FORMER ELECTRIC LIGHTING STATION
ANCHOR STREET
CHELMSFORD
ESSEX

HISTORIC BUILDING RECORDING

Essex County Council

Field Archaeology Unit

January 2008

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As part of our desire to provide a quality service, we would welcome any comments you may have on the content or the presentation of this report.

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Client: Phase 4 Developments Ltd
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1.0 INTRODUCTION

A programme of building recording and archaeological monitoring was undertaken by Essex County Council Field Archaeology Unit (ECC FAU) on the former Chelmsford Electric Lighting Company's electricity generating station, which is Grade II listed, prior to conversion to office accommodation. The work was commissioned by the developer, Phase 4 Developments, and carried out in accordance with a brief issued by the Historic Environment Management team of Essex County Council (ECC HEM), who also monitored the work.

Copies of the report will be supplied to ECC HEM and to the Essex Historic Environment Record (EHER) at County Hall, Chelmsford. The archive will be deposited with Chelmsford Museum. An online OASIS record has been created at *http://ads.ahds.ac.uk/oasis/index.cfm*.

The lighting station was built to supply electricity to the town's early street lighting system. It stands on one of Chelmsford's most important 19th-century industrial sites, formerly occupied by the Anchor Iron Works and Crompton's Arc Works. None of the standing buildings are associated with either works, all being 20th-century in origin. They date almost exclusively to the dual use of the site in the early half of the century for generating electricity for street lighting and manufacturing steam vehicles. The principal extant structures, as numbered in fig.1, are as follows:

From the electric lighting station:

- engine house 1: Grade II listed structure fronting Anchor Street, built c.1902 (LBS 352610)
- Offices 2: Listed with the station and part of the Anchor Street façade

Other, mainly post-1920s structures are also present:

- Stores 3: built with offices c.1902
- Workshop 4: part of the expanded steam vehicle works, built between 1924 and 1939
- Workshop 5: another element of the vehicle works, incorporating parts of the 1902 boiler house
- Extant wall 6 to c.1902 boiler house on street frontage
- House 7, built between 1924 and 1939, incorporating part of c.1902 boiler house

2.0 BACKGROUND

2.1 Site location and description (fig.1)

Anchor Street is situated on the south-west side of Chelmsford, within an area of 19th-century town expansion between Moulsham Street and New London Road (TL 7053 0612, fig.1). The listed engine house/offices, boiler house wall and house stand on the street frontage, with the two workshops located to the rear of the plot. The surrounding structures are mainly late 19th-century brick terraced houses to the west and modern flats to the south, known as Albion Court. The flats stand on part of the former Arc Works and later motor works that fronted Queen Street.

All structures are built in brick with steel-framed roofs typical of early 20th century industrial buildings, with two formal entrances located on Anchor Street. All buildings are in structurally good order. The southern boundary wall is part of the demolished motor works. The engine house and offices were recently used as the Devon House Health and Leisure Club and were still fitted-out as such on the first building recording visit. Since closure, the interiors had suffered from occupation by squatters.

2.2 Planning background

Chelmsford Borough Council received a planning application for conversion of the listed building for office (B1) use in June 2006. As part of the broader application, the adjacent

house was to be refurbished and sold and the workshops and other buildings behind the frontage demolished.

Mindful of the possible effects on the historic integrity of the listed building and to ensure a record was made of the outbuildings before demolition, the ECC HEM team recommended a full archaeological condition to the planning permission, based on advice given in Planning Policy Guidance Note 16: Archaeology and Planning (DOE 1990). The condition also recommended an archaeological evaluation of the site in view of its location within the Roman suburb of Moulsham and position in the backlands of the existing post-medieval streetscape. The results of the below-ground work will be covered in a separate report (Allen forthcoming).

2.3 Historical background

Available surveys and secondary sources were used to provide background information on the industrial development of the site during the 19th and 20th-centuries and the importance of the lighting station and motor works to it. Cartographic and documentary research was undertaken at the Essex Records Office Chelmsford whose references in the text are prefixed ERO. The full results are presented below.

Thomas Bewley established the Moulsham Iron Foundry on Anchor Street in 1841 to produce agricultural machinery (Grieve 1994). The foundry is shown on the 1842 Chelmsford Tithe Map within a square plot extending to Queen Street (fig.2). Any surviving foundry remains are likely to lie below the listed building.

Bewley's works remained in production until the 1860s, when T.H.P. Dennis, a hydraulics engineer and former ironmonger, took over the site. He established the Anchor Iron Works shown on the first edition Ordnance Survey map of 1874 (fig.3). Rather than rebuild, Bewley's original L-shaped foundry was extended to the south-west and peripheral buildings added on the other side of an open yard. Two townhouses were built on the Moulsham Street frontage, with access to a long garden facing Queen Street. Colonel R.E.B. Crompton, an electrical engineer, joined with Dennis a year later, and in 1878 founded the Crompton & Co Arc Works (Grieve 1994). As a pioneer of the electric industry, he manufactured components for electric lighting and generation, such as arc lights and dynamos (Cocroft & Menuge 1999). In April 1890, in an agreement with Chelmsford Corporation, he replaced the existing gas lighting with 18 arc lamps in the three main streets of the town and erected 200 incandescent lamps in the surrounding thoroughfares (Booker 1974).

The scale of the works was impressive and by 1895 the Arc Works had spread onto the Queen Street frontage and extended considerably across the former yard (fig.4). Its importance cannot be underestimated, as the fledgling British electronics industry was based in Chelmsford in the late 19th-century and is perhaps one of the reasons why Marconi, the inventor of radio, established himself in the town in 1898 (Cocroft & Menuge 1999).

A fire in 1895 caused Crompton and Co. to close the Anchor Street factory and set up a new one in Writtle Road (Cocroft & Menuge 1994). The Chelmsford Electric Lighting Company took over the north part of the Anchor Street site and a 'lighting station' (ERO DB/7 Pb120) was built to power street lighting by 1902 (Kelly's Directory 1902; Cocroft & Menuge 1999). In fact, in 1901, Chelmsford was the first town in Britain to have electric public street lighting (Listed Buildings Online) and it is likely the power station was established then, set up under Crompton's influence.

In 1902, Thomas Clarkson took over the vacant Crompton buildings on the south side of the site as Clarkson & Capel Steam Car Syndicate Ltd (Crawley et al 1979), producing steam-powered buses. On the north side, a new wrought iron chimney for the boiler house was built in 1904 (ERO D/B 7Pb120). Associated crude plans and elevations indicate the boiler house contained four boilers and was a fairly low building with large doors on the west side of the Anchor Street frontage. By 1908 the Chelmsford Electric Lighting Company had been taken over or changed its name to the Electric Supply Corporation (Cocroft & Menuge 1999).

As Clarkson Ltd, the motor company developed a prototype steam omnibus chassis for the 1903 Automobile Show at Crystal Palace (Crawley et al 1979). The name had again changed by 1909 to the National Steam Car Co., with Clarkson as general manager and engineer. A timetable from 1918 shows that Clarkson was not only manufacturing omnibuses at the Anchor Street works but running a bus service in the surrounding area and into London, and providing vehicles for private hire with seating for up to 34 passengers (ERO D/F 271/10/141).

By 1919 an expanded route network was being operated by the 'National' bus company, based in Duke Street. Clarkson's involvement is likely, as his company is included in the timetable from that year for the hire of 'char-a-bancs, saloon cars and motor buses'. However, there is no mention of his company in the 1923 timetable, issued by the National Omnibus & Transport Co Clarkson's involvement is unknown this point, and with the change to the National Omnibus Co also came a change from steam to the internal combustion engine (Booker 1974).

The 1919 OS map shows Clarkson's enterprise labelled as 'motor works' and the lighting station as 'electricity works' The electricity works comprise the engine and boiler houses fronting Anchor Street and a building leading off into the yard (fig.5). The same layout is seen on the 1924 OS map (sheets 54 SW & SE, not illustrated). It is unclear whether Clarkson was still producing steam omnibuses at this stage and there are no specific references to Clarkson, but instead to a 'motor works'. It is however possible that buses and other vehicles were still being hired-out.

Between 1924 and 1939 the lighting station closed and the motor works expanded northwards into the old works. Perhaps when the National Omnibus & Transport Co. became Eastern National in 1930 (D/F 271/13/30), the site was adopted for maintaining and servicing buses for the Duke Street depot. The rear wall of the engine house was removed, perhaps to bring buses into it, and an extension built (fig.6), perhaps an awning with large folding doors often seen at surviving bus stations from the era. The front of the massive boiler house was mostly demolished and a house built in its place. Workshops 3 and 4 were built at the same time, workshop 4 being built on the south end of the offices. New access on the east side of the offices was established into workshop 3 (fig.6). From this point onwards, the history of the site is vague.

It is not clear when the motor works closed, but by the mid-1970s some, if not the entire site, was used as a garage (Booker 1974). What kind of garage is unknown, and perhaps the association with buses continued. Latterly, part of the site was used for warehousing (listed buildings online 1986). In 1987 the structures occupying the south side of the site were demolished and sold off for housing, to become Albion Court. Around this time the structures on the north side were refurbished as the Devon House Health & Fitness club.

3.0 OBJECTIVES

The purpose of the historic building survey was, as outlined in the brief (ECC HEM 2007), to provide a detailed record of the listed industrial structure and associated outbuildings. None of the site structures date to before the fire of 1895. Those subject to the survey were the listed engine house and offices of the electric lighting station (c.1902) and workshops associated with the later phase of the steam vehicle manufacture, built in the inter-war period, were recorded to RCHME level 3 standard. Other contemporary and later auxiliary structures, of lesser importance, are shown in fig.1 and mentioned in the text under the general site description and included in photographs in the site archive.

