NZ TRANSPORT AGENCY
WAKA KOTAHI

Technical Report Number 14

Assessment of Effects

Economics

For the Christchurch Southern Motorway Stage 2 and Main South Road Four Laning

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Butcher Partners
Consulting Economists

Phone: +64 3 3296 117
Mobile: +64 275 397534
Email: gvbutcher@xtra.co.nz
Office: 3/107 Holmes Road, Tai-Tapu
Christchurch,
Postal: PO Box 37 -129,
Christchurch, 8245, New Zealand

Author	Geoffrey Butcher
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This Technical Report has been produced in support of the Assessment of Environmental Effects (AEE) for the Main South Road Four Laning and Christchurch Southern Motorway Stage 2 Project. It is one of 20 Technical Reports produced (listed below), which form Volume 3 of the lodgement document. Technical information contained in the AEE is drawn from these Technical Reports, and cross-references to the relevant reports are provided in the AEE where appropriate.

A Construction Environmental Management Plan (CEMP) has been prepared to provide the framework, methods and tools for avoiding, remedying or mitigating environmental effects of the construction phase of the Project. The CEMP is supported by Specialised Environmental Management Plans (SEMPs), which are attached as appendices to the CEMP. These SEMPs are listed against the relevant Technical Reports in the table below. This Technical Report is highlighted in grey in the table below. For a complete understanding of the project all Technical Reports need to be read in full along with the AEE itself; however where certain other Technical Reports are closely linked with this one they are shown in bold.

Schedule of Technical Reports for the AEE

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3	Assessment of stormwater disposal and water quality	19	Erosion and Sediment Control Plan, Accidental Aquifer Interception Management Plan
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For further information on the structure of the lodgement documentation, refer to the ‘Guide to the lodgement documentation’ document issued with the AEE in Volume 1.

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The NZ Transport Agency (NZTA) seeks to improve access for people and freight to and from the south of Christchurch via State highway 1 (SH1) to the Christchurch City centre and Lyttelton Port by constructing, operating and maintaining the Christchurch Southern Corridor. The Government has identified the Christchurch motorway projects, including the Christchurch Southern Corridor, as a road of national significance (RoNS).

The proposal forms part of the Christchurch Southern Corridor and is made up of two sections: Main South Road Four Laning (MSRFL) involves the widening and upgrading of Main South Road (MSR), also referred to as SH1, to provide for a four-lane median separated expressway; and the construction of the Christchurch Southern Motorway Stage 2 (CSM2) as a four-lane median separated motorway. The proposed construction, operation and maintenance of MSRFL and CSM2, together with ancillary local road improvements, are referred to hereafter as 'the Project'.

MSRFL

Main South Road will be increased in width to four lanes from its intersection with Park Lane north of Rolleston, for approximately 4.5 km to the connection with CSM2 at Robinsons Road. MSRFL will be an expressway consisting of two lanes in each direction, a median with barrier separating oncoming traffic, and sealed shoulders. An interchange at Weedons Road will provide full access on and off the expressway. MSFRL will connect with CSM2 via an interchange near Robinsons Road, and SH1 will continue on its current alignment towards Templeton.

Rear access for properties fronting the western side of MSRFL will be provided via a new road running parallel to the immediate east of the Main Trunk rail corridor from Weedons Ross Road to just north of Curraghs Road. For properties fronting the eastern side of MSRFL, rear access is to be provided via an extension of Berketts Drive and private rights of way.

The full length of MSRFL is located within the Selwyn District.

CSM2

CSM2 will extend from its link with SH1 / MSRFL at Robinsons Road for approximately 8.4 km to link with Christchurch Southern Motorway Stage 1(CSM1, currently under construction) at Halswell Junction Road. The road will be constructed to a motorway standard comprising four lanes, with two lanes in each direction, with a median and barrier to separate oncoming traffic and provide for safety.[1] Access to CSM2 will be limited to an interchange at Shands Road, and a half-interchange with eastward facing ramps at Halswell Junction Road. At four places along the motorway, underpasses (local road over the motorway) will be used to enable connectivity for local roads, and at Robinsons / Curraghs Roads, an overpass (local road under the

[1] CSM2 will not become a motorway until the Governor-General declares it to be a motorway upon request from the NZTA under section 71 of the Government Roading Powers Act 1989 (GRPA). However, for the purposes of this report, the term "motorway" may be used to describe the CSM2 section of the Project.

motorway) will be provided. CSM2 will largely be constructed at grade, with a number of underpasses where elevated structures provide for intersecting roads to pass above the proposed alignment.

CSM2 crosses the Selwyn District and Christchurch City Council boundary at Marshs Road, with approximately 6 km of the CSM2 section within the Selwyn District and the remaining 2.4 km within the Christchurch City limits.

