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Requirements by

Transit New Zealand for Designation of State Highway 2 (Tauranga Eastern Arterial)

and

Tauranga District Council for Bell Road Interchange

Prepared for
Transit New Zealand and
Tauranga District Council

Volume 2

Beca Carter Hollings & Ferner
Consulting Engineers

APPENDIX 1
Orders in Council

Extract from *N.Z. Gazette*, 3 March 1994, No. 20, p. 978

he Resource Management (Approval of Transit ew Zealand as Requiring Authority) Notice 1994

ursuant to sections 167 and 420 (6) of the Resource lanagement Act 1991, the Minister for the vironment, hereby gives the following notice:

otice

Title and commencement—(1) This notice may be cited the Resource Management (Approval of Transit New land as Requiring Authority) Notice 1994.

) This notice shall come into force on the 7th day after date of its publication in the *New Zealand Gazette*.

terpretation—In this notice "State highway" and torway" have the same meaning as in section 2 (1) of Transit New Zealand Act 1989.

pplication of notice—This notice shall apply in tion to and not in substitution for the Resource nagement (Approval of Transit New Zealand as uiring Authority) Order 1992.

4. *Approval as requiring authority*—Transit New Zealand is hereby approved as a requiring authority under section 167 of the Resource Management Act 1991, for its particular network utility operation being the construction and operation (including the maintenance, improvement, enhancement, expansion, realignment and alteration) of any State highway or motorway pursuant to the Transit New Zealand Act 1989.

5. *Approval in respect of existing designation*—Transit New Zealand is hereby approved as a requiring authority under section 167 of the Resource Management Act 1991 for the Christchurch Northern Arterial (State Highway 74) in the district of Christchurch City Council.

Dated at Wellington this 17th day of February 1994.

SIMON UPTON, Minister for the Environment.

Notice No. 1500

APPENDIX 2

Technical Report 1 - Traffic Model Development and Validation Report, March 1998

Tauranga Eastern Arterial
Scheme Assessment

Traffic Modelling and Economic Evaluation

Prepared for
Transit New Zealand

Beca Carter Hollings & Ferner
Consulting Engineers

TAURANGA EASTERN ARTERIAL

Traffic Modelling and Economic Evaluation

Prepared for

TRANSIT NEW ZEALAND

By

BECA CARTER HOLLINGS & FERNER LTD

Report Prepared by: Angie Crafer
David Philip
Verified by: Andrew Murray
Approved for Release by: pp.Mike Foster

Final
June 1998
3602796/16/01
ALC7NR02.DOC

APPENDIX A Capital Cost Estimates

EXECUTIVE SUMMARY

This report details the analysis which has been undertaken to assess the traffic and economic aspects of the options which have been analysed as part of the Tauranga Eastern Arterial Investigation.

Two separate studies were undertaken as part of the economic evaluation of the options considered for the Tauranga Eastern Arterial.

The initial study, the "50 year strategic analysis" was undertaken to investigate the timing of particular options or the components of a project option. The criteria assumed for this timing was taken to be when the user cost benefits were found to be 4 times the capital costs. User cost benefits were assumed to arise from travel time cost savings, accident cost savings and vehicle operating cost savings. The capital costs were assumed to include the costs of construction and maintenance. The criteria used is in accordance with Transfund's requirements for a fundable project, that is that the benefit cost ratio (B/C) is equal or greater than 4, with the costs and benefits being included over a 25 year period starting from the time when construction starts. A 50 year analysis period was assumed so that any project which was not considered fundable for some time would be included in the analysis. This study allowed the analysis of the staging of certain options, for example, a 2 lane bypass followed by widening to 4 lanes at a later date could be tested to determine when each separate project was viable.

The second study comprised a simple benefit cost ratio analysis which was used to compare the benefits and costs of the options if construction was assumed to start as soon as possible. This was undertaken to provide a comparable benefit cost ratio between the options. This study was also undertaken using the procedures set out in Transfund's Project Evaluation Manual, with the evaluation including the cost values of capital and maintenance, and user costs arising from travel time, accidents and vehicle operating costs.

TRAFFIC MODEL

A traffic model was used to provide the basis for determining the user costs. The traffic model was developed using the TRIPS transportation modelling software. Trip origin-destination matrices were determined from roadside interview and number plate surveys undertaken in 1997. These surveys were designed in order that information concerning the origin and destination of journeys, and the purpose of the journey was gathered. The data from the surveys was input into a large database and the addresses matched to zones representing the Tauranga District Council and Western Bay of Plenty District Council planning areas. Trip demand matrices which give the number of journeys wanting to travel between each pair of zones was subsequently output from the database.

The roading network included in the traffic model includes all the major roads in the study area. The zones described above, representing small areas were linked into the roading network at strategic locations, generally representing a collector road in that area. When the trip demand matrices were assigned to the network model, the TRIPS program simulates each journey between the origin and destination zones. The optimal route is determined from a combination of the shortest travel time and distance travelled. The program uses an iterative procedure in order to determine the routes, as if all trips travelled on the shortest route by distance, another route may become faster due to congestion on the shorter route.

Future year trip demand was determined from an analysis of the growth rates in each zone and of the observed growth rate on the roads both within and outside the study area. In the same way that the original trip demand matrices were assigned to the roading network, so the future year matrices were assigned to possible future roading networks.

The traffic models were developed for four daily periods (morning peak, inter-peak, evening peak and off-peak periods) and for nine periods in time, i.e. the years 1997, 2001, 2006, 2011, 2016, 2021, 2031, 2041 and 2051. The modelling program is able to output travel time, distance, flows and speeds on all the roads included in the modelled network. These values were used to compute total travel time costs, vehicle operating costs and accident costs for all of the options tested. Annual user costs were calculated for each of the modelled years and a year-by-year time stream of annual costs developed by interpolation of the results at each year. These user cost streams were used in both studies, comparing the costs with either the previous implemented roading scenario for the first study, or the do-minimum scenario for the second study.

The following sections detail the results and conclusions from each study.

50 YEAR STRATEGIC ANALYSIS

The 50 year strategy study investigated the bypass options as well as widening of the existing road (Option C). The bypass options investigated included Option A3 (the Alternative Route) and Option B (the Swamp Route). Option A (the Sandhill Route) was not included in this part of the study as, with it being longer and more costly than the Alternative Route, it would only have shown that it would be viable at a later date

Strategies were investigated which comprised the staging of different components of an option. The following table indicates the years in which the separate components within each strategy would become viable. Some facilities were assumed to be required for traffic management, safety, social and environmental reasons rather than being strictly justified by their B/C, for example the installation of a signalised intersection at SH2/Cameron Road in Te Puke, and the installation of a roundabout at SH2/Domain Road.

PROJECTS INCLUDED IN EACH STRATEGY

STRATEGY	OPENING YEAR
Strategy I (incorporating Option C)	
Existing	
Construct Passing Lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Passing Lanes N1, N4 and S3	2010
Install roundabout at SH2/SH33 intersection	2015
Include widening SH2 from Te Maunga to Domain to 4 lanes	2016
Include widening SH2 from Domain through Te Puke to 4 lanes	2023
Include widening SH2 from Te Puke to Paengaroa to 4 lanes	2043
Strategy II (incorporating Option C)	
Existing	
Construct Passing Lanes N2, N2, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Passing Lanes N1, N4 and S3	2010
Install roundabout at SH2/SH33 intersection	2015
Include widening SH2 from Domain through Te Puke	2023
Include widening SH2 from Te Maunga to Domain to 4 lanes	>2047
Include widening SH2 from Te Puke to Paengaroa to 4 lanes	>2047
Strategy III (incorporating Option A3)	
Existing	
Construct Passing Lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Option A3 (Alternative Route) with 2 lanes, at grade intersections	2011
Widen SH2 from Te Maunga to Domain to 4 lanes	2021
Widen Bypass between Domain and Bell to 4 lanes	>2047
Strategy IV (incorporating Option B)	
Existing	
Construct Passing lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Option B (Swamp Route) with 2 lanes, at grade intersections	2011
Widen SH2 from Te Maunga to Domain to 4 lanes	2022
Widen Bypass between Domain and Bell to 4 lanes	>2047
Strategy V (incorporating Option A3)	
Existing	
Construct Passing Lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Option A3 (Alternative Route) with 2 lanes, grade separated intersections	2012
Widen SH2 Te Maunga to Domain to 4 lanes	2022
Widen Option 2 between Domain and Bell to 4 lanes	>2047

PROJECTS INCLUDED IN EACH STRATEGY	
STRATEGY	**OPENING YEAR**
Strategy VI (incorporating Option B)	
Existing	
Add in Passing Lanes N2, N3, S1, S2	1998
Include Cameron Road signals	2005
Include Domain Road roundabout	2005
Construct Option B (Swamp Route) as 2 lanes, grade separated intersections	2011
Widen SH2 between Te Maunga and Domain to 4 lanes	2022
Widen Option B from Domain to Bell to 4 lanes	>2047
Strategy VII (incorporating Option A3)	
Existing	
Construct Passing Lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Option A3 (Alternative Route) with 4 lanes, grade separated intersections, widen SH2 from Te Maunga to Domain Road	2014
Strategy VIII (incorporating Option B)	
Existing	
Construct Passing Lanes N2, N3, S1, S2	1998
Install signalised intersection at SH2/Cameron Road	2005
Install roundabout at SH2/Domain Road	2005
Construct Option B (Swamp Route) with 4 lanes, grade separated intersections, widen SH2 from Te Maunga to Domain Road	2016

An incremental analysis of the total 50 year present value of user costs and capital costs was undertaken and indicated that the optimal strategy was Strategy III (incorporating Option A3), based on a critical incremental benefit cost ratio of 3. This strategy includes the Alternative Route (Option A3) with at-grade intersections. The strategy including the Alternative Route with grade-separated intersections, Strategy V, was found to be only marginally less economical than Strategy III. The following table provides a summary of the results of the incremental analysis.

INCREMENTAL ANALYSIS

						Incremental		
Least Cost Option	**Benefits $ million**	**Costs $ million**	**Next Option**	**Benefits $ million**	**Costs $ million**	**Benefits $ million**	**Costs $ million**	**BCR**
Strategy II (Option C)	40	10	Strategy I (Option C)	46	11	6	2	3.4
Strategy I (Option C)	46	11	Strategy VIII (Option B)	117	23	70	12	6.0
Strategy VIII (Option B)	117	23	Strategy VII (Option A3)	127	24	10	0	21.1
Strategy VII (Option A3)	127	24	Strategy V (Option A3)	137	24	10	1	10.8
Strategy V (Option A3)	137	24	Strategy IV (Option B)	137	25	(0)	1	-0.4
Strategy V (Option A3)	137	24	Strategy III (Option A3)	141	26	4	1	3.3
Strategy III (Option A3)	141	26	Strategy VI (Option B)	141	27	(0)	1	-0.3
Strategy III (Option A3)	141	26						

BENEFIT COST ANALYSIS

The Sandhill Route, Swamp Route (Option B) and Alternative Route (Option A3) were all analysed to determine the benefit cost ratios from an analysis period comprising 25 years form 1 July 1998 to 30 June 2023. Based on the costs of a 2 or 4 lane expressway with a 9m grassed median, the costs and benefit cost ratios of the options (excluding the Te Maunga to Domain Road section) are as follows:

Option	Cost $ million	B/C Ratio
Widening of Existing Alignment (Option C)	159	0.2
Sandhill Route (4 lanes)	115	1.1
Swamp Route (4 lanes)(B)	112	1.5
Alternative Route (4 lanes)(A3)	99	1.8

Note: B/C ratio includes intangible benefits from Te Puke WTP survey

Compared to the Alternative Route (Option A3), the Sandhill Route and the Swamp Route (Option B) have incremental B/C ratios of -5.2 and -1.1 respectively. This means that for the additional costs, neither the Sandhill Route nor the Swamp Route (B) offer any additional benefits.

The net present value of benefits associated with Option A3 over the B/C analysis period was calculated to be $148.26 million, 6% greater than the $140.12 million associated with Option B. Whilst the benefit cost ratios of Option A3 and Option B are close, Option A3 provides the cheaper solution and is therefore considered to be the most economical.

CONTENTS

FIGURES

APPENDICES

1. INTRODUCTION

1.1. REPORT PURPOSE AND SCOPE OF STUDY

This report details the analysis which has been undertaken to assess the traffic and economic aspects of the options which have been analysed as part of the Tauranga Eastern Arterial Investigation.

Option selection was undertaken using a 50 year strategy study which investigated the staging of projects over such a time frame, and used an incremental analysis to determine the economically preferred strategy. A benefit cost ratio evaluation was then undertaken for the options over a 25 year time frame in accordance with the procedures outlined in Transfund's Project Evaluation Manual (PEM) (First Revision, effective from 1 May 1997, Manual No PFM2).

The traffic analysis provides information regarding the current traffic situation, and the predicted future situation. This involves the use of a transportation model which is also described. This report is not intended as a detailed technical report on the modelling, but rather presents the background information to support the calculation of the economic evaluation of the project.

1.2. REPORT STRUCTURE

The remainder of this report is set out in the following manner:

Section 2	Discusses the strategic planning considerations of the project including the need for the project and the location and function of access improvements.
Section 3	Details the options evaluated, their general features and the engineering cost estimates.
Section 4	Describes the traffic data used in the study, details the origin-destination survey analysis, and includes a description of the existing conditions, the methodology and development of the traffic models, the scenarios assessed and summarises the results of the traffic modelling.
Section 5	Describes the accident analysis undertaken.
Section 6	Details the economic evaluation undertaken, including the methodology adopted, the assumptions used, and the results.
Section 7	Discusses the main influencing factors in the economic evaluation, including cost components, main influencing factors, and the sensitivity of the analysis.
Section 8	Contains a summary and conclusion of the evaluation.

1.3. ACRONYMS USED IN THIS STUDY

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
AIS	Accident Investigation System
AM	Morning Peak Period
Beca	Beca Carter Hollings & Ferner Ltd
BCR (B/C)	Benefit Cost Ratio
CBD	Central Business District
GST	Goods and Services Tax
FYRR	First Year Rate of Return
HCV I	Heavy Commercial Vehicle Type I - diesel powered rigid trucks with or without trailers or articulated vehicle with 3 or 4 axles
HCV II	Heavy Commercial Vehicle Type II - diesel powered trucks and trailers and articulated vehicles with 5 or more axles
IP	Interpeak Period
LCV	Light Commercial Vehicle - vans, utes, light trucks
LOS	Level of Service
LTSA	Land Transport Safety Authority
MCV	Medium Commercial Vehicle - two axle diesel powered heavy trucks without a trailer
MD	Midday Period
NPV	Net Present Value
O/D	Origin/Destination
PAU	Planning Area Unit
PEM	Project Evaluation Manual, Transit New Zealand, Manual No PFM2
PM	Evening Peak Period
PVB	Present Value Benefits
PVC	Present Value Costs
SH2	State Highway 2
SH29	State Highway 29
SH33	State Highway 33
TDC	Tauranga District Council
Transit NZ	Transit New Zealand
TTC	Travel Time Costs
VOC	Vehicle Operating Costs
WBoPDC	Western Bay of Plenty District Council

2. PURPOSE OF STUDY

2.1. DESCRIPTION OF THE STUDY AREA

State Highway 2 is the main East Coast highway between Waihi and Katikati to the north of Tauranga and Whakatane to the south. The section of SH2 investigated in this study, and shown in Figure 2.1, is to the east of Tauranga, from the SH2/SH29 Te Maunga roundabout (RS 164) to the SH2/SH33 Paengaroa intersection (RS 189).

The existing highway is located on the flood plain of the Kaituna River in the Western Bay of Plenty. State highways 2 and 29 leave Tauranga from the south and run together eastwards before diverging at the Te Maunga intersection. From Te Maunga, SH2 runs southeast, parallel to the coast, and crosses the Tauranga/Kawerau/Teneatua branch railway line at the Welcome Bay overbridge. Domain Road and Bell Road exit SH2 to the north, servicing the rapidly growing areas of Papamoa and Papamoa Beach. SH2 continues southeast, skirting the foothills adjacent to the Kaituna flood plain before crossing the upper flood plain known as Long Swamp on the outskirts of Te Puke and passing through the town centre. From Te Puke, the highway heads east, passing through Waitangi and around over the Kaituna River, past the Rangiuru Freezing Works before meeting with SH33 at Paengaroa Junction. SH33 continues south from Paengaroa Junction to meet with the settlement of Paengaroa some 3 km further on and Rotorua some 50 km further, whilst SH2 exits from the main highway, running east towards Whakatane.

The highway from Te Maunga to Te Puke is a two lane rural highway with a 100 kph speed limit. The speed limit drops to 70 kph on the west of Te Puke and to 50 kph through Te Puke. The road through the town centre is now a four lane road, although it was trialed as 2 lanes for a short period in late 1997. To the east of Te Puke, the speed limit increases to 80 kph and 100 kph east of No 1 Road. Except for a 70 kph speed limit through Waitangi, the remainder of SH2 to Paengaroa Junction has a 100 kph limit, operating as a rural highway.

The study area contains a wide range of land use, including residential and industrial/commercial in Te Puke and Waitangi, residential in Papamoa and Papamoa Beach, with the remainder being mainly rural. Many areas of Papamoa Beach have been recently developed with a significant amount of residential sub-division occurring. A large area to the east of Papamoa Beach has been identified as a possible industrial area.

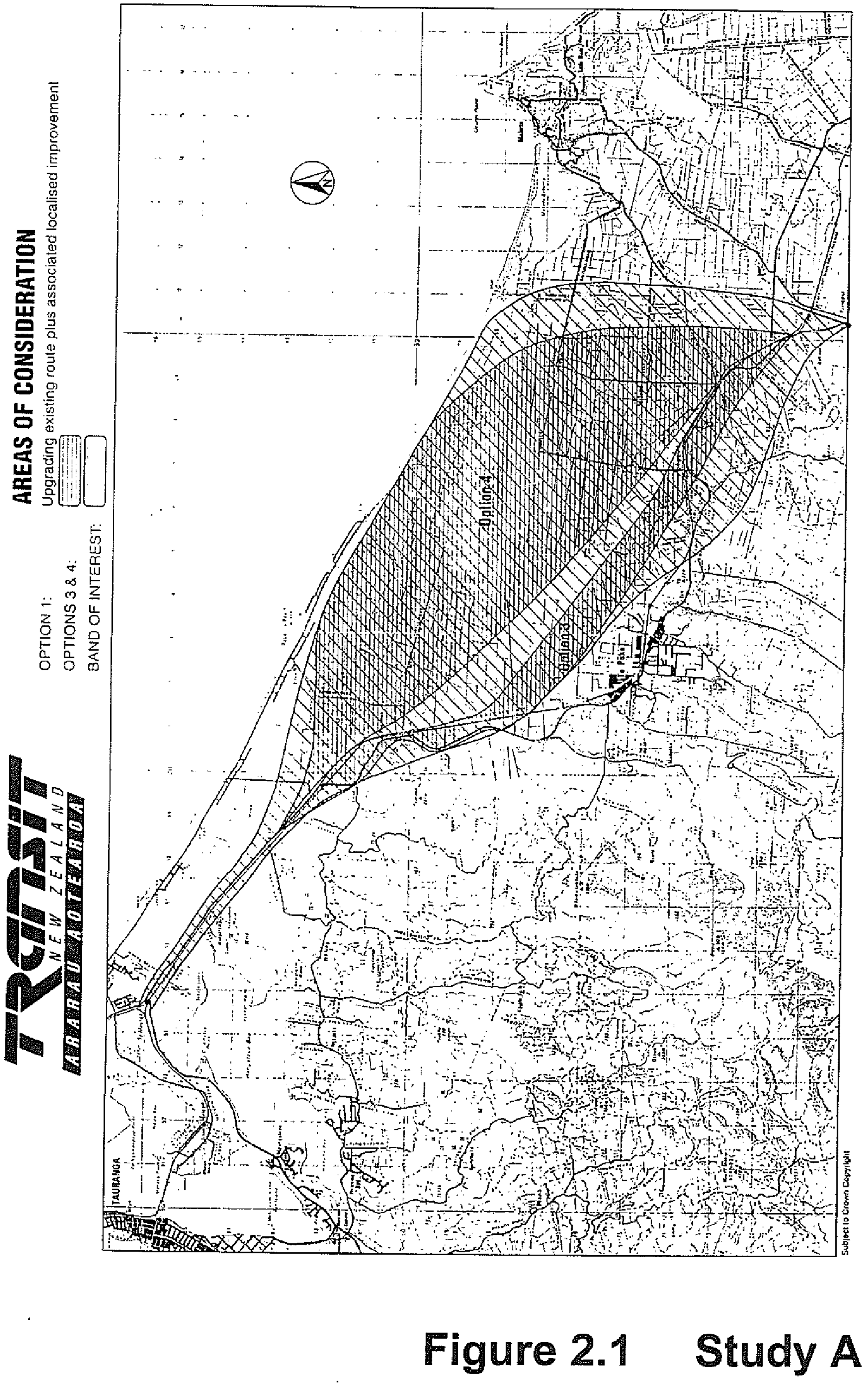

Figure 2.1 Study Area

2.2. NEED FOR STUDY

Currently, SH2 between Te Puke and Domain Road carries an annual average daily traffic volume (AADT) of 14,300. This volume increase significantly during certain periods of the week and year, probably reaching 17,000 vehicles per day at peak times.

Currently the main problems with the State Highway comprise:

- The mixed nature of the traffic which the highway carries, being major arterial route traffic, commuter traffic as well as local trips. From an analysis of the roadside and number plate survey data, it appears that major arterial traffic to and from Rotorua and points south, and Whakatane and points east, constitute approximately 50% of the traffic travelling on SH2 north of Te Puke. The remaining traffic originates and terminates in Te Puke and its environs and comprises commuter traffic, generally between Te Puke and Tauranga, Mount Maunganui and Papamoa, and other local traffic.

- The State Highway passing through the built-up area of Te Puke. The high number of accesses, the on-street parking, pedestrian movements, intersections (two roundabouts), local traffic entering the highway and the general urban/commercial environment of the highway with the associated speed limit of 50 kph results in a poor level of service both on the highway and for side road traffic. This is evident from the road recently being narrowed to 2 lanes to try to create a safer and slower environment. Despite the peak hour flows being in the order of 1,000 vehicles per hour per direction, well below the theoretical capacity of about 1,800 vehicles per hour, the resulting delays meant that the road had to be returned to a 4 lane highway.

- The large number of logging trucks using the highway, and the associated and perceived safety concerns of highway and side road traffic and pedestrians. This is especially of concern for pedestrians crossing the main street in Te Puke, and for other environmental and social concerns of heavy vehicles using the main street.

- The general low level of service between Paengaroa and Te Maunga. This relates to the highway being a two lane facility carrying approximately 14,000 vehicles per day with a 12% heavy commercial vehicle content. A lack of passing opportunities along the road results in a lower overall speed along the highway and driver frustration.

- Accesses from the highway causing conflicting traffic manoeuvres which are made more unsafe due to many having insufficient sight distances. The study area contains a wide range of land use, including residential and industrial/commercial in Te Puke, residential in Papamoa and Papamoa Beach, with the remainder being mainly rural. Many areas of Papamoa Beach have been recently developed with a significant amount of sub-division occurring. A large area to the east of Papamoa Beach, another area close to Maketu Road and another area just to the north of Te Puke have been identified as possible industrial areas. These will all add to the demands on the State Highway.

- Vertical and horizontal geometric alignment deficiencies in and around Te Puke, around the area of Bell Road and at the intersection with Domain Road.
- In the last five years, traffic has been increasing on this section of SH2 at over 5% per annum. From an analysis of the growth in traffic on the State Highway over the past 5 years, the projected growth rate from 1997 is 5.7% per annum east of Domain Road and 6.2% through Rangiuru. This high growth rate will have a significant effect on the need for improvements to the highway.

2.3. OBJECTIVES OF STUDY

The objectives of the study are to :

1. Lodge a requirement for a favoured option in the relevant District Plans.
2. Provide a designated option which shall be a four lane divided highway with full grade separation and access control to alleviate the problems described in Section 2.2.

The objectives of the transportation and economics sections of the study are to determine the most appropriate sequence of projects which will be able to cater for the predicted demand on the network whilst retaining safety and access functions. This will be based on Transfund's Project Evaluation Manual (PEM). A benefit cost ratio would then be determined for the optimal scheme in accordance with the PEM.

3. OPTIONS

3.1. GENERAL DESCRIPTION OF OPTIONS

Four options have been considered in the study, these comprise the following:

- The Sandhill Route - upgrade the existing route to a four lane divided highway from Te Maunga to Domain Road and then follow a new alignment to the north of the existing route, through the "option 4" corridor which follows the sandhills to the north of the Kaituna River.
- Option A3 - The Alternative Route - upgrade the existing route to a four lane divided highway from Te Maunga to Domain Road and then follow a new alignment to the north of the existing route, through the "option 4" corridor. This route follows an alignment to the south of the Sandhill Route.
- Option B - The Swamp Route - upgrade the existing route to a four lane divided highway from Te Maunga to Domain Road and then follow a new alignment to the north of the existing route, through the "option 3" corridor, a more southerly route than the "option 4" corridor passing through the peat area.

The bypass options comprising the Sandhill Route, Option A3 and Option B can all be constructed as stage facilities with 2 lane facilities being widened to 4 lanes as required.

- Option C - The Existing Route - upgrade the existing route to a four lane divided highway , except in Te Puke where a portion of it would be undivided. This option proposes the staged widening of various sections of State Highway 2 and intersection improvements, as considered necessary, according to the traffic flow predicted on each section. These include the following sections of road:
    - SH2: Te Maunga to Domain Road,
    - SH2: Domain Road to No 3 Road,
    - SH2: No 3 Road to No 1 Road, through Te Puke,
    - SH2: No 1 Road to SH33 Paengaroa Intersection

These options are shown in Figure 3.1.

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Figure 3.1 Tauranga Eastern Arterial Study: Options

3.2. DESIGN AND SAFETY STANDARDS

3.2.1. WIDENING THE EXISTING STATE HIGHWAY (OPTION C)

All options include the four committed passing lanes along the section of SH2 between Te Maunga and Domain Road. Widening of State highway 2 between Te Maunga and Domain Road occurs in all of the options during the analysed 50 year period. The option comprising improvements to the existing State highway between Domain Road and Paengaroa Intersection includes various passing lane and widening stages.

The alignment and cross-section have been determined with the use of a digital terrain model. The accuracy of this model has not been verified by ground survey, however for this level of investigation it is considered adequate.

The following describes the proposed works for upgrades along SH2.

Section 1 - Te Maunga to Domain Road

The highway is flat through this section with a maximum grade of 1.50%. The centreline design generally follows the existing horizontal alignment with minor curve easing. The vertical alignment also follows the existing with minor cuts and fills to improve sight distances and speed values. Throughout this section the design speed value is approximately 110 kph.

The three committed passing lanes which are to be constructed during 1998/99 include a 1,200 metre northbound section between Kairua Road and Mangatawa Lane (N3), a 920 metre southbound section between (S1) and a 900 metre section between Mangatawa Lane and RP164/4 (S2). A further passing lane has been identified northbound section between Trumans Lane and Mangatawa Lane (N4). The location of these passing lanes is shown in Figure 3.2.

Widening of this section of road to 4 lanes would affect property accesses and in some cases, low level accesses will be required. Current analysis indicates that this section would not reach a traffic volume warranting widening to 4 lanes for at least the next 8 to 15 years.

Section 2 - Domain Road to No 3 Road, Te Puke

Three passing lane locations have been identified between Domain Road and Te Puke, namely N1, N2 and S3, as shown in Figure 3.2. The 900 metre northbound section located between Bell Road and RP164/8 (N2), is scheduled for construction during 1998/99.

If the proposed Te Puke Bypass is built, widening of this section of road to 4 lanes is unlikely.

Section 3 - Te Puke: No 3 Road to No 1 Road and Section 4 - No 3 Road to Paengaroa Intersection

In the Options Report for the Tauranga Eastern Arterial Roading Study, Option C (widening the existing road) was discarded for both adverse economical and environmental reasons, in favour of the Te Puke Bypass. Options. As for Section 2 comments above, if the proposed Te Puke Bypass is built, widening of this section of road to 4 lanes is unlikely in the foreseeable future.

3.2.2. BYPASS OPTION

The Sandhill Route, Alternative Route (Option A3) and the Swamp Route (Option B) all provide a two or four lane divided highway with a 100 kph speed limit from an intersection at Domain Road to the Paengaroa Intersection. The design speed is 110 kph. An intersection at Bell Road has also been proposed.

Reducing traffic on the existing SH2 would increase safety by reducing the potential for conflicting movements, especially through Te Puke. Transferring longer distance traffic to a limited access road would also increase safety.

3.3. INTERSECTION CONTROLS

3.3.1. BASE SCENARIO

Intersection improvements are proposed at the intersections of SH2/Domain Road and SH2/Cameron Road prior to the need for major works. Despite both these intersection improvements having an overall detrimental effect on the travel time of through traffic, it is considered that the delay to side road traffic and the safety of the intersections as drivers accept shorter gap acceptances to access the State Highway would result in the need for these improvements.

3.3.2. EXISTING STATE HIGHWAY

Intersection improvements at Paengaroa, Maketu Road, Collins Road and Bell Road are predicted to be required over the 50 year evaluation period. The costs associated with improvements at Maketu Road, Collins Road and Bell Road have not been included in the analysis as they are most likely to be as a result of industrial/commercial development and would occur in all options, including the Do Minimum scenario.

Other intersection upgrades, for example through Te Puke would be assessed on an isolated needs basis during any detailed design.

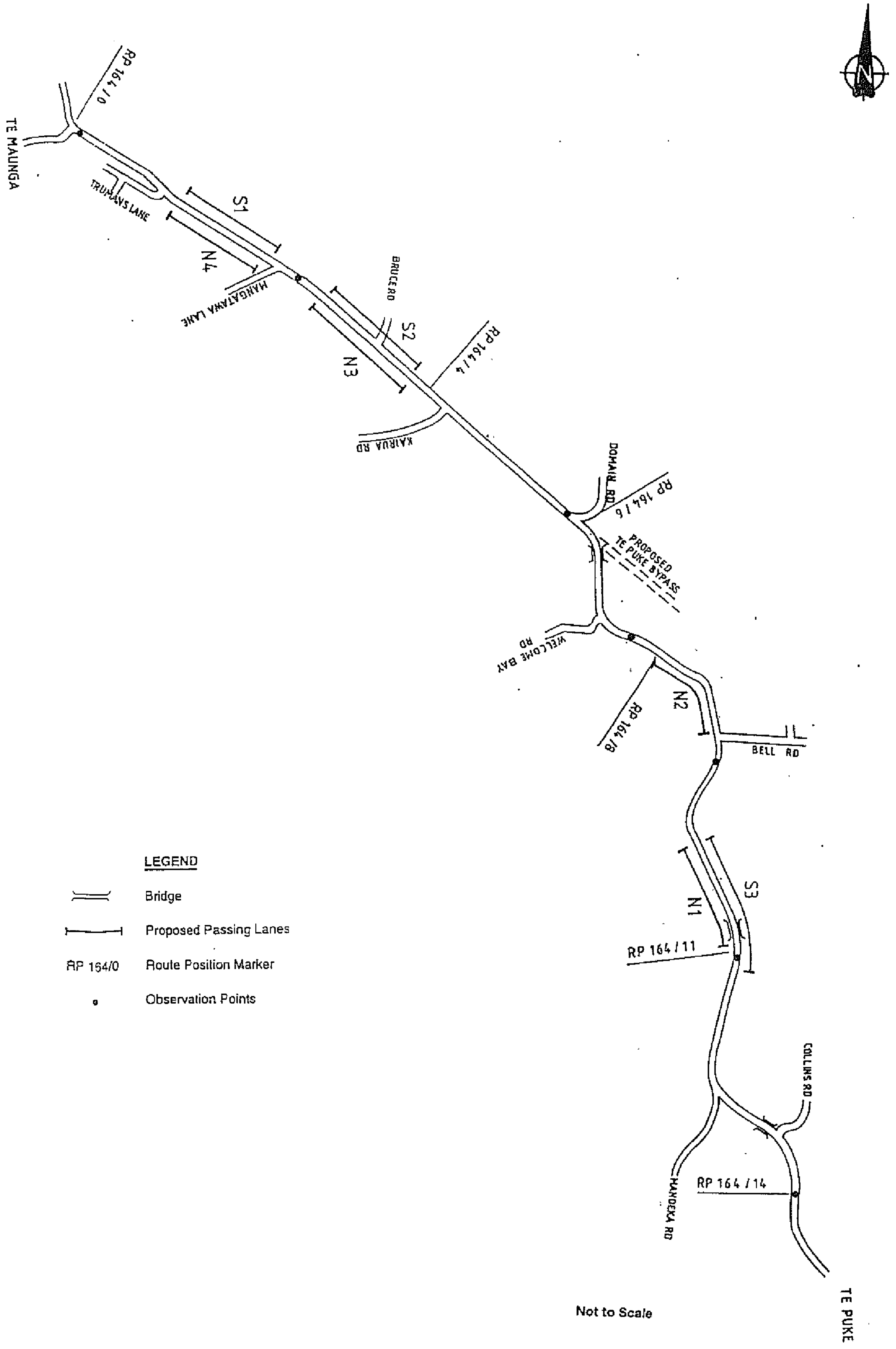


Figure 3.2 Location of Passing Bay Options

3.3.3. NEW ALIGNMENTS

The final intersection designs for either of the new alignment options been assumed to be as follows:

SH2/Domain Road:	Grade separated interchange
SH2/Bell Road:	Grade separated interchange
SH2/SH33:	Grade separated interchange

However, the staged construction of these alignments means that initially, and until demand justified the need to provide grade separated facilities, these intersections would have the following form:

SH2/Domain Road:	Two lane roundabout
SH2/Bell Road:	Two lane roundabout
SH2/SH33:	Two lane roundabout

3.4. ENGINEERING COST ESTIMATES

3.4.1. CONSTRUCTION COSTS

Cost estimates for widening and upgrading the existing State Highway have been undertaken for the various sections. Estimates for each of the sections are contained in Appendix A. The cost estimates for each of the new alignment options are also given in Appendix A. The estimates include the following components: land purchase, earthworks, other civil works, signage, landscaping, lighting, professional fees, mitigation and compensation, with contingencies included as 25% on earthworks and 15% on other civil works.

The costs are summarised in Table 3.1.

Table 3.1 Summary Of Engineering Construction Cost Estimates

	Cost $ M
Passing Lanes N2, N3, S1, S2	1.569
Domain Road Intersection - roundabout	0.500
Cameron Road Intersection - signals	0.200
Passing Lanes N1, S3, N4	1.780
Paengaroa Intersection - roundabout	0.250
SH2 widening to 4 lanes: Te Maunga to Domain Road	6.250
SH2 widening to 4 lanes: Domain Road to Te Puke	60.269
SH2 widening and improvements: through Te Puke	36.767
SH2 widening to 4 lanes: Te Puke to Paengaroa	53.820

Sandhill Alignment: 4 lanes Domain to Paengaroa, grade separated intersections	114.668
Option A3 Alignment: 2 lanes Domain to Paengaroa, at grade intersections	83.219
Option A3 Alignment: 2 lanes Domain to Paengaroa, grade separated intersections	87.419
Option A3 Alignment: 4 lanes Domain to Paengaroa, grade separated intersections	98.790
Option B Alignment: 2 lanes Domain to Paengaroa, at grade intersections	83.046
Option B Alignment: 2 lanes Domain to Paengaroa, grade separated intersections	88.202
Option B Alignment: 4 lanes Domain to Paengaroa, grade separated intersections	112.403

3.4.2. MAINTENANCE COSTS

Maintenance costs have been developed for each option as a cost in addition to the existing maintenance costs. Table 3.2 summarised the annual and periodic maintenance costs for each project.

Table 3.2 Summary of Annual and Periodic Maintenance Costs ($)

	Annual	8, 16, 24, etc years after construction	2, 12, 22, etc years after construction	10, 20, 30, etc years after construction
SH2/Domain Road roundabout	1,000	150,000		
SH2/Cameron Road signals	1,000	150,000		
Two lane Alternative Route (Option A3)	15,975		614,096	438,640
Four lane Alternative Route (Option A3)	31,950		1,230,075	878,625
Four lane Sandhill Route	31,950		1,230,075	878,625
Two lane Swamp Route (Option B)	15,654		602,679	430,485
Four lane Swamp Route (Option B)	31,308		1,205,358	860,970

4. TRAFFIC ANALYSIS

4.1. EXISTING TRAFFIC CONDITIONS

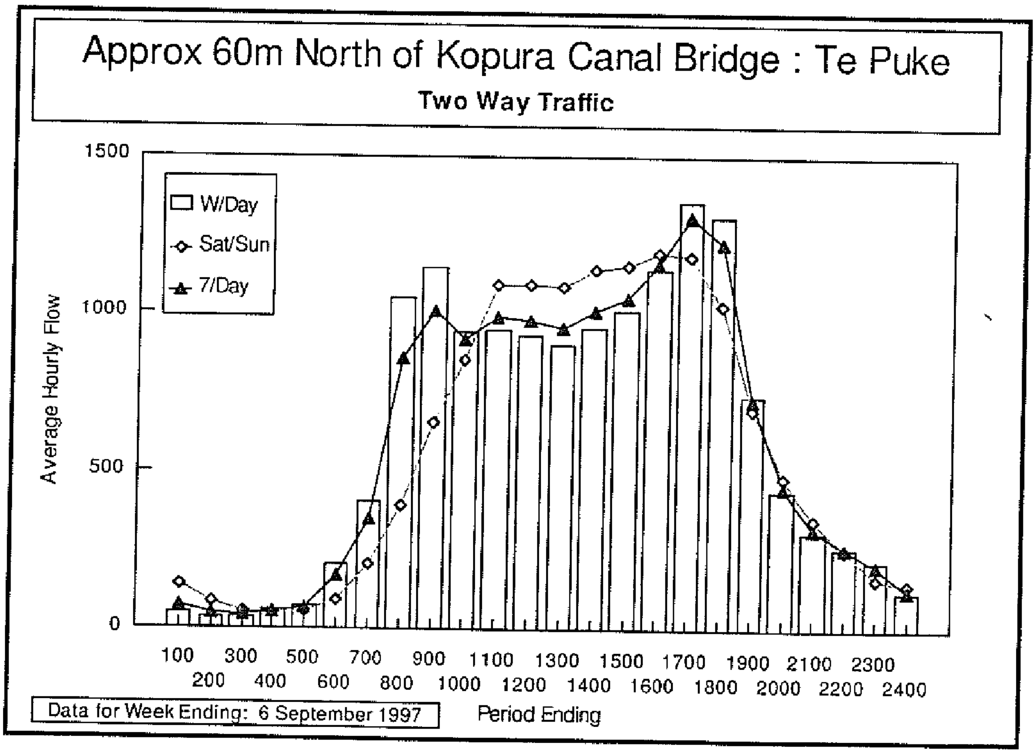
4.1.1. TRAFFIC FLOWS

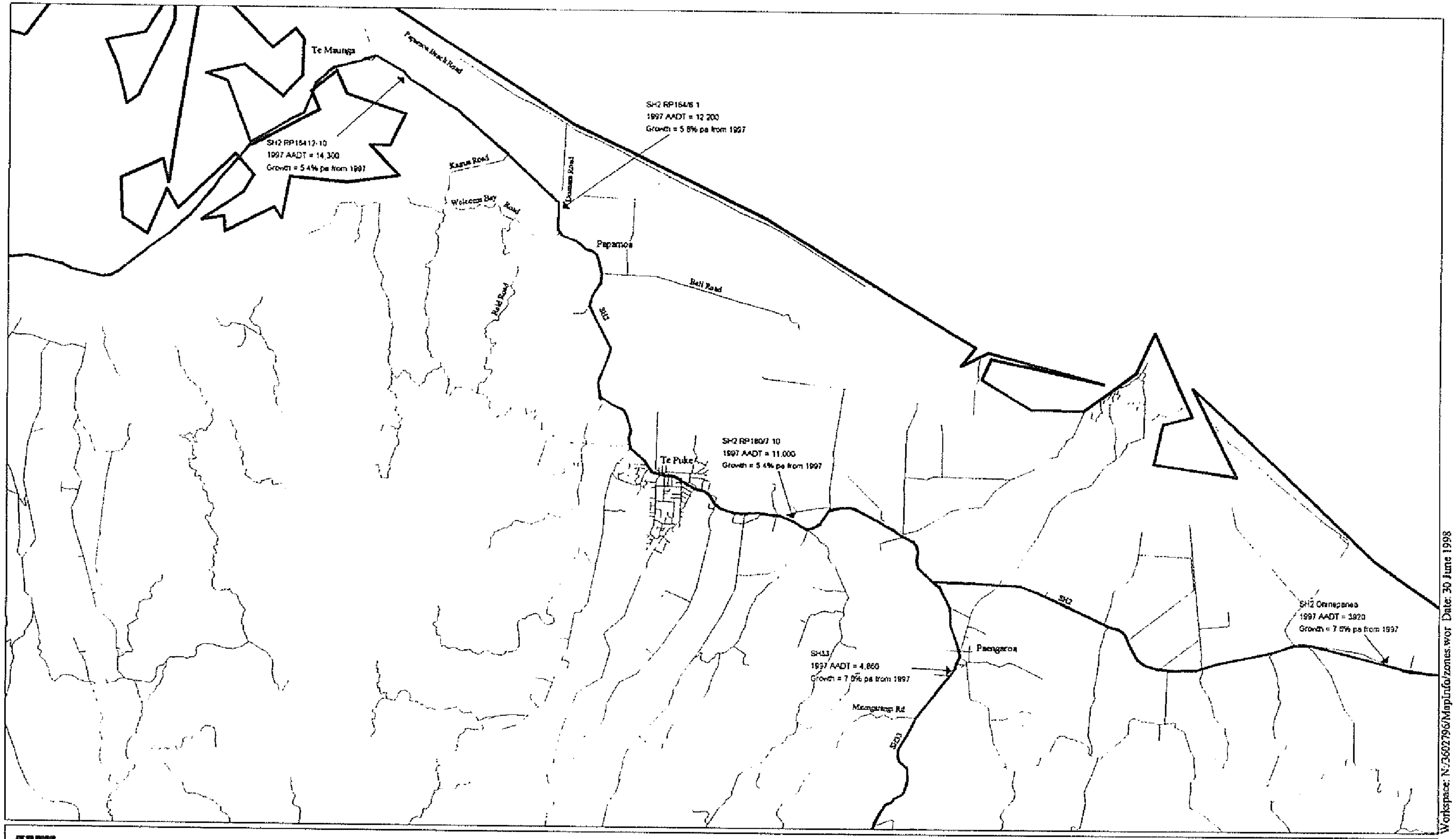
Figure 4.1 indicates the daily traffic volumes which were observed between 1993 and 1997 in the study area. These traffic volumes provided by Transit New Zealand have growth rates determined from 5 years of historical data for each year.

4.1.2. PROFILE OF TRAFFIC

The traffic count on SH2, north of Kopura Canal Bridge has been used to determine the profile of traffic throughout the day. Graph 1 indicates the profile of traffic during the week and also at the weekend.

Graph 1 Profile of Existing Traffic on SH2, between Bell Road and Te Puke





Workspace: N:/3602796/MapInfo/zones.wor Date: 30 June 1998

BECA

Note AADT = Annual Average Daily Traffic
Projected growth rate derived from previous 5 years of traffic volume data

Scale: 1:150,000

Figure 4.1

Observed Traffic Volumes and Projected Growth Rates

The graph clearly indicates the morning peak period as 7am to 9am and the evening peak period as 4pm to 6pm during weekdays, indicating the influence of commuter traffic during week days.

4.1.3. TRAFFIC COMPOSITION

The following traffic composition was obtained from traffic counts on SH2, Domain Road and Papamoa Beach Road, undertaken in 1997:

Table 4.1 Traffic Composition (percentages)

		Car	LCV	MCV	HCVI	HCVII
SH2, east of Te Maunga Roundabout	All days	82.7	2.3	3.2	4.2	6.7
	Weekday	80.1	2.5	3.6	4.8	8.1
SH2, north of Kopura Canal Bridge	All days	86.0	2.4	1.7	3.5	6.0
	Weekday	83.7	2.6	2.0	3.9	7.6
PEM Rural Strategic	All days	77	9	5	4	5
	Weekday	71	12	5	4	8
Papamoa Beach, north of Sandhurst Drive	All days	94.6	2.5	0.7	1.4	0.2
	Weekday	94.1	2.8	0.9	1.4	0.2
PEM Urban Arterial	All days	83	10	3	2	2
	Weekday	81	10	4	2	3
Domain Road, east of the Garden Drive	All days	90.0	6.4	1.1	1.4	0.4
	Weekday	89.3	6.6	1.3	1.7	0.6
PEM Urban Other	All days	88	9	1	1	1
	Weekday	87	8	2	2	1

Note: definitions of vehicle classifications are given in Section 1.3

Combining the percentages for cars and LCVs indicates a similarity between SH2 and the "typical" composition given in the PEM for rural strategic roads. Similarly, for Papamoa Beach and the PEM composition for urban arterial roads and Domain Road and the PEM composition for urban other roads. The default compositions from the PEM are shown in Table 4.2.

Table 4.2: Vehicle Composition

	CAR	LCV	MCV	HCV I	HCV II
RURAL STRATEGIC					
Weekday	71	12	5	4	8
Weekend/Holiday	89	3	3	3	2
All Periods	77	9	5	4	5
URBAN OTHER					
Weekday	71%	12%	5%	4%	8%
Weekend/Holiday	89%	3%	3%	3%	2%
All Periods	77%	9%	5%	4%	5%
URBAN ARTERIAL					
Morning Peak	82%	10%	3%	2%	3%
Inter Peak	78%	10%	4%	3%	5%
Evening Peak	84%	11%	2%	2%	1%
Evening/ Night-time	81%	9%	3%	2%	5%
Weekend Holiday	88%	8%	2%	2%	1%

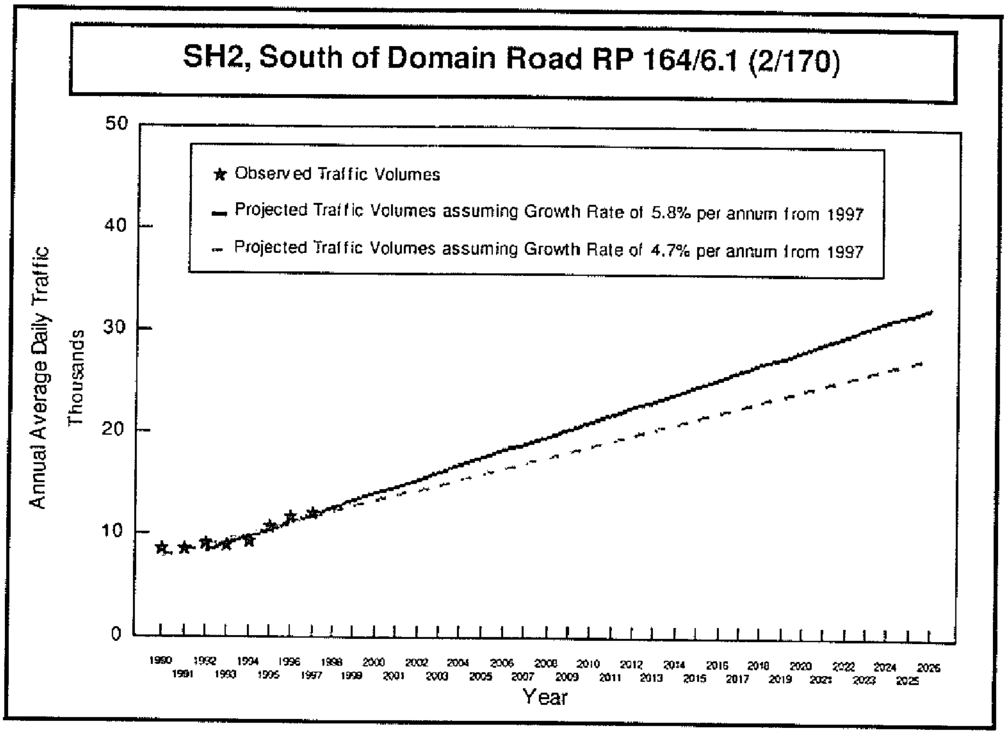
SOURCE: PEM, PFM2, TABLE A4.1

In the economic calculations the composition of traffic has been assumed to be similar to that detailed in the Project Evaluation Manual (PEM) for a rural strategic road, for all roads, because as trips can re-route to alternative routes which may have a different status, it is not considered appropriate that the same trip may have a different travel time cost depending on the road travelled on.

4.1.4. HISTORICAL TRAFFIC GROWTH

An analysis of the 1992 to 1997 traffic flows on SH2, south of Domain Road indicates that the traffic volumes have been increasing at a rate of 6.5% per annum since 1992. (Note: growth rates are quoted as arithmetic, not geometric rates). Using a regression analysis, this would relate to a 5.8% increase in growth from the projected 1997 traffic volume, assuming historical growth continues. An analysis of the traffic growth which occurred between 1990 and 1997 indicates a growth rate of 6.1% per annum since 1990, correlating to a lower predicted growth rate of 4.7% from 1997. This is illustrated in Graph 2 which also shows the projection of traffic flows should either growth rate continue.

Graph 2 Historical Traffic Volumes on State Highway 2



These growth rates could be considered to be the "low" and "high" growth scenarios with a "probable" scenario being the average of the growth rates based from 1997, ie 5.3% per annum.

Table 4.3 details the growth rates of historical traffic flows in the study area, and provides the annual growth rate for the historical flows, and the equivalent growth rate which would occur from 1997, should the growth rate remain the same. These rates were used to factor up flows to 1997 values in order to validate the modelled 1997 flows.

Table 4.3 Traffic Growth Rates

	Historical Arithmetic Annual Growth Rate - regression on 1990 to 1997 data	Historical Arithmetic Annual Growth Rate - regression on 1992 to 1997 data	Projected Annual Growth Rate "Probable Growth"
SH2, south of Domain Road	4.7% pa from 1997	5.8 pa from 1997	**5.3% pa** **from 1997**
SH2, north side of Mangatawa Lane	3.5% pa from 1997	5.4% pa from 1997	**4.5% pa** **from 1997**
SH2, Rangiuru, north of rail overbridge	4.1% pa from 1997	5.4% pa from 1997	**4.8% pa** **from 1997**

4.1.5. TRAVEL TIMES

Travel time information was collected by BCHF in November 1997 using "floating car" surveys where a car travels at the same speed as the traffic stream. Routes were taken along SH2 between Te Maunga Roundabout and Paengaroa Intersection, and a circuit around Domain Road, Papamoa Beach Road, Girven Road, Maunganui Road and SH2. Travel times were noted at several locations along the route in order to obtain travel times for various sections and at significant intersections. The average of the observed travel times for the morning peak, midday and evening peak periods, are summarised in Table 4.4.

Table 4.4 Observed Travel Times (mins), November 1997

		Morning Peak Period	**Midday Period**	**Evening Peak Period**
SH2: Domain Road to SH2/SH33 Intersection	North/ Westbound	14.65	15.38	15.70
	South/ Eastbound	14.77	15.15	15.43
Domain Road/ Papamoa Beach Road: Sunrise Avenue to SH2	North/ Westbound	6.25	6.11	5.71
	South/ Eastbound	6.42	6.58	6.23

4.2. TRAFFIC MODELLING

4.2.1. MODELLING METHODOLOGY

Modelling of the road network is necessary to determine the amount of traffic which would use a changed road network, to estimate the distance which would be travelled, and also the time taken by motorists while travelling each of the options considered. The model can also indicate the parts of the road network affected by any proposals, and for possible changes in accidents and travel times.

The distance travelled and time taken to travel would change according to different road network scenarios, as motorists change their routes to get to a certain destination by the best possible route. BCHF have developed a transportation model for the years 1997, 2001, 2006, 2011, 2016, 2021, 2031, 2041 and 2051 with associated 1 hour origin-destination matrices for each of the morning peak, interpeak, evening peak and off peak periods. The modelled roading network extends from the Paengaroa Intersection to Te Maunga and includes SH2, Domain Road and Papamoa Beach Road, as shown in the modelled network in Figure 4.2. The surveyed trip demand area covered a wider area, incorporating Tauranga, in order that growth predictions in the Tauranga area could be applied to non-through traffic.

The Traffic Model Development and Validation Report, March 1998 describes the development of the model including the matrices and roading network.

4.2.2. FUTURE LAND USE

The land use predictions detailed in the Traffic Model Development and Validation Report, April 1998 (revision 2) have been provided by TDC and WBoPDC and are generally based on household predictions. Some areas including the Tauranga CBD have been assumed to grow at a constant rate, commensurate with the observed growth in industry/commerce of 2.4% per annum. Other areas are considered as potential development sites for industry, including the area to the north of Bell Road, expansion of the Te Puke industrial area and close to the Paengaroa Intersection at Rangiuru. These areas have been considered on an isolated basis, and in conjunction with Wasley Consultants, a prediction of the likely land use has been developed. The trip rate and distribution of trips from these areas has been assumed to be similar to that currently occurring within the Te Puke industrial area.

Future year matrices cannot be validated against observed traffic flows, however the application of the various growth rates to the planning area units and the external zones has been validated against traffic counts growthed up to a future year using the combined growth rates at key locations. The resulting growth rates for traffic flows on SH2 either side of Te Puke and to the east of the Te Maunga Intersection are shown in Table 4.5. The modelled growth rate in trips indicates that the growth assumptions used in the model are quite conservative in comparison with current trends, the PEM advises a 3% growth rate for strategic rural areas.

TEART Option 10, 1997

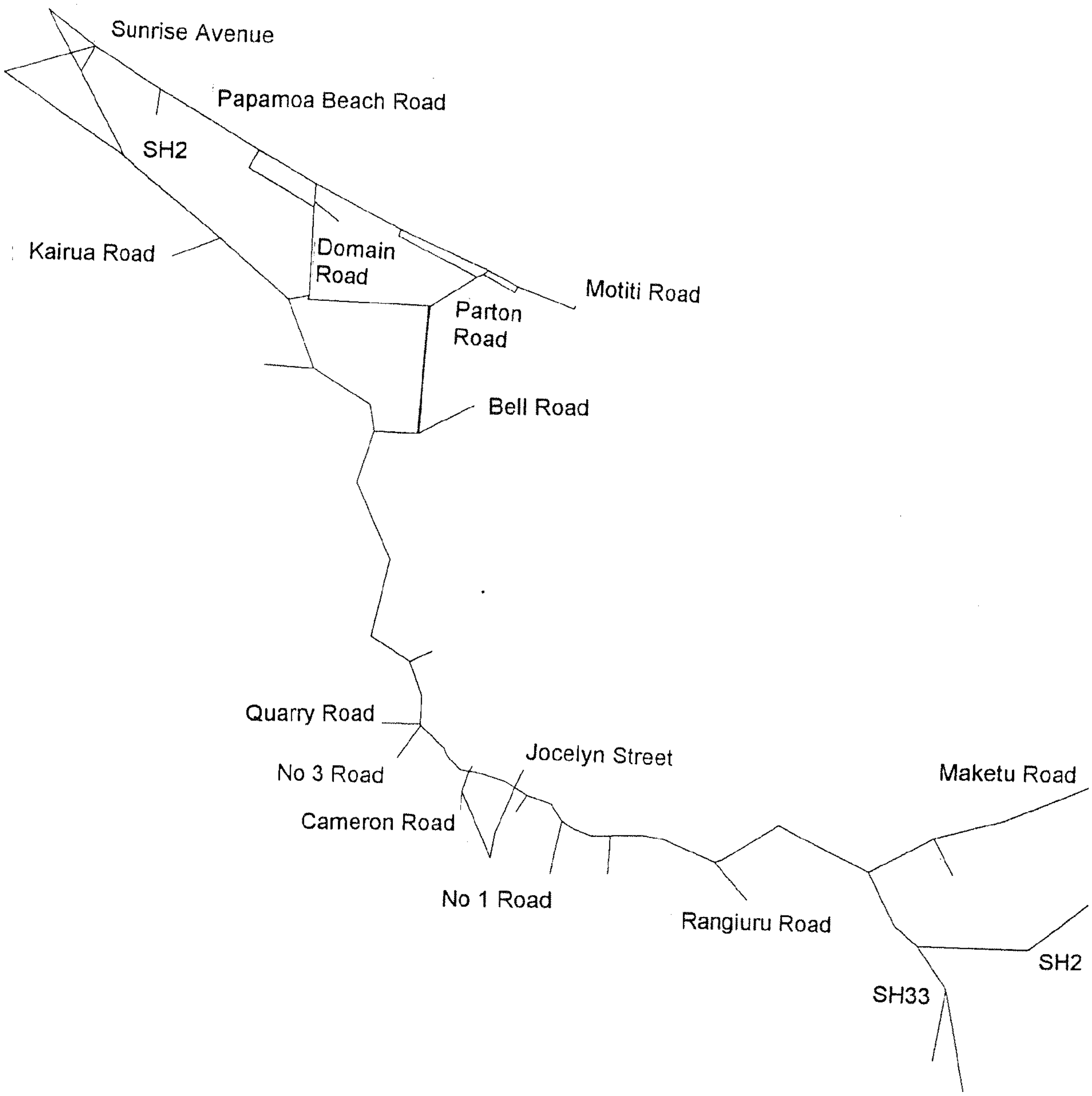


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Figure 4.2 Modelled Roading Network

Table 4.5 Modelled AADT Flows with Growth Per Annum - Do Minimum Network

		1997	2001	% pa from 1997	2006	% pa from 2001	2011	% pa from 2006	2016	% pa from 2011	2021	% pa from 2016	2031	% pa from 2021	2041	% pa from 2031	2051	% pa from 2041
SH2, Kopura Canal	Northbound	7070	7866	2.8%	9714	4.7%	11398	3.5%	13424	3.6%	15408	4.9%	17788	1.5%	19732	1.1%	21748	1.0%
SH2, Kopura Canal	Southbound	7063	7781	2.5%	9571	4.6%	11334	3.7%	13146	3.2%	15345	4.9%	17657	1.5%	19633	1.1%	21594	1.0%
SH2, east of Te Maunga Roundabout	Westbound	7578	8479	3.0%	9595	2.6%	10686	2.3%	11881	2.2%	13000	3.0%	14711	1.3%	16217	1.0%	17734	0.9%
SH2, east of Te Maunga Roundabout	Eastbound	7629	8473	2.8%	9618	2.7%	10757	2.4%	11940	2.2%	13244	3.1%	15042	1.4%	16721	1.1%	18360	1.0%
Papamoa Beach Road	Westbound	6159	7216	4.3%	8695	4.1%	10144	3.3%	11552	2.8%	13280	4.8%	15423	1.6%	17787	1.5%	20220	1.4%
Papamoa Beach Road	Eastbound	6447	7566	4.3%	8994	3.8%	10394	3.1%	11771	2.6%	13254	4.4%	15352	1.6%	17608	1.5%	19970	1.3%
Domain Road	Northbound	2013	2282	3.3%	3257	8.5%	4263	6.2%	5156	4.2%	6133	8.5%	7236	1.8%	7819	0.8%	8523	0.9%
Domain Road	Southbound	1850	2107	3.5%	3096	9.4%	4050	6.2%	5002	4.7%	5809	8.9%	6709	1.5%	7490	1.2%	8280	1.1%
Tara Road	Westbound	618	710	3.7%	754	1.2%	912	4.2%	1017	2.3%	1340	4.9%	2219	6.6%	2615	1.8%	2712	0.4%
Tara Road	Eastbound	439	486	2.7%	538	2.1%	631	3.5%	906	8.7%	1052	5.8%	1770	6.8%	2665	5.1%	3262	2.2%
SH2, east of Paengaroa Intersection	Eastbound	2722	3183	4.2%	3630	2.8%	3963	1.8%	4441	2.4%	4971	3.4%	5711	1.5%	6422	1.2%	7109	1.1%
SH2, east of Paengaroa Intersection	Westbound	3249	3786	4.1%	4302	2.7%	4693	1.8%	5238	2.3%	5838	3.3%	6733	1.5%	7552	1.2%	8389	1.1%
SH33, south of Paengaroa Intersection	Southbound	2734	3028	2.7%	3375	2.3%	3808	2.6%	4275	2.5%	4695	3.0%	5349	1.4%	6014	1.2%	6663	1.1%
SH33, south of Paengaroa Intersection	Northbound	2468	2742	2.8%	3109	2.7%	3533	2.7%	3915	2.2%	4382	3.2%	5034	1.5%	5607	1.1%	6218	1.1%
Maketu Road	Northbound	1213	1324	2.3%	1516	2.9%	1712	2.6%	1940	2.7%	2148	3.2%	2512	1.7%	5016	10.0%	6450	2.9%
Maketu Road	Southbound	1027	1139	2.7%	1306	2.9%	1500	3.0%	1683	2.4%	1884	3.5%	2181	1.6%	4504	10.7%	5831	2.9%

4.2.3. TRIP ASSIGNMENT, CONVERGENCE, MODEL CALIBRATION AND VALIDATION

The Traffic Model Development and Validation Report, April details the trip assignment procedures, development of speed flow curves and model calibration and validation. This report was reviewed by John Bolland of Kingston Morrison (Wellington) and his comments were incorporated in the final report.

4.2.4. DEVELOPMENT OF THE OPTIONS

Base Network

Minor and committed works have been included in the do minimum option. These would provide relief from bottlenecks which could otherwise unduly contribute to the benefits of one of the proposed options. The following works have therefore been included in the do minimum network, with the year of inclusion stated:

- Passing Lanes - N2, N3, S1 and S2 as defined in the Te Maunga - Te Puke Passing Lanes Study, January 1998.
- Upgrade to SH2/Domain Road intersection - roundabout.
- Improvements to SH2/Cameron Road I/C - signals.

The coding of the intersections was checked and calibrated to ensure realistic intersection capacities were being modelled.

Bypass Options

The Sandhill Route, Alternative Route (Option A3) and the Swamp Route (Option B) all include the base network with the following projects, possibly included in staged development:

- 2 lanes from Domain Road to Paengaroa Intersection, including intersection upgrades at Domain Road and Paengaroa and an intersection at Bell Road.
- 4 lanes from Te Maunga to Domain Road
- 4 lanes from Domain Road to Bell Road, 2 lanes from Bell road to Paengaroa
- 4 lanes from Bell Road to Paengaroa.

Option C (Existing Alignment)

This option includes the base network with the following projects possibly included in staged development:

- Passing lanes N1, N4, S3
- Upgrade Paengaroa Intersection to a roundabout
- SH2: 4 lanes from Te Maunga to Domain Road

- SH2: 4 lanes from Domain Road to Te Puke
- Widen SH2 with improvements through Te Puke
- SH2: 4 lanes from Te Puke to Paengaroa and upgrade Paengaroa Intersection

With 8 future years being modelled, the various stages of the options have been included in those years either side of their assumed opening date so that the results can be interpolated for the years between the modelled years.

4.3. RESULTS OF THE TRAFFIC MODELLING

4.3.1. MODELLED TRAFFIC FLOWS

The traffic flows on the road network for the do minimum and option scenarios for each of the modelled years have been used in the economic analysis. Appendix B includes modelled 1 hour traffic volumes for the do minimum and Options A3 and B for the years 2011 and 2021, for the morning peak, interpeak, evening peak and off peak periods.

The modelled traffic flows on certain links are shown in Table 4.6 (overleaf) for each option. These are indicated by morning peak period (AM), interpeak (IP) and evening peak (PM). The modelled volumes are for the 5 weekdays, and do not include weekends.

4.3.2. MODELLED TRAVEL TIMES

Table 4.7 provides the modelled travel times between Domain Road intersection with SH2 and the Paengaroa Intersection, in vehicle-minutes for each 1 hour modelled period.

Table 4.7 Modelled Travel Times (minutes)
SH2: Domain Road to Paengaroa Intersection

	AM Peak		Inter Peak		PM Peak	
2001	eastbound	westbound	eastbound	westbound	eastbound	westbound
Base Network	15.38	15.38	15.12	15.40	15.69	16.23
Option A3 (Alternative Route)	9.12	9.11	9.12	9.16	9.16	9.18
Option B (Swamp Route)	9.03	9.00	9.03	9.03	9.05	9.07
Option C (Existing Route)	14.34	14.49	14.27	14.50	14.47	14.78
2011						
Base Option	16.05	16.57	15.67	16.13	18.53	18.65
Option A3 (Alternative Route)	9.17	9.16	9.16	9.18	9.23	9.23
Option B (Swamp Route)	9.04	9.03	9.06	9.07	9.11	9.13

Option C (Existing Route)	14.68	14.86	14.49	14.77	14.93	15.13
2021						
Base Option	19.57	25.77	16.88	18.54	38.54	28.31
Option A3 (Alternative Route)	9.22	9.21	9.24	9.26	9.30	9.31
Option B (Swamp Route)	9.11	9.11	9.13	9.14	9.20	9.20
Option C (Existing Route)	15.06	15.23	14.79	15.08	15.81	16.83
2041						
Base Option	44.11	43.53	25.61	30.41	80.00	72.88
Option A3 (Alternative Route)	9.40	9.29	9.33	9.38	9.41	9.48
Option B (Swamp Route)	9.26	9.18	9.21	9.25	9.30	9.37
Option C (Existing Route)	16.27	15.96	15.34	15.63	17.71	18.02

Table 4.6 Modelled Average 1 Hour Traffic Volumes

		Base Network				Option A3 (Alternative Route)				Option B (Swamp Route)				Option C (Existing Route)			
Location		2001	2011	2021	2041	2001	2011	2021	2041	2001	2011	2021	2041	2001	2011	2021	2041
SH2, north of Te Puke (south of Kopura Canal Bridge)	AM	1173	1775	2451	3127	749	1208	1735	1970	749	1207	1728	1936	1173	1775	2451	3127
	IP	1066	1562	2121	2721	552	898	1283	1475	552	896	1281	1460	1066	1562	2121	2721
	PM	1438	2102	2851	3657	787	1246	1769	2018	787	1244	1765	1983	1438	2102	2851	3657
	OFF	589	804	1054	1342	313	461	629	727	313	460	627	718	589	804	1054	1342
	AADT	15650	22730	30750	39370	8510	13510	19150	21960	8510	13490	19110	21670	15650	22730	30750	39370
SH2, east of Te Maunga	AM	1291	1652	2016	2497	1291	1652	2038	2568	1291	1652	2038	2568	1291	1652	2038	2576
	IP	1138	1448	1795	2276	1138	1448	1795	2266	1138	1448	1795	2266	1138	1448	1795	2266
	PM	1547	1977	2468	3101	1547	1977	2456	3105	1547	1977	2456	3105	1547	1977	2456	3105
	OFF	658	805	976	1223	658	805	976	1223	658	805	976	1223	658	805	976	1223
	AADT	16950	21440	26440	33280	16950	21440	26460	33360	16950	21440	26460	33360	16950	21440	26460	33380
SH2, east of Te Puke	AM	1126	1461	1831	2575	702	894	1115	1418	702	893	1108	1384	1126	1461	1831	2575
	IP	1057	1350	1690	2326	543	686	852	1080	543	684	850	1065	1057	1350	1690	2326
	PM	1387	1784	2238	3103	736	928	1156	1464	736	926	1152	1429	1387	1784	2238	3103
	OFF	646	790	956	1280	370	447	531	665	370	446	529	656	646	790	956	1280
	AADT	15670	19910	24780	34080	8540	10690	13180	16670	8540	10670	13130	16380	15670	19910	24780	34080
Papamoa Beach Road (between Sunrise Avenue and Sandhurst Drive)	AM	945	1307	1690	2286	945	1307	1667	2215	945	1307	1667	2215	945	1307	1667	2207
	IP	967	1350	1741	2303	967	1350	1741	2312	967	16350	1741	2312	967	1350	1741	2312
	PM	1261	1775	2286	3059	1261	1775	2298	3055	1261	1775	2298	3055	1261	1775	2298	3055
	OFF	716	979	1235	1640	716	979	1235	1640	716	979	1235	1640	716	979	1235	1640
	AADT	14780	20540	26350	35060	14780	20540	26330	34970	14780	20540	26330	34970	14780	20540	26330	34960
Domain Road (north of SH2)	AM	414	757	1081	1235	421	765	1146	1506	421	757	1136	1512	414	757	1136	1433
	IP	253	516	806	1077	257	522	812	1100	257	516	806	1086	253	516	806	1086
	PM	435	798	1067	1309	436	799	1207	1585	436	798	1206	1614	435	798	1206	1512
	OFF	183	317	468	627	189	322	475	638	189	317	468	627	183	317	468	627
	AADT	4390	8320	12290	15780	4460	8400	12780	17090	4460	8320	12680	17010	4390	8320	12680	16650
SH2, east of Paengaroa	AM	461	573	716	926	461	573	716	926	461	573	716	926	461	573	716	926
	IP	473	590	739	955	473	590	739	955	473	590	739	955	473	590	739	955
	PM	611	777	983	1275	611	777	983	1275	611	777	983	1275	611	777	983	1275
	OFF	301	363	445	574	301	363	445	574	301	363	445	574	301	363	445	574
	AADT	6970	8660	10810	13970	6970	8660	10810	13970	6970	8660	10810	13970	6970	8660	10810	13970
SH33, south of Paengaroa	AM	369	480	598	772	369	480	598	772	369	480	598	772	369	480	598	772
	IP	331	426	538	693	331	426	538	693	331	426	538	693	331	426	538	693
	PM	354	455	564	727	354	455	564	727	354	455	564	727	354	455	564	727
	OFF	166	197	232	293	166	197	232	293	166	197	232	293	166	197	232	293
	AADT	4600	5840	7260	9320	4600	5840	7260	9320	4600	5840	7260	9320	4600	5840	7260	9320
New Alignment. between Paengaroa and Bell Road	AM					424	568	716	1158	424	568	716	1158				
	IP					514	665	838	1247	514	665	838	1247				
	PM					651	856	1083	1639	651	856	1083	1639				
	OFF					276	343	425	616	276	343	425	616				
	AADT					7140	9230	11600	17420	7140	9230	11600	17420				

Table 4.8 indicates the time saved in vehicle minutes for the bypass options A3 (Alternative Route) and B (Swamp Route) and for the option involving widening the existing route.

Table 4.8 Travel Time Saved (minutes)
SH2: Domain Road to Paengaroa Intersection

	AM Peak		**Inter Peak**		**PM Peak**	
2001	eastbound	westbound	eastbound	westbound	eastbound	westbound
Option A3 (Alternative Route)	6.26	6.27	6.00	6.24	6.53	7.05
Option B (Swamp Route)	6.35	6.38	6.09	6.37	6.64	7.16
Option C (Existing Route)	1.04	0.89	0.85	0.9	1.22	1.45
2011						
Option A3 (Alternative Route)	6.88	7.41	6.51	6.95	9.3	9.42
Option B (Swamp Route)	7.01	7.54	6.61	7.06	9.42	9.52
Option C (Existing Route)	1.37	1.71	1.18	1.36	3.6	3.52
2021						
Option A3 (Alternative Route)	10.35	16.56	7.64	9.28	29.24	19
Option B (Swamp Route)	10.46	16.66	7.75	9.4	29.34	19.11
Option C (Existing Route)	4.51	10.54	2.09	3.46	22.73	11.48
2041						
Option A3 (Alternative Route)	34.71	34.24	16.28	21.03	70.59	63.4
Option B (Swamp Route)	34.85	34.35	16.4	21.16	70.7	63.51
Option C (Existing Route)	27.84	27.57	10.27	14.78	62.29	54.86

The bypass options accrue similar time savings, with Option B (the Swamp Route) gaining slightly greater savings than Option A3 (the Alternative Route) due to its shorter length. Option C, comp[rising widening of the existing route, whilst gaining significant savings in the later years of the evaluation, shows little savings in the initial years.

5. ACCIDENT ANALYSIS

5.1. METHODOLOGY

The methodology used in the accident analysis was to calculate accident rates on key routes and at key intersections, and was based on the assumption that the change in accident numbers and hence accident costs, is directly proportional to the change in traffic flow.

All the key routes where a significant change in traffic flows was expected were included in the analysis. Homogenous routes were selected based on the road environment, speed limit, traffic flows and on the expected impact of each project. Key intersections were analysed separately. Figure 5.1 indicates the routes and intersections analysed.

5.2. CALCULATION OF EXISTING ACCIDENT RATES

The number of reported accidents on each route and intersection between 1992 and 1996 was determined from the LTSA's Accident Investigation System. Accidents recorded at minor intersections were included in the accident rates on the adjacent routes. A listing of the crashes which numbers the accident in relation to the links and intersections shown in Figure 5.1 is given in Appendix C.

Because observed traffic flow information was not available for every link in the network, the accident rates were determined from the modelled 1997 existing network flows. Subsequently the rates calculated are not true 'existing accident rates' but rather estimated 1997 rates, used only for comparing the effects of the option networks. The accident rates on the routes were determined as a function of the route length, recorded 1992-1996 accident history, and the two-way total daily flow. The daily flows on each link were calculated from factored sums of the four modelled periods (am, ip, pm and off peak). Accident rates at intersections were determined as a function of the accident history and the total inflow at the intersection. Intersection accidents were determined from the accident type, location and a subjective assessment of the cause of the accident. For example, rear end accidents some distance from the intersection were attributed to the intersection rather than the route.

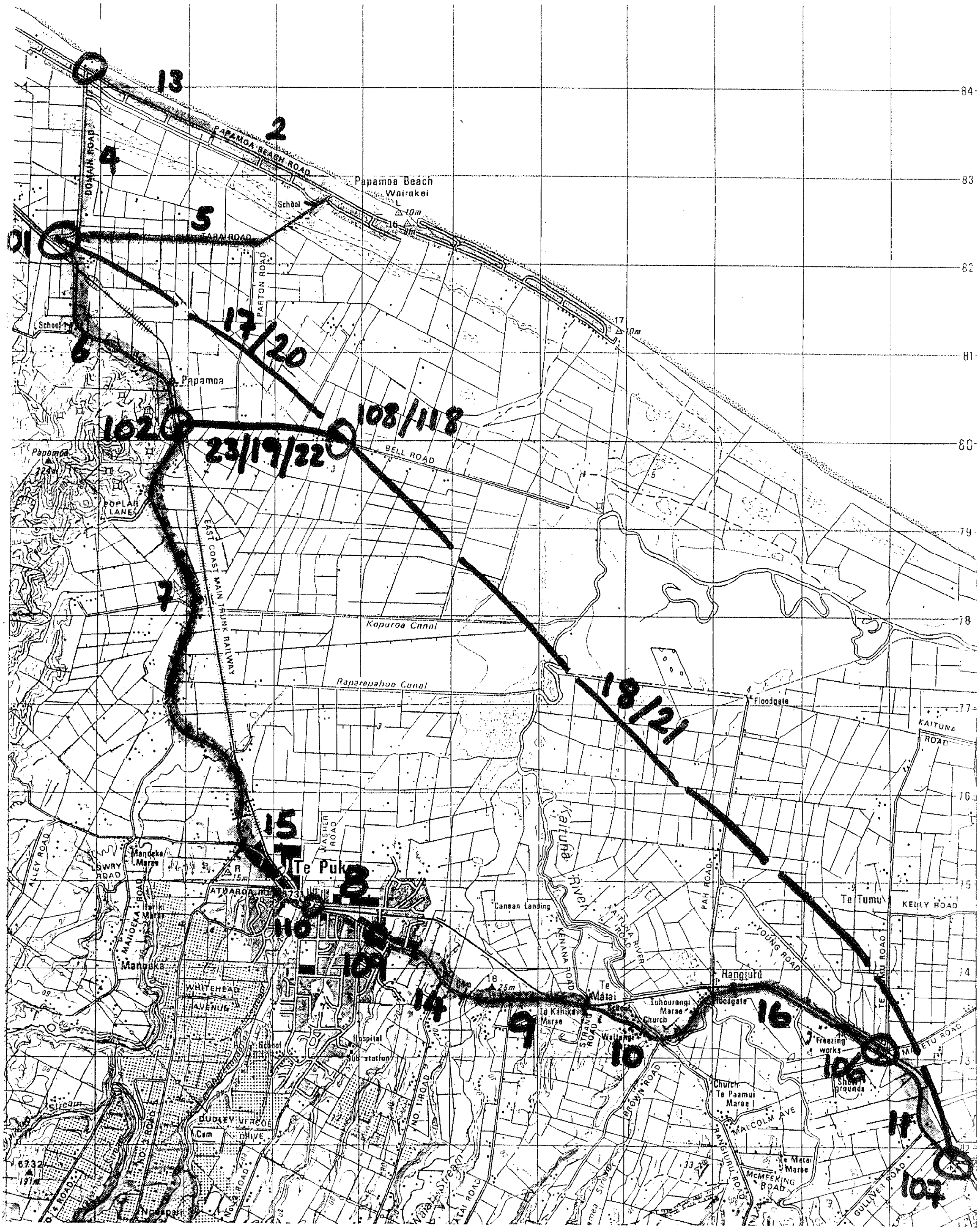


Figure 5.1 Road Sections included in Crash Analysis

Accident rates for only injury accidents were determined, as per the PEM procedures for accident rate analysis. In total, some 269 reported accidents were analysed. The calculation of the existing accident rates is contained in Appendix C.

Rates for new intersections were based on the typical intersection injury accidents from the PEM. The rates used for the new or upgraded intersections are summarised in Table 5.1.

Table 5.1 Assumed Accident Rates at New Intersections

	Assumed Injury Rate per 10^6 veh
3 Arm Roundabout	0.042
4 Arm Roundabout	0.115
4 Arm Signalised Intersection	0.134

5.3. CALCULATION OF ACCIDENT COSTS

The network-wide accident costs for the base, and certain stages of the options were determined from the calculated and predicted rates and the modelled flows for each of the modelled years. For the purposes of route selection, not all the stages of each option were calculated as it was considered that certain stages would represent the future accident costs of other similar projects.

Accident rates and costs for injury accidents were evaluated in the economic analysis. Standard costs per injury accident were obtained from Table A6.10 of the PEM (February 1996 amendment). The unit costs used in the analysis are shown in Table 5.2.

Table 5.2 - Assumed Unit Accident Costs ($1994/accident)

Speed Limit (kph)	Injury Accidents
50	$194,000
60	$194,000
70	$314,000
80	$514,000
100	$514,000
100 Remote	$831,000
100 Motorway	$227,000

Source: PFM2, First Revision

6. ECONOMIC ANALYSIS

6.1. INTRODUCTION

The economic evaluation has been undertaken in accordance with the procedures outlined in the PEM (PFM2, First Revision) to firstly identify the favoured alignment and secondly to determine the Benefit Cost Ratio (BCR) for the favoured alignment.

A fifty year analysis period was used to determine the logical order of project construction for each corridor with a FYRR determining when each option within a project would become viable. However, in many cases, the increase in benefits over the analysis period was found to be exponential rather than linear, resulting in a 25 year benefit cost ratio reaching the current cut-off of 4 earlier than the FYRR reached 36%. Where this occurred, it was assumed that the project would be implemented when the 25 year BCR reached 4. An incremental benefit cost ratio analysis between the options was used to determine the favoured overall option.

The route choice analysis period starts at time zero, 1 July 1998, and comprises a 50 year evaluation from 1 July 1998 to 30 June 2048. A 10% discount factor was used in the analysis.

The BCR analysis period starts at time zero, 1 July 1998, and comprises a 25 year evaluation from the earliest date that major costs could occur, being 1 July 1998. The evaluation period is therefore 1 July 1998 to 30 June 2023. Both a 7% and 10% discount factor were used in the analysis.

Both analyses include the cost values of capital and maintenance, and benefits arising from user costs comprising travel time, vehicle operating costs, crash costs and the values associated with the intangible benefits determined by Opus International Consultants, McDermott Fairgray and Valuation Technologies. These intangible benefits include the willingness of Te Puke residents to pay for improvements and were values accepted by Transit and Transfund. BCHF were instructed to include them in the economic analysis of the Eastern Arterial, a letter to Colin Crampton from Opus International Consultants indicating these benefits to be $229,000 per annum is included in Appendix D.

The traffic models described in Section 4.2 provided the basis for determining the user costs. Traffic models for the do minimum and other options were developed for four daily periods (morning peak, evening peak, interpeak and off-peak periods) and for nine points in time, ie. the years 1997, 2001, 2006, 2011, 2016, 2021, 2031, 2041 and 2051.

Annual user costs were calculated for these years, and a year by year time stream of annual costs developed by interpolation of each years' results. The capital costs over the evaluation period were discounted to the base date of 1 July 1997, resulting in a Net Present Value (NPV) for each option.

The following sections detail the analysis of the benefits included in the economic analysis and the identification of the favoured alignment.

6.2. TRAVEL TIME COST CALCULATION

Travel time costs were derived directly from the traffic models and calculated separately for link travel times (uninterrupted travel along a link), and turn times (turn delays at intersections). The travel time cost for each link and turn was assessed based on a rural strategic link type. The unit costs for standard traffic mixes, occupant time, and vehicle and freight time combined have been obtained from Table A3.3 of the PEM and are detailed in Table 6.1.

Table 6.1 - Travel Time Unit Costs ($/hr, 1994)

Road Type	AM	MIDDAY	PM	OFF
Urban Arterial	13.4	16.6	12.8	13.9
Urban Industrial	18.4	18.4	18.4	18.4
Urban Other	14.2	14.2	14.2	14.2
Rural Strategic	**22.2**	**22.2**	**22.2**	**22.2**
Rural Other	21.0	21.0	21.0	21.0

In order not to prejudice roads considered to carry rural strategic traffic compared to urban traffic, the rural strategic travel time unit costs were used for all traffic.

In the economic evaluation, the travel time costs were updated to 1997 costs by applying a factor of 1.06.

6.3. VEHICLE OPERATING COST CALCULATION

Two components of vehicle operating costs were calculated in the analysis; running costs, and idle costs while at a stop. Running costs were applied to the assessed links in the traffic model, based on the link type and travel speed. Idle costs while at a stop were applied to the modelled turn delays. The standard unit rates ($1994), detailed in the PEM were used and updated to 1997 costs by applying a factor of 1.05.

6.4. ACCIDENT COST CALCULATION

Accident costs were estimated for key routes and intersections, based on an accident rate analysis. Accident rates were calculated on selected accident routes and intersections, based on the reported accident history between 1991-1995 (previously described in Section 5). Due to the lack of sufficient observed traffic flow in certain locations, the accident rates used were based on the modelled 1997 Do Minimum flows, rather than observed 1997 flows. Accident costs for each option were calculated based on the estimated 1997 rates, and future year modelled flows. This methodology is based on the assumption that accident frequencies are directly proportional to the traffic flows (two-way daily flows for links and total daily in-flow for intersections). While this assumption may not strictly be valid, this methodology is recommended in the PEM and in an analysis such as this, gives a valid estimate of the effect of the project on network-wide accident.

The calculation of the existing accident rates and predicted rates at new locations, has been previously detailed in Section 5.

The accident costs ($1994) were updated to 1997 costs by applying a factor of 1.06.

6.5. CAPITAL COSTS

Engineering cost estimates for the projects are contained in Appendix A. The construction costs used in the analysis are summarised in Section 3, Table 3.1.

6.6. MAINTENANCE COSTS

Maintenance costs were not assessed network-wide as such costs would be very difficult to assess, and the effect of options on the maintenance costs of existing roads would be difficult to gauge. The maintenance costs detailed in Section 3.4.2 were used as an indication of the maintenance costs, over and above those for the base case, incurred by each project.

6.7. CALCULATION OF ANNUAL USER COSTS

Typical weekday and weekend daily flow profiles, shown previously in Graph 1, were developed for the study area based on traffic counts undertaken on SH2, south of Kopura Canal Bridge. Factors to estimate the predicted Annual Daily Traffic (ADT) from the four modelled periods were derived from the 7-day profile. The assumed ADT factors are indicated in Table 6.2.

Table 6.2 ADT Factors

Period	Average Hour From:	Contribution	ADT Factor
AM	0700-0900	15.3%	2
IP	0900-1600	47.6%	7
PM	1600-1800	18.5%	2
OFF	1800-2030	18.6%	5.03

Estimated link ADTs were subsequently calculated by summing the peak period flows weighted by the above factors.

In estimating factors for calculating annual costs from the peak costs, it was assumed that the am and pm peak periods occurred for 2 hours of each working day (0700-0900 and 1600-1800) and the ip period occurred for 7 hours (0900-1600), with the off-peak period providing the 13 remaining hours (1800-0700) of each working day. A typical year was assumed to include 245 working days. For the weekend profile, an 11-hour period was assumed (0800-1900) to be equivalent to 11.8 average-hour weekday interpeak periods, with the factoring representing the small difference between the weekday and weekend average peak flow levels. The remainder of the weekend period (1900-0800) was assumed to be equivalent to 13.4 average-hour off-peak weekday periods. The calculation of the annual factors is detailed in Table 6.3.

Table 6.3 Annual Factors

	Weekday		Weekend		Annual
Period	Hours/day	Days/year	Periods/day	Days/year	Periods/year
AM	2	245	0	0	490
IP	8	245	11.8	120	3,371
PM	2	245	0	0	490
OFF	12	245	13.4	120	4,542

6.8. TIME STREAM OF COSTS

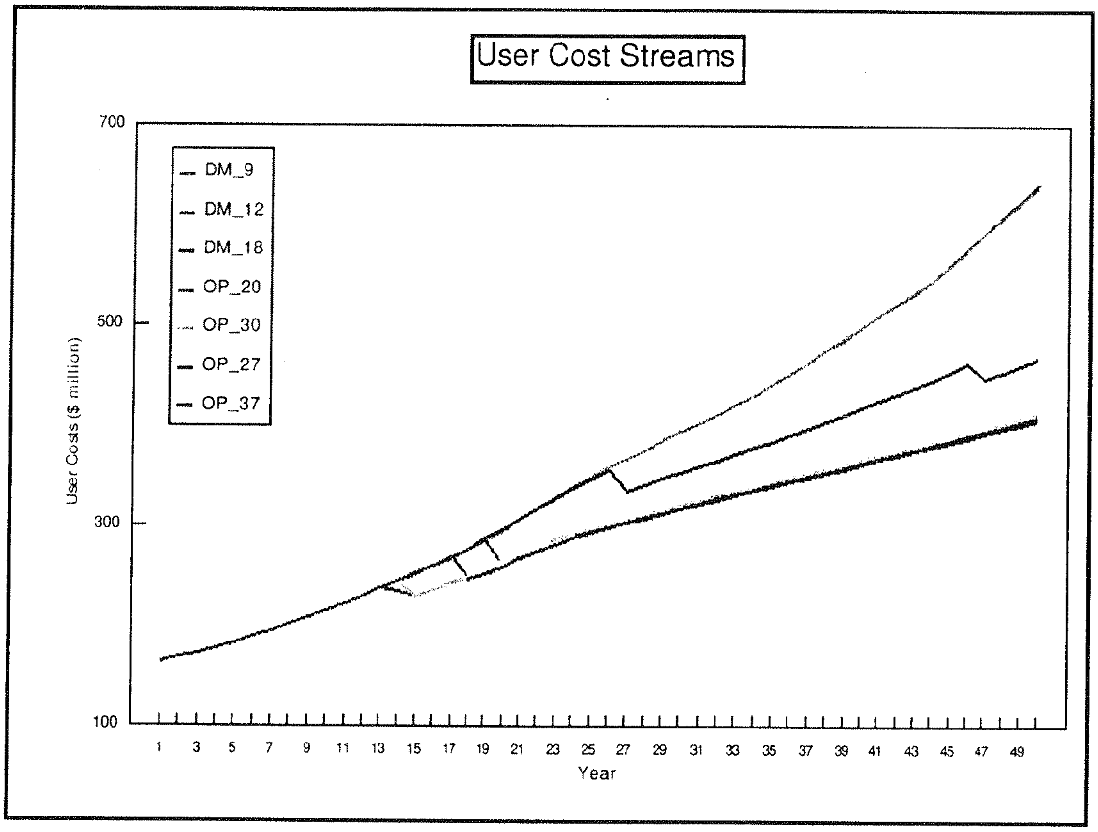
The **Base Date** for the analysis is 1 July 1997 with **Time Zero** as 1 July 1998. The 50 year analysis period was assumed to be 1 July 1998 to 30 June 2048.

Annual costs for every year in the evaluation period were calculated from each of the modelled years' results for each option. Annual costs between modelled years were determined by interpolation of the intervening modelled results. As various stages of each option were completed, the benefits from these works and their associated interpolated results were included in the benefit-cost stream.

The assumed time stream of user costs (travel time, vehicle operating and accident costs), for some of the projects included in the 50 year strategy study, is shown in Graph 6. The difference between the time streams for the do minimum and each option gives the benefit of the project.

Appendix E details the time stream of capital costs and user costs and benefits compared to the base option for each proposed option.

Graph 6 Time Stream of User Costs



Note: DM_9:	Existing Network
DM_12:	Base Network - ie existing network plus passing lanes N1, N3, S1 and S2 constructed in year 1, Domain Road roundabout and Cameron Road signals implemented in year 8.
DM_18	Base network plus passing lanes N1, N3 and S3 constructed in year 13, SH2/SH33 roundabout, Maketu Rd Roundabout, Collins Rd roundabout and Bell Rd roundabout constructed in year 18, 4 laning of SH2 between Te Maunga and Domain Road constructed in year 19, 4 laning SH2 between Domain Road and Te Puke and improvements through Te Puke implemented in year 26 and 4 laning SH2 between Te Puke and Paengaroa constructed from year 46.

OP_20	Base network plus 2 laning of the Alternative Route (Option A3) between Domain Road and Paengaroa, with at grade intersections, implemented in year 13.5, 4 laning SH2 between Te Maunga and Domain Road in year 24.
OP_30	Base network plus 2 laning of the Swamp Route (Option B) between Domain Road and Paengaroa, with at grade intersections, implemented in year 14, 4 laning SH2 between Te Maunga and Domain Road in year 25.
OP_27	Base network plus 4 laning of the Alternative Route (Option A3) between Domain Road and Paengaroa, with grade separated intersection, and 4 laning SH2 between Te Maunga and Domain Road implemented in year 17.
OP_37	Base network plus 4 laning of the Swamp Route (Option B) between Domain Road and Paengaroa, with at grade intersections, and 4 laning SH2 between Te Maunga and Domain Road implemented in year 19.

6.9. STAGING OF PROJECTS WITHIN AN OPTION

The 50 year strategy study investigated the bypass options as well as widening of the existing road. An initial analysis was undertaken to compare the Sandhill Route and the Alternative Route (Option A3). With the Sandhill Route being longer and more costly than the Alternative Route but within the same "corridor", only the Alternative Route was included in the strategy study.

The criteria for when a project would become economically viable assumed this occurred when the project had a 25 year benefit cost ratio (B/C) of 4. Table 6.4 indicates the years in which the projects within each strategy would become viable. Some facilities were assumed to be required for traffic management, safety, social and environmental reasons rather than being strictly justified by their B/C, for example the installation of a signalised intersection at SH2/Cameron Road in Te Puke, and the installation of a roundabout at SH2/Domain Road.

Table 6.4 Projects Included In Each Strategy

STRATEGY	OPENING YEAR
Strategy I (Option C)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Passing Lanes N1, N4 and S3	2010
Then install roundabout at SH2/SH33 intersection	2015
Then include widening SH2 from Te Maunga to Domain to 4 lanes	2016
Then include widening SH2 from Domain through Te Puke to 4 lanes	2023
Then include widening SH2 from Te Puke to Paengaroa to 4 lanes	2043

Table 6.4 Projects Included In Each Strategy

STRATEGY	OPENING YEAR
Strategy II (Option C)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Passing Lanes N1, N4 and S3	2010
Then install roundabout at SH2/SH33 intersection	2015
Then include widening SH2 from Domain through Te Puke	2023
Then include widening SH2 from Te Maunga to Domain to 4 lanes	>2047
Then include widening SH2 from Te Puke to Paengaroa to 4 lanes	>2047
Strategy III (Option A3)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Option A3 (Alternative Route) with 2 lanes, at grade intersections	2011
Then widen SH2 from Te Maunga to Domain to 4 lanes	2021
Then widen Bypass between Domain and Bell to 4 lanes	>2047
Strategy IV (Option B)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Option B (Swamp Route) with 2 lanes, at grade intersections	2011
Then widen SH2 from Te Maunga to Domain to 4 lanes	2022
Then widen Bypass between Domain and Bell to 4 lanes	>2047
Strategy V (Option A3)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Option A3 (Alternative Route) with 2 lanes, grade separated intersections	2012
Then widen SH2 Te Maunga to Domain to 4 lanes	2022
Then widen Option 2 between Domain and Bell to 4 lanes	>2047
Strategy VI (Option B)	
Existing	
Then add in Passing Lanes N2, N3, S1, S2	1998
Then include Cameron Road Signals	2005
Then include Domain Road roundabout	2005
Then construct Option B (Swamp Route) as 2 lanes, grade separated intersections	2011
Then widen SH2 between Te Maunga and Domain to 4 lanes	2022
Then widen Option B from Domain to Bell to 4 lanes	>2047

Table 6.4 Projects Included In Each Strategy

STRATEGY	OPENING YEAR
Strategy VII (Option A3)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Option A3 (Alternative Route) with 4 lanes, grade separated intersections	2014
Strategy VIII (Option B)	
Existing	
Then construct Passing Lanes N2, N3, S1, S2	1998
Then install signalised intersection at SH2/Cameron Road	2005
Then install roundabout at SH2/Domain Road	2005
Then construct Option B (Swamp Route) with 4 lanes, grade separated intersections	2016

6.10. INCREMENTAL ANALYSIS FOR STRATEGIES

An incremental analysis of the total 50 year present value of user costs and capital costs was undertaken and indicated that the optimal strategy was Strategy III (incorporating Option A3), based on a critical incremental benefit cost ratio of 3. This strategy includes the Alternative Route (Option A3) with at grade intersections built as a staged project. Strategy V (incorporating Option A3) also involves staged construction of the Alternative Route (Option A3) , but with grades separated intersections. Strategy III has an incremental benefit cost ratio of 3.3 compared to Strategy V. The following table provides a summary of the incremental analysis.

Table 6.5 Incremental Analysis

						Incremental		
Least Cost Option	**Benefits $ million**	**Costs $ million**	**Next Option**	**Benefits $ million**	**Costs $ million**	**Benefits $ million**	**Costs $ million**	**BCR**
Strategy II (Option C)	40	10	Strategy I (Option C)	46	11	6	2	3.4
Strategy I (Option C)	46	11	Strategy VIII (Option B)	117	23	70	12	6.0
Strategy VIII (Option B)	117	23	Strategy VII (Option A3)	127	24	10	0	21.1
Strategy VII (Option A3)	127	24	Strategy V (Option A3)	137	24	10	1	10.8
Strategy V (Option A3)	137	24	Strategy IV (Option B)	137	25	(0)	1	-0.4
Strategy V (Option A3)	137	24	Strategy III (Option A3)	141	26	4	1	3.3
Strategy III (Option A3)	141	26	Strategy VI (Option B)	141	27	(0)	1	-0.3
Strategy III (Option A3)	141	26						

6.11. BENEFIT COST ANALYSIS

The Sandhill Route, Swamp Route (Option B), Existing Route (Option C) and Alternative Route (Option A3) were all analysed to determine their benefit cost ratios over an analysis period comprising 25 years from 1 July 1998 to 30 June 2023. The base option was assumed to include committed works and intersection upgrades where the options being investigated would otherwise gain significant benefits from such works. The committed works are assumed to include the passing lanes N2, N3, S1, S2 and signals at the SH2/Cameron Road intersection in Te Puke, and a roundabout at the SH2/Domain Road intersection.

Based on the costs of a 2 or 4-lane expressway with a 9m grassed median, the costs and benefit cost ratios of the options (excluding the Te Maunga to Domain Road sections were calculated as follows:

Table 6.6 Summary of Benefit Cost Ratio

Option	**Cost $ million**	**B/C Ratio**
Sandhill Route (4 lanes)	115	1.1
Swamp Route (4 lanes) (Option B)	112	1.5
Alternative Route (4 lanes) (Option A3)	99	1.8
Existing Route (4 lanes) (Option C)	159	0.2
Alternative Route (2 lanes) (Option A3)	83	2.0

Note: B/C ratio of bypass options includes intangible benefits from Te Puke WTP survey and excludes costs and benefits of widening SH2 between Te Maunga and Domain Road.

Table 6.7 details the tangible user cost benefits and capital costs for options A3 and B. Note that capital costs have been evaluated as being in addition to the base option.

Table 6.7 Summary Of Economic Analysis

	User Costs ($ million, NPV)			**Net Present Benefits ($ million, NPV)**	
	Base Option	**Alternative Route Option A3**	**Swamp Route Option B**	**Alternative Route Option A3**	**Swamp Route Option B**
1. Travel Time Costs	937.126	830.185	836.456	106.941	100.670
2. Vehicle Operating Costs	849.748	830.172	830.307	19.576	19.441
3. Accident Costs	129.632	109.397	110.976	20.235	18.656
4. Intangible Benefits: WTP				1.509	1.353
TOTAL USER COSTS	**1916.505**	**1763.634**	**1777.738**	**148.260**	**140.120**
				Net Present Costs ($ million NPV)	
1. Capital Costs				82.384	89.568
2. Maintenance Costs				1.735	1.396
TOTAL CAPITAL COSTS				**84.119**	**90.965**
			BENEFIT COST RATIO:	**1.8**	**1.5**

Note: B/C ratio of bypass options includes intangible benefits from Te Puke WTP survey and excludes costs and benefits of widening SH2 between Te Maunga and Domain Road.

6.12. INCREMENTAL BENEFIT COST RATIO

Compared to the Alternative Route (Option A3), the Swamp Route (Option B) has an incremental B/C ratio of -1.2. An incremental benefit cost ratio of -5.2 was calculated comparing the Alternative Route with the Sandhill Route. This means that for the additional costs, neither the Sandhill Route nor the Swamp Route (B) offer any additional benefits. The Alternative Route (A3) with grade separated intersections is therefore considered to be the most economical, and also offers the advantage that it could be first constructed as a 2 lane facility if required.

6.13. VERIFICATION OF ECONOMIC EVALUATION

The verification of the economic evaluation involved determining the first year benefits of travel time and vehicle operating costs for a bypass option, and comparing it with the results as calculated from the output of the transportation model and economic spreadsheet evaluation.

The travel times and speeds for the base option and one option were deduced from the travel time survey data and judgement to manually calculate the predicted first year benefits. Two options were compared, with and without the bypass, for the predicted opening year of 2011. The journey time and average speed for the section between SH2/Domain and SH2/SH33 were calculated for the base option which includes passing lanes N2, N3, S1 and S2, signalised intersection at SH2/Cameron Road and roundabout at SH2/Domain Road and for the proposed bypass route of Option A3, with 2 lanes and at grade intersections, for each of the study periods. Table 6.8 below shows the predicted journey times and speeds for the two routes.

Table 6.8 2011 Journey Times And Speeds For Base Option and Option A3 (2 lane, at grade intersections)

	Existing SH2 Route		Bypass Route	
Period	**Journey time**	**Average speed**	**Journey time**	**Average speed**
AM	16.21	68	9.91	94
IP	15.79	70	9.97	94
PM	18.40	60	10.13	92
OF	14.71	75	9.72	96

Note: journey times are shown in minutes, speeds are km/hr.

The times shown above for the base option (existing route) journey times in 2011 are larger than those observed during the 1997 floating car surveys and account for the additional traffic in 2011. The 1997 average observed journey times were:

- AM 14.7 minutes;
- IP 15.3 minutes;
- PM 15.6 minutes.

An estimate of the total user benefits was made based on the predicted bypass traffic. It was assumed that benefits attributed to the bypass would account for the majority of the total benefits. Tables 6.9 and 6.10 show the Travel Time and VOC benefits for each of the study periods factored up to the first year benefits.

Table 6.9 Travel Time Benefits From Bypass In First Year

Period	Base Option Journey Time	Bypass Option Journey Time	Travel Time Saved	2 Way Potential Bypass Traffic	Travel Time Cost	Annual Factor	TT Saved
AM	16.21	9.91	6.3	610	$22.20	490	$696,736
IP	15.79	9.97	5.82	700	$22.20	3370	$5,079,871
PM	18.4	10.13	8.27	890	$22.20	490	$1,334,422
OF	14.71	9.72	4.99	360	$22.20	4542	$3,018,922
TOTAL							$10,129,951

Table 6.10 VOC For Existing Route And Bypass In First Year

Period	2 Way Potential Bypass Traffic	Annual Factor	Speed	VOC/ Veh	VOC	Speed	VOC/ Veh	VOC
AM	610	490	68	30.12	$1,657,428	94	30.94	$1,442,683
IP	700	3370	70	30.14	$13,089,558	94	30.94	$11,386,044
PM	890	490	60	30.08	$2,415,003	92	30.84	$2,098,095
OF	360	4542	75	30.24	$9,103,014	96	31.05	$7,920,194
TOTAL					$26,265,003			$22,847,015

The final VOC values shown are based on route distances of 18.41 km for the existing route and 15.6 km for the bypass route. The predicted VOC savings for the first year of the bypass is $3,417,988. The total Travel Time and VOC benefits for the bypass in the first year is $13,547,939.

The total Travel Time and VOC benefits predicted for the equivalent bypass option from the model is $18,264,500, which includes all links in the study network. These figures would suggest that the bypass accounts for approximately 74% of the total benefits on the network. This is considered to be a believable proportion, with the remaining benefits accruing from benefits accrued on the existing network, including at intersections.

7. MAIN INFLUENCING FACTORS IN THE ECONOMIC EVALUATION

7.1. MAIN CONTRIBUTING FACTORS

Table 7.1 details the contribution of each user cost component of the total benefit for each option.

Table 7.1 Contribution of Cost Components to Total Benefit

	Alternative Route Option A3	Swamp Route Option B
Travel Time Costs - Links	70.1 %	69.8 %
Travel Time Costs - Turns	9.4 %	9.9 %
Vehicle Operating Costs - Links	8.8 %	9.1 %
Vehicle Operating Costs - Turns	0.5 %	0.5 %
Accident Costs	11.3 %	10.8 %
Total	100 %	100 %

These proportions are consistent with what would be expected for each of these projects, Option A3 provides a difference in length of 2,435 metres between the intersection at Paengaroa and Domain Road, where as Option B provides a saving of 2,760 metres.

7.2. INFLUENCING FACTORS

7.2.1. MAIN FACTORS

In the course of the modelling, it was found that the main influencing factors for the evaluation of the options was the selection of the do minimum, and the future land use assumptions.

7.2.2. EFFECT OF SELECTION OF DO MINIMUM

The modelled network would experience congestion at several intersections if no improvements were assumed. These problems may be addressed by the relatively minor upgrading of an intersection, and any intersection where significant delays were predicted to occur were therefore assumed to be addressed in order that benefits arising from such works were not attributed to a project. The development of the do minimum network and the improvements assumed have been previously discussed in Section 4.

7.2.3. EFFECT OF LAND USE GROWTH ASSUMPTIONS

The trip demand matrices were developed from data collected from roadside interviews and number plate surveys. Future land use was based on predictions in the growth of households in the WBoPDC and TDC planning area units and the development of industrial areas as predicted by Wasley Consultants.

Should the land use growth assumptions be incorrect, different traffic distributions would result. However, the modelling procedures require that the same traffic distribution is used for the do minimum and option scenarios, and therefore any small change in trip distribution would be unlikely to have a significant effect on the comparative benefits of the options.

7.3. SENSITIVITY TESTS

Due to the large scale of the proposed options, a sensitivity test of the benefits evaluated from the traffic models is essential. Table 7.2 details the sensitivity tests undertaken on the model-based results.

Table 7.2 Sensitivity Tests

		Alternative Route Option A3	Swamp Route Option B
Item	**Change**	**BCR**	**BCR**
No Change	**0 %**	**1.8**	**1.5**
Construction Costs	-20 %	2.2	1.9
	+20 %	1.5	1.3
Accident Benefits	-50 %	1.6	1.4
	+50 %	1.9	1.6
Travel Time Benefits - Links	-50 %	1.2	1.0
	+50 %	2.4	2.1
Travel Time Benefits - Turns	-50 %	1.7	1.5
	+50 %	1.8	1.6
VOC Benefits	-50 %	1.7	1.4

Table 7.2 Sensitivity Tests

		Alternative Route Option A3	Swamp Route Option B
Item	**Change**	**BCR**	**BCR**
Links	+50 %	1.9	1.6
VOC Benefits	-50 %	1.8	1.5
Turns	+50 %	1.8	1.5

The sensitivity tests indicate that the travel time benefits on links are the most influencing factor for both the A3 and B options. Construction costs are also a major contributing factor for both options. The minimal effect of benefits from turns, for both travel time and vehicle operating costs, indicates that there is no undue benefit arising from congested intersections.

7.4. DISCOUNT FACTOR

An additional economic analysis was undertaken with the discount factor assumed to be 7% rather than 10%. This was a requirement of the brief and places more emphasis on the downstream costs and benefits.

In comparison with Table 6.7, and similarly based on the costs of a 2 or 4-lane expressway with a 9m grassed median, the benefit cost ratios of the options (excluding the Te Maunga to Domain Road sections were calculated as follows:

Table 7.3 Benefit Cost Ratios with Discount Factor of 7%

Option	**B/C Ratio**
Sandhill Route (4 lanes)	1.5
Swamp Route (4 lanes) (Option B)	2.1
Alternative Route (4 lanes) (Option A3)	2.4
Existing Route (4 lanes) (Option C)	0.5
Alternative Route (2 lanes) (Option A3)	2.7

Note: B/C ratio of bypass options includes intangible benefits from Te Puke WTP survey.

A lower discount factor of 7% increased the benefit cost ratios of each option, as expected.

8. SUMMARY AND CONCLUSION

- BCHF were commissioned by Transit New Zealand to undertake investigations for the Tauranga Eastern Arterial. As part of this study, traffic modelling and economic evaluation of the options was undertaken. This report details the traffic modelling and economic evaluation of the roading options.
- Traffic models were developed using trip demand data collected during roadside interviews and number plate surveys.
- Four periods (am, interpeak, pm, and off-peak) were modelled for nine points in time, namely 1997, 2001, 2006, 2011, 2016, 2021, 2031, 2041 and 2051. The results from these models were used to develop time streams of costs over a 50 year time period for a strategy study analysis and a 25 year analysis period to determine benefit cost ratios.
- Future year trip demand matrices were developed using the household growth projections in the planning area units defined by WBoPDC and TDC and industrial growth as predicted by Wasley Consultants.
- The options included in the assessment comprised widening the existing route (Option C), the Swamp Route (Option B), the Sandhill Route and the Alternative Route (Option A3).
- Calibration of the 1997 year model involved using floating car travel time survey data and traffic count data, and resulted in a good calibration. The Traffic Model Development and Validation Report was reviewed by Kingston Morrison Ltd.
- Various future intersection improvements were assumed for the do minimum network, in order to avoid 'ballooning' intersection delay giving unrealistically high benefits for a project. Because the models were found to be sensitive to assumptions made for the do minimum network, a conservative approach was taken, which addressed the majority of the potentially congested intersections in the do minimum network.
- A 50 year strategy study was undertaken to investigate the sequencing of options within each strategy. An incremental analysis between the strategies resulted in the strategy which included the staged construction of Option A3 being optimal.
- Option C (widening the existing route) was assumed to comprise construction of passing lanes N1, N4, S3, costing $1.78 million over 1 year, widening SH2 from Domain Road to Te Puke, costing $$60.3 million over 2 years, widening SH2 through Te Puke, costing some $36.8 million over a year and widening SH2 from Te Puke to Paengaroa intersection, costing $53.8 million over 2 years. Costs of $6.25 million (over 2 years) for widening SH2 between Te Maunga to Domain Road are in addition to this cost.

- Option A3 (4 lanes) is assumed to be constructed over a 3 year period at a capital cost of some $99 million. Costs of $6.25 million (over 2 years) for widening SH2 between Te Maunga to Domain Road are in addition to this cost.
- Option B (4 lanes) is assumed to be constructed over a 4 year period at a capital cost of some $112 million. Costs of $6.25 million (over 2 years) for widening SH2 between Te Maunga to Domain Road are in addition to this cost.
- The Sandhill Route (4 lanes) is assumed to be constructed over a 4 year period at a capital cost of some $115 million. Costs of $6.25 million (over 2 years) for widening SH2 between Te Maunga to Domain Road are in addition to this cost.
- Option A3 (2 lanes) is assumed to be constructed over a 2.5 year period at a capital cost of some $83 million.
- An (25 year) economic evaluation was undertaken in accordance with Transfund's Project Evaluation Manual. The detailed evaluation indicated some:
    - $41.7 million of discounted tangible benefits over the 25 year analysis period for Option C (4 lanes) (including benefits from widening SH2, Te Maunga to Domain Road).
    - $146.8 million of discounted tangible benefits over the 25 year analysis period for Option A3 (4 lanes), plus $1.5 million of discounted intangible benefits from the WTP survey (excluding benefits from widening SH2, Te Maunga to Domain Road).
    - $138.8 million of discounted tangible benefits over the 25 year analysis period for Option B (4 lanes), plus $1.4 million of discounted intangible benefits from the WTP survey (excluding benefits from widening SH2, Te Maunga to Domain Road).
    - $101.3 million of discounted tangible benefits over the 25 year analysis period for the Sandhill Route (4 lanes), plus $1.4 million of discounted intangible benefits from the WTP survey (excluding benefits from widening SH2, Te Maunga to Domain Road).
    - $145.5 million of discounted tangible benefits over the 25 year analysis period for Option A3 (2 lanes), plus $1.7 million of discounted intangible benefits from the WTP survey.
- For Option A3 (4 lanes), a discounted net capital cost (including additional maintenance) of some $84.1 million results in a BCR of 1.8.
- For Option B (4 lanes), a discounted net capital cost (including additional maintenance) of some $91.0 million results in a BCR of 1.5.
- For the Sandhill Route (4 lanes), a discounted net capital cost (including additional maintenance) of some $92.8 million results in a BCR of 1.1.
- For Option A3 (2 lanes), a discounted net capital cost (including additional maintenance) of some $74.8 million results in a BCR of 2.0.

- With Option A3 (4 lanes) accruing the most benefits, and being the cheaper option, an incremental analysis comparing the other 4 lane options gave negative incremental benefit cost ratios, confirming that this was the optimal project.
- It was found that almost 70% of the benefits of each bypass option accrued from savings in travel time, with approximately 10% from accident cost savings.
- The evaluation was found to be most influenced by the assumptions used in the definition of the do minimum option. A sensitivity test was used which indicated that the BCR was most sensitive to the capital costs of construction.

