# C261 ARCHAEOLOGY EARLY EAST

## Fieldwork Report

## Archaeological Watching Briefs and Evaluation

## Limmo Peninsula Shaft (XRW10)

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## Non technical summary

*This report presents the results of three archaeological watching briefs and a field evaluation carried out by the Museum of London Archaeology (MOLA) on the site of Limmo Peninsula, London E16, in the London Borough of Newham. This report was commissioned from MOLA by Crossrail Ltd.*

*This work is being undertaken as part of a wider programme of assessment to quantify the archaeological implications of railway development proposals along the Crossrail route. The worksite at Limmo Peninsula shaft site (in the C261 Early East archaeology zone of the Crossrail Project) consists of two main areas, a storage/treatment compound for excavated material from tunnelling removed from the Limmo Peninsula shaft, and a conveyor for excavated material leading south to a barge loading facility at Instone Wharf at the mouth of the Lea.*

*The results of three watching briefs and two evaluation trenches broadly confirm anticipated findings. Window samples from the evaluation trenches identified possible Allerod (late Upper Palaeolithic) deposits over Pleistocene gravels. Overlaying this was prehistoric and historic alluvium beneath 19th-century consolidation dumps of industrial waste material. Overlaying this, excavation has demonstrated that remains of the Thames Ironworks (1846 to 1912) survive beneath modern 20th-century overburden/made ground. The main industrial structure including brick flues and firebricks was probably for metal working in the shipyard.*

*Features within the evaluation trenches correspond to buildings of Thames Ironworks identified on the historic OS maps. Early 19th-century consolidation, and the subsequent construction of the Thames Ironworks, either truncate or directly overlay the historic alluvium, and have most likely destroyed any earlier archaeological remains within their footprints.*

*The assemblages of brick, pottery, glass, and clay tobacco pipe corresponds to the dates at which the Thames Ironworks was in use. They include firebricks stamped with the makers' names, some of which had been imported from Newcastle-on-Tyne, and a highly unusual clay tobacco pipe bowl. Although some of the slag assemblage was adhering to the flues of the structure, it does not provide evidence for iron smelting or smithing in the areas investigated, and may have been fuel waste from furnaces, some of which may have been redeposited from elsewhere in the Ironworks.*

*The archaeological results from the evaluation trial work at Limmo Peninsula will contribute to the archaeological mitigation design for the Limmo Peninsula Shaft.*

*Because of the potential to correlate the well-preserved industrial structures with historic maps and documents relating to the Thames Ironworks, the results from Limmo Peninsula are assessed as being of regional significance.*

*These results will be used by the Project Archaeologist to revise and finalise the mitigation strategy for the site.*

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# 1 Introduction

This report describes four phases of archaeological excavation carried out at Limmo Peninsula Shaft site by the C261 Museum of London Archaeology (MOLA).

All fieldwork was conducted, as described in FDC Notifications, between 09/08/10 to 03/12/10 and supervised by Robert Hartle (MOLA Supervisor), and included the following:

| Task | FDC Notification | Principal Contractor | Date |
|---|---|---|---|
| • **General Watching Brief** on gas main diversion at Limmo Peninsula (two stopple pits: 4.6m (wide) x 10m (long) x 3.6m (deep)). | C123-0001 | C252 McNicholas | 09/08/10 to 11/08/10. |
| • **Targeted Watching Brief** on removal of overburden (including DLR excavated material and earlier 20th-century made ground) | C123-0001 | C252 McNicholas | 05/11/10 to 09/11/10 |
| • **Evaluation** Trenches 1 and 2 (including window sampling by terrier rig)(30-34m long (east to west) x 5-5.5m wide (north to south) x 3 deep) | C123-0001 | C252 McNicholas | 10/11/10 to 23/11/10 |
| • **Targeted Watching Brief** north and south extensions to Trench 2 at its western end. | C123-0001 | C252 McNicholas | 01/12/10 to 08/12/10 |

*Table 1: Fieldwork conducted between 09/08/10 to 08/12/10*

The Limmo Peninsula shaft site lies east of the lower part of the River Lea, and west of Victoria Dock Road/Silvertown Way/Dock Road, OS Grid Reference 539480 180980 (Figure 1). This work was undertaken in order to mitigate the impact of the development works upon archaeological remains; by making an adequate record of them in advance of and during the specified construction ground works at the Limmo Peninsula Shaft site (a mitigation strategy of preservation by record in line with Crossrail requirements).

**All grid coordinates in this report are cited as both the National Ordinance Survey and London Survey Grid, and all levels cited as both Ordnance Datum (m OD) and Above Tunnel Datum (m ATD)(ATD = OD +100m).**

The event code (sitecode) is **XRW10.**

# 2 Planning background

The legislative and planning framework in which all archaeological work took place was summarised in the Method Statement, which formed the project design for the evaluation (MOLA, November 2010).

# 3 Origin and scope of the report

This report has been commissioned from Museum of London Archaeology (MOLA) by Crossrail Ltd. The report has been prepared within the terms of the relevant standard specified by the Institute for Archaeologists (IFA, 2001). It considers the significance of the fieldwork results (in local, regional or national terms) and makes appropriate recommendations for any further action, commensurate with the results.

# 4 Previous work relevant to archaeology of site

The principal previous Crossrail studies are as follows:

- Crossrail, Environmental Statement, February 2005;
- Crossrail, Assessment of Archaeology Impacts, Technical Report. Part 4 of 6, South-East Route Section, 1E0318-E2E00-00001, February 2005 [Specialist Technical Report (STR);
- Crossrail, Amendment of Provisions 1, January 2006;
- Crossrail, Amendment of Provisions 3, November 2006;
- Crossrail, Archaeology Programming Assessment, November 2006;
- Crossrail, MDC4 Archaeology Updated Baseline Assessment, January 2008; and
- Crossrail, Archaeological Monitoring of Ground Investigations, Borehole Package 11, Limehouse to North Woolwich, January 2008.

All on-site archaeological work was carried out in accordance with the following documents:

An *Archaeological Written Scheme of Investigation* (WSI) for the site (Crossrail, June 2010) followed by an *Addendum to SSWSI* (Crossrail, October 2010) were prepared by Crossrail.

A *Method Statement* for archaeological works (McNicholas, October 2010) also informed the MOLA *Method Statement* (MOLA, November 2010).

A DDBA has not been produced for the Limmo Peninsula shaft due to the relatively low impact of the proposed worksites; therefore the WSI includes additional archaeological information, in particular on geology/topography and deposit survival.

# 5 Geology and topography of site

The geological and topographical setting is covered in detail in the Crossrail WSI (Crossrail, June 2010) and is summarised below.

The site lies within the alluvial floodplain of the River Lea and within the wider alluvial floodplain of the River Thames. The drift geology of the general area consists of

Holocene Floodplain/Shepperton gravels, which have been located in boreholes at *c* 96 to 97.00m ATD (Above Tunnel Datum or -100.00m OD), above which lay alluvial deposits, most or all of which are thought to represent prehistoric fills of channels of the River Lea. The early prehistoric alluvial sequence was previously thought to have been removed across the site by river scour from later meandering of the River Lea. More recent boreholes suggest that areas of uneroded prehistoric sequences, e.g. *in situ* peat, survive towards the eastern

margins of area, but their extent is not known. The surface of the alluvium in Crossrail boreholes at the Limmo Peninsula shaft was generally consistent at 102.00m to 102.50m ATD.

Five Crossrail boreholes have been monitored archaeologically within the southern part of the Limmo Peninsula shaft site, *c* 50 to 70m north of the Lower Lea Crossing (Crossrail 2008b). Of particular geoarchaeological interest was an undated peat deposit and associated channel deposits (total thickness *c* 0.4m thick) at *c* 94.60 m ATD. Below these deposits at *c* 94.20m ATD were the Shepperton gravels, which extended down to Eocene London Clay at *c* 92.90m ATD. This peat and associated channel deposits are provisionally interpreted as evidence of the Allerod interstadial, a warm interglacial period dating to *c* 14,000 to 13,000 BC.

The early post-glacial period was represented on site by a build-up of flood plain sands, gravels and sandy silts or alluvial (recorded between *c* 101.00 and 95.00m ATD). These deposits locally are normally sealed by prehistoric peats or marsh deposits, but these deposits appear to be absent on site due to scouring. Made ground sealed the Holocene alluvial deposits in the boreholes. This represents a combination of remains of the Thames Ironworks and modern dumping to raise the ground level. It is estimated that the ironworks ground surfaces would generally have sat at least *c* 0.50m to 1.00m above the level of the alluvium seen in the boreholes, i.e. approximately 102.50 to 103.50m ATD.

It should be noted that Instone Wharf to the south currently lies at 105.00 to 105.40m ATD. This suggests that the river frontage has been raised above the general ground level of *c* 102.00m ATD seen further to the east of both parts of the site. It is therefore possible that the construction of the ironworks was linked with dumping to raise the ground level. Test pit 558 revealed part of a brick wall and a floor constructed of fire bricks at 101.80m ATD, interpreted as part of the 19th-century ironworks.

Modern ground level varies across the site with the depth of modern land raised with spoil from the DLR tunnelling on the Limmo Peninsula. However, a 1952 Ordnance Survey map shows a combination of some mounding with extensive cleared areas. This suggests that some of the made ground may represent clearance of bombed buildings etc after the Second World War.

The Crossrail boreholes recorded made ground varying from *c* 8.00 to 9.50m deep, below ground levels of *c* 110.4 to 110.70m ATD. However, as the elevated Lower Lea Crossing lies at only *c* 106.00m ATD, it is possible that the borehole records may be misleading.

# 6 Research objectives and aims

The overall objective of the evaluation was to obtain data on the extent, nature, depth, quality and significance of any archaeological deposits presently surviving beneath Limmo Peninsula; as a contribution to predictive deposit modelling that will inform mitigation strategies for the Crossrail scheme. All work was undertaken within the overall research framework for London archaeology (Museum of London (MoL), 2002).

Objectives relevant to the trial trench works at this site are included in the WSI (Crossrail, June 2010, section 4), reproduced in the *Method Statement* for the evaluation (MOLA, November 2010, Section 3.3):

- What is the development of the local landscape and topography of the junction of the Lea and Thames floodplains from prehistory to the medieval period? Are any peat deposits present? If so, at what level(s) and at what date did they form? Is there evidence for river scour removing prehistoric alluvial deposits, or conversely, do they survive?
- Is there any evidence for prehistoric activity that has survived later river scouring? If prehistoric remains are present, what is their character and what can be learned about the exploitation of the floodplain by prehistoric groups? In particular, is there any evidence for Mesolithic activity at the base of the alluvium/surface of the sands? Is there any evidence for timber track ways or other structures of later prehistoric date?
- Is there any evidence for Roman activity, in particular for reclamation or flood defences, and marine transgression and regression?
- Is there any evidence for the medieval manor of Covelees?
- What can be learned about the process of land reclamation and management of the area from the medieval period until the construction of the shipyards and wharves in the mid 19th-century?
- What is the evidence for the development of the area in connection with the Thames Ironworks and other shipyards and wharves during the 19th-century?
- Is there any below-ground or above-ground evidence for the 19th-century Thames Ironworks, and other shipyards and wharves? In particular, is there evidence for the internal railway systems, dock structures, or slipways?

