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UNIVERSITY OF BIRMINGHAM

ABBEY MILLS PUMPING STATION

STRATFORD GREATER LONDON

Archaeological Assessment

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Abbey Mills Pumping Station, Stratford, Greater London

Archaeological Assessment

by

Shane Kelleher BA MA AIFA
(Birmingham Archaeology)

for

Purcell Miller Tritton LLP
The Clove Building
Maguire Street
Butler's Wharf
London SE1 2NQ

For further information please contact:
Alex Jones (Director)
Birmingham Archaeology
The University of Birmingham
Edgbaston
Birmingham B15 2TT
Tel: 0121 414 5513
Fax: 0121 414 5516
E-Mail: bham-arch@bham.ac.uk
Web Address: http://www.arch-ant.bham.ac.uk/bufau/

ABBEY MILLS PUMPING STATION, STRATFORD, GREATER LONDON

ARCHAEOLOGICAL ASSESSMENT, 2008.

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SUMMARY

In July 2008, Birmingham Archaeology carried out an archaeological assessment of Abbey Mills Pumping Station, Stratford, Greater London (NGR TQ 38738 83199). The work was commissioned by Purcell Miller Tritton LLP to form part of a programme of works/research the purpose of which was to assess the condition of the historic buildings, establish works required to bring them into good repair and to explore options to bring the redundant structures back into sustainable and beneficial use. The principal aim of the project was to provide detailed information on areas of historical and archaeological significance. More specific aims were to provide an assessment of the potential for below-ground archaeology on the Abbey Mills site, and to evaluate the surviving machinery on site. These aims were achieved by undertaking a review of existing historical research previously carried out for the client, a rapid search of all relevant and readily available published and non-published documentary sources and of the documentary archive held on the site. A search of the Greater London Sites and Monuments Record (GLSMR) and a site inspection were also carried out.

The assessment revealed a site located within an Archaeological Priority Area, in close proximity to evidence of prehistoric activity, and adjacent to the site of one of the largest religious houses of the Middle Ages. The study area was first significantly developed in the 1860s when, as part of Joseph Bazalgette's scheme for constructing London's sewerage system, an impressive pumping station was constructed to connect sewage pipes from lower parts of north London to the Northern Outfall where it was carried to a treatment plant at Beckton. Some fine and significant examples of industrial architecture survive in good condition on site. Whilst the station remains operational, the vast majority of original machinery and industrial elements including a series of rotary beam engines, have been lost. The beam engines were replaced in the 1930s by centrifugal electric pumps, although these themselves now constitute a highly significant example of this type of pumping equipment.

ABBEY MILLS PUMPING STATION, STRATFORD, GREATER LONDON

ARCHAEOLOGICAL ASSESSMENT, 2008.

1 INTRODUCTION

1.1 In July 2008 Birmingham Archaeology carried out an archaeological assessment at Abbey Mills Pumping Station, Stratford, Greater London (Fig. 1). The work was commissioned by Purcell Miller Tritton LLP to form part of a programme of works/research the purpose of which is to assess the condition of the historic buildings, establish works required to bring them into good repair and to explore options to bring the redundant structures back into sustainable and beneficial use.

1.2 This report outlines the results archaeological assessment, which was prepared in accordance with the Institute of Field Archaeologist's *Standard and Guidance for the Investigation and recording of standing buildings or structures* (IFA, 2001b), and of the *Standard and Guidance for archaeological desk-based assessment* (IFA, 2001a).

1.3 The assessment conformed to a Written Scheme of Investigation (Birmingham Archaeology, 2008) which was prepared in accordance with guidelines laid down in *Planning Policy Guidance Note 16: Planning and Archaeology* (DoE, 1990) and *Planning Policy Guidance Note 15: Planning and the Historic Environment* (DoE, 1994).

2 LOCATION AND GEOLOGY

2.1 Abbey Mills Pumping Station is located approximately one mile south of Stratford within the Lea Valley in the London Borough of Newham, and is centred on NGR TQ 38738 83199 (Fig. 2). The Greenway or embankment for the Northern Outfall sewer runs from north-west to south-east along the northern boundary of the site, whilst the new Abbey Mills Pumping Station stands *c*. 150m to the south.

2.2 According to the Solid and Drift map (British Geological Survey, 1967) the underlying geology consists of London Clay Formation deposits of clay, silt and sand. This is overlain by superficial alluvium deposits consisting of silty peaty sandy clay.

2.3 The present character of the Abbey Mills Pumping Station site is of landscaped areas of grassy lawns, mature trees and vegetation interspersed with a network of paths and roads leading between the various buildings (Fig. 3).

3 SIGNIFICANCE AND STATUTORY PROTECTION

3.1 Conservation Area Status

Abbey Mills Pumping Station is located within the Three Mills Conservation Area as designated by Newham Borough Council. This means that the local authority have extra controls over demolition, minor developments, and the protection of trees in this area. An area is given conservation area status so that its special quality or character is retained for present and future generations to enjoy.

3.2 Archaeological Protection

Abbey Mills Pumping Station lies within Newham Archaeological Priority Area. An Archaeological Priority Area is an area "specified by Local Planning Authorities to help protect archaeological remains that might be affected by development" (www.english – heritage.org.uk/server/show/nav.10750). This means that a site in such an area should be assessed for its archaeological potential when application is made for its redevelopment.

3.3 Listed Building Protection

Many of the buildings at the Abbey Mills Pumping Station site (nine in total) are individually statutorily listed. The listing status for each of these buildings ranges from Grade II (buildings of special interest, which warrant every effort being made to preserve them) to Grade II* (particularly important buildings of more than special interest). These buildings are also listed as important as a group. Criteria for inclusion on the Statutory List of Buildings of Special Architectural or Historic Interest are set out in the Department for Communities and Local Government Circular 01/2007 '*Revisions to Principles of Selection for Listed Buildings*' (DCLG, 2007) and can be summarised as follows::

- **Architectural Interest**: to be of special architectural interest a building must be of importance in its architectural design, decoration or craftsmanship; special interest may also apply to nationally important examples of particular building types and techniques (eg. buildings displaying technological innovation or virtuosity) and significant plan forms;

- **Historic Interest**: to be of special historic interest a building must illustrate important aspects of the nation's social, economic, cultural or military history and/or have close historical associations with nationally important people. There should normally be some quality of interest in the physical fabric of the building itself to justify the statutory protection afforded by listing.

- **Group Value**: …the extent to which the exterior contributes to the architectural or historic interest of any group of buildings of which it forms a part (squares, terraces, model villages etc.). Generally known as group value.

The fact that the Abbey Mills Pumping Station buildings are included on the statutory list means that Listed Building Consent is required for any future development at the study area. Listed Building Consent for Grade II buildings is normally decided by the local Conservation Officer, whilst consent for Grade II* buildings is decided by English Heritage. However, as these buildings are listed as a group, and are a group containing a Grade II* building, it is likely that overall consent would be required from English Heritage.

TABLE 1: *Listed buildings at the Abbey Mills Pumping Station Site*

Building ref.	Building	Listed Status
A	A Station	Grade II*
B	B Station and attached Screen House	Grade II
C	C Station	Grade II
G	A Station Store	Grade II
H	North-west Chimney Base	Grade II
J	Entrance Lodge and Site Gates	Grade II
K	Former Superintendents House	Grade II
N	South-east chimney	Grade II
Q	The Creek Valve Chamber	Grade II

3.4 Statement of Significance

"The complex is of national and international importance and the significance of the buildings and landscape setting is high" (Purcell Miller Tritton 2008, 13; Section §.3.5).

4 AIMS AND OBJECTIVES

4.1 The principal aim of the project was to provide detailed information on areas of historical and archaeological significance.

4.2 More specific aims were to provide:

- An assessment of the potential for below-ground archaeology on the Abbey Mills site.
- An assessment of the surviving machinery on site.

5 METHODOLOGY

5.1 These aims were achieved in the following manner:

- A review of existing historical research previously carried out for Purcell Miller Tritton LLP.
- A rapid search of all relevant and readily available published and non-published documentary sources, including historic maps and photographs was carried out in the Library of the University of Birmingham and online.
- A rapid survey of the documentary archive held at Abbey Mills Pumping Station.

- A search of the Greater London Sites and Monuments Record, the principal source of archaeological information for the area.

