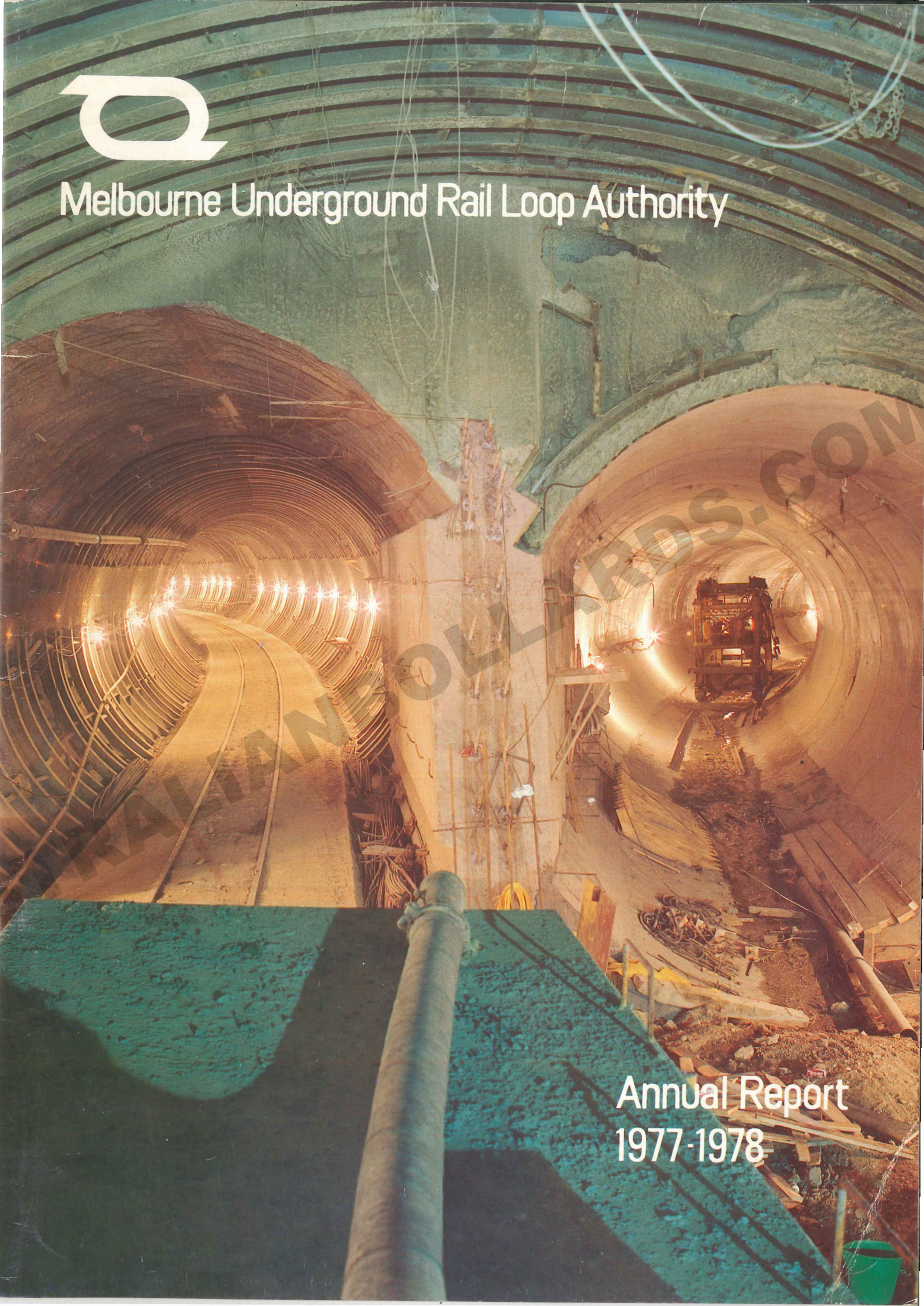




Melbourne Underground Rail Loop Authority



Annual Report
1977-1978

Front Cover

Thirty metres below Spring Street in the vicinity of the Treasury Gardens the Clifton Hill loop (left) runs towards Jolimont Station and the City Circle (right) towards Flinders Street Station. They meet at this "Y" junction. It is in the Clifton Hill loop that City Circle trains will run on a "closed circuit".

Back Cover

Experimental station finishes were installed at Museum Station for the purposes of evaluating on site the overall design, colour schemes and materials. A visual display unit was part of the presentation. Work went on simultaneously in construction of escalators to link platforms with the concourse area.

Below

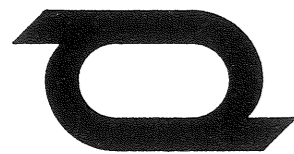
Architectural concept of an appropriate form of redevelopment for the Flagstaff Station construction worksite: opposite the historic Royal Mint building and Flagstaff Gardens, with frontages to both William and LaTrobe Streets. The main station entrance is under the William Street canopy with other entrances from LaTrobe Street and Little Lonsdale Street.



Report of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1978

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Melbourne Underground Rail Loop Authority

5th Floor
50 Queen Street
Melbourne
Victoria
Australia 3000

Postal Address
P.O. Box 258
Collins Street 3000
Melbourne

The Honorable R. R. C. Maclellan, M.L.A.
Minister of Transport,
570 Bourke Street,
Melbourne 3000.

16th October, 1978.

Dear Minister,

Pursuant to the provisions of the Melbourne Underground Rail Loop Act, 1970, we the Members of the Authority submit the following report on its operations for the year ended 30th June, 1978, together with statements of its financial transactions for that year and of its financial position as at 30th June, 1978, which, to the best of our knowledge and belief, are certified correct.

Yours sincerely,

R. B. Roscoe Chairman
I. F. Beaurepaire Member
Kenneth H. Vial Member
G. F. W. Brown Member
J. A. Allen Member
W. H. B. Daddo Member
 Kingsley A. Allen (overseas) Member

Members

- R. B. ROSCOE, Chairman
- T. P. SCOTT, Deputy Chairman to 21st March, 1978
- K. A. ALLEN
- I. F. BEAUREPAIRE, C.M.G.
- G. F. W. BROWN, C.M.G.
- W. H. B. DADDO
- W. C. S. ELLIS, O.B.E.
- A. G. GIBBS, A.O. (resigned 23rd July, 1978)
- J. A. HANCOCK, O.B.E. (from 22nd May, 1978)
- SIR KENNETH VIAL, C.B.E.

General Manager and Director of Engineering

F. G. Watson, B.A., F.I.E.Aust., F.A.I.M., M.I.E.T., M-S.A.E.-A.

Secretary and Assistant General Manager — Administration

W. L. R. Daniels, F.C.I.S., F.A.S.A.

CONSULTANTS — Engineering

John Connell-Mott, Hay & Anderson, Hatch, Jacobs (Principal Consultants)

Railway Construction Board

Victorian Railways Board

Sub-Consultants to the Principal Consultants

McIntyre, McIntyre and Partners Pty Ltd

Perrott, Lyon, Mathieson Pty Ltd

Stephenson and Turner

Riley, Barden and Kirkhope

Rider Hunt and Partners

Alan S. Porritt and Associates

Wolferstan Trower and Partners

Golder Associates Pty Ltd

Consultants — Property

George J. Connor & Associates Pty Ltd

Office and Registry

50 Queen Street, Melbourne 3000

Report of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1978

Death of Mr. T. P. Scott

The passing on 21st March, 1978, of Mr. Thomas Peat Scott, Deputy Chairman of the Authority, was an occasion of great sadness. Mr. Scott became a Member of the Authority and Deputy Chairman in 1971 and made a valuable contribution to the planning, construction and progress of the Loop project.

Preamble

In accordance with the Melbourne Underground Rail Loop Act 1970 and amendments the Authority is responsible for the supervision and co-ordination of the planning, financing and construction of an underground rail loop and ancillary works for the purpose of increasing the capacity and efficiency of the existing Melbourne suburban rail network.

The Authority is a corporate body comprising nine part-time Members, including the Chairman, appointed by the Governor in Council.

When completed the Loop will be fully integrated with the suburban rail network.

The Loop runs partly underground (through four tunnels), partly on the surface and partly elevated.

Three underground stations are being provided.

Review of Activity

Vigorous progress towards completion of all works in 1982 continued to be maintained.

By the end of the year about 90% of tunnel excavation had been completed and a significant feature of activity was a number of tunnel drives broken through, including two at the west end of Museum Station by the largest tunnelling shield ever used in Australia with a compressed air tunnelling technique.

