Review of the F3 to M7 Corridor Selection

Hon. Mahla Pearlman AO

Australian Government

August 2007

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31 August 2007

The Hon Jim Lloyd MP
Minister for Local Government, Territories and Roads
Parliament House
CANBERRA ACT 2600

Dear Minister

I am pleased to present the Review report for your consideration.

I have given due consideration to the MWT 'Interim report – F3 to Sydney Orbital Corridor Review (March 2006)' and concluded the following:

1. that the assumptions and data used in the SKM 'F3 to Sydney Orbital Link Study 2004' were valid and reasonable at the time of the study;

2. that there have been changes affecting land use and transport flows since the SKM Study's publication, but that these changes reinforce the selection of the preferred route; and

3. that the SKM study recommendations progress as follows:

   a. the preferred route follow a Type A corridor Purple option and that this be progressed to the next stages of investigation including: detailed concept design, economic and financial assessment and environmental impact assessment; and

   b. a Type C corridor be planned now.

The NSW Government indicated in its submission to the Review its intention to develop a discussion paper on the connection of the F3 to the M2 and/or M7. I am confident that my Review has undertaken a sufficiently rigorous and detailed analysis of the proposed connection to both inform and direct any future NSW Government investigations. I would encourage both the Australian and NSW Governments to proceed directly with the next stages of a Type A Purple option link connecting the F3 to M2.

Yours sincerely

THE HON MAHLA PEARLMAN AO

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Terms of Reference for the Review

"Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

- whether the assumptions and data used in the *F3 to Sydney Orbital Link Study 2004* were valid and reasonable at the time of the study;
- whether changes since the report's publication affecting land use and transport flows in Western Sydney would support any significant changes to these projections; and
- whether any significant changes to those projections would alter the conclusions reached in the *F3 to Sydney Orbital Link Study* of April 2004".

Executive Summary

The Review Process

To reach my conclusions, I followed a process of calling for public submissions, holding meetings in public, analysing submissions and the presentations in public, obtaining data from the relevant authorities, and analysing that data.

Terms of Reference One

Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

- **whether the assumptions and data used in the *F3 to Sydney Orbital Link Study 2004* were valid and reasonable at the time of the study.**

I have concluded from my analysis that the assumptions and data used in the SKM Study were valid and reasonable at the time of the SKM Study.

The basis for my conclusion is as follows:

- SKM adopted a standard approach to its traffic modelling. It used inputs of the then current land use and network assumptions and adopted a standard process of calibrating the STM;
- the differences in SKM's land use projections (population and employment) and those predictions in current 2006 TDC data reflect more up to date census data and government policy;
- the current TDC data reinforces SKM's assumptions about population growth in Outer South Western Sydney, Inner Sydney and the Central Coast;
- the current TDC data reinforces SKM's assumptions that there would be a shift of employment to Western Sydney;
- so far as concerns person trips, there is a slight and insignificant difference (in the order of 0.3%) in 2011 projections of total vehicle distance travelled between SKM's forecast and the current TDC 2006 data;
- there is a close match between SKM forecasts of traffic volumes for 2001 with actual RTA AADT counts in 2002;
- at the highest level, and speaking broadly, there is a similar pattern of distribution of car trips across all SSDs between SKM's forecasts and those projections in the current TDC data; and
- SKM's projections of commercial vehicle origins and destinations are broadly consistent with the CTS 2003 origins and destinations.

Terms of Reference Two

Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

- **whether changes since the report's publication affecting land use and transport flows in Western Sydney would support any significant changes to these projections.**

I have concluded from my analysis that there have been policy changes affecting land use and transport flows but those changes would not support any significant changes to the projections in the SKM Study. To the contrary those changes reinforce the need for the Link.

The basis for my conclusion is as follows:

- there have been changes in terms of land use since the time of the SKM Study, and the *Metropolitan Strategy* sets out the most significant of these;
- projections of population and employment increase across the Sydney Region between 2001 and 2031, particularly within south western and north western Sydney and are likely to reflect the *Metropolitan Strategy*. However, the increase in population and employment is not large overall; the matter to notice is that the distribution is shifting;
- the projections for person trips to 2021 show a similar rate of growth between the 2001 data used by SKM and the current TDC 2006 data and the rate of growth to 2031 is also similar. This comparison shows that there is not forecast to be any significant change to the projected person trips in the SKM Study;
- in comparison and broadly speaking, the projections show less bus trips forecast in the current TDC 2006 data than in the 2001 data used by SKM, and hence there are projected to be more cars using the road network in 2021 than forecast by SKM but the relative change is not significant;
- there are differences in car driver trip projections between the 2001 data used by SKM and the current TDC 2006 data, but growth occurs in western and south-western Sydney and again reflects the *Metropolitan Strategy*;
- in terms of total car driver trips the current TDC 2006 data adopts a continuation of the growth rate used by SKM, and the largest difference in projected growth is likely to occur in western and south western Sydney, again reflecting the *Metropolitan Strategy*;
- the projections show that more car driver trips are taking place within the Central Coast rather than to/from the Central Coast reflecting the greater employment increase within the Central Coast;
- projected daily car trips in 2001, 2021 and 2031 show only a small proportion to and from the Central Coast and reveal a pattern of distribution east and west across the Sydney Region rather than north to south;
- there have been only minor changes in daily traffic counts since the opening of the M7 across all main roads and the motorways in the study area; and

- as far as can be derived from the available material, there is an indication that the origins and destinations of commercial freight vehicles might shift towards the Central Western SSD and such flows are likely to accord with the draft *Sydney Urban Corridor Strategy*. This is confirmed by recent M2 commercial vehicle traffic counts, which indicate that the majority of heavy vehicles are travelling west of Pennant Hills Road rather than east.

Terms of Reference Three

Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

- **whether any significant changes to those projections would alter the conclusions reached in the F3 to *Sydney Orbital Link Study* of April 2004.**

I have concluded from my analysis that there is no case altering the conclusions reached in the SKM Study.

In particular:

1. there is a need for the Link now;
2. the Type A corridor is to be preferred against a Type C corridor, but planning for a Type C corridor should commence immediately;
3. a Type A corridor Purple option should be the preferred route; and
4. a motorway standard east facing connection between the Purple option and the M2 should be examined in the concept design of the Link.

Public Input

A number of issues raised by the public should be considered during the development of a concept proposal and the preparation of an EIS. These are:

1. amenity issues, such as ventilation stack, noise and vibration impacts, tunnel safety, tunnel gradients and structural impacts on affected properties;
2. costing and financing issues, such as future road upgrades as a consequence of the construction of the Link;
3. the issue of lane configuration, that is, a three lane tunnel in each direction or a two lane tunnel in each direction but with climbing lanes at gradients; and
4. the appropriate tolling regime, that is the adoption of no toll scenarios, or different tolling regimes, or flexible tolling.

1 Review Process

The following outlines the context for and the steps that I took in coming to the conclusions that allowed me to provide answers to the terms of reference of the review (the Review).

1.1 Background

Sinclair Knight Merz (SKM) was commissioned by the New South Wales Roads and Traffic Authority (RTA) to carry out a strategic study for the Australian Government to identify a route for the National Highway connecting the F3 and the Western Sydney Orbital (now the M7) or the M2 Motorway (M2) to relieve pressure on Pennant Hills Road (the interim National Highway).

SKM produced its final report in 2004 (the SKM Study). It comprised a main report, seven working papers, a draft options development report and two value management workshop records.

SKM concluded that a Type A corridor Purple option (linking the F3 to the M2) would meet the terms of reference under which it was appointed and would satisfy the objectives and criteria underpinning the SKM Study.

Throughout this Report, I have used the term "the Link" to refer generally to a new route connecting the F3 and the M2. When referring to particular corridors or routes, I have used the names accorded to them in the SKM Study.

Subsequent to the publication of the SKM Study, Transurban Ltd (which became the owner of the M2) made submissions asserting that a Type A corridor Yellow option would provide a better route. To assess that assertion, Masson Wilson Twiney (MWT) was appointed to carry out a desktop review of the traffic forecasts used by SKM and Transurban (the MWT Report).

1.2 Establishment of the Review Process

As part of the Review process, a Secretariat was set up to report directly to me. It comprised four members of staff of the Australian Government Department of Transport and Regional Services (DOTARS) who had no previous connection with the SKM Study nor any direct involvement with NSW road proposals. Those members were Joan Armitage, Simon Stratton, Erin Cann and Tracey Butcher.

Stephen Alchin of Booz Allen Hamilton and Christian Griffiths of GTA Consulting were appointed as technical advisers in order to provide me with advice and data analysis, so that I could evaluate the information and data provided to the Review.

1.3 Examination of the SKM Study and the MWT Report

The next step in the Review was to examine the SKM Study and the MWT Report, and to familiarise myself with their respective conclusions.

As part of this familiarisation process, and in company with members of the Secretariat, I attended conferences with the relevant personnel at, first, SKM, and second, MWT. SKM also set up and accompanied myself and the Secretariat on a tour of the general areas comprised in the Type A, Type B and Type C broad corridors identified in the SKM Study.

1.4 Review Website

I arranged for the Secretariat to set up a website for the Review. The whole of the SKM Study and the MWT Report were placed on the Review website. Details of my appointment, the terms of reference, and the establishment of the Secretariat were also posted.

As the Review progressed copies of all submissions received following the public consultation process were placed on the website.

1.5 Public Consultation

On 3 March 2007, I issued an advertisement calling for submissions and setting a closing date of 13 April 2007. The advertisement was placed on the Review website, and also placed in the following newspapers:

- Sydney Morning Herald
- Daily Telegraph
- Hills Shire Times
- Hills News
- Northern District News
- Hornsby Advocate

Two requests were received for extensions of time in which to make submissions. They were from the NSW Government and from DOTARS. Each provided reasons for their respective requests, and I granted each of them an extension of time until 27 April 2007. I also agreed to accept a late submission from Mr Norman Jones.

Material additional to their submissions was also accepted after the closing date from Mr Peter Waite OAM, Mr Matt Mushalik, Cr Tony Hall and Mr Brian Ash (Pennant Hills District Civic Trust Inc).

In total, 53 submissions were received. A complete list of those persons or organisations who made submissions is to be found in Appendix 1.

After all submissions had been received, I then invited each person or organisation that had made a submission to present their submission to me at a meeting to be conducted in public. Each of them was asked to speak for 20 minutes to expand upon their submission generally and to express their particular issues and concerns. Ten of those that had made submissions were asked to address a number of specific questions each of which was directed to clarifying my understanding of the submission they had made.

I placed a notice informing the public about the meetings on the Review website and in the following newspapers:

- Sydney Morning Herald
- Daily Telegraph
- Central Coast Express
- Hills Shire Times
- North Side Courier
- Hills News
- Northern District News
- Weekly Times
- Hornsby Advocate

Twenty seven persons and organisations accepted my invitation. The meetings were held at Parramatta Court House on Monday 18 June, Tuesday 19 June and Wednesday 20 June 2007. The meetings were open to the public, but they were not public forums; rather they were designed to afford an opportunity to those who wished to elucidate their submission directly to me, and to permit members of the public to observe the proceedings. They were conducted in accordance with meeting guidelines, published on the Review website.

The meetings were recorded and a transcript of the whole of the proceedings was made available on the Review website.

A complete list of the persons and organisations which appeared at the meetings is attached at Appendix 2.

Submissions and the transcript of the meetings in public were then analysed to identify issues relating to my terms of reference.

1.6 Policy and Data Analysis

The next step in the Review process was to collect and consider all relevant policy documentation that had issued since the completion of the SKM Study. A complete list of these documents is to found in Appendix 3, and a discussion of the most important of these documents can be found in Chapter 3.

On 22 May 2007, I requested the NSW Government to furnish the Review with relevant data that would allow me to compare the traffic forecasts and data used and documented by SKM in the SKM Study with up-to-date traffic forecasts and data.

The Transport Data Centre (TDC) responded to my request. I attended, in company with the Secretariat, a meeting with the relevant personnel at the TDC, at which I outlined the material that I was seeking and discussed with them the best method of providing it. Subsequently, the TDC provided the Review with the data it had furnished to SKM, and its 2006 data for the period 2001 to 2031.

Data was also furnished to the Review by Railcorp and by the RTA.

The provision of the data was expanded upon and clarified in various telephone conversations between the relevant providers and members of the Secretariat (including the technical advisers), as well in a telephone conference between myself, the Secretariat and technical advisers with personnel at TDC and in a similar telephone conference with the relevant officer at the RTA.

I then directed the technical advisers to examine and analyse the data so provided. I asked them to compare, so far as they were able, data used by SKM and MWT with the current TDC data.

I also asked them to provide advice on the implications of that data and the differences in data, so that I could consider the data and come to the conclusions required to answer my terms of reference.

I note that I received some data from the RTA and Transurban which was furnished 'in confidence'. The data furnished from the RTA concerned some projected network assumptions that were not NSW Government policy and not even departmental policy. This data was a very small part of the material furnished by the RTA, and after examining it, I concluded that it would have no material impact on the conclusions I have reached.

The same can be said of the data from Transurban. Transurban did not provide a complete set of data for the MWT Report or to the Review. Some of the data it provided was furnished on the basis that it was 'commercial in confidence'. Again, I have examined this data and have concluded that it would have no material impact on the conclusions I have reached in this Review.

1.7 Acknowledgments

I would like to acknowledge the professional contributions to the Review made by the Secretariat staff, Joan Armitage, Simon Stratton, Erin Cann and Tracey Butcher. Their diligence, understanding and assistance were exemplary. Additional assistance was received from DOTARS staff Michael Alder, Berlinda Crowther, Jessica Sain and Jelena Zubovic.

I would also like to acknowledge the professional assistance provided to the Review by Stephen Alchin and Christian Griffiths.

I acknowledge with thanks the assistance provided by Michelle Holland of Booz Allen Hamilton in formatting tables and figures for this Report.

I wish to thank the NSW Government agencies that provided data to assist me in addressing my terms of reference. In particular, the staff of the TDC, Tim Raimond, Peter Hidas and Frank Milthorpe, gave unfailing support and information. I also thank Peter Prince from SKM and Chris Wilson from MWT for providing background information.

2 Terms of Reference One

"Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

1. Whether the assumptions and data used in the *F3 to Sydney Orbital Link Study 2004* were valid and reasonable at the time of the study".

2.1 Introduction

In approaching a consideration of the assumptions and data used in the SKM Study, I have focused on those assumptions and data that SKM utilised in its assessment of land use and traffic flows. They were the key elements that led to the conclusions and recommendations in the SKM Study.

I have considered those assumptions and data in context, that is, having regard to the SKM Study as a whole. In particular, I have paid attention, first, to SKM's terms of reference, secondly, to the project objectives that it developed, thirdly, to the qualitative strategic criteria that it used, fourthly, to the traffic and transport projections it applied, and fifthly, to the approach that it took to the assessment of possible route options.

2.1.1 SKM's Terms of Reference

The request for tender documentation under which SKM was commissioned included terms of reference, and these led to particular parameters according to which SKM conducted the SKM Study and derived its recommendation for the preferred route. Specifically, these terms of reference were:

- no further options are available for the upgrading of Pennant Hills Road;
- the Link is to be suitable for the construction of an urban freeway standard road with adequate capacity for forecast traffic in 2025;
- the route may connect directly to the WSO or to the M2;
- route options should examine the feasibility of tunneling to avoid built up areas;
- the B2 and B3 routes (the subject of an earlier 1970 RTA study) are not to be considered as above ground options as they were previously abandoned on environmental grounds;
- opportunities for public transport from the development of a new National Highway route should be investigated (e.g. dedicated public transport or high occupancy lanes); and
- the NSW proposal to upgrade the Sydney to Newcastle railway should be considered.

2.1.2 Objectives

SKM developed a number of project objectives in its identification of the Link, which were confirmed in value management workshops[1]. The final set of project objectives that SKM used in its consideration and evaluation of route options were:

- improved F3 to Sydney Orbital connection linked to the regional network;
- improved safety on the existing National Highway and surrounding corridor;
- improved travel reliability and reduction of costs of inter regional commercial vehicle movements on the interim National Highway;
- reduction of arterial road congestion and improvement of urban amenity, especially along Pennant Hills Road;
- provision of opportunities to improve public transport along the interim National Highway; and
- meeting inter regional commercial transport needs, including improved access to Sydney ports.

SKM also evaluated its route selection against the National Highway objectives, which were to:

- facilitate overseas and interstate trade and commerce;
- allow safe and reliable access by a significant proportion of Australians to major population centres;
- minimise the cost of the National Highway to the Australian community;
- support regional development; and
- contribute to ecologically sustainable development.

2.1.3 Strategic Criteria

SKM considered a number of qualitative strategic criteria in its development and selection of the Link. These are briefly described as follows:

- social effects (including properties likely to be affected, urban design impacts, local amenity, impact of traffic emissions and noise);
- environmental effects (including threatened fauna species, impact on bushland and national parks, water quality, air quality, visual impact and heritage impact);
- economic performance (including capital and operational cost and benefit/cost ratio); and
- engineering feasibility.

[1] Two value management workshops were held, attended by participants from DOTARS, RTA, SKM and facilitators. The use of value management workshops is standard practice to ensure that a study like the SKM Study remains on track and meets the particular terms of reference.

2.1.4 Traffic Projections and Transport Benefits

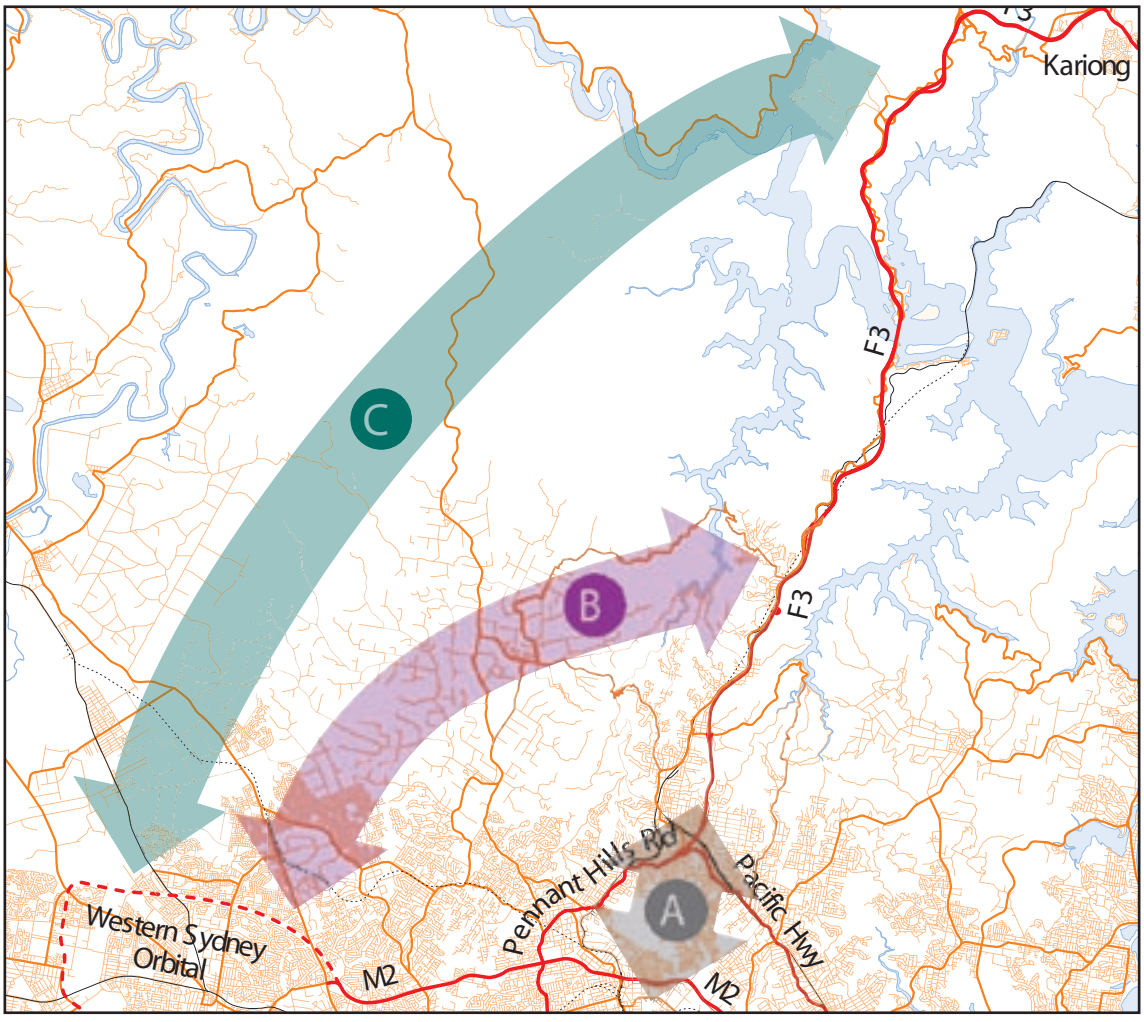
SKM undertook a technical assessment of traffic and transport performance and benefits (including traffic volume, traffic congestion, relief to Pennant Hills Road, road safety, improvement of public transport and improved network access).

2.1.5 The Approach Taken

The SKM Study was carried out in stages, and comprised a comprehensive analysis of existing traffic and transport conditions in the Sydney region, an examination of the need for a new connection between the F3 and the WSO or the M2, and the development and assessment of possible route options.

SKM identified 17 feasible route options, which it grouped into three broad corridors, known as Type A, Type B and Type C – see Figure 1.

Figure 1 – Map of Type A, B and C Corridors



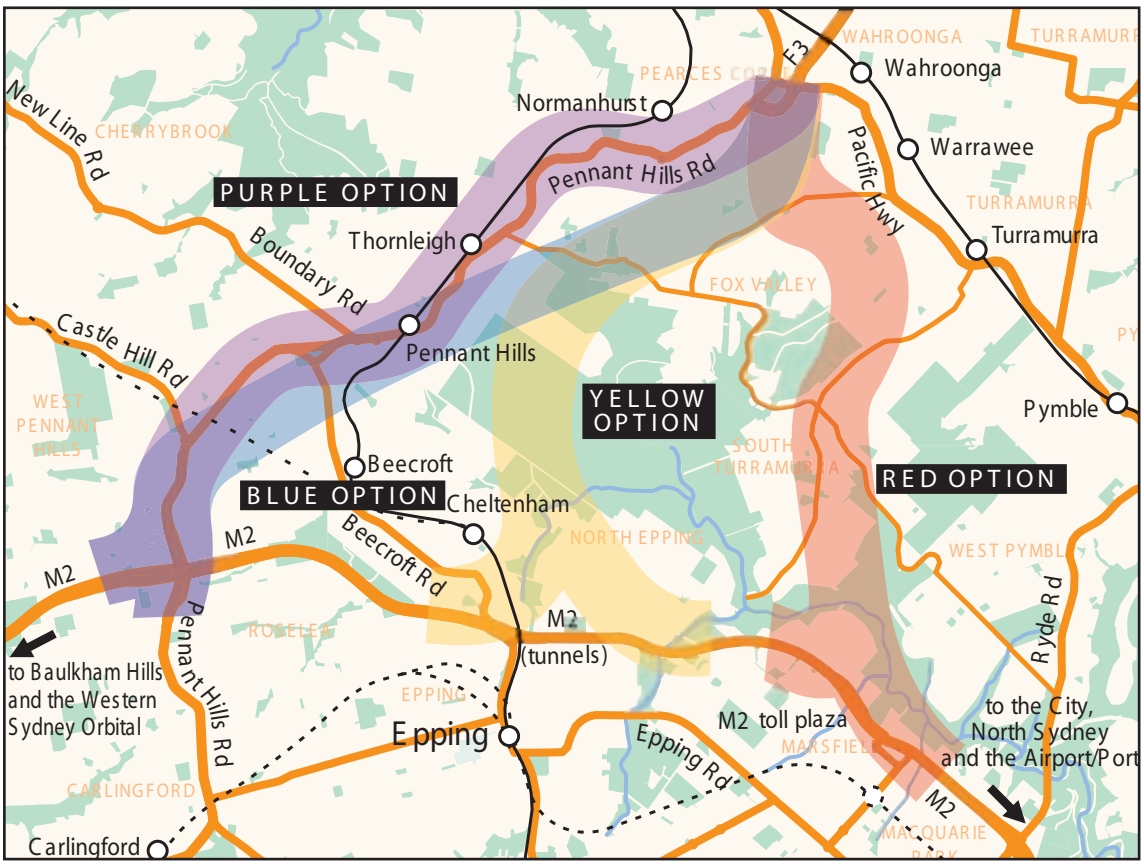
Source: SKM Main Report

It then assessed these three broad corridors against the project objectives, strategic criteria and traffic projections and transport benefits. It concluded:

- a Type A corridor would best satisfy medium term objectives, including providing relief to Pennant Hills Road;
- a Type B corridor would be the least beneficial in meeting the project objectives; and
- a Type C corridor would potentially provide greater long term strategic benefits, but would not be warranted within the 20 year time frame of the SKM Study.

SKM then turned to a consideration of four possible route options within a Type A corridor – the Purple option, the Blue option, the Red option and the Yellow option – see Figure 2.

Figure 2 – Map of Type A Corridor Options



Source: SKM Main Report

It assessed all four of these options in a similar way to its assessment of the broad corridors, that is, against the project objectives, strategic criteria and traffic projections and transport benefits.

It ultimately concluded that a Type A corridor Purple option would best satisfy SKM's terms of reference, the project objectives, the National Highway objectives and would provide the greatest traffic relief to Pennant Hills Road.

Against the foregoing background, I now turn to the assumptions and data used in the assessment of traffic projections and transport benefits.

2.2 Overview of Assumptions and Data

In order to assess the traffic effects of the various route options, SKM developed a multi-modal model based on the Sydney Strategic Travel Model (STM) used by the TDC using software known as EMME/2. SKM was provided with inputs and outputs of the TDC model, which were:

- Land use assumptions – which included population and employment assumptions based upon the NSW Government's Urban Development Programme (Scenario A), and 1996 Census information;
- Network assumptions, which included:
  - existing and potential future road networks, and road network capacity; and
  - existing and potential future public transport networks, and the assumed characteristics (e.g. frequency) of public transport services running on that network;
- Trip tables for the years 2001, 2011 and 2021 which represent travel demand, mode choices, and trip assignment in terms of each respective mode including car, train and bus.

The next step was for SKM to calibrate the existing conditions in the STM in order to use it as the basis for modelling future years, and in turn assess the impact of the Link on the specific regions of the metropolitan area that SKM was examining. SKM calibrated the model by adjusting:

1. the road network characteristics, such as link capacities, to better reflect the actual capacity of the network, especially for future years and particularly within the area relevant to the SKM Study as shown in Figure 3;
2. the trip tables to take into account trips with an origin or destination outside (or external to) the Sydney Statistical Division[2];
3. speed parameters in the STM to better align with travel time speed survey results; and
4. demand trip tables to better correlate with the origin and destination patterns observed in its number plate survey and actual RTA Average Annual Daily Trips (AADT) data.

[2] Sydney Statistical Division refers to the statistical division comprising the whole of the Sydney Region. This can be divided into statistical sub-divisions (SSD). A full list of each SSD and the local government areas and statistical local areas within each of them are shown in Appendix 5.

