

# Risk assessment workshop report

8 April 2005







## Risk assessment workshop report

#### Prepared for

Greater Wellington Regional Council and Transit New Zealand

#### Prepared by

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In association with

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8 April 2005



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#### **Executive summary**

An initial Risk Assessment workshop was held on 24 February 2005. This workshop was attended by the members of the Technical Steering Group with the purpose of identifying and assessing risks that could affect the Western Corridor Transportation Study.

The workshop focussed predominately on threats to the elements, as a tool for decision making. However, an opportunity risk identification brainstorming session was held to capture the group's ideas on aspects that can be built into an element once it is assembled in a scenario.

In order to rank the identified risks, each risk was rated with a likelihood of the event occurring, and a consequence should it occur. The risk scores for each risk category were summed using a statistical average approach to provide an indication of the level of threat each element is exposed to. As a result a risk score for each element has been determined, which allows an indicative ranking to be performed.

From the analysis several trends are apparent. All elements are currently assessed to have a **very high** risk exposure category, this reflects the uncertainty inherent in the level of detail in this project. Within this category the following applies:

- Coastal highway elements generally have a higher level of risk than Transmission Gully elements. This is a reflection on the influences of external stakeholders and the higher level of uncertainty in engineering elements (i.e. geotechnical risks) due the lesser state of knowledge.
- Link Road and Parallel Road elements have a lower level of risk than the other highway elements.
- Rail improvement elements have a level of risk greater than Parallel / Link Roads, but less than Coastal Highway and Transmission Gully Routes.
- Comparison between the categories of risk shows that the commercial/economic cost risks have a tendency to be the greatest threat to an element, followed by Engineering/Site risks.

When the project elements are combined to scenarios the resulting score regresses to the mean and no real distinction can be made between them. Given the scale of the scenarios and the current state of knowledge this appears to be a reasonable result.

It should be recognised that all the identified risks need to be managed, and should be regularly reviewed in order to assess their relative change of probability or consequence as the project proceeds through the various stages from feasibility to design through to project completion. This project will utilise the information provided from the Risk Assessment Workshop combined with other sources to assess which elements to be moved forward into scenarios. Risk Management Processes should be continued once scenarios are assembled.



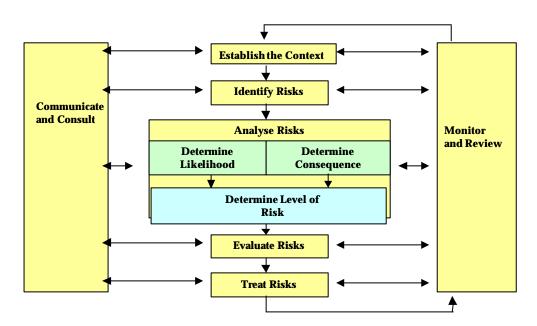
#### 1. Purpose of the Risk Management System

Risk Management has been defined as 'the culture, processes and structures that are directed towards realizing potential opportunities whilst managing adverse affects'

The *Process* of Risk Management involves the follow steps

- Establish Context what are the objectives?
- Risk Identification what can go wrong?
- Risk Analysis what is the degree of risk?
- Risk Evaluation is the degree of risk acceptable?
- Risk Treatment what can be done to avoid, minimise or mitigate the effects of unacceptable risk?
- Monitoring how effective are the steps of the process? Relevant at all stages.
- Communicate and Consult sharing knowledge throughout the process with internal and external stakeholders. Relevant at all stages.

The following flow diagram summarises this process:



The above Risk Management methodology has been used as a framework for this project along with Transit's Risk Management process Manual (AC/Man/1) guidelines.

This report lies within the 'Risk Assessment' stage, incorporating the combined process of identification, analysis and evaluation.



#### 2. Risk Assessment Workshop

An initial Risk Assessment workshop was held on 24 and 25 February attended by the members of the Technical Steering Group. The purpose of the workshop was to identify and assess risks that could affect this project. In particular the focus was in terms of individual "Elements to be considered" as identified in the *Confirmed Elements Report*, 18 February 2005. A complete list of attendees are included in Appendix 1.

#### 3. Risk Context

Within the risk management process there needs b be an awareness of the objectives, obligations, expectations and risk tolerances of internal and external stakeholders that affect an event or activity. This is known as establishing the **context** for the Risk Management Process. This formed the first step of the workshop.

Each Project Element was to be considered in terms of the goals of Greater Wellington and Transit New Zealand and their policies, drivers and risk tolerance. It was stated that the risks facing external stakeholders' were to be filtered to determine how they may affect each Project Element being reviewed.

The purpose of undertaking the Risk Assessment was discussed as being a tool used to compare the risk exposure of individual elements, and assist in the decision making process.

#### 4. Risk Identification

The Transit New Zealand Risk Management Manual, Appendix 1: was used as a prompt list under the following headings:

Benefit Risks Base Travel Demand, Growth Forecasts, Assignment, Crashes

Cost Risks Commercial, Legal, Economic, Managerial

Community, Political, Environmental, Land and Property Site Conditions, Engineering, Services, Natural Events

A full list of prompts used is included in Appendix 2.

The workshop focussed predominately on threats to the elements, as a tool for decision making. However, an opportunity risk identification brainstorming session was held to capture the group's ideas on aspects that can be built into an element once it is assembled in a scenario. The list of ideas is recorded in Appendix 4.



#### 5. Risk Analysis

Risk analysis seeks to develop an understanding of risk by consideration of the magnitude of consequences of an event, should it occur, and the likelihood of it's occurrence. For this assessment the process of understanding the risks focuses on a comparative ranking between elements, and between risks.

The workshop participants have used their knowledge and experience to assess the risks which may affect the project elements. The opinion of the participants has been used to assess risks to the elements and assess the levels of probability and consequence each risk contains.

In order to rank the identified risks, each of the identified risks have been rated with a likelihood of the event occurring, along with a consequence should it occur. The Transit New Zealand Risk Management Manual uses a Semi-Quantitative mechanism to rate, score and rank risks, both as threats and opportunities. This process was used for the workshop. The scoring and rating tables are included in Appendix 2. The full list of risks and their assessed score and rank can be seen in Appendix 3.



#### 6. Risk Evaluation

The risk scores for each risk category have been summed using a statistical average approach to provide an indication of the level of threat each element is exposed to. From this a risk score for each element has been obtained. The summary of this output has provided below.

	Element	Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment, Crashes)	Cost Risks (Commercial, Legal, Economic, Managerial)	Cost Risks (Community, Political, Environmental, land and Property)	Cost Risks (Site Conditions, Engineering, Services, Natural Events)	Sum
	HC1	275	319	319	370	323
	HC2	275	319	319	370	323
Coastal highway improvements	HC4	275	319	321	370	323
	HC5	312	284	311	307	304
	HC7	284	347	281	316	308
	HC8	284	273	223	287	268
Transmission gully highway	HT1	268	307	206	308	275
improvements	HT4	323	320	225	305	296
	HE3	43	284	278	187	221
Link Roads	HE5	13	256	162	214	185
	HE6	175	190	154	283	207
Parallel Roads	HP3	176	153	291	154	202
Travel Demand	TP1	275	248	201	131	221
Management	TR5	269	228	223	280	251
	RT1	244	310	234	222	255
	RT2	244	310	234	203	251
Rail Improvements	RT3	244	310	234	203	251
	RE1	230	304	234	203	245
	RS1	230	302	302	235	269
	RS2	230	302	302	235	269

Key	<70	70-159	160-349	350+
AC/Man/1	Moderate		Very	
Classification	or less	High	High	Extreme



Although the table above is indicative only, it can be noted that several trends are apparent:

- All elements are currently exposed to a **very high** risk exposure in some form. This reflects the uncertainty inherent in the level of detail in this project.
- Coastal highway elements generally have a higher level of risk than Transmission Gully elements. This is a reflection on the influences of external stakeholders and the higher level of uncertainty in engineering elements (i.e geotechnical risks) due the lesser state of knowledge.
- Link Road and Parallel Road elements have a lower level of risk than the other highway elements.
- Rail improvement elements have level of risk greater than Parallel / Link Roads, but less than Coastal Highway and Transmission Gully Routes.
- Comparison between the categories of risk shows that the commercial/ economic cost risks have a tendency to be the greatest threat to an element, followed by Engineering/Site risks.

When the project elements are combined into scenarios no real distinction can be made between the resulting scores. Given the scale of the scenarios and the current state of knowledge this appears to be a reasonable result. All scenarios scored in the vicinity of 250 and should be considered to have a very high risk profile.

The following table shows the combinations of elements that form the scenarios and the resulting statistical average scores for the scenarios.



i	Scenario	s			
Elements	Major PT and TDM	Major Roads	Reliability	Congestion relief	Economic Efficiency
HC1					
HC2					
HC4			323		
HC5				304	304
HC7		308	308		
HC8		268		268	
HT1		275			
HT4					
HE3			221	221	221
HE5					
HE6		207	207	207	207
HP3		202	202		
TP1					
TR5					
RT1	255		255		
RT2	251		251	251	251
RT3					
RE1					
RS1	269		269		269
RS2					
RS11*	269		269		269
Sum * Assuma PS	224	<b>255</b>	243	252	231

<sup>\*</sup> Assume RS 11 similar risk profile to RS1



#### 7. Monitoring, Consulting, Review

It should be recognised that all the identified risks need to be managed, and should be reviewed at key stages in order to assess their relative change of probability or consequence as the project proceeds through the various stages from feasibility to design to project completion.

This project will use the information provided above as well as from other knowledge to assess elements to be moved forward into scenarios. Risk Management Processes should be continued once scenarios are assembled into discrete units.

Opportunity Risks should be developed as scenarios are confirmed, to maximise gains for the project.



## **Appendices**



#### Appendix A

#### **Workshop Attendees**

Anthony (Tony) Brennand (GWRC)

John Allard (GWRC) – Thursday only Graham Spargo (GWRC) – Friday only Peter Ward (Transit New Zealand)

Catherine Worsley (Transit New Zealand) – Thursday only
David Silvester (Transit New Zealand) – Friday (part) only

Greg Campbell (Wellington City Council)
Geoff Marshall (Porirua City Council)

Peter Knight (Kapiti Coast District Council) Lachlan Wallach (Upper Hutt City Council)

Don Wignall (Land Transport New Zealand - Funding)

Tim Selby (Land Transport New Zealand – Safety) – Thursday only Neil Buchanan (NZ Rail Corporation / OnTrack) – Thursday (part) only

Ross Hayward (Toll Metro) – Thursday only

Geoff Norman (Toll Metro)

Leena Singh (Toll Metro) – Thursday only

Steven Knowles (Maunsell Limited)
Darrell Statham (Maunsell Limited)

Stephen Garlick (Maunsell Limited) – Thursday only

Darren Cash (Maunsell Limited) Rachael Urquhart (Maunsell Limited)

Paul Thomas (Environmental Management Services Limited)

Robert Schofield (Boffa Miskell Limited) – Friday only

Apologies:

Dave Watson (GWRC)
Joe Hewitt (GWRC)
Anthony Cross (GWRC)
Rhona Nicol (GWRC)

Bob Alkema (Land Transport New Zealand – Funding)

Lyle Earl (Hutt City Council) Seamus O'Sullivan (Toll Freight)



#### **Appendix B**

#### **Prompt List used for Risk Assessment workshop**

Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment, Crashes)

Base Travel Demand

**Growth Forecasts** 

Assignment

Crashes

Other

#### Cost Risks (Commercial, Legal, Economic, Managerial)

Project Scope

Team Relationships (Performance, Communications etc)

Funding

Procurement

Legislative/Regulation Issues

**Document Control** 

Market Issues

**Programming Issues** 

Insolvency (Contractor)

Contractual Claim/Dispute

Health and Safety

Inadequate QC/QA

Post-Construction Liability

Other

#### Cost Risks (Community, Political, Environmental, land and Property)

Community

**Industrial Action by Others** 

**Ecological Issues** 

Impact on Public Health

Heritage Issues (Historic Places Trust)

Resource Management Act Consents

**Building Consent** 

Land - Designation

Land - Purchase

Political

Other



Cost Risks (Site Conditions, Engineering, Services, Natural Events)

Project Scope Definition (Unscheduled Items)

Design Standards (Definition)

Client Initiated Changes

New/Change in Technology

Topographical Data

**Site/Ground Conditions** 

Design Issues

Design Changes

Redesign / Rework

Buildability

Traffic Management

Impact of Value Engineering (Risk/Opportunity Assessment)

Changes Arising from Safety Audits

Issues - Pavement/Surfacing

Issues - Structures

Traffic Control and Lighting

Services

Natural Events

Other



## Appendix C

#### Risk Rating and scoring tables

#### Table 1a: Rating the Likelihood (L) of a Threat

(Generally applicable to a passive process)

Likelihood	Probability (for short term activities such as asset improvement)	Frequency (for long term activities such as in asset management and Corporate business)	Description	Rating	
Likely	>50%	Greater than once per year	The threat can be expected to occur or a very poor state of knowledge has been established on the threat.	5	
Quite Common	20%-50%	Once per 1-5 years	The threat will quite commonly occur or a poor state of knowledge has been established on the threat.	4	
Unlikely	10%-20%	Once per 5-10 years	The threat may occur occasionally or a moderate state of knowledge has been established on the threat.	3	
Unusual	1%-10%	Once per 10 – 50 years	The threat could infrequently occur or a good state of knowledge has been established on the threat.	2	
Rare	<1%	Less than once per 50 years	The threat may occur in exceptional circumstances or a very good state of knowledge has been established on the threat.	1	

# Table 1b: Rating the Likelihood (L) of an Opportunity (Generally applicable to an active process)

Likelihood	Probability (for long and short term activities)	Description	Rating
Almost Certain	>90%	The opportunity is almost certain to be realised or a very high degree of confidence in delivering the gains has been established for the opportunity	5
Expected	75% - 90%	The opportunity is expected to be realised in most circumstances or a high degree of confidence in delivering the gains has been established for the opportunity	4
Likely	50% - 75%	The opportunity will probably be realised or a moderate degree of confidence in delivering the gains has been established for the opportunity	3
Unlikely	25% - 50%	The opportunity is unlikely to be realised or a low degree of confidence in delivering the gains has been established for the opportunity	2
Very Unlikely	<25%	The opportunity is very unlikely to be realised or a very low degree of confidence in delivering the gains has been established for the opportunity	1



Table 2: Rating the Consequence

	Descriptor	Health & Safety	Image / Reputation	Environment	Stakeholder Interest	Cost	Time	Rating		
	Substantial	Multiple fatalities	International Media Cover	Permanent widespread ecological damage	Commission of Inquiry	+\$10M	Many years	100		
	Major	Several fatalities	Sustained National Media Cover	Heavy ecological damage, costly restoration	Ministerial Inquiry	+ \$1M to \$10M	Years	70		
Threat	Medium	Medium I		Injuries or Short Term		Major but recoverable ecological damage	Ministerial Questions or 3 <sup>rd</sup> party investigation	+ \$100k to \$1M	Months	40
	Minor	Minor Injuries	Local Media Cover	Limited but medium-term negative effects	Official Information Request	+ \$10k to \$100k	Weeks	10		
	Negligible	Slight Injuries			Minor Complaint	+ \$0 to \$10k	Days	1		
	Negligible	Prevention of Slight Injuries	Brief Local Media Cover	Short-term enhancement	Letter of support	- \$0 to \$10k	Days	-1		
2	Minor	Prevention of Minor Injuries	Local Media Cover	Limited but medium-term enhancement	Submission in support for RMA and LTMA	- \$10k to \$100k	Weeks	-10		
Opportunity	Medium	Prevention of Serious Injuries	Regional Media Cover or Short Term National Cover	Medium to long term ecological enhancement	Champions in community	- \$100k to \$1M	Months	-40		
0	Major	Saving of Several fatalities	Sustained National Media Cover	Long Term and important ecological enhancement	Small financial contribution	- \$1M to \$10M	Years	-70		
	Substantial	Saving of Multiple fatalities	International Media Cover	Permanent widespread ecological enhancement	Large financial contribution	-\$10M	Many Years	-100		



Table 3a: Threat Categories, with suggested Treatment Types

MITIGATE WHENEVER POSSIBLE

	CONSEQUENCES (loss)													
Likelihood Likely (5)	Negligible (1)	Minor (10)	Medium (40)	Major (70)	Substantial (100)									
Likely (5)	5 Low threat ACCEPT ACTIVELY - Enhance systems to minimise potential - Accept - Repair	50 Moderate threat ACCEPT ACTIVELY - Enhance systems to minimise potential	200 Very high threat AVOID - Immediate action - Enhance systems to minimise potential	350 Extreme threat AVOID Immediate action - Cease activity	500 Extreme threat AVOID - Immediate action - Cease activity									
Quite Common (4)	4 Low threat ACCEPT ACTIVELY - Enhance systems to minimise potential - Accept - Repair	40 Moderate threat ACCEPT ACTIVELY - Enhance systems to minimise potential - Insure	160 Very High threat AVOID - Immediate action - Enhance systems to minimise potential	280 Very high threat AVOID - Immediate action - Contingency Plans	400 Extreme threat AVOID - Immediate action - Cease activity									
Unlikely (3)	3 Negligible threat ACCEPT PASSIVELY - Repair	30 Moderate threat ACCEPT ACTIVELY - Enhance systems to minimise potential - Insure - Contingency Plans	120 High threat ACCEPT ACTIVELY OR TRANSFER Immedia action Insure Contingency Plans	210 Very high threat AVOID - Immediate action - Avoid - Contingency Plans	300 Very high threat AVOID -Immediate action - Avoid - Contingency Plans									
Unusual (2)	2 Negligible threat ACCEPT PASSIVELY - Repair	20 Low threat ACCEPT ACTIVELY OR TRANSFER Repair	80 High threat ACCEPT ACTIVELY OR TRANSFER - Monitor - Insure - Contingency Plans	140 High threat AVOID OR TRANSFER - Monitor - Insure - Contingency & Disaster Plans	200 Very high threat AVOID OR TRANSFER - Monitor - Insure - Contingency & Disaster Plans									
Rare (1)	Negligible threat ACCEPT PASSIVELY     Repair	10 Low threat ACCEPT ACTIVELY OR TRANSFER - Repair	40 Moderate threat ACCEPT ACTIVELY OR TRANSFER - Monitor - Insure - Contingency Plans	70 High threat AVOID OR TRANSFER - Monitor - Insure - Contingency & Disaster Plans	100 High threat AVOID OR TRANSFER - Monitor - Insure - Contingency & Disaster Plans									

