

# Driving Alone- Sydney's Cross City Tunnel

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**Abstract:** The cross city tunnel in Sydney has been a fairly spectacular failure as a Public Private Partnership – the operating company has gone into receivership less than 2 years after the tunnel opening in August 2005. The tunnel, built at a cost of about \$800 million failed to attract the traffic required to meet interest payments. Even when use of the tunnel was free, the traffic did not approach the forecast traffic levels of 90,000 vehicles per day.

The paper argues that the project was always a marginal one – the volume of traffic that needs to move east-west across the city is relatively small. This fundamental problem was exacerbated by the high cost of the toll (\$3.56), the lack of traffic growth in the east of Sydney and the negative reaction of consumers against what they saw as Government attempts to force them to use the tunnel.

Whilst a major difference of this project compared to earlier PPPs is that the private partners bore most of the risk, the actions of the Government in breaking the terms of the original contract will expose them to higher risks and financing costs in the future. The issue for the private infrastructure sector is that the public views the project as a dismal failure and hence their appetite for future PPPs may be diminished.

## 1. Introduction

There has been widespread adoption by Governments across the world of Public Private Partnerships (PPPs) as a way of providing public infrastructure. Grimsey and Lewis (2004, p15) report that the UK version of PPPs, Private Financing Initiatives (PFIs) fund between 10 to 15 percent of public infrastructure. In NSW, PPPs have averaged around 11% of the overall NSW capital works budget since 1993-1994, and this percentage is expected to remain between 10% and 15% in future (NSW Joint Select Committee on the Cross City Tunnel, 2006b, p30).

PPPs are seen to have the dual benefits of reducing the calls on the government purse as well as bringing the skills of the private sector to bear on the delivery of important infrastructure. Given the popularity of PPPs it is not surprising that an extensive literature has developed. However, as Sagalyn (2007, p7) comments:

*Descriptions of projects, institutional structures and financing arrangements are commonplace, yet we know little about the details of deal negotiations and project execution and even less about project performance..... We lack systematic evaluations of actual practice, reasoned debate on the thorny policy issues and summaries of common implementation challenges... This void reflects a troublesome gap between theory and practice: Those who know about how to organize public/private ventures seldom stand back from their work and evaluate it, and those who write about the subject are seldom knowledgeable enough about the details to go beyond broad assertions*

This paper attempts to fill this gap by describing in reasonable detail the story of a major transport PPP, the Sydney Cross City Tunnel. This description is greatly assisted by the availability of a range of contract documents which were tabled in the NSW Parliament in November 2005, the report of a Joint Select Committee of the NSW Parliament (2006a and 2006b) and a report from the NSW Auditor-General (2006).

## 2. The Cross City Tunnel: the story so far

The story so far is based on a range of documents including the NSW Auditor-General Report, the reports of the Joint Select Committee and Sexton (2007).

In 1991- The idea of a tunnel going under the city linking the east of the and west of the city has been in the public domain for a considerable period of time. For example, the Concrete Kumagai Joint Venture, with the encouragement of Sydney City Council prepared an environmental study of an east-west route i.e. from William Street (outside the Australian Museum) under Park and Druitt Street to Sussex Street in 1990. The economic evaluation for this project prepared a benefit-cost analysis for the route using a traditional economic methodology. A very interesting aspect of this evaluation was that a positive benefit cost ratio (i.e. where the Present Value of the Benefits exceed

the Present Value of the Costs) was only obtained when additional benefits in the form of the operation of a large underground car park with associated retail was added to the scheme. Without these additional benefits, when the road user benefits including travel time savings were compared to construction costs, the benefit cost ratio was only 0.88 (Manindis Roberts Consultants, 1990, p12). For an inner urban road project, with large traffic volumes - this was a very low benefit –cost ratio and is a reflection of two main factors – the very high cost of tunneling through inner city locations and the relatively low levels of traffic that wants to move east-west across the city.

In 1998 the NSW Government proposed a cross city tunnel which was fairly similar to the Kumagai vision i.e. from William Street (outside the Australian Museum) under Park and Druiit Street to Sussex Street.

The Roads and Traffic Authority (RTA), the main road building arm of the government commenced an environmental impact study for the project in July 1999. The Government took the view from the outset that the project would best be undertaken as a PPP, largely to reduce the cost of funds to Government. In September, 1999, the State Government adopted a modified proposal – a longer tunnel, under William Street from Kings Cross to Sussex Street. The announced tolls were \$2.50 each way cross city (see Figure 1).

In August 2000, the EIS was released for public comment.

In September 2000 the RTA called for tenders from the private sector to finance, design, construct and operate the project for a period of thirty years and then hand ownership back to the Government. In terms of a PPP, the project could be classified as a BOOT scheme (Build, Own, Operate and Transfer).

