TRANSPORT OVERVIEW

Introduction

The completion of the Perth Waterfront development will see a reconnection of the Perth CBD with one of its most valuable assets, the Swan River. Along with a number of other transformational projects within the CBD such as Perth City Link and the Perth Cultural Centre, Perth Waterfront will see a revitalisation and expansion of the existing central city area.

Perth Waterfront will result in a number of changes in the existing transport network, with new infrastructure being provided to ensure the successful delivery of this project.

A significant amount of detailed technical work has been completed to make sure the proposed changes to the foreshore and the transport network bring as much benefit to Perth as possible. This document summarises the technical transport work that has been completed to date and provides information on the changes to the transport network that will help shape our city for years to come.

Background

Planning for the Perth Waterfront has taken place over a number of years with a view to addressing the physical and psychological barrier currently presented by major transport infrastructure on the southern face of the city. As plans have been developed and refined, the impacts on the transport network have been constantly reviewed.

The project is now entering Phase 3, whereby design documentation will be prepared, statutory approvals obtained and public works contractors will be commissioned. This document provides information on transport investigations for the first two phases of the project development.

Phase	Description	Start Date	Finish Date	Status
1	Concept master-planning and preliminary business case	July 2009	March 2010	Complete
2	Preliminary design, technical site investigations and Feasibility Analysis	March 2010	February 2011	Complete
3	Design documentation, statutory approvals, public works procurement, and marketing and sales of development sites.	February 2011	April 2012	Future Phase
4	Public works construction and creation of development sites	April 2012	2014	Future Phase
5	Staged construction of built form by the private sector	2013	2022	Future Phase
6	Ongoing program of dedicated place management and maintenance	Ongoing		Future Phase

Planning for the Perth Waterfront has been guided by the following transport related principles:

- The transport system should support and be integrated with land use planning rather than be the driver of land use planning.

- Where practical give priority to sustainable transport modes (walking, cycling, and public transport) over other modes.
- Accept that some increases to delay and congestion for general traffic are likely to occur, however ensure that these can be managed effectively.
- Promote pedestrian and cyclist travel to and through the project area and along the foreshore.
- Manage the provision of car parking within the development area as part of the transport network and in the context of the wider area.
- Ensure that the operation of the Bus Port is not compromised by the redevelopment.
- Ensure that modifications to Freeway ramps do not adversely impact traffic flows on the Freeway.

These principles have informed the planning for Perth Waterfront and reflect general Government policies relating to transit oriented development (TOD) when developing in areas with excellent transport accessibility.

Transport planning for the Perth Waterfront has also been influenced by plans and policies set by the City of Perth which are guiding the initial transformation of the central city. The City released the Urban Development Framework: A Vision for Perth 2029 in January 2010. Many of the principles for Perth Waterfront reflect the objectives of the Urban Development Framework, including prioritising pedestrian oriented transport and improving connectivity around the city.

There are also a number of other developments and proposals around the Perth CBD which will help shape our future transport network. These schemes include:

- Perth Riverside
- Perth City Link
- Forrest Place enhancement
- St Georges Terrace enhancement works
- Public transport proposals including priority on some city streets
- Opening up of many existing one-way streets to two-way traffic
- Other individual projects and development proposals

All of these projects, along with Perth Waterfront, will have a substantial impact on how the future of the Perth CBD will be shaped.

The Site

The transport network around the site of Perth Waterfront is currently dominated by wide, higher speed roads. Riverside Drive, and William and Barrack Streets south of The Esplanade, all act as routes to the Freeway system and the Causeway, with minimal adjacent development. The nature of these roads (as depicted in the image of Riverside Drive below), and the existing open space, form a physical barrier between the CBD and the Swan River.

Riverside Drive was originally envisaged in the 1950's as part of an orbital road system around the CBD. Under this plan, it formed the southern link between the Causeway and Freeway interchange. The northern portion of the planned orbital has since been constructed as the Graham Farmer Freeway (GFF). A key driver in the construction of this important regional link, was the desire to reduce traffic impacts on Riverside Drive and the southern extent of the city.

Prior to the opening of the GFF, traffic volumes on Riverside Drive were as high as 78,000 vehicles per day – Average Annual Weekday Traffic (AAWT). Following opening of the GFF, volumes dropped significantly to approximately 25,000 to 30,000 vehicles per day as cross city, regional traffic moved to the new link.