The general aims of the investigations at Limmo Peninsula were:

- To gain an understanding of the development of the landscape from Pleistocene to medieval periods.
- To gain an understanding of the development of the site of the former Thames Ironworks and Ship Building Company Ltd.

# 7 Methodology of site-based and off-site work

All archaeological excavation and recording during the evaluation was carried out in accordance with the Crossrail WSI, the MOLA *Method Statement* and the *Archaeological Site Manual* (MoL, 1994).

The site finds and records can be found under the site code XRW10 in the MOLA archive. They will be stored there pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail scheme.

## 7.1 General and Targeted Watching Brief Methodology

Two pits associated with the main gas diversion (see 8.5, Photo 13 and Photo 14) and the preparatory ground reduction (see 8.4, Photo 12) where conducted as general watching briefs. An extension to evaluation trench 2 was undertaken as a targeted watching brief (see 8.5, Photo 6). Both general and targeted watching briefs consisted of a basic monitoring presence, by a MOLA Senior Archaeologist, to observe works carried out by the Principal Contractor without constraint on their working methods. Excavation was by machine, operated by the Principal Contractor down to the first significant archaeological horizon under supervision of a MOLA Senior Archaeologist. Further manual cleaning, investigation and recording was then undertaken by the MOLA Senior Archaeologist. A written and drawn record of all archaeological deposits encountered was made in accordance with the principles set out in the Museum of London site recording manual (MoL 1994).

## 7.2 Evaluation Methodology

Two evaluation trenches were excavated within the area of preparatory ground reduction (see 8.1, Photo 1). Trenches were excavated by machine by the contractors down to the first significant archaeological horizon under supervision of a MOLA Senior Archaeologist. Further manual cleaning, investigation and recording were then undertaken by MOLA staff. A written and drawn record of all archaeological deposits encountered was made in accordance with the principles set out in the Museum of London site recording manual (MoL 1994).

The locations of the trenches were recorded by MOLA Geomatics by optical survey using MOLA GPS control. The survey was tied in to Crossrail London Survey Grid control stations provided by Crossrail site surveyors, which were then tied into the OS. A Survey Report was produced by MOLA Geomatics (MOLA, December 2010), which was will be submitted to Crossrail for transformation into The London Survey Grid.

# 8 Results and observations including stratigraphic report and quantitative report

| Task | Date | Figures | Photos |
|---|---|---|---|
| **Evaluation** Trenches 1 and 2 (including window sampling by terrier rig)(30-34m long (east to west) x 5-5.5m wide (north to south) x 3 deep)(8.1). | 10/11/10 to 23/11/10 | Figure 1 to Figure 7 | Photo 1 to Photo 4, and Photo 15 |
| **Terrier Rig** Window Sample Results from within Trenches 1 and 2 (8.2). | 22/11/10 | Figure 2 | Photo 8 |
| **Targeted Watching Brief** Trench 2 extensions (8.3). | 01/12/10 to 08/12/10 | Figure 1 to Figure 7 | |
| **Targeted Watching Brief** on removal of overburden (including DLR excavated material and earlier 20th-century made ground)(8.4). | 05/11/10 to 09/11/10 | Figure 1 to Figure 2 | Photo 12 |
| **General Watching Brief** on gas main diversion at Limmo Peninsula(two stopple pits: 4.6m (wide) x 10m (long) x 3.6m (deep))(8.5). | 09/08/10 to 11/08/10 | Figure 1 to Figure 2 | Photo 13 to Photo 14 |

*Table 2: Archaeological investigations*

For trench locations see Figure 1 and Figure 2.

## 8.1 Evaluation

Photo 1: Trench 1 (right) with Structures [12] and [13] (front), timbers [16] & [15] and concrete pads [14] (centre), looking west

| **Trench 1** ***(Figure 1 to Figure 2 and Photo 1 to Photo 4)*** | |
|---|---|
| Location | Limmo Peninsula worksite, within future Limmo Peninsula Main Shaft |
| Dimensions | 34.00m long (east to west) x 5.50m wide (north to south) x 3.00m deep (maximum) |
| London Survey grid coordinates | 89743 35522 |
| OS National grid coordinates | 539519 181035 |
| Modern Ground Level | Excavation began 105.00m ATD, the general base of the 20th-century overburden (see 8.4) |
| Modern subsurface deposits | Subsurface deposits were composed of 20th-century dump/make up layers of mixed clay, ash and demolition material (Contexts [4],[5],[6],[7],[8],[9],[10] and [11]). |
| Level of base of archaeological deposits observed and/or base of trench | Base of trench: 102.60m ATD, extended to 102.00m ATD within three small test pits at the west, centre and east of the trench. |
| Natural observed | Natural not reached during excavation |
| Extent of modern truncation/overburden | To a depth of 103.50m ATD minimum |

| Archaeological remains | Dating Evidence, Finds, and Samples |
|---|---|
| Clinker deposit [18], with large fragments of slag and occasional brick. | Early 19th-century made ground/consolidation<br>Bulk sample {1} (10 litres) |
| At the eastern end, at 103.5m ATD, was a rectangular brick structure [12](Photo 2 and Photo 3). Three walls of [12] were exposed within the limits of the trench, internally backfilled with gravel and rubble which was overlain by a brick floor surface two courses deep. Keyed into this structure at the north was a square brick structure [13]. A bolt was still present at the corner of structures [12] and [13]. Structure [12] appeared to be truncated south by a metal pipe and a concrete floor. The construction cut of structure [12] and [13] must have truncated layer [18]. However, it is not now visible, having presumably been backfilled immediately post-construction with the same material it truncated. | *c* 1846 to 1869 - Structures [12]/[13] appear to correspond to a building marked on the 1869 OS Map (Figure 5). However, it does not appear on the 1916 OS map (Figure 7), so was presumably not in use and possibly demolished/ backfilled at the time of the Ironworks closure in 1912.<br><br>Brick Samples taken – London stock bricks, approximately 19th or early 20th-century. |
| Horizontal timber beams [16] and planks [15] in the eastern half of the trench. | *c* 19th-century – they are perpendicular and parallel to structures [12] and [13], correspond to general alignments on the 1869 OS map, and may have been part of the floor of a building marked in that area. |
| Concrete pads with inlaid timbers and bolts [14] in the centre of the trench. A possible floor surface of rammed clinker material [17] surrounded the area of the concrete [14]. | *c* 19th-century – these features are perpendicular and parallel to structures [12] and [13], correspond to general alignments on the OS maps of 1869 & 1916. They may have been part of the floor of a large building first marked in that area on the 1869 map (Figure 5), or, equally, from a later phase when the building was expanded, as shown on the 1916 map (Figure 7). |
| Clinker deposits [1] and [2], overlaying Structures [12] and [13]. | Early 20th-century:<br>Pottery: [2] contained the earliest pottery sherd from the site – half a bone china saucer with a date range of 1794 to 1830. Possibly re-deposited.<br>Clay Tobacco Pipe: post-1840.<br>Glass: [2] contained the neck and mouth of a Codd bottle, introduced in 1870. |

**Interpretation and summary**

The lowest archaeological layer exposed, a clinker deposit [18] at the base of the trench, is most likely an early 19th-century consolidation layer associated with the original construction of the Ironworks in 1846, onto which all the features found in trench were then constructed.

Brick structure [12] could possibly have been a small workshop or perhaps some kind of working platform. However, it is impossible to determine how far, if at all, the walls originally continued above the level of the surviving brick floor. A bolt survived at the corner of structures [12] and [13] (Photo 2 and Photo 3), and may once have tethered machinery to the structures. A metal pipe was also found along the west face of structure [12] and may have also been associated with machinery, perhaps providing or draining steam or water? The function of the small square structure [13] at its north is also unclear, but could possibly be the truncated base of a chimney?

The concrete pads [14] seem to be the footings for machinery, which would have been bolted down, while the associated timbers and floor surface ([15], [16] & [17]) were probably walkways and work surfaces. They may have been part of the floor of a large building first marked in that area on the 1869 OS map (Figure 5), or, equally, from a later phase when the building was expanded, as shown on the 1916 OS map (Figure 7).

The latest deposits ([1] and [2]) may represent accumulations associated with the operation of the ironworks or be dumps associated with the abandonment of the Ironworks site in the early 20th-century.

Structure [12]/[13] appears to correspond to a building marked on the 1869 OS Map and which is still visible on the 1897 OS Map (Figure 6). However, the structure does not seem to appear on the 1916 OS map. Presumably, it was no longer in use and, therefore, possibly demolished/ backfilled at the time of the Ironworks closure in 1912.

A drain discovered at the west end of Trench 1 was constructed of 20th-century bricks and ceramic pipe and may have been a very late addition to the site prior to it being sealed under late 20th-century made ground.

The latest deposits ([1] and [2]) may represent accumulations associated with the operation of the ironworks or be dumps associated with the abandonment of the Ironworks site in the early 20th-century.

Photo 2: Trench 1, brick structures [12] and [13], looking west

Photo 3: Trench 1, brick structures [12] and [13], looking east

Photo 4: Trench 2 (left), with timber baseplates with concrete [32] & [33] and timber sleepers (front) and brick structure [31] (rear), looking west

| **Trench 2** ***(Figure 1 to Figure 2 and Photo 4 to Photo 8)*** | |
|---|---|
| Location | Limmo Peninsula worksite, within future Limmo Peninsula Main Shaft |
| Dimensions | 30.00 metres long (east to west) x 5.00 wide (north to south) x 3.00m deep |
| London Survey grid coordinates | 89745 35507 |
| OS National grid coordinates | 539522 181019 |
| Modern Ground Level/top of the slab | Excavation began at 105.00m ATD, the approximate base of the DLR rubble dumps and top of earlier mid to late 20th-century made ground (see 8.4) |
| Modern subsurface deposits | Subsurface deposits were composed of 20th-century made ground dumps of mixed clay, ash and demolition material (Contexts [19],[20],[21],[22],[23],[24],[28] and [29]) |
| Level of base of archaeological deposits observed and/or base of trench | Base of trench: 102.6m ATD, extended to 102m ATD within two small test pits at the west, by structure [31] and in the centre of the trench. |
| Natural observed | Natural geology not reached |
| Extent of modern truncation/overburden | 103.4m ATD at the eastern end and 103.5m ATD at the western end |

| | |
|---|---|
| **Archaeological remains** | **Dating Evidence, Finds, and Samples** |
| Loose silty clinker dump layer (36) Lowest layer across the base of trench. | Early 19th-century made ground<br>Bulk sample {2} (10 litres) |
| An approximately rectangular brick structure [31] aligned north-south (top at 103.52m ATD) (Photo 3 & Photo 4). 6.7m of this structure was exposed within the limit of excavation. This structure was composed of two parallel horseshoe shaped barrel vaulted brick flues, which showed evidence of exposure to extreme heat, and were partially filled with an unidentified accumulated industrial by-product [30]. A brick pit or chamber was also attached to the north. The construction cut of structure [31] must have truncated layer (36), however, it is not now visible, having presumably been immediately backfill post-construction with the same material it truncated. | *c* 1846–1869 – Appears on OS maps from 1869 onwards (Figure 5 and Figure 6). However, it does not appear on the 1916 OS map (Figure 7), so was presumably not in use and possibly demolished/ backfilled at the time of the Ironworks closure in 1912.<br><br>Brick samples - 19th or early 20th-century fire bricks and London stock brick.<br><br>Bulk environmental sample {3}(10 litres) taken from the fill (Context 30) of the flues within structure [31]. |
| Rammed silty ash clinker layers [25] and [26] | *c* 19th-century |
| Parallel horizontally laid timber beams or sleepers (34), inlaid into layer [26], beside parallel concrete and horizontal timbers [32] and [33], which were also cut into layer [26] | *c* 19th-century – probably relate to all the features found in trench 1, since they are either perpendicular and parallel to those features. As with the features in trench 1, these features also correspond to historic alignments on the historic OS maps, and may have been part of the floor of a large building first marked in that area on the 1869 OS map (Figure 5), or, equally, from a later phase when the building was expanded, as shown on the 1916 OS map (Figure 7). |
| Ash clinker demolition layer [27], which overlaid all archaeological features. | Undated |

