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20 January 2009

Mr Michael Deegan
Infrastructure Coordinator
Infrastructure Australia
Level 21, Deutsche Bank Building
126 Phillip Street
Sydney NSW 2000

Dear Mr Deegan

M5 MOTORWAY EXPANSION – response to minimum information requirements

I refer to Infrastructure Australia's request for further minimum information on the M5 Motorway Expansion, which are listed in Infrastructure Australia's report to Council of Australian Governments (December 2008) as potential projects for Building Australia Fund (BAF) support.

Our comprehensive response to the specific questions and information requirements with regard to the appraisal and deliverability assessments are detailed in the attached report, providing robust evidence to support the M5 Motorway information presented so far.

Should you have any queries please contact Peter Duncan, Deputy Director General on (02) 9228 5585.

Yours sincerely


John Lee
Director General



Infrastructure Australia Priority List

Initiative: M5 Expansion

Proponent: NSW Roads and Traffic Authority

Minimum Information Requirements

Submission Cover Sheet

Date 20 January 2009

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Introduction

Background

On 13 May 2008 the Minister for Infrastructure, Transport, Regional Development and Local Government, the Hon. Anthony Albanese, announced \$5 million funding in 2007- 2008 for feasibility studies into the potential improvements to the M5 Transport Corridor from Port Botany/Sydney Airport to South West Sydney.

On 14 May 2008 the then NSW Premier, Morris Iemma, announced a further contribution of \$10 million to investigate the viability of the M5 East Duplication. The study corridor is detailed in Figure 1.

The strategic options identification and development work has been progressing for the preparation of the feasibility assessment based upon the methodology detailed below:

- Needs assessment of transport network
- Development of Study Objectives
- Development of Strategic Alternatives
- Assessment of Strategic Options with Strategic Merit Test
- Development of Strategic Alternatives
- Identification of short-list of Strategic Alternatives
- Preliminary environmental assessment and traffic modelling of strategic alternatives
- Multi-criteria analysis of short list of Strategic Alternatives
- Rapid Economic Appraisal of shortlist of Strategic Alternatives
- Identification of Indicative Preferred Option(s)

On 31 October 2008 the NSW Government provided a submission to Infrastructure Australia a submission detailing the profiling and appraisal of an indicative preferred option for expanding the capacity of the M5 transport corridor between General Holmes Drive, Mascot and Camden Valley Way, Prestons to encourage Australia's economic growth whilst maintaining or improving Sydney's environmental and social development. A further submission was provided to Infrastructure Australia on 14 November 2008 which provided updated information on the development of the project.

Following the November submission to Infrastructure Australia the NSW Government was requested to provide further information regarding the traffic and economic appraisal of the indicative preferred option including funding, governance and procurement strategies for delivery of the project as detailed in the document provided by Infrastructure Australia titled *"Infrastructure Australia Priority List – Minimum information requirements."* A copy of this document is contained in Appendix 1.

At this stage of the feasibility study the indicative preferred option for the M5 Expansion comprises:

Duplication of the M5 East Freeway from Cooks River, Mascot to King Georges Road, Beverly Hills. Several options are still under consideration, but for the purposes of this submission the assumed scope is:

- a new three lane westbound tunnel with portals in the vicinity of the current ones;
- the existing eastbound tunnel connected to the Princes Highway, Marsh Street and the northern link along the F6 corridor only;
- the existing westbound tunnel converted to eastbound and connected to General Holmes Drive only;
- widening to three lanes each way at the western end from the portals to the King Georges Road ramps;
- maintaining two lanes each way at the western end under King Georges Road; and
- maintaining two lanes each way at the eastern end from the portals to General Holmes Drive.

A northern link along the F6 corridor from the M5 East Freeway, Mascot to Euston Road, St Peters and Gardeners Road, Mascot, was subsequently incorporated into the indicative preferred option. Several options are still under consideration, but for the purposes of this submission the assumed scope is:

- a new road, two lanes each way along the F6 corridor from the M5 East Freeway to Euston Road at Campbell Street;
- upgrading Euston Road to two lanes each way from Campbell Street to Sydney Park Road; and
- Connections from the new road south of Campbell Street to Gardeners Road at Bourke Road."

Two plans indicating the two components of the current indicative preferred option is contained in Figure 1 and Figure 2.

The purpose of this report is to provide responses to the minimum information requirements request from Infrastructure Australia.

