

**University of Southern Queensland
Faculty of Engineering and Surveying**

**Own Identification of contributing factors for the
success of toll roads in Australia under Public Private
Partnerships**

**A Dissertation submitted by
Mr Luke Diffin**

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ABSTRACT

In Australia, Public Private Partnerships (PPPs) have been established as a common method for governments to deliver major road infrastructure projects. Success of PPPs has varied when measured against Government, Community, Market and Industry interests. Some projects have failed financially while still having a positive impact on the community. Other projects have failed to reach delivery stage as a result of community objections. The holistic success of PPP toll roads is ultimately determined by the needs of major project participants being satisfied in an unbiased equilibrium manner.

PPP toll roads delivered in Sydney, Brisbane and Melbourne have had varying degrees of financial success, however there are other vitally important factors to be considered. Tollways directly contribute to travel time savings, vehicle operating cost savings, reduced accidents and vehicle emissions and can make a contribution to the overall economic performance of a city. Therefore these pieces of infrastructure contribute to society as a whole and not just the investors who provide capital for the projects.

Even with recent financial failings of PPP toll roads, Governments within Australia are still actively pursuing the PPP model to deliver road infrastructure. Lessons must be learnt from past failures to ensure the successful delivery and operation of future projects. Overall success will be a result of finding a balance between the needs of Government, Private Sector and Society.

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Luke Diffin

Student Number: 0061016940

A handwritten signature in blue ink, appearing to read 'L. Diffin', with a horizontal line extending to the right.

24th October 2015

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ADT	Average Daily Traffic
AHP	Analytical Hierarchy Process
AMG	Airport Motorway Group
AML	Airport Motorway Limited
AMT	Airport Motorway Trust
BCC	Brisbane City Council
BOOT	Build Own Operate Transfer
CBR	Cost Benefit Ratio
CCM	Cross City Motorway
CSF	Critical Success Factor
DMR	Department of Main Roads
DUAP	Department of Urban Affairs and Planning
ED	Eastern Distributor
EIS	Environmental Impact Statement
GBTS	Government Builds, Tolls then Sells
IAS	Impact Assessment Statement
NSW	New South Wales
PFI	Private Finance Initiative
PPP	Public Private Partnership
RBS	Royal Bank of Scotland
RTA	Roads and Traffic Authority
SATS	Sydney Area Transportation Study
SSF	Success Sub-Factors

Chapter 1 – Introduction

1.1 Background

In Australia, Public Private Partnerships (PPPs) have been established as a common method for governments to deliver major road infrastructure projects. The first toll roads to be completed under the PPP framework in Australia were the Sydney M4, which opened in 1992, followed by the Sydney Harbour Tunnel and Sydney M5 (South Western Motorway) later that same year. Since this time, Sydney, Melbourne and Brisbane have had multiple toll roads delivered using variants of the PPP delivery model. These capital cities have embraced private sector participation as a way of fast tracking much needed road infrastructure that might reasonably not have been provided by public investment only (Li and Hensher 2010).

The move towards Public Private Partnerships in the 1990s was a result of developed economies experiencing major structural changes after the international recession of 1989/90. The liberalisation of economic management, the importance of balanced budgets and low public sector debt and currency volatility meant that governments had to look to the private sector for capital to fund the provision of public assets and services (Earl and Regan 2003).

The growth of privately funded government infrastructure projects in Australia is driven by both government demand and private sector supply forces. Malone (2004) identified the drivers for both the government and private sectors. He proposed that Government was attracted to the PPP model as; they perceived that value for money can be achieved from private sector efficiencies in design, management and asset utilisation, efficient risk allocation; government had limited resources; there was an ongoing need for infrastructure to cater for changing demographics, and the requirement to replace infrastructure; fiscal charters enforcing debt minimisation targets and finally recognition that large public sector infrastructure projects have historically been delivered with large time and cost overruns.

Private sector drivers were identified as; the opportunities that the large potential markets hold for those engaged in financial markets, the construction industry and ancillary services; that PPP projects provide more certainty for those engaged in construction and ancillary service industries where the long term nature of the projects and the associated income streams provide the opportunity for the engaged parties to reduce their exposure to the market cycles and, lastly, the financial sector interests for finding markets for large pools of capital from superannuation funds and their need to secure predictable long term investment opportunities.

A number of PPP toll roads have been delivered in Sydney, Melbourne and Brisbane since the opening of the first PPP toll roads in the early 1990s. Sydney has had the M2 (Hills Motorway) 1997, the Eastern Distributor 1999, the M5 (Eastern Motorway) 2001, the M7 (Westlink) 2005, the Cross City Tunnel 2005 and the Lane Cover Tunnel 2007. In Melbourne, City Link opened in 2000, Eastlink in 2008 followed by Peninsula Link in 2013 (although this is not a tolled road). Brisbane's first PPP toll road was the CLEM7 tunnel which opened in 2010, followed by the Go-Between Bridge in same year, Airport Link in 2013 and Northern Link in 2015.

Of these tolls roads, the Cross City Tunnel, CLEM7 and Airport Link became insolvent within one year of opening, while the Lane Cover Tunnel became insolvent within three years. Although these projects can be perceived as vital pieces of infrastructure, they were financially unsuccessful for their investors. It is largely acknowledged in literature that the failure of these projects is directly related to the poor performance of traffic forecasts which were used as the basis to determine the viability of the projects. Black (2014) stated that this is an unresolved issue of proposed toll roads and tunnels in Australia and identified that most toll roads have been built around the financial model rather than the traffic model as they should be.

Melbourne's CityLink, Sydney's M2, M4, M5 and M7 have all been financially successful because the traffic projections have been close enough to accurate (Back 2014). As reported by Hodge (2005), early projections for investor returns for the M2 were 24% on their original investment. This was followed by Macquarie Bank reporting that one stapled security purchased for \$A1.04 in 1999 was valued at \$A6.61 in 2003.

Financial achievement is an important component of any PPP project however other factors are as vitally important. Tollways directly contribute to travel time savings, vehicle operating cost savings, reduced accidents & vehicle emissions and make a contribution to the overall economic performance of a city (Ernst & Young, 2008). It is therefore evident that these pieces of infrastructure contribute to society as a whole and not just the investors who provide capital for the project.

Although some recent PPP toll roads may have failed, Governments within Australia are still actively pursuing the PPP model to deliver road infrastructure. This is evident by the recent award of the Northconnex project and Westconnex projects in Sydney.

A direct response to project failure due to incorrect traffic forecasting is the development of the Government Builds, Tolls then Sells (GBTS) model. Under this model the government engages the private sector to design, construct and initially operate the facility followed by selling off the right to collect tolls and operate once the actual traffic volumes are known. Under this model the government bears risk during the initial operational stage while the private sector bears the traffic risk after ramp up.

In order for the successful delivery of future projects, lessons must be learnt from past failures. Successful outcomes of future projects require balance between the needs of Government, Private Sector and Society which this paper will explore further.

1.2 Project Aim and Objectives

1.2.1 Aim

This research project aims to identify the contributing factors to the success of toll road projects in Australia under the Public Private Partnerships (PPP) model.

1.2.2 Specific Objectives

In order to achieve the aim above the following objectives have been determined:

1. Identify historically how toll roads have been developed in Australia using Public Private Partnerships.
2. Investigate and establish a framework for the evaluation of success.
3. Validate the proposed framework
4. Assess the performance of representative case studies.
5. Provide recommendations for the future successful delivery of projects based on the findings from the case studies.

1.3 Methodology

The methodology to undertake this project consists of reviewing a representative sample of case study projects to identify those factors which contributed to their success or detriment. The factors which will be used to measure the case study's performance will be based upon those identified from the literature review and the framework will be tailored to encompass additional factors, particular to toll roads in Australia, which also have a contributing effect.

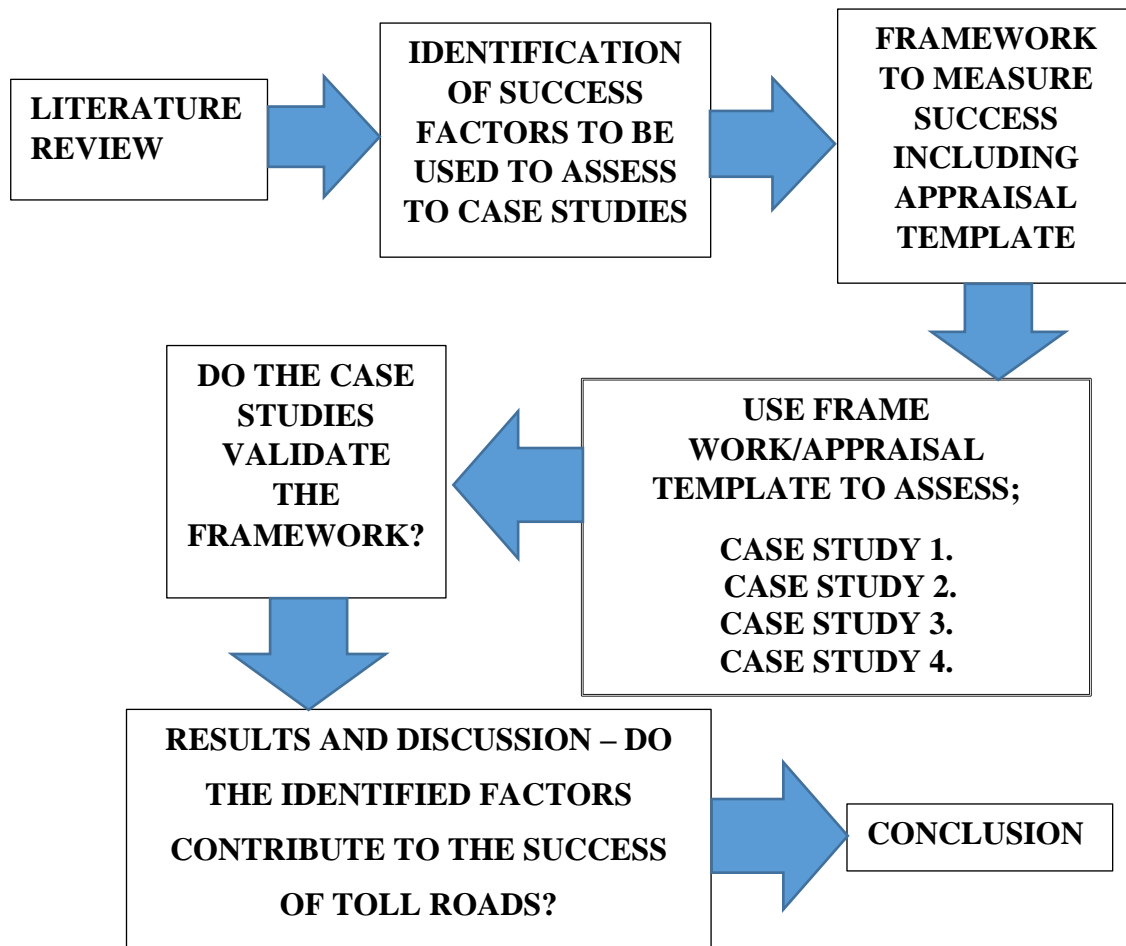


Figure 1 – Research methodology flow diagram

1.3.1 Framework for Evaluating Success

Based upon the literature review in Chapter 2, previous studies have identified a multitude of factors which contribute to the success of PPP projects. Of these factors identified, the following will form the basis of the framework for this study;

1. Risk allocation and sharing.
2. Strength of private consortium.
3. Political Support.
4. Public/Community Support.
5. Transparency of Procurement.
6. Economic Viability.

The selection of these factors recognises that the needs of major project participants must be represented in an unbiased equilibrium manner for ultimate project success. The factors may potentially exist in varying degrees to achieve a successful balance.

This research project will also examine additional factors identified while examining the case studies. These factors were not specifically covered in the literature review research but may contribute to a project's perceived success or failure, these are:

7. Environmental outcomes.
8. Economic contribution to the cities/regions in which they are constructed.
9. Additional factors that become apparent during research

Ultimately upon completion of the case study review, a comprehensive framework comprising factors, particularly applicable to PPP toll road projects in Australia, will be established. These will be based upon those identified in previous literature reviews but measured against the Australian experience and further expanded or modified as required.

1.3.2 Framework Validation

The framework developed through the abovementioned methodology will be validated by cross referencing the case studies selected and finding common factors contributing to success (or failure). For example, a case study project may have experienced strong public and community support which appears to have contributed to its success. Another project, however may also have had strong public and community support but this did not contribute to or was insufficient to affect this project's success. The competing effects of these factors will need to be gauged and weighed against each other to ascertain their contribution to the project delivery and operation.

The most effective way to undertake this validation will be to compare and contrast the findings from the case study reviews at their completion. Parallels can then be drawn to evaluate where commonalities exist i.e. common success factors and this will ultimately determine the framework which will be the outcome of this project.

1.3.3 Proposed Case Studies

For a comprehensive validation of the framework, case studies need to be selected which are diverse and represent a cross section of those PPPs delivered in Australia in recent years. The following projects have been selected:

1. Eastern Distributor (Sydney)
2. Cross City Tunnel (Sydney)
3. Westlink M7 (Sydney)
4. Go Between Bridge (Brisbane)

All four projects have well documented literature available to adequately investigate their delivery. The Cross City Tunnel has been extensively reported by the media as having problems in a number of arenas. In addition, the Westlink M7 and Eastern Distributor have generally been perceived as being successful while the Go-Between Bridge PPP delivery model is a direct response to the issues suffered by failed toll roads.

Chapter 2 - Literature Review

2.1 Identification of Success Factors

There is a substantial amount of literature pertaining to the evaluation of the PPP contractual model and discussion on its effectiveness. In this literature review, relevant papers have been selected from the last 16 years to provide an understanding of factors that have been found to contribute to the success of PPP projects. Although this thesis topic relates specifically to toll roads, this section looks at success factors from a broad range of projects and sectors.

Chua, Koh and Loh (1999) looked at key Critical Success Factors (CSFs) of PPP construction projects. This investigation focused on the success factors which are associated with the construction component of project delivery. The study sought to identify the CSFs for construction projects based on accumulative knowledge and judgment of experts in the industry. Chua et al (1999) used an Analytical Hierarchy Process (AHP) to seek 'consistent subjective expert judgement'. They then presented a hierarchical model for construction project success which was determined by a variety of factors pertaining to four main project aspects which were: project characteristics, contractual arrangements, project participants and interactive processes. These factors were broken down to give a further 67 factors.

Using the AHP procedure, they developed a hierarchical model for construction project success. It was perceived that this systematic approach in soliciting the expert's judgment and a consistency check, have made it a reliable way to determine the priorities to form a set of factors which may then be incorporated into other evaluation systems. As stated 'the study exploits the AHP method to weight the relative importance of success-related factors to identify the CSFs among them.

The main components of the hierarchical model were further broken up into further sub-hierarchies as shown figure 2. These sub-hierarchies were based upon a number of previous studies as identified in the literature.

Project aspect (1)	Success-related factor (2)
Project characteristics	(1) Political risks; (2) economic risks; (3) impact on public; (4) technical approval authorities; (5) adequacy of funding; (6) site limitation and location; (7) constructability; (8) pioneering status; (9) project size
Contractual arrangements	(10) Realistic obligations/clear objectives; (11) risk identification and allocation; (12) adequacy of plans and specifications; (13) formal dispute resolution process; (14) motivation/incentives
Project participants	(15) PM competency; (16) PM authority; (17) PM commitment and involvement; (18) capability of client key personnel; (19) competency of client proposed team; (20) client team turnover rate; (21) client top management support; (22) client track record; (23) client level of service; (24) Capability of contractor key personnel; (25) competency of contractor proposed team; (26) contractor team turnover rate; (27) contractor top management support; (28) contractor track record; (29) contractor level of service; (30) capability of consultant key personnel; (31) competency of consultant proposed team; (32) consultant team turnover rate; (33) consultant top management support; (34) consultant track record; (35) consultant level of service; (36) capability of subcontractors key personnel; (37) competency of subcontractors proposed team; (38) subcontractors team turnover rate; (39) subcontractors top management support; (40) subcontractors track record; (41) subcontractors level of service; (42) capability of suppliers key personnel; (43) competency of suppliers proposed team; (44) suppliers team turnover rate; (45) suppliers top management support; (46) suppliers track record; (47) suppliers level of service
Interactive Processes	(48) Formal design communication; (49) informal design communication; (50) formal construction communication; (51) informal construction communication; (52) functional plans; (53) design complete at construction start; (54) constructability program; (55) level of modularization; (56) level of automation; (57) level of skill labors required; (58) report updates; (59) budget updates; (60) schedule updates; (61) design control meetings; (62) construction control meetings; (63) site inspections; (64) work organization chart; (65) common goal; (66) motivational factor; (67) relationships

Figure 2 – Success related factor considered in study by Chua et al (1999)

A questionnaire was developed by Chua et al (1999) to obtain quantitative data from chosen ‘experienced’ practitioners. These practitioners were senior managers involved in the delivery of infrastructure in Singapore and from either construction companies, consultancies or statutory boards.

