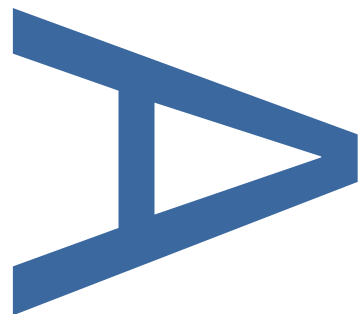
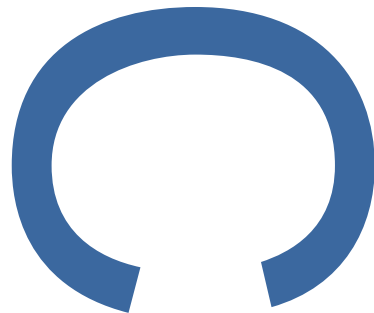


**LEA BRIDGE GASWORKS, LEYTON,
LONDON E10 7PD**



**Archaeological Watching Brief and
Deposit Model for Geotechnical
Investigations**



Planning reference

Local planning authority London Borough of Waltham Forest

PCA report no. R13942 ***Site Code*** CEM19

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PRE-CONSTRUCT ARCHAEOLOGY LIMITED

www.pre-construct.com

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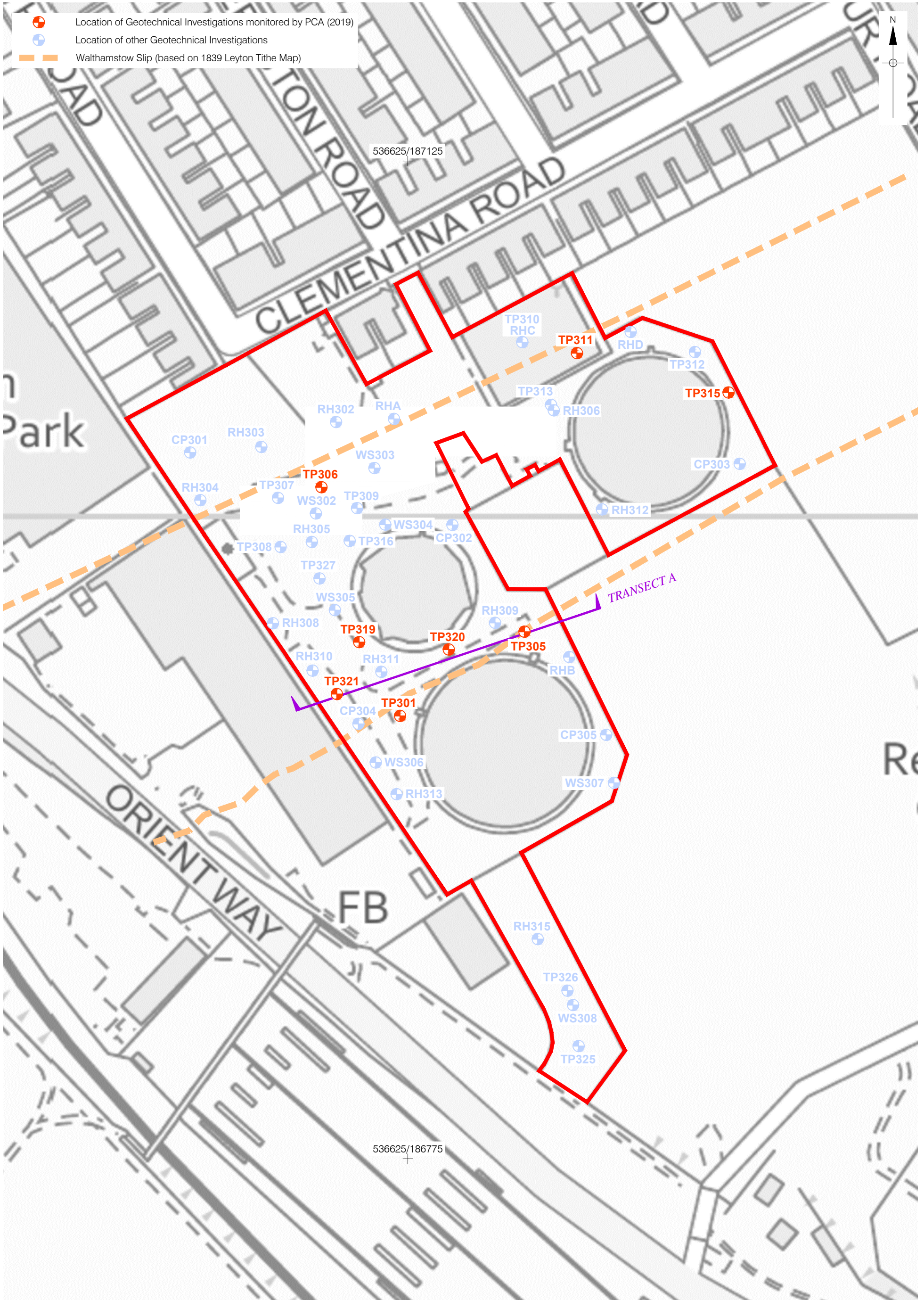
1 ABSTRACT

- 1.1 This report details the working methods and results of an archaeological watching brief conducted by Pre-Construct Archaeology Ltd during geotechnical investigations at the site of Lea Bridge Gasworks, Leyton, London E10 7PD.
- 1.2 A total of eight test pits were excavated by the geotechnical contractor, CC Ground Investigations Ltd and monitored by Pre-Construct Archaeology Ltd between 13th November 2019 and 14th November 2019.
- 1.3 The project was commissioned by RPS Group on behalf of St William Homes LLP.
- 1.4 The site is situated in an Archaeological Priority Zone as defined in the Local Development Framework of Waltham Forest Council (Robertson 2019).
- 1.5 During the investigation natural gravel deposits overlaid by clay layers were recorded sloping from the east (0.9m BGL) to the west (3.4m BGL) of the site. These deposits were interpreted as a possible gravel terrace sealed by alluvial clay, likely the former eastern bank of the River Lea. These deposits were partially disturbed by modern activity; in half of the Test Pits dug reworked clay deposits overlaying the alluvial clay were found, showing partial damage to the natural sequence.
- 1.6 The natural deposits and the reworked clay layers were overlaid by a various sequence of modern deposits. These deposits are related to 19th century and 20th century site developments, most likely the fireworks manufactory and gasworks infrastructure.
- 1.7 No archaeological finds or archaeological features were observed during the excavation of the eight pits. There was no evidence for any finds or features relating to the Walthamstow Slip.

2 INTRODUCTION

- 2.1 This report details the results and working methods of an archaeological watching brief that was undertaken by Pre-Construct Archaeology Ltd (PCA) at Lea Bridge Gasworks, Leyton, London E10 7PD (Fig.1). The watching brief monitored eight geotechnical test pits that were dug in advance of the redevelopment of the site.
- 2.2 The site is centred on Ordnance Survey National Grid Reference TQ 36636 86999 and approximately 29,760sqm in size. The site is situated in an Archaeological Priority Zone due to its location within the alluvial flood plain of the River Lea. This area has the potential for preservation of archaeological and palaeo-environmental prehistoric remains. The site is bounded to the north by a residential area, to the east and the south by open fields and to the west by a light industrial estate.
- 2.3 The site was previously the subject of an archaeological desk-based assessment, in which a low archaeological potential for the prehistoric to the post-medieval period was assessed due to post depositional activity, and a low potential for the late 19th century fireworks manufactory and 20th century gasworks infrastructures was also assessed (Robertson 2019).
- 2.4 A site-specific Written Scheme of Investigation (WSI) detailing the methodology and work programme for the archaeological watching brief was prepared prior to the fieldwork (Hawkins 2019) and approved by Adam Single of the Greater London Archaeological Advisory Service (GLAAS) on behalf of the London Borough of Waltham Forest.
- 2.5 The site was excavated on 13th November and 14th November 2019 by the geotechnical contractor, CC Ground Investigations Ltd and monitored by PCA.
- 2.6 The project was commissioned by RPS Group on behalf of St William Homes LLP and supervised by Cecilia Galleano of PCA. The investigation was managed by Helen Hawkins and monitored by Adam Single of GLAAS on behalf of the local planning authority, the London Borough of Waltham Forest.
- 2.7 The completed archive comprising written, drawn and photographic records will, upon completion of the project, be deposited with the London Archaeological Archives (LAA) under the unique site code CEM 19.





0 50m

Figure 2
 Detailed Site Location
 1:1,250 at A3

3 PLANNING BACKGROUND

- 3.1 The follow planning background is summarised from the Archaeological Desk-Based Assessment written for the current investigation (Robertson 2019).
- 3.2 General Planning Background
- 3.2.1 The redevelopment of the site is subject to heritage policies contained within the National Planning Policy Framework (NPPF), revised in 2018 and 2019, the London Plan (2016), the Waltham Forest Borough Core Strategy (2012) and the London Borough of Waltham Forest's Development Management Policies (2013) and draft Local Plan (2019).
- 3.3 National Guidance: National Planning Policy Framework
- 3.3.1 The NPPF constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications. Chapter 16 of the NPPF 2019 concerns the conservation and enhancement of the historic environment.
- 3.3.2 In considering any proposal for development, including allocations in emerging development plans, the local planning authority will be mindful of the policy framework set by government guidance, existing development plan policy and of other material considerations.
- 3.4 Regional Policy: The London Plan
- 3.4.1 Additional relevant planning strategy framework is provided by The London Plan, updated March 2016, new draft 2018. Specifically, Policy 7.8 is of relevance to archaeology within Greater London.
- 3.5 Local Policy: Archaeology in the London Borough of Waltham Forest
- 3.5.1 Relevant policy statements for the protection of the buried archaeological resource within the borough are contained within Policy CS12 of Waltham Forest Borough Core Strategy (2012) and Policy DM28 of the London Borough of Waltham Forest' Development Management Policies Local Plan (2013), both of which form part of the London Borough of Waltham Forest Local Plan.
- 3.6 Site-Specific Planning Background
- 3.6.1 The site does not contain or lie in the vicinity of World Heritage Sites, Scheduled Monuments, Historic Battlefield sites, Historic Wreck sites or Historic Parks and Gardens. The site does, however, lie within an Archaeological Priority Zone as defined by the London Borough of Waltham Forest.
- 3.6.2 In agreement with the Greater London Archaeological Advisory Service (GLAAS), RPS Group requested PCA to archaeologically monitor the excavation of a series of geotechnical test pits (a watching brief). Prior to commencement, the project design was detailed within a Written Scheme of Investigation (Hawkins 2019) which was approved by Adam Single of the GLAAS on behalf of the London Borough of Waltham Forest.