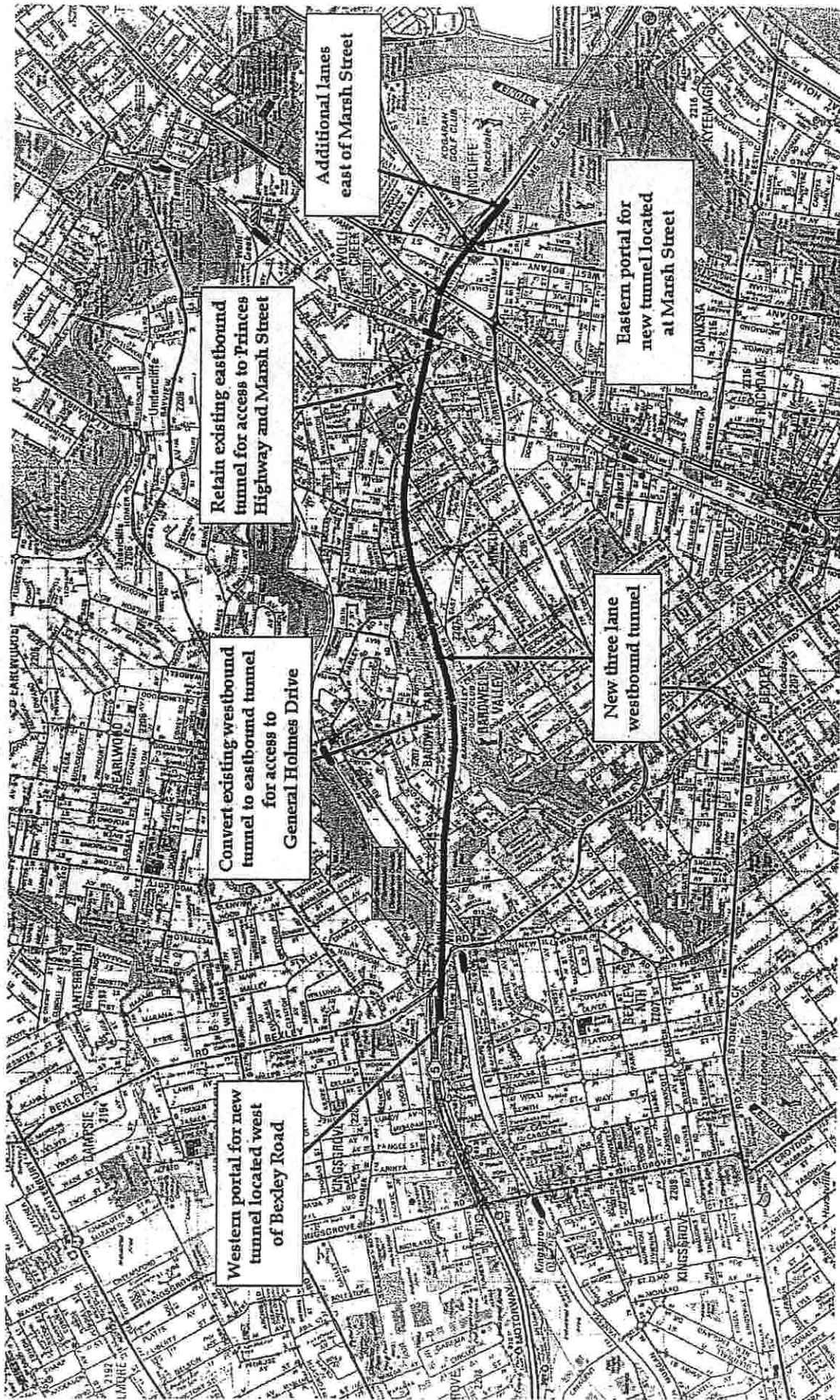


Figure 1 – M5 East Expansion – New three lane westbound tunnel

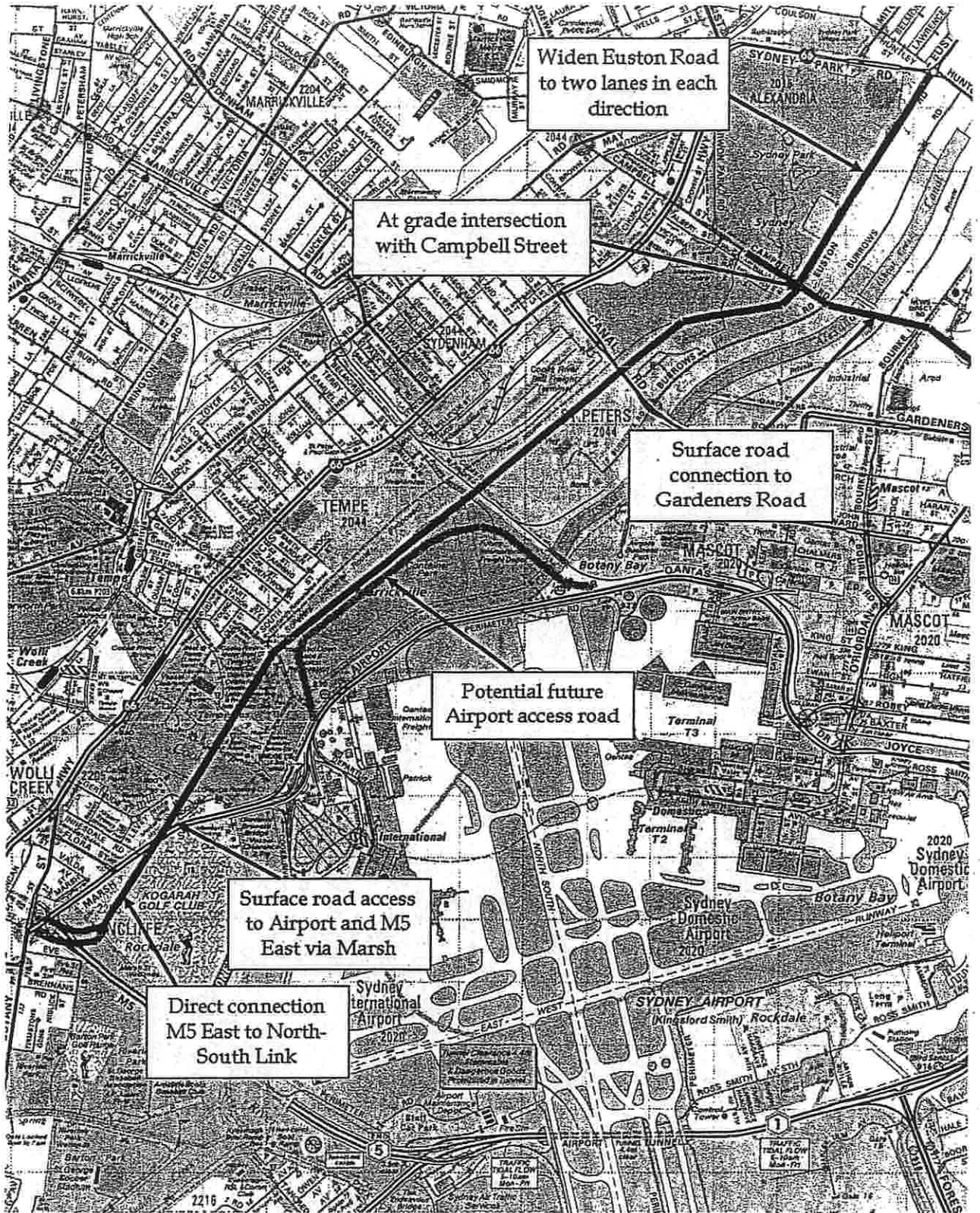


Figure 2 - North-South Link - Marsh Street to Euston Road

Appraisal – Economic Cost-Benefit Analysis

1. Demand modelling methodology, assumptions and results

1.1 Summary

Infrastructure Australia (IA) needs to understand the basis upon which travel demand estimates have been created. Details of the demand modelling methodology, the assumptions and the results requested by IA are provided for the M5 Expansion, including the North-South Link (the "project") in the context of the following information request (shown as dot points in italic format):

- *A comprehensive list of the detailed assumptions which drive demand, including the rate of population growth, employment growth, private vehicle demand, public transport demand; and how these change over the appraisal period;*

Detailed assumptions are given in the supporting documents which are referenced. A summary of these documents is provided in Sections 1.3 and 1.4 below.

- *Detail of any changes in land use such as residential densification or Transport Orientated Developments (TODs) assumed in the demand modelling;*

Details of the anticipated changes in land use are discussed in Section 1.4 below.

- *The underlying justification for these assumptions and growth rates, particularly the benefit extrapolation approach used in the post forecast period;*

The behaviour models which are the basis for travel estimates are derived from sets of data and forecasting techniques undertaken by the NSW State Government Transport Data Centre and the Australian Census Bureau. The justification and underlying assumptions are given in the referenced reports and are further summarised in Sections 1.3, 1.4 and 1.6 below.

The benefit extrapolation approach undertaken by the RTA in the economic analysis is to halve the growth in demand trend for the period beyond the forecast period. For example, under the economic analysis prepared for the M5 the rate of growth for travel time benefit between the forecast periods of 2016 and 2026 is 3%. During the period beyond 2026 the rate of growth is halved to 1.5%. This approach is adopted for all projected benefits/disbenefits including Vehicle Operating Costs, Safety benefits and externalities to ensure the analysis prepared is conservatively based.

- *The methodology used to estimate demand - the nature of the transport model used and how knock-on and wider network effects are calculated; plus an explanation of the independence of forecasts and the degree of external or independent scrutiny;*

The modelling approach adopted follows a conventional four step modelling process in which the number of daily trips, from households to attractors such as work places and school, is estimated, then distributed among zones, and divided according to mode of travel. Finally the trips are assigned to the road network.

Truck travel has been estimated from count survey data. This provided present estimates of truck movements between zones. These were extrapolated to future years based on information on freight transport growth from State-wide surveys.

- *A detailed disaggregation - by year, date and user type - of the results of the demand modelling, including all the information set out in Tables 1 & 2 of the Infrastructure Australia's minimum information requirements document.*

Detailed results from the demand model for the project are shown in Section 1.4 below.

1.2 Discussion

In response to IA's requirements, traffic modelling assumptions and methodology used in the forecasting process are discussed under the following headings:

- i. Strategic Travel Model
- ii. Strategic Road Model
- iii. Strategic Road Model Calibration and Validation
- iv. Summary of Inputs, Assumptions and Results

This will provide an understanding on modelling methodology used to estimate demand for the project and estimate impact on the wider network.

1.3 Strategic Travel Model

The Strategic Travel Model (STM) is operated by the Transport Data Centre (TDC) for projecting travel patterns in Sydney, Newcastle and Wollongong under different land use, transport and pricing scenarios. It can be used to test alternative settlement, employment and transport policies, to identify likely future capacity constraints, or to determine potential usage levels of proposed new transport infrastructure or services.

The STM produces travel forecasts for:

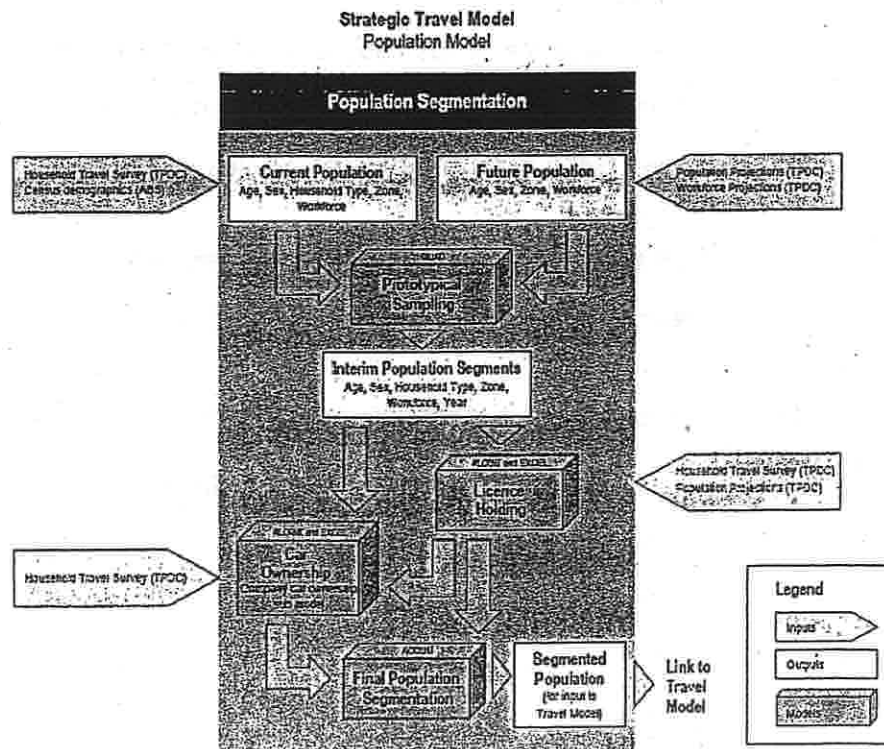
- The Greater Metropolitan Area (GMA)
- 5 yearly intervals from 2006 to 2031
- Car, Train and Bus trips
- Work and non-work trips
- 24 hour, average weekday travel
- Am/pm peak and interpeak travel (factored from 24 hour travel)

The STM is a series of models and processes that attempt to replicate, in a simplified manner, peoples travel choices and behaviour under a given scenario. The STM combines the perceived travel behaviour with likely population and employment, size and distribution, and likely road and public transport networks and services to estimate future travel under different strategic land use and transport scenarios.

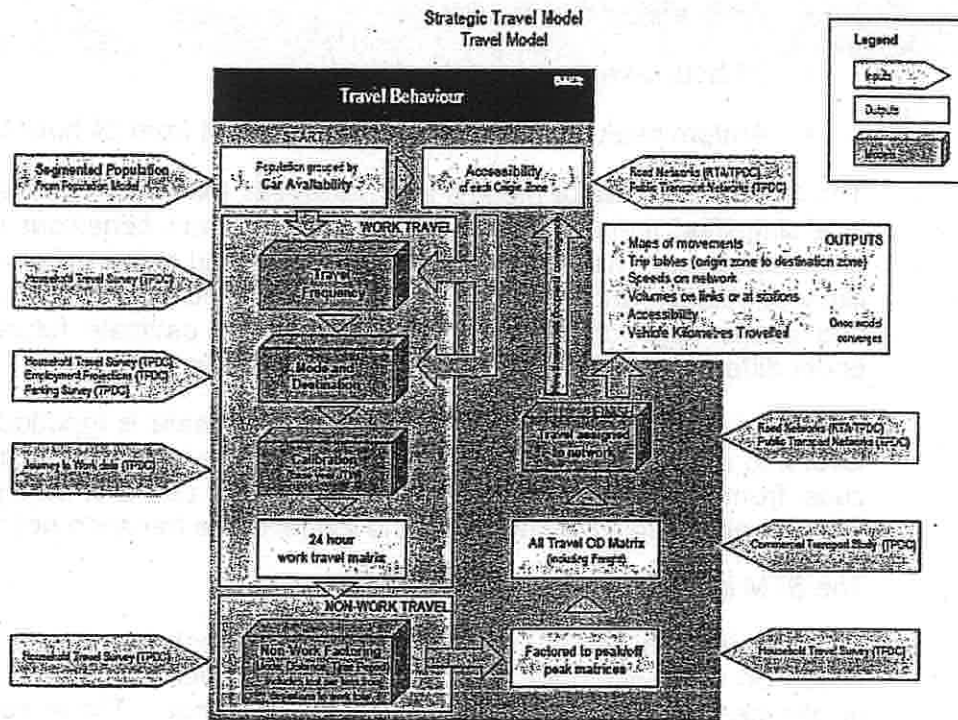
The STM model is defined in travel zones and data is inputted at this level and the STM produces estimates of travel to and from each travel zone, from and to every other travel zone, as well as travel within zones. This travel is then assigned within the model to the transport network.

The STM is implemented in two sections:

The **Population Model** which segments the population into groups based on socio-demographics that influence travel choices, as well as on the basis of car ownership and licence holdings. These segments are grown into the future based on population, employment and other projections and trends. This segmentation occurs at the model wide level and the travel zone level. The model structure is shown in Figure 3.



The Travel Model is implemented in EMME transport modelling software which is comprised of a series of work travel models, of travel frequency, mode and destination choices, calibration, factoring of non-work travel, addition of freight movements, and assignment of travel to the road and public transport networks. The model structure is shown in Figure 4.