- A site inspection to assess the extent and character of existing field monuments, existing machinery associated with the pumping station and the potential for below ground archaeology.

- The results of this historic research and site visit were then inputted into a GIS for both interpretative and illustrative purposes.

6 WALKOVER SURVEY

6.1 A walkover survey of the study area was carried out in order to determine current land-use and conditions, and how this may have affected any features and deposits of historical or archaeological interest. Surface levels comprised landscaped areas of grassy lawns and mature trees, and vegetation interspersed with a network of paths and roads leading between the various listed and unlisted pumping station buildings. The north-east edge of the site is demarcated by a rising green embankment which carries the northern outfall of north London's sewage system. A further embankment on the eastern side of the site appears to carry sewage pipes from the new Abbey Mills Pumping Station 150m to the south of the historic pumping station. The largest open space on the site which hasn't been covered in lawn or trees is adjacent to the historic pumping station to the north-east; this partially marks the former location of an original boiler house which was demolished following bomb damage sustained during World War II. This is now covered in concrete/tarmac which displays a regular grid-like pattern of vegetation through cracks, marking the position of subsurface coalbunker vaults. The walkover survey also entailed gaining entry into each of the extant buildings on site, in order to assess them for *in-situ* industrial archaeology mainly in the form of machinery relating to the pump house (an Historic Building Assessment has previously been carried out by the client, Purcell Tritton Miller 2008).

7 ARCHAEOLOGICAL AND HISTORICAL CONTEXT

The Stratford area has a rich and diverse history dating back to prehistoric times. The Greater London SMR search has identified archaeological sites and monuments within 250m of the study area where it delineates features dating back to the Neolithic period (section 8.1 below). In addition to gaining an understanding of the development of the site within its immediate area, it is also important to briefly place the site within its local and wider archaeological and historical context.

7.1 The Wider Context

The lower Lea Valley appears to have been continuously occupied since the end of the last Ice Age *c.* 12,000 years ago. Traces of human activity from all periods have been found in the ground: "from Neolithic farms to Roman Roads, from Saxon fish ponds to medieval monasteries" (MOLAS/PCA 2006, 3). Humans have being occupying high gravel terraces in the Thames Valley and that of its tributaries (of which the River Lea is one) from the Palaeolithic period.

7.2 The Local Context – Prehistoric Evidence

As can be seen from previous archaeological work carried out in the vicinity of the study area (section 8.1 below) there is evidence of human occupation/presence from the Neolithic or perhaps the Mesolithic period onwards. In addition to the evidence for prehistoric activity presented below, further excavations on the east bank of the Channelsea River close to the Stratford Market site (see section 8.1 below) revealed a dense area of features (pit, postholes, hut-gullies, ditches) cut into the clay subsoil covering an area of at least 0.6ha; this would seem to indicate a multi-phase settlement. A number of more widely spaced ditches on the east side of the site probably formed part of a field system. The main time-span represented by the finds is from the Bronze Age/early Iron Age to the 4th century AD. Residual finds also attest to earlier use of the site from the Mesolithic period onwards (Gilman 1992, 109).

7.3 The Local Context- Medieval Evidence

Whilst evidence has been found for Saxon activity close to the study area (see section 8.1 below), and unsubstantiated links to King Alfred and the Stratford area (MOLAS/PCA 2006, 10), the most significant Medieval activity in the Stratford area was the construction of Stratford Langthorne Abbey. This monastic house, which is recalled in local street names such as Abbey Lane, Abbey Road, and of course the Abbey Mills Pumping Station itself, was located *c.* 350m north-east of the study area, lying between the Channelsea and Marsh Lane (now Manor Road). The Cistercian Stratford Langthorne Abbey was a daughterhouse of the abbey of Savigny in Normandy. It was founded by William de Montfichet in 1135 and was dedicated in honour of St. Mary. Unusually sited for a Cistercian foundation (Cistercians normally founded their abbeys in secluded areas away from large conurbations), the abbey became very wealthy and was as important as its sisterhouses at Jervaulx, Riveaulx, and Fountains in Yorkshire. The Victoria County History (1907, 129) notes that it was "one of the richest and, owing to its proximity to London, one of the most important of the order in England". Its success was no doubt due to its proximity to London, major roads, river crossings and to the major resources of the marsh and the river. Over time the abbey acquired much of the land in the area including the area now occupied by the Abbey Mills Pumping Station; this was, however, outside the abbey precinct. It would appear that the current site was part of the abbey's marsh which lay to the south and west of the abbey precinct (Fig. 5).

At the Dissolution the abbey was formally surrendered to the crown in 1538. The abbey site slowly became industrialised and "by the time railway works began in the mid 19th-century nearly all visible traces of the abbey had disappeared" (MOLAS 2008, 2). Excavations over the last thirty years have served to illuminate the extent and location of the abbey. The stone foundations of the abbey church and part of the cloister were excavated, whilst excavations within the church and graveyard revealed 647 human inhumations (MOLAS/PCA 1996, 11). These were later reburied at the Cistercian Abbey at Sutton Coldfield in the West Midlands (www.wikipedia.org). Further archaeological interventions such as that at Bakers Row (see section 8.2 below) uncovered further evidence of the abbey site. The site at Baker's Row was considered important enough to be protected as a Scheduled Ancient Monument (SAM).

The numerous buildings on site included the abbey church, dormitories, cloisters, brewhouses, an infirmary, a dovecote, weavers and shearing workshops, and tanneries. Other important buildings owned and controlled by the abbey were the watermills which were used primarily to grind flour for bread to be consumed at the monastery and sold

in the City of London. One of these mills; the Abbey Mills, from which the current study area got its name, is the earliest mentioned mill in the area, originally known as Wiggen Mill, until it was initially bequeathed by Queen Maud to Barking Abbey in 1118 and later purchased by Stratford Langthorne Abbey (VCH 1973, 89). It stood on a small island in the Channelsea River, just to the north-east of the study area, and remained in the Abbey's possessions until the Dissolution. It was rebuilt in 1768, and burnt down in the 1861/2 and rebuilt again in 1863/4 as a tall brick structure. During World War II it was burnt down again, and finally removed in 1967 (VCH 1973, 89).

7.4 The Local Context- Post-Medieval Evidence

The area surrounding the Abbey Mills Pumping Station gradually changed from being a managed monastic landscape to an industrialised one. Stratford had become a considerable manufacturing district. The varied industries, which included breweries, distilleries, chemical and dye works, guano, manure, and gas works, were "well provided by railway facilities, and the navigable Lea on one side of it affording access to the Thames and docks" (Thorne 1876). By the time of the first edition Ordnance Survey map in the early 1860s, much of the area to the north of the study area had been developed with rows of houses, streets, and industries such as gasworks had been built. The area to the east of the site consisted of a large industrial site which was called West Ham Print Works. The current study area was still free of development apart from some roads/pathways and the northern outfall which bounds the north-east side of the site. The land was labelled Stratford Marsh and was located just to the north of an area known as Mill Meads. By the time of the next Ordnance Survey map in 1896 the study area and its immediate surroundings had taken on a very different character. The West Ham gasworks had developed up to the northern outfall sewer, whilst terraces of housing had been constructed to the north-west. Within the study area, the Abbey Mills Pumping Station which still occupies the site, had been constructed. An interesting feature of this map is the narrow gauge rails running from Abbey Creek to the coal bunkers to the north-east of the pumping station. It would seem that the coal was transported by river to this point and then carted to the pumping station along these tracks. By the time of the 1916 Ordnance Survey map, C station had been erected to the east of the original pumping station, so completing the site to its full extent and as it survives today.

The Abbey Mills Pumping Station was part of the Metropolitan Board of Works' plans to lift up, over 13m, all or most of the waste water received from the lower parts of north London and push it to the adjacent Northern Outfall Sewer, fed from higher areas of north London, and then sent to the treatment works at Beckton. This scheme was necessitated by the fact that London's crude sewers could not cope as the city's population expanded, culminating in "The Great Stink" of 1858 which had nearly forced the relocation of Parliament to Henley on Thames. The new drainage system was the brainchild of Joseph Bazalgette, the chief engineer of the Metropolitan Board of Works.