The structure of the questionnaire and subsequent processing of the data allowed for the top 10 of each project’s objectives to be provided. The results showed that the project characteristics of economic risk and adequacy of funding were the most important CSFs. For contractual arrangements, the adequacy of plans and specification was ranked the most important. The project participants characteristic had the Project Manager as the most CSF while the interactive processes characteristic, had monitoring and control as the most important CSF.

The paper concludes that critical success factors extend beyond the Project Manager, monitoring and control efforts. These additional factors for project success consist of understanding the characteristics of a project, having adequate contractual arrangements and having a competent management team.

Although this study only looks at the construction component of project delivery, many of the critical components identified could be used within a success framework as construction will be a major component within a holistic review of infrastructure delivery.

In another paper, Zhang (2005) also recognised the importance of identifying those factors which contribute to the success of PPPs and the significance of enhancing those key attributes for future projects. Zhang identified that problems existed world-wide in relation to the delivery of infrastructure using Public Private Partnerships (PPPs). He proposed that the ongoing worldwide trend towards PPPs creates the need for improved practices for their future delivery. Furthermore, that the development of such practices is dependent upon analysing and categorising the multiple factors that are critical to the success of PPPs. This formed the basis of his research to develop a suitable Critical Success Factor (CSF) package for PPPs based on a ‘public private win-win principle’.

The research consisted of two components, firstly a literature review to identify previous research that classified CSFs, followed by an examination of previous successful projects along with lessons learnt of failing projects in both developed and developing countries. The second component was a quantitative assessment that used questionnaire surveys.

Zhang (2005) proposed that PPPs are not merely a method for government to transfer all risk to the private sector and therefore remove all responsibility. Instead they require appropriate allocation and management of risks with a project procurement protocol based on a public private win-win principle which balances governmental supports and private sector inputs.

The five critical success factors identified within Zhang’s research were (1) favourable investment environment, (2) economic viability, (3) a reliable concessionaire consortium with strong technical strength, (4) sound financial package, and (5) appropriate risk allocation via reliable contractual arrangements. An explanation of each factor is provided. Unlike Chua et al (1999), Zhang provided a model that looked at factors outside the construction component although one of the success factors include construction related factors. The CSFs were further broken up into success sub-factors (SSFs).

The author had forty six questionnaire surveys completed by industry and academia respondents. These respondents were from 42 different organisations/institutions and a number of different countries. The questionnaire allowed for ‘world-wide expert opinions’ on the relative significance of the CSFs and SSFs using a scale of 0 to 5.

Based upon the results, the top five most significant for the SSFs under the CSF for 'favourable investment environment' were (1) stable political system; (2) government support; (3) predictable and reasonable legal framework; (4) favourable economic system; (5) the project is well suited for privatisation. The top three SSFs under the CSF 'economic viability' were (1) long-term demand for the product/services offered by the project; (2) sufficient profitability of project to attract investors; and (3) long-term cash flow that is attractive to lenders. For the CSF 'reliable concessionaire consortium with strong technical strength' the top five SSFs were (1) strong and capable project team; (2) good relationship with host government authorities; (3) leading role by key enterprise or entrepreneur; (4) effective project organisation structure; and (5) sound technical solution/cost effective technical solution. The top five most significant SSFs under the CSF 'sound financial package' were (1) appropriate toll/tariff levels and suitable adjustment formula; (2) sound financial analysis; (3) abilities to deal with fluctuations in interest/exchange rates; (4) sources and structures of main debts and standby facilities; and (5) long term debt financing that minimises refinancing risks. Finally, the top five SSFs under the CSF 'appropriate risk allocation via reliable contractual arrangements' are (1) concession agreement; (2) loan agreement; (3) guarantees/support/ comfort letters; (4) supply agreement; and (5) operation agreement.

The CSFs of PPP projects in the United Kingdom were investigated by Bing, Akintoye, Edwards and Hardcastle (2005). Bing et al recognised that PPPs are increasingly being used in the United Kingdom and although there has been failures, projects have been undertaken successfully but the reasons for success are not entirely clear. The research identifies some of the procurement issues that have been reported such as the high costs in tendering, complex negotiation, cost restraints on innovation, and differing or conflicting objectives among the project stakeholders. However, it also perceived that projects have been regarded as successful and that previous research had sought to investigate what were the drivers of success. This forms the basis of the paper as it attempts to explore the relative importance of critical success factors (CSFs) associated with construction PPP projects in the UK.

The research used a literature review to compile 18 CSFs that were identified in previous studies from 1992 to 2002. The 18 CSFs were then compiled into a questionnaire survey instrument. The survey was then undertaken by UK

organisations that were involved with Private Finance Initiatives (PFI). A total 64 surveys were received from 500 distributed. The breakup of the respondents was 16 from the public sector and 45 from the private sector. The intent of the survey was to test the relative importance of the 18 CSFs identified from the literature review explored by means of Likert rating scale questions in the survey instrument.

The 18 CSFs identified were strong private consortium, appropriate risk allocation and risk sharing, competitive procurement process, commitment/responsibility of public/private sectors, thorough and realistic cost/benefit assessment, project technical feasibility, transparency in the procurement process, good governance, favourable legal framework, available financial market, political support, multi-benefit objectives, government involvement by providing guarantees, sound economic policy, stable macro-economic environment, well-organised public agency, shared authority between public and private sectors and social support.

The results showed different perceptions of the most important CSFs between the public and private sector. In the private sector the top five CSFs were strong private consortium, appropriate risk allocation and risk sharing, commitment/responsibility of public/private sectors, available finance market and thorough realistic/benefit assessment. While the private sectors top five were competitive procurement process, good governance, political support, well organised public support and strong private consortium. Of the total respondents the top five CSFs were strong private consortium, appropriate risk allocation and risk sharing, available finance market, commitment/responsibility of public/private sectors and thorough realistic/benefit assessment. It should be noted as the survey respondents were 25% public sector and 75% private sector the results are skewed toward the private sector.

Further investigation is done by using factor analysis to 'identify a relatively small number of factor groupings that can be used to represent relationships among sets of many inter-related variables'. The residual 17 CSFs were grouped into five principal factors and interpreted as follows: effective procurement, project implement-ability, government guarantee, favourable economic conditions and available financial market. This revealed five factor groupings (accounting for about 70% of the overall variances between factors) for CSFs for UK construction PPP/PFI projects.

Bing et al (2005) concludes that the three factors: a strong private consortium, appropriate risk allocation available financial market emerge as being the most important in the development of successful UK PPP/ PFI projects.

Garvin (2007) completed research that looked to determine whether PPPs were effective in delivering infrastructure. The research differed from the previous literature as it proposed that the competing interests of participants had to reach an overall equilibrium for PPP projects to be successful overall.

He proposed that the Public Private Partnership (PPP) movement is arguably the most significant worldwide trend in the public sector. This is being driven by the interplay between three factors which are: general reluctance by governments to raise taxes; the advent of private sector participants that are willing and capable of handling the risks and delivering the services of infrastructure; the realisation that pension fund and institutional investment managers of the attractiveness of privately financed infrastructure projects to the risk/return requirements of their clientele.

The research is motivated by two questions. Firstly, are PPP outcomes better than, or at least equal to, more traditional infrastructure development and management strategies? And secondly, what is necessary for this market to develop and realise its potential?

Garvin takes a particular perspective of the PPP movement which is based on past and current research by others and his involvement in case based research of large infrastructure projects. From this, two fundamental propositions have been produced which form the basis of the current work. These propositions are:

Proposition I – the basic objectives of a PPP programme is to nurture the development of this market and to sustain its existence. To do so, a PPP programme must establish equilibrium among four environments: (1) state, (2) society, (3) industry, and (4) the market.

Proposition II – projects are the operational expression of any PPP Programme. As such any particular project can either maintain the equilibrium of the overall programme or distort it. Further the collective performance of all projects will determine whether the PPP Programme is effective as a strategy or policy for infrastructure development and management. Each PPP project should provide

marginal improvement in one or more of the following areas: (a) quality of service; (b) price/cost of service; (c) time of service availability; (d) level of environmental impacts; and (e) equitable distribution of social benefits

From these propositions, Garvin goes on to present an Equilibrium framework consisting of four continuums (state, society, industry and market), four quadrants (social interests, industry interests, market interests and state interest) and a central zone called the range of balance. This is shown conceptually in Figure 3.

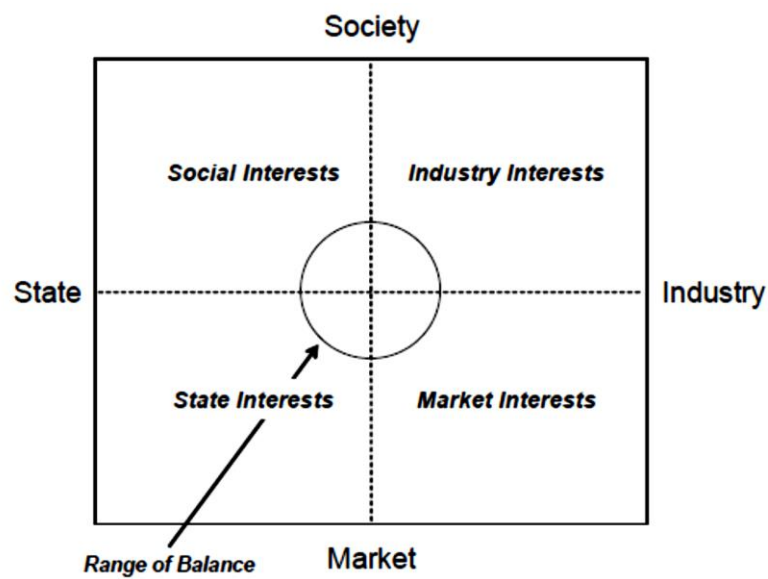


Figure 3 – PPP Equilibrium frame work as proposed by Garvin (2007)

This equilibrium framework is used as the basis for the central hypothesis of the work where Garvin proposes that the scatter of a programme’s project must cluster within the ‘range of balance’. In other words any programme for delivery of infrastructure must balance the requirement of social interests, state interests, market interest and industry interest. It is then suggested that if the balance is not maintained then the programme will suffer from bias towards a particular quadrant. The framework therefore assists in establishing boundaries for the overall programme and also provides a platform for plotting the general location of each project and evaluating a programme’s evolution.

The research methodology uses a longitudinal, case based approach to study the effectiveness of programmes by using the frame work shown in figure 3 as the basis evaluation of effectiveness. The analytical technique breaks up the evaluation into two components which are the Enabling Legislation template and the Project Appraisal template. The two components are then broken up into further elements. The appraisal technique then involves classifying whether the specified project programme element within the evaluation moves towards one of the four quadrants in the equilibrium figure or results in no movement. This technique is extremely subjective and very precise, however Garvin notes the intention of the framework is to serve a guide to channel the assessment effort and not as an instrument to pin point the exact location.

The framework is applied to a Case Study which is the AB680 programme in California. The programme consisted of delivering infrastructure using the private sector to develop and finance projects. This evaluation concludes that the programme is outside of balance as bias tends toward market and industry interests.

Garvin concludes that the PPP movement in the USA has a long way to go in understanding PPP arrangements. Sub-optimal outcomes not fixed with the PPP framework are able to encourage private and public sectors to play to their strengths which can result in balancing the interests of state, society, industry and market.

Garvin's framework is further used by Bosso and Garvin (2008) to complete an assessment of six other toll road case studies in the United States. This paper is essentially the same research that Garvin presented in 2007 with additional case studies that further demonstrate the application of the assessment framework. The additional toll road case studies included the I-81 Fluor Virginia, I-81 STAR solutions, Pocahontas Pkwy 1, Pocahontas Pkwy 2, SR 91 Express Lanes and the Dulles Greenway. Of these case studies only two projects remained in the 'range of balance' with remaining case studies having 'bias' towards industry interests. Refer to figure 4 for the mapping of all case studies. In addition based on the commentary in the paper the two projects located within the 'range of balance' could be classified as successful.

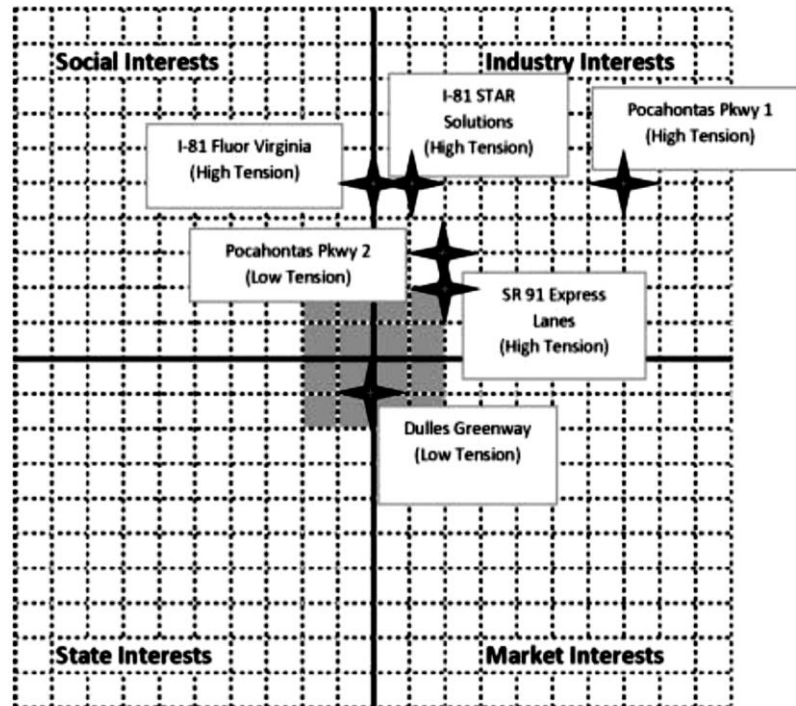


Figure 4 – Map of case studies within Equilibrium Framework (Garvin & Bosso 2008)

Osei-Kyei and Chan (2015) completed a review of studies completed on CSFs for PPPs from 1990 to 2013. The researchers identified that the Critical Success Factors for Public-Private Partnerships is a major research interest worldwide and as a result the paper aims to methodically review studies on the CSFs for implementing PPPs. The research methodology consisted of a three stage search process which comprised ; identification of academic journals, selection of target papers and examination of targets papers. Identification was completed using the ‘Scopus’ search engine. Selection of the target papers involved a more visual and comprehensive search in all the selected journals. The papers retrieved from the target journal were subjected to the ‘content analysis technique’ to determine all features of the publications. The features included authors’ origin/country, active contributors, countries of research focus, findings from the publications and methodologies adopted. A total of twenty seven papers were identified as being relevant and examined as target papers.

The total number the CSFs identified in the twenty seven papers is shown in figure 5.

Findings from studies on PPP CSFs from 1990 to 2013 (years inclusive).

Critical success factors (CSF)	Publications																											Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Appropriate risk allocation and sharing	X					X	X		X			X			X	X	X		X		X	X	X	X				13
Strong private consortium		X	X						X	X		X			X	X	X	X	X		X		X		X			12
Political support				X		X						X	X	X		X	X						X		X			9
Public/community support						X						X	X				X				X	X			X	X		8
Transparent procurement	X				X			X	X	X		X	X													X		8
Favorable legal framework	X				X				X			X												X	X			7
Stable macroeconomic condition	X	X															X	X						X	X	X		7
Competitive procurement	X			X			X																X	X		X		6
Strong commitment by both parties						X	X			X		X	X												X			6
Clarity of roles and responsibilities among parties				X		X	X	X	X	X																X		6
Financial capabilities of the private sector			X					X							X				X		X							5
Technology innovation		X														X		X	X		X							5
Good feasibility studies	X				X							X				X						X						5
Open and constant communication				X	X	X	X		X																			5
Detailed project planning	X		X	X																X			X					5
Government providing guarantees		X	X											X									X		X			5
Trust					X	X			X													X						4
Selecting the right project								X											X	X		X						4
Long term demand for the project	X	X				X								X														4
Clear project brief and design development				X		X					X												X					4
Political stability	X																	X				X						3
Competitive financial proposals								X									X			X								3
Mature and available financial market												X	X										X					3
Acceptable level of tariff			X																	X	X							3
Streamline approval process		X																				X	X					3
Compatibility skills of both parties				X																		X						2
Choosing the right partner																		X			X							2
Good leadership and entrepreneurship skills																			X	X								2
Sound economic policy												X	X		X								X					2
Well organized and committed public agency									X			X																2
Good governance									X			X														X		2
Clear goals and objectives			X				X																					2
Employment of professional advisors						X	X																					2
Financial accountability				X	X																							2
Consistent monitoring				X			X																					2
Reliable service delivery			X				X																					2
Environmental impact of project																					X		X					2

Figure 5 – critical success factors 1990 to 2013 as reviewed by Osei-Kyei & Chan (2015)

The top five identified CSFs from the analysis were appropriate risk allocation and sharing, strong private consortium, political support, public/community support and transparent procurement.

