



# Royal Arsenal, Building 10 (Southern Blocks)

## Archaeological Observation and Recording Report

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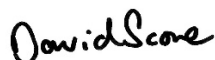
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## Royal Arsenal, Building 10 (Southern Blocks)

### *Archaeological*

### *Observation and Recording Report*

*Written by Steve Teague*

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## Summary

Between April-July 2018 Oxford Archaeology undertook archaeological observation and recording at Building 10 (Southern Blocks) within the Royal Arsenal, Woolwich, during redevelopment for housing and commercial units. Building 10 contained the Royal Carriage Factory that was constructed between 1802 and 1805. Internal dividing walls and culverts pertaining to original layout of Block 1, a storage building prior to its remodeling during or after c 1890, were revealed. Also revealed were a pair of barrel-vaulted cellars that adjoined a third cellared room, likely to have formed part of Block 5, the South Erecting Shop, which was constructed in 1886. Within Block 1L, the walls of an engine room were uncovered. These were constructed during the 1850s and were contained within a boiler house. Two substantial limestone-built structures with iron fittings attached to their surface were found within the engine room. These are likely to represent plinths or bases for machinery. Notable finds included two work tokens, each inscribed 'ROYAL CARRIAGE DEPART' and dated to the First World War.

## Acknowledgements

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The project was managed for Oxford Archaeology by David Score. The fieldwork was directed by Dan Sykes, who was supported by Adam Rapijko, Bernadeta Rzadek and Benjamin Slader. Survey and digitizing were carried out by Adam Rapijko and Conan Parsons. Thanks are also extended to the teams of OA staff who cleaned and packaged the finds under the management of Leigh Allen, and prepared the archive under the management of Nicky Scott.



## **1 INTRODUCTION**

### **1.1 Scope of work**

- 1.1.1 Oxford Archaeology (OA) was commissioned by Berkeley Homes Ltd to undertake archaeological observation and recording within Building 10 (Southern Blocks development), situated in the southern part of the Royal Arsenal site at Woolwich. The development of the existing building comprised both commercial and residential elements.
- 1.1.2 A planning condition for the development of the Building 10 area required a programme of archaeological work. This was undertaken in agreement with the local planning authority as advised by Mark Stevenson, Greater London Archaeology Advisory Service (GLAAS). Discussions with Mark Stevenson established the scope of work required to satisfy the planning condition. A written scheme of investigation (WSI) outlined how OA would implement the archaeological works (OA 2019).
- 1.1.3 All work was undertaken in accordance with local and national planning policies.

### **1.2 Location, topography and geology**

- 1.2.1 Building 10 is situated in the southern part of the historic Royal Arsenal and the development area consists of the south-eastern ranges of the building (NGR TQ 43972 79050). Historically bordering Merbury Street to the south and Essex Street to the east, the southern ranges of Building 10 now contain the new development, which encompasses the new Crossrail station immediately to the south.
- 1.2.2 The geology of the site is Terrace Gravels and Thanet Sand Formation overlying London Clay.

### **1.3 Archaeological and historical background**

- 1.3.1 Much of the area encompassed by the main Arsenal complex was included in a programme of extensive archaeological investigations undertaken by OA on behalf of English Partnerships (now the London Development Agency) during 1999 and 2000 (OA 2002). Subsequently, further archaeological works have been undertaken for various developers, the leading one being Berkeley Homes, on sites across the Arsenal as development of that area has progressed. Information on the archaeological and historical background to the Warren and Teardrop sites is to be found in the desk-based assessment for that development (OA 2004).
- 1.3.2 A full historic building record has been produced for Building 10 (OA 2008) which contains historical information and survey of the existing building. This will not be reproduced here, but it is sufficient to note here that Building 10 contained the Royal Carriage Factory, one of the largest manufacturing complexes at the Arsenal that developed piecemeal over a number of years. (For reference, the area which is impacted by the current development is covered by the parts of Building 10 referred to in the 2008 document as Blocks 2, 5 and 1L. Block 2, the southernmost dates to 1802-5 and is contemporaneous with the main Building 10 quadrangle to the north,

which includes Block 1. Blocks 5 dates to 1886 and effectively fill in the gap between Block 2 and the main structure to the north.)

