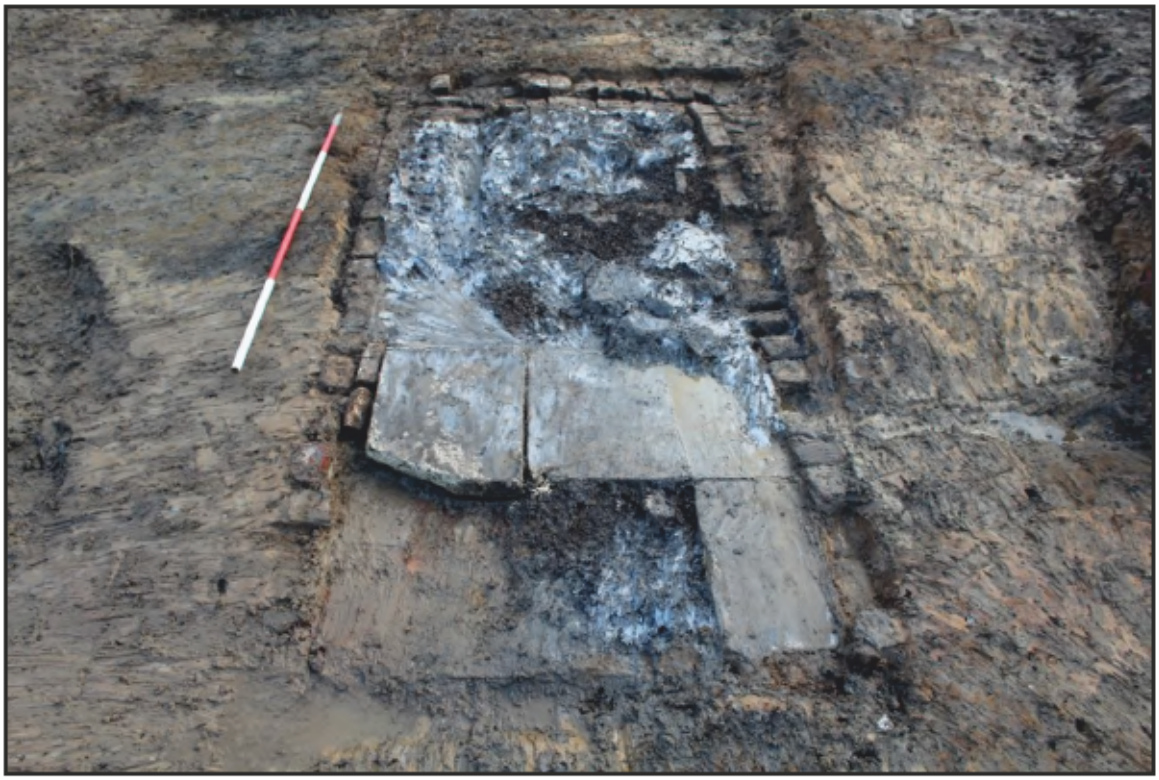


Plate 21: Slip storage tank (Group 43): view north-west. 2m scale

Plate 22: Excavated slip storage tank (Group 43): view north-east. 0.5m scale

Plate 23: Slate lining [1119] (Group 43).: view south-east. 0.5m scale

Plate 24: Ad-hoc wall [1024] (Group 45) with floor surface [1029] in foreground: view south east. 2m scale

Plate 25: Muffle kiln [1046] (Group 28): view north-west. 1m scale

Plate 26: Muffle kiln [1046] (Group 28): view south-west. 1m scale

Plate 27: Coal store (Group 22): view south-east. 1m scale

Plate 28: Coal store (Group 23): view south-east. 1m scale

Plate 29: Waste pit [1147] view south-west. 1m scale

Plate 30: Wall [1339]: view south-west. 2m scale

Plate 31: Wall [1331]: view north-east. 2m scale

Plate 32: Wall [1018]: view south-east. 1m scale

Plate 33: Wall [1005]: view south-east. 1m scale

Plate 34: Wall [1327]: view north-west. 2m scale

Plate 35: Surface [1156]: view north-west. 1m scale

Plate 36: Surface [1052]: north-east. 1m scale

Plate 37: Dipping room floor surface [1261] below 20th century floor surface Group 69: view south-east. 2m scale

Plate 38: Structure [1049] (Group 27): view south-west. 1m scale

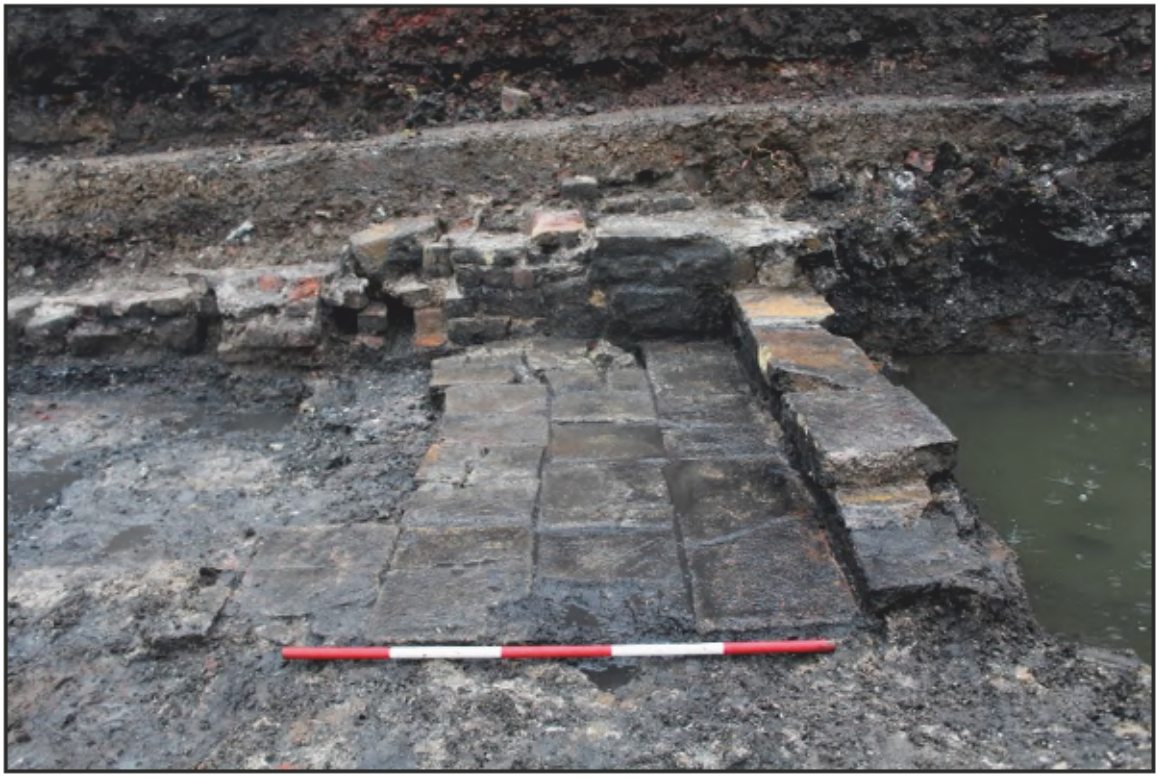


Plate 39: Structure [1337]: view south-west. 1m scale

Plate 40: Structure [1318], floor surface [1320] and wall [1321]: view north-east. 2m scale

Plate 41: Structure [1075]: view south-east. 0.5m scale

Plate 42: Brick tank [1086]: view south-west. 2m scale

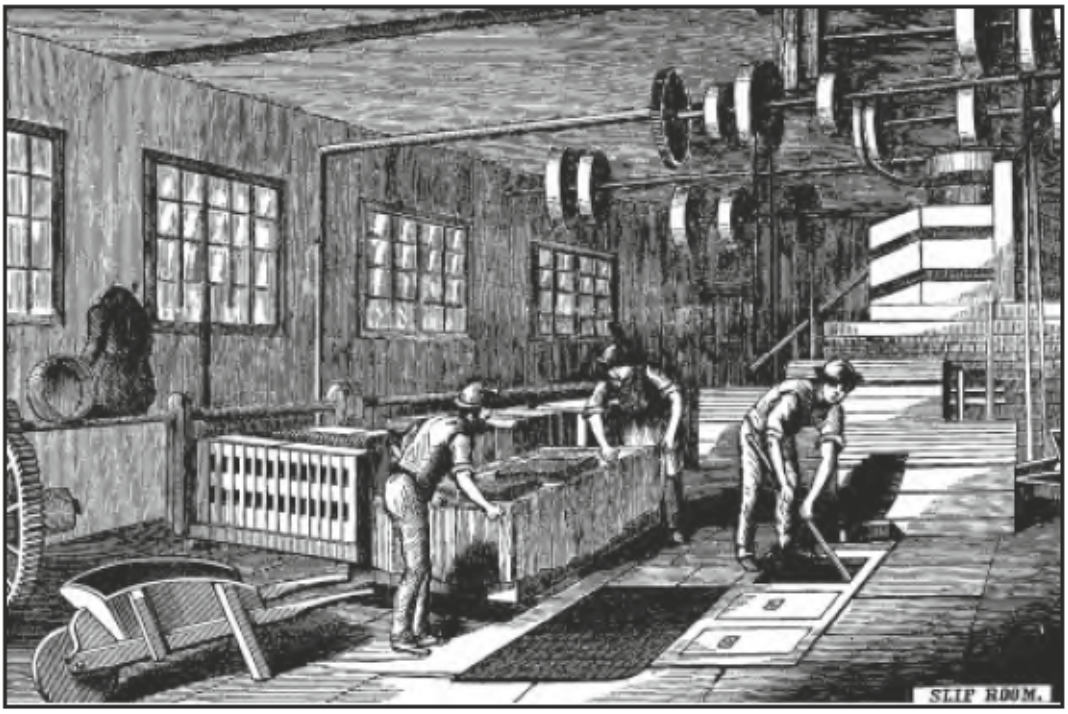
Plate 43: Wall [1007]: view south-west. 1m scale

Plate 44: Twentieth century floor surfaces [1002] and [1052]: view north-west. 2m scale

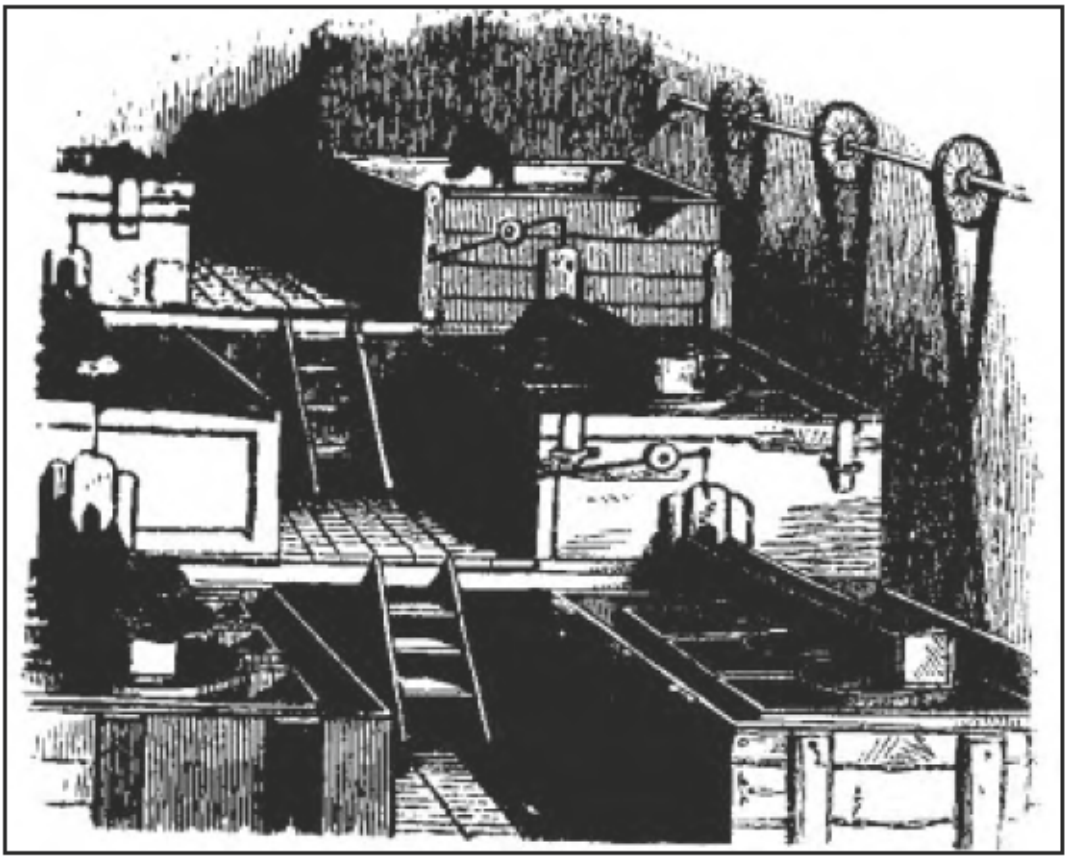
Plate 45: Surface [1333]: view north-west

Historic Plates

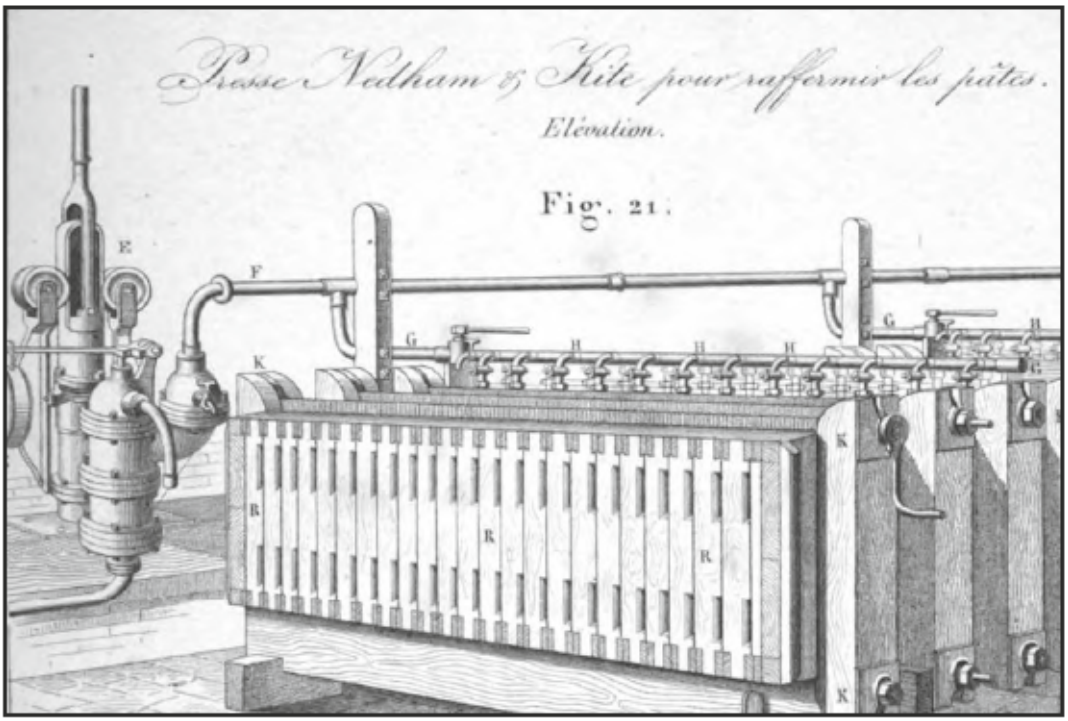
Historic Plate A: The Slip House at Worcester. The presses are on the left and a mixing pot on the right. (Source: Worcester Porcelain Museum)



Historic Plate B: A series of sieved (Source: Tomlinson's Cyclopaedia)

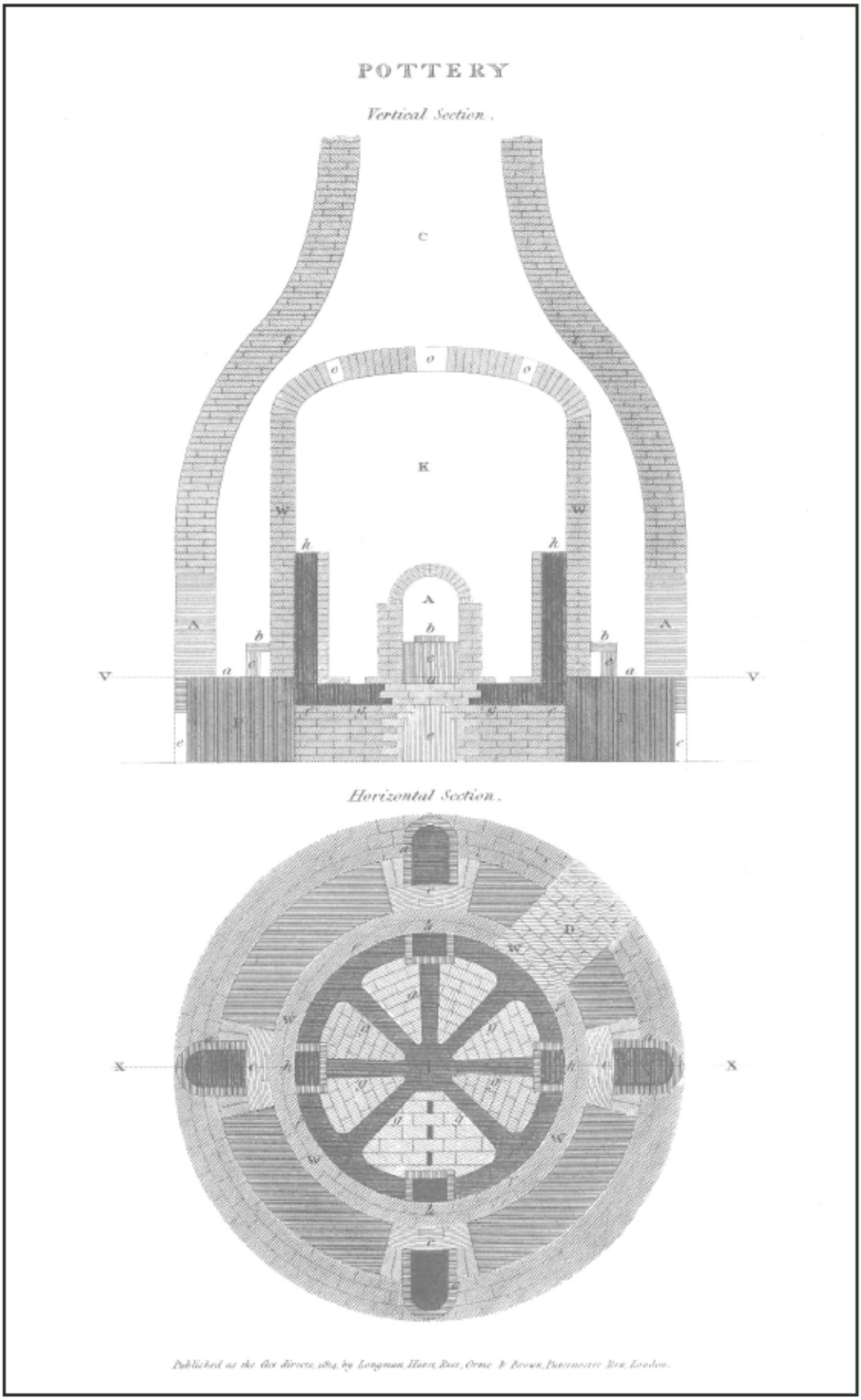


Historic Plate C: Press (Source: Potbanks website)

