# Economics Assessment

December 2017

Brown, Copeland and Company Limited

Technical Report 4


NZ TRANSPORT AGENCY WAKA KOTAHI
Mt Messenger Bypass
New Zealand Government

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# Glossary

| Abbreviation | Definition |
|---|---|
| AEE | Assessment of Environmental Effects |
| BCR | Benefit Cost Ratio |
| EEM | Economic Evaluation Manual |
| HCV | Heavy Commercial Vehicle |
| LPG | Liquefied Petroleum Gas |
| PEM | Project Evaluation Manual |
| RMA | Resource Management Act 1991 |
| SH | State Highway |
| SIA | Social Impact Assessment |
| TR | Technical Recommendation |

# Executive Summary

The NZ Transport Agency is progressing a series of improvements to State Highway 3 (SH3) north of New Plymouth, between Mt Messenger and Awakino Gorge (the SH3 improvements investment package). The Mt Messenger Bypass project (the Project) is the most significant of three sections of route improvements proposed as part of the investment package. It involves the section of corridor in the vicinity of Mt Messenger between Uruti and Ahititi.

This report principally addresses the economic effects of the Project as a stand-alone project, but it is also important to consider the Project in the context of the total SH3 improvements investment package.

The Project objectives are to:

1 To enhance safety of travel on SH3.
2 To enhance resilience and journey time reliability of the state highway network.
3 To contribute to enhanced local and regional economic growth and productivity for people and freight by improving connectivity and reducing journey times between the Taranaki and Waikato Regions.
4 To manage the immediate and long term cultural, social, land use and other environmental effects of the Project by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, highway design and conditions.[1]

Enabling people and communities to provide for their social, economic and cultural wellbeing and health and safety, the efficient use and development of natural and physical resources and opportunities for economic growth and employment are relevant considerations under the Resource Management Act 1991 (RMA).

The key drivers for the New Plymouth District economy are oil and gas exploration and extraction, manufacturing and services provided to the oil and gas, agriculture and agricultural product processing activities within the wider Taranaki region. The key drivers of the Taranaki economy are agriculture, manufacturing (including agricultural product processing and the heavy engineering industry) and the oil and gas industry.

SH3 north of New Plymouth is a significant transport link for Taranaki's oil and gas, heavy engineering and agricultural product processing industries.

During the Project's three year construction period (mid 2018 to mid 2021), there will be additional expenditure, employment and incomes for Taranaki businesses and residents. Including both direct and indirect (or multiplier) economic impacts, the Project is expected to lead to 148 additional jobs, $11.0 million per annum in additional wages and salaries and $66.2 million per annum in additional expenditure on goods and services purchased from local Taranaki businesses.

[1] Mt Messenger Bypass Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency; August 2017 (see Section 2.2).

When completed, the Project will lead to reductions in vehicle operating, travel time and road accident costs and improvements in route resilience, benefitting local residents and businesses and visitors to the New Plymouth District and wider Taranaki Region.

The Project will also contribute a range of additional economic benefits including improvements in trip time reliability, increased regional economic growth, generated traffic, potential travel benefits, specific road user benefits for Taranaki businesses and lifeline economic benefits.

The Project will not result in negative economic externality effects. A small number of local property values may possibly be negatively affected by the Project. However such effects are a reflection of, and not in addition to, the intangible impacts of the Project identified in the Assessment of Environmental Effects (AEE).

The NZ Transport Agency's Detailed Business Case for the Project has scored it 'high' for strategic fit, 'low' for effectiveness and 0 to 1 for efficiency.[2] The last measure reflects a base case benefit cost ratio for the Project of 0.5 and a BCR ranging between 0.4 and 0.7 in sensitivity testing.

The Project will have significant overall net positive economic benefits for the New Plymouth District and the Taranaki region.

[2]Mt Messenger Bypass Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency; August 2017 (see Section 8.4).

# 1 Introduction

## 1.1 Purpose and Scope of this Report

This report forms part of a suite of technical reports prepared for the NZ Transport Agency's Mt Messenger Bypass project (the Project). Its purpose is to inform the Assessment of Effects on the Environment Report (AEE) and to support the resource consent applications and a Notice of Requirement to alter the existing State Highway designation, and which are required to enable the Project to proceed.

This report assesses the economic effects of the Project. The purpose of this report is to:

1 provide an overview of economics and the Resource Management Act 1991 (RMA) (section 3);

2 describe the New Plymouth District and Taranaki regional economies (section 4);

3 present an assessment the economic effects arising from the Project (section 5); and

4 comment on issues arising from consultation (section 6).

## 1.2 Project Description

The Project involves the construction and ongoing operation of a new section of SH3, generally between Uruti and Ahititi to the north of New Plymouth. This new section of SH3 will bypass the existing steep, narrow and winding section of highway at Mt Messenger. The Project comprises a new section of two lane highway, approximately 6km in length, located to the east of the existing SH3 alignment.