Designed by Bazalgette and architect Charles Driver, the Abbey Mills Pumping Station and its twin at Crossness on the south side of the river were like 'Cathedrals of Waste'. The centrepiece of the site was the pumping station itself, Greek cross in plan, and constructed in an eclectic style which includes elements of Byzantine, Celtic, French, Venetian Gothic, and Flemish architecture. The interior is heavily ornamented in intricate cast-ironwork (a speciality of Driver's) and contained eight rotary beam engines which were replaced in the 1930s by centrifugal electric pumps which are still operational as a standby for the new pumping station to the south. The pumping station was flanked by two impressive octagonal chimneys, constructed in decorative

brickwork. These went out of use when electrification was introduced in the 1930s, and were demolished in 1940 for the safety of the station in the event of an air attack. Other buildings on site include further later pumping houses B and C station which were necessitated as London's population increased, economiser houses, stores, and a screen house.

The pumping station continued in use until 1997 when its status was relegated to standby.

8 PREVIOUS ARCHAEOLOGICAL WORK

A search of the Greater London Sites and Monuments Record has revealed a number of previous archaeological investigations in the vicinity of study area (see Table 2). These archaeological interventions have further illuminated the varied history and prehistory of this area.

8.1 Various programmes of archaeological work at the Stratford Market Depot, *c.* 70m to the north-east of the Abbey Mills Pumping Station site, have produced evidence for activity in the area from at least the Neolithic period onwards. The earliest of these features was a sparse amount of residual Neolithic flint (**MLO58322**) uncovered during works in connection with the Jubilee Line extension. Further prehistoric evidence uncovered in this excavation were a single horse burial (**MLO58331**) which has been provisionally dated to the Iron Age/Roman period, and a single crouched inhumation (**MLO58333**) from the Iron Age. Saxon and Medieval remains were also found at this site, including sparse residual middle and late Saxon pottery (**MLO58354**), greenstone walls of a building belonging to Stratford Langthorne Abbey, associated destruction layers, and 14/15th century pottery. Two isolated burials which were probably medieval in date were also uncovered (**MLO58358**). Evidence for the Post-Medieval function of this site was also revealed including brick-lined channels and floors belonging to J. Tucker's West Ham Abbey Print Works (**MLO58362**).

8.2 The rich Medieval history of this area was further highlighted in excavations carried out at Bakers Row, Stratford *c.* 400m to the north-east of the study area (**MLO10229**). This excavation, which was located within Stratford Langthorne Abbey precinct, revealed part of the abbey moat and stone precinct wall, and the preserved footings of a 13th-century stone structure. Evidence for Saxon-Norman occupation was also demonstrated.

8.3 Sub-surface evidence directly relating to the Abbey Mills Pumping Station has been uncovered during an archaeological watching brief at Gay Road, West Ham *c.* 30m to the north-west of the study area (**MLO63834**). A linear feature at the west end of the site corresponded to Low Level Sewer No.2, linked to the 1868 pumping station; a late 19th-century overflow pipe was also discovered, which followed the course of an earlier open sewer, the Mill Meads Common Sewer between Stratford and the Channelsea River.

TABLE 2: *Gazetteer of Archaeological Sites and Monuments (including archaeological events) in and within 250m of the Study Area (from Greater London SMR; see Figure 4).*

SMR Ref. No.	Type	Site name/brief description	NGR centroid	Period/Date	Status
MLO58322	FS	Stratford Market Depot, Residual Neolithic flint	TQ 3890 8352	Neolithic	

MLO58354	FS	Stratford Market Depot, Residual middle/late Saxon pottery	TQ 3890 8357	Early Medieval	
MLO34624	AS	Stratford Langthorne Abbey Bakehouse	TQ 3892 8327	Late medieval	
MLO40079	AS	Stratford Langthorne Abbey Gatehouse	TQ 3892 8327	Late medieval	
MLO54878	AS	Stratford Langthorne Abbey Malt kiln	TQ 3892 8327	Late Medieval	
MLO10229	AS/PAF	Bakers Row- Stratford Langthorne Abbey (Site of)	TQ 3904 8336	Late Medieval	
MLO73101	AS	Channelsea River Bridge	TQ 3890 8327	Post medieval	
MLO63834	PAF	Gay Road, West Ham 19th-century sewer	TQ 3868 8310	Post Medieval	
MLO58331	PAF	Stratford Market Depot horse burial	TQ 3890 8357	Iron Age/Roman	
MLO58358	PAF	Stratford Market Depot Religious House/Abbey wall	TQ 3890 8357	Late Medieval	
MLO58361	PAF	Stratford Market Depot burials/inhumations`	TQ 3890 8357	Late Medieval	
MLO58362	PAF	Stratford Market Depot printing works	TQ 3890 8357	Post Medieval	
MLO90633	LBII	116-130 Abbey lane (semi-detached houses built by Bazalgette 1886	TQ 38808 83326	Post Medieval	Grade II
MLO90648	LBII*	Abbey Mills Pumping Station , 1868 by Bazalgette and E. Cooper	TQ 38738 83199	Post Medieval	Grade II*
MLO90689	LBII	Ancillary Pumphouse at Abbey Mills c. 1868	TQ 38741 83178	Post Medieval	Grade II
MLO90690	LB II	Bases of former Chimney Stacks at Abbey Mills	TQ 38674 83259	Post Medieval	Grade II
MLO90632	LBII	Gate Lodge at Abbey Mills Pumping Station	TQ 38609 83290	Post Medieval	Grade II
MLO90691	LBII	Gates and Gatepiers at entrance to Abbey Mills Pumping Station	TQ 38608 83302	Post Medieval	Grade II
MLO90631	LBII	Offices/former superintendents house at Abbey Mills Pumping Station	TQ 38673 83301	Post Medieval	Grade II
MLO90630	LBII	Stores Building at Abbey Mills Pumping Station	TQ 38695 83186	Post Medieval	Grade II
MLO63837	FS	Gay Road, West Ham 17th/18th century ceramic ware	TQ 3868 8310	Post Medieval	

Site Classification:

SAM: Scheduled Ancient Monument
CA: Conservation Area
RPG: Registered Park or Garden
AS: Archaeological Site
AE: Archaeological Earthwork
FS: Archaeological Findspot
PAF: Previous Archaeological Fieldwork

LBI: Grade I Listed Building
LBII*: Grade II* Listed Building
LBII: Grade II Listed Building
LLB: Locally Listed Building

9 ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL

As seen above, the Abbey Mills Pumping Station is located in close proximity to significant, well preserved archaeology dating from the prehistoric period to the post-medieval period. Situated within an archaeological priority area, this area has already been assessed as having a high archaeological potential.

9.1 Prehistoric and Palaeoenvironmental Potential

The Greater London SMR search has shown that there is clear evidence for prehistoric activity/settlement within the vicinity of the study area. Molas/PCA have identified that Prehistoric archaeology in the Lea Valley is likely to be found within the "natural Quaternary stratigraphy or alluvium- the natural silt deposits, several metres thick, in ancient stream beds" (2006, 3). As the site is located on alluvium deposits it is possible that there are may be Prehistoric deposits/evidence present at the study area. In addition to this there may be increased potential for the presence of important geomorphological features in which well-preserved organic sequences may have developed. Such features may contain valuable sedimentary records relating to palaeoenvironmental conditions that prevailed on and around the study area during the historic and prehistoric periods (Dr Thomas Hill, University of Birmingham *pers comm*.). In addition valley floor sedimentary archives commonly contain abundant alluvial sequences that may cover buried archaeological sites, preventing their identification, whilst also potentially preserving such archaeological and palaeoenvironmental deposits (Howard and Macklin 1999).

9.2 Medieval Archaeology Potential

Previous archaeological work in the vicinity of the study area has uncovered significant medieval archaeological remains/deposits mainly in relation to Stratford Langthorne Abbey which stood *c.* 200m to the north-east of Abbey Mills Pumping Station. This close proximity to such an important medieval religious house would normally infer that there is a high potential for uncovering medieval remains. The monastic landscape would have been a well managed one including the management and control of drainage across the area in order for the estate lands to have been used for pasture and cultivation. The waterways would also have been exploited for watermills such as Abbey Mills, and leats would have been cut for this purpose. It is not clear what exact function the study area had during this period. However, it is known that it was outside the abbey precinct, it was low ground which was undoubtedly marshy, a fact attested to the by the area being called Stratford Marsh in the mid 19th-century. An early 19th-century representation of the Stratford Langthorne Abbey site depicts a marsh named Abbey Marsh just to the south-east of the abbey site; it is likely that this extended over the current study area. Therefore, although the study area was located in very close proximity to one of the most important religious houses of medieval England, it is unlikely that any settlement/built evidence relating to the abbey is present at the Abbey Mills Pumping Station site, however there may be evidence of their estate management and engineering feats such as drainage ditches/channels, revetments etc.