Figure 3 –The Area in the SKM Study

Source: SKM Working Paper 4

Once SKM made these changes to the STM to better reflect the actual conditions on the road network, it tested the model against standard criteria to ensure that its modelled results were within an acceptable range of the actual surveyed results. The tests verified that SKM's calibration of the STM was within the appropriate tolerance level, and hence was suitable as the basis for preparing future year models.

SKM then modified future year trip tables for 2011 and 2021 in a similar way to that described above, along with similar road network characteristic updates, to reflect future road networks. These updates were based upon the RTA's "Future Projects for Transport Modelling Purposes". This ensured that all planned future changes to the network were incorporated into the modelling process.

I accept the advice from the technical advisers that this process for calibrating the model adopted by SKM appears appropriate and reasonable.

The modelling requires certain inputs, being various assumptions and data. I turn now to describe the inputs to SKM's models of land use and transport networks for future years.

2.2.1 Land Use Assumptions

Land use assumptions used in the SKM Study comprised projections of expected population and employment for the years 2001, 2011 and 2021. These projections were supplied by the TDC.

These indicated the following:

2001-2011

- Sydney City was assumed to have the highest population growth rate, averaging 6.7% per year;
- Camden (including the Bringelly new release area) was assumed to have the second highest population growth rate of 5.8% per year;
- Camden (Bringelly) was assumed to have the highest employment growth rate of 5.5% per year; and
- Baulkham Hills was assumed to have the second highest employment growth rate of 2.6% per year.

2011-2021

- Concord and Camden (Bringelly) were assumed to have the highest population growth rate of 2.9% per year; and
- Camden was assumed to have the highest employment growth rate of 2.9% per year.

Central Coast land use assumptions included:

- the existing ratio of employment to population was 1:3.5;
- this existing ratio was assumed to stay constant over the next 20 years (that is from the time of the SKM Study);
- over the 20 years to 2021, the population of the Central Coast was assumed to increase by more than 70,000, mainly in Wyong; and
- over the 20 years to 2021, 20,000 jobs were assumed to be created on the Central Coast, mainly in Wyong.

Other major land use assumptions were as follows:

- the population of the Sydney Region[3] was forecast to grow to 5 million people by around 2021 and 6 million by around 2042;
- by 2021, with a forecast total Sydney Region population of 5 million, the distribution would have shifted, with 2.25 million east of Parramatta (45%), 2.35 million west of Parramatta (47%) and up to 400,000 on the Central Coast (8%);
- there would be a major shift to the large employment areas in the western half of Sydney;
- each sub-region in Sydney would have at least one major regional centre and a number of employment zones, stitched together by a rail and bus network, the WSO, the M2 and the F3; and
- industry would relocate close to the M7 when completed.

[3] Sydney Region means, consistently with the 1968 *Sydney Region Plan*, all of Sydney's local government areas, including Gosford and Wyong.

2.2.2 Network Assumptions

In relation to the development of the current and future transport network, SKM's modelling incorporated projects listed in the NSW Government's *Action for Transport 2010* (November 1998). This encompassed the completion of the Sydney Orbital network (including the M7) by 2007, a range of bus transit way projects by 2010, arterial road upgrades, and new heavy rail projects.

Two significant new rail infrastructure projects were included in *Action for Transport 2010*. They were:

- the North West Rail Link from Epping to Castle Hill for completion by 2010; and
- the Hornsby to Newcastle High Speed Rail (stage 1 to Warnervale by 2007 and stage 2 to Newcastle to commence by 2010).

The main future road network assumptions based on the information from the RTA were:

- M2 widening from two to three lanes eastbound of Windsor Road by 2011 and two to three lanes each direction by 2021;
- F3 widening from two to three lanes, specifically from Kariong to Wahroonga by 2011;
- Pennant Hills Road widening south of the M2 to James Ruse Drive from two to three lanes by 2011; and
- Pennant Hills Road north of the M2 reduced from three to two lanes.

2.3 Assessment of Assumptions and Data

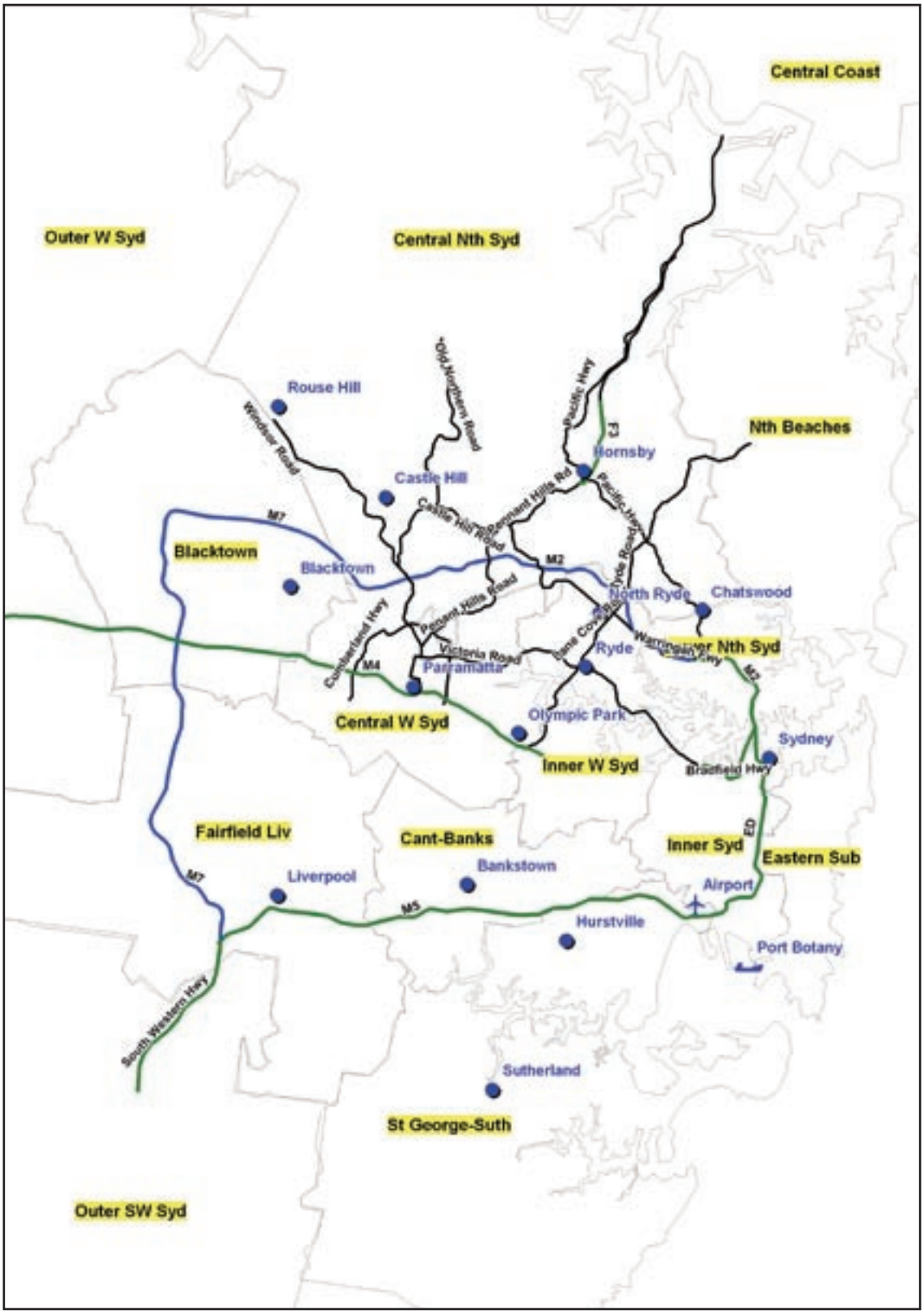
Against this background I now turn to compare the current TDC data with SKM's assumptions and data in order to test the validity and reasonableness of the latter.

2.3.1 Geography

For the purpose of my analysis, geographical areas were selected across the metropolitan area. The land use data and trip tables were provided to the Review at the transport zone level, or 901 small areas within the metropolitan area. These transport zones were aggregated to the SSD level. There are 14 SSDs across the metropolitan area as illustrated in Figure 4. The Local Government Areas and Statistical Local Areas within each of the SSDs are shown in Appendix 5.

When comparing the SSDs against the Inscope–Outscope discussion in the MWT Report, it is evident that the MWT analysis applied eight areas across Sydney rather than the 14 SSDs. However the eight areas assumed are reasonably consistent with the 14 SSDs.

Figure 4 – Sydney SSDs Adopted for the Purposes of Trip Table Analysis



2.3.2 Land Use

2.3.2.1 Population Projections

One of the tests as to whether the population projections were valid and reasonable at the time of the SKM Study is whether subsequent data has confirmed their reasonableness. The following compares the SKM projections against:

- population estimates recently issued by the Australian Bureau of Statistics (ABS), following the 2006 census; and
- population projections prepared by the TDC in November 2006.

Since the 2006 census, the ABS has revised the estimated resident population for the Sydney Statistical Division in 2001. As shown in Table 1, the estimate of population in 2001 is slightly above that used by SKM; however, the difference is less than 2%. The SKM population estimate for 2001 is close to the population estimate subsequently developed by the TDC in its November 2006 projections; it is 10,000 persons below or 0.24%.

Table 1 – Comparison of Population Projections for the Sydney Statistical Division Used by SKM Against TDC Nov. 2006 Projections and ABS Estimated Resident Population

	Estimates/Projections			% difference TDC01 from TDC06 and ABS		% increase 2001 to 2006
	2001	2006	2011	2001	2006	
Estimates Used by SKM (1)	4,052,987	4,251,078	4,449,168			4.89
Estimates Used in TDC 2006 Data (2)	4,062,694	4,253,172	4,443,650	-0.24	-0.05	4.69
Estimated Resident Population (3)	4,128,272	4,284,379		-1.86	-0.78	3.78

Sources:

1. SKM estimates are the underlying projections provided by TDC to SKM and 'rounded' in Working Paper 4
2. Transport Data Centre
3 Australian Bureau of Statistics (2007) - Catalogue No. 3218.0. Estimate for 2006 is provisional

The consistency between the projections out to 2021 used by SKM and those now available from the TDC also suggest that SKM's projections were reasonable. As shown in Table 2, the latest (November 2006) projections start with an almost identical 2001 population to that used by SKM, and reach a marginally lower 2021 figure. However, relative to the size of the metropolitan population, these differences at the Sydney Statistical Division level are relatively small. For example, the 15,154 difference (i.e. 785,364 – 770,210) in the population increase between the projections used by SKM and the latest TDC figures is equal to 0.3% of the 2021 population total used by SKM.

Table 2 – Comparison of Projected Sydney Statistical Division Population Growth

	SKM		TDC (Nov. 2006)	
	2001	**2021**	**2001**	**2021**
Projected Population	4,052,987	4,838, 351	4,062,695	4,832,905
Change 2001-2021		785,364		770,210
% Change 2001 - 2021		19.4%		19.0%

It is possible to compare the projections below the Sydney Statistical Division at a SSD level. Table 3 compares the SKM projections with TDC 2006 projections. The differences for 2001, both by number and percentage, can be seen to be minor.

The latest TDC 2006 data reinforces SKM's land use assumptions (population and employment) as it indicates that Outer South Western Sydney (which includes Camden) and Inner Sydney are the highest population growth areas for the years 2001 to 2021. The latest data also shows, as assumed by SKM, that population would be approaching almost 400,000 on the Central Coast in 2021.

2.3.2.2 Employment Projections

Table 4 presents the employment projections used by SKM and the current TDC 2006 projections. Table 4 indicates that, under the latest projections, there were approximately 5% more jobs across the Sydney Statistical Division in 2001 than had been indicated in the SKM projections. The TDC 2006 projections also indicate that under-estimation of jobs was greater in the case of the Central Coast, with employment in this area being about 10% higher than the SKM projections, that is 90,000 compared to 82,000 jobs.

The latest data also reinforces SKM's assumption that there would be a large shift of employment to western Sydney (most employment growth shown in the TDC 2006 data is in the western areas of Sydney).

2.3.2.3 Conclusion

There are differences between population and employment projections used by SKM and the current 2006 projections of TDC, as shown in Tables 3 and 4. These differences can be accounted for by the fact that SKM's projections were based on the 1996 census data and Scenario A and TDC 2006 data is based on 2001 census data and the *Metropolitan Strategy* (which is referred to later in this Report). This conclusion is consistent with that derived in the MWT Report, where MWT pointed out that land use forecasts are continually under review and that the differences between SKM's projections and TDC 2005 data (which MWT was reviewing) could similarly be accounted for.

But there are also similarities in the population projections used by SKM and the current TDC 2006 projections, particularly as regards population increases in Outer Western Sydney and Inner Sydney, and a large shift of employment to western Sydney.

I conclude therefore that SKM's land use assumptions and data were valid and reasonable at the time of the SKM Study.

Table 3 – Comparison of Population Projections Used by SKM and Current (Nov. 2006) Projections from Transport Data Centre

Statistical Subdivision as at 2007	A			B			A-B = C					
	Nos. Supplied to SKM - based on 2001 UDP Scenario A			Projections prepared by TDC at Nov 2006			SKM cf. Nov. TDC 2006					
							Number			% Difference		
	2001	2011	2021	2001	2011	2021	2001	2011	2021	2001	2011	2021
Blacktown	260,052	298,912	359,529	262,707	294,556	336,538	-2,655	4,356	22,991	-1.02	1.46	6.39
Cantrby-Bnkstwn	307,819	315,641	326,882	306,444	316,861	329,676	1,375	-1,220	-2,794	0.45	-0.39	-0.85
Central Coast	286,820	320,835	359,563	292,814	327,576	364,759	-5,994	-6,741	-5,196	-2.09	-2.10	-1.45
Central Nth Sydney	394,583	448,076	491,937	400,688	442,883	483,290	-6,105	5,193	8,647	-1.55	1.16	1.76
Central W Sydney	290,255	326,366	358,878	288,583	326,020	363,788	1,672	346	-4,910	0.58	0.11	-1.37
Eastern Suburbs	240,715	249,893	260,325	234,710	244,022	248,681	6,005	5,871	11,644	2.49	2.35	4.47
Fairfield-Liverpool	343,174	365,898	383,703	345,035	377,086	412,869	-1,861	-11,188	-29,166	-0.54	-3.06	-7.60
Inner Sydney	294,785	346,784	387,346	284,301	346,857	382,974	10,484	-73	4,372	3.56	-0.02	1.13
Inner W Sydney	156,987	183,307	213,143	158,848	182,344	196,611	-1,861	963	16,532	-1.19	0.53	7.76
Lower Nth Sydney	285,077	297,813	312,809	286,113	301,998	315,225	-1,036	-4,185	-2,416	-0.36	-1.41	-0.77
Northern Beaches	224,278	238,991	263,396	227,742	237,010	248,548	-3,464	1,981	14,848	-1.54	0.83	5.64
Outer SW Sydney	231,199	273,171	305,058	231,836	266,784	335,659	-637	6,387	-30,601	-0.28	2.34	-10.03
Outer West Sydney	310,139	339,868	350,776	313,866	328,137	358,275	-3,727	11,731	-7,499	-1.20	3.45	-2.14
St George-Sutherland	427,104	443,613	465,006	429,006	451,516	456,013	-1,902	-7,903	8,993	-0.45	-1.78	1.93
Syd Stat. Div. Total	4,052,987	4,449,168	4,838,351	4,062,694	4,443,650	4,832,906	-9,707	5,518	5,445	-0.24	0.12	0.11

Table 4 – Comparison of Employment Projections Used by SKM and Current (Nov. 2006) Projections from Transport Data Centre

Statistical Subdivision as at 2007	A			B			A-B = C					
	Nos. Supplied to SKM - based on 2001 UDP Scenario A			Projections prepared by TDC at Nov 2006			SKM cf. Nov. TDC 2006					
							Number			% Difference		
	2001	2011	2021	2001	2011	2021	2001	2011	2021	2001	2011	2021
Blacktown	75,015	86,549	103,051	83,087	101,004	119,771	-8,072	-14,455	-16,720	-10.76	-16.70	-16.22
Canterbury-Bankstown	105,663	110,988	117,061	102,288	111,722	110,687	3,375	-734	6,375	3.19	-0.66	5.45
Central Coast	82,091	91,380	101,706	90,508	114,559	129,064	-8,417	-23,179	-27,358	-10.25	-25.37	-26.90
Central Nth Sydney	118,608	133,632	146,548	131,636	178,117	200,442	-13,028	-44,485	-53,894	-10.98	-33.29	-36.78
Central W Sydney	181,626	200,326	218,318	179,849	204,529	211,755	1,777	-4,203	6,563	0.98	-2.10	3.01
Eastern Suburbs	76,490	80,619	84,978	80,423	87,220	87,348	-3,933	-6,601	-2,370	-5.14	-8.19	-2.79
Fairfield-Liverpool	109,145	118,441	126,520	111,229	128,733	143,847	-2,084	-10,292	-17,327	-1.91	-8.69	-13.70
Inner Sydney	479,495	527,274	573,308	503,951	544,697	571,631	-24,456	-17,423	1,677	-5.10	-3.30	0.29
Inner West Sydney	69,788	77,915	86,823	69,505	79,421	81,906	283	-1,506	4,917	0.41	-1.93	5.66
Lower Nth Sydney	218,004	238,380	256,882	228,503	258,940	277,739	-10,499	-20,560	-20,857	-4.82	-8.62	-8.12
Northern Beaches	77,969	82,799	89,784	82,841	94,540	99,650	-4,872	-11,741	-9,866	-6.25	-14.18	-10.99
Outer SW Sydney	57,290	68,920	78,340	64,993	81,781	96,575	-7,703	-12,861	-18,235	-13.45	-18.66	-23.28
Outer West Sydney	90,650	99,894	104,864	100,997	118,713	135,356	-10,347	-18,819	-30,492	-11.41	-18.84	-29.08
St George-Sutherland	121,603	128,480	136,366	127,309	144,793	154,479	-5,706	-16,313	-18,113	-4.69	-12.70	-13.28
Syd Stat. Div. Total	1,863,437	2,045,597	2,224,549	1,957,119	2,248,770	2,420,250	-93,682	-203,173	-195,701	-5.03	-9.93	-8.80

2.3.3 Network Assumptions

Assumptions as to the future form of the transport system differ from time to time in accordance with variation and refinement of government policies.

SKM derived its network assumptions from *Action for Transport 2010* and data and information provided by the RTA.

It was valid and reasonable for SKM to work on the basis that the projects outlined in those government policies would be likely to be implemented, because those policies were adopted by the NSW Government at the time of the SKM Study.

It was also valid and reasonable for SKM to rely on data and information provided by the RTA, it being the NSW Government's road transport agency.

2.3.4 Trip Tables

For the purposes of the Review's analysis, I have used the terminology described in Table 5.

Table 5 – Review Data Sets, Titles and Definitions

Title	Model Year Forecasts Available	Comment
TDC06	2001, 2006, 2011, 2016, 2021, 2026, 2031	Latest available STM model outputs based on November 2006 land use inputs (uncalibrated)
TDC01	2001, 2011, 2021	STM model outputs based on 2001 land use inputs (uncalibrated) provided to SKM by TDC for the purposes of the SKM Study
SKM	2001, 2011, 2021	Model outputs calibrated by SKM for the SKM Study

As can be seen from Table 5 there are three data sets:

- latest TDC STM outputs, based on 2006 data (TDC06);
- STM outputs provided to SKM by TDC, based on 2001 data (TDC01); and
- model outputs arrived at and reported by SKM as a consequence of its calibration process (SKM).

I sound, however a note of caution. One must bear in mind the nature of the model, the STM, which produces the trips tables. The STM is a high level strategic model for the whole of metropolitan Sydney. It is designed to show flows and patterns at a reasonable level of data but it is not an absolute representation. Furthermore, the latest STM has been updated. It now reflects the latest policy changes, for example, the *Metropolitan Strategy* (see my discussion of this policy in Terms of Reference Two). And now it has a methodological change. The TDC advised the Review that the STM methodology now allows for the home to work trip to include a deviation or detour (for example to drop a child off at school) and includes it as a separate trip, whereas it did not previously record the trip separately.

Bearing that qualification in mind, I turn to a comparative analysis of trip tables.

2.3.4.1 Person Trips

Prior to the consideration of vehicle trips on the road network, an assessment has been made of the total number of person trips in the network. This allows for comment to be made on the total number of trips in the model, the split between motorised and non-motorised trips, and the split of motorised trips into public transport movements and vehicle movements.

The Review focuses on differences between car driver trips, train passenger trips and bus passenger trips rather than trips by car passengers, taxi, bicycle or walk. This results in a manageable data set, covers the majority of trips across the network, and focuses on those trips expected to use the Link.

A summary of the modelled person trip totals is included at Table 6.

Table 6 – TDC STM Modelled Person Trips (TDC06 versus TDC01)

	TDC06	TDC01	TDC06	TDC01	TDC06	TDC01
Total Daily Trips	**2001**	**2001**	**2011**	**2011**	**2021**	**2021**
All Day Car Trips	8,104,828	7,331,226	9,108,777	7,932,097	10,330,226	8,651,239
All Day Train Trips	792,128	1,018,551	895,306	1,100,845	1,088,482	1,255,187
All Day Bus Trips	452,074	689,397	373,162	750,903	360,934	929,402
Total (Car+Train+Bus)	9,349,030	9,039,174	10,377,245	9,783,845	11,779,642	10,835,828

Diff (TDC06-TDC01) - Car	11%	15%		19%
Diff (TDC06-TDC01)- Train	-22%	-19%		-13%
Diff (TDC06-TDC01) - Bus	-34%	-50%		-61%
Diff (TDC06-TDC01) - All	3%	6%		9%

Growth (2021-2001) - Car	27%	18%
Growth (2021-2001) - Train	37%	23%
Growth (2021-2001) - Bus	-20%	35%
Growth (2021-2001) - All	26%	20%

Table 6 compares TDC06 with TDC01. On the face of it there appears to be differences in total person trips for the year 2021, that is, there are 9% more person trips in TDC06 than TDC01. The equivalent figures for 2011 and 2001 are 6% and 3% respectively. This is explained by the different STM methodology in TDC06. Therefore, in order to make an effective comparison, a check was made for 2011 vehicle kilometres travelled (because the total distance travelled by vehicles in the network remains effectively the same).

The data sets provided by the TDC to the Review contained average travel distances between each of 901 transport zones. These were then converted by the number of trips at SSD level resulting in total vehicle distance travelled. This shows a difference in total 2011 vehicle distance kilometres travelled of 0.3% when comparing the TDC06

and TDC01 data sets. This is not a significant difference and confirms that although the number of trips between TDC06 and TDC01 is different, the car vehicle travel is effectively the same.

2.3.4.2 Car Driver Trip Tables

Tables 7 and 8 show a comparison of car driver trips tables by origin and destination between TDC01 and TDC06 respectively. Figures 5, 6, 7, and 8 present a graphic illustration of trip table information in relation to the Central Coast, North East Hornsby and North West Ku-ring-gai, being areas in which car drivers are likely to use the Link. The following broad and general conclusions can be drawn:

- both TDC01 and TDC06 show a broad spread of trips across the Sydney Region;
- both TDC01 and TDC06 show a pattern of distribution to and from all SSDs; and
- both TDC01 and TDC06 show a large number of local trips. This is particularly illustrated in Figures 5, 6, 7 and 8. This is consistent with the pattern of travel across Sydney, where some 50% of trips are less than 5km in length (as noted in the *Metropolitan Strategy*).

Speaking broadly and at a very general level, the comparison shows a similar pattern of distribution and, at that high level, a conclusion can be drawn that the assumptions and data used by SKM were valid and reasonable at the time for the SKM Study.

Table 7 – Daily Car Driver Trips between SSDs – TDC01 – Year 2001

Statistical Sub-Division (SSD)		Statistical Sub-Division (SSD)														
		Blacktown	Cant-Banks	Central Coast	Central Nth Syd	Central W Syd	Eastern Sub	Fairfield Liv	Inner Syd	Inner W Syd	Lower Nth Syd	Nth Beaches	Outer SW Syd	Outer W Syd	St Geor-Suth	Totals
Statistical Sub-Division (SSD)	Blacktown	216,648	5,099	746	39,156	47,443	652	18,739	4,819	4,014	7,733	928	2,693	47,087	1,678	397,435
	Cant-Banks	5,147	200,654	670	7,272	37,369	5,534	42,688	37,042	30,098	11,021	1,367	11,130	3,563	58,684	452,239
	Central Coast	745	670	539,636	11,280	2,880	393	556	4,885	978	6,418	2,211	64	327	347	571,390
	Central Nth Syd	39,049	7,206	11,286	376,071	63,900	2,947	8,181	18,144	9,089	73,313	16,390	1,262	11,446	2,970	641,254
	Central W Syd	47,932	37,558	2,882	64,968	281,921	3,251	53,395	15,455	23,821	34,297	3,503	7,776	19,120	12,174	608,053
	Eastern Sub	658	5,562	394	2,965	3,238	184,516	1,482	115,263	5,655	17,490	3,568	553	419	14,478	356,241
	Fairfield Liv	18,835	42,281	556	8,214	52,822	1,472	295,201	9,120	7,023	5,237	687	34,399	14,436	12,846	503,129
	Inner Syd	4,872	37,607	4,883	18,359	15,538	117,696	9,215	393,461	43,421	54,534	16,542	4,122	3,638	66,022	789,910
	Inner W Syd	4,059	30,405	978	9,205	23,760	5,654	7,087	42,846	91,095	23,035	2,506	2,074	2,554	13,665	258,923
	Lower Nth Syd	7,829	11,128	6,420	74,741	34,309	17,694	5,289	54,113	23,135	335,651	45,531	1,481	3,825	10,176	631,322
	Nth Beaches	930	1,363	2,211	16,396	3,475	3,549	687	16,290	2,489	44,862	353,218	151	457	1,543	447,621
	Outer SW Syd	2,671	10,973	64	1,252	7,672	546	34,131	4,073	2,050	1,461	150	337,812	5,581	4,864	413,300
	Outer W Syd	47,216	3,515	328	11,366	18,832	413	14,281	3,594	2,519	3,771	453	5,616	465,175	1,046	578,125
	St George-Suth	1,682	58,278	347	2,972	12,020	14,403	12,807	64,980	13,521	10,056	1,543	4,909	1,057	483,709	682,284
	Totals	398,273	452,299	571,401	644,217	605,179	358,720	503,739	784,085	258,908	628,879	448,597	414,042	578,685	684,202	7,331,226

Note: 2001 trip tables are modelled trip numbers
There are minor differences between the horizontal and vertical totals in Table 7. For example, as regards to the Central Coast SSD, the difference between horizontal and vertical totals is eleven trips out of more than 571,000 trips. These differences are not material. The technical advisers have indicated that they may have been due to a difference in the sequence in which the trips in the model were aggregated by time of day versus between zones.