As commented on in the paper, the identification of ‘appropriate risk allocation and sharing’ is not surprising as this is one of the fundamental components of PPP arrangements. Osei-Kyei and Chan make further comment that although this is a feature of the model, it is important for governments to refrain from the idea of transferring all risk as this could affect the progress or future participation. This comment is consistent with Garvin’s (2007) equilibrium model where he proposes that the PPP arrangement cannot be biased towards any of the four continuums (state, society, industry and market). The transferring of all risk to the private sector could result in the equilibrium being compromised which may then affect the ongoing viability of the programme.

The 'strong private consortium' CSF highlights that any group undertaking a PPP must be equipped with strong technical, operational and managerial capacity to undertake work. The 'political support' factor is critical, as without this support approval will not be granted for public expenditure on public projects. This is supported by the recent cancelling of the East-West Link in Melbourne where the change of government resulted in the cancelling of the project although the contract for the project had been awarded.

The public/community support factor is identified as significant as the public's perception of a project can affect its delivery through such issues as land acquisitions. Finally the transparent procurement factor again relates to public perception which can also effect the successful implementation of projects.

The analysis also covered a review of the methodologies used to establish CSFs in the twenty seven publications. Case studies were the most favoured at 41% followed by questionnaire survey at 37% and mixed methods at the remaining 22%.

2.2 The success of PPP projects in Australia - Discussion

The literature reviewed, relates to the identification of success factors from a combination of case studies of PPP projects and the completion of questionnaires by people involved in the delivery of PPPs. Other than Garvin's (2007) work, none of the papers specifically focus on toll roads and even Garvin's case studies were located in the United States. Hodge (2005) completed a general evaluation of the CityLink toll road in Melbourne and the M2 motorway in Sydney. Hodge commented that the CityLink project successfully transferred the majority of risk to the private sector and that government avoided the majority of legal conflicts. Based on the previously identified CSFs, this can be viewed as a level of success (Parts of the project identified as having shortcomings were; the political governance of the project due to the lack of protection of consumers). This can be related back to the findings of Osei-Kyei and Chan who found that 'transparent procurement' was in the top five of CSFs identified in the twenty seven journals reviewed. As with the CityLink project, Hodge once again criticises the governance of the M2 motorway delivery. Using evidence from the Macquarie Bank's website (the financiers of the motorway) Hodge details the large returns experienced by investors alluding to the government not getting the best deal for consumers. Based on this he proposes that

the perception that governments are prone to making bad business deals for the sake of delivering conspicuous projects to voters is understandable.

In recent times one of the most significant issues facing toll roads in Australia has been the financial failure of projects due to the inaccuracy of patronage forecasting. The patron forecasting used during the bid process forms the basis of the viability of the project. A range of literature has been written by academics in relation to patronage forecasting. Zheng and Hensher (2010) presented a paper which investigated the characteristics and demand forecasts in Australia. The first part of the study consists of a summary of all toll roads in Australia which details the length, tolls rates, years opened, operators(s) and payment alternatives. The second part looks at the accuracy of the traffic forecasts. The results showed a significant negative error for the 'Year 1 forecasting performance' for the toll roads assessed. The results included the M2 -32.8%, M7 -51.8%, Cross City Tunnel -51.1%, Lane Cove Tunnel -37% and Eastlink -45%.

Black (2014) has completed research looking at traffic risk in toll roads in Australia. As Zheng and Hensher had done, he presents a summary of the ratio of forecasted opening volumes versus actual opening volumes. The summary presents slightly different ratios to Zheng and Hensher and shows that the Eastern Distributor achieved the highest ratio of 0.82 which means it had the closest match for forecast versus actual. Refer to figure 6 for comparison of daily versus forecast traffic volumes.

TOLL FACILITY	OPENING VOLUME (DAILY FORECAST)	OPENING VOLUME (DAILY ACTUAL)	RATIO ACTUAL / FORECAST
M2, Sydney	72,000	40,000	0.56
M7, Sydney Orbital	196,500	94,808	0.48
Cross City Tunnel, Sydney	85,000	27,000	0.32
Lane Cove Tunnel, Sydney	104,786*	44,420	0.42
East Link, Melbourne	259,000	149,000	0.58
Eastern Distributor, Sydney	33,000	27,000	0.82
Brisbane Airport Tunnel Link	135,000	47,000	0.35
Clem7 Riverside Motorway, Brisbane	60,000	26,711**	0.45
	945 286	455 939	0.48

Figure 6 – Traffic forecast vs actual on Australian Toll Roads (Black 2013)

Black proposes three problems with traffic modelling in Australia. The first issue relates to the recognised errors in the modelling approach to strategic land use and strategic planning. Secondly he proposes that models rely on ‘exogenous’ inputs like future population distributions which are difficult to predict. The third problem he identifies is that Australian traffic consultants pay no attention to the research and development undertaken into the assumptions supporting the models they are using along with their inaccuracies. He finally concludes that ‘in the Australian experience traffic projections for most toll roads have been built around the financial model, not vice versa as it should be’.

Chapter 3 – Evaluation and Appraisal Framework

3.1 Introduction and justification of Evaluation and Appraisal Framework

As identified in Chapter 1, nine success factors have been chosen as the basis for evaluating success. In order to standardise the case studies, a review template has been developed which provides a tool to test the nominated success factors against the case studies. Responses to the questions and statements provided for each factor will be used to assess the performance of each case study.

The success factors-appropriate risk allocation and sharing, strong private consortium, political support, public/community support and transparency of procurement have been taken from the Osei-Kyei research who identified the top five success factors from twenty seven research papers completed between 1990 and 2013.

Economic Viability was chosen as having significant relevance to the Australian Toll Road Sector due to the financial failure of multiple toll roads in Sydney and Brisbane. Economic viability was also identified by Zhang as one of the top five ‘critical success factors’.

Environmental outcomes and Economic contribution to the cities/regions in which these projects are constructed were selected as, although not significantly covered by the literature review, it can be argued that they are one of the main drivers for Governments to construct toll roads. In terms of public perception these factors can be characterised as being of the foremost importance.

Finally, additional success factors identified outside of the frame work that are considered significant will be detailed as part of the assessment.

3.1.1 Evaluation and Appraisal Framework

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
1	<p>Risk allocation and sharing</p> <ul style="list-style-type: none"> • Were the major risks allocated to the party best able to manage it? • Did government refrain from the idea of transferring all project risk to the private sector? • Did the public partner retain risks that obviously went beyond the control of the private sector? 	
2	<p>Strength of private consortium.</p> <ul style="list-style-type: none"> • Was the construction company component of the consortium large and well established? • Was the consortium equipped with strong technical, operational and managerial capacity to undertake the project? • Did the consortia (Private contractor concessionaire) have easy access to the financial market with the associated benefits of lower financial costs? • Was the winning consortium proposal a Cost effective technical solution? 	
3	<p>Political Support.</p> <ul style="list-style-type: none"> • Did the government (previous and current) have a positive political attitude towards the private sector involved in the infrastructure project? • Where there existing government policy for the management of PPPs? • Had the project been part of a long term transport plan? • Was political backing strong and did the government at the 	

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
	time 'sell' the project?	
4	<p>Public/Community Support.</p> <ul style="list-style-type: none"> • Project acceptance and understanding by the public community be it media, trade unions, non-governmental organisations • Did host government create awareness and undertake public education? • Did the project have political capital? • Where community concerns addressed during planning and construction phases • Was the public perception of the project positive or negative 	
5	<p>Transparency of Procurement.</p> <ul style="list-style-type: none"> • Tendering process that ensured value for money through competitive bidding process? • Level of communication with stakeholders • Public and private sections transparent and open to the external stakeholders 	
6	<p>Economic Viability.</p> <ul style="list-style-type: none"> • Accuracy of the traffic volumes – Forecast versus actual • Effect of actual traffic volumes on financial performance, short term and long term • Forecast Traffic volumes and financial model 	
7	<p>Environmental outcomes.</p> <ul style="list-style-type: none"> • Reduction in traffic congestion • Reduced air and noise pollution 	

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
	<ul style="list-style-type: none"> • Removal of traffic from local streets • Improvement of visual and environmental amenity 	
8	<p>Economic contribution to the cities/regions in which they are constructed.</p> <ul style="list-style-type: none"> • More efficient movement of freight resulting in economic benefits • Improvement to service delivery to the business districts along the corridor • General reduction in travel times for road users resulting greater efficiency 	
9	Additional factors identified during research	

Chapter 4 – Case Studies

4.1 Eastern Distributor (Sydney)

4.1.1 Introduction

The Eastern Distributor had been proposed for decades in a variety of forms however it was not until 1995 that the project was initiated. This was the result of a change in the New South Wales state government in March 1995 where the incoming Labour Government lead by Bob Carr promised its construction. The final alignment is shown in figure 7. The intent of the project was to relieve the transport corridor between Sydney's Central Business District and the Sydney Airport of its myriad of traffic problems. It was also intended to reduce traffic on local streets and improve the area's visual and environmental amenity (RTA 1998).

Expressions of Interest were called for in 1994 with three consortiums submitting proposals for the project. The three consortiums consisted of:

1. Transfield and Babcock & Brown
2. Leighton Contractors, Macquarie Corporate Finance and NAB (as the sole debt arranger)
3. Baulderstone Hornibrook advised by the Commonwealth Bank of Australia

In August 1996, Airport Motorway Limited (AML) was officially endorsed by the government as the preferred proponent. The AML private consortium consisted of Leighton Contractors as the constructor and Macquarie Bank as the financiers. AML would own and operate the Eastern Distributor, with a licence to charge tolls until 2048 and after this time it would revert back to the public sector.

Construction commenced in August 1997 and the Motorway opened in December 1999 with a construction cost of \$700 million.

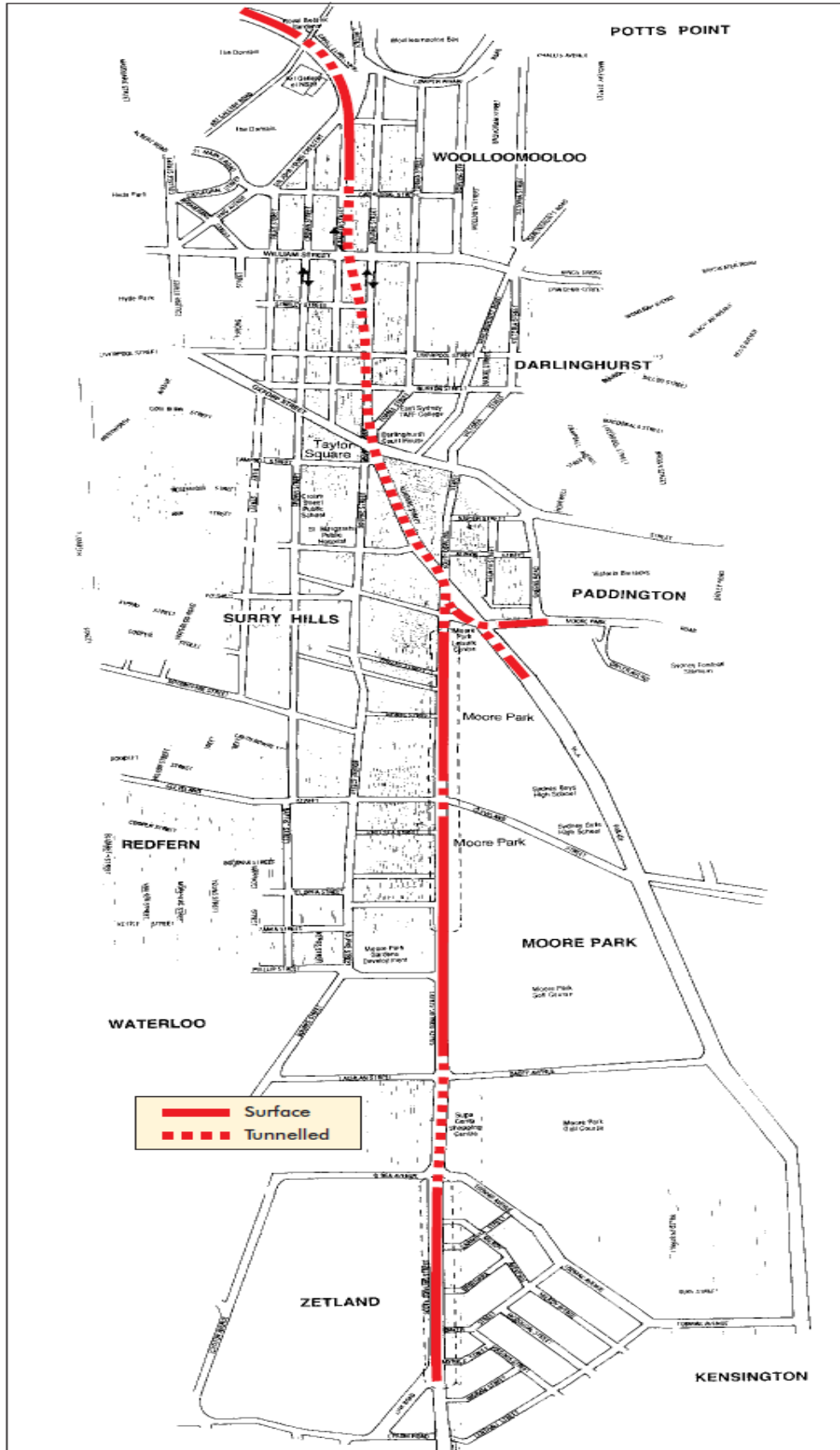


Figure 7 – Route of Eastern Distributor (Source: RTA Summary of Contracts 1998)

4.1.2 Background

The following background information to the Eastern Distributor which details the evolution of the project has been adapted from the RTA document 'Eastern Distributor – Summary of Contracts 1998' and from the Ozroads document 'Cahill/Eastern Distributor/Eastern Freeway: History and Development'.

The Eastern Distributor has an extensive history spanning over four decades from initial concept to the actual start of construction in 1997. This included multiple on surface and tunnel schemes.

The Eastern Distributor was first proposed in 1951 as part of the County of Cumberland Scheme and was envisaged as part of a ring road system around the city centre. The intention was to collect and disperse traffic from freeways radiating from the city and therefore bypass city streets.

In the early 1970s a major assessment of Sydney's transport requirement was complete, this was called the Sydney Area Transportation Study (SATS). The study envisaged the Eastern Distributor as a surface freeway with underpasses at William Street and Oxford Street. The SATS also resulted in many of the freeways proposed in the County of Cumberland Scheme being abandoned. The government however retained the Eastern Distributor as a crucial proposed by-pass of the city centre.

Considerable change had occurred with the nature of transport and traffic problems on the eastern side of the city between the 1950s and the 1970s. The completion of the Cahill Freeway and the upgrading of Southern Cross Drive in this time along the general growth of car ownership had resulted in greatly increased traffic volumes in the inner eastern suburbs. This was a result of the increased traffic volumes having to travel through the suburbs of Woolloomooloo, Darlinghurst, East Sydney, Surry Hills and East Redfern when traveling from the Harbour Bridge/Cahill Freeway to the eastern and southern sides of the city.

The Eastern Distributor was further considered in the late 1970s with the emphasis being on addressing the impact of traffic on local roads between the Cahill Expressway and Southern Cross Drive.

In 1984 the Department of Main Roads (DMR) which later became the RTA proposed to construct the Eastern Distributor in a trench, as envisaged by the SATS, with underpasses at William Street and Oxford Street (Taylor Square). The proposal resulted in a strong negative response from the community due to the impact on the area along with the displacement of hundreds of residents.

In the following year in response to perceived impact on the area, the DMR exhibited an Environmental Impact Statement (EIS) for an amended scheme which had tunnels from North of William Street to the intersection of South Dowling Street, Moore Park Road and Anzac Parade. This scheme consisted of three stages with only Stage 1 being completed in 1987, this consisted of the William Street Underpass. Stages 2 and 3 were not constructed due to escalating costs.

In 1994 the RTA investigated the feasibility and desirability of operating the Eastern Distributor as a toll road. This was a result of a number of factors exacerbating the traffic problems in the inner eastern suburbs since the EIS in 1985, these factors were;

- Completion of the Sydney Harbour Tunnel in 1992 which further increased traffic flow through the inner eastern suburbs
- Completion of the third runway at Sydney Airport which increased domestic and overseas air travel which increased the significance of the route from the city centre to airport along with the North Shore and Eastern Suburbs.
- The emergence of the “crescent” between Chatswood and the Airport/Central Industrial Area/Port Botany as the central focus of Sydney’s post-industrial focus had placed more pressure on the Eastern Distributor corridor.
- The increasing population of the inner suburbs due to the availability of obsolete industrial land and the construction of the New Southern Railway.
- The increased community awareness of environmental issues and the increasing reluctance to tolerate high volumes of traffic on residential streets.

