



Plate 94: Trench 121 looking south, scale 2m

4.4 Site 23 Bramley-Moore Dock north quay crane bases

- 4.4.1 Two trenches were excavated on BMD's northern quay (Trenches 231 and 232; Fig 9), originally designed to target two of the crane bases depicted on historic mapping (Fig 12). Subsequent revisions of the WSI however necessitated the amendment of the trench locations to maintain an adequate distance from the dock wall. Excavation revealed archaeological remains in both trenches, however, as a result of the relocation neither the crane bases or their associated hydraulic systems were encountered.
- 4.4.2 Both trenches contained the same general deposits, the earliest being a dark reddish-brown sandy silt (**23107** and **23208**), exceeding 0.4m thick. This was, in turn, overlain by a grey silty sand (**23105** and **23205**) up to 0.49m thick, subsequently, overlain by a light greyish-brown silty sand bedding layer (**23101** and **23201**). Overlying the bedding layer was concrete, **23100**, in Trench 231, and cobble setts, **23200**, in Trench 232.
- 4.4.3 **Trench 231:** the western half of the trench was devoid of archaeology, the principal archaeological remains identified in the eastern half of the trench being related to the remains of a cellar (Fig 11; Plate 95). North/south-aligned L-shaped wall, **23102**, was identified approximately 1.5m from the eastern end of the trench. It was approximately three bricks wide at the northern end of the trench, widening out to seven bricks wide 1m from the southern limit of excavation, which suggests that this wall may have been a supporting wall of the east/west section of the High Level Coal Railway depicted on historic mapping (Fig 12). There were two walls identified within the northern and southern sections of the trench, the northern wall **23112**, appeared to be keyed into wall **23102**, whilst the southern wall **23104**, appeared to be a separate structure, although possibly contemporary as all three walls were lime-washed.



Plate 95: Trench 231 looking west with structures **23102**, **23104** and **23112** in the foreground, scale 2m

- 4.4.4 There appeared to be a concrete floor surface **23113** within the cellar, with evidence of a manhole. There were also the remains of a several iron features within the room, one of which was a ladder fixed to wall **23112**, which was the likely method of access to this room rather than by stairs, suggesting that it may have been a service room, rather than for storage. The room was subsequently filled by five deposits (**23106**, **23108**, **23109**, **23110** and **23111**), which were all quite distinct, but did all contain ash, clinker, and lime.
- 4.4.5 **Trench 232**: only contained a single structural feature, sandstone wall **23207** (Fig 11; Plate 96), which was an L-shaped structure, approximately 2m long, 0.78m wide and surviving to a height of 0.5m. Wall **23207** was constructed in a similar way to the column bases identified on Site 8, which may suggest that the structure was a column base or a supporting structure for the east/west section of the High Level Coal Railway (Fig 12). The wall was overlain by a layer of concrete, **23206**, and three layers of backfill deposits (**23204**, **23203** and **23202**).



Plate 96: Trench 232 looking north, scale 2m

4.5 Site 25 Bramley-Moore Dock east quay crane bases

- 4.5.1 A single trench, measuring 12.5m long by 2.2m wide and aligned north-east/south-west, was excavated on the eastern quay of BMD (Plate 97). The trench location was originally designed to target one of the crane bases depicted on historic mapping (Fig 12), however subsequent revisions of the WSI necessitated their relocation. As a result, although several structures were identified within the trench, none of them appeared to relate to the crane base they had originally targeted or any part of the hydraulic system which powered the cranes.



Plate 97: Trench 25 looking south-east, scale 2m

- 4.5.2 The earliest deposit encountered within the trench was mid-brownish-grey silty sand **2502**, which also contained a substantial amount of rubble. Several brick structures were identified cutting this deposit, which included three brick-built bases (**2505**, **2506** and **2508**) and wall **2507**. The three brick-built bases were all of approximately the

same dimensions, 1.85m long by 1.45m wide and surviving to a height of 0.6m. There was evidence of a hole at the northern end of two of the bases (**2505** and **2508**), in the case of **2508** an iron rod remained *in situ*, which suggested that the structures were likely supports for machinery. Base **2506** appeared to have been heavily worn on the western face, creating a semi-circular groove within the feature (Plate 98).



*Plate 98: Brick-built base **2506** with semi-circular groove, looking south-east, scale 1m*

- 4.5.3 Located between bases **2506** and **2508** was wall **2507**, which was aligned north-west/south-east and measured 1.5m long, 0.5m wide and survived to a height of 0.43m. The wall did not appear to extend to the limits of the trench, so may have functioned as a supporting structure rather than a division.
- 4.5.4 At the north-eastern end of the trench there was a concrete slab, **2509**, identified in the base of the trench (Plate 99). The slab appeared to have several holes cast into it, potentially, as with the brick-built bases, to support machinery.



*Plate 99: Concrete slab **2509**, looking south-west, scale 1m*

4.5.5 These structures were overlain by mid-brownish-red sand and rubble **2503**, which contained several sandstone blocks with circular holes cut into them (**2504** and **2510**). These may have been used as weights or anchor stones. Deposit **2503** was overlain by concrete **2501**, which incorporated metal rails **2500**, part of the railway system surviving around the dock.

4.6 Site 28 Bramley-Moore Dock red brick structure

4.6.1 A single trench, measuring 10m long by 1.4m wide and aligned north-east/south-west, was excavated in the north-eastern part of the east quay of BMD (Fig 9; Plate 100). The trench was targeted on a red brick structure constructed up against the Regent Road Dock walls; however, there was no evidence of this structure present within the trench, suggesting it had been thoroughly removed when it was demolished.



Plate 100: Trench 28 looking south-west, scale 2m

- 4.6.2 Only two structural features were identified in this trench, the first, at the northern end of the trench being an east/west-aligned drain **2806** (Fig 11), constructed from machine-made bricks and bonded with Portland cement. Immediately to the west of drain **2806** was manhole **2805**, only visible in section.
- 4.6.3 These structures were overlain by a series of three make-up layers (**2807**, **2808** and **2809**), which, in turn, were overlain by a layer of crushed concrete **2803**, 0.1m thick. Crushed concrete **2803** was overlain by brick surface **2800**, constructed from machine-made bricks and bonded with a thin layer of creamy coloured mortar.

5 DISCUSSION

5.1 Historic Building Record

- 5.1.1 **Origins:** the present Transit Shed dates from between 1956-57 and 1968, during which period the earlier shed was demolished, and the new shed built in the same location. Although the two sheds were very similar in form, the present building was constructed upon a larger footprint, presumably fulfilling the requirement for greater capacity and to accommodate the increased size of modern transport. Its constructional details, with its use of reinforced concrete, impermeable red brick, steel roof trusses and sliding steel doors, are indicative of this period and the office block at the eastern end also appears to date from this period.
- 5.1.2 **Function:** the single-storey transit shed was a structure common to the mercantile docks of the nineteenth and twentieth centuries, and was primarily concerned with the unloading, sorting and dispatch of goods arriving through the dock. Such buildings became increasingly important as improvements in transport through the adoption of steam power over sail and increasingly efficient rail transport during the course of the nineteenth century facilitated the rapid redistribution of goods across the country.
- 5.1.3 Unlike many of the multi-storey warehouses the transit shed at Bramley-Moore Dock was an architecturally austere structure built to prioritise economy and function over form, with the layout designed to facilitate the arrival and efficient onward transit of goods with the provision of only limited storage space. The large loading doors expedited this purpose, allowing ships arriving at the dock to unload their goods onto the south quay either via crane or ramp, where they could be transported through the doors into the interior of the building for unloading and sorting. The externally-mounted sliding steel doors improved on the earlier transit sheds by providing weather protection without obstructing the space available for temporary storage of goods in the flanking bays. The goods could then be held in one of these bays before being loaded onto a truck for road transport or transferred onto the railway which now directly passed the southern side of the building.
- 5.1.4 While these buildings also offered far superior resistance to fire than the earlier timber versions, the presence of numerous fire hose stations along the northern wall implies that the threat remained. Each shed appears to have been provided with separate office and welfare facilities, which were set against the southern wall and in most cases in the corners, out of the way of the working floor. The most substantial of these remains in the south-eastern corner of the eastern shed, but the assignment of numbers to each shed may imply a unified operation, with sheds 1 and 2 located elsewhere on the dock.
- 5.1.5 **Development:** by the time the new shed was built the decline of Bramley-Moore Dock was already advanced, with the loss first of its trade in bunker coal and then later the export market following the closure of the coal fields in South Lancashire and further afield. Redundancy through loss of trade probably led to the demolition of the internal structures, the blocking of many of the existing openings and the repurposing of the building to serve as longer term storage facilities. Most recently the office block at the eastern end of the building and quay has been used by Svitzer as an operations hub

for its fleet of tugs, with the remainder used for storage and as a music venue and for filming.

5.2 Evaluation Trenching

- 5.2.1 **Reliability of field investigation:** the archaeology exposed during the evaluation was predominantly structural in nature, relatively well preserved where encountered and clearly distinguishable from the surrounding deposits. Following the sheds and High Level Coal Railway going out of use, they appear to have been reduced to ground level. Only the structures identified on Site 8 appeared to correspond well with the historic mapping, those identified elsewhere likely relating to internal structures of the Nelson Dock north quay shed at Site 12 and the High Level Coal Railway (Fig 12).
- 5.2.2 **Interpretation:** only the archaeological features identified at Site 8 appeared to correspond well with historic mapping, with walls **8103** and **8206** likely relating to the western wall of the narrower mid-nineteenth century shed shown on the 1851 OS map on the western quay. The sandstone column bases identified throughout the three trenches are evenly spaced and appeared to show evidence of iron staining in a shallow depression on their tops, confirming that they are column bases for iron columns. The column bases revealed in Trench 81 are on a north-east/south-west alignment, reflecting the angle of the north-western wall of the later shed as depicted on the 1905 OS map (Fig 12).
- 5.2.3 The remaining trenches containing archaeological structures likely relate to internal structures of the High Level Coal Railway. The trenches targeting crane bases, those at Sites 23 and 25, did not appear to reveal the crane bases or any structures relating to the hydraulic system which would have operated them, but this is likely due to the trenches needing to be positioned further away from the dock walls, due to health and safety concerns and that the walls are listed structures. However, two of the trenches at those sites, Trenches 231 and 25, did identify some substantial structures, which likely relate to the High Level Coal Railway (Fig 12). The cellar identified in Trench 231, was likely related to some form of service access rather than storage, due to the presence of an iron ladder, whilst in Trench 25, brick base **2506** exhibited evidence of a semi-circular groove cut into its western face, which may have been to accommodate a pipe, potentially relating to the hydraulic system.
- 5.2.4 Wall **12104**, identified in Trench 121 at Site 12, is likely an internal division within the former shed, as the structure does not correspond particularly well with the 1905 OS map (Fig 12). The structures identified in Trench 28 appear to relate to the surface water drainage system of the dock, rather than the red brick structure targeted.
- 5.2.5 **Significance:** the archaeological structures were relatively well-preserved across the site, with only their superstructures having been demolished. Although the structures identified on Sites 23 to the north and 25 to the east likely did not relate to the crane bases or their associated hydraulic system that they were intended to target, they did identify well-preserved remains which likely related to both the eastern High Level Coal Railway and its northern arm. With reference to the Desk-Based Assessment (OAN 2020) the remains of the former are therefore of medium/regional significance and the latter of high/national significance. Similarly, the remains of the transit sheds

identified at site 8 can be attributed a medium/regional significance. The structures identified at Sites 12 and 28 did not contain structures of archaeological interest.

- 5.2.6 The recommendations made in the DBA for a Level 1 Building Survey of Site 24, Level 2 Building Recording of Site 11, and excavation of Sites 8 and 12 were completed as part of this phase of works, although no column bases were identified in the trenches excavated on Site 12. The recommendations for the excavation of Sites 23, 25 and 28 were undertaken as part of this phase of works but did not appear to encounter their targeted structures, as such, they will need to be monitored by an archaeological watching brief during pre-commencement works. The excavations of Sites 18 and 29 could not be undertaken at this time due to access issues, as such, they will be required to be excavated once the area becomes available. Watching brief will also be required during pre-construction works in the areas of Sites 14, 15, 16, 17, 19 and 30.

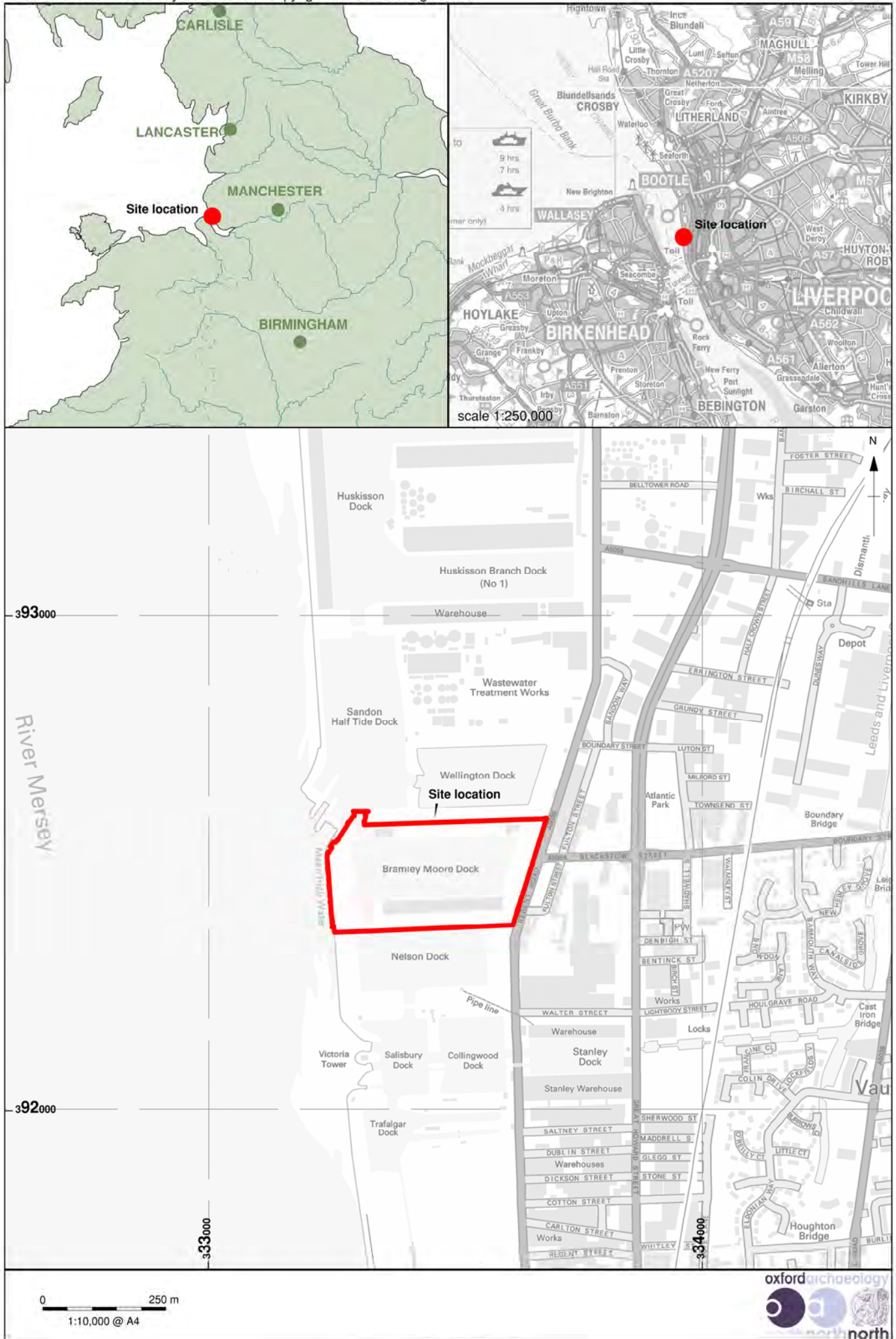


Figure 1: Site location

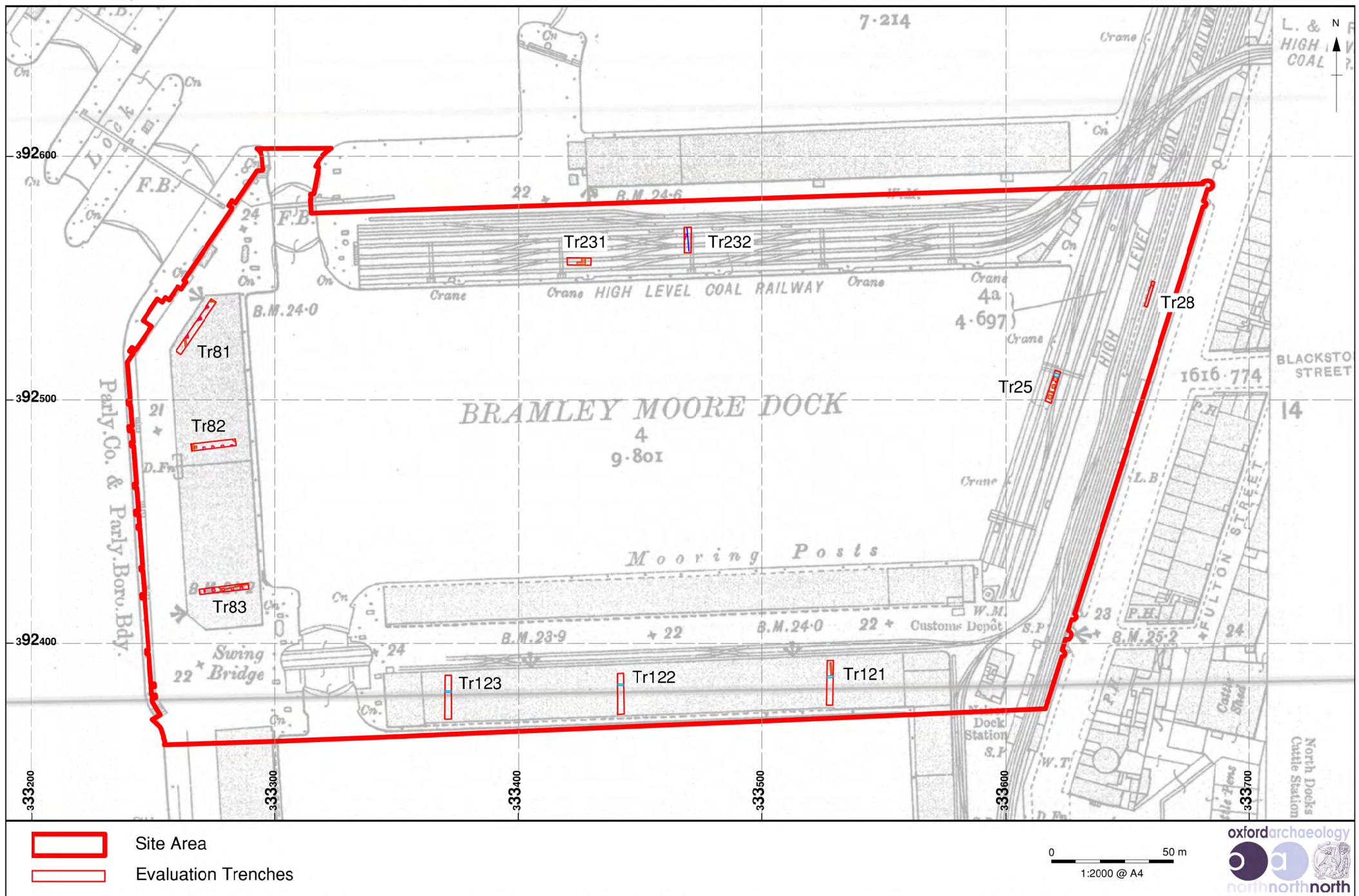


Figure 2: Evaluation trenches superimposed on the Ordnance Survey 25":1 mile map, revised 1905 (pub.1908)