In addition, the survey was required to consider the following: plan form of the site; materials and method of construction; building chronology, development, modification and phasing; function and internal layout; surviving fixtures and fittings; and relationships between the standing structures.

4.0 DESCRIPTION OF RECORDING WORKS

Each of the standing buildings was assigned a number and referenced to the phased block/location plan (fig.1). Copies of the architect's drawings were supplied by the client and used as part of the survey to produce annotated floor plans and sections through the listed structure. External and internal architectural descriptions were made and the function of each building was assessed. Any evidence of later adaption or change of use is included in the appropriate description and discussion.

A series of photographs (digital and 35mm black and white print) were taken to record the buildings. Specific shots were taken of any areas of important architectural detail, fixtures or fittings. A representative selection of all photographs is reproduced at the back of the report as plates 1-28. The remainder can be found in the archive.

In the case of the main building, much internal character and fittings had been lost when the power station became a gym, and subsequent use by squatters had affected the interiors. Contractors were on site to clear the buildings, starting with the ground floor of Devon House. Some modern partition walls had already been removed for machine access. The other parts still contained partitions and fittings from the gym which are included on the plans and some of the photographs as a record. However, a second visit, undertaken after the main building had been stripped out, was able to record early features in the fabric, thus providing a better idea of the industrial structure, which was the aim of the survey. Photographs are included in the report from both stages, although a true impression of the works was only properly gained from the subsequent visit, from which most of the plates are included. The two workshops at the rear of the site were recorded to a lower level during an archaeological evaluation by ECC FAU to investigate the site's Roman and industrial 19th-century past.

Research was undertaken at the Essex Records Office to understand the origins development and importance of the site. Existing surveys and secondary sources were also examined (section 2.4). For ease of reference, the site and Anchor Street are described as aligned east to west in the following text, although truly SE-NW.

5.0 HISTORIC BUILDING DESCRIPTIONS

5.1 General description

No buildings remain that relate to either the Arc Works or Anchor Iron Foundry, and the following descriptions only relate to the surviving buildings of the electric lighting station, which was an electricity generating station built for the specific use of powering street lighting.

The lighting station complex is located on the frontage of Anchor Street and consists of the engine house 1, offices 2 and building 3, perhaps a contemporary store attached to the end (fig.1). A later, yellow-brick house (6) is attached to the west wall of the engine house and further along are remnants of the frontage wall of the station's boiler house, now forming part of the site boundary (7). A modern electricity sub-station and toilet block are located behind the wall, neither of which were recorded in the survey. The main entrance into the site is located in the north-west corner, off Anchor Street, with another immediately to the east of the offices, now boarded off.

Workshop 4 stands in the south-east corner of the site, behind the offices. Adjoining to the west is the buttressed outer wall to Clarkson's original steam bus works, forming the southern boundary with Albion Court. Further along to the west is workshop 5, opposite the main gates. The hardstanding areas between the buildings were recently used for car parking to the gym and are laid over the remains of earlier industrial structures encountered by ECC FAU during the archaeological evaluation of the site (Allen, forthcoming).

The main historic structure is built from yellow mass-produced stock bricks in lime mortar, typical of utilitarian buildings of the late 19th to early 20th-century period, blending in with the yellow brick terraces to the west of the site. The internal walls are mixed with reds. Against this, later walls of red and Fletton brick in hard grey cement can easily be recognised. The red brick walls are probably contemporary with the gym, but the Fletton walls appear earlier, post-dating the power station and contemporary with the expansion of the motor works in the second quarter of the 20th-century.

5.2 **Electric lighting station** (engine house 1, offices 2 & ?stores 3)

The lighting station is dated to c.1902 and the surviving elements comprise the engine house, offices and possible stores. To the west of the block stood the boiler house, now demolished, containing four large boilers to power the turbines in the engine room. There was a tall brick chimney in between. The office block on the east side of the site may have

been the head office of the Chelmsford Electric Co., but is more likely to have had a different or combined function, as there are obvious linkages to the engine house on both levels.

The main subject of the survey is a tall square building, brick-built in 9 inch 'imperial' yellow stocks with orange brick and terracotta dressings. The engine house part is six bays long with twin glazed double pile north-light/slate roofs on an angle iron frame, originally built single-storeyed with gables to west and east. Its rear brick wall has been removed and the present wall is inserted between vertical steel girders. The office range is contemporary and probably originally functioned as an ancillary structure, e.g. switch room, accumulator room, pump house, or a combination. It is now a two-storeyed structure with a shallow 25º pitched slate gabled roof hidden behind a pediment facing the road (plate 1).

5.2.1 External description

The north side of the complex presents the prominent elevation facing Anchor Street. Its decorative façade and association with the preceding Arc Works site are the two likely reasons for its listed status. In contrast, those elevations away from the road are remarkably plain and utilitarian. External descriptions are already included in the RCHME survey (Cocroft & Menuge 1999) and List description.

On the north elevation (plate 1), the structure stands on a high blue-brick plinth finishing in a sandstone sill band with pier and panel walling above to the engine house and plain walling to the office block. The main entrance is located on the fourth bay of the engine house as a pair of doors surmounted by a wooden glazed fanlight. A second, smaller doorway is located in the west bay. Tall iron-framed windows in each of the six bays light the large internal working area. Each has a terracotta semi-circular arched head, fluted keystone and red brick imposts and terracotta aprons. The lower panes of the windows were painted over when the gym first floor was added and the interiors boarded. The sill to the eastern bay of the engine house was raised when the gym was established to allow an additional entry point.

The two-storey office range (plate 1, left) has cambered-headed widows to each of the three bays. A central office door has been blocked in to form a small window. Twin projecting brick bands run along the top of the office and engine house. Above, in the engine house, sandstone ball finials top each of the piers, with another placed on the segmental arched pediment above the main entrance that also contains a brick keystone (plate 2). A swept pediment with sandstone copings completes the office range. The glazing of the north light can be seen on the roof of the engine house.

Much of the twin-gabled west elevation (plate 3) is either hidden by the later house, or painted over in white, perhaps showing the height of the demolished boiler house. A fire escape has been fitted to the south gable and modern windows for toilets. However, above the modern fire door is a blocked bearing box for line-shafting between the engine and boiler house. To the left of the door is a rebuilt area where the brick chimney stood. The pediment appears to have been rebuilt on the south gable, or else simply repointed. An oculus window in the shorter gable, to the north, is blocked.

The rear (south) elevation (plate 4) is far less decorative and has been rebuilt, as part of the motor works, after the lighting station closed in the inter-war period. Tall steel uprights define five bays. The ground floor is built from a thin Fletton wall punctuated by wide iron casement windows. The upper level is covered in corrugated iron sheeting, fixed to an outer timber/board frame with brieze block inner wall, apparent on the second visit (plate 5). There are two modern wooden casements. The brickwork on the two pediments and walls facing the yard has been disturbed, probably when the extension/awning, apparent on the 1939 map (fig.6), was removed. The neatly-tiled roof is viewed without a pediment on this side and there are two wooden triangular ventilation louvres either side. Two others sited on the north roof were also observed from this side. Some small single storey structures of relatively late date extend from the east and form a block with workshop 4.

On the east side of office range 3 (plate 6), the wall contains later iron–framed Crittalls casement windows in each of the four bays. Sills and frames are painted a light green and there are some rebuilt parts under the sills but no architectural detail. The eastern gate post has the same moulded head as those on the pediment above. There is no opposite gate pier and the workshop that once stood on the other side of the entrance has been replaced by modern flats.

5.2.2 Engine house: internal description

The engine house was built as one tall, large open space to contain turbines and other large pieces of generating machinery. As such, it had little in the way of internal ornamentation or decoration.

It is assumed that when the lighting station closed in the early 1920s, this equipment was removed so the building could be used by the steam car works. As buses were primarily being made, such a tall building would make a useful assembly shop once the back wall was taken down. Between the closure of the works, post-1940, and the establishment of the Devon House gym, the building is thought to have been used as a carpet warehouse.

Subsequently, as Devon House, a first floor was added and internal partition walls inserted for different areas of the fitness club (retained in grey in figs.7 & 8). On the ground floor, the front part (heavy gym) was lined out in boarding and mirrors, obscuring the front entrances and window bases, which were only revealed after the first strip. The rear was converted to a training room and bar area, with associated stores. Staircases were inserted in the north-east corner of the engine room, leading off from a new entrance at the front. On the first floor was a second bar and large seating area, with mirrors on the back wall. The old engine house floor was screed leaving no evidence to indicate the former positions of plant or other features. The partition wall between engine house and offices is occupied by areas of disturbance/rebuild, blocked doorways and 'windows' and some evidence for line-shafting mechanisms, methods of power transferral over large distances, though these could date to the later use of the building by the steam car company.

Although an artificial division, the two floors of the former lighting station are described separately, but should be viewed as one in the industrial context of the building. In the descriptions, an emphasis is placed on the remaining industrial fabric rather than its later use. This is reflected in the choice of photographic plates which are mainly taken after the stripping out of the gym. In many cases it is not clear whether existing door openings are original or inserted. Apparent blocked windows are evident on first floor level with the office range, which are puzzling and would suggest the offices were later in build, but may be associated with removed internal staircases and observation points into the main area. New openings, fire doors, etc., have been inserted on the east wall where the boiler house once stood.

Ground floor

The ground floor is presently divided by an inserted load-bearing wall to carry the heavy 6 x 19 inch steel ceiling joists of the gym floor above. The area to the north (heavy gym) is open plan with a concrete screed floor. Two pairs of vertical steel joists pass from floor to ceiling to support the roof valley (plate 6). On the road elevation are two pairs of ledged, battened and braced doors, concealed, along with the lower parts of the windows, by boards and mirrors during the life of the gym. The central green door (plates 7 & 8) is the main entrance to the engine house, partly blocked by Fletton brickwork. A narrower set of doors stand in the north-west corner. On the west wall is a blocked doorway that connected the engine room to boiler house, observed from inside house 7, after the walls were stripped of plaster (fig.7). Similarly, on the opposite east wall, there is a blocked doorway leading into the office area and an area of disturbed brickwork (fig.7), that were seen only after the office walls were stripped (see section 5.2.3).

