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INQUIRY INTO IMPACT OF THE WESTCONNEX PROJECT

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Do the business cases for major Australian transport infrastructure adequately incorporate planning concerns?

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Introduction

In Australia, state and federal based infrastructure agencies require business cases to be developed to demonstrate that public investment decisions about major transport infrastructure projects are an economically efficient use of society's resources (Infrastructure Australia, no date, Infrastructure Victoria, no date; Infrastructure NSW, 2012). However, reports from third party authorities such as the Victorian Auditor-General (2015) on the recently cancelled East West Link toll road in Melbourne and by SGS Economics and Planning (2016) on the currently proposed WestConnex project in Sydney raises questions about the extent to which all significant planning considerations are properly evaluated in these business cases. Given the political (Legacy, forthcoming) and even antagonistic approach governments have had towards transportation planning across several Australia states in recent years (Legacy et al, 2017), compounded by efforts by project proponents to misrepresent the costs and benefits of major projects (Flyvbjerg, 2007), there is a danger that planning factors that may sit in tension with proposed projects are downplayed or ignored within business cases. This produces a 'distancing' of transport infrastructure decisions from their wider land use and city-shaping possibilities (see Dodson, 2009 and also Dodson 2017). This paper uses Sydney's WestConnex motorway business case to examine this tension, and the role the business case plays in exacerbating this 'distancing'.

The technique used in Australian transport infrastructure business cases is cost-benefit analysis (CBA) (described in Department of Finance and Administration, 2006). CBA requires all benefits and costs associated with a project to be valued in dollar terms on a year-by-year basis from the start of project operation. Then a compound discount rate is applied to values in each year to reduce each to a present value, to take account of social time preference for money to be spent sooner rather than later (and to reflect interest savings if public investment is repaid earlier). From these calculations a benefit:cost ratio is derived, being the sum of the present values of yearly benefits from the project as a ratio of the sum of the present values of yearly costs from the project. For projects to proceed, the benefit:cost ratio should exceed one; if it is below one, society will be wasting resources because their use will not be fully repaid.

The principal implications arising from requiring a positive business case for projects to proceed centre around the extent to which planning costs and benefits can be monetised. If they cannot, they are left out of the business case. In practice there are many potentially significant planning benefits and costs associated with major transport projects that are impossible to value, or that require expensive analysis to value. In the former category are such planning dimensions as equity, impacts on

community, or species extinction. Expensive-to-value dimensions might include such items as heritage, vegetation loss, and health impacts from vehicle emission outlets.

The paper evaluates the WestConnex business case in terms of what potential planning factors have been included or excluded. This is done in three parts. The first part summarises planning items that have been included and costed in the WestConnex business case. The second part investigates factors that ought to be incorporated into a CBA business case evaluation because they can have significant impacts on other social, economic and environmental urban imperatives articulated across metropolitan strategies, but that have been excluded or inadequately considered in the WestConnex case. The third part considers the kinds of planning issues that are normally excluded from CBA, and which have been left out of the WestConnex business case. Implications of inadequately assessing WestConnex planning issues are briefly explored in the paper's conclusion.

Cost-benefit analysis and transport infrastructure

The use of cost-benefit analysis (CBA) to appraise transport infrastructure projects has become mandatory across most transport agencies in Australia. But CBA can incorporate a range of problems and assumptions that weaken the reliability of its assessment of project merit. This paper focuses on how well cost-benefit analysis identifies the value of the costs and benefits of transport projects such as WestConnex. It does not address other potential CBA problems such as the choice of discount rate and the treatment of uncertainty.

A range of economic, social and environmental impacts related to the evaluation of transport infrastructure projects is set out by Infrastructure Victoria (2016, p. 40), adapted from Australian Transport Assessment and Planning (ATAP) guidelines. The list includes impacts relating to improved accessibility (including changes in travel times), improved comfort/quality of transport amenity, changes in revenue and operating/investment costs, wider economic impacts, improved safety, improved health outcomes, changes in values associated with environmental externalities (including pollution and greenhouse gases), and non-traffic based environmental impacts including changes in amenity values and impact on biodiversity/ecosystems. Most of these impacts identified by Infrastructure Victoria can be converted into money values, using a range of sources, the main exception being impacts on species diversity (Infrastructure Victoria, 218, p. 66). However, Infrastructure Victoria's list of impacts is far from exhaustive, and omits a number of less obvious potential costs and benefits.