Table 3b: Opportunity Categories, with Suggested Treatment Types

ENHANCE WHEREVER POSSIBLE

		cor	NSEQUENCES	(gain)	
Likelihood	Negligible (-1)	Minor (-10)	Medium (-40))	Major (-70)	Substantial (-100)
Almost Certain (5)	-5 Low Opportunity ACCEPT ACTIVELY - ENHANCE	-50 Moderate Opportunity ACCEPT ACTIVELY - ENHANCE	-200 Very high Opportunity ACCEPT ACTIVELY - ENHANCE	-350 Extreme Opportunity ACCEPT ACTIVELY - ENHANCE	-500 Extreme Opportunity ACCEPT ACTIVELY
Expected (4)	-4 Low Opportunity ACCEPT ACTIVELY – ENHANCE/MAXIM ISE	-40 Moderate Opportunity ACCEPT ACTIVELY ENHANCE/MAXIMI SE	-160 Very High Opportunity ACCEPT ACTIVELY – ENHANCE/MAXIMI SE	-280 Very high Opportunity ACCEPT ACTIVELY – ENHANCE/MAXIM ISE	-400 Extreme Opportunity ACCEPT ACTIVELY - ENHANCE
Likely (3)	-3 Negligible Opportunity ACCEPT PASSIVELY	-30 Moderate Opportunity ACCEPT PASSIVELY	-120 High Opportunity  ACCEPT ACTIVELY – ENHANCE/MAXIMI SE	-210 Very high Opportunity ACCEPT ACTIVELY – ENHANCE/MAXIM ISE	-300 Very high Opportunity ACCEPT ACTIVELY - MAXIMISE
Unlikely (2)	-2 Negligible Opportunity REJECT	-20 Low Opportunity ACCEPT PASSIVELY	-80 High Opportunity ACCEPT PASSIVELY	-140 High Opportunity ACCEPT PASSIVELY	-200 Very high Opportunity ACCEPT ACTIVELY - MAXIMISE
Very Unlikely (1)	-1 Negligible Opportunity REJECT	-10 Low Opportunity REJECT	-40 Moderate Opportunity REJECT	-70 High Opportunity ACCEPT PASSIVELY	-100 High Opportunity ACCEPT ACTIVELY - MAXIMISE



## Appendix D

**Risk Register and Assessment sheets** 

RISK WORKSHOP - 24/25 FEB 2005

RISK WORKSHOP - 24/25 FEB 2005								1		1	1						1		
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Ref. Description	Risk Score	Risk Score		Risk Score	Risk Ris Score Sc		Risk Score		Risk Score	Risk Score	Risk Score	Risk Score	Risk Score		Risk Score	Risk Score	Risk Score	Risk Score	Risk Risk Score Score
	(Rating * Rating)		(Rating * Rating)	(Rating * Rating)	(Rating * Rating) (Rating * Rating)	ating * Rating)	(Rating * Rating)				(Rating * Rating)			(Rating * Rating)	(Rating * Rating)	(Rating * Rating)			(Rating * Rating) (Rating * Ratin
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment, Crashes)	(riaming riaming)	(	(· · · · · · · · · · · · · · · · · · ·		(	9	(	(· · · · · · · · · · · · · · · · · · ·	(	(· · · · · · · · · · · · · · · · · · ·	(	(	(	(· · · · · · · · · · · · · · · · · · ·			(**************************************	(	( taming taming)
1.1 Base Travel Demand 1.2 Growth Forecasts	140	140	140	140		140	210	210	2	20 2	20 14	10	20 140	80	14		0 14	0 14	140
1.2 Growth Forecasts 1.3 Assignment / Mode Choice	40	0 40	300	500 400		400	210 400	280	4	10	2 24	4 12	20 400	0 400	28		0 40	0 40	0 400
1.4 Crashes	140	) 140	140	210	210	210	140		8	0 2	20 1	10 8	80 140	300	20	00 20	0 20	0 20	200
1.5 Other - Oil Shock	30	0 30	300	120	300	300	300	400		3	3 30	00 3	00 300	0 120		1	1	1	1 1
0.0 Cost Piche (Communich Land Franchis Managerica)		1								1	+		_				1	1	<del> </del>
Cost Risks (Commercial, Legal, Economic, Managerial)     Project Scope	35	0 35	350	_500	500	210	280	350	28	30 12	0 3	30	350	120	_ 35	50 35	035	0 35	0 350
2.2 Team Relationships (Performance, Communications etc)	16	0 16	350 0 160	500 160	160	120	160	200	28	14	0 12	20	40 280	0 120	35 16	50 35 50 16	0 35 0 16	0 35 0 16 0 50	0 160
2.3 Funding 2.4 Procurement	50		500	400	500	400	500	500	50	0 50		00 3	00 350	0 400	50	50	0 50	0 50	500
2.4 Procurement 2.5 Legislative/Regulation Issues	80	80	80	80	80	80	140	140	8		0 8	80 8	80 80	80	14 14		0 14	0 14	0 140
2.5 Legislative/Regulation Issues  2.6 Document Control	140	140	140	140	140	70	140	140	35	35	14	14	140	70	14	14	14	14	0
2.7 Market Issues	50	50	500	280	500	500	500	500	12	0 21	0 35	50 2	00 200	350	50		0 50	0 50	0 500
2.8 Programming Issues															20	00 20	0 20	0 12	200
2.9 Insolvency (Contractor) 2.10 Contractual Claim/Dispute																			<del>                                     </del>
2.11 Health and Safety	20	0 20	200	160	200	200	120	120	12	0 2	20 1	10	20 200	0 200	20	00 20	0 20	0 20	5
2.12 Inadequate QC/QA																			
2.13 Post-Construction Liability 2.14 Other																			<u> </u>
2.14 Other																			+
3.0 Cost Risks (Community, Political, Environmental, land and Property)																			1
3.1 Community	35	0 35	350	350	350	210	280	350	16	<mark>60</mark> 3	30 3	30	50 350	210	28	30 28	0 28	0 28	350
3.2 Industrial Action by Others	25	250	250	200	140	240	200	200	35	10	16	20 41	20 50	0 240	21	10 21	0 24	0 24	250
3.3 Ecological Issues 3.4 Impact on Public Health	35		350	280 160	140	120	280	80	35		2 2	20 1	60 40	0 120	12	20 12	0 21	0 21	0 350 0 160
3.5 Heritage Issues (Historic Places Trust)	40			400	120	200	80	140	16		80	30 5	00 40	200	21	10 21	0 21	0 21	280
3.6 Resource Management Act Consents	28	0 28	280	280	280	210	210	210	35	0 21	0 28	3	50 160	0 210	28	30 28	0 28	0 28	<mark>0</mark> 350
3.7 Building Censent 3.8 Land - Designation (combined with 3.6)																			+
3.9 Land - Purchase	35	0 35	350	350	500	350	210	210	_ 35	0 28	30 21	10 14	40 200	0 350	28	30 28	0 28	0 28	<mark>0</mark> 350
3.10 Political	30			300		200	200	200	35 35	14	0 10	00 2	00 300	200	21	10 21	0 21	0 21	210
3.11 Other		+								1	+		1	1		-	1	-	<del>                                     </del>
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural Events)		1	<del>                                     </del>							+	+		+					1	+
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural Events) 4.1 Project Scope Definition (Unscheduled Items)	50 50	0 50 0 50	500 500	500 500	500 500	400 500	400	400	16	12	0 30	00 14	40 200	0 400	28	30 28	0 28	0 28	<mark>0</mark> 350
4.2 Design Standards (Definition)	50	50	500	500	500	500	400	400	28	30 28	35	50 2	00 200	500	28	30 28	0 28	0 28	0 350
4.3 Client Initiated Changes 4.4 New/Change in Technology		+					400	400			+	-		1				1	+
4.5 Topographical Data	50	0 50	500	350	210	400	300	300	16	60 28	50	00	40 50	0 400	28	30 28	0 28	0 28	0 350
4.5 Topographical Data 4.6 Site/Ground Conditions	50		500 500	350	500	120	400		12	0 21	0 50		20 50	0 120	21	10 14	0 14	0 14	
4.7 Design Issues (combined with 4.6) 4.8 Design Changes	50		-500	-050	200	400	280	400	40	20	20	1	000	-400		20	0		200
4.8 Design Changes 4.9 Redesign / Rework (combined with 4.8)	50	50	500	350	280	400			16	28	DU	1	200	400	- 28	8	8	8	280
4.10 Buildability		1								1									†
4.11 Traffic Management	28	0 28	280	160	280	210	80	80	12	0 8	0 8	30 8	80 280	0 210	20	00 20	0 20	0 20	200
4.12 Impact of Value Engineering (Risk/Opportunity Assessment)  4.13 Changes Arising from Safety Audits	4.4	2	140	110	60	440	4.40	- 00		10	10	20	00	0 140		20	2		90
4.13 Changes Arising from Safety Audits 4.14 Issues - Pavement/Surfacing	140	0 140	140	140 120		140 140		210	21		0 12	10 2	10 (	0 140	გ	10 21	0 21	0 21	0 120
4.15 Issues - Structures	40	0 40	400	400	400	300	400		40	00 40			00 20	0 210	30		0 30	0 30	280
4.16 Traffic Control and Lighting	80	) 80	80	80 120	80	80	80	80	8		0 8	30 8	80 (	0 80	2	20 2	0 2	0 2	
4.17 Services 4.18 Natural Events	21	21	210	120	120	210	80	80	21	0 7	0 7	70	70 (	210	21	80 8	0 8	0 8	120
7. TO INCIDENT L. YORKS	210	21	210	140	210	140	300	300	121	12	12	.0 2	30	140	- 2	21	21	21	210

KEY
Less than 70 (Negligible - Moderate)
70-159 (High)
160-349 (Very high)

RISK CATEGORY INDICATOR																				
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment, Crashes)	275	275	275	312	284	284	26	323	43	13	175	176	275	269	244	244	244	230	230	230
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)	319	319	319	284	347	273	30	7 320	284	256	190	153	248	228	310	310	310	304	302	302
3.0 Cost Risks (Community, Political, Environmental, land and Property)	319	319	321	311	281	223	20	6 225	278	162	154	291	201	223	234	234	234	234	302	302
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural Events)	370	370	370	307	316	287	30	305	187	214	283	154	131	280	222	203	203	203	235	235
Sum All	323	323	323	304	308	268	275	296	221	185	207	202	221	251	255	251	251	245	269	269
Rank	2	2	1	5	4	10	7	7 6	16	20	18	19	17	12	11	13	13	15	8	8

	Greater Wellington Regional Council / Transit New Zealand			We	stern Corridor Transpo	ortation Study						Page 1 of 2
	Eve				Likelihood			Consec	quence		Risk	_
Ref.	Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Category
	Benefit Risks (Base Travel Demand, Growth Forecasts, Assignn		Opportunity	(Table Ta Of Tb)	Probability	Ratilig	Consequences	(Table 2)	Ratilig	(Kating Kating)	Ranking	Category
1.1	Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	25	High
							don't have sufficient travel capacity so need new transport					
	Growth Forecasts Assignment / Mode Choice	growth forecasts are inadequatly low under estimation of mode share off road	T T	Quite Common Quite Common	20% - 50% 20% - 50%	4	facility	Substantial	100 70	400 280	3 6	Extreme
	Crashes	under estimation of mode share on road	T	Unusual	20% - 50% 1% - 10%	2	don't have sufficient travel capacity so need new transport	Major Substantial	100	200	20	Very High Very High
	Other - Oil Shock		Ť	Rare	<1%	1		Negligible	1	1	32	Negligible
	Cost Risks (Commercial, Legal, Economic, Managerial) Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
	Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	24	Very High
2.3	Funding	funding is unavailable	T	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
2.4	Procurement	limited amount of rail design and construction expertise in NZ.  Resources may not be readily available	т.	Unusual	1% - 10%	2	time delay to contract	Major	70	140	25	High
	Legislative/Regulation Issues	unforseen legislation (new)	Ť	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	25	High
	Document Control	gaaaan (van)				_						9
2.7	Market Issues	higher construction costs through market forces	T	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
		Programming of construction work around existing rail services.  Will be pratically impossible to replace all rail services with										
2.8	Programming Issues	buses during construction phase.	Т	Likely	>50%	5		Medium	40	200	20	Very High
2.9	Insolvency (Contractor)											,
2.10	Contractual Claim/Dispute											
2 11	Health and Safety	increased risk due to proximity of live traffic lanes (to workers and public)	т	Likely	>50%	5	injury occurs	Medium	40	200	20	Very High
	Inadequate QC/QA	and public)	'	Likely	230 /6	3	injury occurs	Wediam	40	200	20	very riigir
2.13	Post-Construction Liability											
2.14	Other											
3.0	Cost Risks (Community, Political, Environmental, land and Prop	perty)										ļ
3.1	Community	increased costs and time	T	Quite Common	20% - 50%	4	legal action and political protest	Major	70	280	6	Very High
	Industrial Action by Others											
	Ecological Issues Impact on Public Health	increased costs with mitigating environ impacts construction activity greater than anticipated	T	Unlikely Unlikely	10% - 20% 10% - 20%	3		Major Medium	70 40	210 120	14 28	Very High High
3.4	Impact on Fubilic Health	onerous conditions imposed. Additional costs to obtain HPT		Offlikely	10% - 20%	3		iviedium	40	120	20	riigii
3.5	Heritage Issues (Historic Places Trust)	approval	Т	Unlikely	10% - 20%	3	change loaction of road	Major	70	210	14	Very High
2.0	Barrer Manager Act Consents		т	Ouite Commen	000/ 500/	4	Aires and seek acceptance from	Maion	70	200	•	\/\
	Resource Management Act Consents  Building Consent	substantial delays in obtaining consents & associated costs		Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	6	Very High
0	Suitaing Contoons											
3.8	Land - Designation (combined with 3.6)											
2.0	Land - Purchase	land purchases delayed	-	Quite Common	20% - 50%	4	delays to programme and increased costs for land purchase	Major	70	280	6	Very High
	Political	loss of political support (no unity)	T	Unlikely	10% - 20%	3	delays to project & revision of objectives	Major	70	210	14	Very High
	Other	, , , , , ,						,				, 0
4.0	Cost Risks (Site Conditions, Engineering, Services, Natural Eve	200										
4.0	Cost Risks (Site Conditions, Engineering, Services, Natural Eve	nis)										
	Project Scope Definition (Unscheduled Items)	substantial scope changes	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
	Design Standards (Definition)	changes to current design standards	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
	Client Initiated Changes New/Change in Technology											
4.5	Topographical Data	lack of topographical data	T	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
	Site/Ground Conditions	Unstable rock in hilolside above construction site	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	14	Very High
	Design Issues (combined with 4.6) Design Changes	No unique rick	T	Quite Common	20% - 50%	4		Major	70	280	6	Very High
4.8	Redesign / Rework (combined with 4.8)	No unique risk No unique risk		Quite Common	20% - 30%	4		iviajor	70	200	0	very High
	Buildability	No unique risk										
		Replacing some existing rail services with buses during										
		construction phase. Limited availability of buses. Road congestion delaying bus leg of journey and adversley affecting										1
4.11	Traffic Management - bus replacements	congestion delaying bus leg or journey and adversiey affecting connections with rail sevices.	т	Likely	>50%	5		Medium	40	200	20	Very High
4.12	Impact of Value Engineering (Risk/Opportunity Assessment)	No unique risk										
	Changes Arising from Safety Audits	safety audit affects scope more than allowed for	T	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	29	High
	Issues - <del>Pavement/Surfacing</del> Ballast/Rails Issues - Structures		T	Unlikely Unlikely	10% - 20% 10% - 20%	3		Major Substantial	70 100	210 300	14 5	Very High Very High
	Traffic Control and Lighting		T	Unusual	1% - 10%	2		Minor	100	20	31	Low
	Services		Ť	Unusual	1% - 10%	2		Medium	40	80	29	High
1.40	Notived Events	No unique riek	-	I la lita i	100/ 000/	2		Marian	70	040	4.4	V
	Natural Events Other	No unique risk No unique risk		Unlikely	10% - 20%	3		Major	70	210	14	Very High
7.13		no anguo non										1
		•								- -		
	Date of Risk Review:	24/02/2005	· · · · · · · · · · · · · · · · · · ·	Likely	>50%	5	1	Substantial	100	1		Extreme

	Likely	>50%	5
at	Quite Common	20% - 50%	4
hreat	Unlikely	10% - 20%	3
F	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
_	Expected	75% - 90%	4
ortı	Likely	50% - 75%	3
å	U balticate.	050/ 500/	2
g.	Unlikely	25% - 50%	

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Medigible | 1 | Medium | 40 | Minor | 10 | Medigible | 1 | Minor | -10 | Medium | -40 | Major | -70 | Substantial | -100 | Major | -100 | Medium | -40 | Major | -70 | -70 | Major | -70 | -70 | Major | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -70 | -

	Greater Wellington Regional Council / Transit New Zealand			VVC	stern Corridor Transpo	ortation Study						Page 1 of 2
	Ever				Likelihood				quence		Risk	
D. C	Para tartan	What? How?	Threat /	Descriptor	Book of the	Button	0	Descriptor	Button	Score	Bestiese	0.1
Ref.	Description  Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment Control of the Cont	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Category
	Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	24	High
							don't have sufficient travel capacity so need new transport	- 7				
1.2	Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	3	Extreme
	Assignment / Mode Choice	under estimation of mode share off road	T	Unlikely	10% - 20%	3	don't have sufficient travel capacity so need new transport	Major	70	210	15	Very High
	Crashes		Т	Unusual	1% - 10%	2		Substantial	100	200	18	Very High
1.5	Other - Oil Shock		Т	Rare	<1%	1		Negligible	1	1	32	Negligible
2.0	Cost Risks (Commercial, Legal, Economic, Managerial)											
2.1	Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
	Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	22	Very High
2.3	Funding	funding is unavailable	T	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
24	Procurement	limited amount of rail design and construction expertise in NZ.  Resources may not be readily available	т	Unusual	1% - 10%	2	time delay to contract	Major	70	140	24	High
	Legislative/Regulation Issues	unforseen legislation (new)	T T	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	24	High
	Document Control											
2.7	Market Issues	higher construction costs through market forces	T	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
		Programming of construction work around existing rail services.  Will be pratically impossible to replace all rail services with										
2.8	Programming Issues	buses during construction phase.	Т	Likely	>50%	5		Medium	40	200	18	Very High
2.9	Insolvency (Contractor)											
2.10	Contractual Claim/Dispute											
211	Health and Safety	increased risk due to proximity of live traffic lanes (to workers and public)	т	Likely	>50%	5	injury occurs	Medium	40	200	18	Very High
	Inadequate QC/QA	und public)	'	Lintely	250 /6	3	injury coours	Wicdium	<del>1</del> 0	200	10	vory riigii
2.13	Post-Construction Liability											
2.14	<del>Other</del>											
2.0	Cost Risks (Community, Political, Environmental, land and Prop	out o										
	Community  Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	4	Extreme
3.2	Industrial Action by Others	mis-casea socie ana imie		Linoty	7 00 70		logal dollar and political protect	major		000	·	ZALOMO
3.3	Ecological Issues	increased costs with mitigating environ impacts	T	Likely	>50%	5		Major	70	350	4	Extreme
3.4	Impact on Public Health	construction activity greater than anticipated	T	Quite Common	20% - 50%	4		Medium	40	160	22	Very High
3.5	Heritage Issues (Historic Places Trust)	onerous conditions imposed. Additional costs to obtain HPT approval	т	Quite Common	20% - 50%	4	change loaction of road	Major	70	280	12	Very High
0.0	Tromago rocado (riistorio Filados Frast)	арргочаг		Quite Common	2070 0070	,	Sharige loadion of road	Wajoi	70	200	12	vory riigir
	Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Likely	>50%	5	time and cost over base case 5yrs	Major	70	350	4	Extreme
3.7	Building Consent											
3.8	Land - Designation (combined with 3.6)											
3.0	Land Designation (combined with 5.0)											
3.9	Land - Purchase	land purchases delayed	T	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	4	Extreme
	Political	loss of political support (no unity)	Т	Unlikely	10% - 20%	3	delays to project & revision of objectives	Major	70	210	15	Very High
3.11	Other											
4.0	Cost Risks (Site Conditions, Engineering, Services, Natural Ever	nts)										
	3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3											
	Project Scope Definition (Unscheduled Items)	substantial scope changes	T	Likely	>50%	5	delays to project and increased costs	Major	70	350	4	Extreme
	Design Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs	Major	70	350	4	Extreme
	Client Initiated Changes New/Change in Technology											
4.5	Topographical Data	lack of topographical data	Т	Likely	>50%	5	delays to project and increased costs	Major	70	350	4	Extreme
4.6	Site/Ground Conditions	Risk lower than RT1	T	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	24	High
	Design Issues (combined with 4.6)	No unique risk	-	Owite C	000/ 500/			Marin	70	000	40	\/a== 115.1
4.8	Design Changes Redesign / Rework (combined with 4.8)	No unique risk No unique risk		Quite Common	20% - 50%	4		Major	70	280	12	Very High
	Buildability	No unique risk										
		·										
		Replacing some existing rail services with buses during										
		construction phase. Limited availability of buses. Road conestion delaying bus leg of journey and adversley affecting connections										
		with rail services. Temporary speed restrictions will apply to rail										
	Traffic Management - bus replacements, TSRs	services passing the station site during construction phase.	Т	Likely	>50%	5		Medium	40	200	18	Very High
	Impact of Value Engineering (Risk/Opportunity Assessment)	No unique risk	_		10/			.,				10.
	Changes Arising from Safety Audits Issues - Pavement/Surfacing	safety audit affects scope more than allowed for	T T	Unusual Unlikely	1% - 10% 10% - 20%	2	delays to project and increased costs	Medium Medium	40 40	80 120	30 28	High High
	Issues - Pavement/Surracing Issues - Structures		T T	Quite Common	10% - 20% 20% - 50%	4		Major	70	120 280	28 12	Very High
4.16	Traffic Control and Lighting		Ť	Unusual	1% - 10%	2		Minor	10	20	31	Low
	Services		T	Unlikely	10% - 20%	3		Medium	40	120	28	High
4 10	Natural Events	No unique risk	т	Unlikely	10% - 20%	3		Major	70	210	15	Veny High
	Other	No unique risk		Unilkely	10% - 20%	3		Major	70	210	15	Very High
L										<u> </u>		
									_			_