The primary objectives of the Project are to enhance the safety, resilience and journey time reliability of travel on SH3, and contribute to enhanced local and regional economic growth and productivity for people and freight.

A full description of the Project including its design, construction and operation is provided in the Assessment of Effects on the Environment Report, contained in Volume 1: AEE, and is shown on the Drawings in Volume 2: Drawing Set.

## 1.3 Author Experience and Qualifications

This report has been prepared by Mr Michael Copeland, a consulting economist and managing director of Brown, Copeland and Company Limited. He has undertaken a wide range of studies for public and private sector clients in New Zealand and overseas. Mr Copeland holds a Bachelor of Science degree in mathematics and a Master of Commerce degree in economics. He has over 40 years' experience in the application of economics to various areas of business including transport economics and resource management matters.

# 2 Project Background

The future route efficiency, safety and reliability of SH3 travelling north over Mt Messenger, through to the Awakino Gorge and on to Te Kuiti, Hamilton and beyond is the priority inter-regional transport issue for the Taranaki region.[3] The Mt Messenger section of the state highway network, which has a history of crashes and road closures, is strategically important to the Taranaki region providing access to northern markets and export outlets[4], tourism linkages and access to health, cultural and other services.

The NZ Transport Agency is progressing a series of improvements to SH3 north of New Plymouth, between Mt Messenger and Awakino Gorge (the SH3 Awakino Gorge to Mt Messenger programme). The Mt Messenger Bypass project is the most significant of the three elements of route improvements proposed as part of the investment package.

Mt Messenger is located approximated 58 kilometres northeast of New Plymouth and 183 kilometres south of Hamilton.

This report principally addresses the economic effects of the Mt Messenger Bypass Project as a stand-alone project, but it is also important to consider the Project in the context of the total SH3 improvements investment package.

The Mt Messenger Bypass Project objectives are:

1 to enhance safety of travel on SH3.
2 to enhance resilience and journey time reliability of the state highway network.
3 to contribute to enhanced local and regional economic growth and productivity for people and freight by improving connectivity and reducing journey times between the Taranaki and Waikato Regions.
4 to manage the immediate and long term cultural, social, land use and other environmental effects of the Project by so far as practicable avoiding, remedying or mitigating any such effects through route and alignment selection, highway design and conditions[5].

The project is estimated to cost $200 million and will be funded through the Government's Accelerated Regional Roading Programme and National Land Transport Fund[6].The construction start date is expected to be mid 2018, and construction is expected to take three years.

[3]Regional Land Transport Plan for Taranaki 2015/16 – 2020/21; Taranaki Regional Council in conjunction with Stratford, New Plymouth and South Taranaki District Councils and NZ Transport Agency; March 2015 (see page 18).
[4]I.e. the so called "golden triangle" of Auckland, Waikato and Bay of Plenty regions including the Ports of Auckland and Tauranga and Auckland Airport.
[5]NZ Transport Agency: Mt Messenger Bypass Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency; August 2017 (see Section 2.2).
[6]Announcement by Minister of Transport, dated 31 August 2017.

# 3 Economics and the RMA

## 3.1 Community Economic Wellbeing

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 1991 (RMA). In particular, Part 2 section 5(2) of the RMA refers to enabling "... people and communities to provide for their social, economic and cultural well-being and health and safety ..." as part of the meaning of "sustainable management".

As well as indicating the relevance of economic and safety effects in considerations under the RMA, section 5 also refers to "people and communities", 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.

The Project will generate additional expenditure, employment and incomes within the local New Plymouth District and wider Taranaki regional economies. Also by improving road safety, route resilience and travel time reliability and reducing vehicle operating costs and travel times the Project will also directly contribute to the social and economic wellbeing of local residents and businesses and to the health and safety of residents and visitors to the District and Region. This is discussed in later sections of this report.

## 3.2 Economic Efficiency

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.[7] 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."*[8]

More generally, economic efficiency can be considered in terms of:

1 Maximising the value of outputs divided by the cost of inputs;

2 Maximising the value of outputs for a given cost of inputs;

3 Minimising the cost of inputs for a given value of outputs; and

[7]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.

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

4 Minimising waste.

The Project enables economic efficiency, especially from a District or regional perspective, as set out in later sections of this report.

## 3.3 Viewpoint for Economic Assessment

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.

For the Project, the New Plymouth District and Taranaki Region are relevant communities of interest, because the economic effects of the Project will largely (but not solely)[9] impact on the residents and businesses of these communities.

Generally with projects considered under the RMA[10], 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'. In such cases, only the so called 'externalities' are relevant – i.e. those side effects of the project which affect third parties other than the buyer and seller.