Where no direct market price exists, the money value of benefits and costs can be measured indirectly, as with a number of items on the Infrastructure Victoria list. One such method is contingent valuation, which involves asking how much people are willing to pay/accept for keeping/losing a nominated item. In Australia, the most well-known application of this method was the valuation of conserving the Kakadu conservation zone (Carson, Wilks and Imber, 1994). However, studies have shown that valuations derived in this way might be unstable because willingness to pay for a good is less than willingness to accept the same good (Carson, Flores and Hanemann, 1992). Nevertheless, recent developments relating to survey design and implementation provide confidence in the validity and reliability of results using this

method (OECD, 2014). Another method of estimating money valuation is hedonic pricing. This uses regression analysis to estimate the importance of on-site and external factors in generating the value of properties affected by a project. From this the capitalised value of each of the contributory elements can be derived, including external items such as traffic noise and street trees. The Sydney Airport Third Runway EIS used this method to estimate the cost of aircraft noise generated by a third runway to residents living under the runway flight path (Kinhill Engineers, 1990). Travel cost methods (for measuring recreation benefits) and defensive expenditure are other approaches used in CBA for valuing intangible costs and benefits (OECD, 2014). The value of time savings, which are central to transport CBA, are more easily measured, such as by travellers' income per hour for business trips or some fraction of this for commuting trips. But developments such as mobile phones and wi-fi have challenged this approach, since trips can now be used for production or leisure rather than cause such uses to be displaced (c.f. Laird, Nash and Mackie, 2014). Accounting for productivity during travel significantly reduces the net value of business travel time savings (Fickling *et al.*, 2008).

Where market prices exist, these do not necessarily represent their true social value. The classic instance of this relates to the Roskill Commission on the Third London Airport (1971). In that study, the social cost of the loss of historic churches was assessed by their insurance value, which was ridiculed as grossly under-estimating their true social value (Coombs and Jenkins, 2002, p. 238).

The social value of costs and benefits might also vary according to their location. For transport CBA, the most important instance is perhaps pollution emissions that have health impacts such as PM, CO and nitrogen and sulphur oxides (Van Wee and Tavasszy, 2008, p. 51). For example, if emission outlets that collect pollution from road tunnels are located near residential precincts, this may lift local pollution thresholds above safe levels. Nevertheless, CBAs that consider this are rare: an exception is Koning et al. (2002).

A weakness of most CBA transport applications is that they fail to adequately consider indirect effects. In particular, project impacts on land use, via changes in travel times and costs on land use that can be modelled by land use and transport interaction models, are usually ignored (Van Wee and Tavasszy, 2008, p. 46; Laird, Nash and Mackie, 2014). Further, non-land use related impacts on the wider economy such as job productivity, are also not usually included (Van Wee and Tavasszy, 2008). For such impacts, spatial computable general equilibrium (CGE) models can be used (Gunn, 2004), though applications of CGE models to transport projects are scarce because of their detailed data requirements (Vickery, 2008,p. 75). Further, even CGE models may not adequately estimate long-term self-reinforcing cumulative effects, for which quasi-dynamic production function models are needed (Laird, Nash and Mackie, 2014). One particular issue arising here is the influence of reduced transport costs on urban agglomeration and economic density. Some analysts believe that the quantitative relations that might generate such benefits are not well known (Van Wee and Tavasszy, 2008, p. 51). Nevertheless, it can be argued that as transport costs are reduced, firms can benefit from access to a larger labour supply and workers benefit from increased opportunities for work; while at the same time lower transport costs can increase the size of firms' markets which allows firms to enjoy scale

economies and benefit from proximity to other more efficient firms, with resulting productivity gains (Venables, 2007; Vickerman, 2008, pp. 71-72). For London's Crossrail project, such agglomeration effects have been estimated to amount to 24 per cent of user benefits (Department for Transport, 2005). Another neglected CBA land use issue is the treatment of parking. Rail projects reduce parking demands, while road projects increase them (Van Wee and Tavasszy, 2008, p. 51). A final indirect effect in transport CBA relates to energy use, such as that used in vehicle production (ibid.) (though in contemporary Australia this effect is generated offshore).