In February 2001, the RTA selected three consortiums from the eight consortia that registered an interest, to submit detailed proposals for the project. Each of the consortiums prepared details proposals for the Government scheme – the long tunnel. Two of the three consortiums also prepared detailed bids for a number of alternative schemes.<sup>1</sup>

In October 2001 the Minister for Urban Affairs and Planning issued the conditions of approval for the CCT project.

In February 2002 – the CrossCity Motorway Consortium (CCM) was announced as the preferred tenderer. CCM's non-complying 'Long 80' bid was selected as the final project. The Long 80 route extended the tunnel further east to Rushcutters Bay (see Figure 1)<sup>2</sup>.

In March 2002, the then Treasurer wrote to the then Minister for Roads stressing the need to deliver the project at 'no net cost to Government', stating that the RTA should use its own capital budget to cover cost increases. This reluctance of the Government to fund any additional works, and the constraints on the RTA budget, meant that the costs increases were passed back to the CCM (see below).

In May 2002, the RTA developed a Supplementary EIS for CCM's 'Long 80'. The new conditions of approval added substantially to the project scope and cost.

In December 2002, the Project Deed (contract) was executed containing the changes to the toll escalation ratios to cover \$75 million in extra costs (see below).

In December 2004 the first amendment deed was signed allowing CCM to increase the base toll by 15 cents in return for funding \$35million worth of additional project costs.

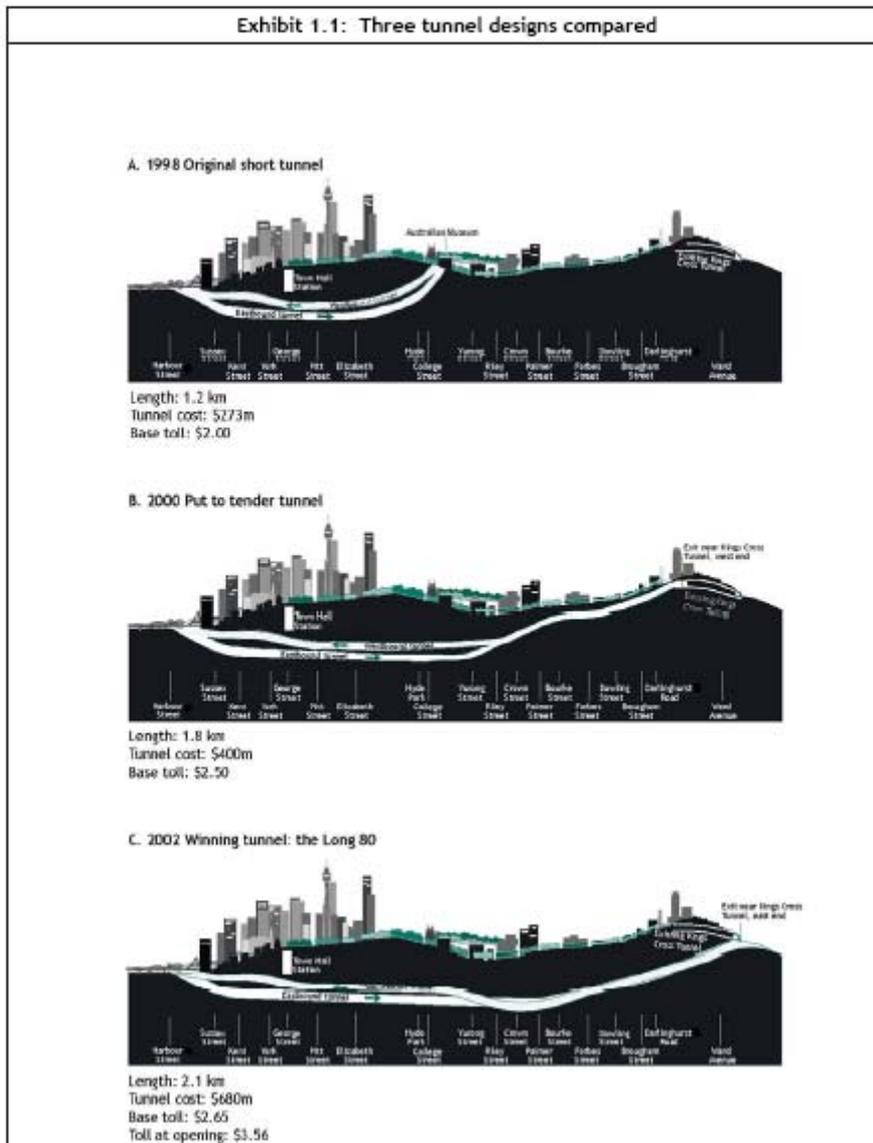
The final cost of the tunnel is estimated as \$800 million. It was funded through \$220 million of equity (Cheung Kong Infrastructure 50%, DB Capital Partners (30%) and Belfinger Berger (20%) and by borrowing \$580 million from a range of Australian and international banks led by Westpac and Deutsche Bank.