The range of outputs from the STM includes:

- Travel demand by mode in the form of Origin-Destination matrices
- Travel volumes by road section and by time period
- Travel times/speeds by road section and by time period
- Travel times between Origins and Destinations by mode and time period
- Rail and bus patronage by line and time period
- Rail station entry and exit passenger totals

Some examples of recent projects or scenarios examined by the STM include:

- Parramatta Rail Link (and Epping to Chatswood Rail Link)
- North West Rail Link
- South West Rail Link
- M7
- M4 East

- Increased petrol prices
- Strong CBD employment growth
- Greater levels of Greenfield development
- Unsworth strategic bus network

Further details on the Strategic Travel Model are contained in Appendix 2.

1.4 Strategic Road Model

The outputs from the Transport Data Centres Strategic Travel Model are used as inputs to the Halcrow/MWT Strategic Road Model.

The Halcrow MWT Strategic Road Model of the Sydney Metropolitan Area is based on two main sources:

- Network – based on network model development by Halcrow MWT over several years, and
- Demands – based on outputs from the Transport Data Centre's Strategic Travel Model (STM)

As detailed in Section ** the Sydney Travel Model is a four step multi modal model run by the Transport Data Centre. The model is used to test:

- Major infrastructure changes
- Different population/employment growth and distribution scenarios

The STM is under constant development and for the M5 East, the model used STM outputs from September 2007. The primary assumptions in the STM at this time were:

- • TPDC Nov 2006 population projections (see Appendix A)
- • TPDC Nov 2006 employment forecasts (see Appendix A)
- • RTA Oct 2006 Road networks
- • Rail itineraries supplied by RailCorp
- • TPDC Sep 2004 bus networks
- • Macros v1.2 (development version).

At this stage of the M5 East traffic modelling for the feasibility study, the STM was based on the 2001 Census and Journey to Work information. The TDC has recently released updated models based on the 2006 census. These models and their results are currently being evaluated for use in updating the forecasts for the M5 East Expansion. Updated land use forecasts from the Australian Bureau of Statistics have also been recently released.

These updates increase the forecast 2026 population by around 400,000 persons. This increased population will also have an impact on the forecasts travel demand along the M5 Transport Corridor.

The Transport Data Centre have released a summary documents explaining the inputs and methodology behind the STM. These documents are contained in Appendix 2 – Halcrow/MWT M5 East Expansion Traffic Modelling Report (Draft) January 2009.

Traffic zones in the model are based on those developed by the Transport Data Centre (TDC) for Census Journey to Work (JTW) and Household Travel Survey data. Within the project corridor, a finer zoning system was developed to reflect better the loading of traffic onto the road network. In addition, external zones were defined at points where major roads cross the study area boundary. The final zone system comprises a total of 318 travel zones.

A daily model, representing total 24-hour traffic for an average weekday was used to provide inputs into project evaluation. A morning peak period (AM 2-hour) model was used to provide traffic volumes for road and interchange design.

1.5 Strategic Road Model Calibration and Validation

The UK Highways Agency defines traffic model calibration and validation in the Design Manual for Roads and Bridges. The Halcrow MWT Highway Model has been calibrated to these criteria as there is no local equivalent.

The UK Highways Agencies criteria and the outcomes of the calibration are detailed in Tables 1 to 4 below.

The M5 East corridor caters for travel generally between southwestern Sydney and eastern Sydney. It also caters for a significant amount of travel between southwestern Sydney and northeastern Sydney.

Table 1 Model Calibration AM Peak

	Criteria	Halcrow MWT Model Result
Assigned hourly flows compared with observed flows		
1. Individual flows within 15% for flows 700-2700vph		
2. Individual flows within 100vph for flows <700vph	>85% of cases	87%
3. Individual flows within 400vph for flows >2700vph		
4. Total screenline flows to be within 5%	All (or nearly all) screenlines	22 of 24 screenlines
5. GEH Statistic		
i) individual flows < GEH < 4	>85% of cases	85%
ii) screenline totals < GEH < 4	All (or nearly all) screenlines	21 of 24 screenlines

Table 2 Model Calibration PM Peak

Criteria	Halcrow MWT Model Result
Assigned hourly flows compared with observed flows	
1. Individual flows within 15% for flows 700-2700vph	
2. Individual flows within 100vph for flows <700vph	>85% of cases 92%
3. Individual flows within 400vph for flows >2700vph	
4. Total screenline flows to be within 5%	All (or nearly all) screenlines 20 of 24 screenlines
5. GEH Statistic	
i) individual flows: GEH < 5	>85% of cases 90%
ii) screenline totals: GEH < 4	All (or nearly all) screenlines 12 of 24 screenlines

Table 3 Model Validation AM Peak

Criteria	Halcrow MWT Model Result
Travel times within 15% (or 1 minute if higher)	>85% of routes 86%

Table 4 Model Validation PM Peak

Criteria	Halcrow MWT Model Result
Travel times within 15% (or 1 minute if higher)	>85% of routes 82%

The final comparison to determine the validity of the model is a visual comparison of the trip length distribution against the distribution from the STM. This comparison is made in Figures 4.2 and 4.3.

In these figures the "Original" bars represent the trip length distribution from the STM, while the "Adjusted" line shows the final trip length distribution for the calibrated and validated highway model.

Figure 5 Trip Distribution Calibration AM Peak

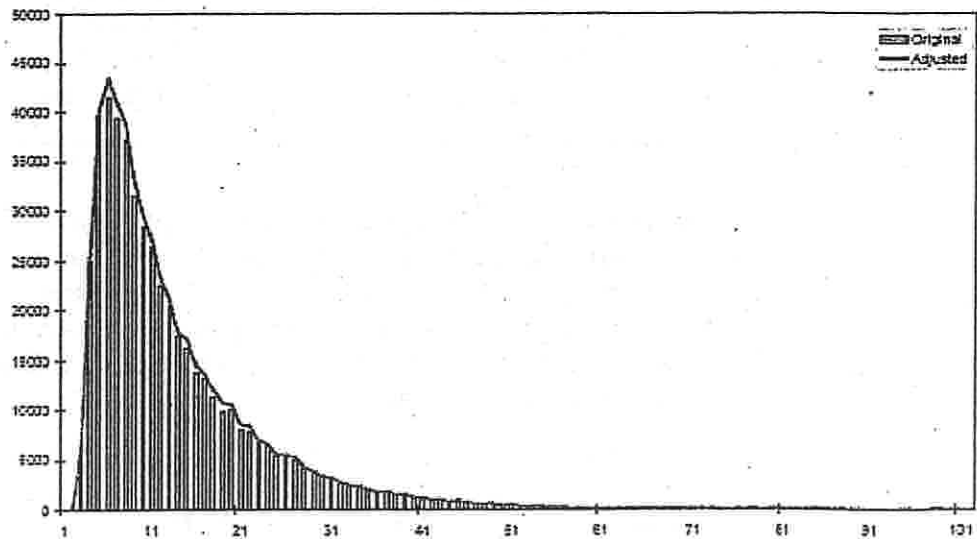
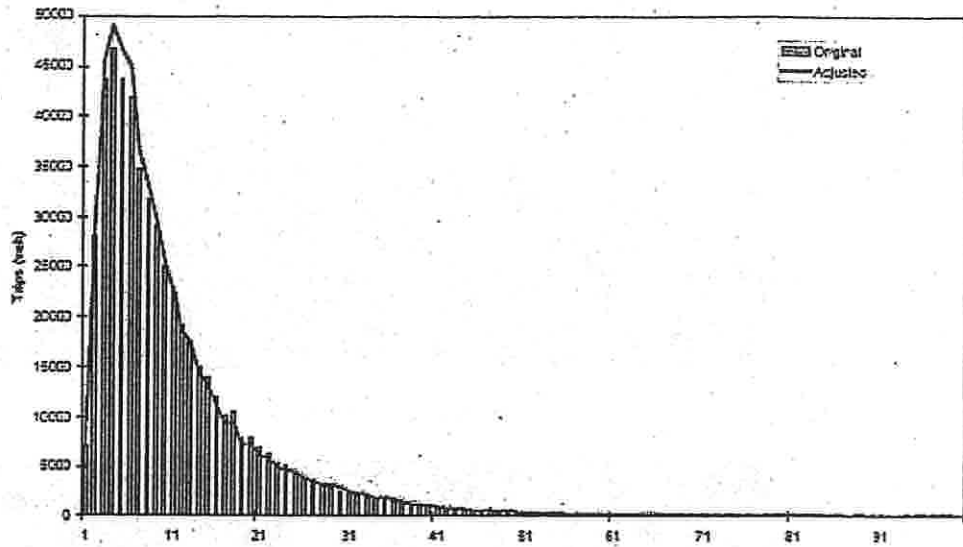


Figure 6 Trip Distribution Calibration PM Peak



1.6 Summary of Inputs, Assumptions and Results

The M5 East corridor caters for travel generally between south western Sydney and eastern Sydney. It also caters for a significant amount of travel between south western Sydney and north eastern Sydney.

These regions defined for the purposes of the traffic modelling as comprising the following Local Government Areas are detailed in Table 5.

Table 5 Trip Distribution Calibration PM Peak

South West Sydney	Bankstown Camden Campbelltown Fairfield Liverpool Wollondilly Hurstville	Sydney East	Sydney Randwick Rockdale Waverley Woollahra Botany Bay	Sydney North	North Sydney Manly Mosman Warringah Willoughby
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Based upon the population and employment growth predicted in The Metropolitan Strategy Tables 5 to 9 detail the forecast growth in these three regions. The time periods chosen for analysis closely reconcile with the opening dates of the motorway and a 10 year time period after commencement of operations to provide best estimated of future economic and financial benefits.