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
t¢	Almost Certain	>90%	5
Ë	Expected	75% - 90%	4
Opportunity	Likely	50% - 75%	3
8	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

	Substantial	100
at	Major	70
Threat	Medium	40
Ė	Minor	10
	Negligible	1
ty	Negligible	-1
Opportunity	Minor	-10
ort	Medium	-40
<u>d</u>	Major	-70
0	Substantial	-100

Greater Wellington Regional Council / Transit New Zealand			vves	stern Corridor Transpo	ortation Study						Page 1 of 2
	Event What Have	Thursd /	Descriptor	Likelihood	I			quence	Coore	Risk	
Ref. Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Category
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Ass		орренинку	(Table Ta el Tb)	Trobubling	rtating	Contact derived	(Table 2)	rtuting	(realing realing)	rtunting	Guiogory
1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	22	High
						don't have sufficient travel capacity so need new transport					
1.2 Growth Forecasts	Impact higher than HC4 if growth forecasts are under estimated	Т	Quite Common	20% - 50%	4	facility. Higher than HC4	Substantial	100	400	3	Extreme
1.3 Assignment / Mode Choice	under estimation of mode share off road. Threat less than RT1	т	Unlikely	10% - 20%	3	don't have sufficient travel capacity so need new transport facility.	Major	70	210	12	Very High
1.4 Crashes	under estimation of mode share on road. Threat less than it i	Ť	Unusual	1% - 10%	2	racinty.	Substantial	100	200	18	Very High
1.5 Other - Oil Shock		Т	Rare	<1%	1		Negligible	1	1	32	Negligible
2.0 Cost Risks (Commercial, Legal, Economic, Managerial) 2.1 Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	21	Very High
2.3 Funding	funding is unavailable	Т	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
0.45	limited amount of rail design and construction expertise in NZ.	-	11	40/ 400/	•	en tit in an and		70	4.40	00	10.1
2.4 Procurement 2.5 Legislative/Regulation Issues	Resources may not be readily available unforseen legislation (new)	T T	Unusual Unusual	1% - 10% 1% - 10%	2 2	time delay to contract project delayed or scope affected	Major Major	70 70	140 140	22 22	High High
2.6 Document Control	uniorseem legislation (new)	'	Ollusual	170 - 1070	2	project delayed or scope affected	iviajoi	70	140	22	riigii
2.7 Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
	Programming of construction work around existing rail services.  No electric units currently operate north of Paraparaumu, therefore it will be easier to programme work around existing										
2.8 Programming Issues	freight and long distance rail services during construction phase.	Т	Unlikely	10% - 20%	3		Medium	40	120	26	High
2.9 Insolvency (Contractor)			, i								
2.10 Contractual Claim/Dispute											
2.11 Health and Safety	increased risk due to proximity of live traffic lanes (to workers and public)	т	Likely	>50%	5	injury occurs	Medium	40	200	18	Very High
2.11 Health and Salety 2.12 Inadequate QC/QA	ana public)	1	LIKEIY	>00%	5	injury occurs	iviedium	40	200	10	very migri
2.13 Post-Construction Liability											
2.14 Other											
0.0 0 × 1.5 × 1.0											
3.0 Cost Risks (Community, Political, Environmental, land and 3.1 Community	increased costs and time	Т	Quite Common	20% - 50%	4	legal action and political protest	Major	70	280	6	Very High
3.2 Industrial Action by Others	inordaded decid directions	•	Quito Common	2070 0070	-	logar dollori and political proteot	iviajoi	7.0	200		very riigir
3.3 Ecological Issues	increased costs with mitigating environ impacts	Т	Unlikely	10% - 20%	3		Major	70	210	12	Very High
3.4 Impact on Public Health	construction activity greater than anticipated	Т	Unlikely	10% - 20%	3		Medium	40	120	26	High
3.5 Heritage Issues (Historic Places Trust)	onerous conditions imposed. Additional costs to obtain HPT approval	т	Unlikely	10% - 20%	3	change loaction of road	Major	70	210	12	Very High
3.3 Heritage Issues (Historic Flaces Trust)	арргоча	'	Offlikely	10% - 20%	3	change loaction of road	iviajoi	70	210	12	very migh
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	6	Very High
3.7 Building Consent											
2 9 Land Decignation (combined with 2.6)											
3.8 Land - Designation (combined with 3.6)											
3.9 Land - Purchase	land purchases delayed	Т	Quite Common	20% - 50%	4	delays to programme and increased costs for land purchase	Major	70	280	6	Very High
3.10 Political	loss of political support (no unity)	Т	Unlikely	10% - 20%	3	delays to project & revision of objectives	Major	70	210	12	Very High
3.11 Other											
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural	Events)										
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural	Events)										
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
4.2 Design Standards (Definition)	changes to current design standards	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
4.3 Client Initiated Changes 4.4 New/Change in Technology											
4.5 Topographical Data	lack of topographical data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
4.6 Site/Ground Conditions	Risk lower than RT1	Ť	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	22	High
4.7 Design Issues (combined with 4.6)							.,.				
4.8 Design Changes	No unique risk	Т	Unusual	1% - 10%	2		Medium	40	80	28	High
4.9 Redesign / Rework (combined with 4.8) 4.10 Buildability	No unique risk										
4.11 Traffic Management - bus replacements. TSRs	No unique risk  Replacing some existing rail services with buses during construction phase. Limited availability of buses. Road conestion delaying bus leg of journey and adversley affecting connections with rail services. Temporary speed restrictions will apply to rail services passing the station site during construction phase.	т	Likely	>50%	5		Medium	40	200	18	Vory High
4.11 Irramo Management - bus replacements, 15Rs 4.12 Impact of Value Engineering (Risk/Opportunity Assessment)	No unique risk	1	LIKEIY	>0070	5		iviedium	40	200	10	Very High
4.13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	28	High
4.14 Issues - Pavement/Surfacing Ballast/Rails		T	Unlikely	10% - 20%	3		Major	70	210	12	Very High
4.15 Issues - Structures		T	Unlikely	10% - 20%	3		Substantial	100	300	5	Very High
4.16 Traffic Control and Lighting 4.17 Services		T T	Unusual Unusual	1% - 10% 1% - 10%	2 2		Minor Medium	10 40	20 80	31 28	Low High
T. IT OCIVICES		'	Unusual	1/0 - 1070	2		ivieuiuIII	40	60	20	Flight
4.18 Natural Events	No unique risk	Т	Unlikely	10% - 20%	3		Major	70	210	12	Very High
4.19 Other	No unique risk										
							l	1			
	view: 24/02/2005		Likely	<b>&gt;50%</b>	5		Substantial		=		Evtreme

	Likely	>50%	5
#	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
È	Unusual	1% - 10%	2
	Rare	<1%	1
t\$	Almost Certain	>90%	5
Opportunity	Expected	75% - 90%	4
or i	Likely	50% - 75%	3
d d	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

	Substantial	100
at	Major	70
Threat	Medium	40
Ė	Minor	10
	Negligible	1
₹	Negligible	-1
l ii	Minor	-10
ort	Medium	-40
Opportunity	Major	-70
0	Substantial	-100

	Greater Wellington Regional Council / Transit New Zealand			We	estern Corridor Transpo	ortation Study						Page 1 of 2
	Evel	nt			Likelihood			Conse	quence		Risk	
		What? How?	Threat /	Descriptor			_	Descriptor		Score		
Ref.	Description  Description  Description  Description	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Category
	Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	23	High
							don't have sufficient travel capacity so need new transport	,				, and the second
	2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	3	Extreme
	Assignment / Mode Choice	under estimation of mode share off road	T	Quite Common	20% - 50%	4	don't have sufficient travel capacity so need new transport	Major	70	280	6	Very High
	Crashes Other - Oil Shock		T	Unusual Rare	1% - 10% <1%	2		Substantial	100	200	18 32	Very High
'-	Other - Oil Shock		'	Naie	<170	'		Negligible	'	'	32	Negligible
	Cost Risks (Commercial, Legal, Economic, Managerial)											
	Project Scope	need to do more work on local roads than anticipated	T	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
	P Team Relationships (Performance, Communications etc) Funding	break down in stakeholder relationships (within team) funding is unavailable	T	Quite Common Likely	20% - 50% >50%	5	reputation / image project doesn't proceed	Medium Substantial	40 100	160 500	22 1	Very High Extreme
۷.	T unding	limited amount of rail design and construction expertise in NZ.		Likely	25076	3	project doesn't proceed	Substantial	100	300	'	LXIIGIIIG
	Procurement	Resources may not be readily available	Т	Unusual	1% - 10%	2	time delay to contract	Major	70	140	23	High
	Legislative/Regulation Issues	unforseen legislation (new)	Т	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	23	High
	Document Control  Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
۷.	ividiket issues	Programming of construction work around existing rail services.		Likely	>50%	5	cost changes significantly	Substantial	100	300	<u>'</u>	Extreme
		Will be pratically impossible to replace all rail services with										
	Programming Issues	buses during construction phase.	Т	Likely	>50%	5		Medium	40	200	18	Very High
	Insolvency (Contractor) Contractual Claim/Dispute											
<del>∠. I</del>	Contractual Claim/Dispute	increased risk due to proximity of live traffic lanes (to workers										
	Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	18	Very High
	Inadequate QC/QA											
	Post-Construction Liability											
<del>2.1</del>	4 Other											
3.	Cost Risks (Community, Political, Environmental, land and Prop	perty)			<u> </u>							J.
	Community	increased costs and time	Т	Quite Common	20% - 50%	4	legal action and political protest	Major	70	280	6	Very High
	Industrial Action by Others		<b>-</b>	11.21.1	100/ 000/	•		Maria	70	040	10	V I P. I
3.	B Ecological Issues I Impact on Public Health	increased costs with mitigating environ impacts construction activity greater than anticipated	T	Unlikely Unlikely	10% - 20% 10% - 20%	3		Major Medium	70 40	210 120	13 27	Very High High
0.	impact of the ability reduction	onerous conditions imposed. Additional costs to obtain HPT		Orimitory	1070 2070	0		Wicalam	40	120	2,	i ligii
3.	Heritage Issues (Historic Places Trust)	approval	Т	Unlikely	10% - 20%	3	change loaction of road	Major	70	210	13	Very High
2	Danis Maria		т	Ouita Camana	200/ 500/		i	Maiaa	70	200	•	\/\
	Resource Management Act Consents  Building Consent	substantial delays in obtaining consents & associated costs		Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	6	Very High
0.	Durang Concern											
3.	Land - Designation (combined with 3.6)											
		Land and the state of	_	0 11 0								.,
	D Land - Purchase  Political	land purchases delayed loss of political support (no unity)	T	Quite Common Unlikely	20% - 50% 10% - 20%	3	delays to programme and increased costs for land purchase delays to project & revision of objectives	Major Major	70 70	280 210	6 13	Very High Very High
3.1	Other	loss of political support (no drinty)	•	Orlincity	1070 - 2070	3	delays to project a revision of objectives	iviajoi	70	210	10	very riigii
4.	Cost Risks (Site Conditions, Engineering, Services, Natural Eve	nts)		_	1	1			I			<u> </u>
1	Project Scope Definition (Unscheduled Items)	substantial scope changes	т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
	2 Design Standards (Definition)	changes to current design standards	T	Quite Common	20% - 50%	4	delays to project and increased costs  delays to project and increased costs	Major	70	280	6	Very High
4.	Client Initiated Changes							,				, ,
4.	New/Change in Technology	last of the countries I date	<u>.</u>	Ouite Commit	200/ 500/		delegate and inserted to the	Medica	70	000		Van 1811
	Topographical Data Site/Ground Conditions	lack of topographical data Risk lower than RT1	T	Quite Common Unusual	20% - 50% 1% - 10%	4	delays to project and increased costs delays to project and increased costs	Major Major	70 70	280 140	6 23	Very High High
	Design Issues (combined with 4.6)	Trior lower than IVI I		Offusual	170 - 1070		dolays to project and increased costs	iviajur	10	140	20	riigii
4.	Design Changes	No unique risk	Т	Unusual	1% - 10%	2		Medium	40	80	28	High
	Redesign / Rework (combined with 4.8)	No unique risk										
4.1	Buildability	No unique risk Replacing some existing rail services with buses during										
		construction phase. Limited availability of buses. Road										
1		congestion delaying bus leg of journey and adversley affecting										
	Traffic Management - bus replacements	connections with rail sevices.	Т	Likely	>50%	5		Medium	40	200	18	Very High
	Impact of Value Engineering (Risk/Opportunity Assessment) Changes Arising from Safety Audits	No unique risk safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	28	High
	I Issues - <del>Pavement/Surfacing</del> Ballast/Rails	sarcty addit affects scope more than allowed for	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	13	Very High
4.1	Issues - Structures		Ť	Unlikely	10% - 20%	3		Substantial	100	300	5	Very High
4.1	Traffic Control and Lighting		T	Unusual	1% - 10%	2		Minor	10	20	31	Low
4.1	7 Services		Т	Unusual	1% - 10%	2		Medium	40	80	28	High
41	Natural Events	No unique risk	т	Unlikely	10% - 20%	3		Major	70	210	13	Very High
4.1	Other	No unique risk		O. lintoly	10,0 20,0			ajoi				, r ngn
<u> </u>					]							]
	Date of Risk Review:	24/02/2005		Likely	>50%	5		Substantial	100			Extreme
	Date of RISK Review:	. 64(14(41))		ILINGIV	1/JU/0	. 5	1	L DUDSIANNAI	100	1		LYLLELLE

_				
ſ		Likely	>50%	5
	at	Quite Common	20% - 50%	4
	Threat	Unlikely	10% - 20%	3
	Ė	Unusual	1% - 10%	2
		Rare	<1%	1
Γ	nity	Almost Certain	>90%	5
	-	Expected	75% - 90%	4
	pporti	Likely	50% - 75%	3
	<del>d</del>	Unlikely	25% - 50%	2
	0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Megligible | 1 | Minor | -10 | Medium | -40 | Major | -70 | Substantial | -100 | Medium | -100 |

	Greater Wellington Regional Council / Transit New Zealand			We	stern Corridor Transpo	ortation Study						Page 1 of 2
	Eve				Likelihood			Consec	quence		Risk	
Ref.	Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Category
	Benefit Risks (Base Travel Demand, Growth Forecasts, Assignn		Оррогини	(Table Ta of Tb)	Trobability	Rating	Odiscquences	(Table 2)	Rating	(Rating Rating)	Ranking	Category
1.1	Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	23	High
			_				don't have sufficient travel capacity so need new transport					
	Growth Forecasts Assignment / Mode Choice	growth forecasts are inadequatly low under estimation of mode share off road	T T	Quite Common Quite Common	20% - 50% 20% - 50%	4	facility	Substantial	100 70	400 280	3 6	Extreme
	Crashes	under estimation of mode share on road	T	Unusual	20% - 50% 1% - 10%	2	don't have sufficient travel capacity so need new transport	Major Substantial	100	200	18	Very High Very High
	Other - Oil Shock		Ť	Rare	<1%	1		Negligible	1	1	32	Negligible
	Cost Risks (Commercial, Legal, Economic, Managerial) Project Scope	need to do more work on local roads than anticipated	_	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
	Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	22	Very High
2.3	Funding	funding is unavailable	Т	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
0.4	Dan sure and	limited amount of rail design and construction expertise in NZ.	-	Harranal	40/ 400/	0	Aire a deless to a contract	Maian	70	440	00	1.0.4
	Procurement Legislative/Regulation Issues	Resources may not be readily available unforseen legislation (new)	· ·	Unusual Unusual	1% - 10% 1% - 10%	2	time delay to contract project delayed or scope affected	Major Major	70 70	140 140	23 23	High High
	Document Control	uniorocon logiciation (now)		Ondoddi	170 1070	_	project delayed or ecope anotice	Major	70	140	20	1 light
2.7	Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
		Programming of construction work around existing rail services.										
2.8	Programming Issues	Will be pratically impossible to replace all rail services with buses during construction phase.	т	Likely	>50%	5		Medium	40	200	18	Very High
2.9	Insolvency (Contractor)	basse daming contentation phase.		Zinoiy	7 00 70	J		modium		200	.0	, 10.7 mg.
2.10	Contractual Claim/Dispute											
2 11	Health and Safety	increased risk due to proximity of live traffic lanes (to workers	т	Likely	>50%	5	inium, occurs	Medium	40	200	18	Very High
	Inadequate QC/QA	and public)	-	Likely	>50%	5	injury occurs	iviedium	40	200	10	very nign
2.13	Post-Construction Liability											
2.14	Other											
2.0	Cost Risks (Community, Political, Environmental, land and Prop	ontiv)										
3.1	Community	increased costs and time	Т	Quite Common	20% - 50%	4	legal action and political protest	Major	70	280	6	Very High
3.2	Industrial Action by Others											
	Ecological Issues	increased costs with mitigating environ impacts	Ţ	Unlikely	10% - 20%	3		Major	70	210	13	Very High
3.4	Impact on Public Health	construction activity greater than anticipated onerous conditions imposed. Additional costs to obtain HPT		Unlikely	10% - 20%	3		Medium	40	120	27	High
3.5	Heritage Issues (Historic Places Trust)	approval	Т	Unlikely	10% - 20%	3	change loaction of road	Major	70	210	13	Very High
								,				
	Resource Management Act Consents Building Consent	substantial delays in obtaining consents & associated costs	Т	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	6	Very High
3.7	Building Consent											
3.8	Land - Designation (combined with 3.6)											
	Land - Purchase Political	land purchases delayed	T	Quite Common	20% - 50%	3	delays to programme and increased costs for land purchase	Major Major	70 70	280 210	6 13	Very High
	Other	loss of political support (no unity)		Unlikely	10% - 20%	3	delays to project & revision of objectives	iviajoi	70	210	13	Very High
4.0	Cost Risks (Site Conditions, Engineering, Services, Natural Eve	nts)		1					1			
4.1	Project Scope Definition (Unscheduled Items)	substantial scope changes	-	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
	Design Standards (Definition)	changes to current design standards	T	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	6	Very High
4.3	Client Initiated Changes							,				, ,
	New/Change in Technology	last of the countries I date	-	Ouite Commit	000/ 500/	4	delays to see to add to see a local	Marin	70	000		Va. IP.I
	Topographical Data Site/Ground Conditions	lack of topographical data Risk lower than RT1	T	Quite Common Unusual	20% - 50% 1% - 10%	4	delays to project and increased costs delays to project and increased costs	Major Major	70 70	280 140	6 23	Very High High
	Design Issues (combined with 4.6)	THORITON GIVEN THE		Onusual	170 1070		dolayo to project and moreascu costs	iviajoi	70	140	20	riigii
4.8	Design Changes	No unique risk	T	Unusual	1% - 10%	2		Medium	40	80	28	High
	Redesign / Rework (combined with 4.8) Buildability	No unique risk										
4.10	Buildability	No unique risk Replacing some existing rail services with buses during										4
		construction phase. Limited availability of buses. Road										
		congestion delaying bus leg of journey and adversley affecting	_									
4.11	Traffic Management - bus replacements Impact of Value Engineering (Risk/Opportunity Assessment)	connections with rail sevices.	Т	Likely	>50%	5		Medium	40	200	18	Very High
	Impact of Value Engineering (Risk/Opportunity Assessment) Changes Arising from Safety Audits	No unique risk safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	28	High
	Issues - <del>Pavement/Surfacing</del> Ballast/Rails	2 2.2ait aireste esepe inere triair airenea foi	T	Unlikely	10% - 20%	3	23.2,2 to project and more accordance	Major	70	210	13	Very High
	Issues - Structures		T	Unlikely	10% - 20%	3		Substantial	100	300	5	Very High
	Traffic Control and Lighting		T T	Unusual	1% - 10%	2		Minor	10	20	31	Low
4.1/	Services		I	Unusual	1% - 10%	2		Medium	40	80	28	High
	Natural Events	No unique risk	Т	Unlikely	10% - 20%	3		Major	70	210	13	Very High
	Other	No unique risk										
								]				
	Date of Risk Review:	24/02/2005		Likely	>50%	5		Substantial	100	╗		Extreme