The study concluded that although there were many details to resolve there was widespread support for a freeway and a willingness for motorists to pay for the travel benefits it would provide.

In May 1994 the Capital Works Committee of the NSW state government approved the issuing by the RTA of invitations to the private sector to submit preliminary proposals to finance, design, construct and maintain the Eastern Distributor. Of the five proposals received in December 1994, three proponents were shortlisted to develop and submit a detailed proposal. As detailed in Chapter 4.1.1 Airport Motorway Limited was selected as the preferred proponents to own and operate the toll road for a period of 48 years. It should be noted that the original concession period was 38 years however the period was extended 10 years to cover the costs of \$140 million of environmental improvements requested from the RTA as a result of the Environmental Impact Statement.

The final scheme as detailed in the Guidelines for Proponents consisted of “Twin two lane tunnels and approaches connecting the Cahill Expressway to South Dowling Street, Moore Park Road and Anzac Parade with grade separations at:

- Sir John Young Crescent
- William Street
- Connections to Anzac Parade and Moore Park Road

4.1.3 The Current Status of the Eastern Distributor

Airport Motorway Limited (AML) remains the owner and operator of The Eastern Distributor. The toll road is managed on behalf of the AML investors by the Transurban Group and operates a cash less tolling system. Transurban Group are also a majority stakeholder in AML with a 75% share.

A report in the Australian Financial Review in June 2013 stated that it was believed that the internal rate of return on the Eastern Distributor has been about 45 per cent (Boyd 2013). The healthy financial state of the toll road is reinforced by the Moody’s Investors Services ‘Rating Action’ in the same year which affirmed Airport Motorways Trusts (AMT is the financing vehicle for the Airport Motorway Limited) A3 rating and stable outlook. Moody’s made further comment that the A3 rating reflected that the strengths of Airport Motorway Groups (AMGs) business profile which includes its essential nature in the road network, mature traffic profile and supportive features in the concession agreement (Moody’s 2013).

4.1.4 Measurement against Proposed Framework using Appraisal Template

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
1	<p>Risk allocation and sharing</p> <ul style="list-style-type: none"> • Were the major risks allocated to the party best able to manage it? • Did government refrain from the idea of transferring all project risk to the private sector? • Did the public partner retain risks that obviously went beyond the control of the private sector? 	<p>AML and the Trustees obligation under the Deed were to: Finance, Design, Construct, Operate, Maintain & Repair the ED for 48 year concession period.</p> <p>AML accepted the following risks;</p> <ul style="list-style-type: none"> • Cost of project may be greater • AML revenue may be less than they estimated • Traffic volumes may be less than estimated • Assumption under ‘base case’ financial model may be incorrect <p>Based on the above;</p> <ul style="list-style-type: none"> • The risks other than the traffic volumes were allocated to the consortium which had the best capacity to manage them. • Government transferred all construction and operation risk to the consortium however • RTA were required not to build any opposing arterial roads and recognise the importance of the ED in the Sydney Metropolitan traffic system so the public partner retained risks that obviously went control of AML • Consortium took risks on traffic volumes which could be argued as beyond the control of AML. Based on the evidence in Chapter 4.1.3 it appears the road patronage was under estimated meaning if the government took the risk on this they would be getting better value for money

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
2	<p>Strength of private consortium.</p> <ul style="list-style-type: none"> • Was the construction company component of the consortium large and well established? • Was consortium equipped with strong technical, operational and managerial capacity to undertake the project? • Did the consortia (Private contractor concessionaire) have easy access to the financial market with the associated benefits of lower financial costs? • Was the winning consortium proposal a Cost effective technical solution? 	<ul style="list-style-type: none"> • Eastern Distributor Consortium (Airport Motorway Limited) consisted of Leighton Contractors as the constructors and Macquarie Bank as the financiers. • Leighton Contractors are a large multinational Construction Company so the construction component of the consortium was large, and well established • Macquarie Bank were and still are substantial participants in toll road financing • Based on the strength of the two participants the consortium had a strong technical, operational capacity to undertake the project • Macquarie Bank due to their standing had easy access to the financial markets • As the procurement process was competitive tender (Construction component was design and construct) it can be said the technical solution was cost effective from the perspective that it was the cheapest of the three proposals.
3	<p>Political Support.</p> <ul style="list-style-type: none"> • Did the government (previous and current) have a positive political attitude towards the private sector involved in the infrastructure project? • Where there existing government policy for the management of PPPs? • Had the project been part of a long term transport plan? • Was political backing strong and did the government at the time 'sell' the project? 	<ul style="list-style-type: none"> • No specific evidence of negative political attitude towards the private sector consortium however previous infrastructure works including toll roads had been completed in NSW using PPP arrangements prior to the ED. • Revised Guidelines on private sector involvement in public infrastructure projects were issued in Sept 1995, these were a response to the Audit Office findings on the M2. Revised Guidelines were not applied to the ED as commitment to project was made in March 1995. • Eastern Distributor had been part of a long term traffic plan. Concept conceived in the 1950s as part of Eastern freeway, many proposals made until final tunnel configuration. • Ongoing political support to construct the ED. Stage 1 of alternative scheme constructed in the early 1990s however remaining stages were not constructed due to cost escalation. ED was election promise of Bob Carr in 1995 in which he became premier.

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
4	<p>Public/Community Support.</p> <ul style="list-style-type: none"> • Project acceptance and understanding by the public community be it media, trade unions, non-governmental organisations • Did host government create awareness and undertake public education • Did the project have political capital? • Where community concerns addressed during planning and construction phases? • Was the public perception of the project positive or negative? 	<ul style="list-style-type: none"> • RTA completed a feasibility and desirability study in 1994 with the study concluding while there were issues to resolve there was generally wide support for the ED. • Government did create awareness and undertake public education through the EIS (Environmental Impact Statement) process • Project had political capital as demonstrated by Bob Carr making it an election promise. Successive governments had failed to deliver the project for whatever reason since its inception in the 1950s. • Community concerns were addressed during the planning phase with the design addressing submissions received in response to the EIS. Modifications resulted in additional project costs of \$140 million. • Public perception generally positive due to the impact it had removing large traffic volumes from the inner eastern suburbs of Woolloomooloo, Darlinghurst, East Sydney and Redfern. Some negative perception due to tolls as Bob Carr had originally promised a toll free ED
5	<p>Transparency of Procurement.</p> <ul style="list-style-type: none"> • Tendering process that ensured value for money through competitive bidding process • Level of communication with stakeholders • Public and private sections transparent and open to the external stakeholders 	<ul style="list-style-type: none"> • Competitive tender process undertaken with three consortiums submitting proposals. • EIS design changes were not competitively tendered due to time constraints with having the ED completed before the Sydney Olympics in 2000. • Summary of Contract provided by RTA in 1998 in accordance with NSW Governments <i>Guidelines for Private Sector Participation in the Provision of Public Infrastructure</i> • Performance Audit Report completed by the NSW Audit Office in 1997 to examine the processes that have been applied by the RTA to deliver the ED.
6	<p>Economic Viability.</p> <ul style="list-style-type: none"> • Accuracy of the traffic volumes – Forecast versus actual • Effect of actual traffic volumes on financial performance, short term and long term 	<ul style="list-style-type: none"> • Initial traffic volumes were 27,000 Average Daily Traffic (ADT) compared to the 33,000 ADT forecast • It appears the long term traffic volumes were underestimated with reports that the internal rate of return is 45%. If correct the

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
	<ul style="list-style-type: none"> • Forecast Traffic volumes and Financial model • Did the public receive value for money? 	<p>erroneous traffic forecast has had a positive impact on the financial model.</p> <ul style="list-style-type: none"> • Based on the above the public is not receiving value for money as the returns are not what should be reasonably expected. If the higher volumes were known this may have been reciprocated in reduced tolls or a reduced concession period
7	<p>Environmental outcomes.</p> <ul style="list-style-type: none"> • Reduction in traffic congestion • Reduced air and noise pollution • Removal of traffic from local streets • Improvement of visual and environmental amenity 	<p>Some of the Environmental Outcomes of the project were/are:</p> <ul style="list-style-type: none"> • Reduced traffic on inner eastern city streets • Less traffic noise and air pollution • Improved local access in the inner eastern suburbs with the • Improved amenity on local streets due to traffic calming measures • General improvement to area with increase in shops and cafes on street which previously had high levels of traffic and congestion
8	<p>Economic contribution to the cities/regions in which they are constructed.</p> <ul style="list-style-type: none"> • More efficient movement of freight resulting in economic benefits • Improvement to service delivery to the business districts along the corridor • General reduction in travel times for road users resulting greater efficiency 	<p>The EIS gave the following economic benefits</p> <ul style="list-style-type: none"> • Reduced travel time savings (this is identified as the biggest single economic benefit and is much greater than all economic costs) • Reduced accidents • Amenity improvements resulting increased property values • Residual value of the ED asset as the end of the study period <p>The EIS also provided the following cost benefit ratios from multiple economic valuations of the project</p> <ul style="list-style-type: none"> • Original EIS Statement, Nov 1996 – 2.3 • RTA Representative Report, April 1997 – 1.7 • RTA EIS Revised Economical Analysis Report, June 1997 – 4.5 • EIS by Director-General, Department Of Urban Affairs and Planning June 1997 – 3.0

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
9	Additional factors identified during research	No additional factors of significance identified.

4.1.5 Conclusion

The Eastern Distributor when measured against the proposed framework demonstrated strengths in all of the appraisal criteria. The strongest component of the toll road appears to be the Economic Contribution it makes to the city of Sydney and the Environmental outcomes it made the by removing large traffic volumes from the inner eastern suburbs. The toll road has a high level of economic viability however as the reported rates of return are so high the public are not receiving value for money. An increased level of value may have been received by the government taking on the patronage risk within the Public Private Partnership delivery model.

Due to the duration between the project's inception and its actual delivery, a high level of community and public support was evident - the project had evolved over 40 years. The majority of the procurement process was completed within the Government guidelines however due to the time constraints caused by a need to meet the Sydney Olympics in 2000 the design changes resulting from the EIS submissions could not be competitively tendered.

Based on the assessment, this project has the required factors for success which is supported by its ongoing prosperity and continuing positive impact on its surrounding environment.

4.2 Cross City Tunnel (Sydney)

4.2.1 Introduction

The Cross City Tunnel is a 2.1 km-long twin-tunnel tollway located in Sydney which is currently owned and operated by Transurban. The tunnel connects Darling Harbour on the Western fringe of the Central Business District to Rushcutters Bay in the Eastern Suburbs. The toll road also connects to the north and south bound lanes of the Eastern Distributor as shown in figure 8.

Construction for the tunnel commenced in January 2003 with the toll way opening to traffic on the 28th August 2005. The toll road was Sydney's first completely electronic tollway with no capacity to manually collect cash tolls.

The project has been contentious since its inception with the main issue being patronage. The toll road was placed into administration within two years of opening which followed its sale in the same year. The tunnel went into receivership for a second time in 2013 and was sold to Transurban in 2014.

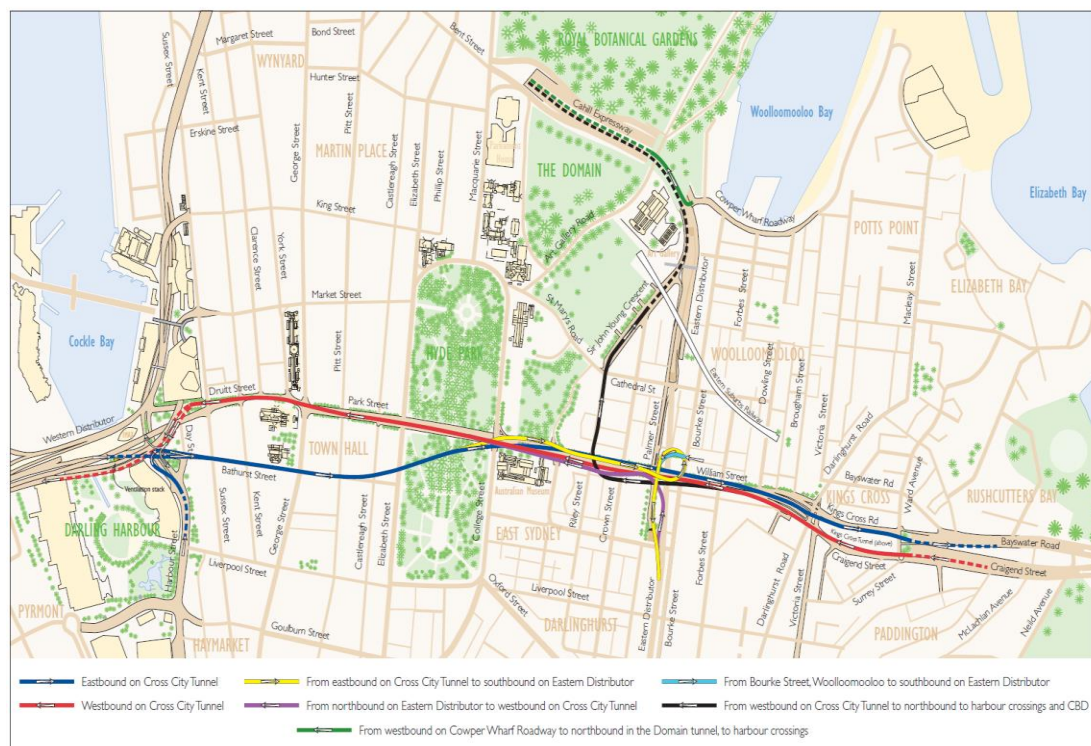


Figure 8 – CCT horizontal alignment (Source RTA Summary of Contracts 2008)

4.2.2 Background

The concept of the Cross City Tunnel had existed since 1990 with numerous proposals since that time being created for an east west tunnel under the Sydney CBD. The basic concept for the final design was developed by the RTA from the mid-1990s. The preliminary concepts proposed by the RTA involved much shorter two lane tunnels than the final design however both of them passed under Druiitt and Park Streets. The key events in the history of the Cross City Tunnel can be found in Table 1 which gives a brief overview in chronological order of the important stages.

Date	Event
1990	The State Government and City of Sydney Council propose a tunnel under Park Street leading to an underground car park and bus interchange.
1995	City of Sydney Council propose a tunnel from the Western Distributor under Market Street and Hyde Park connecting to William Street near Boomerang Street.
22 Oct 1998	Premier (Mr Carr) and Minister for Roads (Mr Scully) release an exhibition for comment on the initial concept (the 'short tunnel') in a 16 page report titled <i>The Cross City Tunnel: Improving the Heart of the City</i> . \$2.00 toll is flagged.
April 1999	The City of Sydney Council releases the <i>Cross City Tunnel Alternative Scheme</i> . This was a longer tunnel than proposed in the 1998 <i>Improving the Heart of the City</i> , running to the eastern end of the Kings Cross Tunnel, including narrowing William Street.
22 July 1999	Director General of Planning issues requirements for the preparation of the initial EIS by letter to the RTA.
24 Sept to 11 Dec 1999	The RTA publishes the modified proposal in the brochure <i>Cross City Tunnel, Environment Assessment</i> .
Nov 1999	The <i>Action for Transport 2010</i> plan released is and includes the project in section titled, 'Making space for cyclists and walkers'.
2 Aug 2000	The RTA releases the <i>Cross City Tunnel Environmental Impact Statement</i> for public comment.
15 Sept 2000	The RTA invites <i>Registrations of Interest</i> from the private sector parties 'for the financing, design, construction, operation and maintenance of the Cross City Tunnel project' (<i>Cross City Tunnel: Summary of Contracts</i> , June 2003, p 10).
6 Oct 2000	Closing date for submissions to the EIS.
23 Oct 2000	Closing date for registrations of interest to construct and operate the tunnel.
Feb 2001	Minister for Roads (Mr Scully) announces that 3 consortia have been short listed to prepare detailed proposals: Cross City Motorways (CCM), E-TUBE and Sydney City Tunnel Company.