- 1.3.3 In 2005 several test pits were dug in Blocks 2, 5 and 6 of Building 10 as part of a wider evaluation of the Warren development area at the Royal Arsenal (OA 2005). No significant archaeology was revealed.

## **1.4 Potential**

- 1.4.1 Previous archaeological investigation (although limited) and site investigation works would indicate that there is a significant depth (c 2m) of made ground below the existing Building 10 floor slab. The previous work and historical information do not indicate any specific potential and the majority of the impacts from the current development do not go below the depth of made ground, and so features are most likely to relate to the relatively recent (1800s onwards) construction and modification of the current building.

## 2 AIMS AND METHODOLOGY

### 2.1 General aims

- To establish the presence or absence of archaeological remains within the proposed development area and excavate and record them to an appropriate level.
- To record the extent, condition, nature, character, quality and date of any archaeological remains which may be affected by the proposed works.
- To establish the ecofactual and environmental potential of archaeological deposits and features within the site and to take samples where appropriate.
- To make available the results of the investigation.

### 2.2 Specific aims and objectives

- To record any evidence of structures relating to activity at the Arsenal.

### 2.3 Methodology

- 2.3.1 The concrete slab within Block 2 was removed and then reduced generally to a level of c 6.65m aOD using a 360-degree excavator. The subsequent ground works included the excavation of a number of pile caps and other services together with some discrete probing to test for obstructions indicated by previous survey work. The pile caps and associated trenches within the South Range (the new commercial area) within the existing historic building (Block 2) were excavated to a maximum depth of c 1.85m to around 4.80m aOD.
- 2.3.2 Ground work was monitored during April-May 2018 and intermittently between June to mid-July 2019 when following a meeting with Mark Stevenson it was concluded that sufficient activity had been monitored to mitigate the effects of the development and understand the nature of the archaeological features present. Monitoring of specific deeper excavations for an attenuation tank (formally a target for archaeological observation) was not in the event necessary as this was in an area covered by general ground reduction which had been previously monitored. Recording was undertaken in accordance with the WSI.

## 3 RESULTS

### 3.1 Presentation of the results

3.1.1 The results of the fieldwork are presented below, grouped by site area (Blocks 2, 5 and 1L). Full details of the context descriptions are presented in Appendix 1 and the finds reports in Appendix 2.

### 3.2 General

3.2.1 The removal of the extant concrete slab the subsequent general reduction of the site revealed a 0.50m thick ubiquitous dark brown deposit (20162) of sandy silt containing small stones and fragments of brick. This was probably levelling in advance of the construction of the slab. The base of this deposit was only encountered in several of the deeper excavations undertaken in association with formation of the pile caps (Plate 1). Here the natural, light orangey yellow sandy silt, was recorded at between 4.80-5.16m aOD. A stone cannonball, later reused as decorative architectural adornment, was recovered from deposit 20162, together with a residual piece of struck flint.

### 3.3 Block 2

3.3.1 Two NE-SW aligned brick walls (20160=20169 and 20183) ran at right-angles to the north and south walls of the existing building. Both walls originally formed part of the original 19th-century building, as repairs were visible on the internal wall of the existing building at the point where both walls joined them (Plate 1). The walls were both constructed with red and yellow frogged bricks bonded with light yellowish mortar, similar to the walls of the existing building. A narrow culvert (20161, Plate 2) was built into and ran alongside the western side of wall 20160.

