Lilydale Quarry Rail Station

Cost Benefit Analysis

Intrapac

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SGS Economics & Planning

1991–2016 25 years of Independent insight.

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1 INTRODUCTION

1.1 Background and SGS's brief

Previous planning for Intrapac's Lilydale Quarry development site envisaged the incorporation of an additional heavy rail station, notwithstanding the proximity of the land to the existing station in the Lilydale town centre.

The designation of the station site, but with no commitment from State Government to actually provide the station, poses significant uncertainty for Intrapac. At this point, the company is indifferent as to whether the station is built or not, but a commitment to do one or the other is required so that Intrapac can resolve its development plan and proceed to market.

Accordingly, SGS was commissioned to conduct an outline cost benefit analysis on the early provision of the rail station at the Quarry site.

1.2 Cost benefit analysis

Cost benefit analysis in government policy development

As specified in State Government guidelines, cost benefit analysis (CBA) must address the full spectrum of environmental, social and business impacts of the proposal at hand. Positive and negative effects are quantified and monetised (expressed in dollar terms) as far as possible and then compared to arrive at a conclusion as to whether the proposal is likely to make the (Victorian) community better off, or worse off, in net terms compared with persevering with business as usual conditions.

The principal steps in the generic cost benefit analysis method (see Figure 1) include:

1. Differentiating between the outcomes under a 'business as usual' or 'base case' scenario (for example, continuing with the rail station designation on the Lilydale Quarry land) and those arising with an alternative 'project case', that is, construction of the rail station in the short term
2. Identifying the economic, social and environmental costs and benefits that might arise in moving from the 'base case' to the 'project case'
3. Quantifying and monetising these costs and benefits, where possible, over a suitable project evaluation period (in this case 13 years) and with due acknowledgment of on-going benefits and costs
4. Generating measures of net community impact using discounted cash flow techniques over the 13 years in question; this requires expression of future costs and benefits in present value terms using a discount rate that is reflective of the opportunity costs of resources diverted to the implementation of the project cases
5. Testing the sensitivity of these measures to changes in the underlying assumptions utilised, and
6. Supplementing this quantitative analysis with a description of costs and benefits that cannot be readily quantified and monetised.

It is important to note that *all* impacts of the proposed regulations versus the base case *must* be taken into account, whether or not they are 'traded' effects or 'externalities'.

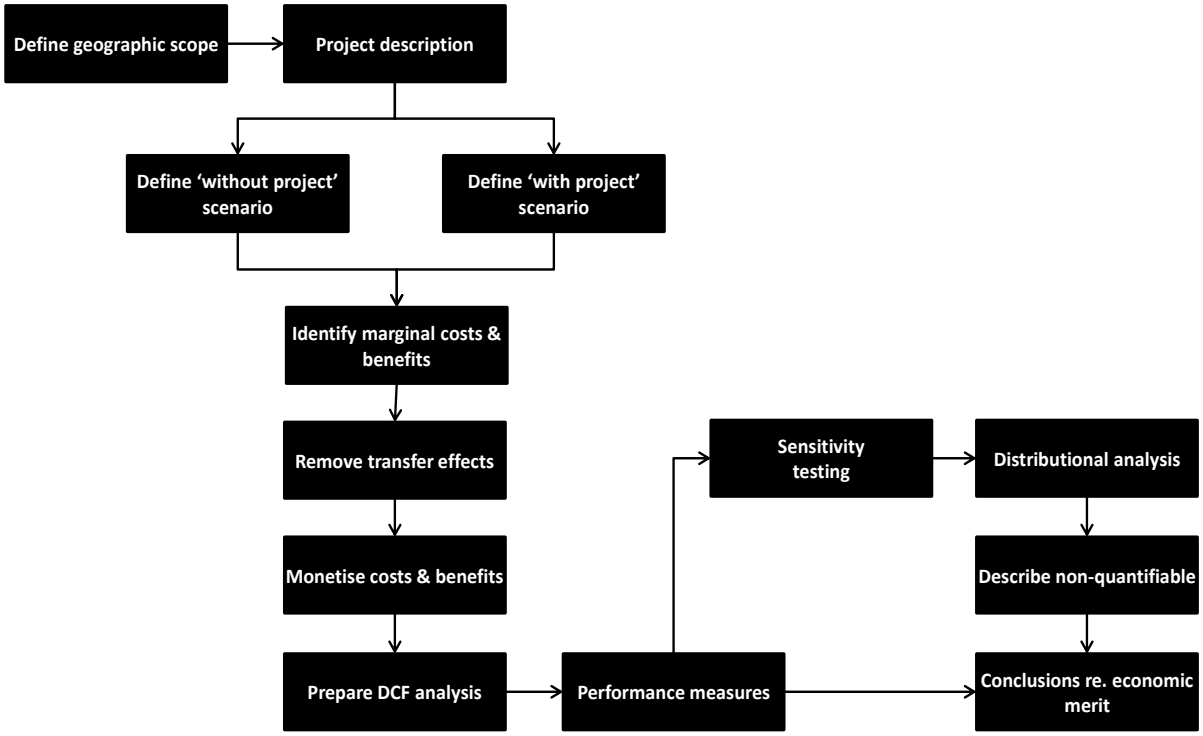
As the name implies, traded effects have a price in the market.