Table 8 – Daily Car Driver Trips between SSDs – TDC06 – Year 2001

Statistical Sub-Division (SSD)		Statistical Sub-Division (SSD)														
		Blacktown	Cant-Banks	Central Coast	Central Nth Syd	Central W Syd	Eastern Sub	Fairfield Liv	Inner Syd	Inner W Syd	Lower Nth Syd	Nth Beaches	Outer SW Syd	Outer W Syd	St Geor-Suth	Totals
Statistical Sub-Division (SSD)	Blacktown	271,543	4,104	551	55,321	48,431	573	22,807	3,623	3,588	5,465	852	2,912	71,415	1,414	492,599
	Cant-Banks	4,104	261,380	402	7,549	45,196	5,085	53,893	44,067	55,927	8,638	1,097	8,681	2,571	88,273	586,863
	Central Coast	551	402	529,678	4,517	1,312	236	305	1,458	546	2,246	798	102	718	172	543,041
	Central Nth Syd	55,321	7,549	4,517	443,112	81,505	3,538	9,109	19,826	11,799	87,661	22,239	1,477	15,527	2,557	765,737
	Central W Syd	48,431	45,196	1,312	81,505	307,095	2,188	60,100	13,012	29,196	32,810	2,753	5,711	13,088	9,257	651,654
	Eastern Sub	573	5,085	236	3,538	2,188	235,536	1,182	131,592	6,115	16,933	3,690	621	461	13,513	421,263
	Fairfield Liv	22,807	53,893	305	9,109	60,100	1,182	374,617	7,383	8,354	3,828	549	40,721	16,380	11,892	611,120
	Inner Syd	3,623	44,067	1,458	19,826	13,012	131,592	7,383	461,434	62,483	70,145	16,660	3,340	3,016	66,018	904,057
	Inner W Syd	3,588	55,927	546	11,799	29,196	6,115	8,354	62,483	131,653	27,417	2,325	1,894	2,265	21,060	364,622
	Lower Nth Syd	5,465	8,638	2,246	87,661	32,810	16,933	3,828	70,145	27,417	330,366	44,824	1,047	2,790	6,438	640,608
	Nth Beaches	852	1,097	798	22,239	2,753	3,690	549	16,660	2,325	44,824	344,728	171	454	978	442,118
	Outer SW Syd	2,912	8,681	102	1,477	5,711	621	40,721	3,340	1,894	1,047	171	320,063	6,261	4,099	397,100
	Outer W Syd	71,415	2,571	718	15,527	13,088	461	16,380	3,016	2,265	2,790	454	6,261	444,395	930	580,271
	St Geor-Suth	1,414	88,273	172	2,557	9,257	13,513	11,892	66,018	21,060	6,438	978	4,099	930	477,174	703,775
	Totals	492,599	586,863	543,041	765,737	651,654	421,263	611,120	904,057	364,622	640,608	442,118	397,100	580,271	703,775	8,104,828

Note: 2001 trip tables are modelled trip numbers

Figure 5 – All Daily Car Driver Trips To/From the Central Coast – TDC01 – Year 2001

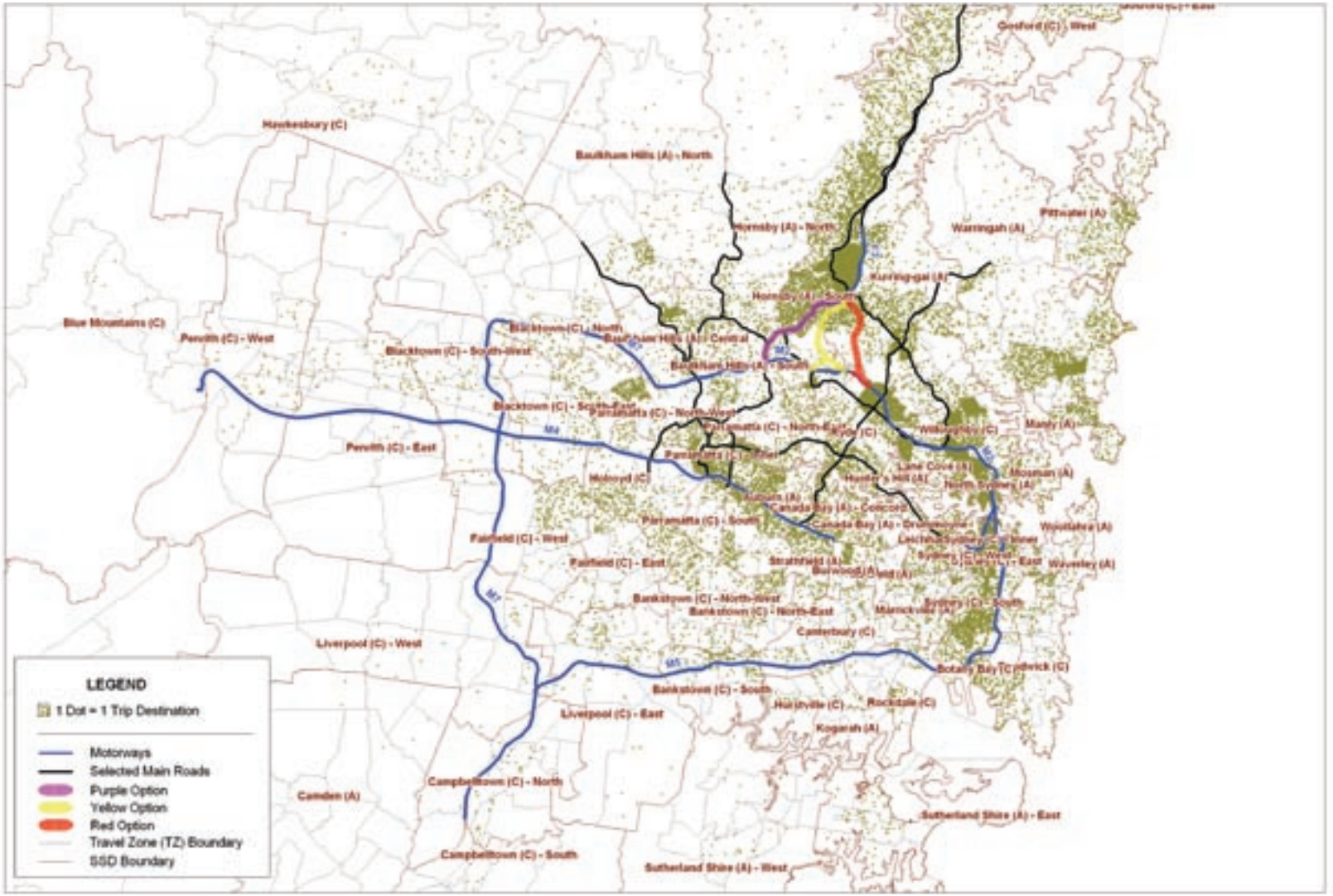


Figure 6 – All Daily Car Driver Trips To/From the Central Coast – TDC06 – Year 2001

Figure 7 – All Day Car Driver Trips To/From the NE Hornsby and NW Ku-ring-gai Area – TDC01 – Year 2001

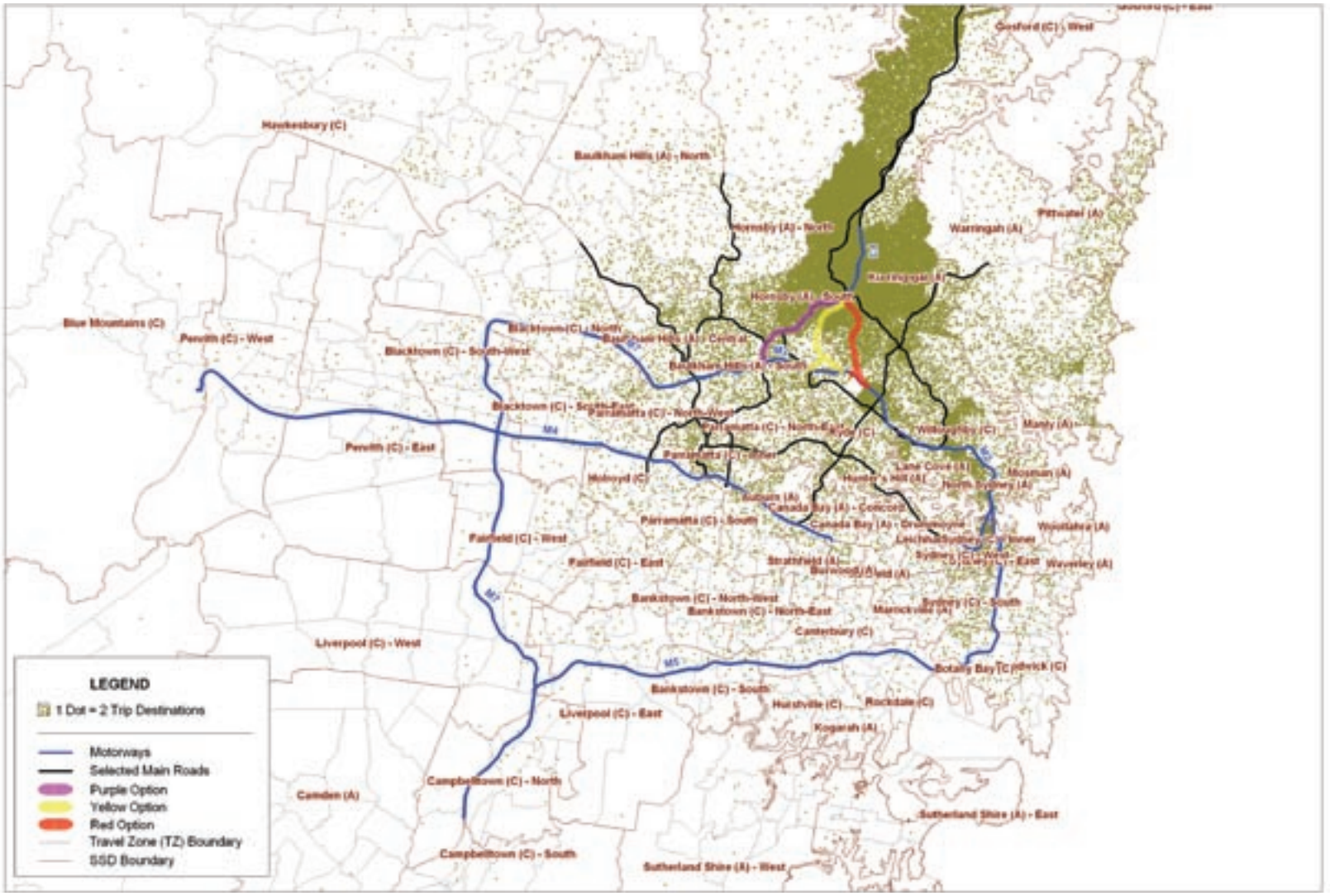
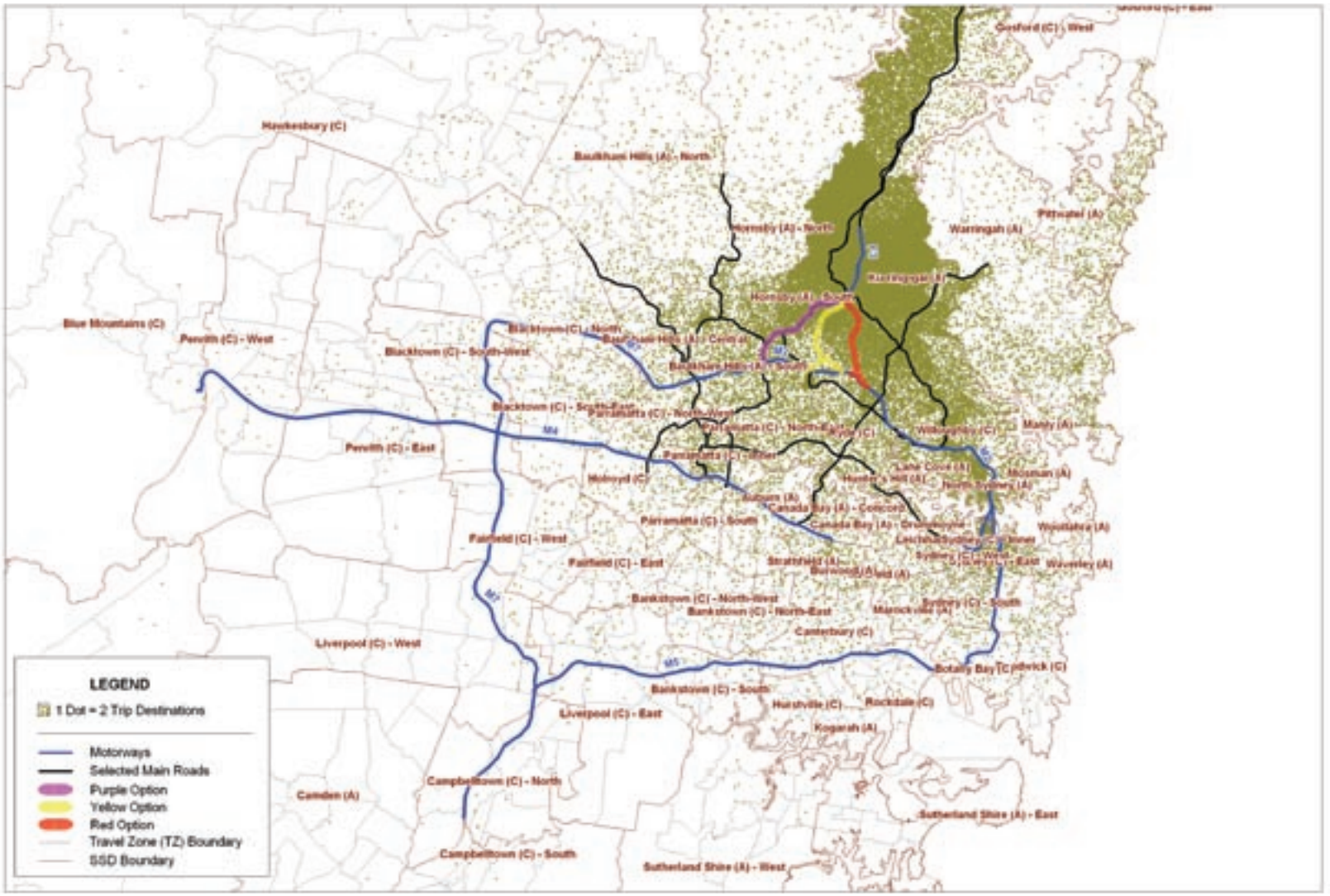


Figure 8 – All Daily Car Driver Trips To/From the NE Hornsby and NW Ku-ring-gai Areas – TDC06 – Year 2001



2.3.5 Traffic Count Data and SKM Modelled Results

Recent traffic count data can be used to check whether the SKM model adopted a reasonable basis for the modelling of future years (i.e. did the SKM model match available traffic counts at the time of the SKM Study, and does it still match more recent counts?)

Table 9 sets out a comparison between AADT traffic counts and SKM modelled volumes on key roads in the Study area.

Table 9 – AADT Traffic Volume Counts versus Model Forecasts on Key Roads – All Vehicles Existing Conditions

		Counts	Modelled(1)
		RTA AADT	SKM - No Link
Site #	Arterial Rd	2002	2001
74.200	F3 Freeway at Edgeworth David Avenue (2)	71,249	78,772
74.087	Pennant Hills Rd - Nth of Boundary Rd	75,628	75,482
52.014	Lane Cove Rd at De Burghs Bridge	77,363	75,037
53.198	Pacific Hwy - btw Ryde Rd & Stanhope Rd	49,022	48,571
53.018	Pacific Hwy - Sth of Telegraph Rd	63,557	63.595
	TOTAL	336,819	341,457
	Compared against RTA 2002		1.4%

(1) AM Peak 2 Hour flows from WP 4, Appendix A, Table 4-1 factored up to AADT volumes using expansion factors from Table 5-3 on p.66.of WP 4.

(2) As no specific expansion factor for this particular location is reported in Table 5-3 of WP 4, the expansion factor for the F3 at Hawkesbury River has been used to derive the AADT volumes.

The results show a close match between the 2002 actual RTA AADT counts and the 2001 modelled projections derived by SKM. Across the five locations, the total modelled 2001 volumes were only 1.4% above the actual 2002 counts. This supports a conclusion that the SKM model formed a good base to model future years.

2.3.6 Commercial Vehicles

2.3.6.1 Heavy Commercial Vehicle Origin and Destination

SKM had no access to heavy commercial vehicle (rigid and articulated) projections from the TDC, as no such data was available at the time of the SKM Study. SKM utilised heavy commercial vehicle origin and destination data obtained from surveys conducted in 2001 and 2002 (by MWT) to forecast freight movements within the study area. It conducted its own origin and destination number plate surveys for traffic travelling along Pennant Hills Road and the F3 in 2003 to supplement this data. SKM also utilised 2002 RTA AADT data to determine the amount of heavy commercial vehicles on the key roads within the study area.

To check the accuracy of its number plate surveys, SKM conducted an internal audit of the 2002 results. It found that the data was consistent with earlier 2001 survey data and produced reasonable and expected results on which to base existing truck volumes from the F3 to Pennant Hills Road and the Pacific Highway.

SKM's analysis found that the daily heavy commercial vehicle movements on Pennant Hills Road in the case of a Type A corridor would be 4,000 to 11,000 AADT and in the case of a Type C corridor would be 2,000 AADT.

SKM also found that approximately 43% of heavy commercial vehicle movements from northern origins had an origin or destination in the CBD and inner suburbs and north-eastern Sydney, whilst 57% had an origin or destination in the west, northwest and south/southwest areas of Sydney. That is, the pattern was almost evenly distributed between east and west.

TDC has since produced a commercial vehicle model from its 2003 Commercial Transport Study (CTS 2003). I have not overlooked the fact that the CTS 2003 trip tables are based on more refined regional boundaries than those utilised by SKM. The origins and destinations in the SKM Study do not precisely correlate with the origins and destinations in the CTS 2003 model. For example some local government areas in SKM's 'west' and 'south/southwest' regions would be included in a 'central west' region under CTS 2003. Nevertheless the broad east-west conglomeration of regions is basically the same.

Based on the CTS 2003 trip tables, Table 10 shows the origin and destination of heavy commercial vehicles (rigid and articulated) from the Central Coast, North East Hornsby and North West Ku-ring-gai for 2003. It shows that in 2003, there are 14,766 freight trips to and from the Central Coast each day (that is the difference between the total Central Coast trips and those within the Central Coast). Table 10 shows that these 14,766 freight trips are, as SKM's analysis found, distributed quite evenly between central, eastern and south/south-western Sydney. For example 44% of heavy commercial vehicle movements from northern origins had a destination in the inner and north-eastern Sydney, whilst 56% had an origin or destination in the central west, northwest and south/southwest areas of Sydney.

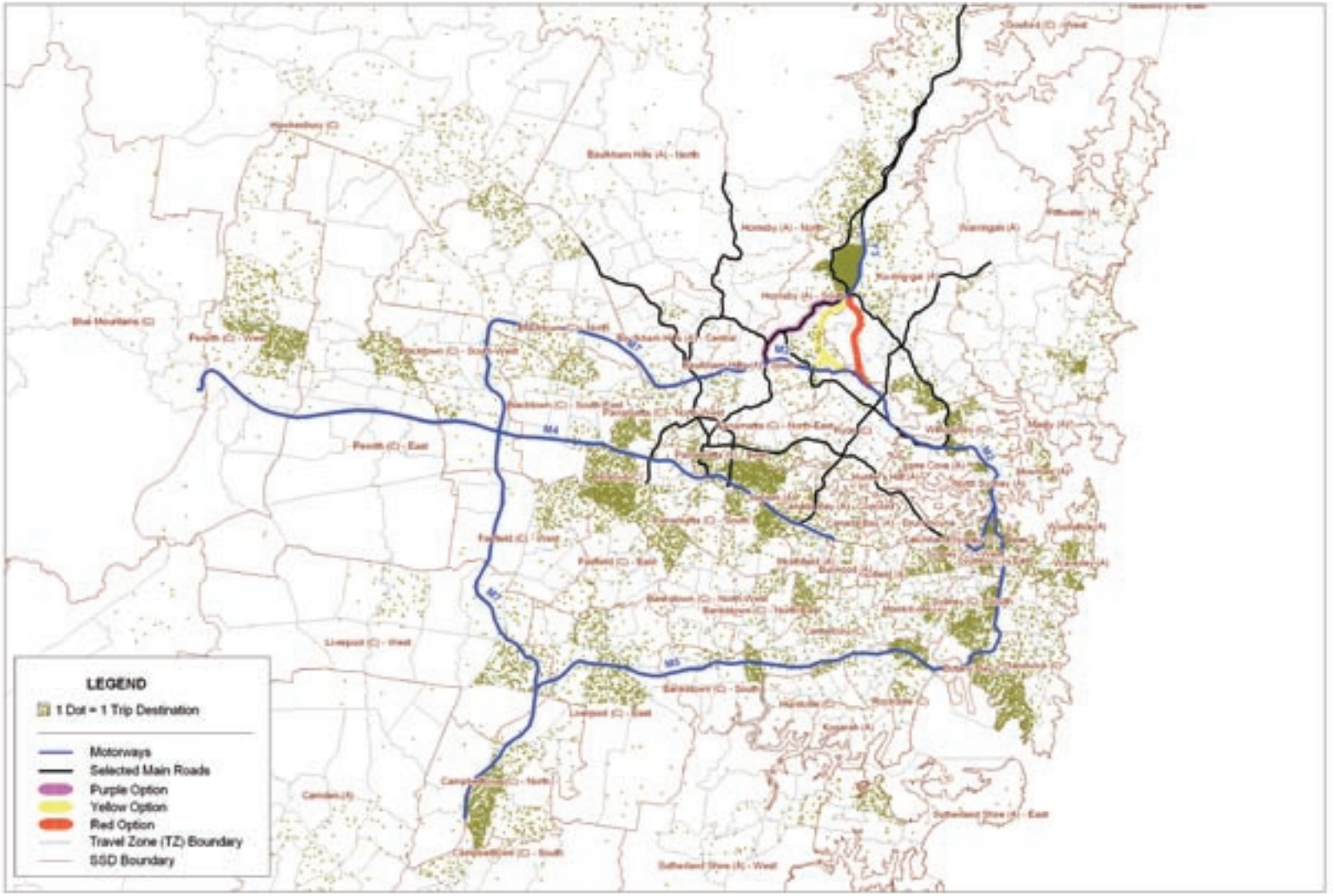
The comparison reveals that the CTS 2003 model origin and destinations are broadly consistent with SKM's origin and destination survey results. This confirms that SKM's analysis was valid and reasonable. This is graphically illustrated by Figure 9.

Table 10 – Estimated Weekday Truck Trips

	Origin/Destination Area					
	Central Coast		NE Hornsby		NW Ku-ring-gai	
Origin/Destination Stat. Sub-Div.	**No.**	**%**	**No.**	**%**	**No.**	**%**
Blacktown*	805	0.8	17	0.6	4	3
Cant-Banks	433	0.4	139	4.9	20	15
Central Coast	84876	85.2	154	5.4	22	17
Central Nth Syd	1003	1.0	228	8.0	10	8
Central W Syd*	2262	2.3	1142	40.1	23	17
Eastern Sub	955	1.0	4	0.1	0	0
Fairfield Liv*	1188	1.2	206	7.2	14	11
Inner Syd	2756	2.8	167	5.9	10	8
Inner W Syd	365	0.4	115	4.0	1	0
Lower Nth Syd	590	0.6	99	3.5	4	3
Nth Beaches	397	0.4	7	0.2	0	0
Outer SW Syd*	2002	2.0	113	4.0	11	8
Outer W Syd*	1715	1.7	12	0.4	2	2
St George-Suth*	294	0.3	446	15.7	11	8
Total	99,641	100.0	2,849	100.0	132	100

*central west, northwest and south/southwest SSDs

Figure 9 – All Daily Freight Trips To/From the Central Coast, NE Hornsby and NW Ku-ring-gai Areas – 2003



2.4 Terms of Reference One: Conclusion

The foregoing analysis shows:

- SKM adopted a standard approach to its traffic modelling. It used inputs of the then current land use and network assumptions and adopted a standard process of calibrating the STM;
- the differences in SKM's land use projections (population and employment) and those predictions in current 2006 TDC data reflect more up to date census data and government policy;
- the current TDC data reinforces SKM's assumptions about population growth in Outer South Western Sydney, Inner Sydney and the Central Coast;
- the current TDC data reinforces SKM's assumptions that there would be a shift of employment to Western Sydney;
- so far as concerns person trips, there is a slight and insignificant difference (in the order of 0.3%) in 2011 projections of total vehicle distance travelled between SKMs forecast and the current TDC06 data;
- there is a close match between SKM forecasts of traffic volumes for 2001 with actual RTA AADT counts in 2002;
- at the highest level, and speaking broadly, there is a similar pattern of distribution of car trips across all SSDs between SKM's forecasts and those projections in the current TDC data; and
- SKM's projections of commercial vehicle origin and destination are broadly consistent with the CTS 2003 origin and destinations.

These factors support a conclusion, which I draw, that the assumptions and data used in the SKM study were valid and reasonable at the time of the SKM Study.

3 Terms of Reference Two

"Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

2. whether changes since the report's publication affecting land use and transport flows in Western Sydney would support any significant changes to these projections".

3.1 Outline of Policy Changes

Since the time of the SKM Study there have been changes to both NSW and Australian government policy. The NSW Government's major changes are identified in the *Sydney Metropolitan Strategy - City of Cities: A Plan for Sydney's Future* (2005) and subsequent supporting policy documents.

These policies affect the distribution of population and employment and outline changes in land use planning which in turn affect transport flows and demands.

The following briefly describes the major policy reports issued since the SKM Study. For a full list of these documents see Appendix 3.

3.1.1 Sydney Metropolitan Strategy: City of Cities

The *Metropolitan Strategy* states that Sydney's population is projected to grow from 4.25 to 5.3 million by 2031. Much of the additional population is planned to be accommodated in new land release areas in the North West and South West sectors of Sydney. These new growth centres are envisaged to encompass up to 40% of new housing stock, with other significant growth occurring in the Wyong, Gosford, Liverpool and Campbelltown areas.

Furthermore, the *Metropolitan Strategy* also sets targets to increase the number of jobs within the Sydney Region from around 2m in 2004 to 2.5m in 2031. Just over half of this increase in employment is planned to occur in North West Sydney (approximately 99,000 additional jobs), South West Sydney (approximately 80,000 additional jobs) and the Central Coast (approximately 55,000 additional jobs). The employment areas of particular note are expected to be:

- an employment crescent referred to as the 'Global Arc' stretching from Port Botany/ Sydney Airport, the CBD and lower Northern Sydney to Macquarie Park (expected to provide 150,000 additional jobs by 2031);
- the Central Coast (from 95,000 jobs in 2004 to 150,000 jobs in 2031);
- the M4 corridor towards Parramatta (including Rhodes and Homebush Bay);
- the central west area of Sydney between the Cumberland Highway and the M7;
- the Western Sydney Employment Hub around the M7 and M4 Light Horse Interchange (expected to provide 36,000 additional jobs by 2031);

- the western end of the M2 corridor in the vicinity of Blacktown and Quakers Hill; and
- the south western corridor (Hume Highway) in the vicinity of Liverpool and further south at Ingleburn.

The *Metropolitan Strategy* also outlines specific dwelling and employment planning targets for various sub-regions by 2031.[4] These include:

- Inner North 30,000 new dwellings and 54,000 new jobs;
- North 21,000 new dwellings and 8,000 new jobs;
- North West 140,000 new dwellings and 80,000 new jobs; and
- Central Coast 56,000 new dwellings and 55,000 new jobs.

The *Metropolitan Strategy* seeks to facilitate the development of jobs by better connecting the centres and regions with a number of medium to long-tem transport solutions. These transport solutions are considered in more detail in subsequent planning documentation being the NSW Government's *State Infrastructure Strategy* (May 2006) and *Urban Transport Statement* (November 2006).