3.3.2 To the east of wall 20160/20169, there were three arched structures (culverts or potential flues) that were aligned at an angle with the walls of the existing building. Structure 20157 ran from its NE corner to a point where wall 20160/20169 joined the south wall of the building. Though the relationship of the structure with the extant walls of the building was not established, it is likely that they were contemporary. A deposit of black silt or ash was observed within the structure (Plate 3). A second structure (20174) ran from the SE corner of the building and probably joined the central part of culvert 20157, though this was not examined in plan. A third structure (20159) extended from the junction of wall 20160 with the extant north wall of the building and possibly joined the north side of structure 20157. All three structures were of a similar construction, built with 19th-century type frogged red and yellow bricks bonded by light greyish mortar, similar to the walls of the extant building.

3.3.3 A north-south wall (20175) arched over structure 20174 suggesting the culvert/flue was in use when the wall was constructed (Plate 4). The wall was of similar build to the other walls described above.

3.3.4 The decayed remains of three equally spaced timbers (Structure 20158), set parallel and aligned with the north wall of the building, pre-dated structure 20157 (Plate 3). They were formed with rectangular cut timbers measuring 0.13m wide and up to 1.6m

in length. They possibly represented the remains of sleepers for a north-south aligned narrow gauge railway, of 19th century date. Their relationship with the extant building is unknown.

### 3.4 Block 5

- 3.4.1 A pair of vaulted cellars (20153-55), which were delimited by and abutted a NE-SW aligned wall to their west (20050), were revealed. The cellars were both barrel-vaulted, the base of their springing vault arches surviving on top of the remains of the walls (Plate 5). The internal area of the north cellar measured 5.5m x 1.7m (18 x 5½ feet). The southern cellar was slightly wider at 2.2m (7 feet) but probably of the same length and both were at least 1.0m in depth. Wall 20150 probably delimited the eastern extent of a cellared building that had largely been destroyed. It survived to a height of at least 1.4m and had evidence for an internal division (Plate 6). All the walls were of a similar construction, 19th century frogged red brick, English bond course, bonded by light greyish mortar.
- 3.4.2 To the west was a small circular brick-built soakaway or well (20156) that remained open for depth of c 6.0m (Plate 7). To the west were two brick-built soakaways (20185 and 20186), connected by a drain/culvert, possibly modern in date.

### 3.5 Block 1L

- 3.5.1 A contractor excavation with Block 1L revealed a pair of massive rectangular stone-built structures (20187 and 20189), likely to represent machine bases (Plates 8 and 9). They were spaced 1.50m apart. The full dimensions of the western structure (20187) were partially exposed by the investigation, which revealed the structure to be 5.77m long and 3.17m wide. The eastern structure was of a similar width and was at least 2.10m in length. Both were constructed with large well-finished ashlar-like sandstone blocks (56¼ x 48 x 24 inches) bonded by creamy lime flecked mortar with grey Portland cement repairs. The gap between the two structures was emptied to a depth of 2.44m which revealed that both structures had a stepped foundation. There were a number of small regularly spaced rectangular slots on the surface of both structures, together with a pair of deep, parallel grooves running vertically down the west face of Structure 20189. In addition, there was a row of four larger holes on the surface of 20187, each attached to a length of iron rod. Structure 20189 also had two small cast-iron fittings inserted into its surface, which along with the above probably were associated with the fitting of machinery which the blocks once supported.
- 3.5.2 The possible machine bases appear to have been contained within a brick-built structure defined by wall 20191 to the west and wall 20190 to the south. Both were quite substantial, measuring 0.70m-0.75m in width and constructed with 19th century red and yellow frogged bricks bonded by light greyish lime mortar.