On the south (training room/bar) side (plate 9), most of the partition walls had been stripped out by the time of the second visit, giving a much better understanding of space. The south wall is constructed in 4 inch Fletton brickwork, with brick piers supporting the steel frame mentioned in section 5.2.1 and seen from the car park (plate 4). The inclusion of steel-framed windows confirms a likely 1920/30s date for the rebuilt south end, presumably around the existing steel frame. The windows are the same Crittalls type as those on the eastern side of the office building. There are several blocked apertures against the office building (fig.7) which were recorded on the office side (see section 5.2.3)

First floor

The first floor remained as one open space during the time of the gym, used as a social area. The south side, as defined by the roof bays, is 3m wider than the north side at 10.3m. On the first visit, seating units occupied most of the floor, with a large bar along the west wall (plate 9).

The main features are the steel supportive trusses and wide, naturally-lit roof spaces, (plates 10-14). The light angle-iron roof structure (fig.9) is in two parts, supported in the centre by pairs of 6 x 10 inch bolted vertical steel girders rising from the ground floor. These are braced in the middle and tied in by a horizontal section with a central piece rising to a long girder spanning the length of the building. Secondary horizontal members, to secure the building longitudinally, originally passed on the shoulders either side, but were cut through when the first floor was inserted (fig.8). At either end of the central trusses are brick-formed supporting arches, sat upon brick piers that extend down to the ground floor (plates 7, 13 & 14). Several other features can be seen in the end walls. Again, those on the east side comprise blocked windows and areas of disturbed brickwork in most cases better seen from inside offices 2 (fig.8). There is a high blocked square aperture at its south end that lines up well with another on the opposite west wall and may have once housed a bearing box. In their day, these would have held overhead line-shafts to power band-driven machinery run off an engine. Such machinery could have been associated with either the power station or car works, perhaps more likely the latter due to its height. A larger blocked aperture is located just over the modern fire escape on the west wall (plate 3), but it is unclear what this represents. A large expanse of rebuilt brickwork and render between this and the steel valley joist (plate 13) marks the position of the former brick chimney located in the gap between the west wall and the boiler room. This is also seen externally (plate 3).

The north wall presents an attractive array of long iron-framed arch-headed windows, with a wider wooden-framed one over the main entrance forming a ‘sunbeam’ fanlight over the main

entrance (plate 12). This window is fixed and is a central showpiece. The iron-framed windows either side tilt open at the top (plate 15) through cord activation on the original working floor below. Either side of the windows, the bays are represented by relatively grand moulded pilasters (plate 11). Their flat heads would seem to have carried part of the structure, a horizontal steel girder perhaps to tie in the verticals. However, none is evidenced from the brickwork at either end and such a feature would also be an obvious visual impairment to the main façade,

The south wall, which is rebuilt, is plain and functional; completely different to the frontage. Here the wall is formed from four 5 x 10 inch steel joists, made from 1.6m lengths with 'winged' heads and ramped tails (plate 16). They are positioned out of line with the metal trusses and moulded pilasters on the front wall. Each of the lengths are bolted together and tied internally by a bolted horizontal section (fig.9). The main walling material is clearly modern, with brieze blocks on the inner face and a lightweight wooden frame/boarding on the outer set into the rebates, onto which the external cladding was fixed (fig.9). This was only revealed once the interior was stripped and cladding removed. The pre-cast wings on the outside may have held the rear awning/extension, and there is a single bolt left *in-situ* to hint at this, but are assumed to be contemporary with the power station.

The roof is carried on bolted angle-iron trusses held in tension by long horizontal iron rods (fig.9). The north lights are arranged in three sections, two rows of which have been boarded in at the front and one row in the valley (plates 11 & 12). The south-facing roofs have been plastered on the inside and the roof vents blocked.

5.2.3 Office range: internal description

The office range is so-called in the List description (1986) and the RCHME report (Cocroft & Menuge 1999) and its ordered two level exterior gives that impression. But, as mentioned in section 5.2.2, it is likely to have had a closer association to the functioning of the lighting station. Indeed, direct linkages between the two suggest a close association with the chain of electricity production. The walls are thinner in this structure, containing machinery/apparatus of a smaller scale than the turbines in the engine room.

On both levels, there are blocked window apertures on the partition west wall of the office range, which is puzzling and initially suggests the office range was built afterwards, which is unlikely given the harmony of the street frontage. Placed off-centre, they are likely to be observation points onto the working floor, perhaps from a gantry or else to bring light in from the engine room north windows.

It was only after the interiors were stripped and gym features removed (partitions, showers, etc) that a better understanding of the office building could be achieved. Therefore most of the plates are taken from the second visit, after the internal walls had been stripped.

Ground floor

As part of the gym, the ground floor of the office range was divided into a sauna and exercise room at the front and showers and WCs at the back (fig.7). Modern fluorescent lighting, sauna room and plain door architraves and skirting boards are contemporary gym features. The original ceiling joists were boxed in (plate 17).

Various windows, doorways and disturbed/rebuilt areas were exposed after the strip on both floors, contemporary with the works, and these are shown in fig.7. They show a high degree of interaction between the two areas and are interpreted as observation and access areas and places where machinery or apparatus has been removed from the walls. Most of these features were recorded on the office side of the west partition wall only, beneath the plaster. Beginning at the south end (plate 19), the wall shows a blocked segmental-headed aperture, similar to windows on the front of the engine house, but slightly narrower, next to the stairs. Behind the stairs is a blocked flat-headed door, proving the staircase is a later insertion, related to the reuse of the buildings after the lighting station closed.

Below the stairs and continuing past the inserted red brick wall, is an area of rough brickwork (plates 19 & 20), perhaps where wall-mounted equipment or machinery has been removed and 'made good'. Moving further northwards, into the next room, a blocked portal and doorway were uncovered (fig.7, plate 20). The portal would have been used as a feed for cables or otherwise. A further, gym-era, doorway at the north end of the offices has been blocked in after the strip (plate 20). In the northernmost corner stands a rainwater down pipe, showing that water was collected and pumped back into the boilers to produce steam for the turbines.

The original tripartite windows on the street frontage have a main central sash (with 'beehive' fixtures) and narrow side sashes (plate 18). Those on the east wall are steel-framed Crittalls casement windows (detail of window shown on plate 21) inserted in or after the mid-1920s, which would correlate with the closing of the lighting station and expansion of Clarkson's works. Concrete lintels and sills are sited above each of the windows on both floors. The sills are covered in 4 inch earthenware tiles, common to the period. The windows have flat frames curved latches and sliding handles to the casements (plate 21). Interestingly, the casements only open on the right side. There is no evidence of earlier windows.

Above, in the ceiling, the recently-exposed paired steel floor joists have been cut into the walls either side, laid on concrete pads, and filled-in with mixed brick and grey cement. The joists are contemporary with the insertion of the first floor, lath and plaster ceiling and stairs to the car works, perhaps to provide first floor office space in the mid-1920s to 1930s period.

First floor

The top floor was decorated like the gym floor below, but after the strip, the brick walls and steel joists were exposed. Again, the partition wall with the engine house has blocked features, namely two windows toward either end (fig.8), one of which was later cut through by a modern connecting door into the gym rest area (plate 14). The windows may have served as observation points from a gantry set around the machinery (though this is likely, there is no evidence for one) in building 2 or simply as a means of bringing light into the area that was only lit initially at the front.

A yellow English-bonded brick partition wall divides the third and fourth bays and includes the stair opening (fig.8), set within a low re-pointed segmental headed arch (plate 22). The wall is contemporary with the floor insertion and stairs. Two inserted doorways through the wall date from the gym alterations.

The ceiling has been stripped away to expose the roof frame which is of king post strut form (fig.10) and initially open to the floor below

5.3 Stores 3

Most recently used as a crèche for the gym, this is a single storey structure with a gabled, partly glazed roof. Its original use is unknown. The frontage on the east side conforms to the main office build of English-bonded brickwork and Crittalls windows (plate 6) and is likely to be contemporary in construction and alterations. Direct entry was gained from the engine house through a wide doorway, since partly blocked when the gym was in use (fig.7; plate 19, left) and offices. The floor is screed and the roof frame of light construction on a small steel joist ridge piece. No fixtures or fittings of pre-gym use remain.

5.4 Workshop 4

A single-storeyed open-plan workshop stands to the south of building 3, facing onto the later eastern Anchor Street entrance. Both are part of the inter-war development of Clarkson's works between 1924 and 1939. It is built in pier and panel in English-bonded Fletton bricks underneath a gabled corrugated asbestos roof (plate 6). The wall remnant to a larger demolished Clarkson workshop is still evident along the yellow brick wall of the neighbouring

new development to the east (plate 6). Inside, workshop 4 is a light metal roof frame and a fixing plate of some sort at the south end, below the ceiling (plate 23, centre). The 'reception' building (fig.1) to the east is contemporary and of similar build, but not entered, while the unnumbered 'office' building is wholly modern.

5.5 Workshop 5

Again, this building dates from the expansion of the works in the inter-war period, when the lighting station was incorporated into the car works. It would appear to have been built on one level as a workshop, with vehicular entry on the west side and a gabled corrugated asbestos roof. Two metal roof vents fitted to the ridge (plate 24) provided release points for gases and fumes produced by activities below (welding, machinery, etc). Later on a first floor was fitted and fenestrated on both levels. The building was subsequently incorporated into the gym as a second 'heavy gym.'

