



DRAFT ARCHIVAL RECORD
EVELEIGH CARRIAGEWORKS PEDESTRIAN ENTRY
BLACKSMITHS' WORKSHOP



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TABLE OF CONTENTS

1.0	Background	5
2.0	Terminology & Abbreviations	6
3.0	Current Situation	9
4.0	Site Description	10
5.0	Brief History	13
6.0	The Physical Fabric	20
7.0	Cultural Significance	28
8.0	Archival Photographs	32
9.0	Measured Drawings	39

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1.0 INTRODUCTION

1.1 BACKGROUND

The Carriage Workshop and part of the Blacksmiths' Shop is being adaptively reused as a Contemporary Performing Arts Centre and site entry respectively by the NSW Ministry for the Arts.

The site is currently owned by State Rail Authority, however it is within the operational area of the Redfern-Waterloo Authority and is expected to be transferred from State Rail to Redfern-Waterloo Authority early in 2006. The Ministry for the Arts will have rights (ownership or long term lease) over the Carriage Workshop and adjacent areas.

This archival record was required as part of the approval conditions for the project. Separate archival records are being prepared for the First Aid Building and the Carriage Workshops.

1.2 AUTHORSHIP

This report was prepared by Otto Cserhalmi + Partners Pty Ltd (OCP) and written Jean Rice.

The firm Tonkin Zulaika Greer who designed the projects prepared the measured drawings in conjunction with Otto Cserhalmi + Partners, who are providing heritage architectural component of the project. The archival photos were taken by Jaime Plaza for the Ministry for The Arts.

1.3 BACKGROUND INFORMATION

The sources providing background information for conservation and adaptive reuse of the part of the Blacksmiths' Shop and the Pedestrian Entry, Eveleigh CarriageWorks include but are not limited to the following:

- *Eveleigh Carriageworks Conservation Management Plan* prepared by OCP PL, 2002
- *Blacksmith's Shop Building Conservation Management Plan* prepared by OCP PL, 2003
- Documentation prepared by Tonkin Zulaikha Greer on behalf of the Redfern-Waterloo Authority for "the Pedestrian Entry and Substation" being Drawings DA 100 to 103, DA 200 to 201, DA 300 to 303, and previously approved DA Drawings A 110, A 310 to 312.

1.4 METHODOLOGY AND LIMITATIONS

This report has been prepared on the basis of the NSW Heritage Office guidelines for archival recording. There has been limited access to high level areas of the building and to contaminated areas. It is proposed to undertake further detailed recording when access is available and to add this to the final archival record.

2.0 TERMINOLOGY & ABBREVIATIONS

The names for buildings and items used in this report are based on the usage in the source document, i.e. *Eveleigh Carriageworks Conservation Management Plan* prepared by Otto Cserhalmi + Partners PL, 2002 and *Blacksmith's Shop Building Conservation Management Plan* prepared by Otto Cserhalmi + Partners PL, 2003, and were derived from the historical State Rail Authority NSW and general railway terminology .

The Carriageworks project for the Ministry for the Arts, adopted a set of names that now have common usage relating to the site. In the interests of clarity, the following is a comparison of the historical and current usage of terminology for the site.

2.1 DESCRIBING THE SITE AND BUILDINGS

The following list of names and descriptions outlines the historical terminology used for the buildings and sites referred to in this document:

Eveleigh Railway Workshops complex - refers to both the original workshops sites on either side of the main line, that is, the Locomotive Workshops site as well as the Carriageworks . In other sources, the site has been referred to as the "Eveleigh Railyards" and the "Eveleigh Rail Yards". It is also referred to simply as the Eveleigh Railway Workshops.

Eveleigh Carriageworks - refers to the set of workshops concerned with carriage building. It is situated on the northern side of the main line. In some references it is referred to as the Eveleigh Carriage Workshops Site. It is also referred to variously as the Eveleigh North site, the Wilson Street site/ workshops.

Carriage Workshops - refers to the former Carriage and Wagon workshops. Bays 16-25 on the northern side of the main line. Also known as the Eveleigh Carriage Workshops.

Locomotive Workshops - refers to the entire building, original Bays 1-15, present Bays 1-16 on the southern side of the main line.

Blacksmiths' Shop - refers to the long building immediately north of the Carriage Workshops, with a retaining wall to Wilson Street. Also known as the Blacksmith's Shop, Blacksmith('s') Workshop(s), and the Carriage & Wagon Blacksmith's Shop

The following names and descriptions are used in this and other documentation relating to the NSW Ministry for the Arts cultural project at the Eveleigh Carriageworks and have been included to provide a reference when reading those documents in conjunction with this Statement of Heritage Impact.

CarriageWorks at Eveleigh - the name given to the Ministry for the Arts precinct. This precinct contains the following: the Carriage Workshop, Blacksmiths' Shop, the roadway bisecting the two buildings, and six (6) metres of the western Traverser No. 2 on the western side of the Carriage Workshops.

Ministry for the Arts site - refers to the section of the Eveleigh Carriageworks acquired by the Ministry for the Arts (MFA) to establish the Contemporary Performing Arts Centre.

Contemporary Performing Arts Centre - the use for the eastern half of the Carriage Workshop and the name given to the proposed functioning facility.

2.2 CONSERVATION TERMINOLOGY

The terms *place*, *cultural significance*, *fabric*, *maintenance*, *compatible use*, *preservation*, *reconstruction*, *restoration*, *adaptation* and *conservation* used throughout this report are as defined in the *Australia ICOMOS Charter for the Conservation of Places of Cultural Significance ("The Burra Charter")* 1999, Article 1.1 to 1.17.

- 1.1 Place means site, area, land, landscape, building or other works, group of buildings or other works, and may include components, contents, spaces and views.
- 1.2 Cultural Significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups.
- 1.3 Fabric means all the physical material of the place including components, fixtures, contents and objects.
- 1.4 Conservation means all the processes of looking after a place so as to retain its cultural significance.
- 1.5 Maintenance means the continuous protective care of the fabric and setting of a place, and is to be distinguished from repair. Repair involves restoration or reconstruction.
- 1.6 Preservation means maintaining the fabric of a place in its existing state and retarding deterioration.
- 1.7 Restoration means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.
- 1.8 Reconstruction means returning a place to a known earlier state and is distinguished from restoration by the introduction of new materials into the fabric.
- 1.9 Adaptation means modifying a place to suit the existing use or a proposed use.
- 1.10 Use means the functions of a place, as well as the activities and practices that may occur at the place.
- 1.11 Compatible use means a use which respects the cultural significance of a place. Such use involves no, or minimal impact, on cultural significance.
- 1.12 Setting means the area around a place, which may include the visual catchment.
- 1.13 Related place means a place that contributes to the cultural significance of another place.
- 1.14 Related object means an object that contributes to the cultural significance of a place, but is not that place.
- 1.15 Associations mean the special connections that exist between people and a place.
- 1.16 Meanings denote what a place signifies, indicates, evokes or expresses.
- 1.17 Interpretation means all the ways of presenting the cultural significance of a place.

2.3 RAILWAY TERMINOLOGY

The following terms and names particular to railways, railway workshops, carriages and wagons have been included to clarify the descriptions of the following items used in this report, their operation and functions.

Bogie A device located towards each end of a carriage which can swivel independently to follow curves in the railway lines. It consists of a frame supported by wheels (in NSW either four or six) and carries sets of springs to soften and control the ride, springs or ride control levers, brake equipment linked to the brake cylinder and other equipment associated with the safe operation of the car.

Car or Carriage Synonymous for a vehicle which conveys passengers, their related baggage, etc.

Forge A furnace in which metal is heated before shaping by beating or hammering.

Foundry The workshop in which molten metal is poured into moulds.

Run Round Track A section of rail line parallel, or close to, a receiving or passing line and laid out so that an engine (with or without vehicles attached) can detach from one end of a set of vehicles and pass beside those vehicles and be attached to the opposite end of the vehicles usually to draw the vehicles back in the opposite direction to that in which they arrived.

Traverser A platform or framework to which a length of rails are attached and which moves locomotives, wagons and carriages transversely along rails. Such a device is sometimes constructed outside a wide locomotive-shed so that a locomotive entering from a single approach track can move onto the traverser and then be moved sideways to line up with any one of the shed lines.

Wag(g)on Describes a vehicle designed for conveying freight or goods traffic, or related to that type of business. The spelling changed early this century. Wagons were overhauled at the Eveleigh Carriage and Wagon Shops until the 1909-13 period when a new works was built for wagon repairs at Clyde Sidings and they were removed from the Eveleigh site.

Wrought Iron Metal fashioned or formed by beating with a hammer.

2.4 ABBREVIATIONS

Abbreviations used throughout the text are as follows:

AO	Archives Office (no longer in existence - now NSW State Records)
ATP	Australian Technology Park
CMP	Conservation Management Plan
CoS	City of Sydney Council
CPAC	Contemporary Performing Arts Centre
DCP	Development Control Plan
DIPNR	Department of Infrastructure, Planning and Natural Resources (see DOP)
DOC	Department of Community Services
DOP	Department of Planning NSW (formerly DIPNR)
DPWS	Department of Public Works and Services (no longer in existence, historical reference)
ECW	Eveleigh Carriage Workshops
ELW	Eveleigh Locomotive Workshops
HOff	NSW Heritage Office
ICOMOS	International Council on Monument and Sites
LEP	Local Environmental Plan
MP	Master Plan
ML	Mitchell Library
NSWSR	NSW State Records (see AO)
SHFA	Sydney Harbour Foreshore Authority
REP	Regional Environmental Plan
SEPP	State Environmental Planning Policy
RWA	Redfern-Waterloo Authority
SRA	State Rail Authority (NSW)
SRAO	State Rail Archives Office (no longer in existence, records to NSWSR)
SSCC	South Sydney City Council
SSHS	South Sydney Heritage Study

3.0 CURRENT SITUATION

Eveleigh Carriageworks stretches along the northern side of the railway lines from Redfern station, almost to Macdonaldtown station. The Blacksmiths' Shop is located on Wilson Street, Darlingtown.

