

**OVERVIEW**

**LOCATION:** PERTH, AUSTRALIA  
**SCOPE:** INTER-URBAN  
**TRANSPORT MODE:** RAIL  
**PRINCIPAL CONSTRUCTION:** GRADE  
**NEW LINK:** PARTIALLY (SOME USE OF EXISTING TRACKS)

**PRINCIPAL OBJECTIVES**

**LOCAL TRANSPORT LINK**  
**ALTERNATIVE TO CAR**  
**TRAVEL TIME SAVINGS**  
**IMPROVED AIR QUALITY**  
**CITY CENTRE REGENERATION**

**PRINCIPAL STAKEHOLDERS**

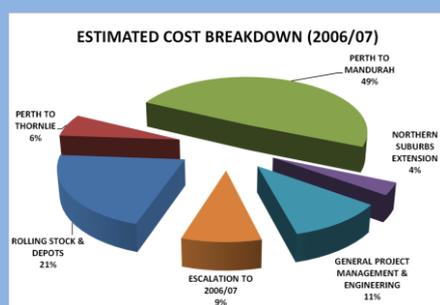
**CLIENT/FUNDER:** PUBLIC TRANSPORT AUTHORITY/NEW METRORAIL  
**DESIGN:** MAUNSELL ETC  
**CONTRACTORS:** LEIGHTON KUMAGAI ETC

**PLANNING AND IMPLEMENTATION**

**APPROX. PLANNING START DATE:** 1990  
**CONSTRUCTION START DATE:** 2004  
**OPERATION START DATE:** 2007  
**MONTHS IN PLANNING:** 168  
**MONTHS IN CONSTRUCTION:** 36  
**PROJECT COMPLETED:** ON SCHEDULE  
**(TUNNELS 39 MONTHS BEHIND SCHEDULE)**

**COSTS (IN 2010USD)**

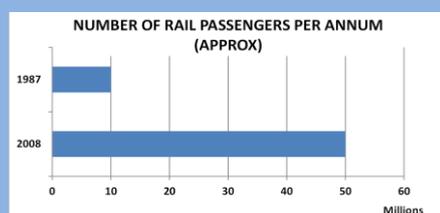
**PREDICTED COST:** 1.57BN  
**ACTUAL COST:** 1.75BN  
**PROJECT COMPLETED:**  
**12% OVER BUDGET**  
**FUNDING:** 100% PUBLIC



**INFRASTRUCTURE QUANTITIES**

**LENGTH:** 70.1KM  
**NUMBER OF STATIONS:** 9  
**NUMBER OF BRIDGES:** 31  
**SETS OF TUNNELS:** 2  
**COST PER KM (IN 2010 USD):** 0.025BN

**PATRONAGE**



**INTRODUCTION**

An inter-urban railway line of 70.1km length, running from Perth, the capital of Western Australia, to the town of Mandurah.



There are nine stations on the line, with associated bus and/or park-and-ride facilities and some transit-oriented developments.

The project also included revisions to bus routes, to provide feeder services into rail stations.

**BACKGROUND**

The project originated in a long-term aspiration to resurrect the passenger rail network in the Perth region, reflecting a gradual evolution of transport and land use policy. The Metropolitan Region Planning Authority, established in 1960, adopted a Corridor Plan for Perth in 1970, which aimed to deal with urban sprawl by focusing development around transport corridors. In 1989, 1993 and 1995, successive transport strategies were produced: emphasising the role of public transport in providing an alternative to car use; separating strategic and operational responsibility; and prioritising accessibility over mobility, with an aim of increasing the modal share of public transport.

The government decided in principle to extend commuter rail services in 1992. The Department of Transport favoured a light rail scheme, and established the South West Area Transit (SWAT) project to develop an option supported by the local community. The SWAT report was never published, however, and the state rail operator Westrail began developing a heavy rail scheme. A masterplan was published in 2000, and revised in 2001 when the incoming government changed the route. A supplementary masterplan detailed the final section of the route through Perth's central business district: this caused considerable debate locally and led to the establishment of an advisory committee to examine the options.

An environmental impact assessment was carried out as part of the masterplanning process, and an environmental management plan was prepared, although not released for public comment. The project involved a range of mitigation measures in response to high levels of biodiversity, heritage issues, and fragile land and water resources, including species restoration and land swaps.

An economic analysis conducted in 2004 suggested the project generated a benefit-cost ratio of 3.3:1 (at 7%) and substantial non-economic benefits including increased 'liveability' and encouraging a shift from car to rail travel, particularly if transit-oriented development were also encouraged.