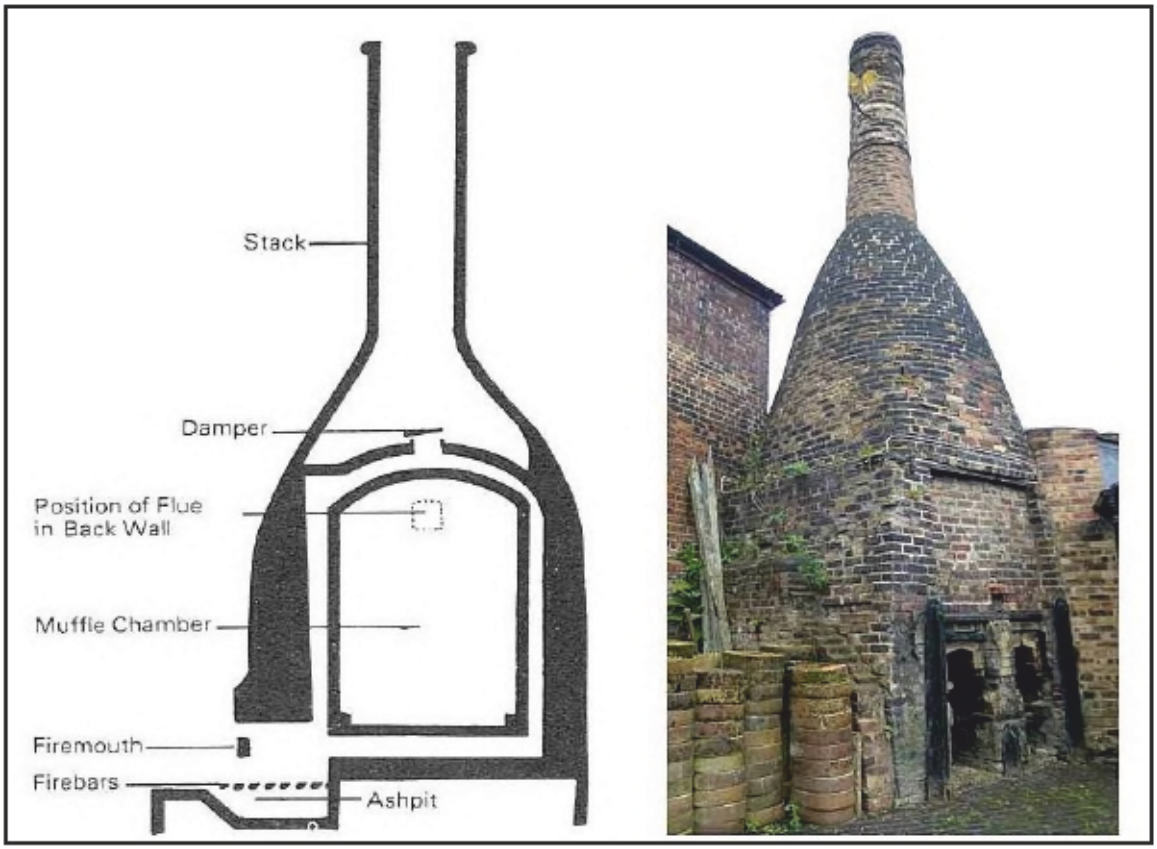


Historic Plate D: Example of plaster mould from Laing Art Gallery. Mailings example. (Source: Author)

Plate E: Hovel kiln (Source: Rees' Manufacturing Industry 1819-20)



Historic Plate F: Muffle enamel kiln cross section and external view of an oven at Gladstone Pottery Museum. (Source: Longton Drawing and photo: Terry Woolliscroft Collection)



APPENDIX 5: POTTERY AND KILN FURNITURE ASSESSMENT

Lucy Robinson

Introduction

A very large assemblage of pottery was collected from the excavation amounting to a total of 13,929 sherds (391.5kg) with a total EVEs of 383.7 (Table 2). The majority of the ceramics were the products of the factories on site between 1736-1893. A large assemblage of kiln furniture was also recovered. This comprised 691 saggar sherds (244kg) with a total EVES of 22.48 and 2438 items of small kiln furniture (1.8kg). Fragments of three plaster of Paris moulds (920g) were also recovered.

A small group of sherds (136) were identified as wares used by the workers at the factories and discarded as domestic waste. These range in date from the early 18th century to the 19th century.

Overall the assemblage was in relatively good condition. The lack of abrasion means the pottery was deposited soon after breakage and shows no evidence of redeposition. There were very few examples of intact vessels in the assemblage. Pottery was recovered from 49 contexts across the site. The bulk of the assemblage was excavated from two contexts; fill [1146] of pit [1147] and fill [1237] of extraction pit [1238].

Methodology

All the recovered pottery and kiln furniture was processed by PCA North staff with the assistance of volunteers from the Swaledale and Arkengarthdale Archaeology Group. The assemblage was quantified by the standard measures of sherd count, weight, and Estimated Vessel Equivalents (EVEs) (Orton, Tyers & Vince 1993, 168) and the information was entered into an MS Access database using fabric codes as established by Jenny Vaughan (NCAS).

The assemblage is discussed in two parts according to the nature of the ceramics; the pottery identified as products of the Skinnerburn/Newcastle Pottery which operated in this area of Newcastle between 1736 to 1893 (including the kiln furniture) and the domestic waste discarded on site by workers of the factory. Where there is discussion of the percentages of a particular fabric, this will refer to the percentage within this sub-division rather than the assemblage as whole. This will allow for a more specific study of fabrics and form within each section. A preliminary typology of the transfer-printed designs produced at the site is proposed to allow future study of the transition in domestic consumption and fashion trends relating to pottery during the period of production. An overview of the firing faults identified in this category will also show the transition in production techniques and developments in technologies.

There is no current typology for North East kiln furniture types, therefore the kiln furniture has been identified and a preliminary typology created to identify advancements in form and function and when and why handmade furniture was used.

The domestic pottery from the site is intrinsically more difficult to identify. The issues in this identification will be addressed and any sherds of significant interest to the nature of the domestic life of the workers will be discussed.

One of the foremost objectives of the excavation was to identify any pottery types previously unseen in excavations of Tyneside potteries. Much of the pottery recovered early in the excavation and during the evaluation phase of work was recovered during hand cleaning of the site following machine excavation and therefore is unstratified. These finds are still important in providing information regarding vessel shapes, production methods and decoration types used at the pottery. The unstratified assemblage is not used in quantitative consideration of the site assemblage as a whole, but has been used to identify the evolution of products and place diagnostic sherds broadly within the chronology of the site.

Another major objective of the excavation was to consider the variation in products manufactured at the Skinnerburn/Newcastle Pottery during the changes in ownership between 1736 and 1893. For this, the date ranges of the different ownerships must be considered alongside the final spot dates of the ceramics from particular contexts.

The Pottery Types

The types of pottery within the entire assemblage range in styles from denser utilitarian storage vessels and saggars to more delicate transfer wares and sponge decorated pieces. The pottery manufactured on the site is represented by the discarded or dumped fragments recovered within the assemblage. It is difficult to differentiate which of these sherds are waster fragments and which are not in most contexts. The pottery may have been very successful at manufacturing one product and therefore less wasters of this 'ware' would turn up archaeologically, which has been taken into consideration when identifying the products manufactured at the Skinnerburn/Newcastle Pottery.

Black glazed redwares are the most common fabric found within the entire assemblage; 4588 sherds 70364g and101.25 EVES. Most of this pottery came from a single pit (fill [1146] of pit [1147]), a waster dump containing 4473 sherds (65941g) of black glazed redware (BLGRE) of varying forms; seemingly a misfiring on a large scale. The second most common fabric are sherds in a biscuit fired state comprising 4151 sherds weighing 634.92g and 121.17 EVEs. The remainder of the assemblage considered to be products of the factories were identified by decoration or form. By comparing glazed sherds to those of identical form or decoration in a biscuit state, it was possible to identify whether or not they were being made on site. The majority of these sherds are White glazed earthenwares decorated with transfer-printed designs or sponged decoration.

Smaller quantities of other fabrics such as creamwares, pearlwares and salt-glazed stoneware have been categorised as domestic products consumed by the workers themselves and discarded on site. This is due to their relevant obscurity within the assemblage or their unparalleled decorations.

Kiln furniture was also present in the assemblage in large quantities, with a wide range of form variations.

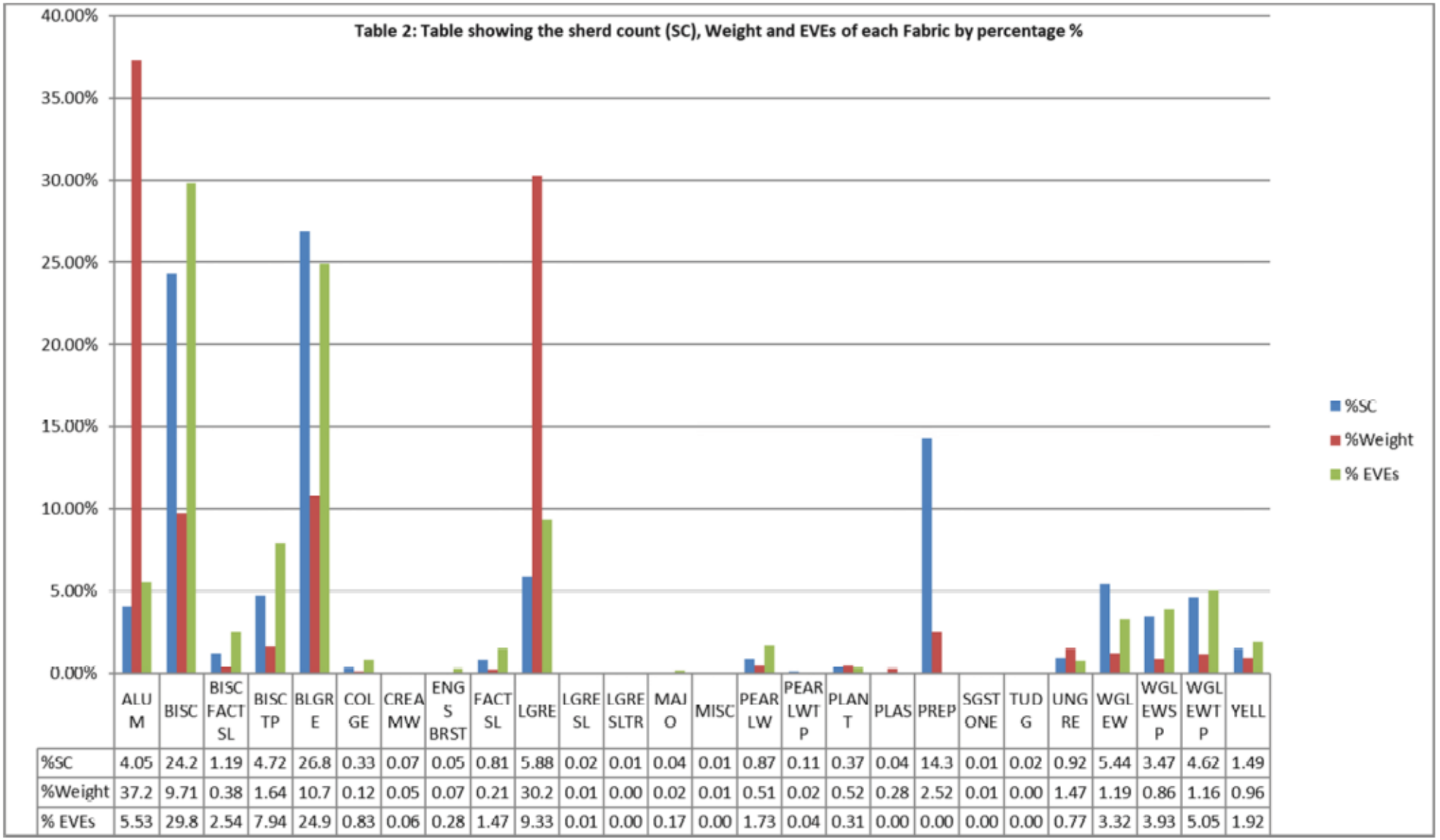
Pottery Fabric	SC (No.)	EVEs	Weight (g)
Aluminium rich ware [Saggars] (ALUM)	691	22.48	243619

Biscuit fired ware (BISC)	4151	121.17	63492
Biscuit fired ware with Factory Slip decoration (BISCFACTSL)	203	10.32	2460
Biscuit fired ware with transfer-print (BISCTP)	805	32.25	10693
Black glazed redware (BLGRE)	4588	101.25	70364
Colour-glazed refined whiteware (COLGE)	57	3.38	797
Creamware (CREAMW)	12	0.26	294
English stoneware with Bristol glaze (ENGS BRST)	8	1.13	449
Industrial/Factory slipware (FACTSL)	139	5.96	1375
Later-glazed redware (LGRE)	1003	37.90	197477
Later-glazed redware with slip (LGRESL)	3	0.06	72
Later-glazed redware with slip trailing (LGRESLTR)	1	0	28
Majolica (MAJO)	7	0.68	159
Miscellaneous unsourced medieval/post-medieval (MISC)	1	0	49
Pearlware (PEARLW)	149	7.03	3330
Pearlware with transfer-print (PEARLWTP)	18	0.17	151
'Plant pot' unglazed redware (PLANT)	63	1.25	3383
Plaster of Paris (PLAS)	3	0	920
Preparatory clay kiln furniture (PREP)	2438	0	16408
Salt-glazed stoneware (SGSTONE)	1	0	75
Reduced Greenware (RG)	3	0	16
Unglazed redware (UNGRE)	157	3.13	9616
White-glazed earthenware (WGLEW)	928	13.47	7760
White-glazed earthenware with sponged decoration (WGLEWSP)	592	15.96	5587
White-glazed earthenware with transfer-print (WGLEWTP)	788	20.53	7578
Yellow ware (YELL)	255	7.80	6267

The quantification of the pottery types by sherd count and EVEs is shown in Table 1.

Table 1: Quantification of pottery types by sherd count (SC) and EVEs for the Skinnerburn/Newcastle Pottery assemblage

Table 2: Table showing the sherd count (SC), Weight and EVEs of each Fabric by percentage %



	ALUM	BISC	BISC FACTSL	BISC TP	BLGRE	COLGE	CREAMW	ENGS BRST	FACTSL	LGRE	LGRESL	LGRESLTR	MAJO	MISC	PEARLW	PEARLWTP	PLANT	PLAS	PREP	SGSTONE	TUDG	UNGRE	WGLEW	WGLEWSP	WGLEWTP	YELL
%SC	4.05	24.2	1.19	4.72	26.8	0.33	0.07	0.05	0.81	5.88	0.02	0.01	0.04	0.01	0.87	0.11	0.37	0.04	14.3	0.01	0.02	0.92	5.44	3.47	4.62	1.49
%Weight	37.2	9.71	0.38	1.64	10.7	0.12	0.05	0.07	0.21	30.2	0.01	0.00	0.02	0.01	0.51	0.02	0.52	0.28	2.52	0.01	0.00	1.47	1.19	0.86	1.16	0.96
% EVEs	5.53	29.8	2.54	7.94	24.9	0.83	0.06	0.28	1.47	9.33	0.01	0.00	0.17	0.00	1.73	0.04	0.31	0.00	0.00	0.00	0.00	0.77	3.32	3.93	5.05	1.92

The Skinnerburn/Newcastle Pottery products

The products manufactured by Skinnerburn/Newcastle Pottery are identified primarily by the sherds found in a biscuit state. These are the easiest to recognise as products as they are unfinished and often have firing faults, hence their disposal. The examples which have had decoration successfully applied and achieved the full glost firing are identified as products by the correlating examples found in the biscuit state (Table 3).

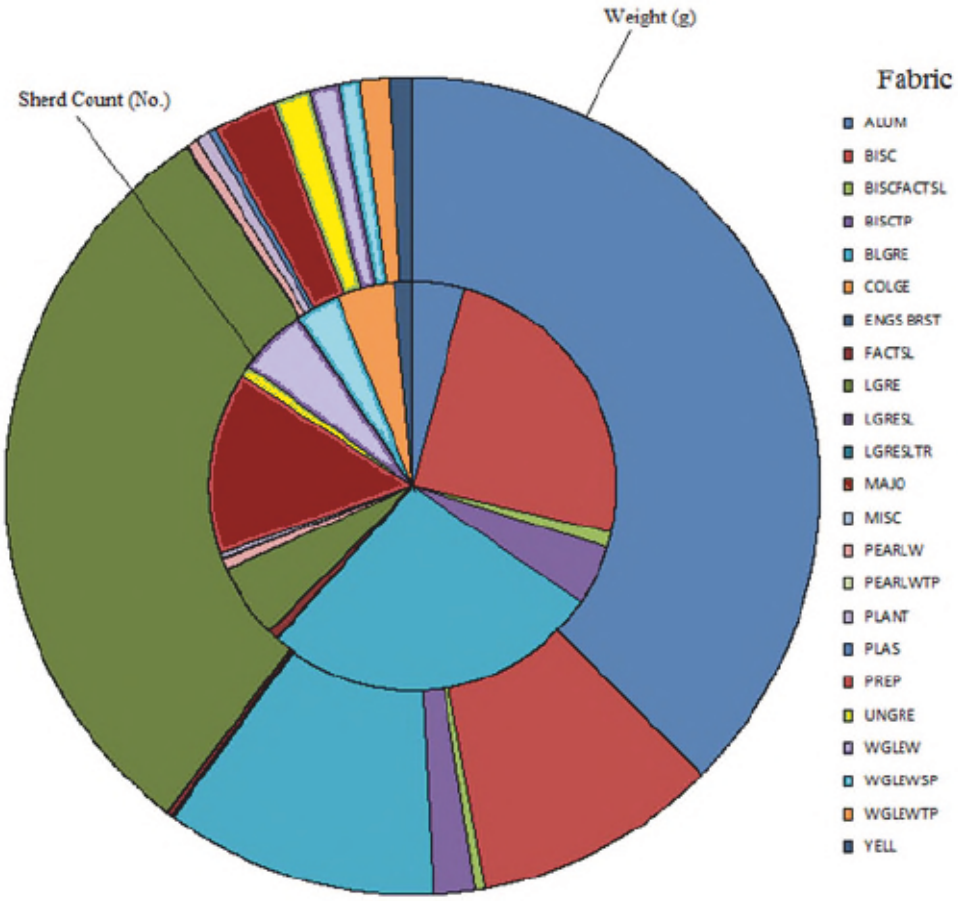


Table 2: Sherd count (SC) and weight of the Skinnerburn/Newcastle Pottery products within the assemblage

Biscuit Wares

The biscuit wares include a wide variety of forms (Table 4) as well as varying transfer and sponged decorations which can be dated primarily after 1840.