| | |
|---|---|
| **Interpretation and summary** | |
| As with Trench 1, the clinker deposit (36) at the base of the trench is most likely an early 19th-century consolidation layer composed of dumped industrial waste. This is most likely associated with the original construction of the Ironworks in 1846.<br><br>The timber beams (34) found at the east end of trench 2, set into a floor surface of rammed clinker [26], may have been sleepers for the Ironworks railway system, or perhaps baseplates for machinery within a building. Indeed, parallel concrete and horizontal timbers [32], and [33] (Photo 7), found to the north-west and south-east of (34) and also set into layer [26], may have been the remains of workshop foundations. The top of rammed silty ash clinker layers [25] and [26] probably represent the original ground height (2.6m OD/102.6m ATD).<br><br>The function of the rectangular brick structure [31] (Photo 3 and Photo 4) is unclear. However, it was presumably involved in industrial processes such as metal working or forging, given the presence of firebricks within the structure, charring and industrial residues [30] within the flues, and metal slag within the backfill of it's brick chambers. It seems to have been only partially demolished prior to its abandonment and backfilling.<br><br>All archaeological features are directly overlain by an ash clinker demolition layer [27], itself overlaid by the modern overburden (Contexts [19],[20],[21],[22],[23],[24],[28] and [29]). | |

Photo 5: Trench 2, Structure [31] showing parallel flues and brick floored chamber, looking north

Photo 6: Trench 2, structure [31] showing parallel flues and brick floored chamber, looking south-east

Photo 7: Trench 2, horizontal timber beams (baseplates?) [33], looking south-west

## 8.2 Terrier Rig Window Sample Results from within Trenches 1 and 2

Photo 8: Trench 2 with terrier rig in operation, looking north-west

| **AH1** ***(Figure 2 and Photo 8)*** | | | | | |
|---|---|---|---|---|---|
| Location | | | | Trench 2 | |
| OS National grid coordinates | | | | 539532 181019 | |
| LSG coordinates | | | | 89755 35507 | |
| Surface Level | | | | 102.77m ATD | |
| Natural observed | | | | 99.00m ATD | |
| **Top (m)** | **Base (m)** | **Top (m ATD)** | **Base (m ATD)** | **Description** | **Interpretation** |
| 0 | 1.50 | 102.77 | 101.27 | Iron concretions/slag Context [36] | Iron smelting waste. Post medieval. |
| 1.50 | 3.75 | 101.27 | 99.02 | Light brownish grey laminated clayey silt with occasional mollusc fragments and occasional fine rooting. Grades into unit below. | Partially oxidised, indicating fairly dry terrestrial soils episodically inundated by overbank flood events. Historic alluvium. |

| | | | | | |
|---|---|---|---|---|---|
| 3.75 | 6.75 | 99.02 | 96.02 | Light grey finely laminated silty clay with bands of dark grey humified organics/peat occasionally throughout, no rooting, grades into below | Upper marsh or mudflat clays and peats. Historic / late prehistoric alluvium. |
| 6.75 | 7.85 | 96.02 | 94.92 | Light grey clay silt with laminations of fine sands (increasing in size and frequency with depth).Clear and horizontal contact. | Marsh/Mudflat clays, with more fluvially active episodes indicated by sandy lenses. Prehistoric alluvium. |
| 7.85 | 7.85 | 94.92 | 94.92 | Dark grey, fine to medium sands with granular flint gravel. | Pleistocene gravels |

| **AH2 *(Figure 2*)** | | | | | |
|---|---|---|---|---|---|
| Location | | | | Trench 1 | |
| OS National grid coordinates | | | | 539530 181034 | |
| LSG coordinates | | | | 89754 35522 | |
| Surface Level | | | | 102.75m ATD | |
| Natural observed | | | | 100.45m ATD | |
| **Top (m)** | **Base (m)** | **Top (m ATD)** | **Base (m ATD)** | **Description** | **Interpretation** |
| 0 | 1.20 | 102.75 | 101.55 | Iron concretions/slag Context [18] | Iron smelting waste. Post medieval. |
| 1.20 | 2.30 | 101.55 | 100.45 | Light brownish grey laminated clayey silt with occasional mollusc fragments and occasional fine rooting. Grades into unit below. | Partially oxidised alluvium, indicating fairly dry terrestrial soils episodically inundated by overbank flood events. Historic alluvium. |
| 2.30 | 3.10 | 100.45 | 99.65 | Light grey finely laminated silty clay with bands of dark grey humified organics/peat occasionally throughout, no rooting, grades into below | Upper marsh or mudflat clays and peats. Historic / late prehistoric alluvium. |
| 3.10 | 7.70 | 99.65 | 95.05 | Light grey clay silt with laminations of fine sands (increasing in size and frequency with depth).Clear and | Marsh/Mudflat clays, with more fluvially active episodes indicated by sandy lenses.<br>Prehistoric alluvium. |

| | | | | | |
|---|---|---|---|---|---|
| | | | | horizontal contact. | |
| 7.70 | 7.90 | 95.05 | 94.85 | Dark grey, fine to medium sands with granular flint gravel. | Early Holocene sands. Prehistoric (Mesolithic) |
| 7.90 | 8.12 | 94.85 | 94.63 | Coarse grey sand and angular grey flint gravel | Early Holocene gravels |
| 8.12 | 8.20 | 94.63 | 94.55 | Dark brown organic silt | Possible Allerod deposits |
| 8.20 | 8.30 | 94.55 | 94.45 | Dark brown organic silt with angular gravel | Possible Allerod deposits |
| 8.30 | 8.50 | 94.45 | 94.25 | Coarse orange sand and angular orange flint gravel (depth unknown) | Pleistocene gravels |

The lowest natural deposits were encountered at 99.00m ATD in window sample AH1 (Trench 2), and at 100.45m ATD in window sample AH2 (Trench 1). The top of the archaeological sequence has been confirmed to be at 103.50m ATD.

Window sampling has shown the underlying natural geology consists of Pleistocene gravels (94.92m and 94.45m ATD). Window sample AH2 recorded possible Allerod (late Upper Palaeolithic) deposits lying over the Pleistocene gravels (94.63m ATD). Overlaying this were early Holocene (Mesolithic) Shepperton gravels and sands (95.05m ATD), overlain by prehistoric and historic alluvial deposits (101.27m and 101.55m ATD), most or all of which are thought to represent fills of channels of the River Lea at its confluence with the Thames.

Above this, it appears that the construction of the ironworks was linked with consolidation dumping (102.77m ATD) to raise the ground level. It should be noted that Instone Wharf to the south currently lies at 105.00 to 105.40m ATD. This suggests that the river frontage has been raised above the general ground level of *c* 102m ATD seen further to the east of both parts of the site. Above this consolidation are the remains of the Thames Ironworks (103.50m ATD), sealed themselves by extensive 20th-century dumping, including DLR excavated material etc, to levels up to *c* 110 to 111m ATD.

## 8.3 Targeted Watching Brief on Trench 2 extensions

Photo 9: Trench 2 extension, showing structure [31], looking south-west

Photo 10: Trench 2 extension, showing structure [31], looking north

Photo 11: Trench 2, structure [31], looking north-east

| **Trench *2 (Extentions) (Photo 9, Photo 10 and Photo 11)*** | |
|---|---|
| Location | Limmo Peninsula, south within the area of future Limmo Peninsula Shaft |
| Dimensions | 30.00 metres long (east to west) x 5.00 wide (north to south) x 3.00 deep<br>Extension:<br>North - approximately 2.00m wide (E to W) x 10.00m long in to Trench 1 (N)<br>South - approximately 6.00m wide (E to W) x 4.00m (S) |
| London Survey grid coordinates | 89745 35507 |
| OS National grid coordinates | 539522 181019 |
| Modern Ground Level/top of the slab | Excavation began at 105.00m ATD, the approximate base of 20th-century made ground (see 8.4). |
| Modern subsurface deposits | Subsurface deposits were composed of 20th-century made ground dumps of mixed clay, ash and demolition material |
| Level of base of archaeological deposits observed and/or base of trench | Base of trench: 102.60m ATD |
| Natural observed | Natural not observed |
| Extent of modern truncation | 103.50m ATD |

| Archaeological remains | Dating Evidence, Finds, and Samples |
|---|---|
| Brick structure [31] was further exposed to an extent of 11.50m long (N to S) x 5.80m wide (E to W) x >0.90m high. This structure was composed of two parallel barrel vaulted brick flues and, to the north and south, various chambers/pits floored with brick, themselves connected by raised brick floor surfaces. The end of the brick chamber at the north end of brick structure [31] was revealed and marked the structure's north limit. The structure still extended into the south limit of excavation, although a south-east corner was discovered (Photo 9 to Photo 11). | *c* 1846 to 1869 – Appears on OS maps from 1869 onwards (Figure 5 and Figure 6*)* |
| **Interpretation and summary** | |
| The full extent of structure [31] was discovered to the north, east and west. Further excavation has revealed it to be a much more complicated structure than previously thought. Although still not fully uncovered, a south-east corner was found and may represent the south limit of the feature. Unfortunately, the function of this structure remains unclear at this time. | |

## 8.4 Targeted Watching Brief on Made Ground Reduction at Limmo Peninsula

Photo 12: Area at Limmo Peninsula reduced from 107.00m ATD to 105.00m ATD, looking west

A general preparatory ground reduction (Photo 12), from 107.00m ATD to 105.00m ATD, was undertaken in area of the future Limmo Peninsula shaft (in order to remove reputed DLR spoil and other 20th-century overburden). This was monitored by a MOLA Senior Archaeologist as a general watching brief. The DLR rubble was very mixed clay and silt containing frequent small to large concrete fragments, timber beams and modern rubbish, including plastic. No archaeological features were encountered.