It is important to note that the Metropolitan Strategy refers to "a possible motorway-standard National Network link between the F3 freeway at Wahroonga and the M2 Motorway at Pennant Hills, subject to Federal funding". It also refers to the investigation into "the need for a road corridor reservation between the F3 freeway north of the Hawkesbury River and north western Sydney and the M7 Motorway, as a second major road route between Sydney, the Central Coast and further north".

3.1.2 Employment Lands for Sydney Action Plan

The NSW Government released its *Employment Lands for Sydney Action Plan* in March 2007. The *Action Plan* describes a range of strategies and actions to increase the supply of land for industrial and other employment generating purposes in the Sydney Region.

The *Action Plan* highlights the extent and significance of industrial land in western Sydney. As of April 2006, there were 14,790 hectares of land zoned for industrial purposes in Sydney with 70% of this land located in the north-west, south-west and central west sub-regions of Sydney, and a further 12% located on the Central Coast.

Implementation of the *Action Plan* would result in the various western Sydney sub-regions increasing their share of such land. Of the 7,500 additional hectares of industrial zonings proposed under the Metropolitan Strategy, the Action Plan proposes that:

1. 929 hectares be located in the Western Sydney Employment Hub near the intersection of the M4 and M7 motorways;

[4] The sub-regions used in the *Metropolitan Strategy* differ slightly from the SSDs used by the Australian Bureau of Statistics. These differences are not material for the purposes of the Review. For the purposes of the *Metropolitan Strategy*, the 'Inner North' sub-region covers the followings Local Government Areas (LGAs): Hunters Hill, Lane Cove, Mosman, North Sydney, Ryde and Willoughby. The 'North' sub-region covers the Hornsby and Ku-ring-gai LGAs. The 'North West' sub-region covers the Baulkham Hills, Blacktown, Blue Mountains, Hawkesbury and Penrith LGAs. The 'Central Coast' sub-region covers the Gosford and Wyong LGAs.

2. 2,000 hectares be located in the North West and South West Growth Centres; and

3. additional land be investigated for industrial zoning between the Western Sydney Employment Hub and Badgerys Creek in south west Sydney.

In addition to the industrial land zonings in western Sydney, a further 2,000 hectares of land on the Central Coast is proposed to be zoned for such purposes.

3.1.3 NSW State Infrastructure Strategy

The *State Infrastructure Strategy* outlines a series of upgrades in relation to the road network. New motorways include the M4 East Extension and the F3 to M2 link, whilst planning for F3 to M7 corridor reservation is also envisaged.

3.1.4 NSW Urban Transport Statement

The *Urban Transport Statement* draws on both the *Metropolitan Strategy* and *State Infrastructure Strategy* but adds specific details on both bus and passenger rail infrastructure projects. The *Urban Transport Statement* initiative is to increase the reliability of public transport across the Sydney Region.

Once again the *Urban Transport Statement* refers to the planning for a proposed link between the F3 and M2 and possibly F3 and M7 over the next decade.

A series of strategic bus corridors are also outlined in the *Urban Transport Statement* for development by 2011. These include:

- Rouse Hill - Macquarie Park (Strategic bus corridor 8 via the M2);
- Parramatta – Hornsby (Strategic bus corridor 41 via Pennant Hills Road);
- Chatswood-Hornsby (via Pacific Highway); and
- duplication of the Iron Cove Bridge (on Victoria Road) to provide three general traffic lanes and a bus lane, with the extension of the bus lane from Iron Cove Bridge through to Darling Street, Rozelle.

Rail projects include:

- 'Rail Clearways' separating 14 rail routes into five independent clearways (2010) including Hornsby Platform 5 and stabling;
- Epping to Chatswood Rail Line;
- North West Rail Link (from Rouse Hill through Macquarie Park to CBD);
- Harbour Rail Link; and
- South West Rail Link.

Possible additional rail projects subject to Australian Government funding are:

- two extra tracks between West Ryde and North Strathfield;
- two extra tracks on the Main North Line between Hornsby and Epping; and
- a freight only underpass between North Strathfield and Homebush.

The NSW Government's current plans for the rail network differ in four relevant ways from the plans that were represented in the transport modelling in the SKM Study. Significantly, the Hornsby to Newcastle high speed rail line identified as part of the rail network in the SKM Study based on *Action for Transport 2010* did not proceed and is no longer included in the NSW Government's future infrastructure plans.

Secondly, the Parramatta to Epping section of the Parramatta-Chatswood Rail Link is not proceeding at this time; though the potentially more relevant section between Epping and Chatswood is scheduled to be opened in 2008.

Thirdly, the NSW Government has decided (since the SKM study) to invest in a 'Rail Clearways' programme to improve the reliability and levels of service on the existing rail network.

Fourthly, the NSW Government, Australian Government and the Australian Rail Track Corporation are investigating the provision of additional tracks on the Main Northern line and an underpass at North Strathfield as a means of improving access for freight trains into Sydney.

3.1.5 Ports Growth Plan

The NSW Government *Ports Growth Plan* (2003) and subsequent decisions relating to port infrastructure incorporate strategies to accommodate future growth in containerised trade. The key elements of the Ports Growth Plan include:

- retention of Sydney Harbour as a working port. This includes cruise ships, ship construction and repair activities and the import of construction materials and oil;
- relocation of general cargo and car stevedoring from Port Jackson to Port Kembla;
- consideration of expanding Port Botany;
- securing of the former BHP steelworks site at Newcastle Port for port use after an expanded Port Botany reaches capacity; and
- preservation of Sydney Harbour foreshore for recreational and residential/ commercial development.

Subsequent NSW Government freight and land use policies now encompass all actions outlined above and the NSW Government has since granted planning approvals for the expansion of Port Botany.

Port Botany's container task is forecast to double by 2021, and container movements on the surrounding road and rail network are expected to increase accordingly. It is predicted that Sydney will remain NSW's principal origin and destination of import/ export container movements. Currently around 90% of all container freight imported to NSW is delivered within a 40 kilometre radius of Port Botany (i.e. south of the Hawkesbury River).

3.1.6 NSW Intermodal Terminal Policy

In October 2005, the NSW Government's Freight Infrastructure Advisory Board (FIAB) released a report entitled *Railing Port Botany's Containers – Proposals to Ease Pressure on Sydney's Roads*. The FIAB identified Moorebank as a key future hub for the Sydney Basin and recommended that adequate provisions be made to allow common-user,

'open access' operations at the terminals. The report also supported a network of intermodal freight hubs at Enfield and Eastern Creek and an expansion of existing freight hubs at Minto and Ingleburn.

In May 2007 the NSW Government's response to the FIAB report was:

- the establishment of a new freight terminal at Enfield and, subject to discussions with the Australian Government, at Moorebank (as part of a terminal network including existing Camellia, Leightonfield, Yennora and Minto facilities) with consideration of adequate provisions for common-user access;
- appropriate planning controls applied to keep an Eastern Creek option open for a future intermodal terminal;
- a 40% target share for rail containers (at Port Botany); and
- reductions in truck movements around Port Botany and inner suburbs by up to 300 per day.

Even if the NSW 40% rail mode share target is achieved, container truck traffic will still increase considerably. Daily truck traffic generated by terminals at Port Botany is forecast to increase by 61% from the current 2,900 movements to 4,700 movements by 2021 even with a 40% rail mode share.

These changes to port infrastructure and the supporting rail and intermodal terminal network and an increasing road freight task will increase freight activity between Port Botany and Sydney's industrial areas, particularly the inner/outer west, and generate additional employment and attract vehicle movements from/to those areas.

3.2 Other Policy

There have been a range of other changes to transport policy since the time of the SKM Study relating to issues that do not directly impact on land use and transport network data and assumptions, but more to project planning and delivery. The more important of these are described below.

3.2.1 Richmond Review

In August 2005, Professor David Richmond was appointed by the NSW Government to review a variety of issues surrounding privately financed motorways. His review, now called the Richmond Report, made a number of recommendations, all of which have been adopted by the NSW Government.

One of these was to abandon the government's previous policy that motorways should be developed at "no cost" to government.

A second important recommendation was that the number of existing arterial road lanes should not be reduced to induce traffic on to new motorways, and that lane closures can only occur if subject to other Government priorities, for example, strategic bus corridors.

Thirdly, a full costing analysis must be carried out in the planning stage of any toll project.

3.2.2 NSW Government State Plan

The NSW Government's *State Plan* released in November 2006 sets out goals and priorities for the next 10 years. This will have an effect on new transport infrastructure delivery as a number of priorities include safer roads, cleaner air and progress on greenhouse gas reductions, and improvements in the efficiency of the road network. On all of the above priorities the NSW Government in its submission to the Review suggested that the Link will provide a range of benefits towards their delivery.

The *State Plan* sets the following targets:

- an increase the public transport share of trips to and from the CBD to 75% by 2016 (currently 72%); and
- an increase the journeys to work in the Sydney metropolitan region by public transport to 25% by 2016 (currently 20-22%).

These targets indicate that the NSW Government is seeking to encourage people to use public transport rather than motor vehicles to access the CBD and other major employment centres, such as those on the lower North Shore (which tend to be located on rail lines and at nodes in the public transport network).

3.2.3 AusLink

The Australian Government's policy for transport infrastructure investment has also changed since the time of the SKM Study. Australian Government land transport investment is now no longer limited to the former National Highway System (extending instead to a much expanded national road and rail network), requires state government funding contributions and seeks to engage private financing in the delivery of projects.

The *AusLink White Paper* (2004) set out the Australian Government's policy objectives and its related investment programme for 2004 to 2009. Implementation of this investment programme was achieved through Bilateral Agreements with each state/territory jurisdiction. Among other considerations the NSW Agreement provided for:

- cooperation in assessing future priorities for the National Network in NSW by undertaking joint studies of individual corridors and developing a 20-year (or long-term) strategy for each corridor to guide future investment;
- integration of transport and land use planning at a network level, and avoidance of excessive additions to the traffic load on the AusLink National Land Transport Network from State arterial or local road systems; and
- assessment of the potential scope for private sector participation to reduce the cost to government of the project. (In the case of projects estimated to cost in excess of $500 million the parties agreed that formal expressions of interest would normally be sought from the private sector.)

3.2.4 AusLink Sydney Urban Corridor Strategy

A draft *AusLink Sydney Urban Corridor Strategy* has been jointly developed by the Australian and NSW governments. This outlines a number of short-term strategic priorities (italicised) to 2015. Those that relate to the SKM Study area include:

- *Improve north-south freeway connections to the orbital network.* Suggested response includes: Consider motorway links from the Sydney Orbital to the F3 and the F6.
- *Manage growth of rail freight and passenger services on the shared network and facilitate separation between the two.* Suggested response includes: Improve the capacity and reliability of the public transport system to alleviate congestion.
- *Provide greater separation of freight and passenger train movements.*
- *Improve coordination of freeway and motorway management and pricing.* Suggested responses include: Consider measures to control the volume of traffic during commuter peak periods, e.g. ramp metering.
- *Enhance capacity along the M2, M4, M5 and M7 corridors.*

The *AusLink Sydney-Brisbane Corridor Strategy* has a related short-term priority in relation to the North Sydney rail network, which is: *Increase rail capacity between North Strathfield and Newcastle.*

3.3 Summary

The policies I have outlined describe changes in terms of land use and transport network, and the *Metropolitan Strategy* is the most significant of these. In summary, they envisage:

- population and employment growth;
- provision of new bus and rail infrastructure;
- port and intermodal freight hub expansion; and
- road network upgrades.

These changes need to be considered within the context of changes to policy relating project planning and delivery such as the Richmond Report and the AusLink bilateral agreements.

I turn then to analyse whether and to what extent these changes would support any significant changes to projections of traffic flow and transport demand contained in the SKM Study.

3.4 Comparison of Land Use Projections

As I have earlier indicated, land use projections form the basis for trip tables, which in turn are used to project traffic demand on road links.

The latest land use projections at the travel zone level prepared by the TDC in November 2006 extend the projection horizon to 2031, ten years beyond that available

to and used by SKM. The TDC has indicated that these latest population projections accord reasonably well at the SSD level with the planning intentions outlined in the *Metropolitan Strategy*.

I have not lost sight of the fact that the *Metropolitan Strategy* will ultimately be implemented at the local and regional level, and that when that is done traffic forecasts may vary. At the moment however the projections prepared by the TDC reflect the high level policy of the *Metropolitan Strategy* and are the projections used by the NSW Government.

3.4.1 Population

The projections indicate that Sydney's population will continue to grow in the period after 2021, i.e. the time horizon used by SKM. However, Table 11 shows population growth over the 10 years from 2021 to 2031, whilst still significant, will start to slow compared to the growth between 2001 and 2011 and between 2011 and 2021. Absolute growth is projected to be less, and the percentage growth is somewhat smaller than for the preceding decades.

Table 11 – Comparison of Projected Ten Year Increases in Population to 2031

	2001	2011	2021	2031
Projected Population	4,062,695	4,443,651	4,832,905	5,147,869
Ten year increase		380,956	389,254	314,964
% increase over each decade		9.4%	8.8%	6.5%

Table 14 provides a comparison of the distribution of population (at the SSD level) under the projections used by SKM and those now available from the TDC. Table 14 also incorporate figures for 2031 contained in the latest November 2006 projections from the TDC.

The projections show an increase in population across all SSDs. Considerable population growth is projected to occur in Blacktown, the Central West, the Inner Sydney and the Outer South Western SSDs. This is likely to reflect the population policy set out in the *Metropolitan Strategy*. Another matter to note is that the growth on the Central Coast, although increasing, is not as large as that in some of the other SSDs.

3.4.2 Employment

The employment projections in Table 15 show an increase in all SSDs over the period 2001 to 2031, with the percentage increase over those years being greatest for Blacktown, the Central Coast, the Central North, the Outer South Western Sydney and the Outer Western Sydney SSDs. Once again this reflects the employment policy outlined in the *Metropolitan Strategy*.

As with the population projections, shown in Table 11, the rate of employment growth slows over each decade through to 2031. This is shown in Table 12.

Table 12 – Comparison of Projected Ten Year Increases in Employment to 2031 (using Nov 2006 Projections)

	2001	2011	2021	2031
Projected Employment	1,957,119	2,248,770	2,420,250	2,499,460
Ten year increase		291,651	171,480	79,210
% increase over each decade		14.9%	7.6%	3.3%

Employment on the Central Coast in 2021 is projected to be approximately 27,000 persons greater (or 27%) than in the projections used by SKM. However, employment growth on the Central Coast during the following decade to 2031 is projected to be quite modest, totalling less than 2,000 persons. Table 13 shows that the ratio of projected population to employment drops from 3.2 people for each job on the Central Coast in 2001 to 2.9 people in 2031. SKM assumed that the existing ratio of population to employment was 3.5:1 and would continue.

Table 13 – Ratio of Population to Employment on the Central Coast (using Nov 2006 projections)

	2001	2011	2021	2031
Employment on the Central Coast	90,508	114,559	129,064	130,886
Population on the Central Coast	292,814	327,576	364,759	379,639
Ratio of Population to Employment	3.2	2.9	2.8	2.9

The availability of more jobs on the Central Coast would be expected to reduce the demand for people to travel south to Sydney for employment, i.e. as people look to secure jobs near their home that minimise the time and cost of commuting.

Table 14 – Comparison of Population Projections Used by SKM with Nov 2006 Projections prepared by Transport Data Centre

Statistical Subdivision as at 2007	Nos. Supplied to SKM - based on 2001 UDP Scenario A			Projections prepared by TDC at Nov 2006				SSD as % of Total (using SKM Projections)			SSD as % of Total (using Nov 2006 Projections)			
	2001	2011	2021	2001	2011	2021	2031	2001	2011	2021	2001	2011	2021	2031
Blacktown	260,052	298,912	359,529	262,707	294,556	336,538	387,598	6.4	6.7	7.4	6.5	6.6	7.0	7.5
Canterbury-Bankstown	307,819	315,641	326,882	306,444	316,861	329,676	338,959	7.6	7.1	6.8	7.5	7.1	6.8	6.6
Central Coast	286,820	320,835	359,563	292,814	327,576	364,759	379,639	7.1	7.2	7.4	7.2	7.4	7.5	7.4
Central Nth Sydney	394,583	448,076	491,937	400,688	442,883	483,290	514,433	9.7	10.1	10.2	9.9	10.0	10.0	10.0
Central W Sydney	290,255	326,366	358,878	288,583	326,020	363,788	397,771	7.2	7.3	7.4	7.1	7.3	7.5	7.7
Eastern Suburbs	240,715	249,893	260,325	234,710	244,022	248,681	250,143	5.9	5.6	5.4	5.8	5.5	5.1	4.9
Fairfield Liverpool	343,174	365,898	383,703	345,035	377,086	412,869	448,954	8.5	8.2	7.9	8.5	8.5	8.5	8.7
Inner Sydney	294,785	346,784	387,346	284,301	346,857	382,974	402,491	7.3	7.8	8.0	7.0	7.8	7.9	7.8
Inner W Sydney	156,987	183,307	213,143	158,848	182,344	196,611	207,193	3.9	4.1	4.4	3.9	4.1	4.1	4.0
Lower Nth Sydney	285,077	297,813	312,809	286,113	301,998	315,225	329,094	7.0	6.7	6.5	7.0	6.8	6.5	6.4
Northern Beaches	224,278	238,991	263,396	227,742	237,010	248,548	263,903	5.5	5.4	5.4	5.6	5.3	5.1	5.1
Outer SW Sydney	231,199	273,171	305,058	231,836	266,784	335,659	403,949	5.7	6.1	6.3	5.7	6.0	6.9	7.8
Outer W Sydney	310,139	339,868	350,776	313,866	328,137	358,275	382,265	7.7	7.6	7.2	7.7	7.4	7.4	7.4
St George-Sutherland	427,104	443,613	465,006	429,006	451,516	456,013	441,479	10.5	10.0	9.6	10.6	10.2	9.4	8.6
Sydney Stat Div Total	4,052,987	4,449,168	4,838,351	4,062,694	4,443,650	4,832,906	5,147,871	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 15 – Comparison of Employment Projections Used by SKM with Nov 2006 Projections prepared by Transport Data Centre

Statistical Subdivision as at 2007	Nos. Supplied to SKM - based on 2001 UDP Scenario A			Projections prepared by TDC at Nov 2006				SSD as % of Total (using SKM Projections)			SSD as % of Total (using Nov 2006 Projections)			
	2001	2011	2021	2001	2011	2021	2031	2001	2011	2021	2001	2011	2021	2031
Blacktown	75,015	86,549	103,051	83,087	101,004	119,771	133,245	4.0	4.2	4.6	4.2	4.5	4.9	5.3
Canterbury-Bankstown	105,663	110,988	117,061	102,288	111,722	110,687	107,041	5.7	5.4	5.3	5.2	5.0	4.6	4.3
Central Coast	82,091	91,380	101,706	90,508	114,559	129,064	130,886	4.4	4.5	4.6	4.6	5.1	5.3	5.2
Central Nth Sydney	118,608	133,632	146,548	131,636	178,117	200,442	209,221	6.4	6.5	6.6	6.7	7.9	8.3	8.4
Central W Sydney	181,626	200,326	218,318	179,849	204,529	211,755	214,945	9.7	9.8	9.8	9.2	9.1	8.7	8.6
Eastern Suburbs	76,490	80,619	84,978	80,423	87,220	87,348	85,753	4.1	3.9	3.8	4.1	3.9	3.6	3.4
Fairfield-Liverpool	109,145	118,441	126,520	111,229	128,733	143,847	154,104	5.9	5.8	5.7	5.7	5.7	5.9	6.2
Inner Sydney	479,495	527,274	573,308	503,951	544,697	571,631	574,180	25.7	25.8	25.8	25.7	24.2	23.6	23.0
Inner West Sydney	69,788	77,915	86,823	69,505	79,421	81,906	82,375	3.7	3.8	3.9	3.6	3.5	3.4	3.3
Lower Nth Sydney	218,004	238,380	256,882	228,503	258,940	277,739	289,858	11.7	11.7	11.5	11.7	11.5	11.5	11.6
Northern Beaches	77,969	82,799	89,784	82,841	94,540	99,650	102,101	4.2	4.0	4.0	4.2	4.2	4.1	4.1
Outer SW Sydney	57,290	68,920	78,340	64,993	81,781	96,575	112,086	3.1	3.4	3.5	3.3	3.6	4.0	4.5
Outer West Sydney	90,650	99,894	104,864	100,997	118,713	135,356	145,000	4.9	4.9	4.7	5.2	5.3	5.6	5.8
St George-Sutherland	121,603	128,480	136,366	127,309	144,793	154,479	158,665	6.5	6.3	6.1	6.5	6.4	6.4	6.3
Syd Stat. Div. Total	1,863,437	2,045,597	2,224,549	1,957,119	2,248,770	2,420,250	2,499,460	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.4.3 Summary

In summary the latest population and employment projections indicate population and employment growth generally within the Sydney Region, but particularly within south western and north western Sydney. However, the increase in population and employment is not large overall; the matter to notice is that the distribution is shifting. I turn then to an analysis of trip tables and traffic forecasts against the latest land use projections.

3.5 Trip Tables

For ease of understanding, I have adopted in this section of my report the same terminology as adopted for Terms of Reference One and for convenience it is repeated here as Table 16.

Table 16 – Review Data Sets, Titles and Definitions

Title	Model Year Forecasts Available	Comment
TDC06	2001, 2006, 2011, 2016, 2021, 2026, 2031	Latest available STM model outputs based on November 2006 land use inputs (uncalibrated)
TDC01	2001[1], 2011, 2021	STM model outputs based on 2001 land use inputs (uncalibrated) provided to SKM by TDC for the purposes of their Study
SKM	2001, 2011, 2021	Model outputs calibrated by SKM for their Study

[1] 2001 data summary provided by TDC, detailed data provided by SKM

As can be seen from Table 16 there are three data sets:

- latest TDC STM outputs, based on 2006 data (TDC06);
- STM outputs provided to SKM by TDC, based on 2001 data (TDC01); and
- model outputs arrived and reported by SKM as a consequence of its calibration process (SKM).

I also repeat the note of caution that I set out earlier. The STM is a high level strategic model for the whole of metropolitan Sydney, designed to show flows and patterns at a reasonable level of detail, but not in absolute terms.

3.5.1 Person Trips

The Review focuses on differences between car driver, train passenger and bus passenger trips rather than other modes such as car passengers, taxi, bicycle and walk. This results in a manageable data set and focuses on those trips expected to use the Link.

A summary of person trips is provided in Table 17 based on TDC06 compared to TDC01 for the years 2001, 2011 and 2021.

Table 17 – TDC STM Modelled Person Trips (TDC06 vs. TDC01) to 2031

	TDC06	TDC01	TDC06	TDC01	TDC06	TDC01	TDC06
Total Daily Trips	**2001**	**2001**	**2011**	**2011**	**2021**	**2021**	**2031**
All Day Car Trips	8,104,828	7,331,226	9,108,777	7,932,097	10,330,226	8,651,239	1,555,494
All Day Train Trips	792,128	1,018,551	895,306	1,100,845	1,088,482	1,255,187	1,312,229
All Day Bus Trips	452,074	689,397	373,162	750,903	360,934	929,402	414,398
Total (Car+Train+Bus)	9,349,030	9,039,174	10,377,245	9,783,845	11,779,642	10,835,828	13,282,121
Diff (TDC06-TDC01) - Car		11%		15%		19%	
Diff (TDC06-TDC01)- Train		-22%		-19%		-13%	
Diff (TDC06-TDC01) - Bus		-34%		-50%		-61%	
Diff (TDC06-TDC01) - All		3%		6%		9%	
Growth (2021-2001) - Car					27%	18%	
Growth (2021-2001) - Train					37%	23%	
Growth (2021-2001) - Bus					-20%	35%	
Growth (2021-2001) - All					26%	20%	
Growth (2031-2021) - Car							12%
Growth (2031-2021) - Train							21%
Growth (2031-2021) - Bus							15%
Growth (2031-2021) - All							13%

Table 17 shows what appears to be a substantial difference in person trips. As I noted in reference to Terms of Reference One, this is partly a consequence of the latest STM methodology, which has now changed.

Although the methodology has changed, Table 17 shows that the relative growth in person trips is similar, thus; TDC01 2001 to TDC01 2021 shows a 20% increase in total person trips and TDC06 2001 to TDC06 2021 shows a 26% increase in total person trips. This is not a significant change in comparison to the projections used by SKM for the year 2021 (TDC01). Importantly, for the purpose of Terms of Reference Two Table 17 shows an increase of 13% between the total person trips for the 10 year period 2021 (TDC06) to 2031 (TDC06) as compared to an increase of 26% for the 20 year period prior to 2021. This information was not available to SKM but it serves to highlight that similar rates of growth are expected beyond 2021 to that adopted by SKM for the period to 2021, and as such this is not a significant change.

The person trips are then summarised in terms of the respective mode share in Table 18.

Table 18 – TDC STM Modelled Person Trips (TDC06 vs. TDC01) Mode Share

	Mode Share Percentage						
	TDC06	TDC01	TDC06	TDC01	TDC06	TDC01	TDC06
Total Daily Trips	**2001**	**2001**	**2011**	**2011**	**2021**	**2021**	**2031**
All Day Car Trips	87%	81%	88%	81%	88%	80%	87%
All Day Train Trips	9%	11%	9%	11%	9%	12%	10%
All Day Bus Trips	5%	8%	4%	8%	3%	9%	3%
Total (Car+Train+Bus)	100%	100%	100%	100%	100%	100%	100%

Table 18 shows a higher mode share to car for all forecast years across both sets of trip tables, e.g. in 2021 88% under TDC06 compared to 80% under TDC01. Train mode share is relatively stable, but bus mode share is lower, for example, in 2021 with 3% compared to 9%.

TDC advised the Review that the explanation for the different mode shares was due to assumptions in *Action for Transport 2010* (with construction of transit ways across Sydney) and the long term strategic plan for rail projects (for example high speed rail to the Central Coast and Newcastle). These assumptions and projects are different under the *Metropolitan Strategy*.

In comparison and broadly speaking, the projections show less bus trips forecast in TDC06 than TDC01, and hence there are projected to be more cars using the road network in 2021 than forecast by SKM but the relative change is not significant.

3.5.2 Train Passenger Trips

In terms of train passenger trips across the network, TDC06 has fewer trips in it (13% fewer in 2021) than TDC01 as a consequence of the mode share differences (see Table 17).

Despite this, the latest data set has 37% more train trips in 2021 than 2001. This compares to a 23% growth in train trips over the same period using the data provided to SKM. In other words, the latest data set projects growth in train trips to 2021 similar to SKM, along with increases beyond 2021 to 2031.

However, these differences between TDC06 and TDC01 are not significant in the context of vehicle patronage on the Link as train trips represent only 9% of all trips.

3.5.3 Car Driver Trips by SSD

Car driver trips have been analysed, at two levels, firstly, in terms of total car driver trips by SSD and secondly in terms of origin and destination of car driver trips between SSD.

3.5.3.1 Total car driver trips

It is important to note in Table 19 that each SSD includes trips, on the one hand, within each SSD and on the other hand to/from other SSDs. Table 19 shows that the TDC06 data adopts a continuation of the growth rate used by SKM for all car trips across the metropolitan area.

