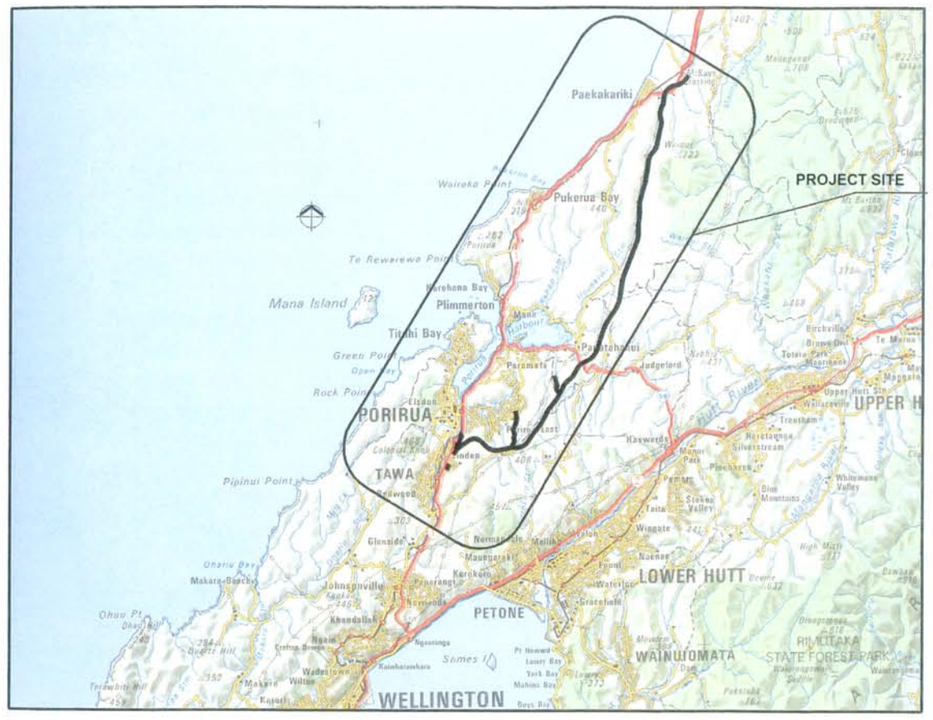

Transmission Gully Motorway
Cost Estimate – Executive Summary

Transmission Gully Motorway - Cost Estimate

1 Introduction

In August 2003, Transit New Zealand (TNZ) commissioned the update of the current cost estimate for the Transmission Gully Motorway project to obtain more certainty in the estimated cost of the project prior to committing funds for geotechnical investigation.

This executive summary report has been produced to summarise the feasibility design work undertaken and the subsequent cost estimate update prepared under the August 2003 commission.

The updated estimate has been produced in accordance with the requirements set out in Transit New Zealand's Cost Estimation Manual (SM014). The estimate is to be called an Option Estimate (OE) as **no on-site geotechnical investigation** has been undertaken.

2 Background

In 1989, Wellington Regional Council (WRC) issued the findings of the Greater Wellington Area Land Use and Transport Strategic Review (GATS), which led to the adoption of the Inland (Transmission Gully) route as the preferred location of the future SH1.

TNZ adopted a revised route for which they obtained designation and in April 1996 the cost estimate was updated based on earthwork rates obtained from local contractors. The estimated cost of $210.2 million (viaduct option) was presented in a technical report dated May 1997 called "Inland Motorway Linden to MacKays Crossing (Transmission Gully) Technical Report – Volume 1.

In November 1998 the cost estimate was updated to $245.3 million (viaduct option) to include the following items:

- Escalation from April 1996 to November 1998 (based on CCI forecast);
- Tolling; and
- Updated contingency allowances

3 Scope of Work

The Transmission Gully Motorway project is defined as a 27 kilometre long motorway (with tolling) from MacKays Crossing in the north, through SH58 to the southern reconnection to SH1 near Linden.

The projects major components are as follows:

- Four lane motorway from MacKays Crossing to Linden
- Grade separated interchanges at Linden, Kenepuru, Warspite Avenue, James Cook Drive, SH58 and SH1 near MacKays crossing
- Two lane link roads at Kenepuru, Warspite Avenue and James Cook Drive

Separately, Beca have also prepared cost estimates for the following alternatives:

- At-grade intersection at Warspite Avenue
- At-grade intersection at James Cook Drive
- No tolling facilities
- Motorway to Motorway ramps from north to east at SH58

The Option Estimate is based on a Design and Construct method of procurement.

4 Feasibility Design

The following feasibility design tasks were undertaken during the preparation of the Option Estimate:

- Update of digital terrain model
- Updated alignment to generally achieve design speed of 120km/h, radius curves of 600m and no cut slope heights greater than 50m
- Geotechnical Report – desktop review. Note: **No on-site geotechnical investigation** has been undertaken
- Ecology Report - desktop review
- Drainage – desktop review
- Structures – desktop review including generic sketches
- Updated property purchase estimates

5 Cost Estimate Process

The cost estimate is determined through establishing a set of costs in the following progressive order:

Base Estimate

The total sum of the elements that make up an estimate, inclusive of:

- Property Purchase costs (Nett);
- Investigation & Reporting costs;
- Design and Project Documentation costs;
- Construction: MSQA and Physical Works cost.

The physical works base estimate is produced from the sum of calculated quantities from a drawing multiplied by the current market rates for each work item. No contingencies are allowed for at this stage.

Expected Estimate

The base estimate plus an allowance for contingency produced from a project specific risk analysis that calculates the statistical average (mean) of the cost impact of risk.

95th Percentile Estimate The Expected Estimate plus an allowance for funding risk produced from a project specific risk analysis to calculate the statistical 95th percentile cost impact of risk.

To provide additional confidence in the cost estimate, Transit NZ commissioned an Industry Expert to independently estimate the physical works component of the estimate and review the risk analysis that derived the allowances for contingency and funding risk. The Industry Expert and Consultant reconciled their estimates to present one agreed estimate as included in this report.

6 Exclusions from the Option Estimate

The following items denote the exclusions from the Option Estimate:

- Sunk Costs (I&R Only)
- Goods and Services Tax (GST)
- Escalation
- Operating costs associated with the project outcome

7 Option Estimate Summary

An Option Estimate (OE) is prepared during the Investigation & Reporting phase of a project. The OE includes an Expected Estimate and 95th Percentile Estimate. These estimates are based on a preliminary brief, limited site information and general information about the type of construction, scope of work and possible alignment. All risks must be identified and their impact on the out-turn cost analysed and included in the estimate.

Estimated rates reflect the current market rates that are appropriate to the defined scope of works and where required new rates have been calculated based on a "first principal" basis.

A Risk Analysis has been undertaken to ascertain allowances for contingency and funding risk based on the output from the risk management workshops carried out on the 29th and 30th of January 2004.

The Expected Estimate is $830,000,000 and the 95th Percentile Estimate is $950,000,000.

Separately, Beca have also prepared Expected additions/reductions for the following alternatives:

- At-grade intersection at Warspite Avenue: Expected Reduction of $15 million.
- At-grade intersection at James Cook Drive: Expected Reduction of $10 million.
- No tolling facilities: Expected Reduction of $18 million.
- Motorway to Motorway ramps from north to east at SH58: Expected Addition of $20 million.

Transmission Gully Motorway

Option Estimate

OE

Item	Description	Base Estimate	Contingency	Funding Risk
A	**Project Property Cost**	**20,600,000**	**8,000,000**	**6,000,000**
B	**Investigation and Reporting (Including Geotech Investigation)**	**22,000,000**	**7,300,000**	**7,000,000**
C	**Design and Project Documentation**	**22,000,000**	**11,000,000**	**13,000,000**
	Construction			
1	**MSQA, Transit Managed Costs and Consent monitoring fees**	21,000,000	3,000,000	5,000,000
	Physical Works			
	Main Highway		162,700,000	66,650,000
2	Environmental Compliance	14,300,000		
3	Earthworks	73,000,000		
4	Ground Improvements	4,200,000		
5	Drainage	13,300,000		
6	Pavement and Surfacing	28,800,000		
7	Bridges	218,600,000		
8	Retaining Walls	15,700,000		
9	Traffic Services	14,300,000		
10	Service Relocations	6,800,000		
11	Landscaping	8,000,000		
12	Traffic Management and Temporary Works	300,000		
13	Preliminary and General	59,600,000		
	Interchanges			
14	Linden Interchange (SH1/TGM Connection)	10,200,000	Included above	Included above
15	Kenepuru Interchange (Grade Separated)	23,900,000	Included above	Included above
16	SH58 Interchange (Grade Separated)	16,800,000	3,500,000	6,350,000
17	Warspite Avenue (Grade Separated)	10,200,000	3,000,000	5,000,000
18	James Cook Drive (Grade Separated)	6,400,000	1,500,000	3,000,000
	Links			
19	Warspite Avenue (2,000m - Allowance only)	10,000,000	3,300,000	5,000,000
20	James Cook Drive (950m - Allowance only)	5,000,000	1,700,000	3,000,000
D	**Total Construction**	**560,400,000**	**178,700,000**	**94,000,000**
Total Base Estimate		**625,000,000**		
E	Analysed Contingency		**205,000,000**	
Expected Estimate			**830,000,000**	
F	Analysed Funding Risk			**120,000,000**
95th percentile Estimate				**950,000,000**

Date of Estimate: 08/03/2004	**Cost Index**	**1,089**
Estimate prepared by: Carl Viljoen	**Signed**	
Estimate internal peer review by: Gerard Lieshout	**Signed**	
Estimate external peer review by: Rob MacDonald & Associates	**Signed**	

Note: These estimates are exclusive of Sunk I&R Costs, Escalation and Goods and Services Tax (GST).