## 8.5 General Watching Brief on gas main diversion at Limmo Peninsula

Photo 13: Eastern stopple pit, looking east

Photo 14: Base of eastern stopple pit, looking north-east

| **Eastern Stopple Pit *(Figure 1, Figure 2, Photo 13 and Photo 14)*** | |
|---|---|
| Location | Eastern stopple pit, south-eastern part of Limmo Peninsula site |
| Dimensions | 4.60m (N to S) x 10.00m (E to W) x 3.60m (deep) |
| London Survey grid co-ordinates | 89848 35459 |
| OS National grid co-ordinates | 539626 180974 |
| Modern Ground Level (adjacent to pit) | 106.60m ATD |
| Modern subsurface deposits | Reddish brown course sandy silt [37], with occasional clay lenses and 20th-century rubble (concrete, brick, rubbish etc). 3.00m thick. |
| Level of base of archaeological deposits observed and/or base of pit | 103.00m ATD |
| Natural geology observed | Not reached |
| Extent of modern truncation/overburden | [37] to a depth of 103.58m ATD |
| **Archaeological and built heritage remains** | **Date** |
| Reddish black coarse gravel silty sand clinker deposit [38], with frequent small-large fragments of slag and occasional brick fragments at 103.58m ATD forming base of pit | Undated – potentially 19th to early 20th-century |

| **Pit interpretation and summary** |
|---|
| The lowest layer [38] at the base of the trench may be a 19th-century dump layer or, alternatively, associated with the operation or abandonment of the site by the Thames Ironworks company in the early 20th-century. The subsurface deposit [37] overlaying [38] was undoubtedly 20th-century made ground. |

| **Western Stopple Pit *(Figure 1 and Figure 2)*** | |
|---|---|
| Location | Western stopple pit, south-western part of Limmo Peninsula site |
| Dimensions | 4.60m (N to S) x 10.00m (E to W) at top x 3.60m (deep) |
| London Survey grid coordinates | 89704 35496 |
| OS National grid coordinates | 539482 181008 |
| Modern Ground Level (adjacent to pit) | 106.60m ATD |
| Modern subsurface deposits | Unknown – obscured by shoring |
| Level of base of archaeological deposits observed and/or base of pit | Base of trench 103.00m ATD |
| Natural geology observed | Not reached |
| Extent of modern truncation/overburden | Unknown |
| **Archaeological and built heritage remains** | **Date** |
| Black silty clinker layer [39] at the base of the pit, including brick, slag, timber fragments and timber beams (unclear if any of these were *in situ* or re-deposited). | Undated – probably 19th to early 20th-century |
| **Pit interpretation and summary** | |
| This pit had already been completed by the time MOLA had been called to site. Access was not available and the base of pit was observed from the top of the trench, while sides of the trench were obscured by shoring sheets.<br><br>The lowest layer [39] at the base of the trench is again possibly a 19th-century dump layer (similar to layer [18] in Evaluation trench 1 and [36] in trench 2). However, equally be associated with the abandonment of the site in the early 20th-century by the Thames Ironworks company (similar to layers [1] and [2] in trench 1 and [27] in Trench 2). | |

# 9 Assessment of results against original expectations and review of evaluation strategy

GLAAS guidelines (English Heritage, 1998) require an assessment of the success of the evaluation 'in order to illustrate what level of confidence can be placed on the information which will provide the basis of the mitigation strategy'. The recommendations suggest that there should be:

Assessment of results against original expectations (using criteria for assessing national importance of period, relative completeness, condition, rarity and group value)(Guidance Paper V, 4 7)

Department of the Environment guidelines for assessing the importance of individual monuments for possible Scheduling include the following criteria: *Period*; *Rarity*; *Documentation*; *Survival/Condition*; *Fragility/Vulnerability*; *Diversity*; and *Potential*. The guide lines stresses that 'these criteria should not. be regarded as definitive; rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case'.

### *Criterion 1: period*

Window sample AH2 showed possible Allerod (late Upper Palaeolithic) deposits overlaying the Pleistocene gravels. Window samples from both AH1 and AH2 also showed possible historic and prehistoric alluvium beneath the 19th-century archaeological deposits at the bases of evaluation Trenches 1 and 2.

However, taken as a whole, the archaeological deposit sequence is largely characteristic of the mid-19th to early 20th-century. The archaeological remains identified represent a series of well preserved industrial features, albeit partially truncated, whose function, although not precisely identified at this point, is clearly associated with the activities of the Thames Ironworks and Shipbuilding Company Ltd (1846 to the early 20th-century). The two bricks structures in Trenches 1 and 2 can be confidently identified on the OS map from 1869, and therefore were constructed sometime between 1846 and 1869.

### *Criterion 2: rarity*

The archaeological remains identified in the fieldwork are provisionally assessed as being of moderate importance.

Structure [31] in Trench 2 is potentially a rare industrial feature and a comparative example has yet to be identified.

A clay tobacco pipe, dated to post-1840, recovered from Trench 1, is potentially unique and its form of bowl and unusual decoration have no direct parallels.

### *Criterion 3: documentation*

There are likely to be surviving documentary records for remains in the area from what appears to be the earliest development of the site in the early 19th-century onwards. In particular, there may be considerable contemporary documentation for the later 19th-century occupation of the site by Thames Ironworks and Ship Building Ltd from 1846.

Much of this documentation may well be specific enough to relate to individual properties and features.

### *Criterion 4: group value*

The earliest archaeological remains on the site appear to relate to the formation and development of the Thames Ironworks in the mid- to late- 19th-century. By the end of the 19th-century the majority of the site was part of the extended Thames Ironworks. There is a group value in that the site-specific remains can probably be set within a wider area context, from both archaeological and historical data sources.

### *Criterion 5: survival/condition*

The evaluation trenches have demonstrated that 19th-century industrial archaeology survives well on the site, despite any intrusive construction in the later 20th-century development over and through them during the later years of the Thames Ironworks. The good state of preservation is largely due to the absence of major development on the site in the late 20th-century and extensive overburden covering the site from the Docklands Light Railway development.

### *Criterion 6: diversity*

Given its consistency, state of preservation and potential group value it is likely that the classes of 19th to 20th-century industrialisation encountered in the trial trenches extend more widely across the site. Diversity would be represented mainly by possible changes in ownership and land use, e.g. from an 18th-century rural area to a 19th-century industrialised site.

### *Criterion 7: potential*

The potential of the site appears to be associated with development of a previously open area from the 19th-century. Land usage within this time frame seems to have shifted from rural to industrial. Documentary resources, allied to the archaeological evaluation results, may clarify the nature of that potential. In particular, the existence of late-19th century industrial features are of some importance.

The evaluation methodology has allowed a representative sample of the buried site stratigraphy to be assessed and the results appear to be consistent trench to trench, giving a good confidence rating. While there is no evidence to clarify the Prehistoric, Roman, medieval or earlier post-medieval objectives, a better understanding of the 19th-century archaeology has been achieved. There are significant results with regard to later post-medieval industrial development and for profiling natural geology and stratigraphic survival.

# 10 Statement of potential archaeology

Excavation on the site has shown that there is good archaeological survival of 19th-century industrialisation. Furthermore, it seems likely that this is true of the remaining, unexcavated areas. Indeed, some of the features revealed in the evaluation trenches clearly continue beyond the sections.

Unfortunately, construction of the Thames Ironworks (docks, slipways and wharves etc) appear to have truncated any earlier archaeological remains within their footprints. However, these remains themselves are significant industrial archaeology. While there was no clear indication of pre-19th-century archaeology within the limits of excavation, this does not mean it is also absent outside those limits.

The archaeological remains are assessed as of local significance in terms of the development of this part of London increasing to regional significance in the case of industrial remains associated with the Thames Ironworks because of the comparative potential with documentary evidence.

# 11 Conclusions

## 11.1 Geology and alluvium – Graham Spurr

Window sampling has shown the underlying natural geology consists of Pleistocene gravels at 94.92 to 94.45m ATD.

Possible Allerod (late Upper Palaeolithic) deposits overlay the Pleistocene gravels in one of the two window samples at 94.63m ATD. Further analysis of the Allerod deposits sampled in AH2 at the post excavation stage has the potential to answer research questions relating to this rarely observed pre-Holocene deposit particularly in terms of changes in the on-site and regional vegetation, the date of the deposit and its relationship to the wider depositional environment.

Overlaying this were early Holocene (Mesolithic) Shepperton gravels and sands (95.05m ATD), overlain in turn by prehistoric and historic alluvial deposits (101.27m and 101.55m ATD), most or all of which are thought to represent fills of channels of the River Lea at its confluence with the Thames.

## 11.2 Post-medieval

The window samples showed that the alluvium was overlain, and probably truncated, by consolidation dumping/land raising, probably in advance of construction of the Thames Ironworks in the mid 19th-century.

The window samples produced no clear evidence of pre-19th-century activity (eg potential Roman activity, later river management, the medieval manor of Covelees or post medieval land reclamation). Therefore, it seems likely that construction of the Thames Ironworks (docks, slipways and wharves etc) would have truncated any earlier archaeological remains within its footprint, if present. However, the evidence from two window samples should not be considered conclusive evidence for the absence of earlier archaeology, especially over the wider area of the site. Moreover, whilst 19th-century features probably truncated earlier archaeological deposits, they themselves form significant industrial archaeological remains (see below).

Investigation of the sequence continued in the evaluation trenches, the bases of which were at approximately 102.5m ATD, except within several small trial pits which reduced the base to approximately 102.00m ATD. This limit was placed upon the work due the practical considerations of safe trench depth and the level of the water table.

## 11.3 19th-century industrial development and the Thames Ironworks

Excavation has confirmed that the remains of the Thames Ironworks (1846 to 1912) do still survive beneath modern 20th-century overburden/made ground.

At 102.00m ATD, consolidation deposits [18] and [36] either directly overlay or truncate the historic alluvium. These deposits are most likely 19th-century industrial waste re-used as consolidation and levelling for the establishment and construction of the Thames Ironworks in 1846 and, therefore, the a foundation layer for the features observed in both trenches.

The evaluation trenches revealed a variety of features were revealed including potential baseplates, walkways, and ground surfaces. In Trench 1, the concrete pads [14] seem to represent the footings for machinery, while the associated timbers and floor surface

([15], [16] & [17]) were probably walkways or work surfaces. Several features in Trench 2 are perpendicular and parallel to the features in Trench 1. The timber beams (34) found at the east end of Trench 2, set into a floor surface of rammed clinker [26], are again probably baseplates or sleepers for machinery, originally within a building. These features from Trenches 1 and 2 may all have been part of the floor of a large building first marked in that area on the 1869 OS map (see Figure 5), or, equally, from a later phase when the building was expanded, as shown on the 1916 OS map (see Figure 7). Parallel concrete and horizontal timbers [32], and [33] (Photo 7), found to the north-west and south-east of (34) and also set into layer [26], may have been the remains of the buildings foundations, or partitions walls within it.

The precise nature of brick structures [12]/[13] in Trench 1 and [31] in Trench 2 is not currently understood. However, features [12]/[13] and [31] do all appear on the 1869 OS Map (Figure 5), and so can be confidently dated to within 1846 to 1869.

Structure [31] could have been involved in industrial metallurgy processes, given the presence of firebricks within the structure, charring and industrial residues [30] within the flues, and metal slag within the backfill of it's brick chambers. Moreover, it's position immediately north and outside a large building, next to and at the terminus of two railway lines, suggests some kind of intermediary role, perhaps also a position for loading or off loading carriages? Unfortunately, no trace of the sites railway system survives anywhere on site, having presumably been completely removed and salvaged when the Ironworks ceased operation in 1912. This structure, as well as brick structures [12]/[13], appear to have disappeared by 1916 (see Figure 7), therefore, were presumably not in use and possibly demolished/ backfilled at the time of the Ironworks closure in 1912.

