

# REVIEW OF TRAFFIC MODELLING AND PROJECT JUSTIFICATION

DRAFT REPORT

## **Proposed Highway Link F3 Freeway to Branxton**

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**Prepared for  
Department of Urban Affairs and Planning**

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# 1. Introduction

This report presents the results of a review of the traffic modelling assessments and traffic related project justifications for the proposed Highway Link between the F3 Freeway and Branxton.

An Environmental Impact Statement (EIS) for the Highway Link proposal was exhibited in 1995. However, the proposal was not advanced to the approval stage. Subsequently minor amendments to the proposal have been developed to accommodate a major development application at Allandale. The proposed amendments were assessed through a Review of Environmental Factors (REF) and a supplementary REF.

Additional environmental and engineering assessments for the proposed Highway Link (Connell Wagner, 2001) have been undertaken to update information presented in the EIS and supplementary REFs. The additional assessments included an updated traffic model and future traffic predictions.

The purpose of this report is to review;

- the assumptions and methodology used in the EIS and additional traffic models;
- the traffic data and traffic forecasts produced in the EIS and compare these with available updated data; and
- the project justification in relation to updated information.

The following documents were reviewed in the preparation of this report:

- *National Highway Extension From F3 Freeway West of Newcastle to New England Highway West of Maitland – Corridor Assessment Working Paper* (June 1993) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority
- *National Highway Extension EIS – Supplementary Investigations Relating to the Kurri Kurri Corridor, Issues Paper* (July 1993) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority
- *Proposed Highway Link F3 Freeway to Branxton – Environmental Impact Statement* (June 1995) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority and Federal Department of Transport
- *Proposed Highway Link F3 Freeway to Branxton – Allandale to Illalong Section REF* (August 1998) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority
- *Proposed Highway Link F3 Freeway to Branxton – Allandale to Illalong Section Supplementary REF* (July 2000) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority

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- *Proposed Highway Link F3 Freeway to Branxton – Concept Design Review and Staging Strategy* (May 2001) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority
  - *Proposed Highway Link F3 Freeway to Branxton – Additional Environmental and Engineering Assessment* (May 2001) prepared by Connell Wagner Pty Ltd for the Roads and Traffic Authority
  - *Proposed Highway Link F3 Freeway to Branxton – Representation Report* (September 2001) prepared by Environmental Technology Branch (RTA Operations)
  - *Spreadsheet Notes “Proposed Highway Link F3 Freeway to Branxton – TRANPLAN Year 2000 Traffic Modelling versus EMME/2 Modelling”* (date unknown) provided by the Roads and Traffic Authority
  - *Proposed Highway Link F3 Freeway to Branxton – Matters Requiring Clarification with DUAP – Engineering and Planning Issues. Response to DUAP Questions* (date unknown) prepared by the Roads and Traffic Authority

Discussions were also undertaken with Mr Ron Brown of Northern Transport Planning and Engineering in relation to the updated traffic modelling process (TRANPLAN 2001).

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## 2. Overview of Traffic Assessment

### 2.1 Background to Traffic Assessments

The environmental impact assessment of the Highway Link proposal has been undertaken over an extended period of time.

Traffic analysis undertaken as part of the Highway Link proposal assessment has included:

- Route selection studies (1993)
- EIS documentation (1995)
- REFs (1998 and 2000) for proposed alignment modifications to the Allandale - Illalong section to allow for the proposed Greta Camp development.
- Updated traffic model (2000) as part of the additional environmental and engineering assessments (2001).

Road network traffic models have been used for the EIS, REF and additional traffic assessments to produce predicted travel demand for the new Highway Link and future traffic changes to other roads within the road network.

As well as predicting potential traffic impacts of the proposed Highway Link, these models generate key inputs into the economic analysis and assessment of the proposal's transport objectives, and hence proposal justification.

Two traffic models have been used in the assessment of the traffic impacts of the proposal to the road network. Both models are based on the RTA's TRANPLAN model for the Lower Hunter which was developed in 1991.

The EIS assessment was based on an EMME/2 model adapted from the RTA TRANPLAN (1991) model. Subsequent modelling was undertaken using the TRANPLAN (2000) model with updated land use and road link data.

The assessment process for the Highway Link proposal is somewhat complicated by the length of time between assessments and various forms of traffic analysis used. However, this situation provides an opportunity to compare future land use assumptions and predicted base case traffic flows with updated traffic and land use data. This will enable an understanding as to the appropriateness of the assumptions and predicted traffic flows.

Details regarding the modelling assumptions and a review of the traffic flow predictions are provided in the following sections of this report.