8 Comparison with Previous Estimates

A summary of the movement of cost from the CCI updated November 1998 estimates ($245 million) and the March 2004 Option Estimate ($830 million) is listed below:

- The following items were excluded from the 1998 estimate and have now been included in the 2004 estimate:
  - Land Purchase Costs
  - Environmental Mitigation during and post construction
  - Ground improvement works at the SH58 Interchange
  - ATMS ducts and pits for future provision of an Automated Traffic Management System
  - Revegetation
  - Grade separated interchanges & links at Warspite Avenue and James Cook Drive
- The following design/construction changes have been made to improve the security and safety of the proposed route and to match future expectation of higher ecological and environmental standards:
  - 2004 alignment generally meets 120km/h design speed requirement
  - 2004 alignment generally meets requirement for no curves less than 600m radius
  - Widening of the alignment by over 3m to improve safety
  - TL5 edge and median barriers to bridges
  - Additional drainage provisions and the replacement of long culverts with bridge structures
  - No cut slopes greater than 50m. This has resulted in additional bridging
  - Increased Preliminary and General allowance to cover current, additional management requirements by contractors during construction

9 Risks and Opportunities

The following five risks impact on the accuracy of the cost estimate. These items may also be seen as opportunities to reduce the cost estimate. We have included possible treatment of these risks going forward to improve the accuracy of the cost estimate.

1. Geotechnical Conditions: The cost estimate is based on assumptions rather than on-site investigation. Undertaking on-site geotechnical investigation will improve the accuracy of the Base Estimate and reduce the residual risk component. Geotechnical type risks in the residual risk register sum to a statistical mean of $50 million and 95th Percentile of $80 million including geotechnical impacts on bridge structures.

2. Earthworks Balance: The Base Estimate assumes that dump and borrow sites will be found adjacent to the alignment (within 2.5km radius). Geotechnical investigations will provide more certainty of earthworks balances. However, investigation into possible dump and borrow sites should be undertaken.

3. Environmental impacts during construction: Size of open areas, winter works extent of Erosion and Sediment Control all impact on the accuracy of the cost estimate. Following further investigation, consultation should proceed and consents obtained to confirm the expected requirements.

4. Ecological impacts post construction: Length of culverts, extent of bridging and revegetation, fish passage, etc is included in the cost estimate. Following further investigation, consultation should proceed and consents obtained to confirm the expected requirements.

5. Design Standards: Changes to design standards to improve safety and route security. Complete Scheme Assessment to develop opportunities and/or reduce risk associated with the standard of design required for the route.

10 Programme

A preliminary programme has been prepared and analysed to obtain an Expected construction completion date of July 2014 and a 95th Percentile construction completion date of July 2015. **Note:** Funding risks are not included in this analysis.

11 Conclusion

Following reconciliation of the Option Estimate with the Industry Experts the Expected Estimate is $830,000,000 and the 95th Percentile Estimate is $950,000,000

We propose that the budget estimate for this project is set at the Expected Estimate of **$830,000,000** exclusive of escalation and GST.

The key activities to reduce the risk range of the cost estimate are:

- On-site geotechnical investigation
- Investigation into possible dump and borrow sites
- Obtaining of consents to confirm environmental and ecological impacts
- Completion of Scheme Assessment to confirm standard of design associated with safety and route security

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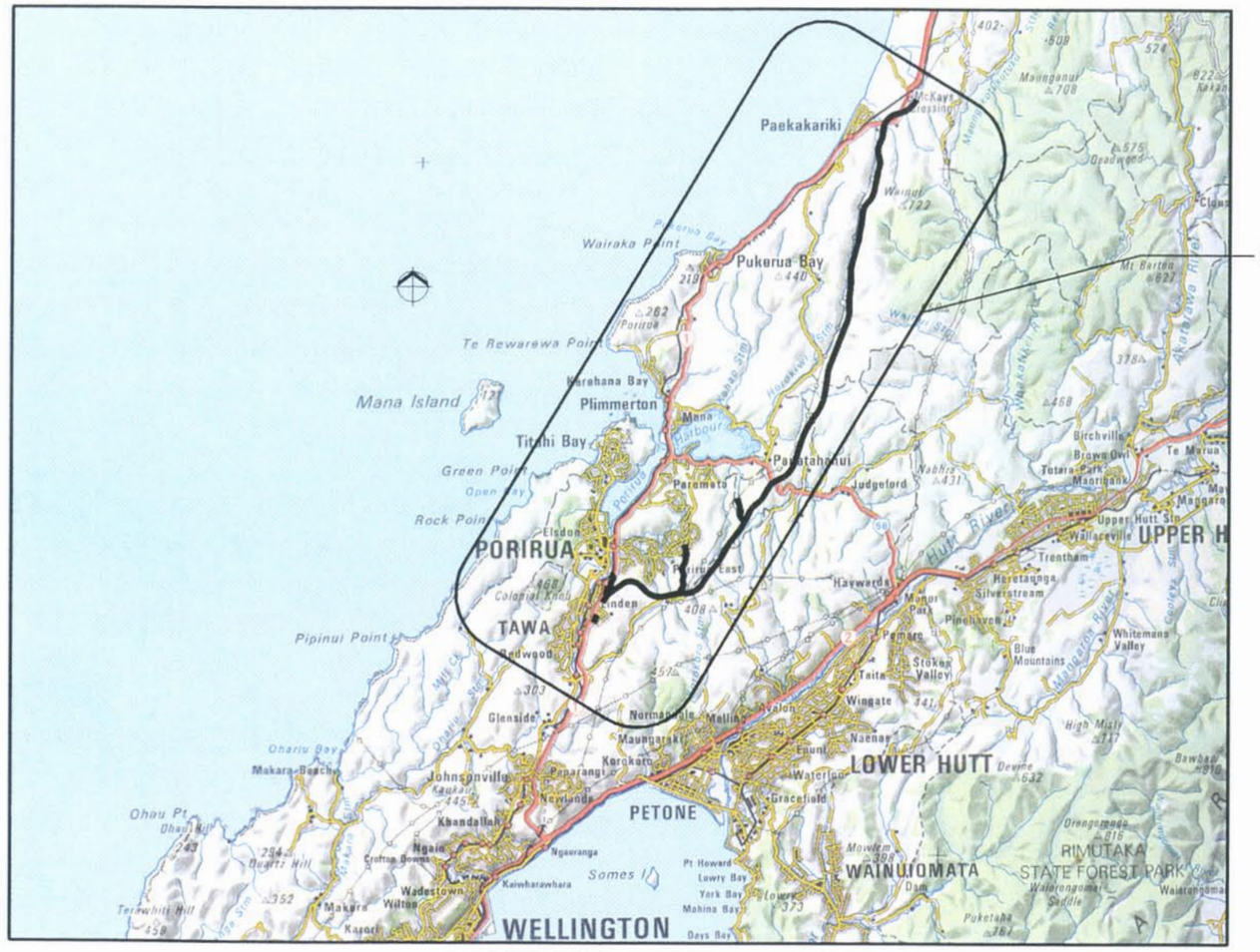
TRANSMISSION GULLY MOTORWAY
OPTION ESTIMATE

(VOLUME 2 : DRAWINGS)



DRAWING LIST

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C102	PLAN & LONG SECTION - SHEET 2	C112	PLAN & LONG SECTION - SHEET 12
C103	PLAN & LONG SECTION - SHEET 3	C113	PLAN & LONG SECTION - SHEET 13
C104	PLAN & LONG SECTION - SHEET 4	C114	PLAN & LONG SECTION - SHEET 14
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C107	PLAN & LONG SECTION - SHEET 7	C117	PLAN & LONG SECTION - SHEET 17
C108	PLAN & LONG SECTION - SHEET 8	C118	TYPICAL CROSS SECTION
C109	PLAN & LONG SECTION - SHEET 9	C119	AERIAL PHOTO LAYOUT PLAN

3203069/INDEX A

Drawing Plotted: 05 March 2004 11:22

AutoCAD Rel. 16

REALIGN ACCESS TRACK UNDER BRIDGE

WARSPITE AVE INTERCHANGE

CANNON CREEK BRIDGE

JOIN LINE

JOIN LINE

CANNONS CREEK BRIDGE

R1=800.00 L=710.24

P=3.77% L=1205.13

CL=90.00

D=410.58

CL=75.00

R=1000.00 L=201.26

CL=75.00

CL=100.00

R

R2=9700.00 L=715.18

RHS=6.7%

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No.	Revision	By	Chk	Appd	Date
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Drawn	ARM	9.03	
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* Refer to Revision 1 for Original Signatures

