

The F3-M2 connector: Supporting research

April 2012

*A project
commissioned by
the Northern
Sydney Regional
Organisation of
Councils with
Gosford City
Council*

Report commissioned by:

This report has been collectively commissioned by eight NSW Councils who are increasingly concerned about the critical missing motorway “link” between the M2 and F3 freeways in the Northern Sydney region.

The **Northern Sydney Regional Organisation of Councils (NSROC)** is comprised of **seven councils** in the northern part of Sydney which have voluntarily come together to address regional issues, work co-operatively for the benefit of the region, and advocate on agreed regional positions and priorities. The seven member councils are **Hornsby**, **Hunters Hill**, **Ku-ring-gai**, **Lane Cove**, **North Sydney**, **Ryde** and **Willoughby**.

In addition to the NSROC council group, **Gosford City Council** has also supported this report as it also views this motorway project as a priority for the community.

For further information about these organisations go to:

www.nsroc.com.au

www.gosford.nsw.gov.au



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Acronyms

Acronym	Description
BCR	Benefit cost ratio
CBD	Central business district
GDP	Gross domestic product
MWT	Masson Wilson Twiney
NRMA	National Roads and Motorists Association
NSROC	Northern Sydney Regional Organisation of Councils
NSW	New South Wales
RTA	Roads and Traffic Authority
SKM	Sinclair Knight Merz
TEU	Twenty foot equivalent unit
VCR	Volume to capacity ratio

1 *Introduction and overview*

The F3-M2 connector is the major “missing link” between Sydney’s orbital motorway network and the F3 freeway which connects Sydney to the Central Coast, Newcastle and beyond to the Pacific and New England Highways.

In the absence of the link, north-south travel along this major freight and general traffic route between the F3 freeway’s end at Wahroonga and the M2 at the Pennant Hills Road interchange is interrupted by over 20 sets of traffic lights. Vehicles travelling from the north and connecting to the M2 are forced to use Pennant Hills Road or travel north-south along the congested Pacific Highway.

If the 8 km link was built, it would save motorists up to 15 minutes per journey in peak periods – this equates to around two and a half hours a week or 125 hours per year less commute time.

In an NRMA survey, the community voted Pennant Hills Road between the M2 and F3 as one of the five worst roads in NSW.¹ Governments have committed funding to address problems at the other four sites in the top five but not to this section of Pennant Hills.²

This is the only section of the National Road Network through Sydney that is not motorway standard and all levels of Government (national, state and local) have recognised the need to construct a new link.

Figure 1 shows the location of the missing link.

¹ NRMA (2011), *NSW’s worst road spots revealed – Red Flag survey results*, February 2 2011. Accessed 21 February 2011 at www.mynrmacommunity.com

² The four others were the Pacific Highway between Coffs Harbour and Macksville, the Princes Highway between Berry and Bateman’s Bay, the M5 Motorway at the King Georges Road intersection and the M4 Motorway where the toll gates used to be at Auburn.

Figure 1 Sydney orbital network map



Business, commuters and local residents are familiar with proposals for a motorway grade link between the F3 and M2. Major studies since the 1970s have investigated surface and underground routes. Proposals were further developed in the 2000s and extensive public consultation occurred with decisions made by the Australian and NSW governments on a preferred route and to progress planning with a view to constructing the link.

The proposed link would replace the current section of National Highway on Pennant Hills Road to complete the Sydney Orbital network on an uninterrupted motorway standard road and would involve two unidirectional tunnels between the F3 Freeway at Wahroonga and the M2 at its interchange at Pennant Hills Road.

The link has been incorporated in key planning documents including the 2010 Metropolitan Strategy, the 2008 State Infrastructure Strategy as well as the Auslink Sydney Urban Corridor Strategy developed collaboratively by the Australian and NSW Governments in 2007.

Although the link is enshrined in planning policy, neither the Commonwealth or State Government has committed to a start date for constructing the link. Rather, \$150 million in funding for engineering and planning studies previously committed by the Australian Government was deferred in the 2011-12 Budget to 2015-16.

This creates a risk of no action with consequences for the national, state and local economies including:

- higher costs and constraints on freight movement on this national north-south corridor connecting Melbourne through to Brisbane which flow through to increased costs of goods and services
- longer travel times on arterial roads that connect the north and north west to other parts of Sydney because traffic growth and the use of arterial roads for regional and national functions will increase congestion

- even greater impacts for local communities already affected by noise, high accident rates and the severance of their suburbs by roads that limit their access to local services and affect community cohesion
- constraints on economic development in the north and north west of Sydney as new housing and business development applications are rejected because of insufficient road capacity along Pennant Hills Road
- increased costs of constructing the link as a result of delay.

Table 1 summarises some of the key announcements and commitments in relation to the link over the last decade.

Table 1 F3-M2 connector timeline

Date	Event
January 2001	Australian Government allocates \$1 million for a feasibility study for a link between the orbital and the F3 freeway at the same time it announced commencement of the Western Sydney Orbital (now known as the M7)
March 2002	Study into proposed F3/M2 link commences and includes extensive public consultation
April 2004	SKM completes study and recommends a preferred option – a tunnel connecting the F3 at Wahroonga with the M2 at the existing Pennant Hills Road/M2 interchange with an alignment generally following Pennant Hills Road.
May 2004	Preferred option endorsed by the Australian Government. NSW Government concurs.
2004 and 05	The private sector made submissions that included estimates of higher traffic volumes and toll revenues on a more easterly route.
January 2006	The Australian Government Minister for Local Government commissioned Masson Wilson Twiney (MWT) to undertake an independent review of the traffic forecasts used by SKM and the private sector. MWT completed an interim report in March 2006 and their analysis supported the preferred route.
Early 2007	The Australian Government engaged the Hon. Mahla Pearlman AO to review the assumptions and data in the SKM and MWT reports and consider whether any significant changes to projections would alter the conclusions reached in the 2004 report.
August 2007	The Pearlman Review concluded that the assumptions and data used in the SK M report were valid at the time of the study and changes since had reinforced the

Date	Event
	selection of the preferred route particularly based on traffic volume forecasts and freight routes from the north to Sydney's west. Pearlman concluded there was an immediate need for the link.
September 2007	During their election campaign, the Labor party committed \$150 million to undertake feasibility and planning studies under the National Building Program.
November 2007	The Coalition Government made election commitment of \$1.5 billion over seven years to 2014 to fund construction of the connector but did not form Government after the election.
October 2008	The NSW Government made a confidential submission to Infrastructure Australia on the F3-M2 connector seeking Australian Government funding.
May 2011	The Australian Government announced deferral of \$150 million previously committed under the National Building Program to a feasibility study until 2015-16 as part of the 2011-12 budget.

The May 2011 decision to defer funding for planning studies has created uncertainty about the Australian Government's ongoing commitment to the project and its priority for investment. The project appears on Infrastructure Australia's priority list in the 'Early Stage' category.³ The NSW Government has indicated it supports the project but has not yet articulated its priority as it embarks on the process of developing a Long Term Transport Master Plan in 2012 as well as a 20 year State Infrastructure Strategy being developed by Infrastructure NSW.

Scope of this report

The Northern Sydney Regional Organisation of Councils with Gosford City Council has engaged PwC to develop a summary of the benefits of the link drawing on analysis from the studies already completed, the experiences of businesses affected by the link and any other readily available information. These Councils represent nearly three quarters of a million of the greater metropolitan area's residents. By 2036, there will be nearly 2 million residents in these councils and other affected councils (refer Table 2).