The assemblages of brick, pottery, glass, and clay tobacco pipe indicate a mid to late 19th-century (or possibly early 20th-century) date for this activity, which corresponds to the dates at which the Thames Ironworks was in use. They include firebricks stamped with the makers' names, some of which had been imported from Newcastle-on-Tyne, and a highly unusual clay tobacco pipe bowl. Although some of the slag assemblage was adhering to the flues of the structure, it does not provide evidence for iron smelting or smithing in the areas investigated, and may have been fuel waste from furnaces, some of which may have been redeposited from elsewhere in the Ironworks.

GLIAS (Greater London Industrial Archaeology Society) specialists Malcolm Tucker and Robert Carr visited the site on Tuesday 7th December. Unfortunately, although clearly representing activity from the earliest phase of the Thames Ironworks (*c* 1846 to 1869), the exact function or nature of the structures within trenches 1 & 2 still remains unclear. Further historic documentary research will hopefully contribute further to the interpretation of these features. Although not all features are precisely dated or understood, they nevertheless do begin to offer clues to some of the processes and activities that took place in this area of the Thames Ironworks. These features when combined with documentary research will undoubtedly provide a greater understanding of the development of the site and the operation and operation of the former Thames Ironworks and Ship Building Company Ltd after its establishment in 1846.

## 11.4 Later development

Excavation has confirmed that the buildings of the Thames Ironworks were covered by extensive made ground sometime after its closure in 1912 and the site's subsequent use for ship repair before the Second World War. This overburden does include DLR waste over post-war dumping, and was shown to be *c* 7.50m thick, between 103.5m ATD and the pre-excavation ground levels of *c* 110.4 to 110.7m ATD.

# 12 Recommendations for appropriate mitigation strategy

A significant area within the proposed Limmo Peninsula shaft has now been evaluated. The Project Archaeologist will produce recommendations for further work if necessary during the Limmo Peninsula Shaft excavation.

# 13 Publication and dissemination proposals

The watching brief and evaluation results will be disseminated via this report; the supporting site archive of finds and records (including digital data) and by incorporation into the wider predictive deposit modelling for the Crossrail scheme. Any publication proposals will be considered in the wider context of archaeological potential and results within the scheme.

# 14 Archive deposition

The site archive containing original records and finds will be stored temporarily with MOLA pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail project.

# 15 Bibliography


Atkinson, D R and Oswald, A, 1969 London clay tobacco pipes, *J British Archaeol Assoc* 32, 171–22

Crossrail, 2005, *Assessment of Archaeology Impacts, Technical Report, Part 4 of 6, South-East Route Section*. Crossrail (doc No. 1E0318-E2E00- 00001)

Crossrail, November 2006, *Archaeological Programming Assessment*, Report Number 1E0318-G0E00-00006 (Rev B)

Crossrail, January 2008a, MDC4 Archaeology, Updated Baseline Assessment

Crossrail, January 2008b, *Archaeological Monitoring of Ground Investigations, Borehole Package 11, Limehouse to North Woolwich*

Crossrail, June 2010, Site-specific Written Scheme of Investigation (SS-WSI): *C123 INTERMEDIATE SHAFTS Limmo Peninsula Shaft* (Doc No: C123-JUL-T1-TPL-CR086_SH003_Z-00001, Revision 7.0)

Crossrail, October 2010, *Addendum to SSWSI: Trial Trench Evaluation and Detailed Excavation – Limmo Peninsula Shaft* (Doc No: C123-JUL-T1-RGN-CR144_SH011_Z-00002, Revision 3.0)

English Heritage, 1991 *Management of Archaeological Projects (MAP2)*

English Heritage Greater London Archaeology Advisory Service, June 1998 *Archaeological Guidance Papers 1-5*

English Heritage Greater London Archaeology Advisory Service, May 1999 *Archaeological Guidance Papers 6*

Higgins, D A and Davey, P, 1994 *Draft guidelines for using the clay tobacco pipe record sheets*, unpublished report

Institute for Archaeologists, (IFA), 2001 *By-Laws, Standards and Policy Statements of the Institute for Archaeologists, (*rev. 2001), *Standard and guidance: field evaluation*

Institute for Archaeologists (IFA), supplement 2001, *By-Laws, Standards and Policy Statements of the Institute for Archaeologists: Standards and guidance – the collection, documentation conservation and research of archaeological materials*

McNicholas, October 2010, Limmo Peninsula Shaft, *Method Statement: Excavating for Archeologists* (ref no. D/B2 rev1)

MOLA, November 2010, *C261 Early East Section Method Statement for an Archaeological Evaluation and Watching Briefs at Limmo Peninsula Shaft* (C123), (Doc No: C261-MLA-T1-GMS-CR094-00001, Version 2)

Museum of London, 1994 *Archaeological Site Manual 3rd edition*

Museum of London, 2002 *A research framework for London archaeology 2002*

Oswald, A, 1975 *Clay pipes for the archaeologist*, BAR 14, Oxford

Smith, T P, 2005 The materials used to building the kilns, in *The Doulton stoneware pothouse in Lambeth* (ed K Tyler with J Brown, T P Smith, L Whittingham), MoLAS Study ser 15, 32–36

# 16 Acknowledgements

The author would like to thank [redacted] (C252 McNicholas Project Manager) for his invaluable assistance on site. as well as Malcom Tucker and Robert Carr (GLIAS specialists) for bringing to bear their specialist knowledge on their site visit.

The evaluation was supervised by the author with the assistance of archaeologists Tanya Bowing and Sasathorn Pickering. Other MOLA staff who were involved in the evaluation included Mark Burch and Gideon Simon (surveying), Maggie Cox (photography), Graham Spurr (geoarchaeologist), Paul Thrale (MOLA timber specialist), Lyn Blackmore (19th/ 20th c pottery and clay tobacco pipes), and Lynne Keys (Slag Samples). The MOLA Senior Contracts Manager was George Dennis and Project Officer was Elaine Eastbury.

# 17 NMR OASIS archaeological report form

### OASIS ID: molas1-91040

**Project details**

| | |
|---|---|
| Project name | Limmo Peninsula |
| Short description of the project | Four phases of archaeological excavation (two general watching briefs, an evaluation with two trenches and a targeted watching brief) carried out at the site of Crossrail Limmo Peninsula Shaft by the Museum of London Archaeology (MOLA), between 09/08/10 to 03/12/10. 20th-century made ground (10m OD) on structural remains of 19th-20th-century Thames Ironworks (3.5m OD) , over 19th-century made ground (2.6m OD), overlaying alluvial and natural deposits (0.49mOD). |
| Project dates | Start: 09-08-2010 End: 08-12-2010 |
| Previous/future work | Not known / Not known |
| Any associated project reference codes | XRW10 - Sitecode |
| Type of project | Field evaluation |
| Site status | Local Authority Designated Archaeological Area |
| Current Land use | Industry and Commerce 1 - Industrial |
| Monument type | IRONWORKS Post Medieval |
| Significant Finds | CLAY PIPE (SMOKING) Post Medieval |
| Significant Finds | POTTERY Post Medieval |
| Methods & techniques | 'Targeted Trenches' |
| Development type | Rail links/railway-related infrastructure (including Channel Tunnel) |
| Prompt | Crossrail Act 2008 |
| Position in the | Not known / Not recorded |

planning process

**Project location**

| | |
|---|---|
| Country | England |
| Site location | GREATER LONDON NEWHAM NEWHAM Limmo Peninsula |
| Postcode | E16 |
| Study area | 34300.00 Square metres |
| Site coordinates | TQ 39626 80974 51.5099173307 0.012256974093 51 30 35 N 000 00 44 E Point |
| Site coordinates | TQ 39482 81008 51.5102585379 0.01019650601560 51 30 36 N 000 00 36 E Point |
| Site coordinates | TQ 39519 81035 51.5104920280 0.01074007840650 51 30 37 N 000 00 38 E Point |
| Height OD / Depth | Min: -1.00m Max: 0.45m |

**Project creators**

| | |
|---|---|
| Name of Organisation | MOLA |
| Project brief originator | Crossrail |
| Project design originator | Crossrail |
| Project director/manager | Elaine Eastbury |
| Project supervisor | Robert Hartle |

**Project archives**

| | |
|---|---|
| Physical Archive recipient | LAARC |
| Physical Archive ID | XRW10 |
| Physical Contents | 'Ceramics','Glass','Industrial' |

| | |
|---|---|
| Digital Archive recipient | LAARC |
| Digital Archive ID | XRW10 |
| Digital Contents | 'Stratigraphic','Survey','other' |
| Digital Media available | 'Geophysics','Images raster / digital photography','Survey','Text' |
| Paper Archive recipient | LAARC |
| Paper Archive ID | XRW10 |
| Paper Contents | 'Stratigraphic','Survey' |
| Paper Media available | 'Context sheet','Matrices','Notebook - Excavation',' Research',' General Notes','Plan','Report','Section','Survey ' |

**Project bibliography 1**

| | |
|---|---|
| Publication type | Grey literature (unpublished document/manuscript) |
| Title | C261 ARCHAEOLOGY EARLY EAST Fieldwork Report Archaeological Watching Briefs and Evaluation C123 Limmo Peninsula Shaft - XRW10 |
| Author(s)/Editor(s) | Hartle, R |
| Date | 2011 |
| Issuer or publisher | MOLA |
| Place of issue or publication | LONDON |
| Description | A4 ring bound report |

| | |
|---|---|
| Entered by | Robert Hartle (rhartle@museumoflondon.org.uk) |
| Entered on | 11 January 2011 |

# 18 Appendices:

## 18.1 Building materials

***Ian M Betts***

Six brick samples were collected from XRW10 (contexts [12], [13] and [31]).

The building material from XRW10 has been fully recorded and the information added to the Oracle database.

Listed below is a summary of the building material in each context:

| Context | Fabric | Type | Date |
|---|---|---|---|
| [12] | 3032, 3035 | Brick | 1830–1900/1940 |
| [12] | 3261 | Firebrick | 1830–*c* 1910 |
| [13] | 3035 | Brick | 1830–1900/1940 |
| [31] | 3034 | Brick | 1830–1900/1940 |
| [31] | 3261 | Firebrick | 1830–*c* 1910 |

*Table 3: Summary of the building material*

**Discussion**

Three different kinds of bricks are present on the site. London-made dark red brick (fabrics 3032, 3034) from contexts [12] and [31], yellow London stock (fabric 3035), probably from a brickyard in north Kent or south Essex, from contexts [12] and [13] and white, yellow, pink and cream firebricks (fabric 3261) from contexts [12] and [31].

Many of the bricks have deep frogs, whilst the examples from [12] and [13] appear to have very indistinct letters or marks in the frog base. The latter feature would indicate a Victorian or later date.

There are two kinds of firebrick from the site. There are rectangular examples of normal brick shape and large square bricks. Some of the former are stamped POTTER in either the top of bottom surface. At present the origin of these bricks is uncertain, although it is known that firebricks were brought into London from Newcastle, Glasgow and the West Midlands.

The large firebricks from structure [31], measuring 301–302mm square, are stamped COWEN on the top or bottom surface. These show evidence of burning, which has resulted in the clay body turning a pinkish-grey colour. Firebricks stamped COWEN have been found on other London sites, notably Doulton's factory in Lambeth (AEB01) (Smith 2005, 33–34). They were made by Joseph Cowen & Co of Blaydon-on-Tyne, Newcastle which was in operation between *c* 1823–1904.

