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**EVELEIGH WORKSHOPS MANAGEMENT PLAN FOR  
MOVEABLE ITEMS AND SOCIAL HISTORY**

**Volume VI Appendices**

**July 1996**

**Prepared for**



**City West Development Corporation**

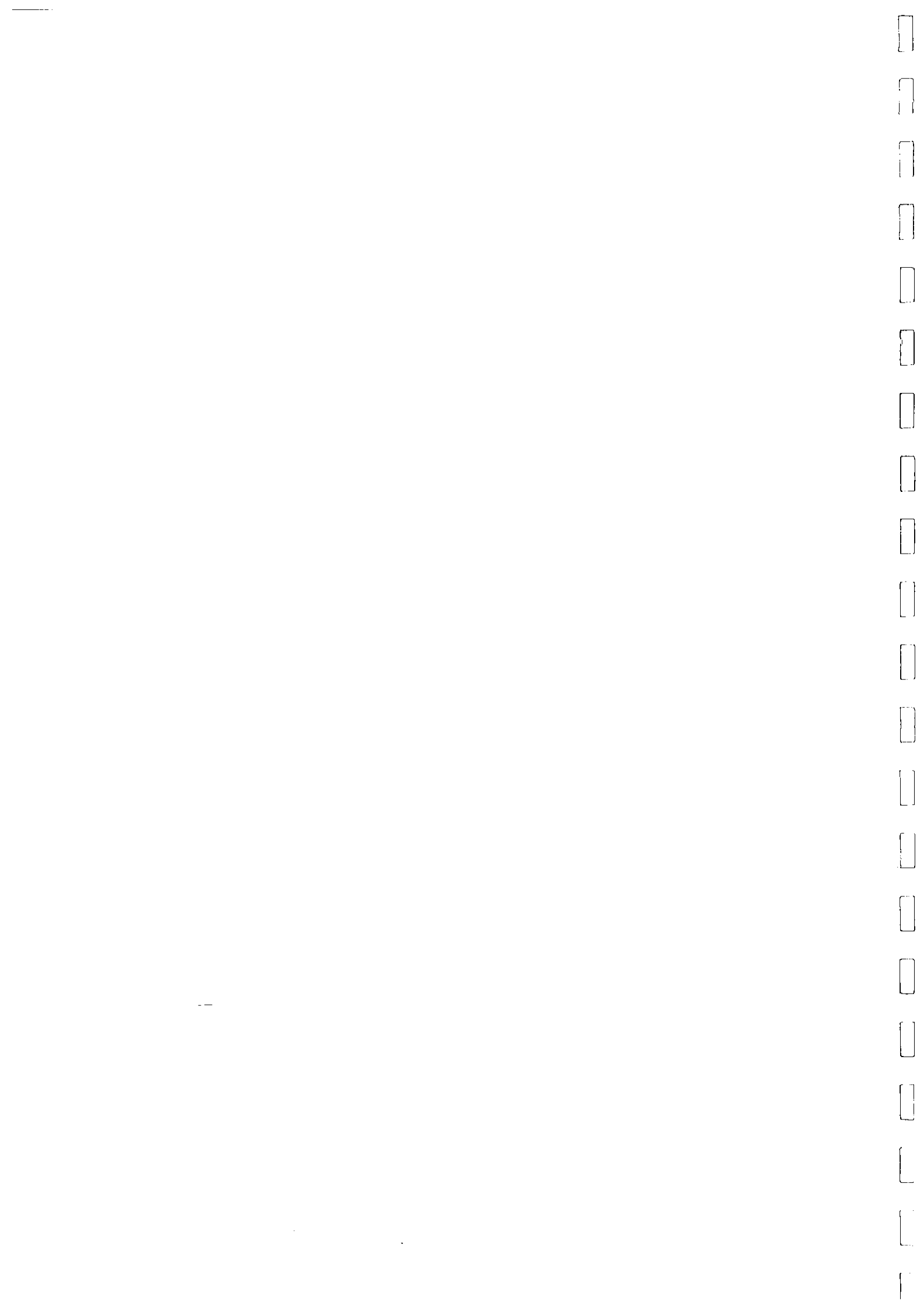


**State Rail Authority**



**Department of Urban Affairs and  
Planning**

**H018**



GODDEN  
MACKAY

This is **Volume VI** of a six-volume set of reports commissioned by City West Development Corporation, State Rail Authority and the Department of Urban Affairs and Planning.

- Volume I      Management Plan for Moveable Items
- Volume II     Social and Oral History
- Volume III    Inventory
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## **APPENDIX A**

### **Study Team**





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Personnel	Responsibilities
Don Godden	<b>Overall Team Leader</b> <ul style="list-style-type: none"> <li>• Co-ordination, management and timetabling;</li> <li>• Review description of relics, function of relics and organisation of workshops;</li> <li>• Prepare heritage assessment of site and individual relics;</li> <li>• Prepare conservation policy;</li> <li>• Prepare management strategies;</li> <li>• Document review.</li> </ul>
Lucy Taksa	<b>Co-ordinator of the Social History Section</b> <ul style="list-style-type: none"> <li>• Co-ordinate and manage the social history;</li> <li>• Interviews with informants;</li> <li>• Obtain select material on history and significance of individual relics from former workers;</li> <li>• Prepare oral history;</li> <li>• Liaise with Mary Dallas in incorporation of Aboriginal social history.</li> </ul>
Joan Kent	<b>Social History Researcher</b> <ul style="list-style-type: none"> <li>• Interviews with informants;</li> <li>• Transcription of interviews;</li> <li>• Assistance with social history report.</li> </ul>
Mary Dallas	<b>Aboriginal History</b> <ul style="list-style-type: none"> <li>• Liaison with local Aboriginal groups;</li> <li>• Preparation of Statement of Social Significance of Workshops to Local Aboriginal Groups.</li> </ul>
Jill Sheppard	<b>Assistant Co-ordinator for Conservation Management Plan</b> <ul style="list-style-type: none"> <li>• Input in to Conservation Management Plan for relics;</li> <li>• Prepare discussion issues, constraints and opportunities;</li> <li>• Co-ordinate interviews with former staff;</li> <li>• Review of report sections.</li> </ul>
Tony Brassil	<b>Industrial Archaeology</b> <ul style="list-style-type: none"> <li>• Input in to Conservation Management Plan for relics as required;</li> <li>• Follow-up interviews with informants;</li> <li>• Description of relics, function and operation of workshops.</li> <li>• Physical condition of relics;</li> <li>• Prepare implementation section.</li> </ul>



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Personnel	Responsibilities
Richard Flanagan	<b>Interpretation Concepts</b> <ul style="list-style-type: none"> <li>• Prepare recommendations for interpretation of the site;</li> <li>• Assist with recommendations for interpretation of individual machines;</li> <li>• Recommendations for written material, signage, audio visual displays and visitation.</li> </ul>
Conservation Department Museum of Applied Arts and Sciences  Roger Parris Ross Goodwin Graham Clegg Kerry Ward	<b>Expert Conservation and Curatorial Advice</b> The Conservation Department, the Museum of Applied Arts and Sciences has offered the services of experts in the following areas: Metallurgy; Fitting and Turning/Conservation; Engineering; Scientific Instrument Making and Conservation. <ul style="list-style-type: none"> <li>• Input in to implementation, conservation procedures and maintenance section of the report.</li> </ul>



**APPENDIX B**

**Railway Workshop Context (pp. 13-18, Eveleigh  
Locomotive Workshops Conservation Plan, prepared by  
Heritage Group, State Projects, 1995)**



## World Development of Railway Buildings

The industrial era and the technology of iron came to many countries with the building of railways and structures associated with railways. Throughout the world railway workshops are often amongst the first and largest heavy engineering developments in a country.

Railway "sheds", over stations, developed differently to railway workshops. Railway sheds needed large spans, also leading to the use of iron, but as there was no need for crane loads, spans could be greater and designs were not constrained by the need for bays. The English models essentially generated by needs and contemporary technology were repeated and developed throughout England and in other countries. In "Railway Architecture" it is estimated there were in excess of 4,000 engine sheds built in Great Britain in the 19th and 20th centuries. The use of the term "engine sheds" overlaps with the term "workshop". They refer specifically to sheds where engines were maintained but also generally to whole railway workshop complexes.

The earliest sheds were roundhouses with a turntable in the centre but these quickly became redundant and straight sheds became more common. The design of sheds was often the responsibility of the chief mechanical engineer and various private companies developed their own standardised design which was then repeated. Well known large sheds included Swindon, Derby, Crewe, Rugby (with 25 tracks), Glasgow, Highbridge, Stafford, York - well known either because of their size or because they have survived.

Throughout the late 19<sup>th</sup> and early 20<sup>th</sup> century steam railways developed throughout the world. No definitive worldwide study has been done and the brief comments that follow are based on published sources and on the personal experiences of the authors of this report and others consulted. There are still operating steam railways in India, China and South America which must have had operating workshops. Little is known about these nor those in Eastern European countries and the former USSR which also must have had operating steam facilities. In a published example in Pakistan the erecting shop of a locomotive works at Moghulpura uses later forms of construction that is, riveted plate construction.

In the USA the Smithsonian Institute commented in 1986, when Eveleigh was still in operation, that there was nothing comparable in the USA. Equivalents were closed, most demolished, one remained as an empty building and one small workshop remained equipped.

In England personal experience and comments of experts at the Ironbridge Industrial Archaeology Institute indicate that most of the once extensive number of equivalent workshops have been demolished. Swindon was originally much larger but is mostly demolished, Ashford in Kent is closed and mostly demolished. Workshops at Crewe and Derby are still railway workshops but have virtually all modern machinery. The Crewe and Derby workshops resemble Eveleigh in their architectural style and in the comparably random layout of the yards.

The Ironbridge Museum is a working museum of traditional trades and a possible model for Eveleigh. England no longer has the heavy engineering capacity it formerly did demonstrated by the necessity to send large wheels to India to be turned.

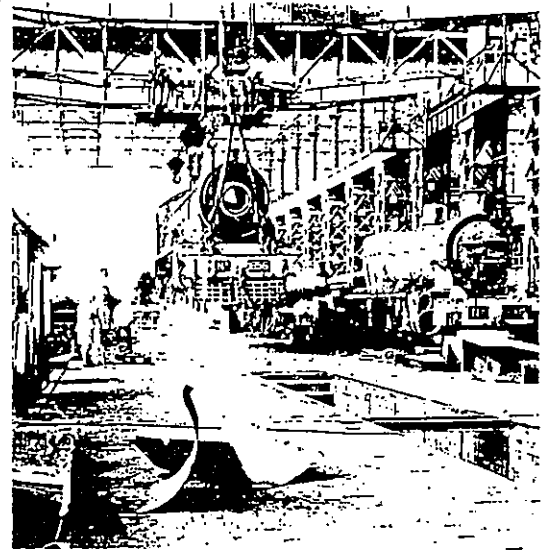


Illustration 1.4: The Erecting Shop of the Locomotive Works at Moghulpura, Pakistan. Though similar in functional layout and structural system to Eveleigh, this building is from a later genre with riveted "lattice" columns, Nock, p.78.



Illustration 1.5: Engine Shed, Hasland, Midland Railway, England, Binney & Pearce, p.169. This is typical of Engine Sheds built in Australia for example, those shown in illustration 1.1.





## Other Iron Buildings

Though iron was used in Greek and Roman buildings it was not in large scale use until the industrial revolution. The large scale structural use of iron was developed in the nineteenth century by engineers who developed a better understanding of the material and in whose structures the use of exposed iron was acceptable.

The development of the use of iron in architecture was confined to a few structural types. Firstly there were the greenhouses requiring large span, open buildings and developed in England and in Europe in the 1830' and 1840's. Then the railway buildings, where development paralleled the expansion of the railways. "The same engineers who built the iron locomotives and rolling stock designed also the roadbeds, the locomotive shelters, the repair shops and the passenger halls." (Steiner p39). This led to the transfer of the technology from engineering structures to buildings, particularly as these structures had no precedents.

Exhibition buildings and exposition halls were another type where the use of iron suited the needs and was aesthetically acceptable particularly when the products displayed included machinery. Markets of various sorts also exploited iron structurally such as the early Covent Garden Fruit Market in 1826 and many late 19<sup>th</sup> century examples in France. Also in the late 1800's iron was applied to department stores as exemplified by the Bon Marche in Paris in the 1870's.



Illustration 1. 6: Glasgow Railway Workshops. The brickwork is similar to Eveleigh with semicircular arched openings. (Believed to be demolished), Binney & Pearce, p. 171.



Illustration 1.7: Glasgow Railway Workshops. The double columns, trussed roof, gantry crane, bays and top lit roof are very similar to Eveleigh. (The Glasgow Workshops are believed to be demolished), Binney & Pearce, 170.



In Australia, surviving examples of these types of buildings include a green house in Adelaide, railway workshops such as Eveleigh and railway sheds such as Sydney Terminal. The large exhibition buildings in Australia tended to be timber eg the Garden Palace, Sydney and the Melbourne Exhibition Building and iron examples are not known. Iron market buildings were built such as the now demolished Darling Harbour Meat Market and the George Street Markets (now site of the Queen Victoria Building), Sydney. Examples in other states are not known but may exist. By the time department stores came to be built in Australia the "Iron Age" was ending and they tended to be built of steel and/or concrete. The Mark Foy's building, Sydney, was modelled on the Bon Marche, Paris, but used an innovative concrete structure. The South Dowling Tram Depot was a late 1908 cast iron columned structure by Cowdery Junior but this is now demolished. The MacLay Museum at Sydney University utilises cast iron structurally and in box gutters within Gothic stone walls.



Illustration 1.8: George Street Markets, 1870, was an example of another type of iron building in Australia. It was replaced by the QVB, Sharkey Collection 776, PWD.

In the period 1900-1910 the structural use of cast and wrought iron was overtaken by the use of riveted steel construction and then by rolled steel. Subsequently cast and wrought iron were mostly used for decorative elements or balustrading, gates, ventilators etc.

Cast and wrought iron are different materials. Early use of iron in building was predominantly cast iron. The use of wrought iron in building developed when new processes were discovered for producing it economically. Cast iron contains about 3.0 - 5.0% carbon (and is more resistant to rust) and wrought iron contains about 0.02 - 1.0% carbon. The removal of carbon gives wrought iron its strength in tension and makes it easier to shape. In comparison cast iron has high compressive strength but is brittle. Wrought iron's malleability enabled it to be rolled into plates and rods and later other shapes that could be riveted. From 1830 to 1850 many efforts were made to combine cast and wrought iron to exploit the characteristics of both materials.

Processes for the manufacture of steel were not developed until the late 19<sup>th</sup> century, steel was not generally available until the 1890's and was not produced in Australia until 1915. Steel is produced by heating iron to high temperatures and adding carbon (up to 2%) in a controlled process. Steel supplanted wrought iron because it could be cast, rolled or forged and could be welded and was more economically made in a mass production process. (Elliot)

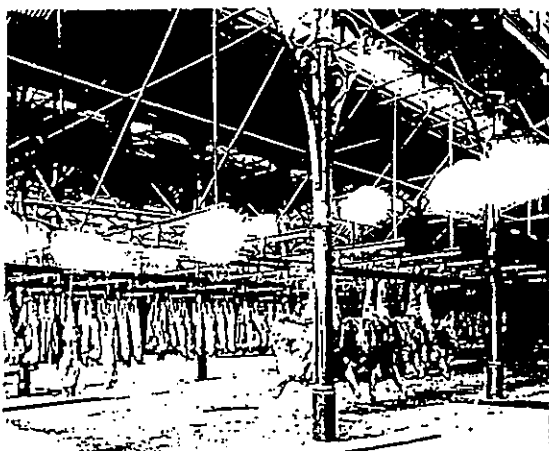


Illustration 1.9: Meat Markets, Darling Harbour. Interior view. The photograph shows round cast iron columns, wrought iron trusses and iron roofs, Sharkey Collection, PWD.



## Australian Railway Workshops

Railways and their associated buildings developed in Sydney, Melbourne and Newcastle from the 1850's, in the mid 1850's in South Australia, in the mid 1860's in Queensland, in 1870 in Tasmania and in 1880 in Western Australia. All States had railway workshops and in some cases there has been a succession of workshops eg Newcastle and Sydney. The construction of large scale workshops coincided with the period of greatest expansion in the rail networks in the 1880's in NSW and Victoria but not until the first decade of the 1900's in Western Australia.

The workshops in Melbourne, Newcastle and Perth have been assessed in detail by C&M Doring and those at Launceston have been inspected by the authors of this report and are compared to Eveleigh in this report. The facilities at Ipswich, Queensland and Islington in Adelaide are not known to the authors and are not commented on. It is understood that neither is of the scale nor substantial character of the other major workshops.

### Newport Workshops, Melbourne

The Newport workshops in Melbourne are comparable in nature and scale to Eveleigh and were built at the same time. They were designed by architects Brereton & Lewis and reputedly based on British Workshops. As an integrated complex and in their design they are superior to Eveleigh. The Locomotive and Carriage Workshops are in one complex on either side of central administrative and power facilities. A "road" ran across the centre of the complex linking all sections of the operations. At Eveleigh the main southern & western railways separated the Locomotive and Carriage Workshops.

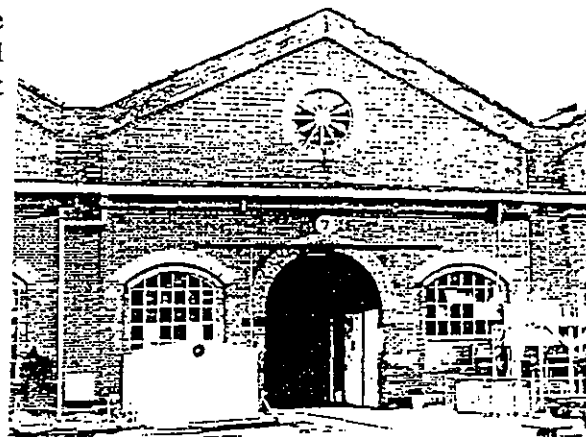


Illustration 1.10: Newport Railway Workshops, Melbourne. The composition of the building is less formal than Eveleigh. At Newport the gable is expressed as a pediment and the windows are semi-circular arches. Generally the buildings are similar with face brickwork divided into bays and forming a parapet, polychrome work around openings, the bulls eye window and the central opening, Doring, Newport.

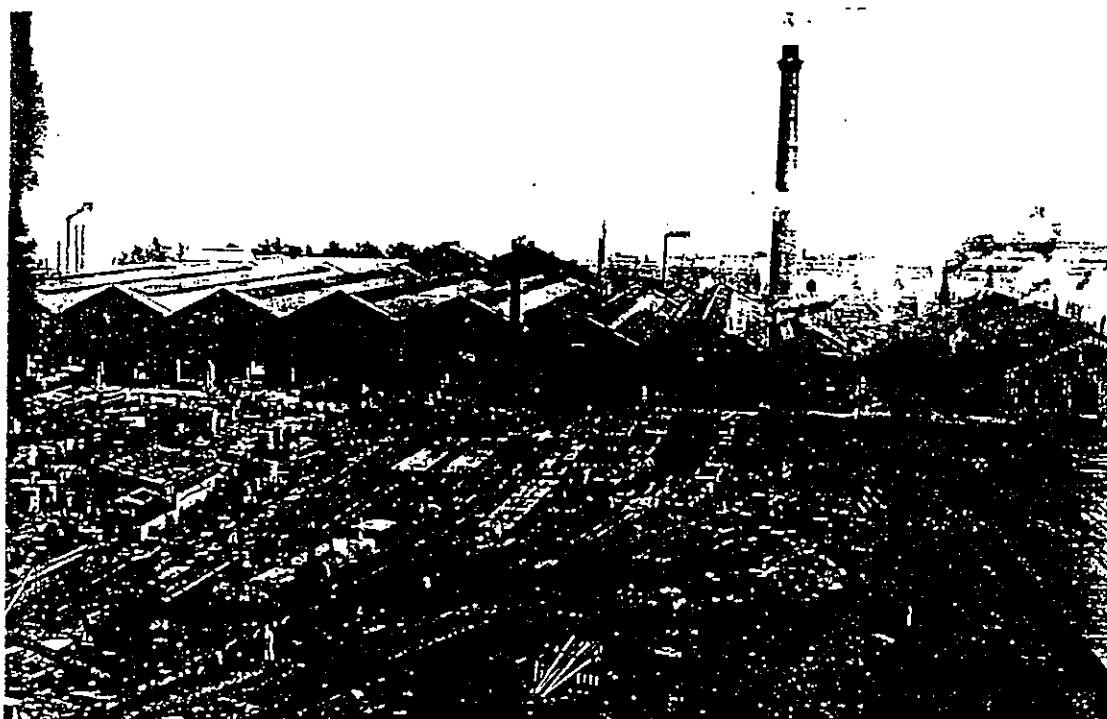


Illustration 1.11: Newport Railway Workshops, Melbourne. Historical view of half of the complex which is repeated to the left of this photo. Note the configuration of the building in bays and how the fan of rail lines serve each bay, Doring, Newport.



The Newport Workshops are similar in overall form to Eveleigh and in fact to the building-“type” described previously. They have a series of bays with brick external walls, double pitched roof with top lights, each bay with a central door and cast-iron windows on each side. The composition of the brick walls is similar to Eveleigh with pediments and semi-circular arches to the doors. The windows however have segmental arched heads and there are no stone dressings. Internally, the columns in the East block, which has no cranes, are single round columns. In the West block the columns are twin H sections which at first give the appearance of the later rolled steel joists. Remarkably, they are cast iron with the twin columns which are in fact being part of one casting. At Eveleigh the columns are round and are much more classically derived. The designers at Newport were probably trying for a more modern appearance. The trusses were not analysed in the Doring report on Newport but, from photos appear to be riveted angles with a flat bottom chord (ie at level of column tops) and span 45 or 47 feet. As at Eveleigh there were many later buildings but of lesser quality and value. At the time of the Dorings’ study of 1988 much machinery was intact, showing the whole range of functions. Since then the complex has largely been stripped with much machinery sold for scrap. The main buildings are being conserved, while ancillary buildings have been removed leaving equipment of world significance, eg 1860 Kirkstall steam hammer and mechanical crane, exposed to the weather.

#### Midland Workshops, Perth

The Midland Workshops in Perth were initially constructed between 1904 and 1912, with continuing additions. They were in operation in 1993 when surveyed by C & M Doring but are now closed. The main building has a structural steel frame of rolled steel sections riveted together in lattice style. It has a saw tooth roof and the external walls are brick divided simply into bays with a straight parapet. The window frames are cast iron. As dictated by their function, the workshops have long wide-span bays with overhead cranes, the bays arranged side by side. This is in common with Eveleigh and Newport but the character of the buildings is substantially different because of their later construction date.

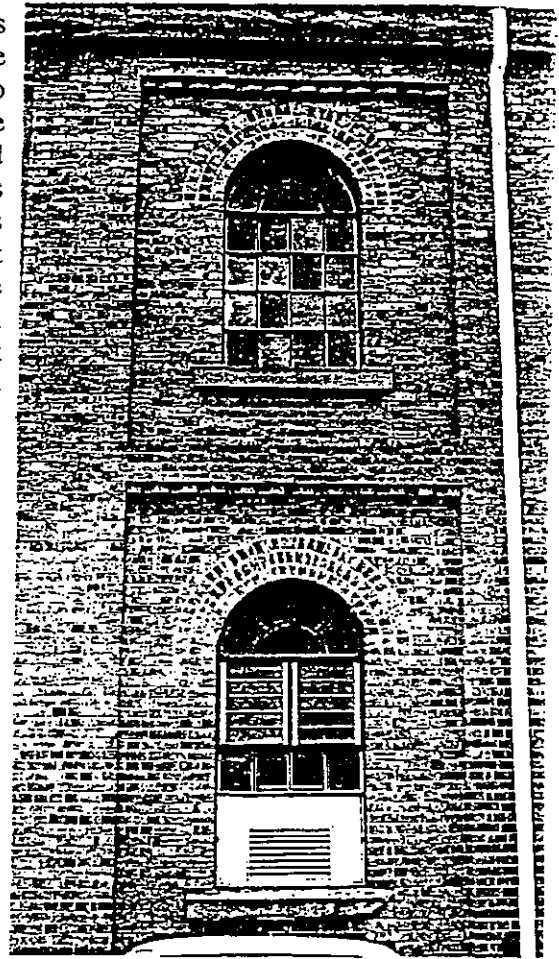


Illustration 1.12: Honeysuckle Point. Detail of former Loco Boiler Shop, showing brickwork detailing, store sills and cast iron windows, Doring, Honeysuckle.



Illustration 1.13: Honeysuckle Point Workshops, NSW, Interior view. Note the double columns and lattice girders, identical to Eveleigh. The roof trusses are timber, Doring, Honeysuckle.





Though not as large as Eveleigh or Newport, Midland has a more comprehensive collection of workshops and their machinery and plant were all in working order in 1993. The functional layout is more sophisticated at Midland. The future of the workshops is uncertain and plans for complete demolition and redevelopment have been abandoned because of the prohibitive cost of decontamination.

#### Honeysuckle Point Workshops

The Honeysuckle Point workshops are contemporary with Eveleigh and the former Locomotive Boiler shop was designed by Cowdery and has the same double columns and lattice girders as Eveleigh. They support an 1884 Craven rope drive crane which was still threaded with the rope when surveyed in 1990 (therefore the only example in Australia with intact rope drive). The buildings however are much smaller, 2 bays wide and the bays are much narrower and are spanned with timber trusses. Recent works have stripped much of the relics associated with the railways.

#### Launceston Railway Workshops

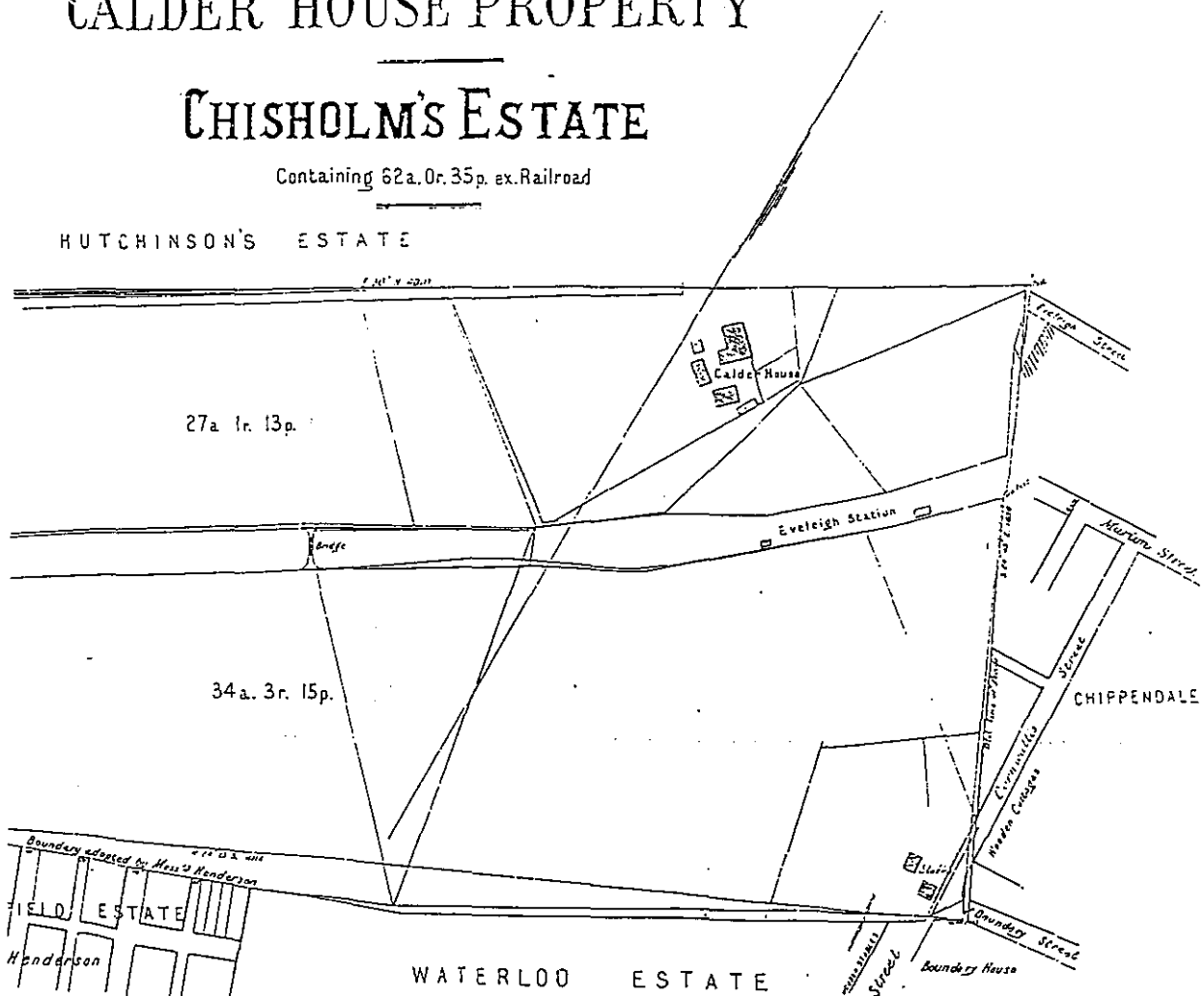
The Launceston Railway Workshops are closed and are subject to redevelopment. They are a smaller scale complex and though the buildings represent a range of functions much of the machinery has been stripped. The buildings are generally of timber and iron with some recent major concrete framed buildings.

## CALDER HOUSE PROPERTY

### CHISHOLM'S ESTATE

Containing 62a. 0r. 35p. ex. Railroad

HUTCHINSON'S ESTATE



Plan 2. 1: Chisholm's Estate. This plan shows Chisholm's land when it was resumed for the Eveleigh Rail Yards including his house, the main rail line bisecting the property and also Eveleigh Station and a bridge. SRAO ELW1.



**APPENDIX C**

**Historical Background (Sections 3.4-3.7 Eveleigh Locomotive Workshops Conservation Plan, prepared by Heritage Group, State Projects, 1995, based on the 1986 Godden Mackay Heritage Study of Eveleigh Locomotive Workshops, pp. 21-58)**



### 3.4 THE EVELEIGH YARDS

See Godden Makays "Heritage Study" for a more detailed history of the Eveleigh Yards. The chronology which follows, notes key events in the development of the yards..

Plan 2.3 on page 23 is an 1887 diagram of the Workshops. It shows the original configuration and indicates broadly how the yards operated. The site is bisected by the main lines with the Paint Shop and Carriage Shops to the north and the Locomotive Shop and Engine Running Shed to the south.

The Engine Running Shed is now demolished but was the first building completed and was the building over which Cowdery was criticised for extravagance. It comprised three segmental arched bays each covering 7 "roads" without intervening columns



Illustration 1.15: Engine Running Shed, Eveleigh. The interior view shows the iron structure of the arched roof, Sharkey Collection 971, PWD.

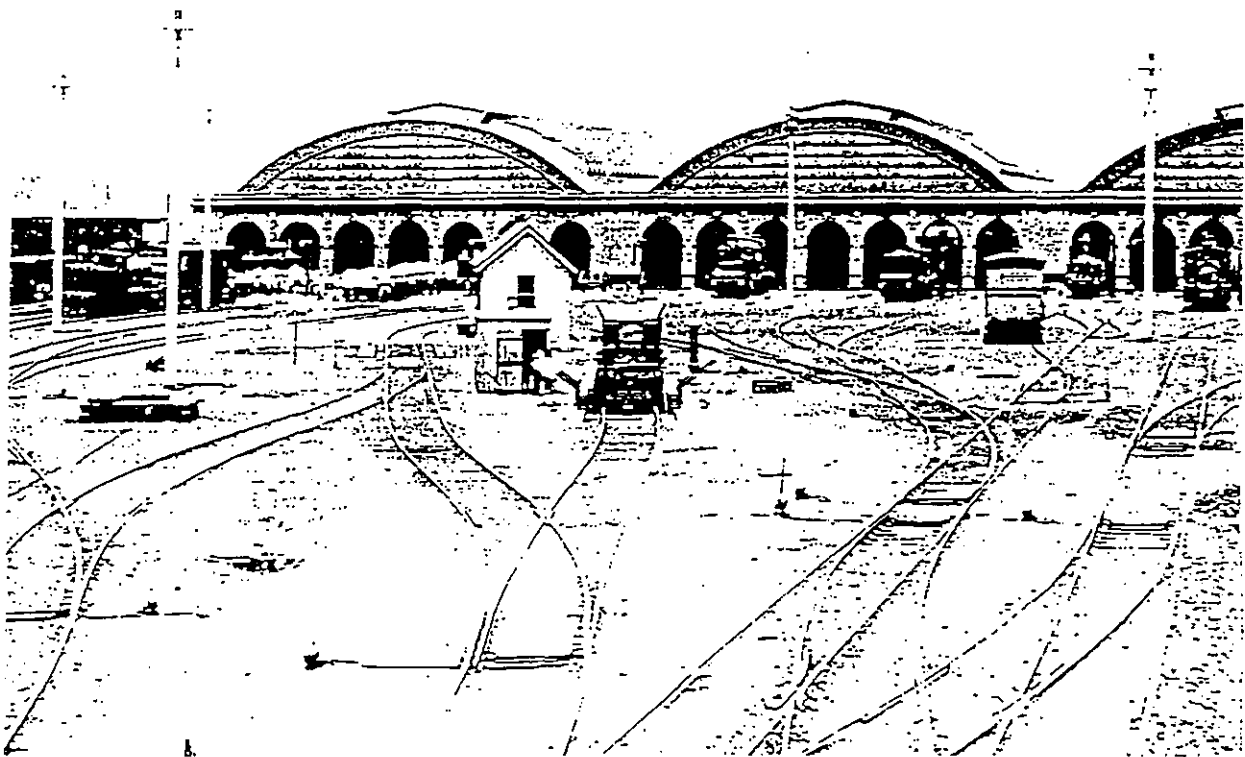


Illustration 1.14: Eveleigh Engine Running Sheds, 1887. Exterior view showing Cowdery's segmental arched roofs each covering seven "roads". The last bay was demolished in 1960, Burke, p143.



The original phase of the yards to 1897, included Bays 1-15 of the Locomotive Workshops, Bays 16-25 of the Carriage Sheds, the Engine Running Shed, the Paint Shop, a General Store and various smaller buildings and the associated turntables, traversers and rail lines. Later developments are described in the "Heritage Study". The major changes were the demolition of the Running Shed (northmost bay in 1925, then the southernmost bay, and the middle bay in 1965) and the resumption of adjacent houses to the south for the Alexandria Goods Yard (c 1917). The yards continued to grow and expand throughout its life, and functions were continually changing. In later years workshops at Chullora and Clyde took over aspects of work formerly performed at Eveleigh and functions were rearranged accordingly. The yards declined gradually in the late twentieth century as the work culture changed, until the closure in 1988. Today the functions formerly carried out at Eveleigh are no longer carried out by government enterprises or no longer carried out in Australia.

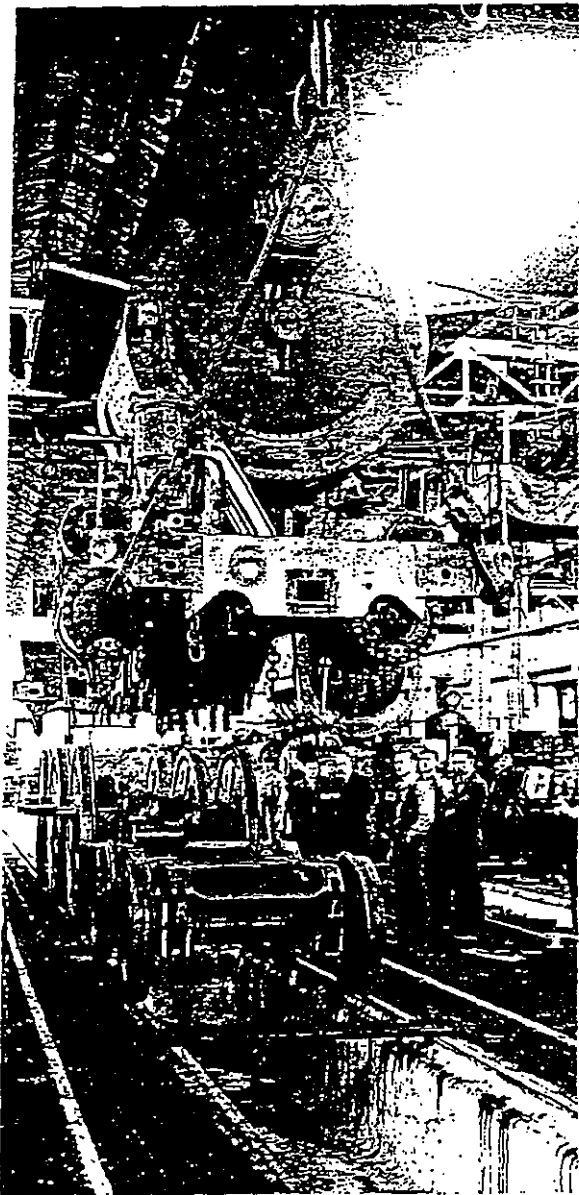


Illustration 1.16: A C38 being lowered to the wheels in the Erecting Shop at Eveleigh. This building remains in SRA ownership and use, Burke, p.191.

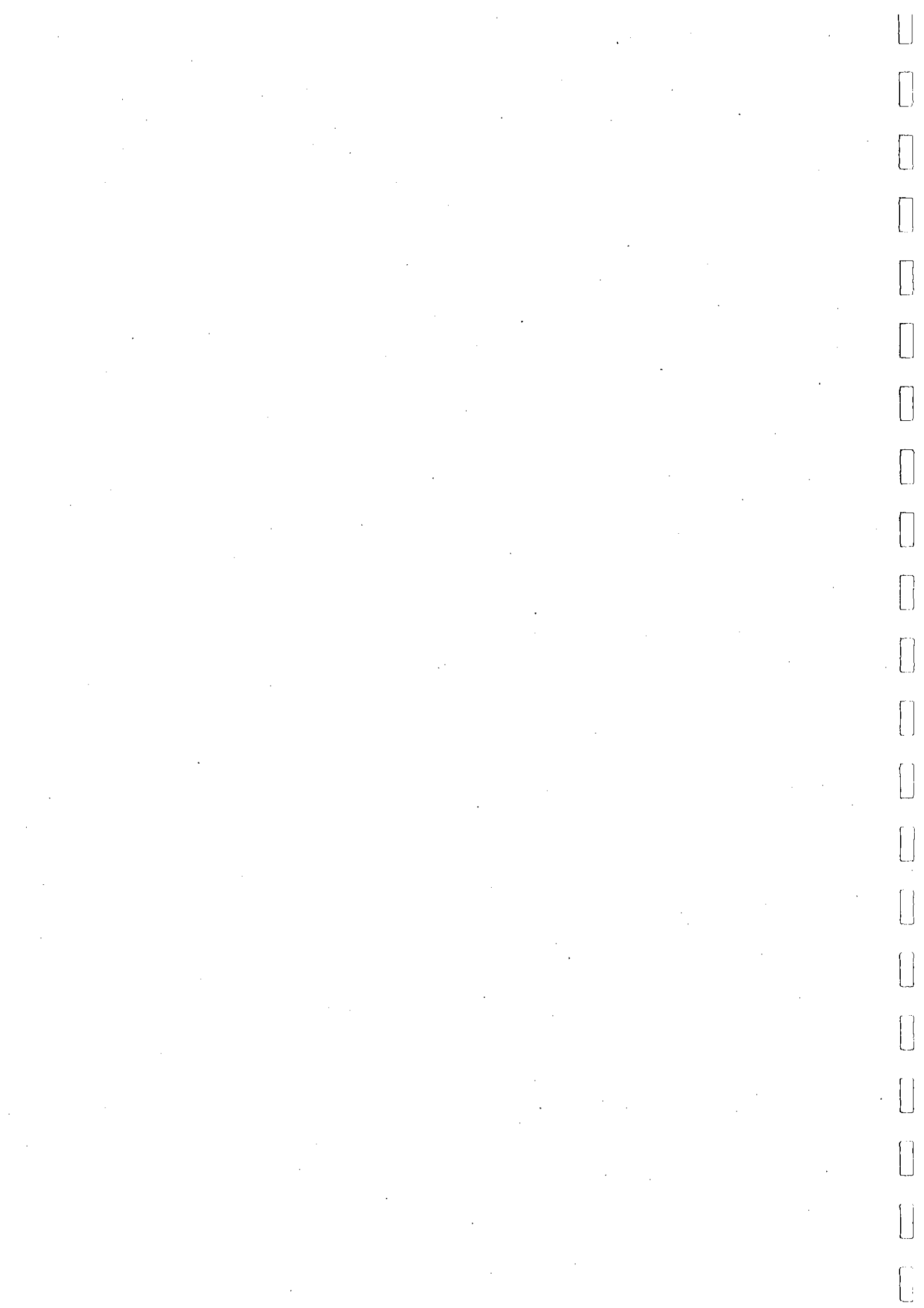




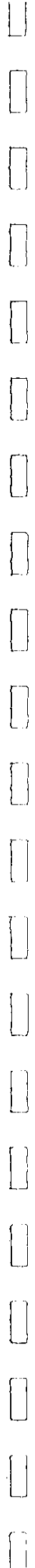
2. 5: 1924 plan showing the arrangement of the Locomotive Workshops. It indicates the function of each building and shows the lines, turntables and traversers linking buildings. SRA Plan Room.

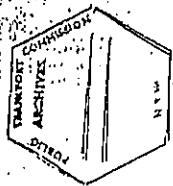




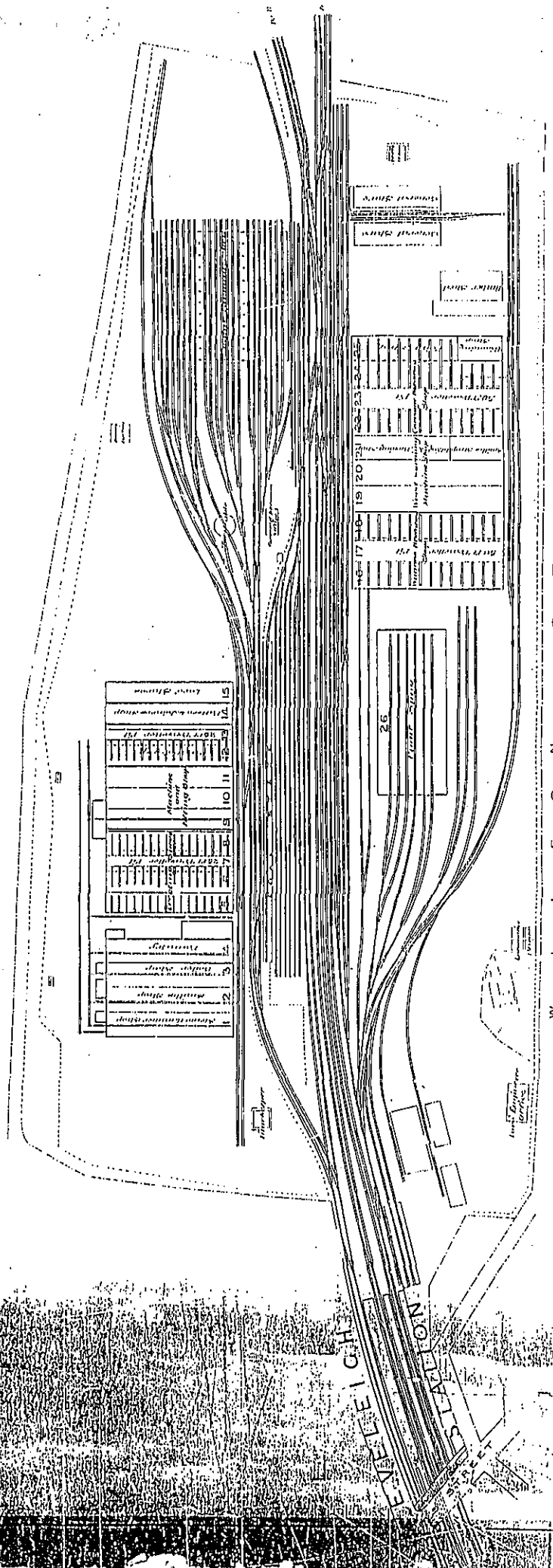


Plan 2. 3 Diagrams of Workshops in 1887 showing original configuration. The Locomotive Workshops are Bays 1 - 15 above the main railway line with the Engine Shed to the right. To the north (below) are Bays 16 - 25 the Carriage Repairing Shop, the Paint Shop, various stores and on Wilson Street the Locomotive Engineers Office and the Locomotive (water tank with Calder House between them. SRAO EW7





N. S. W. R.  
DIAGRAM OF WORKSHOPS  
FVELHIGH







2. 5: 1924 plan showing the arrangement of the Locomotive Workshops. It indicates the function of each building and shows the lines, turntables and traversers linking buildings. SRA Plan Room.







