

Standing Remains of the  
Former Gas Works,  
Wolverhampton Road, Walsall  
Waterfront, West Midlands

An Archaeological Building  
Record. 2004

Project No. 1268  
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**Standing Remains of the Former Gas Works, Wolverhampton Road, Walsall  
Waterfront, West Midlands**

**An Archaeological Building Record, 2004**

By Christopher Hewitson

for

Advantage West Midlands

courtesy of

Johnson, Poole & Bloomer Land Consultants

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<b>Summary .....</b>	<b>1</b>
<b>1.0 Introduction .....</b>	<b>1</b>
<b>2.0 Site Location.....</b>	<b>1</b>
<b>3.0 Objective.....</b>	<b>2</b>
<b>4.0 Methods .....</b>	<b>2</b>
<b>5.0 Historical Background.....</b>	<b>2</b>
The History of Walsall .....	2
The History of Coal Gas Production .....	3
The Production of Coal Gas .....	3
The Development of the Site.....	4
<b>6.0 Description .....</b>	<b>6</b>
The Gas Retort House .....	6
The Canal Boundary Wall.....	7
<b>7.0 Discussion .....</b>	<b>8</b>
<b>Acknowledgements .....</b>	<b>10</b>
<b>Bibliography.....</b>	<b>11</b>

**Figures**

- Fig. 1:** Location
- Fig. 2** The Site
- Fig. 3** Historical Development
- Fig. 4** Gable Elevation and Cross-Section the Retort House
- Fig. 5** Elevations the Retort House
- Fig. 6** Plans the Retort House
- Fig. 7** Elevations the Canal Boundary Wall

**Plates**

- Plate 1:** The Boundary Wall and Retort House
- Plate 2:** The Retort House, South Elevation
- Plate 3:** The Retort House, East Elevation
- Plate 4:** Detail of Pipes
- Plate 5:** Detail of Sluice Doors
- Plate 6:** Canal Boundary Wall, East Elevation
- Plate 7:** View of Site from the Canal Approach

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### **Standing Remains of the Former Gas Works, Wolverhampton Road, Walsall Waterfront, West Midlands: An Archaeological Building Record, 2004**

#### **Summary**

*Archaeological building recording was carried out at the site of the former gas works, Wolverhampton Road, Walsall. The site opened as a coal gas works in 1850 and ceased production in 1895 when the site became an electricity generating station. The only surviving remains of the original gas works were the retort house. Examination of the canal boundary wall revealed three phases of development. The first phase consisted of a small section of wall associated with the early development of the gas works. The remaining two phases probably dated to the early-20<sup>th</sup> century and were associated with the conversion of the site to the electricity generating station. The site represented an important example of a mid-19<sup>th</sup> century gas works, with the retort house in particular having well-preserved building fabric with minimal alteration.*

#### **1.0 Introduction**

In December 2004 and January 2005 Birmingham Archaeology undertook the archaeological building recording of a series of standing structures that constituted the remains of the former Gas Works, Wolverhampton Road, Walsall. The work was commissioned by Johnson, Poole and Bloomer Land Consultants for Advantage West Midlands and was a condition of the planning permission prior to redevelopment of the site. The specific purpose of the project was to record the structure and, in so doing, gain a full understanding of the building fabric within the context of the building as a whole. This report outlines the architectural development of the site as recorded.

#### **2.0 Site Location**

The site was located on the south side of Wolverhampton Road, Walsall, (NGR 400650 298650) on a plot of land between the arms of the Walsall Canal and the Walsall Town Wharf branch (Fig. 1 & 2). It was latterly a showroom for Rover Cars. The site lies within the Walsall Locks Conservation Area and the retort house and boundary wall are individually listed (Walsall MBC 2004). The topography of the land sloped gently north – south away from the road before becoming flat around the waterfront area. The underlying geology of the site was grey shales of the Carboniferous Coal Measures (Litherland 1996, 2). Archaeological investigations showed the underlying soil stratigraphy was natural clays overlain by a deep build-up of made-ground of up to 2.5m (Coates 1999, 4).

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### **3.0 Objective**

The objective of the archaeological recording was to provide a permanent record of the principal upstanding architecture, specifically the gas retort house and the surviving canal boundary wall. Also, through investigation and interpretation of the building fabric, to establish the structural development of the site.

### **4.0 Methods**

The survey was undertaken to RCHME Level 3, as defined in *Recording Historic Buildings: A Descriptive Specification* (RCHME 1996), of the principal structures of architectural and archaeological interest. A measured, phased plan of the retort house and canal boundary wall were produced at a scale of 1:200. This was supplemented by recording of the principal elevations and cross-sections by use of Reflectorless EDM.

In addition to the drawn record, a referenced photographic survey was produced using digital, monochrome and colour transparencies. Interpretation of the building was assisted by written notes detailing the evolution of the structure into its final form.

The record included the external walls and roofs, noting the fabrics used and the forms of the main architectural features such as doors and windows.

The site-based recording work was supplemented by examination of historical material including maps, photographs and written documentation within the Walsall Local History Centre.

### **5.0 Historical Background**

#### *The History of Walsall*

The early history of Walsall is uncertain and the earliest reference may date back to the recording of the place name 'Walesho' recorded in a will of 1002-4 (Baker 1989, 5). The first certain reference dates to 1159, when the Henry II granted the manor to Herbert le Rous in a Royal Charter (Litherland 1996, 2). The development of the area west of the town centre had begun by the 16<sup>th</sup> century when the district of Town End was first mentioned (VCH Staffs 17, 1976, 184). However, the development of the area around the site did not occur until the late-18<sup>th</sup> century. Wolverhampton Road was initially called the road to Bentley but was turn-piked in 1748 (VCH Staffs 17, 1976, 166). The Birmingham Canal was extended to Walsall in 1799 (Hadfield 1966, 90). This coincided with the building-up of ground levels during the establishment of the town wharf. Expansion along Wolverhampton Road occurred throughout the 19<sup>th</sup> century. The present work represents the latest phase of extensive redevelopment that has occurred throughout the western side of the town.

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### *The History of Coal Gas Production*

The earliest mention of gas production from coal occurred in 1688 when John Clayton mentioned experimentation with coal distillation to the Royal Society. In 1791 Phillipe Lebon took out a patent on a 'Thermolampe' that developed gas from wood (WLHC 346.1, 6). However, the first commercial use of gas was by William Murdoch whilst working for Boulton and Watt in 1792, who lit the premises in Redruth, Cornwall. He later lit their premises in Soho, Birmingham by the same technique (WLHC P363.63, 1-2). Initially the gas used was unpurified and was dirty so the technique did not take off. However, by 1812 the first gas company was established, the London Gas Light and Coke Company. By 1815 provincial companies were established with the first in the West Midlands being John Gostlings at the bottom of Gas Street, Birmingham established in 1819 (Shill 1996, 117). By 1882 there were 500 companies operating under a private act of parliament.

Coal gas was initially used solely as a means of street lighting and its success can be directly associated with the health improvement acts of the mid-19<sup>th</sup> century that sought to improve sanitation but also improve street lighting. The invention of electric light filament in 1887 brought about serious competition to gas light. However, the invention of the 'Upright Incandescent Burner' by Baron Von Welsbach meant lighting continued to use gas for several years to come (WLHC P363.63, 5). By this time alternative uses for gas had been developed including cooking, heating and boilers (WLHC 346.1, 7). The coal gas industry also produced several by-products which were extensively used in the chemical industry. The most plentiful was coke that sold at a higher price than the equivalent coal. Other by products included tar, liquor and sulphur as well as a range of chemicals the most notable being Benzole and Toluol that was used for explosives in World War I.