In this respect, the 'business case' analysis undertaken by the NZ Transport Agency in relation to the Project[11] (and other road improvement or alternatives to roading projects) is unusual in that the analysis is undertaken not from its own narrow NZ Transport Agency perspective but from a broader national perspective with the costs of the Project compared to road user and other benefits. However, the NZ 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:

1 not all costs and benefits are included in the business case's quantified assessment; and

2 the quantified assessment is from the national viewpoint. It does not consider the efficiency of the Project from a New Plymouth District or Taranaki regional viewpoint.

These factors are considered later in this report.

[9] To a lesser degree residents and businesses in neighbouring regions and visitors to New Plymouth and Taranaki will also benefit from the Project.

[10] 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.

[11] Mt Messenger Bypass Project Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency, dated August 2017.

## 3.4 With and Without Analysis

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.

## 3.5 Intangible or Non-monetarised Effects

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.

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.

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 other Technical Reports appended in Volume 3 of the AEE.

# 4 The New Plymouth District and Taranaki Regional Economies

## 4.1 Population

Statistics New Zealand data indicate that the resident population in the New Plymouth District increased from 71,100 in 2006 to 79,800 in 2016 – i.e. an increase of 12.2%. Over the same time period New Zealand's population has increased by 12.1%. In 2016 New Plymouth had 1.7% of New Zealand's total population.[12] Statistics New Zealand's medium projection is for the District's population to grow to 93,800 by 2043, implying an average annual rate of growth of 0.6% per annum. This compares with a medium projection average growth rate for New Zealand's total population of 0.7% per annum.[13]

For the Taranaki region as a whole, the population has increased from 107,300 in 2006 to 116,700 in 2016 – i.e. an increase of 8.8%.[14] In 2016, Taranaki had 2.5% of New Zealand's population. In 2043 the region's population is expected to grow to 130,200, implying an average annual growth rate of 0.4% over the period 2016 to 2043[15]. As described in the Strategic Transport Assessment (Technical Report 1, Volume 3 of the AEE), SH3 is the main route utilised by the region's population to travel to and from the northern parts of the North Island.

## 4.2 Employment

Employment data highlights the dependence of the New Plymouth District on manufacturing and the services sector. In 2016, 4,250 jobs (12.0%) of the District's 35,300 jobs were in the manufacturing sector with the main sub-sectors being fabricated metal products manufacturing (1,050 jobs), machinery and equipment manufacturing (660 jobs), primary metal and metal products manufacturing (230 jobs), food product manufacturing[16] (910 jobs), wood products manufacturing (520 jobs) and basic chemicals and chemical products manufacturing (230 jobs). Other important sectors in terms of employment are health care and social assistance (4,700 jobs or 13.3% of total jobs), retail trade (3,700 jobs or 10.5% of total jobs), construction (3,050 jobs or 8.6% of total jobs), education and training (2,600 jobs or 7.4% of total jobs) and accommodation and food services (2,500 jobs or 7.1% of total

[12]Source: Statistics New Zealandwww.stats.govt.nz; NZ.Stat; Sub-national Population Estimates, (data extracted 17 July, 2017).
[13]Source: Statistics New Zealand www.stats.govt.nz; NZ.Stat; Area Unit Population Projections by Territorial Local Authority; (data extracted 17 July, 2017).
[14]Source: Statistics New Zealandwww.stats.govt.nz; NZ.Stat; Sub-national Population Estimates, (data extracted 17 July, 2017).
[15]Source: Statistics New Zealand www.stats.govt.nz; NZ.Stat; Area Unit Population Projections by Territorial Local Authority; (data extracted 17 July, 2017).
[16]Principally meat and meat products manufacturing (750 jobs).

jobs).[17] The oil and gas sector employed only 450 persons in New Plymouth in 2016 but it is an important generator of economic activity within the District.

The key economic drivers for the New Plymouth District are oil and gas exploration and extraction, manufacturing and services provided to the oil and gas, agriculture and agricultural product processing activities within the wider Taranaki region. There is also some tourism activity within the District which accounts for some but not all[18] of the jobs created in the retail trade and accommodation and food services sectors. Employment in other sectors within the District is to a large extent driven by the demand for goods and services by these industries and their employees with the so called 'multiplier' effects[19]creating additional jobs for the District's economy.

Statistics New Zealand estimate total employment in the Taranaki region in February 2016 at 50,700, which represents 2.4% of the total persons employed in New Zealand. The agriculture, forestry and fishing industry group employed 3,850 persons (7.6% of total jobs) of which most (3,833 persons) were engaged in agriculture. Other significant sectors are manufacturing employing 8,900 persons or 17.6% of total jobs (of which the most significant subsectors are food products manufacturing (4,650 jobs of which 2,350 were meat and meat products manufacturing jobs and 1,900 were dairy products manufacturing jobs), fabricated metal products manufacturing (1,200 jobs), machinery and equipment manufacturing (1,100 jobs), primary metal and metal products manufacturing (240 jobs), wood and wood products manufacturing (650 jobs) and basic chemicals and chemical products manufacturing (530 jobs)), health care and social assistance (5,600 jobs or 11.0% of total jobs), retail trade (4,850 jobs or 9.6% of total jobs), construction (4,100 jobs or 8.1% of total jobs), education and training (3,750 jobs or 7.4% of total jobs) and accommodation and food services (3,100 jobs or 6.1% of total jobs). The oil and gas extraction industry employed 590 persons within the region in 2016.

