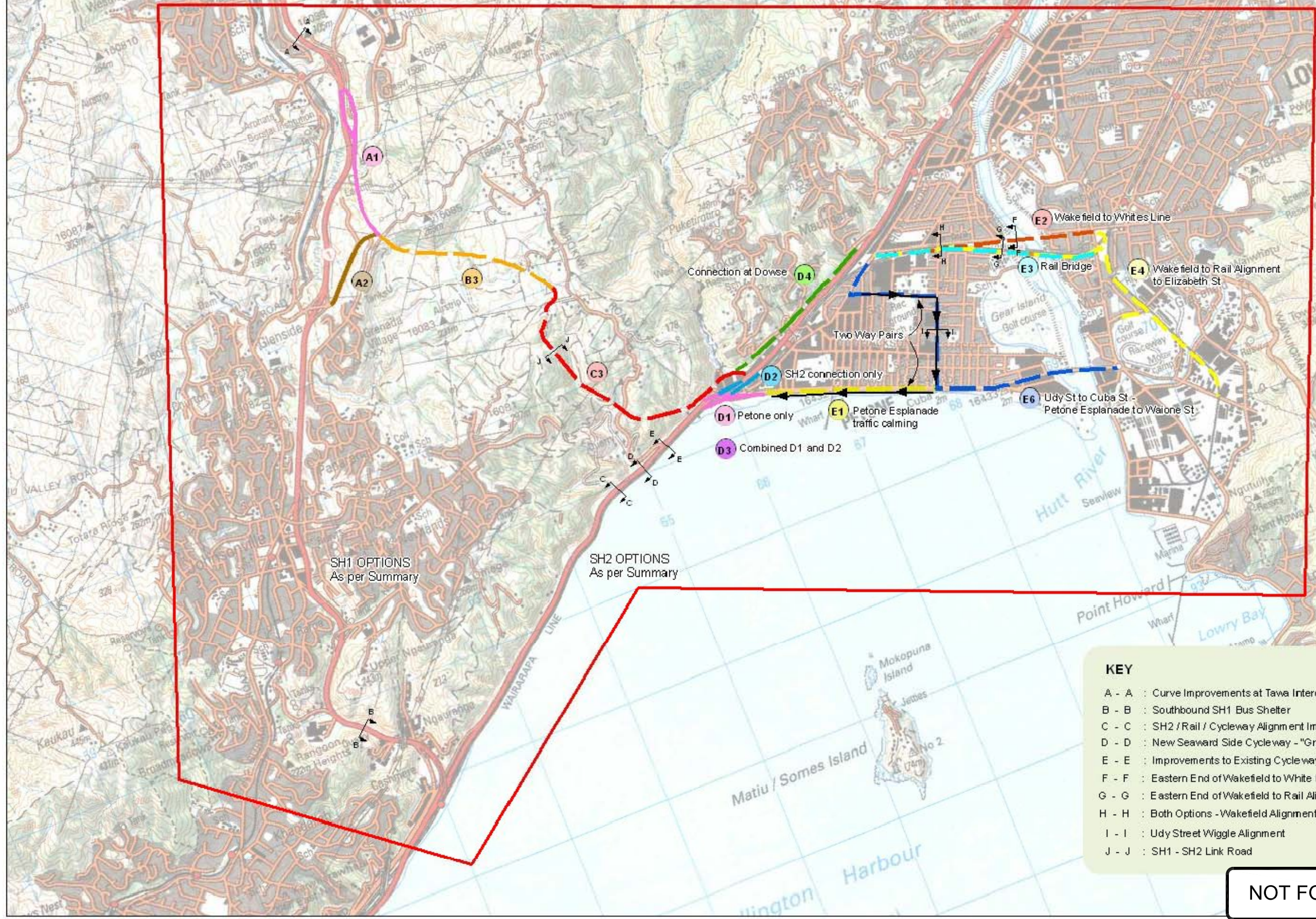




Appendix B Long Sections and Cross Sections

NGAURANGA TRIANGLE SHORT LIST OPTIONS DEVELOPMENT

Date: 08/05/09



- KEY**
- A - A : Curve Improvements at Tawa Interchange
 - B - B : Southbound SH1 Bus Shelter
 - C - C : SH2 / Rail / Cycleway Alignment Improvements
 - D - D : New Seaward Side Cycleway - "Great Harbour Ways"
 - E - E : Improvements to Existing Cycleway
 - F - F : Eastern End of Wakefield to White Lines Alignment
 - G - G : Eastern End of Wakefield to Rail Alignment
 - H - H : Both Options - Wakefield Alignment
 - I - I : Udy Street Wiggle Alignment
 - J - J : SH1 - SH2 Link Road

NOT FOR CONSTRUCTION

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SKM

Sinclair Knight Merz Ltd
Cedar Park Commercial
12-16 Nicholls Lane
Parnell, Auckland
NEW ZEALAND

Tel: +64 9 928 5500
Fax: +64 9 928 5501
Web: www.skmconsulting.com

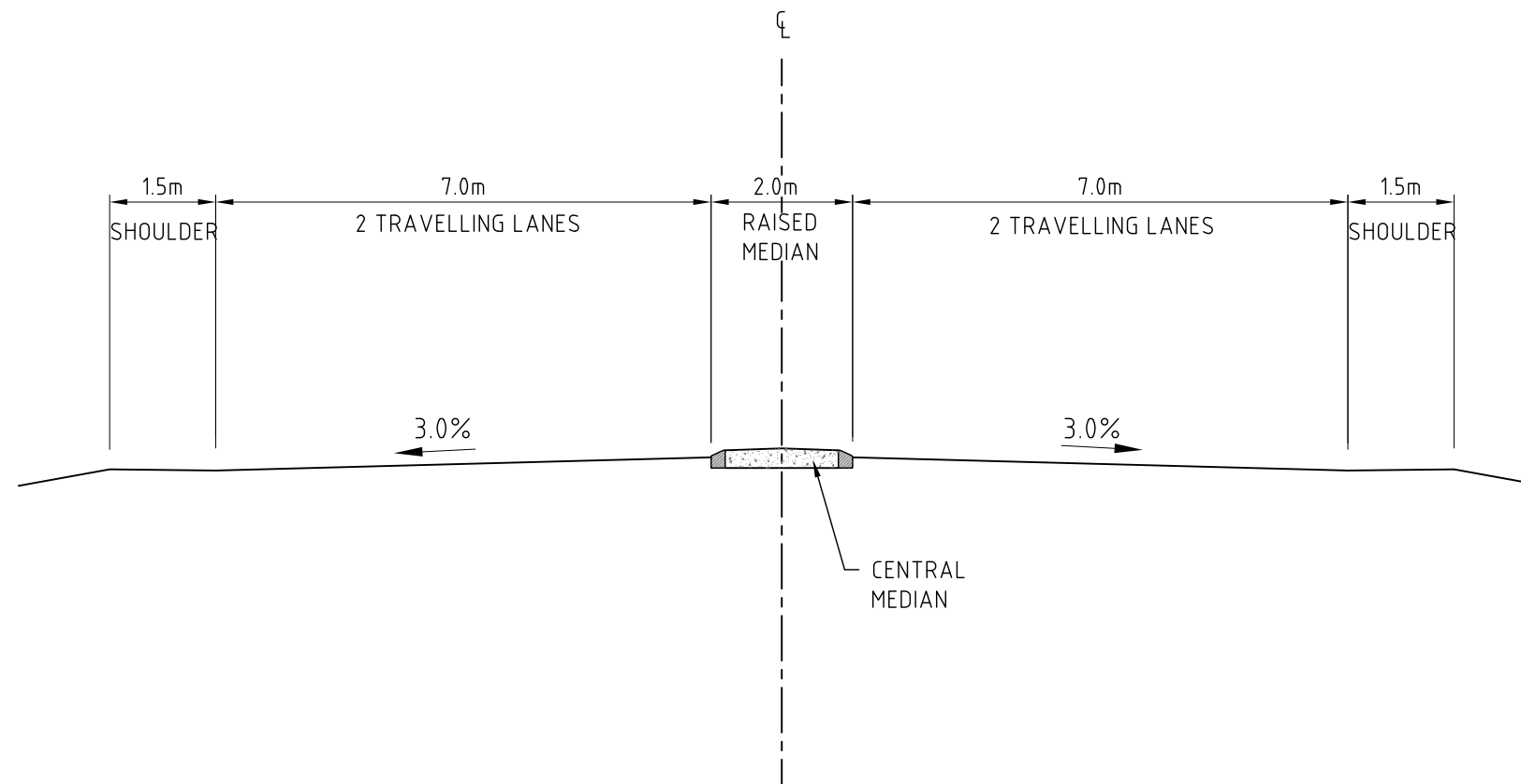
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CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE NGAURANGA TRIANGLE SHORT LIST OPTIONS DEVELOPMENT			
SCALE N.T.S	PROJECT No ZB00938	DRAWING No ZB00938-SK-0001	REV A

NOTE:
DESIGNED TO MATCH EXISTING MOTORWAY IN THAT ARE BASED ON MWH PFR DATED 2006

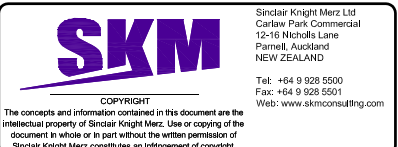
THIS IS A CROSS SECTION OF THE TYPICAL LAYOUT OF THE CURVE REALIGNMENT PROJECTS THAT FORM PART OF THE TAWA INTERCHANGE PROJECT. THIS CROSS SECTION DOES NOT CONSIDER THE LINK ROAD.