Date	Event
14 May 2001	The RTA submits the <i>Preferred Activity Report</i> to the Department of Urban Affairs and Planning (DUAP) with a <i>Cross City Tunnel Representations Report</i> .
19 May to 18 June 2001	<i>Preferred Activity Report</i> , containing more than 20 modifications to the proposal as presented in the EIS, publicly exhibited.
16 Aug 2001	RTA presents an <i>Addendum to the Representations Report</i> to the DUAP.
Sept 2001	The <i>Proposed Cross City Tunnel: Director General's Report</i> , as required under s115C of the <i>Environmental Planning and Assessment Act</i> is submitted to the Minister for Urban Affairs and Planning.
3 Oct 2001	Planning approval, including 240 conditions, is granted by the Minister of Urban Affairs and Planning (Dr Refshauge).
Oct 2001	Detailed proposals for implementation of the project lodged by the three consortia and reviewed by assessment panel.
Feb 2002	Budget Committee of Cabinet approves CCM to be selected as preferred proponent and for the CCM 'long 80 tunnel' option to be selected as the preferred proposal.
27 Feb 2002	Minister for Roads (Mr Scully) announces CCM is the preferred proponent. The tender submission from CCM incorporated changes to the Approved Activity that the Minister for Roads considered would provide more benefits and reduce construction related impacts to the community. As a result of the proposed changes a number of additional environmental impacts would occur. A supplementary EIS is prepared.
14 Mar 2002	Letter from the Treasurer (Mr Egan) to the Minister for Roads (Mr Scully) stating 'A key objective of the project has been its development at no net cost to Government' and 'It is not certain at this time that the project can achieve a 'no net cost' to Government' outcome. If the project cannot proceed without a Government contribution, any such contribution would need to be funded out of the RTA's existing forward capital program'.
30 Jul to 31 Aug 2002	<i>Supplementary Environmental Impact Statement</i> goes on public display. Displayed at 19 locations and the RTA website, with a toll free number for public comment. 25,000 copies of the brochure were distributed.
4 Nov 2002	<i>Supplementary Cross City Tunnel Representations Report</i> was submitted by the RTA to DUAP drafted in response to the Supplementary EIS, as a result of additional studies and community feedback. Further alterations to the project proposed.
25 Nov 2002	<i>Supplementary Cross City Tunnel Representations Report</i> released to the public. The right hand turn out of Cowper Wharf Road was reinstated. The report was displayed at 19 locations and the RTA website, with a toll free information line. 5,000 copies of the brochure were distributed.
Dec 2002	<i>Cross City Tunnel: Proposed Modifications of Approved Project – Director General's Report</i> was completed.
12 Dec 2002	Planning approval granted by the Minister for Planning (Dr Refshauge). Approved route twice the length of the 1998 initial concept. Projected approval subject to 292 Conditions of Approval.

Date	Event
16 Dec 2002	Approval given by the Treasurer (Mr Egan) to sign project deed, under <i>Public Authorities (Financial Arrangements) Act 1987</i> .
18 Dec 2002	Contract between CCM consortium and RTA is signed, to finance, construct, operate and maintain the CCT. Differential tolling, \$2.50 per car and \$5.00 for heavy vehicles
28 Jan 2003	Major work starts on the \$680 million Cross City Tunnel.
3 Mar 2003	RTA meets the Auditor General to explain that if the terms of the CCT had been made public during the negotiations of the Lane Cove Tunnel Project Deed, those negotiations would have been compromised (Lane Cove Tunnel Project was signed on 4 December 2003).
24 June 2003	The first order for the production of state papers by the Legislative Council relating to the Cross City Tunnel. Focuses on documents relating to contract negotiations for the financing, construction, operation and maintenance of the Cross City Tunnel. Sir Laurence Street, independent Legal Arbitrator, upholds the validity of the claim of privilege on the majority of documents and only a small selection of privileged documents were made public. A substantial volume of documents were released into the public domain without a claim for privilege being made.
June 2003	Contract summary provided to the Auditor-General.
Sept 2003	Documents relating to the Cross City Tunnel tabled in the Legislative Council. Documents that were considered privileged by the RTA sent to an Independent Arbitrator to determine the validity of this claim which was upheld. A substantial volume of documents were released into the public domain without a claim for privilege being made.
3 Dec 2003	Letter from the Minister for Roads (Mr Scully) to the Minister for Infrastructure, Planning and Natural Resources (Mr Knowles) regarding the relocation of the ventilation stack for the Cross City Tunnel expressing 'disappointment and concern at the fact that extracts from the draft Cabinet Minute on this issue have been sighted by members of the Cross City Motorway Consortium, with the consequence that the Government's ability to secure an outcome which best protects the interest of the NSW taxpayers may have been compromised'. This letter was forwarded to ICAC by Mr Andrew Stoner MP on 3 November 2005.
29 Feb 2004	'Cross City Tunnel – Summary of Contract' tabled in Parliament.
21 Dec 2004	Treasurer (Mr Egan) approves the RTA to enter into the Cross City Tunnel Project First Amendment Deed with CCM under s20 of the <i>Public Authorities (Financial Arrangements) Act 1987</i> . This deed included provision that 'in consideration for the CCM's agreement to fund and carry out certain [changes if required by the RTA], CCM may increase the Base Toll to be collected from motorists on the terms set out in the First Amendment Deed'.
23 Dec 2004	The First Amendment Deed entered into by RTA and CCM enabling \$35 million of additional works to be paid for through a higher base toll (increased by \$0.15).
3 Aug 2005	Hon Joseph Tripodi replaces the Hon Carl Scully as Minister for Roads.
28 Aug 2005	Cross City Tunnel opened.

Date	Event
13 Oct 2005	Papers considered privileged in June 2003 to be reassessed by Sir Laurence Street in view of the public interest in matters concerning the Cross City Tunnel. This was the first time the House had resolved that privileged documents be reassessed by an arbiter. The documents were tabled in the House in 20 October 2005.
18 Oct 2005	Call for papers relating to the Cross City Tunnel produced since the original call for papers in June 2003. Documents tabled in the House on 18 October 2005.
Nov 2005	Summary of <i>Cross City Tunnel Project Deed</i> made public.
4 Nov 2005	Dispute of the validity of the claim of privilege on documents received on 1 November 2005 from the Minister for Roads, the Cabinet Office and NSW Treasury received by the Clerk of the Legislative Council. According to standing order, the documents were released to Sir Laurence Street for assessment. Determined that material be made public. Documents tabled on 16 November 2005.
December 2005	Cheung Kong Infrastructure, the major equity investor in the Cross City Tunnel project, writes down the carrying value of their investment in the Cross City Tunnel by A\$102 million, 'in view of lower [than] projected toll revenue'.
9 Feb 2006	Announcement made that Mr Peter Sansom is to be replaced as Chief Executive of CrossCity Motorway by former Brisbane and Wellington ports chief Mr Graham Mulligan.
17 Feb 2006	Hon Eric Roozendaal replaces the Hon Joseph Tripodi as Minister for Roads.
28 Feb 2006	Joint Select Committee on the Cross City Tunnel tables its First Report.
5 Mar 2006	Tunnel toll halved to \$1.78 for cars and \$3.56 for heavy vehicles for a period of at least three months. Premier (Mr Iemma) and Minister for Roads (Mr Roozendaal) announce that 12 category C and D road changes will be reversed and that negotiations with CCM will continue in relation to other road changes.
April 2006	The ICAC reported on allegations of corruption in reference to the possible leaking a Cabinet minutes. The ICAC made no findings that any person engaged in corrupt conduct.
April 2006	William Street surface works completed.
19 Dec 2035	Cross City Tunnel due to be returned to public ownership.

Table 1 – Chronology of key events relating to the CCT (NSW PJSC on CCT 2006)

4.2.3 Multiple Receiverships for Cross City Tunnel (CCT)

Following the opening of the tunnel in August 2005, the actual traffic volumes were significantly lower than the traffic volumes forecasted by the Cross City Motorway (CCM). This resulted in lower than expected revenue and the tunnel being placed into receivership on the 26th December 2006 which was followed by a competitive tender process to sell the asset. The tunnel was formally transferred from the Cross City Motorway consortium to a new consortium formed by ABN AMRO and Leighton Contractors on the 27th September 2007. Based on Figure 9 the estimated road patronage at May 2006 was 34,000 while the CCM projected patronage was 87,088 meaning the patronage was overestimated by a factor of more than 2.5. The Cross City Tunnel was sold for \$700 million with construction costs estimated to be \$1 billion (AAP 2007).

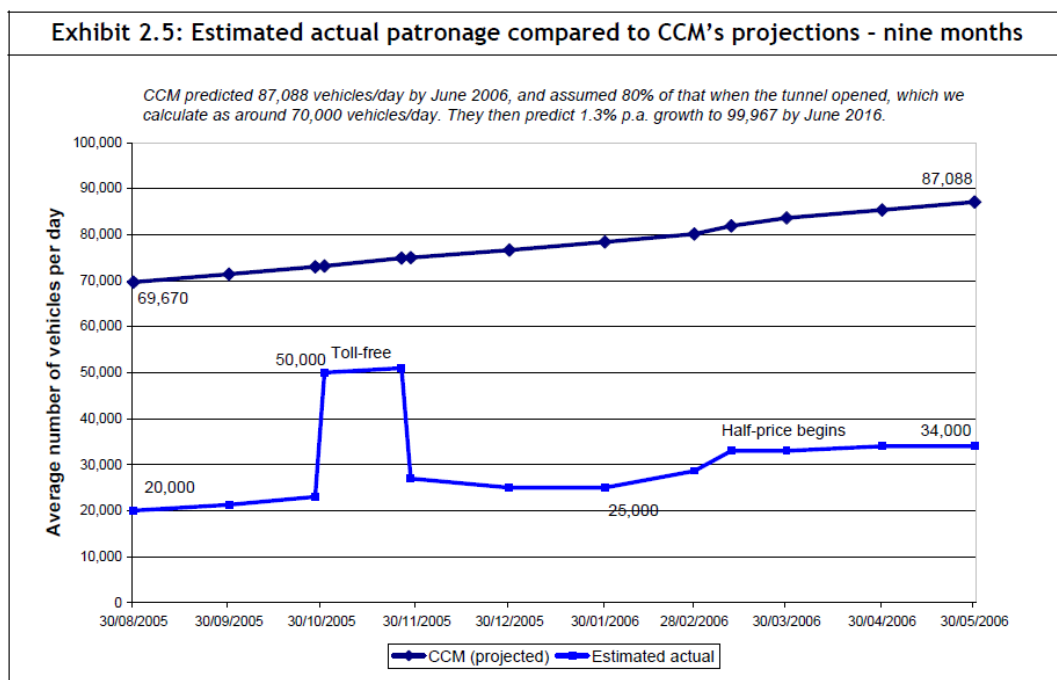


Figure 9 – Estimated actual patronage vs CCM's projects (NSW A-D 2006 page 32)

The second financial failure occurred in September 2013 when the consortium comprising of the Royal Bank of Scotland (RBS), EISER Infrastructure Partners and Leighton Contractors placed the asset in receivership. This was in the wake of a legal dispute with the NSW government over stamp duty.

4.2.4 Current status of the Cross City Tunnel

After negotiation with the tunnels' receivers and managers, Transurban purchased the toll road for \$475 million in 2014 (AAP 2014). Transurban remains the current owner and operator of the toll road. Traffic volumes for the second half of 2014 as reported by Transurban (*Traffic and Revenue Data Dec 2014*) were 36,630 trips. Traffic volumes have increased only slightly since opening and are still much less than the original projected patronage however based on the asset purchase price the toll road may become profitable.

4.2.5 Measurement against Proposed Framework using Appraisal Template

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
1	<p>Risk allocation and sharing</p> <ul style="list-style-type: none"> • Were the major risks allocated to the party best able to manage it? • Did government refrain from the idea of transferring all project risk to the private sector? • Did the public partner retain risks that obviously went beyond the control of the private sector? 	<p>The Cross City Motorway (CCM) Consortium were contracted to finance, build, own, operate and maintain the tunnel for the concession terms. Concession period was until 2035.</p> <p>Trustee and company accepted;</p> <ul style="list-style-type: none"> • All risks associated with the financing, design, construction, operation, maintenance and repair costs of the project • The risks that traffic volumes or project revenues might be less than expected • Tax risks, and • The risks that their works or operational and maintenance activities might be disrupted by the lawful actions of other government and local government authorities or a court or tribunal. <p>Based on the above ;</p> <ul style="list-style-type: none"> • The risks other than the traffic volumes was allocated to the consortium which had the best capacity to manage them. • Government transferred all construction and operation risk to the consortium however RTA shared some of the risks associated with the project planning approvals and more specifically carbon monoxide treatment. • Consortium took risks on traffic volumes which as with the ED could be argued in beyond the control of CCM. Based on the evidence in Chapter 4.2.3 the road patronage was over estimated meaning the government avoided losses in this instance.

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		<ul style="list-style-type: none"> Note that the government had ‘no net cost to government’ basis for the bid process for this project
2	<p>Strength of private consortium.</p> <ul style="list-style-type: none"> Was the construction company component of the consortium large and well established? Was consortium equipped with strong technical, operational and managerial capacity to undertake the project? Did the consortia (Private contractor concessionaire) have easy access to the financial market with the associated benefits of lower financial costs? Was the winning consortium proposal a Cost effective technical solution? 	<ul style="list-style-type: none"> The company who constructed the project was a Joint Venture between Baulderstone Hornibrook and its parent company at the time Bilfinger Berger. Baulderstone Hornibrook were a large well established Australian civil contractor who had previously completed the M5 East Tunnel project. Bilfinger Berger are a large multinational contractor. Based on the background of the construction JV the consortium had a strong technical, operational and managerial capacity to complete the project. ABN AMRO, the financing component of the consortium, is a large international bank with easy access to financial markets. Winning consortium was a Cost effective technical solution as they won the tender by using a non-conforming design. As reported in the Auditors Generals Report the ‘Long 80’ bid clearly represents value for money than the proposals submitted by other Proponents. The winning design was longer and deeper than the other bids which meant vehicles could travel at 80km/h as well as minimising the disruption to William St.
3	<p>Political Support.</p> <ul style="list-style-type: none"> Did the government (previous and current) have a positive political attitude towards the private sector involved in the infrastructure project? Where there existing government policy for the management of PPPs? Had the project been part of a long term transport plan? Was political backing strong and did the government at the 	<ul style="list-style-type: none"> No evidence of any animosity existed between the State government and the consortium prior to operational stage of the PPP. Once the tunnel was opened the relationship deteriorated to the point where the Government and CCM were openly criticising each other in the media. (Phibbs 2007) Government had promoted PPP as means of providing large infrastructure projects. NSW Government had <i>Working with Government Guidelines for Privately Financed Project</i> Nov 2001 to

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
	time 'sell' the project?	<p>management PPP's</p> <ul style="list-style-type: none"> • Tunnel was part of a long term plan, The idea of the Tunnel was first conceived in 1990 and in 1998 the government proposed scheme under 'Action for Transport 2010' strategic plan • Project had been part of the Action for Transport 2010 plan and therefore had strong political backing which is substantiated by its construction. However once constructed following community backlash over surface road closures political backing was lost. Politicians started to criticise the project, the procurement process and the over optimistic traffic forecasts. This was a catalyst for a number of government inquiries. • Although government avoided financial risk they were unable to absolve themselves from the political risk associated with the project not meeting expectations (Infrastructure Australia 2008 p. 15)
4	<p>Public/Community Support.</p> <ul style="list-style-type: none"> • Project acceptance and understanding by the public community be it media, trade unions, non-governmental organisations • Did host government create awareness and undertake public education • Did the project have political capital? • Where community concerns addressed during planning and construction phases? • Was the public perception of the project positive or negative? 	<ul style="list-style-type: none"> • Public consultation undertaken as part of the EIS for the Cross City Tunnel indicated broad level of support with the broader community seeing the merit of removing surface traffic (PPK Environment and Infrastructure 2006) • Community consultation was undertaken under the EIS however the Joint Select Committee on the CCT found there was insufficient public interest evaluation. (Joint Select Committee on the CCT 2006a) • Negative public perception when the tunnel opened which was centred on the cost of the toll and extent and impact of the road alterations (Auditor General's Report 2006 p. 27). Other issues included lack of community empathy, transparency, identity and a project in isolation (Infrastructure Implementation Group 2005) • Stakeholders Representations from the EIS resulted in restored access and restrictions to surface roads for travel travelling through Woolloomooloo and Kings Cross

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		<ul style="list-style-type: none"> Project had political capital prior to opening however this quickly dissipated once the tunnel was opened
5	<p>Transparency of Procurement.</p> <ul style="list-style-type: none"> Tendering process that ensured value for money through competitive bidding process Level of communication with stakeholders Public and private sections transparent and open to the external stakeholders 	<ul style="list-style-type: none"> Tendering process ensured value for money as 3 Consortiums bided for the work. Tendering completed within <i>Working with Government Guidelines for Privately Financed Project Nov 2001</i> Summary of Contract provided by RTA in 2003 in accordance with NSW Governments November 2001 Guidelines for Private Sector Participation in the Provision of Public Infrastructure Performance Audit Report completed by the NSW Audit Office in 2006 to examine the processes that have been applied by the RTA to deliver the CCT. Auditor General commented that during the financial evaluation of the bids the there was a large focus on the upfront fee to the government and that value for money for motorists (lowest toll) was of less concern. This evidently would have had a negative impact on the procurement process. Although unsubstantiated there was a public perception that the project was done under a secret deal.
6	<p>Economic Viability.</p> <ul style="list-style-type: none"> Accuracy of the traffic volumes – Forecast versus actual Effect of actual traffic volumes on financial performance, short term and long term Forecast Traffic volumes and Financial model 	<ul style="list-style-type: none"> Traffic volumes at May 2006 were 34,000 ADT compared to the 87,088 ADT forecast. Long term traffic volumes were overestimated with traffic volumes in the last quarter of 2014 being 36,660 trips. Effect on financial performance is two operators have gone into receivership and the asset value has dropped from \$1 billion to \$475 million. Initial financial model was totally dependent on traffic volumes. Transurban can potentially make the toll road profitable as they purchased the tunnel for \$475 million. Note that although the tunnel operators encountered financial stress due

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		to low the traffic volumes the tunnel continued to operate.
7	<p>Environmental outcomes.</p> <ul style="list-style-type: none"> • Reduction in traffic congestion • Reduced air and noise pollution • Removal of traffic from local streets • Improvement of visual and environmental amenity 	<ul style="list-style-type: none"> • As detailed in the RTA Summary of Contract (2008) the Primary objective of the tunnel was to reduce through traffic in central Sydney. Benefits were expected to be; <ul style="list-style-type: none"> ○ Improved travel time and service reliability for buses in the CBD ○ Better access and movement in the city for pedestrians, cyclists, taxis and delivery vehicles ○ Safer and more pleasant street environments for pedestrians, residents, workers and businesses ○ Better air quality in the city ○ Improved travel times for east west through traffic • As the traffic volumes remain low the extent of traffic removed from the CBD is not as high as anticipated. The magnitude of the benefits is therefore debatable.
8	<p>Economic contribution to the cities/regions in which they are constructed.</p> <ul style="list-style-type: none"> • More efficient movement of freight resulting in economic benefits • Improvement to service delivery to the business districts along the corridor • General reduction in travel times for road users resulting greater efficiency 	<ul style="list-style-type: none"> • Monetarised cost benefit ratio (BCR) for the Cross City Tunnel as documented in the EIS is 3.4:1. (RTA 2010) • Reduced traffic volumes in the CBD would ultimately improve service delivery to businesses and reduce travel times however as stated above as the traffic volumes removed from the CBD are lower than predicted the magnitude in improvement is debatable.
9	<p>Additional factors identified during research</p>	No additional factors of significance identified.