³ This means it is recognised as addressing a nationally significant issue or problem but the identification or development of the right solution is at an early stage. Refer Infrastructure Australia (2011) *Communicating the Imperative for Action*, A report to the Council of Australian Governments, June 2011, p. 80.

Table 2 Population of affected councils

Local Government Area	Population (2006)	Population (2036)
Hornsby	157,000	187,000
Hunters Hill	14,000	18,000
Ku-ring-gai	105,000	134,000
Lane Cove	32,000	38,000
North Sydney	62,000	77,000
Ryde	101,000	134,000
Willoughby	67,000	82,000
Gosford	162,000	196,000
Hills Shire	165,000	259,000
Blacktown	280,000	481,000
Hawkesbury	62,000	90,000
Wyong	143,000	228,000
Total	1,350,000	1,924,000

Source: Bureau of Transport Statistics (2009) *October 2009 Release Population Forecasts*

2 *Impact of the missing link*

The 2004 SKM report identified the key problems of the existing link between the F3 and M2 including:

- i) slow, unreliable and unsafe travel conditions on this stretch of road
- ii) loss of safety and amenity for people living and working in the corridor
- iii) air quality impacts in the Sydney Basin
- iv) loss of productivity and increased economic costs.⁴

An indicator of congestion on a road is the volume to capacity ratio (VCR). SKM reported a morning peak VCR for Pennant Hills road of 1.1 and for the Pacific Highway of 1.2. A VCR of 1.0 or more indicates actual traffic volumes exceed a road's theoretical capacity and normally indicates economic need for improvement.⁵

SKM's analysis showed that over the 20 years prior to its study Sydney's population had grown by an average of 1.2% per year but travel demand (in terms of passenger kilometres of travel) was estimated to have grown by about 2.7%, or more than twice the population growth rate.⁶

Since SKM prepared its report, population, freight and congestion forecasts have been released that show continued growth which is adding pressure on this part of the road network:

- Sydney's population is now expected to grow from 5.5 million in 2011 to 7.2 million in 2036, or 1.4% per annum.⁷ Growth will be faster in the north west with the population increasing 44% from around 0.8 million to 1.2 million or about 1.8% per annum.
- The number of trips made by freight vehicles on an average weekday in the Sydney metropolitan area is expected to grow 47% from 1.5 million in 2011 to 2.2 million in 2036, faster than the rate of population growth with heavy vehicles growing at 2.2% per annum. The rate of growth will be faster in the North West with the number of daily vehicle trips increasing from 217 000 in 2011 to 374 000 in 2036, or 72% (2.8% per annum).⁸
- The social costs of congestion are projected to rise strongly to an estimated \$20.4 billion by 2020. The city specific levels are forecast

⁴ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 3

⁵ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 3, p 6

⁶ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 4, p 8

⁷ Bureau of Transport Statistics (2009) *October 2009 Release Population Forecasts*

⁸ Bureau of Transport Statistics (2010) *February 2010 Release Freight Forecasts*

to rise from \$3.5 billion (2005) to \$7.8 billion (2020) for Sydney. This constitutes a rise of 123% between 2005 and 2020 – an annual growth rate of 5.5%.⁹

On highly congested roads, incremental growth in traffic can cause exponential declines in travel speeds or trip times. Many motorists have experienced the “school holiday” affect where reductions in traffic volumes of 5 to 10 per cent in school holiday periods result in a proportionately much greater reduction in travel times on normally congested routes.¹⁰ The NRMA suggests that as a rule of thumb, when traffic congestion is reduced by 5%, traffic speeds increase by 50%.¹¹

Conversely, it could be expected that for congested routes such as Pennant Hills Road and the Pacific Highway incremental annual traffic growth may lead to much more than incremental impacts on travel speeds and trip times although growth in demand would also likely slow as more businesses and commuters opt to avoid the heavily congested route altogether.

Congestion on the existing route generates major costs to business and the community and as it worsens will increase the types of costs incurred as described in the following sections.

2.1 Impacts on freight movement

The F3 is the main strategic national highway between Sydney, the Central Coast, Newcastle and beyond to Brisbane. Links between it and other parts of the Sydney region as well as through connections to the south of Sydney affect the efficiency of the logistics sector along the eastern seaboard from Brisbane to Melbourne. NSW is both a destination but also a ‘through’ state on freight corridors between southern and northern states and territories. Approximately 25 per cent of trucks using Pennant Hills Road have origins or destinations north of Newcastle, in northern NSW and in Queensland.¹²

The missing link affects performance of the national freight network

The Sydney orbital network is a 110 kilometre motorway standard ring-road. Since the opening of the M7 in 2005, Sydney’s orbital network has provided motorway grade access to key centres and locations across Sydney. Freeways to the west (Great Western Highway) and the south west (Hume Highway) connect regional NSW and beyond (e.g. interstate to Victoria) to the orbital network facilitating access to key freight and logistics centres in the west and south west of Sydney and to Sydney’s major international gateway – the Port Botany and Sydney Airport precinct.

To the north there is no such motorway connection. Rather freight and other vehicles use the 8 km stretch of Pennant Hills Road between the F3 in

⁹ Bureau of Transport and Regional Economics (2007) Estimating urban traffic and congestion cost trends for Australian cities, Working Paper No. 71, p xv

¹⁰ NRMA (2011) *Decongestion – 10 ways to relieve Sydney’s traffic headache*, May 2011, p. 25.

¹¹ NRMA (2011) *Decongestion – 10 ways to relieve Sydney’s traffic headache*, May 2011, p. 25.

¹² SKM (2004) *F3 to Sydney Orbital Link Study*.

the north to connect to the M2 at the Pennant Hills Road interchange on their journey through Sydney or to destinations in western Sydney. Some traffic also uses the Pacific Highway.

SKM forecast in 2004 that the existing interim National Highway route using Pennant Hills Road would not be able to continue to provide a reliable service to businesses reliant on long distance road transport on the National Highway – it is forecast to carry 96,400 vehicles including up to 16,700 heavy trucks per week day if no new link is constructed.¹³

The 2007 Sydney Urban Corridor Strategy developed collaboratively by the NSW and Australian Governments recognised that congestion on Pennant Hills Road directly affects performance of the National road network and identified improved north-south motorway connections to Sydney's orbital network as a short-term priority.¹⁴ It was also identified as one of the corridor sections on which traffic was forecast to increase most.¹⁵

Business has also identified the limitations of the existing road. Woolworths has identified the M2 to F3 Link as one of the bottlenecks and infrastructure gaps in the national network. Bottlenecks or “missing links” in infrastructure in and around cities means Woolworths' trucks are forced onto local suburban roads unnecessarily increasing congestion, slowing delivery times and impacting on broader freight productivity.¹⁶ The Grattan institute cites infrastructure bottlenecks as detracting from Australia's productivity performance.¹⁷

Increased freight as well as air passenger movements will generate greater demand

In her 2007 review, the Hon. Mahla Pearlman found that 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 will 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.¹⁸ The opening of the M7 in 2005 saw additional development of distribution centres and manufacturing facilities promoting the shift of freight generation and freight intensive industry to Sydney's west.¹⁹ Traffic counts on Pennant Hills Road show that more heavy vehicles head to or come from the west rather than the east. These patterns could be further reinforced by proposals to establish freight terminals at Moorebank and Eastern Creek.