### 2.2 Assessment of Highway Link Objectives

The assessment of potential traffic and transport impacts of the proposed Highway Link in the EIS and subsequent traffic assessments have been related to the achievement of key transport objectives. These objectives have remained relatively consistent throughout the assessment process.

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The transport objectives of the proposed Highway Link are well documented in the EIS and include:

- Strategic National Highway objectives
- Specific project related National Highway objectives
- RTA State Road Network objectives
- Regional and local road objectives for the Lower Hunter Valley

The key project specific objectives can be summarised to be:

- Improve transport efficiency
  - provide an efficient high standard link between the F3 Freeway and the New England Highway (SH9) west of Maitland
  - provide net economic benefits by reducing travel time and operating costs
- Improve road safety
  - improve road safety by reducing accident occurrence and severity
- Compatibility with strategic planning incentives
  - reduce conflict between local and regional traffic flows
  - improve urban amenity by reducing the impacts of through traffic flows (particularly heavy vehicles)
  - meet the transport needs of future urban and potential employment development Newcastle and the Hunter Valley

In 1998 the NSW Government released *Action for Transport 2010 – An integrated Transport Plan for NSW*. This plan outlines policy objectives for improving the State's transport system. This includes proposed road network improvements in the Lower Hunter Valley. The Highway Link between the F3 Freeway and SH9 is one of the projects identified by this plan.

The results of the traffic analysis undertaken in the EIS (1995) and *Additional Environmental and Engineering Assessment Report* (2001) demonstrate that there would be significant benefits obtained by construction of the Highway Link. These benefits are primarily reported as changes to traffic flows along selected road links, but are generally well related back to the project's transport objectives.

The EIS and subsequent traffic analysis indicates that as a result of the Highway Link construction:

- There would be significant travel demand for the Highway Link proposal along the Kurri Kurri route providing improved level of road service
- Increased traffic capacity within the road network
- Traffic reductions would occur along roads such as the SH9 between Tarro and Branxton and the MR220 through Cessnock
- Reduced travel time and vehicle kilometres
- Reduced accidents based road improvements and typical accidents rates for similar road types

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These results are consistent with the achievement of the stated project objectives.

The travel demand predictions generated by the updated modelling analysis (TRANPLAN 2000) are generally consistent with those produced in the EIS (see section 3.4). This tends to indicate that the Highway Link proposal would still achieve the transport objectives described in the EIS.

## **2.3 Review of Traffic Impacts**

As indicated above, the traffic impact assessments presented in the EIS and subsequent documents are based primarily on the predicted traffic flows changes along road links and the available link capacity (volume/capacity ratios).

The road link based methodology used in the traffic analysis is considered appropriate to determine the strategic need for and implications of the Highway Link.

However, it needs to be recognised that the strategic nature of the road network models used do have constraints in terms of assessing more localised traffic issues.

### **2.3.1 Intersection Analysis**

While the assessment of traffic impacts based on road link volume / capacity ratios is generally considered an appropriate methodology (particularly for non-urban conditions), the traffic assessment would have benefited by an analysis of likely operating conditions at key intersections within the road network.

Key intersections would include the interchanges along the Highway Link at the F3 Freeway at Seahampton and the New England Highway at Branxton.

Other key intersections would include:

- Newcastle Link Road intersections due to the anticipated traffic increase in urban areas
- John Renshaw Drive at the F3 Freeway and New England Highway
- New England Highway intersections

Significant benefits in intersection operation would be expected along the New England Highway with regional traffic generally redirected to the Highway Link. However, these benefits are expected to be off set by worsening intersection operation along the Newcastle Link Road compared to the base case scenario.

### **2.3.2 John Renshaw Drive Upgrade**

The EIS identified the adverse impact of increased heavy vehicle flows along the Newcastle Link Road as a result of the Highway Link proposal. It was suggested that John Renshaw Drive be upgraded between Buchanan and the New England Highway to redirect heavy vehicles accessing the Newcastle Port away from the Newcastle Link Road.

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The revised TRANPLAN (2000) model indicated that future traffic volumes along the eastern section of John Renshaw Drive would not decrease compared to the base case (no Highway Link) as was reported in the EIS. This is assumed to be the result of planned road upgrades along this section of John Renshaw Drive. It was confirmed by discussions with Ron Brown of Northern Transport Engineering that upgrading of John Renshaw Drive was included in the model, however, the details regarding what the upgrading involved was not clearly defined.

Both the EIS and the *Additional Environmental and Engineering Assessment Report* have identified the upgrade of John Renshaw Drive as an important component of the Highway Link proposal as a mitigation measure to reduce heavy vehicle traffic along the Newcastle Link Road.