Redfern-Waterloo Authority was created by the NSW Government in late 2004 to manage public infrastructure, land and properties in the Redfern and Waterloo Area. The whole of the site is owned by the State Rail Authority of NSW (SRA), however it is within the operational area of the Redfern-Waterloo Authority and is expected to be transferred from State Rail to Redfern-Waterloo Authority in 2006.

The Ministry for the Arts will have rights over the Carriage Workshop and adjacent areas. The Ministry for the Arts was the applicant for the adaptive reuse of the Carriage Workshop and Blacksmiths' Shop for use as a Contemporary Performing Arts Centre and for the construction of the new entry.

The site has been declared State Significant (under SEPP (Major Projects) 2005, Schedule 2, Map 16) and the Minister for Planning is now the consent authority. The whole of the Eveleigh Carriageworks' site is listed on the NSW State Heritage Register. This recognises the site as having state heritage significance and applies the NSW Heritage Act, as amended. The Redfern-Waterloo Authority Act 2004 also applies. Clause 29 of the RWA Act deals with Heritage Matters.

The site entry and Contemporary Performing Arts Centre is currently in construction.

The Archival record is to meet development approval conditions for the Pedestrian Entry and Substation for the Eveleigh CarriageWorks' site. This includes the Blacksmiths' Shop and the area to the east of the Blacksmiths' Shop fronting Wilson Street (currently occupied by the Wilson Street Stairs and the Ambulance / First Aid Station). The area along Wilson Street will be developed as an Pedestrian Entry to the site, including a new wider stair and ramp from Wilson Street into the site.



Plan showing the location of the site.

4.0 SITE DESCRIPTION

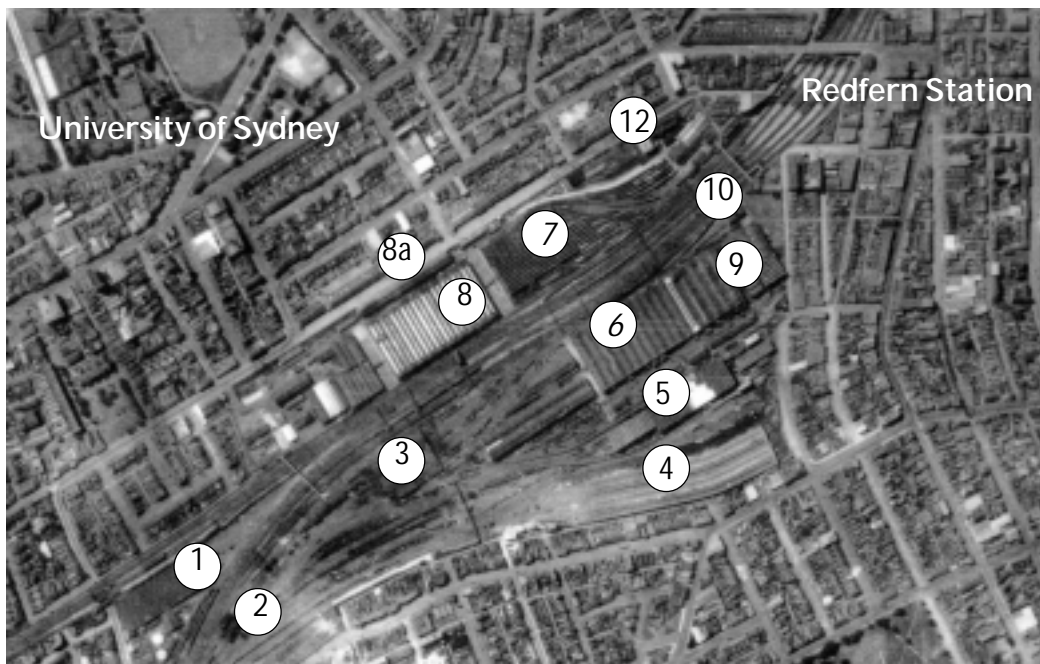
The former Blacksmiths' Shop is part of the workshop complex of the Eveleigh Railway Workshops, and is located on the Eveleigh Carriageworks site, off Wilson Street, Darlington. The complex is located in the inner city immediately to the south of Sydney CBD and Central Station. The immediate surroundings contain densely developed residential suburbs and mixed commercial and industrial areas.

Eveleigh Carriageworks stretches along the northern side of the railway lines and is bounded on the north by Little Eveleigh and Wilson Streets, Redfern, on the west by Iverys Lane, on the east by Redfern Station and Little Eveleigh Street, and on the south by the main railway lines leading out of Sydney. The majority of the whole Carriageworks site is at rail level, with the exception of some buildings along Wilson Street, which are located higher, at street level. The Blacksmiths' Shop is located in the central area of the site, occupied by the main workshops where the carriages were built and maintained.

The site was in continuous use as Carriage (earlier Carriage and Wagon) Workshops until its closure in 1988. It was Government built and has been in continuous Government Ownership since the purchase of the land in 1879. The site is currently owned by the State Rail Authority of New South Wales.

The Blacksmiths' Shop is a freestanding building located along the northern Wilson Street boundary of the Carriageworks site, with the eastern end of the building being located opposite the intersection of Wilson Street and Codrington Street in Darlington. The northern facade of the building forms the long regular panelled brick wall along this boundary.

The Blacksmiths' Shop is bordered by Wilson Street to the north, the Air Raid Shelters to the west, the roadway between it and the Carriage Workshops building to the south and the Ambulance Room/First Aid Building to the east. There is an entry stair off Wilson Street located at the eastern side of the Blacksmiths' Shop, providing pedestrian access from the Wilson Street level down to the rail level of the Carriageworks site.



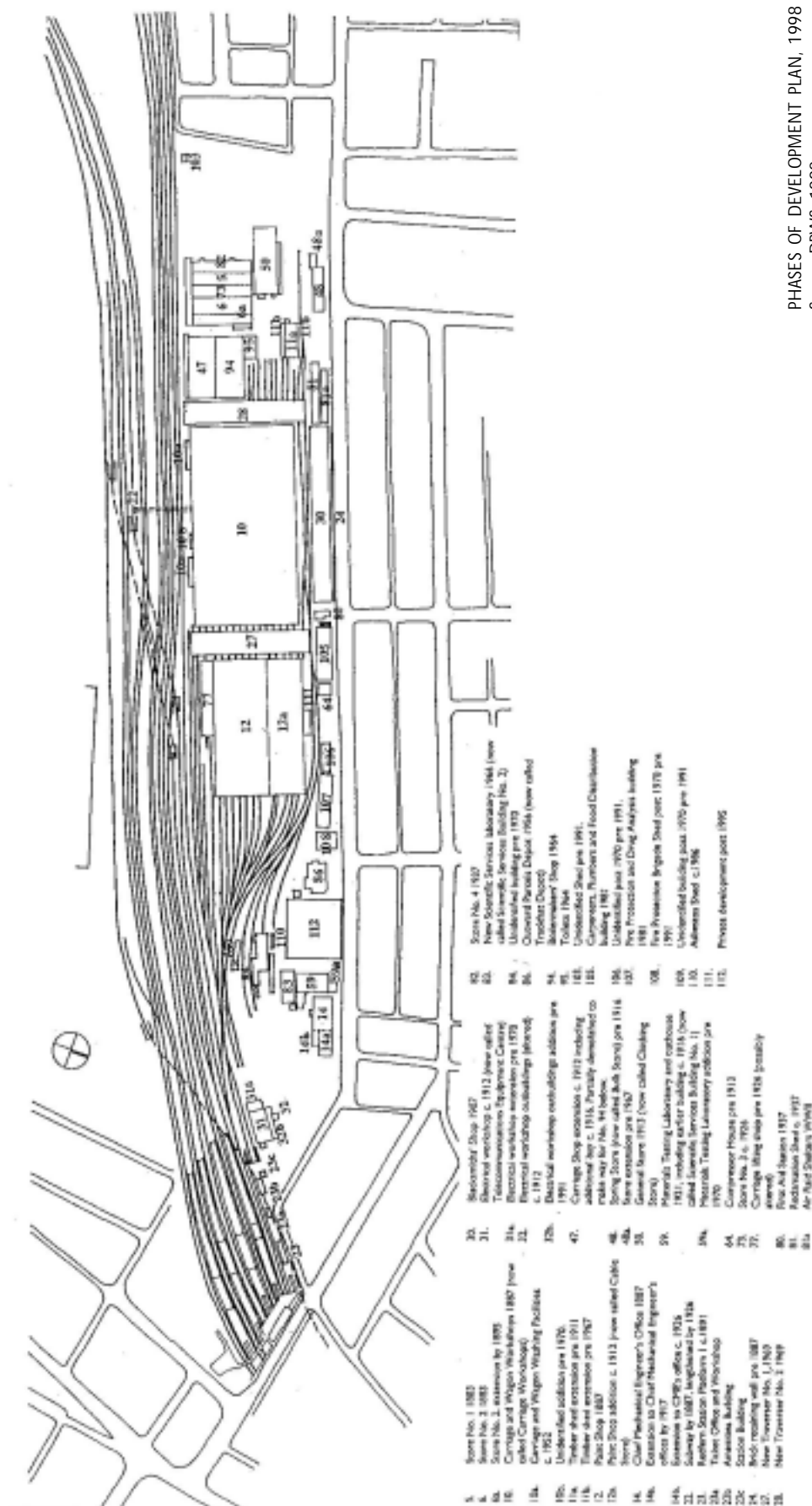
1930 aerial photograph of the Eveleigh Railway Workshops showing items referred to in this report.