The transfer-printed biscuit wares and sherds with factory slip show the range in decorative styles and technologies used on the site spanning the period of production.

The most common forms are standard bowls and plates with the majority undecorated. A small number of sherds show the production of more intricate forms such as the one sherd of a jelly mould and a few breakfast and Bute style cups. The production of decorative teapots on site is also shown in the assemblage by the floral moulded lids with pre-firing perforations, examples of which are also seen in the glost fired white-glazed earthenwares.

One particularly interesting sherd within the biscuit ware assemblage is that of a James Keiller Dundee Marmalade jar (unstratified). This sherd was unglazed with the ink print but no final glost firing, indicating that it was waster. Another sherd of the exact style of James Keiller Dundee Marmalade jar was found in the backfill [1124] of a storage bay within the slip house structures. Both sherds feature oak –leaf, wreath and bow design and must date before 1830. From the 1870s onwards production of the Keiller style marmalade jars was common place at The Maling Factory in Ouseburn with the company producing millions of jars annually for Keiller. This indicates that these jars may also have been produced on site at Skinnerburn/Newcastle Pottery slightly earlier than those produced at the Maling Factory, creating a potential dialogue between the two potteries and their association with the James Keiller Company.

Fabric	Form	Form code	SC (No.)	EVE	Weight (g)
BISC		UNKNOWN	3071	2.39	41952
BISC	Bowl	BOWL	234	22.24	3099
BISC	Carinated bowl	BOWL CARN	1	0.11	58
BISC	Deep bowl	BOWL DEEP	19	2.22	1385
BISC	Bowl flanged	BOWL FL	58	7.87	2433
BISC	Bowl flared	BOWL FLAR	2	0.19	56
BISC	Sugar bowl	BOWL SUG	2	1.75	71
BISC	Chamber pot	CHP	4	0.52	213
BISC	Tea cup	CUP	127	13.75	1178
BISC	Breakfast cup	CUP BREK	4	1.77	166
BISC	Bute style tea cup	CUP BUTE	4	0.60	55
BISC	Dish	DISH	183	15.39	3085
BISC	Flanged dish	DISH FLNG	2	0.16	43
BISC	Meat dish	DISH MEAT	1	0.02	377
BISC	Rectangular dish	DISH RECT	5	0.21	358

BISC	Serving dish	DISH SERV	11	1.49	814
BISC	Food mould	FMOU	1	0.14	133
BISC	Jar	JAR	25	5.16	447
BISC	Cylindrical jar	JAR CYL	15	2.58	304
BISC	Jug	JUG	33	3.49	789
BISC	Tureen lid	LID TURN	1	0.20	30
BISC	Mug	MUG	1	0.08	2
BISC	Cylindrical mug	MUG CYL	5	0.59	73
BISC	Small cylindrical mug	MUG SCYL	1	1.00	225
BISC	Ointment jar	OINT	7	2.10	215
BISC	Plaque	PLAQ	1	0.18	82
BISC	Plate	PLATE	232	22.40	3779
BISC	Rectangular plate	PLATE RECT	1	0.10	18
BISC	Saucer	SAUC	79	8.19	1367
BISC	Tea pot	TPOT	6	3.80	240
BISCFACTSL		UNKNOWN	116	0	1401
BISCFACTSL	Bowl	BOWL	62	5.93	634
BISCFACTSL	Cup	CUP	4	1.38	34
BISCFACTSL	Dish	DISH	1	0.13	14
BISCFACTSL	Egg cup	EGG	1	0.29	15
BISCFACTSL	Jar	JAR	2	0.67	26
BISCFACTSL	Cylindrical jar	JAR CYL	2	0.22	70
BISCFACTSL	Jug	JUG	11	1.26	226
BISCFACTSL	Cylindrical mug	MUG CYL	4	0.44	40
BISCTP		UNKNOWN	430	0.07	5118
BISCTP	Bowl	BOWL	30	5.63	597
BISCTP	Deep bowl	BOWL DEEP	1	0.17	71
BISCTP	Cup	CUP	57	5.39	397
BISCTP	Breakfast cup	CUP BREK	1	0.17	8
BISCTP	Bute style cup	CUP BUTE	2	0.43	45
BISCTP	Dish	DISH	16	1.12	327
BISCTP	Rectangular dish	DISH RECT	3	0	145
BISCTP	Serving dish	DISH SERV	2	0.20	84
BISCTP	Jar	JAR	1	0	49
BISCTP	Cylindrical jar	JAR CYL	2	0	262
BISCTP	Jug	JUG	14	1.27	605
BISCTP	Tureen lid	LID TURN	2	0.07	127
BISCTP	Miscellaneous	MISC	1	0.06	11
BISCTP	Cylindrical mug	MUG CYL	4	0.48	110
BISCTP	Plate	PLATE	188	11.66	2130

BISCTP	Sauce	SAUC	50	5.36	599
BISCTP	Tea pot	TPOT	1	0.17	8

Table 3: Biscuit Wares within the production assemblage

Redwares

Glazed redwares, including black and yellow glazed, and unglazed redwares form the second largest fabric type with 5810 sherds in total making up 34% by count and 43% by weight of the production assemblage (Table 5).

The vast majority of black glazed redwares was recovered from a single deposit [1146] within of pit [1147]. The sherds of BLGRE display an array of firing faults from a matte glaze caused by thin glazing or underfiring, to heavily bloated large sherds with black coring showing poor kiln reduction and overfiring. This indicates that this deposit was made following a particularly problematic firing or perhaps represents a trial period to find out if this was a viable product for the factory to make. There are varying forms within the BLGRE, someone of which have been difficult to identify due to warping or distortion in the kiln.

Redwares with slip decoration

Large utilitarian vessels with slip interior are frequent within the redware assemblage. These vessels have a strong light red/orange fabric, usually unglazed on the exterior with a yellow or brown slip- painted interior. Although many of these vessels are identified as having a vivid yellow slip-coated interior, the slip itself is actually white and only appears yellow through the final glost glaze. The most commonly occurring forms within the redwares are deep or deep flared bowls (BOWL DEEP & BOWL DFRL) with 'yellow' slip interiors. These are typical domestic forms produced throughout the life of the pottery. Some more crude vessels in the forms of cylindrical jars (JAR CYL) and storage jars (JAR ST) are seen in the assemblage and are likely products made for food storage i.e. dripping containers. These vessels found within the assemblage often have stacking scars and poor glaze application due to their intended utilitarian use.

There is also a small number of 'plant pot' unglazed redwares within the assemblage which are all of the same standard plant pot form with a lipped rim and one pre-firing perforation through the base. These may be earlier examples of the plant pots later made by Wallace & Co at the Ouseburn pottery after their move from the Newcastle Pottery in 1893.

Fabric	Form	Form code	SC (No.)	EVE	Weight (g)
BLGRE		UNKNOWN	3550	2.23	56445
BLGRE	Bowl	BOWL	185	15.25	2982
BLGRE	One handled bowl	BOWL 1HND	1	0.20	89
BLGRE	Deep bowl	BOWL DEEP	253	17.36	3984
BLGRE	Deep flared Bowl	BOWL DFRL	186	19.42	3993
BLGRE	Cup	CUP	62	7.69	478
BLGRE	Flared cup	CUP FLAR	331	36.83	2030
BLGRE	Jar	JAR	7	0.78	73
BLGRE	Cylindrical jar	JAR CYL	2	0.44	21
BLGRE	Shouldered jar	JAR SHL	1	0.02	12
BLGRE	Jug	JUG	2	0.28	70
BLGRE	Drinking jug	JUG DJ	3	0.75	105
BLGRE	Miscellaneous	MISC	3	0	39
BLGRE	Tea pot	TPOT	2	0	43
LGRE		UNKNOWN	661	0.05	170908
LGRE	Bottle	BOT	7	4.97	102
LGRE	Upright bottle	BOT UPR	1	1.00	67
LGRE	Bowl	BOWL	68	5.47	3947
LGRE	Deep bowl	BOWL DEEP	138	12.48	12397
LGRE	Deep flared bowl	BOWL DFRL	62	4.44	3712
LGRE	Deep inturned bowl	BOWL DIN	1	0.25	159
LGRE	Deep rounded bowl	BOWL DRN	2	0.33	189
LGRE	Flared bowl	BOWL FL	2	0.15	45
LGRE	Cup	CUP	19	2.15	156
LGRE	Dish	DISH	2	0	39
LGRE	Baking Dish	DISH BAK	3	0.13	203
LGRE	Rounded dish	DISH RND	6	0.45	551
LGRE	Jar	JAR	3	0.42	329
LGRE	Cylindrical Jar	JAR CYL	24	5.23	3576
LGRE	Storage jar	JAR ST	3	0.30	995
PLANT		UNKNOWN	63	1.25	3383
UNGRE		UNKNOWN	125	0.35	7663
UNGRE	Bowl	BOWL	3	0.11	283
UNGRE	Deep bowl	BOWL DEEP	26	2.30	1344
UNGRE	Cylindrical jar	JAR CYL	2	0.37	135
UNGRE	Stopper	STOPP	1	0	191

Table 4: Redwares within the production assemblage

White-Glazed Earthenwares

The white-glazed earthenwares, including those with transfer-printed decoration and sponged decoration, make up 13% of the production assemblage (Table 6) with a total of 2275 sherds weighing 20230g. Those with decoration can be dated more closely depending on the colour and decoration used, however standard blue willow pattern spans the entire production period at the site. Examples of green floral decoration on cups and saucers can be dated after 1840 and sherds with cut sponge decoration can be dated after 1850. One example of a cut sponged decorated vessel found in layer [1198] can be more closely dated to between 1830-1840 due to the style of sponged design on the exterior body. The white glazed earthenwares produced on site have a wide variety of forms. Just as with the biscuit wares, the most prevalent of these forms are bowls and plates both decorated and undecorated. Other dining forms such as tea cups and saucers are frequent within the production assemblage indicating the earlier manufacturing of tea services on site.

The most common decorations on the white glazed earthenwares are the standard blue willow pattern transfer designs, variations on floral or chinoiserie inspired transfers or sponged decorated designs of varying colours and prints. One prominent design was the 'Tyneside Albion' transfer-print [Fig.3] - this is specified as 'Tyneside' due to the difference in the Albion transfer design across the country and in reference books on British post medieval ceramics (Neale 2005, 94). This transfer design is seen on 221 sherds within the assemblage both biscuit fired and on white glazed earthenwares, meaning this particular design was commonly produced on site. Another transfer design of interest was the 'CONCH' design [Fig.4]; featuring a large conch shell surrounded by floral patterns with a Chinese fencing inspired interior border. This transfer is more crudely applied and frequents more in the biscuit fired fabrics than in the white glazed earthenwares. Where it is identified in the glazed sherds the transfer is often blurred in a 'flow blue' effect. It is possible this transfer was being trialled to assess its suitability as a design.

Fabric	Form	Form Code	SC (No.)	EVE	Weight (g)
WGLEW		UNKNOWN	838	1.45	5433
WGLEW	Bowl	BOWL	21	2.34	431
WGLEW	Deep bowl	BOWL DEEP	1	0.06	68
WGLEW	Flared bowl	BOWL FL	5	0.74	177
WGLEW	Tea cup	CUP	4	0.67	64
WGLEW	Dish	DISH	8	0.68	317
WGLEW	Jar	JAR	2	0	66
WGLEW	Cylindrical jar	JAR CYL	3	0.53	56
WGLEW	Jug	JUG	3	0.11	31
WGLEW	Ointment jar	OINT	1	0	46
WGLEW	Plate	PLATE	22	1.65	278
WGLEW	Tea Pot	TPOT	6	3.65	348

WGLEWSP		UNKNOWN	438	0.68	2867
WGLEWSP	Bowl	BOWL	64	6.35	815
WGLEWSP	Flared bowl	BOWL FL	10	1.21	301
WGLEWSP	Chamber Pot	CHP	1	0.12	160
WGLEWSP	Cup	CUP	36	4.33	180
WGLEWSP	Dish	DISH	15	1.26	398
WGLEWSP	Rectangular dish	DISH RECT	2	0	32
WGLEWSP	Jug	JUG	7	0.64	176
WGLEWSP	Ointment jar	OINT	3	0	373
WGLEWSP	Plate	PLATE	16	1.37	285
WGLEWTP		UNKNOWN	562	0.38	2929
WGLEWTP	Bowl	BOWL	15	1.4	338
WGLEWTP	One handled bowl	BOWL 1HND	2	0	86
WGLEWTP	Flared bowl	BOWL FL	3	0.26	65
WGLEWTP	Cup	CUP	24	2.4	159
WGLEWTP	Breakfast tea cup	CUP BREK	3	0.41	89
WGLEWTP	Bute shape tea cup	CUP BUTE	8	1	96
WGLEWTP	Dish	DISH	23	1.81	524
WGLEWTP	Rectangular dish	DISH RECT	2	0	79
WGLEWTP	Soap dish	DISH SOAP	2	0	41
WGLEWTP	Jar	JAR	1	0.19	12
WGLEWTP	Cylindrical jar	JAR CYL	5	0.40	113
WGLEWTP	Jug	JUG	12	1.85	381
WGLEWTP	Lid	LID	1	0.68	39

Table 5: White-Glazed earthenwares within the production assemblage

Pearlware and Yellow ware

Other fabrics produced on site include Pearlware, Pearlware with transfer-printed designs and Yellow wares (Table 8).

There are 155 sherds of pearlware both transfer-printed and undecorated in total weighing 3106g.

There are 255 sherds of Yellow ware weighing 6267g. The majority of the yellow wares came from backfill [1163] inside the slip house structure, deposited when the pottery was demolished. The forms and sizes of the vessels as well as their deposition on site indicate this pottery is probably from the later stages of production after 1850. Although they achieved their final firing, it appears the yellow wares from this backfill [1163] were waster products as some appear to have firing faults such as fused sherd and heavy crazing.

Fabric	Form	Form code	SC (No.)	EVE	Weight (g)
PEARLW		UNKNOWN	92	0.35	1766

PEARLW	Bowl	BOWL	7	0.44	216
PEARLW	Deep bowl	BOWL DEEP	1	0.11	126
PEARLW	Flared bowl	BOWL FL	11	1.19	269
PEARLW	Cup	CUP	6	0.65	28
PEARLW	Dish	DISH	5	0.48	184
PEARLW	Jar	JAR	5	0.69	145
PEARLW	Jug	JUG	1	0.11	40
PEARLW	Miscellaneous	MISC	1	0.12	57
PEARLW	Plate	PLATE	7	0.60	123
PEARLW	Saucer	SAUC	1	0.05	1
PEARLWTP		UNKNOWN	15	0	97
PEARLWTP	Plate	PLATE	3	0.17	54
YELL		UNKNOWN	231	5.87	5536
YELL	Bowl	BOWL	2	0.09	12
YELL	Deep bowl	BOWL DEEP	1	0.17	182
YELL	Deep flared bowl	BOWL DFRL	10	0.85	299
YELL	Flared bowl	BOWL FL	5	0.43	149
YELL	Dish	DISH	4	0.28	58
YELL	Miscellaneous	MISC	2	0.11	31

Table 6: Pearlware and Yellow ware within the production assemblage

Kiln Furniture

The kiln furniture (excluding saggars) was made of a fabric referred to as preparatory clay (PREP). This fabric is a mixture of clay scraps or off-cuts from the same clay used to make the products of the factories, because of this the kiln furniture is grouped with the other products of the factory assemblage (Table 7).

The saggars make up only 4% of the total production assemblage with 691 sherds, however due to the relatively dense and large nature of these vessels they cumulatively weigh 243.6kg making up 37% of the total production assemblage weight.

Several saggars contained 'bitstone' (SAGBIT) on the interior base of the vessel. This 'bitstone' contained crushed quartz pebbles, sand and flint and was added to the aluminium rich saggar fabric to prevent articles affixing in the kiln (Barker 1998, 320). There were few examples within the assemblage of saggars containing pre-firing perforations on the walls excavated from [1264] and from unstratified layers. These perforations are too large and inconsistent to be for the affixation of horizontal bars or pins for glost placing earthenwares (Barker 1998, 335) and are more likely perforations to allow for heat escape or even transferral around the saggars during firings.

The saggars are relatively standardised in size and shape, all approximately 20cm deep with a diameter of roughly 34cm and a thickness of 2cm. The only example on site of an intact saggar was [1251] which saw a whole vessel placed into a pit, cut into the floor of the mixing ark in the slip house. Light grey slip

was noted filling the saggar and the pit cut. This particular saggar has a diameter of 33.5cm, a depth of 21cm and a thickness of 2cm with bitstone on the interior base. The buried saggar was intact until removal and is in very good condition, showing little use in the kiln by the colour of the fabric and the integrity of the bitstone surface.

There were 2438 examples of smaller kiln furniture recovered making up 14% of the production assemblage, weighing 16.4kg There is a wide variety of kiln furniture forms for very specific functions within the kiln. Handmade coils are common in the assemblage, often made of a mix of earthenware and terracotta scraps. Many of these coils have thumb or finger indentations showing how they were handmade for purpose when separating vessels within the kilns or saggars.

Several different forms of handmade separators (SEP) and ridged separators (SEPR) with saggar wall attachments (SEPWA) were also recovered. These pieces had a specific purpose with ridged bodies made to stop vessels and furniture affixing in the kiln during the glost firing of more delicate plates and dishes. Kiln stilts with wedged or 'fishtail' feet were also very frequent and the different forms and sizes represent specific requirements for different firings, with bigger examples made for holding larger serving dishes or plates in the kiln and smaller examples and cockspurs used for separating several smaller plates or saucers within a saggar. There were 70 examples of cockspurs embossed with 'C.F. Patent' and numerical sizing codes were found within the production assemblage indicating they were mass manufactured elsewhere and bought in by the pottery.