4 GEOLOGY AND TOPOGRAPHY

- 4.1 The British Geological Survey records the underlying geology of the site as Alluvium (Clay, Silty, Peaty, Sandy) overlying Lambeth Group (Clay, Silt and Sand) (BGS 2019).
- 4.2 Previous geotechnical investigations confirmed the bedrock and superficial geology, with made ground recorded to a maximum depth of 2.9m below ground level (BGL), over superficial alluvium deposits to a maximum reported depth of 3.0m BGL, over superficial River Terrace Deposits to a maximum reported depth of 7.6m BGL, over bedrock deposits of the Lambeth Group, the top of which was encountered between 4.3m and 7.6m BGL (Robertson 2019).
- 4.3 A similar sequence was observed during the excavation of the eight test pits; the bedrock deposit was not reached, however superficial gravel deposits were recorded overlaid by alluvial and made ground deposits.
- 4.4 The site level was approximately between 6m OD and 7m OD, excluding the gasworks infrastructure.
- 4.5 The site lies within an Archaeological Priority Zone which consists of the alluvial floodplain of the River Lea. In particular the site is located on the east side of the River Lea floodplain, within Zone 3.15, which forms a step between the deeper part of the valley floor and the high terrace (Robertson 2019).

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

5.1 The archaeological and historical background for the site is presented in full in a desk-based assessment previously undertaken by RPS Group (Robertson 2019) and summarized below.

5.2 Prehistoric

5.2.1 The Lea Valley is known for its Palaeolithic potential with a scatter of sites producing hand-axes and flakes (Wymer 1999), however the HER records a sole Palaeolithic findspot within the study area; a hand-axe retrieved from Park Road 750m east of the site.

5.2.2 No evidence of Mesolithic activity has been identified within a 750m radius of the site.

5.2.3 A number of investigations within the vicinity of the study site have recorded evidence of former palaeochannels. To the southeast of the study site, borehole monitoring works recorded a former channel of Neolithic date, abandoned by the Bronze Age, that may have been a tributary of the River Lea. A further Prehistoric palaeochannel was recorded during archaeological works at Argall Way approximately 400m northwest of the study site. Two fragments of residual fire cracked flint were also identified.

5.2.4 A hoard of Bronze Age spearheads was found in the 19th century during construction of a well at Lea Bridge Pumping Station, 750m west of the site.

5.2.5 There are no remains attributed to the Iron Age on the HER within a 750m radius of the site.

5.2.6 Whilst Prehistoric archaeological remains have been found within alluvial deposits of the wider Lea Valley, the HER records no direct evidence of occupation within a 750m radius of the study site. Corcoroan et al (2011) also notes that no Prehistoric remains have been found in the landscape zone that incorporates the site.

5.3 Roman

5.3.1 Margary records the Roman road from London to Great Dunmow 'crossing the River Lea near Clapton' and the projected route of the road is to the southeast of the study site. Evidence for the possible crossing point, comprising compacted river bed, is recorded 400m south of the study site. A Roman marble sarcophagus containing a male skeleton was also found in the same vicinity of the putative crossing.

5.3.2 The line of a possible Roman road running from Lambourne to Walthamstow is theorised to follow the line of Lea Bridge Road c.600m north of the site, however there is no firm archaeological evidence to support the theory.

5.3.3 The HER also records stone coffins of possible Roman or Medieval origin that were uncovered in 1839 during works for the railway in Hackney Marsh, 600m southeast of the site.

5.4 Saxon / Medieval

5.4.1 Documentary evidence shows that Leyton was first named during the Saxon period as Lugetune, translated as 'The Tun [farm] on the River Lea'. However, the historic core of the

settlement was located over 1km east of the site and there is no Saxon evidence recorded on the HER within a 750m radius of the site.

5.4.2 The Hackney Marsh was recorded in 1185 as comprising marshy meadows and bogs forming Lammas land, while the Lea Bridge Road to the north of the site is thought to have at least Medieval origins.

5.5 Post-Medieval and Modern

5.5.1 Documentary evidence reveals that a wooden causeway comprising 12 footbridges led from Blackbridge over the marshes to Lockbridge; corresponding with the route of the current Lea Bridge Road to the north of the study site. The causeway was built or repaired by Monoux before 1544 and was subsequently repaired by Laxton c 1580. The bridges were reported as "in disrepair" by 1611-13 and by 1694 only "the ruins remained". The wooden piles were apparently still visible in the 19th century.

5.5.2 The approximate location of the study site can be identified on Rocque's Map of 1754, to the north of the River Lea on undeveloped and unenclosed land. There are no changes in the vicinity of the site by the Ordnance Survey Drawing of 1799.

5.5.3 To the northwest of the site, the Drawing depicts a precursor of the current Lea Bridge Road including the bridge itself that was constructed in 1757. To the south of the river, the artificial channel of the River Lee Navigation (Hackney Cut) is shown that was built in 1770.

5.5.4 The 1839 Leyton Tithe map shows the site remained undeveloped by this time and incorporated part of five enclosed parcels aligned ENE/WSW, with a drain also crossing its southern portion.

5.5.5 By the 1863 Ordnance Survey, there are no changes on the site and it remains undeveloped. The original location of the Lea Bridge Gasworks had been established to the northwest of the site, which subsequently expanded with additional infrastructure.

5.5.6 The first development of the site itself is shown on the 1896 Ordnance Survey, with a 'Fireworks Manufactory' comprising a series of buildings set against a road/track shown at the northwestern boundary of the site. Two further rectangular structures are shown abutting a field boundary crossing the centre of the site. By 1915, the Fireworks Manufactory is no longer shown and the field boundaries within the site have been remodelled. It is understood that the first circular gas holder (column-guided) had been built in 1899 on the site (National Grid pers comm.), however this is not shown on the 1915 map. Residential development has expanded up to the northwestern boundary of the site by this time.

5.5.7 The 1921 Ordnance Survey depicts the circular gas holder at the centre of the site. By 1936 a second gas holder, built in 1922 and spiral-guided, is shown in the northeastern portion of the site. A bowling green is depicted immediately north of this structure and access roads are shown traversing the site. A number of small ancillary buildings are present in the northwestern portion of the site and a rail terminus is shown just inside its southwest boundary.

- 5.5.8 An unexploded ordnance risk review by EOD Contracts Ltd (2017) concluded that there was evidence the site had sustained a direct strike during WWII bombing raids, although an aerial photograph from 1945 indicates the gasholders survived the bombing. The 1954 Ordnance Survey shows that by this time a rectangular building and a tank had been added to the north of the earliest gasholder on the site and the bowling green converted into a tennis court.
- 5.5.9 A 1970 plan of the gasworks provides additional detail to the Ordnance Survey mapping and shows a third gasholder ('No. 7'; built in 1962 and spiral-guided) had been constructed in the southern portion of the site. The rectangular building shown on the 1954 Ordnance Survey map is labelled 'gas purifiers' and south of this various infrastructure is shown, including an engine-house, tanks, cooler and test room. The 1975 Ordnance Survey shows little change.
- 5.5.10 A 1978 plan of the gasworks shows the three gasholders still present but much of the infrastructure at the centre of the site has been removed, such as the rectangular gas purifiers structure. There are no further changes of note up to 2019 shown on mapping or satellite imagery. During 2019, National Grid undertook a programme of demolition of all super structures on the site including the gasholders, which had been out of commission since 2012.

6 ARCHAEOLOGICAL METHODOLOGY

- 6.1 A detailed methodology for the archaeological watching brief is given in the Written Scheme of Investigation (Hawkins 2019), which accords with standards and guidance set out by the Chartered Institute for Archaeologists (CIFA 2014).
- 6.2 The watching brief monitored the excavation of eight geotechnical test pits (Figure 2). The location and orientation of the test pits was modified where possible, in order to target two potential archaeological features relating to the Walthamstow Slip (illustrated on the Leyton Tithe map and on the 1836 OS map, see also Figure 2). These features are shown running parallel to each other in a NE/SW direction and they would have crossed the site to the north and to the south, from west to east. A deposit model is shown on Figure 3.
- 6.3 The test pits were all machine excavated with a 360° machine provided with a 0.70m wide toothless bucket. The test pits were all excavated in 0.10m spits under constant archaeological supervision. The deposits encountered during the excavation were recorded on a test pit Recording Sheet and the spoil heap was checked by deposit in order to record context characteristics, inclusions and finds. At least one height per deposit was measured, and a sketch section illustrating the sequence of each test pit was also drawn. Every test pit was photographed, and its location was surveyed by the CC Ground Investigations Ltd. Test pits were not entered due to depth and contamination concerns.
- 6.4 The excavation of Test Pit (TP) 306 was abandoned because of a thick concrete foundation found at 0.28m BGL (possibly related to a rectangular building block, as illustrated on the OS Map 1954). TP 315 was monitored instead.

Table 1: Test Pit Dimensions

| TEST PIT | LENGTH (m) | WIDTH (m) | DEPTH (m) |
|----------|------------|-----------|-----------|
| 319 | 4.6 | 0.7 | 3.5 |
| 320 | 4.5 | 0.7 | 3.8 |
| 305 | 3.8 | 0.7 | 3.6 |
| 301 | 4 | 0.7 | 3.6 |
| 321 | 4 | 0.7 | 3.6 |
| 306 | 3.9 | 0.7 | 0.45 |
| 311 | 3.9 | 0.7 | 2.9 |
| 315 | 3.6 | 0.7 | 2.3 |

- 6.5 All recording systems adopted during the investigations were fully compatible with those most widely used elsewhere in London; that is those developed out of the Department of Urban Archaeology Site Manual, as presented within PCA's *Operations Manual 1*.
- 6.6 The complete site archive include site records and photographs will be deposited at the Museum of London Archaeological Archive (LAA) under the unique site code CEM19.

7 PHASED ARCHAEOLOGICAL SEQUENCE

7.1 Phase 1: Natural Gravel

7.1.1 A layer of light greyish-brown sandy natural gravel, occasionally overlaid by a reddish-brown sandy natural gravel layer, was observed in TPs 319/1, 320/2, 305/3, 321/5 and 315/8.

Table 2: Contexts (Natural greyish brown sandy gravel)

| Test Pit | Context | Type | Interpretation | Length (m) | Width (m) | Depth (m) | Level (m OD) |
|----------|---------|-------|----------------|------------|-----------|-----------|--------------|
| 319 | 11 | Layer | Natural gravel | 4.6 | 0.7 | 3.4 | 3.00 |
| 320 | 20 | Layer | Natural gravel | 4.5 | 0.7 | 3.3 | 3.55 |
| 305 | 28 | Layer | Natural gravel | 3.8 | 0.7 | 3.1 | 3.65 |
| 301 | | | N/A | | | | |
| 321 | 44 | Layer | Natural gravel | 4 | 0.7 | 2.30 | 4.30 |
| 306 | | | N/A | | | | |
| 311 | | | N/A | | | | |
| 315 | 57 | Layer | Natural gravel | 3.6 | 0.7 | 1.5 | 5.1 |

7.1.2 The reddish-brown sandy gravel layer was observed in TPs 320/2, 301/4, 311/7, 315/8.

Table 3: Contexts (Natural reddish-brown sandy gravel)

| Test Pit | Context | Type | Interpretation | Length (m) | Width (m) | Depth (m) | Level (m OD) |
|----------|---------|-------|----------------|------------|-----------|-----------|--------------|
| 319 | | | N/A | | | | |
| 320 | 19 | Layer | Natural gravel | 4.5 | 0.7 | 2.9 | 3.95 |
| 305 | | | N/A | | | | |
| 301 | 37 | Layer | Natural gravel | 4 | 0.7 | 3 | 3.85 |
| 321 | | | N/A | | | | |
| 306 | | | N/A | | | | |
| 311 | 51 | Layer | Natural gravel | 3.9 | 0.7 | 1.2 | |
| 315 | 56 | Layer | Natural gravel | 3.6 | 0.7 | 1.35 | 5.25 |

7.1.3 Both these gravel deposits represent the superficial river terrace deposits; they likely belong to the River Lea floodplain. They were observed sloping from the east (at 0.90m BGL) to the west (at 3.4m BGL) and appeared to represent a section of the east river bank.