Plan 2. 4: Plan dated 1893, and updated in 1898 by the Eveleigh Chief Mechanical Engineers Office showing the water service. It shows the Locomotive Workshops still with their original functions but various ancillary buildings have been added around it, eg. foundry and laundry, SRA Plan Room.

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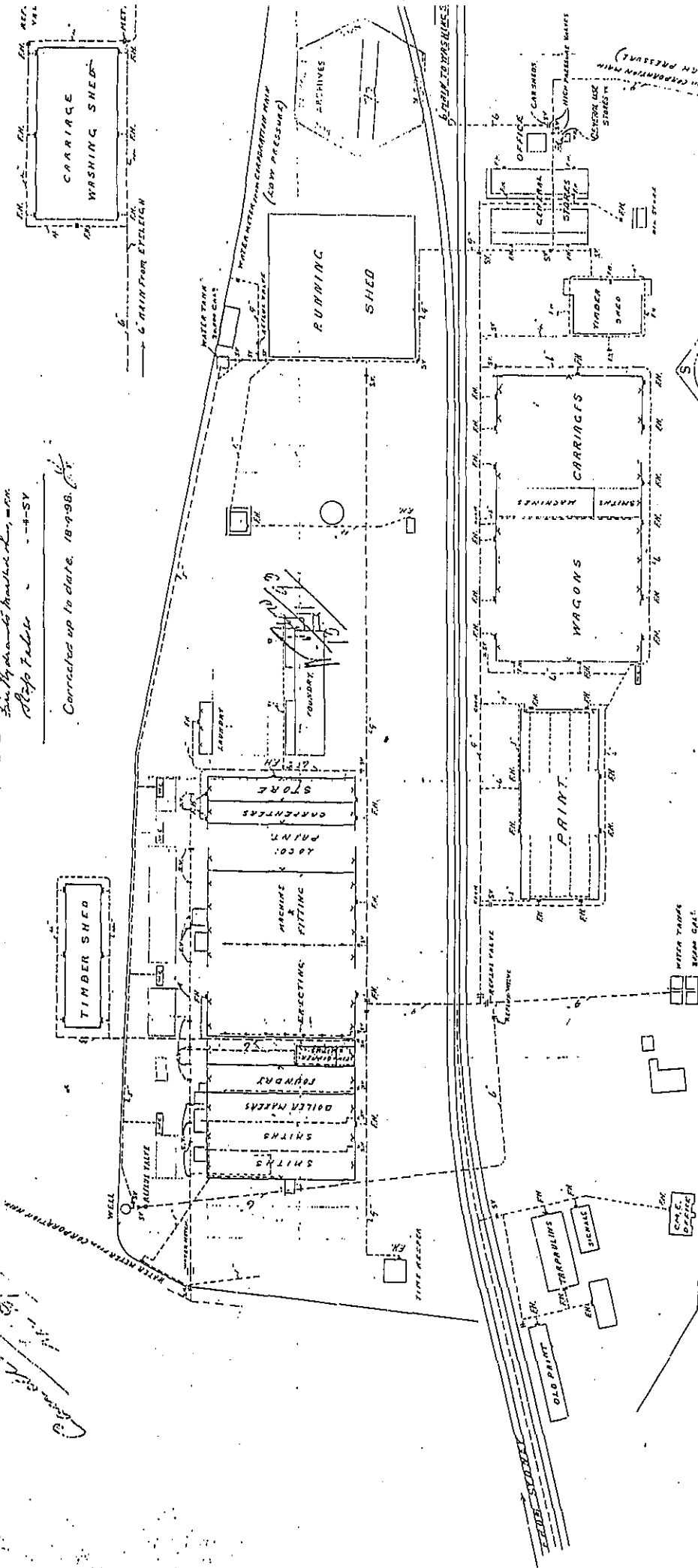
1893

# NEW SOUTH WALES GOVERNMENT RAILWAYS

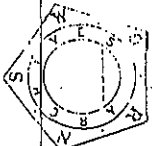
Plan of Water Service - Enslip Workshops

Note: See Appendix to this plan, with  
Stop Table - 1893

Corrected up to date. 18-9-98.



Chief Mechanical Engineer's Office  
Enslip 8-2-98-1893

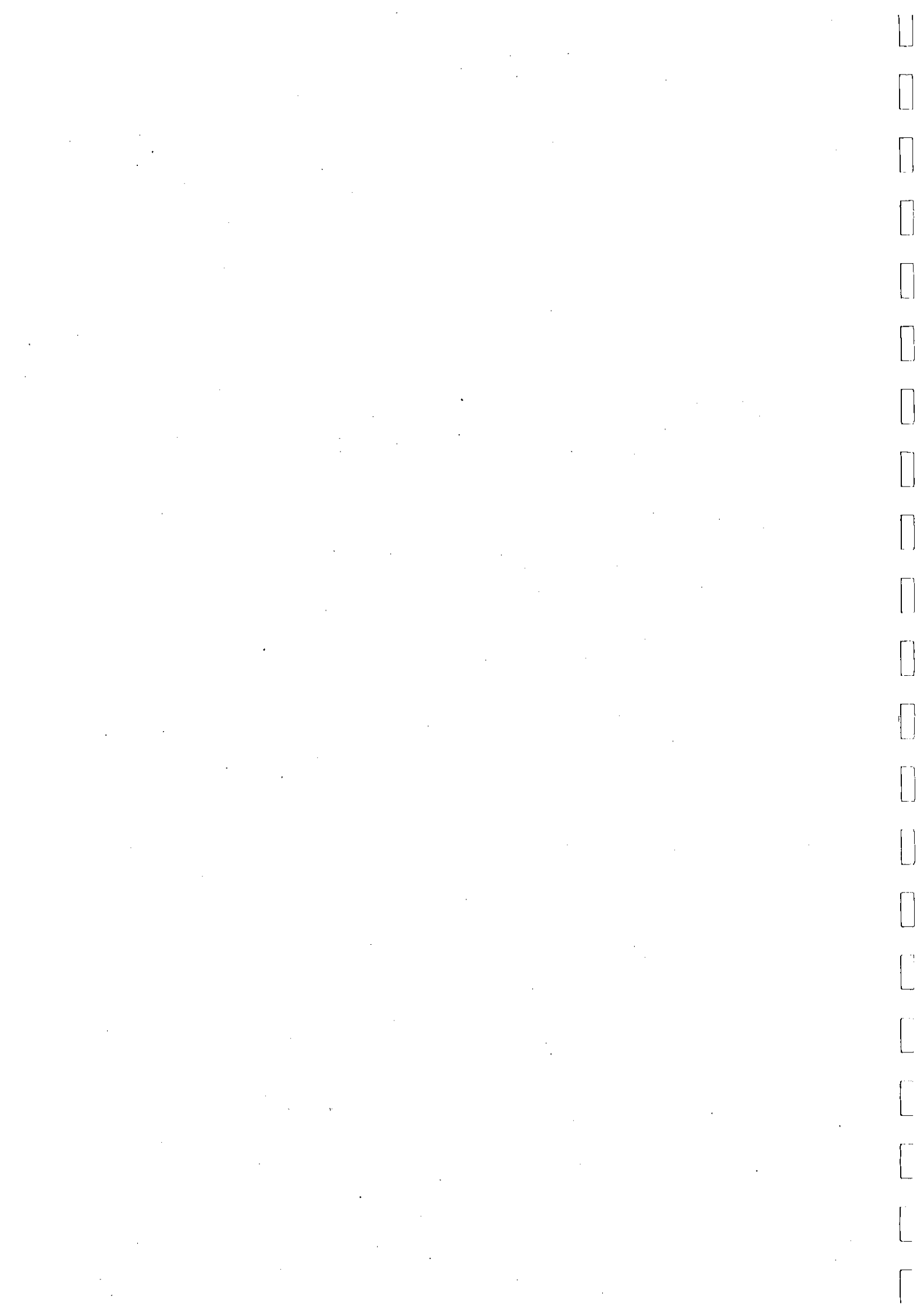


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Scale, 1 inch = 132 ft

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### 3.5 THE LOCOMOTIVE WORKSHOP

#### 3.5.1 Chronology

The chronology has been prepared from a range of primary and secondary sources which are listed in the bibliography. The chronology covers both the yards and the workshop but concentrates on the Locomotive Workshop.

- 1871 Planning for a large modern workshops complex at Redfern began.
- 1875 The site at Eveleigh was selected.
- 1880 Settlement for land was reached - 64.5 acres resumed from the estate of the late John Chisolm for c. \$100,000.
- 1882 Clearing of land commenced. Because of the sandy nature of the soil, much work went into the design and construction of the workshop foundations.
- 1884 The contract for the construction of Bays 1-4 was let to George Fishburn for a cost of \$40,725 and work was commenced shortly after.
- 1885 Work underway and purchase of machinery commenced. The foundations for Bays 5-15 were completed, enabling the contract for the construction of these bays to be let to John Ahern at a price of \$80,837.
- 1886 Construction of the workshops continued.
- 1887 Workshops 1-4 were officially opened. These contained the 'dirty trades' of foundry work, boilermaking and blacksmithing. They were originally separated from Bays 5-15 by a space equivalent in width to one of the bays. Annexes were built on the southern and western sides.
- 1887 (late) Workshops 5-15 were completed and opened

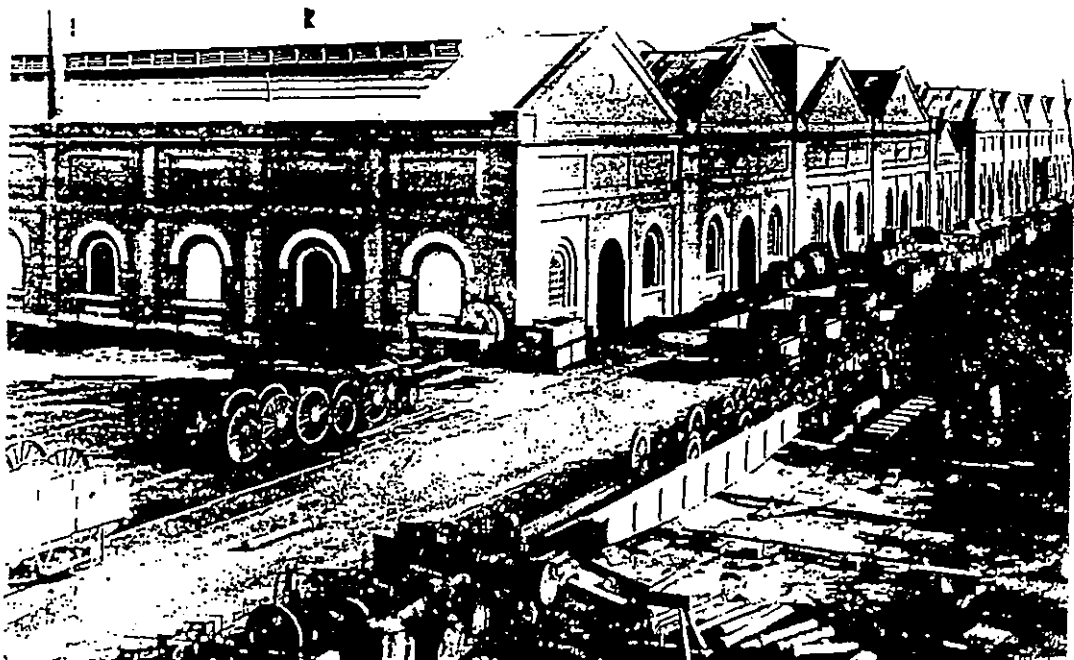


Illustration 1.17: View from the north, Eveleigh Workshops showing original configuration. Note eastern wall windows and Bay 4a. There is a turntable on tracks to Bay 1.. 1884. ML GPO Video Disk 1 06678

- 1892 Union negotiations led to the workshops being closed on Saturdays
- 1896 Lightening rods fitted to 120 foot high chimney for Boiler House behind Bay 2/3. An extension of 200 feet added to the western end of the Large Erecting Shed (west of the Loco Shop) completed 1896.
- 1899 Large Erecting Shop added to the site, to the west of the Loco Shop, enabling many of the engine repair functions to be removed from the main building. Work commenced on converting Bays 12 and 13 for an Interlocking Shop. This work began in November with the removal of the brick wall between Bays 11 and 12 and the installation of iron columns and crane girders. A compressed-air plant was installed in an annexe to Bays 3 and 4. New foundry erected adjacent to large Erecting shop allowing Boiler Shop to expand into Bay 4.
- 1900 Compressed air plant installed in Boiler Shop (Bays 3-4) and air mains installed.
- 1901 By the end of 1901, work on the conversion of Bays 12 and 13 was near completion. The Ground-Traverser from Bay 13 was dismantled, removed and re-erected outside Bay 15 between it and the Large Erecting Shop. The rails in Bay 13 were removed, the pits filled-in and a crane installed in Bay 12. Work also began on the conversion of the rope-driven cranes to electric motor drives, as the recent installation of AC current generators at Ulimo Power Station had made the supply of electricity to the Railways easily and cheaply available. This work was completed for the main workshops in September 1902.
- 1902 A new Copper and Tinsmiths Shop was erected in a shed on the southern side of Bays 5-9, the former shop in the laneway between Bays 4 and 5 was demolished shortly after. A large corrugated iron building was erected on the eastern end of the workshops to house a Spring Shop in the northern half and Steam Hammer shop in the southern half. This allowed expansion of the Blacksmith Shop into Bay 1 and the Boiler Shop.

Most overhead cranes in the workshops were converted to electric drives. A 5-ton Craven electric crane was installed in Bay 9.

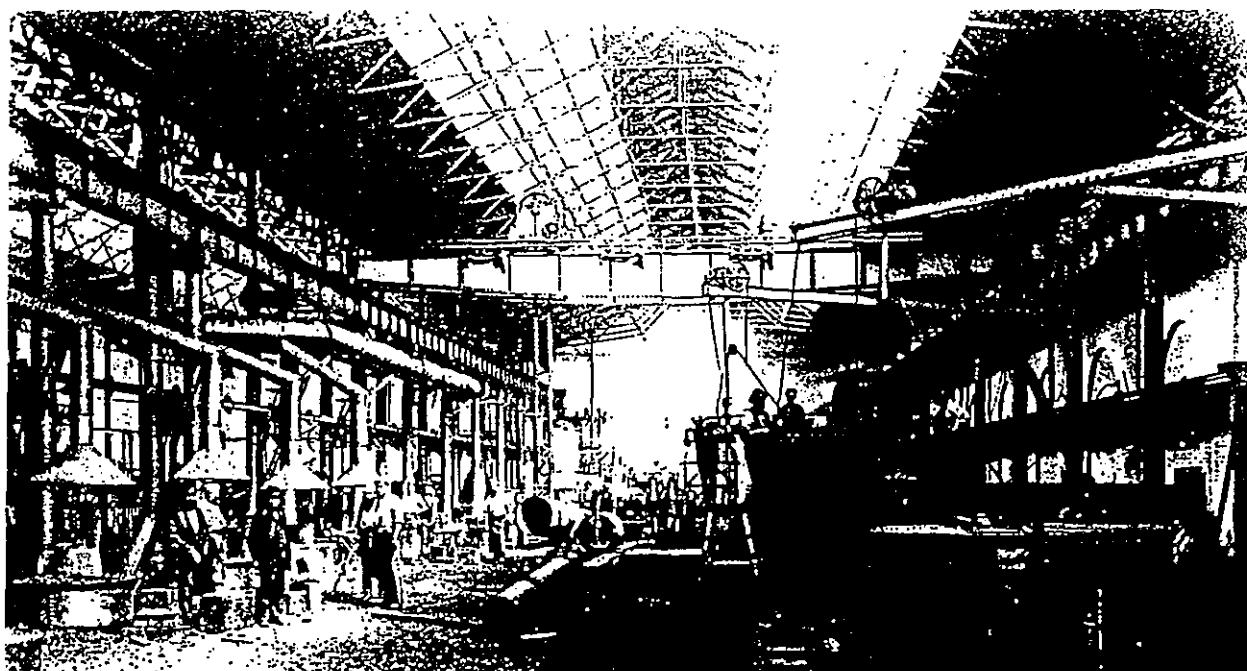


Illustration 1.18: Interior view looking south along Bay 3, prior to the wall on the right being demolished. Note the wall engine at centre back. The flues correspond with the flues on the original plan. ML GPO Video Disk 06681 Sh 976, 1884.

- 1903 The annexes located in the laneway between Bays 4 and 5 were demolished and the laneway was roofed over and end-walls erected to match the surrounding building. The wall adjoining Bay 4 was removed and replaced by iron columns. The Boiler Shop then expanded into this bay.
- 1905 The above works were largely completed.
- 1906 Ground Traverser between Bay 15 & Large Erecting Shed converted to electric power.
- 1907 The Commissioners for Railways decided to begin the manufacture of new locomotives at Eveleigh and the New Locomotive Shop (to the east of the Loco Shop) was designed and constructed for this purpose. A new compressor house was also established to the south of the New Locomotive Shop. Ground Traverser (between Bay 15 and the Large Erecting Shed) extended to south.
- 1908 Four "M" class Locomotive boilers installed in Bay 2-3 Boiler House.
- 1910 Construction of indoor toilet facilities in workshops - result of labour negotiations.
- 1911 A Grinding and File Making Shop was established in the old Cleaning Annexe behind Bay 9.
- 1914 Electrification of machinery in the workshops was a major undertaking, Bay 14 was completed in January and Bays 8 and 9 were completed by the beginning of August.
- Bay 11 became part of the Machine Shop as a temporary arrangement. It was also converted to electric drive.
- Lockable tool room installed in Bay 14, a 110ft. long pit in constructed in Bay 4..
- All steam pipes in the workshops were lagged with asbestos.
- New Locomotive Shop extended to the South.



Illustration 1.19: Eveleigh Rail Yard in 1910. The Spring Shop on the left. Note a second tower has been added and Bay 4a has altered, ML GPO Video Disc 1, 12018.

- 1914-18**      *World War I.* War needs strained capacity of railways. Though workers supported the war it brought worse conditions and declining wages.
- 1915**      Bay 7 Ground Traverser was converted to electric drive.  
The Machine Shop wall mounted steam engines were replaced by electric motors. An additional 25-ton electric overhead travelling crane was installed in Bay 4.  
The Millwrights moved from the former Laundry into a section of Bay 9
- Public Works Annual Report includes "Report on Locomotive Manufactories and Locomotive Repairing Establishments", by A. Forster, Design Engineer, Metropolitan Railway Construction Branch. Report analyses workshops in Europe, England, America and Australia as a result of surveys in 1911-1914. The report concludes that Eveleigh works are too congested and recommends establishment of a new locomotive and repairing works.
- 1916**      Electrification of machinery in the machine shop (Bays 10-13) was completed.  
Ajax forging machines were installed in the Blacksmiths Shop.  
A trial production run of 5000 18lb field gun shells was made - this was later discontinued.
- 1917**      A new Pattern Shop was constructed, the old Pattern Shop in Bay 14 was vacated and subsequently became part of the Machine Shop.

Several new buildings were completed which led to a rearrangement of the workshops. The Steam Hammer Shop was moved to a new shed behind Bay 1; Bays 1 and 2 remained the Blacksmiths Shop and Bays 3, 4 and 4a remained the Boiler Shop. Bays 5-8 contained the Old Erecting Shop, with the Traverser in Bay 7. Twenty-four engines and twelve tenders could be accommodated in this section. Bays 9-14 housed the now extensive Machine Shop, with the Tool Room on the northern side of Bay 14. The Millwrights were again moved, this time from Bay 9 to the northern side of Bay 15, which continued to house a Locomotive Store, much reduced in size, in its southern side.

Strained conditions led to eight strikes at Eveleigh between July 1915 and July 1917. In 1916 James Fraser (Acting Chief Commissioner) addressed workers at Eveleigh on introduction of the Taylor card system. The introduction of this system on 2 August 1917 led to an 82 day general strike. It started when 1100 men struck at Randwick Tramway Depot and 3000 at Eveleigh. Volunteers kept trains running including boys from Newington and S.C.E.G.S. (Shaw) private schools at Eveleigh.



Illustration 1.20: Schoolboys from Newington in the Eveleigh Workshops during railway strike, 1917, Newington College 1863-1963, p.89.

- 1922 The Bay 7 Grand Traverser was removed and the Bay converted into another workshop with a 35-ton electric overhead crane installed.
- 1923 A major portion of the boiler repair work was shifted to a new facility at Chullora.
- 1924 First Australian Railways Union (ARU) Shop Committee established at Eveleigh.
- 1925 The northern half of Bay 1 was cleared and a 1500-ton capacity 'Davy' press was imported from England and installed. Two boilers were installed with it to provide steam to drive the air-compressor which drove the press. The boilers penetrated the east wall with the flues outside and the furnaces inside. New crane installed at about this time to service the Davy press.
- Manufacture of new locomotives ceased.
- 1937 Chullora Workshop opened enabling much of the repair work to be removed from Eveleigh and the old Erecting Shop located in Bays 5 and 6 was vacated later in the year.
- 1939 Shower facilities installed.
- 1939-45 *World War II*
- 1940s Stan Jones led Eveleigh Shop Committee of ARU. Jones was an influential figure and one of the Communist Party's leading activists.
- 1940 As a result of World War II, Bays 5 and 6 were cleared of machinery and plans drawn up for the installation of equipment supplied by the Department of Defence for the manufacture of 25lb field-gunshells.
- 1941 A mezzanine floor supported on timber columns was added to Bay 5 and the machinery for shell manufacture installed by February. Bay 8 was altered for a ammunitions annexe.
- 1943 By this year Bay 8 was vacated as the Department of Defence had organised its own factories. The Millwrights was gradually transferred from Bay 15 to this location.



Illustration 1.21: View from Redfern overbridge. Bay 3 has a high level window. Note the chimney stack, the additional tower, which now total three, and the Spring Shop to the north of the Workshops. SRAO ELW 601/41

1945 Production of 25lb field-gun shells ceased in Bay 5 with the end of World War II. The machinery was removed soon after.

Reintroduction of construction of new locomotives.

1946 The transfer of Fitting Shop machinery from Bay 15 where it was housed during the war, to Bays 6 and 7 was completed by August.

An extension to the crane runway of the 5-ton crane in Bay 1 was undertaken in October. (This crane runway was probably originally installed in 1925 with the Davy Press)

1947 Forty-eight 25-cycle AC welding power points were installed around the workshops.

1949 Plans were drawn up to convert the Bay 5 mezzanine level to a staff canteen and meal room with a recreation facility. This was carried out later in that year.

Stan Jones resigns over coal strike.

1940s late Cleaning of boilers, as described by Vince Kenny, involved stripping interior of boilers and whole shop was full of asbestos dust.

1950 Construction of new locomotives ceased.

1955 The Machine Shop, which now occupied seven bays, provided 7,000 separate items per year in addition to the milling and machining of parts for the repair of locomotives.

Railway centenary.

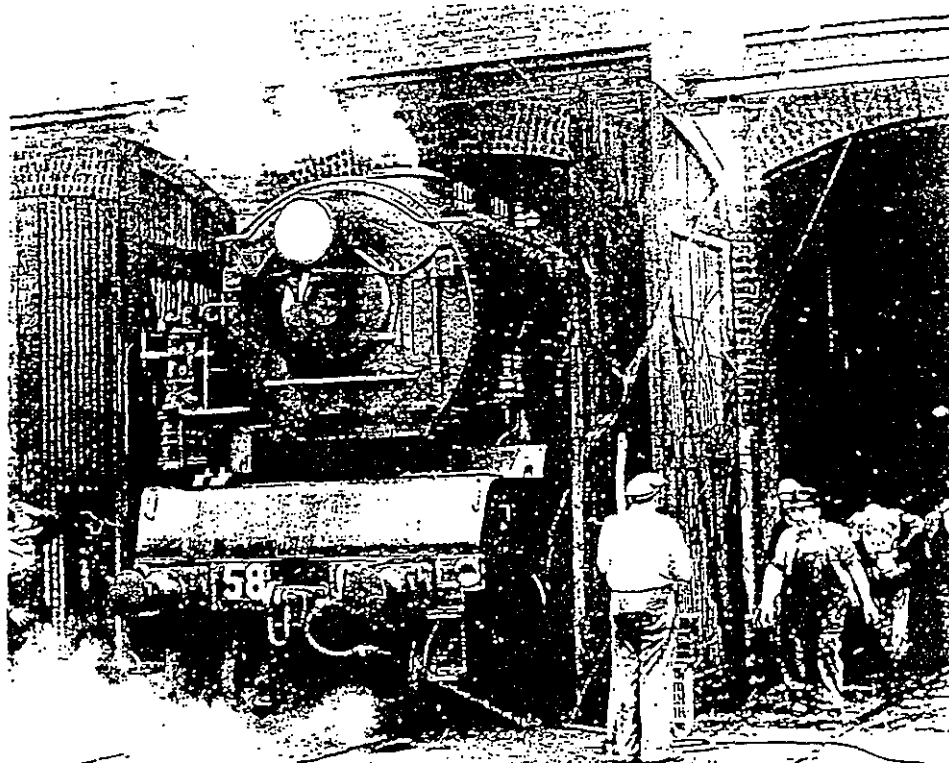


Illustration 1.22: Fitters at Eveleigh shepard 5801 from the Locomotive Workshops for the trial trip of 19<sup>th</sup> January 1950. The mountain type D58 was the largest locomotive built in Department workshops. Eleven were built at Eveleigh and another two at Cardiff. Burke, p.192.

- 1950's Contracting of work to private workshops increased due to lack of staff.
- c.1965 Steam locomotion abandoned.
- 1970's Rearrangement and re-equipment to update the works. The Blacksmiths remained in Bays 1 and 2. Bay 3 contained a Hot Spring Coiling Section in its northern half and a Heat Treatment Plan in its southern half and Bays 4 and 4a contained a Fabrication Shop. Bay 5 contained the Staff Canteen in its southern half and a portion of the Fitting Shop in its northern half. Bay 6 housed the Fitting Shop in its southern half and the Apprentice Section in its northern half, while Bays 7 and 8 contained the majority of the Fitting Shop. Bay 9 was given over to the production of wheels and axles and Bays 10,11 and 12 contained the Machine Shop. Bays 13 and 14 housed an Air Brakes Shop in their southern half and the Tool Room occupied the northern half of both bays. Bay 15 housed a Rail Motor Test Room on the north side and a store remained in the southern half.
- 1980's Decisions taken to remove railway workshop activities from the Eveleigh Locomotive Workshops. Activities progressively wound down.
- 1988 Railway workshops activities closed.
- 1989 Paddy's Markets relocated to Bays 5-15; Remaining historic machinery relocated to Bay's 1-4a.
- From 1989, buildings on site were progressively demolished over an extended period including the Pattern Shed, Foundry, Smith's Shops and most recently the Wheelpress Shop.
- 1991 NSW Government announced the creation of a Technology Park at Eveleigh in association with the University of NSW, the University of Sydney and the University of Technology.
- Decontamination works were carried out to cleared areas of the site progressively.
- 1994 Paddy's Market returns to Haymarket.
- 1995 City West Development Corporation takes ownership of the Locomotive Workshops, Bays 1-15, in addition to the New Locomotive Shed and the Manager's Office.
- Contracts let for the conversion and adaptive re-use of the former New Locomotive Shed and Manager's Office and for construction of public domain works.

### 3.5.2 Sequence of Development

The main structure of the Eveleigh Locomotive Workshops were little altered in fabric or function (until its recent closure) from its original construction. There were many small additions and many functions moved from bay to bay or to other buildings. This section analyses the changes with particular reference to the plans held in railway archives and to historical photographs. See captions and notes on photographs and plans for additional information. The SRA plan room was visited and was found to hold some hundreds of plans relating to this building. Those obviously relevant were accessed but time did not allow for these records to be searched more thoroughly. Diagrams indicate the way the workshops developed generally and the configuration of the buildings at the end of each phase but do not address internal arrangements in detail.

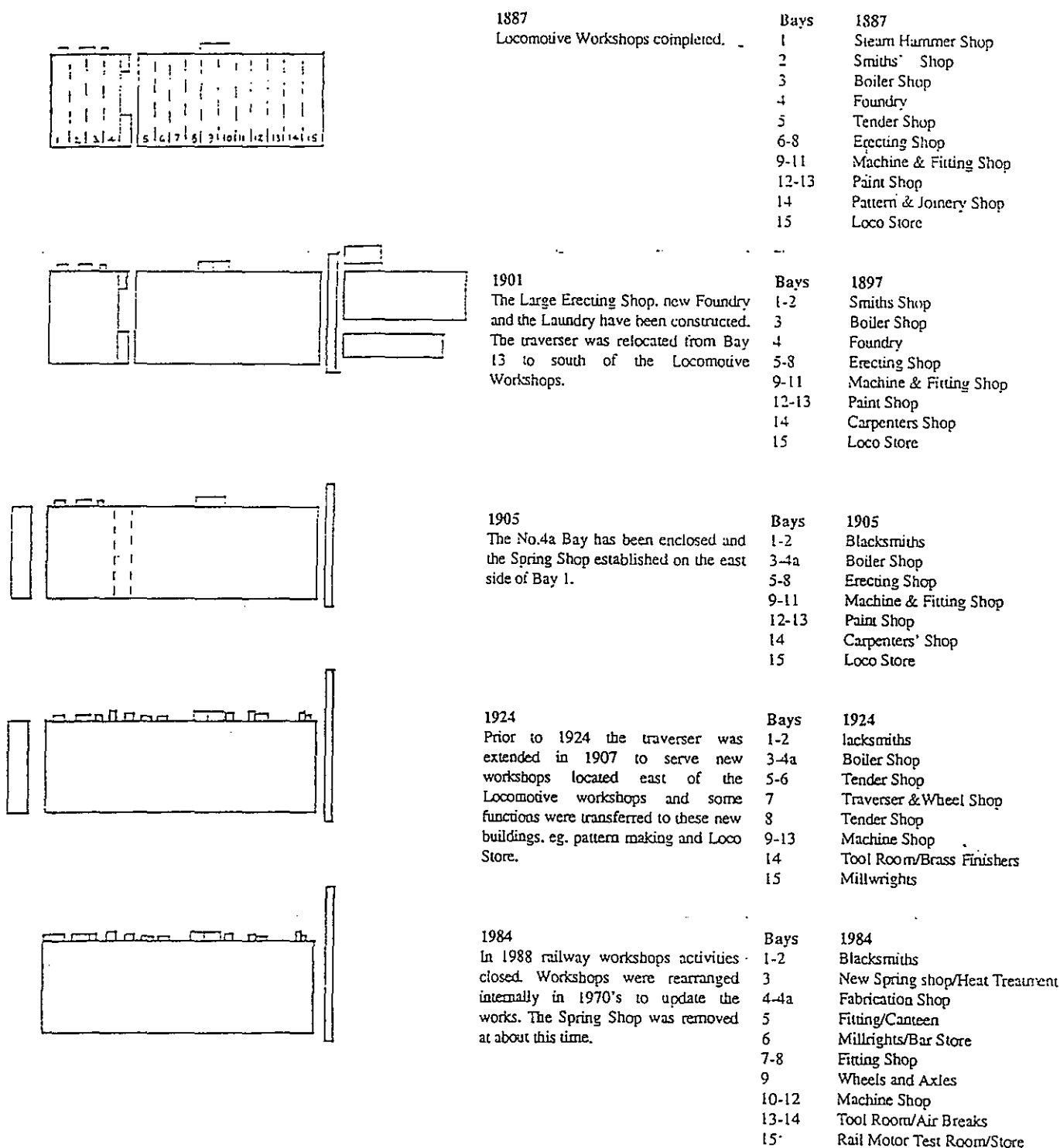


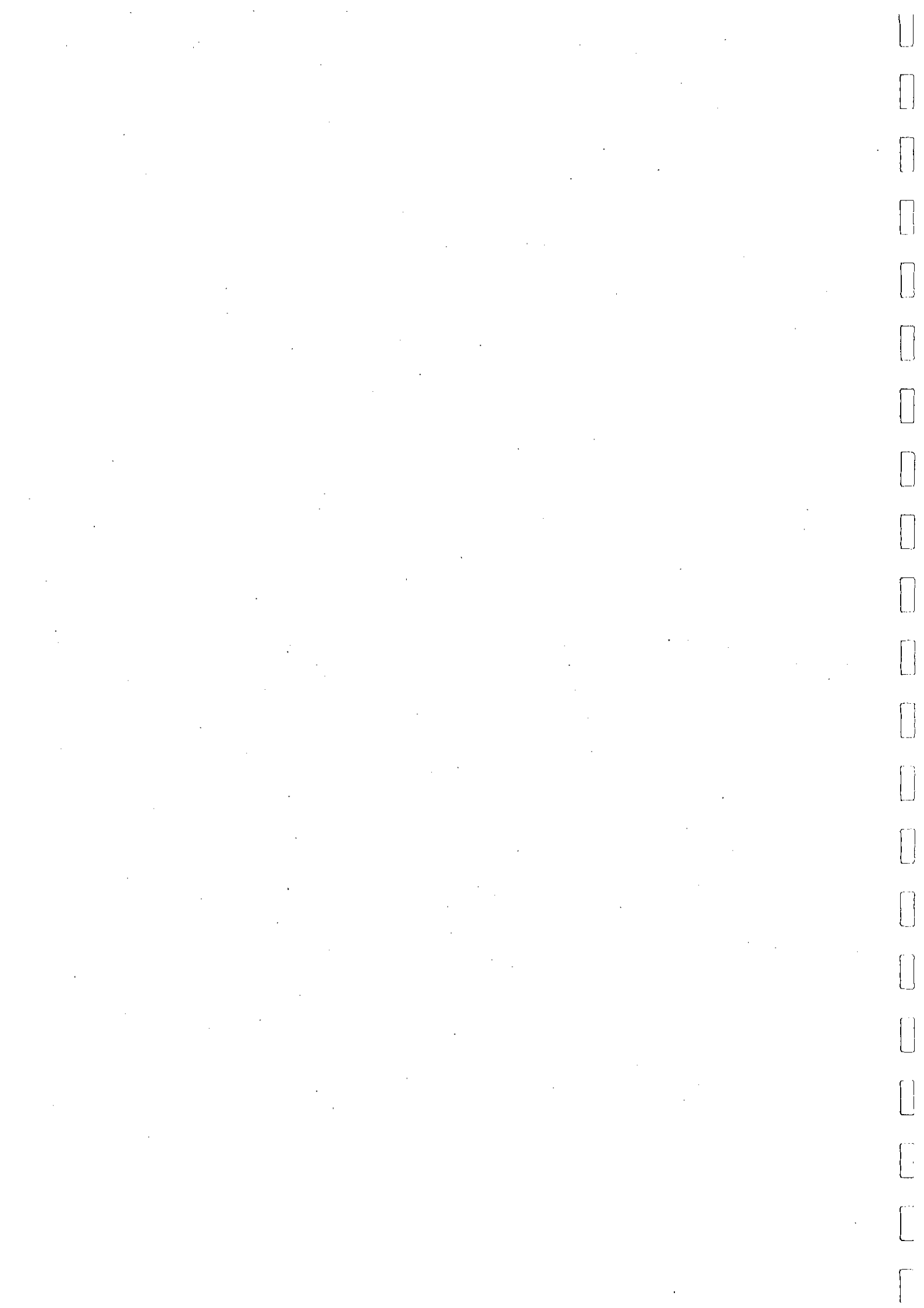
Illustration 1.23: Sequence of development..



Plan 2. 6: 1884 drawing signed by Cowdery showing the plan for Bays 1-4. Part is roof plan and part floor plan. Note the wall between Bays 3 & 4, Bay 3 with no window in the wall behind, and the location of stormwater drains. Detailed wall elevations and sections are shown. The "front" or "Sydney side" elevation is what is now referred to as the north wall. SRAO ELW 3.







Jan 2, 7: 1883(?) drawing showing Bay 1 to 4 foundations which are brick with timber piers under each brick pier or column and  
jack arches spanning between piers in the external walls. These are believed to have been built according to this drawing but have not  
been dug up to investigate them. SRAO ELW 2.



CONTRACT NO. 4

N. S. W. R.

NEW WORKSHOPS - TIVELICH  
FOUNDATIONS FOR WORKSHOPS No 1 to 4

GENERAL SCALE 1" = 10' 0"

SCALE OF DETAILS 1" = 1' 0"

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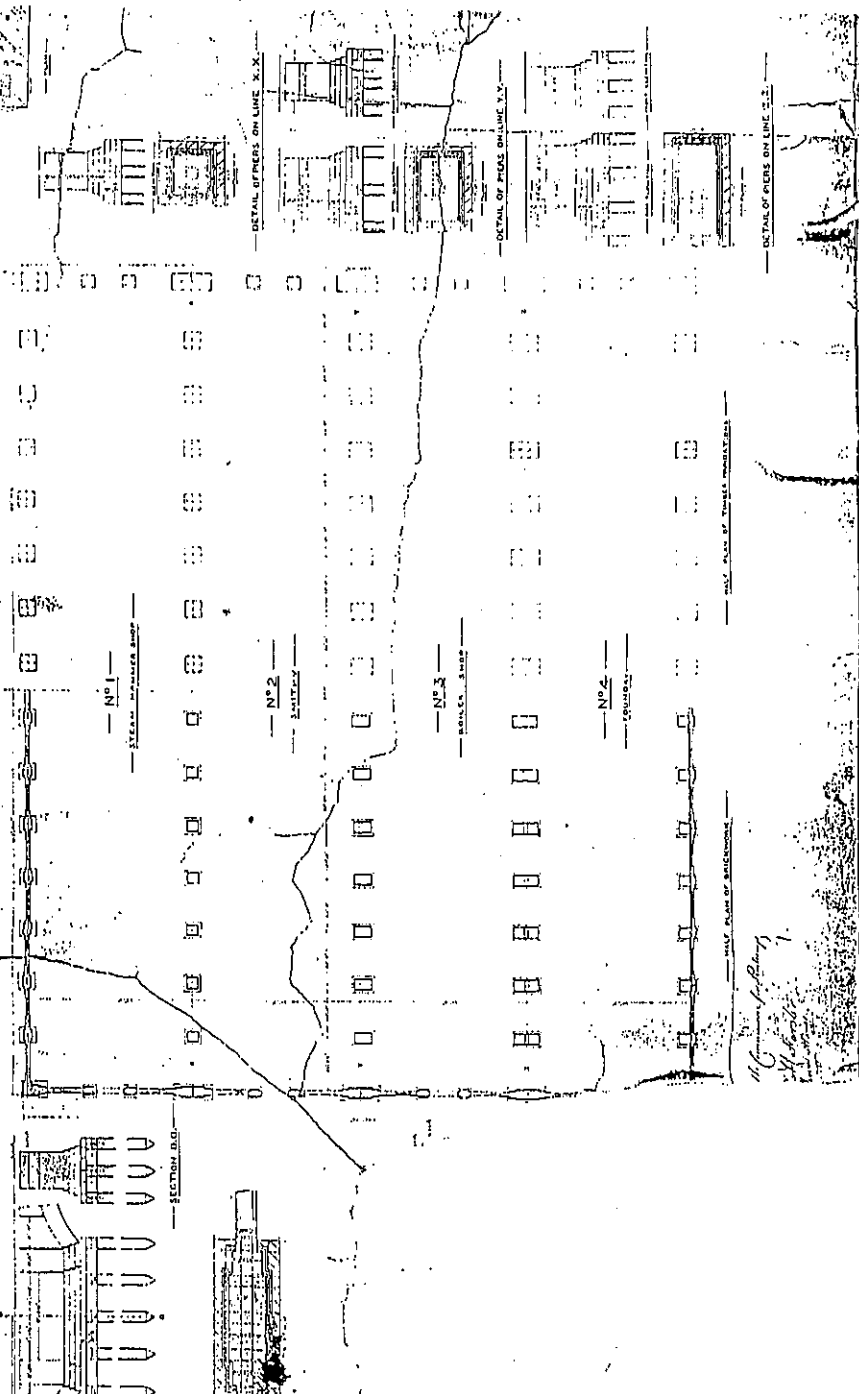
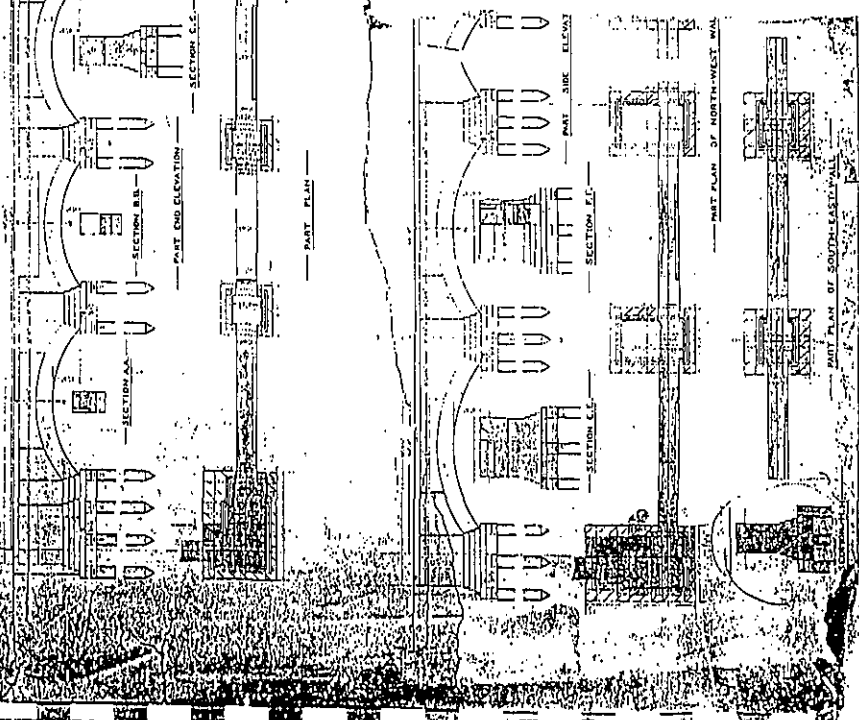
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Plan 2. 8: Original plan of Bays 5 to 15 is dated 18 ? and signed by George Cowdery. It shows roof and roof structure plans in part with glazed roof lights. The remainder shows the floor plan identifying the use of each bay and where cranes were located. Note the wall between Bays 11 & 12 which is now removed. Foundations for engines are shown at the top left hand corner of Bays 9 & 11. The elevation shows no windows behind these footings. Note the large openings to the Traverser bays, numbers 7 & 13. SRAO ELW 13.