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Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 2

Discipline: CIVIL

Drawing No.: 3203069/C102

Rev: A

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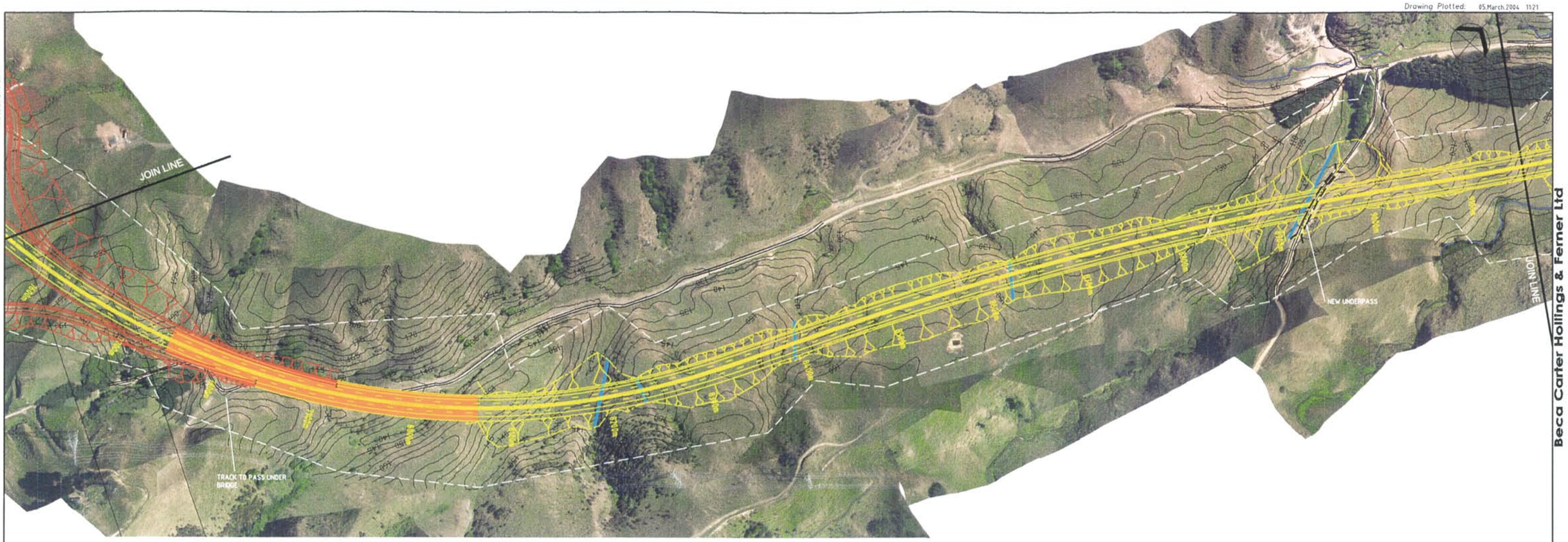

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Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 3

Discipline: CIVIL

Drawing No.: 3203069/C103

Rev: A

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AutoCAD Rel. 16

JOIN LINE

REALIGN TRACK

SOUTHERN TOLL PLAZA

SILVERWOOD FOREST

REALIGN TRACK AND CONSTRUCT UNDERPASS

REALIGN TRACK AND CONSTRUCT OVERPASS

R=3700.00 L=1010.44

R=4000.00 L=1025.15

D

CL=75.00

R=1000.00 L=148.82

CL=75.00

D=426.28

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Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 4

Discipline: CIVIL

Drawing No.: 3203069/C104

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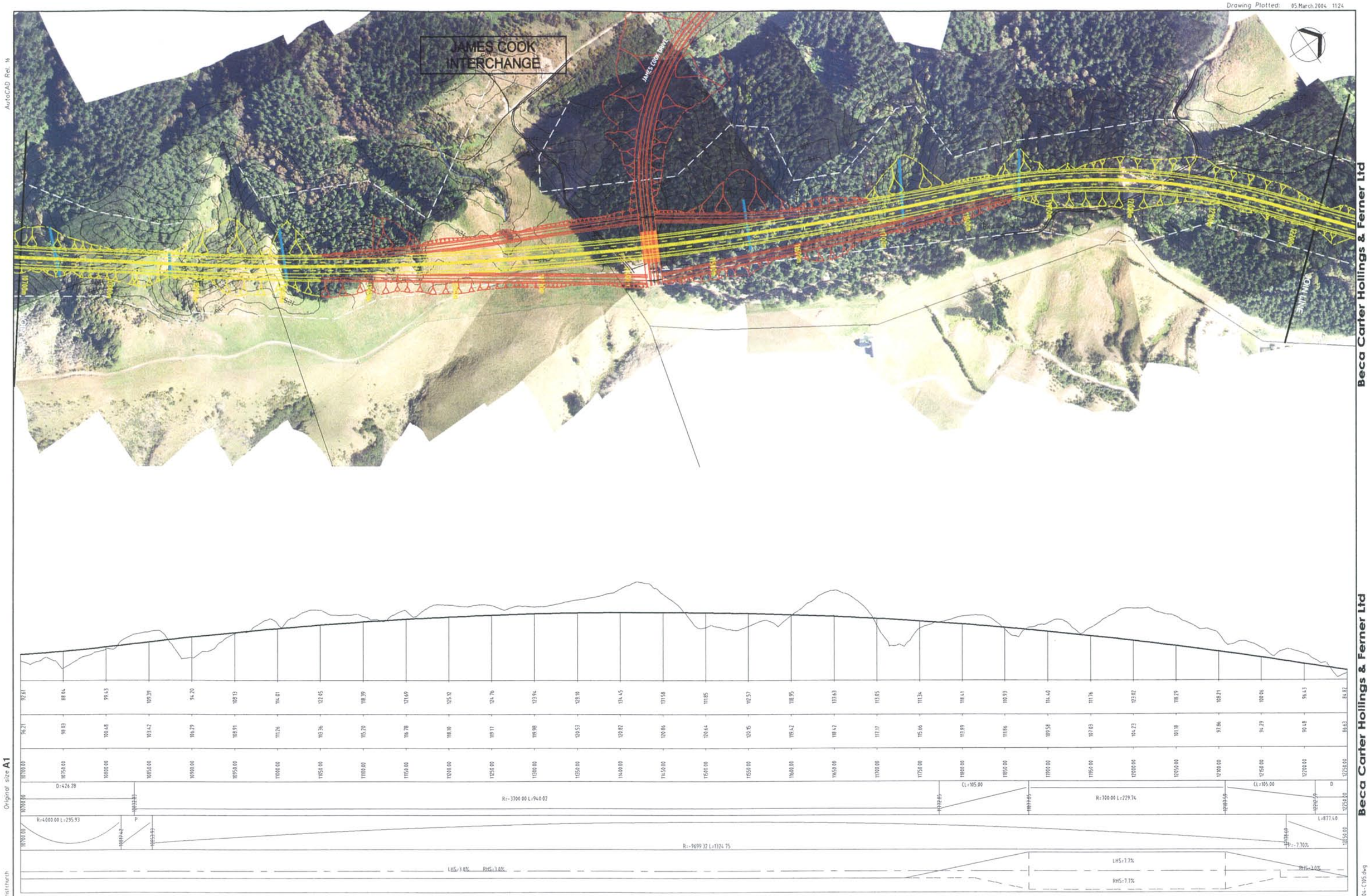

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Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 5

Discipline: CIVIL

Drawing No.: 3203069/C105

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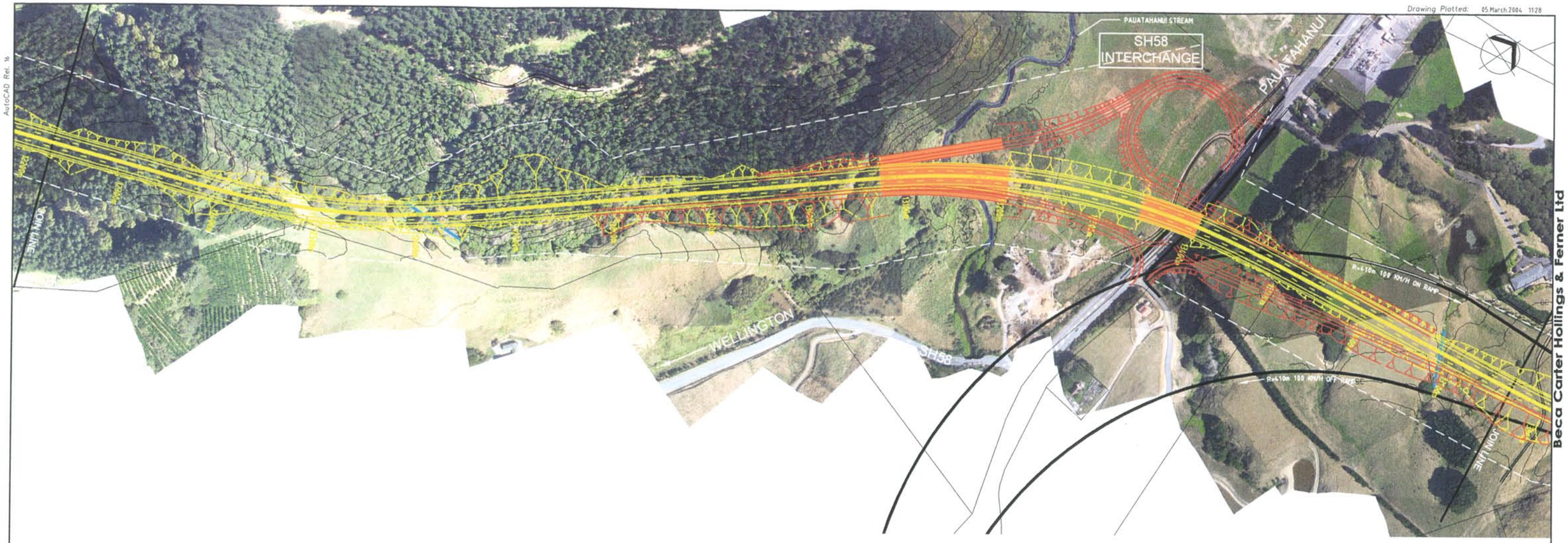