7.2 Phase 2: Alluvial Clay

7.2.1 Overlaying the gravel terrace deposits a layer of compact light-brown clay was observed in TPs 320, 305, 301, 321 and 311. These deposits were interpreted as alluvial clay deposits. These deposits appeared to follow the gravel terrace slope, except for the case of TP 320 where the clay deposits were observed at a higher level (2.75m BGL).

7.2.2 Sporadic flecks of coal were noted within the surface of layer [18] (TP 320), probably a result of contamination from the deposit above [17], which was rich in coal flecks.

7.2.3 In TP 311 the gravel terrace deposits were overlaid by a thick deposit of light reddish-brown sand. This layer was interpreted as a possible alluvial deposit.

Table 4: Contexts (Alluvial clay and sand)

| Test Pit | Context | Type | Interpretation | Length (m) | Width (m) | Depth(m) | Level (m OD) |
|----------|---------|-------|----------------|------------|-----------|----------|--------------|
| 319 | | | | | | | |
| 320 | 18 | Layer | Alluvium clay | 4.5 | 0.7 | 2.75 | 4.10 |
| 305 | 27 | Layer | Alluvium clay | 3.8 | 0.7 | 2.4 | 4.35 |
| 301 | 35 | Layer | Alluvium clay | 4 | 0.7 | 2.4 | 4.45 |
| 321 | 43 | Layer | Alluvium clay | 4 | 0.7 | 1.3 | 5.3 |
| 306 | | | N/A | | | | |
| 311 | 50 | Layer | Alluvium sand | 3.9 | 0.7 | 1.85 | 4.75 |
| 315 | | | N/A | | | | |

7.3 Phase 3: Made Ground

7.3.1 In TPs 319, 320, 305 and 321 deposits of made ground clay with different nuances of grey were recorded overlying the alluvium clay deposits and gravel deposits. Their thickness was about 0.20m [17, 26, 42], except for context [9], which was 1.3m thick and appeared to seal a made ground gravel deposit [10]. These deposits were interpreted as reworked alluvial clay contexts. In the case of TP 319, deposit [9] and the gravel layer [10] were contaminated by hydrocarbons and mixed with Ceramic Building Material (CBM), glass fragments and slag inclusions.

7.3.2 In TP 315 the natural deposits of gravel were sealed by multiple layers of made ground. These comprised: a 0.45m thick dark grey silt and ash made ground deposit [55] (with frequent clinker), a 0.25m thick dark brown silty clay Made ground deposit [54] (with moderate CBM flecks) and by the deposit [53] described below.

7.3.3 In TP 311 the natural deposits of gravel were sealed by multiple layers of made ground. These comprised: a 0.30m thick light reddish brown sand made ground deposit [50], a 0.45m thick light brown coarse sand made ground deposit [49] (with flecks of CBM) and by deposit [48] described below.

7.3.4 In TP 305 the reworked layer of clay [26] was sealed by multiple layers of made ground. These comprised: a 1.10m thick dark brown clayey sand layer [25] (with occasional CBM flecks), a 0.47m thick dark brown gravelly sand layer of industrial refuse [24] (with frequent copper alloy fragments, iron fragments and slag chunks), a 0.33m thick dark brown silty clay layer [23] (with frequent charcoal and CBM fragments) and by the deposit [22] described below.

7.3.5 In TP 320 the reworked layer of clay [17] was sealed by multiple layers of made ground. These comprised: a 0.54m thick black silt made ground layer [16] (with moderate CBM fragments), a 0.16m thick mid-brown clayey-gravel deposit [15], a 0.30m thick mid-brown silty-clay deposit [14] (with frequent concrete and CBM fragments), a 0.2m thick black gravelly-sand made ground layer [13] (hydrocarbon contaminated), and by deposit [12] described below.

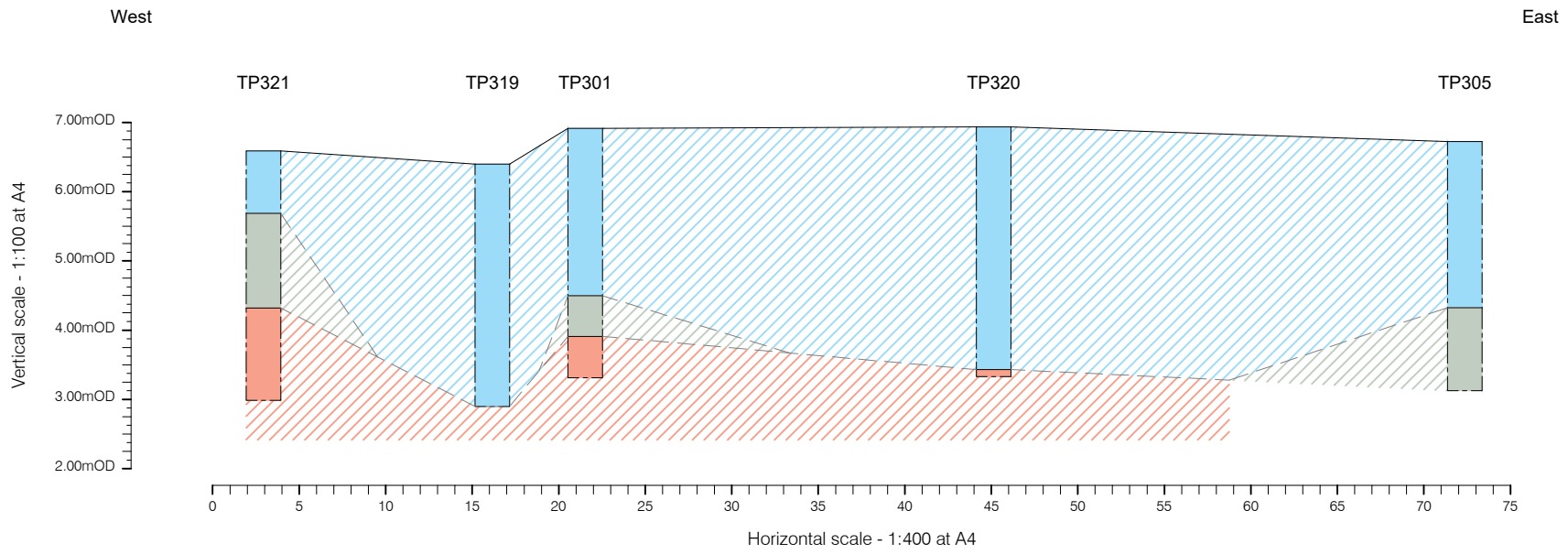
7.3.6 In TP 319 the natural layer of gravel [11] was sealed by multiple layers of made ground. These comprised: a 0.4m thick light greenish-grey silty gravel layer [10] (heavily hydrocarbon contaminated and mixed with occasional fragments of post-med bricks), the deposit [9] above

described; a 0.10m thick thin dark blueish-green clay layer [8] (heavily hydrocarbon contaminated), a 0.20m thick dark grey gravel made ground layer [7], a 0.30m thick greenish-brown gravel clay deposit [6], a 0.30m thick greyish-black silt layer [5] (with occasional fragments and flecks of CBM), a 0.10m thick mid brown clay deposit [4], a 0.20m thick greenish-white sand chalk-ash deposit [3], a 0.40m thick black gravel sand made ground layer [2] (hydrocarbon contaminated, with occasional whole modern frogged bricks), and by the deposit [1] described below.

- 7.3.7 In TPs 319, 320, 305, 311, 315 dark brown rubble (composed by fragments of CBM and concrete, glass and pebbles) and gravel made ground deposits [1, 12, 22, 48 and 53] were observed. Their thickness was in between 0.20m and 0.50m.
- 7.3.8 In TP 321, under a 0.23m thick concrete slab, a dark brown silty-clay deposit was interpreted as topsoil and was 0.37m thick.
- 7.3.9 In TP 321 the reworked clay deposit [42] was sealed by multiple layers of made ground. These comprised: a 0.2m thick mid-brown gravelly silt made ground context [41] (with patches of clay and modern CBM fragments), a 0.2m thick black sandy gravel made ground context [40], a 0.10m thick light brown mottled blue clay made ground deposit [39] (with moderate CBM inclusions), and by a 0.27m thick silty clay made ground [38], observed under a 0.23m thick concrete slab.
- 7.3.10 In TP 301 a series of fills of modern truncation [36] were encountered under a 0.12m concrete slab, a brief description of the fills from the top to the primary fill follows: fill [30] was a black fine sand deposit with pieces of concrete; fill [31] was a red sand deposit with frequent loose yellow frogged bricks; fill [33] was dark greenish brown sandy clay overlaying the primary fill [34], a dark bluish brown clay fill (heavily hydrocarbon contaminated). All these fills were contained in a wide cut [36], of which only the west side was exposed. The portion of this truncation visible within TP 301 was 3.5m long, 0.7m wide and 2.4m deep.
- 7.3.11 In TP 306 under a 0.10m of gravel layer [45] and 0.18m of light brown silty sand, a thick concrete foundation [47] was exposed and partially dug to a depth of 0.45m. This concrete foundation could be possibly related to a rectangular building block illustrated on OS map 1954 and described in the Historical Background section.