4.2.6 Conclusion

The Cross City Tunnel project delivered a world class piece of infrastructure at no net cost to the taxpayer. It is also likely that the adopted PPP model allowed the project to be supplied far earlier than would have been possible using Government funded models.

When measured against the proposed framework, the project only performed well against the strength of the private consortium criteria. However even the merit of this criteria was debatable as the risk allocation and erroneous traffic projections resulted in the project being placed in receivership within two years of opening. The consortium delivered a high quality asset in good time and ultimately at a very cheap price however their failure to adequately predict the traffic volumes was a significant failure.

Although the tunnel resulted in positive environmental outcomes as well as economic contributions, the magnitude of these criteria is significantly impacted by the reduced traffic volumes. Obviously the tunnel has resulted in reduced traffic volumes through the city, however as they are less than half of the projected volumes, the traffic reductions and economic benefits would not be as high as originally thought.

The project had strong political and community support up to the opening of the tunnel however once opened the Cross City Tunnel was greeted with significant controversy resulting in the State Government receiving strong criticism from the public and the media. This saw political support for the project evaporate. The Infrastructure Implementation Group (2005) identified public/community issues as being;

- Transparency – Although massive amounts of public documentation was available there was a perception that there was no transparency. This was due to the lack of interaction with users which was needed in addition to the consultation with the local communities. Public communication should have been stronger and ongoing after planning approval.
- The Toll – CCT was singled out although motorists paid higher tolls in higher numbers every day. This was identified as a complex issue which related to

identity, perceived value for money, transparency and a community toll threshold that few people recognised.

- Identity – CCT had an identity crisis as it was perceived as not having a destination as well as denying existing access to important destinations
- Community Empathy – CCT was the first toll road with full electronic tolling which created community issues which the operator did not expect.
- Project In Isolation – CCT was not perceived as part of the wider Sydney motorway network.

It should be also be noted that Auditors General Performance Audit (2006 p. 7) indicated there was a widely held view that the road changes were not necessary and were introduced to force people into the tunnel to profit the operator. The Audit however found no evidence of this and the objective of the road changes were to reduce the through traffic in and around Central Sydney and improve the public domain. This finding confirms that the community consultation failed to identify and communicate to prevent resentment towards the road changes.

The other significant failing of the project was its economic viability which was a result of the inaccurate traffic projections and was compounded by the public backlash against the road changes. As shown in figure 9 the actual estimated patronage did not reach the projected patronage during the toll free period indicating the original feasibility study was flawed. During the bidding process there was a significant difference between the three consortiums patronage projections. The Auditor General considered that the assessment panel should have more robustly challenged all bidders (Infrastructure Australia 2008). One of the lessons learnt from this, as identified by Infrastructure Australia (2008, p. 18), is that the assessment of project bids must identify key assumptions which the success of a project depends upon and that these critical assumptions should be subject to independent evaluation.

The procurement of the consortium for this project was transparent, however one of the criticisms of the procurement process by the Auditor General was that, during the financial evaluation of the bids, there was a large focus on the upfront fee to the government and that value for money for motorists (lowest toll) was of less concern.

4.3 Westlink M7 (Sydney)

4.3.1 Introduction

The West Link M7 is a 40 kilometre long motorway located in Western Sydney. It links the M2, M4 and M5 motorways and forms a critical part of the Sydney Orbital freeway and motorway system. The toll road has a fully electronic, distance based tolling system. The motorway replaced the Cumberland Highway as the Auslink National Transport Link through Sydney and allowed motorists to avoid 58 sets of traffic lights. The alignment of the Westlink M7 is shown in figure 10.

Construction for the motorway commenced in July 2003 with the tollway opening on the 16th December 2005 which was 8 months ahead of schedule. It is considered to be a highly successful example of a true PPP (Infrastructure Australia 2008 p. 27).

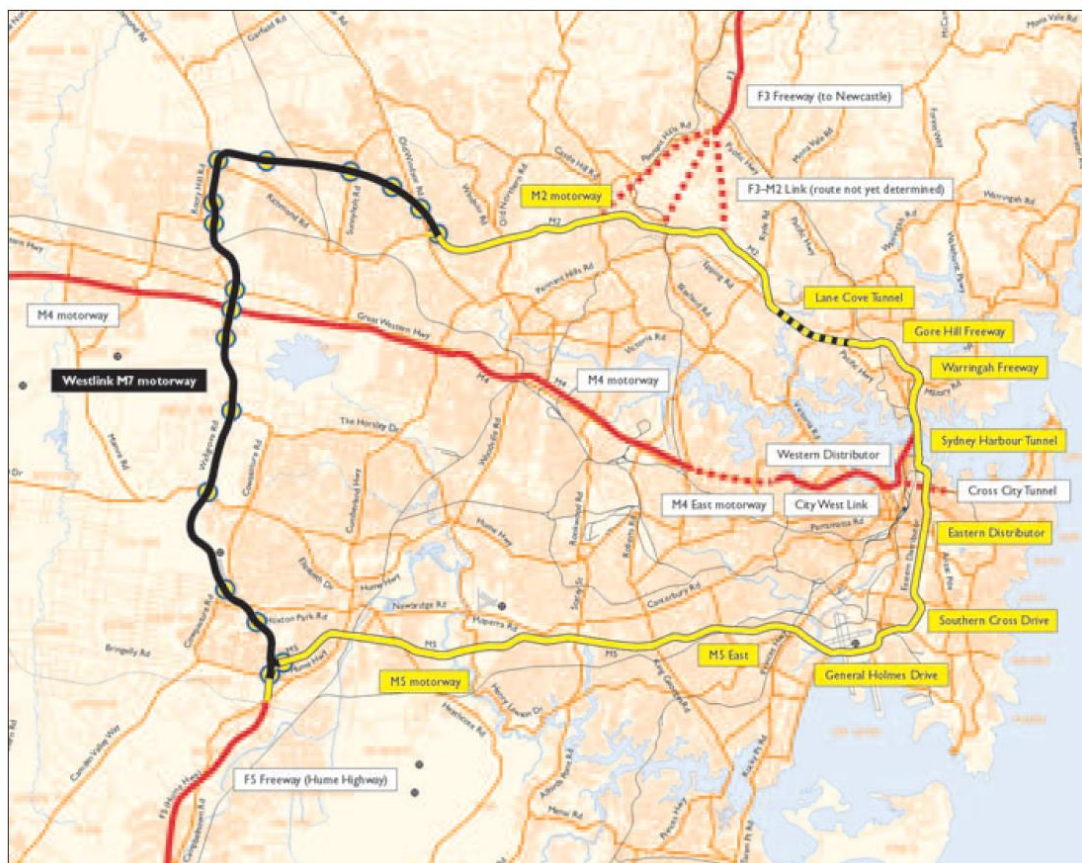


Figure 10 – Westlink M7 alignment (Source: RTA Summary of Contracts 2003)

4.3.2 Background

The concept of what would become the Westlink M7 has a long history, with the idea of north-south freeway in Sydney's West being first raised in the 1960s. In 1974, the *Sydney Area Transportation Study* proposed the need for an outer-metropolitan highway and identified a corridor for its route. In 1993, the Liverpool to Hornsby Study Final Route identified a preferred route to connect the M5 to the M1 (Infrastructure Australia 2008).

In 1994 it was recognised by the Commonwealth Government that a motorway linking the M5, M4 and the M2 would improve the National Highway freight route. In late 1994 the Commonwealth Government announced a feasibility study to look at three routes with the final presented route being broadly similar to the Westlink M7. This was followed in 1996 by the Commonwealth providing funding for preconstruction activities and the preparation of EISs (RTA 2010 p. 8).

In 1998 extensive community consultations were undertaken on the Western Sydney's Orbital (later became Westlink M7) preliminary design and features in the suburbs where the motorway was to be located. The consultation process resulted in changing the route to a more easterly direction through Cecil Park and moving the alignment at Prestons Road to reduce the impact on endangered ecological communities (RTA 2010 p. 9).

Although initially envisaged as a toll free road the possibility of the route being tolled was first raised by the Commonwealth Government in 1998 as it could not fund the road in the short to medium term (Infrastructure Australia 2008 p. 29).

An Environmental Impact Statement for the M7 was publicly exhibited by the RTA in 2001 with two hundred and sixty seven submissions being received in response to the EIS. Consideration of the submissions resulted in 23 modifications to the proposal. Planning approval for the motorway was granted on the 28th February 2002 (RTA 2010, p. 9).

In July 2001 the RTA invited Registrations for Interest from private sector parties for the finance, design, construction, operation and maintenance of the Western Sydney Orbital. Three consortia were selected by the closing date of 29 August 2001:

- The Westlink Motorway consortium, sponsored by Leighton Contractors, Abigroup, Transurban and Macquarie Bank.
- The Orbital Alliance consortium, sponsored by Theiss, Baulderstone Hornibrook, CKI and Deutsche Bank.
- The Western Link Joint Venture consortium, sponsored by Transfield and Bouygues Travaux.

The three consortiums developed detailed proposals which were submitted on the 19th March 2002. A detailed evaluation process was undertaken by the Evaluation Committee which consisted of various representatives from State Treasury, RTA and a procurement consultant. On the 28th October 2002 the Westlink Motorway consortium were announced as the preferred proponent to operate and maintain the motorway for a period of 34 years. The execution of the principal contracts for the project occurred on the 13th February 2003, with major construction starting in July 2003 (RTA 2010, p. 12).

At the time of opening, the equity investors in the consortium were Transurban Limited 40%, Macquarie Infrastructure Group 40%, Leighton Holdings and Contractors 10% and Abigroup Limited 10%.

4.3.3 The Current Status of the Westlink M7

Westlink Motorway Limited continues to own and operate the Westlink M7. The current equity investors in the consortium are Transurban 50%, Queensland Investment Corporation 25%, and Canada Pension Plan Investment Board 25%.

The traffic volumes of the M7 were approximately 52 percent below forecasts within first year of operation however fortunately toll revenue forecasts were better than traffic forecasts. This was due to the compensating errors in trip lengths. In recent years motorway traffic has shown strong growth with the southern section of the road reflecting a high level of industrial development. (Department of Infrastructure and Growth 2011, p. 22). Traffic volumes have increased 160% since opening as shown in figure 11.

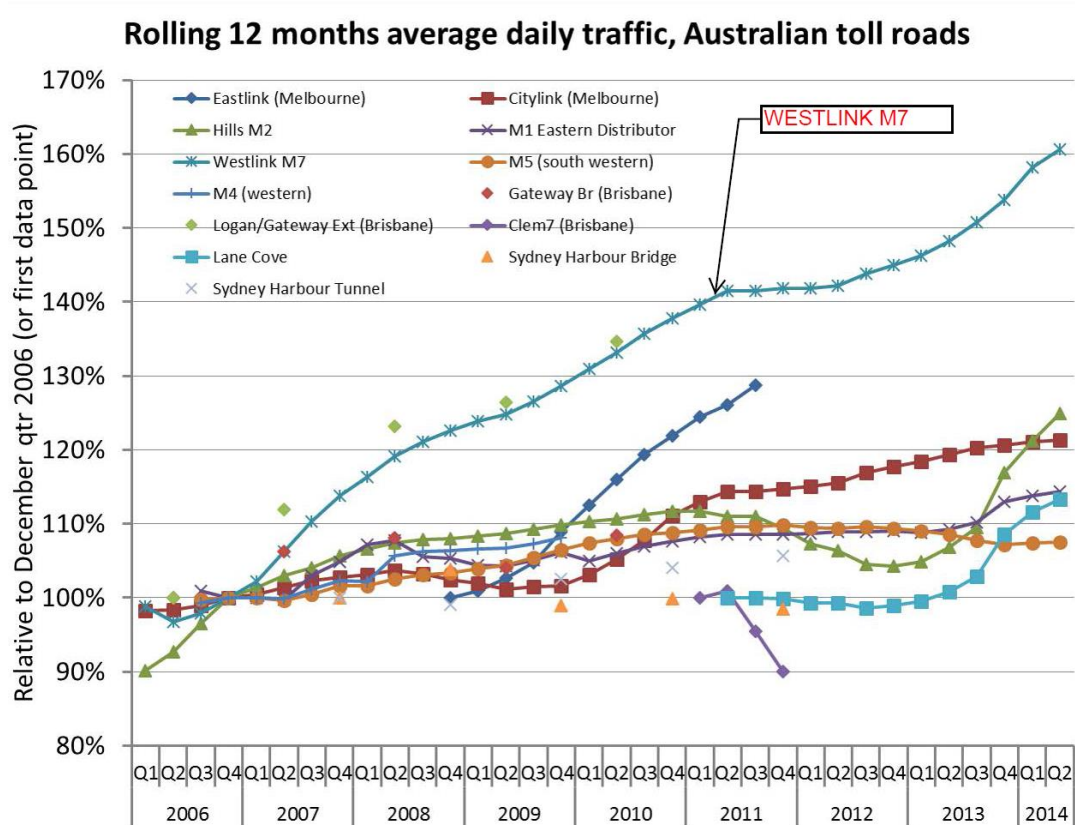


Figure 11 – Westlink Rolling 12 Month ADT 2006 to 2014 (ChartingTransport.com 2014)

4.3.4 Measurement against Proposed Framework using Appraisal Template

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
1	<p>Risk allocation and sharing</p> <ul style="list-style-type: none"> • Were the major risks allocated to the party best able to manage it? • Did government refrain from the idea of transferring all project risk to the private sector? • Did the public partner retain risks that obviously went beyond the control of the private sector? 	<p>Based on the Infrastructure Australia Report (2008)</p> <ul style="list-style-type: none"> • Private Sector Consortium accepted majority of the risk including construction costs, traffic volumes or projected revenue below expectations, traffic management during construction, tax, lawful disruptions by other government authorities impacting on works, operation and maintenance activities • Risks were allocated to the parties best able to manage as even the traffic volumes were developed and tested by the consortium. The RTA made no representations or promises regarding traffic volumes. • The RTA did refrain from transferring risk that went beyond the consortiums control. For example the RTA would pay for any costs associated amendments or changes to planning approval which were not a result of a breach by Westlink M7. In addition RTA would pay reasonable costs to Westlink M7 should a legal challenge to the RTA halt works
2	<p>Strength of private consortium.</p> <ul style="list-style-type: none"> • Was the construction company component of the consortium large and well established? • Was consortium equipped with strong technical, operational and managerial capacity to undertake the project? • Did the consortia (Private contractor concessionaire) have easy access to the financial market with the associated benefits of lower financial costs? • Was the winning consortium proposal a Cost effective technical solution? 	<ul style="list-style-type: none"> • The Westlink consortium at the time of delivery consisted of Transurban, Macquarie infrastructure Group (MIG), Leighton Holdings, Leighton Contractors and Abigroup Limited • The construction company component, Leighton Contractors and Abigroup were large well established companies. Leighton Contractors are still one the most experienced project development and construction companies in Australia. Abigroup were also a well-established road construction contractor with extensive experience in delivery of large scale road projects. • Transurban and MIG at the time of delivery were both one the world's largest toll road owners and managers. MIG was managed by the Infrastructure and Specialised Funds division of Macquarie Bank and as