Of these total trips, only an estimated 20% of vehicles (around 6,000 vehicles per day) are making the journey from the Causeway all the way through the site. The majority of traffic trips on Riverside Drive are therefore arriving to, or departing from, the CBD rather than travelling through it.

The quality of pedestrian paths varies however a recreational shared path, which includes access for cyclists, runs along the Swan River. There is excellent public transport access with the Bus Port and Esplanade Station right next to the site. These facilities allow for access by Public Transport to all regions of Perth. The Blue CAT bus runs through the area and a ferry terminal provides a direct link from the CBD to South Perth.

There are over 3,000 publicly available parking bays within close proximity to Perth Waterfront and over 100 existing on-street short stay parking bays in the project area. This includes a number of ACROD bays, taxi ranks, loading zones and motorcycle parking.

The Plan

Transport proposals for the Perth Waterfront, which have been developed during Phase 1 and 2, have considered a number of issues, including:

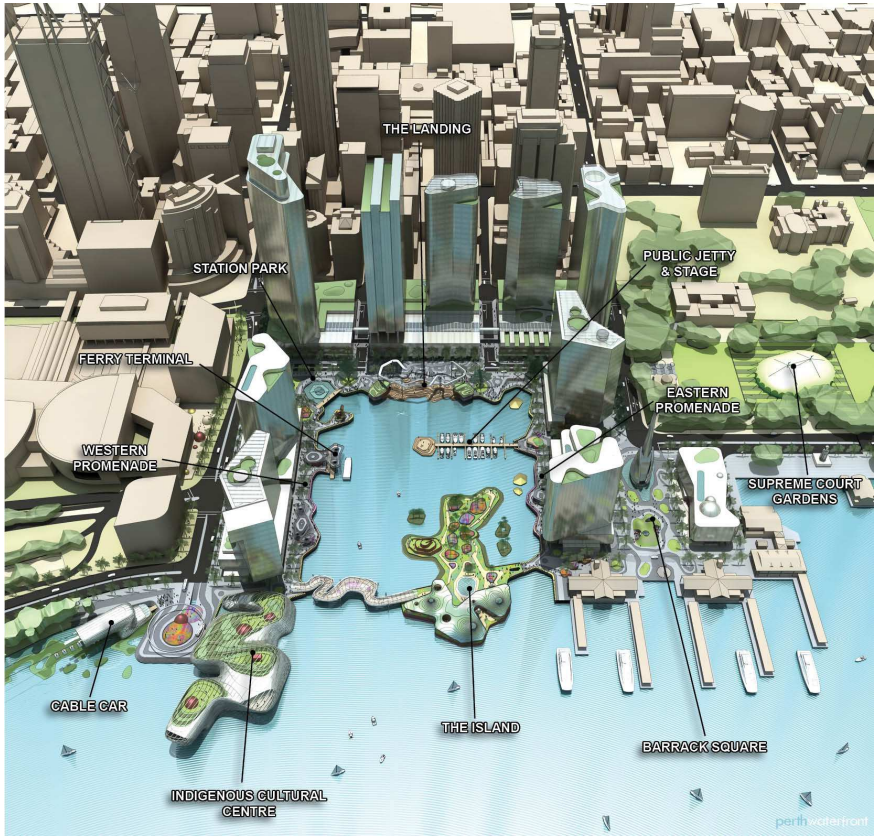
- The principles described above;
- Urban design priorities of the Department of Planning;
- How the project links into the existing and proposed transport network around Perth;

- How each mode, including pedestrians, buses, cyclists and cars, will all fit and operate in a small area;
- Standards, policies and guidelines from other Government departments – especially for design of roads in the project area;
- How future growth elsewhere in Perth will affect key transport links, including the railway network, Bus Port and key roads; and
- Development of proposals which reflect TOD principles.

The project masterplan (shown to the left) was prepared by the Department of Planning and Western Australian Planning Commission, and released by the State Government in February 2011. It provides for development of land uses around a central Inlet which will revitalise this part of the CBD and reconnect the city and the Swan River.