Table 5: Contexts (Made Ground)

| Test pit | Context | Type | Interpretation | Length (m) | Width (m) | Thickness (m) | Level (m OD) |
|----------|---------|---------|---------------------|------------|-----------|---------------|--------------|
| 319 | 1 | Layer | Made ground | 4.6 | 0.7 | 0.2 | 6.40 |
| 319 | 2 | Layer | Made ground | 4.6 | 0.7 | 0.4 | 6.20 |
| 319 | 3 | Layer | Made ground | 4.6 | 0.7 | 0.2 | 5.80 |
| 319 | 4 | Layer | Made ground | 4.6 | 0.7 | 0.1 | 5.60 |
| 319 | 5 | Layer | Made ground | 4.6 | 0.7 | 0.3 | 5.50 |
| 319 | 6 | Layer | Made ground | 4.6 | 0.7 | 0.3 | 5.20 |
| 319 | 7 | Layer | Made ground | 4.6 | 0.7 | 0.2 | 4.90 |
| 319 | 8 | Layer | Made ground | 4.6 | 0.7 | 0.1 | 4.70 |
| 319 | 9 | Layer | Made ground | 4.6 | 0.7 | 1.3 | 4.60 |
| 319 | 10 | Layer | Made ground | 4.6 | 0.7 | 0.4 | 3.30 |
| 320 | 12 | Layer | Made ground | 4.5 | 0.7 | 0.5 | 6.85 |
| 320 | 13 | Layer | Made ground | 4.5 | 0.7 | 0.2 | 6.15 |
| 320 | 14 | Layer | Made ground | 4.5 | 0.7 | 0.3 | 5.95 |
| 320 | 15 | Layer | Made ground | 4.5 | 0.7 | 0.16 | 5.65 |
| 320 | 16 | Layer | Made ground | 4.5 | 0.7 | 0.54 | 5.49 |
| 320 | 17 | Layer | Made ground | 4.5 | 0.7 | 1.05 | 4.95 |
| 305 | 22 | Layer | Made ground | 3.8 | 0.7 | 0.20 | 6.75 |
| 305 | 23 | Layer | Made ground | 3.8 | 0.7 | 0.33 | 6.55 |
| 305 | 24 | Layer | Made ground | 3.8 | 0.7 | 0.47 | 6.22 |
| 305 | 25 | Layer | Made ground | 3.8 | 0.7 | 1.2 | 5.75 |
| 305 | 26 | Layer | Made ground | 3.8 | 0.7 | 0.2 | 4.55 |
| 301 | 30 | Fill | Fill of [36] | 2.30 | 0.7 | 0.68 | 6.85 |
| 301 | 31 | Fill | Fill of [36] | 2.30 | 0.7 | 0.1 | 6.17 |
| 301 | 32 | Fill | Fill of [36] | 3 | 0.7 | 1.2 | 4.77 |
| 301 | 33 | Fill | Fill of [36] | 3.5 | 0.7 | 0.10 | 4.67 |
| 301 | 34 | Fill | Fill of [36] | 2.30 | 0.7 | 0.12 | 4.57 |
| 301 | 36 | Cut | Cut | 4 | 0.7 | 2.4 | 6.85 |
| 321 | 38 | Layer | Made ground | 4 | 0.7 | 0.27 | 6.60 |
| 321 | 39 | Layer | Made ground | 4 | 0.7 | 0.1 | 6.33 |
| 321 | 40 | Layer | Made ground | 4 | 0.7 | 0.2 | 6.23 |
| 321 | 41 | Layer | Made ground | 4 | 0.7 | 0.2 | 6.03 |
| 321 | 42 | Layer | Made ground | 4 | 0.7 | 0.13 | 5.83 |
| 306 | 45 | Layer | Made ground | 3.9 | 0.7 | 0.10 | 6.40 |
| 306 | 46 | Layer | Made ground | 3.9 | 0.7 | 0.18 | 6.30 |
| 306 | 47 | Masonry | Concrete foundation | 3.9 | 0.7 | 0.17 | 6.12 |
| 311 | 48 | Layer | Made ground | 3.9 | 0.7 | 0.45 | 5.95 |
| 311 | 49 | Layer | Made ground | 3.9 | 0.7 | 0.45 | 5.50 |
| 311 | 50 | Layer | Made ground | 3.9 | 0.7 | 0.3 | 5.05 |
| 315 | 53 | Layer | Made ground | 3.9 | 0.7 | 0.9 | 6.40 |
| 315 | 54 | Layer | Made ground | 3.6 | 0.7 | 0.2 | 5.50 |
| 315 | 55 | Layer | Made ground | 3.6 | 0.7 | 0.25 | 5.30 |






-  Made Ground
-  Alluvium Clay (F.3)
-  Terrace Gravel (F.1)

Figure 3
Transect A
(Scales on transects as indicated at A4)

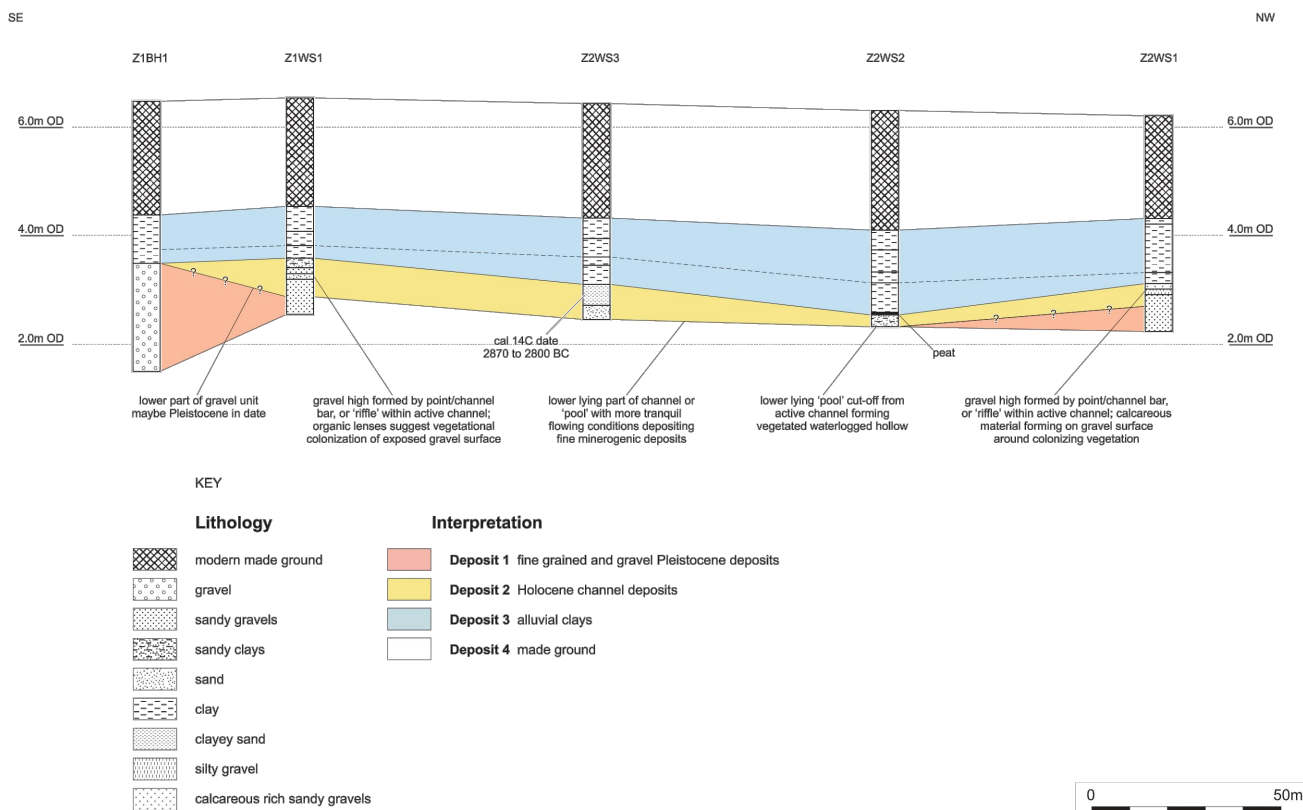
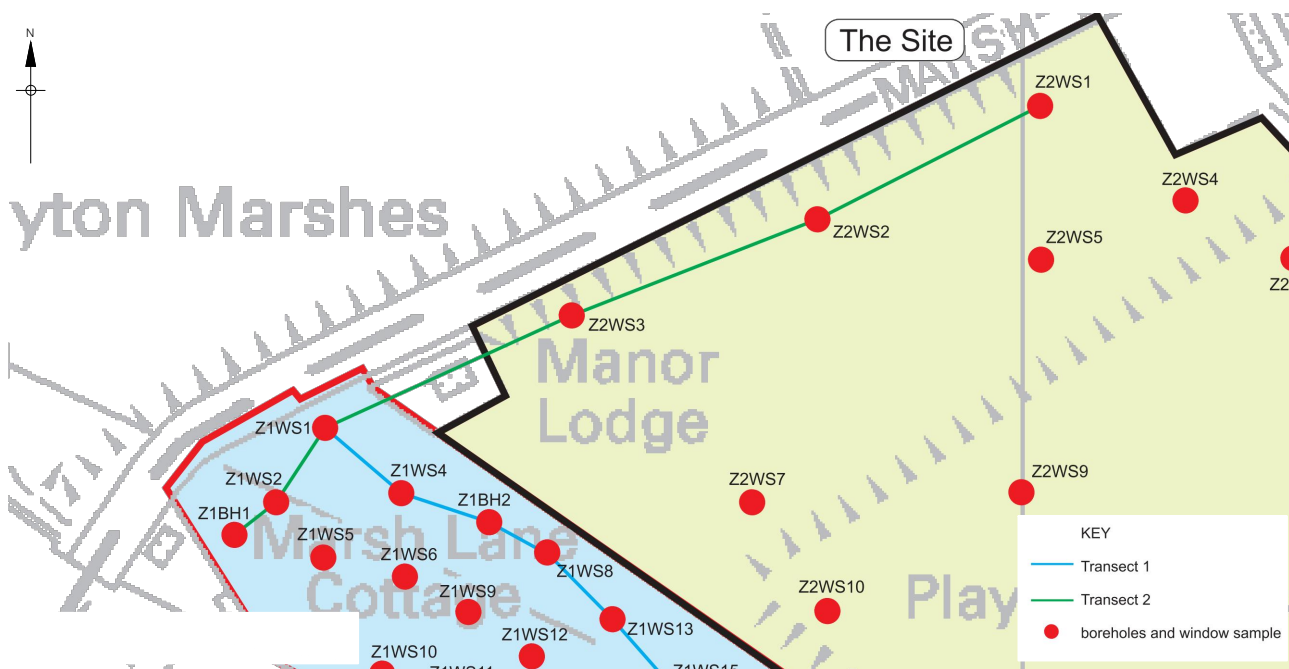


Figure 4
Transect and Transect Location (Marsh Lane Playing Fields, Leyton 2007)
1:2,500 and 1:2,000 at A4

8 CONCLUSIONS

- 8.1 A slope of the gravel deposits from the east to the west of site is visible in the transect model A (Figure 3). This slope has been interpreted as the possible gravel terrace section of the eastern side of the River Lea.
- 8.2 The gravel superficial deposits were sealed by alluvial clay layers and alluvial sand layers. These deposits were disturbed by modern activity, as shown in half of the test pits dug, where deposits of reworked clay overlay the alluvial layers.
- 8.3 The natural superficial deposits were sometimes cut directly by modern truncation, as in the case of TP 301. Most frequently the natural deposits and the reworked clay layers were overlaid by a various sequence of late post-medieval to modern deposits. These deposits were related to the several post-medieval and modern developments across the site. From the 19th century to the end of the 20th century, the site area saw development of various structures, such as the firework manufactory and the gasworks.
- 8.4 The investigations supplement earlier geotechnical monitoring works carried out to the south of the site at Marsh Lane Playing Fields (Bull and Halsey, 2007). These investigations revealed natural gravel horizons consistent with the Kempton Park Gravels between 3.5m OD and 4m OD (see Figure 4). The latter were overlain by clays indicative of an active channel, and in parts by an orange gravel that showed signs of being reworked by fluvial action. Alluvium was also noted across the site indicative of either overbank flooding or soil horizons dating to the latter part of the Holocene.
- 8.5 The investigations at the subject site broadly reflect these results. The gravel at the site showed slightly more variability, ranging in height between 3m OD and c.5m OD which may indicate the presence of tributaries feeding into the main channel. The overlying alluvium at the site is likely to reflect the overflooding associated with the main channel (River Lea) to the west of the site.
- 8.6 No archaeological finds or archaeological features were observed during the excavation of the eight test pits. There was no evidence for any features representing the Walthamstow Slip although any possible remnants are likely to have been removed by modern development on the site.