TRANSIT NEW ZEALAND

TAURANGA EASTERN ARTERIAL OPTION COMPARISON

ENGINEER'S ESTIMATE

Item	Description	Option Estimates				
		A	AA	A1	A2	A3
1.0	**Establishment @ 7.5%**	4,400,000	8,700,000	4,400,000	4,300,000	4,200,000
2.0	**Earthworks**	0	0	0	0	0
2.1	Demolition and Site Clearance	839,335	734,399	970,663	991,295	989,730
2.2	Topsoil - Strip, stockpile, replace, grass	1,557,360	1,137,598	1,682,650	1,565,180	1,558,920
2.3	Excavate to waste (All used as Bund fill)	594,685	594,685	582,735	545,150	545,150
2.4	Excavate to fill	828,005	828,049	753,665	689,445	689,445
2.5	Import fill and compact	12,872,288	9,661,787	14,650,188	13,840,475	13,778,050
3.0	**Drainage, Farm Access and Fencing**	0	0	0	0	0
3.1	Supply, install and relay culverts	3,549,320	312,620	3,549,320	3,549,320	3,549,320
3.2	Farm access and underpasses	6,516,000	4,556,000	5,976,000	5,776,000	5,776,000
3.3	Fencing	1,214,000	910,500	1,276,400	1,221,200	1,216,315
4.0	**Kerb and Channel**	0	0	0	0	0
5.0	**Safety Barriers**	0	0	0	0	0
5.1	New Jersey Barriers	583,680	4,316,160	506,880	506,880	506,880
5.2	W. Section Guard rail	233,920	175,440	233,920	233,920	210,800
6.0	**Pavement**	0	0	0	0	0
6.1	Supply and place GAP65 sub-base	7,188,250	5,221,000	7,591,500	7,255,500	7,226,500
6.2	Supply and place TNZ M/4 AP40	5,067,075	3,652,220	5,351,450	5,114,525	5,094,050
7.0	**Sealing**	0	0	0	0	0
7.1	Supply and apply two coat chip seal	2,456,384	2,456,384	2,576,420	2,470,160	2,460,150
7.2	Pavement Marking	87,850	87,850	90,190	88,120	87,925
8.0	**Bridges**	0	0	0	0	0
	Overbridge Parton Road	900,000	900,000	900,000	900,000	900,000
	Overbridge Bell Road	1,200,000	0	900,000	900,000	0
	Overbridge Kaituna Road	1,200,000	0	1,200,000	1,100,000	1,100,000
	Overbridge Pah Road	1,250,000	0	1,000,000	1,250,000	1,250,000
	Overbridge Te Tumu Road	1,300,000	1,300,000	1,300,000	1,300,000	1,300,000
	Overbridge Strang Road	0	0	0	0	0
	Overbridge Maketu Road	900,000	900,000	900,000	900,000	900,000
	Underpass ECTM Railway	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000
	Kaituna River Bridge	5,000,000	75,000,000	3,400,000	3,400,000	3,400,000
	Canal Crossing 1	0	0	0	0	0
	Canal Crossing 2	0	0	0	0	0
	Canal Crossing 3	0	0	0	0	0
9.0	**Lighting**	500,000	500,000	500,000	500,000	500,000
10.0	**Silt Control**	100,000	100,000	100,000	100,000	100,000
11.0	**Landscaping**	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
12.0	**Services - Relocation or New**	500,000	500,000	500,000	500,000	500,000
13.0	**Traffic Control**	100,000	100,000	100,000	100,000	100,000
	SubTotal	**63,288,152**	**124,994,692**	**63,341,981**	**61,447,170**	**60,289,235**
14.1	**Contingencies Earthworks @ 25%**	4,172,918	3,239,130	4,659,975	4,407,886	4,390,324
14.2	**Contingencies Other Works @ 15%**	6,989,472	16,805,726	6,705,312	6,572,344	6,409,191
	SubTotal	**74,450,542**	**145,039,548**	**74,707,268**	**72,427,400**	**71,088,750**
15.0	**Engineering Fees @ 12.5%**	9,306,318	18,129,944	9,338,409	9,053,425	8,886,094
16.0	**Land purchase**	13,500,000	13,500,000	14,200,000	13,600,000	13,521,000
	TOTAL ESTIMATE (excl. GST)	**97,256,860**	**176,669,492**	**98,245,677**	**95,080,825**	**93,495,844**
	Length **km**	15.95	15.95	16.73	16.04	15.975
	Cost/m **$/m**	6,098	11,076	5,872	5,978	5,853
	BC					

TRANSIT NEW ZEALAND

TAURANGA EASTERN ARTERIAL OPTION COMPARISON

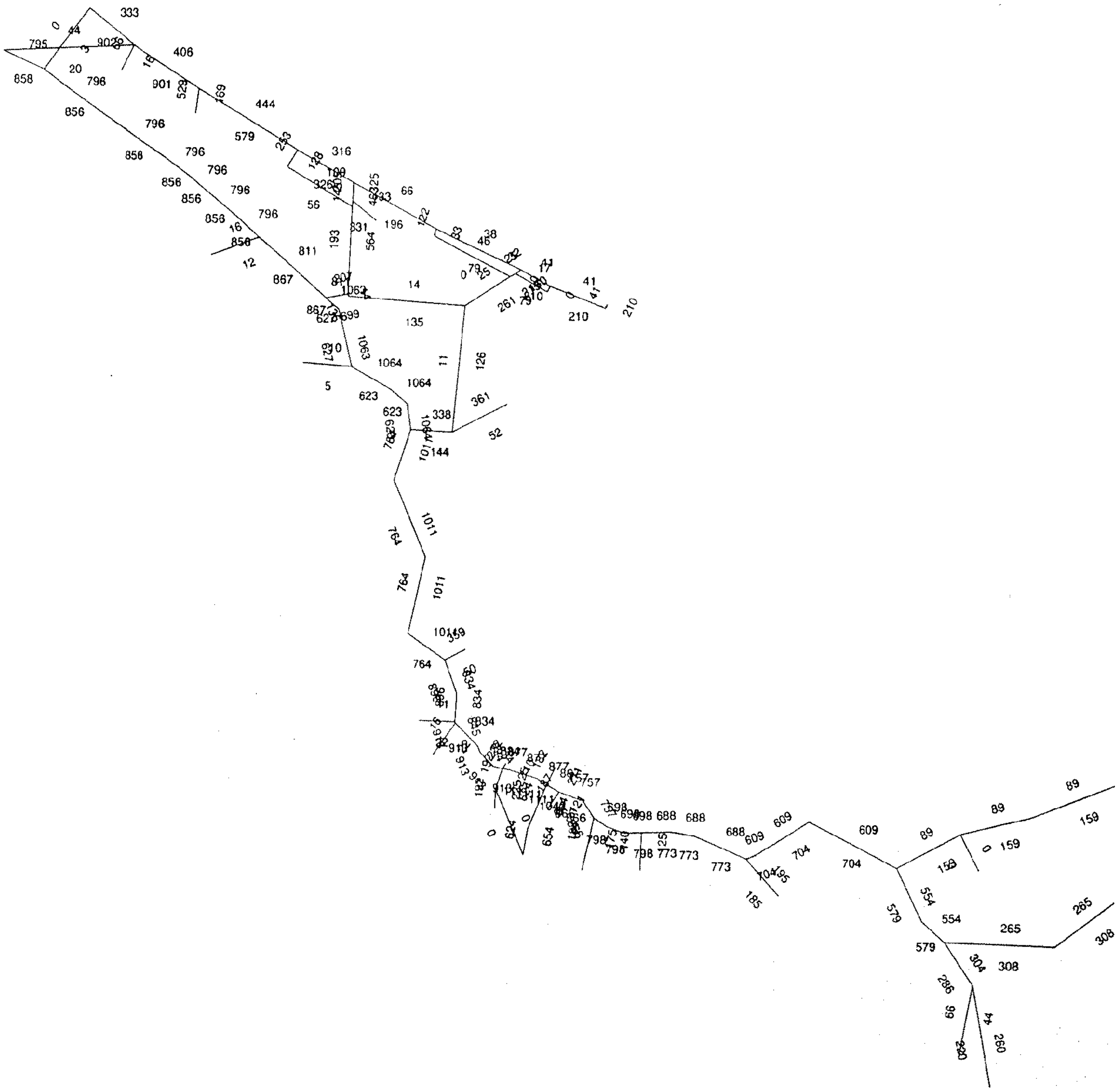
ENGINEER'S ESTIMATE

Item	Description	Option Estimates							
		B	BA	C	Sandhills	A3 (sand) 2 lane	A3* 4 lane min width	A3** 2 lane comb. width	A3* 2 lane min
1.0	**Establishment @ 7.5%**	5,600,000	14,550,000	6,050,000	4,800,000	2,800,000	4,200,000	3,150,000	3,300,000
2.0	**Earthworks**	0	0	0	0	0	0	0	0
2.1	Demolition and Site Clearance	891,075	648,757	3,580,000	1,515,309	925,830	925,830	881,299	925,830
2.2	Topsoil - Strip, stockpile, replace, grass	1,764,300	795,028	1,280,000	1,974,834	1,303,320	1,303,320	1,125,194	1,303,320
2.3	Excavate to waste (All used as Bund fill)	574,810	574,810	190,743	764,888	505,325	505,325	436,263	505,325
2.4	Excavate to fill	600,237	600,237	515,003	1,065,042	581,918	581,918	502,385	581,918
2.5	Import fill and compact	23,819,725	7,437,625	17,222,125	17,502,188	4,445,055	11,112,638	9,593,863	11,112,638
3.0	**Drainage, Farm Access and Fencing**	0	0	0	0	0	0	0	0
3.1	Supply, install and relay culverts	2,921,935	208,510	1,011,540	1,426,580	3,057,905	3,057,905	3,057,905	3,057,905
3.2	Farm access and underpasses	5,480,000	1,620,000	0	4,356,000	4,909,600	4,909,600	4,909,600	4,909,600
3.3	Fencing	1,214,000	128,400	1,757,040	1,310,000	1,221,200	1,221,200	1,219,197	1,221,200
5.0	**Safety Barriers**	0	0	0	0	0	0	0	0
5.1	New Jersey Barriers	557,280	8,398,080	471,360	583,680	0	3,834,000	0	0
5.2	W. Section Guard rail	239,360	107,780	66,640	233,920	256,360	297,840	210,800	256,360
6.0	**Pavement**	0	0	0	0	0	0	0	0
6.1	Supply and place GAP65 sub-base	7,073,000	3,138,500	14,166,000	10,367,650	3,594,400	7,226,500	3,594,400	3,594,400
6.2	Supply and place TNZ M/4 AP40	4,985,825	2,156,180	10,620,025	7,437,040	2,556,450	5,094,050	2,556,450	2,556,450
7.0	**Sealing**	0	0	0	0	0	0	0	0
7.1	Supply and apply two coat chip seal	2,410,716	2,410,716	4,952,185	3,427,900	1,118,250	2,460,150	1,118,250	1,118,250
7.2	Pavement Marking	87,850	87,850	200,000	95,561	43,963	87,925	43,963	43,963
8.0	**Bridges**	0	0	0	0	0	0	0	0
	Overbridge Parton Road	1,200,000	0	0	900,000	820,000	820,000	820,000	820,000
	Overbridge Bell Road	1,300,000	0	0	0	820,000	820,000	820,000	820,000
	Overbridge Kaituna Road	0	0	0	0	1,020,000	1,020,000	1,020,000	1,020,000
	Overbridge Pah Road	1,050,000	0	0	0	1,170,000	1,170,000	1,170,000	1,170,000
	Overbridge Te Tumu Road	1,300,000	1,300,000	0	1,350,000	1,180,000	1,180,000	1,180,000	1,180,000
	Overbridge Strang Road	0	0	930,000	0	0	0	0	0
	Overbridge Maketu Road	900,000	900,000	930,000	900,000	820,000	820,000	820,000	820,000
	Underpass ECTM Railway	1,350,000	1,350,000	3,150,000	1,350,000	1,350,000	1,350,000	1,350,000	1,350,000
	Kaituna River Bridge	3,200,000	160,000,000	5,503,680	5,000,000	3,400,000	3,400,000	3,400,000	3,400,000
	Canal Crossing 1	1,400,000	0	2,708,160	0	0	0	0	0
	Canal Crossing 2	1,800,000	0	2,708,160	0	0	0	0	0
	Canal Crossing 3	0	0	2,708,160	0	0	0	0	0
9.0	**Lighting**	500,000	500,000	1,000,000	500,000	500,000	500,000	500,000	500,000
10.0	**Silt Control**	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
11.0	**Landscaping**	1,000,000	1,000,000	2,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
12.0	**Services - Relocation or New**	500,000	500,000	1,000,000	500,000	500,000	500,000	500,000	500,000
13.0	**Traffic Control**	100,000	100,000	1,500,000	100,000	100,000	100,000	100,000	100,000
	SubTotal	**73,920,113**	**208,612,473**	**86,320,821**	**68,560,592**	**40,099,576**	**59,598,201**	**45,179,569**	**47,267,159**
14.1	**Contingencies Earthworks @ 25%**	6,912,537	2,514,114	5,696,968	5,705,565	1,940,362	3,607,258	3,134,751	3,607,258
14.2	**Contingencies Other Works @ 15%**	6,940,495	29,783,402	9,529,943	6,860,750	4,720,219	6,775,376	4,896,085	4,925,719
	SubTotal	**87,773,145**	**240,909,989**	**101,547,732**	**81,126,907**	**46,760,157**	**69,980,835**	**53,210,405**	**55,800,136**
15.0	**Engineering Fees @ 12.5%**	10,971,643	30,113,749	12,693,467	10,140,863	5,845,020	8,747,604	6,651,301	6,975,017
16.0	**Land purchase**	8,250,000	8,250,000	35,000,000	19,400,000	13,600,000	12,521,000	12,521,000	12,521,000
	TOTAL ESTIMATE (excl. GST)	106,994,788	279,273,738	149,241,199	110,667,770	66,205,177	91,249,439	72,382,706	75,296,153
	Length km	15.65	15.65	19.46	17.35	16.04	15.975	15.975	15.975
	Cost/m $/m	6,837	17,845	7,669	6,379	4,128	5.712	4,531	4,713
	BCR								

APPENDIX B Modelled Traffic Volumes

APPENDIX B Modelled Traffic Volumes

Opt 12, 2011 am



12am11_9.NET

Base Option 2011 AM Peak

Opt 12, 2011 ip

12ip11_9.NET

Base Option 2011 Inter Peak

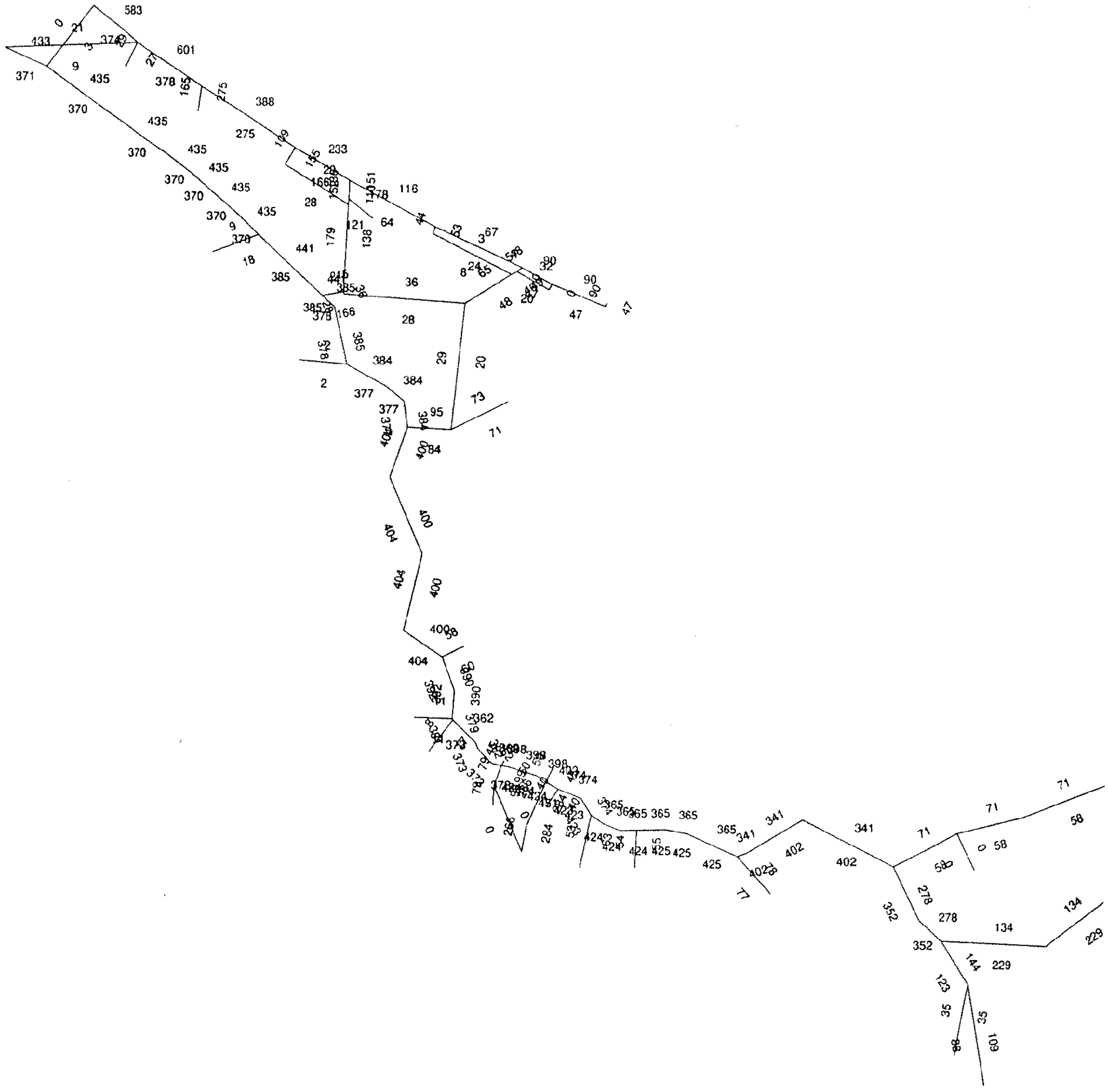
Opt 12, 2011 pm

12pm11_9.NET

Base Option 2011 PM Peak

MVA SYSTEMATICA

Opt 12, 2011 of



12of11_9.NET

Base Option 2011 Off Peak

MVA SYSTEMATICA

Opt 12, 2021 am

12am21_9.NET

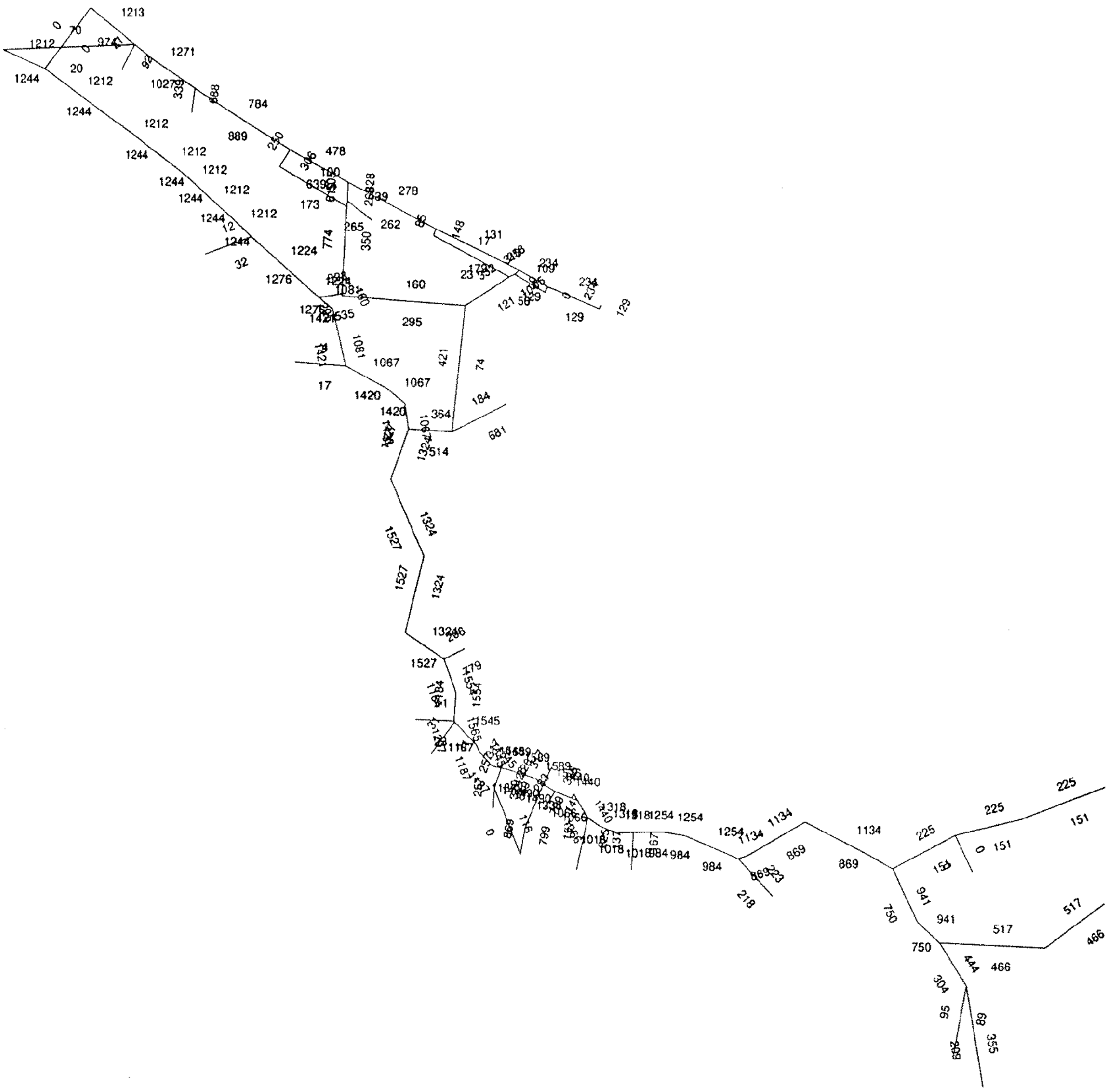
Base Option 2021 AM Peak

Opt 12, 2021 ip

12ip21_9.NET

Base Option 2021 Inter Peak

Opt 12, 2021 pm



12pm21_9.NET

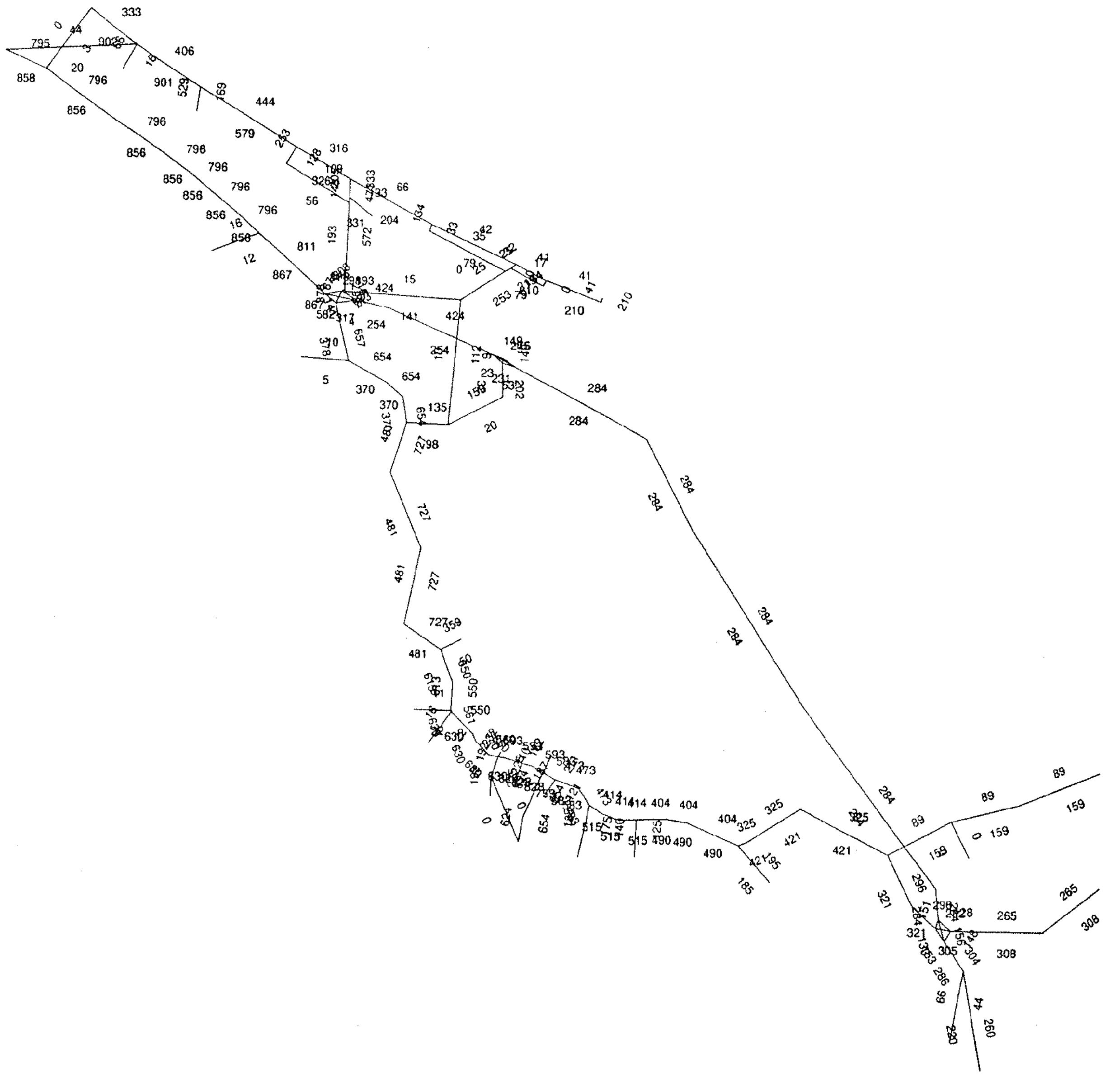
Base Option 2021 PM Peak

Opt 12, 2021 of

12of21_9.NET

Base Option 2021 Off Peak

Opt 27, 2011 am



27am11_5.NET

Swamp Route (Option B) 2011 AM Peak

MVA SYSTEMATICA

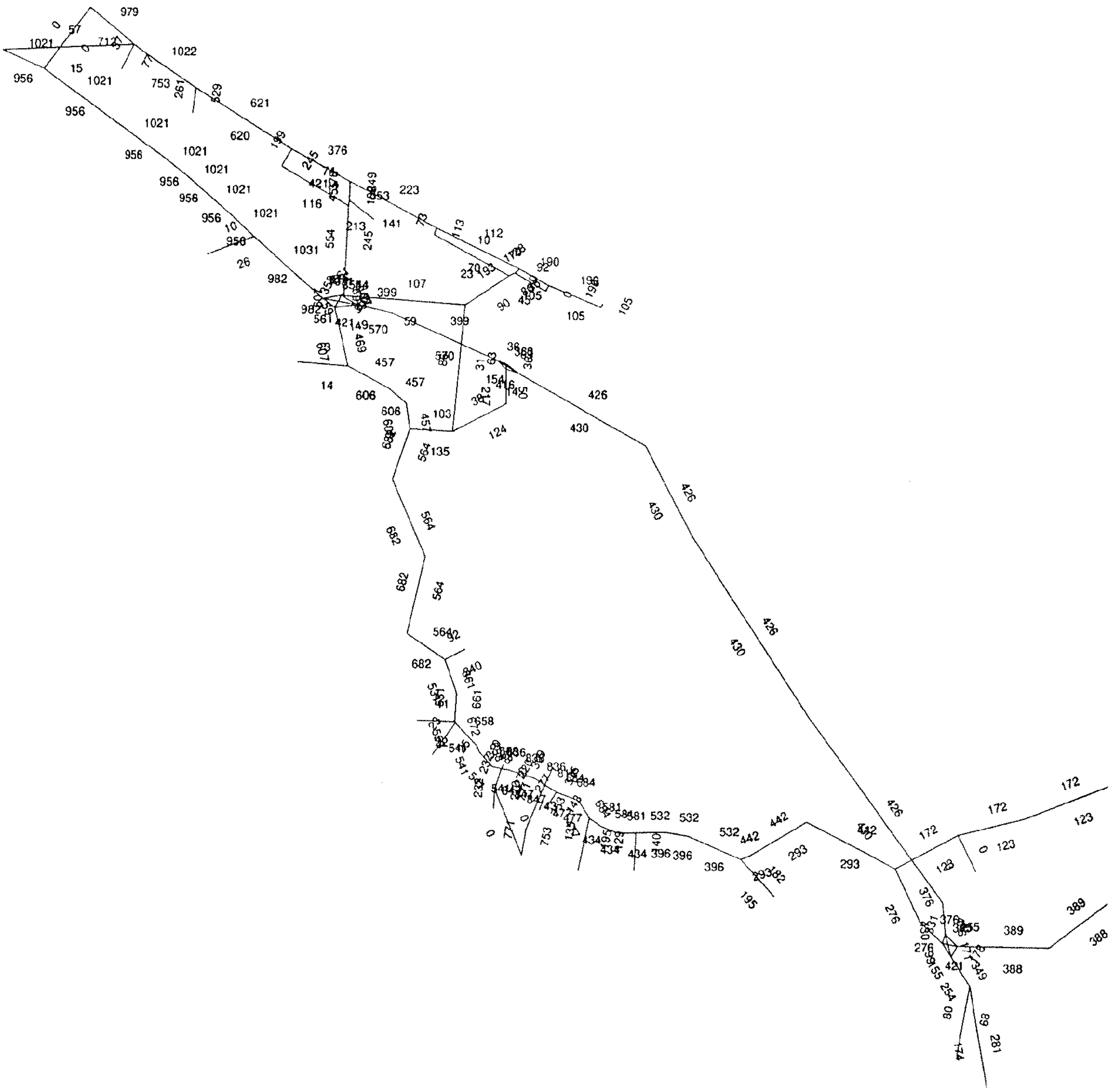
Opt 27, 2011 ip

27ip11_5.NET

Swamp Route (Option B) 2011 Inter Peak

MVA SYSTEMATICA

Opt 27, 2011 pm

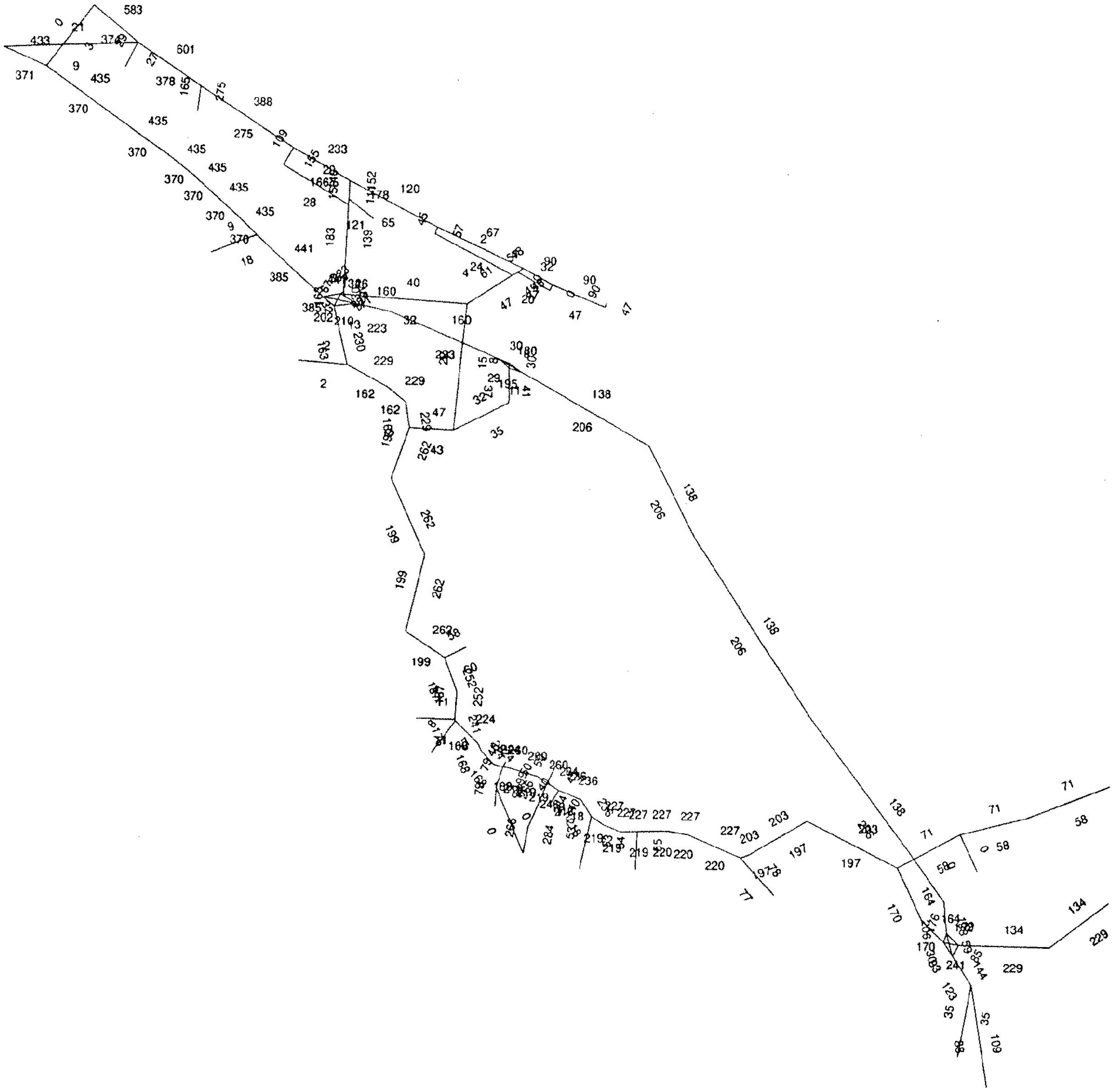


27pm11_5.NET

Swamp Route (Option B) 2011 PM Peak

MVA SYSTEMATICA

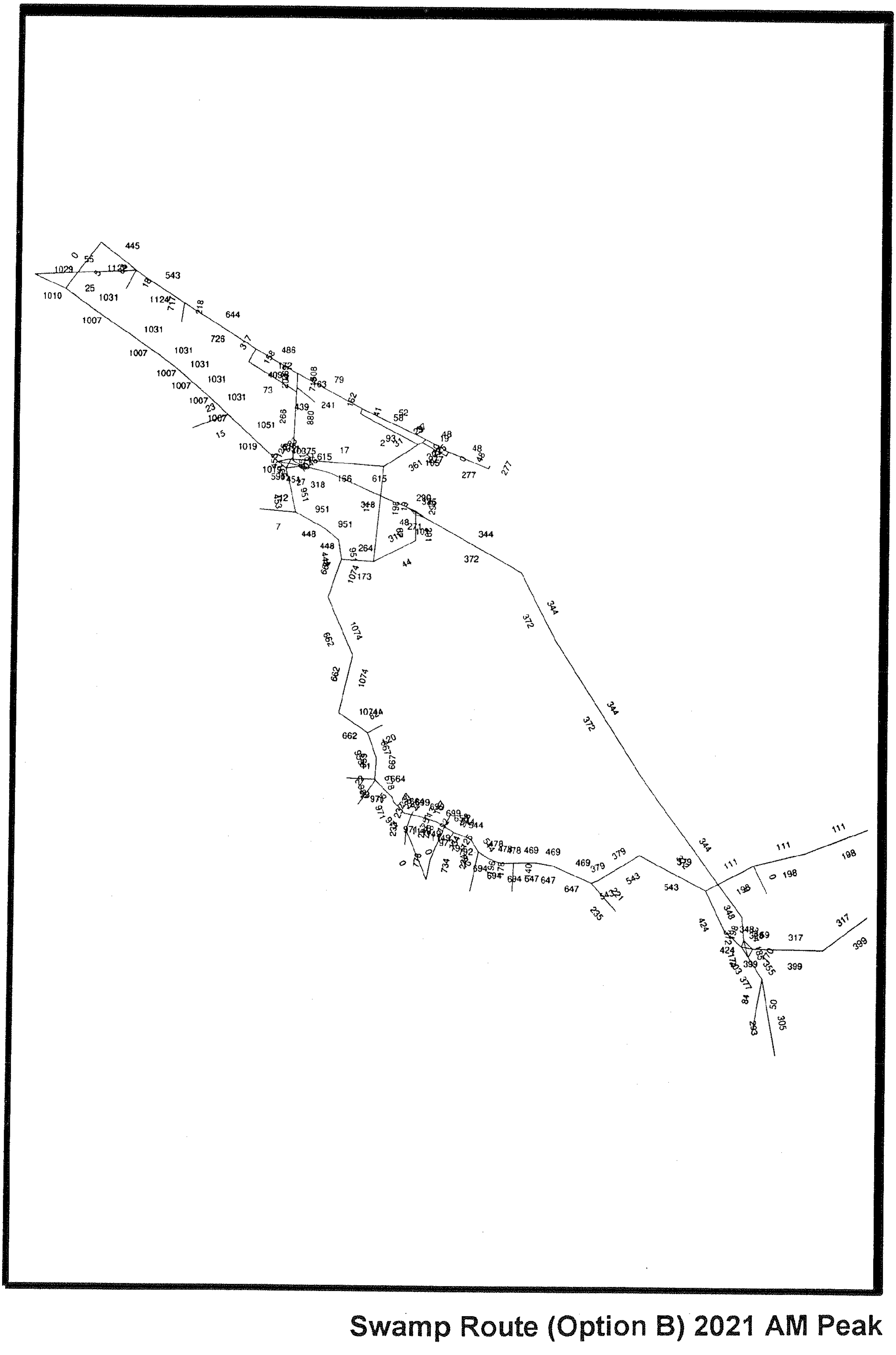
Opt 27, 2011 of



27of11_5.NET

Swamp Route (Option B) 2011 Off Peak

Opt 27, 2021 am



27am21_5.NET

Swamp Route (Option B) 2021 AM Peak

MVA SYSTEMATICA

Opt 27, 2021 ip

27ip21_5.NET

Swamp Route (Option B) 2021 Inter Peak

Opt 27, 2021 pm

27pm21_5.NET

Swamp Route (Option B) 2021 PM Peak

MVA SYSTEMATICA

Opt 27, 2021 of

27of21_5.NET

Swamp Route (Option B) 2021 Off Peak

Opt 37, 2011 am

37am11_5.NET

Alternative Route (Option A3) 2011 AM Peak

MVA SYSTEMATICA

Opt 37, 2021 am

37am21_5.NET

Alternative Route (Option A3) 2011 PM Peak

Opt 37, 2011 ip

37ip11_5.NET

Alternative Route (Option A3) 2011 Inter peak

Opt 37, 2021 ip

37ip21_5.NET

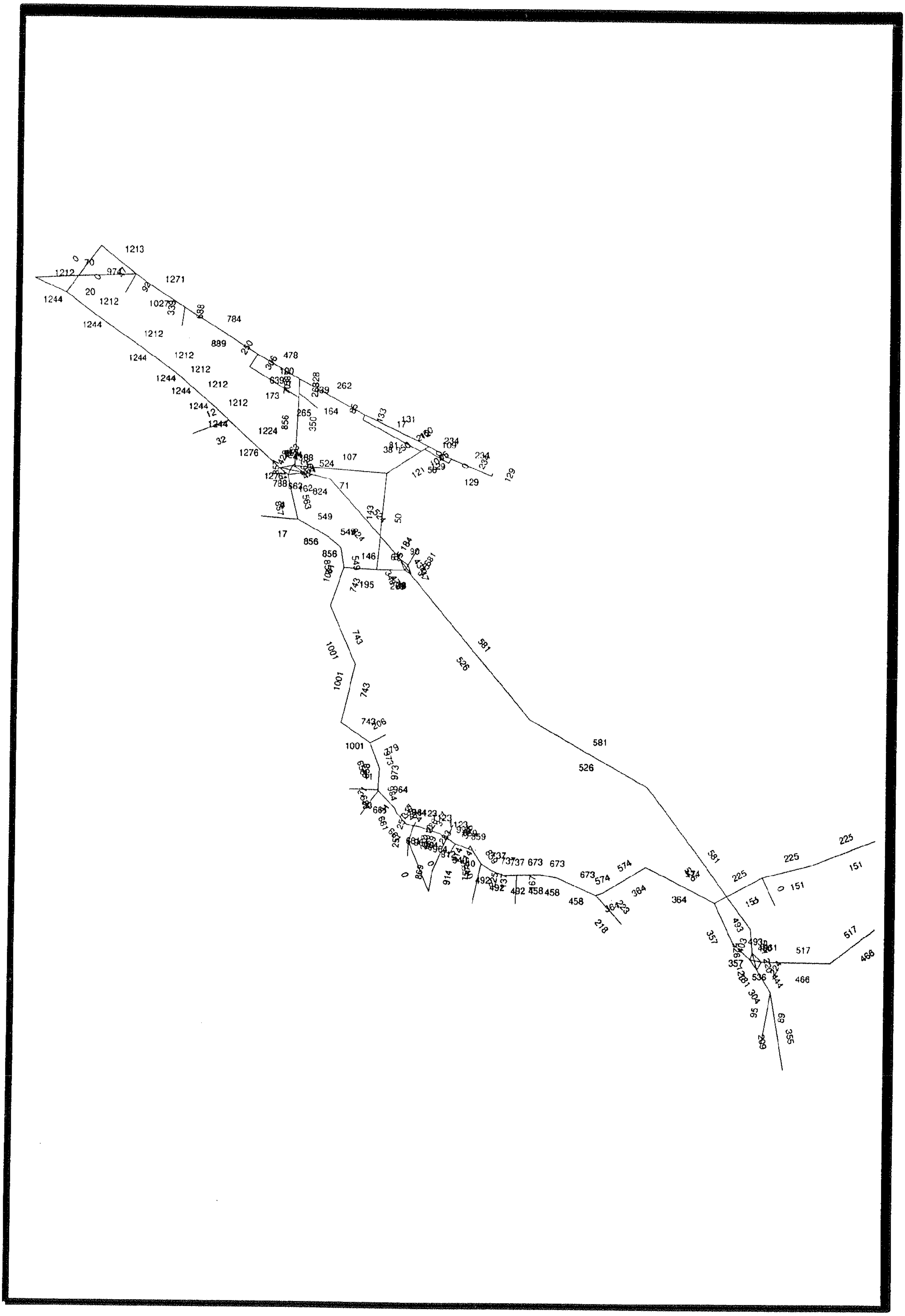
Alternative Route (Option A3) 2011 Off Peak

Opt 37, 2011 pm

37pm11_5.NET

Alternative Route (Option A3) 2021 AM Peak

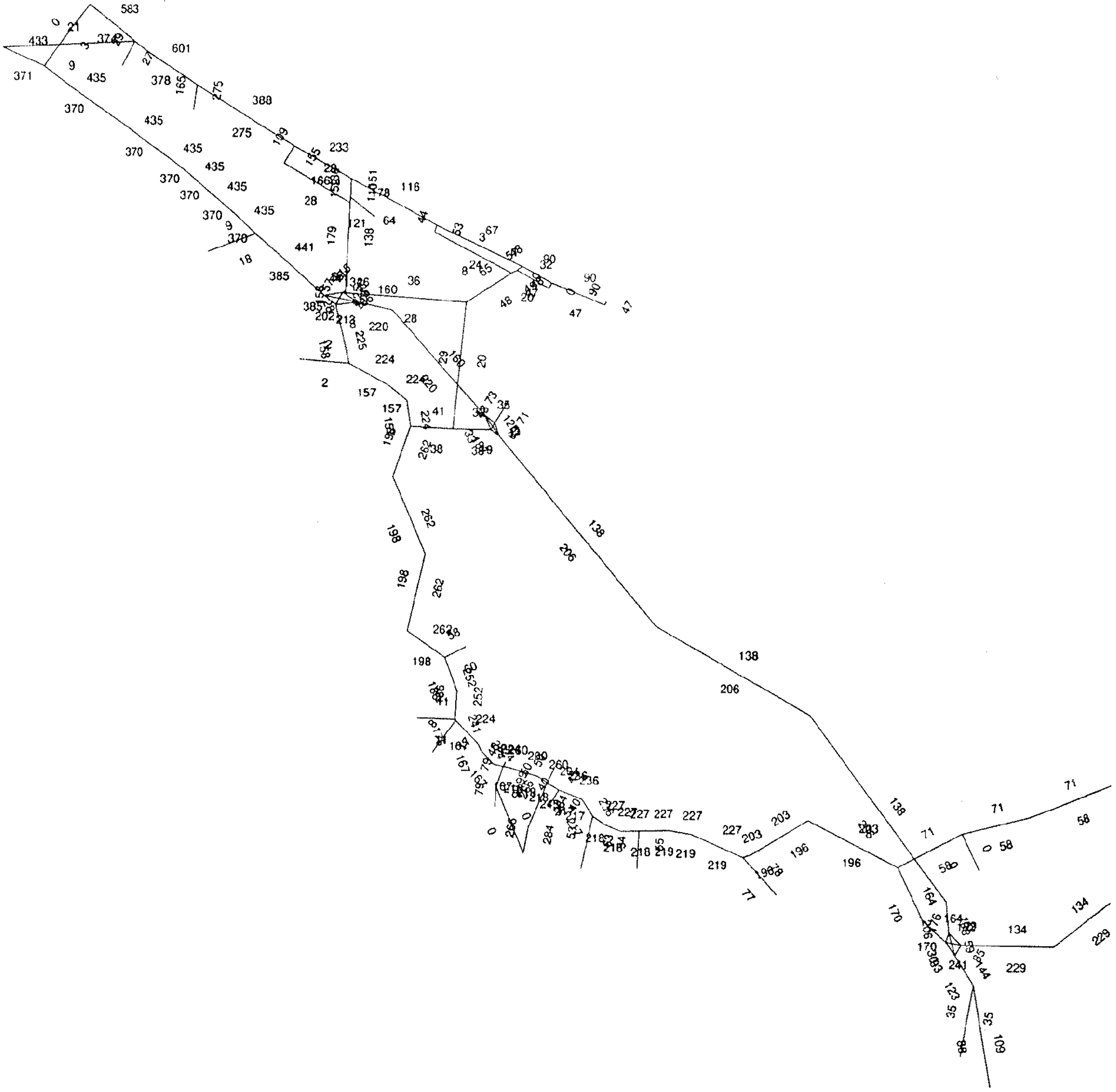
Opt 37, 2021 pm



37pm21_5.NET

Alternative Route (Option A3) 2021 Inter Peak

Opt 37, 2011 of



37of11_5.NET

Alternative Route (Option A3) 2021 PM Peak

Opt 37, 2021 of

37of21_5.NET

Alternative Route (Option A3) 2021 Off Peak

APPENDIX C Accident Cost Analysis

Accident Rate Analysis:
Accident Costs on Links

				Existing Rates	New/Upgraded Rates																										
			Cost per Accident	10	11	12	13	14	15	16	17	18	19	90	20	21	22	23	23	24	25	30	31	32	33	34	40	41	42	43	44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7	66.7
4	2.05	70	$314,000	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
5	4.4	70	$314,000	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6
6	2.79	100	$514,000	22.2	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
7	4.96	100	$514,000	12.5	12.5	12.5	12.75	12.5	12.5	12.5	12.75	12.75	12.75	12.75	12.75	12.75	12.5	12.5	12.5	12.75	12.5	12.5	12.5	12.75	12.5	12.5	12.5	12.75	12.5	12.5	12.5
8	2.13	50	$194,000	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
9	1.4	100	$514,000	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1
10	1.1	70	$314,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
13	1.59	70	$314,000	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6
14	0.69	80	$514,000	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9
15	0.99	70	$314,000	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
16	2.85	100	$514,000	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8
17	3.7	100m	$227,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
18	12.1	100m	$227,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
19	1.09	100	$514,000	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
20	4	100m	$227,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
21	11.6	100m	$227,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
22	1.28	100	$514,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
23	0.9	100	$514,000	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
TOTALS																															

Accident Rate Analysis: Accident Costs on Links

2001 Costs

2001

Link	Length	Speed	Cost per Accident	2001Ex	2001_11	2001_12	2001_13	2001_14	2001_15	2001_16	2001_17	2001_18	2001_19	2001_90	2001_20	2001_21	2001_22	2001_23	2001_24	2001_25	2001_30	2001_31	2001_32	2001_33	2001_34	2001_35	2001_40	2001_41	2001_42	2001_43	2001_44
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.98	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$184,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.66	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,056	$1,203,056	$1,203,056	$1,203,056	$1,203,056	$1,203,056	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,455,336	$10,455,336	$10,422,766	$10,422,766	$10,422,766	$10,455,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2006 Costs

2006

			Cost per Accident	2006Ex	2006_11	2006_12	2006_13	2006_14	2006_15	2006_16	2006_17	2006_18	2006_19	2006_90	2006_20	2006_21	2006_22	2006_23	2006_24	2006_25	2006_30	2006_31	2006_32	2006_33	2006_34	2006_35	2006_40	2006_41	2006_42	2006_43	2006_44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,456	$1,628,455	$1,628,455	$1,661,024	$1,628,456	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,456	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,456	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,456	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.85	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,667	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,056	$1,203,055	$1,203,055	$1,203,056	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,456,335	$10,456,336	$10,422,766	$10,422,766	$10,422,766	$10,456,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2011 Costs

2011

			Cost per Accident	2011Ex	2011_11	2011_12	2011_13	2011_14	2011_15	2011_16	2011_17	2011_18	2011_19	2011_90	2011_20	2011_21	2011_22	2011_23	2011_24	2011_25	2011_30	2011_31	2011_32	2011_33	2011_34	2011_35	2011_40	2011_41	2011_42	2011_43	2011_44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.85	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,456,335	$10,456,335	$10,422,766	$10,422,766	$10,422,766	$10,456,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2016 Costs

				2016																											
			Cost per Accident	2016Ex	2016_11	2016_12	2016_13	2016_14	2016_15	2016_16	2016_17	2016_18	2016_19	2016_90	2016_20	2016_21	2016_22	2016_23	2016_24	2016_25	2016_30	2016_31	2016_32	2016_33	2016_34	2016_35	2016_40	2016_41	2016_42	2016_43	2016_44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.86	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.26	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,767	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,455,336	$10,455,336	$10,422,766	$10,422,766	$10,422,766	$10,455,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2021 Costs

			Cost per Accident	2021										
				2021Ex	2021_11	2021_12	2021_13	2021_14	2021_15	2021_16	2021_17	2021_18	2021_19	2021_90
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.85	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.08	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668

	2021_20	2021_21	2021_22	2021_23	2021_24	2021_25	2021_30	2021_31	2021_32	2021_33	2021_34	2021_35	2021_40	2021_41	2021_42	2021_43	2021_44
Link	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS	$10,455,335	$10,455,335	$10,422,766	$10,422,766	$10,422,766	$10,455,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2031 Costs

2031

			Cost per Accident	2031Ex	2031_11	2031_12	2031_13	2031_14	2031_15	2031_16	2031_17	2031_18	2031_19	2031_90	2031_20	2031_21	2031_22	2031_23	2031_24	2031_25	2031_30	2031_31	2031_32	2031_33	2031_34	2031_35	2031_40	2031_41	2031_42	2031_43	2031_44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.86	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.58	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.85	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,055	$1,203,056	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,456,335	$10,456,336	$10,422,766	$10,422,766	$10,422,766	$10,456,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2041 Costs

2041

			Cost per Accident	2041Ex	2041_11	2041_12	2041_13	2041_14	2041_15	2041_16	2041_17	2041_18	2041_19	2041_90	2041_20	2041_21	2041_22	2041_23	2041_24	2041_25	2041_30	2041_31	2041_32	2041_33	2041_34	2041_35	2041_40	2041_41	2041_42	2041_43	2041_44
Link	Length	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$104,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.86	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,066	$1,203,066	$1,203,066	$1,203,066	$1,203,066	$1,203,066	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,455,336	$10,455,336	$10,422,766	$10,422,766	$10,422,766	$10,455,336	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis: Accident Costs on Links

2051 Costs

2051

Link	Length	Speed	Cost per Accident	2051Ex	2051_11	2051_12	2051_13	2051_14	2051_15	2051_16	2051_17	2051_18	2051_19	2051_90	2051_20	2051_21	2051_22	2051_23	2051_24	2051_25	2051_30	2051_31	2051_32	2051_33	2051_34	2051_35	2051_40	2051_41	2051_42	2051_43	2051_44
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
2	1.56	70	$314,000	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016	$477,016
4	2.05	70	$314,000	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887	$680,887
5	4.4	70	$314,000	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564	$419,564
6	2.79	100	$514,000	$1,743,028	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860	$1,381,860
7	4.96	100	$514,000	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455	$1,661,024	$1,628,455	$1,628,455	$1,628,455
8	2.13	50	$194,000	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952	$904,952
9	1.4	100	$514,000	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675	$1,129,675
10	1.1	70	$314,000	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414	$166,414
13	1.59	70	$314,000	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736	$164,736
14	0.59	80	$514,000	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004	$291,004
15	0.99	70	$314,000	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570	$611,570
16	2.85	100	$514,000	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657	$811,657
17	3.7	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$367,876	$367,876	$367,876	$367,876	$367,876	$367,876	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
18	12.1	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$1,203,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
19	1.09	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$184,045	$184,045	$184,045	$184,045	$184,045	$184,045	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20	4	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$397,704	$397,704	$397,704	$397,704	$397,704	$397,704	$0	$0	$0	$0	$0
21	11.6	100m	$227,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$1,153,342	$0	$0	$0	$0	$0
22	1.28	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$144,084	$144,084	$144,084	$144,084	$144,084	$144,084	$0	$0	$0	$0	$0
23	0.9	100	$514,000	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$0	$0	$0	$0	$0	$0	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309	$101,309
TOTALS				$9,130,267	$8,769,099	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099	$8,801,668	$8,801,668	$8,801,668	$8,801,668	$10,456,336	$10,456,336	$10,422,766	$10,422,766	$10,422,766	$10,455,335	$10,464,229	$10,464,229	$10,464,229	$10,496,798	$10,464,229	$10,464,229	$8,769,099	$8,801,668	$8,769,099	$8,769,099	$8,769,099

Accident Rate Analysis:
Accident Costs on Nodes

				Existing Rates	New/Upgraded Rates																										
			Cost per Accident	10	11	12	13	14	15	16	17	18	19	90	20	21	22	23	23	24	25	30	31	32	33	34	40	41	42	43	44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
101	1	100	$514,000	0.152	0.152	**0.068**	0.152	0.068	0.068	0.068	**0.068**	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
102	1	100	$514,000	0.155	0.155	0.155	0.155	**0.068**	0.068	0.068	0.155	**0.068**	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
106	1	100	$514,000	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
107	1	100	$514,000	0.249	0.249	0.249	0.249	**0.068**	0.068	0.068	0.249	**0.068**	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
109	1	50	$194,000	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
110	1	50	$194,000	0.027	0.027	0.027	0.027	0.027	**0.124**	0.124	0.027	0.027	**0.124**	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124
108	1	100	$514,000												0.068	0.068	0.068	0.068	0.000	0.068	0.068	0.068	0.000	0.068	0.068	0.068	0.000	0.068	0.068	0.068	0.000
118	1	100	$514,000												0.042	0.042	0.042	0.042	0.000	0.042	0.042	0.042	0.000	0.042	0.042	0.042	0.000	0.042	0.042	0.042	0.000
TOTALS																															

Note. For link numbers, refer to Figure .1

Accident Rate Analysis:
Accident Costs on Nodes

2001 Costs

2001

Node	X	Speed	Cost per Accident	2001Ex	2001_11	2001_12	2001_13	2001_14	2001_15	2001_16	2001_17	2001_18	2001_19	2001_90	2001_20	2001_21	2001_22	2001_23	2001_24	2001_25	2001_30	2001_31	2001_32	2001_33	2001_34	2001_35	2001_40	2001_41	2001_42	2001_43	2001_44
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note. For linx numbers, refer to Figure

Accident Rate Analysis:
Accident Costs on Nodes

2006 Costs

2006

			Cost per Accident	2006Ex	2006_11	2006_12	2006_13	2006_14	2006_15	2006_16	2006_17	2006_18	2006_19	2006_90	2006_20	2006_21	2006_22	2006_23	2006_24	2006_25	2006_30	2006_31	2006_32	2006_33	2006_34	2006_35	2006_40	2006_41	2006_42	2006_43	2006_44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note: For link numbers, refer to Figur

Accident Rate Analysis: Accident Costs on Nodes

2011 Costs

2011

Node	X	Speed	Cost per Accident	2011Ex	2011_11	2011_12	2011_13	2011_14	2011_15	2011_16	2011_17	2011_18	2011_19
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041
109	1	50	$194,000	$654	$854	$854	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681

Node	X	Speed	Cost per Accident	2011_90	2011_20	2011_21	2011_22	2011_23	2011_24	2011_25	2011_30	2011_31
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$2,807	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807
118	1	100	$514,000	$0	$1,734	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734
TOTALS				$11,681	$16,221	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221

Node	X	Speed	Cost per Accident	2011_32	2011_33	2011_34	2011_35	2011_40	2011_41	2011_42	2011_43	2011_44
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note. For link numbers, refer to Figur

Accident Rate Analysis: Accident Costs on Nodes

2016 Costs

2016

			Cost per Accident	2016Ex	2016_11	2016_12	2016_13	2016_14	2016_15	2016_16	2016_17	2016_18	2016_19	2016_90	2016_20
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221

			Cost per Accident	2016_21	2016_22	2016_23	2016_24	2016_25	2016_30	2016_31	2016_32	2016_33	2016_34	2016_35	2016_40	2016_41	2016_42	2016_43	2016_44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note. For link numbers, refer to Figur

Accident Rate Analysis:
Accident Costs on Nodes

2021 Costs

2021

			Cost per Accident	2021Ex	2021_11	2021_12	2021_13	2021_14	2021_15	2021_16	2021_17	2021_18	2021_19	2021_90	2021_20	2021_21	2021_22
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807	$2,807	$2,807
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734	$1,734	$1,734
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221	$16,221	$16,221

			Cost per Accident	2021_23	2021_24	2021_25	2021_30	2021_31	2021_32	2021_33	2021_34	2021_35	2021_40	2021_41	2021_42	2021_43	2021_44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note. For ınk numbers, refer to Figur

Accident Rate Analysis: Accident Costs on Nodes

2031 Costs

2031

			Cost per Accident	2031Ex	2031_11	2031_12	2031_13	2031_14	2031_15	2031_16	2031_17	2031_18	2031_19	2031_90	2031_20	2031_21	2031_22	2031_23	2031_24	2031_25	2031_30	2031_31	2031_32	2031_33	2031_34	2031_35	2031_40	2031_41	2031_42	2031_43	2031_44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,388	$10,172	$11,681	$11,681	$16,221	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note: For link numbers, refer to Figur

Accident Rate Analysis:
Accident Costs on Nodes

2041 Costs

2041

			Cost per Accident	2041Ex	2041_11	2041_12	2041_13	2041_14	2041_15	2041_16	2041_17	2041_18	2041_19	2041_90	2041_20
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221

			Cost per Accident	2041_21	2041_22	2041_23	2041_24	2041_25	2041_30	2041_31	2041_32	2041_33	2041_34	2041_35	2041_40	2041_41	2041_42	2041_43	2041_44
Node	X	Speed	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296
102	1	100	$514,000	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note: For link numbers, refer to Figur

Accident Rate Analysis:
Accident Costs on Nodes

2051 Costs

2051

Node	X	Speed	Cost per Accident	2051Ex	2051_11	2051_12	2051_13	2051_14	2051_15	2051_16	2051_17	2051_18	2051_19	2051_90	2051_20	2051_21	2051_22	2051_23	2051_24	2051_25	2051_30	2051_31	2051_32	2051_33	2051_34	2051_35	2051_40	2051_41	2051_42	2051_43	2051_44
			Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury	Injury
100	1	50	$194,000	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461	$461
101	1	100	$514,000	$5,140	$5,140	$2,296	$5,140	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,296	$2,206
102	1	100	$514,000	$3,200	$3,200	$3,200	$3,200	$1,403	$1,403	$1,403	$3,200	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403	$1,403
106	1	100	$514,000	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894	$2,894
107	1	100	$514,000	$7,471	$7,471	$7,471	$7,471	$2,041	$2,041	$2,041	$7,471	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041	$2,041
109	1	50	$194,000	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654	$654
110	1	50	$194,000	$422	$422	$422	$422	$422	$1,932	$1,932	$422	$422	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932	$1,932
108	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,807	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0	$2,807	$2,807	$2,807	$0
118	1	100	$514,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,734	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0	$1,734	$1,734	$1,734	$0
TOTALS				$20,242	$20,242	$17,398	$20,242	$10,172	$11,681	$11,681	$17,398	$10,172	$11,681	$11,681	$16,221	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681	$16,221	$16,221	$16,221	$11,681

Note. For link numbers, refer to Figur

APPENDIX D Willingness to Pay Intangible Benefits

A

code	no	road1	roadaname	dist	road2	number	date	year	day	time	axtype	veh1	v1dir	veh2	x1	x2	x3	x4	x5	x6	curve	wetdry	light	weather	junction	control	markings	speed	fatal	serious	minor	non-inj	age	east	north
2	357	PAPAMOA	BEACH	80S	ALEXANDER	36782	30/07/	92	THR	1620	BA	C	N	1B					817		R	D	ON	F		N	C	70						280139	638346
2	362	PAPAMOA	BEACH	2000S	DOMAIN	38605	26/08/	92	WED	2200	CB	C	S	1							R	W	DU	L		N	C	70						280170	638330
2	375	PAPAMOA	BEACH	200W	GRANT	36758	03/09/	93	FRI	1415	CC	C	W	1C						M	R	D	BF	F		N	N	70						280171	638330
2	374	PAPAMOA	BEACH	300S	GRANT	3075	16/04/	93	FRI	2010	EA	M	N	1C					862	M	R	D	DN	F		N	C	70			1			280210	638306
2	392	PAPAMOA	BEACH	20W	MCCALLUM	3745	16/06/	95	FRI	1930	EA	C	W	1C	102A	259A				MP	R	D	DO	F	T	N	C	70			1			280223	638308
2	373	PAPAMOA	BEACH	50E	GRANT	31294	27/02/	97	THR	1830	GC	C	E	1V					977		R	D	BF	F	D	N	C	70						0	0
2	405	PAPAMOA	BEACH	I	PARTON	1687	04/02/	92	TUE	1740	JA	T	N	1C	285B	235B					R	D	OF	F	T	G	C	70		2	1			280273	638278
2	358	PAPAMOA	BEACH	300S	ALEXANDER	32291	10/01/	93	SUN	1715	LB	C	N	1C					977		R	D	BF	F	D	N	C	70						280155	638334
2	404	PAPAMOA	BEACH	100W	PARTON	41331	03/12/	95	SUN	1200	LB	C	N	1C					971		R	D	BN	F	D	N	C	70						280262	638288
4	313	DOMAIN		300E	2	34333	01/05/	93	SAT	1350	BC	C	E	1C							M	D	BU	F		N	C	100						279978	638237
4	315	DOMAIN		50S	GRAVATT	5472	24/12/	92	THR	1815	CA	M	W	1	103A	113A					R	W	ON	F		N	C	50			1			279986	638375
4	316	DOMAIN		50S	GRAVATT	2416	19/05/	96	SUN	315	CB	C	N	1					999	PZ	R	D	DO	F		N	C	100		1				279986	638375
4	319	DOMAIN		10N	TARA	1612	10/01/	92	FRI	2345	CC	C	S	1	102A	250A					R	D	DN	F	T	N	C	100			3			279976	638239
4	321	DOMAIN		100S	TARA	5744	04/12/	95	MON	630	DA	M	S	1					806		E	D	ON	M		N	C	100			1			279970	638236
4	322	DOMAIN		I	TARA	1684	21/02/	93	SUN	1725	DA	C	S	1	101A					P	M	D	BN	F	T	N	C	100		1				279979	638239
4	323	DOMAIN		I	TARA	41419	30/11/	95	THR	2330	DA	C	S	1						FT	S	D	DO	F	T	N	N	70						279979	638239
4	320	DOMAIN		90N	TARA	3288	31/07/	92	FRI	2100	DB	C	E	1	232A					GV	M	W	DN	L		N	C	100		1	1			279978	638244
4	314	DOMAIN		I	DONCASTER	42187	12/11/	96	TUE	1245	GD	C	N	1C							R	D	OF	F	T	G	C	50						279985	638303
4	324	DOMAIN		I	TOPAZ	6437	27/12/	95	WED	1550	JA	M	S	1C	229B	285B					R	D	BF	F	T	G	C	50			1			279986	638394
4	317	DOMAIN		30S	PAPAMOA BEACH	34483	31/05/	96	FRI	1730	MB	C	S	1C							R	D	DO	F	T	N	C	50						279988	638418
5	419	TARA		800W	DOMAIN	1552	06/03/	92	FRI	842	AE	C	N	1V	155A	128B			977	V	R	D	ON	F	D	N	C	100			3			280060	638230
5	418	TARA		1500E	DOMAIN	3666	08/07/	94	FRI	2320	CB	C	N	1	103A	240A				VC	R	W	DN	L		N	N	100			2			280128	638225
5	414	PARTON		I	PAPAMOA BEACH	1013	14/01/	94	FRI	1835	DC	C	E	1	103A	112A				C	E	D	BN	F	T	G	C	70			3			280273	638278
5	416	PARTON		I	TARA	34486	11/05/	96	SAT	2100	DC	C	E	1						GF	R	D	DO	F	T	G	C	100						280179	638221
5	420	TARA		I	PARTON	30590	13/01/	93	WED	330	FA	C	E	1C							E	D	DN	F	T	G	C	100						280179	638221
5	417	TARA		1000E	DOMAIN	37527	17/08/	95	THR	1740	GC	C	E	1C					977		R	D	BN	F	D	N	N	100						280074	638225
5	450	PARTON		100S	DICKSON	33902	24/04/	92	FRI	830	GE	C	E	1V					975		R	D	BF	F	D	N	C	100						280247	638264
5	415	PARTON		I	PAPAMOA BEACH	37127	06/07/	96	SAT	1305	JA	C	W	1C							R	D	BF	F	T	G	C	70						280273	638278
5	451	PARTON		I	DICKSON	34006	21/05/	94	SAT	1300	JA	V	N	1C							R	W	OF	F	T	G	C	70						280254	638270
5	452	PARTON		400S	SIMPSON	34898	06/06/	96	THR	1558	JA	C	S	1C					975	F	R	W	OF	L	D	N	C	100						280231	638256
5	453	PARTON		I	SIMPSON	3072	26/06/	93	SAT	805	LB	C	W	1C	287B						R	W	BF	F	T	N	C	50			1			280265	638275
5	454	PARTON		I	SIMPSON	2417	17/05/	96	FRI	1445	LB	C	W	1S	487B						R	D	BF	F	T	N	R	50			1		10	280265	638275
5	455	PARTON		300W	SIMPSON	6438	27/12/	95	WED	2015	LB	S	W	1C	287A	287B			975		R	D	BN	F	D	N	C	70			1		25	280196	638234
6	209	200164		I	WELCOME BAY	4871	12/09/	95	TUE	1400	AA	C	N	1T	226A						E	D	BN	F	T	N	C	100			3			279974	638132
6	191	200164		400N	POPLAR	149	08/08/	92	SAT	1704	AB	C	N	1C	154A	102A				C	R	D	TN	F		N	C	100	1					280078	638053
6	188	200164		200N	MANOEKA	2278	14/02/	95	TUE	1100	AF	M	E	1	197A						R	D	BN	F		N	C	100		1				280082	637698
6	189	200164		200N	MANOEKA	31398	28/02/	97	FRI	2345	BE	C	W	1C				8 13	817	C	E	D	DN	F		N	N	100						280082	637698
6	194	200164	83	600N	BELL	3303	10/07/	92	FRI	1110	BE	C	S	1C	138A	195A					M	D	BN	F		N	C	100			2			280072	638065
6	202	200164		500N	WELCOME BAY	40164	10/12/	94	SAT	1745	CB	C	N	1							R	D	BN	F		N	C	100						279978	638185
6	195	200164		700S	BELL	4145	21/08/	94	SUN	400	DA	C	N	1	103A	240A				T	M	D	DN	F		N	C	100			1			280065	637958
6	208	200164		I	WELCOME BAY	4924	24/08/	95	THR	2340	DA	C	S	1	101A					E	M	D	DO	F	T	S	P	100		1				279974	638132
6	211	200164		300S	DOMAIN	37102	07/07/	95	FRI	2045	DA	C	S	1							M	D	DN	F		N	C	100						279973	638212
6	213	200164		100S	DOMAIN	40922	20/09/	96	FRI	1820	DA	C	S	1C						FV	E	D	TN	F		N	L	100						279952	638222
6	199	200164		500S	WELCOME BAY	3879	13/07/	96	SAT	855	DB	C	N	1	271A					C	E	W	BN	F		N	C	100			1			280020	638112
6	201	200164		300S	WELCOME BAY	2667	11/01/	95	WED	1750	DB	C	N	1	250A					C	E	D	ON	F		N	C	100			1			279999	638114
6	198	200164		600S	WELCOME BAY	31928	28/03/	96	THR	1950	EB	V	S	1C						Q	E	D	DN	F		N	C	100						280030	638101
6	204	200164		400N	WELCOME BAY	32820	04/05/	95	THR	1840	EC	C	E	1					912	W	R	D	DN	F		N	C	100						279976	638176
6	212	200164		150S	DOMAIN	33939	06/07/	95	THR	1630	FD	C	S	1C						F	R	D	ON	F		N	C	100						279959	638223
6	192	200164		400N	POPLAR	5061	22/11/	96	FRI	1645	GC	V	N	1C	164B	222B			975		E	D	BN	F	D	N	C	100			1			280078	638053
6	200	200164		300S	WELCOME BAY	30589	07/04/	93	WED	1610	GD	C	S	1C					977		M	D	OU	F	D	N	C	100						279999	638114
6	193	200164		500S	BELL	42084	27/12/	95	WED	1440	GE	C	N	1CVC					978		R	D	BF	F	D	N	C	100						280074	637976
6	196	200164		I	POPLAR	36951	07/03/	95	TUE	1623	GE	T	S	1C							E	D	BN	F	T	N	L	100						280057	637934
6	206	200164		I	WELCOME BAY	5180	29/11/	94	TUE	1130	JA	C	N	1C	285B					FS	M	D	BU	F	T	G	P	100			1			279974	638132
6	207	200164		I	WELCOME BAY	2242	14/04/	95	FRI	950	JA	C	S	1C	285B						E	D	BF	F	T	G	L	100			3			279974	638132
6	210	200164		I	WELCOME BAY	1629	13/03/	96	WED	1455	JA	C	N	1C	122B						E	D	BF	F	T	S	L	100			1			279974	638132
6	197	200164	98	I	POPLAR	33922	03/02/	92	MON	1705	KB	C	S	1T							E	W	BF	F	T	S	C	100						280057	637934
6	203	200164		170N	WELCOME BAY	4796	07/10/	93	THR	1600	LB	M	N	1C	287B				962		R	D	BF	F	D	N	P	100		1	1			279977	638151
6	205	200164		300N	WELCOME BAY	2241	23/04/	95	SUN	1720	LB	C	N	1V	103B	287B	236B		962		R	W	OF	F	D	N	C	100			2			279976	638166
6	190	200164		200N	MANOEKA	2914	22/06/	97	SUN	1700	NA	T	N	1E	250A	711B					E	D	BF	F		N	C	100			1		20	280082	637698
6	214	200164		100S	DOMAIN	30277	09/01/	97	THR	925	QG	V	N	1							M	D	ON	F		N	C	100						279952	638222
7	157	200164		1500S	MANOEKA	5476	06/11/	92	FRI	400	BA	C	S	1C	103A	240A					R	D	DN	F		N	C	100			2			280156	637551
7	180	200164		700N	MANOEKA	4394	02/10/	92	FRI	2134	BA	C	N	1C	101A	134A					R	W	DN	F		N	C	100		1				280085	637741
7	158	200164		70N	COLLINS	3623	07/05/	94	SAT	2130	BE	C	N	1C	103A	259A					E	D	DN	F		N	C	100			1			280144	637642
7	160	200164		A	KOPUROA CANAL BR	150	27/07/	95	THR	225	BE	C	N	1T	101A	240A				B	M	W	DN	F		N	C	100	3	1				280110	637828
7	167	200164		150S	BELL	5783	14/11/	96	THR	1346	BE	C	S	1CC	138A	171A	197A	101B			E	W	ON	H		N	L	100		1	3			280091	638009
7	174	200164		600S	POPLAR	3066	01/01/	93	FRI	1705	BE	C	S	1C	240A						R	D	BN	F		N	C	100			1			280088	637882
7	162	200164		500N	COLLINS	36946	16/03/	95	THR	1830	CB	C	N	1					902	F	R	D	BN	F		N	N	30						280107	637664
7	166	200164		800N	MANOEKA	3896	20/07/	96	SAT	600	CB	C	S	1	102A	240A				P	R	W	DN	F		N	C	100			1			280095	637758
7	170	200164		700S	POPLAR	36947	11/07/	95	TUE	2100	CB	C	S	1						V	R	D	DN	F		N	C	100						280089	637872
7	175	200164		600S	POPLAR	225	11/12/	94	SUN	344	CB	C	S	1	241A				972	P	R	D	DN	F		N	C	100	1	1	2			280088	637882
7	164	200164		1000S	POPLAR	3977	24/07/	93	SAT	520	CC	C	S	1	104A					TE	R	D	DN	F		N	C	100		1				280101	637842
7	165	200164		1000S	POPLAR	37029	28/08/	94	SUN	1330	DA	C	S	1						FB	E	D	BN	F		N	L	100						280101	637842

A

code	no	road1	roadaname	dist	road2	number	date	year	day	time	axtype	veh1	v1dir	veh2	x1	x2	x3	x4	x5	x6	curve	wetdry	light	weather	junction	control	markings	speed	fatal	serious	minor	non-inj	age	east	north
7	168	200140		200S	BELL	2043	21/04/	94	THR	2245	DA	C	S	1	103A	232A				V	M	D	DN	F		N	C	100			1			280091	638001
7	173	200164		50N	BELL	34984	28/04/	94	THR	1650	DA	T	S	1C					956	D	R	D	TF	F		N	C	100						280088	638027
7	159	200164	132	100N	COLLINS	1807	21/04/	92	TUE	1715	DB	M	N	1	632A						E	D	BN	F		N	C	100			1			280139	637638
7	169	200164		200S	BELL	4372	05/09/	95	TUE	1330	DB	C	N	1	101A				806	HT	M	W	OF	L		N	P	100			2			280090	638000
7	171	200164		30S	MANOEKA	36945	12/04/	95	WED	1430	DB	C	S	1						P	E	D	BU	F	T	N	C	100						280089	637679
7	163	200164		1000S	POPLAR	3391	17/03/	93	WED	1520	EA	V	N	1T	252A					M	R	D	BU	F		N	C	100			1			280101	637842
7	179	200164		200N	BELL	39212	27/11/	94	SUN	1230	FD	C	N	1C							R	D	BF	F		N	L	100						280085	638040
7	177	200164		600N	MANOEKA	34307	16/02/	93	TUE	1510	FF	C	S	1C							R	D	BN	F		N	C	100						280086	637734
7	176	200164		I	MANOEKA	1012	18/01/	94	TUE	805	GD	C	S	1C	253A						M	D	BN	F	T	N	C	100			1			280087	637677
7	178	200164		600N	MANOEKA	2957	16/02/	93	TUE	1510	GD	C	S	1V	250A				978		R	D	BN	F	D	N	C	100			1			280086	637734
7	161	200164		1200S	POPLAR	33911	13/03/	96	WED	830	KB	C	N	1V					978		E	D	BN	F	D	N	C	100						280108	637832
7	172	200164		50N	BELL	2989	12/07/	93	MON	1145	MB	T	N	1V	227B						R	D	BN	F		N	C	100			1			280088	638027
8	77	200180	JELLICOE	I	KING	36129	13/05/	94	FRI	1050	AC	C	E	1T							R	D	BU	F	T	N	C	50						280352	637423
8	81	200180	13	100E	OXFORD	33925	01/05/	92	FRI	1330	AC	T	S	1C							R	D	OF	F		N	R	50						280343	637424
8	82	200180	JELLICOE	90E	OXFORD	39583	05/09/	92	SAT	2259	AC	C	W	1C						M	R	D	DO	F		N	R	50						280342	637425
8	89	200180	JELLICOE	30W	OXFORD	40301	20/09/	96	FRI	1115	AC	C	W	1C							E	D	BF	F		N	R	50						280330	637429
8	329	JELLICO	E	I	JOCELYN	40181	15/10/	96	TUE	1145	AC	C	E	1T							E	D	OF	F	R	G	C	50						280316	637439
8	80	200180	JELLICOE	60W	KING	1172	17/01/	96	WED	1745	AD	C	E	1CC	101A	113A				MM	R	D	BF	F		N	C	50		1				280348	637422
8	113	200180	JELLICOE	I	OROUA	3077	15/01/	93	FRI	1305	AO	C	W	1T	160A						E	D	BF	F	M	N	C	50			1			280275	637459
8	132	200164	JELLICOE	60S	DUNLOP	33220	22/02/	96	THR	1850	BE	V	N	1C							M	W	ON	H		N	C	50						280219	637474
8	136	200164		I	DUNLOP	4571	07/03/	95	TUE	1930	BE	C	W	1C	101A	111A				KT	M	D	TF	F	T	N	L	50		3				280216	637478
8	328	JELLICO	E	100W	CAMERON	1300	19/02/	97	WED	1905	BE	C	E	1T	138A				901		M	W	DO	H		N	C	50			1			0	0
8	90	200164	JELLICOE	100E	JOCELYN	31911	29/02/	96	THR	2250	CB	C	E	1						H	R	D	DO	F		N	C	50						280323	637433
8	110	200180	JELLICOE	100W	BOUCHER	4890	10/11/	96	SUN	845	CB	C	E	1	103A	240A				P	R	D	BF	F		N	R	50			2			280292	637453
8	107	200180	JELLICOE	60E	BOUCHER	181	23/09/	95	SAT	1920	CC	C	E	1	168A	113A				TI	R	D	DO	F		N	R	50	2	1	1			280304	637445
8	112	200180	JELLICOE	100E	OROUA	5381	19/10/	93	TUE	1555	DA	C	E	1	111A	632A				P	E	D	OF	F		N	R	50		1	1			280285	637456
8	118	200180	004 JELLIC	I	BELVEDERE	36150	09/07/	92	THR	140	DA	C	E	1						P	E	D	DO	F	T	N	C	50						280265	637461
8	133	200164		40S	DUNLOP	34	26/02/	93	FRI	120	DA	C	S	1	101A	111A				T	M	D	DO	F		N	C	50	1	1				280218	637475
8	76	200180		10E	KING	1921	26/02/	95	SUN	1500	DB	C	W	1	240A					F	E	D	OU	F	T	N	P	50			1			280354	637422
8	127	200180	JELLICOE	50W	CAMERON	37064	04/05/	95	THR	10	DB	C	S	1						FB	M	W	DO	F		N	L	50						280238	637465
8	128	200180	JELLICOE	70N	CAMERON	5560	24/09/	94	SAT	2025	DB	C	S	1	111A					B	M	W	DO	L		N	L	50			2			280237	637464
8	129	200164	JELLICOE	200S	DUNLOP	5	11/01/	95	WED	1250	DB	C	S	1	101A	111A	232A			B	M	W	DO	L		N	L	50	1		1			280232	637466
8	84	200180	JELLICOE	70E	OXFORD	37062	14/02/	95	TUE	1630	EA	T	W	1VC						MM	R	D	UF	F		N	C	50						280339	637425
8	87	200180	JELLICOE	40E	OXFORD	31925	09/03/	96	SAT	240	EA	C	E	1C						M	E	D	DO	F		N	C	50						280337	637425
8	104	200180	JELLICOE	70W	JOCELYN	37065	14/05/	95	SUN	2030	EA	C	S	1CCC						MMM	R	D	DO	F		N	R	50						280310	637441
8	119	200180	003 JELLIC	30E	BEATTY	2255	10/06/	92	WED	925	EA	S	S	1T	450A					M	R	D	ON	F		N	C	50		1			16	280259	637462
8	86	200180	JELLICOE	I	PALMER	2496	17/06/	97	TUE	1300	FA	T	W	1T	191B	197B					R	W	ON	L	T	N	C	50		1				280337	637427
8	137	200180	JELLICOE	I	DUNLOP	5151	23/09/	95	SAT	1015	GA	C	N	1C	171A						R	D	BN	F	T	N	C	50			1			280216	637478
8	120	200180	JELLICOE	I	BEATTY	34306	21/05/	93	FRI	800	GD	T	E	1V							R	D	ON	F	T	N	C	50						280256	637462
8	121	200180		100E	STATION	40296	18/11/	92	WED	1650	GD	C	E	1C					975		R	W	OU	L	D	N	L	50						280253	637463
8	109	200180	JELLICOE	I	BOUCHER	2956	05/03/	93	FRI	2100	JA	M	W	1C	101B	285B					R	D	DO	F	T	G	R	50			2			280299	637448
8	116	200164	JELLICOE	I	ATUAROA	2441	07/06/	97	SAT	1825	JA	M	N	1C	104A	283B					R	D	DO	F	T	S	C	50		1	1			280270	637492
8	117	200180	JELLICOE	I	BELVEDERE	36761	23/08/	93	MON	1755	JA	C	W	1V							R	D	TF	FS	T	G	C	50						280265	637461
8	134	200164		20S	DUNLOP	39287	15/09/	92	TUE	1640	JA	C	N	1C					975		R	D	OF	FS	D	N	C	50						280217	637477
8	135	200164		I	DUNLOP	4663	04/10/	92	SUN	1700	JA	C	N	1C	102B	285B					R	D	BN	F	T	G	C	50			1			280216	637478
8	139	200164	JELLICOE	I	DUNLOP	2191	16/04/	97	WED	1020	JA	C	N	1C	122B						R	D	BF	F	T	S	C	50			1			280216	637477
8	141	200164	JELLICOE	20N	DUNLOP	1037	10/01/	96	WED	1215	JA	M	N	1C	128B				975		R	D	BF	F	D	N	P	50			1			280215	637478
8	78	200180	JELLICOE	I	KING	38347	04/11/	94	FRI	1640	KA	V	W	1C							R	D	BU	F	T	G	R	50						280352	637423
8	79	200180	JELLICOE	30W	KING	40180	30/08/	96	FRI	1140	KA	C	E	1C					962		R	D	BF	F	D	N	C	50						280349	637423
8	111	200180	JELLICOE	140W	BOUCHER	34005	22/04/	96	MON	1445	KB	C	W	1T					978		R	D	BF	F	D	N	C	50						280289	637456
8	114	200164	JELLICOE	I	ATUAROA	41879	27/11/	96	WED	1110	KB	C	S	1C							R	D	OF	F	T	S	C	50						280270	637492
8	138	200164	JELLICOE	I	DUNLOP	38166	10/08/	96	SAT	1610	LB	C	N	1C							R	D	BF	F	T	S	P	50						280216	637477
8	140	200164	JELLICOE	I	DUNLOP	33435	18/05/	97	SUN	750	LB	C	W	1C					978		R	D	BF	F	D	N	C	50						280216	637477
8	105	200180	JELLICOE	100E	BOUCHER	39290	17/07/	92	FRI	2010	MA	C	W	1C							R	D	DO	F		N	R	50						280308	637443
8	106	200180	JELLICOE	50E	BOUCHER	5916	10/09/	92	THR	1535	MA	C	W	1C	221B						R	D	BF	F		N	C	50			1			280304	637446
8	108	200180	JELLICOE	50S	BOUCHER	36128	10/06/	94	FRI	2105	MA	C	S	1C							R	D	DO	F		N	R	50						280302	637447
8	83	200164	JELLICOE	5S	PALMER	37112	07/03/	95	TUE	1000	MB	C	E	1C						M	R	D	BF	F	T	N	R	50						280340	637425
8	85	200180	JELLICOE	I	PALMER	39582	04/07/	92	SAT	1400	MB	C	E	1C							R	D	OU	F	T	G	R	50						280337	637427
8	88	200180	JELLICOE	20E	OXFORD	39362	25/09/	96	WED	2010	MO	C	N	1						H	R	W	DO	L		N	R	50						280336	637425
8	130	200180	JELLICOE	100W	CAMERON	4482	15/10/	93	FRI	1220	NA	T	W	1E	713B						R	D	BF	F		N	C	50			1		9	280231	637467
9	57	200180	27	100W	TE MATAI	3304	01/08/	92	SAT	905	AA	S	E	1C	426A						R	W	ON	F		N	C	100			1		40	280459	637363
9	59	200180		200W	TE MATAI	3071	15/02/	93	MON	1910	AA	M	E	1C	113A				953		R	D	BN	F		N	L	100			1			280448	637363
9	49	200180		500N	STRANG	6070	09/12/	94	FRI	1500	AB	C	E	1C	251A					B	R	D	BU	F		N	C	100			1			280507	637365
9	46	200180		15S	STRANG	15	23/01/	95	MON	1130	BE	C	E	1T	250A						E	D	BN	F	X	G	C	100	1	1				280555	637353
9	55	200164		50W	TE MATAI	154	21/09/	96	SAT	1405	BE	C	W	1C	271A	101B					R	D	BF	F		N	L	100	1	4				280461	637362
9	58	200180		190W	TE MATAI	64	04/05/	96	SAT	2200	BE	C	E	1T	101A	242A	138A		972		R	D	DN	F		N	L	100	1					280450	637362
9	48	200180		500N	STRANG	37031	30/08/	94	TUE	1440	CB	C	W	1							R	D	BF	F		N	C	100						280507	637365
9	62	200180	24	400W	TE MATAI	4298	18/07/	92	SAT	200	CB	C	E	1	102A	139A				BG	R	W	DN	L		N	C	100			1			280429	637365
9	50	200180		300E	TE MATAI	34545	28/04/	96	SUN	1750	CC	C	E	1						C	R	D	OF	F		N	L	100						280499	637364
9	44	200180	37	100E	STRANG	3308	21/07/	92	TUE	1810	DA	C	S	1	103A					C	M	W	DN	H		N	L	100			1			280566	637354
9	63	200180	24	400W	TE MATAI	4299	18/07/	92	SAT	200	EB	C	W	1C	102A	117A	139A	102B	605B	Q	R	W	DN	L		N	C	100			1			280429	637365
9	53	200180		I	TE MATAI	5372	16/10/	95	MON	1540	FD	B	E	1TBM	171A						R	D	BF	F	T	N	C	100			1			280468	637363

A

code	no	road1	roadaname	dist	road2	number	date	year	day	time	axtype	veh1	v1dir	veh2	x1	x2	x3	x4	x5	x6	curve	wetdry	light	weather	junction	control	markings	speed	fatal	serious	minor	non-inj	age	east	north
9	56	200180		100W	TE MATAI	39572	01/08/	92	SAT	910	FD	C	W	1CC							R	W	ON	F		N	C	100						280459	637363
9	61	200180		200W	TE MATAI	3070	22/04/	93	THR	1030	FD	V	E	1C	253A						E	D	BN	F		N	L	100			1			280448	637363
9	45	200180		I	STRANG	36138	14/06/	94	TUE	1600	GD	V	E	1CC							R	D	BF	F	T	N	C	100						280555	637355
9	52	200180		I	TE MATAI	36369	16/04/	94	SAT	1815	GD	C	E	1C							R	D	DO	F	T	S	P	100						280468	637363
9	54	200180		I	TE MATAI	40598	02/11/	96	SAT	650	LB	C	W	1C							R	D	OF	F	T	S	L	100						280468	637363
9	51	200180		300S	TE MATAI	5926	11/09/	92	FRI	1550	MB	V	E	1V	227A						R	D	ON	F		N	C	100			2			280496	637360
9	60	200180		200W	TE MATAI	3069	22/04/	93	THR	945	MB	C	S	1C	227B						R	D	BN	F		N	L	100		1	2			280448	637363
9	47	200180		50N	STRANG	3671	22/05/	94	SUN	1800	PA	C	S	1E	250A	735B					R	D	DN	F		N	C	100		1			18	280550	637358
10	43	200180		200E	KENANA	5374	21/10/	95	SAT	1115	BC	C	W	1B	131A						E	D	BN	F		N	C	70			1			280577	637353
10	39	200180		80W	RANGIURU	34309	09/01/	93	SAT	315	DA	C	W	1							E	D	DO	F		N	C	70						280634	637322
10	37	200184		I	RANGIURU	31912	25/02/	96	SUN	45	DB	C	E	1							E	D	DO	F	T	N	C	50						280642	637319
10	36	200180		A	KAITUNA RV BR	37533	31/07/	95	MON	1730	EB	T	N	1C						Q	M	W	TN	L		N	C	70						280645	637323
10	40	200180		44 100W	RANGIURU	36151	10/07/	92	FRI	1855	GC	V	S	1C					977	F	R	D	DO	F	D	N	C	70						280634	637321
10	41	200180		200W	RANGIURU	3061	09/02/	93	TUE	2130	LB	C	W	1C	103B	287B			977		R	D	DO	F	D	N	C	70		1	2			280625	637326
10	42	200180		500S	STRANG	36949	28/02/	95	TUE	1245	MB	C	S	1C					978		E	D	BF	F		N	C	70						280602	637342
10	38	200180		60W	RANGHURU	3013	12/06/	96	WED	1540	NA	C	N	1E	713B						R	U	BF	U		N	C	50			1		2	280637	637324
11	12	200180		400N		33 39597	26/03/	92	THR	1600	FA	T	S	1T							R	D	BN	F		N	C	100						280948	637209
11	14	200180		800N		33 3067	22/02/	93	MON	1730	LB	M	N	1C	287B	250B			978		R	D	BN	F	D	N	C	100		1				280936	637247
11	10	200180		100N		33 1609	19/03/	94	SAT	1210	MB	B	N	1C	227B						R	D	BF	F		N	C	100			2			280969	637194
11	13	200180		I	GULLIVER	1668	03/03/	95	FRI	1800	MB	M	S	1C	101A	111A					M	D	BU	F	Y	N	P	100			2			280939	637220
11	15	200180		10E	MAKETU	1036	05/01/	97	SUN	1240	MB	C	E	1C	227B						R	D	B	F	X	G	C	100			2			280897	637306
13	355	PAPAMOA BEACH		60E	ALAN	31703	16/02/	96	FRI	2200	CB	C	W	1						F	R	D	DO	F		N	C	70						280039	638391
13	356	PAPAMOA BEACH		250N	ALEXANDER	1683	23/02/	93	TUE	1925	CC	C	N	1	103A	251A				P	R	D	TN	F		N	C	70		1	1			280110	638358
13	361	PAPAMOA BEACH		500S	DOMAIN	36392	13/06/	96	THR	2200	DB	C	N	1					977	F	R	D	DO	F	D	N	C	50						280034	638397
13	359	PAPAMOA BEACH		300E	ALLAN	30807	02/02/	97	SUN	940	GE	C	S	1C					977	TW	R	D	BF	F	D	N	C	70						280063	638384
13	368	PAPAMOA BEACH		I	DOUGLAS	39412	13/09/	95	WED	955	LB	C	W	1C							R	D	BF	F	T	N	C	70						280081	638375
13	369	PAPAMOA BEACH		I	DOUGLAS	38214	15/07/	96	MON	1430	MB	C	S	1T							R	W	OF	L	T	N	C	70						280081	638375
13	360	PAPAMOA BEACH		I	ALLAN	5241	15/09/	93	WED	2040	NA	C	W	1E	102A	108A	735B				R	D	DO	F	T	N	C	70			1	U		280030	638392
14	68	200180		I	NO 1	34324	31/05/	93	MON	1705	AB	M	E	1C							E	D	TN	F	X	N	L	100						280393	637382
14	65	200180		100E	NO 1	4664	02/10/	92	FRI	1530	AD	C	E	1	103A	111A	151A				E	D	OU	F		N	C	100			1			280402	637374
14	74	200180	JELLICOE	200E	KING	34007	11/05/	96	SAT	2125	AD	C	E	1					817		E	D	DN	F		N	C	70						280370	637414
14	73	200180		16 200E	KING	24	18/02/	92	TUE	1150	BC	C	W	1T	252A	131A	632A				E	D	BF	F		N	C	50	1		2			280372	637412
14	66	200180		100E	NO 1	4358	19/08/	95	SAT	2050	DA	C	W	1C	103A					S	M	D	DF	F		N	C	80			1			280402	637374
14	67	200180		100E	NO 1	42087	17/12/	95	SUN	850	DA	V	W	1						V	M	W	ON	H		N	C	80						280402	637374
14	72	200180	JELLICOE	300N	NO 1	36763	29/08/	93	SUN	1320	DA	C	S	1						T	M	D	ON	F		N	C	50						280372	637413
14	71	200180	JELLICOE	140W	NO 1	39692	21/09/	96	SAT	1155	FD	C	W	1C							E	D	BF	F		N	P	50						280385	637395
14	69	200180		I	NO 1	3073	14/06/	93	MON	1145	JA	M	W	1V	285B						R	D	BF	F	T	G	L	100		1				280393	637382
14	70	200180		I	NO 1	36943	12/04/	95	WED	830	KA	T	N	1C							R	W	OU	F	T	N	L	80						280393	637382
14	75	200180		80E	KING	37532	03/08/	95	THR	1140	MB	C	N	1C							R	D	OU	F		N	C	70						280358	637421
14	64	200180	JELLICOE	300E	NO1	34878	13/05/	96	MON	2046	QG	T	E	1							R	W	DO	H		N	C	50						280419	637366
15	146	200164		400N	TE PUKE QUARRY	3068	27/04/	93	TUE	1530	BE	T	S	1CC					999		E	W	ON	LS		N	C	70		1	1			280165	637581
15	142	200164		200N	ATUAROA	37043	11/07/	95	TUE	2300	FA	V	S	1C							R	D	DO	F		N	C	70						280192	637509
15	145	200164		200S	TE PUKE QUARRY	5006	06/11/	96	WED	830	FD	C	S	1CC	258A				971		R	D	BF	F	D	N	P	70			2			280173	637526
15	143	200164		300E	NO 3	39193	19/12/	94	MON	1400	GA	T	S	1T					978		R	D	BU	F	D	N	C	70						280187	637515
15	152	200164		250S	COLLINS	39571	11/12/	92	FRI	945	GC	T	N	1T				9 77	831		M	D	BN	F	D	N	C	70						280161	637617
15	153	200164		300N	TE PUKE QUARRY	3004	20/02/	95	MON	1300	GD	C	N	1C	250A				977		R	D	BN	F	D		C	70			2			280161	637572
15	154	200164		150N	TE PUKE QUARRY	39291	16/02/	92	SUN	1410	GD	C	N	1C					975		E	D	BF	F	D	N	L	70						280160	637560
15	148	200164		I	TE PUKE QUARRY	5474	04/12/	92	FRI	550	HA	C	E	2T	250A	285A					R	W	OF	L	T	G	C	70			1			280163	637543
15	156	200164		140 200N	TE PUKE QUARRY	3305	18/06/	92	THR	1815	JA	C	N	1C	104B	289B			978		E	D	DN	F	D	N	C	70		1	1			280157	637556
15	149	200164		I	TE PUKE QUARRY	36762	29/07/	93	THR	1525	JA	C	N	1C							E	D	BF	F	T	G	L	70						280163	637543
15	150	200164		I	TE PUKE QUARRY	4154	22/07/	94	FRI	10	JA	C	N	1C	103A	285B				S	E	D	DN	F	T	G	C	70			4			280163	637543
15	151	200164		142 I	TE PUKE QUARRY	2460	20/05/	92	WED	1750	JA	C	N	1C	103B	285B					E	W	DN	F	T	G	P	70			1			280163	637543
15	155	200164		140 150N	TE PUKE QUARRY	2254	04/06/	92	THR	1810	KB	C	N	1T	103A	128B			975		E	D	DO	F	D	N	C	70			1			280160	637560
15	144	200164		200S	NO 3	3274	09/04/	96	TUE	1640	LB	C	W	1C	287B				978		E	W	OF	L	D	N	P	70		1				280178	637521
15	147	200164		143 I	NO 3	2197	05/05/	92	TUE	1040	LB	M	N	1C	287B	235B					R	D	OF	F	T	N	C	70		1				280164	637538
16	23	200180		800W	TE TUMU	1597	04/03/	94	FRI	2120	BA	C	W	1C	134A						R	D	DN	F		N	N	100			1			280827	637346
16	29	200180		500E	RANGIURU	4653	11/01/	95	WED	2230	BE	C	E	1C	258A	101B					E	D	DN	F		N	C	100		1	2			280679	637351
16	35	200180		50E	RANGIURU	41392	08/11/	96	FRI	1650	BE	T	N	1T						V	M	D	BN	F		N	C	100						280649	637325
16	27	200180		250E	PAH	3062	03/06/	93	THR	1935	DA	C	S	1	101A					F	E	W	DN	F		N	C	100			1			280728	637375
16	31	200180		300E	RANGIURU	2954	31/01/	93	SUN	615	DA	C	W	1	103A	240A				F	E	D	ON	F		N	C	100			1			280669	637328
16	32	200180		200E	KAITUNA RV BR	1680	01/01/	96	MON	910	DA	C	N	1	103A	111A				V	M	D	BN	F		N	C	100			4			280667	637328
16	26	200180		650E	PAH	39577	29/12/	92	TUE	800	DB	C	N	1						X	E	D	BN	F		N	C	100						280768	637376
16	30	200180		450W	PAH	4219	17/09/	96	TUE	2205	DB	M	W	1	191A						M	D	DN	F		N	C	100			1			280676	637339
16	34	200180		150E	RANGIURU	5179	13/11/	94	SUN	2120	DB	C	E	1	197A					C	E	D	DN	F		N	C	100			2			280656	637325
16	22	200180		30W	SHOWGROUNDS	33910	19/05/	96	SUN	2030	EC	V	W	1						W	R	D	DO	F		N	C	100						280890	637304
16	33	200180		180E	RANGIURU	40293	14/01/	92	TUE	2215	FA	C	W	1C							R	D	DN	F		N	C	100						280659	637322
16	24	200180		I	AFFCO	40294	14/05/	92	THR	645	LB	C	W	1V							R	D	TN	FF	T	N	L	100						280803	637464
16	25	200180		I	AFFCO	3604	03/08/	93	TUE	725	LB	V	W	1C	287B					F	R	W	ON	F	T	N	L	100			1			280803	637464
16	28	200180		200W	PAH	5592	08/12/	96	SUN	2110	LB	C	E	1C	287B	235B			977		R	D	DN	F	D	N	C	100		1	2			280688	637361
100	366	PAPAMOA BEACH		I	DOMAIN	40473	27/10/	96	SUN	510	DA	C	E	1							E	W	DO	L	R	G	R	50						279984	638418
100	364	PAPAMOA BEACH		I	DOMAIN	4625	31/10/	93	SUN	330	FA	C	S	1C	103A	171A				P	R	W	DO	L	R	U	U	50			3			279984	638418
100	318	DOMAIN		I	PAPAMOA BEACH	4033	15/08/	95	TUE	815	HA	C	E	1C	285A						R	D	BN	F	R	G	R	70			1			279984	638418

code	no	road1	roadaname	dist	road2		number	date	year	day	time	axtype	veh1	v1dir	veh2	x1	x2	x3	x4	x5	x6	curve	wetdry	light	weather	junction	control	markings	speed	fatal	serious	minor	non-inj	age	east	north
100	365	PAPAMOA	BEACH	I	DOMAIN		2103	04/01/	95	WED	2030	HA	C	W	2C	284A						E	D	TF	F	R	G	R	50			1			279984	638418
100	367	PAPAMOA	BEACH	I	DOMAIN		5024	13/11/	96	WED	1545	HA	C	E	1C	285A						R	D	BF	F	R	G	C	70			1			279984	638418
101	309	200164		I	DOMAIN		38215	05/08/	96	MON	1650	AC	C	S	1C						V	E	W	OF	L	T	G	L	100						279945	638230
101	227	200164		I	DOMAIN		42898	14/12/	96	SAT	1355	BC	C	W	2C							M	W	ON	H	T	G	C	100						279945	638230
101	310	200164		I	DOMAIN		42104	29/11/	96	FRI	1740	DA	C	N	1							E	D	BN	F	T	G	C	100						279945	638230
101	215	200164		I	DOMAIN		1685	10/02/	93	WED	1635	JA	C	S	1CC	285B						R	W	OU	L	T	G	C	100		1				279945	638230
101	219	200164		I	DOMAIN		34980	12/05/	94	THR	1700	JA	C	W	1C							R	D	OF	F	T	G	C	100						279945	638230
101	222	200164		I	DOMAIN		2415	07/05/	96	TUE	1530	JA	M	S	1C	122B						R	D	BF	F	T	G	L	100			1			279945	638230
101	221	200164		I	DOMAIN		38525	28/04/	95	FRI	2150	KA	T	W	1C							R	D	DN	F	T	G	C	100						279945	638230
101	220	200164		I	DOMAIN		34981	17/06/	94	FRI	1450	KB	C	E	1C							R	W	ON	L	T	G	C	100						279945	638230
101	311	200164		I	DOMAIN		41875	06/12/	96	FRI	935	KB	C	N	1C							E	D	BF	F	T	G	L	100						279945	638230
101	218	200164		I	DOMAIN		2044	24/03/	94	THR	1810	LB	V	S	1C	146A	237B					R	W	TO	L	T	G	C	100			1			279945	638230
101	301	200164		I	DOMAIN		4270	03/09/	93	FRI	1545	LB	P	S	1C	287B						R	D	BF	F	T	N	C	100			1			279945	638230
101	302	200164		I	DOMAIN		30058	02/01/	94	SUN	1140	LB	C	S	1C							R	D	BF	F	T	G	C	100						279945	638230
101	308	200164		I	DOMAIN		2669	14/05/	96	TUE	1450	MB	T	N	1V	227B						R	D	BF	F	T	G	C	100			1			279945	638230
102	184	200164		I	BELL		1628	13/03/	96	WED	1945	CB	C	S	1	631A					P	R	D	TF	F	T	S	C	100			1			280084	638018
102	183	200164		I	BELL		3622	22/06/	94	WED	1730	GD	C	N	1C	154A						M	D	DO	F	T	G	P	100			1			280084	638018
102	187	200164		85 I	BELL		1806	30/04/	92	THR	1955	GD	C	N	1C	102A	155A	163A				R	D	DO	F	T	N	P	100			1			280084	638018
102	181	200164		I	BELL		39573	11/07/	92	SAT	1610	GE	C	N	1C							R	D	ON	F	T	G	L	100						280084	638018
102	185	200164		I	BELL		35576	31/05/	96	FRI	1800	KA	C	S	1C							E	D	DO	F	T	N	C	100						280084	638018
102	182	200164		I	BELL		4289	05/09/	93	SUN	1330	LB	S	S	1V	287B						R	D	BN	F	T	G	P	100			1		31	280084	638018
102	186	200164		I	BELL		38666	26/08/	96	MON	915	LB	T	S	1T							S	W	OF	L	T	S	L	100						280084	638018
106	21	200180		75 I	MAKETU		2196	12/05/	92	TUE	1040	FD	T	W	1CC	171A	143B					R	D	BN	F	X	N	C	100			5			280891	637302
106	17	200180		I	MAKETU		34308	20/02/	93	SAT	1505	HA	V	S	2C							R	W	ON	L	X	S	C	100						280891	637302
106	19	200180		I	TE TUMU		5559	20/12/	94	TUE	1350	JA	C	S	1C	285B						R	D	BN	F	X	G	P	100			1			280891	637302
106	20	200180		I	TE TUMU		2668	20/05/	96	MON	745	JA	C	E	1C	122B						R	D	OF	F	T	G	C	100			3			280891	637302
106	16	200189		I	MAKETU		42536	29/12/	95	FRI	1512	KB	C	W	1C							R	D	BF	F	T	S	C	100						280895	637306
107	3	200189		100E		33	1018	02/01/	97	THR	1420	FD	C	W	1C	252A						R	D	ON	F			L	100			1			280988	637188
107	11	200180		80N		33	36952	18/08/	95	FRI	2150	FE	V	N	1C							R	D	DN	F		T	C	100			.			280968	637190
107	5	200189		70E		33	4806	08/09/	94	THR	1440	FF	T	E	1CVT	171A	102B	232B	171D			M	D	BF	F		N	C	100			1			280980	637186
107	2	200189		150E		33	3976	20/08/	93	FRI	1635	GE	C	E	1C	158A				978		R	D	OF	F	D	N	C	100			1			280992	637181
107	6	200189		I		33	3696	24/05/	94	TUE	1100	JA	C	S	1C	285B					F	R	W	ON	L	T	G	R	100		1	2			280976	637182
107	9	200189		I		33	5713	20/11/	96	WED	1210	JA	T	S	1C	101B	285B					R	D	BF	F	T	G	L	100		1	1			280976	637182
107	7	200189		I		33	35575	13/06/	96	THR	745	KB	C	W	2C							R	D	BF	F	T	G	L	100						280976	637182
107	8	200189		I		33	41389	03/10/	96	THR	1400	QG	T	W	1							S	D	BF	F	T	G	C	100						280976	637182
109	100	200180	JELLICOE	I	JOCELYN		34004	01/02/	96	THR	1550	AC	T	N	1C							R	D	BF	F	R	G	R	50						280316	637439
109	97	200180	JELLICOE	I	JOCELYN		4396	09/09/	92	WED	2050	CB	C	E	1	101A	602A				PIJ	R	D	DO	F	R	G	R	50		1	3			280316	637439
109	102	200164		I	JOCELYN		3147	29/06/	96	SAT	250	CB	C	W	1	101A					CP	R	D	DO	F	R	G	C	50		1				280316	637438
109	98	200180	JELLICOE	I	JOCELYN		34325	29/01/	93	FRI	1555	DB	T	N	2CCC							R	D	BF	F	R	G	R	50						280316	637439
109	91	200180	JELLICOE	100E	JOCELYN		39288	11/05/	92	MON	1415	FC	C	E	1C							R	D	ON	F		N	X	50						280323	637433
109	92	200180	JELLICOE	100E	JOCELYN		36676	02/07/	96	TUE	1635	FC	C	W	1C							R	D	BF	F		N	X	50						280323	637433
109	93	200180	JELLICOE	80E	JOCELYN		39289	26/03/	92	THR	1627	FC	C	S	1C							R	D	BN	F		N	X	50						280322	637434
109	99	200180	JELLICOE	I	JOCELYN		37063	23/05/	95	TUE	1130	GF	C	N	2C							M	D	BN	F	R	G	R	50						280316	637439
109	103	200164	JELLICOE	I	JOCELYN		30250	10/01/	97	FRI	1005	GF	T	S	2C							E	D	OF	F	R	G	C	50						280315	637438
109	101	200180	JELLICOE	I	JOCELYN		34008	07/05/	96	TUE	1705	LB	C	S	1C							S	D	BN	F	R	G	R	50						280316	637439
109	95	200180	JELLICOE	50E	JOCELYN		3627	05/05/	94	THR	1650	NA	C	E	1E	259A	126A			902		R	D	BN	F		N	X	50		1			20	280320	637435
109	94	200164	JELLICOE	50E	JOCELYN		6207	22/12/	94	THR	1450	NB	C	S	1E	713B						R	D	BU	F		N	R	50			2		10	280320	637435
109	96	200180	JELLICOE	40E	JOCELYN		4359	24/08/	95	THR	917	PO	C	E	1E	257A	734B					R	D	BN	F		N	C	50			1		57	280319	637436
110	125	200164	JELLICOE	20W	CAMERON		41068	13/11/	96	WED	315	CB	C	W	1						T	R	D	DO	F		N	C	50						280241	637464
110	123	200180	JELLICOE	I	CAMERON		4662	16/11/	92	MON	905	FD	C	W	1CC	171A				801		R	W	OF	L	X	N	C	50			2			280243	637464
110	122	200180	JELLICOE	I	STATION		37290	19/07/	96	FRI	1635	JA	C	E	1C							R	W	OF	H	T	S	P	50						280244	637463
110	124	200180	JELLICOE	I	CAMERON		34627	06/07/	97	SUN	1800	KB	C	W	1C							R	D	DO	F	X	S	C	50						280243	637464
110	126	200180	JELLICOE	40W	STATION		42903	30/12/	96	MON	1540	MA	C	W	1C							R	W	OF	H		N	C	50						280239	637465

APPENDIX E Cost and Benefit Time Streams

Faxed 15/7

15 July 1997

OPUS
INTERNATIONAL CONSULTANTS

Transit New Zealand
P O Box 5084
WELLINGTON

ATTENTION: Colin Crampton

File: 2/61444

Dear Sir

TE PUKE INTERNAL BYPASS ECONOMICS : WILLINGNESS TO PAY SURVEY

This letter is an update of my previous letter of 20 March 1997 that formed the basis of a TNZ submission.

As you are aware, due to review criticisms, Opus International, McDermott Fairgray and Valuation Technologies (Dr Leslie Syme) agreed to undertake a validation survey of the intangible benefits. (Refer our discussions on 3 April and my fax of 4 April 1997). This survey concentrated on 2 aspects:

i) determining the travel costs to alternative shopping centres and the amount that would be saved, and
ii) the direct "willingness to pay" for improvements.

The survey was to include a minimum of sample size 100.

The preliminary results of the incompleted survey (sample of 85) were presented at a stakeholders meeting on 23 May 1997.

I am pleased to advise that the survey has now been completed (sample size 102). Although neither Leslie Syme or McDermott Fairgray have produced a revised report based on this second survey, I have been given the results. The values differ slightly from those presented at the stakeholders meeting based on the additional survey responses. Table 1 attached sets out the findings, comparison with previous surveys/assumptions and economics.

In summary:

- The validation survey generally confirms the findings of the original survey. The values are in the same order of magnitude.
- The questions in the 2nd survey relating to the travel cost savings were very direct and consequently the results are less open to interpretation.
- The survey indicated that there are a wide range of reasons people shop at alternative centres with a better range of shops, services and lower prices featuring regularly. Traffic nuisance and environment conditions was not ranked as a major reason for not

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shopping in the main street. Although $6.4M p.a. is spent on travel to an alternative centre approx only 7% of all shopping trips would be saved by constructing the internal bypass.