The key transport elements of this plan include:

- The development of a pedestrian friendly environment around the Swan River with active public spaces and easy connections to public transport stations and the ferry terminal;
- New bus priority lane on Mounts Bay Road providing fast access for Transperth buses to William Street;
- Continuation and improvement of the existing shared use path along the Swan River;
- Enhancement of Barrack Square precinct as a shared use area with focus on pedestrians and cyclists;
- Parallel pedestrian phases at all traffic signals;



Perth Waterfront masterplan

- The Blue CAT will continue to service Barrack Square and a new stop will be provided on Riverside Promenade;
- The ferry terminal will be located in the Inlet providing easier transfer between bus or train to the ferry;

- The modification of Riverside Drive west of Barrack Street, no longer providing a continuous route to Mounts Bay Road (west) or the Freeway from the Causeway;
- Creation of a minor road between William Street and Barrack Street (Riverside Promenade). This road will be designed as a pedestrian friendly, low speed environment. Through traffic will be discouraged through traffic management, streetscape design and lower speed limits;
- Introduction of two-way flow along William Street south of Mounts Bay Road, extending all the way to the Point Lewis Rotary, to provide alternative access to Mounts Bay Road from the west;
- Modification of access from William Street to Mitchell Freeway and Kwinana Freeway;
- Extension of Howard Street and Sherwood Court to Riverside Promenade. These sections of road will be two-way;
- Creation of two new all movements traffic signal intersections along The Esplanade at Howard Street and Sherwood Court to replace the existing T-junctions and improve pedestrian connectivity;
- Introduction of two-way traffic along Mounts Bay Road by the addition of one westbound lane between William Street and Mill Street;
- Creation of a new signalised intersection on Mounts Bay Road near Mercantile Lane to provide access for buses exiting the Bus Port to Mounts Bay Road eastbound;
- Adequate on-street parking will be provided within the development to replace those bays which are removed from Barrack Square and The Esplanade;
- A speed limit of 40kph through most of the site to make it safer for pedestrians and cyclists; and
- Fewer cars passing through the site using this area as a Freeway access.

Technical Work

Over the past few years, the transport plans for the Perth Waterfront have been tested and analysed to make sure the impacts are understood. This technical work included:

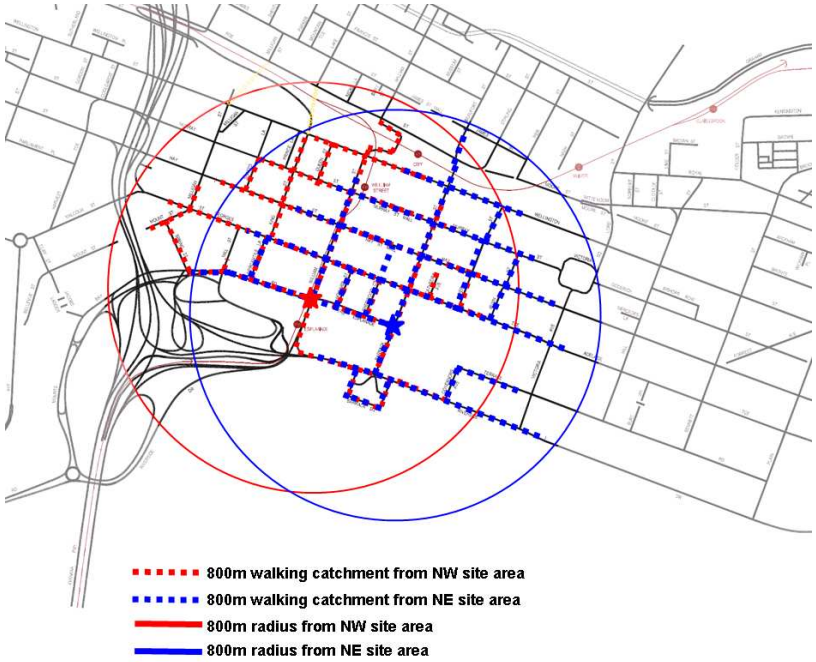
- Use of Australian standard design guidelines for roads and paths;
- Examination of accessibility to the project area;
- Review of speed limit impacts;
- Making sure that public transport can provide the service required;
- Review of the amount of parking required; and
- Technical transport modelling.

The technical work has constantly progressed and evolved with plans for the site. Much of the work undertaken is based on numerical and technical analysis, a summary of which is provided below.

A variety of standards and guidelines were used to design the transport network for Perth Waterfront. These include accepted Australia-wide standards for road design, footpaths, intersection

design and other aspects such as width for ACROD parking bays. Where available, local plans and policies of organisations such as Main Roads WA and City of Perth were also used.