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<sup>1</sup> The submission of alternative proposals is encouraged by PPPs in order to generate some alternative and hopefully innovative solutions to infrastructure provision.

<sup>2</sup> It was called the long 80 because the longer tunnel allowed the speed limit to increase to 80 km per hour.

Figure 1: The three tunnel designs compared



Source: NSW Auditor –General (2006, p19).

On August 28<sup>th</sup>, 2005 the tunnel opened and surface road closures start. In contrast to other toll roads the operators of CCM decide not to start the project with a toll free period. The initial low traffic figures are a cause of concern and are widely reported in the press.

In October 2005 CCM announced a toll free period which runs for one month. Traffic levels increase but are still significantly below the break even traffic levels (see Figure 2).

In November 2005, documents associated with the project were released to the public after being tabled in Parliament.

In 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'.

In February 2006 the toll is cut in half for a trial period. The relationship between the private partners and the government worsens.

In June 2006 – Government reverses 13 road closures – a “slanging” match breaks out in the press between the Government and CCM.

In December 2006 with only very limited improvements in traffic levels CCM calls in the receivers.

In April 2007 the receiver announces that they intend to sell the tunnel

In June 2007 ABN Amro is named the new buyer at a price of \$695 million.

The outcome of this long process was disillusionment with PPPs by the public, a lot of criticism of the NSW Government's role in the project, and the private sector partner - the CrossCity Motorway Consortium - going into receivership. So what went wrong? It is considered that three issues deserve some detailed consideration. These issues include:-

1. The role of traffic forecasts;
2. The size of the toll
3. The role of road closures

They are discussed below.

### **3. Traffic forecasts**

The traffic forecasts for the CCT proved to be very optimistic. Figure 2, which is reproduced from the report of the NSW Auditor-General (2006) shows that at the full toll level of \$3.56, the actual tunnel traffic did not reach even 50% of the forecast traffic levels.

Traffic forecasting is an activity which is prone to error. Flyvberg et al (2006) reported results from a statistically significant study of traffic forecasts in transportation infrastructure projects. For 50% of road projects, the difference between actual and forecasted traffic is more than  $\pm 20\%$ ; for 25% of road projects, the difference is larger than  $\pm 40\%$ . Highly inaccurate traffic forecasts combined with large standard deviations translate into large financial and economic risks.

The work of the international rating service, Standard and Poor's, has identified an optimism bias in the traffic forecasts of toll roads. They suggest that empirical evidence indicates that toll road forecasts have, on average, overestimated traffic by 20%–30%. The key conclusions focused on errors and optimism bias after the first year of operations. The error range was considerable, stretching from projects that had underperformed by 70% to projects that had overperformed by 20%. The error distribution was also skewed, suggesting the presence of systematic optimism bias. The mean error was negative 30% or in other words, on average, forecasts overestimated traffic demand by about 30%. (quoted in NSW Parliament Joint Select Committee on the Cross City Tunnel, 2006a, p80).