The key drivers of the Taranaki economy are largely agriculture, manufacturing (including agricultural product processing and the heavy engineering industry) and the oil and gas industry. The last of these, although employing relatively few people is estimated to have contributed 19.7% of the region's gross domestic product in 2016 compared to 14.8% by agriculture and 10.8% by manufacturing. Tourism's contribution to the region's GDP in 2016 was 1.5%.[20]

[17]Source: Statistics New Zealand www.stats.govt.nz; NZ.Stat; Business Demography Tables. Geographic units by industry and area unit 2000 -16; (data extracted 17 July, 2017).

[18] Employment in tourism is difficult to identify from official statistics since the relevant sectors such as retail trade and accommodation and food services for which data is collected meet the needs of domestic and international visitors, business travellers and local residents and businesses.

[19] These are discussed in greater detail later in this report.

[20]Infometrics Taranaki Region Economic Profile: https://ecoprofile.infometrics.co.nz/taranaki%20region

## 4.3 Significance of SH3 to the New Plymouth and Taranaki Economies[21]

### 4.3.1 Oil and Gas Industry

Outputs from Taranaki's oil and gas industry are transported by pipeline (gas) and road (LPG). For LPG shipments to the north SH3 is very important, especially since shipments by sea transport are not now possible due to Auckland's Manukau Harbour no longer being dredged for use by Holcim's cement vessels[22]. SH3 is also important for providing access to the Maui pipeline for repairs and maintenance, whilst LPG shipments by road via SH3 provide a back-up source of fuel for gas customers in the top half of the North Island in the event of a Maui pipeline failure.

Existing and future oil and gas industry participants in Taranaki are also dependent upon SH3 for transporting into the region a number of inputs required for exploration, new developments and the operation and maintenance of existing facilities. This includes hazardous chemicals.

### 4.3.2 Heavy Engineering Sector

Taranaki's heavy engineering sector, made up principally of the machinery and equipment and fabricated metal products manufacturing groups, services the local oil and gas sector as well as customers elsewhere in New Zealand and overseas. Whilst Port Taranaki is used for some exports, access to the top half of the North Island is required for other export customers (utilising the Ports of Auckland and Tauranga) and domestic customers to the north. Road transport utilising SH3 is also used for various inputs required from outside the region.

A feature of this industry's inputs and outputs are the number of oversized loads that need to be carried. Improvements to SH3 are expected to enable this route to be used for such loads, increasing local firms' competitiveness with Auckland, Waikato and overseas competitors. The alternative of using SH1 via Bulls or Marton is estimated to more than double land transport costs. There are less but still significant costs using SH4 (as a detour if it is open).

[21] Material in this section from Appendix 1 (Detailed Independent Analysis; Venture Taranaki in Association with NZ Institute of Economic Research and Beca Group Ltd) of: The Road Ahead – Economic Development Study on State Highway 3 North; Venture Taranaki; 2012, and interviews with Taranaki industry representatives.

[22] With the closure of Holcim's cement plant at Westport, Holcim are now directly importing cement from overseas to main ports and not utilising a coastal shipping service which previously serviced smaller ports such as Manukau.

### 4.3.3 Agricultural Sector

The bulk of milk produced within the Taranaki region is processed at Fonterra's milk processing plants within the region[23] and the dairy products produced by these plants are sent by rail for export. However, to balance plant capacity and milk supply at different times of the season, Fonterra sends some milk out of the region for processing at plants in the Waikato region utilising SH3, especially during the winter season when plants in Taranaki are closed. SH3 is also used for the shipment of non-containerised milk products[24], which are shipped to stores in the north for consolidation with other products into containers for export. SH3 is also utilised for the shipment south of milk and milk products for processing and further processing at Fonterra's Taranaki plants. Closures of SH3 add additional costs for either detours and/or holding back milk and milk products until the route is reopened. In exceptional circumstances (closures in all north-south routes for a period longer than 24 hours) milk and milk products may need to be dumped. In the case of milk products movement by road, extended delays can result in export orders not being fulfilled.

Livestock from Taranaki farms is largely processed locally by Silver Fern Farms[25] and Anzco[26]and rail used for the export of meat and meat products from these plants. However SH3 north of New Plymouth is used for trucking stock to Taranaki's three processing plants as well as the trucking of some stock out of the region for processing at Universal Beef Limited's (cattle) processing plant at Te Kuiti. Silver Fern Farms estimate around 30% of the stock they process is transported down SH3 north of New Plymouth. Closures of SH3 require detours via either SH4 or SH1 or the postponement of stock delivery to the processing plants. Some chilled products are also trucked north using SH3 for export.