The kiln furniture is particularly significant within the assemblage due to the broad range of forms and functions. Further research is recommended on the manufacture and usage of each form type and the preparatory clay used.

Fabric	Form	Form code	SC (No.)	EVE	Weight (g)
ALUM	Saggar	SAG	595	21.97	206498
ALUM	Saggar with bitstone	SAGBIT	96	0.51	37121
PREP		UNKNOWN	1	0	15
PREP	Cockspur	COCKS	144	0	920
PREP	Coils	COIL	1174	0	9212
PREP	Separator	SEP	12	0	168
PREP	Ridged separator	SEPR	29	0	76
PREP	Separator w/wall attachment	SEPWA	5	0	67
PREP	Stilt	STIL	225	0	1412
PREP	Stilts w/ fishtail feet	STILF	96	0	664
PREP	Stilt w/wedged feet	STILW	759	0	3935

Table 7: Kiln furniture within the production assemblage

Slip Casting Moulds

(+) SF 3

247g; 140mm widest diameter, 80mm high.

A heavily abraded and damaged, but near complete plaster mould. It is circular and conical-shaped with a rounded base; about 35% of its rim is present.

(+) SF5

129g; 64x61x35mm.

Fragment of an abraded and rust stained circular plaster mould with a diameter of 120mm and 29% of its rim present. The interior shape suggests a mould for a 'sweet dish' with partitions and wavy edged-rim, *cf.* Bell 1971: 125.

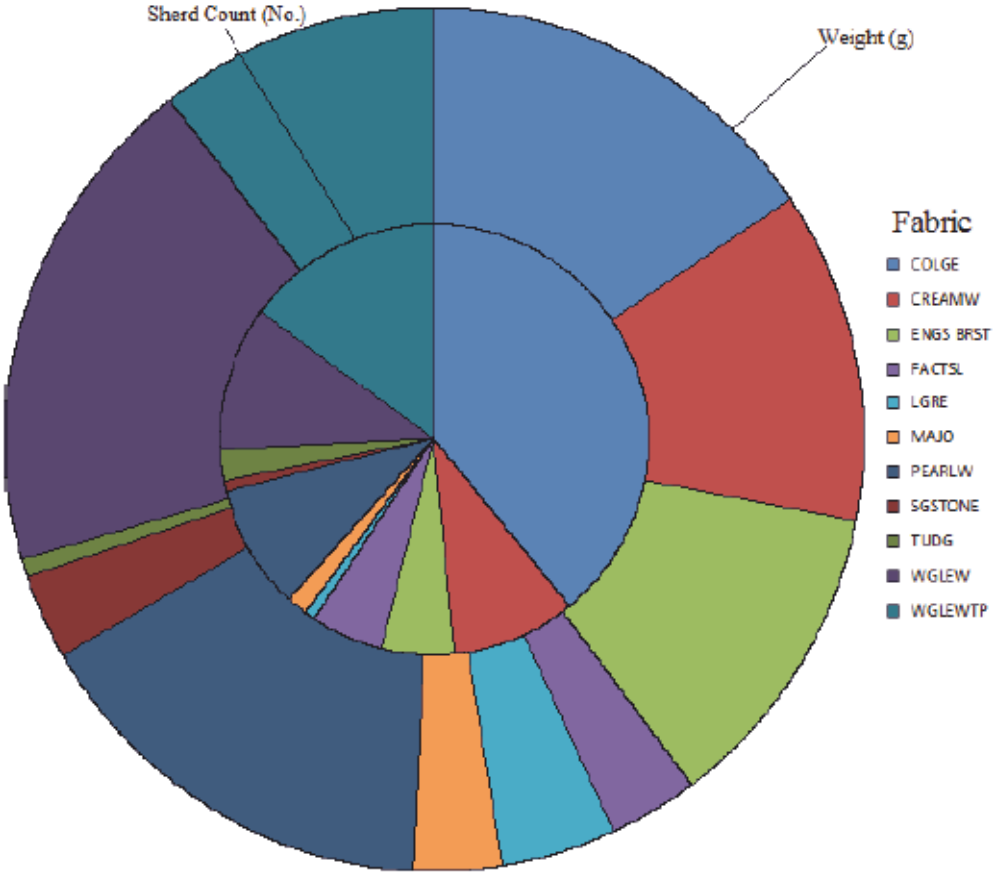
(+) SF 6

544g; 140x92x65mm.

Fragment of a large rectangular plaster mould with rounded corners with a vessel intact.

Domestic Waste Pottery

Domestic waste pottery (136 sherds weighing 2741g) has been identified within the assemblage by sherds which have no associating biscuit ware example or sherds which have decoration that is uncommon to the assemblage (Table 9). The inherent issue in identifying domestic waste ceramics on a production site is that the majority of recovered sherds are likely wasters so in theory any sherd could be considered a product of the site. Sherds of more infrequent fabrics or forms within an assemblage could be argued to be from more successful or perfected firings and therefore produce less waste.



Fabric	Form	Form code	SC (No.)	Weight (g)
COLGE		UNKNOWN	45	220
COLGE	Bowl	BOWL	1	10
COLGE	Flared bowl	BOWL FL	1	14
COLGE	Tea pot	TPOT	3	123
CREAMW		UNKNOWN	9	209
CREAMW	Bowl	BOWL	2	66
CREAMW	Flared bowl	BOWL FL	1	19
ENGS BRST	Bottle	BOT	1	100
ENGS BRST	Cylindrical jar	JAR CYL	6	176
FACTSL		UNKNOWN	6	74
FACTSL	Cup	CUP	1	5
LGRE	Dish	DISH	1	102
MAJO	Jar	JAR	1	43
MAJO	Jug	JUG	1	35
PEARLW		UNKNOWN	2	46
PEARLW	Bowl	BOWL	3	148

PEARLW	Cup	CUP	1	5
PEARLW	Jar	JAR	3	31
PEARLW	Cylindrical jar	JAR CYL	2	37
PEARLW	Ointment jar	OINT	1	108
SGSTONE		UNKNOWN	1	75
WGLEW		UNKNOWN	1	3
WGLEW	Bowl	BOWL	7	105
WGLEW	Flared bowl	BOWL FL	3	165
WGLEW	Cylindrical jar	JAR CYL	1	41
WGLEW	Tureen lid	LID TURN	2	131
WGLEWTP	Bowl	BOWL	2	24
WGLEWTP	Cup	CUP	4	15
WGLEWTP	Bute style tea cup	CUP BUTE	1	16
WGLEWTP	Dish	DISH	5	67
WGLEWTP	Soap dish	DISH SOAP	2	41
WGLEWTP	Jug	JUG	1	12
WGLEWTP	Lid	LID	1	39
WGLEWTP	Plate	PLATE	1	23
WGLEWTP	Saucer	SAUC	2	13

Table 8: The most common forms within the domestic waste assemblage

Coloured-glazed refined whitewares make up 39% of the domestic waste assemblage. These are most commonly sherds with a brown streaky glaze emulating Rockingham type ware (*c.*1800-1900).

The second most common fabric is white-glazed earthenwares and white-glazed earthenwares with transfer-print which comprise 26% of the domestic assemblage in total. Due to the high volumes of 'whiteware' products produced across Tyne & Wear between the 17th and 19th centuries it is difficult to attribute white fabrics to specific production sites. Therefore, several sherds of creamware and pearlware have been identified as domestic waste due to characteristics uncommon to the rest of the Skinnerburn/Newcastle Pottery assemblage such as decoration or form.

There are 12 sherds of Creamware within the assemblage weighing 294g.

Seven sherds of unstratified English stoneware with Bristol glaze are present weighing 276g.

Pearlware is more easily identifiable as domestic waste within the Skinnerburn/Newcastle Pottery assemblage. Due to the small quantity of ointment jars, 'bear grease' style lids and adjoining bottoms and tapered decanter-style bottles, it is easy to identify these forms as domestic rather than products of the works There are 12 sherds of Pearlware in total weighing 375g.

Later-glazed Redwares identified as domestic waste are represented by a single sherd with a brown glazed body and yellow slip trailing design. This sherd is likely to be from a 'Tyneside dish' dating to the *c.* mid-19th century (Bell 1986, 25).

Factory-Slip wares are represented by 7 sherds weighing 79g. The sherds excavated from backfill [1228] are the only examples within the assemblage of brown 'Mocha' decoration on a red and blue banded body.

There are 2 sherds of Majolica weighing 78g both sherds were excavated from fill [1057] and have a brown streaky glaze.

Only one sherd of Salt-Glazed stoneware was recovered unstratified during the cleaning of the site.

Medieval

The only medieval sherds were excavated from the basal fill of a 2m slot through a medieval ditch [1064]. These three sherds (16g) have been identified as 'reduced greenwares' (RG) and date from the 13th to 14th century.

Typologies Discussion

Kiln Furniture

The kiln furniture from the Skinnerburn/Newcastle Pottery shows a definite evolution in the technologies used during firing and stacking processes. This can be seen clearly in the transition from handmade earthenware cockspurs and stilts to mass manufactured cockspurs and stilts featuring embossed details of patents and batch sizes. However, it must be acknowledged that some of the cruder handmade coils do not necessarily indicate earlier dates as they may have been made as one-off pieces to correct stacking issues or placement problems which arose whilst using later made kiln furniture as well.

Figure 1: From left to right; one example of a handmade earthenware coil, one ridged separator used to separate plates within the kiln during glost firings, one separator wall attachment for within saggar walls (with separator still in situ), one biscuit state stilt with wedged feet for plate separation within saggars, one stilt with a 'fishtail' foot to separate deeper vessels such as

dishes, two examples of three legged stilts in different sizes and forms and two examples of cockspurs in different sizes and forms

The kiln furniture was split into the categories handmade Coils (COIL), Cockspurs (COCKS), Stilts (STIL), Stilts with wedged feet (STILW), Stilts with 'fishtail' feet (STILF), Separators (SEP), Separators with ridging (SEPR) and Separator wall attachments (SEPWA) (Figure 1).

The cockspurs range considerably within the assemblage in both size and manufacture (Figure 2). There are 33 examples of small, crude handmade cockspurs some of which had blue glaze residues from glost firing. The remaining 111 cockspurs within the assemblage were later mass manufactured, some of which were embossed with 'Patent' and a numerical sizing code.

Figure 2: Two examples of cockspurs from the Skinnerburn/Newcastle Pottery assemblage with embossed 'Patent' and numerical sizing codes

Stamps & Makers Marks

There are several different stamps, makers' marks and pictorial marks in the assemblage, many of which are identifiable and easily dated.

Anchor pictorial marks

There are 38 sherds with an incised stamp of an anchor on the exterior base. Of these sherds, 35 are biscuit wares and the three are white-glazed earthenwares. The Anchor pictorial stamp is similar to that of Fell & Co of Newcastle upon Tyne who were producing pottery and using the Anchor mark between

1817-1830 (Fisher 1970, 49). The anchor pictorial mark was a popular marking used frequently by potteries in the Tyneside area during the 18th and 19th centuries (Bell 1971, 146).

Flower pictorial marks

There are 22 sherds with an incised stamp of a flower design on the exterior base. Of these sherds, 20 are biscuit wares and two are white-glazed earthenwares. The flower pictorial mark is similar in style to the 1842 Minton Year Cypher (Fisher 1970, 69). It is possible that this stamp is an imitation due to the renowned success of the Minton potteries during the 18th and 19th centuries; however, it is more likely that this print is a simple batch marking from the potter to keep track of production.

Numerical incised stamps

There are three sherds featuring large numerical batch stamps on the exterior base, two of which are biscuit wares and one of which is white-glazed earthenware. The numerical incised stamp likely relates to either a batch coding system used within the pottery or a size standard. One sherd features both the 'Tyneside Albion' transfer design and the numerical stamp '8'; this is the only example of a vessel with this design also featuring a numerical stamp.

Wallace & Co incised stamps

There are 29 sherds with the impressed mark 'Wallace & co' on the exterior base, 28 of which are biscuit wares and one pearlware. This stamp dates to the use of the pottery between 1858-1893.

Wallace & Co transfer-printed ink stamps

There are 18 sherds with a blue ink stamp on the exterior base with the Wallace & Co company name. Of these sherds ten are biscuit wares and eight are white-glazed earthenwares. There are several variations in the design of the ink stamp but the standard design is that of a decorative 'belt loop' design oval. Some sherds have 'Albion' printed within the belt loop to identify the pattern on the interior and one sherd has the partial stamp reading 'FIB...' in the centre of the decorative oval.

Miscellaneous ink stamps

There are three sherds featuring a blue ink stamp reading 'Semi China' on the exterior base, two of which are on white glazed earthenware fabric. One sherd has the 'W&Co' above the central semi-china stamp, likely dating it to the later phase of ownership by Wallace & Co following the renaming to Wallace & Co from James Wallace & Co after 1858. Both white-glazed earthenware sherds are transfer-printed with a deep blue chinoiserie inspired design on the interior. The biscuit ware sherd is slightly different, with a smaller version of the 'semi china' stamp in brown on the exterior base. This sherd (Small Find 14) also had lead pencil notation on the interior.

One sherd of white-glazed earthenware has a partial blue ink stamp on the exterior base that reads 'Pheasants...W&Co'. The W&Co dates this sherd to between 1858-1893. The stamp is likely referring to

the transfer-printed design applied to the interior body of the vessel which was the 'Asiatic Pheasant' design. The same stamp is seen in examples of 'Asiatic Pheasant' printed vessels made by John Carr & Sons at the Low Lights Pottery in North Shields during this period, the only difference being the W&Co logo print.

One sherd of white-glazed earthenware with a brown willow transfer-printed design has a partial ink stamp on the exterior base reading 'Iron Stone China' with a crown and foliate design. The same printed mark on a willow pattern plate is shown in Bell 1971, pg.146 and dates the sherd to the final period of production at the Skinnerburn/Newcastle Pottery between 1838-1893.

One sherd of biscuit ware with a brown foliate transfer design on the interior features a partial brown ink stamp on the exterior base that reads 'J&C' with a knotted roped design and 'FOREST' underneath. This stamp is the only one of this style within the assemblage and resembles the stamp used by R.S&Co (Godden 1980, 165) during the 18th century.

Maling incised stamp

There are eight sherds of a biscuit ware storage jar within the assemblage which are printed on the exterior base with the stamp 'MALING NEWCASTLE'. This vessel is directly attributable to the Maling Factory in Ouseburn who were manufacturing utilitarian vessels of this nature from approximately 1860 onwards.

Firing Faults

Firing faults in the assemblage range from the effects of catastrophic kiln issues such as bloating and black coring caused by poor firing techniques to more minor faults such as stacking scars and glaze crawling. All of these faults create a comprehensive record of the technologies and firing techniques used at the Skinnerburn/Newcastle Pottery through the study of waster sherds (Table 10).

Firing Faults	Firing Faults Description
BC	black coring - black core within fabric due to smoky, reducing kiln conditions and overfiring
BL	bloating - swelling due to expanding gases within a fired piece due to over-rapid firing or overfiring seen as bulges on the vessel surface.
C	cracking
CRA	crazing - fine cracks throughout the glaze due to differences between the degree of contraction of the body and the glaze.
CRL	crawling - bare areas seen on vessel where the molten glaze has retreated.
CS	surface cracking - where the cracks do not pass right through the body and sometimes seen as a characteristic 'S' crack in the base underside, due to differential water content through the ware or the base having been made too thick.
CSP	spiral cracking/dunting - fine cracks along the lines of strain in the vessel following the rotation of the throwing wheel.
CTB	cracking through body - cracks pass right through body of vessel

DIM	dimpling - small dimples in glaze surface due to faulty glaze application, underfiring, etc.
DIS	distortion/warping - due to uneven drying or uneven firing
EN	encrusting - surface encrusted with debris which may indicate that vessel has fallen into fire box
EX	exploded - vessel has broken up or part has blown off e.g. base due to ware being too damp when placed in kiln or fired too rapidly.
F	fused sherd.s
FD	finger dents - from pressing fingers too deeply into wet clay body.
GB	blistered glaze - fine bubbling on glaze surface due to expanding gases from overfiring or over-rapid firing.
GBT	bitty glaze - glaze has particles roughening surface.
GM	matt glaze - the glaze is not shiny due to too thin a glaze coat, underfiring, etc.
GPL	glaze pooling - the glaze forms a thick puddle/pool in base or side of vessel or a pyramidal accretion on the rim
GR	raw glaze - the glaze has not been fired
HDM	handling damage - damage while stacking the kiln e.g. dented end of a handle
LM	laminating - a layer has laminated off
SP	Stacking scars - from other pots in the kiln e.g. bits of other pots adhering.
STR	kiln stacking scars from ring props/trivets

One particularly noteworthy example of firing faults within this assemblage is seen in the pot excavated from fill [1146] of pit [1147]. Matte glazing caused by too thin a glaze coat or under firing was seen in 865 sherds and 44 sherds were bloated or had blistered glaze. Other firing faults were seen such as significant warping or distortion from over firing, heavy bloating to the point of surface cracks and burnt stacking scars.

Decoration

For this assessment, only the most common transfer-prints have been be considered. The most common transfers within the assemblage show the designs most frequently applied to vessels produced at the Skinnerburn/Newcastle Pottery and give insight to the popularity of certain styles and colours during the period of production.

Within the transfer designs, the most common prints are blue willow pattern (469 sherds) and brown or black 'Tyneside Albion' (247 sherds) (Figure 3).

There are 50 sherds with a black 'conch' and floral transfer decoration (Figure 4), a design unfamiliar to Tyneside assemblages. Of the 'conch' transferred sherds, 35 were in a biscuit fabric; it is possible this design was trialled on site which would explain the uncommon design and waster quantity.

Figure 3 'Tyneside Albion' transfer printed design

Figure 4 'Conch' transfer-printed design on a biscuit fired sherd

Sponge decorated wares also make up a large proportion of the decorations found on sherds within the assemblage. 536 sherds of sponge decorated vessels were recovered in total.

Sherds of intrinsic interest

A few sherds within the assemblage have lead pencil notations on the surface (Small Finds 10, 11, 14 & 15), all of which are in a biscuit state and show firing faults or residues. Two of these have numerical notations which could relate to order numbers or quantities for glaze recipes (SF 14 & 15). One sherd with a lead notation on the exterior body of a bowl fragment reads 'Mollett (?) 64 42', which is possibly a glaze recipe.