The later history of the coal gas industry was defined by its nationalisation after World War II. This led to the amalgamation of production and the closing of smaller inefficient sites. The discovery of natural gas in the north sea in the 1960s led to the end of coal gas production in Britain.

### *The Production of Coal Gas*

Coal gas was produced by the distillation of coal. This was done by the heating of coal in retorts and the subsequent collection of the gas produced by a condenser. The retorts were long tubes into which the coal was placed and heated (WLHC 346.1, 10). William Murdoch initially used vertical, then inclined, and finally horizontal retorts. Horizontal retorts were long cast-iron tubes 18" or 24" in diameter, with a door at the end into which the coal was placed. These were set in beds of five, seven or nine and were heated by coke-furnaces underneath. The horizontal retorts were 'charged' by hand either through shovelling or the use of a long iron scoop. This was done every six hours in rotation to

## Birmingham Archaeology

ensure continuous production. The cast-iron retorts were later replaced by fired-clay retorts. Horizontal retorts continued to be used throughout the 19<sup>th</sup> century until they were eventually replaced by vertical retorts at the turn of the century that allowed continuous production of gas in each retort (WLHC 346.1, 11).

From the retorts the gas passed from cast-iron pipes through water which sealed the gas and helped remove the tar and liquor. The remainder of the tar and liquor was removed by a series of air-cooled pipes that acted as a condenser. The ammonia was removed by a washer of water sprays. Finally the gas passed through lime to remove hydrogen sulphide. Originally wet lime was used but proved difficult to dispose of, so dry, slaked lime was used until it was eventually replaced by iron-oxide in the 1870s.

From here the gas passed into the gas holders prior to redistribution for gas lighting. In the 19<sup>th</sup> century these were of a simple design, being a single bell (as opposed to the telescopic bells seen in modern gas holders) that overlay a pool of water sealing the gas (WLHC 346.1, 13).

A typical mid-19<sup>th</sup> century gas works would comprise a gas retort house with a series of out buildings designed for the purification process. There would then be several gas holders close to the main buildings. Especially in the West Midlands, the typical location of the gas works would be close to the canal network usually on an adjacent plot of land. This allowed ease of distribution of coal in particular. Coal initially came from local sources but the poor quality of South Staffordshire coal meant that by the mid-19<sup>th</sup> century gasworks looked further afield (Shill 1996, 117). The by-products from the industry may not have been sold locally and the canal allowed easy distribution. However, it was not uncommon to have a chemical plant associated with the gas works (WLHC 346.1, 7).

### *The Development of the Site*

The first gas works in Walsall were built in 1826 on land presently occupied by the Arboretum. However, these were deemed inadequate for the increasing demand for street lighting and an act of parliament was passed allowing the construction of a new gas works on the site on Wolverhampton Road.

*“That the gas works theretofore established and then belonging to the Town Council of the Borough of Walsall as trustees for carrying out the act of 1824 into execution were imperfect and it was expedient that new gas works should be erected on an extended scale and in a more suitable situation and that power be given to the Council to dispose of the then existing gas works and the site thereof”* (WLHC 346.1, 2).

The gas works were constructed between 1849 and 1850. By 1859 the ‘Birmingham and South Staffordshire Gas Light and Coke Company’ had joined the Walsall company in producing gas in the area. By 1875 they had both been bought out by the Birmingham Corporation. In 1876 the expansion of the gas industry in Walsall meant a further act of

## Birmingham Archaeology

parliament was passed that municipalised the gas industry and allowed the construction of a second gas works at Pleck. This was eventually to take over production of gas for the whole area. The Wolverhampton Road site eventually closed for gas production in 1895. However, it continued to operate as a gas distribution centre (WLHC P665.7, 3) and a small electricity generating station was built. By 1901 this had taken over the site (Ellis 1999, 18).

The 1887 Ordnance Survey Map (Fig. 3) shows the Gas Works at its full extent during its working life. The gas retort house stood apart from a series of buildings located adjacent to the lock. These probably survive in part in the canal boundary wall on the western side of the site. Their locale adjacent to the canal may suggest that they were warehouse buildings associated with the loading of coal. It is probable the smaller buildings were associated with the purification of the coal gas. By this period four gas holders were located on the site. Two were of similar size with one smaller and a larger one directly north of the gas retort house. Although these were roughly contemporary their varying size may reflect expansion of the gas works and its holding capacity. The adjacent Corporation Works have been suggested to have been an independent distribution centre for the by-products of the gas work, in particular the coke (Hewitson & Litherland 1999, 18).

By the 1903 Ordnance Survey map (Fig. 3) the gas works was redundant and this is reflected in the removal of the smallest gas holder and the demolition of some of the smaller outbuildings probably associated with the purification process. The retention of three gas holders would comply with the evidence that suggested the gas works continued as a distribution centre even after it ceased production. The remaining buildings within the complex probably survived due to their association with the electricity generating station.

The 1917 Ordnance Survey map (Fig. 3) suggests that the electricity generating station had expanded and taken over much of the western canal frontage. The remainder of the boundary wall construction would be associated with this expansion. The map appears to depict the demolition of the retort house. However, this would seem unlikely as the present building copies its form and location exactly. It would be more likely that this was an error during the production of the maps when the revisions included the demolition of the gas holders. It would also be probable that a coal or oil powered electricity generating station was located in the gas retort house as this allowed the well-ventilated space for the associated machinery.



## Birmingham Archaeology

### 6.0 Description

#### *The Gas Retort House* (Figs. 4, 5 and 6, Plates 1, 2, and 3)

Industrial Gas Retort House. Dated to 1850. Undecorated style. Constructed in clamped red-brick in English Garden Wall bond with recessed mortar. Blue brick decoration. Simple large rectangular plan open inside.

The southern gable façade (Fig. 4, Plate. 2) was the most visibly unaltered. It had two undecorated piers at either end. Three central segmental-arched windows (the central larger than those to the side) were flanked by two semi-circular arch-way entrances. These had been reduced in size, then blocked. The first floor had eight lunettes with blue-brick decoration arranged in three rows. A continuous blue-brick string ran along the sill line of the lowest four. Two cast-iron pipes ran from the first to ground floor and may be original fittings (Plate 4).

The principal northern façade was obscured by late-20<sup>th</sup> century corrugated-steel rendering associated with its conversion to a Rover showroom. A low, flat-roofed, single-storey office extension had also been added. The ground floor originally had a large entrance set to one side, that is now breeze-blocked and provides access to the above offices. The northern façade mirrored the southern façade with a series of eight lunettes on the first floor.

The eastern façade (Fig. 5, Plate 3) retained some original features but had been cement rendered. It had a broad central pier with panels either side and further piers at either end. Three large segmental-arched windows with cast iron casement frames were placed in each panel and on the central pier. A large modern concrete ramp designed for vehicular access ran sloped south - north and obscured much of the façade. This led to a first-floor vehicular entrance. The remnants of four original lunettes were visible in the interior but had subsequently been blocked and obscured by the cement render.