9 ACKNOWLEDGEMENTS

- 9.1.1 Pre-Construct Archaeology would like to thank RPS Group for commissioning the work on behalf of St William Homes LLP.
- 9.2 The author would also like to thank Adam Single of the Greater London Archaeological Advisory Service (Historic England) for monitoring the project on behalf of the London Borough of Waltham Forest.
- 9.3 The author would also like to thank Helen Hawkins for her project managing and editing and CC Ground Investigations Ltd for excavating and surveying the test pits.

10 BIBLIOGRAPHY

- BGS 2019. British Geological Survey Geology of Britain Viewer
<https://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>
- Bull, R and Halsey, C, 2007. *Marsh Lane Playing Fields, Leyton E10: An archaeological assessment and geotechnical watching brief report*, MoLAS-PCA unpublished report
- CIFA, 2014. Standard and guidance for an archaeological watching brief.
https://www.archaeologists.net/sites/default/files/CIfAS&GWatchingbrief_2.pdf
- Hawkins, H. 2019. *Lea Bridge Gas Works, Leyton E10 7PD: WSI for an Archaeological Watching Brief*, Pre-Construct Archaeology Ltd, unpublished report
- London Borough of Waltham Forest Development Management Strategies
<https://walthamforest.gov.uk/content/development-management-policies>
- NPPF 2019 <https://www.gov.uk/government/publications/national-planning-policy-framework--2>
- Robertson, A. 2019, *Archaeological Desk-Based Assessment Lea Bridge Gas Works, Lea Bridge, London, RSP Group*, unpublished report
- Taylor, J. 2009. Fieldwork Induction Manual. Pre-Construct Archaeology Operations Manual 1. Pre-Construct Archaeology unpublished report.

11 PLATES

Plate 1: Test Pit 319 (photograph looks west)



Plate 2: Test Pit 320, 0.50m scale (photograph looks west)



Plate 3: Test Pit 305, 0.50m scale (photograph looks north)



Plate 4: Test Pit 301 (photograph looks south-west)



Plate 5: Test Pit 321, 0.50m scale (photograph looks east)



Plate 6: Test Pit 315 (photograph looks north)



Plate 7: Test Pit 306, 0.50m scale (photograph looks south)



Plate8: Test Pit 311, 0.50m scale (photograph faces north)



12 CONTEXT INDEX

| Context | Type | Test Pit | Interpretation | Length (m) | Width (m) | Thickness (m) |
|---------|-------|----------|----------------|------------|-----------|---------------|
| 1 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.2 |
| 2 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.4 |
| 3 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.2 |
| 4 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.1 |
| 5 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.3 |
| 6 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.3 |
| 7 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.2 |
| 8 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.1 |
| 9 | Layer | 319 | Made ground | 4.6 | 0.7 | 1.3 |
| 10 | Layer | 319 | Made ground | 4.6 | 0.7 | 0.4 |
| 11 | Layer | 319 | Natural gravel | 4.6 | 0.7 | 0.1 |
| 12 | Layer | 320 | Made ground | 4.5 | 0.7 | 0.5 |
| 13 | Layer | 320 | Made ground | 4.5 | 0.7 | 0.2 |
| 14 | Layer | 320 | Made ground | 4.5 | 0.7 | 0.3 |
| 15 | Layer | 320 | Made ground | 4.5 | 0.7 | 0.16 |
| 16 | Layer | 320 | Made ground | 4.5 | 0.7 | 0.54 |
| 17 | Layer | 320 | Made ground | 4.5 | 0.7 | 1.05 |
| 18 | Layer | 320 | Alluvial clay | 4.5 | 0.7 | 0.15 |
| 19 | Layer | 320 | Natural gravel | 4.5 | 0.7 | 0.4 |
| 20 | Layer | 320 | Natural gravel | 4.5 | 0.7 | 0.5 |
| 22 | Layer | 305 | Made ground | 3.8 | 0.7 | 0.2 |
| 23 | Layer | 305 | Made ground | 3.8 | 0.7 | 0.33 |
| 24 | Layer | 305 | Made ground | 3.8 | 0.7 | 0.47 |
| 25 | Layer | 305 | Made ground | 3.8 | 0.7 | 1.2 |
| 26 | Layer | 305 | Made ground | 3.8 | 0.7 | 0.2 |
| 27 | Layer | 305 | Alluvial clay | 3.8 | 0.7 | 0.7 |
| 28 | Layer | 305 | Natural gravel | 3.8 | 0.7 | 0.5 |
| 30 | Fill | 301 | Fill of [36] | 2.30 | 0.7 | 0.68 |
| 31 | Fill | 301 | Fill of [36] | 2.30 | 0.7 | 0.1 |
| 33 | Fill | 301 | Fill of [36] | 3 | 0.7 | 1.2 |
| 34 | Fill | 301 | Fill of [36] | 3.5 | 0.7 | 0.30 |
| 35 | Layer | 301 | Alluvial clay | 4 | 0.7 | 0.60 |
| 36 | Cut | 301 | Cut | 4 | 0.7 | 1.8 |
| 37 | Layer | 301 | Natural gravel | 4 | 0.7 | 0.6 |
| 38 | Layer | 321 | Made ground | 4 | 0.7 | 0.37 |
| 39 | Layer | 321 | Made ground | 4 | 0.7 | 0.1 |
| 40 | Layer | 321 | Made ground | 4 | 0.7 | 0.2 |

| Context | Type | Test Pit | Interpretation | Length (m) | Width (m) | Thickness (m) |
|---------|---------|----------|----------------|------------|-----------|---------------|
| 41 | Layer | 321 | Made ground | 4 | 0.7 | 0.3 |
| 42 | Layer | 321 | Made ground | 4 | 0.7 | 0.1 |
| 43 | Layer | 321 | Alluvial layer | 4 | 0.7 | 1 |
| 44 | Layer | 321 | Natural gravel | 4 | 0.7 | 1.3 |
| 45 | Layer | 306 | Made ground | 3.9 | 0.7 | 0.10 |
| 46 | Layer | 306 | Made ground | 3.9 | 0.7 | 0.18 |
| 47 | Masonry | 306 | Foundation | 3.9 | 0.7 | 0.17 |
| 48 | Layer | 311 | Made ground | 3.9 | 0.7 | 0.45 |
| 49 | Layer | 311 | Made ground | 3.9 | 0.7 | 0.45 |
| 50 | Layer | 311 | Made ground | 3.9 | 0.7 | 0.3 |
| 51 | Layer | 311 | Natural gravel | 3.9 | 0.7 | 0.8 |
| 52 | Layer | 311 | Natural gravel | 3.9 | 0.7 | 0.9 |
| 53 | Layer | 315 | Made ground | 3.6 | 0.7 | 0.2 |
| 54 | Layer | 315 | Made ground | 3.6 | 0.7 | 0.25 |
| 55 | Layer | 315 | Made ground | 3.6 | 0.7 | 0.45 |
| 56 | Layer | 315 | Natural gravel | 3.6 | 0.7 | 0.6 |
| 57 | Layer | 315 | Natural gravel | 3.6 | 0.7 | 0.8 |

13 OASIS FORM

OASIS ID: preconst1-374654

Project details

Project name Lea Bridge Gasworks, Leyton E10 7PD: Archaeological Watching Brief on Geotechnical Investigations

Short description of the project A total of eight test pits were excavated by the geotechnical contractor and monitored by Pre-Construct Archaeology Ltd between 13th November 2019 and 14th November 2019. During the investigation natural gravel deposits overlaid by clay layers were recorded sloping from the east (0.9m BGL) to the west (3.4m BGL) of the site. These deposits were interpreted as a possible gravel terrace sealed by alluvial clay, likely the former eastern bank of the River Lea. These deposits were partially disturbed by modern activity; in half of the Test Pits dug reworked clay deposits overlaying the alluvial clay were found, showing partial damage to the natural sequence. The natural deposits and the reworked clay layers were overlaid by a various sequence of modern deposits. These deposits are related to 19th century and 20th century site developments, most likely the firework manufactory and Gasworks infrastructure. No archaeological finds or archaeological features were observed during the excavation of the eight pits. There was no evidence for any finds or features relating to the Walthamstow Slip.

Project dates Start: 13-11-2019 End: 14-11-2019

Previous/future work No / Not known

Any associated project reference codes CEM19 - Sitecode

Type of project Recording project

Site status Local Authority Designated Archaeological Area

Current Land use Vacant Land 3 - Despoiled land (contaminated derelict and ?brownfield? sites)

Monument type NONE None

Significant Finds NONE None

Investigation type "Test-Pit Survey"

Prompt National Planning Policy Framework - NPPF

Project location

Country England

Site location GREATER LONDON WALTHAM FOREST LEYTON Lea Bridge Gasworks

Postcode E10 7PD

Study area 29760 Square metres

Site coordinates TQ 36636 86999 51.564797358543 -0.02846756003 51 33 53 N 000 01 42 W Point

Height OD / Depth Min: 0m Max: 0m

Project creators

Name of Organisation Pre-Construct Archaeology Limited

Project brief originator GLAAS

Project design originator RPS

Project director/manager Helen Hawkins

Project supervisor Cecilia Galleano

Type of sponsor/funding body Housing Developer

Name of sponsor/funding body St William LLP

Project archives

Physical Archive Exists? No

Digital Archive recipient LAA

Digital Archive ID CEM19

Digital Contents "none"

Digital Media available "Images raster / digital photography","Text"

Paper Archive recipient LAA

Paper Archive ID CEM19

Paper Contents "none"

Paper Media available "Context sheet"

Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)

Title LEA BRIDGE GASWORKS, LEYTON, LONDON E10 7PD: Archaeological Watching Brief on Geotechnical Investigations

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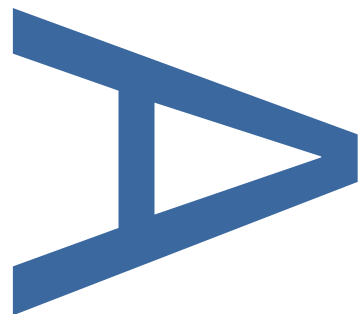
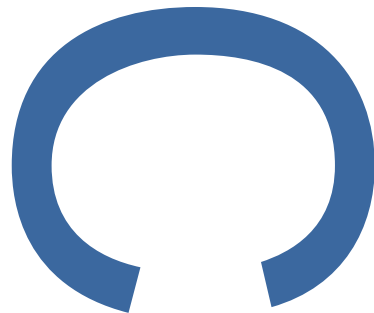
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14 APPENDIX 1: WRITTEN SCHEME OF INVESTIGATION