The smaller stamped firebricks recovered from structure [31], are probably Victorian or early Edwardian in date, which would also agree with the dating of the old Thames Ironworks (1846–1912).

## 18.2 19th-century pottery

***Lyn Blackmore***

*Summary/Introduction*

A small number of finds were collected from three contexts.

*Methodology*

The pottery from this site was examined macroscopically, using a binocular microscope (x 20) where appropriate, and recorded on paper and computer, using standard Museum of London codes for fabric, form and decoration. The numerical data comprises sherd count (SC), estimated number of vessels (ENV) and weight (by grammes) and was entered onto the ORACLE database.

*Fabrics and forms*

A total of 25 sherds (16 ENV, 1008g) were recovered from three contexts. Arguably the earliest is [2], which contained half a bone china saucer with a date range of 1794–1830.

Contexts [31] and [35] are both dated to 1830–1900. The former contained sherds from a stoneware flagon and flared jar/measure, both with Bristol glaze. Context [35] contained 20 sherds from a range of tablewares (13 ENV), some transfer-printed, some in bone china with red bands around the rim; also present are the bases of two stoneware jars, probably used for marmalade or similar condiments. None of the pottery is of high quality.

*Discussion*

This evaluation supplied a 19th-century post-medieval pottery assemblage, material that can be considered as being representative of the condition and chronologies of the ceramics that might be found in any future excavations within the footprint of this development (and in its immediate environs).

## 18.3 Clay tobacco pipe

***Lyn Blackmore***

*Introduction/methodology*

The clay tobacco pipe assemblage from XRW10 was recorded in accordance with current Museum of London Archaeology practice and entered onto the Oracle database. The English pipe bowl has been classified and dated according to the Chronology of London Bowl Types (Atkinson and Oswald 1969), using the prefix AO. Quantification and recording follow guidelines set out by Higgins and Davey (1994; Davey 1997).

*Quantification*

| | |
|---|---|
| Total no. of fragments | 1 |
| No. of bowl fragments | 1 |
| No. of stem fragments | - |
| No. of mouthpieces | - |
| Accessioned pipes | - |
| Marked pipes | - |
| Decorated pipes | - |
| Imported pipes | - |
| Complete pipes | - |
| Wasters | - |
| Kiln material fragments | - |
| Boxes (bulk\accessioned) | - |

*Table 4:* Clay tobacco pipe quantification

*Character and dating of the clay pipes*

Context [2] contained the bowl of a clay pipe with moulded decoration of four large symmetrically arranged leaf motifs, one front, one back and one on each side, which extend to *c* 75% of the height of the bowl; the rim is unmilled (Photo 15). The 'spur' is textured like a sawn-off branch and projects from the front, ie on the same alignment as the stem, not perpendicular to it as is normally the case. From the form of the bowl and the unusual decoration this pipe dates to after 1840 (J Pearce pers comm.); no direct parallels have yet been found.

Photo 15: Clay pipe bowl from Trench 1

## 18.4 Glass

***Lyn Blackmore***

Context [2] contained the neck and mouth of a Codd bottle, with the glass alley that formed part of the method for stopping gas from carbonated drink escaping. This form of bottle was introduced in 1870.

## 18.5 Slag

***Lynne Keys***

*Introduction & methodology*

A slag assemblage weighing just under 15kgs was examined for this report. It was examined by eye and categorised on the basis of morphology and colour. Each slag or other material type in each context was weighed; details are given in the table below.

| | XRW 10 | | Limmo Peninsula (Crossrail) |
|---|---|---|---|
| **cxt** | **<s> slag identification** | **wt (g)** | **comment** |
| 18 | 1 sample residue | 4812 | burnt coal, coal, fuel ash slag, ferruginous concretions, run slag, tiny iron fragments |
| 30 | 3 cinder with run slag on surface | 1109 | |
| 30 | 3 fuel ash slag | 2595 | red colour; very cindery |
| 30 | 3 sample residue | 2964 | mix of tiny: cinder, fuel ash slag, furnace brick frags., tiny slag runs, occasional iron fragments |
| 30 | 3 vitrified brick surface | 1411 | |
| 30 | 3 vitrified furnace lining | 373 | |
| 36 | 2 sample residue | 1612 | burnt coal & coal |
| | **total wt. = 14,876g** | | |

*Table 5:* Quantification table for the slag & related debris

*Discussion*

The slag assemblage contained no evidence for iron smithing or iron working; although samples were tested with a magnet, no diagnostic micro-slags such as hammerscale were found. Apart from some slag dribbles and occasional tiny fragments of iron, there is nothing in the assemblage to suggest either iron smelting or smithing took place in the

areas excavated. Much of the material consists of a red, very cindery, fuel ash slag which was produced by a reaction at very high temperature between a fuel (probably coal) and a clay or porous ceramic surface. Some fragments appear to have been formed at great heat on a ceramic surface and then to have flaked off.

The overall impression, particularly from the slag filling the unidentified structure in evaluation trench 2, is that it is re-deposited material and not necessarily generated where it was found [however, some of this material was adhering to the flues of the structure, and is assumed to be waste from its use RH/NE].

*Recommendations for further work*

Documentary sources should be consulted for identification and use of the structure in trench 2. This specialist will forward photographs of the structure to David Cranstone to see whether he can suggest what it was used for and to put him in touch with the archaeological supervisor and project manager for the Limmo Peninsula excavation.

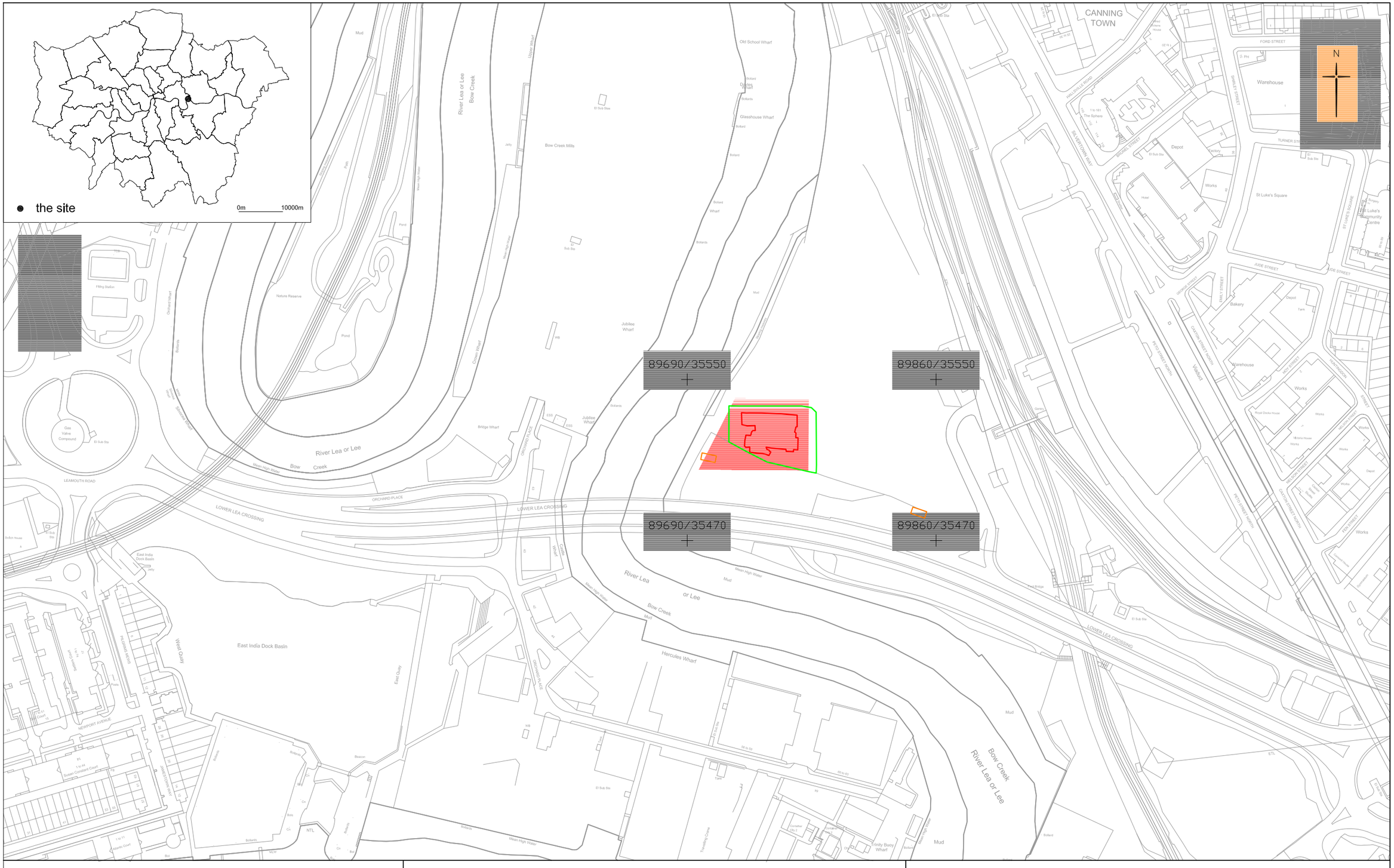



Fig 1: Location of Limmo Peninsula worksite

- Area of GWB (ground reduction)
- Area of GWB (stopple pits)
- Area of TWB and location of evaluation trenches