Figure 4 Small Find 10- Sherd with lead pencil notation

Another notation on the exterior base of a plate reads more clearly as '...T.Plates Cups 10 Saucers 14' with a vertical lead line down the middle (SF 11). This is likely to be an order for production.

Figure 5: Small Find 11- Sherd with lead pencil notation

There were also two sherds within the assemblage that had no identifiable form or function. One sherd is in the biscuit fired state whilst the other appears to have some light blue glazing; whether or not this was intentional or glaze leakage in the kiln during glost firing is unknown. Both sherds had the same shape with smooth edges and a small knob-shaped handle. The sherd in the biscuit state has extensive orange staining and has a handwritten engraving on the top of the handle which appears to be an '&' symbol (Figures 7 and 8). The correlating sherd with glaze also appears to have some handwritten engraving on the 'shoulder' reading 'Short' (Figure 9). It is possible that these fragments were used in the pottery production process due to their unusual shape and handwritten engravings, however further research is needed to identify the definitive function of these pieces.

Figure 6- Unknown sherd in biscuit fired state

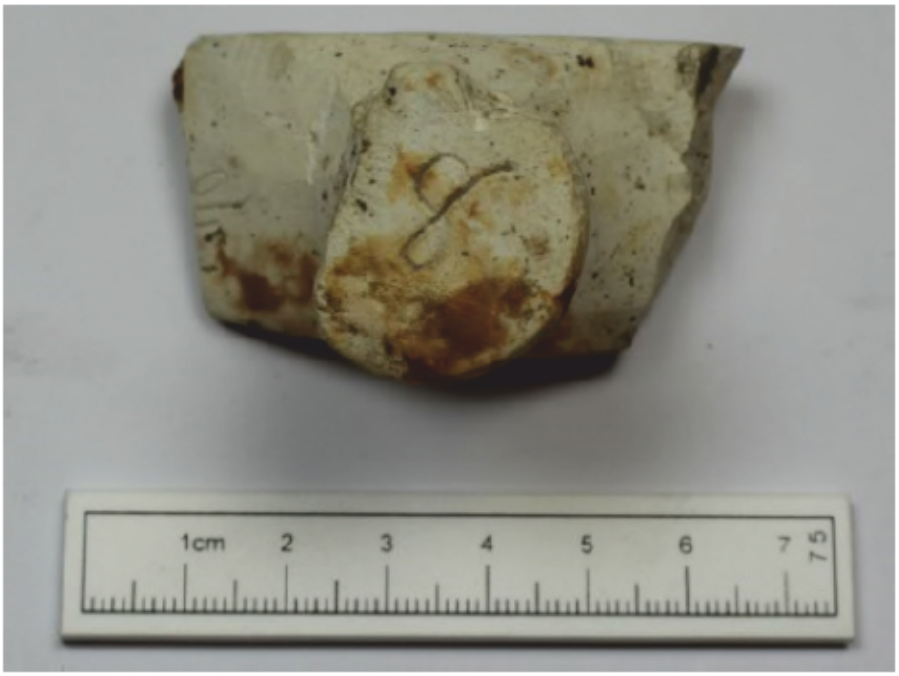


Figure 8 Unknown sherd in biscuit fired state (showing engraving)

Figure 7- Unknown sherd with glaze

Archaeological Phases

Phase 2: Agricultural field boundaries (medieval to early post medieval?)

Phase 2 contexts yielded the smallest amount of pottery excavated within a phase (excluding those within which none was recovered) with a cumulative total of seven sherds. Three of these sherds were identified as 13th-14th century reduced Greenwares with partial oxidisation. The remaining sherds can be considered intrusive in the phase, likely redeposited during the sequence of the Potteries' demolition and constructions between 1700 and 1896.

Phase 4.1-Post Medieval: Newcastle Pottery (c. 1820s)

The Phase 4.1 assemblage is distinctly small with just 127 weighing 15.2kg; the sherds recovered are notably similar in nature to those from 4.2. The pottery within this phase dates broadly to between 1740-1900; however, based on historical documentation and record regarding the potteries on this site this phase can be more tightly dated to between 1736-1893. There were no cyphers, maker's marks or ink stamps on any sherds within this phase, limiting the ability to date the phase more closely.

The Phase 4.1 assemblage included 116 pieces of kiln furniture (including saggars) weighing 6.98kg. Within these are a mixture of handmade, thumbed clay 'slugs' used for quick fixes within the kiln and mass manufactured kiln furniture (e.g. embossed cockspurs and stilts). This kiln furniture does not aid

accurate dating however, as even crude pieces do not necessarily indicate an earlier manufacture due to their 'quick fix' nature.

Phase 4.2-Post Medieval: Backfill of clay extraction pit

The huge quantity of pottery (4886 sherds weighing 302.781kg) recovered from the backfill of the clay extraction pit is almost exclusively attributable to the production on site during the ownership of Wallace & Sons between 1838 and 1893. The majority of the sherds within this phase are in the biscuit fired state (2327 sherds weighing 356.26kg), 49 of which have cyphers, ink marks and incised makers marks which state them specifically to between 1842-1893 (depending on the pictorial marking/Makers mark). Fifteen sherds have the impressed maker's mark of 'Wallace & co.' on the exterior base which specifically dates these sherds to the period of James' Wallace's ownership (1858-1893). The fill which produced the largest assemblage [1237] produced the majority of stamped, incised or marked sherds were recovered; therefore, making this is the most precisely dated context from the excavation. The remainder of the material also indicates that this assemblage is predominantly production waste and refuse from the period of Wallace ownership. 1645 sherds are either saggars (ALUM) or kiln furniture (PREP), weighing in total 926.59kg.

35 sherds feature a black transfer printed design (CONCH) which has been identified as potentially unique to this pottery. This transfer print is most commonly found on biscuit fired sherds with no glost firing, indicating they were perhaps trial designs or wasters.

The remainder of the pottery within this phase are non-specific, common variants of the refined whitewares, creamwares and pearlwares typical of the period and location.

Phase 4.3-Post Medieval: Newcastle Pottery (to 1893)

Phase 4.3 contexts produced a considerably larger assemblage than those in 4.1 and notably similar to that of 4.2. There were 1923 sherds recovered within this phase weighing 103.591kg in total.

Of these sherds, 818 are attributable to production or manufacturing i.e. Biscuit wares, saggars, kiln furniture and plaster of Paris moulds. Particular pieces (such as mould-made, embossed cockspurs and mass manufactured stilts) can be roughly dated to between 1775 – 1840; these dates are consistent with the advancement in kiln furniture technologies in the North East during the 18th century. One of the most interesting finds was [1251] – an intact saggar buried in the base of a mixing ark [1182] and presumably had some function associated with the production, though its precise purpose is unknown. This is the only example of a whole saggar within the Skinnerburn/Newcastle Pottery assemblage and dates to 1700-1893, but is more likely closer to 1765+ due to the well-worn quarts bitstone on the interior base (Barker 1998, 321).

This assemblage also included decorative tablewares which date specifically to 1850 onwards (175 sherds in total weighing 2.648kg), such as the white glazed earthenwares with ranging transfer designs

or sponge decorated earthenwares. These ceramics are likely from the production of refined wares and tablewares under the ownership of James Wallace from 1858 onwards.

The assemblage from this phase compares well with that from Phase 4.2; the ceramics are similar in form, fabric and function as well as date. It is probable that the assemblages from 4.2 and 4.3 yield from disuse in a very similar time scale. The overall date range from this assemblage is between 1805-1893.

Phase 5.1-Demolition of pottery and backfilling (deposition post 1893)

Phase 5.1 produced a large assemblage similar to that of 4.2 and 4.3 with 1229 sherds weighing 64.355kg. This material was deposited when the pottery was demolished, but represents waste production from the factory.

The majority of sherds within this particular assemblage are production wasters or same-fabric fragments dumped together (520 sherds weighing 10.904kg). This is most clearly found in context [1163] which produced a huge quantity of yellow ware (YELL) fragments in one location (177 sherds in total).

White glazed earthenware (WGLEW) sherds also make up a large percentage of the assemblage (252 sherds weighing 4.732kg). Included within these are diagnostic sherds with transfer printed and sponge decoration which indicates that the date range within which this pottery was deposited was 1830-1893. Like Phases 4.2 and 4.3, this assemblage dates to the ownership of Wallace & Co (1838) and then James Wallace (1858+). Several of the transfer printed sherds featuring the 'Wallace & Co' incised stamp have manufacturing faults such as transfer smudging, kiln furniture marks or bloating which links this assemblage directly to production during Wallace & Co's ownership.

Unlike the previous phases, this assemblage has only a very small proportion of kiln furniture (214 sherds weighing 28.173kg). The lack of kiln furniture in favour of 'finished', glost fired sherds indicates that this phase relates primarily to the disuse of finished products rather than the deposition of manufacturing tools and waster pots.

Phase 5.2- Late Post Medieval to Modern (Deposition post 1896 to modern)

Again this material was deposited when the pottery was demolished, but represents waste production from the factory. Although by far the smallest, Phase 5.2 has a particularly interesting assemblage in terms of production waste. There is the largest density of waster sherds and kiln furniture within this assemblage when compared to other phases. In total there are 124 sherds (4.478kg) of which 73 (3.646kg) are production waste, furniture or gear. The fabric dominant in this phase is the preparatory clay used in kiln furniture (PREP) with 38 sherds in total identified as such. This identifies the assemblage from this phase as waste primarily from the production areas. Few of the kiln furniture fragments are later, mass manufactured pieces, most are handmade clay 'slugs' which makes dating difficult as mentioned in above.

This phase can be broadly dated to 1805-1893. The white glazed earthenwares are the most significant as many have datable sponged decoration (WGLEWSP). Sherds with sponged decoration make up the majority of decorative fragments within this assemblage with 34 identified weighing 0.241kg. Sponged decoration (SPON) is commonly recognised as popular after 1840, with cut sponge (SPON1) becoming popular after 1850. This assemblage can be considered closer to 1840-1893 considering the quantity of spongewares present.

Discussion

The pottery excavated at the site ranges in date from 1700-1900 (not including the three sherds of medieval pottery). The majority of fabrics and forms were dated broadly between 1805-1893 when production ceased on site and moved to Ouseburn to continue manufacturing plant pots.

Comparison with other potteries on the Newcastle Quayside and in Ouseburn working during this period would allow for further analysis of the output and technologies used at the Skinnerburn/Newcastle Pottery and would be highly recommended in the further research of this site.

Overall, it appears the Potteries were producing highly decorated table wares and earthenware items for domestic use. The high number of transfer decorated sherds indicates this was the primary technique for decoration and by the far the most popular within this period. Sponge decorated designs were applied to sturdy domestic wares such as jugs and cylindrical jars which were popular vessels in the 18th and 19th century. The high quantity of redwares also shows the Potteries were producing more utilitarian items for domestic use as most forms were identified as deep or deep flared bowls, likely used in everyday food preparation by the consumer.

The redwares and yellow wares could indicate a shift in the market focus and the rising popularity for more uniform, simple designs. However, the transfer-printed vessels remain the most popular and most frequently produced of this period as seen in the waster ceramics, which correlates with the Victorian fashion for highly decorated ceramics.

The site is of considerable regional significance due to the scarcity of excavation on this scale of pottery works in the Tyne and Wear area. The lack of a typology for kiln furniture of North East transfer-printed designs further contributes to the significance this assemblage and provides an opportunity for further research as part of the further analysis leading to publication.

Proposals for further work and publication

- Review the database and consolidate typology, forms and decoration types
- Define which fabrics/forms were attributable to which period of ownership at the Skinnerburn/Newcastle Pottery and formulate a sequence of production
- Define the pottery types and decoration types to create a full typology for the Skinnerburn/Newcastle Pottery products
- Define how quickly the Pottery takes up changes in ceramic technology i.e. the introduction of new potter types, processes and types of kiln furniture
- Create a full typology of the kiln furniture manufactured and used at the Skinnerburn/Newcastle Pottery
- Identify the socio-economic target audience of the Skinnerburn/Newcastle Pottery products
- Identify firing faults and their causes/resolutions spanning the period of production on the site and whether these faults can be attributable to certain kiln technologies
- Determine how the pottery was stacked in the kilns and how the various forms of kiln furniture both mass manufactured and handmade were used within the kilns
- Define the range of makers stamps, pictorial marks and batch codes and their temporal significance
- Define the output of James Keiller Dundee Marmalade jars in the Tyneside region during the period of production at the Skinnerburn/Newcastle Pottery. Consider the impact of their production of jars had to the Keiller company on a whole
- Define any distribution patterns on the Skinnerburn/Newcastle Pottery works of ceramic types, forms, kiln furniture and domestic waste to see if it correlates or adds to the understanding of its layout and re-use over time/differing ownership
- Illustrations of sherds of intrinsic interest

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Context	CCD
1014	1780-1893
1016	1770-1840
1029	1775-1893
1057	1805-1893
1057	1850-1893
1063	1350-1500
1092	1805-1893
1096	1736-1893
1098	1830-1840
1115	1600-1900
1117	1820-1893
1121	1805-1893
1124	1805-1830
1139	1775-1893
1140	1805-1900
1146	1805-1893
1149	1805-1893
1151	1740-1900
1154	1740-1900
1159	1805-1893
1161	1830-1893
1162	1850-1893
1163	1825-1893
1164	1805-1893
1183	1840-1893
1189	1775-1900
1192	1780-1840
1193	1740-1900
1194	1840-1893
1195	1775-1893
1196	1800-1840
1214	1800-1893
1219	1830-1893
1220	1805-1893
1223	1840-1893
1228	1805-1893
1235	1775-1900
1237	1840-1893
1251	1700-1893

1263	1840-1893
1264	1840-1893
1273	1775-1893
1277	1840-1893
1287	1840-1893
1305	1805-1840
1310	1805-1893
1361	1780-1840
1365	1810-1850
1370	1850-1893

Table 9: Spot dates by context

APPENDIX 6: CLAY TOBACCO PIPE ASSESSMENT

By Eniko Hudak

The excavations at Forth Banks/Pottery Lane, Newcastle (FBP16) yielded a very small assemblage of clay tobacco pipes, just nine fragments weighing 52g. All fragments are in a fair condition some showing signs of heavy usage. The pipes were recovered from five individually numbered contexts and three stem fragments were unstratified.

All pipes were recorded in a relational database and were identified with the help of the Tyneside clay tobacco pipe typology as established by Edwards (1987); and Parsons' types (1964) and Atkinson and Oswald's typology (1969) for later items. The pipes were further coded by decoration and quantified by fragment count and weight.

The clay tobacco pipe assemblage from the site comprises three bowls and six stem fragments only one of which was decorated. The pipe bowls range in date between c. 1780-1900, and all show evidence of use. The bowls and the decorated stem are discussed by type below.

Context	Phase	Count	Type	Date
0		3	stems	
1162	5.1	1	P18d	1855-1873
1163	5.1	1	stem	1730-1953
1194	4.3	1	AO33v	1894-1900
1219	5.1	1	stem	1730-1953
1220	4.3	2	P13	1780-1850+

Table 1 – Distribution of clay pipes

P13 – Parsons type 13 (Parsons 1964)

One bowl and one decorated stem fragment could be assigned to this type from context (1220), which is spurred and the mouth of the bowl is parallel to the stem. Both fragments are decorated with fluting/ribbing, and the stem fragment also has some relief geometric design with possibly a Parsons type d makers' mark (*ibid.* 247) dated to after 1840, but none of the letters are visible. The bowl fragment is heavily sooted. This bowl type was originally dated to 1780-1840 by Parsons, and the type also forms part of the Tyneside typology as established by Edwards (1987), but as Vaughan (2007) also notes it is unclear whether the ribbing is part of the definition of this type and suggests an extended date range to 1780-1850s. However, these fragments seem to be residual in Phase 4.3.

P18d – Parsons type 18d (Parsons 1964)

This type is a spur-less briar copy dated to after 1840 by Parsons (*ibid.*). The only example in the assemblage (context (1162)) has side lugs to the front and back of the bowl as well as Parsons type d stamps on the sides of the stem of George Hamilton of Hexham, who was working between 1855 and 1873 (*ibid.* 251). This pipe is also residual.

AO33v – Atkins and Oswald type 33 variant (Atkins and Oswald 1969)

The last bowl in the assemblage seems to be an Irish AO33 (dated 1840+) copy with a more upright bowl and without the milling on the rim, and is broken at the spur (context (1194)). This bowl also bears an ink stamp facing the smoker, which reads 'M. HAILS/ALBION INN/NEWGATE ST/NEWCASTLE-ON-TYNE'. Ink stamps are very rare on clay pipes and normally occur after 1850 (Oswald 1975).

Michael Hails is listed as the innkeeper of the Albion Inn in Ward's Directory of Newcastle upon Tyne for 1898. Kelly's Directory for 1894 and Ward's Directory for 1910 lists different owners of the Albion Inn, therefore the pipe stamp cannot be earlier than 1894 or later than 1910.

Significance and Recommendations

The assemblage contains some interesting fragments, but due to its small size it has little significance. The low number of pipes from the site, however, is noteworthy as it might indicate an informal 'ban' on smoking within the pottery either due to the presence of combustible materials (two fragments were found in the coal store) or reduced productivity. More research and literary evidence is needed to be able to come to a conclusion in this matter if possible. There are no recommendations for further work on the assemblage at this stage, but it is recommended to illustrate the ink-stamped pipe for the publication as it is a rare find.

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APPENDIX 7: BRICK ASSESSMENT

By John Nolan NCAS

Introduction

114 bricks, or fragments of brick, from 47 post-medieval contexts were submitted for cataloguing and assessment. Of these, 53 were fire-bricks, 60 were common or housebricks, and there was one sanitary-ware drain trap. All the material had been washed, dried, and labelled with their context numbers.

The material appears to range in date from the late 18th century to the second half of the 19th century.

Methodology.

The assemblage was examined and catalogued. Dimensions - length, width, and thickness – were recorded (in millimetres) where possible, as was any evidence for manufacture and use. Fragments were not weighed, as experience has shown this is not significantly helpful to identification and dating.

The terms 'upper face', 'lower face', 'sides' and 'header/end faces' are used in the catalogue descriptions. With the common bricks, upper faces are characterised by usually having a 'wiped' or sometimes 'rain-pocked' appearance. The lower faces are generally rougher, often sanded or bearing impressions of straw or grass, and with shallow 'combed' frogs which appear on bricks from the 17th century to the 1840s.

The common brick was compared with examples from dated buildings in NCAS's reference collection, and reference to manufacturer's stamps was sought in secondary sources, principally Brickworks of the North East (Peter J. Davison 1986).