9.3 Post-Medieval Archaeology Potential

The post-medieval history of the study area saw little change down to the construction of the Abbey Mills Pumping Station in the 1860s. John Roque's map of 1746 shows the area to the west of the abbey under marsh, whilst the West Ham tithe map of 1853 shows the land still undeveloped. Any subsurface archaeology from this period is likely

to pertain from the construction of the pumping station and there is a likelihood that redundant piping/channels may be uncovered such as that uncovered at Gay Road, West Ham (**MLO63834**). It is also likely that some subsurface features may have been truncated/removed during landscaping works which were carried out prior to the 1916 Ordnance Survey map. This saw the insertion of lawns and trees in a semi-formal setting.

When the above information is taken into account it is difficult to pinpoint zones of archaeological potential as there is a similar potential across the entire study area.

10 ARCHAEOLOGICAL ASSESSMENT OF EXTANT INDUSTRIAL MACHINERY

As noted above, the purpose of the Abbey Mills Pumping Station (Plate 1, Fig. 9) was to lift up, over 13m, all or most of the waste water received from the lower parts of north London and push it to the adjacent Northern Outfall Sewer, fed from higher areas of north London, and then sent to the treatment works at Beckton, or "outfall reservoirs at Barking and thence into the Thames" (Halliday 1999, 82). Two low level sewage pipes entered the station from the south, these initially ran through a screening chamber at A Station Screen House (Building F), this effectively removed many undesirable elements from the sewage such as refuse, vegetation, and the occasional dead body. The sewage then entered A Station (Building A), where, in order to pump the waste to the desired level, eight condensing rotary beam engines were installed at in A Station which opened in 1868. Two boiler houses fitted with Cornish Boilers were constructed and installed to create enough steam to power the beam engines. Two 212 ft tall chimneys (Buildings H and N) were constructed to emit the smoke from these boilers. Economiser houses (Buildings I and M), an early form of sustainability, were later added to keep a constant source of heat so that the boilers didn't have to be constantly preheated prior to use. The water was pumped towards the Northern Outfall Sewer where it merged with sewage from higher parts of north London. The Creek Valve Chamber (Building Q) was later added (1910-14), this regulated flow of the sewage into the Northern Outfall in times of flood, allowing the excess to flow into the nearby Abbey Creek.

B Station (1891-6, Building B) and C Station (1910-14, Building C) were added to alleviate the pressure on A Station as the population of London continued to increase.

10.1 A Station-Building A (Plates 2 to 8, numbering following Purcell Miller Tritton 2008)

A Station was originally powered by eight condensing rotary beam engines rated at 142 horsepower (Bell, 2008). The steam for these engines was provided in two flanking boiler houses, each equipped with eight Cornish boilers. Unfortunately none of these survive. The steam engines became obsolete and in 1931-3 were replaced with eight cast iron/steel electrically driven centrifugal pumps designed by W.H. Allen & sons of Bedford, with a gross capacity of 224,000 gallons a minute (Purcell Miller Tritton 2008, 14). This change of power source also rendered the chimneys, boiler houses, and coalbunkers redundant.

Of the original surviving machinery/industrial elements the most significant would appear to be the original 10ft 6in cast iron sewage pipes which are still in use. The fact that that these are still in use is a testament to their engineering, design, and the quality of materials used. Of the 1930s features, the most significant elements are the motor housings, the central control cabin, and a large control panel. These are highly important considering their condition, context/setting, and their continuity of function.

The extant machinery and industrial paraphernalia of both the mid/late 19th-century and the 1930s can be considered to be of high significance.

10.2 North West and South East Chimney Bases-Buildings H & N

These structures do not contain any significant extant machinery.

10.3 North West and South East Former Economiser Houses-Buildings I & M

These structures do not contain any significant extant machinery.

10.4 A Station Screen House- Building F (Plate 9)

This early 20th-century building retains three original cast iron filth hoists, which, as has been demonstrated above, had a pivotal role in the workings of A station. These filth hoists provide a tangible link to a particularly unpleasant part of the process flow at Abbey Mills pumping station. Their age, condition, and their contribution to our understanding of the process flow of the pumping station ensures that these filth hoists are of medium significance.

10.5 A Station Store- Building G

This structure does not contain any significant extant machinery.

10.6 The Eastern Lodge and Site Gates-Building J

These structures do not contain any significant extant machinery.

10.7 The former Superintendent's House-Building K

This structure does not contain any significant extant machinery.

10.8 The Former Blacksmiths Shop-Building D

This structure does not contain any significant extant machinery.

10.9 B Station and attached Screen House-Building B (Plates 10 to 12)

This late 19th-century structure underwent a machinery strip-out in the 1990s and the original steam engines were later replaced by diesel and electrically-driven pumps. The only surviving significant industrial elements are a possibly original 5-ton overhead gantry crane made by Henry J Coles of London, concrete machine bases, and a large wall gauge. The attached screen house contains four filth hoists. These extant features are considered to be of medium significance due to their possible original date and for their contribution to our understanding of the individual functions of these buildings and the process flow of the pumping station.

10.10 C Station- Building C (Plates 13 to 15)

Like B Station, this early 20th-century structure underwent a machinery strip-out in the 1990s. This originally had gas fired engines which were later replaced by diesel ones. The only surviving significant industrial features concrete machine bases and an original

5 ton gantry crane by Thomas Smith and Sons, of Rodley near Leeds. This crane is considered to be of medium significance.

10.11 The Creek Valve Chamber- Building Q

This structure does not contain any significant extant machinery.

10.12 Northern Outfall Control Chamber

This structure does not contain any significant extant machinery.

10.13 D Station- Building D

This 1970s structure is no longer extant above surface level.

10.13 Other structures/machinery of interest (Plates 16 to 18)

The subsurface barrel vaulted coalbunkers to the north-east of A station are a highly visual reminder of a time when steam was used to power Abbey Mills Pumping Station. They evoke images of coal being transported along the Channelsea River and carted over narrow gauge rails to these bunkers ready to feed the fires which produced the steam for the beam engines. These are considered to be of medium significance.

Another interesting industrial element is found just outside the eastern boundaries of the study area on the Channelsea Footpath, this is a nautilus shaped pump housing from C station.