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threa	Unlikely	10% - 20%	3
F	Unusual	1% - 10%	2
	Rare	<1%	1
ty	Almost Certain	>90%	5
unity		>90% 75% - 90%	5 4
ortui			5 4 3
pportunity	Expected Likely	75% - 90%	4

	Substantial	100
at	Major	70
Threat	Medium	40
F	Minor	10
	Negligible	1
ty.	Negligible	-1
E	Minor	-10
or	Medium	-40
Opportunity	Major	-70
0	Substantial	-100

Second   Company   Compa	Greater Wellington Regional Council / Transit New Zealand	-	,	vve	stern Corridor Transpo	itation Study		Company		_	Page 1 of 1	
March   Marc		Event What? How?	Threat /	Descriptor	Likelihood		<del>_</del>		equence	Score	Risk	T
Marie Mari	f. Description				Probability	Rating	Consequences		Rating		Ranking	Catego
Continue		ssignment, Crashes)						, ,				
Self-free Conference of the Co	1 Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	26	High
The part of the County   Cou							don't have sufficient travel capacity so need new transport					
Application	2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4		Substantial	100	400	8	Extrem
Company   Comp			_		4004 0004							.,
The Coll Control of Springer Management (Control Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springer Management (Control of Springer)  The Coll Control of Springe			I									Very H
The Control of Control			<u> </u>									High Very H
Section	Other - On Orlock	on prices skyrocket	'	Ornikery	1070 - 2070	3	major mode state	Odbotantiai	100	300	13	Very
in The Indicate Age Contenting Contenting and Contenting Contentin	Cost Risks (Commercial, Legal, Economic, Managerial)											
Company   Section of the Company   Section o	Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70		11	Extre
Section 1.	Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common			reputation / image				24	Very F
Spitcher Programme Research Control of Programme And Spitcher Progra	Funding		Т								1	Extre
Comment   Comm	Procurement		T _									High
T LLay 50% 5 ox care gas applications 5 ox care		unforseen legislation (new)	T	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	26	Hig
Part		higher construction costs through market forces	_	Likely	- F00/	F	anat ahangan aignificantly	Cubatantial	100	500	4	Extre
An experience	Programming legues	nigher construction costs through market forces	'	Likely	>50%	5	cost changes significantly	Substantial	100	500	I .	Extre
T Libery 150% 6 April control processing of the fall for broth fall for the fall fo	Insolvency (Contractor)											
Commonstrate   Comm	Contractual Claim/Dispute											
An experiment   An experimen		increased risk due to proximity of live traffic lanes (to workers										
## DEAD COMMINION, POLICEAL Engineering Services, Name of Experience (Comminion), Policeal En	Health and Safety	, ,	Т	Likely	>50%	5	injury occurs	Medium	40	200	23	Very H
State (Community, Pollincial, Environmental, turk and Property)  **Community Pollincial, Environmental, Env	Inadequate QC/QA											
In the Community, Reider al, Consequence A, Land and Revocation  Accordance Consequence A, Land and Co	Post-Construction Liability											
International Contents and Times   Total Library   Sept.   Sept.   Eagle actions and protected protected   Major   70   300   11   Eagle action Action (Sept. International Contents	Other											
International Contents and Times   Total Library   Sept.   Sept.   Eagle actions and protected protected   Major   70   300   11   Eagle action Action (Sept. International Contents												
Justical Activity Disease of Police Services (Controlled Services				Libratio	F00/	_	land astica and adition are too	Maion	70	250	44	Futur
Compact space   Increased coases with minigrating antiform process of Maler (Parker Flation   Compact space of Maler	Industrial Action by Others	increased costs and time		Likely	>50%	5	legal action and political protest	Major	70	350	11	Extre
particular flation (Prices Treat) contraction activity greater thin strictiqued as the Affinian (Prices Treat) approach (Additional crisis to solution (ADT) approach (A		increased costs with mitigating environ impacts	т т	Likoly	<b>&gt;50%</b>	5		Major	70	350	11	Extre
orienzus continones (protection of Picose Trust) experience (accordance in Picose In P												Very I
T Quite Common 20%-50% 4 change loaceton froad Substantial 100 400 8 E Ending General authority General authority General A Debt Common 20%-50% 4 diams and cost over base case Sys Major 70 280 181 Ve thinking A Debt Systam of Publishing A Debt Systam of	impact of Fubility reality			Quite Common	2070 - 3070			Wicalam	40	100	24	VCIYI
source Management Act Consents  obstantial delays in obtaining consents & associated codes  T Quite Common  20% - 50%  4 time and cost over base case Syrs  Major  70 280 18 Verificate  and - Designation (combined with 3.8)  and - Pluthase  ind purchases delayed  T Likey  50%  5 delays to project and increased costs for land purchase  Substantial  100 300 15 Verificate  Fig. 100 500 1 1 End  Fi	Heritage Issues (Historic Places Trust)	·	Т	Quite Common	20% - 50%	4	change loaction of road	Substantial	100	400	8	Extre
and Coesignation (combined with 3.6)  of - Purchases  of operation (combined with 3.6)  of - Purchases  of operation (combined with 3.6)  of - Purchases  of operation (combined with 3.6)  of operation of combined with 3.6)  of operation (combined with 3.6)  of opera	3	VII										
nd Designation (combined with 3.6)  nd Purchases  land purchases delayed  to I Likely  50%  5 delays to programme and increased costs for land purchases  Substantial  100 300 11 Estimate Selected to the sel	Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	18	Very F
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onlihilated Changes  with Changes free Exhancings pographical Data el Ground Conditions sign Changes elsesing (Combined with 4.6) sign Changes elsesing (Combined with 4.8) sign Changes elsesing (Rework (combined with 4.8) sign Changes elsesing (Rework (combined with 4.8)) elsesing (Rework (combined with 4.8) elsesing (Rework (combined with 4	Design Standards (Definition)		T			5					1	Extre
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sues - Structures  It Quite Common 20% - 50% 4 Substantial 100 400 8 Example 20% - 50% 4 Medium 40 80 30 Forcions  It Unusual 1% - 10% 2 Medium 40 80 30 Forcions  It Unlikely 10% - 20% 3 Major 70 210 20 Vertural Events  It Unlikely 10% - 20% 3 Major 70 20 Vertural Events  It Unl	Issues - Pavement/Surfacing		T									Very
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tural Events causes damage T Unlikely 10% - 20% 3 delays to project and increased costs Major 70 210 20 Vener	Services		Т	Unlikely	10% - 20%	3		Major	70	210	20	Very
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	Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	20	Very I
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Date of Risk Review: 24/02/2005		L	1	1				<u> </u>	1			L
	Date of Biok B	2aview: 24/02/2005		I ikoly	\50%	5		Substantial	100			Extr

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
t\$	Almost Certain	>90%	5
. <u>i</u>	Expected	75% - 90%	4
ort.	Likely	50% - 75%	3
Opportunity	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Megligible | 1 | Minor | -10 | Medium | -40 | Major | -70 | Substantial | -100 | Major | -100 | Major | -100 | Major | -70 | Substantial | -100 | Major |

Greater Wellington Regional Council / Transit New Zealand			We	estern Corridor Transpo	ortation Study					Page 1 of 1		
E	vent	<b>T</b> 1	Business	Likelihood		_		equence	0	Risk		
ef. Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Categor	
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assign	gnment, Crashes)	- Срронанну			· · · · · · · · · · · · · · · · · · ·		1 /		1 ( 0 0/ 1			
I.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	25	High	
100 11 5	and the second and the second the	т	0.34.0	000/ 500/		don't have sufficient travel capacity so need new transport	0.1.4.4.4.1	400	400	•	<b>.</b>	
1.2 Growth Forecasts	growth forecasts are inadequatly low	'	Quite Common	20% - 50%	4	facility don't have sufficient travel capacity so need new transport	Substantial	100	400	8	Extrem	
1.3 Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	facility	Substantial	100	300	15	Very Hi	
1.4 Crashes	crash savings aren't realised with implementation of HC4	Т	Unusual	1% - 10%	2	high accident rate	Major	70	140	25	High	
1.5 Other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Substantial	100	300	15	Very H	
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)												
2.1 Project Scope	need to do more work on local roads than anticipated	T	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	11	Extre	
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	24	Very F	
2.3 Funding	funding is unavailable	T	Likely	>50%	5	project doesn't proceed	Substantial	100	500	11	Extrer	
2.4 Procurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	30	High	
2.5 Legislative/Regulation Issues 2.6 Document Control	unforseen legislation (new)		Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	25	High	
2.7 Market Issues	higher construction costs through market forces	т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extren	
2.8 Programming Issues	Ingrici construction costs through market forces	'	LIKOIY	25070	<u> </u>	cost changes significantly	Odbatantiai	100	300	'	Extici	
2.9 Insolvency (Contractor)												
10 Contractual Claim/Dispute												
	increased risk due to proximity of live traffic lanes (to workers											
.11 Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	23	Very H	
.12 Inadequate QC/QA												
.13 Post-Construction Liability .14 Other												
14 Uner												
.0 Cost Risks (Community, Political, Environmental, land and P	• • • • • • • • • • • • • • • • • • • •											
.1 Community	increased costs and time	T	Likely	>50%	5	legal action and political protest	Major	70	350	11	Extre	
3.2 Industrial Action by Others	Secretary Manager Street	_	1.21 - 1	500/				70	050	44	F	
3.3 Ecological Issues 3.4 Impact on Public Health	increased costs with mitigating environ impacts	T	Likely Unlikely	>50% 10% - 20%	5 3		Major Medium	70 40	350 120	11 29	Extrei Higl	
5.4 Impact on Fublic Health	construction activity greater than anticipated onerous conditions imposed. Additional costs to obtain HPT		Offlikely	10% - 20%	3		Medium	40	120	29	nigi	
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Substantial	100	400	8	Extrer	
						, in the second						
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	T	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	18	Very H	
3.7 Building Consent												
3.8 Land - Designation (combined with 3.6)												
, , , , , , , , , , , , , , , , , , ,												
3.9 Land - Purchase	land purchases delayed	T	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	11	Extren	
.10 Political	loss of political support (no unity)	Т	Unlikely	10% - 20%	3	delays to project & revision of objectives	Substantial	100	300	15	Very H	
.11 Other												
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural E	Events)											
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.2 Design Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs  delays to project and increased costs	Substantial	100	500	1	Extre	
4.3 Client Initiated Changes	g				-	and the project and more access				·		
4.4 New/Change in Technology												
4.5 Topographical Data	lack of topographical data	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extrer	
4.6 Site/Ground Conditions	lack of info / data	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.7 Design Issues (combined with 4.6)		_			_						_	
4.8 Design Changes 4.9 Redesign / Rework (combined with 4.8)	onsite conditions necessitate design changes	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.9 Redesign / Rework (combined with 4.8)  10 Buildability												
11 Traffic Management	underestimate TM allowances	т	Quite Common	20% - 50%	4		Major	70	280	18	Very F	
12 Impact of Value Engineering (Risk/Opportunity Assessment)	and a solution of the anomalicos	'	Quito Johnnon	2070 - 0070			iviajoi	70	200		VCIYI	
13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	25	Hig	
14 Issues - Pavement/Surfacing		T	Unlikely	10% - 20%	3		Major	70	210	20	Very F	
15 Issues - Structures		Т	Quite Common	20% - 50%	4		Substantial	100	400	8	Extre	
16 Traffic Control and Lighting		Т	Unusual	1% - 10%	2		Medium	40	80	30	Hig	
17 Services		Т	Unlikely	10% - 20%	3		Major	70	210	20	Very I	
40.11.	significant natural event (unusual event) during construction			4007 0000		Library Control Programme Control Cont			2.0			
18 Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	20	Very F	
19 Other							1					
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Date of Risk Revi	ew: 24/02/2005		Likely	>50%	5		Substantial	100	7		Extre	
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	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
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	Rare	<1%	1
ty.	Almost Certain	>90%	5
Opportunity	Expected	75% - 90%	4
ortı	Likely	50% - 75%	3
dd	Unlikely	25% - 50%	2
0	Verv Únlikelv	<25%	1

Greater Wellington Regional Council / Transit New Zealand			We	estern Corridor Transpo	rtation Study					Page 1 of 1		
E	vent			Likelihood				equence		Risk		
ef. Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Catego	
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assig	nment, Crashes)	- Срронанну			··ug		1 /		1 ( 0 0/ 1			
1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	25	High	
100 11 5	and the second section of the	_	0.11.0	000/ 500/	,	don't have sufficient travel capacity so need new transport	0.1.4.4.4.1	400	400	•	<b>-</b>	
1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility don't have sufficient travel capacity so need new transport	Substantial	100	400	8	Extrem	
I.3 Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	facility	Substantial	100	300	15	Very H	
1.4 Crashes	crash savings aren't realised with implementation of HC4	Т	Unusual	1% - 10%	2	high accident rate	Major	70	140	25	High	
1.5 Other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Substantial	100	300	15	Very H	
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)												
2.1 Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	11	Extre	
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	24	Very F	
2.3 Funding	funding is unavailable	T	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extre	
2.4 Procurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	30	High	
2.5 Legislative/Regulation Issues 2.6 Document Control	unforseen legislation (new)		Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	25	Hig	
2.7 Market Issues	higher construction costs through market forces	т т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extrer	
2.8 Programming Issues	Inglici construction costs through market forces	'	LIKCIY	25070	<u> </u>	cost changes significantly	Odbatantiai	100	300	'	Extici	
2.9 Insolvency (Contractor)												
.10 Contractual Claim/Dispute												
	increased risk due to proximity of live traffic lanes (to workers											
.11 Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	23	Very H	
.12 Inadequate QC/QA												
.13 Post-Construction Liability												
14 Other												
.0 Cost Risks (Community, Political, Environmental, land and P	• • • • • • • • • • • • • • • • • • • •											
.1 Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	11	Extre	
3.2 Industrial Action by Others	A control of the state of the s	_	121.1	500/	_			70	050	44	E	
3.3 Ecological Issues 3.4 Impact on Public Health	increased costs with mitigating environ impacts construction activity greater than anticipated	T	Likely Unlikely	>50% 10% - 20%	5 3		Major Medium	70 40	350 120	11 29	Extre Hig	
5.4 Impact on Fublic Health	onerous conditions imposed. Additional costs to obtain HPT		Offlikely	10% - 20%	3		Medium	40	120	29	Під	
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Substantial	100	400	8	Extrer	
						, in the second						
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	T	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	18	Very H	
3.7 Building Consent												
3.8 Land - Designation (combined with 3.6)												
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3.9 Land - Purchase	land purchases delayed	Т	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	11	Extren	
.10 Political	loss of political support (no unity)	Т	Unlikely	10% - 20%	3	delays to project & revision of objectives	Substantial	100	300	15	Very H	
.11 Other												
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural E	ivents)											
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.2 Design Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs  delays to project and increased costs	Substantial	100	500	1	Extre	
4.3 Client Initiated Changes					-	and the project and more access				·		
4.4 New/Change in Technology												
4.5 Topographical Data	lack of topographical data	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.6 Site/Ground Conditions	lack of info / data	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.7 Design Issues (combined with 4.6)	to the state of th				_							
4.8 Design Changes	onsite conditions necessitate design changes	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre	
4.9 Redesign / Rework (combined with 4.8)												
11 Traffic Management	underestimate TM allowances	т	Quite Common	20% - 50%	4		Major	70	280	18	Very H	
.12 Impact of Value Engineering (Risk/Opportunity Assessment)	and to the anowallood	<u>'</u>	Quite Common	2070 - 0070	7		iviajoi	7.0	200	10	VEIVE	
13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	25	Hig	
14 Issues - Pavement/Surfacing	V	T	Unlikely	10% - 20%	3	,,	Major	70	210	20	Very H	
15 Issues - Structures		Т	Quite Common	20% - 50%	4		Substantial	100	400	8	Extre	
16 Traffic Control and Lighting		Т	Unusual	1% - 10%	2		Medium	40	80	30	Hig	
17 Services		T	Unlikely	10% - 20%	3		Major	70	210	20	Very I	
	significant natural event (unusual event) during construction			4004								
18 Natural Events	causes damage	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	20	Very H	
19 Other							1					
_1	I	L	1	<u>I</u>		1	1	1			1	
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	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
ty.	Almost Certain	>90%	5
iar	Expected	75% - 90%	4
ortı	Likely	50% - 75%	3
Opportunity	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

## **ELEMENT: RT16 - NEW STABLING NORTH OF WAIKAN**

**Project not required** 

## **ELEMENT: RM7 - PASSENGER REAL TIME**

Funding
How the solution will work / robustness
Accuracy of info
Vandalism of stations