Its location, scale, style and wall fabric suggest its build incorporates part of the old c.1902 boiler house. The east elevation provides the best detail, showing English-bonded rough sooty yellow stock bricks, much the same as the more recognisable boiler house wall remnant fronting Anchor Street as building 7. A large entrance is sited on the east end wall with blocked flanking segmental headed windows (plate 25). It appears that elements of the boiler house walls to west, east and south were raised when the workshop was built and only its north wall built entirely new (plate 24). Indeed, the side and rear walls are thicker than the front, at three rather than two bricks wide. Thick walls were favoured in boiler houses in case one of the boilers exploded.

The workshop faces the main site entrance and the north elevation fenestrated in Crittalls windows on both levels (plate 24), similar to those in the refitted office range, but with regular 'clawed' opening fixtures. These were probably added after the first floor was inserted.

Inside, there are seven bays defined by brick piers and steel ceiling joists and a late concrete ground floor (plate 26). The upstairs has been divided into offices/WCs either ends of the gym training area. The angle iron roof trusses are fairly typical, and there is a glazed section on the south side of the roof. The fact that the brick piers discontinue on the first floor provides proof that the walls were raised when the workshop was erected. No boiler house or workshop fixtures remain on the walls.

5.6 House 6

The house (plate 3) is to be retained and refurbished as part of the development. Good effort was made to blend the house in with the power station when it was constructed between 1924 and 1939. However, the red brick dressings are plainer and the brickwork more basic, in cavity wall bond.

5.7 Boiler house 7

House 6 was built on only a small part of the lighting station's boiler house site, that originally extended across to the terraces on the other side (fig.5) and as far back as Albion Court at the rear of the site as workshop 5. The roadside wall largely screens a modern electricity sub-station and small inter-war toilet block (fig.6). As a low single storey structure, it probably retains its original height, with the roof removed and the top of the wall capped. An iron vent is the only visible feature (plate 26).

6.0 DISCUSSION

The history of the Anchor Street site is short but complex and the structures recorded in the survey belong to two main phases of relatively late industrial activity that post-dates the Arc Works: the 1902 electric lighting station and the subsequent expansion of Clarkson's steam car works/motor works in the inter-war period, between 1924 and 1939. Subsequent development of the site is unclear, but there are mentions of a garage on the site in the 1970s and later on, a carpet warehouse, as well as the gym from the late 1980s. These changes have blurred the immediate understanding of the site's character in the early part of the 20th-century by obscuring the spatial layout and internal relationships between the principle surviving buildings. However, an effort is made to piece the evidence together into a coherent phasing of major site development.

Pre-1902

The study has confirmed that no above-ground remains of the former Anchor Iron Works or Crompton's Arc Works survive. However, archaeological trenches within workshop 5 recorded footings of former Arc Works buildings (Allen forthcoming).

Electric lighting station (c.1902-late 1930s)

The early power stations generated their electricity from coal and consisted of a boiler house (and chimney) where steam was produced and an engine house where steam was fed through to run the turbines to produce electricity. Other necessary elements in the chain

before the electricity was delivered were accumulator rooms, switch rooms and pump rooms (as water was needed as a coolant), often separate to the engine room. One or all of these may be sited in a separate building or part of the main building. The Anchor Street works is bound to fit into this generic picture, but with so much alteration it is difficult to pinpoint functional areas other than for the engine house and the largely demolished boiler house. It is the RCHME survey that refers to the eastern bays beneath the swept pediment as 'offices' but in reality, any of the functions listed above may have been housed here. It is certainly puzzling that there are ground and first floor windows on the office frontage originally built as a single floored structure, perhaps only with a gantry or walkway on the higher levels. Blocked windows in the wall between the offices range and engine house are also odd features but in this context would balance out the natural light in this part of the buildings and could perhaps be used as observation/communication points into the main working area, which would not be unusual. Nor would it be unusual to combine different functions into the end part of the building.

It is clear that every effort was made to construct an impressive street frontage to the lighting station. However, far less attention was given to the side and rear walls. The east office wall had plain brickwork and no windows (but probably some form of ventilation), let alone fancy embellishments. Very little is known about the rear south wall that was rebuilt later on the same position. All that remains of the original fabric is its steel framework. No evidence remains of brick walling or cladding, nor the location of doors or other fixtures. It is however, unlikely to have been built open-sided. Building 3 is contemporary with the main structure, but is an entirely different building whose function remains unknown, but may well have been used as stores for components and tools.

Expansion of motor works (mid 1920s-late 1930s)

After the lighting station closed, between the above dates, the motor works expanded into the north side of the site. Steam traction was out of favour by 1920, with the local bus company at least, but for a firm specialising in steam omnibuses, the engine house offered a large working area with a high ceiling. At this stage, it is believed, the rear (south) wall was removed between the steel frame and an awning probably added to carry a large folding door set on wheels for ease of entry. At the same time a first floor, partition wall and stairs were added to the office range, probably creating 'offices' for the first time. Windows and doors through into the engine room were blocked and equipment stripped out. The east wall of the office range was fenestrated for the first time. Bearing boxes were blocked.

New workshops were built across the rear of the site, one of which (building 5) incorporated parts of the old boiler house that was demolished at this time. A small, later 'reception' building was constructed, as well as WCs, behind the surviving boiler house wall at the front.

The post-war period

Recent history of the site would benefit from further research. It is not clear whether the 'motor works' shown on maps is the same as the garage reported in Booker in 1974 and whether either had an association with buses. The facts are that in this era the rear of the old lighting station was rebuilt in Fletton brick and blockwork and clad externally in corrugated iron sheeting.

In 1987 the site was divided again when the south part, the original Clarkson's works, was demolished and redeveloped as Albion Court. Soon after, the Devon Health Club was established on the north side, replacing a carpet warehouse. Whether all the old lighting station buildings had been used for warehousing is not known, but they were reutilised and refitted as training rooms and gym areas in the new form. A small modern office was built alongside workshop 4. Latterly an electricity sub-station was built, re-engaging the site with its power-generating past in a small way.

7.0 SITE ASSESSMENT

The former electric lighting station in Anchor Street is an outstanding example of an early power generating plant, whose pier and panel construction, long windows and north light construction is typical of large industrial buildings of the late 19th and early 20th centuries. Its well-built, quite elaborately decorated facade and association with Crompton has ensured a grade II listed protection.

The first electricity station was established by Ferranti in Deptford in 1889 and in the next 20 years almost every town in Britain had its own power station, provided either by private companies or municipal authorities (Buchanan 1980). Street lighting had developed from small generators powering arc-lights from the 1850s, but by the end of the century, as confidence grew in the new industry, street lighting became more common. In 1901, Chelmsford was one of the first towns in the country to have public street lighting installed.

Late 19th-century Chelmsford was an important centre for the pioneering new industries, especially the early electronics industry, with good communications and proximity to London

and plenty of available land. Crompton's Arc Works at Anchor Street was a pioneer in the manufacture of electrical components from 1878 and Christy Brothers had diversified into electrical engineering by 1895. Precision steel bearings were being made by Hoffmans after 1899 in their multi-storey factory in New Street. The town's early involvement in the electrical industry is likely to have contributed to Marconi establishing his business in Chelmsford in 1899 (Cocroft & Menuge 1999).

The survey has recorded an important site for the study of the early 20th-century development of electricity generation for street lighting in the context of a developing industrial town. As the site today reflects the extent of the historic lighting station site, the study was able to produce a record of a complete entity, an uncommon opportunity. It was also able to document an important survival from another industry pioneered in the late 19th-century, the steam omnibus, a relatively short-lived industry, largely superseded by the internal combustion engine by the 1920s. Through Bewley's Moulsham Iron Works to the Anchor Street Works, Crompton's Arc Works and Clarkson's steam car works, the study shows the complexity of well-used industrial sites whose fabric and character can change considerably over short periods of time within a changing commercial environment.

Below-ground remains relating to other, now demolished, elements of the Arc Works, Iron Works and Lighting Station are likely to be present on the site. Archaeological investigation as well as documentary/cartographic reconstruction therefore has potential to further the understanding of the use and development of this highly-important site in Chelmsford's industrial past.

ACKNOWLEDGEMENTS

Thanks are due to the client, Phase 4 Developments, for commissioning the works and supplying architect's drawings. The assistance of staff at the Essex Records Office is also acknowledged. Fieldwork, recording and photography were undertaken by the author. Illustrations were prepared by the author and produced by Andrew Lewsey. The site was monitored by Teresa O'Connor of ECC HEM on behalf of the LPA.