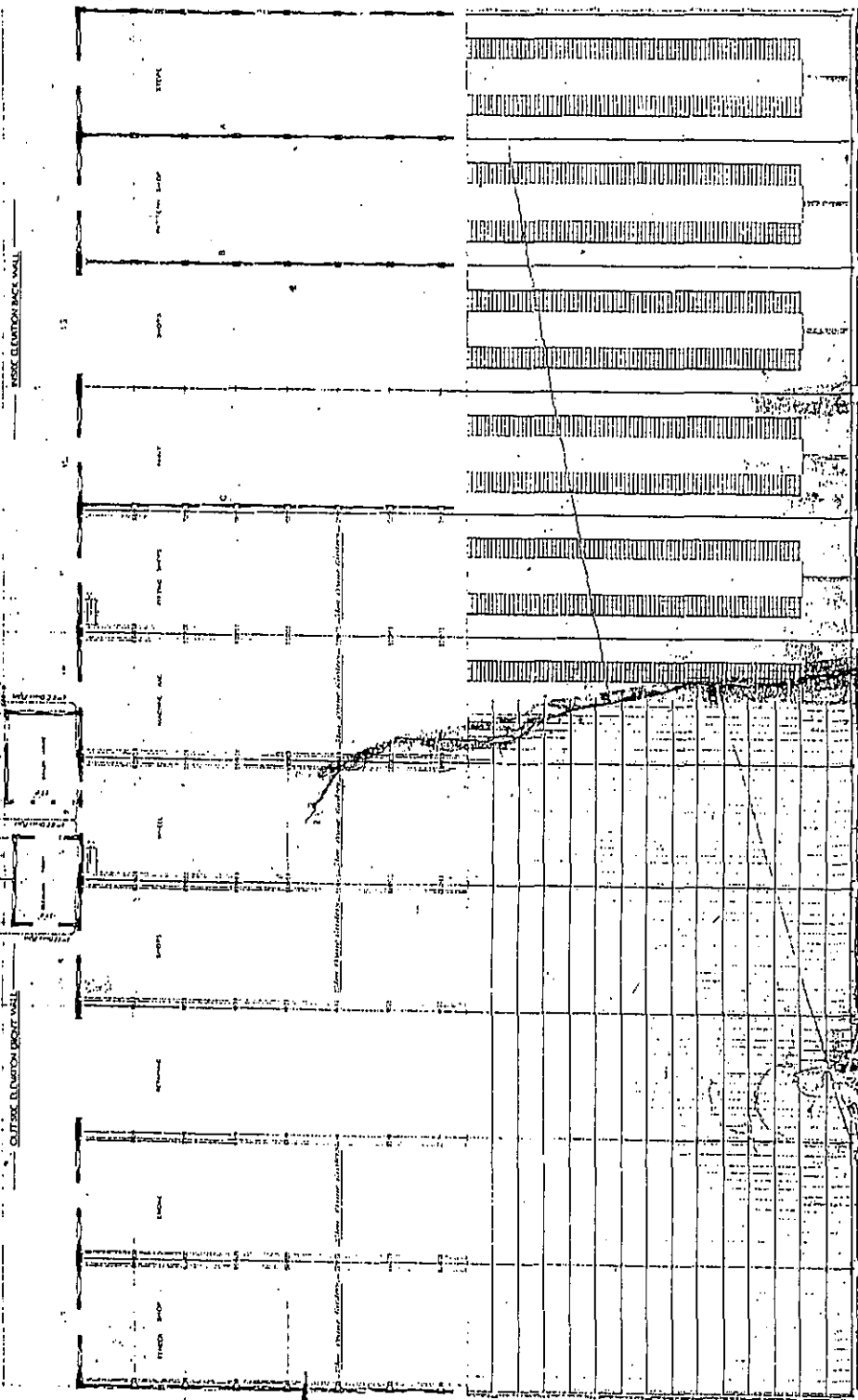
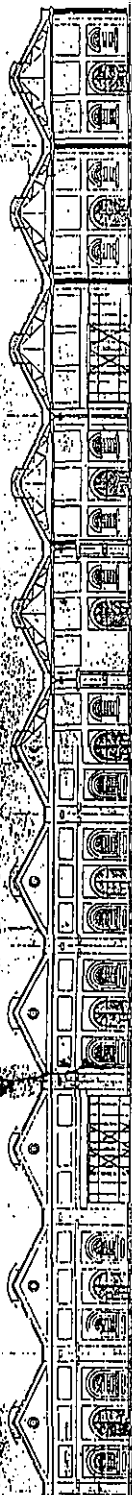
C N S W R

NEW YORK CITY  
SUPERSTRUCTURE SHOPS 5 TO 15

CONTRACT N°5B

DRAWING N°1

72



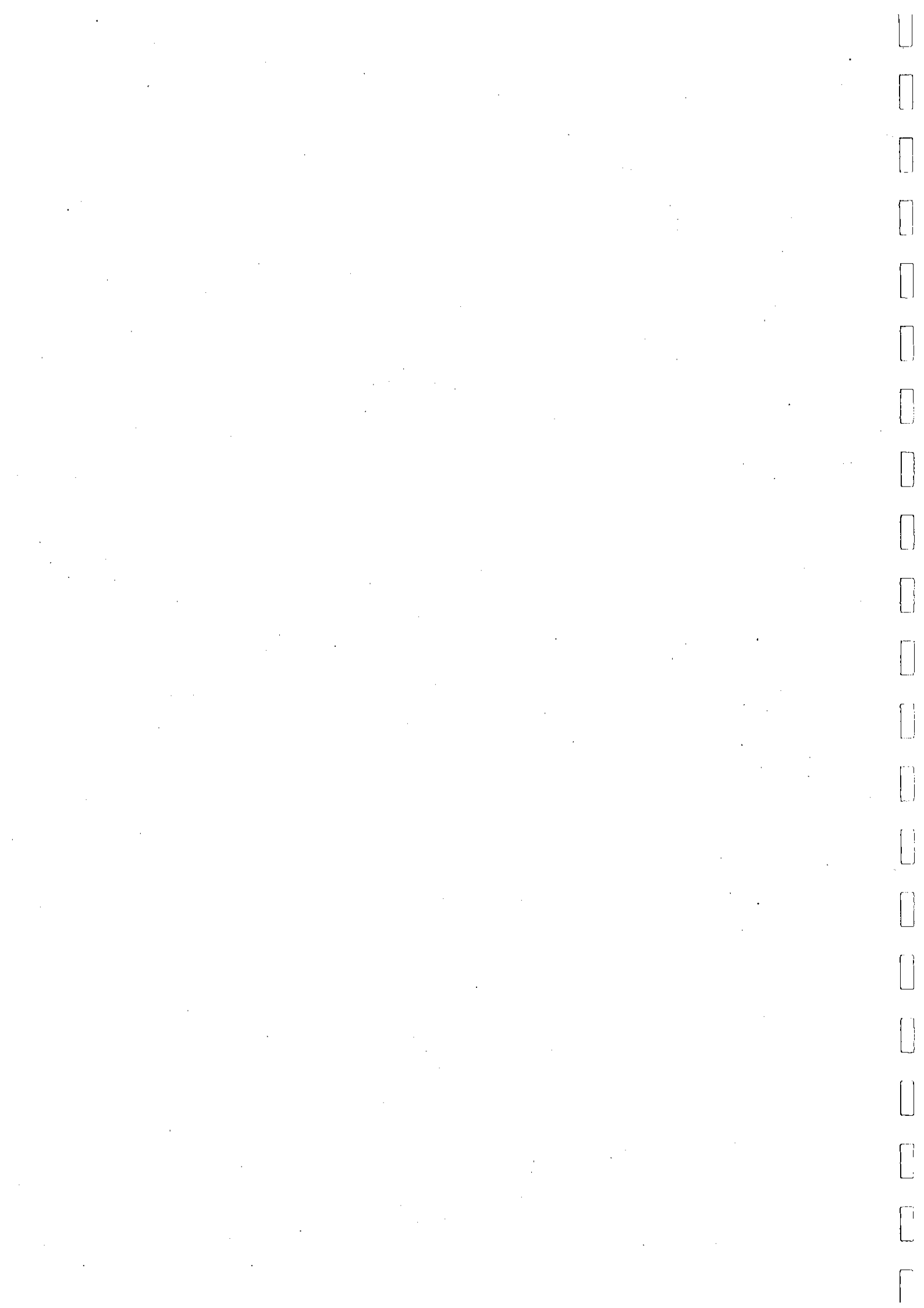


Figure 2. 9: Plan of Bays 5 to 15 dated 1884 and is signed by George Cowdery. It shows the brick foundations to walls and under columns and a series of pits in Bays 5, 6, 8 & 12. The pits are dimensioned on the drawing, stairs down into the pits are shown and the location of stormwater drains are shown. SRAO ELW 15.



**CONTRACT N° 5**

**R. W. N.**

**NEW WORKSHOPS EVELEIGH**

## FOUNDATIONS AND PITS SHOPS 5 TO 15

DRAWING N° 1 -

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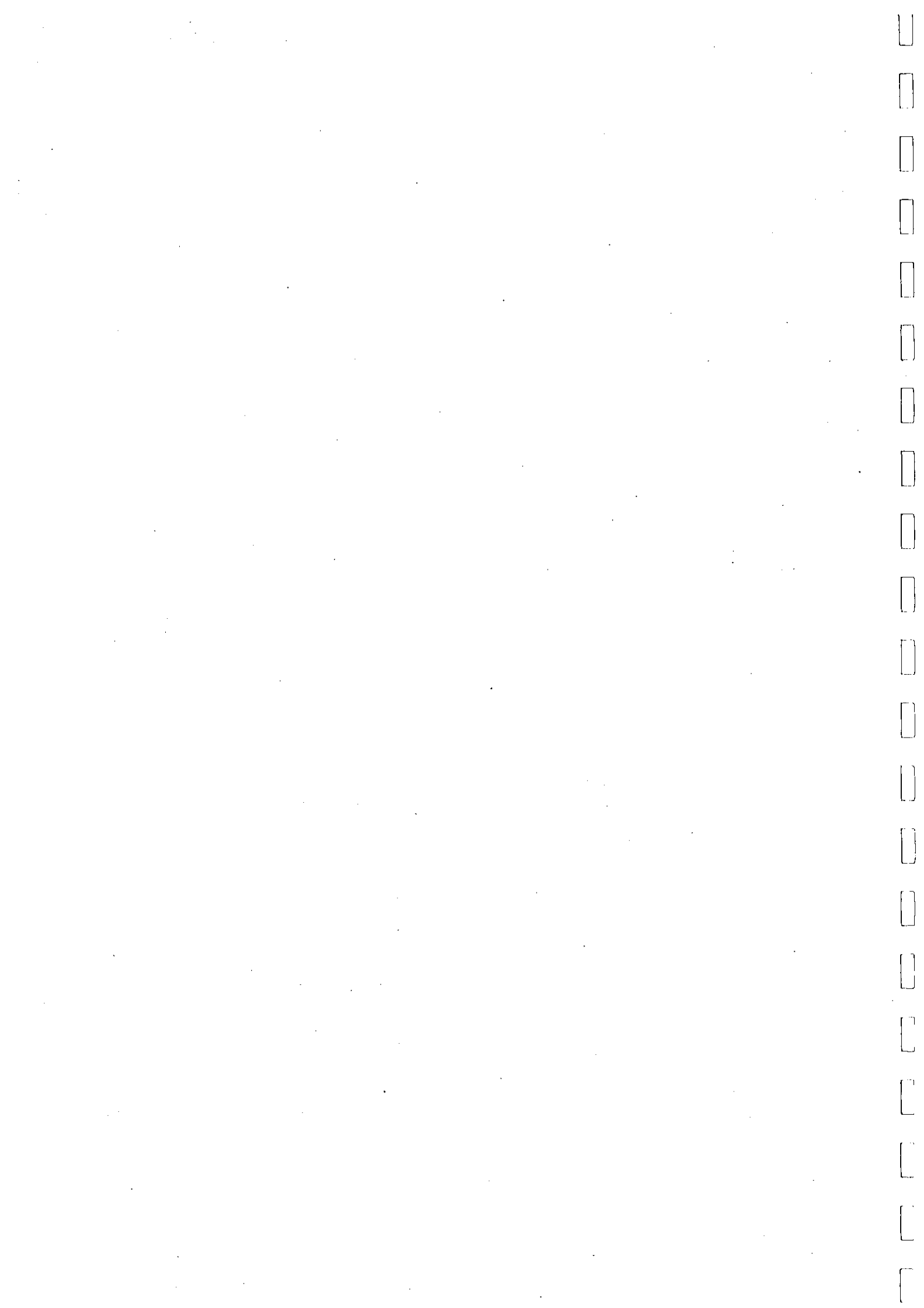
Dr. A. N. S.

• FIRE WALL 5

החברות המציינות לעיל הן חברות בבעלות מלאה של החברה.

The following is a list of the names of the persons who have been  
 named in the above mentioned report, and who are now in the  
 service of the Government, and who are also named in the  
 report of the Committee on the subject of the same.







Plan 2. 10: 1884 drawing showing the Bays 5-15 pits and footings in detail with detailed dimensions, 4 feet wide & 2 1/2 feet deep. Drains to pits are also shown. These pits probably exist below the surface at present and these drawings could be used to predict their locations. Note also the extended footing for the engine. SRAO ELW 16.



336

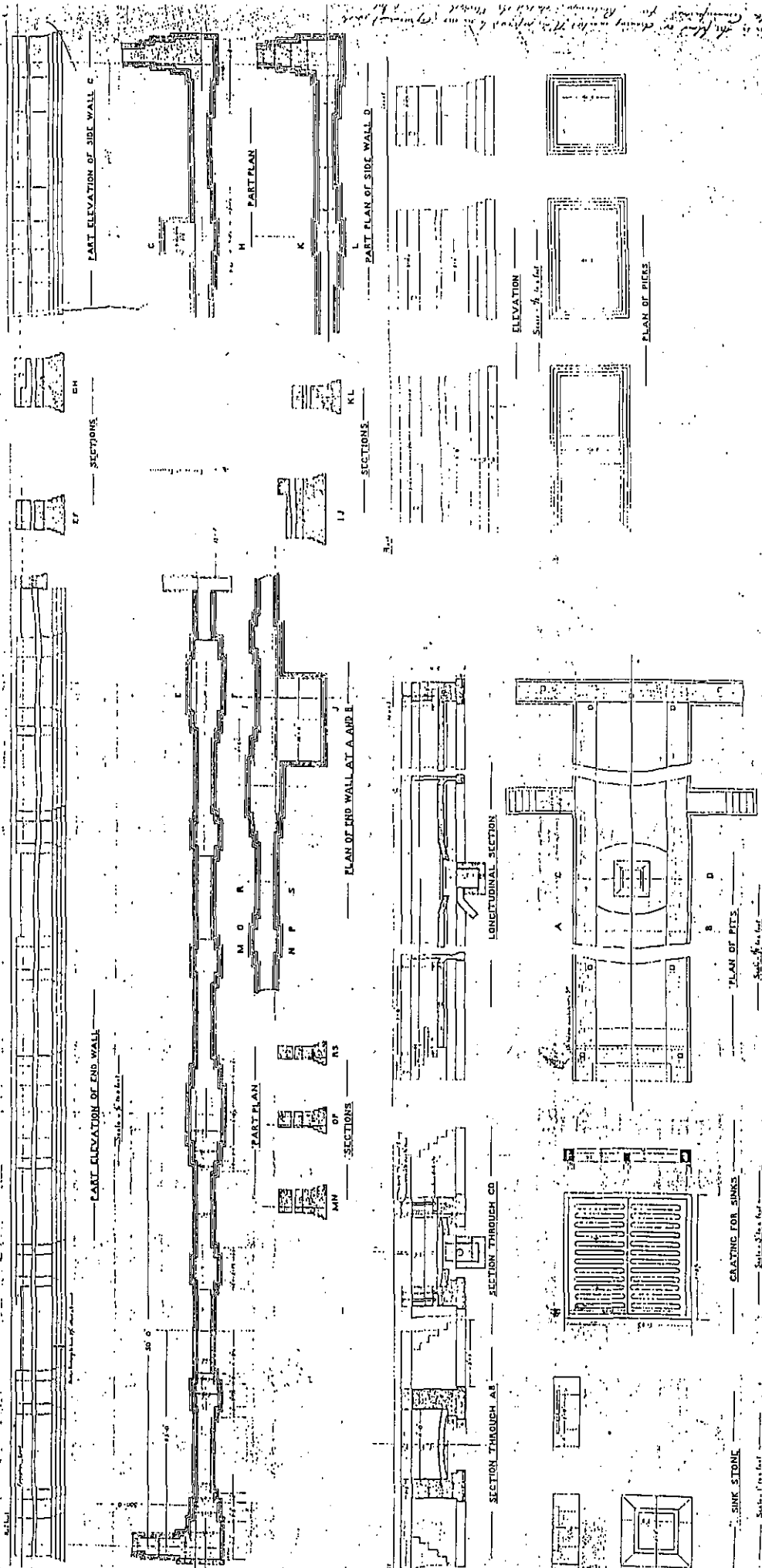
CONTRACT N° 5

N. S. W. R. *Large Garden*  
NEW WORKSHOPS EVELICH

DRAWING N° 2

72

DETAILS OF FOUNDATIONS AND PITS SHOPS 5 TO 15.

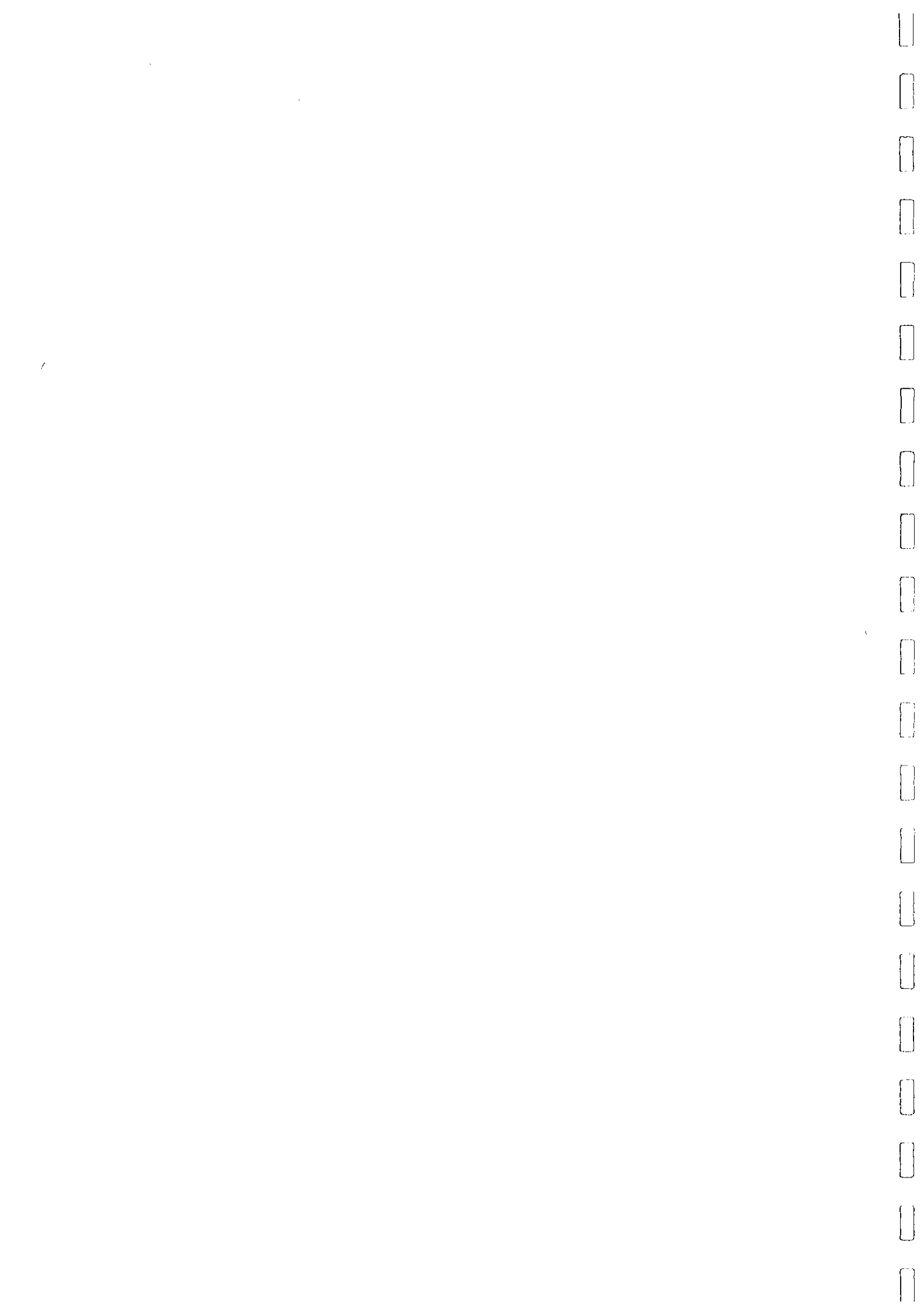


PLAN OF PITS

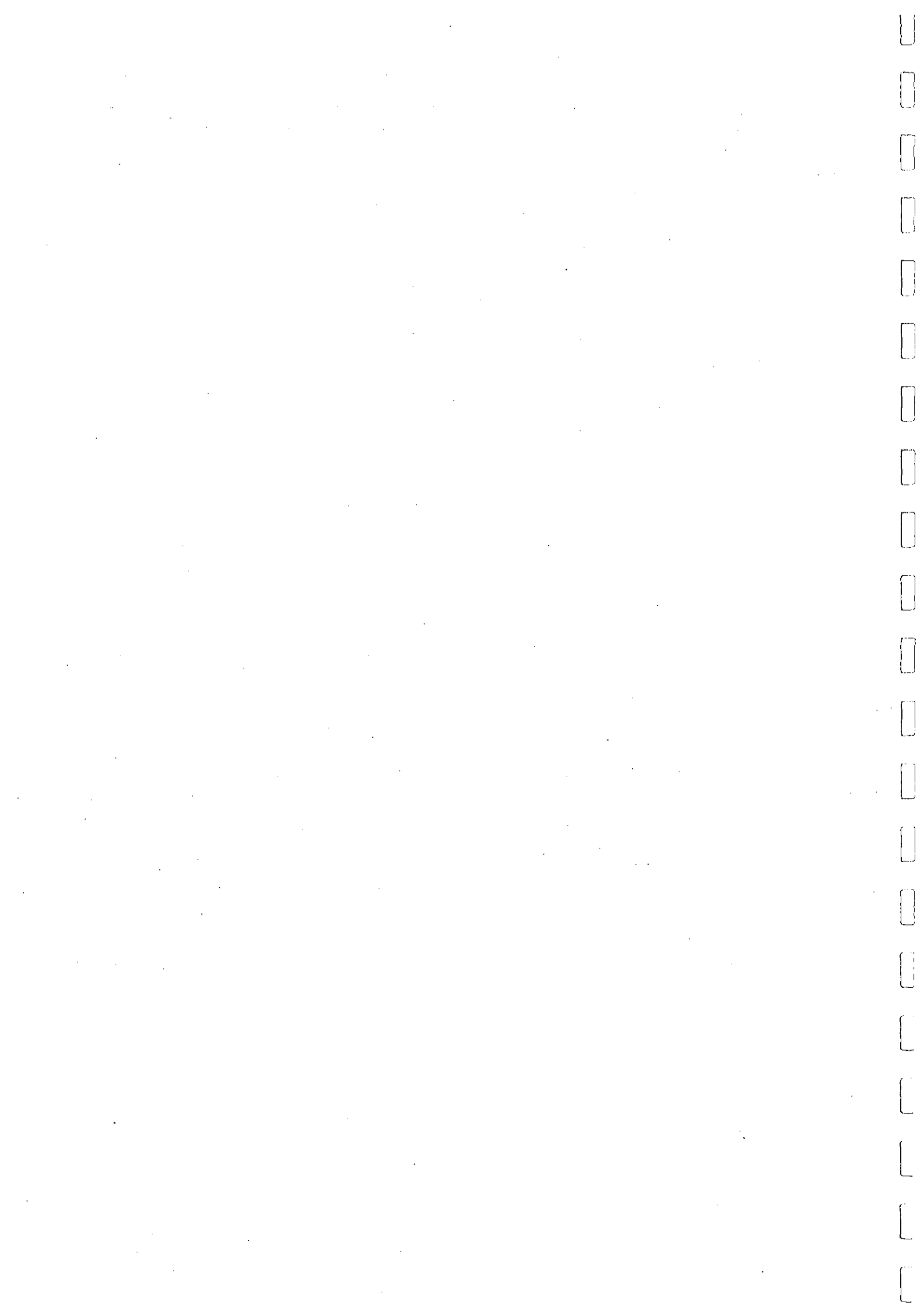
D. W. R.



an 2. 11: The roofs are shown here in great detail including the lantern structure and end and side elevations. Also shown are the  
ss and the strut detail, and detailed sections and elevations of cast iron gutters and various wall boxes into which the gutters  
:charge. SRAO ELW 21.









Plan 2. 12: Details of the walls are shown including elevations and sections, coping stones and cornice, cast iron downpipes in the wall and details of the large iron, riveted sliding doors to the traverser bays. These no longer exist. SRAO ELW 17.

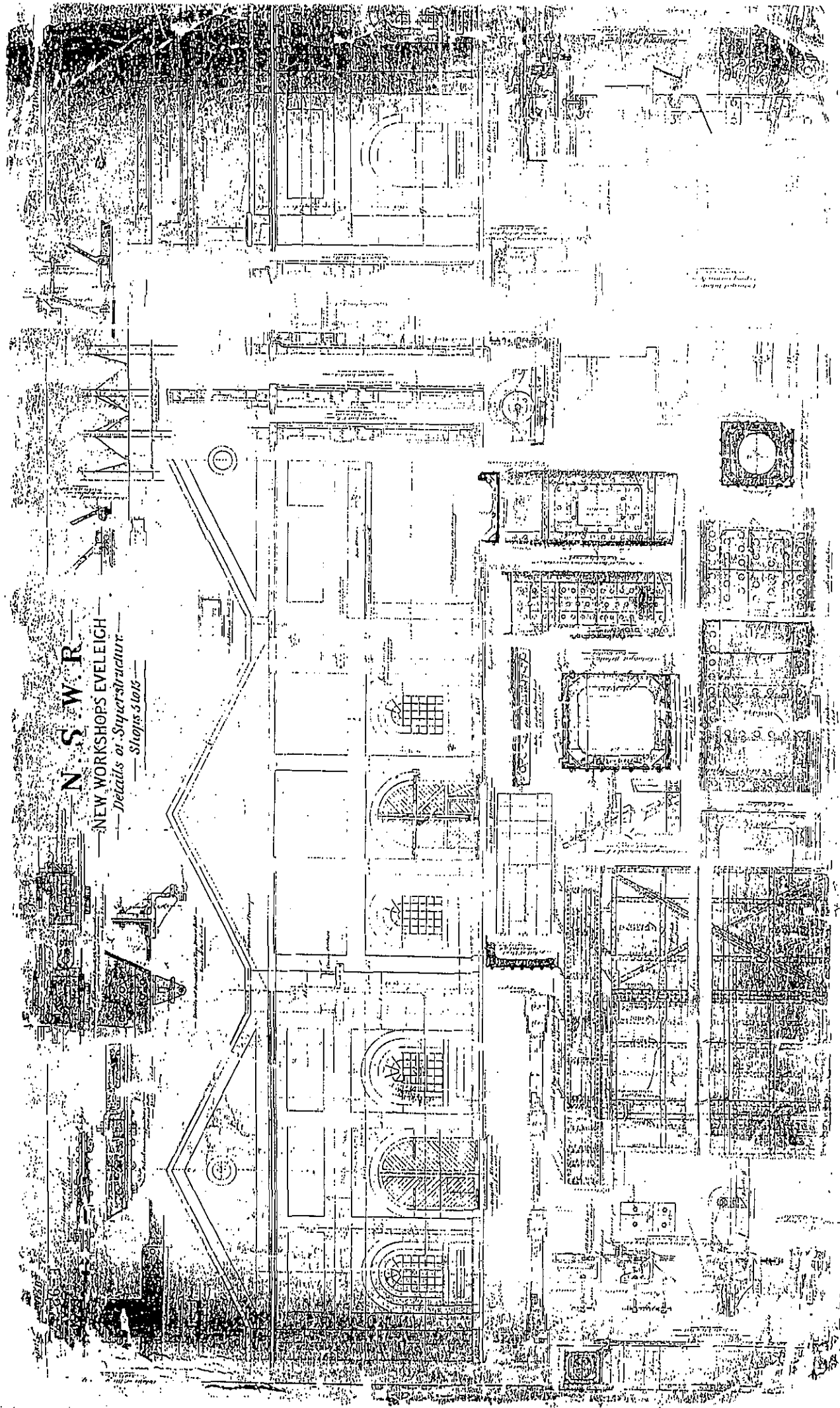


N. S. W. R.

NEW WORKSHOPS EVELEIGH

Details of Superstructure

Shops 3 to 5



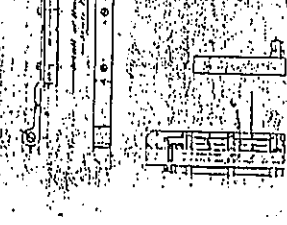
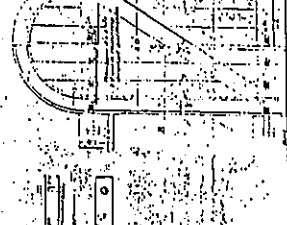
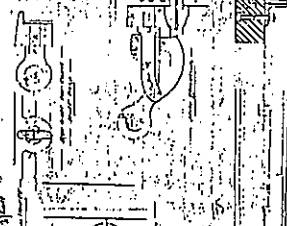
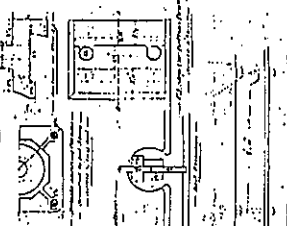
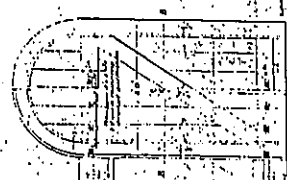
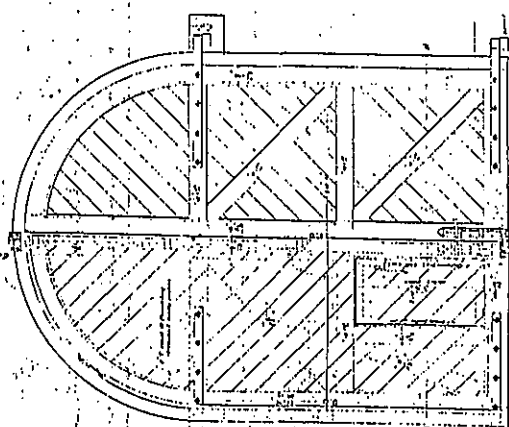
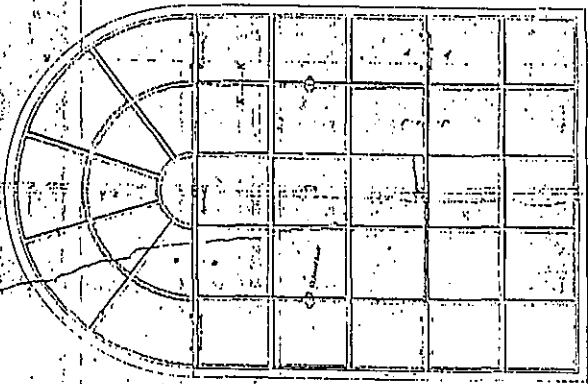
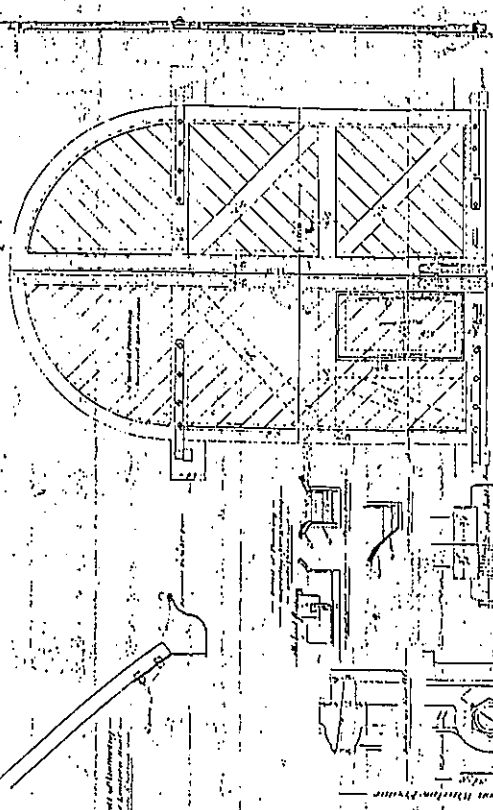


Plan 2. 13: The detailed drawing of windows, doors and gutters indicate the high level of detail to which the building was deliberately designed with detailed designs for catches, bolts and hinges. Also shown is a detail for fillets for glazing purlins (re the roof glazing) and details of east iron gutters. The drawing is signed by Cowdery in October 1885. SRAO ELW 22.



MS. W. R.  
NEW WORKSHOPS EVELEIGH  
DETAILS OF DOORS WINDOW LASHES  
SHOPS 3 TO 15

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### 3.5.3 Locomotive Workshops Operational History

When first conceived by John Whitton, the Eveleigh Railway Workshops were to undertake the construction of the infrastructure of the Railways such as the safe working systems and some of the perway systems, but their main tasks were for the maintenance and repair of locomotives and rolling stock and the manufacture of rolling stock such as wagons and passenger carriages. At the time they were built, there was no other facilities in NSW for the construction of locomotives.

The workshops were established on both the north and south sides of the main western and southern rail lines, which led to a duplication of some workshop functions, but the really heavy work, such as forging and casting of ferrous and non-ferrous metal, was to be carried out on the locomotive side. When the workshops were established, most of the rolling stock had a wooden chassis, so the separation of services was not a major impediment to production. The locomotive workshops were virtually set up as a medium engineering enterprise. They were designed as two separate buildings - one of four bays and one of eleven bays - each of which was to serve a different function.

The so called 'dirty trades' of foundry, blacksmithing and boilermaking were located in Bays 1-4. In reality these were not so much the dirty trades but were those which required fire as an operating element. In the annexes which were built on the western end of Bay 4, where Bay 4A is now located, were housed the coppersmiths and the tinsmiths sections. These trades were distinctly "cleaner" than the blacksmiths and foundrymen but they also needed heat for soldering and annealing and tinning of their products. Most soldering, which was almost certainly brazing, was of heavy units and would have been completed on a forge using spelter.

Bay 1 and 2 were generally known as the blacksmiths or smiths shops, although on some early drawings Bay 1 has been termed the steam hammer shop, Bay 2 the smiths shop, Bay 3 the boilersmiths shop and Bay 4 the foundry.

The steam hammer shop appears to have been equipped with nine forges on the eastern side of Bay 1 and thirteen forges on the western side. An early photograph indicates there were an average of three forges to each steam hammer. The forges were of the typical railway type with cast iron hoods and cast iron tuyeres serving a cast iron fire bed covered in fire brick. The cast iron tuyeres (air inlets) were watercooled. Air was supplied via blowers erected against the south wall of Bays 1 and 2. The air reached the machinery through underground pipes which still exist and are operational. The precise type of hammers which were installed in the steam hammer shop, when the locomotive workshops were established, is unknown. However it is likely that they were similar to the ones extant in the Bay 2 north and it would appear, from early photographs, that the extant arch hammer and the 20cwt hammer were installed shortly after the workshops opened. In the blacksmiths shop, the 1912 drawing indicates that there were four steam hammers in the precise location in Bay 2 north in which the steam hammers are now located and the drawing also indicates the Rootes blowers and other items within the workshop.

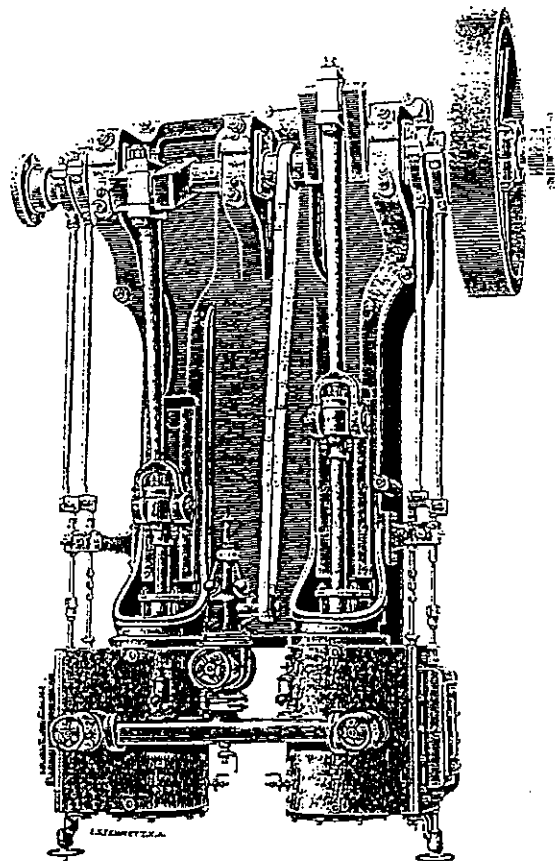
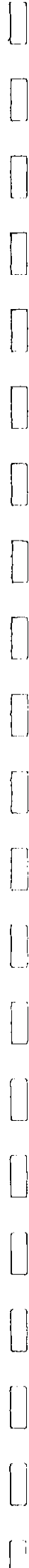
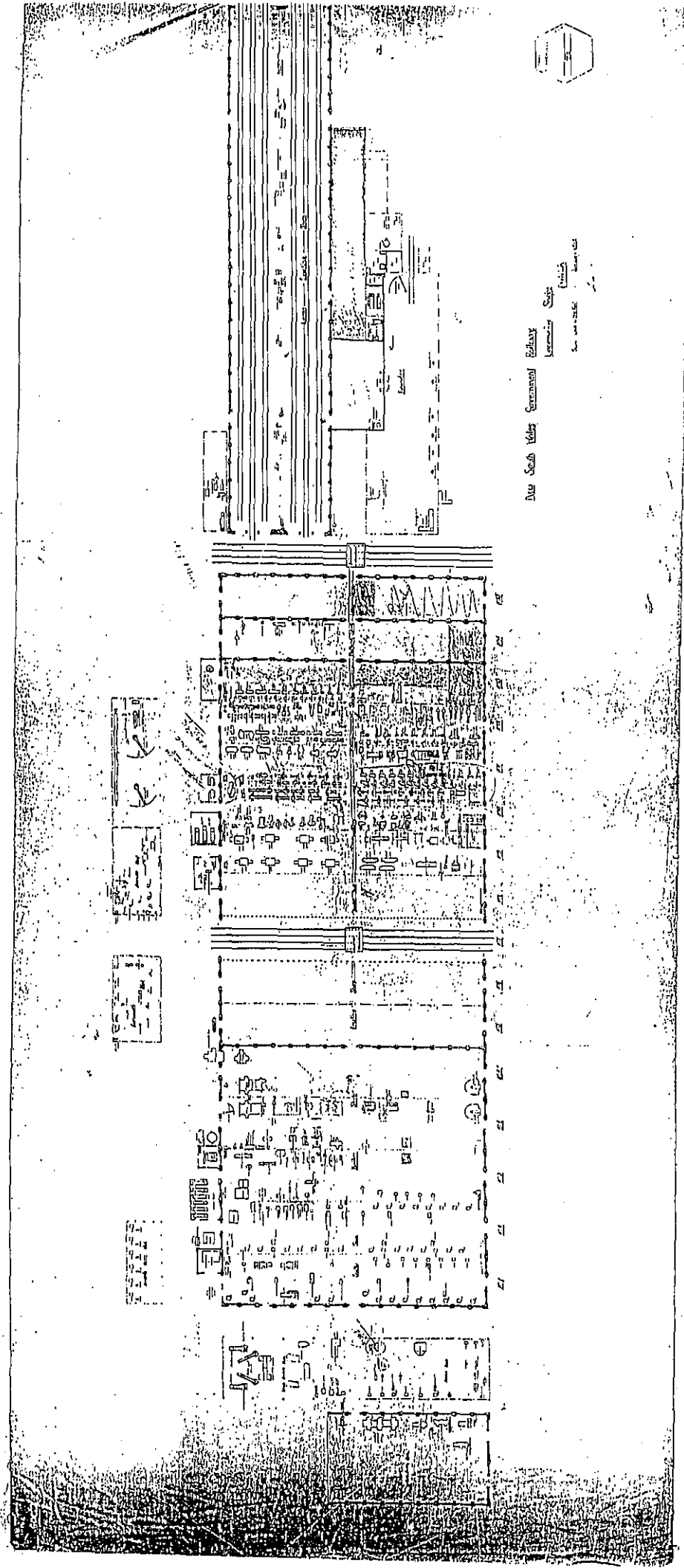


Illustration 1. 24: Steam driven wall engine of the type used at Eveleigh to drive crane and possibly line shafts. SRAO ELW 601/49.



Plan 2. 14 Plan of the Eveleigh Railway Workshops, in 1912, including the New Locomotive Shed, the Spring Shop and the Large Erecting Shed and adjoining new foundry. This plan shows the layout of the machinery in detail at this time. Much of the information is only legible by viewing the SRA Archives aperture card. Many of the machines in Bays 1-4 are still in these locations. The plan shows the chimney stack at the southern end of Bay 2 and the hydraulic accumulator at the southern end of bay 4. SRAO ELW 29.