SECTION A-A
DESIGN SPEED 110KM\H - TYPICAL TAWA INTERCHANGE DETAIL

NOT FOR CONSTRUCTION

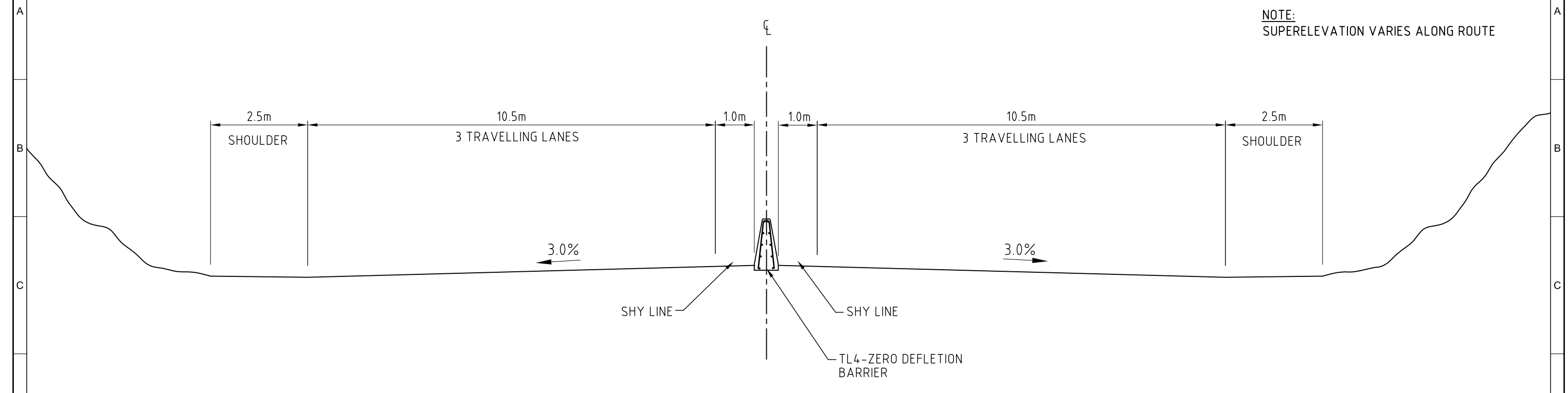
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A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



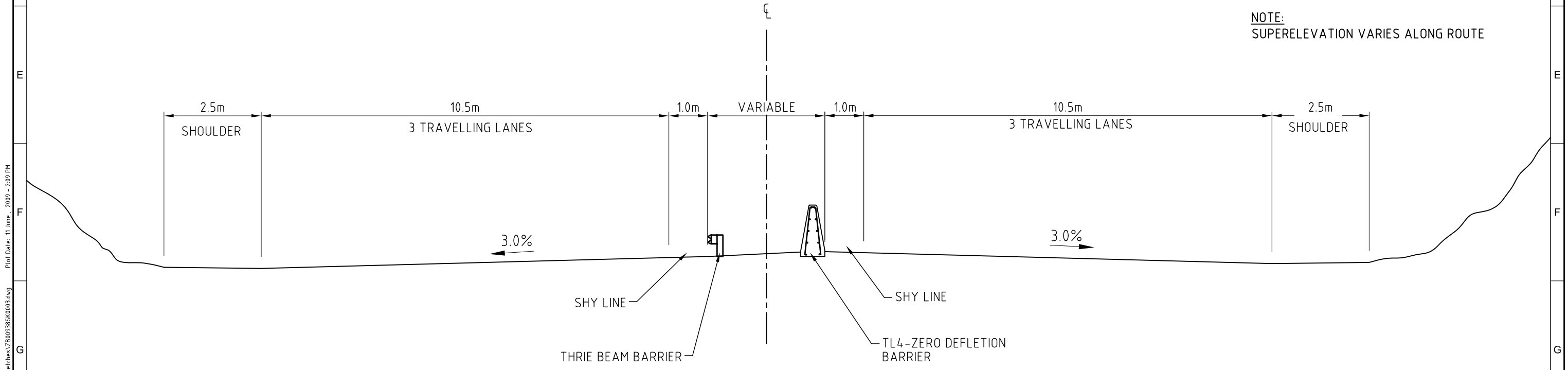
CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE TAWA INTERCHANGE TYPICAL CROSS SECTION			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0002	REV A

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TYPICAL EXISTING ALIGNMENT - SH1 (a)

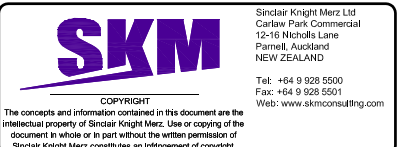


TYPICAL EXISTING ALIGNMENT - SH1 (b)

NOT FOR CONSTRUCTION

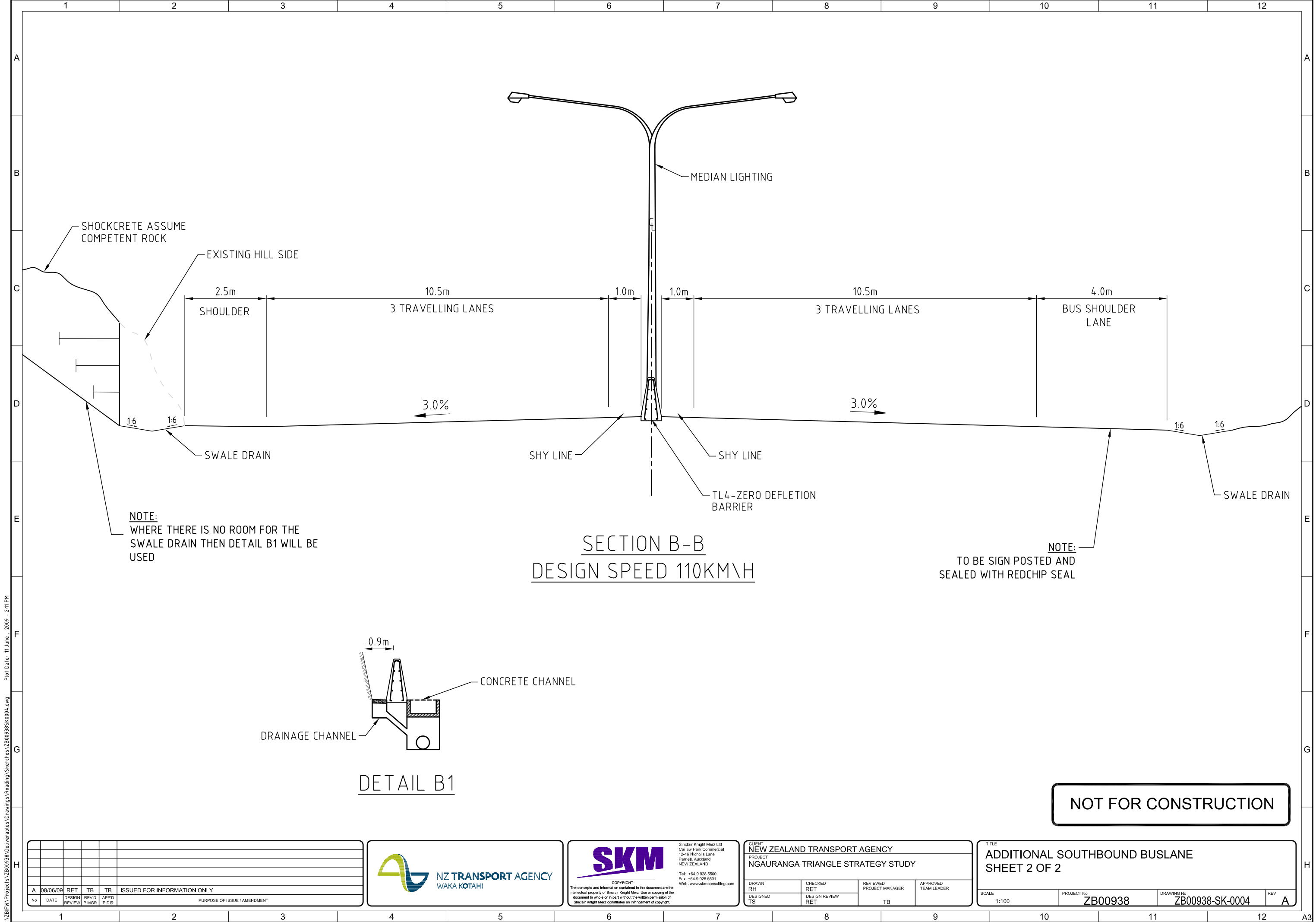
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No	DATE	DESIGN REVIEW	RET	TB	TB	PURPOSE OF ISSUE / AMENDMENT
A	08/06/09	RET	TB	TB		ISSUED FOR INFORMATION ONLY



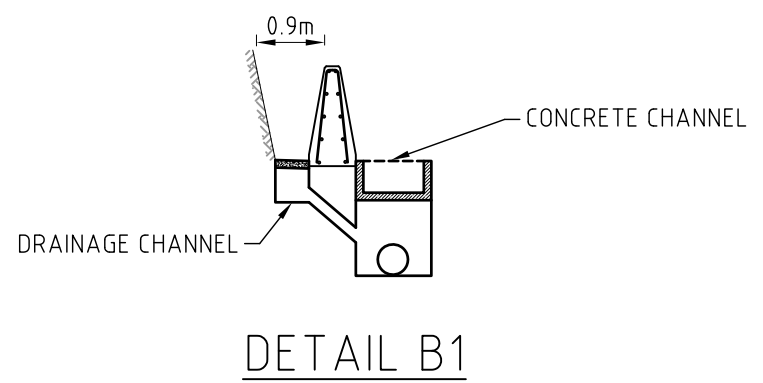
CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE ADDITIONAL SOUTHBOUND BUSLANE SHEET 1 OF 2			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0003	REV A