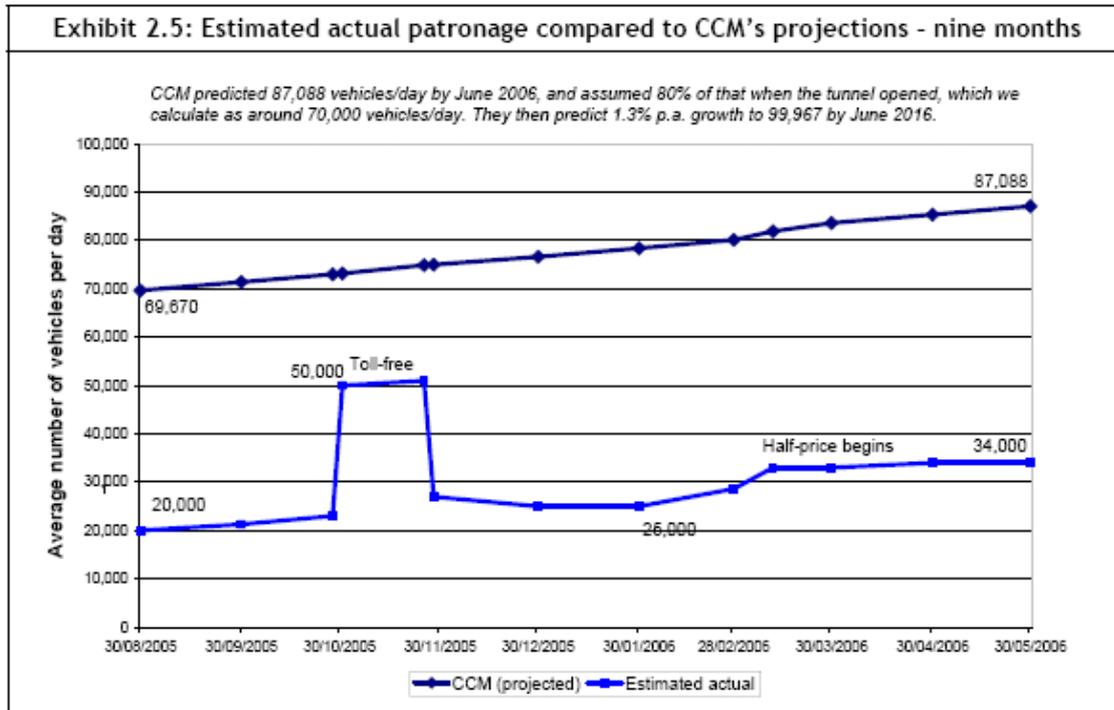
Similar comments about problems with the accuracy of US traffic forecasts are contained in Hawkins et al (2007). Forecasting for tolls is particularly difficult because when the forecasts are undertaken the exact value of the final toll is often unknown. Traffic forecasting for the CCT is particularly difficult because of the limited ability of any errors in the forecasts to be mediated by subsequent urban development. Some previous toll roads in Sydney, notably the M2 have opened with traffic levels lower than the forecasts but over time, as urban development had occurred, new residents have become users of the toll road and forecast traffic levels have been met. There is very little potential for increased residential development in the Eastern Suburbs of Sydney to generate this "new development" effect.

A number of traffic forecasts were undertaken for the CCT:-

- Traffic consultants Masson Wilson Twiney Pty Ltd, provided all the traffic figures for the RTA. The Environmental Impact Statement for the 'long tunnel' forecast traffic figures using the tunnel daily of 69,600 in 2006 and 77,600 in 2016. These figures were revised in the Supplementary EIS, with the figures for the 'long tunnel' recalculated at 86,300 for 2016. Traffic forecasts for the 'long 80 tunnel' were 101,700 for 2016. ( NSW Parliament Joint Select Committee on the Cross City Tunnel, 2006a, p79)
- The CrossCity Motorway's Consortium had their own traffic estimates, calculated by Hyder Consulting. These were higher, with a figure of 'up to 90,000' by 2006 cited in CCM's submission to the Committee.( NSW Parliament Joint Select Committee on the Cross City Tunnel, 2006a, p79)

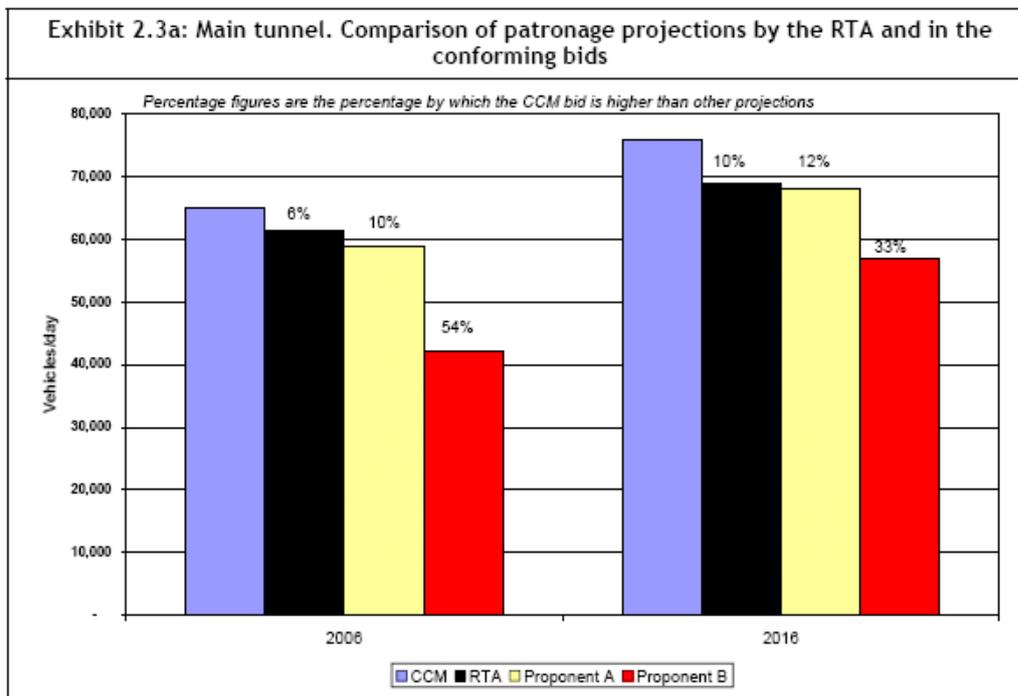
In addition, the two other shortlisted consortia submitted traffic forecasts which were released and are shown in Figure 3 for just the main tunnel (there is a smaller tunnel, the Sir John Young Crescent Exit Tunnel that directs traffic from the east over the harbour bridge).