The transition from excavation and lining of tunnels and platform tunnels to the installation of station structures for use by future train passengers, was marked by the handing over of the first platform tunnels to platform contractors and the commencement of platform installation. Progress was made in the installation of escalators at Museum Station. Experimental station finishes were installed at Museum Station. Other experimental activities included trial track systems, noise and vibration control and passenger information dissemination.

At the Overpass, the majority of the pre-stressed concrete beams were in position by the end of the year, with completion of the construction project scheduled for the end of 1978.

The first stages of operation of sections of the Loop, previously programmed from December, 1979, will be delayed until approximately October, 1980, in consequence of the cancellation of the building contract and modification of the Victorian Railways Board's new Metropolitan Train Control (METROL) building.

For 1978/79 the Authority has been authorised to borrow a further \$60 million and this has permitted the scheduling of an active construction program to the 30th June next.

In accordance with Government approval in June, 1977, negotiations with David Jones Limited, Sydney, in relation to the development of land owned by the Authority and Melbourne City Council in the Museum Station area continued and were at an advanced stage at the year's end.

No firm proposals were submitted to the Authority for the redevelopment of the Flagstaff Station area although considerable interest was shown in the site. It is anticipated that as economic conditions improve the area will attract the firm proposals necessary to proceed with orderly redevelopment. The area, comprising 0.65 hectare at the intersection of William and LaTrobe Streets is at one of the highest points in the city and centrally placed in respect to the major traffic routes leading to the principal freeway outlets and Westgate Bridge.

Construction 1977/78

The Loop comprises four underground rail tracks in separate tunnels (the Burnley, the Caulfield/Sandringham, the North Melbourne and Clifton Hill/City Circle) forming a new link (and thereby a loop and city circle) in the existing suburban rail system from east of Princes Bridge/Flinders Street Station to the north of Spencer Street Station, together with three new city stations (Parliament, Museum and Flagstaff) and a new overpass structure to carry two additional elevated rail tracks between Flinders and Spencer Street Stations.

The main works undertaken during the year were tunnelling and station construction in the underground portion of the Loop, the commencement of finishing works and construction of sub-surface booking halls at Parliament and Museum Stations, the construction of the overpass for two additional elevated tracks between Spencer Street and Flinders Street Stations, and trackwork, signalling, overhead traction wiring and structural work associated with the connections of the underground portion of the Loop to the existing surface tracks.

UNDERGROUND PORTION

Eastern Section—Flinders Street—Wellington Parade to Swanston Street via Spring and LaTrobe Streets

(a) Tunnel construction

by Codelfa-Holland Pty Ltd

- completion of the excavation of the North Melbourne loop tunnel by extension from a point beneath Exhibition Street to the junction with Museum Station.
- completion of the concrete lining of the North Melbourne loop tunnel from Parliament Station in Spring Street southwards to the railway boundary on the south side of Wellington Parade South and between Parliament and Museum Stations.
- completion of the concrete lining of the Burnley loop tunnel from a point under the Treasury Gardens to the junction with Victorian Railways property on the south side of Wellington Parade South and between Parliament and Museum Stations.
- completion of the concrete backfilling of the construction tunnel adit between the Burnley loop and North Melbourne loop tunnels under Wellington Parade and Spring Street.
- excavation of the Caulfield-Sandringham loop tunnel between Parliament and Museum Stations, and concrete lining of the section of this tunnel from Parliament Station to the ventilation shaft at the Commonwealth Centre (Spring and LaTrobe Streets).
- completion of the excavation of the Clifton Hill loop—City Circle tunnel from their junction under Spring Street (Y-Junction) northwards to Parliament Station, and from Parliament Station to a point near the corner of Russell and LaTrobe Streets.
- commencement of the concreting of the lining of the Clifton Hill loop tunnel from Wellington Parade to the Spring Street Y-Junction and of the Clifton Hill loop-City Circle tunnel northwards from the Y-Junction to Parliament Station.

- completion of the concrete lining of the Treasury Gardens ventilation shaft.
- completion of the excavation and concrete lining of the cross-passages from the upper tunnels to the North and South draught relief shafts at Parliament Station.

(b) Parliament Station construction

by Codelfa-Holland Pty Ltd

- completion of the excavation of the Caulfield-Sandringham loop and Clifton Hill loop-City Circle platform tunnels and the three connecting cross-passages and relay rooms.
- commencement of concreting of the lining of the Caulfield-Sandringham loop platform tunnel and the three cross-passages and relay rooms.

by various Government instrumentalities and other contractors

- diversion of services to make way for construction of Parliament Station south booking hall.

by John Holland (Constructions) Pty Ltd—Parliament Station Construction

- construction of piles for the support of the eastern wall of the south booking hall and commencement of pile construction for support of the booking hall roof slab.
- commencement of platform construction.

Central Section—Swanston Street to William Street via LaTrobe Street

(a) Tunnel construction

by John Holland (Constructions) Pty Ltd

- completion of the excavation and concrete lining of the two lower tunnels from the working shaft in an easterly direction below Elizabeth Street to Museum Station.
- completion of the erection of shields for tunnel excavation in the chambers under LaTrobe Street to the west of Elizabeth Street (by the Melbourne and Metropolitan Board of Works as sub-contractor).
- excavation using shields and lining with precast concrete segments of the two upper tunnels under Elizabeth Street to Museum Station. The work was carried out under the protection of compressed air by the Melbourne and Metropolitan Board of Works as sub-contractor.
- completion of the excavation and concrete lining of the Burnley loop tunnel from the working shaft in a westerly direction under LaTrobe to Flagstaff Station.
- excavation of the Caulfield loop from the working shaft in a westerly direction under LaTrobe Street to Flagstaff Station.

by Codelfa Construction Pty Ltd and Cogefar Construction Pty Ltd, Joint Venture operating under the name of "C.M.T.—Construction of Metropolitan Tunnels"

- excavation of the North Melbourne loop tunnel beneath LaTrobe Street from Flagstaff Station in an easterly direction toward Museum Station.
- excavation of the draught relief shaft in the grounds of the former Royal Mint at the east end of Flagstaff Station.

(b) Museum Station construction

by Leighton Contractors Pty Ltd

- completion of construction of the concrete structure including floor slabs, intermediate track and concourse slabs, walls and wall piers, columns, roof slabs, lift wells and the majority of the escalator declines.



(Above) A breakthrough at Flagstaff Station in the Burnley loop tunnel provided the first opening for the full length of one of the four loops around Melbourne.

(Left) Pre-cast concrete segments were used as the primary tunnel lining for sections of both the Caulfield-Sandringham and Clifton Hill loops, west of Museum Station. The tunnel air was pressurised to oppose water inflow during excavation of soft, wet ground by a tunnel shield.

(Below) Bench excavation in a running tunnel using a tracked back-hoe. About 90% of tunnel excavation had been completed by the end of the 1977/78 year.



- completion of a temporary road access ramp from the north side of LaTrobe Street to the Station's main concourse level.
- restoration of tramway tracks over the Station and partial restoration of roadway.

by Otis Elevators Pty Ltd

- continuation of manufacture of 21 escalators and 3 lifts for the Station and Booking Halls.
- commencement of installation of escalators and lifts in the Station.

by John Holland (Constructions) Pty Ltd

- commencement of the construction of booking halls and installation of architectural finishes.

Western Section—William Street to Adderley Street

(a) Tunnel construction

by Codelfa Construction Pty Ltd and Cogefar Construction Pty Ltd, Joint Venture operating under the name of "C.M.T.—Construction of Metropolitan Tunnels"

- completion of the excavation and concrete lining of the Caulfield-Sandringham loop tunnel under LaTrobe Street from Adderley Street to Flagstaff Station.
- completion of the concrete lining of the Clifton Hill loop-City Circle tunnel under LaTrobe Street from Adderley Street to Flagstaff Station.
- completion of excavation and concreting of the draught relief shaft in Flagstaff Gardens at the west end of Flagstaff Station.
- excavation of the North Melbourne loop tunnel from the Adderley Street access shaft towards Dudley Street.

(b) Flagstaff Station construction

by Codelfa Construction Pty Ltd and Cogefar Construction Pty Ltd, Joint Venture operating under the name of "C.M.T.—Construction of Metropolitan Tunnels"

- completion of the excavation and concreting of all loop platform tunnels.
- excavation and permanent decking of the sub-surface concourse beneath LaTrobe Street.
- excavation and concreting of the escalator system.

by John Holland (Constructions) Pty Ltd

- commencement of platform construction.