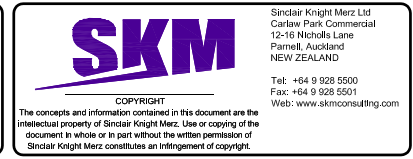
NOTE:
WHERE THERE IS NO ROOM FOR THE
SWALE DRAIN THEN DETAIL B1 WILL BE
USED

NOTE:
TO BE SIGN POSTED AND
SEALED WITH REDCHIP SEAL



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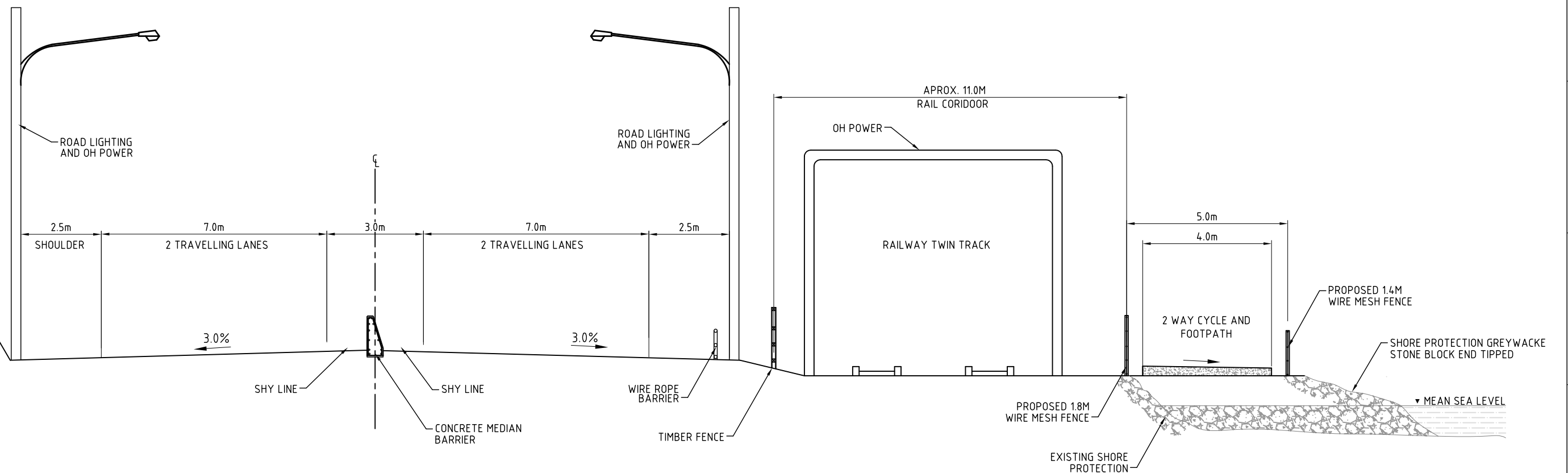


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE ADDITIONAL SOUTHBOUND BUSLANE SHEET 2 OF 2			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0004	REV A

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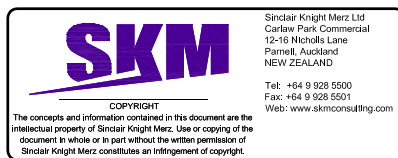
- NOTE:**
1. LIGHTING TO COMBINED CYCLE/FOOTPATH TO BE CONSIDERED
 2. 5.0M WIDTH REQUIRED TO PROVIDE 0.5M CLEARANCE TO PROPOSED FENCES
 3. CYCLE PATH SURFACED WITH ASPHALT CONCRETE TNZ M/10 MIX 10



TYPICAL CROSS SECTION SECTION C-C
(AT HOROKIWI ROAD USED FOR DIMENSIONS)

NOT FOR CONSTRUCTION

No	DATE	DESIGN REVIEW	REV'D P.MGR	APPD P.DR	PURPOSE OF ISSUE / AMENDMENT
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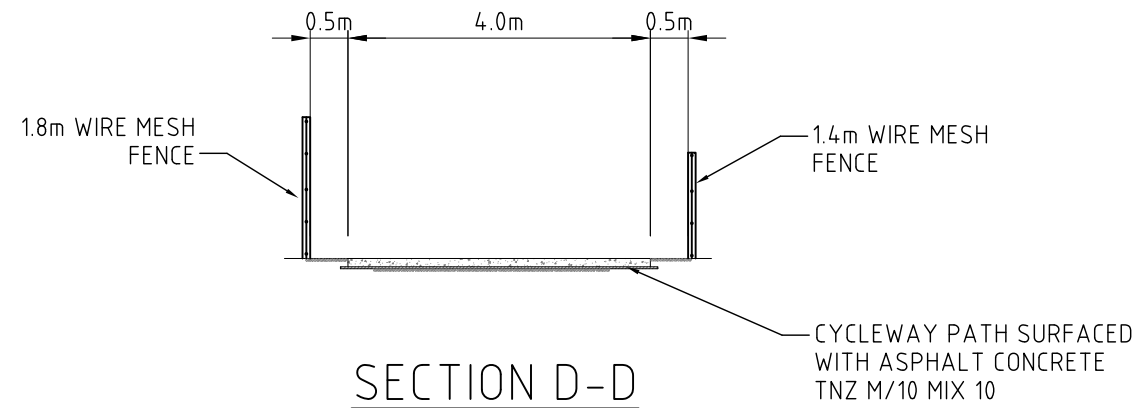


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH2 PEDESTRIAN AND CYCLEWAY TYPICAL CROSS SECTION			
SCALE 1:150	PROJECT No ZB00938	DRAWING No ZB00938-SK-0005	REV A

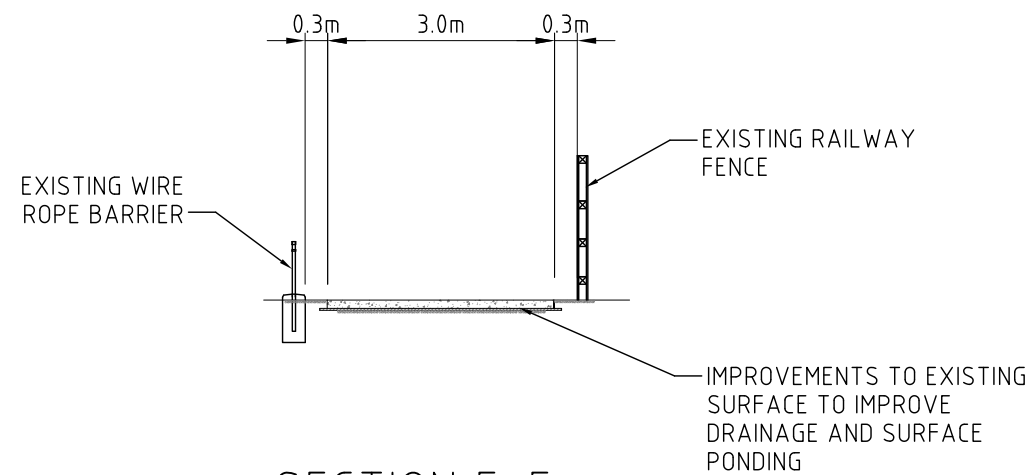
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NOTE:
DUE TO SPACE CONSTRAINTS THIS WILL NOT BE
ACHIEVED IN ALL LOCATIONS.



**SECTION D-D
PROPOSED NEW CYCLEWAY**

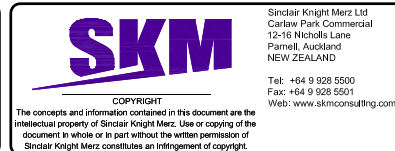
NOTE:
WIDTHS WILL VARY DEPENDING ON AVAILABLE
SPACE, CROSS SECTION SHOWN IS IDEAL



**SECTION E-E
UPGRADE OF NEW FACILITY**

NOT FOR CONSTRUCTION

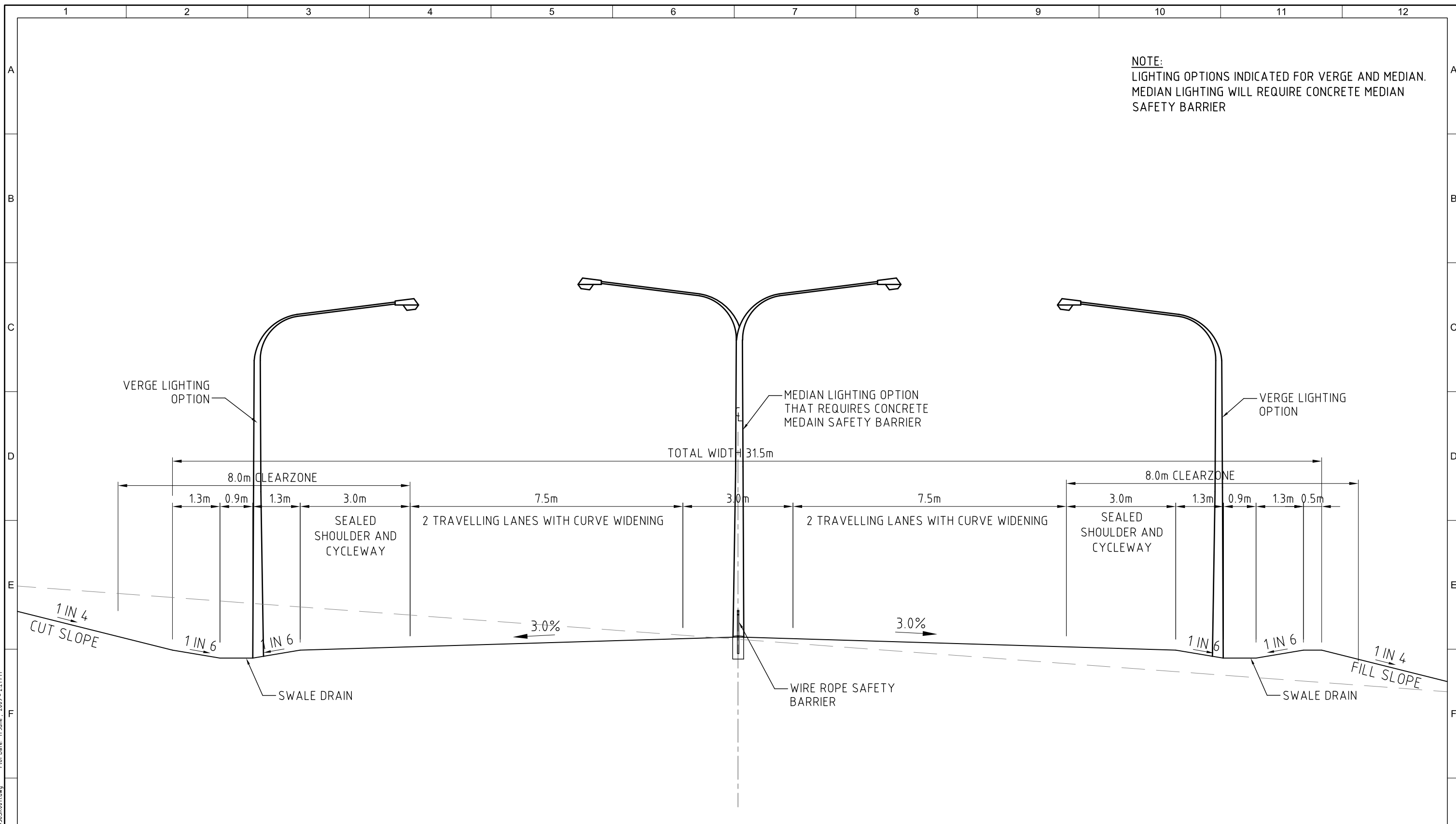
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A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE TYPICAL CYCLEWAY CROSS SECTIONS			
SCALE 1:150	PROJECT No ZB00938	DRAWING No ZB00938-SK-0006	REV A