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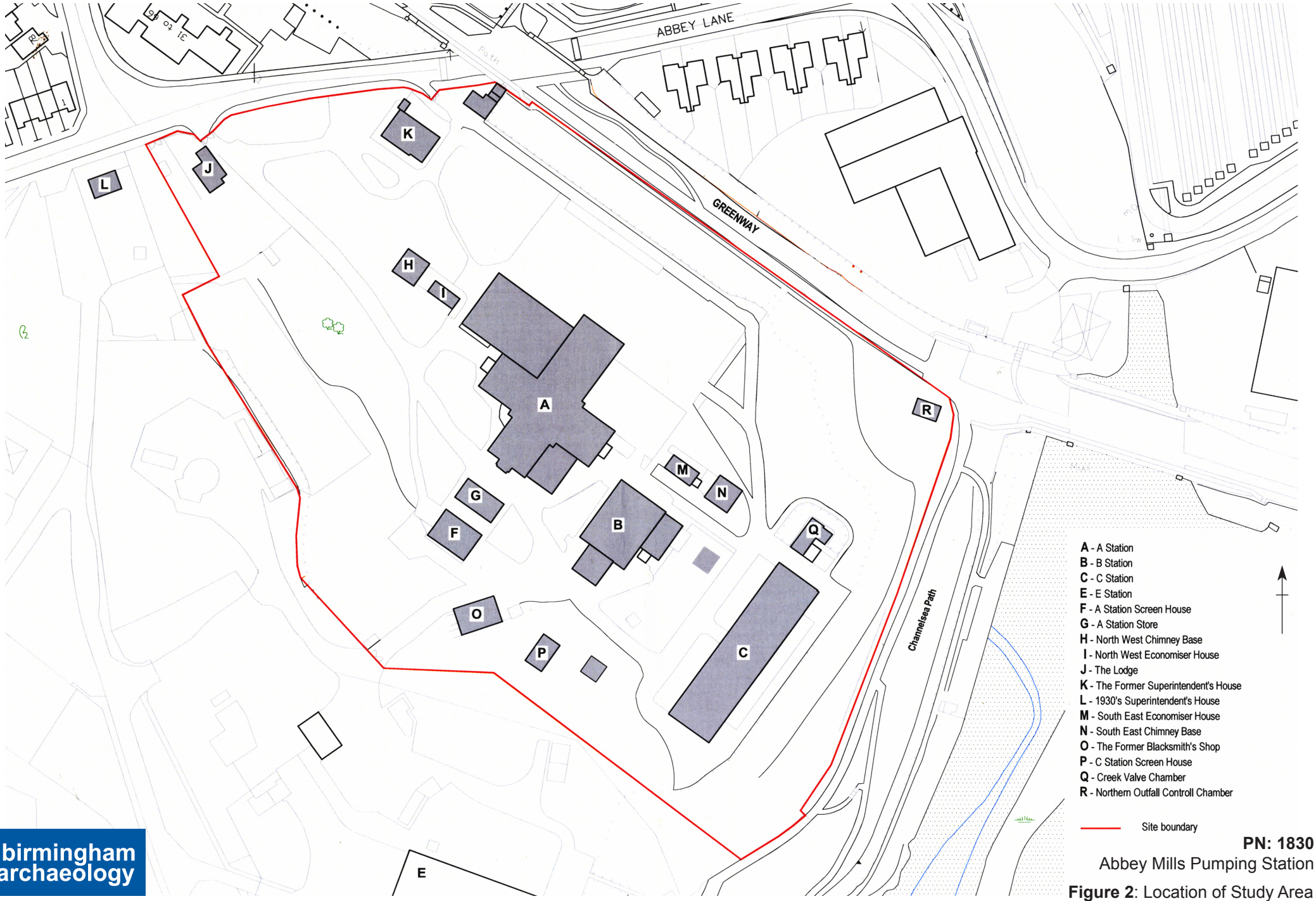
www.barch.bham.ac.uk

PN: 1830

Abbey Mills Pumping Station

Figure 1: Site Location



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Abbey Mills Pumping Station

Figure 2: Location of Study Area

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(Courtesy of Google Earth)

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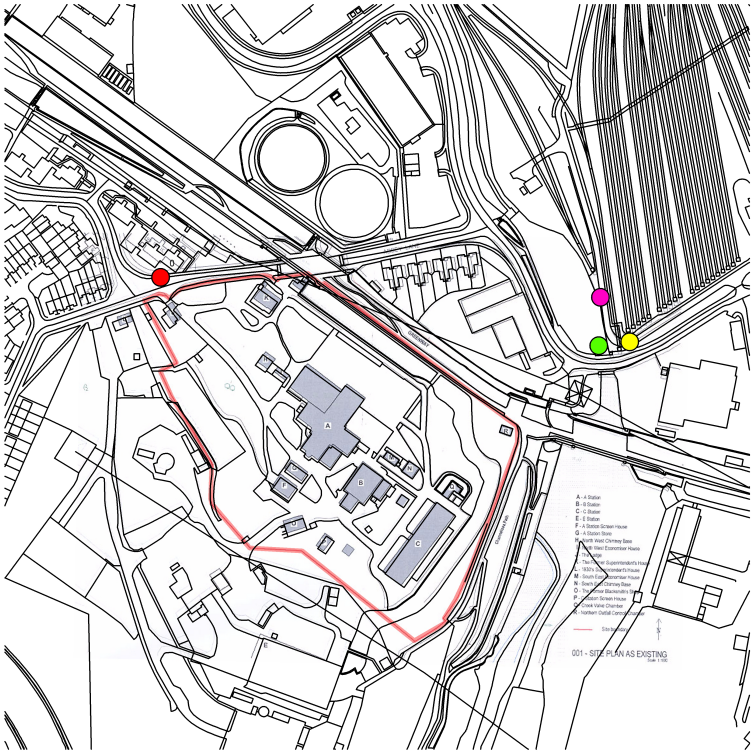
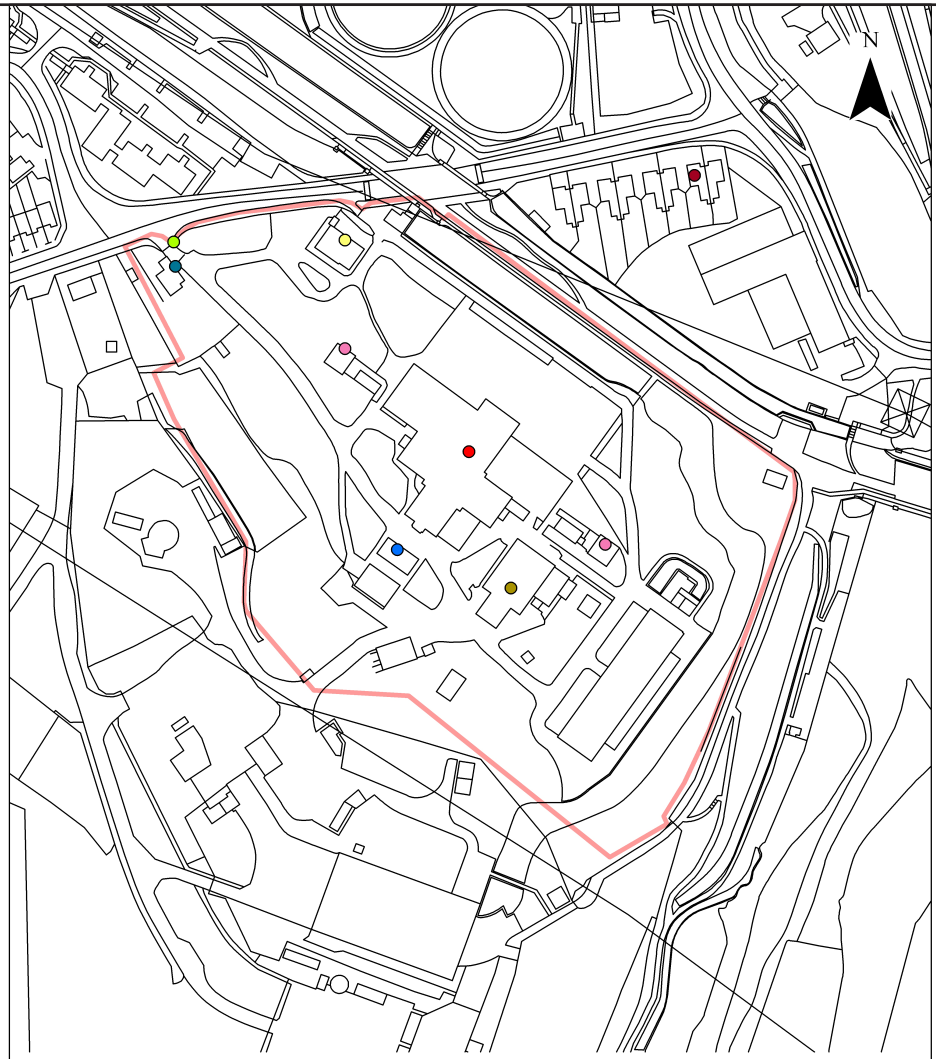
Figure 3: Aerial View of Study Area

A



- Stratford Market Depot Sites
- Stratford Langthorne Abbey sites
- Bakers Row
- Channelsea River Bridge
- Gay Road, West Ham

B



- Gates and Gatepiers
- Gate Lodge
- Ancillary Pumphouse
- 116-130 Abbey Lane
- Bases of Former Chimneys
- Superintendents House
- Stores Building
- Abbey Mills Pumping Station