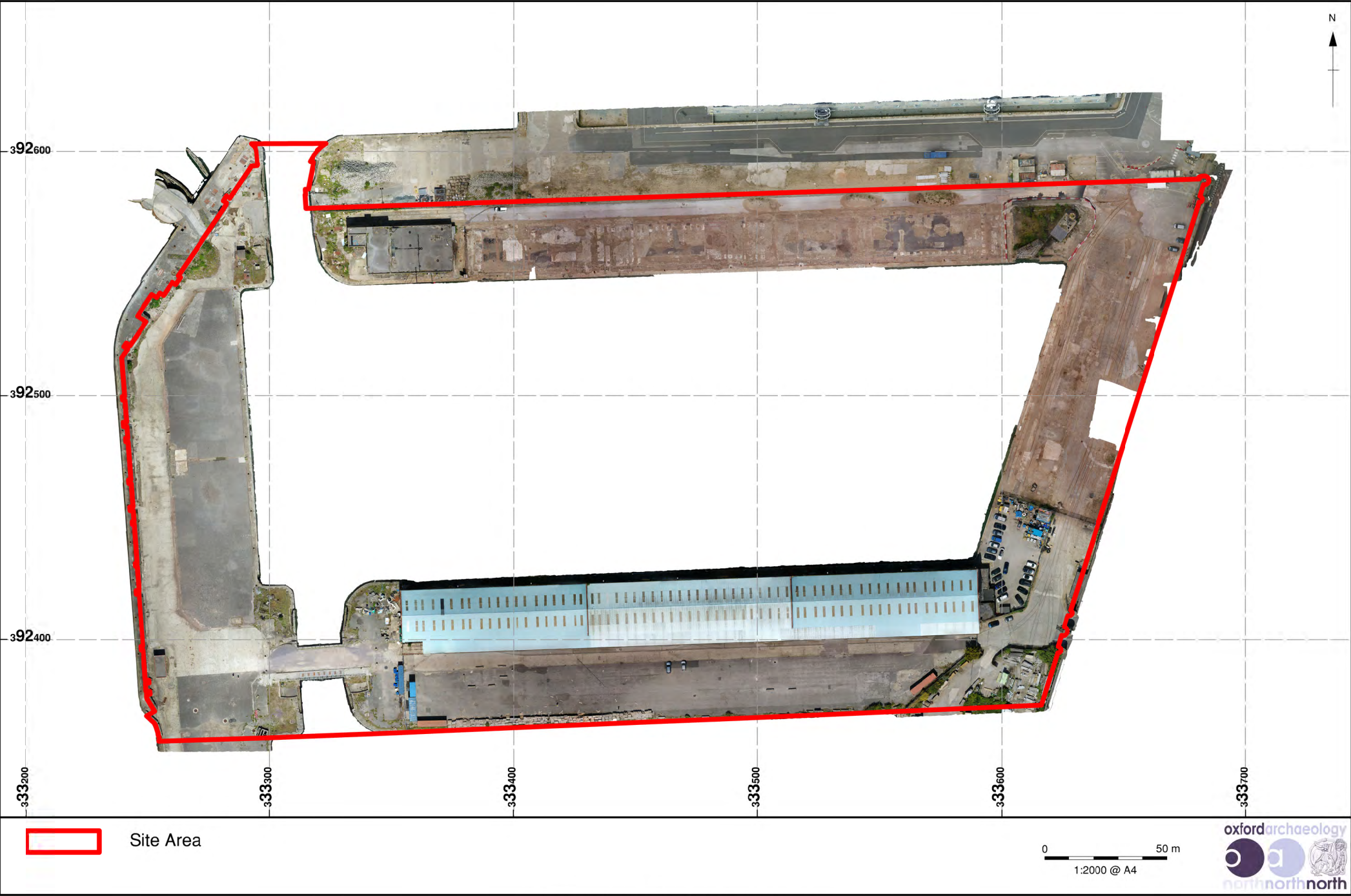


Figure 3: Photogrammetric Survey

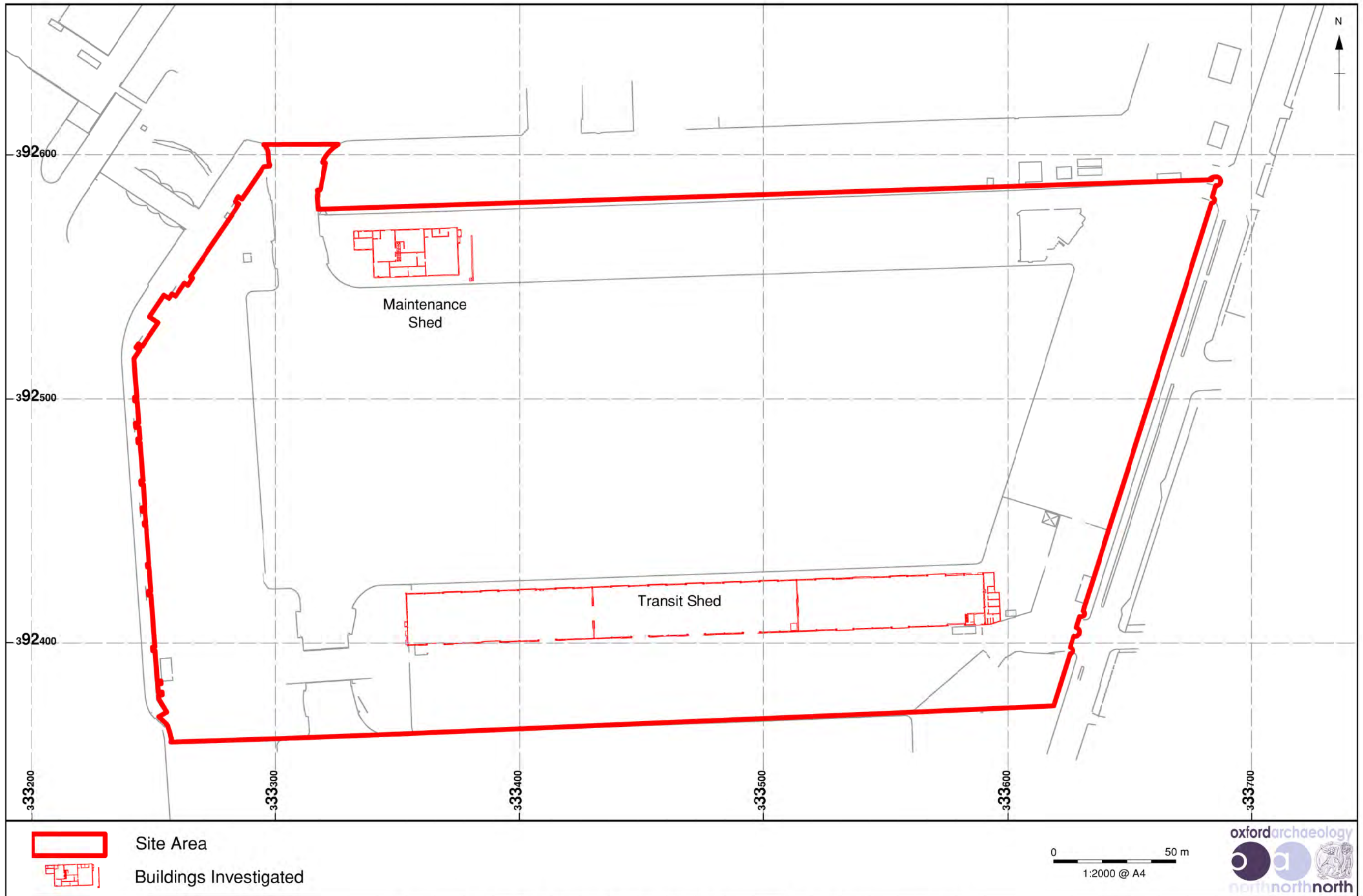


Figure 4: Plan of Bramley Moor Dock showing buildings investigated

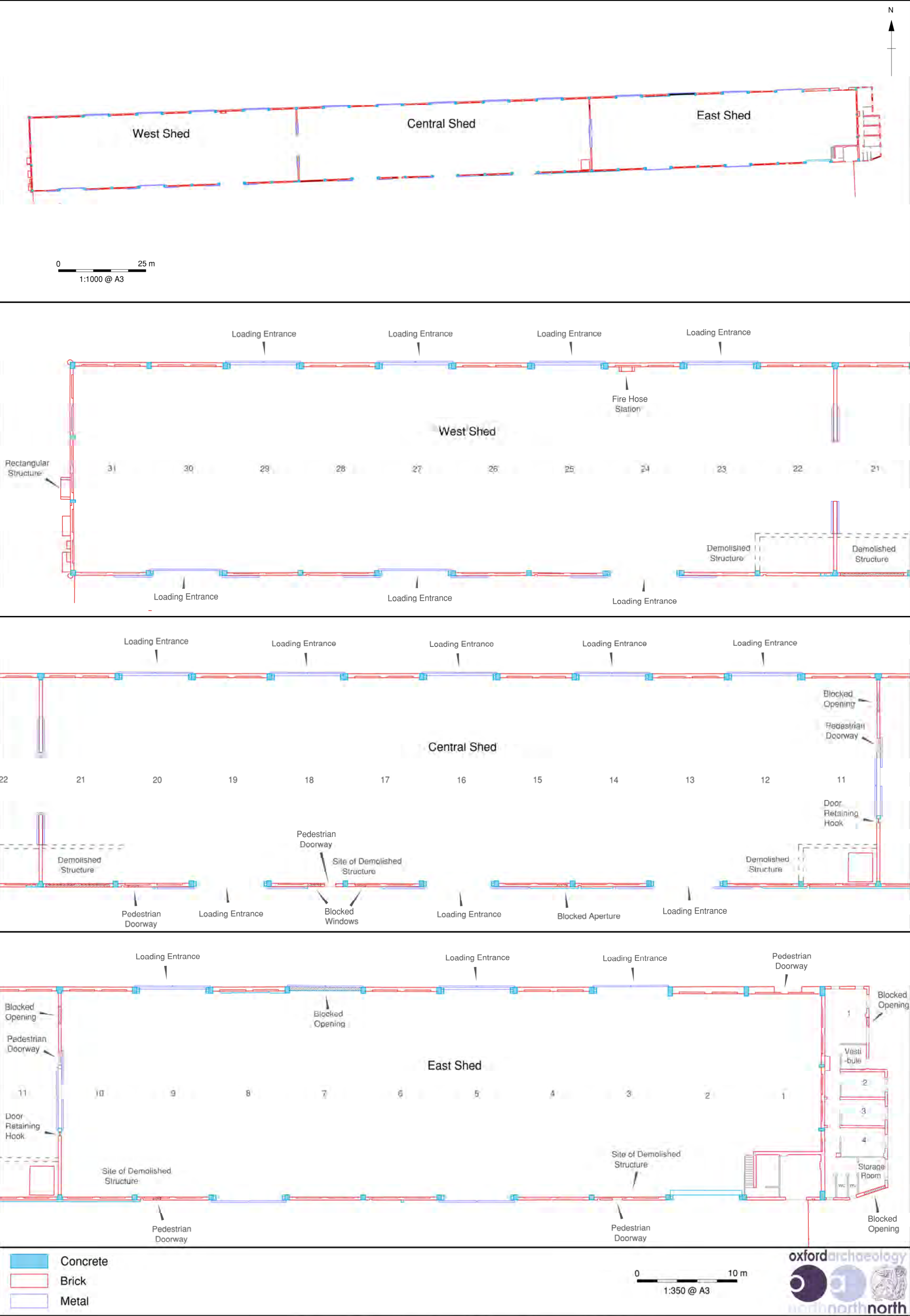


Figure 5: Plan of three bay shed on south quay of the dock

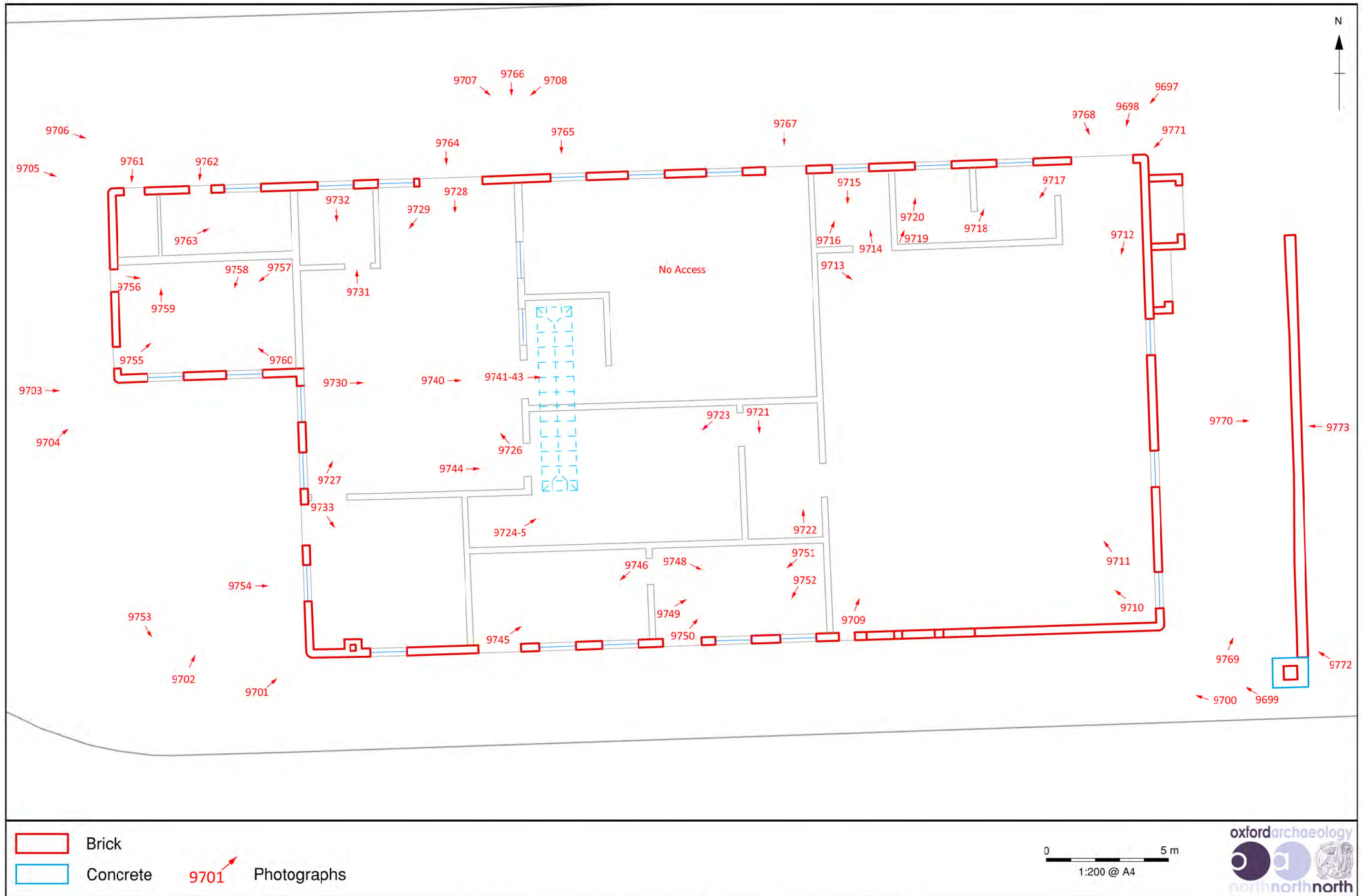


Figure 6: Plan of North Quay Building Bramley Moor Dock

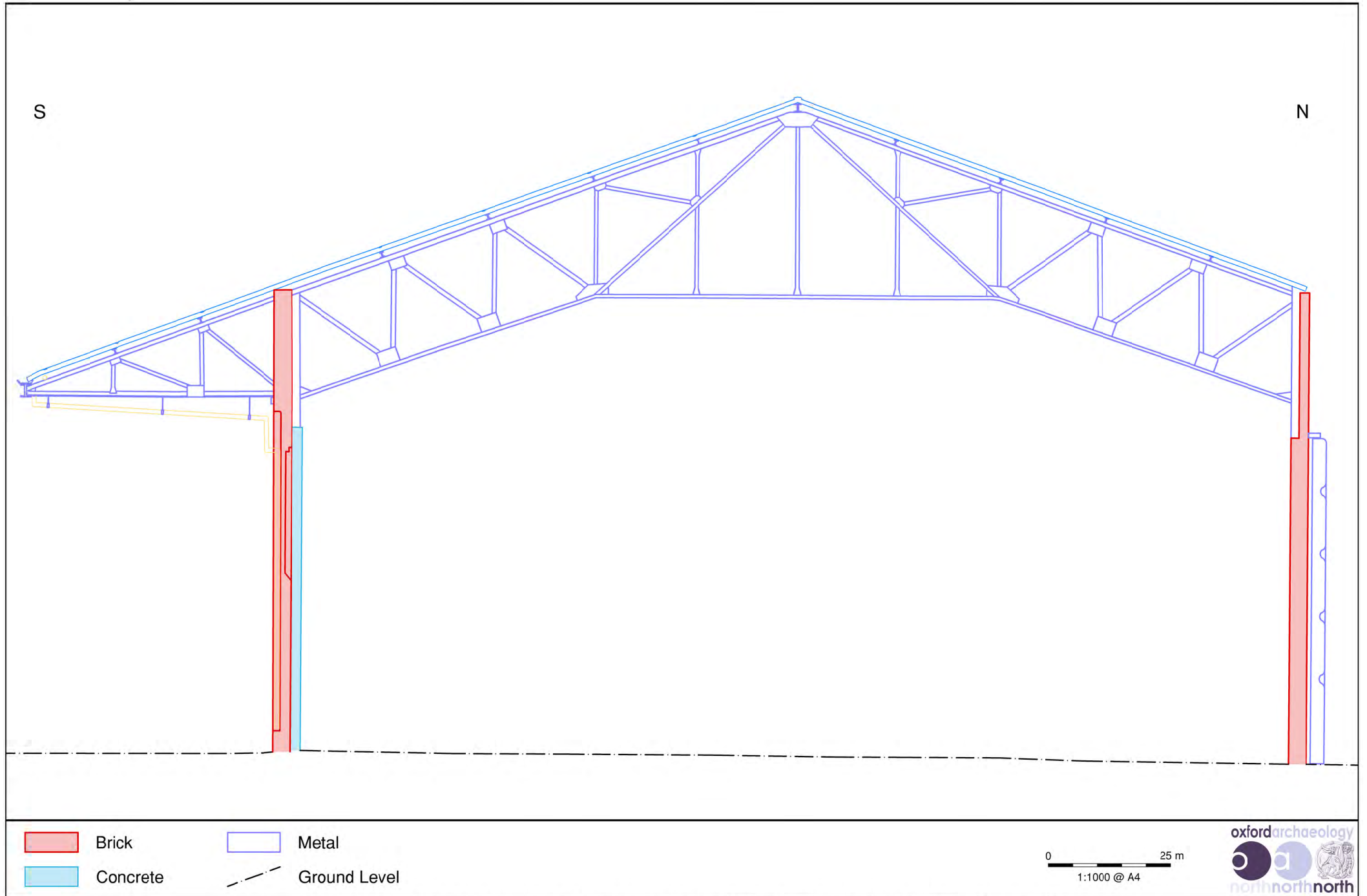


Figure 7: North-south cross-section of three bay shed on south key of the dock

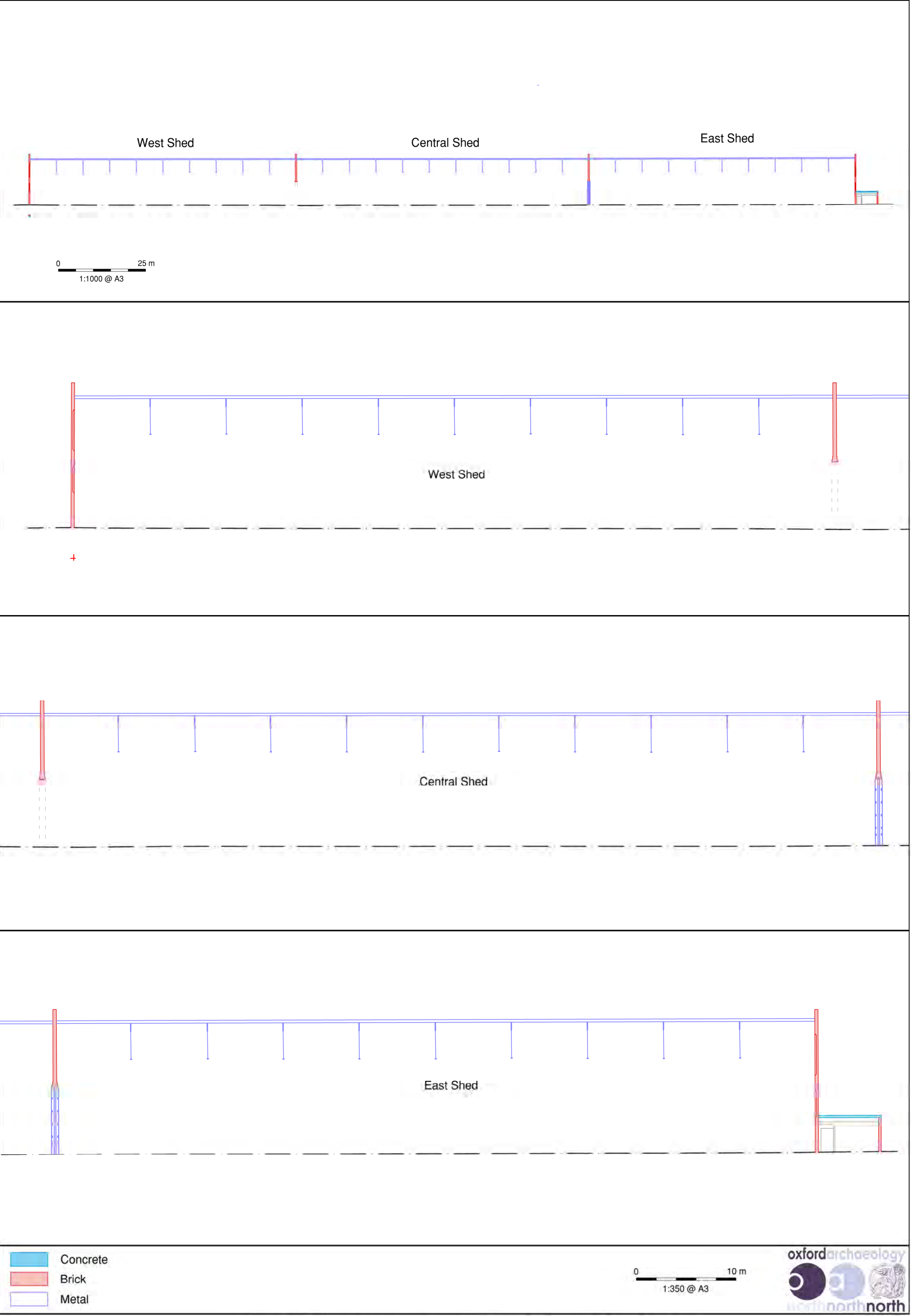


Figure 8: East-west cross-section of three bay shed on south key of the dock

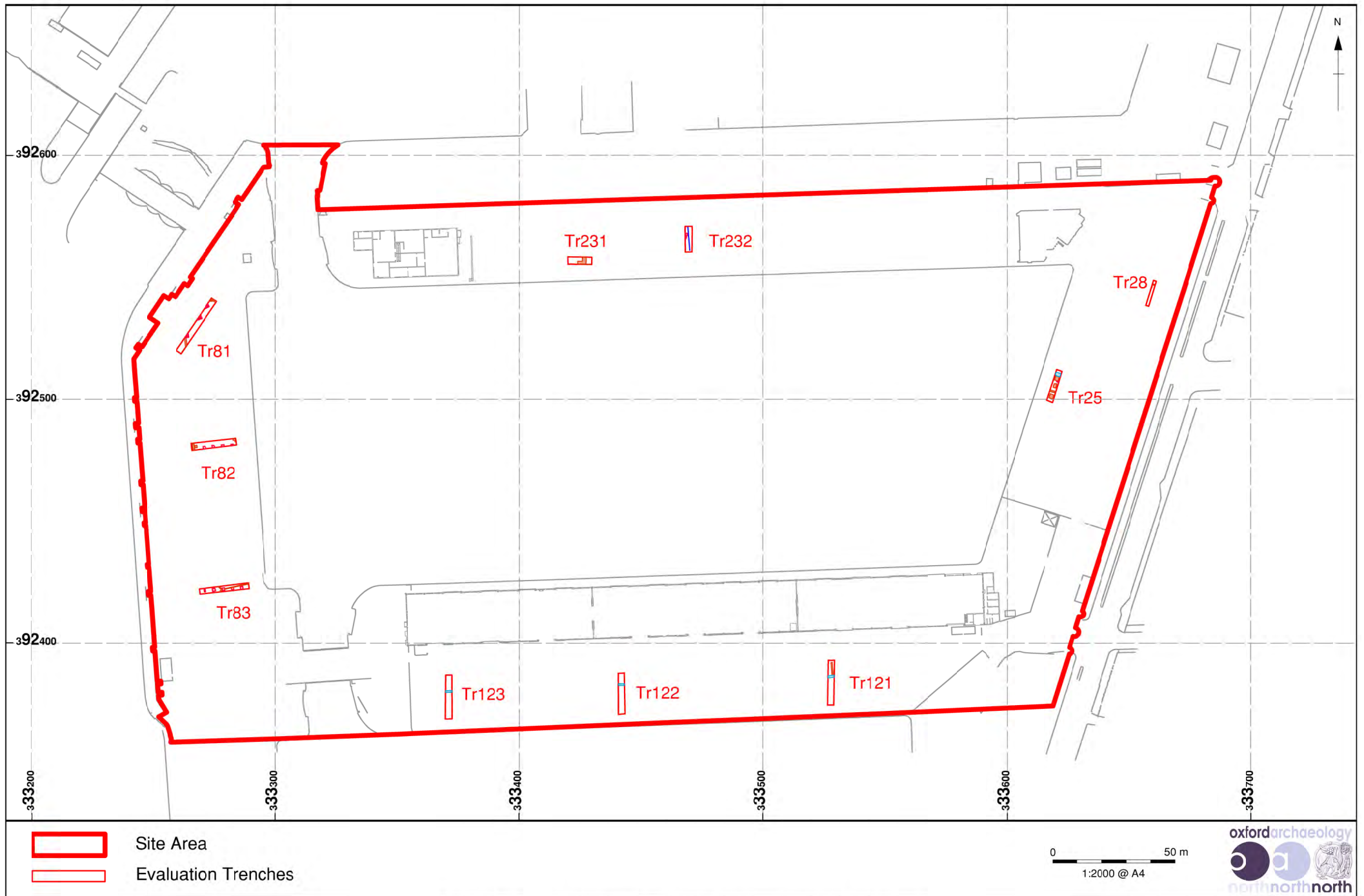


Figure 9: Plan of Bramley Moor Dock evaluation trenches

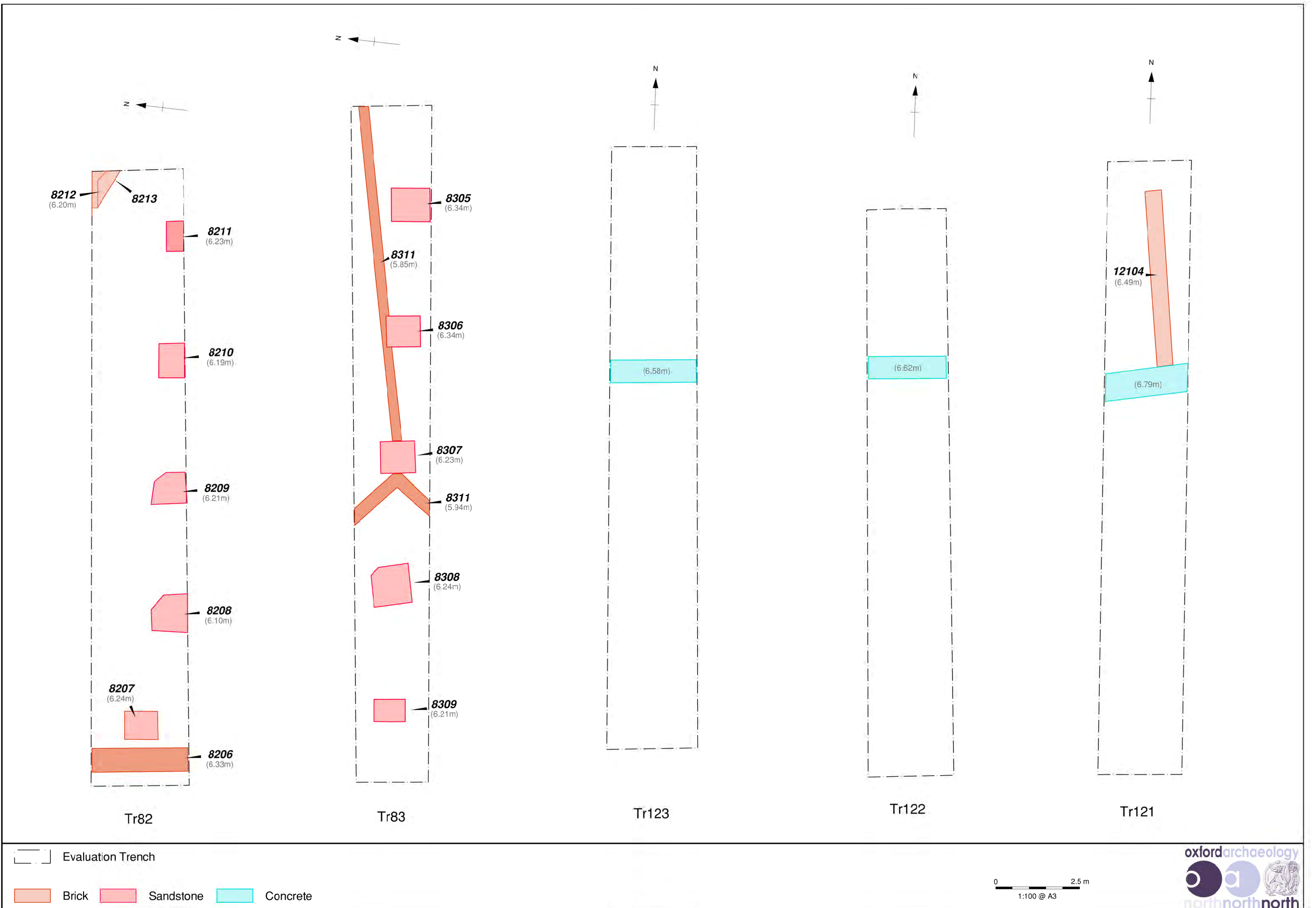


Figure 10: Detailed trench plans

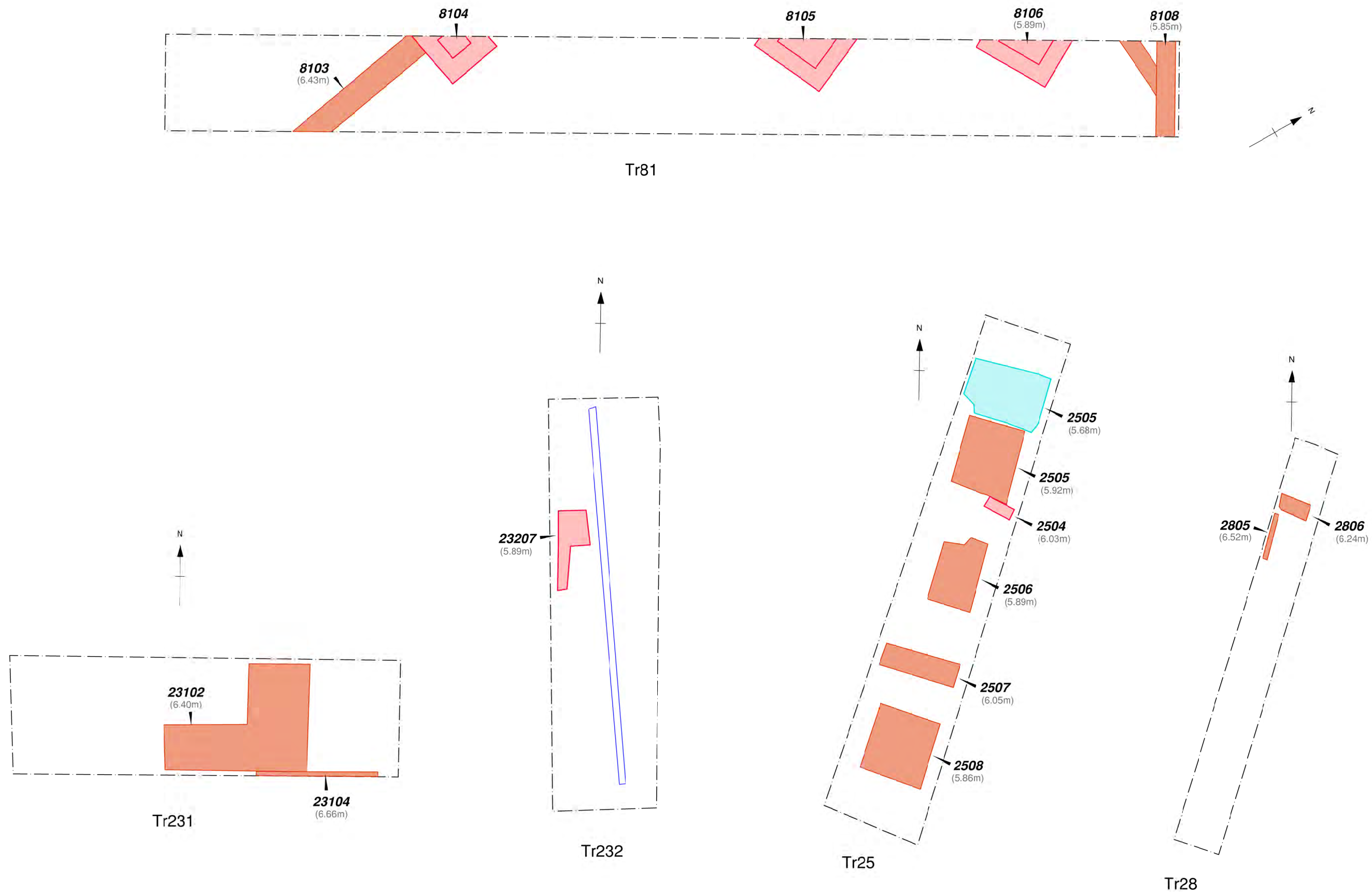


Figure 11: Detail trench plans

APPENDIX A WRITTEN SCHEME OF INVESTIGATION



Bramley-Moore Dock, Regent Road, Liverpool

Written Scheme of Investigation Archaeological Investigations

April 2020

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Bramley-Moore Dock, Regent Road, Liverpool

Written Scheme of Investigation for an Archaeological Investigation

Centred on SJ 33452 92491

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1 INTRODUCTION

1.1 Project details

- 1.1.1 Oxford Archaeology (OA) North has been commissioned by Laing O'Rourke to undertake an archaeological investigation of Bramley-Moore Dock (BMD) and the north quay of Nelson Dock (NGR: SJ 33452 92491; Fig 1). The fieldwork is to mitigate the destruction or covering of archaeological remains as part of the development of a new football stadium with associated facilities and infrastructure.
- 1.1.2 Following the production of a desk-based assessment (DBA) by OA North (2019), which was produced to inform a full planning application of the development (planning ref: 20F/0001). OA North were subsequently contacted to design adequate mitigation works suggested by the DBA, liaison with the client and the archaeologist for Merseyside Environmental Advisory Service (MEAS), as advisors to Liverpool Council, further refined the scope of works to be undertaken. OA North were subsequently commissioned by Laing O'Rourke, following their appointment as Principal Contractor for the project, to produce this Written Scheme of Investigation (WSI) and undertake the archaeological fieldwork, which is to include: a photogrammetric survey of the current state of the dock, building survey of two of the upstanding structures on the site, and twelve trenches situated around BMD and the north quay of Nelson Dock.
- 1.1.3 All work will be undertaken in accordance with local and national planning policies referenced within this document.