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		<p>such had easy access to the Financial Market.</p> <ul style="list-style-type: none"> Based on the RTA assessment criteria, which did not just look at the price but also ‘non price assessment’ including the design and construct component, it can be perceived that the winning consortium was a cost effective technical solution. In addition the RTA Summary of Contracted (2003) that the Westlink proposal represented better value for money than the other alternatives.
3	<p>Political Support.</p> <ul style="list-style-type: none"> Did the government (previous and current) have a positive political attitude towards the private sector involved in the infrastructure project? Where there existing government policy for the management of PPPs? Had the project been part of a long term transport plan? Was political backing strong and did the government at the time ‘sell’ the project? 	<ul style="list-style-type: none"> No evidence of any negative political attitude towards the private sector involved in the project. NSW Government had Working with Government Guidelines for Privately Financed Project Nov 2001 to manage PPP’s The M7 route formed part of the National Highway System and as such required funding by the Commonwealth. Federal Government instigated the PPP as originally the road was to be toll free however in 1998 as the Federal Government could not fund the road in the short to medium term. The concept of a north-south freeway-standard link in Western Sydney was first proposed by the NSW Department of Main Roads in the 1960s. The need for an orbital connection was then identified in ‘The Sydney Area Transportation Plan 1974’ followed by ‘The Liverpool to Hornsby Strategy Final Route 1993, and then the proposed ‘Action for Sydney 2010’. The project had therefore been planned for over forty years. Toll road had strong political backing from both State and Federal Government. The M7 formed part of the NSW governments ‘Action for Transport 2010’. The Federal Government provided funding for the initial feasibility studies and instigated the PPP when they realised they couldn’t fund the project in the ‘short to medium term’.
4	<p>Public/Community Support.</p> <ul style="list-style-type: none"> Project acceptance and understanding by the public 	<ul style="list-style-type: none"> As detailed in the Infrastructure Partnerships Australia (2010) Case Study on the M7 the ‘road had been comprehensively hailed by all

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
	<p>community be it media, trade unions, non-governmental organisations</p> <ul style="list-style-type: none"> • Did host government create awareness and undertake public education • Did the project have political capital? • Where community concerns addressed during planning and construction phases? • Was the public perception of the project positive or negative? 	<p>stakeholders as great achievement that delivers significant benefits to the community’.</p> <ul style="list-style-type: none"> • As stated by Infrastructure Australia (2008) responsiveness and successful community relations was a hallmark of the Westlink M7 project. • Project had strong political capital with both the NSW Premier Morris Iemma and the Prime Minister. John Howard both attending the toll road opening. • Community concerns were addressed during the process, this resulted in changing the route to a more easterly direction through Cecil Park and moving the alignment at Prestons Road to reduce the impact on endangered ecological communities. • Westlink M7 commissioned the market research firm UMR to undertake a perception study 6 months after opening. 47% of respondent had a positive opinion of the M7, 28% somewhat positive. Based on the study and the overall lack of negative publicity it can be perceived the overall public perception the project was positive.
5	<p>Transparency of Procurement.</p> <ul style="list-style-type: none"> • Tendering process that ensured value for money through competitive bidding process • Level of communication with stakeholders • Public and private sections transparent and open to the external stakeholders 	<ul style="list-style-type: none"> • Tendering process ensured value for money as three Consortiums bided for the work. • Tendering completed within <i>Working with Government Guidelines for Privately Financed Project Nov 2001</i> • Summary of Contract provided by RTA in 2003 in accordance with NSW Governments November 2001 Guidelines for Private Sector Participation in the Provision of Public Infrastructure • Summary of Contracts does not disclose the private sector parties cost structures, profit margins, intellectual property or any other matters which may impact on their competitiveness with their competitors. • In addition another report titled <i>Post Implementation Review M7 Motorway, Cross City Tunnel and Lane Cove Tunnel (March 2010)</i> was

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		<p>completed by the RTA which was required under the NSW Governments <i>Working with Government Guidelines</i>, December 2006. The purpose of the review was to assist in refining the processes used in developing private sector motorway projects in the future.</p>
6	<p>Economic Viability.</p> <ul style="list-style-type: none"> • Accuracy of the traffic volumes – Forecast versus actual • Effect of actual traffic volumes on financial performance, short term and long term • Forecast Traffic volumes and Financial model 	<ul style="list-style-type: none"> • At the time of opening in 2006 initial traffic volumes were lower than forecasted. Actual 94,808 ADT, Projected 196,500 ADT (Black 2014) • Traffic Volumes Q2 2014 were 154,000 (ChartingTransport.com) • The project has been commercially successful, as highlighted in operator Transurban’s 2011 <i>Investor Roadshow Presentation</i> • Figure 11 shows a growth of 160% since 2006 which is also confirmed by Department of Infrastructure and Growth (2011) who also reported a strong growth. • Even though tolls were lower, toll revenue forecasts were better than traffic forecasts. This was due to the compensating errors in trip lengths. • Financial model was dependent on the traffic volumes however it was also dependent on the trip lengths
7	<p>Environmental outcomes.</p> <ul style="list-style-type: none"> • Reduction in traffic congestion • Reduced air and noise pollution • Removal of traffic from local streets • Improvement of visual and environmental amenity 	<ul style="list-style-type: none"> • Infrastructure Australia (2008) identified some of the key environmental outcomes as being; <ul style="list-style-type: none"> ○ Reduced number of heavy vehicles using local roads, resulting in better air quality and less noise in residential areas. ○ Improved travel efficiency also improves air quality by reducing the interrupted progress that heavy vehicles experienced when using the Cumberland Highway ○ Extensive use of noise mounds and noise walls along the

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		corridor.
8	<p>Economic contribution to the cities/regions in which they are constructed.</p> <ul style="list-style-type: none"> • More efficient movement of freight resulting in economic benefits • Improvement to service delivery to the business districts along the corridor • General reduction in travel times for road users resulting greater efficiency 	<ul style="list-style-type: none"> • Benefit: cost ratio was identified by the RTA (2003) and calculated to be between 2.7 and 5.1 as a ratio of the benefits versus the design and contract costs plus the operation and maintenance costs • Infrastructure Partnerships Australia (2010) have also identified the following economic benefits; <ul style="list-style-type: none"> ○ Increased efficiency to freight and distribution industries with major businesses (Woolworths, Coles, TNT) relocating their logistics centres to business parks near the motorway ○ CB Richards Industrial Research concluded the M7 was responsible for a huge surge in the industrial development in Sydney
9	<p>Additional factors identified during research</p> <ul style="list-style-type: none"> • Extensive Market Research <ul style="list-style-type: none"> ○ Identification of the needs of the toll road users 	<ul style="list-style-type: none"> • Infrastructure Australia (2008) reported that one of the lessons learnt was that extensive market research was important to help sell the project to the client base. The research ensured the pricing strategy suited expected use patterns. The use of the distance based toll system met the needs of the road operator and was also considered ‘fair’ by the patrons using the toll road.

4.3.5 Conclusion

The Westlink M7 is a highly successful PPP toll road. Its success is a result of thorough and comprehensive planning, extensive community consultation and market research. In addition the toll road is successful from a design and engineering perspective. When compared against the appraisal model the project performed well against all criteria and the appraisal was also able to identify market research as an additional success factor.

Specifically risk allocation and sharing was effectively transferred to the consortium which, as result of the strengths this party was best suited to manage. The critical risk of patronage forecasting was mitigated through the consortium independently establishing the anticipated volumes. Although the initial patronage volumes did not match the projected volumes the toll road was still economically viable due to a higher than expected proportion of short trips (Department of Infrastructure and Transport 2011 p.23).

A strong level of political support was provided to the project at Federal, State and Local Government Levels. In addition strong public support was encountered as a result of the responsive and successful community relations. Extensive market research resulted in the consortium being able to sell the project to the client base as well as ensuring the pricing strategy suited their expectations. In addition the distance based toll system was also considered 'fair' by the road users (Infrastructure Australia 2008).

The completed toll road resulted in reduced traffic volumes on local roads as well as the Cumberland Highway and therefore reduced air pollution and noise in populated areas of Western Sydney. In addition Western Sydney has received significant economic benefits as result of large companies basing their operations near the road corridor along with increased residential development.

4.4 Go-Between Bridge (Brisbane)

4.4.1 Introduction and Background

The Go-Between Bridge (formerly the Hale Street Link) is a four-lane tolled bridge for vehicles, pedestrians and cyclists across the Brisbane River. The bridge provides a link between Brisbane's inner northern, western and southern suburbs. It connects Coronation Drive and Hale Street in Milton to Montague Road, Merivale and Cordelia Streets in South Brisbane.

Construction of the project commenced in 2008 and the Bridge was opened to traffic on the 5th of July 2010. The bridge formed a key part of Brisbane City Council's long-term plan to improve cross-city travel and tackle congestion. It was the third in a series of TransApex projects planned to accommodate Brisbane's growth. Unlike the two other projects, Clem7 tunnel and Airport Link, the Go-Between Bridge was financed by the government rather than private industry (Department of Infrastructure and Planning 2011, p. 24). The project was delivered under the 'Government, Builds, Tolls then Sells' (GBTS) model. Under this model the asset is sold once in operation when the actual patronage volumes are known.

The contract to design, build and maintain the infrastructure was awarded to the Hale Street Link Alliance which consisted of Seymour White, Macmahon Constructions, Bouygues Travaux Publics and Hyder Consulting. Construction was completed in July 2008 for a cost of \$338 million.

4.4.3 Hale Street Link – A New PPP Model

A direct response to the change in investor appetite for traffic risk has been the emergence of the 'Government Builds, Tolls then Sells' (GBTS) model. Under this model, government engages private sector contractors to design, build and maintain the road and install tolling equipment, under public funded contracts. The government then retains the tolls during the ramp-up stage as the projects develops some patronage data. Once the traffic volumes are known the government then sells the right to levy and collect future tolls to the private sector. The GBTS model was applied to the Go-Between Bridge which was sold to Queensland Motorways (now Transurban Queensland) in December 2013 (Hayford 2014).

4.4.4 The Current Status of the Go-Between Bridge

The Go-Between Bridge was sold by the Brisbane City Council to Queensland Motorways in December 2013 with Queensland Motorway being bought by Transurban in 2014, who is now called Transurban Queensland.

The actual traffic patronage in 2010 was reported to be close to forecasts, with around 11,700 vehicles by September 2010 compared to forecast 12,800 for October 2010. However the comparison is invalid as the early toll was \$1.50 instead of the \$2.70 used in the forecast. Revenue forecasts were over optimistic. The current toll is \$3.02 for a standard vehicle and the patronage in 2014 was 14,000 to 15,000 vehicles a day (Passmore 2014).

4.4.5 Measurement against Proposed Framework using Appraisal Template

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
1	<p>Risk allocation and sharing</p> <ul style="list-style-type: none"> • Were the major risks allocated to the party best able to manage it? • Did government refrain from the idea of transferring all project risk to the private sector? • Did the public partner retain risks that obviously went beyond the control of the private sector? 	<ul style="list-style-type: none"> • Major risk were transferred to the parties best able to manage them as the “Government Builds, Tolls then Sells” (GBTS) model was used. As the construction of the project was completed under an ‘alliance’ Brisbane City Council (BCC) would have taken on some of the construction risk which may have resulted in savings. BCC took the risk on the traffic patronage. • As the GBTS model was used the government (BCC) refrained from transferring all risk to the private sector and as such the public partner retained the risk that went beyond the control of the private sector being the road patronage. As the construction component of the project was completed as an alliance BCC retained some of the risk.
2	<p>Strength of private consortium.</p> <ul style="list-style-type: none"> • Was the construction company component of the consortium large and well established? • Was consortium equipped with strong technical, operational and managerial capacity to undertake the project? • Did the consortia (Private contractor concessionaire) have easy access to the financial market with the associated benefits of lower financial costs? • Was the winning consortium proposal a Cost effective technical solution? 	<ul style="list-style-type: none"> • The ‘construction company’ consisted of an alliance between Seymour White, Macmahon Constructions, Bouygues Travaux Publics and Hyder Consulting and Brisbane City Council. • The construction alliance consisted of a local contractor (Seymour Whyte), a national contractor (Macmahon), a large multinational contractor (Bouygues) and a large international designer (Hyder), this resulted in strong ‘construction company’ that had the advantage of local, national and international knowledge which can therefore be perceived as having strong technical, operational and managerial capacity. • The Project was initially funded by the Brisbane City Council however the toll road is now owned by Transurban which is one of the largest toll road owners and operators in the world and has great financial strength. • GHD was engaged by the Brisbane City Council to complete a feasibility study and impact assessment study of the proposed Hale

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		Street link. GHD looked at a variety of options with the preferred option being a segmentally launched concrete box girder bridge. Based on the feasibility process it appears the final design represented a cost effective technical solution.
3	<p>Political Support.</p> <ul style="list-style-type: none"> • Did the government (previous and current) have a positive political attitude towards the private sector involved in the infrastructure project? • Where there existing government policy for the management of PPPs? • Had the project been part of a long term transport plan? • Was political backing strong and did the government at the time ‘sell’ the project? 	<ul style="list-style-type: none"> • No evidence exists of any negative political attitude towards the private sector involved in the project. • Project formed part of the Brisbane City Council TransApex plan which was a long term transport plan first proposed by future premier Campbell Newman at the 2004 election. • No specific government policy was identified for the Brisbane City Council to manage PPPs. • Campbell Newman (when Major) was known at the time of delivery as ‘can do Campbell’ and had successfully championed the construction of the North South Bypass Tunnel (Clem7). This meant the project had strong political backing from the mayor at the time. • Due to the significant community and press opposition to the proposed bridge, significant effort was put into winning community support. (Department of Infrastructure and Transport 2011p. 26)
4	<p>Public/Community Support.</p> <ul style="list-style-type: none"> • Project acceptance and understanding by the public community be it media, trade unions, non-governmental organisations • Did host government create awareness and undertake public education • Did the project have political capital? • Where community concerns addressed during planning and construction phases? • Was the public perception of the project positive or negative? 	<ul style="list-style-type: none"> • As stated above, there was significant community and press and opposition to the project. Considerable effort was made to win community support, this included naming the bridge after the famous indie rock band The Go-Betweens, having a charity concert with members of the band, having a community open day at opening and making cycle and walking lanes free • Due to the concerns of the community and the negative press which existed, the project had little political capital. • Community concerns were addressed, A feasibility study to assess the project commenced in July 2005. Crucial to Council’s evaluation was a voluntary Impact Assessment Statement (IAS) and Business Case that included comprehensive stakeholder community engagement and

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
		<p>consultation. After 15 months of consultation and issues management an unprecedented 9,000 submissions were made by stakeholders.</p> <ul style="list-style-type: none"> Public perception was generally positive with widespread support from the greater Brisbane community however opponents to the Link were vocal and well organised.
5	<p>Transparency of Procurement.</p> <ul style="list-style-type: none"> Tendering process that ensured value for money through competitive bidding process Level of communication with stakeholders Public and private sections transparent and open to the external stakeholders 	<ul style="list-style-type: none"> The initial feasibility study to find the most efficient concept design followed by the tender process ensured value for money in terms of delivering the asset for operation. Generally not a high level of transparency in the procurement process existed however cost increases have been widely reported with the estimated cost being \$307 million in 2008 however the project's final cost was \$338 million which was a result of a via-duct having to be constructed on the Coronation drive side.
6	<p>Economic Viability.</p> <ul style="list-style-type: none"> Accuracy of the traffic volumes – Forecast versus actual Effect of actual traffic volumes on financial performance, short term and long term Forecast Traffic volumes and Financial model 	<ul style="list-style-type: none"> The actual traffic forecast in 2010 was reported to be close to forecasts, with around 11,700 vehicles by September 2010 compared to forecast 12,800 for October 2010. Patronage in 2014 was 14,000 to 15,000 vehicles a day. “Government Builds, Tolls then Sells” (GBTS) model was used. The government's main priority was to provide infrastructure and not so much the financial return. The actual traffic volumes did not have as much of a significant effect on BCC as they would have had on a consortium using a ‘Build Own Operate Transfer’ (BOOT) PPP Model. The reduced traffic volumes meant BCC was not recovering their costs. As the bridge was sold to Transurban BCC have received market value for the bridge in terms of how much revenue it can generate. BCC's true cost for the bridge is the construction cost less the sale cost. Therefore BCC have ended up with valuable piece of infrastructure at a fraction of the cost.