The western façade (Fig. 5 Plate 1) was largely altered but retained some original features. Constructed in pier and panel form as with the eastern façade, a large vehicular entrance dominated the centre, with a small doorway to the side. A single, original, segmental-arched window survived. The first floor was plain with a single small square window. As with the eastern façade five original lunettes lined the first floor but had been blocked and obscured by render.

The roof was of later corrugated asbestos. Sandstone coping ran along the gables. The roof structure was supported by eleven iron roof trusses (Fig. 4). These were constructed with eleven vertical iron-rods, that met a tie-beam formed by two sloping iron-rods in tension. T-beams connect from the joints at the tie-beam to the joints at the principals.

The interior (Fig. 6) of the gas retort house was open. A single later alteration had created a breeze-block office in the corner through which entrance to the single-storey office to

## Birmingham Archaeology

the north was attained. Four columns supported the thick concrete ceiling that was a later addition associated with the conversion to a car showroom and contemporary with the exterior ramp. The first floor was likewise open, a partition office being the only feature.

### *The Canal Boundary Wall (Fig. 7, Plate 1 and 6)*

The canal boundary wall was originally three phases of construction of a series of buildings that lay adjacent to the canal. Originally an inlet ran parallel to the lock providing a covered unloading wharf for the gas works. The ground level within the site had been elevated reducing the level of visible wall.

*Phase 1:* Earliest phase of build associated with original gas work dock buildings located in centre of wall. Pre-1887. Amalgam of brick techniques due to re-build with a series of eight low openings to canal. Earliest build of clamped red-brick in English bond with two original semi-circular arched openings with blue and white brick decoration on head. Adjacent were two large wood-lintel openings arranged as pair. Addition of wider segmental-arched opening with blue-brick decoration at northern end. Three late simple, wood-lintel openings represented latest alteration. All were blocked using a variety of techniques. Painted white during use. Wall height reduced and capped with cement after demolition of buildings.

*Phase 2:* Later extension to the north of buildings contemporary with conversion to electric works. 1903-1917. Pier and panel construction in machine-cut, English-bond, red-brick. Original segmental-arched window faced canal. Segmental-arched gateway entrance in surviving northern façade led to canal inlet. Two later addition openings were plain with wood-lintels.

*Phase 3:* Roughly contemporary with phase 2. Represented an extension of the wharf frontage to the canal inlet to the south. 1903-1917. Pier and panel construction in red-brick in English bond. Piers had blue-brick copping decoration. Seven segmental-arched openings, one in each panel. Four blocked but three retain sluice-style doors with cast-iron hinge mechanism (Plate 5). Single alteration to create low-opening with rigid steel joist lintel was set between two panels. Wall reduced and capped with concrete after demolition of buildings.

## Birmingham Archaeology

### 7.0 Discussion

The earliest development of the site can be directly attributed to the gas works constructed in 1850. The layout of the gas works was probably complete within the first few years of operation. The principal building was the retort house that presently survives. Evidence for its original use was limited. The form of the building was a good indication of a mid-19<sup>th</sup> century retort house. The floor space was open allowing maximum capacity for the retorts and associated coke furnaces. Evidence from the gas works at Gas Street, Birmingham suggest the retort house would have had a sunken floor, possibly up to four metres in depth (Litherland 2001, 5). In this brick arches would support the furnaces and retorts with the surrounding space allowing ventilation beneath the retort house. Ventilation was provided by the lunettes located around the first floor that were presumably open and allowed through-flow of air to cool the condensing apparatus. The presence of cast-iron pipes passing from the first floor down the exterior supported this proposition.

The truss framework of the roof was composed entirely of iron. This was typical of retort house design that demanded a fire-proof roof. The close spacing of the roof trusses and the use of iron rods in tension is an early example of the iron roof-truss being used to span large spaces. The roof itself had been replaced with corrugated asbestos. The retort house was probably converted to use within the electric works and retained much of the fabric but a sunken floor would have been in-filled. The first floor and ramp were associated with its use as a car showroom.

The location of the remainder of the plant associated with the purification process was unclear. However, a good indication was provided by the 1887 Ordnance Survey map (Fig. 3) that has several small buildings located between the gas holders and the retort house that may have facilitated this process. These were connected to several buildings adjacent to a canal inlet. The canal inlet at this period appeared to be covered as part of the construction of the canal-side warehouses. Survival of these buildings was limited to Phase 1 of the canal boundary wall. The large number of openings would have allowed coal to be directly transported from the narrow-boats into the warehouses on-site and from there to the retort house.

The remainder of the canal boundary wall is unlikely to have related to the gas works during its working life. Phase 2 and 3 related to a period of reconstruction associated with the building of the electric works. The reconstruction appeared to have occurred between 1903 and 1917. It involved the replacement of the majority of the wharf-side buildings and their extension to the north in Phase 2. Access led to the north and around the building to the canal inlet that was uncovered at this period.

Phase 3 followed shortly after and appeared to extend the wharf-side loading facilities to the south. Several openings led to a covered but open wharf-side loading area that lay outside the inlet. The sluice doors were presumably closed when coal was not being loaded.

## **Birmingham Archaeology**

### **8.0 Implications and Recommendations**

The retort house represents a well preserved and relatively unchanged example of a rapidly disappearing industrial building type. Although this does not represent an early example of a gas work complex it is significant due to its construction during a period when the industry was at its most expansive and modification in design associated with the early-19<sup>th</sup> century industry was not as prevalent. It has local significance as the oldest surviving gas works in the Walsall area and due to its presence in the Walsall Locks Conservation Area. In view of its significance it may be valid to recommend further recording of the northern, eastern and western exterior façades if the corrugated steel and cement render is removed during renovation. In the event of demolition, soft-stripping of the corrugated steel and subsequent recording of the façade will be recommended.

The canal boundary wall is probably less significant with very little of the wall relating to the earliest phase of the gas works. What does survive of this was heavily altered. Therefore no further work is recommended in regard to the boundary wall.