Yet, despite the importance of the John Renshaw Road upgrade, it appears that such works are not included as part of the Highway Link proposal. From the TRANPLAN modelling results it appears that the scenario where the Highway Link is constructed without upgrading of John Renshaw Drive has not been considered.

In reviewing the economic analysis information provided, it is unclear if the costs and travel demand benefits of an upgraded John Renshaw Drive have been included in the economic analysis for the Highway Link proposal. Furthermore, it is unclear what upgrading works are actually planned for John Renshaw Drive and, if not proposed as part of the Highway Link proposal, when are such upgrade works likely to occur.

While there would be obvious advantages to upgrading John Renshaw Drive as a heavy vehicle route, there is no discussion relating to consistency of the upgrading works with existing freight strategies for the Hunter region.

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## 3. Traffic Modelling Analysis

### 3.1 Inputs and Assumptions

#### 3.1.1 Base Case Road Network

The base road network within the EMME/2 model (as presented in the EIS), was based on the RTA's TRANPLAN network which included all arterial and major local roads within the Lower Hunter Valley at that time. Additions to the EMME/2 network included the extension of the F3 Freeway to Minmi and the opening of the Newcastle Link Road both of which occurred in 1993.

For the revised TRANPLAN model (2000) it is understood that capacity upgrades along John Renshaw Drive were added to the network represented by the EMME/2 model.

Therefore, the road networks used in the various models are relatively similar and allow general comparisons to be made between them.

#### 3.1.2 Planning and Land Use

Trip generation and distribution was developed in the EMME/2 model using 1991 ABS land use data. The use of ABS land use data is considered appropriate for the strategic assessment of road projects such as the Highway Link proposal.

Initial calibration of the EMME/2 was undertaken in 1993 using traffic survey data ranging from 1988 to 1993 and an origin / destination survey (1993). Spot surveys undertaken in 1994 indicated that the then recent changes to the F3 had a significant impact on regional traffic flows.

The TRANPLAN (2000) model was updated to include 1996 ABS land use data. The key variant between the 1991 and 1996 land use data is the quicker than expected intensification of land use within the Thornton and Beresfield industrial estates and surrounding areas. The updated TRANPLAN model also includes land use assumptions regarding the likely future industrial area at Alstonville which is now anticipated to develop sooner than expected by the 1996 ABS land use data.

The 1996 land use data will provide a reasonable indication of the travel demand patterns resulting from land use changes associated with the opening of the F3 extension and Newcastle Link Road. 1998 traffic survey data was used in the calibration of trip assignments.

However, calibration of TRANPLAN (2000) trip table distributions within the road network remained based on the origin / destination survey undertaken in 1993. It is considered that model calibration, and hence representativeness of recent changes resulting from the F3 extension and Newcastle Link Road operation, would have benefited from information obtained by an updated origin / destination survey.

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However, notwithstanding the above, the modelling results are generally consistent with surveyed traffic growth rates to 1998.

Furthermore, while there may be some discrepancies in trip distribution as a result of using the 1993 origin / destination survey, it is considered unlikely that the use of updated data would significantly change the benefits achieved by the Highway Link at a strategic level.

## **3.2 Presentation of Traffic Model Results**

The presentation of traffic model results is somewhat complicated by the extended assessment period. However, the EMME/2 outputs have been presented and reported in a number of documents produced during the course of the proposal's assessment in manner that has allowed a comprehensive review of the outputs to be undertaken.

However, the presentation of detailed output from the updated TRANPLAN (2000) model has been limited. A summary has been provided in the *Additional Environmental and Engineering Assessment Report* (2001) and a comparison of selected link flows presented in a 4 page table prepared as a separate document (Appendix A). The review of TRANPLAN outputs have therefore not been as extensive as the EMME/2 model and have to some degree been taken at face value.

## **3.3 Methodology and Analysis**

Overall the methodology and analysis used to assess current and future travel conditions within a strategic context appear to have been undertaken competently for both the EMME/2 and TRANPLAN models.

Standard and well recognised modelling procedures have been used to estimate future demand for the Highway Link proposal and other roads within the Lower Hunter network. The production of consistent outputs by two different modelling packages tends to indicate that the modelling methodologies used are appropriate.

The modelling process is based on daily traffic flows. This methodology is considered appropriate for the assessment of the objectives outlined in Section 2.2 of this review at a strategic level. It should be recognised that such a methodology is limited in its ability to assess in detail local level impacts such as intersection operation during peak periods.

## **3.4 Comparison of Traffic Modelling Results**

### **3.4.1 1998 Counts versus TRANPLAN (2000)**

A comparison of traffic flows along selected road links has been presented in the *Additional Environmental and Engineering Report* (2001) between RTA traffic counts (1998) and predicted traffic flows from the TRANPLAN (2000) model.