The most serious problem with identifying benefits and costs in CBA relates to what might be termed fundamentally non-monetary values. As well as species protection, these include ecosystem protection, human lives saved/lost, and loss of social capital. In relation to impacts on natural capital items, Van Wee and Tavasszy (2008, p. 54) have concluded: "it is questionable whether methods to value these impacts in a satisfactory way can be developed at all". Standard CBA is also of little help in gauging the ultimate distribution of project benefits and costs (OECD, 2014). These equity effects are frequently critical to project acceptance: few projects where CBA is applied, for example, can pass Pareto's test, that no-one should be made worse off while some should be made better off (Nwaneri, 1970, p. 236). Various methods of adjusting CBA results to incorporate equity considerations have been proposed, including weighting of benefits and costs by the incomes or marginal tax rates of those gaining or losing (Nwaneri, 1870, p. 240), but these are necessarily arbitrary and essentially beyond the indicative capacity of formal CBA. Layard and Glaister (1994, p. 48) suggest following the approach of the Roskill Commission (1970), to show the costs and benefits of different groups in society separately and let policy makers decide on their own weights,

The WestConnex business case CBA has been analysed by SGS Economics and Planning (2016) for City of Sydney Council. It found numerous shortcomings about how various benefits and costs were measured, though these mainly concerned specific assumptions used, rather than deeper CBA problems as discussed in the literature summarised above. The shortcomings included under-estimation of induced demand, a too-high expansion factor to convert daily demand into annual demand, failing to account for traffic flowing in from the proposed northern extension of WestConnex, and very conservative estimation of construction costs. In terms of the focus of this paper, the SGS report found that reduced amenity and its impacts on urban development, acquisition of land that could be used for other higher value activities, reduced health benefits from reduced public transport patronage, and the cost of more sever car crashes, were not fully accounted for. This paper picks up below on the first two of these points.

In the following section we turn to the case of the WestConnex project, currently Australia's largest, costly and most complex transport infrastructure project, to examine the tension between the business case and land use strategic planning.

The WestConnex project

The WestConnex project involves the construction of a 33 kilometre motorway over three stages in inner western Sydney. The total costs of this project tends to fluctuate between $16.8 billion (the purported cost as suggested by the NSW state government)

to $45 billion based on whether estimates include the construction of connecting roads that will feed the roadway upon its completion (Saulwick, 2017d). When it is completed in 2023, the project will connect up two Sydney motorways — the M4 in western Sydney and the M5 in south-western Sydney (Figure 1). The main rationales of the project are to provide drivers from western Sydney more direct access to the city and to Port Botany or Sydney Airport, and to relieve congestion on Sydney's main east-west road artery, Parramatta Road (NSW Government, no date). Its total cost will be $16.8 billion and the full route is expected to be open to traffic in 2023. Most of the cost will be recouped via distance-based tolls.

As outlined in the available documentation provided on the WestConnex webpage, the Project involves three main stages. Stage one of the project involves widening of the eastern section of the existing M4 motorway from Parramatta. It also includes extending the motorway via a tunnel to Parramatta Road and the City West Link at Haberfield. Stage two will extend the existing M5 motorway via twin tunnels to a new interchange at inner city St Peters. Stage three will connect stages one and two by connecting the extended M4 to the extended M5.

Figure 1: The WestConnex motorway scheme (Source: Roads and Maritime Services, 2015a)

The project has generated significant community and local government opposition which is evidenced by a steady stream of direct action campaigns and protests led by individuals such as Wendy Bacon (Hunjan & Lattouf, 2016), groups such as the Westconnex Action Group, and local councils, most notably the City of Sydney (2017). Opposition to WestConnexhas centred on issues such as loss of heritage housing, emission outlet impacts, traffic impacts in eastern destination areas, and flawed processes of public consultation and housing acquisition along the route. A number of such key issues have not been included in the WestConnex CBA, as the paper will later show. A report for Sydney City Council by SGS Economics and

Planning (2016) has argued that the WestConnex business case selectively over-estimates benefits and under-estimates costs.