## **Birmingham Archaeology**

### **Acknowledgements**

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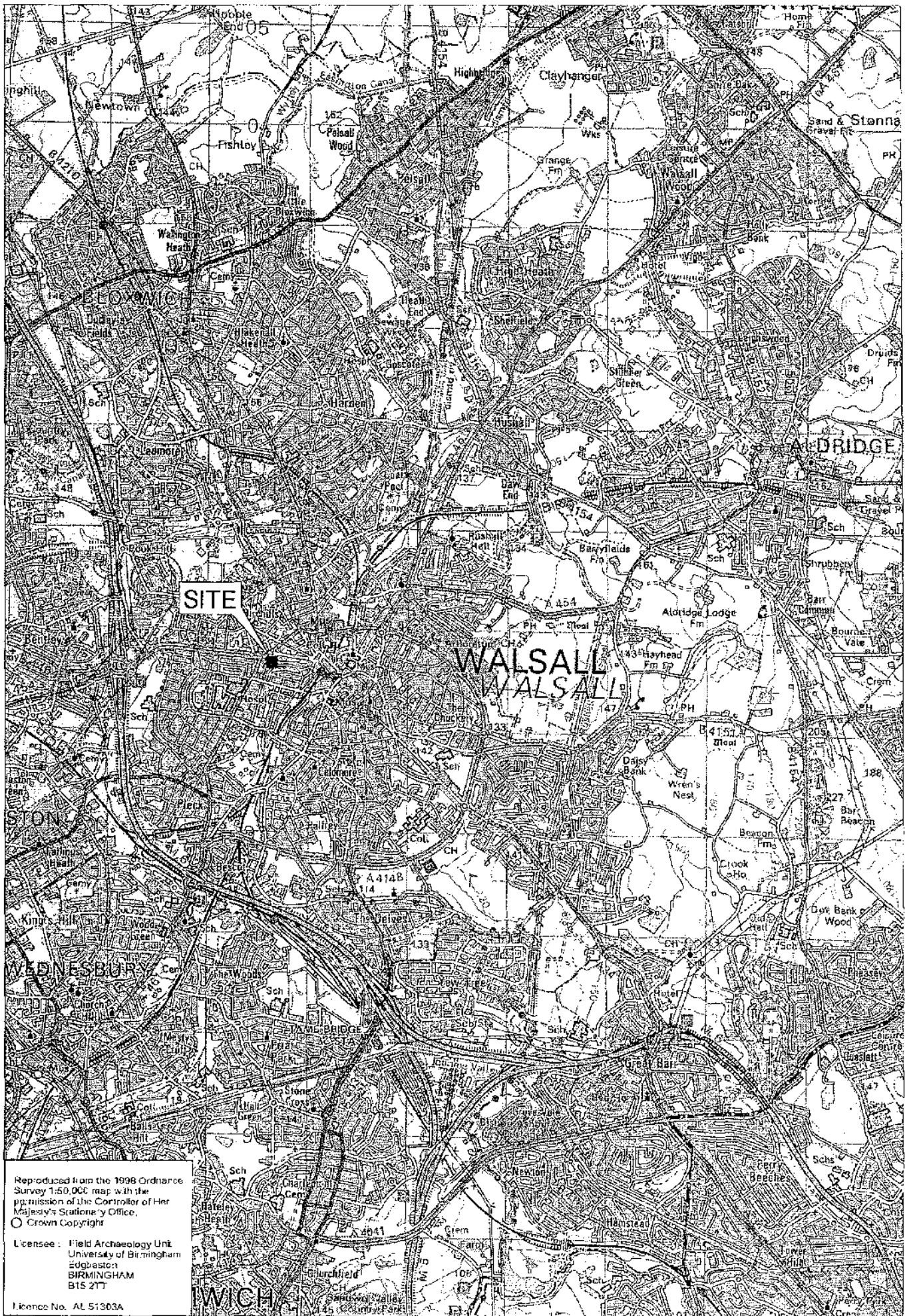