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The comparison generally shows a good correlation between predicted traffic volumes and the recent traffic survey data. This indicates that the 1996 land use data is generally consistent with current travel demands within the Lower Hunter region.

Notable differences were evident along the F3 Freeway at Palmers Road and along MR220 at Nulkaba.

The TRANPLAN (2000) model has predicted lower base case traffic flows on the F3 Freeway at Palmers Road than were actually surveyed in 1998. However, the model has predicted higher traffic flows along the F3 at Minmi. This may possibly be the result of regional traffic diverting to the F3 instead of alternate routes. Some of this would include traffic along the MR220 at Brunkerville.

Interestingly, actual traffic flows along MR220 at Nulkaba are significantly higher than those predicted in the TRANPLAN model. This would suggest that the Highway Link proposal may provide greater benefits than predicted in reducing traffic flows through urban areas along the MR220 such as Cessnock.

Both these discrepancies may also be the result of utilising the 1993 origin destination survey data in the calibration of the trip distribution matrices in the TRANPLAN (2000) model.

### **3.4.2 EMME/2 (1995) versus TRANPLAN (2000)**

A comparison of predicted traffic flows along selected road links for each traffic model was provided by the RTA in response to requests from DUAP for further information on the proposal. This comparison is provided in Appendix A of this report.

The comparison of modelled outputs indicates that the future traffic flows predicted by TRANPLAN (2000) are generally consistent with the flows predicted by the EMME/2 in the EIS.

The TRANPLAN (2000) model has predicted significantly lower traffic flows along the proposed Highway Link between the F3 and Buchanan than the EMME/2 model. This is considered to be the direct result of an upgraded John Renshaw Drive which is included in the TRANPLAN model. However, this is not matched by a proportion decrease in traffic flows predicted along the Newcastle Link Road.

Other noticeable differences in the modelled outputs occur at the following locations:

- MR195 – South of Pelaw Main
- MR220 – at Elrington and Brunkerville

While there are some differences in predicted traffic flows and associated growth rates along certain links flows, it is considered that there is sufficient consistency between the two models to verify the validity of the conclusions reached in the EIS with regard to traffic impacts at a strategic level.

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It should be noted that the two models and the 1998 traffic surveys have highlighted some significant local traffic issues, namely increased traffic flows along the Newcastle Link Road and the impacts of upgrading John Renshaw Drive.

With regard to the road user economic analysis, no discussion of the road network's performance with the Highway Link under the TRANPLAN land use scenario has been provided. Based on the economic analysis contained in the Appendix to the *Concept Design and Staging Report* (2001) the results are assumed to be as presented in Table 1.

**Table 1 – Comparison of Modelled Travel Savings**

	EMME/2 (EIS)	TRANPLAN (2000)
Travel Time Savings (million hours / year)	2.47	4.41
Travel Savings (million Km / year)	6.76	16.84

While the changes are roughly in proportion, the significant difference in outcomes would warrant clarification by the RTA.

Considering the results in Table 1, if the John Renshaw Drive upgrading has reduced volumes on the eastern section of proposed Highway Link, would it not follow that the benefits of the proposal are somewhat diminished compared to the EMME/2 model where John Renshaw Drive was not upgraded? This may be clarified by presentation of VKT savings per vehicle rather than across the whole network.

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## 4. Conclusions

The traffic assessments undertaken within the EIS (EMME/2) and the *Additional Environmental and Engineering Assessment Report* (TRANPLAN) have demonstrated that there would be significant transport benefits of constructing a high standard highway link between the F3 Freeway and Branxton via the Kurri Kurri route.

The review of the traffic modelling methodology and traffic analysis for the Highway Link presented in this report indicates that the traffic assessments have been undertaken competently and in accordance with standard practices. While there may have been some benefit in updating the origin / destination survey for network calibration, it is considered unlikely that such updated data would significantly change the expected benefits of the proposal and the strategic justification for the project.

With regard to the traffic model outputs there is general consistency between the EIS (EMME/2) model and the updates TRANPLAN (2000) model at a strategic road network level. The general consistency between models is considered adequate to verify the traffic conclusions presented in the EIS.

The major traffic benefits of constructing the High Link proposal, as identified by the traffic assessments would include:

- Reduced traffic flows along the New England Highway thereby reducing conflicts between urban and regional traffic flows.
- Reduced traffic along the MR220 from Mulbring to Branxton, including a significant proportion of heavy vehicles. This will result in improved amenity for urban developments along this route.
- Reduced flows on George Booth Drive.
- Improved safety and reduced accident rates.
- Reduced road network travel time and travel distance
- Improved access between Port Newcastle and industrial areas of the Hunter Valley and beyond.