Key Design Features

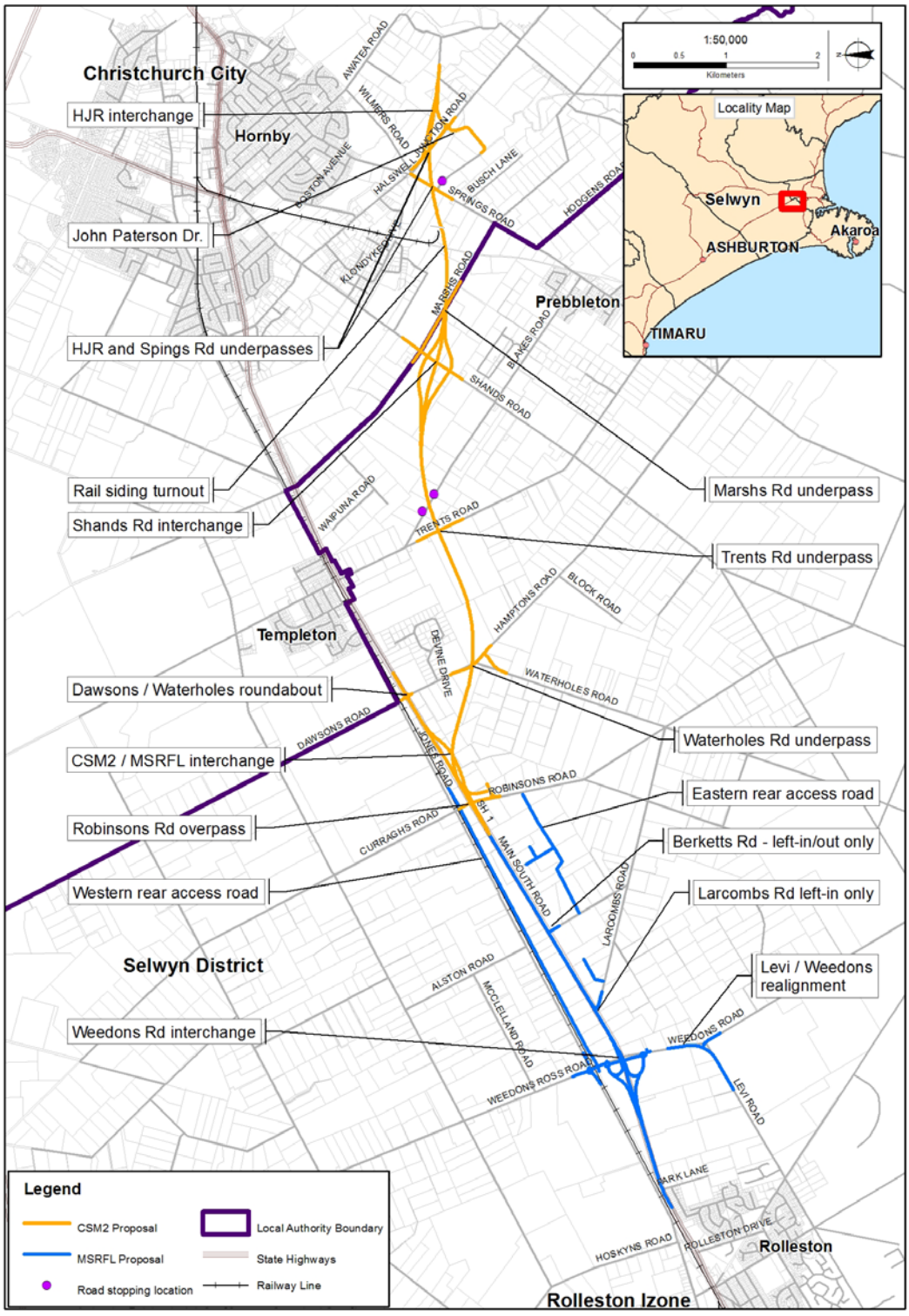
The key design features and changes to the existing road network (from south to north) proposed are:

- a new full grade separated partial cloverleaf interchange at Weedons Road;
- a new roundabout at Weedons Ross / Jones Road;
- a realignment and intersection upgrade at Weedons / Levi Road;
- a new local road running to the immediate east of the rail corridor, to the west of Main South Road, between Weedons Ross Road and Curraghs Road;
- alterations and partial closure of Larcombs Road intersection with Main South Road to left in only;
- alterations to Berketts Road intersection with Main South Road to left in and left out only;
- a new accessway running to the east of Main South Road, between Berketts Road and Robinsons Road;
- an overpass at Robinsons and Curraghs Roads (the local roads will link under the motorway);
- construction of a grade separated y-junction (interchange) with Main South Road near Robinsons Road;
- a link road connecting SH1 with Robinsons Road;
- a short new access road north of Curraghs Road, adjacent to the rail line;
- a new roundabout at SH1 / Dawsons Road / Waterholes Road;
- an underpass at Waterholes Road (the local road will pass over the motorway);
- an underpass at Trents Road (the local road will pass over the motorway);
- the closure of Blakes Road and conversion to two cul-de-sacs where it is severed by CSM2;
- a new full grade separated diamond interchange at Shands Road;
- an underpass at Marshs Road (the local road will pass over the motorway);
- providing a new walking and cycling path linking the Little River Rail Trail at Marshs Road to the shared use path being constructed as part of CSM1;
- an underpass at Springs Road (the local road will pass over the motorway);

- a new grade separated half interchange at Halswell Junction Road with east facing on and off ramps linking Halswell Junction Road to CSM1; and
- closure of John Paterson Drive at Springs Road and eastern extension of John Paterson Drive to connect with the CSM1 off-ramp via Halswell Junction Road roundabout (east of CSM2).

The proposed alignment is illustrated below and encompasses the MSRFL and CSM2 alignments between Rolleston and Halswell Junction Road.

Proposal Location Map



Economic Impact Assessment

Executive Summary

1. This report considers the economic effects of the proposed Christchurch Southern Motorway extension and Main South Road four-laning in terms of the Resource Management Act 1991 (RMA), which in relation to economic matters focuses, *inter alia*, on enabling people and communities to provide for their social, economic, and cultural well-being (section 5) and on the efficient use and development of natural and physical resources (s7(b) of the RMA) and the efficiency of the end use of energy (s7(a) of the RMA).