Fig.1



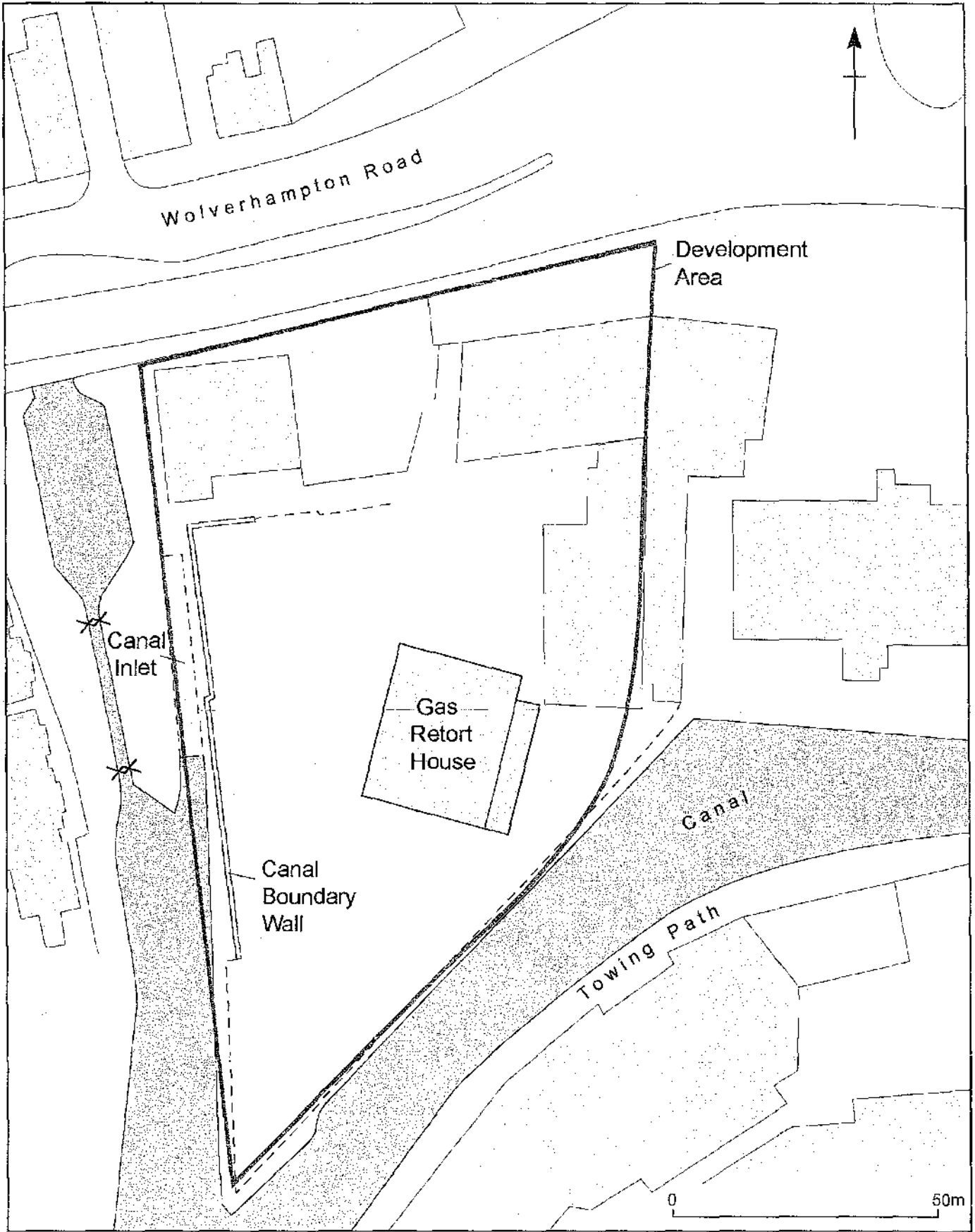


Fig.2

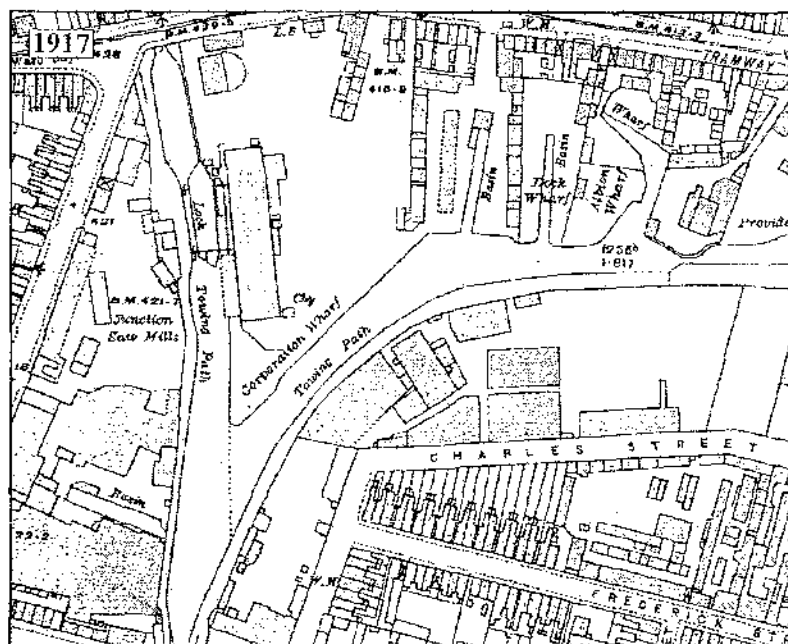
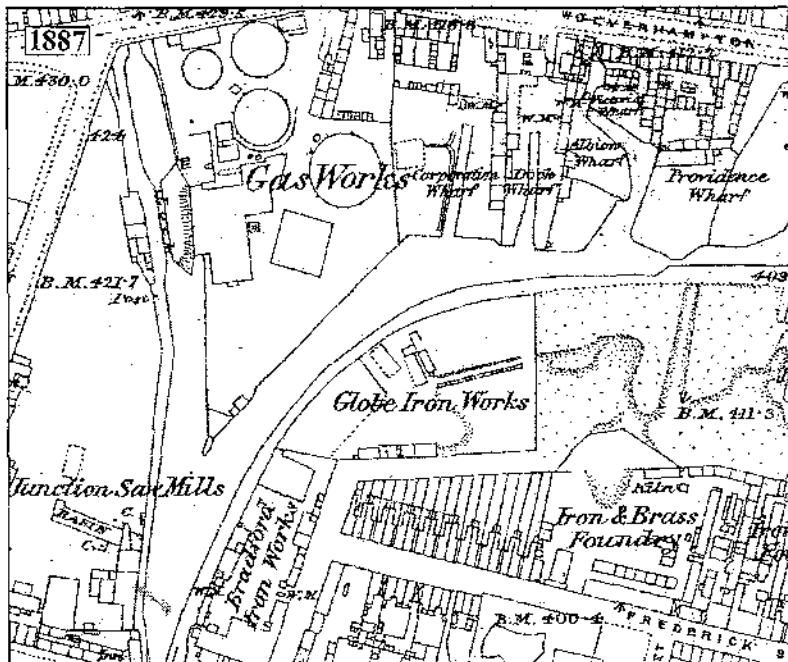
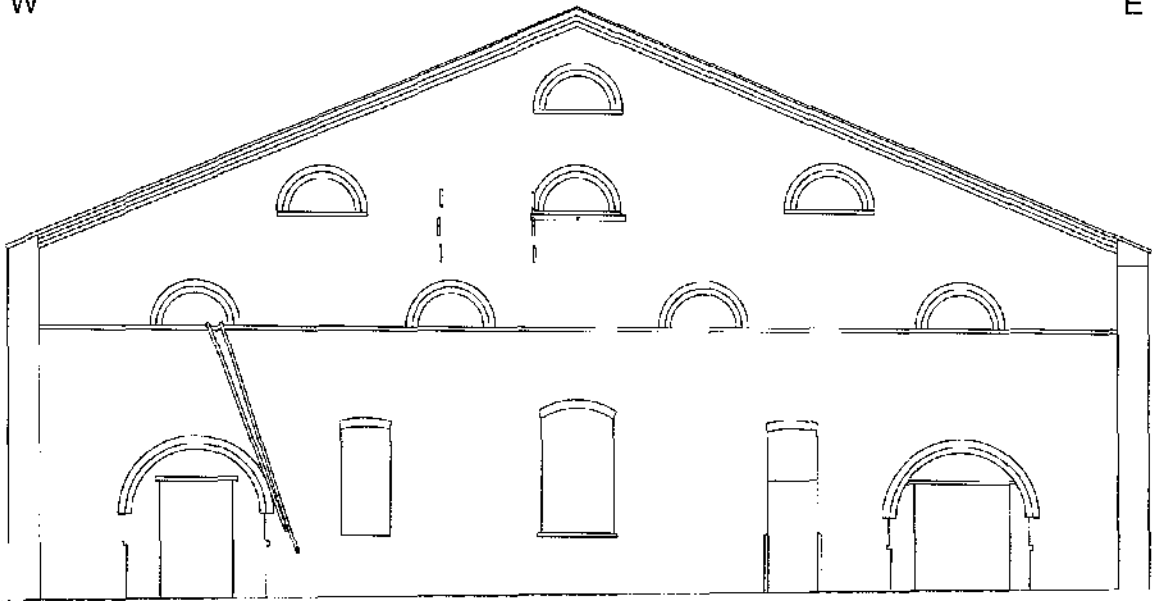


Fig.3