Table 20 excludes trips within each SSD and deals only with trips to/from each SSD. It shows that trips to and from SSDs increase in all successive model year periods, including an increase beyond the year 2021, except for the Central Coast which declines after the 2011. There are also more vehicle trips in the TDC06 data set, and a larger increase between the years 2001 and 2021 (24% as opposed to 15%). This can in part be explained by the different methodology adopted in TDC06.

Table 20 shows another important fact in relation to growth. It shows that, comparing TDC01 and TDC06, the largest difference in growth of projected car driver trips occurs in: Blacktown, Central Northern Sydney, Central Western Sydney, Fairfield – Liverpool, Lower North Sydney, Outer South Western Sydney, and Outer Western Sydney. It also shows that Outer South Western Sydney, Outer Western Sydney, Fairfield/Liverpool and Blacktown have the largest projected growth in car driver trips between the years 2021 and 2031.

These differences between TDC01 and TDC06 and the significant growth in the north west and south west regions is likely to reflect the *Metropolitan Strategy*, which, as I have earlier noted, is designed to encourage population and employment increases in areas in those SSDs (for example the North West and South West Growth Centres, the Western Sydney Employment Hub and the central west area of Sydney between the Cumberland Highway and the M7).

The figures in Table 20 for the Central Coast for the years 2021 and 2031 (13,608 and 12,854) show a significant decrease from comparative figures in Table 19 and that trips to and from the Central Coast to Sydney SSDs are declining. The conclusion can be drawn that, as regards the Central Coast, most car driver trips are taking place within the Central Coast and relatively few car driver trips are taking place to and from the Central Coast. This reflects the conclusion already reached that, while the population of the Central Coast is projected to grow, employment on the Central Coast is expected to grow at a greater rate and the availability of more jobs in the Central Coast would be expected to reduce the demand for people to travel south for employment.

The data in Tables 19 and 20 is graphically illustrated in Figures 10, 11, 12 and 13 in relation to the Central Coast and North East Hornsby and North West Ku-ring-gai.

Table 19 – Daily Two Way Car Driver Trip Tables for Trips To/From and Within Each SSD as Provided by TDC

	TDC06				TDC01			TDC06		TDC01	
SSD	**2001**	**2011**	**2021**	**2031**	**2001**	**2011**	**2021**	**2021-2001**		**2021-2001**	
Blacktown	492,599	577,973	708,494	860,569	397,435	468,163	577,090	215,895	44%	179,655	45%
Cant-Banks	586,863	629,759	680,743	727,701	452,239	467,658	489,086	93,880	16%	36,847	8%
Central Coast	543,041	614,517	693,231	770,951	571,390	655,440	742,506	150,190	28%	171,116	30%
Central Nth Syd	765,737	889,860	992,264	1,094,305	641,254	712,177	777,327	226,527	30%	136,073	21%
Central W Syd	651,654	726,416	803,636	875,815	608,053	640,066	703,865	151,982	23%	95,812	16%
Eastern Sub	421,263	447,752	473,141	491,591	356,241	369,335	395,657	51,878	12%	39,416	11%
Fairfield Liv	611,120	697,523	807,044	922,117	503,129	558,020	589,388	195,924	32%	86,259	17%
Inner Syd	904,057	1,066,774	1,174,874	1,272,751	789,910	849,050	905,107	270,817	30%	115,197	15%
Inner W Syd	364,622	407,203	444,102	480,164	258,923	273,492	337,095	79,480	22%	78,172	30%
Lower Nth Syd	640,608	693,554	754,054	821,485	631,322	636,126	663,876	113,446	18%	32,554	5%
Nth Beaches	442,118	482,207	561,390	653,916	447,621	473,729	535,865	119,272	27%	88,244	20%
Outer SW Syd	397,100	485,256	638,129	827,396	413,300	470,042	535,317	241,029	61%	122,017	30%
Outer W Syd	580,271	641,562	800,680	916,644	578,125	641,902	663,416	220,409	38%	85,291	15%
St George-Suth	703,775	748,420	798,444	840,089	682,284	716,898	735,644	94,669	13%	53,360	8%
Total	8,104,828	9,108,777	10,330,226	11,555,494	7,331,226	7,932,097	8,651,239	2,225,398	27%	1,320,013	18%

Table 20 – Daily Two Way Car Driver Trip Tables for Trips To/From Each SSD as Provided by TDC (Excludes trips within each SSD)

	TDC06					TDC01			TDC06		TDC01	
SSD	**2001**	**2011**	**2021**	**2031**	**2021 and 2031 (Growth %)**	**2001**	**2011**	**2021**	**2021-2001**		**2021-2001**	
Blacktown	221,056	264,204	317,057	371,910	17%	180,787	209,058	236,493	**96,001**	**43%**	55,706	31%
Cant-Banks	325,483	352,531	380,336	405,924	7%	251,585	262,836	274,401	54,853	17%	22,816	9%
Central Coast	13,363	14,630	13,608	12,854	-6%	31,754	34,228	35,431	245	2%	3,677	12%
Central Nth Syd	322,625	370,746	414,714	457,687	10%	265,183	287,346	310,709	**92,089**	**29%**	45,526	17%
Central W Syd	344,559	109,786	428,805	467,238	9%	326,132	340,751	364,573	**84,246**	**24%**	38,441	12%
Eastern Sub	185,727	204,083	218,188	231,380	6%	171,725	181,983	193,731	32,461	17%	22,006	13%
Fairfield Liv	236,503	270,499	308,561	351,522	14%	207,928	228,199	246,723	**72,058**	**30%**	38,795	19%
Inner Syd	442,623	488,659	526,325	561,712	7%	396,449	423,406	451,672	83,702	19%	55,223	14%
Inner W Syd	232,969	258,858	281,200	303,290	8%	167,828	176,161	203,753	48,231	21%	35,925	21%
Lower Nth Syd	310,242	340,778	370,298	398,258	8%	295,671	306,686	319,857	**60,056**	**19%**	24,186	8%
Nth Beaches	97,390	103,996	112,245	121,386	8%	94,403	97,514	102,219	14,855	15%	7,816	8%
Outer SW Syd	77,037	96,580	125,921	159,104	26%	75,488	86,533	106,046	**48,884**	**63%**	30,558	40%
Outer W Syd	135,876	154,533	184,957	216,706	17%	112,950	125,532	133,626	**49,081**	**36%**	20,676	18%
St George-Suth	226,601	244,998	259,097	267,709	3%	198,575	205,608	224,936	32,496	14%	26,361	13%
Total	3,172,054	3,274,880	3,941,312	4,326,680	10%	2,776,458	2,965,842	3,204,170	769,258	24%	427,712	15%

Figure 10 – All Daily Car Driver Trips To/From the Central Coast – TDC06 – Year 2021

Figure 11 – All Daily Car Driver Trips To/From the Central Coast – TDC06 – Year 2031

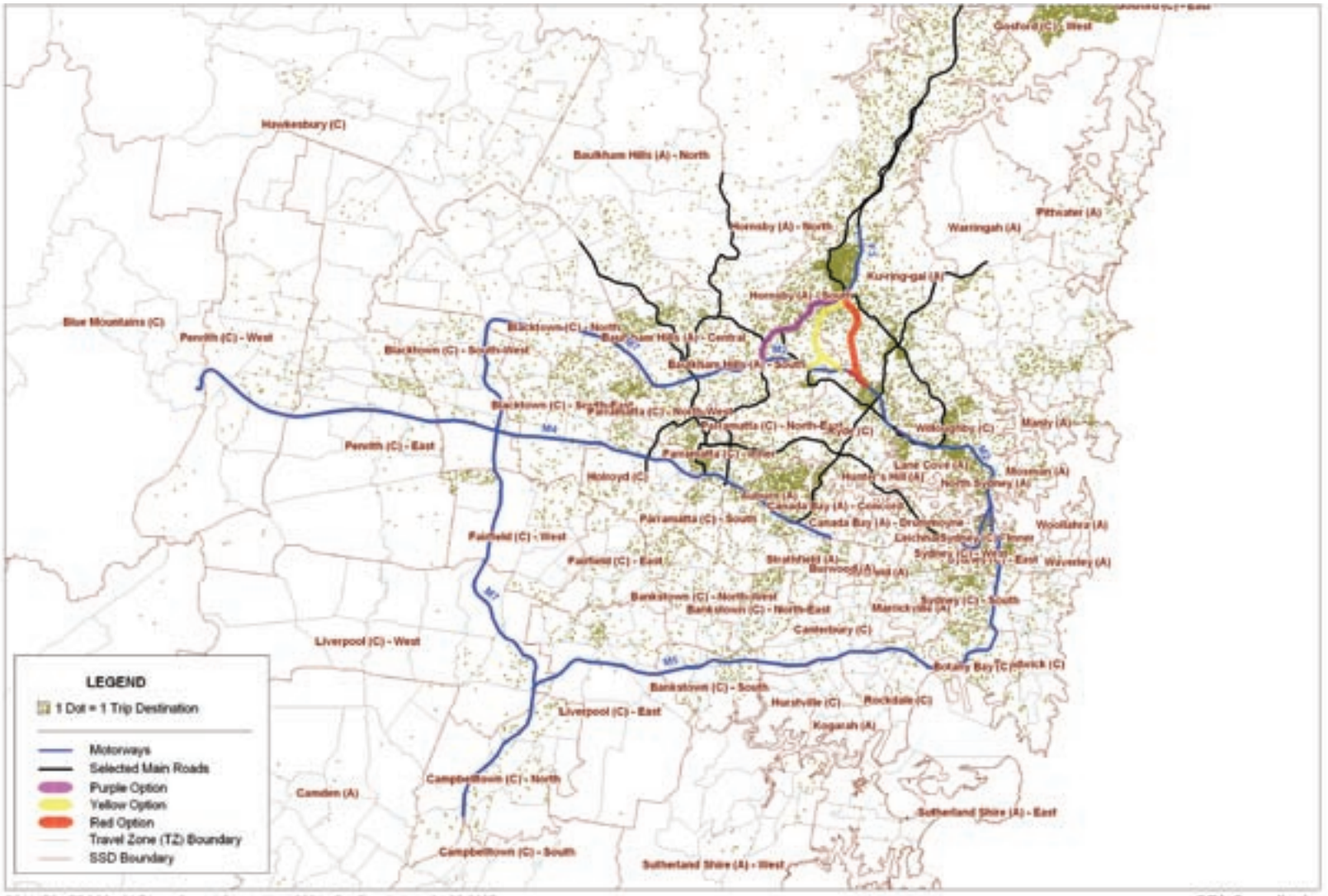


Figure 12 – All Daily Car Driver Trips To/From the NE Hornsby and NW Ku-ring-gai Areas – TDC06 – Year 2021

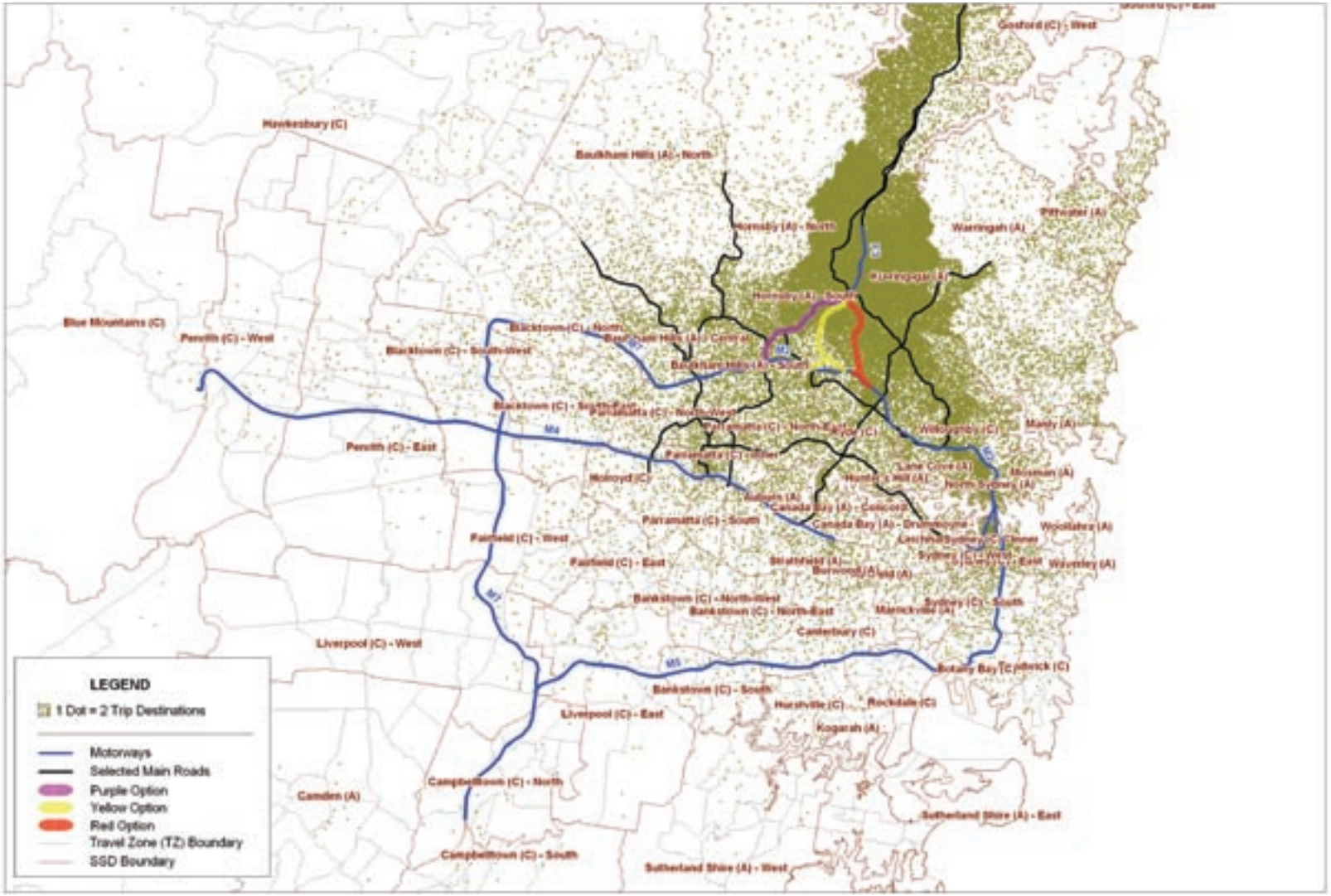
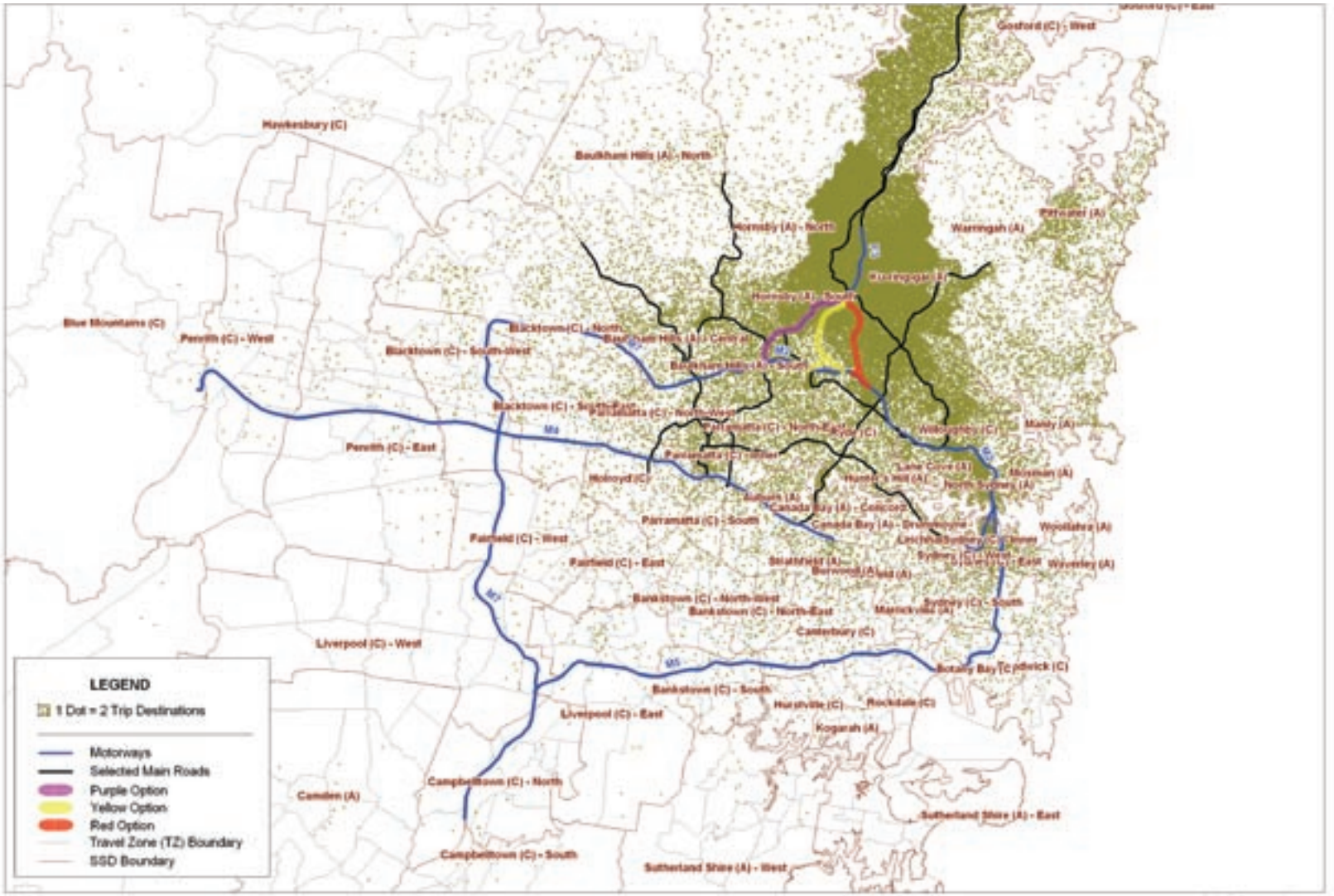


Figure 13 – All Daily Car Driver Trips To/From the NE Hornsby and NW Ku-ring-gai Areas – TDC06 – Year 2031



3.5.3.2 Origin and Destination of Car Trips

Daily car driver trips originating in SSDs with destinations in other SSDs can be seen in Tables 21 and 22 for 2021 and 2031 respectively. Tables 21 and 22 show that, for daily car trips in the Central Coast, most trips are internal trips. For those trips to other SSDs most travel to Central Northern Sydney, Central Western Sydney, Inner Sydney and Lower North Sydney. This is diagrammatically illustrated in Figures 14, 15 and 16.

A further analysis can be made of trips having and origin or destination in Central Northern Sydney. As Tables 21 and 22 show, the majority of those trips are internal (with 577,550 in 2021 and 636,618 in 2031). However, of those that are not internal trips, a comparatively large volume have an origin or destination in Lower North Sydney, that is suburbs such as Lane Cove, Hunters Hill etc (with 101,829 in 2021 and 108,131 in 2031). These trips would be likely to use the Pacific Highway because of their origins or destinations, suggesting that it would not be attractive on a time and cost basis to use the Link.

However, a comparatively large number of Central Northern Sydney trips for 2021 and 2031 have a destination in Central Western Sydney (with 101,072 in 2021 and 108,519 in 2031) and Blacktown (with 94,678 in 2021 and 115,320 in 2031), that is areas to the south and west of Pennant Hills Road.

Figures 14, 15 and 16 show the pattern of projected daily car trips between SSDs in 2001, 2021 and 2031. Two things can be observed. First in each year there is only a small proportion of trips to/from the Central Coast. Secondly for all years car driver trips are from east to west and west to east and to/from Central North Sydney, and southern and western SSDs. In other words the pattern is across the Sydney Region is east to west and vice versa rather than north to south and vice versa.

Table 21 – Daily Car Driver Trips between SSDs – TDC06 – Year 2021

Statistical Sub-Division (SSD)		Statistical Sub-Division (SSD)														
		Blacktown	Cant-Banks	Central Coast	Central Nth Syd	Central W Syd	Eastern Sub	Fairfield Liv	Inner Syd	Inner W Syd	Lower Nth Syd	Nth Beaches	Outer SW Syd	Outer W Syd	St George Suth	Totals
Statistical Sub-Division (SSD)	Blacktown	391,437	5,043	776	94,678	60,217	800	28,967	4,686	4,450	7,765	1,195	6,435	100,325	1,720	708,494
	Cant-Banks	5,043	300,407	482	8,638	55,427	5,719	65,864	50,866	64,500	9,991	1,112	12,482	2,791	97,421	680,743
	Central Coast	776	482	679,623	4,601	1,891	173	494	1,223	426	1,971	618	214	566	173	693,231
	Central Nth Syd	94,678	8,638	4,601	577,550	101,072	3,874	10,563	21,385	14,486	101,829	25,704	2,373	22,493	3,018	992,264
	Central W Syd	60,217	55,427	1,891	101,072	374,831	2,797	70,926	18,369	40,092	40,488	3,310	8,046	15,422	10,748	803,636
	Eastern Sub	800	5,719	173	3,874	2,797	254,953	1,406	156,218	6,874	19,220	3,908	907	497	15,795	473,141
	Fairfield Liv	28,967	65,864	494	10,563	70,926	1,406	498,483	9,245	10,064	4,405	546	69,981	21,272	14,828	807,044
	Inner Syd	4,686	50,866	1,223	21,385	18,369	156,218	9,245	648,549	74,845	85,613	18,662	4,814	3,469	76,930	1,174,874
	Inner W Syd	4,450	64,500	426	14,486	40,092	6,874	10,064	74,845	162,902	34,075	2,777	2,660	2,454	23,497	444,102
	Lower Nth Syd	7,765	9,991	1,971	101,829	40,488	19,220	4,405	85,613	34,075	383,756	52,608	1,536	3,719	7,078	754,054
	Nth Beaches	1,195	1,112	618	25,704	3,310	3,908	546	18,662	2,777	52,608	449,145	197	592	1,016	561,390
	Outer SW Syd	6,435	12,482	214	2,373	8,046	907	69,981	4,814	2,660	1,536	197	512,208	10,380	5,896	638,129
	Outer W Syd	100,325	2,791	566	22,493	15,422	497	21,272	3,469	2,454	3,719	592	10,380	615,723	977	800,680
	St George Suth	1,720	97,421	173	3,018	10,748	15,795	14,828	76,930	23,497	7,078	1,016	5,896	977	539, 347	798,444
	Totals	708,494	680,743	693,231	992,264	803,636	473,141	807,044	1,174,874	444,102	754,054	561,390	638,129	800,680	798,444	10,330,226

Note: 2021 trip tables are projected trip numbers

Table 22 – Daily Car Driver Trips between SSDs – TDC06 – Year 2031

Statistical Sub-Division (SSD)		Statistical Sub-Division (SSD)														
		Blacktown	Cant-Banks	Central Coast	Central Nth Syd	Central W Syd	Eastern Sub	Fairfield Liv	Inner Syd	Inner W Syd	Lower Nth Syd	Nth Beaches	Outer SW Syd	Outer W Syd	St George-Suth	Totals
Statistical Sub-Division (SSD)	Blacktown	488,659	5,505	729	115,320	65,431	1,006	32,551	5,629	4,942	8,717	1,366	7,704	121,092	1,918	860,569
	Cant-Banks	5,505	321,777	400	8,708	60,426	6,019	71,616	53,722	68,628	10,472	1,088	14,978	2,888	101,474	727,701
	Central Coast	729	400	758,097	4,696	1,757	142	428	1,067	368	1,825	525	173	594	150	770,951
	Central Nth Syd	115,320	8,708	4,696	636,618	108,519	3,806	10,876	21,668	14,972	108,131	29,068	2,450	26,528	2,945	1,094,305
	Central W Syd	65,431	60,426	1,757	108,519	408,577	3,513	75,470	22,658	45,228	44,438	3,473	8,821	16,407	11,097	875,815
	Eastern Sub	1,006	6,019	142	3,806	3,513	260,211	1,484	165,576	7,996	20,172	4,002	1,013	581	16,070	491,591
	Fairfield Liv	32,551	71,616	428	10,876	75,470	1,484	570,595	9,866	10,531	4,482	514	93,840	23,784	16,080	922,117
	Inner Syd	5,629	53,722	1,067	21,668	22,658	165,576	9,866	711,039	81,264	93,230	19,293	5,411	3,907	78,421	1,272,751
	Inner W Syd	4,942	68,628	368	14,972	45,228	7,996	10,531	81,264	176,874	36,987	2,948	3,157	2,680	23,589	480,164
	Lower Nth Syd	8,717	10,472	1,825	108,131	44,438	20,172	4,482	93,230	36,987	423,227	57,378	1,585	3,736	7,105	821,485
	Nth Beaches	1,366	1,088	525	29,068	3,473	4,002	514	19,293	2,948	57,378	532,530	190	568	973	653,916
	Outer SW Syd	7,704	14,978	173	2,450	8,821	1,013	93,840	5,411	3,157	1,585	190	668,292	12,918	6,864	827,396
	Outer W Syd	121,092	2,888	594	26,528	16,407	581	23,784	3,907	2,680	3,736	568	12,918	699,938	1,023	916,644
	St George-Suth	1,918	101,474	150	2,945	11,097	16,070	16,080	78,421	23,589	7,105	973	6,864	1,023	572,380	840,089
	Totals	860,569	727,701	770,951	1,094,305	875,815	491,591	922,117	1,272,751	480,164	821,485	653,916	827,396	916,644	840,089	11,555,494