- The validation survey found a higher level of protest votes (55%) in the WTP questions. This is likely to be related to all the interim publicity on the subject. In essence a lot of people either don't want the internal bypass, do not see it as their responsibility to pay for it or could not afford to pay any extra.

- Due to the low number of valid responses to the WTP questions in the 2nd survey, the value may not be as robust as the initial survey.

- The revised BCR is 2.9. This includes the alternative shopping centre travel cost savings (this is a tangible value) and rates WTP. I have assumed that 100% of the WTP value can be incorporated as in the 2nd questionnaire, the respondents offered this value even though they stated that they often shop elsewhere and may not alter their shopping pattern, ie I believe that there is no double counting.

- The validation survey uncovered a high number of concerns relating to the community severance effects. Many believed that the internal bypass would drive a bigger wedge between two socio-economic groups.

- The community now appears divided on the issue of the bypass. A large percentage of the community and stakeholders appear to favour the external bypass constructed as soon as possible whilst the CBD businesses prefer to have the internal bypass built immediately.

- Whilst these surveys appear to have quantified the WTP value for the bypass plus the travel to alternative shopping centres , it may not have necessarily captured the full costs of the environmental conditions imposed on the community by SH2 passing through its CBD.

I hope that the validation survey and findings assist your decision making on this project. Irrespective of the academic critiques, I am sure that there is a place for surveys to measure externalities/intangibles whether they be contingency valuations surveys or other types. I am also sure that this has been a valuable exercise for all those involved.

Yours faithfully

C A Brodie
CIVIL ENGINEERING

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TABLE 1 : SURVEY FINDINGS AND ECONOMIC SUMMARY

	Original Survey August 1996	**Subsequent Assumptions March 1997**	**2nd Survey April/May 1997**
Tangible BCR PV Benefits PV Costs BCR	 $6.8M $3.6M 1.9	 $6.8M $3.6M 1.9	 $6.8M $3.6M 1.9
Sales leakage	$13M to $19M	N/A	N/A
Willingness to Pay via Rates via Parking => WTP via Rates PV (10 yrs)	$268,000 pa N/A $1.8M	$300,000 pa (John Bollard) N/A $2.0M	$229,000 pa $43,000 pa $1.5M (rates)
Travel Cost Savings associated with travel to alternative shopping centres => Travel savings PV (10 yrs)	$418,000 pa $2.7M	$500,000 p.a. (Opus estimate based on 10% saving of $5M pa spend on travel to alternative centres $3.3M	$288,000 p.a. (total cost of travel to alternative centres is $6.4M p.a.) $1.9M
Adjusted BCR	2.3 to 3.3 Excludes sales leakage	3.2 Assumed travel costs plus 2/3 WTP to avoid double counting	2.9 Assumes total travel saving and total WTP rates

APPENDIX E Cost and Benefit Time Streams

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS: 1997																																																							
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																																																							
		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_9	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1085.318	**73.710**	75.801	77.891	79.982	**82.073**	85.269	88.465	91.661	94.858	**98.054**	101.396	104.737	108.078	111.420	**114.761**	118.867	122.972	127.077	131.183	**135.288**	141.641	147.995	154.349	160.702	**167.056**	172.799	178.543	184.286	190.029	195.772	201.516	207.259	213.002	218.746	**224.489**	232.348	240.208	248.067	255.926	263.785	271.645	279.504	287.363	295.223	**303.082**	314.469	325.856	337.243	348.630	360.017	371.404	382.791	394.178	**416.951**
Travel Time Costs - Turns	52.301	**2.108**	2.184	2.261	2.337	**2.413**	2.783	3.154	3.524	3.894	**4.264**	4.300	4.336	4.372	4.407	**4.443**	4.801	5.158	5.516	5.873	**6.231**	7.303	8.376	9.449	10.521	**11.594**	12.223	12.852	13.481	14.111	14.740	15.369	15.998	16.628	17.257	**17.886**	19.429	20.971	22.513	24.056	25.598	27.140	28.683	30.225	31.768	**33.310**	36.063	38.817	41.570	44.324	47.077	49.830	52.584	55.337	**60.844**
Vehicle Operating Costs - Links	980.438	**71.930**	74.072	76.214	78.355	**80.497**	83.307	86.118	88.928	91.738	**94.548**	97.270	99.993	102.715	105.437	**108.160**	110.980	113.801	116.621	119.442	**122.262**	125.483	128.705	131.926	135.147	**138.368**	140.625	142.881	145.138	147.395	149.651	151.908	154.164	156.421	158.677	**160.934**	162.725	164.517	166.308	168.099	169.890	171.682	173.473	175.264	177.056	**178.847**	180.527	182.207	183.887	185.568	187.248	188.928	190.608	192.288	**195.648**
Vehicle Operating Costs - Turns	2.448	**0.106**	0.108	0.111	0.114	**0.117**	0.125	0.134	0.143	0.151	**0.160**	0.171	0.183	0.195	0.206	**0.218**	0.235	0.252	0.269	0.286	**0.303**	0.356	0.409	0.462	0.515	**0.568**	0.598	0.628	0.658	0.689	0.719	0.749	0.779	0.809	0.840	**0.870**	0.945	1.021	1.096	1.171	1.247	1.322	1.398	1.473	1.548	**1.624**	1.758	1.892	2.026	2.160	2.294	2.428	2.562	2.696	**2.964**
Accident Costs	155.568	**12.317**	12.547	12.778	13.008	**13.239**	12.955	12.672	12.388	12.105	**11.821**	12.776	14.050	15.323	16.596	**18.188**	18.682	19.177	19.671	20.165	**20.660**	21.249	21.839	22.428	23.018	**23.608**	23.984	24.360	24.736	25.112	25.488	25.864	26.240	26.616	26.992	**27.368**	27.690	28.013	28.335	28.657	28.980	29.302	29.624	29.947	30.269	**30.592**	30.932	31.273	31.613	31.954	32.294	32.635	32.976	33.316	**33.997**
TOTAL USER COSTS	2276.072	160.170	164.712	169.254	173.796	178.339	184.440	190.542	196.644	202.745	208.847	215.913	223.298	230.683	238.067	245.770	253.565	261.359	269.154	276.948	284.743	296.033	307.323	318.613	329.903	341.193	350.229	359.264	368.299	377.335	386.370	395.405	404.441	413.476	422.511	431.547	443.138	454.728	466.319	477.910	489.501	501.091	512.682	524.273	535.863	547.454	563.749	580.044	596.340	612.635	628.930	645.225	661.520	677.815	710.405
									Note 2006 Accident Costs factored by				0.75	to account for long term trends																																									

Then add in Passing Lanes N2, N3, S1, S2

DM_11	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1082.079	**73.710**	75.755	77.801	79.846	**81.892**	85.075	88.258	91.440	94.623	**97.806**	101.135	104.463	107.792	111.120	**114.448**	118.524	122.600	126.676	130.752	**134.828**	141.163	147.498	153.833	160.168	**166.503**	172.149	177.795	183.441	189.087	194.733	200.379	206.024	211.670	217.316	**222.962**	230.800	238.638	246.476	254.314	262.152	269.990	277.828	285.665	293.503	**301.341**	312.614	323.887	335.160	346.432	357.705	368.978	380.251	391.523	**414.069**
Travel Time Costs - Turns	52.269	**2.108**	2.184	2.261	2.337	**2.413**	2.783	3.152	3.522	3.891	**4.261**	4.297	4.334	4.371	4.408	**4.444**	4.803	5.161	5.519	5.877	**6.236**	7.323	8.410	9.498	10.585	**11.673**	12.274	12.876	13.478	14.080	14.681	15.283	15.885	16.486	17.088	**17.690**	19.268	20.845	22.423	24.001	25.578	27.156	28.734	30.311	31.889	**33.467**	36.086	38.704	41.323	43.942	46.560	49.179	51.798	54.416	**59.654**
Vehicle Operating Costs - Links	980.911	**71.930**	74.081	76.231	78.382	**80.533**	83.346	86.160	88.974	91.787	**94.601**	97.325	100.049	102.773	105.496	**108.220**	111.044	113.868	116.691	119.515	**122.339**	125.561	128.784	132.006	135.229	**138.451**	140.703	142.954	145.206	147.458	149.709	151.961	154.213	156.464	158.716	**160.968**	162.775	164.583	166.391	168.199	170.006	171.814	173.622	175.430	177.238	**179.045**	180.734	182.422	184.110	185.798	187.487	189.175	190.863	192.551	**195.928**
Vehicle Operating Costs - Turns	2.447	**0.106**	0.108	0.111	0.114	**0.117**	0.125	0.134	0.143	0.151	**0.160**	0.171	0.183	0.195	0.206	**0.218**	0.235	0.252	0.269	0.286	**0.303**	0.357	0.410	0.464	0.518	**0.571**	0.600	0.629	0.658	0.687	0.716	0.745	0.774	0.803	0.832	**0.861**	0.938	1.015	1.092	1.169	1.246	1.323	1.400	1.477	1.554	**1.632**	1.759	1.886	2.014	2.141	2.269	2.396	2.524	2.651	**2.906**
Accident Costs	155.568	**12.317**	12.547	12.778	13.008	**13.239**	12.955	12.672	12.388	12.105	**11.821**	12.776	14.050	15.323	16.596	**18.188**	18.682	19.177	19.671	20.165	**20.660**	21.249	21.839	22.428	23.018	**23.608**	23.984	24.360	24.736	25.112	25.488	25.864	26.240	26.616	26.992	**27.368**	27.690	28.013	28.335	28.657	28.980	29.302	29.624	29.947	30.269	**30.592**	30.932	31.273	31.613	31.954	32.294	32.635	32.976	33.316	**33.997**
TOTAL USER COSTS	2273.274	160.170	164.676	169.182	173.687	178.193	184.284	190.375	196.467	202.558	208.649	215.704	223.078	230.452	237.827	245.519	253.288	261.057	268.827	276.596	284.365	295.653	306.941	318.229	329.517	340.805	349.710	358.614	367.518	376.423	385.327	394.231	403.135	412.040	420.944	429.848	441.471	453.094	464.717	476.340	487.962	499.585	511.208	522.831	534.454	546.077	562.124	578.172	594.220	610.267	626.315	642.363	658.411	674.458	706.554
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**1**	**, weeks**	**0**																																																			
Travel Time Costs - Links	1082.120		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	97.806	101.135	104.463	107.792	111.120	114.448	118.524	122.600	126.676	130.752	134.828	141.163	147.498	153.833	160.168	166.503	172.149	177.795	183.441	189.087	194.733	200.379	206.024	211.670	217.316	222.962	230.800	238.638	246.476	254.314	262.152	269.990	277.828	285.665	293.503	301.341	312.614	323.887	335.160	346.432	357.705	368.978	380.251	391.523	414.069
Travel Time Costs - Turns	52.269		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.261	4.297	4.334	4.371	4.408	4.444	4.803	5.161	5.519	5.877	6.236	7.323	8.410	9.498	10.585	11.673	12.274	12.876	13.478	14.080	14.681	15.283	15.885	16.486	17.088	17.690	19.268	20.845	22.423	24.001	25.578	27.156	28.734	30.311	31.889	33.467	36.086	38.704	41.323	43.942	46.560	49.179	51.798	54.416	59.654
Vehicle Operating Costs - Links	980.903		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.601	97.325	100.049	102.773	105.496	108.220	111.044	113.868	116.691	119.515	122.339	125.561	128.784	132.006	135.229	138.451	140.703	142.954	145.206	147.458	149.709	151.961	154.213	156.464	158.716	160.968	162.775	164.583	166.391	168.199	170.006	171.814	173.622	175.430	177.238	179.045	180.734	182.422	184.110	185.798	187.487	189.175	190.863	192.551	195.928
Vehicle Operating Costs - Turns	2.447		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.160	0.171	0.183	0.195	0.206	0.218	0.235	0.252	0.269	0.286	0.303	0.357	0.410	0.464	0.518	0.571	0.600	0.629	0.658	0.687	0.716	0.745	0.774	0.803	0.832	0.861	0.938	1.015	1.092	1.169	1.246	1.323	1.400	1.477	1.554	1.632	1.759	1.886	2.014	2.141	2.269	2.396	2.524	2.651	2.906
Accident Costs	155.568		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.821	12.776	14.050	15.323	16.596	18.188	18.682	19.177	19.671	20.165	20.660	21.249	21.839	22.428	23.018	23.608	23.984	24.360	24.736	25.112	25.488	25.864	26.240	26.616	26.992	27.368	27.690	28.013	28.335	28.657	28.980	29.302	29.624	29.947	30.269	30.592	30.932	31.273	31.613	31.954	32.294	32.635	32.976	33.316	33.997
TOTAL USER COSTS	2273.307		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	208.649	215.704	223.078	230.452	237.827	245.519	253.288	261.057	268.827	276.596	284.365	295.653	306.941	318.229	329.517	340.805	349.710	358.614	367.518	376.423	385.327	394.231	403.135	412.040	420.944	429.848	441.471	453.094	464.717	476.340	487.962	499.585	511.208	522.831	534.454	546.077	562.124	578.172	594.220	610.267	626.315	642.363	658.411	674.458	706.554
Benefit Stream:																																																							
Travel Time Costs - Links	3.198	115.7%	0.000	0.090	0.136	0.181	0.194	0.208	0.221	0.234	0.248	0.261	0.274	0.287	0.300	0.313	0.342	0.372	0.401	0.431	0.460	0.479	0.497	0.516	0.534	0.553	0.650	0.748	0.845	0.943	1.040	1.137	1.235	1.332	1.429	1.527	1.548	1.569	1.591	1.612	1.634	1.655	1.676	1.698	1.719	1.741	1.855	1.969	2.083	2.197	2.312	2.426	2.540	2.654	2.882
Travel Time Costs - Turns	0.032	1.1%	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.003	0.002	0.001	-0.000	-0.001	-0.002	-0.003	-0.003	-0.004	-0.005	-0.020	-0.034	-0.049	-0.064	-0.079	-0.051	-0.024	0.004	0.031	0.059	0.086	0.114	0.141	0.169	0.196	0.161	0.126	0.090	0.055	0.020	-0.016	-0.051	-0.086	-0.122	-0.157	-0.022	0.113	0.247	0.382	0.517	0.652	0.786	0.921	1.190
Vehicle Operating Costs - Links	-0.466	-16.8%	0.000	-0.018	-0.027	-0.035	-0.039	-0.042	-0.046	-0.049	-0.053	-0.054	-0.056	-0.057	-0.059	-0.061	-0.064	-0.067	-0.070	-0.073	-0.077	-0.078	-0.079	-0.080	-0.082	-0.083	-0.078	-0.073	-0.068	-0.063	-0.058	-0.053	-0.048	-0.043	-0.038	-0.034	-0.050	-0.067	-0.083	-0.100	-0.116	-0.132	-0.149	-0.165	-0.182	-0.198	-0.207	-0.215	-0.223	-0.231	-0.239	-0.247	-0.255	-0.263	-0.279
Vehicle Operating Costs - Turns	0.001	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.002	-0.002	-0.003	-0.004	-0.002	-0.001	0.000	0.002	0.003	0.004	0.005	0.007	0.008	0.009	0.008	0.006	0.004	0.002	0.001	-0.001	-0.003	-0.004	-0.006	-0.008	-0.001	0.005	0.012	0.019	0.025	0.032	0.038	0.045	0.058
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	2.765	1.000	0.000	0.073	0.109	0.145	0.156	0.167	0.177	0.188	0.198	0.209	0.219	0.230	0.241	0.251	0.277	0.302	0.327	0.353	0.378	0.380	0.382	0.384	0.386	0.388	0.519	0.650	0.781	0.912	1.043	1.174	1.305	1.436	1.567	1.699	1.666	1.634	1.602	1.570	1.538	1.506	1.474	1.442	1.410	1.378	1.625	1.872	2.120	2.367	2.615	2.862	3.109	3.357	3.852
DM_11																																																							
Construction Period:	**1**	**years**																																																				
Construction	1.426		1.569	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Periodic Maintenance	0.113		0.000	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.000
TOTAL COST	1.544	0.000	1.569	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.001
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0.05731	0.07815	0.09473	0.09238	0.08967	0.08669	0.08351	0.0802	0.07679	0.07334	0.06989	0.06645	0.06307	0.06313	0.06266	0.06175	0.06049	0.05895	0.05387	0.04922	0.04498	0.04109	0.03755	0.04567	0.052001	0.056805	0.060307	0.062702	0.064164	0.064841	0.064866	0.064349	0.063391	0.056539	0.05041	0.044927	0.040025	0.035642	0.031726	0.028227	0.025102	0.022313	0.019622	0.021257	0.022266	0.022917	0.023265	0.02336	0.023246	0.02296	0.022533	0.02350425
50 year BCR	1.8	**FYRR**	0.00%	3.71%	5.06%	6.14%	5.98%	5.81%	5.62%	5.41%	5.20%	4.97%	4.75%	4.53%	4.31%	4.09%	4.09%	4.06%	4.00%	3.92%	3.82%	3.49%	3.19%	2.91%	2.66%	2.43%	2.96%	3.37%	3.68%	3.91%	4.06%	4.16%	4.20%	4.20%	4.17%	4.11%	3.66%	3.27%	2.91%	2.59%	2.31%	2.06%	1.83%	1.63%	1.45%	1.28%	1.38%	1.44%	1.48%	1.51%	1.51%	1.51%	1.49%	1.46%	1.52%
25 Year BCR from first year of construction			1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	24.1																								
25 Year PVB from first year of construction			1.669	1.724	1.783	1.847	1.912	1.980	2.048	2.116	2.183	2.250	2.309	2.362	2.409	2.451	2.488	2.522	2.551	2.578	2.601	2.622	2.644	2.667	2.691	2.716	2.740	2.765	2.789	2.812	2.837																								
25 Year PVC from first year of construction			1.535	1.535	1.535	1.536	1.536	1.536	1.538	1.538	1.541	1.541	1.541	1.541	1.541	1.541	1.541	1.541	1.542	1.542	1.544	1.544	1.544	1.544	1.544	1.544	1.544	1.544	1.544	1.544	1.544																								

Then include Cameron Road Signals

DM_15	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1076.801	**73.710**	75.732	77.753	79.775	**81.797**	84.969	88.142	91.314	94.486	**97.659**	100.971	104.283	107.596	110.907	**114.219**	118.262	122.305	126.348	130.391	**134.434**	140.659	146.884	153.109	159.334	**165.559**	170.854	176.149	181.444	186.739	192.034	197.329	202.625	207.920	213.215	**218.510**	226.044	233.577	241.111	248.645	256.178	263.712	271.246	278.780	286.313	**293.847**	304.291	314.735	325.178	335.622	346.066	356.509	366.953	377.397	**398.284**
Travel Time Costs - Turns	62.900	**2.108**	2.398	2.688	2.978	**3.268**	3.650	4.033	4.415	4.798	**5.180**	5.234	5.288	5.342	5.396	**5.450**	5.829	6.209	6.589	6.969	**7.348**	8.470	9.591	10.712	11.833	**12.955**	13.891	14.827	15.763	16.699	17.635	18.571	19.507	20.443	21.380	**22.316**	23.945	25.573	27.202	28.831	30.460	32.089	33.718	35.347	36.976	**38.604**	41.455	44.305	47.156	50.007	52.857	55.708	58.558	61.409	**67.110**
Vehicle Operating Costs - Links	981.396	**71.930**	74.084	76.239	78.394	**80.548**	83.363	86.178	88.992	91.807	**94.621**	97.347	100.073	102.799	105.524	**108.250**	111.076	113.903	116.729	119.555	**122.382**	125.607	128.832	132.057	135.282	**138.507**	140.801	143.094	145.388	147.682	149.976	152.270	154.563	156.857	159.151	**161.445**	163.241	165.037	166.834	168.630	170.426	172.223	174.019	175.815	177.611	**179.408**	181.160	182.913	184.666	186.418	188.171	189.923	191.676	193.429	**196.934**
Vehicle Operating Costs - Turns	2.964	**0.106**	0.119	0.133	0.146	**0.159**	0.168	0.177	0.186	0.194	**0.203**	0.216	0.228	0.241	0.253	**0.266**	0.284	0.302	0.321	0.339	**0.358**	0.412	0.467	0.522	0.577	**0.631**	0.677	0.723	0.769	0.815	0.860	0.906	0.952	0.998	1.044	**1.090**	1.169	1.248	1.327	1.406	1.486	1.565	1.644	1.723	1.802	**1.882**	2.020	2.159	2.298	2.437	2.576	2.715	2.854	2.992	**3.270**
Accident Costs	151.594	**12.317**	12.453	12.589	12.725	**12.861**	12.585	12.309	12.032	11.756	**11.480**	12.405	13.639	14.873	16.107	**17.650**	18.135	18.619	19.104	19.589	**20.074**	20.647	21.220	21.794	22.367	**22.941**	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	**26.652**	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	**29.813**	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	**32.873**
TOTAL USER COSTS	2275.655	160.170	164.786	169.402	174.018	178.634	184.736	190.838	196.939	203.041	209.143	216.173	223.511	230.849	238.187	245.834	253.586	261.338	269.091	276.843	284.595	295.794	306.994	318.193	329.393	340.592	349.534	358.476	367.418	376.360	385.302	394.244	403.186	412.128	421.070	430.012	441.366	452.720	464.075	475.429	486.783	498.137	509.491	520.845	532.199	543.553	559.045	574.537	590.029	605.520	621.012	636.504	651.996	667.487	698.471
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**8**	**, weeks**	**0**																																																			
Travel Time Costs - Links	1077.281		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	97.659	100.971	104.283	107.596	110.907	114.219	118.262	122.305	126.348	130.391	134.434	140.659	146.884	153.109	159.334	165.559	170.854	176.149	181.444	186.739	192.034	197.329	202.625	207.920	213.215	218.510	226.044	233.577	241.111	248.645	256.178	263.712	271.246	278.780	286.313	293.847	304.291	314.735	325.178	335.622	346.066	356.509	366.953	377.397	398.284
Travel Time Costs - Turns	59.370		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	5.180	5.234	5.288	5.342	5.396	5.450	5.829	6.209	6.589	6.969	7.348	8.470	9.591	10.712	11.833	12.955	13.891	14.827	15.763	16.699	17.635	18.571	19.507	20.443	21.380	22.316	23.945	25.573	27.202	28.831	30.460	32.089	33.718	35.347	36.976	38.604	41.455	44.305	47.156	50.007	52.857	55.708	58.558	61.409	67.110
Vehicle Operating Costs - Links	981.320		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.621	97.347	100.073	102.799	105.524	108.250	111.076	113.903	116.729	119.555	122.382	125.607	128.832	132.057	135.282	138.507	140.801	143.094	145.388	147.682	149.976	152.270	154.563	156.857	159.151	161.445	163.241	165.037	166.834	168.630	170.426	172.223	174.019	175.815	177.611	179.408	181.160	182.913	184.666	186.418	188.171	189.923	191.676	193.429	196.934
Vehicle Operating Costs - Turns	2.790		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.203	0.216	0.228	0.241	0.253	0.266	0.284	0.302	0.321	0.339	0.358	0.412	0.467	0.522	0.577	0.631	0.677	0.723	0.769	0.815	0.860	0.906	0.952	0.998	1.044	1.090	1.169	1.248	1.327	1.406	1.486	1.565	1.644	1.723	1.802	1.882	2.020	2.159	2.298	2.437	2.576	2.715	2.854	2.992	3.270
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2273.847		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.143	216.173	223.511	230.849	238.187	245.834	253.586	261.338	269.091	276.843	284.595	295.794	306.994	318.190	329.393	340.592	349.534	358.476	367.418	376.360	385.302	394.244	403.186	412.128	421.070	430.012	441.366	452.720	464.075	475.429	486.783	498.137	509.491	520.845	532.199	543.553	559.045	574.537	590.029	605.520	621.012	636.504	651.996	667.487	698.471
Benefit Stream:																																																							
Travel Time Costs - Links	4.839	-896.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.164	0.180	0.197	0.213	0.230	0.263	0.296	0.328	0.361	0.394	0.504	0.614	0.724	0.834	0.944	1.295	1.646	1.997	2.347	2.698	3.049	3.400	3.751	4.102	4.452	4.757	5.061	5.365	5.669	5.973	6.277	6.582	6.886	7.190	7.494	8.323	9.152	9.981	10.810	11.639	12.469	13.298	14.127	15.785
Travel Time Costs - Turns	-7.102	1315.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.920	-0.937	-0.954	-0.971	-0.988	-1.005	-1.027	-1.048	-1.070	-1.091	-1.113	-1.147	-1.180	-1.214	-1.248	-1.282	-1.616	-1.951	-2.285	-2.620	-2.954	-3.288	-3.623	-3.957	-4.291	-4.626	-4.677	-4.728	-4.779	-4.830	-4.882	-4.933	-4.984	-5.035	-5.086	-5.138	-5.369	-5.601	-5.833	-6.065	-6.297	-6.529	-6.760	-6.992	-7.456
Vehicle Operating Costs - Links	-0.417	77.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.021	-0.022	-0.024	-0.026	-0.028	-0.030	-0.032	-0.035	-0.038	-0.040	-0.043	-0.046	-0.048	-0.051	-0.053	-0.056	-0.098	-0.140	-0.182	-0.224	-0.267	-0.309	-0.351	-0.393	-0.435	-0.477	-0.466	-0.454	-0.443	-0.431	-0.420	-0.408	-0.397	-0.385	-0.374	-0.362	-0.427	-0.491	-0.555	-0.620	-0.684	-0.749	-0.813	-0.877	-1.006
Vehicle Operating Costs - Turns	-0.343	63.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.043	-0.044	-0.045	-0.046	-0.047	-0.048	-0.049	-0.050	-0.052	-0.053	-0.054	-0.056	-0.057	-0.058	-0.059	-0.060	-0.077	-0.094	-0.111	-0.128	-0.144	-0.161	-0.178	-0.195	-0.212	-0.229	-0.231	-0.233	-0.235	-0.237	-0.239	-0.242	-0.244	-0.246	-0.248	-0.250	-0.261	-0.273	-0.284	-0.296	-0.307	-0.319	-0.330	-0.341	-0.364
Accident Costs	2.482	-459.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.341	0.371	0.410	0.450	0.489	0.538	0.548	0.557	0.567	0.577	0.586	0.602	0.618	0.635	0.651	0.667	0.672	0.677	0.681	0.686	0.691	0.696	0.701	0.706	0.711	0.716	0.722	0.728	0.735	0.741	0.747	0.754	0.760	0.766	0.773	0.779	0.814	0.848	0.883	0.917	0.952	0.986	1.021	1.055	1.124
TOTAL USER BENEFITS	-0.540	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.496	-0.469	-0.433	-0.397	-0.361	-0.315	-0.298	-0.281	-0.264	-0.247	-0.230	-0.141	-0.053	0.036	0.124	0.213	0.175	0.138	0.100	0.062	0.025	-0.013	-0.051	-0.089	-0.126	-0.164	0.105	0.374	0.642	0.911	1.180	1.448	1.717	1.986	2.254	2.523	3.079	3.635	4.191	4.747	5.303	5.859	6.415	6.971	8.083
DM_15																																																							
Construction Period:	**1**	**years**																																																				
Construction	0.093		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	-0.2	-0.1722	-0.1446	-0.1206	-0.0997	-0.0792	-0.0681	-0.0583	-0.0498	-0.0424	-0.0359	-0.02	-0.0068	0.00418	0.01323	0.0206	0.01542	0.011001	0.007262	0.004111	0.001473	-0.00072	-0.00253	-0.004	-0.00518	-0.00611	0.003557	0.011522	0.018008	0.02322	0.027336	0.030512	0.032884	0.034572	0.035682	0.036305	0.040277	0.043227	0.045307	0.046652	0.047378	0.047587	0.047366	0.046792	0.04932321
50 year BCR	-5.5	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-202.42%	-174.33%	-146.36%	-122.02%	-100.91%	-80.12%	-68.90%	-59.05%	-50.43%	-42.88%	-36.29%	-20.29%	-6.89%	4.23%	13.40%	20.86%	15.60%	11.14%	7.35%	4.16%	1.49%	-0.73%	-2.56%	-4.05%	-5.24%	-6.19%	3.60%	11.66%	18.23%	23.50%	27.67%	30.88%	33.28%	34.99%	36.12%	36.75%	40.77%	43.75%	45.86%	47.22%	47.95%	48.17%	47.94%	47.36%	49.92%
25 Year BCR from first year of construction			-11.2	-11.1	-11.0	-10.9	-10.9	-10.9	-10.9	-11.0	-11.0	-11.1	-11.0	-10.9	-10.7	-10.5	-10.2	-9.8	-9.5	-9.1	-8.7	-8.3	-7.9	-7.5	-7.0	-6.5	-6.0	-5.5	-5.0	-4.5	-3.9																								
25 Year PVB from first year of construction			-1.095	-1.084	-1.076	-1.072	-1.070	-1.071	-1.073	-1.078	-1.083	-1.089	-1.086	-1.074	-1.055	-1.030	-1.002	-0.970	-0.935	-0.899	-0.862	-0.824	-0.781	-0.736	-0.688	-0.639	-0.590	-0.540	-0.490	-0.441	-0.389																								
25 Year PVC from first year of construction			0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.098	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099																								

Then include Domain Road roundabout

DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1086.169	**73.710**	75.861	78.012	80.163	**82.314**	85.518	88.721	91.924	95.127	**98.330**	101.681	105.032	108.383	111.734	**115.085**	119.176	123.267	127.358	131.449	**135.540**	141.895	148.250	154.604	160.959	**167.314**	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	**222.249**	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	**301.483**	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	**412.382**
Travel Time Costs - Turns	58.722	**2.108**	2.372	2.636	2.900	**3.164**	3.523	3.882	4.242	4.601	**4.961**	4.953	4.946	4.938	4.931	**4.923**	5.275	5.627	5.979	6.331	**6.683**	7.710	8.737	9.764	10.791	**11.818**	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	**20.582**	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	**35.549**	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	**60.256**
Vehicle Operating Costs - Links	981.068	**71.930**	74.078	76.227	78.375	**80.524**	83.336	86.147	88.958	91.770	**94.582**	97.307	100.032	102.758	105.483	**108.208**	111.024	113.840	116.655	119.471	**122.287**	125.529	128.771	132.013	135.256	**138.498**	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	**161.456**	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	**179.216**	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	**196.926**
Vehicle Operating Costs - Turns	2.763	**0.106**	0.118	0.130	0.142	**0.154**	0.162	0.170	0.179	0.187	**0.195**	0.204	0.213	0.221	0.230	**0.239**	0.256	0.274	0.291	0.309	**0.326**	0.376	0.426	0.476	0.526	**0.576**	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	**1.004**	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	**1.731**	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	**2.935**
Accident Costs	151.594	**12.317**	12.453	12.589	12.725	**12.861**	12.585	12.309	12.032	11.756	**11.480**	12.405	13.639	14.873	16.107	**17.650**	18.135	18.619	19.104	19.589	**20.074**	20.647	21.220	21.794	22.367	**22.941**	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	**26.652**	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	**29.813**	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	**32.873**
TOTAL USER COSTS	2280.317	160.170	164.882	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**8**	**, weeks**	**0**																																																			
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2278.935		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371
Benefit Stream:																																																							
Travel Time Costs - Links	-7.112	230.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.671	-0.710	-0.749	-0.788	-0.827	-0.866	-0.914	-0.962	-1.010	-1.058	-1.106	-1.236	-1.366	-1.496	-1.626	-1.755	-1.954	-2.152	-2.351	-2.549	-2.747	-2.946	-3.144	-3.343	-3.541	-3.740	-4.129	-4.519	-4.909	-5.298	-5.688	-6.078	-6.467	-6.857	-7.246	-7.636	-8.282	-8.928	-9.575	-10.221	-10.867	-11.513	-12.159	-12.805	-14.097
Travel Time Costs - Turns	3.637	-117.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.220	0.281	0.342	0.404	0.465	0.526	0.554	0.582	0.610	0.637	0.665	0.759	0.854	0.948	1.042	1.137	1.196	1.256	1.316	1.375	1.435	1.495	1.555	1.614	1.674	1.734	1.866	1.998	2.130	2.262	2.394	2.526	2.659	2.791	2.923	3.055	3.435	3.815	4.195	4.574	4.954	5.334	5.714	6.094	6.854
Vehicle Operating Costs - Links	0.212	-6.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.040	0.040	0.041	0.041	0.042	0.052	0.063	0.074	0.084	0.095	0.078	0.061	0.043	0.026	0.009	0.007	0.005	0.003	0.001	-0.001	-0.003	-0.005	-0.007	-0.009	-0.011	0.009	0.030	0.050	0.070	0.090	0.111	0.131	0.151	0.172	0.192	0.173	0.155	0.137	0.118	0.100	0.082	0.063	0.045	0.008
Vehicle Operating Costs - Turns	0.175	-5.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.012	0.016	0.019	0.023	0.027	0.028	0.029	0.030	0.030	0.031	0.036	0.041	0.046	0.050	0.055	0.058	0.061	0.064	0.067	0.070	0.073	0.076	0.079	0.082	0.085	0.092	0.098	0.105	0.111	0.118	0.124	0.131	0.138	0.144	0.151	0.169	0.188	0.206	0.224	0.243	0.261	0.280	0.298	0.335
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	-3.088	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.404	-0.377	-0.351	-0.324	-0.298	-0.271	-0.280	-0.289	-0.297	-0.306	-0.315	-0.363	-0.411	-0.459	-0.507	-0.555	-0.692	-0.830	-0.968	-1.105	-1.243	-1.381	-1.518	-1.656	-1.794	-1.931	-2.162	-2.393	-2.624	-2.854	-3.085	-3.316	-3.547	-3.777	-4.008	-4.239	-4.505	-4.771	-5.037	-5.303	-5.570	-5.836	-6.102	-6.368	-6.901
DM_12																																																							
Construction Period:	**1**	**years**																																																				
Construction	0.233		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Periodic Maintenance	0.060		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.298	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	-0.1632	-0.1387	-0.1172	-0.0985	-0.0822	-0.0681	-0.0639	-0.0599	-0.0561	-0.0525	-0.0491	-0.0514	-0.0529	-0.0537	-0.054	-0.0537	-0.0609	-0.06641	-0.07039	-0.07309	-0.07472	-0.07545	-0.07543	-0.07479	-0.07364	-0.07208	-0.07336	-0.07381	-0.07357	-0.07276	-0.07149	-0.06985	-0.06792	-0.06576	-0.06344	-0.06099	-0.05893	-0.05674	-0.05446	-0.05212	-0.04976	-0.0474	-0.04506	-0.04275	-0.0421091
50 year BCR	-10.4	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-54.84%	-46.58%	-39.37%	-33.09%	-27.63%	-22.88%	-21.47%	-20.12%	-18.84%	-17.63%	-16.48%	-17.27%	-17.78%	-18.05%	-18.13%	-18.04%	-20.47%	-22.31%	-23.65%	-24.55%	-25.10%	-25.35%	-25.34%	-25.12%	-24.74%	-24.22%	-24.64%	-24.79%	-24.71%	-24.44%	-24.02%	-23.47%	-22.82%	-22.09%	-21.31%	-20.49%	-19.80%	-19.06%	-18.29%	-17.51%	-16.72%	-15.92%	-15.14%	-14.36%	-14.15%
25 Year BCR from first year of construction			-4.7	-4.9	-5.2	-5.5	-5.7	-6.0	-6.3	-6.4	-6.7	-6.9	-7.2	-7.5	-7.7	-8.0	-8.2	-8.4	-8.6	-8.9	-9.1	-9.3	-9.5	-9.7	-9.9	-10.0	-10.2	-10.4	-10.5	-10.7	-10.8																								
25 Year PVB from first year of construction			-1.338	-1.408	-1.482	-1.559	-1.637	-1.716	-1.796	-1.874	-1.961	-2.026	-2.103	-2.181	-2.258	-2.334	-2.409	-2.482	-2.554	-2.623	-2.689	-2.753	-2.815	-2.874	-2.932	-2.986	-3.038	-3.088	-3.135	-3.180	-3.224																								
25 Year PVC from first year of construction			0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.292	0.292	0.293	0.293	0.293	0.293	0.293	0.293	0.296	0.296	0.296	0.296	0.296	0.296	0.296	0.296	0.298	0.298	0.298	0.298	0.298	0.298																								
combined benefits for 11, 15, 12			0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	-0.7	-0.6	-0.6	-0.5	-0.4	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.0	0.0	0.0	0.0	-0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	0.2	0.7	1.3	1.8	2.3	2.9	3.4	4.0	5.0

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
BASE YEAR FOR COSTS 1997																																																					
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048																																																					
Existing Alignment Improvements - Passing Lanes N1, N4 and S3																																																					
DM_13	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1081.527	73.710	75.828	77.946	80.063	82.181	85.371	88.561	91.751	94.941	98.130	101.462	104.793	108.124	111.455	114.786	118.839	122.891	126.944	130.996	135.049	141.289	147.528	153.768	160.008	166.248	171.558	176.868	182.178	187.488	192.798	198.108	203.419	208.729	214.039	219.349	227.029	234.708	242.388	250.068	257.748	265.427	273.107	280.787	288.467	296.146	306.775	317.404	328.033	338.662	349.291	359.920	370.549	381.177	402.435
Travel Time Costs - Turns	58.715	2.108	2.372	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.952	4.944	4.935	4.927	4.918	5.271	5.624	5.977	6.330	6.683	7.710	8.736	9.762	10.789	11.815	12.692	13.568	14.445	15.322	16.198	17.075	17.952	18.829	19.705	20.582	22.079	23.576	25.074	26.571	28.068	29.566	31.063	32.560	34.067	35.555	38.027	40.499	42.972	45.444	47.917	50.389	52.862	55.334	60.279
Vehicle Operating Costs - Links	981.390	71.930	74.083	76.237	78.391	80.545	83.359	86.173	88.988	91.802	94.617	97.343	100.069	102.796	105.522	108.248	111.067	113.885	116.704	119.522	122.340	125.586	128.832	132.078	135.325	138.571	140.867	143.163	145.459	147.755	150.052	152.348	154.644	156.940	159.237	161.533	163.304	165.076	166.847	168.619	170.390	172.161	173.933	175.704	177.476	179.247	181.005	182.763	184.521	186.279	188.037	189.794	191.562	193.310	196.826
Vehicle Operating Costs - Turns	2.763	0.106	0.118	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.441	1.513	1.586	1.659	1.732	1.852	1.972	2.093	2.213	2.334	2.454	2.575	2.696	2.936
Accident Costs	151.594	12.317	12.453	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.966	32.261	32.873
TOTAL USER COSTS	2275.989	160.170	164.854	169.537	174.221	178.905	185.000	191.096	197.191	203.287	209.382	216.366	223.658	230.950	238.242	245.842	253.568	261.294	269.020	276.746	284.472	296.608	306.744	317.879	329.015	340.151	349.048	357.944	366.841	375.738	384.635	393.532	402.429	411.326	420.223	429.120	440.457	451.795	463.132	474.469	485.806	497.143	508.481	519.818	531.155	542.492	557.778	573.064	588.349	603.635	618.921	634.207	649.492	664.778	696.349
	Opening (from Time 0)																																																					
User Cost Stream:	Years:	13	, weeks	0																																																			
Travel Time Costs - Links	1080.775		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	135.049	141.289	147.528	153.768	160.008	166.248	171.558	176.868	182.178	187.488	192.798	198.108	203.419	208.729	214.039	219.349	227.029	234.708	242.388	250.068	257.748	265.427	273.107	280.787	288.467	296.146	306.775	317.404	328.033	338.662	349.291	359.920	370.549	381.177	402.435
Travel Time Costs - Turns	55.729		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	6.683	7.710	8.736	9.762	10.789	11.815	12.692	13.568	14.445	15.322	16.198	17.075	17.952	18.829	19.705	20.582	22.079	23.576	25.074	26.571	28.068	29.566	31.063	32.560	34.067	35.555	38.027	40.499	42.972	45.444	47.917	50.389	52.862	55.334	60.279
Vehicle Operating Costs - Links	981.265		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.340	125.586	128.832	132.078	135.325	138.571	140.867	143.163	145.459	147.755	150.052	152.348	154.644	156.940	159.237	161.533	163.304	165.076	166.847	168.619	170.390	172.161	173.933	175.704	177.476	179.247	181.005	182.763	184.521	186.279	188.037	189.794	191.562	193.310	196.826
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.441	1.513	1.586	1.659	1.732	1.852	1.972	2.093	2.213	2.334	2.454	2.575	2.695	2.936
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.956	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.965	32.261	32.873
TOTAL USER COSTS	2273.470		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	284.472	296.608	306.744	317.879	329.015	340.151	349.048	357.944	366.841	375.738	384.635	393.532	402.429	411.326	420.223	429.120	440.457	451.795	463.132	474.469	485.806	497.143	508.481	519.818	531.155	542.492	557.778	573.064	588.349	603.635	618.921	634.207	649.492	664.778	696.349
Benefit Stream:																																																					
Travel Time Costs - Links	3.618	104.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.298	0.337	0.375	0.414	0.453	0.491	0.606	0.721	0.836	0.951	1.066	1.250	1.433	1.617	1.800	1.983	2.167	2.350	2.534	2.717	2.900	3.144	3.388	3.631	3.875	4.119	4.362	4.606	4.850	5.093	5.337	5.798	6.259	6.720	7.181	7.642	8.103	8.564	9.025	9.946
Travel Time Costs - Turns	0.004	0.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.004	0.003	0.002	0.001	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	-0.001	-0.001	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004	-0.005	-0.006	-0.007	-0.009	-0.010	-0.012	-0.014	-0.016	-0.018	-0.019	-0.023
Vehicle Operating Costs - Links	-0.157	-4.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.040	-0.043	-0.045	-0.048	-0.051	-0.054	-0.058	-0.061	-0.065	-0.069	-0.073	-0.073	-0.074	-0.074	-0.074	-0.075	-0.075	-0.076	-0.076	-0.077	-0.077	-0.072	-0.068	-0.063	-0.059	-0.054	-0.050	-0.045	-0.040	-0.036	-0.031	-0.018	-0.005	0.008	0.021	0.034	0.048	0.061	0.074	0.100
Vehicle Operating Costs - Turns	-0.000	-0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	3.465	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.263	0.298	0.333	0.368	0.402	0.437	0.549	0.661	0.773	0.885	0.997	1.179	1.362	1.545	1.727	1.910	2.093	2.275	2.458	2.641	2.823	3.071	3.319	3.566	3.814	4.062	4.309	4.557	4.805	5.052	5.300	5.772	6.244	6.717	7.189	7.661	8.133	8.605	9.078	10.022
DM_13																																																					
Construction Period:	1 years																																																					
Construction	0.516		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.780	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.001		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Periodic Maintenance	0.035		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
TOTAL COST	0.552	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.780	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051	0.001	0.071	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.051
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0.06611	0.06804	0.06907	0.06936	0.06902	0.06817	0.07783	0.08517	0.09054	0.09422	0.09649	0.10379	0.108969	0.112348	0.114212	0.114809	0.114353	0.113031	0.111005	0.108412	0.105374	0.104197	0.102362	0.100001	0.097222	0.094122	0.090733	0.087272	0.08365	0.079965	0.076259	0.075503	0.074255	0.072609	0.07065	0.068446	0.066059	0.06354	0.060934	0.06115774
50 year BCR	6.3	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.97%	12.32%	12.51%	12.56%	12.50%	12.34%	14.09%	15.42%	16.39%	17.06%	17.47%	18.79%	19.73%	20.34%	20.68%	20.79%	20.71%	20.47%	20.10%	19.63%	19.08%	18.87%	18.54%	18.11%	17.60%	17.04%	16.44%	15.80%	15.16%	14.48%	13.81%	13.67%	13.45%	13.15%	12.79%	12.39%	11.96%	11.51%	11.03%	11.07%
25 Year BCR from first year of construction			1.8	2.1	2.3	2.5	2.7	2.9	3.1	3.4	3.6	3.8	3.9	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.3	5.5	5.6	5.7	5.9	6.0	6.1	6.3	6.4	6.5	6.6																								
25 Year PVB from first year of construction			1.005	1.119	1.237	1.356	1.477	1.597	1.715	1.832	1.945	2.056	2.165	2.273	2.378	2.479	2.578	2.673	2.765	2.853	2.937	3.017	3.096	3.174	3.250	3.324	3.396	3.465	3.532	3.595	3.660																								
25 Year PVC from first year of construction			0.545	0.545	0.545	0.546	0.546	0.546	0.546	0.546	0.548	0.546	0.550	0.550	0.550	0.550	0.550	0.550	0.550	0.550	0.551	0.551	0.552	0.552	0.552	0.552	0.552	0.552	0.552	0.552	0.553																								
Then include SH2/SH33 as roundabout																																																					
DM_14	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1114.320	73.710	76.513	79.317	82.121	84.924	88.250	91.575	94.900	98.226	101.551	105.012	108.473	111.933	115.394	118.855	123.054	127.253	131.451	135.650	139.849	146.275	152.700	159.126	165.552	171.977	177.396	182.814	188.232	193.650	199.068	204.486	209.904	215.323	220.741	226.159	233.704	241.249	248.793	256.338	263.883	271.428	278.973	286.517	294.062	301.607	311.939	322.270	332.602	342.933	353.265	363.596	373.928	384.259	404.922
Travel Time Costs - Turns	51.622	2.108	2.425	2.742	3.059	3.376	3.716	4.056	4.394	4.734	5.073	5.026	4.979	4.932	4.884	4.837	5.061	5.284	5.508	5.731	5.955	6.342	6.730	7.117	7.505	7.892	8.642	9.391	10.141	10.890	11.639	12.389	13.138	13.888	14.637	15.387	16.161	16.934	17.708	18.482	19.256	20.030	20.804	21.578	22.352	23.125	24.723	26.321	27.919	29.516	31.114	32.712	34.309	35.907	39.103
Vehicle Operating Costs - Links	979.302	71.930	74.030	76.131	78.232	80.332	83.143	85.954	88.764	91.575	94.386	97.108	99.830	102.552	105.274	107.996	110.814	113.632	116.450	119.268	122.086	125.322	128.558	131.794	135.029	138.265	140.554	142.843	145.132	147.421	149.710	151.999	154.288	156.578	158.867	161.156	162.947	164.739	166.531	168.323	170.115	171.906	173.698	175.490	177.282	179.073	180.826	182.579	184.331	186.084	187.836	189.589	191.342	193.094	196.599
Vehicle Operating Costs - Turns	2.411	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.185	0.192	0.199	0.207	0.214	0.222	0.230	0.238	0.248	0.258	0.268	0.278	0.288	0.308	0.327	0.346	0.366	0.385	0.422	0.458	0.495	0.531	0.568	0.604	0.641	0.677	0.714	0.750	0.788	0.825	0.862	0.900	0.937	0.974	1.012	1.049	1.086	1.123	1.201	1.279	1.357	1.435	1.513	1.591	1.669	1.747	1.903
Accident Costs	151.594	12.317	12.453	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.965	32.261	32.873
TOTAL USER COSTS	2299.249	160.170	165.542	170.913	176.285	181.657	187.863	194.070	200.276	206.483	212.689	219.758	227.135	234.512	241.890	249.575	257.311	265.046	272.781	280.517	288.252	298.894	309.535	320.177	330.819	341.461	350.325	359.189	368.054	376.918	385.782	394.647	403.511	412.375	421.240	430.104	440.568	451.031	461.495	471.959	482.423	492.887	503.351	513.814	524.278	534.742	548.808	562.874	576.940	591.005	605.071	619.137	633.203	647.269	675.401
	Opening (from Time 0)																																																					
User Cost Stream:	Years:	18	, weeks	0																																																			
Travel Time Costs - Links	1090.532		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	146.275	152.700	159.126	165.552	171.977	177.396	182.814	188.232	193.650	199.068	204.486	209.904	215.323	220.741	226.159	233.704	241.249	248.793	256.338	263.883	271.428	278.973	286.517	294.062	301.607	311.939	322.270	332.602	342.933	353.265	363.596	373.928	384.259	404.922
Travel Time Costs - Turns	48.150		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.955	6.342	6.730	7.117	7.505	7.892	8.642	9.391	10.141	10.890	11.639	12.389	13.138	13.888	14.637	15.387	16.161	16.934	17.708	18.482	19.256	20.030	20.804	21.578	22.352	23.125	24.723	26.321	27.919	29.516	31.114	32.712	34.309	35.907	39.103
Vehicle Operating Costs - Links	980.757		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.322	128.558	131.794	135.029	138.265	140.554	142.843	145.132	147.421	149.710	151.999	154.288	156.578	158.867	161.156	162.947	164.739	166.531	168.323	170.115	171.906	173.698	175.490	177.282	179.073	180.826	182.579	184.331	186.084	187.836	189.589	191.342	193.094	196.599
Vehicle Operating Costs - Turns	2.244		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.346	0.366	0.385	0.422	0.458	0.495	0.531	0.568	0.604	0.641	0.677	0.714	0.750	0.788	0.825	0.862	0.900	0.937	0.974	1.012	1.049	1.086	1.123	1.201	1.279	1.357	1.435	1.513	1.591	1.669	1.747	1.903
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.965	32.261	32.873
TOTAL USER COSTS	2274.768		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	298.894	309.535	320.177	330.819	341.461	350.325	359.189	368.054	376.918	385.782	394.647	403.511	412.375	421.240	430.104	440.568	451.031	461.495	471.959	482.423	492.887	503.351	513.814	524.278	534.742	548.808	562.874	576.940	591.005	605.071	619.137	633.203	647.269	675.401
Benefit Stream:																																																					
Travel Time Costs - Links	-9.757	751.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-4.800	-4.986	-5.172	-5.358	-5.544	-5.730	-5.838	-5.946	-6.054	-6.162	-6.270	-6.378	-6.486	-6.594	-6.702	-6.810	-6.675	-6.540	-6.405	-6.270	-6.135	-6.000	-5.865	-5.731	-5.596	-5.461	-5.163	-4.866	-4.569	-4.271	-3.974	-3.676	-3.379	-3.082	-2.487
Travel Time Costs - Turns	7.580	-684.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.728	1.367	2.006	2.645	3.284	3.923	4.050	4.177	4.304	4.432	4.559	4.686	4.814	4.941	5.068	5.196	5.919	6.642	7.365	8.089	8.812	9.536	10.259	10.982	11.706	12.429	13.304	14.179	15.053	15.928	16.803	17.678	18.552	19.427	21.176
Vehicle Operating Costs - Links	0.509	-39.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.254	0.264	0.275	0.285	0.295	0.305	0.313	0.320	0.327	0.334	0.341	0.348	0.356	0.363	0.370	0.377	0.357	0.337	0.316	0.296	0.275	0.255	0.235	0.214	0.194	0.174	0.179	0.184	0.190	0.195	0.200	0.205	0.211	0.216	0.226
Vehicle Operating Costs - Turns	0.371	-28.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.069	0.099	0.130	0.161	0.191	0.198	0.204	0.210	0.216	0.223	0.229	0.235	0.241	0.248	0.254	0.289	0.325	0.360	0.396	0.431	0.466	0.502	0.537	0.573	0.608	0.651	0.693	0.735	0.778	0.820	0.863	0.905	0.948	1.033
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	-1.298	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-3.779	-3.286	-2.792	-2.298	-1.804	-1.310	-1.278	-1.245	-1.212	-1.180	-1.147	-1.114	-1.082	-1.049	-1.016	-0.984	-0.110	0.763	1.637	2.510	3.383	4.257	5.130	6.004	6.877	7.750	8.970	10.190	11.410	12.630	13.850	15.069	16.289	17.509	19.949
DM_14																																																					
Construction Period:	1 years																																																					
Construction	0.045		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.002		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Periodic Maintenance	0.022		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000
TOTAL COST	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.151	0.001	0.001	0.001
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-0.5892	-0.4657	-0.3597	-0.2692	-0.1921	-0.1268	-0.1124	-0.0996	-0.08817	-0.07799	-0.06894	-0.06069	-0.05373	-0.04737	-0.04172	-0.03671	-0.00374	0.023537	0.045888	0.06398	0.078403	0.089676	0.09825	0.104525	0.108847	0.111519	0.117337	0.121176	0.123347	0.124122	0.123736	0.122396	0.120275	0.117529	0.12173198
50 year BCR	-18.8	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-852.05%	-673.38%	-520.15%	-389.22%	-277.79%	-183.41%	-162.56%	-144.02%	-127.50%	-112.78%	-99.69%	-88.05%	-77.70%	-68.50%	-60.34%	-53.09%	-5.41%	34.04%	66.36%	92.52%	113.38%	129.68%	142.08%	151.15%	157.40%	161.27%	169.68%	175.23%	178.37%	179.49%	178.93%	176.99%	173.93%	169.96%	176.04%
25 Year BCR from first year of construction			-48.4	-39.7	-41.2	-42.6	-43.8	-44.8	-45.7	-46.5	-47.2	-43.5	-43.6	-43.2	-42.4	-41.3	-40.1	-38.6	-37.0	-33.9	-32.2	-30.5	-28.6	-26.8	-24.8	-22.9	-21.0	-18.8	-16.9	-15.2	-13.3																								
25 Year PVB from first year of construction			-2.218	-2.323	-2.415	-2.497	-2.569	-2.633	-2.690	-2.739	-2.783	-2.822	-2.825	-2.801	-2.753	-2.686	-2.603	-2.509	-2.406	-2.297	-2.182	-2.065	-1.942	-1.815	-1.686	-1.556	-1.426	-1.298	-1.171	-1.048	-0.921																								
25 Year PVC from first year of construction			0.046	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.059	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.069	0.069	0.069	0.069																								
Then include widening SH2 from Te Maunga to Domain to 4 lanes																																																					
DM_5	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1099.612	73.710	76.244	78.778	81.313	83.847	87.129	90.410	93.692	96.974	100.255	103.663	107.071	110.479	113.887	117.294	121.434	125.573	129.712	133.851	137.991	144.289	150.587	156.885	163.184	169.482	174.722	179.962	185.202	190.442	195.682	200.922	206.162	211.402	216.642	221.882	229.074	236.267	243.459	250.652	257.844	265.037	272.229	279.422	286.614	293.807	303.559	313.311	323.063	332.815	342.568	352.320	362.072	371.824	391.329
Travel Time Costs - Turns	51.658	2.108	2.425	2.742	3.059	3.376	3.716	4.056	4.394	4.734	5.073	5.027	4.980	4.933	4.887	4.840	5.063	5.286	5.508	5.731	5.954	6.343	6.732	7.122	7.511	7.900	8.649	9.398	10.147	10.896	11.645	12.394	13.143	13.892	14.641	15.390	16.180	16.970	17.759	18.549	19.339	20.129	20.919	21.709	22.499	23.289	24.873	26.457	28.042	29.626	31.210	32.794	34.379	35.963	39.132
Vehicle Operating Costs - Links	981.939	71.930	74.091	76.252	78.414	80.575	83.393	86.211	89.029	91.847	94.665	97.394	100.123	102.852	105.582	108.311	111.139	113.968	116.796	119.625	122.453	125.698	128.942	132.186	135.431	138.675	140.969	143.264	145.558	147.853	150.147	152.442	154.736	157.031	159.325	161.619	163.420	165.220	167.020	168.820	170.620	172.421	174.221	176.021	177.821	179.621	181.382	183.144	184.905	186.666	188.427	190.188	191.949	193.710	197.232
Vehicle Operating Costs - Turns	2.414	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.185	0.192	0.199	0.207	0.215	0.222	0.230	0.238	0.248	0.258	0.268	0.278	0.288	0.308	0.327	0.347	0.366	0.386	0.422	0.459	0.496	0.532	0.568	0.604	0.641	0.677	0.714	0.750	0.789	0.827	0.865	0.904	0.942	0.980	1.018	1.057	1.096	1.133	1.210	1.288	1.365	1.442	1.519	1.596	1.673	1.751	1.905
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2284.092	160.170	165.252	170.334	175.417	180.499	186.678	192.858	199.038	205.217	211.397	218.404	225.713	233.023	240.332	247.944	255.620	263.296	270.972	278.648	286.324	296.839	307.354	317.869	328.384	338.899	347.583	356.267	364.951	373.634	382.318	391.002	399.686	408.369	417.053	425.737	435.866	445.996	456.124	466.254	476.383	486.512	496.641	506.770	516.899	527.029	540.510	553.991	567.472	580.953	594.434	607.915	621.397	634.878	661.840
	Opening (from Time 0)																																																					
User Cost Stream:	Years:	19	, weeks	0																																																			
Travel Time Costs - Links	1085.012		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	144.289	150.587	156.885	163.184	169.482	174.722	179.962	185.202	190.442	195.682	200.922	206.162	211.402	216.642	221.882	229.074	236.267	243.459	250.652	257.844	265.037	272.229	279.422	286.614	293.807	303.559	313.311	323.063	332.815	342.568	352.320	362.072	371.824	391.329
Travel Time Costs - Turns	48.183		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.955	6.343	6.732	7.122	7.511	7.900	8.649	9.398	10.147	10.896	11.645	12.394	13.143	13.892	14.641	15.390	16.180	16.970	17.759	18.549	19.339	20.129	20.919	21.709	22.499	23.289	24.873	26.457	28.042	29.626	31.210	32.794	34.379	35.963	39.132
Vehicle Operating Costs - Links	981.430		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.698	128.942	132.186	135.431	138.675	140.969	143.264	145.558	147.853	150.147	152.442	154.736	157.031	159.325	161.619	163.420	165.220	167.020	168.820	170.620	172.421	174.221	176.021	177.821	179.621	181.382	183.144	184.905	186.666	188.427	190.188	191.949	193.710	197.232
Vehicle Operating Costs - Turns	2.245		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.347	0.366	0.386	0.422	0.459	0.496	0.532	0.568	0.604	0.641	0.677	0.714	0.750	0.789	0.827	0.865	0.904	0.942	0.980	1.018	1.057	1.096	1.133	1.210	1.288	1.365	1.442	1.519	1.596	1.673	1.751	1.905
Accident Costs	152.291		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2269.161		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	296.839	307.354	317.869	328.384	338.899	347.583	356.267	364.951	373.634	382.318	391.002	399.686	408.369	417.053	425.737	435.866	445.996	456.124	466.254	476.383	486.512	496.641	506.770	516.899	527.029	540.510	553.991	567.472	580.953	594.434	607.915	621.397	634.878	661.840
Benefit Stream:																																																					
Travel Time Costs - Links	5.520	98.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.986	2.113	2.241	2.368	2.496	2.674	2.852	3.030	3.208	3.386	3.564	3.743	3.921	4.099	4.277	4.629	4.982	5.334	5.686	6.039	6.391	6.743	7.096	7.448	7.800	8.380	8.959	9.538	10.118	10.697	11.276	11.856	12.435	13.594
Travel Time Costs - Turns	-0.033	-0.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.002	-0.004	-0.006	-0.008	-0.007	-0.007	-0.006	-0.006	-0.005	-0.005	-0.004	-0.004	-0.004	-0.003	-0.019	-0.035	-0.051	-0.067	-0.083	-0.099	-0.115	-0.131	-0.147	-0.163	-0.150	-0.136	-0.123	-0.110	-0.096	-0.083	-0.069	-0.056	-0.029
Vehicle Operating Costs - Links	-0.673	-12.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.376	-0.384	-0.393	-0.401	-0.410	-0.415	-0.421	-0.426	-0.431	-0.437	-0.442	-0.448	-0.453	-0.458	-0.464	-0.472	-0.481	-0.489	-0.497	-0.506	-0.514	-0.523	-0.531	-0.540	-0.548	-0.556	-0.565	-0.573	-0.582	-0.590	-0.599	-0.607	-0.615	-0.632
Vehicle Operating Costs - Turns	-0.002	-0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.007	-0.008	-0.009	-0.010	-0.009	-0.008	-0.007	-0.006	-0.006	-0.005	-0.004	-0.003	-0.002
Accident Costs	0.795	14.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.445	0.456	0.465	0.474	0.484	0.491	0.499	0.506	0.513	0.520	0.528	0.535	0.542	0.550	0.557	0.565	0.572	0.580	0.588	0.596	0.603	0.611	0.619	0.626	0.634	0.634	0.633	0.633	0.632	0.632	0.632	0.631	0.631	0.630
TOTAL USER BENEFITS	5.607	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.055	2.181	2.308	2.435	2.561	2.742	2.923	3.103	3.284	3.464	3.645	3.825	4.006	4.186	4.367	4.702	5.036	5.371	5.706	6.040	6.375	6.709	7.044	7.379	7.713	8.298	8.883	9.468	10.052	10.637	11.222	11.807	12.391	13.561
DM_5																																																					
Construction Period:	2 years																																																					
Construction	1.073		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.0093		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.058		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000
TOTAL COST	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.29122	0.28106	0.27035	0.25926	0.24796	0.2413	0.23381	0.225685	0.217106	0.208221	0.199158	0.190021	0.1809	0.171867	0.162981	0.159618	0.155338	0.1506	0.145439	0.139972	0.134291	0.128497	0.122642	0.116789	0.110987	0.108546	0.105632	0.10235	0.098792	0.095035	0.091145	0.087176	0.083176	0.08275126
50 year BCR	4.9	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.54%	24.65%	23.71%	22.73%	21.74%	21.16%	20.50%	19.79%	19.04%	18.26%	17.46%	16.66%	15.86%	15.07%	14.29%	13.99%	13.62%	13.21%	12.75%	12.27%	11.78%	11.27%	10.75%	10.24%	9.73%	9.52%	9.26%	8.98%	8.66%	8.33%	7.99%	7.64%	7.29%	7.26%
25 Year BCR from first year of construction			1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.6	3.7	3.8	3.9	4.0	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.8	4.9	5.0	5.1	5.1																								
25 Year PVB from first year of construction			1.669	1.914	2.151	2.378	2.597	2.806	3.005	3.195	3.375	3.546	3.713	3.876	4.034	4.187	4.333	4.474	4.609	4.738	4.860	4.977	5.090	5.201	5.309	5.412	5.512	5.607	5.699	5.786	5.873																								
25 Year PVC from first year of construction			1.106	1.106	1.107	1.107	1.117	1.117	1.128	1.129	1.129	1.129	1.129	1.130	1.130	1.130	1.134	1.134	1.138	1.138	1.138	1.139	1.139	1.139	1.139	1.139	1.140	1.140	1.140	1.140	1.140																								
Then include widening SH2 from Domain through Te Puke to 4 lanes																																																					
DM_17	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1013.373	73.710	75.498	77.285	79.073	80.861	83.901	86.942	89.982	93.023	96.063	99.059	102.055	105.051	108.046	111.042	114.283	117.523	120.763	124.004	127.244	131.140	135.036	138.932	142.827	146.723	149.671	152.620	155.568	158.517	161.465	164.413	167.362	170.310	173.259	176.207	179.562	182.916	186.271	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	223.658	228.293	232.927	237.562	242.196	246.831	256.100
Travel Time Costs - Turns	52.009	2.108	2.421	2.735	3.048	3.362	3.702	4.042	4.382	4.722	5.062	5.015	4.967	4.919	4.871	4.823	5.057	5.291	5.524	5.758	5.991	6.527	7.062	7.597	8.133	8.668	9.260	9.853	10.445	11.037	11.630	12.222	12.815	13.407	13.999	14.592	15.559	16.526	17.494	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.738	31.562	33.387	35.211	37.035	38.859	42.508
Vehicle Operating Costs - Links	984.558	71.930	74.132	76.334	78.537	80.739	83.565	86.392	89.218	92.045	94.871	97.602	100.333	103.063	105.794	108.525	111.396	114.266	117.137	120.008	122.878	126.165	129.452	132.738	136.025	139.311	141.567	143.823	146.079	148.335	150.591	152.846	155.102	157.358	159.614	161.870	163.902	165.935	167.968	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.028	189.971	191.915	193.858	195.802	197.745	201.632
Vehicle Operating Costs - Turns	2.435	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.184	0.191	0.198	0.206	0.214	0.222	0.230	0.238	0.248	0.259	0.270	0.280	0.291	0.317	0.344	0.371	0.398	0.424	0.453	0.482	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.447	1.536	1.625	1.714	1.802	1.891	2.069
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2200.844	160.170	164.543	168.916	173.289	177.662	183.610	189.557	195.505	201.452	207.400	213.995	220.893	227.790	234.688	241.889	248.720	255.550	262.381	269.212	276.043	284.351	292.659	300.967	309.275	317.584	323.773	329.962	336.151	342.340	348.530	354.719	360.908	367.097	373.286	379.476	386.186	392.896	399.606	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	472.969	481.766	490.564	499.361	508.159	516.956	534.551
	Opening (from Time 0)																																																					
User Cost Stream:	Years:	26	, weeks	0																																																			
Travel Time Costs - Links	1046.709		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	144.289	150.587	156.885	163.184	169.482	174.722	179.962	155.568	158.517	161.465	164.413	167.362	170.310	173.259	176.207	179.562	182.916	186.271	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	223.658	228.293	232.927	237.562	242.196	246.831	256.100
Travel Time Costs - Turns	48.230		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.966	6.343	6.732	7.122	7.511	7.900	8.649	9.398	10.445	11.037	11.630	12.222	12.815	13.407	13.999	14.592	15.559	16.526	17.494	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.738	31.562	33.387	35.211	37.035	38.859	42.508
Vehicle Operating Costs - Links	982.143		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.698	128.942	132.186	135.431	138.675	140.969	143.264	146.079	148.335	150.591	152.846	155.102	157.358	159.614	161.870	163.902	165.935	167.968	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.028	189.971	191.915	193.858	195.802	197.745	201.632
Vehicle Operating Costs - Turns	2.248		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.347	0.366	0.386	0.422	0.459	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.447	1.536	1.625	1.714	1.802	1.891	2.069
Accident Costs	152.291		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2231.622		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	296.839	307.354	317.869	328.384	338.899	347.583	356.267	336.151	342.340	348.530	354.719	360.908	367.097	373.286	379.476	386.186	392.896	399.606	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	472.969	481.766	490.564	499.361	508.159	516.956	534.551
Benefit Stream:																																																					
Travel Time Costs - Links	38.303	102.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.634	31.925	34.217	36.509	38.800	41.092	43.383	45.675	49.513	53.351	57.188	61.026	64.864	68.701	72.539	76.377	80.215	84.052	89.170	94.288	99.405	104.523	109.641	114.758	119.876	124.993	135.229
Travel Time Costs - Turns	-0.048	-0.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.298	-0.142	0.015	0.172	0.328	0.485	0.641	0.798	0.621	0.443	0.266	0.088	-0.089	-0.267	-0.444	-0.622	-0.799	-0.977	-1.217	-1.457	-1.697	-1.937	-2.176	-2.416	-2.656	-2.896	-3.376
Vehicle Operating Costs - Links	-0.714	-1.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.521	-0.482	-0.443	-0.405	-0.366	-0.327	-0.289	-0.250	-0.483	-0.715	-0.948	-1.181	-1.413	-1.646	-1.878	-2.111	-2.344	-2.576	-2.759	-2.941	-3.123	-3.306	-3.488	-3.671	-3.853	-4.035	-4.400
Vehicle Operating Costs - Turns	-0.003	-0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.016	-0.008	-0.000	0.007	0.015	0.023	0.030	0.038	0.030	0.021	0.013	0.004	-0.005	-0.013	-0.022	-0.030	-0.039	-0.047	-0.059	-0.071	-0.082	-0.094	-0.106	-0.117	-0.129	-0.141	-0.164
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	37.539	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.799	31.294	33.788	36.283	38.777	41.272	43.767	46.261	49.680	53.099	56.518	59.938	63.357	66.776	70.195	73.614	77.033	80.452	85.136	89.819	94.503	99.187	103.870	108.554	113.238	117.921	127.288
DM_17																																																					
Construction Period:	2.0 years																																																					
Construction	8.703		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.031		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
Periodic Maintenance	0.212		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.530	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.093	0.000	1.530	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.093	0.000	1.530	0.000	0.000	0.000	0.000	0.000
TOTAL COST	8.946	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135	0.041	1.571	0.041	0.041	0.041	0.041	0.041	0.041	0.041	1.134	0.041	1.571	0.041	0.041	0.041	0.041	0.041	0.041	0.041	1.134	0.041	1.571	0.041	0.041	0.041	0.041	0.041
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.094514	2.069033	2.030875	1.982556	1.926238	1.863775	1.796749	1.726507	1.685565	1.637781	1.584763	1.527849	1.468186	1.406743	1.344339	1.281654	1.219257	1.157612	1.11364	1.068096	1.021629	0.974783	0.928012	0.881688	0.836117	0.791546	0.77674839
50 year BCR	4.2	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.41%	23.13%	22.70%	22.16%	21.53%	20.83%	20.08%	19.30%	18.84%	18.31%	17.71%	17.08%	16.41%	15.72%	15.03%	14.33%	13.63%	12.94%	12.45%	11.94%	11.42%	10.90%	10.37%	9.86%	9.35%	8.85%	8.68%
25 Year BCR from first year of construction			0	0.0	0.3	0.5	0.7	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998		Time: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
BASE YEAR FOR COSTS 1997																																																							
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																																																							

Then include widening SH2 from Te Puke to Paengaroa to 4 lanes

DM_18	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	964.246	73.710	74.996	76.282	77.569	78.855	81.811	84.768	87.724	90.680	93.636	96.546	99.455	102.365	105.274	108.184	111.274	114.363	117.453	120.543	123.632	127.254	130.875	134.496	138.117	141.738	144.274	146.810	149.346	151.883	154.419	156.955	159.491	162.028	164.564	167.100	169.499	171.897	174.296	176.694	179.092	181.491	183.889	186.288	188.686	191.085	193.725	196.365	199.005	201.645	204.285	206.925	209.565	212.205	217.485
Travel Time Costs - Turns	51.249	2.108	2.407	2.706	3.005	3.305	3.641	3.977	4.314	4.650	4.987	4.937	4.888	4.839	4.790	4.740	4.970	5.199	5.428	5.657	5.886	6.419	6.952	7.486	8.019	8.552	9.136	9.720	10.303	10.887	11.471	12.055	12.639	13.222	13.806	14.390	15.344	16.299	17.253	18.207	19.162	20.116	21.070	22.024	22.979	23.933	25.745	27.556	29.368	31.179	32.991	34.803	36.614	38.426	42.049
Vehicle Operating Costs - Links	986.047	71.930	74.164	76.399	78.633	80.868	83.698	86.529	89.359	92.189	95.020	97.753	100.486	103.220	105.953	108.686	111.562	114.437	117.312	120.187	123.062	126.366	129.669	132.973	136.276	139.580	141.841	144.101	146.362	148.623	150.884	153.144	155.405	157.666	159.927	162.187	164.227	166.267	168.306	170.346	172.386	174.426	176.465	178.505	180.545	182.585	184.639	186.693	188.748	190.802	192.857	194.911	196.966	199.020	203.129
Vehicle Operating Costs - Turns	2.397	0.106	0.120	0.134	0.148	0.162	0.168	0.175	0.181	0.188	0.194	0.201	0.208	0.215	0.221	0.228	0.240	0.253	0.265	0.277	0.289	0.315	0.341	0.367	0.393	0.419	0.447	0.475	0.503	0.531	0.559	0.588	0.616	0.644	0.672	0.700	0.747	0.793	0.840	0.887	0.934	0.980	1.027	1.074	1.121	1.168	1.256	1.344	1.432	1.520	1.608	1.697	1.785	1.873	2.049
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2172.407	160.170	164.059	167.948	171.838	175.727	181.590	187.453	193.315	199.178	205.041	211.550	218.362	225.174	231.985	239.100	245.782	252.463	259.145	265.826	272.508	280.555	288.603	296.651	304.698	312.746	318.518	324.291	330.064	335.836	341.609	347.382	353.154	358.927	364.700	370.473	376.220	381.968	387.715	393.463	399.210	404.958	410.706	416.453	422.201	427.948	434.849	441.750	448.650	455.551	462.451	469.352	476.253	483.153	496.955
	Opening (from Time 0)																																																							
User Cost Stream:	Years:	46	, weeks	0																																																			
Travel Time Costs - Links	1045.626		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	144.289	150.587	156.885	163.184	169.482	174.722	179.962	155.568	158.517	161.465	164.413	167.362	170.310	173.259	176.207	179.562	182.916	186.271	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	199.005	201.645	204.285	206.925	209.565	212.205	217.485
Travel Time Costs - Turns	48.215		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.965	6.343	6.732	7.122	7.511	7.900	8.649	9.398	10.445	11.037	11.630	12.222	12.815	13.407	13.999	14.592	15.559	16.526	17.494	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.368	31.179	32.991	34.803	36.614	38.426	42.049
Vehicle Operating Costs - Links	982.178		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.698	128.942	132.186	135.431	138.675	140.969	143.264	146.079	148.335	150.591	152.846	155.102	157.358	159.614	161.870	163.902	165.935	167.968	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.748	190.802	192.857	194.911	196.966	199.020	203.129
Vehicle Operating Costs - Turns	2.248		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.347	0.366	0.386	0.422	0.459	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.432	1.520	1.608	1.697	1.785	1.873	2.049
Accident Costs	152.291		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.202	20.765	21.329	21.890	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2230.557		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	296.839	307.354	317.869	328.384	338.899	347.583	356.267	336.151	342.340	348.530	354.719	360.908	367.097	373.286	379.476	386.186	392.896	399.606	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	448.650	455.551	462.451	469.352	476.253	483.153	496.955
Benefit Stream:																																																								
Travel Time Costs - Links	1.084	101.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.653	26.648	28.643	30.637	32.632	34.626	38.615
Travel Time Costs - Turns	0.015	1.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.370	0.383	0.396	0.408	0.421	0.434	0.459
Vehicle Operating Costs - Links	-0.035	-3.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.720	-0.831	-0.942	-1.053	-1.164	-1.275	-1.497
Vehicle Operating Costs - Turns	0.001	0.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.016	0.016	0.017	0.018	0.018	0.020
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	1.065	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.319	26.216	28.112	30.009	31.906	33.803	37.597

DM_18																																																							
Construction Period:	2 years																																																						
Construction	0.705		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.910	26.910	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.0010		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.026	0.026	0.026	0.026	0.026	0.026
Periodic Maintenance	0.010		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.948	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.716	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.910	26.910	0.026	0.974	0.026	0.026	0.026	0.026	0.026
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.262899	0.257641	0.251166	0.243739	0.235687	0.226903	0.22942569
50 year BCR	1.5	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	36.74%	36.00%	35.10%	34.06%	32.92%	31.71%	32.06%
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0	0.0	0.4	0.8	1.1	1.5	1.8	2.2	2.5																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.546	0.809	1.065	1.312	1.550	1.791																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.369	0.705	0.705	0.715	0.715	0.716	0.716	0.716	0.716																								

From DM_14, 4 LANE Domain to Te Puke

DM_19	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1027.163	73.710	75.757	77.803	79.850	81.897	84.977	88.057	91.138	94.218	97.298	100.339	103.381	106.422	109.463	112.505	115.800	119.096	122.392	125.688	128.984	132.987	136.990	140.992	144.995	148.998	152.094	155.190	158.286	161.382	164.478	167.574	170.670	173.766	176.862	179.958	183.694	187.430	191.166	194.902	198.639	202.375	206.111	209.847	213.583	217.320	222.452	227.584	232.717	237.849	242.981	248.114	253.246	258.378	268.643
Travel Time Costs - Turns	52.019	2.108	2.421	2.735	3.048	3.362	3.702	4.042	4.382	4.722	5.062	5.015	4.967	4.919	4.871	4.823	5.057	5.291	5.524	5.758	5.991	6.527	7.062	7.597	8.133	8.668	9.260	9.853	10.445	11.037	11.630	12.222	12.814	13.407	13.999	14.591	15.562	16.533	17.504	18.475	19.445	20.416	21.387	22.358	23.329	24.300	26.142	27.984	29.827	31.669	33.511	35.354	37.196	39.038	42.723
Vehicle Operating Costs - Links	981.903	71.930	74.072	76.215	78.358	80.500	83.319	86.137	88.955	91.774	94.592	97.314	100.036	102.759	105.481	108.203	111.064	113.926	116.787	119.648	122.509	125.787	129.065	132.342	135.620	138.898	141.146	143.394	145.642	147.890	150.138	152.386	154.634	156.882	159.130	161.378	163.403	165.428	167.454	169.479	171.504	173.530	175.555	177.580	179.606	181.631	183.559	185.487	187.416	189.344	191.272	193.200	195.128	197.056	200.912
Vehicle Operating Costs - Turns	2.436	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.184	0.191	0.198	0.206	0.214	0.222	0.230	0.238	0.248	0.259	0.270	0.280	0.291	0.317	0.344	0.371	0.398	0.424	0.453	0.482	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.947	0.994	1.041	1.088	1.135	1.182	1.272	1.361	1.451	1.541	1.631	1.720	1.810	1.900	2.079
Accident Costs	151.594	12.317	12.453	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.406	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2215.115	160.170	164.823	169.477	174.130	178.783	184.753	190.722	196.692	202.661	208.630	215.280	222.237	229.195	236.153	243.419	250.305	257.191	264.077	270.962	277.848	286.264	294.681	303.097	311.513	319.929	326.265	332.601	338.938	345.274	351.610	357.946	364.282	370.618	376.955	383.291	390.386	397.482	404.577	411.672	418.768	425.863	432.959	440.054	447.149	454.245	463.543	472.842	482.141	491.439	500.738	510.036	519.335	528.633	547.231
	Opening (from Time 0)																																																							
User Cost Stream:	Years:	26	, weeks	0																																																		
Travel Time Costs - Links	1051.922		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	146.275	152.700	159.126	165.552	171.977	177.396	182.814	158.286	161.382	164.478	167.574	170.670	173.766	176.862	179.958	183.694	187.430	191.166	194.902	198.639	202.375	206.111	209.847	213.583	217.320	222.452	227.584	232.717	237.849	242.981	248.114	253.246	258.378	268.643
Travel Time Costs - Turns	48.236		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.965	6.342	6.730	7.117	7.505	7.892	8.642	9.391	10.445	11.037	11.630	12.222	12.814	13.407	13.999	14.591	15.562	16.533	17.504	18.475	19.445	20.416	21.387	22.358	23.329	24.300	26.142	27.984	29.827	31.669	33.511	35.354	37.196	39.038	42.723
Vehicle Operating Costs - Links	981.454		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.322	128.558	131.794	135.029	138.265	140.554	142.843	145.642	147.890	150.138	152.386	154.634	156.882	159.130	161.378	163.403	165.428	167.454	169.479	171.504	173.530	175.555	177.580	179.606	181.631	183.559	185.487	187.416	189.344	191.272	193.200	195.128	197.056	200.912
Vehicle Operating Costs - Turns	2.248		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.346	0.366	0.385	0.422	0.458	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.947	0.994	1.041	1.088	1.135	1.182	1.272	1.361	1.451	1.541	1.631	1.720	1.810	1.900	2.079
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2236.946		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	298.894	309.535	320.177	330.819	341.461	350.325	359.189	338.938	345.274	351.610	357.946	364.282	370.618	376.955	383.291	390.386	397.482	404.577	411.672	418.768	425.863	432.959	440.054	447.149	454.245	463.543	472.842	482.141	491.439	500.738	510.036	519.335	528.633	547.231
Benefit Stream:																																																								
Travel Time Costs - Links	38.610	102.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.946	32.268	34.590	36.913	39.235	41.557	43.879	46.201	50.010	53.819	57.627	61.436	65.244	69.053	72.862	76.670	80.479	84.288	89.487	94.686	99.885	105.084	110.283	115.482	120.682	125.881	136.279
Travel Time Costs - Turns	-0.086	-0.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.304	-0.147	0.010	0.167	0.324	0.481	0.638	0.796	0.599	0.402	0.205	0.008	-0.189	-0.386	-0.583	-0.780	-0.977	-1.174	-1.419	-1.664	-1.908	-2.153	-2.397	-2.642	-2.887	-3.131	-3.620
Vehicle Operating Costs - Links	-0.697	-1.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.510	-0.469	-0.427	-0.386	-0.345	-0.304	-0.263	-0.222	-0.456	-0.689	-0.923	-1.156	-1.390	-1.623	-1.857	-2.091	-2.324	-2.558	-2.733	-2.909	-3.084	-3.260	-3.435	-3.611	-3.786	-3.962	-4.313
Vehicle Operating Costs - Turns	-0.005	-0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.016	-0.008	-0.000	0.007	0.015	0.023	0.030	0.038	0.028	0.019	0.009	-0.000	-0.010	-0.020	-0.029	-0.039	-0.049	-0.058	-0.070	-0.082	-0.094	-0.105	-0.117	-0.129	-0.141	-0.152	-0.176
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	37.822	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.116	31.644	34.172	36.701	39.229	41.757	44.285	46.813	50.181	53.550	56.918	60.287	63.655	67.024	70.392	73.760	77.129	80.497	85.264	90.032	94.799	99.566	104.334	109.101	113.868	118.635	128.170

DM_19																																																							
Construction Period:	2 years																																																						
Construction	8.703		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.0311		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041
Periodic Maintenance	0.212		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.530	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.093	0.000	1.530	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.093	0.000	1.530	0.000	0.000	0.000	0.000	0.000
TOTAL COST	8.946	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135	0.041	1.571	0.041	0.041	0.041	0.041	0.041	0.041	0.041	1.134	0.041	1.571	0.041	0.041	0.041	0.041	0.041	0.041	0.041	1.134	0.041	1.571	0.041	0.041	0.041	0.041	0.041
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.117567	2.092202	2.053957	2.005375	1.94865	1.885666	1.818029	1.747106	1.702562	1.651678	1.596975	1.536749	1.475102	1.411963	1.348113	1.284203	1.220772	1.15826	1.115323	1.070621	1.024829	0.978514	0.932151	0.88613	0.840773	0.79634	0.78212786
50 year BCR	4.2	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.67%	23.39%	22.96%	22.42%	21.78%	21.08%	20.32%	19.53%	19.03%	18.46%	17.84%	17.18%	16.49%	15.78%	15.07%	14.36%	13.65%	12.96%	12.47%	11.97%	11.46%	10.94%	10.42%	9.91%	9.40%	8.90%	8.74%
25 Year BCR from first year of construction			0.0	0.0	0.3	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.1	2.3	2.4	2.6	2.8	2.9	3.1	3.3	3.4	3.5	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5																								
25 Year PVB from first year of construction			0.000	0.000	2.221	4.415	6.569	8.673	10.716	12.694	14.601	16.433	18.219	19.951	21.625	23.237	24.784	26.266	27.679	29.026	30.306	31.521	32.691	33.813	34.888	35.915	36.892	37.822	38.703	39.539	40.359																								
25 Year PVC from first year of construction			6.175	8.703	8.706	8.815	8.818	8.820	8.822	8.824	8.826	8.828	8.829	8.866	8.867	8.909	8.910	8.911	8.912	8.913	8.913	8.914	8.914	8.929	8.929	8.945	8.946	8.946	8.946	8.947	8.947																								

Then include widening SH2 from Te Maunga to Domain to 4 lanes

DM_17	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1013.373	73.710	75.498	77.285	79.073	80.861	83.901	86.942	89.982	93.023	96.063	99.059	102.055	105.051	108.046	111.042	114.283	117.523	120.763	124.004	127.244	131.140	135.036	138.932	142.827	146.723	149.671	152.620	155.568	158.517	161.465	164.413	167.362	170.310	173.259	176.207	179.562	182.916	186.271	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	223.658	228.293	232.927	237.562	242.196	246.831	256.100
Travel Time Costs - Turns	52.009	2.108	2.421	2.735	3.048	3.362	3.702	4.042	4.382	4.722	5.062	5.015	4.967	4.919	4.871	4.823	5.057	5.291	5.524	5.758	5.991	6.527	7.062	7.597	8.133	8.668	9.260	9.853	10.445	11.037	11.630	12.222	12.815	13.407	13.999	14.592	15.559	16.526	17.494	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.738	31.562	33.387	35.211	37.035	38.859	42.508
Vehicle Operating Costs - Links	984.558	71.930	74.132	76.334	78.537	80.739	83.565	86.392	89.218	92.045	94.871	97.602	100.333	103.063	105.794	108.525	111.395	114.266	117.137	120.008	122.878	126.165	129.452	132.738	136.025	139.311	141.567	143.823	146.079	148.335	150.591	152.846	155.102	157.358	159.614	161.870	163.902	165.935	167.968	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.028	189.971	191.915	193.858	195.802	197.745	201.632
Vehicle Operating Costs - Turns	2.435	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.184	0.191	0.198	0.206	0.214	0.222	0.230	0.238	0.248	0.259	0.270	0.280	0.291	0.317	0.344	0.371	0.398	0.424	0.453	0.482	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.447	1.536	1.625	1.714	1.802	1.891	2.069
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2200.844	160.170	164.543	168.916	173.289	177.662	183.610	189.557	195.505	201.452	207.400	213.996	220.893	227.790	234.688	241.889	248.720	255.550	262.381	269.212	276.043	284.351	292.659	300.967	309.275	317.584	323.773	329.962	336.151	342.340	348.530	354.719	360.908	367.097	373.286	379.476	386.186	392.896	399.606	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	472.969	481.766	490.564	499.361	508.159	516.956	534.551
	Opening (from Time 0)																																																							
User Cost Stream:	Years:	53	, weeks	0																																																		
Travel Time Costs - Links	1051.922		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	146.275	152.700	159.126	165.552	171.977	177.396	182.814	158.286	161.382	164.478	167.574	170.670	173.766	176.862	179.958	183.694	187.430	191.166	194.902	198.639	202.375	206.111	209.847	213.583	217.320	222.452	227.584	232.717	237.849	242.981	248.114	253.246	258.378	268.643
Travel Time Costs - Turns	48.236		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.965	6.342	6.730	7.117	7.505	7.892	8.642	9.391	10.445	11.037	11.630	12.222	12.814	13.407	13.999	14.591	15.562	16.533	17.504	18.475	19.445	20.416	21.387	22.358	23.329	24.300	26.142	27.984	29.827	31.669	33.511	35.354	37.196	39.038	42.723
Vehicle Operating Costs - Links	981.454		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.322	128.558	131.794	135.029	138.265	140.554	142.843	145.642	147.890	150.138	152.386	154.634	156.882	159.130	161.378	163.403	165.428	167.454	169.479	171.504	173.530	175.555	177.580	179.606	181.631	183.559	185.487	187.416	189.344	191.272	193.200	195.128	197.056	200.912
Vehicle Operating Costs - Turns	2.248		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.346	0.366	0.385	0.422	0.458	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.947	0.994	1.041	1.088	1.135	1.182	1.272	1.361	1.451	1.541	1.631	1.720	1.810	1.900	2.079
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2236.946		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	298.894	309.535	320.177	330.819	341.461	350.325	359.189	338.938	345.274	351.610	357.946	364.282	370.618	376.955	383.291	390.386	397.482	404.577	411.672	418.768	425.863	432.959	440.054	447.149	454.245	463.543	472.842	482.141	491.439	500.738	510.036	519.335	528.633	547.231
Benefit Stream:																																																								
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

DM_17																																																							
Construction Period:	2 years																																																						
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	66.902	30.135
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	FYRR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0	0.0																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.471	0.664																								

Then include widening SH2 from Te Puke to Paengaroa to 4 lanes

DM_18	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	984.246	73.710	74.996	76.282	77.569	78.855	81.811	84.768	87.724	90.680	93.636	96.546	99.455	102.365	105.274	108.184	111.274	114.363	117.453	120.543	123.632	127.254	130.875	134.496	138.117	141.738	144.274	146.810	149.346	151.883	154.419	156.955	159.491	162.028	164.564	167.100	169.499	171.897	174.296	176.694	179.092	181.491	183.889	186.288	188.686	191.085	193.725	196.365	199.005	201.645	204.285	206.925	209.565	212.205	217.485
Travel Time Costs - Turns	51.249	2.108	2.407	2.706	3.005	3.305	3.641	3.977	4.314	4.650	4.987	4.937	4.888	4.839	4.790	4.740	4.970	5.199	5.428	5.657	5.886	6.419	6.952	7.486	8.019	8.552	9.136	9.720	10.303	10.887	11.471	12.055	12.639	13.222	13.806	14.390	15.344	16.299	17.253	18.207	19.162	20.116	21.070	22.024	22.979	23.933	25.745	27.556	29.368	31.179	32.991	34.803	36.614	38.426	42.049
Vehicle Operating Costs - Links	986.047	71.930	74.164	76.399	78.633	80.868	83.698	86.529	89.359	92.189	95.020	97.753	100.486	103.220	105.953	108.686	111.562	114.437	117.312	120.187	123.062	126.366	129.669	132.973	136.276	139.580	141.841	144.101	146.362	148.623	150.884	153.144	155.405	157.666	159.927	162.187	164.227	166.267	168.306	170.346	172.386	174.426	176.465	178.505	180.545	182.585	184.639	186.693	188.748	190.802	192.857	194.911	196.966	199.020	203.129
Vehicle Operating Costs - Turns	2.397	0.106	0.120	0.134	0.148	0.162	0.168	0.175	0.181	0.188	0.194	0.201	0.208	0.215	0.221	0.228	0.240	0.253	0.265	0.277	0.289	0.315	0.341	0.367	0.393	0.419	0.447	0.475	0.503	0.531	0.559	0.588	0.616	0.644	0.672	0.700	0.747	0.793	0.840	0.887	0.934	0.980	1.027	1.074	1.121	1.168	1.256	1.344	1.432	1.520	1.608	1.697	1.785	1.873	2.049
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2172.407	160.170	164.059	167.948	171.838	175.727	181.590	187.453	193.315	199.178	205.041	211.550	218.362	225.174	231.985	239.100	245.782	252.463	259.145	265.826	272.508	280.555	288.603	296.651	304.698	312.746	318.518	324.291	330.064	335.836	341.609	347.382	353.154	358.927	364.700	370.473	376.220	381.968	387.715	393.463	399.210	404.968	410.706	416.453	422.201	427.948	434.849	441.750	448.650	455.551	462.451	469.352	476.253	483.153	496.955
	Opening (from Time 0)																																																							
User Cost Stream:	Years:	53	, weeks	0																																																		
Travel Time Costs - Links	1051.922		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	114.786	118.839	122.891	126.944	130.996	139.849	146.275	152.700	159.126	165.552	171.977	177.396	182.814	158.286	161.382	164.478	167.574	170.670	173.766	176.862	179.958	183.694	187.430	191.166	194.902	198.639	202.375	206.111	209.847	213.583	217.320	222.452	227.584	232.717	237.849	242.981	248.114	253.246	258.378	268.643
Travel Time Costs - Turns	48.236		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.918	5.271	5.624	5.977	6.330	5.965	6.342	6.730	7.117	7.505	7.892	8.642	9.391	10.445	11.037	11.630	12.222	12.814	13.407	13.999	14.591	15.562	16.533	17.504	18.475	19.445	20.416	21.387	22.358	23.329	24.300	26.142	27.984	29.827	31.669	33.511	35.354	37.196	39.038	42.723
Vehicle Operating Costs - Links	981.454		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.248	111.067	113.885	116.704	119.522	122.086	125.322	128.558	131.794	135.029	138.265	140.554	142.843	145.642	147.890	150.138	152.386	154.634	156.882	159.130	161.378	163.403	165.428	167.454	169.479	171.504	173.530	175.555	177.580	179.606	181.631	183.559	185.487	187.416	189.344	191.272	193.200	195.128	197.056	200.912
Vehicle Operating Costs - Turns	2.248		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.288	0.308	0.327	0.346	0.366	0.385	0.422	0.458	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.947	0.994	1.041	1.088	1.135	1.182	1.272	1.361	1.451	1.541	1.631	1.720	1.810	1.900	2.079
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2236.946		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	245.842	253.568	261.294	269.020	276.746	288.252	298.894	309.535	320.177	330.819	341.461	350.325	359.189	338.938	345.274	351.610	357.946	364.282	370.618	376.955	383.291	390.386	397.482	404.577	411.672	418.768	425.863	432.959	440.054	447.149	454.245	463.543	472.842	482.141	491.439	500.738	510.036	519.335	528.633	547.231
Benefit Stream:																																																								
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	-164.712	-169.182	-173.687	-178.193	-184.284	-190.375	-196.467	-202.558	-209.547	-216.550	-223.862	-231.174	-238.485	-245.842	-253.568	-261.294	-269.020	-276.746	-288.252	-298.894	-309.535	-320.177	-330.819	-341.461	-350.325	-359.189	-338.938	-345.274	-351.610	-357.946	-364.282	-370.618	-376.955	-383.291	-390.386	-397.482	-404.577	-411.672	-418.768	-425.863	-432.959	-440.054	-447.149	-454.245	-463.543	-472.842	-482.141	-491.439	-500.738	-510.036	-519.335	-528.633	-547.231

DM_18																																																							
Construction Period:	2 years																																																						
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.910	26.910
Annual Maintenance	0.0000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.910	26.910
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				-133.31	-124.42	-116.04	-109.1	-102.46	-96.127	-90.097	-84.733	-79.604	-74.811	-70.231	-65.866	-61.725	-57.877	-54.219	-50.747	-47.459	-44.938	-42.361	-39.881	-37.502	-35.226	-33.054	-30.829	-28.7054	-24.6502	-22.8282	-21.1338	-19.5587	-18.0964	-16.7366	-15.4751	-14.3048	-13.2451	-12.2598	-11.3442	-10.4938	-9.70426	-8.97153	-8.29182	-7.66155	-7.07735	-6.53606	-6.0635	-5.62285	-5.2122	-4.82975	-4.47376	-4.14258	-3.83464	-3.54845	-3.3393485
50 year BCR	ERR	FYRR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	-11848.6	-5802.1																								
25 Year PVB from first year of construction			********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	********	-2236.946	-2240.968	-2244.690	-2248.192																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.362																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE) NPV @ 1997/1998 1998/1999 1999/2000 2000/2001 2001/2002 2002/2003 2003/2004 2004/2005 2005/2006 2006/2007 2007/2008 2008/2009 2009/2010 2010/2011 2011/2012 2012/2013 2013/2014 2014/2015 2015/2016 2016/2017 2017/2018 2018/2019 2019/2020 2020/2021 2021/2022 2022/2023 2023/2024 2024/2025 2025/2026 2026/2027 2027/2028 2028/2029 2029/2030 2030/2031 2031/2032 2032/2033 2033/2034 2034/2035 2035/2036 2036/2037 2037/2038 2038/2039 2039/2040 2040/2041 2041/2042 2042/2043 2044/2045 2045/2046 2046/2047 2047/2048 2048/2049 2049/2050 2050/2051 2051/2052
ANALYSIS YEAR 10% Year 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
TIME ZERO 1 July 1998 Time 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
BASE YEAR FOR COSTS 1997
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048

4 lane Option A3, grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1064.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808	178.301	183.796	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	55.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	596.066	610.824	626.582	642.340	658.098	673.856	705.371

Note 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Option A3 grade separated intersections

OP_27	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	911.320	73.710	73.359	73.008	72.658	72.307	75.040	77.774	80.507	83.240	85.974	88.668	91.362	94.056	96.750	99.444	102.260	105.076	107.892	110.708	113.524	116.963	120.403	123.843	127.283	130.722	132.962	135.202	137.443	139.683	141.923	144.163	146.403	148.643	150.883	153.123	156.232	157.341	159.450	161.559	163.669	165.778	167.887	169.996	172.105	174.214	176.463	178.712	180.961	183.210	185.458	187.707	189.956	192.205	196.703
Travel Time Costs - Turns	34.063	2.108	2.201	2.294	2.387	2.479	2.783	3.087	3.391	3.696	3.999	3.900	3.801	3.702	3.604	3.505	3.619	3.733	3.846	3.960	4.074	4.285	4.497	4.708	4.919	5.130	5.194	5.258	5.322	5.386	5.450	5.514	5.578	5.642	5.706	5.770	5.866	5.963	6.060	6.156	6.253	6.350	6.446	6.543	6.640	6.736	6.861	6.987	7.112	7.237	7.362	7.487	7.612	7.737	7.988
Vehicle Operating Costs - Links	958.262	71.930	73.538	75.145	76.753	78.361	81.101	83.841	86.582	89.322	92.062	94.716	97.369	100.023	102.677	105.330	108.098	110.866	113.634	116.402	119.170	122.369	125.568	128.766	131.965	135.164	137.380	139.597	141.814	144.031	146.248	148.465	150.682	152.899	155.116	157.333	159.282	161.231	163.180	165.129	167.078	169.027	170.976	172.925	174.874	176.823	178.817	180.811	182.804	184.798	186.792	188.786	190.780	192.774	196.762
Vehicle Operating Costs - Turns	1.550	0.106	0.109	0.113	0.116	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.176	0.182	0.187	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253	0.256	0.260	0.263	0.266	0.269	0.273	0.276	0.279	0.282	0.287	0.292	0.296	0.301	0.306	0.311	0.315	0.320	0.325	0.330	0.336	0.342	0.348	0.354	0.361	0.367	0.373	0.379	0.392
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2028.633	160.170	160.987	161.805	162.622	163.440	169.007	174.574	180.141	185.708	191.275	197.270	203.512	209.755	215.997	222.487	228.580	234.673	240.766	246.860	252.953	260.283	267.613	274.943	282.273	289.603	294.391	299.178	303.966	308.753	313.540	318.328	323.115	327.903	332.690	337.477	341.857	346.236	350.616	354.996	359.375	363.754	368.134	372.513	376.893	381.272	385.871	390.471	396.070	399.669	404.269	408.868	413.467	418.066	427.265
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	17	, weeks	0																																																			
Travel Time Costs - Links	992.449		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	110.708	113.524	116.963	120.403	123.843	127.283	130.722	132.962	135.202	137.443	139.683	141.923	144.163	146.403	148.643	150.883	153.123	155.232	157.341	159.450	161.559	163.669	165.778	167.887	169.996	172.105	174.214	176.463	178.712	180.961	183.210	185.458	187.707	189.956	192.205	196.703
Travel Time Costs - Turns	37.731		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	3.960	4.074	4.285	4.497	4.708	4.919	5.130	5.194	5.258	5.322	5.386	5.450	5.514	5.578	5.642	5.706	5.770	5.866	5.963	6.060	6.156	6.253	6.350	6.446	6.543	6.640	6.736	6.861	6.987	7.112	7.237	7.362	7.487	7.612	7.737	7.988
Vehicle Operating Costs - Links	974.822		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	116.402	119.170	122.369	125.568	128.766	131.965	135.164	137.380	139.597	141.814	144.031	146.248	148.465	150.682	152.899	155.116	157.333	159.282	161.231	163.180	165.129	167.078	169.027	170.976	172.925	174.874	176.823	178.817	180.811	182.804	184.798	186.792	188.786	190.780	192.774	196.762
Vehicle Operating Costs - Turns	1.737		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253	0.256	0.260	0.263	0.266	0.269	0.273	0.276	0.279	0.282	0.287	0.292	0.296	0.301	0.306	0.311	0.315	0.320	0.325	0.330	0.336	0.342	0.348	0.354	0.361	0.367	0.373	0.379	0.392
Accident Costs	143.867		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2150.605		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	246.860	252.963	260.283	267.613	274.943	282.273	289.603	294.391	299.178	303.966	308.753	313.540	318.328	323.115	327.903	332.690	337.477	341.857	346.236	350.616	354.996	359.375	363.754	368.134	372.513	376.893	381.272	385.871	390.471	395.070	399.669	404.269	408.868	413.467	418.066	427.265
Benefit Stream:																																																							
Travel Time Costs - Links	91.944	72.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	20.741	22.016	24.931	27.847	30.762	33.677	36.592	39.845	43.099	46.352	49.606	52.859	56.113	59.366	62.620	65.873	69.126	74.941	80.755	86.569	92.384	98.198	104.012	109.826	115.641	121.455	127.269	136.110	144.951	153.792	162.633	171.474	180.315	189.156	197.997	215.679
Travel Time Costs - Turns	18.003	14.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.371	2.609	3.425	4.241	5.056	5.872	6.688	7.500	8.313	9.125	9.938	10.750	11.563	12.375	13.187	14.000	14.812	16.212	17.613	19.013	20.413	21.813	23.213	24.613	26.013	27.413	28.813	31.159	33.504	35.850	38.195	40.541	42.886	45.232	47.577	52.268
Vehicle Operating Costs - Links	6.286	5.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.069	3.116	3.160	3.203	3.247	3.291	3.334	3.413	3.492	3.571	3.650	3.729	3.807	3.886	3.965	4.044	4.123	3.950	3.777	3.604	3.431	3.258	3.085	2.912	2.739	2.566	2.393	2.170	1.947	1.724	1.502	1.279	1.056	0.833	0.610	0.164
Vehicle Operating Costs - Turns	0.878	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.116	0.128	0.168	0.207	0.247	0.287	0.327	0.366	0.406	0.445	0.485	0.524	0.564	0.603	0.643	0.682	0.722	0.790	0.858	0.926	0.994	1.062	1.130	1.198	1.266	1.333	1.401	1.516	1.630	1.744	1.858	1.972	2.086	2.201	2.315	2.543
Accident Costs	9.219	7.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711	4.819	4.927	5.035	5.143	5.251	5.359	5.467	5.575	5.682	5.778	5.875	5.971	6.067	6.163	6.259	6.355	6.451	6.547	6.643	6.724	6.805	6.886	6.967	7.048	7.129	7.210	7.290	7.452
TOTAL USER BENEFITS	126.330	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.289	31.957	35.874	39.792	43.709	47.627	51.544	55.636	60.128	64.421	68.713	73.005	77.297	81.590	85.882	90.174	94.466	101.672	108.877	116.082	123.288	130.493	137.699	144.904	152.109	159.315	166.520	177.679	188.837	199.996	211.155	222.313	233.472	244.631	255.789	278.107
WTP via Rates	0.434		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	126.764		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.518	32.186	36.103	40.021	43.938	47.856	51.773	56.065	60.357	64.650	68.942	73.234	77.526	81.819	86.111	90.403	94.696	101.901	109.106	116.311	123.517	130.722	137.928	145.133	152.338	159.544	166.749	177.908	189.066	200.225	211.384	222.542	233.701	244.860	256.018	278.336

OP_27																																																							
Construction Period:	3.0 years																																																						
Construction	22.993		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.055	36.055	32.930	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.072		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Periodic Maintenance	0.482		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	23.546	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.055	36.055	32.930	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	0.038	0.038	0.038	0.038	0.038
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.23356	5.01776	5.11679	5.15635	5.14644	5.0957	5.01167	4.93378	4.828635	4.701834	4.55818	4.401788	4.23616	4.064267	3.888618	3.711316	3.534114	3.457296	3.365237	3.261343	3.148528	3.029271	2.905676	2.779518	2.652283	2.525211	2.399324	2.327167	2.2483	2.16454	2.077429	1.988267	1.898147	1.807981	1.718521	1.69847818
50 year BCR	5.4	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	22.23%	21.31%	21.73%	21.90%	21.86%	21.64%	21.28%	20.96%	20.51%	19.97%	19.36%	18.69%	17.99%	17.26%	16.51%	15.76%	15.01%	14.68%	14.29%	13.85%	13.37%	12.87%	12.34%	11.80%	11.26%	10.72%	10.19%	9.88%	9.55%	9.19%	8.82%	8.44%	8.06%	7.68%	7.30%	7.21%
25 Year BCR from first year of construction			1.83507	2.1	2.3	2.5	2.6	2.8	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.1	4.2	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.5	5.6																								
25 Year PVB from first year of construction			42.699	47.763	52.695	57.475	62.092	66.535	70.798	74.876	78.769	82.475	86.101	89.631	93.051	96.353	99.531	102.578	105.493	108.275	110.923	113.440	115.881	118.239	120.509	122.688	124.773	126.764	128.660	130.462	132.244																								
25 Year PVC from first year of construction			23.268	23.272	23.353	23.356	23.449	23.451	23.453	23.455	23.456	23.458	23.459	23.460	23.492	23.493	23.529	23.529	23.530	23.531	23.532	23.532	23.533	23.533	23.545	23.546	23.546	23.546	23.547	23.547	23.547																								

25 Year PVB excl WTP from first year of construction 42.457
25 Year PVB of WTP from first year of construction 0.242
25 Year BCR from first year of construction excl WTP 1.8

23 (24 + 4 lane TM-Domain - opening in 3 yrs) minus 24 (A3 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																																																							
Travel Time Costs - Links	6.326	109.6%	0.000	0.000	0.000	0.513	0.518	0.523	0.527	0.532	0.537	0.552	0.568	0.584	0.599	0.615	0.637	0.658	0.680	0.702	0.723	0.784	0.845	0.906	0.966	1.027	1.154	1.280	1.407	1.534	1.661	1.787	1.914	2.041	2.168	2.294	2.640	2.985	3.331	3.676	4.022	4.368	4.713	5.059	5.404	5.750	6.286	6.822	7.358	7.893	8.429	8.965	9.501	10.037	11.109
Travel Time Costs - Turns	0.999	17.3%	0.000	0.000	0.000	-0.096	-0.089	-0.082	-0.075	-0.068	-0.061	-0.050	-0.038	-0.026	-0.015	-0.003	0.018	0.040	0.061	0.083	0.104	0.220	0.337	0.453	0.569	0.685	0.730	0.775	0.819	0.864	0.909	0.953	0.996	1.043	1.087	1.132	1.172	1.211	1.251	1.291	1.330	1.370	1.410	1.449	1.489	1.529	1.570	1.612	1.653	1.695	1.736	1.778	1.819	1.861	1.944
Vehicle Operating Costs - Links	-2.170	-37.6%	0.000	0.000	0.000	-0.214	-0.221	-0.229	-0.236	-0.243	-0.250	-0.257	-0.263	-0.269	-0.276	-0.282	-0.297	-0.312	-0.327	-0.343	-0.358	-0.363	-0.368	-0.373	-0.379	-0.384	-0.395	-0.406	-0.417	-0.429	-0.440	-0.451	-0.462	-0.473	-0.484	-0.496	-0.499	-0.502	-0.505	-0.507	-0.510	-0.513	-0.516	-0.519	-0.522	-0.525	-0.532	-0.538	-0.544	-0.551	-0.557	-0.563	-0.570	-0.576	-0.589
Vehicle Operating Costs - Turns	0.062	1.1%	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.005	0.007	0.012	0.017	0.022	0.028	0.033	0.035	0.037	0.039	0.041	0.043	0.045	0.046	0.048	0.050	0.052	0.055	0.057	0.059	0.061	0.064	0.066	0.068	0.070	0.073	0.075	0.077	0.079	0.080	0.082	0.084	0.086	0.088	0.089	0.093
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	5.217	0.904	0.000	0.000	0.000	0.201	0.206	0.211	0.216	0.220	0.225	0.246	0.267	0.288	0.309	0.330	0.359	0.388	0.418	0.447	0.476	0.653	0.830	1.007	1.184	1.361	1.523	1.686	1.848	2.010	2.172	2.334	2.496	2.659	2.821	2.983	3.368	3.752	4.137	4.521	4.906	5.290	5.675	6.059	6.444	6.828	7.401	7.974	8.547	9.120	9.692	10.265	10.838	11.411	12.557
OP_23																																																							
Construction Period:	2 years																																																						
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006

25 Yr BCR from 1st yr of construction, excl TM-Dom, incl WTP 2.2
25 Year PVB from first year of construction 40.4 40.2 (excl WTP)
25 Year PVC from first year of construction 18.038

4 lane Option B, grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.796	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

Note 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Option B (Swamp Route) grade separated intersections