Table 6 Population forecasts for M5 Corridor

LGA	2006	2016	2026	2031
South West Sydney	850,370	956,493	1,079,792	1,135,058
Sydney East	541,087	612,565	639,492	652,900
Sydney North	333,942	344,172	356,968	362,745
Total	535,200	603,000	663,000	695,600

Table 7 Population growth for M5 Corridor(% pa)

LGA	2006-16	2016-26	2026-31	2006-2031
Growth	10 Yrs	10 Yrs	5 Yrs	25 Yrs
South West Sydney	3.5%	2.2%	1.8%	2.6%
Sydney East	0.8%	0.7%	0.7%	0.7%
Sydney North	3.1%	1.5%	1.4%	2.1%
Total	1.2%	1.0%	1.0%	1.1%

Table 8 Employment forecasts for M5 Corridor

LGA	2006	2016	2026	2031
South West Sydney	295,107	330,968	358,298	368,669
Sydney East	586,451	621,829	643,760	648,181
Sydney North	15,500	18,600	21,300	22,900
Total	181,300	208,200	231,800	246,500

Table 9 Employment Growth for M5 Corridor(% pa)

LGA	2006-16	2016-26	2026-31	2006-2031
Growth	10 Yrs	10 Yrs	5 Yrs	25 Yrs
South West Sydney	4.9%	2.1%	2.0%	3.2%
Sydney East	0.9%	1.0%	1.2%	1.0%
Sydney North	1.8%	1.4%	1.5%	1.6%
Total	1.4%	1.1%	1.2%	1.2%

There are several significant land use developments which are planned to occur within the M5 corridor over the next 5 - 10 years. These developments will significantly increase the population and employment balance within the corridor. The impact on transport demand of these developments within the M5 corridor have been considered in the preparation of the traffic model and these considerations are discussed below.

1.6.1 Sydney Airport Expansion

The traffic model for the region covered by the Sydney Airport requires modification due to the unusual travel patterns for the airport which are best represented by journey to work trip data from the SMT.

Consequently, the data for the Sydney Airport region has been manually removed from the traffic model and has been updated to include traffic generation based upon the Sydney Airport Masterplan 2009. The Masterplan assumes an increase in passengers from around 30 million in 2006 to 78.9 million in 2029. During this time mode share to public transport is anticipated to grow by 5%. Significant commercial and retail

developments are also proposed on Sydney Airport land that adds to the total traffic generation.

The TDC assumes Sydney Airport as an employment zone for the purposes of the STM. The Halcrow MWT traffic model removes this zone from the trip table provided as an output from the SMT and divides the Airport trip generation into passenger trips, employment trips and taxi trips. These trips are distributed through the traffic model based upon:

Passenger trips	The results of a number plate survey undertaken at the Airport in 2005 to determine LGA origins/destinations
Employment trips	The TDC distribution from an employment zone; and
Taxi trips	An estimated distribution that all trips are generally to the CBD

Table 10 summarises the predicted traffic generation from the growth and development at Sydney Airport.

Table 10 Sydney Airport trip generation for 2006, 2016 and 2026

	AM Peak (vehicles/hour)			PM Peak (vehicles/hour)		
	Total Departures	Total Arrivals	Total Two-Way	Total Departures	Total Arrivals	Total Two-Way
2006	4,500	3,500	8,000	2,600	3,500	6,100
2016	7,500	5,600	13,100	4,800	6,600	11,400
2026	9,700	7,300	17,000	7,000	9,400	16,400

1.6.2 Port Botany Expansion

The Port Botany expansion EIS forecast the container throughput expressed as twenty foot equivalent units (TEU's) will increase from 1.25 million TEU's in 2006 to 3.2 million TEU's in 2021. The port's landside transport strategy seeks to increase the proportion of containers handled by rail from 20% to 40% and strategies are being implemented aimed to achieve this shift to rail. The EIS forecasts that if, as a worst case, the proportion of containers handled by rail remains at 20% then daily road container transport trips would increase as detailed in Table 11 below:

Table 11 Truck trips for Port Botany Expansion

	AM Peak (vehicles/hour)	PM Peak (vehicles/hour)	Daily Total (vehicles/day)
2002			2,910
2006			3,800
2011	256	118	3,750
2016	316	144	5,150
2021	376	234	6,270

The trips generated from Port Botany are incorporated into the SMT model with Port Botany treated as a special zone in the model. The trip generations from this zone are also incorporated into the Halcrow/MWT traffic model.

1.6.3 Green Square Development

The Green Square redevelopment area includes part of the suburbs of Rosebery, Zetland and Alexandria. It is centred on the Green Square railway station midway between the Sydney CBD and the Airport. Table 12 below provide TDC land use forecasts for the zones along with the forecast morning peak traffic generation

Table 12 Green Square Land Use and Traffic Generation

Year	Residential Population (persons)	Employment (jobs)	AM Peak Hour (veh/hr)		Traffic Generation (two-way)
			Arrival	Departure	
2001	7,646	25,374			
2006	12,933	26,028	5135	2476	7611
2011	16,089	28,050	5601	2813	8415
2016	22,165	32,330	6670	3365	10,036
2021	18,971	29,626	5884	3040	8924
2026	20,580	31,020	6212	3191	9404

1.6.4 Summary of M5 Corridor Demand

The total market for vehicle travel along the M5 corridor can be indicated by extracting the peak hour trip table travel demands from the TDC model between the local government areas in the south west and those in the east and north of Sydney. The AM peak volumes are detailed in Table 13, the pattern for evening peak hour and daily travel would be similar.

Table 13 AM Peak Hour Corridor Vehicle Trips

LGA	Direction	2006	2011	2016	2021	2026
South West Sydney to Sydney North	Eastbound	555 (87)	579 (102)	612 (116)	647 (129)	668 (143)
	Westbound	480 (109)	505 (125)	524 (141)	538 (159)	557 (178)
South West Sydney to Sydney East	Eastbound	4697 (332)	5213 (381)	5512 (430)	5729 (475)	6039 (520)
	Westbound	2556 (346)	2809 (426)	2999 (507)	3143 (611)	3360 (715)

Table 14 summarises the potential growth in traffic along the corridor, reflecting all potential demand. The demand shown in Table 14 would not all relate to travel along the M5 Corridor as some would use parallel routes.

Table 14 Growth in Total AM Peak Hour Demand on M5 Corridor

Direction	2006	2011	2016	2021	2026
Eastbound	5,246 (419)	5,792 (483)	6,142 (5460)	6,376 (604)	6,707 (663)
Westbound	3,036 (455)	3,314 (551)	3,523 (648)	3,681 (770)	3,917 (893)
Two-way	8,282 (874)	9,106 (1,034)	9,647 (1,194)	10,057 (1,374)	10,624 (1,556)
%Growth on 2006		10% (18.3%)	16.5% (36.6%)	21.4% (57.2%)	28.3% (78%)

1.7 Indicative Preferred Option

Duplication of the M5 East Freeway from Cooks River, Mascot to King Georges Road, Beverly Hills. Several options are still under consideration, but for the purpose of this submission the assumed scope is:

- a new three lane westbound tunnel with portals in the vicinity of the current ones;
- the existing eastbound tunnel connected to the Princes Highway, Marsh Street and the northern link along the F6 corridor only;
- the existing westbound tunnel converted to eastbound and connected to General Holmes Drive only;
- widening to three lanes each way at the western end from the portals to the King Georges Road ramps;
- maintaining two lanes each way at the western end under King Georges Road; and
- maintaining two lanes each way at the eastern end from the portals to General Holmes Drive.

A northern link along the F6 corridor from the M5 East Freeway, Mascot to Euston Road, St Peters and Gardeners Road, Mascot, was subsequently incorporated into the indicative preferred option. Several options are still under consideration, but for the purposes of this submission the assumed scope is:

- a new road, two lanes each way along the F6 corridor from the M5 East Freeway to Euston Road at Campbell Street;
- upgrading Euston Road to two lanes each way from Campbell Street to Sydney Park Road; and
- Connections from the new road south of Campbell Street to Gardeners Road at Bourke Road."

1.8 Traffic Modelling of Tolling Scenarios

A preliminary traffic assessment has been undertaken utilising the traffic models detailed in Sections 1.3 and 1.4 to assess the changes in traffic volumes on key roads, including the M5 East Motorway and the North-South Link.

The following options have been assessed to determine the changes in traffic flows, potential revenue and Government contribution:

- with and without the Northern Link
- with the direct connection to the M5 East tunnels
- considering both tolled and untolled scenarios

Option F	M5 Expansion plus Northern Link (both tolled)
Option G	M5 Expansion plus Northern Link (both untolled)
Option H	M5 Expansion plus Northern Link (M5 Expansion only tolled)
Option I	M5 Expansion only (tolled)
Option J	M5 Expansion only (untolled)

A single tolling regime has been adopted for comparison purposes between the options. The regime adopted provides for:

Private vehicle	\$0.33/kilometre
Commercial vehicles	\$0.83/kilometre (2.5 times the private vehicle rate)

The results of the traffic assessment are detailed in Tables 15 to 17, including the Base Case where no improvements are provided.

The network VKT and VHT calculations from the traffic model are based upon AM peak hour flows which have been factored to daily flows using a value of 3000.

Table 15 Annual Network VKT and VHT Travelled by Forecast Year

Scenarios	2016	2026
VKT (km)		
Base Case	20849 (1719)	23690 (2285)
Option F	20851 (1724)	23687 (2289)
Option G	20873 (1727)	23698 (2291)
Option H	20848 (1724)	23686 (2290)
Option I	20855 (1724)	23690 (2290)
Option J	20875 (1727)	23704 (2291)
VHT (hours)		
Base Case	42352 (2734)	54390 (4044)
Option F	41638 (2648)	53385 (3922)
Option G	41625 (2666)	53414 (3953)
Option H	41608 (2647)	53339 (3920)
Option I	41797 (2662)	53612 (3942)
Option J	41813 (2680)	53685 (3975)

Note: Values in brackets are truck values
 Source: Appendix B - Halcrow MWT M5 East Expansion Traffic Modelling Report
 Draft – January 2009

As noted in Section 1.4 these VKT and VHT calculations are based upon 2001 Census and Journey to Work information. The updating of the traffic model to incorporate the 2006 census data and updated land use forecasts from the Australian Bureau of Statistics, will increase the 2026 population forecast by about 400,000 persons. These updates to the model are anticipated to impact on the VKT and VHT calculations resulting in greater benefits to be generated by the M5 Expansion project.

