

APPENDIX K

Waitarere Beach Road Curves Project Assessment of Economic Effects

Prepared for The New Zealand Transport Agency

November 2015



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BUILDING A BETTER WORLD

**WAITARERE BEACH ROAD CURVES PROJECT
ASSESSMENT OF ECONOMIC EFFECTS**

**Prepared for
New Zealand Transport Agency**

**By
Brown, Copeland & Co Ltd**

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INTRODUCTION

Background

1. The Waitarere Beach Road Curves Project (the Project) is proposed by the NZ Transport Agency (the Transport Agency) to improve the level of safety on a 4.3 kilometre section of State Highway 1 (SH1), some 7 kilometres north of Levin. The Project will also provide some travel time savings, although this is not the Project's primary objective. Eight deaths or serious injuries occurred on this stretch of road during the five year period January 2009 to December 2013.
2. The surrounding land use is primarily farm land and includes several rural residential properties. There are also some community facilities in the immediate area.

Purpose

3. The purpose of this report is to assess the economic effects of the proposed Project. The report is an appendix to the Assessment of Environmental Effects (AEE) **for the Project**.

Scope

4. The remainder of this report is in 6parts:
 - Project description;
 - Economics and the Resource Management Act (RMA);
 - The Horowhenua District economy;
 - Project cost benefit analysis;
 - Increased economic activity during project construction and operation;
 - Conclusions

PROJECT DESCRIPTION

5. The Project is part of the Otaki to north of Levin section of the Wellington Northern Corridor Roads of National Significance (RoNS) programme. The project area is approximately 7 km north of the centre of Levin. The objectives of the Project are:

In relation to State Highway 1 north of Levin to:

- enhance inter-regional and national economic growth and productivity;
- improve journey times on the state highway network;
- enhance safety of travel on the state highway network; and
- appropriately balance the needs of both interregional traffic and local road users.

To achieve the above objectives in a cost effective manner.

6. It is proposed to improve this section of State Highway 1 (SH1) by:

- Replacing the three existing curves with two curves;
 - Increasing the radii of the curves to improve the alignment of the road;
 - Widening the highway cross section to provide a median strip and wider shoulders (tapering in to connect to the sections of highway outside the project area);
 - Providing a wire rope median barrier within the median strip;
 - Providing wire rope barriers on the outer edge of the hard shoulder (this does not include across private access ways);
 - Improving the layout of, and visibility at, the Waitarere Beach Road/SH1 intersection;
 - Improving the layout of, and visibility at, the Clay Road/SH1 intersection;
 - Closing the Paeroa Road intersection with SH1, and connecting Paeroa Road by a parallel road to a new intersection with SH1 further to the south, at the curve north of the Huia Marae access; and
 - Providing for a right turning lane at entrance to the Poroutawhao School.
7. The Project will require significant earthworks due to the undulating topography. Improvements to stormwater management will also be made with roadside swales and stormwater retention ponds at key locations and the installation of new culverts for the realigned sections and the upgrade of existing culverts where the existing SH1 alignment is retained.

ECONOMICS AND THE RMA

Community Economic Wellbeing

8. Economic considerations are intertwined with the concept of the sustainable management of natural and physical resources, the promotion of which is the purpose of the Resource Management Act (RMA). In particular, Part 2 section 5(2) refers to enabling “people and communities to provide for their ... economic ... well-being” as part of the meaning of “sustainable management”.
9. 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 effects of a proposal, it is the effects 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.
10. The Project will improve the economic and social wellbeing of the local community by improving road safety (and reducing travel times) and increasing economic activity during the Project’s construction.

Economic Efficiency

11. Part 2 section 7(b) of the RMA directs 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 concept of economic efficiency.¹ Economic efficiency can be defined as:

“the effectiveness of resource allocation in the economy as a whole such that outputs of goods and services fully reflect consumer preferences for these goods and services as well as individual goods and services being produced at minimum cost through appropriate mixes of factor inputs.”²

12. More generally, economic efficiency can be considered in terms of:
- maximising the value of outputs divided by the cost of inputs;
 - maximising the value of outputs for a given cost of inputs;
 - minimising the cost of inputs for a given value of outputs; and
 - minimising waste.