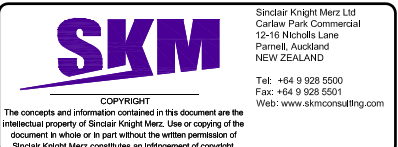
NOTE:
LIGHTING OPTIONS INDICATED FOR VERGE AND MEDIAN.
MEDIAN LIGHTING WILL REQUIRE CONCRETE MEDIAN SAFETY BARRIER



TYPICAL CROSS-SECTION J-J
DESIGN SPEED 70KM/H

NOT FOR CONSTRUCTION

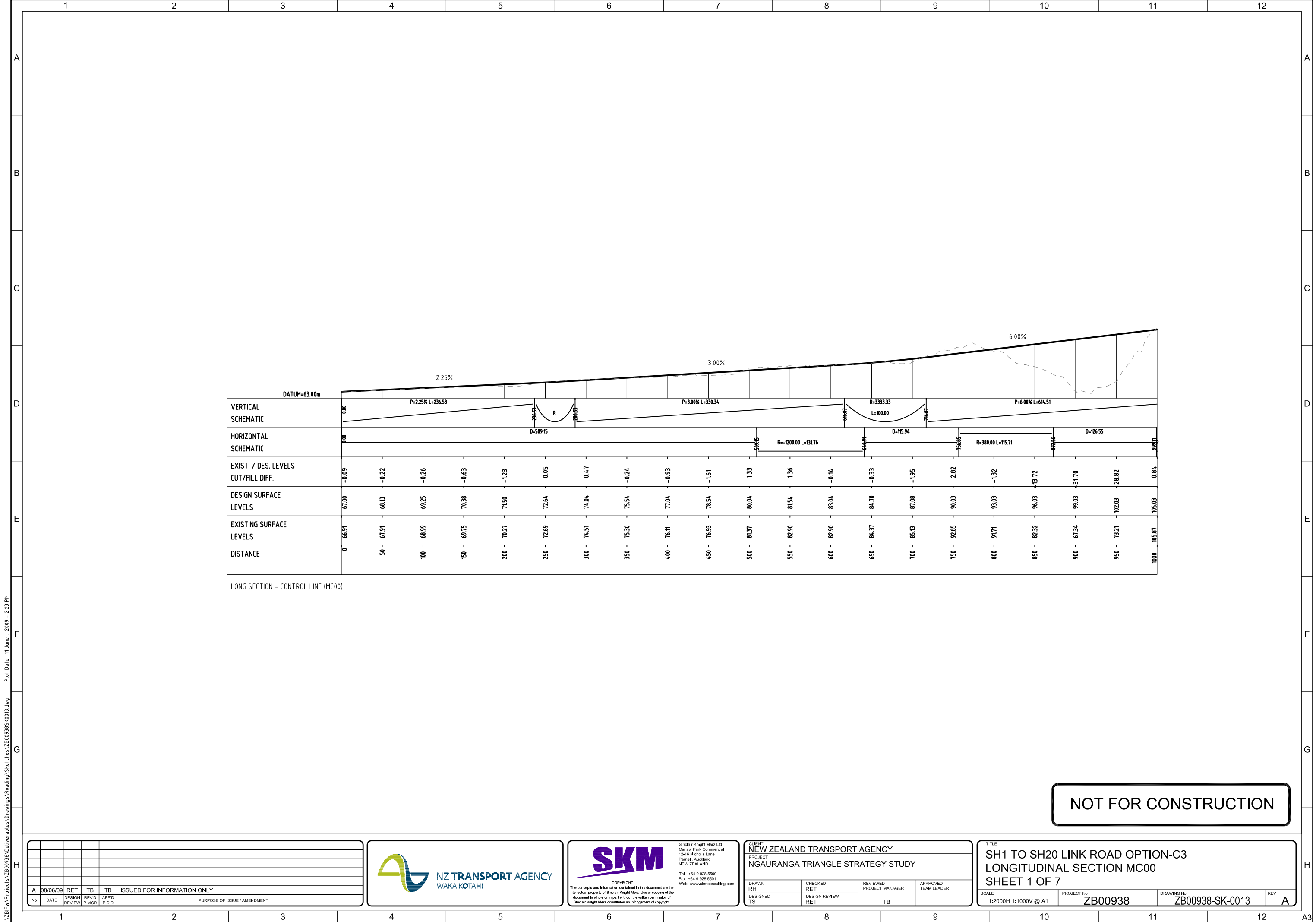
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CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 - SH2 LINK ROAD CROSS SECTION			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0011	REV A

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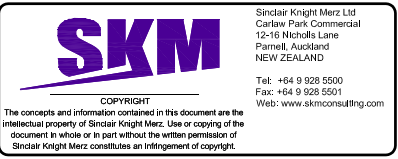


	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
VERTICAL SCHEMATIC	[Graphical representation of vertical alignment]																					
HORIZONTAL SCHEMATIC	[Graphical representation of horizontal alignment]																					
EXIST. / DES. LEVELS CUT/FILL DIFF.	-0.09	-0.22	-0.26	-0.63	-1.23	0.05	0.47	-0.24	-0.93	-1.61	1.33	1.36	-0.14	-0.33	-1.95	2.82	-1.32	-13.72	-31.70	-28.82	0.84	
DESIGN SURFACE LEVELS	67.00	68.13	69.25	70.38	71.50	72.64	74.04	75.54	77.04	78.54	80.04	81.54	83.04	84.70	87.08	90.03	93.03	96.03	99.03	102.03	105.03	
EXISTING SURFACE LEVELS	66.91	67.91	68.99	69.75	70.27	72.69	74.51	75.30	76.11	76.93	81.37	82.90	82.90	84.37	85.13	92.85	91.71	82.32	67.34	73.21	105.87	
DISTANCE	0	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	

LONG SECTION - CONTROL LINE (MC00)

NOT FOR CONSTRUCTION

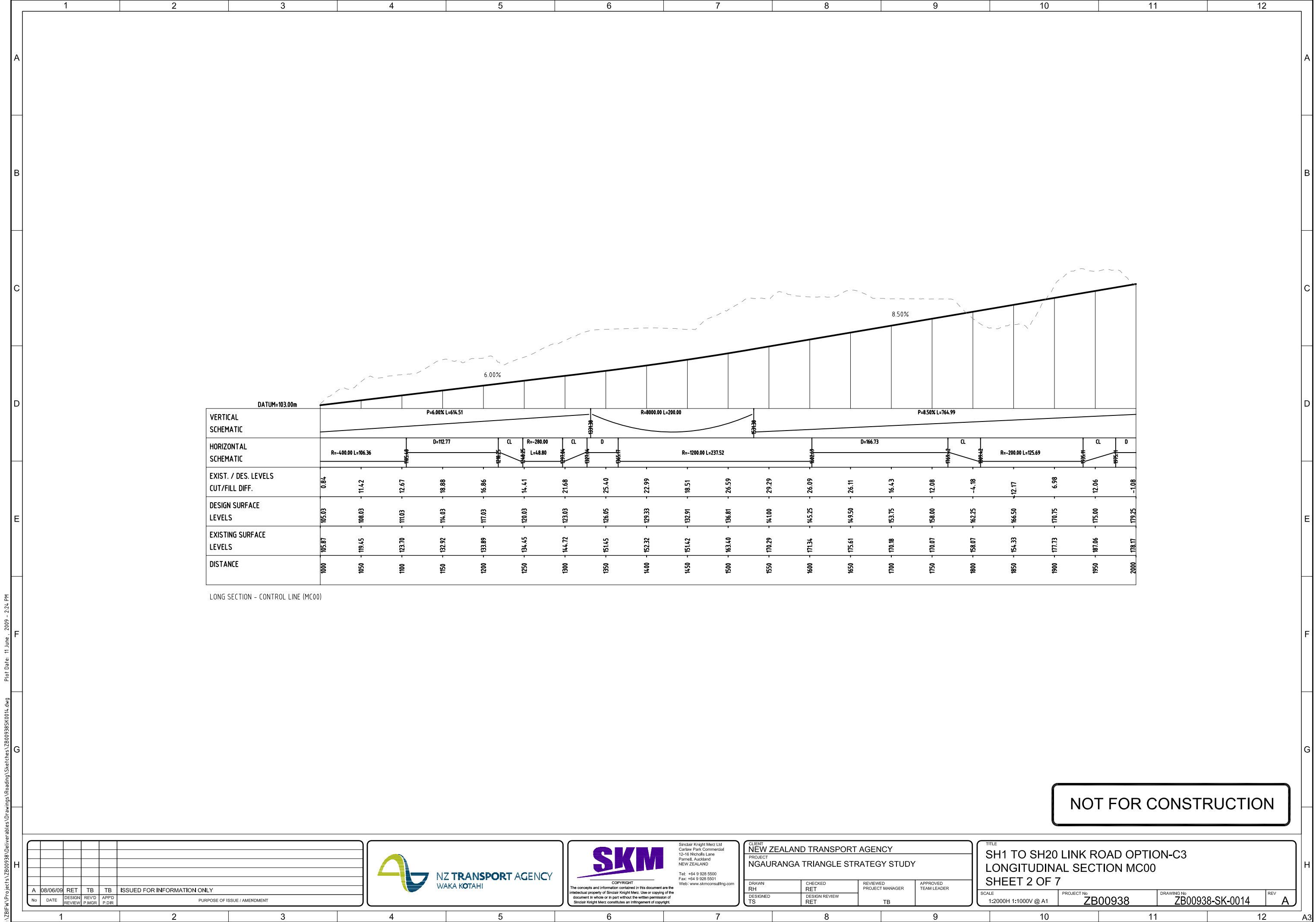
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A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 1 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0013	REV A

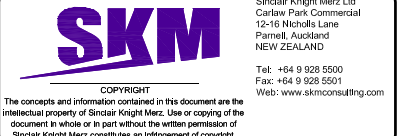
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LONG SECTION - CONTROL LINE (MC00)