Table 16 Daily Forecasts on M5 Expansion and North-South Link for 2016 and 2026 (Tolled and Untolled)

Sections	2016		2026	
	AM	PM	AM	PM
Base Case				
M5 East (Eastbound)	4540	3420	4790	3590
M5 East (Westbound)	2390	4170	2410	4340
Northern Link (Northbound)				
Northern Link (Southbound)				

Option F	M5 Expansion and Northern Link (both tolled)			
M5 East (Eastbound)	6600	2540	7320	3180
M5 East (Westbound)	3240	5390	3880	5940
Northern Link (Northbound)	1760	440	2040	720
Northern Link (Southbound)	340	1040	770	1540
Option G	M5 Expansion plus Northern Link (both untolled)			
M5 East (Eastbound)	7850	4490	8350	4990
M5 East (Westbound)	4490	6360	4850	6730
Northern Link (Northbound)	2660	1540	2900	1730
Northern Link (Southbound)	1480	2700	1830	2910
Option H	M5 Expansion plus Northern Link (M5 Expansion only tolled)			
M5 East (Eastbound)	6680	2650	7410	3290
M5 East (Westbound)	3320	5560	4020	6060
Northern Link (Northbound)	2540	1340	2790	1520
Northern Link (Southbound)	1270	2490	1680	2720

Source: Halcrow MWT M5 East Expansion Traffic Modelling Report Draft – January 2009

Table 17 Daily Forecasts on M5 Expansion only for 2016 and 2026 (Tolled and Untolled)

Option I	M5 Expansion only (tolled)			
M5 East (Eastbound)	6130	2520	6860	3160
M5 East (Westbound)	3340	5390	3950	5850
Northern Link (Northbound)				
Northern Link (Southbound)				
Option J	M5 Expansion only (untolled)			
M5 East (Eastbound)	7370	4320	7840	4850
M5 East (Westbound)	4540	6180	4880	6600
Northern Link (Northbound)				
Northern Link (Southbound)				

Source: Halcrow MWT M5 East Expansion Traffic Modelling Report Draft – January 2009

1.9 Induced Travel

In the context of traffic forecasts with the project, when capacity increases are implemented in a road network there are a number of responses to the improved road capacity that travellers can make. These types of responses are sometimes collectively called "diverted trips" and include:

- Re-routing of trips onto different roads to take advantage of travel time savings.
- Redistribution of trips so that some trips switch to destinations that are now closer and require less travel time.
- Re-timing of trips.
- Mode shifts from transit or car passenger to car driver (i.e. an increase in car vehicle-kms).

Most traffic on the project road will be diverted trips from alternative existing routes which gain benefit from changes to their trip length or the speed and ease of travel. There is also the potential that additional travel can result that would have otherwise not occurred. This is sometimes called "induced traffic". Induced travel results from trips that would not have been undertaken without the road improvement and could include additional trips as a result of improved accessibility and land uses and patterns caused by the improved accessibility. There has been limited research in Australia on the implications of induced traffic. An initial appraisal of the relationship between induced demand and road investment is contained in Australia Road Research Board Research Report ARR 299 -Induced Demand and Road Investment – An Initial Appraisal.

For the preliminary modelling for the M5 Expansion project fixed trip tables have been used for and no induced demand has been assumed in the project patronage forecast and associated VKT and VHT estimations. Based on UK and US research and knowledge on other major infrastructure projects in NSW, the induced demand could increase patronage between 1% and 2%. Induced trips generate a benefit which is considerably less than that for existing trips. As this analysis has excluded induced traffic the amount of travel is slightly under-stated and the sum of the road user benefits is also understated by a small amount.

1.10 Independence of the Travel Demand Estimation Process

In regard to independence of forecasts and the degree of external or independent scrutiny, the following points are noted:

- The traffic model has been developed over several years for the development of several major infrastructure Sydney road projects.
- During the past three years the MWT traffic model has been extensively reviewed with regards to the land use, population and employment assumptions in the development of the M4 extension project. This model has been used as the base model for the M5 Expansion project with further updating of population and employment estimates from the Transport Data Centre.
- During the development of the MWT traffic model for several road projects, the RTA has reviewed model parameters and practicality of assignment methodology. This demonstrated rigorous scrutiny on model parameters being used in forecasting project patronage.
- As noted previously the MWT traffic model has been progressively updated based upon updated information from reviews of the Transport Data Centre Strategic Transport Model and calibrated by MWT against traffic count data and travel speeds.
- The MWT traffic model will be further revised subject to the release of further updates from the Transport Data Model Strategic Transport Model for the preparation of the M5 Expansion feasibility study in March 2009.

2.0 Economic Appraisal Method, Assumptions and Results

2.1 Strategic Cost Estimate

The November 2008 submission to Infrastructure Australia detailed the indicative preferred option as comprising:

- A new three lane westbound tunnel with portals in the vicinity of the current ones;
- The existing eastbound tunnel connected to the Princes Highway and Marsh Street only;
- The existing westbound tunnel converted to eastbound and connected to General Holmes Drive only;
- Widening to three lanes each way at the western end from the portals to the King Georges Road ramps;
- Maintaining two lanes each way at the western end under King Georges Road;
- Maintaining two lanes each way at the eastern end from the portals to General Holmes Drive; and
- A surface Road Link connecting Marsh Street to Euston Road, St. Peters.

Since the submission to IA several options have been developed for the surface road northern link along the F6 corridor from the M5 East Freeway, Mascot to Euston Road, St Peters and Gardeners Road. For the purposes of this submission the assumed scope is:

- a new road, two lanes each way along the F6 corridor from the M5 East Freeway to Euston Road at Campbell Street;
- upgrading Euston Road to two lanes each way from Campbell Street to Sydney Park Road; and
- Connections from the new road south of Campbell Street to Gardeners Road at Bourke Road."

A strategic estimate of cost has been prepared for the M5 Expansion only and the M5 Expansion combine with the North-South Link. These strategic estimates are detailed in Table 18 and 19 respectively.

2.2 Economic Assessment

- *Detailed report of the economic methodology used, including all parameters and values used, assumptions, algorithms; population growth, discount rates, etc.;*

The economic methodology used is as set out in the RTA's Economic Analysis Manual and National Guidelines for Transport Systems management in Australia Guidelines for Project Evaluation.

The parameters, values used, assumptions and discount rates were provided in part B of the Summary of Initiative Appraisal (refer section 1 of this report). The algorithms are as set out in the detailed disaggregation information and additional information is available in the review of the excel calculation worksheet provided. The population growth forecast is prepared by NSW governments Transport Data Centre.

- *A detailed disaggregation of the results of economic modelling, including a detailed quantitative breakdown and qualitative explanation of each benefit type for each modelled year and the calculation used to derive that benefit, including all the information set out in tables 3 & 4 below*

An economic and financial assessment of the following five alternative construction and tolling scenarios has been undertaken based on the preliminary traffic modelling. The alternatives considered were:

Option F	M5 Expansion plus Northern Link (both tolled)
Option G	M5 Expansion plus Northern Link (both untolled)
Option H	M5 Expansion plus Northern Link (M5 Expansion only tolled)
Option I	M5 Expansion only (tolled)
Option J	M5 Expansion only (untolled)

A detailed quantitative disaggregated breakdown of the results of the economic modelling are set out in the tables 3 & 4 and as set out in Section 2.3. In addition the excel calculation worksheets provide additional information, contained in Appendix 3, if required. A summary is provided in Table 20 below:

Table 20 Summary of M5 Expansion BCR Summary

Option	BCR Summary (7% Discount Rate)				
	Option F	Option G	Option H	Option I	Option J
BCR (with assumed WEB's) *	2.02	1.79	2.03	2.35	2.12
BCR (direct user benefits only)	1.55	1.38	1.56	1.81	1.54
NPV (\$m, 2008 dollars) i.e. 'Net Benefit'	\$1,837	\$1,260	\$1,845	\$1,706	\$1,147
NPV / \$	0.6	0.4	1.6	1.0	0.7
IRR	10.8%	9.7%	11.1%	12.5%	11.2%

Details of the economic assessment, including the assumptions and sensitivity analysis are detailed in Section 2.3

The economic inputs provided from the Halcrow modelling are expanded from AM peak hour modelling. This has the ability to slightly skew the results compared to a more detailed analysis using AM & PM peaks, inter-peak and off-peak traffic segments. For example the analysis suggests that an untolled M5 Expansion project would not deliver the BCR that a tolled expansion would achieve. This is due to the higher congestion that an untolled motorway achieves during peak hour but neglects to value the benefits during inter-peak periods where available capacity is better utilised. This more detailed analysis will be performed in future studies.

The BCR of the project including the Northern link is lower than the BCR of the M5East tunnel duplication due to the relatively high cost of the Northern link and the lower traffic volumes that divert to use the road. It should be noted that the marginal BCR of the Northern link is still greater than 1 (i.e. approx BCR of 1.2).

The qualitative explanation of each benefit type is set out below.

- Travel time savings – The majority of the economic benefits are derived by car users achieving better travel times on the network. Given the heavily congested route of the M5 corridor the addition of new infrastructure will deliver significant savings.
- Vehicle operating costs, safety benefits and externalities – These benefits/disbenefits are all factors driven by travel distance or vehicle kilometres travelled. For the majority of scenarios the number of vehicle kilometres travelled for both cars and trucks increases as a result of the project. This is due to the project being a duplication of an existing piece of infrastructure which attracts traffic to the faster travel speeds to the detriment of total distance travelled.
- Wider Economic Benefits – no further detailed analysis has been prepared to more accurately quantify the percentage attributed to

these benefits since the analysis provided in the October and November submissions.

To date, given the strategic analysis stage of this projects design, no external consultants have been engaged to provide reports on the options being analysed.