Note: 2031 trip tables are projected trip numbers

Figure 14 – Daily Car Trips between SSDs – TDC06 – Year 2001

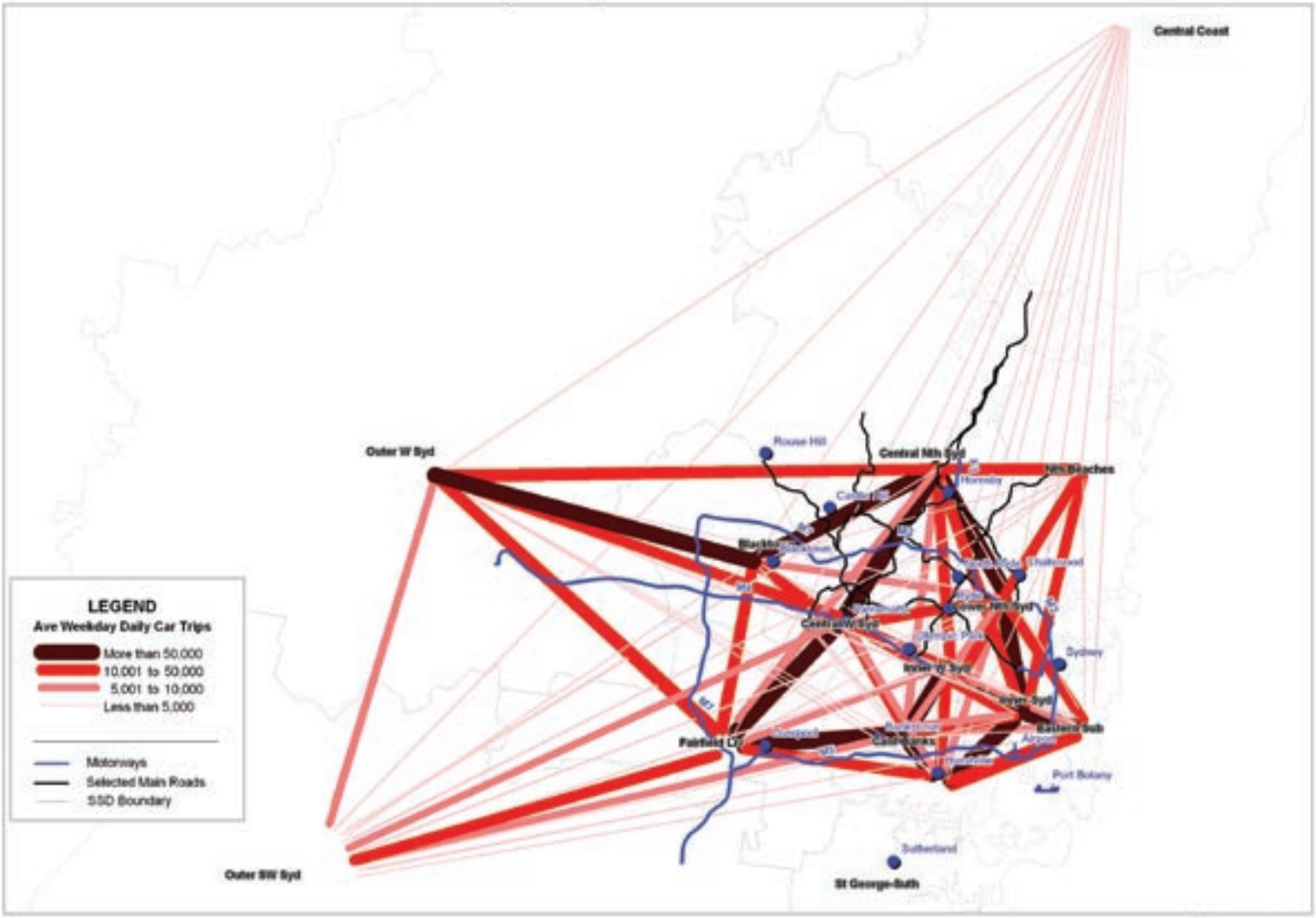


Figure 15 – Daily Car Trips between SSDs – TDC06 – Year 2021

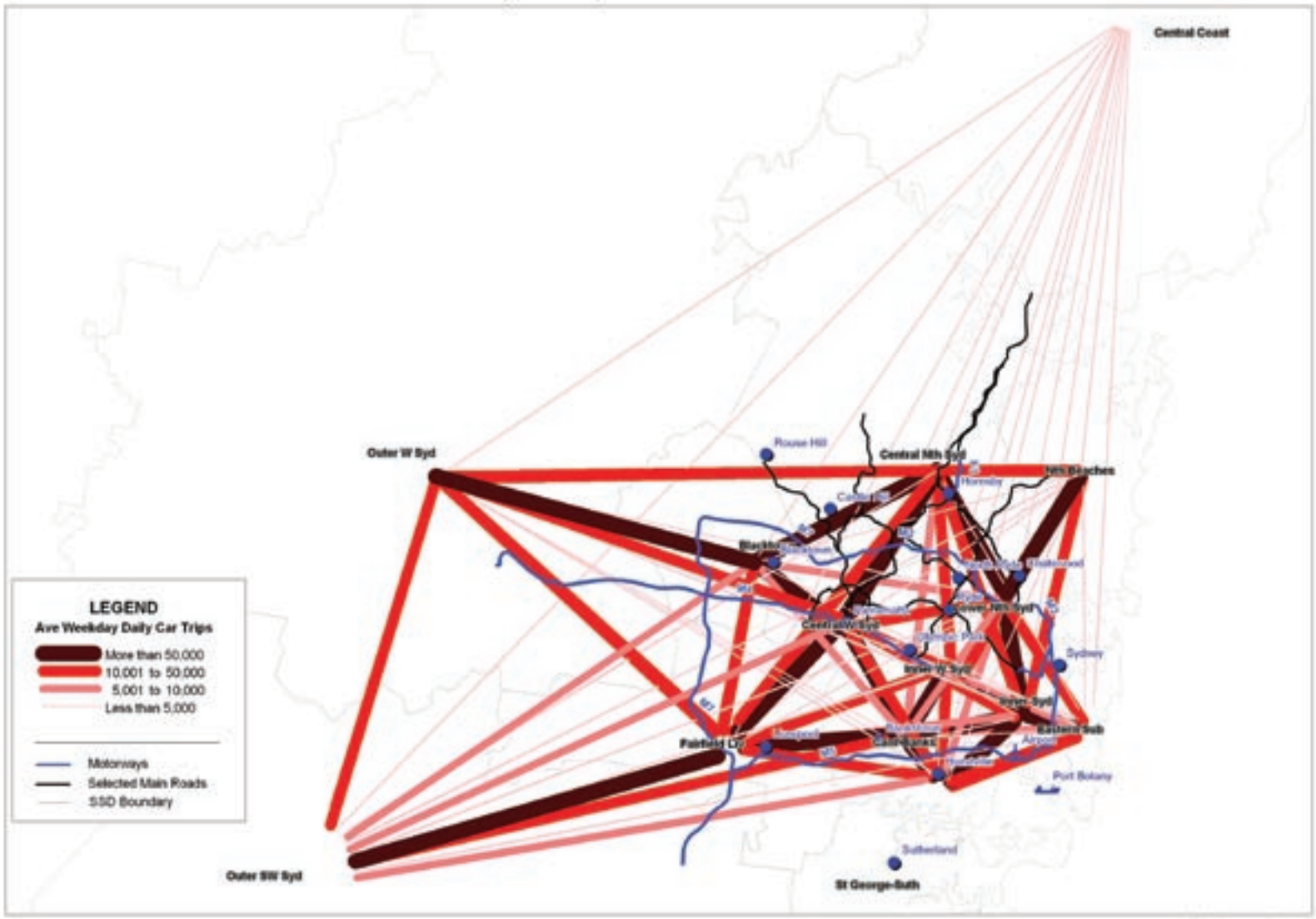
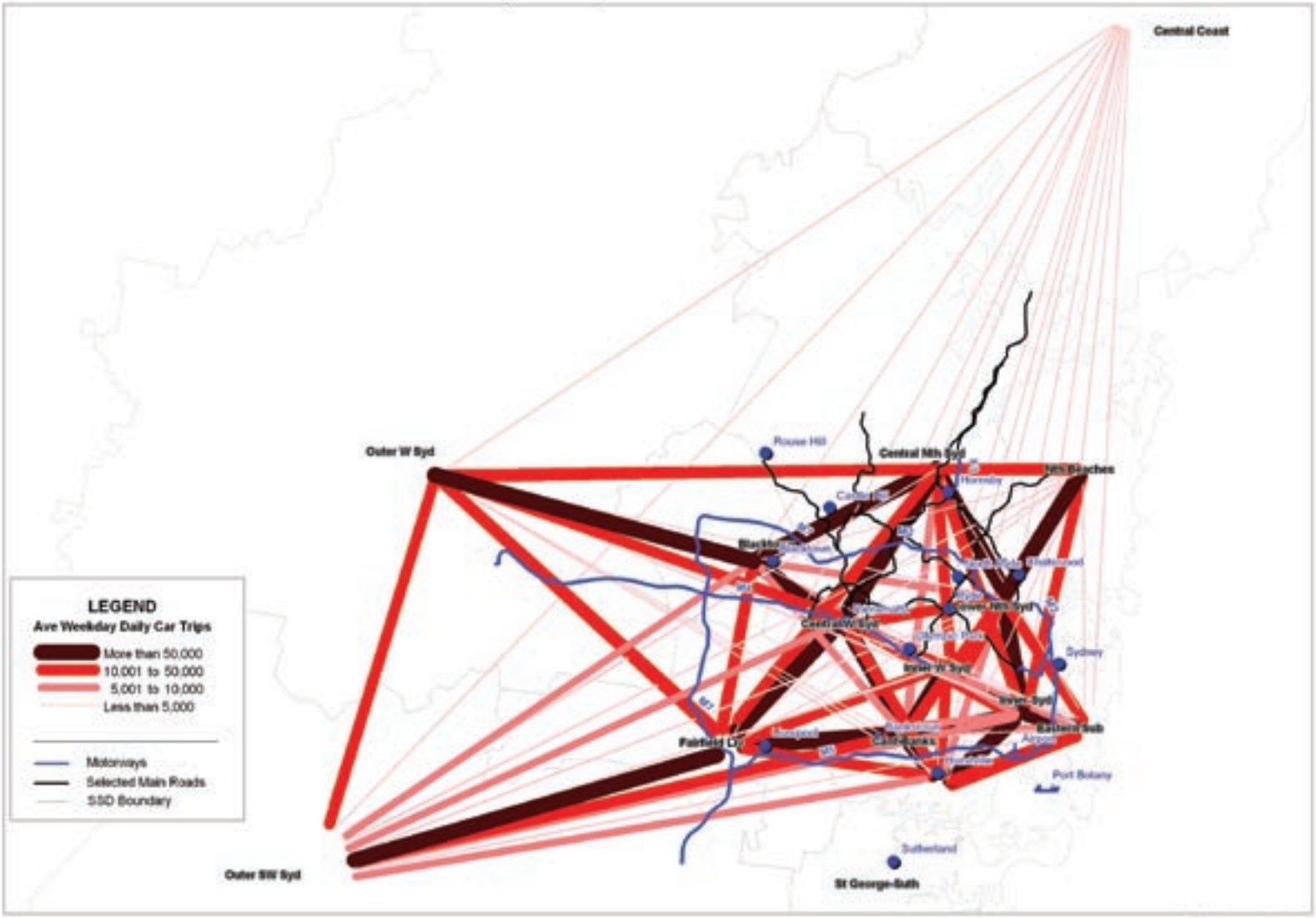


Figure 16 – Daily Car Trips between SSDs – TDC06 – Year 2031



3.6 Current Traffic Counts

Table 23 shows daily traffic counts on the main roads around the northern and western areas of Sydney since the opening of the M7.

The results show virtually no change in total daily traffic volumes between 2002 and 2006 on the main roads in the study area, inclusive of key roads such as Pennant Hills Road, Pacific Highway and the F3. Minor increases or decreases in the order of a few percent are not of significance. However some reduction in traffic volumes is evident on the Cumberland Highway between 2005 and 2006 (a difference of 6,428 in daily traffic volumes or around 10%) since the opening of the M7.

The same comparison across the motorways shows a higher level of growth, particularly between 2005 and 2006, confirming the additional capacity provided by the opening of the M7 in December 2005.

The analysis above supports the conclusion that there have been no changes since the SKM Study that would lead to any significant changes to the projections.

Table 23 - RTA AADT Traffic Counts on Selection of Motorways and Main Roads

RTA Site #		RTA AADT 2-way Volumes				
		1999	2002	2005	2006 [1]	2006-2002
Main Roads						
74.2	F3 (M1) Sydney-Newcastle Fwy, Wahroonga - at Edgeworth David Av Ovbr	74,364	78,600	76,649	75,754	-4%
74.03	Pennant Hills Rd, West Pennant Hills - Sth of Copeland Rd	65,046	70,521	71,646	73,793	5%
74.087	Pennant Hills Rd, Pennant Hills - at Railway Bridge	73,933	75,628	74,631	75,277	-1%
66.248	Cumberland Hwy (Smithfield Rd), Smithfield - Nth of Robert St	59,087	58,610	63,881	57,453	-2%
74.452	Beecroft Rd, Cheltenham - Sth of Old Beecroft Rd (Nth of M2)	34,700	34,217	32,548	32,144	-6%
53.001	Mona Vale Rd, Pymble - Nth of Woodlands Av (Nth of Pacific Hwy)	44,959	44,083	40,906	43,145	-2%
53.198	Pacific Hwy, Killara - Sth of Cecil St (btw Ryde Rd & Stanhope Rd)	48,876	49,022	47,816	47,452	-3%
53.018	Pacific Hwy, Pymble - Sth of Telegraph Rd (btw Ryde Rd & Bobbin Head Rd)	63,086	63,557	64,050	63,946	1%
53.200	Ryde Rd - Nth of M2	73,458	70,760	70,997	75,733	7%
52.014	Lane Cove Rd - de Burghs Bridge	78,776	77,363	76,962	75,797	-2%
53.053	Eastern Arterial Rd, St Ives - Sth of Nicholson Ave	19,601	18,806	18,248	18,499	-2%
28.008	Centenary Drv, Flemington - at Railway Ovbr (Sth of M4)	77,515	87,027	90,538	89,028	2%
	Sub Total	713,401	728,194	728,872	728,021	
Motorways [3]						
	M7 (Transurban) [2]	-	-	-	96,211	
	M2 (Transurban) [2]	-	-	74,399	87,397	
	M4 - Toll Plaza, Silverwater (RTA)	86,843	89,180	96,514	105,034	18%
	Eastern Distributor (RTA)	-	97,080	103,689	109,829	13%
	M5 East (RTA)	57,960	84,677	103,774	107,550	27%
84.001	M5 (Hume Hwy), Ingleburn - Sth of Brooks Rd Ovbr	67,700	73,802	77,814	80,459	9%
	Sub Total for M4, ED, M5 East and M5		344,739	381,791	402,872	
	Compared to 2002 (4 sites)			11%	17%	

[1] Based on full year data therefore includes impact of the M7 opening

[2] Location as per ASX reported results available on website

[3] WIM=weigh in motion sites

3.7 Commercial Vehicle Trips

To my surprise, there is a dearth of current material dealing with commercial vehicle flows and demand in the Sydney region. The material that is available does not allow for any firm conclusions about commercial transport flows so far as they would have any significant effect on the projections in the SKM Study.

Nevertheless I deal in this section of my report with such material as is available.

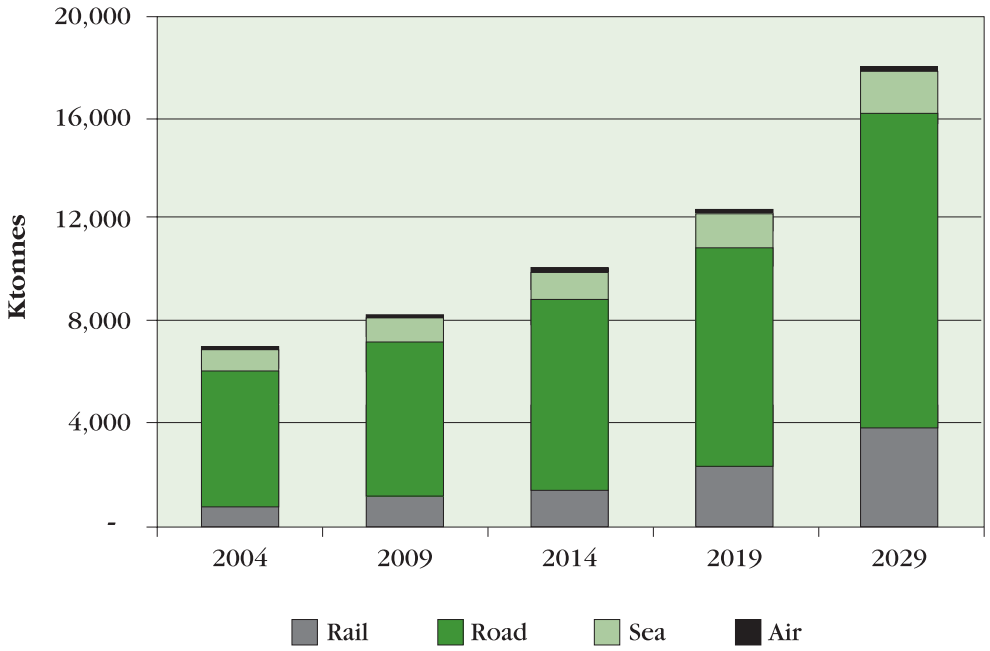
3.7.1 Long distance commercial vehicle freight

Since the SKM Study was completed two reports have set out long term projections of freight movements in the corridor north of Sydney.

The first of these was a report prepared in early 2006 by the Bureau of Transport and Regional Economics (BTRE). The BTRE report projected growth in freight movements between 1999 and 2025 and its projections showed a steady growth in freight volumes in the Sydney/Brisbane corridor across all modes, especially for road freight. The BTRE report converted these tonnages to average traffic volumes on the F3. As an average figure, heavy vehicle movements in 1999 were modelled at 1,513 vehicles per day and in 2025 at 3,255 vehicles per day. Rigid and articulated vehicles represent 4.8% and 5.7% for the respective years of all vehicle movements.

The second study was the *North-South Rail Corridor Study*, initiated by DOTARS in 2005 to comprehensively examine the growing freight demand on the rail corridor between Melbourne-Sydney-Brisbane and to consider a range of options for addressing that demand. Relevantly for the purpose of the Review, the *North-South Rail Corridor Study* estimated that rail's mode share of freight would increase, with investment in infrastructure and improvements in services on the Sydney-Brisbane corridor, to around 29% in 2029 and in the Melbourne-Brisbane corridor to around 64% in 2029. Nevertheless, the *North-South Rail Corridor Study* recognised that the freight task is growing substantially and road transport volumes are expected to increase accordingly for the Sydney-Brisbane Corridor. Figure 17 illustrates this graphically.

Figure 17 – Projected Rail Mode Share on the Sydney-Brisbane Route 2004-2029 in the North South Rail Corridor Study



Source Ernst and Young (2006)

3.7.2 Current M2 truck counts

Based on RTA counts of heavy vehicle freight origin and destination movements to/from Pennant Hills Road, the MWT Report concluded that more heavy vehicles were heading to, or coming from the west rather than the east. MWT stated that Pennant Hills Road was the main desire line for freight movements within the Link. This conclusion is supported by current heavy vehicle counts.

The M2 traffic survey counts (2006) supplied by the RTA to the Review show that a higher amount of heavy vehicles are travelling on the M2 west of Pennant Hills Road (7,998 heavy vehicles per day (weekly average)) rather than east of Pennant Hills Road (4,173 heavy vehicles per day (weekly average)). These figures set out in Table 24 incorporate the opening of the M7 which is estimated to have a 20% heavy vehicle volume of total traffic.

Table 24 – Average Daily Heavy Vehicle Movements on the M2

	11-17 December 2006	Total
West	Site 1 West of Windsor Rd	7,731
	Site 2 Windsor Rd to Pennant Hills Rd	7,998
East	Site 3 Pennant Hills Rd to Beecroft Rd	4,173
	Site 4 West of Lane Cove Rd	4,189
	Site 5 East of Lane Cove Rd	2,597

Furthermore Table 24 indicates that the amount of heavy vehicle traffic on the M2 east of Lane Cove road is only 2,597 per day (weekly average) compared to 7,731 per day (weekly average) west of Windsor Road. This indicates that there are a higher number of heavy vehicles travelling on the M2 that have an origin or destination in western Sydney rather than an origin and destination in eastern Sydney.

3.7.3 Commercial Vehicle Forecasts

The dearth of material to which I have earlier alluded continues into commercial vehicle forecasts. For example, the CTS 2003 was not a forecast of commercial vehicles trips. Rather it was a commercial vehicle survey which, amongst other things, showed AADT traffic volumes on key roads for commercial vehicles.

SKM did however make forecasts for 2011 and 2021. Its forecasts of commercial vehicle volumes are set out in Table 25.

Table 25 – SKM Commercial Vehicle Forecasts

Location	2001	2011	2021
F3 at Hawkesbury River	9,200	12,300	17,500
Pennant Hills Road north of Boundary Rd	7,000	9,700	13,300
Pacific Highway south of Telegraph Rd	3,400	4,600	6,400
Ryde Rd / Lane Cove Rd at de Burghs Bridge	4,100	5,600	7,700
M2 west of Lane Cove Rd	1,900	2,600	3,600

The only forecast of commercial vehicle origins and destinations carried out since the SKM Study was that done in the Halcrow Report prepared for the draft *Sydney Urban Corridor Strategy*. It is important, however, to bear in mind that, for the purpose of the draft *Sydney Urban Corridor Strategy*, Halcrow's commercial vehicle forecasts were developed at a high strategic level across Sydney and in particular were not intended to be used in any issue of the Link. Nevertheless Halcrow's modelled volumes are useful in revealing a pattern of commercial vehicle movements.

The Halcrow Report developed heavy commercial vehicle (rigid and articulated) forecasts for the years 2001, 2011, 2016, 2021 and 2025 using the modelled CTS 2003 flows provided by the TDC as a base with estimates of future growth in commercial vehicle travel derived from the BTRE. It concluded that the growth in commercial

[5] AM peak hour forecasts

vehicle travel beyond 2006 is expected to be an average of 3% per annum, or an increase of 70% between 2001 and 2021, and an approximate doubling by 2026. These increases are the same for both articulated and rigid vehicle types. It is therefore reasonable to assume that commercial vehicle volumes will be in the order of double existing volumes by the year 2031. This same pattern of increases holds true for commercial vehicle trips to and from the Central Coast.

The Halcrow Report modelled commercial vehicle flows up to 2026 to and from northern Sydney to various locations in the 2 hour AM peak period, which is shown in Table 26. Projections are provided for rigid vehicles and articulated vehicles. Table 26 shows, that in 2026, most heavy commercial vehicles are travelling to western Sydney (49%), particularly to central western Sydney and still quite a significant proportion of heavy vehicles are travelling to central and eastern Sydney (35%) and southern Sydney (16%).

Table 26 – Commercial Vehicle Forecasts to 2026 to and from Central Coast, Lower Hunter and Northern Sydney

	Rigid	Articulated	Total	Percentage of Total
Sydney*	170	40	210	8%
East*	110	10	120	4%
Inner West*	250	30	280	10%
Inner North*	100	30	130	5%
North East*	50	100	150	5%
Central West	390	310	700	27%
South	370	50	420	16%
North West	180	200	380	15%
South West	60	100	160	6%
Total	**1680**	**870**	**2,550**	

Source: Halcrow Report

*central and eastern SSDs

3.7.4 Commentary

The most that can be said from the above material, is that, at the highest strategic level, that the projected origin's and destinations of commercial freight vehicles might shift towards the Central Western Sydney SSD. It can also be said, however, that commercial vehicle traffic flows are likely in the future to accord with the draft *Sydney Urban Corridor Strategy*. That strategy, which I have discussed earlier makes the following points:

- freight trip generation is highest in areas that have high numbers of industrial sites and warehouses. There are significant remnants of these activities near Port Botany but these activities are spread across Sydney tending to concentrate adjacent to the M4 and M5 motorways in suburbs including Bankstown, Silverwater, Fairfield, Wetherill Park, Ingleburn and Minto, and increasingly expanding along the M7;

- as industrial areas expand in western Sydney and south western Sydney and contract in inner Sydney, the transport task associated with transporting containers to and from the west of the CBD is expected to increase. It is forecast that by 2025 almost 50% of containers handled at Port Botany will be transported to/from western and south western Sydney; and
- State Environmental Planning Policy (SEPP 59) was promulgated to rezone land in western Sydney for employment and residential purpose and open space. The SEPP 59 area is now referred to as the Western Sydney Employment Hub, which is important in promoting economic activity and employment in western Sydney. Close to half of Sydney's industrial construction is expected to take place within the area of SEPP 59.

This expanding concentration of industrial activities generating commercial vehicle trips in western Sydney reinforces SKM's conclusion that the Link was needed and that the need is continuing under current policy initiatives.

3.8 Terms of Reference Two: Conclusion

The foregoing analysis shows:

- there have been changes in terms of land use since the time of the SKM Study, and the *Metropolitan Strategy* sets out the most significant of these;
- projections of population and employment increase across the Sydney Region between 2001 and 2031, particularly within south western and north western Sydney and are, likely to reflect the *Metropolitan Strategy*. However, the increase in population and employment is not large overall; the matter to notice is that the distribution is shifting;
- the projections for person trips to 2021 show a similar rate of growth between the 2001 data used by SKM and the current TDC 2006 data, and the rate of growth to 2031 is also similar. This comparison shows that there is not forecast to be any significant change to the projected person trips in the SKM Study;
- in comparison and broadly speaking, the projections show less bus trips forecast in the current TDC 2006 data than in the 2001 data used by SKM, and hence there are projected to be more cars using the road network in 2021 than forecast by SKM but the relative change is not significant;
- there are differences in car driver trip projections between the 2001 data used by SKM and the current TDC 2006 data, but growth occurs in western and south-western Sydney and again reflects the *Metropolitan Strategy*;
- in terms of total car driver trips, the current TDC 2006 data adopts a continuation of the growth rate used by SKM, and the largest difference in projected growth is likely to occur in western and south western Sydney, again reflecting the *Metropolitan Strategy*;
- the projections show that more car driver trips are taking place within the Central Coast rather than to/from the Central Coast reflecting the greater employment increase within the Central Coast;

- projected daily car trips in 2001, 2021 and 2031 show only a small proportion to and from the Central Coast and reveal a pattern of distribution east and west across the Sydney Region rather than north to south;
- there have been only minor changes in daily traffic counts since the opening of the M7 across all main roads and the motorways in the study area; and
- as far as can be derived from the available material, there is an indication that the origins and destinations of commercial freight vehicles might shift towards the Central Western SSD and such flows are likely to accord with the draft *Sydney Urban Corridor Strategy*. This is confirmed by recent M2 commercial vehicle traffic counts, which indicate that the majority of heavy vehicles are travelling west of Pennant Hills Road rather than east.

All these factors lead me to conclude that, although there have been changes affecting land use and transport flows in Western Sydney since the SKM Study, those changes would not support any significant changes to the projections in the SKM Study. To the contrary, those changes reinforce the need for the Link.

4 Terms of Reference Three

"Giving due consideration to the information in the *Interim Report – F3 to Sydney Orbital Corridor Review March 2006*, consider and advise on:

3. whether any significant changes to those projections would alter the conclusions reached in the F3 to Sydney Orbital Link Study of April 2004".

The analysis that I have undertaken in response to Terms of Reference One and Terms of Reference Two have led to the conclusion that the assumptions and data used in the SKM Study were valid and reasonable at the time of the SKM Study and there is no support for any significant change in the SKM projections.

As a consequence, I have concluded, in response to Terms of Reference Three, that there is no case for altering the conclusions reached in the SKM Study.

However, three important issues arose during the Review. They are:

- the need for the Link;
- the Type C corridor; and
- the Purple option.

I focus here on those parts of my analysis that directly pertain to these issues.

4.1 The need for the Link

Three of the most significant policy documents that have been issued since the time of the SKM Study have specifically referred to the desirability of a connection between the F3 and the M2 or the M7.

It is referred to in the *Metropolitan Strategy*, which also refers to the investigation of a road corridor reservation designed to be a second major road route between Sydney, the Central Coast and further north. That is to say that, speaking in terms of the Review, the Metropolitan Strategy refers to a Type A corridor and the investigation of a possible Type C corridor.

The NSW Government *State Infrastructure Strategy* contains the same reference and the draft *AusLink Sydney Urban Corridor Strategy* refers to a consideration of a motorway link from the Sydney Orbital to the F3.

The effect of the inclusion of these matters in these policy documents shows that a connection between the F3 and the M2 by way of a Type A corridor is now enshrined in planning policies and that current policies envisage at least investigation of a Type C corridor route.

There are other parts of the *Metropolitan Strategy* that reinforce the need for the Link. For example, the *Metropolitan Strategy* envisages employment growth in the Western Sydney Employment Hub, the western end of the M2 corridor, and the south western corridor in the vicinity of Liverpool.

Another factor reinforcing the need for the Link is the projected establishment of new freight terminals at Enfield and Moorebank envisaged by the NSW Government's response to the FIAB report.