Externalities on the other hand are unpriced costs and benefits sustained by third parties in any market transaction. The cost benefit analysis must account for these impacts even though they are not directly mediated (bought and sold) in the market. The monetised value of these external effects needs to be imputed using a variety of techniques as advised by DTF in its *Cost Benefit Analysis Tool Kit*.

Another vital characteristic of cost benefit analysis is that the community benefit delivered by this regulatory initiative is judged by reference to the *'Kaldor-Hicks'* rule. This states that the initiative in question is worth undertaking if the gain in welfare by the beneficiaries is greater than the loss in welfare for those adversely affected. In other words, a particular project case would be warranted if the beneficiaries could, if required, compensate those adversely affected and still be better off. This is where the term ***'net'*** *community benefit* comes from. Whether such compensation is actually paid is not material.

The *'Kaldor Hicks'* rule differs from the *'Pareto'* test which is sometimes invoked in town planning practice. The Pareto test is that an initiative is *only* warranted if there are *no* losers in the process. The Pareto test is not sanctioned in regulatory impact and government investment assessment because it places an unworkable onus of proof on the economic merits of a project.

FIGURE 1. COST BENEFIT ANALYSIS METHOD



Source: SGS Economics & Planning Pty Ltd

Common errors and misapplications in cost benefit analysis

There are some common pitfalls in assessment of net community benefit in matters of planning regulation. One is to confuse 'economic impact' with 'economic benefit'. The former deals with the commercial flow on effects of an initiative or program (sales made, people employed, suppliers contracted etc.), while the latter relates to an improvement in community welfare.

By way of illustration, a $10 million construction contract to dig a long trench then fill it up again would generate the same economic *impact* (i.e. multiplier) as a $10 million contract using the same equipment

and workers to undertake earthworks for the improvement of a parkland. The economic *benefit* from the latter is clearly superior to the former.

Another pitfall is to construe construction and operational jobs as a 'benefit' of a proposal whereas they are typically factored into cost benefit analyses as a cost. This is because the labour in question has an opportunity cost – it could be deployed elsewhere to produce benefits for the community were it not for the project at hand. Employment is usually only counted as a benefit when the project creates jobs for people who would otherwise be permanently unemployed or underemployed.

For these reasons, amongst others, the DTF advises that the use of economic multipliers should generally be avoided in economic (CBA) evaluations.

A third common misapplication of economic thinking to the net community benefit test in urban planning issues is to implicitly or explicitly confine the analysis to the local district or host region of the development in question. Again, in line with usual advice offered by jurisdictional Treasuries, the frame for assessing net community benefit should be set at the State jurisdiction level. To do otherwise runs the risk of patently illogical findings; that is, a net community benefit may be found for the local area, but this might be more than offset by transfers or external costs for neighbouring communities or the host metropolitan area or state.

The upshot, in the case of the Lilydale Quarry rail station, is that a given project case must be demonstrated to generate a net community benefit at the level of the State and not necessarily at the local or district levels.