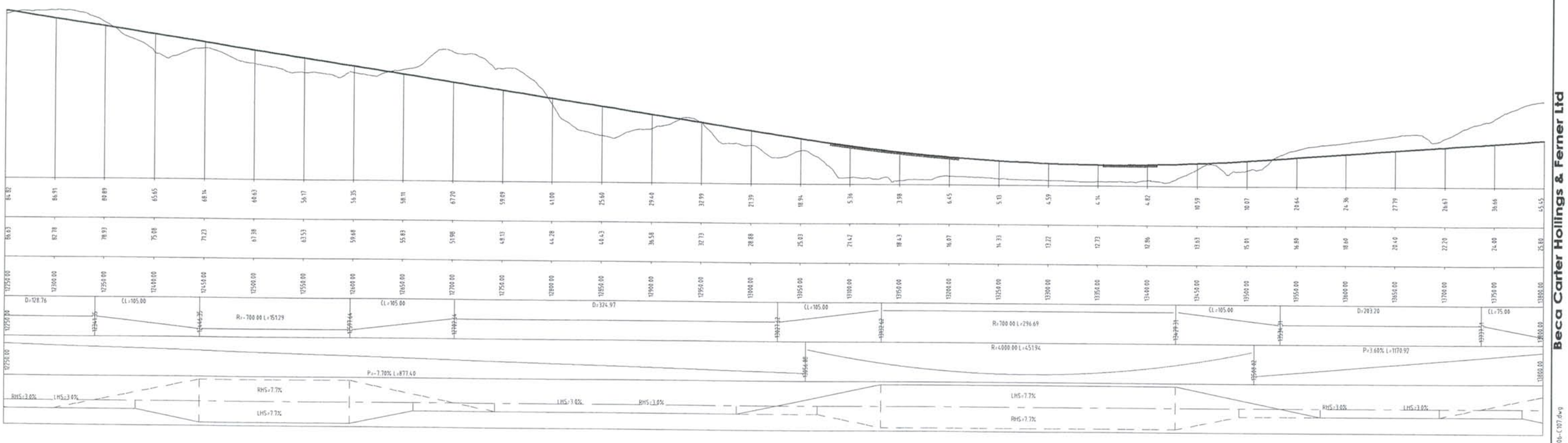

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Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 6

Discipline: CIVIL

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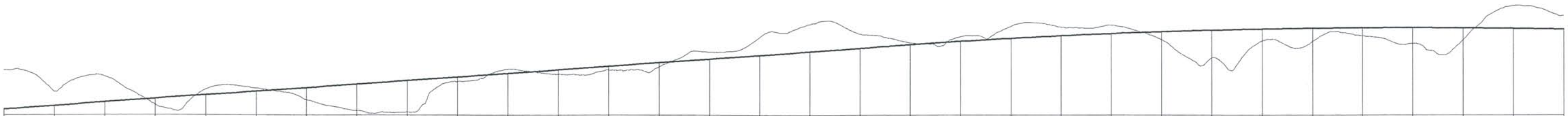

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25.80	27.60	29.40	31.20	33.00	34.80	36.60	38.39	40.19	41.99	43.79	45.59	47.39	49.19	50.99	52.79	54.59	56.39	58.17	59.81	61.28	62.57	63.69	64.63	65.40	66.00	66.42	66.68	66.75	66.66	66.39	65.94
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Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 7

Discipline: CIVIL

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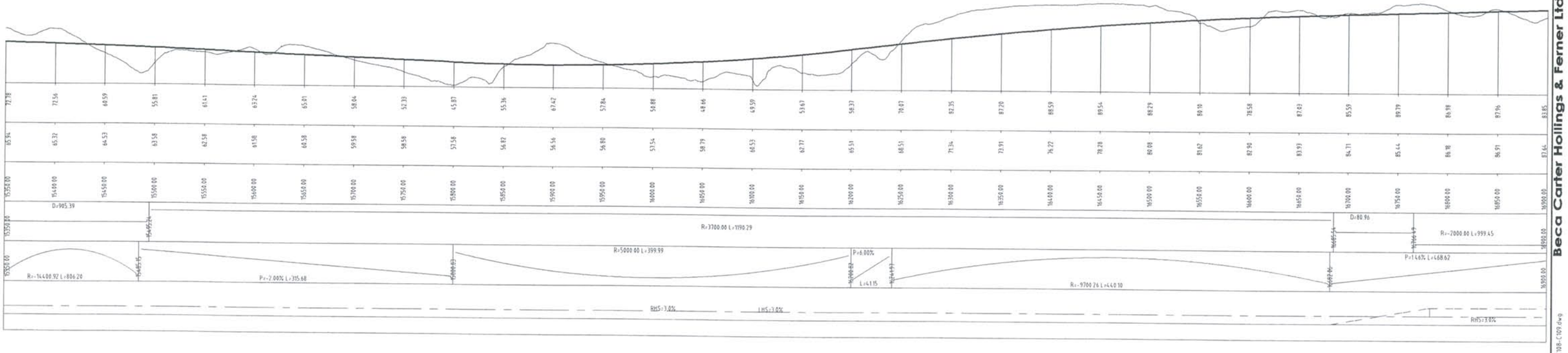

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Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 8

Discipline: CIVIL

Drawing No.: 3203069/C108

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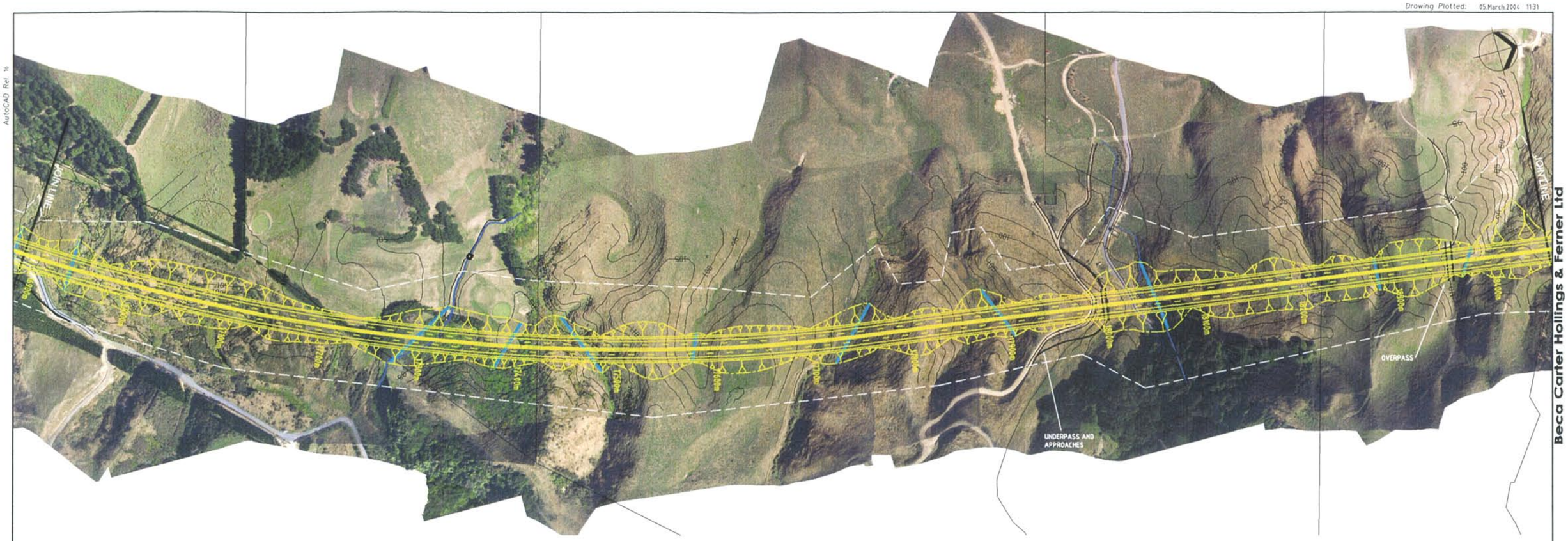