**Figure 2 Comparing actual patronage and CCM traffic projections**



Source: NSW Auditor-General (2006) p32

**Figure 3. Comparison of projections by three short listed consortia and the RTA**



Source: NSW Auditor-General (2006) p30

The Figure clearly shows that the CCM estimates were by far the highest projections and were almost double those of the third consortium's projections for traffic levels in 2006.

The Auditor-General was critical of the RTA for not being more circumspect about the traffic forecasts of CCM. Although the traffic forecasts were the responsibility of CCM and they clearly were bearers of the revenue risk<sup>3</sup>, the errors in the forecasts exposed the Government to a high degree of political risk<sup>4</sup> and ultimately forced the CCM into receivership. The very low levels of traffic using the tunnel also meant that the above ground traffic changes, which were designed on the basis of much lower above-ground traffic levels, were unable to cope with the amount of traffic using the network, leading to a significant public backlash against the project.

The RTA in response to the Auditor-General report defend themselves by saying that three sets of traffic forecasts (their own forecasts, CCM and Proponent A) were all within 10% of each other and that the ramp-up period – or the time it takes for the traffic to reach a stable level- for the CCT is likely to be two to three years (NSW Auditor-General's Report, 2006, p9).

#### **4. The size of the toll**

At \$3.56 each way the size of the toll was the highest per km of any toll in Sydney. This was considerably higher than the original \$2 toll proposed in 1998. The higher toll was the result of not only inflation but also the decision to build a much longer tunnel and the Government's position that the tunnel had to be built at no cost to Government. This meant that all the RTA costs and a number of road changes which were required by the Department of Planning had to be paid by the proponent. The RTA allowed for these extra charges to be funded by firstly a change in the escalation factor for the tolls. About \$75 million of extra work undertaken by CCM was paid for by a change in the escalation rates from the original CPI to enable the tolls to increase by 4% or the CPI (whichever is higher) up to 2012 and 3% or the CPI (whichever is higher) between 2012 and 2018. An additional \$35 million in roadworks was paid for by an increase in the base toll of \$0.15. Figure 4, taken from the report of the Auditor-General, shows the impact of these two changes on the toll. If these changes had not been made, the opening toll would have been \$3.05 and not \$3.56.

The RTA and the operators probably took the view that given the large travel time savings that the tunnel afforded (between 15 and 20 minutes in peak hours) and the high incomes of many residents living in Eastern Sydney, motorists would not be deterred by the high prices.

Mr Paul Forward, former Chief Executive of the RTA, in evidence to the NSW Parliament Joint Select Committee on the Cross City Tunnel ( 2006a, p89) presented the rational argument for what he calls a "maximum" toll:

*The issue of the toll is very much about people's ability to pay and the value that they seek from that toll. One needs to take it back and look at the time savings. If people are going to save 20 minutes, then they make a judgment as to whether that 20 minutes or 15 minutes is worth paying the toll for. What we have noticed on other road projects is that, over time, people start to consider that decision in a fairly rational way and make their choice. So whilst it is a maximum toll, it is the toll that was felt could be set in reflection of the time savings the people would acquire through using the tunnel.*

This proved not be the case – note the large differences in usage when the toll was removed in October 2005 and made half price in March 2006 (see Figure 2). The experience of the CCT clearly shows that tolled roads are price elastic – there are quite sharp decreases in demand as prices rise.<sup>5</sup>