1.2 Location, topography and geology

- 1.2.1 Bramley-Moore Dock (centred on NGR SJ 33452 92491) is constructed on land reclaimed from the River Mersey, within the Liverpool Maritime Mercantile City World Heritage Site (WHS) and within the Stanley Dock Conservation area. The site is bordered by Regent Road to the east, with Nelson Dock to the south, Wellington Dock to the north and the River Mersey to the west.
- 1.2.2 The solid geology of the area is mapped as Pebbly (gravelly) Sandstone of the Chester Formation formed in the Triassic Period (BGS 2020). The drift geology of the area is mapped as Clay, Silt and Sand Tidal Flat Deposits formed in the Quaternary Period (*ibid*).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND AND POTENTIAL

2.1 Archaeological and historical background

- 2.1.1 The archaeological and historical background of the site has been described in detail in the Archaeological Desk-Based Assessment (DBA) produced by OA North (2019), and will not be reproduced here.

2.2 Potential

- 2.2.1 The DBA highlights the significance of the application site resting largely on the period and the group value of Jesse Hartley's 1848 central docks development, and the important part played by the subsequent development of railway infrastructure. The remains of the High Level Coal Railway and its connections to the Liverpool Overhead Railway are significant in terms of their rarity, survival, vulnerability and potential to provide significant archaeological evidence pertaining to the importance of Bramley-Moor Dock to the railway infrastructure of the Liverpool Docks (*ibid*). As such, the archaeological remains encountered may be related to early developments of the docks structure.

3 PROJECT AIMS

3.1 General

3.1.1 The general project aims can be summarised as follows;

- to adhere to and fulfil the agreed programme of works associated with the archaeological potential of the site, and consequently to successfully discharge any condition, in whole, or in part, dependent on results;
- to inform a decision as to whether further archaeological works will be required in advance of development ground works;
- to compile a professional archival record of any archaeological remains within the excavation works.

3.2 Specific aims and objectives

3.2.1 The specific aims and objectives of the archaeological investigations are:

- to determine or confirm the general nature of any remains present;
- to determine or confirm the approximate date or date range of any remains, by means of artefactual or other evidence;
- to record the upstanding structural features of the dock, including the south quay shed, a building at the north-eastern end of the north quay and the dock structure itself;
- to evaluate the level of survival of early structural remains;
- to ascertain the form and function of early structural remains, which are no longer upstanding.

4 PROJECT SPECIFIC EXCAVATION AND RECORDING METHODOLOGY

4.1 Scope of works

- 4.1.1 Experience has shown the importance of a close working relationship between the client and their archaeological contractor on any development project. Such a relationship will help to ensure the timely and successful completion of the project in an efficient and cost-effective manner, achieving high technical and academic standards, whilst meeting all the requirements of the tender documentation, and fulfilling all the client's archaeological obligations. This ethic is at the heart of our approach to this project
- 4.1.2 The DBA (OA North 2019) recommended a range of archaeological mitigation measures, which would render the significance of the effects of the development as neutral. These are to include an aerial photogrammetric survey of the site, followed by Historic England (HE) Level 1 and Level 2 Historic Building Recording (HE 2016) of the two upstanding buildings on the site (Sites 11 and 24; Fig 2). Following the photogrammetric survey and historic building recording, a phase of archaeological evaluation trenches will be excavated around the site, targeted on specific archaeological features identified from historic mapping (Sites 8, 12, 18, 23, 25, 28 and 29; Fig 2).
- 4.1.3 The proposed trench locations will be located by a Global Positioning System (GPS), accurate to within +/- 0.02m, they will then be scanned by a Cable Avoidance Tool and Signal Generator, prior to commencement of the mechanical excavation, which will be supervised by a suitably experienced and qualified archaeologist. Any structural remains identified within the trenches will then be cleaned and recorded, the trenches will be fully recorded through digital photogrammetry and GPS. The survey will then be used to produce accurate scale drawings. If potentially significant archaeological remains are identified, the client and the archaeologist at MEAS will be informed as soon as practicable. No backfilling of the trenches will be undertaken without prior approval of the archaeologist at MEAS. Once the trenches have been fully recorded and the archaeologist at MEAS has approved and signed them off, they will be backfilled prior to the OA North field team leaving site. If significant remains are identified, the archaeologist at MEAS may require further archaeological works.

4.2 Programme

- 4.2.1 It is anticipated that the photogrammetric survey fieldwork will take a single day to complete, by a team consisting of a licensed drone pilot and an assistant. The Historic Building Recording will take two days to complete, by a team consisting of a qualified buildings archaeologist and an assistant. The archaeological trial trench evaluation will take ten days to complete, by a team consisting of Project Officer and two assistants. All phases of work will be undertaken under the management of Paul Dunn, Senior Project Manager.
- 4.2.2 All fieldwork undertaken by OA North is overseen by the Operations Manager, Alan Lupton MCIfA.

4.3 Site specific methodology

- 4.3.1 A summary of OA's general approach to excavation and recording can be found in *Appendix A*. Standard methodologies for Geomatics and Survey, Environmental evidence, Artefactual evidence and Burials can also be found below (*Appendices B, C, D and E* respectively). OA is a registered member of the Chartered Institute for Archaeologists (CIfA; RO number 17), as are many of its staff, and all work carried out will meet industry standards and follow relevant guidelines (*i.e.* CIfA 2014a; 2014b; 2014c; 2014d; HE 2015a; 2015b; 2016).

4.4 Photogrammetric Survey

- 4.4.1 Since 2010 OA North has been developing the use of photogrammetry using aerial photography, and since then has undertaken over a hundred surveys across the country and abroad. OA North have been pioneers in the use of the technique, and as a consequence has been invited to speak at numerous international archaeological conferences to outline our experiences of the technique.
- 4.4.2 OA North has been developing not only the use of the technique for landscape recording, but also building recording, allowing very detailed and precise metric surveys of standing buildings, and entails the use of a combination of ground, UAV and mast photography to enable complete photographic coverage of buildings, in conjunction with accurate survey control (generated with a reflectorless total station), able to achieve accuracies of 10-20mm across substantial buildings. The photogrammetry can generate accurate visually impressive graphical models for a broad range of landscapes and structures, and produces improved photographically textured outputs over laser scanning and can be achieved in a fraction of the time.
- 4.4.3 **CAA Licence:** UAV Pilots need to be licensed with the Civil Aviation Authority to undertake commercial work and OA North has a licensed commercial pilot and one in training (licence number BNUCS-S 0478-12-02-02).
- 4.4.4 **Measured Survey:** the survey will be produced by photogrammetry using aerial photographs taken from a UAV (Unmanned Aerial Vehicle). The control for the photogrammetric survey will be surveyed by means of survey grade GPS and reflectorless total station. The GPS that will be used is a Leica 1200 differential system and is capable of accuracies of +/- 0.02m and provides for an effective means of recording the detail of the features and also establishing survey control.
- 4.4.5 A control network will be established across the extent of each site. The GPS will be used to record survey points on the ground for a proposed general UAV model of the topography. In addition it is proposed to use a reflectorless total station to record the locations of targets placed on the wall elevations, which will be located with respect to the ground control points.
- 4.4.6 **Building and Topographic Photogrammetric Survey:** Photogrammetry is a long established technique which has been updated and refined such that it is now an extremely simple, cost effective and very accurate means of recording features and landscapes in three dimensions. It uses aerial photographs taken from a small electrically powered model helicopter (UAV) which has the ability to carry a light weight camera up to altitudes of 400 feet. The advantage of the UAV is that it can take

photographs from variable altitudes to suit the level of recording required of the survey; low level photographs provide a very high resolution of ground features sufficient to be able to distinguish pebbles, whereas higher level photographs provide overall control across larger areas. Typically a survey model would entail the use of photographs taken from multiple altitudes, such that there is good ground resolution but which is accurate across a larger area.

4.4.7 It is proposed to create the following primary models using Agisoft Photoscan which can then be combined within Pointools software:

- A general topographic model will be generated for each site. This will be taken from a combination of high and low altitudes and is intended to provide general coverage. Around each structure the camera angle will be set to oblique so that it can also record the wall elevations, and this will be reinforced by photographs taken from a photographic mast. This model will provide an interactive model of the overall site, and will show both plan and elevation detail. It will be used to generate detailed contour drawings of each of the sites and their environs.
- The interiors of the structures will, where possible, be recorded from ground photography and a considerable amount of photographic recording is undertaken around the apertures of the buildings to be able to link the interior surfaces with the external surfaces. Ultimately this will create a single model incorporating both internal and external surfaces.

4.4.8 **Photography:** in conjunction with the archaeological survey a photographic archive will be generated, which will record significant features as well as aspects of the general landscapes, and will be undertaken in accordance with guidelines in Historic England's *Understanding Historic Buildings: a guide to good recording practice* (2016). This photographic archive will be maintained using the same Sony A5100 mirrorless camera with 24 mega pixel resolution as is used for the aerial photography. The photographic record will include detailed coverage of all elevations and all the structures will be viewed from multiple vantage points.

4.4.9 **Processing the Photographs:** the 3D models will be generated using Agisoft Photoscan Pro software, and will combine the photographs, compute the positions that the images were taken from, generate a 3d mesh, and then the photographs will be reapplied to the 3D mesh as a texture. Prior to initiating the processing, the photographs will need to be prepared, and this will entail the masking out of any background detail still left in the photographs, and then the application of survey control. The end product is a series of 3D models that can be viewed as 2D plans or in 3D within Adobe reader.

4.4.10 **Manipulating the Models:** a process of manipulation will be undertaken to the individual models to create integrated 3d model structures and to deliver the primary outputs of the project.

4.4.11 **Primary Topographic Model:** the primary topographic model of the overall castle will be output as a 3DS file for incorporation into other packages and also as a 3D PDF file for general viewing. Contour and view shade outputs of the overall site model will be

generated and will provide effective outputs for general viewing. 2D slices through the model can be generated to provide plans of the structures as opposed to the general earthwork topography.

4.4.12 *Elevations*: the elevation views of the structures can be output as 2D textured surfaces which can be used at a subsequent date, if required, to generate elevation drawings (draughting of the elevations is not anticipated within the present contract).

4.4.13 *Final Navigable 3D model of the site*: for each site where necessary individual models will be combined in Pointools. This will provide a single combined model which can be output as PDF files. Video outputs can also be generated flying around the primary textured and view shade models.

4.4.14 **Output**: The following outputs will be generated by the survey:

- A full set of detailed aerial and ground photography that was used for the photogrammetry
- Oblique general aerial photography from the UAV for each site to provide general views for outreach purposes
- 3D models of each site in .3ds and pdf formats.
- Georeferenced vertical 2D aerial textured files (.jpg) of each of the sites superimposed onto control data within a CAD system
- Contour plans of each site and the environs, incorporating extremely close 50mm or 10mm contour separations, also superimposed onto the survey control
- Video files of a fly through and around the site for incorporation onto a web site.

4.5 Historic Building Recording

4.5.1 A HE Level 1 Historic Building Record is required of Site 24, western building on north quay, and a HE Level 2 Building Record is required of Site 11, south quay shed (HE 2016).

4.5.2 **Historic England Level 1 Survey Methodology**: the HE Level 1 survey is essentially a basic visual record, supplemented by the minimum information needed to identify the building's location, age and type (HE 2016). The survey will primarily comprise a photographic archive, which will be produced utilising a high resolution digital SLR camera (18 megapixel). The images will be taken using RAW format files and saves as 8-bit TIFFs for archive purposes. A full photographic index will be produced and the archive will comprise the following:

- the external appearance and setting of the building, including a mixture of general shots and detailed views taken from perpendicular and oblique angles;
- general shots of the surrounding landscape;
- the general appearance of the principal rooms and circulation areas;

- any external or internal detail, structural or architectural, which is relevant to the design, development and use of the buildings, and which does not show adequately on general photographs;
 - any internal detailed views of features of special architectural interest, fixtures and fittings, or fabric detail relevant to phasing the building.
- 4.5.3 **Site drawings:** architect's plans (supplied by the client) or a print-out of the photogrammetric survey will be annotated on site. This will include any wear marks, masonry marks or any salient detail relating to the historic and contemporary use of the building.
- 4.5.4 **HE Level 2 Survey Methodology:** the HE Level 2 is a descriptive record, similar to a Level 1 survey but where more information is required (HE 2016). As such, both the interior and exterior of the building will be described and photographed, producing an analysis of the building's development and use (*ibid*).
- 4.5.5 **Photographic Record:** a photographic archive will be produced utilising a high resolution digital SLR camera (18 megapixel). The images will be captured using RAW format files; saved as 8 bit TIFFs for archive purposes. A full photographic index will be produced and the archive will comprise the following:
- the external appearance and setting of the building, including a mixture of general shots and detailed views taken from perpendicular and oblique angles;
 - general shots of the surrounding landscape;
 - the general appearance of the principal rooms and circulation areas;
 - any external or internal detail, structural or architectural, which is relevant to the design, development and use of the buildings, and which does not show adequately on general photographs;
 - any internal detailed views of features of special architectural interest, fixtures and fittings, or fabric detail relevant to phasing the building.
- 4.5.6 **Site Drawings:** architect's plans (supplied by the client) or print-outs of the photogrammetric survey will be annotated on site to produce the following drawings. These drawings will then be used as the basis of CAD drawings, which will be included within the final report as figures. This will be undertaken by manual survey (using Disto electronic distance measurement equipment) and enhanced by the use of a Leica reflectorless total station for the cross sections.
- 4.5.7 **Annotation of Drawings:** irrespective of the means used to generate drawings, they will be annotated with salient information, including wear marks, masonry marks, and salient detail relating to historic and contemporary use.
- 4.5.8 **Fabric Description:** a visual inspection of the building will be undertaken utilising the OA North building investigation *proforma* sheets. A description will be maintained to HE Level 2 standards (HE 2016). The records will be essentially descriptive and provide a systematic account of the origin, development and use of the building, which will include:

- a description of the plan, form, fabric, function, age and development sequence;
- a detailed description of the materials used, development sequence and phasing, including any alterations, repair, and rebuilding, will be provided. This will include evidence of any demolished or lost structures with the complex;
- an account of the past and present use.

4.6 Archaeological Evaluation

- 4.6.1 **Setting-out:** The position of the trenches (Fig 2), agreed in consultation with the archaeologist at MEAS, will be established on-site using a GPS. The trench locations will then be scanned using a Cable Avoidance Tool and Signal Generator (CAT and Genny), by an appropriately experience and trained member of staff. Any services will be marked and avoided; the project officer will also assess the location of the trenches in location to any listed structures (i.e. wet dock walls), if they are likely to encroach upon any listed building the trenches will be repositioned, the archaeologist at MEAS will be consulted if services or listed buildings are to impact upon the size of the trenches. **No listed buildings are to be impacted upon by the trenching works.** For the trenches which are likely to impact upon cobble setts and rails of historic interest, care will be taken to not disturb these and will aim to preserve them *in situ*. However, if the trenches are to impact upon cobble setts they will be stored separately from the rest of the overburden, to be reinstated once the trenches have been completed. Once the trenches are marked out and deemed clear of services, digital photographs will be taken of the trench locations to show their state prior to excavation, excavation can then begin.
- 4.6.2 **Excavation of the evaluation trenches:** the topsoil and subsoil will be removed by mechanical excavator, fitted with a toothless ditching bucket, under constant supervision of a suitably trained and experienced archaeologist. Excavation will proceed to either natural geology, the first significant archaeological horizon, or a safe working depth.
- 4.6.3 The mechanical excavator will be used to define carefully the extent of any surviving structures or archaeological remains. Thereafter, the remains will be cleaned manually to define their extent, nature, form and function. Significant archaeological deposits will be excavated by hand as necessary to define the stratigraphy, and to enable interpretation of the remains.
- 4.6.4 **Recording of the evaluation trenches:** any archaeological remains will be cleaned by hand sufficiently to enhance any features; site levels will be related to the Ordnance Survey National Grid and Datum. The trenches will be recorded by the use of GPS and, where structural remains are identified, by photogrammetry, with scale drawings being subsequently produced at appropriate scales.
- 4.6.5 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on *pro-forma* context sheets and will be accompanied with sufficient pictorial records (plans, sections and digital photographs) to identify and illustrate individual features. The site

archive will include plans and sections at appropriate scales (plane 1:20 and sections 1:10).

- 4.6.6 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard viewpoints of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using 16 or 18 megapixel digital SLR or hybrid compact digital cameras, and all frames will include a graduated metric scale (HE 2015b). The images will be taken in JPEG and RAW formats. Photograph records will be maintained on photographic *pro-forma* sheets.
- 4.6.7 **Backfilling:** no backfilling of the trenches will be undertaken without prior approval of the archaeologist for MEAS. Once the trenches have been fully recorded and the archaeologist for MEAS has approved and signed them off, they will be backfilled prior to the OA North field team leaving site. The backfilling would achieve a basic level of reinstatement, i.e. there would be minimal compaction of material, of that provided by the mechanical excavator, and there will be no reinstatement of hardstanding, although any tarmac removed will be kept separate of overburden and the area made level and safe. If cobble setts have been disturbed during the trenching works, they will be reinstated. Once the trenches have all been backfilled digital photographs will be taken to show how they have been left.