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Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 9

Discipline: CIVIL

Drawing No.: 3203069/C109

Rev.: A

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Document No. 3569108-C109.dwg

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Drawing Plotted: 05 March 2004 11:36

AutoCAD Rel. 16

PROVIDE TRACK TO OD UNDER BRIDGE

PROVIDE ACCESS ROAD UNDER BRIDGE

JOHN LINE

JOHN LINE

Beca Carter Hollings & Ferner Ltd

Original size A1

Originating Office: Christchurch

No	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:

Beca Carter Hollings & Ferner Ltd
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Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

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Reduced Scale (A3)	1:4000		
Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

DO NOT SCALE

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 10

Discipline: CIVIL

Drawing No.: 3203069/C110

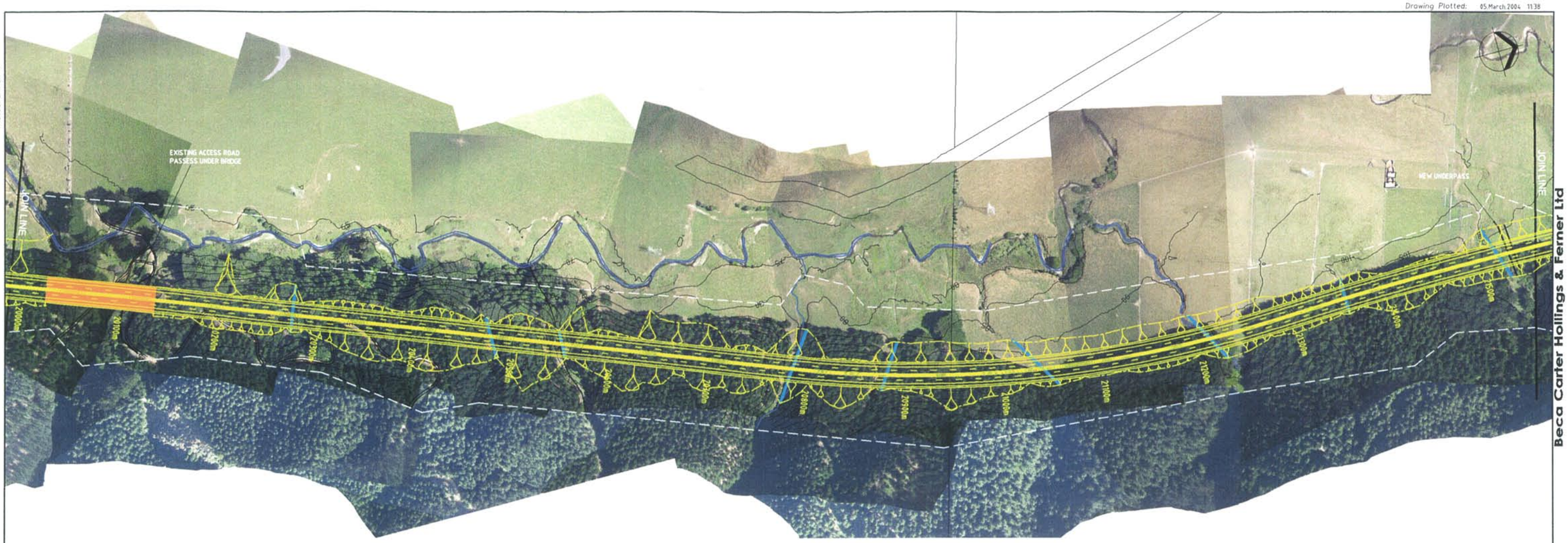
Rev.: A

IF IN DOUBT ASK.

Document No. 3369C110-C110.dwg

Beca Carter Hollings & Ferner Ltd

Drawing Plotted: 05 March 2004 11:38



No	Revision	By	Chk	Appd	Date
B	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga
Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000
Reduced Scale (A3)	1:4000

Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 11

Discipline: CIVIL

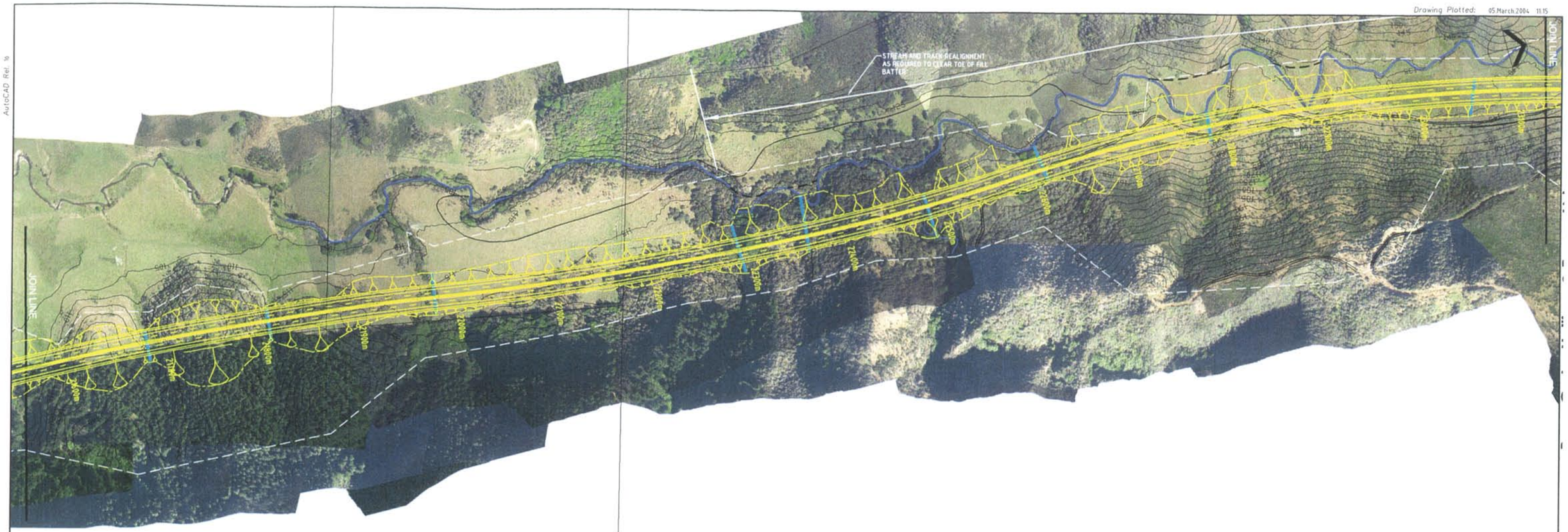
Drawing No.: 3203069/C111

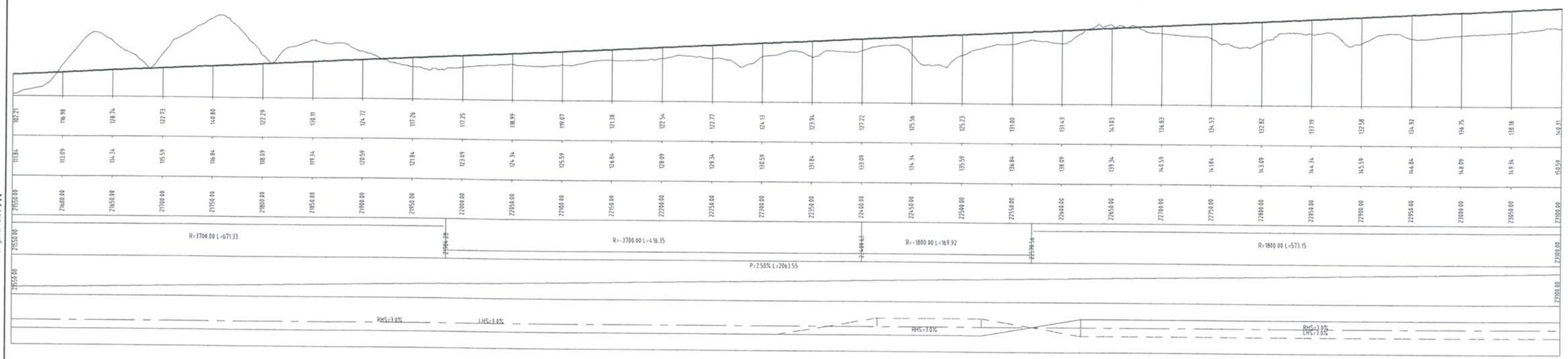
Rev.: A

DO NOT SCALE

IF IN DOUBT ASK.