This report summarises the catalogue data, and offers date-ranges for the samples. Suggestions are made for which samples should be retained.

Common bricks.

Dimensions suggest that none are earlier than the very late 18th century, and most belong to the first half of the 19th century. All but two were hand-moulded: there was one possibly pressed brick in context 1097 and another perforated brick in context 1089 with a line of seven irregularly-sized holes down the centre. This may have been for use in a drying floor, though more perforations would be expected for this usage, or possibly as a vent brick. However, some later brick types use vertical perforations as a form of frog

Fire-bricks.

Of the 53 fire-bricks, thirteen were quarls or fragments of quarl (contexts 1126 (2), 1127 (2), 1224, 1227, 1236 (2), 1267 (2), 1268, 1279, 1362), five were side wedges (contexts 1023, 1024,1050 x 2, 1219), two end wedges (contexts 1023, 1344)), and one was a fire-bar (context 1089). Twenty-one had maker's stamps. Most of the stamps belong to manufacturers working in the second half of the 19th century (context and number of samples given in square brackets):

T. Hedley & Bros. Craghead?…& Co. BLAYDON [1126 x 1].

Possibly J. Graham & Co., working at Blaydon Haugh in 1875 (Davison, 131).

T.H… [1024 x 1]

Not firmly identifiable, possibly 'THB' - T. Hedley & Bros, Craghead 1880-1906/08 (Davison, 170, 184), or T.Hardy, Carrs Hill (Davison, 131). A less likely candidate, as the other bricks are relatively 'local', is T. Henderson, Dilston Park,1886-1910 (Davison, 86)

CARGEY & Co. [1210 x 1].

Working at Low Elswick in1869 (Davison, 63, 68).

D & H BLAYDON [1023 x 2].

Possibly the partnership of W. Dodds and W. Harriman, working at Blaydon

1847-57 (Davison, 146).

E & M [1046 x 1; 1065 x 1; 1210 x 1].

The firm of Emerson and Milner were working at Blaydon Burn in 1834 but, as the lettering is bolder and more regularly formed than it is on 'E&M' bricks found at Blaydon Burn, the FBP16 examples are more likely to be products of W. Cochran-Carr, who took over Emerson and Milner's yard at Blaydon in 1850, then worked at Benwell 1869-1934, and who 'inherited' their trademark (Davison 63, 83).

IHR & Co. [1046 x 3].

J.H. Richardson and Company were making fire-bricks at Rabbit Banks, Redheugh, between 1847 and 1858: the Rabbit Banks fire-brick works apparently continued until 1870 (Davison, 132, 133).

M.T.& Co. [1050 x 1; 1060 x 1; 1219 x 2; 1286 x 1].

M. Thompson was making fire-bricks at Ouseburn in 1855, and at Delaval, Scotswood Road, in 1875 (Davison, 67).

STOURBRIDGE [1210 x 2].

This trade-name was used by J. Snowball &

Sons, working at Swalwell and Walbottle, 1875/6-1925. Snowball's Firebrick works at Derwenthaugh apparently continued until 1938 (Davison, 132,133, 136).

T.CARR [1046 x 1].

Thomas Carr is working at Bell's Close between1828-81 or 1834-94 (Davison, 63, 68). Like a number of Tyneside fire-brick makers, Thomas Carr's products had a wide distribution, examples having been found in Santa Cruz, California (http://scplweb.santacruzpl.org).

WALBOTTLE [1046 x 1; 1089 x 1].

Walbottle Firebrick Works, working between 1869-1906, later became Newburn brickworks (Davison, 87).

An un-marked fire-brick fragment (context 1224) was moulded with a U-shaped groove along its side, perhaps intended to interlock with a 'tongue' on another. A broken brick (context 1046) had the paw-print of a small animal, probably a cat, which had trodden on the 'green' brick in the maker's yard.

Sanitary ware.

A large salt-glazed drain trap (context 1344), broken into five pieces, was marked LAMBTON. This was presumably a product of the Firebrick and Sanitary Works, Lambton D Pit, Co. Durham, working *c.*1894-1947, though a Lambton Brick and Sanitary Pipeworks operated at Bournmoor from 1902- 1947 [Davison, 186-1880).

Discussion.

The earliest pottery manufactory in the Forth Banks/Skinnerburn area seems to have been sited close to the Skinner Burn itself. In 1787 a pottery - Skinner Burn Pottery,- was being worked by George Spearman & Co. This too appears to have been in the Skinner Burn ravine (the eastern part of the development site), as the western part of the site was still open fields in 1788 (Beilby). By 1802 however a complex of pottery works buildings had developed there, and this survived until 1893 (Phoenix Consulting, 23; Bell, 27).

Map evidence for the expansion of the Skinner Burn Pottery into the field west of the Skinner Burn ravine between 1788 and 1802 fits comfortably with the suggested earliest date for the samples of common bricks given above. The works' buildings appear to have been fully developed by the late 1850s, which may account for the paucity of later 19th-century common bricks in the assemblage. Most of the fire-bricks however are post-1850 in date, which possibly reflects the need to regularly renew the kiln linings. Perhaps the latest sample was the drain-trap, which may belong to the post-1893 re-use of the former pottery premises.

A number of samples showed heavily vitrified residues indicative of subjection to high temperatures as kiln linings [1046,1073,1166, 1210,1326,1362]. Other samples, less directly exposed to heat, were discoloured or sooted. While some of these heat-damaged bricks were clearly found as part of kiln structures, others seem to have been re-used as walling or flooring material. The presence of lime mortar on broken faces is evidence for workplace economies in recycling building materials.

Recommendations (retention/disposal).

None of the common brick or un-marked fire-brick is worth retention, unless any can be firmly assigned to construction of a structure of known date. Of the stamped fire-brick, provided good quality, close-up, record photographs and dimensional data are included in the site archive there seems little justification in retaining the actual bricks. Examples with the most complete brick stamps could however be offered to a regional museum collection (e.g. Beamish).

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Context	L	W	Th.	%	Form	Description	Stamp	Maker
1005	225	110	70	whole	house	dark red, mortar traces all but one end and side		
1006	220	110	70	whole	house	dark red, overfired, no mortar traces		
1020	220	110	62	whole	house	dark red, lime mortar lower face.		
1020	225	110	70	whole	house	mid-dark red, shallow combed frog. No traces of mortar		
1023	235	115	65/52	whole	firebrick	end-wedge, purple discolouration one side	D & H BLAYDON	?Dodds and Harriman, Blaydon 1847-57?
1023	220	110	60/50	whole	firebrick	side-wedge, very clean pale yellow	D & H BLAYDON	?Dodds and Harriman, Blaydon 1847-57?
1023	225	115	67	whole	firebrick	dark orange-brown, absolutely clean!		
1024	0	116	60/45	half	firebrick	side-wedge,mortar all sides, purple vitrified residues on widest side	T.H....	?T.Hedley & Bros, Craghead 1880-1906/08?
1024		115	63	half	firebrick	very discoloured mortar traces on faces and one side		
1029	225	115	65	whole	house	dark red, shallow combed frog, no mortar traces		
1032	225	103	65	whole	house	dark red, shallow combed frog, no mortar traces		
1034	0	113	80	threequarter	house	dark red, shallow combed frog, 'rainpocked' upper face, No mortar		
1034	0	115	65	half	firebrick	heat-reddened, no mortar		
1036	c.220	116	65	3quarter	house	shallow combed frog, mortar traces all faces. Two frags		
1037	225	110	65	whole	house	light. red, some mortar all faces		
1041	225	110	65	whole	house	mortar traces all but one side		
1042	225	110	65	whole	house	dark red, shallow combed frog, mortar traces all except one side and		
1046		116	65	half	firebrick	mortar traces all but one side which has purple vitrified residues	(E) & M	?Emerson & Milner, 1834; Cochran Carr, Blaydon 1850-?, Benwell, 1869-1934
1046	235	115	65		firebrick	one end of upper face roughly bevelled, one side dark heat discolouration. Two frags	T.CARR	Bells Close, 1828-81 or 1834-94 (D, 63, 68)
1046	0	110	63	threequarter	firebrick	no obvious mortar	IHR & (Co)	J.H.Richardson & Co, Redheugh 1847-58
1046	0	110	65	threequarter	firebrick	broken end heat discoloured/sooted	IHR & Co.	J.H.Richardson & Co, Redheugh 1847-58
1046	0	0	65	frag	firebrick	mortar traces all but one face/side which has purple vitrified residues	IHR (&Co)	J.H.Richardson & Co, Redheugh 1847-58
1046	0	110	65	threequarter	firebrick	mortar both faces, broken end discoloured/sooted	WALBOTT(LE)	Walbottle Firebrick Wks 1869-1906
1046	0	110	60	threequarter	firebrick	pawprint |(cat?) one side, mortar traces both faces, broken end heat-		
1046	0	0	65	frag	firebrick	no measurable dimensions. Severe heat damage one face/side with purplish residues. 5 frags		
1050	227	115	63-43	whole	firebrick	side wedge, some heat discolouration, no trace of mortar	M.T & Co.	M, Thompson & Co, Ouseburn & Scotswood Rd.
1050	0	115	63-43	threequarter	firebrick	side wedge, some heat discolouration, no trace of mortar		
1060	0	112	60	threequarter	firebrick	some mortar traces	M.T & Co.	M, Thompson & Co, Ouseburn & Scotswood Rd.
1060	230	115	65	whole	house	dark red, shallow combed frog, some coarse discoloured mortar lower		
1060	230	112	62	whole	firebrick	lime mortar upper face, sides and ends, lower face heavy purple		
1065	0	112	63	frag	firebrick	broken both ends, mortar all but one side which is sooted-flue lining?	E & M	Emerson & Milner 1834+, or?Cochran Carr, Benwell, 1850+
1065	215	115	65	whole	house	dark red, shallow combed frog, traces of mortar on sides		
1073	0	110	c.60	half	firebrick	mortar traces, heavy purplish residues on one side. 2 frags.		
1073	0	115	0	frag	firebrick	one face worn/trimmed to form a wedge		
1076	220	110	65	whole	house	mid-red, shallow combed frog, mortar traces lower face and one side, mould marks		
1079	230	115	65	whole	house	dark red, mortar traces all but one side		
1080	225	110	65	whole	house	dark red, mortar on all but ends. 2 frags.		
1082	225	110	65	whole	house	mortar all faces showing traces of header/stretcher		
1089	240	70	60	whole	firebrick	'firebar', some mortar	WALBOTTLE	Walbottle Firebrick Wks 1869-1906
1089	220	110	73	whole	house	dark red, 7 holes (10-15mm dia.) from face to face, mould-marks both sides, mortar one face, sides and ends		
1097	220	115	80	whole	house	dark red, mortar all but one side, press-moulded?		
1126	230	115	60	whole	firebrick	one side discoloured and worn, no obvious. mortar traces		
1126	230	110	64	whole	firebrick	one side heat discoloured, no obvious mortar		
1126	0	115	65	half	firebrick	one side heat discoloured, mortar traces one face	...& C0. BLAYDON	?J. Graham & Co. Blaydon Haugh 1875?
1126	0	115	65	half	firebrick	one face worn to a bevel at surviving end, mortar traces on surviving		
1126	220	110	65	whole	house	mid-red, mortar traces all but one side.		
1126	0	0	67	frag	firebrick	quarl, mortar traces on both faces and edges -reused		
1126	0	110	65	half	firebrick	dark red, mortar all faces except one side which is discoloured		
1126	0	0	60	frag	firebrick	quarl, heat discolouration, mortar traces both faces and one side		
1127	0	0	55	frag	firebrick	quarl, discoloured on broken edges, no obvious mortar traces		
1127	0	115	68	half	firebrick	heavy heat discolouration one face – from kiln floor?		

Context	L	W	Th.	%	Form	Description	Stamp	Maker
1127	0	0	55	frag	firebrick	quarl, heavy vitrified and discoloured residues on one face – from kiln		
1128	220	116	70	whole	house	dark red, mortar traces all over		
1129	230	115	65	whole	house	dark red, mortar traces all faces		
1166	0	110	60	frag	firebrick	mortar sides and ends, purplish vitrified residues one face, the other		
1166	0	105	75	half	house	dark red, shallow combed frog, mortar both faces and end		
1182	225	110	60	whole	house	dark red, mortar all but one side		
1210	230	110	63	whole	firebrick	some mortar both faces and ends, one side has vitrified mortary	E & M	Emerson & Milner 1834+ or Cochran Carr, Benwell 1850-
1210	230	110	63	whole	firebrick	some heat discolouration, mortar traces one side and one face, other side slightly sooted		
1210	237	115	62	whole	firebrick	traces mortar one face and end, one side heat discolouration	STOURBRIDGE	J. Snowball & Sons, Swalwell/Walbottle, 1875-1925
1210	237	115	62	whole	firebrick	traces mortar one face and end, one side heat discolouration	STOURBRIDGE	J. Snowball & Sons, Swalwell/Walbottle, 1875-1925
1210	233	115	60	whole	firebrick	one corner chipped, no mortar traces	CARGEY & Co.	
1217	230	110	68	whole	house	mid-red, shallow combed frog, mortar traces lower face and one side		
1219	0	110	60/45	half	firebrick	side wedge. Very clean	M.T &….	M. Thompson & Co, Ouseburn 1855 & Scotswood Rd.1873
1219	0	116	60	threequarter	firebrick	some mortar on lower face, one side has heavy purple	M.T.& CO.	M. Thompson & Co, Ouseburn 1855 & Scotswood Rd.1873
1224	225	110	65	whole	house	dark red, mortar on all but one side		
1224	0	0	70	frag	firebrick	quarl? One side has moulded U-groove, mortar all faces, incl broken		
1227	235	110	65	whole	firebrick	?quarl - very abraded/rounded one side. Possibly set on edge in		
1227	0	115	62	half	house	dark red, pale yellow wash, some mortar upper face. 2 frags		
1236	235	0	65	frag	firebrick	quarl, broken, heavy vitrified residues one face, mortar traces on lower face and broken edges		
1236	0	0	60	frag	firebrick	?quarl, large dark fe.(?) inclusions		
1258	0	115	65	threequarter	firebrick	heat discolouration/vitrified residues one face, mortar all but one side, mortar on broken end		
1258	230	113	60	whole	house	dark red, mortar on all but one end		
1261	230	115	75	whole	house	dark red, lower face gritted, no obvious mortar traces		
1267	0	250	60	frag	firebrick	quarl, heat discolouration, mortar on lower face, some vitrified residues on upper – from kiln floor?		
1267	c.220	0	55	frag	firebrick	quarl. Heavily heat discoloured. 6 frags		
1268	0	0	0	frag	firebrick	quarl? Very abraded. No measurable dimensions		
1279	0	115	60	half	firebrick	mortar traces one end and side, other end has purple vitrified residues with mortar overlying – reused material		
1279	0	0	60	frag	firebrick	quarl, mortar traces on face and broken edges -reused		
1283	223	110	67	whole	house	dark red, shallow combed frog, mortar traces except on one side and end, and over chipping on end		
1286	0	110	65	half	firebrick		(M.)T & Co.	M. Thompson & Co, Ouseburn 1855 & Scotswood Rd. 1873
1304	220	110	60	whole	house	dark red, upper face worn - flooring brick? No obvious motar traces		
1309	218	110	65	whole	house	dark red, wiped upper face, mortar on lower face, ends, and one side		
1321	225	110	65	whole	house	dark red, shallow combed frog, mortar both faces and one end, traces of header/stretcher bond		
1326	0	115	110	threequarter	firebrick	heavy vitrified deposit one end, some mortar other faces showing impressions of a header/stretcher bond		
1344	435	435	95		trap	brown salt-glazed trap surround in five pieces	LAMBTON	Firebrick & Sanitary Pipe Wks, D Pit, 1894-1947
1362	225	115	70	whole	house	one of two bricks fused together, thick vitrified residues one side, other faces mortared		
1362	0	0	53	frag	firebrick	quarl, one of two stretcher bricks fused together, thick vitrified residues one side, other faces mortared		
1362	225	110	65	whole	house	dark red, shallow combed frog, mortar traces on all but one side, which		

APPENDIX 8: SPECIFICATION FOR STRIP AND RECORD EXCAVATION AT FORTH BANKS/POTTERY LANE

Tyne and Wear Archaeology Service

Specification for Strip and Record Archaeological Excavation at Forth Banks/Pottery Lane, Newcastle upon Tyne

Planning Application: 2015/0315/01/DET

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Date: 29th November 2016

County Archaeologist's Reference Number: MON13345

The Tyne and Wear Specialist Conservation Team is the curatorial service for archaeology and industrial archaeology throughout the Tyne and Wear districts. It helps and advises Newcastle, Gateshead, North Tyneside, South Tyneside and Sunderland Councils to carry out their statutory duties to care for the precious historic environment of Tyneside and Wearside. The Team can be found at the Housing, Planning and Transport Division of the Environment & Regeneration Directorate of

Newcastle City Council

Introduction

Site grid reference: NZ 2459 6351

Planning permission has been granted for a 7 and 9 storey residential development on the above site.

An archaeological desk based assessment has been produced (Phoenix Consulting Archaeological Consultancy, April 2015).

The appointed archaeologist **must** familiarise themselves with the results of the assessment before starting work.

The south-west part of the site was occupied by a pottery from the 18th century. This was destroyed by fire in 1758.

In 1787 the Skinner Burn Pottery was in operation. In 1862 it is recorded as The Newcastle Pottery. It was demolished between 1879 and 1896. A small length of stone wall on Cookson's Lane may relate to the pottery.

The other industrial archaeological feature within the site is Skinnerburn Foundry or Iron Works. This was in operation from at least 1830. In 1899 the buildings were largely re-built for Robert Henzell's Northern Oil Company, where oil was stored, blended and distributed. Part of the site was taken over by the Co-operative Wholesale Society Ltd who used it for the storage of cattle. The eastern side of the warehouse was converted into offices sometime after 1927 and later still used for residential accommodation.

Preliminary evaluation trenching (Pre-Construct Archaeology Ltd) in November 2016 revealed limited remains of Skinnerburn Foundry in trench 1. However considerable remains of the Skinner Burn Pottery were recorded in trenches 2 and 3, including a brick tank in the pottery slip house with a timber base, truncated pottery kilns, a brick culvert and various walls and floor surfaces. Finds include a substantial amount of pottery sherds, wasters and kiln furniture. Beneath the post medieval deposits, a couple of ditches of probable medieval date were recorded.

Further archaeological work required:

No further archaeological work is required on the site of the iron works (north-east of Cookson's Lane).