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A	08/06/09	RET	TB	TB		

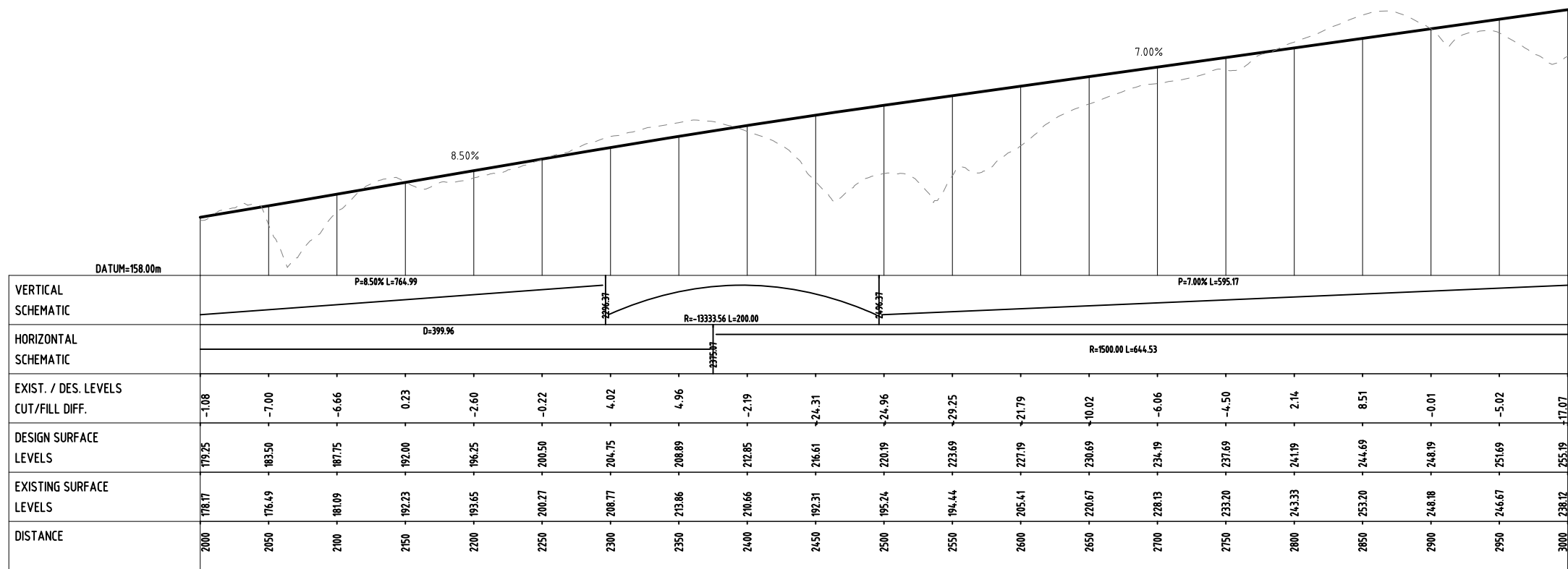


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 2 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0014	REV A

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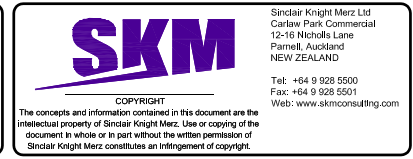
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LONG SECTION - CONTROL LINE (MC00)

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CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 3 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0015	REV A

1 2 3 4 5 6 7 8 9 10 11 12

A

B

C

D

E

F

G

H

A

B

C

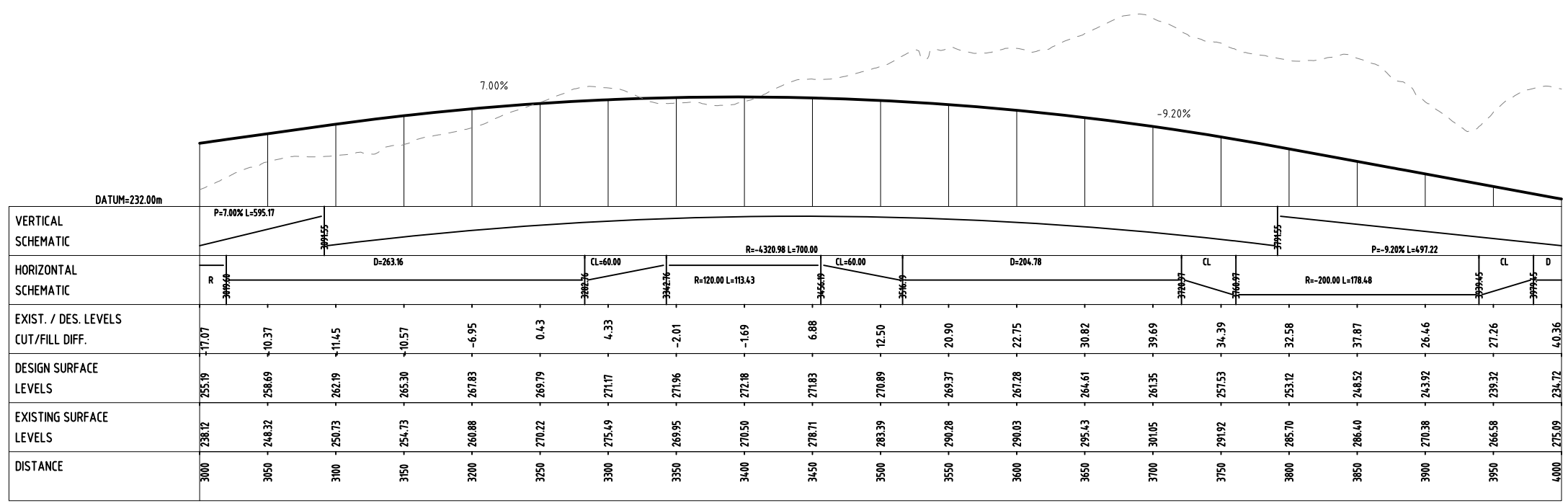
D

E

F

G

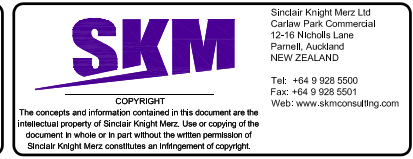
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LONG SECTION - CONTROL LINE (MC00)

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						PURPOSE OF ISSUE / AMENDMENT

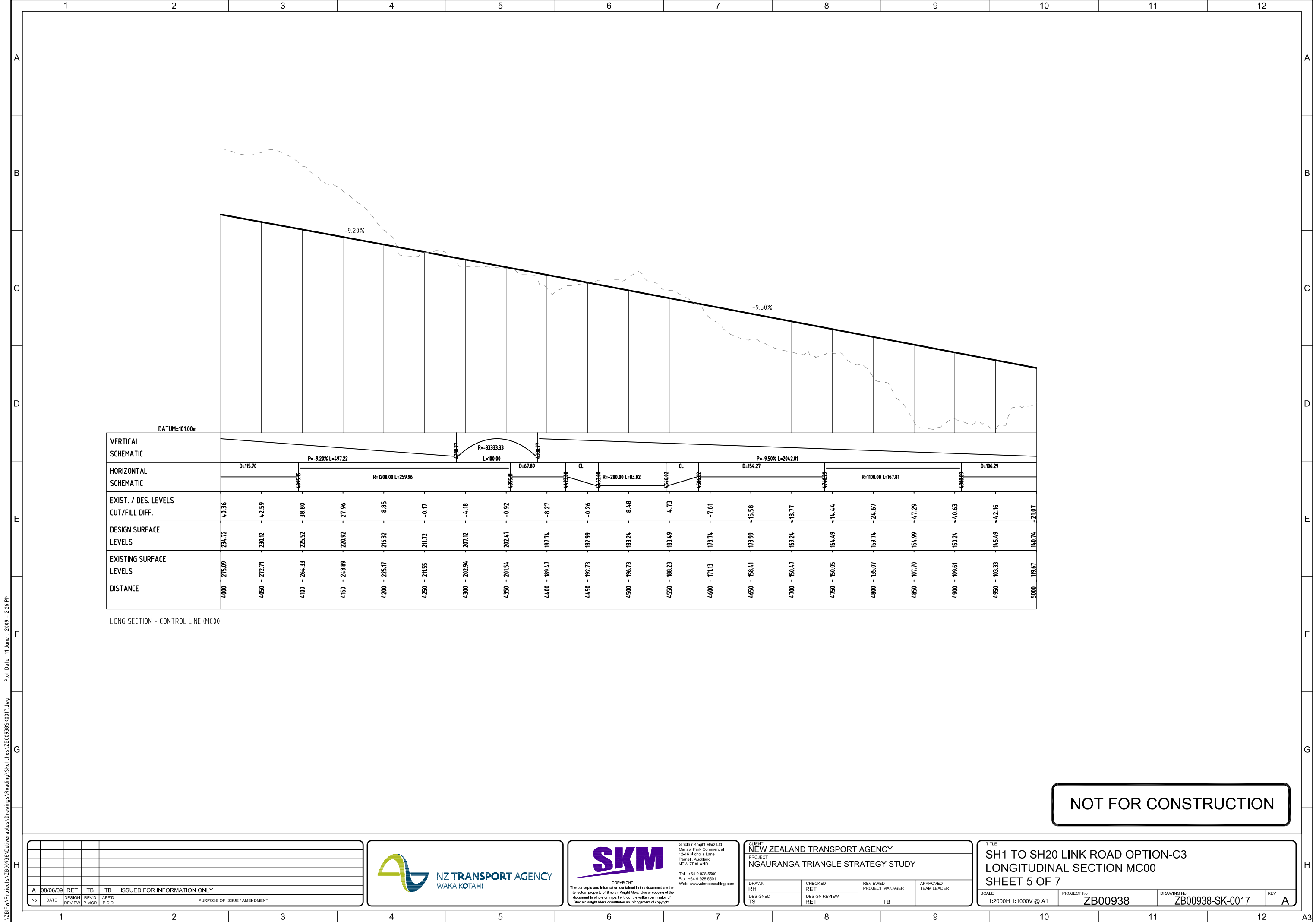


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 4 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0016	REV A

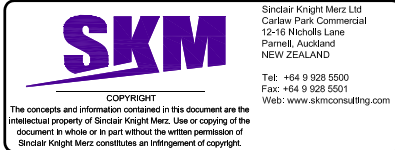
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1 2 3 4 5 6 7 8 9 10 11 12 A3