2. The economic test of this Project under the RMA is whether it assists the community to achieve economic and social well being, and whether it is an efficient use of resources. Both of these measures are encapsulated by the Benefit Cost Ratio, with a ratio of greater than 1 indicating it is an efficient use of resources, although this ratio has to then be modified to reflect and environmental effects to which a financial value can not be attached.

3. Using conventional road project assessment techniques, the Project generates benefits equivalent to approximately 1.5 times the costs. The inclusion of more dispersed community benefits associated with this "Road of National Significance" could raise this figure to 2.5. This implies that the road is an efficient use of resources and helps the community to provide for its social and economic well being, provided that the mitigation measures recommended by those investigating the environmental aspects of the Project are undertaken.

4. Because the costs of mitigation are included in the Project cost, the only environmental costs to be balanced against the financial benefits are the costs after mitigation, and these costs are assessed by other experts as being minor.

5. The economic modelling of costs and benefits is based on population and employment levels and distributions which does not take into account any effects of the Christchurch earthquakes. While the effect of the quakes on these parameters remains uncertain, a likely outcome is that there will be faster-than-forecast growth on the southern fringes of the city and in Selwyn, particularly Rolleston. Modeling suggests that this could significantly increase the future traffic benefits of the Project, which means that it is likely to be an even more efficient use of resources than is currently estimated.

6. The conclusion is that the Project generates benefits equivalent to approximately 1.5 times the costs using conventional road project assessment. The inclusion of more dispersed community benefits associated with this "Road of National Significance" could raise this figure to 2.5. There are no significant offsetting intangible costs that require consideration. The Project is therefore an efficient use of resources, and will help enable the community to provide for its social and economic wellbeing in terms of s 5 of the RMA.

1 Introduction

This report considers the economic effects of the proposed Christchurch Southern Motorway extension (CSM2) and Main South Road four-laning (MSRFL) (hereinafter referred to as CSM2 or the Project) in terms of the Resource Management Act 1991 (RMA), which in relation to economic matters, focuses, *inter alia,* on enabling people and communities to provide for their social, economic, and cultural well-being (section 5) and on the efficient use and development of natural and physical resources (s7(b) of the RMA) and the efficiency of the end use of energy (s7(a) of the RMA).

Scope of this report

1. Begins with a brief discussion of the meaning of economic efficiency in the context of this Project, and the ways in which the standard Benefit Cost Ratio (BCR) used for conventional analysis needs to be extended to reflect total efficiency, particularly on Roads of National Significance;
2. Outlines and comments on the basis for the Project in terms of Christchurch's and Selwyn's population and employment growth which underlie the traffic analysis and hence the BCR;
3. Considers the Canterbury earthquakes of 2010-2012 which may have significantly changed the number and location of businesses and households. At present, there is insufficient information available about these changes to incorporate them into the traffic models and the BCR analysis. This report nonetheless considers the expected nature of those changes, and outlines whether, and if so how, the BCR can be expected to alter as a result of any earthquake effects.
4. Discusses the effects of the project on property values, and considers the comparative costs and benefits of the chosen alignment and a possible alternative alignment in the Spring Road – Shands Road area; and
5. Discusses the way in which the Project will affect the social and economic well being of the community.

2 *Economics and the RMA*

2.1 Community Economic Wellbeing

Economic considerations are intertwined with the concept of the sustainable management of natural and physical resources, which is embodied in the RMA. In particular, Part II section 5(2) refers to enabling "people and communities to provide for their … economic
... well being" as part of the meaning of "sustainable management", the promotion of which is the purpose of the RMA.

As well as indicating the relevance of economic effects in considerations under the RMA, section 5 also refers to "people and communities" (emphasis added), which highlights that in assessing the impacts of a proposal it is the impacts on the community and not just the applicant or particular individuals or organisations, that must be taken into account. This is underpinned by the definition of "environment" which also extends to include people and communities

2.2 Economic Efficiency

Part II section 7(b) of the RMA notes that in achieving the purpose of the Act, all persons "shall have particular regard to … the efficient use and development of natural and physical resources", which includes the economic concept of efficiency. Efficiency, as has been noted by the Environment Court[2], means economic efficiency, which efficiency is defined in its widest sense and incorporates all costs and benefits associated with all resources affected by the Project, including those which are not traded in the market and those for which prices can not be assessed. While economics can in some cases assist in placing values on goods and services that are not traded in markets, there generally remain some non-quantifiable costs and benefits, some of which are intangible. Decision makers under the RMA need to weigh up these non-quantifiable costs and benefits against the quantified values that have been calculated in order to decide whether a project is overall an efficient use of resources.

2.3 Viewpoint for Economic Assessment

Depending on the circumstances, one can look at economic efficiency from a local, regional or national perspective. A market cost benefit analysis considers costs and benefits from a national perspective, and this is the approach that has been taken here. In some circumstances, particularly when considering the economic impacts of a project on employment and income, it may also be appropriate to look at impacts from a regional or even district perspective. This has not been done in this case because any employment effects are likely to be extremely diffuse and difficult to

[2] Jackson, J. Marlborough Ridge Ltd v Marlborough District Council [1998] NZRMA 73

assess. They are assumed to be minor from both a regional and a national perspective.

Conventional cost benefit analysis of road improvement projects involves comparison of project benefits (including vehicle operating cost savings, travel time cost savings, accident cost savings and trip travel time reliability improvements) with project costs (including capital costs and changes in operation and maintenance costs). The economic efficiency of the use of those resources can be estimated using the methods set out in the NZTA's Economic Evaluation Manual (EEM), which is based on considerable local and international research and which has been consistently applied over roading projects. The benefits of a project are divided by the costs of the project (incorporating a discount rate) to produce a Benefit Cost Ratio (BCR).