2002 aerial photograph of the Eveleigh Railway Workshops complex showing items referred to in this report. Some items in the key have been demolished since the 1930 photograph and are not shown on the 2002 photograph.

KEY to photographs above:

- | | | |
|---------------------------------|--------------------------------|---|
| 1. Former Carriage Shed | 6. Locomotive Workshops | 10. Works Manager's Office |
| 2. Gasworks | 7. Paint Shop | 11. Large Erecting Shed |
| 3. Former Engine Running Shed | 8. Carriage Workshops | 12. CME's (Chief Mechanical Engineer's) |
| 4. Former Alexandria Goods Yard | 8a. Blacksmiths' Shop Building | |
| 5. Former Foundry | 9. New Engine Workshops | |



5.0 BRIEF HISTORY

The following brief history has been taken from the *Eveleigh Carriageworks Conservation Management Plan*, for the whole Eveleigh Carriageworks site, prepared by Otto Cserhalmi + Partners PL, 2002 and the *Blacksmiths' Shop Building Conservation Management Plan* prepared by Otto Cserhalmi + Partners PL 2003. Please refer to the detailed history in the aforementioned documents for any references or details of the information included below.

5.1 THE SITE

The area was originally occupied by the Cadigal people, part of the Eora language group, who inhabited the area south of Port Jackson. Early land grants were to Hutchinson, Chisholm, King, Chippendale, and Sheppard, but there was little development until the late 1870s. Hutchinson's son-in-law, John Rose Holden, built Everleigh House (later written 'Eveleigh'). The location can be seen on the Woolcott and Clark's 1854 map.

In 1855, the State's first rail line divided Chisholm's farmland. The land developed for the Railway Workshops, Chisholm's grant, is shown on a detail of a pre 1855 parish map of Petersham. There is a low-lying swampy area on the southern boundary at the eastern end of Chisholm's grant.

The station was named Eveleigh after the nearby house. In 1879 congestion of the Devonshire Street railyards led the Government to buy Chisholm's land for new rail workshops.

In 1880, construction started on the south or 'down line' side. The development of the 'up line' side, now known as the Eveleigh Carriage Workshops progressed in stages. The first buildings were two of the large timber stores at the Macdonaldtown end of the site, completed in 1883. Between 1884 and 1887 the fan of rails was laid in and the Car and Wagon Workshops, the Paint Shop, the grand Locomotive, (later Mechanical), Engineers Office on Wilson Street, and a Tender Shop near Redfern Station for painting locomotives, (now demolished), were completed.

In 1886, the second Eveleigh Station was built. It was renamed Redfern Station in 1906 when Sydney Terminal was completed. Residential development of the area continued around the railway workshops, stimulated by the need for workers' housing.



Parish Map of Petersham, pre 1855. Source: ISSN 1441-6352 Volume PMAPMNO4, Parish Maps CD, County of Cumberland, Parish of Petersham, 14062201,

In 1900, the internal traversers were removed and external ones installed giving a more efficient layout and ability to handle longer carriages. Further developments at the Eveleigh Carriage and Wagon Workshops continued right through the life of the site but the bulk of the major alterations and additions were completed on the years up to about 1927.

The construction of the Blacksmiths' Shop in 1907 allowed the smithing function to be removed from the main building and that space to be reallocated. Additional repair and painting shops were built to handle the State's expanding fleet of rail vehicles. Special facilities were built for signalling, lighting, driver training, laboratories and trimming at the east end of the site. Later the stores were expanded and then converted to a hostel.

Staff amenities such as toilets, ambulance (First Aid) room, canteen and offices were added at various locations. The 1920s also heralded the commencement of a slow decline of the Eveleigh site as motor cars and lorries became more common and passengers numbers decreased.

Apprentices were trained to provide a highly specialised and skilled workforce. The workshops were served by rails, including head shunts, points and run-arounds and by traversers, and within the buildings by cranes, to enable movement of vehicles. Elevated rails and pits allowed work under vehicles. Thousands of people worked here and identified strongly with the place. The great strike of 1917 commenced here and loyalists lived on the site during the strike.

In the mid 1920s, work started on a new workshop at Chullora. In later years workshops at Chullora and Clyde took over work formerly performed at Eveleigh and functions were rearranged.

Between the period of the 1920s and 1940s saw the electrification of the Sydney suburban lines and the construction of the City Railway, as well as the opening of the Sydney Harbour Bridge resulting in changed to the type and amount of work being undertaken by the Railways' workshops. Work continued through WWII with some use for aircraft component manufacturing.

Since this time buildings have been demolished at the east and west ends of the site. The site declined gradually in the late twentieth century until its closure in 1988.

5.2 THE BLACKSMITHS' SHOP

Early plans of the Carriage Workshops site show a cutting or embankment along Wilson St adjacent to the carriage Workshop Building. A survey plan of the site believed to be from 1886 or 1887 shows a brick retaining wall in this location. A later plan for the Blacksmiths Shop shows the wall and has a note saying "14 inch retaining wall existing".

In 1907, a new building was erected on the northern side of the Carriage Workshops building to house the Carriage and Wagon Blacksmiths' Shop. This allowed more room within Bay 21, which had previously contained the Blacksmiths' area, for expansion of the Woodworking Machine Shop.

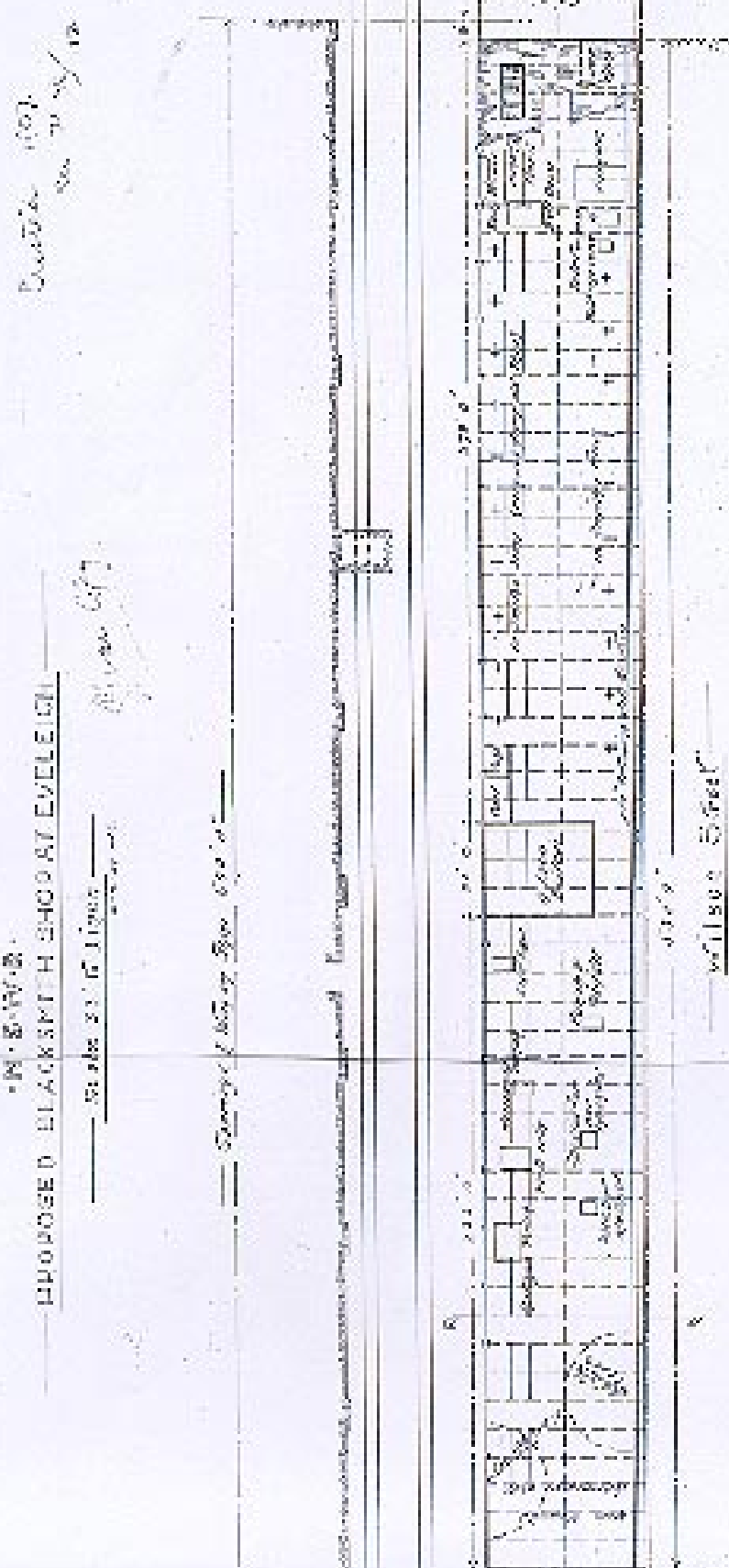
This new Blacksmiths' Shop was purpose built as a blacksmith shop, adjacent to the Carriage Workshops but slightly removed. The Annual report for 1910 notes that a shop 529 ft. by 50 ft. had been erected near the present Carriage and Wagon repair shops and fitted with forges etc. for the carriage and wagon work.