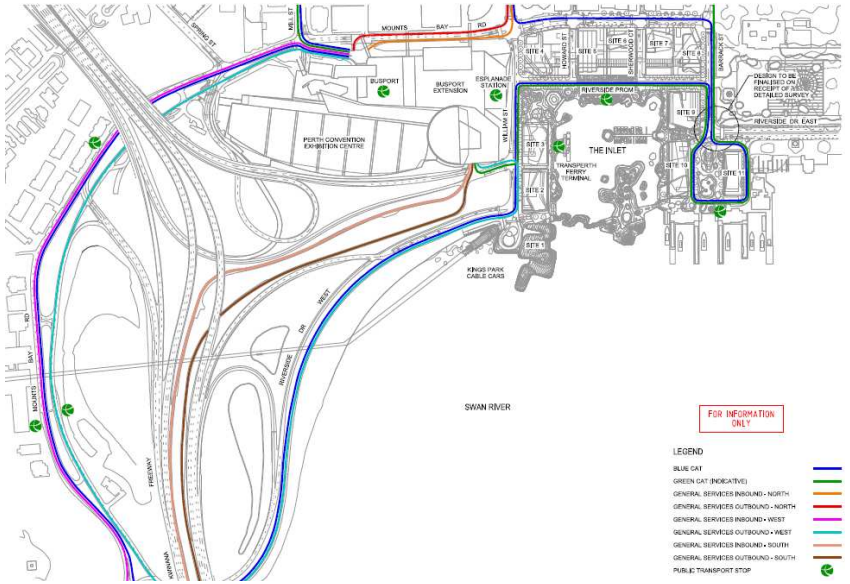
Perth Waterfront is one of the most accessible development sites in the Perth Metropolitan area. Within a ten minute walk of the site, as indicated on the plan below, there is unparalleled access to public transport stations, excellent pedestrian and cycle links and road links to anywhere in Perth. The proximity to the Esplanade Station and Bus Port in particular, allows for large numbers of people to easily access the area without having cars congest the road network.



Walkable catchment from Perth Waterfront

With the City of Perth already moving towards lower speed limits in the CBD, the Perth Waterfront is also supporting these moves with proposals for 40kph speed limits for the majority of roads in the project area. These initiatives will promote greater pedestrian and cycle safety without causing major time penalties for drivers.

The Department of Transport has worked closely with the project team to ensure access for public transport is maintained and, where possible, improved. Access to the Bus Port is crucial for thousands of public transport users every day and a new bus priority lane will be provided on Mounts Bay Road. Existing bus access from the Kwinana Freeway will also be maintained.



Bus services to and from the subject area

The amount of parking bays provided throughout the site will influence the number of cars trips made to and from the development. Over supply of parking bays will ultimately add to local congestion and be inconsistent with the policies of the City of Perth and various State Government Departments.

At present, there is room for a maximum of 142 vehicles to park on-street in the project area. This will be reduced to a total of 104 with priority provided to ACROD bays, loading zones, taxi ranks, motorcycles and short term parking.

On site parking is proposed for the 11 development sites proposed for the Perth Waterfront project. The amount of parking for each of these sites is determined by various policies and requirements, including the Perth Parking Policy (which sets maximum provisions for parking) and the City of Perth Planning Scheme No.2. Where practical, the amount of parking provided uses a minimal allocation or is car-free. The general levels recommended include:

- Residential Podium Development (1 Bedroom Apartments) – 0 bays per unit
- Residential Tower Development (2 Bedroom + Apartments) – 1 bay per unit
- Retail – 1 bay per 200m^2
- Commercial – As per Perth Parking Policy (PPP) 1 bay per 100m^2 of site area
- Other (such as taxi, emergency etc.) – as per requirements of City of Perth

In total, some 1772 off-street parking bays are recommended which is well below the maximum levels accepted under the Perth Parking Policy and City of Perth City Planning Scheme for the land uses proposed. This includes 175 bays for the Indigenous Cultural Centre (Site 1) which will be available for general public parking.