## **ELEMENT: RM6 - CARRIAGE OF BICYCLES**

Only an issue in terms of capacity available on trains

# **ELEMENT:** RM2 - MANAGEMENT OF RAIL PRIORITIES Not an issue if RT1 and RT2 are completed

Greater Wellington Regional Council / Transit New Zealand			vve	stern Corridor Transpo	ntation Study						Page 1 of 2
	Event	<b>T</b> 1 (	- Description	Likelihood				equence	0	Risk	
Ref. Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Category
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assi		Оррогини	(Table Ta Of Tb)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating Rating)	Kanking	Category
1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	24	High
						don't have sufficient travel capacity so need new transport					
1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	3	Extreme
1.3 Assignment / Mode Choice	under estimation of mode share off road	Т	Unlikely	10% - 20%	3	don't have sufficient travel capacity so need new transport	Major	70	210	15	Very High
1.4 Crashes		T	Unusual	1% - 10%	2		Substantial	100	200	18	Very High
1.5 Other - Oil Shock		Т	Rare	<1%	1		Negligible	1	1	32	Negligible
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)											
2.1 Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	4	Extreme
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	22	Very High
2.3 Funding	funding is unavailable	T	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
	limited amount of rail design and construction expertise in NZ.	_		404 4004							A
2.4 Procurement	Resources may not be readily available	T	Unusual	1% - 10%	2	time delay to contract	Major	70	140	24	High
2.5 Legislative/Regulation Issues 2.6 Document Control	unforseen legislation (new)	ı	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	24	High
2.7 Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
Z.7 Walket 1350C3	Programming of construction work around existing rail services.	'	LINCIY	20070	3	Cost Granges significantly	Gubstantiai	100	300		Extreme
	Will be pratically impossible to replace all rail services with										
2.8 Programming Issues	buses during construction phase.	Т	Likely	>50%	5		Medium	40	200	18	Very High
2.9 Insolvency (Contractor)											
2.10 Contractual Claim/Dispute											
	increased risk due to proximity of live traffic lanes (to workers										
2.11 Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	18	Very High
2.12 Inadequate QC/QA											
2.13 Post-Construction Liability 2.14 Other											
2.14 Otner											
3.0 Cost Risks (Community, Political, Environmental, land and F	Property										_
3.1 Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	4	Extreme
3.2 Industrial Action by Others	inordaded cools and time	·	Lincoly	20070		logal dollori and political protoct	Widjoi	70	000	7	Extreme
3.3 Ecological Issues	increased costs with mitigating environ impacts	Т	Likely	>50%	5		Major	70	350	4	Extreme
3.4 Impact on Public Health	construction activity greater than anticipated	Т	Quite Common	20% - 50%	4		Medium	40	160	22	Very High
	onerous conditions imposed. Additional costs to obtain HPT										
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Major	70	280	12	Very High
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Likely	>50%	5	time and cost over base case 5yrs	Major	70	350	4	Extreme
3.7 Building Consent											
2.01 and Designation (see this admitt 2.0)											
3.8 Land - Designation (combined with 3.6)											
3.9 Land - Purchase	land purchases delayed	т	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	4	Extreme
3.10 Political	loss of political support (no unity)	Ť	Unlikely	10% - 20%	3	delays to project & revision of objectives	Major	70	210	15	Very High
3.11 Other	1000 of political support (110 arms)	•	Orimitory	1070 2070	•	dolayo to project a revision of objectives	Iviajoi	70	210	10	vory riigir
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural I	Events)										
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	T	Likely	>50%	5	delays to project and increased costs	Major	70	350	4	Extreme
4.2 Design Standards (Definition)	changes to current design standards	Т	Likely	>50%	5	delays to project and increased costs	Major	70	350	4	Extreme
4.3 Client Initiated Changes											
4.4 New/Change in Technology	lack of tanographical data	Т	Likahi	> E00/	F	delays to project and increased easts	Major	70	250	A	Evtromo
4.5 Topographical Data 4.6 Site/Ground Conditions	lack of topographical data Risk lower than RT1	I T	Likely Unusual	>50% 1% - 10%	5 2	delays to project and increased costs delays to project and increased costs	Major Major	70 70	350 140	4 24	Extreme High
4.6 Site/Ground Conditions 4.7 Design Issues (combined with 4.6)	No unique risk		Unusual	1/0 - 10%		delays to project and increased costs	iviajor	70	140	24	nigh
4.8 Design Changes	No unique risk	Т	Quite Common	20% - 50%	4		Major	70	280	12	Very High
4.9 Redesign / Rework (combined with 4.8)	No unique risk	•	Quito Sommon	20,0 00,0			ajoi				10.9 (11911
4.10 Buildability	No unique risk										
	Replacing some existing rail services with buses during										
	construction phase. Limited availability of buses. Road conestion										
	delaying bus leg of journey and adversley affecting connections										1
	with rail services. Temporary speed restrictions will apply to rail	_			_						] ,,
4.11 Traffic Management - bus replacements, TSRs	services passing the station site during construction phase.	T	Likely	>50%	5		Medium	40	200	18	Very High
4.12 Impact of Value Engineering (Risk/Opportunity Assessment)	No unique risk	_	I lavarel	10/ 100/	2	delays to project and increased costs	Madis	40	90	20	Llink
4.13 Changes Arising from Safety Audits 4.14 Issues - Pavement/Surfacing	safety audit affects scope more than allowed for	T T	Unusual Unlikely	1% - 10% 10% - 20%	3	delays to project and increased costs	Medium Medium	40 40	80 120	30 28	High High
4.14 Issues - Pavernent/Surfacing 4.15 Issues - Structures		T T	Quite Common	20% - 50%	4		Major	70	280	12	Very High
4.16 Traffic Control and Lighting		Ť	Unusual	1% - 10%	2		Minor	10	20	31	Low
4.17 Services		T T	Unlikely	10% - 20%	3		Medium	40	120	28	High
			21	11,1 20,0					120		g
4.18 Natural Events	No unique risk	Т	Unlikely	10% - 20%	3		Major	70	210	15	Very High
4.19 Other	No unique risk										
							<u> </u>				<u> </u>

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
₹	Almost Certain	>90%	5
Opportunity	Expected	75% - 90%	4
	Likely	50% - 75%	3
8	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

	Substantial	100
at	Major	70
Threat	Medium	40
	Minor	10
	Negligible	1
	Negligible	-1
in in	Minor	-10
ort	Medium	-40
Opportunity	Major	-70
O	Substantial	-100

Description  1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assignment / Base Travel Demand  1.2 Growth Forecasts  1.3 Assignment / Mode Choice  1.4 Crashes  1.5 Other - Oil Shock	(What can happen and how can it happen)  Inment, Crashes)  Inaccuracy in base info data, found pre construction	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assignated Provided Provid	nment, Crashes)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2) Rating		(Rating * Rating)		
1.1 Base Travel Demand 1.2 Growth Forecasts 1.3 Assignment / Mode Choice 1.4 Crashes	<u>, , , , , , , , , , , , , , , , , , , </u>					Consequences	(**************************************		(Francis Francis)	Kalikiliy	Categor
.2 Growth Forecasts .3 Assignment / Mode Choice .4 Crashes	inaccuracy in base into data, tourid pre construction		Llauguel	10/ 100/	2	Dade the base modelling investigation	Major	70	140	22	Lligh
I.3 Assignment / Mode Choice I.4 Crashes			Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	23	High
1.3 Assignment / Mode Choice 1.4 Crashes			A			don't have sufficient travel capacity so need new transport					
1.4 Crashes	growth forecasts are inadequatly low	T	Likely	>50%	5	facility	Substantial	100	500	1	Extrem
.4 Crashes		1 -	0 11 0			don't have sufficient travel capacity so need new transport				_	
	under estimation of mode share off rail, modelling parameters	T	Quite Common	20% - 50%	4	facility	Substantial	100	400	5	Extren
1.5[Other - Oil Shock	crash savings aren't realised with implementation of HC4	_ <u>T</u>	Unlikely	10% - 20%	3	high accident rate	Major	70	210	18	Very H
	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Medium	40	120	27	High
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)	the late to the second and the late to the	_	1.711	500/	_	Description of the control of the co	O between	400	500		- E i
2.1 Project Scope	need to do more work on local roads than anticipated & project c	T	Likely	>50%	5	health & safety - more accidents, ped accidents?	Substantial	100	500	1	Extre
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	19	Very H
2.3 Funding	funding is unavailable	Т	Quite Common	20% - 50%	4	project doesn't proceed	Substantial	100	400	5	Extrer
2.4 Procurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	30	High
2.5 Legislative/Regulation Issues	unforseen legislation (new)	Т	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	23	High
#:6 Document Control									4		4
2.7 Market Issues	higher construction costs through market forces	Т	Quite Common	20% - 50%	4	cost changes significantly	Major	70	280	15	Very H
2.8 Programming Issues											
.9 Insolvency (Contractor)		1									
10 Contractual Claim/Dispute											4
	increased risk due to proximity of live traffic lanes (to workers	ı									
11 Health and Safety	and public)	Т	Quite Common	20% - 50%	4	injury occurs	Medium	40	160	19	Very F
12 Inadequate QC/QA											
13 Post-Construction Liability											
14 Other											
		1									
.0 Cost Risks (Community, Political, Environmental, land and Pr	roperty)										
.1 Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	9	Extre
.2 Industrial Action by Others						3	7		4		
3.3 Ecological Issues	increased costs with mitigating environ impacts	Т	Quite Common	20% - 50%	4		Major	70	280	15	Very F
3.4 Impact on Public Health	construction activity greater than anticipated	T	Quite Common	20% - 50%	4		Medium	40	160	19	Very H
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B.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Substantial	100	400	5	Extrer
2.0 Homago 100000 (Historio Fidoco Huot)	арргоча	· · · · · ·	Quito Common	2070 0070	,	Sharige loadilon of road	Gubotantian	100	400		Extro
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	т	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	15	Very H
3.7 Building Consent	oubotantial dolays in obtaining someonic a desconated socie		Quito Common	2070 0070	-	unio and cool ever bace case byto	iviajoi	70	200	10	VOIYII
5.1 Building Consont											
3.8 Land - Designation (combined with 3.6)									4		4
sis zana zosignaton (sombinoa manolo)											
3.9 Land - Purchase	land purchases delayed	Í T	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	9	Extren
10 Political	loss of political support (no unity)	i i	Unlikely	10% - 20%	3	delays to project & revision of objectives	Substantial	100	300	14	Very H
11 Other	loss of political support (no unity)	· ' '	Offlikely	10% - 20%	3	delays to project & revision of objectives	Substantial	100	300	14	Very
TT OTHER		1									
1.0 Cost Risks (Site Conditions, Engineering, Services, Natural E	vents)										
4.0 Oost Maks (Site Conditions, Engineering, Services, Natural E	vento)		<del></del>						7		<del></del>
4.1 Project Scape Definition (Unceled thems)	substantial scope changes	1 +	Liliahi	- F00/	_	delays to project and ingregord costs	Cubotontial	100	500	4	Futro-
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	<u> </u>	Likely	>50%	5	delays to project and increased costs	Substantial			1	Extre
1.2 Design Standards (Definition)	changes to current design standards		Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre
L3 Client Initiated Changes											_
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13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	23	Hig
14 Issues - Pavement/Surfacing		Т	Unlikely	10% - 20%	3		Medium	40	120	27	Higl
15 Issues - Structures		T	Quite Common	20% - 50%	4		Substantial	100	400	5	Extre
16 Traffic Control and Lighting		T	Unusual	1% - 10%	2		Medium	40	80	30	High
17 Services		Т	Unlikely	10% - 20%	3		Medium	40	120	27	Higi
	significant natural event (unusual event) during construction		السننديسية								4
18 Natural Events	causes damage	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	23	Higi
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		1									1
9 Other											
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- Eo	Medium	-40
à	Major	-70
0	Substantial	-100

	Event			Likelihood				quence	Risk		
	What? How?	Threat /	Descriptor				Descriptor		Score		
ef. Description	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Categor
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1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	ı	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	17	High
		_				don't have sufficient travel capacity so need new transport					_
1.2 Growth Forecasts	opportunity to mitigate incorrect growth forecast	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	1	Extrem
		_		100/ 000/		don't have sufficient travel capacity so need new transport		400		_	.,
1.3 Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters	T	Unlikely	10% - 20%	3	facility	Substantial	100	300	5	Very Hi
1.4 Crashes 1.5 Other - Oil Shock	crash savings aren't realised with implementation of HC4	T	Unusual	1% - 10%	2	high accident rate	Major	70	140	17	High
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4.6 Site/Ground Conditions	lack of info / data	T	Likely	>50%	5	delays to project and increased costs	Minor	10	50	21	Moder
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14 Issues - Pavement/Surfacing											
15 Issues - Structures		Т	Unusual	1% - 10%	2		Minor	10	20	27	Low
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	significant natural event (unusual event) during construction										
.18 Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Minor	10	30	26	Moder
19 Other											
			1								1
	·	•	•			•	•	•			•
Date of Risk Rev	riew: 24/02/2005		Likely	>50%	5		Substantial	100			Extre
		•			-						

	Likely	>50%	5
## ## ## ## ## ## ## ## ## ## ## ## ##	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
<del> </del>	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
. <u>e</u>	Expected	75% - 90%	4
Į.	Likely	50% - 75%	3
Oppor	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Negligible | 1 | Minor | -10 | Medium | -40 | Major | -70 | Substantial | -100 | Major | -100 | Major | -100 | Major | -70 | Substantial | -100 | Major |

	Event	Likelihood					Consequence				
Ref. Description	What? How?	Threat /	Descriptor	Dealer Hiller	Datin	C	Descriptor	Detina	Score	Dandina	0-1
Ref. Description  1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, As	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Category
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1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	additional capacity reduces growth risk	Major	70	280	15	Very High
1.3 Assignment / Mode Choice	under estimate assignment of vehicle using TGM	Ť	Quite Common	20% - 50%	4	don't have sufficient travel capacity so need new transport	Substantial	100	400	3	Extreme
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1.5 Other - Oil Shock	oil prices skyrocket	T	Quite Common	20% - 50%	4	major mode shift	Substantial	100	400	3	Extreme
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)			1								
2.1 Project Scope - relative to a HC4	need to do more work on local roads than anticipated	T	Likely	>50%	5	health & safety - more accidents, ped accidents?	Major	70	350	11	Extreme
Z.2 Team Relationships (Performance, Communications etc)     Funding	break down in stakeholder relationships (within team)	T T	Likely	>50% >50%	5 5	reputation / image	Medium Substantial	40 100	200 500	22 1	Very High
2.4 Procurement	funding is unavailable procurement problems	T T	Likely Unusual	1% - 10%	2	project doesn't proceed time delay to contract	Major	70	140	24	Extreme High
2.5 Legislative/Regulation Issues	unforseen legislation (new)	T	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	24	High
2.6 Document Control	uniorocon registation (new)		Orlabaar	170 1070		project delayed of ecope directed	Major	7.0	140	27	i ligit
2.7 Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extreme
2.8 Programming Issues	, in the second					, ,					
2.9 Insolvency (Contractor)											
2.10 Contractual Claim/Dispute											
	increased risk due to proximity of live traffic lanes (to workers	_		4004	_					-	
2.11 Health and Safety 2.12 Inadequate QC/QA	and public)	Т	Unlikely	10% - 20%	3	injury occurs	Medium	40	120	27	High
2.12 Inadequate QC/QA 2.13 Post Construction Liability											
2.14 Other											
2.14 Ottlor											
3.0 Cost Risks (Community, Political, Environmental, land and	d Property)										
3.1 Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	11	Extreme
3.2 Industrial Action by Others					-	3	.,.				
3.3 Ecological Issues	increased costs with mitigating environ impacts	Т	Quite Common	20% - 50%	4		Major	70	280	15	Very High
3.4 Impact on Public Health	construction activity greater than anticipated	T	Unusual	1% - 10%	2		Medium	40	80	28	High
	onerous conditions imposed. Additional costs to obtain HPT										
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Unusual	1% - 10%	2	change loaction of road	Major	70	140	24	High
		_		4004 0004					0.0	40	.,
3.6 Resource Management Act Consents 3.7 Building Consent	substantial delays in obtaining consents & associated costs	Т	Unlikely	10% - 20%	3	time and cost over base case 5yrs	Major	70	210	18	Very High
3.7 Building Consent											
3.8 Land - Designation											
Sid Zana Dosignation											
3.9 Land - Purchase	land purchases delayed	Т	Unlikely	10% - 20%	3	delays to programme and increased costs for land purchase	Major	70	210	18	Very High
3.10 Political	loss of political support (no unity)	Т	Unusual	1% - 10%	2	delays to project & revision of objectives	Substantial	100	200	22	Very High
3.11 Other											
4.0 Cost Risks (Site Conditions, Engineering, Services, Natura	al Events)								1		1
		_	0 11 0						400		
4.1 Project Scope Definition (Unscheduled Items)	increased likelihood of scope change on HT4	T	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400 400	3	Extreme
<ul><li>4.2 Design Standards (Definition)</li><li>4.3 Client Initiated Changes</li></ul>	changes to current design standards	T T	Quite Common Quite Common	20% - 50% 20% - 50%	4	delays to project and increased costs	Substantial Substantial	100 100	400	3	Extreme Extreme
4.4 New/Change in Technology		I	Quite Common	2070 - 3070	4		Substantial	100	400	3	Extreme
4.5 Topographical Data	lack of topographical data	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Substantial	100	300	13	Very High
4.6 Site/Ground Conditions	lack of topographical data	Ť	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Extreme
4.7 Design Issues		Ť	Quite Common	20% - 50%	4	, , , , , , , , , , , , , , , , , , , ,	Substantial	100	400	3	Extreme
4.8 Design Changes											
4.9 Redesign / Rework (combined with 4.8)											
4.10 Buildability											
4.11 Traffic Management		Т	Unusual	1% - 10%	2		Medium	40	80	28	High
4.12 Impact of Value Engineering (Risk/Opportunity Assessment)		_		404						2-	
4.13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	T	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	28	High
4.14 Issues - Pavement/Surfacing 4.15 Issues - Structures		T T	Unlikely Ouite Common	10% - 20%	3 4		Major	70 100	210 400	18 3	Very High
4.15 Issues - Structures 4.16 Traffic Control and Lighting		T	Quite Common Unusual	20% - 50% 1% - 10%	2		Substantial Medium	40	80	28	Extreme
4.17 Services		Ť	Unusual	1% - 10% 1% - 10%	2		Medium	40	80	28	High High
	significant natural event (unusual event) during construction	1	Oriusuai	170 - 1070			Miculum	40	30	20	riigii
4.18 Natural Events	causes damage	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Substantial	100	300	13	Very High
4.19 Other		•	J. Millory	10,0 20,0		The project and more account occord	Judaturuur	100	300	10	. Sry riight

ſ		Likely	>50%	5
	at	Quite Common	20% - 50%	4
	ırea	Unlikely	10% - 20%	3
	Ē	Unusual	1% - 10%	2
		Rare	<1%	1
ı	₹	Almost Certain	>90%	5
	Ë	Expected	75% - 90%	4
	ort	Likely	50% - 75%	3
	Opportunity	Unlikely	25% - 50%	2
	0	Very Linlikely	~25%	1

	Substantial	100
at	Major	70
Threat	Medium	40
Ė	Minor	10
	Negligible	1
ty	Negligible	-1
iun	Minor	-10
Opportunity	Medium	-40
dd	Major	-70
O	Substantial	-100