New South Wales Government Railway  
Station  
Length  
Area

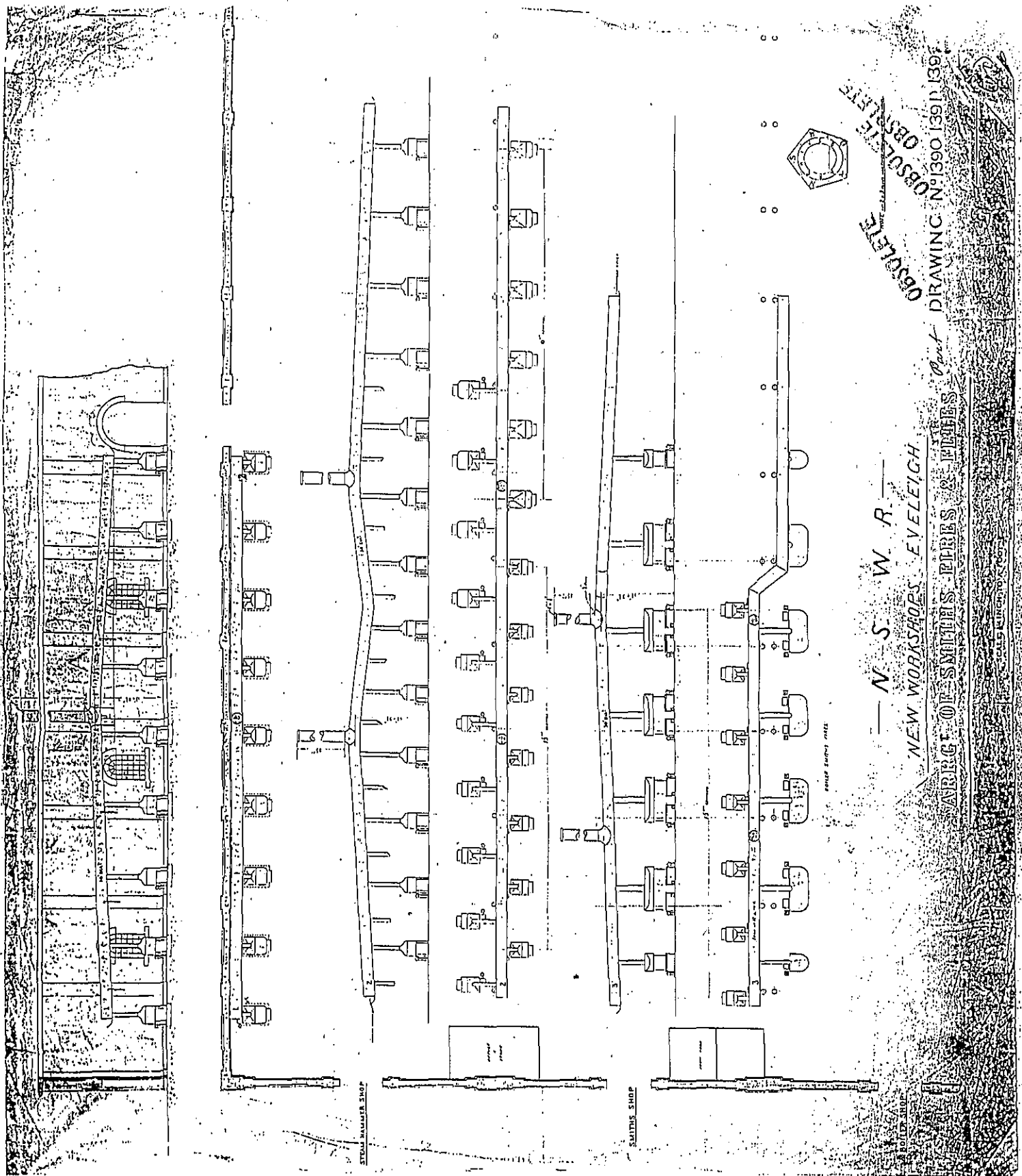
Station	Length	Area
Sydney	1.2	1.2
Melbourne	1.2	1.2
Brisbane	1.2	1.2
Perth	1.2	1.2
Adelaide	1.2	1.2
Hobart	1.2	1.2
Darwin	1.2	1.2



Plan 2. 15 The 1887 drawing showing the Smiths Fires and Flues is stamped obsolete, presumably at some later date. Photographic evidence confirms that flues and fires were installed according to this layout. Note that elevations of each installation are shown in the plan of the bay above. SRAO, ELW 26.



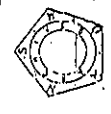


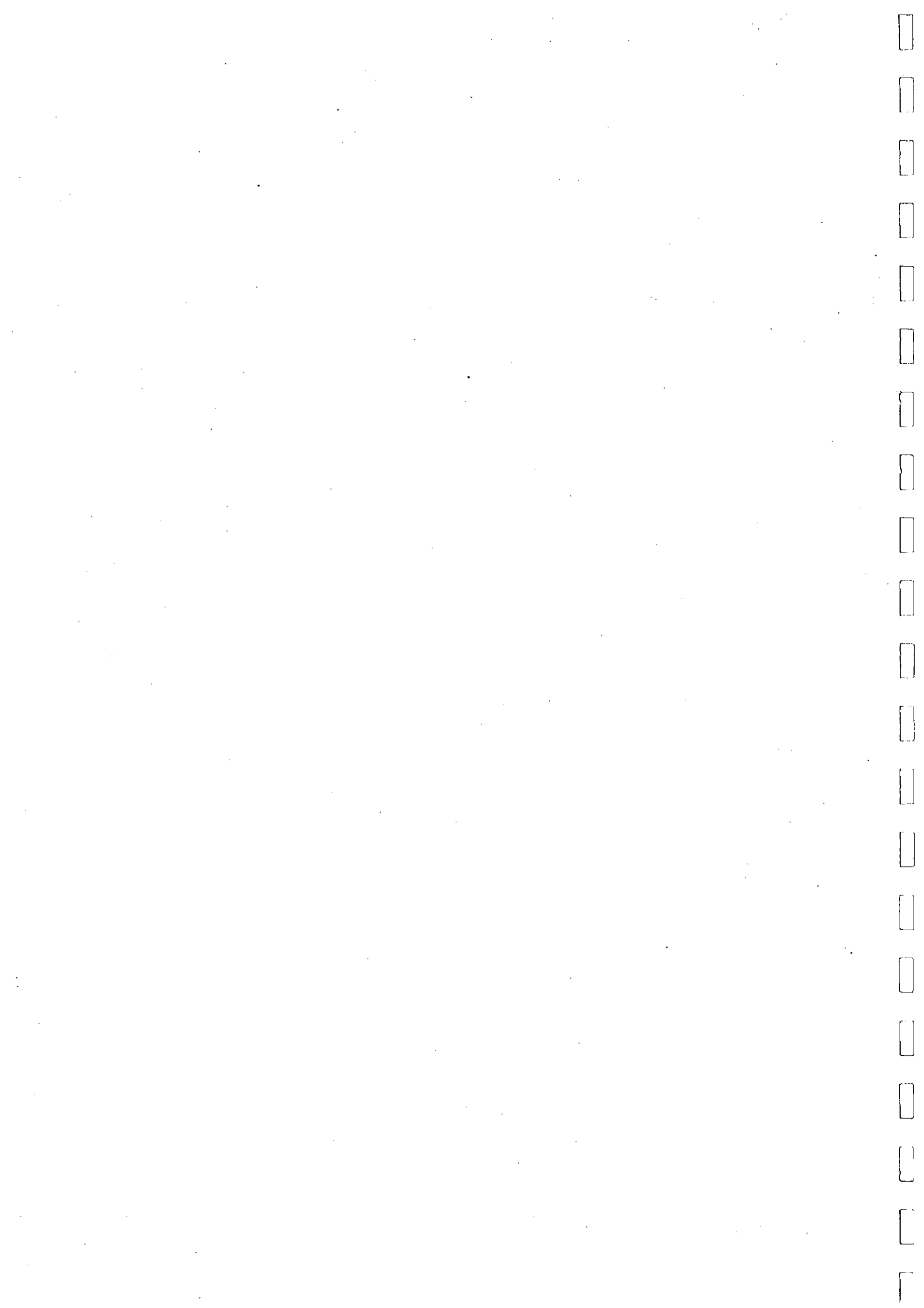


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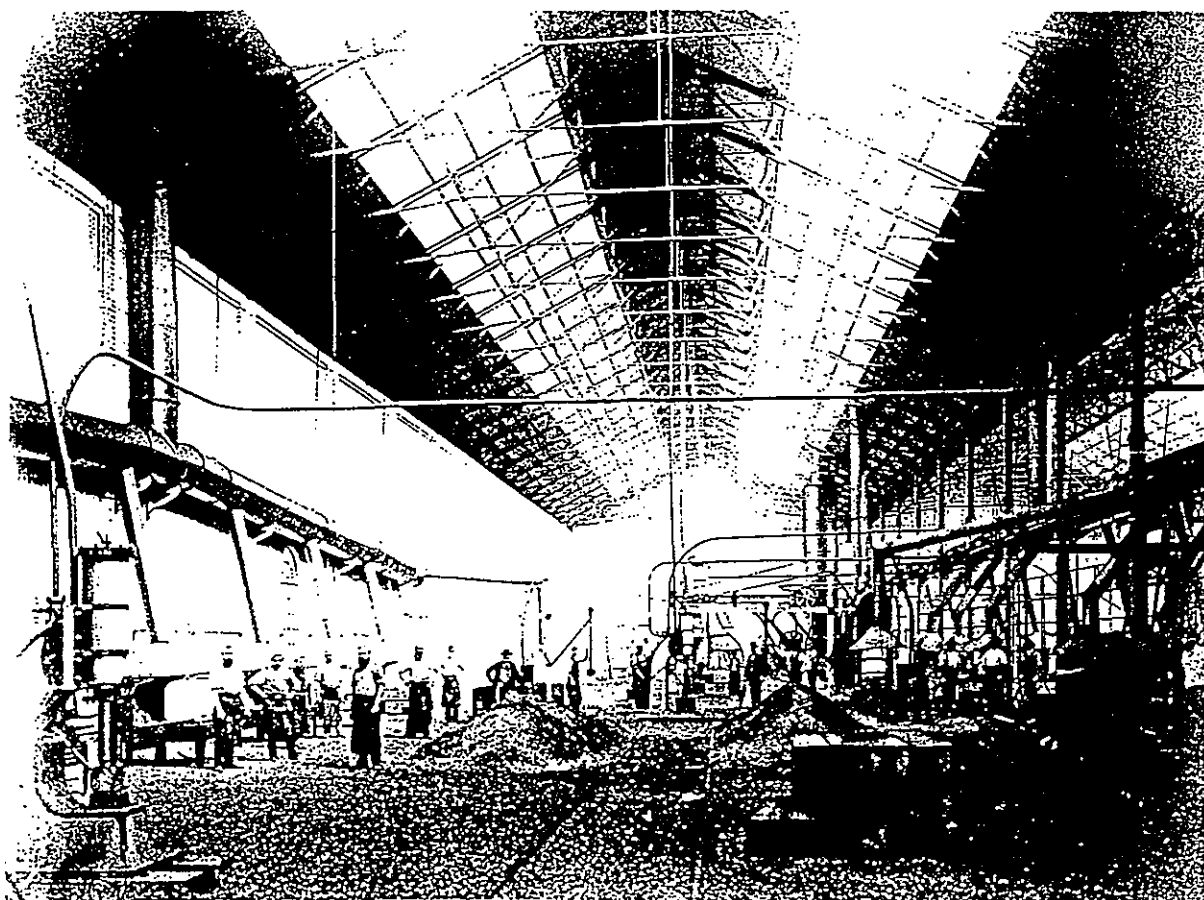
The boiler shop was equipped with larger forges than found in the Blacksmiths shop. On the early drawing, these forges are called Boilersmith fires and there is a total of five fires, each with a hearth area at least four times of that of the normal smiths forges. It is apparent that the boiler shell material was heated here so the holes for the rivets could be punched.

All of the flues from the forges, which were vertical, passed into an almost horizontal overhead flue which was about a metre in diameter. This overhead flue then passed into two 10m high stacks which were also about 1m in diameter. These steel stacks appear not to have been equipped with an induced draft fan, the heat from the forges being sufficient to create a draft.

The second group of bays, Bays 5-15, Bays 5, 6, 7 and 8 comprised the erecting shop. A traverser ran the length of Bay 7 to facilitate movement of locomotives and rolling stock undergoing repair to the various working pits. Bays 9-11 were the machine and fitting shops where the majority of lathes, wheel lathes, hydraulic presses and rams were located. Bay 12 was the paint shop, Bay 14 the pattern and joiners shop and Bay 15 housed the locomotive stores.

The traversers located in bays 7 and 13 were powered by their own small vertical or horizontal boiler. The overhead cranes which served the erecting shop were powered by a continuous rope which ran from the small 2-cylinder vertical steam engines mounted on the south wall. Forgings and castings from the first four bays could then be brought to the machine and fitting shop for final finishing and then transferred to the erecting shop where locomotives were assembled.

Illustration 1. 25: Steam Hammer Shop, believed to be Bay 1 north, looking south, taken soon after opening of the workshops. Small steam hammer l.h.s. foreground, 8cwt(?) steam hammer mid background obscuring a further two steam hammers with the arch hammer in background. Note the tool racks between Bays 1 & 2 (r.h.s.) which are still there. Rail track in foreground believed to be to remove ash (visible in two piles). Blocks of timber (r.h.s. foreground) possibly for anvil or hammer footings.. ML GPO Video Disk 1 06679 Sh 1884.





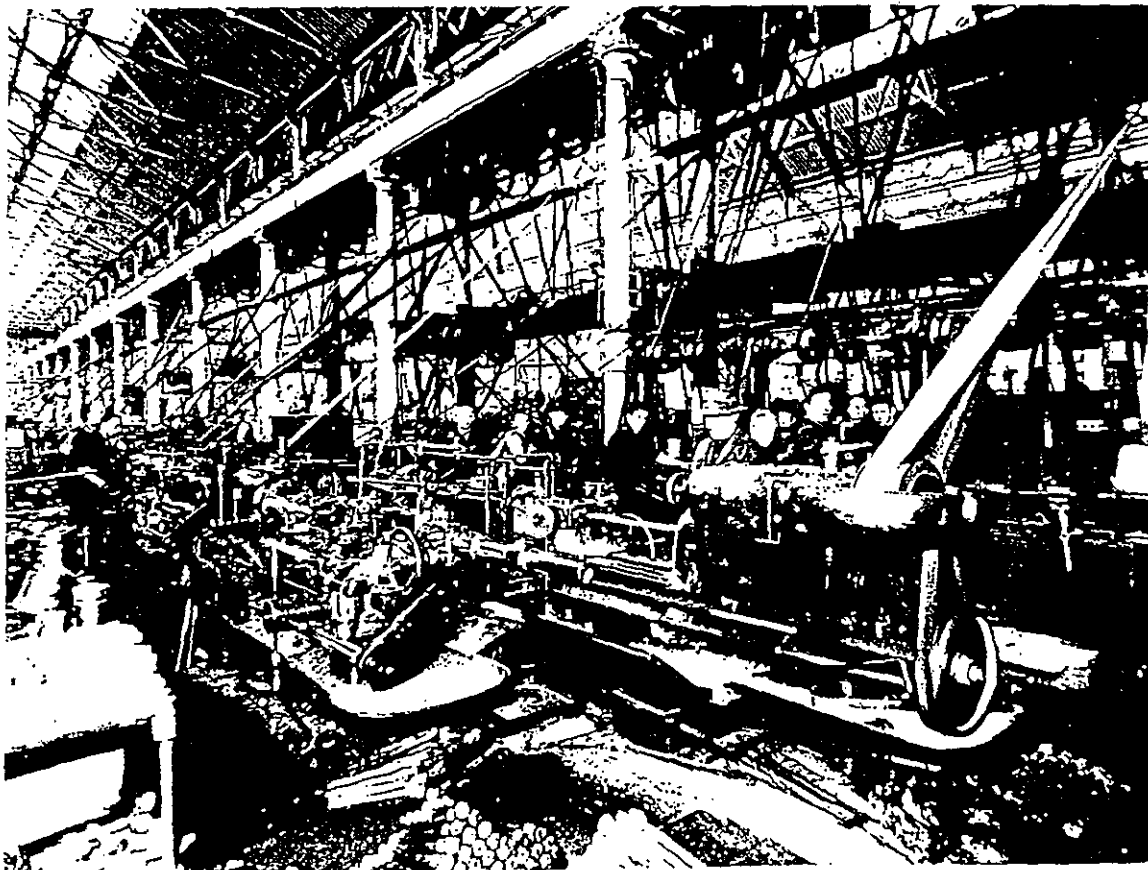
The machine and turning shop was powered by a line shaft and a series of countershafts again powered by the twin-cylinder steam engines on the south wall. Belts ran, usually, from the countershafts to lathes, shapers, grinders and milling machines which were located on the floor of Bays 9, 10 and 11. It is evident that wagons ran the length of Bay 9 and possibly Bay 11 from the forge and foundry delivering work for machining and removing completed work.

#### Safety

In the early photographs, it is evident that many, if not all the belts which ran to the machines, generally at head height, were uncaged. In some cases the belts appear to be 6m long and doubtless this, in part, accounted for the poor safety record of the early days of the workshops operation.

It became evident soon after the workshops were completed in 1887 that they would soon be inadequate for the amount of work that was to be undertaken on the railways. In the early 1890s planning was underway for major changes which would allow much greater output. By 1889 the large erecting shop had been added at the end of Bay 15. This massive shop then took over part of the work being done in Bays 5, 6, 7 and 8. At the same time, Bays 12 and 13 were converted to an interlocking shop to manufacture items of the railway safe working system. The traverser from Bay 7 was relocated outside Bay 15 to facilitate the removal of parts and locomotives and rolling stock between the workshops and the new erecting shop.

Illustration 1. 26: Machine Shop lathes belt driven from counter shaft. Bay 10 or 11 looking south from northern end of bay. Screwing crown stays. SRAO ELW 601/23.



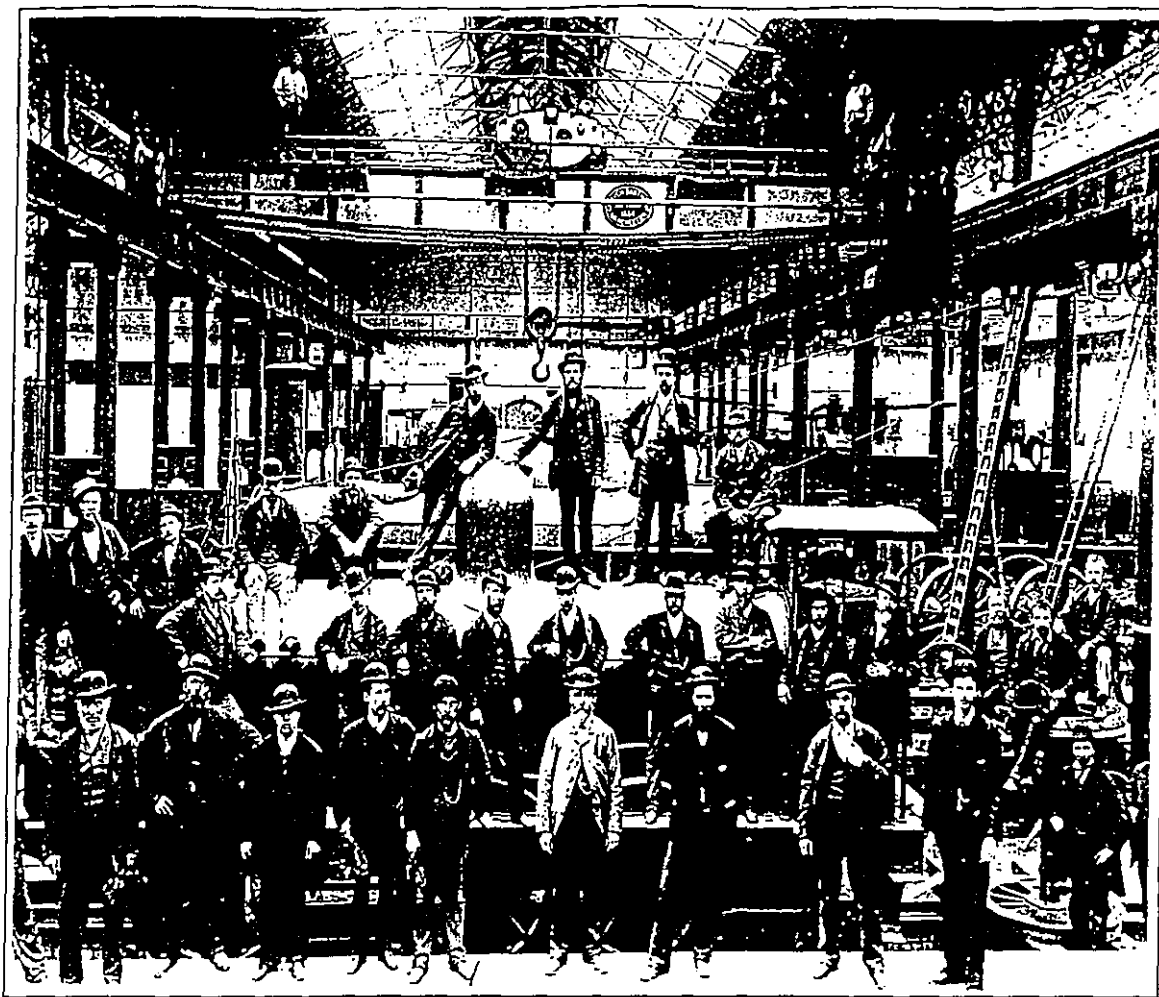


Illustration 1. 27: Erecting Shop, c1886 with locomotive in foreground under repair. Shows the rope drive 1884 Craven crane and the workmen dressed up especially for the photograph. Bay 6 looking north from central road with traverser bay on l.h.s. (Bay 7). SRAO ELW 601/1 7



Illustration 1. 28: Wheel Shop, Bay 9 looking south, showing wall engine on back wall l.h.s. The counter shafts are shown suspended under the column headstock with belts driving counter shafts fixed to girders between the columns. Machines were driven by belts directly off the line shaft or off the counter shafts. Note the wheels on the centre road and the overhead travelling crane. SRAO ELW 601/19.



Eveleigh for some time had had its own gas works which were located near Macdonaldtown Station. A small generating unit had been constructed close to the running shed which supplied a small amount of electricity to both the workshops and the running sheds. However, in 1901 with the establishment of Ultimo Power Station, which belonged to the Rail and Tramway Department, electric power was made available to the workshops. Work commenced shortly after on the conversion of the rope-driven cranes to electric motor drives. Work also commenced on the replacement of the steam engines at the south end of the workshops by powerful electric motors. This, however, was not completed until 1914.

By 1902 the construction of new buildings was well underway. A new coppersmiths and tinsmiths shop was erected in a steel-framed corrugated iron clad shed on the south side of Bays 5-9 and the annexes located on the west end of Bay 4 were demolished. Shortly after, gable-ended brick walls were established between Bay 4 and 5 and this became Bay 4A. In 1907, the decision was taken to begin the manufacture of new locomotives at Eveleigh. To this effect, the new engine shop was constructed adjacent to the spring shop which had been built on land at the east end of Bay 1.

By 1912 the foundry had been moved from the locomotive shops, and the machine and fitting shops had been enlarged, as had the boiler shop which now occupied Bays 3, 4 and 4A. It is evident from the 1912 drawing that much new machinery was introduced to both the machine and fitting shop and into the enlarged boiler shop. By this time, the new radial arm drills had been introduced as had harder drill bits with the result that boiler shell rivet holes could be drilled rather than hot punched. This meant that the boiler forges in Bay 3 could be removed. By this stage also, the smaller work that had been completed within the blacksmiths shop was now being done in an annex erected in line with the coppersmiths and tinsmiths shops at the end of Bay 1 and 2, using pneumatic strikers.

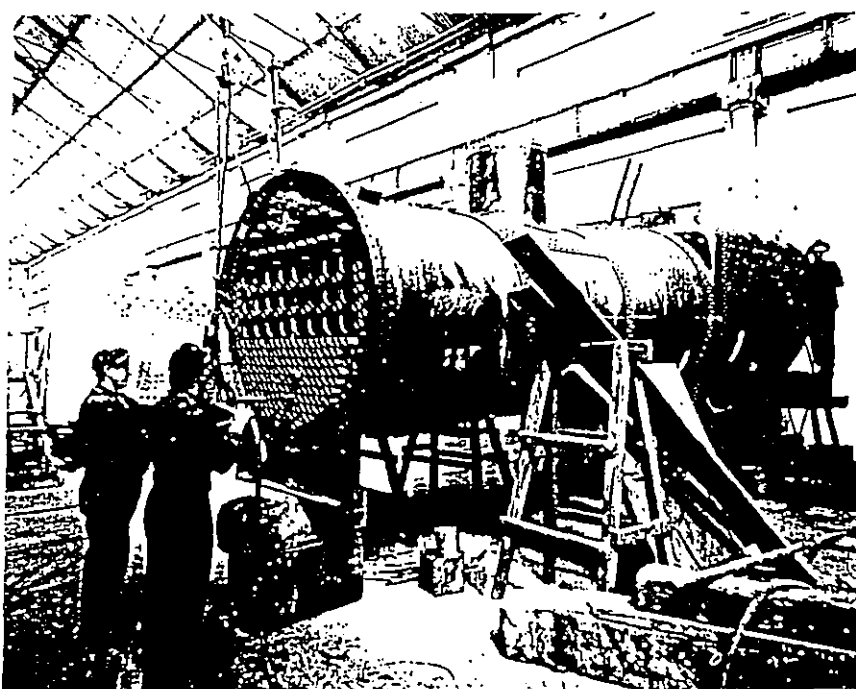


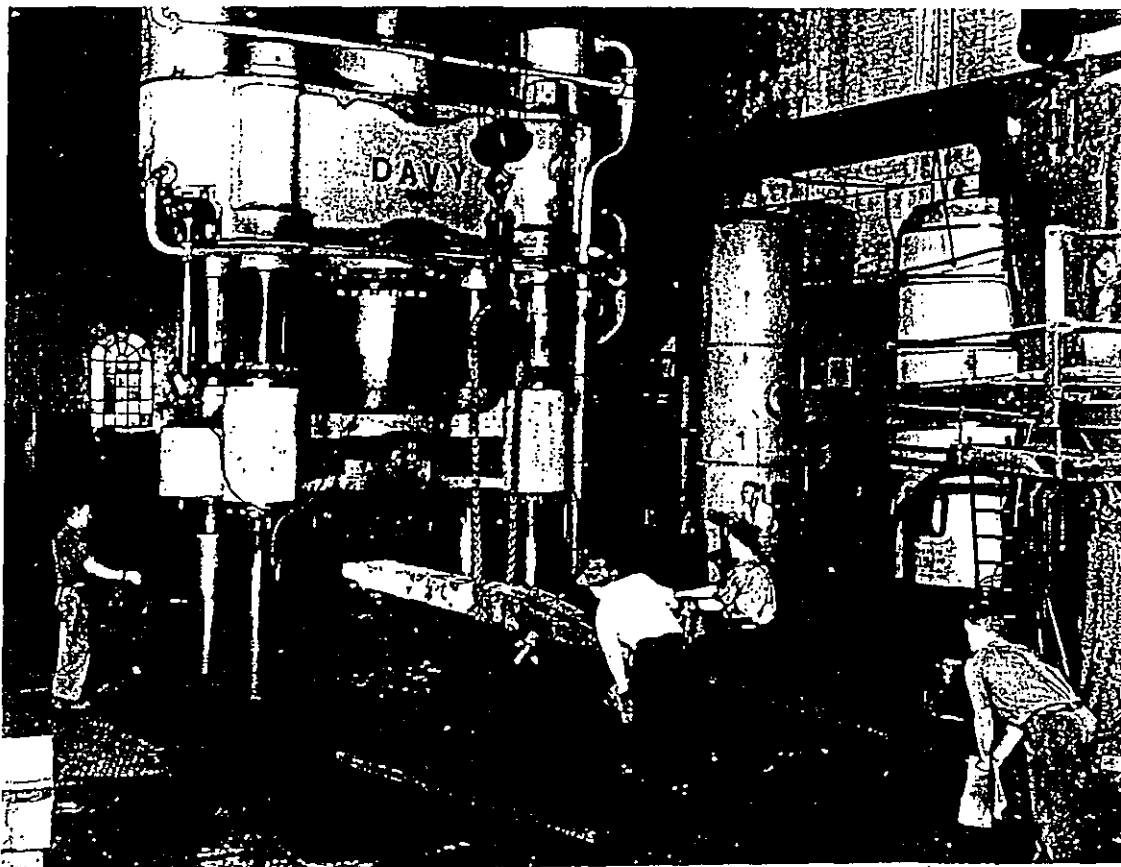
Illustration 1.29: Bay 4a looking south-west showing rolling of tubes with pneumatic tube expanders to D53 class boiler. SRAO ELW 601/47.

A second steam hammer shop was built at the rear of the Spring shop which, according to the 1912 drawing, contained a series of very large steam hammers, two hydraulic cranes and furnaces. Such a workshop would have been necessary to supplement the work being done in Bay 1 for the production of new locomotives.

To supplement the forging capacity of the workshops, the massive 1500 ton Davey press was installed in 1925 with its own dedicated boilers and intensifier system. At this time, this was reputed to be the largest steam hydraulic press in Australia. It was able to complete work such as the manufacture of the massive steel chassis required for the locomotives being constructed at Eveleigh. The action of the press was a slow gentle push rather than the aggressive stamp of the hammers and its operation had a much gentler effect on both men and buildings than the large steam hammers.

By 1937, the whole of the workshops precinct was covered with buildings. Besides Bays 1-15, there was the new foundry, erecting shop, engine shop, the new pattern shop, the oliver smiths shop, plumbers, tinsmiths and coppersmiths shops, the wheel press shop, ammonia shop, first aid station, timber store, joiners shop, locksmiths, the garage, a greatly extended timekeepers building, the spring shop and the steam hammer shop, the compressor house and numerous other stores and ancillary buildings. Eveleigh had reached the peak of its manpower and its production. It was in this year that the Chullora workshops were established and the new permanent way workshops and the boiler repair workshops relieved some of the pressure on Eveleigh.

Illustration 1.30: Bay 1 north looking north, showing Davy Press in operation. Supervisor on the left, operator at handle on right, pressing white hot metal manipulated by three men through balanced tongs supported from overhead crane. Note boiler on r.h.s.. SRAO ELW 601/29



### World War II

During World War II, Eveleigh, like many other Government and private enterprises, dedicated part of its output to the war effort. Bays 5 and 6 were dedicated to the Department of Defence for the manufacture of 25 pound field gun shells (see Plan ). In 1941, a mezzanine floor supported on timber columns was added to Bay 5 and the machinery for the manufacture of shells installed by February of that year. Other additions to Bay 8 were made and this became a munitions annexe.

### Post War

During the period between the wars, and for some time after, the overhead line shaft became increasingly redundant as the new era of machines had their own stand alone electric motors with belt drive and eventually machines were designed with their own integrated motor. The line shafts were gradually dismantled along with the counter shafts. Post-war locomotive manufacturing lasted only from 1945 to 1952, when Eveleigh became once again a repair and maintenance facility. The decision to abandon steam locomotives, taken in 1963, meant that Eveleigh, which was dedicated to steam loco maintenance and repair, entered its final phase.

The 1970's re-organisation and attempt at modernisation came too late. Too much of the machinery was suited only to the steam locomotive era. The spring shop was dismantled and the spring coiling section was moved to Bay 3 along with the heat treatment plant. Bay 5 mezzanine, which had been established during the war, became the staff canteen and remains as one of the few remnants of the war effort. The apprentices were located in Bay 6 north and the fitting shop occupied Bays 6 south, 7 and 8. The wheel and axle shop was located in Bay 9 while the adjacent Bays 10, 11 and 12 contained the machine shop. Bays 13 and 14 housed the air brake shop in their southern half and the tool room occupied the northern half of both bays. Bay 15 housed a rail motor test room on the north side and the store room remained in the southern half. However, the attempt at bringing Eveleigh into line with modern developments in rail transport was unsuccessful. The buildings contained old equipment and machinery which became progressively inappropriate to a modern transport era and the complex was closed in 1988.



### 3.6 JOHN WHITTON & GEORGE COWDERY

#### John Whitton

Whitton was born in Yorkshire in 1820. His initial railway experience was with John Billington (his mother's maiden name was Billington) preparing plans and tenders for railway construction and waterworks. He later was engineer for the Manchester, Sheffield and Lincoln railway (1847) and the Oxford, Worcester and Wolverhampton line (1852-6). He arrived in Australia in 1856 as the engineer-in-chief to layout and superintend the construction of railways in NSW.

He found himself at odds with the Governor and the government on a range of issues such as the gauge and the quality of works. Whitton argued for a wider gauge and extension of the network. He was subject to allegations of fraud by John Fowler which were disproved and there was friction between Whitton and Goodchap, the Commissioner. He supervised unprecedented growth in the railways with 1,000 miles of new track between 1880-85. He retired in 1890 and died in 1898.

Notes from ADB Volume 6:1851-1890.

#### George Cowdery<sup>1</sup>

Cowdery, born in 1830, was the son of an English railway engineer who worked for Betts & Macintosh, private contractors. As a child he travelled extensively around England as his father moved from site to site. George started work, at the age of 14, for Sir Samuel Moreton Peto, of Brassey, Peto & Betts a construction company which specialised in the building of bridges and railways. He worked in the drawing office and went out on the lines with the Engineer measuring up and setting out. When working in North Wales on the Chester & Holyhead Railway through the Isle of Anglesey (which his father was in charge of) George first met Robert Stephenson who was building the tubular Britannia Bridge over the Menai Straits. Cowdery worked on the Oxford, Worcester and Wolverhampton railway for Peto & Betts. It was here during work on timber piles to large timber truss bridges that he met Mr John Whitton and John Fowler both of whom he later worked for in NSW. These bridges were experimental designs by Brunel. Cowdery also worked on tunnels, stone viaducts, sea walls, light houses and pier heads.

Cowdery would have been familiar with an earlier, 1819-26, suspension bridge over the Menai Straits designed by Telford and regarded as a masterpiece of elegance and design (Copplesstone) with brilliantly detailed iron work. Both bridges are regarded as landmarks in the development of iron structures (Copplesstone, p.305).

Work was slow in England because of the Crimean War and Cowdery came to Australia in 1856 with letters of introduction to the Governor of Victoria. He found regular employment constructing roads and surveying new railway lines in Victoria. He travelled to NSW following the awarding of the contract for the Menangle to Picton line to his former employers, Brassey, Peto and Betts. He worked on the Great Southern Railway at Douglas Park and John Whitton appointed him District Engineer of the Great Southern Railway in 1863.

<sup>1</sup> All notes on Cowdery from Cowdery's "Life Sketch", Manuscript ML/AC163 and from "The Greatest Public Work. The NSW Railways, 1848-1889" by Robert Lee.

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Cowdery built the first two large railway tunnels in the colony as well as six large viaducts on the Great Southern Line. In 1868 he was transferred to work on the Great Western line, including the supervision of the completion of the famous Zig-Zag line at Lithgow. In the early 1870's railway work almost ceased and the lure of gold at Hill End caused Cowdery to temporarily abandon the railways. He worked for a time as a mining engineer and also surveyed the mines and published a plan. He returned to the railways working on the rail beyond Goulburn then Grafton to Glenn Innes, then Orange to Narromine.

In 1878 Cowdery was appointed the Deputy Engineer for Existing Lines. The Existing Lines Branch looked after everything to do with the permanent way including design & construction of new lines and all new buildings. The separate Locomotive Branch was responsible for all aspects of rolling stock. In 1880 he was appointed Chief Engineer for Existing Lines and Tramways and began to plan the new railway workshops and running sheds at Eveleigh, reputed to be the first use of an arched truss roof for engine sheds. This form of truss roof had been in use for train sheds (ie over platforms) since Brunel's Paddington Station, 1850-4. Cowdery also widened the Redfern Tunnel under Cleveland Street and quadrupled the mainline through Homebush.

There was conflict between Whitton and Cowdery over the cost of the Eveleigh complex, Cowdery's choice of a Whipple truss bridge at Lewisham, the design of Whitton's iron girder bridges and his timber viaduct over the Murrumbidgee flood plain at Wagga Wagga. Whitton considered the running sheds extravagant but comparison by Goodchap with the costs of inferior American sheds vindicated Cowdery. In April 1884 a Royal Commission was established to "investigate the rival claims of the Engineers". The commission could not fault Whitton's designs. Cowdery appears to have retained his position despite his obvious, and very public, difference of opinion with Whitton.

George Cowdery retired in 1890 and died in 1913. His son George Robert, later became Engineer for Tramways, a post he held for 37 years.

### 3.7 THE MACHINERY

#### 3.7.1 General

Little documentary evidence survives of the plant and equipment at Eveleigh. Plant cards from the plant card system are missing as is documentation assembled when the workshops closed. Searches of the material still located at Eveleigh and at the railway archives has failed to locate documentation which would help with the history of the machines. In many cases the only clue to the history of the machines including the date of manufacture or installation, is evidenced by the fabric of the machines itself. In some cases, the date of manufacture is cast into the machine (as in the case of the Craven Bros rollers), on to the name plate (as for the Craven Bros crane) or stamped on the small name plate screwed to the machine or motor (as for the Craven Bros electric motors on the 1907 crane).

Heavy equipment was predominantly of cast iron with massive bronze bearings. There was no facility for an attached motor as almost all of the early machines (possibly up to World War I) were belt driven from line shafts and counter shafts. Early machines were generally over-designed and components which needed machining were kept to a minimum. Later machines had facilities for the attachment of a separate motor to drive the machine by belt and later still, machines were designed with an integrated motor system. Later machines made great use of webs which were cast into the body of the machine and those produced after World War I and certainly after World War II were made of steel components which were welded together rather than being cast in a single piece.

The early drawings of Eveleigh sometimes show accurate representations of machines, and it can be assumed that extant ones, if they are of the same configuration as shown in the drawing (and there is no evidence to the contrary), are in fact the machines depicted. Early photographs also provide evidence that some extant machines were installed at the time the workshops opened. Other machines are closely associated with the particular piece of plant and their date of installation can also be fairly accurately assumed.

As the historic record is so broken ~~there appears to be little chance of~~ <sup>extensive careful further research, including overseas</sup> producing a definitive history of the machines located in the workshops. Researching the oral history of the place could provide more information regarding machinery. <sup>would be necessary to</sup>

The following section comments on the history of the machinery according to their method of operation - hydraulic, steam and belt driven.

### 3.7.2 The Hydraulic System

The original hydraulic system in Annex 6 powered punches, presses and spring formers. The hydraulic system was installed when the workshops were established. The combined steam engine/pump had the same configuration as the one shown in the 1912 drawing (Plan No. 2.13) and it is probably the original which was installed to provide hydraulic power to the punches and formers in the workshop as well as the spring buckling presses, spring stripper and Ryerson spring formers. The hydraulic system is one of the earliest introduced into Sydney and precedes the 1891 Sydney and Suburban Hydraulic Power Company in Darling Harbour (now the Pump House Brewery) by some four years. This makes the hydraulic system the oldest still operational in Sydney and possibly Australia.

The Hydraulic Engine House is Annex 6 at the southern end of Bay 3. Immediately to its west are the hydraulic accumulators. The reservoir and some of the hydraulic lines are likely to date from 1887, as the accumulator close to the building almost certainly dates from then. The electric motor is believed to have been installed some time immediately after World War 1 as was the second accumulator. Extra hydraulic power would certainly have been necessary when the workshops commenced building their own locomotives.

All the hydraulic machines probably date from last century. Every piece is massive cast iron and has the early form of hydraulic valving. However, little of this machinery would appear to be in its original location. Spring buckling presses were possibly located originally in Bay 4, as were the spring formers, and the spring stripper. They would have been moved to the new spring shop which was built adjacent to Bay 1 along with the two spring presses by Ryerson. When the spring shop was demolished, all were returned to Bay 4. It is likely that the two hydraulic presses now installed in Bay 1 south were relocated from the old boiler shop probably from Bay 3 or Bay 4. The date of relocation can really only be guessed as knowledge of the operation of the workshop is insufficiently detailed to make an assumption.



### 3.7.3 The Steam System

The massive hammers, presses and punches were powered directly by steam generated in boilers. The C36 class locomotive steam boilers which are now in the Annexe 4 on the south end of Bays 2 and 3 are the third generation of steam boilers in this location. Little is known of the two earlier sets of boilers. However, the present set would certainly operate at higher pressure than either of the previous ones and it is likely that when they were introduced the steam lines were also replaced. The six steam hammers (see section 4.6) which comprise the 40 cwt arch hammer, the 20 cwt steam hammer and the four 8.5 cwt steam hammers all appear to have been installed when the workshops opened. All appear to be in their original location. None have had any major alteration and all appear to be in operational condition.

The Rootes blowers located on the south wall of Bays 1 and 2 appear to be in their original location and although the two smaller ones may have been installed in the nineteenth century, it is believed that the most westerly was installed some time in the twentieth century. The machines are certainly early but there is no evidence of their date of installation. It is, however, certain that they have been in this location since 1912 and possibly many years before.

The Davey Press was installed in 1925 along with steam reservoirs and steam intensifiers. From photographic evidence, the south set of steam reservoirs was replaced possibly in the 1950s.

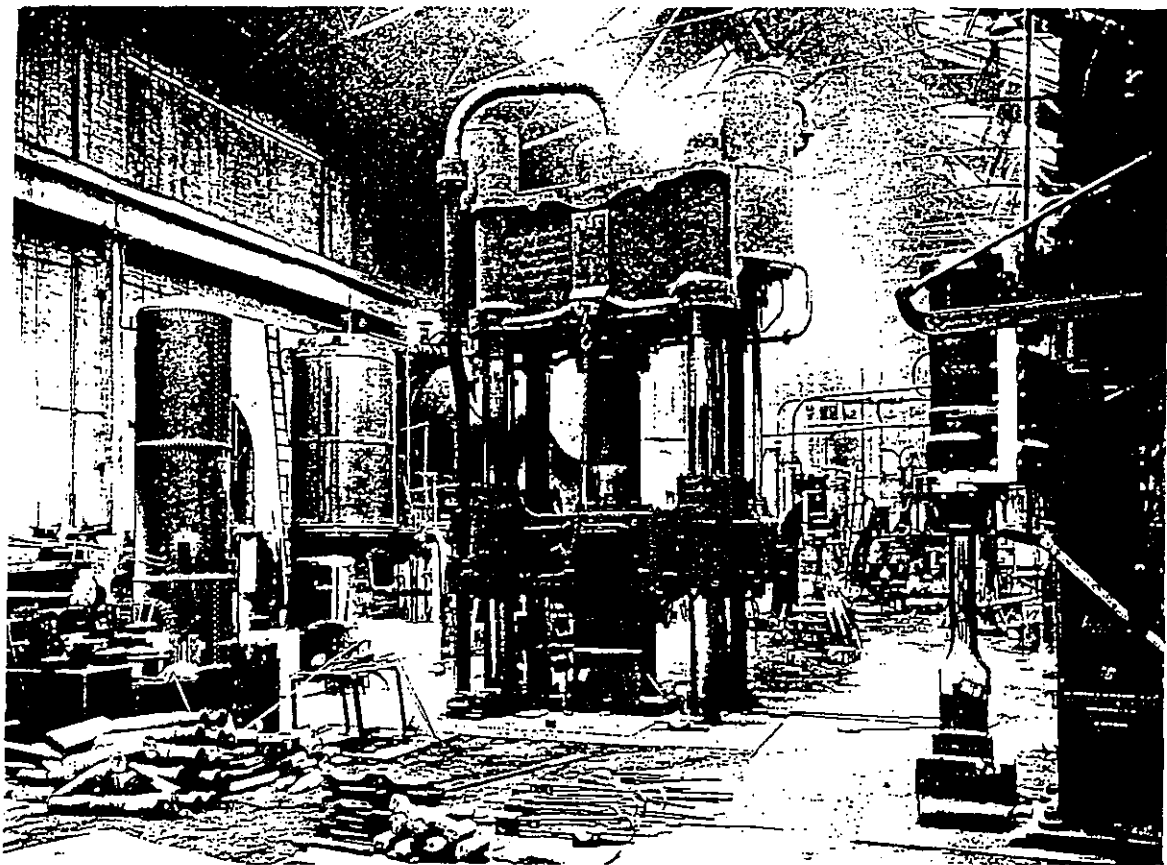


Illustration 1.31: The Davy Bros. Press in Bay 1 north looking south. Taken some time after installation with the Davis and Primrose 8½ Cwt steam hammer in the right foreground with three steam hammers in the background the most distant one being the arch hammer. All steam hammers are shown on the 1912 plan. SRAO EL W 601/43.