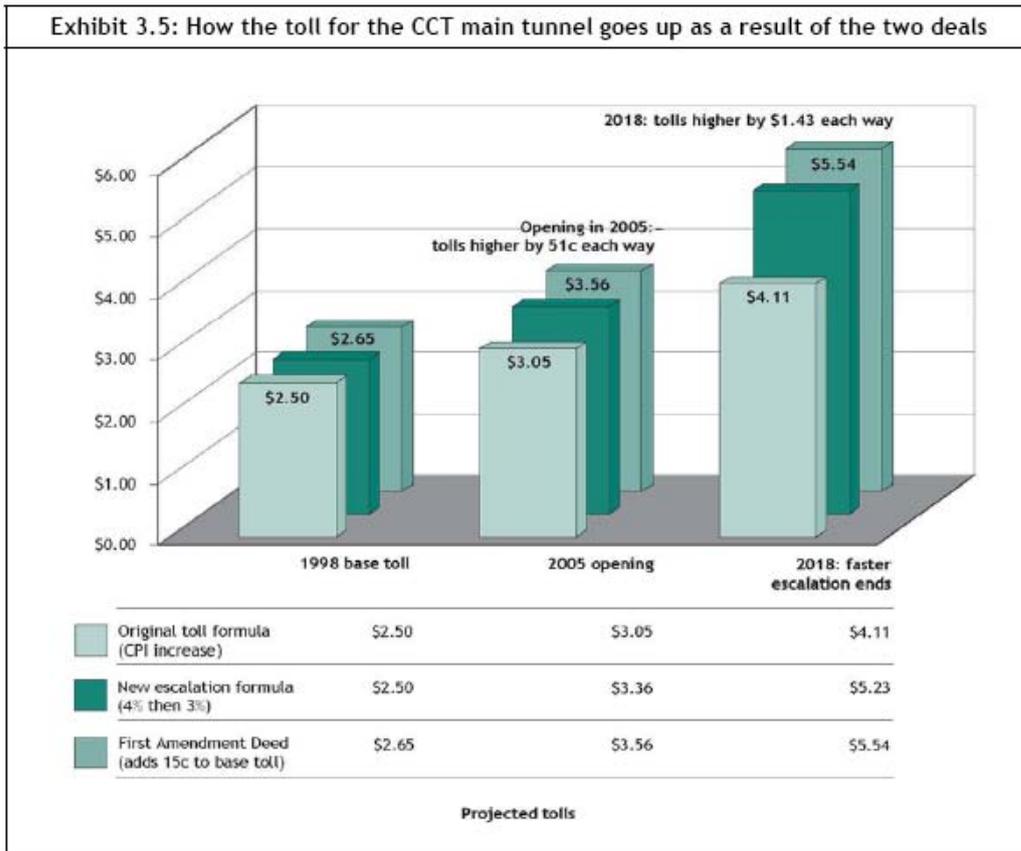
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<sup>3</sup> Revenue risk is the risk for a project that revenue will not meet the financial projections usually as a result of below forecast usage of the facility in question.

<sup>4</sup> The page one story in the Sydney Morning Herald the day CCM called in the Administrators stated: "The Iemma Government's reputation for public-private partnerships is in tatters after the troubled Cross City Tunnel was put into receivership less than 18 months after it opened (Baker and John, 2006).

<sup>5</sup> The experience of the CCT might also indicate that the RTA estimates of the benefits of travel time savings may be too generous.

**Figure 4: Impact of the revised escalation rates and higher base toll**



Source: NSW Auditor-General (2006) p49

## 5. Road closures

An important element of the CCT was changing traffic arrangements on surface roads. In total changes were made to 73 roads. The majority of these changes were foreshadowed in the EISs for the project. The rationale for the road changes were twofold: to reduce the amount of road space given the increased capacity of the tunnel<sup>6</sup> and also to encourage traffic to use the tunnel.

A widely held view was the road closures and changes were not necessary but were introduced to force motorists into the tunnel to profit the operator. The NSW Auditor found that this was not the case. The Auditor's General (2006,p54) concluded:

*We found that the main objective of the road changes was to reduce through traffic in and around Central Sydney and to improve the public domain.*

However, the Auditor-General (2006,p54) criticized the Government on two related issues:

*Maintaining toll-free alternative routes was a key principle in the original design. But road restrictions added progressively meant that, in the end, there were no direct, convenient toll-free alternatives left.*

and

*There was extensive consultation with stakeholders about the road changes. But it did not capture the significant resentment among prospective toll payers.*

<sup>6</sup> This is particularly the case with the closing of lanes in William Street which is directly above the tunnel

The resentment of the public about the road changes probably contributed to the low patronage levels in the tunnel. The change in the senior Government figures, both the Premier and Minister for Main Roads did not help the process of communicating with the public about the road changes.

In the wake of increasing unpopularity of the changes in the road network, and a forthcoming State election the State Government reversed a number of road changes, including 13 road closures in June 2006. This was an attempt to take the political “heat” out of the project, although it exposed the Government to damages claims from the CCM, destroyed any last vestiges of the notion of a partnership in the project and probably increased the costs of the NSW State Government undertaking future PPPs since future private sector partners are likely to price in an increase in regulatory/political risk into projects.

## 6. Discussion

So clearly a lot of things seemed to go wrong with the CCT project. However, unlike previous projects such as the Sydney Harbor Tunnel, the taxpayer bore no revenue risk for the project<sup>7</sup>. Despite the original consortium going into receivership, the tunnel has remained open and the project has been purchased at a price that has meant that the original equity partners made a small return on the project and all the banks got their money back.<sup>8</sup>

So what are the lessons from the CCT project:

Firstly, it is clear that all the parties have underestimated the revenue risk from traffic projections.