The trip table analysis set out in my response to Terms of Reference Two is yet another factor reinforcing the need for the Link. It shows that, up to 2031, car driver trips are projected to grow particularly in western and south western Sydney.

Furthermore, there is an indication that the origins and destinations of commercial freight vehicles might shift towards the Central Western SSD.

My conclusion is that a Link is needed now.

4.2 Type C Corridor

4.2.1 The claims

The claims raised in submissions and at the meetings in public in favour of a Type C corridor in summary turned on the following points:

- logic dictates a direct route from the south of Sydney via the M7 straight to the north;
- a Type C corridor would alleviate heavy vehicle traffic from Pennant Hills Road and the suburbs of Seven Hills and Blacktown; and
- a Type C corridor would alleviate the vulnerability of the present single northern exit from Sydney in terms of fire, accident and sabotage.

4.2.2 SKM's approach

As I have earlier indicated, SKM assessed all three broad corridors (Type A, B and C). It concluded that, in comparison to a Type A corridor, a Type C corridor would not satisfy the project objectives or the National Highway objectives as well as a Type A corridor. Specifically its analysis showed:

- the total cost of a Type C corridor would be in the range of $2.7 to $3.6 billion (2003 dollars), compared to $1.5 to $2.2 billion (2003 dollars) for a Type A corridor;
- a Type C corridor would provide less relief to Pennant Hills Road than a Type A corridor in terms of commercial and non-commercial vehicles;
- the traffic volumes projected in 2021 on a Type C corridor would be 31,000 to 48,000 AADT compared to 73,000 to 103,000 for a Type A corridor;
- the daily truck relief to Pennant Hills Road would be up to 2,000 AADT for a Type C corridor compared to 4,000-11,000 for a Type A corridor;
- a Type C corridor would have medium to high social effects (noise, impact on properties) compared to a low social effect of a Type A corridor;
- a Type C corridor would have medium to high environmental impact compared to low environmental impact of a Type A; and
- the benefit cost ratio of a Type C corridor in 2003 dollars would be 0.1 to 0.3 compared to a benefit cost ratio for a Type A corridor of 1.2 to 1.4.

Nevertheless SKM concluded that a Type C corridor should be further investigated in terms of its potential use beyond 2021 as part of a wider land use strategic review of Sydney's long term development.

Some of the persons making submissions held the belief that that a Type C corridor was rejected too early in the SKM Study as a consequence of a direction to that effect by DOTARS. I accept that this belief was genuinely held but it is clear from SKM's analysis of the broad corridor options and in particular its assessment of the Type C corridor that I have just outlined, that it assessed all three options and that, in comparison to the Type A corridor, the Type C corridor failed on all accounts. It was therefore valid and reasonable for SKM to proceed to a more detailed study of the possible route options in the Type A corridor without further consideration of the Type C corridor (or Type B corridor).

4.2.3 MWT Report

The MWT Report reached a similar conclusion to that of SKM. MWT examined more recent trip tables and BTRE growth projections for the Link. Although these recent data and projections showed slightly higher amounts of traffic using a possible Type C corridor, MWT considered that they were not high enough to justify building a Type C corridor route now. MWT concluded that a Type C corridor would serve a restricted potential market and would not provide the required traffic relief to Pennant Hills Road. Overall, MWT took the view that a Type C corridor was unlikely to be economically justified or financially viable prior to 2021 but that it should be considered strategically in the longer term.

4.2.4 Review analysis

The analysis I have undertaken in regard to Terms of Reference Two supports the SKM conclusion (reinforced by MWT) that a Type C corridor is not justified now. My conclusion along these lines is derived from the following:

- projected daily car trips in 2021 and 2031 have only a small proportion of trips to and from the Central Coast to the remaining SSDs, and car driver trips are generally from east to west/west to east and from Central North Sydney to southern SSDs rather than to/from the north;
- although not conclusive, since it is forecast at the highest strategic level, the Halcrow Report indicates that origins and destinations of commercial vehicles might shift towards the Central Western Sydney SSD (Parramatta area) rather than further west to Blacktown, Fairfield and Penrith; and
- SKM rejected a Type C corridor in favour of a Type A corridor partly on the basis of cost and, in the light of experience with other recently completed projects, the actual cost of building any of the options is now likely to be significantly more. It remains true accordingly that a Type C corridor would be more expensive to build than Type A corridor.

Despite these factors confirming the conclusion that a Type A corridor is to be preferred to a Type C corridor, there is no doubt that a Type C corridor ought to be planned now. This is because, firstly, there are strategic reasons why an additional corridor to the north will be justifiable at least in some time in the future. These reasons arise from the vulnerability of the F3 to closure because of accident, bushfire and the single

Hawkesbury River crossing. Secondly, a clear majority of persons and organisations who made submissions to the Review preferred a Type C corridor and accordingly that reflects public opinion.

For these reasons I concur in favour of a Type A corridor as against a Type C corridor, but I urge the commencement of planning for a Type C corridor immediately.

4.3 Type A corridor Purple option

A number of people, and particularly Transurban, have voiced their preference for a Type A corridor Yellow option rather than a Type A corridor Purple option. Their rationale for this preference is, firstly that a Yellow option would provide better relief to the wider Sydney transport network, and specifically include the Pacific Highway. Secondly, that SKM did not adequately consider the provision of relief to the Pacific Highway and if it had done so it would have preferred the Yellow option.

4.3.1 SKM's approach

In its assessment of the four Type A corridor options SKM concluded that the Purple option satisfied the project objectives and the National Highway objectives better than the Blue, Red and Yellow options and that it would perform best overall in terms of technical criteria. SKM also concluded that it would be more acceptable in terms of social and environmental impact. Of particular relevance is SKM's conclusion that, in terms of traffic relief in 2021:

- the Purple option would provide 43,800 AADT relief to Pennant Hills Road compared to 28,700 with the Yellow option;
- in respect to the Pacific Highway, the Purple option would provide traffic relief of 2,000 AADT compared to 6,700 AADT with the Yellow option;
- in terms of commercial vehicle relief in respect to Pennant Hills Road, the Purple option would provide around 10,600 AADT compared to 8,000 AADT with the Yellow option;
- in terms of commercial vehicle relief to the Pacific Highway, the Purple option would provide approximately 300 AADT to around 700 AADT with the Yellow option; and
- overall the Purple option would provide approximately 45,800 AADT for traffic relief to Pennant Hills Road and the Pacific Highway together, whilst the Yellow option would provide approximately 35,400 AADT traffic relief to Pennant Hills Road and the Pacific Highway together.

This indicates that both Purple and Yellow options would provide relief to Pennant Hills Road and the Pacific Highway in 2021, but overall the Purple option would provide better relief.

4.3.2 MWT Report

The MWT Report compared the SKM projections with those of Transurban. MWT concluded that, even though there were differences in land use scenarios and trip tables, the Yellow option would not provide the travel time savings inherent in the Purple option, and the Purple option provided a better alignment and access to Sydney's road network.

The MWT Report considered the temporal patterns of traffic demand at two sites, the first on the Pacific Highway (RTA Site No. 53.018) and the second on Pennant Hills Road (RTA Site No. 74.087), in assessing their traffic function. The MWT Report indicated that Pennant Hills Road carries four times the volume of articulated vehicles than the Pacific Highway and higher volumes of rigid commercial vehicles.

The MWT Report confirmed the importance of Pennant Hills Road over the Pacific Highway as a heavy vehicle route. It concluded with the following comment:

"The current function of Pennant Hills Road has characteristics of freight and temporal demand that better align with Auslink's objectives than roads to the east, such as the Pacific Highway. This suggests that the Purple Option would better align with freight demand and regional traffic demand in the corridor."

4.3.3 Review analysis

In the earlier section of this report, I have noted:

- current land use policy, in particular the Metropolitan Strategy, envisages a shift of industrial activity and employment growth towards western Sydney and the Central Coast and significant population growth in western Sydney. That policy reinforces the selection of a route within the Link more to the west than the east;
- daily car trips to/from the Central Coast (other than internal trips) travel to destinations in Central North Sydney, Central Western Sydney, Inner Sydney and Lower North Sydney in respect of which a Purple option would provide a more direct route;
- a comparatively large number of Central Northern trips for 2021 and 2031 have a destination in Central Western Sydney and Blacktown, that is, in areas to the south and west to Pennant Hills Road and these are more likely to use a Purple option;
- the CTS 2003 suggests that a sizable concentration of trips have origins or destinations in locations immediately to the south and the west of Pennant Hills Road and a Purple option would provide the most direct route for such trips;
- although not conclusive the same holds true for commercial vehicle forecasts for 2026, namely that most commercial vehicle trips have and origin or destination in the Central Western Sydney SSD; and
- current land use policy, particularly the Metropolitan Strategy, encourages and is likely to lead to an increase in industrial activity in western Sydney around the M7 and this suggests that over time more freight trips will have origins and destinations in western Sydney.

These factors influence me in supporting the conclusion of SKM and MWT that a Type A corridor Purple option should be the preferred route.

There is, however, a matter I would like to add. SKM did not provide for a motorway standard east facing connection between the Purple option and the M2. Such a connection would in my opinion make the Purple option more attractive to those persons who might otherwise travel along the Pacific Highway. I recommend that such a connection be examined in any future concept design of the Link.

5 Public Input

5.1 Introduction

I deal here with issues raised in the public submissions and at the meetings in public.

From the submissions it is apparent that the community is concerned about effective transport planning in Sydney, and has made informed and knowledgeable comment about the planning process.

Many of the issues raised in submissions were also raised during the community consultation process undertaken by SKM and SKM did in fact consider these concerns. But it is important to note that the SKM Study was a strategic study, designed to select a preferred route. The detailed assessment and design of the preferred route was a matter for a later stage. SKM envisaged further refinement at stages extending beyond the SKM study and, as SKM said, members of the public will have further opportunity to express their concerns at these stages.

Like SKM, I recommend that, if the preferred route is to proceed, the issues that I outline below should be carried through for consideration during the development of a concept proposal and the preparation of an Environmental Impact Statement (EIS).

By way of introduction, it should be noted that, of the 53 submissions received, the largest number came from persons in the Pennant Hills area. Figure 18 shows the location of those persons and organisations making submissions.

Also by way of introduction, it is useful to note the preferences expressed by those persons and organisations making submissions for a preferred route. As Figure 19 shows, most of those persons and organisations favoured a Type C corridor. Of those that accepted a Type A corridor, most preferred the Purple option. However, the preferences were varied.

Figure 18 – Number of submissions received by suburb

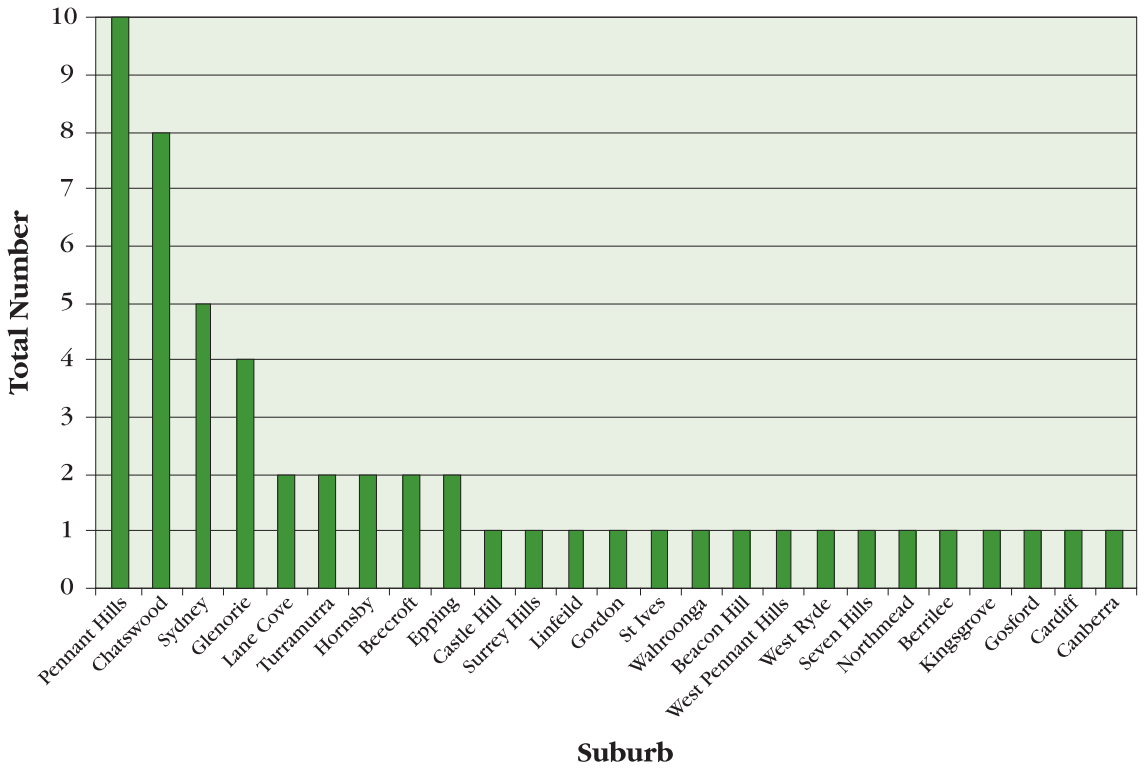
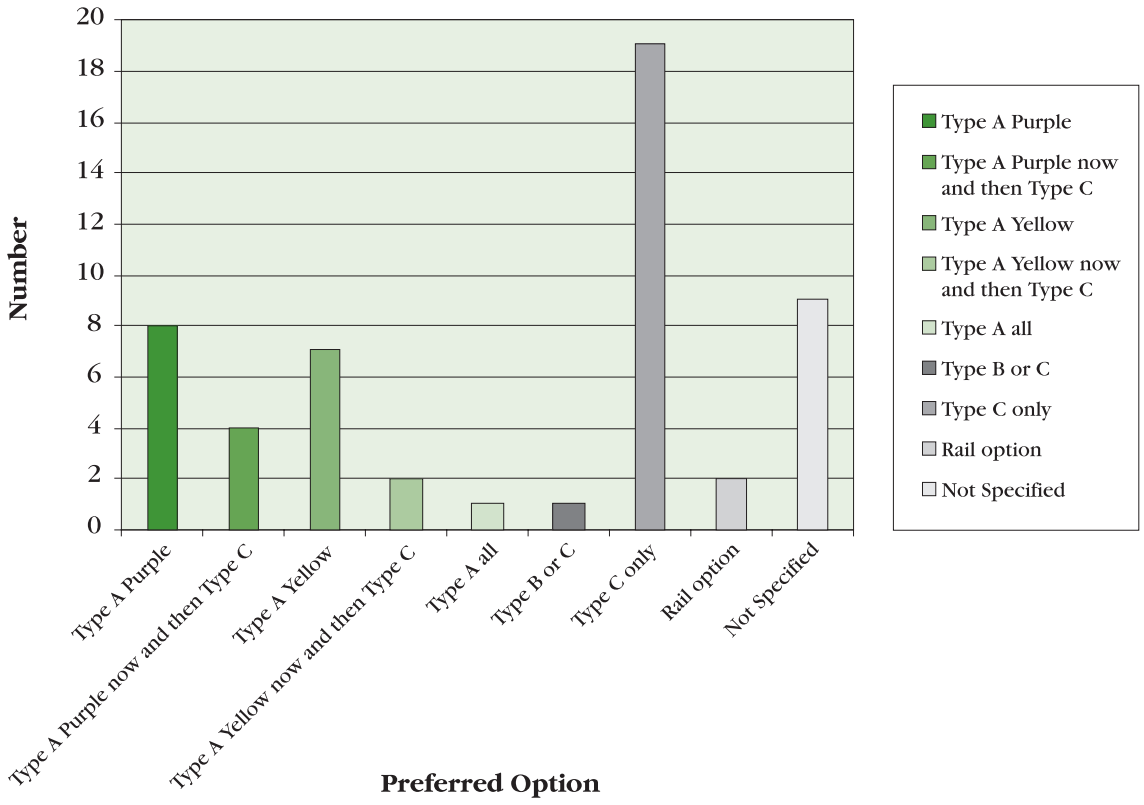


Figure 19 – Preferred options indicated in the submissions



5.2 Issues Already Covered

As will be apparent from the earlier chapters of this Report, my analysis has encompassed many of the issues raised in the public submissions and meetings in public, such as for example the changes indicated in the *Metropolitan Strategy*. However, it is appropriate that I acknowledge those issues directly by outlining some of the things that were said whilst at the same time recognising that I have dealt with them in the earlier part of this Report. Accordingly I merely note them at this stage under six separate headings.

5.2.1 Metropolitan Strategy

"The Interim Report provides a good assessment of the movement of manufacturing, warehousing and transport industries to the Western Regions adjacent to the M7 but they fail to consider this change in a long term context. The Metropolitan Strategy further emphasises the future development of the Western Sydney regions with 390500 new dwellings and 214000 new jobs by 2031. This 59.8% of Sydney's dwelling growth and 47.2% of new jobs growth." (Pennant Hills District Civic Trust, Brian Ash, written submission)

"The Metropolitan Strategy has changed the numbers about population and employment growth targets in the area since the study of SKM was done, and we think that that makes a very substantial difference to figures and we believe that the numbers should be updated before any future decision is made on it." (Chatswood West Ward Progress Association Inc, James D. McCredie, transcript)

"Under the NSW Government's urban consolidation policy and the Metropolitan Strategy for Sydney, Ku-ring-gai Council was directed….to accommodate a further 10,000 dwellings mainly along the Pacific Highway corridor from the F3 south to the Willoughby City Council border. These projected increases in population over the next 20 years in the Ku-ring-gai LGA were not known when the 2004 Study was completed. (Cr Tony Hall, written submission)"

5.2.2 Richmond Report

"The Richmond "Review of future provision of motorways in NSW" (December 2005) in Section 6.5.6 proposes that a future policy be established that requires that there is an arterial road available as an alternative route to the toll road, and that once the toll road opens, the arterial road has at least the same number of general traffic lanes as it had prior to the opening of the toll road." (James McCredie, written submission)

5.2.3 Type C – Type A Corridor

"Without origin/destination data on all commercial vehicles entering the study area and specifically how they access Pennant Hills Road north of the M2, the changes to traffic volumes envisaged by the consultants cannot be validated. Consequently, the conclusion reached that a type A corridor is the route of choice cannot be validated. Again, I suggest that if there was a route north using a type C corridor, this would draw not only commercial traffic, but a significant proportion of the travelling public." (West Valley Pennant Hills Progress Association, Margaret Whalen, transcript)

"The F3, the Pacific Highway and the railway to the north were closed in the recent floods. They've been closed in bushfires. They've been closed by accidents. It is illogical not to have an alternative route. The proof is there." (Peter Waite, transcript)

5.2.4 Purple v Yellow

"If we go ahead with the purple option, there is very little traffic relief provided on the Pacific Highway corridor, and obviously traffic from the Central Coast will continue to use the Pacific Highway corridor." (CCROC, transcript)

"This [Transurban modelling] indicates that the yellow option should be considered as a viable alternative because this route alignment provides benefits to the network as a whole, which includes deferring the need to upgrade the Pacific Highway to relieve already congested conditions." (Transurban, written submission)

5.2.5 Freight

"The phasing out of Sydney harbour as a working harbour with the port of Newcastle assuming more freight and port related activities will necessitate the provision of quicker, cheaper and more reliable freight transport to the heart of Sydney's manufacturing, warehousing and distribution industries." (Pennant Hills District Civic Trust Inc., Brian Ash, written submission)

"I think the conclusion, as far as impacts of the Port of Newcastle on heavy goods traffic, as I said, is that that is a medium- to long-term impact. I think the point to make is that whether that happens or doesn't happen is not a critical factor in terms of the viability and the need for the link. …Because there is sufficient justification, as has been demonstrated, I think, in the SKM study, that with the demands as forecast then - and that is before the additional effects that would arise from the points I have just made about the change in land use pattern, and so on, before that additional effect is added in, there is, from the previous work done by SKM, a justification for the route." (Leighton Contracts and Maunsell, transcript)

5.2.6 The opening of the M7

"The M7 Motorway opened in December 2005. A reduction has been noticed in the volume of cars passing through Seven Hills and south-east Blacktown. However, there has not been the reduction in heavy vehicles expected by the government and hoped for by residents." (ROBSHAFT, written submission)

"Since the opening of the M7, there has been a clearly observable build-up in traffic, in particular heavy vehicle traffic, along the Pennant Hills Road. It is an everyday sight on the Pennant Hills Road - which, it should be remembered, is the only road traffic route north-south on this side of the continent - to see as many as seven or eight B-doubles lined up one behind the other being held up at traffic lights." (Derek Jones, transcript)

I now turn to deal with those issues that were raised but are not directly relevant to my terms of reference. They are important nonetheless. I do not traverse every single one of them but instead I group them into several categories and comment on them directly.

5.3 Community Consultation

Some of the persons making submissions claimed that they were not properly consulted during the SKM Study. In particular, residents from the Wahroonga and the Pacific Highway area that made submissions to the Review raised concerns that they were not included in the consultation process and therefore the robustness of the SKM Study was questioned.

"The data collected was inadequate because the residents of Wahroonga and the suburbs north were not adequately canvassed for their views." (Julie Matthews, written submission)

The SKM Study included an extensive community consultation process. The SKM Study area extended over seven local government areas, namely Blacktown, Parramatta, Ryde, Gosford, Baulkham Hills, Hornsby and Ku-ring-gai. The community consultation process involved establishing an 1800 telephone line, setting up and maintaining a web site, briefings for stakeholders, advertising, planning focus meetings, community focus groups, newsletters, background reports and public displays. By the end of the consultation process:

- 1,044 calls had been made to the 1800 number;
- SKM distributed 115,000 copies of Newsletter No. 1 and 117,500 of Newsletter No. 2;
- the study team provided 15 briefings to councils and 12 briefings to other community and business groups;
- community focus groups were held numerous times at Dural and Pennant Hills;
- public information days were held at Gosford, Thornleigh, North Ryde, Dural and Parklea with an estimated 2,000 people attending the displays;

- route option displays were held in Gosford, Dural, Hornsby and Carlingford with an estimated 2,500 people attending the displays; and
- SKM received 991 public submissions. SKM's analysis of the public submissions showed that 20% of submissions originated from Wahroonga, 15% from Turramurra, 9% from Normanhurst and 6% from Thornleigh. Together, submissions from these areas comprised half of the total received.

This seems to me to have been a comprehensive community consultation process. Whilst of course it may have been possible that some persons may have not heard about the consultation process, it was thorough and indeed at least one submission to the Review has acknowledged this.

"The SKM Study showed that across the 'study area' community, the Purple tunnel option achieved the most community acceptance. Only a comprehensive, independent study such as the one undertaken by SKM, could accurately determine the views of both the local and wider community.

Approximately 120,000 households and businesses in the entire study area were consulted, with the aid of at least the following:

- *SKM 'F3 to WSO' website*
- *telephone hotline*
- *regular newsletters*
- *community focus groups*
- *public displays*

over a period of two years". (Peter Hrastnik, written submission)

5.4 Time frame of the SKM Study

Many of the submissions claimed that the 20 year time frame of the SKM Study did not allow for consideration of long-term strategic need and that, if a long term approach had been taken, SKM would have come to a different outcome, possibly a Type C corridor over a Type A corridor.

"The time-scale of the report and its projections are very short term. Given that the construction time of the F3 to M2 Link is expected to be four years or more, it will be at least 2011 before it is completed, even if the project is commenced this year. Yet, the detailed figures are only estimated to 2021, meaning that they encompass only the first 10 years, at most, of actual working life of the Link." (Tony Duffy, written submission)

"In general, members felt that the project did not look far enough ahead, and should have given more weight to the wider economic and social benefits of a type C corridor. Members felt that while a type A corridor alone may help to relieve congestion on Pennant Hills Road, it was not the best way to spend national road funds, as it would not improve northern access to and from Sydney." (Hillside Progress Association, Bob Arps, written submission)

The time frame was dictated by two factors:

- SKM's terms of reference was to provide a route with adequate capacity for forecast traffic in 2025; and
- the TDC 2001 data provided to SKM contained projections only up to 2021.

5.5 Public Transport, Rail Improvements and Global Warming

A number of submissions expressed the view that integrated transport solutions, including public transport and rail upgrades, should be considered rather than simply a road solution. It was claimed that the estimated cost of building the Link would be better spent on improving public transport systems and rail upgrades.

"Such 'missing link' road solutions swallow large amounts of capital which would be more appropriately directed to long term public transport infrastructure within the context of an integrated transport plan for the State of NSW." (STEP Inc, written submission)

These submissions claimed that public transport improvements would result in improved commuter traffic flows and increased rail freight movements. Some submissions suggested road upgrades and also the construction of a very high speed train.

Other submissions claimed that, in the light of global warming and peak oil impacts, large scale road infrastructure projects are undesirable and not justified. Instead efforts should be focussed on upgrading and improving public transport and improving rail systems.

"Calculations show that by 2020, as much as 40% of our present urban car traffic has to be replaced by public transport, cycling or other means of low carbon transport. New freeways are not only uneconomic (the oil isn't there) but also unnecessary, as the damage from global warming will physically force us to go through this transformation." (Matt Mushalik, written submission)

"[A]ny federal government money for the F3 to M7 link should not go towards the road but the rail upgrades of the Main North Line from Sydney to Newcastle. This would ensure we could address the problems of Peak Oil, Global Warming, National and economic security." (David Bell, written submission)

"A Western Type C option is inappropriate and not acceptable. The imperatives of global warming and approaching peak-oil mean that such major road projects cannot be justified." (STEP Inc, written submission)

"Effective rail access between Sydney, the Sydney region and the Central Coast and Hunter regions is part of the vision for Greater Sydney transport. The present rail system does not perform this function; it is slow and tedious for passenger journeys and not an effective alternative to the motor car. In addition, the conflict between passenger and freight carriage on this one route means freight on this very, very important link in the Greater Sydney system is unduly delayed at substantial cost to the economy, because freight has to wait for passengers." (10,000 Friends of Greater Sydney, transcript)

SKM did conduct an analysis of rail and public transport scenarios. It tested three scenarios. Assuming the development of the Link, they were:

- no further investment in rail capacity enhancement; or
- rail enhancement to maintain rail current market share for passenger and freight; or
- significant investment in rail to increase rails market passenger and freight.

A further fourth scenario tested was a 'public transport only option' without a preferred route.

SKM's conclusion was as follows:

The analysis showed that it would be difficult to achieve the transport objectives set for the F3 to Sydney Orbital link by upgrading public transport alone. However, potential public transport enhancements would lead to an increase in the volume of the public transport travel and overall mode share and therefore serve wider community transport objectives (SKM Main Report, page 6-4).

This conclusion may not be a direct answer to the claims raised in the submissions, but these claims are actually beyond my terms of reference. The same comment may be made about global warming and peak oil issues. This Review has been directed to focus on the assumptions and data in the SKM Study, changes to land use and transport flows and the outcomes of the SKM Study. However, I note these claims for completeness, and so that they will not be lost sight of in any further progress of the Link.

5.6 Pennant Hills Road after building a Type A corridor

Whilst some submissions acknowledged that a Type A corridor would increase the amenity of Pennant Hills Road, other submissions claimed that it was essential to provide investment in public transport for the additional road space so created. In particular some submissions claimed that additional road capacity will increase traffic demand on the road surface and can, without proper planning, lead to increased congestion and reduction in traffic flow efficiency on the increased road capacity despite the construction of the tunnel.