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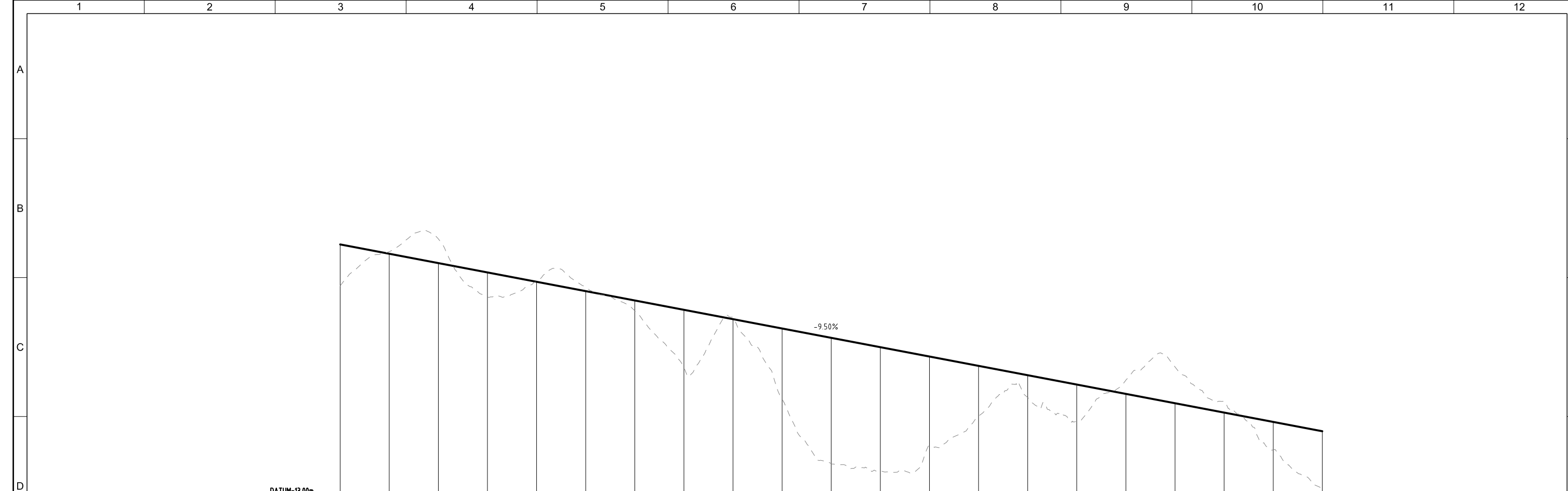
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A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 5 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0017	REV A

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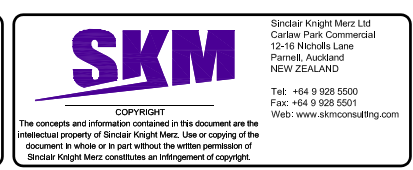


VERTICAL SCHEMATIC																					
HORIZONTAL SCHEMATIC																					
EXIST. / DES. LEVELS CUT/FILL DIFF.	-21.07	1.08	12.29	12.51	0.46	1.72	-5.25	29.31	0.79	36.02	63.95	62.82	45.40	25.55	11.34	18.84	7.01	18.44	5.36	14.23	29.84
DESIGN SURFACE LEVELS	140.74	135.99	131.24	126.49	121.74	116.99	112.24	107.49	102.74	97.99	93.24	88.49	83.74	78.99	74.24	69.49	64.74	59.99	55.24	50.49	45.74
EXISTING SURFACE LEVELS	119.67	137.07	143.53	113.98	122.20	118.71	106.99	78.18	103.53	61.97	29.29	25.67	38.34	53.44	62.90	50.65	71.75	78.43	60.60	36.26	15.90
DISTANCE	5000	5050	5100	5150	5200	5250	5300	5350	5400	5450	5500	5550	5600	5650	5700	5750	5800	5850	5900	5950	6000

LONG SECTION - CONTROL LINE (MC00)

NOT FOR CONSTRUCTION

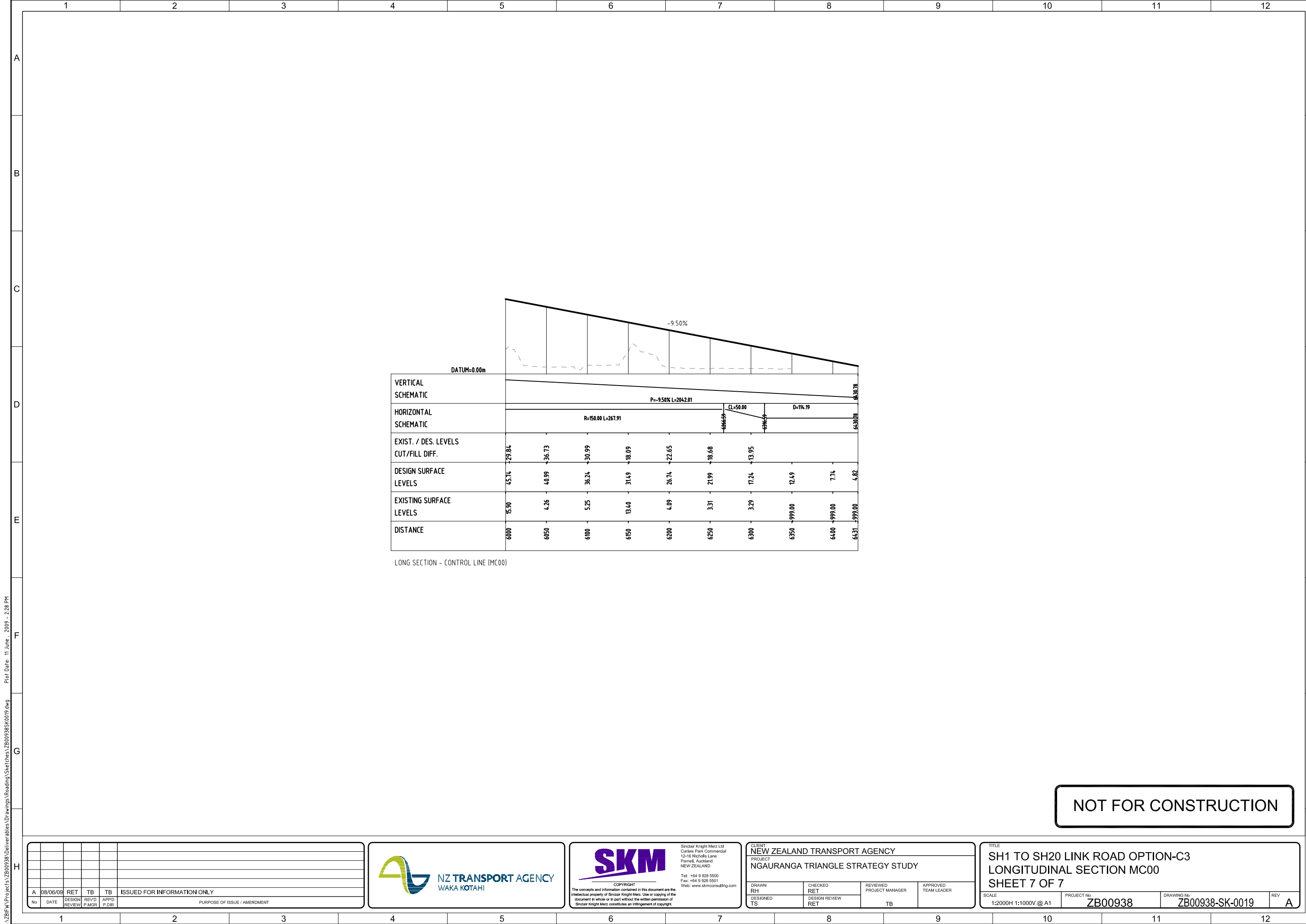
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A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 6 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0018	REV A

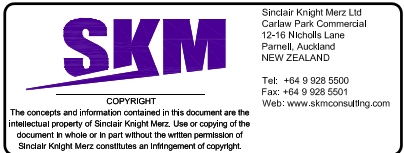
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LONG SECTION - CONTROL LINE (MC00)

NOT FOR CONSTRUCTION

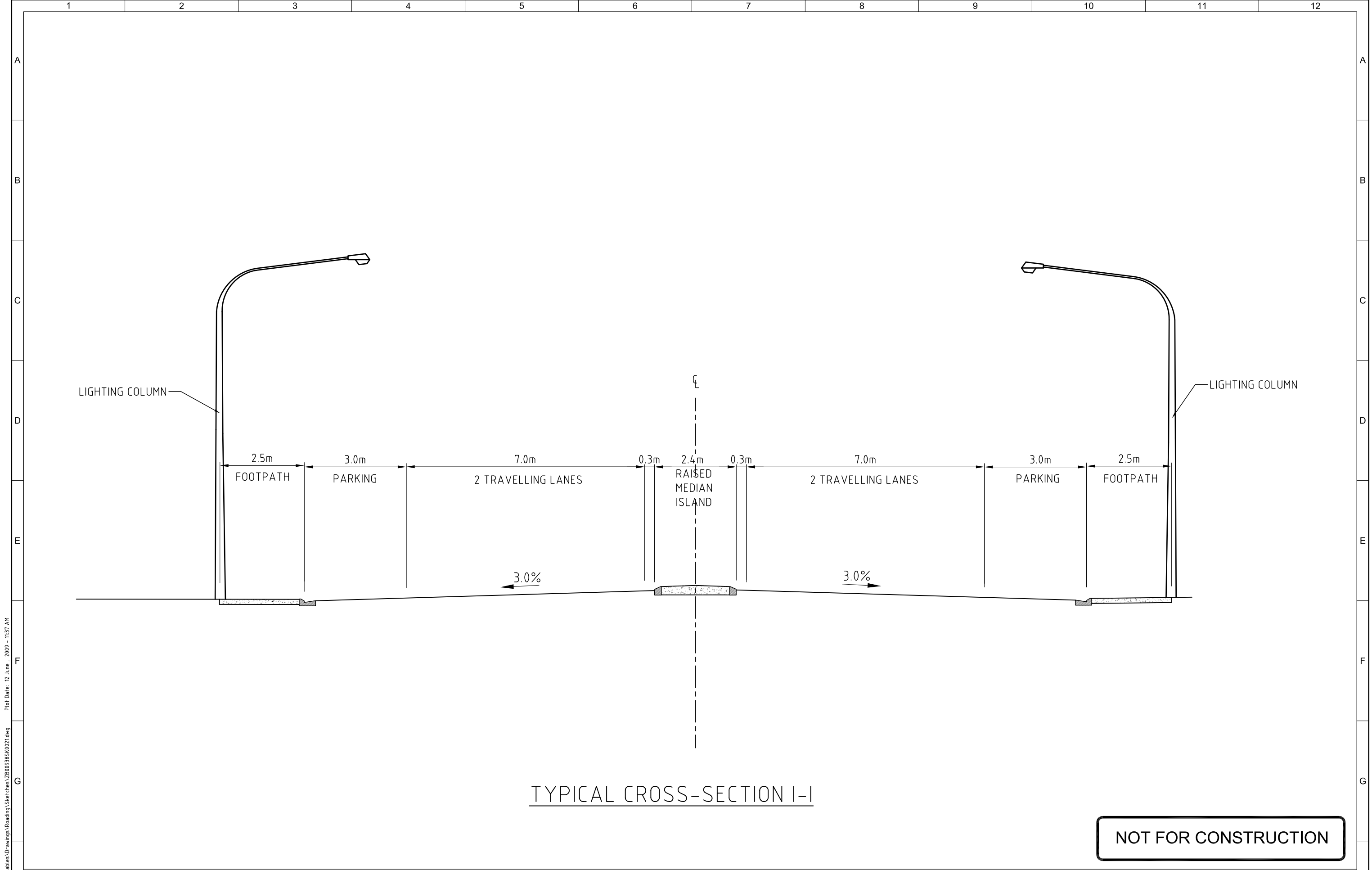
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A	08/06/09	RET	TB	TB			ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE SH1 TO SH20 LINK ROAD OPTION-C3 LONGITUDINAL SECTION MC00 SHEET 7 OF 7			
SCALE 1:2000H 1:1000V @ A1	PROJECT No ZB00938	DRAWING No ZB00938-SK-0019	REV A