The economic efficiency of those resources that can be valued has been dealt with in part in the economic evaluation and the calculation of a Benefit Cost Ratio (BCR) under the NZTA's Economic Evaluation Manual (EEM) procedures. The EEM includes the costs of construction (including costs of property used), lifetime road operation and maintenance costs, traffic-related benefits (including vehicle operating costs, time savings, accident costs and trip time reliability) and where possible a number of non-market effects[3].

For any given project there may be specific non-market effects which the EEM procedures do not cover. In the CSM2 case these non-market effects include the range of social and environmental effects which are discussed in other technical reports[4], and also the broader strategic values which are implicit in the Government's decision to classify the Christchurch Southern Corridor as one of the Roads of National Significance (RoNS).

2.4 Benefit Cost Ratio

The combined CSM2 and MSRFL Project has an estimated benefit : cost ratio of 1.5[5]. A BCR exceeding 1.0 means that, taking into account all identifiable costs and benefits for which a financial value could be assessed, the Project is an efficient use of resources[6]. In particular the benefits include savings in travel time[7], reductions in accidents and reductions in CO_2 emissions. The benefits accrue not just to users of the new route but also to drivers on the rest of the road network, who will experience less congested roads. Excluded from the BCR calculations are any benefits to residents living close to the existing roads who will endure less noise and vibration as existing traffic levels are reduced, as well as costs to residents living close enough to the new route to be affected by noise, vibration and visual impacts. Assessments of those effects are included in other technical reports, and brief reference to the relevant effects is made in section 3 of this report.

The costs of the Project include the actual costs of construction including any mitigation required to reduce the impacts on affected parties and the environment, and

3 For example, CO_2, dust and noise when these are particularly significant aspects of a project.
4 Noise, Landscape, noise, lighting, ecology and social impacts.
5 This figure is included in section 16.2.3 of the *Scheme Assessment Report*.
6 The BCR is based on traffic modeling and costs across the entire network.
7 There is an increase in vehicle operating costs, particularly in the early years of the project.

the costs of all property that needs to be acquired for the road. Because mitigation costs have been included, the social costs to adjacent residents need to be assessed on the assumption that mitigation work has been undertaken. While the mitigation works are intended to reduce the effects to levels which are considered to be acceptable, this does not mean that they will be zero.

2.5 Roads of National Significance (RoNS)

Roading projects generate a number of social and economic effects on the wider community, but these are not generally included in any numerical analysis. In the past BCR and a qualitative assessment of any intangibles were needed to assess roading projects. However in more recent projects, for example, Transmission Gully, other criteria are included relating to strategic fit and effectiveness. These are criteria which attempt to cover the effects which are generally not included in the numerical analysis. Instead, the extent to which a project generates such benefits is indicated by the degree to which it "fits" with the broad strategic objectives of local authorities, Land Transport Management Act 2003 (LTMA)[8] objectives, New Zealand Transport Strategy (NZTS)[9] targets, and key Government Policy Statement on Land Transport Funding (GPS)[10] factors.

The rationale for CSM2 is contained in the Traffic and Transportation Effects Report (Technical report)[11], which shows a strong link between CSM2 and the achievement of a range of economic and social objectives. This link is the reason that CSM2 is part of the Christchurch RoNS package[12].

The RoNS projects, which include CSM2 and MSRFL, have been scored against Strategic Fit, Effectiveness and Efficiency. The inclusion of the first two categories is an implicit acknowledgement that the standard economic analysis framework does not take into account some intangible costs and benefits associated with improvements in economic growth[13] that are expected to flow from a better transport network with increased connectivity.

In RoNS terminology[14] these benefits are described as WEBs (Wider Economic Benefits), and they include:

- Agglomeration impacts – the productive advantages that arise from close spatial concentration of economic activity, most likely to arise within major urban areas; and

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8 Land Transport Management Act 2003 - The LTMA sets outs the five transport objectives, which are the basis for the targets set out in the NZTS. Note NZTS is non-statutory and there is currently no National Land Transport Strategy

9 New Zealand Transport Strategy 2008

10 Government Policy Statement on Land Transport Funding 2012 (in force 1 July 2012)

11 Technical Report 2, Chapter 2. *CSM2 and MSRFL Assessment of Traffic and Transportation Effects*

12 *Roads of National Significance. Economic Assessments Review. Summary Report* July 2010. NZ Transport Agency

13 "Second order effects on wider economic activity, including agglomeration benefits, labour productivity and supply, and the impacts of improved competition. There may be additional effects at a macro-economic level resulting in GDP changes. P4 *ibid*

14 *Ibid.*

- The impacts on employment levels experienced both within urban areas and more widely throughout the area of influence of the road project.

The RoNS report[15] concludes that

> *"While there are issues with the limited data available and with the use of results from different schemes and countries, the findings suggest that the WEBs from the RoNS are likely to be substantial when added to the benefits traditionally calculated for a road project"*

The Christchurch RoNS project overall is expected to generate these wider benefits, which are normally regarded as intangible but have been quantified in this case, which are equivalent to approximately 60 - 80[16] per cent of the conventionally measured benefits. This implies that the BCR for the Project is about 2.6. Therefore, the Project is by implication an efficient use of resources, unless there are very significant non-market disbenefits associated with the Project.

2.6 The Need for the Project

The need for the Project is based on expected population and employment growth in the city as a whole, and particularly in the areas south of the city, as well as the strategic need for better access to the port of Lyttelton[17]. Growth is based on Statistics New Zealand Medium Term Growth projections (medium-high variant). These projections are based on 2006 census figures, and the abandonment of the 2011 census mean that it is not possible to verify whether outcomes are consistent with projections over the period 2006-11.