2 Delivery – project risks, governance and timing

Table 17: Deliverability Assessment Information

Criteria	Descriptors
<p>1. Need for Commonwealth funding</p>	<p><u>1.1 - Question</u> Does the project deliver an effective and efficient response to addressing an identified funding need?</p> <p><u>Response to Q1.1</u> The M5 Expansion (herein referred to as "the project") is a proposal for additional infrastructure to reduce congestion along the corridor and increase the efficiency of transportation of goods and services between the Sydney's south and southwest and west by increasing the capacity of the M5 Transport Corridor to meet the forecast future demand through the corridor.</p> <p>This increase in demand will be as a consequence of growth in population and employment along the corridor particularly as a result of:</p> <ul style="list-style-type: none"> • Development of the South West Growth Centre • Expansion of Port Botany • Growth in passenger movements at Sydney Airport and commercial/retail development on Sydney Airport land <p>In terms of goal definition the project would:</p> <ul style="list-style-type: none"> • Remove the transport bottleneck long the M5 Corridor between Port Botany/Sydney Airport and Western Sydney which has considerable economic cost in terms of lost productivity , particularly with regards to the movement of freight • Improve connection between Port Botany/Sydney Airport, freight distribution centres and the National Highway Network • Enable expansion of business clusters along the corridor by encouraging trade between markets in goods, services and information • Linking Western Sydney (third largest economy in Australia) with Port Botany, Sydney Airport and central CBD • Opportunities for better utilisation of existing land in the M4 and M7 corridors • An efficient and well functioning transport network will encourage continued growth in population and trade in and between key centres and opportunities for improved public transport, social equity through access to jobs and services and equitable distribution of employment. • Improved travel conditions will provide significant benefits in improved quality of life and local amenity

Criteria	Descriptors
	<p>Should funding not be made available for implementation of the M5 Expansion, due to the forecast increase in transport demand as a consequence of land use developments along and adjacent to the corridor this would result in increased congestion and travel time for private and commercial vehicles along the M5 transport corridor.</p> <p>The results of this increased congestion will be impacts on economic productivity with consequential impacts on the economic growth of Sydney and Australia and Australia's global competitive advantage.</p>
	<p><u>1.2 - Question</u> Has the project taken into account the relevant market structure and pricing mechanism?</p> <p><u>Response to Q1.2</u> <i>Relevant Road Network market structure</i></p> <p>The M5 expansion project forms part of the Sydney Orbital network in the South Western section of the ring road. The M5East tunnel is an untolled section of the Orbital and is abutted by the M5West where there is a cashback scheme which refunds tolls paid by non-business users. The concession on the M5West is currently due to expire in 2023, however the NSW Government has received an unsolicited proposal from Interlink Roads, the Motorway operator, to widen the M5 West. The proposal includes a request for a concession term extension.</p> <p><i>Pricing mechanism</i></p> <p>The M5 expansion has been tested using a distance based toll (pricing mechanism) where cars are charged 33 cents per kilometre and trucks 83 cents per kilometre (i.e. 2.5x cars) in 2008. This distance based pricing is in line with the successful M7 project but is significantly less than recent urban tunnel toll rates (i.e. compared to Cross City Tunnel (\$1+ per km and Lane Cove Tunnel approx 60 cents per km).</p> <p>Besides assessment of the project as a stand alone project there is potential to view the pricing regime on a corridor basis. This could include incorporating a corridor tolling regime which covers both the Eastern and Western section of the M5 covering a 30 year concession period (i.e. beyond the expiry of the existing M5West concession term).</p>

	<p><u>1.3 - Question</u> Can the private sector partially or fully fund the project in return for the revenues?</p> <p><u>Response to Q1.3</u></p> <p>See comments in previous Section 2.3 – Financial Assessment</p>
	<p><u>1.4 - Question</u> Why should the Australian government rather than State or Council government fund the project – what is the national interest?</p> <p><u>Response to Q1.4</u></p> <p>The M5 Corridor provides a direct link between the key centres of Port Botany/Sydney Airport with the freight distribution centres located in south western and western Sydney and the Auslink National Network along the eastern seaboard of Australia.</p> <p>The corridor currently experiences high levels of congestion resulting in increased travel time for private and commercial vehicles impacting of economic productivity and the growth of Sydney's and Australia's economy.</p> <p>The predicted increase in transport demand along the corridor will only add to the existing poor traffic conditions further impacting on Australia's economic growth.</p> <p>As detailed in the RTA's IA submission documentation (<i>Ref. 13</i>) the project contributes in a significant way to the National Strategic priorities:</p> <ul style="list-style-type: none"> ▪ Expand Australia's productive capacity - A reduction in overall travel times and costs and thus increased efficiency of transportation of goods and people between Sydney's south, southwest and west be a positive outcome for Australia productive capacity. ▪ Increase Australia's productivity - Investing in new infrastructure within the existing M5 Transport Corridor will increase the capacity of the transport network with a resultant reduction in congestion, improved traffic flow and increased productivity. The increased productivity will principally be achieved through: <ul style="list-style-type: none"> ➢ Improved transfer of freight from Port Botany to the logistic centres in Western Sydney ➢ Improved distribution of goods from the logistic centres and intermodal terminals at Enfield and Moorebank to the wider Sydney area ▪ Diversify Australia's economic capabilities - The increased transport efficiency and the resulting improved productivity may lead to opportunities to encourage diversification of Australia's economy through:

- Improved connectivity between major importing centres to deliver a wide range of goods for various commercial entities
- Improved access through reduced travel times between importing centres and growth centres such as the Western Sydney Employment Hub and the South West Growth Centre

- **Build on Australia's global competitive advantages** – Increased capacity of the transport network will support Australia's global; competitive advantage by improving the efficiency of access to key centres within the corridor and across wider Sydney.

- **Develop our cities and regions** - The expansion of the capacity of the transport network will relieve the existing congested travel conditions and cater for future demand on the corridor, between the CBD and western Sydney. An efficient and well functioning transport network will encourage continued growth in population and trade in and between the key centres.

An efficient and reliable transport network will also provide opportunities for improved public transport, social equity through access to jobs and services, urban form along the existing corridor and employment distribution across Western Sydney and the CBD.

Improved access to and from Sydney Airport supports Sydney as the major gateway to Australia for overseas tourists

- **Reduce greenhouse gas emissions** – Support the reduction of greenhouse gases from vehicles emissions, particularly heavy vehicles, through improved traffic flow along the corridor, including reduced congestion on existing M5 Corridor,

Expansion of the existing Motorway infrastructure provided greater opportunities for promoting pedestrian and cycle facilities in the corridor.

- **Improve social equity, and quality of life, in our cities and regions** - The improved travel conditions for all road users through the corridor will result in significant benefits through reduced noise and improved air quality, reduce the potential for encroachment of vehicles onto the surrounding surface arterial road network, health and well-being benefits for local and regional transport users

Improved connectivity between residential areas and centres of community activity such as the eastern and southern beaches, the Western Sydney Parkland and educational and health facilities

- **Strengthen linkages** – The implementation of the project is consistent with the following State and Federal Government policies and strategies

- NSW State Infrastructure Strategy NSW 2006-07 to 2015-16
- Urban Transport Statement

	<ul style="list-style-type: none"> ➤ 2007 Sydney Urban Corridor Strategy ➤ Sydney Airport Master Plan 2009 ➤ NSW Government State Plan ➤ City of Cities – Sydney Metropolitan Strategy
	<p><u>1.5 - Question</u> What is the proposed State/Council funding contribution for the project?</p> <p><u>Response to Q1.5</u> The NSW State Government has no allocation in its forward budget estimates for the project.</p>
	<p><u>1.6 - Question</u> What other sources of Commonwealth funding are being provided for the project?</p> <p><u>Response to Q1.6</u> The Federal Government has provided \$5 million to undertake a feasibility study to identify potential improvements to the M5 Transport Corridor.</p>
	<p><u>1.7 - Question</u> Where a balance of funding sources is envisaged, does the balance reflect the respective interests of the funders?</p> <p><u>Response to Q1.7</u> It is proposed that the project may be fully funded from the Building Australia Fund or partially funded by the Building Australia Fund, the NSW Government and the private sector.</p>
	<p><u>1.8 - Reference documents/information</u></p>
2. Construction risks and budgetary implications	<p><u>2.1 - Question</u> Does the project pose particular construction risks due to nature of the engineering, location, geography or geology?</p> <p><u>Response to Q2.1</u> The indicative preferred option comprises two main parts, the M5 Expansion and the North-Soth Link. The M5 Expansion generally involves the construction of a new three lane westbound tunnel adjacent to the existing M5 East tunnels. The existing M5 East tunnels were excavated generally through Sydney sandstone and no significant geotechnical features were encountered during the works.</p> <p>Currently a desk top review of the geotechnical investigations undertaken from the original construction works is being undertaken as part of the feasibility study and to identify any requirements for supplementary investigations during the</p>

	<p>detailed concept design phase.</p> <p>The Northern Link comprises a surface road, generally as an elevated structure through the existing F6 road corridor. The location of the project in the vicinity Sydney Airport has potential risks related to impinging on the AOL . Details of the AOL have been obtained from Sydney Airports Corporation Limited (SACL) for incorporation into the current concept design.</p> <p>The RTA has extensive experience in managing contractors in the construction of major motorways, including tunnel projects, and delivering projects to meet scope, quality, time and cost targets.</p> <p>Risk management workshops will be held during the development, procurement and delivery of the project.</p>
	<p><u>2.2 - Question</u> What scale of financial risks do these pose?</p> <p><u>Response to Q2.2</u> As noted in the response to Q2.1 the RTA is currently undertaking a desk top assessment of current geotechnical information from the original construction of the M5 East freeway.</p>
	<p><u>2.3 - Question</u> Have those risks been adequately assessed in the construction costs assessment?</p> <p><u>Response to Q2.3</u> The assessment of construction deliverability risk and the allocation of associated costs on a likelihood basis is accounted for in the cost estimate and is based on the best information available at the time.</p>
	<p><u>2.4 - Question</u> Can the project be staged to reduce risks/improve manageability?</p> <p><u>Response to Q2.4</u> The construction timeframe for the project would be between three to four years. The M5 Expansion comprised two components a new three lane westbound tunnel, including reconfiguration of the existing tunnels and a North_South Link connecting the M5 East tunnel with the south-western CBD.</p> <p>Each of these components would need to be delivered as a whole and to ensure efficient operation of the road network both components would need to be constructed concurrently.</p>

	<p><u>2.5 - Question</u></p> <p>Is there sufficient capacity to ensure the delivery of the project and realisation of benefits including relevant skills and expertise both during and post construction?</p> <p><u>Response to Q2.5</u></p> <p>Yes. There are a small number of contractors in Australia who would have sufficient resources and financial capacity to undertake a project of this magnitude with an estimated project cost of \$3.5 billion (2008). A number of these contractors are currently engaged with other infrastructure projects on the Hume Highway, Pacific Highway, Great Western Highway, South-East Queensland and other areas. These projects are at different stages of delivery and a steady stream of new projects coming online assists contractors to maintain their established management and resource structures for large projects. The 3 - 4 year construction timeframe for the project would provide opportunity for contractors to optimise their resources and plant across a range of projects.</p> <p>The proposed design and construct procurement model discussed in Response 7.1 will ensure the benefits of competitive tendering are well achieved. On previous projects of such size it has sometimes been the practice of the major contractors to form joint ventures for the purpose of tendering and delivery, in order to pool resources and reduce risk to a manageable size. An alternative approach which the RTA could consider would be to tender the project in two parts, to be constructed simultaneously.</p>
	<p><u>2.6 - Reference documents/information</u></p>
<p>3. Consequential construction risks</p>	<p><u>3.1 - Question</u></p> <p>Have any consequential risks to the wider network been identified?</p> <p><u>Response to Q3. 1</u></p> <p>At this stage of the project development the key consideration with regards to the impacts on the wider network have generally comprised:</p> <ul style="list-style-type: none"> • Connecting the new westbound tunnel with the existing M5 East freeway • Balancing traffic flows east and west of the tunnel portals • The current operation of General Holmes Drive, and in particular the Airport Tunnel. <p>Several alternative connections between the new westbound tunnel and the existing M5 East freeway have been investigated. These alternative are current being assessed considering several factors including environmental impact, constructability and cost</p>