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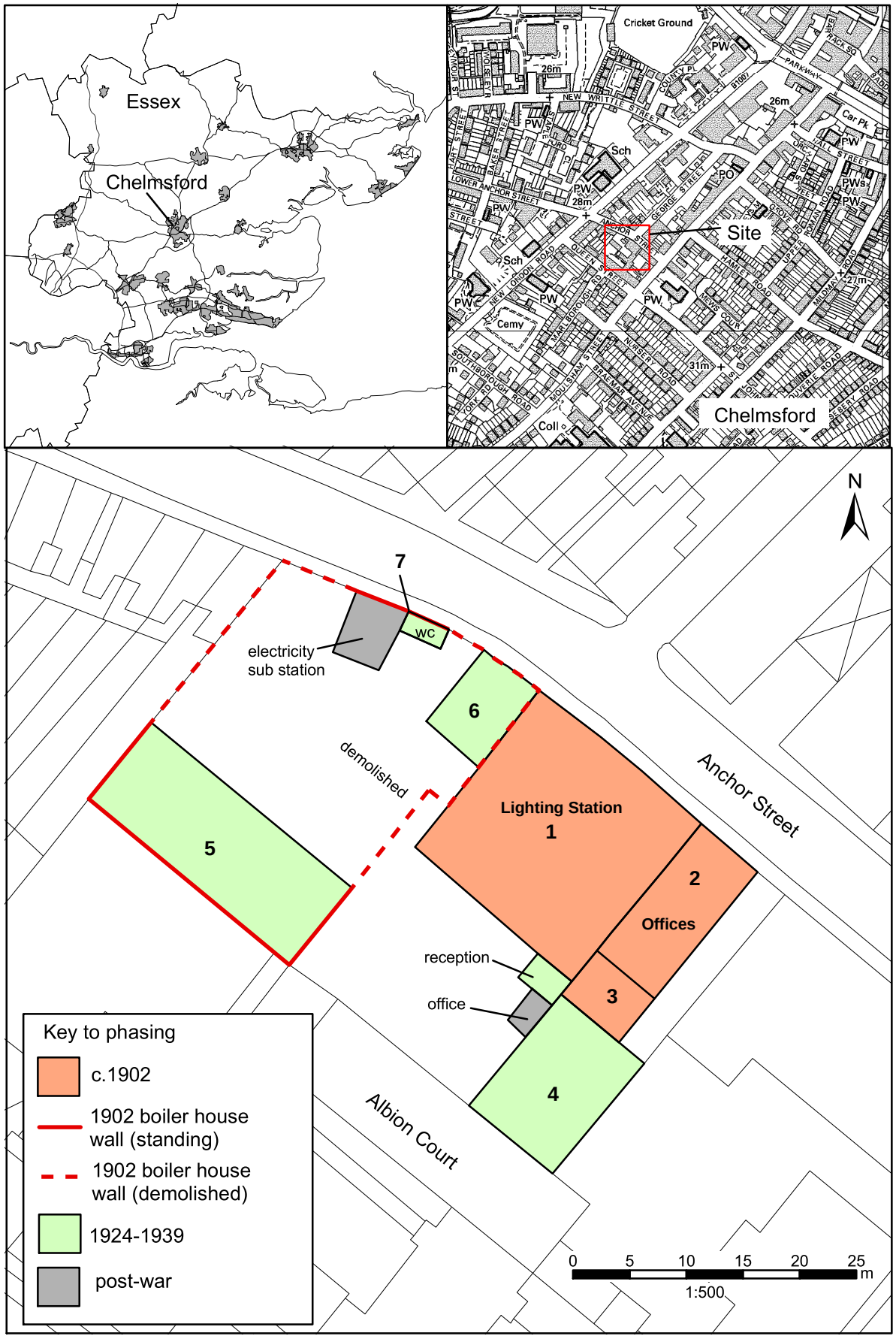

Fig.1. Site location and phased block plan

Essex County Council
Field Archaeology Unit

Fig.2 Bewley works shown on Chelmsford tithe map, 1842 (D/CT 72A)

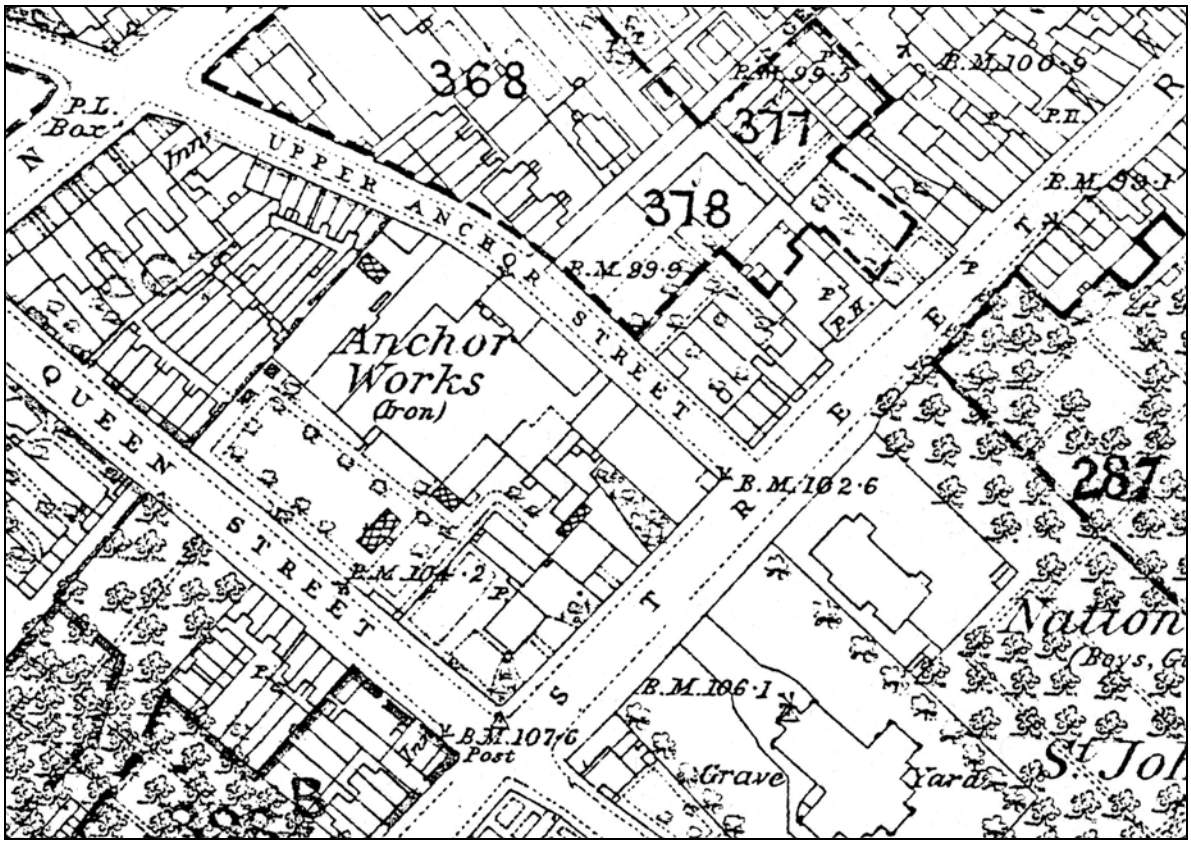

Fig.3 Anchor Iron Works from First Edition OS map, 1874 (sheet 52/8)

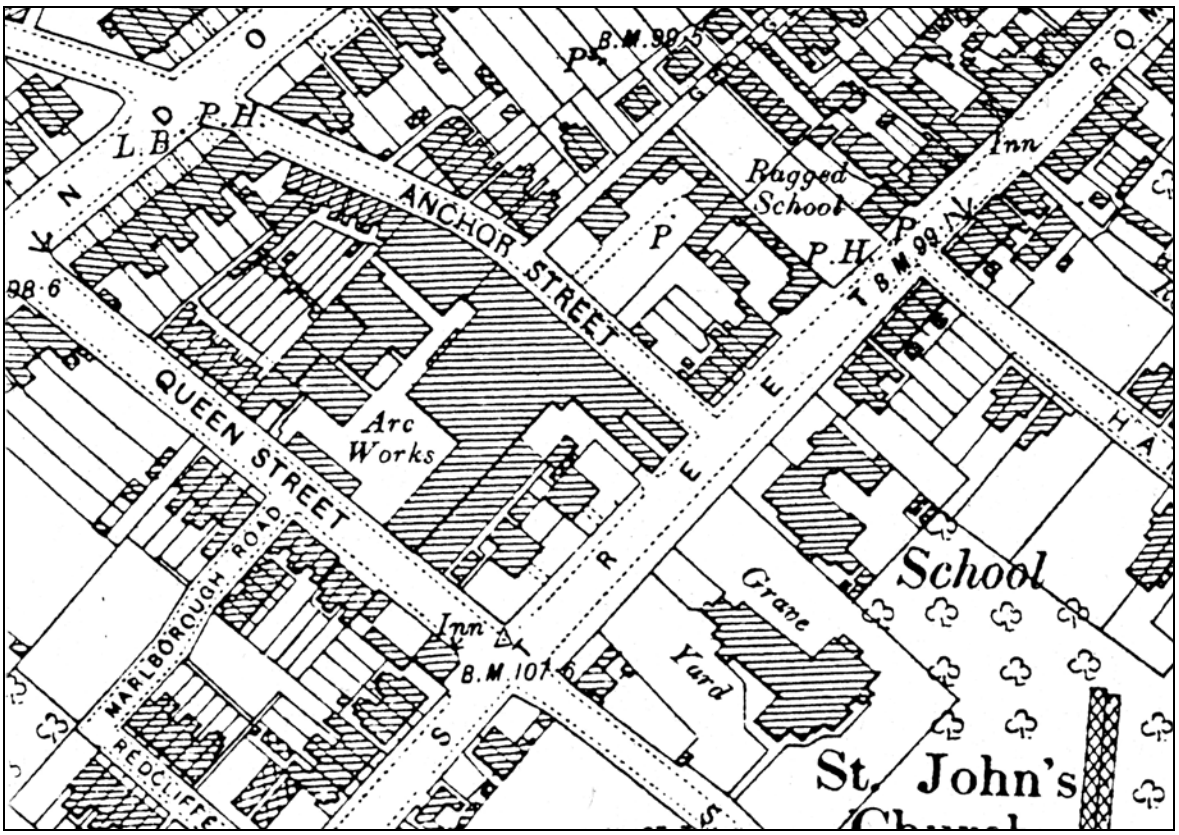

Fig.4 Crompton's Arc Works shown on Second Edition OS map, 1896 (sheet 52/8)