Planning and other items costed

The monetised benefits and costs included in the WestConnex business case (Roads and Maritime Services, 2015a) are summarized below.

Costs

Capital costs are broken down into (a) design and construction costs, (b) property costs and 'other resourcing and associated project costs', and (c) urban renewal costs. Components under (a) comprise design and construction contracts, tolling equipment, 'retained works', contamination and remediation works, and client (RMS) costs. The property costs are potentially under-valued, because the government rejected a recommendation to compensate home owners on a 'reinstatement basis' that allowed them to buy an 'equivalent home' (Saulwick, 2017b). The business case does not give details of non-property cost items included under (b). Under (c), an Urban Amenity Improvement Program is included, costing $200 million. This comprises initiatives such as creation of new or improved open spaces and plazas, streetscape upgrades, new/improved walking and cycling links, and bike racks. These are intended to support increased densities along Parramatta Road, where traffic volumes are predicted to fall after WestConnex is finished. The other costs included in the business case are *operating and maintenance costs*, and *lifecycle costs*. The latter comprise periodic replacement and renewal costs.

Benefits

Benefits included are in three categories: (a) user benefits; (b) 'other' benefits (non-user benefits accruing to society as a whole); and (c) wider economic benefits (including agglomeration economies).

The most valuable user benefit included is *savings in travel time* which is assessed using the Transport for NSW (2015) guidelines. The second user benefit is *savings in vehicle operating costs*. The final user benefit is *improvements in travel time reliability*. These have been calculated using UK Government methodology (Department for Transport UK, 2014).

Items under 'other' benefits include *crash cost savings*. These are calculated by applying crash rates derived from Austroads (2014) and applying 'willingness to pay' values for crashes avoided from Transport for NSW (2015). The next 'other' benefit is *environmental externalities (including greenhouse gas savings)*. The valuation placed on greenhouse gas savings cannot be derived, as the Austroads (2014) reference given for the basis of the valuation calculations does not include anything

on how per tonne emission reductions are valued. The remaining 'other' benefit identified in the business case is the *residual value of the project assets* at the end of the appraisal period in 2060 after depreciation to that year.

Two items are included under wider economic benefits. The first is *agglomeration economies*, generated by the improvement in accessibility of firms and workers to each other and is measured by productivity improvements from the increased density of jobs in WestConnex eastern destination areas primarily around Mascot and Rozelle, along with marginal increases in Sydney CBD. The second is *labour market deepening*, realised through reductions in the cost of commuting leading to more people electing to join the workforce. This is valued by calculating the additional tax revenue from the increased workforce.

The achievement of these wider economic benefits, which the business case values at over $9bn in undiscounted terms, must be considered dubious. Employment/industrial zones in the Mascot area, for example, are being steadily rezoned to residential uses to meet increasing demand from higher density residential use that commands higher bid rents than employment uses. The required increase in on-site parking that increased employment densities via WestConnex imply seems unlikely in the face of competition for valuable space from residential intensification and employer capacity to source extra required labour from workers using the airport rail line, in particular.

Extra employment densities via WestConnex in central Sydney are even more dubious. Current CBD planning controls for new offices allow a maximum of one parking space per 75sm or 175sm of office floor space. Such areas would accommodate between five and twelve workers at prevailing occupation levels. This makes it unlikely that new CBD workers will be able to drive and park anywhere except high-priced public car parks. Moreover, extra car traffic will exacerbate already severe levels of road congestion in central Sydney: this has not been modelled in the WestConnex business case.

Similarly, the mooted agglomeration economies added to the Rozelle area have little basis. The business case discusses the way in which the Rozelle exit will support the redevelopment of the adjacent Bays Precinct for mixed use development, incorporating a technology hub as a focus. However the abandonment by Google of plans to establish an Australian base there laid bare the fallacious reasoning of the business case: according to the Premier, "the reason Google opted out was because of the disturbance when a WestConnex motorway interchange and potentially a metro station were built in the area" (Saulwick, 2017a). Global experience of technology precincts suggests that large volumes of traffic coming off a motorway would be antithetical to the kind of urban amenity that is sought by employers and workers in such precincts.