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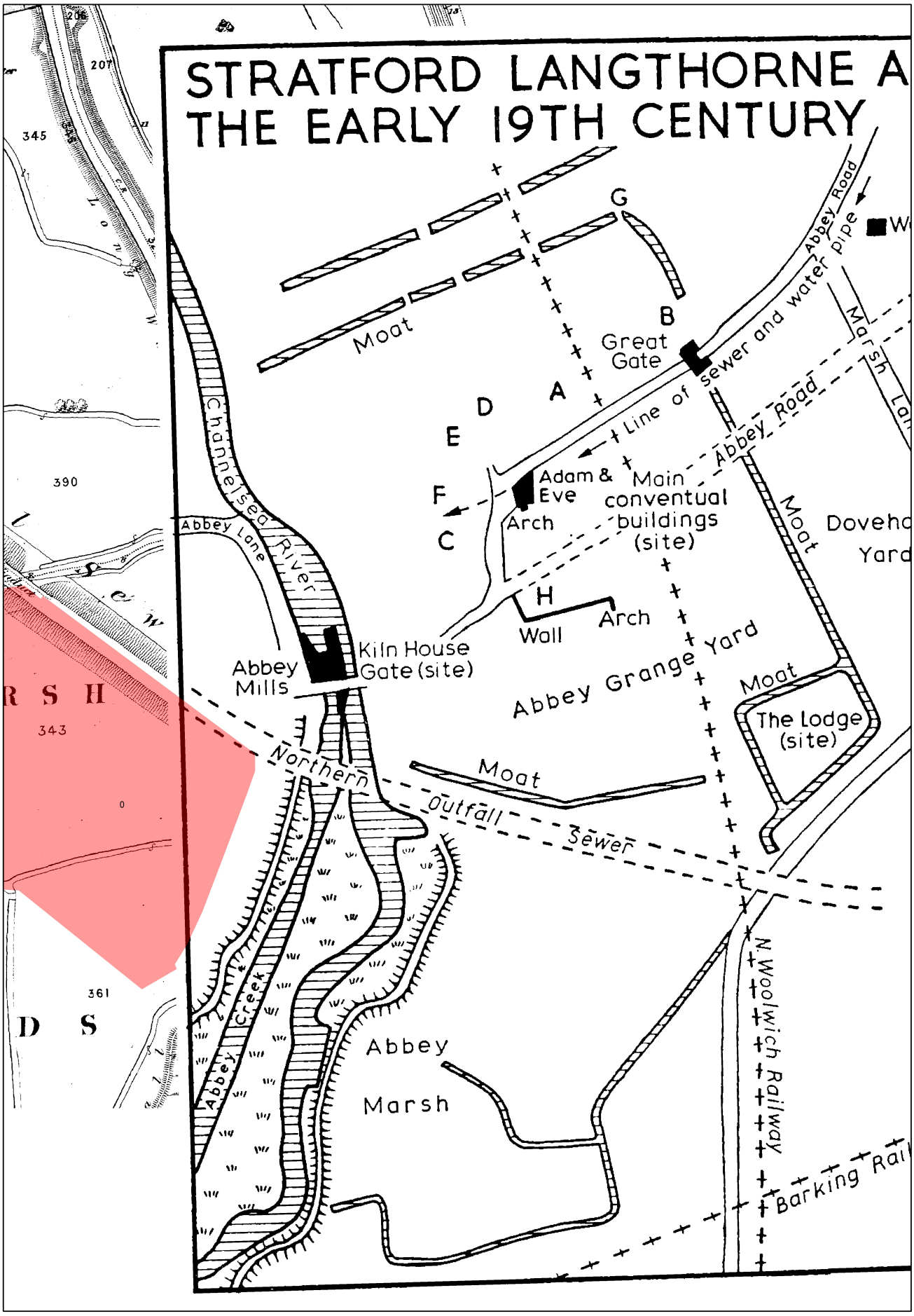
Abbey Mills Pumping Station

Figure 4: Greater London Sites and Monuments Record Location Maps



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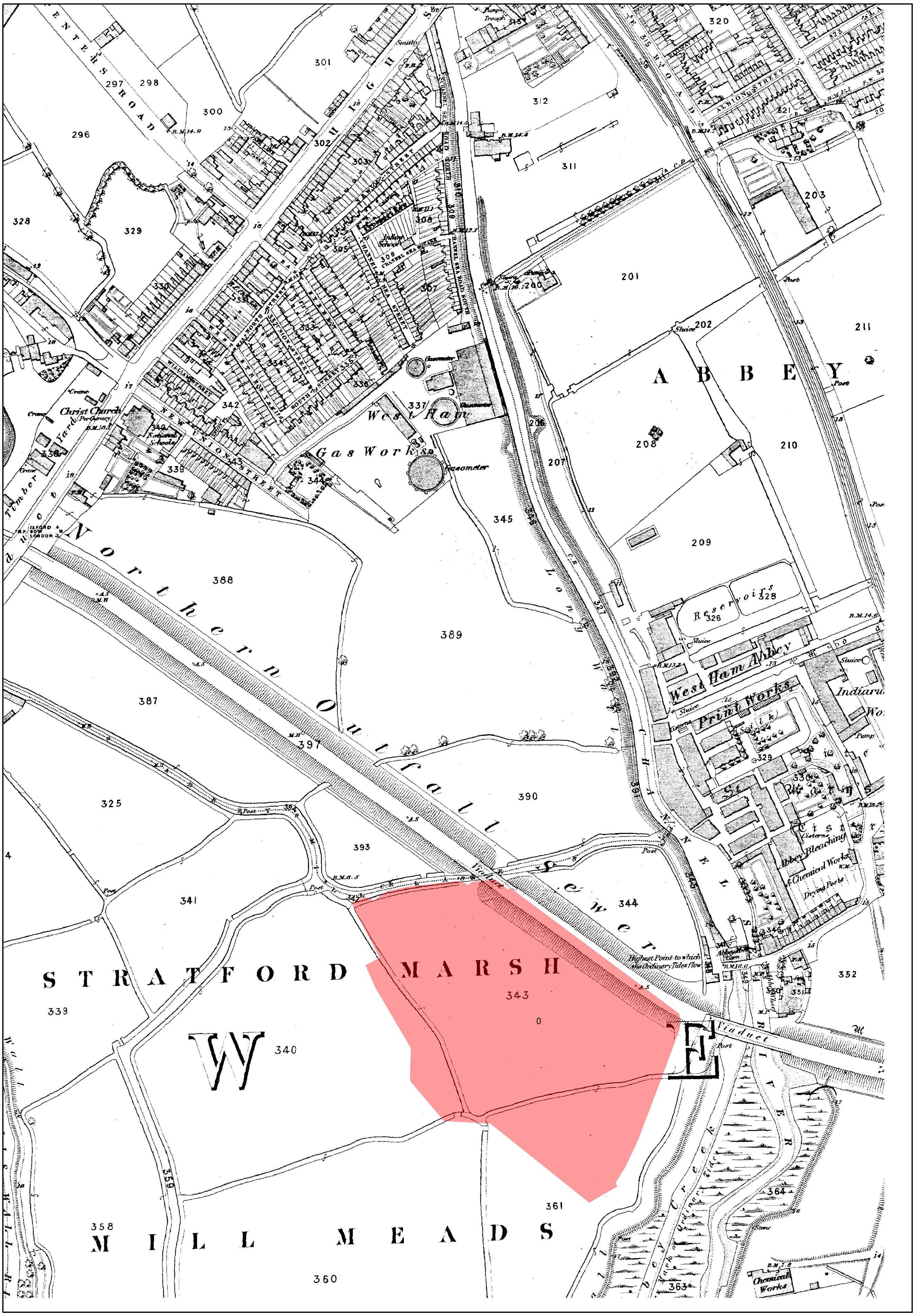
Abbey Mills Pumping Station

Figure 5: Stratford Langthorne Abbey Site in the Early 19th Century Map (VCH) overlaying the 1st Edition Ordnance Survey Map



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Abbey Mills Pumping Station

Figure 6: 1st Edition Ordnance Survey Map (1869)