OVERPASS STRUCTURE FOR ELEVATED TRACKS BETWEEN FLINDERS STREET AND SPENCER STREET STATIONS, NECESSITATED BY LOOP OPERATION

by John Holland (Constructions) Pty Ltd

- continuation of construction of the overpass structure for the two additional tracks between Spencer Street and Flinders Street Stations including erection of piers and the casting and erection of post tensioned reinforced concrete beams.

by various government instrumentalities

- continuation of services to facilitate construction of the overpass.

APPROACHES FROM SURFACE TRACKS TO UNDERSTREET TUNNELS

by Victorian Railways Board

(a) between Flinders Street and Richmond Stations.

- further re-arrangement of trackwork and signalling.
- construction of closure box tunnel sections for the Burnley loop except for two roof deck sections left open for access purposes.
- commencement of box tunnel sections and ramps for the second Caulfield tunnel between the Y-Junction and Richmond Station.

(b) Flinders Street east yard.

- construction of the City Circle box section tunnel and ramp, removal of bridging and shoring, and reconstruction of a portion of the bridge abutment in Wellington Parade South.

(c) between North Melbourne Station and Dudley Street bridge

- further construction of the west box tunnel and ramp at the junction of the North Melbourne loop.

(d) between Spencer Street and Adderley Street

- completion of construction of the box tunnels for the Burnley loop and Clifton Hill loop-City Circle and further construction of box section tunnel for the Caulfield-Sandringham loop.
- completion of construction of dual ramps from Spencer Street Station to the Burnley loop and Clifton Hill loop-City Circle.
- further re-arrangement of trackwork, overhead power lines and signalling in the Spencer Street yard to facilitate construction work.
- fitting out of a new signal control room north of Spencer Street Station.

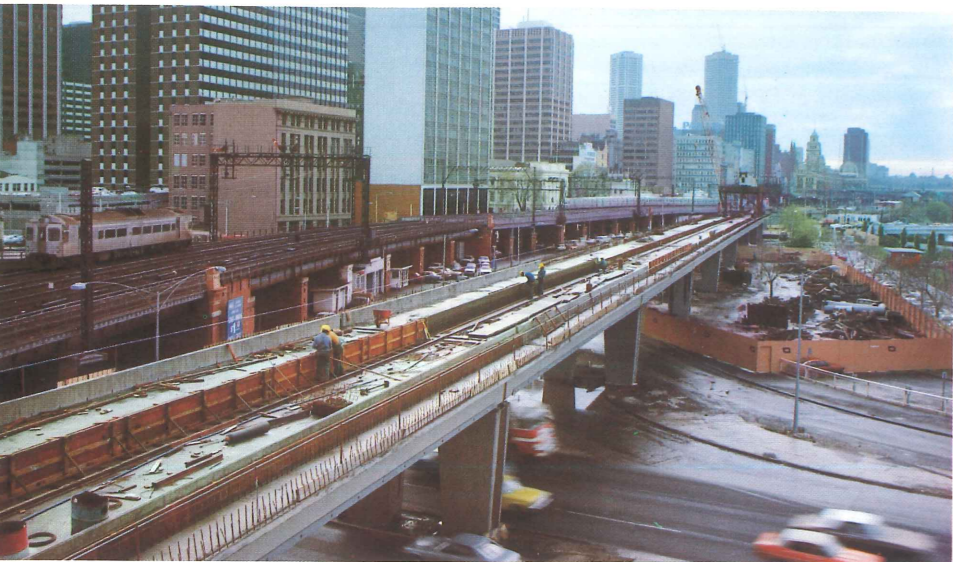
(e) In Spencer Street Station area

- further remodelling of platform 9/10 for through island operation and commencement of construction of access stairway, passenger subway, complementary alterations to tracks, overhead power lines, signalling and verandahs.
- completion of the re-arrangement of the parcels handling facilities necessitated by the remodelling of platforms 9/10 at Spencer Street Station.

Construction Status at 30th June, 1978

Clifton Hill Loop and City Circle

- The ramp and box section tunnel for the Clifton Hill loop adjacent to and under Wellington Parade—structure completed.
- Circular tunnel for Clifton Hill loop from Wellington Parade to the Clifton Hill loop-City Circle junction in Spring Street (Y-Junction)—excavated and partly concrete lined.
- box section tunnel and ramp in Flinders Street East yard completed.
- The ramp and box section tunnel for the City Circle tunnel east of Princes Bridge Station leading under the existing Clifton Hill lines—structure completed.
- Circular tunnel for City Circle from Wellington Parade South bridge to the Spring Street Y-Junction—structure completed.



The provision of two additional elevated tracks between Spencer Street and Flinders Street Stations is a vital link in the MURLA project. The Overpass structure is 722 metres long and passes over five principal traffic routes. (Top) Overpass construction continues from beams already positioned. (Above) Overpass approaching completion. The existing viaduct is on the left with city buildings in the background. (Right) With an average length of 30 metres and weighing up to 290 tonnes, Overpass beams are positioned by launch girder winches with remote control.

Box section tunnels are built by "cut and cover" under operating railway tracks. Circular tunnels which run under city streets are constructed by mining methods. A special collar links them. (Below) Two views of the transition from box tunnels to circular tunnels near Adderley Street.



- Circular tunnel from and including Spring Street Y-Junction to the south end of Parliament Station—excavated and partly concrete lined.
- Circular tunnel from Parliament Station to Museum Station—67% fully excavated.
- Circular tunnel from Museum Station to Flagstaff Station—section under Elizabeth Street excavated.
- Circular tunnel from Flagstaff Station to Adderley Street completed.
- Box tunnel under the Spencer Street yards completed.
- Ramp connection from the box tunnel to Platform 9, Spencer Street Station—completed.

Burnley Loop

- Ramp near the corner of Jolimont Road and Brunton Avenue, and the box tunnel under the Flinders Street railway yards—completed (except for an access opening in the roof of two boxes).
- Circular tunnel from Wellington Parade South to Parliament Station completed.
- Circular tunnel from Parliament Station to Museum Station completed.
- Circular tunnel from Museum Station to Flagstaff Station completed.
- Circular tunnel from Flagstaff Station to Adderley Street completed.
- Box tunnel under the Spencer Street yards completed.
- Ramp connection from the box tunnel in Spencer Street yards to platform 10, Spencer Street Station—completed.

Caulfield-Sandringham Loop

- The Sandringham ramp and the Caulfield-Sandringham Y-Junction near the Melbourne Cricket Ground are both complete.
- Box section tunnel and ramp for Caulfield connection between the Y-Junction and Richmond Station—shoring 50% completed, excavation 35% completed and concreting commenced.
- Circular tunnel from the railway boundary at Wellington Parade South to Parliament Station fully excavated and 84% concrete lined.
- Circular tunnel between Parliament Station and Museum Station fully excavated and 35% concrete lined.
- Circular tunnel from Museum Station to Flagstaff Station—95% excavated.
- Circular tunnel from Flagstaff Station to Adderley Street—completed.
- Box tunnel under the Spencer Street yards—85% completed.

North Melbourne Loop

- Circular tunnel from the railway boundary on the south side of Wellington Parade South to Parliament Station—structure complete.
- Circular tunnel from Parliament Station to Museum Station—structure complete.
- Circular tunnel from Museum to Flagstaff Stations—27% completed and a further 40% excavated.
- Circular tunnel from Flagstaff Station to Adderley Street—completed.
- Circular tunnel from Adderley Street to Dudley Street—90% excavated.
- box tunnels for the western branch connection with existing tracks at North Melbourne—completed.
- ramp for western branch—shoring completed, excavation 95% completed, concrete 60% completed.

Parliament Station

- North Melbourne loop platform tunnel—fully excavated and concreted.
- Burnley loop platform tunnel—fully excavated and concreted, and platform construction has commenced.
- Caulfield-Sandringham loop platform tunnel—fully excavated and concrete lining commenced.
- Clifton Hill loop and City Circle platform tunnel—fully excavated.
- Lower relay rooms—structures completed.
- Lower platform cross-passage—structure completed.
- Upper relay rooms—fully excavated and lining commenced.
- Upper cross-passage—fully excavated and lining commenced.
- Escalator declines, machine rooms, and concourses at platform levels—structures completed.
- Lift shaft—structure completed.
- North and South draught relief shafts—excavated and 90% concrete lined.
- All major underground services diverted around the structure of South Booking Hall.
- South Booking Hall—piling for support of the eastern wall is complete and 30% of the piles for roof slab support constructed.