These benefits are consistent with the project objectives established during the EIS process. On this basis the proposed link is considered to be justified as it would satisfy an identified strategic need within the regional road network and provides significant benefits to communities in the Lower Hunter region.

Furthermore, the review road user economic analysis has indicated that the benefits of the project outweigh the project costs and hence can be justified economically. However, this will require the implications of the John Renshaw Drive upgrade to be clarified.

This review has noted that while there will be significant strategic benefits of the proposal, local impacts are likely to occur and would warrant further consideration as part of the detail project design. These impacts include the predicted traffic flow increases along the Newcastle Link Road and the associated impacts of heavy vehicles on the urban development surrounding this link.

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Furthermore, a clear statement needs to be provided regarding the strategic fit of the John Renshaw Upgrade with the Highway Link proposal and the project objectives.

Clarification is warranted on what is planned for John Renshaw Drive, when will it occur and how such works have been factored into the economic analysis of the Highway Link proposal.

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## **Appendix A - TRANPLAN (2000) versus EMME/2**

**Proposed Highway Link - F3 Freeway to Branxton**  
**TRANPLAN Year 2000 Traffic Modelling versus EMME/2 Modelling**

Proposed F3 to Branxton Highway Link Location	A		B		1		2		C		D		3		4	
	EIS Base		EIS Project		Base Review		EIS Project		Full Project Review		Full Project Review		Full Project Review		Full Project Review	
	2001	2011	1996	2016	2001	2011	1996	2016	2001	2011	1996	2016	1996	2016	1996	2016
A. F3 to Buchanan	-	-	-	-	-	-	-	-	-	-	-	-	-	13,000	16,400	16,400
B. Buchanan to Kurri Kurri	-	-	-	-	-	-	-	-	-	-	-	-	-	18,200	25,400	25,400
C. Kurri Kurri to Weston	-	-	-	-	-	-	-	-	-	-	-	-	-	12,900	19,400	19,400
D. Weston to Allandale	-	-	-	-	-	-	-	-	-	-	-	-	-	10,600	16,900	16,900
E. Allandale to Greta	-	-	-	-	-	-	-	-	-	-	-	-	-	10,100	16,100	16,100
F. Greta to Branxton	-	-	-	-	-	-	-	-	-	-	-	-	-	9,000	15,000	15,000
1. Pacific Highway, Hexham	49,000	58,700	45,500	57,300	42,000	50,200	39,500	50,100	42,000	50,200	39,500	50,100	42,000	50,200	39,500	50,100
2. New England Highway, Tarro	41,800	48,800	35,900	44,900	34,700	40,500	31,500	38,700	34,700	40,500	31,500	38,700	34,700	40,500	31,500	38,700
3. New England Highway, Thornton	35,000	38,500	29,400	44,000	27,100	30,800	22,700	33,500	27,100	30,800	22,700	33,500	27,100	30,800	22,700	33,500
4. New England Highway, Lochinvar	12,200	14,100	12,400	17,800	5,500	6,400	4,500	6,100	5,500	6,400	4,500	6,100	5,500	6,400	4,500	6,100
5. New England, E. of Branxton	12,600	15,400	13,000	18,300	4,900	6,100	5,400	6,600	4,900	6,100	5,400	6,600	4,900	6,100	5,400	6,600
6. Buchanan Road, Buchanan	800	800	800	900	1,200	1,300	1,100	1,300	1,200	1,300	1,100	1,300	1,200	1,300	1,100	1,300
7. John Renshaw Drive, E. of Buchanan	6,600	7,600	7,600	8,400	3,300	3,900	5,900	8,700	3,300	3,900	5,900	8,700	3,300	3,900	5,900	8,700
8. John Renshaw Drive, Buchanan	10,900	12,500	10,400	13,800	2,400	2,700	1,300	1,800	2,400	2,700	1,300	1,800	2,400	2,700	1,300	1,800
9. F3 / Leneghans Drive, Black Hill	19,200	22,600	16,300	28,800	14,600	18,200	12,800	24,300	14,600	18,200	12,800	24,300	14,600	18,200	12,800	24,300
10. Link Road, W. of Minmi Road	28,100	35,900	20,200	30,400	24,400	38,500	27,000	39,600	24,400	38,500	27,000	39,600	24,400	38,500	27,000	39,600
11. Link Road, E. of Minmi Road	21,900	23,100	16,300	27,800	28,900	29,700	22,100	35,700	28,900	29,700	22,100	35,700	28,900	29,700	22,100	35,700
12. Minmi Road, Edgeworth	6,400	8,200	3,800	12,100	-	8,900	4,800	13,100	-	8,900	4,800	13,100	-	8,900	4,800	13,100
13. Main Road, W. of Edgeworth	10,800	13,700	8,400	15,400	-	12,100	7,700	13,800	-	12,100	7,700	13,800	-	12,100	7,700	13,800
14. F3, S. of George Booth Drive	23,800	28,100	14,700	25,100	24,800	29,300	15,100	25,300	24,800	29,300	15,100	25,300	24,800	29,300	15,100	25,300
15. Cameron Park Drive	7,700	8,600	3,100	6,400	7,700	9,200	2,500	7,000	7,700	9,200	2,500	7,000	7,700	9,200	2,500	7,000
16. George Booth Drive, Sugarloaf Range	4,000	4,600	2,300	3,200	100	100	100	100	100	100	100	100	100	100	100	100
17. MR218, Gillieston Heights	6,900	7,800	7,500	8,200	8,300	9,200	7,800	8,000	8,300	9,200	7,800	8,000	8,300	9,200	7,800	8,000
18. MR195, S. of Pelaw Main	4,000	5,400	2,600	3,000	-	4,700	3,300	5,000	-	4,700	3,300	5,000	-	4,700	3,300	5,000
19. MR220, Brunkerville	8,600	10,000	5,700	8,000	6,200	7,500	4,400	6,500	6,200	7,500	4,400	6,500	6,200	7,500	4,400	6,500
20. MR220, Elrington	5,200	5,100	4,000	5,800	3,100	3,500	2,300	2,300	3,100	3,500	2,300	2,300	3,100	3,500	2,300	2,300
21. MR220, North Rothbury	5,100	6,300	4,300	6,500	3,600	5,000	3,000	3,600	3,600	5,000	3,000	3,600	3,600	5,000	3,000	3,600
22. Sawyers Gully Road, sawyers Gully	3,100	4,700	1,800	2,500	400	500	400	400	400	500	400	400	400	500	400	400
23. Majors Lane, Keinbah	3,700	5,800	2,000	2,900	1,000	1,300	700	800	1,000	1,300	700	800	1,000	1,300	700	800
24. Camp Road, Iialong	1,800	3,200	1,200	1,800	100	300	100	200	100	300	100	200	100	300	100	200
25. Old Maitland Road, Bishops Bridge	2,000	2,200	1,200	1,500	1,600	1,900	1,200	1,500	1,600	1,900	1,200	1,500	1,600	1,900	1,200	1,500
26. Allandale Road, Allandale	600	1,000	400	400	-	2,400	600	900	-	2,400	600	900	-	2,400	600	900