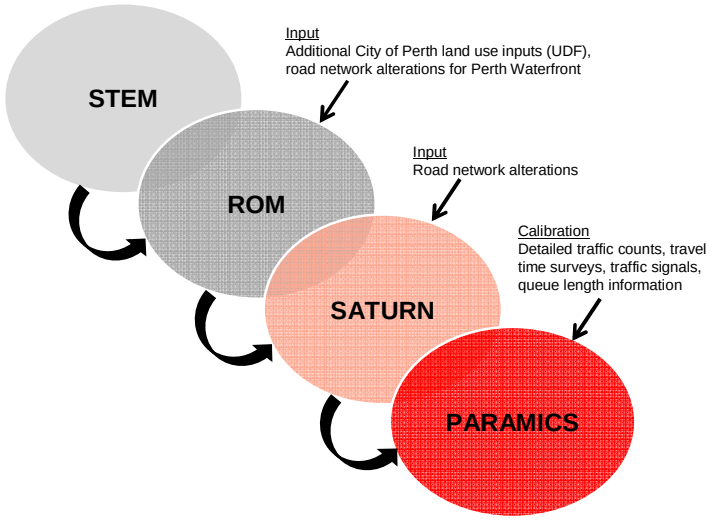
Modelling

Detailed transport modelling has been developed for Perth Waterfront which provides an indication of what future traffic patterns will look like. Modelling is a useful tool which has helped to inform many decisions including where public transport priority lanes are located, how intersections are configured and how much road space is required. In Perth, there are a variety of models available which have been used. The purpose of these models is described below.

STEM – The Strategic Transport Evaluation Model (STEM) is a broad model which helps to determine how many trips will be made by transport mode in the future if travel patterns change, for example if more people use public transport or if fuel costs increase. This model is run by the Department of Planning and covers the entire Perth Metropolitan region.

ROM – The Regional Operations Model (ROM) is run by Main Roads Western Australia (MRWA) and is a highway traffic model of the entire metropolitan area. ROM uses information from STEM, along with constantly updated traffic counts and the configuration of roads, to show how traffic will be distributed around metropolitan Perth in the future. ROM is used for assessing broad traffic patterns and movements.

SATURN – The City of Perth operates the SATURN model which covers all roads in the City's boundaries as well as a "buffer area" of roads in adjoining Council areas. SATURN is a "roads only" model so it is an excellent tool to examine changes in the way traffic moves around the City in the future. Information from this model helped to examine the Perth Waterfront proposals but was not detailed enough to understand the localised impacts.



PARAMICS – To understand the local impacts of the Perth Waterfront, a Paramics micro-simulation model was developed. This model allowed the project team to understand the impacts of small design changes in future years. Information fed into the model includes the size and use of buildings in Perth Waterfront (to understand the number of trips made per day), the signal timings at intersections, number and timing of buses on roads in the project area and the configuration of the roads themselves. A Base model was developed in Paramics in 2009 which accurately reflected traffic patterns at that time and formed the basis of future year models used for assessment and comparison.

Modelling Results

The modelling work for Perth Waterfront was completed using the aforementioned models, with data and methodology agreed with key bodies, including Main Roads WA, Department of Transport and City of Perth.

To determine variations between current and future operations of the road network, a 2009 base model and a 2031 model (a standard forecast year for land use and transport planning) have been used. The models enable comparisons on performance, establish key areas of impact and an opportunity to test a range of future network scenarios.

Key information to assess the network performance differences between the base and forecast year models include traffic volumes, the time taken to complete specific journeys (from point to point) and also the performance of various bus routes. The model outputs are derived primarily from SATURN and Paramics, as the finer grained models, and are outlined further below.

It should be noted that various other factors outside of proposed changes for the Perth Waterfront will also influence future travel patterns to 2031. These include:

- General growth in traffic numbers between now and 2031;
- The cost of using different modes of transport in the future;
- The amount and timing of land use development in both the Perth CBD and metropolitan region;
- Road network changes in both Perth CBD and on roads in localities adjacent to the central city area;
- Provision of public transport services; and
- Other policies or factors which may not be currently in place.

2009 Base Model

Under the 2009 Base Model, a high number of vehicles use the roads in the project area as evident by the levels of congestion that are currently experienced and the volumes outlined in the *Existing and Forecast Traffic Volumes* figure on the following page. The four key roads in the project area, Mounts Bay Road, The Esplanade, Riverside Drive and William Street all currently carry significant volumes of traffic.

2031 Model

Following development of the base model, various scenarios for 2031 were developed and tested to ensure optimal performance of the network, involving:

- Improving bus priority around the project area and increasing the number of bus services into the Bus Port;
- Changing the configuration of a number of intersections, including removing traffic signals at some locations;
- Restricting certain turns from a number of roads; and
- Changing the design of various roads.