Drawing Plotted: 05 March 2004 11:15





No	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga.
Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000	Design	DGA	9.03	Approved For Construction*
Reduced Scale (A3)	1:4000	Drawn	ARM	9.03	
		Dsg Check*			
		Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 12

Discipline: CIVIL

Drawing No.: 3203069/C112

Rev.: A

DO NOT SCALE

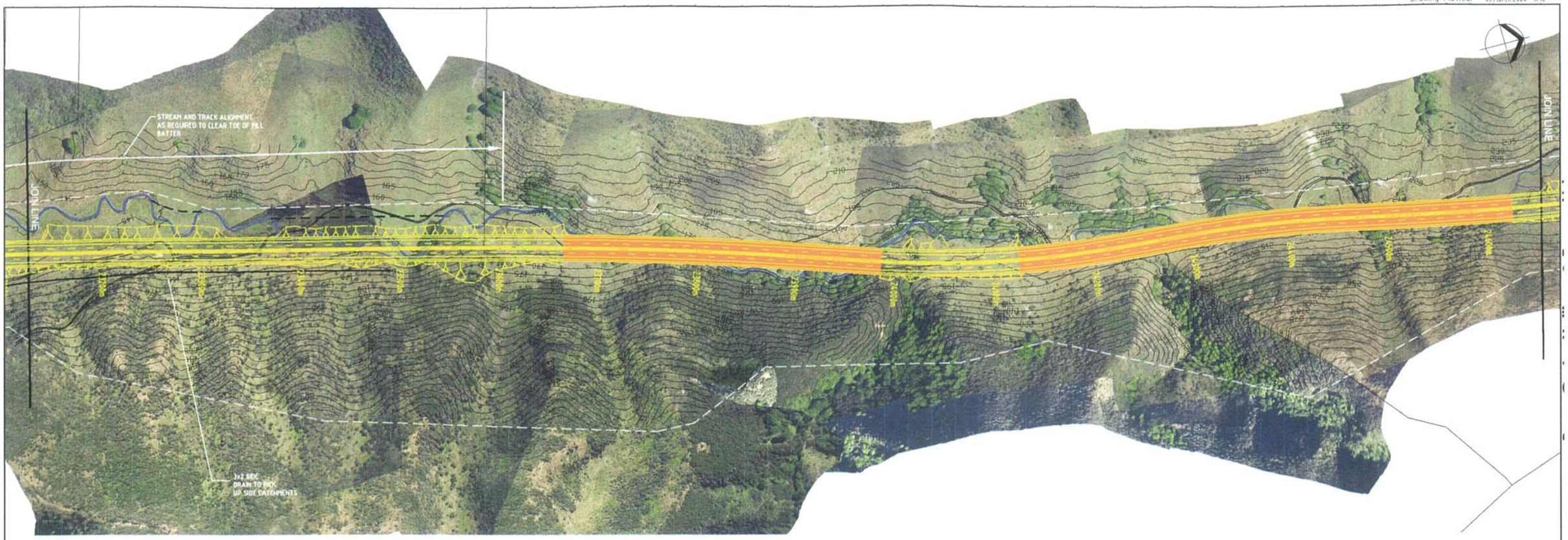
IF IN DOUBT ASK.

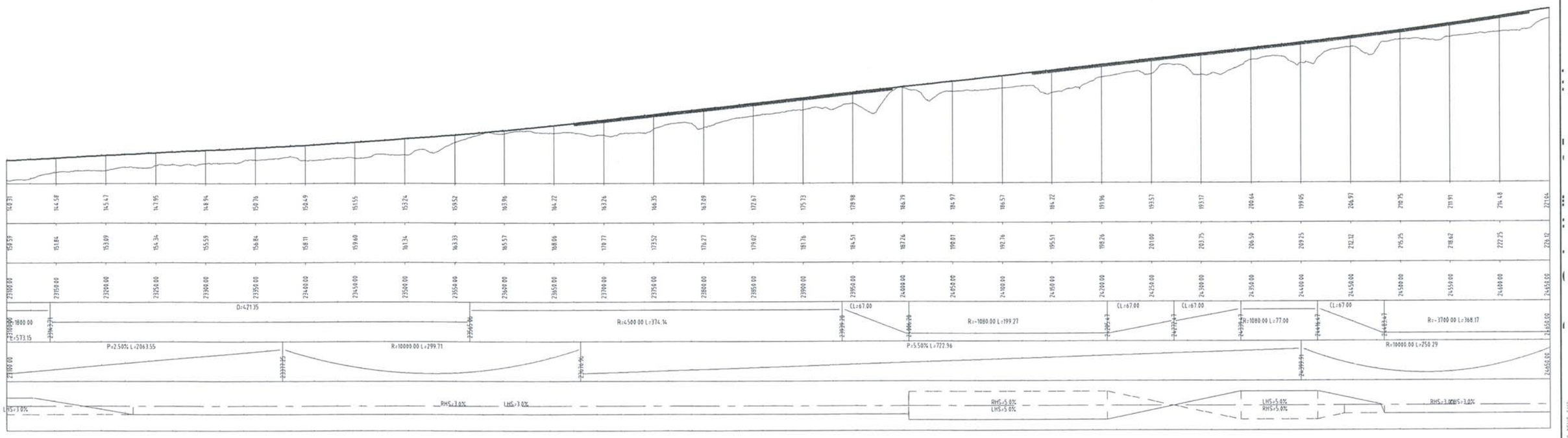
Original size A1

Originating Office: Christchurch

Drawing Plotted: 05 March 2004 11:16

AutoCAD Rel. 16





Original size A1

Originating Office: Christchurch

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga, Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1) 1:2000
Reduced Scale (A3) 1:4000

Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg. Check*			
Dwg. Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 13

Discipline: CIVIL

Drawing No.: 3203069/C113

Rev.: A

DO NOT SCALE

IF IN DOUBT ASK.

Drawing Plotted: 05 March 2004 11:40

AutoCAD Rel. 16

SUMMIT

OHARIU FAULT

REALON TRACK

JOIN LINE

JOIN LINE

KEY:

ZONE OF OHARIU FAULT

R=-3700.00 L=368.17

P=8.00% L=168.56

D=351.77

CL=110.00

R=675.00 L=305.87

CL=110.00

CL=80.00

R=-900.00 L=408.85

R=-7099.75 L=1135.96

P=-8.00% L=1915.05

LHS=3.0% RHS=3.0%

LHS=8.1%

RHS=8.1%

RHS=6.0%

LHS=6.0%

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga, Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000
Reduced Scale (A3)	1:4000

Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARAARA AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 14

Discipline: CIVIL

Drawing No.: 3203069/C114

Rev.: A

Originating Office: Christchurch

Original size: A1

DO NOT SCALE

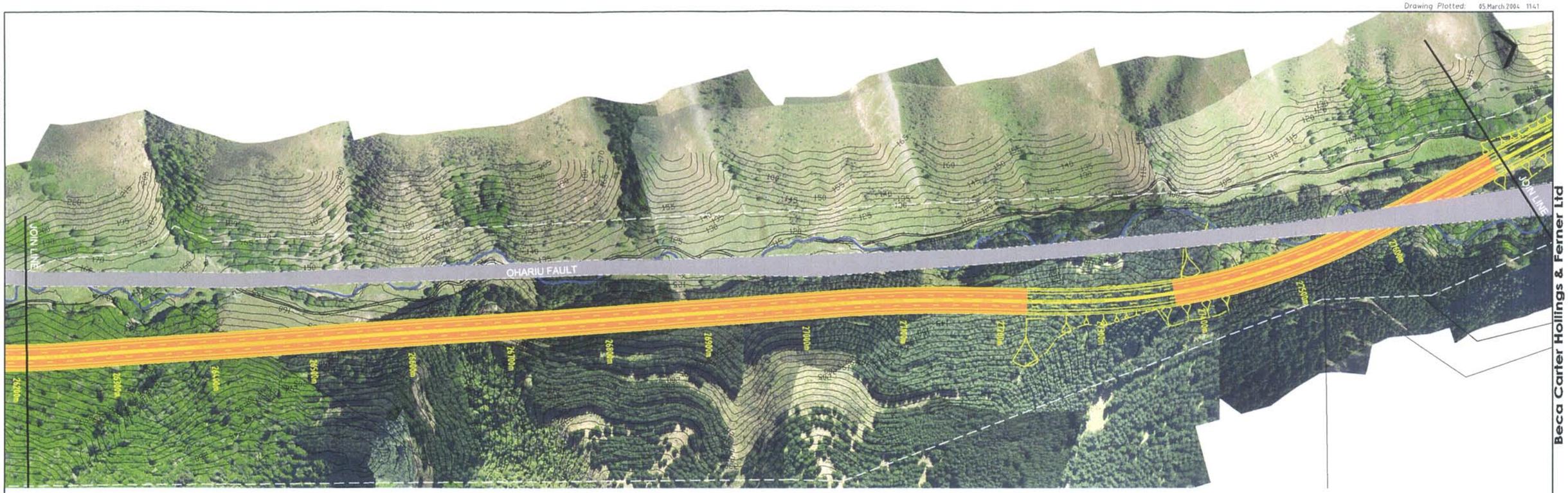
IF IN DOUBT ASK.