OP_37	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	909.867	73.710	73.306	72.902	72.497	72.093	74.836	77.579	80.322	83.065	85.808	88.508	91.207	93.907	96.607	99.307	102.146	104.985	107.824	110.663	113.502	116.936	120.370	123.804	127.238	130.672	132.887	135.102	137.317	139.532	141.747	143.962	146.177	148.392	150.607	152.822	154.912	157.002	159.092	161.182	163.271	165.361	167.451	169.541	171.631	173.721	175.978	178.236	180.493	182.750	185.008	187.265	189.522	191.780	196.294
Travel Time Costs - Turns	33.817	2.108	2.199	2.291	2.382	2.474	2.775	3.076	3.378	3.679	3.981	3.880	3.779	3.679	3.578	3.478	3.589	3.701	3.813	3.925	4.037	4.204	4.371	4.538	4.705	4.872	4.974	5.075	5.177	5.278	5.380	5.481	5.583	5.685	5.786	5.888	5.975	6.062	6.150	6.237	6.325	6.412	6.500	6.587	6.674	6.762	6.883	7.003	7.124	7.245	7.366	7.486	7.607	7.728	7.969
Vehicle Operating Costs - Links	956.108	71.930	73.458	74.985	76.513	78.041	80.792	83.542	86.293	89.043	91.794	94.455	97.116	99.777	102.438	105.099	107.887	110.674	113.461	116.249	119.036	122.253	125.469	128.686	131.903	135.119	137.318	139.516	141.714	143.913	146.111	148.309	150.508	152.706	154.904	157.103	159.044	160.986	162.928	164.869	166.811	168.753	170.694	172.636	174.577	176.519	178.488	180.457	182.426	184.395	186.364	188.333	190.302	192.271	196.210
Vehicle Operating Costs - Turns	1.545	0.106	0.109	0.113	0.116	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.165	0.170	0.176	0.181	0.187	0.193	0.198	0.206	0.215	0.223	0.231	0.240	0.244	0.249	0.254	0.259	0.264	0.268	0.273	0.278	0.283	0.287	0.292	0.296	0.300	0.305	0.309	0.313	0.318	0.322	0.326	0.331	0.336	0.342	0.348	0.354	0.360	0.365	0.371	0.377	0.389
Accident Costs	123.010	12.317	11.771	11.225	10.679	10.133	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.755	13.988	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.596	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2024.346	160.170	160.843	161.515	162.188	162.861	168.446	174.032	179.617	185.202	190.788	196.792	203.043	209.293	215.544	222.040	228.173	234.306	240.438	246.571	252.704	260.000	267.295	274.591	281.887	289.183	293.959	298.736	303.513	308.290	313.067	317.844	322.621	327.398	332.175	336.952	341.288	345.625	349.961	354.298	358.634	362.971	367.307	371.644	375.980	380.317	384.895	389.473	394.051	398.629	403.207	407.785	412.364	416.942	426.098
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	19	, weeks	0																																																			
Travel Time Costs - Links	999.526		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	116.936	120.370	123.804	127.238	130.672	132.887	135.102	137.317	139.532	141.747	143.962	146.177	148.392	150.607	152.822	154.912	157.002	159.092	161.182	163.271	165.361	167.451	169.541	171.631	173.721	175.978	178.236	180.493	182.750	185.008	187.265	189.522	191.780	196.294
Travel Time Costs - Turns	38.452		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	4.204	4.371	4.538	4.705	4.872	4.974	5.075	5.177	5.278	5.380	5.481	5.583	5.685	5.786	5.888	5.975	6.062	6.150	6.237	6.325	6.412	6.500	6.587	6.674	6.762	6.883	7.003	7.124	7.245	7.366	7.486	7.607	7.728	7.969
Vehicle Operating Costs - Links	975.660		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	122.253	125.469	128.686	131.903	135.119	137.318	139.516	141.714	143.913	146.111	148.309	150.508	152.706	154.904	157.103	159.044	160.986	162.928	164.869	166.811	168.753	170.694	172.636	174.577	176.519	178.488	180.457	182.426	184.395	186.364	188.333	190.302	192.271	196.210
Vehicle Operating Costs - Turns	1.774		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.206	0.215	0.223	0.231	0.240	0.244	0.249	0.254	0.259	0.264	0.268	0.273	0.278	0.283	0.287	0.292	0.296	0.300	0.305	0.309	0.313	0.318	0.322	0.326	0.331	0.336	0.342	0.348	0.354	0.360	0.365	0.371	0.377	0.389
Accident Costs	145.116		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.596	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2160.528		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	260.000	267.295	274.591	281.887	289.183	293.959	298.736	303.513	308.290	313.067	317.844	322.621	327.398	332.175	336.952	341.288	345.625	349.961	354.298	358.634	362.971	367.307	371.644	375.980	380.317	384.895	389.473	394.051	398.629	403.207	407.785	412.364	416.942	426.098
Benefit Stream:																																																							
Travel Time Costs - Links	84.867	72.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.969	27.880	30.801	33.721	36.642	39.921	43.199	46.478	49.756	53.035	56.313	59.592	62.870	66.149	69.428	75.261	81.094	86.928	92.761	98.595	104.428	110.262	116.095	121.929	127.762	136.595	145.427	154.260	163.092	171.925	180.757	189.590	198.422	216.087
Travel Time Costs - Turns	17.281	14.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.507	4.366	5.226	6.086	6.946	7.721	8.496	9.271	10.045	10.820	11.595	12.370	13.145	13.919	14.694	16.104	17.513	18.922	20.332	21.741	23.150	24.560	25.969	27.378	28.788	31.138	33.487	35.837	38.187	40.537	42.887	45.237	47.587	52.287
Vehicle Operating Costs - Links	5.448	4.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.276	3.302	3.327	3.353	3.379	3.476	3.573	3.671	3.768	3.866	3.963	4.061	4.158	4.256	4.353	4.187	4.022	3.856	3.691	3.525	3.359	3.194	3.028	2.862	2.697	2.499	2.301	2.103	1.905	1.707	1.509	1.310	1.112	0.716
Vehicle Operating Costs - Turns	0.841	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.170	0.212	0.253	0.295	0.337	0.375	0.413	0.451	0.489	0.527	0.565	0.603	0.641	0.679	0.717	0.785	0.853	0.922	0.990	1.059	1.127	1.195	1.264	1.332	1.400	1.515	1.630	1.744	1.859	1.973	2.088	2.202	2.317	2.546
Accident Costs	7.970	6.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.246	4.350	4.454	4.557	4.661	4.775	4.889	5.003	5.117	5.231	5.345	5.458	5.572	5.686	5.800	5.903	6.006	6.109	6.211	6.314	6.417	6.520	6.623	6.726	6.828	6.909	6.990	7.071	7.152	7.233	7.314	7.394	7.475	7.637
TOTAL USER BENEFITS	116.407	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.158	40.109	44.061	48.013	51.965	56.267	60.570	64.873	69.176	73.478	77.781	82.084	86.386	90.689	94.992	102.240	109.488	116.737	123.985	131.234	138.482	145.730	152.979	160.227	167.475	178.655	189.835	201.015	212.195	223.374	234.554	245.734	256.914	279.273
WTP via Rates	0.355		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	116.762		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.387	40.338	44.290	48.242	52.194	56.496	60.799	65.102	69.405	73.707	78.010	82.313	86.615	90.918	95.221	102.469	109.717	116.966	124.214	131.463	138.711	145.959	153.208	160.456	167.704	178.884	190.064	201.244	212.424	223.603	234.783	245.963	257.143	279.502

OP_37																																																							
Construction Period:	4 years																																																						
Construction	22.622		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.226	31.226	28.101	28.101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.058		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
Periodic Maintenance	0.391		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.011	0.000	1.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.011	0.000	1.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.011	0.000	1.415	0.000	0.000
TOTAL COST	23.071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.226	31.226	28.101	28.101	0.037	1.453	0.037	0.037	0.037	0.037	0.037	0.037	0.037	1.048	0.037	1.453	0.037	0.037	0.037	0.037	0.037	0.037	0.037	1.048	0.037	1.453	0.037	0.037	0.037	0.037	0.037	0.037	0.037	1.048	0.037	1.453	0.037	0.037
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.15695	5.19729	5.18767	5.13686	5.0524	4.97173	4.863976	4.734723	4.588772	4.430227	4.262585	4.08881	3.911403	3.732459	3.563725	3.476583	3.384097	3.279694	3.166306	3.046429	2.92218	2.796345	2.66742	2.539653	2.413071	2.339941	2.260165	2.175555	2.08765	1.997747	1.906938	1.816129	1.72607	1.7055993
50 year BCR	5.0	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	22.35%	22.53%	22.49%	22.27%	21.90%	21.55%	21.08%	20.52%	19.89%	19.20%	18.48%	17.72%	16.95%	16.18%	15.40%	15.07%	14.67%	14.22%	13.72%	13.20%	12.67%	12.12%	11.56%	11.01%	10.46%	10.14%	9.80%	9.43%	9.05%	8.66%	8.27%	7.87%	7.48%	7.39%
25 Year BCR from first year of construction			1.40986	1.6	1.9	2.1	2.3	2.5	2.6	2.8	3.0	3.1	3.3	3.5	3.6	3.7	3.9	4.0	4.1	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.1	5.2	5.3																								
25 Year PVB from first year of construction			32.201	37.303	42.269	47.061	51.728	56.199	60.487	64.589	68.504	72.231	75.877	79.427	82.866	86.187	89.382	92.447	95.379	98.177	100.840	103.371	105.825	108.196	110.477	112.667	114.762	116.762	118.667	120.477	122.266																								
25 Year PVC from first year of construction			22.840	22.843	22.846	22.849	22.915	22.917	22.983	22.994	22.996	22.997	22.999	23.000	23.001	23.002	23.028	23.028	23.058	23.058	23.059	23.059	23.060	23.060	23.061	23.061	23.071	23.071	23.083	23.083	23.083																								

25 Year PVB excl WTP from first year of construction 32.038
25 Year PVB of WTP from first year of construction 0.163

33 (34 + 4 lane TM-Domain - opening in 3 yrs) minus 34 (B 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																																																							
Travel Time Costs - Links	6.357	121.3%	0.000	0.000	0.000	0.518	0.522	0.526	0.530	0.534	0.537	0.553	0.569	0.585	0.601	0.617	0.640	0.664	0.687	0.711	0.734	0.791	0.849	0.906	0.963	1.021	1.150	1.279	1.408	1.537	1.666	1.796	1.925	2.054	2.183	2.312	2.660	3.007	3.355	3.703	4.050	4.398	4.746	5.093	5.441	5.789	6.318	6.847	7.376	7.906	8.435	8.964	9.493	10.023	11.081
Travel Time Costs - Turns	0.957	18.3%	0.000	0.000	0.000	-0.091	-0.085	-0.079	-0.073	-0.066	-0.060	-0.048	-0.037	-0.025	-0.013	-0.001	0.018	0.038	0.057	0.077	0.096	0.211	0.325	0.439	0.554	0.668	0.712	0.757	0.801	0.845	0.889	0.933	0.977	1.022	1.066	1.110	1.136	1.162	1.189	1.215	1.241	1.267	1.294	1.320	1.346	1.372	1.409	1.445	1.481	1.517	1.554	1.590	1.626	1.663	1.735
Vehicle Operating Costs - Links	-2.115	-40.3%	0.000	0.000	0.000	-0.213	-0.220	-0.226	-0.233	-0.239	-0.246	-0.253	-0.259	-0.266	-0.273	-0.280	-0.291	-0.301	-0.312	-0.323	-0.333	-0.341	-0.349	-0.356	-0.364	-0.372	-0.382	-0.392	-0.402	-0.412	-0.421	-0.431	-0.441	-0.451	-0.461	-0.471	-0.476	-0.481	-0.486	-0.491	-0.496	-0.500	-0.505	-0.510	-0.515	-0.520	-0.523	-0.525	-0.527	-0.530	-0.532	-0.535	-0.537	-0.539	-0.544
Vehicle Operating Costs - Turns	0.043	0.8%	0.000	0.000	0.000	-0.001	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.003	-0.002	-0.000	0.001	0.002	0.008	0.014	0.020	0.026	0.032	0.034	0.036	0.038	0.040	0.042	0.044	0.046	0.048	0.050	0.052	0.054	0.056	0.057	0.059	0.060	0.062	0.063	0.065	0.067	0.068	0.070	0.071	0.073	0.075	0.076	0.078	0.079	0.081	0.084
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	5.242	1.000	0.000	0.000	0.000	0.213	0.216	0.219	0.222	0.225	0.228	0.249	0.269	0.290	0.311	0.331	0.365	0.398	0.432	0.465	0.499	0.669	0.839	1.009	1.179	1.349	1.515	1.680	1.846	2.011	2.176	2.342	2.507	2.673	2.838	3.003	3.374	3.744	4.115	4.486	4.856	5.227	5.597	5.968	6.338	6.709	7.274	7.838	8.403	8.968	9.533	10.097	10.662	11.227	12.357
OP_33																																																							
Construction Period:	2 years																																																						
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006

25 Year BCR from first year of construction 1.7 includes WTP
25 Year PVB from first year of construction 29.853 29.7
25 Year PVC from first year of construction 17.610

TIME STREAM OF USER COSTS

2 lane Option A3, at grade

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13
TIME ZERO 1 July 1998		Time	0	1	2	3	4	5	6	7	8	9	10	11	12
BASE YEAR FOR COSTS: 1997															
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048															
		1997				2001					2006				
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.966	12.672	12.388	12.106	11.480	12.406	13.639	14.873	16.107
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485
2 lane Option A3, at grade intersections									Note 2006 Accident Costs factored by				0.75	to account for long term trends		
OP_26	Year		1	2	3	4	5	6	7	8	9	10	11	12	13
Travel Time Costs - Links	937.816	73.710	73.873	74.035	74.198	74.361	77.173	79.986	82.798	85.610	88.422	91.204	93.986	96.768	99.550
Travel Time Costs - Turns	35.159	2.108	2.196	2.285	2.373	2.461	2.765	3.069	3.373	3.678	3.982	3.890	3.798	3.706	3.614
Vehicle Operating Costs - Links	964.437	71.930	73.448	74.966	76.483	78.001	80.733	83.464	86.195	88.927	91.658	94.302	96.947	99.591	102.235
Vehicle Operating Costs - Turns	1.620	0.106	0.110	0.114	0.118	0.122	0.126	0.131	0.135	0.139	0.144	0.150	0.156	0.162	0.168
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.967	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801
TOTAL USER COSTS	2052.469	160.170	161.407	162.644	163.882	165.119	170.755	176.392	182.028	187.665	193.302	199.383	205.712	212.041	218.369
	Opening (from Time 0)														
User Cost Stream:	Years:	13	, weeks	26										
Travel Time Costs - Links	991.303		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734
Travel Time Costs - Turns	37.487		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931
Vehicle Operating Costs - Links	970.979		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483
Vehicle Operating Costs - Turns	1.729		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230
Accident Costs	140.904		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107
TOTAL USER COSTS	2142.403		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485
Benefit Stream:															
Travel Time Costs - Links	93.090	69.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	18.246	13.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	10.129	7.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.886	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	12.181	9.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	134.533	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WTP via Rates	0.644		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	135.176		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_26															
Construction Period:	2.5 years														
Construction	24.632		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.288	33.288
Annual Maintenance	0.045		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.309		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	24.986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.288	33.288
mid point of year			1	2	3	4	5	6	7	8	9	10	11	12	13
SPPWF			0.90909	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.4241	0.38554	0.35049	0.31863	0.28966
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	5.4	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
25 Year BCR from first year of construction			2.3	2.5	2.7	2.9	3.0	3.2	3.4	3.5	3.6	3.8	3.9	4.0	4.2
25 Year PVB from first year of construction			57.685	62.340	66.876	71.276	75.526	79.618	83.545	87.304	90.892	94.310	97.653	100.908	104.063
25 Year PVC from first year of construction			24.916	24.917	24.918	24.919	24.920	24.921	24.922	24.923	24.942	24.943	24.966	24.966	24.967
Then widen SH2 from Te Maunga to Domain to 4 lanes															
OP_20	Year		1	2	3	4	5	6	7	8	9	10	11	12	13
Travel Time Costs - Links	932.365	73.710	73.789	73.868	73.947	74.026	76.837	79.648	82.459	85.270	88.081	90.850	93.620	96.390	99.160
Travel Time Costs - Turns	34.277	2.108	2.221	2.333	2.445	2.558	2.855	3.153	3.450	3.748	4.045	3.940	3.836	3.731	3.627
Vehicle Operating Costs - Links	956.558	71.930	73.494	75.058	76.622	78.186	80.924	83.662	86.400	89.138	91.876	94.527	97.178	99.829	102.480
Vehicle Operating Costs - Turns	1.563	0.106	0.110	0.114	0.119	0.123	0.128	0.133	0.138	0.143	0.148	0.153	0.158	0.163	0.168
Accident Costs	108.247	12.317	11.407	10.497	9.587	8.677	8.503	8.329	8.155	7.982	7.808	8.452	9.312	10.171	11.031
TOTAL USER COSTS	2033.010	160.170	161.020	161.870	162.719	163.569	169.247	174.924	180.602	186.280	191.957	197.923	204.104	210.285	216.466
	Opening (from Time 0)														
User Cost Stream:	Years:	24	, weeks	0										
Travel Time Costs - Links	988.879		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734
Travel Time Costs - Turns	36.499		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931
Vehicle Operating Costs - Links	971.364		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483
Vehicle Operating Costs - Turns	1.680		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230
Accident Costs	138.211		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107
TOTAL USER COSTS	2136.632		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485
Benefit Stream:															
Travel Time Costs - Links	2.425	42.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.988	17.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	-0.385	-6.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.049	0.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	2.693	46.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	5.770	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_20															
Construction Period:	2 years														
Construction	0.666		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.006		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.035		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.707	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	8.2	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
25 Year BCR from first year of construction			0.5	1.0	1.5	2.0	2.4	2.8	3.2	3.6	4.0	4.3	4.6	4.9	5.2
25 Year PVB from first year of construction			0.355	0.698	1.028	1.344	1.647	1.935	2.210	2.471	2.719	2.954	3.184	3.408	3.626
25 Year PVC from first year of construction			0.667	0.685	0.685	0.686	0.686	0.687	0.687	0.687	0.687	0.693	0.694	0.701	0.701
Then widen Bypass between Domain and Bell to 4 lanes															
OP_21	Year		1	2	3	4	5	6	7	8	9	10	11	12	13
Travel Time Costs - Links	923.039	73.710	73.617	73.524	73.431	73.339	76.104	78.870	81.636	84.402	87.168	89.887	92.607	95.327	98.046
Travel Time Costs - Turns	35.165	2.108	2.196	2.285	2.373	2.461	2.765	3.069	3.373	3.678	3.982	3.889	3.797	3.704	3.612
Vehicle Operating Costs - Links	957.640	71.930	73.515	75.101	76.687	78.272	81.017	83.761	86.506	89.250	91.995	94.648	97.302	99.956	102.609
Vehicle Operating Costs - Turns	1.620	0.106	0.110	0.114	0.118	0.122	0.126	0.131	0.135	0.139	0.144	0.150	0.156	0.162	0.168
Accident Costs	108.247	12.317	11.407	10.497	9.587	8.677	8.503	8.329	8.155	7.982	7.808	8.452	9.312	10.171	11.031
TOTAL USER COSTS	2025.711	160.170	160.845	161.520	162.196	162.871	168.516	174.161	179.806	185.450	191.095	197.027	203.173	209.320	215.466
	Opening (from Time 0)														
User Cost Stream:	Years:	53	, weeks	0										
Travel Time Costs - Links	988.879		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734
Travel Time Costs - Turns	36.499		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931
Vehicle Operating Costs - Links	971.364		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483
Vehicle Operating Costs - Turns	1.680		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230
Accident Costs	138.211		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107
TOTAL USER COSTS	2136.632		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485
Benefit Stream:															
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_21															
Construction Period:	1 years														
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	FYRR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

YEAR (JULY-JUNE)	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024
ANALYSIS YEAR	14	15	16	17	18	19	20	21	22	23	24	25	26
TIME ZERO 1 July 1998	13	14	15	16	17	18	19	20	21	22	23	24	25
BASE YEAR FOR COSTS: 1997													
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048													
	2011					2016					2021		
DM_12	14	15	16	17	18	19	20	21	22	23	24	25	26
Travel Time Costs - Links	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301
Travel Time Costs - Turns	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571
Vehicle Operating Costs - Links	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089
Vehicle Operating Costs - Turns	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662
Accident Costs	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683
TOTAL USER COSTS	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307
2 lane Option A3, at grade intersections													
OP_26	14	15	16	17	18	19	20	21	22	23	24	25	26
Travel Time Costs - Links	102.332	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	137.578	140.077
Travel Time Costs - Turns	3.523	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	5.640	5.789
Vehicle Operating Costs - Links	104.879	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	136.854	139.037
Vehicle Operating Costs - Turns	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284
Accident Costs	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864
TOTAL USER COSTS	224.945	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	298.949	304.050
User Cost Stream:													
Travel Time Costs - Links	108.709	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	137.578	140.077
Travel Time Costs - Turns	4.223	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	5.640	5.789
Vehicle Operating Costs - Links	106.544	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	136.854	139.037
Vehicle Operating Costs - Turns	0.206	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284
Accident Costs	15.843	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864
TOTAL USER COSTS	235.525	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	298.949	304.050
Benefit Stream:													
Travel Time Costs - Links	6.376	13.899	15.046	16.193	17.340	18.487	21.237	23.986	26.736	29.485	32.235	35.230	38.225
Travel Time Costs - Turns	0.700	1.625	1.850	2.075	2.300	2.525	3.285	4.046	4.806	5.567	6.328	7.065	7.782
Vehicle Operating Costs - Links	1.665	3.381	3.434	3.486	3.538	3.590	3.638	3.685	3.732	3.780	3.827	3.940	4.053
Vehicle Operating Costs - Turns	0.032	0.076	0.068	0.099	0.111	0.122	0.159	0.196	0.233	0.269	0.306	0.342	0.378
Accident Costs	1.807	3.708	3.803	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711	4.819
TOTAL USER BENEFITS	10.580	22.691	24.221	25.751	27.282	28.812	32.509	36.207	39.904	43.602	47.299	51.278	55.257
WTP via Rates	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	10.809	22.920	24.450	25.980	27.511	29.041	32.738	36.436	40.133	43.831	47.528	51.507	55.486
OP_26													
Construction	16.644	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000
TOTAL COST	16.660	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016
mid point of year	14	15	16	17	18	19	20	21	22	23	24	25	26
SPPWF	0.26333	0.23939	0.21763	0.19784	0.17986	0.16351	0.14864	0.13513	0.12285	0.11168	0.10153	0.0923	0.083905
PV of 1st yr benefits	2.84641	5.48681	5.32104	5.14006	4.94801	4.7484	4.86633	4.92357	4.93019	4.89491	4.82531	4.75387	4.65555
50 year BCR	11.39%	21.96%	21.30%	20.57%	19.80%	19.00%	19.48%	19.71%	19.73%	19.59%	19.31%	19.03%	18.63%
25 Year BCR from first year of construction	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.3	5.4
25 Year PVB from first year of construction	107.108	110.038	112.849	115.538	118.104	120.547	122.868	125.120	127.298	129.395	131.408	133.336	135.176
25 Year PVC from first year of construction	24.967	24.967	24.968	24.968	24.968	24.976	24.976	24.985	24.985	24.985	24.985	24.985	24.986
Then widen SH2 from Te Maunga to Domain to 4 lanes													
OP_20	14	15	16	17	18	19	20	21	22	23	24	25	26
Travel Time Costs - Links	101.930	104.847	107.763	110.680	113.597	116.514	120.062	123.611	127.160	130.709	134.258	136.617	138.976
Travel Time Costs - Turns	3.522	3.628	3.734	3.841	3.947	4.053	4.207	4.360	4.513	4.667	4.820	4.921	5.023
Vehicle Operating Costs - Links	105.131	107.905	110.679	113.452	116.226	118.999	122.201	125.403	128.605	131.807	135.008	137.199	139.390
Vehicle Operating Costs - Turns	0.173	0.178	0.183	0.188	0.193	0.198	0.205	0.212	0.219	0.226	0.233	0.238	0.243
Accident Costs	12.105	12.447	12.790	13.132	13.474	13.817	14.237	14.657	15.078	15.498	15.918	16.125	16.331
TOTAL USER COSTS	222.861	229.005	235.149	241.293	247.436	253.580	260.912	268.243	275.575	282.907	290.238	296.101	299.964
User Cost Stream:													
Travel Time Costs - Links	108.709	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	136.617	138.976
Travel Time Costs - Turns	4.223	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	4.921	5.023
Vehicle Operating Costs - Links	106.544	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	137.199	139.390
Vehicle Operating Costs - Turns	0.206	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.238	0.243
Accident Costs	15.843	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	16.125	16.331
TOTAL USER COSTS	235.525	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	296.101	299.964
Benefit Stream:													
Travel Time Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.961	1.101
Travel Time Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.718	0.766
Vehicle Operating Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.346	-0.354
Vehicle Operating Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.041
Accident Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.476	2.532
TOTAL USER BENEFITS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.848	4.086
OP_20													
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000
Annual Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216
mid point of year	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
SPPWF	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001
PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0.33864	0.326889
50 year BCR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	47.90%	46.24%
25 Year BCR from first year of construction	5.5	5.8	6.0	6.3	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2
25 Year PVB from first year of construction	3.837	4.040	4.235	4.422	4.600	4.770	4.932	5.088	5.237	5.380	5.517	5.647	5.770
25 Year PVC from first year of construction	0.701	0.701	0.701	0.701	0.702	0.702	0.704	0.704	0.707	0.707	0.707	0.707	0.707
Then widen Bypass between Domain and Bell to 4 lanes													
OP_21	14	15	16	17	18	19	20	21	22	23	24	25	26
Travel Time Costs - Links	100.766	103.635	106.505	109.374	112.244	115.113	118.590	122.067	125.544	129.021	132.498	134.815	137.132
Travel Time Costs - Turns	3.520	3.647	3.775	3.903	4.031	4.159	4.425	4.692	4.958	5.224	5.490	5.637	5.783
Vehicle Operating Costs - Links	105.263	108.041	110.819	113.596	116.374	119.152	122.359	125.566	128.773	131.980	135.187	137.383	139.579
Vehicle Operating Costs - Turns	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284
Accident Costs	12.105	12.447	12.790	13.132	13.474	13.817	14.237	14.657	15.078	15.498	15.918	16.125	16.331
TOTAL USER COSTS	221.827	227.951	234.074	240.198	246.321	252.445	259.829	267.213	274.596	281.980	289.364	294.237	299.110
User Cost Stream:													
Travel Time Costs - Links	108.709	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	136.617	138.976
Travel Time Costs - Turns	4.223	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	4.921	5.023
Vehicle Operating Costs - Links	106.544	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	137.199	139.390
Vehicle Operating Costs - Turns	0.206	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.238	0.243
Accident Costs	15.843	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	16.125	16.331
TOTAL USER COSTS	235.525	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	296.101	299.964
Benefit Stream:													
Travel Time Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_21													
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
mid point of year	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5
SPPWF	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001
PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year PVB from first year of construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25 Year PVC from first year of construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

YEAR (JULY-JUNE)	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037
ANALYSIS YEAR	27	28	29	30	31	32	33	34	35	36	37	38	39
TIME ZERO 1 July 1998	26	27	28	29	30	31	32	33	34	35	36	37	38
BASE YEAR FOR COSTS: 1997													
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048													
								2031					
DM_12	27	28	29	30	31	32	33	34	35	36	37	38	39
Travel Time Costs - Links	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866
Travel Time Costs - Turns	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066
Vehicle Operating Costs - Links	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336
Vehicle Operating Costs - Turns	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368
Accident Costs	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232
TOTAL USER COSTS	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868
2 lane Option A3, at grade intersections													
OP_26	27	28	29	30	31	32	33	34	35	36	37	38	39
Travel Time Costs - Links	142.575	145.074	147.572	150.071	152.569	155.068	157.566	160.065	162.684	165.303	167.922	170.541	173.160
Travel Time Costs - Turns	5.938	6.087	6.236	6.385	6.534	6.683	6.832	6.981	7.137	7.293	7.448	7.604	7.759
Vehicle Operating Costs - Links	141.220	143.403	145.586	147.769	149.952	152.135	154.318	156.501	158.434	160.367	162.301	164.234	166.168
Vehicle Operating Costs - Turns	0.291	0.298	0.305	0.312	0.319	0.326	0.333	0.340	0.347	0.355	0.363	0.370	0.378
Accident Costs	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070
TOTAL USER COSTS	309.151	314.251	319.352	324.453	329.554	334.655	339.755	344.856	349.792	354.727	359.663	364.598	369.534
User Cost Stream:													
Travel Time Costs - Links	142.575	145.074	147.572	150.071	152.569	156.068	157.566	160.065	162.684	165.303	167.922	170.541	173.160
Travel Time Costs - Turns	5.938	6.087	6.236	6.385	6.534	6.683	6.832	6.981	7.137	7.293	7.448	7.604	7.759
Vehicle Operating Costs - Links	141.220	143.403	145.586	147.769	149.952	152.135	154.318	156.501	158.434	160.367	162.301	164.234	166.168
Vehicle Operating Costs - Turns	0.291	0.298	0.305	0.312	0.319	0.326	0.333	0.340	0.347	0.355	0.363	0.370	0.378
Accident Costs	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070
TOTAL USER COSTS	309.151	314.251	319.352	324.453	329.554	334.655	339.755	344.856	349.792	354.727	359.663	364.598	369.534
Benefit Stream:													
Travel Time Costs - Links	41.220	44.215	47.210	50.205	53.200	56.195	59.190	62.185	67.489	72.794	78.098	83.402	88.707
Travel Time Costs - Turns	8.509	9.237	9.964	10.691	11.419	12.146	12.873	13.601	14.942	16.283	17.624	18.965	20.307
Vehicle Operating Costs - Links	4.166	4.278	4.391	4.504	4.617	4.730	4.842	4.966	4.798	4.640	4.483	4.326	4.168
Vehicle Operating Costs - Turns	0.414	0.449	0.485	0.521	0.557	0.593	0.629	0.664	0.730	0.796	0.860	0.925	0.990
Accident Costs	4.927	5.035	5.143	5.251	5.359	5.467	5.575	5.682	5.778	5.875	5.971	6.067	6.163
TOTAL USER BENEFITS	59.236	63.214	67.193	71.172	75.151	79.130	83.109	87.087	93.737	100.386	107.035	113.685	120.334
WTP via Rates	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	59.465	63.443	67.422	71.401	75.380	79.359	83.338	87.316	93.966	100.615	107.264	113.914	120.563
OP_26													
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000
TOTAL COST	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016
mid point of year	27	28	29	30	31	32	33	34	35	36	37	38	39
SPPWF	0.076278	0.069343	0.063039	0.057309	0.052099	0.047362	0.043057	0.039143	0.035584	0.032349	0.029408	0.026735	0.024304
PV of 1st yr benefits	4.535815	4.399375	4.250256	4.091891	3.927194	3.758624	3.588247	3.417785	3.343687	3.254815	3.154468	3.045466	2.930213
50 year BCR	18.15%	17.61%	17.01%	16.38%	15.72%	15.04%	14.36%	13.68%	13.38%	13.03%	12.63%	12.19%	11.73%
25 Year BCR from first year of construction	5.5	5.5	5.6										
25 Year PVB from first year of construction	136.930	138.598	140.247										
25 Year PVC from first year of construction	24.986	24.986	24.989										
Then widen SH2 from Te Maunga to Domain to 4 lanes													
OP_20	27	28	29	30	31	32	33	34	35	36	37	38	39
Travel Time Costs - Links	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989
Travel Time Costs - Turns	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409
Vehicle Operating Costs - Links	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642
Vehicle Operating Costs - Turns	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313
Accident Costs	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824
TOTAL USER COSTS	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177
User Cost Stream:													
Travel Time Costs - Links	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989
Travel Time Costs - Turns	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409
Vehicle Operating Costs - Links	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642
Vehicle Operating Costs - Turns	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313
Accident Costs	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824
TOTAL USER COSTS	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177
Benefit Stream:													
Travel Time Costs - Links	1.241	1.381	1.520	1.660	1.800	1.940	2.080	2.220	2.610	3.000	3.390	3.780	4.171
Travel Time Costs - Turns	0.813	0.861	0.909	0.956	1.004	1.052	1.099	1.147	1.188	1.228	1.269	1.309	1.350
Vehicle Operating Costs - Links	-0.362	-0.370	-0.378	-0.386	-0.394	-0.402	-0.410	-0.418	-0.429	-0.441	-0.452	-0.463	-0.475
Vehicle Operating Costs - Turns	0.042	0.044	0.046	0.047	0.049	0.051	0.052	0.054	0.056	0.058	0.061	0.063	0.065
Accident Costs	2.589	2.646	2.703	2.760	2.816	2.873	2.930	2.987	3.038	3.090	3.142	3.194	3.245
TOTAL USER BENEFITS	4.324	4.562	4.800	5.038	5.276	5.514	5.752	5.989	6.463	6.936	7.410	7.883	8.356
OP_20													
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000
TOTAL COST	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006
mid point of year	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5
SPPWF	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173
PV of 1st yr benefits	0.314475	0.301617	0.288497	0.275271	0.262064	0.248984	0.236117	0.223531	0.219272	0.21394	0.207765	0.200945	0.193648
50 year BCR	44.48%	42.66%	40.81%	38.93%	37.07%	35.22%	33.40%	31.62%	31.01%	30.26%	29.39%	28.42%	27.39%
25 Year BCR from first year of construction	8.3	8.5	8.6										
25 Year PVB from first year of construction	5.887	5.998	6.107										
25 Year PVC from first year of construction	0.707	0.707	0.707										
Then widen Bypass between Domain and Bell to 4 lanes													
OP_21	27	28	29	30	31	32	33	34	35	36	37	38	39
Travel Time Costs - Links	139.450	141.767	144.084	146.401	148.718	151.036	153.353	155.670	157.874	160.077	162.281	164.485	166.689
Travel Time Costs - Turns	5.929	6.075	6.221	6.367	6.513	6.659	6.805	6.951	7.117	7.283	7.449	7.615	7.781
Vehicle Operating Costs - Links	141.776	143.972	146.168	148.364	150.560	152.757	154.953	157.149	159.095	161.041	162.987	164.933	166.879
Vehicle Operating Costs - Turns	0.291	0.298	0.305	0.311	0.318	0.325	0.332	0.339	0.347	0.355	0.363	0.371	0.379
Accident Costs	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824
TOTAL USER COSTS	303.982	308.855	313.728	318.601	323.473	328.346	333.219	338.091	342.583	347.076	351.568	356.060	360.552
User Cost Stream:													
Travel Time Costs - Links	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989
Travel Time Costs - Turns	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409
Vehicle Operating Costs - Links	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642
Vehicle Operating Costs - Turns	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313
Accident Costs	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824
TOTAL USER COSTS	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177
Benefit Stream:													
Travel Time Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_21													
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
mid point of year	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5
SPPWF	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173
PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction	ERR	ERR	0.0										
25 Year PVB from first year of construction	0.000	0.000	0.000										
25 Year PVC from first year of construction	0.000	0.000	0.021										

YEAR (JULY-JUNE)	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS: 1997														
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048														
					2041									2051
DM_12	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371
2 lane Option A3, at grade intersections														
OP_26	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	175.779	178.398	181.017	183.636	186.255	189.230	192.205	195.180	198.156	201.129	204.104	207.079	210.054	216.004
Travel Time Costs - Turns	7.915	8.070	8.226	8.381	8.537	8.734	8.932	9.129	9.327	9.524	9.722	9.919	10.117	10.512
Vehicle Operating Costs - Links	168.101	170.035	171.968	173.902	175.835	177.804	179.773	181.742	183.712	185.681	187.650	189.619	191.588	195.526
Vehicle Operating Costs - Turns	0.385	0.393	0.400	0.408	0.416	0.425	0.435	0.444	0.454	0.464	0.473	0.483	0.492	0.512
Accident Costs	22.290	22.510	22.730	22.950	23.170	23.396	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	374.469	379.405	384.341	389.276	394.212	399.588	404.964	410.341	415.717	421.093	426.470	431.846	437.222	447.975
User Cost Stream:														
Travel Time Costs - Links	175.779	178.398	181.017	183.636	186.255	189.230	192.205	195.180	198.155	201.129	204.104	207.079	210.054	216.004
Travel Time Costs - Turns	7.915	8.070	8.226	8.381	8.537	8.734	8.932	9.129	9.327	9.524	9.722	9.919	10.117	10.512
Vehicle Operating Costs - Links	168.101	170.035	171.968	173.902	175.835	177.804	179.773	181.742	183.712	185.681	187.650	189.619	191.588	196.526
Vehicle Operating Costs - Turns	0.385	0.393	0.400	0.408	0.416	0.425	0.435	0.444	0.454	0.464	0.473	0.483	0.492	0.512
Accident Costs	22.290	22.510	22.730	22.950	23.170	23.396	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	374.469	379.405	384.341	389.276	394.212	399.588	404.964	410.341	415.717	421.093	426.470	431.846	437.222	447.975
Benefit Stream:														
Travel Time Costs - Links	94.011	99.316	104.620	109.924	115.229	123.344	131.458	139.573	147.688	155.803	163.918	172.033	180.148	196.377
Travel Time Costs - Turns	21.648	22.989	24.330	25.671	27.013	29.286	31.559	33.832	36.105	38.378	40.652	42.925	45.198	49.744
Vehicle Operating Costs - Links	4.011	3.853	3.696	3.538	3.381	3.183	2.985	2.786	2.588	2.390	2.192	1.994	1.796	1.399
Vehicle Operating Costs - Turns	1.055	1.120	1.185	1.250	1.315	1.426	1.537	1.648	1.758	1.869	1.980	2.091	2.202	2.423
Accident Costs	6.269	6.355	6.451	6.547	6.643	6.724	6.805	6.886	6.967	7.048	7.129	7.210	7.290	7.452
TOTAL USER BENEFITS	126.983	133.633	140.282	146.931	153.581	163.962	174.344	184.725	196.107	205.488	215.870	226.252	236.633	257.396
WTP via Rates	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	127.212	133.862	140.511	147.160	153.810	164.191	174.573	184.954	195.336	205.717	216.099	226.481	236.862	257.625
OP_26														
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439
TOTAL COST	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455
mid point of year	40	41	42	43	44	45	46	47	48	49	50	51	52	53
SPPWF	0.022096	0.020086	0.01826	0.0166	0.015091	0.013719	0.012472	0.011338	0.010307	0.00937	0.008519	0.007744	0.00704	0.00640011
PV of 1st yr benefits	2.810745	2.688784	2.565767	2.442896	2.32116	2.252573	2.177272	2.097047	2.013414	1.927656	1.84065	1.753897	1.667539	1.64883131
50 year BCR	11.25%	10.76%	10.27%	9.78%	9.29%	9.02%	8.71%	8.39%	8.06%	7.72%	7.37%	7.02%	6.67%	6.60%
Then widen SH2 from Te Maunga to Domain to 4 lanes														
OP_20	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
User Cost Stream:														
Travel Time Costs - Links	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
Benefit Stream:														
Travel Time Costs - Links	4.561	4.951	5.341	5.731	6.121	6.690	7.259	7.828	8.397	8.966	9.535	10.103	10.672	11.810
Travel Time Costs - Turns	1.391	1.431	1.472	1.512	1.553	1.578	1.603	1.628	1.653	1.678	1.703	1.728	1.753	1.803
Vehicle Operating Costs - Links	-0.486	-0.497	-0.509	-0.520	-0.531	-0.540	-0.550	-0.559	-0.568	-0.577	-0.586	-0.596	-0.605	-0.623
Vehicle Operating Costs - Turns	0.067	0.070	0.072	0.074	0.076	0.078	0.079	0.080	0.082	0.083	0.084	0.086	0.087	0.090
Accident Costs	3.297	3.349	3.401	3.452	3.504	3.547	3.591	3.635	3.678	3.722	3.765	3.809	3.852	3.939
TOTAL USER BENEFITS	8.830	9.303	9.777	10.250	10.724	11.353	11.983	12.612	13.242	13.871	14.501	15.130	15.760	17.019
OP_20														
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006
mid point of year	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits	0.186017	0.178173	0.170218	0.162236	0.154299	0.148507	0.142492	0.136343	0.130135	0.123929	0.117776	0.111717	0.105786	0.10385219
50 year BCR	26.31%	25.20%	24.08%	22.95%	21.82%	21.00%	20.15%	19.28%	18.41%	17.53%	16.66%	15.80%	14.96%	14.69%
Then widen Bypass between Domain and Bell to 4 lanes														
OP_21	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	168.892	171.096	173.300	175.503	177.707	180.074	182.441	184.807	187.174	189.541	191.908	194.274	196.641	201.374
Travel Time Costs - Turns	7.947	8.113	8.279	8.446	8.612	8.854	9.096	9.337	9.579	9.821	10.063	10.305	10.547	11.031
Vehicle Operating Costs - Links	168.825	170.771	172.717	174.663	176.609	178.591	180.572	182.554	184.536	186.517	188.499	190.481	192.462	196.426
Vehicle Operating Costs - Turns	0.387	0.395	0.403	0.411	0.419	0.431	0.443	0.455	0.466	0.478	0.490	0.502	0.514	0.537
Accident Costs	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	365.044	369.536	374.028	378.520	383.012	387.796	392.580	397.364	402.148	406.931	411.715	416.499	421.283	430.850
User Cost Stream:														
Travel Time Costs - Links	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
Benefit Stream:														
Travel Time Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OP_21														
Construction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.319
Annual Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.319
mid point of year	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS 1997																																																							
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048																																																							

2 lane Option A3, grade separated intersections

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	55.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.963	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.656	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.956	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	396.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371
									Note 2006 Accident Costs factored by				0.75	to account for long term trends																																								

2 lane Option A3 (AlternativeRoute) grade separated intersections

OP_24	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	929.219	73.710	73.706	73.702	73.698	73.694	76.474	79.254	82.033	84.813	87.593	90.338	93.083	96.829	98.574	101.319	104.216	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.996	133.543	135.996	138.449	140.901	143.354	145.807	148.260	150.713	153.166	155.618	158.071	160.612	163.153	165.695	168.236	170.777	173.318	175.859	178.400	180.941	183.482	186.388	189.294	192.199	195.105	198.011	200.917	203.823	206.728	212.540
Travel Time Costs - Turns	34.965	2.108	2.177	2.246	2.315	2.384	2.694	3.004	3.315	3.625	3.936	3.849	3.762	3.675	3.588	3.502	3.637	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926	6.037	6.147	6.257	6.368	6.478	6.588	6.699	6.809	6.919	7.056	7.193	7.330	7.466	7.603	7.740	7.877	8.013	8.150	8.287	8.453	8.618	8.784	8.950	9.116	9.281	9.447	9.613	9.945
Vehicle Operating Costs - Links	962.597	71.930	73.415	74.900	76.384	77.869	80.592	83.315	86.038	88.761	91.484	94.114	96.745	99.375	102.006	104.636	107.388	110.140	112.892	115.643	118.395	121.575	124.754	127.933	131.113	134.292	136.475	138.657	140.839	143.022	145.204	147.387	149.569	151.751	153.934	156.116	158.048	159.981	161.913	163.846	165.778	167.711	169.643	171.576	173.508	175.441	177.410	179.379	181.349	183.318	185.287	187.257	189.226	191.195	195.134
Vehicle Operating Costs - Turns	1.611	0.106	0.109	0.112	0.115	0.118	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.178	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288	0.293	0.298	0.304	0.309	0.314	0.319	0.325	0.330	0.335	0.342	0.349	0.356	0.363	0.370	0.377	0.384	0.391	0.398	0.406	0.413	0.421	0.429	0.437	0.445	0.453	0.461	0.469	0.485
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2041.819	160.170	161.187	162.204	163.221	164.238	169.841	175.444	181.047	186.650	192.253	198.288	204.571	210.853	217.135	223.665	229.845	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285	302.299	307.313	312.327	317.341	322.355	327.369	332.383	337.397	342.411	347.249	352.086	356.923	361.761	366.598	371.435	376.273	381.110	385.947	390.785	396.059	401.333	406.606	411.880	417.154	422.428	427.702	432.976	443.524
	Opening (from Time 0)																																																							
User Cost Stream:	Years:	14	, weeks	26																																																	
Travel Time Costs - Links	990.897		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	111.696	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.996	133.543	135.996	138.449	140.901	143.354	145.807	148.260	150.713	153.166	155.618	158.071	160.612	163.153	165.695	168.236	170.777	173.318	175.859	178.400	180.941	183.482	186.388	189.294	192.199	195.105	198.011	200.917	203.823	206.728	212.540
Travel Time Costs - Turns	38.017		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.963	4.946	4.938	4.931	4.923	4.456	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926	6.037	6.147	6.257	6.368	6.478	6.588	6.699	6.809	6.919	7.056	7.193	7.330	7.466	7.603	7.740	7.877	8.013	8.150	8.287	8.453	8.618	8.784	8.950	9.116	9.281	9.447	9.613	9.945
Vehicle Operating Costs - Links	971.007		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	109.206	110.140	112.892	115.643	118.396	121.575	124.754	127.933	131.113	134.292	136.475	138.657	140.839	143.022	145.204	147.387	149.569	151.751	153.934	156.116	158.048	159.981	161.913	163.846	165.778	167.711	169.643	171.576	173.508	175.441	177.410	179.379	181.349	183.318	185.287	187.257	189.226	191.195	195.134
Vehicle Operating Costs - Turns	1.751		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.217	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288	0.293	0.298	0.304	0.309	0.314	0.319	0.325	0.330	0.335	0.342	0.349	0.356	0.363	0.370	0.377	0.384	0.391	0.398	0.406	0.413	0.421	0.429	0.437	0.445	0.453	0.461	0.469	0.485
Accident Costs	141.824		12.547	12.778	13.008	13.239	12.956	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	16.281	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2143.495		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	241.856	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285	302.299	307.313	312.327	317.341	322.355	327.369	332.383	337.397	342.411	347.249	352.086	356.923	361.761	366.598	371.435	376.273	381.110	385.947	390.785	396.059	401.333	406.606	411.880	417.154	422.428	427.702	432.976	443.524
Benefit Stream:																																																								
Travel Time Costs - Links	93.496	69.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.480	16.154	17.348	18.542	19.736	22.543	25.350	28.157	30.964	33.771	36.812	39.853	42.893	45.934	48.975	52.015	55.056	58.097	61.137	64.178	69.560	74.943	80.325	85.707	91.090	96.472	101.854	107.237	112.619	118.001	126.185	134.369	142.553	150.737	158.921	167.106	175.290	183.474	199.842
Travel Time Costs - Turns	17.717	13.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.819	1.855	2.072	2.289	2.506	3.205	3.904	4.604	5.303	6.002	6.758	7.534	8.300	9.066	9.832	10.599	11.365	12.131	12.897	13.663	15.023	16.383	17.743	19.103	20.463	21.823	23.183	24.543	25.903	27.263	29.567	31.872	34.177	36.482	38.787	41.092	43.397	45.702	50.312
Vehicle Operating Costs - Links	10.102	7.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.818	3.700	3.764	3.828	3.891	3.954	4.017	4.080	4.143	4.206	4.319	4.432	4.546	4.659	4.773	4.886	5.000	5.113	5.226	5.340	5.183	5.027	4.870	4.714	4.558	4.401	4.245	4.088	3.932	3.775	3.577	3.379	3.180	2.982	2.784	2.585	2.387	2.189	1.792
Vehicle Operating Costs - Turns	0.864	0.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.089	0.100	0.111	0.121	0.156	0.190	0.225	0.259	0.294	0.331	0.369	0.406	0.444	0.481	0.519	0.566	0.594	0.632	0.669	0.735	0.800	0.866	0.932	0.997	1.063	1.129	1.194	1.260	1.325	1.438	1.550	1.663	1.775	1.888	2.000	2.113	2.225	2.450
Accident Costs	11.262	8.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.854	3.803	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711	4.819	4.927	5.035	5.143	5.251	5.359	5.467	5.575	5.682	5.778	5.875	5.971	6.067	6.163	6.259	6.355	6.451	6.547	6.643	6.724	6.805	6.886	6.967	7.048	7.129	7.210	7.290	7.452
TOTAL USER BENEFITS	133.440	0.992	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.010	25.601	27.181	28.761	30.341	34.048	37.755	41.462	45.169	48.876	52.942	57.007	61.073	65.139	69.204	73.270	77.335	81.401	85.467	89.532	96.280	103.027	109.775	116.522	123.270	130.017	136.765	143.512	150.260	157.007	167.491	177.975	188.460	198.944	209.428	219.912	230.396	240.880	261.848
WTP via Rates	0.584		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	134.023		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.239	25.830	27.410	28.990	30.570	34.277	37.984	41.691	45.398	49.105	53.171	57.236	61.302	65.368	69.433	73.499	77.564	81.630	85.696	89.761	96.509	103.256	110.004	116.751	123.499	130.246	136.994	143.741	150.489	157.236	167.720	178.204	188.689	199.173	209.657	220.141	230.625	241.109	262.077

OP_24																																																								
Construction Period:	2.5 years																																																						
Construction	23.522		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.968	34.968	17.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.041		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.281		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	23.844	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.968	34.968	17.500	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016

mid point of year			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
SPPWF			0.90909	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.4241	0.38554	0.35049	0.31863	0.28966	0.26333	0.23939	0.21763	0.19784	0.17986	0.16351	0.14864	0.13513	0.12285	0.11168	0.10153	0.0923	0.083905	0.076278	0.069343	0.063039	0.057309	0.052099	0.047362	0.043057	0.039143	0.035584	0.032349	0.029408	0.026735	0.024304	0.022095	0.020086	0.01826	0.0166	0.015091	0.013719	0.012472	0.011338	0.010307	0.00937	0.008519	0.007744	0.00704	0.00640011
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	2.93002	5.62135	5.42293	5.21413	4.99647	5.09509	5.13283	5.12159	5.06999	4.98543	4.90745	4.802444	4.675973	4.532807	4.377027	4.212109	4.041002	3.866196	3.689775	3.513478	3.434176	3.340256	3.235029	3.12133	3.001567	2.877783	2.751699	2.624757	2.498153	2.372876	2.300993	2.222568	2.139087	2.052961	1.964568	1.875279	1.785989	1.697435	1.67732108
50 year BCR	5.6	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.29%	23.58%	22.74%	21.87%	20.96%	21.37%	21.53%	21.48%	21.26%	20.91%	20.58%	20.14%	19.61%	19.01%	18.36%	17.67%	16.95%	16.21%	15.47%	14.74%	14.40%	14.01%	13.57%	13.09%	12.59%	12.07%	11.54%	11.01%	10.48%	9.95%	9.65%	9.32%	8.97%	8.61%	8.24%	7.86%	7.49%	7.12%	7.03%
25 Year BCR from first year of construction			2.3	2.5	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.4	4.5	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.5	5.6	5.7	5.8	5.8																								
25 Year PVB from first year of construction			54.499	59.302	63.978	68.510	72.888	77.100	81.141	85.007	88.697	92.210	95.644	98.985	102.220	105.341	108.342	111.220	113.972	116.597	119.096	121.468	123.769	125.991	128.131	130.184	132.148	134.023	135.809	137.507	139.184																								
25 Year PVC from first year of construction			23.728	23.781	23.782	23.783	23.784	23.785	23.786	23.787	23.787	23.805	23.806	23.826	23.827	23.827	23.827	23.828	23.828	23.828	23.829	23.835	23.836	23.844	23.844	23.844	23.844	23.844	23.844	23.844	23.844																								
25 Year PVB excl WTP from first year of construction			54.108																																																				
25 Year PVB of WTP from first year of construction			0.392																																																				

Then widen SH2 Te Maunga to Domain to 4 lanes

OP_23	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	922.275	73.710	73.578	73.445	73.313	73.181	75.956	78.731	81.506	84.281	87.056	89.786	92.515	95.245	97.974	100.704	103.580	106.456	109.330	112.206	115.081	118.568	122.055	125.542	129.029	132.516	134.842	137.168	139.494	141.820	144.146	146.473	148.799	151.125	153.451	155.777	157.973	160.168	162.364	164.559	166.755	168.950	171.146	173.341	175.537	177.732	180.102	182.472	184.842	187.212	189.582	191.951	194.321	196.691	201.431
Travel Time Costs - Turns	34.072	2.108	2.201	2.294	2.387	2.480	2.783	3.087	3.390	3.694	3.997	3.899	3.800	3.702	3.603	3.505	3.619	3.732	3.846	3.960	4.074	4.285	4.496	4.708	4.919	5.131	5.196	5.262	5.328	5.393	5.459	5.525	5.590	5.656	5.722	5.787	5.884	5.981	6.079	6.176	6.273	6.370	6.467	6.564	6.661	6.758	6.882	7.007	7.131	7.256	7.380	7.504	7.628	7.752	8.001
Vehicle Operating Costs - Links	955.025	71.930	73.468	75.007	76.545	78.084	80.814	83.544	86.274	89.004	91.734	94.371	97.008	99.645	102.282	104.918	107.685	110.452	113.219	115.986	118.753	121.937	125.122	128.307	131.491	134.676	136.870	139.063	141.257	143.450	145.644	147.837	150.031	152.225	154.418	156.612	158.547	160.482	162.418	164.353	166.289	168.224	170.160	172.095	174.030	175.966	177.942	179.917	181.893	183.869	185.844	187.820	189.796	191.771	195.723
Vehicle Operating Costs - Turns	1.561	0.106	0.109	0.113	0.116	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.176	0.182	0.187	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253	0.257	0.260	0.263	0.266	0.270	0.273	0.276	0.280	0.283	0.288	0.292	0.297	0.302	0.307	0.311	0.316	0.321	0.326	0.331	0.337	0.343	0.349	0.355	0.361	0.367	0.373	0.380	0.392
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2036.360	160.170	161.137	162.103	163.070	164.037	169.635	175.233	180.831	186.430	192.028	198.042	204.304	210.565	216.826	223.335	229.486	235.638	241.789	247.941	254.092	261.456	268.819	276.183	283.546	290.910	296.762	300.614	305.465	310.317	315.169	320.021	324.873	329.725	334.577	339.428	343.881	348.334	352.787	357.240	361.693	366.145	370.598	375.051	379.504	383.957	388.658	393.359	398.060	402.761	407.462	412.163	416.864	421.565	430.967
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	25	, weeks	0																																																
Travel Time Costs - Links	988.554		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	111.696	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.996	133.543	135.996	137.168	139.494	141.820	144.146	146.473	148.799	151.125	153.451	155.777	157.973	160.168	162.364	164.559	166.755	168.950	171.146	173.341	175.537	177.732	180.102	182.472	184.842	187.212	189.582	191.951	194.321	196.691	201.431
Travel Time Costs - Turns	37.098		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.963	4.946	4.938	4.931	4.923	4.456	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926	5.262	5.328	5.393	5.459	5.525	5.590	5.656	5.722	5.787	5.884	5.981	6.079	6.176	6.273	6.370	6.467	6.564	6.661	6.758	6.882	7.007	7.131	7.256	7.380	7.504	7.628	7.752	8.001
Vehicle Operating Costs - Links	971.401		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	109.206	110.140	112.892	115.643	118.396	121.575	124.754	127.933	131.113	134.292	136.475	139.063	141.257	143.450	145.644	147.837	150.031	152.225	154.418	156.612	158.547	160.482	162.418	164.353	166.289	168.224	170.160	172.095	174.030	175.966	177.942	179.917	181.893	183.869	185.844	187.820	189.796	191.771	195.723
Vehicle Operating Costs - Turns	1.707		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.217	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288	0.257	0.260	0.263	0.266	0.270	0.273	0.276	0.280	0.283	0.288	0.292	0.297	0.302	0.307	0.311	0.316	0.321	0.326	0.331	0.337	0.343	0.349	0.355	0.361	0.367	0.373	0.380	0.392
Accident Costs	141.824		12.547	12.778	13.008	13.239	12.956	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	16.281	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2140.584		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	241.856	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285	300.614	305.465	310.317	315.169	320.021	324.873	329.725	334.577	339.428	343.881	348.334	352.787	357.240	361.693	366.145	370.598	375.051	379.504	383.957	388.658	393.359	398.060	402.761	407.462	412.163	416.864	421.565	430.967
Benefit Stream:																																																								
Travel Time Costs - Links	2.344	40.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.280	1.407	1.534	1.661	1.787	1.914	2.041	2.168	2.294	2.640	2.985	3.331	3.676	4.022	4.368	4.713	5.059	5.404	5.750	6.286	6.822	7.358	7.893	8.429	8.965	9.501	10.037	11.109
Travel Time Costs - Turns	0.918	15.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.775	0.819	0.864	0.909	0.953	0.998	1.043	1.087	1.132	1.172	1.211	1.251	1.291	1.330	1.370	1.410	1.449	1.489	1.529	1.570	1.612	1.653	1.696	1.736	1.778	1.819	1.861	1.944
Vehicle Operating Costs - Links	-0.394	-6.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.406	-0.417	-0.429	-0.440	-0.451	-0.462	-0.473	-0.484	-0.496	-0.499	-0.502	-0.505	-0.507	-0.510	-0.513	-0.516	-0.519	-0.522	-0.525	-0.532	-0.538	-0.544	-0.551	-0.557	-0.563	-0.570	-0.576	-0.589
Vehicle Operating Costs - Turns	0.043	0.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.039	0.041	0.043	0.045	0.046	0.048	0.050	0.052	0.055	0.057	0.059	0.061	0.064	0.066	0.068	0.070	0.073	0.075	0.077	0.079	0.080	0.082	0.084	0.086	0.088	0.089	0.093
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	2.911	0.505	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.586	1.848	2.010	2.172	2.334	2.496	2.659	2.821	2.983	3.368	3.752	4.137	4.521	4.906	5.290	5.675	6.059	6.444	6.828	7.401	7.974	8.547	9.120	9.692	10.265	10.838	11.411	12.557

OP_23																																																								
Construction Period:	2 years																																																						
Construction	0.606		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.032		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.134849	0.134385	0.13289	0.130557	0.12755	0.12401	0.12006	0.115803	0.111328	0.114253	0.115727	0.115988	0.115245	0.113679	0.111445	0.108678	0.105492	0.101988	0.098249	0.096811	0.094822	0.092394	0.089625	0.086595	0.083375	0.080025	0.076596	0.07662365
50 year BCR	4.5	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.98%	20.91%	20.68%	20.31%	19.85%	19.30%	18.68%	18.02%	17.32%	17.78%	18.01%	18.05%	17.93%	17.69%	17.34%	16.91%	16.41%	15.87%	15.29%	15.06%	14.75%	14.38%	13.95%	13.47%	12.97%	12.45%	11.92%	11.92%
25 Year BCR from first year of construction			0.0	0.2	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2	3.3	3.5	3.7	3.8	4.0	4.1	4.3	4.4	4.5	4.7	4.8	4.9																								
25 Year PVB from first year of construction			0.000	0.141	0.282	0.422	0.559	0.692	0.823	0.948	1.070	1.187	1.306	1.428	1.550	1.670	1.790	1.906	2.020	2.131	2.238	2.341	2.443	2.542	2.639	2.733	2.824	2.911	2.995	3.076	3.156																								
25 Year PVC from first year of construction			0.606	0.606	0.623	0.623	0.623	0.624	0.624	0.624	0.625	0.625	0.630	0.631	0.637	0.637	0.637	0.637	0.638	0.638	0.638	0.638	0.640	0.640	0.643	0.643	0.643	0.643	0.643	0.643	0.643																								

Then widen Option 2 between Domain and Bell to 4 lanes

OP_25	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	913.447	73.710	73.412	73.113	72.815	72.517	75.249	77.982	80.714	83.446	86.179	88.862	91.546	94.229	96.913	99.597	102.428	105.260	108.092	110.924	113.755	117.181	120.607	124.033	127.459	130.884	133.179	135.473	137.768	140.062	142.357	144.651	146.946	149.240	151.534	153.829	155.994	158.160	160.325	162.491	164.656	166.822	168.987	171.153	173.318	175.484	177.816	180.148	182.480	184.813	187.145	189.477	191.809	194.141	198.806
Travel Time Costs - Turns	33.771	2.108	2.177	2.246	2.315	2.384	2.694	3.004	3.314	3.625	3.935	3.847	3.760	3.673	3.585	3.498	3.634	3.770	3.906	4.042	4.178	4.159	4.141	4.123	4.104	4.086	4.369	4.653	4.936	5.219	5.502	5.786	6.069	6.352	6.635	6.919	7.053	7.188	7.322	7.457	7.591	7.726	7.860	7.995	8.129	8.264	8.426	8.588	8.750	8.912	9.074	9.236	9.398	9.560	9.884
Vehicle Operating Costs - Links	956.067	71.930	73.491	75.051	76.612	78.173	80.907	83.641	86.375	89.109	91.843	94.484	97.126	99.767	102.408	105.049	107.817	110.585	113.353	116.121	118.890	122.082	125.275	128.467	131.660	134.852	137.047	139.243	141.438	143.633	145.829	148.024	150.219	152.415	154.610	156.805	158.747	160.689	162.631	164.573	166.515	168.457	170.398	172.340	174.282	176.224	178.200	180.176	182.151	184.127	186.103	188.078	190.054	192.030	195.981
Vehicle Operating Costs - Turns	1.556	0.106	0.109	0.112	0.115	0.118	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.178	0.184	0.191	0.198	0.205	0.204	0.203	0.203	0.202	0.201	0.215	0.228	0.241	0.255	0.268	0.282	0.295	0.308	0.322	0.335	0.342	0.349	0.356	0.363	0.370	0.377	0.384	0.391	0.398	0.405	0.412	0.420	0.428	0.436	0.443	0.451	0.459	0.467	0.482
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2028.278	160.170	160.969	161.768	162.566	163.365	168.931	174.498	180.064	185.631	191.197	197.181	203.411	209.642	215.873	222.351	228.483	234.616	240.749	246.881	253.014	260.083	267.153	274.222	281.292	288.361	293.411	298.460	303.510	308.560	313.609	318.659	323.709	328.758	333.808	338.858	343.326	347.796	352.264	356.733	361.202	365.670	370.139	374.608	379.077	383.546	388.248	392.951	397.654	402.357	407.059	411.762	416.465	421.168	430.573
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	53	, weeks	0																																																
Travel Time Costs - Links	988.554		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	111.696	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.996	133.543	135.996	137.168	139.494	141.820	144.146	146.473	148.799	151.125	153.451	155.777	157.973	160.168	162.364	164.559	166.755	168.950	171.146	173.341	175.537	177.732	180.102	182.472	184.842	187.212	189.582	191.951	194.321	196.691	201.431
Travel Time Costs - Turns	37.098		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.963	4.946	4.938	4.931	4.923	4.456	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926	5.262	5.328	5.393	5.459	5.525	5.590	5.656	5.722	5.787	5.884	5.981	6.079	6.176	6.273	6.370	6.467	6.564	6.661	6.758	6.882	7.007	7.131	7.256	7.380	7.504	7.628	7.752	8.001
Vehicle Operating Costs - Links	971.401		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	109.206	110.140	112.892	115.643	118.396	121.575	124.754	127.933	131.113	134.292	136.475	139.063	141.257	143.450	145.644	147.837	150.031	152.225	154.418	156.612	158.547	160.482	162.418	164.353	166.289	168.224	170.160	172.095	174.030	175.966	177.942	179.917	181.893	183.869	185.844	187.820	189.796	191.771	195.723
Vehicle Operating Costs - Turns	1.707		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.217	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288	0.257	0.260	0.263	0.266	0.270	0.273	0.276	0.280	0.283	0.288	0.292	0.297	0.302	0.307	0.311	0.316	0.321	0.326	0.331	0.337	0.343	0.349	0.355	0.361	0.367	0.373	0.380	0.392
Accident Costs	141.824		12.547	12.778	13.008	13.239	12.956	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	16.281	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2140.584		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	241.856	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285	300.614	305.465	310.317	315.169	320.021	324.873	329.725	334.577	339.428	343.881	348.334	352.787	357.240	361.693	366.145	370.598	375.051	379.504	383.957	388.658	393.359	398.060	402.761	407.462	412.163	416.864	421.565	430.967
Benefit Stream:																																																								
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

OP_25																																																								
Construction Period:	1 years																																																						
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.319
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.319

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	FYRR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034	2034/ 2035	2035/ 2036	2036/ 2037	2037/ 2038	2038/ 2039	2039/ 2040	2040/ 2041	2041/ 2042	2042/ 2043	2044/ 2045	2045/ 2046	2046/ 2047	2047/ 2048	2048/ 2049	2049/ 2050	2050/ 2051	2051/ 2052
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998		Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS 1997																																																									
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																																																									

2 lane Option B, grade separated intersections

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.796	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.656	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.296	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.406	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	596.066	610.824	626.582	642.340	658.098	673.856	705.371

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

2 lane Option B (Swamp Route) grade separated intersections

OP_34	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	927.910	73.710	73.651	73.592	73.533	73.474	76.265	79.056	81.848	84.639	87.430	90.186	92.942	95.699	98.455	101.211	104.130	107.048	109.967	112.885	115.803	119.362	122.921	126.480	130.038	133.597	136.022	138.447	140.871	143.296	145.721	148.146	150.571	152.996	155.420	157.845	160.363	162.881	165.399	167.917	170.435	172.953	175.470	177.988	180.506	183.024	185.905	188.785	191.666	194.546	197.426	200.307	203.187	206.068	211.829
Travel Time Costs - Turns	34.696	2.108	2.177	2.245	2.314	2.382	2.690	2.998	3.305	3.613	3.921	3.832	3.743	3.654	3.565	3.476	3.608	3.739	3.870	4.002	4.133	4.420	4.708	4.995	5.282	5.570	5.715	5.861	6.006	6.152	6.297	6.443	6.588	6.734	6.879	7.025	7.136	7.247	7.358	7.469	7.580	7.691	7.802	7.913	8.024	8.134	8.292	8.450	8.608	8.765	8.923	9.081	9.238	9.396	9.712
Vehicle Operating Costs - Links	950.737	71.930	73.342	74.755	76.168	77.580	80.314	83.047	85.780	88.513	91.246	93.889	96.532	99.175	101.817	104.460	107.227	109.994	112.761	115.528	118.295	121.484	124.673	127.861	131.050	134.239	136.411	138.583	140.755	142.927	145.099	147.272	149.444	151.616	153.788	155.960	157.882	159.803	161.724	163.646	165.567	167.489	169.410	171.332	173.253	175.175	177.124	179.074	181.024	182.973	184.923	186.873	188.822	190.772	194.671
Vehicle Operating Costs - Turns	1.588	0.106	0.109	0.112	0.115	0.118	0.123	0.127	0.132	0.136	0.141	0.146	0.151	0.156	0.161	0.166	0.173	0.180	0.187	0.193	0.200	0.215	0.229	0.244	0.259	0.274	0.280	0.287	0.294	0.300	0.307	0.314	0.321	0.327	0.334	0.341	0.347	0.352	0.358	0.364	0.370	0.376	0.381	0.387	0.393	0.399	0.406	0.414	0.421	0.428	0.436	0.443	0.451	0.458	0.473
Accident Costs	123.010	12.317	11.771	11.225	10.679	10.133	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.755	13.986	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2037.940	160.170	161.050	161.929	162.809	163.688	169.310	174.933	180.555	186.177	191.799	197.853	204.153	210.453	216.754	223.300	229.513	235.725	241.938	248.150	254.363	261.882	269.401	276.920	284.440	291.959	296.965	301.972	306.978	311.984	316.991	321.997	327.003	332.010	337.016	342.023	346.792	351.561	356.331	361.100	365.870	370.639	375.408	380.178	384.947	389.716	394.937	400.157	405.378	410.598	415.818	421.039	426.259	431.480	441.920
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	14	, weeks	0																																																				
Travel Time Costs - Links	988.913		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	104.130	107.048	109.967	112.885	115.803	119.362	122.921	126.480	130.038	133.597	136.022	138.447	140.871	143.296	145.721	148.146	150.571	152.996	155.420	157.845	160.363	162.881	165.399	167.917	170.435	172.953	175.470	177.988	180.506	183.024	185.905	188.785	191.666	194.546	197.426	200.307	203.187	206.068	211.829
Travel Time Costs - Turns	37.621		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.608	3.739	3.870	4.002	4.133	4.420	4.708	4.995	5.282	5.570	5.715	5.861	6.006	6.152	6.297	6.443	6.588	6.734	6.879	7.025	7.136	7.247	7.358	7.469	7.580	7.691	7.802	7.913	8.024	8.134	8.292	8.450	8.608	8.765	8.923	9.081	9.238	9.396	9.712
Vehicle Operating Costs - Links	970.257		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.227	109.994	112.761	115.528	118.295	121.484	124.673	127.861	131.050	134.239	136.411	138.583	140.755	142.927	145.099	147.272	149.444	151.616	153.788	155.960	157.882	159.803	161.724	163.646	165.567	167.489	169.410	171.332	173.253	175.175	177.124	179.074	181.024	182.973	184.923	186.873	188.822	190.772	194.671
Vehicle Operating Costs - Turns	1.730		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.173	0.180	0.187	0.193	0.200	0.215	0.229	0.244	0.259	0.274	0.280	0.287	0.294	0.300	0.307	0.314	0.321	0.327	0.334	0.341	0.347	0.352	0.358	0.364	0.370	0.376	0.381	0.387	0.393	0.399	0.406	0.414	0.421	0.428	0.436	0.443	0.451	0.458	0.473
Accident Costs	141.190		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2139.711		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	229.513	235.725	241.938	248.150	254.363	261.882	269.401	276.920	284.440	291.959	296.965	301.972	306.978	311.984	316.991	321.997	327.003	332.010	337.016	342.023	346.792	351.561	356.331	361.100	365.870	370.639	375.408	380.178	384.947	389.716	394.937	400.157	405.378	410.598	415.818	421.039	426.259	431.480	441.920
Benefit Stream:																																																								
Travel Time Costs - Links	95.481	71.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.046	16.219	17.391	18.564	19.737	22.533	25.329	28.125	30.921	33.717	36.786	39.855	42.923	45.992	49.061	52.130	55.198	58.267	61.336	64.405	69.810	75.215	80.621	86.026	91.432	96.837	102.243	107.648	113.054	118.459	126.668	134.878	143.087	151.297	159.506	167.715	175.925	184.134	200.553
Travel Time Costs - Turns	18.113	13.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.668	1.888	2.109	2.330	2.550	3.290	4.030	4.769	5.509	6.248	6.979	7.710	8.441	9.172	9.903	10.634	11.365	12.096	12.826	13.557	14.943	16.329	17.715	19.100	20.486	21.872	23.258	24.643	26.029	27.415	29.728	32.041	34.354	36.667	38.980	41.293	43.606	45.919	50.545
Vehicle Operating Costs - Links	10.851	8.2%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.797	3.846	3.894	3.943	3.992	4.045	4.099	4.152	4.206	4.259	4.383	4.506	4.630	4.754	4.877	5.001	5.125	5.248	5.372	5.496	5.350	5.205	5.059	4.914	4.769	4.623	4.478	4.332	4.187	4.041	3.863	3.684	3.505	3.327	3.148	2.969	2.791	2.612	2.254
Vehicle Operating Costs - Turns	0.885	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.094	0.105	0.115	0.126	0.161	0.197	0.232	0.268	0.303	0.339	0.375	0.411	0.447	0.483	0.519	0.555	0.591	0.627	0.663	0.730	0.797	0.864	0.931	0.998	1.065	1.131	1.198	1.265	1.332	1.445	1.558	1.671	1.784	1.897	2.010	2.123	2.236	2.462
Accident Costs	11.896	9.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.759	3.855	3.951	4.046	4.142	4.246	4.350	4.454	4.557	4.661	4.775	4.889	5.003	5.117	5.231	5.345	5.458	5.572	5.686	5.800	5.903	6.006	6.109	6.211	6.314	6.417	6.520	6.623	6.726	6.828	6.909	6.990	7.071	7.152	7.233	7.314	7.394	7.475	7.637
TOTAL USER BENEFITS	137.224	1.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.354	25.902	27.450	28.999	30.547	34.275	38.004	41.732	45.460	49.189	53.262	57.335	61.408	65.481	69.555	73.628	77.701	81.774	85.848	89.921	96.736	103.552	110.367	117.183	123.998	130.814	137.629	144.445	151.260	158.076	168.613	179.151	189.688	200.226	210.763	221.301	231.839	242.376	263.451
WTP via Rates	0.584		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	137.808		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	24.583	26.131	27.679	29.228	30.776	34.504	38.233	41.961	45.689	49.418	53.491	57.564	61.637	65.710	69.784	73.857	77.930	82.003	86.077	90.150	96.965	103.781	110.596	117.412	124.227	131.043	137.858	144.674	151.489	158.305	168.842	179.380	189.917	200.455	210.992	221.530	232.068	242.605	263.680

OP_34																																																								
Construction Period:		3 years																																																					
Construction	25.626		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.401	29.401	29.401	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.040		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.276		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	25.942	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.401	29.401	29.401	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits		0	0	0	0	0	0	0	0	0	0	0	0	0	5.61104	5.42222	5.22136	5.0122	4.79792	4.89015	4.92595	4.91483	4.86503	4.78366	4.70723	4.605161	4.482748	4.344534	4.194401	4.035661	3.871117	3.703138	3.533706	3.364479	3.289854	3.200992	3.101097	2.992911	2.878766	2.76064	2.6402	2.518842	2.39773	2.277822	2.208586	2.133113	2.06311	1.970024	1.885077	1.799293	1.713528	1.628485	1.609047
50 year BCR	5.3	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.63%	20.90%	20.13%	19.32%	18.49%	18.85%	18.99%	18.96%	18.75%	18.44%	18.15%	17.75%	17.28%	16.75%	16.17%	15.56%	14.92%	14.27%	13.62%	12.97%	12.68%	12.34%	11.95%	11.54%	11.10%	10.64%	10.18%	9.71%	9.24%	8.78%	8.51%	8.22%	7.91%	7.59%	7.27%	6.94%	6.61%	6.28%	6.20%
25 Year BCR from first year of construction			2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.2	5.3	5.4	5.4	5.5																								
25 Year PVB from first year of construction			57.843	62.673	67.375	71.932	76.331	80.563	84.623	88.507	92.213	95.742	99.193	102.550	105.802	108.941	111.961	114.856	117.625	120.267	122.781	125.170	127.487	129.724	131.877	133.944	135.921	137.808	139.605	141.313	143.001																								
25 Year PVC from first year of construction			25.828	25.880	25.881	25.882	25.883	25.884	25.885	25.886	25.886	25.904	25.904	25.924	25.925	25.925	25.926	25.926	25.926	25.927	25.927	25.934	25.934	25.941	25.942	25.942	25.942	25.942	25.942	25.942	25.942																								
														25.9																																									

Then widen SH2 between Te Maunga and Domain to 4 lanes

OP_33	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	920.929	73.710	73.521	73.333	73.144	72.956	75.743	78.531	81.318	84.105	86.893	89.633	92.373	95.114	97.854	100.594	103.489	106.384	109.279	112.174	115.070	118.571	122.072	125.574	129.075	132.576	134.872	137.168	139.463	141.759	144.055	146.350	148.646	150.942	153.237	155.533	157.703	159.874	162.044	164.214	166.384	168.555	170.725	172.896	175.065	177.236	179.587	181.938	184.289	186.640	188.992	191.343	193.694	196.045	200.748
Travel Time Costs - Turns	33.849	2.108	2.199	2.291	2.382	2.474	2.775	3.076	3.378	3.679	3.981	3.880	3.779	3.679	3.578	3.478	3.589	3.701	3.813	3.925	4.037	4.210	4.383	4.556	4.729	4.902	5.003	5.104	5.206	5.307	5.408	5.509	5.611	5.712	5.813	5.915	5.999	6.084	6.169	6.254	6.338	6.423	6.508	6.593	6.678	6.762	6.884	7.005	7.126	7.248	7.369	7.491	7.612	7.733	7.976
Vehicle Operating Costs - Links	953.108	71.930	73.396	74.862	76.328	77.793	80.533	83.273	86.013	88.752	91.492	94.142	96.791	99.441	102.090	104.740	107.518	110.295	113.073	115.851	118.628	121.825	125.021	128.218	131.414	134.611	136.793	138.975	141.157	143.339	145.521	147.703	149.885	152.067	154.249	156.431	158.357	160.284	162.210	164.137	166.063	167.989	169.916	171.842	173.768	175.695	177.647	179.599	181.551	183.503	185.455	187.407	189.359	191.311	195.216
Vehicle Operating Costs - Turns	1.546	0.106	0.109	0.113	0.116	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.165	0.170	0.176	0.181	0.187	0.193	0.198	0.207	0.215	0.224	0.233	0.241	0.246	0.251	0.255	0.260	0.265	0.270	0.274	0.279	0.284	0.289	0.293	0.297	0.301	0.305	0.310	0.314	0.318	0.322	0.326	0.331	0.336	0.342	0.348	0.354	0.360	0.365	0.371	0.377	0.389
Accident Costs	123.010	12.317	11.771	11.225	10.679	10.133	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.755	13.986	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2032.442	160.170	160.996	161.823	162.649	163.476	169.095	174.714	180.333	185.952	191.571	197.604	203.884	210.163	216.443	222.969	229.148	235.327	241.506	247.685	253.864	261.213	268.562	275.911	283.260	290.609	295.450	300.291	305.132	309.973	314.814	319.655	324.496	329.337	334.178	339.019	343.418	347.817	352.216	356.615	361.013	365.412	369.811	374.210	378.609	383.008	387.663	392.319	396.974	401.630	406.286	410.941	415.597	420.252	429.564
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	25	, weeks	0																																																			
Travel Time Costs - Links	986.558		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	104.130	107.048	109.967	112.885	115.803	119.362	122.921	126.480	130.038	133.597	136.022	137.168	139.463	141.759	144.055	146.350	148.646	150.942	153.237	155.533	157.703	159.874	162.044	164.214	166.384	168.555	170.725	172.896	175.065	177.236	179.587	181.938	184.289	186.640	188.992	191.343	193.694	196.045	200.748
Travel Time Costs - Turns	36.745		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.608	3.739	3.870	4.002	4.133	4.420	4.708	4.995	5.282	5.570	5.715	5.104	5.206	5.307	5.408	5.509	5.611	5.712	5.813	5.915	5.999	6.084	6.169	6.254	6.338	6.423	6.508	6.593	6.678	6.762	6.884	7.005	7.126	7.248	7.369	7.491	7.612	7.733	7.976
Vehicle Operating Costs - Links	970.636		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.227	109.994	112.761	115.528	118.295	121.484	124.673	127.861	131.050	134.239	136.411	138.975	141.157	143.339	145.521	147.703	149.885	152.067	154.249	156.431	158.357	160.284	162.210	164.137	166.063	167.989	169.916	171.842	173.768	175.696	177.647	179.599	181.551	183.503	185.455	187.407	189.359	191.311	195.216
Vehicle Operating Costs - Turns	1.688		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.173	0.180	0.187	0.193	0.200	0.215	0.229	0.244	0.259	0.274	0.280	0.251	0.255	0.260	0.265	0.270	0.274	0.279	0.284	0.289	0.293	0.297	0.301	0.305	0.310	0.314	0.318	0.322	0.326	0.331	0.336	0.342	0.348	0.354	0.360	0.365	0.371	0.377	0.389
Accident Costs	141.190		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2136.817		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	229.513	235.725	241.938	248.150	254.363	261.882	269.401	276.920	284.440	291.959	296.965	300.291	305.132	309.973	314.814	319.655	324.496	329.337	334.178	339.019	343.418	347.817	352.216	356.615	361.013	365.412	369.811	374.210	378.609	383.008	387.663	392.319	396.974	401.630	406.286	410.941	415.597	420.252	429.564
Benefit Stream:																																																								
Travel Time Costs - Links	2.355	81.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.279	1.408	1.537	1.666	1.795	1.925	2.054	2.183	2.312	2.660	3.007	3.355	3.703	4.050	4.398	4.746	5.093	5.441	5.789	6.318	6.847	7.376	7.906	8.435	8.964	9.493	10.023	11.081
Travel Time Costs - Turns	0.876	30.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.757	0.801	0.845	0.889	0.933	0.977	1.022	1.066	1.110	1.136	1.162	1.189	1.215	1.241	1.267	1.294	1.320	1.346	1.372	1.409	1.445	1.481	1.517	1.554	1.590	1.626	1.663	1.735
Vehicle Operating Costs - Links	-0.380	-13.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.392	-0.402	-0.412	-0.421	-0.431	-0.441	-0.451	-0.461	-0.471	-0.476	-0.481	-0.486	-0.491	-0.496	-0.500	-0.505	-0.510	-0.515	-0.520	-0.523	-0.525	-0.527	-0.530	-0.532	-0.535	-0.537	-0.539	-0.544
Vehicle Operating Costs - Turns	0.042	1.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.038	0.040	0.042	0.044	0.046	0.048	0.050	0.052	0.054	0.056	0.057	0.059	0.060	0.062	0.063	0.065	0.067	0.068	0.070	0.071	0.073	0.075	0.076	0.078	0.079	0.081	0.084
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	2.894	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.680	1.846	2.011	2.176	2.342	2.507	2.673	2.838	3.003	3.374	3.744	4.115	4.486	4.856	5.227	5.597	5.968	6.338	6.709	7.274	7.838	8.403	8.968	9.533	10.097	10.662	11.227	12.357

OP_33																																																								
Construction Period:		2 years																																																					
Construction	0.606		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.032		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.134412	0.134222	0.132956	0.130811	0.127966	0.12454	0.120688	0.116506	0.112088	0.11447	0.115493	0.115384	0.11434	0.112532	0.110108	0.107195	0.103901	0.100321	0.096533	0.096145	0.093211	0.090843	0.088135	0.085168	0.082013	0.078727	0.075361	0.07540307
50 year BCR	4.5	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.91%	20.88%	20.69%	20.35%	19.91%	19.38%	18.78%	18.13%	17.44%	17.81%	17.97%	17.95%	17.79%	17.51%	17.13%	16.68%	16.17%	15.61%	15.02%	14.80%	14.50%	14.13%	13.71%	13.25%	12.76%	12.25%	11.73%	11.73%
25 Year BCR from first year of construction			0.0	0.2	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2	3.3	3.5	3.7	3.8	4.0	4.1	4.2	4.4	4.5	4.6	4.8	4.9																								
25 Year PVB from first year of construction			0.000	0.141	0.282	0.421	0.558	0.693	0.823	0.950	1.072	1.190	1.310	1.431	1.562	1.672	1.790	1.906	2.018	2.127	2.232	2.333	2.433	2.531	2.626	2.718	2.808	2.894	2.976	3.055	3.134																								
25 Year PVC from first year of construction			0.606	0.606	0.623	0.623	0.623	0.624	0.624	0.624	0.625	0.625	0.630	0.631	0.637	0.637	0.637	0.637	0.638	0.638	0.638	0.638	0.640	0.640	0.643	0.643	0.643	0.643	0.643	0.643	0.643																								

Then widen Option 3 from Domain to Bell to 4 lanes

OP_35	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	911.770	73.710	73.352	72.995	72.637	72.279	75.019	77.758	80.497	83.236	85.976	88.667	91.358	94.050	96.741	99.432	102.281	105.129	107.977	110.825	113.673	117.106	120.538	123.971	127.404	130.837	133.109	135.381	137.654	139.926	142.198	144.471	146.743	149.016	151.288	153.560	155.707	157.854	160.001	162.148	164.295	166.442	168.589	170.736	172.883	175.030	177.340	179.650	181.959	184.269	186.579	188.889	191.198	193.508	198.127
Travel Time Costs - Turns	8.306	2.108	1.866	1.624	1.382	1.139	1.112	1.084	1.056	1.028	1.000	0.800	0.600	0.400	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	954.188	71.930	73.418	74.906	76.394	77.882	80.625	83.368	86.111	88.854	91.597	94.252	96.908	99.563	102.219	104.874	107.657	110.440	113.223	116.006	118.789	121.992	125.196	128.399	131.602	134.806	136.991	139.177	141.362	143.548	145.733	147.918	150.104	152.289	154.475	156.660	158.587	160.514	162.441	164.368	166.295	168.221	170.148	172.075	174.002	175.929	177.887	179.846	181.804	183.762	185.720	187.679	189.637	191.595	195.512
Vehicle Operating Costs - Turns	0.306	0.106	0.093	0.081	0.069	0.057	0.045	0.034	0.023	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	123.010	12.317	11.771	11.225	10.679	10.133	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.756	13.986	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	1997.581	160.170	160.500	160.830	161.161	161.491	166.720	171.948	177.177	182.406	187.634	193.520	199.651	205.783	211.915	218.293	224.313	230.333	236.353	242.373	248.390	255.499	262.604	269.710	276.816	283.922	288.637	293.352	298.067	302.782	307.497	312.212	316.927	321.642	326.358	331.073	335.360	339.647	343.934	348.221	352.508	356.795	361.082	365.369	369.656	373.943	378.437	382.930	387.423	391.916	396.409	400.903	405.396	409.889	418.876
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	53	, weeks	0																																																			
Travel Time Costs - Links	986.558		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	104.130	107.048	109.967	112.885	115.803	119.362	122.921	126.480	130.038	133.597	136.022	137.168	139.463	141.759	144.055	146.350	148.646	150.942	153.237	155.533	157.703	159.874	162.044	164.214	166.384	168.555	170.725	172.896	175.065	177.236	179.587	181.938	184.289	186.640	188.992	191.343	193.694	196.045	200.748
Travel Time Costs - Turns	36.745		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.608	3.739	3.870	4.002	4.133	4.420	4.708	4.995	5.282	5.570	5.715	5.104	5.206	5.307	5.408	5.509	5.611	5.712	5.813	5.915	5.999	6.084	6.169	6.254	6.338	6.423	6.508	6.593	6.678	6.762	6.884	7.005	7.126	7.248	7.369	7.491	7.612	7.733	7.976
Vehicle Operating Costs - Links	970.636		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.227	109.994	112.761	115.528	118.295	121.484	124.673	127.861	131.050	134.239	136.411	138.975	141.157	143.339	145.521	147.703	149.885	152.067	154.249	156.431	158.357	160.284	162.210	164.137	166.063	167.989	169.916	171.842	173.768	175.696	177.647	179.599	181.551	183.503	185.455	187.407	189.359	191.311	195.216
Vehicle Operating Costs - Turns	1.688		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.173	0.180	0.187	0.193	0.200	0.215	0.229	0.244	0.259	0.274	0.280	0.251	0.255	0.260	0.265	0.270	0.274	0.279	0.284	0.289	0.293	0.297	0.301	0.305	0.310	0.314	0.318	0.322	0.326	0.331	0.336	0.342	0.348	0.354	0.360	0.365	0.371	0.377	0.389
Accident Costs	141.190		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.106	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2136.817		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	229.513	235.725	241.938	248.150	254.363	261.882	269.401	276.920	284.440	291.959	296.965	300.291	305.132	309.973	314.814	319.655	324.496	329.337	334.178	339.019	343.418	347.817	352.216	356.615	361.013	365.412	369.811	374.210	378.609	383.008	387.663	392.319	396.974	401.630	406.286	410.941	415.597	420.252	429.564
Benefit Stream:																																																								
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

OP_35																																																								
Construction Period:		1 years																																																					
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.218
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.218
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	**FYRR**	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
BASE YEAR FOR COSTS: 1997																																																							
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																																																							

2 lane Option B, at grade

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808	178.301	183.796	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	55.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	961.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.296	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2278.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

2 lane Option B (Swamp Route), at grade Intersections

OP_36	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	936.144	73.710	73.814	73.918	74.021	74.125	76.946	79.767	82.588	85.409	88.229	91.018	93.807	96.597	99.386	102.175	105.134	108.094	111.053	114.013	116.972	120.584	124.195	127.806	131.418	135.029	137.503	139.978	142.452	144.927	147.401	149.876	152.350	154.824	157.299	159.773	162.364	164.956	167.547	170.138	172.729	175.320	177.911	180.503	183.094	185.685	188.635	191.585	194.536	197.486	200.436	203.386	206.337	209.287	215.187
Travel Time Costs - Turns	34.854	2.108	2.192	2.276	2.361	2.445	2.748	3.052	3.356	3.660	3.963	3.870	3.777	3.684	3.591	3.498	3.625	3.752	3.878	4.005	4.132	4.396	4.660	4.923	5.187	5.450	5.584	5.718	5.851	5.985	6.119	6.252	6.386	6.519	6.653	6.787	6.932	7.076	7.221	7.366	7.511	7.656	7.801	7.945	8.090	8.235	8.447	8.660	8.872	9.084	9.297	9.509	9.721	9.933	10.358
Vehicle Operating Costs - Links	952.493	71.930	73.374	74.819	76.263	77.708	80.448	83.189	85.929	88.670	91.410	94.064	96.718	99.372	102.026	104.681	107.459	110.237	113.015	115.793	118.571	121.773	124.975	128.177	131.379	134.581	136.762	138.944	141.125	143.307	145.488	147.670	149.851	152.033	154.214	156.396	158.316	160.237	162.157	164.078	165.998	167.919	169.839	171.760	173.680	175.600	177.551	179.502	181.452	183.403	185.354	187.304	189.255	191.206	195.107
Vehicle Operating Costs - Turns	1.593	0.106	0.109	0.112	0.115	0.118	0.123	0.128	0.133	0.139	0.144	0.149	0.154	0.159	0.164	0.169	0.176	0.182	0.189	0.196	0.203	0.216	0.228	0.240	0.253	0.265	0.272	0.279	0.286	0.293	0.300	0.307	0.313	0.320	0.327	0.334	0.341	0.347	0.354	0.360	0.367	0.373	0.380	0.387	0.393	0.400	0.410	0.420	0.431	0.441	0.451	0.462	0.472	0.482	0.503
Accident Costs	123.010	12.317	11.771	11.225	10.679	10.133	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.755	13.986	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2048.093	160.170	161.260	162.350	163.440	164.530	170.185	175.841	181.497	187.152	192.808	198.902	205.242	211.582	217.922	224.508	230.768	237.029	243.290	249.550	255.811	263.369	270.928	278.487	286.046	293.605	298.659	303.712	308.766	313.820	318.873	323.927	328.981	334.034	339.088	344.142	349.018	353.894	358.771	363.647	368.523	373.399	378.276	383.152	388.028	392.904	398.253	403.602	408.950	414.299	419.648	424.997	430.345	435.694	446.391
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	14	, weeks	0																																																			
Travel Time Costs - Links	992.582		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	105.134	108.094	111.053	114.013	116.972	120.584	124.195	127.806	131.418	135.029	137.503	139.978	142.452	144.927	147.401	149.876	152.350	154.824	157.299	159.773	162.364	164.956	167.547	170.138	172.729	175.320	177.911	180.503	183.094	185.685	188.635	191.585	194.536	197.486	200.436	203.386	206.337	209.287	215.187
Travel Time Costs - Turns	37.478		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.625	3.752	3.878	4.005	4.132	4.396	4.660	4.923	5.187	5.450	5.584	5.718	5.851	5.985	6.119	6.252	6.386	6.519	6.653	6.787	6.932	7.076	7.221	7.366	7.511	7.656	7.801	7.945	8.090	8.235	8.447	8.660	8.872	9.084	9.297	9.509	9.721	9.933	10.358
Vehicle Operating Costs - Links	971.075		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.459	110.237	113.015	115.793	118.571	121.773	124.975	128.177	131.379	134.581	136.762	138.944	141.125	143.307	145.488	147.670	149.851	152.033	154.214	156.396	158.316	160.237	162.157	164.078	165.998	167.919	169.839	171.760	173.680	175.600	177.551	179.502	181.452	183.403	185.354	187.304	189.255	191.206	195.107
Vehicle Operating Costs - Turns	1.726		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.176	0.182	0.189	0.196	0.203	0.216	0.228	0.240	0.253	0.265	0.272	0.279	0.286	0.293	0.300	0.307	0.313	0.320	0.327	0.334	0.341	0.347	0.354	0.360	0.367	0.373	0.380	0.387	0.393	0.400	0.410	0.420	0.431	0.441	0.451	0.462	0.472	0.482	0.503
Accident Costs	141.190		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.794	19.051	19.309	19.566	19.823	20.080	20.338	20.595	20.852	21.065	21.278	21.492	21.705	21.918	22.131	22.344	22.558	22.771	22.984	23.209	23.434	23.660	23.885	24.110	24.335	24.560	24.786	25.236
TOTAL USER COSTS	2144.052		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	230.768	237.029	243.290	249.550	255.811	263.369	270.928	278.487	286.046	293.605	298.659	303.712	308.766	313.820	318.873	323.927	328.981	334.034	339.088	344.142	349.018	353.894	358.771	363.647	368.523	373.399	378.276	383.152	388.028	392.904	398.253	403.602	408.950	414.299	419.648	424.997	430.345	435.694	446.391
Benefit Stream:																																																								
Travel Time Costs - Links	91.811	69.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.042	15.173	16.305	17.436	18.568	21.311	24.055	26.798	29.542	32.285	35.304	38.323	41.342	44.362	47.381	50.400	53.419	56.438	59.457	62.476	67.808	73.141	78.473	83.805	89.137	94.469	99.802	105.134	110.466	115.798	123.938	132.078	140.217	148.357	156.496	164.636	172.776	180.915	197.194
Travel Time Costs - Turns	18.255	13.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.651	1.876	2.101	2.326	2.551	3.314	4.078	4.841	5.604	6.368	7.110	7.853	8.596	9.339	10.081	10.824	11.567	12.310	13.053	13.796	15.147	16.499	17.851	19.203	20.555	21.907	23.259	24.610	25.962	27.314	29.573	31.831	34.089	36.348	38.606	40.865	43.123	45.381	49.898
Vehicle Operating Costs - Links	10.033	7.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.565	3.603	3.640	3.678	3.715	3.756	3.796	3.836	3.877	3.917	4.031	4.146	4.260	4.374	4.489	4.603	4.717	4.831	4.946	5.060	4.916	4.771	4.627	4.482	4.338	4.193	4.049	3.904	3.760	3.615	3.436	3.256	3.076	2.897	2.717	2.537	2.358	2.178	1.819
Vehicle Operating Costs - Turns	0.889	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	0.091	0.102	0.112	0.123	0.161	0.198	0.236	0.274	0.311	0.347	0.383	0.419	0.455	0.491	0.527	0.562	0.598	0.634	0.670	0.736	0.802	0.868	0.935	1.001	1.067	1.133	1.199	1.265	1.331	1.441	1.551	1.661	1.771	1.882	1.992	2.102	2.212	2.432
Accident Costs	11.895	9.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.759	3.855	3.951	4.046	4.142	4.246	4.350	4.454	4.557	4.661	4.775	4.889	5.003	5.117	5.231	5.345	5.458	5.572	5.686	5.800	5.903	6.006	6.109	6.211	6.314	6.417	6.520	6.623	6.726	6.828	6.909	6.990	7.071	7.152	7.233	7.314	7.394	7.475	7.637
TOTAL USER BENEFITS	132.883	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.098	24.598	26.098	27.599	29.099	32.788	36.476	40.165	43.854	47.542	51.568	55.594	59.620	63.646	67.672	71.698	75.724	79.750	83.776	87.802	94.510	101.219	107.928	114.636	121.345	128.053	134.762	141.471	148.179	154.888	165.297	175.706	186.115	196.525	206.934	217.343	227.752	238.162	258.980
WTP via Rates	0.584		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	133.467		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.327	24.827	26.327	27.828	29.328	33.017	36.705	40.394	44.083	47.771	51.797	55.823	59.849	63.875	67.901	71.927	75.953	79.979	84.005	88.031	94.739	101.448	108.157	114.865	121.574	128.282	134.991	141.700	148.408	155.117	165.526	175.935	186.344	196.754	207.163	217.572	227.981	238.391	259.209

OP_36																																																							
Construction Period:	3.0 years																																																						
Construction	24.128		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.682	27.682	27.682	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.040		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.276		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.430	0.000	0.603	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	24.444	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	27.582	27.682	27.682	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.446	0.016	0.618	0.016	0.016	0.016	0.016	0.016	0.016	0.016

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	5.32439	5.15167	4.96635	4.77215	4.57221	4.67934	4.7292	4.73132	4.69097	4.62431	4.5582	4.465901	4.352708	4.223188	4.081244	3.930206	3.7729	3.611714	3.448653	3.285391	3.214329	3.129036	3.032686	2.927994	2.817273	2.702485	2.585285	2.467059	2.348963	2.231949	2.165206	2.092151	2.014485	1.933649	1.850863	1.767147	1.683357	1.600196	1.58176374
50 year BCR	5.4	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.78%	21.08%	20.32%	19.52%	18.70%	19.14%	19.35%	19.36%	19.20%	18.92%	18.65%	18.27%	17.81%	17.28%	16.70%	16.08%	15.43%	14.78%	14.11%	13.44%	13.15%	12.80%	12.41%	11.98%	11.53%	11.06%	10.58%	10.09%	9.61%	9.13%	8.86%	8.56%	8.24%	7.91%	7.57%	7.23%	6.89%	6.55%	6.47%
25 Year BCR from first year of construction			2.3	2.5	2.7	2.8	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.0	4.2	4.3	4.4	4.5	4.7	4.8	4.9	5.0	5.0	5.1	5.2	5.3	5.4	5.5	5.5	5.6	5.7																								
25 Year PVB from first year of construction			55.380	60.064	64.629	69.059	73.339	77.461	81.418	85.206	88.823	92.269	95.640	98.922	102.103	105.174	108.128	110.963	113.674	116.262	118.725	121.066	123.337	125.531	127.644	129.672	131.613	133.467	135.232	136.911	138.570																								
25 Year PVC from first year of construction			24.330	24.382	24.383	24.384	24.385	24.386	24.387	24.388	24.388	24.406	24.406	24.426	24.427	24.427	24.428	24.428	24.428	24.428	24.429	24.435	24.436	24.443	24.444	24.444	24.444	24.444	24.444	24.444	24.444																								
														24.4																																									

Then widen SH2 from Te Maunga to Domain to 4 lanes

OP_30	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	930.655	73.710	73.730	73.750	73.769	73.789	76.607	79.425	82.244	85.062	87.880	90.657	93.434	96.212	98.989	101.766	104.699	107.633	110.566	113.499	116.432	119.988	123.543	127.099	130.655	134.210	136.540	138.870	141.199	143.529	145.859	148.189	150.518	152.848	155.178	157.508	159.716	161.924	164.132	166.340	168.548	170.756	172.965	175.173	177.381	179.589	181.981	184.374	186.766	189.159	191.551	193.944	196.336	198.729	203.514
Travel Time Costs - Turns	34.058	2.108	2.216	2.325	2.433	2.541	2.838	3.135	3.432	3.729	4.026	3.922	3.817	3.713	3.608	3.503	3.610	3.716	3.823	3.929	4.036	4.184	4.332	4.480	4.628	4.775	4.869	4.962	5.055	5.149	5.242	5.335	5.428	5.522	5.615	5.708	5.831	5.953	6.076	6.198	6.320	6.443	6.565	6.688	6.810	6.932	7.122	7.312	7.502	7.692	7.882	8.072	8.262	8.452	8.832
Vehicle Operating Costs - Links	954.590	71.930	73.420	74.909	76.399	77.889	80.637	83.384	86.132	88.880	91.627	94.288	96.949	99.609	102.270	104.930	107.718	110.505	113.292	116.079	118.867	122.078	125.289	128.500	131.711	134.922	137.111	139.300	141.489	143.678	145.867	148.056	150.245	152.434	154.623	156.812	158.741	160.671	162.601	164.531	166.460	168.390	170.320	172.250	174.179	176.109	178.069	180.029	181.990	183.950	185.910	187.870	189.830	191.790	195.711
Vehicle Operating Costs - Turns	1.550	0.106	0.110	0.114	0.119	0.123	0.127	0.131	0.136	0.140	0.144	0.150	0.156	0.162	0.168	0.173	0.178	0.183	0.188	0.192	0.197	0.204	0.211	0.218	0.225	0.232	0.237	0.241	0.245	0.249	0.253	0.258	0.262	0.266	0.270	0.274	0.281	0.287	0.293	0.300	0.306	0.312	0.319	0.325	0.331	0.338	0.347	0.356	0.365	0.374	0.383	0.392	0.402	0.411	0.429
Accident Costs	120.471	12.317	11.698	11.079	10.460	9.841	9.640	9.439	9.237	9.036	8.835	9.561	10.528	11.496	12.463	13.672	14.058	14.444	14.830	15.216	15.602	16.068	16.534	17.000	17.467	17.933	18.186	18.439	18.692	18.945	19.198	19.451	19.704	19.957	20.210	20.463	20.671	20.880	21.088	21.297	21.505	21.714	21.922	22.131	22.339	22.547	22.774	23.001	23.228	23.454	23.681	23.908	24.134	24.361	24.815
TOTAL USER COSTS	2041.324	160.170	161.173	162.177	163.180	164.184	169.849	175.515	181.181	186.847	192.513	198.577	204.884	211.191	217.497	224.046	230.263	236.481	242.699	248.916	255.134	262.522	269.909	277.297	284.685	292.073	296.942	301.811	306.681	311.550	316.419	321.288	326.157	331.027	335.896	340.765	345.240	349.715	354.190	358.665	363.140	367.615	372.090	376.566	381.041	385.516	390.294	395.073	399.851	404.630	409.408	414.187	418.965	423.744	433.301
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	25	, weeks	0																																																			
Travel Time Costs - Links	990.235		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	105.134	108.094	111.053	114.013	116.972	120.584	124.195	127.806	131.418	135.029	137.503	138.870	141.199	143.529	145.859	148.189	150.518	152.848	155.178	157.508	159.716	161.924	164.132	166.340	168.548	170.756	172.965	175.173	177.381	179.589	181.981	184.374	186.766	189.159	191.551	193.944	196.336	198.729	203.514
Travel Time Costs - Turns	36.629		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.625	3.752	3.878	4.005	4.132	4.396	4.660	4.923	5.187	5.450	5.584	4.962	5.055	5.149	5.242	5.335	5.428	5.522	5.615	5.708	5.831	5.953	6.076	6.198	6.320	6.443	6.565	6.688	6.810	6.932	7.122	7.312	7.502	7.692	7.882	8.072	8.262	8.452	8.832
Vehicle Operating Costs - Links	971.424		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.459	110.237	113.015	115.793	118.571	121.773	124.975	128.177	131.379	134.581	136.762	139.300	141.489	143.678	145.867	148.056	150.245	152.434	154.623	156.812	158.741	160.671	162.601	164.531	166.460	168.390	170.320	172.250	174.179	176.109	178.069	180.029	181.990	183.950	185.910	187.870	189.830	191.790	195.711
Vehicle Operating Costs - Turns	1.682		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.176	0.182	0.189	0.196	0.203	0.216	0.228	0.240	0.253	0.265	0.272	0.241	0.245	0.249	0.253	0.258	0.262	0.266	0.270	0.274	0.281	0.287	0.293	0.300	0.306	0.312	0.319	0.325	0.331	0.338	0.347	0.356	0.365	0.374	0.383	0.392	0.402	0.411	0.429
Accident Costs	140.867		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.439	18.692	18.945	19.198	19.451	19.704	19.957	20.210	20.463	20.671	20.880	21.088	21.297	21.505	21.714	21.922	22.131	22.339	22.547	22.774	23.001	23.228	23.454	23.681	23.908	24.134	24.361	24.815
TOTAL USER COSTS	2140.837		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	230.768	237.029	243.290	249.550	255.811	263.369	270.928	278.487	286.046	293.605	298.659	301.811	306.681	311.550	316.419	321.288	326.157	331.027	335.896	340.765	345.240	349.715	354.190	358.665	363.140	367.615	372.090	376.566	381.041	385.516	390.294	395.073	399.851	404.630	409.408	414.187	418.965	423.744	433.301
Benefit Stream:																																																								
Travel Time Costs - Links	2.347	73.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.108	1.253	1.398	1.542	1.687	1.831	1.976	2.121	2.265	2.648	3.032	3.415	3.798	4.181	4.564	4.947	5.330	5.713	6.096	6.654	7.211	7.769	8.327	8.885	9.442	10.000	10.558	11.673
Travel Time Costs - Turns	0.849	26.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.756	0.796	0.836	0.877	0.917	0.957	0.998	1.038	1.078	1.101	1.123	1.146	1.168	1.191	1.213	1.235	1.258	1.280	1.303	1.325	1.347	1.370	1.392	1.414	1.436	1.459	1.481	1.526
Vehicle Operating Costs - Links	-0.349	-10.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.356	-0.364	-0.371	-0.379	-0.386	-0.394	-0.401	-0.408	-0.416	-0.425	-0.434	-0.444	-0.453	-0.462	-0.472	-0.481	-0.490	-0.499	-0.509	-0.518	-0.528	-0.537	-0.547	-0.556	-0.566	-0.575	-0.584	-0.603
Vehicle Operating Costs - Turns	0.044	1.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.041	0.044	0.046	0.049	0.052	0.054	0.057	0.060	0.060	0.060	0.060	0.061	0.061	0.061	0.061	0.062	0.062	0.062	0.063	0.064	0.066	0.067	0.068	0.069	0.070	0.072	0.074
Accident Costs	0.324	10.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.355	0.359	0.364	0.368	0.372	0.376	0.381	0.385	0.389	0.394	0.399	0.403	0.408	0.413	0.418	0.422	0.427	0.432	0.437	0.435	0.434	0.432	0.431	0.429	0.428	0.426	0.424	0.421
TOTAL USER BENEFITS	3.216	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.901	2.085	2.270	2.454	2.639	2.823	3.008	3.192	3.377	3.778	4.179	4.580	4.982	5.383	5.784	6.185	6.586	6.988	7.389	7.959	8.529	9.099	9.670	10.240	10.810	11.380	11.950	13.091

OP_30																																																							
Construction Period:	2 years																																																						
Construction	0.606		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.005		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.032		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.643	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.152071	0.151663	0.150072	0.147517	0.144187	0.140242	0.135824	0.131049	0.12602	0.128176	0.128899	0.128431	0.126983	0.124736	0.121849	0.118456	0.114672	0.110598	0.106316	0.10411	0.101426	0.098369	0.09503	0.091486	0.0878	0.084028	0.080217	0.0798832
50 year BCR	5.0	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	23.66%	23.60%	23.35%	22.95%	22.43%	21.82%	21.13%	20.39%	19.61%	19.94%	20.06%	19.98%	19.76%	19.41%	18.96%	18.43%	17.84%	17.21%	16.54%	16.20%	15.78%	15.31%	14.79%	14.23%	13.66%	13.07%	12.48%	12.43%
25 Year BCR from first year of construction			0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.7	1.9	2.1	2.3	2.6	2.7	2.9	3.2	3.4	3.5	3.7	3.9	4.1	4.2	4.4	4.6	4.7	4.9	5.0	5.1	5.3	5.4																								
25 Year PVB from first year of construction			0.000	0.159	0.319	0.476	0.631	0.782	0.929	1.071	1.209	1.341	1.475	1.611	1.745	1.879	2.009	2.137	2.261	2.382	2.498	2.609	2.718	2.825	2.928	3.028	3.124	3.216	3.304	3.388	3.472																								
25 Year PVC from first year of construction			0.606	0.606	0.623	0.623	0.623	0.624	0.624	0.624	0.625	0.625	0.630	0.631	0.637	0.637	0.637	0.637	0.638	0.638	0.638	0.638	0.640	0.640	0.643	0.643	0.643	0.643	0.643	0.643	0.643																								

Then widen Bypass between Domain and Bell to 4 lanes

OP_31	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	921.230	73.710	73.557	73.403	73.250	73.097	75.869	78.641	81.414	84.186	86.958	89.685	92.412	95.140	97.867	100.594	103.477	106.360	109.244	112.127	115.010	118.493	121.977	125.461	128.944	132.428	134.719	137.011	139.303	141.596	143.887	146.179	148.471	150.763	153.055	155.347	157.513	159.680	161.847	164.014	166.181	168.348	170.515	172.682	174.849	177.015	179.373	181.731	184.089	186.447	188.805	191.163	193.521	195.879	200.595
Travel Time Costs - Turns	34.865	2.108	2.192	2.276	2.361	2.445	2.748	3.052	3.356	3.660	3.963	3.870	3.777	3.684	3.591	3.498	3.625	3.752	3.878	4.005	4.132	4.396	4.660	4.923	5.187	5.450	5.584	5.718	5.852	5.986	6.120	6.254	6.388	6.522	6.656	6.790	6.936	7.082	7.228	7.373	7.519	7.665	7.811	7.957	8.102	8.248	8.498	8.748	8.998	9.248	9.498	9.748	9.998	10.248	10.748
Vehicle Operating Costs - Links	956.731	71.930	73.443	74.956	76.470	77.983	80.736	83.489	86.241	88.994	91.748	94.410	97.074	99.737	102.401	105.064	107.858	110.651	113.445	116.239	119.032	122.248	125.464	128.680	131.896	135.112	137.306	139.501	141.696	143.890	146.084	148.279	150.473	152.667	154.862	157.056	158.990	160.923	162.856	164.789	166.722	168.655	170.588	172.521	174.454	176.387	178.349	180.311	182.272	184.234	186.195	188.157	190.118	192.080	196.003
Vehicle Operating Costs - Turns	1.593	0.106	0.109	0.112	0.115	0.118	0.123	0.128	0.133	0.139	0.144	0.149	0.154	0.159	0.164	0.169	0.176	0.182	0.189	0.196	0.203	0.216	0.228	0.240	0.253	0.265	0.272	0.279	0.286	0.293	0.300	0.307	0.313	0.320	0.327	0.334	0.341	0.347	0.354	0.361	0.367	0.374	0.380	0.387	0.394	0.400	0.412	0.425	0.437	0.449	0.461	0.473	0.485	0.497	0.522
Accident Costs	120.471	12.317	11.698	11.079	10.460	9.841	9.640	9.439	9.237	9.036	8.835	9.561	10.528	11.496	12.463	13.672	14.058	14.444	14.830	15.216	15.602	16.068	16.534	17.000	17.467	17.933	18.186	18.439	18.692	18.945	19.198	19.451	19.704	19.957	20.210	20.463	20.671	20.880	21.088	21.297	21.505	21.714	21.922	22.131	22.339	22.547	22.774	23.001	23.228	23.454	23.681	23.908	24.134	24.361	24.815
TOTAL USER COSTS	2033.891	160.170	160.999	161.827	162.656	163.485	169.117	174.749	180.382	186.014	191.646	197.675	203.945	210.215	216.485	222.997	229.193	235.390	241.586	247.783	253.980	261.421	268.863	276.304	283.746	291.188	296.068	300.948	305.828	310.709	315.589	320.469	325.349	330.230	335.110	339.990	344.451	348.912	353.373	357.834	362.295	366.755	371.216	375.677	380.138	384.599	389.407	394.215	399.024	403.832	408.640	413.448	418.257	423.065	432.681
	Opening (from Time 0)																																																								
User Cost Stream:	Years:	53	, weeks	0																																																			
Travel Time Costs - Links	990.235		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	105.134	108.094	111.053	114.013	116.972	120.584	124.195	127.806	131.418	135.029	137.503	138.870	141.199	143.529	145.859	148.189	150.518	152.848	155.178	157.508	159.716	161.924	164.132	166.340	168.548	170.756	172.965	175.173	177.381	179.589	181.981	184.374	186.766	189.159	191.551	193.944	196.336	198.729	203.514
Travel Time Costs - Turns	36.629		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	3.625	3.752	3.878	4.005	4.132	4.396	4.660	4.923	5.187	5.450	5.584	4.962	5.055	5.149	5.242	5.335	5.428	5.522	5.615	5.708	5.831	5.953	6.076	6.198	6.320	6.443	6.565	6.688	6.810	6.932	7.122	7.312	7.502	7.692	7.882	8.072	8.262	8.452	8.832
Vehicle Operating Costs - Links	971.424		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	107.459	110.237	113.015	115.793	118.571	121.773	124.975	128.177	131.379	134.581	136.762	139.300	141.489	143.678	145.867	148.056	150.245	152.434	154.623	156.812	158.741	160.671	162.601	164.531	166.460	168.390	170.320	172.250	174.179	176.109	178.069	180.029	181.990	183.950	185.910	187.870	189.830	191.790	195.711
Vehicle Operating Costs - Turns	1.682		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.176	0.182	0.189	0.196	0.203	0.216	0.228	0.240	0.253	0.265	0.272	0.241	0.245	0.249	0.253	0.258	0.262	0.266	0.270	0.274	0.281	0.287	0.293	0.300	0.306	0.312	0.319	0.325	0.331	0.338	0.347	0.356	0.365	0.374	0.383	0.392	0.402	0.411	0.429
Accident Costs	140.867		12.547	12.778	13.008	13.239	12.966	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537	18.439	18.692	18.945	19.198	19.451	19.704	19.957	20.210	20.463	20.671	20.880	21.088	21.297	21.505	21.714	21.922	22.131	22.339	22.547	22.774	23.001	23.228	23.454	23.681	23.908	24.134	24.361	24.815
TOTAL USER COSTS	2140.837		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	230.768	237.029	243.290	249.550	255.811	263.369	270.928	278.487	286.046	293.605	298.659	301.811	306.681	311.550	316.419	321.288	326.157	331.027	335.896	340.765	345.240	349.715	354.190	358.665	363.140	367.615	372.090	376.566	381.041	385.516	390.294	395.073	399.851	404.630	409.408	414.187	418.965	423.744	433.301
Benefit Stream:																																																								
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