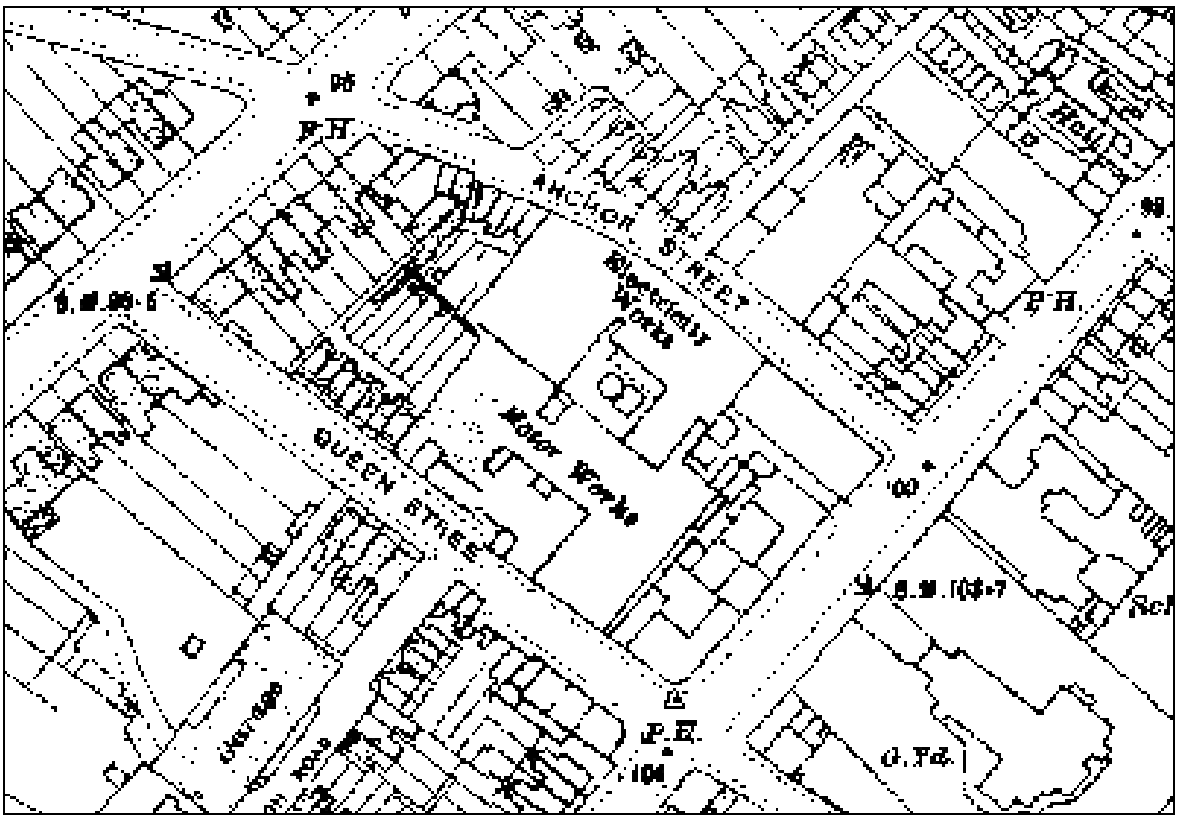

Fig.5 Generating Station and Steam Car Co. from New Series OS map, 1919 (sheet 54/15)

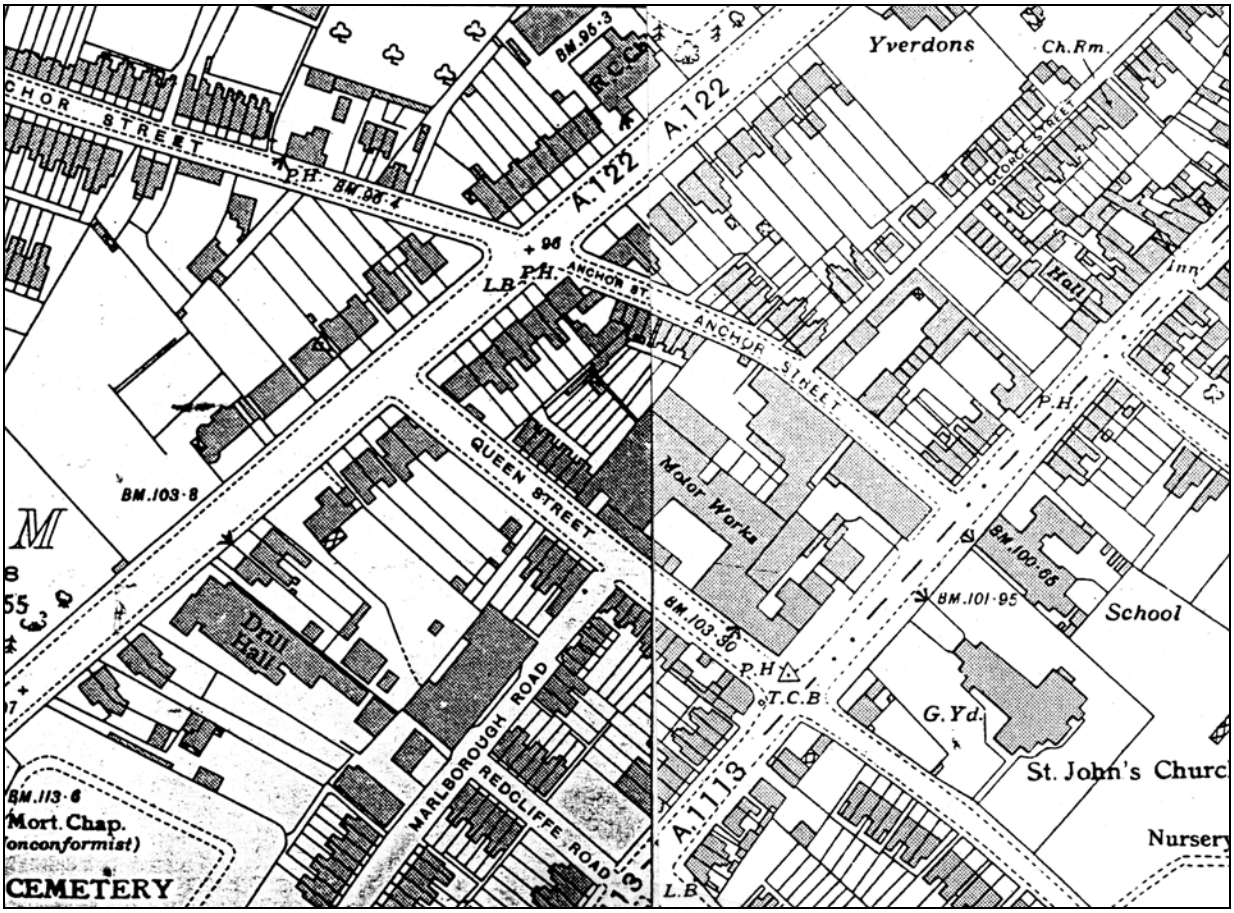

Fig.6 Motor works from New Series OS map, 1939 (sheets 54/14 & 15)