Taranaki is the major poultry producing region in New Zealand. Poultry breeding, growing, processing and distribution are concentrated in North Taranaki with the major processing facility, owned by Tegel Foods Limited (Tegel), at Bell Block[27]. Tegel's processing plant at Bell Block is the largest of its 3 plants, the other two being in Auckland and Christchurch. The Bell Block plant processes 25 million chickens per annum. Tegel is the second largest private sector employer (behind Fonterra) in the Taranaki region providing over 1,000 jobs. An advantage of its Bell Block site is the relatively short distance between the processing plant and Tegel's production farms. Over half of the output from Tegel's Bell Block plant is sent by refrigerated truck north via SH3. This includes finished product for domestic distribution and export and raw material for further processing at Tegel's Henderson plant. Tegel is dependent on SH3 being open and safe to travel on in order to distribute product to

[23] Fonterra has milk processing plants at Whareroa (near Hawera), Eltham (2) and Kapuni and a coolstore at New Plymouth.

[24] About 20 return "curtainsider" truck journeys per day for 300 days per annum.

[25] Silver Fern Farms have plants at Hawera (cattle) and Waitotara (sheep). It estimates that each year around 40,000 cattle and 10,000 sheep are trucked north to south along SH3 to its processing plant. This corresponds to circa 1,200 return truck movements per annum.

[26] Anzco has a plant at Eltham (cattle).

[27] See Regional Land Transport Plan for Taranaki 2015/16 – 2020/21; Taranaki Regional Council in conjunction with Stratford, New Plymouth and South Taranaki District Councils and NZ Transport Agency; March 2015 (see page 7).

customers throughout the upper North Island. In the event of a road closure, the only viable alternative adds approximately 6 hours in travel time, and impacts Tegel's ability to deliver customer orders in full and on time.

There are a range of inputs (e.g. packaging materials and animal feeds), to the agriculture and agricultural product processing industries which are transported into the region or within the region using SH3.

### 4.3.4 Forestry

SH3 north of New Plymouth is used to transport logs from the north of the region (and to a lesser extent from South Waikato) to Port Taranaki for export. Improvements on the route will help improve Port Taranaki's competitive position for the log export trade.

# 5 Assessment of Economic Effects

## 5.1 Increased Economic Activity During Project Construction

During the Project's anticipated three year construction period (from mid 2018 to mid 2021) there will be increased economic activity for the New Plymouth District and the wider Taranaki region. This will be as a consequence of the additional expenditure, employment and incomes directly generated by the Project's construction and the indirect (or multiplier) expenditure, employment and incomes generated as a consequence of impacts on suppliers of goods and services to the Project and those employed on it.

The Project is estimated to have a total capital cost of $199.6 million[28] of which around 58% or $115.8 million is expected to be spent in the Taranaki region. $16.6 million of this local expenditure will be on wages and salaries for employees engaged in the Project's construction.[29] Over the 3 year construction period for the Project, it is estimated that there will be 74 additional jobs[30], $5.5 million in additional wages and salaries per annum and $33.1 million per annum in additional expenditure with local Taranaki region businesses for the supply of goods and services to the Project. These are the direct economic impacts of the Project.

However in addition to these direct economic impacts there are indirect impacts arising from the effects on suppliers of goods and services provided to the Project from within the local economy (i.e. the "forward and backward linkage" effects) and the supply of goods and services to employees on the Project and to those engaged in supplying goods and services to the Project (i.e. the "induced" effects). For example, there will be additional jobs and incomes for employees of supermarkets, restaurants and bars as a consequence of the additional expenditure by employees directly involved in the Project.

Multipliers can be estimated to gauge the size of these indirect effects. The size of the multipliers is a function of the extent to which a local economy is self-sufficient in the provision of a full range of goods and services and the area's proximity to alternative sources of supply. Local multipliers typically fall in the range of 1.5 to 2.0 and taking 2.0 as the multiplier for the Taranaki region, given its relative self-sufficiency and distance from major centres, implies total impacts (i.e. direct plus indirect impacts) during the three year construction period of 148 additional jobs, $11.0 million per annum in additional wages and salaries and $66.2 million per annum in additional expenditure with local businesses.

Taking a national viewpoint, the level of economic activity (i.e. expenditure, employment and incomes) is likely to be the same with or without the Project – if funds are not utilised for the Project they are likely to be utilised on an alternative NZ Transport Agency project, even if in a different region in New Zealand. However, taking a New Plymouth District or Taranaki 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

[28] Net of contingency allowances.

[29] Data provided by the Mt. Messenger Alliance.