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Base Case Year 1996  
Base Network Year 2016  
Option 6 Year 1996  
Option 6 Year 2016  
Option 1 Year 1996  
1B Branxton Single Year 2016  
1A Greta Single Carriageway Year 2016  
1C Greta Dual Carriageway Year 2016  
Option 5 Year 1996  
Option 5 Year 2016  
Option 1B Year 2016 Plus Pelaw Main Link  
Option 1A Year 2016 Plus Pelaw Main Link  
Option 5 Year 2016 Plus Pelaw Main Link  
Option 1B Year 2016 With Kurri Kurri Interchange Only  
Option 1A Year 2016 With Kurri Kurri Interchange Only  
Option 1A Year 1996 Without Pelaw Main Link

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Base Case Year 1996  
Base Network Year 2016  
Option 6 Year 1996  
Option 6 Year 2016  
Option 1 Year 1996  
1B Branxton Single Year 2016  
1A Greta Single Carriageway Year 2016  
1C Greta Dual Carriageway Year 2016  
Option 5 Year 1996  
Option 5 Year 2016  
Option 1B Year 2016 Plus Pelaw Main Link  
Option 1A Year 2016 Plus Pelaw Main Link  
Option 5 Year 2016 Plus Pelaw Main Link  
Option 1B Year 2016 With Kurri Kurri Interchange Only  
Option 1A Year 2016 With Kurri Kurri Interchange Only  
Option 1A Year 1996 Without Pelaw Main Link