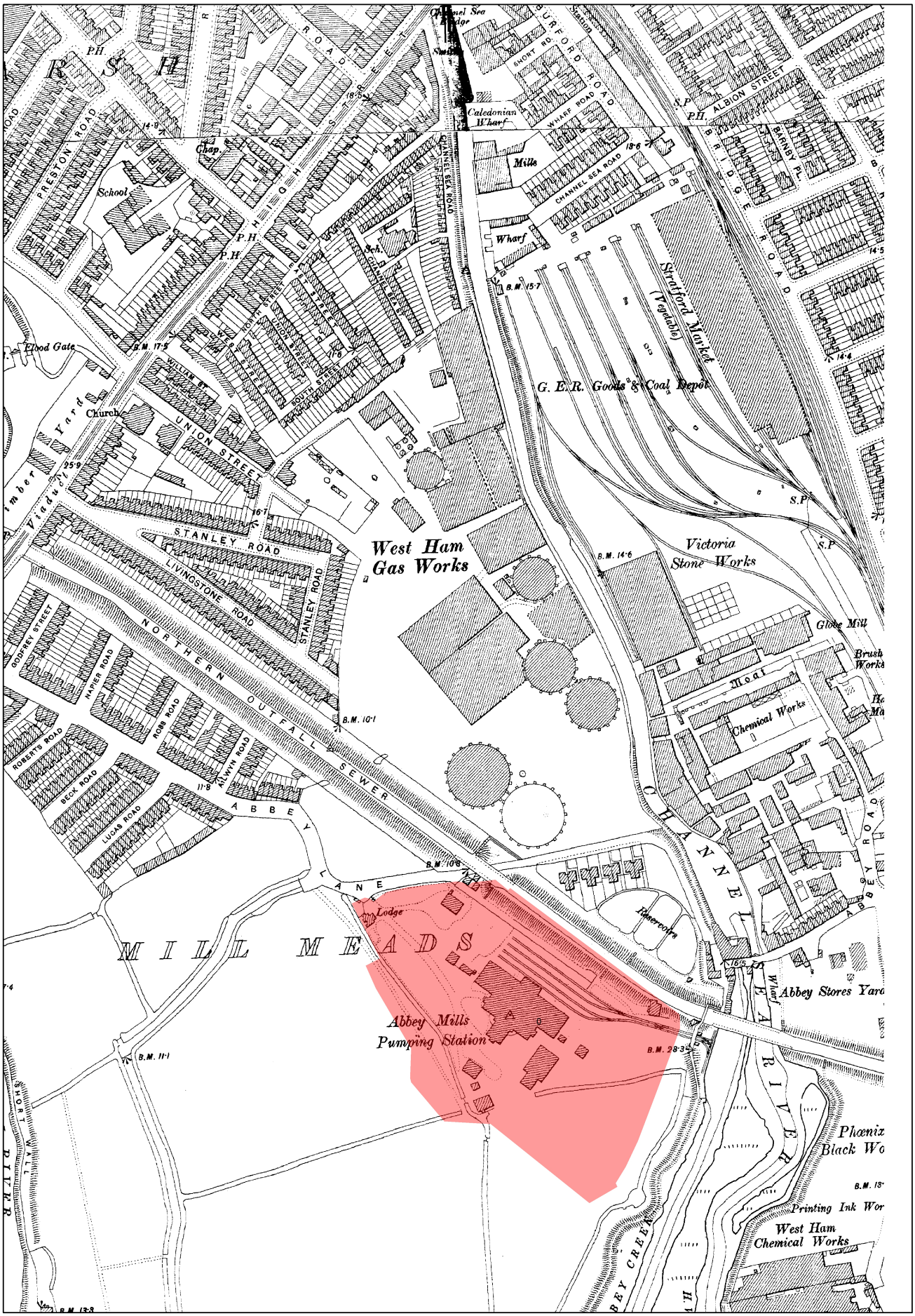

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Figure 7: 1st Edition revision Ordnance Survey Map (1896)