¹³ SKM 2004 *F3 to Sydney Orbital Link Study*, p 4-9.

¹⁴ Auslink (2007) *Sydney Urban Corridor Strategy*, p31

¹⁵ Auslink (2007) *Sydney Urban Corridor Strategy*, p18

¹⁶ Woolworths Limited (2011) *Submission responding to National Land Freight Strategy Discussion Paper*, 9 May 2011, p. 4.

¹⁷ Eslake, S & Walsh, M, 2011, *Australia's Productivity Challenge*, p. 25, Grattan Institute Melbourne.

¹⁸ Pearlman, M (2007) *Review of the F3 to M7 Corridor Selection*, p66

¹⁹ Masson Wilson Twiney (2006) *F3 to Sydney Orbital Corridor review*, p65

Pearlman concluded in 2007 that these trends only serve to reinforce the need for a link now.²⁰

More recent projections of freight movements through the existing port and airport show continued strong growth. In 2010-11 container trade through Sydney's Port Botany reached over 2 million TEUs for the first time with a value of over \$61 billion.²¹ Containerised freight volumes are expected to increase over 3.5 times or by 5.5 million TEU from 2010-11 to 2030-31.²² In 2008, air freight through Sydney Airport was 634 000 tonnes with a value of \$36 billion.²³ These air freight volumes are expected to increase by 85%, or an additional 480,000 tonnes, from 2009 to 2029.²⁴

Apart from this growth which will generate demand from the north to container handling sites in the west, the NSW's Port Growth Plan, while a product of the previous Government, identifies Newcastle as the state's next major container facility as Port Botany reaches capacity, envisaged in the plan to occur in about 2025.²⁵ This makes links from the north to Sydney's west, south west and north west more critical.

Further, a Joint Study of Sydney's Aviation Capacity has been undertaken by the Commonwealth and NSW Governments. The report outlines expected growth in activity at existing airports including Kingsford Smith and the RAAF bases at Richmond and Williamtown as well as recommends that the Australian and NSW governments commit to establishing a supplementary airport for the Sydney region with Wilton in Sydney's south west being the preferred site if Badgerys Creek is ruled out.²⁶ Airports are major trip generators and increased activity at existing sites as well as a potential new site are likely to contribute significantly to increased travel demand between Sydney's west and south west and the north.

2.2 Impacts on Sydney's arterial network

Sydney is economically the most valuable region in Australia. It accounts for about one quarter of Australia's GDP and is home to a higher proportion of international company headquarters than any other Australian capital city.

²⁰ Pearlman, Hon. Mahla AO, *Review of the F3 to M7 Corridor Selection*, Australian Government, August 2007, p. xiii.

²¹ Sydney Ports Corporation (2011) *Trace report 2010/11*, p. 1-2

²² NSW Government (2011) *Port Botany and Sydney Airport Transport Improvement Program*, p. v

²³ Sydney Airport (2008) *Economic impact report*, accessed 27 February 2012 at: <http://www.sydneyairport.com.au/corporate/about-us/economic-impact-report.aspx>

²⁴ NSW Government (2011) *Port Botany and Sydney Airport Transport Improvement Program*, p. v

²⁵ NSW Government (2011) *NSW Ports Growth Plan – Summary sheet*, accessed 10 January 2012 at: http://www.maritime.nsw.gov.au/ports/growth_plan.html

²⁶ Joint Study on aviation capacity in the Sydney region, Executive Summary, Report of the Steering Committee to the Australian and NSW Governments, p. 34

Major corporations are located in the north and north-west. For example, Woolworths, ResMed, Wattyl Limited, Capital Finance and Subaru are all located at Norwest Business Park.²⁷

Traffic congestion likely to grow affecting the north and north-west

The NSW Government's 2008 draft plan for the North subregion (part of the Metropolitan Strategy) identified that there are large and increasing volumes of traffic including heavy trucks travelling day and night through the northern parts of Sydney causing a significant loss of urban amenity along Pennant Hills Road. It operates as a major arterial road carrying up to 75,600 vehicles per day, with inter-regional and long-distance through-traffic volumes making up about 23 per cent of the total daily traffic.²⁸ Over 10 per cent of the daily traffic on Pennant Hills Road is trucks (on average 8,800 trucks each week day).²⁹ The Plan states that road travel demand in the corridor is likely to grow, even with implementation of integrated land use/transport planning, significant investments in rail, and travel demand management policies.

Growth on the Central Coast puts increasing pressure on the F3. Traffic to and from the Central Coast makes up about 60 per cent of the total daily traffic on the F3.³⁰ Growth in the north-west sector will also increase pressure on the arterial roads in North Sydney that feed the F3 Freeway. The rates of population growth forecast for the Central Coast and North West (1.47% and 1.85% per annum respectively) are significantly higher than the average rate forecast for the whole of the Greater Metropolitan Area (1.32%).³¹

Inter-regional transport is compromised

Research in Masson Wilson Twiney's 2006 report showed that Pennant Hills Road's traffic reflects a regional and inter-regional function more than the Pacific Highway, which has a more commuter-style function. The volume of heavy vehicles, especially articulated vehicles is substantially higher on Pennant Hills Road than on the Pacific Highway.³² Traffic growth on Pennant Hills Road over the prior 10 years had averaged 3 to 4% per year and about 1% per year on the Pacific Highway south of Wahroonga which has been operating at capacity for a longer period.³³

Most freight in Sydney is moved by road (86%) with the key routes including Pennant Hills Road, the southern end of the F3, the Hume Highway (near Ingleburn), the M4, M5, General Holmes Drive and Foreshore Road each carrying more than 5000 heavy vehicles per day.³⁴

²⁷ Capital Corporation (2009) *Introducing Norwest Business Park*, accessed 28 February 2012 at: http://www.capitalnorwest.com.au/Snapshots/Norwest_Flyer.pdf

²⁸ NSW Government (2008) *Metropolitan Strategy – Transport North – Key Directions (DRAFT)*, p. 62.

²⁹ NSW Government (2008) *Metropolitan Strategy – Transport North – Key Directions (DRAFT)*, p. 62.

³⁰ SKM (2004) *F3 to Sydney Orbital Link Study*, p 16.

³¹ Derived from Bureau of Transport Statistics, *Population Forecasts 2006-2036*, October 2009 Release.

³² Masson Wilson Twiney (2006) *F3 to Sydney Orbital Corridor review*, p65.

³³ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 3, p. 5.

³⁴ Auslink (2007) *Sydney Urban Corridor Strategy*, piii.

Use of Pennant Hills Road to service long distance and inter-regional travel demands as well as local and commuter demands results in high levels of congestion.