1.3 Base case and project case

The base case and project case are as follows:

- **The Base Case** assumes no provision of a station at the Quarry site but that the State Government will duplicate the rail line from Mooroolbark to Lilydale in any case as part of its planned development of train services in this sector of Melbourne.
- **The Project Case** involves commitment by the State Government to deliver a station at the Quarry site in the short to medium term.

On this basis, the following profiles of housing development were adopted for the Base Case and the Project Case. Note that under the Project Case, the Quarry site is expected to generate an additional 1,200 dwellings compared to the Base Case

TABLE 1 NOMINAL FLOW OF HOUSING CONSTRUCTION - LILYDALE QUARRY LAND

		1	2	3	4	5	6	7	8	9	10	11	12	13
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Base case	Annual housing stock addition	200	200	200	200	200	200	200	200	200	200	-	-	-
	Cumulative housing stock	200	400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,000	2,000	2,000
Project case	Annual housing stock addition	250	250	250	250	250	250	250	250	250	250	250	250	250
	Cumulative housing stock	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,250

Source: SGS Economics & Planning with data from Intrapac

2 ECONOMIC IMPACTS

2.1 Costs

The marginal costs versus the Base Case associated with the Project Case include:

- The construction cost of the rail station and track lowering
- The additional transport operating costs associated with Lilydale trains making an extra stop, and
- The cost of bringing forward the planned track duplication.

2.2 Benefits

The marginal benefits for Project Case include:

- Achievement of higher densities and delivery of more dwellings on build out,
- Improved vehicle kilometres travelled (VKT) outcomes resulting from mode shift (private vehicle operating costs and externalities), and
- Additional health benefits via the ability to walk or cycle to the train station.

3 QUANTIFICATION & MONETISATION

3.1 Time frame for the cost benefit analysis

A thirteen-year time horizon was used in the CBA of the Project Cases versus the Base Case (2018 – 2031). While the station infrastructure would be a long-lived asset, a 13 year 'window' provides a sufficient basis to gauge the economic merits of this investment, particularly in the context of a broad-brush assessment.

3.2 Methodology to measure impacts

A range of measurement strategies, principles and assumptions were applied to quantify and monetise the marginal impacts of the Project Case versus the Base Case. These methods are set out in Table 2 and Table 3.

TABLE 2. METHOD FOR QUANTIFYING AND VALUING COSTS

Cost item	Measurement and monetisation strategy and rationale	Method
1. Construction costs for rail station	There will be a significant capital cost in constructing even a basic rail station at the Quarry land.	A capital cost for the station was applied based on advice from Yarra Ranges City Council and Intrapac.
2. Additional rail operating costs	The Lilydale Quarry rail station is relatively close to that at Lilydale town centre. Stopping and starting within this short distance may cause additional public transport operating costs, including station related costs	SGS sourced operating cost data from desk top literature searches
4. Duplication costs	Duplication of the track is already planned. However, in the Project Case it is assumed this duplication will be brought forward to allow higher densities on the quarry site.	Total cost and timings provided by Intrapac.

Source: SGS Economics and Planning Pty ltd

TABLE 3. METHOD FOR QUANTIFYING AND VALUING BENEFITS

Impacts	Measurement and monetisation strategy and rationale	Method
1. Additional dwellings at build-out	The station would enable higher densities to be achieved versus the Base Case	SGS estimated the present value of the flow of housing services under Project Case versus the Base Cases as proxied by the residual land value of the additional dwellings in question.
2. Health benefits	In addition to a shift in mode share in favour of public transport, the Project Case is expected to encourage more active transport (walking and cycling) leading to saved health costs	SGS made assumptions about active transport levels per household based on VISTA data. Health benefits per kilometre walked or cycled were sourced from Commonwealth transport CBA guidelines
3. Reduced private VKT operating costs and externalities	Availability of train services on the 'doorstep' of the development is expected to shift transport mode share of the resident population in favour of public transport, thereby reducing VKT	SGS made assumptions about VKT per household based on the level of public transport service available. This took into account VISTA data on household travel behaviours, as available from the State Government. These assumptions were applied to the flow of dwelling stock under the Project Case. Private vehicle operating costs and externalities were sourced from Commonwealth transport CBA guidelines

Source: SGS Economics & Planning Pty Ltd

3.3 Discount rate

With reference to Department of Treasury and Finance guidance, the proposed rail project is best characterised as a 'Category 2 Investment' (see Table 4). Consistent with this categorisation, the CBA of the Project Case was completed using a benchmark (real) discount rate of 7%.