## 4 DISCUSSION

- 4.1.1 Undisturbed pre-19th century levels were generally not revealed during the ground works, except within several small trenches that were excavated during piling preparation works. Where reached, no earlier deposits other than natural were found.
- 4.1.2 Within Block 2, a number of brick walls and culverts were revealed. These are likely to have been contemporary with the extant building that was constructed in 1802-5 as part of Building B, which contained Royal Carriage Factory. Walls 20183, 20160/20169 and 20175 each correspond to internal dividing walls depicted on a plan of 1866 drawn by Colonel Sir H James. This depicts an 'Iron Store', as well as two smaller storage rooms, including an 'Oil Store', at the far east end of the building. Several intercepting culverts within this part of the building are likely to have been used to supply water, although a black deposit observed filling Structure 20157 that crossed the oil store could suggest other uses. It is likely that the internal layout of Block 2 was modified after its remodelling in c 1890 or perhaps at some part after, resulting in the demolition of the internal divisions at the east end of the building (OA 2008, 28-33).
- 4.1.3 Block 5, the 'South Erecting Shop' was constructed in 1886 (*ibid.*, 12), and so presumably it is from this period that cellared structures (20150 and 20153-5) pertain, since the 1866 plan shows a largely open area. Wall 20150 that divides the two sets of cellars corresponds to an internal wall on the west end of Block 2 between the 'Copper Store' and the 'Iron Store'. Perhaps the 1886 building was connected and open to Block 2 at their west ends at some point, although this is not evident on an 1886 plan of the building (*ibid.*, fig. 5). However, the 1866 plan does depict well/soakaway 20156 as a small square labelled 'S.C.W'.
- 4.1.4 The large stone structure within Block 1L is likely to form the base or plinth that supported a substantial piece of machinery that was utilised for the carriage works. As such its position corresponds with the location of an 'Engine Room' depicted on the 1866 plan which shows that it formed part of a 'Boiler House'. The stone work abutted brick walls to the south and west that correspond closely with the outline of the boiler room. These were additions to Block 1L that formed part of the southern side of the original primary quadrangle that was constructed in 1802-5. This engine room was probably added in the Crimean period expansion at the Arsenal during the 1850s (*ibid.*, 25 and fig. 12).
- 4.1.5 Building 10 continued in use as manufacturing unit up to the First World War. Two work tokens, each bearing the inscription 'ROYAL CARRIAGE DEPART' and dating to this period, were recovered.
- 4.1.6 The works detailed above are part of a long series of investigations undertaken at the Royal Arsenal. An overarching post excavation assessment will be undertaken to review all these works and the Building 10 element will be assessed as part of this process and agreement reached on what elements of the results will be taken forward in a final publication.

## APPENDIX A      CONTEXT LIST

Context	Type	Fill of	Width	Length	Depth	Description	Comment
20150	Wall	20179	0.49		1.40	Red frogged bricks 9 1/16 x 4 5/16 x 2 3/4 inches, English bond, light greyish lime mortar	West wall of 19C cellars 20153 and 20154
20151	Wall				0.97	Yellow frogged bricks 7 7/8 x 3 15/16 x 2 1/2 inches, irregular bond, light greyish lime mortar	Basement wall, built on wall 20152
20152	Wall	20181			0.67	Red bricks 8 5/16 x 3 15/16 x 2 1/2 inches, irregular bond, light greyish lime mortar	19C basement wall, below wall 20152
20153	Structure	20179	3.10	6.30	1.0+	Basement with arched ceiling (vaulted). Red frogged bricks, 9 1/16 x 4 5/16 x 2 3/4 inches, English bond, light greyish lime mortar	19C Cellar
20154	Structure	20179	3.30	6.30	1.0+	Basement with arched ceiling (vaulted). Red frogged bricks, 9 1/16 x 4 5/16 x 2 3/4 inches, English bond, light greyish lime mortar	19C Cellar
20155	Wall	20179				Red frogged bricks 9 1/16 x 4 5/16 x 2 3/4 inches, English bond, light greyish lime mortar	19C cellar wall
20156	Structure	20180	0.70	1.30	6.0+	Soakaway. Yellow frogged bricks 9 1/16 x 4 5/16 x 2 3/4 inches, header bond, light greyish lime mortar	19/20C? soakaway
20157	Structure	20163	0.70	8.0+	0.70	NE-SW culvert. Red and yellow frogged bricks 9 1/16 x 4 5/16 x 2 3/4 inches, stretcher bond, light greyish lime mortar	19/20C culvert?
20158	Structure	20164	0.13	1.60	0.20	Timber structure consisting of parallel placed three timbers	Possible sleepers for a N-S 19C narrow gauge railway, truncated by culvert 20157
20159	Structure	20165	0.70	6.1+	0.70	N-S culvert. Red and yellow frogged bricks 9 1/16 x 4 5/16 x 2 3/4 inches, stretcher bond, light greyish lime mortar	19/20C culvert?