In any case, the Christchurch earthquakes would have had so much impact on the census figures as to make them of limited value for verifying the short term accuracy of the growth projections. Current expectations, based on a "Rapid Recovery" from the earthquakes, are that between 2011 and 2041 there will be a 40 % increase in total households and a 25 % increase in employment[18]. This includes a doubling of population within the parts of Selwyn District that are close to the city and within the Great Christchurch Urban Development Strategy (UDS) area.

The Statistics NZ forecasts are trend forecasts. While the trend has been for rapid growth in the Selwyn District including Rolleston, the proposed motorway will reduce the time taken to commute into the city and is likely to make Rolleston even more attractive to potential residents. This "generated traffic" is not a factor which is incorporated into the trend population forecasts, and from this perspective the population forecasts and hence the traffic modeling based on these forecasts will understate the potential benefits of the Project.

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15 *Ibid.*

16 *Roads of National Significance, Economic Assessments Review, Summary Report.* June 2010. Figures 3.1, 3.2 and 3.3.

17 *Assessment of Traffic and Transportation Effects.* Technical Report No 2. Christchurch Southern Motorway Stage 2 and Main South Road Four Laning. June 2012.

18 GHD; *ibid* Table 2-1.

2.7 Christchurch Earthquake Effects

The effects of the Christchurch earthquake are not yet clear. Some 8,000 existing residential properties, primarily on the east of the city, have been deemed unsuitable for housing because of their susceptibility to liquefaction in future earthquakes. Hence residents in these properties are going to have to shift. While there is considerable debate as to likely changes in medium term population[19] and where those that remain will live, there is to date no strong evidence as to what the final outcome will be. One likely outcome is that there will be faster-than-forecast growth on the southern fringes of the city (e.g. Wigram and Halswell Junction Road area) and in Selwyn district, particularly in Rolleston.

This uncertainty means that land use forecasts incorporating the effects of the displacements caused by the earthquakes were not available at the time the modeling for NZTA was undertaken, and the current Cost Benefit Analysis (CBA) is based on traffic modeling which uses the Medium Term population and employment projections of Statistics NZ which in turn are based on the 2006 census[20].

However, to investigate the effects of faster growth in the south and southwest, an alternative approach was adopted in which the modeled 2026 and 2041 benefits were brought forward to the periods 2016 and 2026 respectively, with the latter then held constant to 2041[21]. Benefits for 2041 remain unchanged (and are the same as for 2026 in these sensitivity tests), as it is likely that the total level of development in the land use forecasts is appropriate, but that it will occur at a faster rate"[22].

If the earthquakes do indeed lead to this significantly more rapid development in the southwest, then the Project will generate substantially greater benefits. The effect is to increase the estimated Net Present Value (NPV) benefits from $353m in the base case to $494m in the accelerated development scenario, and to increase the BCR from 1.5 in the base case to 2.1 in the accelerated southwest development case[23].

2.8 Property Value Effects

The value of a number of properties will be either adversely or positively affected by the Project as a consequence of both tangible effects (e.g. ease and hence cost of travel for commuters), and intangible effects (such as visual and noise effects, or loss of business values). Sometime the change in value is used as a proxy measure of the value of the intangible effects (e.g. a house close to a noisy road will have less value than a house further away), but the change in value is a reflection of the noise and the two impacts cannot be added together.

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19 Expectations for the medium term range from losses of several per cent (compared to the forecast growth path), as residents who have left do not return, to gains of several per cent as there is an influx of construction labour to rebuild the city, and a booming economy driven by this reconstruction.

20 The revised Christchurch Traffic model is now based on the population and employment figures from the "Rapid Recovery Scenario", developed after the Christchurch 2010 and 2011 earthquakes.

21 Benefits in intermediate years are estimated by interpolation.

22 *Scheme Assessment Report*. P 244.

23 Economic Evaluation. Section 15.7 *Scheme Assessment Report*.

The change in property value is not realised until the property is sold, and at this point there is a loss (gain) of financial wealth to the seller which is a reflection of the loss (gain) of amenity values which occurred when a project was implemented. The new buyer suffers the cost (benefit) of reduced (increased) amenity, but this is offset by the lower (higher) price and the buyer is hence not affected by the project.

The major changes in property values will accrue to all those properties that now have better access on the improved network. However, since these benefits have already been reflected in the reduced operating costs and travel costs that are included in the BCR, the change in property values is excluded from the analysis to avoid double-counting of benefits.

2.9 Economic Assessment of Alternative Alignments

An alternative (Alignment C) to the Preferred Alignment was considered in the Shands Road / Marshs Road vicinity. Alignment C would have increased the distance between the motorway and Aberdeen subdivision from an average 550 metres to 950 metres and from a minimum of 150 metres between the closest house and the off-ramp to 550 metres. Alignment C could thus have benefited the 60 houses in the subdivision[24] to varying degrees. It should be noted, however, that the NZTA's noise expert considers the proposed mitigation works to be adequate to reduce noise from the Preferred Alignment to an acceptable level.

A comparison of the Preferred Alignment and Alignment C has been undertaken[25]. This comparison considered issues related to construction and land cost, engineering design, accessibility, physical environmental impacts, social environmental impacts, and alignment with broader strategic objectives. It concluded that Alignment C was moderately preferable in visual terms, since it would be closer to existing industrial areas and less obtrusive to existing residents in the Prebbleton area, and would be moderately preferable in social environmental terms since it would have less effect on adjacent housing. The Preferred Alignment has 32 houses within 200 metres of the motorway including 7 which are less than 50m from the motorway, while Alignment C has 29 houses within 200 m of which 5 are within 50 m of the motorway. However, the NZTA's experts consider that these proximity effects can be mitigated satisfactorily, and the costs of the limited mitigation required are included in the BCR.