SKM's analysis showed average peak travel speeds on Pennant Hills Road are often below 25 km/h at Pennant Hills and can be as low as 14 km/h. The road is congested during commuter peak periods and business hours which results in unreliable travel times and can lead to major disruptions to inter-regional traffic movements.³⁵ Trip times measured by Roads and Maritime Services indicate travel times between 6:15am and 9am range between 11 to 23 minutes – at 23 minutes, speeds are around 20 km/h.³⁶

An accident on Pennant Hills Road in peak periods has ramifications across the region causing extended delays. Without the motorway link, there is little redundancy in the road network that provides options for re-routing traffic. Popular “rat-runs” on local streets are themselves congested as more people avoid travelling along Pennant Hills Road.³⁷

A comparable situation existed along the length of the Cumberland Highway (made up of a number of arterial roads between Wahroonga and Casula including Pennant Hills Road) which was previously part of the national road network. However, construction of the M7 motorway allowed motorists to bypass 48 sets of traffic lights with a journey from south of Liverpool to West Pennant Hills reduced to less than 30 minutes compared to previous journey times in excess of an hour.³⁸ In addition to reduced travel times on this route, it has taken an estimated 60,000 vehicles per day off the existing Western Sydney road network.³⁹ Roads and Maritime Services reports this has resulted in:

- safe and more efficient road transport for both passenger vehicles and freight in western Sydney
- faster travel and improved access between western Sydney and to other growing cities and regions
- improved public transport with transitways that enable faster travel times to key regional destinations.

Reliance on this congested route stymies business development

Relief of congestion on existing arterial roads and the surrounding congested rat runs through construction of the F3-M2 link could also have transformational benefits.

³⁵ SKM (2004) *F3 to Sydney Orbital Link Study*, p3

³⁶ Roads and Maritime Services (2011) *Key Roads Performance Report*, December 2011

³⁷ Hornsby Shire Council (2007) *Review of F3-M7 Corridor selection – Submission to Infrastructure Australia*, accessed 27 February 2012 at: http://www.infrastructure.gov.au/roads/F3toM7Review/pdf/SUBMISSION_16-Hornsby_Shire_Council.pdf

³⁸ RMS *Building Sydney Motorways – M7 Motorway*, accessed 14 February 2012 at http://www.rta.nsw.gov.au/roadprojects/projects/building_sydney_motorways/m7/index.html

³⁹ RMS *Building Sydney Motorways – M7 Motorway*, accessed 14 February 2012 at http://www.rta.nsw.gov.au/roadprojects/projects/building_sydney_motorways/m7/index.html

For example, with the building of the M7, new business development has occurred along the existing, less congested roads as well as the M7 itself helping to generate urban renewal and economic growth in western Sydney. Companies such as Woolworths, Coles, Coca-Cola, TNT, Bluescope Steel and LG Electronics have all relocated to business and industrial parks close to the M7 following its construction.⁴⁰

The NSW Metropolitan Strategy identified parts of the Pacific Highway and Pennant Hills Road as potential enterprise corridors. These are areas which have potential to provide low cost accommodation for a range of local and regional services, including start-up offices, light industrial, showrooms, building supplies and retail.⁴¹

However, it is probable that at least some of these businesses could not establish without some congestion relief on Pennant Hills Road. For example, a development application for a McDonald's restaurant on the eastern side of Pennant Hills Road was rejected by Hornsby Shire Council. The reasons for refusing the development included traffic impacts on Pennant Hills Road with an expected likely increase in rear enders or side swipe crashes as traffic queues form on Pennant Hills road reducing capacity from three lanes to two.⁴² The proposed McDonalds would have been the only outlet encountered by south bound traffic between Wyong and Winton along the national Highway network (F3, Pennant Hills Road, M2, M7, F5) and as a result it was expected visitation patterns would not be typical of a suburban McDonalds restaurant with implications for parking provision and access.

2.3 Impacts on local communities

The regional and inter-regional function of Pennant Hills Road in addition to local residential and business use has significant impacts on local communities.

As the road has developed, widened and is used by increasing volumes of traffic including high rates of growth of heavy vehicles, local residents and businesses are affected. Impacts include:

- longer travel distances and travel times for what were previously simple, more direct trips where right hand turns are no longer allowed or where wait times have increased because of traffic volumes
- shifting local traffic to 'rat runs' that were previously quieter residential areas
- constraints on planning for new residential areas because the road does not have capacity for additional residential traffic.

⁴⁰ Infrastructure Partnerships Australia (2007) *Case study – Westlink M7*, p8

⁴¹ NSW Government (2008) *Metropolitan Strategy – Economy and Employment North – Key Directions (DRAFT)*, p. 25.

⁴² Hornsby Shire Council (2010) *Development Application – Erection of a McDonalds Restaurant, 361-365 Pennant Hills Road, Pennant Hills* accessed via <https://businesspapers.hornsby.councilsonline.com.au/>.

- business decisions not to expand or to locate in local area because of the limitations on mobility around the region
- disruptions/accidents on arterial roads cause severe traffic grid lock in the area
- relatively high crash rates involving fatalities and serious injuries on the road.

Longer travel times, use of rat runs and severance effects on community

An example of impacts of traffic queuing is the intersection of Pennant Hills Road and the Comenarra Parkway Thornleigh. Traffic turning right into the Comenarra Parkway forms extensive queues in the morning peak. Traffic regularly “jumps” the right turn queue by turning left into Station Street and accessing Commenarra Parkway via Station Street and Park Road. This vastly increases the volume of traffic passing Thornleigh Railway station which conflicts with pedestrians attempting to access the station from the footbridge over Pennant Hills Road

The section of Pennant Hills Road between Beecroft Road and Castle Hill Road, West Pennant Hills is subject to extensive delays in both the morning and afternoon peaks, resulting in drivers using rat runs along Victoria Avenue or Copeland Road to avoid Pennant Hills Road.

High crash rates

SKM reported that the Pennant Hills Road crash rate is nearly double the Sydney arterial road network average with 114 fatal and serious crashes occurring in 2001 on the section north of the M2 Motorway.⁴³ In 2010 there were 193 serious crashes on Pennant Hills Road and there has been an average of approximately 250 over the last 6 years (refer Table 3).⁴⁴ In comparison there has only been one fatality on the M2 since it opened.

Pennant Hills Road also appears five times in the NRMA’s list of the top 101 crash sites as the location of a crash or near cross street.⁴⁵ Analysis shows crash rates are much higher on Pennant Hills road than on motorway grade roads such as the M4, M5 and F3.⁴⁶ Relatively high crash rates have impacts on all who use the road but particularly for local residents and businesses who are most affected.

⁴³ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 7, p7-1

⁴⁴ Hornsby Shire Council (2011) *Personal communication*, F3 - M2 Link Consolidation Study - Pennant Hills Rd crash data

⁴⁵ NRMA (2007) *NSW’s top 101 crash sites based on NRMA insurance motor comprehensive claims data*, accessed 17 January 2012 at: <http://www.nrma.com.au/documents/brochures/top101nsw.pdf>

⁴⁶ Auslink (2007) *Sydney Urban Corridor Strategy*, p12

Table 3 - Pennant Hills Road crash summary

Year	Number of reported crashes	Crashes involving heavy vehicles	Crashes with injuries
2005	174	20	59
2006	263	32	85
2007	251	29	67
2008	252	32	92
2009	246	30	77
2010	193	34	63
Total	1379	177	443

Source: Hornsby Shire Council (2012) *Unpublished data, Pennant Hills Rd*

The RTA has a standard set of economic parameters to assess the costs of changes in crash rates. These include the average crash cost per million vehicle kilometres travelled (VKT). The parameters, listed in Table 4, show lower costs on motorway roads than arterial roads because of the lower crash rate per kilometre travelled. These costs measure direct costs of an accident and not the wider impacts, such as widespread traffic delays.