OP_31																																																							
Construction Period:	1 years																																																						
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.171
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.171

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	FYRR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO: 1 July 1998		Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS 1997																																																								
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																																																							

2 lane Option A3**, at grade

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1064.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.691	13.571	14.447	15.324	16.200	17.076	17.953	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.594	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.966	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.965	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

Note. 2006 Accident Costs factored by 0.75 to account for long term trends

2 lane Option A3**, at grade intersections

OP_26	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	937.816	73.710	73.873	74.035	74.198	74.361	77.173	79.986	82.798	85.610	88.422	91.204	93.986	96.768	99.550	102.332	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	137.578	140.077	142.575	145.074	147.572	150.071	152.569	155.068	157.566	160.065	162.684	165.303	167.922	170.541	173.160	175.779	178.398	181.017	183.636	186.255	189.230	192.205	195.180	198.155	201.129	204.104	207.079	210.054	216.004
Travel Time Costs - Turns	35.159	2.108	2.196	2.285	2.373	2.461	2.765	3.069	3.373	3.678	3.982	3.890	3.798	3.706	3.614	3.523	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	5.640	5.789	5.938	6.087	6.236	6.385	6.534	6.683	6.832	6.981	7.137	7.293	7.448	7.604	7.759	7.915	8.070	8.226	8.381	8.537	8.734	8.932	9.129	9.327	9.524	9.722	9.919	10.117	10.512
Vehicle Operating Costs - Links	954.437	71.930	73.448	74.966	76.483	78.001	80.733	83.464	86.195	88.927	91.658	94.302	96.947	99.591	102.235	104.879	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	136.854	139.037	141.220	143.403	145.586	147.769	149.952	152.135	154.318	156.501	158.434	160.367	162.301	164.234	166.168	168.101	170.035	171.968	173.902	175.835	177.804	179.773	181.742	183.712	185.681	187.650	189.619	191.588	195.526
Vehicle Operating Costs - Turns	1.620	0.106	0.110	0.114	0.118	0.122	0.126	0.131	0.135	0.139	0.144	0.150	0.156	0.162	0.168	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284	0.291	0.298	0.305	0.312	0.319	0.326	0.333	0.340	0.347	0.355	0.363	0.370	0.378	0.385	0.393	0.400	0.408	0.416	0.425	0.435	0.444	0.454	0.464	0.473	0.483	0.492	0.512
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2052.469	160.170	161.407	162.644	163.882	165.119	170.755	176.392	182.028	187.665	193.302	199.383	205.712	212.041	218.369	224.945	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	298.949	304.050	309.151	314.251	319.352	324.453	329.554	334.655	339.755	344.856	349.792	354.727	359.663	364.598	369.534	374.469	379.405	384.341	389.276	394.212	399.588	404.964	410.341	415.717	421.093	426.470	431.846	437.222	447.975
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**11**	**, weeks**	**26**																																																			
Travel Time Costs - Links	984.245		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	102.576	99.550	102.332	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	137.578	140.077	142.575	145.074	147.572	150.071	152.569	155.068	157.566	160.065	162.684	165.303	167.922	170.541	173.160	175.779	178.398	181.017	183.636	186.255	189.230	192.205	195.180	198.155	201.129	204.104	207.079	210.054	216.004
Travel Time Costs - Turns	36.725		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.322	3.614	3.523	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	5.640	5.789	5.938	6.087	6.236	6.385	6.534	6.683	6.832	6.981	7.137	7.293	7.448	7.604	7.759	7.915	8.070	8.226	8.381	8.537	8.734	8.932	9.129	9.327	9.524	9.722	9.919	10.117	10.512
Vehicle Operating Costs - Links	969.096		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	101.174	102.235	104.879	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	136.854	139.037	141.220	143.403	145.586	147.769	149.952	152.135	154.318	156.501	158.434	160.367	162.301	164.234	166.168	168.101	170.035	171.968	173.902	175.835	177.804	179.773	181.742	183.712	185.681	187.650	189.619	191.588	195.526
Vehicle Operating Costs - Turns	1.693		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.192	0.168	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284	0.291	0.298	0.305	0.312	0.319	0.326	0.333	0.340	0.347	0.355	0.363	0.370	0.378	0.385	0.393	0.400	0.408	0.416	0.425	0.435	0.444	0.454	0.464	0.473	0.483	0.492	0.512
Accident Costs	138.984		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	13.343	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.395	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2130.742		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	221.607	218.369	224.945	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	298.949	304.050	309.151	314.251	319.352	324.453	329.554	334.655	339.755	344.856	349.792	354.727	359.663	364.598	369.534	374.469	379.405	384.341	389.276	394.212	399.588	404.964	410.341	415.717	421.093	426.470	431.846	437.222	447.975
Benefit Stream:																																																							
Travel Time Costs - Links	100.148	74.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.807	12.183	12.752	13.899	15.046	16.193	17.340	18.487	21.237	23.986	26.736	29.485	32.235	35.230	38.225	41.220	44.215	47.210	50.205	53.200	56.195	59.190	62.185	67.489	72.794	78.098	83.402	88.707	94.011	99.316	104.620	109.924	115.229	123.344	131.458	139.573	147.688	155.803	163.918	172.033	180.148	196.377
Travel Time Costs - Turns	19.008	14.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.616	1.316	1.401	1.625	1.850	2.075	2.300	2.525	3.285	4.046	4.806	5.567	6.328	7.065	7.782	8.509	9.237	9.964	10.691	11.419	12.146	12.873	13.601	14.942	16.283	17.624	18.965	20.307	21.648	22.989	24.330	25.671	27.013	29.286	31.559	33.832	36.105	38.378	40.652	42.925	45.198	49.744
Vehicle Operating Costs - Links	12.013	8.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.583	3.248	3.329	3.381	3.434	3.486	3.538	3.590	3.638	3.685	3.732	3.780	3.827	3.940	4.053	4.166	4.278	4.391	4.504	4.617	4.730	4.842	4.965	4.798	4.640	4.483	4.326	4.168	4.011	3.853	3.696	3.538	3.381	3.183	2.985	2.786	2.588	2.390	2.192	1.994	1.796	1.399
Vehicle Operating Costs - Turns	0.922	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.062	0.065	0.076	0.088	0.099	0.111	0.122	0.159	0.196	0.233	0.269	0.306	0.342	0.378	0.414	0.449	0.485	0.521	0.557	0.593	0.629	0.664	0.730	0.795	0.860	0.925	0.990	1.055	1.120	1.185	1.250	1.315	1.426	1.537	1.648	1.758	1.869	1.980	2.091	2.202	2.423
Accident Costs	14.102	10.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.530	3.306	3.613	3.708	3.803	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711	4.819	4.927	5.035	5.143	5.251	5.358	5.467	5.575	5.682	5.778	5.875	5.971	6.067	6.163	6.259	6.355	6.451	6.547	6.643	6.724	6.805	6.886	6.967	7.048	7.129	7.210	7.290	7.452
TOTAL USER BENEFITS	146.194	1.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.566	20.116	21.161	22.691	24.221	25.751	27.282	28.812	32.509	36.207	39.904	43.602	47.299	51.278	55.257	59.236	63.214	67.193	71.172	75.151	79.130	83.109	87.087	93.737	100.386	107.035	113.685	120.334	126.983	133.633	140.282	146.931	153.581	163.962	174.344	184.725	195.107	205.488	215.870	226.252	236.633	257.396
WTP via Rates	0.783		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	146.977		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.795	20.345	21.390	22.920	24.450	25.980	27.511	29.041	32.738	36.436	40.133	43.831	47.528	51.507	55.486	59.465	63.443	67.422	71.401	75.380	79.359	83.338	87.316	93.966	100.615	107.264	113.914	120.563	127.212	133.862	140.511	147.160	153.810	164.191	174.573	184.954	195.336	205.717	216.099	226.481	236.862	257.625

OP_26																																																							
Construction Period:	2.5	years																																																				
Construction	26.336		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.414	29.414	14.707	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.056		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.364		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614
TOTAL COST	26.755	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.414	29.414	14.723	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630

	mid point of year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
		SPPWF	0.90909	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.4241	0.38554	0.35049	0.31863	0.28966	0.26333	0.23939	0.21763	0.19784	0.17986	0.16351	0.14864	0.13513	0.12285	0.11168	0.10153	0.0923	0.083905	0.076278	0.069343	0.063039	0.057309	0.052099	0.047362	0.043057	0.039143	0.035584	0.032349	0.029408	0.026735	0.024304	0.022095	0.020086	0.01826	0.0166	0.015091	0.013719	0.012472	0.011338	0.010307	0.00937	0.008519	0.007744	0.00704	0.00640011
	PV of 1st yr benefits			0	0	0	0	0	0	0	0	0	0	3.12114	5.89322	5.63253	5.48681	5.32104	5.14006	4.94801	4.7484	4.86633	4.92357	4.93019	4.89491	4.82531	4.75387	4.65555	4.535815	4.399375	4.250256	4.091891	3.927194	3.758624	3.588247	3.417785	3.343687	3.254815	3.154468	3.045466	2.930213	2.810746	2.688784	2.565767	2.442896	2.32116	2.252573	2.177272	2.097047	2.013414	1.927656	1.84085	1.753897	1.667539	1.64883131
50 year BCR	5.5	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.67%	22.03%	21.05%	20.51%	19.89%	19.21%	18.49%	17.75%	18.19%	18.40%	18.43%	18.30%	18.04%	17.77%	17.40%	16.95%	16.44%	15.89%	15.29%	14.68%	14.05%	13.41%	12.77%	12.50%	12.17%	11.79%	11.38%	10.95%	10.51%	10.05%	9.59%	9.13%	8.68%	8.42%	8.14%	7.84%	7.53%	7.20%	6.88%	6.56%	6.23%	6.16%
25 Year BCR from first year of construction			2.6	2.8	2.9	3.1	3.3	3.4	3.6	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.6	4.7	4.8	4.9	4.9	5.0	5.1	5.2	5.3	5.4	5.4	5.5	5.6	5.6	5.7																								
25 Year PVB from first year of construction			69.485	74.141	78.677	83.076	87.326	91.418	95.345	99.104	102.692	106.110	109.454	112.709	115.863	118.909	121.839	124.650	127.338	129.904	132.347	134.668	136.921	139.098	141.195	143.208	145.136	146.977	148.731	150.398	152.047																								
25 Year PVC from first year of construction			26.683	26.684	26.686	26.687	26.688	26.689	26.712	26.713	26.740	26.741	26.741	26.742	26.742	26.743	26.743	26.744	26.753	26.753	26.753	26.754	26.754	26.754	26.754	26.754	26.754	26.755	26.758	26.758	26.762																								
25 Year PVB excl WTP from first year of construction			68.894																																																				
25 Year PVB of WTP from first year of construction			0.591																																																				

Then widen SH2 from Te Maunga to Domain to 4 lanes

OP_20	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	932.365	73.710	73.789	73.868	73.947	74.026	76.837	79.648	82.459	85.270	88.081	90.850	93.620	96.390	99.160	101.930	104.847	107.763	110.680	113.597	116.514	120.062	123.611	127.160	130.709	134.258	136.617	138.976	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	34.277	2.108	2.221	2.333	2.445	2.558	2.855	3.153	3.450	3.748	4.045	3.940	3.836	3.731	3.627	3.522	3.628	3.734	3.841	3.947	4.053	4.207	4.360	4.513	4.667	4.820	4.921	5.023	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	956.558	71.930	73.494	75.058	76.622	78.186	80.924	83.662	86.400	89.138	91.876	94.527	97.178	99.829	102.480	105.131	107.905	110.679	113.452	116.226	118.999	122.201	125.403	128.605	131.807	135.008	137.199	139.390	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	1.563	0.106	0.110	0.114	0.119	0.123	0.128	0.133	0.138	0.143	0.148	0.153	0.158	0.163	0.168	0.173	0.178	0.183	0.188	0.193	0.198	0.205	0.212	0.219	0.226	0.233	0.238	0.243	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	108.247	12.317	11.407	10.497	9.587	8.677	8.503	8.329	8.155	7.982	7.808	8.452	9.312	10.171	11.031	12.105	12.447	12.790	13.132	13.474	13.817	14.237	14.657	15.078	15.498	15.918	16.125	16.331	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	2033.010	160.170	161.020	161.870	162.719	163.569	169.247	174.924	180.602	186.280	191.957	197.923	204.104	210.285	216.466	222.861	229.005	235.149	241.293	247.436	253.580	260.912	268.243	275.575	282.907	290.238	296.101	299.964	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**19**	**, weeks**	**0**																																																			
Travel Time Costs - Links	981.820		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	102.576	99.550	102.332	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	136.617	138.976	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	35.737		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.322	3.614	3.523	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	4.921	5.023	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	969.480		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	101.174	102.235	104.879	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	137.199	139.390	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	1.644		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.192	0.168	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.238	0.243	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	136.291		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	13.343	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	16.125	16.331	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	2124.971		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	221.607	218.369	224.945	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	296.101	299.964	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
Benefit Stream:																																																							
Travel Time Costs - Links	2.425	42.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.961	1.101	1.241	1.381	1.520	1.660	1.800	1.940	2.080	2.220	2.610	3.000	3.390	3.780	4.171	4.561	4.951	5.341	5.731	6.121	6.690	7.259	7.828	8.397	8.966	9.535	10.103	10.672	11.810
Travel Time Costs - Turns	0.988	17.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.718	0.766	0.813	0.861	0.909	0.956	1.004	1.052	1.099	1.147	1.188	1.228	1.269	1.309	1.350	1.391	1.431	1.472	1.512	1.553	1.578	1.603	1.628	1.653	1.678	1.703	1.728	1.753	1.803
Vehicle Operating Costs - Links	-0.385	-6.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.346	-0.354	-0.362	-0.370	-0.378	-0.386	-0.394	-0.402	-0.410	-0.418	-0.429	-0.441	-0.452	-0.463	-0.475	-0.486	-0.497	-0.509	-0.520	-0.531	-0.540	-0.550	-0.559	-0.568	-0.577	-0.586	-0.595	-0.605	-0.623
Vehicle Operating Costs - Turns	0.049	0.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.041	0.042	0.044	0.046	0.047	0.049	0.051	0.052	0.054	0.056	0.058	0.061	0.063	0.065	0.067	0.070	0.072	0.074	0.076	0.078	0.079	0.080	0.082	0.083	0.084	0.086	0.087	0.090
Accident Costs	2.693	46.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.476	2.532	2.589	2.646	2.703	2.760	2.816	2.873	2.930	2.987	3.038	3.090	3.142	3.194	3.245	3.297	3.349	3.401	3.452	3.504	3.547	3.591	3.635	3.678	3.722	3.765	3.809	3.852	3.939
TOTAL USER BENEFITS	5.770	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.848	4.086	4.324	4.562	4.800	5.038	5.276	5.514	5.752	5.989	6.463	6.936	7.410	7.883	8.356	8.830	9.303	9.777	10.250	10.724	11.353	11.983	12.612	13.242	13.871	14.501	15.130	15.760	17.019

OP_20																																																							
Construction Period:	2	years																																																			
Construction	1.073		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.009		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.058		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000
TOTAL COST	1.140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006

	mid point of year		1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
	PV of 1st yr benefits			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.33864	0.326889	0.314475	0.301617	0.288497	0.275271	0.262064	0.248984	0.236117	0.223631	0.219272	0.21394	0.207765	0.200945	0.193648	0.186017	0.178173	0.170218	0.162236	0.154299	0.148507	0.142492	0.136343	0.130135	0.123929	0.117776	0.111717	0.105786	0.10385219
50 year BCR	5.1	**FYRR**	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	29.70%	28.67%	27.58%	26.45%	25.30%	24.14%	22.98%	21.83%	20.71%	19.60%	19.23%	18.76%	18.22%	17.62%	16.98%	16.31%	15.62%	14.93%	14.23%	13.53%	13.02%	12.50%	11.96%	11.41%	10.87%	10.33%	9.80%	9.28%	9.11%
25 Year BCR from first year of construction			0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.6	4.7	4.8	5.0	5.1	5.2	5.3	5.4																								
25 Year PVB from first year of construction			0.355	0.698	1.028	1.344	1.647	1.935	2.210	2.471	2.719	2.954	3.184	3.408	3.626	3.837	4.040	4.235	4.422	4.600	4.770	4.932	5.088	5.237	5.380	5.517	5.647	5.770	5.887	5.998	6.107																								
25 Year PVC from first year of construction			1.106	1.106	1.107	1.107	1.117	1.117	1.128	1.129	1.129	1.129	1.129	1.130	1.130	1.130	1.134	1.134	1.138	1.138	1.138	1.139	1.139	1.139	1.139	1.139	1.140	1.140	1.140	1.140	1.140																								

Then widen Bypass between Domain and Bell to 4 lanes

OP_21	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	923.039	73.710	73.617	73.524	73.431	73.339	76.104	78.870	81.636	84.402	87.168	89.887	92.607	95.327	98.046	100.766	103.635	106.505	109.374	112.244	115.113	118.590	122.067	125.544	129.021	132.498	134.815	137.132	139.450	141.767	144.084	146.401	148.718	151.036	153.353	155.670	157.874	160.077	162.281	164.485	166.689	168.892	171.096	173.300	175.503	177.707	180.074	182.441	184.807	187.174	189.541	191.908	194.274	196.641	201.374
Travel Time Costs - Turns	35.165	2.108	2.196	2.285	2.373	2.461	2.765	3.069	3.373	3.678	3.982	3.889	3.797	3.704	3.612	3.520	3.647	3.775	3.903	4.031	4.159	4.425	4.692	4.958	5.224	5.490	5.637	5.783	5.929	6.075	6.221	6.367	6.513	6.659	6.805	6.951	7.117	7.283	7.449	7.615	7.781	7.947	8.113	8.279	8.446	8.612	8.854	9.096	9.337	9.579	9.821	10.063	10.305	10.547	11.031
Vehicle Operating Costs - Links	957.640	71.930	73.515	75.101	76.687	78.272	81.017	83.761	86.506	89.250	91.995	94.648	97.302	99.955	102.609	105.263	108.041	110.819	113.596	116.374	119.152	122.359	125.566	128.773	131.980	135.187	137.383	139.579	141.776	143.972	146.168	148.364	150.560	152.757	154.953	157.149	159.095	161.041	162.987	164.933	166.879	168.825	170.771	172.717	174.663	176.609	178.591	180.572	182.554	184.536	186.517	188.499	190.481	192.462	196.426
Vehicle Operating Costs - Turns	1.620	0.106	0.110	0.114	0.118	0.122	0.126	0.131	0.135	0.139	0.144	0.150	0.156	0.162	0.168	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.277	0.284	0.291	0.298	0.305	0.311	0.318	0.325	0.332	0.339	0.347	0.355	0.363	0.371	0.379	0.387	0.395	0.403	0.411	0.419	0.431	0.443	0.455	0.466	0.478	0.490	0.502	0.514	0.537
Accident Costs	108.247	12.317	11.407	10.497	9.587	8.677	8.503	8.329	8.156	7.982	7.808	8.452	9.312	10.171	11.031	12.105	12.447	12.790	13.132	13.474	13.817	14.237	14.657	15.078	15.498	15.918	16.125	16.331	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	2025.711	160.170	160.845	161.520	162.196	162.871	168.516	174.161	179.806	185.450	191.095	197.027	203.173	209.320	215.466	221.827	227.951	234.074	240.198	246.321	252.445	259.829	267.213	274.596	281.980	289.364	294.237	299.110	303.982	308.855	313.728	318.601	323.473	328.346	333.219	338.091	342.583	347.076	351.568	356.060	360.552	365.044	369.536	374.028	378.520	383.012	387.796	392.580	397.364	402.148	406.931	411.715	416.499	421.283	430.850
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**53**	**, weeks**	**0**																																																		
Travel Time Costs - Links	981.820		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	102.576	99.550	102.332	105.276	108.220	111.164	114.109	117.053	120.658	124.263	127.869	131.474	135.080	136.617	138.976	141.334	143.693	146.052	148.410	150.769	153.128	155.486	157.845	160.074	162.303	164.531	166.760	168.989	171.218	173.447	175.676	177.904	180.133	182.539	184.945	187.352	189.758	192.164	194.570	196.976	199.382	204.194
Travel Time Costs - Turns	35.737		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.322	3.614	3.523	3.650	3.777	3.904	4.032	4.159	4.425	4.692	4.958	5.224	5.490	4.921	5.023	5.124	5.226	5.327	5.429	5.530	5.632	5.733	5.835	5.949	6.064	6.179	6.294	6.409	6.524	6.639	6.754	6.869	6.984	7.156	7.329	7.501	7.674	7.847	8.019	8.192	8.364	8.709
Vehicle Operating Costs - Links	969.480		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	101.174	102.235	104.879	107.643	110.406	113.170	115.933	118.696	121.891	125.086	128.281	131.476	134.671	137.199	139.390	141.581	143.772	145.963	148.154	150.345	152.536	154.727	156.918	158.863	160.808	162.753	164.698	166.642	168.587	170.532	172.477	174.422	176.366	178.345	180.323	182.301	184.280	186.258	188.236	190.214	192.193	196.149
Vehicle Operating Costs - Turns	1.644		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.192	0.168	0.174	0.180	0.186	0.192	0.198	0.204	0.217	0.230	0.244	0.257	0.270	0.238	0.243	0.249	0.254	0.259	0.265	0.270	0.275	0.281	0.286	0.291	0.297	0.302	0.307	0.313	0.318	0.323	0.328	0.334	0.339	0.347	0.356	0.364	0.372	0.380	0.389	0.397	0.405	0.422
Accident Costs	136.291		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	13.343	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	16.125	16.331	16.538	16.744	16.951	17.157	17.364	17.570	17.777	17.983	18.151	18.320	18.488	18.656	18.824	18.993	19.161	19.329	19.497	19.666	19.847	20.029	20.210	20.392	20.574	20.755	20.937	21.118	21.482
TOTAL USER COSTS	2124.971		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	221.607	218.369	224.945	231.176	237.406	243.637	249.867	256.098	263.648	271.198	278.748	286.298	293.848	296.101	299.964	304.827	309.690	314.552	319.415	324.278	329.141	334.004	338.867	343.329	347.791	352.253	356.715	361.177	365.640	370.102	374.564	379.026	383.488	388.235	392.982	397.729	402.475	407.222	411.969	416.716	421.463	430.956
Benefit Stream:																																																							
Travel Time Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Travel Time Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Links	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vehicle Operating Costs - Turns	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Accident Costs	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	0.000	ERR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

OP_21																																																							
Construction Period:	1	years																																																			
Construction	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.932
Annual Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Periodic Maintenance	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.932

	mid point of year		1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
	PV of 1st yr benefits			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50 year BCR	ERR	**FYRR**	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032																								

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034	2034/ 2035	2035/ 2036	2036/ 2037	2037/ 2038	2038/ 2039	2039/ 2040	2040/ 2041	2041/ 2042	2042/ 2043	2044/ 2045	2045/ 2046	2046/ 2047	2047/ 2048	2048/ 2049	2049/ 2050	2050/ 2051	2051/ 2052
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1998		Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
BASE YEAR FOR COSTS 1997																																																								
50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048																																																								

4 lane Option A3**, grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	56.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.963	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.295	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.966	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

Note 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Option A3 grade separated intersections

OP_27	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	911.320	73.710	73.359	73.008	72.658	72.307	75.040	77.774	80.507	83.240	85.974	88.668	91.362	94.056	96.750	99.444	102.260	105.076	107.892	110.708	113.524	116.963	120.403	123.843	127.283	130.722	132.962	135.202	137.443	139.683	141.923	144.163	146.403	148.643	150.883	153.123	155.232	157.341	159.450	161.559	163.669	165.778	167.887	169.996	172.105	174.214	176.463	178.712	180.961	183.210	185.458	187.707	189.956	192.205	196.703
Travel Time Costs - Turns	34.063	2.108	2.201	2.294	2.387	2.479	2.783	3.087	3.391	3.695	3.999	3.900	3.801	3.702	3.604	3.505	3.619	3.733	3.846	3.960	4.074	4.285	4.497	4.708	4.919	5.130	5.194	5.258	5.322	5.386	5.450	5.514	5.578	5.642	5.706	5.770	5.866	5.963	6.060	6.156	6.253	6.350	6.446	6.543	6.640	6.736	6.861	6.987	7.112	7.237	7.362	7.487	7.612	7.737	7.988
Vehicle Operating Costs - Links	958.262	71.930	73.538	75.145	76.753	78.361	81.101	83.841	86.582	89.322	92.062	94.716	97.369	100.023	102.677	105.330	108.098	110.866	113.634	116.402	119.170	122.369	125.568	128.766	131.965	135.164	137.380	139.597	141.814	144.031	146.248	148.465	150.682	152.899	155.116	157.333	159.282	161.231	163.180	165.129	167.078	169.027	170.976	172.925	174.874	176.823	178.817	180.811	182.804	184.798	186.792	188.786	190.780	192.774	196.762
Vehicle Operating Costs - Turns	1.560	0.106	0.109	0.113	0.116	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.176	0.182	0.187	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253	0.256	0.260	0.263	0.266	0.269	0.273	0.276	0.279	0.282	0.287	0.292	0.296	0.301	0.306	0.311	0.315	0.320	0.325	0.330	0.336	0.342	0.348	0.354	0.361	0.367	0.373	0.379	0.392
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.967	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.396	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2028.633	160.170	160.987	161.805	162.622	163.440	169.007	174.574	180.141	185.708	191.275	197.270	203.512	209.755	215.997	222.487	228.580	234.673	240.766	246.860	252.953	260.283	267.613	274.943	282.273	289.603	294.391	299.178	303.966	308.753	313.540	318.328	323.115	327.903	332.690	337.477	341.857	346.236	350.616	354.996	359.375	363.754	368.134	372.513	376.893	381.272	385.871	390.471	395.070	399.669	404.269	408.868	413.467	418.066	427.265
	Opening (from Time 0)																																																							
User Cost Stream:	**Years:**	**16**	**, weeks**	**0**																																																			
Travel Time Costs - Links	988.598		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	107.892	110.708	113.524	116.963	120.403	123.843	127.283	130.722	132.962	135.202	137.443	139.683	141.923	144.163	146.403	148.643	150.883	153.123	155.232	157.341	159.450	161.559	163.669	165.778	167.887	169.996	172.105	174.214	176.463	178.712	180.961	183.210	185.458	187.707	189.956	192.205	196.703
Travel Time Costs - Turns	37.309		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	3.846	3.960	4.074	4.285	4.497	4.708	4.919	5.130	5.194	5.258	5.322	5.386	5.450	5.514	5.578	5.642	5.706	5.770	5.866	5.963	6.060	6.156	6.253	6.350	6.446	6.543	6.640	6.736	6.861	6.987	7.112	7.237	7.362	7.487	7.612	7.737	7.988
Vehicle Operating Costs - Links	974.224		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	113.634	116.402	119.170	122.369	125.568	128.766	131.965	135.164	137.380	139.597	141.814	144.031	146.248	148.465	150.682	152.899	155.116	157.333	159.282	161.231	163.180	165.129	167.078	169.027	170.976	172.925	174.874	176.823	178.817	180.811	182.804	184.798	186.792	188.786	190.780	192.774	196.762
Vehicle Operating Costs - Turns	1.716		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.187	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253	0.256	0.260	0.263	0.266	0.269	0.273	0.276	0.279	0.282	0.287	0.292	0.296	0.301	0.306	0.311	0.315	0.320	0.325	0.330	0.336	0.342	0.348	0.354	0.361	0.367	0.373	0.379	0.392
Accident Costs	143.096		12.547	12.778	13.008	13.239	12.966	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601	18.864	19.127	19.390	19.654	19.917	20.180	20.443	20.706	20.970	21.190	21.410	21.630	21.850	22.070	22.290	22.510	22.730	22.950	23.170	23.396	23.620	23.845	24.070	24.295	24.520	24.745	24.970	25.421
TOTAL USER COSTS	2144.943		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	240.766	246.860	252.953	260.283	267.613	274.943	282.273	289.603	294.391	299.178	303.966	308.753	313.540	318.328	323.115	327.903	332.690	337.477	341.857	346.236	350.616	354.996	359.375	363.754	368.134	372.513	376.893	381.272	385.871	390.471	395.070	399.669	404.269	408.868	413.467	418.066	427.265
Benefit Stream:																																																							
Travel Time Costs - Links	95.796	75.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	19.466	20.741	22.016	24.931	27.847	30.762	33.677	36.592	39.845	43.099	46.352	49.606	52.859	56.113	59.366	62.620	65.873	69.126	74.941	80.755	86.569	92.384	98.198	104.012	109.826	115.641	121.455	127.269	136.110	144.951	153.792	162.633	171.474	180.315	189.156	197.997	215.679
Travel Time Costs - Turns	18.425	14.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.133	2.371	2.609	3.425	4.241	5.056	5.872	6.688	7.500	8.313	9.125	9.938	10.750	11.563	12.375	13.187	14.000	14.812	16.212	17.613	19.013	20.413	21.813	23.213	24.613	26.013	27.413	28.813	31.159	33.504	35.850	38.195	40.541	42.886	45.232	47.577	52.268
Vehicle Operating Costs - Links	6.884	5.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.021	3.069	3.116	3.160	3.203	3.247	3.291	3.334	3.413	3.492	3.571	3.650	3.729	3.807	3.886	3.965	4.044	4.123	3.950	3.777	3.604	3.431	3.258	3.085	2.912	2.739	2.566	2.393	2.170	1.947	1.724	1.502	1.279	1.056	0.833	0.610	0.164
Vehicle Operating Costs - Turns	0.898	0.7%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104	0.116	0.128	0.168	0.207	0.247	0.287	0.327	0.366	0.406	0.445	0.485	0.524	0.564	0.603	0.643	0.682	0.722	0.790	0.858	0.926	0.994	1.062	1.130	1.198	1.266	1.333	1.401	1.516	1.630	1.744	1.858	1.972	2.086	2.201	2.315	2.543
Accident Costs	9.990	7.9%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711	4.819	4.927	5.035	5.143	5.251	5.359	5.467	5.575	5.682	5.778	5.875	5.971	6.067	6.163	6.259	6.355	6.451	6.547	6.643	6.724	6.805	6.886	6.967	7.048	7.129	7.210	7.290	7.452
TOTAL USER BENEFITS	131.993	1.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.622	30.289	31.957	35.874	39.792	43.709	47.627	51.544	55.836	60.128	64.421	68.713	73.005	77.297	81.590	85.882	90.174	94.466	101.672	108.877	116.082	123.288	130.493	137.699	144.904	152.109	159.315	166.520	177.679	188.837	199.996	211.155	222.313	233.472	244.631	255.789	278.107
WTP via Rates	0.479		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	132.472		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.851	30.518	32.186	36.103	40.021	43.938	47.856	51.773	56.065	60.357	64.650	68.942	73.234	77.526	81.819	86.111	90.403	94.696	101.901	109.106	116.311	123.517	130.722	137.928	145.133	152.338	159.544	166.749	177.908	189.066	200.225	211.384	222.542	233.701	244.860	256.018	278.336

OP_27																																																							
Construction Period:	**3.0**	**years**																																																				
Construction	24.442		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.875	34.875	31.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.079		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Periodic Maintenance	0.530		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	25.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	34.875	34.875	31.750	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	0.038	0.038	0.038	0.038	0.038	0.038
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33415	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
		PV of 1st yr benefits		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.44232	5.23356	5.01776	5.11679	5.15635	5.14644	5.0967	5.01167	4.93378	4.828635	4.701834	4.55818	4.401788	4.23616	4.064267	3.888618	3.711316	3.534114	3.457296	3.365237	3.261343	3.148528	3.029271	2.905676	2.779518	2.652283	2.525211	2.399324	2.327167	2.2483	2.16454	2.077429	1.988267	1.898147	1.807981	1.718521	1.69847818
50 year BCR	5.3	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.72%	20.89%	20.03%	20.43%	20.58%	20.54%	20.34%	20.01%	19.69%	19.28%	18.77%	18.20%	17.57%	16.91%	16.22%	15.52%	14.81%	14.11%	13.80%	13.43%	13.02%	12.57%	12.09%	11.60%	11.10%	10.59%	10.08%	9.58%	9.29%	8.97%	8.64%	8.29%	7.94%	7.58%	7.22%	6.86%	6.78%
25 Year BCR from first year of construction			2.0	2.2	2.4	2.5	2.7	2.9	3.1	3.2	3.4	3.5	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.6	4.7	4.8	4.9	4.9	5.0	5.1	5.2	5.3	5.4	5.4	5.5																								
25 Year PVB from first year of construction			48.407	53.471	58.403	63.183	67.800	72.243	76.506	80.584	84.476	88.183	91.809	95.339	98.759	102.061	105.238	108.296	111.201	113.983	116.631	119.148	121.589	123.947	126.217	128.396	130.481	132.472	134.368	136.170	137.952																								
25 Year PVC from first year of construction			24.749	24.838	24.841	24.944	24.946	24.948	24.950	24.952	24.953	24.955	24.956	24.991	24.992	25.031	25.032	25.033	25.034	25.035	25.035	25.036	25.036	25.050	25.050	25.051	25.051	25.051	25.051	25.052	25.052																								
25 Year PVB excl WTP from first year of construction			48.120																																																				
25 Year PVB of WTP from first year of construction			0.267																																																				

23 (24 + 4 lane TM-Domain - opening in 3 yrs) minus 24 (A3 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																																																							
Travel Time Costs - Links	6.326	109.6%	0.000	0.000	0.000	0.513	0.518	0.523	0.527	0.532	0.537	0.552	0.568	0.584	0.599	0.615	0.637	0.658	0.680	0.702	0.723	0.784	0.845	0.906	0.966	1.027	1.154	1.280	1.407	1.534	1.661	1.787	1.914	2.041	2.168	2.294	2.640	2.985	3.331	3.676	4.022	4.368	4.713	5.059	5.404	5.750	6.286	6.822	7.358	7.893	8.429	8.965	9.501	10.037	11.109
Travel Time Costs - Turns	0.999	17.3%	0.000	0.000	0.000	-0.096	-0.089	-0.082	-0.075	-0.068	-0.061	-0.050	-0.038	-0.026	-0.015	-0.003	0.018	0.040	0.061	0.083	0.104	0.220	0.337	0.453	0.569	0.685	0.730	0.775	0.819	0.864	0.909	0.953	0.998	1.043	1.087	1.132	1.172	1.211	1.251	1.291	1.330	1.370	1.410	1.449	1.489	1.529	1.570	1.612	1.653	1.695	1.736	1.778	1.819	1.861	1.944
Vehicle Operating Costs - Links	-2.170	-37.6%	0.000	0.000	0.000	-0.214	-0.221	-0.229	-0.236	-0.243	-0.250	-0.257	-0.263	-0.269	-0.276	-0.282	-0.297	-0.312	-0.327	-0.343	-0.358	-0.363	-0.368	-0.373	-0.379	-0.384	-0.395	-0.406	-0.417	-0.429	-0.440	-0.451	-0.462	-0.473	-0.484	-0.495	-0.499	-0.502	-0.505	-0.507	-0.510	-0.513	-0.516	-0.519	-0.522	-0.525	-0.532	-0.538	-0.544	-0.551	-0.557	-0.563	-0.570	-0.576	-0.589
Vehicle Operating Costs - Turns	0.062	1.1%	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.005	0.007	0.012	0.017	0.022	0.028	0.033	0.035	0.037	0.039	0.041	0.043	0.045	0.046	0.048	0.050	0.052	0.055	0.057	0.059	0.061	0.064	0.066	0.068	0.070	0.073	0.075	0.077	0.079	0.080	0.082	0.084	0.086	0.088	0.089	0.093
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	5.217	0.904	0.000	0.000	0.000	0.201	0.206	0.211	0.216	0.220	0.225	0.246	0.267	0.288	0.309	0.330	0.359	0.388	0.418	0.447	0.476	0.653	0.830	1.007	1.184	1.361	1.523	1.686	1.848	2.010	2.172	2.334	2.496	2.659	2.821	2.983	3.368	3.752	4.137	4.521	4.906	5.290	5.675	6.059	6.444	6.828	7.401	7.974	8.547	9.120	9.692	10.265	10.838	11.411	12.557
OP_23																																																							
Construction Period:	**2**	**years**																																																				
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006

25 Year BCR from first year of construction 2.362
25 Year PVB from first year of construction 46.102
25 Year PVC from first year of construction 19.518

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/1998	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	2031/2032	2032/2033	2033/2034	2034/2035	2035/2036	2036/2037	2037/2038	2038/2039	2039/2040	2040/2041	2041/2042	2042/2043	2044/2045	2045/2046	2046/2047	2047/2048	2048/2049	2049/2050	2050/2051	2051/2052
ANALYSIS YEAR	10%	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
TIME ZERO 1 July 1996		Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52

BASE YEAR FOR COSTS 1997

50 YEAR ANALYSIS PERIOD 1/7/1998-30/6/2048

4 lane Existing Route including 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	55.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.963	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.296	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

4 lane Option A3 grade separated intersections

Note 2006 Accident Costs factored by 0.75 to account for long term trends

DM_17	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1013.373	73.710	75.498	77.285	79.073	80.861	83.901	86.942	89.982	93.023	96.063	99.059	102.055	105.051	108.046	111.042	114.283	117.523	120.763	124.004	127.244	131.140	135.036	138.932	142.827	146.723	149.671	152.620	155.568	158.517	161.465	164.413	167.362	170.310	173.259	176.207	179.562	182.916	186.271	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	223.658	228.293	232.927	237.562	242.196	246.831	256.100
Travel Time Costs - Turns	52.009	2.108	2.421	2.735	3.048	3.362	3.702	4.042	4.382	4.722	5.062	5.015	4.967	4.919	4.871	4.823	5.057	5.291	5.524	5.758	5.991	6.527	7.062	7.597	8.133	8.668	9.260	9.853	10.445	11.037	11.630	12.222	12.815	13.407	13.999	14.592	15.559	16.526	17.494	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.738	31.562	33.387	35.211	37.035	38.859	42.508
Vehicle Operating Costs - Links	984.558	71.930	74.132	76.334	78.537	80.739	83.565	86.392	89.218	92.045	94.871	97.602	100.333	103.063	105.794	108.525	111.395	114.266	117.137	120.008	122.878	126.165	129.452	132.738	136.025	139.311	141.567	143.823	146.079	148.335	150.591	152.846	155.102	157.358	159.614	161.870	163.902	165.935	167.968	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.028	189.971	191.915	193.858	195.802	197.745	201.632
Vehicle Operating Costs - Turns	2.435	0.106	0.120	0.134	0.149	0.163	0.170	0.177	0.184	0.191	0.198	0.206	0.214	0.222	0.230	0.238	0.248	0.259	0.270	0.280	0.291	0.317	0.344	0.371	0.398	0.424	0.453	0.482	0.511	0.539	0.568	0.597	0.626	0.655	0.683	0.712	0.759	0.806	0.853	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.447	1.536	1.625	1.714	1.802	1.891	2.069
Accident Costs	148.468	12.317	12.372	12.427	12.482	12.534	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821	23.185	23.548	23.912	24.276	24.640	25.004	25.368	25.731	26.095	26.404	26.712	27.020	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2200.844	160.170	164.543	168.916	173.289	177.562	183.610	189.557	195.505	201.452	207.400	213.995	220.893	227.790	234.688	241.889	248.720	255.550	262.381	269.212	276.043	284.351	292.659	300.967	309.275	317.584	323.773	329.962	336.151	342.340	348.530	354.719	360.908	367.097	373.286	379.476	386.186	392.896	399.606	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	472.969	481.766	490.564	499.361	508.159	516.956	534.551
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	37	weeks	0																																																			
Travel Time Costs - Links	1066.073		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	189.626	192.981	196.335	199.690	203.045	206.400	209.754	214.389	219.023	223.658	228.293	232.927	237.562	242.196	246.831	256.100
Travel Time Costs - Turns	53.495		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.963	18.829	19.706	20.582	22.079	23.575	25.072	18.461	19.429	20.396	21.363	22.331	23.298	24.266	26.090	27.914	29.738	31.562	33.387	35.211	37.035	38.859	42.508
Vehicle Operating Costs - Links	981.643		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	170.001	172.034	174.066	176.099	178.132	180.165	182.198	184.141	186.085	188.028	189.971	191.915	193.858	195.802	197.745	201.632
Vehicle Operating Costs - Turns	2.505		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.196	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	0.900	0.946	0.993	1.040	1.087	1.134	1.180	1.269	1.358	1.447	1.536	1.625	1.714	1.802	1.891	2.069
Accident Costs	152.957		12.547	12.778	13.008	13.239	12.965	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.329	27.637	27.945	28.254	28.562	28.870	29.179	29.485	29.791	30.098	30.404	30.711	31.017	31.324	31.630	32.243
TOTAL USER COSTS	2256.675		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	406.316	413.026	419.736	426.446	433.156	439.866	446.576	455.374	464.171	472.969	481.766	490.564	499.361	508.159	516.956	534.551
Benefit Stream:																																																							
Travel Time Costs - Links	18.320	14.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	64.317	68.886	73.454	78.023	82.592	87.160	91.729	98.184	104.640	111.095	117.550	124.005	130.461	136.916	143.371	156.282
Travel Time Costs - Turns	2.238	1.8%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.108	8.637	9.166	9.696	10.225	10.755	11.284	11.930	12.577	13.223	13.870	14.516	15.163	15.809	16.455	17.748
Vehicle Operating Costs - Links	-0.535	-0.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-1.441	-1.698	-1.955	-2.211	-2.468	-2.725	-2.982	-3.154	-3.327	-3.499	-3.671	-3.844	-4.016	-4.189	-4.361	-4.706
Vehicle Operating Costs - Turns	0.109	0.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.395	0.421	0.447	0.473	0.499	0.525	0.551	0.582	0.614	0.645	0.677	0.708	0.740	0.771	0.803	0.866
Accident Costs	0.129	0.1%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.588	0.596	0.603	0.611	0.619	0.626	0.634	0.634	0.633	0.633	0.632	0.632	0.632	0.631	0.631	0.630
TOTAL USER BENEFITS	20.261	0.160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.967	76.842	81.717	86.591	91.466	96.341	101.216	108.176	115.137	122.097	129.057	136.018	142.978	149.939	156.899	170.820
WTP via Rates	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	20.261		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.967	76.842	81.717	86.591	91.466	96.341	101.216	108.176	115.137	122.097	129.057	136.018	142.978	149.939	156.899	170.820

DM_17																																																							
Construction Period:	2.0	years																																																					
Construction	4.971		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.966	60.169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.016		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
Periodic Maintenance	0.115		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.758	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.970	0.000	2.758	0.000	0.000	0.000	0.000
TOTAL COST	5.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.966	60.169	0.074	2.832	0.074	0.074	0.074	0.074	0.074	0.074	0.074	2.044	0.074	2.832	0.074	0.074	0.074	0.074

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.83449	1.780683	1.721499	1.658358	1.592471	1.524858	1.456377	1.415026	1.369158	1.319935	1.268346	1.215229	1.161287	1.107109	1.053185	1.04238937
50 year BCR	4.0	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	35.96%	34.90%	33.74%	32.51%	31.21%	29.89%	28.55%	27.74%	26.84%	25.87%	24.86%	23.82%	22.76%	21.70%	20.64%	20.43%
25 Year BCR from first year of construction			ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	ERR	0.0	0.0	0.4	0.8	1.1	1.5	1.8	2.1	2.4	2.7	3.0	3.2	3.5	3.7	4.0	4.2	4.4	4.6																								
25 Year PVB from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.924	3.792	5.597	7.336	9.007	10.606	12.133	13.617	15.053	16.438	17.768	19.043	20.261	21.422	22.526	23.620																								
25 Year PVC from first year of construction			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.201	4.971	4.973	5.042	5.043	5.045	5.046	5.048	5.049	5.050	5.051	5.074	5.075	5.101	5.102	5.102	5.103	5.103																								

4 lane Sandhills Option (17.35km), grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021										2031										2041									2051
DM_12	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	1084.393		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808	178.301	183.795	189.288	194.782	200.275	205.769	211.262	216.756	222.249	230.173	238.096	246.020	253.943	261.866	269.790	277.713	285.637	293.560	301.483	312.573	323.663	334.753	345.843	356.932	368.022	379.112	390.202	412.382
Travel Time Costs - Turns	55.734		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694	13.571	14.447	15.324	16.200	17.076	17.963	18.829	19.706	20.582	22.079	23.575	25.072	26.569	28.066	29.562	31.059	32.556	34.053	35.549	38.020	40.491	42.961	45.432	47.903	50.373	52.844	55.315	60.256
Vehicle Operating Costs - Links	981.108		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794	143.089	145.385	147.681	149.977	152.273	154.568	156.864	159.160	161.456	163.232	165.008	166.784	168.560	170.336	172.112	173.888	175.664	177.440	179.216	180.987	182.758	184.529	186.300	188.071	189.842	191.613	193.384	196.926
Vehicle Operating Costs - Turns	2.615		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619	0.662	0.705	0.748	0.790	0.833	0.876	0.919	0.961	1.004	1.077	1.150	1.222	1.296	1.368	1.440	1.513	1.586	1.658	1.731	1.851	1.972	2.092	2.213	2.333	2.453	2.574	2.694	2.935
Accident Costs	153.086		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312	23.683	24.054	24.425	24.797	25.168	25.539	25.910	26.281	26.652	26.968	27.284	27.600	27.916	28.232	28.548	28.864	29.180	29.497	29.813	30.119	30.425	30.731	31.037	31.343	31.649	31.955	32.261	32.873
TOTAL USER COSTS	2276.935	0.000	164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227	359.307	368.386	377.466	386.545	395.625	404.705	413.784	422.864	431.944	443.528	455.113	466.698	478.283	489.868	501.453	513.038	524.623	536.207	547.792	563.550	579.308	595.066	610.824	626.582	642.340	658.098	673.856	705.371

4 lane Sandhills Option grade separated intersections

Note, 2006 Accident Costs factored by 0.75 to account for long term trends

OP_27	Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Travel Time Costs - Links	938.660	75.921	75.560	75.199	74.837	74.476	77.292	80.107	82.922	85.737	88.553	91.328	94.103	96.878	99.653	102.428	105.328	108.228	111.129	114.029	116.929	120.472	124.015	127.558	131.101	134.644	136.951	139.259	141.566	143.873	146.180	148.488	150.796	153.102	155.409	157.717	159.889	162.061	164.234	166.406	168.579	170.751	172.923	175.096	177.268	179.441	181.757	184.073	186.389	188.706	191.022	193.338	195.655	197.971	202.604
Travel Time Costs - Turns	32.861	2.171	2.267	2.363	2.458	2.554	2.661	2.768	2.875	2.982	3.089	3.190	3.297	3.401	3.506	3.610	3.727	3.845	3.962	4.079	4.196	4.414	4.631	4.849	5.067	5.284	5.350	5.416	5.482	5.547	5.613	5.679	5.745	5.811	5.877	5.943	6.042	6.142	6.241	6.341	6.440	6.540	6.640	6.739	6.839	6.938	7.067	7.196	7.325	7.454	7.583	7.712	7.841	7.970	8.227
Vehicle Operating Costs - Links	987.010	74.088	75.744	77.400	79.056	80.712	83.534	86.357	89.179	92.001	94.824	97.557	100.290	103.024	105.757	108.490	111.341	114.192	117.043	119.895	122.746	126.040	129.335	132.629	135.924	139.218	141.502	143.785	146.069	148.352	150.636	152.919	155.202	157.486	159.769	162.053	164.060	166.068	168.075	170.083	172.090	174.098	176.105	178.112	180.120	182.127	184.181	186.235	188.289	190.342	192.396	194.450	196.504	198.557	202.665
Vehicle Operating Costs - Turns	1.597	0.109	0.112	0.116	0.119	0.123	0.128	0.133	0.138	0.143	0.148	0.154	0.159	0.165	0.170	0.176	0.182	0.187	0.193	0.198	0.204	0.215	0.225	0.236	0.247	0.257	0.261	0.264	0.267	0.271	0.274	0.277	0.281	0.284	0.287	0.291	0.296	0.300	0.305	0.310	0.315	0.320	0.325	0.330	0.335	0.339	0.346	0.352	0.359	0.365	0.372	0.378	0.384	0.391	0.404
Accident Costs	127.141	12.686	12.134	11.582	11.030	10.478	10.256	10.034	9.813	9.591	9.369	10.132	11.150	12.168	13.186	14.458	14.859	15.261	15.663	16.064	16.466	16.950	17.435	17.919	18.403	18.887	19.159	19.430	19.701	19.972	20.243	20.514	20.785	21.057	21.328	21.599	21.825	22.052	22.279	22.505	22.732	22.958	23.185	23.412	23.638	23.865	24.097	24.328	24.560	24.792	25.024	25.256	25.488	25.720	26.183
TOTAL USER COSTS	2087.268	164.975	165.817	166.659	167.501	168.343	173.871	179.399	184.927	190.455	195.983	202.364	209.000	215.636	222.271	229.161	235.437	241.713	247.989	254.265	260.541	268.091	275.641	283.191	290.741	298.291	303.222	308.154	313.085	318.016	322.947	327.878	332.809	337.740	342.671	347.602	352.113	356.623	361.134	365.645	370.156	374.667	379.178	383.689	388.200	392.710	397.448	402.185	406.922	411.659	416.397	421.134	425.871	430.608	440.083
	Opening (from Time 0)																																																						
User Cost Stream:	Years:	22	weeks	0																																																			
Travel Time Costs - Links	1014.370		75.801	77.801	79.846	81.892	85.075	88.258	91.440	94.623	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.896	148.250	141.081	131.101	134.644	136.951	139.259	141.566	143.873	146.180	148.488	150.795	153.102	155.409	157.717	159.889	162.061	164.234	166.406	168.579	170.751	172.923	175.096	177.268	179.441	181.757	184.073	186.389	188.706	191.022	193.338	195.655	197.971	202.604
Travel Time Costs - Turns	40.178		2.184	2.261	2.337	2.413	2.783	3.152	3.522	3.891	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	7.307	5.067	5.284	5.350	5.416	5.482	5.547	5.613	5.679	5.745	5.811	5.877	5.943	6.042	6.142	6.241	6.341	6.440	6.540	6.640	6.739	6.839	6.938	7.067	7.196	7.325	7.454	7.583	7.712	7.841	7.970	8.227
Vehicle Operating Costs - Links	982.365		74.072	76.231	78.382	80.533	83.346	86.160	88.974	91.787	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.321	135.924	139.218	141.502	143.785	146.069	148.352	150.636	152.919	155.202	157.486	159.769	162.053	164.060	166.068	168.075	170.083	172.090	174.098	176.105	178.112	180.120	182.127	184.181	186.235	188.289	190.342	192.396	194.450	196.504	198.557	202.665
Vehicle Operating Costs - Turns	1.857		0.108	0.111	0.114	0.117	0.125	0.134	0.143	0.151	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.356	0.247	0.257	0.261	0.264	0.267	0.271	0.274	0.277	0.281	0.284	0.287	0.291	0.296	0.300	0.305	0.310	0.315	0.320	0.325	0.330	0.335	0.339	0.346	0.352	0.359	0.365	0.372	0.378	0.384	0.391	0.404
Accident Costs	147.446		12.547	12.778	13.008	13.239	12.955	12.672	12.388	12.105	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	19.856	18.403	18.887	19.159	19.430	19.701	19.972	20.243	20.514	20.785	21.057	21.328	21.599	21.825	22.052	22.279	22.505	22.732	22.958	23.185	23.412	23.638	23.865	24.097	24.328	24.560	24.792	25.024	25.256	25.488	25.720	26.183
TOTAL USER COSTS	2186.216		164.712	169.182	173.687	178.193	184.284	190.375	196.467	202.558	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	300.922	290.741	298.291	303.222	308.154	313.085	318.016	322.947	327.878	332.809	337.740	342.671	347.602	352.113	356.623	361.134	365.645	370.156	374.667	379.178	383.689	388.200	392.710	397.448	402.185	406.922	411.659	416.397	421.134	425.871	430.608	440.083
Benefit Stream:																																																							
Travel Time Costs - Links	70.023	56.4%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	13.523	29.858	32.670	35.856	39.043	42.229	45.415	48.601	51.788	54.974	58.160	61.347	64.533	70.284	76.035	81.786	87.537	93.288	99.039	104.790	110.541	116.292	122.043	130.816	139.590	148.363	157.137	165.910	174.684	183.457	192.231	209.778
Travel Time Costs - Turns	15.556	12.3%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.458	5.725	6.534	7.345	8.155	8.966	9.776	10.587	11.397	12.208	13.018	13.829	14.639	16.036	17.434	18.831	20.228	21.625	23.022	24.420	25.817	27.214	28.611	30.953	33.296	35.636	37.978	40.320	42.662	45.003	47.345	52.029
Vehicle Operating Costs - Links	-1.257	-1.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.308	-0.668	-0.721	-0.708	-0.696	-0.684	-0.671	-0.659	-0.646	-0.634	-0.622	-0.609	-0.597	-0.828	-1.060	-1.291	-1.523	-1.754	-1.986	-2.217	-2.449	-2.680	-2.911	-3.194	-3.477	-3.760	-4.042	-4.325	-4.608	-4.891	-5.173	-5.739
Vehicle Operating Costs - Turns	0.758	0.6%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.280	0.319	0.358	0.398	0.437	0.477	0.516	0.556	0.595	0.635	0.674	0.713	0.781	0.849	0.917	0.985	1.053	1.120	1.188	1.256	1.324	1.392	1.506	1.619	1.733	1.847	1.961	2.075	2.189	2.303	2.531
Accident Costs	5.639	4.5%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.938	3.964	4.053	4.153	4.253	4.353	4.453	4.553	4.653	4.753	4.853	4.963	5.053	5.143	5.232	5.322	5.411	5.501	5.590	5.679	5.769	5.858	5.948	6.022	6.096	6.170	6.245	6.319	6.393	6.467	6.541	6.690
TOTAL USER BENEFITS	90.720	0.718	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	17.730	39.158	42.856	47.004	51.153	55.302	59.450	63.599	67.747	71.896	76.045	80.193	84.342	91.416	98.490	105.564	112.638	119.712	126.786	133.860	140.934	148.008	155.082	166.103	177.123	188.144	199.165	210.185	221.206	232.227	243.247	265.289
WTP via Rates	0.290		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	91.010		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	17.959	39.387	43.085	47.233	51.382	55.531	59.679	63.828	67.976	72.125	76.274	80.422	84.571	91.645	98.719	105.793	112.867	119.941	127.015	134.089	141.163	148.237	155.311	166.332	177.352	188.373	199.394	210.414	221.435	232.456	243.476	265.518

OP_27																																																							
Construction Period:	4.0	years																																																					
Construction	19.051		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.792	31.792	28.667	28.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.048		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Periodic Maintenance	0.321		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440
TOTAL COST	19.420	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.792	31.792	28.667	28.667	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5	26.5	27.5	28.5	29.5	30.5	31.5	32.5	33.5	34.5	35.5	36.5	37.5	38.5	39.5	40.5	41.5	42.5	43.5	44.5	45.5	46.5	47.5	48.5	49.5	50.5	51.5	52.5	53.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088	0.080001	0.072728	0.066116	0.060106	0.054642	0.049674	0.045158	0.041053	0.037321	0.033928	0.030844	0.02804	0.025491	0.023173	0.021067	0.019152	0.01741	0.015828	0.014389	0.013081	0.011892	0.010811	0.009828	0.008934	0.008122	0.007384	0.006712	0.00610227
PV of 1st yr benefits				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.10357	4.194	4.17065	4.15658	4.110601	4.03863	3.945773	3.836421	3.714342	3.582753	3.444392	3.301579	3.156265	3.109339	3.04486	2.966408	2.877056	2.779433	2.675783	2.568008	2.457714	2.346251	2.234742	2.175742	2.109001	2.036413	1.959593	1.87991	1.798521	1.716393	1.634333	1.62025962
50 year BCR	4.7	FYRR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.83%	21.60%	21.48%	21.40%	21.17%	20.80%	20.32%	19.75%	19.13%	18.45%	17.74%	17.00%	16.25%	16.01%	15.68%	15.27%	14.81%	14.31%	13.78%	13.22%	12.66%	12.08%	11.51%	11.20%	10.86%	10.49%	10.09%	9.68%	9.26%	8.84%	8.42%	8.34%
25 Year BCR from first year of construction			0.8	1.0	1.2	1.5	1.7	1.9	2.1	2.2	2.4	2.6	2.8	2.9	3.1	3.2	3.4	3.5	3.7	3.8	3.9	4.0	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0																								
25 Year PVB from first year of construction			15.339	19.650	23.886	28.024	32.048	35.943	39.701	43.313	46.776	50.086	53.348	56.541	59.652	62.670	65.585	68.391	71.085	73.662	76.123	78.467	80.749	82.961	85.096	87.152	89.123	91.010	92.810	94.524	96.223																								
25 Year PVC from first year of construction			19.228	19.232	19.234	19.237	19.239	19.242	19.297	19.299	19.363	19.364	19.365	19.367	19.368	19.369	19.370	19.371	19.392	19.393	19.417	19.418	19.418	19.419	19.419	19.420	19.420	19.420	19.429	19.429	19.438																								

25 Year PVB excl WTP from first year of construction 15.241

25 Year PVB of WTP from first year of construction 0.098

23 (24 + 4 lane TM-Domain - opening in 3 yrs) minus 24 (A3 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																																																							
Travel Time Costs - Links	6.326	109.6%	0.000	0.000	0.000	0.513	0.518	0.523	0.527	0.532	0.537	0.552	0.568	0.584	0.599	0.615	0.637	0.658	0.680	0.702	0.723	0.784	0.845	0.906	0.966	1.027	1.154	1.280	1.407	1.534	1.661	1.787	1.914	2.041	2.168	2.294	2.640	2.985	3.331	3.676	4.022	4.368	4.713	5.059	5.404	5.750	6.286	6.822	7.358	7.893	8.429	8.965	9.501	10.037	11.109
Travel Time Costs - Turns	0.999	17.3%	0.000	0.000	0.000	-0.096	-0.089	-0.082	-0.075	-0.068	-0.061	-0.050	-0.038	-0.026	-0.015	-0.003	0.018	0.040	0.061	0.083	0.104	0.220	0.337	0.453	0.569	0.686	0.730	0.775	0.819	0.864	0.909	0.953	0.998	1.043	1.087	1.132	1.172	1.211	1.251	1.291	1.330	1.370	1.410	1.449	1.489	1.529	1.570	1.612	1.653	1.695	1.736	1.778	1.819	1.861	1.944
Vehicle Operating Costs - Links	-2.170	-37.6%	0.000	0.000	0.000	-0.214	-0.221	-0.229	-0.236	-0.243	-0.250	-0.257	-0.263	-0.269	-0.276	-0.282	-0.297	-0.312	-0.327	-0.343	-0.358	-0.363	-0.368	-0.373	-0.379	-0.384	-0.395	-0.406	-0.417	-0.429	-0.440	-0.451	-0.462	-0.473	-0.484	-0.496	-0.499	-0.502	-0.505	-0.507	-0.510	-0.513	-0.516	-0.519	-0.522	-0.525	-0.532	-0.538	-0.544	-0.551	-0.557	-0.563	-0.570	-0.576	-0.589
Vehicle Operating Costs - Turns	0.062	1.1%	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.005	0.007	0.012	0.017	0.022	0.028	0.033	0.036	0.037	0.039	0.041	0.043	0.045	0.046	0.048	0.050	0.052	0.055	0.057	0.059	0.061	0.064	0.066	0.068	0.070	0.073	0.075	0.077	0.079	0.080	0.082	0.084	0.086	0.088	0.089	0.093
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	5.217	0.904	0.000	0.000	0.000	0.201	0.206	0.211	0.216	0.220	0.225	0.246	0.267	0.288	0.309	0.330	0.359	0.388	0.418	0.447	0.476	0.653	0.830	1.007	1.184	1.361	1.523	1.686	1.848	2.010	2.172	2.334	2.496	2.659	2.821	2.983	3.368	3.752	4.137	4.521	4.906	5.290	5.675	6.059	6.444	6.828	7.401	7.974	8.547	9.120	9.692	10.265	10.838	11.411	12.557
OP_23																																																							
Construction Period:	2	years																																																					
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006

25 Year BCR from first year of construction 0.931 includes WTP

25 Year PVB from first year of construction 13.033 12.935

25 Year PVC from first year of construction 13.998

25 YEAR BENEFIT COST RATIO EVALUATION

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BASE YEAR FOR COSTS: 1997																											
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																											

4 lane Option A3, grade separated intersections, 4 laning Te Maunga to Domain

		1997				**2001**					**2006**					**2011**					**2016**					**2021**	
DM_12	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	1086.114		75.801	78.012	80.163	82.314	85.518	88.721	91.924	95.127	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808
Travel Time Costs - Turns	58.552		2.184	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694
Vehicle Operating Costs - Links	981.062		74.072	76.227	78.375	80.524	83.335	86.147	88.958	91.770	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794
Vehicle Operating Costs - Turns	2.755		0.108	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619
Accident Costs	151.680		12.547	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312
TOTAL USER COSTS	**2280.163**	**0.000**	164.712	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Option A3 grade separated intersections

OP_27	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	911.320	**73.710**	73.359	73.008	72.658	**72.307**	75.040	77.774	80.507	83.240	**85.974**	88.668	91.362	94.056	96.750	**99.444**	102.260	105.076	107.892	110.708	**113.524**	116.963	120.403	123.843	127.283	**130.722**	132.962
Travel Time Costs - Turns	34.063	**2.108**	2.201	2.294	2.387	**2.479**	2.783	3.087	3.391	3.695	**3.999**	3.900	3.801	3.702	3.604	**3.505**	3.619	3.733	3.846	3.960	**4.074**	4.285	4.497	4.708	4.919	**5.130**	5.194
Vehicle Operating Costs - Links	958.262	**71.930**	73.538	75.145	76.753	**78.361**	81.101	83.841	86.582	89.322	**92.062**	94.716	97.369	100.023	102.677	**105.330**	108.098	110.866	113.634	116.402	**119.170**	122.369	125.568	128.766	131.965	**135.164**	137.380
Vehicle Operating Costs - Turns	1.550	**0.106**	0.109	0.113	0.116	**0.119**	0.124	0.129	0.134	0.139	**0.144**	0.149	0.155	0.160	0.166	**0.171**	0.176	0.182	0.187	0.193	**0.198**	0.208	0.219	0.229	0.240	**0.250**	0.253
Accident Costs	123.437	**12.317**	11.781	11.245	10.709	**10.173**	9.957	9.742	9.527	9.311	**9.096**	9.837	10.825	11.813	12.801	**14.037**	14.427	14.817	15.206	15.596	**15.986**	16.457	16.927	17.397	17.867	**18.337**	18.601
TOTAL USER COSTS	**2028.633**	**160.170**	160.987	161.805	162.622	163.440	169.007	174.574	180.141	185.708	191.275	197.270	203.512	209.755	215.997	222.487	228.580	234.673	240.766	246.860	252.953	260.283	267.613	274.943	282.273	289.603	294.391
	Opening (from Time 0)																										
User Cost Stream:	**Years:**	**3**	**, weeks**	**0**																							
Travel Time Costs - Links	923.314		75.801	78.012	80.163	72.307	75.040	77.774	80.507	83.240	85.974	88.668	91.362	94.056	96.750	99.444	102.260	105.076	107.892	110.708	113.524	116.963	120.403	123.843	127.283	130.722	132.962
Travel Time Costs - Turns	34.716		2.184	2.636	2.900	2.479	2.783	3.087	3.391	3.695	3.999	3.900	3.801	3.702	3.604	3.505	3.619	3.733	3.846	3.960	4.074	4.285	4.497	4.708	4.919	5.130	5.194
Vehicle Operating Costs - Links	960.860		74.072	76.227	78.375	78.361	81.101	83.841	86.582	89.322	92.062	94.716	97.369	100.023	102.677	105.330	108.098	110.866	113.634	116.402	119.170	122.369	125.568	128.766	131.965	135.164	137.380
Vehicle Operating Costs - Turns	1.583		0.108	0.130	0.142	0.119	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.176	0.182	0.187	0.193	0.198	0.208	0.219	0.229	0.240	0.250	0.253
Accident Costs	126.760		12.547	12.589	12.725	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601
TOTAL USER COSTS	**2047.233**		164.712	169.593	174.305	163.440	169.007	174.574	180.141	185.708	191.275	197.270	203.512	209.755	215.997	222.487	228.580	234.673	240.766	246.860	252.953	260.283	267.613	274.943	282.273	289.603	294.391
Benefit Stream:																											
Travel Time Costs - Links	162.800	69.9%	0.000	0.000	0.000	10.007	10.477	10.947	11.417	11.887	12.357	13.013	13.670	14.327	14.984	15.641	16.916	18.191	19.466	20.741	22.016	24.931	27.847	30.762	33.677	36.592	39.845
Travel Time Costs - Turns	23.836	10.2%	0.000	0.000	0.000	0.684	0.740	0.795	0.851	0.906	0.962	1.053	1.144	1.236	1.327	1.419	1.657	1.895	2.133	2.371	2.609	3.425	4.241	5.056	5.872	6.688	7.500
Vehicle Operating Costs - Links	20.202	8.7%	0.000	0.000	0.000	2.163	2.234	2.305	2.377	2.448	2.520	2.591	2.663	2.735	2.806	2.878	2.926	2.973	3.021	3.069	3.116	3.160	3.203	3.247	3.291	3.334	3.413
Vehicle Operating Costs - Turns	1.171	0.5%	0.000	0.000	0.000	0.034	0.038	0.041	0.044	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.080	0.092	0.104	0.116	0.128	0.168	0.207	0.247	0.287	0.327	0.366
Accident Costs	24.919	10.7%	0.000	0.000	0.000	2.688	2.627	2.566	2.506	2.445	2.384	2.568	2.814	3.060	3.306	3.613	3.708	3.803	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711
TOTAL USER BENEFITS	**232.929**	1.000	0.000	0.000	0.000	15.577	16.116	16.655	17.194	17.733	18.272	19.280	20.349	21.419	22.488	23.619	25.286	26.954	28.622	30.289	31.957	35.874	39.792	43.709	47.627	51.544	55.836
WTP via Rates	1.701		0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	**234.630**		0.000	0.000	0.000	15.806	16.345	16.884	17.423	17.962	18.501	19.509	20.578	21.648	22.717	23.848	25.515	27.183	28.851	30.518	32.186	36.103	40.021	43.938	47.856	51.773	56.065

OP_27																											
Construction Period:	**3.0**	**years**																									
Construction	87.315		36.055	36.055	32.930	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.282		0.000	0.000	0.000	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Periodic Maintenance	1.829		0.000	0.000	0.000	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440
TOTAL COST	89.426	0.000	36.055	36.055	32.930	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088
PV of 1st yr benefits				0	0	10.2935	9.67682	9.08722	8.52484	7.98962	7.48125	7.17159	6.87695	6.57661	6.27405	5.98758	5.82391	5.6405	5.44232	5.23355	5.01776	5.11679	5.15635	5.14644	5.0957	5.01167	4.93378
50 year BCR	2.6	**FYRR**	0.00%	0.00%	0.00%	11.51%	10.82%	10.16%	9.53%	8.93%	8.37%	8.02%	7.69%	7.35%	7.02%	6.70%	6.51%	6.31%	6.09%	5.85%	5.61%	5.72%	5.77%	5.75%	5.70%	5.60%	5.52%
25 Year BCR from first year of construction			1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.6	2.6	2.6
25 Year PVB from first year of construction			150.566	155.630	160.561	165.342	169.959	174.402	178.664	182.743	186.635	190.342	193.968	197.497	200.918	204.220	207.397	210.445	213.360	216.141	218.790	221.306	223.747	226.105	228.375	230.554	232.640
25 Year PVC from first year of construction			89.350	89.353	89.356	89.359	89.361	89.363	89.365	89.367	89.413	89.414	89.416	89.417	89.418	89.419	89.420	89.421	89.422	89.422	89.423	89.424	89.424	89.425	89.425	89.425	89.426

25 Year PVB excl WTP from first year of construction	149.057
25 Year PVB of WTP from first year of construction	1.509
25 Year BCR from first year of construction excl WTP	1.7

23 (24 + 4 lane TM-Domain - opening in 3 yrs) minus 24 (A3 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																											
Travel Time Costs - Links	6.326	109.6%	0.000	0.000	0.000	0.513	0.518	0.523	0.527	0.532	0.537	0.552	0.568	0.584	0.599	0.615	0.637	0.658	0.680	0.702	0.723	0.784	0.845	0.906	0.966	1.027	1.154
Travel Time Costs - Turns	0.999	17.3%	0.000	0.000	0.000	-0.096	-0.089	-0.082	-0.075	-0.068	-0.061	-0.050	-0.038	-0.026	-0.015	-0.003	0.018	0.040	0.061	0.083	0.104	0.220	0.337	0.453	0.569	0.685	0.730
Vehicle Operating Costs - Links	-2.170	-37.6%	0.000	0.000	0.000	-0.214	-0.221	-0.229	-0.236	-0.243	-0.250	-0.257	-0.263	-0.269	-0.276	-0.282	-0.297	-0.312	-0.327	-0.343	-0.358	-0.363	-0.368	-0.373	-0.379	-0.384	-0.395
Vehicle Operating Costs - Turns	0.062	1.1%	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.005	0.007	0.012	0.017	0.022	0.028	0.033	0.035
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	**5.217**	0.904	0.000	0.000	0.000	0.201	0.206	0.211	0.216	0.220	0.225	0.246	0.267	0.288	0.309	0.330	0.359	0.388	0.418	0.447	0.476	0.653	0.830	1.007	1.184	1.361	1.523
OP_23																											
Construction Period:	**2**	**years**																									
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216

25 Yr BCR from 1st yr of construction, excl TM-Dom, incl WTP	**1.8**	
25 Year PVB from first year of construction	148.3	146.8 (excl WTP)
25 Year PVC from first year of construction	84.120	

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TIME ZERO: 1 July 1998		Time: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
BASE YEAR FOR COSTS: 1997																											
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																											

4 lane Option B, grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021	
DM_12	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	1086.114		75.801	78.012	80.163	82.314	85.518	88.721	91.924	95.127	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808
Travel Time Costs - Turns	58.552		2.184	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694
Vehicle Operating Costs - Links	981.062		74.072	76.227	78.375	80.524	83.335	86.147	88.958	91.770	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794
Vehicle Operating Costs - Turns	2.755		0.108	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619
Accident Costs	151.680		12.547	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312
TOTAL USER COSTS	**2280.163**	**0.000**	164.712	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Option B (Swamp Route) grade separated intersections

OP_37	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	909.867	**73.710**	73.306	72.902	72.497	**72.093**	74.836	77.579	80.322	83.065	**85.808**	88.508	91.207	93.907	96.607	**99.307**	102.146	104.985	107.824	110.663	**113.502**	116.936	120.370	123.804	127.238	**130.672**	132.887
Travel Time Costs - Turns	33.817	**2.108**	2.199	2.291	2.382	**2.474**	2.775	3.076	3.378	3.679	**3.981**	3.880	3.779	3.679	3.578	**3.478**	3.589	3.701	3.813	3.925	**4.037**	4.204	4.371	4.538	4.705	**4.872**	4.974
Vehicle Operating Costs - Links	956.108	**71.930**	73.458	74.985	76.513	**78.041**	80.792	83.542	86.293	89.043	**91.794**	94.455	97.116	99.777	102.438	**105.099**	107.887	110.674	113.461	116.249	**119.036**	122.253	125.469	128.686	131.903	**135.119**	137.318
Vehicle Operating Costs - Turns	1.545	**0.106**	0.109	0.113	0.116	**0.119**	0.124	0.129	0.134	0.139	**0.144**	0.149	0.155	0.160	0.165	**0.170**	0.176	0.181	0.187	0.193	**0.198**	0.206	0.215	0.223	0.231	**0.240**	0.244
Accident Costs	123.010	**12.317**	11.771	11.225	10.679	**10.133**	9.919	9.705	9.490	9.276	**9.062**	9.800	10.785	11.770	12.755	**13.986**	14.375	14.764	15.153	15.542	**15.931**	16.401	16.871	17.340	17.810	**18.280**	18.537
TOTAL USER COSTS	**2024.346**	**160.170**	160.843	161.515	162.188	162.861	168.446	174.032	179.617	185.202	190.788	196.792	203.043	209.293	215.544	222.040	228.173	234.306	240.438	246.571	252.704	260.000	267.295	274.591	281.887	289.183	293.959
	Opening (from Time 0)																										
User Cost Stream:	**Years:**	**4**	**, weeks**	**0**																							
Travel Time Costs - Links	929.099		75.801	78.012	80.163	82.314	74.836	77.579	80.322	83.065	85.808	88.508	91.207	93.907	96.607	99.307	102.146	104.985	107.824	110.663	113.502	116.936	120.370	123.804	127.238	130.672	132.887
Travel Time Costs - Turns	34.949		2.184	2.636	2.900	3.164	2.775	3.076	3.378	3.679	3.981	3.880	3.779	3.679	3.578	3.478	3.589	3.701	3.813	3.925	4.037	4.204	4.371	4.538	4.705	4.872	4.974
Vehicle Operating Costs - Links	960.786		74.072	76.227	78.375	80.524	80.792	83.542	86.293	89.043	91.794	94.455	97.116	99.777	102.438	105.099	107.887	110.674	113.461	116.249	119.036	122.253	125.469	128.686	131.903	135.119	137.318
Vehicle Operating Costs - Turns	1.601		0.108	0.130	0.142	0.154	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.165	0.170	0.176	0.181	0.187	0.193	0.198	0.206	0.215	0.223	0.231	0.240	0.244
Accident Costs	128.243		12.547	12.589	12.725	12.861	9.919	9.705	9.490	9.276	9.062	9.800	10.785	11.770	12.755	13.986	14.375	14.764	15.153	15.542	15.931	16.401	16.871	17.340	17.810	18.280	18.537
TOTAL USER COSTS	**2054.678**		164.712	169.593	174.305	179.017	168.446	174.032	179.617	185.202	190.788	196.792	203.043	209.293	215.544	222.040	228.173	234.306	240.438	246.571	252.704	260.000	267.295	274.591	281.887	289.183	293.959
Benefit Stream:																											
Travel Time Costs - Links	157.016	69.6%	0.000	0.000	0.000	0.000	10.681	11.142	11.602	12.062	12.522	13.173	13.825	14.476	15.127	15.778	17.030	18.282	19.534	20.786	22.038	24.959	27.880	30.801	33.721	36.642	39.921
Travel Time Costs - Turns	23.603	10.5%	0.000	0.000	0.000	0.000	0.748	0.806	0.864	0.922	0.980	1.073	1.166	1.259	1.352	1.446	1.686	1.926	2.166	2.407	2.647	3.507	4.366	5.226	6.086	6.946	7.721
Vehicle Operating Costs - Links	20.276	9.0%	0.000	0.000	0.000	0.000	2.544	2.605	2.666	2.727	2.788	2.852	2.916	2.981	3.045	3.109	3.138	3.166	3.194	3.222	3.251	3.276	3.302	3.327	3.353	3.379	3.476
Vehicle Operating Costs - Turns	1.153	0.5%	0.000	0.000	0.000	0.000	0.038	0.041	0.044	0.048	0.051	0.054	0.058	0.061	0.065	0.069	0.080	0.092	0.104	0.116	0.128	0.170	0.212	0.253	0.295	0.337	0.375
Accident Costs	23.436	10.4%	0.000	0.000	0.000	0.000	2.666	2.604	2.542	2.480	2.418	2.605	2.854	3.103	3.352	3.664	3.759	3.855	3.951	4.046	4.142	4.246	4.350	4.454	4.557	4.661	4.775
TOTAL USER BENEFITS	**225.484**	1.000	0.000	0.000	0.000	0.000	16.677	17.197	17.718	18.239	18.759	19.758	20.819	21.880	22.942	24.065	25.693	27.321	28.950	30.578	32.206	36.158	40.109	44.061	48.013	51.965	56.267
WTP via Rates	1.545		0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	**227.029**		0.000	0.000	0.000	0.000	16.906	17.426	17.947	18.468	18.988	19.987	21.048	22.109	23.171	24.294	25.922	27.550	29.179	30.807	32.435	36.387	40.338	44.290	48.242	52.194	56.496

OP_37																											
Construction Period:		**4 years**																									
Construction	94.499		31.226	31.226	28.101	28.101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.252		0.000	0.000	0.000	0.000	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
Periodic Maintenance	1.634		0.000	0.000	0.000	0.000	0.000	1.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.011	0.000	1.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.011	0.000
TOTAL COST	96.385	0.000	31.226	31.226	28.101	28.101	0.037	1.453	0.037	0.037	0.037	0.037	0.037	0.037	0.037	1.048	0.037	1.453	0.037	0.037	0.037	0.037	0.037	0.037	0.037	1.048	0.037

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088
PV of 1st yr benefits				0	0	0	10.0086	9.37892	8.78101	8.2143	7.67806	7.34725	7.03395	6.71689	6.39934	6.09966	5.91678	5.71674	5.50418	5.28301	5.05657	5.15695	5.19729	5.18767	5.13685	5.0524	4.97173
50 year BCR	2.3	**FYRR**	0.00%	0.00%	0.00%	0.00%	10.38%	9.73%	9.11%	8.52%	7.97%	7.62%	7.30%	6.97%	6.64%	6.33%	6.14%	5.93%	5.71%	5.48%	5.25%	5.35%	5.39%	5.38%	5.33%	5.24%	5.16%
25 Year BCR from first year of construction			1.48103	1.5	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3
25 Year PVB from first year of construction			142.468	147.570	152.535	157.348	161.995	166.465	170.754	174.856	178.771	182.498	186.144	189.693	193.133	196.454	199.649	202.714	205.646	208.443	211.107	213.638	216.092	218.462	220.744	222.934	225.029
25 Year PVC from first year of construction			96.195	96.317	96.320	96.322	96.325	96.327	96.329	96.331	96.332	96.373	96.375	96.376	96.377	96.378	96.379	96.380	96.380	96.381	96.382	96.382	96.383	96.383	96.384	96.384	96.384
25 Year PVB excl WTP from first year of construction			141.116																								
25 Year PVB of WTP from first year of construction			1.353																								

33 (34 + 4 lane TM-Domain - opening in 3 yrs) minus 34 (B 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																											
Travel Time Costs - Links	6.357	121.3%	0.000	0.000	0.000	0.518	0.522	0.526	0.530	0.534	0.537	0.553	0.569	0.585	0.601	0.617	0.640	0.664	0.687	0.711	0.734	0.791	0.849	0.906	0.963	1.021	1.150
Travel Time Costs - Turns	0.957	18.3%	0.000	0.000	0.000	-0.091	-0.085	-0.079	-0.073	-0.066	-0.060	-0.048	-0.037	-0.025	-0.013	-0.001	0.018	0.038	0.057	0.077	0.096	0.211	0.325	0.439	0.554	0.668	0.712
Vehicle Operating Costs - Links	-2.115	-40.3%	0.000	0.000	0.000	-0.213	-0.220	-0.226	-0.233	-0.239	-0.246	-0.253	-0.259	-0.266	-0.273	-0.280	-0.291	-0.301	-0.312	-0.323	-0.333	-0.341	-0.349	-0.356	-0.364	-0.372	-0.382
Vehicle Operating Costs - Turns	0.043	0.8%	0.000	0.000	0.000	-0.001	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.003	-0.002	-0.000	0.001	0.002	0.008	0.014	0.020	0.026	0.032	0.034
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	**5.242**	1.000	0.000	0.000	0.000	0.213	0.216	0.219	0.222	0.225	0.228	0.249	0.269	0.290	0.311	0.331	0.365	0.398	0.432	0.465	0.499	0.669	0.839	1.009	1.179	1.349	1.515

OP_33																											
Construction Period:		**2 years**																									
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216

25 Year BCR from first year of construction	1.5	includes WTP, excludes Te Maunga to Domain widening	
25 Year PVB from first year of construction	140.120	138.8	
25 Year PVC from first year of construction	90.965		

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BASE YEAR FOR COSTS: 1997																											
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																											

2 lane Option A3, grade separated intersections

		1997				2001					2006					2011					2016					2021	
DM_12	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Travel Time Costs - Links	1086.114		75.801	78.012	80.163	82.314	85.518	88.721	91.924	95.127	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808
Travel Time Costs - Turns	58.552		2.184	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694
Vehicle Operating Costs - Links	981.062		74.072	76.227	78.375	80.524	83.335	86.147	88.958	91.770	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794
Vehicle Operating Costs - Turns	2.755		0.108	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619
Accident Costs	151.680		12.547	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312
TOTAL USER COSTS	2280.163	0.000	164.712	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

2 lane Option A3 (AlternativeRoute) grade separated intersections

OP_24	Year:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Travel Time Costs - Links	929.219	73.710	73.706	73.702	73.698	73.694	76.474	79.254	82.033	84.813	87.593	90.338	93.083	95.829	98.574	101.319	104.216	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.995	133.543	135.996
Travel Time Costs - Turns	34.955	2.108	2.177	2.246	2.315	2.384	2.694	3.004	3.315	3.625	3.936	3.849	3.762	3.675	3.588	3.502	3.637	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926
Vehicle Operating Costs - Links	952.597	71.930	73.415	74.900	76.384	77.869	80.592	83.315	86.038	88.761	91.484	94.114	96.745	99.375	102.006	104.636	107.388	110.140	112.892	115.643	118.395	121.575	124.754	127.933	131.113	134.292	136.475
Vehicle Operating Costs - Turns	1.611	0.106	0.109	0.112	0.115	0.118	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.178	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288
Accident Costs	123.437	12.317	11.781	11.245	10.709	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601
TOTAL USER COSTS	2041.819	160.170	161.187	162.204	163.221	164.238	169.841	175.444	181.047	186.650	192.253	198.288	204.571	210.853	217.135	223.665	229.845	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285
	Opening (from Time 0)																										
User Cost Stream:	Years:	2	, weeks	26																							
Travel Time Costs - Links	937.114		75.801	78.012	76.931	73.694	76.474	79.254	82.033	84.813	87.593	90.338	93.083	95.829	98.574	101.319	104.216	107.113	110.010	112.907	115.804	119.352	122.900	126.448	129.995	133.543	135.996
Travel Time Costs - Turns	35.504		2.184	2.636	2.607	2.384	2.694	3.004	3.315	3.625	3.936	3.849	3.762	3.675	3.588	3.502	3.637	3.772	3.907	4.043	4.178	4.505	4.833	5.161	5.488	5.816	5.926
Vehicle Operating Costs - Links	955.038		74.072	76.227	77.380	77.869	80.592	83.315	86.038	88.761	91.484	94.114	96.745	99.375	102.006	104.636	107.388	110.140	112.892	115.643	118.395	121.575	124.754	127.933	131.113	134.292	136.475
Vehicle Operating Costs - Turns	1.635		0.108	0.130	0.129	0.118	0.124	0.129	0.134	0.139	0.144	0.149	0.155	0.160	0.166	0.171	0.178	0.184	0.191	0.198	0.205	0.220	0.236	0.252	0.267	0.283	0.288
Accident Costs	126.003		12.547	12.589	11.717	10.173	9.957	9.742	9.527	9.311	9.096	9.837	10.825	11.813	12.801	14.037	14.427	14.817	15.206	15.596	15.986	16.457	16.927	17.397	17.867	18.337	18.601
TOTAL USER COSTS	2055.294		164.712	169.593	168.763	164.238	169.841	175.444	181.047	186.650	192.253	198.288	204.571	210.853	217.135	223.665	229.845	236.026	242.207	248.388	254.569	262.109	269.650	277.190	284.731	292.271	297.285
Benefit Stream:																											
Travel Time Costs - Links	149.001	69.3%	0.000	0.000	3.233	8.620	9.044	9.467	9.890	10.314	10.737	11.343	11.949	12.554	13.160	13.766	14.960	16.154	17.348	18.542	19.736	22.543	25.350	28.157	30.964	33.771	36.812
Travel Time Costs - Turns	23.047	10.7%	0.000	0.000	0.293	0.780	0.829	0.878	0.927	0.976	1.025	1.104	1.184	1.263	1.342	1.422	1.638	1.855	2.072	2.289	2.506	3.205	3.904	4.604	5.303	6.002	6.768
Vehicle Operating Costs - Links	26.024	12.1%	0.000	0.000	0.995	2.654	2.743	2.832	2.920	3.009	3.098	3.193	3.287	3.382	3.477	3.572	3.636	3.700	3.764	3.828	3.891	3.954	4.017	4.080	4.143	4.206	4.319
Vehicle Operating Costs - Turns	1.119	0.5%	0.000	0.000	0.013	0.035	0.039	0.042	0.045	0.048	0.051	0.054	0.058	0.061	0.065	0.068	0.079	0.089	0.100	0.111	0.121	0.156	0.190	0.225	0.259	0.294	0.331
Accident Costs	25.677	11.9%	0.000	0.000	1.008	2.688	2.627	2.566	2.506	2.445	2.384	2.568	2.814	3.060	3.306	3.613	3.708	3.803	3.898	3.992	4.087	4.190	4.294	4.397	4.500	4.604	4.711
TOTAL USER BENEFITS	224.868	1.046	0.000	0.000	5.542	14.778	15.282	15.785	16.288	16.791	17.294	18.262	19.291	20.321	21.350	22.441	24.021	25.601	27.181	28.761	30.341	34.048	37.755	41.462	45.169	48.876	52.942
WTP via Rates	1.873		0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	226.741		0.000	0.000	5.771	15.007	15.511	16.014	16.517	17.020	17.523	18.491	19.520	20.550	21.579	22.670	24.250	25.830	27.410	28.990	30.570	34.277	37.984	41.691	45.398	49.105	53.171

OP_24																											
Construction Period:	2.5 years																										
Construction	73.823		34.968	34.968	17.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.131		0.000	0.000	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Periodic Maintenance	0.858		0.000	0.000	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.439	0.000	0.614	0.000
TOTAL COST	74.812	0.000	34.968	34.968	17.500	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.455	0.016	0.630	0.016

		mid point of year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		SPPWF	0.90909	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.4241	0.38554	0.35049	0.31863	0.28966	0.26333	0.23939	0.21763	0.19784	0.17986	0.16351	0.14864	0.13513	0.12285	0.11168	0.10153	0.0923
		PV of 1st yr benefits		0	4.33579	10.2503	9.63089	9.03937	8.47581	7.94	7.43157	7.1291	6.84177	6.54776	6.25066	5.96966	5.80522	5.62135	5.42293	5.21413	4.99847	5.09509	5.13283	5.12159	5.06999	4.98543	4.90745
50 year BCR	3.0	**FYRR**	0.00%	0.00%	5.80%	13.70%	12.87%	12.08%	11.33%	10.61%	9.93%	9.53%	9.15%	8.75%	8.36%	7.98%	7.76%	7.51%	7.25%	6.97%	6.68%	6.81%	6.86%	6.85%	6.78%	6.66%	6.56%
25 Year BCR from first year of construction			2.0	2.0	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.6	2.7	2.7	2.8	2.8	2.8	2.9	2.9	2.9	3.0	3.0	3.0
25 Year PVB from first year of construction			147.217	152.020	156.696	161.228	165.605	169.818	173.859	177.725	181.414	184.928	188.362	191.702	194.937	198.059	201.060	203.938	206.690	209.315	211.813	214.186	216.487	218.709	220.849	222.901	224.866
25 Year PVC from first year of construction			74.778	74.779	74.780	74.782	74.783	74.783	74.784	74.806	74.807	74.807	74.808	74.808	74.809	74.809	74.810	74.810	74.810	74.810	74.811	74.811	74.811	74.811	74.812	74.812	74.812

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BASE YEAR FOR COSTS: 1997																											
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																											

4 lane Sandhills Option (17.35km), grade separated intersections, 4 laning Te Maunga to Domain

		1997				2001					2006					2011					2016					2021	
DM_12	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	1086.114		75.801	78.012	80.163	82.314	85.518	88.721	91.924	95.127	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808
Travel Time Costs - Turns	58.552		2.184	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694
Vehicle Operating Costs - Links	981.062		74.072	76.227	78.375	80.524	83.335	86.147	88.958	91.770	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794
Vehicle Operating Costs - Turns	2.755		0.108	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619
Accident Costs	151.680		12.547	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312
TOTAL USER COSTS	**2280.163**	**0.000**	164.712	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

4 lane Sandhills Option grade separated intersections

OP_27	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	938.660	**75.921**	75.560	75.199	74.837	**74.476**	77.292	80.107	82.922	85.737	**88.553**	91.328	94.103	96.878	99.653	**102.428**	105.328	108.228	111.129	114.029	**116.929**	120.472	124.015	127.558	131.101	**134.644**	136.951
Travel Time Costs - Turns	32.861	**2.171**	2.267	2.363	2.458	**2.554**	2.661	2.768	2.875	2.982	**3.089**	3.193	3.297	3.401	3.506	**3.610**	3.727	3.845	3.962	4.079	**4.196**	4.414	4.631	4.849	5.067	**5.284**	5.350
Vehicle Operating Costs - Links	987.010	**74.088**	75.744	77.400	79.056	**80.712**	83.534	86.357	89.179	92.001	**94.824**	97.557	100.290	103.024	105.757	**108.490**	111.341	114.192	117.043	119.895	**122.746**	126.040	129.335	132.629	135.924	**139.218**	141.502
Vehicle Operating Costs - Turns	1.597	**0.109**	0.112	0.116	0.119	**0.123**	0.128	0.133	0.138	0.143	**0.148**	0.154	0.159	0.165	0.170	**0.176**	0.182	0.187	0.193	0.198	**0.204**	0.215	0.225	0.236	0.247	**0.257**	0.261
Accident Costs	127.141	**12.686**	12.134	11.582	11.030	**10.478**	10.256	10.034	9.813	9.591	**9.369**	10.132	11.150	12.168	13.186	**14.458**	14.859	15.261	15.663	16.064	**16.466**	16.950	17.435	17.919	18.403	**18.887**	19.159
TOTAL USER COSTS	**2087.268**	**164.975**	165.817	166.659	167.501	168.343	173.871	179.399	184.927	190.455	195.983	202.364	209.000	215.636	222.271	229.161	235.437	241.713	247.989	254.265	260.541	268.091	275.641	283.191	290.741	298.291	303.222
	Opening (from Time 0)																										
User Cost Stream:	**Years:**	**4**	**, weeks**	**0**																							
Travel Time Costs - Links	950.559		75.801	78.012	80.163	82.314	77.292	80.107	82.922	85.737	88.553	91.328	94.103	96.878	99.653	102.428	105.328	108.228	111.129	114.029	116.929	120.472	124.015	127.558	131.101	134.644	136.951
Travel Time Costs - Turns	33.760		2.184	2.636	2.900	3.164	2.661	2.768	2.875	2.982	3.089	3.193	3.297	3.401	3.506	3.610	3.727	3.845	3.962	4.079	4.196	4.414	4.631	4.849	5.067	5.284	5.350
Vehicle Operating Costs - Links	983.881		74.072	76.227	78.375	80.524	83.534	86.357	89.179	92.001	94.824	97.557	100.290	103.024	105.757	108.490	111.341	114.192	117.043	119.895	122.746	126.040	129.335	132.629	135.924	139.218	141.502
Vehicle Operating Costs - Turns	1.642		0.108	0.130	0.142	0.154	0.128	0.133	0.138	0.143	0.148	0.154	0.159	0.165	0.170	0.176	0.182	0.187	0.193	0.198	0.204	0.215	0.225	0.236	0.247	0.257	0.261
Accident Costs	131.250		12.547	12.589	12.725	12.861	10.256	10.034	9.813	9.591	9.369	10.132	11.150	12.168	13.186	14.458	14.859	15.261	15.663	16.064	16.466	16.950	17.435	17.919	18.403	18.887	19.159
TOTAL USER COSTS	**2101.091**		164.712	169.593	174.305	179.017	173.871	179.399	184.927	190.455	195.983	202.364	209.000	215.636	222.271	229.161	235.437	241.713	247.989	254.265	260.541	268.091	275.641	283.191	290.741	298.291	303.222
Benefit Stream:																											
Travel Time Costs - Links	135.556	58.2%	0.000	0.000	0.000	0.000	8.226	8.614	9.002	9.389	9.777	10.353	10.929	11.505	12.081	12.657	13.848	15.039	16.229	17.420	18.611	21.423	24.234	27.046	29.858	32.670	35.856
Travel Time Costs - Turns	24.792	10.6%	0.000	0.000	0.000	0.000	0.862	1.115	1.367	1.619	1.872	1.760	1.648	1.537	1.425	1.313	1.548	1.783	2.018	2.252	2.487	3.296	4.106	4.915	5.725	6.534	7.345
Vehicle Operating Costs - Links	-2.818	-1.2%	0.000	0.000	0.000	0.000	-0.199	-0.210	-0.221	-0.231	-0.242	-0.250	-0.258	-0.266	-0.274	-0.282	-0.317	-0.353	-0.388	-0.424	-0.459	-0.511	-0.564	-0.616	-0.668	-0.721	-0.708
Vehicle Operating Costs - Turns	1.112	0.5%	0.000	0.000	0.000	0.000	0.034	0.037	0.040	0.043	0.047	0.050	0.053	0.056	0.060	0.063	0.075	0.087	0.098	0.110	0.122	0.162	0.201	0.240	0.280	0.319	0.358
Accident Costs	20.430	8.8%	0.000	0.000	0.000	0.000	2.329	2.274	2.220	2.165	2.111	2.273	2.489	2.706	2.922	3.192	3.275	3.358	3.441	3.524	3.608	3.697	3.786	3.875	3.964	4.053	4.153
TOTAL USER BENEFITS	**179.072**	0.769	0.000	0.000	0.000	0.000	11.252	11.830	12.408	12.986	13.564	14.186	14.862	15.538	16.214	16.944	18.429	19.914	21.399	22.884	24.368	28.066	31.763	35.461	39.158	42.856	47.004
WTP via Rates	1.545		0.000	0.000	0.000	0.000	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	**180.616**		0.000	0.000	0.000	0.000	11.481	12.059	12.637	13.215	13.793	14.415	15.091	15.767	16.443	17.173	18.658	20.143	21.628	23.113	24.597	28.295	31.992	35.690	39.387	43.085	47.233

OP_27																											
Construction Period:		**4.0 years**																									
Construction	96.294		31.792	31.792	28.667	28.667	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.256		0.000	0.000	0.000	0.000	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
Periodic Maintenance	1.743		0.000	0.000	0.000	0.000	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000	1.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.029	0.000
TOTAL COST	98.293	0.000	31.792	31.792	28.667	28.667	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038	1.478	0.038	0.038	0.038	0.038	0.038	0.038	0.038	1.067	0.038

mid point of year			1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5
SPPWF			0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088
PV of 1st yr benefits				0	0	0	6.79709	6.49027	6.18305	5.87806	5.57742	5.29899	5.04317	4.79006	4.54129	4.31175	4.2587	4.17965	4.07979	3.96354	3.83471	4.01013	4.12196	4.18032	4.194	4.17065	4.15658
50 year BCR	1.8	**FYRR**	0.00%	0.00%	0.00%	0.00%	6.92%	6.60%	6.29%	5.98%	5.67%	5.39%	5.13%	4.87%	4.62%	4.39%	4.33%	4.25%	4.15%	4.03%	3.90%	4.08%	4.19%	4.25%	4.27%	4.24%	4.23%
25 Year BCR from first year of construction			1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8
25 Year PVB from first year of construction			104.945	109.256	113.492	117.630	121.654	125.550	129.307	132.920	136.383	139.693	142.954	146.147	149.259	152.276	155.191	157.998	160.691	163.269	165.729	168.073	170.355	172.567	174.703	176.758	178.730
25 Year PVC from first year of construction			98.020	98.144	98.147	98.149	98.152	98.154	98.156	98.158	98.159	98.201	98.202	98.250	98.251	98.252	98.253	98.254	98.255	98.255	98.256	98.272	98.273	98.291	98.292	98.292	98.292

25 Year PVB excl WTP from first year of construction	103.592
25 Year PVB of WTP from first year of construction	1.353

23 (24 + 4 lane TM-Domain - opening in 3 yrs) minus 24 (A3 2 lane, gr sep opening in 2.5 yrs) = benefits of 4 lane TM-Domain

Benefit Stream:																											
Travel Time Costs - Links	6.326	109.6%	0.000	0.000	0.000	0.513	0.518	0.523	0.527	0.532	0.537	0.552	0.568	0.584	0.599	0.615	0.637	0.658	0.680	0.702	0.723	0.784	0.845	0.906	0.966	1.027	1.154
Travel Time Costs - Turns	0.999	17.3%	0.000	0.000	0.000	-0.096	-0.089	-0.082	-0.075	-0.068	-0.061	-0.050	-0.038	-0.026	-0.015	-0.003	0.018	0.040	0.061	0.083	0.104	0.220	0.337	0.453	0.569	0.685	0.730
Vehicle Operating Costs - Links	-2.170	-37.6%	0.000	0.000	0.000	-0.214	-0.221	-0.229	-0.236	-0.243	-0.250	-0.257	-0.263	-0.269	-0.276	-0.282	-0.297	-0.312	-0.327	-0.343	-0.358	-0.363	-0.368	-0.373	-0.379	-0.384	-0.395
Vehicle Operating Costs - Turns	0.062	1.1%	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.004	0.005	0.007	0.012	0.017	0.022	0.028	0.033	0.035
Accident Costs	0.000	0.0%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL USER BENEFITS	**5.217**	0.904	0.000	0.000	0.000	0.201	0.206	0.211	0.216	0.220	0.225	0.246	0.267	0.288	0.309	0.330	0.359	0.388	0.418	0.447	0.476	0.653	0.830	1.007	1.184	1.361	1.523
OP_23																											
Construction Period:		**2 years**																									
Construction	4.931		0.000	3.125	3.125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.045		0.000	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
Periodic Maintenance	0.267		0.000	0.000	0.000	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.000	0.210
TOTAL COST	5.242	0.000	0.000	3.125	3.125	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.156	0.006	0.216

25 Year BCR from first year of construction	1.1	includes WTP
25 Year PVB from first year of construction	102.639	101.287
25 Year PVC from first year of construction	92.789	

TIME STREAM OF USER COSTS

YEAR (JULY-JUNE)	NPV @	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023
ANALYSIS YEAR	10%	Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TIME ZERO: 1 July 1998		Time:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
BASE YEAR FOR COSTS: 1997																											
50 YEAR ANALYSIS PERIOD: 1/7/1998-30/6/2048																											

4 lane Existing Route including 4 laning Te Maunga to Domain

		1997				**2001**					**2006**					**2011**					**2016**					**2021**	
DM_12	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	1086.114		75.801	78.012	80.163	82.314	85.518	88.721	91.924	95.127	98.330	101.681	105.032	108.383	111.734	115.085	119.176	123.267	127.358	131.449	135.540	141.895	148.250	154.604	160.959	167.314	172.808
Travel Time Costs - Turns	58.552		2.184	2.636	2.900	3.164	3.523	3.882	4.242	4.601	4.961	4.953	4.946	4.938	4.931	4.923	5.275	5.627	5.979	6.331	6.683	7.710	8.737	9.764	10.791	11.818	12.694
Vehicle Operating Costs - Links	981.062		74.072	76.227	78.375	80.524	83.335	86.147	88.958	91.770	94.582	97.307	100.032	102.758	105.483	108.208	111.024	113.840	116.655	119.471	122.287	125.529	128.771	132.013	135.256	138.498	140.794
Vehicle Operating Costs - Turns	2.755		0.108	0.130	0.142	0.154	0.162	0.170	0.179	0.187	0.195	0.204	0.213	0.221	0.230	0.239	0.256	0.274	0.291	0.309	0.326	0.376	0.426	0.476	0.526	0.576	0.619
Accident Costs	151.680		12.547	12.589	12.725	12.861	12.585	12.309	12.032	11.756	11.480	12.405	13.639	14.873	16.107	17.650	18.135	18.619	19.104	19.589	20.074	20.647	21.220	21.794	22.367	22.941	23.312
TOTAL USER COSTS	**2280.163**	**0.000**	164.712	169.593	174.305	179.017	185.123	191.229	197.335	203.441	209.547	216.550	223.862	231.174	238.485	246.105	253.866	261.627	269.388	277.149	284.910	296.157	307.405	318.652	329.900	341.147	350.227

Note: 2006 Accident Costs factored by 0.75 to account for long term trends

DM_17	Year:		1	2	3	**4**	5	6	7	8	**9**	10	11	12	13	**14**	15	16	17	18	**19**	20	21	22	23	**24**	25
Travel Time Costs - Links	1013.373	**73.710**	75.498	77.285	79.073	**80.861**	83.901	86.942	89.982	93.023	**96.063**	99.059	102.055	105.051	108.046	**111.042**	114.283	117.523	120.763	124.004	**127.244**	131.140	135.036	138.932	142.827	**146.723**	149.671
Travel Time Costs - Turns	52.009	**2.108**	2.421	2.735	3.048	**3.362**	3.702	4.042	4.382	4.722	**5.062**	5.015	4.967	4.919	4.871	**4.823**	5.057	5.291	5.524	5.758	**5.991**	6.527	7.062	7.597	8.133	**8.668**	9.260
Vehicle Operating Costs - Links	984.558	**71.930**	74.132	76.334	78.537	**80.739**	83.565	86.392	89.218	92.045	**94.871**	97.602	100.333	103.063	105.794	**108.525**	111.395	114.266	117.137	120.008	**122.878**	126.165	129.452	132.738	136.025	**139.311**	141.567
Vehicle Operating Costs - Turns	2.435	**0.106**	0.120	0.134	0.149	**0.163**	0.170	0.177	0.184	0.191	**0.198**	0.206	0.214	0.222	0.230	**0.238**	0.248	0.259	0.270	0.280	**0.291**	0.317	0.344	0.371	0.398	**0.424**	0.453
Accident Costs	148.468	**12.317**	12.372	12.427	12.482	**12.538**	12.271	12.004	11.738	11.471	**11.204**	12.113	13.324	14.535	15.747	**17.261**	17.736	18.212	18.687	19.162	**19.638**	20.202	20.765	21.329	21.893	**22.457**	22.821
TOTAL USER COSTS	**2200.844**	**160.170**	164.543	168.916	173.289	177.662	183.610	189.557	195.505	201.452	207.400	213.995	220.893	227.790	234.688	241.889	248.720	255.550	262.381	269.212	276.043	284.351	292.659	300.967	309.275	317.584	323.773
	Opening (from Time 0)																										
User Cost Stream:	**Years:**	**2**	**, weeks**	**0**																							
Travel Time Costs - Links	1014.249		75.801	78.012	79.073	80.861	83.901	86.942	89.982	93.023	96.063	99.059	102.055	105.051	108.046	111.042	114.283	117.523	120.763	124.004	127.244	131.140	135.036	138.932	142.827	146.723	149.671
Travel Time Costs - Turns	51.712		2.184	2.636	3.048	3.362	3.702	4.042	4.382	4.722	5.062	5.015	4.967	4.919	4.871	4.823	5.057	5.291	5.524	5.758	5.991	6.527	7.062	7.597	8.133	8.668	9.260
Vehicle Operating Costs - Links	984.414		74.072	76.227	78.537	80.739	83.565	86.392	89.218	92.045	94.871	97.602	100.333	103.063	105.794	108.525	111.395	114.266	117.137	120.008	122.878	126.165	129.452	132.738	136.025	139.311	141.567
Vehicle Operating Costs - Turns	2.421		0.108	0.130	0.149	0.163	0.170	0.177	0.184	0.191	0.198	0.206	0.214	0.222	0.230	0.238	0.248	0.259	0.270	0.280	0.291	0.317	0.344	0.371	0.398	0.424	0.453
Accident Costs	148.761		12.547	12.589	12.482	12.538	12.271	12.004	11.738	11.471	11.204	12.113	13.324	14.535	15.747	17.261	17.736	18.212	18.687	19.162	19.638	20.202	20.765	21.329	21.893	22.457	22.821
TOTAL USER COSTS	**2201.557**		164.712	169.593	173.289	177.662	183.610	189.557	195.505	201.452	207.400	213.995	220.893	227.790	234.688	241.889	248.720	255.550	262.381	269.212	276.043	284.351	292.659	300.967	309.275	317.584	323.773
Benefit Stream:																											
Travel Time Costs - Links	71.865	30.9%	0.000	0.000	1.090	1.453	1.616	1.779	1.941	2.104	2.267	2.622	2.977	3.332	3.687	4.043	4.893	5.744	6.594	7.445	8.296	10.755	13.214	15.673	18.132	20.591	23.136
Travel Time Costs - Turns	6.840	2.9%	0.000	0.000	-0.148	-0.198	-0.179	-0.159	-0.140	-0.121	-0.102	-0.061	-0.021	0.019	0.060	0.100	0.218	0.337	0.455	0.574	0.692	1.184	1.675	2.167	2.658	3.150	3.434
Vehicle Operating Costs - Links	-3.352	-1.4%	0.000	0.000	-0.161	-0.215	-0.230	-0.245	-0.260	-0.275	-0.290	-0.295	-0.300	-0.306	-0.311	-0.316	-0.371	-0.426	-0.482	-0.537	-0.592	-0.636	-0.681	-0.725	-0.769	-0.814	-0.774
Vehicle Operating Costs - Turns	0.334	0.1%	0.000	0.000	-0.007	-0.009	-0.008	-0.007	-0.006	-0.005	-0.004	-0.003	-0.002	-0.001	0.000	0.001	0.008	0.015	0.022	0.029	0.035	0.059	0.082	0.106	0.129	0.152	0.166
Accident Costs	2.918	1.3%	0.000	0.000	0.243	0.324	0.314	0.304	0.295	0.285	0.275	0.292	0.315	0.338	0.361	0.389	0.398	0.408	0.417	0.426	0.436	0.445	0.455	0.465	0.474	0.484	0.491
TOTAL USER BENEFITS	**78.605**	0.337	0.000	0.000	1.016	1.355	1.513	1.672	1.830	1.989	2.147	2.555	2.969	3.383	3.797	4.217	5.147	6.077	7.007	7.937	8.867	11.806	14.746	17.685	20.624	23.564	26.454
WTP via Rates	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Additional Travel Cost Savings	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL BENEFITS	**78.605**		0.000	0.000	1.016	1.355	1.513	1.672	1.830	1.989	2.147	2.555	2.969	3.383	3.797	4.217	5.147	6.077	7.007	7.937	8.867	11.806	14.746	17.685	20.624	23.564	26.454

DM_17																											
Construction Period:	**2.0**	**years**																									
Construction	139.696		98.966	60.169	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Annual Maintenance	0.609		0.000	0.000	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
Periodic Maintenance	3.852		0.000	0.000	0.000	2.758	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.970	0.000	2.758	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.970	0.000	2.758	0.000
TOTAL COST	144.157	0.000	98.966	60.169	0.074	2.832	0.074	0.074	0.074	0.074	0.074	0.074	0.074	2.044	0.074	2.832	0.074	0.074	0.074	0.074	0.074	0.074	0.074	2.044	0.074	2.832	0.074
		mid point of year	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5
		SPPWF	0.86678	0.78799	0.71635	0.65123	0.59203	0.5382	0.48928	0.4448	0.40436	0.3676	0.33418	0.3038	0.27618	0.25108	0.22825	0.2075	0.18864	0.17149	0.1559	0.14173	0.12884	0.11713	0.10648	0.0968	0.088
		PV of 1st yr benefits		0	0.72791	0.88232	0.89592	0.89977	0.8955	0.88458	0.86824	0.93937	0.99229	1.02782	1.04869	1.0587	1.17476	1.26096	1.32178	1.36112	1.38238	1.67329	1.89988	2.07144	2.19611	2.28099	2.32798
50 year BCR	0.5	**FYRR**	0.00%	0.00%	0.50%	0.61%	0.62%	0.62%	0.62%	0.61%	0.60%	0.65%	0.69%	0.71%	0.73%	0.73%	0.81%	0.87%	0.92%	0.94%	0.96%	1.16%	1.32%	1.44%	1.52%	1.58%	1.61%
25 Year BCR from first year of construction			**0.2**	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25 Year PVB from first year of construction			31.540	34.002	36.461	38.896	41.293	43.637	45.919	48.130	50.265	52.318	54.359	56.372	58.345	60.269	62.136	63.942	65.681	67.351	68.951	70.478	71.962	73.398	74.782	76.113	77.387
25 Year PVC from first year of construction			144.001	144.008	144.013	144.019	144.023	144.028	144.031	144.128	144.131	144.134	144.137	144.139	144.142	144.144	144.145	144.147	144.149	144.150	144.151	144.152	144.153	144.154	144.155	144.156	144.156

APPENDIX 3
Newsletters

TRANSIT NEW ZEALAND ARARAU AOTEAROA

AREAS OF CONSIDERATION

OPTION : Upgrading existing route plus associated localised improvement

OPTIONS 3 & 4: ▤

BAND OF INTEREST: ▨

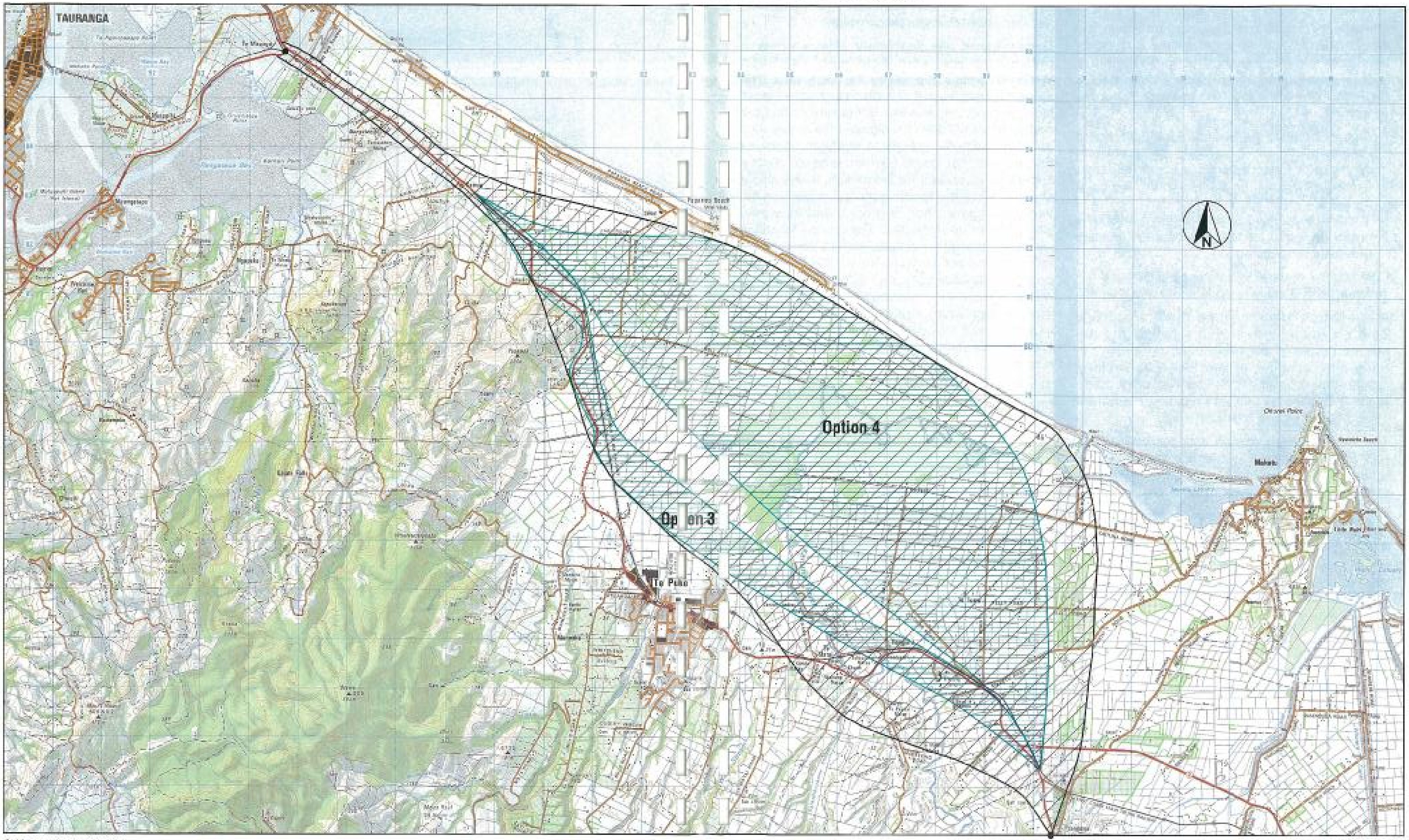

FIGURE 1
TAURANGA EASTERN ARTERIAL - REC 29

TRANSIT
NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No.1

TAURANGA EASTERN ARTERIAL

Many of you will have heard of the roading studies in the Te Puke area that Transit New Zealand has undertaken over the past years. The purpose of those studies was to find solutions to the following issues:

- conflict between passing traffic and parking manoeuvres in the Te Puke main street
- safety of pedestrians crossing the main street
- environmental and social concerns for the effects of heavy vehicles in the main street
- a lack of passing areas and low overall speed in the Paengaroa to Te Maunga stretch of highway
- an ever increasing number of highway access points with insufficient sight distance
- vertical and horizontal alignment deficiencies in the vicinity of Te Puke and Bell Road
- safety of pedestrians from the school and marae at Waitangi crossing the highway

Transit New Zealand is in the process of finalising documentation to commission a consultant in February 1997 to complete the necessary studies and consultation to enable a formal Designation to be lodged with the District Councils for inclusion in their District Plan. It is expected that the studies will take at least a year.