	Event			Likelihood			Conseq	uence	_	Risk		
Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Categ	
Benefit Risks (Base Travel Demand, Growth Forecasts, Ass		Оррогини	(Table Ta Of Tb)	Probability	Rating	Consequences	(Table 2)	Rating	(Nating Nating)	Ranking	Caley	
Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unlikely	10% - 20%	3	Redo the base modelling investigation	Major	70	210	16	Very I	
			·									
Growth Forecasts	growth forecasts are inadequatly low	Т	Unlikely	10% - 20%	3	additional capacity reduces growth risk	Major	70	210	16	Very	
Assignment / Mode Choice	under estimate assignment of vehicle using TGM	Т	Quite Common	20% - 50%	4	don't have sufficient travel capacity so need new transport	Substantial	100	400	3	Extre	
Crashes	uncertainty of crash rates	Т	Unusual	1% - 10%	2	high accident rate	Major	70	140	23	Hi	
Other - Oil Shock	oil prices skyrocket	T	Unlikely	10% - 20%	3	major mode shift	Substantial	100	300	9	Very	
Cost Risks (Commercial, Legal, Economic, Managerial)		Т	Ouite Common	200/ 500/		hankh 0 safati, mana ancidanta mad ancidanta?	Maian	70	200	40	\/	
Project Scope - relative to a HC4 Team Relationships (Performance, Communications etc)	need to do more work on local roads than anticipated break down in stakeholder relationships (within team)	T	Quite Common Quite Common	20% - 50% 20% - 50%	4	health & safety - more accidents, ped accidents? reputation / image	Major Medium	70 40	280 160	12 22	Very Very	
Funding	funding is unavailable	Ť	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Ext	
Procurement	procurement problems	T T	Unusual	1% - 10%	2	time delay to contract	Major	70	140	23	F	
Legislative/Regulation Issues	unforseen legislation (new)	Ť	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	23	H	
Document Control	difference of the district of		Chadai	170 1070		project delayed or ecope anotice	Major	70	140	20		
Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Ext	
Programming Issues	, in the second					, i						
Insolvency (Contractor)												
Contractual Claim/Dispute												
	increased risk due to proximity of live traffic lanes (to workers											
Health and Safety	and public)	T	Unlikely	10% - 20%	3	injury occurs	Medium	40	120	27	H	
Inadequate QC/QA												
Post-Construction Liability												
Other												
Cost Risks (Community, Political, Environmental, land and	Property										L	
Configuration Community, Political, Environmental, land and Community	increased costs and time	Т	Quite Common	20% - 50%	4	legal action and political protest	Major	70	280	12	Ver	
Industrial Action by Others	increased costs and time		Quite Common	20% - 30%	4	legal action and political protest	iviajoi	70	200	12	Ver	
Ecological Issues	increased costs with mitigating environ impacts	Т	Quite Common	20% - 50%	4		Major	70	280	12	Ven	
Impact on Public Health	construction activity greater than anticipated	T	Unusual	1% - 10%	2		Medium	40	80	28	H	
impact on rability realist	onerous conditions imposed. Additional costs to obtain HPT		Onadan	170 1070	_		Modium	.0		20		
Heritage Issues (Historic Places Trust)	approval	Т	Unusual	1% - 10%	2	change loaction of road	Medium	40	80	28	H	
, , , , , , , , , , , , , , , , , , , ,						J				_		
Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Unlikely	10% - 20%	3	time and cost over base case 5yrs	Major	70	210	16	Ver	
Building Consent												
Land - Designation - designation in place												
Land - Purchase	land purchases delayed	T	Unlikely	10% - 20%	3	delays to programme and increased costs for land purchase	Major	70	210	16	Very	
Political	loss of political support (no unity)	T	Unusual	1% - 10%	2	delays to project & revision of objectives	Substantial	100	200	21	Ver	
Other												
Cost Risks (Site Conditions, Engineering, Services, Natural	Events											
Cost Risks (Site Conditions, Engineering, Services, Natural	Events)										1	
Project Scope Definition (Unscheduled Items)	increased likelihood of scope change on HT4	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Ext	
Design Standards (Definition)	changes to current design standards	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Ext	
Client Initiated Changes	g	Ť	Quite Common	20% - 50%	4	,	Substantial	100	400	3	Ext	
New/Change in Technology												
Topographical Data	lack of topographical data	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Substantial	100	300	9	Very	
Site/Ground Conditions	lack of info / data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Ext	
Design Issues		Т	Quite Common	20% - 50%	4		Major	70	280	12	Very	
Design Changes												
Redesign / Rework (combined with 4.8)												
Buildability		_		404						2.5		
Traffic Management		Т	Unusual	1% - 10%	2		Medium	40	80	28	Н	
Impact of Value Engineering (Risk/Opportunity Assessment)		т	Um : : !	40/ 400/		delays to assign and in assess to the	NA='	70	440	00		
Changes Arising from Safety Audits Issues - Pavement/Surfacing	safety audit affects scope more than allowed for		Unusual Unlikely	1% - 10%	2	delays to project and increased costs	Major	70	140	23 16	H Von	
Issues - Pavement/Surracing Issues - Structures	large long bridges	†	Quite Common	10% - 20% 20% - 50%	3 4		Major Substantial	70 100	210 400	3	Ver	
Traffic Control and Lighting	naryo long bhages	T	Unusual	20% - 50% 1% - 10%	2		Medium	40	80	28	EX.	
Services		+	Unusual	1% - 10%	2		Medium	40	80	28	H	
		, , , , , , , , , , , , , , , , , , ,	Onaguai	170 1070			Woodum	-10	30		1	
Natural Events	earthquake and high batters	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Substantial	100	300	9	Very	
Other				==,.								
		•	1						i l		1	

	Likely	>50%	5
at	Quite Common	20% - 50%	4
ıreat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
-≨	Almost Certain	>90%	5
unity	Expected	75% - 90%	4
ort	Likely	50% - 75%	3
oddC	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

	Substantial	100
at	Major	70
Threat	Medium	40
Ė	Minor	10
	Negligible	1
ty	Negligible	-1
iun	Minor	-10
Opportunity	Medium	-40
dd	Major	-70
O	Substantial	-100

	Event			Likelihood				quence	Risk		
Persylation	What? How?	Threat /	Descriptor (Table 1a or 1b)	Drahahilitu	Datina	Concernment	Descriptor	Doting	Score	Donking	Cotom
Description Lenefit Risks (Base Travel Demand, Growth Forecasts, A	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Catego
ase Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Minor	10	20	30	Low
						don't have sufficient travel capacity so need new transport					
Frowth Forecasts	growth forecasts are inadequatly low	Т	Unlikely	10% - 20%	3	facility	Medium	40	120	17	Hig
	, i		, ,			don't have sufficient travel capacity so need new transport					
ssignment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	facility	Major	70	210	7	Very H
rashes	crash savings aren't realised with implementation of HC4	T	Unusual	1% - 10%	2	high accident rate	Medium	40	80	20	Hig
other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Substantial	100	300	4	Very I
ost Risks (Commercial, Legal, Economic, Managerial)											
roject Scope	need to do more work on interface than anticipated	Т	Unusual	1% - 10%	2		Medium	40	80	20	Hiç
eam Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Rare	<1%	1	reputation / image	Medium	40	40	28	Mode
unding	funding is unavailable	Т	Unlikely	10% - 20%	3	project doesn't proceed	Substantial	100	300	4	Very
rocurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	20	Hi
egislative/Regulation Issues	unforseen legislation (new)	Т	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	14	Hi
ocument Control	history and the state of the same and the same	т	I Heater	F00/	5		Medium	40	000	10	\/
larket Issues <del>regramming Issues</del>	higher construction costs through market forces	-	Likely	>50%	5	cost changes significantly	ivieaium	40	200	10	Very
nogramming issues esolvency (Contractor)											
ontractual Claim/Dispute											
	increased risk due to proximity of live traffic lanes (to workers										
ealth and Safety	and public)	Т	Unusual	1% - 10%	2	injury occurs	Minor	10	20	30	Lo
nadequate QC/QA											
ost-Construction Liability											
<del>Vther</del>											
ost Risks (Community, Political, Environmental, land ar	ad Drawarty)										
ost Risks (Community, Political, Environmental, land ar Community	increased costs and time	Т	Likely	>50%	5	legal action and political protest	Major	70	350	2	Extr
ndustrial Action by Others	increased costs and time	,	Likely	23076	<u> </u>	legal action and political protest	iviajoi	70	330		LXII
cological Issues	increased costs with mitigating environ impacts	Т	Unlikely	10% - 20%	3		Medium	40	120	17	Hi
npact on Public Health	construction activity greater than anticipated	T	Quite Common	20% - 50%	4		Medium	40	160	13	Very
	onerous conditions imposed. Additional costs to obtain HPT										
eritage Issues (Historic Places Trust)	approval	Т	Likely	>50%	5	change loaction of road	Substantial	100	500	1	Extr
		_			_						
esource Management Act Consents uilding Consent	substantial delays in obtaining consents & associated costs	Т	Likely	>50%	5	time and cost over base case 5yrs	Major	70	350	2	Extr
<del>uliding Consent</del>											
and - Designation (combined with 3.6)											
and - Purchase	land purchases delayed	Т	Unusual	1% - 10%	2	delays to programme and increased costs for land purchase	Major	70	140	14	Hig
olitical	loss of political support (no unity)	Т	Unusual	1% - 10%	2	delays to project & revision of objectives	Substantial	100	200	10	Very
<del>Yther</del>											
test Bishe (Site Conditions Funiversity Comises Natur	of Europa										L.,
ost Risks (Site Conditions, Engineering, Services, Natu	rai Events)		I					1			1
roject Scope Definition (Unscheduled Items)	substantial scope changes	т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	14	Hi
esign Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs	Medium	40	200	10	Very
lient Initiated Changes											
lew/Change in Technology											
opographical Data	lack of topographical data	Т	Rare	<1%	1	delays to project and increased costs	Medium	40	40	28	Mod
ite/Ground Conditions	lack of info / data	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	17	Hi
esign Issues (combined with 4.6)											
esign Changes	onsite conditions necessitate design changes	T	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	20	Hi
edesign / Rework (combined with 4.8) uildability											
raffic Management	underestimate TM allowances	Т	Unusual	1% - 10%	2		Medium	40	80	20	Н
npact of Value Engineering (Risk/Opportunity Assessment)	underestimate rivi anowanees		Onusuai	170 - 1070			Wicalum	40	30	۷	
changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	20	Н
sues - Pavement/Surfacing	. ,	Ť	Unlikely	10% - 20%	3	, y	Major	70	210	7	Very
sues - Structures		T	Unlikely	10% - 20%	3		Substantial	100	300	4	Very
raffic Control and Lighting		T	Unusual	1% - 10%	2		Medium	40	80	20	H
ervices		T	Rare	<1%	1		Major	70	70	27	Н
	significant natural event (unusual event) during construction										
latural Events Other	causes damage	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	7	Very
											1

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
È	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
Ë	Expected	75% - 90%	4
off	Likely	50% - 75%	3
Opportu	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Medigible | 1 | Medium | 40 | Medium | 40 | Medium | 40 | Medium | 40 | Minor | 10 | Medium | 40 | Medium | 40 | Major | 40 | Major | 40 | Major | 40 | Substantial | 4100 | Medium | 40 | Major | 40 | Maj

Control of the Control of Contr	Month   Mont	Greater Wellington Regional Council / Transit New Zealand			vve	stern Corridor Transpo	riadon olday					Page 1 of		
Procession   Pro	Company   Comp			Threat /	Descriptor	Likelihood		<del>_</del>		equence			T T	
Control of the Control of Contr	Company   Comp	Description				Probability	Rating	Consequences		Rating		Ranking	Catego	
Committed Sections   Committ	April   Communication   Comm		Assignment, Crashes)	,							, (		J	
The state of the content of the co	Control control   Control co	1 Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	14	High	
Application of the Color   Color Application	Part   Common							' '						
Segment   March   Ma	Add Section   Control	2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4		Negligible	1	4	30	Low	
Straight on paragraphic method within the mode of the Mark 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Control   Cont	Assistant Made Obside	de a cationation of acada above off acil acada llica acada above	_	I Indianalia	400/ 000/	2		Main	70	240	40	\/a=.15	
The Control Control   Control Control   Control Cont	Clark   Clark   Section			 										
Section of content and processing of content and processing of the content and processing of t	Part   Table			i i									Very Hi	
Page   Cape	The part of the part of the state and the antiferent part of the antiferent part o					,. =.,.	-						10.,	
The content of the		Cost Risks (Commercial, Legal, Economic, Managerial)												
Turning (marring securible of the Color of the State of the Color of t		Project Scope	·	Т									Modera	
Procedure   Proc	Procession   Security   Securit												High	
Local Explosion Secure   To Unusual   16-10%   2   proposition process descripted in construction   16-10%	Comparison   Com											-		
The company of the co	Control Control   Control Control   Control			<u> </u>										
The contraction of the contracti	March Loads		uniorseem legislation (new)		Oriusuai	176 - 1076		project delayed or scope affected	iviajoi	70	140	14	riigi	
Programme places	Processing Section   Processed (as on its provertify of the lards of windows)   F   Process   F	Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Major	70	350	4	Extren	
Interview   Commonword Commonwo	Incompany   Commands	Programming Issues							,					
February	Part and Defended and deep boronamy of the Partic boron (in section 1997)   Particular and Defended (in the Particular and D	Insolvency (Contractor)												
Process   Proc	Part	Contractual Claim/Dispute												
Part   Control	Section   Process   Proc	Licelth and Cafety		-	D	-40/	4	inium, oppure	M:	40	40	00		
Final Community Position (Community Position (	Procedure   Process   Pr		aria public)	1	kare	<1%	1	injury occurs	ivilnor	10	10	28	Low	
Commany   Comm	Community													
Community   Comm	Community continuous continuous T Unition Williams (Section and political protein) More 10 20 20 Months (Section and political protein) More 10 10 10 10 10 10 10 10 10 10 10 10 10													
Community   Comm	Community excitations   Community excitations   T   Unificity   Community processed costs in integrating environ impacts   T   Unificial Plants   T   Unifical Plants   T   Unificial Plants   T   Unifical Plants   T   Unificial													
Includes the Author Control Co	Industrial Actions by College   Control Cont									_				
County   C	Exception   Suppose   Internation   Intern	Community	community resistance	T	Unlikely	10% - 20%	3	legal action and political protest	Minor	10	30	25	Moder	
Improved for public legals the construction searching properties and introduced control or process of distinct of control or process of control or pro	Impact on patic health   Consequence with an interpreted   The content of the c		The state of the s	_	0.11.0	000/ 500/	4		M. C.	40	400	40		
convox confinition improved. Additional costs to obtain HPT approval approv	And - Designation (Manufarment Act Concerns)  And - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  Land - Pertratage  Land - Designation (Correlated with 3.5)  La			-										
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Resource Management Act Consents  substantial delays in obtaining consents & associated costs  T Quite Common  20% - 50%  4 tims and cost over base case Syrs  Major  70 280 9 Very  Land 1. Purchase  Land quarkness delayed  T Unlikely  T Rase  VN  1 delays to programme and increased costs for land purchase  Major  70 210 10  100 150  18 18  Cost Ricks (Sint Conditions, Engineering, Services, Natural Events  Propriet Score Delinion Standards  T Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Very  Selective Standards  Major  70 350 4 Very  Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 4 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 1 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 1 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 1 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 1 Estimated  Likely  5-57%  5 delays to project and increased costs  Major  70 350 1 Estimated  Major  71 Likely  100 500 1 Estimated	Securic Management Act Consents  Audictariant delays in abstantial delay	Heritage Issues (Historic Places Trust)	· · · · · · · · · · · · · · · · · · ·	Т	Unusual	1% - 10%	2	change loaction of road	Medium	40	80	20	High	
Building Contents Land - Designation (combined with 3.6)	Building Comment  Land - Designation (combined with 3.6)  Land - Designation (combined with 3.6)  Land - Purchase  Land - September (as of political support from unity)  T Unilisely  T Rand  Life  T Unilisely  T Rand  Life  T Unilisely  Life  Soft Conditions Explaneating, Sendices, Natural Events  Substantial  100  100  100  100  100  100  100  1													
Land - Designation (combined with 3.6) Land - Designation	Land - Designation (combined with 3.6)  Land - Purbase  In an opurchase delayed  In an opurchase		substantial delays in obtaining consents & associated costs	Т	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	9	Very H	
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Political codes    Substantial   100   100   19   19   19   19   19	Second Processed Control   Substantial   Support (no unity)   T   Rare   <1%   1   delays to project & Tevision of objectives   Substantial   100   100   19   Fire   100   100   100   19   Fire   100   100   100   100   19   Fire   100	9 Land - Purchase	land purchases delayed	Т Т	Unlikely	10% - 20%	3	delays to programme and increased costs for land purchase	Major	70	210	10	Very Hi	
Cost Risks (Site Conditions, Engineering, Services, Natural Events)    Cost Risks (Site Conditions, Engineering, Services, Natural Events)	Cost Risks (Site Conditions, Engineering, Services, Natural Events)  Project Scope Definition (Unscheduled Items)  Substantial scope changes  T Unlikely 10% - 20% 3 delays to project and increased costs  Substantial  100 300 6 Very!  Design Standards (Definition)  Clase Alreaded Changes  How Changes Interviews  T Lukely 550% 5 delays to project and increased costs  Major 70 350 4 Extre  Change Alreaded Changes  How Changes Interviews  T Lukely 550% 5 delays to project and increased costs  Substantial  100 550 1 Estre  Substantial  100 550 1			T									High	
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Project Scope Definition (Unscheduled Items) substantial scope changes T Unlikely 10% - 20% 3 delays to project and increased costs	Project Scope Definition (Unscheduled Items) substantial scope changes the project and increased costs the project and increas													
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NewChange in Technology Topographical data I ack of topographical data I Likely I Likely I Solw Solw Solw Solw Solw Solw Solw Solw	New/Change in Technology   Topographical Data   lack of topographical data   T   Likely   550%   5   delays to project and increased costs   Substantial   100   500   1   Extra Control Cost   Substantial   100   500   1   Extra Cost   Subst		Granges to current design standards		Likely	200%	5	delays to project and increased costs	iviajui	70	330	4	Extre	
Topographical Data   Silve Ground Conditions   Silve Ground Conditio	Topographical Data slack of topographical data slack of topographical data slack of info / da													
Sile Ground Conditions   Likely   Some   Sile Common   Some   Substantial   Substantia	Site-Ground Conditions   Site-Ground Condition		lack of topographical data	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extrer	
Design Changes onsite conditions necessitate design changes T Rare 41% 1 delays to project and increased costs Negligible 1 31 31 Negli Redesign / Rework (combined with 4.8) Buildability Underestimate TM allowances Unusual Unusual Unusual Unusual Unusual Unlikely Unikely Unusual Un	Design Changes   Onsite conditions necessitate design changes   T   Rare   <1%   1   delays to project and increased costs   Negligible   1   31   Negligible   3	Site/Ground Conditions		T			5	, , ,				1	Extre	
Redesign / Rework (combined with 4.8)  Buildability  Underestimate TM allowances  T Unusual 1% - 10% 2  Impact of Value Engineering (Risk/Opportunity Assessment)  Changes Arising from Safety Audits  Issues - Pavement/Surfacing  Issues - Pavement/Surfacing  Issues - Structures  T Unusual 1% - 20% 3  delays to project and increased costs  Medium 40 80 20 Hi  T Unlikely 10% - 20% 3  delays to project and increased costs  Major 70 210 10 Very  Issues - Pavement/Surfacing  T Quite Common 20% - 50% 4  Services  T Unusual 1% - 10% 2  Services  T Unusual 1% - 10% 2  Medium 40 80 20  Hi  Services  T Unusual 1% - 10% 2  Medium 40 80 20  Hi  Services  T Rare < 1% 1  Services  T Unlikely 10% - 20% 3  delays to project and increased costs  Medium 40 80 20  Hi  Services  Medium 40 80 20  Hi  Services  T Rare < 1% 1  Services  T Unlikely 10% - 20% 3  delays to project and increased costs  Medium 40 80 20  Hi  Services  Medium 40 80 20  Hi  Services  Medium 40 80 20  Hi  Services  T Unlikely 10% - 20% 3  Medium 40 80 20  Hi  Services  T Unlikely 10% - 20% 3  Medium 40 80 20  Hi  Services  Services  Medium 40 80 20  Hi  Services  Services  Medium 40 80 20  Hi  Services  Services  Services  Services  Services  Services  Services  T Unusual 1% - 10% 20 3  Services  Servi	Redesign / Rework (combined with 4.8)   Buildebility   Underestimate TM allowances   T Unusual 1% - 10% 2   Medium 40 80 20 Higgs													
Buildability   Underestimate TM allowances   T	Buildability Traffic Management Underestimate TM allowances T Unusual To Value Engineering (Risk/Opportunity Assessment) Changes Arising from Safety Audits Issues - Pavement/Surfacing T Unlikely Traffic Control and Lighting T Unusual T Unusual T Unusual T Unusual T Unlikely T Unlikely T Unlikely T Unlikely T Unusual T Unusual T Unusual T Unusual T Unusual T Unlikely T Unlikely T Unlikely T Unusual T Unusual T Unusual T Unusual T Unlikely T Unlikely T Unusual T U		onsite conditions necessitate design changes	Т	Rare	<1%	1	delays to project and increased costs	Negligible	1	1	31	Neglig	
Traffic Management underestimate TM allowances T Unusual 1% - 10% 2 Medium 40 80 20 Hi Impact of Value Engineering (Risk/Opportunity Assessment)  Changes Arising from Safety Audits Issues - Pavement/Surfacing Issues - Structures T Unlikely T	Traffic Management underestimate TM allowances T Unusual 1% - 10% 2 Medium 40 80 20 Higher of Value Engineering (Risk/Opportunity Assessment)  Changes Arising from Safety Audits  safety audit affects scope more than allowed for T Unlikely 10% - 20% 3 delays to project and increased costs Medium 40 120 16 Higher Major 70 210 10 Very 10% - 20% 3 Major 70 210 10 Very 10% - 20% 3 Major 70 210 10 Very 10% - 20% 50% 4 Substantial 100 400 3 Extrement/Surfacing 10% - 10% - 10% 2 Medium 40 80 20 Higher Major 70 70 24 Higher Major 70 70 70 70 16 Higher Major 70 70 70 70 16 Higher Major 70 70 70 70 70 70 70 70 70 70 70 70 70													
Impact of Value Engineering (Risk/Opportunity Assessment) Changes Arising from Safety Audits Issues - Pavement/Surfacing Issues - Pavement/Surfacing Issues - Structures In Unlikely In Value Legineering (Risk/Opportunity Assessment) In Unlikely In Value In	Impact of Value Engineering (Risk/Opportunity Assessment) Changes Arising from Safety Audits Issues - Pavement/Surfacing Issues - Structures Traffic Control and Lighting Services  Natural Events Changes Arising from Safety Audits Safety audit affects scope more than allowed for T Unlikely 10% - 20% 3 delays to project and increased costs Medium 40 120 16 High Hold Hold Hold Hold Hold Hold Hold Hold		underestimate TM allowances	т	Unusual	1% - 10%	2		Medium	40	80	20	Hia	
Changes Arising from Safety Audits         safety audit affects scope more than allowed for         T         Unlikely         10% - 20%         3         delays to project and increased costs         Medium         40         120         16         Hissues - Plance of the project and increased costs           Issues - Structures         T         Unlikely         10% - 20%         3         delays to project and increased costs         Medium         40         10         Very Structures           Traffic Control and Lighting         T         Unusual         1% - 10%         2         Medium         40         80         20         His           Services         T         Rare         <1%	Changes Arising from Safety Audits Safety audit affects scope more than allowed for T Unlikely 10% - 20% 3 delays to project and increased costs Medium 40 120 16 High Substance of the second of the				Onasuai	170 - 1070			IVICUIUITI	40	00	20	riig	
Saues - Pavement/Surfacing   T   Unlikely   10% - 20%   3   Substantial   100   400   3   Extr.	Issues - Pavement/Surfacing   T   Unlikely   10% - 20%   3   Major   70   210   10   Very     Issues - Structures   T   Quite Common   20% - 50%   4   Substantial   100   400   3   Extre     Taffic Control and Lighting   T   Unusual   1% - 10%   2   Medium   40   80   20   High     Services   Significant natural event (unusual event) during construction causes damage   T   Unlikely   10% - 20%   3   delays to project and increased costs   Medium   40   120   16   High     Autural Events   Cuther   Cu			Т	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	16	Hig	
Issues - Structures Traffic Control and Lighting Tunusual	Issues - Structures Traffic Control and Lighting Services T Rare The Unusual 1% - 10% 2	Issues - Pavement/Surfacing		T									Very F	
Services  T Rare <1% 1  Natural Events Other  T Rare <1% 1  Unlikely 10% - 20% 3  delays to project and increased costs  Medium 40  100 120  100 16  History  Major 70  Major 70  Major 70  Major 70  Major 70  Medium 40  100 16  History  Medium 40  Medium	Services  T Rare <1% 1  Natural Events Other  T Rare <1% 1  Unlikely 10% - 20% 3  delays to project and increased costs  Medium 40  120  16  High	Issues - Structures		Т									Extre	
Significant natural event (unusual event) during construction causes damage  T Unlikely 10% - 20% 3 delays to project and increased costs  Medium 40 120 16 Hi  Other	Significant natural event (unusual event) during construction causes damage  T Unlikely 10% - 20% 3 delays to project and increased costs  Medium 40 120 16 High												Hig	
Natural Events causes damage T Unlikely 10% - 20% 3 delays to project and increased costs Medium 40 120 16 Hi Other	Natural Events causes damage T Unlikely 10% - 20% 3 delays to project and increased costs Medium 40 120 16 Hig	Services		Т	Rare	<1%	1		Major	70	70	24	Hig	
Other	Other	Natural Events		_	Unlikely	10% - 20%	2	delays to project and increased costs	Modium	40	120	16	LU:~	
			Toduses uarriage		Unlikely	10% - 20%	3	delays to project and increased costs	wedium	40	120	10	Higi	
	Date of Risk Review: 24/02/2005   Likely  >50%   5   Substantial   100   Extre								1					
	Date of Risk Review: 24/02/2005 Likely >50% 5 Substantial 100 Extre		I	1	II.	ı				1	1	ı	•	