Furthermore, at least one submission claimed that, since freight carrying dangerous goods would not be permitted to use the tunnel, freight will compete on the surface road with local and commuter traffic and hence create an increasing traffic mix safety hazard.

> *"Heavy trucks will not be forced to use the tunnel and trucks carrying dangerous cargos will be banned from the Tunnel. This means that normal passenger vehicles (and small delivery vehicles) using the surface road for local and commuter journey requirements will have to compete for reduced surface and road space with an ever increasing number of heavy trucks (with many carrying dangerous goods) creating an increasing traffic mix safety hazard." (Malcolm Powell, written submission)*
>
> *"STEP previously highlighted that experience showed that any additional road space induced large increases in traffic demand and that the 2002-2004 study did not adequately address that aspect. We believe that, in the absence of adequate leading investment in public transport, additional road space will always cause increased traffic demand and that this has been demonstrated in the case of the M7 and will undoubtedly be shown if this new link is developed." (STEP Inc, written submission)*

The SKM terms of reference required SKM to investigate opportunities for public transport, if the Link was built, including providing dedicated public transport or high occupancy lanes and the project objectives required the investigation of opportunities for significant improvement to the urban amenity along Pennant Hills Road. This resulted in SKM suggesting the possible reallocation of one lane for a priority bus lane in each direction on Pennant Hills Road. SKM also suggested that wider pavements and a cycleway along Pennant Hills Road could also be considered. It recommended the investigation of these possibilities in detail at the EIS stage.

As to the issue of freight carrying dangerous goods, SKM stated that freight carrying dangerous goods in the Link would only be 10%. This seems to be a matter of traffic management, rather than a question of the amenity of Pennant Hills Road.

5.7 Amenity Issues

Many submissions raised concerns about the amenity impact of the construction of a Type A corridor Purple option. These issues dealt with matters such as ventilation stacks, noise and vibration impacts, tunnel safety, tunnel gradients and possible structural impacts on affected properties.

These are important issues, but the SKM study was a strategic concept study. If a Type A corridor Purple option is to be built it must be preceded by detailed design and an EIS process. At that stage each of these amenity issues will be essential considerations and must be investigated.

"No details are provided regarding local air quality along the preferred corridor. Details regarding proposed standards of filtration, the method by which location stacks will be determined, height and form of exhaust stacks etc should be provided." (Hornsby Shire Council, written submission)

"The community believes that in long road tunnels, where the technology is available and it is possible to remove these toxic particles and gases, the RTA and the government have a duty of care to do so." (Phillip Swalwell, transcript)

"It is anticipated that further traffic noise will be generated at tunnel entrances, particularly around the Wahroonga area, and may result in further or increased heights of noise walls and therefore it may be difficult to achieve noise attenuation criteria." (Ku-ring-gai Council, written submission)

"The Review failed to explore the property impacts of vibration during the tunnel construction. There is a great risk of damage to the Heritage Conservation Area of Pennant Hills, with heritage listed homes in The Crescent and Hampden Avenue, as well as damage to residential and commercial buildings in the tunnel's trajectory." (Leone Healy, written submission)

5.8 Construction Costs

A number of criticisms were raised in submissions and the meetings in public claiming that SKM failed to address in an adequate manner the costing of the various options. In particular it was said that SKM failed to include costs of construction, the external costs during construction (e.g. removal of debris, retrofitting, noise and amenity impacts), the consequential costs (such as upgrading the F3 and M2 and providing motorway standard ramps east on the M2 for the Type A corridor Purple option) and finally the effect of network tolls. It was claimed that had these costs been considered, the outcome of the SKM Study may have been different and the case for a Type C corridor may have been strengthened.

"We maintain that the alternative of a western option for the connection of the F3 and the Sydney Orbital via a second Hawkesbury River crossing is economically justified, strategically logical and socially responsible. We don't address costs in our submission, but they are addressed in other submissions. … We believe that if the assessment included all the costs, including the costs of health and the costs of traffic delays, et cetera, an economic case could be built." (Pennant Hills District Civic Trust Inc, Brian Ash, transcript)

"The economic assessment fails to take into account future requirements for upgrading the F3 between Sydney and Gosford to 8 lanes, a virtually impossible task, except at exorbitant cost, if a western route is not provided." (10,000 Friends of Greater Sydney, written submission)

"When it came to costing out the different options, the study also failed to take into account that option A requires the expense of widening the F3 to six lanes now and eight lanes before too long, and that is definitely talked about in the [MWT] 2006 report - eight lanes. There is also the cost of widening the M2. The failure to bring these two large expenses to the table comparing the cost of different options is probably enough in itself to make the study invalid." (Julie Matthews, transcript)

For the purpose of comparative assessment of the options SKM did an indicative construction cost estimate. SKM also did an economic analysis at a broader strategic level containing strategic cost estimates and operational cost estimates, resulting in a benefit cost ratio for each corridor. It concluded that, overall, the Type A corridor performed best and the Type C corridor was most expensive against all criteria.

SKM conducted a detailed costing for all Type A corridors. SKM undertook a strategic Road User Cost Benefit Analysis (RUCBA) based on the principles and procedures set out in the RTA Economic Analysis Manual (Version 2, 1999, 2002 update). The RUCBA drew upon a range of inputs relevant to the SKM study:

- capital costs of development;
- annual operating costs;
- travel demand forecasts;
- transport network measures of travel distance and time; and
- unit costs of travel and transport impacts.

The RUCBA was accompanied by detailed costing breakdowns for the Type A corridor, differentiating between a toll and no toll scenario and two and three lane scenarios. This detailed costing took into account the construction costs, debris, retrofitting, demolition etc. Ultimately SKM provided a strategic capital cost estimate in 2003 dollars. This method included strategic investigations, indicative route alignments and a scope of work consistent with RTA practice.

This cost analysis was a high level costing approach and was the standard practice for this type of strategic study at the time. For example the RUCBA was used for the Lane Cove Tunnel and associated Sydney road network improvements. However, more detailed costing would be required at a design stage, but nevertheless the costing process undertaken was valid and reasonable at the time.

SKM conducted a separate investigation regarding the possibility of widening the F3 and determined that the F3 would reach its capacity at around 2021 and therefore any future widening would be beyond the timeframe of the SKM Study.

SKM's economic analysis did not consider the provision of an eastern standard motorway connection for the Type A Purple option, because its analysis indicated that a low volume of traffic would flow between the Link and the eastern section of the M2.

The economic analysis did however include the costs of widening the M2 to four lanes if a Type A corridor Yellow option was built and the upgrade of the North Rocks Rd intersection south of the M2 if a Type A corridor Purple or Blue option were to be built. These issues would be further considered at the design and EIS stage.

5.9 Cost Increases

A number of submissions raised concerns about the cost estimates used in the SKM Study for each of the options. It was claimed that cost estimates are now out-of-date and that, in light of recently completed tunnel projects, severely underestimated. The likely impact of such underestimation was claimed to possibly impact on the selection of the Link and to reinforce the need for costings to be reconsidered.

> *"[O]riginal costings are at 2004 estimates. Infrastructure construction costs have changed and in light of experience gained with the development of the Lane Cove Tunnel and the M7 the economic cost of each option needs review." (Michael Dally, written submission)*
>
> *"Costings are now 3 years out of date and need revision in light of experience gained with the development of the Lane Cove Tunnel and the M7." (Brian Vern-Barnett, written submission)*

I acknowledge, in light of experience with other recently completed projects, particularly those involving tunnels, that the actual cost of building any of the options is now likely to be significantly more than estimated by SKM. This is not a problem unique to the SKM study. For example, a recent Evans and Peck (2007) report prepared for DOTARS identified a number of road projects in Queensland where the actual cost of the project had proved to be considerably more than originally estimated.

The cost of building tunnelled motorways is now about $400 million per kilometre. For example, the Rivercity Motorway in Brisbane has a capital cost estimated to be about $2.003 billion for a 4.8km four lane tunnel and approximately 1km of surface road. The Cross City Tunnel in Sydney cost $810 million for a 2.3km tunnel. The M4 East (medium-length tunnel option) was estimated in 2004 to cost $1.8 billion for an approximately 4.5km, six lane tunnel.

The effect of these increases in estimated construction costs only confirms the conclusions from the SKM Study and the MWT Report that a Type C corridor route would be more expensive to build than a Type A corridor. But, as the Richmond Report mandates, a full costing analysis must be carried out in the planning stage of any Link.

5.10 Two or Three Lane Directional Tunnels

Questions were also raised in submissions about the issue of whether a Type A corridor Purple option should comprise a two or three lane tunnel in each direction. Concerns were raised that the adoption of two lane carriageway tunnels would significantly limit capacity, reliability and resilience of the Link.

This is an issue connected with the financing of a Type A corridor Purple option. SKM recommended that planning and design should be based on constructing the tunnel as two lanes in each direction if tolled and three lanes in each direction in untolled. This distinction was based on the premise that if a toll is applied it would reduce traffic volumes using the Link.

"[T]hat the SKM Road Network Coding was for three lane each-way tunnels but their final recommendation is for two or three lane each-way tunnels dependent on tolling decisions and there is no indication that SKM have modelled the two lane each way tunnel alternative. This is particularly significant considering that SKM network assumptions do include Pennant Hills Road being reduced to two lanes in each direction. Evidence of the modelling of the combined four lanes each way must be produced and independently verified." (Pennant Hills District Civic Trust Inc, Brian Ash, written submission)

"NRMA continues to hold strong reservations about the continued reliance by the RTA on two lane road tunnels in Sydney in contrast to the three lane road tunnels utilised in Melbourne on the City link and Eastlink projects.

Whilst construction of a three lane tunnel may have a higher initial construction cost than an equivalent two lane tunnel, a three lane tunnel provides significantly improved current and future capacity as well as increased flexibility to manage incidents such as breakdowns without significantly impacting traffic flow." (NRMA, written submission)

"If there is an uphill tunnel, it needs to have that extra passing lane in it. The reason I say that is anyone only has to drive through the M5 tunnel in the afternoon and they will know what I am talking about. If they had built the M5 tunnel and started a passing lane a couple of hundred metres before the western exit at Bexley North, you wouldn't have that problem that they have every single day. That is chronic." (Tony Duffy, transcript)

In this connection the recommendation of the Richmond Report which the NSW Government has accepted is that funding by way of PPPs is acceptable but that government contribution to funding is also acceptable, and that 'a no cost to government' strategy should be abandoned. Hence there is now available more flexibility in financing and this gives rise to more choices. For example consideration could be given to a three lane tunnel in each direction, or to a two lane tunnel in each direction but with climbing lanes at gradients or even the adoption of a no toll scenario, or different tolling regimes. All these considerations arise at the planning and design stage and are beyond my terms of reference.

5.11 Tolling and Flexible Tolling

A number of submissions expressed opposition to a toll on the Link. There were strong concerns about the appropriateness on the reliance of public private partnerships (PPPs) and community tolerance of such arrangements. Tolls on the Sydney Motorway were expressed as being "unfair" and that they created a disparity between road users in Sydney, with drivers in south-west Sydney receiving toll subsidies and drivers in the north-west being forced to pay full prices. Concerns were also raised about the disparity that seems to exist between NSW and other states in terms of tolls on National Highway routes. It was felt that a toll would reduce the viability of the Link and toll avoidance, in particular by freight vehicles, would not solve congestion problems on Pennant Hills Road and surrounding areas.

"The proposed tunnel is set up to maximise the profits of the operating companies, i.e. construct the tunnel, and restrict the size of Pennant Hills Road to choke the traffic into the tunnel at the expense of Hornsby Shire Council residents. These Public Private Partnerships conflict with good public policy, e.g. Cross city tunnel is a classic: these are no longer tolerated by current community standards." (Frank Murray, written submission)

"Council will have strong concerns should the corridor be subjected to a further toll, given the impost of existing tolls on residents of north west Sydney and the high level of fuel excise already paid as part of the petrol pricing structure. Any further application of a toll on this link will only further exacerbate the inequities that exist between NSW and other states in terms of tolls on National Highways." (Baulkham Hills Shire Council, written submission)

"The disparity of tolls on the Sydney Orbital System is perhaps causing unwanted outcomes, such as truck drivers using local roads in Western and North Western Sydney to avoid tolls on the M7 and M2. Some rationalisation of tolls needs to take place. Currently, drivers using tollways in North Western Sydney, are clearly paying more in tolls than other Sydney drivers. Also the practice of substituting toll lanes for public lanes by closing public lanes and roads, with the building of new tunnels, needs, in my view, to be stopped." (James Clark, written submission)

Some persons, and in particular Transurban, claimed that SKM did not take into account different tolling regimes in its selection of alternative routes, nor did it consider potential flexible tolling arrangements made possible by cashless tolling when reaching its conclusion as to its preferred route.

"The SKM Link study was undertaken when there was limited opportunity for integrating the tolling regimes between various motorways. Sydney's motorways, traditionally considered as separate entities with travellers forced to pay a fixed toll when crossing each motorway, should increasingly be considered as part of an interconnected network. The SKM Link study attempts to demonstrate the sensitivity of the performance of each option to different tolling regimes on connecting motorways (particularly M2), but does not take this into account in its ranking of the alternative routes. In Section 16.4 of the Traffic Working Paper (Working Paper no 4), SKM demonstrates that under alternative toll scenarios the performance and hence ranking of the options would change. SKM did not consider potential flexible tolling arrangements made possible by cashless tolling when forming its final ranking of options." (Transurban, written submission)

SKM's analysis showed that different toll scenarios produce different traffic volumes on the different route options. For example:

- in 2011 and 2021, assuming no toll on the preferred route and a discounted M2 toll, AADT flows showed that the Type A corridor Purple option performed best;
- in 2021, assuming a full M2 toll for users of the Type A corridor Red and Yellow options, AADT flows showed that the Red option performed better than the Yellow option;
- in 2011 and 2021, assuming $3.50 toll on the Link and a full M2 toll, AADT flows showed that the Yellow option performed better than the Red option; and
- in 2021, assuming 25 cents per kilometre toll for each kilometre on the Link the M2 and the M7, the AADT flow showed that the Yellow performed best.

The SKM analysis also shows that traffic volumes on the Link would be reduced if a toll was applied and accordingly traffic relief to Pennant Hills Road would also be reduced. Furthermore, forecast traffic volumes on each of the Link options are sensitive to the value of the applied toll.

In summary, SKM found that the Type A corridor Purple option would best satisfy the National Highway objectives with or without a toll and that the Type A corridor Red and Yellow options would have the least benefit in traffic reduction with a toll in place.

The projections derived by SKM from this analysis concerning tolling, appear to be valid and reasonable at the time of the SKM Study, but three things must be borne in mind:

- MWT cautions against the evaluation of route options when using toll scenarios as an indicator, since this is only a partial indicator and can distort travel demand in the context of broader strategic objectives;
- at the time of the SKM Study, Transurban was not the owner of the motorways in the Sydney transport network that it now owns (it now owns the M2, the M7, the M4 (50.61% share), the Eastern Distributor (71.35% share) and the M5 (50% share)); and
- with the introduction of cashless tolling on some motorways and the wider control of Transurban and modern technology, more opportunities for flexible tolling regimes may now exist than did at the time of the SKM Study.

Ultimately the issue of tolling will be considered fully in the next stages of the project when financing of the Link is decided.

Appendix 1 – Public Submissions

The following is a complete list of those persons or organisations who made submissions to the Review.

List of Submissions made to the Review of the F3 to M7 Corridor Selection

	Name	Organisation Name
1	Mr Peter Waite OAM JP	N/A
2	Mr David Dash	N/A
3	Mr Stephen Gray	N/A
4	Mr Desmond M Dent	10,000 Friends of Greater Sydney
5	Mr Wayne Olling	Residents of Blacktown & Seven Hills Against Further Traffic
6	Mr Ian Turner	N/A
7	Ms Julie Matthews	N/A
8	Cr Nick Ebbeck	Ku-ring-gai Council
9	Mr Bob Arps	Hillside Progress Association
10	Mr Jeff Organ	Willoughby City Council
11	Ms Joan and Mr Brian Shaw	Bryan Shaw Signwriters
12	Ms Norma Elwyn McCarthy	N/A
13	Mr John Longton	N/A
14	Mr John Burke	STEP Inc
15	Mr Brian Ash	Pennant Hills District Civic Trust Inc.
16	Mr James D. McCredie	Chatswood West Ward Progress Association Inc.
17	Mr James D. McCredie	N/A
18	Mr Trevor Chard	N/A
19	Mr Mark Divola	N/A
20	Mr Ron and Mrs Rondalyn Dupen	N/A
21	Mr Dave Walker	Baulkham Hills Shire Council
22	Mr Peter Wilson	Central Coast Regional Organisation of Councils
23	Mr James Geoffrey Clark	N/A
24	Mr Athol Mullen	N/A
25	Mr Warren Grzic	N/A
26	Mr Peter Hrastnik	N/A
27	Mr Phillip Sawlwell	Pennant Hills District Civic Trust Inc.
28	Mr Matt Mushalik	N/A
29	Ms Lisa Hunt	Transurban
30	Ms Jocelyn Howell	N/A

	Name	Organisation Name
31	Mr R Whiteman	Glenorie Progress Association
32	Mr Tony Duffy	N/A
33	Mr Liam McKay	Tourism and Transport Forum Australia
34	Mr Malcolm Powell	N/A
35	Mr Maxwell Woodward	Hornsby Shire Council
36	Mr Michael & Mrs Belinda Petith	N/A
37	Mr Jim Donovan	N/A
38	Ms Margaret Whalen	West Pennant Hills Valley Progress Association Inc
39	Cr Tony Hall	N/A
40	Mr Ben Zoffman	N/A
41	Mr Alex Davidson	N/A
42	Dr Brian and Mrs Kathrine Vern-Barnett	N/A
43	Mr Frank Murray	N/A
44	Mr David Lovell	Leighton Contractors Pty Limited, in conjunction with Maunsell
45	Mr Mark Wolstenholme	NRMA Motoring & Services
46	Mr and Mrs Michael Dally	N/A
47	Mr Bob Lawrence	N/A
48	Mr Derek Richard Jones	N/A
49	Ms Leone Healy	N/A
50	Mr David Bell	N/A
51	Ms Leslie Riggs	Australian Government Department of Transport and Regional Services (DOTARS)
52	Hon Eric Roozendaal	NSW Government
53	Mr Norman A. Jones	N/A

Appendix 2 – Individuals and Organisations that Appeared Before the Chair at the Meetings in Public

Name	Organisation Name
	Monday 18 June
Mr Ken Dobinson	10,000 Friends of Greater Sydney
Mr Wayne Olling	Residents of Blacktown and Seven Hills Against Further Traffic
Mr Jeff Organ	Willoughby City Council
Mr Greg Piconi	Ku-ring-gai City Council
Mr James D McCredie Ms Prue Dally	Chatswood West Ward Progress Association
Mr Andrew King	Baulkham Hills City Council
Mr Peter Waite OAM JP	N/A
Cr Tony Hall	N/A
Ms Leslie Riggs Mr Robert Hogan Mr Ashok Mehta	Australian Government Department of Transport and Regional Services
Mr David Lovell Mr Robin Guess Mr Martin Oaten	Leighton and Maunsell
Mr Liam McKay Mr Larry McGrath	Tourism and Transport Forum Australia
Mr Steven Green	Central Coast Regional Organisation of Councils
Mr Bob Arps	Hillside Progress Association
Professor David Richmond Mr John Brewer	NSW Government
	Tuesday 19 June
Mr Brian Ash	Pennant Hills District Civic Trust
Mr Malcolm Powell	N/A
Mr David Bell	N/A
Mr Derek Richard Jones	N/A
Ms Julie Matthews	N/A
Mr John Longton	N/A
Mr Mark Divola	N/A
Mr Norman A Jones	N/A

Name	Organisation Name
	Wednesday 20 June
Ms Margaret Whalen	West Pennant Hills Valley Progress Association
Mr Matt Mushalik	N/A
Mr Frank Murray	N/A
Mr Tony Duffey	N/A
Mr Phillip Swalwell	Pennant Hills District Civic Trust

Appendix 3 – Recent Policy Reports

DOTARS, AusLink (2007) *Sydney Urban Corridor Strategy*. (draft)

DOTARS, AusLink (2004) *AusLink White Paper*.

Ernst and Young, ACIL Tasman and Hyder Consulting (2006) *North-South Rail Corridor Study*, prepared for DOTARS.

Freight Infrastructure Advisory Board (2005) Railing Port Botany's Containers: Proposals to Ease Pressure on Sydney's Roads.

Halcrow (2006) *Sydney Urban Corridors Demand and Constraints Review*, report prepared for DOTARS, NSW Department of Planning, the RTA and Ministry of Transport.

Ku-ring-gai Municipal Council (2006) *Traffic and Transport Policy*.

Maunsell Australia Pty Ltd (2006) *Sydney Urban Corridors Study*, prepared for DOTARS, NSW Department of Planning, NSW Ministry of Transport and the RTA.

NSW Government, Department of Planning (2005) *Sydney Metropolitan Strategy – City of Cities: A Plan for Sydney's Future*.

NSW Government, Department of Planning (2006) *Port Botany: Sydney Container Growth*.

NSW Government, Department of Transport *Action for Transport 2010*.

NSW Government, Department of Treasury (2006) *State Infrastructure Strategy: 2006-07 to 2015-16*.

NSW Government (2006) *Urban Transport Statement: Responding to the Challenges of Travel and Transport within and Across Sydney*.

NSW Government, Premier's Department (2006) *NSW State Plan*.

NSW Government (2007) Employment Lands for Sydney Action Plan, an action of the Metropolitan Strategy for Sydney.

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Appendix 4 – F3-M7 Corridor Selection - History

The following sets out a chronology of events and studies that led to the Review. In its submission to the Review, DOTARS provided a history of the F3-M7 Corridor Selection. The following chronology is substantially based on that submission.

Timeframe	Decision or Process
1980s	The RTA undertook a study to investigate route options for a road network bounded by the Pacific Highway, Pennant Hills Road, Beecroft Road and Epping Road. Proposed surface route options developed by the study, known as the B2/B3 routes were abandoned by the NSW Government in 1996 because of environmental impacts on Lane Cove Valley bushland.
1993	The Australian Government announced its intention to extend National Highway links across major cities.
January 1994	The Australian Government declares the Cumberland Highway – Pennant Hills Road to be considered as the interim National Highway route through Sydney until an alternative route is available for traffic.
1990s	In the 1990s the RTA investigated route options for the Western Sydney Orbital (WSO), now known as Westlink M7. As part of the investigation, a 1993/94 study identified a route that would bypass Pennant Hills Road and connect the proposed WSO from Dean Park to Mount Colah on the F3. The NSW Government did not adopt the proposal because of high environmental impacts and low traffic demand. However the NSW Government received representations from the community at that time, seeking provision for a link to be made between the F3 and the WSO and for relief of traffic pressures on Pennant Hills Road. The WSO replaced most of the Cumberland Highway section of the interim National Highway south of M2.
December 2000	WSO Environmental Impact Statement recognises a need for a National Standard Highway link between the WSO or M2 and the F3 Freeway, suggesting the need to 'initiate a study into the options for the long term development of a high standard road link between the M2 Motorway and the F3 Freeway.'
4 January 2001	The Australian Government and the NSW Government agreed (through a Memorandum of Understanding) to undertake a study to identify a route for the interim National Highway from the F3 to the WSO or the M2.
4 January 2001	The Australian Government releases a media announcement stating their intention to establish a link from the F3 to the WSO or M2 to relieve pressure on Pennant Hills Road and to complete the National Highway through Sydney.
April 2001	The RTA calls for expressions of interest for the F3 to Sydney Orbital Study.
8 February 2002	SKM is contracted by the RTA to conduct a strategic study to identify a route to replace the present interim National Highway.
April 2004	The SKM Study is released.
6 May 2004	The Australian Government announces its endorsement of the Type A corridor Purple option.
October 2004	Hills Motorway, the then owners of the M2, presents a case to DOTARS and the RTA for the Type A corridor Yellow option and requests that the route selection decision between the Purple and the Yellow options be re-opened.
June 2005	Transurban acquires the M2 from Hills Motorway and carries out its own assessment of the Purple and Yellow options.

Timeframe	Decision or Process
September 2005	Transurban confirms the assertion made by Hills Motorway that it prefers the Type A corridor Yellow option.
December 2005	Minister Lloyd agrees to a review of assumptions, models and data used by SKM and Transurban in relation to the Type A corridor Purple and the Yellow options.
23 March 2006	MWT submits the draft interim report to the Australian Government and the NSW Government. It is "interim" on the basis that MWT is awaiting further data from Transurban.
19 February 2007	Minister Lloyd announced that he is establishing an independent review of the F3 to M7 Corridor Selection.

Appendix 5 – Local Government Areas and Statistical Local Areas in Sydney Statistical Sub-Division

SSD	Local Govt. Area	Statistical Local Area
Blacktown	Blacktown	Blacktown - N
		Blacktown - SE
		Blacktown - SW
Canterbury-Bankstown	Bankstown	Bankstown - NE
		Bankstown - NW
		Bankstown - S
	Canterbury	Canterbury
Central Coast	Gosford	Gosford - E
		Gosford - W
	Wyong	Wyong - NE
		Wyong - S and W
Central Nth Sydney	Baulkham Hills	Baulkham Hills - Central
		Baulkham Hills - N
		Baulkham Hills - S
	Hornsby	Hornsby - N
		Hornsby - S
	Ku-ring-gai	Ku-ring-gai
Central W Sydney	Auburn	Auburn
	Holroyd	Holroyd
	Parramatta	Parramatta - Inner
		Parramatta - NE
		Parramatta - NW
		Parramatta - S
Eastern Suburbs	Randwick	Randwick
	Waverly	Waverley
	Woollahra	Woollahra
Fairfield Liverpool	Fairfield	Fairfield - E
		Fairfield - W
	Liverpool	Liverpool - E
		Liverpool - W

SSD	Local Govt. Area	Statistical Local Area
Inner Sydney	Botany	Botany (now Botany Bay)
	Leichhardt	Leichhardt
	Marrickville	Marrickville
	(former) South Sydney	South Sydney
	Sydney	Sydney - Inner
		Sydney - Remainder
		Sydney - Inner
		Sydney - E
		Sydney - S
		Sydney - W
Inner W Sydney	Ashfield	Ashfield
	Burwood	Burwood
	Canada Bay	Concord (now Canada Bay)
		Drummoyne (now Canada Bay)
	Strathfield	Strathfield
Lower Nth Sydney	Hunters Hill	Hunters Hill
	Lane Cove	Lane Cove
	Mosman	Mosman
	North Sydney	North Sydney
	Ryde	Ryde
	Willoughby	Willoughby
Northern Beaches	Manly	Manly
	Pittwater	Pittwater
	Warringah	Warringah
Outer SW Sydney	Camden	Camden
	Campbelltown	Campbelltown - N
		Campbelltown - S
	Wollondilly	Wollondilly
Outer Western Sydney	Blue Mountains	Blue Mountains
	Hawkesbury	Hawkesbury
	Penrith	Penrith - E
		Penrith - W

SSD	Local Govt. Area	Statistical Local Area
St George-Sutherland	Hurstville	Hurstville
	Kogarah	Kogarah
	Rockdale	Rockdale
	Sutherland	Sutherland - E
		Sutherland - W

Australian Government