[30] Based on an average salary rate of $75,000 per annum.

used elsewhere in New Zealand and not on an alternative road construction project in the New Plymouth District or the Taranaki region. Local firms will be engaged to provide goods and services to the Project, local residents will be engaged to work on the Project, and local firms will in turn provide goods and services to these employees.

Economic impacts such as increases in business turnover, employment and incomes are not in themselves measures of improvements in economic welfare or economic well-being. However, there are economic welfare enhancing benefits associated with increased levels of economic activity. These relate to one or more of the following:

1 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.

2 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.

3 Reduced unemployment and underemployment[31] of resources: To the extent that 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 underutilised 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.

4 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.

It is reasonable to assume that any increases in economic activity as a consequence of increased road construction activity in the New Plymouth District and the Taranaki Region from the Project will give rise to one or more of these four welfare enhancing economic benefits for the District and Region.

## 5.2 Road User Economic Benefits from Project Operation

The Project will lead to reductions in vehicle operating, travel time and road accident costs and improvements in route resilience, benefitting local residents and businesses and visitors to the District and region. These traffic-related benefits of the Project are detailed and quantified in the Mt Messenger Bypass Project Detailed Business Case, dated September 2017 (see Section 8.1). In present value terms, the Project is expected to lead to travel time savings of $44.8 million, vehicle operating cost savings of $19.9 million, accident cost savings of $11.3 million, road resilience benefits of $13.7 million and carbon dioxide

[31] 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.

emission reduction benefits of $1.0 million. The Project is also expected to reduce road maintenance costs by $1.4 million in present value terms over its operating life.[32]

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. It is expected nearly all[33] of the traffic using SH3 north of New Plymouth after the improvements from the Project will have an origin or destination within the Taranaki region.

For businesses, savings in vehicle operating, travel time and accident costs and improvements in route resilience[34] result in increased productivity and improvements in business competitiveness. For residents, the traffic-related benefits of the Project will produce cost savings, improve personal safety and enable the freeing up of time for other productive or leisure activities.

## 5.3 Additional Economic Benefits

### 5.3.1 Trip Time Reliability Benefits

Trip time reliability benefits relate to the savings in time that are made when motorists perceive a reduction in the likelihood of delays as a result of road congestion, road accidents or other incidents which lead variability in travel times for particular journeys. When this occurs time is wasted by allowing for such events even when they do not occur and unproductive time is wasted at the destination. The Project in conjunction with other improvements on SH3 north of New Plymouth is expected to provide improvements in trip time reliability.

### 5.3.2 Increased Economic Growth

The Project will increase the attractiveness of the New Plymouth District and the wider Taranaki region for business and residential development, as well as improve accessibility for visitors. Therefore the Project[35] is likely to result in increased levels of economic activity within the District and region from greater economic activity and population growth. As discussed previously in relation to the Project's construction, increases in levels of economic activity are not in themselves measures of improvements in economic welfare or economic well-being. However, there are economic welfare enhancing benefits associated with

[32]Mt Messenger Bypass Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency; August 2017 (see Section 8.1).

[33] The only exception would be on the rare occasions when SH1 and SH4 routes north and south are closed and SH3 provides the only alternative for traffic from outside the Taranaki region to move between the south and middle of the North Island and the north of North Island.

[34] Improvements in route resilience translate into saved vehicle operating and travel time costs (and possibly accident cost savings) for residents, businesses and visitors as a consequence of traffic delay times on SH3 and/or longer detours via alternative routes are reduced. Also there are benefits from trips not having to be postponed or cancelled.

[35] Especially in conjunction with the other improvements proposed as part of the SH3 improvements investment package.

increased levels of economic activity to the extent that they lead to increased economies of scale, increased competition, reductions in unemployment and underemployment of resources and improvements to services provided by central government.

### 5.3.3 Generated Traffic[36]

The traffic benefits of the Project identified in the Detailed Business Case are based on the same assumed future growth rate for traffic on the route with and without the Project[37]. However, the Project, in conjunction with other improvements to SH3 north of New Plymouth, has the potential to generate additional traffic[38] on the route and to this extent the quantified road user economic benefits are conservatively estimated. Improvements to the route are likely to generate additional leisure trips by residents and visitors, whilst greater route resilience and trip time reliability in particular will improve the competitiveness of Taranaki based businesses and the attractiveness of the region to locate new businesses or expand existing businesses.

Improvements to SH3 in conjunction with other promotional activities may also help to unlock the tourism potential of the Taranaki region. Although tourism currently plays a relatively minor role within the region's economy, it has the potential to increase in significance especially as tourism activity at other locations in New Zealand reach saturation levels.[39]For example, the Pouakai Crossing in the Egmont National Park is potentially an alternative to the Tongariro Crossing in the Tongariro National Park. The Lonely Planet publication recently listed Taranaki as the second best region in the world to visit.[40]

The Project, together with other SH3 improvements, has the potential to generate additional traffic (or alternatively lead to a reduction in suppressed traffic) on the route, increasing the Project's road user benefits and additional economic benefits from higher levels of economic growth and economic activity within the region.