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### 3.7.4 Equipment Which Operated From The Line Shafts And Counter Shafts

A variety of machinery was operated from the line shafts and counter line shafts which ran along the double row of columns between the bays.

The *Bretts impact punch* and the *De Burg electric shears* are both machines which could have been made to operate from their own attached electric motor or from a line shaft or counter shaft. Both appear to have been designed last century although they could have been designed early this century. Both appear on the 1912 drawing. The De Burg shears is shown as being in its present location adjacent to the rear wall of Bay 1 in 1912 while the impact punch has been relocated from Bay 3 (see section 4.6 for locations). It is possible that both machines were relocated from the old boiler shop, as a wall mounted engine operated a line shaft which powered some of the machinery in Bay 3. With the advent of electric power, these very heavy machines could be relocated to any position within the workshops as the power source could readily be attached to the chassis.

The *electric shears* and *plate rollers* are both now located in Bay 4 south. Their original position is not known but both were probably originally powered from line shaft or counter shaft. Neither of the machines is shown in its present location in the 1912 drawing and it would appear that they were relocated some time later with the extra versatility of layout that the introduction of electric power offered.

The *continuous forging machine* by the Ajax Manufacturing Company was installed in 1916. The machine was driven by a separate electric motor which may or may not have been supplied with the machine. It is likely, because of its configuration and operational requirements, to have been located in this position since it was installed.

The collection of *steel swages, fullers, and dies* which are located on what appeared to be the original tool racks between Bays 1 and 2 and Bays 2 and 3 possibly date from early this century or even late last century. However, as these tools wore out fairly quickly with continued use, it is possible that all of them have been remade. All of them appear to be in fair condition and are in their approximate operational location.

The *overhead cranes* throughout the workshops are in their original location. It was not normal practice to move a crane to a different location simply because of the wearing in which took place with each set of crane wheels and the overhead track. When the workshops closed down, it is believed all cranes were in operational condition.

The *wall cranes* are installed to facilitate the movement of materials from furnaces to hammers and other machines. However, very few drawings indicate the position of wall cranes. The 1912 drawings, for example, which contain so much information, show only the very large cranes located either in the new steam hammer shop and in the wheel press shop.

**APPENDIX D**

**Eveleigh Locomotive Workshops Conservation Plan,  
prepared by Heritage Group, State Projects, 1995,  
Statement Of Significance (Section 5.3, pp. 109-111)**

### 5.3 STATEMENT OF SIGNIFICANCE - EVELEIGH RAILWAY YARDS

The Eveleigh Railway Yards (ahead of Newport and Midland) are some of the finest historic railway engineering workshops in the world and Eveleigh contains one of the most complete late 19<sup>th</sup> and early 20<sup>th</sup> century forge installations, collection of cranes and power systems, in particular the hydraulic system. The place is of international significance and is one of the finest of Australia's industrial heritage items. The value of the place is increased by the fact that it is comprised of assemblages, collections and operational systems rather than individual items. Conversely, the significance has been reduced by its closure, relocation of some machinery and its disassociation from the operating rail network.

#### Historic

- The workshops were an important part of the NSW rail network which was instrumental in the development of the state during the 19<sup>th</sup> and 20<sup>th</sup> centuries.
- The construction of the workshops influenced the development of the local area (which was developed for worker's housing) both by providing employment and by its bulk and presence, starting bells and sirens.
- The yards were associated with developments in working conditions now crucial to the Australian cultural identity, eg. the *weekend* (Chronology 1892). The yards had an important association with the labour movement. The place was seen initially as a positive instrument of state socialism and in later periods as the site of important labour actions and of restrictive work practices.
- They were conceived by Whitton, the 'father' of the NSW railways, and were an integral part of his NSW rail system, and were executed in detail by Cowdery.
- The design of the buildings was associated with Cowdery coming to prominence and was a point of public conflict between Cowdery and Whitton which came to a head in a Royal Commission in 1884.
- The place was in continuous use as railway workshops for over 100 years until closure in 1988.

#### Aesthetic

- The whole complex has a strong industrial character generated by the rail network itself, by the large horizontal scale of the buildings, the consistent use of brick and corrugated iron, the repetitive shapes of roof elements and of details such as doors and windows and because of the uniform grey colours.
- The simple, strong functional forms of the buildings have landmark quality, not only as important townscape elements in the Redfern/Eveleigh area, but as part of the visual train journey of thousands of commuters, marking arrival in the city centre.
- The major buildings from the original 19<sup>th</sup> Century development of the site are well designed, detailed and built exhibiting a high degree of unity of design, detailing and materials.

#### Scientific

- The Eveleigh railway workshops have considerable research potential for understanding the operation of railway workshops. This potential is enhanced by the extent of archival material available and because the relatively recent closure means that there are many former workshop workers who are still alive and who know how the place operated.
- They have unique educational value enhanced by the highly accessible location and the relationship with the ATP and the three universities. They contain potential to achieve an understanding of the work practices of today through an understanding of the cultural continuity between 19<sup>th</sup> century technology and 21<sup>st</sup> century technology.
- There is potential for further research to yield information about the labour movement, labour relations and the nature of work practices in the 19<sup>th</sup> and 20<sup>th</sup> centuries.
- Archaeological remains have the potential to reveal further information about the operation of the Yards.

#### Social

- The Workshops were one of the largest employers in Sydney at the turn of the century declining only in the latter half of the 20<sup>th</sup> century. It was and is a source of pride in demonstrating the capacity of Australian industry and workers and a high level of craft skills.
- The place is significant to railway workers, former railway workers and railway unions and is associated with the stories of workers, locals, etc. which are important to cultural identity.
- Although no longer operating as a workshop, the place maintains symbolic value for the community as a former workplace and a place that provided economic input into the local area.

## 5.4 STATEMENT OF SIGNIFICANCE - ELW BUILDING

### Historic

- The Locomotive Workshop (along with Newport) is the largest surviving, intact, high quality railway workshop, dating from the steam era surviving in Australia and possibly in the world.
- It was one of the largest continuously covered industrial spaces of its time in Australia and demonstrates nineteenth century industrial building development which required, open plans to flexibly accommodate machinery and large numbers of men.
- The size and quality of the building indicates the importance of railways at the time.
- The Locomotive Workshops are part of the original construction of the Eveleigh Railway Yards.
- The building is associated with historic figures eg. Cowdery and Whitton, and historic events eg. strikes, parliamentary inquiry.
- The building is a rare surviving example of the 'architectural' work of George Cowdery, better known for his designs for bridges and tunnels and other engineering works.
- The building is historically associated with local industries and builders.
- Famous and much loved classes of locomotives were produced and maintained in this building.
- The building was used for the wartime production of weapons, evidence of which still exists in the mezzanine in Bay 5 South and which is supplemented by plans showing the layout of machinery for making ammunition.

### Aesthetic

- The locomotive workshop is a highly developed example of a cast and wrought iron structure in Australia and demonstrates an exceptional standard of design, construction, craftsmanship and unity of materials.
- When built it was the most technologically advanced and largest railway workshop in Australia.
- The building is the largest, earliest and best industrial building remaining in the Eveleigh complex and one of the finest remaining late 19<sup>th</sup> Century industrial buildings in Australia.
- The building demonstrates engineering precision in a building with an extraordinarily carefully and ingeniously resolved structure, apparently simple, yet multi-functional and complex. The cast and wrought iron structure in particular has a high degree of technical excellence. The ingenuity of the design is seen in the piers footings providing structural support and the integrated system of columns, girders, crane tracks, gutters and downpipes.
- The building is an excellent example of a major building designed by George Cowdery and with the carriage Shops are the best surviving examples of his work.
- Internally and externally the large scale and industrial character expresses the power of 19<sup>th</sup> century industry. It has its own special atmosphere enhanced by noise, odour, smoke and light and it has a powerful sense of place, in particular when machines are in operation.
- The building has elegant, restrained and well proportioned brick facades with stone dressings.
- The building has a high degree of integrity and authenticity including the building itself, ancillary structures, the machinery, the rails and cranes and current and former drive and power systems. Other components of the place are known to exist under the bitumen floor, including rails and pits in some bays.
- The building is an example of the best work of builders John Ahern, George Fishburn and Harold Norris.
- The building displays some of the finest work of local industries, eg. the Globe foundry (some columns).

### Scientific

- The building has potential to reveal information about construction techniques and design of cast iron, wrought iron and steel buildings.
- The building has a high level of design interpretability because it is consistent to the smallest element. It has a high degree of authenticity because of its comprehensive set of detailed drawings.
- The place has potential archaeological remains, such as the infilled pits, traverser road, underground flues and core store in particular, and sub-surface remains generally, have the potential to be excavated to further demonstrate how the place operated.
- The building has educational value in showing architectural taste in how classical rules were applied to all parts of the building.

## 5.5 STATEMENT OF SIGNIFICANCE - ELW MACHINERY

### Historic

- The building houses the most complete set of authentic and operational late 19<sup>th</sup> century and early 20<sup>th</sup> century forge and hydraulic power technology in Australia, superior to anything in the UK or USA. Midlands, however, has a more complete early 20<sup>th</sup> Century installation.
- The remaining machinery demonstrates the functioning of sections of the workshop: in particular the forge, materials handling systems and power systems. The historical development of the machinery and associated power systems demonstrates continuing technological development throughout the life of the place as a railway workshop.
- The extant early power systems, and the succession of power systems including hydraulics, steam, air, oil and electricity are rare surviving examples and demonstrate a continuity of technological development.

### Aesthetic

- The machinery, in particular the cranes and the machinery in Bays 1-4a, are an essential component of the sense of place and are an integral part of its industrial character.
- The Davy press is the largest operating steam press in Australia.
- The building houses the only known operating hydraulic system of its kind in Australia.
- The collection of overhead cranes is the best in Australia.

### Scientific

- There is research potential into late 19<sup>th</sup> century technological development, the operation of specific equipment, and into steam, hydraulic and other power systems in industry.
- The operating machinery and power systems enhance the educational value of the place. The working parts have the highest value and their survival in operable condition is rare, in particular the hydraulic system, the boilers and the air compressors.
- As Australia moves into the 21<sup>st</sup> century the survival of complete examples of 19<sup>th</sup> and 20<sup>th</sup> century machinery and technology will be vital to an understanding of Australia as an industrial nation.

**APPENDIX E**

**Discussion of Assemblages, Collections Systems,  
Complexes and Precincts, prepared by Don Godden for  
Eveleigh Locomotive Workshops, 1995**

#### 4.6.2 Assemblages, Collections, Systems, Complexes and Precincts

Heritage items do not exist as neatly defined entities. Usually an industrial item, especially one associated with the railway, exists as a part of a large and complex group of associated items. These groups of associated items can be defined as assemblages, collections, systems, complexes and precincts. The term assemblages, collections and systems are usually applied to machinery and plant. The term complex usually to an industrial complex which is a combination of machinery, plant and buildings while a precinct usually applies to a group of buildings in a single location.

##### An Assemblage

An assemblage may be regarded as a relic or structure including all the artefacts, tools and items normally associated with it when it was operating. In the case of a machine it would include the spanners and wrenches used to tighten nuts, the tools needed to adjust gears or belts, the safety screens which prevent contact with moving parts and, if applicable, samples of the completed or partially completed work. It would also include signs, pipework and associated services.

##### A Collection

A collection is usually a number of relics or structures which belong to a group because they perform the same function or produce the same finished product. In many cases it is inappropriate to keep a single representative example of a collection of machinery in that the collection itself indicates the way in which a workshop operated.

##### Systems

A system is more than a collection of artefacts, rather it is an operational group of related relics or structures which cannot function effectively if any one is removed.

##### A Precinct

A precinct normally encompasses a geographic area which contains a number of functionally related items. A precinct may include elements of a service industry, possibly, as well as elements of production and manufacturing industries.

The majority of items within the workshops belong to systems and assemblages. There are the collections of the Rootes blowers and the steam hammers but they belong to, and are treated as an integral part of the steam system. The huge collection of forging tools are regarded, along with the anvils and furnaces, as being a part of the assemblages associated with the hammers. There are items such as the sheet metal rollers, sheet metal furnaces and the shears which, because of their present condition are classified as individual relics.

All the in situ items extant in the workshop were part of the workshops complex and each one is significant in interpreting the place.

The following sub-sections consider the hydraulic and steam systems, and then various assemblages. The consideration of "systems" overlaps with the services which are not considered separately. The location of items is shown on plans in Appendix E.



#### 4.6.3 Systems in the Workshops - Hydraulic Power

The hydraulic system in the workshop consists of one steam hydraulic pump, one electric hydraulic pump, two hydraulic accumulators, a series of high pressure hydraulic lines which run along the east facade and the south facade and then internally to a number of machines, a low pressure return pipe and a cast iron reservoir and six items of hydraulic machinery in Bay 1 south and Bay 4 north. High pressure water is generated by the pumps and the pulsing produced by the pistons is removed by the hydraulic accumulators which also provide an artificial head to the water before it is conveyed to the hydraulic machines through 50mm ID high pressure pipes.

##### **The Hydraulic Pumps**

The two pumps are located in the brick annex abutting Bay 4 south (Annex 6). The steam hydraulic pressure pump by Fielding & Platt, Gloucester, England, operates on the Tweddles system. The two cylinder horizontal steam engine is integrated with a two cylinder high pressure pump manufactured in the late nineteenth century. The two reciprocating pump cylinders are double acting and are driven directly by steam cylinders with which they each share a common piston shaft. The pump cylinders are mounted behind and in line with each steam cylinder. The wishbone con rods from the two metre diameter flywheel are joined to each cylinder/pump piston at the crosshead. The speed is regulated by a ball type governor driven from the flywheel crankshaft. The machine appears to be in very good condition and an inspection of the steam cylinders in 1993 indicated that they had some superficial rust only.

The electrically driven hydraulic pressure pump by Hat, Horn, Davey & Co., of Leeds, England, is powered by an electric motor by Hugh J. Scott & Co., Voltworks, Belfast. The 100 horsepower motor drives the open shaft and con rod, vertical, triplex, single acting pressure pump via a large reduction gear. Both pump and motor are mounted on a single cast iron bed which has been modified to suit the motor.

The pump and motor both appear to be in excellent condition and were both operating as late as 1988. Other equipment within the Hydraulic Pumphouse includes a workbench, cupboard, a series of tools and spare parts for both sets of pumps. All of the equipment within the room is related to the pumps and the operation of the hydraulic equipment. A full inventory of all equipment, tools and materials located within the Hydraulic Pumphouse is available.

##### **The Reservoir**

The reservoir is a three piece cast iron unit mounted on a timber platform supported by columns at the north end of the annex. The reservoir is fitted with a volume indicator and receives water from the low pressure return pipe and supplies water to the pumps again through a low pressure 4 inch dia. pipe.

##### **The Hydraulic Power Accumulators**

Immediately west of the annex there are two hydraulic accumulators with valves and safety override equipment mounted on heavy vertical guideframes. The accumulators are really large boiler sections filled with scrap iron and/or sandstone. Both appear to be in fair condition with some rust evident on the shafts. It would appear that both could be made operational by cleaning or perhaps machining the shafts.

### The Hydraulic Machinery

The hydraulic machinery, which is driven via the lines and the accumulators, consists of two Ryerson 72 inch spring forming machines, a hydraulic spring buckling press by Fielding & Platt a second spring buckling press by Craven Bros., a hydraulic spring stripper by Craven Bros. and two small general purpose hydraulic presses.

The two hydraulic presses are located in Bay 1 south. They are both vertical acting single lever operation presses connected by standard valving to the hydraulic lines. The press closest to the northeast corner of Bay 1 south is a standard railway manufactured hydraulic press, while the other which is on the opposite side of the bay is a ram press by Tangy Bros. of Birmingham, England. Both exhibit the typical massive cast iron structure common to early 20th century hydraulic equipment.

The Ryerson spring forming machines consist of a table top, a long wide section of horizontally mounted flat chain mesh against which a curved ram can be forced by hydraulic pressure. When the press was being operated a straight red hot spring leaf was placed between the ram and the spring and the spring is forced to take the shape of the dye.

The hydraulic spring buckling press by Fielding & Platt and the hydraulic spring stripper by Craven Bros. were both used for the assembling and dismantling of leaf spring units. Again all of these machines evidence the massive cast iron construction which was common before the advent of rapid, deep oxy acetylene welding techniques. The Craven spring stripping press is the sturdiest of all the hydraulic machines and the massive cast iron frame held loco spring units during dismantling.

The reservoir, lines and hydraulic machinery all appear to be in good condition. However, it is not known what actions were taken by the SRA when the equipment was mothballed. A detailed inspection should be undertaken.

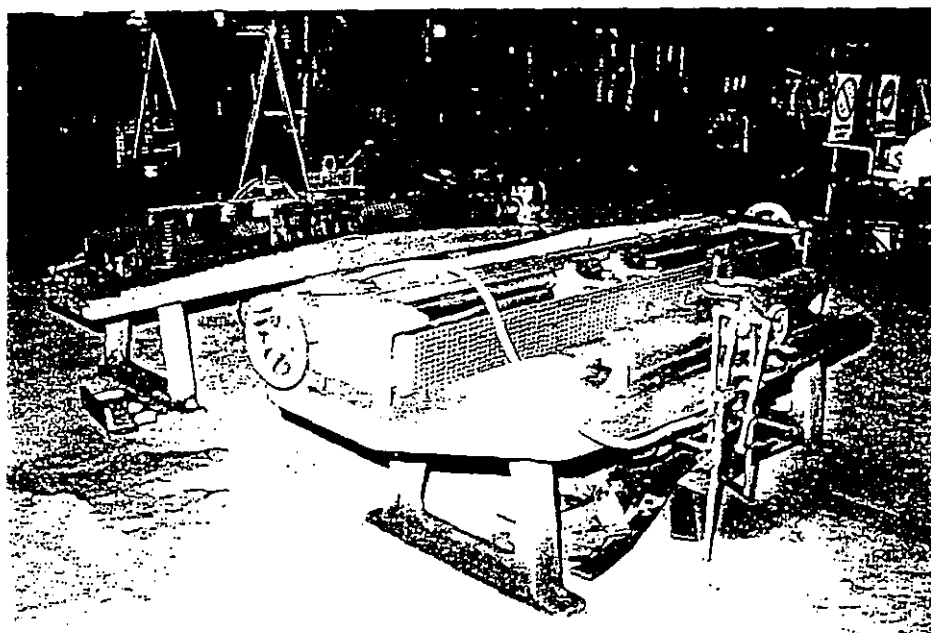


Illustration 2. 46: Bay 4 north. The Ryerson spring formers. Photo by D. Godden 1985.

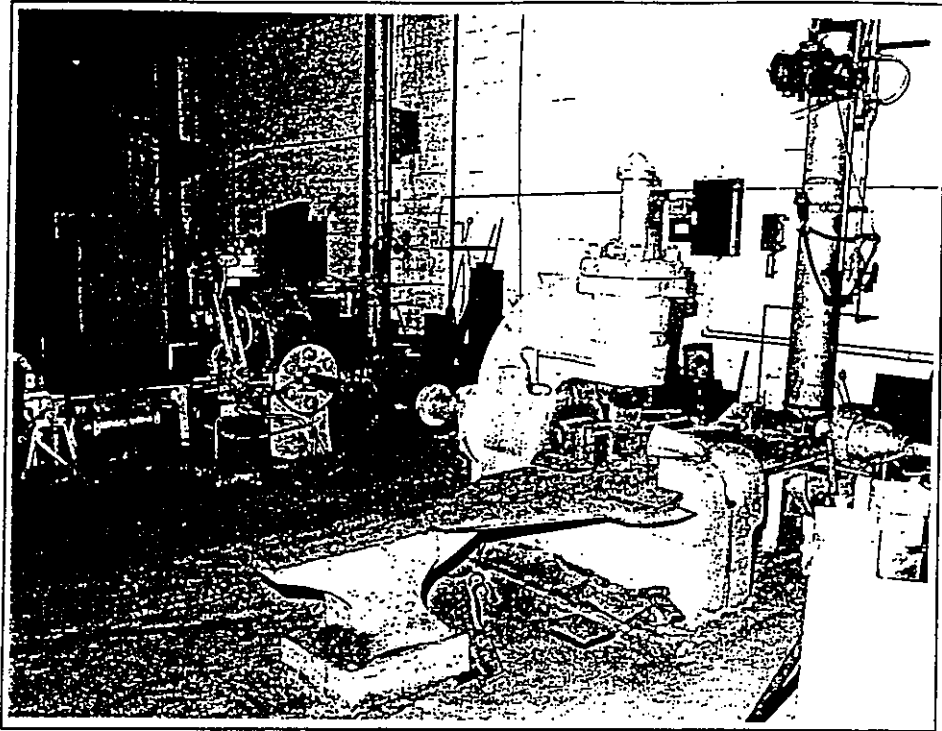


Illustration 2. 47: Bay 4 north. The Fielding & Platt hydraulic spring buckling press was used to assemble leaf springs. Photo by D. Godden 1985.

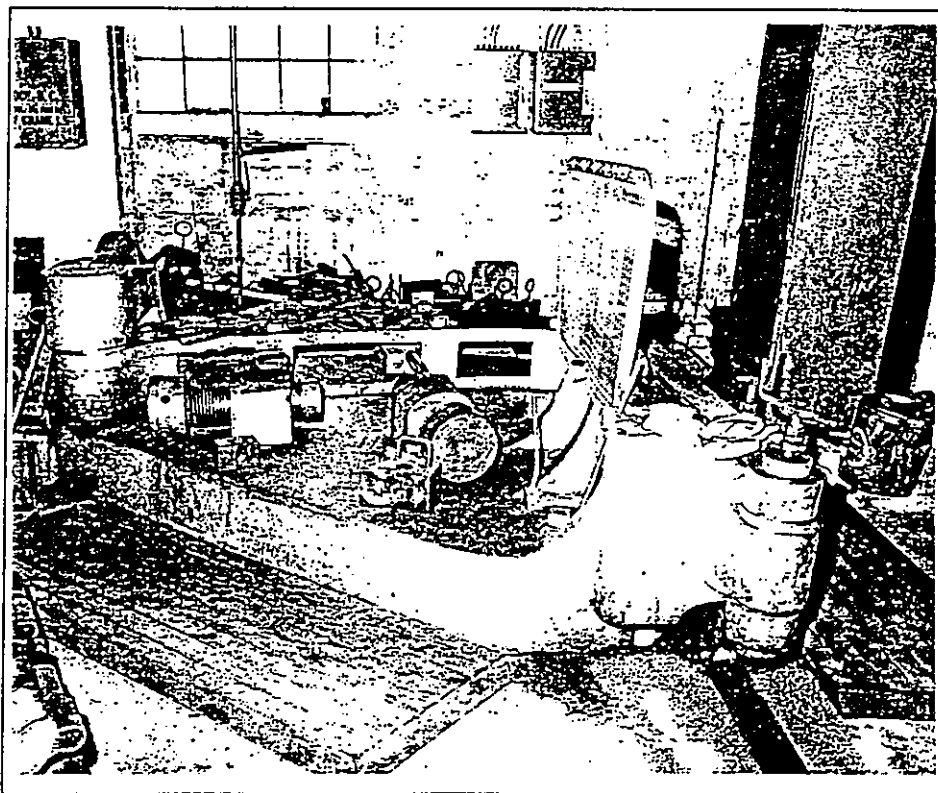


Illustration 2. 48: Bay 4 north. The Craven Bros hydraulic spring stripper was used to dismantle leaf spring for repair. Photo by D. Godden 1985.

#### 4.6.4 Systems in the Workshops - Steam Power

The steam power system consists of four 36 class locomotive boilers, now oil-fired, located in the annex abutting the south wall of Bay 2, a series of steam lines which carry steam to the machines and equipment in Bay 1 north, Bay 1 south, and Bay 2 north, the exhaust vents from the machines served by the steam lines as well as the machines themselves which include the 40 hundredweight (cwt) arch steam hammer, the 10 cwt steam hammer, the 4 units of 8½ cwt hammers, and 3 Rootes blowers.

High pressure steam was generated in the boilers and sent via the steam lines and a series of valves to the various machines which were powered by the steam. When the steam had done its work and passed through the machines it was not returned to the system via condenser but was rather exhausted to the atmosphere.

##### The C36 Class Steam Boilers

The four 36 class steam boilers which are located in the annex at the south end of Bay 2 were possibly built at the Eveleigh workshops. This fact is uncertain although ten C36 class boilers were built here between 1924 and 1927. It is believed that these boilers were installed in this location in the late 1920s. At the time of installation the boilerhouse was modified to accept these boilers which were larger than the four M class boilers they replaced.

The boilers are distinguished by their 4m high steel stacks which rise above the skillion addition to the boilerhouse and by their massive steel locomotive frontplates. The boilers were originally fired from the rear by coal fed automatically to the grates. Later they were modified to be fired by force-fed oil.

The condition of the boilers is unknown although three were in operation at the time the workshops closed in 1988. Recommendations at that time were made to the SRA that the boilers were to be blown down and limed to prevent corrosion taking place. It is unknown whether this procedure was carried out. Before the boilers can be recommissioned they would have to pass inspection and because of their age would probably only be allowed to produce steam at a relatively low pressure. The boilers are located in a pit which at present fills up with water after rain due to blocked drains. Urgent action is required to remedy this problem.

##### The Steam Lines

The steam lines are all 6in. high pressure seamless or welded seam steel. They are characterised by the lagging which is held in place by steel sheet and by the expansion loops which occur at intervals generally in the centre of straight runs of pipe. Because of the danger to staff steam lines have traditionally be run at high level throughout workshops, descending vertically to the machines which they power. An exhaust vent, usually in the form of an 8in. pipe now runs from each of the items of machinery generally straight to a vent in the roof. In some cases the exhaust vents have bell-mouths on them to allow the easy dissipation of the steam and to cut down on the noise of the blowoffs.

The steam lines appear to be in fair condition. Assessing operational ability will need to be done by a bore inspector or similar expert.

### **The 40cwt Steam Hammer**

This massive arch steam hammer has a single vertical cylinder with twin vertical guide rails for the hammer cast into the main frame. The arch frame is 2m wide at its base and the hammer is in excess of 4m high. It is the largest hammer at present in the workshops and is probably the largest hammer in existence in workshops anywhere in NSW.

In its final days the hammer was designated as a general purpose tool but it is possible that it was designed to perform a specific task when manufactured. The hammer is operated by a single lever which determines the amount of steam admitted to the cylinder. This determines not only the strength of blow but the speed at which the blows are issued.

The hammer bears no makers name or crest and it is believed that it was manufactured in the Railway workshops possibly as early as 1887.

The hammer is part of a system and must also be regarded not as a single item but as an assemblage. There are a series of tools such as tongs, fullers, swages and anvils which are all task specific which belong to the hammer. The assemblage in its entirety including the crane which serves it as well as the remnant monorail should be regarded as a single unit.

The condition of the hammer, like most of the steam equipment, is unknown. However, it is believed that besides some rust which may have settled in the cylinder it should be in almost operable condition.

### **The 20cwt Steam Hammer**

The 20cwt steam hammer was manufactured by Davis Primrose Engineers, Leeds, England, possibly prior to the First World War. The hammer was made specifically for the NSW Government and on the shoulder of the main frame the insignia NSWG is cast into the iron. There are several other pieces of equipment throughout the workshops which have the same insignia. This indicates that the machine was specifically ordered from the manufacturers by the NSW Government.

This hammer has a single frame, it is bolted to a brick and concrete plinth, it stands in excess of 3½m high and has a stroke of almost 1m.

As with the arch hammer, the hammer is not only a part of the system but is also part of an assemblage with all tools for its operation as well as the tongs, fullers, swages, and anvils which were part of its operating environment are still extant. The whole assemblage must be regarded as an integral unit and all of these elements must be conserved with the machine.

This machine appears to be in good to excellent condition and the cylinder has been opened and any excess moisture dried out. This machine could be returned to operation with steam although with some modification could be used with a supply of compressed air.

### The 8½ Cwt Hammers

The four 8½ cwt Davis and Primrose steam hammers are located in Bay 2 north. The machines were purpose made for the NSW Government and bear the NSWG insignia on the shoulder of the frame. They are general purpose machines and like the other hammers are fully equipped with their anvils, fullers, swages and dies. The date of manufacture is unknown but it would appear that they were installed prior to the First World War.

Operation is by a single lever which controls the admission of steam to the cylinder and controls both the stroke and speed of blows.

The hammers have recently had their head opened and any condensed moisture dried out. It is believed that they are in excellent condition and could be returned to operation providing a source of steam is available. Again, with some modification, these units could be run on compressed air. It should be noted that similar machines are at present in the blacksmith shop of the carriage workshops on the north side of the tracks. These hammers (in the Carriage Shops) were made to be operated on compressed air rather than steam (as in the Locomotive Shop).

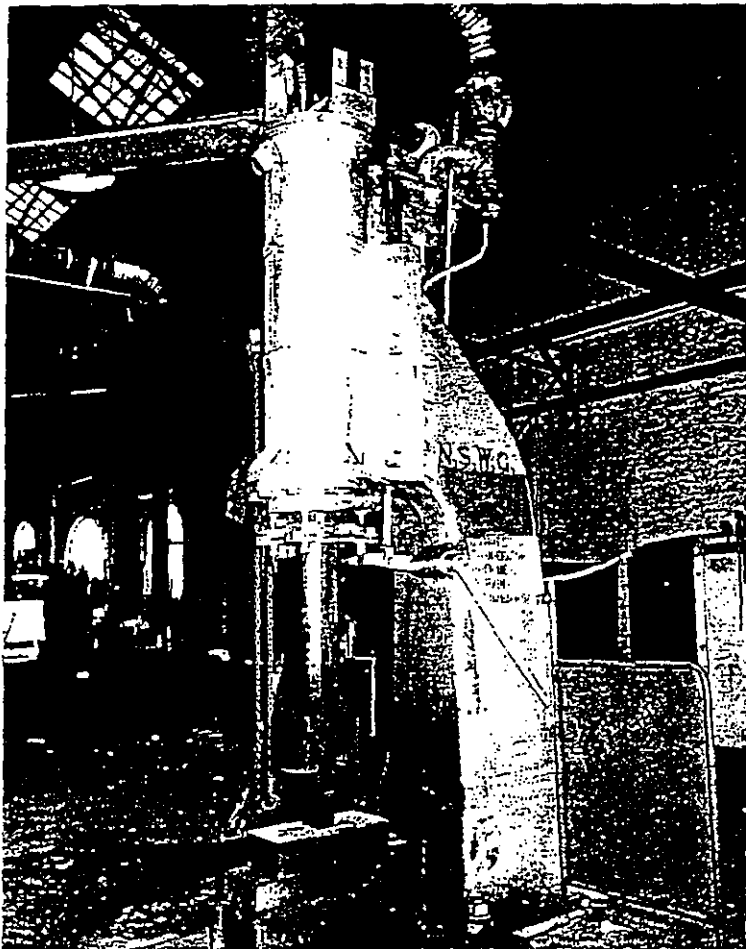


Illustration 2. 49: Bay 2 north. The 8.5 Cwt Steam Hammer is one of a collection of four which date from the 19th century. Photo by D. Godden 1985.

### The Rootes Blowers

The three Rootes blowers on the south wall of Bay 1 south produce large quantities of low pressure air for the forges which were located throughout Bays 1-4. The air was circulated in underground pipes. The blowers were manufactured by Thwaites Bros. of Bradford, Yorkshire, in 1910. They were powered by the boilers and when the workshops were operating were running for the whole shift. Each machine is powered by a single piston which drives two conrods which in turn drive two opposing intermeshing gears which act in a rotary motion to push low pressure air through the system.

Again these pieces appear to be in excellent condition. The equipment needed to maintain them is stored in part at the rear of the machines.

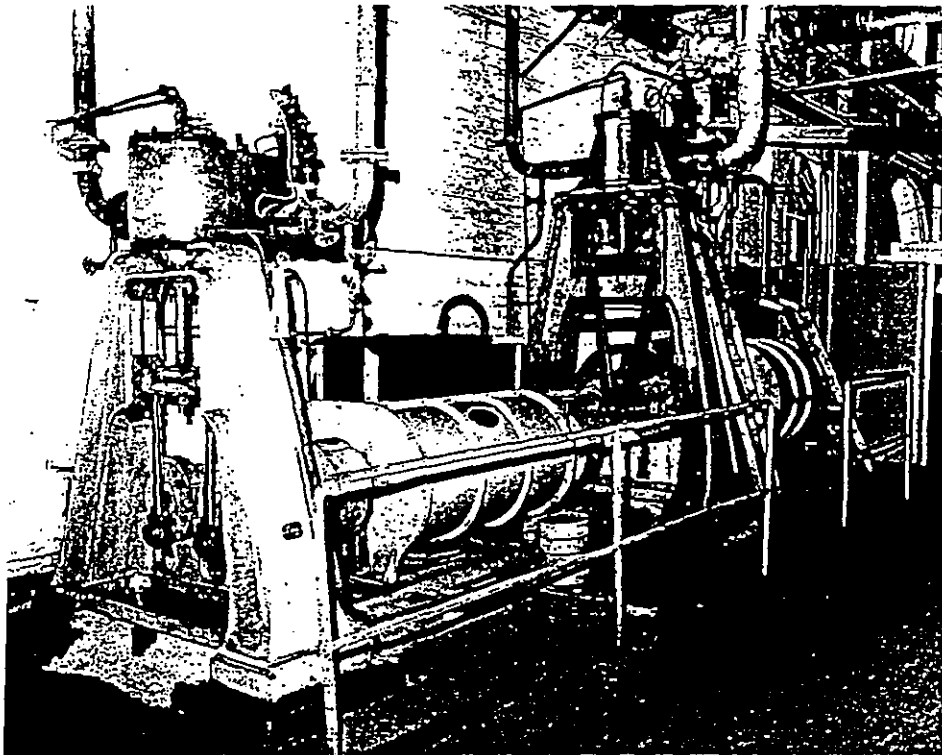


Illustration 2. 50: Bay 1 south. The Rootes Blowers by Bradford were used to supply high volume low pressure air to the furnaces. Photo by D. Godden 1985.

### The Davy Press

The Davy press is located in Bay 1 north and is the most impressive machine in the workshops complex. It was a hydraulic machine powered by steam by the easternmost boiler in Annex 4 which was dedicated to the Davey press. The press stands almost 5m high and 3m across. Its operation involved a number of men under the control of a press foreman or supervisor. Ancillary equipment for the operation of the Davy include two steam reservoirs, a steam intensifier and a hydraulic unit. As well there are a series of massive balanced tongs work in partially completed form and a large number of dies, anvils, fullers and swages which were used to produce a variety of forgings.

The oil-fired furnace for the Davy press is located at the northeast corner of Bay 1 north. The material to be forged was brought to the Davy by the use of the overhead crane.

It is essential to regard the Davy and all of its associated equipment as an assemblage rather than a single item. All of the equipment and work in progress should be kept with the Davy although it may be stored against the wall in a vertical or horizontal configuration rather than lying in a random fashion on the floor as at present.

The southernmost steam reservoirs for the Davy press are now located in an annex which has been constructed on the eastern side of Bay 1 north. It is believed that this annex may have been constructed for a different set of reservoirs. The steam reservoir now consists of two short, large diameter horizontal pressure vessels located on a concrete plinth and supported by a universal section steel frame.

The condition of the Davy press and the steam intensifiers and steam reservoirs is unknown. It is believed that no effort has been made to service these machines in the past 7 years. Unlike much of the other equipment within the workshops the Davy press required trained and skilled tradesmen to set up and operate it. No documentation exists today which will allow the Davy to be brought back to operation. However it is believed that some previous operators still possess that knowledge. The other ancillary equipment such as the balanced tongs, the overhead crane and fullers, swages and dies and punches, still appear to be in very good condition. The superficial rust which has formed on these has had phosphoric acid based rust converters sprayed on them recently and this has checked any further corrosion.

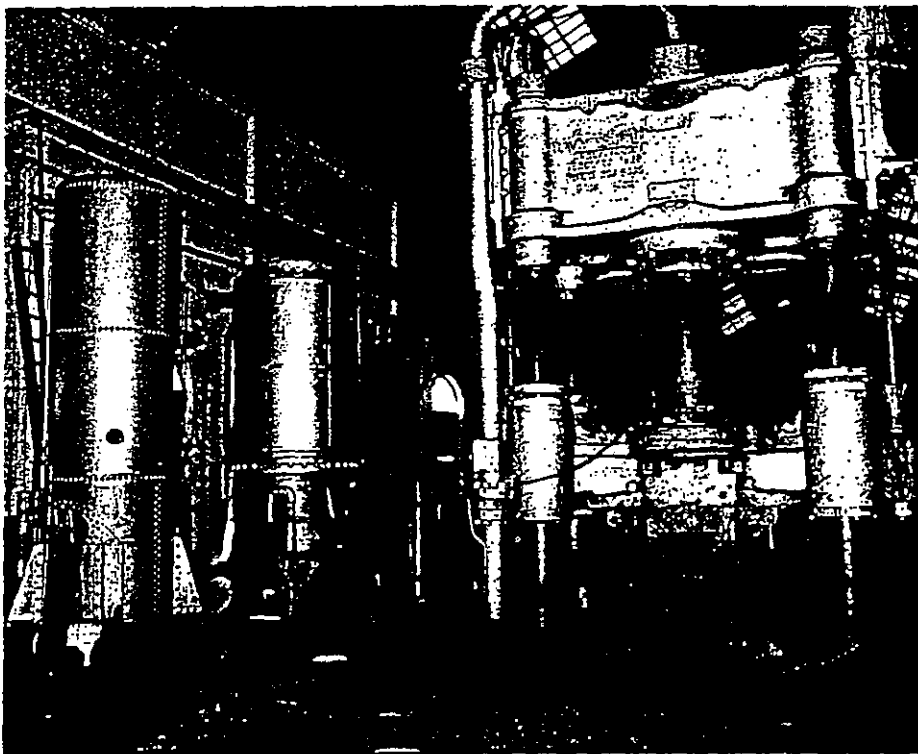


Illustration 2. 50: Bay 1 north. The massive Davy 1500 ton press was the largest machine installed at the Locomotive Workshops. Photo by D. Godden 1985.



### **The Oliver Hammers (Allen Strikers)**

Two steam powered Allen strikers remain of the four which were previously installed in Bay 2 south. These strikers were made between 1899 and 1916. The strikers are operated by pedal by the blacksmith who also manipulates the material being worked and these machines most closely represent the action of the human striker. After the Second World War many of these machines in other industries were almost entirely replaced by small electro-pneumatic hammers which are also operated by the smith.

The strikers have their own dedicated early model water-cooled Tyre furnaces with the cast iron hood and an extensive collection of tongs and fullers. The strikers were used throughout the Railway workshops for completing small forging tasks and for sharpening tools.

The strikers are in excellent condition and although they have not been taken apart appear to be in almost operable condition.

## **4.6.5 Assemblages of Items within the Workshops**

### **The Electro-Pneumatic Hammers**

The 7 cwt electro-pneumatic hammer located in Bay 1 south and the two 2 cwt electro-pneumatic hammers located in Bay 2 south, are all by B & S Massey of Manchester. The electro-pneumatic hammer was a great advance on the steam hammer. The machine itself is self contained with an electric motor which drives a piston through a conrod, which forces compressed air through a valve into the operating cylinder which depresses and raises the hammer.

The electric motor operates continuously driving the air piston while the hammer piston is activated by a lever. On large hammers the lever is operated by a foreman blacksmith who stands beside the hammer and does not directly manipulate the work which is done by assistants. On the smaller hammers the blacksmith actually operates the hammer with a foot ring.

All three hammers are assemblages and are associated with wall cranes, their own dedicated furnace and a large collection of tongs, dies and stamps.

### **The Impact Punch**

The Impact Punch by Bretts is located at the north end of Bay 1 south. The machine is now electrically driven but because of its form appears as though it was originally driven by overhead line shaft. The machine is old, reputedly being installed in 1899. The small electric motor which is now mounted at the top of the machine drives a massive flywheel through a pulley. The punch is activated by pedals which applies alternate blows to the two working tables located on either side of the machine.

The machine is part of an assemblage, has a furnace located nearby, and although material could be worked cold, large sections were worked hot. Associated with the machine is a large selection of dies and punches. The machine appears to be in excellent order and was operated as recently as 1992.

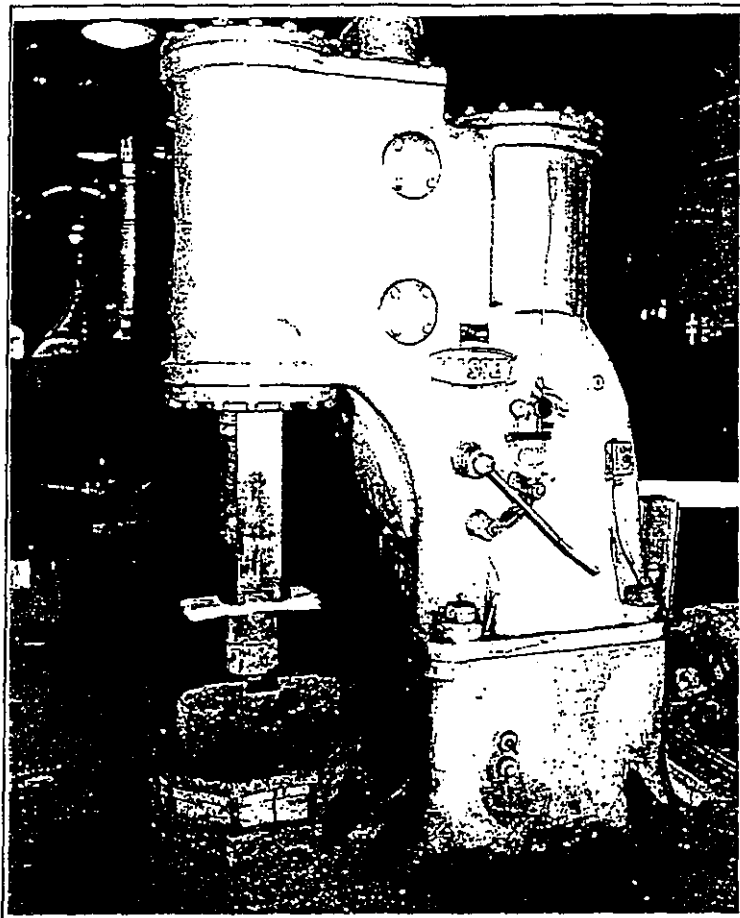


Illustration 2. 52: Bay 1 south. The Massey Electro-Pneumatic Hammer was a relative newcomer to the Blacksmiths Shop. Photo by D. Godden 1985.