Lea Bridge Gasworks, Leyton



**Archaeological Watching Brief on
Geotechnical Works**



Planning reference

n/a

Local planning authority

London Borough of Waltham Forest

Site Code

tbc

PCA project no

K6408

Date

November 19

PRE-CONSTRUCT ARCHAEOLOGY LIMITED

www.pre-construct.com

| Project Information | |
|--------------------------|---|
| Site name | Lea Bridge Gasworks, Leyton |
| Project type | Archaeological Watching Brief on Geotechnical Works |
| Site address | Lea Bridge Gasworks, Clementina Road, Leyton, E10 7PD |
| NGR | TQ 36636 86999 |
| Local planning authority | London Borough of Waltham Forest |
| Planning reference | |
| Commissioning client | RPS |
| Project dates | November 2019 |
| Archive site code | tbc |

| PCA Information | | | |
|---------------------|--|-------------------|--|
| PCA project code | K6408 | PCA report number | |
| PCA Project Manager | Helen Hawkins | | |
| PCA office | London | | |
| Address | Unit 54 Brockley Cross Business Centre, Endwell Road, London SE4 2PD | | |
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| Quality Control | | |
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| Written by: | Helen Hawkins | |
| Graphics by: | RPS | |
| Graphics checked by: | HH | |
| Project Manager approval: | HH | November 19 |
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1 INTRODUCTION

- 1.1 Pre-Construct Archaeology Limited has been commissioned by RPS on behalf of St William Homes LLP to undertake an archaeological watching brief on geotechnical works at Lea Bridge Gas Works, Leyton London E10 7PD. The site is centred on Ordnance Survey National Grid Reference TQ 36636 86999.
- 1.2 The site lies within an Archaeological Priority Area (River Lea and Tributaries) as defined in the adopted Local Development Framework. This is due to its location within the alluvial floodplain of the River Lea which has the potential to preserve archaeological and palaeo-environmental remains dating from the prehistoric periods.
- 1.3 RPS previously carried out an archaeological desk based assessment (RPS 2019) to assess the impact of the proposed development on potential archaeological assets. The desk based assessment identified that the site has been identified as having a low archaeological potential for the prehistoric to Post Medieval periods. The potential for Modern activity is invested in buried remains associated with a late 19th century fireworks manufactory and 20th century gas works and a pylon. The extant remains of the gasworks include three gasholders that have all been decommissioned and demolished to ground level. The remains are considered to be of low/local significance.
- 1.4 Geotechnical investigations comprising trial pits and window samples are to be carried out. These will be monitored by an archaeologist to assess the below ground archaeological potential and extent of truncation on the site.
- 1.5 This Written Scheme of Investigation has been prepared by Helen Hawkins of Pre-Construct Archaeology Limited (PCA), to detail a methodology by which an archaeological watching brief will be implemented during the geotechnical works.

2 BACKGROUND

- 2.1 The following backgrounds are taken from the archaeological desk based assessment (RPS 2019).
- 2.2 Geology and Topography
- 2.2.1 The British Geological Survey records the underlying geology of the site as Alluvium (Clay, Silty, Peaty, Sandy) overlying Lambeth Group (Clay, Silt and Sand).
- 2.2.2 Previous geotechnical investigations have confirmed the above, with Made Ground recorded to a maximum depth of 2.9m below ground level (bgl), over superficial alluvium deposits to a maximum reported depth of 3.0m bgl, over superficial River Terrace Deposits to a maximum reported depth of 7.6m bgl; over bedrock deposits of the Lambeth Group, the top of which was encountered between 4.3m and 7.6m bgl.
- 2.3 Topography
- 2.3.1 The site lies within the alluvial floodplain of the River Lea, on the north side of the river itself. In terms of geoarchaeology the site falls within Landscape Zone 3.15, as defined by Corcoran et al (2011). This zone lies along the eastern side of the floodplain, forming a step between the deeper part of the valley floor and the high terrace. It may have originated from outcrops of bedrock, eroded river terrace, or Pleistocene and Holocene slope deposits.
- 2.3.2 Excluding the gasworks infrastructure, the site is approximately level at between 6m and 7m above Ordnance Datum (OD). However, as indicated by the depth of made ground noted above, all levels are entirely artificial being a product of Modern land forming and engineering.
- 2.4 Archaeological and Historical Background
- Prehistoric
- 2.4.1 The Lea Valley is known for its Palaeolithic potential with a scatter of sites producing hand-axes and flakes (Wymer 1999), however the HER records a sole Palaeolithic findspot within the study area; a hand-axe retrieved from Park Road 750m east of the site.
- 2.4.2 No evidence of Mesolithic activity has been identified within a 750m radius of the site.
- 2.4.3 A number of investigations within the vicinity of the study site have recorded evidence of former palaeochannels. To the southeast of the study site, borehole monitoring works recorded a former channel of Neolithic date, abandoned by the Bronze Age, that may have been a tributary of the River Lea. A further Prehistoric palaeochannel was recorded during archaeological works at Argall Way approximately 400m northwest of the study site. Two fragments of residual fire cracked flint were also identified.
- 2.4.4 A hoard of Bronze Age spearheads was found in the 19th century during construction of a well at Lea Bridge Pumping Station, 750m west of the site.
- 2.4.5 There are no remains attributed to the Iron Age on the HER within a 750m radius of the site.
- 2.4.6 Whilst Prehistoric archaeological remains have been found within alluvial deposits of the wider Lea

Valley, the HER records no direct evidence of occupation within a 750m radius of the study site. Corcoroan et al (2011) also notes that no Prehistoric remains have been found in the landscape zone that incorporates the site.

Roman

- 2.4.7 Margary records the Roman road from London to Great Dunmow 'crossing the River Lea near Clapton' and the projected route of the road is to the southeast of the study site. Evidence for the possible crossing point, comprising compacted river bed, is recorded 400m south of the study site. A Roman marble sarcophagus containing a male skeleton was also found in the same vicinity of the putative crossing.
- 2.4.8 The line of a possible Roman road running from Lambourne to Walthamstow is theorised to follow the line of Lea Bridge Road c.600m north of the site, however there is no firm archaeological evidence to support the theory.
- 2.4.9 The HER also records stone coffins of possible Roman or Medieval origin that were uncovered in 1839 during works for the railway in Hackney Marsh, 600m southeast of the site.

Saxon / Medieval

- 2.4.10 Documentary evidence shows that Leyton was first named during the Saxon period as *Lugetune*, translated as 'The Tun [farm] on the River Lea'. However, the historic core of the settlement was located over 1km east of the site and there is no Saxon evidence recorded on the HER within a 750m radius of the site.
- 2.4.11 The Hackney Marsh was recorded in 1185 as comprising marshy meadows and bogs forming Lammas land, while the Lea Bridge Road to the north of the site is thought to have at least Medieval origins.

Post-Medieval and Modern

- 2.4.12 Documentary evidence reveals that a wooden causeway comprising 12 footbridges led from Blackbridge over the marshes to Lockbridge; corresponding with the route of the current Lea Bridge Road to the north of the study site. The causeway was built or repaired by Monoux before 1544 and was subsequently repaired by Laxton c 1580. The bridges were reported as "in disrepair" by 1611-13 and by 1694 only "the ruins remained". The wooden piles were apparently still visible in the 19th century.
- 2.4.13 The approximate location of the study site can be identified on Rocque's Map of 1754, to the north of the River Lea on undeveloped and unenclosed land. There are no changes in the vicinity of the site by the Ordnance Survey Drawing of 1799.
- 2.4.14 To the northwest of the site, the Drawing depicts a precursor of the current Lea Bridge Road including the bridge itself that was constructed in 1757. To the south of the river, the artificial channel of the River Lee Navigation (Hackney Cut) is shown that was built in 1770.
- 2.4.15 The 1839 Leyton Tithe map shows the site remained undeveloped by this time and incorporated part of five enclosed parcels aligned ENE/WSW, with a drain also crossing its southern portion.

- 2.4.16 By the 1863 Ordnance Survey, there are no changes on the site and it remains undeveloped. The original location of the Lea Bridge Gas Works had been established to the northwest of the site, which subsequently expanded with additional infrastructure.
- 2.4.17 The first development of the site itself is shown on the 1896 Ordnance Survey, with a 'Fireworks Manufactory' comprising a series of buildings set against a road/track shown at the northwestern boundary of the site. Two further rectangular structures are shown abutting a field boundary crossing the centre of the site. By 1915, the Fireworks Manufactory is no longer shown and the field boundaries within the site have been remodelled. It is understood that the first circular gas holder (column-guided) had been built in 1899 on the site (National Grid pers comm.), however this is not shown on the 1915 map. Residential development has expanded up to the northwestern boundary of the site by this time.
- 2.4.18 The 1921 Ordnance Survey depicts the circular gas holder at the centre of the site. By 1936 a second gas holder, built in 1922 and spiral-guided, is shown in the northeastern portion of the site. A bowling green is depicted immediately north of this structure and access roads are shown traversing the site. A number of small ancillary buildings are present in the northwestern portion of the site and a rail terminus is shown just inside its southwest boundary.
- 2.4.19 An unexploded ordnance risk review by EOD Contracts Ltd (2017) concluded that there was evidence the site had sustained a direct strike during WWII bombing raids, although an aerial photograph from 1945 indicates the gas holders survived the bombing. The 1954 Ordnance Survey shows that by this time a rectangular building and tank had been added to the north of the earliest gas holder on the site and the bowling green converted into a tennis court.
- 2.4.20 A 1970 plan of the gas works provides additional detail to the Ordnance Survey mapping and shows a third gas holder ('No. 7'; built in 1962 and spiral-guided) had been constructed in the southern portion of the site. The rectangular building shown on the 1954 Ordnance Survey map is labelled 'gas purifiers' and south of this various infrastructure is shown, including an engine-house, tanks, cooler and test room. The 1975 Ordnance Survey shows little change.
- 2.4.21 A 1978 plan of the gas works shows the three gasholders still present but much of the infrastructure at the centre of the site has been removed, such as the rectangular gas purifiers structure. There are no further changes of note up to 2019 shown on mapping or satellite imagery. During 2019, National Grid undertook a programme of demolition of all super structures on the site including the gasholders, which had been out of commission since 2012.
- 2.5 Proposed Works
- 2.5.1 The site is to be redeveloped for housing. The proposed works comprise geotechnical investigations to inform the proposed development.
- 1.1.1 This document forms the Written Scheme of Investigation detailing the methodology by which the archaeological watching brief will be undertaken.
- 1.1.2 All works will be undertaken in accordance with the following documents:
- This Written Scheme of Investigation (pending approval from the Archaeology Advisor to the Local Planning Authority)

- *MoRPHE* (English Heritage, 2015).
- *Guidelines for Archaeological Projects in Greater London* (Greater London Archaeological Advisory Service, Historic England, 2015)
- '*Standard and guidance for archaeological field evaluation*' (CIfA 2017)

1.1.3 Pre-Construct Archaeology Limited is a Registered Organisation (number 23) with the Chartered Institute for Archaeologists and will operate within the Institute's 'Code of Practice'.

1.2 Aims and Objectives

1.2.1 Specific research objectives include the following:

- To establish the presence or absence of the 19th and 20th century gasworks buildings of significance, assess the level of survival of these buildings and to record any remains.
- To establish the below ground geological and archaeological sequence.
- To establish the extent of all past post-depositional impacts on the archaeological resource in the upper levels of the site.