5 PROJECT SPECIFIC REPORTING AND ARCHIVE METHODOLOGY

5.1 Programme

- 5.1.1 The level of reporting will depend upon the archaeological significance of the results. If significant remains of regional importance are revealed, then an interim report or statement will be provided to the archaeologist for MEAS following completion of the evaluation phase (*Section 5.2.1*). If only limited or no archaeological remains are discovered, then only an archive report will be produced (*Section 5.2.2*). If excavation is required, an English Heritage MAP2 style of post-excavation assessment report will be compiled following the fieldwork and will define the resource implications of completing the post-excavation programme (*Section 5.2.3*). This will form the basis and methodological approach with which to address a more comprehensive level of analysis and an appropriate level of subsequent publication, should it be required. The decision as to which reporting strategy will be followed will be discussed with the client and the archaeologist for MEAS upon completion of the fieldwork.
- 5.1.2 A copy of the report in Adobe Acrobat (.pdf) format will be provided to the client, and the archaeologist for MEAS for review and approval. Once approved, a digital copy of the final report will be provided to the client for their submission to the Local Planning Authority.

5.2 Content

- 5.2.1 ***Interim evaluation report for significant remains:*** if significant archaeological remains are identified during the evaluation, an interim report will be produced. This will be an assessment of the quality and preservation of the archaeological remains identified. This will be presented verbally or electronically to the archaeologist for MEAS to prevent any delay in progressing to the excavation stage. The results will then be combined with the excavation results in a post-excavation assessment (*Section 5.2.3*).
- 5.2.2 ***Archival evaluation report for limited archaeological remains:*** a draft copy of a written synthetic post-excavation assessment report will be submitted to the client for comment within six weeks of completion of the fieldwork, although the time frame for production of the report can be tailored to the client's requirements upon prior agreement. The report will include a copy of this WSI, and indications of any agreed departure from that design. It will present, summarise, and interpret the results of the programme detailed above and present an assessment of the history of the site. The report will include the following:
- a title page detailing site address, National Grid Reference (NGR), author/originating body, client's name and address;
 - full contents listing;
 - a non-technical summary of the findings of the fieldwork;
 - a description of the archaeological background;
 - a detailed account of the historical development of the site, as appropriate;
 - a description of the topography and geology of the site;

- a description of the methodologies used during the fieldwork;
- a description of the findings of the fieldwork;
- detailed plans of the evaluation trenches, showing the archaeological features exposed. The site location will be plotted with at least four 12-figure national grid references on the site plan at a scale of 1:2500;
- interpretation of the archaeological features exposed and their context within the surrounding landscape;
- specialist analysis reports on the artefactual/ecofactual/industrial remains from the site;
- appropriate photographs of specific archaeological features. Appropriate photographs of specific finds of interest will also be included, if needed;
- a consideration of the importance of the archaeological remains present on the site in local, regional and national terms;
- a complete bibliography of sources consulted;
- appendices to include a detailed list of all recorded contexts, all retrieved finds, all samples taken, all drawings produced and all photographs taken;
- illustrative material will include a location map, site map, site plans and pertinent photographs.

5.2.3 *Post-excavation assessment for significant remains following mitigation excavation phase:*

if the archaeological results are deemed to be of regional or national importance as a result of discussions with the archaeologist for MEAS, then the results of the evaluation will be combined with the results of the excavation following completion of the fieldwork. An assessment of the archive will then be undertaken, and the resource requirements for analysis and publication will be defined, in accordance with the guidelines of MAP2 (English Heritage 1991). This will involve an assessment of the dataset, followed by a review of the project archive to establish the potential for further analysis. The assessment will take place in close consultation with the client, and the format for the final report will also be agreed at this stage of the work. The Harris Matrix, largely produced during the excavation programme, will be completed and checked as part of the assessment. The assessment will involve the compilation of a brief archive report, outlining the significance of the stratigraphic, artefactual and environmental evidence, and presenting recommendations for further analysis, as appropriate. The report will also include a short summary of the stratigraphic history of the site.

5.2.4 The project assessment will include an updated project specification, which will comprise a full project design for a programme of full analysis and publication, and will be in accordance with MAP2 (English Heritage 1991). This document will be submitted to the client within six months of the completion of the fieldwork.

5.2.5 Analysis: an appropriate programme of analysis should then be undertaken to prepare a research archive, as detailed in Appendix 6 of MAP2; the precise scope for this element will be defined within the updated project specification. Following the

analysis of the excavation results, a report will be written which will present, summarise, and interpret the results of the programme and will incorporate specialist reports on artefact assemblages and environmental reports. It will include an index of archaeological features identified in the course of the project, with an assessment of the site's development. It will incorporate appropriate illustrations, including copies of the site plans and section drawings all reduced to an appropriate scale. The archive report will be submitted within 12 months of the completion of the fieldwork.

5.3 Specialist input

- 5.3.1 OA has a large pool of internal specialists, as well as a network of external specialists with whom OA have well established working relationships. A general list of these specialists is presented in *Appendix G*; in the event that additional input should be required, an updated list of specialists can be supplied.

5.4 Archive

- 5.4.1 The results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current Historic England guidelines (2015a), and in accordance with the Guidelines for the Preparation of Excavation Archives for Long-Term Storage (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. This archive will be provided in the English Heritage Centre for Archaeology format.
- 5.4.2 The site archive will be deposited with National Museums Liverpool (NML) following completion of the project. This will follow appropriate industry guidelines (CIfA 2014d) and the NML's own guidelines (NML 2020). The Archaeology Data Service (ADS) online database project Online Access to index of Archaeological Investigations (OASIS) will be created once the fieldwork commences and then completed as part of the archiving phase of the project.

6 HEALTH AND SAFETY

6.1 Roles and responsibilities

- 6.1.1 The Senior Project Manager, Paul Dunn, has responsibility for ensuring that safe systems of work are adhered to on site. Elements of this responsibility will be delegated to the Project Officer, who implements these on a day to day basis. Paul Dunn and the Project Officer are supported by OA North's Health and Safety Advisor, Fraser Brown.
- 6.1.2 The Director with responsibility for Health and Safety at OA is Dan Poore Tech IOSH (Chief Business Officer).

6.2 Method statement and risk assessment

- 6.2.1 A summary of OA's general approach to health and safety can be found in *Appendix I*. A risk assessment has also been undertaken and approved and will be kept on site, along with OA's standard Health and Safety file, which will contain all relevant health and safety documentation.
- 6.2.2 The Health and Safety file will be available to view at any time.
- 6.2.3 **Unexploded Ordnance:** a UXO assessment undertaken by PlanIT UXB (2017), commissioned by BuroHappold, identified that the potential for larger items of explosive ordnance to remain as Unexploded Bombs (UXBs) on areas around the wet docks is limited, as the site itself did not receive any direct bomb strikes. Any UXBs with shallow penetration depths are likely to have been discovered as a result of the post-war redevelopment of the site, it is therefore reasonable to discount these potential threat items (*ibid*). The principal risk of encountering UXBs would be within the wet dock, however, as the archaeological works are to be undertaken on the areas around the wet docks, UXO mitigation will not be required during the excavation of the archaeological evaluation trenches. Obviously, care will be taken during the excavation of the trenches, with a banksman monitoring the excavations carefully to ensure no potential UXBs are struck, a briefing on potential UXBs will be given to all field staff as part of the induction.

6.3 Monitoring of works

- 6.3.1 At least 14 days' notice of the commencement of the archaeological works will be given to the archaeologist for MEAS. They will have free access to the site (subject to Health and Safety considerations) and all records to ensure the works are being carried out in accordance with this WSI and all other relevant standards. Any required visits will be carried out under the auspices of the Main Contractors Health and Safety Plan, and visitors will wear appropriate PPE and be accompanied at all times.

7 BIBLIOGRAPHY

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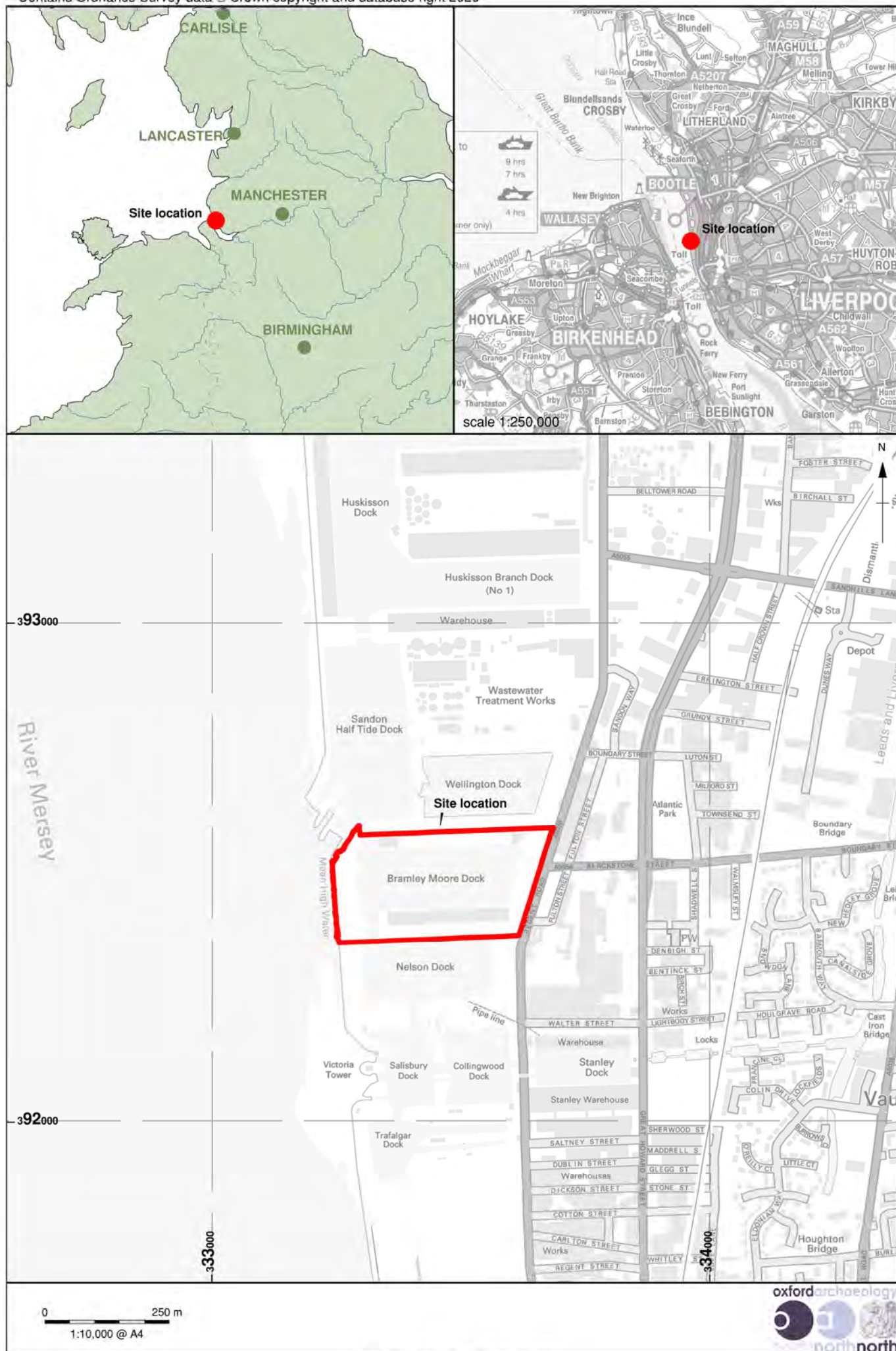


Figure 1: Site location

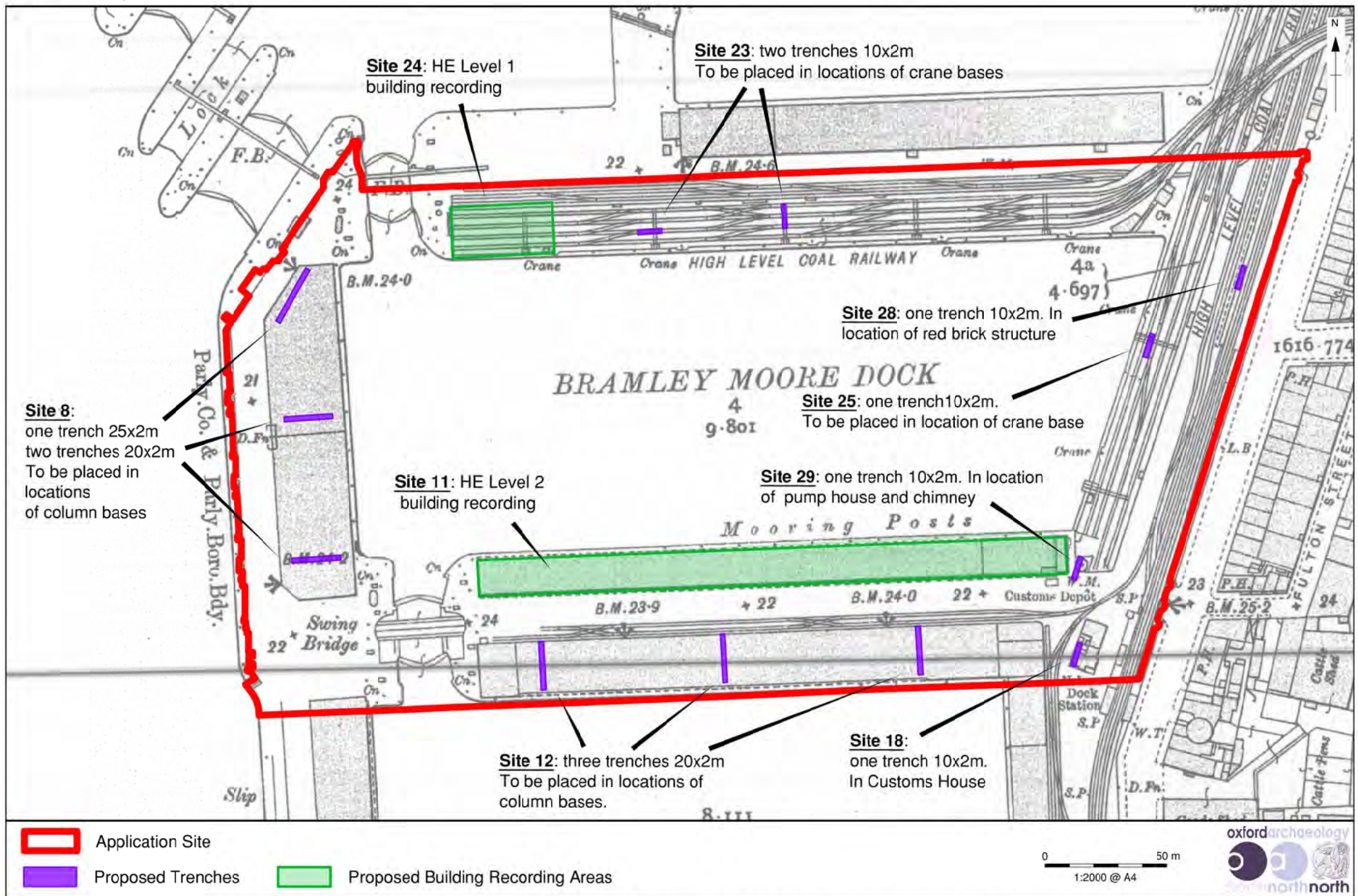


Figure 2: Proposed trenches and building recording areas superimposed on the Ordnance Survey 25":1 mile map, revised 1905 (pub.1908)

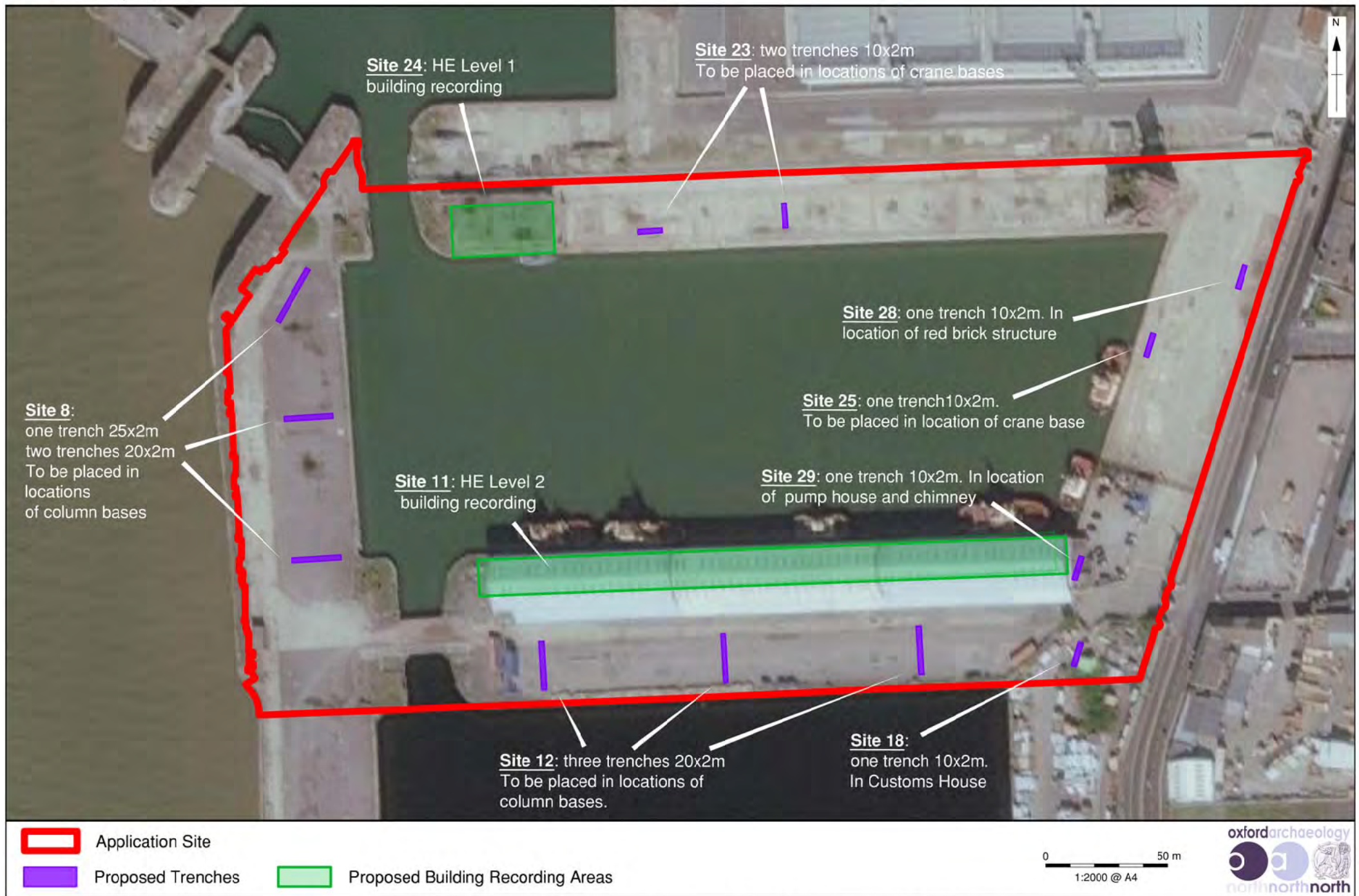


Figure 3: Proposed trenches and building recording areas superimposed on ESRI world imagery