The purpose of this newsletter is to alert you to the fact that this study is about to get under way and that you, as a landowner in the area of the study, will continue to receive newsletters next year as the study progresses.

We are also interested to receive any information that you think would be beneficial to the study. On the back of this newsletter is the name of a Transit New Zealand staff member who is able to answer any questions you may have at this early stage in the programme.

Yours faithfully

Colin Knaggs
Transit New Zealand
December 1996

THE CONSULTANT'S BRIEF

The contract will require the consultant to investigate possible alignment improvements to State Highway 2 between the State Highway 29 junction at Te Maunga and the State Highway 33 junction at Paengaroa.

Preliminary scoping of options conducted by Works Consultancy Services Limited in 1990/91 identified two alignments that were worthy of further investigation with Benefit Cost Ratios (BCR) in the order of 3.0. The two alignments are as follows:

- Option 3 (called the Swamp Route) which is a staged alignment using parts of the existing highway but incorporating a major deviation between the Kopuroa Canal and the Rangiuru Straight.
- Option 4 (called the Sandhills Route) which is a major deviation (no staging) between Domain Road and Paengaroa.

Common to both routes is the construction of the Te Maunga to Domain Road highway with 4 lanes.

At its March 1996 meeting the Transit New Zealand Authority resolved to designate the favoured route in the interests of preserving the route from changes in land use - particularly residential development. The Authority made funds available for this investigation during the 1996/97 and 1997/98 financial years.

The alignments described above are concepts only and during the investigation the respective routes will become more accurately defined as constraints are identified and managed.

It is recognised that community consultation is a critical factor in defining the path of these routes hence Transit New Zealand has defined a band of interest within which it will be sending regular newsletters. This is the area that is shown on the map. The generally defined corridors of options 3 and 4 are also depicted.

The design requirements are for the road to be four lanes with a grass divider in the middle. The road would have limited access to remove the current access problems.

CONSULTATION

The consultants will be required to undertake consultation with the community. Transit New Zealand also requires that groups such as the Automobile Association, Road Transport Association, Te Puke business representatives and Federated Farmers be consulted.

During August and September 1996 a series of preliminary Hui were held with TANGATA WHENUA groups affected by the study area. The presentation consisted of an introduction to Transit New Zealand, an overview of the project and the requirements of RMA consultation. There was also an opportunity for groups to highlight concerns and issues that could be focussed on by the successful consultant for the project. It was also a chance before the tender goes out to confirm the various tangata whenua groups and how they would like to be consulted. The groups identified will form the base for tangata whenua consultation for the project but are by no means the final make-up of tangata whenua groups as this will be further refined during the consultation process. If any other tangata whenua groups feel they should be included would they please contact Rawhiti Moses (Transit New Zealand Facilitator) 07 838 8227 to discuss.

The following are the groups identified where a preliminary hui was held:

- Waitaha (including associated Hapu)
- Tapuika (including associated Hapu)
- Nga Makino
- Ngati Pikiao
- Ngati Whakaue.

It is likely that, in addition to the newletters, there will be meetings, Open Days, displays and the opportunity for you to send in submissions or to tell the consultants your opinions and information.

WHERE TO FIND INFORMATION

If you have information to give us or you want information on the project, then contact:

Colin Crampton
Transit New Zealand
Hamilton
Phone: 07 838 8220

TRANSIT
NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No. 2

STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

You may have read in the newspaper that Transit New Zealand has appointed consultants (Beca Carter Hollings & Ferner Ltd) to undertake the studies and consultation to determine a new State highway alignment that bypasses Te Puke and Waitangi. The realignment is likely to start in the vicinity of Domain Road, Papamoa and reconnect with the existing highway north of Paengaroa.

Transit New Zealand is proceeding now with the designation approval under the Resource Management Act for four-laning the highway from Te Maunga to Domain Road, Papamoa. There are no alternative feasible alignments in this section mainly because of the existing and proposed residential zoning and the railway line. Investigations and consultation have occurred and the application has been lodged with the Tauranga District Council. The consideration of grade separated (like on the Auckland southern motorway) access to the State highway between Te Maunga and Domain Road will be part of the Eastern Arterial Project.

The Eastern Arterial studies and consultation will take approximately 14 months and we will be sending out newsletters regularly to keep you informed. We will also hold Open Days to give you the opportunity to meet with the consultants and get more detailed information.

Yours faithfully

Colin Knaggs
Transit New Zealand

May 1997

STAGE ONE

The bypass study area is from Domain Road to Paengaroa and includes all the land from the existing State highway to the coast. The Te Maunga - Domain Road study area is concerned with grade separated access to the four-laned highway which is the subject of a separate designation application. Stage One of the study is to determine what lands are not suitable for a State highway. There are three major areas of investigation.

- The first is to review past investigations and available information regarding the ground conditions such as wetland or peat areas. Such land presents construction difficulties.

- The second action is to consider the Matters of National Importance that are listed in the Resource Management Act 1991 and other important environmental matters. In particular we are aware that there are likely to be sites of cultural and spiritual significance to the tangata whenua that should be avoided if at all possible. There may also be sites of ecological importance such as Wildlife Reserves and the coastal environment generally, which need to be protected from development.

- The third element is to find options that meet Transit New Zealand design guidelines and are in accordance with Transit's Economic Evaluation criteria.

If you know of other matters that may influence the initial choice of options please let the consultant team know by contacting anyone on the numbers listed below.

Stage One will end with the presentation of some alignment options to the public. The Transit New Zealand brief requires that one of the options for further study must be an upgrade of the existing State highway alignment.

STAGES TWO AND THREE

Stage Two will involve the consideration of these alignments and the comparative scoring of each to determine which is the favoured option.

Stage Three involves the in-depth study of the favoured alignment and the preparation of an Assessment of Effects which is needed to gain consent under the Resource Management Act 1991.

PUBLIC CONSULTATION

Full public consultation is to occur during Stages Two and Three of the Project. During Stage One targeted groups and individuals with knowledge of the relevant elements will be contacted. If you wish to be consulted please telephone any of the consultancy staff listed below.

TANGATA WHENUA CONSULTATION

The consultants will be contacting hapu representatives to organise consultation immediately to determine where the sites of cultural and spiritual importance are located. Such information will be dealt with sensitively, and if necessary confidentially, to preserve the knowledge on such matters. As a starting point contact will be made with the following groups that Transit New Zealand staff have already met with:

- Waitaha (including associated Hapu)
- Tapuika (including associated Hapu)
- Ngati Makino
- Ngati Pikiao
- Ngati Whakaue
- Nga Potiki.
- Ngati Pukenga

If your hapu group has not been contacted and you would like to be consulted on this project please telephone the consultancy staff members listed below.

FURTHER INFORMATION

The consultants (Beca Carter Hollings & Ferner Ltd) have an office in Tauranga in Harrington House. You can meet by prior appointment the staff listed below or you can telephone us at any time. The contacts are:

Christine Ralph, Keith Frentz and John Hannah
Phone: 07 578 0896 Postal Address: PO Box 903, Tauranga
Fax: 07 578 2968 email: cralph@beca.co.nz

The Transit New Zealand Project Manager is:
Colin Crampton. He can be contacted through phone: 07 838 8220

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TRANSIT
NEW ZEALAND
ARARAU AOTEAROA

STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

Since our last newsletter in May the consultants have completed the preliminary investigations to determine what areas are suitable for a new alignment of State Highway 2 from Domain Road to Paengaroa.

This newsletter advises what constraints have been identified and we seek your response on the accuracy of this information. At this stage we would be interested in your ideas as to where alignments could be constructed. Your suggestions will be taken into account when the various options for the alignment are developed. Beca Carter Hollings & Ferner Ltd propose to develop the options and publish these in an October newsletter, so we need your contributions no later than 9 September 1997.

At its last meeting the Transit Authority confirmed that its energies would be directed to the Tauranga Eastern By-pass instead of the Te Puke Internal By-pass. This decision is supported by the Western Bay of Plenty District Council. However Transit and the Western Bay of Plenty District Council are working together on plans for the interim improvement of the Te Puke mainstreet and the Waitangi area. We will keep the public informed of the progress on those plans.

Yours faithfully

Colin Knaggs
Transit New Zealand
August 1997

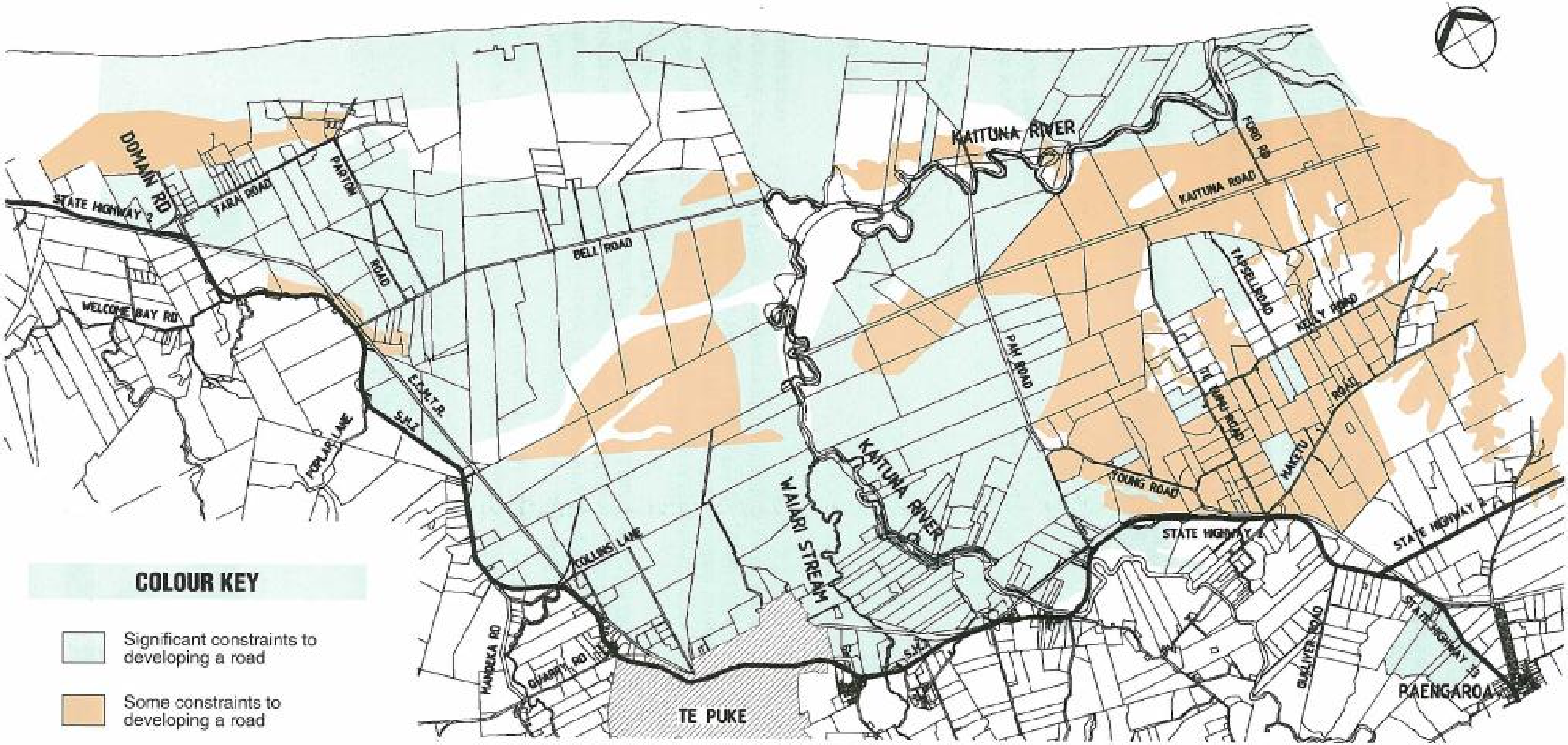
PRELIMINARY RESEARCH COMPLETE

Research into the background geotechnical aspects of the land have been completed and arrangements are being made to undertake some soil testing. All land in the area can support a highway construction but the peaty soils present more extensive construction and maintenance methods and consequently costs.

The team has consulted with Ngati Pukenga, Nga Potiki, Waitaha, Tapuika, Ngati Whakaue, Ngati Pikiao, Ngati Makino, and Ngati Kapawa to learn which areas have spiritual and cultural significance. There are few land holdings in Maori land title and few identified Pa or urupa. The Kaituna River and the coast were, and remain significant areas for the collection of food and consequently other activities.

The coastal strip is also considered to be an important ecological and landscape area and one that warrants consideration under the Resource Management Act. Other ecological areas include the Kaituna Wildlife Management Reserve and the mouth of the Kaituna River.

Residential zoning at Papamoa has been proposed in the Tauranga Review District Plan and such development brings with it social and employment services. The Western Bay of Plenty District Council is investigating industrial zonings at north Te Puke and Rangiuru.



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COLOUR KEY

🟦 Significant constraints to developing a road

🟧 Some constraints to developing a road

☐ Very few known constraints

NOTE: Not to scale

WHAT ARE THE CONSTRAINTS TO DEVELOPING AN ALIGNMENT

The plan in this newsletter is in three colours identifying three types of land constraints in the study area. All constraints are potentially reducible to some degree by further investigation, design measures, additional costs, or by negotiation.

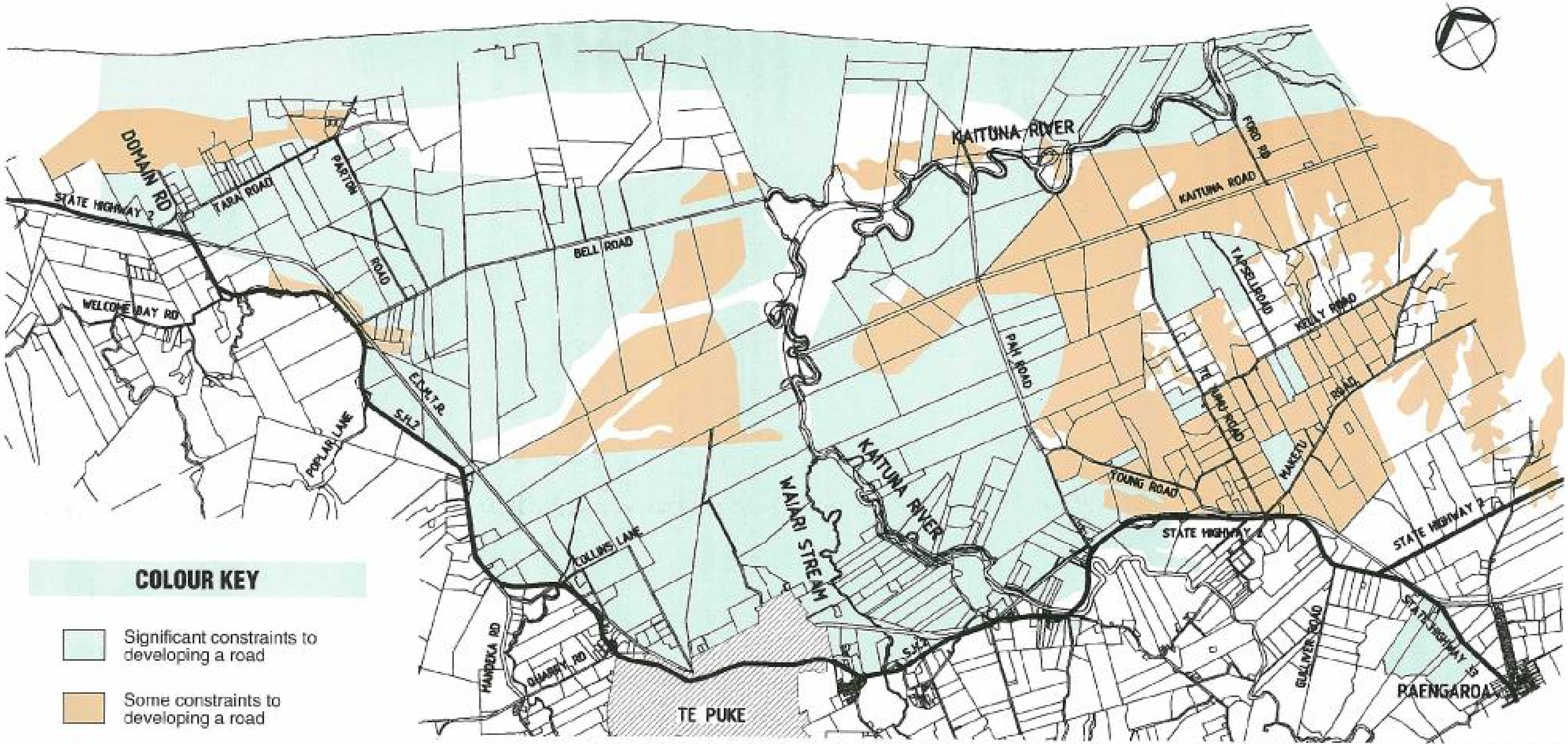
Please tell us if this information is correct and if there are other significant aspects or features that a highway should avoid. We would be interested in your suggestions as to where to place a highway. Draw on the map and send it back to the address in the next column within three weeks. We would appreciate your responses by 9 September 1997.

FURTHER INFORMATION

The consultants (Beca Carter Hollings & Ferner Ltd) have an office in Tauranga in Harrington House, Willow Street, central Tauranga. You can meet, by prior appointment, the staff listed below or you can telephone us at any time. The contacts are:

Christine Ralph, Keith Frentz and John Hannah: Phone: 07 578 0896 Postal Address: PO Box 903, Tauranga
Fax: 07 578 2968 email: cralph@beca.co.nz

The Transit New Zealand Project Manager is: Colin Crampton. He can be contacted through phone: 07 838 8220



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TRANSIT
NEW ZEALAND
ARARAU AOTEAROA

STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

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Colin Knaggs
Transit New Zealand
August 1997

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TRANSIT NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No. 4

STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

Welcome to Newsletter No. 4. This newsletter presents the three options to be studied and explains how the consultant, Beca Carter Hollings & Ferner Ltd, arrived at them. I emphasise that at this stage the preliminary analysis has identified options that are considered to be feasible and that these options will now be assessed in greater detail from several points of view; including ecology, landscape, noise, community values, archaeological and cultural.

Consultation is a very important part of the preliminary and final assessments, and I invite you to submit your views on the options to the consultant either by phone or by letter. Transit New Zealand and Beca Carter Hollings & Ferner Ltd will also be holding "Information Days" to allow you to view larger scale plans and talk to members of the study team about the options.

From now on the consultant is moving the study into top gear, so don't be surprised if over the next few weeks you come across people with clipboards wandering around your area. In some cases the consultant team will need to visit properties to study some things in more detail. If they need to come onto your property they will contact you to check that this is alright and make a convenient time to visit.

Don't forget that this is a crucial stage of the whole study and that your views are important as they will help shape the outcomes. The consultant looks forward to hearing from you and hopes that you find the information interesting.

Yours faithfully

Colin Knaggs
Transit New Zealand
November 1997

WE NEED TO HEAR FROM YOU BY 1ST DECEMBER

So if you want to respond to the options being studied you can:

- Attend the "Information Days" to be held at:

  The Paengaroa Hall on Tuesday 18 November between 4pm and 8pm.

  The Papamoa Sports Centre on Wednesday 19 November between 4pm and 8pm.

  The Te Puke Hall (Pioneer Room) on Thursday 20 November between 4pm and 8pm.

- Phone Christine Ralph at Beca Carter Hollings & Ferner Ltd on (07) 578 0896.
- Or you can write to Christine, C/- Beca Carter Hollings & Ferner Ltd, PO Box 903, Tauranga, Fax on (07) 578 2968 or Email on cralph@beca.co.nz

This is an opportunity to be involved in finding the route for Tauranga's Eastern Arterial, so please let us know what you think.

FURTHER INFORMATION

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Christine Ralph, Amanda Rowe and John Hannah
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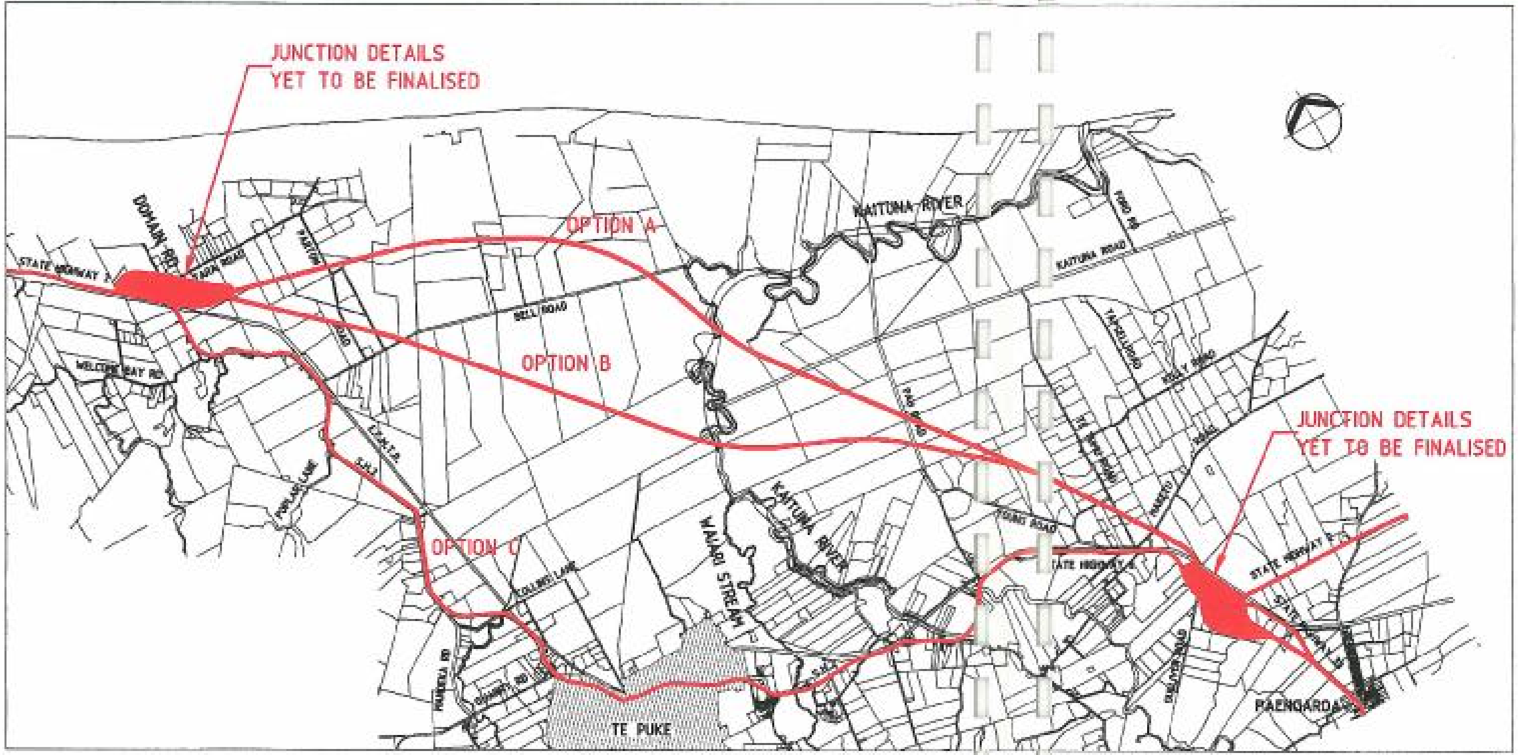
OPTIONS TO BE CONSIDERED



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DESIGN

The proposed road will consist of four lanes, two in each direction. The four lanes will be separated by a grassed median 9 metres wide and a shoulder on each side of this grassed median strip of 1.5 metres. The outer edges of the road will each have a shoulder of about 2.5 metres and a berm.

SELECTION OF OPTIONS

The following was taken into account by the consultant when considering the alignment of the possible routes.

A. Geometric Requirements

- The design speed is 100kph and takes account of the general environment.
- Desirable minimum horizontal radius is 500 metres. In constrained situations where the road is ver close to sensitive land uses, an absolute minimu radius of 400 metres with up to 8% super elevation may be used.

B. Physical Constraints

- Alignment positioned to minimise disturbance to buildings where possible (e.g. avoid houses). Th necessitates the new route being well clear o existing roads wherever possible so separate access can be maintained to properties which are service by these roads.
- Alignment positioned to suit topography to minimise cuts and fills (and hence minimise constructio width).
- Alignment positioned to suit existing propert boundaries to minimise disturbance to useable lar where possible.
- Alignment positioned to avoid areas of existing ar potential high density residential developmen
- Alignment positioned to avoid, where possible, areas of unsuitable ground conditions.
- Alignment positioned to avoid areas of ecological importance e.g. the Lower Kaituna Wildlife Management Reserve - Kaituna Wetlands.
- Alignment positioned to avoid areas of cultural sensitivity.

one of the above has precedence over any of the others. The preliminary alignment selection is generally a balance between geometric requirements, physical nstraints and cultural matters.

CONSULTATION TO DATE

onsultation with local iwi is ongoing. Representatives Ngati Pukenga, Nga Potiki, Waitaha, Tapuika, Ngati Whakaue, Ngati Pikiao, Ngati Makino and Ngati Kapawa ve been consulted to identify areas of spiritual and ultural significance and Maori land titles. This has helped in the identification of the options.

Further consultation is about to commence to discuss these options.

Two meetings have been held with the Community Advisory Group and they have given feedback on the constraints documented in Newsletter No. 3 and on the options shown in this newsletter. The Community Advisory Group is made up of representatives of organisations with roading, ecological, community and tangata whenua interests.

HOW THE ASSESSMENT OF THE OPTIONS WILL BE DONE

The community's responses to the options will be considered alongside the many other factors to determine which of the alignments should be recommended for the preferred route. Following that recommendation, an Assessment of Environmental Effects necessary for approval of the preferred alignment will be completed.

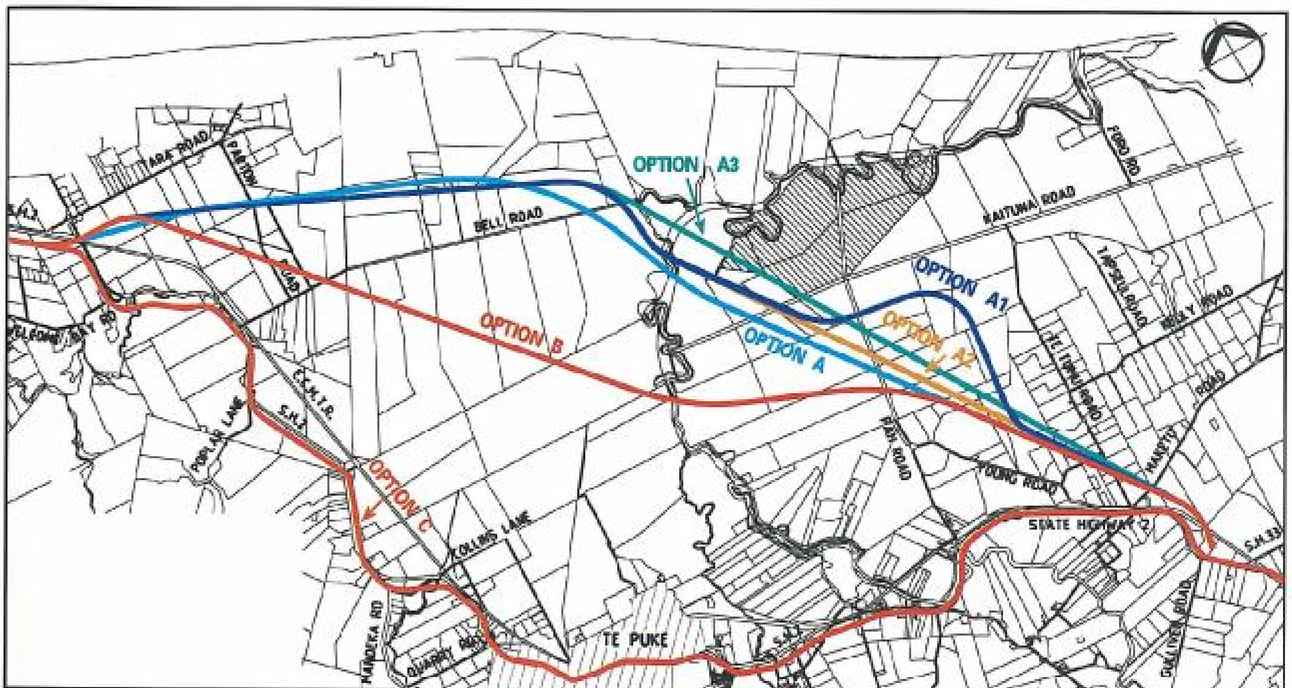
Assessment Criteria

The following factors will be studied by a range of experts:

Ecology	• e.g. wildlife, vegetation, habitat variety, species diversity and water quality.
Landscape	• e.g. landforms, opportunity for visual integration and visibility.
Noise	• e.g. proximity and effect on dwellings, public buildings and marae.
Social/Economic	• e.g. number of dwellings affected by alignment, existing land uses, community services and community responses.
Archaeological/ Cultural	• e.g. significance of archaeological and cultural sites, Maori land and areas of spiritual value.
Transportation Aspects	• e.g. vehicle operating costs, travel time, crash savings and access control.
Project Costs	• e.g. land purchase, mitigation measures, earthworks and road formation.
Economics	• e.g. the relationship between the project costs and the benefits.

TRANSIT NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No. 5



STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

The purpose of this newsletter is to tell you of three new options, Options A1, A2 and A3, which have emerged during consultation and are being considered in addition to Options A, B and C.

We had excellent turn-outs at the Open Days at Paengaroa, Papamoa and Te Puke in November. Our consultants spoke to at least 260 people during these three days when the original Options A, B and C were on display. We have received and analysed 104 submissions. The submissions did not reveal a clear opinion as to the preferred alignment. Various suggestions have been made during the on-going consultation and we show above three variations on Option A.

An assessment of these new options is being carried out at present and the next newsletter will be issued when a decision by Transit has been made on the preferred option, in May.

Yours faithfully

Colin Knaggs
Transit New Zealand
March 1998

THE THREE NEW OPTIONS

The three new options have come about as a result of consultation and are in response to some of the concerns raised. The new options attempt to traverse a longer section of the better sand hills country west of the Kaituna River and to follow property boundaries more closely. In addition, Option A3 cuts through part of the Kaituna Reserve, the part in rural production, in order to try and minimise the impact on, and disruption to, the nearby farms.

As with the original options, an assessment of the new options is being carried out. The community's response will be considered alongside the many other factors outlined in the last newsletter to determine which of the alignments should be recommended for the preferred route.

The hapu groups have been sent details of these options for their comments. Your comments are also welcomed.

At the bottom of this page is a tear off portion. If you wish to comment, please fill this out and send to Beca Carter Hollings & Ferner Ltd at the address below by 10 April 1998.

PREFERRED ALIGNMENT DELAYED

It is anticipated that an announcement on the preferred alignment will be made in May in Newsletter No. 6. Open Days will be organised when the Consultant has plans of the preferred alignment available for further discussion and analysis.

FURTHER INFORMATION

The consultant, Beca Carter Hollings & Ferner Ltd, has an office in Tauranga in Harrington House. You can meet, by prior appointment, the staff listed below or you can telephone them at any time. The contacts are:

Amanda Rowe, Christine Ralph, John Hannah and Don Young
Phone: 07 578 0896 Postal Address: PO Box 903, Tauranga
Fax: 07 578 2968 Email: arowe@beca.co.nz

The Transit New Zealand Project Manager is:
Colin Crampton. He can be contacted on telephone number: 07 838 8220

COMMENTS ON OPTIONS A1, A2 AND A3

My comments are: ……………………………………………………

Your Name:

Property Address:

Contact Phone Numbers: Home Business Fax

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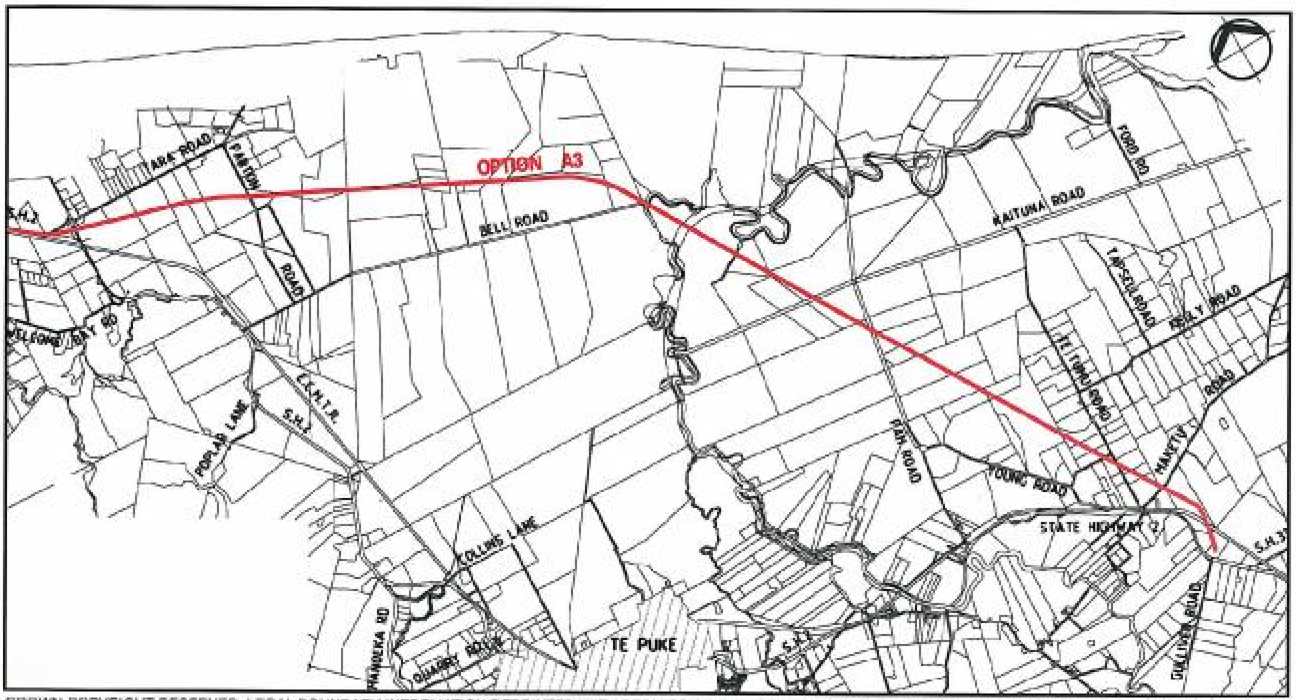
TRANSIT
NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No. 6



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STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

You will be aware that over the past 18 months Transit New Zealand's consultant, Beca Carter Hollings & Ferner Ltd (BCHF), has been studying options for the proposed Tauranga Eastern Arterial. I am pleased to announce that the favoured alignment for the Eastern Arterial is the A3 Option shown on the plan above. The Transit New Zealand Authority has resolved to proceed with the designation process to secure this land for the future roading corridor.

The next stage in the project is to carry out a more detailed assessment of environmental effects (AEE) on A3 (with some modifications). This AEE will form part of the requirement notices to Tauranga and Western Bay of Plenty District Councils to designate the route for the purposes of a State highway. The consultant will be carrying out consultation with affected landowners as part of this on going process.

Once the requirement notice has been made to the Councils there will be an opportunity for you to make formal submissions on the proposal. Until then though, the consultant is happy to hear from anyone who has concerns or queries.

Yours faithfully

Colin Knaggs
Transit New Zealand
June 1998

BACKGROUND

Six options have been considered by the project team. As part of the option selection process a study team was involved in assessing each option. The study team involved consultants specialising in noise, landscape, archaeology, ecology, social, cultural, property valuation and economics in addition to engineers. From the assessments provided by each of the team members and the community input, the preferred alignment was recommended.

Economically, the A options proved better than Options B or C. Option A3 was preferred over the other A options on archaeological, social, noise and economic grounds. It has therefore been decided to progress Option A3 through to the next stage. The A3 option that will be progressed will be a version that avoids a Pa site near the Kaituna River and the Kahikatea stand on the Kaituna Reserve. The alignment will also ensure a habitat buffer of ecological areas of the reserve, the enhancement of the reserve drainage, maximisation of the use of the sandhill country, minimisation of the impact on dairy farm management and preservation of the flood protection scheme.

THE NEXT STAGE

The next phase of the project is to complete an AEE for Option A3. This AEE will be completed over the next few months so that the notice of requirement for the designation can be lodged with the Councils prior to Christmas. The AEE process will require some detailed design to be carried out including some design on the junctions at either end of the road. The design of these junctions will be available at the open days and will mean that those landowners who have been affected in a general way in these areas will get more detailed information regarding the degree of impact.

CONSULTATION

Consultation during the next phase, which is the assessment of environmental effects of the favoured option, will occur through:

- Individual meetings with landowners directly affected
- Open days
- Public submissions
- Personal advice to directly affected property owners
- Community/Cottage meetings on request
- Hapu meetings
- Meetings and responses of the Community Advisory Group.

OPEN DAYS

Open days will be held at:

Papamoa Sports Centre	13 July	4-8pm
Paengaroa Hall	14 July	4-8pm

If you cannot attend these open days, the consultant will meet with you at a mutually agreeable time.

SUBMISSIONS

Submissions concerning the preferred option will be received until 7 August 1998. Please send them to the address below stating your name and address.

FURTHER INFORMATION

The consultant, Beca Carter Hollings & Ferner Ltd, has an office in Tauranga in Harrington House. You can meet, by prior appointment, the staff listed below or you can telephone them at any time. The contacts are:

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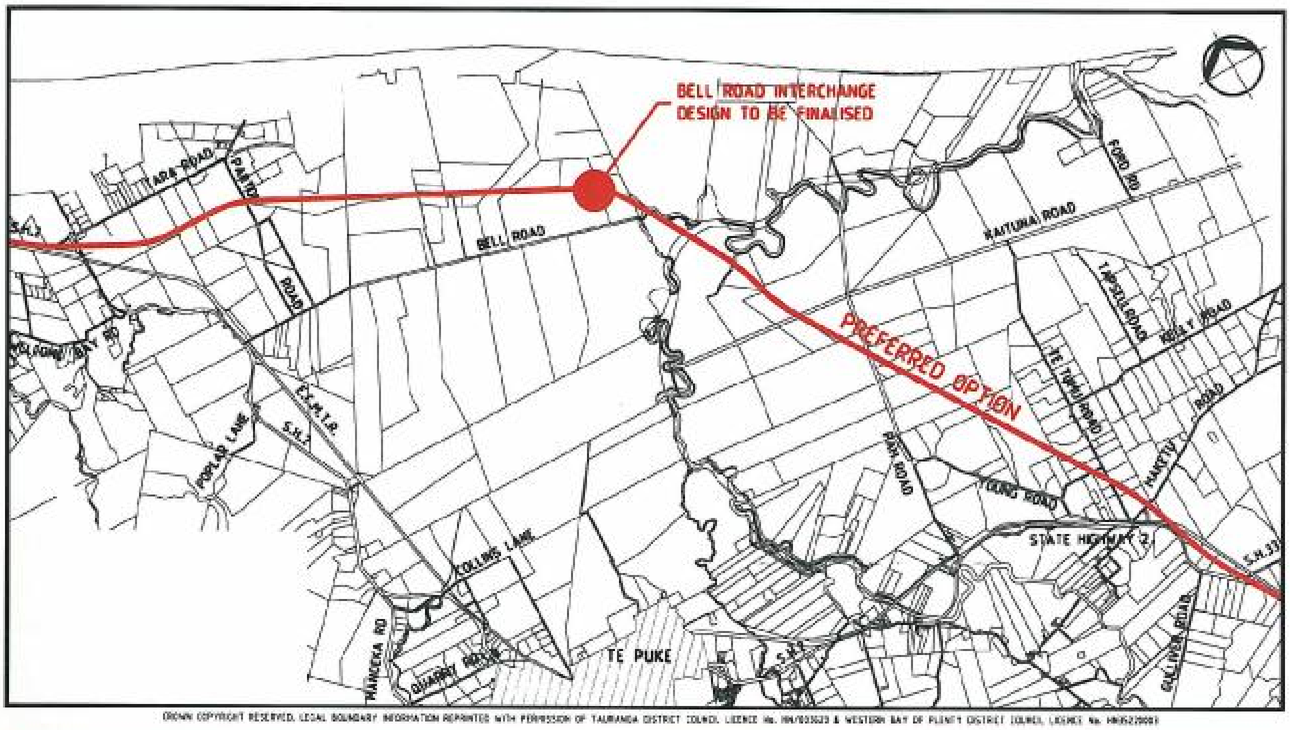
TAURANGA
DISTRICT COUNCIL

Community Newsletter No. 7



STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

Since our last newsletter in June, our consultant, Beca Carter Hollings & Ferner Ltd (BCHF), has been carrying out consultation with directly affected landowners and preparing the Assessment of Environmental Effects (AEE) for the Designation.

It was hoped that the Designation Requirement Notice would have been lodged with the Tauranga and Western Bay of Plenty District Councils prior to Christmas. However, two developments have resulted in a delay. Tauranga District Council has decided to proceed with plans to designate land for another interchange in the location of Bell Road (see above plan). The purpose of this is to give access to the future urban growth area at Papamoa East. The design for this interchange, the necessary consultation and further AEE analysis will be carried out by BCHF. The Designation Requirement Notice will be lodged at the same time as the Designation for the Eastern Arterial.

In addition, during archaeological investigations for the AEE, the location of a Pa site underneath the proposed alignment, near the Kaituna River, has been confirmed. Due to the Pa site's importance, the route has been realigned to avoid it. The realignment is minor, affecting the route from the end of Bell Road to the Kaituna Reserve.

We are very appreciative of the community's willingness to respond to this project over the past months and your agreement to let our consultant's teams onto your properties. Despite the small delays described above the project is proceeding smoothly and is well on the way to being lodged, around April next year.

Yours faithfully

Colin Knaggs
Transit New Zealand
December 1998

Paula Thompson
Tauranga District Council
December 1998

BELL ROAD INTERCHANGE

The Tauranga District Council's Strategic Plan, "Strategic Directions", envisages a substantial area of urban development north of the proposed Eastern Arterial, between the alignment and the coast, in the long term. In order to better serve this area, Tauranga District Council has decided to designate land for an interchange in the vicinity of Bell Road.

Proceeding with the designation of the land for this interchange at the same time as the designation for the Eastern Arterial gives future certainty, both for landowners and for the District Council, in the future planning of the area.

It is not intended to define the linkages between the interchange and Bell Road or any roads in Papamoa at this stage as these will be subject to future structure planning and subdivision arrangements. The interchange will be a typical diamond interchange involving overbridges.

PA SITE

Whilst carrying out investigations for the Eastern Arterial a Pa site was confirmed which, although previously recorded in the general area, has not in the past been accurately located. The investigations to date indicate that the Pa site was affected by the proposed alignment.

The NZ Historic Places Act requires consent to be given prior to any modification, disturbance or destruction of archaeological sites. Because of the significance of the Pa, as advised through consultation with Waitaha representatives, it was agreed that the route should be realigned to avoid any adverse effects to the Pa. The alignment has been moved slightly further north at the end of Bell Road.

To retain an alignment that meets Transit's safety standards for highways the alignment to the east, between the Kaituna River and the Kaituna Reserve, has been moved slightly southwest as shown on the plan overleaf.

THE NEXT STAGE

The consultants are currently completing the AEE on the proposed alignment with the above outlined modifications. Further consultation will be carried out with landowners directly affected by the changes.

Following completion of the additional work resulting from the above changes, BCHF will be lodging the Notice of Requirement on behalf of Transit around April 1999. The Designation will then be notified and you will get the chance to make submissions. In the meantime, please do not hesitate to contact the consultant at the telephone numbers and addresses given below.

FURTHER INFORMATION

The consultant, Beca Carter Hollings & Ferner Ltd, has an office in Tauranga in Harrington House. You can meet, by prior appointment, the staff listed below or you can telephone them at any time. The contacts are:

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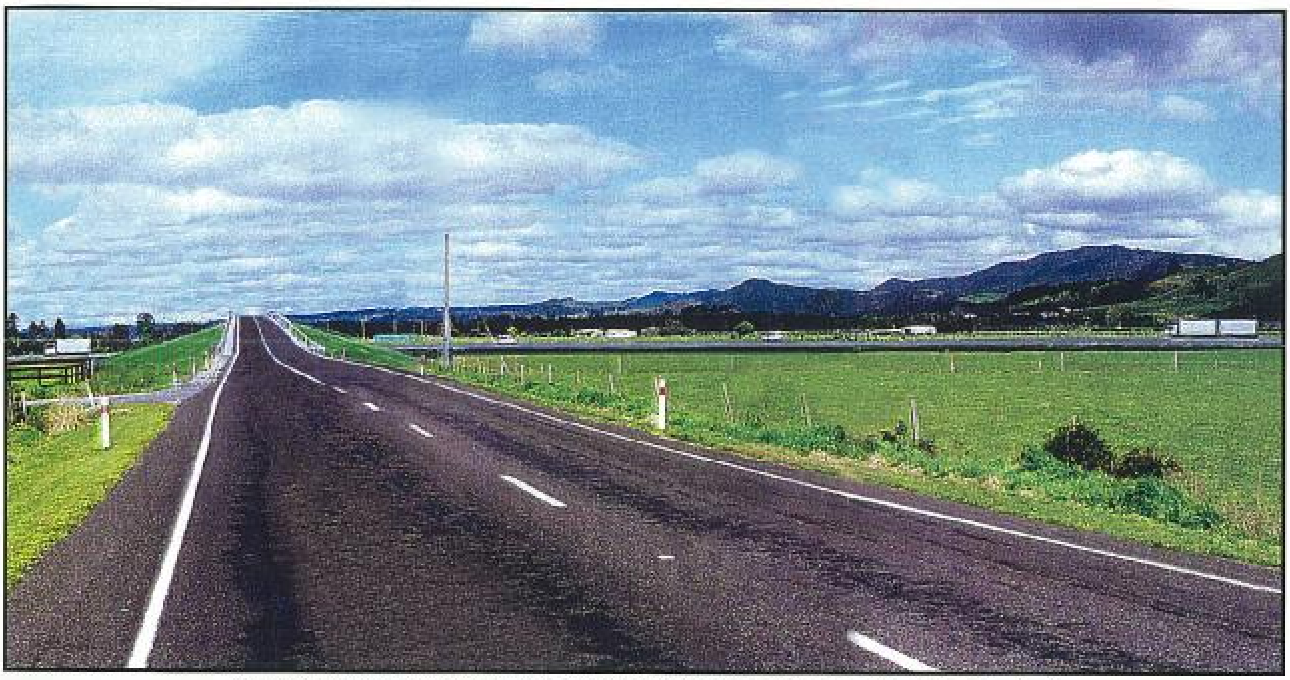
TRANSIT NEW ZEALAND
ARARAU AOTEAROA

Community Newsletter No. 8



View of Proposed Arterial and Parton Road Overbridge (Before Mitigation Planting)

STATE HIGHWAY 2
EASTERN ARTERIAL ROADING PROJECT

Our apologies for the time that has lapsed since the last newsletter. You may recall our last newsletter (December 1998) when we reported two outstanding issues preventing lodgment prior to Christmas 1998. These matters have now been resolved and we are going to lodge the designation shortly. We are hopeful that a Hearing will be held in the latter part of this year, although it may not be until the New Year. The timing of the process is determined by the Tauranga and Western BOP District Councils.

Four Notices of Requirement for designation will be lodged with the respective Councils – one for the Eastern Arterial by Transit New Zealand and one for the Bell Road interchange by Tauranga District Council. The third and fourth notices relate to the Sandhurst Interchange (located between Truman Lane and Mangatawa Lane) which involves separate designations on behalf of Tauranga District Council and Transit New Zealand.

This newsletter includes a summary of the mitigation measures recommended in the draft Assessment of Environmental Effects. We have provided information on the social/recreational, ecological, visual, archeological and noise measures as they seemed to be of the most interest to people. More detailed information is recorded in the Assessment of Environmental Effects which will be available once the designations are lodged.

Yours faithfully

Colin Knaggs
Transit New Zealand
August 1999

ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following is an outline of the mitigation measures recommended by the consultant team and agreed to by Transit New Zealand, and Tauranga District Council where it relates to the Bell Road interchange.

ECOLOGICAL

The alignment will be close to habitats of high and moderate value and the following measures are suggested to reduce potential effects:

- The Kaituna river crossing should be constructed from stopbank to stopbank to avoid disruption to river edge habitat;
- Wetland/swale treatment areas should be developed parallel to the highway to receive roadway stormwater before discharging into streams. Locally sourced plants should be used;
- Produce a Silt and Sedimentation Control Plan prior to construction commencing;
- Roadway derived stormwater from the highway at the reserve area will be isolated and directed to discharge into the Kaituna drainage scheme rather than the wetlands reserve.

VISUAL/LANDSCAPE

A planting plan has been prepared to mitigate any potential visual effects, particularly at main intersections and at the Kaituna River bridge.

ARCHAEOLOGICAL

- Transit NZ will seek to agree a protocol with all hapu that confirms the procedures to protect or manage archaeological sites under the NZ Historic Places Act during construction and to protect any artifacts that might be found.
- The exact position of several sites is unknown and consequently monitoring of earthworks in several locations is recommended. It is anticipated that a hapu representative would be present when topsoil is removed.

NOISE

The mitigation measures that are recommended to maintain noise levels within Transit guidelines include:

- use of noise attenuation barriers and bunds to screen houses and the Lower Kaituna Wildlife Management Reserve from traffic noise, and the use of noise-reducing road surfaces.
- An even lower noise level is being recommended for the area near the reserve. Monitoring will be undertaken at the Reserve at six-monthly intervals. Should noise levels exceed 50dBA then additional noise mitigation works will be implemented to reduce the level by 4 dBA.

SOCIAL

Transit NZ will:

- Contribute to the Kaituna Drainage Scheme's capital and maintenance costs administered by Environment BOP;
- Provide project information to the Councils for distribution to the community on an ongoing basis and to directly affected landowners as required.
- Meet the construction costs of an alternative access to the Reserve from the end of Te Tumu Road, (along the unformed portion of Kaituna Road), because the current access from Pah Road will no longer be available.
- Produce a Dust Mitigation plan as part of the earthworks consents, to ensure that dust is not a problem during construction.
- Provide directional signs to Te Puke at each end of the arterial.

RECREATION

To mitigate the loss of approximately 8.66ha of reserve land, Transit NZ will:

- Provide approximately 10.7ha of land adjacent to the reserve to be vested as a Government Purpose Lower Kaituna Wildlife Management Reserve.
- The stormwater retention pond at the reserve required during construction may be retained if the Department of Conservation and Eastern Fish and Game Council consider it appropriate to the long-term use of the reserve.

FURTHER INFORMATION

The consultant, Beca Carter Hollings & Ferner Ltd, has an office in Tauranga in Harrington House. You can meet, by prior appointment, the staff listed below or you can telephone them at any time. The contacts are:

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The Transit New Zealand Project Manager is:
Colin Crampton. He can be contacted on telephone number: 07 838 8220

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APPENDIX 4
Ecological Characteristics and Appraisal of Effects

TRANSIT NEW ZEALAND, HAMILTON

TE PUKE EASTERN ARTERIAL

ECOLOGICAL CHARACTERISTICS AND APPRAISAL OF EFFECTS

BIORESEARCHES
Consulting Biologists and Archaeologists, P O Box 2828, Auckland 1, New Zealand

Transit New Zealand, Hamilton

Te Puke Eastern Arterial

Ecological Characteristics and Appraisal of Effects

AUGUST 1999

FOR : BECA CARTER HOLLINGS & FERNER LTD (TAURANGA)
BY : BIORESEARCHES
K V Bennett B.Sc; Dip. Wild. Mgt
G L Don M.Sc Hons
R O Gardner Ph.D
E StG Sides M.Sc Hons

CONTENTS

CONTENTS

Page No.

1. INTRODUCTION

This report presents the results of field investigations of the final preferred Option (Option A3) for the Te Puke Eastern Arterial which would bypass Te Puke township on its northern side (Figure 1).

That Option was selected from several alternatives via a desk-top evaluation which considered a range of factors (eg. land ownership, geotechnics, economics, noise, landscape etc) including ecological aspects. The final evaluation ranked Option A3 as the least preferred on an ecological basis in isolation, but was the most preferred when all the other factors were integrated.

Subsequent to the original proposal for Option A3, the proposed roadway alignment was moved to avoid all the areas of remnant kahikatea vegetation to the north of Kaituna Road, which are situated in an otherwise grazed area of the Lower Kaituna Wildlife Management Reserve (Figure 2). As a result of this modification the Option A3 alignment would traverse land which is comprised predominantly of grazed pasture.

Option A3 would also cross a waterway draining into the Bell Rd oxbow of the Kaituna River, the Bell Rd oxbow itself to the northeast of the Niccol property entrance, the Kaituna River to the southwest of the present launching ramp and carpark, the Waimarae Stream which flows into the western section of the Kaituna wetland and several large constructed drains.

This report focuses on the ecological aspects of the proposed alignment. It does not consider aspects such as recreational or amenity values, such as the use of some areas for waterfowl and "upland" game hunting.

A total of six sites were sampled for aquatic biota and five for water, sediment and elutriate quality. Specific surveys to document the vegetation and wildlife features were also completed. An additional part of the brief for this survey was to provide comment on some areas of the Kaituna wetland habitat. The brief did not include a full baseline field survey of the entire Lower Kaituna Wildlife Management Reserve.

Beca Carter Hollings & Ferner

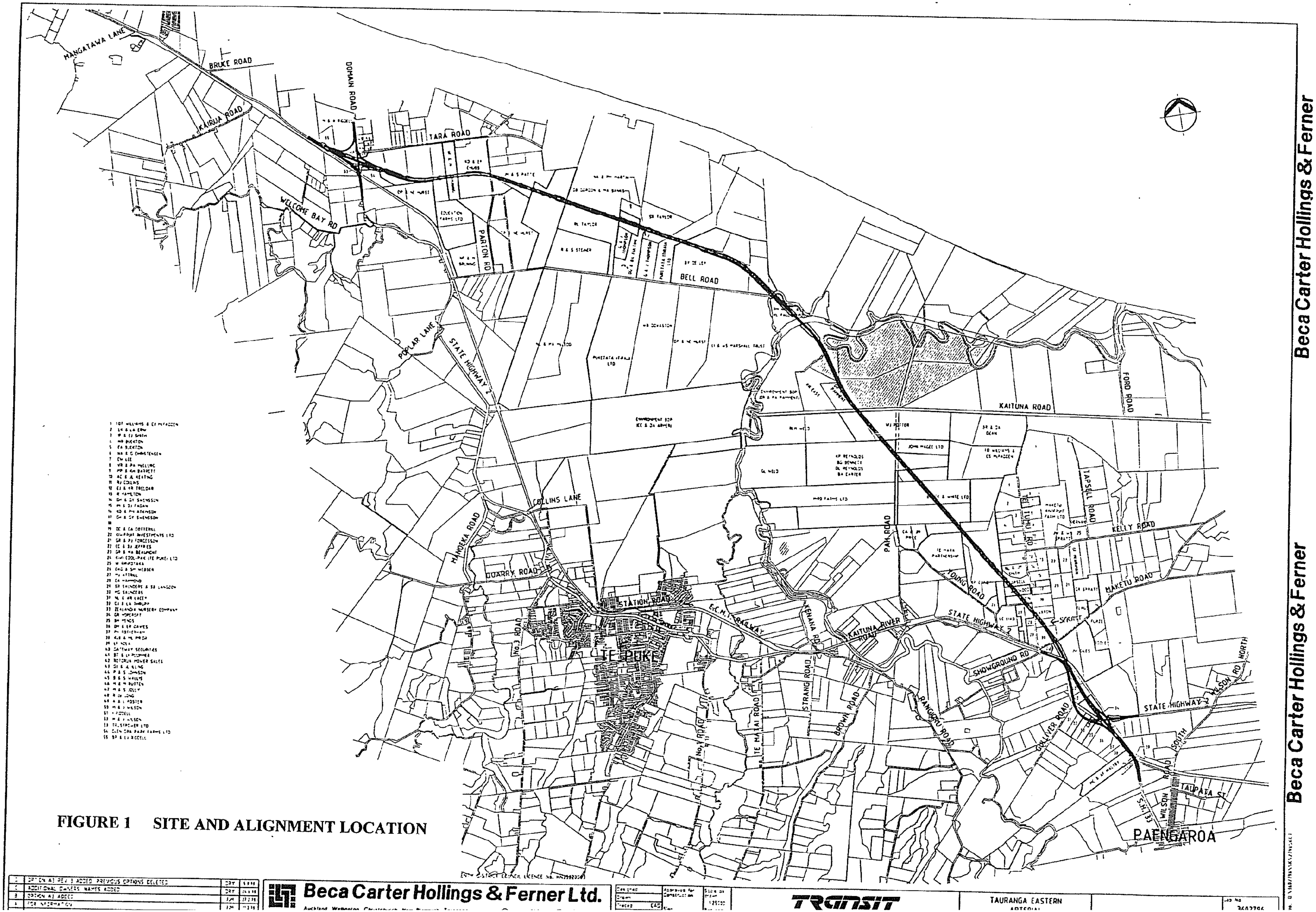

FIGURE 1 SITE AND ALIGNMENT LOCATION

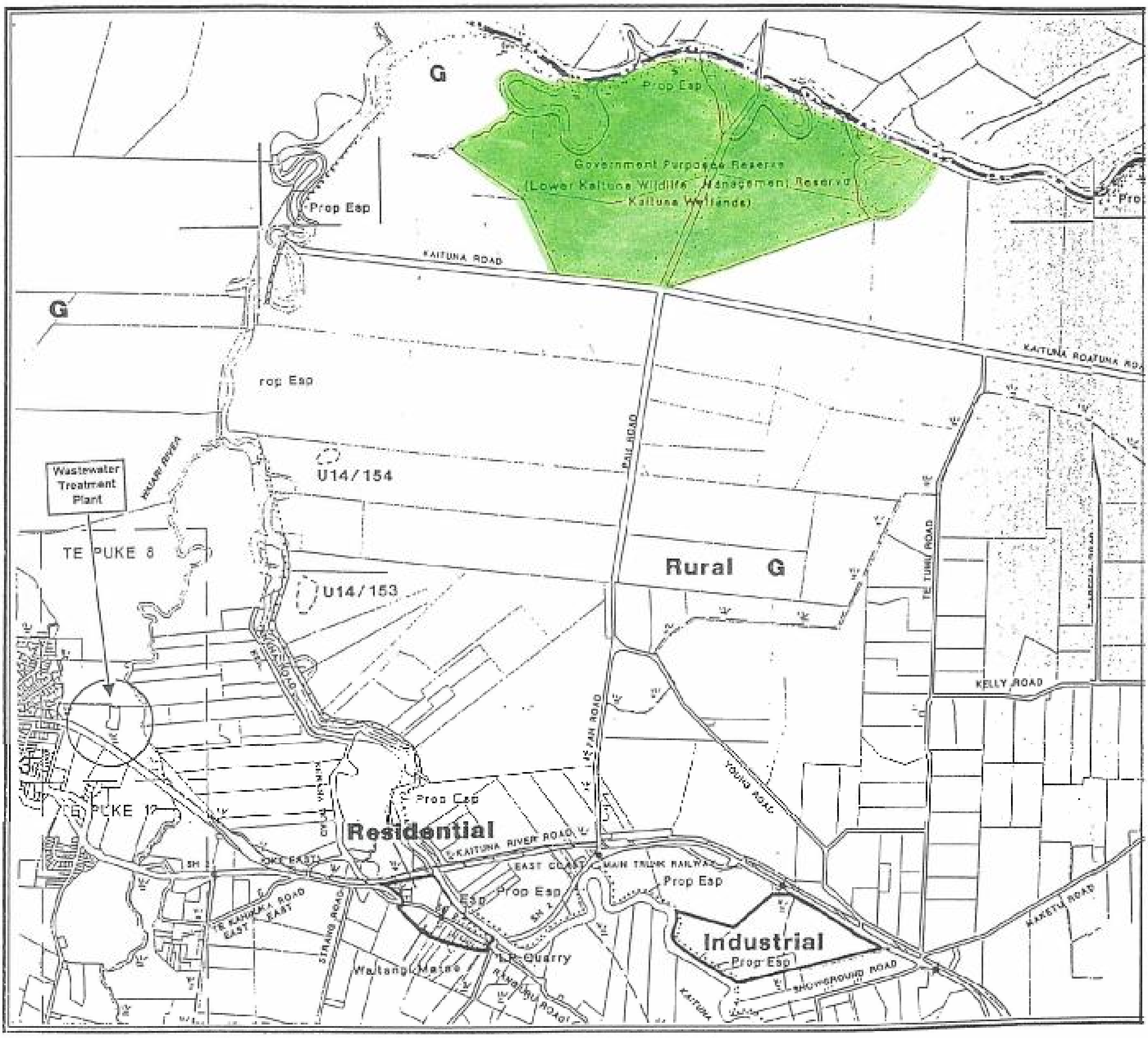

FIGURE 2 LOWER KAITUNA WILDLIFE MANAGEMENT RESERVE

Irving, 1991 following the preliminary botanical survey of Miller, 1983 considered that the whole Lower Kaituna Management Reserve (*"apart from pasture and rough pasture areas"*) should be ranked as being of high botanical value (i.e. it is the last or one of the last few remaining areas of a vegetation type within an Ecological District in a modified condition but retaining the main elements of composition and structure).

Both Irving, 1991 and Beadel, 1994 use rankings for botanical conservation developed by Shaw 1988, 1994. Those rankings in descending order of significance are exceptional (= national importance), very high (= regional importance), high (= district importance) and moderate (= local importance). This scale is comparable with the N.Z. Wildlife Service (now D.O.C.) ranking system for indigenous fauna. International botanical sites are those containing ecological processes, vegetation types or taxa that have significance beyond New Zealand because of (a) features so special that they have an international profile and (b) they are of importance for international research (e.g. comparable with similar features in other countries).

Note that the "footprint" of the proposed alignment does not intrude into the area of the Reserve defined as having a high botanical rating by Irving, 1991.

The Eastern Arterial roadway would lie in the Tauranga Ecological District, a summary of which is presented in Appendix 6.1. (McEwen, 1987).

The Department of Conservation (D.O.C), 1996 describes the "Maketu-Waihi Estuaries and Kaituna River Mouth Complex" as a significant wetland habitat complex in an international context. That area of c.863 ha comprises the Waihi Estuary, Maketu Estuary and the adjacent Kaituna River mouth. The description in D.O.C, 1996 does not, however, include specific reference to the Lower Kaituna Wildlife Management Reserve which is adjacent to the proposed alignment (refer Appendix 6.2).

The Proposed Regional Coastal Environment Plan (Environment B.O.P, 1995) also lists the "Maketu/Waihi Estuaries and Okurei Point" as being an Area of Significant Conservation Value (ASCV) but the wetland area adjacent to the proposed alignment is excluded on the basis of its being beyond the coastal zone. The landward boundary of the Coastal Zone is defined as whichever is the lesser of -

- *(i)* *"1 km upstream from the mouth of the river; or*
- *(ii)* *the point upstream that is calculated by multiplying the width of the river mouth by 5."*

The E.B.O.P, 1995 Summary is shown in Appendix 6.3.

The proposed Bay of Plenty Regional Land Management Plan lists the "Kaituna River and Wetland/Lower Kaituna Wildlife Management Reserve" as being a significant wetland habitat. The listed habitats essentially follow Rasch, 1989.

Beadel, 1994 considered the botanical values of Kaituna River freshwater wetland, which is included in the "Maketu/Waihi Estuaries and Okurei Point" ASCV, to be of importance in the context of the District; it was not considered to be of Regional or National Significance. Maketu Spit and Waihi Estuary were also considered to contain vegetation of significance within the District (Appendix 6.4).

Nearby areas of coastal vegetation of higher significance were the Kaituna sand dunes (National significance) and the Te Arawa freshwater (Maketu-Waihi) wetland which is of Regional significance (Appendix 6.2).

Beadel, 1994 notes, however, that the "Kaituna River" vegetation is contiguous with a larger area (i.e. that closer to the proposed alignment) which is outside the coastal zone.

Rasch, 1989 (based on 1982-84 field surveys) rated the "Kaituna River and Wetland/Lower Kaituna Wildlife Management Reserve" (i.e. 22 km of river and 50 ha of wetland) as being of "High" wildlife value. The 50 ha area of wetland at the "Matakana Island Wildlife Refuge" was considered to be of "Outstanding" wildlife value (Appendix 6.5).

The total area of the Lower Kaituna Wildlife Management Reserve is c.229 ha. Of that area c.56 ha are presently leased as grazing land by the Department of Conservation.

The comment in Rasch, 1989 regarding a 50 ha area of wetland having a "High" wildlife value appears to underestimate the area of notable habitat within the Reserve relative to similar remaining areas in the District.

Garrick, 1990 summarised the natural features of the Reserve based on a description of the area prepared in 1980. Between 1980 and 1990 there had been no formal surveys undertaken within the Reserve although the area had been briefly inspected by a botanist in 1983. Garrick, 1990 concluded that *"on the basis of size alone then, the Kaituna reserve is of considerable local and regional significance in terms of its existing and potential values as wildlife habitat. In terms of representativeness, that is, as an example of a freshwater wetland type which formerly characterised the area, the reserve is of lesser significance than some of the other wetlands which occur within the region due to the many unnatural and modifying influences which have acted on it and the future management undertakings which will be required to maintain it as a wetland. Nevertheless the area is still of some importance in this regard as an example of a 'landform' or ecosystem which has been severely reduced in extent elsewhere."*

At present the Management Reserve area is jointly managed by the Department of Conservation in regard to high flora and fauna values of the northern portion in particular, and the Eastern Fish and Game Council, which has excavated areas of the wetland and planted native vegetation to create waterfowl habitat. That area, predominantly in the southeastern section, as well as other areas, is utilised for gamebird hunting, including both waterfowl and "upland" gamebirds.

The Department of Conservation's Management Strategy lists the following regarding the Kaituna Wildlife Management Reserve:-

Issue

> *"4 Joint management of the Kaituna Wildlife Management Reserve is between two different agencies (the Department and Eastern Region Fish and Game Council) result in differing objectives for management of the Reserve."*

Management

> *"4 Raise and maintain water levels (about 1 m above Moturiki datum) in the Lower Kaituna Wildlife Management Reserve in conjunction with the Environment BOP.*
>
> *5 Divide the Lower Kaituna Wildlife Management Reserve into :*
>
> - *areas essential for protecting representative ecosystems; and*
> - *areas which could be used for gamebird and waterfowl hunting.*
>
> *The latter areas would be managed by Eastern Region Fish and Game Council, through appointment to control and manage under the Reserves Act 1977.*

Priority activity for Tauranga Management Area

> - *Manage the freshwater wetlands on Matakana Island and Kaituna to ensure their long term viability."*

The Kaituna River provides habitat and a migratory pathway for a diversity of native fish (refer Section 2.3.2.4.) but was not considered to be a wetland area of national importance to fisheries (Davis, 1987). Maketu Estuary was considered to be of "significant" but not "outstanding" fisheries value; "*This estuary is important to the Maori people as a traditional fishing area, although it has been modified substantially by the local catchment board.*" (Davis, 1987).

Mitchell, 1990 identified whitebait spawning sites in the lower Kaituna River. Those sites are shown in Appendix 6.6 and are within the area identified by Beadel, 1994 as containing significant vegetation in the context of the District. That area is well beyond the proposed roadway alignment.

A whitebait survey of the Kaituna River was conducted by Fisheries Research Division (Saxton *et al*, 1987) in 1983 (August to November) which found that of 7973 whitebait analysed, 88.2% were inanga (*Galaxias maculatus*), 8.5% were banded kokopu (*G. fasciatus*) while 3.0% were koaro (*G. brevipinnis*). Of the total sample 0.3% were unidentified *Galaxias* species including giant kokopu (*Galaxias argenteus*) which was described as relatively insignificant in terms of the numbers present.

In general the Kaituna River was classified as an inanga-dominated whitebait river. On the basis of both mean and peak counts for the five main whitebaiting waterways in the Bay of Plenty (Rangitaiki, Waioeka, Whakatane, Kaituna Rivers and Pongakawa Stream) the Kaituna River was rated as the fourth in order of importance as listed respectively above.

Therefore the most significant habitat **traversed** by the Option A3 alignment would be the Kaituna River mainstem upstream from the existing boat ramp and carpark.

The most significant **nearby** habitat is the non-pasture area of the Lower Kaituna Wildlife Management Reserve.

The ungrazed area of the Reserve, which consists of c.130 ha of wetland habitat and c.43 ha of scrub/sand ridge habitat, represents about 74% of the remaining, but once extensive, Kawa Swamp (refer Figure 4A), i.e. it is the only large remnant of the swamp remaining. In the context of the <u>eastern</u> Tauranga Ecological District it is the largest area of heavily vegetated wetland habitat, and on an areal basis is similar to the lower and middle reaches of the Kaituna River (Table 1A).

The Reserve was not, however, included in D.O.C. 1996 which summarises wetland habitats of international significance, or in E.B.O.P. 1995 which outlines areas of regional significance. Within the context of the Bay of Plenty Conservancy area the Reserve represents less than 1% of the total area of wetland habitat. The reason for the Reserve's exclusion from the "Maketu - Waihi Estuaries and Kaituna Mouth Complex" wetland was that it was too dry (i.e. did not contain sufficient or sufficiently high wetland values) at the time of the comparative assessments (D.O.C. pers. comm.). The recent installation of a new culvert (refer below) should alleviate that situation on a permanent basis.

The wildlife value of the Reserve area was stated as "high" (i.e. district importance) in Rasch, 1989 and local or regional (i.e. moderate or very high) in Garrick, 1990. Its botanical values were also described as "high" by Irving, 1991. (Table 1B).

Of the c.130 ha of wetland habitat in the Reserve (i.e. excluding scrub and grazed pasture) all areas have been modified to varying degrees by drainage works which had commenced in the 1920's (Figure 3) and the more recent Kaituna River Catchment Scheme which resulted in realignment of the River's mainstem. The most recent modification to the area has occurred in its southeastern portion; Eastern Region Fish and Game Council has excavated a number of shallow ponds and planted native vegetation for the purposes of wildfowl shooting and habitat enhancement and has constructed vehicle access tracks around some pond perimeters. A number of permanent maimais is present. The Council also owns and administers a 7 ha Wildlife Refuge on the southern side of Waihi Estuary. The brief summarised basis for the more recent works in the Reserve is outlined below.

Garrick, 1990 stated that since 1980 *"the wetlands have been subject to prolonged periods in which inundation has been less frequent and extensive than was previously the case, and accordingly it is probable that there has been some change in the distribution and abundance, and possibly even presence, of certain flora and fauna. More extensive drying out of parts of the reserve during this period may also have resulted in some change to ground levels and contours through shrinkage and settling, and it is conceivable that the 1989 Edgecumbe earthquake may have had a similar net effect."*

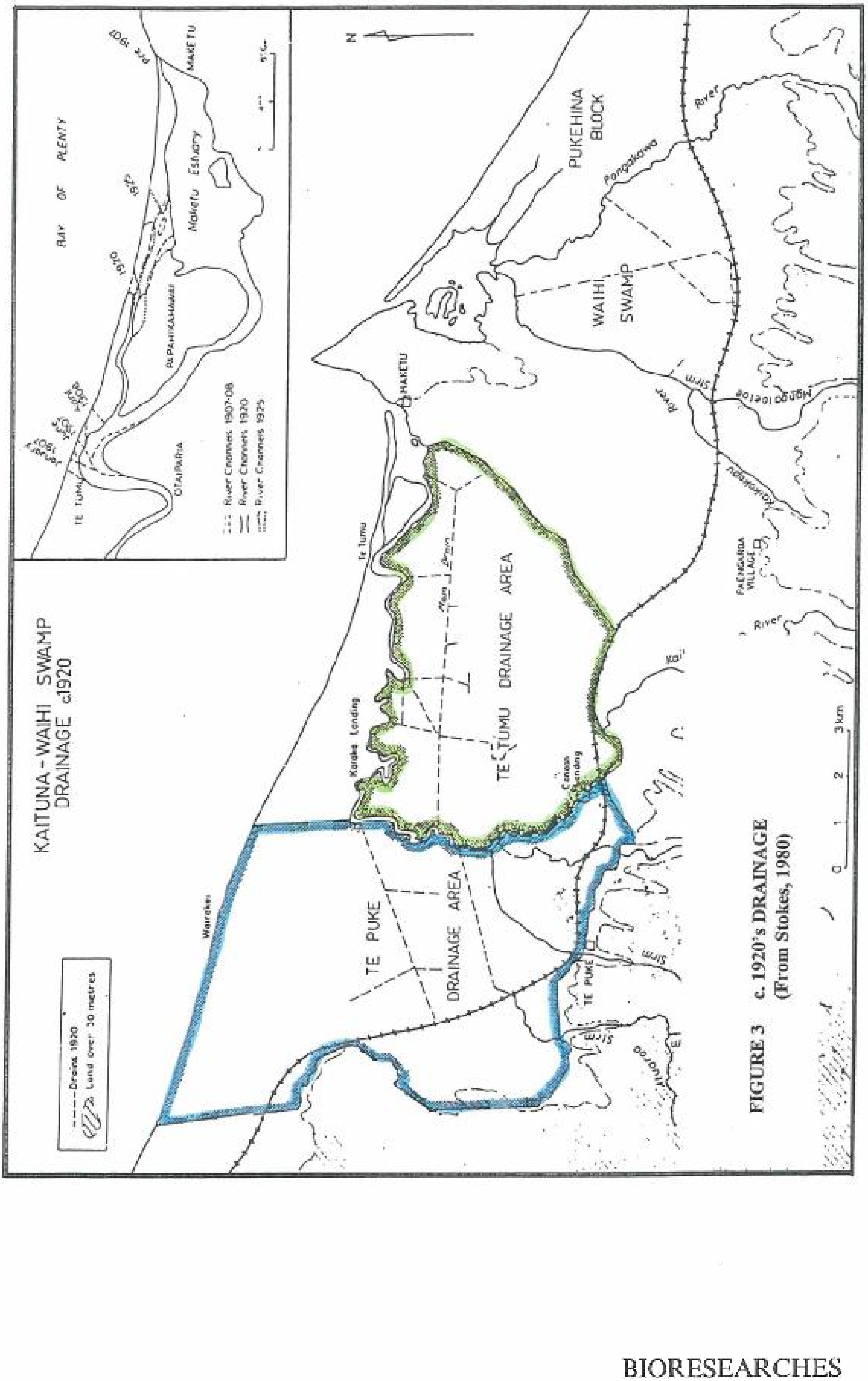

FIGURE 3 c. 1920's DRAINAGE
(From Stokes, 1980)

It was decided that water levels should be raised to c.0.7 m across a series of excavations.

"Excavation and development of ponds in the vicinity of old river loops and water courses is likely to result in the creation of diverse and productive wetland bird habitat. However, much of the reserve elsewhere has an underlying peat horizon, and excavation in these areas may not produce the same diversity and quality of habitat. Bog or peat soils are more acidic and less fertile than mineralised soils and this should be borne in mind and investigated before development plans for the restoration and enhancement of the reserve are drawn up.

Currently resource information pertaining to the reserve is also inadequate. Prior to the formulation of any management or development plan, surveys of the distribution of flora and fauna within the area will be required. As previously indicated, flora of rare or threatened status may be present within the reserve, as may be some vegetation associations not adequately protected elsewhere. Flora and fauna surveys would identify parts of the reserve that may require special attention; would assist with the design of an enhancement programme and management planning in general; and would enable a better assessment to be made of the reserve's significance to the Department of Conservation and to fish and game interests. Such information is needed to answer, amongst numerous other concerns, such questions as what weed management will be required, should certain areas be grazed, should a planting/revegetation programme be undertaken?"

The suggested courses of action in Garrick, 1990 which relate to the habitats of native flora and fauna were as follows :

> "7. *Undertake a botanical survey of the reserve to determine whether significant flora and/or vegetation associations are present within the area, and to provide such other resource information as may be required for management planning.*
>
> 8. *Undertake a wildlife survey to investigate the current distribution and abundance of species, and to describe and assess habitats."*

The field investigations reported in the following section were completed in the period 3 - 6 August 1998 under fine, dry conditions. None of the waterways was in flood at the time of sampling. The eastern part of the Reserve and western-most kahikatea stand were also inspected on 27 July 1999 with members of Eastern Fish & Game and the Wildfowlers Association.

Following completion of the field investigations reported herein, a 1.2 m diameter culvert was installed at the "lower oxbow" which will enable pumping of water from the diagonal drain to the wetland to cease. The flap-gate controlled culvert, understood to be situated above the upstream intrusion of the salt wedge, will raise water levels generally throughout the wetland area, provide ready access to the wetland for fish and probably aid the control of terrestrial weed species in lower lying areas. The new culvert is about two kilometres downstream from the proposed Kaituna River bridge crossing of the alignment and about 1.7 km from the alignment itself at its closest point.

Plates of the sampling stations and general habitat are shown in Section 7.

Following the draft AEE preparation, discussions were held with Eastern Fish and Game, Department of Conservation and the Wildfowlers Association; comments were also received from Environment B.O.P.

TABLE 1A WETLAND AREA SUMMARY

KAWA SWAMP REMNANTS		
	ha approx.	**% total**
Kaituna River (lower; Beadel, 1994)	34	19.3
Lower Kaituna Wildlife Management Reserve	130 (c)	73.9
Te Arawa wetland	12	6.8
TOTAL	**176 ha**	
EASTERN TAURANGA ECOLOGICAL DISTRICT (Mt Maunganui to Waihi Estuary)		
(notable wildlife and/or botanical freshwater wetlands; Rasch, 1989; Beadel, 1994)		
	ha approx.	**% total**
Middle Kaituna River (10.5 km)	32 (a)	9.3
Lower Kaituna River (22 km)	110 (b)	32.0
Lower Kaituna Wildlife Management Reserve	130 (c)	37.8
Te Arawa wetland	12	3.5
Waewaetutuki (part)	60	17.4
TOTAL	**344 ha**	

(a) 1.5 km stated in Rasch, 1989 incorrect; based on nominal width of 30 m

(b) based on nominal width of 50 m

(c) total area: c.229 ha
grazed: c.56 ha
75% remainder : c.130 ha (25% scrub/sand ridge habitat)

BAY OF PLENTY CONSERVANCY (D.O.C, 1996)
(wetland sites of international importance)

Wetland Area	**ha (approx.)**
● Tauranga Harbour	19554
● Maketu-Waihi Estuaries and Kaituna River Mouth Complex	863 (a)
● Ohiwa Harbour	2800
● Kaituna Catchment Lakes and Wetland Complex : Lake Rotorua Lake Rotoiti Lake Rotoehu Lake Rotoma	13253
● Upper Tarawera Catchment Lakes & Wetland Complex	7658
● Arahaki Lagoon	30
TOTAL	**44158 ha**

(a) excludes Lower Kaituna Wildlife Management Reserve and Kaituna River areas.

The term "wetland" is used in the sense defined in the text of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention). Thus wetlands are "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". (D.O.C, 1996).

TABLE 1B WETLAND AREA VALUES AND SIGNIFICANCE

KAWA SWAMP REMNANTS	**Botanical**	**Wildlife**
Kaituna River (lower; Beadel, 1994)	District Beadel, 1994	High Rasch, 1989
Lower Kaituna Wildlife Management Reserve	High Irving, 1991	High Rasch, 1989 Local or Regional Garrick, 1990
Te Arawa wetland	Regional Beadel, 1994	**NR** Rasch, 1989
EASTERN TAURANGA ECOLOGICAL DISTRICT (Mt Maunganui to Waihi Estuary)		
Middle Kaituna River	**NR** Beadel, 1994	High Rasch, 1989
Lower Kaituna River	District Beadel, 1994	High Rasch, 1989
Lower Kaituna Wildlife Management Reserve	as above	as above
Te Arawa wetland	as above	as above
Waewaetutuki (part)	District Beadel, 1994	**NR** Rasch, 1989

NR = not rated
Also refer Appendix 6.4 - significant botanical sites in the Tauranga Ecological District.
Also refer Appendix 6.5 - significant freshwater wetland wildlife habitats.

Rankings (decreasing order of significance) (a) international, national, regional, district.
(b) outstanding, high, moderate-high, moderate, potential.

2. ECOLOGICAL CHARACTERISTICS

2.1. Vegetation and Flora

2.1.1. Introduction

The route is situated in the low-lying coastal terrain c.5 km upriver from the mouth of the Kaituna River, on sandy alluvium or sandy peats. This ground was subject to intensive drainage projects near the beginning of this century, and the native vegetation, perhaps originally of flax, cabbage tree scrub communities and kahikatea forest, is now found only on the wettest ground, towards the Kaituna River mouth.

2.1.2. Vegetation History

Figure 4 (Stokes, 1980) indicates that the broad vegetation type in the proposed alignment area in pre-European times was "swamp" adjacent to the coast with "fern and manuka scrub" further inland.

Soils on either side of the Kaituna River consist of gleys and organics (Stokes, 1980). The Te Puke block of 10,510 ha in 1879 is described by Stokes, 1980 as consisting *"mainly of open fern land, gently undulating but crossed by deep bush covered gullies"*. To the north was an area of coastal swamp and sand hills; to the south, some fairly broken country covered with bush. The "swampland" on the eastern and southern side of the Kaituna River was known as the Kawa Swamp; the similar area on the western side (adjacent to the existing Bell Road) was the Te Parapara Swamp. (Refer Figure 4A).

The main early industry was flax milling which persisted in various forms and with a variable number (0-5) of mills operating at any one time. *"Large areas were damaged by fires which swept through the swamps periodically; big fires were recorded in 1891, 1905, 1906, 1908 and 1914"* (Stokes, 1980).

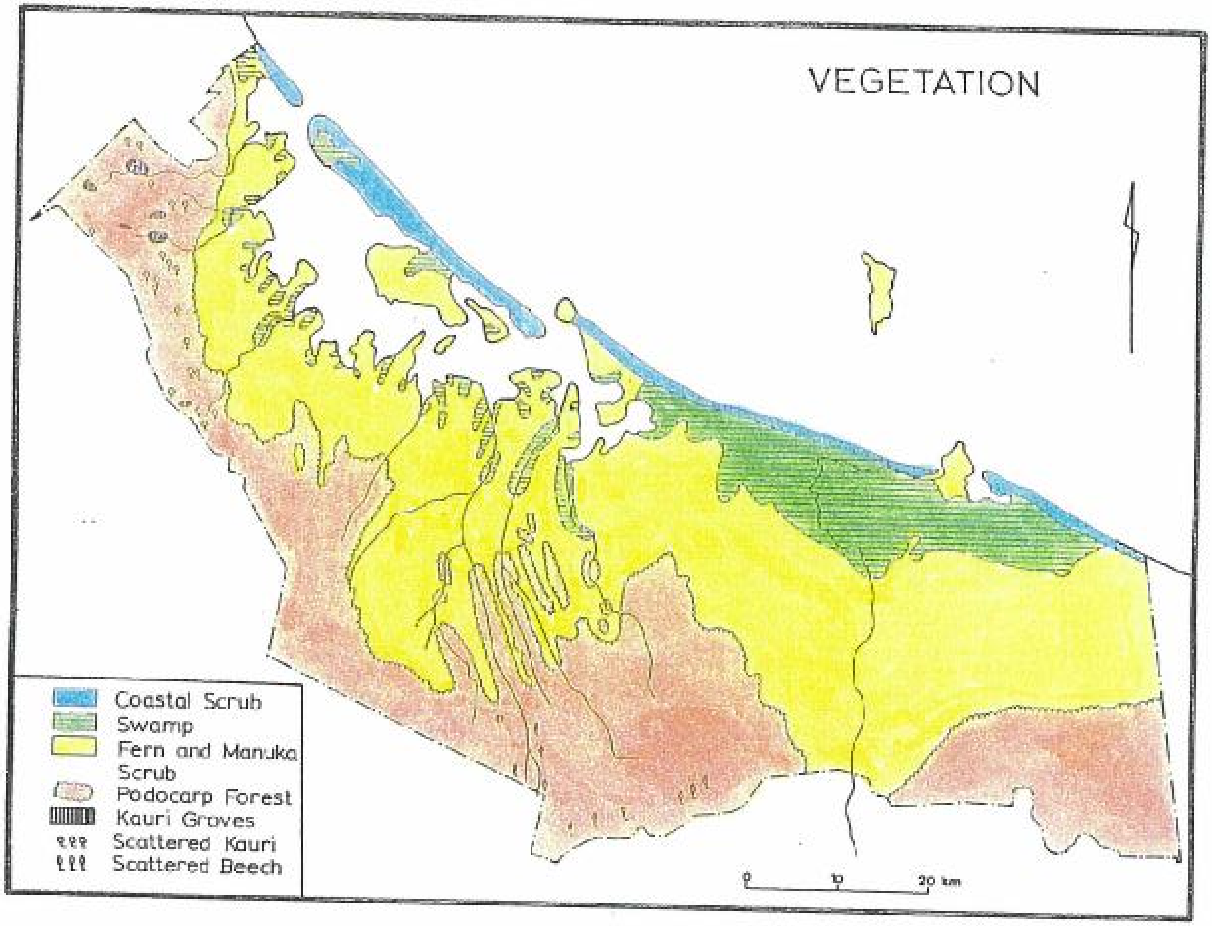

FIGURE 4 PRE-EUROPEAN VEGETATION
(From Stokes, 1980)

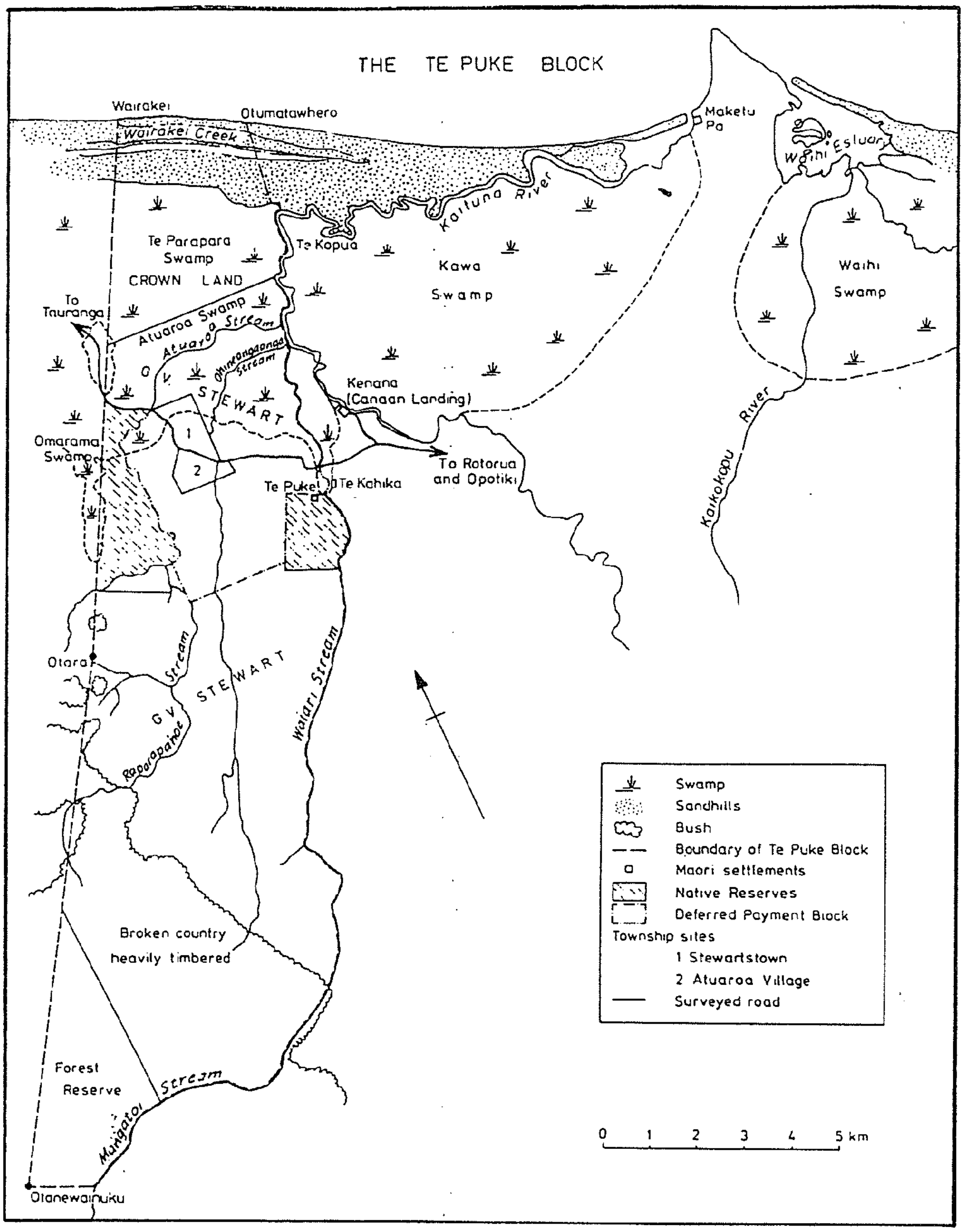

FIGURE 4A 1879 FEATURES OF THE "TE PUKE BLOCK" (From Stokes, 1980)

"*In June, 1926 an Auckland Company, Flaxlands Development Ltd, purchased an area of approximately 3,000 acres of Kaituna Swamp Land which at time of purchase was covered in thick manuka scrub, raupo and rubbish*" (Taylor, 1969). The aim was to establish an industry based on flax cultivation rather than depleting wild stocks; the operation closed in 1930 but "*By August, 1931, the growth of flax exceeded all expectations being free from disease and judged as being as fine as any other flax from plantations anywhere in the North Island*" (Taylor, 1969). Native flax fibre had difficulty competing overseas with plantation-grown sisal and jute but a small internal market persisted until 1945.

The 1943 topographic map (Figure 5) indicates that significant drainage had occurred by that time in the areas to the west, south and south east of the lower Kaituna River. Those areas were defined in c.1920 as the Te Puke and Te Tumu Drainage Areas.

Vegetation adjacent to the lower Kaituna still covered a significant area and consisted of flax and manuka reaching a height of c.6 m in inland areas and adjacent to Kopura (Kopuroa) Canal, with flax, manuka and blackberry in the present Wildlife Management Reserve Area. Clusters of taller vegetation are shown north of the present Pah Road extension and to the west of Pah Road. Drains were present in the present Reserve area.

The 1965 topographic map (Figure 6) indicates that further vegetation clearance mainly involved the "8' Manuka, Flax" on either side of Pah Road and encroachment into the southern edges of the flax, manuka and blackberry adjacent to the Kaituna River and along Kaituna Road. The major drain at the Pah Road right angled bend had been constructed at this time.

Drainage patterns in c. 1960 are also shown on Figure 6A together with the area flooded in July 1951. Figure 6B shows the Stage I works which had been completed by the Kaituna River Board by 1951. (National Resources Survey, 1962).

The 1980 topographic map (Figure 7) shows further contraction of the vegetation in the area adjacent to the Kopuroa and Raparapahoe Canals and to the east of the large drain at the Pah Road bend. Otherwise the area now vested as the Lower Kaituna Wildlife Management Reserve,

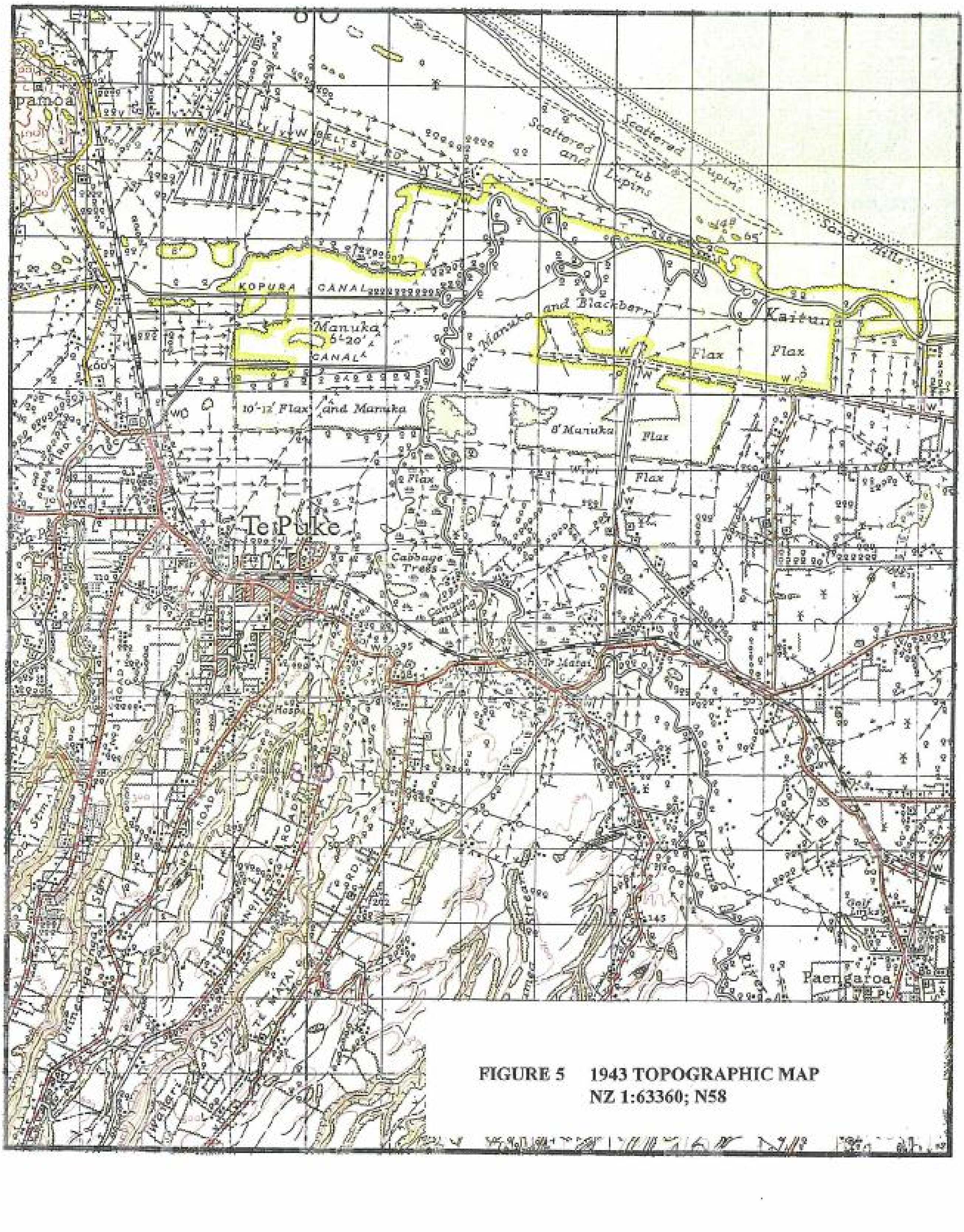

FIGURE 5 1943 TOPOGRAPHIC MAP
NZ 1:63360; N58

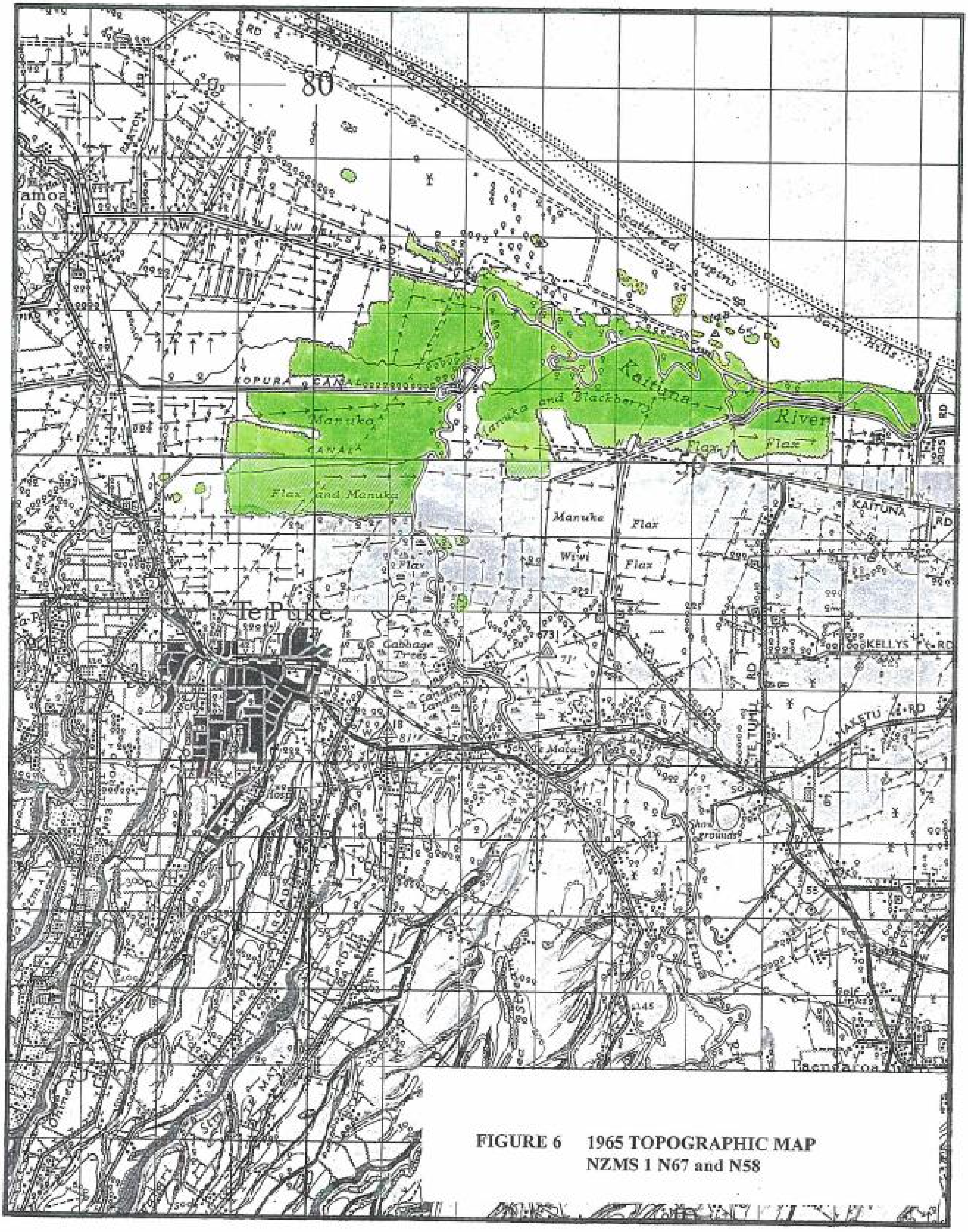

FIGURE 6 1965 TOPOGRAPHIC MAP
NZMS 1 N67 and N58

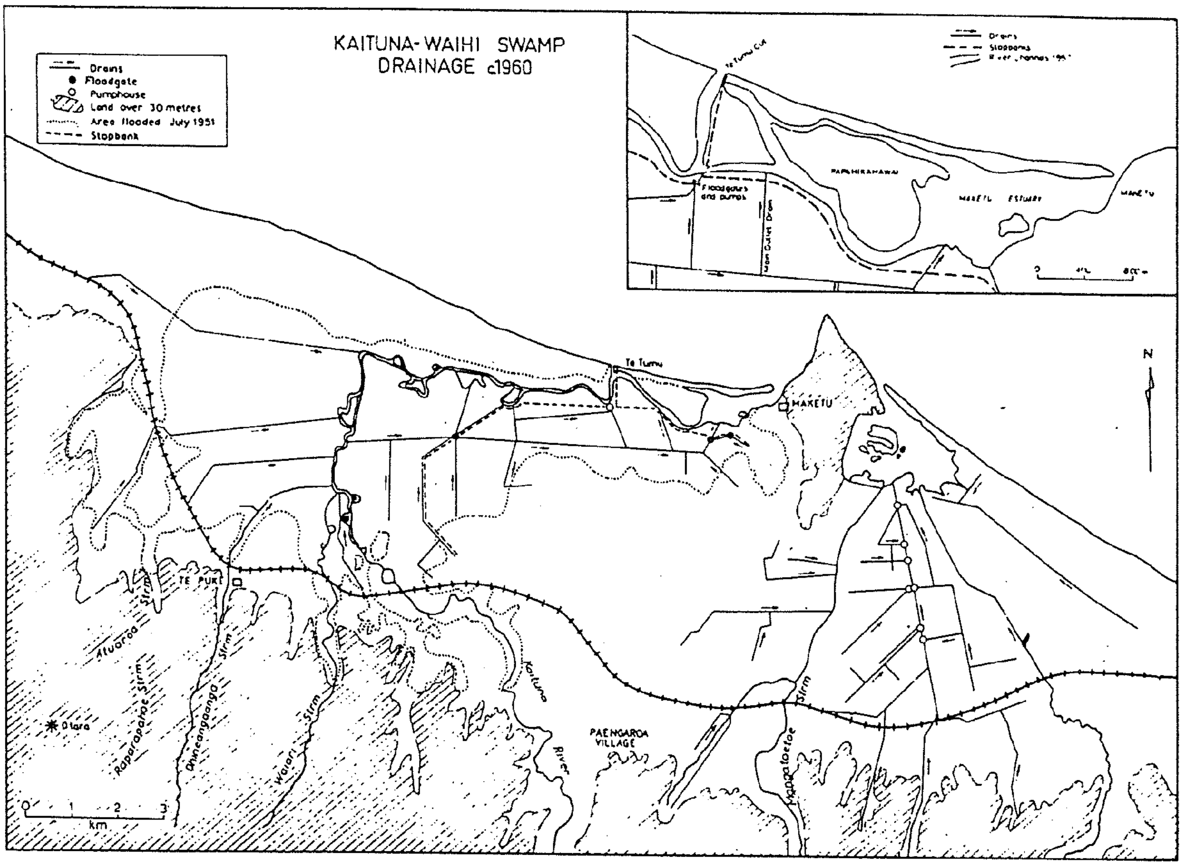

FIGURE 6A **c. 1960's DRAINAGE**
(From Stokes, 1980)

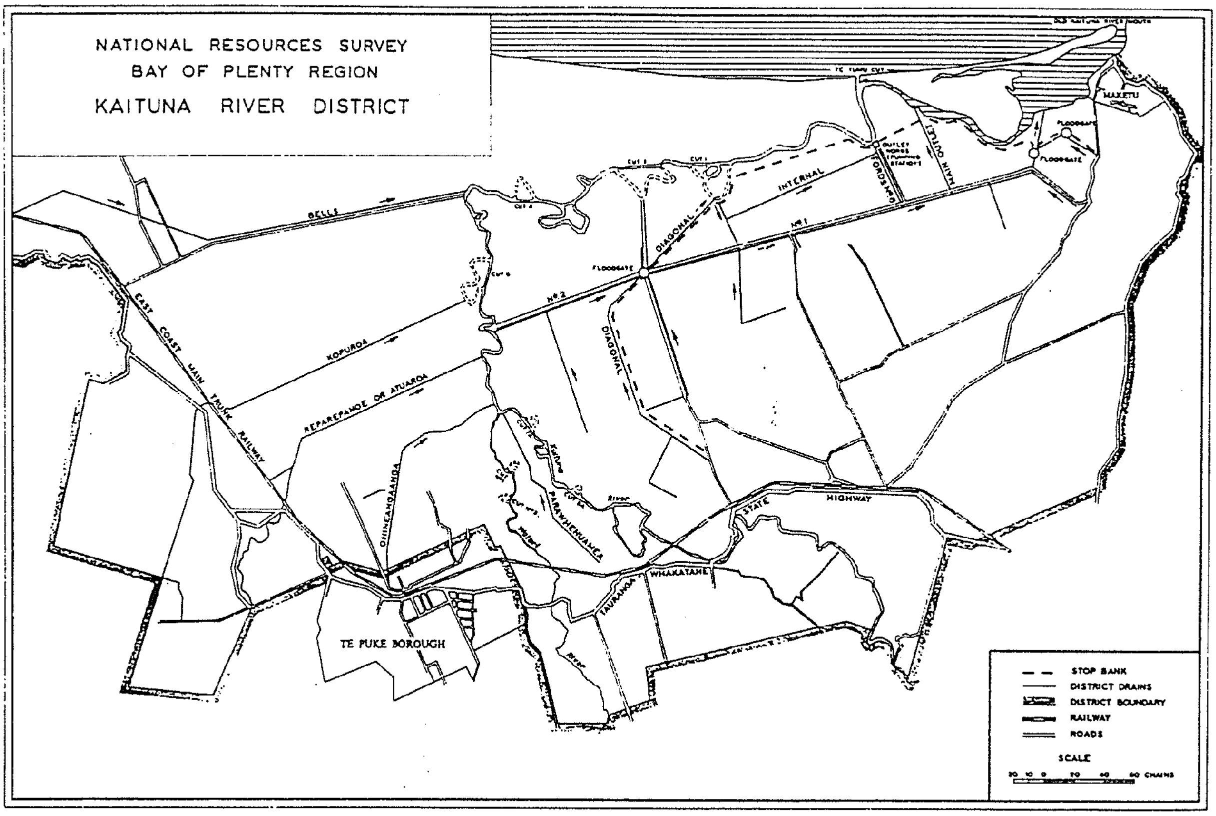

FIGURE 6B DRAINAGE WORKS COMPLETED BY 1951
(from National Resources Survey, 1962)

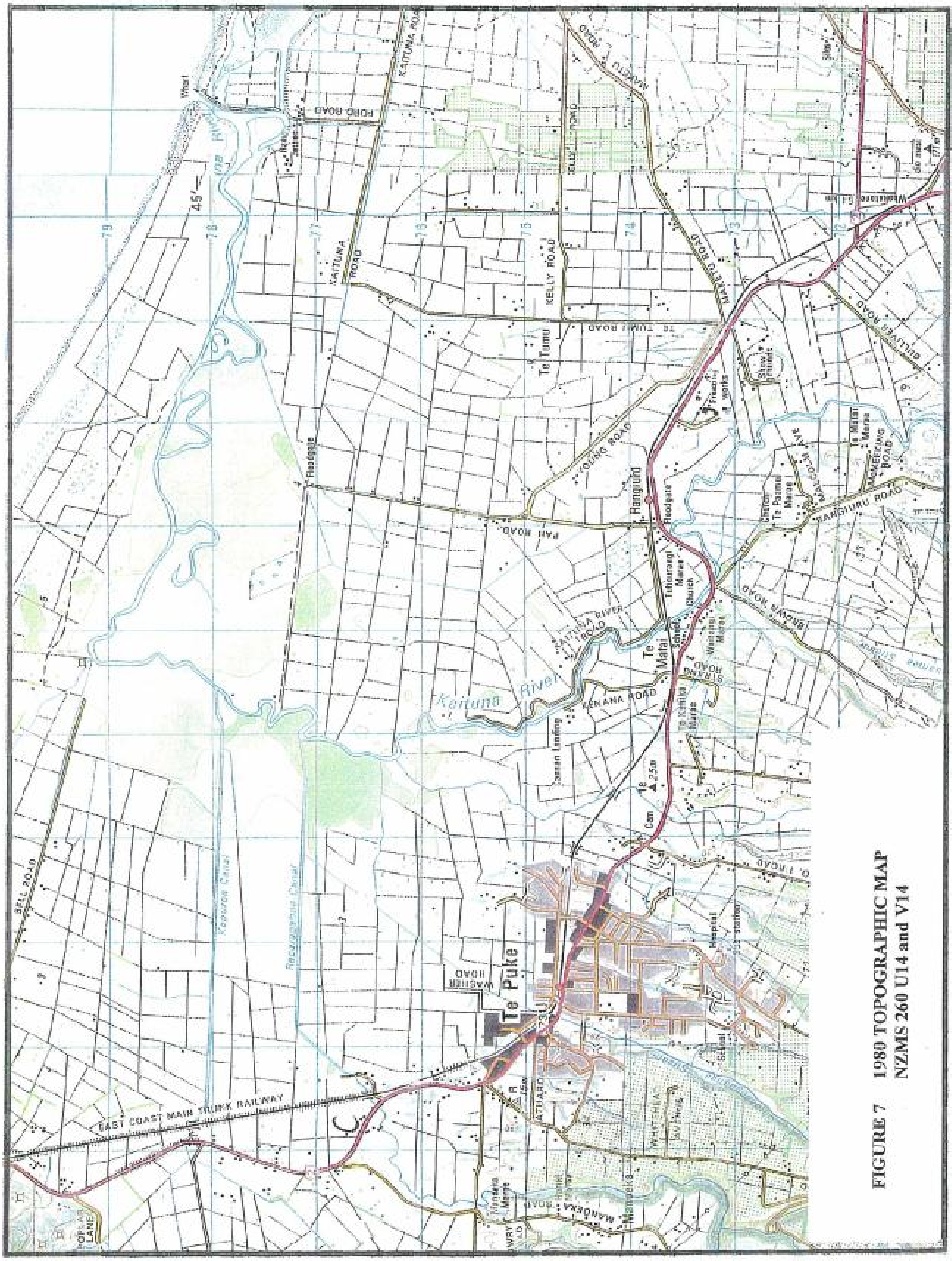

FIGURE 7 1980 TOPOGRAPHIC MAP
NZMS 260 U14 and V14

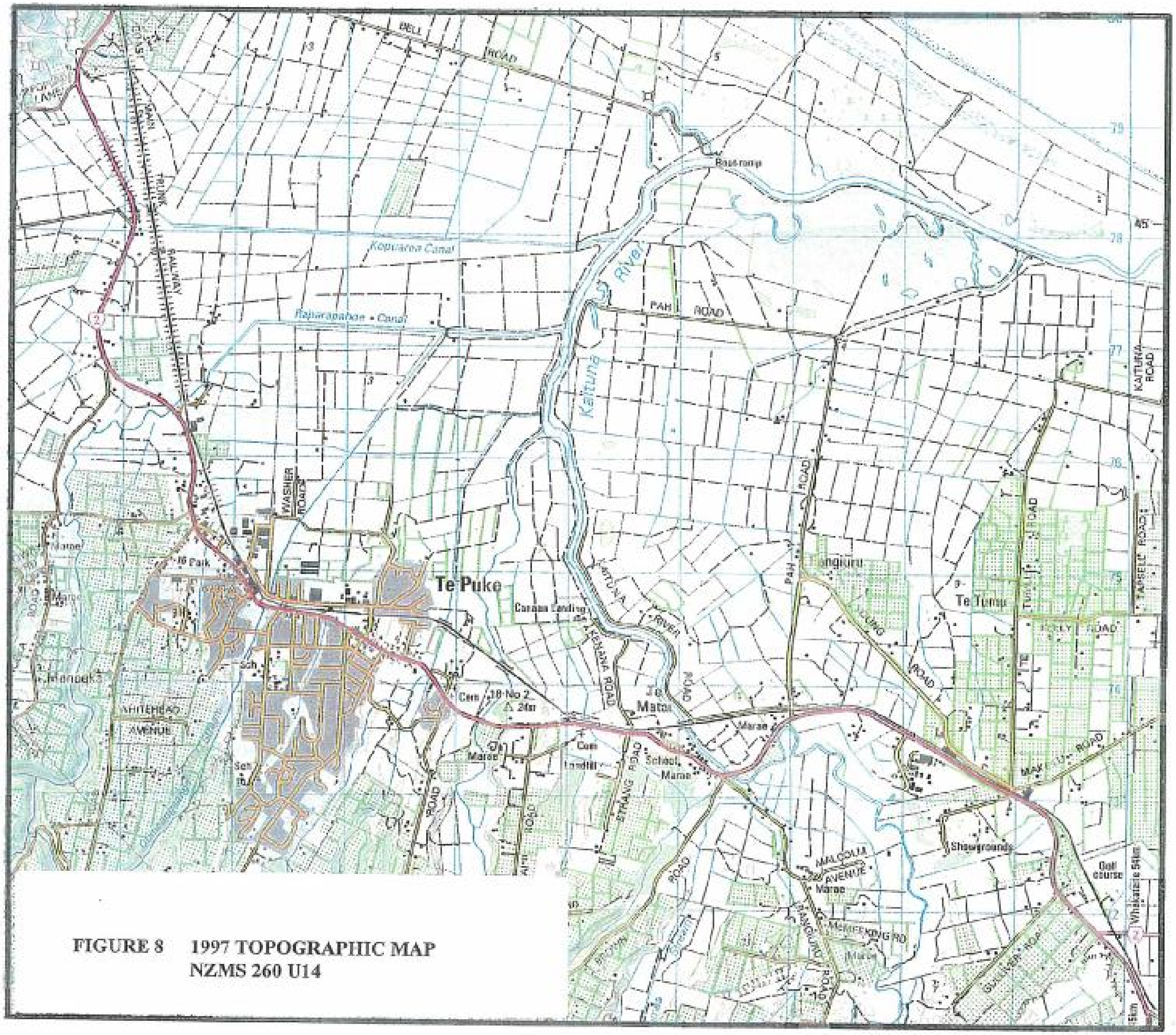

FIGURE 8 1997 TOPOGRAPHIC MAP
NZMS 260 U14

LAND INFORMATION NEW ZEALAND
MAP LICENCE NL 094494/1

including most of the area now in pasture, is unchanged in comparison with the situation illustrated in 1965. A relatively large area (c. 10 ha) of un-developed land is also shown in the now Potter property, and, on the opposite side of the road, the only cleared area is the c. 10 ha block which was cleared prior to 1943.