Two of the major stakeholders from the project have stated that they will be reviewing their positions on projects that are dependent on revenue from traffic forecasts. The head of Westpac’s institutional banking division, Phil Chronican was quoted in the press as saying that the bank would be more skeptical and critical of traffic forecasts in the future.

A 20 percent equity shareholder, the German construction firm, Bilfinger Berger, said in its annual report “in the future, the company will only participate in transport infrastructure models involving limiting risk from traffic volumes”.<sup>9</sup>

Secondly, whilst the project worked in a way that minimized the financial risks to taxpayers, it is clear that the governance of the project generated some undesirable outcomes. It is possible to reach a similar conclusion to Hodge (2004, 42) who made this comment about the City Link project in Melbourne.

*So, overall while the commercial risks within the deal appear to have been carefully defined and managed the same could not be said of the state's governance in the absence of traditional checks and balances afforded major projects. We might conclude that government confused its governance role and its commercial role. .... The separation of commercial and governance roles is not easy, and is clearly the challenge for governments implementing future PPPs.*

In its efforts to squeeze the best deal for the taxpayer, which probably was not surprising given the Treasurer’s insistence that the project be undertaken at no cost to the Government, the interests of the public that were likely to be users of the tunnel or alternative routes to the tunnel were jeopardized. This could be seen in both the final toll price and the number of road closures/changes made by the RTA (which were based on very optimistic assumptions about the traffic volumes which would use the tunnel).

One easy way for this issue to be remedied would be for the size of the toll to be considered a criteria in the assessment of bids. In some PPPs in Victoria, such as the new East Link Tollway, the toll level is the point of competition in the bidding process. As the NSW Auditor-General (2006, p28) comments:-

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<sup>7</sup> In the case of the Sydney Harbour Tunnel, the private consortium received a guaranteed revenue stream that was not related in any way to the amount of traffic that used the road (Beder, 1991)

<sup>8</sup> Though it is interesting to note that several of the equity partners and some of the banks had written off or written down their investments or loans. The biggest financial winner from the whole project was probably a hedge fund who purchased one of the bank’s loans for 75% of its face value.

<sup>9</sup> Reported in Sexton (2007).

*This makes value for money for motorists, not the size of the upfront payment, the decisive criterion in the assessment process.*

Another strategy is to make more details of the project open to public scrutiny. In the case of the CCT, most of the documentation became available after the project had been operating for some time. Governments in NSW have made a practice of only releasing limited details of PPPs, on the basis that the details are commercial-in-confidence. Grimsey and Lewis (2004,p158) make the point a public interest test for any PPP is:

*Do the partnership arrangements ensure that the community can be well informed about the obligations of government and the private sector partner, and can these be overseen by the public auditor?*

The NSW Joint Select Committee on the Cross City Tunnel also supported greater disclosure through one of its Recommendations (Number 8). This recommendation suggests:

*That the documents to be publicly released for any Public Private Partnership or Privately Financed Project include:*

- *The full contract and any material variations*
- *A contract summary (verified for accuracy by the Auditor General)*
- *Details of the public interest evaluation conducted prior to the decision to enter into the PPP or PFP*
- *a summary of the Public Sector Comparator and the comparison between it and the successful project (verified for accuracy by the Auditor General)*
- *the base case financial model*
- *The Public Sector Comparator.*

Thirdly, Governments in evaluating projects the public sector needs to make sure that the project is financially viable. Grimsey and Lewis (2004, p204) succinctly describe this issue:

*What is needed is for government to undertake a reality check and not to encourage underbidding. Experience has shown that if the partnership does not work financially for the private sector – where, for example, the consortium has materially underpriced its bid to win the project – it is unlikely that the project will work for the government either. Where a private party drives a bad bargain for itself (the ‘winner’s curse’), which it may do when under intense competitive pressure or under internal pressure because of the loss of other contracts, the project can set off along a wrong trajectory which is likely to result in continuing difficulty, if not commercial failure.*

Figure 5 shows the amount of money that each of the short-listed consortia offered to the RTA as an upfront payment and contrasts it to the Public Sector Comparator<sup>10</sup> (shown as the RTA model). The amount of the upfront payment to the RTA was one of the criteria used in evaluating each of the short-listed proposals. Focusing on the conforming bids (i.e. the route proposed in the request for tender), the CCM is the only proponent that is offering to make a payment to the Government (\$42. million) – the two other proponents wanted a payment **from** Government of \$42 million or \$119.3 million. Whilst hindsight is a wonderful thing, perhaps the Government could have followed the old adage of never taking the lowest quote, especially when it is much cheaper than other quotes<sup>11</sup>.