Beca Carter Hollings & Ferner Ltd

Document No. 3169(114-C115.dwg

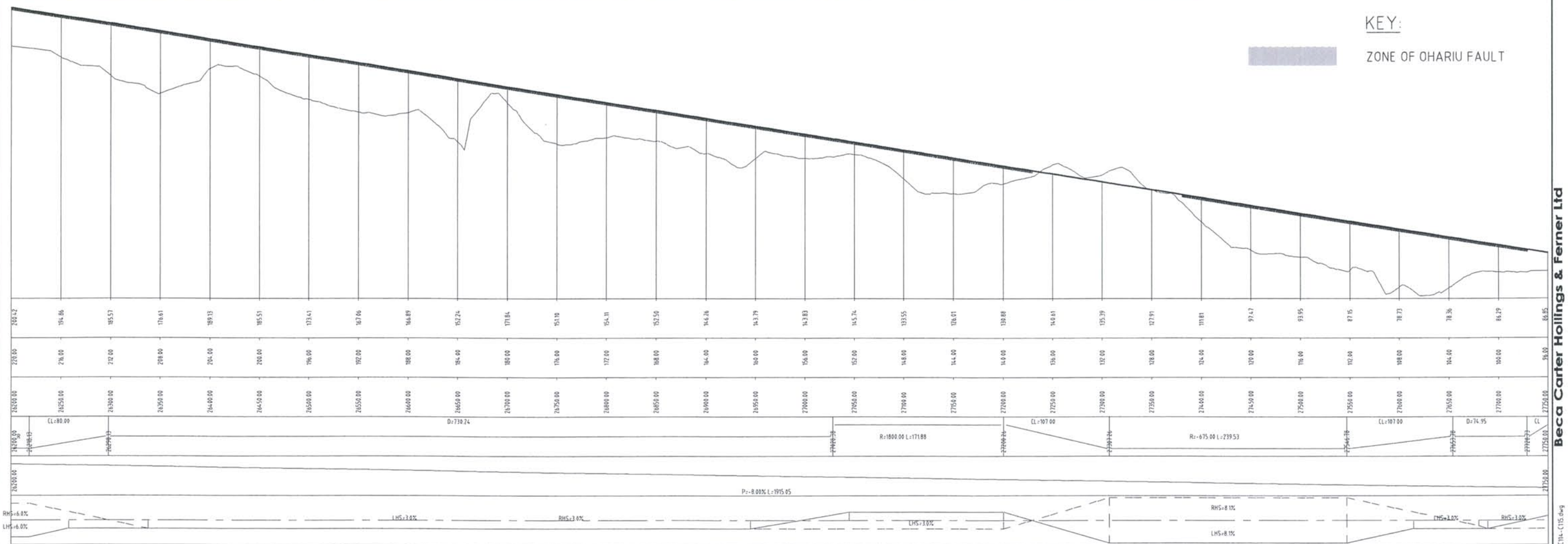
Beca Carter Hollings & Ferner Ltd

Drawing Plotted: 05 March 2004 11:41



KEY:

ZONE OF OHARIU FAULT



No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga, Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000		
Reduced Scale (A3)	1:4000		
Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU ADTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 15

Discipline: CIVIL

Drawing No.: 3203069/C115 Rev: A

DO NOT SCALE

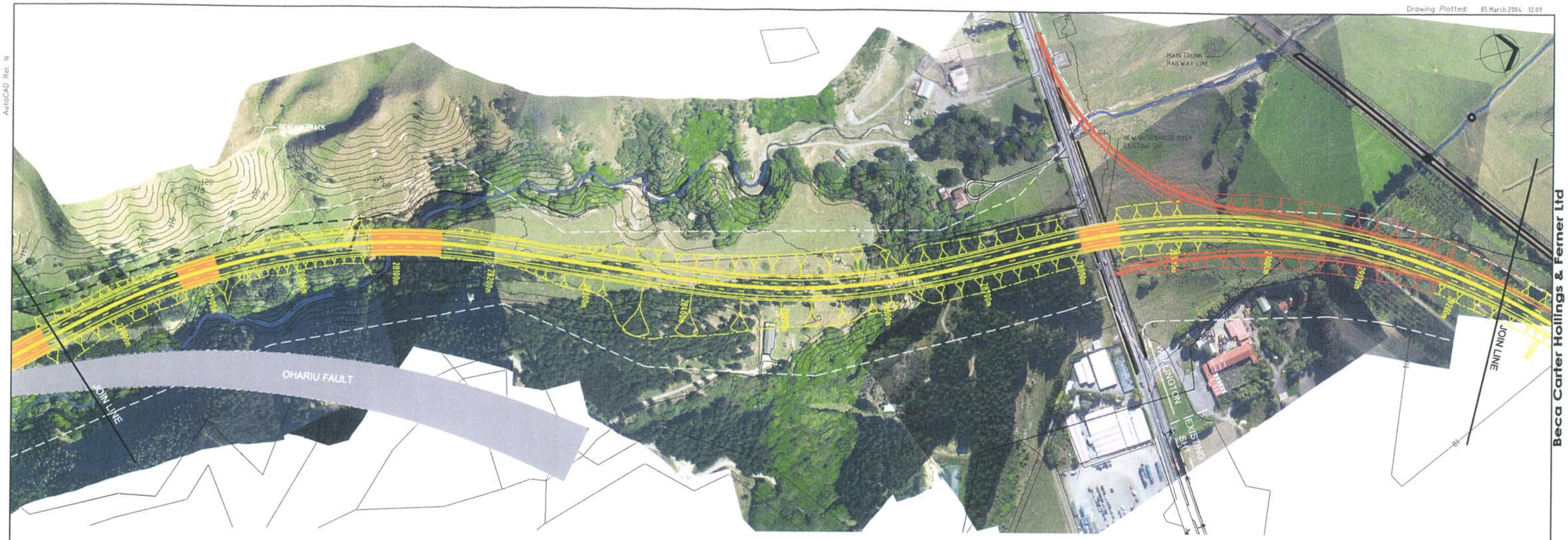
IF IN DOUBT ASK.

Document No. 3969714-C115.dwg

Originating Office: Christchurch

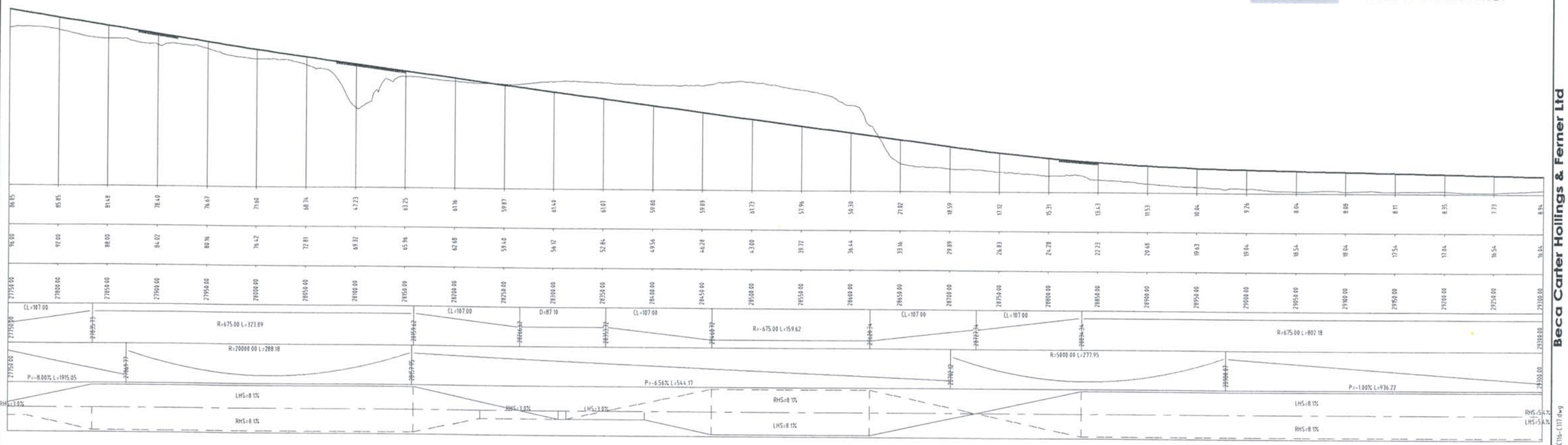
Original size A1

Drawing Plotted: 05 March 2004 12:09



KEY:

ZONE OF OHARIU FAULT



No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga
Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000		
Reduced Scale (A3)	1:4000		
Design	DGA	9.03	Approved For Construction*
Drawn	ARM	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 16

Discipline: CIVIL

Drawing No.: 3203069/C116

Rev.: A

DO NOT SCALE

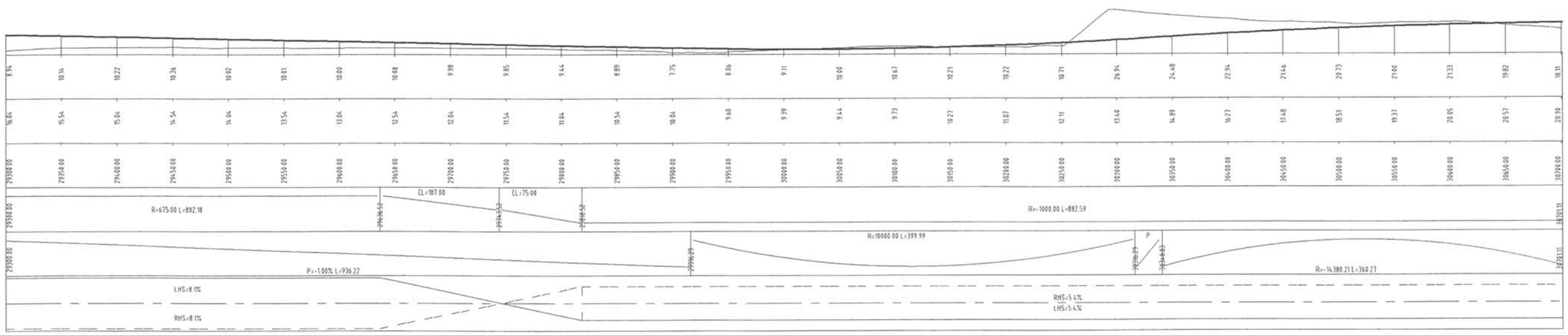
IF IN DOUBT ASK.