Alignment C, however, would require a lot of land with potential commercial values and runs through the middle of a block of land (owned by Calder Stewart and others, and hereinafter referred to as Calder Stewart Land or CSL). That block of land is rezoned for industry and distribution services under Plan Change 54 (PC54) of the Christchurch City District Plan. In contrast the Preferred Alignment requires only a small corner of CSL, plus farm land, a maze, and a chicken raising operation, with the latter having a relocation cost of the order of $16 million.

Since CSL is currently used for rural purposes, an economist might argue that the opportunity cost of the CSL land is its current use. Although it now has a commercial

[24] Based on a visual assessment of the two alignments as shown on aerial photographs with overlays of the two alignments.

[25] Chapter 9, *Scheme Assessment Report*, Section 9.3.

zoning, this zoning could instead be transferred to other land adjacent to the city with similar use values to the CSL block. Hence there would be no further economic loss arising from using the CSL. If this were true, then the Preferred Alignment would be $16 million more costly than Alignment C[26]. However, this reasoning is incorrect, and ignores the fact that the CSL land has been deemed to provide greater community benefits than would any alternative land. These benefits have been widely canvassed in a series of planning documents and decisions. The whole purpose of Proposed Plan Change 1 (Chapter 12A to the Regional Policy Statement) is to provide for the development of industrial land in a place where it was economically efficient to do so (with economic efficiency being a combination of savings in infrastructure and travel costs and benefits of agglomeration economies at the site). The value of these combined savings and benefits is reflected in the difference between expected land raw block commercial land values at CSL compared to its existing use[27]. This difference is currently estimated as being $47.4[28] million, based on the Calder Stewart site having commercial zoning as a result of PC54 being approved.

Considering the following factors:

- Adopting commercial land values for the CSL block;
- Taking into account the relocation costs of a chicken breeding facility located on Marshs Road; and
- Making the strong assumptions that land between the motorway and Marshs Road would no longer be useful for commercial purposes[29] and that land between the motorway and Hornby would not lose any commercial value,

the NZTA's property advisors assessed Alignment C as being $14.1 million more expensive than the Preferred Alignment[30]. Given the recent decision of Christchurch City Council on PC54, this assumption is no longer appropriate. The NZTA's property advisers have done sensitivity testing to show the effect on the difference in land values between the routes assuming that this land suffers no loss in commercial value after the new road is constructed. They concluded that under this unrealistic assumption[31], the cost of Alignment C is less than the preferred option by $0.7 – 3.6 million[32].

This apparent slightly lower cost of Alignment C needs to be viewed in light of a number of other pertinent factors raised by the property advisors and planners, all of which raise the true economic and social cost of Alignment C:

- The land between the motorway (either alignment) and Marshs Road is almost certain to be perceived as being less useful, and hence to have less commercial value, than would be the case if it were not separated by the motorway from the rest of Hornby. That is, it would lose significant value, although less than the $10 million initially assumed;

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26 Line 3, Table 16, pp 85 Chapter 7, *Scheme Assessment Report*

27 The planning process has concluded that social and economic costs associated with developing industrial land are lower at the CSL site than at other potential sites outside the urban fence.

28 $95.3 million compared to $47.9 million. Column 1 lines 1 and 4; Table 20, Chapter 9, *ibid.*

29 Implying a loss of $10 million of value.

30 Column 3, line 6. *ibid.*

31 A strong assumption in the initial analysis is that the land between the motorway and Marshs Rd has no commercial use, while the strong assumption in the second analysis is that the land has no loss of commercial value.

32 Depending on whether the entire block has to be purchased with the parts not wanted being re-sold ($3.6 million) or whether only the land required has to be purchased ($0.7 million).

- Splitting up a large block of commercial land by putting a motorway through the middle of it (Alignment C) would restrict the potential shape of the subdivision and impose restrictions on potential large sites. This would reduce not only the value of the commercial land between the motorway and Marshs Road, but also the land between the motorway and Hornby;
- Negotiations to acquire a very large block of commercial land are likely to be prolonged. This could significantly delay the period until the benefits of the motorway can be realised.

3 Social and Economic Well Being

The enabling of economic and social well-being is to some degree implicit in the BCR calculations, which show whether the value of benefits exceeds the value of costs, and hence whether the community as a whole is expected to be better off. However, consideration needs to be given to any significant negative effects of the motorway on local residents and businesses.

Some costs and benefits are not able to be valued. Typically these include a range of environmental and social impacts. The mitigation measures incorporated into the CSM2 Project aim specifically to mitigate environmental costs associated with storm water run - off and the chemical residues which this may contain, and ensure that operational noise effects on nearby dwellings are at acceptable levels according to the New Zealand standard. Other potential costs which are not included in the BCR analysis include community severance, landscape and urban design, and the impacts on businesses that have frontage onto Main South Road.

"Strategic Fit and Effectiveness", which contribute to social and economic well being, are generally assessed independently of the BCR analysis. For this Project, these factors have specifically been included via the "Road of National Significance" analysis, which suggested that the BCR for the Project should increase from 1.5, as assessed using the conventional project evaluation framework, to 2.6.

3.1 Noise

Operational traffic noise which can impact on adjacent houses can not be entirely avoided. However, the Assessment of Operational Noise Effects (Technical Report 8)[33] concludes that "through the application of the best practicable option, all Protected Premises and Facilities (PPFs) will meet the Category A (quietest) noise criteria for new and altered roads".