Proposed F3 to Brantxton Highway Link Location	5		6		7		8		14		15		10		13	
	Option 1		Option 1		Greta Single 1A		Greta Dual 1C		With Kurri Kurri Interchange Only		1A 2016		2016		Option 5	
	1996	2016	2016	2016	2016	2016	2016	2016	1B 2016	1A 2016	2016	2016	2016	2016	2016	Plus Pelaw Main
A. F3 to Buchanan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B. Buchanan to Kurri Kurri	8,700	12,400	11,200	11,600	11,200	11,600	11,600	11,600	18,700	18,200	18,700	18,200	18,700	18,700	18,600	18,600
C. Kurri Kurri to Weston	8,700	12,400	11,200	11,600	11,200	11,600	11,600	11,600	14,900	14,700	14,900	14,700	18,000	18,000	18,100	18,100
D. Weston to Allandale	8,700	12,400	11,200	11,600	11,200	11,600	11,600	11,600	14,900	14,700	14,900	14,700	15,800	15,800	15,700	15,700
E. Allandale to Greta	8,700	12,400	11,200	11,600	11,200	11,600	11,600	11,600	14,900	14,700	14,900	14,700	15,200	15,200	15,100	15,100
F. Greta to Brantxton	8,700	12,400	-	-	-	-	-	-	14,900	-	14,900	-	14,200	14,200	14,100	14,100
1. Pacific Highway, Hexham	44,800	56,300	56,200	56,200	56,200	56,200	56,200	56,200	56,300	56,200	56,300	56,200	56,300	56,300	56,200	56,200
2. New England Highway, Tarro	36,100	44,300	44,000	44,200	44,000	44,200	44,200	44,300	44,300	44,000	44,300	44,000	44,300	44,300	44,400	44,400
3. New England Highway, Thornton	23,100	34,800	34,800	34,700	34,800	34,700	34,700	34,800	34,800	34,800	34,800	34,800	34,600	34,600	34,300	34,300
4. New England Highway, Lochinvar	4,900	7,000	7,600	7,200	7,600	7,200	7,200	7,475	7,475	7,900	7,475	7,900	7,100	7,100	7,200	7,200
5. New England, E. of Brantxton	5,500	7,200	19,000	19,000	19,000	19,000	19,000	6,800	6,800	21,600	6,800	21,600	7,400	7,400	7,500	7,500
6. Buchanan Road, Buchanan	800	900	900	900	900	900	900	1,000	1,000	1,000	1,000	1,000	900	900	900	900
7. John Renshaw Drive, E. of Buchanan	16,100	20,000	18,900	19,300	18,900	19,300	19,300	18,000	18,000	17,500	18,000	17,500	17,700	17,700	17,500	17,500
8. John Renshaw Drive, Buchanan	10,300	13,100	13,100	13,100	13,100	13,100	13,100	5,900	5,900	6,000	5,900	6,000	6,100	6,100	6,200	6,200
9. F3 / Leneghans Drive, Black Hill	18,200	31,300	30,800	30,900	30,800	30,900	30,900	29,500	29,500	29,500	29,500	29,500	29,100	29,100	28,600	28,600
10. Link Road, W. of Minmi Road	20,700	32,000	32,000	32,100	32,000	32,100	32,100	31,200	31,200	31,200	31,200	31,200	30,800	30,800	30,600	30,600
11. Link Road, E. of Minmi Road	16,900	29,300	29,300	29,300	29,300	29,300	29,300	28,600	28,600	28,600	28,600	28,600	28,200	28,200	28,000	28,000
12. Minmi Road, Edgeworth	3,800	12,200	12,200	12,200	12,200	12,200	12,200	12,100	12,100	10,100	12,100	10,100	12,100	12,100	12,100	12,100
13. Main Road, W. of Edgeworth	8,400	15,000	15,000	15,000	15,000	15,000	15,000	15,600	15,600	15,700	15,600	15,700	16,000	16,000	16,200	16,200
14. F3, S. of George Booth Drive	16,000	26,000	26,000	26,000	26,000	26,000	26,000	25,500	25,500	25,100	25,500	25,100	25,200	25,200	24,800	24,800
15. Cameron Park Drive	3,100	6,600	6,600	6,600	6,600	6,600	6,600	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
16. George Booth Drive, Sugarloaf Range	2,300	2,700	2,800	2,800	2,800	2,800	2,800	3,900	3,900	3,900	3,900	3,900	4,300	4,300	4,400	4,400
17. MR218, Gillieston Heights	7,500	8,200	8,100	8,100	8,100	8,100	8,100	7,900	7,900	7,900	7,900	7,900	8,000	8,000	8,300	8,300
18. MR195, S. of Pelaw Main	2,600	2,900	2,800	2,800	2,800	2,800	2,800	5,700	5,700	5,700	5,700	5,700	5,700	5,700	5,600	5,600
19. MR220, Brunkerville	4,500	7,100	7,500	7,500	7,500	7,500	7,500	7,700	7,700	7,700	7,700	7,700	7,800	7,800	8,100	8,100
20. MR220, Elrington	2,900	5,000	5,500	5,400	5,500	5,400	5,400	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,800	2,800
21. MR220, North Rothbury	3,100	5,700	6,200	6,100	6,200	6,100	6,100	3,500	3,500	3,500	3,500	3,500	3,600	3,600	3,600	3,600
22. Sawyers Gully Road, sawyers Gully	1,600	1,900	1,900	1,900	1,900	1,900	1,900	1,100	1,100	900	1,100	900	500	500	500	500
23. Majors Lane, Keimbah	1,900	2,300	2,300	2,300	2,300	2,300	2,300	1,400	1,400	1,100	1,400	1,100	900	900	900	900
24. Camp Road, Ilialong	1,100	1,200	1,300	1,200	1,300	1,200	1,200	400	400	200	400	200	200	200	200	200
25. Old Maitland Road, Bishops Bridge	1,200	1,600	1,600	1,600	1,600	1,600	1,600	1,400	1,400	1,400	1,400	1,400	1,500	1,500	1,500	1,500
26. Allandale Road, Allandale	400	400	400	400	400	400	400	448	448	400	448	400	800	800	800	800