Between 1980 and 1997 (Figure 8), however, following major realignment of the lower Kaituna River, significant additional land development had occurred throughout the area on both sides of the lower River. Most of the vegetation was removed between the Raparapahoe Canal and Bell Road, adjacent to the Bell Road oxbow and on the northern side of the realigned River channel.

Major clearance also occurred to the north of Pah Road in the now Pamment, East and Department of Conservation properties and south of Pah Road in the now Potter property. Figure 8 reflects the distribution of the present vegetation of the area generally and the Wildlife Management Reserve specifically, including some of the areas excavated by the Eastern Fish and Game Council. No significant standing waterbodies had been present in that area previously.

Therefore, the most significant reduction in tall vegetation and wetland habitat had occurred prior to 1943, however, a substantial undeveloped area remained in the area around the lower Kaituna River. That vegetation, though undergoing some further contraction and drainage, still covered a large area until about 1980, after which the most significant vegetation clearance in the Pah Road area occurred. This clearance occurred in the area that is now the D.O.C. grazing lease when a fire destroyed a cover dominated by tall willow. (A. Garrick pers. comm; Miller, 1983).

Miller, 1983 completed a preliminary botanical assessment of the then proposed Reserve. Features noted at that time were its recent drying out, the *"rampant growth of certain weed species"*, the adverse effects of cattle and goats and the *"invasion of plants"*, such as raupo and willowweed, in the old Kaituna River loops.

"*Most of the Reserve is covered by a canopy, consisting in the main of willows. (Salix* spp.*) Or kanuka (Leptospermum ericoides).*" Beneath the canopy was a dense understorey of coprosmas, blackberry, ferns, carices and various herbaceous plants, but more open areas were badly overgrown with blackberry and thistles and contained dense thickets of flax.

Plant communities are described in full in Appendix 6.9. (Miller, 1983).

Miller concluded that no species of endangered plant was found but an uncommon orchid, *Pterostylis micromega,* was present near the Reserve's centre. That orchid, also known as tukukiwi and swamp greenhood, now has a Category A (highest) national conservation priority rating but was not re-located in that area during a subsequent survey in December 1990.

Miller, 1983 concluded that the "*reserve forms a large potential wetland in a district where wetlands have largely been eliminated. It contains areas of kanuka/manuka swamp and cabbage tree swamp, both being wetland types that are increasingly uncommon.*"

Miller's recommendations (Appendix 6.9) were that the water table should be raised substantially, stock should be removed, raupo should be controlled, the vegetation canopy should not be reduced to small pockets by indiscriminate clearing and further botanical assessment would be desirable.

Garrick, 1990 noted the following on the basis of the Miller, 1983 report:-

> "*The vegetation of much of the area was noted to have been modified by fire, clearance for agriculture, and by the invasion of adventive species. Drains constructed through the area must also have had an influence. Four vegetation 'zones' were identified as follows:*
>
> *(1) areas adjacent to water courses in which oxygen weed, Polygonum sp. raupo, large sedges and rushes were dominant;*
>
> *(2) areas in and adjacent to permanent water where the vegetation was dominated by manuka, flax, cabbage tree, coprosmas, raupo, Polygonum*

sp, rushes and sedges and other semi-aquatic species;

(3) *areas of vegetation comprising native and introduced species in approximately equal proportions with the latter forming a dense canopy;*

(4) *areas composed entirely of introduced flora with willow the predominant canopy species, and blackberry, grasses and other herbaceous species in the understories.*

The composition and distribution of these vegetation types (Figure 1) indicates substantial parts of the area were inundated by tidal overflow and flooding with sufficient frequency and to a sufficient extent to maintain a 'damp' state at least for much if not all of the year, though some parts of the reserve are likely to have been summer-dry. 'Permanent' water was likely to have largely been confined to a few watercourses and drains, and to areas in or adjacent to the oxbows which were created as a result of the Kaituna scheme."

Figure 1 above is reproduced in this report as Figure 8A; of particular note regarding the proposed alignment is the location of marginal vegetation (Zone 1) at the margin of the wetland area closest to the alignment and the presence of "introduced associations" (i.e. Zone 4; grazed pasture) beside the proposed alignment to the south of the oxbow. No "dense natural associations" (Zone 2) would be traversed by the proposed alignment.

Irving, 1991 produced a more detailed description of vegetational types which were mapped (Figure 8B) from aerial photographs and ground checks. Note, however, that the kahikatea stands in grazed pasture near the proposed alignment have been omitted. The Irving, 1991 vegetational zones in comparison with the present situation are shown on Figure 8C.

Vegetational zones nearest the proposed alignment as present in December 1990 were as follows:-

Figure 1. Lower Kaituna Wetlands : Location and Distribution of Principal Features.

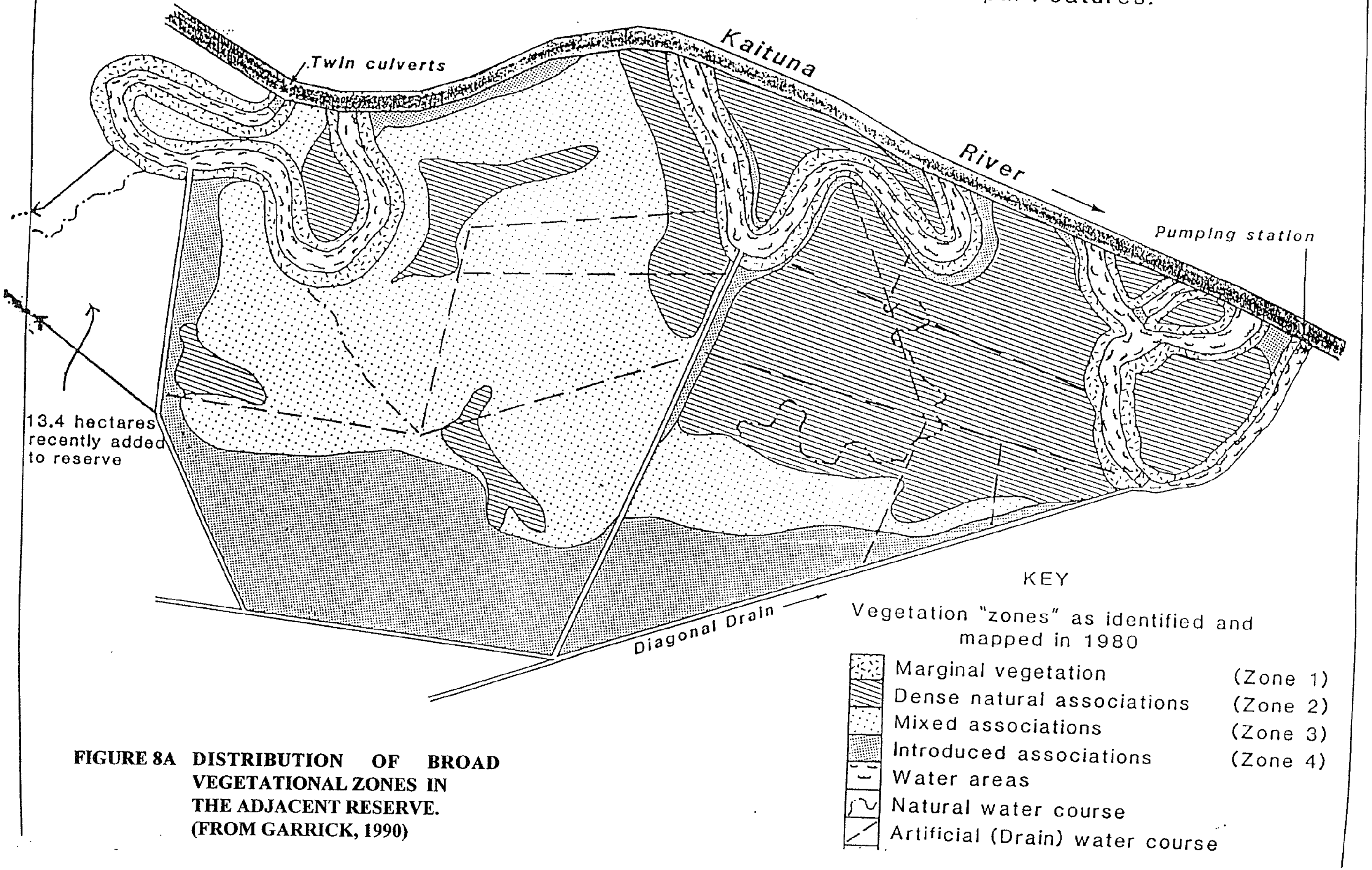

FIGURE 8A DISTRIBUTION OF BROAD VEGETATIONAL ZONES IN THE ADJACENT RESERVE. (FROM GARRICK, 1990)

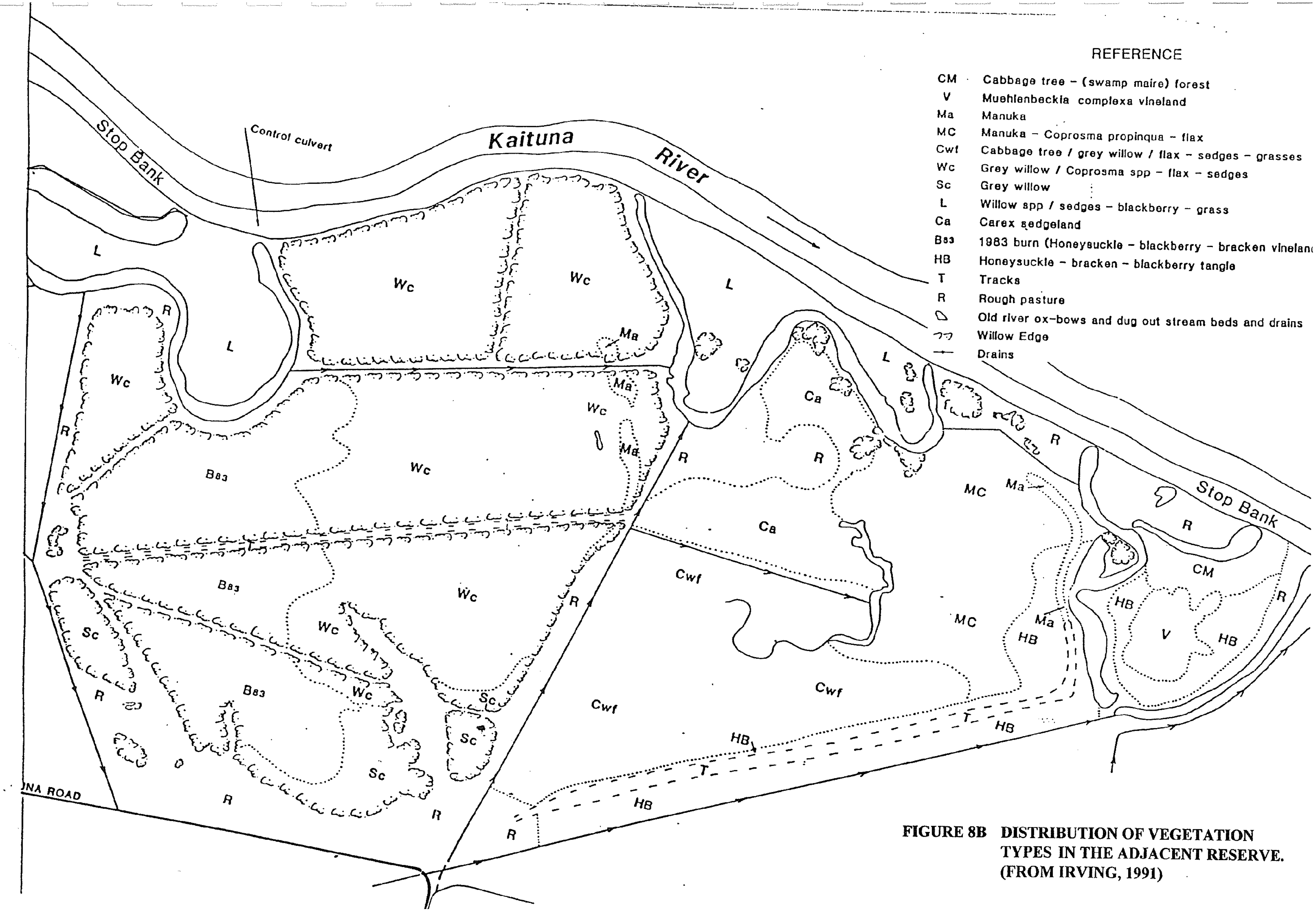

FIGURE 8B DISTRIBUTION OF VEGETATION TYPES IN THE ADJACENT RESERVE. (FROM IRVING, 1991)

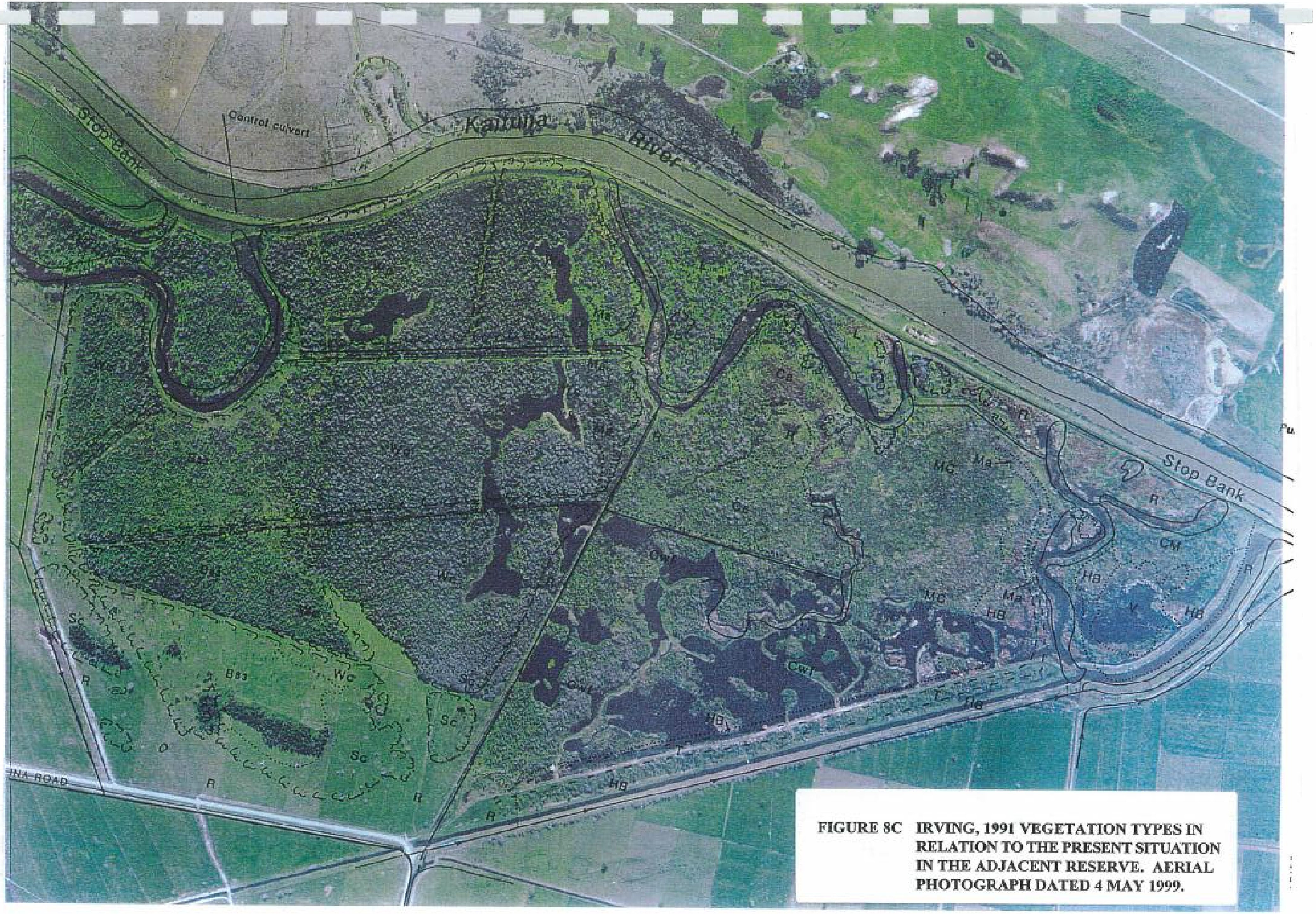

FIGURE 8C IRVING, 1991 VEGETATION TYPES IN RELATION TO THE PRESENT SITUATION IN THE ADJACENT RESERVE. AERIAL PHOTOGRAPH DATED 4 MAY 1999.

Zone L (areas inside the western oxbow).

*(**Willow** spp.)/sedge-blackberry-grass zone*

These areas inside the loops of old oxbows vary depending on the amount of grazing they receive. Both grey and crack willow are present, with crack willow being more common near water courses. Other trees and shrubs include cabbage tree, Coprosma propinqua, C. tenuicaulis (occasional), manuka and kahikatea (occasional).

Kahikatea, rimu, cherry, oak, peach and walnut tress have been planted in the vicinity of some maimais.

Introduced grasses (particularly tall fescue) are common as are blackberry, honeysuckle and thistles. Sedges such as Cyperus ustulatus, Carex geminata and C. lurida are locally common, as is flax.

Zone R (grazed pasture margins beyond the taller vegetated margins)

Rough pasture

These areas are covered by pasture species interspersed by wet pasture 'weeds' such as Juncus gregiflorus, J. effusus, Polygonum hydropiper, Carex lurida and Ranunculus spp.

Zone WC (taller vegetation beyond the grazed pasture margin)

***Grey willow/Coprosma** spp. - flax - sedges*

This is the most common vegetation type in the Lower Kaituna Wildlife Management Reserve. Grey willow over-tops a subcanopy of Coprosma propinqua (very common), C. tenucaulis, flax and occasional manuka, wheki and mamaku.

The sedges B. rubiginosa, B. teretifolia, Carex virgata, C. lurida and C. fascicularis are common. Patches of ferns occur. Fern species include Depraria petersenii, Pteris tremula, Paesia scaberula, Blechnum minus, Blechnum 'black spot', bracken, and small areas of Gleichenia dicarpa.

Introduced grasses are common in contrast to the native swamp millet (Isachne globosa), Cortaderia fulvida and the large sedge Gahnia xanthocarpa which are more sparsely distributed.

Herbs present include Hydrocotyle spp., Galium spp., Centella uniflora, water forget-me-not and beggars' tick (seedlings of the latter were thick in places at the time of the survey.

Zone B83 (area burnt off in 1983; contains kahikatea stands not noted in this 1990 survey).

Burnt 1983 (Honeysuckle-blackberry-bracken) vineland

A fire was still smoldering here in March 1983 (N. Miller pers. comm.). This is now a patchy vegetation zone with a mix of honeysuckle, blackberry and bracken scambling around dead willow trunks (some still standing).

Some live pussy willows are present as is Coprosma propinqua and occasionally manuka. Sedges present are Carex lurida, C. virgata and Baumea spp. Flax is scattered about. Introduced grasses, particularly Yorkshire fog and brown top, are common.

Zone SC (also contains a small kahikatea stand but now predominantly grazed pasture

Grey willows

This vegetation type consists of a dense canopy of tall Salix cinerea with an understorey of Depraria petersenii, ragwort, blackberry and occasional sedges and introduced *grasses. Honeysuckle is common on the edge.*

The areas in which the constructed ponds are now present consisted of the following:-

Zone Cwf (constructed pond area)

Cabbage tree/grey willow/sedges-flax-grasses association

This vegetation covers a large area in the south-east of the reserve and grades into manuka-Coprosma propinqua-flax.

There is an open canopy of cabbage tree and grey willow under which a mix of sedges, yellowing flax, and introduced grasses grow. In shady areas mamaku (Cyathea medularis), wheki (Dicksonia squarrosa) and Depraria petersenii are common. In more open areas blackberry, honeysuckle and thistles are locally common.

Through this area runs an old stream bed. Only where this has been recently dug out was there any water at the time of survey. The vegetation in these depressions however, (Baumea articulata, B. rubiginosa, B. teretifolia, Juncus acuminatus) suggests that the water level is close to the surface, and water is held here at least during the winter months.

Zone MC (the largest area of this zone is within the high ecological value area but it extends into the constructed pond section)

Manuka *- Coprosma propinqua - flax association*

This is a remnant of semi-mineralised peat shrubland in very poor condition. Manuka, Coprosma propinqua and flax form a discontinuous canopy. Cabbage tree and grey willow are also present. The sedges Baumea teretifolia, B. rubiginosa, B. tenax and Carex virgata, and also tangle umbrella fern (Gleichenia dicarpa), are still retained but *all are fighting against the lack of water and resultant weed invasion (blackberry, Carex lurida, introduced grasses). The flax is yellow, and cabbage trees are dying. Manuka is falling over as the peat subsides away from its roots. There are large areas of dead fern (Deprraria petersenii, Histiopteris incisa). There is no sign of water (even in the drain). This area is grazed and hence stock damaged.*

Zone HB (constructed pond area but restricted to the eastern corner of the wetland)

Honeysuckle-blackberry-bracken vineland

The title species of this vegetation type grown together producing a 1½-2 m high dense angle. Cabbage trees are occasionally emergent.

Zone V (as above)

Muehlenbeckia complexa vineland

The vine Muehlenbeckia complexia is dominant in this vegetation type and excludes most other species. Cabbage tree, manuka, Hebe macrocarpa, Coprosma propinqua and grey willow occasionally protrude but the manuka and Hebe seem to be in the process of being smothered.

Other lianes present include Rubus australis and Muehlenbeckia australis. The sedges Carex virgata, Baumea tenax, B. teretifolia and Eleocharis acuta are present.

Irving, 1991 summarised the botanical values as follows:-

> *"Although the reserve has suffered a high degree of botanical modification it is nevertheless the last sizeable remnant of riverine wetland in the Tauranga Ecological District <u>and</u> Northern Volcanic Plateau Ecological Region, and one of only a few remaining wetlands (of any type) in a district which was once*

extensively covered by this ecotype. Kirk (1873) refers to 'hundreds of acres' of swamp around Maketu. (Other remnants are Matakana Island wetlands, [private] (see Beadel 1989a), Tauranga Harbour saltmarshes [private and local authority] (see Beadel 1989a), Arawa wetlands at Maketu [private] (Beadel 1989) and Waihi Estuary [some of which is designated wildlife reserve] (Beadel 1989).

For these reasons, even in its present state, the whole of this wetland reserve (apart from pasture and rough pasture areas) should be ranked (as per Shaw 1988) as being of high botanical value (i.e. it is the "last or one of the few remaining areas of a vegetation type within an Ecological District, in a modified condition but retaining the main elements of composition and structure").

The wetland however is at a critical stage of health, and unless active management is urgently undertaken botanical values will be severely reduced. This is discussed in Section 6.

For the benefit of management the vegetation types can be grouped into categories of botanical importance (within the overall ranking of high botanical value). The categories are 1 - 4, 1 being the most important.

1. - *Cabbage tree - (swamp maire) forest*
- *Muehlenbeckia complexa vineland*
- *Manuka*
- *Carex sedgeland*

2. - *Manuka - Coprosma propinqua - flax association*
- *Grey willow/Coprosma spp. - flax sedges*
- *Tracks*
- *Old oxbow and dug-out stream beds and drains.*

3. - *Cabbage tree/grey willow/sedges - flax - grass association*
- *Grey willows*
- *(Willow spp.)/sedge - blackberry - grass zone*
- *Burnt 1983 (Honeysuckle - blackberry - bracken) vineland*

4. - *Rough pasture*

Note that there is a contradiction in the above; "rough pasture" is specifically excluded from the high botanical value area in Paragraph 2 but included as Category 4 above.

The swamp greenhood orchid (tukukiwi), which is a Category A plant of national conservation priority was not relocated by Irving, 1991. None of the plants listed as being present in the Reserve by Irving, 1991 is considered to be threatened or of local concern in the Bay of Plenty Conservancy (Beadel, 1992). The most significant populations of the wetland ferns (*Cyclosorus interruptus* and *Thelypteris confluens* of national significance occur on Matakana Island (Beadel, 1992); those species are also present in the Te Arawa wetland but have not been recorded in the Reserve.

It is clear that, as with many other now rural areas, there has been substantial clearing of native vegetation in the areas to the north of Te Puke township over the past c. 80 years. Most of the clearance and drainage works had occurred prior to 1943.

2.1.3. **Vegetation and Flora**

Nearly all the route lies in pasture or orcharding properties. Five sites are noted below, where the natural vegetation has not been completely effaced.

1. Head of unnamed stream at grid ref. NZMS 260 U14 055 793 (Plates 1-3). This deep and meandering channel lies entirely in pasture. Along its banks is an open cover of 12 m tall crack willow (*Salix fragilis*). Among the grasses and other weeds and the notable amount of inorganic farm and household rubbish are

scattered individuals of native shrub-layer and ground-cover species: wheki tree fern (*Dicksonia squarrosa*), *Coprosma propinqua*, young cabbage trees (*Cordyline australis*), juvenile mamaku tree ferns (*Cyathea medullaris*), carices (*Carex secta*), and other sedges (*Eleocharis sphacelata, Baumea ?rubiginosa*). The water has a covering of duckweed (*Lemna minor*).

2. Northern of the two sections of oxbow (U14 058 791) on Bell Road (Plates 5-7). the road verge and steep 1-2 m high bank down to the water have a cover of pampas grass (*Cortaderia selloana*), blackberry (*Rubus fruticosus*), tall fescue (*Festuca arundinacea*) and other weeds. In the water, for a metre or two out from the bank, there is an aquatic growth of knotweed (*Polygonum* sp.), *Myriophyllum aquaticum* and hornwort (*Ceratophyllum demersum*).

3. Crossing of Kaituna River.
The river here is situated in pasture enclosed by stopbanks (U14 061 787). Along the water's edge are a few smallish crack willows, and scattered individuals of a native rush (*Juncus gregiflorus*). In the water here only hornwort was noted. (Plates 8 and 9).

4. Waimarae Stream Crossing
This shallow meandering section of stream (U14 065 781) lies entirely in wet pasture. Formerly it flowed into a large cut-off of the Kaituna River (Plate 13), some hundred or so metres away to the east, but it has now been ditched to flow southwards. The vegetation in the stream channel is of exotic herbaceous weeds and grasses among a taller growth of raupo (*Typha orientalis)*, a large sedge (*Baumea articulata* or *Eleocharis sphacelata*) and smaller sedges (*Baumea ? rubiginosa, Carex ? fascicularis or C. maorica, Carex virgata, Carex secta*). (Plates 10-12).

5. North of the right-angled bend in Pah Road there is a narrow strip of "islands" of young kahikatea (*Dacrycarpus dacrydioides*), within the part of the Reserve that

is now grassed and the subject of the DoC pastoral lease.

The existing kahikatea are composed of individuals c. 8-13 m tall and 10-20 cm dbh. The largest diameter individual seen in the western "island" was 26 cm dbh. Coring this tree with an increment borer yielded an age for it of c. 20 plus x years, where x is the number of years needed for the tree to reach breast height, and can be supposed to be between 2 and 5 years. This is a fairly rapid growth rate and indicates that under the water regime of the last twenty or so years at least, the ground here is very suitable for a restoration of this species.

The individual kahikatea trees tend to be in clusters or short lines, on slightly raised ground, and may be growing on the bases of an older generation of large trees, probably kahikatea. Such old kahikatea stumps, now existing just as root-flanges around a rotten core of up to c. 50 cm diameter, and hardly raised above the existing surface, are found through the DoC pasture (Plate 29) and also immediately north in the willow forest. Axe marks were seen on several of these stump remnants, and also on scattered pieces of kahikatea wood through this paddock and in the debris heaps here. It is suggested then that there was a kahikatea forest here in late pre-European times, that this was destroyed possibly by flooding, and that the stumps have in part been cleared, or taken for firewood etc., in historic times.

The origin of the band of young kahikatea is obscure, but it is not a planting. A. Garrick suggested (pers. comm.) that it is an even-aged stand of c. 25 years and that it came up on the former edge of the willow forest here perhaps through the bringing of seed by birds that favoured this habitat. Northwards towards the heart of the willow forest there are several (young-mature ?) kahikatea emergent over the willows, and possibly a good fruiting year for them may have been the source of these young trees.

The young kahikatea have only a few native plant species associated with them: cabbage trees (as relatively juvenile plants, not as codominants or relics), and mahoe and wheki (both species as young individuals). The only groundcover species is the adventive fern *Deparia petersenii*. Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*) are dense around the stand edges.

On the northern side of the young kahikatea, to the edge of the willow forest here, the DoC pasture contains scattered cabbage trees of c. 6-10 m tall and 15-25 cm dbh. These are clearly not very old, but would be survivors of the fire that occurred here. Within this pasture there are a number of low debris heaps containing soil and burnt wood fragments. These are mostly of willow, but there is also large old kahikatea stump material, and on one heap (Plate 30) there is a burnt length a metre of so long of what would appear to be the trunk of a young kahikatea (i.e. of a size similar to those in the "band"). No young kahikatea were noted in the willow forest immediately to the north. One piece of wood in the debris heap was not identified; it may have been brought here by floods.

Between the kahikatea and Pah Road, and then further southwards and west, there are no tall kahikatea and very few cabbage trees, suggesting that at least in historic times this ground carried scrub, probably of manuka as indicated on Figure 5.

The large drain here, which flows southwards contains occasional colonies of hornwort and *Potamogeton ochreatus*. It is noted that although the NZMS 1 topographical sheets of the 1960's (Figure 6) mention for the area in general a vegetation of flax, blackberry and manuka, there seem to be no plants of the latter species in the area now, even along the banks of large drains such as the one noted here.

Restoration of kahikatea forest along this coastal side of the proposed route and on the noise bund would give travellers an opportunity to see what has now become a rather uncommon kind of native vegetation in the region.

2.1.4. Conclusions

No notable vegetation, individual trees of any particular botanical value or habitats containing a significant native flora would be traversed by the Option A3 alignment.

The nearest area of notable native vegetation is the remnant grove of kahikatea in the Department of Conservation grazing lease section of the Reserve (refer Plate 18). Restoration of kahikatea forest would be appropriate in this area, particularly if any replanted areas were contiguous with existing stands.

2.2. Wildlife

2.2.1. Introduction

Wildlife along the proposed Option A3 alignment was documented by field survey, reference to Ornithological Society of NZ bird records, Garrick, 1990 and the Department of Conservation's reptile and amphibian database. In general the wildlife values of the area which would be traversed by the proposed Option A3 alignment are low as a result of habitat modification for farming purposes.

The crossing of the Kaituna River would be in an area which has moderate wildlife values but which is typical of c.22 km (Rasch, 1989) of similar habitat.

The route would be adjacent to the western end of the Lower Kaituna Wildlife Management Reserve which has high wildlife values in the context of the Tauranga County, and upstream (by c. 5 km) from the Kaituna River mouth which is part of the "Maketu-Waihi Estuaries and Kaituna River Mouth Complex", considered to be a significant habitat in an international context. The

Management Reserve adjacent to the proposed alignment was not included in the above wetland complex in D.O.C, 1996 because it was relatively dry at the time the comparative evaluations were undertaken (D.O.C. pers. comm.).

2.2.2. **Avifauna**

2.2.2.1 Alignment area

Tables 2, 3 and 3A list species of birds which have been recorded in the general area adjacent to the alignment. As stated in Section 2.2.1., the avifaunal habitat values of the area which the alignment would traverse are low and no notable habitat would be adversely affected. Adjacent and downstream habitats have relatively high avifaunal values and provide habitat for the majority of the species listed.

TABLE 2 **Species of "terrestrial, freshwater wetland and inland" birds listed by OSNZ as being present in the 10,000 yard grids for the proposed alignment, plus additional species observed during the field survey. Some species present on an intermittent basis only.**

Common Name	Maori Name	Scientific Name
• australasian bittern	matuku	*Botaurus poiciloptilus*
australasian harrier	kahu	*Circus approximans*
australasian pied stilt	poaka	*Himantopus himantopus leucocephalus*
australian magpie	-	*Gymnorhina tibicen*
• banded dotterel	tuturiwhatu	*Charadrius bicinctus bicinctus*
blackbird	-	*Turdus merula*
black-fronted dotterel	-	*Charadrius melanops*
• black-fronted tern	tarapiroe	*Sterna albostriata*
black shag	kawau	*Phalacrocorax carbo novaezelandiae*
black swan	-	*Cygnus atratus*
brown quail	-	*Synoicus ypsilophorus*
california quail	-	*Callipepla californica*
• caspian tern	taranui	*Sterna caspia*
chaffinch	-	*Fringilla coelebs*
common myna	-	*Acridotheres tristis*
feral pigeon	-	*Columba livia*
goldfinch	-	*Carduelis carduelis*
greenfinch	-	*Carduelis chloris*
grey duck	parera	*Anas superciliosa superciliosa*
grey teal	tete	*Anas gracilis*
grey warbler	riroriro	*Gerygone igata*
hedgesparrow	-	*Prunella modularis*
housesparrow	-	*Passer domesticus*
little black shag	-	*Phalacrocorax sulcirostris*
little shag	kawaupaku	*Phalacrocorax melanoleucos brevirostris*
mallard	-	*Anas platyrhynchos*
NZ kingfisher	kotare	*Halcyon sancta vagans*
NZ pipit	pihoihoi	*Anthus novaeseelandiae novaeseelandiae*

TABLE 2/Continued

Common name	Maori name	Scientific name
NZ shoveler	kuruwhengi	*Anas rhynchotis variegata*
North Island fantail	piwakawaka	*Rhipidura fuliginosa placabilis*
North Island fernbird	matata	*Bowdleria punctata vealeae*
paradise shelduck	putangitangi	*Tadorna variegata*
pied shag	kahuhiruhi	*Phalacrocorax varius varius*
pukeko	-	*Porphyrio porphyrio melanotus*
red-billed gull	tarapunga	*Larus novaehollandiae scopulinus*
redpoll	-	*Carduelis flammea*
ring-necked pheasant	-	*Phasianus colchicus*
• royal spoonbill	kotuku-ngutupapa	*Platalea regia*
silvereye	tauhou	*Zosterops lateralis lateralis*
skylark	-	*Alauda arvensis*
song thrush	-	*Turdus philomelos*
South Island pied oystercatcher	torea	*Haematopus ostralegus finschi*
southern black-backed gull	karoro	*Larus dominicanus dominicanus*
spur-winged plover	-	*Vanellus miles novaehollandiae*
starling	-	*Sturnus vulgaris*
tui	-	*Prosthemadera novaeseelandiae novaeseelandiae*
welcome swallow	-	*Hirundo tahitica neoxena*
white-faced heron		*Ardea novaehollandiae novaehollandiae*
• white heron	kotuku	*Egretta alba modesta*
white-winged black tern	-	*Chlidonias leucopterus*
yellowhammer	-	*Emberiza citrinella*

• *denotes a particular national conservation rating.*

black-fronted tern:	*Category B (second highest)*
banded dotterel:	*Category C (third highest)*
australasian bittern:	*Category O*
royal spoonbill:	*Category O*
caspian tern:	*Category O*
white heron:	*Category O*

Category O: Species threatened in NZ, but which are known to be secure in other parts of their range outside NZ.

TABLE 3 **Species of marine and estuarine birds listed by OSNZ or being present in downstream Kaituna River mouth habitats (not assumed to be complete).**

Common Name	Maori name	Scientific name
arctic skua	-	*Stercorarius parasiticus*
australasian gannet	takapu	*Morus serrator*
eastern bar-tailed godwit	kuaka	*Limosa lapponica baueri*
lesser knot	huahou	*Calidris canutus canutus*
• NZ dotterel (northern)	tuturiwhatu	*Charadrius obscurus aquilonius*
Pacific golden plover	-	*Pluvialis fulva*
red-necked stint	-	*Calidris ruficollis*
• reef heron	matuku-moana	*Egretta sacra sacra*
turnstone	-	*Arenaria interpres*
• variable oystercatcher	toreapango	*Haematopus unicolor*
• white-fronted tern	tara	*Sterna striata*
• wrybill	ngutuparore	*Anarhynchus frontalis*

• *denotes a particular national conservation rating.*

northern NZ dotterel:	*Category B (second highest)*
wrybill:	*Category B (second highest)*
variable oystercatcher:	*Category C (third highest)*
white-fronted tern:	*Category C (third highest)*
reef heron:	*Category O*

TABLE 3A ADDITIONAL SPECIES RECORDED FROM THE LOWER KAITUNA WILDLIFE MANAGEMENT RESERVE BY GARRICK, 1990

Common name	**Maori name**	**Scientific name**
banded rail	moho-pereru	*Rallus philippensis assimilis*
little egret	-	*Egretta garzetta nigripes*
marsh crake	koitareke	*Porzana pusilla affinis*
spotless crake	puweto	*Porzana tabuensis plumbea*
bellbird	korimako, makomako	*Anthornis melanura melanura*
long-tailed cuckoo	koekoea	*Eudynamys taitensis*
● New Zealand pigeon	keruru, kukupa	*Hemiphaga novaeseelandiae novaeseelandiae*
shining cuckoo	pipiwharauroa	*Chrysococcyx lucidus lucidus*
morepork	ruru	*Ninox novaeseelandiae novaeseelandiae*

● *denotes a particular national conservation rating*

New Zealand pigeon : Category B (second highest)

A species in the general vicinity which is not listed in the Tables is eastern rosella (*Platycercus eximius*).

The avifaunal values of the proposed specific Option A3 alignment are discussed below.

On the western side from the existing S.H.2 to approximately the end of Bell Road, and on the eastern side from the eastern bank of the Kaituna River through to the S.H. 2 south of Te Puke, the habitats consist predominantly of grazed pasture, constructed drainage channels, hedgerows and exotic plantings. Those areas are utilised by a range of common native and introduced birds and are similar to extensive areas throughout the Bay of Plenty.

At the end of Bell Road is an oxbow of the Kaituna River which was created as a result of the Lower Kaituna Catchment Scheme.

The southern arm of the oxbow alongside the Niccol property (Plate 4) has developed into a locally notable standing water and wetland habitat with good marginal vegetation along shallower edge areas. A small stand of raupo has developed at the Bell Road end. The habitat is utilised by a large number of ducks, mainly mallard, white-faced heron, welcome swallow, pukeko and shags.

The remainder of the oxbow, from Bell Road around to the River, contains habitat which is similar to that in 22 km of the lower main River although water velocities are lower. Ducks, white-faced heron, welcome swallow, pukeko and shags are all common. The riparian zones lack any substantial cover except at the major bend where there is a grove of tall willows along a section of the true right (southern) bank (Plates 5, 6 & 7).

On a relative scale the Niccol property section of the oxbow, to the south of Bell Road, is a higher value habitat than the northern section.

The Kaituna River crossing, upstream from the existing boat ramp and carpark, is typical with limited marginal vegetation and grazed pasture to its banks (Plates 8 & 9). Shags, especially black shags, are particularly common, with mallards, little shags, pukekos, spur-winged plovers and australasian harriers. A large group of shags utilises rocks in paddocks, water's edge boulders and horizontal wooden fence tops for roosting in this area.

The Waimarae Stream crossing area (within the Wildlife Management Reserve) is also utilised by similar species as above but is adjacent to a large truncated oxbow which was previously the main River channel (Plates 10, 11 & 12). Its southern side consists of grazed pasture but the northern area is heavily vegetated and contains a reasonable diversity of common native and introduced "terrestrial" species. Calls for spotless crake (*Porzana tabuensis plumbea*; puweto) were played in this area with no response.

A duck shooting maimai is situated on the northern bank of the truncated oxbow (Plate 13) close to (60 m) the alignment's crossing of Waimarae Stream. The alignment would, however, pass to the south of the truncated oxbow and there would be no further modification of that habitat.

From the Waimarae Stream the route would traverse grazed paddocks which were clearly vegetated until 1980 and once contained kahikatea forest at least in parts. All this area contains extensive, and often large, drainage channels (Plates 14 - 17).

The nearest area of native tree habitat to the alignment within the Reserve would be a small area of remnant kahikatea and exotics adjacent to the DC grazing lease access track (Plates 18-20). Typical birds utilising that stand were fantail, goldfinch, silvereye, housesparrow, grey warbler and chaffinch, with pukeko, australasian harrier, mallard and paradise shelduck in surrounding grazed areas. No small land snails were located in leaf litter from within this stand. As an avifaunal habitat this small kahikatea stand is of low value and supports species also found in the nearby exotic-dominated scrub and in many urban situations. A larger, more significant area of kahikatea-dominated vegetation is present nearby to the east.

The largest area of kahikatea (Plate 21) is the pre-eminent area of native forested habitat remaining. There is clearly an opportunity to increase the area of this forest type by retiring surrounding grazing paddocks and re-vegetating with kahikatea. The QE II covenant area (I'Anson Reserve) at Te Puna is a good example of revegetated pasture within Tauranga County.

To the north of the band of young kahikateas, but separated by grazed pasture, is an area of willow-dominated "sand ridge" habitat (Plate 22). (Refer Section 2.2.2.3).

In summary the avifaunal values of the terrestrial areas which would be traversed by the Option A3 "footprint" are low. The wildlife values of the lower Kaituna River (22 km) have been described by Rasch, 1989, as high, but the proposed crossing area does not have any particularly notable values relative to similar areas both upstream and downstream.

2.2.2.2 Notable species

From Tables 2, 3 and 3A there are twelve species with national conservation priority ratings which have been recorded in the local vicinity, including the Kaituna River mouth. Other species are likely in Maketu Estuary habitats but those areas are even more removed from the general roadway area.

Australasian bittern (Category O) has been recorded on the Wildlife Management Reserve area (also refer Section 2.2.2.4) and may use the truncated oxbow, near the proposed Waimarae Stream crossing, for feeding at times.

Banded dotterel (Category C) is most likely to be found in River mouth habitats but may feed in dry pasture areas during the summer, especially paddocks which contain stubble from harvested crops. Banded dotterels breed in the southern North Island and South

Island.

Black-fronted tern (Category B) breeds in the South Island and may feed in Kaituna River habitats in the summer. This tern also feeds on earthworms and grass-grubs in areas of farmland.

Caspian tern (Category O) would utilise the lower Kaituna River for feeding.

Both royal spoonbill and white heron (both Category O) are occasional visitors to lower Kaituna River riparian habitats and areas of wet pasture; both breed in the South Island.

N.Z. pigeon (Category B) has been recorded by Garrick, 1990. Although the area of tall forested habitat is limited, suitable food trees are kahikatea (if fruiting), coprosma, mahoe, cabbage tree, privet and the young leaves and buds of willows. None of the "preferred fruit" species (Heather and Robertson, 1996), miro, tawa, taraire, puriri and pigeonwood, were recorded in the Reserve area by Irving, 1991.

NZ dotterel (Category B), reef heron (Category O), variable oystercatcher (Category C) and wrybill (Category B) are all more likely to utilise River mouth habitats (c. 5 km downstream) for feeding and breeding (except wrybill).

White-fronted tern (Category C) is likely to utilise lower River habitats for feeding, especially, as with caspian tern, during periods of whitebait migration.

The proposed Option A3 alignment would not result in any significant adverse effect on these species, none of which is likely to utilise that specific area on a regular basis.

2.2.2.3 Sand ridge habitat

Between the Waimarae oxbow and the western grove of kahikatea the tall vegetation area consists of sand ridge rather than wetland habitat. That area was traversed during the survey and found to provide habitat for common native and introduced birds typical of similar scrub habitats e.g. blackbird, grey warbler, hedgesparrow, yellowhammer, magpie, pukeko (common) and pheasant. Rabbits were present. Additional birds recorded in the vicinity of the kahikatea stands were fantail, goldfinch, silvereye, house sparrow, chaffinch and harrier with mallard and paradise shelduck in adjoining paddocks.

The sand ridge area provides a buffer between the western grazed paddocks and the wetland area on its eastern side. It is understood that Eastern Fish and Game and the Wildfowlers Association wish to develop the sand ridge habitat into an "upland" game hunting area by enhancing the habitat for birds such as california quail, brown quail and pheasant.

California quail were introduced from the USA in 1865 and are typically found in farmland and scrub, or rough pasture associated with manuka (Ogle and Cheyne, 1981; Heather & Robertson, 1996). This quail commonly nests on dry ground in long grass near a thick cover of blackberry, gorse or bracken. In Whangamarino wetland it occurred in crack willow forest, kahikatea stands, swamp margins and beside the main trunk railway (Ogle and Cheyne, 1981).

Brown quail, which were introduced from Australia before 1870, are mainly seen along the dusty edges of country roads as well as in scrub and open rough grassland well supplied with cover (Heather and Robertson, 1996). They nest under thick vegetation such as roadside verges and bracken. In Whangamarino wetland brown quail occurred on a causeway beneath the Kopuku mine cableway and at swamp margins on farmed "islands". (Ogle & Cheyne, 1981).

Pheasant have been introduced from different sources from 1842 onwards and are found mainly in open farm country, usually where pasture or crops join scrub or scrub-covered gullies, and particularly in maize fields. They also occur in partly opened-up fern and manuka country and lupin-covered sand dunes. In order to travel safely from one area to another pheasants need covered communication lanes, such as hedges, windbreaks, and scrub along roads and watercourses (Robertson, 1985). Nest sites are hayfields, scrub, roadsides, pasture and rough pasture, garden and crop areas, ditch and river banks, and swamps (Robertson, 1985). In Whangamarino wetland they occurred in the wetland area, amongst pampas grass, on wetland margins and in short vegetation in peat bogs. (Ogle & Cheyne, 1981).

When inspected the sand ridge area appeared to present suitable "upland" game habitat potential; whether that situation will continue with the higher water levels provided by the new culvert is unknown. Secondly the actual management of populations of at least pheasant is difficult. Soulsby, 1997 has cautioned that "*Unfortunately, since Westerskov's work (early 1950's), there have been no other studies on pheasant to help us understand their ecology or productivity.*" He noted the need for more ecological work so that there is a better understanding of whether *"there is any habitat manipulation or management that can be undertaken to improve the abundance of wild birds."*

Therefore while the sand ridge terrain may be favourable to "upland" game, at least at present, some basic ecological questions remain regarding the management of at least populations of pheasants.

The proximity of the roadway and vegetated earth bund to the western edge of the sand ridge area is unlikely to adversely affect existing "upland" game populations.

California quail and pheasant still persist in urban areas of Auckland City beside significant, but unbunded, arterial roadways (pers. obs).

2.2.2.4 Constructed pond habitats

The Eastern Fish and Game Council has constructed a number of large ponds in the southeastern area of the Reserve between the Pah Road right-angled bend and its eastern boundary. Vehicle accessways have also been developed. A considerable area of vegetation (refer Section 21.2) has been cleared to create a waterfowl shooting area. A number of permanent maimais is present.

The ponded habitats are generally very shallow with soft muddy margins which are gradually becoming colonised by aquatic plants. Flax and cabbage trees have been planted alongside the vehicle tracks in some places (Plates 23 - 28).

Calls for spotless crake were played at several locations in this area with no response, however, they have been recorded in this area (Wildfowlers pers. comm.). On the day of survey, birds recorded utilising the constructed habitats were welcome swallow, australasian pied stilt (5), black shag, mallard (12), pukeko, NZ kingfisher, white-faced heron and spur-winged plover.

In addition, three australasian bittern (Category O species) were observed in the eastern-most section. Bittern had also been recorded in the Reserve by the survey undertaken in the 1982-84 period (Rasch, 1989), and it is understood at least six are present in this area (Wildfowlers pers. comm.). Typical fernbird, bittern and spotless crake habitat in the Whangamarino wetland is shown in Appendix 6.10. (Ogle and Cheyne, 1981).

Ring-necked pheasant was present in peripheral pampas-cabbage tree habitat.

Fernbirds were recorded, and observed with the use of a lure tape, in an area of undisturbed vegetation containing *Coprosma propinqua*, flax, cabbage trees, *Baumea* and *Carex secta* between two of the more northern excavated ponds. Judging from the contiguous vegetation types, it is probable that a significant population of fernbirds is present. The pair located (Plate 25) was immediately adjacent to a vehicle track around one of the ponds.

At present the ponds collectively represent a large area of shallow open standing water, a habitat type which does not appear to have been present in this area to this extent previously. In this regard they have increased habitat diversity significantly.

In the longer term, because of their shallow nature, the ponds are likely to progress towards heavily vegetated wetlands containing rushes, sedges and possibly raupo, ie: the present areas of open standing water are likely to diminish in extent. It is understood, however, that Eastern Fish and Game and the Wildfowlers Association will undertake periodic clearance of emergent vegetation in this area and throughout the Reserve.

At present the ponds clearly provide a large area of habitat for common introduced and native "waterbirds" including game birds, and are utilised by australasian bittern, although this species was also present in the 1982-84 period. (Rasch, 1989)

It is understood that N.Z. shoveler have recently "returned" to this area as a result of pond development.

In terms of assisting the conservation of native species of birds, the constructed ponds provide feeding habitat for australasian bittern; the developed area will not be suitable for breeding until dense growths of raupo, sedges and rushes (reeds) have developed in perimeter areas. A requirement of the D.O.C. is that waterway maintenance ensures that some areas of emergent vegetation remain throughout the Reserve to provide feeding and breeding habitat for wetland birds. The ponds are also utilised intermittently by some of the less commonly observed native wading birds (eg. white heron) and waterfowl, which utilise the ponds for feeding.

Therefore the constructed ponds provide a significant area of waterfowl, wading bird and wetland bird habitat in this area which consisted previously of mainly cabbage tree/grey willow/sedges-flax-grasses with honeysuckle-blackberry-bracken vineland and *Muehlenbeckia complexa* vineland. (Irving, 1991).

The constructed ponds have probably increased the diversity of species using the Reserve and possibly increased the abundance of some, however, no formal comprehensive wildlife survey of the Reserve has yet been completed despite the recommendation of Garrick, 1990. It is clear, however, that the overall diversity of the avifauna in this part of the Reserve is high and is likely to remain so.

2.2.3 **Reptiles and amphibians**

No native reptiles or amphibians were located along the proposed alignment. Ponded areas would support green frogs (*Litoria* sp.), the adults and tadpoles of which are predated by wading birds such as white-faced heron, white heron and australasian bittern.

Department of Conservation records indicate that copper skink (*Cyclodina aenea*), which is widespread in the North Island, has been recorded at Mt. Maunganui. Shore skink (*Oligosoma smithi*) occurs in high tide drift and sand dune habitats at the Kaituna River mouth. Moko skink (*Oligosoma moko*) was recorded at Papamoa Beach in 1950 (U14 28020 63820) and represents one of the few mainland populations known (McEwen, 1987).

The proposed Option A3 alignment would not affect any significant native reptile habitat.

2.2.4. **Other wildlife**

Introduced mammals such as hedgehog, rodents, mustelids (stoat, ferret, weasel) and feral cats (Garrick, 1990) have been recorded in the area. European rabbit (*Orytolagus cuniculus cuniculus*) was observed in the willow-dominated "sand ridge" habitat to the north of the kahikatea stands, and brush-tailed possum (*Trichosurus vulpecula*) sign was recorded in the constructed pond area. Goats were present in the past but it is understood these have been removed.

2.2.5. **Conclusions**

The proposed alignment Option A3 "footprint" would traverse terrestrial areas of low wildlife value. Its crossing of the Kaituna River would be at a point which does not have any particularly notable wildlife values relative to the 22 km of similar habitat in the lower River.

The most notable wildlife habitat on the western side of the River adjacent to the alignment is the Niccol property section of the Bell Road oxbow which would be avoided.

On the eastern side of the River the most notable adjacent habitat is the Lower Kaituna Wildlife Management Reserve. Although the alignment would cross the western grazed area of the Reserve, it would avoid all areas of tall vegetation habitat including the remnant kahikatea stands. There is an opportunity to retire surrounding grazed pasture and reinstate the former kahikatea forest vegetation lost as a result of past disturbances (e.g. floods, fires).

The most significant downstream wildlife habitat so defined at present is the Kaituna River mouth area which is c.5 km from the proposed River crossing.

The Eastern Fish and Game Council constructed ponds within the Reserve provide feeding habitat for australasian bittern, but not breeding habitat (bittern was recorded in the Reserve in the 1982-84 wildlife survey) and have increased the wildlife diversity within the Reserve.

In summary, although the Option A3 alignment footprint would be in close proximity to areas with a relatively high wildlife habitat value, no notable habitat would be traversed.

2.3. Freshwater Habitats

2.3.1. Water, Elutriate and Sediment Quality

2.3.1.1 Introduction

Alignment Option A3 would traverse four natural waterways and a number of constructed drains, some of which are large. The survey was completed prior to the commissioning of the new culvert connecting the Reserve area with the Kaituna River.

Water, elutriate and sediment samples were collected at five sites - EA 1, EA 2N, EA 3, EA 4 and EA 5 (Figure 9). Only the latter station was not directly on the proposed

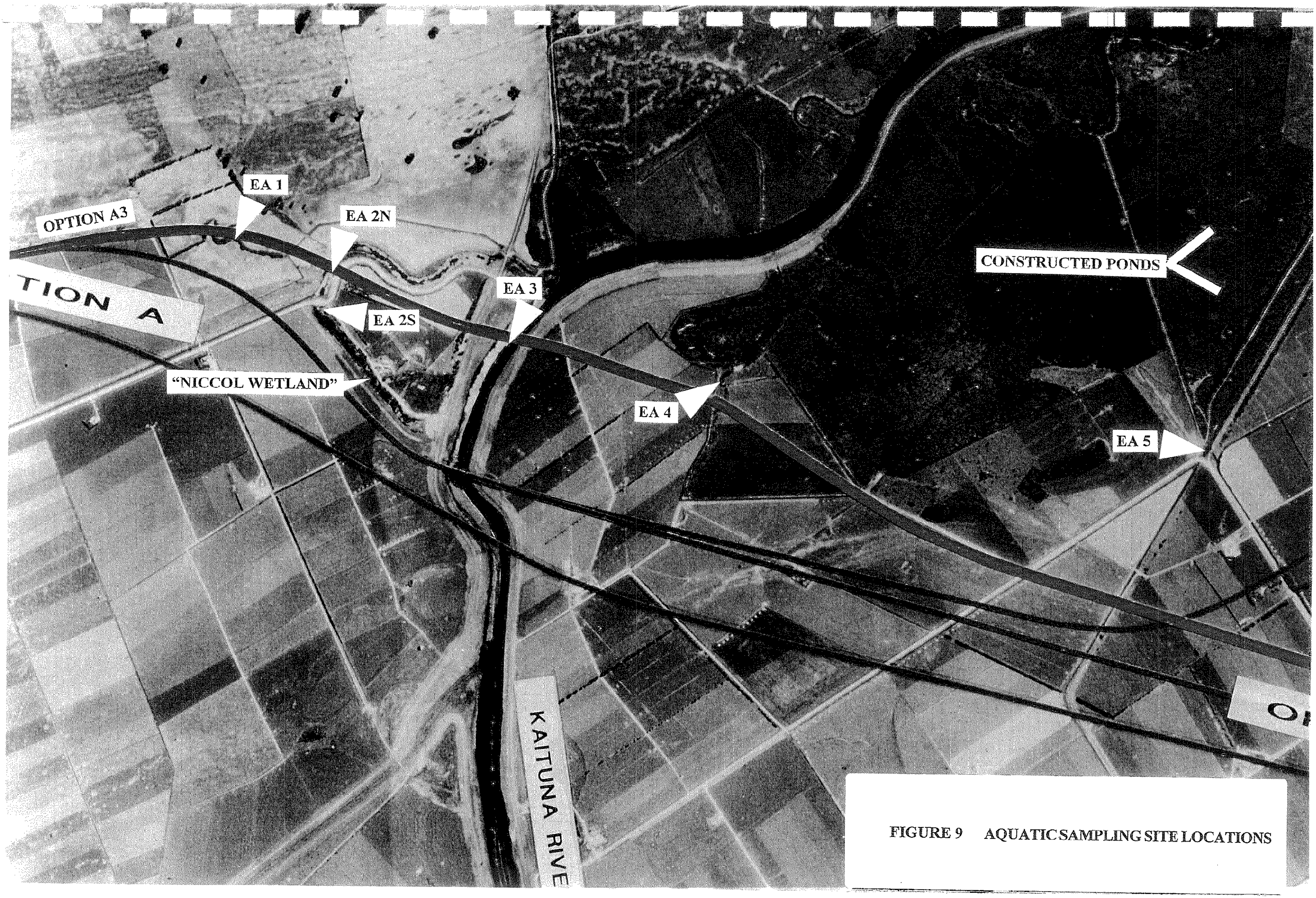

FIGURE 9 AQUATIC SAMPLING SITE LOCATIONS

alignment but was sampled as a representative area of typical drainage habitat and because access could not be gained to the Pamment and Potter properties. Drains within those areas discharge to the Kaituna River via the Site EA 5 channel which forms the southeastern boundary of the Reserve, and which is shown on the 1943 topographic map (refer Figure 5) and as a distinct channel on the 1965 map (Figure 6).

The aim was to determine whether any adverse effects would be likely, or whether there are any areas in which special measures in mitigation would be appropriate during the construction phase, because of a release of potential contaminants from the sediments.

Samples were collected at the following sites shown in Figure 9 :

Site No [(a)]	Plate No.	Location
EA 1	1, 2, 3	By De Lay property northwest of Kaituna River oxbow.
EA 2N	5, 6, 7	Kaituna River oxbow on northern side end Bell Rd straight.
EA 3	9	Kaituna River mainstem upstream from carpark and boat ramp.
EA 4	10, 11, 12	Waimarae Stream in D.O.C. Reserve.
EA 5	16	Main drain at Pah Rd right angled bend.

[(a) aquatic station numbers are constant for all following sections]

The constituents measured included a range of metals, total ammonia, sulphide, total petroleum hydrocarbons and a range of pesticides in recognition of the agricultural and horticultural use of the majority of the area.

Surface sediment samples were collected and analysed for grain size, copper, lead, zinc and total petroleum hydrocarbons. Those results better reflect the longer term influence of sources of contamination, enable the broad "contamination status" of the sediments to be established and can be compared with ten other sites which have been recently sampled in the same manner in the Bay of Plenty area (Bioresearches 1997(a), 1997(b), 1998).

All samples were collected on 3 August 1998.

2.3.1.2 Methods of Analysis

Grain Size

Approximately 100 g of the sediment sample was mixed with water and dispersant (6.6% sodium polymetaphosphate and 1.4% sodium carbonate) and left for twenty four hours.

The mixed sample was then passed through a series of Wentworth sieves using a Rotap sieving machine. Mesh sizes were 3.35 mm, 2.00 mm, 1.18 mm, 0.60 mm, 0.15 mm and 0.063 mm. The less than 0.063 mm fraction was further differentiated using pipette analyses.

Fractions were then dried, cooled and weighed, and are expressed as percentage composition by weight.

Size classes of the sediment fractions are described as follows:

> 3.4 mm	gravel
2.0 - 3.4 mm	granules
1.18 - 2.0 mm	very coarse sand
0.6 - 1.18 mm	coarse sand
0.3 - 0.6 mm	medium sand
0.15 - 0.3 mm	fine sand
0.063 - 0.15 mm	very fine sand
0.004 - 0.063 mm	silt
<0.004 mm	clay

Sediment quality

Metals digestion	Nitric acid/hydrogen peroxide. High pressure microwave. [USEPA method 3051].
Metals	Flame AAS [APHA 3111 B].
Hydrocarbons	Super-critical fluid extraction [USEPA method 3560]. Silica treatment. Measurement by GC-FID [USEPA method 8015 mod].

Water and Elutriate Quality

Metals digestion	Nitric acid (total recoverables). High pressure microwave [USEPA 3015].
Mercury	Cold vapour AAS [APHA 3112 B, modified].
Arsenic	Continuous flow hydride generation AAS [APHA 3114 B, modified].
Other metals	Graphite furnace AAS [APHA 3113 B].
Sulphide	Methylene blue spectrophotometry [APHA 4500-S^{2-} D].
Ammonia	Phenate spectrophotometry. [APHA 4500-NH_3].
Hydrocarbons	Methylene chloride extraction. Silica treatment. Measurement by GC-FID [USEPA method 8015 mod].
OC-pesticides	Liquid-liquid extraction; clean-up on florisil; GC-ECD.

Hardness EDTA titration [APHA 2340 C].

Elutriation Method

The elutriate was prepared using water from the site. Sediment and unfiltered water were then combined in a sediment-to-water ratio of 1:4 on a volume basis at room temperature. The mixture was stirred vigorously for thirty minutes with a magnetic stirrer. At ten minute intervals the mixture was also stirred manually to ensure complete mixing. After the thirty minute mixing period the mixture was allowed to settle for one hour. The supernatant was then siphoned off and filtered through a 0.45 μm - mesh filter to remove particulates prior to chemical analysis (USEPA, 1991).

2.3.1.3 Results and Discussion

Water quality results, which indicate background conditions at the time of sampling, are shown in Table 4 and elutriate results in Table 5. Additional water quality data are shown in Table 14. (Section 2.3.2).

Tables 6 and 7 show comparisons between the elutriate results and USEPA criteria for aquatic life protection.

Sediment grain size data and concentrations of copper, lead, zinc and total petroleum hydrocarbons in bulk sediments are shown in Tables 8 and 9.

(A) Ambient Water and Elutriate Quality

Ambient water (Table 4) at all sites was acidic (i.e. pH <7.0) especially in the Waimarae Stream (pH = 4.2). Concentrations of total ammonia were low relative to USEPA chronic criteria but highest in the By De Lay property (EA 1) and Kaituna oxbow (EA 2N). Concentrations of available sulphide were higher than the minimum detection level at all

TABLE 4

AMBIENT WATER QUALITY

		By De Lay property	Kaituna oxbow	Kaituna River	Waimarae Stream	Pah Rd drain
Stream/River Water		**EA 1**	**EA 2N**	**EA 3**	**EA 4**	**EA 5**
pH		6.4	6.0	6.4	4.2	5.9
total ammonia	mgN/m^3	790	940	46	72	510
sulphide	mg/m^3	7	4	<1	2	4
arsenic	mg/m^3	<1	<1	<1	<1	<1
cadmium	mg/m^3	<0.1	<0.1	<0.1	<0.01	<0.01
chromium	mg/m^3	<1	<1	<1	<1	<1
copper	mg/m^3	<1	<1	<1	<1	<1
lead	mg/m^3	0.2	2.4	1	<0.1	<0.1
mercury	mg/m^3	<0.005	<0.005	<0.005	<0.005	<0.005
nickel	mg/m^3	<1	<1	<1	<1	<1
zinc	mg/m^3	10	26	6	180	32
hardness	$gCaCO_3/m^3$	139	133	18	156	166
alpha-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
beta-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Lindane	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
delta-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002

TABLE 4 (continued)

		By De Lay property	Kaituna oxbow	Kaituna River	Waimarae Stream	Pah Rd drain
Stream/River Water		**EA 1**	**EA 2N**	**EA 3**	**EA 4**	**EA 5**
Heptachlor	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Aldrin	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Heptachlor epoxide	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endosulfan I	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
4,4'-DDE	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Dieldrin	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endrin	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endosulfan II	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
4,4'-DDD	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endrin aldehyde	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endosulfan sulfate	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
4,4'-DDT	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Endrin Ketone	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Methoxychlor	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
Chlordane, total	mg/m^3	<0.002	<0.002	<0.0 02	<0.002	<0.002
total petroleum hydrocarbons	<200	<200	<200	<200	<200	<200

(mg/m^3 = ppb; g/m^3 = ppm)

TABLE 5

ELUTRIATE WATER QUALITY

		By De Lay property	Kaituna oxbow	Kaituna River	Waimarae Stream	Pah Rd drain
Elutriate		**EA 1**	**EA 2N**	**EA 3**	**EA 4**	**EA 5**
pH		7.4	6.6	6.8	6.2	6.4
total ammonia	mgN/m^3	880	1600	2200	1300	410
sulphide	mg/m^3	3	9	5	7	4
arsenic	mg/m^3	13	<1	<1	<1	22
cadmium	mg/m^3	<0.1	<0.1	<0.1	<0.1	<0.1
chromium	mg/m^3	<1	<1	<1	<1	<1
copper	mg/m^3	<1	<1	<1	<1	<1
lead	mg/m^3	0.2	0.8	0.2	<0.1	<0.1
mercury	mg/m^3	<0.005	<0.005	<0.005	<0.005	<0.005
nickel	mg/m^3	<1	2	<1	1	<1
zinc	mg/m^3	15	41	21	130	66
hardness	gCaCO$_3$/m^3	135	149	56	136	117
alpha-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
beta-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Lindane	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
delta-BHC	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Heptachlor	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Aldrin	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002

TABLE 5 (continued)

		By De Lay property	Kaituna oxbow	Kaituna River	Waimarae Stream	Pah Rd drain
Elutriate		**EA 1**	**EA 2N**	**EA 3**	**EA 4**	**EA 5**
Heptachlor epoxide	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endosulfan I	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
4,4'-DDE	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Dieldrin	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endrin	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endosulfan II	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
4,4'-DDD	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endrin aldehyde	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endosulfan sulfate	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
4,4'-DDT	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Endrin Ketone	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Methoxychlor	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
Chlordane, total	mg/m^3	<0.002	<0.002	<0.002	<0.002	<0.002
total petroleum hydrocarbons	<200	<200	<200	<200	<200	<200

(mg/m^3 = ppb; g/m^3 = ppm)

TABLE 6 COMPARISON OF ELUTRIATE TOTAL AMMONIA CONCENTRATIONS WITH USEPA CRITERIA FOR THE PROTECTION OF AQUATIC LIFE (mgN/m^3)

[Criteria as revised October 1996; converted to mg/m^{3}N]

ACUTE CRITERIA mg/m^3 as Nitrogen				
	10°C	**15°C**	**20°C**	**25°C**
pH				
6.50	25482	24660	23838	23838
6.75	23016	22194	22194	21372
7.00	20550	19728	18906	18906
CHRONIC CRITERIA mg/m^3 as Nitrogen				
	10°C	**15°C**	**20°C**	**25°C**
pH				
6.50	2219	2055	2055	2055
6.75	2219	2137	2055	2055
7.00	2219	2137	2055	2055

Elutriate Total Ammonia Levels as Nitrogen (mg/m^3)		
EA 1	By De Lay property	880
EA 2N	Kaituna oxbow	1600
EA 3	Kaituna River	2200 ●
EA 4	Waimarae Stream	1300
EA 5	Pah Rd drain	410

- chronic criteria exceeded; below acute criteria

TABLE 7

COMPARISON OF ELUTRIATE CONCENTRATIONS
WITH USEPA CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

$(mg/m^3 = ppb)$

	By De Lay property		Kaituna oxbow		Kaituna River		Waimarae Stream		Pah Rd drain	
	EA 1		EA 2N		EA 3		EA 4		EA 5	
		USEPA		**USEPA**		**USEPA**		**USEPA**		**USEPA**
total ammonia	880	RT	1600	RT	2200	RT	1300	RT	410	RT
sulphide	3	RT	9	RT	5	RT	7	RT	4	RT
arsenic	13	190	<1	190	<1	190	<1	190	22	190
cadmium	<0.1	1.47	<0.1	1.42	<0.1	0.29	<0.1	1.61	<0.1	1.69
chromium	<1	11	<1	11	<1	11	<1	11	<1	11
copper	<1	15.7	<1	15.1	<1	2.7	<1	17.3	<1	18.2
lead	0.2	4.8	0.8	4.6	0.2	0.4	<0.1	5.6	<0.1	6.1
mercury	<0.005	0.012	<0.005	0.012	<0.005	0.012	<0.005	0.012	<0.005	0.012
nickel	<1	208.3	2	200.7	<1	36.9	1	229.7	<1	242.1
zinc	15	140.1	41	134.9	21	24.8	130	154.5	66	162.8

NOTES

(i) RT = refer text

(ii) hardness values used are ambient stream/river levels

(iii) chromium as hexavalent Cr; trivalent less toxic

TABLE 8 **SEDIMENT GRAIN SIZE RESULTS (PERCENTAGE COMPOSITION)**

		By De Lay property	Bell Rd oxbow	Kaituna River	Waimarae Stream	Pah Rd drain
Grain Size (mm)	**Description**	**EA 1**	**EA 2**	**EA 3**	**EA 4**	**EA 5**
>3.35	gravel	19.36	1.77	0.65	16.41	5.17
2.0 - 3.35	granules	13.64	2.98	0.50	7.75	4.70
1.18 - 2.0	very coarse sand	12.89	4.00	0.65	8.43	5.43
0.6 - 1.18	coarse sand	10.81	8.33	1.35	7.64	13.46
0.3 - 0.6	medium sand	13.77	13.31	3.31	5.47	16.85
0.15 - 0.3	fine sand	13.52	9.59	15.63	3.87	24.52
0.063 - 0.15	very fine sand	5.85	18.76	37.45	5.81	6.63
0.0039 - 0.063	silt	9.30	30.44	32.96	25.77	15.05
<0.0039	clay	0.86	10.82	7.50	18.85	8.19

TABLE 9 COMPARATIVE PERCENTAGES OF SILT AND CLAY (%)

(coordinates listed in Table 11)

	% silt & clay
Minden Rd Stream	15.8
Wairoa River - S.H. 2 bridge	52.2
Wairoa River - upper	67.8
Kopurererua Stream - lower	31.7
Cambridge Rd tip - willow wetland	91.6
Omokoroa adjacent S.H. 2 - Bruning property	24.8
"Mangawhai Stream" - Omokoroa	8.1
Te Puna Stream - S.H. 2 bridge	35.9
QE II Reserve - Te Puna	16.1
Te Puna adjacent S.H. 2 - Fitchl property	47.1
Mean	**39.1**
SD	**26.1**

sites except the Kaituna River (EA 3). Waters were also "hard" at all sites except the River.

Ambient levels of arsenic, cadmium, chromium, copper, mercury, nickel, pesticides and total petroleum hydrocarbons were low throughout.

Concentrations of lead were low except at the Kaituna oxbow (EA 2N) where a relatively high level was recorded. The USEPA chronic aquatic life protection criterion was not exceeded, however, as a result of the high water hardness which buffers potentially toxic effects.

Zinc concentrations were low at all stations except the Waimarae Stream. There the recorded level was high and exceeded both the chronic and acute (170.6 mg/m^3) criteria. The stream appeared to be "flowing" from the nearby truncated oxbow (Plate 13) but the reason for the high level was not obvious.

The <u>elutriate concentrations</u> (Table 5) which reflect the potential for the release of dissolved constituents following sediment disturbance, and hence the potential for direct adverse downstream effects, are shown in Table 5. At all sites there was an increase in pH, including the Waimarae Stream site where an increase from 4.2 to 6.2 was recorded.

A significant increase in total ammonia concentrations occurred at all sites except the Pah Rd Drain (EA 5). The resulting concentration at EA 3 (Kaituna River) would exceed the chronic aquatic life protection level, prior to mixing, at water temperatures of 15°C and above (Table 6). Sulphide levels increased at EA 2N, EA 3 and EA 4 only, with the highest occurring at the Kaituna oxbow (EA 2N) and Waimarae Stream (EA 4). The toxicity of sulphides derives mainly from H_2S rather than from the hydrosulphide (HS^-) or sulphide ($S^=$) ions. At pH 9 about 99% of the sulphide is in the form of HS^-, at pH 7 it is equally divided between HS^- and H_2S, but at pH 5 about 99 percent is present as H_2S which is the more toxic.

A guideline of 2 mg/m^3 of undissociated H_2S is considered protective as H_2S is rapidly oxidised in well-aerated water to sulphates and elemental sulphur. At all sites the concentration would be higher than 2 mg/m^3 prior to any mixing with the receiving waters occurring (i.e. reasonable mixing). At Sites EA 2N and EA 4, especially the latter (Waimarae Stream), the ambient pH is low suggesting that most of the sulphide could be present in the more toxic form in the immediate area of any sediment disturbance. Isolation of the crossing areas would prevent adverse downstream effects.

Elutriate levels of cadmium, chromium and copper were low and unchanged from background concentrations. Significant increases in the levels of arsenic occurred at EA 1 (By De Lay property) and EA 5 (Pah Rd Drain) but the resulting concentrations remained well below the aquatic life protection criterion (Table 7).

No change or a decrease in the levels of lead, mercury, pesticides and total petroleum hydrocarbons occurred throughout, while a minor increase in nickel occurred at Sites EA 2N and EA 4; both were inconsequential relative to the aquatic life protection criteria.

Zinc elutriate concentrations showed increases above ambient at all sites except EA 4. All resulting levels remained below the aquatic life protection criteria but that at EA 4 (Waimarae Stream) was relatively close and the highest of all five sites, while that at EA 3 (Kaituna River) was also just below the criterion.

In summary, only total ammonia at the Kaituna River Site (EA 3) exceeded the chronic criterion for aquatic life protection in the elutriate. Concentrations of zinc in elutriate at both EA 3 and EA 4 (Waimarae Stream) were close to, but below, the chronic criteria, but the ambient concentration of zinc in Waimarae Stream was higher than the acute criterion. The relatively high elutriate levels (total ammonia, zinc) would require only minimal dilution to reduce their levels to those significantly below aquatic life protection criteria.

The presence of large quantities of organic matter in the Waimarae Stream may have buffered the potentially significant effect of the high zinc concentration as a reasonably diverse biota was present.

(B) Sediment Grain Size

Grain size results are shown in Table 8.

Sediments at EA 1 (By De Lay property) were reasonably well sorted but silts were dominant at EA 2N (Bell Rd oxbow) and the Waimarae Stream (EA 4).

The Kaituna River Site (EA 3) consisted of very fine sand and silt, while fine and medium sands dominated the Pah Rd Drain (EA 5) sediments.

The proportions of silts and clays at the five sites were as follows:-

		% silt & clay
EA 1	By De Lay property	10.2
EA 2N	Kaituna oxbow	41.3
EA 3	Kaituna River	40.5
EA 4	Waimarae Stream	44.6
EA 5	Pah Rd Drain	23.2

Based on results from other Bay of Plenty habitats (Table 9) the proportions of silt and clay at EA 1 and EA 5 are relatively low while those at the remaining stations are about average.

(C) Sediment Quality

Sediment quality results are shown in Table 10; comparative results are presented in Table 11.

TABLE 10

RESULTS OF SEDIMENT QUALITY ANALYSES (mg/kg dry wt)

	By De Lay property	Kaituna oxbow	Kaituna River	Waimarae Stream	Pah Rd drain	Guideline Levels	
	EA 1	**EA 2N**	**EA 3**	**EA 4**	**EA 5**	**TEL**	**PEL**
copper	5.6	16	5.7	20	2.3	35.7	197
lead	3.4	7.9	8.6	15	6.6	35	91.3
zinc	● 167	97	45	89	50	123	315
TPH	<15	<15	<15	<15	44	NS	NS

TPH = total petroleum hydrocarbons

NS = not stated

● = above TEL but below PEL

TABLE 11 COMPARATIVE SEDIMENT QUALITY

(mg/kg dry wt)

	copper	lead	zinc	TPH
Minden Rd Stream (U14 814 845)	3.9	7.4	27	51
Wairoa River - S.H. 2 bridge	5.9	15	40	<15
Wairoa River - upper (U14 836 829)	7.1	13	55	423
Kopurererua Stream - lower (U14 869 839)	3.8	11	54	<15
Cambridge Rd tip - willow wetland (U14 865 837)	25	38 ●	178 ●	20
Omokoroa adjacent S.H. 2 - Bruning property (U14 764 884)	14	19	124 ●	<15
"Mangawhai Stream" - Omokoroa (U14 768 878)	5.8	7.2	29	<15
Te Puna Stream - S.H. 2 bridge	11	45 ●	38	83
QE II Reserve - Te Puna (U14 804 850)	7.2	12	45	<15
Te Puna adjacent S.H. 2 - Fitchl property (U14 795 848)	7.5	15	52	<15
TEL Guideline	**35.7**	**35**	**123**	-
PEL Guideline	**197**	**91.3**	**315**	-

The results in Table 10 are compared with the draft interim Canadian freshwater sediment quality guidelines (Smith *et al*, 1996).

The TEL (threshold effect level) represents a concentration below which adverse effects are expected to occur rarely; this value has been recommended as the interim Canadian sediment quality guideline. The PEL (probable effect level) defines the level above which adverse effects are expected to occur frequently. Concentrations between the TEL and PEL are expected to be associated with adverse biological effects occasionally.

Only zinc at EA 1 (By De Lay property) exceeded the TEL guideline but was well below the PEL level. That concentration is likely to have been a result of quantities of inorganic refuse in the stream above the sampling location (Plate 1).

The zinc concentration at EA 2N (Kaituna oxbow) was also close to the criterion but the reason for this level was not obvious.

Copper, lead and zinc were all relatively high in the Waimarae Stream (EA 4) and the zinc concentrations in ambient water and elutriate were also relatively high at that site. The highest copper-lead-zinc "load" (i.e. sum of concentrations) was at EA 1 (By De Lay property) followed by EA 4 (Waimarae Stream). The lowest "loads" were at EA 3 (Kaituna River) and EA 5 (Pah Rd Drain).

In comparison with other results from Bay of Plenty habitats (Table 11), the zinc concentration at EA 1 (By De Lay property) is similar to that at the Cambridge Rd tip. The copper level in Waimarae Stream sediment is also similar to that recorded in the tip wetland area, and that at EA 2N (Kaituna oxbow) is also relatively high.

Similarly the lead concentration in Waimarae Stream sediments is relatively high and similar to sites adjacent to State Highway 2 (eg. Wairoa bridge, Bruning property, Fitchl property and QE II Reserve).

TABLE 12 COMPARATIVE SEDIMENT QUALITY DATA

(mg/kg dry wt)

(a) Auckland Streams (Bioresearches, 1996) (n = 7)	copper	lead	zinc
mean	15.53	12.24	51.14
SD	5.09	5.34	16.77
SE	1.93	2.02	6.34
95% range	10.81 - 20.25	7.30 - 17.18	35.63 - 66.65

(b) Table 11 Streams Bioresearches, 1997 (a), 1997(b), 1998) (n = 9)	copper	lead	zinc
mean	7.36	16.07	51.56
SD	3.29	11.47	29.02
SE	1.09	3.82	9.67
95% range	4.85 - 9.87	7.26 - 24.88	29.27 - 73.85

(c) This survey (n = 5)	copper	lead	zinc
mean	9.92	8.30	89.60
SD	7.63	4.24	48.99
SE	3.41	1.89	21.91
95% range	0.45 - 19.39	3.05 - 13.55	28.78 - 150.42

Both copper and zinc levels in Waimarae Stream are well above the averages for the stations in Table 11 (Refer Table 12) while the lead concentration is similar. Clearly there is an unexplained source of contamination in the Waimarae Stream area (which appears to drain from the truncated oxbow). Note that both copper and zinc levels were higher in the Waimarae Stream than at the Te Puna Stream bridge, but lead and petroleum hydrocarbons were higher at the latter.

Although total petroleum hydrocarbons were recorded at the Pah Rd Drain site the level is relatively low.

Table 12 summarises sediment quality data from (a) stream sites beside well-used sealed roadways just north of Auckland City, (b) the Table 11 sites, and (c) the habitats sampled in this survey.

Acknowledging the difference in sample number, it is unexpected that the only marked difference between the average concentrations is the clearly higher copper level in the "Auckland streams". The average levels of copper, lead and zinc recorded in this survey (c), are not markedly different, statistically, from those recorded in the Table 11 streams, or from the levels recorded in (a).

In summary the sediments in the proposed crossing areas have unexpectedly moderate levels of contaminants, with the exception of the Kaituna River mainstem as a possible result of a better flushing regime. Zinc levels are moderate-high at the By De Lay property site, Kaituna oxbow and Waimarae Stream, copper concentrations are moderate in the Kaituna oxbow and Waimarae Stream, and the lead level is also moderate in the Waimarae Stream. Petroleum hydrocarbons were recorded in the Pah Rd Drain.

2.3.1.4 Conclusions

Ambient waters at most of the proposed crossing sites are slightly acidic but Waimarae Stream has a very low pH. Concentrations of potential contaminants in ambient waters are generally low and within the chronic aquatic life protection criteria. An exception is zinc in the Waimarae Stream which is high and exceeds the acute criterion. Adverse effects may be buffered by the quantities of organic material present.

Elutriate concentrations of total ammonia increased at all stations but only exceeded the chronic aquatic life protection criterion at the Kaituna River site. Sulphide levels would present a potential threat to habitats, prior to any dilution occurring, at the Kaituna oxbow and Waimarae Stream sites. Dissolved oxygen levels were also low at both these sites (Refer Table 14; Section 2.3.2).

Although some constituent concentrations increased in the elutriate, as compared with background levels, no metal, pesticide or petroleum hydrocarbon would be expected to present a threat to adjacent habitats on disturbance of the sediments. Zinc concentrations at the Kaituna River and Waimarae Stream sites were close to the chronic criteria.

Sediments contained relatively low proportions of silts and clays at the By De Lay property and Pah Rd Drain sites, and average proportions at the remaining sites.

Sediment quality analyses for copper, lead, zinc and petroleum hydrocarbons, indicated that only zinc at the By De Lay property site exceeded the aquatic life protection guideline, but that zinc at the Kaituna oxbow site was also close to that guideline level. The highest copper-lead-zinc load was in the By De Lay property followed by the Waimarae Stream.

In comparison with other results from Bay of Plenty sites, zinc at the By De Lay property site, and copper at the Waimarae Stream and Kaituna oxbow sites are relatively high. Lead at the Waimarae Stream site is at a similar concentration to sites near State Highway 2. In general sediments at the proposed crossing sites contain unexpectedly moderate levels of copper, lead and zinc in particular, with the exception of the Kaituna River mainstem where relatively low levels were recorded.

2.3.2. Aquatic Biota

2.3.2.1. Introduction

Aquatic macroinvertebrates were sampled at six locations, between Bell Road and Pah Road (Figure 9).

2.3.2.2. Methods

Macroinvertebrate samples were collected using a hand net (aperture 400 mm, mesh 1.0 mm), taking at least six one metre sweeps of marginal vegetation at each site. .

Macroinvertebrate samples were returned to the laboratory, sorted, preserved in 70% alcohol, counted and identified to the lowest taxa practicable.

The water quality at each site was assessed visually (for clarity) using a black disc tube and readings were taken for temperature, dissolved oxygen and conductivity.

Fish were surveyed using a backpack electric fishing machine (EFM 300). This machine temporarily stuns the fish so they can be caught without damage. Fish were identified and their length estimated before being returned to their habitat. Freshwater fish database forms were completed at each site and are included in Appendix 6.7.

The New Zealand Freshwater Fish database (serviced by NIWA, Hamilton) was searched for fish records from the Kaituna River catchment. These data and those of Young, 1997 were used to supplement data obtained in this survey.

2.3.2.3. Results

The overall characteristics of the six sites sampled in this area are shown in Table 13. Water quality readings are given in Table 14. Benthic macroinvertebrate results are shown in Appendix 6.8.

TABLE 13 Freshwater Habitat and Community Characteristics.

Site and Description	Riparian Vegetation	Water Flow	Gradient	Predominant Substrate	Macroinvertebrates	Fishes
EA 1 stream	grass/scrub	permanent ?	low	mud	10 taxa; ostracods and mosquito larvae common; pond-skater, beetle larvae and diptera larvae present	eels
EA2N oxbow	grass/scrub	permanent	low	mud	3 taxa; snail, leech and diptera present	eels, mosquito fish
EA2S oxbow	grass/ scrub	permanent	low	mud	1 taxa; caddisfly larvae	eels, mosquito fish
EA 3 river mainstem	grass	permanent	low	mud	10 taxa; shrimp and snails abundant; amphipod, damselfly, mayflies, stonefly, caddisfly and diptera present	giant bully, shortfinned eel
EA 4 isolated stream	grass	permanent	low	mud	9 taxa; diptera abundant; worms, damselflies, beetles present	no fish recorded (eel in adjacent drain)
EA 5 drain	grass	permanent	low	mud	4 taxa; damselflies abundant; snail and dipteran present	mosquito fish

TABLE 14 Water Quality.

Site	Temperature (°C)	Clarity (cm)	Dissolved Oxygen		Conductivity (µS/cm)
			g/m³	% saturation	
EA 1	7.3	37	5.3	44	447
EA2N	10.2	27	1.6	15	274
EA2S	12.0	27	1.1	10	283
EA 3	11.1	73.5	9.4	86	117
EA 4	12.3	11	3.2	30	452
EA 5	13.9	31	8.3	80	333

(A) Site EA1 (Plates 1, 2 & 3)

Habitat Conditions

Site EA1 was situated on an isolated section of an old stream in open farmland. The stream was still with a low gradient channel, was muddy bottomed and on average 3.5 metres wide. It had a fairly uniform average depth of 0.4 m. Cattle had access to the whole length of the stream. A large amount of instream organic debris (willow twigs) was present. Water clarity was poor- moderate with a black disc reading of 37 cm and very high conductivity (447 µS/cm). Dissolved oxygen concentration and saturation were poor (5.3 g/m^3; 44%). Water temperature was low (7.3 °C), and the stream may have been spring fed. Riparian vegetation consisted of a line of willow trees undergrown by pastoral grasses, providing light shade to the stream bed. In the upper section of stream a large amount of rubbish (including wood, car parts and dead cows) had been dumped.

Macrophytes present within the stream included duckweed (*Lemna minor*), starwort (*Callitriche stagnalis*), and watercress (*Rorippa* sp). These macrophytes provided good cover for fish. The green filamentous alga *Vaucheria* sp was abundant.

Macroinvertebrate Communities

Ten taxa were found at this site, although overall abundance was low. The community was dominated by ostracods. Other taxa present included dipteran larvae (mosquito larvae (*Culex* sp), chironomid midge larvae, and Stratiomyidae larvae), beetle larvae (Coleoptera) and the pond-skater *Microvelia* sp. The pond-skater, mosquito larvae, and the dipteran larvae (Stratiomyidae) are commonly found in slow flowing or still waters.

Fish

The only fish species found at this site were several eels (*Anguilla* sp) ranging from 250-400 mm.

(B) Site EA2N (Plates 5, 6 & 7)

Habitat Conditions

This site was situated on an isolated oxbow of the Kaituna River, on the northern side of Bell Road. The oxbow was approximately thirty metres wide, surrounded by open farmland, although was bordered in patches by willows and scrub. The visible substrate was entirely mud and water clarity was poor with a black disc reading of 27 cm. Dissolved oxygen levels were very low (1.6 g/m^3; 15% saturation). Water conductivity was measured at 274 μS/cm. Cattle had no access to the oxbow.

Because of the lack of shade, macrophytes were dense at the shallow margins of the oxbow, providing good cover for fish. The aquatic plants present consisted of duckweed (*Lemna minor*), hornwort (*Ceratophyllum demersum*), *Myriophyllum aquaticum*, pondweed (*Potamogeton ochreatus*), starwort (*Callitriche stagnalis*) and oxygen weed (*Egeria densa*). Algae found within the oxbow were the red filamentous alga *Compsopogon hookeri*, and the green filamentous algae *Spirogyra* sp and *Microspora* sp.

Macroinvertebrate Communities

Three taxa were collected from this site, although the sample comprised only four individuals. Two snails (*Lymnaea columella*), a leech (Hirudinea), and a chironomid midge larva were found.

Fish

Fish species found at this site were eels (*Anguilla* sp) and mosquito fish (*Gambusia affinis*).

(C) Site EA2S (Plate 4)

Habitat Conditions

This site was situated on an isolated oxbow of the Kaituna River, on the southern side of Bell Road. The oxbow was approximately thirty metres wide, surrounded by open farmland, although was bordered in patches by willows and scrub. The visible substrate was entirely mud and water clarity was poor with a black disc reading of 27 cm. Dissolved oxygen levels were very low (1.1 g/m^3; 10 % saturation). Conductivity readings were 283 μS/cm. Cattle had no access to the oxbow.

Because of the lack of shade, macrophytes were dense at the shallow margins of the oxbow, providing good cover for fish. The aquatic plants consisted of duckweed (*Lemna minor*), hornwort (*Ceratophyllum demersum*), *Myriophyllum aquaticum*, pondweed (*Potamogeton ochreatus*), water purslane (*Ludwigia palustris*), starwort (*Callitriche stagnalis*) and oxygen weed (*Egeria densa*). Algae found within the oxbow were the red filamentous alga *Compsopogon hookeri*, and the green filamentous algae *Spirogyra* sp and *Microspora* sp.

Macroinvertebrate Communities

Only one taxa, the caddisfly *Paroxyethira hendersoni* was found at this site.

Fish

Fish species found at this site were eels (*Anguilla* sp) and mosquito fish (*Gambusia affinis*).

(D) Site EA3 (Plate 9)

Habitat Conditions

Site EA3 was on the mainstem of the Kaituna River, approximately 100 m upstream of Bell Road. The river at this site was approximately sixty metres wide, being bounded by pasture on both sides, with a predominantly muddy substrate. The river water was well oxygenated (9.4 g/m^3; 86% saturation) with good water clarity (74 cm). Water temperature was 11.1°C and conductivity was measured at 117 µS/cm.

Macrophytes found at the rivers edge were hornwort (*Ceratophyllum demersum*), the oxygen weeds *Elodea canadensis*, *Lagarosiphon major*, *Egeria densa* and the curly leaved pondweed (*Potamogeton crispus*).

Macroinvertebrate Communities

Ten taxa were found at this site on the Kaituna River mainstem associated with the marginal aquatic plants. The freshwater shrimp (*Paratya curvirostris*) was the most abundant taxon, followed by the snail *Potamopyrgus antipodarum*. Other taxa found in small numbers at this site were the amphipod (*Paracalliope* sp), the mayflies *Mauiulus luma* and *Zephlebia* sp, the stonefly *Zelandobius* sp, the caddis *Pycnocentria evecta*, the lepidopteran *Hygraula nitens* and Chironomidae larvae.

Fish

Fish found at the river margins were shortfinned eels (*Anguilla australis*) and giant bullies (*Gobiomorphus gobioides*).

(E) Site EA4 (Plates 10, 11 & 12)

Habitat Conditions

This stream was an isolated section of farm stream/ wetland (Waimarae Stream), situated near an oxbow wetland. The stream at this site was still, and was blocked from the oxbow by a farm crossing without a culvert. The stream was wide (2.5 metres), fairly shallow (average 0.4 m), muddy bottomed, with very poor water clarity (11 cm black disc visibility) and low oxygen levels (3.2 g/m^3; 30% saturation). Water conductivity was very high (452 µS/cm).

Raupo (*Typha orientalis*) and reeds were the predominant aquatic plants. Other macrophytes included water purslane (*Ludwigia palustris*) and starwort (*Callitriche stagnalis*). The green filamentous alga *Microspora* sp was common at this site.

Macroinvertebrate Communities

Nine taxa were found at Site EA4, dominated by dipteran larvae (Chironomidae midge larvae and *Culex* sp, the mosquito larvae). Other taxa present were beetle larvae (*Rhantus pulverosus*, Dytiscidae and Scirtidae larvae), worms (Oligochaeta), the red damselfly (*Xanthocnemis zealandica*), the blue damselfly (*Austrolestes colensonis*) and the pond-skater (*Microvelia* sp).

Fish

No fish were recorded at this site, although one eel (*Anguilla* sp.) was found in an adjacent drain.

(F) Site EA5 (Plate 16)

Habitat Conditions

This site was located on a large drain that flowed adjacent to Pah Road. The drain flows entirely through farmland, before discharging into the Kaituna River. The drain was approximately six metres wide and very uniform in width, and estimated to be between 1.5 to 2 metres deep, slow flowing, with a muddy substrate. Water clarity was poor

(31 cm visibility) although oxygen levels were good (8.3 g/m^3; 80% saturation). The water temperature was 13.9°C and conductivity was 333 µS/cm.

The aquatic plants present at the canal margins were duckweed (*Lemna minor*) and hornwort (*Ceratophyllum demersum*). The green filamentous algae *Oedogonium* sp and *Microspora* sp were present at this site.

Macroinvertebrate Communities

Four taxa were collected from this site, the dominant taxon being the red damselfly larvae (*Xanthocnemis zealandica*). The other taxa found were the snail *Physa fontinalis*, the blue damselfly (*Austrolestes colensonis*) and a Stratiomyidae (Diptera) larva.

Fish

Due to vertical banks approximately two metres high, electric fishing was impractical at this site. One mosquito fish (*Gambusia affinis*) was caught in a net sweep of aquatic plants.

2.3.2.4. Previous Fish Surveys

Fish previously found within the Kaituna River catchment (NIWA Freshwater Fish Database, searched 2/7/98; Young, 1997) are listed in Table 15. These fish were recorded during the period from 1909 to 1998. The 'lower river' includes the river and associated streams below State Highway 2 (S.H. 2) and the 'upper river' includes the area above S.H. 2.

TABLE 15 Fish from the Kaituna River Catchment.

Fish Species	Common Name	Lower Kaituna River	Upper Kaituna River
Anguilla australis	Shortfinned eel	✓	✓
A. dieffenbachii	Longfinned eel	✓	✓
Aldrichetta forsteri	Yellow eyed mullet	✓	-
Cheimarrichthys fosteri	Torrentfish	✓	-
Carassius auratus	Goldfish	✓	✓
Galaxias argenteus	Giant kokopu	✓	-
G. brevipinnis	Koaro	✓	✓
G. fasciatus	Banded kokopu	✓	✓
G. maculatus	Inanga	✓	✓
Gambusia affinis	Mosquitofish	✓	✓
Geotria australis	Lamprey	-	✓
Gobiomorphus cotidianus	Common bully	✓	✓
G. huttoni	Redfinned bully	✓	✓
G. gobioides	Giant bully	✓	-
Mugil cephalus	Grey mullet	✓	-
Oncorhynchus mykiss	Rainbow trout	✓	✓
Retropinna retropinna	Common smelt	✓	✓
Rhombosolea retiaria	Black flounder	✓	-
Salmo trutta	Brown trout	-	✓
Salvelinus fontinalis	Brook char	-	✓

A specific survey was completed within the Reserve in December 1997 (Young, 1997) when the water level in the area had been drawn down to enable works during the summer. Most of the Reserve was dry and little open water fish habitat remained; species recorded at the Waimarae Bend were long-finned eels, common bullies and unidentified carp. Although no galaxiids were recorded the new culvert should increase the entry of native fish to the Reserve.

2.3.2.5. Conclusions

The aquatic habitats at the sites surveyed were characterised by their low gradient flow, muddy substrate and lack of shading riparian vegetation. All sites were present in open, grazed paddocks. Sites EA1, EA2N, EA2S, EA4 and EA5 all had little or no visible flow, poor water clarity and very low oxygen levels (with the exception of Site EA5 with 8.3 g/m^3; 80% saturation). Site EA3 on the Kaituna River mainstem had moderate clarity, and good dissolved oxygen levels (9.4 g/m^3; 86% saturation).

Macroinvertebrate communities at most sites generally had low richness and moderate overall abundance. The two sites on the Kaituna River oxbow (Sites EA2S and EA2N) had the lowest taxa and overall abundance of the sites, with one and three taxa found respectively. Site EA3 on the Kaituna River mainstem had the highest overall abundance, due to a high abundance of freshwater shrimps (*Paratya curvirostris*) and high numbers of the snail *Potamopyrgus antipodarum*. The dominant taxon varied between the other sites; ostracods were abundant at Site EA1, chironomid larvae at Site EA4 and the red damselfly (*Xanthocnemis* sp) at Site EA5. Few sensitive EPT taxa were present; one caddisfly (Trichoptera) at Site EA2S (the only macroinvertebrate present at that site) and two mayflies (Ephemeroptera), one stonefly (Plecoptera), and one caddisfly at Site EA3 (Kaituna River mainstem). EPT taxa comprised only 1.8% of sample abundance at Site EA3. The poor habitat quality, slow flowing or still waters and muddy substrates at most sites are considered to be the limiting habitat characteristics for these macroinvertebrates.

Eels were recorded at four of the five sites surveyed, with no fish being recorded at Site EA4. The introduced mosquito fish (*Gambusia affinis*) was found at three sites and the giant bully (*Gobiomorphus gobioides*) was found in the Kaituna River mainstem only (Site EA3). In general, all sites had a low diversity of fish species present.

This survey found that apart from the Kaituna River mainstem (Site EA3) the aquatic ecological values of the sites assessed were low. Degradation of the sites through farming practices and river diversion has resulted in conditions only suitable for a small range of fish and macroinvertebrates considered to be tolerant of conditions typical of low quality habitats, eg. poor water clarity, low dissolved oxygen and a mud substrate. However, the list of fish species in the river catchment (Table 15) highlights the importance of the lower Kaituna River as a pathway for the many diadromous native fish (that move between marine and freshwaters) found in this catchment and the better access of fish to the Reserve via the new culvert is likely to enhance the fisheries values of that area significantly.

3. IMPACTS OF PROPOSED DEVELOPMENTS

3.1. No notable vegetation, special vegetation site or community of rare or endangered plants would be traversed by the alignment Option A3 footprint.

3.2. The alignment has been altered to avoid the small western stand of remnant kahikatea which is presently surrounded by grazed pasture. The traverse would be well to the west of the pre-eminent remnant stand of kahikatea in the local area.

3.3. No notable wildlife habitats would be destroyed by the traverse of the alignment Option A3 footprint. On the western side of the Kaituna River, the Niccol property oxbow wetland would be avoided. The crossing of the Kaituna mainstem would be in an area of typical River habitat which is grazed to its edges, and has no particularly notable features relative to large similar areas both upstream and downstream.

3.4. Within the grazed area of the DoC Reserve the route would avoid the truncated oxbow near Waimarae Stream and all taller vegetation habitat around the oxbow's margins. The bund toe would be 60 metres from the water's edge.

3.5. The traverse of alignment Option A3 would not impact on any notable wildlife habitat within the Lower Kaituna Wildlife Management Reserve. The areas within the Reserve which have high ecological values are in the northeastern section well away (c.1200m) from the alignment. The area of the Reserve closest to the alignment is that managed by the Eastern Fish and Game Council. That area has lower relative ecological values overall; ongoing modifications to those habitats are clearly permitted under the present Reserve management strategy, and it is understood that that section is a popular shooting area for both waterfowl and "upland" gamebirds.

3.6. The presence of alignment Option A3 would not diminish the wildlife values of the adjacent area or the resource values of the higher ecological value habitats in the northeastern section of the Reserve. Clearly the presence of the road would increase the potential for road kill of wildlife especially in the open section to the east of the 4.5 metre high bund. The presence of the bund along the western side of the Reserve may decrease the potential in that area as birds would gain altitude to clear both the bund and vegetation along the bund crest.

3.7. The areas of tall vegetation habitat immediately adjacent to the alignment are utilised by mainly common species of birds, including gamebirds. Some would be displaced from the area during the construction phase but, provided the habitat is retained, can be expected to utilise the area once construction activities have ceased. Most of the potentially affected species are also found in urban and urban fringe habitats, including gamebirds such as california quail, ring-necked pheasant and waterfowl. It is noted that both fernbird and australasian bittern have persisted in the southeastern section of the Reserve despite the relatively recent construction activities and the understood significant use of firearms in that area in particular.

3.8. As the final alignment for Option A3 avoids intrusion into any tall vegetation (i.e. willow-dominated or kahikatea), any "edge effects" would be much reduced. It is likely that the major "edge effects" on the previously modified perimeters of the Reserve have already occurred as a result of land clearance which began in about the 1940's.

3.9. The alignment would not result in any habitat fragmentation as all the remaining habitat would be retained. The only possible barrier created would be to introduced mammals, some of which are significant predators of native wildlife; the presence of the road would not necessarily be negative in terms of the dispersal of those species, rather the opposite may apply. As no management plan has been finalised the intended level of predator control in the Reserve is not known. It is understood, however, that the Wildfowlers Association wishes to have good road access, suitable for machinery, to all parts of the Reserve.

3.10. The presence of the roadway would increase the quantity of vehicle-derived litter in this area. The public commonly uses bridges in particular as refuse disposal points. There are means of reducing the quantities of litter entering the Reserve area (refer Section 4.2).

3.11. No notable aquatic habitat would be destroyed by Option A3. The By De Lay property, Kaituna oxbow, Waimarae Stream and eastern drain habitats are all poor quality habitats with low dissolved oxygen levels, muddy substrates, low macroinvertebrate diversity and only moderate abundance, and with a low diversity of fishes. Construction works in those areas would not destroy any significant aquatic habitat.

The Kaituna River habitat is a higher quality area at the proposed crossing point and part of an important migration pathway for fish. A bridge with set back abutments (stopbank to stopbank) would reduce adverse effects to the minimum practicable and there would be no disruption to migratory pathways. At present the riparian edge areas at the proposed crossing point consist essentially of grazed pasture and have no significant habitat value; riparian planting would enhance the ecological values of this section of the River significantly.

3.12. The range of chemical analyses indicated that unexpectedly moderate levels of at least copper, lead and zinc contamination are present. Sediments generally contain low to moderate proportions of silts and clays but sediment disturbance would release concentrations of total ammonia (Kaituna River site) and sulphide (Kaituna oxbow, Waimarae Stream in particular), which have the potential to result in adverse downstream effects prior to reasonable mixing.

Rapid dilution is likely at the River site. Zinc concentrations at the By De Lay property, copper and lead in Waimarae Stream and copper at the Kaituna oxbow site are relatively high, and works areas would need to be isolated from the Kaituna River mainstem to mitigate against adverse downstream effects. Most of the areas crossed by Option A3, with the exception of the River mainstem, could be physically isolated (i.e. By De Lay property, Waimarae Stream, eastern drains), while a control gate is present downstream from the Kaituna oxbow crossing. While any instream works in the latter are likely to result in adverse water quality effects, that area is a poor quality habitat relative to habitats in the River mainstem.

In general, and providing the contaminated areas can be isolated during the construction phase, any adverse effects would be minor and no worse than the effects of natural river flood flows.

3.13. The completed roadway would be a source of contaminated runoff. To the west of the Kaituna River there is sufficient terrain in which to develop wetland buffer areas for stormwater runoff. Those areas could also be developed to reflect the previous vegetation and habitat types of the former Te Parapara Swamp (Figure 4A).

Similar areas of wetland could be developed on the eastern side of the River with the aim of providing buffers prior to stormwater being directed to the existing large drains (e.g. aquatic Site EA5). In this manner most of the stormwater from the eastern section of the roadway could be directed to the large drain forming the southeastern boundary of the Reserve, thus avoiding any direct impingement of roadway-derived stormwater on the Reserve habitats. Attenuation of roadway-derived particulates could also be achieved by utilising the existing constructed drains as retention areas. It is understood that these large drains are separated from the hydraulic regime of the Reserve wetland habitats, which required the pumped addition of River water during the summer to maintain their wetland characteristics, but now have direct contact with the River via the new culvert.

It would not be appropriate to use roadway-derived stormwater for additional maintenance of the Reserve wetland areas or to use those areas for stormwater treatment. There is an opportunity, however, to isolate this operational effect of the roadway from the adjacent Reserve area which would further reduce the overall impact of the roadway on adjacent habitats.

If roadway-derived stormwater is able to be directed away from and/or around the present

Reserve area, and existing drainage channels can be modified to provide retention of particulates, the adverse effect of roadway-derived stormwater runoff on the Reserve area would be negligible. Dilution of *treated* stormwater in the inland drains and in the Kaituna River mainstem is unlikely to result in a significant adverse effect on the wetland near the River mouth, or River mouth habitats themselves.

At present all runoff from Te Puke, Te Matai and State Highway 2 drains to the Kaituna River in an uncontrolled and untreated manner; that area includes c.6 road and c.8 rail crossings of tributary streams, drains, and the main River.

3.14. Although no tall vegetation habitat would be destroyed by the alignment, its "footprint" within the western section of the Reserve property, presently consisting of grazed and drained pasture, would remove an area which would otherwise be suitable for rehabilitation to kahikatea, flax and manuka habitat as occurred previously. The land is clearly suitable for kahikatea revegetation; remnant stands remain nearby and grazed paddocks, at least on the eastern side of the proposed alignment, contain stumps of old kahikatea trees. There is an opportunity to restore the previous vegetation types in some of the adjoining areas earlier than would probably have occurred under the existing land use situation in that part of the Reserve property. Therefore, development of the Option A3 alignment may also enable the timetable for Reserve rehabilitation to be contracted significantly. The reduction in the total potential area which could be ultimately rehabilitated is likely to be compensated by revegetation of other areas adjacent to the alignment but beyond the existing Reserve boundaries. In addition a significant area of new vegetation would be created as a result of planting the 4.5 metre high noise bund alongside the western vegetated area of the Reserve.