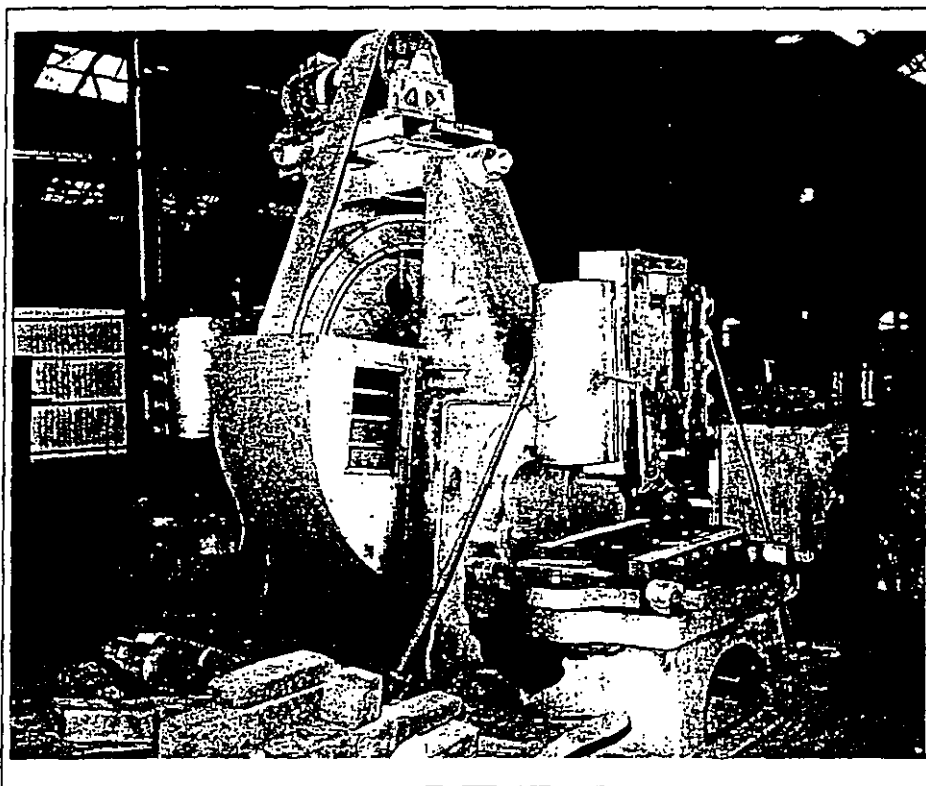


Illustration 2. 53: Bay 1 south. The Bretts impact punch exhibits all the characteristics of late 19th century medium engineering machinery with its massive cast iron body, lack of safety equipment and drive mounting. Photo by D. Godden 1985.

### **The Electric Shears**

The De Burgue electrically driven shears are located in the small skillion roofed annex outside Bay 1. This machine exhibits all the hallmarks of the massive cast iron machines manufactured before World War I. The exposed gearing allows very slow and very powerful shearing action to cut various sections of steel up to 50mm thick. The shears are associated with a small table and are equipped with a built-in jib crane. A small trolley on rails assists the location of the work.

The condition of the shears is excellent and they are often used by Mr Guido Governor the resident blacksmith.

### **Metal Shears or Guillotine**

The metal shears or guillotine by James Bennie and Sons, Glasgow, Clyde Engineering Works, Govan, Glasgow, was manufactured probably before the First World War. The shears are for cutting plate up to 12mm thickness. The machine is driven by an electrically powered flywheel from a motor which is mounted on the machine itself. The machine has a single action with no apparent adjustment for depth of cut.

The condition of the machine is excellent and in 1988 was fully equipped with a set of tools for its fine adjustment and overhaul. Spare blades were also available.

The shears are thought to be in operating condition. When workshops closed down the shears were freshly painted on the orders of the boilermaker foreman.

### **The Horizontal Plate Roller**

The horizontal plate rollers by Craven Bros, Manchester, were manufactured in 1886 and are amongst the oldest pieces of machinery in the workshops. They are presently located in Bay 4 south, southeast which corner is part of the boilermaker's shop, but their original location has not been determined. Originally the plate rollers would have been powered from the overhead line shaft. They are fitted with a removable top roller which facilitates the rolling of boiler shells or boiler shells strakes.

The horizontal plate roller appears to be in good condition and has recently been operated.

A second small set of plate rollers are located close to the Craven Bros. roller. These were manufactured by the Railways themselves sometime in the twentieth century. They are lighter in construction and are suitable only for lighter plate. Again, these departmental rollers are in very good condition.

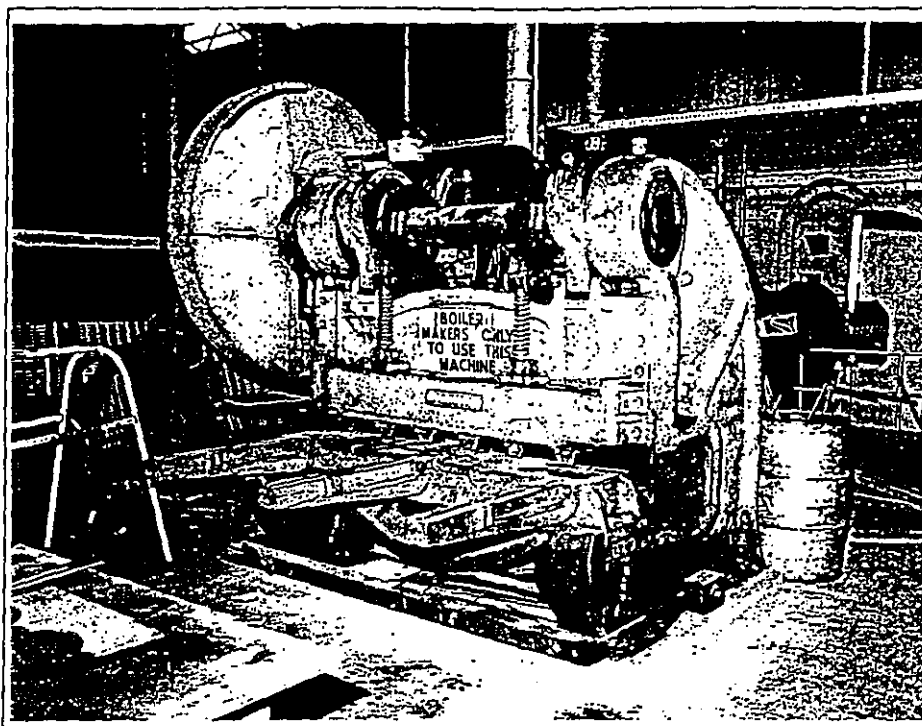


Illustration 2. 54: Bay 4 south. The James Bennie and sons metal shears were used by the boilermakers for cutting boiler shell plate to the correct size. Photo by D. Godden 1985.

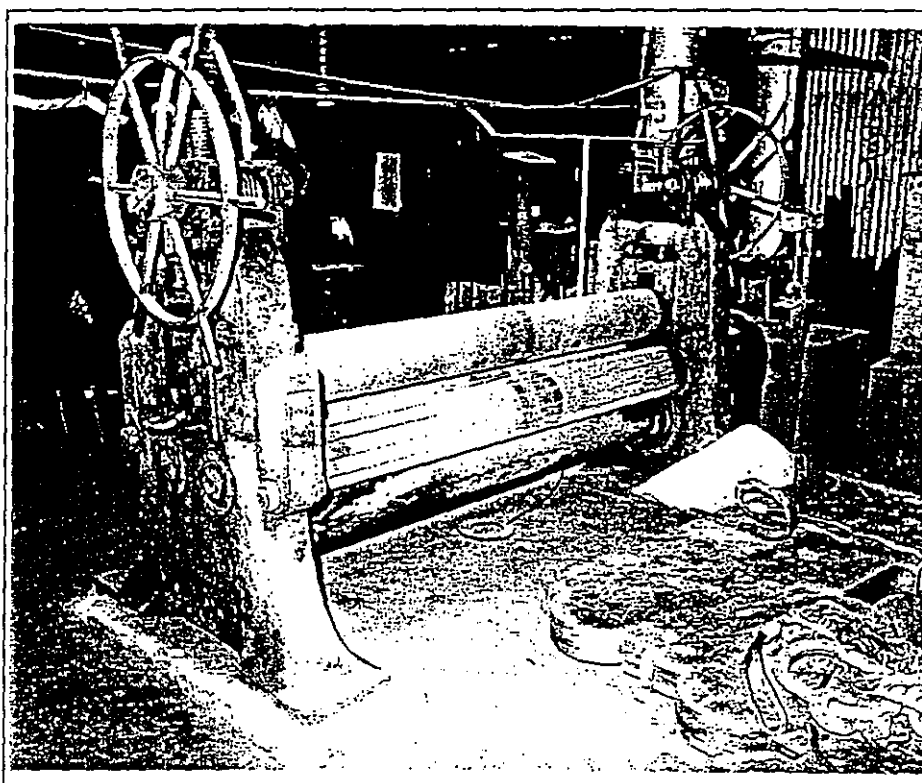


Illustration 2. 55: Bay 4 south. The Craven Horizontal Plate Roller was manufactured by Craven Bros. of Manchester in 1886 and is one of the oldest machines in the Workshops. Photo by D. Godden 1985.

### **The Continuous Forging Machine**

This machine, by the Ajax Manufacturing Co., Cleveland, Ohio, USA, was installed in 1916. The machine is belt driven by a separate electric motor. The machine has a series of dies and swages associated with it which are located nearby and it is equipped with its own dedicated oil-fired furnace. This is the smallest of two of the continuous forging machines which were operating at Eveleigh in 1986.

The continuing forging machine is in excellent condition and is at the moment being operated by Mr Guido Governor.

### **Collection of Swages**

In a massive steel tool stand located at the south end of Bay 4 there are a series of dies and swages. This collection belongs to several of the machines throughout the workshops and is invaluable to their operation.

This collection appears to be in good to excellent condition and although the precise use of all of the elements is not known all should be conserved.

### **The Wall Cranes**

Throughout the workshops there are a number of wall cranes. These cranes are located in Bays 1 to 4A as well as Bays 6, 7, 9, 10, 11, 12, 13, 14, and 15.. They indicate the way in which the workshop is operated and are ideal interpretative devices. Some of the cranes are complete, such as those in Bay 1, which are dedicated to certain forging machines and furnaces. Others, whose precise purpose is unknown, are not complete and the hoisting equipment, either hand or electrically operated, has been removed at the time of the closure of the workshops. Most of the wall cranes are in good to very good condition.

### **The Rail Lines and Turntables**

In order to operate efficiently a series of rail lines ran around and through the workshops. In some cases these lines were made for locomotives to traverse in other cases they were simply for rolling wheel assemblies prior to machining or repair. The rail lines which run along the south wall of the workshops were amongst the most important. It is believed that both of these lines still exist beneath the tarmac which was laid when the Sydney Markets Authority took over the site in 1990. The southmost tracks ran from the traverser at the west end of the workshops immediately in front of the corrugated iron clad buildings to a turntable immediately outside the weighbridge. The turntable then turned the rolling stock and locos through 90° this line ran between the spring shop and the main workshops east wall. When the works were closed in 1988 a small locomotive steam crane was parked on the rails some 20m south of the northeast corner of the workshops building.

These lines, when inspected in 1990, were in good condition. The inner tracks which ran again from the traverser to the end of Bay 1 had turntables at Bay 1, 4 and 9. These turntables can be returned to operating condition by stripping the bitumen from their surfaces. At the time the bitumen was laid the Markets Authority were informed that the tracks themselves and the turntables were to be covered in plastic sheet or sand so that the hot mix did not stick to them.

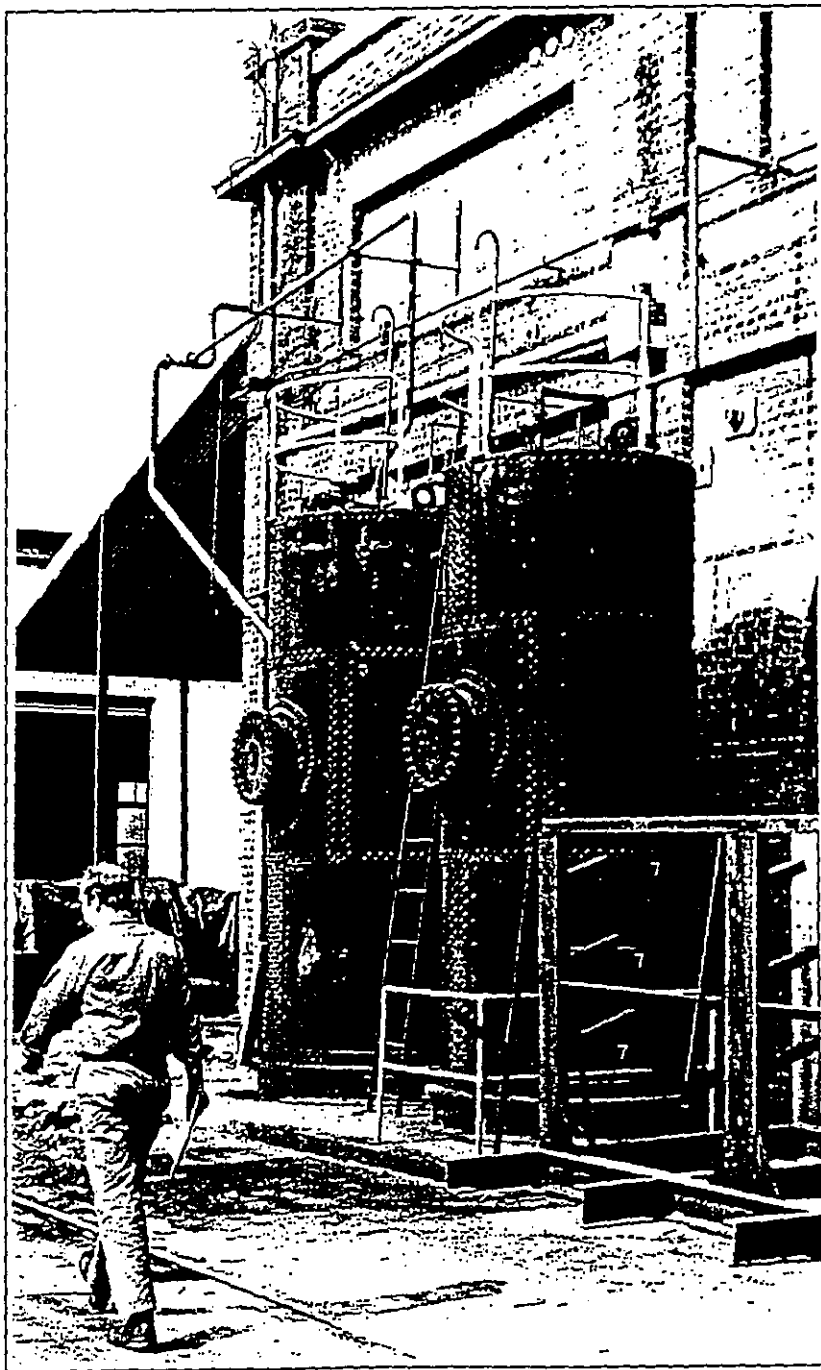


Illustration 2. 56: Bay 1 south exterior. Rail tracks and fuel oil reservoir. Photo by D. Godden 1985.

#### 4.6.6 Collections Within the Workshops

The major collection within the workshop are the electric overhead travelling cranes which are often referred to as EOHTs of which there are thirteen in the workshops. The cranes are presently located in Bay 1, Bay 3, Bay 4, Bay 4A, Bay 6, Bay 8, Bay 9 (two cranes), Bay 10, Bay 11, Bay 12, Bay 13 and Bay 15. The cranes were used for transverse movement of goods throughout the workshops. Longitudinal movement was achieved through the outside rail lines and the central set of lines through the workshops.

All cranes operate on 600V DC electricity although some have motors which are rated at 550V DC. All cranes have three motors with an underslung cabin equipped with three motor controllers in cast iron cases with massive high duty copper contacts. The earliest crane is in Bay 4 and bears the insignia Craven Bros Manchester 1886. Other cranes are believed to date from the same period. Until 1901 it is believed that all cranes still operated from the wall mounted steam engines at the south end of the building. It not clear if these were those that drove the line shafting and where additional motors were located. These engines were believed to be Tangye vertical two piston engines which were all powered from the boilers at the end of Bay 2.

Overhead cranes are made specifically for individual locations and are not simply bought from the shelf. Each one of the cranes at present in the workshops was designed and made for that particular Bay to carry out a specific series of tasks. The cranes in the main are not interchangeable.

It is believed that all cranes could be made serviceable and that all would meet requirements of Workcover. It is believed that all cranes are complete and that all are equipped with serviceable hoists. However, in most cases the tools used to maintain them are missing as are the slings which were normally found the north end of each bay.

Associated with the cranes are various access ways, particularly on the end walls which are essential to the operation of the cranes.

**APPENDIX F**

**Conservation Policy: Eveleigh Precinct Sydney,  
prepared by Schwager Brooks and Partners for NSW  
Department of Planning, 1994**



# 4.0

## PLANNING AND HERITAGE MANAGEMENT FRAMEWORK

### 4.1 INTRODUCTION

This section summarises the existing planning and heritage management framework on the Eveleigh precinct. Refer to Section 5 for the Procedures related to the Management of Heritage Issues.

### 4.2 EXISTING OWNERSHIP

Currently the whole of the Eveleigh Precinct is owned by various agencies of the NSW State Government. The bulk of the land is within the ownership of the State Rail Authority, the remainder, on the Henderson Road frontage, is controlled by the NSW Department of Housing.

The SRA has declared a portion of their total area surplus to requirements.

It is envisaged that the surplus land will remain within State Government ownership and that the bulk of it will progressively be leased to the Australian Technology Park, Sydney. A separate portion of land will be made available for the construction of affordable housing.

SRA will hold the remainder of the Precinct into the foreseeable future.

### 4.3 SRA OPERATIONS

City Rail's medium and long term rail strategies for Sydney comprise several projects such as MetroWest which may require significant construction sites near the CBD, such as at Eveleigh. They are therefore, likely to limit any potential leases over underutilised buildings to relatively short terms. Within the overall context a number of issues have been identified.

- The current pedestrian bridge across the railway, at the western end of Redfern station is at the end of its service life. It is proposed to demolish it once a central concourse is established, if not before.

- There is long term potential to redevelop the air space over Redfern Station, probably in conjunction with private enterprise.
- The Chief Mechanical Engineer's office building will be retained and remain as an operational facility.
- There are no long term plans for the Paint Shop, which is currently used to store redundant rolling stock. Access by rolling stock into this building tends to disrupt the main suburban lines during shunting operations.
- There are no long term plans for the Carriage Workshop, which is currently used to dismantle redundant rolling stock.
- For most long term options of the northern precinct potential retention of the Carriage Workshop and Paint Shop represents a significant planning constraint.
- The Large Erecting Shop contains a significant collection of historic rolling stock, managed by the SRA Special Trains Unit.

### SRA SECTION 170 REGISTER

Section 170 of the *Heritage Act* requires government instrumentalities to establish and keep a *Heritage and Conservation Register* of each item of the environmental heritage under its control which is either subject to a conservation instrument or could become so.

The SRA Section 170 Register contains a plan of the Eveleigh Railway Workshops (HC File 31364) which comprises the area around Redfern Station and land on both sides of the main rail corridor. Specific items which are mentioned separately in the Register include:

- Gas Holder, Macdonaldtown
- Station, Redfern
- Workshops (Loco and Carriage), Redfern

Other buildings and structures within the SRA precinct are included on the S170 Register by virtue of their being within the designated plan area.

There is no formal requirement, in the *Heritage Act*, for the listed items to be protected or conserved. The SRA does maintain an internal policy to consider the heritage impact of any proposal for listed items.

#### 4.4 AUSTRALIAN TECHNOLOGY PARK SYDNEY

This is a venture between the three major universities of inner Sydney. It has strong support of all levels of government and of key sections of industry. The ATP Board was incorporated on 16 July, 1993.

The prime aim of the ATP is to foster the research, development and commercialisation of advanced technology as a means of creating new or expanded economic activity in Australia. It will function as a base for a combination of emerging research firms and established technology organisations.

A key element is the generation of a synergy between all of the participants in the Park, to generate new lines of research and enquiry and to provide mutual lines of complementary support for members trying to break into new markets.

The ATP has been given a commitment by the NSW Government that the land and facilities of the south precinct of Eveleigh will be made available, on a lease hold basis. There will be a progressive uptake of land or existing buildings, as required.

The total area envisioned for eventual take up by the ATP equates to the Master Planning area established in Map 5 Sheet 2 of the REP, with the exception of the Redfern Station sub precinct, a parcel at the western end, which is set aside for future housing and the Alexandria Hotel on the corner of Henderson Road and Garden Street.

The development of the ATP is expected to take place over a 7 to 10 year period, as funding support and expressions of interest are received.

Firm proposals that have emerged to date include the re-use of the Works Manager's

Office for the Australian Graduate School of Engineering Innovation and proposals to adapt the New Locomotive Shop for a National Innovation Centre.

#### 4.5 REGIONAL ENVIRONMENTAL PLAN

Planning for the Precinct is managed by *Regional Environmental Plan No. 26 - City West Amendment No 1 (Eveleigh Precinct)* which was gazetted in July 1993. The Consent Authority for the Eveleigh Precinct is South Sydney Council, except those areas requiring the preparation of a Master Plan (established in Map 5 Sheet 2) of the Regional Environmental Plan, for which the Minister for Planning is the Consent Authority.

The State Rail Authority remains as the determining authority for railway undertakings.

This Conservation Policy has been developed partly in response to Clause 42 of the REP which requires the preparation of Master Plans to illustrate and explain, where appropriate, proposals for various issues including, *heritage conservation, implementing the guidelines set out in any applicable conservation policy, and protection of archaeological relics.*

Approval is required under the REP for demolition. In the area outside that which requires Master Plans to be prepared, South Sydney Council is the Consent Authority for such approvals.

There were no Conservation Areas established by the REP Amendment for the Eveleigh precinct, although the Urban Development Plan establishes certain curtilages around some Heritage Items.

#### REP HERITAGE ITEMS

Based on a series of heritage studies prepared since 1986 and on discussions between relevant authorities, Map 4 Sheet 2 of the REP identifies and locates a number of buildings and site elements as Heritage Items. These are as follows:

- Locomotive Workshop Bays 1-15, including Machinery in Bays 1-4.
- New Locomotive Shop
- Works' Manager's office.

- Large Erecting Shop.
- Administration Building, former Chief Mechanical Engineer's office.
- Gasometer and Pumps.
- Redfern Station (Booking Office).

The *Gasometer and Pumps* referred to in the REP should in fact be described as a Gasholder. The associated pumps, which may have been present in 1990, when the REP research was in preparation, appear to have been removed.

## 4.6 URBAN DEVELOPMENT PLAN

In response to the provisions of the REP, an *Urban Development Plan* for the Eveleigh Precinct has been prepared to make more detailed provisions relating to development within the precinct. The Heritage Conservation Principle contained in the UDP states... *It is vital that development provides for the conservation of heritage items through their re-use and adaption, and that new buildings reflect and enhance their significance.*

The *Urban Development Plan* requires that Conservation Plans be prepared for Heritage Items to demonstrate appropriate and economically viable, adaptive re-use. *Conservation plans are to address the guidelines for conservation management established in a Conservation Policy for the Precinct.*

Clause 3.4 of the UDP requires the definition of curtilages around several of the identified Heritage Items. These are referred to in Section 7.12 of this document.

## 4.7 NSW HERITAGE ACT

The Heritage Council NSW supports the heritage measures outlined in the REP and has resolved that action under the *Heritage Act* is not necessary at this stage. It has requested that the SRA consult with the Heritage Council in regard to any proposals for items on its S170 Register.

The *Heritage Act* requires an application to be made for any excavation permit under S140 if it is intended to disturb or excavate any land for the purpose of discovering, exposing or moving a relic. A relic is defined as any deposit, object or material evidence:

- Which relates to the settlement of the area that comprises NSW not being Aboriginal settlement; and
- Which is 50 years or more old;

It is essential that coordinated planning is undertaken for all intervention in archaeological resources which have been assessed as significant.

Due consideration should be given to the potential for archaeological material in any master planning redevelopment or re-use process.

## 4.8 ADDITIONAL ITEMS OF HERITAGE SIGNIFICANCE

Additional heritage analysis undertaken as part of the formulation of these conservation policies has indicated that the significance of other items within the precinct is such that they should be brought within heritage planning procedures. (See Fig.6) These procedures must respond to a number of differing situations, depending on whether individual items are within SRA control, covered by the Master Planning requirements of the REP or under the jurisdiction of South Sydney Council. They are outlined in Section 5.

### ITEMS ON SRA LAND

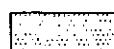
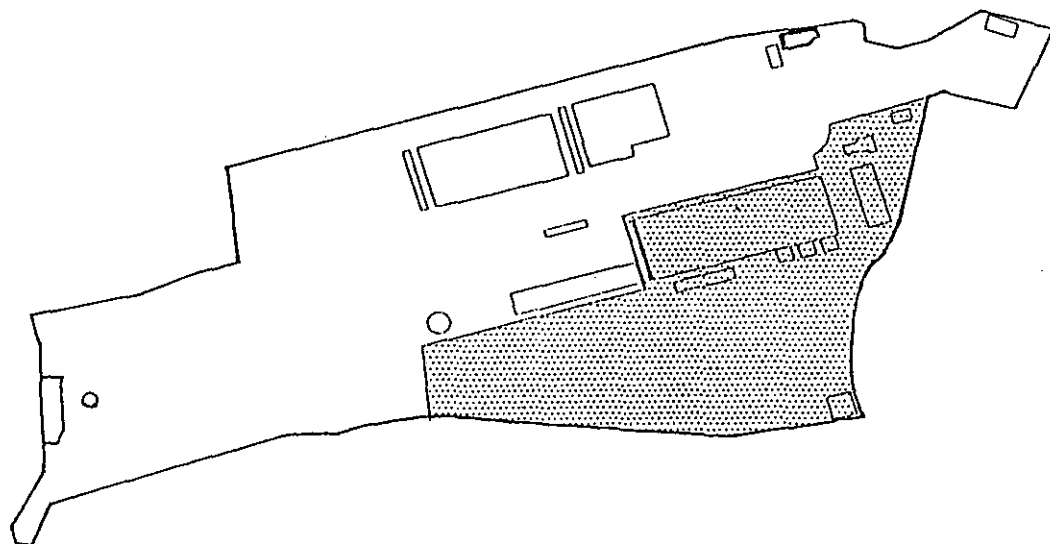
- The Carriage Workshops.
- The Paint Shop.
- The two traversers at the Carriage Workshops.
- Equipment in Carriage Workshops.
- Turntable and Associated Trackwork.
- Air Raid Shelters.

### MASTER PLANNING AREA ITEMS

- The traverser next to the Locomotive Workshops.
- The cast iron Water Tank and stand.
- Equipment in Bays 5-15 and adjacent to the Loco Workshops. (Fig.6 Item A7)
- Alexandria Hotel

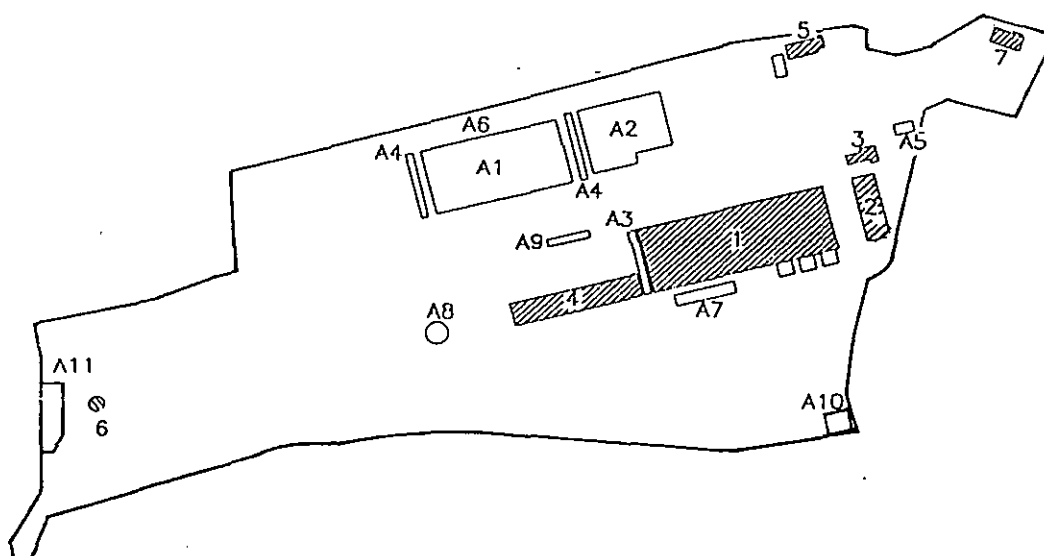
### SOUTH SYDNEY COUNCIL ITEMS

- Burren Street Housing (Privately owned)



LAND SUBJECT TO  
MASTER PLANNING  
REQUIREMENTS

FIG.5 MASTER PLANNING AREA ESTABLISHED BY REP



#### HERITAGE ITEMS

- |   |  |
|---|--|
| 1 | LOCOMOTIVE WORKSHOP BAYS 1-15<br>INCLUDING MACHINERY IN BAYS 1-4 |
| 2 | NEW LOCOMOTIVE SHOP  |
| 3 | WORKS MANAGERS OFFICE  |
| 4 | LARGE ERECTING SHOP  |
| 5 | ADMINISTRATION BUILDING  |
| 6 | FORMER CHIEF MECHANICAL ENGINEER'S OFFICE                        |
| 7 | GASOMETER AND PUMPS  |
|   | REDFERN STATION (Booking Office)                                 |

#### ADDITIONAL ITEMS

- |      |                                    |
|------|------------------------------------|
| A 1  | CARRIAGE WORKSHOPS                 |
| A 2  | PAINT SHOP                         |
| A 3  | LOCO TRAVERSER                     |
| A 4  | CARRIAGE TRAVERSERS                |
| A 5  | WATER TANK AND STAND               |
| A 6  | CARRIAGE WORKSHOP MACHINERY        |
| A 7  | LOCOMOTIVE WORKSHOP MACHINERY      |
| A 8  | TURNTABLE AND ASSOCIATED TRACKWORK |
| A 9  | AIR RAID SHELTERS                  |
| A 10 | HOTEL                              |
| A 11 | BURREN ST HOUSES                   |

FIG.6 IDENTIFICATION OF HERITAGE AND ADDITIONAL ITEMS

# 5.0

## HERITAGE MANAGEMENT PROCEDURES

### 5.1 INTRODUCTION

For a summary of the Heritage Management Procedures refer to the chart on page 9. The discussion on Criteria and Guidelines in Section 2.2 should also be taken into account with each of these types of procedures.

### 5.2 REP HERITAGE MANAGEMENT PROCEDURES

Division 6 of the REP establishes Heritage Conservation procedures for identified Heritage Items.

Development of or including a Heritage Item or within a conservation area must be compatible with the conservation of the heritage significance of the Item. Before granting consent to development, the Consent Authority must consider the heritage significance of the Item.

The Consent Authority may request a Conservation Plan to accompany an application for development consent relating to a Heritage Item. Before granting consent for the demolition of a Heritage Item, the Consent Authority must seek the views of the Heritage Council of NSW.

In addition to the REP requirements, this Conservation Policy recommends that applicants for development consent, who are lodging a Conservation Plan, should be required to demonstrate that the conservation planning was undertaken as an integral part of the formulation of design briefs and design proposals affecting the heritage items.

### 5.3 HERITAGE MANAGEMENT PROCEDURES FOR ADDITIONAL ITEMS ON SRA LAND

It is recommended that these items be individually identified within the SRA Heritage and Conservation Register, under Section 170 of the *NSW Heritage Act*.

It is recognised that the SRA has a particular service charter, but encourage the SRA to conserve identified items as part of long term planning strategies.

The SRA should be encouraged to prepare Conservation Plans for the items prior to any demolition or re-use of buildings or the relocation of the items of equipment identified in Sections 9.4 - 9.6.

Sufficient area in the precinct generally should be retained as a strategic resource by the State Rail Authority to facilitate the key role and nature of the transportation corridor, whether for railways as we know them or for some future land transport medium.

It is desirable that the historic buildings on SRA land be retained and used for railway related purposes as one means of ensuring their conservation until long term use strategies for the railway land are identified.

If the former Carriage Workshops and Paint Shop cannot be retained or re-used within long term SRA planning frameworks, SRA should consider releasing that portion of the overall site for other purposes, if such a release still retains sufficient site area for SRA purposes.

Should any of the identified heritage buildings or other significant items be declared surplus to SRA requirements, in either the short or long term, consideration should be given for their transfer to another State Government management or ownership structure which

has, as one of its major aims, the conservation of their heritage significance.

If, after careful analysis of potential re-use or transfer of ownership, any of the heritage buildings or equipment within SRA control are declared redundant they should be recorded in an appropriate manner prior to demolition or major change.

#### **5.4 HERITAGE MANAGEMENT PROCEDURES FOR ADDITIONAL ITEMS LOCATED WITHIN MASTER PLANNING AREAS**

Master Plans are required to address the Criteria and Guidelines set out in any applicable Conservation Policy.

Prior to any demolition, relocation or conservation of the Additional Items identified in this Policy, a Heritage Report should be prepared which clearly sets out the factors which have been taken into consideration and provides guidance for the actions which are proposed.

#### **5.5 HERITAGE MANAGEMENT PROCEDURES FOR SOUTH SYDNEY COUNCIL ITEMS**

These items should be recorded in the South Sydney Heritage Study which is currently in preparation.

The items should be included on the Heritage Schedules of the applicable Local Environmental Plan and managed according to the Heritage Management procedures of that LEP, possibly as part of a conservation area.

# 6.0

## DESCRIPTION OF ADDITIONAL SIGNIFICANT ITEMS

### 6.1 ITEMS UNDER SRA CONTROL

#### CARRIAGE WORKSHOPS

This building dates from the initial development campaign of 1884-1887. It was essentially a repeat of the Locomotive Workshops facility with the purpose of constructing and repairing carriages.

The two main buildings were located on either side of the rail corridor and performed complementary roles within the total complex. The large masses of the two structures formed a portal to the rail entry into central Sydney.

The Carriage Workshops building has essentially the same structural and construction systems as the Locomotive Workshops. It is regarded as being of equal significance to the other building.

#### PAINT SHOP

This large single storey building also dates from the initial development campaign and was erected to provide a facility for the painting and detailing of carriages.

It is a very large building, containing 8 roads in the brick section and 5 roads in the adjacent metal clad section. Each road is separated by a single row of cast iron columns which support the saw tooth south light roof. This roof profile was deliberately chosen to provide higher levels of natural light than was available or necessary in the main workshops.

The Paint Shop is significant as a large, purpose built industrial structure which was a major component of the early complex.

#### TWO CARRIAGE TRAVERSERS

These two items are located at either end of the Carriage Workshops and performed the same function as that at the Locomotive Workshops.

The traversers are significant for their ability to demonstrate the industrial processes of the early works.

#### EQUIPMENT IN CARRIAGE WORKSHOPS

The most important item in the Workshops is an overhead travelling crane, dating from 1885, fabricated by Craven Bros. It is similar to the four 1884 cranes in the Locomotive Workshops and has been converted from the original rope drive to electric power. There are a number of additional items of equipment, including several steam hammers, located in the adjacent building which are also considered to be of sufficient significance to warrant conservation.

The Carriage Workshops also contain a section of elevated staff toilets which are a rare survivor of that form of accommodation. They are able to demonstrate the industrial practices of the period with the additional control and supervision that was possible from the elevated location.

#### TURNTABLE AND TRACKWORK

This is located to the west of the Large Erecting Shop and is vital to service the requirements of steam trains which pass between that building and the main rail system.

#### AIR RAID SHELTERS

These are scattered around the existing rail corridor, generally located against embankments or cuttings. They were designed more as protection against flying fragments than to withstand direct blast.



These shelters are now rare survivors of an interesting aspect of wartime history.

## **6.2 ITEMS WITHIN MASTER PLANNING AREAS**

### **LOCOMOTIVE WORKSHOP TRAVERSER**

This item of machinery is located between the Locomotive Workshop and the Large Erecting Shop. It was fundamental to the industrial processes of the workshops as it enabled individual items of rolling stock to be moved from bay to bay within the workshops. The traverser was initially located in Bay 13 of the main shops but was moved to its current location at the turn of the century.

It is significant for the same reasons as those near the Carriage Workshops.

### **CAST IRON WATER TANK AND STAND**

This item was fabricated in the Purvey Shops at Newcastle in 1924. It is typical of the type of water tank that was once common in railway precincts and elsewhere in the early decades of this century but is now rare. It was fabricated from cast iron panels which were bolted together with a special jointing and was supported on a framework of RSJ bearers. It stands on an elevated steel frame.

### **EQUIPMENT ADJACENT TO THE LOCOMOTIVE WORKSHOPS**

This comprises all of the original equipment in the annexes along the south side of the building, the air receivers, the hydraulic wheel presses and cranes in a separate building to the south that are of significance. It also refers to equipment such as the overhead cranes that are located in Bays 5 - 15 of the Locomotive Workshops.

The actual location of the external items, with the exception of those in the annexes, is not considered to be of prime importance and they could be relocated to Bays 1-4A of the main workshops.

### **ALEXANDRIA HOTEL**

This two storey building is located on the corner of Henderson Road and Garden Street.

It defines the south east corner of the site and provides a tangible link with the local community.

The hotel is a reasonable example of the Interwar Free Classical style and retains much of its external detailing.

## **6.3 ITEMS UNDER THE JURISDICTION OF SOUTH SYDNEY COUNCIL**

### **BURREN STREET HOUSING**

The historical links between this privately owned housing and the rail network has not been ascertained, however it provides a firm visual and historic continuity with the nearby housing in Burren Street and elsewhere.

The individual houses appear to have been developed over a period of time, reflecting the general development of the local community.

# 7.0

## STRATEGIC CONSERVATION ISSUES

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### 7.1 RETENTION OF SIGNIFICANCE

#### BACKGROUND

The Eveleigh precinct is considered to have a high level of cultural significance based on its ability to demonstrate its role as an important component of the NSW railways system after 1888. The precinct contains a number of fine buildings and industrial structures and a large collection of equipment and machinery.

The resources available in the historic buildings at Eveleigh and their ability to develop a cultural continuity with the surrounding communities, present major opportunities for the development of an integrated new facility and urban environment.

#### CRITERIA

Long term conservation of the outstanding cultural significance of the Eveleigh Precinct should be an important component of future use and management strategies.

#### GUIDELINES

It is recommended that the assessment of cultural significance, which includes the essential relationships between railway operations, buildings and equipment, be accepted and used as the basis for future conservation and management.

A management and planning approach which includes conservation should be consistently applied across the whole precinct, irrespective of particular ownership or management regimes at any point.

The identified historic buildings and collection of significant machinery should be retained in the long term to demonstrate and interpret their role in the interface between the rail system and the construction and repair of rolling stock.

The current proposal to utilise a portion of the precinct for the development of advanced technology is consistent with the retention of the technological aspect of Eveleigh's significance.

The development of new housing on a portion of the overall precinct should raise no heritage issues other than those required to be addressed by the Master Planning processes.

### 7.2 INTEGRATION OF CONSERVATION, DEVELOPMENT AND USE

#### BACKGROUND

The Eveleigh precinct is about to enter a phase of development and re-development, in part as the Advanced Technology Park, Sydney, in part for additional housing and as a continuing resource for the SRA.

The scale of the large historic buildings at Eveleigh and the location of many of them within the site area designated for the Australian Technology Park indicate that a full integration between the old and the new provides many planning opportunities.

#### CRITERIA

Conservation and re-use of the identified significant items should take place within the context of the development and future use of the Eveleigh precinct.

#### GUIDELINES

Planning for the conservation of the significant items should be integrated with the general planning for the future of the precinct or for sections of it.

Opportunities for compatible re-use should be explored to the fullest extent, consistent with the retention of heritage values.

## 7.3 MANAGEMENT OF HERITAGE ASSETS

### BACKGROUND

In recent years the NSW Government has promoted a different view point with regard to the management of heritage buildings.

Traditionally historic buildings were often regarded as being unsuitable or outdated in terms of the service charter of public organisations. New buildings could be purpose designed to suit changing requirements or contemporary technology. Old buildings were often left to run down, with reducing levels of capital expenditure and deferred maintenance. Expenditure on old buildings was not measured against their asset worth.

Current Government policy is to convert public accounting to an accrual basis and to take account of the asset value of all existing buildings and equipment. In this context there is a requirement to allocate maintenance expenditure in order to protect or recoup the value of existing assets, including heritage buildings. While it may take several years to reverse the effects of long periods of deferred maintenance and to change attitudes, the task has clearly been established.

In the case of Eveleigh, the major buildings represent substantial physical assets, the replacement cost of which would be very high. Approximate areas, in square metres are as follows:

Locomotive Workshop:	26,500
Carriage Workshop:	16,500
Large Erecting Shop:	7,500
New Loco Shop:	2,400
Paint Shop:	7,000
Works' Manager's Office:	1,500

Compared to the Powerhouse Museum's current budgets of \$500 p.s.m. for the cost of new storage space, the scale, materials and quality of construction of the historic workshops indicate a replacement cost closer to \$1,000 p.s.m. On this basis, there are clearly some valuable physical assets, both within the ATP precinct and those retained by the SRA, with a total replacement value in the tens of

millions of dollars. Proximity to the rail network is another aspect of the asset value.

The significant machinery recommended for conservation should also be viewed as an asset whose cultural and monetary value will increase as it becomes older and rarer.

### CRITERIA

Conservation of the significant items at Eveleigh should be undertaken in recognition of the asset value represented by the existing structures and equipment, in addition to their cultural qualities.

### GUIDELINES

The existing buildings and equipment at Eveleigh should be considered for re-use in preference to demolition for redevelopment.

There is a large resource of usable floor space and enclosed volume within the existing historic buildings. Consideration should be given to re-using these spaces for contemporary needs concurrent to the construction of new space.

The various historic buildings, structures, equipment and artefacts should be regarded as valuable assets and be subject to the normal processes of asset management to retain their value.

## 7.4 PROGRESSIVE CONSERVATION

### BACKGROUND

It is recognised that the timetable for the development of the Australian Technology Park is likely to be between 7 and 10 years. Strategic planning and development within the SRA precinct is a long term exercise.

There are advantages in the staged development of the precinct, particularly in the current, depressed economic times.

- Expertise and resources can be assembled gradually and progressively.
- Commitments by research organisations to the ATP can be progressively assembled.
- Detailed issues of fabric conservation and re-use potential can be explored and work

programmes developed in co-ordination with ATP developments and expressions of interest.

- Detailed interpretation opportunities can be explored.
- Public support can be nurtured and visitation gradually increased to those areas which are publicly accessible.
- A greater understanding of the nature of the precinct can be developed as the Master Planning initiatives are implemented.
- Hasty decisions meeting short term needs, to the detriment of long term conservation aims, can be avoided.

#### CRITERIA

Conservation of significant building fabric and machinery should take place progressively as part of planned programmes.

#### GUIDELINES

The responsible authorities should take no short to medium term actions, which unnecessarily prejudice opportunities to implement medium to long term retention and conservation of the historic buildings at Eveleigh until such time that re-use options have been fully considered.

Conservation should be carried out over a reasonable time frame, consistent with the age and future lifespan of the buildings, the availability of resources and adequate research into issues and opportunities. Longer term strategies which effectively deal with an issue are preferred over short term solutions that may require compromises due to inadequate resources.

If funds are not available for a full conservation programme or alternative needs identifiable to establish early re-use, then progressive programmes of basic maintenance or moth balling may be preferred in the short term.

## 7.5 CONSERVATION PROCESSES

### BACKGROUND

In order to achieve a consistency in approach and understanding of the methodologies of conservation at Eveleigh a standardised terminology should be adopted.

### CRITERIA

Conservation activities and processes at Eveleigh should be undertaken in accordance with the principles of *The Burra Charter* issued by Australia ICOMOS. These are the accepted national standards for conservation practice.

### GUIDELINES

Refer to the Appendices for a summary of the relevant activities and processes.

## 7.6 GENERAL CONSERVATION OF BUILDING FABRIC

### BACKGROUND

Most of the building elements to be conserved are of a robust nature and in reasonable condition, despite long years of heavy industrial use and alteration.