CBA planning items inadequately costed

Perhaps the biggest class of planning items overlooked in the WestConnex business case, and by CBA in general, is *costs accruing during the construction phase*, except for project capital costs. This ignores costs generated by the construction process such as noise, traffic detours and slow-downs, and loss of revenue to adjacent businesses

that are potentially highly significant in urban transport projects. Such costs have been claimed by local communities affected by Stage 1 of the WestConnex project (AECOM Australia Pty Ltd and GHD Ltd, 2015). While some such costs, such as disruption to residents' daily lives through pedestrian and vehicle diversions, cannot be adequately valued for a business case, estimates of other construction phase costs are certainly very possible. These include:

- Time and vehicle operation costs of slowdowns in traffic caused by construction (to be assessed using modelling equivalent to that used to assess the value of travel savings for users of the completed project);
- Loss of revenue to businesses adjacent to project construction and/or affected by traffic diversions;
- The costs of increased noise from construction (which could be valued by using hedonic price analysis, or estimates by local valuers, of losses in property value due to increased noise).

The business case forecasts that while WestConnex will decrease vehicle hours travelled each day by 108,600 in 2031, total journey lengths will increase by 615,200 vehicle kilometres per day in 2031 (Roads and Maritime Services, 2015b). By encouraging longer journeys the motorway will *promote urban sprawl*, which has well-documented costs for infrastructure and other costs. The lower travel times via the motorway reduce time disincentives of living further out and thus encourage expansion of the urban area. The net costs to society of such expansion have been comprehensively calculated in a study commissioned for the state government (Centre for International Economics, 2010). The study estimated the total extra costs (including transport, physical infrastructure, social infrastructure, and environmental costs) of shifting from the 2005 metropolitan strategy new dwelling ratio of 70 per cent infill and 30 per cent greenfield to a 50:50 ratio would be $4.992 billion in present value terms from 2011 to 2036.

Next, the costs of *reductions in public transport* have been ignored. The business case predicts 45,000 journeys will switch from public transport to road trips on WestConnex on an average weekday by 2031 (Roads and Maritime Services, 2015b). The social costs of this are (a) a reduction in public transport frequency to lower operating costs in the face of revenue losses from declining passenger numbers, or (b) an increase in fares if service levels are maintained, necessitated by lower passenger numbers, or (c) increased government losses on public transport. These costs could be valued in the business case by:

- Calculating the time costs involved in extra waiting for lower frequency services;
- Calculating the increase in fare revenue from remaining public transport users; or
- Calculating the increase in public transport losses from the loss of 45,000 trips per day, assuming fares and service frequency do not change.

Further, the business case excludes the *costs of upgrading connecting roads* to accommodate forecast traffic volumes entering and leaving the WestConnex motorway system as "they are considered outside the direct scope and cost of

WestConnex" (Roads and Maritime Services, 2015a, p. 188). This is despite such upgrading happening during the construction of WestConnex. Examples of this include the Hill Road ramp at Auburn as part of Stage 1, and the significant upgrade of roads around St Peters Interchange as part of Stage 2. Since such upgrading is directly due to the construction of WestConnex, the costs involved should be included in the business case. Proposed upgrading of a 3.2 km corridor south of the CBD, on which roads agency modeling shows a doubling of traffic to 40,000 vehicles a day by 2021 due to the WestConnex interchange at St Peters, has been estimated by Sydney City Council to cost at least $1 billion, a figure not included in the WestConnex budget or business case (O'Sullivan, 2017).