## TIMELINE

CONTEXT: 1970: METROPOLITAN REGION PLANNING AUTHORITY FOUNDED

CONTEXT: 1970: METROPOLITAN REGION PLANNING AUTHORITY ESTABLISHES CORRIDOR PLAN FOR PERTH

CONTEXT: 1979: CLOSURE OF PERTH-FREMANTLE RAIL SERVICE

CONTEXT: 1982: NEW TRANSPORT POLICY IMPLIES EVENTUAL CLOSURE OF RAILWAYS

CONTEXT: 1983: RAIL SERVICE REINSTATED BY NEW GOVERNMENT

CONTEXT: 1985: INQUIRY RECOMMENDS RAIL SERVICE ELECTRIFICATION



CONCEPTION: 1990: SOUTH WEST RAPID TRANSIT STUDY INTO OPTIONS FOR NEW LINE

CONCEPTION: 1992: GOVERNMENT ANNOUNCES 'IN PRINCIPLE' DECISION TO BUILD LINE, ESTABLISHES SWAT

CONCEPTION: 1992: WESTRAIL IN FAVOUR OF HEAVY RAIL LINE

INCEPTION: 1994: ROUTE RESERVED

CONTEXT: 1995: EXTENSION OF EXISTING NETWORK FROM KENWICK TO FREMANTLE ANNOUNCED

INCEPTION: 1997: PREPARATION OF MASTERPLAN BEGINS

INCEPTION: 2000: INITIAL MASTERPLAN ISSUED

DELAY: 2001: NEW GOVERNMENT, NEW ROUTE, REVISED MASTERPLAN

INCEPTION: 2001: PUBLIC ENVIRONMENTAL REVIEW CONSULTATION

INCEPTION: 2002: SUPPLEMENTARY MASTERPLAN ON ROUTE THROUGH PERTH CBD

CONSTRUCTION: 2003: FORECAST CONSTRUCTION START (CITY TUNNELS)

CONSTRUCTION: 2003: CONTRACT AWARDED (CONTROL SYSTEM)

CONSTRUCTION: 2004: CONTRACTS AWARDED (CIVIL ENGINEERING WORKS)

CONSTRUCTION: 2004: ACTUAL CONSTRUCTION START (CITY TUNNELS & MAIN TRACK)

CONSTRUCTION: 2004: CONTRACTS AWARDED (RAIL AND BUS STATIONS)

DELIVERY: 2007: CONSTRUCTION COMPLETION, OPEN TO TRAFFIC

## CHARACTERISTICS

A project budget of AUD 1.217bn (USD 1.57bn in 2010 prices<sup>i</sup>) was approved in 2001, although by 2002 this had been revised to AUD 1.419bn, of which 9% represented a cost escalation. The actual cost (in 2007) was AUD 1.6bn (USD 1.75bn in 2010 prices, an increase of 12% on the original budget). Labour and materials shortages and the loss of over 70 days due to industrial action were amongst the reasons for rising costs.

The state's Public Transport Authority acted as the client, letting eight Design & Build contracts with private sector consultant-contractor joint ventures (the largest to Leighton-Kumagai JV). Its subsidiary, New MetroRail, was responsible for contract management (except on one contract involving associated roadworks, managed by the state roads agency on behalf of New MetroRail). Maunsell was the only international company involved, acting as principal design consultant on two contracts delivering the infrastructure. Three contracts involved design and construction of stations, and were led by architects as principal design consultants.

Tunnelling under Perth City was highly complex due to the soft ground conditions and high risk of subsidence, and involved the use of 5,000 seismic sensors.

## TIMELINE ISSUES

The initial masterplan envisaged the staged development of the project as funds became available. The final project, however, involved a much compressed schedule, with services to Rockingham and Waikiki commencing at the end of 2006 and to Mandurah by the end of 2007.

Complex ground conditions delayed the start of construction in the city centre by about a year, and industrial action also caused delays. The design of Murdoch station was amended to save a colony of Giant Spider Orchids growing there, leading to an additional six months in the planning process.

Overall the project finished on schedule, although the tunnels through Perth were subject to over three years delay.

## FUNDING

The project was funded entirely by the Government from existing resources and is therefore debt-free. The use of private funding had been considered, but a review by Deutsche Bank, Booz Allen & Hamilton, Blake Dawson Waldron and Skea Nelson Hager concluded public funding was more cost effective. The choice to fully fund the project reflects the availability of funds during an economic boom, the relatively low cost of finance and a reduction in overall risk.

<sup>i</sup> Costs have been converted to USD at 2010 prices, using historic inflation rates and current exchange rates, to allow comparison between projects.