From an overall efficiency and social wellbeing viewpoint, one must take into account not only the houses that may be negatively affected, but also those that will be positively affected. The latter group includes houses on Main South Road, which will have reduced traffic noise as a consequence of the motorway. There are 50 houses in Templeton-west which are within 100 m of Main South Road, 10 houses in Templeton-east which are within 30 metres of Main South Road, and a further 35 houses around Marshs Road which are within 30 metres of Main South Road. In additional there are 10 or so scattered houses along Main South Road which will enjoy a reduction in traffic noise.

In contrast, the proposed new alignment will be 350[34] - 900 m (600 m average) from the 70 or so houses in the Aberdeen subdivision. There are also about half a dozen other houses reasonably close to the proposed alignment (some of which will be purchased by

[33] Marshall Day. Technical Report 8. Assessment of Operational Noise Effects.

[34] The closest point of the off-ramp will be 150 m from the closest point of the subdivision, and 450 m from the centre of the subdivision. The centre of the motorway will be 100 m further away.

the Crown), and about 50 houses in the Claremont subdivision at Devine Drive which could be affected. However, the closest dwelling in Claremont is some 230 m from the proposed motorway and the centre of the Claremont subdivision is roughly equi-distant between the existing traffic on Main South Road and the expected traffic on the proposed new motorway.

3.2 Community Severance

Community severance is discussed in the Social Impact Assessment (Technical Report 13)[35]. This report notes that "*as social boundaries in the impact area are very soft, with different boundaries for different networks and social facilities, it's more likely that the Project will lead to some redefinition of boundaries than cause severance as a clear negative effect*"..

While the proposed closure of Blakes Road could entail a diversion of up to 2 km[36], community connectivity on other routes will be maintained via overbridges. The reduction in traffic through Templeton on Main South Road could significantly reduce the existing severance between Templeton-east, where the convenience store is, and Templeton-west where the majority of the Templeton houses are.

The Social Impact Assessment concludes that "*Overall, with the closure of only one local road (Blakes Road - as a result of CSM2) and the construction of over and underpasses, with some left in and out options from local roads as well, plus mitigation of property access, the potential for short and longer-term social severance relating to residents, businesses and services is assessed here as low*". [37]

3.3 Landscape and Urban Design

The new motorway will increase the area of landscape that is disrupted by roading and traffic. My understanding is that the associated adverse and landscape visual effects will not be significant once landscaping and mitigation measures are in place. The Landscape and Visual Effects Report (Technical Report 4)[38] states that:

> *The receiving environment is considered to be of a moderate level of naturalness. This is due to the extent of modification of the land cover and current land use activities leaving few remaining natural features.*
>
> *At either end of the CSM2 and MSRFL visual amenity is low, while within the middle, rural section, amenity values range between moderate to high.*
>
> *Local residents, particularly those within the 1 km band, are likely to be adversely affected to some degree in relation to rural character and visual amenity and this will range between substantial to negligible. In comparison, road users are more*

35 Taylor Baines. *Social Assessment, pp 40 - 41* Technical Report 13.
36 The 10 or so houses on Blakes Road could have to travel an additional 2 - 3 km.
37 Taylor Baines, *ibid*, p41
38 Milne, T; *Landscape and Visual Effects* Technical Report 4.

likely to show a high degree of acceptance to the provision of infrastructure that is integrated into the landscape through design, earthworks contouring, and planting

Overall potential landscape and visual amenity effects are considered to be appropriately addressed by the proposed landscaping, as illustrated in Technical Report 7 and recommended mitigation.

3.4 Improved Cycling

There is some expectation of improved cycling on existing roads which will become less congested than they are currently[39], and a 2 metre shared footpath / cycleway is provided for on the proposed new overbridges. The scheme also includes a 1.7 km off-road facility linking the CSM1 walk/cycle path at Halswell Junction Road with the Little River Rail Trail at Marshs Road. While the cost of this cycle facility is included in the Project, the uncertainty regarding the number of cyclists who will use this path means that potential benefits have been excluded from the BCR analysis.

3.5 Improved Community Environment for Hornby and Templeton communities

It is expected that the Project will reduce traffic volumes and improve levels of amenity through the Templeton, Hornby and Prebbleton communities[40], and that residents will benefit from a reduction in noise, vibration, air pollution and other effects associated with high traffic volumes.

3.6 Business Impacts

There are about 30 businesses that have frontage onto the main highway into Christchurch, but which will be by-passed if CSM2 is constructed. To the extent that they depend on casual stops by passing motorists they may lose some business, although to the extent that it is easier to stop on and cross a road with reduced traffic they may gain some business.

The Social Impact Assessment did not reveal any expected significant loss of business in the Templeton shops; in fact the reverse. Business respondents also said that:

- The car parking on the street was considered very important to all these businesses and they had argued to have it maintained.
- By far the majority of customers/clients stop outside the shops on the way south, that is, they do not stop on the way north and cross the road as it is too busy;
- Their visible presence on the Main South Rd did not attract custom except possibly the Maryland food bar which did get people stopping for fish and chips;
- Reversing out of the car parks onto the Main South Rd requires "care and patience". Some would like to see traffic slowed down to 50 k outside the shops;

[39] *Scheme Assessment Report*. Section 6.9.4

[40] Assessment of Traffic and Transportation Effects. Technical Report 2. Section 2.6.1

- State Highway One is considered too dangerous for walking or cycling. Many of the business respondents described the road as even busier in 2012;
- All of them thought that the Project would be positive as it would result in less traffic on SH1 and could lead to more custom[41].

It is expected that most other businesses will have similar sentiments. Either drive-by traffic is a trivial part of their business and / or less traffic will make people more willing to stop, including local customers.