Museum Station

- Concrete structure under street—97% completed.
- Tramway re-instated.
- Roadworks in LaTrobe Street—75% completed.
- Escalators and Lifts—shop assembly 36% completed, installation 17% completed.
- Booking halls—east entrance excavation 45% completed, north entrance excavation 10% completed.
- architectural finishes and station services commenced.

Flagstaff Station

- All loop platform tunnel structures completed.
- Excavation of sub-surface concourse—70% completed.
- Escalator system west—excavation 85% completed, concreting 75% completed.
- Escalator system east—excavation 60% completed, concreting 50% completed.
- West Draught relief shaft—structure completed.
- East Draught relief shaft commenced.

Overpass Structure for elevated tracks

- foundations—completed.
- piers—97% completed.
- beams—36 (of a total of 44) concrete beams cast and pre-stressed and 34 erected.

- special plant and equipment for lifting, transporting and placing bridge beams—fully mobilised.
- strengthening of end vault adjacent to Queens Bridge to accommodate two additional railway tracks—95% completed.

Ancillary works

- Emergency exit from Caulfield-Sandringham box tunnel located at the corner of Brunton Avenue and Jolimont Road—structure completed.
- New "E" Signal Box—constructed, equipped and commissioned.
- Treasury Gardens ventilation shaft and cross-passages—structure completed.
- ventilation shaft at Commonwealth Centre excavated and concrete lining commenced. Three of the four ventilation cross-passages excavated and concreted.
- new parcels subway access to platform 9/10 at Spencer Street Station—completed and construction of new passenger access commenced.
- new parcels handling facilities—completed.
- rearrangement made of gantry crane loading area, Spencer Street.
- new overhead structures provided to suit altered and additional trackwork for loop operations in Flinders Street West Yard.
- also building construction commenced by V.R.B. for a new Metropolitan Train Control Centre—METROL—at Batman Avenue, partly financed by the Authority.

Construction Program 1978/79

UNDERGROUND PORTION

Eastern Section

(a) Tunnels

- complete the box tunnel construction of the Caulfield-Sandringham loop across the access opening in the Flinders Street yards.
- continue the Caulfield ramp and box tunnel near the Melbourne Cricket Ground.
- complete concrete lining of the Caulfield-Sandringham tunnel from Parliament Station to Museum Station.
- complete excavation and concrete lining of the Clifton Hill loop-City Circle tunnel between Parliament and Museum Stations.
- complete lining of the Commonwealth Centre ventilation shaft.

(b) Services

- commence installation in the running tunnels of: concrete support for track; pumps and discharge pipework for tunnel drainage; fire mains; compressed air piping; support brackets for all tunnel services; and cables for power, lighting, signalling, television monitoring, public address system, control and monitoring system and train information.

(c) Parliament Station

- complete concrete lining of the upper level platform tunnels.
- complete platform construction in the Burnley, North Melbourne and Caulfield-Sandringham loop platform tunnels.
- commence construction of secondary structural work in the south escalator tunnels and platform concourses at upper and lower levels.
- complete piling and roof slab construction for the south booking hall and commence excavation below roof slab.

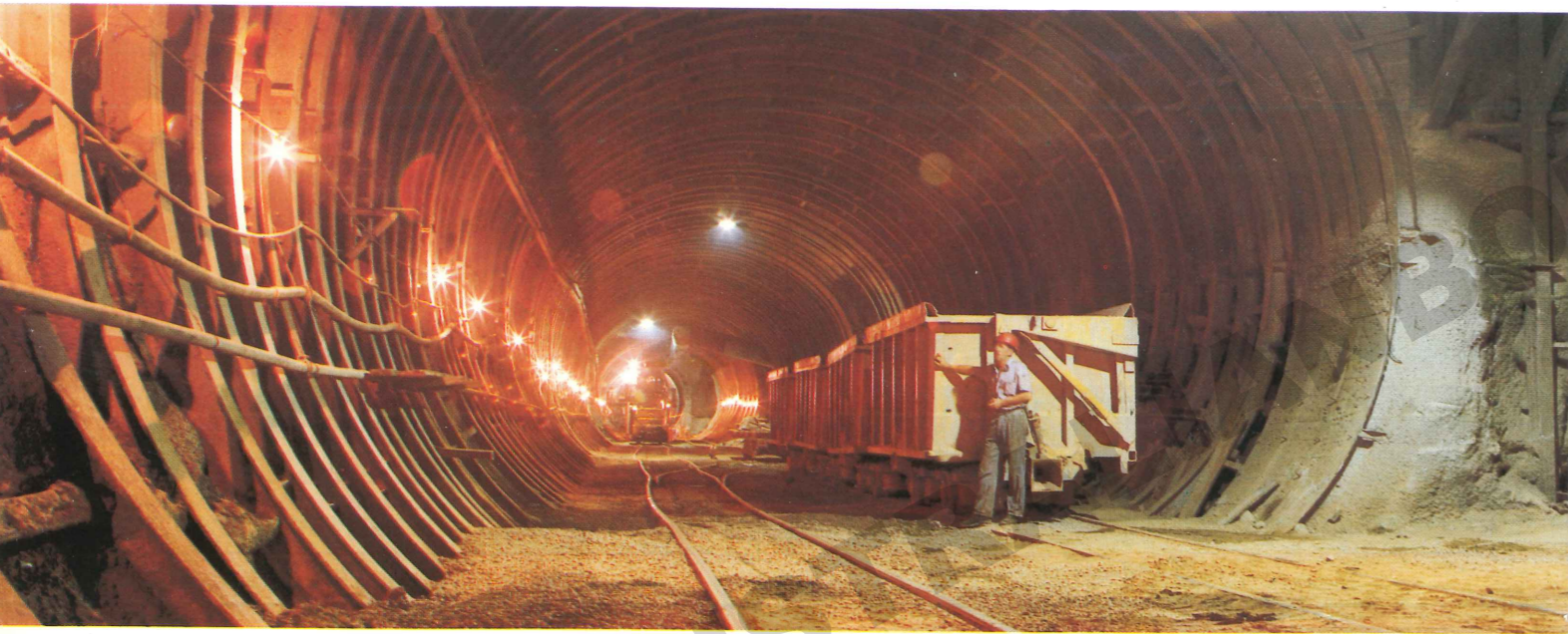
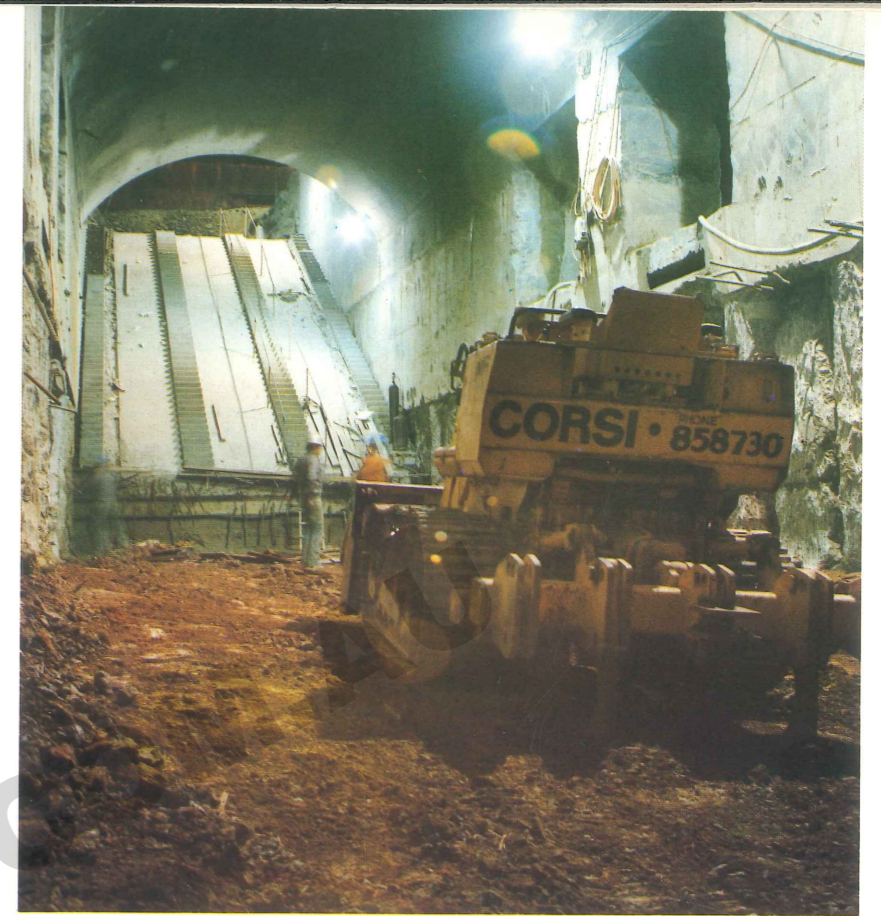


Parliament Station is steadily taking shape under Spring Street near Parliament House. During the year work was begun on construction of a booking hall for the southern entrance of the station. (Left) Pile installation opposite the Hotel Windsor. (Below) A temporary rail track provides access for a work train to a station platform area.