In parallel with the omission of such costs are *uncosted increases in traffic congestion* that are not being addressed by road and intersection upgrades. The impacts of providing exits from WestConnex at inner west Rozelle are a key example. By 2031, the traffic volumes exiting the WestConnex tunnels there are predicted to add to existing surface traffic volumes such as to create a demand significantly beyond the capacity of the Harbour Bridge and Anzac Bridge. The business case states that the current capacity of both the Anzac and Harbour bridges therefore limits the viability of a WestConnex exit ramp towards the CBD at Rozelle, until such time an additional harbour crossing capacity is provided by the new harbour tunnel: "Given engineering design restrictions and the need to avoid queuing in the main tunnels, the proposed motorway exit at Rozelle will require active management until such time as the Western Harbour Tunnel opens to traffic" (Roads and Maritime Services, 2015b, p. 75). Another example of uncosted increases in congestion is given in Technical Paper no. 1 (Roads and Maritime Services, 2015b): "Weekday volumes along … eastern … Parramatta Road [in] the section east of Glebe Point Road [are] predicted to experience higher volumes up to an extra 20,000 vehicles per average weekday. Further investigation is on-going to assess how this impact could be mitigated." The costs of the increased congestion could be calculated using modeling similar to that used to calculate the value of time savings from faster journeys for motorists using WestConnex.

A major omission from the business case is *decreases in property values* due to WestConnex. While property owners in the path of the project have had their properties acquired with compensation (but with considerable community anger that inadequate compensation has been paid in a number of cases) (Nicholls, 2016), declines in values of properties because they are close to proposed exhaust stacks, for instance, have not been compensated (Saulwick, 2013). Declines in value are likely for properties where there is increased traffic noise or proximity to emission outlet stacks, or where there is visual blight from interchanges. Declines are also likely for properties along roads where traffic accesses WestConnex, or along roads that become 'rat runs' for traffic avoiding tolls. The latter declines in value will be offset to a greater or lesser extent by increases in property values along roads – principally Parramatta Road – where traffic volumes are expected to fall, although this purported benefit was disputed is a study conducted by SGS Economics and Planning (Saulwick & McKenny, 2015; SGS Economic and Planning, 2015).. In the case of business properties, changes in property values would capitalize impacts of WestConnex on each business. There is certainly precedent for measuring changes in property values as part of transport infrastructure evaluation, with the Sydney Airport Third Runway

EIS being a major NSW example (Kinhill Engineers, 1990). As in that study, changes in property values could be estimated using hedonic price modeling.

A further potential cost that has been excluded is the *opportunity cost of land used* for WestConnex. If the best alternative use of that land has a social benefit:cost ratio above the WestConnex central scenario range of 1.71 to 1.88, then the use of that land for a motorway is costing society the extra benefits that could be gained by that alternative use (although identification of the value of one site that is part of an integrated project across many sites is conceptually difficult). For example, Sydney City Council's alternative plan proposes an upgrade of north-south arterial King Georges Road to substitute for the WestConnex tunnel under the inner west, potentially smaller tunnels linking the existing motorway network to the Cross City Tunnel and to the airport, and work on a new rail line between central Sydney and Parramatta accelerated (Saulwick, 2017c). This would free up land to be used for the WestConnex interchange at inner west St Peters, where the Council says 13,000 dwellings could be built. Thus WestConnex costs should in theory include the difference in land value between housing 13,000 households there instead of using it for WestConnex.

Other costs arising from WestConnex construction have also been omitted. One of the major impacts has been the destruction of fifty-three houses in the Federation period heritage suburb of Haberfield to accommodate an interchange (thefifthestate.com, 2017). Compensation for the market value of the houses lost does not include the heritage value of those houses to the general community. This heritage value could have potentially used willingness to pay methodology (Department of Finance and Administration, 2006) to arrive at an estimate of the lost value [ref. giving example].

Another cost that could have had an estimate of value put on it is the loss of trees that will be cut down to allow construction. A total of 827 trees have been cut down from Sydney Park alone to accommodate road widening needed to handle traffic coming off WestConnex (Sydney City Council, 2017). There has been a growing body of work that has attempted to put a monetary value on trees, and urban greenspace more generally [refs]. [Example of per tree value].

Planning items excluded from CBA

One central planning impact that is beyond the scope of CBA is that of equity. By definition, the WestConnex project favours motorists at the expense of public transport users. The equity implications of this are not clear. The project is framed by the NSW Government as infrastructure that will connect people living in the western suburbs to the jobs and services contained in the inner city. However, many low income residents in western Sydney are forced to own cars because of poor public transport access, a reality that will only be exacerbated by the prioritisation of constructing WestConnex. Constructing WestConnex will further widen inequality with the inner west which is home to comparatively higher income earners in areas where WestConnex is being constructed, but who have access to public transport to get to work. Nevertheless, small area data on socio-economic profiles cross-tabulated against the distribution of benefits and costs would provide significant insight into the equity impacts of the project.