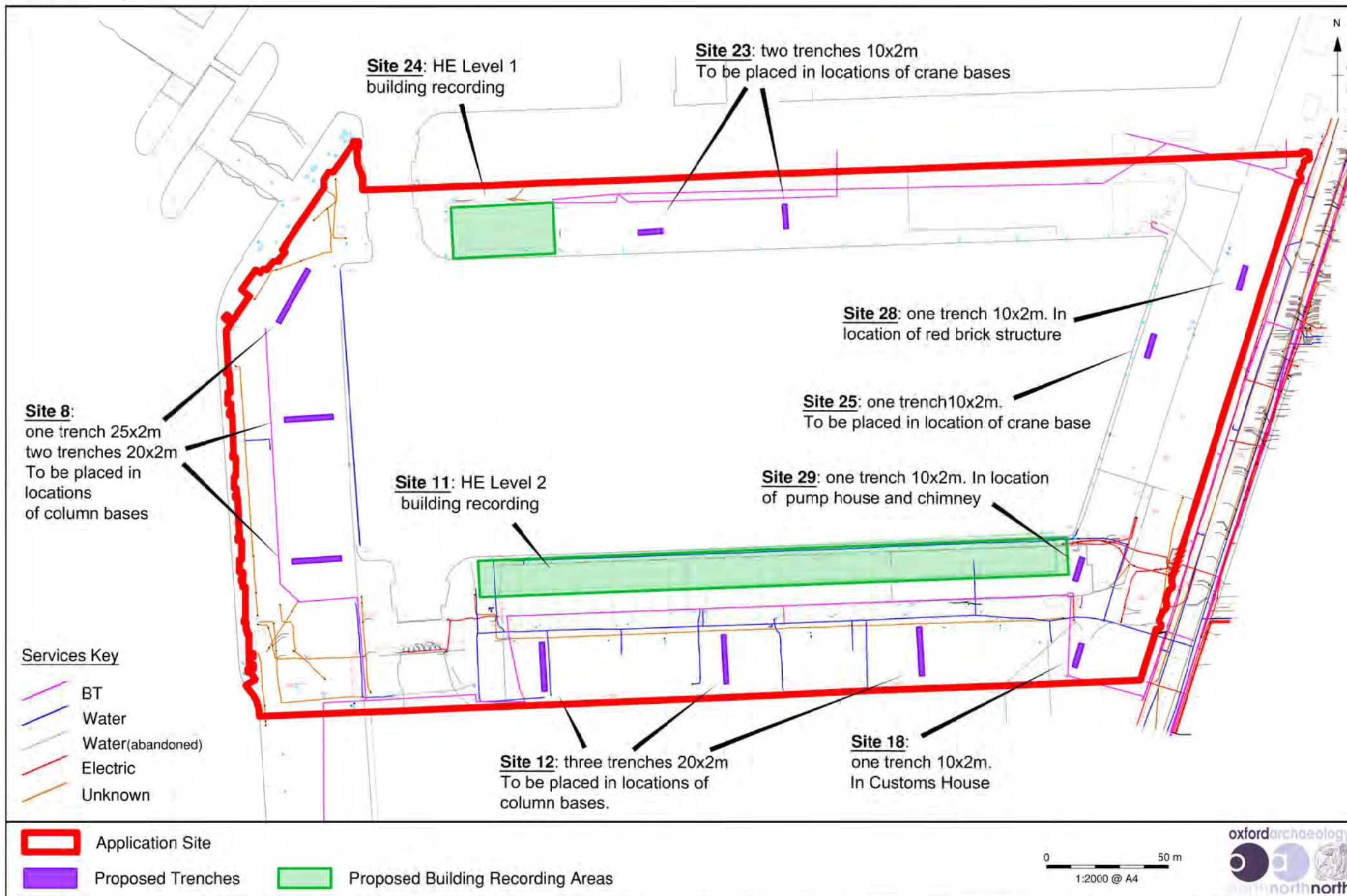


Figure 4: Proposed trenches and building recording areas superimposed on data extracted from Murphys Surveys drawing MS32089-U-RevE-A11-01

OA STANDARD FIELDWORK METHODOLOGY APPENDICES

The following methods and terms will apply, where appropriate, to all OA fieldwork unless varied by the accompanying detailed Written Scheme of Investigation.

Copies of all OA internal standards and guidelines referred to below are available on request.

APPENDIX A GENERAL EXCAVATION AND RECORDING METHODOLOGY

A.1 Standard methodology – summary

Mechanical excavation

- A.1.1 An appropriate mechanical excavator will be used for machine excavation. This will normally be a JCB or 360° tracked excavator with a 1.5 m to 2 m wide toothless ditching bucket. For work with restricted access or working room a mini excavator may be used.
- A.1.2 All mechanical excavation will be undertaken under direct archaeological supervision.
- A.1.3 All undifferentiated topsoil or overburden of recent origin will be removed down to the first significant archaeological horizon, in successive, level spits.
- A.1.4 Following mechanical excavation, all areas that require examination or recording will be cleaned using appropriate hand tools.
- A.1.5 Spoil heaps will be monitored in order to recover artefacts to assist in the analysis of the spatial distribution of artefacts. Modern artefacts will be noted but not retained.
- A.1.6 After recording, evaluation trenches and test pits will usually be backfilled with excavated material in reverse order of excavation, and compacted as far as is practicable with the mechanical excavator. Area excavations will not normally be backfilled.

Hand excavation

- A.1.7 All investigation of archaeological levels will usually be by hand, with cleaning, examination and recording both in plan and section.
- A.1.8 Within significant archaeological levels the minimum number and proportion of features required to meet the aims of the excavation will be hand excavated. Pits and postholes will usually be subject to a 50% sample by volume. Linear features will be sectioned as appropriate. More complex features such as those associated with funerary activity will usually be subject to 100% hand excavation.
- A.1.9 In the case of evaluations, it is not necessarily the intention that all trial trenches will be fully excavated to natural stratigraphy, but the depth of archaeological deposits across the site will be assessed. The stratigraphy of a representative sample of the evaluation trenches will be recorded even where no archaeological deposits have been identified. Any excavation, both by machine and by hand, will be undertaken with a view to avoiding damage to any archaeological features or deposits, which appear to be worthy of preservation in situ.

Recording

- A.1.10 Written descriptions will be recorded on proforma sheets comprising factual data and interpretative elements.
- A.1.11 Where stratified deposits are encountered a Harris matrix will be compiled during the course of the excavation.
- A.1.12 Plans will normally be drawn at 1:100, but on urban or deeply stratified sites a scale of 1:50 or 1:20 will be used. Detailed plans will be at an appropriate scale. Burials will be drawn at scale 1:10 or recorded using geo-referenced digital photography.
- A.1.13 The site grid will be accurately tied into the National Grid and located on the 1:2500 or 1:1250 map of the area.
- A.1.14 A register of plans will be kept.
- A.1.15 Long sections of showing layers will be drawn at 1:50. Sections of features or short lengths of trenches will be drawn at 1:20.
- A.1.16 A register of sections will be kept.
- A.1.17 Generally, all sections will be tied in to Ordnance Datum.
- A.1.18 A full photographic record, illustrating in both detail and general context the principal features and finds discovered will be maintained. The photographic record will also include working shots to illustrate more generally the nature of the archaeological work.
- A.1.19 Photographs will be recorded on OA Photographic Record Sheets.

A.2 Relevant industry standards and guidelines

- A.2.1 The Chartered Institute for Archaeologists Standard and Guidance notes relevant to fieldwork are:
 - Standard and Guidance for Archaeological Field Evaluation
 - Standard and Guidance for Archaeological Excavation
 - Standard and Guidance for an Archaeological Watching Brief.
- A.2.2 These will be adhered to at all times.

A.3 Relevant OA manual and other supporting documentation

- A.3.1 All fieldwork will be undertaken in accordance with the requirements of the OA Field Manual (ed. D Wilkinson 1992), and the revised OA fieldwork manual (publication forthcoming).
- A.3.2 Further guidance is provided to all excavators in the form of the OA 'Fieldwork Crib Sheets - a companion guide to the Fieldwork Manual'. These have been issued ahead of formal publication of the revised Fieldwork Manual.

APPENDIX B GEOMATICS AND SURVEY

B.1 Standard methodology - summary

- B.1.1 The aim of OA methodology is to provide comprehensive survey cover of all investigation areas. Additionally, it is designed to provide coverage for any areas, beyond the original scope of the project, which arise as a result of further work. It provides digital plans of all required elements of the project and locates them within an overall grid.
- B.1.2 It also maintains all necessary survey data and ensures that the relevant information is copied into the primary record, in order to ensure the integrity of the project archive. Furthermore, it ensures that all core data is securely stored and backed up. It establishes accurate project reference systems utilising a series of control stations and permanent base lines.
- B.1.3 The survey will be conducted using a combination of Total Station Theodolite (TST) survey utilising Reflectorless Electronic Distance Measurement (REDM) where appropriate, hand-measured elements and GPS (Global Positioning System), or photogrammetry.
- B.1.4 Before the main work commences, a network of control stations will be laid out encompassing the area. Control stations will be tied in to known points or existing features using rigorous metric observation. The control network will be set in using a TST to complete a traverse or using techniques as appropriate to ensure sufficient accuracy. A GPS, or other appropriate method, will be used to orientate the control network to National Grid or other recognised coordinate system.
- B.1.5 All control stations will be checked by closed traverse and/or GPS, as appropriate. The accuracy of these control stations will be accessed on a regular basis and re-established accordingly. All stations will be recorded on Survey Control Station sheets.
- B.1.6 Each control station will be marked with a PGM (Permanent Ground Marker). Witness diagrams will include the full 3-D co-ordinates generated, a sketch diagram and measurements to at least three fixed details, written description of the mark and a photograph of the control point in its environs.
- B.1.7 Prior to entry into the field all equipment will be checked, and all pre-survey information will be logged onto the field computer and uploaded onto survey equipment as appropriate. The software in the field computer will be verified and all cabling between the GPS and/or TST and computer will be checked. Prior to conducting the survey, the site will be reconnoitred for locations for a viable control network and check the line of sight and any possible hindrance to survey. Daily record sheets will be kept to record daily tasks and conditions.
- B.1.8 All spatial data will be periodically downloaded onto a field computer, and backed up onto CD, or DVD. It will be cleaned, validated and inspected.
- B.1.9 All survey data will be documented on daily survey record sheets. Information entered on these sheets includes key set up information (Instrument height etc.) as well as daily variables and errors/comments. All survey data will be digitally recorded in a raw

format and translated during the download process this shall allow for any errors to be cross referenced with the daily survey record and corrected accordingly.

- B.1.10 A weekly summary of survey work will be produced to access development and highlight problems. This information also will be recorded on the weekly survey journal. Technical support for the survey equipment and download software shall be available at all times. In those instances, where sites are remotely operated, all digital data will be backed up regularly and a copy returned to Oxford on a weekly basis.
- B.1.11 A site plan will initially be created by a rapid survey of relevant archaeological features by mapping their extent using a combination of TST and GPS. This will form the basis for deciding excavation strategy and will be updated as the excavation clarifies the extent of, and relationships between, archaeological features.
- B.1.12 Excavated archaeological interventions and areas of complex stratigraphy will be hand drawn. At least two Drawing Points (DPs) will be set in as a baseline and measurements taken off this by tape and offset. The hand drawn plans will be referenced to the digitally captured pre-site plan by measuring in the DPs with a TST or GPS. These hand drawn elements will then be scanned in, geo-referenced using the DPs as reference points and digitised following OA's digitising protocols. For further details on hand planning procedure please refer to the fieldwork guidelines.
- B.1.13 Where appropriate photogrammetry or rectified photography may be used to record standing structures or burials. This will be carried out in line with Standard OA procedures for photogrammetry or rectified photography.
- B.1.14 Survey data recorded in the field will be downloaded using appropriate downloading software, and saved as an AutoCAD Map DWG file, or an ESRI Shapefile. These files will be regularly updated and backed up with originals being stored on an OA server in Oxford.
- B.1.15 All drawings will be composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols. Once created, additional GIS/CAD work will normally be carried out at the local OA central office or at on-site remote locations when appropriate. Support for all GIS/CAD work will be available from OA's Oxford Office during normal office hours. The aim of the GIS/CAD work is to produce workable draft plans, which can be produced as stand-alone products, or can be readily converted to GIS format. Any hand-drawn plans will be scanned and digitised on site in the first instance. Subsequent plans will be added to the main drawing as it develops.
- B.1.16 All plan scans will be numbered according to their plan site number. Digital plans will be given a standard new plan number taken out from the site plan index.
- B.1.17 All digital data will be backed up incrementally on CD or DVD. On each Friday the entire data directory will be backed up and returned to Oxford where it will be copied onto the OA projects server. Each CAD drawing will contain an information layout which will include all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements will be made available as hard copy for archiving purposes.

B.2 Relevant industry standards and guidelines

- B.2.1 Historic England (2007) Understanding the Archaeology of Landscapes A Guide to Good Recording Practice.
- B.2.2 Historic England (2015), Metric Survey Specifications for Cultural Heritage.
- B.2.3 Historic England (2016), Understanding Historic Buildings A Guide to Good Recording Practice.
- B.2.4 Historic England (2017), Photogrammetric Applications for Cultural Heritage. Guidance for Good Practice.

B.3 Relevant OA manual and other supporting documentation

- B.3.1 OA South Metric Survey, Data Capture and Download Procedures
- B.3.2 OA South Digitising Protocols
- B.3.3 OA South GIS Protocols
- B.3.4 These will be superseded by the OA South Geomatics Manual (in progress).

APPENDIX C ENVIRONMENTAL EVIDENCE

C.1 Standard methodology – summary

- C.1.1 Different environmental and geoarchaeological sampling strategies may be employed according to established research targets and the perceived importance of the strata under investigation. Where possible an environmental specialist(s) will visit the site to advise on sampling strategies. Sampling methods will follow guidelines produced by Historic England and Oxford Archaeology. A register of samples will be kept. Specialists will be consulted where non-standard sampling is required (e.g. TL, OSL or archaeomagnetic dating) and if appropriate will be invited to visit the site and take the samples.
- C.1.2 Geoarchaeological sampling methods are site specific, and methodologies will be designed in consultation with the geoarchaeological manager on a site by site basis.
- C.1.3 Bulk soil samples, where possible of 40 litres or 100% of a deposit if less is available, will be taken from potentially datable features and layers for flotation for charred plant remains and for the recovery of small bones and artefacts. Larger soil samples (up to 100L) may be taken for the complete recovery of animal bones, marine shell and small artefacts from appropriate contexts. Smaller bulk samples (general biological samples) of 10-20 litres will be taken from any waterlogged deposits present for the recovery of macroscopic plant remains and insects. Series of incremental 2L samples may be taken through buried soils and deep feature fills for the recovery of snails and/or waterlogged plant remains, depending on the nature of the stratigraphy and of the soils and sediments. Columns will be taken from buried soils, peats and waterlogged feature fills for pollen and/or phytoliths, diatoms, ostracods and foraminifera if appropriate. Soil samples will be taken for soil investigations (particle size, organic matter, bulk chemistry, soil micromorphology etc.) and possibly for metallurgical analysis in consultation with the appropriate specialists.
- C.1.4 Bulk samples from dry deposits will be processed by standard water flotation using a modified Siraf-style machine and meshes of 0.25mm (flot) and 0.5 or 1mm depending on sediment type and like modes of preservation (residue). Heavy residues will be wet sieved, air dried and sorted. Samples taken exclusively for the recovery of bones, marine shell or artefacts will be wet sieved to 2mm. Waterlogged samples (1L sub-sample) and snail samples (2L) will be processed by hand flotation with flots and residues collected to 0.25mm (waterlogged plants) and 0.5mm (snails) respectively; these flots and residues will be sorted by the specialist. Samples specifically taken for insects, pollen, other microflora and microfauna, metallurgy and soil analysis will be submitted as whole earth to the appropriate specialists or processed following their instructions.

C.2 Relevant industry standards and guidelines

- C.2.1 Historic England 2010. Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood.
- C.2.2 Historic England 2011. Environmental Archaeology. A guide to the theory and practice of methods, from sampling and recovery to post excavation, (2nd ed)

- C.2.3 Historic England 2004. Dendrochronology: Guidelines on Producing and Interpreting Dendrochronological Dates (revision due 2020).
- C.2.4 University of Bradford 2019 Archaeomagnetism: Magnetic Moments in the Past <https://www.brad.ac.uk/archaeomagnetism/>
- C.2.5 Historic England 2008. Luminescence Dating. Guidelines on Using Luminescence Dating in Archaeology (revision due 2020).
- C.2.6 Historic England 2008. Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains (currently being revised).
- C.2.7 Historic England 2015. Archaeometallurgy. Guidelines for Best Practice.
- C.2.8 Historic England 2015 Geoarchaeology. Using Earth Sciences to Understand the Archaeological Record.
- C.2.9 Historic England 2017. Organic Residue Analysis and Archaeology.
- C.2.10 Baker, P and Worley, F 2019. Animal Bones and Archaeology: Recovery to Archive. Historic England

C.3 Relevant OA manual and other supporting documentation

- C.3.1 Oxford Archaeology 2017. Environmental Sampling Guidelines, 4th ed.