Item	Success Factors and Sub-Success Factor Appraisal Criteria	Assessment
7	<p>Environmental outcomes.</p> <ul style="list-style-type: none"> • Reduction in traffic congestion • Reduced air and noise pollution • Removal of traffic from local streets • Improvement of visual and environmental amenity 	<ul style="list-style-type: none"> • Toll Road formed part of the TransApex plan whose main objective was to relieve congestion in Brisbane. <p>BCC website claims the Go-Between Bridge would;</p> <ul style="list-style-type: none"> • Improves cross river accessibility • Reduce Congestion • Opens up extra networks for pedestrian and cyclists • Provide additional relief in the event of an accident elsewhere in the city • Cater for future population growth in Wet End and South Brisbane
8	<p>Economic contribution to the cities/regions in which they are constructed.</p> <ul style="list-style-type: none"> • More efficient movement of freight resulting in economic benefits • Improvement to service delivery to the business districts along the corridor • General reduction in travel times for road users resulting greater efficiency 	<ul style="list-style-type: none"> • The cost benefit analysis which formed part of the Business case for the project detailed project costs over a thirty year period as detailed by Kraatz (2009) and claimed the following: <p>The HSL is economically positive for both the base case and a number of additional sensitivities. These additional sensitivities included increasing the discount rate and construction costs. Additionally, the economic assessment found that:</p> <ul style="list-style-type: none"> - Approximately 65% of the benefits arise from travel time savings; - Approximately 24% of benefits arise from vehicle operating cost savings; and - Approximately 10% of benefits arise from a reduction in vehicle emissions.
9	<p>Additional factors identified during research</p>	<p>No additional factors of significance identified.</p>

4.4.6 Conclusion

The Go–Between Bridge provided the first river crossing over the Brisbane River in 40 years with debate still continuing whether it should be considered a success. When the project is measured against the frame work it is more successful than unsuccessful.

The risk allocation and construction component of the toll road can be classed as successful as the delivery resulted in world class piece of infrastructure and the use of the GBTS PPP model was a smart response to the challenges of the project. Political support was mixed however the ‘can do’ Major, Campbell Newman championed the project and ensured its delivery.

Public community support was mixed however the patronage numbers now appear to be close to forecast which generally shows a high level of support as the community has not ‘boycotted’ the bridge. There appeared not to be a high level of Transparency of procurement as there was not the same level of reporting provided for road projects in New South Wales.

The economic viability was the most contentious issue however this is debatable as it really is a question of what the function of government is. A Brisbane City Council representative stated that the economic viability was not the priority of the toll way and this is substantiated by the adoption of the GBTS model. As the toll way has now been sold to Transurban BCC have received market value for the asset and even if this is less than the actual cost they are still in a better financial positon than had they built the bridge and not tolled it.

Economic contribution is difficult to quantify however the bridge would have some effect on traffic congestion and travel times and therefore would be making a positive economic contribution.

Chapter 5 - Framework Validation

The case studies were used to test the appropriateness of the nominated factors to enable project success. Although specific results were recorded against each of the factors, the overall perception of success within society also had to be gauged.

The Eastern Distributor and Westlink M7 toll roads are perceived as successful. The success of the M7 project is substantiated by the Infrastructure Australia (2008) report that stated that it considered the project a highly successful example of a true PPP. The Eastern Distributor's level of accomplishment is supported by Warren (2007) who proposed that the Eastern Distributor was successful, this was also supported by the Infrastructure Implementation Group (2005) who reported that the project was a relative success.

The Cross City Tunnel is classed as a failed PPP. Ferguson (2009) refers to the project as a disaster although this was more from the perspective of an investor, while Phibbs labelled the project as a 'fairly spectacular failure as a Public Private Partnership'. In addition the Second Audit Report undertaken by the NSW State Government was completed to address the public mistrust in private involvement in the provision of infrastructure. This provided additional support to the notion that the Cross City Tunnel was a debacle.

While the classification of the abovementioned three case studies is clear, the Go-Between Bridge is ambiguous. Based on the evidence encountered in the case study review the project could be deemed as a success, however literature does not provide a clear statement to substantiate this theory. As a result for validation purposes this toll road will be overall classified as neutral.

A summary of the case study outcomes based on the Appraisal Criteria is provided in Table 2. The summary details whether each of success factors were adequately addressed in the case study projects.




Item	Success Factor	Success Factor Status from Case Study			
		Eastern Distributor	Cross City Tunnel	Westlink M7	Go-Between Bridge
1	Risk Allocation and Sharing	●	●	●	●
2	Strength of private consortium	●	●	●	●
3	Political Support	●	●	●	●
4	Public/Community Support	●	●	●	●
5	Transparency of Procurement	●	●	●	●
6	Economic Viability	●	●	●	●
7	Environmental factors	●	●	●	●
8	Economic contribution	●	●	●	●
9	Additional factors	●	●	●	●
 Success Factor was evident  Success Factor was not evident					
 Success Factor marginally evident					

Table 2 – Case Study Success Factors Status Summary

The framework is validated by the results of the case studies and is consistent with the perceived level of success of the subject projects. The case studies of the Eastern Distributor and the Westlink M7 had eight contributing success factors and are perceived to be successful. The Cross City Tunnel did not possess four of the eight factors and is widely regarded as an unsuccessful PPP. While the Go-Between Bridge was neutral on two of the factors and as a result incurs ongoing debate on its success.

In addition, the framework provides a gauge of how balanced a project is when considered in terms of equilibrium-where the requirements of society are considered as a whole. The inclusion of the Environmental Outcomes criteria provides an

opportunity to measure how the toll road impacted on the surrounding environments. This was one of the strongest attributes of the Eastern Distributor and Cross City Tunnel which justifies its inclusion in the framework.

Economic Contribution was also required to provide a holistic framework and the results of the case studies substantiate its inclusion. This was also one of the most successful outcomes of the Westlink M7 and was also significant for the Eastern Distributor. The results of the case studies, and the fact that the increase of economic performance is one of the main drivers for road infrastructure, confirms the inclusion of Economic Contribution in the framework.

The framework is also consistent with the Equilibrium Framework proposed by Garvin (2007). Garvin's concept proposed that for a PPP project to be overall successful the competing interests of participants must reach an overall balance. The overall successful projects could be said to be located within Garvin's range of balance within his P3 equilibrium framework. For example the Eastern Distributor's high rate of return was in the interest of industry. The fact that all the risk was taken on by the consortium was in the interest of the state while the strong environmental outcomes and economic contribution was in the interest of society. This overall resulted in a relatively balanced programme. The Cross City Tunnel however was outside the range of balance as the risk allocation, combined with the lack of economic viability, meant the interests of the state were too arduous which resulted in a bias. In addition it was perceived by the community that road closures forcing motorists to use the toll road were in the interest of the private consortium (industry). NSW parliamentary enquiry however concluded that this was unfounded.

In conclusion the significance of the factors selected on the overall performance of the case studies justifies their selection and therefore validates the framework. The selected success factors provide a holistic appraisal structure which is consistent with Garvin's equilibrium framework.

Chapter 6 – Results and Discussion

6.1 – Case Study Results

The case studies provided clear evidence that consideration of all the success factors does lead to a successful Public Private Partnership. It was apparent that the Eastern Distributor and the Westlink M7 toll roads had adequately addressed all of the success factors. They had a high level of achievement in terms of being financially viable along with meeting their main objective of servicing society. In addition, marketing was identified as an extra success factor that was critical to the toll road meeting the requirements of the road users. The Cross City Tunnel Project did not have the success factors of Political Support; Public/Community Support, Transparency of Procurement and Economic Viability and has struggled to be viable to this day.

Risk allocation and sharing was evident in all of the case studies as this is one of the main components of the PPP delivery model. As discussed in the background and literature review chapter, governments are attracted to the PPP the model by the belief that the risks are allocated to the parties best able to manage them. From the evidence of the case studies this is generally supported. The risks associated with project delivery such construction risk are definitely managed more effectively by the construction consortiums than with government. From a delivery point of view all the case study projects were finished well ahead of programme with no major engineering issues. However when it came to the risks associated with traffic patronage it is debatable whether the consortiums were the best parties to manage this aspect. The Eastern Distributor and Cross City Tunnel case studies demonstrate the two extremes of what the can be the outcome of taking on the traffic patronage risk. The Cross City Tunnel was a failure due to the actual traffic volumes being less than forecast which resulted in the toll road going into receivership. The Eastern Distributor predicted traffic volumes appeared to have been under estimated which resulted in huge returns (45% IRR) for the consortium, however this meant the users were not really receiving value for money as the tolls could have been lower. If the government takes on the traffic risk as is done with the Government Builds, Tolls

then Sells (GBTS) model two positive outcomes are achieved. Firstly the toll rate that is finally adopted is the market rate as dictated by the actual patronage and secondly it ensures the ongoing viability of the PPP model. The private sector was not going to keep funding toll roads after the disasters of the Cross City Tunnel, Lane Cover Tunnel, CLEM7 and Airport Link.

The strength of private consortium that delivered the toll roads was another important factor which was supported by the case studies. All the case studies had strong private consortiums which was supported by the fact that all the case study consortiums delivered world class pieces of infrastructure well before their contractual completion dates. The main weakness of the consortiums was their ability to properly manage the development of traffic forecasts.

Political Support was identified as a fundamental success factor, as without this projects will simply not progress past concept stage. All the case studies had a strong level of political support however the Cross City Tunnel only experienced this at the opening of the toll road. The Cross City Tunnel provides the perfect example of what can happen to a project if the public/community support is withdrawn and even becomes hostile. As detailed in the case study the public perception was that secret deals had been done between the government and the consortium to make changes to surface roads and funnel road patrons into the tunnel against their will. This resulted in a negative media campaign and road users actively boycotting the toll road. In contrast the Westlink M7 toll road completed market research to identify whether its tolling strategy was going to meet the expectations of society. Ultimately this strategy meant that the toll road users thought the distance based tolling rates were fair as they were only being charged for what they used. The Westlink M7 strategy also resulted in 'Marketing' being identified as an additional success factor. Transparency of Procurement as a success factor was also supported by the case studies as it effected the level of public/community support. Generally the Roads and Maritime Service projects had a high level of transparency which was supported by the existence of multiple government reports and audits. As previously discussed, there was a public perception of secret deals that resulted in the surface road changes for the Cross City Tunnel however parliamentary enquiries found this was unfounded. The Cross City Tunnel however demonstrated that the perception of

transparency of procurement as being an important success factor as without it public support can be lost resulting in political pressure.

Positive environmental outcomes represents one of the leading objectives for the development of a road infrastructure. All the case study projects resulted in positive environmental impacts on the surrounding communities to the toll roads. This was particularly evident with the Eastern Distributor where a number of indirect public domain improvements were made. This included a substantial reduction in through traffic in the inner city suburbs of Surry Hills and Darlinghurst which resulted in improvement in environmental quality, amenity and the local economy. This has translated into significant redevelopment and upgrading of existing buildings, reinforcing an active area for community and business. Positive environmental outcomes such as the removal of traffic from local roads and moving large traffic volumes away from built up areas are key success factors for any toll road. This is one of the true benefits to society as a whole.

As previously stated, one of the main drivers for toll roads is an increase to the economic performance of a city or region by reducing travel times, reducing vehicle operating costs, reducing accidents and vehicle emissions. All the case studies showed that some level of economic contribution was achieved with the Westlink M7 having a major impact on the economic prosperity of the areas located adjacent to the corridor. Once again this is a critical success factor as the economic contribution benefits the whole of society including the individual, business and the state.

6.2 A future model for project delivery

The main recommendations that can be made as a result of the findings of the case studies to achieve the successful delivery of projects in the future include;

1. Governments should continue to adopt the PPP model and appoint the majority of the risk to the delivery consortiums, however to ensure the ongoing feasibility of the model governments must take a more active role in the management of traffic patronage risk. One such method is the adoption of the Government Builds, Tolls then Sells (GBTS). Ultimately governments

need the PPP model to remain healthy and attractive to the private sector as they no longer have the economic or managerial capacity to deliver such projects.

2. Any PPP toll road delivery strategy must include a well-developed plan of how the public and community will be brought into the project. This includes engagement from the conceptual to operational stage. As demonstrated by the Cross City Tunnel Project, a community who feels they have been excluded from the development and delivery of a project can generate high political and economic consequences. A well planned marketing campaign as demonstrated by the Westlink M7 case study can be a key component to ensure the product being delivered meets community expectations which then results in public support.
3. Any delivery of a PPP toll road must ensure transparency of the procurement process between the public and private sector. By doing so the risk of negative public community support is minimised which can reduce political risk
4. The accuracy of traffic forecasts is critical to the economic prosperity of any PPP toll road and as such must be one of the main focuses of government and delivery consortiums. Where the accuracy of traffic forecasts is questionable steps must be taken to mitigate the risk such as the adoption of the GBTS model.
5. Positive Environmental Outcomes including strong public domain improvements are one of the key indirect outcomes of road infrastructure and as such must be a key motivation for any PPP toll road.
6. Economic contribution to the cities/regions in which the toll roads are constructed is the fundamental reason for their existence. It is therefore vital that any toll road delivery must be based on the positive cost benefit ratio.

Ultimately the success factors identified can be adopted as a high order appraisal technique to govern whether a proposed project including its delivery method has the attributes to be considered a successful Public Private Partnership.

6.3 Government Builds, Tolls then Sells (GBTS) model.

The evolution of the Government Builds, Tolls then Sells (GBTS) model can be directly related to the equilibrium framework proposed by Garvin (2007).

Garvin proposed that the basic objective of a PPP programme was to nurture the development of the market and sustain its existence. He further proposed that to do this a PPP programme must establish equilibrium among four environments: (1) state, (2) society, (3) industry, and (4) the market.

The financial failure of toll roads in the last ten years has meant there was no longer an equilibrium among the four environments, as the state was the main beneficiary. State and society was basically receiving below cost infrastructure while industry made significant losses and the market was becoming unfeasible. This meant the PPP programme was not nurturing the development of the market and its existence was becoming unsustainable.

The government response to the imbalance was the development of the GBTS model. Under the GBTS model, the government bears the traffic risk during the ramp up period and the private sector bears the traffic risk after the ramp up-where traffic patronage risk is low. The change in the delivery model ensures the PPP programme remains sustainable and therefore ensures its existence.

Chapter 7 – Conclusion

The success factors identified in the literature review and then tested against the case studies all played important functions in ensuring overall success of the projects. As such all factors need to be considered for a holistic approach which not only ensures the success of an individual project but the ongoing sustainability of the Public Private Partnership market along with addressing the needs of society as a whole.

Eight factors were initially identified in including;

1. Risk allocation and sharing.
2. Strength of private consortium.
3. Political Support.
4. Public/Community Support.
5. Transparency of Procurement.
6. Economic Viability.
7. Environmental outcomes.
8. Economic contribution to the cities/regions in which they are constructed.

The Westlink M7 case study found marketing was also a critical component of the project success. All factors from the framework were found to be significant, however economic viability and public/community support appeared to be the most critical as they ensured the ongoing nurturing of the market as well as enabled continuing of political support for the PPP delivery model. Therefore the eight factors identified plus the additional factor identified in the Westlink M7 case study contribute to the success of PPP toll roads in Australia.

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APPENDICES

A.1 Project Specification

University of Southern Queensland
Faculty of Engineering and Surveying

ENG4111 Research Project Part 1 **PROJECT SPECIFICATION**

For	Luke Diffin
Topic	Own Identification of contributing factors for the success of tolls roads in Australia under Public Private Partnerships (PPP)
Supervisor	Steven Goh
Enrolment	ENG4111 – Semester 1 ENG4112 – Semester 2
Project Aim	The objective is to investigate what makes a Public Partnership toll road Project successful in terms of a given framework and what successful attributes can be replicated for future projects.

Programme **Version 1, 15th March 2015**

1. Establish framework criteria for the measurement of success. Investigate existing frameworks for PPP evaluation and decide upon those criteria which should be included. This will be undertaken as part of the Literature Review.
2. Investigate the success of specific toll road projects in Australia according to the framework by collecting and analysing the raw data outlined below.
3. Collect data for each criterion for the chosen case studies using the following sources;
 - a. Literature Review
 - b. Publicly available financial information e.g. Annual Reports
 - c. Strategic Transport Plans produced by Government and other Industry Organisations.
 - d. Business case studies.
 - e. Community sentiment from Media Reports, Minutes of Community Liaison Groups etc.
 - f. Data on road patronage and tolls.
4. Analyse the collected data and evaluate how projects can be categorised according to the framework.
5. Validation of proposed framework.
6. Provide recommendations for the future successful delivery of projects based upon lessons learnt from the case studies.

Agreed:

(Student)
(17 / 03 / 2015)

(Supervisor)
(/ /)