Museum Station has been built by the "cut and cover" method, involving diversion of trams and vehicles in LaTrobe Street, between Swanston and Elizabeth Streets. (Bottom left) Restoration of the roadway above the underground station enabled trams and east bound traffic to return

to their original alignment. Restoration of west bound traffic will follow. (Bottom right) Installation of two of the 21 station escalators, to be supplemented by three lifts.

Flagstaff Station has required special construction methods because of ground conditions. Construction is proceeding to schedule. (Right) Making provision for escalators between platform and concourse areas. (Below left) Preparation for the installation of a pre-cast concrete platform, with a rail track to be laid on the right. (Below right) A platform tunnel viewed from one of the four running tunnels.



Central Section

(a) Tunnels

- complete the construction of the Caulfield-Sandringham, and North Melbourne loop tunnels between Museum and Flagstaff Stations.
- proceed with the construction of the Clifton Hill loop-City Circle tunnel from Elizabeth Street to Flagstaff Station.
- commence the construction of a ventilation shaft approximately mid-way between Flagstaff and Museum Stations.

(b) Services

- commence installation in the running tunnels of: concrete support for track; pumps and discharge pipework for tunnel drainage; fire mains; compressed air piping; support brackets for all tunnel services; and cables for power, lighting, signalling, television monitoring, public address system, control and monitoring system and train information.

(c) Museum Station

- complete construction of Museum Station structure and reinstatement of roadworks in LaTrobe Street.
- continue with manufacture and installation of escalators and lifts.
- complete structure at the south west corner of Swanston and LaTrobe Streets for the east entrance, the booking hall and the plant room for electrical and ventilation equipment.
- complete structure for the entrance on the north side of LaTrobe Street between Elizabeth Street and Swanston Street.
- continue installation of architectural finishes and station services.
- commence structure at the south east corner of Elizabeth Street and LaTrobe Street for the west entrance and booking hall (to be integrated with redevelopment).

Western Section

(a) Tunnels

- complete excavation of the circular section of the North Melbourne loop tunnel to near Dudley Street.

(b) Services

- commence installation in the running tunnels of: concrete support for track; pumps and discharge pipework for tunnel drainage; fire mains; compressed air piping; support brackets for all tunnel services; and cables for power, lighting, signalling, television monitoring, public address system, control and monitoring system and train information.

(c) Flagstaff Station

- complete excavation and construction of Flagstaff Station main understreet structure.
- continue construction of the draught relief system at the east end of the Station.

APPROACHES FROM SURFACE TRACKS TO UNDERSTREET TUNNELS

- continue construction of the second Caulfield box section tunnel and ramp between the Y-Junction and Richmond Station.
- continue construction of the west ramp leading from North Melbourne Station into the North Melbourne loop.
- complete Caulfield-Sandringham box section tunnels in the Spencer Street railway yards.
- commence construction of Caulfield-Sandringham ramp in the Spencer railway yards.

OVERPASS STRUCTURE FOR ELEVATED TRACKS

- complete construction of the overpass structure to provide for two additional tracks between Spencer Street and Flinders Street Stations.
- rearrange trackwork in the overpass junction area to provide for loop operation.

Ancillary Works

- continue with installation of equipment required for loop operation in the new No. 2 Signal Control Room at the north end of No. 13/14 platform, Spencer Street Station.
- complete overhead structures associated with the rearrangement for loop working of trackwork in the "A" Box junction area between the west of Flinders Street Station and the end of the overpass.
- commence construction of substations on the south side of Wellington Parade and the south end of Adderley Street.
- commence construction of fan structure at top of the Commonwealth Centre ventilation shaft.

Planning

The Program—which provides for the completion of all works on the loop in 1982—is necessarily under constant review.

The cessation of all work on the Victorian Railways Board's new Metropolitan Train Control (METROL) building in Batman Avenue in June and the subsequent decisions of the Board, with the agreement of the Government, the Melbourne City Council and the Melbourne and Metropolitan Board of Works, to demolish part of the new structure and to re-plan and modify the design and construction will result in later occupation of the building for the computer based train describer system which is required for the safe and efficient working of trains in the underground tunnels. Based on preliminary information (which has become available since the end of the year under review) it is not expected that the Burnley loop and Museum Station will be available for operation before at least October, 1980.

Tests continued on systems of track supports, control of noise and vibration in train running, reduction of stray-currents emanating from the traction power system, a train describer system for the monitoring and control of train movements, provision of passenger information, and the suitability of various station finishes.

Industrial Relations

Industrial action which affected the Loop project represented about 3.3% of total work time available.

Of this, over 90% resulted from industrial action outside the control of the Authority's contractors.

ction, strong emphasis is placed on safety. The Authority, Principal contractors operate a continuing and purposeful safety program. A employed by each major contractor.

e, as measured by frequency and severity rates, continued to improve r.

ouncil continued its active involvement in furthering safety on the

courses in safety for supervisors was conducted during the year. s were presented to each supervisor who completed the course. This ued.

n the form of posters was prepared and issued on all sites. The themes se posters highlighted problem areas of operations peculiar to the

nd performance awards continued to attract considerable interest, with ment in overall standards.

ined with numerous groups associated with safety, with a free s and information which benefitted the Loop project.

M.I.M. Holdings Limited) provided generous co-operation and g a visit to Melbourne by a senior executive to address the Loop ail on mine safety. Engineers from the Loop project later visited Mount dy of on-site safety techniques.

ce to Treat was served on the owners of land in Spring Street located d Little Collins Streets and known as 85-91 Spring Street for the front erty required for the construction of an entrance to the south booking tation.

ong standing claims for compensation for acquisition of station and involving substantial sums of money, was negotiated during the year. e effected before June 30 in one case and final payment on the other is the new financial year.

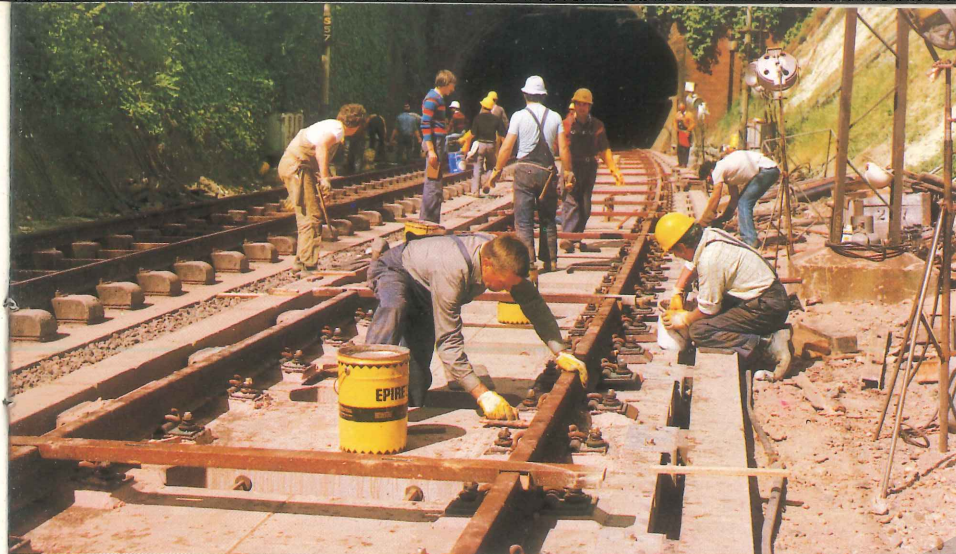
Development

rea

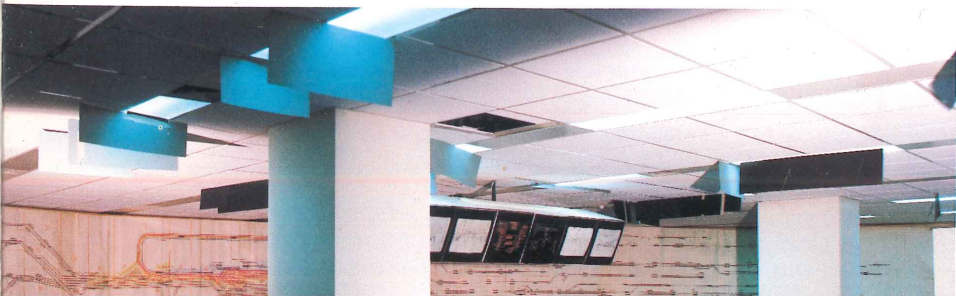
Annual Reports for 1975/76 and 1976/77, detailed information was urse of planning for the redevelopment of the properties owned by the Melbourne City Council based on Governmental approval for negotiations David Jones Ltd as both developer and occupier. This company had aving the necessary expertise to plan, construct and manage the type mended by the Consultants engaged by the State Government to ment of the area.