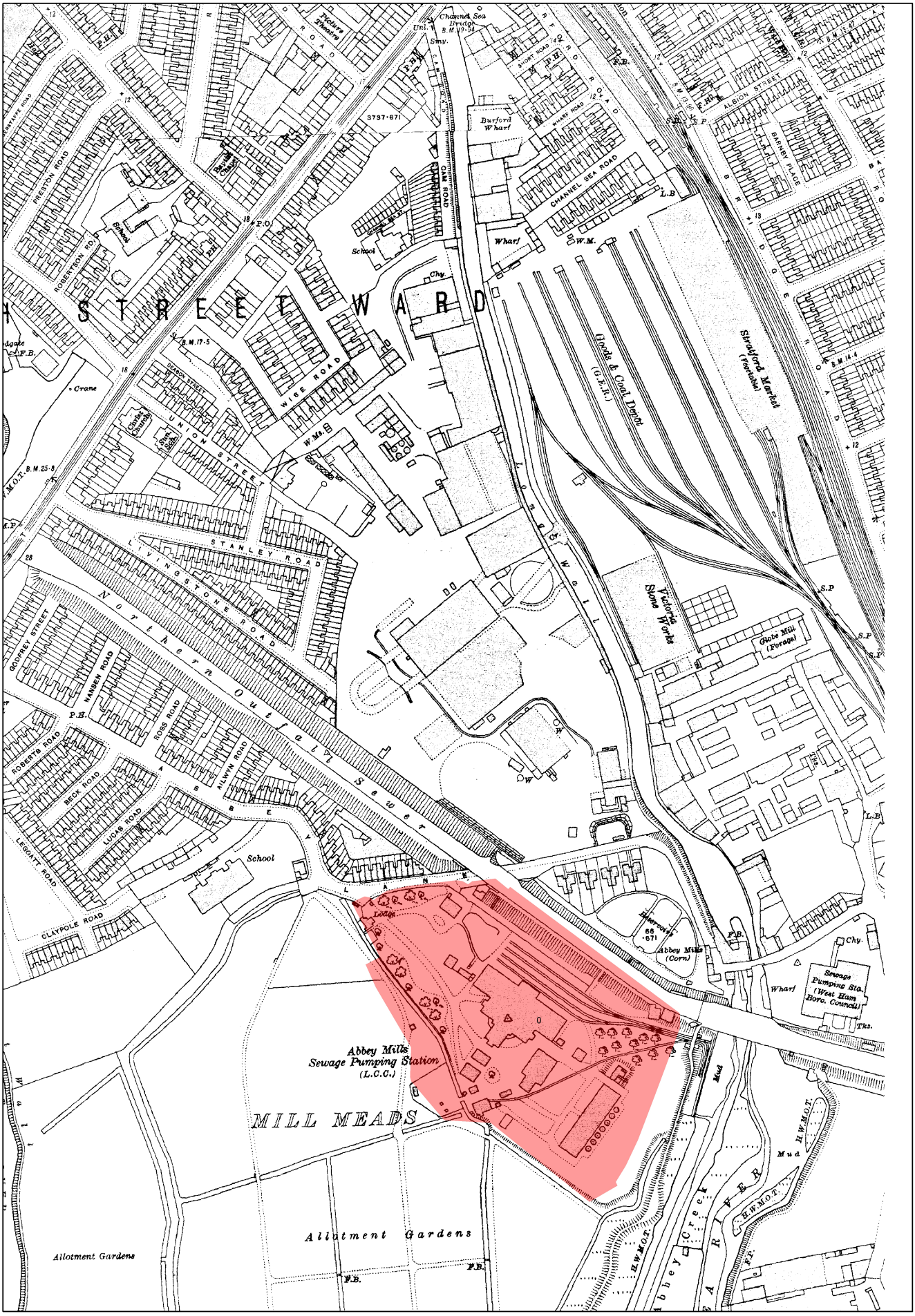

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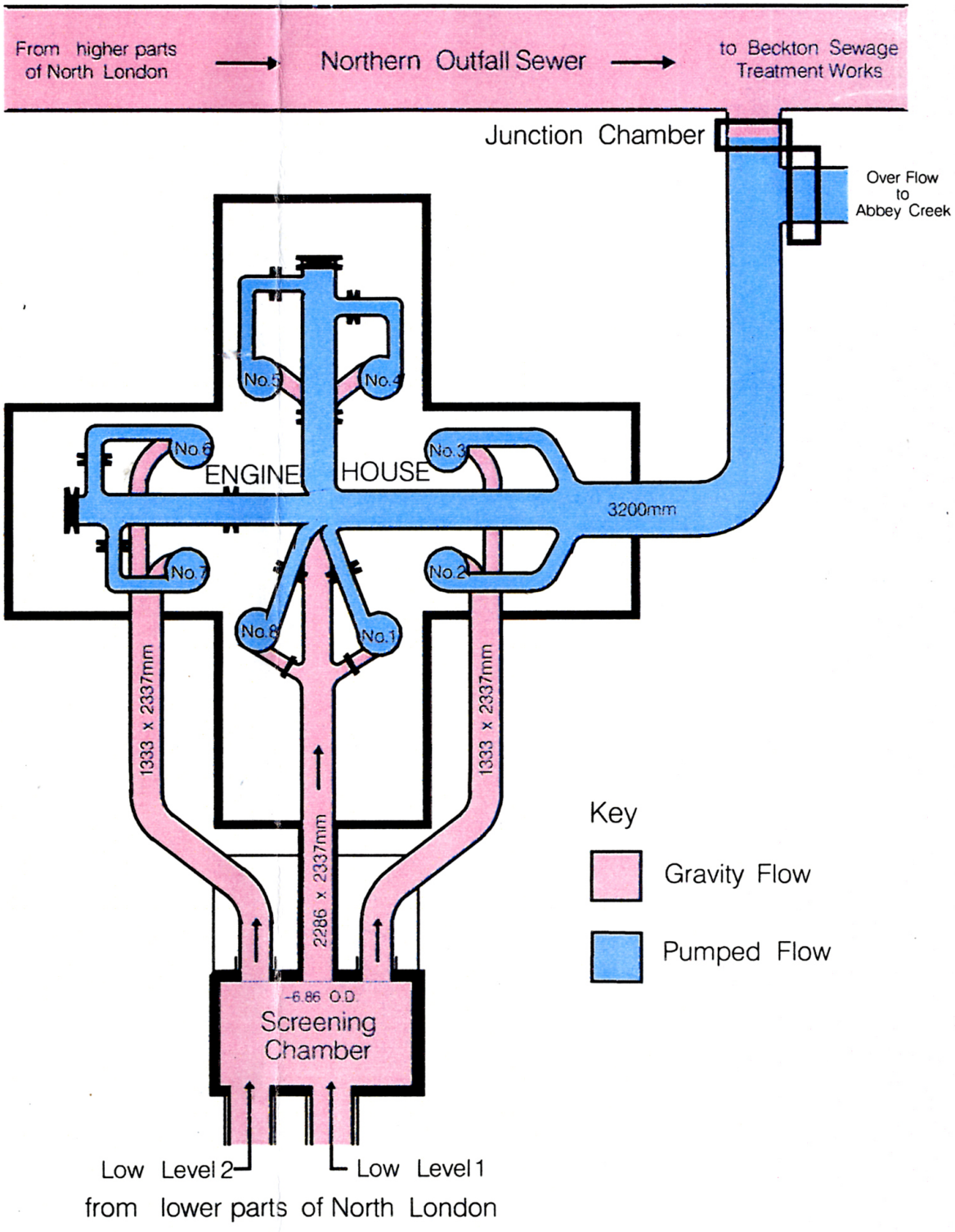
Figure 8: 2nd Edition Ordnance Survey Map (1916)



PN: 1830
Abbey Mills Pumping Station

Figure 9: Flow Schematic of Abbey Mills Pumping Station

Plate 1

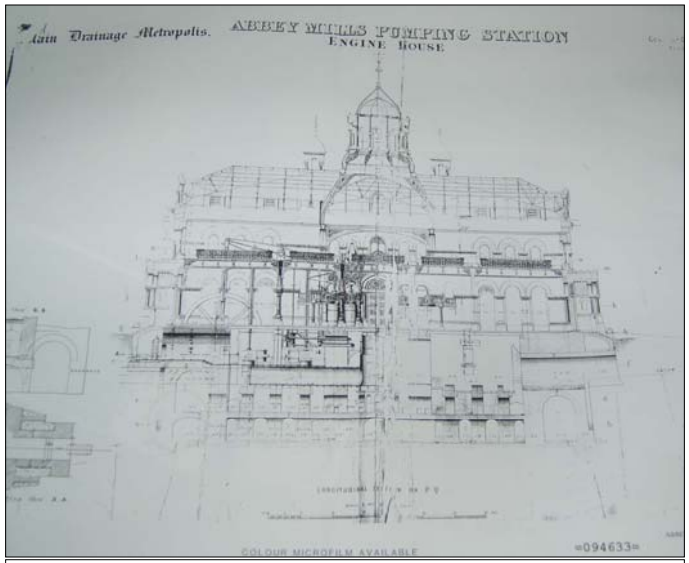


Plate 2

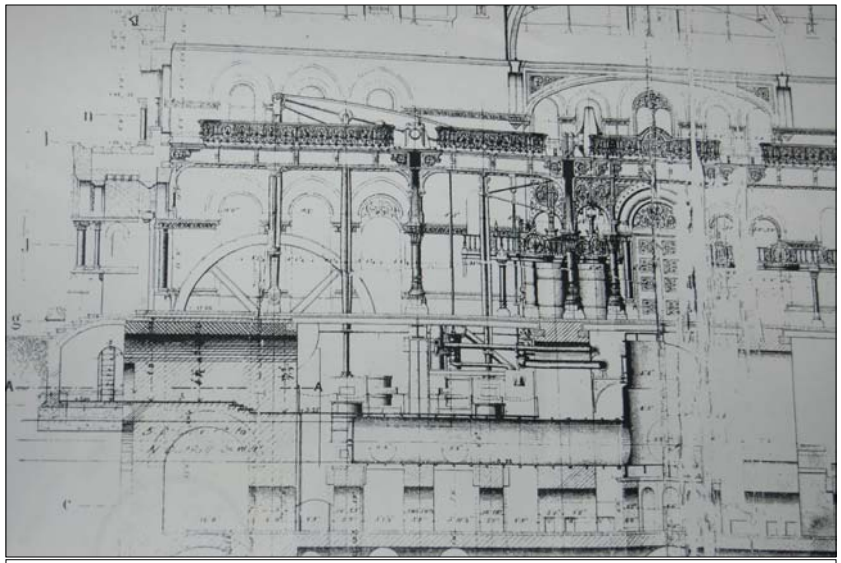


Plate 3

Plate 4

Plate 5

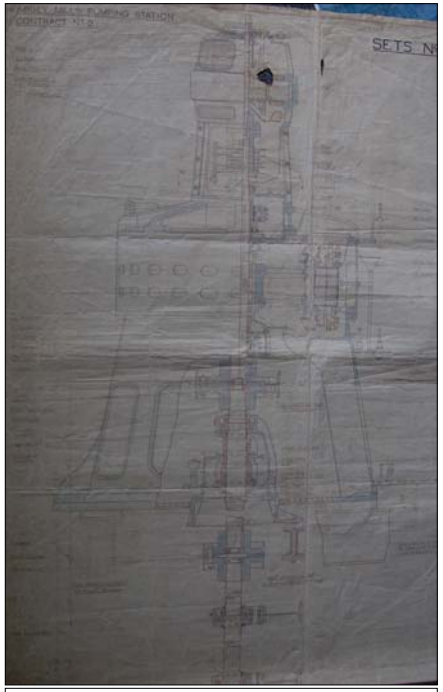


Plate 6

Plate 7

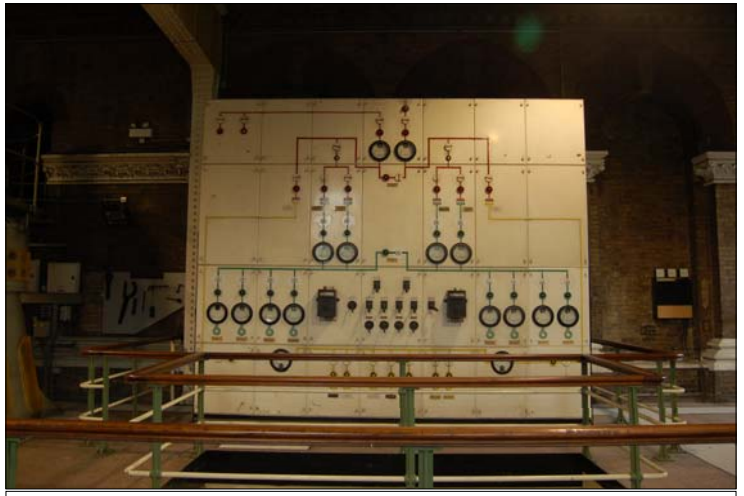


Plate 8

Plate 9

Plate 10

Plate 11

Plate 12

Plate 13

Plate 14

Plate 15

Plate 16

Plate 17

Plate 18