Drawing Plotted: 05.March.2004 12:10

AutoCAD Rel. 16

KEY:

ZONE OF OHARIU FAULT



No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION				9.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Touranga, Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	1:2000		
Reduced Scale (A3)	1:4000		
Design	DGA	9.03	Approved For Construction*
Drawn	ARN	9.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: PLAN AND LONG SECTION SHEET 17

Discipline: CIVIL

Drawing No.: 3203069/C117

Rev: A

DO NOT SCALE

IF IN DOUBT ASK.

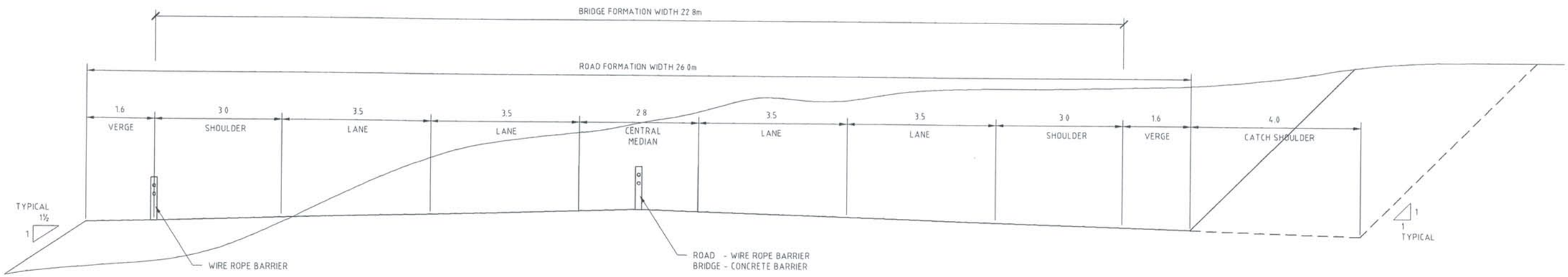
Originating Office: christchurch

Original size A1

Beca Carter Hollings & Ferner Ltd

Document No. 3069116-C117.dwg

Drawing Plotted: 05 March 2004 11:14



* 4 0m CATCH SHOULDER PROVIDED
WHEN CUT SLOPES EXCEED 30m IN HEIGHT

TYPICAL CROSS SECTION
TRANSMISSION GULLY MOTORWAY

SCALE 1:50

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JAM			10.03

Drawing Originator:
Beca Carter Hollings & Ferner Ltd
Consulting Engineers
Auckland, Wellington, Christchurch, Hamilton, New Plymouth, Tauranga, Melbourne, Sydney, Singapore, Port Moresby, Jakarta, Kuala Lumpur.

Original Scale (A1)	AS SHOWN		
Reduced Scale (A3)	½ SHOWN		
Design	DGA	10.03	Approved For Construction*
Drawn	JAM	10.03	
Dsg Check*			
Dwg Check*			Date

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: TYPICAL CROSS SECTION

Discipline: CIVIL

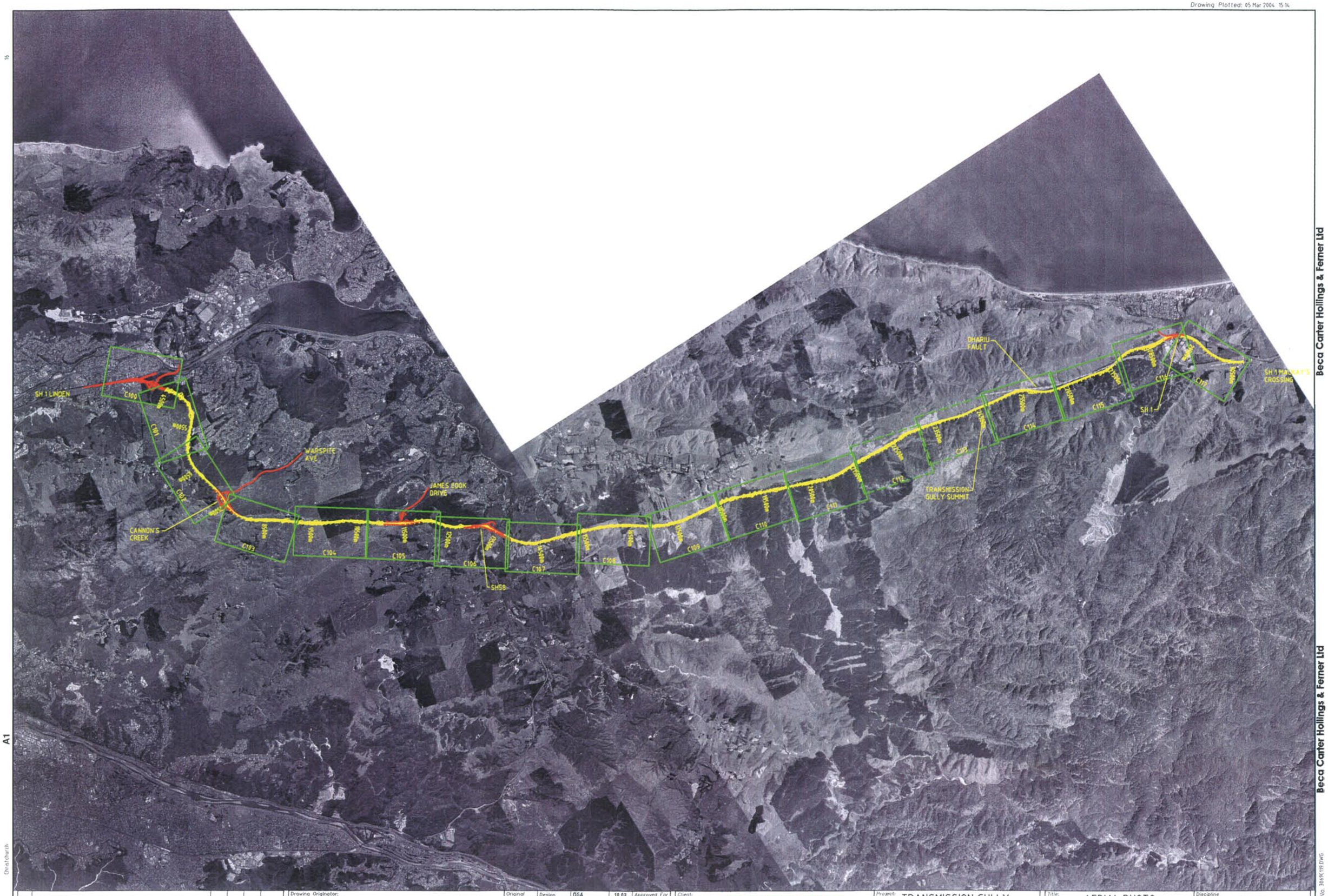
Drawing No.: 3203069/C118

Rev: A

DO NOT SCALE

IF IN DOUBT ASK.

Drawing Plotted: 05 Mar 2004 15:14



Beca Carter Hollings & Ferner Ltd

Beca Carter Hollings & Ferner Ltd

A1

Christchurch

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	RJS			03.04

Drawing Originator:

Beca Carter Hollings & Ferner Ltd
Australia, Brazil, Brunei, China, India, Indonesia, Malaysia, Myanmar, New Caledonia, New Zealand, Papua New Guinea, Singapore

Original Scale (A1)	Design	DGA	10.03
NTS	Drawn	RJS	03.04
Reduced Scale (A3)	Dsg Check*		
NTS	Dwg Check*		Date

Approved For Construction*

* Refer to Revision 1 for Original Signatures

Client: TRANSIT NEW ZEALAND ARARAU AOTEAROA

Project: TRANSMISSION GULLY MOTORWAY OPTION ESTIMATE

Title: AERIAL PHOTO LAYOUT PLAN

Discipline: CIVIL

Drawing No.: 3203069/C119

Rev.: A

Document No: 3169C119.DWG

DO NOT SCALE

IF IN DOUBT ASK