maintained during the year aimed at reaching an acceptable basis of en the parties. At the year's end progress was at an advanced stage.

rea



(Top left) Laying experimental sections of rail track for test purposes. (Upper left) A photographic display of MURLA activity mounted in Queen's Hall, Parliament House. (Left) Presentation of a Safety Award by MURLA Chairman, Mr. R. B. Roscoe, to the Manager—Construction and Plant, Codelfa Cogefar, Mr. B. O. Puncher, on behalf of a tunnelling gang. (Lower left) Mock-up of the section of Metrol which will monitor the position of — and control of — all trains on the suburban rail network including the underground rail loop. (Above) Equipment for noise control research in an underground tunnel. (Below) A blessing for the Full Face Tunnel Boring Machine ("Mole") before its final assignment: excavation of the Clifton Hill loop between Parliament and Museum Stations.



Information Services

Information services have been maintained since the Authority's inception. Facilities are provided at the Authority's office, 5th Floor, 50 Queen Street, Melbourne; at the site office of Museum Station, 204 LaTrobe Street; and a lecture and display centre at the Flagstaff Station site, 462 Little Lonsdale Street.

With the time for the running of the first train through the loop becoming closer there is evidence of heightened interest by the community in general in construction progress and the effect which the Loop will have on travel patterns and overall city development.

Enquiries throughout the year were continuous.

Students at all levels from primary to tertiary were particularly anxious to obtain information, much of it directed at specialist aspects required in individual study programs. Lecture, film screening and question time sessions were provided at Flagstaff site, by arrangement, for students of Form 3 standard and above.

Talks and lectures were given to professional and business groups and to members of service clubs and special interest societies.

The Authority's second colour film "Action Loop", accepted for commercial distribution by 20th Century Fox, received wide screening.

Loans of 16 mm copies were made to registered borrowers through the State Film Centre and to other groups through a commercial distributor. Several copies of the film are permanently resident with the Education Department of Victoria.

Static displays, principally involving coloured photographs of activities, were placed in several locations including Queens Hall at Parliament House, the Stock Exchange of Melbourne, the Government Pavilion at the Royal Agricultural Show and at the Silver Jubilee Train, Spencer Street Station.

Media liaison enabled consistent coverage of news and general items in the daily media, radio and television programs, magazines and journals.

The nature of construction precludes visits by the public except on special occasions. Over a two day period at the end of October two "open days" were arranged which permitted the first general inspection of circular tunnels under Melbourne streets. Among the 16,000 visitors who attended there was a high proportion of young family groups.

Visitors to the project during the year included His Excellency Sir Henry Winneke, Governor of Victoria; The Honorable R. J. Hamer, Premier of Victoria; The Lord Mayor of Melbourne, Cr. I. Rockman; and Parliamentary Members from both Houses of the Legislature.

Finance

Loans

Borrowings by the Authority in 1977/78 amounted to \$60,500,000 comprising \$51,000,000 of Inscribed Stock (the amount of the loan allocation) and \$9,500,000 of temporary accommodation pursuant to determinations by the Treasurer under Section 20 of the Melbourne Underground Rail Loop Act.

All of the borrowings were privately arranged. Again the Inscribed Stock was placed mainly with the Savings Banks, Insurance Companies and Superannuation Funds. The temporary accommodation was procured from banking and money market sources.

The Inscribed Stock issued during the year, the total Inscribed Stock issued to the 30th June, 1978, and the amounts of Inscribed Stock outstanding as at that date at the various interest rates applicable thereto are shown in the following table:

Rate % P.A.	Issued		Outstanding at 30/6/78
	During 1977/78	To 30/6/78	
	\$	\$	\$
11.0	7,465,000	13,875,000	13,832,636
10.9	6,750,000	7,350,000	7,350,000
10.8	15,000	15,000	15,000
10.7	2,550,000	13,580,000	13,532,500
10.6	6,850,000	20,661,000	20,661,000
10.5	—	34,845,000	34,349,545
10.4	17,352,300	17,386,300	17,386,300
10.35	—	612,000	612,000
10.3	10,017,700	26,672,700	26,498,421
10.1	—	1,000,000	1,000,000
9.9	—	600,000	588,426
9.85	—	5,508,000	5,504,250
9.8	—	2,600,000	2,600,000
9.5	—	50,000	50,000
8.9	—	1,020,000	1,020,000
8.7	—	4,990,000	4,990,000
7.4	—	11,305,000	10,957,095
7.3	—	1,688,100	1,651,850
7.15	—	25,000	25,000
7.1	—	3,170,000	3,070,000
7.0	—	41,900	41,900
6.9	—	570,000	570,000
6.7	—	10,000	10,000
6.6	—	50,000	50,000
6.4	—	7,250,000	7,002,709
6.3	—	1,000,000	987,500
6.2	—	3,150,000	3,100,000
6.0	—	1,000,000	NIL
5.7	—	100,000	NIL
		<u>\$51,000,000</u>	<u>\$180,125,000</u>
			<u>\$177,456,132</u>

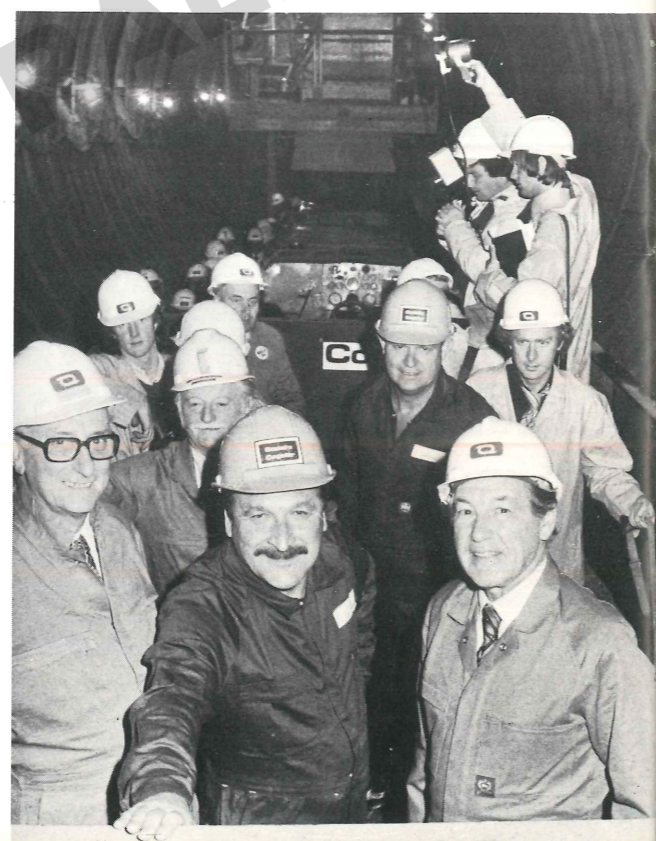
Other borrowings of the Authority at the 30th June, 1978, comprised an advance from the State Government's Works and Services Account of \$1,973,595, short term advances under Section 20 of the Melbourne Underground Rail Loop Act, \$13,500,000, and advance subscriptions for Inscribed Stock, \$100,000.