0 1: 2500 @ A3 250m

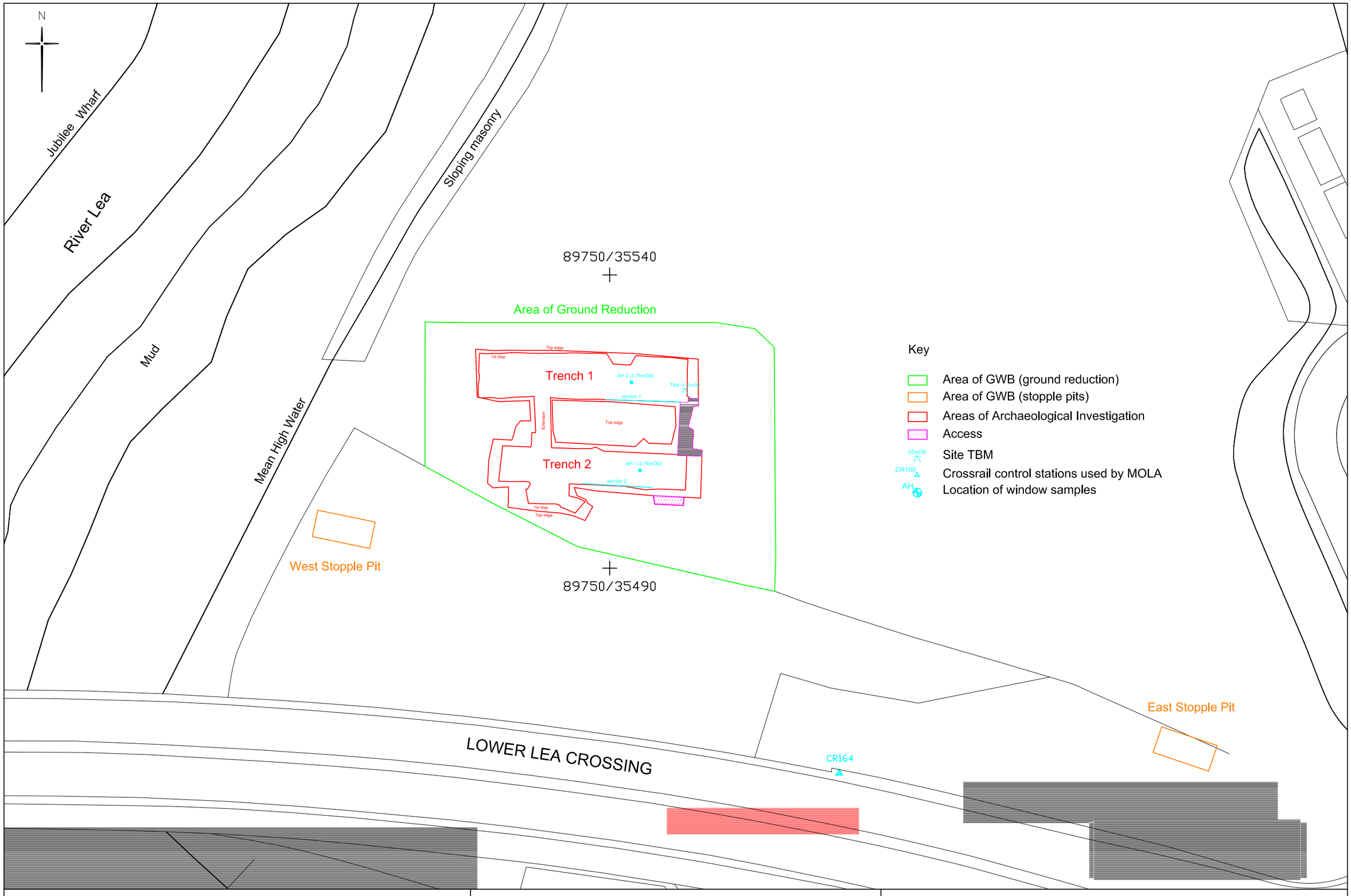



Fig 2: Location of archaeological investigations at Limmo Peninsula

Event code / Site code: XRW10

Site Address: Crossrail: Limmo Peninsula Shaft

Type of fieldwork: TWB / Evaluation

Print scale 1:600 @ A3

0 60m

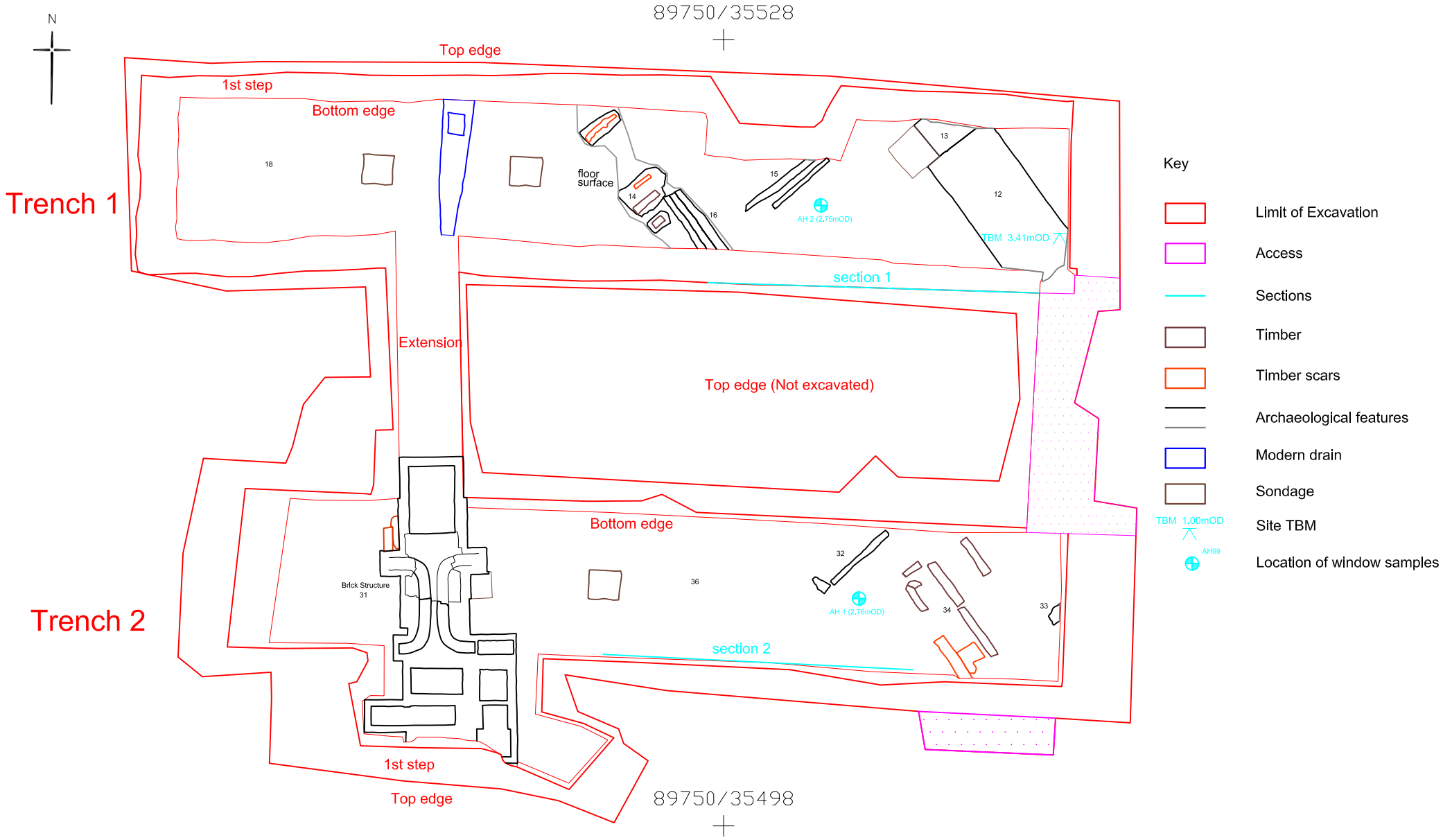



Fig 3: Multicontext plan of archaeological features in Trenches 1 and 2

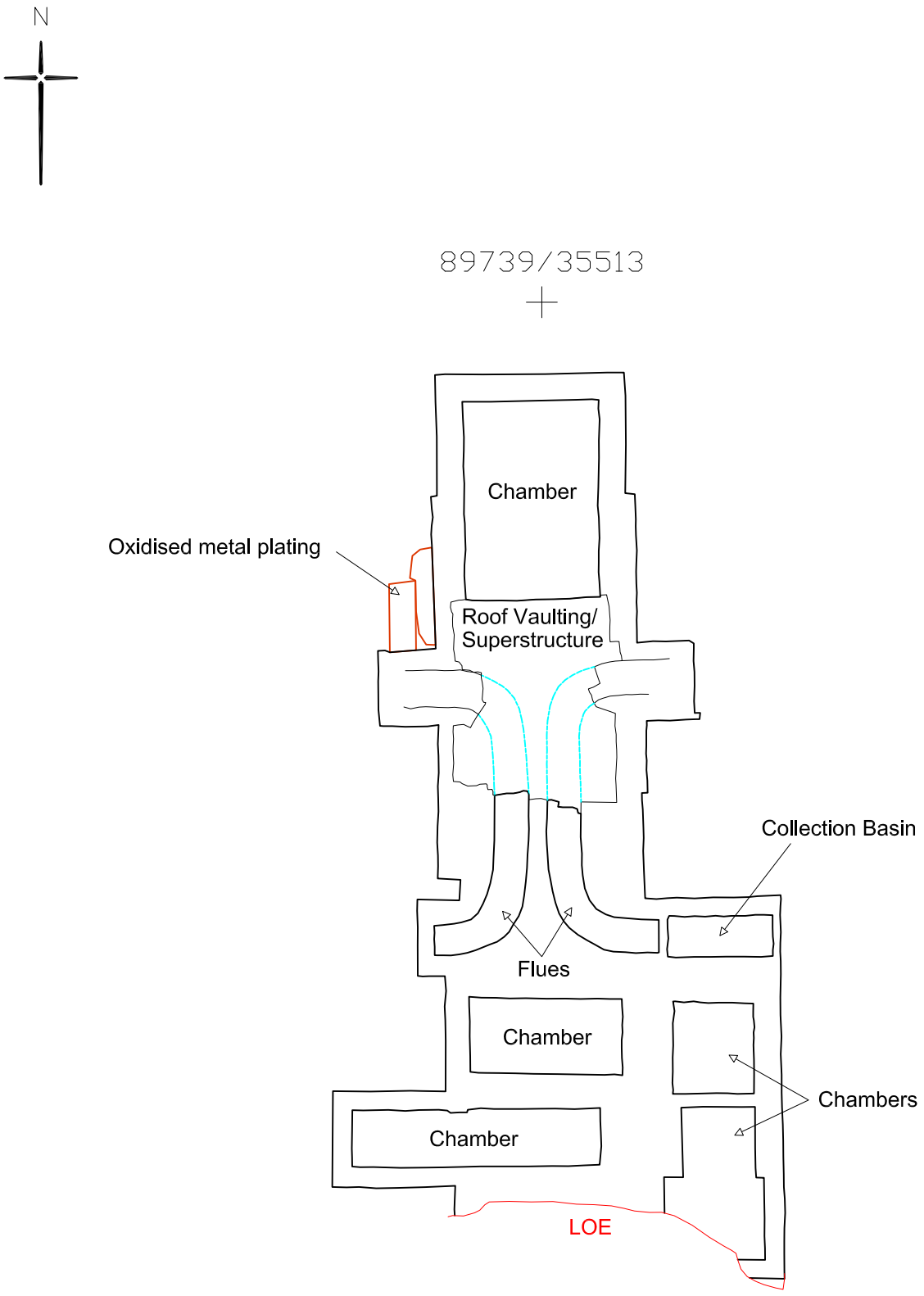
Event code / Site code: XRW10

Site Address: Crossrail: Limmo Peninsula

Type of fieldwork: TWB / Evaluation

Print scale 1:200 @A4

0 10m




# Brick Structure [31]

| | | |
|---|---|---|
| Fig 4: Detail of Brick structure [31] in Trench 2 | Event code / Site code XRW10<br>Site Address: Crossrail: Limmo Peninsula<br>Type of fieldwork: TWB / Evaluation | Print scale 1:80 @ A4<br>0 4m |