APPENDIX D ARTEFACTUAL EVIDENCE

D.1 Standard methodology - summary

- D.1.1 Before a site begins arrangements concerning the finds will be discussed with the Finds Team Leader. Information will be provided by the project manager about the nature of the site, the expected size and make-up of the finds assemblage and any site specific finds retrieval strategies. On-site requirements will be discussed and a conservator appointed who can be called on to make site visits if required. Special requirements regarding particular categories of material will be raised at this early stage for instance the likelihood of recovering assemblages of waterlogged material, large timbers, quantities of structural stone or ceramic building material. Specialists may be required to visit sites to discuss retrieval strategies.
- D.1.2 The project manager will supply the Finds Team Leader with contact details of the landowner of the site so that consent to deposit any finds resulting from the investigation can be sought.
- D.1.3 The on-site retrieval, lifting and short term packaging of bulk and small finds will follow the detailed guidelines set out in the OA Finds Manual (sections 2 and 3), First Aid for Finds and the UKIC conservation guidelines No.2.
- D.1.4 All finds recovered from site will be transported to an OA regional office for processing; local sites will return finds at the end of each day, away based sites at the end of each week. Special arrangements can be discussed for certain sites with the Team Leader before the start of a project. Larger long running sites may in some instances set up on-site processing units to deal with the material from a particular site.
- D.1.5 All finds qualifying as Treasure will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act (1996), and the Treasure (Designation) Order 2002. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft.
- D.1.6 Each box of finds will be accompanied by a finds context checklist itemising the finds within each box. The number of bags of finds from each context and individual small find from each context will be recorded. A member of the processing team will check the list when it arrives in the department. There are separate forms for finds recovered from fieldwalking.
- D.1.7 The processing programme is reviewed on a weekly basis and priorities are worked out after discussions with the Fieldwork Team Leader and the Post-excavation Team Leader. Project managers will keep the Finds Team Leader informed of any pressing deadlines that they are aware of. All finds from evaluations are dealt with as a matter of priority.
- D.1.8 All bulk finds are washed (where appropriate), marked, bagged and boxed by the processing team according to the guidelines set out in section 4 and 5 of the OA Finds Manual, First-aid for finds and the UKIC guidelines No.2. They must also take into account the requirements of the receiving museum. Primary data recording count and weight of fragments by material from each context is recorded on the site database.

- D.1.9** Unstable and sensitive objects are recorded onto the database and then packaged and stored in controlled environments according to their individual requirements. The advice of a conservator will be sought for sensitive objects in need of urgent conservation. All metalwork will be x-rayed prior to assessment (and to meet the requirements of most receiving museums).
- D.1.10** Finds recovered from the environmental sample processing will be incorporated into the main assemblage and added to the database.
- D.1.11** On completion of the processing and data entry a finds file for each archaeological investigation will be produced, a summary of which is available for the project manager. The assemblage is allocated an OA number for storage purposes. Bulk finds are stored on a roller racking system, metals in a secure controlled storage and organic finds are refrigerated where possible.
- D.1.12** The movement of finds in and out of the storage areas is strictly monitored and recorded. Carbon copy transit forms exist to record this information. Finds will not be removed from storage without the prior knowledge of the Finds Team Leader.
- D.1.13** Finds information summarised in the finds compendium is used to assess the finds requirements for the post excavation stages of the project. The Team Leader holds a list of all specialists used by OA (see below) both internal and external.
- D.1.14** On completion of the post excavation stage of the project the team prepares the finds assemblage for deposition with the receiving museum. Discussions will be held with the museum, the excavator and the Finds Team Leader to finalise any selection, retention or discard policy. Most museums issue strict guidelines for the preparation of archives for deposition with their individual labelling, packaging and recording requirements.

D.2 Relevant industry standards and guidelines

- D.2.1** UKIC, 1983, Packaging and Storage of Freshly-Excavated Artefacts from Archaeological Sites. Conservation Guidelines No.2. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.2** UKIC, 1988, Excavated Artefacts and Conservation: UK sites Revised Edition. Conservation Guidelines No.1. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.3** Society of Museum Archaeologists, 1993, Selection, retention and dispersal of Archaeological Collections. Download available via <http://www.socmusarch.org.uk/publica.htm>)
- D.2.4** Watkinson, D E & Neal, V, 1998, First Aid for Finds (3rd edition). RESCUE & UKIC

D.3 Relevant OA manual and other supporting documentation

- D.3.1** Allen, L, and Cropper, C (internal publication only) Oxford Archaeology Finds Manual.

APPENDIX E HUMAN REMAINS

E.1 Standard methodology - summary

- E.1.1 Human remains will not be excavated without a relevant licence/faculty and, where applicable (for example, a post medieval cemetery), a risk assessment from the local environmental officer.
- E.1.2 All human remains will be treated with due care and regard to the sensitivities involved, and will be screened from the public throughout the course of the works.
- E.1.3 Excavation will be undertaken in accordance with ClfA (Roberts and McKinley 1993), Historic England (2018), the Advisory Panel on the Archaeology of Burials in England (APABE, 2015, 2017) and British Association of Biological Anthropology and Osteoarchaeology Code of Practice (2019) and Code of Ethics (2019). For crypts and post-medieval burials, the recommendations set out by the ClfA (Cox 2001) and by the Association of Diocesan and Cathedral Archaeologists and APABE (2010) are also relevant.
- E.1.4 In accordance with recommendations set out in the Historic England and Church of England (2005) and updated by the Advisory Panel on the Archaeology of Burials in England (2017), skeletons will not be excavated beyond the limits of the trench, unless they are deemed osteologically or archaeologically important.
- E.1.5 Where any soft tissue survives and/or materials (for example, inner coffins, mattresses and other paddings) soaked in body liquor, no excavation or handling of the remains will take place until an appropriate risk assessment has been undertaken. Relevant protocols (i.e. Cox 2001) for their excavation, recording and removal will be adhered to.
- E.1.6 OA does not excavate or remove modern burials (those less than 100 years old) and does not remove or open sealed lead coffins. Appropriate PPE (e.g. chemical suit, latex gloves) will be worn by all staff when working with lead coffins.
- E.1.7 Graves and their contents will be hand excavated in plan. Each component (for example, skeleton, grave cut, coffin (or remains of), grave fill) will be assigned a unique context number from a running sequence. A group number will also be assigned to all of these, and small finds numbers to features such as coffin nails, hobnails and other grave goods (as appropriate).
- E.1.8 Soil samples will be normally taken during the excavation of inhumations, usually from the region of the skull, chest, right hand, left hand, abdomen and pelvis, right foot and left foot. Infants (circa. less than 5 years) will normally be recovered as bulk samples. Soil samples will also be taken from graves that appear to contain no human bone.
- E.1.9 Burials (including the skeleton, cremation, coffin fittings, coffin, urn, grave goods / other) will be recorded by photographic and written record using specialised pro forma context sheets, although these records may only include schematic representations of the location and position of the skeletons, depending on the nature and circumstances of the burial.

- E.1.10 Where digital imaging is used it will be done in accordance with the British Association of Biological Anthropology and Osteoarchaeology Recommendations on the Ethical Issues Surrounding 2D and 3D Digital Images of Human Remains (2019).
- E.1.11 Where necessary, hand drawn plans (usually at 1:10, sometimes 1:5) will be made, especially of contexts where required details cannot be adequately seen using photography (for example, urned cremations; undisturbed hob nails).
- E.1.12 Levels will be taken. For inhumations this will be on the skull, pelvis and feet as a minimum.
- E.1.13 Human remains that are exhumed will be bagged and labelled according to skeletal region and carefully packed into suitable containers (for example, acid free cardboard boxes) and transported to a suitable storage location. Any associated coffins and coffin fittings will be contained with the human remains wherever possible.
- E.1.14 Urned cremations will not usually be half sectioned, but excavated in spits and/or quadrants (i.e. large deposits or spreads), or recovered as a bulk sample.
- E.1.15 Wherever possible, urned cremations will be carefully bandaged, recovered whole and will be excavated in spits in the laboratory, as per the recommendations of McKinley (2004, 2017).
- E.1.16 Unless deemed osteologically or archaeologically important disarticulated bone / chanel will be collected and reserved for re-burial if immediate re-internment as close to its original position is not practicable. In some instances, a rapid scan of this material may be undertaken by a qualified osteologist, if deemed relevant.
- E.1.17 If undisturbed, pyre sites will normally be excavated in quadrants, at the very least in 0.5 m blocks of 0.5 m spits.
- E.1.18 Pyre debris dumps will be half sectioned or quadrant and will be subject to 100% sampling.
- E.1.19 Wooden and lead coffins and any associated fittings, including fixing nails will be recorded on a pro forma coffin recording sheet. All surviving coffin fittings will be recorded by reference to Reeve and Adams (1993) and the unpublished master catalogue that is being compiled by OA. Where individual types cannot be paralleled, they will be drawn and/ or photographed and assigned a style number. Biographical details obtained from legible departum plate inscriptions will be recorded and further documentary research will be made.
- E.1.20 Funerary structures, such as brick shaft graves and/or vaults will be recorded by photogrammetry or hand-drawn at a scale of 1:10 or 1:20, as appropriate. Location, dimensions and method of construction will be noted, and the structure added to the overall trench plan.
- E.1.21 Memorials, including headstones, revealed within the areas of development will be recorded irrespective of whether they are believed to be in situ.
- E.1.22 Where required, memorials will be accorded an individual context number and will also be included as part of the grave group, if the association with a burial is clear.

E.1.23 Memorials will be recorded on pro-forma context sheets, based on and following the guidelines set out by Mytum (2002), and will include details of:

- Shape
- Dimensions
- Type of stone used
- Condition, completeness and fragmentation of stones, no longer in original positions
- Iconography (an illustration may best describe these features)
- Inscription (verbatim record of inscription; font of the lettering)
- Stylistic type

E.2 Relevant industry standards and guidelines

- E.2.1 Advisory Panel on the Archaeology of Burials in England, 2013, Science and the Dead. A guideline for the destructive sampling of archaeological human remains for scientific analysis. English Heritage Publishing.
- E.2.2 Advisory Panel on the Archaeology of Burials in England, 2017 Guidance for Best Practice for the Treatment of Human Remains Excavated from Christian Burial Grounds in England
- E.2.3 Advisory Panel on the Archaeology of Burials in England, 2015 Large Burial Grounds. Guidance on sampling in archaeological fieldwork projects
- E.2.4 Association of Diocesan and Cathedral Archaeologists and APABE, 2010 Archaeology and Burial Vaults. A guidance note for churches. Guidance Note 2
- E.2.5 British Association of Biological Anthropology and Osteoarchaeology. 2019a Code of Practice (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.6 British Association of Biological Anthropology and Osteoarchaeology. 2019b Code of Ethics (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.7 British Association of Biological Anthropology and Osteoarchaeology, 2019c Recommendations on the Ethical Issues Surrounding 2D and 3D Digital Images of Human Remains (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.8 Cox, M, 2001 Crypt archaeology. An approach. ClfA Paper No. 3
- E.2.9 English Heritage, 2002 Human Bones from Archaeological Sites. Guidelines for producing assessment documents and analytical reports
- E.2.10 Historic England, 2018 The Role of the Human Osteologist in an Archaeological Fieldwork Project. Swindon, Historic England
- E.2.11 McKinley, J, and Roberts, C, 1993 Excavation and post-excavation treatment of cremated and inhumed human remains, ClfA Technical Paper No. 13

- E.2.12 McKinley, J, 2004 Compiling a skeletal inventory: cremated human bone. In Brickley, M, and McKinley, J (eds) Guidelines to the Standards for Recording Human Remains, ClfA Technical Paper No. 7. 9-13
- E.2.13 McKinley, J, 2017 Compiling a skeletal inventory: cremated human bone. In Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, ClfA 14-19
- E.2.14 Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, ClfA 2017
- E.2.15 Mytum, H, 2000 Recording and Analysing Graveyards. CBA Handbook No. 15
- E.2.16 Reeve, J, and Adams, M, 1993 The Spitalfields Project. Volume I – The Archaeology Across the Styx. CBA Research Report No. 85
- E.2.17 The Human Tissue Act 2004

E.3 Relevant OA manual and other supporting documentation

- E.3.1 Loe, L, 2008 The Treatment of Human Remains in the Care of Oxford Archaeology. Oxford Archaeology internal policy document
- E.3.2 Oxford Archaeology 2018 *Fieldwork Manual Human Remains* unpublished

APPENDIX F REPORTING

F.1 Standard methodology - summary

F.1.1 For Watching Briefs and Evaluations, the style and format of the report will be determined by OA, but will include as a minimum the following:

- A location plan of trenches and/or other fieldwork in relation to the proposed development.
- Plans and sections of features located at an appropriate scale.
- A section drawing showing depth of deposits including present ground level with Ordnance Datum, vertical and horizontal scale.
- A summary statement of the results.
- A table summarising the features, classes and numbers of artefacts contained within, spot dating of significant finds and an interpretation.
- A reconsideration of the methodology used, and a confidence rating for the results.
- An interpretation of the archaeological findings both within the site and within their wider landscape/townscape setting.

F.1.2 For Excavations, a Post-Excavation Assessment and Project Design will generally be prepared, as prescribed by Historic England Management of Research Projects in the Historic Environment (MoRPHE) 2006, Section 2.3. This will include a Project Description containing:

- A summary description and background of the project.
- A summary of the quantities and assessment of potential for analysis of the information recovered for each category of site, finds, dating and environmental data. Detailed assessment reports will be contained within appendices.
- An explicit statement of the scope of the project design and how the project relates to any other projects or work preceding, concurrent with or following on from it.
- A statement of the research aims of the fieldwork and an illustrated summary of results to date indicating to what extent the aims were fulfilled.
- A list of the project aims as revised in the light of the results of fieldwork and the current post-excavation assessment process.

F.1.3 A section on Resources and Programming will also be produced, containing:

- A list of the personnel involved indicating their qualifications for the tasks undertaken, along with an explanation of how the project team will communicate, both internally and externally.
- A list of the methods which will be used to achieve the revised research aims.

- A list of all the tasks involved in using the stated methods to achieve the aims and produce a report and research archive in the stated format, indicating the personnel and time in days involved in each task. Allowance should be made for general project-related tasks such as monitoring, management and project meetings, editorial and revision time.
- A cascade or Gantt chart indicating tasks in the sequence and relationships required to complete the project. Due allowance will be made for leave and public holidays. Time will also be allowed for the report to be read by a named academic referee as agreed with the County Archaeological Officer, and by the County Archaeological Officer.
- A report synopsis indicating publisher and report format, broken down into chapters, section headings and subheadings, with approximate word lengths and numbers and titles of illustrations per chapter. The structure of the report synopsis should explicitly reflect the research aims of the project.

F.1.4 The Project Design will be submitted to the County Archaeological Officer or equivalent for agreement.

F.1.5 Under certain circumstances (e.g. with very small mitigations), and as agreed with the County Archaeological Officer or equivalent, a formal Assessment and Project Design may not be required and either the project will continue straight to full analysis, or a simple Project Proposal (MoRPHE 2006 Section 2.1) will be produced prior to full analysis. This proposal may include:

- A summary of the background to the project
- Research aims and objectives
- Methods statement outlining how the aims and objectives will be achieved
- An outline of the stages, products and tasks
- Proposed project team
- Estimated overall timetable and budget if appropriate.

F.1.6 Once the post-excavation Project Design or Project Proposal has been accepted, the County Archaeological Officer or his appointed deputy will monitor the progress of the post-excavation project at agreed points. Any significant variation in the project design will be agreed with the County Archaeological Officer.

F.1.7 The results of the project will be published in an appropriate archaeological journal or monograph. The appropriate level of publication will be dependent on the significance of the fieldwork results and will be agreed with the County Archaeological Officer. An OASIS (Online Access to the Index of Archaeological Investigations) form will be completed for each project as per Historic England guidelines.

F.2 Relevant industry standards and guidelines

F.2.1 Oxford Archaeology (OA) adheres to the national standards in post-excavation procedure as outlined in Historic England's Management of Research Projects in the Historic Environment (MoRPHE; EH 2006). Furthermore, all post-excavation projects

take into account the appropriate regional research frameworks as well as national research agendas such as the Framework for Historic Environment Activities & Programmes in Historic England (SHAPE; EH 2008).

APPENDIX G LIST OF SPECIALISTS REGULARLY USED BY OA

G.1.1 Below are two tables, one containing 'in-house' OA specialists, and the other containing a list of external specialists who are regularly used by OA.