Table 4 - Crash costs by road type

Road Type	Average crash cost (\$/MVKT)
Local	\$65,700
Arterial	\$47,900
Freeway/motorway	\$14,900

Source: RTA (2009) *Economic parameters for 2009*, RTA Economic Analysis Manual – Appendix B

Compromised design and location of residential developments

During the development of Hornsby Shire Council's Housing Strategy, the RTA provided a submission on a draft raising serious concerns about road capacity to accommodate the impacts of additional residential development proposed by both Hornsby and Hills Shire councils. The submission stated:

Should there be no intersection or road capacity improvements provided along Pennant Hills Road or Carlingford Road in the vicinity of these

*Housing Precincts then the RTA strongly objects to any further major redevelopment within the Carlingford Precinct.*⁴⁷

Following a review of submissions on the draft Housing Strategy, four of the five proposed Carlingford housing precincts were deleted and the number of dwellings reduced from 800 to 306.^{48, 49}

Given the North West region is estimated to grow in population by almost 400,000 by 2036⁵⁰ which requires over 100,000 new houses, demand from residential development reinforces the need for the link.⁵¹

Increased noise and air quality impacts

Local residents are affected by noise generated by heavy vehicles. The 2007 Sydney Urban Corridor Strategy stated:

*Noise impacts from road traffic are generally greater at intersections carrying large volumes of commercial vehicles where acceleration and brake noise from trucks is prevalent, such as along Pennant Hills Road. There is a need to consider ameliorative measures early in the planning process otherwise this issue will become increasingly challenging to handle as traffic volumes increase.*⁵²

Congestion results in static and more frequent stops and starts of motor vehicles. This leads to greater fuel consumption, up to double that generated in free flowing conditions, as well as higher exhaust pollution.⁵³ Additional emissions from heavy traffic have also been linked to health issues particularly respiratory conditions.

⁴⁷ Popoff, A (2010) *Hornsby Shire Housing Strategy – Amendments*, Roads and Traffic Authority, p9

⁴⁸ Hornsby Shire Council (2010) *Hornsby Shire Housing Strategy Planning Proposal – Report on Submissions*, accessed 16 January 2012 at: http://www.hornsby.nsw.gov.au/media/documents/planning-and-building/housing-strategy/report-7-july-2010/Housing_Strategy_Report_on_Submissions.pdf

⁴⁹ Hornsby Shire Council (2011) *List of Housing Strategy precincts gazetted by the Minister for Planning*, accessed 16 January 2012 at: http://www.hornsby.nsw.gov.au/data/assets/pdf_file/0020/26534/Housing-Strategy-Precincts.pdf

⁵⁰ Bureau of Transport Statistics (2009) *October 2009 Release Population Forecasts*

⁵¹ Using NSROC average of 2.6 people per household as per: profile.id (2009) *NSROC Region – Community profile*, 2006 and 2001 enumerated census information

⁵² Auslink (2007) *Sydney Urban Corridor Strategy*, p12

⁵³ CIE and Bureau of Transport and Regional Economics 2006 quoted in SMH 23 Jan 2006

3 *Why the F3-M2 Connector?*

The F3-M2 connector has been recognised by all levels of government as a beneficial project. Various studies have identified and confirmed a preferred alignment and analysed the benefits. Some of the benefits have been quantified and monetised as part of the analysis of benefits and costs e.g. the benefits of reduced trip times for motorists. In addition, a wide range of additional benefits have been identified but not captured as monetised benefits in the analysis because of the difficulty of converting them to dollar values despite their importance.

New road options have been the focus of investigations because analysis shows rail freight lines and the Main North Rail Line will not be able to carry the expected growth in freight and person trips in the corridor, even with the necessary investment to increase rail's carrying capacity and mode share.⁵⁴ In addition SKM concluded it is not feasible to increase the capacity of existing roads through grade separation of major junctions to cater for growth because there are critical intersection capacity constraints located close to local urban and commercial centres such as Thornleigh, Pennant Hills, Wahroonga, Turramurra and Pymble.⁵⁵

The following sections describe the proposed connector, the options and alternative alignments that have been considered and the benefits that have been identified to date. This provides a summary of the substantial body of work that has already been completed to identify a solution to problems that have impacts at national, state and local scales.

3.1 *The proposed route*

The proposed F3-M2 connector would replace the current section of National Highway on Pennant Hills Road to complete the Sydney Orbital network on an uninterrupted motorway standard road. The construction would involve two unidirectional tunnels between the F3 Freeway at Wahroonga and the M2 at its interchange at Pennant Hills Road. This is the purple route originally developed as part of the SKM 2004 study, announced as the preferred route by the Australian Government and subsequently confirmed as the preferred route following the Pearlman review.

The tunnels would be approximately 8km long with a speed limit of 80km/hr, have a maximum vehicle height of 4.4m with ramp grades of 6%. It has been proposed that the tunnels be two lanes if tolled or three if untolled.⁵⁶

⁵⁴ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 16, p 9.

⁵⁵ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 4, p 9

⁵⁶ Department of Transport (NSW) (2008) *NSW Submission to Infrastructure Australia: F3-M2 Link*, redacted version, Appendix C, p1

An important function of the link would be to service inter-regional travel demands of Sydney's and the State's road-based economy. As part of the National Land Transport Network, a new link would primarily service commercial and long distance traffic. However, a new link would also provide significant improvements to the region's arterial network for local users and commuters.⁵⁷

3.2 Alternative routes previously considered

SKM were commissioned by the Federal Government to undertake a feasibility study to identify a high standard transport link to replace Pennant Hills Road as part of the National Highway. The study was undertaken between 2002 and 2004 and was managed by the Roads and Traffic Authority (RTA).

SKM generated a range of scenarios and options for meeting transport needs in this region. For example, a high freight rail growth scenario was considered assuming upgrades to the northern freight line and an increase in rail freight mode share from 14% to 23%. Although this would reduce the rate of growth in the number of freight trucks on the F3, the number of trucks would still increase by about 70% on the F3 and more than 80% on Pennant Hills Road.⁵⁸

Analysis of a public transport only option for passengers also indicated it would be difficult to achieve the transport objectives set for the F3 to Sydney Orbital link by upgrading public transport alone although public transport enhancements would lead to an increase in the volume of public transport travel and overall mode share and therefore serve wider community transport objectives.⁵⁹

SKM concluded that rail freight transport and the Main Northern rail line would not be able to carry the expected growth in freight demand in the corridor, even with the necessary investment to increase rail's carrying capacity and mode share.

Routes identified in 2004 SKM study

Potential options were divided into three types of corridors, known as Types A, B and C and shown in Figure 2.

Type A corridors included easterly options that would form a southern extension of the F3 corridor to connect with the M2 and would continue to use the F3 as the major road transport link between Sydney and the north.

Type B corridors included options that would connect the Sydney Orbital between Pennant Hills Road and Dean Park to the F3 between Wahroonga and the Hawkesbury River and would bypass the developed areas of Hornsby and would continue to use the F3 corridor, north of Mt

⁵⁷ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 3, p3-1

⁵⁸ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 19, p3.