### 5.3.4 Potential Travel Benefits

Potential travel benefits relate to the benefits to residents and businesses from knowing a trip can be made even when no trip is undertaken. In cases where route resilience and trip

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[36] Or the reduction in "suppressed traffic" due to SH3's actual and perceived lack of resilience and travel time reliability.

[37]The Detailed Business Case considered changes in the assumed rate of growth of vehicles in both "with" and "without" Project scenarios but not traffic growth generated specifically by the Project. Assuming traffic growth of 3% per annum (the 40 year long term average rate of growth (see Detailed Business Case Section 2.1.6) instead of the base case assumed 2.4% per annum raised the BCR from 0.5 to 0.6.

[38] See discussion of this in Appendix 1 (Detailed Independent Analysis; Venture Taranaki in Association with NZ Institute of Economic Research and Beca Group Ltd) of: The Road Ahead – Economic Development Study on State Highway 3 North; Venture Taranaki; 2012.

[39]See Recreation Assessment (Technical Report 13, Volume 3 of the AEE). For a discussion of the benefits of greater dispersal of tourism activity around the regions see Regional and Seasonal Dispersal of International Tourists; Ministry of Business Innovation and Employment; November, 2016.

[40]Stuff.co.nz, Lonely Planet names Taranaki one of the world's best regions to visit in 2017; 26 October, 2016 (accessed on 24 October 2017).

time reliability are significantly improved, there are likely to be some potential travel benefits from a project. There are benefits to businesses and residents from a reduction in feeling isolated even when trips are not undertaken – for example for residents through more reliable road access to Waikato Hospital and Auckland Airport and for businesses from more reliable road access for "just in time" deliveries of spare parts for machinery. Thus the Project, in conjunction with other improvements to SH3 north of New Plymouth, will give rise to potential travel benefits and these are additional to the road user economic benefits which have been quantified in the Detailed Business Case report.

### 5.3.5 Specific Road User Economic Benefits for Taranaki Businesses

The quantification of road user economic benefits in the Mt Messenger Bypass Project Detailed Business Case has adopted the NZ Transport Agency's standard values for vehicle operating and travel time costs. These are average values to be applied in the evaluation of all road improvement projects throughout New Zealand. From discussions with Taranaki transport operators and other businesses, it is apparent that there are specific additional costs for users of SH3 which are not reflected in the NZ Transport Agency's standard values. In particular, unexpected delays on SH3 north of New Plymouth can lead to significant additional costs as a consequence of:

1 truck drivers being unable to complete New Plymouth-Auckland return journeys within daily maximum allowable driving hours per day. This requires sending replacement drivers to complete journeys or extended delays whilst drivers are required to rest;

2 trucks arriving in Auckland too late to avoid the congestion free period on Auckland's commuter routes; and

3 over-sized loads associated with Taranaki's oil and gas and heavy engineering industries being required to use the much longer SH1 route through Marton or Bulls.

To this extent the quantified road user economic benefits presented in the Detailed Business Case have been conservatively estimated.

For example, the Taranaki Branch of the Road Transport Association has estimated that the additional cost of using SH4 instead of SH3 is $824,000 per day of closure for heavy commercial vehicles. This is based on 350 kilometres of additional running costs at $2.20 per kilometre, an overnight stay for a driver at $160, 4 hours additional driver time at $25 per hour giving a cost one way of $1,030 per trip or $2,060 per two way trip and 400 heavy commercial vehicle movements on SH3 per day.[41]

### 5.3.6 Lifeline Economic Benefits

SH3 provides an alternative north/south route when other routes (e.g. SH1 and SH4) are closed. Although the concurrent closures of SH3 and these alternative routes may occur infrequently and for only limited duration, the economic impacts of such concurrent closures may be significant given that it will effect much wider route catchments than just those for SH3 when other routes are open. Also SH3 north of New Plymouth provides an

[41] Source: Email with attachment dated 27 July, 2017 to R Napier, NZ Transport Agency from T Cloke, Area Executive, RTA.

alternative to rail transport between Taranaki and the top half of the North Island including the Ports of Auckland and Tauranga. To the extent the Project increases the overall resilience of the state highway and rail networks in the central North Island, there are economic benefits additional to those quantified in the Mt Messenger Bypass Project Detailed Business Case.

## 5.4 Potential Economic Costs of the Project

### 5.4.1 Loss of Productive Land

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.

### 5.4.2 Property Value Effects

A small 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 changes[42]as a consequence of the Project, such potential property value changes are a reflection of, and not in addition to, the intangible effects. Any potential change in property value effect does not materialise unless and until an owner sells the property. At this point there is a potential wealth loss to the seller, but no ongoing environmental effects to be borne by the seller. The purchaser of the property gains by potentially having to pay a lesser price for the property but incurs the costs of the ongoing intangible effects. From the perspective of the New Plymouth District or the wider Taranaki region as a whole, these are the costs of the intangible effects as potentially reflected in the reduction in property values but not in addition to the reduction in property values.