Proposed F3 to Branxton Highway Link Location	B		D		EIS Project		% EMME		2		4		% diff
	EIS Base 2011	2011	2011	2011 change	2011	2011	2011	2011 change	Base Review 2016	Full Project Review 2016	% tranplan	% diff	
A. F3 to Buchanan	-	-	-						0	16,400	-		
B. Buchanan to Kurri Kurri	-	-	-						0	25,400	-		
C. Kurri Kurri to Weston	-	-	-						0	19,400	-		
D. Weston to Allandale	-	-	-						0	16,900	-		
E. Allandale to Greta	-	-	-						0	16,100	-		
F. Greta to Branxton	-	-	-						0	15,000	-		
1. Pacific Highway, Hexham	58,700	50,200	-8,500	14%					57,300	50,100	-7,200	13%	-2%
2. New England Highway, Tarro	48,800	40,500	-8,300	17%					44,900	38,700	-6,200	14%	-3%
3. New England Highway, Thornton	38,500	30,800	-7,700	20%					44,000	33,500	-10,500	24%	4%
4. New England Highway, Lochinvar	14,100	6,400	-7,700	55%					17,800	6,100	-11,700	66%	11%
5. New England, E. of Branxton	15,400	6,100	-9,300	60%					18,300	6,600	-11,700	64%	4%
6. Buchanan Road, Buchanan	800	1,300	500	63%					900	1,300	400	44%	-18%
7. John Renshaw Drive, E. of Buchanan	7,600	3,900	-3,700	49%					8,400	8,700	300	4%	-45%
8. John Renshaw Drive, Buchanan	12,500	2,700	-9,800	78%					13,800	1,800	-12,000	87%	9%
9. F3 / Leneghans Drive, Black Hill	22,600	18,200	-4,400	19%					28,800	24,300	-4,500	16%	-4%
10. Link Road, W. of Minmi Road	35,900	38,500	2,600	7%					30,400	38,600	9,200	30%	23%
11. Link Road, E. of Minmi Road	23,100	29,700	6,600	29%					27,800	35,700	7,900	28%	0%
12. Minmi Road, Edgeworth	8,200	8,900	700	9%					12,100	13,100	1,000	8%	0%
13. Main Road, W. of Edgeworth	13,700	12,100	-1,600	12%					15,400	13,800	-1,600	10%	-1%
14. F3, S. of George Booth Drive	28,100	29,300	1,200	4%					25,100	25,300	200	1%	-3%
15. Cameron Park Drive	8,600	9,200	600	7%					6,400	7,000	600	9%	2%
16. George Booth Drive, Sugarloaf Range	4,600	100	-4,500	98%					3,200	100	-3,100	97%	-1%
17. MR218, Gillesston Heights	7,800	9,200	1,400	18%					8,200	7,800	-400	5%	-13%
18. MR195, S. of Pelaw Main	5,400	4,700	-700	13%					3,000	5,000	2,000	67%	54%
19. MR220, Brunkerville	10,000	7,500	-2,500	25%					8,000	6,500	-1,500	19%	-6%
20. MR220, Eirngton	5,100	3,500	-1,600	31%					5,800	2,300	-3,500	60%	29%
21. MR220, North Rothbury	6,300	5,000	-1,300	21%					6,500	3,600	-2,900	45%	24%
22. Sawyers Gully Road, sawyers Gully	4,700	500	-4,200	89%					2,500	400	-2,100	84%	-5%
23. Majors Lane, Keinbah	5,800	1,300	-4,500	78%					2,900	800	-2,100	72%	-5%
24. Camp Road, Iiallong	3,200	300	-2,900	91%					1,800	200	-1,600	89%	-2%
25. Old Maitland Road, Bishops Bridge	2,200	1,900	-300	14%					1,500	1,500	0	0%	-14%
26. Allandale Road, Allandale	1,000	2,400	1,400	140%					400	900	500	125%	-15%