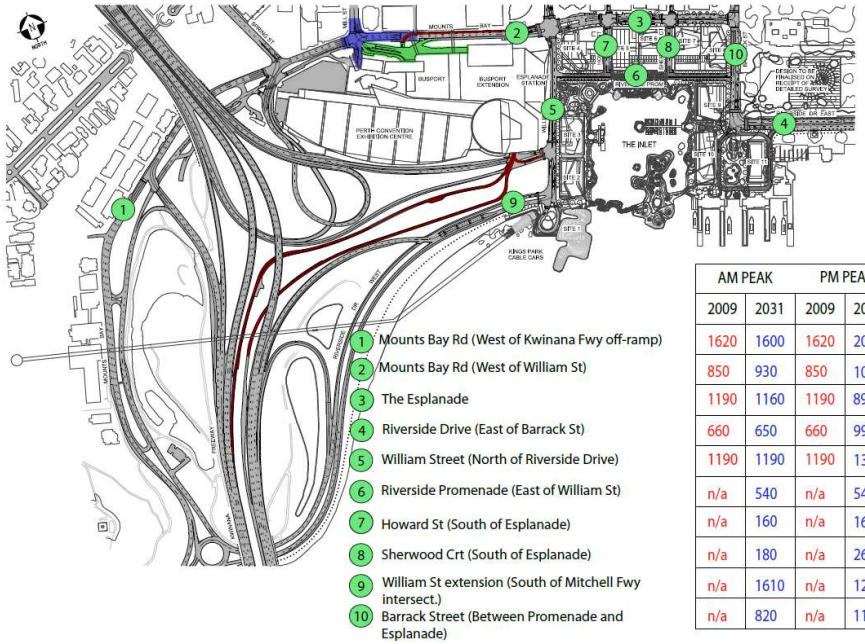
Traffic Volumes

Existing and forecast traffic volumes for 2009 and 2031 are outlined in the following page.

In the modelling outputs for 2031, sections of the following major roads were noted as experiencing congested conditions during either AM or PM peaks:

- Mounts Bay Road;
- The Esplanade;
- William Street;
- Barrack Street;
- Wellington Street; and
- Graham Farmer Freeway.

These areas of anticipated peak hour congestion in 2031 reflect many of the existing congestion points in the city.



	AM PEAK		PM PEAK	
	2009	2031	2009	2031
1	1620	1600	1620	2000
2	850	930	850	1080
3	1190	1160	1190	890
4	660	650	660	990
5	1190	1190	1190	1300
6	n/a	540	n/a	540
7	n/a	160	n/a	160
8	n/a	180	n/a	260
9	n/a	1610	n/a	1200
10	n/a	820	n/a	1190

Existing and forecast traffic volumes

The modelling shows that while some roads will experience additional congestion, others will have less traffic but will still be busy during peak periods. An example is St Georges Terrace which is predicted to have 180 fewer vehicles per day travel east of Barrack Street in 2031, however the road will still experience a degree of congestion.

The removal of a section of Riverside Drive will encourage some traffic to divert to other routes through the city. The most likely alternatives are St Georges Terrace, Wellington Street, Roe Street and Graham Farmer Freeway.

It is also anticipated that people may choose to use other routes further away from the CBD to travel in an east-west direction, or alternately may transfer to public transport options as travel and time costs increase in the future.