13. The Project is consistent with economic efficiency (see next section of this report).

Viewpoint for Economic Assessment

14. An essential first step in carrying out an evaluation of the positive and negative economic effects of a project is to define the appropriate viewpoint that is to be adopted. This helps to define which economic effects are relevant to the analysis. Typically a district (city) or wider regional viewpoint is adopted and sometimes a nationwide viewpoint might be considered appropriate.
15. For the Project, the Horowhenua District is a relevant community of interest, because the economic effects of the Project will largely (but not solely) affect the residents and businesses in the District. The wider Wellington region is a relevant community of interest, particularly in the context of the Project forming part of the Wellington Northern Corridor RoNS. Because funding for the Project will be through the Transport Agency, as the central government agency, the national economic effects of the Project are relevant. The Project is also part of the Wellington Northern Corridor RoNS, which is included in the Government’s portfolio of RoNS.
16. Generally with projects considered under the RMA³, the financial or commercial ‘business case’ analysis undertaken from the viewpoint of the project proposer is considered to be irrelevant. This is because such an analysis is of private costs and benefits, rather than the cost and benefits for “people and communities.” Relevant in such cases are only the so called ‘externalities’ - i.e. those side effects of the project which affect third parties other than the buyer and seller.

¹ See, for example, in *Marlborough Ridge Ltd v Marlborough District Council* [1998] NZRMA 73 at [86], the Court noted that all aspects of efficiency are “economic” by definition because economics is about the use of resources generally.

² Pass, Christopher and Lowes, Bryan, 1993, *Collins Dictionary of Economics* (2nd edition), Harper Collins, page 148.

³ For example new supermarkets for Foodstuffs, a new cement plant for Holcim (NZ) Limited, renewal of gold mining resource consents for Oceana Gold (NZ) Ltd and a new power station for Meridian Energy Ltd.

17. In this respect, the 'business case' analysis undertaken by the Transport Agency in relation to the Project (and other road improvement or alternatives to roading projects) is unusual in that the analysis is undertaken not from its own specific Transport Agency perspective but from a broader national perspective with the costs of the Project compared to road user and other benefits. However, the Transport Agency's quantified assessment of the Project's efficiency only in part addresses "... people and communities ... economic ... wellbeing" and "... the efficient use and development of natural and physical resources" as required under the RMA in that:
- not all costs and benefits are included in the Transport Agency's quantified assessment; and
 - the Transport Agency's quantified assessment is from the national viewpoint. It does not consider the efficiency of the Project from a Horowhenua District or Wellington regional viewpoint.
18. These factors are considered later in this report.

With and Without Analysis

19. In analysing the economic effects of the Project, it is necessary to compare two forward looking scenarios ('with Project' versus 'without Project'), rather than a 'before' and 'after' comparison. This means the proper baseline for evaluating future economic (and non-economic) effects of the Project are the future volumes of traffic on the network without the Project, not current traffic volumes. Also in assessing the Project's economic effects it is necessary to define a "base line" or "do minimum" scenario, which in the case of the Project involves continued operation and maintenance of the existing SH1 alignment.

Intangible or Non-monetarised Effects

20. In economics, 'intangible' costs and benefits are defined as those which cannot be quantified in monetary terms. For any project such effects may include amenity effects, landscape effects, ecological effects, Māori cultural and relationship effects and recreational effects. Such effects may be positive or negative –i.e. a benefit or a cost for a particular community of interest.
21. Sometimes attempts can be made to estimate monetary values for so-called 'intangibles' using techniques such as willingness to pay surveys or inferring values on the basis of differences in property values. However these techniques are frequently subject to uncertainty and criticism.
22. It is generally better to not attempt to estimate monetary values for these effects but to leave them to be part of the overall judgement under s 5 of the RMA. This also avoids the danger of 'double-counting' - i.e. including them within a quantified measure of efficiency and treating them as a separate consideration in the overall judgement under s 5. The 'intangible' effects of the Project are considered in the AEE and in other Technical Reports.

THE HOROWHENUA DISTRICT ECONOMY

23. Statistics New Zealand's June 2015 population estimate for the Horowhenua District is 31,400 or 0.7% of New Zealand's population. In 2009 the population of the District was estimated to be 30,800, implying an increase of 2.0% over the period 2009 to 2015, as

compared to 6.8% population growth for New Zealand as whole. Statistics New Zealand's 'medium' population projections⁴ have the Horowhenua District's population decreasing to 28,600 in 2043 – i.e. a reduction of 9.1% over the period 2015-43, or -0.3% per annum, compared to an increase of 22.7% over the period 2015-43, or +0.7% per annum, for New Zealand as a whole. However a recent report⁵ on the Horowhenua District economy by Infometrics forecasts positive population growth of 0.4% per annum over the next decade (i.e. 2015-25) largely on the basis that the Wellington Northern Corridor RoNS will improve connectivity between Wellington and the Horowhenua District and this will encourage more people and businesses to locate in the District.