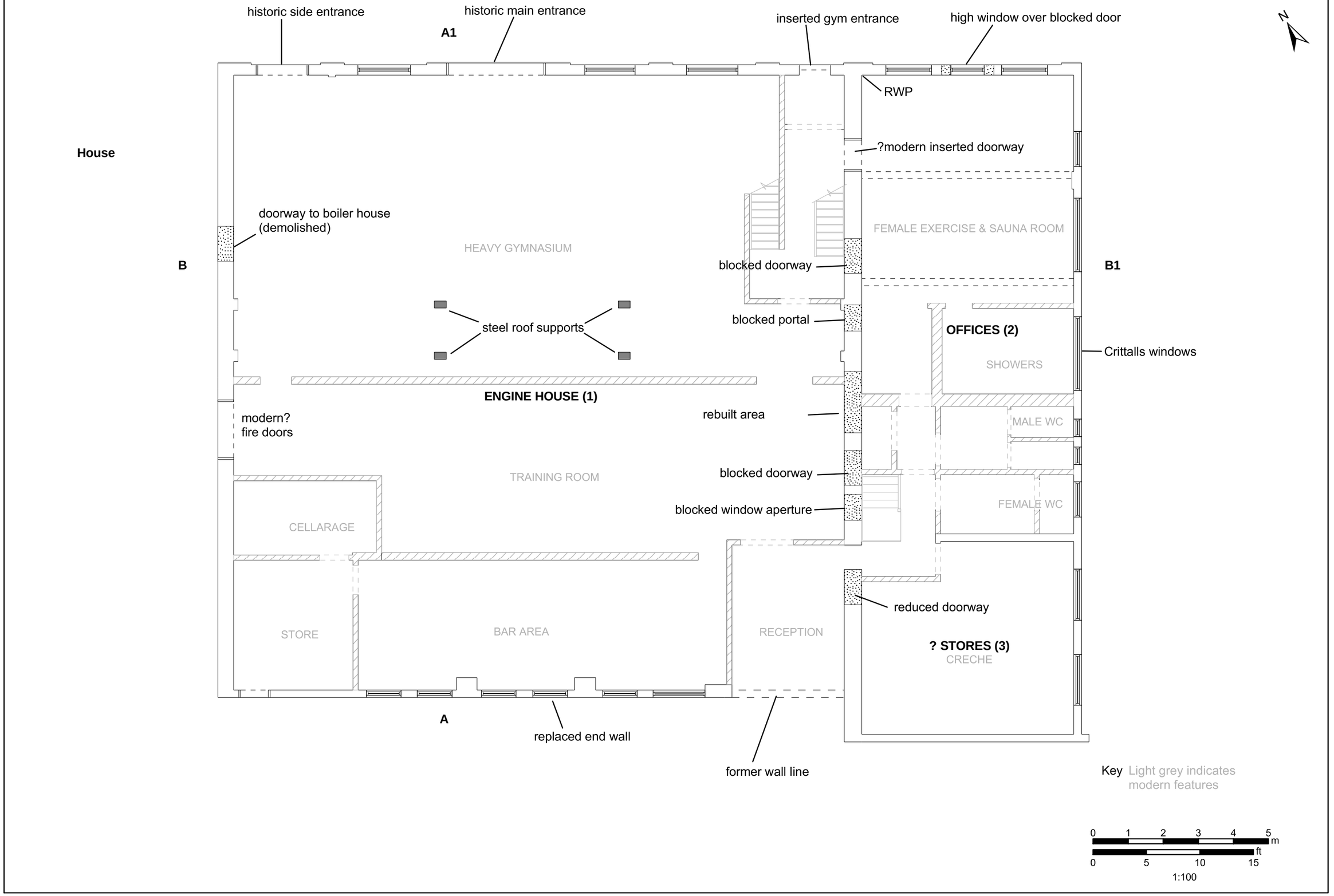

Fig.7. Ground floor plan of Lighting Station

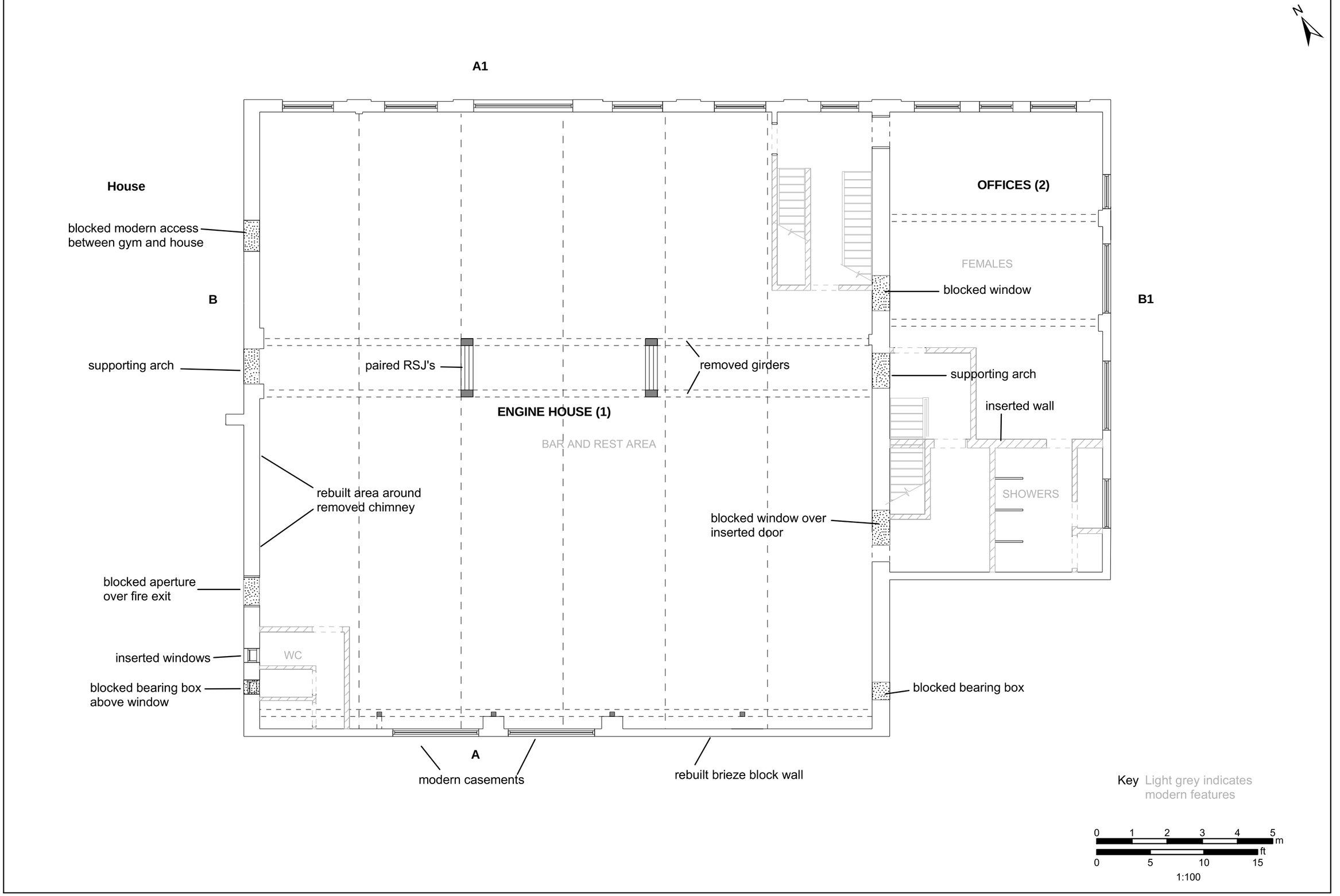

Fig.8. First floor plan of Lighting Station

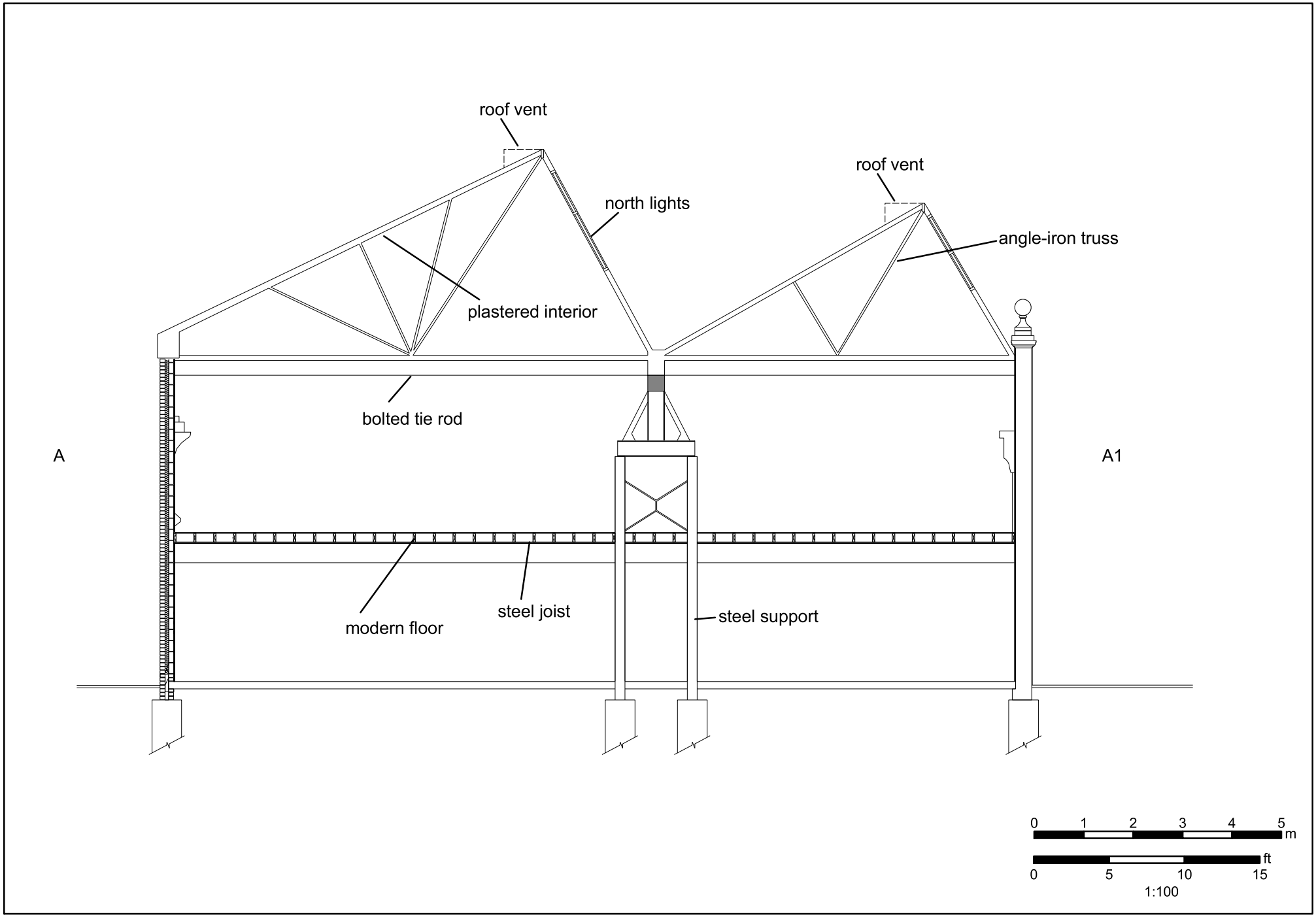

Fig.9. Section A - A1 through Engine House

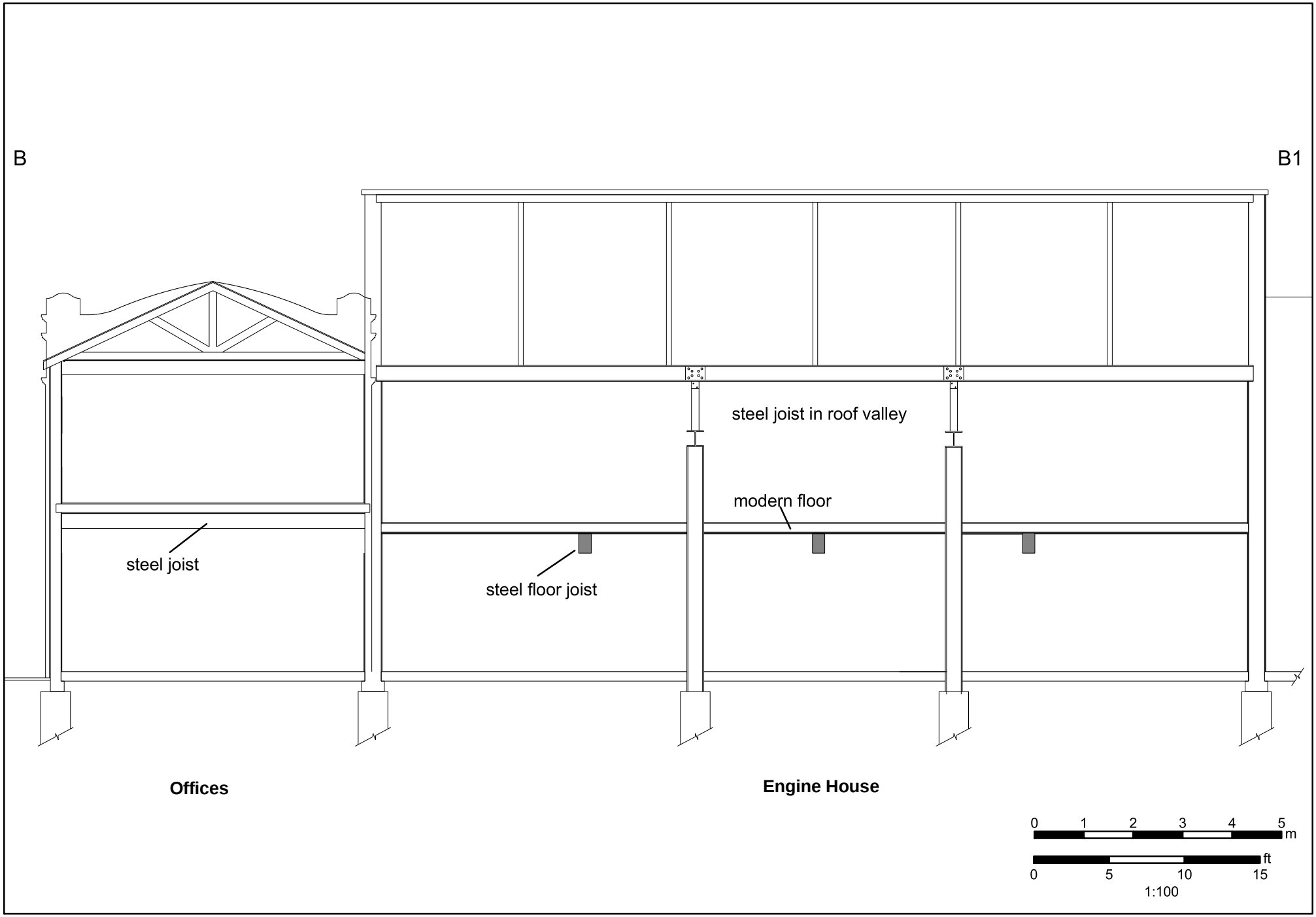

Fig.10. Section B - B1 through Engine House

Plate 1 Listed Anchor Street frontage

Plate 2 Detail of main works entrance

Plate 3 West elevation of engine house and post-1924 house 6

Plate 4 Re-built rear (south) elevation of engine house

Plate 5 Rear elevation of engine house after cladding removed

Plate 6 East office elevation

Plate 7 Ground floor (north) of engine house viewed to west

Plate 8 Original doors into engine house from Anchor Street

Plate 9 Ground floor (south) of engine house, viewed from east to rebuilt wall

Plate 10 Top floor of gym before strip, viewed from north-east

Plate 11 Top floor of gym after strip, viewed from north-east

Plate 12 Top floor of gym after strip, viewed from south-west

Plate 13 Removed chimney scar on west wall of engine house

Plate 14 Blocked doorway cut through blocked window on east wall of engine house

Plate 15 Detail of iron-framed window on north wall

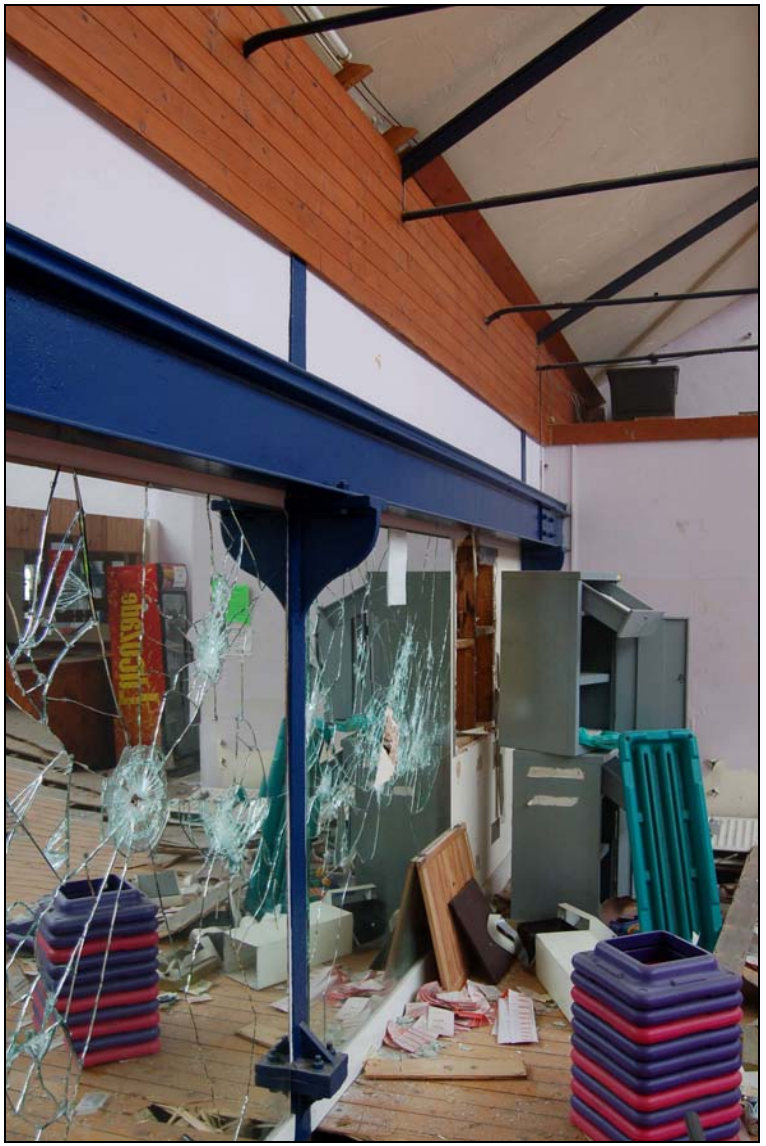

Plate 16 Rebuilt wall on south side from top floor

Plate 17 Ground floor office interior north wall before strip

Plate 18 Detail of front office window

Plate 19 Blocked areas in partition wall between engine house and south part of office range

Plate 20 Blocked areas in front (north) part of office after strip

Plate 21 Inserted Crittall window on east office wall

Plate 22 Partition wall on office first floor

Plate 23 Interior of workshop 4

Plate 24 Main (north) elevation warehouse 5

Plate 25 East wall of boiler house incorporated into warehouse 5 wall

Plate 26 Interior of warehouse 5/boiler house viewed to west

Plate 27 First floor of warehouse 5 viewed to east

Plate 28 Boiler house wall remnant on Anchor Street

Appendix 1: Contents of Archive

Site name: Former Lighting Station, Anchor Street, Chelmsford

Project no. 1818

Index to the Archive

Document wallet containing:

1. Research Archive

1.1 ECC HEM design brief

1.2 ECC FAU written scheme of investigation

1.3 Two copies of client report (one unbound)

1.4 CD containing digital images, architects drawings & copy of report (pdf-formatted)

2. Site Archive

2.1 Photographic register

2.2 Photographic record (digital & 35mm monochrome prints & negatives)

2.3 Site notes & annotated survey plans

Appendix 2: EHER Summary Sheet

Site Name/Address: Former Lighting Station, Anchor Street, Chelmsford, Essex	