The Inscribed Stock outstanding at the 30th June, 1978, matures as follows:

Year Ending	\$
June 1979	2,881,549
1980	3,894,263
1	19,168,558
2	9,462,664
3	12,640,290
4	9,524,985
5	14,766,488
6	23,409,115
7	7,011,938
8	27,063,492
9	3,207,029
1990	3,131,485
1	2,645,326
2	15,823,890
3	7,958,273
4	6,016,111
5	1,633,174
6	702,298
7	224,130
8	109,074
2005	250,000
7	250,000
8	150,000
11	100,000
12	1,550,000
13	2,300,000
14	582,000
16	500,000
18	500,000
	<u>\$177,456,132</u>



(Top left) His Excellency the Governor, Sir Henry Winneke, with the Hon. F. J. Granter (at that time Acting Minister of Transport), and the Chairman and Members of the Authority visited construction sites during August. (Left) MURLA Chairman, Mr. R. B. Roscoe — right — with the Premier of Victoria, the Hon. R. J. Hamer, Vic-Rail Chairman, Mr. A. G. Gibbs and VicRail General Manager, Mr. I. G. Hodges at the unveiling of a plaque on an abutment of the Overpass in Flinders Street Extension. The plaque commemorated early settlers John and Eliza Batman whose house stood nearby. (Lower left) Local and overseas principals of the Authority's Principal Consultants make periodic visits to inspect Loop progress. (Bottom left) The first opportunity for members of the public to walk through circular tunnels under Melbourne streets was provided during two open days in October 1977, with an estimated attendance of 16,000. (Above) Members of the media representing press, radio and television, boarded a work train for an under-street inspection of construction. (Below) "Riding the rattler" to look at construction activity: the Premier (right); Managing Director of Codelfa Cogefar (Mr. Mario Del Favero); MURLA Chairman; Mr. John Connell; the Chairman of Codelfa Construction (Mr. R. L. Johnson); and members of an inspection group.



When the amounts provided by way of Sinking Fund are insufficient to redeem the maturing loans, it is usual for additional loan allocation to be granted to refinance them.

Temporary Financial Accommodation

The Authority continued to enjoy overdraft and substantial standby facilities with Banks. No recourse to the standby arrangements was necessary during the year.

Investment of Unused Funds

The Treasurer of Victoria has authorised the Authority to invest in a wide range of securities, any moneys held by it, which are not part of any sinking fund provided by the Authority for the purpose of redeeming loans, and are not for the time being required for the purpose of its Act. However, within the range of authorised investments, the Authority has continued to invest temporarily funds which are not immediately required, mainly with subscribers to the Authority's loan issues or their affiliated "official market" companies.

Treasurer's Determination ("Loan Redemption Payments")

As required by the Act and in accordance with a Determination made by the Treasurer of Victoria, the Authority duly received the following contributions to loan redemptions and interest on loans.

From City of Melbourne	\$1,500,000
Melbourne & Metropolitan Board of Works	2,250,000
Victorian Railways Board	1,797,580
Consolidated Fund	10,412,000

Interest earned by the Authority is deducted from interest payable by it in the calculation of the "Loan Redemption Payments".

No amount was required to be paid in the year to the Authority for the purpose of defraying administrative expenses.

The amounts contributed by the City of Melbourne and the Melbourne & Metropolitan Board of Works to the Authority's "Loan Redemption Payments" represented 10% and 15% respectively of the amount of the Treasurer's Determination.

The City of Melbourne and the Melbourne & Metropolitan Board of Works are not required to contribute to "loan redemption payments" which relate to loans raised to finance the purchase of land to the south of the Museum Station site fronting Elizabeth Street, Little Lonsdale Street and St. Francis Street North acquired only for redevelopment.

Proposed Borrowings for 1978/79

For 1978/79 the Authority has been authorised to borrow \$62,035,000 (of which \$2,035,000 is to replace maturing loans) by way of issues of Inscribed Stock or Debentures. This sum represents approximately 15.68% of Victoria's total allocation for semi-government issues in the year for new works and is a larger share of the State's allocation than any previously granted to the Authority.

Due to the excessive concentration of semi-government borrowings in the first quarter of the new financial year by way of underwritten public issues the Authority anticipates more difficulty in arranging its private loan borrowings than in previous years. It is expected that in 1978/79 it will be necessary from time to time to have recourse to temporary accommodation under Treasurer's Determinations, pending the absorption of such funds into Inscribed Stock or Debentures.

Most of the amount which the Authority may borrow in 1978/79 is required to meet commitments under contracts which have already been let.

Expenditure

The Authority's expenditure for the year on Loop works, other fixed assets and administrative expenses amounted to \$55,168,695. Total expenditure to date for the same items is \$197,632,838.

Interest payable, less interest receivable, amounted to \$15,707,479 for the year and totals \$36,330,121 to the 30th June, 1978.

Proposed Expenditure 1978/79

The total expenditure proposed by the Authority in 1978/79 is \$86.5 million including interest and redemption payments of \$22.2 million.

Revised Construction Cost

The revised construction cost estimate of the basic plan adopted by the Authority in 1972 (then estimated as \$117.23 million at last quarter 1971 prices) is \$252.7 million updated to June, 1978, prices. This excludes land acquisition, signalling and communications, and administrative and service costs including consultancy fees. The revised basic construction cost includes the cost of technical improvements including a high quality track support system to minimise vibrations transmitted through the ground to nearby buildings.

Within the provisions of the Melbourne Underground Rail Loop Act 1970, as amended, various changes have been made progressively to the scope of the project which was adopted in 1972. Such changes, not previously summarised, include an extra ramp for trains to enter the Caulfield-Sandringham lines tunnel at Jolimont, a second stage access and booking hall for Parliament Station, a second stage access and booking hall within Flagstaff Station and multiple entrances and booking hall arrangements at Museum Station. The cost of these items, together with the cost of land acquisition, signalling and communications and administrative and service costs including consultancy fees, updated to June, 1978, prices, is estimated to be \$114.3 million.

The total estimate, as updated to June, 1978, is \$367 million.

Acknowledgements

The assistance and advice given by The Honorable J. A. Rafferty, M.P., and the officers of the Ministry of Transport were of great value to the Authority. Appreciation is also expressed for the ready co-operation of officers of the Treasury, other Government Departments and Instrumentalities, and the Melbourne City Council.

John Connell-Mott, Hay & Anderson, Hatch, Jacobs, the Authority's Principal Consultants; sub-consultants and research organisations; the Victorian Railways Board; the Railway Construction Board; and professional and legal advisers including the VicRail legal section, all contributed in valuable ways to the furtherance of the Authority's objectives.

The financial support readily given by lending institutions enabled the works program to proceed according to schedule and warm thanks are expressed for this assistance.

The contribution of the officers of the Authority is gratefully acknowledged.