24. Employment data highlight the dependence of the Horowhenua District on the agriculture sector. In February 2015, 1,410 jobs (17.1%) of the Horowhenua District's 8,250 jobs were in the agriculture, forestry and fishing industry group, with most (an estimated 1,365 jobs) being agricultural jobs. Dairy cattle farming accounted for 430 jobs (5.2% of total employment), mushroom and vegetable growing 390 jobs (4.7% of total employment) and poultry farming 260 jobs (3.2% of total employment).⁶ There were 1,300 jobs (15.8% of total employment) in the manufacturing sector, including 450 jobs in food manufacturing (5.5% of total employment) of which meat and meat products manufacturing accounted for 330 jobs (4.0% of total employment). There were 240 jobs (2.9% of total employment) in textile, clothing and footwear manufacturing.
25. Other important employment sectors in the District are health care and social assistance (1,020 jobs or 12.4% of the total), retail trade (1,010 jobs or 12.2% of the total), education and training (780 jobs or 9.5% of the total), construction (470 jobs or 5.7% of the total) and accommodation and food services (450 jobs or 5.5% of the total).
26. In 2013, 10.1% of persons aged 15 and over in the District were unemployed, compared to 7.1% for all New Zealand. The unemployment rate for Maori aged 15 years and over was 19.4%, compared to 15.6% for New Zealand's Maori population. The median personal income for Horowhenua District residents aged 15 years and over was \$21,800, compared to a national median income of \$28,500. 46.0% of people aged 15 and over in the District had an annual income of \$20,000 or less, compared to 38.2% for New Zealand as a whole.⁷

PROJECT COST BENEFIT ANALYSIS

27. 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).
28. The methods used to estimate the benefits and the costs together with the procedures to adopt for their evaluation are set out in the Transport Agency's Economic Evaluation

⁴ Statistics New Zealand prepare three sets of projections – high, medium and low – according to natural population change (i.e. the net effect of birth and death rate assumptions) and net migration assumptions. These projections do not explicitly incorporate assumptions about different rates of economic development.

⁵ Review of Projections for Horowhenua District; for Horowhenua District Council, Infometrics; July, 2014.

⁶ In addition, a large proportion of the 130 agriculture and fishing support jobs would relate to these types of farming.

⁷ Source: Statistics New Zealand 2013 Census.

Manual (EEM)⁸ and are based on considerable local and international research. The methods and data have been refined over a number of years. They are consistently applied over all road improvement project evaluations and alternatives⁹ to roading project evaluations seeking funding from the Transport Agency. This is done to assist with the prioritisation of alternative the Transport Agency and local authority projects¹⁰ which are proposed to be funded from the National Land Transport Fund.¹¹

29. In New Zealand (and overseas) a discount rate is used to cover the time value of money and the opportunity cost of funds (i.e. the returns available from alternative road improvement projects, other government projects or programmes and/or private sector use of funds). The discount rate recommended for use in the EEM is 6%. A project analysis period of 40 years is used.
30. The benefits of a project are divided by the costs of the project (incorporating a cost of funds (the discount rate) of 6% in real terms - i.e. excluding the effects of inflation) to derive a benefit cost ratio (BCR). If the BCR is greater than 1, project benefits exceed project costs and generally this is interpreted as meaning that the use of funds for the project will be an efficient use of resources.
31. However, as noted earlier in this report, not all the costs and benefits of a project can be quantified in monetary terms. 'Intangibles' will need to be considered outside the quantitative BCR calculation and decision makers will need to 'trade off' the BCR against any positive or negative 'intangible' effects.
32. The Transport Agency's BCR is calculated from the national perspective. It is a measure of national economic efficiency. It does not provide information about the distribution of costs and benefits. However, with respect to the Project and the Wellington Northern Corridor RoNS, a BCR greater than 1 when calculated from a national perspective will be larger from a Wellington regional perspective. This is because most of the benefits will accrue to Wellington businesses and residents, whereas the costs of the Project will be funded from a national pool of resources.
33. Similarly from a narrower Horowhenua District perspective the BCR will be considerably higher than the national viewpoint BCR. A considerable proportion¹² of the traffic on the route will have a trip origin and/or trip destination within the District. Therefore the District's residents and businesses benefit from the improvements in safety and travel times but costs are not borne by local ratepayers but by the Transport Agency and therefore are funded from the nationwide collection of petrol taxes and road user charges.

⁸ Previously this document was called the Project Evaluation Manual (PEM). When the procedures were first developed they were contained in a document referred to as Technical Recommendation No. 9 (TR9).

⁹ For example, public transport projects.

¹⁰ I.e. those seeking Transport Agency funding.