Parish: Moulsham	***District:*** Chelmsford
NGR: TL 7053 0612	***OASIS Record No.:*** essexcou1-36118
Type of Work: Building recording	***Site Director/Team:*** Andrew Letch ECC FAU
Dates of Work: August & November 2007	***Size of Area Investigated:*** N/A
Curating Museum: Chelmsford	***Funding Source:*** Phase 4 Developments
Further Work Anticipated? Archaeological evaluation, Aug. 2007	***Related EHER No.:*** LBS 352610
Final Report: Summary in EAH	
Periods Represented: Modern, c.1902-present	

SUMMARY OF FIELDWORK RESULTS:

The former lighting station stands on an important 19th-century industrial site on Anchor Street, previously occupied by the Bewley's Moulsham Foundry, the Anchor Iron Works and Crompton's Arc Works. The latter was a pioneer in the late 19th-century electronics industry, producing components such as arc lights and dynamos. The works were transferred to Writtle Road after a fire in 1895 and an electric lighting station built by 1902 to power the street lighting system set up in 1901. In the same year, a steam omnibus manufacturer, Clarkson & Capel, bought the south part of the site outside the survey area. Between 1924 and 1939 the lighting station had closed and the whole site, including the engine house, was used by a motor works, and as a garage by the mid 1970s. Since the 1970s, part of the site was used as a carpet warehouse and from the late 1980s, a gym; the Devon House Health Club.

Visits were undertaken before conversion works began and after the stripping-out, giving a full account of the industrial fabric.

The Grade II listed lighting station is divided into three distinct areas, the engine room, 'office range'-originally perhaps a switch room, pump room or accumulator room- and possible stores at the back. Part of the original boiler house wall survives against the street frontage. The interiors were seriously altered in the inter-war period and during the 1980s. Floors, walls and windows have been inserted and former apertures blocked.

The structure is typical of late 19th and early 20th-century industrial design, in pier and panel construction, with large north lights and long arched windows to light the open working floor. The street frontage is particularly elaborate incorporating highly-styled Victorian and baroque elements in yellow and red brick which, along with the site's rich industrial past, is the reason for its protected status.

Other Reports: *Archaeological Evaluation on the Site of the Former Arc Works, Anchor Street, Chelmsford* P.Allen, forthcoming (FAU rep. 1815)

Author of Summary: A.R. Letch	***Date of Summary:*** 10th January 2008