Further archaeological excavation is required on the site of the pottery (south-west of Cookson's Lane). The whole site of the pottery site needs to be carefully stripped of topsoil and modern overburden under strict archaeological supervision.

Once this is done, surviving archaeological remains will be hand cleaned, recorded and part excavated.

The archaeological excavation is now required in accordance with paragraph 141 of the National Planning Policy Framework, Core Strategy Policies CS15 and UC14 and saved UDP policies C4.2 and C4.3.

Research Aims and Objectives

The excavation report should make reference to Regional and Thematic Research Frameworks.

'Shared Visions: The North-East Regional Research Framework for the Historic Environment' by David Petts with Christopher Gerrard, 2006 notes the importance of research as a vital element of development-led archaeological work. It sets out key research priorities for all periods of the past allowing commercial contractors to demonstrate how their fieldwork relates to wider regional and national priorities for the study of archaeology and the historic environment. The aim of NERRF is to ensure that all fieldwork is carried out in a secure research context and that commercial contractors ensure that their investigations ask the right questions.

See http://www.algao.org.uk/Association/England/Regions/ResFwks.htm

'Frontiers of Knowledge' edited by Matthew FA Symonds and David JP Mason 2010 is the Research Framework for Hadrian's Wall, part of the Frontiers of the Roman Empire World Heritage Site. The aim of the publication is to assess the existing knowledge base for our understanding of the monument, to identify and prioritise key themes for future research and to set out a strategy and action plan by which the initial set of objectives might be achieved.

For the English Heritage Research Agenda see http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/

Where appropriate note any similar nationwide projects using ADS, internet search engines, ALSF website, HEEP website, OASIS, NMR excavation index.

All staff on site must understand the project aims and methodologies.

Methods statement for strip and record

In order to aid the storage of spoil, the site will be archaeologically excavated in two halves.

The modern overburden will be carefully removed by machine under constant archaeological supervision.

The location of visible archaeological features will be recorded by plan using a total station.

Preliminary hand-cleaning will indicate the industrial structures and below ground archaeological features suitable for further hand cleaning, recording and sample excavation, further informed by discussions with the County Archaeology Officer and Don O'Meara, Scientific Advisor for Historic England.

This will be followed by a programme of selected or targeted excavation. A programme of palaeo-environmental sampling will also be undertaken, with a view to undertaking targeted analysis of the samples.

The work will excavate, record and environmentally sample the archaeological deposits of importance found on the plot.

The aim of the excavation is to ascertain the nature, character, function, degree of survival and date of the archaeological features.

The significance of the site in relationship/comparison to potteries of similar date should be examined, and the results of the fieldwork within the wider research context.

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

The work will be undertaken according to Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide, Project Planning Notes and Technical Guides 2006 (www.english-heritage.org.uk/publications).

All work must be carried out in compliance with the codes of practice of the Chartered Institute for Field Archaeologists and must follow the CIfA Standard and Guidance for Archaeological Excavation.
www.archaeologists.net

Notification

The County Archaeology Officer needs to know when archaeological fieldwork is taking place in Tyne and Wear so that she can inform the local planning authority and can visit the site to monitor the work in progress. The Archaeological Contractor must therefore inform the CAO of the start and end dates of the Evaluation. He must also keep the CAO informed as to progress on the site. The CAO must be informed of the degree of archaeological survival and of any significant finds. The Client will give the CAO reasonable access to the development to undertake monitoring.

PROJECT INITIATION

PROJECT DESIGN

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

HEALTH AND SAFETY AND RISK ASSESSMENT

A health and safety statement and risk assessment, identifying potential risks in a risk log (see template in appendix 2 of The MoRPHE Project Manager's Guide) and specifying suitable countermeasures and contingencies, is required to be submitted to the commissioning client.

See appendix 1 for more information.

PROJECT EXECUTION

The area of strip and record is shown on the accompanying plan.

The excavation area must be accurately surveyed prior to excavation and tied in to the national grid.

The location and extent of archaeological features will be accurately recorded by scale plan using a total station.

Targeted areas will then be selected for excavation in consultation with the County Archaeology Officer and Don O'Meara, Scientific Advisor for Historic England.

All upstanding walls and structures will be drawn and photographed. The size of the bricks will be measured and a note made of the type of mortar.
Outline elevation drawings will be produced for brick walls but both plans and elevations should identify specific features such as arches, culverts, blocked openings, location of flues, changes in fabric etc. Stone walls may warrant stone-by-stone drawings.

Brick-by-brick drawings should be produced of features such as kilns, arched openings, furnaces and any other detailed feature.

Buried deposits and ground level or buried industrial features will be recorded (plan and photograph) and sample excavated.

Any ditches will require at least one section to be excavated across them.

Features over 0.5m in diameter can be half sectioned.

Kilns should be fully excavated.

Pottery, wasters and kiln furniture should be collected for specialist assessment.

Industrial samples should be undertaken where the potential for waste and other industrial residues exists.

Bricks and firebricks need to be recorded and samples collected for assessment by a specialist. In addition samples of brick will be taken from all the upstanding structures. Examples of each type will be included in the site archive or offered to Beamish Museum once the post-ex process is finished and the publication completed.

Any grinding stones, if feasible (depending on their size and weight), should be offered to the Great North Museum as part of the site archive, or Beamish Museum if the GNM won't take them.

The excavation must avoid known services.

The archaeologists must stay a safe distance away from any pylons and overhead power lines.

The excavation areas should be excavated to the depth of natural subsoil.

Tasks

Hand excavation, recording and environmental sampling (as stipulated below) of deposits down to the depth specified above.

Excavation is to be carried out by single context planning and recorded on *pro forma* context sheets.

Environmental sampling (and where relevant scientific dating) are compulsory parts of the excavation exercise. All tenders will give a price for the assessment, full analysis, report production and publication per environmental and scientific dating sample as a contingency.

Samples will be taken of bricks from any brick-built structures. The dimensions of the bricks and the type of bonding must be recorded.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with "Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2003. Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, English Heritage Regional Advisor for Archaeological Science (jacqui.huntley@english-heritage.org.uk or 07713 400387) **before** the evaluation begins. See Appendix 1 for more information.

See Appendix 2 for guidance on procedures relating to human remains.

See Appendix 4 for guidance on Treasure Act procedures.

Recording

A full written, drawn (accurate scale plans, elevations and section drawings) and photographic record (of all contexts in **either** black and white print and colour transparency **or** with a digital camera) will be made. All images must include a clearly visible graduated metric scale.

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

Use of digital cameras

Use a camera of 10 megapixels or more.

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

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

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

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

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

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

Post photography processing:

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

Post photography processing workflow for RAW images:

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

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

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

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

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

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

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

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

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

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

For more guidance on digital photography:

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

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

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

IFA, Guidance on the use and preservation of digital photographs

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

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

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

Printing the images:

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

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

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

A **full set** of images will also be professionally printed in black and white and colour for submission as part of the site archive.

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

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

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

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

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

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

Plans and drawings

The finished report must include a plan and section of each trench (even where no archaeological remains are recorded) plus plans and sections through excavated archaeological features.

The plans will include at least two site grid points and will show section line end points.

The plans will depict building material (i.e. brick and stone) where a complex of structures has been found.

Where there is a complex of interlocking multi-phased structures, a phasing plan will also be included.

There will be elevation drawings of any standing structures such as walls.

Pro-forma context sheets will be used.

All deposits and the base of the trench will be levelled. Levels will be expressed as metres above Ordnance Datum.

Stratigraphy shall be recorded even when no archaeological features have been recognised.

A 'Harris' matrix will be compiled where stratified deposits are recorded.

2) Post-excavation and report production

Finds Processing and Storage

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

Finds shall be recorded and processed in accordance with the CIfA Guidelines for Finds Work (2008)

Finds will be assessed by an experienced finds specialist.

Finds will be assessed by an experienced finds specialist. Specifically, the finds assessment will refer to analogous finds, or assemblages of similar material, from the Tyne and Wear and North-East region.

The most relevant Historic England guidance for finds treatment are 'Investigative Conservation', (English Heritage 2008a), Waterlogged Organic Artefacts (English Heritage 2012), and "Waterlogged Wood" (English Heritage 2010).

Human and animal bone assemblages should be assessed by a recognised specialist (see Appendices 2 and 3 for more information).

Industrial slag and metal working debris will be assessed by a specialist.

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

Brick (including all ceramic building material) dimensions will be measured, a note made of the bonding material, and any other pertinent details such as makers stamps.

Finds processing, storage and conservation methods must be broadly in line with current practice, as exemplified by the CIfA "Standard and guidance for the collection, documentation, conservation and research of archaeological materials", 2001. Finds should be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication "First Aid for Finds" (Watkinson and Neal 1998). Proposals for ultimate storage of finds should follow the UKIC publication "Guidelines for the Preparation of Excavation Archives for Long-term Storage" (Walker 1990). Details of methodologies may be requested from the Archaeological Contractor.

In some cases provision must also be made for the scientific analysis of artefacts. This can include, but not be limited to:

1. Pottery: Luminescence dating (English Heritage 2008b), lipid analysis, thin section analysis, ICPS (Inductively-coupled plasma spectroscopy)
2. Ceramics (brick, tile, structural ceramics): Luminescence dating (English Heritage 2008b)
3. Metal objects: XRF analysis, x-raying of finds (English Heritage 2006).

Advice can be sought from Don O'Meara of Historic England where necessary. It is advisable to discuss potential scientific analysis at all stages of the project to allow for clear planning and understanding between the contractor, the client, and the local authority archaeologist.

All objects must be stored in appropriate materials and conditions to ensure minimal deterioration. Advice can be sought from Don O'Meara of Historic England where necessary.

PRODUCTS

The report

1. The Archaeological Contractor must produce an interim report of 200 words minimum, **two weeks after the completion of the field-work**, for the Client and the Planning Authority, with a copy for information to the County Archaeologist. This will contain the recommendations for any further work needed on site.

2. The production of Site Archives and Finds Analysis will be undertaken according to Management of Research Projects in the Historic Environment (MoRPHE) 2006.

3. A full archive report or post-excavation assessment, with the following features should be produced **within six months of the completion of the field-work**. All drawn work should be to publication standard. The report must include:

* Location plans of trenches and grid reference of site
* Site narrative – interpretative, structural and stratigraphic history of the site
* Plans showing major features and deposit spreads, by phase, and section locations
* Sections of the two main trench axes and through excavated features with levels
* Elevation drawings of walls etc.
* Artefact reports – full text, descriptions and illustrations of finds
* Tables and matrices summarising feature and artefact sequences.
* Archive descriptions of contexts, grouped by phase (not for publication)
* Deposit sequence summary (for publication/deposition)
* Colour photographs of trenches and of archaeological features and finds
* Laboratory reports and summaries of dating and environmental data, with collection methodology.
* A consideration of the results of the field-work within the wider research context (ref. NERRF).
* Recommendations for further work on site, or further analysis of finds or environmental samples
* Copy of this specification

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

- for deposition in the County HER at the address on the first page.

Three digital copies (pdf of the report on CD) must be submitted:

- one for the commissioning client

- one for the planning authority (Newcastle City Council) – this must be formally submitted by the developer to the planning department with the appropriate fee.

- one for deposition in the County HER at the address below. This CD will also include all of the digital images as TIFFs and the accompanying metadata.

The report and CD for the HER must be sent by the archaeological consultant or their client directly to the address below. If the report is sent via the planning department, every page of the report will be stamped with the planning application number which ruins the illustrations. The HER is also often sent a photocopy instead of a bound colour original which is unacceptable.

Publication

The results will warrant publication in a suitable archaeological journal. The tender should therefore include an estimated figure for the production of a short report of, for example 30 pages, in a journal such as Archaeologia Aeliana (current price per page is £50). This is merely to give the commissioning client an indication of potential costs.

Before preparing a paper for publication, the archaeological contractor must discuss the scope, length and suitable journal with the County Archaeology Officer.

Archive Preparation and Dissemination

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

The site archive (records and materials recovered) should be prepared in accordance with:

- "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation" (Brown 2011)
- "Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives" (CIfA 2014).

Documentary Archive

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

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

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

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

Do not fold documents

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

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

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

Do not ink over original pencil drawings.

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

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

Store documents flat

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

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

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

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

Material Archive

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

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

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

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

The archive should include all environmental remains recovered from samples or by hand, all vertebrae remains not used for destructive analysis, environmental remains extracted from specialist samples (such as pollen preparations in silicone oil).

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

Use tie-on rot-proof labels where necessary

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

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

Use permanent ink on bags and labels

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

The archive will be placed in a suitable form in the appropriate museum (Great North Museum).

Contact Keeper of Archaeology, Andrew Parkin at the Great North Museum (0191 222 6765). a.r.parkin@ncl.ac.uk

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

Digital Archive

Copy of the report on CD as a pdf plus all of the digital images as TIFFs.

See MoRPHE Technical Guide 1 – Digital Archiving & Digital Dissemination 2006.

Archaeology Data Service
The digital archive including the image files can, if the appointed archaeologist and commissioning client choose to, be deposited with the ADS (The Archaeology Data Service) which archives, disseminates and catalogues high quality digital resources of long-term interest to archaeologists. The ADS will evaluate datasets before accepting them to maintain rigorous standards (see the ADS Collections Policy). The ADS charge a fee for digital archiving of development-led projects. For this reason deposition of the images with the ADS is optional.

Archaeology Data Service
Department of Archaeology
University of York
King's Manor
York
YO1 7EP
01904 433 954 Web: http://ads.ahds.ac.uk

SIGNPOSTING

OASIS

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

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

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

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

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

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

The tender

Tenders for the work should contain the following:-

1. Brief details of the staff employed and their relevant experience
2. Details of any sub-contractors employed
3. A quotation of cost, broken down into the following categories:-
    * Costs for the excavation, incl. sub-headings of staff costs on a person-day basis, transport, materials, and plant etc.
    * Post-excavation costs, incl. storage materials
    * Cost of Environmental analysis and scientific dating per sample
    * Estimated cost for full publication of results in an archaeological journal
    * Overheads
4. An indication of the required notification period (from agreement to start date) for the field-work; the duration of fieldwork and the expected date for completion of the post-excavation work (a maximum of 6 months after completion of the fieldwork)

APPENDICES

1 Health and safety and insurance
2 Ecology and biodiversity
3 Environmental sampling and scientific analysis
4 Scientific Dating
5 Specific types of sampling
6 Animal bone
7 Human remains
8 Treasure

APPENDIX ONE

HEALTH AND SAFETY AND INSURANCE

A health and safety statement and risk assessment, identifying potential risks in a risk log (see template in appendix 2 of The MoRPHE Project Manager's Guide) and specifying suitable countermeasures and contingencies, is required to be submitted to the commissioning client.

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

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

The Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide 2016 contains general guidance on Risk management (Appendix 2).

Risk assessments must be produced in line with legislative requirements (for example the Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and the Personal Protective Equipment at Work Regulations 2002) and best practice e.g. as set out in the FAME (Federation of Archaeological Managers & Employers) formerly SCAUM (Standing Conference on Archaeological Unit Managers) Health and Safety Manual
www.famearchaeology.co.uk

The Risk Assessment will identify what PPE (hard hats, glasses/goggles, steel toe cap and instep boots, gloves, high-viz clothing etc) is required.

Other potentially applicable legislation:

Working at Heights Regulations 2005, Manual Handling 1992

'Safe use of ladders and stepladders: An employers' guide' HSE Books 2005

Some archaeological work (such as those that are scheduled to last more than 30 days and have more than 20 workers working simultaneously at any point in the project, or exceed 500 person days) may be deemed notifiable projects under Construction Design and Management Regulations 2015.
Where C.D.M Regs apply, the HSE must be notified before work begins.
http://www.legislation.gov.uk/uksi/2015/51/contents/made

Detailed information on hazards and how to carry out a risk assessment can be obtained from the Health and Safety Executive (www.hse.gov.uk) and the local authority health and safety department.

Specific guidance for land contamination and archaeology can be obtained from the Institute for Archaeologists (www.archaeologists.net), the Construction Industry Research and Information Association (www.contaminated-land.org) and the Association of Geotechnical and Geoenvironmental Specialists (www.ags.org.uk).

See also the joint English Heritage and Environment Agency document "Guidance on Assessing the Risk Posed by Land Contamination and its Remediation on Archaeological Resource Management" (English Heritage and Environment Agency 2005).

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

The Archaeological Contractor must detail measures taken to ensure the safe conduct of excavations, and must consult with the client's structural engineers concerning working in close proximity to the foundations of the surrounding buildings.

Excavation trenches should:

- Be protected from vehicles and guarded off for pedestrians
- not have steep sides or must be shored
- have good access and egress

The archaeologists must not work near overhead power lines.

Underground services can be easily damaged during excavation work. If proper precautions are not taken, it is all too easy for workers to hit these services resulting in a risk of

- heat, flame and molten metal from electric cables
- escaping gas from gas pipes
- flooding of the excavation when a water pipe is damaged
- interruption of services

Excavation work in the public highway, kerbside or pavement can only be undertaken by those with a Street Works certificate of competence. Before the excavation takes place the person supervising the digging must have been given service plans and be trained in how to read them. All persons involved in the excavation must know about safe digging practice and emergency procedures. A locator must be used to trace the line of any pipe or cable or to confirm that there are no pipes or cables in the way. The ground will be marked accordingly. There must be an emergency plan to deal with damage to cables and pipes.

APPENDIX TWO

ECOLOGY AND BIODIVERSITY

The commissioning client will advise of any ecological or biodiversity issues which need to be taken into consideration, such as

- the presence of Japanese Knotweed (see below), Himalayan Balsam and Giant Hogweed (invasive plants which must not be disturbed by digging)
- The presence of Dingy Skipper Butterflies, Great Crested Newts, Slow Worms, Adder and Common Lizards
- The presence of species rich grasslands
- Ground nesting birds may be present in nesting season (March to August)
- Designated sites – Local Wildlife Sites, Sites of Local Conservation Interest and Sites of Special Scientific Interest
- The presence of protected trees or trees which are to be retained within the development (see below)

Japanese Knotweed, Himalayan Balsam, Giant Hogweed
Trenches must avoid these plants (it is the commissioning client's responsibility to advise their archaeologist if they are present on the site).
Japanese knotweed was introduced into Britain in the 19th century as an ornamental plant. Over time it has become widespread in a range of habitats, including roadsides, riverbanks and derelict buildings. It out-competes native plants and animals and is now classed as an invasive species. It spreads through its crown, rhizome (underground stem) and stem segments, rather than its seeds. The weed can grow a metre in a month and can grow through concrete and tarmac, damaging buildings and roads. Studies have shown that a 1cm section of rhizome can produce a new plant in 10 days. Rhizome segments can remain dormant in soil for twenty years before producing new plants.