20160	Wall	20166	0.70	5.8+	0.90+	N-S wall. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches) and (9 1/16 x 4 5/16 x 2 3/4 inches), English bond, light greyish lime mortar	19C wall
20161	Structure	20167	0.70	4.9+	0.70	N-S culvert. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches) and (9 1/16 x 5 5/16 x 2 3/4 inches), English bond, light greyish lime mortar	19C culvert, joined with wall 20160
20162	Layer		5.00	30.00	0.50	Dark brown sandy silt with small stones and fragments of brick	Levelling deposit under contemporary concrete floor, modern
20163	Cut		0.70	8+	0.70	Linear, vertical sides, flat base	Construction cut for culvert 20158
20164	Cut		1.60	4.8+		Linear, vertical sides	Construction cut for culvert 20157
20165	Cut		0.70	6.1+	0.70	Linear, vertical sides, flat base	Construction cut for culvert 20159
20166	Cut		1.25	5.80+	0.90+	Linear, vertical sides, flat base	Construction cut for wall 20170
20167	Cut		0.70	4.90+	0.70	Linear, vertical sides, flat base	Construction cut for culvert 20161
20168	Layer					Light orangish yellow sandy silt	Natural
20169	Wall	20170	0.70	6.0+	1.10+	N-S wall. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches) and (9 1/16 x 4 5/16 x 2 3/4 inches), English bond, light greyish lime mortar	19C wall, probably same as wall 20160
20170	Cut		1.25	6.0+	1.10+	Linear, vertical sides, flat base	Construction cut for wall 20169
20171	Fill	20170	1.25	6.0+	1.10+	Mid brownish grey sandy silt with small stones	Fill of construction cut 20170
20172	Structure	20173	0.70	2.3+	0.70	NE-SW culvert. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches) and (9 1/16 x 4 5/16 x 2 3/4 inches), stretcher bond, light greyish lime mortar	19C culvert
20173	Cut		0.70	2.3+	0.70	Linear, vertical sides, flat base	Construction cut for culvert 20172

20174	Structure	20176	0.50+	5.6+	0.16+	SE-NW culvert. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches) and (9 1/16 x 4 5/16 x 2 3/4 inches), stretcher bond, light greyish lime mortar	19C culvert, built over by wall 20175
20175	Wall	20177	0.66	6.0+	0.40	N-S wall. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches), English bond, light greyish lime mortar	19C foundation, built over culvert 20174
20176	Cut		0.50+	5.6+	0.16+	Linear, vertical sides, flat base	Construction cut for culvert 20174
20177	Cut		0.66	6.0+	0.40	Linear, vertical? sides, base not seen	Construction cut for wall 20175
20178	Fill	20176	0.50+	5.6+	0.16+	Mid brownish grey sandy silt with small stones	Fill of construction cut 20176
20179	Cut					Not visible on plan	Construction cut for cellars 20153-5 and wall 20150
20180	Cut					Not visible on plan	Construction cut for soakaway 20156
20181	Cut					Not visible on plan	Construction cut for wall 20152
20182	Structure		0.30	0.80		Soakaway? Yellow/ed frogged bricks 9 1/16 x 4 3/16 x 2 3/4 inches, English bond, light greyish lime mortar	19C? rectangular soakaway with part of a culvert
20183	Structure		0.55	2.85		E-W wall. Red and yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches), English bond, light greyish lime mortar (as Building 10)	19C wall
20184	Structure		0.35	6.6+	1.7+	E-W wall. Red modern brick, English bond, modern cement	Modern 20C wall, covered by concrete slab
20185	Structure		1.27	1.35	2.10+	circular soakaway. Yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches), English bond/irregular, sandy lime mortar	19C soakaway connected to 20186 by culvert
20186	Structure		1.27	1.35	2.10+	circular soakaway. Yellow frogged brick (9 1/16 x 4 3/16 x 2 3/4 inches), English bond/irregular, sandy lime mortar	19C soakaway connected to 20185 by culvert