	<p>As part of the investigations into these tunnel connections work has also been undertaken to consider the balancing of traffic flows onto the western section of the M5 Corridor.</p> <p>The existing eastbound two lanes M5 East tunnel provides a direct connection to General Holmes Drive and off-ramps to access Princes Highway and Marsh Street. As a consequence two full traffic lanes of traffic do not directly access General Holmes Drive.</p> <p>The proposed M5 Expansion project provides for the existing eastbound tunnel to only access Princes Highway and Marsh Street and the proposed reconfiguration of the existing westbound tunnel to an eastbound tunnel would provide for two free flow lanes of eastbound traffic to access General Holmes Drive. This configuration has the potential for General Holmes Drive, and in particular the Airport Tunnel in particular, to operate over capacity during peak hours.</p> <p>In order to reduce the potential saturation of General Holmes Drive a North-South link has been developed which provides a connection between the M5 East tunnels and the south-western CBD. It is anticipated that this North-South Link would access from the existing eastbound tunnel and which would reduce the traffic accessing General Holmes Drive. The provision of the North-South Link would also provide an alternative access to the CBD when breakdowns or accidents impact on the operation of General Holmes Drive.</p> <p>Further traffic assessment will be required to scope the potential for any additional work required on the existing road network in the southern CBD, where the Northern Link connects to Euston Road to enable filtering of the traffic to the key areas of the CBD.</p>
	<p><u>3.2 - Question</u> Will delivery require associated works to enable new project to succeed in practical terms? (NB such information should form part of the CBA).</p> <p><u>Response to Q3.2</u> See Response 3.1</p>
	<p><u>3.3 - Question</u> What is the scale of likely works? Have these been costed?</p> <p><u>Response to Q3.3</u> See comments in Response 3.1</p> <p>The estimated cost for the North-South Link have been included in the strategic cost estimate for the overall project.</p>

	<p><u>3.4 - Question</u></p> <p>Has consideration been given to the requirements that will need to be addressed prior to construction of the project including relevant approvals, land acquisition and planning?</p> <p><u>Response to Q3.4</u></p> <p>Part 3A of the Environmental Planning and Assessment Act, 1979, provides a process for the NSW Minister for Planning to independently determine whether to proceed with a major infrastructure project, following preparation and public exhibition of an environmental assessment and an independent review and assessment by the NSW Department of Planning. It would enable the entire proposal to be assessed under one process and would streamline approval requirements.</p> <p>Based on a preliminary assessment, an appropriate assessment and approval pathway under Part 3A is identified as follows:</p> <ul style="list-style-type: none"> • Specific declaration under Section 75B (1) which identifies the regional significance of traffic benefits. • RTA as proponent of the proposal. • Project level environmental assessment (a concept plan is not considered appropriate, given the level of route option analysis completed to date). • Critical infrastructure declaration recognising the importance of the project to NSW. <p>It is noted that the proposal would require an Environment Protection Licence from the NSW Department of Environment and Conservation for construction and may trigger other NSW statutory approvals and/or licences.</p> <p>If the proposal requires works within the Commonwealth land at Sydney Airport, it would also require approval under the Commonwealth Airports Act, 1996. In addition, the Commonwealth Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act), identifies a number of possible triggers for approval including impacts on threatened species and communities. Based on investigations completed to date a number of ecological communities listed under the EPBC Act are located in close proximity to the M5 Transport Corridor. The need for referral to the Department of Environment, Water, Heritage and the Arts (DEWHA) would be considered once detailed flora and fauna surveys are undertaken.</p> <p>Additional approval requirements would be identified as the development and assessment of the proposal progresses.</p>
	<p><u>3.5 - Question</u></p> <p>Has the project identified how the infrastructure will be operated and maintained following construction?</p>

	<p><u>Response to Q3.5</u> See comments in Response 7.1.</p> <p>The development of the procurement and delivery strategy for the project as part of the feasibility study would also consider the operation and maintenance of the project.</p>
	<p><u>3.6 - Reference documents/information</u></p> <p>No references in this section.</p>
<p>4. Financing risks where private finance is involved and scale of potential public sector exposure</p>	<p><u>4.1 - Question</u> What is the scale of private capital required?</p> <p><u>Response to Q4.1</u> The scale of private capital required depends on the amount and timing of the government contribution which are discussed in Section 2.4.</p>
	<p><u>4.2 - Question</u> Is a competitive market for the provision of private capital likely given the location and type of project?</p> <p><u>Response to Q4.2</u> There has historically been a competitive market for the provision of private capital for toll road projects given the relatively stable cashflows with increases in toll rates (and therefore profitability) linked to CPI. This type of cashflow is looked upon very favourably by investors with longer term investment horizons (like super funds and foreign wealth funds).</p> <p>In addition toll roads which no longer have initial traffic and ramp up risks are looked upon very favourably by pension funds where their payment obligations are linked to CPI and therefore the investment returns match their liabilities.</p> <p>In recent years the competitive market became overheated due to the availability to access large volumes of very inexpensive capital. This has lead to a series of greenfield toll road projects where the financial forecasts, primarily traffic forecasts, have proven to be overly optimistic leading to losses by equity providers and a flow on reduction in equity appetite for greenfield toll road assets.</p> <p>Another factor is the global shortage of debt finance. This shortage of funds has resulted in the delay in the tendering for the most recent Queensland toll road project.</p> <p>It is envisaged that these issues will correct over time and that the short term negative outlook will resolve itself when there is ability to focus on the strong cashflows toll roads generate.</p>

	<p><u>4.3 - Question</u> Have risks been allocated appropriately?</p> <p><u>Response to Q4.3</u> The RTA is currently managing 8 motorway concessions in the Sydney basin with the oldest being the Sydney Harbour Tunnel (opened 1992) and the most recent being Lane Cove Tunnel (opened 2003). During this period there has been a growing maturity surrounding the risk allocations in the concession deeds which have also evolved to meet market conditions which were current during the negotiations.</p> <p>The risk allocation has also been recently aided by the provision of draft national guidelines for the development of PPP transactions.</p> <p>Given the recent changes to the availability of capital and investor concerns about the allocation of traffic risk, there is potential for some reallocation of risk.</p> <p>The allocation of risks would be undertaken in accordance with the State Government's Working with Government policy and any appropriate Federal Government policy should Federal funding be forthcoming.</p>
	<p><u>4.4 - Question</u> Is patronage risk a major unknown and if so will private financing offer value for money?</p> <p><u>Response to Q4.4</u> As noted above, traffic (patronage risk) is considered a major unknown by the private sector when developing greenfield toll road projects. In the case of the M5 Expansion, the majority of the project is the duplication of an existing piece of infrastructure (i.e. the M5 East tunnel) where the current traffic levels are well known. Complicating this analysis is the unknown impact of traffic diversion should the currently untolled road become a toll road and also the impacts of toll decisions on the M5West where the existing concession is due to expire in 2023 and also the future direction of the current cashback scheme.</p> <p>In this environment a wide spectrum of financing and tolling possibilities will need to be explored to achieve the best value for money outcome.</p> <p>Further traffic modelling will be undertaken for the feasibility study to confirm or revise these patronage figures</p>
	<p><u>4.5 - Reference documents/information</u></p>

<p>5. Environmental risks</p>	<p><u>5.1 - Question</u> Have any major environmental impacts or risks been highlighted in the project Cost Benefit Analysis?</p> <p><u>Response to Q5.1</u> The preliminary environmental investigation for the M5 Transport Corridor involved a consideration of constraints mapping, as well as specialist qualitative assessments evaluating noise and vibration, air quality and biodiversity issues. It considered environmental issues and constraints in the context of a range of options for the corridor and canvasses potential impacts for the indicative preferred option.</p> <p>Potential environmental impacts identified for the indicative preferred option included changes to the visual landscape, as well as the traffic and noise of the region. The constraints analysis also illustrated potential risks associated with acid sulphate soils, contaminated sites and areas of high biodiversity value within the study area, particularly in the eastern section. Potential community concern regarding health effects, location of ventilation outlets, property and amenity impacts were also identified.</p> <p>In general, any environmental constraints would be avoided or managed via appropriate mitigation measures. Further environmental assessment and extensive community consultation would be undertaken during design development.</p>
	<p><u>5.2 - Question</u> What is the potential scale of impact?</p> <p><u>Response to Q5.2</u> The preliminary environmental investigation has not identified any potential significant environmental impacts which could not be addressed through appropriate management or mitigated techniques.</p>
	<p><u>5.3 - Question</u> Has a mitigation strategy been described?</p> <p><u>Response to Q5.3</u> Based upon the preliminary environmental investigations undertaken at this stage of the feasibility study a set of preliminary mitigation strategies has been prepared and are contained in the <i>Preliminary environmental Investigation report</i> – Manidis Roberts - January 2009 – Draft. A copy of the preliminary mitigation strategy is contained in Appendix 4.</p> <p>Detailed mitigation strategies would need to be developed during the detailed environmental assessment</p>

	<p><u>5.4 - Reference documents/information.</u></p>
6. Social and other risks	<p><u>6.1 - Question</u> Have any major social impacts or risks been highlighted in the Cost Benefit Analysis?</p> <p><u>Response to Q6.1</u> Social impacts include air quality changes, noise impacts, impacts on travel opportunities, impacts on social character, safety and security, views, pedestrian amenity, local open space and access. The proposal would improve capacity and connectivity and the tunnel section would avoid severance impacts.</p>
	<p><u>6.2 - Question</u> What is the potential scale of impact?</p> <p><u>Response to Q6.2</u> A full assessment of the scale of impacts will be undertaken for the preparation of the feasibility study in March 2009</p>
	<p><u>6.3 - Question</u> Has there been community engagement/consultation?</p> <p><u>Response to Q6.3</u> At this stage of M5 Transport Corridor feasibility study the community engagement has been limited to consultation with key stakeholders, generally Government Authorities, in the vicinity of the project, such as the Sydney Airports Corporation Limited, to provide input to the development of the current concept design.</p> <p>A process of mapping community issues has been undertaken for the feasibility study to identify key community and stakeholders. A community engagement/consultation strategy would be developed as part of the feasibility study. This consultation strategy would be updated progressively through the environmental approval, procurement and delivery phases of the project to ensure the community and stakeholders are provided appropriate and accurate information to provide input throughout the project lifecycle.</p>
	<p><u>Question 6.4</u> Has a mitigation strategy been described?</p> <p><u>Response to Q6.4</u> See response to Q6.3</p>
	<p><u>6.5 - Question</u> Have political risks been identified and assessed?</p>