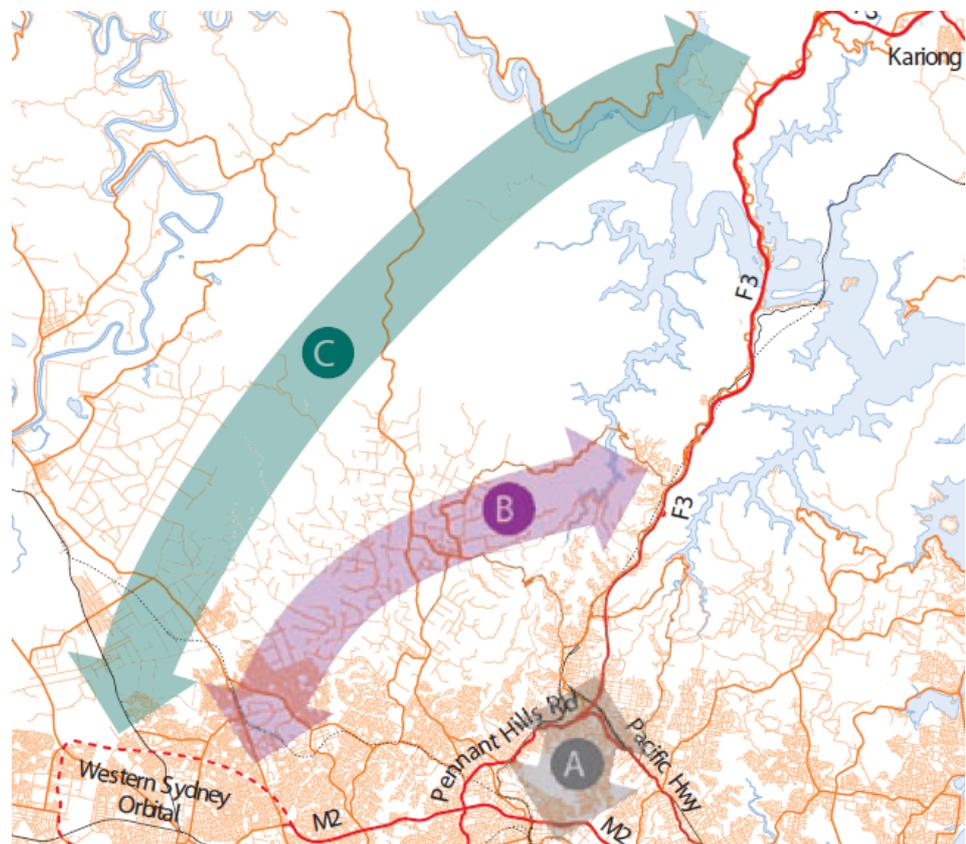
⁵⁹ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 19, p3.

Colah/Berowra as the major road transport link between Sydney and the north.

Type C corridors include the more westerly options which would connect the Sydney Orbital between Windsor Road and Dean Park with the F3 north of the Hawkesbury River. These options would for a second major road corridor between Western Sydney and the north but traffic would continue to use the F3 corridor north of Mt White as the major transport link between Sydney and the north.

The three types of corridors were assessed at a strategic level for their transport, social, and environmental impacts and SKM found that type A options would perform better than types B and C. They would remove more traffic from Pennant Hills Road and best satisfy the National Highway objectives.⁶⁰

Figure 2 - Corridor types for orbital link



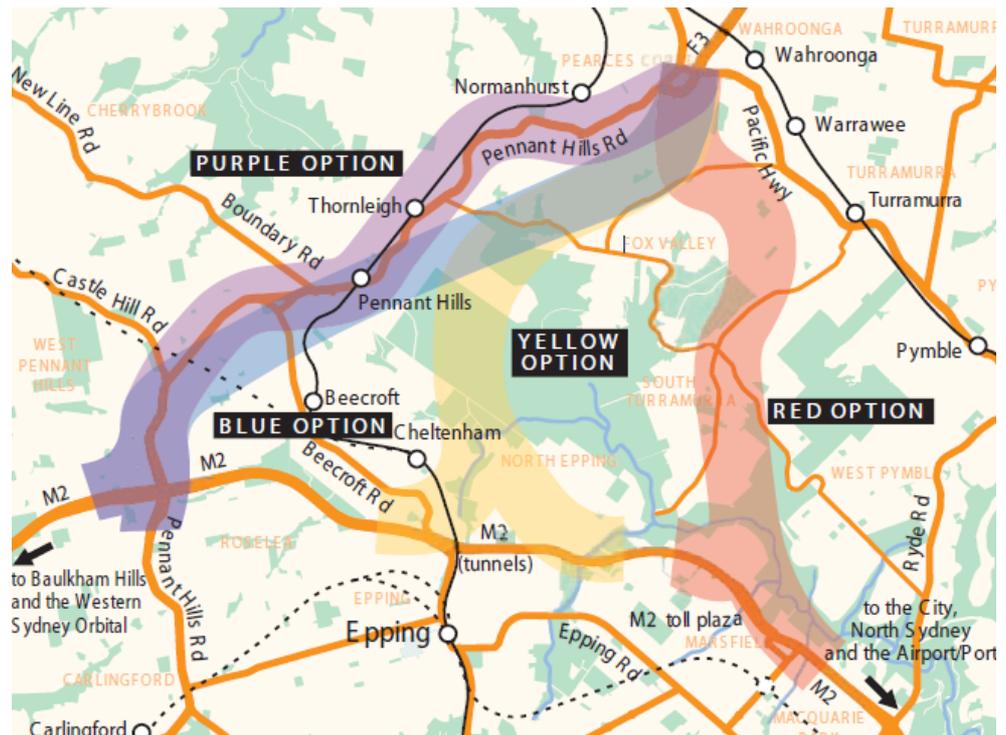
Source: SKM (2004) *F3 to Sydney Orbital Link Study*, p10

The four Type A options shown in Figure 3 involve the construction of a tunnel with connections to the existing arterial road network. The options were further investigated to establish the most suitable link and were assessed against a number of objectives:

⁶⁰ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 10, p12.

- i) provide a high standard access controlled motorway that integrates with the regional transport network,
- ii) minimise social and environmental impacts during construction and operation,
- iii) provide opportunities for improved public transport,
- iv) be economically justified and affordable to government.⁶¹

Figure 3 - Type A options



Source: SKM (2004) *F3 to Sydney Orbital Link Study*, p18

SKM’s analysis found the purple option was the preferred route as it would perform the best overall with regards to technical criteria as well as social and environmental impacts.⁶²

Review of SKM and other forecasts supports preferred route

Following the release of the SKM report in 2004, the private sector made submissions to the Federal Government and RTA in 2005 suggesting the ‘Type A Yellow option’ should be the preferred option. It was considered this would carry more traffic, be more financially viable and provide similar relief to Pennant Hills Road compared to the purple option.

Masson Wilson Twiney were engaged to undertake a desktop review of these forecasts and confirmed the purple option as the preferred option.⁶³

⁶¹ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 11, p11-1

⁶² SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 12, p23

⁶³ NSW Government (2006) *NSW Government submission to the review of the F3 to M7 corridor selection*

Independent 2007 review confirms preferred route and need for link now

Subsequent to the Federal Government's endorsement of the purple option, a number of community groups campaigned against the preferred option in favour of a more western route similar to the Type C options. Consequently in 2007 the Federal Government announced an independent review of the corridor selection process for the link.⁶⁴ The review was conducted by Hon. Mahla Pearlman, the former chief judge of the NSW Land and Environment Court, to advise on:

- Whether the assumptions and data used in the SKM report were valid and reasonable at the time of the report
- Whether changes since the report's publication affecting land use and transport flows in Western Sydney would constitute the need to alter the projections
- Whether any significant changes to those projection would vary the conclusions reached in the SKM report

The review confirmed the original decision to support the purple option and advocated the need for a link immediately. In addition, it was recommended that it would be strategic to plan for a 'Type C' corridor to provide for an additional corridor further north in the future.⁶⁵

3.3 Identified benefits of the connector

SKM and, more recently, the RTA have analysed the costs and benefits of the proposed link. This includes cost benefit analyses to assess the feasibility of the purple option as well as identifying the range of other benefits that are likely to accrue if the link is constructed. The RTA analysis prepared in part for a 2008 submission to Infrastructure Australia has not been publicly released in full so only limited details from the RTA's work (now RMS) can be presented.