A plan of the 'Proposed Blacksmith Shop at Eveleigh' dated September 1907 shows the proposed layout for machinery and equipment and the design of the building.

The upper wall and roof structure of the new shop was supported on the top of the existing retaining wall but the Wilson Street wall is shown as a lightweight structure with a corrugated iron fence on the street alignment.

The drawing shows the proposed layout of the Blacksmith's Shop with ridge line, roof trusses and skylights dotted on the plan. A section of roofing is shown overlaid on the ground plan at the western end with hatching indicating that the skylights were proposed to be glazed.

Major machinery is also located including furnaces, cold saw, smiths fires and jib cranes. There are four centrally located Loco Boilers, with coal and coke store adjacent, and ten smiths fires set along both walls at the southwestern end of the building. A typical section shows relationship between roof truss, retaining wall and column and shows the roof monitor.



'Proposed Blacksmiths' Shop at Eveleigh' drawn 1907.
Source: SRA Plan Room Drawing 875/15 105

DRAFT ARCHIVAL RECORD

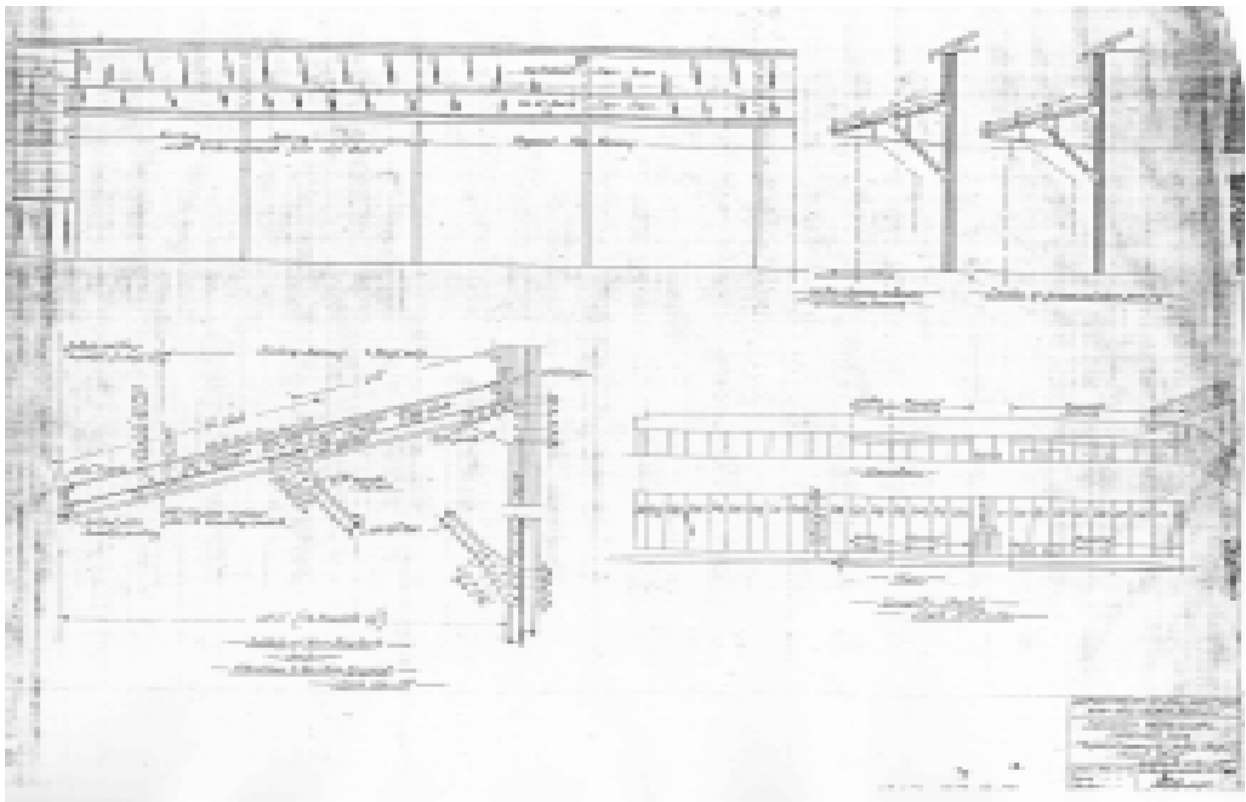
A 1913 plan shows the building but without the detailed machinery layouts. It shows the Wilson Street wall "as built" with 9" brickwork with 14" piers on top of the retaining wall. It shows that the columns were old rail stanchions and that part of the south wall was corrugated iron and louvres. It also shows skylights, roof cross bracing and an office at the east end. Coal bunkers are shown at the east end and boilers at the centre.

A 1912 plan shows separators to be added on the roof. These were part of a system to dispose of timber waste generated by the sawmill in Bays 19 & 20 in the Carriage Workshops building. The plan for the separators shows existing boilers approximately centrally located along the southern side of the shop. Originally coal fired boilers generated steam, which powered machinery, some via lineshafts. The Wilson Street brick wall, at its east end, shows evidence of where brackets for shafts were, and a fly wheel for a motor. Later other power sources were used. At the west end blowers provided air via underground pipes to hearths. Metal was heated in furnaces and forged on blacksmiths' hearths or shaped using pneumatic hammers. Fumes from hearths were collected and exhausted through the roof.

*Department of Railways, N.S.W. Way and Works Branch
Eveleigh Workshops - Carriage Side Proposed
Awning to Smiths Shop, Wilson St Date: 7.4.37*

Source: State Rail Archives (since closed). Location of original now unknown.

This plan shows structural details for extending the awning. A detailed drawing shows proposed new and existing brackets. Spacing of brackets and relationship with existing roof and boilers are shown.



In 1937, the existing awning to the southern side of the building (which had been only two bays wide) was extended to run along almost the entire Sydney end of the southern side of the building. The area in front of the boilers was not given an awning.

The overall form and structure of this building is relatively intact compared to the original 1907 drawings. There is little direct historical documentary information of the Blacksmiths' Shop. Analysis of the plans indicates that the west end was used for smithing with fires, furnaces, flues, hammers and anvils. The east end appears to have been more for machining works, drilling holes etc. and did not have furnaces or fires. There were also some small offices on the ground level for the foremen. It is not clear whether the boilers only serviced this building, or were related to the main building as well. There is evidence of underground structures in the roadway between the two buildings in this location.

It is likely that there would have been some changes in the layout of the machinery in the building that would have entailed the construction or removal of concrete bases and wall brackets etc. There were several minor re-arrangements internally with coal bins shown on plan at various locations. They are now at the west end of the building. This location probably reflects the removal of the boilers from the centre of the building and that coal was only used for the smiths' fires (at the west end of the building. As the oil reservoir tanks (converted boilers) are over the Air Raid Shelters, they must have been installed or relocated to here after WW2.

At some stage some panels of wall louvres on the south facade were replaced with corrugated iron sheeting as is apparent today. This may have been due to a normal process of maintenance where, failing louvred panels were replaced with less expensive cladding, or it may have been due to some operational or functional requirement. Furnaces etc. have also been converted to oil as the fuel tanks were installed outside the building to the south and oil lines run inside.

Improvements in working conditions led to various additions. Ablutions facilities were constructed at ground level at the west of the building. At the east end was a mezzanine with canteen, meal rooms and toilet/change facilities. A single storey lean-to was built against the east wall of the building and is shown as the Railway Institute Branch on plans.

Discussions with Mr. Bill Casley indicate that this building was the canteen at some stage. These additions were all workers' facilities. The lean-to shed may have been the place where English classes were held for migrants. It was demolished prior to the closure of the workshops.

Blacksmithing associated with the maintenance of the State's carriages and wagons was the main work carried out at the shop. This involved major reconstruction projects such as the conversion of non-corridor cars to corridor cars. New carriages were built including the Royal carriages, the first Mann sleeping car, the first electric carriage, the first air-conditioned train in Australia and the Silver City Comet. The works developed new technologies and finished rail vehicles to a high standard.

The Number of people employed in the Blacksmith's shop are indicated in the Mechanical Branch Organisational Charts (NSR 15741 item 21). This chart provides the wages range for the various positions in the Shop and the number of men employed. These include:

1. Foreman (1) in-charge of 4 Subforemen and 2 general workers
2. Subformen Blacksmiths (2) in-charge of 40 to 54 men
3. Subforman Silversmiths in-charge of 71 men
4. Subforeman Spring Maker in-charge of 62 men
5. Subforeman Forger in-charge of 30 men

The Blacksmiths' Shop c.1988. Source: SRAO





5.3 ASSOCIATED ITEMS

THE FIRST AID BUILDING

This building is on the site of a former gas plant which is shown on plans of 1916. The former First Aid building was constructed in 1937 with a 1949 addition of a nurses room and toilets at the rear. It is identified as being of local significance in the site CMP. The First Aid building is located immediately north of the Blacksmiths Shop between it and the modern Carpenters, Plumbers and Food Distribution Building. It is adjacent to the main pedestrian entry stairs to the site.

ORIGINAL ENTRY STAIRS

The location of the existing stair as an access point is significant as this area of the site has been used since the early 1880s as the main entry to the centre of the Carriage Workshops site. Early plans show stairs from Wilson Street, opposite Codrington Street, leading to the traverser between the former Paint Shop and former Car and Wagon Shops.