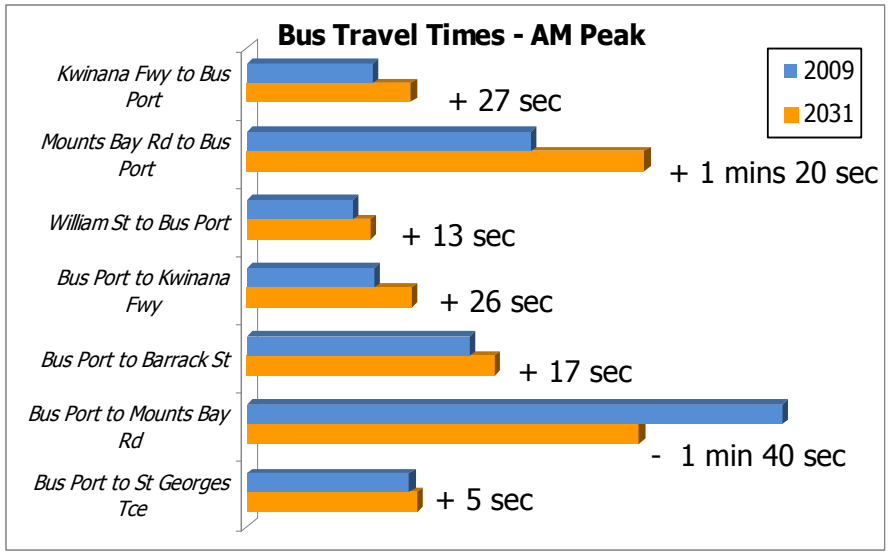
Travel Times

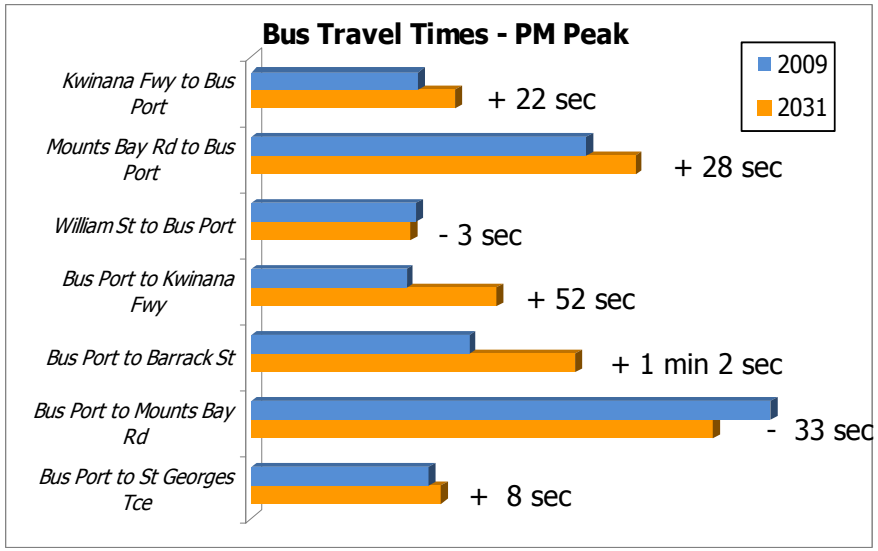
Two of the critical comparators for network performance are travel times for buses and general traffic between 2009 and 2031. Where practical, these times have been compared – although a direct comparison is not always possible due to the road network changes between 2009 and 2031.

Bus Journey Time

Crucially, more signalised intersections will be introduced which will impact on journey travel times. For peak hour bus movements through the site, there are general increases in the time travelled which reflects congested traffic conditions and the impact of new signalised intersections. There are also forecast to be significantly more bus services leaving the Bus Port in 2031.

There will, however, be some improvements in 2031 where new dedicated bus priority lanes are proposed. New bus lanes along Mounts Bay Road between the Bus Port and Point Lewis Rotary will result in a significant improvement in travel times, however, these are not included in the 2031 Perth Waterfront model.





Vehicle Journey Time

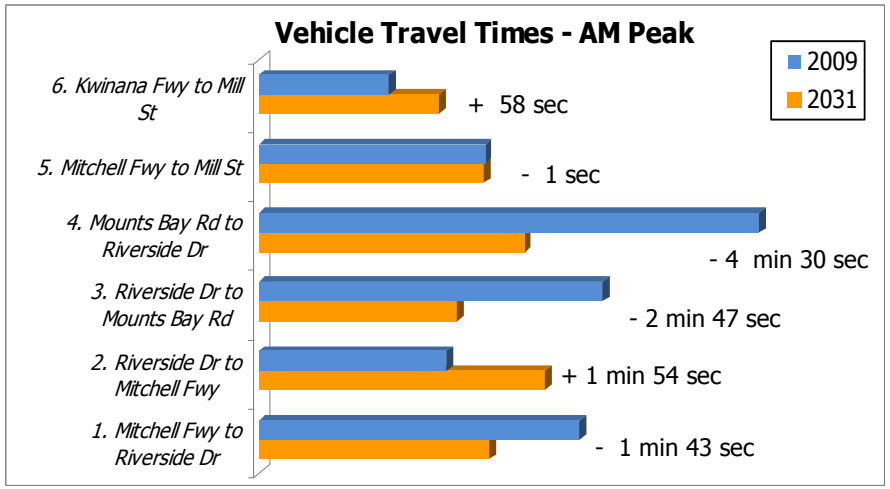
General traffic journey times have also been calculated. The model results show that there is a fluctuation in travel times during peak periods, with some potential improvements and some possible increase in travel times experienced by drivers on some of the main roads in the CBD.