Summary of benefits

The scope and magnitude of benefits will depend on final road design and whether it is tolled or untolled. SKM identified the following for an untolled road (most also apply to a tolled option but the quantum of benefits could vary):

- Traffic Relief on Pennant Hills Road – SKM estimated a reduction of 35,000 vehicle per day for an untolled connection if it was open in 2011 and a reduction of up to 11,000 heavy vehicles from Pennant Hills Road in 2021⁶⁶

⁶⁴ Department of Transport (NSW) (2010) *Infrastructure Australia: Updated Submission by the NSW Government 2010*, p521-22

⁶⁵ Pearlman, M (2007) *Review of the F3 to M7 Corridor Selection*, p66

⁶⁶ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 12, p 5.

- Travel time savings of approximately 10 minutes in comparison to Pennant Hills Road in the opening year if the road is untolled or 15 minutes if tolled and savings of 5 to 10 minutes on the Pacific Highway⁶⁷
- Reduced number of fatal and serious crashes – SKM estimated a reduction of 15 fatal and serious crashes each year
- Improved facilitation of inter-regional movements including between Brisbane-Sydney-Melbourne and providing improved access to regional NSW and Western Sydney
- Reduced operating costs for national freight carriers and long-distance transport operators
- Improvement to regional services through better access to regional centres including Hornsby, Parramatta, Blacktown, Penrith and Chatswood
- More integrated transport – overall effectiveness of the transport system would be improved by providing the conditions for improved public transport reliability and integration in the corridor, particularly along Pennant Hills Road e.g. through facilitating better access to Thornleigh and Pennant Hills train stations
- Potential for redevelopment of Pennant Hills and Thornleigh railway stations and urban development around the stations
- Road space released by the diversion of traffic from Pennant Hills Road, the Pacific Highway and adjoining roads in northern Sydney could improve the attractiveness of other users including the local bus network, cyclists and pedestrians e.g. regional bus services could be provided from Hornsby, Pennant Hills to Blacktown, Parramatta and Penrith using Pennant Hills Road and the M2
- Local amenity benefits of a tunnel compared to surface road options include reduced visual impacts, reduced noise impacts on the Pacific Highway and Pennant Hills road, reduction of the existing severance effects for pedestrians and local communities and reduce impacts on existing properties.⁶⁸

The link would also reduce network volatility. The impacts of a safety incident or road works would be ameliorated because of increased capacity to re-route traffic to alternate routes. A number of recent incidents on the F3 and motorways including the M5 and M4 demonstrate the extent to

⁶⁷ Note these figures based on SKM's assumption at the time that road would open in 2011, SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 16, p 7.

⁶⁸ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 12.

which an incident can quickly result in traffic gridlock. Alternate routes not only allow better access for emergency services to clear incidents and restore normal operations but also provide road users with more options to avoid a reported incident reducing local congestion and its ripple effects across the arterial road network.

2004 SKM cost benefit analysis

In its 2004 report, SKM found that the F3-M2 connector was likely to be economically justified with a benefit cost ratio close to 1 of a tolled dual 2-lane option. Benefit cost ratios of greater than one mean that the monetised benefits outweigh the costs. Table 4 outlines the findings for various tolled and untolled options. These suggest an untolled two lane tunnel is the most economically viable project with a benefit cost ratio of 1.2 (ie. for every \$1 spent there is \$1.20 in benefits).⁶⁹ However, the tolled options would be lower cost for Government.

SKM identified scenarios that would impact favourably on the BCR. For example a scenario of bus network improvements to the north-west region to utilise road space released by the connector could increase the BCR by 0.3 to well above 1. Further, community benefits associated with a tunnel through avoiding the social and environmental impacts of surface roads were not included in the analysis and are also expected to be substantial.

The SKM analysis relied on demographic data from the 1996 census with lower estimates of growth in transport demand than currently forecast. If the analysis were repeated using this updated data, it is likely to result in a higher BCR.

Inclusion of these factors suggests that the benefits substantially outweigh the costs based on SKM's analysis.

⁶⁹ SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 17, p 4.

Table 5 - Road user costs-benefits analysis (2003 prices)

Purple Option Incremental to Base Case				
	No Toll		With \$3.50 Toll	
	Dual 3-lane	Dual 2-lane	Dual 3-lane	Dual 2-lane
Present value				
Capital costs (\$m)	1,282	1,085	1,356	1,159
Benefits (\$m)	1,352	1,344	1,090	1,102
NPV (\$m)	70	259	-266	-57
Benefit-cost ratio	1.1	1.2	0.8	1.0

Source: SKM (2004) *F3 to Sydney Orbital Link Study*, Chapter 17, p17-4

2008 RTA cost benefit analysis

The RTA (now RMS) conducted cost benefit analysis of the project to support the NSW Government’s 2008 submission to Infrastructure Australia but full details have not been released. A summary version of the submission was tabled in Parliament in 2010 and some limited information about the analysis has been derived from this.⁷⁰

The RTA in their cost benefit analysis found that the F3-M2 connector had a benefit cost ratio of 0.74. This assumed that the tunnel was untolled and three lanes each way with total construction costs of \$4.75 billion – much higher (even allowing for inflation than the SKM estimate). The major benefit of the project in this analysis was travel time savings worth \$2.17 billion.⁷¹

A BCR of less than one indicates a project may be economically unviable. Although the detail of the analysis has not been publicly released, a number of factors could have resulted in understating the benefit cost ratio:

- The land use and demographics data does not include the Australian Bureau of Statistics 2006 census data which estimates significantly higher growth in transport demand than currently forecast.
- The base case does not account for the impact of increased network volatility as capacity is reached and users defer or change trips.

⁷⁰ Information on the RTA analysis has been derived from Department of Transport (NSW) (2008) NSW Submission to Infrastructure Australia: F3-M2 Link, redacted version which was tabled in Parliament in 2010.

⁷¹ Department of Transport (NSW) (2008) NSW Submission to Infrastructure Australia: F3-M2 Link, redacted version, Appendix E, p2-6

- It is assumed that some existing lanes on Pennant Hills Road are dedicated solely to public transport – a higher BCR could result if this is not the case
- It is possible the analysis does not include the M2 upgrade, resulting in lower demand although without detail of the analysis it is not possible to confirm this
- The cost of a three lane road is higher than a two lane road and forecast demand coupled with the possible intent to reserve a Type C corridor to provide for long term future demand suggest analysis of two lane options is also warranted
- It is not clear how safety benefits were calculated but if only vehicle kilometres travelled was considered, it is possible that a more sophisticated method that accounts for the lower rate of crashes on motorway grade roads would have generated a higher net benefit.

Scope and limitations of cost benefit analysis

Analysis of wider economic benefits was not included in either the SKM or RTA analysis. These include the economics of increased agglomeration, some labour supply impacts and urban enhancement effects of improvements to surface roads.⁷² These effects are derived from reducing the perceived distance between localities which is not analysed in traditional modelling approaches. In recent years analysis of wider economic benefits has become increasingly common and is accepted as valid additional information to support the decision making process. It more comprehensively captures the range of benefits generated by infrastructure projects.