Senior Officers

F. G. Watson, BA, FIEAust, FAIM, MIET, M-SAE-A

General Manager and Director of Engineering

W. L. R. Daniels, FCIS, FASA

Secretary and Assistant General Manager—Administration

J. W. Anderson, BE, MIEAust

Assistant Executive Engineer, Electric Power, Signals & Communications

M. Armstrong, AASA, ACIS, AAIM

Manager, Accounting and Contracts Administration

G. G. Bennett, BCE, MIEAust, MICE

Executive Engineer, Railway Activities

J. C. Davey, AASA, ACIS

Manager—Administration & Assistant Secretary

T. J. Dwyer, BA, AFAIA(Dip)

Information Services Officer

M. C. Healy, BME, FIEAust, FIArbA, AMAIMM

Chief Manager, Works and Contracts

C. Davidson Johnstone

Manager, Property Division

J. Skopakow, Dip Arch

Executive Architect & Assistant Manager, Architectural Contracts

E. G. Terry, BE, MIEAust

Executive Engineer, Structures & Buildings

M. F. R. Thomson, Dip EE, Dip MechE MIEAust

Executive Engineer, Electric Power, Signals & Communications

R. A. Wegener, ED, BE, MIEAust, AMAIMM

Senior Executive Engineer & Executive Engineer, Tunnels

Statement of Financial Position

As at 30th June 1977		As at 30th June 1978
\$	\$	\$
	Fixed Assets—See Note 1	
120,128,612	Loop Development Account—See Note 2	173,341,050
120,744	Plant	120,851
101,706	Office Furniture Fittings & Equipment	88,154
6,609	Motor Vehicle	6,609
6,101,014	Land Acquisitions & Expenses Section 30A	6,106,380
13,281,304	" " " Other—See Note 3	14,515,914
		20,622,294
139,739,989		194,178,958
	Investments—Inscribed Stock, Fixed Deposits & Bonds	
545,678	Sinking Fund—See Note 6	935,299
—	Staff Retirement Fund	33,061
545,678		968,360
	Currents Assets	
2,704	Cash at Bank and on Hand	145,687
5,000	Investments—Short Term	5,000
38,125	Accrued Interest Receivable	45,442
423,636	Prepayments	281,271
—	Sundry Debtors	200,000
469,465		677,400
	Intangibles—Capitalised Costs	
2,724,154	Administrative Expenses—See Note 4	3,453,880
20,622,642	Interest (Net)—See Note 5	36,330,121
490,035	Contributions to Sinking Fund	803,435
23,836,831		40,587,436
164,591,963		236,412,154
	Less	
	Current Liabilities	
2,069,906	Bank Overdraft	2,000,000
4,000,000	Short Term Advances—Section 20	11,500,000
1,215,000	Inscribed Stock Applications	100,000
3,198,914	Sundry Creditors	871,390
3,205,606	Accrued Interest Payable	4,294,508
32,375	Contractors' Deposits	20,000
13,721,801		18,785,898
	Reserves	
545,678	Sinking Fund Reserve	935,299
—	Staff Retirement Fund	33,061
14,267,479		968,360
\$150,324,484		19,754,258
	SOURCE OF FUNDS	
	Contributions—Pursuant to Sections 25 & 26	
	To Loan Redemption Payments	
5,148,373	Victorian Railways Board	6,945,953
3,396,124	City of Melbourne	4,896,123
3,853,624	Melbourne & Metropolitan Board of Works	6,103,624
6,676,373	Consolidated Fund	17,088,373
19,074,494		35,034,073
56,975	To Administrative Expenses	
	Victorian Railways Board	56,975
2,137,121	For Capital Works	
	Victorian Railways Board	2,137,121
21,268,590		37,228,169
	Loans	
127,074,813	Secured by Inscribed Stock	177,456,132
1,981,081	Works and Services Account	1,973,595
129,055,894		179,429,727
\$150,324,484		\$216,657,896

Statement of Financial Transactions for the year ended 30th June, 1978

	\$	\$
Funds available to the Authority:—		
Contributions—Pursuant to Sections 25 & 26		
Victorian Railways Board	1,797,580	
City of Melbourne	1,500,000	
Melbourne & Metropolitan Board of Works	2,250,000	
Consolidated Fund	10,412,260	
		15,959,840
Borrowings		
Inscribed Stock	51,000,000	
Short Term Advances	9,500,000	
		60,500,000
Interest—Receivable on Investments		985,008
		\$77,444,848
These Funds were applied as follows:—		
Capital Expenditure		
Works	43,834,694	
Advances to Contractors	1,354,013	
Consultancy	6,427,265	
Insurance	1,469,270	
Property Acquisition and Expenses	1,239,976	
Sundry	113,751	
		54,438,969
Administrative Expenses		729,726
Loans		
Interest	16,692,487	
Reductions—Inscribed Stock	626,168	
—Short Term Advances	2,000,000	
Sinking Fund Contributions	313,400	
		19,632,055
Decrease in Current Liabilities		2,435,903
Increase in Current Assets		207,935
Short Fall Loan Redemption Contributions (to be adjusted 1978/79)		260
		\$77,444,848

Notes to and forming part of the Accounts for the year ended 30th June, 1978

Note 1

Fixed Assets are shown at cost. No provision is made for Depreciation.

Note 2

Loop Development Account includes advances to contractors on account of future works of \$3.84 million.

No provision has been made for the value of work which may have been done by contractors but which had not been certified by the Authority's Consultants (as "Engineer" under the Contracts) as at 30th June, 1978.

Notes to and forming part of the Accounts for the year ended 30th June, 1978 (continued)

Year Ended 30/6/77 \$

Year Ended 30/6/78 \$

Note 3

The Authority has taken possession of certain land for which it has not reached agreement as to the amount of compensation payable. The value of that land and provision for such compensation are not included in the Statement of Financial Position.

Note 4

Administrative Expenses

The expenditure for the year was as follows:—
Salaries and Allowances
Other Administrative Expenses

372,836
302,487
\$675,323

398,120
331,606

\$729,726

Note 5

Interest

The net expenditure for the year was as follows:—

Paid and Payable
—on loans raised to finance the purchase of property acquired under Section 30A
—on other borrowings
Less Interest Received and Receivable

298,283
10,001,201

15,912,777
985,008

779,710

14,927,769

\$10,299,484

\$15,707,479

Note 6

Sinking Fund

Contribution
Interest Received

196,375
31,047
\$227,422

313,400
76,221

\$389,621

M. Armstrong

M. ARMSTRONG,
Acting Secretary for Corporate Affairs.

Audit Certificate

The books and accounts of the Melbourne Underground Rail Loop Authority for the year ended 30th June, 1978, have been audited.

In my opinion the accounts are properly drawn up so as to exhibit a true and fair view of the financial position of the Authority as at 30th June, 1978, and the financial transactions of the Authority for the year ended on that date.

B. J. Waldron

B. J. WALDRON,
Auditor-General.

Flagstaff

Station

Booking Hall

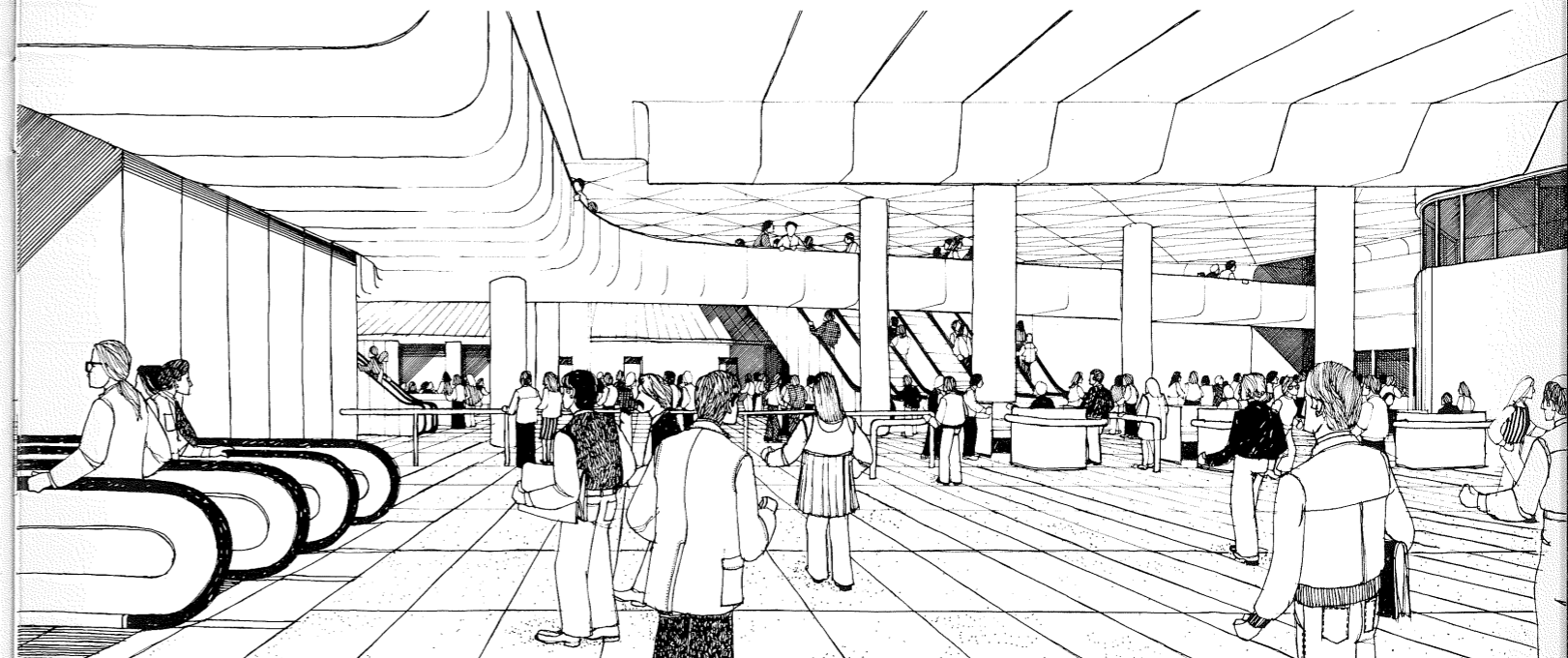
Concourse

The design of Flagstaff Station has called for careful evaluation of the needs of the travelling public whilst at the same time providing appropriate access for ultimate redevelopment from William, LaTrobe and Little Lonsdale Streets.



Looking west from booking hall concourse under the corner of William and LaTrobe Streets. Ticket checking facilities are on the right, booking facilities centre, and escalators to the main William Street entrance at left.

From the concourse under LaTrobe Street — with escalators at left to and from the platform levels — can be seen the ticket checking barriers, escalators (centre) to main William Street entrance, mezzanine level walkway linking Flagstaff Gardens to station and redevelopment area, and offices and booking facilities, at right.



Next train Platform 2
LANGWARRIN
5:23
LAGSTAFF
DALVERN
BYNOX
MURCHISON

COLLARDS.COM