Probably the major exception is Knitworks, located on the corner of Robinsons Road, which is aimed primarily at the visitor market. The shop's main road profile is important to it. However, it is proposed that the Crown will purchase this business and hence the costs to the current owner are reflected in the Cost Benefit Analysis. The motel on the MSRFL section of the existing route is also to be purchased by the Crown for the Project, and hence any losses to that business are also included in the cost benefit analysis.

The Templeton motel may be affected. While signage on the motorway, if feasible, may help mitigate the effects on this business, some losses are inevitable and unavoidable.

3.7 Business Transfer Effects

Any business effects will almost inevitably be transfer effects within the regional economy. That is, any loss in trade for existing businesses will be offset by increases in trade for competing businesses, and the overall efficiency effects and economic impacts are expected to be trivial from a wider community viewpoint.

Generally under the RMA, retail or business redistribution effects, also know as trade competition effects, are not relevant insofar as they impact on individual business. They are only relevant to the extent that they are of such significance that they threaten public amenity values of city, town or suburban centres. There is no expectation that there will be any such loss of amenity in the case of CSM2.

The dynamics of business rises and falls are an inevitable part of commercial life, and over time businesses must address changes in their environment and their future viability is not assured. The effects on smaller business over time should not of themselves mean that the Project approvals should be declined.

3.8 Limited Access – Main South Road

A number of properties on that portion of Main South Rd which is to be four-laned will lose their existing access to Main South Road. Current plans are that those on the north side of the road will be given alternative access via a minor road to be constructed between those properties and the railway line, with residents being able to join the existing Main South Road at either Weedons-Ross Rd, or Dawsons Rd via Jones Rd.

[41] Social Impact Analysis

Residents on the south side of Main South Road will also have alternative access provided. Final design options have been approved and the economic costs associated with this are incorporated into the Cost Benefit Analysis.

3.9 Economic Impacts During Construction

Construction of the Project will generate significant employment and income in the region. To the extent that resources including labour would otherwise be unemployed, this generates a benefit to the region. Current expectations, however, are that the construction sector, including businesses and people prepared to relocate from other centres, will be at full capacity utilisation during the next decade as a result of the Christchurch rebuild. Hence construction activity is likely either to be a substitute for other construction activity in the region with no overall increase, or to be undertaken by labour and companies from beyond the Christchurch area. While this may generate increased economic mass and resultant economies of scale for the regional economy as a whole, any benefit will be "second order", and is unlikely to be significant.

4 Conclusion

Under the RMA the economic test for the Project is whether it assists the community to achieve economic and social well being, and whether it is an efficient use and development of natural and physical resources. Both of these measures are encapsulated by the Benefit Cost Ratio. A ratio of greater than 1 indicates an efficient use of resources, although this ratio has to then be modified to reflect environmental effects to which a financial value can not be attached.

Using conventional road project assessment techniques, the Project generates benefits equivalent to approximately 1.5 times the costs. The inclusion of more dispersed community benefits associated with this "Road of National Significance" could raise this figure to 2.5. This demonstrates that the Project is an efficient use of resources and will help the community to provide for its social and economic well being, provided that the mitigation measures recommended by those investigating the environmental aspects of the Project are undertaken. Because the costs of mitigation are included in the Project cost, the only environmental costs to be balanced against the financial benefits are the costs after mitigation, and these costs are assessed by other experts as being minor.

The economic modelling of costs and benefits is based on population and employment levels and distributions which does not take into account any effects of the Christchurch earthquakes. While the effect of the earthquakes on these parameters remains uncertain, a likely outcome is that there will be faster-than-forecast growth on the southern fringes of the city and in Selwyn, particularly Rolleston. Modeling suggests that this could significantly increase the future traffic benefits of the Project, which means that it is likely to be an even more efficient use of resources than is currently estimated.

Table 1 Affected Businesses on Main South Road

South of Halswell Junction Rd	Harvey Norman Outlet Warehouse Mountain View Holiday park	Minor Minor
Templeton – Marshs Road	Templeton Speights Hotel John Deere Tractors Shell Service Station Campbell Motors Templeton Panel Beaters Norwood Farm Machinery Templeton Vets Clinic Cut Loose Hair Templeton Pharmacy Hilton Press Printers Butchery Robs Bakery Maryland Food Bar, Templeton Convenience Store Totalspan Building Centre Harvest Centre – Harvesters & Tractors Cottage Co	Minor Trivial Medium Trivial Trivial Trivial Trivial Trivial Trivial Trivial Trivial Trivial Minor Minor Trivial Trivial Trivial
Templeton – Trents Road	Cookie Time Templeton Manor Motel Saddlery – Canterbury Equestrian	Minor Minor - Moderate Trivial
Waterholes Rd	Go Karts	Minor
Robinsons Road to Larcombs Rd	Southern Woods Knitworks Warrens Animal Feed Cropmark Seeds Berries Real Fruit Icecream	Trivial Moderate-significant **Project purchase** Trivial Trivial Moderate
Larcombs Rd to Weedons Rd	Blue Gum Lodge Motel Sheds NZ South-Hort Garden and Landscapes Diggalinks – Sales and hire	Minor – moderate Project purchase Trivial Minor Minor

Sources:

1. Taylor Baines (pers. Comm.) interviewed businesses in Templeton who felt that they have little reliance on through traffic and a main road presence.
2. Butcher Partners Ltd assessed other businesses, including discussions with some operators, and formed a view on the likely level of impact depending on the degree to which the business was likely to be casual call-in by passing drivers as opposed to destinations specifically chosen for the service they offer.