The fabric of the current stair is modern probably built in conjunction with the adjacent Carpenters, Plumbers and Food Distribution Building. It may be built over earlier structures, and the upper landing and associated retaining wall is in poor condition.

The Blacksmiths' Shop in 1986. The two heavy pedestal grinders are against the Wilson Street retaining wall with the K15 metal shears and punch and metal rack to the south of the centre line of the building. Source: SRAO

6.0 THE PHYSICAL FABRIC

This section generally describes the building's design and construction. The building is considered element by element and the machinery is then described.

It should be noted that the extent of the proposal as discussed in this document, includes east end of the Blacksmiths' Shop and the area to the east of the Blacksmiths' Shop, which is currently occupied by the Wilson Street Stairs, the Ambulance / First Aid Station and adjacent to the Carpenters, Plumbers & Food Distribution building. This area is to be developed as a new Pedestrian Entry to the CarriageWorks at Eveleigh.

6.1 EXTERNAL SPACES OF THE SITE

The external spaces in the CarriageWorks at Eveleigh site comprise the roadway between the two buildings (Carriage Workshops and the Blacksmiths' Shop), the concrete apron between the traverser bed and the Carriage Workshops on the east, the concrete apron and six (6) metres of the traverser bed on the west of the Carriage Workshops. They contain rail lines which link to other parts of the site.

Throughout the site there are rail lines, including features such as run-arounds, head shunts and traversers. Rails would have been altered often and some bear dates. Old rails have also been used in constructing buildings and fences throughout the site. These reused rails emphasise the railway character of the site. They are important in understanding the site and demonstrate how the place functioned. The rail lines and associated features are of considerable significance.

The First Aid building is located immediately north of the Blacksmiths Shop between it and the modern Carpenters, Plumbers and Food Distribution Building. It is adjacent to the main pedestrian entry stairs. This area and the traverser and the road between are not part of the Ministry of the Arts site and are currently in the ownership of State Rail Authority and will be transferred to the Redfern Waterloo Authority. The area is however included in the current DA and the approved design has been agreed to by State Rail Authority to be undertaken as part of Contemporary Performing Arts Centre.



View of the northern elevation of the Carriage Workshops from the western end of the roadway between the CW and the Blacksmiths' Shop



View from the northern end of the roadway between the Carriage Workshops and the Blacksmiths' Shop



The north elevation of the Blacksmiths' Shop (western end)

6.1 THE BLACKSMITHS' SHOP

6.1.1 BUILDING CONSTRUCTION AND ARCHITECTURAL STYLE

The Carriageworks site is delineated by a cutting running from the western end of Wilson Street to the former pedestrian entry (opposite Ivy Street and east of Chief Mechanical Engineer (CME)'s Building).

The Blacksmiths' Shop building is a one storey long narrow building approximately 160 metres long and 20 metres wide with a 'steel' framed structure supporting 'steel' roof trusses (some elements are wrought iron). The roof is corrugated steel. The floor is a partial concrete slab and dirt. For much of its length the building is open to the south, but protected by a 3 m wide awning. The roof has skylights of alsynite panels and is ventilated with a double-sided monitor along the gabled ridge. There is evidence of louvres on the sides of the monitors but none survive.

The building structure appears to have survived relatively intact when compared to the 1907 drawings. The south, east and west walls are supported by riveted back-to-back railway rails (reused West Cumberland Steel 1884 NSWG), acting as stanchions (or columns), while the north wall is the brick retaining wall from the 1890s and extended in 1907. The east and west walls are sheeted in corrugated iron. The west most portion of the south wall has an ingenious system of wall louvres. There is evidence that there were previously louvres in part of the west (end) wall.

The northern retaining wall is extremely well built, consisting of mostly English bonded brickwork, and about 4m high. The retaining wall extends past the building and forms part of the northern wall of structures along Wilson Street including the Blacksmiths' Shop. The masonry wall over the retaining wall and facing Wilson Street and the 'public', was carefully designed and executed using fine solid brickwork articulated into bays. The building was also constructed reusing railway tracks as riveted columns. Internally the brick wall shows evidence of former industrial processes including grease stains from bearings where line shafts were formerly located.



The interior of the Blacksmiths' Shop



Bottom: View of roof showing counter trusses. Source: OC+P 2003

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The roof consists of wrought iron riveted trussed roofing with double sided roof monitor and this concurs with the 1907 drawing. The trusses alternate with the "main principal" trusses (described on 1907 drawing), resting on the rail stanchions, while the "intermediate" trusses are ingeniously supported by simple counter trusses which span across and under the main trusses. The "main principal" trusses span 50 ft., and the design of the truss conforms to the standard textbook, (Nangle Australian Building Practice 1944), example for a 50 ft. span. The galvanised iron roof is secured to purlins, this is also recommended practice by Nangle in 1944. The truss system also employs the use of doubled vertical struts, thus reducing the stresses on rivets by halving the load on them.

The west most portion of the south wall has an ingenious system of wall louvres. The large pivoting wall sashes allowed full walls to open for maximum ventilation with its sashes and sophisticated cast iron, hand operated winding system. Most of the upper louvres of this unique cladding on the southern facade have been removed and the openings sheeted over with corrugated steel. The lower panels are intact and the winding mechanisms remain in situ as well.

The building is a practical structure built with the minimum of pretensions to pragmatic architectural style. It is a utilitarian structure. Its design derived from the site with the retaining wall on one side and the roadway between it and the Carriageworks. The roof and walls are lightweight and are the minimum required to expediently enclose the space. The brick wall to the street presents a careful architectural composition in brickwork.

6.1.2 INTERNAL PLANNING

The rectangular building has no internal columns, with a single span across the width of the building and bays arranged along its length. Functionally this arrangement of bays does not appear to relate to the layout of work areas or internal structure, as was evidenced in the Carriage Workshops building. However the system of bays is a strong element of the building as it is expressed on the north and south facades, in the break-up of cladding elements and columns on the south, and the rhythm of the panels & piers on the brick wall of the north facade.



Above is the interior view of the wall louvres..

Source: OC+P 2003



Opening mechanism for the louvres.

Source: OC+P 2003

As much of the machinery associated with the Blacksmiths' Shop has been removed, any knowledge of the internal layout of the building has been analysed from historic drawings and photographs. The general arrangement of the space appears to have been as follows:

- The building was loosely divided into three (3) spaces along the length of the building, with the two longer sections containing the work spaces and the smaller central section housing the boilers that powered the machinery.
- The smith's fires and furnaces are located in the long section to the west of the boilers. There was also a punch and shears located here as well, shown in the 1986 photo of the interior.
- Much of the larger tooling machinery e.g. punches, cold saw, plate rollers, and sole bar machines were located in the eastern long section.
- At ground level the eastern and western ends of the building were generally used as storage yards. An office is indicated at the south eastern corner of the building in the 1913 drawings.

The 1985 measured drawings for the building indicate that more internal divisions had been built with the eastern 3 bays being developed into a separated area, with a central open yard ringed by stores on one side and two levels of offices and amenities on 2 sides. There were also separated welding bays, a foreman's office, structures containing the heat treatment & case hardening sections and a large amenities block located at the north western corner of the building. These recent internal structures have since been demolished, but remnants are apparent in the building, e.g. outlines of cubicles of the eastern two storey structure painted onto the retaining wall.

Most of the external masonry walls and corrugated steel sheeting is un-painted, with the exception of a section of corrugated cladding on the western facade.

The building was used for blacksmithing and forging, and contains some remaining blacksmiths' furnaces, blacksmiths' pneumatic hammers, an exhaust system, wall louvre system and a wall mounted jib crane.



Left: Old electrical wiring suspended from the roof structure. Source: OC+P 2003



View of the exterior of the south wall of the Blacksmiths' Shop. Source: OC+P 2005

6.1.3 BLACKSMITHS' SHOP MACHINERY AND EQUIPMENT

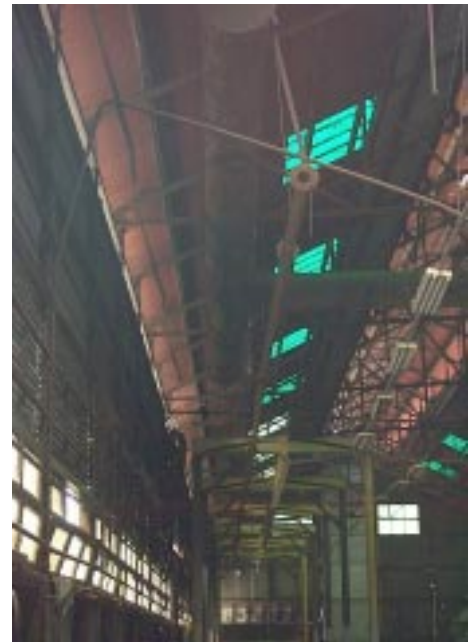
The Blacksmiths Shop was removed from the Machine Shop (Bay 21) to its present location adjacent to the Wilson Street retaining wall in 1907. It is believed that at that time there were a series of steam hammers, at least three pneumatic hammers for forging larger items and a series of anvils, blacksmith's tools and forges installed.

The shop was once well equipped with two steam hammers, two Davis and Primrose electro-pneumatic hammers, three pneumatic hammers by Pilkington and at least one Allen striker or Oliver hammer. It was equipped for most of its working life, with a heavy guillotine, a set of electric shears, numerous hand tools, as well as several frazes (a toothed steel wheel for final shaping of hot steel forged items) and grinders.