### CRITERIA

Extant building fabric, both internally and externally, from a range of periods should be selectively conserved to illustrate the development and growth of the complex.

### GUIDELINES

The basic concept is that if funding and resources are limited, particularly in the short term, it is preferable not to undertake extensive repair or reconstruction works simply to improve the visual imagery of the buildings. To do so will deflect necessary resources and may well reduce the sense of age and maturity of the buildings.

Conservation works should initially focus on basic maintenance and repair to overcome critical issues of deterioration on all historic structures and buildings, in preference to

detailed expenditure on only one or two items in the short to medium term and neglect of the others.

Where new alterations or repairs are required, new materials should closely match the original or adjacent materials. It is important, however, that evidence of change and repair is not so well matched as to be impossible to read on close inspection.

Materials for conservation work should not be sourced by salvaging historic building materials from elsewhere on the precinct unless these materials have become available as a result of other conservation or adaption works or through unavoidable demolition.

For problems of fabric deterioration, such as cracking, rising damp or severe weathering, which appear to have been in evidence for some time, longer term strategies, which focus on analysis and progressive solutions, may be preferable to short term intervention based on less than a full understanding of the issues or on inappropriate technical devices.

External face brick surfaces on the older buildings have collected deposits of dirt and grime from over a century of heavy industrial exposure. Any proposals to clean the outsides of the buildings should not attempt to overclean them by returning them to their original state. A patina of age is acceptable.

Prior to cleaning buildings advice should be sought from the Department of Planning's Heritage Branch on cleaning masonry.

External metalwork items that are redundant or could be considered unsightly should only be removed, in the first instance, if they will cause active deterioration of the underlying structure by progressive rusting.

There is evidence of a wide variety of alterations and additions to some of the external facades of the workshop buildings, which may be considered as unsympathetic to the original architectural character. While it may be desirable to recapture the early architectural clarity, the cost of so doing should not be such as to make a re-use programme uneconomic. The evidence of industrial use can be regarded as a valid part of the history of the building fabric.

Identification and removal of asbestos related products should be an early priority of any re-use programme.

## 7.7 CONSERVATION OF EQUIPMENT GENERALLY

### BACKGROUND

In the period since the Workshops complex closed most the identified components of significant machinery have either been salvaged and relocated into Bays 1-4 of the Locomotive Workshop, or retained in-situ in the annexes and to the south of the Locomotive Workshops or in the Carriage Workshops.

With the progressive closure of other railway workshops around the country and the dispersal of machinery, the importance of the collection at Eveleigh has increased.

One of the important characteristics is the comprehensive nature of the collection. Nevertheless there are many items, particularly small pieces, that have already been sold or scrapped.

The machinery comprises more than the actual items of equipment. There is an entire infrastructure present in Bays 1-4 and the adjacent annexes, which combine to make a complete resource. This includes overhead cranes, power generation and reticulation and other services.

Some items are housed in annexes, attached to the southern facade of the Locomotive Workshops, which were part of the original construction. Their siting and context are important, as are related accessories, materials or products and knowledge of use.

The scale and quality of much of the equipment represented state of the art manufacturing technology in the period from the 1880s to the Second World War. The capacity of many items to remain in service as either a production or educational resource is undiminished.

### CRITERIA

The equipment at Eveleigh which relates to the long term operation of the place as a major railway workshops complex should be conserved.

## GUIDELINES

It is preferred that the bulk of the existing machinery be conserved and returned to an operational condition as a working engineering and educational resource, subject to cost constraints and compatibility with overall uses identified by the master planning processes. This may require some adaption to suit modern requirements or available sources of power.

A collections policy should be developed in relation to the significant machinery to fully assess it for retention, re-use and potential supplementation. This should include aspects such as the most appropriate range of items necessary for the ultimate purpose adopted and disposal or supplementing guidelines.

Conservation of working machinery may include the removal and storage, for preservation, of wearing surfaces and should be guided by an appropriate Heritage Report for each machine.

Machinery which is not returned to working order should be conserved to prevent deterioration and brought to a condition where it can be displayed and interpreted.

External surfaces which have collected deposits of dirt and grime may be cleaned, but not overcleaned to return them to their original state. A patina of age and continuity is acceptable.

A search for existing documentation and the collation of oral records from past Eveleigh working staff should be encouraged.

Archival records should be made of any obsolete equipment prior to its adaption.

Machinery which cannot reasonably be brought back into useful service should be considered for adaption to a display and interpretive role in its current location, if fixed, or within Bays 1-4A, or an alternative appropriate if not fixed.

Ownership and control of the equipment and machinery needs to be clarified. Some items are claimed by the current operator but most are owned by SRA. If the area is leased to ATP and then sub-leased to a specialist operator, the

rights and obligations of use should be clarified.

Additional general-purpose woodworking and metalworking machines could be collected from other rail workshops as they become redundant, to replace those already removed from Eveleigh. This will increase or restore the significance of the assemblage usefulness and interpretive value.

If any redundant equipment is available and suitable for transfer from country rail workshops, sponsorship coverage for the costs of transport and recommissioning would need to be identified. Possible examples are the wood working or blacksmith equipment at Clyde, Chullora and Honeysuckle, and dog spike equipment at Cardiff.

## 7.8 CONSERVATION OF ARCHAEOLOGICAL RESOURCES

### BACKGROUND

The Eveleigh Workshops complex was created, in the late 19th century, by the widespread clearance of existing development. To date there has been inadequate analysis undertaken of the potential for archaeological material to remain from the pre-railway phase. By comparison, relatively more information is available about potential sites from the period of railway use and development.

The site is unlikely to contain archaeological evidence of pre-workshop or even pre-European occupation.

### CRITERIA

The procedures established by the *NSW Heritage Act* must be complied with for any item defined as a relic under the *Act*.

Development of vacant land within the Eveleigh precinct should take into account the potential for archaeological resources.

The exploitation of an archaeological resource should be guided by the nature of the work that causes its disturbance and, secondly, the environment to which it could contribute as part of an in-situ resource.

## GUIDELINES

In the short term it is important that no further disturbance is caused to the archaeological resource through unsupervised work, such as service trenching.

The Master Planning processes should conduct sufficient documentary research to identify potential archaeological sites within the area covered by the applicable Plan. (Refer to the requirements of the *NSW Heritage Act*, noted in Section 4).

The preferred options for the future management of the archaeological resource are for it to either remain undisturbed or, alternatively, to be carefully exploited as part of a planned interpretation policy for the Precinct. The latter would entail:

- The preparation of an archaeological management plan which assesses the significance of identified resources; and
- The plan should lead to a strategy which proposes a program of research for areas to be disturbed ie most significant areas targeted for full research, other areas cleared of archaeological involvement.

This approach should minimise the requirement to obtain excavation permits for each individual proposal which required ground disturbance. Assistance can be obtained from an Archaeologist within the Department of Planning's Heritage Branch.

In all instances the potential for retaining some or all of the archaeological evidence as an in-situ interpretive device should be considered.

It is less satisfactory that identified sites be disturbed through maintenance works, for example trenching for services. Where possible work of this nature should be routed around more sensitive areas. If this is impossible to achieve a threatened site should be archaeologically investigated and recorded prior to that disturbance.

Any subsurface work in areas identified as being of archaeological potential should be supervised by an archaeologist.

## 7.9 GENERAL USE CONSTRAINTS

### BACKGROUND

The history of Eveleigh, as a working component of the NSW railways system, is one of progressive change and upgrading to meet contemporary use requirements. New buildings and facilities were added to the precinct, existing ones changed or extended. Equipment and machinery was also progressively upgraded, adapted to new sources of power or new equipment added. Each of the major historic buildings at Eveleigh has been affected by these processes.

### CRITERIA

The introduction of new uses at Eveleigh, should be managed and guided to protect the essential heritage qualities of the identified buildings and machinery.

### GUIDELINES

Adaption of all of the historic buildings is acceptable, with compatible new uses selected that utilise the original character or permit a creative and responsible re-use of the fundamental architectural and spatial characteristics.

The essential concept for the selection of new uses is that of compatibility, as defined by the *Burra Charter*. This is based on the concept of "loose fit". Uses should be selected or accommodated which are appropriate to the scale, spatial and architectural character of the particular building. The requirements of the new uses should not generate undue change to those characteristics.

Each of the historic buildings has different characteristics which will determine the type of compatible uses that can be developed for them.

A strategic view of the installation of new services into existing buildings should be taken when individual re-use programmes are being developed. It is preferable to create service corridors to reduce the impact on building footings, potential archaeological resources or existing services.

## SUGGESTED USE OPTIONS

There are a number of general types of new uses that can be considered compatible to the historic buildings within the proposed ATP zone:

- Those that relate directly to ATP component organisations, i.e., direct tenancies by particular members or clients of the ATP.
- Those that relate more closely to university operations, such as research laboratories or workshops for teaching and academic research.
- Those that provide a common user resource for many of the ATP component organisations, eg, pilot plants or exhibition space for ATP projects.
- Those that relate to railway heritage or education uses and have a less direct linkage to core ATP activities.
- Those that are essentially unrelated to ATP activities, but which could provide useful income in the start-up phase, eg, commercial or trade exhibitions, warehousing, etc.

## 7.10 INTERPRETATION

### BACKGROUND

Interpretation of historic buildings essentially reveals the long term connections and cohesion that they give to our culture. To interpret an historic building or site is to tell its story in a way that will increase the public's understanding and appreciation of the significance of the place's role in community, regional or national development.

### CRITERIA

Conservation of significant buildings and equipment at Eveleigh should be combined with the interpretation of railway and engineering history as it relates to the historical role of the Eveleigh precinct. Interpretive themes and activities, or the establishment of museums or related operations, that have no linkages with Eveleigh Workshops, the general precinct or the NSW railways system are not recommended.

## GUIDELINES

The recommended goals of Interpretation are to enable the wider public to understand and appreciate:

- The history, role and importance of the Eveleigh Workshops within the NSW railway system.
- The functions and operations of the significant items of equipment conserved at Eveleigh.
- The wide range of skills and trades provided by the people who worked at Eveleigh and the nature and conditions of their working lives.
- The comparison with other turn of the century workshops and with contemporary centres.

There should be a combination of interpretive approaches, which may include some or all of the following:

- Retention of some railway activities and the rail corridor.
- Retention of the various historic buildings.
- Re-use of some historic buildings for contemporary railway management and operational purposes.
- Re-use of some historic buildings, particularly the Large Erecting Shop, for heritage related railway purposes.
- Potential recommissioning of some of the equipment in Bays 1-4A as a working resource.
- Activation or static display of other equipment in Bays 1-4A or elsewhere in the overall precinct.
- Retention of major historic buildings within the precinct, with contemporary re-use to suit the ATP or other.
- If Bays 1-4A are used for display, it should be possible to clearly distinguish between those types of equipment and processes that are related to the place, and those that are introduced as part of an associated display.
- The provision of documentary and oral history material, displays, graphic themes, etc, located at strategic places within the precinct.



## 7.11 PUBLIC ACCESS

### BACKGROUND

Long term conservation and re-use of the Eveleigh precinct should include programmes for public access around and selectively into the historic buildings. In particular, the public and educational interpretation of the significant machinery in the Locomotive Workshops and other buildings is recommended.

### CRITERIA

Public access to the various areas of the precinct and to individual buildings should be consistent with the interpretive and functional roles established for each component.

A balance should be achieved between the desire for access to the historic buildings by the public and the requirements for privacy, confidentiality and security of ATP occupiers.

### GUIDELINES

The public should be allowed to move around the actual area in which the historic buildings are located, but only to enter specific buildings for specific purposes or during particular activities.

The Urban Development Plan recommends that a primary pedestrian route be provided down the centre east-west axis of the Locomotive Workshops with entry from the east. This is not considered necessary in conservation or interpretation terms.

Access to SRA operational facilities or land will largely be dependant on the activities and security requirements at any particular time.

Public access should be restricted to times when the buildings and displays are manned to prevent vandalism and theft.

### SUGGESTED OPTIONS

Bays 1-4A of the Locomotive Workshops. Access should be from the east, with some access from the south. There should also be an internal connection between Bays 4A and 5 if public/trade activities are current in the main body of the workshops.

Bays 5-13 of the Workshops, if and when, public events such as trade shows or exhibitions are being held. Access should be through the various door openings along the south facade.

Bays 14 and 15, if activities such as railway heritage, recreational, community or food

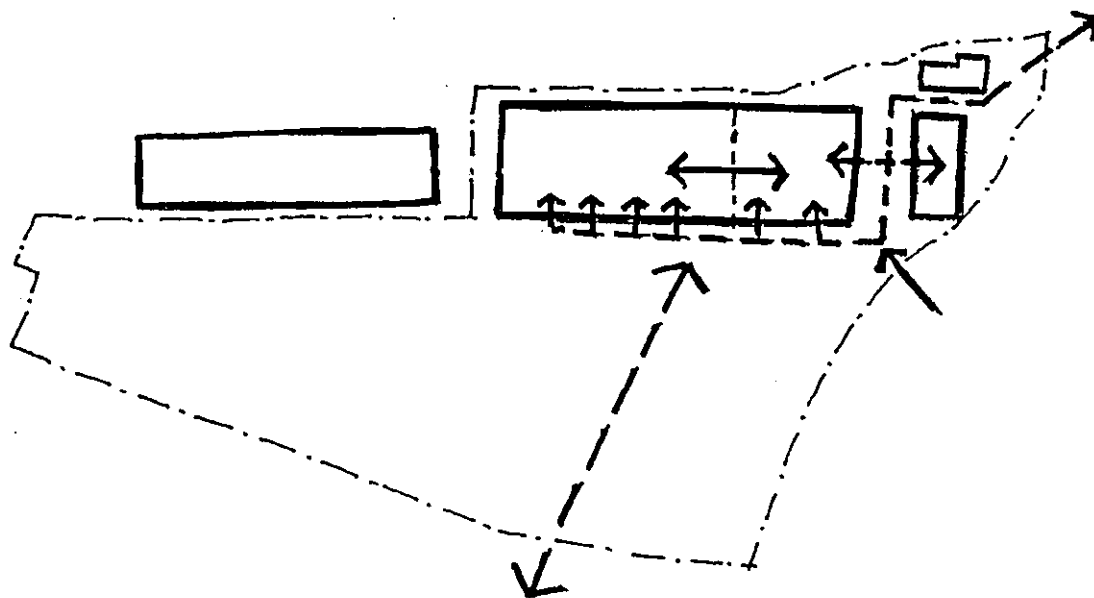


FIG.7 GUIDELINE OPTIONS FOR PUBLIC ACCESS ROUTES

services are established there. Access should be either through the south facade or the openings in the west facade.

Public reception, exhibition or food services areas of the New Loco Shop.

Railway heritage activities in the Large Erecting Shop, with public access from the east, via the ATP precinct.

Reception, exhibition or seminar spaces in the Work Manager's Office.

## 7.12 CURTILAGE

### BACKGROUND

Redevelopment of the now cleared areas of the ATP precinct should take every opportunity to establish physical and visual linkages between the historic buildings, new development and the surrounding community.

### CRITERIA

The historic buildings should be clearly visible from key points within the ATP site to assist with them being fully integrated with the new facilities.

### GUIDELINES

Redevelopment of the ATP precinct should give recognition to the dominant bulk and scale of the Workshop buildings and minimise undue impact on the significance of the historic structures within or adjacent to the precinct.

The Locomotive Workshop, New Locomotive Shop, Works Managers Office, Large Erecting Shop and the locomotive traverser should be considered as a group, in any long term planning of the area, particularly as the land which they occupy crosses ownership boundaries.

Construction of new buildings within the area that encompasses these four historic buildings should be avoided or carefully controlled to ensure that they are subservient in scale and visual impact.

### SUGGESTED OPTIONS

An access way of at least six metres in width must be provided around the Locomotive Workshop for fire fighting vehicles.

An entry to the ATP site in the vicinity of Garden and Boundary Streets is considered necessary if the historic buildings are to retain a direct linkage to the surrounding community.

There should be a roadway of at least 20 metres in width, measured from the main south elevation of the building along the full length of the Locomotive Workshop. This encompasses the projection of existing services annexes and equates to the existing roadway.

This roadway should be sufficient to permit the entry of large vehicles into each of the bays, commensurate with future re-use opportunities for the Workshops. The existing entries from this roadway should remain as the main points of access into Bays 5-15.

An axial link into the ATP site from the intersection of Henderson and Mitchell Roads, as delineated in the Open Space Framework of the UDP, could be left uninterrupted to provide a view through to the Locomotive Workshops from the adjacent neighbourhood.

Consideration should be given, as reflected in the current zoning, for the small, triangular area between the New Erecting Shop and Garden Street to remain undeveloped and be landscaped. This will open this visual link and reinforce the identity of the site with the surrounding community. It will also provide some associated open space for any development the triangular site at the north eastern corner of the ATP site.

Vehicular access across this triangular space to the existing loading bay of the New Locomotive Shop should be considered for retention if to do so would protect the significance of that building by avoiding the need for a new loading bay to be opened in another facade.

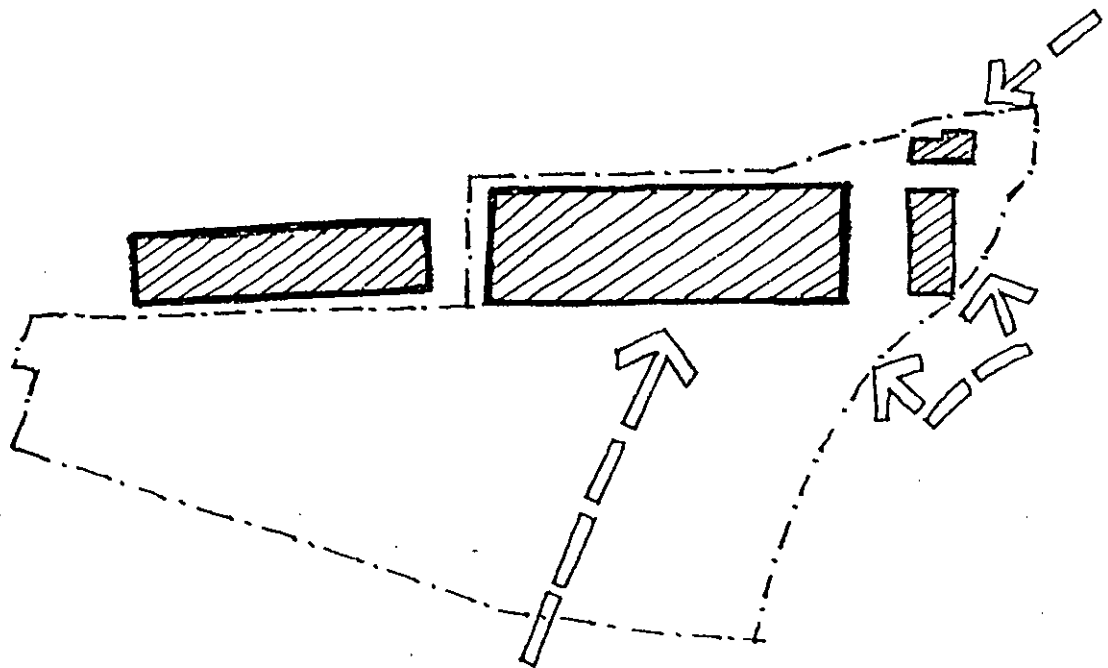


FIG.8 MAJOR VIEWS AND VISUAL AXES TO HISTORIC BUILDINGS

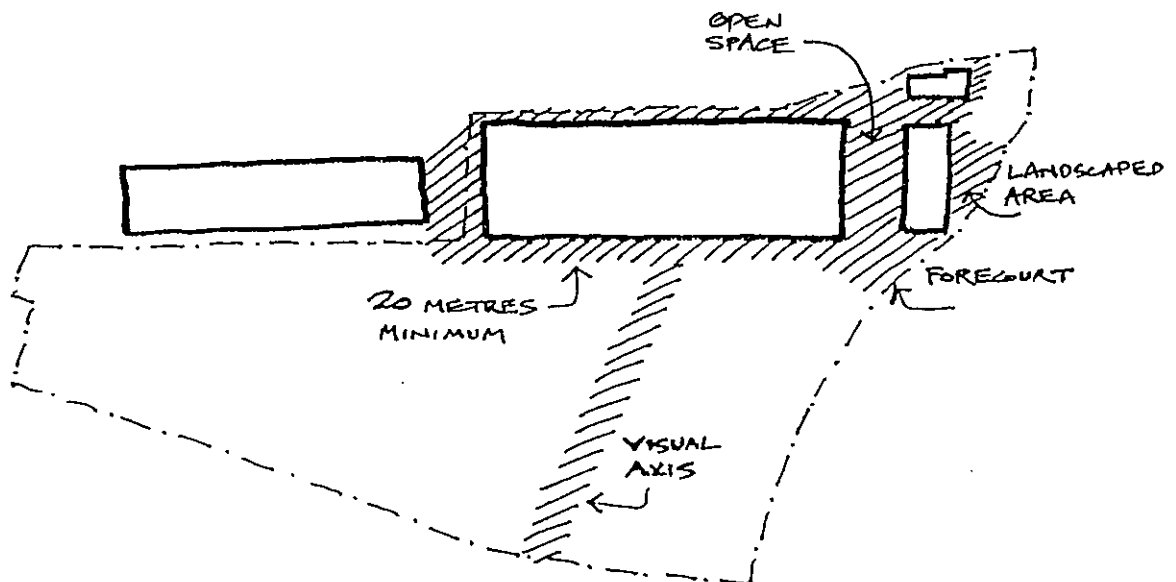


FIG.9 SUGGESTED OPTIONS FOR CURTILAGE IN SECTION 5.12

## 7.13 MAINTENANCE AND SECURITY

### BACKGROUND

There is in excess of 50,000 sq. metres of high volume and extremely well built warehouse style space contained in the various main workshop buildings at Eveleigh. Much of the valuable equipment associated with the traditional engineering operations also remains within the precinct.

The Large Erecting Shop contains a large collection of extremely valuable, important and irreplaceable historic carriages. The enormous damage done to a collection of historic rail and tramway equipment by a fire in Parramatta in mid 1993 is evidence of the potential loss that could be experienced at Eveleigh.

### CRITERIA

Minimum levels of maintenance and security should be established to retard the forces of active deterioration in the period until new service life is provided to buildings which are currently inactive.

Adequate security should be maintained over the equipment in Bays 1-4A at all times to prevent recurrent vandalism and theft.

### GUIDELINES

Essential levels of security and fabric maintenance should be established and continued until other strategies are developed.

The most important short term aspect to security is prevention of loss or damage to the historic equipment, particularly the extremely valuable historic rolling stock in the Large Erecting Shop, where there is currently no real protection against fire damage.

General damage, such as broken glass, is a regular feature of continuing petty vandalism. Security measures should be stepped up, particularly once Paddy's Markets relocates.

Maintenance of fire detection and response capability is essential across the whole Precinct. The Large Erecting Shop should have fire detection and suppression measures installed as a matter of urgency.

Each of the existing buildings and their contents should be checked regularly with a view to assessing the level of fire threat and steps taken to minimise such threats. This is particularly important when buildings are lying relatively empty. Regular inspections of downpipes and drainage lines should also be undertaken.

Maintenance planning for the buildings and equipment should be based on a staged growth pattern, consistent with the continuation or reintroduction of an active service role for each item.

In the longer term, routine maintenance expenditure for the buildings should reach a level which is consistent with acceptable property industry standards. In the short term, relatively high levels of maintenance expenditure may be needed to remedy past neglect and the effects of heavy use.

## 7.14 ORDINANCE COMPLIANCE

### BACKGROUND

The new *Building Code of Australia* is the operative building ordinance for the conservation and re-use of the buildings and structures at Eveleigh. In this regard the most critical issue will be compliance with fire suppression and egress provisions.

### CRITERIA

Approaches to compliance with building ordinances for the conservation and re-use of individual buildings should focus on creative solutions which respond to the spirit and intent of the ordinances if strict compliance to particular criteria would adversely affect significance.

### GUIDELINES

It is recognised that meeting fire safety requirements will be of critical importance in the adaptive re-use of buildings. This may require there be some give and take between heritage requirements and the need to meet fire regulations.

The larger buildings are of such a scale that compliance strategies that protect the architectural integrity will require careful

formulation. Creating large internal voids to reduce escape distances is not a preferred approach.

A fully resolved compliance strategy should be part of the conservation planning processes undertaken for any building.

## 7.15 INTERVENTION

### BACKGROUND

Article 3 of *The Burra Charter* indicates that conservation is based on a respect for the existing fabric of a place and should therefore involve the least possible physical intervention in order not to distort the evidence provided by the fabric.

### CRITERIA

Intervention into the building fabric for non conservation purposes should generally be restricted to approved programmes for re-use.

### GUIDELINES

Limited intervention for exploratory or research purposes, particularly to determine appropriate processes for repair and conservation, is acceptable.

Intervention into any building fabric should respect the integrity of the extant material, be limited in extent to that required by the proposed works and be carefully controlled.

## 7.16 QUALIFIED STAFF

### BACKGROUND

*The Burra Charter* encourages the use of skilled and appropriate professional direction and supervision for conservation activities.

The attitudes, skills and experience required and creative approaches taken in this context are quite different to those applied to the design of new buildings.

### CRITERIA

Appropriate conservation skills should be available within project teams assembled to deal with the historic buildings.

## GUIDELINES

Appropriate professional skills and experience assembled for conservation planning or project activities should include archaeologists, architects, structural engineers, building code compliance advisers, materials specialists and cost planners.

Equally, building contractors, project managers and trades personnel who are experienced with historic buildings should be selected to work on these projects.

## 7.17 CONSERVATION POLICIES TO BE REVIEWED

### BACKGROUND

The Conservation Policies which have been developed for Evelleigh are a response to the issues and information available in the latter half of 1993, at the beginning of the re-use phase of the precinct by the ATP.

Over the coming years many of the recommendations of this policy document, the guidelines of the REP and of master planning processes will be implemented. It is possible that the situation in relation to the current SRA controlled site parcels will also alter.

Conservation policies need to progressively respond to changing situations if they are to remain relevant.

### CRITERIA

The Conservation Policies and the detailed guidelines that support them should be regularly reviewed, approximately every five years.

### GUIDELINES

Reviews should be based on the application of *The Burra Charter* to contemporary circumstances and should consider any revisions to *The Charter* adopted by Australia ICOMOS in the intervening period.

# 8.0

## CONSERVATION ISSUES FOR REP HERITAGE ITEMS

### 8.1 INTRODUCTION

The management of Conservation Issues with regard to the REP Heritage Items should take into account the Heritage Management Procedures outlined in Section 5 and the discussion on Criteria and Guidelines in Section 2.2.

### 8.2 LOCOMOTIVE WORKSHOPS

#### BACKGROUND

The Locomotive Workshops are considered significant primarily for their scale and robust industrial character which can clearly demonstrate their pivotal historic role in the Eveleigh precinct.

The qualities which should be retained include the spatial scale and drama of the interiors, the late 19th century industrial nature of the construction and detailing and the associations of the building with the industrial history of Eveleigh.

The Workshops are in relatively good and stable condition, given their age and the rigorous history of their use.

The Locomotive Workshops, in Bays 5-15, is essentially a series of large voids, each about 100m x 16m in size, separated by rows of paired columns. Doors and windows are only available at each end of the 100 metre length of each bay, although there is some access to light and ventilation through the roof.

The scale of the Locomotive Workshop represents an interesting potential to establish strategic venues, associated with the ATP. The central area, Bays 5-13 provide some 15,000 sq. metres in a single volume, with excellent headroom and overhead lifting capacity with the travelling cranes. By contrast the largest space at the Sydney Showground is 5,000 sq.

metres and at Darling Harbour Exhibition Centre, 25,000 sq. metres, albeit of column-free space in five equal modules.

Cities such as Paris have captured major international business opportunities by providing an enormous range of exhibition and trade venues, usually on the fringes of the city.

#### CRITERIA

The original architectural integrity, spatial drama and structural integrity of the Workshops should remain capable of interpretation.

Evidence of past industrial operations, including the overhead cranes, should be retained for interpretation wherever possible, but particularly in Bays 1-4A and the early annexes along the southern elevation.

#### GUIDELINES

Bays 1-4A of the Locomotive Workshops should be treated differently to the remainder of the building given that the machinery identified as a Heritage Item by the REP is largely located in this area. They should be considered for retention for uses which relate to the display, re-activation and educational use of the machinery. The wall between Bays 4A and 5 creates a natural and effective subdivision within the building.

Uses are preferred which retain much of the large scale open nature of the interiors of the Workshops, at least in the configuration of whole bays.

The large Workshop volumes can be subdivided by the insertion of new mezzanine style floor structures and partitions. New floor structures should be clearly perceived as introduced elements that retain an overall sense of the original volumes. New concrete framed floors that totally fill the available plan

area, from wall to wall and 'bury' the existing structure should be avoided. Steel framed structures should be used, to retain the option of later returning to original form.

Subdivision of the building into separate bays should essentially take place along the centre line of the paired columns. Cross axial subdivision can occur at any interval but should take account of the restricted access to light and air. The preferred character of small internal volumes is that they be designed as self contained modules, clearly distinctive from the main architectural elements.

Services installed in the Workshops should generally be surface mounted or located in new voids, not chased into brick walls. This will match the traditional approach to such features and minimise damage to the original fabric.

In general the addition of services equipment or reticulation on the outside of building should be avoided except if the original concepts adopted for the annexes on the south side of the Workshops are utilised.

The existing patterns of windows, glazing and doors should be retained. Where such openings have been blocked in the past, these may be re-opened to original profiles.

New openings for access or light through external walls should be generally avoided. It is preferable to use the existing patterns.

Alterations to the pattern and general detailing of roofs and roof structures should be avoided. It is acceptable to introduce panels of glazing into existing roof slopes or to install glazed louvres into existing ridge ventilation systems.

The addition of metalwork awnings, fixtures or fittings on the exteriors is acceptable, provided they are of a secondary nature, relate to the architectural composition of the facades and improve the usability of the buildings from the aspect of occupant identity or amenity.

The creation of large "courtyard" volumes within the Workshop buildings, achieved by "cutting" away sections of roof or external walls, could have a detrimental effect on heritage significance.

In general the steel roof structures of the workshop buildings should be left exposed in any re-use proposal. Insulation or similar linings should be installed immediately below the roof slope. Where double glazing is required it should be installed on the inner side of external windows and be clearly distinguishable as a new element.

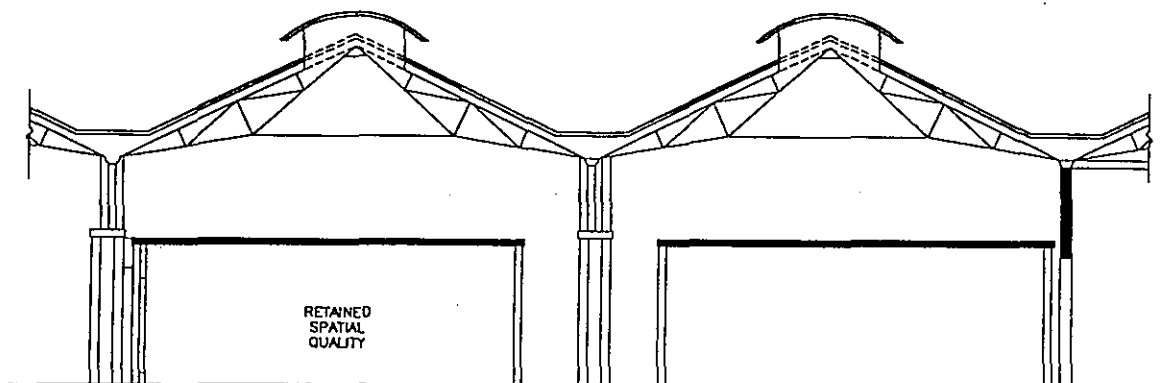


FIG.10 GUIDELINE FOR LOCATION OF MEZZANINE FLOOR OPTION

## SUGGESTED USE OPTIONS

Bays 1-4A and appropriate annexes, should be considered for uses which display and interpret the historic machinery, ideally in a way which includes operational and educational functions.

Bays 5-15 could be used for the following options, many of which require minimal adaption works or new services:

Extensive subdivision, both vertically and horizontally, for occupation by ATP firms. The space could be used for research and office purposes, but is not ideal given the configuration of the building and limited access to windows and entry doors. This option has the greatest impact on significance and is unlikely to be an economical way of providing purpose designed research space.

Limited subdivision of Bays 5-13 for use as exhibition and trade show venues. The nine bays could be subdivided into two or three areas for different exhibition venues. It will be essential for the organisations on the ATP site to have access to a venue for the display and marketing of their products. The availability of a large area of robust space for revolving exhibition programs should prove very attractive.

To support this venue there could be permanent "modules" established in Bays 5 and 13 with toilets, cafeteria, offices, projection facilities and other support operations. The subdivision between bays could be as simple as a painted brick wall on the column line, which could be demolished or rebuilt over time in response to changing exhibition requirements. The overhead crane in most bays could be a useful facility.

Bays 14 and 15 are already subdivided by brick walls. These could be used as separate facilities, or as exhibition venues. Additional gantries could be introduced for improved suspension facilities.

Individual bays could be used to establish short term manufacturing process lines (pilot plants), which are still in the development and testing stage. Each bay could be leased to an ATP member for the period of time that such a space was required. The robust nature of the space provides great flexibility for such a use.

Individual bays could be leased to one of the universities to establish, for a certain period, heavy testing laboratory facilities. Faculties such as architecture, mechanical or structural engineering could establish test facilities where structures are assembled, analysed and tested to destruction.

The open space in Bays 5-15 could be used, in the short term, simply by setting up 'portable' construction sheds or classroom style modules. These could be formed into secure clusters and made available, at peppercorn rentals, to nascent research groups. Such an approach would require very limited capital outlay and would commence the process in a way which responds to the rugged nature of the Workshops.

Sections of the building could be leased, on an interim basis, to organisations who need short term uses such as storage or undercover space, with good vehicle access, eg, distribution contractors, warehousers, vintage car clubs, car dealers, machinery agents, boat brokers.

Sections of the building could be used as short term storage for operations such as a distribution staging post for imported cars or machinery. Such uses require almost no conversion of the existing building but could generate short term initial income.

In the longer term, sections of the building, such as Bays 14 and 15, could be adapted to provide common sporting, recreation or similar facilities for ATP members or the surrounding community. The scale of the buildings is such that squash, half tennis, bowls, aerobics, indoor cricket, child minding, community, food services or other facilities could easily be accommodated.

Bays 14 and 15 could also house display and bookshop facilities related to rail history, as a link with the adjacent Large Erecting Shop.

Existing annexes which do not contain machinery could be used for the provision of new services.



## 8.3 MACHINERY IN BAYS 1-4A

### BACKGROUND

The large collection of early machinery and services infrastructure which remains in situ in Bays 1-4A and annexes of the Locomotive Workshop is an integral part of the cultural significance of Eveleigh.

There are three types of equipment:

- Large items, which are fixed in place and connected to the services infrastructure.
- Large items, which have been collected here from elsewhere in the precinct.
- Small items, including hand held tools and dies.

### CRITERIA

The collection of significant equipment and machinery, the majority of which is currently in Bays 1-4A of the Locomotive Workshop, should be conserved in ways which protect its cultural significance, continue its useful life and contribute to the activities at Eveleigh as both an engineering and educational resource.

### GUIDELINES

The preferred area for conservation and display should include Bay 4A as this is enclosed by the original external wall of Bay 5, forming a natural and cohesive space in Bays 1-4A. The REP only refers to Bays 1-4.

Large items, which are fixed in place and connected to the services infrastructure should remain in-situ. The traditional working nature and atmosphere of some of the eastern most bays should be considered for retention in preference to a formal museum atmosphere.

It is essential to retain multiple examples of existing equipment, hand tools, dies and other items to maintain the expression of the very large scale of the operations. Many of the dies are in fact not repetitive but slightly different and all could be utilised to perform future functions.

The remainder of the equipment, which has been stored in Bays 1-4A in a temporary manner, may be relocated within those bays in order to achieve a logical and well-considered display format. Well controlled pedestrian

access should be devised for the public to view the industrial nature of the area while avoiding danger or disruption or security risk to the machinery

Some relocation or reorganisation of the equipment and machinery to make it more suitable as a working facility is acceptable.

The introduction of contemporary equipment for display in a museum role, which contrasts early Eveleigh machinery with equipment used or developed by the ATP, is acceptable, provided it does not degrade the interpretive capacity of the whole working environment of Bays 1-4A.

Equipment which can reasonably be brought into useful service, without adversely affecting their essential characteristics, should be adapted and recommissioned.

Consideration should be given to the reintroduction either of the traditional or most recent sources of power in this area, if this will assist in the recommissioning of the equipment. Consideration should be given to the re-use of one or both of the Air Receivers as part of a re-introduced compressed air system to power machinery which was formally steam driven. In this case they should be located within Bays 1-4A or in an associated annex.

Compliance requirements for Workcover, in relation to the machinery, should be incorporated if this results in an acceptable level of adaption.

The existing blacksmithing and metalworking operation in Bays 1-4A should continue, for the time being, to ensure that some equipment remains in working order and that general security is maintained.

### SUGGESTED USE OPTIONS

#### STATIC DISPLAY

The existing machinery would be stabilised and displayed in the existing locations or within Bays 1-4A as appropriate. This is the lowest cost option. It would require no ongoing provision of any power source other than lighting. However measures should be taken to ensure the possibility of future activation. This would include, for example,

the treatment of the steam boilers to ensure they do not continue to deteriorate.

This option does not adequately utilise the existing space, captures only some of the interpretive potential and does not make any use of the educational possibilities. In addition it makes very little attempt to become a valid component of or to establish a dialogue with the ATP.

#### ACTIVE DISPLAY

In this option the machinery could be conserved and arranged in the spaces with some degree of activation of moving parts. The original power sources would not be maintained or reworked. Small electric motors would be used for the activation.

This is also a relatively low cost option but does not achieve very much more than the static display approach.

#### ACTIVE MIXED DISPLAY

Major sections of the existing machinery would be conserved and presented for display. At various locations amongst the old machinery, new or contemporary technology would be displayed and modern techniques such as video displays would be set up. In this way there would be an interaction between the new and the old.

This option requires considerable investment to establish a new display environment. There is a danger that the integrity of the old would be compromised by partial loss and by a cleaning up of the general precinct. It is also possible that there may be some confusion created if the separation between new and old was not handled well.

#### ACTIVE WORKSHOP

The preferred option is one which retains the existing in-situ machinery, reactivates key aspects of the power sources, recommissions other items and supplements the installation with equipment brought in from other railway workshops and annexes. The objective is to establish the facility as an operating mechanical engineering resource. It would be focussed in Bays 1-4A and would use the remaining space to display or use

contemporary equipment and interpretive facilities.

The overall operation could include the following functions.

- Repair of historic railway equipment.
- Conservation of architectural metalwork
- Production of decorative metalwork.
- Production of one-off items or test rigs for ATP members.
- Interpretive funding for historic and contemporary technology.
- Educational resource training in traditional metal work trades.
- Educational resource to expand the training of contemporary mechanical engineering students.

The primary aim would be to collect and display a working museum representing the state-of-art engineering workshop technology of late 19th to early 20th century, which was crucial to the maintenance of the NSW railways system, and also represents other workshops which made agricultural and mining machinery, etc, and helped transform Australia from an agricultural colony to an industrialised nation.

The display would be of general interest to school pupils and the visiting public. It would be of special interest and value to students of engineering trades and engineering professions, as they could see and understand the operation of these robust, simple machines more easily than in the more enclosed and complex modern, electric equivalents. The tools could be operated to make short-run or one-off customised orders or experimental rigs for ATP, or repair heritage rolling stock, as well as for educational demonstrations.

This option will require perhaps the greatest expenditure but has the potential to become the most useful and effective approach in terms of both conservation aims and the continuing exploitation of the resource. It should be able to attract funding from education sources as well as heritage or cultural bodies. It will enable this component to become a viable and attractive part of ATP.

There are current initiatives to establish a series of TAFE courses in NSW which focus on the teaching of traditional heritage craft skills.

This facility could become a component of such a network. The machinery could be used as a remote teaching facility for the various universities or TAFE colleges, with access by bus, train or foot.

By adding functional potential such as the dog spike manufacturing equipment, the operator in Bays 1-4A could generate a stable business operation for at least 10 years. This could underwrite the wider use or display of the equipment and reduce potential railway dependance on imported material and have beneficial employment effects. Management issues related to the movement of goods and materials would require careful consideration.

## 8.4 NEW LOCOMOTIVE SHOP

### BACKGROUND

The New Locomotive Shop is considered significant for its scale and robust industrial character which can clearly demonstrate its historic role in the Eveleigh precinct.

The primary qualities which should be retained include the external integrity, the late 19th and early 20th century industrial nature of the construction and detailing and the associations of the building with the industrial history of Eveleigh. The spatial drama of the interior should be retained during any subdivision.

The building is in relatively good and stable condition, given its age and the rigorous nature of its traditional use. It contains evidence of the industrial uses, particularly the overhead cranes.

### CRITERIA

The existing integrity of the New Locomotive Shop should remain capable of interpretation.

Evidence of past industrial operations, including the overhead cranes, should be retained for interpretation wherever possible.

### GUIDELINES

The spatial drama of the Locomotive Workshop and New Engine Shop is integral to their interpretation. It is important that at least some of this spatial drama is retained. On the assumption that the bulk of the Locomotive

Workshops remains relatively unsubdivided, uses which require an increased degree of subdivision of the New Loco Shop are acceptable.

Given the heights available, additional floor levels in both the Locomotive Workshops and the New Loco Shop could be constructed, provided careful consideration was given to the following issues:

- The clear height of the two lower floors would be minimal. In such a large building, the quality of space and access to windows is important.
- Unless large areas of open, internal atrium are created, the sense of spatial drama will be lost.
- The external pattern of windows and other openings is of two levels. Construction of two new internal floors could subdivide the lower range of windows, devaluing the quality of the internal space.
- The integrity of the columns and gantry tracks could be compromised by the addition of a floor level at mid point on the columns.

The New Loco Shop has a fundamentally different layout, with windows and doors down the two long sides, a single row of paired columns down the middle. The southern section of the building has a saw tooth roof configuration. This layout and the general pattern of primary structural elements should act as the framework for any subdivision of this building.

New floor structures should be clearly perceived as introduced elements that retain an overall sense of the original volumes. New concrete framed floors that totally fill the available plan area, from wall to wall and 'bury' the existing structure should be avoided. Steel framed structures should be used, with the option of later returning to original form.

Services installed in the building should generally be surface mounted or hidden within new voids, not chased into brick walls, to match the traditional approach to such features and to minimise damage to the original fabric. In general the addition of services equipment or reticulation on the outside of the building should be avoided.

The existing patterns of windows, glazing and doors should be retained. Where such

**APPENDIX G**

**Policy for the In Situ Conservation of Railway Items:  
conference paper prepared by Don Godden, 1992**

## **POLICY FOR THE IN-SITU CONSERVATION OF RAILWAY ITEMS**

### **1.0 INTRODUCTION**

The railways of NSW is an enormous enterprise. It was developed in the mid nineteenth and early twentieth centuries as the main, if not, the only large scale transport system in the State. Today, in a vastly different world both economically and technologically, it has been significantly reduced in size and financial importance. Despite this the railway still have vast holdings of land and an extraordinary number of buildings, pieces of rolling stock, structures and equipment in its charge.