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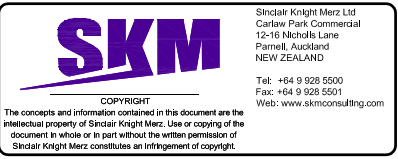


TYPICAL CROSS-SECTION I-I

NOT FOR CONSTRUCTION

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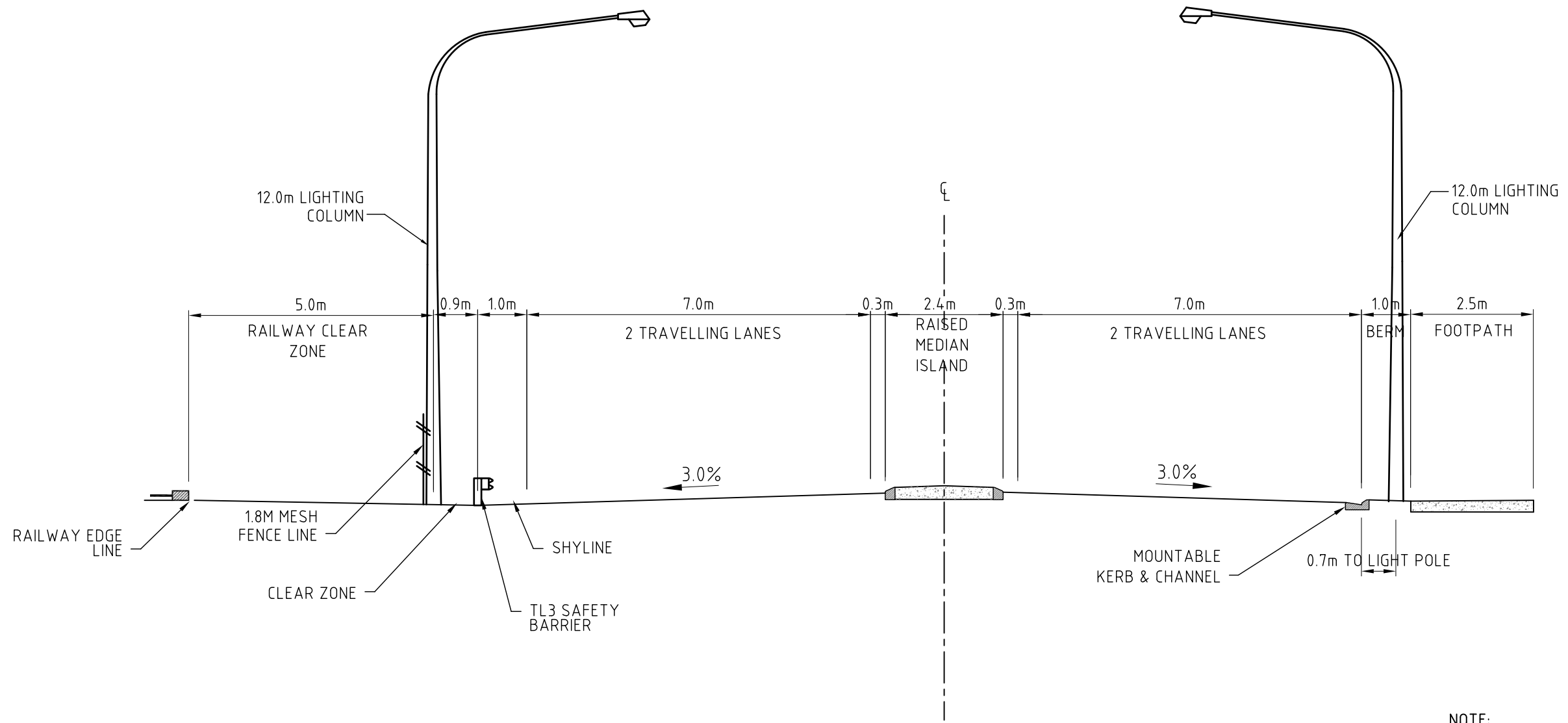
No	DATE	DESIGN REVIEW	REV'D P.MGR	APPD P.DIR	PURPOSE OF ISSUE / AMENDMENT
A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE CROSS VALLEY LINK PETONE ESPLANADE EXPRESSWAY			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0021	REV A

- NOTE:**
1. THERE WILL NEED TO BE WORKS CARRIED OUT AT THE CUBA ST GRADE SEPERATION
 2. RIGHT TURN BAYS ARE REQUIRED TO BE 3.0M WIDE
 3. CENTRAL ISLANDS WILL PROVIDE URBAN DESIGN OPPORTUNITIES
 4. LIGHTING LIKELY TO BE 12.0M HIGH DEPENDING ON DETAIL DESIGN



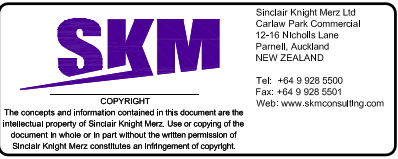
(RISK ASSESSMENT TO BE CARRIED OUT TO DETERMINE REQUIREMENT)

TYPICAL CROSS-SECTION H-H
DESIGN SPEED 70KM/H

- NOTE:**
- PARKING ~ 3.0M AS PER NZS 4404:2004
 - SHOULDER ~ AS PER STATE HIGHTWAY DESIGN MANNUAL

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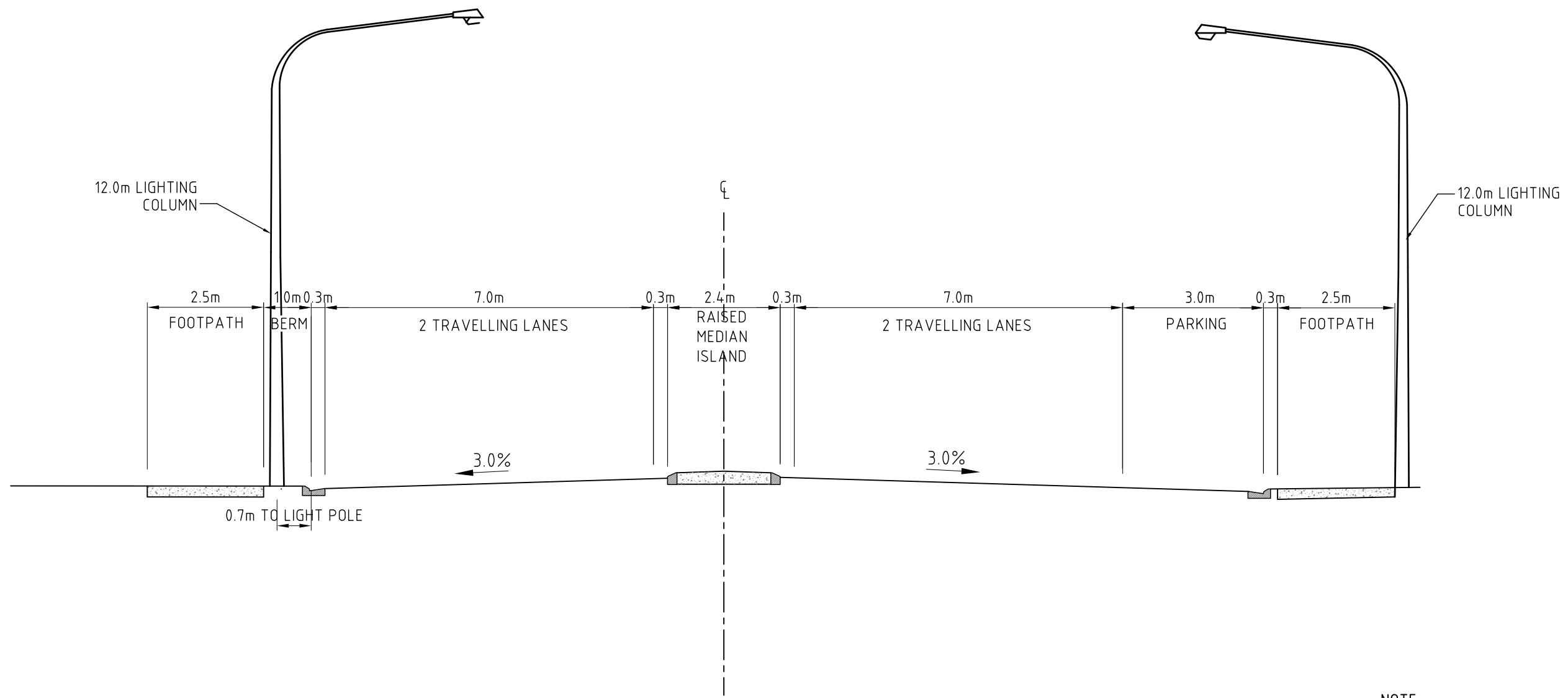


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE CROSS VALLEY 4 LANE OPTION CROSS SECTION SHEET 1 OF 3			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0007	REV A