¹¹ The EEM procedures and databases are not used to determine the overall size of the budget for investment in road improvement projects – in other words the analysis is not used to determine the relative priorities of transport and non-transport related projects.

¹² Data provided by the traffic consultants (MWH New Zealand Limited) indicate that around 40% of the traffic over the route has an origin and/or destination between two traffic counting sites – site 7, which is located just north of Levin and site 9, which is located just south of the Manawatu River bridge. This indicates that more than 40% will have an origin and/or destination within the Horowhenua District.

34. The latest BCR for the Project is estimated at 1.4 and assumes a start date of October, 2019.¹³ The present value of project benefits total \$15.1 million and include \$11.4 million in accident cost savings and \$5.5 million in travel time savings. These are in part offset by slightly higher vehicle operating costs (\$1.7 million) and vehicle emission costs (\$0.1 million). The present value of project costs is \$10.7 million.¹⁴
35. In the BCR estimate, no account is taken of the residual value of the Project at the end of the 40 year analysis period. Whilst the Project does not have a residual value in the sense that it could be sold or redeployed in other uses, it has a residual value in that at the end of the analysis period it is likely to continue providing a stream of safety and travel time cost savings out into the future before major reinvestment is required.
36. As discussed earlier in this report, the Transport Agency's BCR estimate assumes a national economic viewpoint. Adopting a narrower Horowhenua District or Wellington regional viewpoint, the BCR will be much higher since local residents and businesses will receive a considerable proportion of the Project's benefits but pay only a lesser share of its costs. In fact there is no certainty that, if the Project does not proceed, the funds earmarked for it will be available for road improvement (or other) roading projects in the Horowhenua District or the Wellington region. The funds may instead be used for road improvements or other roading projects elsewhere in New Zealand. Therefore, from a Horowhenua District or Wellington regional perspective, the Project has a very much higher BCR since the benefits are significant but the opportunity cost of the funds for the District and the region is very low.
37. Therefore, the Project is consistent with enabling "people and communities to provide for their ... economic ... well-being" and has regard to "... the efficient use and development of natural and physical resources", especially given the Horowhenua District's high level of unemployment and low median incomes (see previous section of this report).¹⁵

INCREASED ECONOMIC ACTIVITY DURING PROJECT CONSTRUCTION AND OPERATION

Project Construction

38. The Project has an estimated capital cost of \$14.2 million. During the Project's anticipated 12 month construction period commencing in October, 2019¹⁶ there will be increased economic activity for the Horowhenua District and the wider Wellington region, as a consequence of the additional expenditure, employment and incomes directly generated by the Project's construction and the indirect (or multiplier¹⁷)

¹³ See Business Case for Implementation Detailed Business Case to proceed from Initiation to Implementation SH1 Waitarere Beach Road Curves; the Transport Agency; March, 2015.

¹⁴ Note that the actual project costs are estimated to be \$14.2 million. However these reduce in present value terms due to the assumed October, 2019 construction start date and the effects of discounting.

¹⁵ Conventional cost benefit analysis of transport projects is now being extended to cover increases in productivity (or efficiency) at the regional and national levels that are in addition to the conventionally measured benefits (e.g. savings in vehicle operating costs, travel time and accidents). These so called wider economic benefits are usually estimated at a programme level (e.g. for the Wellington Northern Corridor RoNS) rather than for individual projects within a programme of road improvements. No wider economic benefits have been estimated for the Project.

¹⁶ As estimated currently. The Project may be brought forward depending on approval processes and availability of funding.

¹⁷ At a district level multipliers are typically around 1.5 – i.e. for every dollar spent on the Project in the local economy, there is an additional \$1.50 spent locally.

expenditure, employment and incomes generated as a consequence of impacts on suppliers of goods and services to the Project and those employed on it.