The traditional classification of these articles is under headings such as the permanent way, (perway), stations and other buildings, safe working systems, rolling stock, structures, plant and machinery, and workshops. Items that are found under the heading "perway" include rail lines, embankments, bridges, cuttings, tunnels, culverts, fences and the associated equipment that goes with maintaining these items. Buildings include stations, which can be either masonry or timber, residences for various classes of employees such as station masters and gatekeepers, goods sheds, parcel depots and offices. The term "Workshops" includes the smaller maintenance workshops at country centres such as Goulburn and the enormous complexes of Eveleigh and Chullora, Clyde and Cardiff. The rolling stock includes locomotives, carriages, various classes of trucks as well as the small motorised and hand-powered trolleys. Structures include the large overhead gantries, water towers, water tanks, foot bridges and cranes which are evident on many of the small platforms associated with goods sheds. Safeworking systems include the signals and signal boxes, interlocking systems, points layouts and automatic train stops. The machinery or plant used on railways comes in an enormous variety and can include all of the general light, medium and heavy engineering plant which is associated with the manufacture of locomotive and rolling stock. Some of this machinery includes compressors, pumps, overhead cranes, hydraulic presses, riveters, and massive metal shears. Besides individual items, there are also the systems which are evident in the workshops, such as hydraulic systems, compressor systems which consist of a power source such as a motor, or steam boiler and engine, a hydraulic accumulator or air compressor, and a series of delivery lines which lead to various individual machines. Taken all together, the N.S.W railways are the largest single enterprise operating in N.S.W. in terms of physical structures. (It could not be reproduced today for less than many billions of dollars).

Many industries undergo change in their methods of production for economic or technological reasons. Accompanying this change is often the associated disposal, demolition, sale, re-use or scrapping of a whole range of buildings, structures, machinery and plant which is obsolete. In some instances these items are neither rare nor culturally significant and their passing is accepted. In other cases these items form an important part of our industrial heritage. However, the NSW railways are not merely undergoing change but also a massive reduction in the length of rail served, the number and type of locomotives and rolling stock, the stations, structures and workshops kept operational and the personnel employed. -

This has meant that a great amount of material, from bridges to buildings and including engineering plant of all types have been made surplus to requirements in the past few years. In many cases, these items have been sold to the highest bidder and many have been demolished or scrapped. Some buildings have been re-used for non-railway purposes, as have some bridges, and some items of machinery have found new leases of life in other workshops or museums. Others have remained in situ awaiting their fate, disused and gradually deteriorating without regular use and maintenance.

In some cases the items have not been conserved for a number of reasons, which may include 1. constituting safety hazard to the public, 2. poor physical condition, 3. much of the original fabric missing, 4. vital parts essential to operation or interpretation missing, 5. lack of items which were associated with the item which it was operational, 6. economic constraints which prevent conservation, 7. present location, 8. value of item as scrap and ultimately, even when none of these apply, 9. lack of knowledge of the importance of an item because no mechanism of assessment was applied to the item before.

In recent years, though assessment procedures have been developed which can be used to identify which items should be conserved.

Those items which have been assessed as being of such significance to warrant conservation may be relocated and conserved or they may conserved in situ in their operating environment. Some items are clearly unsuitable for relocation, such as masonry buildings and bridges, while others aren't suitable for conservation in situ, such as obsolete signals or trackwork.

### **Cultural Significance and its Assessment**

Assessment of cultural significance is the first step in the conservation process. The concept of cultural significance or heritage value is the value that the place or an item has to the community, beyond the immediate financial value. The assessment of cultural significance endeavors to establish why a place or item is considered important and is valued by the community. Cultural significance is embodied in the fabric of the place, and this includes its setting and its relationship to other items, the records associated with the place and response that the place evokes in the community.

There are at present a number of methods used worldwide for the assessment of both buildings and relics of potential cultural significance. Some of these methods are applicable to buildings only, others have been designed to assess relics or engineering plant. Some others are suitable for assessing both categories of item.

The Historic American Engineering Survey, The Institution of Engineers of Great Britain and the Institution of Engineers of Australia all have their own assessment methodology which is primarily aimed at the assessment of relics.

Joan Domicelj, in a recent study for the NSW Department of Planning, considered the criteria for significance assessment which is currently being used by the Australian Heritage Commission in the register of the National Estate. This study was to form the platform on which the development of a NSW Estate Heritage Inventory was to be based. In that report two groups of criteria were to be applied to assessment. The criteria in Group 1 concerned the nature of significance whilst the criteria in group 2 concerned the degree of significance.

Under Group 1, Nature of Significance, the five criteria applied are historic aesthetic, social, scientific and other values.

The Group 2 Degree of Significance Criteria are rarity, representativeness and associational importance.

One of the values of this system lies in its ability to assist with the enunciation of a statement of cultural significance. It also indicates the significance an item has to a local, regional or state community.

The Burra Charter of Australia ICOMOS, in its guidelines for the assessment of cultural significance, provides the simplest assessment methodology. It suggests that significance can be assessed in the categories of aesthetic, historic, scientific and social values. These categories provide a useful frame and basis for considering sites and items. However, they are not always directly applicable to certain relics and on occasion, other categories need to be applied to adequately assess those items.

All of these systems have particular strengths and applications. However, no one system has yet proved adequate because of the variety of categories which must be considered when assessing both buildings and relics. In a previous paper I have outlined a system of assessment using 7 categories which may be adopted to assess both industrial buildings and industrial relics. The categories are historical association, technological importance, structural integrity, interpretive value, operational ability, relative rarity and social significance.

Historical association refers to the length of association a relic or building has had with historic environment in which it is found. Consideration must also be given to the time the item has been sited in the one place within that environment.

Technological importance of a building or relic is the contribution it has made to the understanding of the history of technology or the contribution it has made to the development of technology. It also takes into consideration such data as whether it was the first made, the largest of its type or of revolutionary design.

Relative rarity is a measure of a number of similar items existing now, as to the number originally made.

Social significance refers to the importance that a building or relic may have to a social group or it may be the association the item has with an important individual such as an engineer or designer.

Interpretive ability is the ease with which a building or relic can demonstrate the part it played in a process or in the development of a site.

Structural integrity refers to the physical condition of the relic and the sympathy with which alterations have been made to its fabric.

Operational ability is the ability (usually) of a relic to operate in its present condition, with a minimum amount of work being done to it and providing normal facilities such as a power source and other requisite materials are available.

Each of the above categories may be given a rating from 1 the lowest to 5 the highest. In this rating, an average score, called the significance assessment score can then be given which reflects the cultural significance of the relic or structure.

The different categories should not always be regarded as being equivalent when determining the final significance assessment. In some cases, the consideration of one or more of the categories may not be appropriate.

When assessing an industrial building or relic it is normal to look initially at the four categories of historical association, technological importance, relative rarity and social significance. If the item is assessed as having moderate significance, or higher, a full assessment is then completed. If, in the initial assessment, the relic has below moderate significance when the four initial categories are being assessed, then the remaining three categories, if used, will give an inflated value.

### **Assemblages, Collections, Systems, Complexes and Precincts**

Heritage items do not exist as single neatly defined entities. Usually an industrial item, especially one associated with a railway, exists as part of a large and complex group of associated items. These groups of associated items can be defined as assemblages, collections, systems, complexes and precincts. The terms assemblages, collections and systems are usually applied to machinery and plant, the term complex usually to an industrial complex which is a combination of machinery, plant and buildings while a precinct usually applies to a group of buildings in a single location.



### **An Assemblage**

An assemblage may be regarded as a relic or structure including all the artefacts, tools and items normally associated with it when it was operating. In the case of a workshop machine, it would include the spanners and wrenches used to tighten nuts, the tools needed to adjust gears or belts, the safety screens which prevent contact with moving parts and if applicable, samples of completed or partially completed work. It would also include signs, pipework and associated services.

### **A Collection**

A collection is usually a number of relics or structures which belong to a group because they perform the same function or produce the same finished product.

Eveleigh Railway Workshop has a collection of nine steam hammers and electro pneumatic hammers. None of the hammers is very old, but they range in size from 5cwt to 40cwt and the illustrate the development of blacksmiths striking equipment of early this century. There is some duplication, especially in the lighter range of hammers but all have significance in their own right, they illustrate the layout of the shop, they all have their own services and maintenance tools as well as an extraordinary collection of forging tools.

### **Systems**

A system is more than a collection of artefacts it is an operational group of related relics or structures which cannot function effectively if any of one is removed. An example of a system is the safe working network which consist of a number of systems all of which are independent. however, the removal of one part of any of those systems whether or not they are operational would render the system incomplete.

### **An Industrial Complex**

An industrial complex is a number of functionally related items which are normally grouped together to form a manufacturing or production unit. A complex typically consists of assemblages, collections and systems of items plus the buildings which house them. The complex often remains as a functional entity even after a number of items or even systems have been removed. Examples of industrial complexes are the Eveleigh Workshops and Chullora Workshops. Numerous other complexes exist throughout the NSW State Rail Authority's holdings.

Removal of an item, collection or system from a complex will decrease the cultural significance of both the item and the complex. In some cases, because of the number of items within the complex, the decrease in its cultural significance may only be slight. The removed item, collection or system usually has its significance dramatically decreased.

## **A Precinct**

A precinct encompasses a geographic area which normally contains a number of functionally related items. It may include elements of a service industry, possibly, as well as elements of production and manufacturing industries. Railway Stations with their platforms, waiting rooms and ticket offices, tracks, switches, signal boxes and overhead bridges are regarded as precincts.

Because of its nature, much of the fabric of the railways consists of precincts, collections, systems and complexes and here much of the controversy which surrounds the conservation of railway heritage is centred.

A group of closely related items is normally regarded as being of more value than the sum of the individual elements whether that group be composed of stamps, paintings, matchboxes, railway badges or the contents of a railway workshop compressor house. Collections or systems within the railway are more significant than the individual items of which they are composed. The safe working system of the railways is monolithic. Where it exists on running lines, safety considerations are of paramount importance and the system is regularly upgraded and obsolete material which may lead to confusion is removed. In these cases, all elements of a particular section of the systems cannot be conserved in situ. It may be possible to keep selected elements of the system in situ - for example, the signal box itself, its relationship to other buildings within a precinct, the materials from which it is composed and the levers and interlocks may all be conserved. Although its significance has been decreased by the removal of the signals, its assessment of its heritage value may be such that it is still retained and conserved.

## **Assessment of Groups of Items**

Where an assemblage, collection, system, complex or precinct is known to be substantially intact, the criteria used to assess individual relics may also be used to assess these groups. It should be noted that generally the more intact these groups are, the higher will be the significance and this significance may be higher than for any of the items within the group.

## **Assessing for Relocation or In Situ Conservation**

Clearly it is not possible to conserve the railways as a whole, nor is it possible to conserve many of the complexes, precincts, systems and collections simply because of the nature of technological improvement or upgrading which must take place in order for the railways to remain operational. Hence the task is to rank items in order of their cultural significance and to select the most significant examples for conservation. The assessment of the total holdings must take place at all levels of complexity from individual items to systems and precincts and must identify those appropriate for conservation in situ and those suitable for relocation.

As part of the assessment process, it is necessary to consider the implications of relocation, if it is to be considered as an alternative form of conservation. Railway items typically are relocated to railway museums, rail preservation societies and to private collectors.

The aims of museums and rail preservation societies in general are to operate, for both their members and the general public's enjoyment, selected items of railway history, to provide an educational experience for members of the public, and to be custodians for a range of railway items previously part of a government or private railway.

Their aims are not incompatible with those of organisations such as ICOMOS. Their agenda however, leads them to call for relocation and conservation rather than conservation in situ.

Railway museums by their nature have to run an intensive rather than extensive operation and their holdings by comparison to the SRA are modest. Both these factors affect the way in which conservation is practised in these environments.

Some items are easily relocated and conserved in a variety of museums and collections. These items can vary from railway cap badges through locomotives and rolling stock to platform furniture, machine tools and foundry patterns. Others are more likely to be conserved where they were first installed or erected. Items in this category include bridges, buildings especially masonry ones and massive plant such as turntables.

However, the vast majority of railway items can have arguments presented for either conservation in situ or relocation and conservation. The determining factor should be the degree to which the cultural significance of an item, or group will be effected by relocation.

When determining whether a relic or group of relics should be relocated in order to be conserved the following process should be adopted:

- \* It should be assumed that the relics have been moved to their proposed new location.

Firstly,

The relics which have been relocated should be assessed again using those seven categories.

Secondly,

The complex, precinct or system from which the relics have been removed should be assessed again.

If the decrease in cultural significance for either the relic or the site is unacceptable then the relic should remain and be conserved in situ.

The vast majority of railway items can have arguments presented for either conservation in situ or relocation and conservation. The determining factor should be:

1. The degree to which the cultural significance of an item, or group which is to be moved will be effected by relocation, and;
2. The degree to which the cultural significance of the      which remain will be affected.

### **Relocation**

Relocation in general terms decreases the significance of an item or group and as well as decreasing the significance of the fabric which remains. Taking the levers and interlocking system from the signal box detracts substantially from the significance of the signal box. The cultural significance of the levers and interlocking system are also reduced. The signal box may remain as a shell indicating simply the point from which signaling was done in the past and indicating the style of signal box used in that location.

Relocation is an acceptable means of conservation where items were made to be moved. The classic examples are locomotives and rolling stock, some machinery and plant and even some safe working equipment. By moving these items to a new location and taking associated items, collections, assemblages and systems with them, much of the significance may be retained.

Conservation procedures are also far easier to conduct where there are economies of scale. By bringing distant and widely scattered items together it is possible to restore many of the them.

With large railway items such as locomotives, conservation is easier when full workshop facilities are available. The security and protection of items is usually assured while the item is in the workshop.

Visibility is also an important incentive to conservators. If, for example a significance but isolated set of rail points is under threat, there will be little motivation to conserve them if few enthusiasts and practically none of the general public will ever get to see them. In this case there are two options to be followed:

The first is leave the relics in situ and to allow them to decay but recognise that the resulting ruin will have significance conferred by its remaining fabric and its location, or secondly relocate the relic and conserve it by possibly by placing it in operation in a working museum.

One of the major problems associated with relocation even from one place to another within a complex is that seldom is the total assemblage of the system kept together. Small, seemingly insignificant features are lost, others found to be in poor condition are replaced or reconstructed rather than being restored, while still others are discarded because they do not fit the image of the new operator or conservator.

A second problem with relocation, especially as far as private or public collections are concerned, is the tendency to over-serve. Many items of industrial plant and equipment, cranes and furniture in museums look newer than when they were first commissioned. Steam engines or hydraulic pumps when in use were generally oiled and maintained with affection by their operators. They had the appearance of being cared for but they also had the scars of age; the bumps and dents that go hand in hand with major repairs.

A third concern is that insufficient or no conservation measures are applied to the relocated items or groups. In some cases, items are relocated with the intention of re-erection and reuse in the near future. However, lack of funds and time frequently means that items lie unattended for years before any action is taken. During this time many locomotives, signal posts, machines and pieces of rolling stock have deteriorated to such an extent that conservation is impractical.

These items then form ruins in their relocated position. The loss of significance is twofold - firstly they are no longer in their original location, and secondly, they have deteriorated to such an extent as to be inoperable, separated from their associated relics and often have become impossible to interpret.

On the other hand, items or groups of items which have outstanding significance and which are under threat, such as early crossing systems which will be removed or vandalised shortly after the track is abandoned, should be relocated and conserved. If left in situ, their subsequent loss of integrity and hence significance would be greater than if they were relocated.

Other items such as steam cranes or massive derrick cranes which cannot be accommodated in the yards in which they worked should be moved. However, if storage is available and security can be ensured they should be left in situ, at least while the status quo is maintained.

#### **The Case for In Situ Conservation**

Much of the fabric of both the SRA and the private railways was made for a specific location. That fabric, sometimes present today as single items or in other cases as groups of items, complexes and precincts indicates the way in which the railways operated. The giant workshops at Eveleigh have closed but much of the fabric of the original 1876 buildings remains. Inside the locomotive shop there is a range of plant which was manufactured between 1874 and 1950. Much of this plant is still operable. This needs conserving in situ in order for it to retain its cultural significance.

There are numerous signal boxes which no longer house safe working equipment, or which house interlocking systems no longer linked to the safe working system itself, which indicate the nature, form and general importance of signal boxes through time. Most of these signal boxes are part of the precinct and although neither masonry nor operating they should nevertheless be conserved in situ.

Other pieces of plant such as the water tanks and water towers, even when no longer on operating lines, have enormous evocative power and indicate the part of the infrastructure necessary for the operation of the railway in the steam era.

The workshop buildings adjacent to the rail terminal in Strauchan in Tasmania, the two surviving signal posts and the admirably painted though inaccessible weather board station building form a valuable precinct. The precinct would be much more significant and have much greater potential had the goods shed, platform, cranes, water tower and track been allowed to remain in situ.

One argument for relocation of items is that in their present location they will simply become ruins. The Tarana-Oberon rail line is an example. Unless concerted effort is made, much of the fabric of crossings, culverts, safe working, cuttings and track itself will gradually deteriorate. Today many of the items at Oberon including fencing, signage, seating, station furniture and the crossing are missing and inventory of the line is incomplete. Even in its deteriorated condition, though, with so many items removed, the line, with its station complex at either end as well as the associated rail yards, has a significance that none of the remaining items, no matter how well conserved would have had they been relocated to numerous museum and collections.

There are numerous other lines including some of the shale railways that, had they been left intact rather than having items sold for scrap or sent to other locations, would have provided an extraordinary setting for the lovers of the industrial archaeology of railways.

Very little remains of one of Australia's pioneering railway which ran from Broken Hill in NSW to Coburn in SA. The siding at Siverton, the isolated signal posts at three points on the line and scattered scrap near the supermarket complex which indicates the site of the railway workshop are almost all that remains. The station building, now a museum, sits isolated on the edge of town and the crossing keepers hut at Galena Street is now just a reminder of the permanent way. Even the small platforms at the rear of the shops and buildigns which backed onto the track, unique in Australia, are slowly being changed beyond recognition. The evidence that remains should be conserved. Preferably one would hope preserved rather than restored.

Where a line becomes recently abandoned, as much as possible should be done to conserve the remaining fabric by community and volunteer groups. This conservation should be done according to the guidelines as set out in the Burra Charter.

## **Conclusion**

Items, assemblages, collections and systems in their original location, especially when interpreted, are enormously important to understand our rail heritage. Of special significance are the sites such as the station precincts of Tenterfield, Crookwell, Black Mountain and Homebush, the Eveleigh workshops, and systems such as the pumphouse at Chullora. However there are many others.

Crookwell is a terminus complete with a yard, stockyard, goods shed and platform, weather board station, safe working system, turntable and stationmaster's cottage. It is a precinct which is still complete and one which deserves attention. Eveleigh has been treated badly but the engine shop, erecting shop, workshop bays 1 to 15 and the timekeepers office remain. Much of the equipment and plant was sold, but that remaining in bays 1 to 4, some of which has been relocated, some of which is preserved in situ, make Eveleigh one of the most important rail workshops in the western world. The pump house at Chullora is a 1920s masonry building which supplied the Locomotive Shop with hydraulic power and compressed air. Both systems are still intact and compressed air is still supplied from the pump house to the workshops. The hydraulic system still has its water tower, pipes, accumulator and three massive electrically-driven hydraulic pumps. The pump house exists as a series of assemblages, as a collection and as two systems. With the external accumulator, water tower and air receivers converted from boilers, it is also centre of a precinct.

All these examples, and other railway items and industrial complexes which still exist, have uncertain futures. Their sites are being considered for redevelopment and at Eveleigh, Chullora and Enfield much of the material surplus to requirements has been sold or disposed of.

Throughout its history, the railways have been a major factor in government finances and in times of huge government deficits, its assets will inevitably be measured in financial terms. Conservation of the significant elements of the railways is a daunting task and by necessity will require a combination of both relocation and conservation in situ. Relocation, however, can rarely satisfactorily substitute for conservation in situ. For many items particularly systems, complexes and precincts, it cannot be considered an acceptable conservation procedure. It is necessary to recognize, in attempting to conserve the heritage of the railways, that conservation in situ is the primary aim and that the majority of our conservation effort should be directed to this goal.

**APPENDIX H**

**STANDARDS IN THE MUSEUM CARE OF LARGER AND  
WORKING OBJECTS: SOCIAL AND INDUSTRIAL  
HISTORY COLLECTIONS 1994 MUSEUMS AND  
GALLERIES COMMISSION. (LABELLING/TAGGING).**



## Standards for moving larger objects

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- 18.1 The handling and movement of objects should be kept to an absolute minimum.
- 18.2 Trained personnel and suitable equipment must be available for the safe lifting and transporting of objects.
- 18.3 Every move of an object should be carefully planned in advance, adequate personnel and equipment provided, the route agreed and cleared, and the supervision of the operation agreed.
- 18.4 Objects being moved should be protected from physical shock, vibration and from hostile environmental conditions.
- 18.5 Objects and parts of objects being moved should be kept sufficiently apart from one another to prevent abrasion, crushing and contamination.
- 18.6 Staff and volunteers should be trained in the handling and moving of objects and should be aware of the potential risks to objects and to themselves.
- 18.7 Contractors used for lifting and heavy haulage work should have proven experience in the field and must work closely with museum staff to ensure best practice in care for the object.
- 18.8 Wheeled and tracked objects should only be moved on their own wheels after appropriate engineering advice has been obtained on the mechanical condition of all the moving parts, the suspension, if any, and particularly the bearings. Proper lubrication is essential before a wheeled or tracked object is moved on its own wheels.

### Guidelines and notes

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- 18.9 Larger industrial and social history objects may pose particular problems when moved because of their size and weight. Some may be able to move on their own wheels; some, though having wheels, may be too fragile, old or delicate to move in that way. Others may be so large or heavy, even when broken down into component parts, that specialist heavy hauliers and crane operators have to be engaged.
- 18.10 Moving larger objects, whether manually or mechanically, requires careful planning to ensure that it is done successfully and without danger to people or object.
- 18.11 Collecting larger objects in the field often raises the most severe difficulties of following proper procedures. The more difficult the job, the more important it is to entrust it to highly experienced people.
- 18.12 The following guidelines should in every case be followed:
- One experienced, capable person should be in charge of the whole operation.
  - Everyone involved should be trained and know their responsibilities. The team must ensure that control is maintained throughout the operation.
  - Assess the load: can it be moved? What are its weak points? What is its condition? The original specifications may give its weight: check that they accord with the object as built or as found. Original specifications may also give lifting points/lifting advice. Are the original lifting points still strong enough? Has the

object been moved before? If so, are there records of the move? How was it done? What difficulties were met?

- Modify the object. Can it be reduced into smaller and lighter units? But dismantling should be kept to the minimum necessary, and must be fully record at each stage.
- Does the object need a supporting frame/structure during transit? If so, prepare one.
- Drain all fluids.
- Choose a route and means of transport to minimise disruption to the object. Inspect the beginning, middle and end of the route. Note any obstacles or problems and make necessary preparatory arrangements.
- Check the floor loadings on the route, and provide plates and boards as necessary. Point loadings through wheels of trucks can be very high.
- If taking an unusual load on the roads, inform the police.
- Consider the advisability of a courier or accompanying member of staff.
- Follow the Government Indemnity Scheme "yellow guidelines" (available from the Museums & Galleries Commission) where applicable.
- Ensure security against thieves and vandals throughout the move.

18.13 Special problems attend the moving of some types of object. Aircraft for example have a relatively fragile external skin, which may look more robust than it is. When lifting an aircraft the appropriate manual should be consulted to determine the correct procedure. The aircraft must be lifted at approved jacking points or trestle locations. When lifting by crane, hoisting points and, in some cases, special slings or lifting beams will have to be used. When transporting an aircraft in a dismantled state, the correct cradles for the components must be used. Holding-down straps must be adequate, especially for lightweight items, and must be correctly placed.

18.14 When moving a computer, each cable end must be labelled, and heads of disk drives must be secured.

18.15 When moving unpowered wheeled vehicles, care must be taken to avoid an 'out-of-control' situation. A tug vehicle must have adequate weight and braking capacity for its load. If using a push pole, beware of jackknifing which could cause the load to overtake the tug vehicle.

18.16 For certain larger objects such as carriages, cars and boats, special adjustable trolleys can be designed, making their movement very much easier.

### **Mechanical handling**

18.17 Moving larger and/or very heavy objects poses particular problems: contractors will almost certainly have to be used. It is important to check the experience and competence of such contractors, to develop a good working relationship with them, to talk through their proposals and the needs of the museum (and the object) and to oversee the operation. A crane company should be insured against damage to 'load under hook'.

18.18 Lifting other than from floor to vehicle should be avoided if possible: crane-hire is costly and greatly increases the risk to the object. If lifting is necessary, correct slinging is

essential to avoid damage to the object. Cranes and slings are subject to particular regulations under the Factories Acts.

- 18.19 Loads must be properly secured on or in vehicles; even the heaviest machine may move en route if it is not rigidly fastened down. Choose an air suspension vehicle.
- 18.20 The use of pallets and pallet movers, both manual and motorised, is key to the management of larger objects. Objects should be secured to their pallets by strapping devices, web netting or polythene wrapping sheets. Everyone who uses such equipment should receive appropriate training.
- 18.21 Object should be protected with appropriate packing materials. These will depend on the object, the type of transport, climate (at both ends and microclimate in transit), length of journey and route. Use packing materials that protect the object and do not themselves damage it; for example tarpaulin covers may be dirty and have abrasive fastenings. Suitable packing materials may include medium and high density polyethylene foam, bubble wrap, felt blankets, etc.

### **Manual handling**

- 18.22 Heavy objects should be lifted and carried by hand as little as possible. Prior to any lifting operation a full risk assessment should be carried out (see Section 23).
- 18.23 Everybody involved should be aware of their responsibilities under the *Health & Safety at Work Act 1974*.
- 18.24 The weight alone of a load is no longer considered a sufficient indicator of whether it may be carried by one person without risk of injury. The object's size, stability and the distribution of its weight must all be considered. However, the *Manual Handling Regulations* indicate maximum guideline figures for a load, carried at elbow height close to the body, of 25kg for men and 16.7kg for women. The maximum weight for loads carried in any other position should be reduced by at least 5kg, and by 10kg when lifting from points below elbow height.
- 18.25 A heavy load should not be carried more than 10 yards (10m). Trolleys should be used, and lifts of adequate weight capacity between floors.
- 18.26 Floor surfaces should be clear of obstacles (including matting) and should not be slippery; lighting should be adequate and there should be sufficient space.

### **Sources of advice and help**

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- Guidance on manual handling will be found in:

Health & Safety Executive, *Manual Handling: Guidance on Regulations (Manual Handling Operations Regulations 1992)*.

## **APPENDIX I**

## **List of Inventory Items in Bay Order**

GODDEN  
MACKAY

Bay	Machine Description	Inventory Number
	Frazing wheel and saw	82
1N	Davy Press	1
1N	Davy Steam Intensifier	2
1N	Davy Hydraulic Reservoir	3
1N	Davy Steam Reservoir	4
1N	Balanced billet holders	5 A-P
1N	Davy Work in progress	6
1N	Steel Spacers	7 A-B
1N	Steel Spacers	7 A-B
1N	Metal case of Shims for Davy Press	8
1N	9A Crane balanced special holder.	9A
1N	9B Hand-held tongs, Furnace Rake/ hoes etc.	9B
1N	9A Crane balanced special holder.	9A
1N	9B Hand-held tongs, Furnace Rake/ hoes etc.	9B
1N	Hand trolley for hot work	10
1N	Warning sign for Davy Press	11
1N	Punches, dies and swage blocks	12
1N	Punches, dies and swage blocks	12
1N	Six buckets - lock pins, wedges for crane tongs	13
1N	Assorted metal pieces	14
1N	Steam hammer shafts (2) and rectangular parts bin	15 A-C
1N	Maintenance tool cabinets for Davy Press	18
1N	Metal work tables for Davy (5)	24 A-E
1N	Furnace for Davy	25
1N	Crane slings	16
1N	Collection of large fullers, dies, swages and punches	17
1N	Work in progress for Davy Press	19
1N	Rack of swages, fullers, (both sides of rack)	20
1N	Rack of tongs, hand-held grips and swages	21
1N	Rack of mixed swages, moulds, templates	22
1N	Collection of large swage blocks for Davy	23
1N	Overhead crane	207
1S	Roots No. 5 Blower 1903 Pattern Rly No.Br 751	41
1S	Roots No. 6 Blower 1910 Pattern Rly No. Br 755	42
1S	Forge	44
1S	7cwt jib crane	45
1S	10cwt jib crane	46
1S	Oil furnace (large)	47
1S	Furnace	48
1S	Hydraulic Ram Press	49
1S	Jib crane	50
1S	Brett type impact punch	51
1S	Hydraulic press	52
1S	Furnace	53
1S	40cwt arch steam hammer	54
1S	10cwt jib crane	55
1S	Oil furnace large	56
1S	Davis Primrose 20cwt steam hammer	57
1S	Furnace	59
1S	Anvil	64
1S	Quenching bath	65
1S	Racks of assorted tools	66 A-H
1S	Warning sign for 40cwt hammer	67

GODDEN  
MACKAY

Bay	Machine Description	Inventory Number
1S	Stands of assorted dies	68 A-E
1S	7cwt crane	58
1S	Massey 7cwt electro-pneumatic hammer	60
1S	Roots No. 6 Blower	61
1S	Tool racks between columns	62 A-E
1S	Metal trolley bin	69
1S	Warning sign for 40cwt hammer	70
1S	Assorted tools against walls	71
1S	Hot metal trolley	72
1S	Crane tong support	73
1S	Metal trolley	74
1S	Metal stand with 2 metal boxes	75
1S	De Burgue electric shears	206
2N	Rack of dies, moulds and templates for hammer shop	26
2N	Black-smiths forges	27 A-H
2N	Davis primrose 8cwt steam hammer 1	28
2N	Davis and Primrose steam hammer 8.5 cwt	29
2N	Wall crane for No.29	30
2N	Davis and Primrose 8cwt steam hammer	31
2N	Davis and Primrose 8cwt steam hammer	32
2N	Frazing and grinding wheel	33
2N	Tool racks between columns	34 A-L
2N	Hot metal circular saw	35
2N	Tool racks non-fixed	36 A-P
2N	Benches for moulds, dies, templates and tools	37 A-J
2N	Lathe bed Whit-worth	38
2N	Work bench (timber) with 6" vice	39
2N	Dual grinder	40
2N	Furnace	198
2S	2 ton jib crane	76
2S	1 ton jib crane	77
2S	Frazing wheel and saw	78
2S	Furnace for ajax FR 16	79
2S	Jib Crane	80
2S	Ajax continuous forging machine	81
2S	Frazing wheel/ grinder	83
2S	10cwt jib crane	84
2S	'Covmac' continuous forging machine	84
2S	Furnace for Covmac	86
2S	Blacksmith forge	87
2S	Blacksmith forge	88
2S	Blacksmith forge	90
2S	Allen Striker 1899	91
2S	Frazing wheel Grinder	92
2S	Blacksmith Forge	93
2S	Allen Striker 1899	94
2S	Furnace	95
2S	Massey cwt pneumatic hammer	96
2S	Furnace	97
2S	Massey cwt pneumatic hammer	98
2S	Furnace	99
2S	Stands of tools	100 A-D
2S	Anvils	101 A-C

GODDEN  
MACKAY

Bay	Machine Description	Inventory Number
2S	Racks of tools between columns	102 A-D
2S	Swage block	103
2S	C36 class boiler	188
2S	C36 class boiler	189
2S	C36 class boiler	191
2S Annexe	C36 class boiler	190
3N	Pedding - haus shearing machine	123
3N	Reheating furnace	124
3N	Whitham spring coiler	125
3N	Grinder	126
3N	Craven brothers drill	127
3N	Bevel wheel shaper	128
3N	Furnace	129
3N	Centreless grinder	130
3N	Ward lathe	131
3N	Vertical shaper	132
3N	60" vertical borer Webster & Bennett	133
3N	Genevoise drilling and boring machine	134
3N	Genevoise drilling and boring machines	135
3N	Mandrel rack	136 A-D
3N	Brown and Sharpe universal grinder	137
3N	Herbert twin drill/ borer	138
3N	Allen Striker	139
3N	Cylindrical grinder	140
3N	Lathe	141
3N	Furnace	142
3N	Hydraulic Ram	143
3N	Hydraulic spring press	144
3N	Spindle Router	145
3N	Points/switches	146
3N	Signalling gear	147
3N	furnace	148
3N	Overhead crane	197
3N	Air receivers	199 A-B
3N	Trolley	201
3N	Line shafts and counter-shafts	204 A-D
3S	Churchill grinder	104
3S	Buffer, grinder and quenching bath	105
3S	Furnace	106
3S	Lathe	107
3S	Smith and Coventry grinder	108
3S	Smith Coventry lathe (spring coiling) Ser No. 333	109
3S	Small Lathe	109
3S	Furnace	110
3S	Furnace for springs	111
3S	Spring King eye rolling machine	112
3S	Vickers vane pump (part of Spring King assembly)	113
3S	Vickers Controller	114
3S	Four wheeled trolley	115
3S	Halifax shaper	116
3S	Boring machine	117
3S	Launch's Screw cutting machine	118

GODDEN  
MACKAY

Bay	Machine Description	Inventory Number
3S	Surface grinder	119
3S	Cincinnati milling machine	120
3S	Bed from Genevoise	121
3S	Bed from Genevoise	122
3S	Hydraulic accumulator	193
3S	Crane	195
3S Annexe	Electric motor for hydraulic pump	184
3S Annexe	Hydraulic pressure pump	185
3S Annexe	Steam hydraulic pressure pump	186
3S Annexe	Overhead Reservoir	187
4AN	Thompson 90 degree V twin compressor	216
4AN	7 tonne Crane	218
4N	Spring coiling machine 10"	149
4N	Spring coiling machine	150
4N	Quenching tank	151
4N	Craven Bros. spring disassembler	152
4N	Ryerson spring forming machine	153
4N	Ryerson spring forming machine	154
4N	Quenching tank	155
4N	Hydraulic press and spring tester	156
4N	Double floor grinder	157
4N	Spring buckling press	158
4N	Furnace	159
4N	Hydraulic spring buckling press	160
4N	Furnace	161
4N	Work table	162
4N	Pump	163
4N	Electric starter cabinet	164
4N	Electric motor & base plate	165
4N	Machine parts	166
4N	Centre lathe Denham	167
4N	Axle journal lathe	168
4N	Planing machine	169
4N	Electric motor	170
4N	Motor generator	171
4N	Work bench and vice	172
4N	Armatures	173
4N	Grinding table	174
4N	Electric motor	175
4N	Electric motor	176
4N	Single bed vertical borer with oval heads	177
4N	Rectifier	178
4N	Hydraulic riveter	179 A-E
4N	Overhead crane L/6	196
4N	Overhead crane L/8	202
4N	Height setting table	205 A-C
4N	Wheel shop crane	208
4N	Wheel shop crane	209
4N	Flange press	210
4N	Wheel press	211
4N	Pipe bender	212
4N	Hydraulic press	213



GODDEN  
MACKAY

Bay	Machine Description	Inventory Number
4S	Plate rollers	180
4S	Craven plate rollers 1886	181
4S	Bennie metal guillotine	182
4S	Jib crane 10cwt	183
4S	Pressure vessel	192
4S	Hydraulic accumul-ator	194
7S	Tangye 48" wheel lathe	200
Air Compressor House	Air Compressor	214
Air Compressor House	Air Compressor Ingersoll	215
Air Compressor House	Thompson 90 degree V twin compressor	217

## **APPENDIX J**

### **Interpreting the Eveleigh Railway Workshops, Focus Group**

## **APPENDIX J - INTERPRETING THE EVELEIGH RAILWAY WORKSHOPS**

### **1.0 FOCUS GROUP**

The focus group met on 1 March 1996 at the Eveleigh Railway Workshops, with the following present: Alan Bright, Jack Bruce, Anna Christie, John Crawford, Don Ellsmore, Tom Forgan, Don Godden, Andrew Grant, Chris Johnson, Joan Kent, Jill Sheppard, Greg Spencer and Lucy Taksa.

#### **1.1 Themes Arrived At By Focus Group**

The focus group was asked what it felt the most important 'messages' about the Eveleigh workshops it would wish visitors to take from the interpretation.

The focus group concluded that there were three important 'messages' that visitors ought to leave with. Each 'message' embraced a number of related themes, which are also listed. They were the following-

##### **An appreciation & understanding of technology**

By which the focus group meant:

- an appreciation of 19th century machine design;
  - an understanding why Eveleigh (both its building and machinery) are of heritage significance;
  - an understanding of how people experience work and technology;
  - an understanding of labour and artisan based work;
  - seeing traditional work practices still being performed;
  - an appreciation of the potential for preserving and presenting heritage in both aesthetic and functional ways;
- an impression of the large scale of works and machinery.

##### **An understanding of technological change & development**

By which the focus group meant:

- an understanding of how technology changes;
- an awareness of how new frontiers are opened up through technology;
- a demonstration of the development of technology from 1880;

- a comparison of old and new technologies, in which both continuity and change could be shown, as well as an appreciation of the potential coexistence of developing new technologies and preserving old ones;
- a demonstration of future technology;
- an appreciation of how place anchors our society, ie how the new has evolved from the old.

### **Eveleigh site — workshop/place/history**

By which the focus group meant:

- an understanding of the history, role and function of the workshops;
- a sense of the grandeur of the building;
- an awareness of, and respect for the value of the state's railway and engineering heritage;
- an understanding of the relative scale of technological development;
- an understanding of working conditions in the late nineteenth century;
- an understanding and experience of what Eveleigh was like in its working days as a working environment, what the working conditions were like;
- an appreciation of the workers' feel of the spaces;
- an appreciation of the social relationships formed at work

There was general agreement that these were the three major messages that the interpretation ought be trying to impart. Two other 'messages' were considered but they garnered only small interest. These messages were—

### **An appreciation of Australian achievement**

By which was meant:

- a feeling of national self-esteem for the future;
- a celebration of Australian success past and future.

### **Education**

By which was meant:

- the idea that the experience of visiting the workshops be both educative and enjoyable.

## **1.2 Interpretative Methods Arrived At By Focus Group**

The focus group then considered what methods ought be employed to present each of the three 'messages'.

## **An appreciation and understanding of technology**

Methods suggested included:

- operating extant machinery;
- an introductory video;
- take home brochure;
- audio tapes using edited recordings of former workers;
- an elevated walkway over Guido's workshop, including a video on the walkway when machinery not going;
- high-tech delivery.

It was additionally felt that there needed to be:

- an overview experience;
- a variety of solutions for diverse groups and an overall diversity of experience offered;
- at the least a minimal level of operation of machinery and that this presupposed a decision about type of machinery used;
- that it was important to preserve operation of steam;

and that:

- no option should at this early stage excluded;
- and, most importantly, that the site should not be cleaned up and sanitised.

## **An understanding of technological change and development**

Methods suggested included:

- working machinery (this deemed essential and steam important);
- a working model of loco workshop;
- a contextual model of whole site;
- a wide mix of interpretation methods;
- overall view down to illustrative material;
- active conservation workshop in large erecting shops (link to LWS);
- machinery—operations vs simulation—with people using machinery and explaining to visitors;
- viewing tower eg Redfern Station;
- guided tours;
- audiovisual displays;
- operating trains;
- rail vehicle on interior tracks to move people LWS to LES;
- sonet lumiere.

## **Eveleigh site — workshop/place/history**

Methods suggested included:

- a perimeter walk;
- audio and markers;
- signage locating site in wider community.

It was additionally felt that interpretation in this regard needed to be guided by a strong sense of the distinctive nature of the site, and ought attempt to preserve this sense of place.

### **1.3 Issues Discussed By Focus Group**

Before any final decisions regarding interpretation were made, the focus group identified the following issues as needing further consideration and in some cases, clarification:

- a potential conflict between building works and conservation sequencing;
- occupational health and safety problems, as well as environmental and contamination hazards;
- noise;
- access;
- parking;
- circulation;
- proximity to running line;
- amenities;
- impact of active interpretation;
- security;
- operational requirements of cranes;
- the commerciality of ATP and its specific requirements;
- the need for a front end evaluation of what people want. A three stage evaluation assessing audience was felt desirable, and it was thought most worthwhile to invest in assessment time upfront;
- the cost of interpretation needed to be considered alongside the potential cash flow from interpretation that might draw paying crowds;

It was also felt that given the unique conservation problems of the site, there was difficulty in costing and planning for interpretation and that accordingly a base level conservation cost had to be established, as well as a budget for discretionary expenditure. The focus group also noted that there was the potential for some conflict between the needs of interpretation and conservation.

### **Sound and sight show**

There was discussion about alight and sound show, for which there was considerable support. The following issues with regard to a sight and sound show were identified:

- security;
- public liability;
- night time issues;
- need for high initial cost and running cost having to be balanced against potential return.

### **Working machinery**

The following issues with regard to working machinery were identified:

- noise;
- safety;
- management;
- maintenance;
- operators;
- occupational health and safety;
- power source (compressed air, steam, or electricity?);
- need to preserve of link with steam;
- high initial maintenance costs and operational costs and infrastructure costs.

### **Static display**

The following issues with regard to working machinery were identified:

- base preservation costs (large costs);
- signage and additional interpretation eg audio and higher cost of add ons;
- unknown level of popularity;
- an assessment of potential audience required.

## **2.0 A DIFFERENT APPROACH**

Implicit in the notion of using focus groups is the aim of arriving at a consensus of which, by definition, all approve, or at least all can live with. The consequences for interpretation are obvious enough: one gets recommended an approach that will be safe, worthy and which will meet with the tacit approval, if not enthusiasm of most. It will be non-controversial. There are virtues, mostly political and bureaucratic, that flow from this. The options arising from the focus group are going to be the easiest to win initial support and finance for, because they are more of the same. But they do not necessarily make for the most interesting, the most stimulating or the most popular forms of interpretation. Nor do they make for an interpretation that is firmly grounded in coherent thought. Grouping together similar sounding subjects under particular banners of this or that major 'message', avoids examining the contradictions and distinctions between various subjects, that have to be examined and understood for an interpretation of any significance to be created. Confusion, far from being cleared up, is in this way carried over into an interpretation that makes little overall sense. The question arises: do we wish for an interpretation that challenges, confronts, makes people think and rethink, or one that gives them something that possesses only the virtue of being acceptable to the sensibilities of 1996?

What I have therefore tried to do in the following discussion is examine in more detail some of the issues raised under various banners by the focus group, as well as some issues not considered by it, to try and identify what it is that the site most powerfully tells us about, and from that propose one possible scenario for interpretation, to give an idea of how the site could be imaginatively developed to give tongue to its many stories.

The first and most obvious subject that needs to be given thought are the machines themselves.

### **2.1 The Machines**

The machines are both what makes the site unique, yet also what makes interpretation of it difficult. I don't wish to dwell here on their significance, which has been established and documented by others with the appropriate expertise. I merely wish to allude to the dangers of making a fetish of the machinery as significant in itself to the exclusion of the human story that is at the heart of Eveleigh. If what we end up with—whatever the medium, be it written electronic, audio—are simply the details of the unique interior workings and mechanical job of each machine we will have an interpretation that is both dull and historically false to



the world in which the machines were made and in which the machines were made to work. A second—and related—problem is that the machinery we are left with by and large comes from one part only of that vast industrial complex that was the Eveleigh Railway Yards. So if we seek only to honour these particular machines we would be untrue to the vast world of sub-divided labour, both mechanical and human, that made up the railway yard.