20187	Structure		2.44+	5.77+	2.44+	Stone structure. Cream-orange sandstone rectangular blocks, up to 54 x 17.5 inches, irregular bond, creamy lime flecked mortar with grey Portland cement repairs. Steps out at base.	Industrial machine base? Or monumental plinth?, L18-E19C?
20188	Fill		3.50	5.50		Loose light yellow/grey rubble hardcore	Modern levelling for roadway construction
20189	Structure		2.30	3.62	2.44+	Stone structure. Cream-yellow sandstone well-finished large rectangular blocks, 56 1/4 x 48 x 24 inches, irregular bond, creamy lime flecked mortar with grey Portland cement repairs. Steps out at base.	Industrial machine base? Or monumental plinth?, L18-E19C? Two parallel grooves on west face. Drilled through in places and reinforced cement bars and possible oil sump added.
20190	Structure		0.75	2.5+	0.86+	NW-SE wall, Red and yellow frogged brick (9 1/16 x 4 1/8 x 2 3/8 inches) and (8 1/2 x 3 15/16 x 2 3/8 inches), English bond, light greyish lime mortar	19C wall abutting structure 20189
20191	Structure		0.7	0.75+	0.96+	NW-SE wall, Red and yellow frogged brick (8 5/18 x 3 15/16 x 2 3/4 inches) and (9 1/16 x 4 5/16 x 2 3/4 inches), light greyish lime mortar	19C wall abutting structure 20189
20192	Cut		0.75	2.50	0.86	Not visible on plan	Construction cut for wall 20190
20193	Cut		0.75	2.50	0.96	Not visible on plan	Construction cut for wall 20191
20194	Cut				2.44+	Not visible on plan	Construction cut for structures 20187 and 20189

## APPENDIX B FINDS REPORTS

### B.1 Metals

*By Ian R Scott*

B.1.1 There are two metal finds both from context 20188. They are both factory or works tokens dating from the First World War. They were carried by workers to permit them access to the relevant works. In the case of the examples here, they were to permit access to the Royal Carriage Department. The tokens were stamped with the works number of the individual to whom it was issued.

Context 20188	(1) <b>Work's Token.</b> Woolwich Arsenal Obverse: stamped legend 'ROYAL CARRIAGE DEPART'. Stamped number '852' in the centre. Reverse: small broad arrow in centre, otherwise blank. Brass or bronze. D: 36mm. Sf 571
	(2) <b>Work's Token.</b> Woolwich Arsenal Obverse: stamped legend 'ROYAL CARRIAGE DEPART'. Stamped number '2313' in the centre. Reverse: appears to be blank. Tinned brass or bronze. D: 34mm. Sf 572

### B.2 Flint

*By Elizabeth Kennard*

B.2.1 A single struck flint was recovered from deposit 20162, a modern levelling layer. The piece was an undiagnostic preparation flake with moderate edge damage. The technology utilised was hard hammer percussion. Potential use wear could be seen on the distal edge, though due to the level of damage this could equally be post-depositional.

B.2.2 The assemblage shows limited prehistoric activity in the area and it is not expected that further work would find any significant flint-related activity.