3 SITE METHODOLOGY

3.1 General

- 3.1.1 All geotechnical site works will be monitored by PCA's Archaeological Supervisor but will follow the geotechnical contractor's programme and methodology.
- 3.1.2 The watching brief area will be secured by the client's contractor using suitable fencing. Site security is the responsibility of the client.
- 3.1.3 The watching brief area will be CAT scanned by a trained member of the geotechnical contractor's staff prior to excavation.
- 3.1.4 Geotechnical investigation locations should be identified by the client's geotechnical contractor, and the NGR co-ordinates and OD heights provided to PCA prior to the report being produced. Proposed locations are shown on Figure 2.
- 3.1.5 Window samples will be archaeologically monitored and the arisings and approximate depths of deposits recorded on geotechnical monitoring sheets.
- 3.1.6 For the proposed trial pits, the machining will be undertaken using a HYMAC-type excavator and driver which will be provided by the client's contractor. The plant will use a breaker and/or toothed bucket to break the ground surface, and once complete a toothless ditching bucket will be used to remove modern overburden under the supervision of an archaeologist. Spoil will be mounded at least 1m from the edges of the trench.
- 3.1.7 Machine excavation will continue in spits of 100mm at a time until either significant archaeological strata are found or natural ground exposed, up to a maximum safe working depth of up to 1.2m below ground level. If significant remains relating to the gasworks are exposed, the machine will be used to define them to allow them to be recorded by the attending archaeologist. Excavations below the 1.2m depth will be recorded from the top of the trial pit and the arisings.
- 3.1.8 Following machine excavation, relevant faces of the trenches that require examination or recording will be cleaned using appropriate hand tools if safe to do so.
- 3.1.9 In the event that human remains are encountered, their removal can only take place following the issuing of appropriate licenses from the Ministry of Justice. PCA shall be responsible for ensuring that the correct procedures for removal, handling and care of human remains are followed.
- 3.1.10 All gold and silver will be removed to a safe place and reported to the local coroner according to the procedures relating to the Treasure Act 1996. 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.

3.2 Access and Safety

- 3.2.1 The site will be secured by the client, who will also supply suitable fencing to secure the area.
- 3.2.2 Reasonable access to the site will be granted to the Archaeology Advisor to the LPA and other representatives of the Council who wish to be satisfied, through site inspections, that the archaeological works are being conducted to proper professional standards and in accordance with

the agreements made. Full access will also be provided for the Client and their agents.

- 3.2.3 All relevant health and safety legislation, CDM, COSHH regulations and codes of practice will be respected. This requirement constitutes one of the non-archaeological requirements on the excavation design. PCA's H&S Policy Statement (2019) and Site Rules (2019) will be followed at all times. A site-specific RAMS (PCA 2019) has been prepared; this will be reviewed and updated daily or as necessary by the site supervisor.
- 3.2.4 There is a duty of care for the client to provide all information reasonably obtainable on the location of live services before site works commence.
- 3.2.5 The watching brief locations will be surveyed by the PC using a Cable Avoidance Tool prior to excavation. Should services be encountered during excavation, it will be the assumption of PCA that they are live and will be avoided at all costs.
- 3.2.6 There is a duty of care for the client to provide all information reasonably obtainable on contamination before site works commence. PCA has not been provided with a ground contamination report based on invasive sampling. Contamination is likely to be present on the site and therefore a number of measures are required. These will be discussed in full in the site specific RAMS (PCA 2019, Appendix 2).
- 3.2.7 If during the course of the archaeological investigations items are observed or found which are considered to be potential UXO objects, all work in the vicinity of the excavation will cease and the client will be informed immediately. They will notify relevant bodies and arrange for appropriate attendance from specialists and/or emergency services.
- 3.2.8 Provision will be made on-site by the PC for welfare facilities for the watching brief works. These will be supplied by the PC and will include office space, tool storage and toilet facilities. Welfare will be located in a suitable secure position.
- 3.2.9 PCA has not been informed that there are any listed buildings, areas of ecological importance or public rights of way on the site.
- 3.2.10 Minimum PPE for work on the site will comprise safety helmet, safety boots and high-visibility vest and gloves plus other PPE as outlined in the site specific RAMS (PCA 2019).
- 3.2.11 If asbestos material (suspected or confirmed) is encountered during the excavations its location will be marked, photographed and left in situ. The client will be informed as soon as possible. PCA will not remove any asbestos from site.
- 1.2.2 All PCA's staff are CSCS card holders.

4 RECORDING SYSTEMS

4.1 Site Code

4.1.1 A unique-number site code will be obtained from the Museum of London prior to the work and notified to the Archaeology Advisor to the Local Planning Authority.

4.2 Site Records

4.2.1 The recording systems adopted during the investigations will be fully compatible with those most widely used elsewhere in the LB of Waltham Forest, which is those developed out of the Department of Urban Archaeology Site Manual and presented in PCA's Operations Manual 1 (Taylor & Brown 2009). No alternative recording system will be adopted without the prior agreement with the Archaeology Advisor to the Local Planning Authority.

4.2.2 The site archive will be so organised as to be compatible with the other archaeological archives produced in the Local Authority area. Individual descriptions of all archaeological strata and features excavated and exposed will be entered onto prepared pro-forma recording sheets which include the same fields of entry as are found on the recording sheets of the Museum of London. Sample recording sheets, sample registers, finds recording sheets, accession catalogues, and the photography record cards will follow the Museum of London equivalents. This requirement for archival compatibility extends to the use of computerised databases.

4.2.3 A 'site location plan' indicating the site north and based on the current Ordnance Survey 1:1250 map (reproduced with the permission of the Controller of HMSO) will be prepared. All sections should be located on plan with OS co-ordinates. The location of the OS bench marks used and the site TBM will also be indicated.

4.2.4 The OD height of all principal strata and features will be calculated and indicated on the appropriate plans and sections. Interventions will be recorded on geotechnical investigation monitoring sheets.

4.3 Stratigraphic Matrix

4.3.1 A 'Harris Matrix' stratification diagram will be used to record stratigraphic relationships. This record will be compiled and fully checked during the course of the excavations. Spot dating should be incorporated where applicable during the course of the excavation.

4.4 Photographic Record

4.4.1 A photographic record of the investigations will be prepared. This will consist of high quality, colour digital photographs taken in jpeg and RAW formats by an appropriately trained individual, illustrating in both detail and general context the principal features and finds discovered. The photographic record will also include 'working shots' to illustrate more generally the nature of the archaeological operation mounted. The digital images will be preserved on a dedicated and backed-up server. The RAW files will be converted to high quality tiff images for eventual preservation by the London Archaeological Archive (LAA).

1.3 Survey

4.4.2 The trenches will be surveyed using either a TotalStation or GPS system to locate them to the National Grid, by the client's geotechnical contractor. Locations and OD heights will be supplied to PCA by the contractor.

5 TREATMENT OF FINDS AND SAMPLES

- 5.1.1 All processing will take place at PCA's Brockley premises, or, if appropriate, those of our environmental consultants.
- 5.2 Environmental
- 5.2.1 Different sampling strategies may be employed according to the perceived importance of the deposit or feature under investigation. Close attention will be given to sampling for date, structure and environment. Sample size should take into account the frequency with which material is likely to occur. Bulk sieving should be employed both for recovery of environmental evidence to ensure that complete samples of artefactual evidence are collected for significant deposits.
- 5.2.2 It is possible that the contamination on the site may make the taking and processing of samples unsafe. If the PCA health and safety officer advises that this is the case, PCA will notify the client's consultant immediately.
- 5.2.3 The strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, pollen, diatoms, animal bone and human burials) will be developed in consultation with the Archaeology Advisor to the Local Planning Authority and, if necessary, the Historic England Regional Archaeological Science Advisor. Subsequent on site work and analysis of the processed samples and remains will be undertaken by our own consultants and specialist sub-contractors.
- 5.2.4 A high priority will be given to sampling river and other anaerobic deposits, such as peat, where organic materials may be preserved. Organic samples will be subject to appropriate specialist analysis.
- 5.3 Artefactual
- 5.3.1 All finds retrieval policies of the Museum of London will be adopted and all identified finds and artefacts will be retained according to the stated selection retention and retrieval policy appropriate to the material type and date. No finds will be discarded without the prior approval of the Archaeology Advisor to the Local Planning Authority.
- 5.3.2 All finds will be treated in a proper manner and to standards agreed in advance with the recipient museum. They will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the guidelines set out in the United Kingdom Institute for Conservation's 'Conservation Guidelines No.2' and the Museum of London's 'Standards for the Preparation of Finds to be Permanently Retained by the Museum of London'. All metal objects will be x-rayed and then selected for conservation (except in those cases where the Archaeology Advisor to the Local Planning Authority agrees that this will not be necessary).
- 5.3.3 Ceramic (pottery, clay tobacco, building material fabric and brick form) reference collections, housed at the Museum of London should be referred to for descriptive and analytical purposes in order to ensure that terminology is consistent.
- 5.3.4 Before commencing the excavation PCA will confirm in writing to the Archaeology Advisor to the Local Planning Authority that arrangements are in hand to cover all necessary processing, conservation,

and specialist analysis and storage of finds and samples.

6 ARCHIVES AND REPORTS

6.1 Site Archive Destination

6.1.1 Following the completion and approval of the fieldwork and post-excavation work associated with this project, the resulting archive comprising such items as finds, samples, paper and digital records, photographs and digital data will be transferred by PCA to a local museum or repository which will curate the archive thereafter.

6.1.2 For this project, the repository which is expected to take custody of the archive is:

| |
|---|
| Museum of London Archaeological Archive (MLAA) |
|---|

6.1.3 The custodial transfer of the finds archive will be enabled by means of a Deed of Transfer, issued by MLAA, which must be signed by the landowner.

6.1.4 The landowner or, if PCA is commissioned by a third-party on their behalf, the commissioning client, agrees, by approval of this document, to donate all finds and archives to the aforesaid repository.

6.1.5 PCA will liaise with MLAA to arrange for a Deed of Transfer to be signed by the landowner authorising the transfer of the finds archive.

6.1.6 PCA hereby requests that the landowner, (or their agent on their behalf) completes the Landowner form at Appendix 1.

6.2 Site Archive Standard

6.2.1 The integrity of the site archive will be maintained. The finds and records will be available for public consultation. Appropriate guidance is set out in the Museum and Galleries Commission's Standards in the Museum Care of Archaeological Collections (1992) and Towards an Accessible Archaeological Archive. The Transfer of Archaeological Archives to Museums: Guidelines for Use in England, Northern Ireland Scotland and Wales (SMA 1995). For deposition with LAA, the Guidelines for the Preparation of Archaeological Archives will be followed.

6.2.2 If the finds are not to be donated to MLAA, arrangements will be made for a comprehensive record of all relevant materials (including detailed drawings, photographs and descriptions of individual finds), which can instead constitute the archaeological archive.