	<p><u>Response to Q6.5</u></p> <p>The preliminary mapping of community issues has identified a range of broad issues at this stage. There is wide community interest in the current congestion on the M5 Corridor during peak periods and the operation of the M5 East Tunnel in particular.</p> <p>The community engagement/consultation strategy to be prepared would address the community issues.</p>
	<p><u>6.6 - Question</u></p> <p>Have any other risks been identified and assessed?</p> <p><u>Response to Q6.6</u></p> <p>No other social risks have been identified and assessed at this time.</p>
	<p><u>6.7 - Reference documents/information</u></p>
7. Governance model	<p><u>7.1 - Question</u></p> <p>Is a Governance model specified?</p> <p><u>Response to Q7.1</u></p> <p>At this stage of the project development the procurement and delivery strategy for the M5 Expansion project has not been developed. Based on the current financial assessment of the project detailed in Section 2.3 Financial Assessment, the project would be delivered through partial or full funding from the Australian and/or NSW Governments with potential partial funding from the private sector.</p> <p>Alternative strategies which would be considered for the delivery, maintenance and operation of the project may include:</p> <ul style="list-style-type: none"> • Design, Construct, Maintain and Operate (DCOM) Contract funded by the Australian or NSW Government • Government funded tollroad under a DCOM Contract • Privately partially funded tollroad, with a Government contribution <p>A preliminary assessment of the procurement and delivery strategy would be prepared as part of the M5 Transport Corridor feasibility study and further developed during the environmental assessment process.</p> <p>It is proposed that the NSW Roads and Traffic Authority as the key stakeholder would manage the construction, operation and maintenance of the project on behalf of the Federal and NSW governments.</p>
	<p><u>7.2 - Question</u></p>

	<p>Does the model create the right incentives on all parties?</p> <p><u>Response to Q7.2</u> See comments in Response 7.1</p> <p>Operational management would be the responsibility of the RTA. As demonstrated in the RTA Annual Report 2008), the RTA currently manages a road network comprising nearly 18,000 km of State roads (including 4,269 km of AusLink network and 161 km of privately-funded toll roads) throughout the State. The RTA's primary responsibilities are to manage the road network to maintain travel times, improve road safety, provide road capacity and maintenance solutions, driver licensing and vehicle registrations.</p> <p>The RTA continually reviews international practices in road safety, maintenance and network management. Sustainable practices and environmental management are intrinsic to the way the RTA works.</p>
	<p><u>7.3 - Question</u> Does the model allocate risks to those best placed and incentivised to manage them?</p> <p><u>Response to Q7.3</u> See comments in Response 7.1 and 7.2</p>
	<p><u>7.4 - Question</u> Are all relevant players included or are key players excluded?</p> <p><u>Response to Q7.4</u> See comments in Response 7.1.</p>
	<p><u>7.5 - Question</u> What is the proposed ownership or leasing structure?</p> <p><u>Response to Q7.5</u> The project asset, including the land within the road boundaries and built structures, would be owned by the NSW Roads and Traffic Authority and would be managed by the Authority by the powers vested in it by the NSW Roads Act 1993.</p> <p>In the event that the project is delivered as a privately funded tollroad then the land required to construct, operate and maintained the tollroad would be leased to the successful private sector consortia</p>

	<p><u>7.6 - Question</u> Does ownership/leasing align with risks and incentives?</p> <p><u>Response to Q7.6</u> RTA ownership and leasing of land to the private sector consortia, if required, aligns with project risks and incentives.</p>
	<p><u>7.7 - Question</u> Does the ownership structure drive delivery and operational efficiencies?</p> <p><u>Response to Q7.7</u> The RTA, on behalf of the public, and as owner and overall manager of the project, will ensure value for money in delivery of the project by the private sector, and will ensure that the project objectives and public interest are achieved.</p> <p>Under the proposed procurement and governance model for the project the construction contractor would be engaged under a competitive tendering process appropriate to either full or partial Government/private sector funding. This would encourage efficiency, innovation and competitiveness.</p>
	<p><u>Q7.7 - Reference documents/information</u></p> <p>RTA Annual Report 2008.</p>

2.2 Specific request for information relating to M5 Expansion

<p><i>Include consideration of an increased mode shift to rail for containers leaving Port Botany and travelling to Moorebank, provided by an unsolicited private proposal received by IA, as a sensitivity test. The proposal claims up to 85% of containers could be carried by rail out of Port Botany by 2030. Predicted mode shift data over time to be provided by IA. Impacts on BCR and recommended timing of construction to be considered</i></p>	<p>Preliminary traffic modelling has been undertaken assuming an allocation of 85% of the containers entering Port Botany is transported by rail. The option used for this assessment is Option H which comprises a tolled M5 Expansion and an untolled North-South Link.</p> <p>The tables below compare the 2016 and 2026 car and truck volumes during the AM and PM peaks for the two scenarios. These results indicate, as could be expected, a reduction in truck movements through the M5 East tunnel, however the reduction is not significant, up to 100 trucks in the AM peak, which indicates that although the Port Botany traffic is key component of the truck movement in the tunnel a significant volume of trucks have alternative origins.</p> <p>Additionally there is a consequential increase in the volume of private vehicles with the reduction in truck movements indicating the demand for private vehicle movement through the Corridor.</p> <p>From this modelling it can be concluded that although the total truck movements through the M5 East tunnel is approximately 8% of all traffic any reduction in truck movements there will continue be significant vehicle movements through the tunnel and any spare capacity will be filled by the the latent demand for the Corridor.</p>
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2016	Option H (20% by rail)				Option H (85% by rail)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Car	Truck	Car	Truck	Car	Truck	Car	Truck
M5 Westbound	2478	839	5094	826	2496	768	5201	738
M5 Eastbound	5914	763	2338	477	5949	732	2341	457
North-South Northbound	2296	240	1252	176	2275	240	1248	176
North-South Southbound	1037	235	2419	233	1030	233	2420	234

2026	Option H (20% by rail)				Option H (85% by rail)			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Car	Truck	Car	Truck	Car	Truck	Car	Truck
M5 Westbound	2870	752	5439	1009	2937	1032	5626	898
M5 Eastbound	6534	466	2898	600	6587	836	2903	576
North-South Northbound	2528	259	1394	222	2510	260	1387	219
North-South Southbound	1361	323	2595	297	1336	323	2595	297

<p><i>Comment on and compare traffic flow performance in AM and PM peaks, where the number of lanes in peak direction switches between 3 and 4 lanes</i></p>	<p>The current AM peak period occurs over a more compressed time period than the PM peak. This spreading of peak in the PM reduces the need for a comparable number of lanes within the westbound tunnel as the eastbound tunnels.</p>
<p><i>Comment on and explain the reasons for decrease in BCR due to the addition of the northern link road to southern Sydney. Will this still hold with new traffic forecast figures ?</i></p>	<p>The BCR for the combined M5 Expansion and the North-South Link decreased from the BCR calculated for the M5 Expansion only.</p> <p>The cost of the M5 Expansion only is \$2.1 b while the combined M5 Expansion and North-South-Link is \$3.4 b.</p> <p>The traffic modelling at this stage utilises fixed trip tables and the modelling indicates that vehicles will tend to travel a greater distance to obtain a reduced travel time travelling on the North-South Link and the benefits generated by the provision of this Link are less than for the M5 Expansion thereby reducing the BCR.</p> <p>The marginal BCR for the North-South Link only has been calculated at a value of 1.2. This indicates the level of benefit achieved from the North-South Link consequential of the reduction which occurs from combining the M5 Expansion and North-South Link.</p>

<p><i>Discuss northern link options considered around Sydney Airport, compliance with SACL Masterplan, benefits gained by airport and any changes to SACL roads where SACL might be expected to contribute</i></p>	<p>The forecast increase in traffic generation from the growth of Sydney Airport has been included in the preliminary traffic modelling for the project and is detailed in Section 1.6..</p> <p>SACL has been consulted in the development of the current concept design for the North-South Link. Several alternative arrangements for changes to Airport Drive were discussed and in principal agreement was reached on a preferred option. This preferred option separates the North-South Link from the any relocation of Airport Drive the provision for which would be the responsibility of SACL, should it be deemed necessary</p>
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3 Next Steps

The funding by the Federal and State Governments has been provided to prepare a feasibility study for enhancements to the M5 transport corridor by April 2009. At this stage preliminary works have been undertaken to:

- Assess the current and future transport demand to identify the need for improvements in Sydney's transport network along the M5 corridor to maintain and improve Sydney's and Australia's productivity and reinforce Sydney's current status as a global city
- Identify strategic options to meet the current and future transport demand along the M5 transport corridor
- Evaluation of the strategic options through the Strategic Merit Test to identify a short list of options which potentially meet the objectives of the Federal and State Governments
- Evaluation of the short listed alternatives through a multi-criteria analysis and rapid economic appraisal to identify an indicative preferred option for further development and investigation.

In order to prepare the feasibility study, further confirmation of the assessment of strategic alternatives, investigation and evaluation of the strategic options to confirm the indicative preferred options and detailed concept development and technical assessment undertaken on this option.

To this end the following activities will be undertaken to achieve these outcomes:

- • Finalise the review of the Sydney Transport Model by the Transport Data Centre to provide inputs to the traffic model
- • Update traffic modelling of the strategic options to assess changes in traffic flows on the Sydney road network for each option
- • Revise economic and financial modelling of the options to update economic and financial parameters for these options including benefit cost ratios, potential government contributions
- • Review the evaluation of strategic options to confirm the indicative preferred option
- • Undertake an assessment of the wider economic benefits of the indicative preferred option
- Undertake further concept development of the indicative preferred option, including:
 - Developing the connections between the indicative preferred option and the M5 East freeway in the vicinity of Bexley Road, Bexley North and Marsh Street, Arncliffe
 - Developing further the Northern Link including improved connections between the southern end of the Northern Link and eastern portals of the M5 East tunnel.

- • Undertake environmental, economic, financial and technical investigations and assessments as required to determine the feasibility of the indicative preferred option
- • Assess the alternative methods available for procurement and delivery of the indicative preferred option.