	Likely	>50%	5
at	Quite Common	20% - 50%	4
hreat	Unlikely	10% - 20%	3
<del> </del>	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
Ë	Expected	75% - 90%	4
Į į	Likely	50% - 75%	3
Орропи	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Megligible | 1 | Minor | -10 | Medium | -40 | Major | -70 | Substantial | -100 | Major | -100 | Major | -100 | Major | -70 | Substantial | -100 | Major |

	Event			Likelihood			Consec	quence		Risk	
	What? How?	Threat /	Descriptor				Descriptor		Score		
ef. Description	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Category
<ul><li>1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assistant International Planet Risks (Base Travel Demand</li></ul>		Τ.	Haveval	40/ 400/	0	Dada tha base madelling investigation	Minan	10	200	25	Law
1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction		Unusual	1% - 10%	2	Redo the base modelling investigation	Minor	10	20	25	Low
1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	No consequence	Negligible	1	4	28	Low
1.3 Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	No consequence	Negligible	1	3	29	Negligib
1.4 Crashes	crash savings aren't realised with implementation of HC4	Т	Unusual	1% - 10%	2	high accident rate	Minor	10	20	25	Low
1.5 Other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	No consequence	Negligible	1	3	29	Negligib
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)											
2.1 Project Scope	need to do more work on local roads than anticipated	Т	Unlikely	10% - 20%	3	health & safety - more accidents, ped accidents?	Medium	40	120	16	High
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Unusual	1% - 10%	2	reputation / image	Major	70	140	13	High
2.3 Funding	funding is unavailable	Т	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extren
2.4 Procurement	procurement problems	Т	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	20	High
2.5 Legislative/Regulation Issues	unforseen legislation (new)	T	Likely	>50%	5	project delayed or scope affected	Major	70	350	3	Extren
2.6 Document Control											
2.7 Market Issues	higher construction costs through market forces	T	Unlikely	10% - 20%	3	cost changes significantly	Major	70	210	8	Very Hi
2.8 Programming Issues											
2.9 Insolvency (Contractor)											
10 Contractual Claim/Dispute											
	increased risk due to proximity of live traffic lanes (to workers										
.11 Health and Safety	and public)	Т	Unusual	1% - 10%	2	injury occurs	Minor	10	20	25	Low
.12 Inadequate QC/QA			J	1,0 10,0	_						250
13 Post-Construction Liability											
14 Other											
17 Otrici											
.0 Cost Risks (Community, Political, Environmental, land and F	(reports)										
.1 Community	increased costs and time	Т	Unlikely	10% - 20%	3	legal action and political protest	Minor	10	30	24	Modera
3.2 Industrial Action by Others	increased costs and time	ı ı	Offlikely	1076 - 2076	3	legal action and political protest	IVIII IOI	10	30	24	Modera
		<b>-</b>	I Indiana.	400/ 000/	2		Maralissas	40	100	40	11:-1-
3.3 Ecological Issues 3.4 Impact on Public Health	increased costs with mitigating environ impacts	T	Unlikely	10% - 20%	3		Medium	40	120	16	High
3.4 Impact on Public Health	construction activity greater than anticipated	l l	Unusual	1% - 10%	2	No consequence	Negligible	1	2	31	Negligik
	onerous conditions imposed. Additional costs to obtain HPT	_									
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Medium	40	160	12	Very Hi
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Unlikely	10% - 20%	3	time and cost over base case 5yrs	Major	70	210	8	Very Hi
3.7 Building Consent											
3.8 Land - Designation (combined with 3.6)											
3.9 Land - Purchase	land purchases delayed	Т	Quite Common	20% - 50%	4	delays to programme and increased costs for land purchase	Major	70	280	4	Very Hig
.10 Political	loss of political support (no unity)	Т	Unusual	1% - 10%	2	delays to project & revision of objectives	Major	70	140	13	High
.11 Other							,				
1.0 Cost Risks (Site Conditions, Engineering, Services, Natural I	Events)										
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	16	High
4.2 Design Standards (Definition)	changes to current design standards	T	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	4	Very H
1.3 Client Initiated Changes			222 30			,,,					10.,11
4.4 New/Change in Technology											
4.5 Topographical Data	lack of topographical data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	4	Very H
4.6 Site/Ground Conditions	lack of topographical data	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	8	Very H
4.7 Design Issues (combined with 4.6)	naon or lino / data	1	Offlikely	1070 2070	3	Tabley 5 to project and moreascu 605ts	iviajui	70	210	0	Very II
4.8 Design Changes	onsite conditions necessitate design changes	т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	4	Very H
4.8 Redesign / Rework (combined with 4.8)	onsite conditions necessitate design changes		Quite Common	20% - 50%	4	luciays to project and increased costs	iviajui	70	200	4	very H
4.9 Redesign / Rework (combined with 4.8)  10 Buildability											
	un de se dise etc TM elle sur en es	-	Lie col	40/ 400/			Marill	40	60	00	100
11 Traffic Management	underestimate TM allowances	Т	Unusual	1% - 10%	2		Medium	40	80	20	High
12 Impact of Value Engineering (Risk/Opportunity Assessment)	4. ". ". ". ". ".	_		404						, -	
13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	T	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	13	High
14 Issues - Pavement/Surfacing		Т	Unlikely	10% - 20%	3		Major	70	210	8	Very H
.15 Issues - Structures		Т	Quite Common	20% - 50%	4		Substantial	100	400	2	Extren
.16 Traffic Control and Lighting		Т	Unusual	1% - 10%	2		Medium	40	80	20	High
17 Services		T	Rare	<1%	1		Major	70	70	23	High
	significant natural event (unusual event) during construction										
18 Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	16	High
19 Other											
I	1	I	_1	ı L			1				1

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
Ė	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
iun	Expected	75% - 90%	4
ort	Likely	50% - 75%	3
Opportu	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

	Event			Likelihood				quence		Risk	
Ref. Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Category
1.0 Benefit Risks (Base Travel Demand, Growth Forecasts, A		Opportunity	(Table 1a of 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating Rating)	Ranking	Category
1.1 Base Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Minor	10	20	29	Low
						don't have sufficient travel capacity so need new transport					
1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Minor	10	40	26	Moderate
1.3 Assignment / Mode Choice	change from 58	Ť	Unlikely	10% - 20%	3	don't have sufficient travel capacity so need new transport	Minor	10	30	27	Moderate
1.4 Crashes	crash savings aren't realised with implementation of HC4	T	Unusual	1% - 10%	2	high accident rate	Medium	40	80	23	High
1.5 Other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	no consequences	Negligible	1	3	31	Negligible
2.0 Coot Bicks (Commercial Legal Foonemic Managerial)											
2.0 Cost Risks (Commercial, Legal, Economic, Managerial) 2.1 Project Scope	length creep	Т	Quite Common	20% - 50%	4	health & safety - more accidents, ped accidents?	Major	70	280	8	Very High
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Major	70	280	8	Very High
2.3 Funding	funding is unavailable	Т	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extreme
2.4 Procurement	procurement problems	Т	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	23	High
2.5 Legislative/Regulation Issues	unforseen legislation (new)	T	Likely	>50%	5	project delayed or scope affected	Major	70	350	3	Extreme
2.6 Document Control											
2.7 Market Issues	higher construction costs through market forces	Т	Unlikely	10% - 20%	3	cost changes significantly	Medium	40	120	18	High
2.8 Programming Issues 2.9 Insolvency (Contractor)											
2.10 Contractual Claim/Dispute											
E. 10 Somiacidai Giaini/Dispute	increased risk due to proximity of live traffic lanes (to workers										
2.11 Health and Safety	and public)	Т	Unlikely	10% - 20%	3	injury occurs	Medium	40	120	18	High
2.12 Inadequate QC/QA						.,,,					
2.13 Post Construction Liability											
2.14 Other											
3.0 Cost Risks (Community, Political, Environmental, land an		_	0 11 0	2004 5004				40	100	4.0	
3.1 Community 3.2 Industrial Action by Others	increased costs and time	Т	Quite Common	20% - 50%	4	legal action and political protest	Medium	40	160	13	Very High
3.3 Ecological Issues	increased costs with mitigating environ impacts	Т	Likely	>50%	5		Major	70	350	3	Extreme
3.4 Impact on Public Health	construction activity greater than anticipated	T	Unlikely	10% - 20%	3		Minor	10	30	27	Moderate
0.4 Impact of Fabric Floatin	onerous conditions imposed. Additional costs to obtain HPT		Orimitory	1070 2070	<b>.</b>		Willion	10	00	Li	Wiodorato
3.5 Heritage Issues (Historic Places Trust)	approval	Т	Quite Common	20% - 50%	4	change loaction of road	Medium	40	160	13	Very High
						· ·					, ,
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	T	Likely	>50%	5	time and cost over base case 5yrs	Major	70	350	3	Extreme
3.7 Building Consent											
3.9 Land Designation (combined with 3.6)											
3.8 Land - Designation (combined with 3.6)											
3.9 Land - Purchase	land purchases delayed	т	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	3	Extreme
3.10 Political	loss of political support (no unity)	T	Likely	>50%	5	delays to project & revision of objectives	Major	70	350	3	Extreme
3.11 Other	, soo or pointed and or provide and or			. 5575	-						
4.0 Cost Risks (Site Conditions, Engineering, Services, Natur	al Events)							1			
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	т	Quite Common	20% - 50%	4	delays to project and increased costs	Medium	40	160	13	Very High
4.1 Project Scope Definition (Onscheduled items) 4.2 Design Standards (Definition)	changes to current design standards	T	Quite Common	20% - 50%	4	delays to project and increased costs  delays to project and increased costs	Major	70	280	8	Very High
4.3 Client Initiated Changes	and the same as a surface and the same as a surface as a		Quito Common	2070 0070		2) 1 to project and more about obotio			200		. Jry riigir
4.4 New/Change in Technology											
4.5 Topographical Data	lack of topographical data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Medium	40	160	13	Very High
4.6 Site/Ground Conditions	lack of info / data	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	18	High
4.7 Design Issues (combined with 4.6)	to the state of th			000/							
4.8 Design Changes	onsite conditions necessitate design changes	T	Quite Common	20% - 50%	4	delays to project and increased costs	Medium	40	160	13	Very High
4.9 Redesign / Rework (combined with 4.8) 4.10 Buildability											
4.11 Traffic Management	underestimate TM allowances	Т	Unlikely	10% - 20%	3		Medium	40	120	18	High
4.11 Inamic Management 4.12 Impact of Value Engineering (Risk/Opportunity Assessment)	underesumate min anowances	· ·	Offlikely	10 /0 - 20 /0	3		IVICUIUITI	40	120	10	High
4.13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Minor	10	20	29	Low
4.14 Issues - Pavement/Surfacing		T	Unlikely	10% - 20%	3	,	Major	70	210	11	Very High
4.15 Issues - Structures		Ť	Quite Common	20% - 50%	4		Substantial	100	400	2	Extreme
4.16 Traffic Control and Lighting		T	Unusual	1% - 10%	2		Medium	40	80	23	High
4.17 Services		Т	Unlikely	10% - 20%	3		Major	70	210	11	Very High
	significant natural event (unusual event) during construction										
4.18 Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	18	High
4.19 Other											

ſ		Likely	>50%	5
	at	Quite Common	20% - 50%	4
	ırea	Unlikely	10% - 20%	3
	Ē	Unusual	1% - 10%	2
		Rare	<1%	1
ı	₹	Almost Certain	>90%	5
	Ë	Expected	75% - 90%	4
	ort	Likely	50% - 75%	3
	Opportunity	Unlikely	25% - 50%	2
	0	Very Linlikely	~25%	1

		Substantial	100
	ä	Major	70
	Threat	Medium	40
	È	Minor	10
		Negligible	1
Ī		Negligible	-1
	Ë	Minor	-10
	ort	Medium	-40
	Opportunit	Major	-70
	0	Substantial	-100