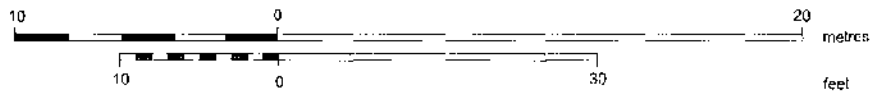
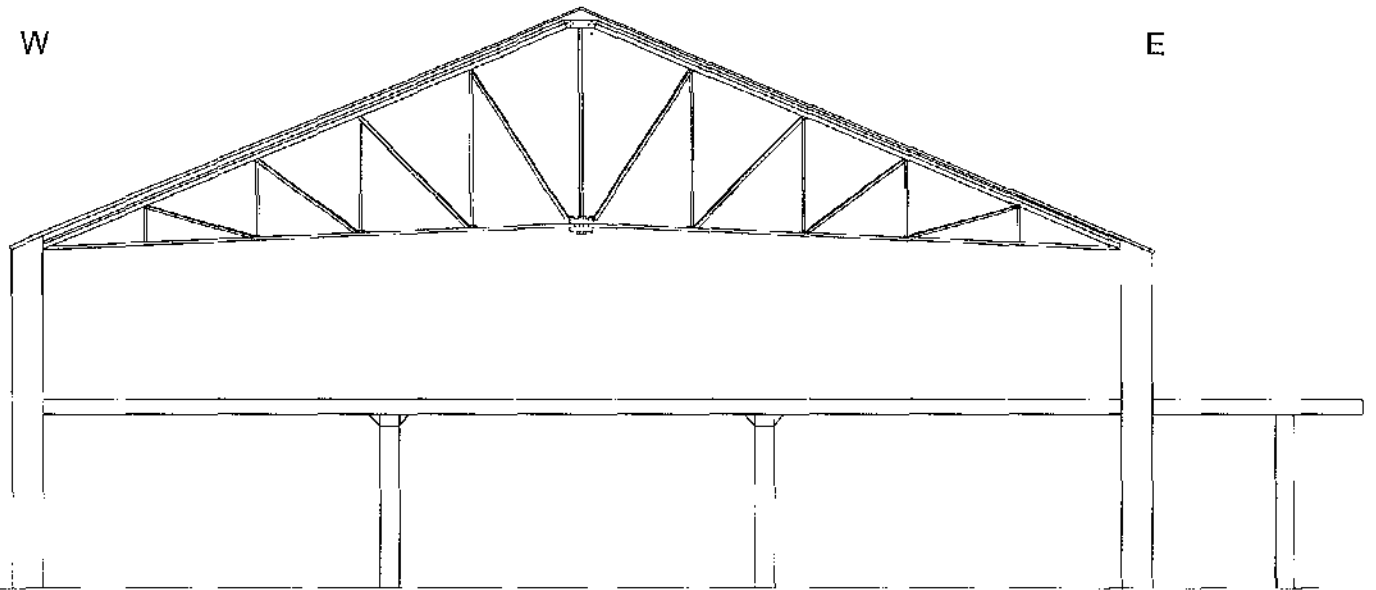
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Southern Gable Elevation and  
Cross-Section, Lexsite, Walsall Waterfront