For other property owners, the increase in attractiveness of the District and region for business and residential development is likely to mean increases in property values. However, again this is likely to largely reflect the road user economic benefits rather than be in addition to these benefits.

## 5.5 Project Economic Efficiency Assessment

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 and route resilience improvements) with project costs (including capital costs and changes in operation and maintenance costs).

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

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

Manual ("EEM")[43]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 alternatives[44]to roading project evaluations seeking funding from the NZ Transport Agency. This is done to assist with the prioritisation of alternative Transport Agency and local authority projects[45] which are proposed to be funded from the National Land Transport Fund.[46]

However, the BCR as a measure of efficiency is now only one of the relevant assessment and ranking criteria, with the other criteria being 'strategic fit' and 'effectiveness'. The Transport Agency has rated the Project 'high' for strategic fit, 'low' for effectiveness and 0 to 1 for efficiency.

The latest base case BCR based on conventional cost benefit analysis for the Project is estimated at 0.5 and ranges between 0.4 and 0.7 in sensitivity testing.[47]

Under the RMA there are important and relevant considerations that are not reflected by the BCR. These include:

1 Not all the costs and benefits of a project can be quantified in monetary terms. 'Intangibles' (landscape, ecology and cultural effects for example) must be considered outside the quantitative BCR calculation.

2 The BCR is calculated from the national perspective and does not provide information about the distribution of costs and benefits from a New Plymouth District or Taranaki regional perspective. At a regional and district level the BCR will be larger as nearly all of the benefits will accrue to local businesses and residents, whereas the costs of the Project will be funded from a national pool of resources.

3 There is no certainty that, if the Project does not proceed, the funds earmarked will be available for road improvement (or other) roading projects in the New Plymouth District or the Taranaki region. The funds may instead be used for road improvement (or other) roading projects elsewhere in New Zealand. Therefore, from a New Plymouth District or Taranaki regional perspective, the Project has a very high BCR since the benefits are significant but the opportunity cost of the funds for the New Plymouth District and the Taranaki region is very low.

4 There are economic benefits (see Sections 4.1 and 4.3 of this report) from the Project and which have been excluded from the quantitative analysis estimating the BCR for the Project.

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[43]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**").

[44]For example, public transport projects.

[45]I.e. those seeking NZ Transport Agency funding.

[46] 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.

[47] Mt Messenger Bypass Detailed Business Case to Proceed from Initiation to Implementation; Mt Messenger Alliance for NZ Transport Agency; August 2017 (see Section 8.4).

5 No account has been taken in the BCR's estimation of the residual value of the Project at the end of the 40 year analysis period.[48] Whilst the Project does not have a residual value in the sense that it cannot be sold or redeployed in other uses, it has a residual value in that it is likely to continue providing a stream of net traffic operating benefits into the future.

[48] Previously the EEM required a 30 year analysis period to be used. The analysis period has recently been increased to 40 years together with the discount rate being lowered from 8% to 6%.

# 6 Issues Arising During Consultation

The Social Impact Assessment (Technical Report 5, Volume 3 of the AEE) lists a number of region-wide social benefits that were identified during consultation. Many of these have an economic dimension including:

1 The safer and more predictable movement of freight and people;

2 Increased competitiveness for the region's businesses;

3 Improved accessibility for the regions businesses, residents and visitors;

4 Increased residential and business growth; and

5 The retention of skills and services within the region.

These types of effects have been addressed earlier in this report and in the Traffic and Transport Assessment (Technical Report 2, Volume 3 of the AEE).

# 7 Conclusions

The Project will result in additional expenditure, employment and incomes for Taranaki businesses and residents during the Project's construction. When completed, it will lead to reductions in vehicle operating, travel time and road accident costs and improvements in and route resilience, benefitting local residents and businesses and visitors to the District and region. In addition, the Project will contribute a range of other economic benefits including improvements in travel time reliability, increased regional economic growth, generated traffic, potential travel benefits, specific road user benefits for Taranaki businesses and lifeline economic benefits.

The latest base case BCR for the Project is 0.5 and the BCR in sensitivity testing ranges between 0.4 and 0.7. In assessing the Project's economic efficiency it is necessary to also have regard to:

1 The additional Project economic benefits to those in the quantified economic benefits included in the BCR's estimation;

2 The residual value of the Project; and

3 The very high BCR for the Project adopting a New Plymouth District or Taranaki regional viewpoint, since local residents and businesses will receive nearly all of the Project's benefits but pay only a proportionate share of its costs.

The Project will have significant overall net positive economic benefits for the New Plymouth District and the Taranaki region.