3.15. In summary, although the Option A3 alignment would be in close proximity to habitats of moderate to high value, it is well separated from the highest value ecological areas in the Lower Kaituna Management Reserve. The areas traversed are dominated by grazed pasture to the east and west of Kaituna River and, except for the River itself, the aquatic habitats are of low ecological value. The area of tall vegetated habitat in the Reserve closest to the alignment is managed by the Eastern Fish and Game Council for the waterfowl and "upland" game shooting. The Council's constructed pond development would also be well separated from the alignment.

There is an opportunity to isolate any potential roadway-derived stormwater effects from the Reserve, to provide wetland buffer areas on other parts of the alignment and to progress the revegetation of the grazed portion of the Reserve more rapidly than would have occurred otherwise.

3.16. The bunded roadway would create additional noise in this rural area. The predicted noise level 70 m from a 4.5 high bund vegetated with tall growing trees would be 50dBA and diminish with increasing distance. At the Waimarae oxbow the bund toe would be 60 m from the nearest standing water of the oxbow. Where the route is closest to the sand ridge habitat there would be a separation of c.150 m. From the bund toe to the constructed pond section in the eastern part of the Reserve the separate distance would range from 750 m near the existing Pah Rd bend to 2150 m at the former pumping station end.

While there would be a short term effect immediately adjacent to the bund construction zone, following its completion birds will continue to utilise the marginal areas of the wetland and sand ridge habitat.

Commissioning of the roadway would not result in an acute effect i.e. displacement of birds from immediately adjacent areas. Any chronic effects are likely to be minor and would not represent significant adverse effects or diminish the existing or future ecological values of the Reserve. The vegetated bund and revegetated margins of the wetland and sand ridge would be utilised by species presently in these marginal habitats, particularly "upland" game species.

Although no data exist on the relationship of certain decibel levels and the behaviour of birds, there are examples of birds tolerating or acclimating to environments where noise levels are higher than "ambient background".

Although the Reserve as a whole contains a high diversity of bird species some of which, such as crakes and fernbird, have specific habitat requirements, only three species have been recorded which have a national conservation priority rating. Those species are australasian bittern and white heron (Category O), both of which also occur outside New Zealand, and N.Z. pigeon (Category B).

"Upland" game species are clearly tolerant of both land clearance and traffic noise. *"Mallard take readily to city ponds and streams, often feeding from the hand. Probably no other waterfowl species is as tolerant of people, though as a game bird it is extremely wary......... "* (Robertson, 1985).

"The grey duck now persists most abundantly in wild wetland areas away from human interference " (Robertson, 1985) in contrast, but has interbred extensively with mallard (Heather & Robertson, 1996).

N.Z. shoveler prefers fertile shallow wetlands, farm dams and sewage ponds, particularly areas fringed with raupo (Heather & Robertson, 1996) but shys away from city ponds.

On an areal basis most of the waterfowl habitat at present would be 750 m to 2150 m from the alignment. The closest "standing water" habitat is the Waimarae oxbow 60 m away. Whether further areas in the western section of the wetland would be excavated is unknown but dependent upon resource consents being granted by the Department of Conservation (D.O.C. pers. comm).

A good example of significant, yet intermittent and irregular, increases in noise levels above ambient occurs at and near airports. The fact that wading birds and some "terrestrial species" acclimate to aircraft noise levels is well documented (e.g. Saul, 1967; Creswell, 1988). At Auckland International a roosting area (Wiroa Island) was constructed to attract birds away from the runways and approach corridors, and a fulltime bird control officer is employed. In the 1960's the then Department of Civil Aviation included a National Bird Hazard Committee to address the problem of birds utilising airport habitats and the consequent risk of bird strike to aircraft. Statistics regarding bird strike incidents are maintained; these list the particular species concerned where possible.

Therefore throughout New Zealand, there is conclusive information to show that seabirds and wading species are not displaced from areas by aircraft noise, some of which is at a far higher decibel level than which would emanate from the bunded roadway.

Birds recorded at the "Airport" roost are shown in Table 16 and include five species with national conservation priority ratings including N.Z. dotterel and wrybill (Category B).

A second example is the commonly used roosting area at Sulphur Point, Tauranga Harbour which is on an area of reclaimed land used for industrial and port purposes. It is also beneath the northern approach to Tauranga Airport. Examples of its use by wading birds and terns are shown in Table 17.

Sulphur Point has been used for nesting by N.Z. dotterel for several years including during the construction phase. A total of 94 white-fronted tern nests was present in December 1996 and banded dotterel, wrybill, caspian tern and reef heron also utilise the area despite the presence of the adjacent industrial area and being overflown by aircraft approaching Tauranga Airport.

In addition, 340 banded dotterel and 6 wrybill have been reported from Tauranga Airport itself (Notornis, 1998).

Other incidental records for waders include N.Z. dotterel nesting alongside Auckland's Northern Motorway (OSNZ News, 1998), banded dotterel nesting and with juveniles at the N.Z. Railways freight yard at Smart Road, Fitzroy, New Plymouth (NZOS News 1987), and in the Mount Maunganui industrial area (2 pairs; 1.12.97; Notornis 1998). Note that a major wading bird roost, and nesting area for pied stilt, black-backed gull, variable oystercatcher and caspian tern, is present 120 m from Auckland's Northern Motorway (OSNZ News 1998). Both waders and terns also roost on a small beach

TABLE 16 Manukau Harbour Shorebird Census "Airport" Area (Ornithological Society of N.Z., South Auckland Region)

	16.06.96	**24.11.96**	**21.06.97**	**15.11.97**	**27.06.98**	**21.11.98**
S.I. pied oystercatcher	4960	480	2800	140	10500	650
● variable oystercatcher	1	-	1	-	1	-
● N.Z. dotterel	6	6	11	5	12	7
● banded dotterel	500	2	15	1	337	2
● wrybill	600	-	100	-	78	1
bar-tailed godwit	800	2850	120	-	200	300
lesser knot	90	1300	150	-	-	50
pied stilt	260	-	110	10	200	14
black shag	1	-	-	-	-	-
pied shag	1	-	2	35	-	37
white-faced heron	1	6	-	11	12	19
spur-winged plover	1	-	8	-	30	7
black-backed gull	2	4	-	-	3	2
red-billed gull	1	-	-	-	-	-
● caspian tern	66	10	29	1	20	4
mallard duck	120	24	-	-	-	-
harrier	2	1	-	2	1	2
turnstone	-	12	-	-	19	-
black-billed gull	-	2	-	-	-	-
little black shag	-	-	-	1	-	-
TOTAL	**7412**	**4697**	**3346**	**206**	**11414**	**1095**
TIDAL HEIGHT (m)	**3.8**	**4.2**	**4.0**	**4.5**	**4.2**	**4.0**

● species with national conservation priority ratings

TABLE 17 Sulphur Point Birds

S.I. pied oystercatcher	52	01.12.96	(a)
	200	08.02.97	(a)
	131	08.06.97	(a)
● N.Z. dotterel	7 (3 pairs + 1 juv)	01.12.96	(a)
	12	14.03.97	(a)
● banded dotterel	18	17.02.97	(a)
	200	08.02.97	(a)
● wrybill	60	08.02.97	(a)
bar-tailed godwit	1200	01.12.96	(a)
● caspian tern	31	08.06.97	(a)
● white-fronted tern	c.200 (+ 94 nests)	01.12.96	(a)
variable oystercatcher	33	01.12.96	(a)
	6	08.06.97	(a)
● reef heron	3	02.07.96	(b)

(a) Notornis, 1998
(b) Notornis, 1997

● species with a national conservation priority rating immediately beside the old toll plaza area on the Northern Motorway and have double-brooded at that site (Dowding *et al*, 1999). N.Z. dotterel nest in Shoal Bay c.100 m from the Northern Motorway and also nested on a golf course when under construction at Gulf Harbour, Whangaparaoa.

N.Z. dotterel have nested in the Waihi Gold Mining Company's waste rock and tailings pond area at Waihi (refer Appendix 8.5) and *"small numbers of N.Z. dotterel breed at highly modified sites, notably on grass at several airports and at Marsden Point oil refinery"* (Dowding, 1993).

Birds such as S.I. pied oystercatcher, banded dotterel, white-faced heron and spur-winged plover can be seen quite frequently feeding alongside runways at New Zealand airports undetered by aircraft taxiing only metres away, while pukeko is a common sight in road and motorway verge areas.

Although many of the species involved in the above examples do not occur in the Reserve, a number of them have higher national conservation priority ratings than the Reserve species and also utilise some of the habitats above on a regular and long term basis.

Even extreme noise as low incident events is unlikely to deter birds from an area provided the habitat conditions otherwise remain suitable. Papakanui Spit, South Head, Kaipara Harbour is at the northern end of the Papakanui Spit Stewardship Area, administered by the Department of Conservation, and is a "key area" within the Auckland Conservancy (geomorphic site of national importance; wildlife habitat of national significance; significant defence use). It is also a significant breeding site for N.Z. dotterel (Dowding, 1993), and is utilised by fairy tern, a Category A species (i.e. highest priority).

"Papakanui Stewardship Area is used by the New Zealand military and co-ordinated by the RNZAF for a number of military activities, including air and ground weapons training, driver training, demolition and general exercises. This disfigures the area,

creates hazards, and conflicts with habitat values. It also creates a misleading public impression of the area and makes control of undesirable recreational activities more difficult. " Department of Conservation, 1993.

From the recent census c.10% of the total Kaipara Harbour wading and seabird count was recorded from the Spit. The Stewardship Area and Wildlife Refuge are utilised for breeding by caspian tern, white-fronted tern, N.Z. dotterel and variable oystercatcher while the adjacent Waionui Inlet supports fernbird, crake and bittern (Department of Conservation, 1993). Despite debris from the military being an *"incongruous element in this wild, largely unmodified area"* no statement appears in the Conservation Management Strategy regarding noise or other effects on the Spit's use by birds. Papakanui Spit is a key area within the Kaipara Harbour which is a wetland of international importance (D.O.C. 1996).

Pollen Island Marine Reserve is bisected by Auckland's Northwest Motorway yet supports about 15 - 20 pairs of fernbirds, nesting N.Z. dotterel, spotless crake, banded rail, seabirds, waterfowl and wading birds.

A 6.2 ha area of estuarine vegetation abutting Tauranga Airport supports banded rail throughout with banded dotterel on adjacent grassland (Owen, Department of Conservation, 1993).

Estuarine vegetation (8.1 ha) along the Te Maunga Causeway (between Tauranga and Mount Maunganui) supports a small population of fernbirds in clearly high traffic noise conditions (Owen, Department of Conservation, 1993). Matua Estuary (36.8 ha), which has residential housing on its northern and southern boundaries, and also a railway line and road along the latter, supports both banded rail (6+) and fernbird (14) despite the "existing threats and impacts" listed.

The 7100 ha Whangamarino wetland, also of international significance, supports populations of fernbird, bittern, spotless crake, mallard, grey duck, grey teal, black swan, N.Z. shoveler, Canada goose and paradise shelduck, and contains pheasant, California quail and brown quail in marginal habitats. The main trunk railway embankment runs along its western side, roadways (rural) are present around its southern and eastern perimeter and the northern end contains, a road, a cableway and coal mines. The western railway embankment section is intensively used for waterfowl hunting (Ogle & Cheyne, 1981). *"Bittern are sometime* (sic) *seen alongside Highway 1 just north of Mercer township in wet areas alongside the road near the sand heaps. This is a busy road and parking may be a problem."* (Chambers, 1989).

Matata Lagoon Wildlife Refuge (65 ha) is situated between State Highway 2 and the sea. Its wildlife value is high (Rasch, 1989).

"Progression of estuarine rush wetland to freshwater raupo-flax wetland, bordered by scrub and dunes. Willow invasive. Relatively unmodified. Large number of species includes banded rail, dabchick, spotless crake, bittern, white heron, reef heron and fernbird." (Rasch, 1989).

The freshwater wetland area of Matata has nationally significant botanical values (Beadel, 1994) and contains the fern *Cyclosorus interruptus*.

Chambers, 1989 regards Matata as an ideal place to observe a high diversity of birds the key species being shoveler, scaup, banded rail, spotless crake, marsh crake and fernbird. Bittern are also present.

"This is a reliable place to observe grey duck. A flock of up to 50 birds can always be seen here." (Chambers, 1989). A large population of N.Z. shoveler can be found here at any time of year. *"This is a reliable place to see them."* (Chambers, 1989).

The full species list for Matata freshwater wetland and its adjoining coastal strip is as follows:-

Bird List for Matata :

Dabchick	California Quail	Fernbird
Black Shag	Pheasant	Grey Warbler
Pied Shag	Banded Rail	Thrush
Little Shag	Spotless Crake	Blackbird
Little Black Shag	Marsh Crake	Hedge Sparrow
White-faced Heron	Pukeko	Pipit
White Heron	S.I. Pied Oystercatcher	Bellbird
Little Egret	Variable Oystercatcher	Tui
Cattle Egret	Spur-winged Plover	Silvereye
Bittern	Pied Stilt	Greenfinch
Black Swan	Red-billed Gull	Goldfinch
Paradise Shelduck	Black-backed Gull	Redpoll
Mallard	White-fronted Tern	Chaffinch
Grey Duck	Caspian Tern	Yellowhammer
Shoveler	Eastern Rosella	Sparrow
Grey Teal	Skylark	Starling
Scaup	Welcome Swallow	Myna
Harrier	Fantail	Magpie

(Chambers, 1989)

In the Wellington Conservancy, Taupo Swamp (c.25 ha) is rated as an internationally significant wetland (D.O.C, 1996). On its eastern boundary is S.H. 1 while the main trunk railway is on its western boundary. The wetland contains a wide diversity of fish (brown mudfish, giant kokopu, banded kokopu, inanga, long-finned eel, short-finned eel, red-finned bully, common bully, giant bully and common smelt). Birds include little shag, bittern, mallard, pukeko and N.Z. kingfisher.

Therefore based on the above examples of (a) species of national conservation priority tolerating higher than ambient noise levels and (b) high value habitats in close proximity to unbunded roadways and railway tracks, the probability of the proposed bunded roadway resulting in a significant adverse effect as a result of noise is very low. Provided the structural integrity of the habitat is retained, which will be the case, the present and future ecological values are unlikely to be diminished as a result of noise generated by the bunded roadway.

3.17. There would also be an increase in lights in this area as a result of the road, however, the road itself would not be lit. Vehicle lights would not penetrate the Reserve in the western section as a result of the 4.5 metre high vegetated bund. Although vehicle lights may be visible from within the Reserve (e.g. from Kaituna Bridge, eastern unbunded section) the probability of their resulting in a significant adverse effect on wildlife is remote. In the Section 3.16. examples, vehicles and trains move through and alongside significant wildlife habitats at Pollen Island, Whangamarino wetland, Matata wetland and Taupo Swamp.

3.18. Similarly any adverse effect as a result of vibration is likely to be negligible as suggested by both the above examples and that of Papakanui Spit which would be subject to significant intermittent vibration at times.

3.19. Although the state of the Reserve is likely to change between the present and the time at which road construction commences, its nature in ten years hence is essentially unknown. The condition of the Reserve will depend on the final Management Plan, the effect of raising water levels, whether or not further consent is given for additional development of standing water bodies and the effect of additional planting both within the Reserve and associated with the 4.5 metre high noise mitigation bund which is likely to precede the roadway.

3.20. The proposed mitigation would, however, protect a Reserve with increased ecological values on the assumption that that trend will occur as a result of changes unassociated with this proposal. The mitigation would conserve and protect both the existing and future potential biodiversity values of the Reserve area.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. Conclusions

4.1.1. The alignment Option A3 as proposed would not destroy any existing vegetation, wildlife habitat or aquatic habitat which is significant even on a local basis.

4.1.2. There are areas of aquatic sediments on the western and eastern sides of the Kaituna River which contain moderate levels of contamination, and which would require isolation to prevent adverse effects on downstream habitats. No significant adverse effect on Kaituna River mainstem habitats would result.

4.1.3. Operation of the roadway is unlikely to diminish the existing ecological values of the western vegetated area of the Reserve administered by the Eastern Fish and Game Council. The alignment is well separated from the high value ecological areas of the Reserve administered by the Department of Conservation.

4.1.4. There is an opportunity to establish wetland areas on the western side of the River to control stormwater which reflect the previous vegetation types of the area.

4.1.5. On the eastern side of the River, roadway-derived stormwater could be managed so that it was isolated from the Reserve area and no adverse effects resulted.

4.1.6. The time scale for rehabilitation of kahikatea-dominated habitat, both contiguous with and adjacent to the Reserve, could be contracted significantly.

4.1.7. There is unlikely to be any significant adverse effect on the Reserve as a result of noise, light or vibration from the roadway based on existing wetland examples and because of the 4.5 metre vegetated bund proposed where the alignment is closest to the Reserve.

4.1.8. Mitigation measures which would reduce any adverse ecological effects significantly appear practicable, and would conserve and protect both the existing and future potential biodiversity values of the adjacent Reserve area.

4.2. **Recommendations**

4.2.1. At the Options evaluation stage of this appraisal, two recommendations were offered; that the final alignment avoid the Niccol property oxbow habitat, and that it also avoid the remnant kahikatea stands within the Lower Kaituna Management Reserve property. Both those recommendations were accommodated and are reflected in the final alignment.

4.2.2. The Kaituna River crossing should be constructed with set back abutments, to avoid disruption to River edge habitats.

4.2.3. The Kaituna oxbow crossing should be designed to minimise instream works (e.g. single bank to bank span).

4.2.4. If practicable the control gate below the proposed Kaituna oxbow crossing should remain closed throughout the construction period of that crossing if instream works are required.

4.2.5. The By De Lay property stream channel and the Waimarae Stream should be isolated (i.e. blocked off) from the Kaituna River oxbow and mainstem respectively throughout the construction period.

4.2.6. Wetland areas should be developed in the western section between State Highway 2 and the River to receive roadway-derived stormwater runoff. Those areas should reflect the former vegetation of Te Parapara Swamp as far as practicable.

4.2.7. Roadway-derived stormwater from the alignment section within the Reserve property should be isolated from the Reserve and directed to the constructed drains, adjacent to Pah Road, which flow into the large drain forming the southeastern boundary of the Reserve.

4.2.8. Sections of the "Pah Road drains" should be modified to retain particulate matter in roadway derived stormwater runoff.

4.2.9. Wetland areas should also be developed in the eastern area between the Reserve and State Highway 2 to receive stormwater runoff from the roadway.

4.2.10.Revegetation and wetland development proposals should involve locally-sourced plant material. A dominant vegetation type in the Kawa and Te Parapara Swamps was clearly flax; local iwi should also be consulted regarding the appropriate types of flax. Areas could be developed with a view to harvesting for cultural purposes.

4.2.11. Kahikatea-dominated vegetation should be established in presently grazed sections of the Lower Kaituna Management Reserve and nearby areas, especially the 4.5 metre noise bund.

4.2.12. A litter-retaining fence should be constructed between the alignment and the presently vegetated area of the Reserve to minimise the intrusion of litter into Reserve habitats.

4.2.13. Comprehensive wetland development, sediment control and stormwater management plans should be finalised prior to the consent application stage.

4.2.14.A sediment/soil quality survey should be undertaken prior to construction along the western perimeter of the vegetated area of the Reserve to provide benchmark data for any subsequent surveys in the longer term.

4.2.15.A five-minute bird count and habitat use survey should also be undertaken prior to construction in the above area in the February-March period to establish the species, relative numbers present and use of that habitat.

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Appendix 6.4

Kaituna River Wetland Summary
(Beadel, 1994)

KAITUNA RIVER

Area	Approx 34 ha
Altitude	0m
Grid reference	NZMS 260 V14 108774
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	**Physical area**
Manuka scrub	Freshwater wetland
Coprosma propinqua subsp. *propinqua*-pampas/harakeke shrubland	Freshwater wetland
Baumea sedgeland	Freshwater wetland
Bolboschoenus sp. (*B. fluviatilis?*)-raupo sedgeland	Freshwater wetland
Harakeke/raupo reedland	Freshwater wetland
Raupo reedland	Freshwater wetland

(S. M. Beadel pers. obs. 1992)

Justification

This site contains one of the last small remnants of the Kawa swamp, a once large wetland covering much of the Maketu Plains. Some of the vegetation types present here are not well-represented at other sites in the ecological district. Only a brief field inspection has been made of this site and other vegetation types and rare or interesting plant species may occur here. A higher ranking for this site may be appropriate and the site should be re-evaluated when further information is available.

This site is contiguous to a larger area, outside of the coastal zone.

SS KAITUNA RIVER

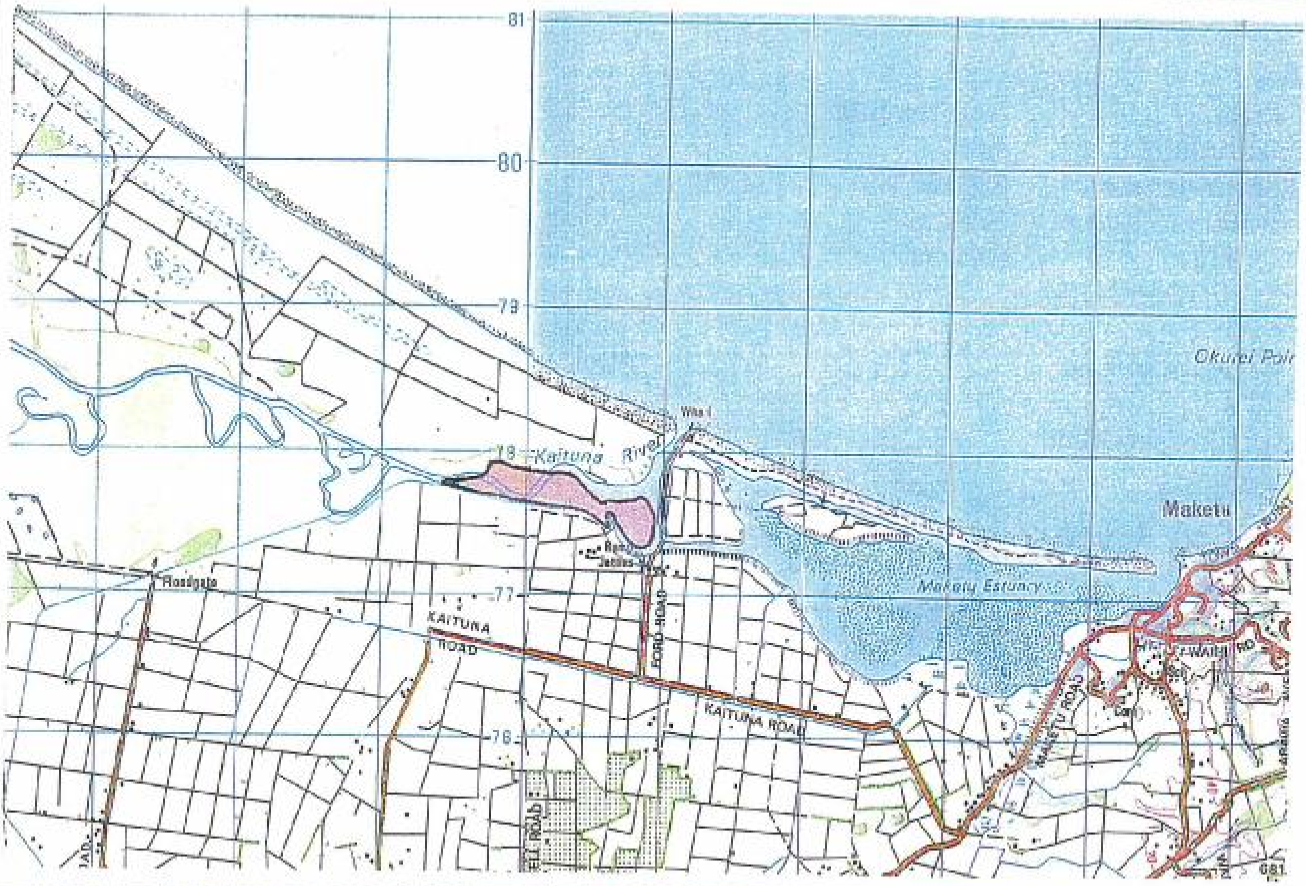


TABLE 3 LIST OF SIGNIFICANT SITES

COROMANDEL ECOLOGICAL REGION (PART)	
Waihi Ecological District (Part)	
National Significance:	Orokawa (Scenic Reserve)
Mayor Island Ecological District	
National Significance:	Tuhua (Mayor Island Wildlife Refuge)

NORTHERN VOLCANIC PLATEAU ECOLOGICAL REGION	
Tauranga Ecological District	
National Significance:	Matakana Island 1. Athenree 1. Blue Gum Bay 1. Tirohanga Te Hopai Island Aongatete Estuary Hunters Creek Waimapu Estuary 1. Kaituna sand dunes
Regional Significance:	Bowentown sand dunes Katikati 1. Wainui Estuary 1. Waipapa Estuary 1. Wairoa Estuary 1. Motuotau Island Arawa
District Significance:	Athenree 2. Bowentown Heads Taupiro Estuary Matakana Island 2. Matakana Island 3. Katikati 2. Blue Gum Bay 2. Wainui Estuary 2. Apata Estuary Waipapa Estuary 2. Tahunamanu Island Motungaio Island Opureora

Table 3 Continued

	Rangiwaea Island
	Mt Maunganui 1.
	Te Puna Estuary
	Wairoa Estuary 2.
	Wairoa Estuary 3.
	Matua Estuary
	Waikareao Estuary
	Waimapu Estuary 2.
	Papamoa sand dunes
	Kaituna River
	Maketu Spit
	Waihi Estuary
	Part Waewaetutuki
	Pukehina 1
Motiti Ecological District	
Regional Significance:	Karewa Island
	Motunau
	Taumaihi Island
District Significance:	Motuputa Island
	Motiti
	Motiti Islets
Otanewainuku Ecological District	
National Signficance:	Matata 1.
Regional Significance:	Herepuru 1.
District Significance:	Otamarakau
	Hauone
	Herepuru 2.
	Matata 4.
White Island Ecological District	
International Significance:	Whakaari
Regional Significance:	Moutoki and Rurima
	Moutohora
District Significance:	Volkner Rocks

Appendix 6.5

Wildlife Habitat Summary

(Rasch, 1989)

(note that for the "Middle Kaituna" the "Area (ha)" figure should be 10.5 k).

6. APPENDICES

Appendix 6.1

Tauranga Ecological District Summary
(McEwen, 1987)

TAURANGA ECOLOGICAL DISTRICT 13.02

Criteria: topography, geology, original vegetation.

TOPOGRAPHY: low coastal plains, sand dunes and swamplands, long straight beaches, large shallow harbour with extensive estuary, smaller estuaries near Maketu, low hills, locally dissected and broken, with rounded interfluves.

GEOLOGY: Pleistocene siltstone, sandstone, conglomerates and pumiceous ignimbrites flank eastern Coromandel and Kaimai Range foothills, west of Tauranga Harbour; domes and lava flows of Pliocene rhyolite form numerous hills (e.g. Mt Maunganui, Kopukairoa, Kairua, Mt Minden and Bowentown); Miocene andesite-dacite lavas and breccias form the fault bounded Papamoa Hills; fluviatile terrace deposits of the last Glaciation W and S of Te Puke; Holocene alluvium, peat and fixed dunes along the coast, including Matakana Island; old volcanic ash beds are more significant than young beds.

CLIMATE: sunny, rather sheltered with strong maritime influence, receiving rains of very high intensity at times from NE and N; very warm summers, mild winters; rainfall 1400-1800mm p.a.

SOILS: volcanic ash soils on terrace, rolling and hilly lands: mainly deep silty soils from weathered brown ashes; composite soils with thin cover of more recent rhyolitic sandy and gravelly ashes (Taupo and Kaharoa), occur in the SE. Alluvial and organic soils on river flats form a complex pattern, many soils showing banding of peat, recent ashes (Kakaroa) and rhyolitic alluvium. Water-tables generally high, river flooding common. Sandy soils on coastal dunes show increasing profile development inland from bare sands near the coast to sand podzols further inland.

VEGETATION: much Polynesian forest clearance: formerly extensive flax swamps, fern, scrub with forest remnants on high country along southern boundary; dwarf mangroves occur in tidal inlets (total area of mangroves in Tauranga Harbour 543 ha).

BIRDS: include Fernbirds in swampy areas N and S of harbour. Grey-faced Petrel breed on Mt Maunganui and the nearby Motuotau I., Diving Petrel breed on Motuotau I. Brown Teal (introduced) occur in large numbers on Matakana I. and Tauranga Harbour. Tauranga Harbour provides a large and important habitat for Arctic breeding migrant and internal migrant shore birds although not comparable with the northern harbours (5-10,000 waders); Wrybill, Banded Rail and N.Z. Dotterel occur, also occasional rare waders; small estuaries at Maketu and Little Waihi support N.Z. Dotterel and migrant waders.

REPTILES: one of the few mainland populations of moko skink (Leiolopisma moco) is at Papamoa.

FISH: include giant kokopu (Galaxias argenteus).

MODIFICATIONS: much of district farmed (intensive dairying, some with sheep or cattle); horticulture (especially kiwi fruit) increasing; exotic forest on Matakana Island and elsewhere.

pasture, exotic forest, scrub, large remnants of indigenous

20.02 Waiapu

Lowlands and hills, some unstable; mostly sedimentary, some alluvial plains; very warm, sunny; mainly hill and steepland soils plus volcanic ash, alluvial and small areas of sand soils; originally forested, now mostly farmed, exotic forests on eroded former farmland, minor scrub, rare indigenous forest remnants.

20.03 Turanga

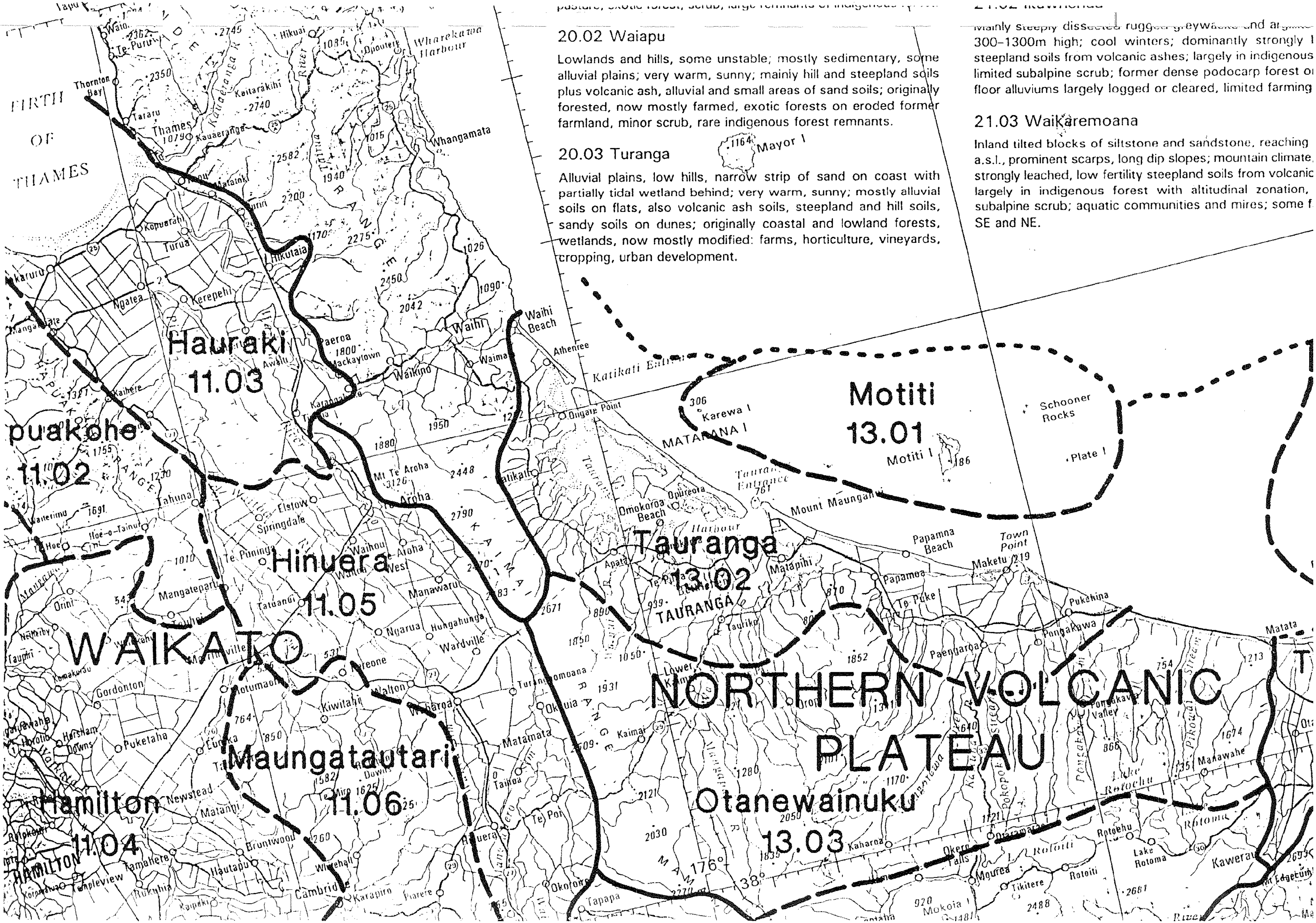
Alluvial plains, low hills, narrow strip of sand on coast with partially tidal wetland behind; very warm, sunny; mostly alluvial soils on flats, also volcanic ash soils, steepland and hill soils, sandy soils on dunes; originally coastal and lowland forests, wetlands, now mostly modified: farms, horticulture, vineyards, cropping, urban development.

21.02 Ikawhenua

Mainly steeply dissected rugged greywacke and ar
300–1300m high; cool winters; dominantly strongly l
steepland soils from volcanic ashes; largely in indigenous
limited subalpine scrub; former dense podocarp forest o
floor alluviums largely logged or cleared, limited farming

21.03 Waikāremoana

Inland tilted blocks of siltstone and sandstone, reaching a.s.l., prominent scarps, long dip slopes; mountain climate, strongly leached, low fertility steepland soils from volcanic largely in indigenous forest with altitudinal zonation, subalpine scrub; aquatic communities and mires; some f SE and NE.



Appendix 6.2

Wetland Habitat Summary
(D.O.C. 1996)

City Council (1988, 1989); Tauranga County Council (1986); Western Bay of Plenty District Council (1989); Wilson & Given (1989).

Reasons for inclusion:

1a Tauranga Harbour is a particularly good representative example of a very large ecosystem containing terrestrial, saltmarsh and mangrove vegetation communities which are considered to be representative of the Bay of Plenty Region.

1c The harbour plays a substantial hydrological, biological and ecological role in the functioning of a coastal system, *i.e.* Bay of Plenty coastal and marine environment.

2a The harbour supports substantial populations of four globally threatened species of birds, *Botaurus poiciloptilus*, *Himantopus novaezelandiae*, *Charadrius obscurus* and *Anarhynchus frontalis*.

2c The harbour is of special importance as breeding habitat for a number of waterfowl species, and as wintering habitat for several international migratory shorebirds. The harbour is important for its fisheries, and has been ranked as being of outstanding value for fish at critical stages of their biological cycles.

3c The harbour regularly supports 1% or more of the regional populations of *Haematopus unicolor* (up to 1.5%), *Charadrius obscurus* (up to 3%), *C. bicinctus* (up to 2.5%) and *Limosa lapponica* (up to 2%).

Source: Keith Owen.

Maketu-Waihi Estuaries and Kaituna River Mouth Complex (19)

Location: 37°46'S, 176°29'E. 35 km southeast of Tauranga City, Bay of Plenty Region, North Island.

Area: c.863 ha.

Altitude: Sea level.

Overview: The wetland comprises the Waihi Estuary, Maketu Estuary and the adjacent Kaituna River mouth. Maketu township on Okurei Point headland bisects the two estuaries. Sandspits with native and adventive duneland vegetation protect both estuaries from the open sea. There are inter-tidal mudflats and sandflats associated with the estuaries. Both estuaries contain a number of low-lying islands of relatively small size, and there is a large island, Papahikahawai, in Maketu Estuary. The Kaituna River Mouth has areas of saltmarsh and freshwater wetlands.

Physical features: The two estuaries are both saline in nature with relatively low freshwater inputs. In the case of Maketu Estuary, the major freshwater input, the Kaituna River, was diverted away from the estuary in 1958 (Richmond & Forbes, 1990). The tidal section of the Kaituna River mouth has predominantly freshwater flows at low tide. The depth of the three wetland areas ranges from 0.5 to 5 metres depending on the tides. The catchment areas of the two estuaries are relatively small in comparison to the Kaituna River, which has a very extensive catchment including Lakes Rotorua and Rotoiti at its source some 45 km inland. The inland sides of both estuaries have major flood control embankments which protect adjacent reclaimed farmland. In the case of Waihi Estuary, four major drainage canals servicing the surrounding low-lying drained farmland enter the estuary.

The Te Arawa freshwater wetland of about 24 ha, owned by the Maori, was in the past an integral part of Maketu Estuary, with the lower portion of the wetland being regularly inundated by saltwater. This area is now separated from the estuary by the Maketu Road causeway, although still of botanical and wildlife significance.

The area has a temperate climate with an average annual rainfall of 1,350 mm. The mean annual temperature range is 12.5°C to 15°C, and the average number of hours of sunshine is 2,300.

Ecological features: The inter-tidal mudflats and sandflats have local areas of seagrass *Zostera novazelandica* and the nuisance sea lettuce *Ulva* spp. The upper tidal flats of both estuaries have local areas of mangroves *Avicennia marina* var. *resinifera* (which is rare in both estuaries), mixed saltmarshes dominated by *Juncus maritimus* var. *australiensis* and *Leptocarpus similis*, and prostrate saltmeadows (especially in the case of Waihi Estuary) dominated by *Sarcocornia quinqueflora, Samolus repens*, *Selliera radicans* and *Cotula coronopifolia.* Freshwater wetlands of Raupo *Typha orientalis*, New Zealand Flax *Phormium tenax*, sedges and Grey Willow *Salix cinerea* can be found on the eastern side of Maketu Estuary off Maketu Road on Te Arawa land (Beadel, 1989a) and at Waihi Estuary between Wharere Road and Waewaetutuki Road (Beadel, 1989b).

Land tenure: The bed of large parts of the two estuaries and the Kaituna River mouth are Crown land. Many of the islands in both estuaries, including Papahikahawai Island and an area of inter-tidal flats within Waihi Estuary, are Maori land.

Conservation measures taken: The Maketu sandspit is Crown land set apart as a Recreation Reserve and administered by the Western Bay of Plenty District Council. This is an important site for coastal breeding shorebirds and gulls. There are a number of Esplanade and Recreation Reserves scattered around the shores of the two estuaries. These are all Crown land, reserved and administered by the Western Bay of Plenty District Council. There are two wetland reserves on Crown land within Waihi Estuary, administered by the Department of Conservation. These total approximately 47 ha and are reserved for wildlife management purposes. The Eastern Region Fish and Game Council owns and administers a 7 ha Wildlife Refuge on the southern side of the estuary.

Conservation measures proposed: A proposed Wildlife Management Reserve covering approximately 17 ha of an enclosed brackish arm (Ford Road Lagoon) at the western end of the Maketu Estuary is currently being processed. This is notable habitat for Anatidae and migrating shorebirds. The Maketu Estuary suffered large-scale environmental degradation when the full flow of the Kaituna River was diverted away from the estuary into the sea at nearby Te Tumu, to allow for flood control works associated with land drainage in the lower catchment. A major restoration programme is under way for the estuary, involving the return of part of the river flow back into the estuary under a controlled situation (Richmond & Forbes, 1990). This was proposed to take place in 1992, and should allow for some long-term recovery of the environmental quality of the estuary.

Land use: Outdoor recreation, mainly involving shellfish gathering, bird-watching, boating and waterfowl hunting.

Possible changes in land use: None known, except for the proposed re-diversion of some of the Kaituna River flow back into Maketu Estuary.

Disturbances and threats: Reclamation and drainage of adjacent saltmarsh and freshwater wetlands on private land surrounding the wetland has caused major losses of wetland habitat, and still poses a threat to the wetland today.

Septic tank discharges from coastal settlements ultimately carry waste water into the two estuaries, especially Waihi Estuary. Recreational activities cause disturbance to nesting shorebirds on the Maketu and Waihi Spits and the islands within the estuaries.

Hydrological and biophysical values: The two estuaries and the Kaituna River mouth have a number of important hydrological and biophysical values including sediment trapping from the surrounding catchment, prevention of coastal erosion, maintenance of water quality and support of estuarine and marine food chains.

Social and cultural values: Maketu Estuary is of immense cultural and historical importance to Te Arawa as the traditionally recognised landing site for the Te Arawa canoe about 600 years ago. "Kaimoana" (seafood) gathering from the two estuaries and the river are important to local Maori.

Noteworthy fauna: Waihi Estuary, Maketu Estuary and Ford Road Lagoon (within Maketu Estuary) are all "Sites of Special Wildlife Interest" of "high", "moderate-high" and "moderate-high" value respectively (Rasch, 1989). This is a nationwide wildlife habitat ranking system officially recognised by the Department of Conservation. The wetland supports a wide diversity of waterfowl species (47 species recorded) including 20 species of shorebirds (Ornithological Society of New Zealand, unpublished data 1986-1991). Notable species found at the wetland include Pacific Reef Egret *Egretta sacra,* Variable Oystercatcher *Haematopus unicolor* (maximum 112), New Zealand Dotterel *Charadrius obscurus* (maximum 42), Banded Dotterel *C. bicinctus*, Wrybill *Anarhynchus frontalis*, Caspian Tern *Sterna caspia* and Black-fronted Tern *Chlidonias albostriatus*. The Te Arawa freshwater wetland supports small populations of Banded Rail *Rallus philippensis assimilis* and North Island Fernbird *Bowdleria punctata vealeae* (K. Owen, pers. obs.). The Australasian Bittern *Botaurus poiciloptilus* has also been recorded in the area. The mudflats and sandflats are important "wintering" areas for migratory shorebirds from the northern hemisphere, including up to 1,400 Bar-tailed Godwit *Limosa lapponica*, 200 Red Knot *Calidris canutus* and 100 Pacific Golden Plover *Pluvialis fulva*. A further seven species which are scarce migrants to New Zealand have been recorded at the wetland: Far Eastern Curlew *Numenius madagascariensis*, Whimbrel *N. phaeopus*, Sharp-tailed Sandpiper *Calidris acuminata*, Curlew Sandpiper *C. ferruginea*, Red-necked Stint *C. ruficollis*, Sanderling *C. alba* and Little Tern *Sterna albifrons*. A small breeding colony of Pied Shag *Phalacrocorax varius* and Black Shag *P. carbo* nest in *Pinus radiata* trees on the western bank of the Kaituna River mouth.

Noteworthy flora: Areas of relatively intact indigenous vegetation in the Te Arawa freshwater wetland are one of the few remaining examples of the freshwater wetland vegetation which once covered large areas west of Maketu. These are of high botanical conservation value (ranked as "high" and "very high" by Beadel, 1989a). The wetland has two threatened ferns, *Cyclosorus interruptus* (nationally rare) and *C. confluens* (nationally vulnerable), and one species of regional significance, *Mimulus repens* (Beadel, 1989a). The 60 ha privately owned freshwater wetland adjoining the southwestern margin of Waihi Estuary is dominated by native wetland vegetation, although a detailed botanical or wildlife survey has not been carried out. The area may contain rare fern species (Beadel, 1989a). Both Maketu and Waihi estuary sandspits have a mixed native and adventive duneland vegetation with the native sand-binding plant Pingao *Desmoschoenus spiralis* present.

Scientific research and facilities: Maketu Estuary has been extensively studied as a result of the Kaituna River diversion and the possible environmental impacts of the diversion on the estuary. These studies continue. The Ornithological Society of New Zealand undertakes twice-yearly censuses of waterfowl populations in the estuaries.

Conservation education: Both estuaries are used by schools, colleges and conservation organisations from the Bay of Plenty Region for education purposes. There are no facilities for conservation education and training, but accommodation is available locally.

Recreation and tourism: Water-based recreation is generally confined to boating, swimming, fishing, bird-watching, shellfish gathering (pipis, cockles) and game-bird hunting. Tourism is low key and usually caters for the domestic market, with an influx of visitors during the summer.

Management authority: The Bay of Plenty Regional Council has statutory responsibilities under the Resource Management Act 1991 for water resources and the preparation of coastal plans. It also undertakes management of the harbour bed and waters. The Department of Conservation (Bay of Plenty Conservancy) is responsible for the management of wildlife, and the Ministry of Agriculture and Fisheries for administration of fisheries and shellfisheries. The Eastern Region Fish and Game Council manages sport fishing and game-bird hunting.

Jurisdiction: Territorial: Bay of Plenty Regional Council and Western Bay of Plenty District Council (except for a very small area of the Kaituna River Mouth which lies in the Tauranga District). Functional jurisdiction for conservation: Department of Conservation, Bay of Plenty Conservancy.

References: Beadel (1989a, 1989b); Given (1990); Rasch (1989); Richmond & Forbes (1990).

Reasons for inclusion:

1a The Maketu-Waihi Estuaries and Kaituna River Mouth are a particularly good representative example of an estuarine wetland complex.

2a The wetlands support substantial populations of three globally threatened birds species, *Charadrius obscurus*, *Anarhynchus frontalis* and *Chlidonias albostriatus*.

2b The wetlands support several rare and local plant species, such as *Thelypteris confluens* and *Cyclosorus interruptus*.

2c The wetlands are of special importance as breeding habitat for a number of waterfowl species, and as wintering habitat for several international migratory shorebirds.

3c The wetlands regularly support 1% or more of the regional populations of *Haematopus unicolor* (up to 1.5%) and *Charadrius obscurus* (up to 3%).

Source: Keith Owen.

Appendix 6.3

Regional Coastal Environment Plant Summary
(E.B.O.P., 1995)

AREA OF SIGNIFICANT CONSERVATION VALUE

Site Name: MAKETU/WAIHI ESTUARIES AND OKUREI POINT

Site Number: 04 010

Map Reference: NZMS 260 - V14 : 150 790

The ASCV includes that part of the coastal marine area of Maketu and Waihi Estuaries and inshore coastal waters bounded by a line running from the west bank of the Kaituna River at longitude 176°25' East, northwards one nautical mile to latitude 37°44' South, thence a straight line running east ale to intersect with a line running south along longitude 176°30' East to meet Pukehina Beach, then following the natural line of MHWS westward around the margins of Waihi estuary, Okurei (Town) Point and Maketu estuary to the west bank of the mouth of the Kaituna River.

Brief Locality Description and Summary

Located between Whakatane and Tauranga are two bar built estuaries separated by a headland.

Maketu Estuary is located on the Western side of Okurei (Town Point). In the past Maketu had been the outlet of the Kaituna River. Flood control works diverted most of the river flow from the estuary in 1958. As a result of these works large areas of marsh died off and influxes of sand from the sea destroyed pipi and cockle beds. Offshore there has been a build up of sand. Because of public concern about the degradation of Maketu estuary, the Department of Conservation was instructed by Cabinet to prepare a restoration strategy. Part of the works which has now been approved by the Planning Tribunal is to redivert part of the Kaituna River flow back into the estuary. Presently, there are large beds of cockles and pipis which are intensively harvested for food.

Okurei Point is a headland composed of laharic pumiceous flows. Strata have been reworked by river flow and contain rhyolitic, andesetic and ignimbritic boulders. Numerous pa and 67 midden sites are concentrated in this area. On the shore are a raised bed of preexisting boulders and offshore extensive rock reefs with large mussel, kina and paua populations.

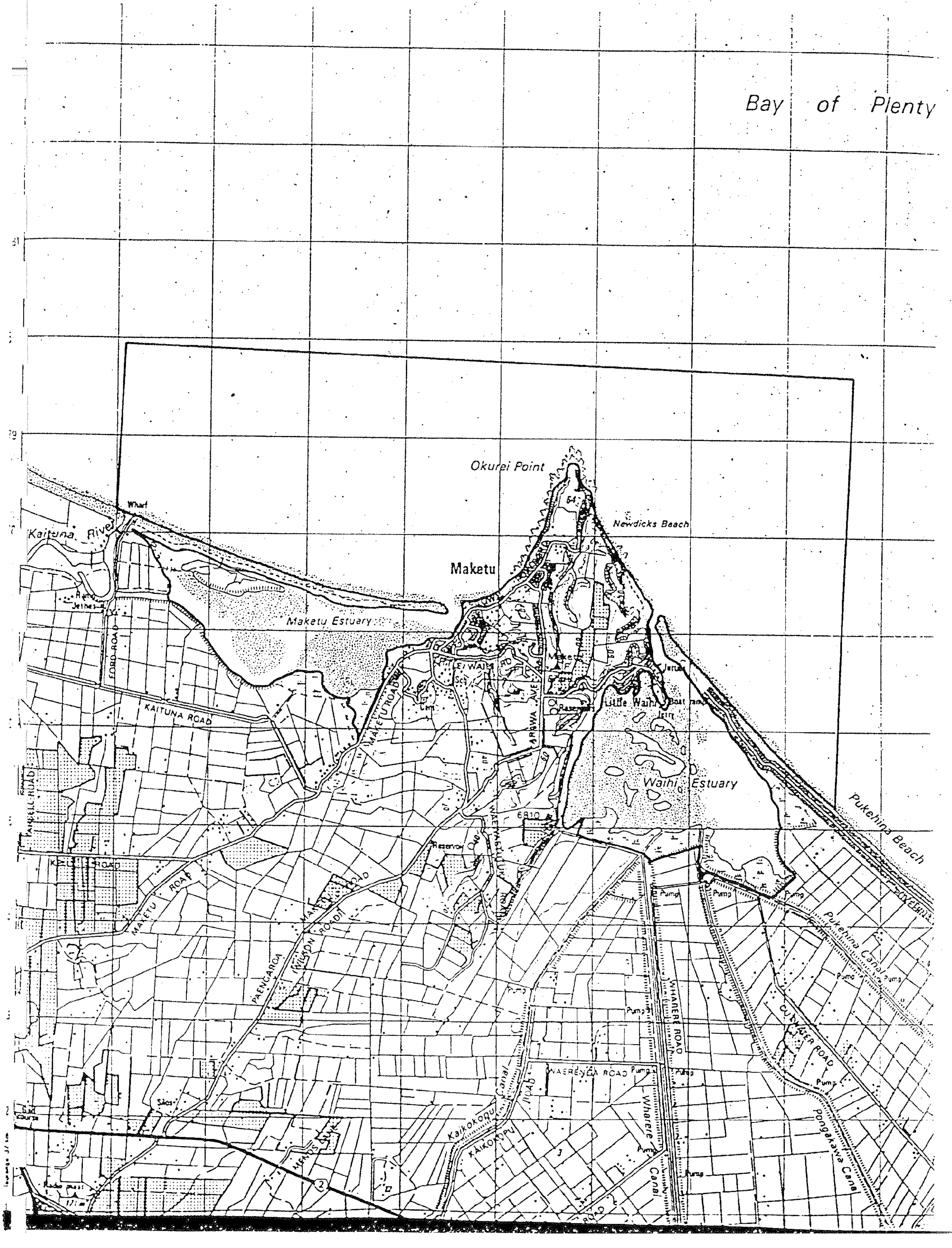
Little Waihi Estuary receives inflow from the Pukehina and Kaikokopu rivers. These rivers have all been channelised, stopbanked and regularly dredged. This has resulted in less sand than expected entering the estuary. It has extensive wetlands on its landward side. Mangroves, merge into saltmarsh then a freshwater wetland. Several sandy cays also exist.

AREA OF SIGNIFICANT CONSERVATION VALUES

ASCV 04-010 MAKETU/WAIHI ESTUARIES/OKUREI POINT

MAP REF: N.Z.M.S. 260 V14
SCALE 1:50,000

Department of Conservation
Te Papa Atawhai



10.0 Conservation Values (as per Schedule 2, draft NZCPS)

10.1 Maori Cultural Values

Consultation with tangata whenua to identify values is not yet complete. However, earlier consultation for the restoration planning of Maketu estuary clearly identified that estuary as being regionally important as a Tauranga waka (Arawa canoe first landing) and for mahinga kai (Richmond & Forbes, 1990).

10.2 Protected Areas

(i) Maketu Spit

Maketu Spit is a recreation reserve administered by the Western Bay of Plenty District Council. This spit contains a small population (five plants) of *Austrofestuca littoralis*, a species classed as rare. This species was once relatively common in sand dune communities in New Zealand; however only 13 locations are now known to occur in the North Island (Beadel, 1994). A small population of pingao sedge also survives on the spit. At the tip of the spit on average five pairs of the endangered New Zealand dotterel nest (Owen 1991). These birds favour lightly vegetated areas, where predators can be sighted, to nest. They feed in the estuary and along the coast.

(ii) Little Waihi Spit

Parts of Pukehina Spit are also a recreation reserve. At the spit tip is a roost where up to 88 nationally rare variable oyster catchers have been recorded, about 4.4% of the total population (Owen 1991).

(iii) Wildlife Management Reserve

In the upper reaches of Little Waihi Estuary below MHWS is a wildlife management reserve This site contains relatively intact saltmarsh vegetation. The salt marsh in the Waewaetutuki wetland is representative of the remaining saltmarsh in Waihi Estuary. There are two regionally uncommon species at this site, *Mimulus repens* and *Bolboschoenus caldwellii*. While *Mimulus repens* occurs locally throughout New Zealand it is known from only one other site in the Tauranga Ecological District and not currently known from elsewhere in the Coromandel-Bay of Plenty-East Cape region. *Bolboschoenus caldwellii* is known from only a few locations between East Cape and Cape Colville (Beadel, 1994). These wetlands also hold high numbers of North island fernbird and a few Australasian bittern (K Owen, pers. comm.).

(iv) Other Protection

On the north east and south margins of the Waihi estuary there is either an esplanade or a marginal strip protection.

10.3 Wetlands, Estuaries, Coastal Lagoons

The Kaituna River Mouth, Maketu/Little Waihi complex meet the following Ramsar criteria for an internationally significant wetland (Owen 1991, pers. comm).

1(c) It is a particularly good representative example of a common type of wetland.

2(a) It supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or waterfowl and an appreciable number of individuals of any one or more of these species.

The waterfowl include nine nationally vulnerable species, the New Zealand dotterel, banded dotterel, wrybill, Caspian tern, black fronted tern, reef heron, royal spoonbill, Australasian bittern and banded rail. Nationally rare species found in this are include the variable oystercatcher, Pacific golden plover, far eastern curlew, Asiatic whimbrel, sharp-tailed sand piper, curlew sandpiper, red necked stint, sanderling and eastern little tern and the regionally vulnerable North Island fernbird. The plants include the nationally vulnerable *Thelypteris confluens* and the nationally rare *Cyclosorus interruptus*.

2(c) It is of special value as a habitat of plants or waterfowl at a critical stage of their biological cycle. In the case of international migrants - it is summering over. For other species it is during breeding.

3(c) % of individuals of a population.

(a) 5.6% of the variable oystercatcher national population reside at the wetland, i.e. 112 birds.

(b) 1.4% of the New Zealand dotterel national population reside at the wetland, i.e. 42 birds.

In the south-west part of Little Waihi Estuary is an excellent example of transitional wetland sequence of mangroves, estuarine rushes (*Leptocarpus similis* and *Juncus spp.*) and freshwater raupo (*Typha orientalis*), sedges (*Scirpus spp.*) and flax (*Phormium tenax*). This Waewaetutuki wetland is one of the largest remaining in the Bay of Plenty. It has not yet been thoroughly examined by botanists but it could be of higher ranking than its present district ranking. This wetland is relict of the once extensive Pongakawa wetlands. This still acts as a buffer zone between the estuary and surrounding farmland. Within this estuary are large areas of minimally modified tidal flats used by a wide variety of waders including migrants. About 1300 eastern bar tailed godwits are recorded in summer on these two estuaries. Some 50 - 100 knots are recorded. Rarer migrants include ruddy turnstone, red necked stint, whimbrel sp., golden plover, Mongolian dotterel, pectoral sandpiper and sharp tailed sand piper (OSNZ 1986 - 1994). These birds arrive in September and depart in February - March. Of interest is the departure to Siberia and other northern latitudes when large numbers of birds arrive from further south to feed before continuing their migration north , and thus Maketu and Little Waihi are important staging posts for migration (Ken Murray, pers. comm.).

Of national importance are the populations of New Zealand coastal birds such as variable oystercatcher. About 5.4% of the total population is found at Little Waihi and Maketu estuaries (Owen 1991). These birds prefer to feed on the extensive cockle beds found there.

In Maketu Estuary there are remnant marshes in the south eastern corner. This wetland has been given a regional significance ranking by Beadel, 1994. In the mid part of the estuary are extensive intertidal flats and channels which contain large cockle and pipi beds. Cockles and worms are extensively harvested by variable oyster catcher.

In both estuaries significant numbers of juvenile flounder, kahawai (*Arripis trutta*), yellow eye mullet *(Aldrichetta forsteri*), grey mullet and eels are found. Juvenile flounder are eaten by reef herons while yellow eye mullet are preyed upon by Caspian terns.

10.4 Marine Mammals and Birds

Maketu and Little Waihi Estuary are important feeding and roosting areas for migratory birds and for waders. Forty-eight species of waders, wetland and shorebirds as well as migrant visitors are found in Maketu and Little Waihi Estuaries and Kaituna wetlands (Owen 1991). Eight of these are nationally threatened or endangered species including the New Zealand dotterel (*Charadrius obscurus*) which breeds on Maketu Spit, caspian tern (*Hydroprogne caspia)*, banded rail (*Rallus philippensis)* which breeds in the area, wrybill (*Anarhynchus frontalis)*, Australasian bittern (*Botaurus stellaris)*, banded dotterel (*Charadrius bicinctus)*, reef heron *(Egretta sacra)*, white heron (*E. alba modesta*), royal spoonbill (*Platalea leucorodia*) which there are some dozen birds and variable oystercatcher (*Haematopus unicolor)*.

Maketu and Little Waihi Estuaries are important feeding areas for waders such as eastern bar-tailed godwit, pied stilt and variable oyster catcher.

10.5 Ecosystems, Flora and Fauna Habitats

The Maketu and Little Waihi Estuaries coupled with Okurei Point are excellent examples of three regionally significant coastal ecosystems. Maketu Estuary after the removal of the Kaituna River waters in 1958 has developed a strong marine component including starfish (*Patriella regularis*), sand dollar (*Arachniodes novae zelandiae*) and large cockle population (Richmond & Forbes 1990. It would be more accurately referred to as Maketu Inlet. On the other hand, Little Waihi Estuary if clearly estuarine including a strong freshwater component on its margins. An excellent example is the Waewaetutuki wetland with its cabbage tree/grey willow -

(*Coprosma propinqua* subsp. *propinqua*)/Lemna minor - sedges - Blechnum minus forest and (Cabbage tree)/*Muehlenbeckia complexa*/harakeke - *Coprosma propinqua* subs. *propinqua* - *Baumea articulata* - *B.* sp. (*B. rubiginosa*) -raupo scrubland (Beadel 1994).

The reefs off Okurei Point have the largest mussel beds in the Bay of Plenty and are under intense harvesting pressure.

10.6 Scenic Sites

Not applicable.

10.7 Historic Sites

Numerous pa and 67 middens have been located on the land adjacent to the ASCV.

10.8 Coastal Landforms and Associated Processes

The entrances of Maketu and Little Waihi Estuaries are located on either side of the Okurei Point Headland. This geomorphological phenomenon of converging littoral drift is the only example found in New Zealand. In addition only one example is known from Australia making the New Zealand example of more than national significance (Professor T R Healy, pers. comm.). Converging spits with mouths adjacent to a headland are caused by longshore drifts converging from both east and west. Okurei Point shelters the coast from swells from the east at Maketu and from the north at Little Waihi. Motiti Island also contributes through its refraction of swells.

Okurei Point is a raised river bed with pre-existing boulders. Erosion of this headland has resulted in the formation of reefs offshore. These can be boulders, grouped or individuals surrounded by sand. On top of these boulders are extensive mussel beds.

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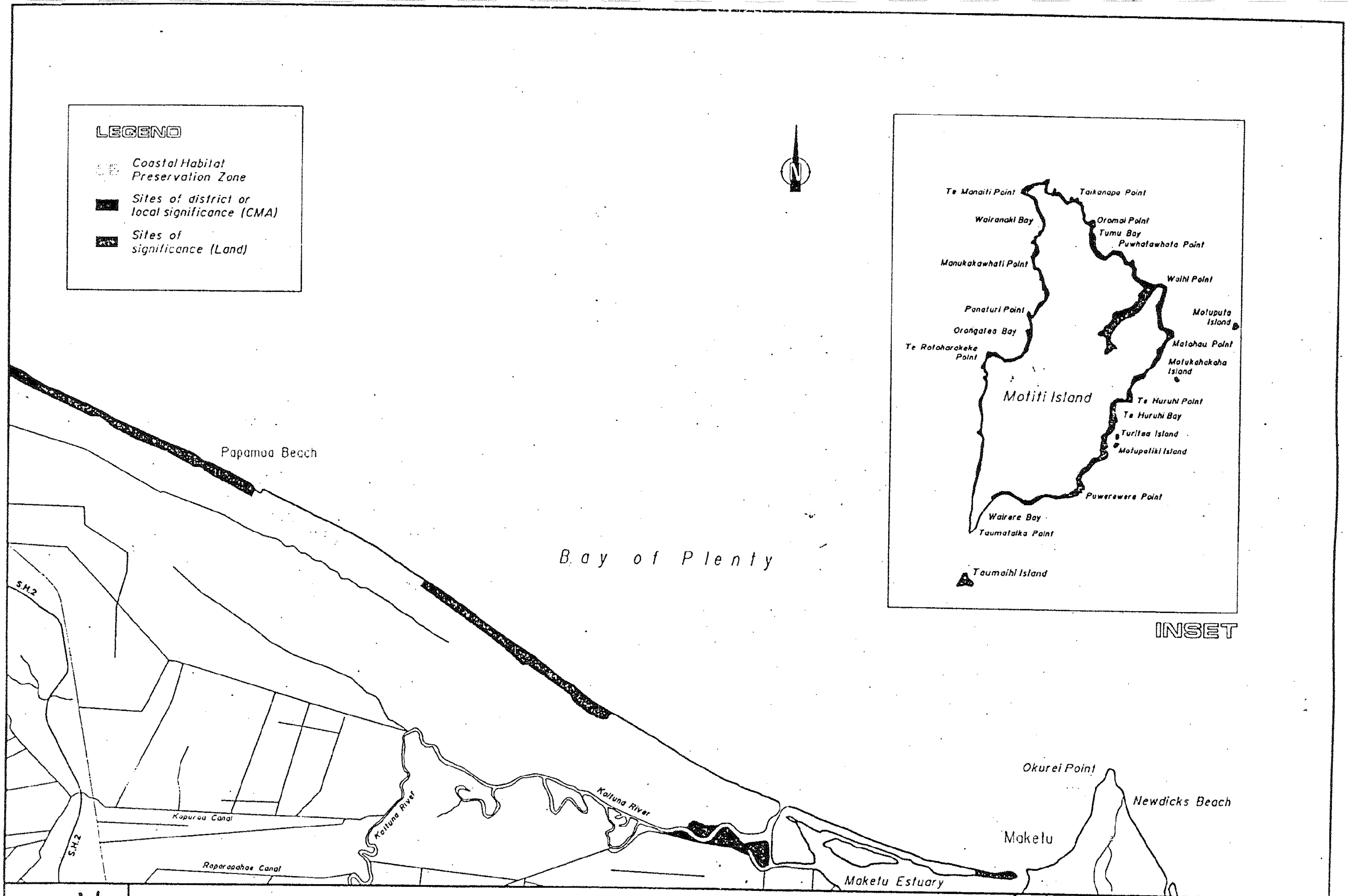

REGIONAL COASTAL ENVIRONMENT PLAN

SCALE = 1:50000

MAP 1 - SHEET 7

ZONES AND SIGNIFICANT SITES

TAURANGA COUNTY - FRESHWATER WETLANDS AND LAKES

OUTSTANDING

NAME	NUMBER	MAP REFERENCE	AREA (HA)	DESCRIPTION
Matakana Island Wildlife Refuge	2	N53/3474-5843	50	Flax-sedge wetland surrounding 10 ha open water. Cabbage tree, willow and some raupo present and surrounded by pines. Fernbird, spotless crake and banded rail present, brown teal released. Common waterfowl, shags, and field birds. DOC.

HIGH

NAME	NUMBER	MAP REFERENCE	AREA (HA)	DESCRIPTION
Middle Kaituna River	42	N67/3856-5404 to 3825-5468	1.5 k	Moderately sized river travelling through developed land. Riparian vegetation includes willows, other exotics, and small amounts of rushes and sedges. High numbers of common waterfowl and field birds. Private.
Kaituna River and Wetland/Lower Kaituna Wildlife Management Reserve	43	N58, 67/3857-5404 to 3882-5514	22 k of river and 50 ha wetland	Varying vegetation on riparian strip: willow, scrub, pines, wattles, cabbage tree. Some pockets of rush-sedge wetland. Bittern and Caspian tern present. High numbers of waders, waterfowl and field birds. Crown/Private.

Appendix 6.6

Kaituna River Whitebait Spawning Sites
(Mitchell, 1990)

4.2 Kaituna River

Date of observations: 23/02/88, 20/03/88, 18/04/88. Spawning was observed at the same sites in autumn 1989 and 1990.

Spawning observed: +.

Eggs found: +.

Locality: Spawning occurred on both banks of the mainstem, 2 km upstream from the cut (Fig. 2). The true left bank was the favoured site and spawning occurred along an 120 m stretch extending back 8-10 m from the river's edge. Some spawning also occurred on the true right bank opposite the main site. The banks appear to have been artificially raised during stopbanking, and channels connected to old borrow pits have cut through the banks to the river. Spawning was observed, and eggs were found, on the margins of the borrow pits close to the channels.

Vegetation: *Paspalum*, *Festuca*, and *Juncus gregiflorus* on patches of slightly higher ground were used amid a swampy area covered with *Glyceria maxima*, *Juncus bufonus*, *Typha orientalis*, and *Paspalum*.

Land use: Grazing dry stock on the true left bank (cattle, goats, sheep). Grazing dairy cattle on the true right bank.

Threats to survival of eggs: Part of the left bank was fenced in autumn 1989, but grazing is a threat in dry autumns. The right bank is grazed regularly. Possible salt intrusion since opening of the Kaituna Cut has killed bankside willows and they are now collapsing onto the site. Remnant native vegetation (*Phormium*, *Coprosma*, *Cordyline*) attracts stock. A surveyed public access road goes through the middle of the spawning site on the right bank.

Land tenure: The true left bank is the property of E.J. Ford, Moehau Street, Te Puke. The right bank is part of the lower Kaituna Flood Protection Scheme and is administered by the Bay of Plenty Regional Council.

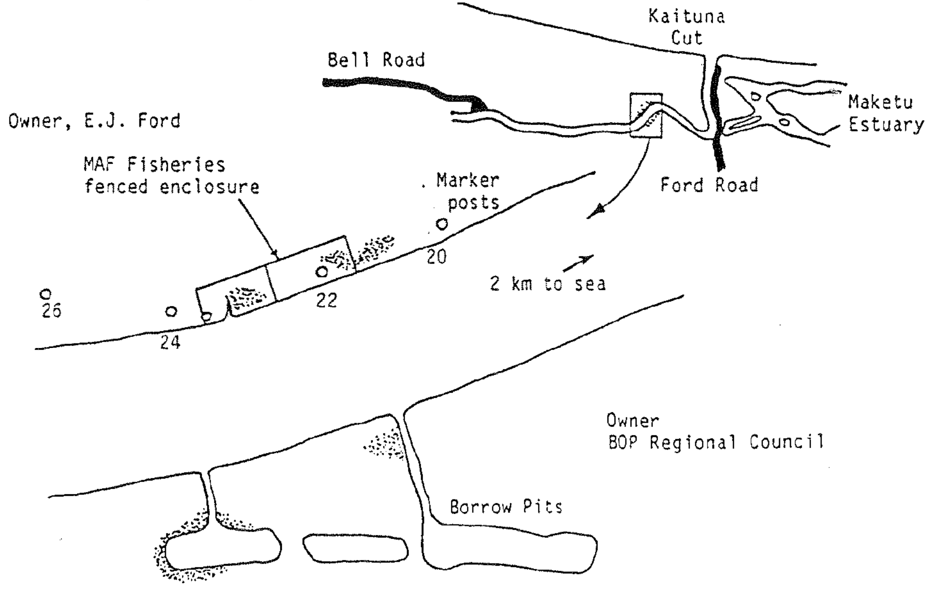

FIGURE 2. Whitebait spawning sites on the Kaituna River.

Appendix 6.7

Fisheries Record Forms

FRESHWATER FISH DATABASE FORM

98112FISH.WPD

Date 05.08.98	River/Lake system KAITUNA RIVER		SITE 1
Time 1100 HRS NZST	Sampling locality BELL ROAD, LAST FARM ON NORTHSIDE OF ROAD		
Observer K BENNETT	Access DOWN RACE TOWARD BELL ROAD AND ACROSS PADDOCK		Altitude (m) 5
Organisation BIORESEARCHES	NZMS 260 Map U14 Co-ords: 057 793		Inland dist. (km) 6
Fishing method EFM 300	Length fished (m) 25	Permanent water YES?	Tidal water NO?

HABITAT DATA

Water	Colour -				Clarity MOD. 37 CM	Temp. °C 7.3	Cond µS 447
	Average width (m) 3.5		Average depth (m) 0.4		Maximum depth (m) 0.6	Dissolved Oxygen Saturation (%) 44	gm^{-3} 5.3
Habitat type (%)	Still 100	Backwater	Pool	Run	Riffle	Rapid	Cascade
Substrate type (%)	Mud 100	Sand	Fine gravel	Coarse gravel	Cobble	Boulder	Bedrock
Fish cover (%)	Substrate	Weed algae 50	Instream debris 90	Bank veg.	Undercut banks	Over head shade 20	Other
Catchment vegetation (%)	Native forest	Exotic forest	Horticulture	Urban zone	Scrub	Pastoral 100	Other
Riparian vegetation (%)	Native forest	Exotic forest	Grass tussock 50	Exposed bed	Scrub willow 50	Raupo flax	Other

Type of river/ stream / lake ISOLATED SECTION OF OLD STREAM CHANNEL Photo no.

Water level MODERATE - HIGH Downstream blockage SOIL PLUG Pollution *

Bottom fauna abundance LOW Predominant species group OSTRACODS

Purpose of work AEE ROAD CONSTRUCTION

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 EELS (*Anguilla* spp)	6	250 - 400 MM	
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

* RUBBISH DUMPED AT TOP OF STREAM FOR ~ 100 M ALONG LENGTH INCLUDING WOOD, OLD CARS, DEAD COWS ETC.

FRESHWATER FISH DATABASE FORM

98112FISH

Date 05.08.98	River/Lake system KAITUNA RIVER OXBOW			SITE 2S
Time 0945 HRS NZST	Sampling locality SOUTH SIDE OF BELL ROAD (ADJACENT TO NICCOL'S PROPERTY)			
Observer K BENNETT	Access FROM BELL ROAD			Altitude (m) 5
Organisation BIORESEARCHES	NZMS 260	Map U14	Co-ords: 058 791	Inland dist. (km) 6
Fishing method EFM 300	Length fished (m) 15 M	Permanent water YES		Tidal water YES

HABITAT DATA

Water	Colour BROWN			Clarity 27 CM		Temp. °C 12.0	Cond μS 283
	Average width (m) 30		Average depth (m) C.1-2	Maximum depth (m) C.2-3		Dissolved Oxygen Saturation (%) 10	gm^{-3} 1.1
Habitat type (%)	Still 95	Backwater	Pool	Run 5	Riffle	Rapid	Cascade
Substrate type (%)	Mud 100	Sand	Fine gravel	Coarse gravel	Cobble	Boulder	Bedrock
Fish cover (%)	Substrate	Weed algae 30	Instream debris	Bank veg. 10	Undercut banks	Over head shade	Other
Catchment vegetation (%)	Native forest	Exotic forest	Horticulture	Urban zone	Scrub	Pastoral 100	Other
Riparian vegetation (%)	Native forest	Exotic forest	Grass tussock 90	Exposed bed	Scrub willow 10	Raupo flax	Other

Type of river/ stream / lake	OXBOW		Photo no.
Water level	NORMAL	Downstream blockage LAND WITH OUTFLOW	Pollution
Bottom fauna abundance	VERY LOW	Predominant species group *PAROXYETHIRA* SP	
Purpose of work	AEE ROAD CONSTRUCTION		

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 MOSQUITO FISH (*Gambusia affinis*)	1 X	20 mm	
2 EEL (*Anguilla* spp)	1	200 mm	
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

OXBOW FISHED BY COMMERCIAL EEL FISHERMEN.

FRESHWATER FISH DATABASE FORM

98112FISH

Date 05.08.98	**River/Lake system** KAITUNA RIVER OXBOW			SITE 2N
Time 1000 HRS NZST	**Sampling locality** NORTH SIDE OF OXBOW - BELL ROAD			
Observer K BENNETT	**Access** BELL ROAD			**Altitude (m)** 5
Organisation BIORESEARCHES	**NZMS** 260	**Map** U14	**Co-ords:** 058 792	**Inland dist. (km)** 6
Fishing method EFM 300	**Length fished (m)** 20	**Permanent water** YES		**Tidal water** YES

HABITAT DATA

Water	**Colour** BROWN			**Clarity** POOR		**Temp. °C** 10.2	**Cond µS** 274
	Average width (m) 30		**Average depth (m)** C.1-2	**Maximum depth (m)** C.2-3		**Dissolved Oxygen** **Saturation (%)** 15	**gm^{-3}** 1.6
Habitat type (%)	**Still** 95	**Backwater**	**Pool**	**Run** 5	**Riffle**	**Rapid**	**Cascade**
Substrate type (%)	**Mud** 100	**Sand**	**Fine gravel**	**Coarse gravel**	**Cobble**	**Boulder**	**Bedrock**
Fish cover (%)	**Substrate**	**Weed algae** 40	**Instream debris** 5	**Bank veg.** 10	**Undercut banks**	**Over head shade**	**Other**
Catchment vegetation (%)	**Native forest**	**Exotic forest**	**Horticulture**	**Urban zone**	**Scrub**	**Pastoral** 100	**Other**
Riparian vegetation (%)	**Native forest**	**Exotic forest**	**Grass tussock** 80	**Exposed bed**	**Scrub willow** 20	**Raupo flax**	**Other**
Type of river/ stream / lake		OXBOW					**Photo no.**
Water level		NORMAL	**Downstream blockage** SMALL OUTLET TO RIVER			**Pollution** -	
Bottom fauna abundance		VERY LOW	**Predominant species group** SNAIL (*LYMNAEA* SP) AND CHIRONOMIDS				
Purpose of work		AEE ROAD CONSTRUCTION					

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 EEL (*Anguilla* spp)	1	200 MM	
2 ELVERS (*Anguilla* spp)	3	60 - 80 MM	
3 MOSQUITO FISH (*Gambusia affinis*)	10+	15 - 30 MM	
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

FRESHWATER FISH DATABASE FORM

98112FISH

Date 05:08.98	River/Lake system KAITUNA RIVER SITE 3			
Time 0845 HRS NZST	Sampling locality C.100 M UPSTREAM OF BELL ROAD BOAT RAMP			
Observer K BENNETT	Access END OF BELL ROAD			Altitude (m) 5
Organisation BIORESEARCHES	NZMS 260	Map U14	Co-ords: 062 787	Inland dist. (km) 6
Fishing method EFM 300	Length fished (m) 30		Permanent water YES	Tidal water YES

HABITAT DATA

Water	Colour -			Clarity 73.5 CM		Temp. °C 11.1	μ/s 117
	Average width (m) 60		Average depth (m) C.2-3	Maximum depth (m)		Dissolved Oxygen Saturation (%) 86	gm^{-3} 9.4
Habitat type (%)	Still	Backwater	Pool	Run 100	Riffle	Rapid	Cascade
Substrate type (%)	Mud 95	Sand	Fine gravel	Coarse gravel	Cobble	Boulder 5	Bedrock
Fish cover (%)	Substrate	Weed algae 10	Instream debris	Bank veg. 5	Undercut banks	Over head shade	Other
Catchment vegetation (%)	Native forest	Exotic forest	Horticulture	Urban zone	Scrub	Pastoral 100	Other
Riparian vegetation (%)	Native forest	Exotic forest	Grass tussock 98	Exposed bed	Scrub willow 2	Raupo flax	Other
Type of river/ stream / lake	LARGE LOWLAND RIVER						Photo no.
Water level	NORMAL		Downstream blockage -			Pollution -	
Bottom fauna abundance	MODERATE		Predominant species group FRESHWATER SHRIMP (*Paratya* sp)				
Purpose of work	AEE ROAD REALIGNMENT						

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 GIANT BULLIES (*Gobiomorphus gobioides)*	4 X	70 - 130 MM	WEED MATS
2 SHORTFINNED EELS (*Anguilla australis*)	4 X	200 - 400 MM	BOULDERS
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

SHRIMPS - EXTREMELY ABUNDANT.

FISHED RIVER MARGIN.

FRESHWATER FISH DATABASE FORM

98112FISH

Date 04.08.98	River/Lake system KAITUNA RIVER			SITE 5
Time 1700 HRS NZST	Sampling locality CANAL ADJACENT TO PAH ROAD, TE PUKE			
Observer K BENNETT	Access FROM ROAD			Altitude (m) 5
Organisation BIORESEARCHES	NZMS 260	Map U14	Co-ords: 074 770	Inland dist. (km) 5
Fishing method NOT FISHED	Length fished (m) NIL	Permanent water YES		Tidal water YES?

HABITAT DATA

Water	Colour BROWN		Clarity 31 CM	Temp. °C 13.9	Cond μS 333
	Average width (m) 6	Average depth (m)	Maximum depth (m) ~1.5 - 2.0	Dissolved Oxygen Saturation (%) 80	gm^{-3} 8.3

Habitat type (%)	Still 100	Backwater	Pool	Run	Riffle	Rapid	Cascade
Substrate type (%)	Mud 100	Sand	Fine gravel	Coarse gravel	Cobble	Boulder	Bedrock
Fish cover (%)	Substrate	Weed algae 50	Instream debris	Bank veg.	Undercut banks	Over head shade	Other
Catchment vegetation (%)	Native forest	Exotic forest	Horticulture	Urban zone	Scrub	Pastoral 100	Other
Riparian vegetation (%)	Native forest	Exotic forest	Grass tussock 100	Exposed bed	Scrub willow	Raupo flax	Other

Type of river/ stream / lake	MAIN DRAINAGE CANAL			Photo no.
Water level	NORMAL	Downstream blockage	-	Pollution
Bottom fauna abundance	LOW	Predominant species group	RED DAMSELFLY LARVAE	
Purpose of work	AEE HIGHWAY REALIGNMENT			

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 MOSQUITO FISH (*Gambusia affinis*)	1	30 MM	CAUGHT IN NET SWEEP
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

VERTICAL CANAL BANKS 2 M - ELECTRIC FISHING IMPRACTICAL.

FRESHWATER FISH DATABASE FORM

98112FISH

Date 04.08.98	River/Lake system KAITUNA RIVER			
Time 1530 HRS NZST	Sampling locality PAH ROAD		SITE 4	
Observer E SIDES	Access FARM TRACK			Altitude (m) 5
Organisation BIORESEARCHES	NZMS 260	Map U14	Co-ords: 064 781	Inland dist. (km) 5
Fishing method EFM 300	Length fished (m) 25		Permanent water YES	Tidal water NO

HABITAT DATA

Water	Colour BROWN			Clarity POOR - 11 CM		Temp. °C 12.3	Cond μS 452
	Average width (m) 2.5		Average depth (m) 0.4	Maximum depth (m) 0.7		Dissolved Oxygen Saturation (%) 30	gm^{-3} 3.2
Habitat type (%)	Still 100	Backwater	Pool	Run	Riffle	Rapid	Cascade
Substrate type (%)	Mud 100	Sand	Fine gravel	Coarse gravel	Cobble	Boulder	Bedrock
Fish cover (%)	Substrate	Weed algae	Instream debris	Bank veg. 50	Undercut banks	Over head shade	Other
Catchment vegetation (%)	Native forest	Exotic forest	Horticulture	Urban zone	Scrub	Pastoral 100	Other
Riparian vegetation (%)	Native forest	Exotic forest	Grass tussock 100	Exposed bed	Scrub willow	Raupo flax	Other

Type of river/ stream / lake	FARM DRAIN/WETLAND		Photo no.
Water level	AVERAGE	Downstream blockage FARM CROSSING WITHOUT CULVERT	Pollution -
Bottom fauna abundance	LOW	Predominant species group	
Purpose of work	AEE ROAD CONSTRUCTION		

FISH DATA

Species and life stage	Abundance	Length data	Comments / capture location
1 NO FISH RECORDED ✱			
2 EEL IN ADJACENT DRAIN (*Anguilla* sp)	LOW	1 X	DEPTH 1 M.
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

General comments about site or fish

✱ FISHING MACHINE PROBABLY NOT VERY EFFECTIVE DUE TO HIGH CONDUCTIVITY.

RAUPO AND RUSHES MAIN AQUATIC PLANTS.

Appendix 6.8

Benthic Macroinvertebrate Results

PHYLUM	CLASS: Order	Family	Taxa	FFG	Taxa MCI	Site EA1	Site EA2N	Site EA2S	Site EA3	Site EA4	Site EA5
ANNELIDA	**OLIGOCHAETA**		Oligochaeta indet	CB	1					10	
	HIRUDINEA		Hirudinea	P	3		1				
MOLLUSCA	**GASTROPODA**	Hydrobiidae	*Potamopyrgus antipodarum*	CB	4				59		
		Physidae	*Physa fontinalis*	CB	3						1
		Lymneaidae	*Lymnaea columella*	CB	3		2				
ARTHROPODA	**CRUSTACEA: Ostracoda**		Ostracoda indet type A	F	3	3					
			Ostracoda indet type B	F	3	13					
	Amphipoda		*Paracalliope* sp	CB	5				1		
	Decapoda		*Paratya curvirostris*	CB	5				152		
	INSECTA:										
	Odonata	Zygoptera	*Xanthocnemis zealandica*	P	5				1	11	26
			Austrolestes colensonis	P	5					6	1
	Ephemeroptera	Leptophlebiidae	*Mauiulus luma*	CB	5				1		
			Zephlebia sp	CB	7				1		
	Plecoptera	Gripopterygidae	*Zelandobius* sp	CB	5				1		
	Trichoptera	Hydroptilidae	*Paroxyethira hendersoni*	Pi	2			1			
		Conoesucidae	*Pycnocentria evecta*	CB	7				1		
	Hemiptera	Veliidae	*Microvelia* sp	Pi	5	1				1	
	Coleoptera	Scirtidae	Scirtidae indet	*	8	1				2	
		Dytiscidae	Dytiscidae indet	*	5	2				5	
			Rhantus pulverosus	*	*	4				15	
	Lepidoptera		*Hygraula nitens*	S	4				1		
	Diptera	Culicidae	*Culex* sp	*	*	8				17	
		Chironomidae	Chironomidae indet	CB	1	5	1		1	31	
		Stratiomyidae	Stratiomyidae indet	*	5	1					1
	Collembola	Collembola indet.	Collembola indet	CB	6	1					
		TOTALS:	**NO. TAXA**			10	3	1	10	9	4
			NO. EPT TAXA			0	0	1	4	0	0
			NO. INDIVIDUALS			39	4	1	219	98	29

* = unknown

Appendix 6.9

Botanical Report - 1983

(Miller, 1983)

PROPOSED WILDLIFE RESERVE AT THE LOWER KAITUNA RIVER

PRELIMINARY BOTANICAL REPORT

Introduction:

The area under consideration consists of a flat, low-lying area adjacent to the lower reaches of the Kaituna River, just above the point where this river enters the Maketu Estuary. (Grid Reference N58 84– 51–). The proposed reserve has an area of approximately 250 hectares. On the northern side it is bounded by the Kaituna River, on the other three sides by farmland, formerly wetlands, now drained. Access is via Pah Road, which runs off S.H. 2 between the Rangiuru Freezing Works and Te Matai.

The Kaituna River is stopbanked along the length of the reserve, as well as further upstream and downstream. In addition the river has been straightened out considerably in this vicinity. Three old bends of the river lie within the reserve. They contain water, but there is no flow. This stopbanking of the river, carried out by the Bay of Plenty Catchment Commission, has had a serious effect on the reserve. The area supports a number of stands for the shooting of waterfowl. The area was visited on several occasions during February and March 1983.

Vegetation:

Around the southern and western perimeter of the reserve is an area of pasture, frequently grazed by cattle. A number of other open areas through the reserve support weedy pasture. Most of the reserve is covered by a canopy, consisting in the main of willows (Salix spp.) or Kanuka (Leptospermum ericoides). This vegetation tends to be very dense, with a large number of drawn-up trees growing closely together.

This canopy generally has a dense understory of Coprosmas (mostly C. propinqua, C. robusta and C. tenuicaulis and their hybrids) and blackberry (Rubus fruticosus agg.) with a ground cover of ferns, niggerheads (Carex secta) and various herbaceous plants. Many of the more open areas of the reserve are badly overgrown with blackberry and thistles (Cirsium vulgare) which together with dense thickets of flax (Phormium tenax) make progress through some parts of the reserve a laborious and uncomfortable experience. A feature of the reserve is the rampant growth of certain weed species (e.g. thistles growing to 8 feet, 2.4m, in height). This is a result of the recent drying out of the reserve in response to the construction of stop-banks along the Kaituna River. The numerous fallen willows and Cabbage trees (Cordyline australis) seen are probably also due to drying out, with the resultant soil shrinkage and cracking weakening the roots of the trees allowing them to be blown over by strong winds.

Other undesirable influences at work are the intrusion of cattle into the canopy zones, and the browsing by goats throughout the reserve. The cattle are, of course, necessary to graze the pasture areas around the perimeter of the reserve, but further fencing is desirable to keep them away from the remainder of the reserve. Goats have no place in such a reserve and their removal or eradication is desirable. About 40 - 50 goats were seen on one visit to the reserve.

Plant Communities:

The pasture around the southern and western perimeter of the reserve is typical rather poor lowland pasture, consisting of grasses such as ryegrass (Lolium perenne), Yorkshire Fog (Holcus lanatus), various rushes (Juncus spp.) and sedges (Carex spp.), together with weedy perennials such as pennyroyal (Mentha pulegium), ragwort (Senecio jacobaea) and Lotus pedunculatus. This pasture is heavily grazed, which tends to keep the number of species rather small.

Much of the remaining open areas, both around the perimeter and through old clearings throughout the reserve, consists of weedy pasture. Apart from the grasses etc., already mentioned, other species found included marsh bedstraw (Galium palustre), beggars' ticks (Bidens frondosa), Fireweeds (Erechtites spp.), willow herb (Epilobium ciliatum), buttercup (Ranunculus flammula), spearmint (Mentha spicata), Tarweed (Parentucellia viscosa), Epilobium pallidiflorum and scattered plants of Phormium tenax. A widespread ground cover plant is the native lobelia (Lobelia anceps) with small but attractive white or pale blue flowers. Thistles (Cirsium vulgare) and blackberry (Rubus fruticosus agg.) are widespread and vigorous. Towards the north-eastern corner of the reserve these two weeds combine with flax (Phormium tenax) to form almost impenetrable thickets.

The canopy zone is dominated by either willows, mostly crack (Salix fragilis) and pussy (S. cinerea) willows; or by kanuka (Leptospermum *ericoides*). The understory consists largely of Coprosmas (*C. propinqua*, *C. tenuicaulis*, *C. robusta* and their hybrids) and blackberry (*Rubus fruticosus* agg.) with occasional plants of Hangehange (*Geniostoma ligustrifolium*). Scattered cabbage trees (*Cordyline australis*) may form part of the canopy or the understory. Flax (*Phormium tenax*) also forms part of the understory, as does manuka (*Leptospermum scoparium*).

The groundcover is made up of sedges such as the niggerhead (*Carex secta*) and *Baumea* sp.; various ferns such as Kio-kio (*Blechnum capense*) swamp kiokio (*B. minus*), *Doodia media*, *Pteris tremula*, *Athyrium australe* *A. japonicum*, *Pneumatopteris pennigera* and *Phymatosorus scandens* growing on tree bases; beggars' ticks (*Bidens frondosa*) and ragwort (*Senecio jacobaea*) both spreading and growing vigorously to the detriment of other species; other herbs including the small grass *Oplismenus imbecillus*, *Polygonum hydropiper* and *P. persicaria*, *Erigeron floribundus* and *Centella uniflora*.

To the north of the central loop of the old course of the Kaituna River the willow canopy consists of large, widely spaced willows. Under these are found a more open type of understory and groundcover with additional species including a velvety nightshade (*Solanum sublobatum* and spearmint (*Mentha spicata*). In addition, a small colony of a woolley leaved mint was found. This is still awaiting positive identification but is believed to be *Mentha longifolia*, a European species not previously recorded in New Zealand.

Another interesting species found was the orchid *Pterostylis micromega*, an uncommon species. A small colony was found on the finge of manuka scrub along an old cut fenceline near the centre of the reserve. The first visit to the reserve was not made until late February, which is rather late for orchids, so further interesting species might be found on subsequent visits.

Towards the centre of the reserve, on the eastern side of the recently dug central drain, an area of *Cordyline australis* forms an open canopy, with an understory of *Phormium tenax* and *Coprosma tenuicaulis*. A few crack and pussy willows also form part of the canopy. Beggars' ticks (*Bidens frondosa*) and blackberry are particularly bad weeds in this area.

There are also small scattered areas of open swamp dominated by the sedge Scirpus lacustris with bindweed (Calystegia sepium), Centella uniflora, the willow weeds Polygonum hydropiper and P. decipiens, buttercup (Ranunculus flammula) and Galium palustre. These small swamps are very dry at present, and are rapidly being invaded by thistles and Bidens frondosa.

The old loops of the Kaituna River, now closed off by stopbanks, still contain open water but are rapidly being converted into swamps by the invasion of plants, particularly Raupo (Typha orientalis) and P. decipiens). The open water is often partly covered by the floating fern, Azolla filiculoides. These old river areas provide a major habitat for ducks, and their preservation is desirable.

Botanical Value of Proposed Reserve:

No species on the endangered species list were found in the reserve, but further investigation of the area is desirable. The reserve forms a large potential wetland in a district where wetlands have largely been eliminated. It contains areas of kanuka/manuka swamp and cabbage tree swamp, both being wetland types that are increasingly uncommon. The presence of the orchid Pterostylis micromega is a valuable feature, and a very interesting mint was also found.

Provided the water table can be restored to its previous level, which hopefully will remove much of the present severe weed problem, the reserve could regain much of its value as a varied and interesting wetlands area, which has suffered much from recent work on the Kaituna River.

Recommendations:

1. It is vital that the water table should be raised substantially. It is understood that this is to be done, and that much of the reserve will be under several centimetres of water. This should eliminate many of the worst weeds such as thistles, blackberry and Bidens frondosa, and should encourage a return to the original state of the reserve before the stopbanks were constructed.
2. Cattle should be fenced off from the canopy areas of the reserve.
3. Goats should be removed or eradicated from the reserve.
4. The spread of raupo into the old loops of the Kaituna River should be controlled.

5. A number of "corridors" through the reserve are being cleared at present for drainage, fencing and access purposes. Care should be taken not to reduce the canopy into small pockets by the indiscriminate forming of further such "corridors" in the future.

6. Where such corridors have been cleared, the felled canopy should be piled and burnt, rather than left lying to form a habitat for weeds such as blackberry. In general this is being done, but the fallen trees tend to be piled against the edge of the untouched canopy areas and then burnt. This poses a serious fire hazard to the remaining canopy area. Such fires should be set in open ground.

7. Further botanical investigation of the reserve, earlier in the summer, is desirable.

N.C. MILLER
April 1983

Appendix 6.9

Botanical Report - 1983
(Miller, 1983)

PROPOSED WILDLIFE RESERVE AT THE LOWER KAITUNA RIVER
PRELIMINARY BOTANICAL REPORT

Introduction:

The area under consideration consists of a flat, low-lying area adjacent to the lower reaches of the Kaituna River, just above the point where this river enters the Maketu Estuary. (Grid Reference N58 84- 51-). The proposed reserve has an area of approximately 250 hectares. On the northern side it is bounded by the Kaituna River, on the other three sides by farmland, formerly wetlands, now drained. Access is via Pah Road, which runs off S.H. 2 between the Rangiuru Freezing Works and Te Matai.

The Kaituna River is stopbanked along the length of the reserve, as well as further upstream and downstream. In addition the river has been straightened out considerably in this vicinity. Three old bends of the river lie within the reserve. They contain water, but there is no flow. This stopbanking of the river, carried out by the Bay of Plenty Catchment Commission, has had a serious effect on the reserve. The area supports a number of stands for the shooting of waterfowl. The area was visited on several occasions during February and March 1983.

Vegetation:

Around the southern and western perimeter of the reserve is an area of pasture, frequently grazed by cattle. A number of other open areas through the reserve support weedy pasture. Most of the reserve is covered by a canopy, consisting in the main of willows (*Salix* spp.) or Kanuka (*Leptospermum ericoides*). This vegetation tends to be very dense, with a large number of drawn-up trees growing closely together.

This canopy generally has a dense understory of Coprosmas (mostly *C. propinqua*, *C. robusta* and *C. tenuicaulis* and their hybrids) and blackberry (*Rubus fruticosus* agg.) with a ground cover of ferns, niggerheads (*Carex secta*) and various herbaceous plants. Many of the more open areas of the reserve are badly overgrown with blackberry and thistles (*Cirsium vulgare*) which together with dense thickets of flax (*Phormium tenax*) make progress through some parts of the reserve a laborious and uncomfortable experience. A feature of the reserve is the rampant growth of certain weed species (e.g. thistles growing to 8 feet, 2.4m, in height). This is a result of the recent drying out of the reserve in response to the construction of stopbanks along the Kaituna River. The numerous fallen willows and Cabbage trees (Cordyline australis) seen are probably also due to drying out, with the resultant soil shrinkage and cracking weakening the roots of the trees allowing them to be blown over by strong winds.

Other undesirable influences at work are the intrusion of cattle into the canopy zones, and the browsing by goats throughout the reserve. The cattle are, of course, necessary to graze the pasture areas around the perimeter of the reserve, but further fencing is desirable to keep them away from the remainder of the reserve. Goats have no place in such a reserve and their removal or eradication is desirable. About 40 - 50 goats were seen on one visit to the reserve.

Plant Communities:

The pasture around the southern and western perimeter of the reserve is typical rather poor lowland pasture, consisting of grasses such as ryegrass (Lolium perenne), Yorkshire Fog (Holcus lanatus), various rushes (Juncus spp.) and sedges (Carex spp.), together with weedy perennials such as pennyroyal (Mentha pulegium), ragwort (Senecio jacobaea) and Lotus pedunculatus. This pasture is heavily grazed, which tends to keep the number of species rather small.

Much of the remaining open areas, both around the perimeter and through old clearings throughout the reserve, consists of weedy pasture. Apart from the grasses etc., already mentioned, other species found included marsh bedstraw (Galium palustre), beggars' ticks (Bidens frondosa), Fireweeds (Erechtites spp.), willow herb (Epilobium ciliatum), buttercup (Ranunculus flammula), spearmint (Mentha spicata), Tarweed (Parentucellia viscosa), Epilobium pallidiflorum and scattered plants of Phormium tenax. A widespread ground cover plant is the native lobelia (Lobelia anceps) with small but attractive white or pale blue flowers. Thistles (Cirsium vulgare) and blackberry (Rubus fruticosus agg.) are widespread and vigorous. Towards the north-eastern corner of the reserve these two weeds combine with flax (Phormium tenax) to form almost impenetrable thickets.

The canopy zone is dominated by either willows, mostly crack (Salix fragilis) and pussy (S. cinerea) willows; or by kanuka (Leptospermum *ericoides*). The understory consists largely of Coprosmas (*C. propinqua*, *C. tenuicaulis*, *C. robusta* and their hybrids) and blackberry (*Rubus fruticosus* agg.) with occasional plants of Hangehange (*Geniostoma ligustrifolium*). Scattered cabbage trees (*Cordyline australis*) may form part of the canopy or the understory. Flax (*Phormium tenax*) also forms part of the understory, as does manuka (*Leptospermum scoparium*).

The groundcover is made up of sedges such as the niggerhead (*Carex secta*) and *Baumea* sp.; various ferns such as Kio-kio (*Blechnum capense*) swamp kiokio (*B. minus*), *Doodia media*, *Pteris tremula*, *Athyrium australe* *A. japonicum*, *Pneumatopteris pennigera* and *Phymatosorus scandens* growing on tree bases; beggars' ticks (*Bidens frondosa*) and ragwort (*Senecio jacobaea*) both spreading and growing vigorously to the detriment of other species; other herbs including the small grass *Oplismenus imbecillus*, *Polygonum hydropiper* and *P. persicaria*, *Erigeron floribundus* and *Centella uniflora*.

To the north of the central loop of the old course of the Kaituna River the willow canopy consists of large, widely spaced willows. Under these are found a more open type of understory and groundcover with additional species including a velvety nightshade (*Solanum sublobatum* and spearmint (*Mentha spicata*). In addition, a small colony of a woolley leaved mint was found. This is still awaiting positive identification but is believed to be *Mentha longifolia*, a European species not previously recorded in New Zealand.

Another interesting species found was the orchid *Pterostylis micromega*, an uncommon species. A small colony was found on the finge of manuka scrub along an old cut fenceline near the centre of the reserve. The first visit to the reserve was not made until late February, which is rather late for orchids, so further interesting species might be found on subsequent visits.

Towards the centre of the reserve, on the eastern side of the recently dug central drain, an area of *Cordyline australis* forms an open canopy, with an understory of *Phormium tenax* and *Coprosma tenuicaulis*. A few crack and pussy willows also form part of the canopy. Beggars' ticks (*Bidens frondosa*) and blackberry are particularly bad weeds in this area.

There are also small scattered areas of open swamp dominated by the sedge Scirpus lacustris with bindweed (Calystegia sepium), Centella uniflora, the willow weeds Polygonum hydropiper and P. decipiens, buttercup (Ranunculus flammula) and Galium palustre. These small swamps are very dry at present, and are rapidly being invaded by thistles and Bidens frondosa.

The old loops of the Kaituna River, now closed off by stopbanks, still contain open water but are rapidly being converted into swamps by the invasion of plants, particularly Raupo (Typha orientalis) and P. decipiens). The open water is often partly covered by the floating fern, Azolla filiculoides. These old river areas provide a major habitat for ducks, and their preservation is desirable.

Botanical Value of Proposed Reserve:

No species on the endangered species list were found in the reserve, but further investigation of the area is desirable. The reserve forms a large potential wetland in a district where wetlands have largely been eliminated. It contains areas of kanuka/manuka swamp and cabbage tree swamp, both being wetland types that are increasingly uncommon. The presence of the orchid Pterostylis micromega is a valuable feature, and a very interesting mint was also found.

Provided the water table can be restored to its previous level, which hopefully will remove much of the present severe weed problem, the reserve could regain much of its value as a varied and interesting wetlands area, which has suffered much from recent work on the Kaituna River.

Recommendations:

1. It is vital that the water table should be raised substantially. It is understood that this is to be done, and that much of the reserve will be under several centimetres of water. This should eliminate many of the worst weeds such as thistles, blackberry and Bidens frondosa, and should encourage a return to the original state of the reserve before the stopbanks were constructed.
2. Cattle should be fenced off from the canopy areas of the reserve.
3. Goats should be removed or eradicated from the reserve.
4. The spread of raupo into the old loops of the Kaituna River should be controlled.

5. A number of "corridors" through the reserve are being cleared at present for drainage, fencing and access purposes. Care should be taken not to reduce the canopy into small pockets by the indiscriminate forming of further such "corridors" in the future.

6. Where such corridors have been cleared, the felled canopy should b piled and burnt, rather than left lying to form a habitat for weeds such as blackberry. In general this is being done, but the fallen trees tend to be piled against the edge of the untouched canopy areas and then burnt. This poses a serious fire hazard to the remaining canopy area. Such fires should be set in open ground.

7. Further botanical investigation of the reserve, earlier in the summer, is desirable.

N.C. MILLER
April 1983

Appendix 6.10

Whangamarino Wetland Bird Habitats
(Ogle & Cheyne, 1981)

Generalised vegetation description (plant names only, no cover values).	% of wetland with this vegetation	No. of spotless crakes	% of spotless crakes (based on 89 individuals)
Willows (pussy willow, for all but 1 crake)/manuka and/or *Coprosma tenuicaulis*/ *Carex* spp - *Juncus* spp - *Ludwigia palustris*/ duckweeds.	14	68	76
Willows (equal numbers in pussy willow and crack willow)/ *Glyceria maxima* (with or without other herbaceous plants).	12	8	9
Willows (all pussy willows)/ sedges and/or raupo.	5	8	9
Cabbage tree-kowhai/manuka/ sedges and grasses.	<1	1	1
Raupo only.	<1	2	2
Acid peat vegetation (manuka/ *Baumea* spp - wirerush - umbrella fern).	57	2	2
Vegetation without spotless crakes	12		
TOTALS	c. 100%	89	c.100%
Stations with flax as part of the vegetation		48	54
Stations with raupo as part or all of the vegetation		13	15

TABLE 6: Distribution of spotless crakes related to vegetation cover.

Generalised vegetation description (plant names only, no cover values)	% of wetland with this vegetation	No. of fernbirds	% of fernbirds
Manuka/<u>Baumea</u> spp.[1] - wirerush - umbrella fern	57	273	75
Pussy willow/manuka (sometimes with <u>Coprosma tenuicaulis</u> and/or <u>Baumea articulata</u>[2])/ <u>Carex</u> spp.[3]	14	70	20
Crackwillow or pussy willow/ <u>Baumea articulata</u> (no shrub understorey)	2	11	3
Pussy willow/<u>Coprosma tenuicaulis</u> (no manuka)	Not mapped c.1?	5	1
Crack willow or pussy willow/short herbs (50cm tall)	14	5	1
Vegetation mostly without fernbirds	c.12		
TOTALS	c.100	364	100%

TABLE 7: Generalised vegetation types with fernbirds in Whangamarino Swamp.

Footnotes 1, 2, 3 - see overleaf.

Generalised vegetation description (plant names only, no cover values)	% of wetland with this vegetation	No. of bitterns	% of bitterns (based on 123 individuals)
(i) Acid bog : manuka/*Baumea* spp. - wirerush - umbrella fern.	57	26	21
(ii) Semi-mineralised bog: pussy willow/manuka, or *Coprosma tenuicaulis*/tall bamboo sedge, or other *Baumea* spp./*Carex* spp.	5	27	22
(iii) Mineralised swamp: Willows/bamboo sedges/*Carex* spp. - water plantain - buttercup - water purslane - willow weeds - *Galium*. (Rarely *Scirpus fluviatilis*, *Osmunda*, manuka.)	32	68	55
(iv) Miscellaneous sites	6	2	2
Totals	100%	123	100%

TABLE 3: Distribution of bitterns in known vegetation types.

Type (ii) Semi-mineralised bog : 27 bitterns				
			Cover of pussy willows	
	<10%	10-19%	20-49%	≥50%
No. of bitterns	1	3	11	12
% of bitterns in type (ii)	15%		85%	
Type (iii) Mineralised swamp : 68 bitterns				
		Cover of pussy willow and/or crack willows		
	<10%	10-19%	20-49%	≥50%
No. of bitterns	19*	19	22	8
% of bitterns in type (iii)	56%		44%	
Open sites, usually with scattered willows			Willow treeland or forest	

* 3 birds in open swamps without willows.

TABLE 4: Distribution of bitterns related to cover of willows.

7. PLATES

PLATES 1, 2, 3 AQUATIC SITE EA 1

PLATE 4 "NICCOL WETLAND" (OXBOW)
AQUATIC SITE EA 2S

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PLATES 5, 6 & 7 KAITUNA RIVER OXBOW
AQUATIC SITE EA 2N

PLATE 8 KAITUNA RIVER - VIEW
TOWARDS TRUE RIGHT BANK;
AQUATIC SITE EA 3

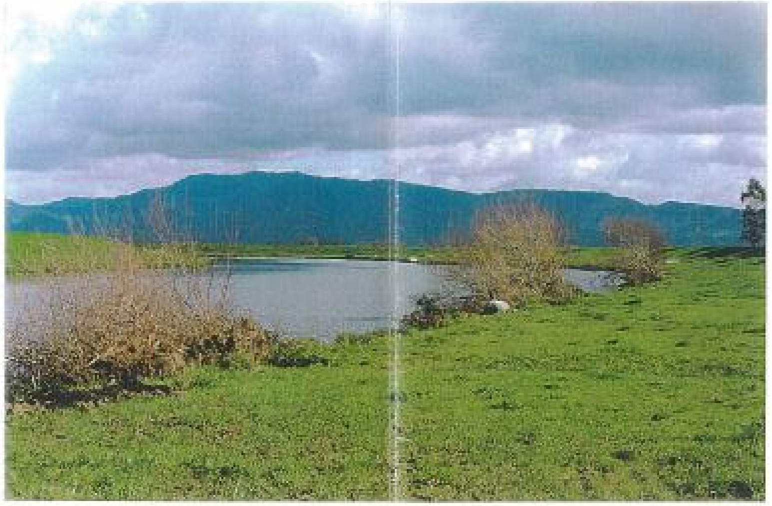


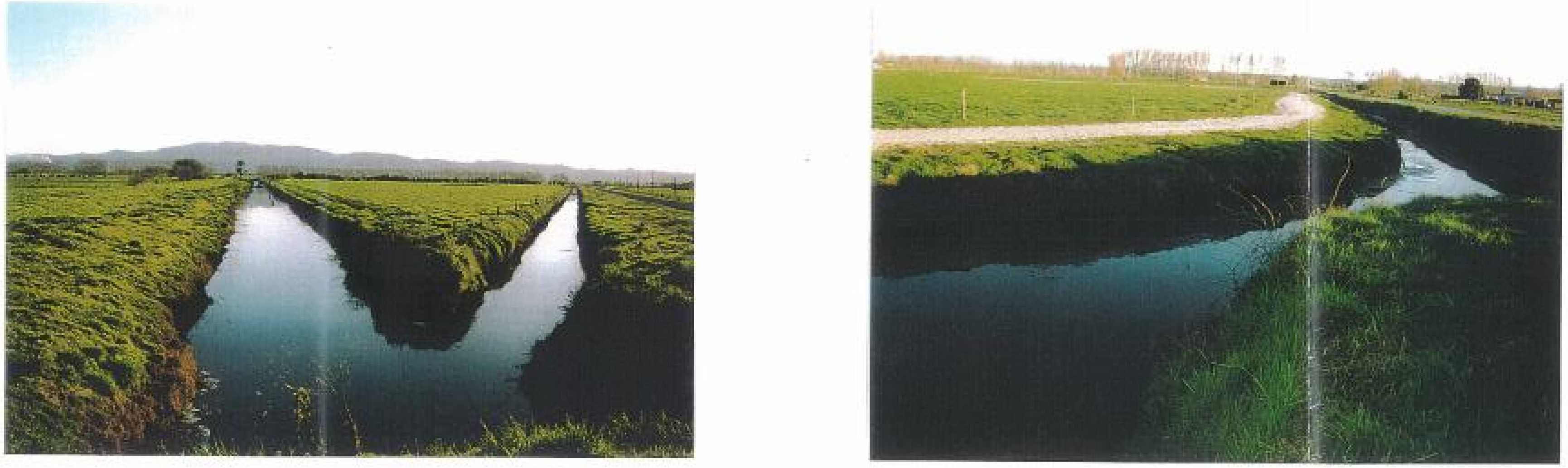
PLATE 9 KAITUNA RIVER - TRUE
LEFT BANK; AQUATIC
SITE EA 3

PLATE 10 WAIMARAE STREAM
AQUATIC SITE EA 4

PLATE 11 WAIMARAE STREAM
AQUATIC SITE EA 4

PLATE 12 WAIMARAE STREAM
AQUATIC SITE EA 4

PLATE 13 TRUNCATED OXBOW OF
KAITUNA RIVER ADJACENT
WAIMARAE STREAM
(MAIMAI ARROWED)



PLATES 14 & 15 LARGE CONSTRUCTED DRAINS
AT PAH RD RIGHT-ANGLED BEND

PLATE 16 DRAIN AT PAH RD BEND AND
ENTRANCE TO RESERVE
AQUATIC SITE EA 5

PLATE 17 DRAIN FORMING SOUTHEASTERN
BOUNDARY OF RESERVE
(DOWNSTREAM FROM PLATE 16)

PLATE 18, 19, 20 KAHIKATEA REMNANT
CLOSEST TO ALIGNMENT A3;
VIEW FROM NORTHERN SIDE;
PADDOCK IN FOREGROUND
CONTAINS KAHIKATEA STUMPS.

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PLATE 21 LARGEST OF REMNANT KAHIKATEA GROVES; WELL SEPARATED FROM ALIGNMENT A3;

VIEW FROM NORTHERN SIDE; PADDOCK IN FOREGROUND CONTAINS THE REMAINS OF LARGE KAHIKATEAS.

PLATE 22 "SAND RIDGE SCRUB" AT END OF PADDOCK INTRUSION TO SCRUBLAND
(TO NORTH OF EA 5 - FIGURE 9)

PLATE 23 & 24 CONSTRUCTED PONDS IN
WILDLIFE MANAGEMENT
RESERVE
(REFER FIGURE 9)

PLATE 25 FERNBIRD HABITAT (ARROWED)
IN CONSTRUCTED POND AREA

PLATES 26, 27, 28 CONSTRUCTED PONDS IN WILDLIFE MANAGEMENT RESERVE (REFER FIGURE 9) OLDER PONDED AREA (LOWER LEFT) HAS A MUCH REDUCED OPEN WATER AREA AS A RESULT OF DEVELOPMENT OF AQUATIC VEGETATION

PLATE 29 ROOT FLANGE OF OLD KAHIKATEA STUMP IN GRAZED PADDOCK. (PLATE 18)

PLATE 30 BURNT PIECE OF KAHIKATEA IN GRAZED PADDOCK. (PLATE 18)