6.2.3 The minimum acceptable standard for the site archive is defined in the Management of Archaeological Recording Projects in the Historic Environment (MoRPHE 2015). It will include all materials recovered, (or the comprehensive records of such materials as referred to above) and all written, drawn, and photographic records, including a copy of all reports relating to the investigations undertaken. It will be quantified, ordered, indexed, and internally consistent before transfer to MLAA. It will also contain a site matrix, a site summary and brief written observations on the artefactual and environmental data.

6.2.4 United Kingdom Institute for Conservation guidelines for the preparation of excavation archives for long term storage (1990) will be followed.

6.2.5 A short summary of the results of the work, even if negative, will be bound into the client report for submission to the LPA and the Greater London HER along with the GLHER report form as soon as

possible after the completion of archaeological works.

6.2.6 Minimum requirements for public dissemination is for OASIS report forms to be submitted to the OASIS Project as soon as possible or within six months of completion of fieldwork, and the provision of a short paragraph summary of the results for publication in the London Archaeologist: Excavation Round-Up. Such publications will meet the minimum requirements set out in Management of Archaeological Recording Projects in the Historic Environment (MoRPHE 2015) and derive from a 'phase 2 review' as defined in the same document.

6.2.7 Where the mentioned 'phase 2' review indicates the need for further assessment and analysis the recommendations set out in the Management of Archaeological Recording Projects in the Historic Environment (MoRPHE 2015). will be followed.

6.3 Report

6.3.1 Notwithstanding details included above all fieldwork and results will be fully recorded and a watching brief report prepared and provided to Historic England for comment.

6.3.2 the watching brief report will include:

- Non-technical summary;
- Introduction;
- Planning Background;
- Previous archaeological work relevant to the watching brief;
- Topography of the site;
- Research objectives;
- Methodology;
- The results of the watching brief and their significance;
- Conclusions (and recommendations following consultation with the Council);
- Bibliography;
- Acknowledgements;
- OASIS form.

6.3.3 The project resource agreed between PCA and the client allows for the production of a grey literature watching brief report to include CAD illustrations and artefact assessment as necessary, based on little or no archaeology being found. It is intended that PCA will provide a draft copy of the watching brief report for comment within two weeks of the completion of the watching brief, to then be provided to the Archaeology Advisor to the Local Planning Authority.

7 SIZE AND STRUCTURE OF EXCAVATION TEAM

- 7.1 The day to day direction of the fieldwork will be undertaken by a member of staff who has considerable experience of working in the urban environment. All archaeologists involved in the fieldwork will be in the full-time employment of PCA or seconded from other Registered Organisations.
- 7.2 The excavation team will be selected from current staff and will include the supervisor with further archaeologists if necessary plus attendance staff.
- 7.3 A standard working day is 08.00 - 16.30. A morning and afternoon tea break and 45-minute lunch break are included within this period. Any workings outside of these times are considered to be overtime. Overtime rates are 150% Monday-Friday & all-day Saturday, 200% Sunday and Bank Holidays.

8 PROGRAMME

- 8.1 A proposed start date for the works is to be confirmed.
- 8.2 The on-site fieldwork programme is subject to the client's programme.

9 PUBLIC ENGAGEMENT

- 9.1 No public engagement is proposed for the watching brief stage of the project.

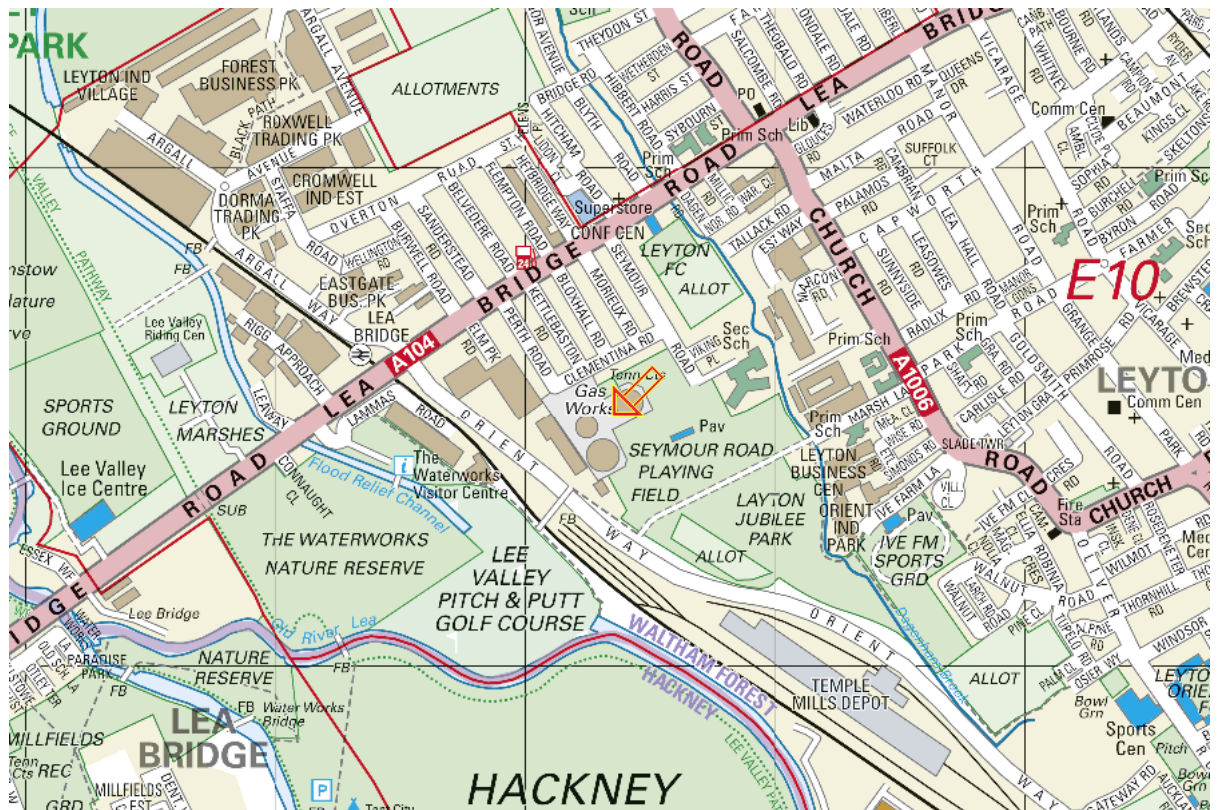
10 BIBLIOGRAPHY

RPS 2019, *ARCHAEOLOGICAL DESK-BASED ASSESSMENT: Lea Bridge Road Gas Works LONDON BOROUGH OF WALTHAM FOREST* unpublished client report

Historic England *Guidelines for evaluating and recording England's former gasworks and redundant gasholders*

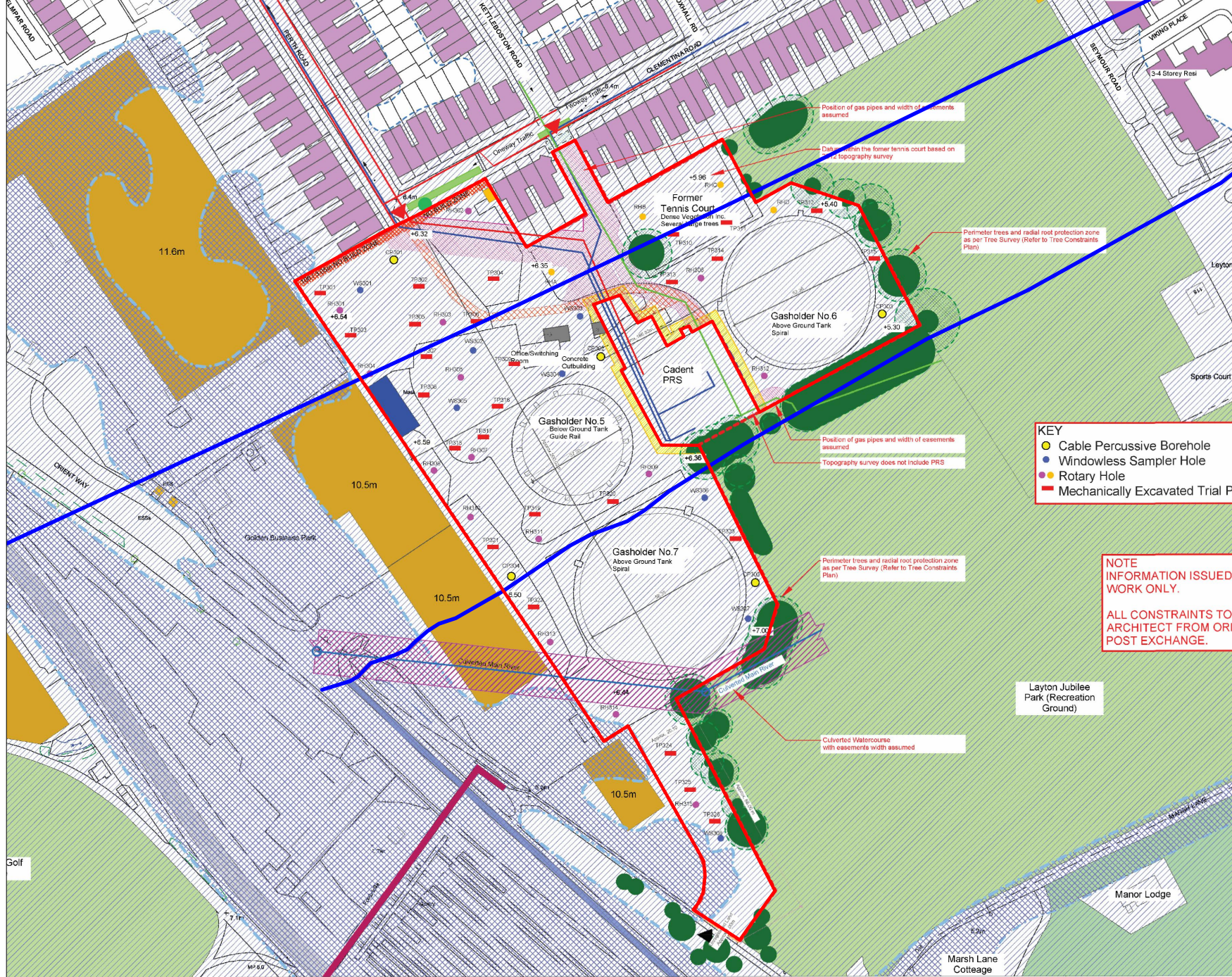
Taylor, J with Brown, G 2009, *Fieldwork Induction Manual: Operations Manual 1*, Pre-Construct Archaeology Limited

Figure 1: Site Location Plan



Reproduced, with acknowledgment Streetmap 2019

Figure 2: Geotechnical Investigation Proposed Locations



- Site Boundary
- Walthamstow Slip boundaries as shown on 1839 Leyton Tithe map

- KEY**
- Cable Percussive Borehole
 - Windowless Sampler Hole
 - Rotary Hole
 - Mechanically Excavated Trial Pit

NOTE
 INFORMATION ISSUED
 WORK ONLY.
 ALL CONSTRAINTS TO
 ARCHITECT FROM ORIGIN
 POST EXCHANGE.



Not to Scale:
 Illustrative Only

Walthamstow Slip
 boundaries as shown on
 1839 Leyton Tithe map