Internal archaeological specialists used by OA

Specialist	Specialism	Qualifications
John Cotter	Medieval and Post Medieval pottery, Clay Pipe and CBM	BA (Hons), MCIfA
Dr Alex Davies	Prehistoric Pottery	BA (Hons), MA, PhD, ACIfA
Edward Biddulph	Roman Pottery	BA (Hons), MA, MCIfA
Kate Brady	Roman Pottery	BA, ACIfA
Cynthia Poole	CBM and Fired Clay	BA (Hons), MSc
Ian Scott	Metalwork and Glass	BA (Hons)
Leigh Allen	Metalwork and worked bone	BA (Hons), PGDip
Dr Ruth Shaffrey	Worked stone artefacts	BA, PhD, MCIfA
Julian Munby	Architectural Stone	BA, FSA
Dr Rebecca Nicholson	Fish and Bird Bone	BA (Hons), MA, D.Phil, MCIfA, FSA Scot
Dr Lee Broderick	Animal bone	BA (Hons), MA, MSc, FZG, SAC Dip (ecology), PhD
Dr Mairead Rutherford	Pollen	BSc, MSc
Ian Smith	Animal Bone	BA (Hons), MSc, PCIfA
Dr Martyn Allen	Animal Bone	BA (Hons), MA, PhD
Dr Denise Druce	Charred plant remains, charcoal and pollen	BA (Hons), PhD, MCIfA
Sharon Cook	Charred plant remains	BSc, MSc, ACIfA
Elizabeth Stafford	Geoarchaeology and land snails	BA (Hons), MSc
Carl Champness	Geoarchaeology	BA (Hons), MSc, ACIfA
Nicola Scott	Archaeological archive deposition	BA (Hons Dunelm)
Mike Donnelly	Flint	BSc, MCIfA
Dr Louise Loe	Human Bone	BA PhD, MCIfA, BABAO
Helen Webb	Human Bone	BSc, MSc, MCIfA, BABAO
Mark Gibson	Human Bone	BA, MSc, ACIfA, BABAO
Dr Lauren McIntyre	Human Bone	BSc, MSc, PhD, MCIfA, BABAO
Ui Choileain	Human Bone	Pg Dip, MA, MSc, BABAO
Natasha Dodwell	Human Bone	BA, MSc, BABAO

External archaeological specialists regularly used by OA

Specialist	Specialism	Qualifications
Lynne Keys	Slag	BA (Hons)
Quita Mould	Leather	BA, MA
Penelope Walton Rogers, The Anglo Saxon Laboratory	Identification of Medieval Textiles	FSA, Dip.Acc
Dana Goodburn-Brown	Conservation	BSc (Hons), BA, MSc
Steve Allen, York Archaeological Trust	Conservation	BA, MA, MAAIS
Dr Richard Macphail	Soils, especially Micromorphology	BA (Hons), MSc, PhD
Dana Challinor	Charcoal	MA, MSc
Dr Nigel Cameron	Diatoms	BSc, MSc, PhD
Dr David Smith	Insects	BA (Hons), MA, PhD
Professor Adrian Parker	Phytoliths and pollen	BSc (Hons), D.Phil
Dr David Starley	Metalworking Slag	BSc (Hons), PhD
Wendy Carruthers	Charred and waterlogged plant remains	BA (Hons)
Dr John Whittaker	Ostracods and Foraminifera	BA (Hons), PhD
Dr John Crowther	Soil Chemistry	MA, PhD
Dr Martin Bates	Geoarchaeology	BSc, PhD
Dr Dan Miles	Dendrochronology	D.Phil, FSA
Dr Jean-Luc Schwenninger	Optically Stimulated Luminescence Dating	PhD
Dr David Higgins	Clay Pipe	BA, PhD, MCIfA
Dr Hugo Anderson- Wymark	Flint	BSc, PhD, FSA Scot, MCIfA
Dr Damian Goodburn- Brown	Ancient Woodwork	BA, PhD

APPENDIX H DOCUMENTARY ARCHIVING

Standard methodology – summary

- H.1.1 The documentary archive constitutes all the written, drawn, photographic and digital records relating to the set up, fieldwork and post-excavation phases of the project. This documentary archive, together with the artefactual and environmental ecofact archive collectively forms the record of the site. The report is part of the documentary archive, and the archive must provide the evidence that supports the conclusions of the report, but the archive may also include data which exceeds the limitations of research parameters set down for the report and which could be of significant value to future researchers.
- H.1.2 At the outset of the project OA Archive manager will contact the relevant local receiving museum or archive repository to notify them of the imminent start of a new fieldwork project in their collecting area. Relevant local archiving guidelines will be observed and site codes, which integrate with the receiving repository, will be agreed for labelling of archives and finds.
- H.1.3 Where there is currently no receiving museum for the project archive, although responsibility for the archive ultimately lies with the client, OA will hold the archive on their behalf for a period of up to 3 years after completion of the report, after which time (in the event that a suitable depository has not been secured) provision for further storage of the archive will be made in agreement with Oxford Archaeology, the client and the relevant planning archaeologist.
- H.1.4 During the course of the project the Archive team will assist the Project Manager in the management of the archive including the cataloguing and development technique suitable for photographic archive requirements.
- H.1.5 The hard copy site archive will be security copied by scanning to PdFA and a copy of this will be housed on the OA Archive Server. A full digital copy of the archive, including scanned hard copy and born digital data, will be deposited with and made publicly available on-line through the ADS. A further copy will be maintained on the OA server and if requested a copy on disk will also be sent to the receiving museum with the hard copy. This will act as a safeguard against the accidental loss and the long-term degeneration of paper records and photographs.
- H.1.6 Born digital data will only be printed to hard copy for the receiving museum where practical. Archive elements that need maintaining in digital form will be sent to ADS in accordance with Arches Standard and ADS guidelines. A copy will be sent to the receiving museum by CD and back-up copies will be stored on the OA digital network. In most cases a digital copy of the report will be included in the OASIS project library hosted by ADS.
- H.1.7 Prior to deposition the Archive team will contact the museum regarding the size and content of the archive and discuss any retention and dispersal policies which may be applicable in line with local and SMA Guidelines ' Selection, Retention & Dispersal of Archaeological Collections' 1993.

- H.1.8 The site archive will then be deposited with the relevant receiving museum or repository at the earliest opportunity unless further archaeological work on the site is expected. The documentary archive will include correspondence detailing landowner consent to deposit the artefacts and any copyright licences in accordance with the receiving museum guidelines. Deposition charges will be required from the client as part of the project costs but the level of the fee is set by the receiving body, and may be subject to change during the lifespan of the project. Changes to archiving charges beyond OA's control will be passed across to the client.
- H.1.9 Oxford Archaeology will retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it will provide the receiving repository or museum for the archive with a full licence for use to the client in all matters directly relating to the project as described in the Written Scheme of Investigation, and in line with the relevant receiving body guidelines.
- H.1.10 OA will advise the receiving repository or museum for the archive of 3rd party materials supplied in the course of projects which are not OA's copyright.
- H.1.11 OA undertakes to respect all requirements for confidentiality about the client's proposals provided that these are clearly stated. It is expected that such conditions shall not unreasonably impede the satisfactory performance of the services required. Archaeological findings and conclusions can be kept confidential for a limited period but will be made publicly available in line with the above procedure either after a specified time period agreed with the client at the outset of the project, or where no such period is agreed, after a reasonable period of time. It is expected that clients respect OA's general ethical obligations not to suppress significant archaeological data for an unreasonable period.

H.2 Relevant industry standards and guidelines

- H.2.1 At the end of the project the site archive will be ordered, catalogued, labelled and conserved and stored according to the following national guidelines:
- H.2.2 The 2014 EAC Guidelines A Standard and Guide to the Best Practice for Archaeological Archiving in Europe (GB) Perrin K, Brown E et al.
- H.2.3 The 2014 CIFA Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives.
- H.2.4 The 2011 AAF guide Archaeological Archives A Guide to Best Practice in Creation, Compilation, Transfer and Curation. Brown D.
- H.2.5 The UKIC's Guidelines for the preparation of excavation archives for long-term storage.
- H.2.6 The MGC's Standards in the museum care of archaeological collections.
- H.2.7 Local museum guidelines such as Museum of London Guidelines: (<http://www.museumoflondonarchaeology.org.uk/English/ArchiveResearch/DeposRe> source) will be adopted where appropriate to the archive collecting area.
- H.2.8 The site archive will be prepared to at least the minimum acceptable standard defined in Management of Archaeological Projects 2, Historic England 1991.

H.3 Relevant OA manual and other supporting documentation

H.3.1 The OA Archives Policy.

APPENDIX I HEALTH AND SAFETY

I.1 Standard Methodology - summary

- I.1.1 All work will be undertaken in accordance with the current OA Health and Safety Policy, the OA Site Safety Procedures Manual, a site-specific Risk Assessment and, if required, Safety Plan or Method Statement. Copies of the site-specific documents will be submitted to the client or their representative for approvals prior to mobilisation, and all relevant H and S documentation will be available on site at all times. The Health and Safety documentation will be read in conjunction with the project WSI.
- I.1.2 Where a project falls under the Construction (Design and Management) Regulations (2015), all work will be carried out in accordance with the Principal Contractor's Construction Phase Plan (CPP).

I.2 Relevant industry standards and guidelines

- I.2.1 All work will be carried out according to the requirements of all relevant legislation and guidance, including, but not exclusively:
 - I.2.2 The Health and Safety at Work Act (1974).
 - I.2.3 Management of Health and Safety at Work Regulations (1999).
 - I.2.4 Manual Handling Operations Regulations 1992 (as amended).
 - I.2.5 The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013).
 - I.2.6 The Construction (Design and Management) Regulations (2015).
 - I.2.7 Relevant OA manual and other supporting documentation
 - I.2.8 The OA Health and Safety Policy.
 - I.2.9 The OA Site Safety Procedures Manual.
 - I.2.10 The OA Risk Assessment templates.
 - I.2.11 The OA Method Statement template.
 - I.2.12 The OA Construction Phase Plan template.



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APPENDIX B TRENCH DESCRIPTIONS AND CONTEXT INVENTORY

Site 8

Trench 81						
General description					Orientation	NE-SW
North-east/south-west aligned trench located at the northern end of Bramley-Moore Dock's western quay, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench contained three sandstone column bases, a wall and a brick culvert.					Length (m)	35
					Width (m)	2.8
					Avg. depth (m)	1.27
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
8100	Layer	2.8	0.06	Tarmac	-	-
8101	Layer	2.8	0.12	Concrete	-	-
8102	Layer	2.8	0.25	Concrete	-	-
8103	Structure	3.42	0.75	Brick wall	-	-
8104	Structure	1.6	1.17	Sandstone column base	-	-
8105	Structure	1.29	0.96	Sandstone column base	-	-
8106	Structure	1.73	1.08	Sandstone column base	-	-
8107	Layer	-	-	Made ground	-	-
8108	Structure	3.07	2.8	Brick culvert	-	-

Trench 82						
General description					Orientation	E-W
East/west aligned trench located in the middle of the three trenches on the western quay of Bramley-Moore Dock, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench contained five sandstone column bases and two walls at either end of the trench.					Length (m)	17.5
					Width (m)	2.4
					Avg. depth (m)	1.2
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
8200	Layer	-	0.05	Tarmac	-	-
8201	Layer	-	0.10	Cobble setts	-	-
8202	Layer	-	0.06	Bedding for cobbles 8201	-	-
8203	Layer	-	0.07	Concrete	-	-
8204	Layer	-	0.23	Layer of bricks	-	-
8205	Layer	-	0.79	Made ground	-	-
8206	Structure	0.80	-	Brick wall	-	-
8207	Structure	0.48	0.30+	Sandstone column base	-	-
8208	Structure	0.85	0.70+	Sandstone column base	-	-
8209	Structure	0.90	0.75+	Sandstone column base	-	-
8210	Structure	0.97	0.82+	Sandstone column base	-	-

8211	Structure	0.40	0.78+	Sandstone column base	-	-
8212	Structure	0.55	0.77	Brick wall		
8213	Structure	1.17	0.20	Foundation for 8212		

Trench 83						
General description					Orientation	E-W
East/west aligned trench located at the southern end of the western quay of Bramley-Moore Dock, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench contained five sandstone column bases and a Y-shaped drain.					Length (m)	17.5
					Width (m)	2.4
					Avg. depth (m)	1.2
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
8300	Layer	-	0.05	Tarmac	-	-
8301	Layer	-	0.13	Cobble setts	-	-
8302	Layer	-	0.14	Concrete	-	-
8303	Layer	-	0.12	Layer of bricks	-	-
8304	Layer	-	0.70	Made ground	-	-
8305	Structure	1.10	0.64+	Sandstone column base	-	-
8306	Structure	1.05	0.45+	Sandstone column base	-	-
8307	Structure	1.03	0.40+	Sandstone column base	-	-
8308	Structure	1.15	0.30+	Sandstone column base	-	-
8309	Structure	0.50	0.40+	Sandstone column base	-	-
8310	Layer	-	0.75	Made ground	-	-
8311	Structure	-	-	Brick drain	-	-

Site 12

Trench 121						
General description					Orientation	N-S
North/south aligned trench located at the eastern end of the northern quay of Nelson Dock, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench contained a single north-south aligned brick wall.					Length (m)	18.5
					Width (m)	2.2
					Avg. depth (m)	1.12
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
12100	Layer	-	0.08	Tarmac	-	-
12101	Layer	-	0.09	Cobble setts	-	-
12102	Layer	-	0.06	Sand and gravel bedding for 12101	-	-
12103	Layer	-	0.12	Concrete	-	-
12104	Structure	0.53	0.31	Wall	-	-
12105	Layer	-	0.10	Light yellow grey layer	-	-
12106	Layer	-	0.57	Crushed sandstone rubble, made ground	-	-
12107	Layer	-	-	Concrete slab		

Trench 122						
General description					Orientation	N-S
North/south aligned trench located in the middle of the three trenches on the northern quay of Nelson Dock, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench was devoid of archaeology.					Length (m)	17.5
					Width (m)	2.34
					Avg. depth (m)	1.18
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
12200	Layer	-	0.06	Tarmac	-	-
12201	Layer	-	0.11	Cobble setts	-	-
12202	Layer	-	0.06	Sand and gravel bedding for 12201	-	-
12203	Layer	-	0.19	Concrete	-	-
12204	Layer	-	0.07	Light yellow grey made ground	-	-
12205	Layer	-	0.68	Red sandstone made ground	-	-

Trench 123						
General description					Orientation	N-S
North/south aligned trench located at the western end of northern quay of Nelson Dock, targeting the remains of the former shed depicted on this quay, on historic mapping. The trench was devoid of archaeology.					Length (m)	18
					Width (m)	2.5
					Avg. depth (m)	1.17
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
12300	Layer	-	0.08	Tarmac	-	-
12301	Layer	-	0.12	Cobble setts	-	-
12302	Layer	-	0.06	Sand and gravel bedding for 12301	-	-
12303	Layer	-	0.11	Concrete	-	-
12304	Layer	-	0.78	Red sandstone made ground	-	-

Site 23

Trench 231						
General description					Orientation	E-W
East/west aligned trench located at the western end of the northern quay of Bramley-Moore Dock, targeting the remains of crane bases depicted on historic mapping. The trench had three walls (23102, 23104 and 23112), which appeared to form a cellar, potentially as a service room.					Length (m)	10
					Width (m)	3.2
					Avg. depth (m)	1.2
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
23100	Layer	-	0.17	Concrete	-	-

23101	Layer	-	0.36	Light greyish-brown silty sand made ground	-	-
23102	Structure	-	-	Brick wall	-	-
23103	Layer	-	0.20	Compact layer of coal	-	-
23104	Structure	-	-	Brick wall	-	-
23105	Layer	-	0.49	Grey silty sand made ground	-	-
23106	Layer	-	0.34	Grey rubble made ground	-	-
23107	Layer	-	0.37	Reddish-brown silty sand made ground	-	-
23108	Layer	-	0.18	White lime rubble layer	-	-
23109	Layer	-	0.12	Fine yellow silty sand layer	-	-
23110	Layer	-	0.08	Thin black silty sand layer	-	-
23111	Layer	-	0.23	Greenish-yellow silty sand layer		--
23112	Structure	-	-	Brick wall	-	-
23113	Structure	-	-	Concrete floor		

Trench 232						
General description					Orientation	N-S
North/south aligned trench located centrally on the northern quay of Bramley-Moore Dock, targeting the remains of crane bases depicted on historic mapping. The trench contained a L-shaped sandstone structure, similar in construction to the sandstone column bases identified in the trenches on Site 8.					Length (m)	9.5
					Width (m)	2.6
					Avg. depth (m)	1.12
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
23200	Layer	-	0.15	Cobble setts	-	-
23201	Layer	-	0.22	Sand and gravel bedding for 23200	-	-
23202	Layer	-	0.07	Mid- reddish-orange sandy silt made ground	-	-
23203	Layer	-	0.05	Dark blueish-black layer	-	-
23204	Layer	-	0.24	Light yellowish-grey silty sand layer	-	-
23205	Layer	-	0.20	Mid- brownish-grey silty sand layer	-	-
23206	Layer	-	0.08	Concrete	-	-
23207	Structure	-	-	L-shaped sandstone structure	-	-
23208	Layer	-	0.85	Dark greyish-brown silty sand layer	-	-

Site 25

Trench 25						
General description					Orientation	NE-SW
North-east/south-west aligned trench located centrally on the eastern quay of Bramley-Moore Dock, targeting the remains of crane bases depicted on historic mapping. The trench contained three brick bases, concrete slab and a brick wall.					Length (m)	9.5
					Width (m)	2.6
					Avg. depth (m)	1.12
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
2500	Structure	-	0.16	Metal railway lines	-	-
2501	Layer	-	0.22	Concrete	-	-
2502	Layer	-	0.70	Mid- brownish-grey silty sand made ground	-	-
2503	Layer	-	0.46	Mid- brownish-red sand	-	-
2504	Structure	-	0.24	Sandstone slab with two circular holes cut into it	-	-
2505	Structure	1.35	0.69	Brick base	-	-
2506	Structure	1.58	0.60	Brick base	-	-
2507	Structure	0.50	0.43	Brick wall	-	-
2508	Structure	1.48	0.47	Brick base	-	-
2509	Structure	1.35	0.20	Concrete slab	-	-
2510	Structure	0.28	0.30	Sandstone slab with a circular hole cut into it	-	-

Site 28

Trench 28						
General description					Orientation	NE-SW
North-east/south-west aligned trench located at the northern end of the northern quay of Bramley-Moore Dock, targeting the remains of a red brick structure. The trench contained two brick drains.					Length (m)	11
					Width (m)	1.2
					Avg. depth (m)	1.15
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
2800	Layer	-	0.27	Brick layer	-	-
2801	Structure	0.30	0.20	Drain	-	-
2802	Structure	-	-	Metal railway line	-	-
2803	Layer	-	0.10	Concrete	-	-
2804	Layer	-	0.18	Reddish-brown silty sand made ground	-	-
2805	Structure	0.46	0.23	Manhole for drain 2801	-	-
2806	Structure	-	-	Drain	-	-
2807	Layer	-	0.15	Red silty sand made ground	-	-
2808	Layer	-	0.19	Black silty sand layer	-	-
2809	Layer	-	0.41	Yellowish-grey silty sand layer	-	-

APPENDIX C BIBLIOGRAPHY

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APPENDIX D

SITE SUMMARY DETAILS

Site name:	Bramley-Moore Dock, Regent Road, Liverpool
Site code:	BMD20
Grid Reference	SJ 33452 92491
Type:	Evaluation
Date and duration:	21/05/2020-05/06/2020: 11 days
Area of Site	8.54 ha
Location of archive:	The archive is currently held at OA North, Mill 3, Moor Lane, Lancaster, LA1 1QD, and will be deposited with National Museums Liverpool in due course.
Summary of Results:	<p>Oxford Archaeology (OA) North was commissioned by Laing O'Rourke to undertake an archaeological investigation of Bramley-Moore Dock (BMD) and the north quay of Nelson Dock, Regent Road, Liverpool (NGR: SJ 33452 92491) in advance of the submission of a planning application for the construction of a new football stadium with associated facilities and infrastructure.</p> <p>Following the production of a desk-based assessment (DBA) by OA North (2019), which was produced to inform a full planning application of the development (planning ref: 20F/0001). OA North were subsequently contacted to design an adequate mitigate strategy based upon recommendations made in the DBA, and were commissioned by Laing O'Rourke, following their appointment as Principal Contractor for the project, to produce the Written Scheme of Investigation and undertake the archaeological fieldwork, which included: a photogrammetric survey of the current state of the dock, building survey of two of the upstanding structures on the site, and to excavate twelve evaluation trenches, although only ten were possible to excavate at the time, situated around BMD and the north quay of Nelson Dock. The fieldwork was undertaken in May 2020.</p>



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