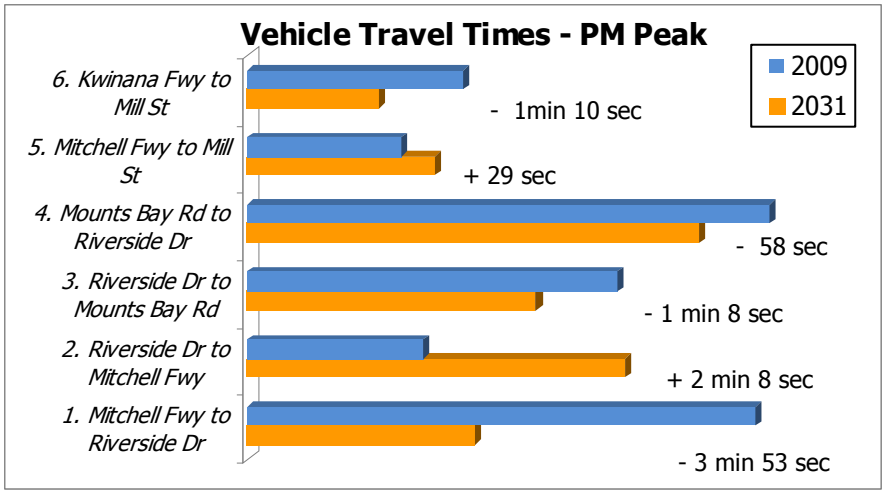
The improvement in some of the travel times is caused by a reduction in traffic through the area with the removal of a section of Riverside Drive. This traffic is largely expected to use other routes across the city. Other improvements result from more efficient traffic signal timings and an improved road network configuration.

There is still expected to be some congestion during peak periods at signalised intersections and for traffic exiting individual buildings or using uncontrolled intersections, as per current conditions. Key intersections in the Perth Waterfront area have been signalised to include parallel pedestrian phasing, which is presently being rolled out by the City of Perth.

The overall pattern of journey times for general traffic is expected to be relatively stable, although the current journey from Riverside Drive to Mitchell Freeway will be increased due to the removal of Riverside Drive between Barrack and William Streets.

Some traffic will use Barrack Street, The Esplanade and William Street to make this trip in 2031 so additional travel time will be caused by having to pass through more signalised intersections.





Travel Time Modelling Points

1. Mounts Bay Road
2. Kwinana Freeway – Northbound
3. Kwinana Freeway – Southbound
4. Mitchell Freeway – Northbound
5. Mitchell Freeway – Southbound
6. Mill Street
7. Riverside Drive

Construction Impacts

During construction of the road network and utilities for Perth Waterfront, it is expected that some local diversions will be put in place to ensure traffic can pass through the area. The majority of diversions will be short-term, however, some sections of the road network may have diversions in place for a number of months. The main changes during construction include:

- Opening up of a two-way link between the Point Lewis Rotary and the intersection of William Street and Riverside Drive. This will provide an alternative route into the CBD from Mounts Bay Road;
- Closure of William Street between The Esplanade and Riverside Drive to allow for realignment of services under the road;
- Part closure of traffic lanes along Mounts Bay Road between Spring Street and William Street to allow for construction of water mains and reconfiguration of traffic lanes;
- Intersection of William Street and Mounts Bay Road to become a temporary signalised T-junction; and
- Closure of the western section of Barrack Square to allow for construction of The Inlet.

The changes during construction will be clearly signposted and drivers will be given ample warning of impending changes to main routes. The main construction stage impacts will be experienced during 2012. Once the section of Riverside Drive between Barrack and William Streets is closed in early 2013, all other major road network changes associated with Perth Waterfront will be open.

Perth Waterfront Transport Network

The proposals for Perth Waterfront will bring lasting and positive change to the centre of Perth. Reconnection with the Swan River and removal of significant barriers, such as Riverside Drive, will result in a refocussing of the city itself and creation of new opportunities for residents, businesses and visitors alike.

The transport network alterations to the project area will help support the development and are focussed on the importance of pedestrians, public transport and other non-motorised transport modes.

Road access through the project area will be maintained, and in some cases improved, however the move from higher volume, higher speed roads to lower speed shared use city centre roads is necessary to enable more active urban space and make the area safer for pedestrians. Similarly, reduced car parking numbers will help decrease car trips to and from the project area.

Technical work completed for the Perth Waterfront project suggests that the road network will operate in 2031 to a level that is broadly similar to present day conditions.

The level of change expected is due to traffic diverting from the project area and changes in travel patterns. Some localised congestion during peak periods will remain, as would be expected within the city centre with a forecast population of some 2.2 million people in 2031.