Even with these advances, accurate methodologies are still to be developed for a range of wider economic benefits including:

- Facilitation of new residential and employment areas through enhanced capacity and connectivity
- Increased urban density and unlocking the development potential of 'brown field' sites
- Urban amenity improvements including urban design enhancements
- Greater competition in labour markets
- Impacts on property prices for existing residential and commercial areas
- Increased reliability of deliveries for businesses resulting in improved productivity

⁷² RTA (2010) *Post Implementation Review, M7 Motorway, Cross City Tunnel and Lane Cover Tunnel*, March 2010, Motorway Projects Branch, p. 39.

- Reduced costs of goods and services e.g. because of lower freight costs
- Greater access to services such as educational facilities and hospitals.⁷³

The RTA did identify some non-monetised benefits and rated these qualitatively as show in Table 6. These benefits are not captured in the BCR but are significant and particularly important to local communities. Although not quantified, these benefits lend weight to the viability of the project.

Table 6 Non-monetised benefits and costs of F3-M2 connector

Cost/Benefit	Rating
Visual amenity	Highly beneficial
Noise reduction from surface roads	Highly beneficial
Improved road side air quality	Moderately beneficial
Social amenity	Moderately beneficial
Social cohesion	Moderately beneficial

Source: Department of Transport (NSW) (2008) *NSW Submission to Infrastructure Australia: F3-M2 Link*, redacted version, Appendix E, p9

Importantly, cost benefit analysis undertaken consistent with NSW Treasury guidelines measures the costs and benefits over a 20 year time horizon. The effective life of infrastructure of this nature is much longer. The utility of the F3-M2 connector will benefit multiple generations. The project needs to be considered in the context of a long term vision for the future of the region.

⁷³ RTA (2010) *Post Implementation Review, M7 Motorway, Cross City Tunnel and Lane Cover Tunnel*, March 2010, Motorway Projects Branch, p. 39.

4 *Next steps*

Despite the analysis completed to date, confirmation of a preferred route and past Government commitments, the priority of the connector and when it may be constructed remains unclear.

The following sections outline next steps that will progress the supporting analysis of the project and can help inform decisions of the Australian and NSW Governments on the connector's priority.

4.1 *Provide a strategic planning context*

In the past, NSW submissions to Infrastructure Australia seeking Australian Government support and funding for priority projects have been criticised for:

- Lack of consistency with State objectives and national infrastructure priorities
- Projects being selected and positioned in isolation without an appropriate strategic context
- Lack of rigour in project evaluation, including inadequate project scoping and underestimated costs
- Lack of proper consideration of “non-build” options, including demand management measures.⁷⁴

This lack of strategic context and underpinning rigour has contributed to stop, start signals on key infrastructure projects and has affected confidence that projects will proceed.

Planning processes that should help to provide this context are now underway including the development of a 20 year NSW Transport Master Plan and State Infrastructure Strategy.

The Long Term Transport Master Plan will cover all transport modes and identify a clear direction for transport over the next 20 years. The 20 year State Infrastructure Strategy will identify major infrastructure requirements. The strategy will also identify barriers to projects being successful and identify how to garner public and private resources to deliver them.

Establishing this context, clear objectives for infrastructure and supporting analysis of existing problems and options for addressing them is needed to effectively position and prioritise the F3-M2 connector. This work should contribute to a more stable pipeline of infrastructure projects in NSW and increase the confidence of businesses and communities in future commitments to construct the link. In the absence of this certainty, there

⁷⁴ NSW Government (2011) *Strategic Overview – Submission to Infrastructure Australia, November 2011*, p. 4.

are likely to be adverse impacts on economic development and productivity.

4.2 Update and complete supporting analysis

Although a number of studies of preferred routes and some cost benefit analysis of the project have been undertaken, additional analysis is needed to both update and supplement the work that has already been completed. This has been recognised by the Australian Government which has committed (although now deferred) \$150 million to complete this work. The additional analysis provides an opportunity to engage the private sector in the planning of the project which can later facilitate more effective and efficient procurement.

The work also needs to be positioned within the strategic context provided by the Long Term Transport Master Plan and the State Infrastructure Strategy so that the evaluation is consistent with national and state level objectives.

The additional analysis would at least include:

- 1 A refresh of the existing cost benefit analyses to ensure it is consistent with best practice and includes contemporary estimates of costs, and the most recent population and travel demand forecasts—the analysis could also be supplemented with analysis of wider economic benefits
- 2 Engineering studies of the preferred route to inform detailed planning of tunnel design and construction
- 3 Environmental impact assessment of the preferred route that meets all necessary planning requirements – completing this work now will avoid delays when funding is available for the project.

A strong case for the link has already been made. Based on this established case, the project has been included on Infrastructure Australia’s priority list and is embedded in a number of Australian and NSW Government planning documents. Extensive public consultation has also occurred.

The intent of the additional analysis is to progress the project rather than repeat what has already been done or to re-open debates that are now resolved such as the preferred alignment of the route. To an extent, this may mean there is some “retro-fitting” of past analysis to demonstrate alignment with new infrastructure planning requirements and to avoid unnecessary duplication of past analysis.

4.3 Investigate funding options

Budgetary pressures on the Australian and NSW Governments create a challenge for funding all worthy infrastructure projects despite the expected economic benefits and improvements in productivity. Citigroup

has estimated that greater than \$770 billion needs to be spent on infrastructure in Australia in the 10 years to 2018.⁷⁵

The funding question relates to who will raise funds and how they might be repaid. In NSW road projects have been funded using consolidated revenue (ie. funded by taxpayers) or through collection of tolls (ie. funded by road users) or a combination of both with various models of asset ownership and operation.

Some road projects have been delivered at no cost to Government (e.g. the Cross City and Lane Cover Tunnel projects). The M7 was funded, designed and built by the private sector, with around \$360 million of funding support provided by the Commonwealth Government with the remainder of the estimated \$1.54 billion capital cost met by the private sector.⁷⁶ There has been some debate about the balance of risk sharing between Government and the private sector for these projects. However, various models for sharing risk between the public and private sectors are available.⁷⁷

Private sector funding can bring forward project delivery if funding models can be structured to provide adequate returns without compromising the viability of a project. However, in some cases Government contributions remain essential and can be justified where projects generate large economic returns that are not captured financially.

The appropriateness of funding models varies by project and depends on a range of factors including size, complexity and forecasts of patronage and revenue. Timing of projects can also affect feasibility and cost e.g. construction of several major road projects concurrently can put upward pressure on prices because of competition for specialist labour and equipment.

The reality is that the construction of the F3-M2 connector will not proceed until funding sources are identified and committed. Detailed consideration involving Government and the private sector is needed to identify the most appropriate model for the F3-M2 connector.

⁷⁵ Citigroup Economic & Market Analysis, Australia's Infrastructure Supercycle, 20 June 2008.

⁷⁶ RTA (2010) *Post Implementation Review, M7 Motorway, Cross City Tunnel and Lane Cover Tunnel*, March 2010, Motorway Projects Branch, p. 12.

⁷⁷ For example, see PwC (2011) *Funding Infrastructure: Time for a new approach?*, June 2011, available from <http://www.pwc.com.au/industry/infrastructure/publications/funding-infrastructure.htm>