The Shop had at least eleven forges and at one stage, had two 50 class boilers mounted immediately inside the south wall. It is presumed that the boilers generated steam which was fed to Roots blowers which produced high volume, low pressure air for the forges and for the high pressure air compressors. It is also presumed that the steam from these boilers was used for heating throughout the Paint Shop and was used to power engines which drove machinery located in the timber mill. There are likely to be underground supply lines associated with the former boilers.

At one stage the Blacksmiths' Shop had three welding bays and at least one swage block for relatively heavy work.

About eleven items remain in the Blacksmiths' Shop and no machinery was purposely conserved. Much machinery has been removed. Archaeological remains are likely to exist, including footings for boilers and other machinery and underground flues and pipes for air. Some of the remaining flues which were considered dangerous and have been lowered on to the ground within building. The most significant items are described in the following section.



*View of the roof showing trusses and gantry in background.
Source: OC+P 2003*

FURNACES

Associated with the forging equipment were a series of forges and small furnaces in which iron and steel could be heated and hence softened, prior to being forged. The extant furnaces would have been used to heat material larger than that which could be accommodated in the smaller Blacksmiths forges of which none remain in this shop. The heated material, almost invariably steel, was taken from the furnaces by tongs and, in the case of larger pieces, possibly balanced tongs on chain fulcrums, suspended from small pedestal or wall cranes which were then moved to the steam or pneumatic hammers.

Basically all of the furnaces at Eveleigh consist of a steel box holding a stack of bricks with a hollow centre, known as the heating chamber, which was fired with gas. The steel frame is to contain the bricks when they expand on heating and prevent the furnace from collapsing. The brick walls at the bottom and top of the furnace, were several bricks thick to provide insulation for the heating chamber. The door the furnace had a steel frame lined on its inner surface with fire brick. The heavy door was counterbalanced with cast iron weights on a chain which ran over a pulley mounted on the front of the furnace frame.

Four of the furnaces situated along the north-east wall of the Blacksmiths' Shop are relatively small measuring about 500 mm square by 200mm high with the outer steel frame measuring about 1.2m cubed. They stand about 1.6m high and have steel and cast-iron frames. The counter balanced doors have all been removed.

These furnaces were introduced late in the life of the Blacksmiths Shop as they are all composed of welded plate, bar and angle iron and some incorporate cast elements as well.

PNEUMATIC HAMMERS

It is assumed that about the time of the blacksmiths' operation being relocated to its current position, the Pilkington pneumatic hammers were introduced to the Blacksmiths Shop. There were three pneumatic hammers in the Blacksmiths' Shop when it closed in 1986, two 7.5 cwt Pilkington pneumatic hammers and one 5 cwt (250kg) weight hammer.



View of the furnaces Source: OC+P 2003

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The advantage of the pneumatic hammer is that it is powered by compressed air which requires an air compressor and receiver which can be powered by an electric motor. Compressed air is far safer than steam and, in general, can power a much greater variety of tools and machines. Steam power also had the disadvantage of taking two hours before steam could be raised for the powering of any sort of equipment. This led to a substantial saving in time in the workshop, once steam was no longer universally used to power the hammers.

SMALL WALL MOUNTED JIB CRANE

The jib crane is marked SWL500kg and is typical of the double-ended rail type, which is found throughout the workshops. It has a horizontal jib and a stay attached to the toe of the jib, returning to the wall at about 30 degrees. There is a typical roller plate which is held the block and tackle, obviously hand-operated, attached to the jib.

EXHAUST SYSTEM

The exhaust system was an integral part of the forging process. All blacksmiths' forges had a short chimney built into their cowl which fed directly into the exhaust system. The removal of flame and smoke was an essential part of the forging process. The present exhaust system was probably introduced some time after World War Two. It would have replaced an earlier system which removed fumes, dust and smoke from the Blacksmiths' forges.

The remaining overhead exhaust unit in the Blacksmiths' Workshops consisted of an H - shaped series of 800 mm diameter steel pipe which runs down both sides of the Shop. On the northern side, the section is about 60 m long, and on the southern side, the section is about 18 m long. Both of these side legs continue across to a central raiser. This central raiser is about 1.2 m in diameter and is supported on a steel column, which is located next to the central pneumatic hammer. The riser, which passes out through the roof once had an exhaust fan located above it. Only the northmost leg of the 'H' remains in situ with the other sections which were dangerous being lowered to the ground in 2005 and where they remain.

The whole of the exhaust pipe is attached by straps to the lower chord of the roof trusses. It is about 6 metres above ground level and has inlet pipes, about 400 mm in diameter at about 4 m intervals.



View of the pneumatic hammer Source: OC+P 2003



Wall mounted jib-crane. Source: OC+P 2003



View of the exhaust system Source: OC+P 2003

7.0 CULTURAL SIGNIFICANCE

While this report addresses the Blacksmiths' Shop building which was intimately related in terms of operation and function to the other buildings on the site. The operations of the Blacksmiths' Shop were fundamentally necessary to the work carried out in the Carriage Workshops and the blacksmithing operations were originally located within the Carriage Workshops and were relocated later to make way for the expansion of other divisions within the workshops. Also, the combined Locomotive and Carriageworks sites have a higher level of significance than individual buildings on the individual sites, or either site on its own. The combined sites have exceptional significance.

7.1 THE SITE

The Eveleigh Locomotive and Carriage Workshops when considered together, are of exceptional significance nationally and internationally as part of one of the best surviving examples of railway workshop complexes. Buildings, open spaces, circulation, rails, machinery, moveable items and services demonstrate the processes of railway manufacture and maintenance of engines and illustrate the processes of technological and operational change from 1887 to the present day. The significance of the Eveleigh Carriageworks, in particular, are as follows:

1. The largest intact, high quality workshops site that survive from the steam era in Australia. The Carriageworks represent the prestige of the New South Wales Railways at its peak and its fall tracks the changes and eventual decline of the industry until its closure in 1988. In contrast to the railways of other nations, the NSW Railways, hence Eveleigh, were a government enterprise rather than privately owned. The Carriage Workshops building is a rare surviving example of the work of George Cowdery (Chief Engineer of Existing Lines) and the high level of technological innovation and design undertaken by local industries and builders. It is also associated with John Whitton, who was instrumental in establishing the NSW Railways. Many of the buildings retain a high level of integrity and authenticity along with some of their ancillary structures, including the line shafting that powered machinery, rails and cranes.
2. An historical landmark in the area. Viewed from the main railway line, with the Locomotive Workshops on the other side, the Eveleigh Railway Complex forms a gateway that visually defines the southern edge of the city. Internally and externally the large scale and industrial character expresses the power of 19th century industry. It is also from the main line that the industrial scale and proportions of the site can be appreciated.
3. A place of high potential for industrial archaeology and interpretation. Underfloor components including rails and pits are extant in some bays. Many of the site's buildings and systems have the potential to demonstrate the former industrial processes.
4. The contribution that the place made to the development of the surrounding suburbs and associated community, state and nation is immense. The Eveleigh Railway Workshops was seminal in many major industrial strikes, the ramifications of which were felt throughout the nation. It is of national significance for its part as one of the biggest employers of migrant labour and for its history in the employment of women starting with World War II. The place is held in high esteem by former workers and the surrounding community, confirmed by their reminiscences and community interest in the place.

5. On an International/National level, the various aspects of the rail network in the site and 'rail level' are vital to the significance of the site. They demonstrate how vehicles were moved about the site and allow interpretation of the operation of the Carriage Workshops and the overall Eveleigh Carriageworks site. 'Rail level' is a key generator of the character of the site. The key elements of the rails are of considerable significance.

7.2 THE CARRIAGE WORKSHOPS

The Carriage Workshops, together with Locomotive Workshops are of International/National significance when considered together. They are the finest examples of late 19th century large industrial buildings surviving in New South Wales and Australia. The buildings are substantially intact from the original 1887 period, with finely detailed polychrome brickwork and well articulated facades that embody the pride of the late Victorian era. The Carriage and Locomotive Workshops were the first major building complex designed and constructed by the NSW Railways to allow the repairing of railway vehicles under controlled conditions. Prior to the 1880s, most repairs were undertaken in the open air. The NSW Railway system's most significant carriages were constructed in these workshops, including the four Royal Carriages, two Commissioner's Inspection Carriages, as well as many significant sleeping carriages and interstate express carriages, including prototypes.

The Carriage Workshops' southern facade, facing the main 'up line', was carefully conceived to present a significant and bold visual statement to the commuting public. Its fabric embodies 110 years of gradual change in the NSW Railways' attitudes to the Eveleigh Railway Workshops complex: from extreme care and finest workmanship in the 1887 initial building, continuing through the 1913 additions of the raised roof section of Bay 25 north. With time the attention to detail gradually lessened, resulting in the most pragmatic changes in the 1970 and 1980s period, as evidenced by the rudimentary annexes on the south facade.

The Carriage Workshops building, initially with two internal traversers in Bays 17 and 23, later moved externally, chronicles in a built form the growth of railway carriages. Once long distance travel became a reality in the late 1800s, larger carriages with more comfort and facilities led to longer carriages which did not fit on the internal traversers. The traversers were moved outside each end of the building and the internal pits filled in providing more space for carriage building. It contained wagon repairing shops, wood working machine shop, fitting and turning shop, smith shop, carriage repairing shop, paint shop, trimming shop and stores.

The interiors of the Carriage Workshops were some of the best preserved industrial complexes from 1887 in Australia. The finely crafted cast-iron columns supporting delicate tracery-like wrought and cast iron trusses are impressive. The use of cambered main strut members of the roof trusses shows that NSW Railways was at the forefront of building technology, on par with Great Britain and other advanced countries of the late 19th century. The design of the cast iron columns is sophisticated, it combined in single or double column combinations, supporting overhead cranes, while the hollow columns acted as downpipes for rainwater disposal.