39. The Transport Agency takes no account of such effects in its estimation of a project's BCR because in taking a national viewpoint the level of economic activity (i.e. expenditure, employment and incomes) are likely to be the same with or without the project - if funds are not utilised on one project they are likely to be utilised on an alternative the Transport Agency project, even if in a different region in New Zealand. However, taking a Horowhenua District or Wellington regional perspective, there are likely to be increased levels of economic activity as a consequence of the Project, since without it, the funds earmarked for it are likely to be used elsewhere in New Zealand and not on an alternative road construction project in the Horowhenua District or the Wellington region. Local firms will be engaged to provide goods and services to the Project (particularly supplies such as aggregate and daily project resource needs), local residents will be engaged to work on the Project and local firms will in turn provide goods and services to these employees.
40. Economic impacts such as increases in business turnover, employment and incomes are not in themselves measures of improvements in economic welfare or economic wellbeing. However, there are economic welfare enhancing benefits associated with increased levels of economic activity. These relate to one or more of:
- a. increased economies of scale: Businesses and public sector agencies are able to provide increased amounts of outputs with lower unit costs, hence increasing profitability or lowering prices;
 - b. increased competition: Increases in the demand for goods and services allows a greater number of providers of goods and services to enter markets and there are efficiency benefits from increased levels of competition;
 - c. reduced unemployment and underemployment¹⁸ of resources: To the extent resources (including labour) would be otherwise unemployed or underemployed, increases in economic activity can bring efficiency benefits when there is a reduction in unemployment and underemployment. The extent of such gains is of course a function of the extent of underutilized resources within the local economy at the time, and the match of resource requirements of a project and those resources unemployed or underemployed within the local economy; and
 - d. increased quality of central government provided services: Sometimes the quality of services provided by central government (such as education and health care) are a function of population levels and the quality of such services in a community can be increased if increased economic activity maintains or enhances population levels.
41. It is reasonable to assume that any increases in economic activity as a consequence of increased road construction activity in the Horowhenua District and the Wellington region from the Project will give rise to one or more of these four welfare enhancing economic benefits for the District and region.

¹⁸ Underemployment differs from unemployment in that resources are employed but not at their maximum worth; e.g. in the case of labour, it can be employed at a higher skill and/or productivity level, reflected in higher wage rates.

Project Operation

42. The Project will lead to reductions in accident costs and travel times for through traffic and local traffic - i.e. local residents and businesses. These traffic-related benefits of the Project are detailed in the Transport Impact Assessment report. It is interesting to note that whereas some major infrastructure projects give rise to national and regional economic benefits, but localised (or “community”) costs, this Project is anticipated to bring significant local economic benefits in addition to national and regional economic benefits. More than 40% of the traffic using this part of SH1 have an origin and/or destination within the Horowhenua District.
43. For businesses, savings in accident costs and travel times result in increased productivity and improvements in business competitiveness. For residents the traffic related benefits of the Project will provide expenditure savings and the freeing up of time for other productive or leisure activities. There also community wide cost savings and other benefits associated with reductions in accident costs. For example the reduction in the number and severity of road crashes means reduced trauma for local residents arriving at the scene of accidents as first responder.¹⁹

LOSS OF PRODUCTIVE LAND

44. The productivity of land required for the Project is incorporated in the cost to the Transport Agency for the purchase of the land. It is therefore internalised into the Transport Agency’s decision making process and does not need to be separately considered as an externality at the local, regional or national level. Farms and residents who are required to give up land for the Project will be compensated in accordance with the assessed market value of the land. This is outside RMA considerations, but is economic mitigation or offset for loss of land.

PROPERTY ACCESS DIS-BENEFITS

45. For some farms and residents, the installation of a median barrier as part of the Project to achieve improved safety will prevent direct exit and entry to properties and will necessitate additional travel. The additional costs of this travel have been incorporated in the assessment of the overall costs and benefits of the Project. The median barrier will contribute to safety improvements for all traffic, including local traffic, which will also benefit from fewer road closures as a consequence of accidents.

PROPERTY VALUE EFFECTS

46. A number of properties within the vicinity of the Project will possibly be adversely affected as a consequence of visual, noise, severance and other so-called “intangible” effects. In economics, intangible effects are those which cannot easily be measured in monetary terms. Whilst it may sometimes be possible to estimate property value changes²⁰ as a consequence of the Project, such potential property value changes are a reflection of, and not in addition to, the intangible effects.

¹⁹ See Business Case for Implementation Detailed Business Case to proceed from Initiation to Implementation SH1 Waitarere Beach Road Curves; NZTA; March, 2015.

²⁰ In practical terms this is not straightforward since a number of factors influence changes in property values over any given time period.

47. For some property owners, the benefits of the Project may mean increases in property values. However any such increases are likely to be a reflection of, not in addition to, the traffic related benefits already discussed above in this report.
48. To include any property value changes (either negative or positive) that could be estimated to result from the Project is likely to lead to double counting of costs and benefits.

CONCLUSIONS

49. The Project, which will lead will lead to significant improvements in road safety and contribute to savings in travel times, has been assessed as having a BCR of 1.4. It will lead to increases in expenditure, employment and incomes within the Horowhenua District during its 12 month construction. It is consistent with enabling “people and communities to provide for their ... economic ... well-being” and has regard to “... the efficient use and development of natural and physical resources”.
50. The Project will have significant overall net economic benefits for the Horowhenua District and the Wellington region.