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	Event	<b>T</b> 1	David Control	Likelihood				quence	0	Risk	
Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Categ
Benefit Risks (Base Travel Demand, Growth Forecasts, Assi		Оррогини	(Table Ta Of Tb)	Probability	Kating	Consequences	(Table 2)	Rating	(Kalling Kalling)	Ranking	Categ
Base Travel Demand	Inaccuracy in base info data, found pre construction	T	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	22	High
						don't have sufficient travel capacity so need new transport					
Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	3	Extrer
	,					don't have sufficient travel capacity so need new transport					
Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	facility	Substantial	100	300	9	Very H
Crashes - opportunity to reduce crashes	crash savings aren't realised with implementation of HC4	T	Unlikely	10% - 20%	3	high accident rate	Major	70	210	12	Very H
Other - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Substantial	100	300	9	Very H
Cost Risks (Commercial, Legal, Economic, Managerial)											
Project Scope	need to do more work on local roads than anticipated	T	Unlikely	10% - 20%	3	highway well understood	Major	70	210	12	Very F
Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	<u>T</u>	Unlikely	10% - 20%	3	only WCC TLA	Medium	40	120	26	Hig
Funding	funding is unavailable	<u>T</u>	Quite Common	20% - 50%	4	project doesn't proceed	Substantial	100	400	3	Extre
Procurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	29	Hig
Legislative/Regulation Issues	unforseen legislation (new)	T	Rare	<1%	1	?? Cant read what's written	Major	70	70	31	Hig
Document Control Market Issues	higher construction costs through market forces	Т	Likoby	>50%	F	aget changes significantly	Substantial	100	500	4	Extre
Programming Issues	higher construction costs through market forces	ı	Likely	>30%	5	cost changes significantly	Substantial	100	500	ı	Exile
Programming issues Insolvency (Contractor)											
Contractual Claim/Dispute											
Communication of the contract	increased risk due to proximity of live traffic lanes (to workers										
Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	19	Very
Inadequate QC/QA			Linoty	- 5570		,,	calum	10	200		VOIY
Post-Construction Liability											
Other											
Cost Risks (Community, Political, Environmental, land and F	Property)										
Community	increased costs and time	T	Unlikely	10% - 20%	3	less community severance / ?? Of property	Major	70	210	12	Very
dustrial Action by Others			,				,				
cological Issues	increased costs with mitigating environ impacts	T	Unlikely	10% - 20%	3	less ratepayers risk	Major	70	210	12	Very
mpact on Public Health	construction activity greater than anticipated	T	Unlikely	10% - 20%	3	less risk than coast	Medium	40	120	26	Hi
	onerous conditions imposed. Additional costs to obtain HPT										
Heritage Issues (Historic Places Trust)	approval	T	Unusual	1% - 10%	2	low risk, few values	Substantial	100	200	19	Very
Resource Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Unlikely	10% - 20%	3	simpler consent process	Major	70	210	12	Very
Building Consent											
Land - Designation (combined with 3.6)											
,											
Land - Purchase	land purchases delayed	<u>T</u>	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	8	Extre
Political	loss of political support (no unity)	Т	Unusual	1% - 10%	2	delays to project & revision of objectives	Substantial	100	200	19	Very
Other											
Cost Risks (Site Conditions, Engineering, Services, Natural	Events)										
Project Scope Definition (Unscheduled Items)	substantial scope changes	т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Extr
Design Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extr
Client Initiated Changes	Jee 12 Earlie 22 July 20 July					,	222200100				
New/Change in Technology											
opographical Data	lack of topographical data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Extr
Site/Ground Conditions	lack of info / data	T	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	26	Hi
Design Issues (combined with 4.6)						,					1
Design Changes	onsite conditions necessitate design changes	T	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	3	Extr
Redesign / Rework (combined with 4.8)											
Buildability											
raffic Management	underestimate TM allowances	T	Unlikely	10% - 20%	3		Major	70	210	12	Very
mpact of Value Engineering (Risk/Opportunity Assessment)											
hanges Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	22	Hi
ssues - Pavement/Surfacing		T	Unusual	1% - 10%	2		Major	70	140	22	Hi
ssues - Structures		Т	Unlikely	10% - 20%	3		Substantial	100	300	9	Very
		Т	Unusual	1% - 10%	2		Medium	40	80	29	Н
raffic Control and Lighting		Т	Unlikely	10% - 20%	3		Major	70	210	12	Very
raffic Control and Lighting	assume services not adequately mapped										1
Traffic Control and Lighting Services	assume services not adequately mapped significant natural event (unusual event) during construction										
raffic Control and Lighting services latural Events		Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	22	н
affic Control and Lighting ervices	significant natural event (unusual event) during construction	T	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	22	н

Date of Risk Review: 24/02/2005 Compiled by: Darren Cash Contributors:

Very subject to downstream constraints plus Petone / Grenada flow / 1.2 volumes
1.5 Opportunities exist to optimise use of extra lane - HOV / HOT
2.4 Have some potential fpr PPP

	Likely	>50%	5
お	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
È	Unusual	1% - 10%	2
	Rare	<1%	1
_			
Opportunity	Almost Certain	>90%	5
Ę	Expected	75% - 90%	4
ā	Likely	50% - 75%	3
d	Unlikely	25% - 50%	2
-	Very Unlikely	<25%	1

	Substantial	100
ät	Major	70
Threat	Medium	40
Ė	Minor	10
	Negligible	1
Opportunity	Negligible	-1
Ę	Minor	-10
ē	Medium	-40
ô	Major	-70
•	Substantial	-100

Very High High Medium

E CONTRACTOR DE	Event			Likelihood				quence		Risk	
	What? How?	Threat /	Descriptor				Descriptor		Score		
ef. Description	(What can happen and how can it happen)	Opportunity	(Table 1a or 1b)	Probability	Rating	Consequences	(Table 2)	Rating	(Rating * Rating)	Ranking	Categor
.0 Benefit Risks (Base Travel Demand, Growth Forecasts, Assignate Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Major	70	140	23	High
. I base Travel Demand	inaccuracy in base into data, found pre construction	'	Unusuai	1% - 10%	2	, ,	iviajoi	70	140	23	High
		_				don't have sufficient travel capacity so need new transport		400	400		
1.2 Growth Forecasts	growth forecasts are inadequatly low	Т	Quite Common	20% - 50%	4	facility	Substantial	100	400	8	Extren
2 Assignment / Made Chaice	under estimation of made above off roll modelling parameters	т	Unlikely	10% - 20%	3	don't have sufficient travel capacity so need new transport	Cubatantial	100	300	44	Van. U
1.3 Assignment / Mode Choice	under estimation of mode share off rail, modelling parameters				3	facility	Substantial		210	11	Very H Very H
I.4 Crashes I.5 Other - Oil Shock	crash savings aren't realised with implementation of HC4	<u> </u>	Unlikely Unlikely	10% - 20% 10% - 20%	3	high accident rate major mode shift	Major Substantial	70 100	300	16 11	Very F
1.5 Other - Oil Shock	oil prices skyrocket	'	Utilikely	10% - 20%	3	major mode shirt	Substantial	100	300	11	very
2.0 Cost Risks (Commercial, Legal, Economic, Managerial)											
2.1 Project Scope	need to do more work on local roads than anticipated	Т	Likely	>50%	5	health & safety - more accidents, ped accidents?	Substantial	100	500	1	Extre
2.2 Team Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	T	Quite Common	20% - 50%	4	reputation / image	Medium	40	160	21	Very F
2.3 Funding	funding is unavailable	Ť	Likely	>50%	5	project doesn't proceed	Substantial	100	500	1	Extre
2.4 Procurement	procurement problems	T	Unusual	1% - 10%	2	time delay to contract	Medium	40	80	29	Hig
2.5 Legislative/Regulation Issues	unforseen legislation (new)	Ť	Unusual	1% - 10%	2	project delayed or scope affected	Major	70	140	23	High
2.6 Document Control	()		0.12.2	1,7	_						9
2.7 Market Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Substantial	100	500	1	Extre
2.8 Programming Issues											
2.9 Insolvency (Contractor)											
10 Contractual Claim/Dispute											
	increased risk due to proximity of live traffic lanes (to workers										
11 Health and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	20	Very F
12 Inadequate QC/QA											
13 Post-Construction Liability											
14 Other											
.0 Cost Risks (Community, Political, Environmental, land and P	Property)										
.1 Community	increased costs and time	T	Likely	>50%	5	legal action and political protest	Major	70	350	10	Extre
.2 Industrial Action by Others											
3.3 Ecological Issues	increased costs with mitigating environ impacts	T	Unusual	1% - 10%	2		Major	70	140	23	Hig
3.4 Impact on Public Health	construction activity greater than anticipated	T	Quite Common	20% - 50%	4		Medium	40	160	21	Very H
	onerous conditions imposed. Additional costs to obtain HPT										
B.5 Heritage Issues (Historic Places Trust)	approval	Т	Unlikely	10% - 20%	3	change loaction of road	Medium	40	120	26	High
3.6 Resource Management Act Consents	substantial delays in obtaining consents & associated costs	T	Quite Common	20% - 50%	4	time and cost over base case 5yrs	Major	70	280	13	Very H
3.7 Building Consent											
3.8 Land - Designation (combined with 3.6)											
3.9 Land - Purchase	land purchases delayed	T	Likely	>50%	5	delays to programme and increased costs for land purchase	Substantial	100	500	1	Extrer
10 Political	loss of political support (no unity)	T	Unlikely	10% - 20%	3	delays to project & revision of objectives	Major	70	210	16	Very H
.11 Other											
4.0 Cost Risks (Site Conditions, Engineering, Services, Natural E	Events)							,			
			1								
4.1 Project Scope Definition (Unscheduled Items)	substantial scope changes	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	11	Extre
4.2 Design Standards (Definition)	changes to current design standards	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre
1.3 Client Initiated Changes											
1.4 New/Change in Technology											
1.5 Topographical Data	lack of topographical data	Т	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	16	Very I
4.6 Site/Ground Conditions	lack of info / data	Т	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Extre
4.7 Design Issues (combined with 4.6)											
1.8 Design Changes	onsite conditions necessitate design changes	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Major	70	280	13	Very I
1.9 Redesign / Rework (combined with 4.8)											
10 Buildability											
11 Traffic Management	underestimate TM allowances	Т	Quite Common	20% - 50%	4		Major	70	280	13	Very I
12 Impact of Value Engineering (Risk/Opportunity Assessment)											
13 Changes Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Medium	40	80	29	Hig
14 Issues - Pavement/Surfacing		T	Unlikely	10% - 20%	3		Medium	40	120	26	Hig
15 Issues - Structures		Т	Quite Common	20% - 50%	4		Substantial	100	400	8	Extre
16 Traffic Control and Lighting		T	Unusual	1% - 10%	2		Medium	40	80	29	Hig
17 Services		Т	Unlikely	10% - 20%	3		Medium	40	120	26	Hig
	significant natural event (unusual event) during construction										
18 Natural Events	causes damage	T	Unlikely	10% - 20%	3	delays to project and increased costs	Major	70	210	16	Very F
19 Other											
•	•	•	•			•					•
Date of Risk Revi	iew: 24/02/2005		Likely	>50%	5		Substantial	100			Extre
		1		i l		· I	1		i		

	Likely	>50%	5
at	Quite Common	20% - 50%	4
Threat	Unlikely	10% - 20%	3
<del> </del>	Unusual	1% - 10%	2
	Rare	<1%	1
nity	Almost Certain	>90%	5
Ë	Expected	75% - 90%	4
o To	Likely	50% - 75%	3
Opportu	Unlikely	25% - 50%	2
0	Very Unlikely	<25%	1

| Substantial | 100 | Major | 70 | Medium | 40 | Minor | 10 | Medigible | 1 | Medium | 40 | Medium | 40 | Medium | 40 | Medium | 40 | Minor | 10 | Medium | 40 | Medium | 40 | Major | 40 | Major | 40 | Major | 40 | Substantial | 4100 | Medium | 40 | Major | 40 | Maj

Greater Wellington Regional Council / Transit New Zealand Western Corridor Transportation Study Page 1 of 1

	Event		- David	Likelihood				quence		Risk	
Description	What? How? (What can happen and how can it happen)	Threat / Opportunity	Descriptor (Table 1a or 1b)	Probability	Rating	Consequences	Descriptor (Table 2)	Rating	Score (Rating * Rating)	Ranking	Cate
nefit Risks (Base Travel Demand, Growth Forecasts, Ass	<u> </u>										
se Travel Demand	Inaccuracy in base info data, found pre construction	Т	Unusual	1% - 10%	2	Redo the base modelling investigation	Medium	40	80	28	Hi
wth Forecasts	growth forecasts are inadequatly low	т	Quite Common	20% - 50%	4	don't have sufficient travel capacity so need new transport	Substantial	100	400	2	Ext
WIII FOIECASIS	growth forecasts are madequally low		Quite Common	20% - 30%	4	facility don't have sufficient travel capacity so need new transport	Substantial	100	400	2	EXI
signment / Mode Choice	under estimation of mode share off rail, modelling parameters	Т	Unlikely	10% - 20%	3	facility	Substantial	100	300	9	Very
ashes - opportunity to reduce crashes	crash savings aren't realised with implementation of HC4	T	Unlikely	10% - 20%	3	high accident rate	Substantial	100	300	9	Very
ner - Oil Shock	oil prices skyrocket	Т	Unlikely	10% - 20%	3	major mode shift	Medium	40	120	23	H
st Risks (Commercial, Legal, Economic, Managerial)											
ject Scope	need to do more work on local roads than anticipated	T	Unlikely	10% - 20%	3	highway well understood	Medium	40	120	23	H
am Relationships (Performance, Communications etc)	break down in stakeholder relationships (within team)	Т	Unlikely	10% - 20%	3	only WCC TLA	Medium	40	120	23	ŀ
nding	funding is unavailable	T	Quite Common	20% - 50%	4	project doesn't proceed	Substantial	100	400	2	Ex
curement gislative/Regulation Issues	procurement problems unforseen legislation (new)	T T	Unusual Rare	1% - 10% <1%	2	time delay to contract ?? Cant read what's written	Medium Major	40 70	80 70	28 31	H
cument Control	uniorseen regisiation (new)		Itaic	V170	<u>'</u>	:: Oant read what's whiten	iviajoi	10	10	31	
rket Issues	higher construction costs through market forces	Т	Likely	>50%	5	cost changes significantly	Major	70	350	7	Ext
gramming Issues											
<del>olvency (Contractor)</del>											
ntractual Claim/Dispute	increased risk due to proximity of live traffic lanes (to workers										
alth and Safety	and public)	Т	Likely	>50%	5	injury occurs	Medium	40	200	17	Ver
dequate QC/QA											
st-Construction Liability											
<del>ner</del>											
st Risks (Community, Political, Environmental, land and	Property)										1
mmunity	increased costs and time	Т	Unlikely	10% - 20%	3	less community severance / ?? Of property	Major	70	210	11	Ver
ustrial Action by Others			S.I.I.I.G.I.	1070 2070		The second secon	major		2.0		
ological Issues	increased costs with mitigating environ impacts	Т	Unlikely	10% - 20%	3	less ratepayers risk	Major	70	210	11	Ver
pact on Public Health	construction activity greater than anticipated	Т	Unlikely	10% - 20%	3	less risk than coast	Medium	40	120	23	H
ritage Issues (Historic Places Trust)	onerous conditions imposed. Additional costs to obtain HPT approval	_	Unusual	1% - 10%	2	low risk, few values	Substantial	100	200	17	Ver
inage issues (Historic Flaces Trust)	арргоча	l	Ullusual	176 - 1076		low risk, rew values	Substantial	100	200	17	vei
source Management Act Consents	substantial delays in obtaining consents & associated costs	Т	Unlikely	10% - 20%	3	simpler consent process	Major	70	210	11	Ver
ilding Consent											
and Designation (searchine) with 2.6\											
nd - Designation (combined with 3.6)											
nd - Purchase	land purchases delayed	Т	Likely	>50%	5	delays to programme and increased costs for land purchase	Major	70	350	7	Ext
olitical	loss of political support (no unity)	T	Unusual	1% - 10%	2	delays to project & revision of objectives	Substantial	100	200	17	Ver
ner											
st Risks (Site Conditions, Engineering, Services, Natural	Events)										
oject Scope Definition (Unscheduled Items)	substantial scope changes	T	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	2	Ex
sign Standards (Definition)	changes to current design standards	T	Likely	>50%	5	delays to project and increased costs	Substantial	100	500	1	Ex
ent Initiated Changes w/Change in Technology											
pographical Data	lack of topographical data	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	2	Ex
e/Ground Conditions	lack of info / data	T	Unlikely	10% - 20%	3	delays to project and increased costs	Medium	40	120	23	l H
sign Issues (combined with 4.6)											
sign Changes	onsite conditions necessitate design changes	Т	Quite Common	20% - 50%	4	delays to project and increased costs	Substantial	100	400	2	Ex
design / Rework (combined with 4.8)											
idability  Iffic Management	underestimate TM allowances	Т	Unlikely	10% - 20%	3		Major	70	210	11	Ver
pact of Value Engineering (Risk/Opportunity Assessment)			S.I.Miloty	1373 2070			ajoi	10	210	.,	1
anges Arising from Safety Audits	safety audit affects scope more than allowed for	Т	Unusual	1% - 10%	2	delays to project and increased costs	Major	70	140	20	H
ues - Pavement/Surfacing		T	Unusual	1% - 10%	2		Major	70	140	20	H
ues - Structures		T	Unlikely	10% - 20%	3		Major	70	210	11	Ver
ffic Control and Lighting	assume services not adequately mapped	T T	Unusual Unlikely	1% - 10% 10% - 20%	3		Medium Major	40 70	80 210	28 11	Ver
nines	significant natural event (unusual event) during construction	1	Officely	10 /0 - 20 /0	3		iviajui	70	210	11	ver
rvices				1% - 10%	2	delays to project and increased costs	Major	70	140	20	F
tural Events	causes damage	Т	Unusual	170 - 1070							
ural Events		Т	Unusual	1 /6 - 10 /6							
tural Events		Т	Unusual	176 - 1076			·				
tural Events ner  Date of Risk Rev	causes damage view: 24/02/2005	Т	Likely	>50%	5		Substantial	100	7		
tural Events  —er  Date of Risk Rev Compile	view: 24/02/2005 d by: Darren Cash	ea T	Likely Quite Common	>50% 20% - 50%	5 4	to bo	Major	70			Ver
	view: 24/02/2005 d by: Darren Cash	Threat	Likely Quite Common	>50%		Threat					Ext Very H

Notes: Very subject to downstream constraints plus Petone / Grenada flow / volumes (HOV) 2.1
3.4 opportunity - reduced emissions

=00/	
y >50%	5
e Common 20% - 50%	4
tely 10% - 20%	3
sual 1% - 10%	2
<1%	1
ost Certain >90%	5
ected 75% - 90%	4
y 50% - 75%	3
xely 25% - 50%	2
Unlikely <25%	1
	tely 10% - 20% sual 1% - 10% - 10% - 11% -

	Substantial	100
ä	Major	70
Threat	Medium	40
	Minor	10
	Negligible	1
oity.	Negligible	-1
Ę	Minor	-10
Opportunity	Medium	-40
ဝိ	Major	-70
	Substantial	-100



## Appendix 5

## **Opportunity Risks**

#### **OPPORTUNITIES 'BRAIN STORMING'**

	COMMUNITY	ECOLOGY	POLITICS	ENGINEERING
MEDIA, IMAGE	consult after	sea protection		truckway
	flood	coastal		24hr work
	educate on how they			
	save (Consumer	interprete - destroy? /		
	report)	protect		innovation
				fast, timely, info
				(spend more but more
	CO2 savings	media campaign		efficient)
	_	1 -		iconic
				invisible coast
				smart highway
	viewing - sign post	eco slope stability		gateway
ENVIRONMENT		forest link (bird corridor)		
LIVIKONWENT	cycle track	(P Bay)		electric hybrid priority
	general sign post	wetland enhancement		
			team united voice to	
	tourist		govt	big initial budget
	advertise			tolls
				developers do work -
FUNDING (LESS COST)				BOOT
FUNDING (LESS COST)				services
				lane rental
				HOT lane
				tidal 1 way peak
				direction
HEALTH & SAFETY	reduce severence			rest lay by / walk
	emergency route			eng / client spec H&S
	security			stds
				access to walking
				tracks (secure
	access to hospital			parking)
	discover history			
	better access to			
	regional parks			
	enhance heritage			
	through corridor			