Walsall MBC

NGR: 400650 298650

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Fig. 4

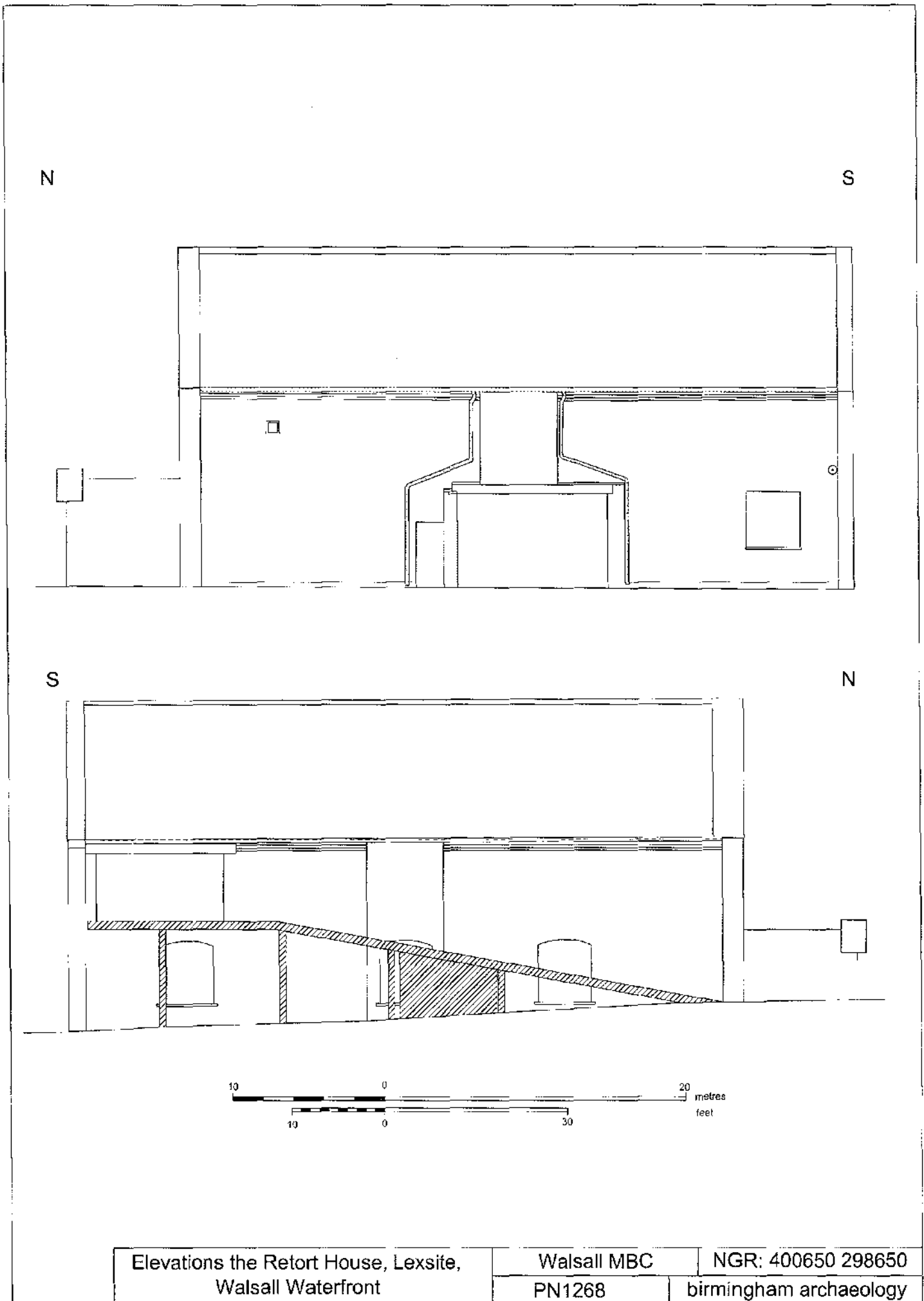
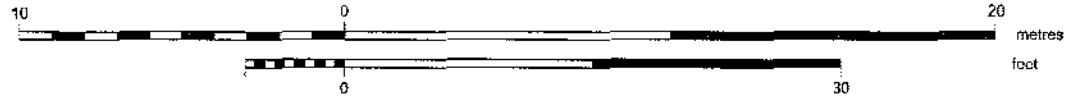
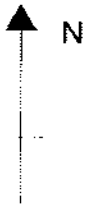
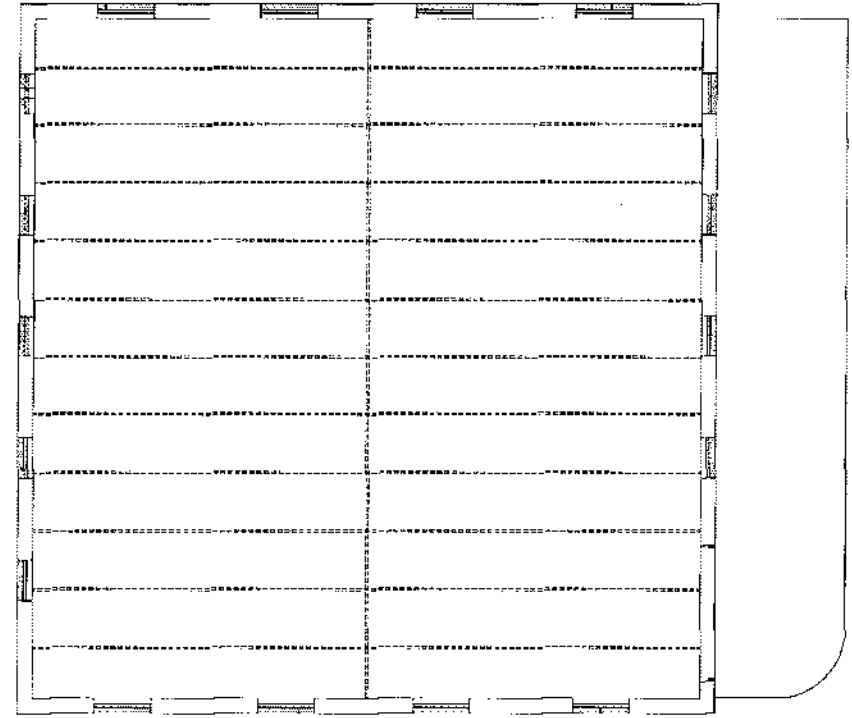
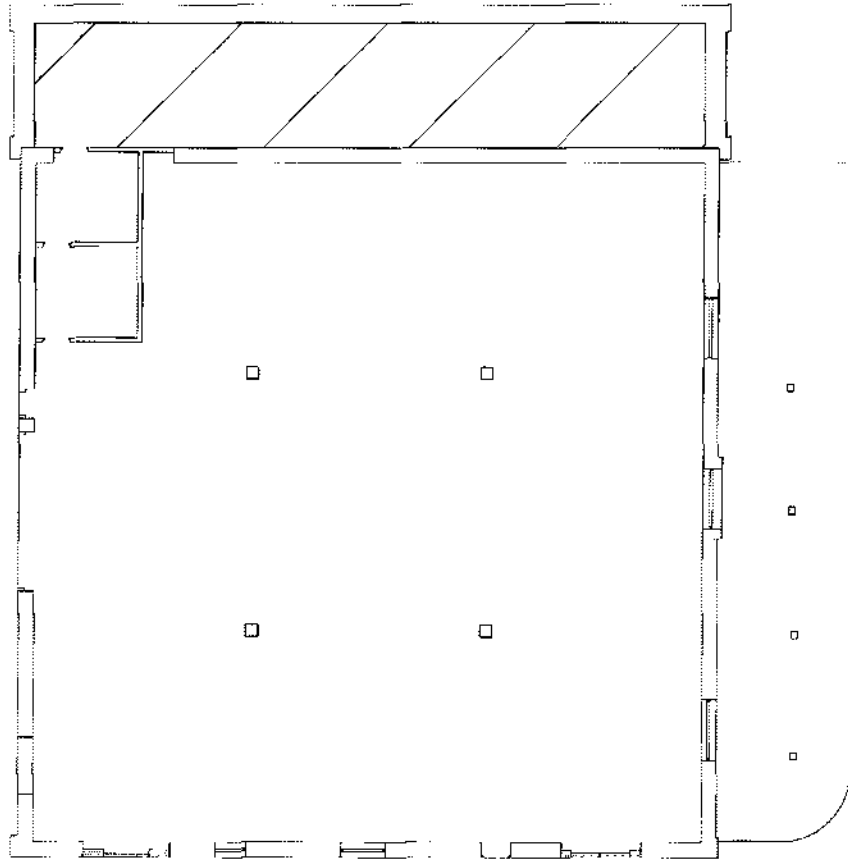