Though the initial uses have altered over the 100 years following its construction, the essential functionality of the building ensured it was useable by the Railways. This surviving building is in excellent condition considering its age and heavy use. When compared to the Locomotive Workshop Building, it is in better condition, with more of its fabric preserved, inadvertently, due to the less aggressive use of the joinery and trimming works when compared to the heavy engineering works at the 'Loco' shops.

7.3 THE BLACKSMITHS' SHOP

The Blacksmiths' Shop is of State Significance. It is one of the earliest buildings at the Carriageworks site, dating from 1907, and its design and surviving fabric provide a valuable record of the NSW Railways of that time. The retaining wall which was incorporated into the building predates the building itself.

The brick retaining walls along Wilson Street reflect the early NSW Railway engineers' careful detailing and well controlled construction. Sections of this wall date back to before 1900 and the brick quality and mortar joints are in an excellent condition. The quality of these retaining walls was so high that they were incorporated into many structures and buildings constructed along Wilson Street. Some of these buildings included the Spring Store and the Blacksmiths' Shop.

The masonry wall, built on top of the retaining wall and facing Wilson Street and the 'public', was carefully designed and executed using fine solid brickwork articulated into bays. The long length of this wall, with its regular bays, provides a strong and complimentary streetscape to the existing terrace houses on Wilson Street.

The structure was purpose built as a blacksmiths' workshop, adjacent to the Carriage Workshops but slightly removed to ensure relatively clean dust-free conditions were maintained within the Carriage Workshops. This building clearly shows the prudent and practical sense of the early Railway Engineers with the utilisation of an existing, well built retaining wall as part of the structure of the building and the pragmatic reuse of no longer functioning railway tracks as riveted columns and roof structure. The overall form and structure of this building is relatively intact compared to the original 1907 drawings.

The building in engineering terms is a valuable resource in tracing the development of late 19th century and early 20th century factory building construction techniques. The riveted trussed roof of this building was advanced for its day and the system used in its main trusses was still recommended in textbooks 40 years later. The roof also retains the ingenious, simple counter trusses which reduced the need for extra column spanings. The building retains evidence of rare early large pivoting wall sashes that allowed full walls to open for maximum ventilation with its sashes and sophisticated cast iron, hand operated winding system services. Evidence of former steam operated line shafts survive today.

Significant Items are listed below:

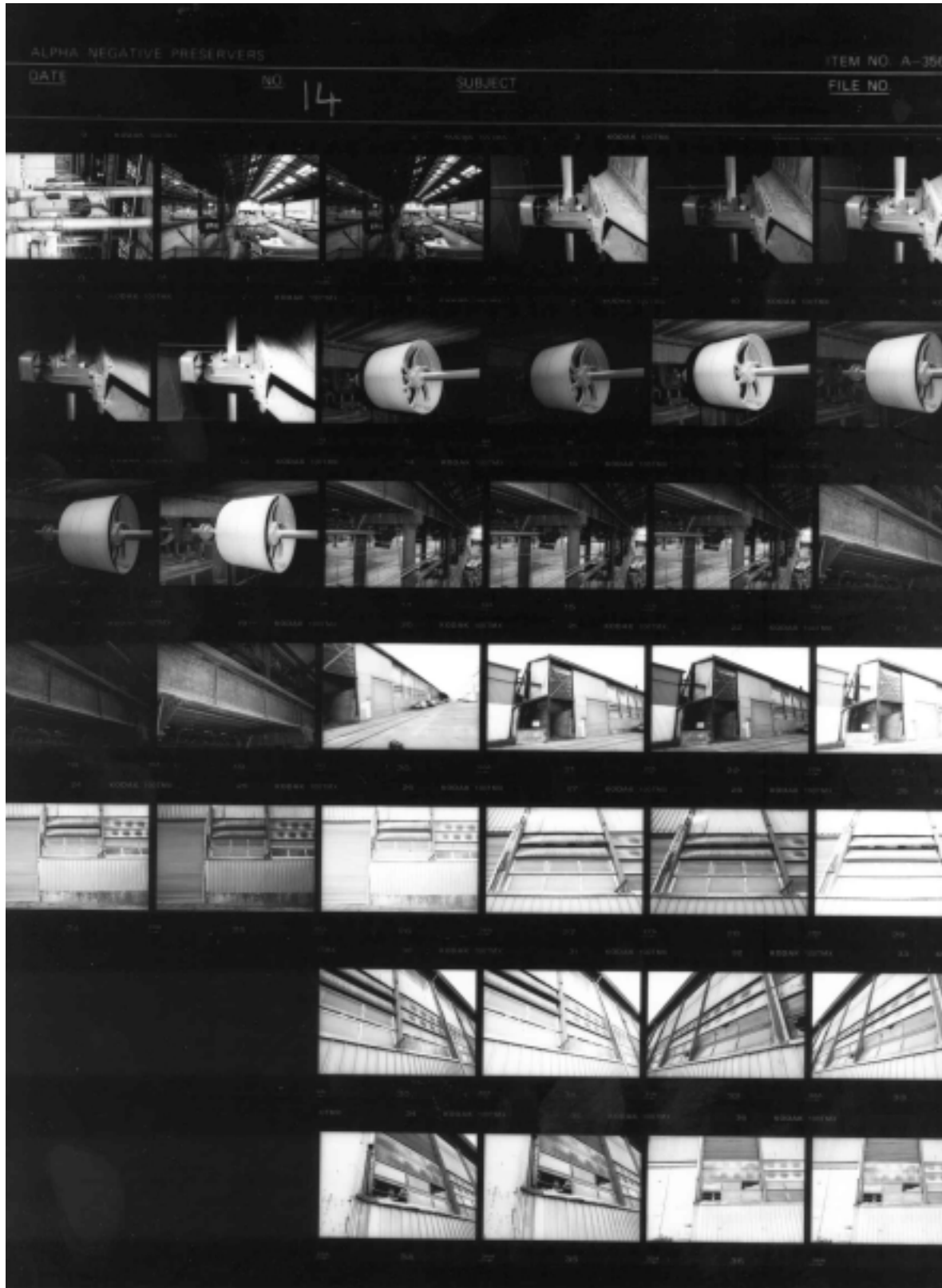
1. Original 1907 wrought iron, riveted plate truss system including "main principal", "intermediate" trusses and monitor roofing. (Considerable)
2. Northern brick wall including former 1890s retaining wall, extension above retaining wall 1907, and return of brick walls at southern and western ends. (Considerable)
3. The reused "West Cumberland Steel 1884 NSWG" rail stanchions. (Some)
4. The original and extended (1937) awning structure, reusing former rail elements. (Some)
5. The pivoting horizontal sashes on west and north walls, including cast iron, hand turned wheel mechanisms. (Considerable)
6. Coal store bins on south western corner of site. (Further Research)
7. The brick retaining walls along Wilson Street. (Considerable)

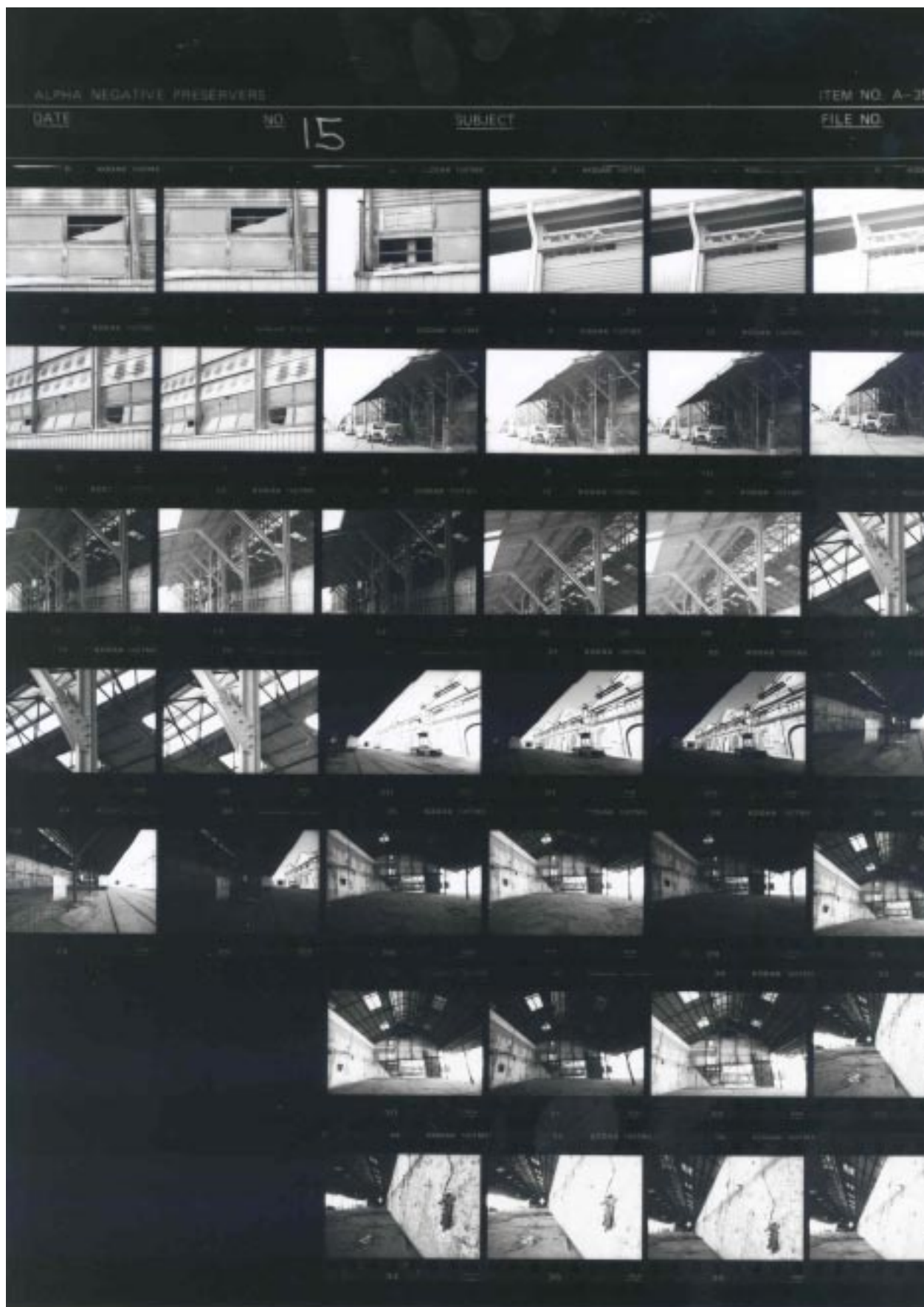
Significant machinery is (level of significance in brackets):