Another planning item that is not easily costed is air pollution. While total greenhouse emissions are forecast to decline over the base case if WestConnex is constructed, emissions will be concentrated around interchanges, where traffic volumes will exceed current levels on Parramatta Road, and emission stacks. Higher concentrations of air pollutants will have negative implications for health.

It is also difficult to value losses to the community from changes in access to open space and other amenities. Similarly it is difficult to place a value on the substantial loss of 'place amenity' that will be suffered by those who are forced to move because their dwelling is in the path of the motorway.

[Check EIS for other items for this section]

Implications

We can now summarize how well the WestConnex CBA has identified and valued project benefits and costs using current CBA practice, as outlined earlier in the paper, as a benchmark. In terms of the checklist of items identified by Infrastructure Victoria (2016) for inclusion in transport project CBAs, the main omissions in the WestConnex CBA relate to the costs of upgrading connecting roads, uncosted increases in traffic congestion, changed health outcomes, changes in values associated with pollution (but not greenhouse gases, for which values are included), and non-traffic based environmental impacts including various amenity and biodiversity/ecosystems impacts. The amenity effects include noise and other negative impacts from the motorway that would be capitalised into lower property values. The cost of land for interchanges is also undervalued in opportunity cost terms. The WestConnex CBA has attempted to include wider economic changes, though as argued above, this analysis is flawed. Other omissions beyond the Infrastructure Victoria list include changed heritage values, business losses during construction (though businesses elsewhere may have benefited pro rata, in which case it becomes a distributional impact), and costs of public transport reductions, net costs of increased urban sprawl. Finally, the distribution of benefits and costs has been ignored, which is an inherent weakness of CBA in general.

The omission of so many costs from the business case puts the case to construct WestConnex into serious doubt. Given that the project had already been accepted as part of the state infrastructure strategy and the metropolitan strategy before the business case was prepared, it suggests that there was little incentive for the government to prepare an exhaustive analysis that compared this project with alternatives, and much incentive to prepare a narrowly based case. Cantarelli and Flyvbjerg (2013) call this phenomenon 'lock in' which they describe as occurring in part through the escalation of commitment (e.g. the project appears in other policy documents and where the benefits are over inflated), and when there has been a closure of other alternatives which can oftentimes be driven by path dependency (e.g. as we see in many Australian cities with the privileging of motorways over public transport investments) (Curtis & Low, 2012; Low & Astle, 2009). This raises associated questions about the extent to which, former established procedures for determining benefit:cost ratios through EISs prepared prior to decisions to proceed or not have been supplanted by politically-driven decision-making in which business case assessment produces pre-determined outcomes (Sturrup, 2016). While the notion

of ‘lock in’ explains, in part, the rationale for the narrowly scoped CBA undertaken for WestConnex, the political motivations that sit behind the rationale to scope the CBA in this way lend themselves to questions about the changing relationships and influences of the private and public sectors in transportation planning (and its governance) and what this means for how investment decisions get made.

The potential costs to society in terms of inefficient use of resources are considerable. For a start, it must be considered dubious to forecast traffic numbers out to 2060 so as to accumulate sufficient benefits to make the business case stack up, when there is considerable uncertainty about the extent to which there will be disruption from self-driving cars beyond the next decade. Some commentators are predicting the greater efficiency of driverless transportation will mean millions of cars taken off the road around the world (Lloyd, 2017). More generally, business cases of the kind analysed in this paper act to bias the allocation of society’s resources to uses that are valued in narrow market terms, and that largely ignore wider externalities and non-market impacts. The intention of requiring infrastructure projects to prove their business case was commendable in terms of seeking to reduce wasteful decisions based on political imperatives. But this potential has been squandered by the omission of significant planning costs from business cases such as the one analysed here, and by the failure to use business cases in the way they should be used: to provide one ex ante test of whether a project should proceed, not to provide ex post justification for decisions already made.

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