### B.3 Stone

*By Ruth Shaffrey*

B.3.1 A single piece of stone was retained during the watching brief at Building 10, Duke of Wellington. This is a cannonball of Kentish Rag which measures 145mm diameter and weighs 3.98kg (20162, SF 570). It has been flattened across one side suggesting that it was reused, probably as a decorative feature on top of a structure such as a wall or gatepost.

B.3.2 The cannonball should be retained.

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## APPENDIX C      BIBLIOGRAPHY

OA, 2019 Royal Arsenal, B.10 Southern Blocks. Written Scheme of Investigation for Observation and Recording

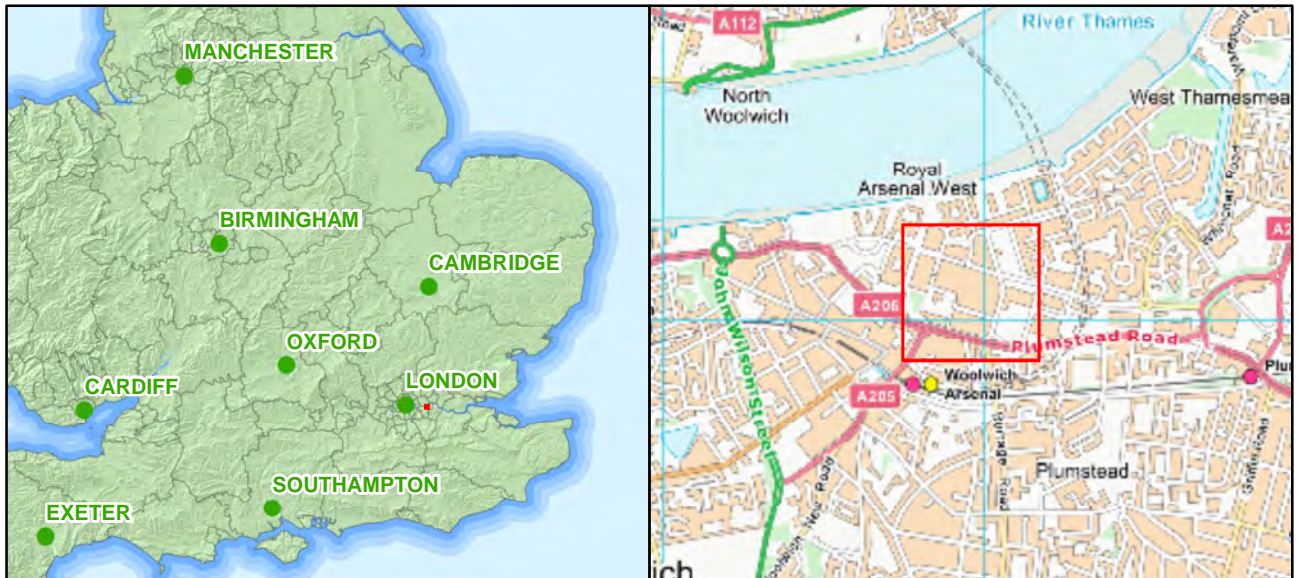
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Figure 1: Site location