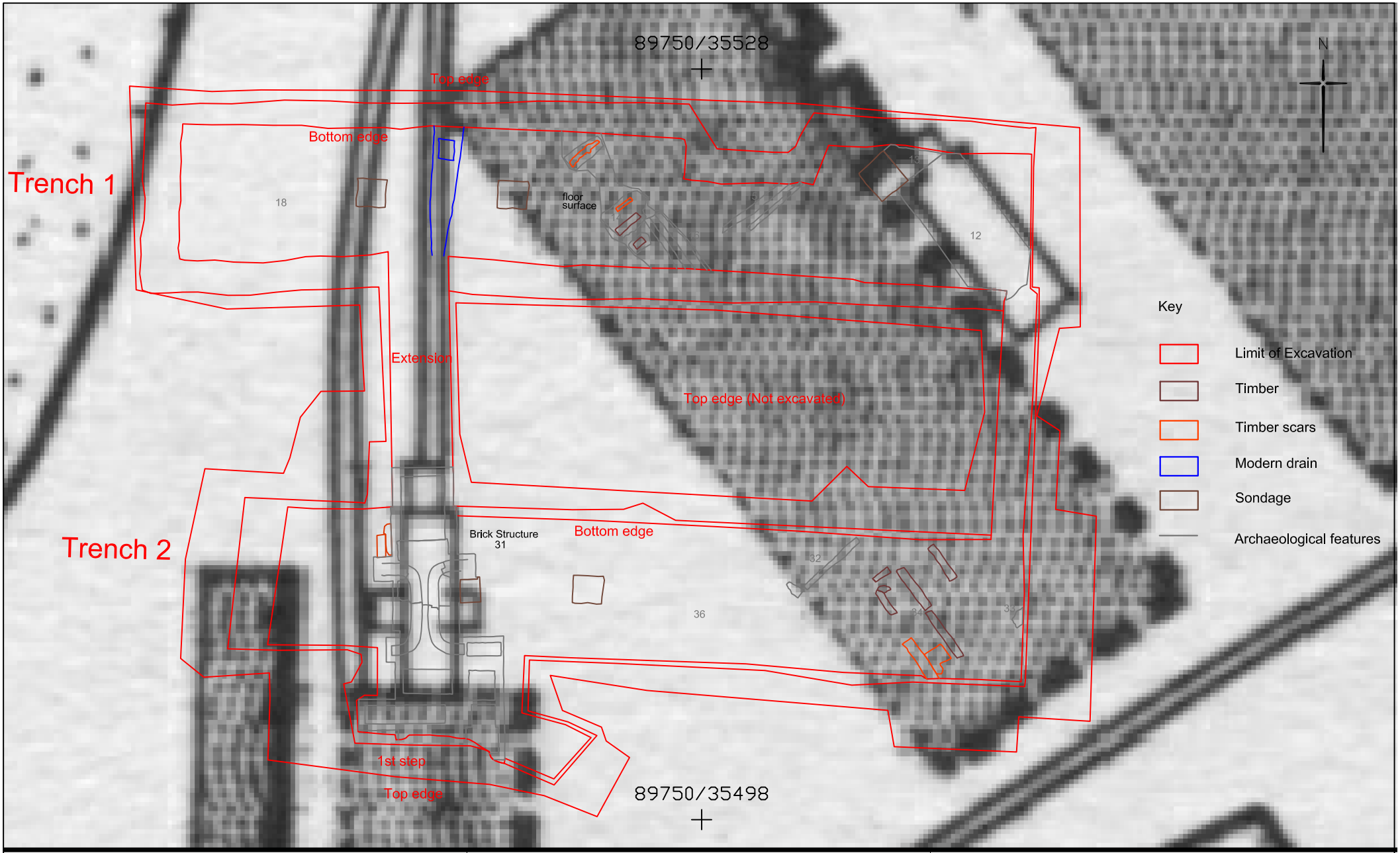



Fig 5: Plan of Archaeological features overlain on OS 1869 Map

Event code / Site code: XRW10

Site Address: Crossrail: Limmo Peninsula

Type of fieldwork: TWB / Evaluation

Print scale 1:200 @A4

0 10m

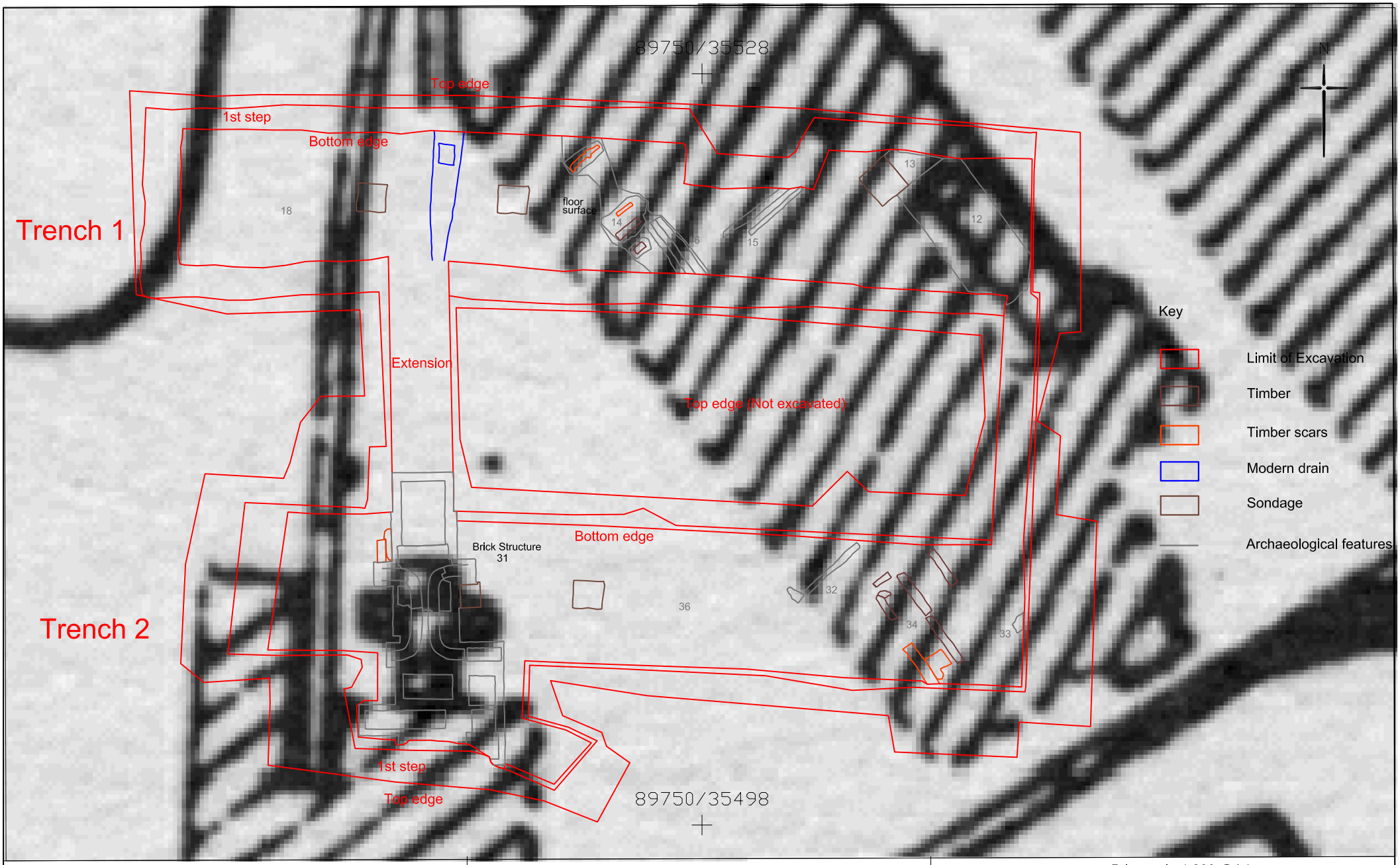



Fig 6: Plan of Archaeological features overlain on OS 1897 Map

Event code / Site code: XRW10

Site Address: Crossrail: Limmo Peninsula

Type of fieldwork: TWB / Evaluation

Print scale 1:200 @A4

0 10m

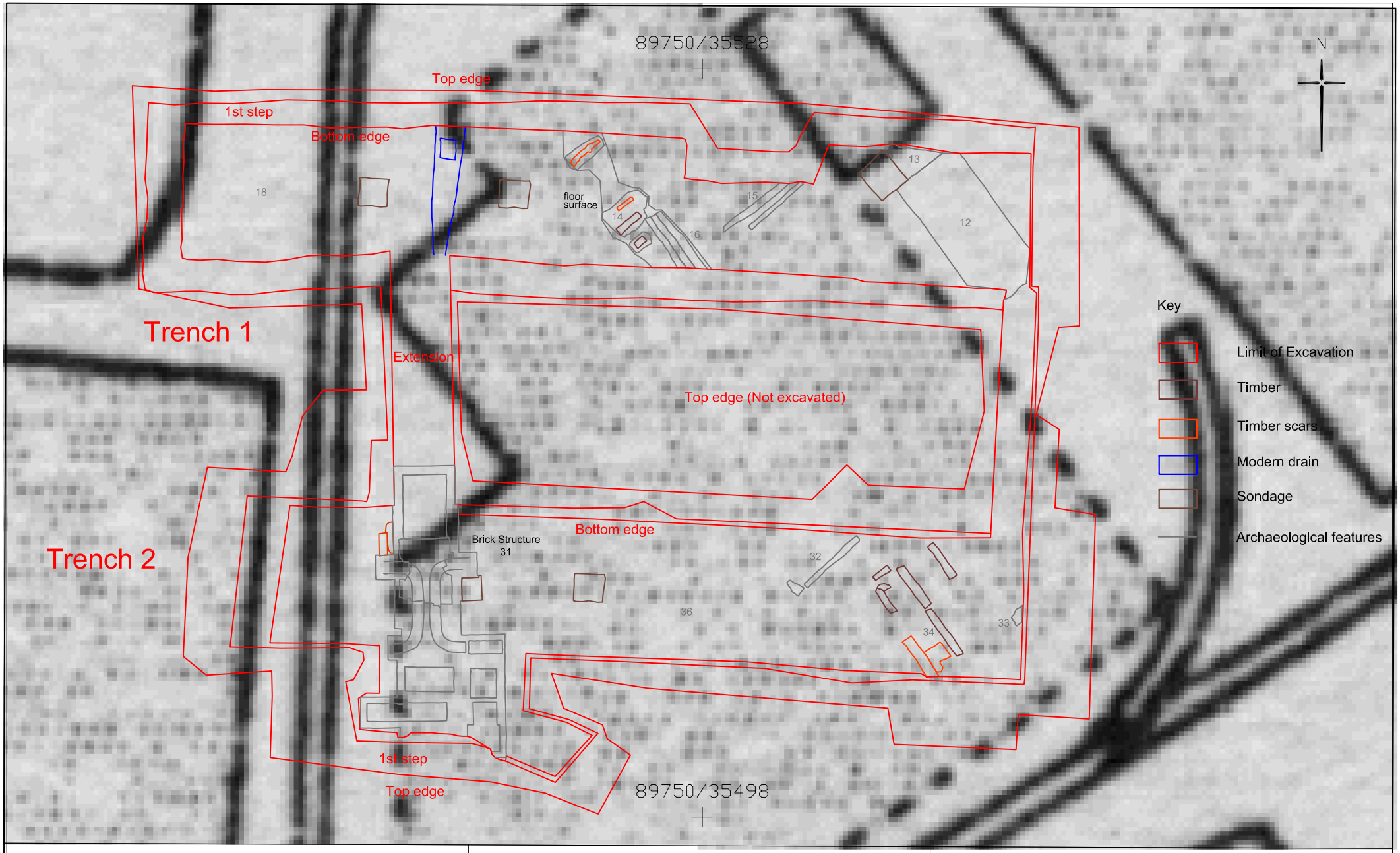



Fig 7: Plan of Archaeological features overlain on OS 1916 Map

Event code / Site code: XRW10

Site Address: Crossrail: Limmo Peninsula

Type of fieldwork: TWB / Evaluation

Print scale 1:200 @A4

0 10m