TABLE 4. DTF RECOMMENDED DISCOUNT RATES

Categories	Types of Investment	Basis	Rate (real)
Category 1	Provision of goods and services in traditional core service delivery areas of government, such as public health, justice and education. The benefits of these projects can be articulated but are not easily translated to monetary terms. E.g. schools, hospitals, police stations and civic open spaces.) Other projects in this category include projects evaluating potentially catastrophic scenarios for which considerable uncertainty surrounds estimates of costs and benefits.	Projects falling within this category should use a real risk free rate plus a very small risk premium. Based on long-term average government bond rates, an appropriate real discount rate for these projects is four per cent.	4%
Category 2	Provision of goods and services in traditional core service delivery areas of government (i.e. non-commercial investments), but those for which the benefits attributed to the project are more easily translated to monetary terms. E.g. public transport, roads and public housing).	These projects should be discounted using a risk free rate plus a modest risk premium depending on the project's sensitivity to the economy. Based on long term average government bond rates, an appropriate real discount rate for these projects is seven per cent.	7%
Category 3	Commercial investments with similar risks as the private sector. While there should ideally be limited government involvement in this area, government should require a rate of return on commercial investments comparable to that which the private sector requires given the degree of risk associated with the area of activity.	These projects should use a market rate of return as the default discount rate, commensurate with the risk profile associated with the industry and specific characteristics of the project. Given that there is the potential for such investments to be significantly more risky than an average market return, project proponents should liaise with DTF regarding the appropriate rate.	Consult with DTF.

Source: Department of Treasury and Finance

4 RESULTS

4.1 CBA findings

The following tables set out the present values of the marginal costs and benefits for the Project Case versus the Base Case. Two sets of results are provided – Table 5 describes the results of the model as described in the previous sections, while Table 6 gives the results of the same model assuming a $3m discount in construction costs, enabled by co-delivery with level crossing removal works in the district.

TABLE 5. CBA - PROJECT CASE VERSUS BASE CASE

Marginal Costs	
PV Construction cost	$14,211,200
PV Operating costs	$4,555,500
PV Duplication costs (bring forward)	$9,992,800
PV Total Costs	**$28,759,500**

Marginal Benefits	
PV Additional dwellings	$33,084,600
PV Health benefit	$24,155,800
PV Mode shift efficiency	$5,836,100
PV Total Benefits	**$63,076,500**
Net Present Value (NPV)	**$34,317,000**
Benefit-Cost Ratio (BCR)	**2.19**

TABLE 6. CBA – PROJECT CASE VERSUS BASE CASE WITH CONSTRUCTION DISCOUNT

Marginal Costs	
PV Construction cost	$11,922,500
PV Operating costs	$4,555,500
PV Duplication costs (bring forward)	$9,992,800
PV Total Costs	**$26,470,800**

Marginal benefits	
PV Additional dwellings	$33,084,600
PV Health benefit	$24,155,800
PV Mode shift efficiency	$5,836,100
PV Total Benefits	**$63,076,500**
Net Present Value (NPV)	**$36,605,700**
Benefit-Cost Ratio (BCR)	**2.38**

4.2 Conclusion

The first analysis shows a BCR of 2.19 and NPV of $34.3m. With the potential construction cost discount, the BCR increases to 2.38 and the NPV of the Project Case to $36.6m.

The analysis suggests the project is worthwhile in either cost scenario, both having a BCR greater than 2 and a net community benefit of over $30m.

It should be noted that only a 'sketch' cost benefit analysis has been possible within the time and resources available for this study. This said, the findings indicate a sound case for more exhaustive investigation of the merits of bringing forward the rail duplication and the construction of a station to serve the Quarry site.

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