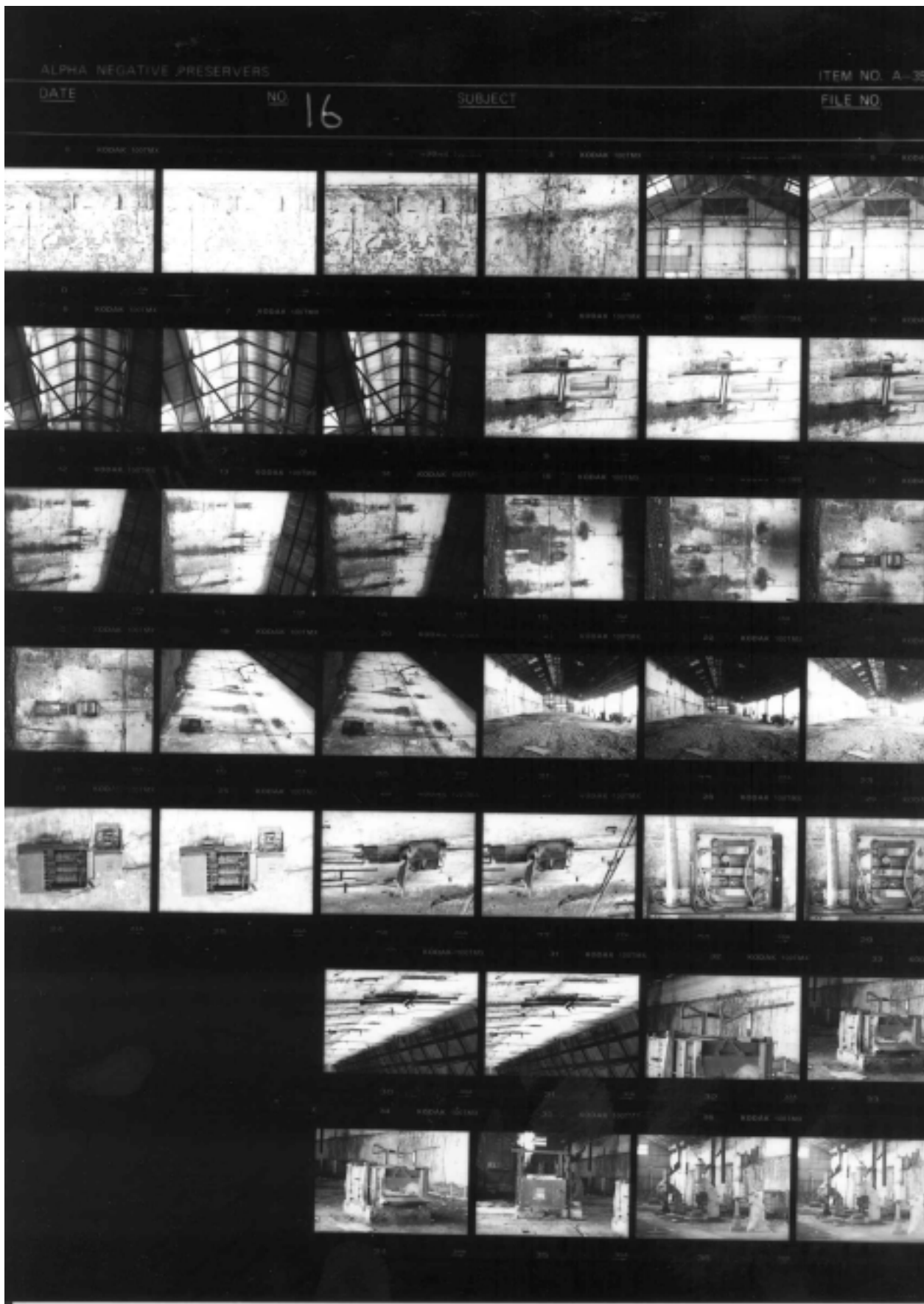
1. Blacksmiths' Pneumatic Hammers (3). (International/National)
2. The Furnaces. (State)
3. The Exhaust System. (Local)
4. Oil Storage Tanks over Air Raid Shelter. (Local)
5. Small, Wall-Mounted Jib Crane. (Local)

8.0 ARCHIVAL PHOTOS

The proof sheets of the archival photos have been scanned and copies are included here. Note that the quality of the originals is much higher than the scans shown here.





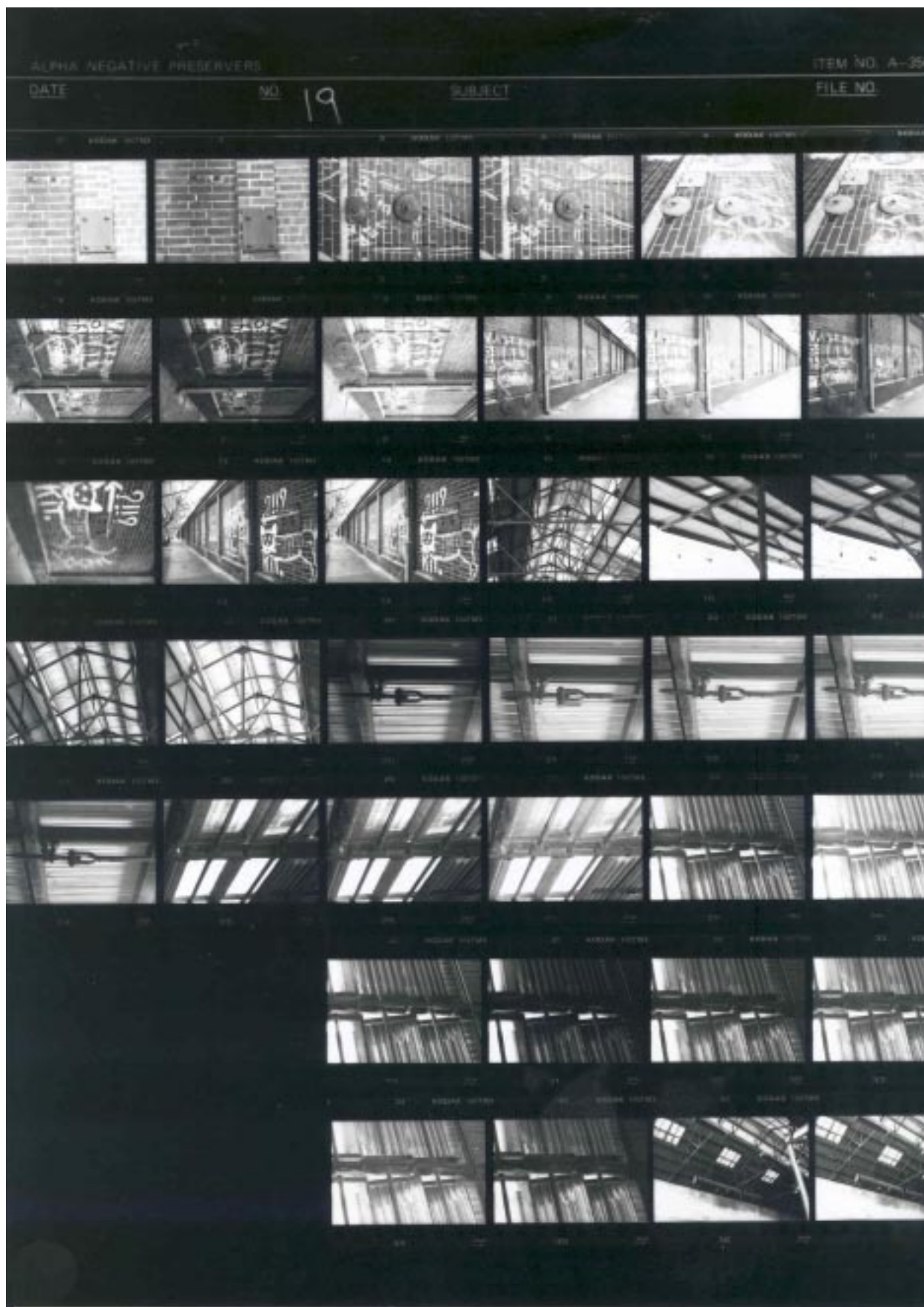






DRAFT ARCHIVAL RECORD

MARCH 2006





9.0 MEASURED DRAWINGS

Reduced versions of the base drawings are included here. These have to be confirmed on site with detailed measurements of areas not now accessible.