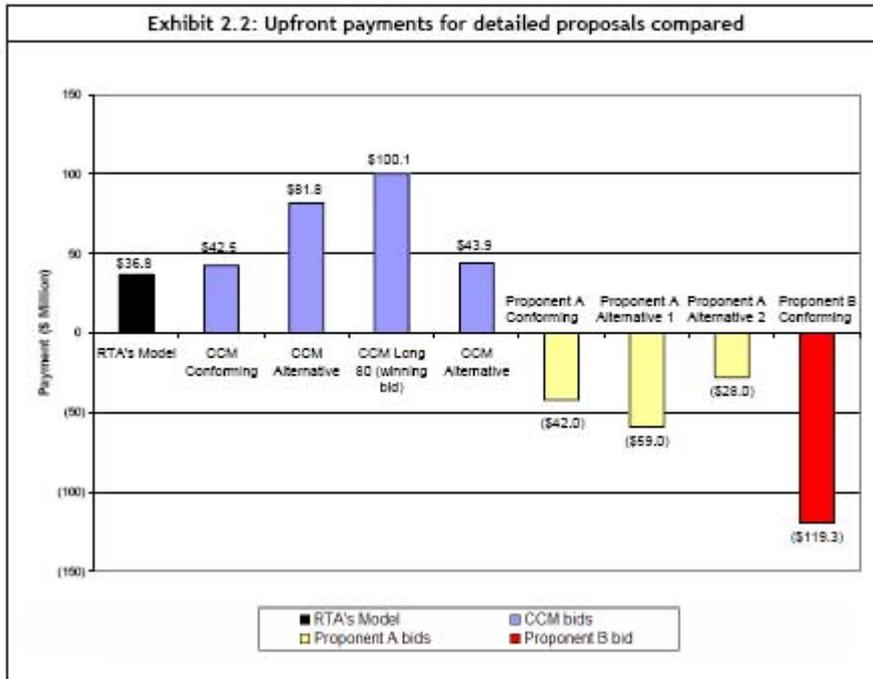
Fourthly, the pricing model for toll roads may need to be reviewed. Quiggin (2007) argues that road projects are not good targets for PPPs because you cannot implement the fundamental principle of a PPP that the party who is best able to control the risk should bear it. In cases of road projects, the party who is best able to minimize revenue risks is the Government since they can control other parts of the transport network and the level of urban development.

There is also the important issue that the tolling system could jeopardize the opportunity to institute a road pricing model that prices the externalities associated with contributing to congestion on urban streets. In such a pricing model cars would be penalized for entering congested areas such as the city – in the case of the CCT motorists are being charged for **reducing** congestion by going under the city.

<sup>10</sup> A hypothetical constructed benchmark to assess the value-for-money of conventionally financed procurement in comparison with a privately financed scheme for delivering a publicly funded service (Grimsey and Lewis, 2004,xiv)

<sup>11</sup> Obviously the tender documents would have to be carefully structured to allow this to occur.

**Figure 5 – A Comparison of the Upfront payments**



Source: NSW Auditor-General (2006) p27

Perhaps a different pricing model could be utilized that relies on shadow pricing or the Government might have to share revenue risk (as well as “super profits”) with the private partner.

The final issue is perhaps the most important one- if a project barks like a dog, has four legs and a tail it probably is a dog. The first cost-benefit study undertaken for this route indicated that unless additional revenue benefits were considered (i.e. car park and retailing revenue) the benefit-cost ratio was less than one. This result, by a private sector construction company very keen on building the link, should have sounded a warning about the fundamental viability of the project. A project with such humble beginnings, that did not have the advantage of a growing residential population to generate increases in tunnel revenue over time, was probably always going to be a risky project. However, the fact that a consortium went into receivership trying to run the project and the good price paid by the new owners in the recent forced sale indicates the strong appetite for PPPs amongst the private sector. The Government can leverage this strong appetite to its advantage in the future but only if it has appropriate safeguards in place to protect the public interest.

## 7. Conclusion

This paper details the story of the Sydney Cross City Tunnel, the first road PPP to go into receivership in Australia. The story reveals the project failed on the back of a set of unrealistic traffic forecasts that were probably affected by a relatively high toll and public resentment with a series of road changes. Nevertheless, the project delivered a high quality road project at no cost to the taxpayer and the sale of the project by the receivers led to all the banks involved being repaid in full. It remains to be seen if the new owners can successfully operate the venture.

The lessons from the project include the need for all stakeholders to consider traffic forecasts with an increased level of skepticism. Recent systematic reviews of the accuracy of traffic forecasts should help this process. Governments should also be more skeptical of deals that perhaps are too good to be true and develop an increased attention to protecting the public interest in PPPs rather than just looking at the bottom line. The last more fundamental concern suggests that the traditional pricing model for road PPPs may be flawed and alternative models may need to be developed.

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