In the UK there are two main pieces of legislation that cover Japanese Knotweed. These are:

Wildlife and Countryside Act 1981
Listed under Schedule 9, Section 14 of the Act, it is an offence to plant or otherwise cause the species to grow in the wild. This lists over 30 plants including Japanese knotweed, giant hogweed and parrot's feather. An offence under the Wildlife and Countryside Act can result in a criminal prosecution.

Environmental Protection Act 1990
Japanese Knotweed is classed as 'controlled waste' and as such must be disposed of safely at a licensed landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991. Soil containing rhizome material can be regarded as contaminated and, if taken off a site, must be disposed of at a suitably licensed landfill site and buried to a depth of at least 5 m. An infringement under the Environmental Protection Act can result in enforcement action being

taken by the Environment Agency which can result in an unlimited fine. You can also be held liable for costs incurred from the spread of Knotweed into adjacent properties and for the disposal of infested soil off site during development which later leads to the spread of Knotweed onto another site.

See also the Environment Agency 'Japanese Knotweed Code of Practice'.

It's down to landowners to control these plants, but they don't have to remove them. However, causing the plants to spread by removing or disposing of them incorrectly [i.e. disturbing them through archaeological excavation] would be illegal {info taken from www.environment-agency.gov.uk and www.devon.gov.uk}.

Trees
The commissioning client will advise their appointed archaeologist of any protected trees which must be avoided by the evaluation. Damage to trees covered by a Tree Protection Order carries a substantial fine. Where there are protected trees within a site, or unprotected trees which are to be retained within a development, the developer's arboriculturalist must install Herras fencing before the evaluation begins to protect the root protection areas (which may be larger than the canopy of the tree) in accordance with BS5837:2012. The local authority landscape and ecology officer may wish to visit the site to check that the fencing has been erected in the right place.

APPENDIX THREE

ENVIRONMENTAL SAMPLING AND SCIENTIFIC ANALYSIS

This is a compulsory part of the archaeological work.

The environmental remains are identified as an element of the historic record as important as the physical remains of buildings, or of manmade artefacts. In this way the adequate recognition of the importance of these remains on an archaeological site is as important as the other elements of the recording process. It is also acknowledged that the manner in which this is applied to commercial or research projects needs to be undertaken in the spirit of the government National Planning Policy Framework and be: relevant, proportionate and fit for purpose. This balances the needs of development, with a consideration of the importance of the archaeological remains in the context of the historic environment more generally.

Aims of environmental sampling: to determine the nature, presence or absence of environmental material, and to determine the abundance and concentration of this material. It is then to interpret these elements within the overall context of the archaeological remains. The questions that can be asked of these remains are often site or period specific and analysis should consider regional research frameworks, and regional reviews of environmental evidence when interpreting remains.

Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Don O'Meara, Historic England Advisor for Archaeological Science (don.o'meara@historicengland.org.uk) **before** the evaluation begins. The sampling strategy should include a reasoned justification for selection of deposits for sampling and in this way contacting the Science Advisor allows a clear and proportionate plan to be agreed at an early stage.

The primary document to consider when undertaking environmental sampling is the Historic England guidance 'Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post excavation' (English Heritage 2011b), though a number of supplementary documents (detailed below) provide further detailed advice.

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

The choice of material for assessment should be demonstrated as adequate to address the objectives. Evaluations and assessment of environmental material should provide clear statements of their potential and significance in addition to descriptive records. These statements should relate to the original objectives but may also lead to new or modified objectives.

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

Archive reports should include full data from all specialist materials. All reports, including any publications, must present sufficient primary data to support the conclusions drawn.

Types of sample

Before work commences the contractor should detail the types of material they intend to sample for and why, as well as the material they will not be sampling for. This will largely be determined by local preservation conditions and can be determined by consulting the best practice guidelines (English Heritage 2011, 6-8).

Therefore consideration should be given to issues such as:

1. Is there likely to be waterlogging on the site e.g. near Newcastle-Gateshead Quayside, within the urban centre, on sites with deep stratigraphy
2. Is the site on an acidic or basic drift geology; this will affect the preservation of material such as pollen, molluscs, animal and human bone

Bulk samples for flotation
These are used to recover charred and mineral-replaced plant remains, small bones, industrial residues etc. Such samples should be whole earth, 40-60 litres or 100% of small features. The geological sieve used to capture the flot/washover should be 0.25-0.3mm. The residue sieve size should be 0.5-1mm.

Waterlogged Samples:
These samples contain a high proportion of organic material and are more typically recovered during urban excavations, though consideration must also be given that deep features on any archaeological site may show evidence of waterlogging. These samples are typically smaller than those for bulk flotation, but must also be processed using specialist methods.

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

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

Aims and objectives

The primary objective of environmental archaeology is to inform the archaeologist further on aspects of the site by either supporting the conclusions made on-site, or suggesting new aspects which can be considered when the environmental remains are analysed. The aim is to present this in a format which can be interpreted by the client, and other stakeholders in the project (Local Authority, Historic England, other researchers). Finally, the role of the post-excavation work is to archive

pertinent remains to allow for the potential of future scientific work and analysis. In this manner the environmental archaeology allows the developer to adequately address the guidelines for heritage assets as set out in the National Planning Policy Framework where it outlines that local authorities "should also require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible" (NPPF 2012, paragraph 141).

All tenders will give a price for the assessment, full analysis, report production and publication per sample.

As a standard the full sample must be assessed by the laboratory, not just a small sub-sample, e.g. 10 litres of a 40 litre sample. This acknowledges that the sample is itself only a small part of a greater whole, and to only process a small portion of the sample would be to subsample the archaeological feature further (English Heritage 2011, 33). Alterations to this advice can be discussed with either the County Archaeologist or the Regional Science advisor in the context of the overall project aims.

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

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

Historic England guidelines encourage question driven archaeological research, and therefore if you feel alternative sampling or analysis would be better applied to an archaeological site this can be discussed with the Historic England Regional Science Advisor.

APPENDIX FOUR
SCIENTIFIC DATING

This is a compulsory part of the archaeological work, where it is relevant.

Deposits will be assessed for their potential for radiocarbon, archaeomagnetic and luminescence dating. Guidelines have been produced for a number of these techniques such as Archaeomagnetic Dating (English Heritage 2006a), Luminescence dating (English Heritage 2008b), and Dendrochronology (English Heritage 1998).

For large excavations, particularly of prehistoric sites, a specialist scientific dating consultant must be part of the post-excavation assessment team. The need for this provision will be discussed with the client, county archaeologist, and the contractor during the excavation phase when the size and significance of the remains are fully revealed. They will ensure that money set aside for dating is well spent, that the most appropriate samples are submitted for dating, that the right number of samples are submitted for dating. The Historic England Science Advisor for the North-East, as well as the Historic England Scientific Dating team can provide contact details for scientific dating experts (contact Alex Bayliss Alex.Bayliss@historicengland.org.uk).

APPENDIX FIVE
SPECIFIC TYPES OF SAMPLES

Pollen

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

Forams and diatoms

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

Insects

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

Industrial Activity

Where there is evidence for industrial activity, macroscopic technological residues (such as slags) can be collected by hand. Separate samples should be collected for micro-slags (hammer-scale and spherical droplets). Guidance should be sought from the Historic England Regional Science Adviser on the sampling strategy for industrial features and advice on cleaning and packaging. As advised in Historic England guidelines (Historic England 2015b), the potential volume of material that can be produced on such sites means a careful sampling strategy is needed to ensure only relevant volumes of pertinent material is collected. Specialist on-site advice must be sought on identification of metalworking features. Slag and metal

working debris must be assessed by a specialist and depending on the significance of the remains provision should be made for adequate scientific analysis of the remains, including chemical or physical analysis, and the x-raying of material (English Heritage 2006b; Historic England 2015b).

Specialist advice can also be sought during the creation of the site archive to ensure an adequate volume of material is retains within the archive, while also ensuring excessive amounts of material are not retained. The key guidance for these remains is 'Archaeometallurgy' (Historic England 2015b). Work at metal production sites of all periods should also consider the Historical Metallurgy Society's research framework (2008).

Other industrial processes which should be considered include glass working and pottery production as both of these industries are prominently in the history and archaeology of the Tyne and Wear region. Guidelines for identifying and analysing glass remains have been published (English Heritage 2011a), as well as guidelines for pottery production sites (Historic England 2015a). In tandem with these guidelines when working on post-medieval sites the guidance 'Science for Historic Industries: Guidelines for the investigation of 17th to 19th century industries' (English Heritage, 2006d) should be consulted.

Buried soils and sediments

Buried soils and sediment sequences should be inspected and recorded on site by a recognised geoarchaeologist. Procedures and techniques in the Historic England guidelines "Environmental Archaeology" (English Heritage 2011) and "Geoarchaeology", (Historic England 2015d) should be followed.

Wood

Sampling strategies for wooden structures should follow the methodologies presented in "Waterlogged wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood" (English Heritage 2010). Considerations should also be given to the Historic England Document "Waterlogged Organic Artefacts", (English Heritage 2012). If timbers are likely to be present on your site, contact a wood specialist beforehand. Pre-excavation planning will determine questions to ask, agree on a sampling strategy, allocate reasonable time and budget.

Recording of wood should follow guidelines which use standard measurements and terminology (see English Heritage 2010, 7-20) when recording plans, photographs, size and orientation of the wood (radial, tangential,transverse), toolmarks, joints, presence of bark, insect damage, recent breaks, and relationship to other wood or timbers from the site.

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

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

Leather and organic materials

Waterlogged organic materials should be dealt with following recommendations: "Waterlogged Organic Artefacts – Guidelines on their Recovery, Analysis and Conservation", (English Heritage 2012). It should be noted that the earlier publication "Guidelines for the care of waterlogged archaeological leather", (English Heritage and Archaeological Leather Group 1995), has been superseded by the English Heritage 2012 guidance.

Glass

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

Specialist analysis can reveal the origin of the raw materials, recycling of glass, glass working technology, and origins of imported glass. Local examples of the potential of glass analysis can be seen in material analysed from the Roman excavations at Binchester, Co. Durham (Paynter 2004), as well as window glass examined from Belsay House, Northumberland (Dungworth and Harrison 2011).

APPENDIX SIX
ANIMAL BONE

The analysis of animal bones from archaeological sites has great potential to provide information on a variety of scales. These can range from the context level interpretation, to site wide, local, regional and international issues (English Heritage 2014, 3). Their analysis can explore themes such as hunting and fowling, fishing, plant use, trade networks, seasonality, diet, butchery, animal husbandry, food procurement, age structures, farrowing areas, species ratios, and local environment. However, at these varieties of scales it is recognised that the importance of the remains does not rest solely on the size of the assemblage.

Animal bone assemblages should be assessed by a recognised specialist. The purpose and scope of the assessment should be clearly outlined as per best practice guidelines (English Heritage 2014, 18). In many cases, particularly for evaluation exercises, the material may not be examined beyond the assessment stage, however the assessment must present in a clear and informative manner the pertinent information relating to the assemblage. The format outlined in Historic England guidelines (English Heritage 2014, Table 4) is presented as the standard which should be adhered to.

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

Fish and Bird bone

Though coming under the overall treatment of animal bone the bones of fish and birds are often rarer due to their more delicate nature, requiring higher levels of preservation. However, because of this in cases where fish bones are well preserved this should be treated with a high priority (English Heritage 2011, 30-31). Because fish bones are so small, particularly freshwater and estuarine species, they are often only recovered in large bulk samples. Samples must always be sieved with an appropriate sized sieving mesh. An example of the questions that can be asked of suitable assemblages can be seen from the material from Fenwick's Entry (Nicholson 1988).

Both the guidelines "Environmental Archaeology" (English Heritage 2011) and "Animal Bones and Archaeology" (English Heritage 2014) can be consulted for sampling of these remains. Dated assemblages of fish bones should be archived to museums for future dating and isotope analysis where this is not undertaken as part of the post-excavation process.

Rescue excavations carried out in the 1970s at the Iron Age hillfort of Broxmouth in East Lothian produced an assemblage of fish bone. Recent analysis of this material has proved the presence of large specimens of ling and other species which suggests that the Broxmouth population carried out deep-sea fishing. It has previously been suggested that Iron Age fishing would only have been undertaken by lines from the shore. It has also been suggested that fish was not consumed in Iron Age Britain due to religious or cosmological reasons {Hannah Russ, Ian Armit, Jo McKenzie, Andrew Jones, 2012, Deep-sea fishing in the Iron Age? New evidence from Broxmouth hillfort, South-east Scotland in Environmental Archaeology, Vol 17, Number 2, pp 177-184).

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

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

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

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

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

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

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

Acidic soils mean poor preservation of bone.

See English Heritage 2011, "Environmental Archaeology – a guide to the theory and practice of methods from sampling and recovery to post excavation", Centre of Archaeology Guideline 1.

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

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

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

APPENDIX SEVEN
HUMAN REMAINS

Human remains must be treated with care, dignity and respect. It must also be acknowledged that in archaeological terms the human skeleton is particularly 'information rich' and therefore is treated as a special archaeological deposit in its own right. Some of the potential benefits from the study of human skeletons include understanding demography, growth profiles, patterns of disease, genetic relationships, activity patterns, diet, burial practices, human evolution.

The expectations of the scope for post-excavation analysis will be discussed by the client, contractor, County Archaeologist, and the Historic England Science Advisor during all phases of the project. This will ensure all stakeholders in the project understand their responsibilities and expectations. It is important to emphasise that this includes the excavation, assessment, analysis (including scientific analysis), and long-term storage or reburial of the remains.

An important element when determining a project design is to consider the preservation conditions. Therefore, when evaluating a burial site consideration should be made as to whether waterlogging may be present at the lower stratigraphic layers. Excavators should consider carefully the implications for this based on information provided to them: DBA's, evaluation reports, geotechnical reports etc.

Excavation needs to consider whether the human remains fall under secular law, or ecclesiastical law, particularly in cases where the legal effects of consecration may have been removed from a cemetery, in the case of Christian burial grounds. If in doubt as to the status of a particular burial ground Joseph Elders of the Church of England is a point of contact of archaeological matters: joseph.elders@churchofengland.org

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

The excavation area must be shielded from public view with screens, and all staff, including supervisors and field staff must be aware of the ethical considerations around the treatment of human remains (English Heritage 2005),

The excavation of human remains is a delicate and time consuming operation. The process can take one or two days per skeleton. If the skeleton cannot be excavated all in one day cover it with plastic sheeting overnight to prevent it from drying out and cracking. This damage could lead to damage to the bone which would hinder further analysis. The remains should be excavated as completely as possible to give the osteoarchaeologist the maximum amount of data.

An osteoarchaeologist should be employed for any burial excavation from the start of the project.

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

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

Sampling strategies need to consider elements of the skeleton which might be missed during excavation. This includes:

- The area around the skull: to recover all teeth, as well as calcified cartilage around the neck, and the hyoid bone
- The area around the hands and feet: to recover smaller phalanges, as well as sesamoid bones.
- The sediment around the lower abdomen: to recover kidney stones, or gall bladder stones.

Particular care should be taken when lifting the skull and pelvis due to their importance for aging and sexing an individual. In addition, when sampling the lower abdomen it should be borne in mind that foetal bones may be present in the cases of women who died during childbirth. Where long bones (radius, ulna, humerus, femur, tibia, fibula) are observed to be particularly delicate the excavator should bag each bone separately.

In cases where waterlogging may be present the county archaeologist and the Historic England Science Advisor should be informed as waterlogging will have implications both for the recovery of artefactual material, as well as health and safety considerations.

It is important to remember that the whole assemblage of bones from the skeleton is important for a holistic examination of age, sex, disease, diet etc. Therefore though a number of key bones are used for the main points of analysis, the excavator must consider that different bones impart different types of information.

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

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

Analysis of the osteological material should take place according to published guidelines "Human Bones from Archaeological Sites (English Heritage 2004). In the event of destructive analysis being undertaken the Historic Guidance 'Science

and the Dead' should be consulted before sampling takes place (Historic England 2013).

In light of guidelines approved by the Ministry of Justice and Historic England (English Heritage 2005), the analysis of the remains to fully understand the life experience of the individual being exhumed should be considered part of the process of properly respecting the dead. This analysis can include, where appropriate, scientific analysis such as DNA and stable isotope analysis.

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

Some of the potential benefits from the study of human skeletons – demography, growth profiles, patterns of disease, genetic relationships, activity patterns, diet, burial practices, human evolution. New scientific techniques available include DNA and stable isotope analyses.

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

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

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

AMS can now be used to date cremated bone.

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

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

Health & Safety associated with human remains:

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

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

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

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

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

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

Working with human remains may cause psychological stress and this should be considered in the risk assessment.

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

APPENDIX EIGHT
TREASURE

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

Summary Definition of Treasure (Portable Antiquities Scheme www.finds.org.uk)

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

- Any metallic object, other than a coin, provided that at least 10 per cent by weight of metal is precious metal (that is, gold or silver) and that it is at least 300 years old when found. If the object is of prehistoric date it will be Treasure provided any part of it is precious metal.
- Any group of two or more metallic objects of any composition of prehistoric date that come from the same find (see below)
- Two or more coins from the same find provided they are at least 300 years old when found and contain 10 per cent gold or silver (if the coins contain less than 10 per cent of gold or silver there must be at least ten of them). Only the following groups of coins will normally be regarded as coming from the same find: Hoards that have been deliberately hidden; Smaller groups of coins, such as the contents of purses, that may been dropped or lost; Votive or ritual deposits.
- Any object, whatever it is made of, that is found in the same place as, or had previously been together with, another object that is Treasure.
- single precious metal coins that have been modified into objects – that is, altered in some way as to make it likely that they were taken out of circulation - can, if older than 300 years old, qualify as Treasure. This is usually seen in the form of a conversion of the coin into a brooch or pendant, or some other form of jewellery or dress accessory, evidence of which can include the addition of a suspension loop to the top, a pin (or the remains of one) at the back, or gilding. Additionally, piercings can be present.

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

Note: An object or coin is part of the 'same find' as another object or coin if it is found in the same place as, or had previously been together with, the other object.

Finds may have become scattered since they were originally deposited in the ground.

If anything is found which could be Treasure, under the Treasure Act 1996, it is a legal requirement to report it to the local coroner within 14 days of discovery. The Archaeological Contractor must comply with the procedures set out in The Treasure Act 1996. Any treasure must be reported to the coroner and to The Portable Antiquities Scheme Finds Liaison Officer, Ellie Cox ellie.cox@durham.gov.uk who can provide guidance on the Treasure Act procedures.

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

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