Fig. 5

Ground Floor

First Floor



Plan of the Retort House, Lexsite, Walsall  
Waterfront

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Fig. 6

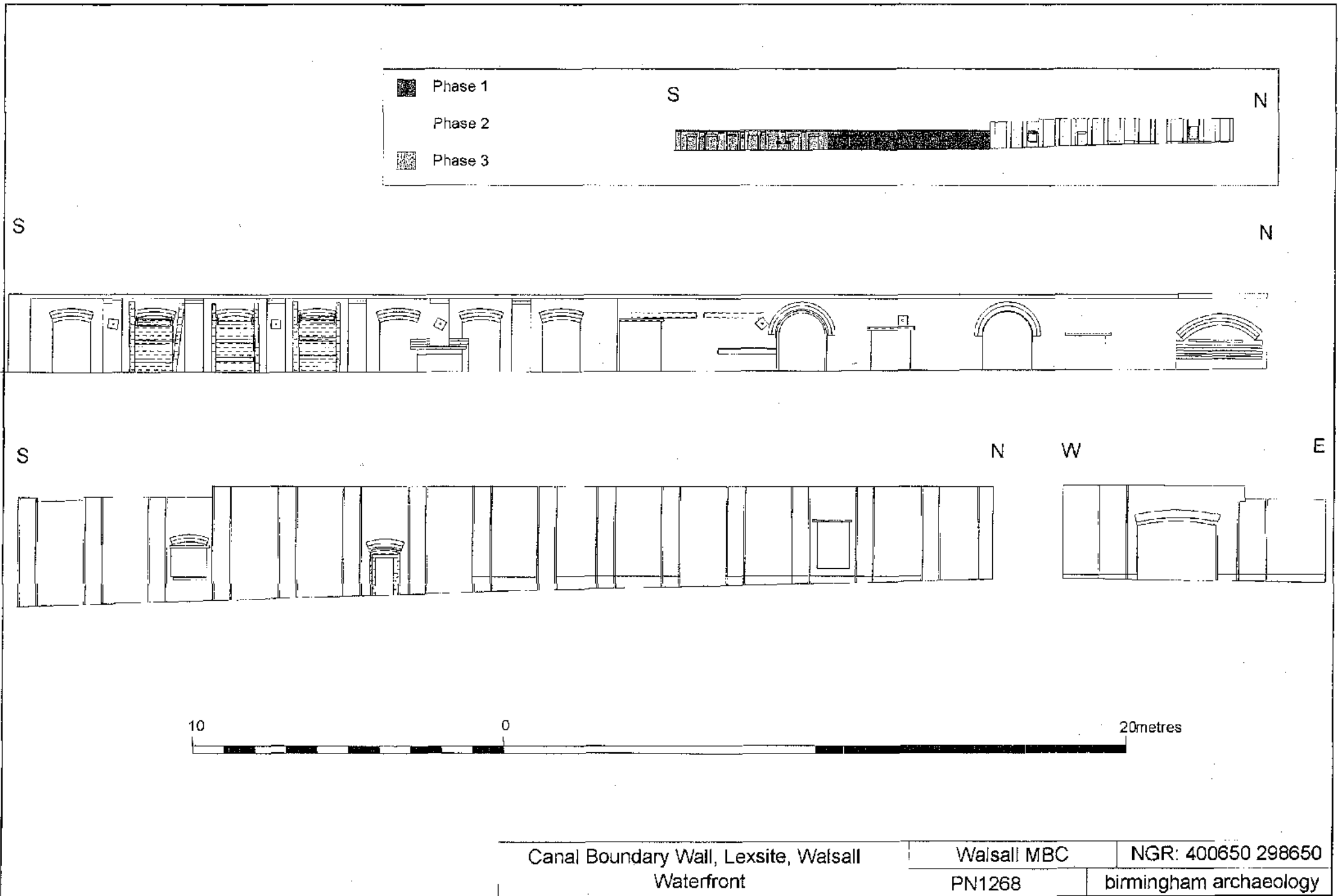


Fig. 7

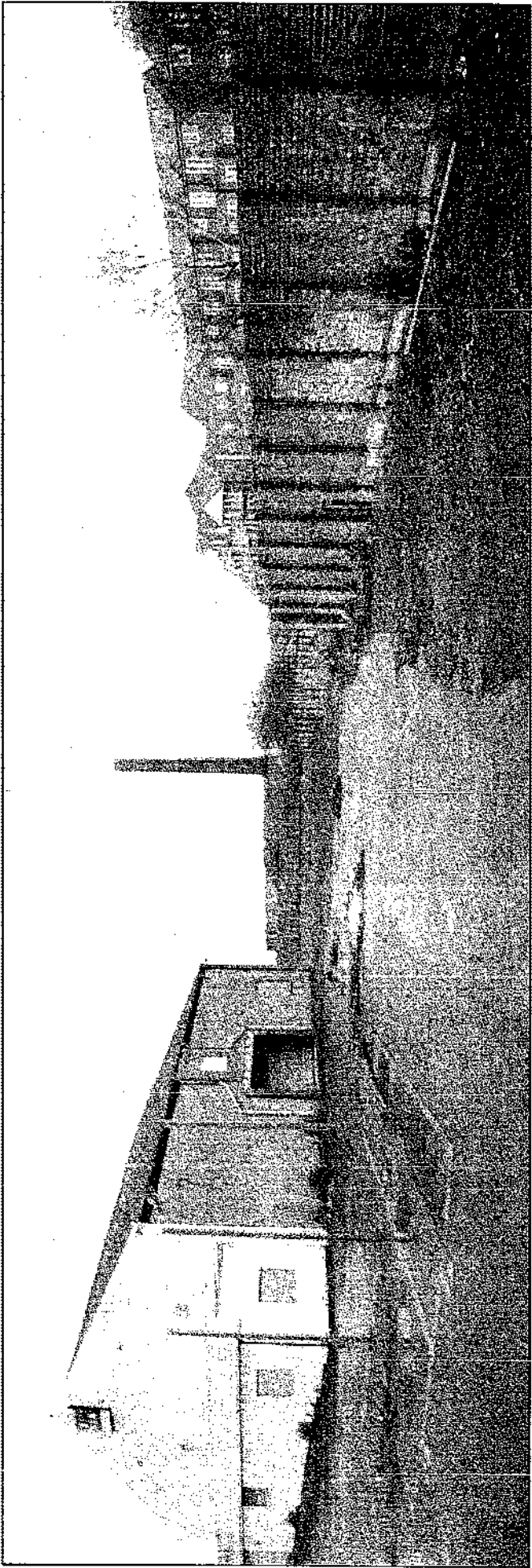


Plate 1

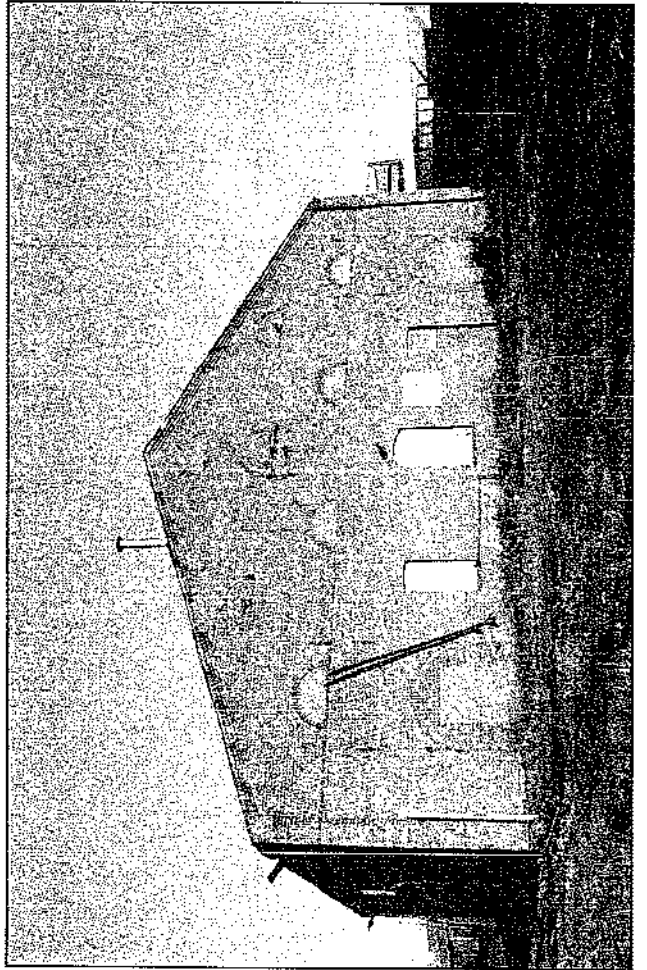


Plate 2

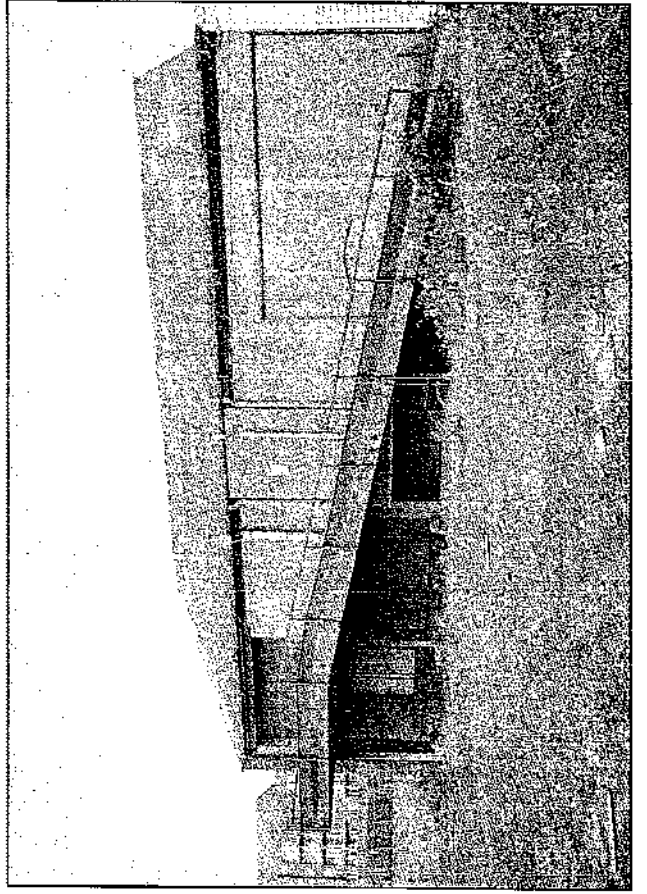


Plate 3



Plate 4

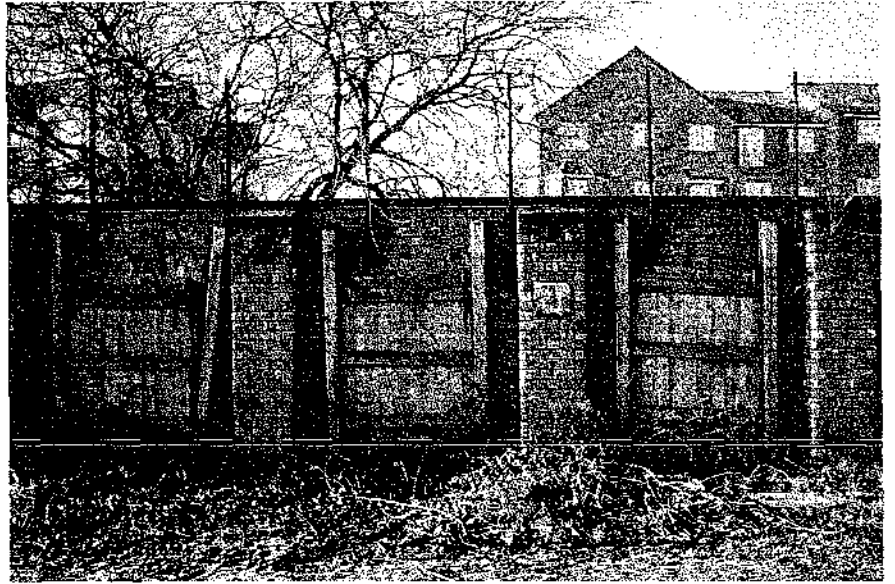


Plate 5



Plate 6



Plate 7