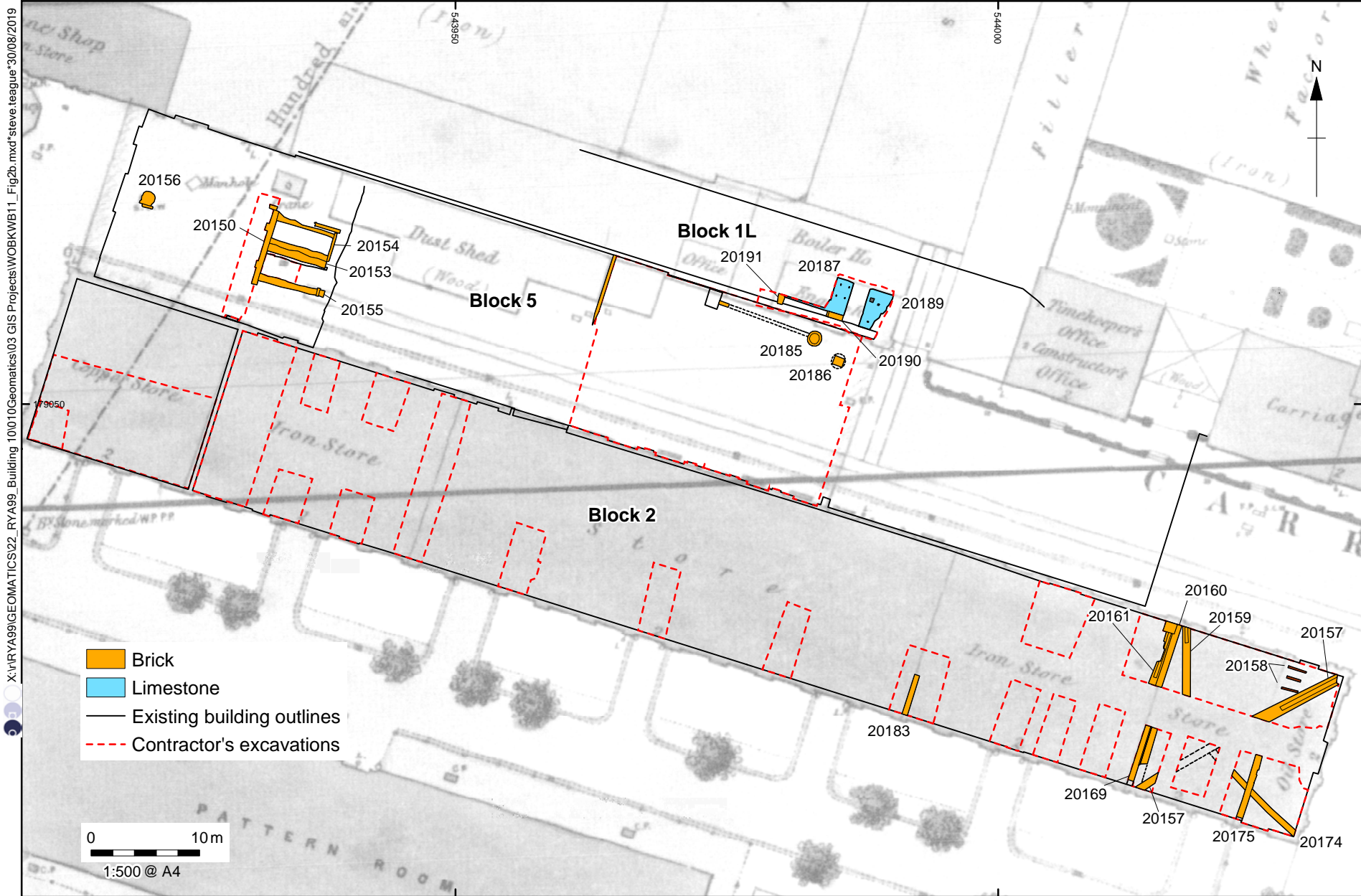


Figure 2: Site plan with Col Sir H Jame's plan of 1866





Plate 1: Wall 20169, view to S



Plate 2: Wall 20160 and culvert 20161,  
view to N



Plate 3: Timber sleeper remains 20158 and culvert 20157, view to N



Plate 4: Wall 20175 overlying culvert 20174, view to N



Plate 5: Cellars 20153 and 20154, view to SE



Plate 6: Wall 20150, view to E



Plate 7: Well/soakaway 20156, view to E



Plate 8: Stone structures 20187 and 20189, brick wall 20190, view to SW



Plate 9: Stone structure 20187 and brick wall 20191, view to NW





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