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- NOTE:**
1. THERE WILL NEED TO BE WORKS CARRIED OUT AT THE CUBA ST GRADE SEPERATION
 2. RIGHT TURN BAYS ARE REQUIRED TO BE 3.0M WIDE
 3. CENTRAL ISLANDS WILL PROVIDE URBAN DESIGN OPPORTUNITIES
 4. LIGHTING LIKELY TO BE 12.0M HIGH DEPENDING ON DETAIL DESIGN

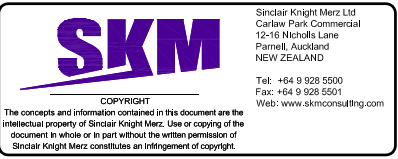


TYPICAL CROSS-SECTION F-F
DESIGN SPEED 70KM/H

- NOTE:**
- PARKING ~ 3.0M AS PER NZS 4404:2004
 - SHOULDER ~ AS PER STATE HIGHTWAY DESIGN MANNUAL

NOT FOR CONSTRUCTION

No	DATE	DESIGN REVIEW	REV'D P.MGR	APPD P.DIR	PURPOSE OF ISSUE / AMENDMENT
A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY

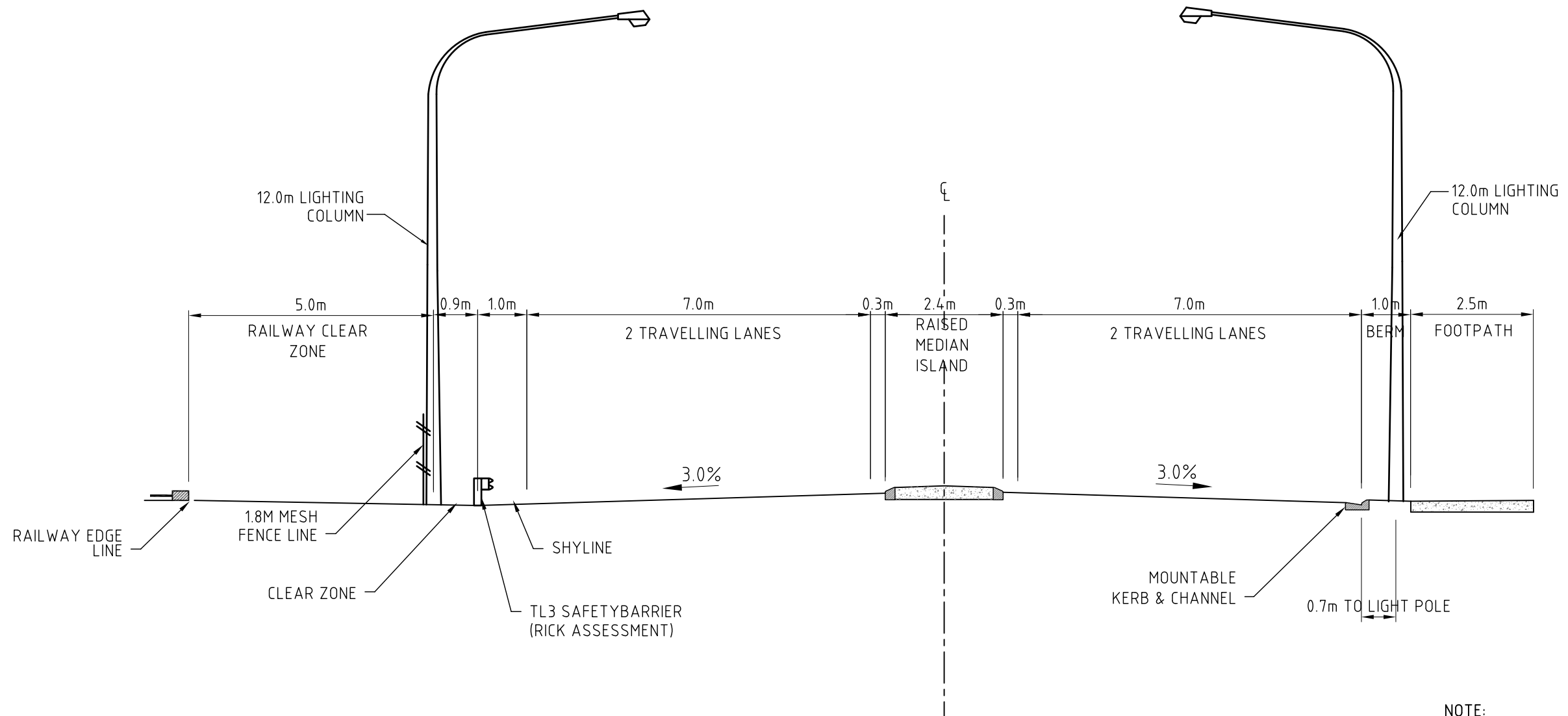


CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE CROSS VALLEY 4 LANE OPTION CROSS SECTION SHEET 2 OF 3			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0008	REV A

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- NOTE:**
1. THERE WILL NEED TO BE WORKS CARRIED OUT AT THE CUBA ST GRADE SEPERATION
 2. RIGHT TURN BAYS ARE REQUIRED TO BE 3.0M WIDE
 3. CENTRAL ISLANDS WILL PROVIDE URBAN DESIGN OPPORTUNITIES
 4. LIGHTING LIKELY TO BE 12.0M HIGH DEPENDING ON DETAIL DESIGN



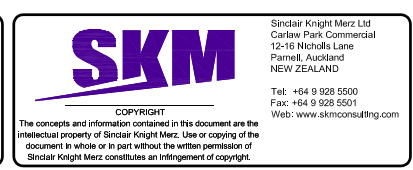
(RISK ASSESSMENT TO BE CARRIED OUT TO DETERMINE REQUIREMENT)

TYPICAL CROSS-SECTION G-G
DESIGN SPEED 70KM/H

- NOTE:**
- PARKING ~ 3.0M AS PER NZS 4404:2004
 - SHOULDER ~ AS PER STATE HIGHTWAY DESIGN MANNUAL

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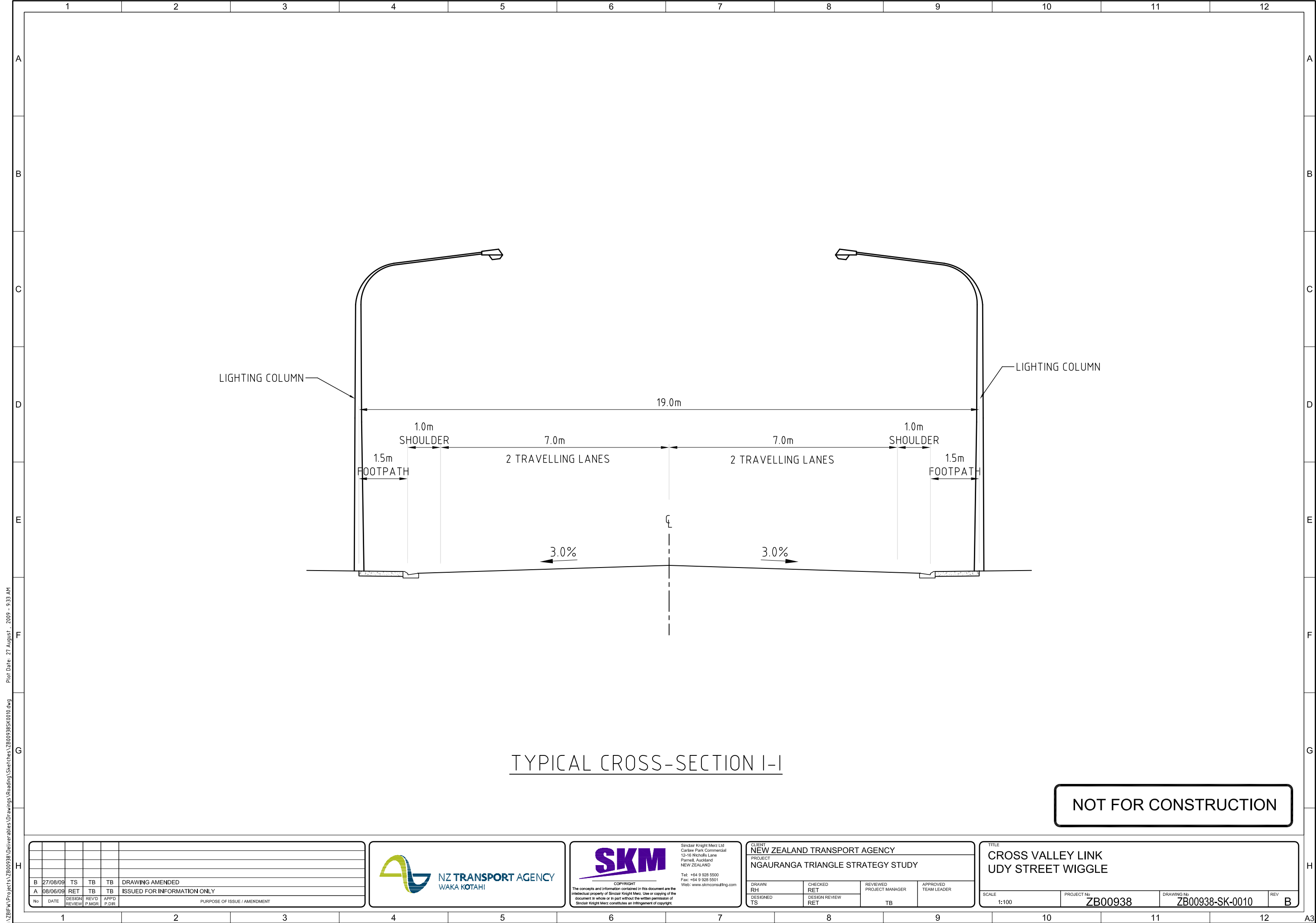
No	DATE	DESIGN REVIEW	REVD P.MGR	APPD P.DR	PURPOSE OF ISSUE / AMENDMENT
A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE CROSS VALLEY 4 LANE OPTION CROSS SECTION SHEET 3 OF 3			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0009	REV A

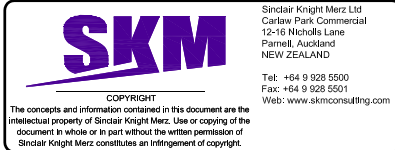
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TYPICAL CROSS-SECTION I-I

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No	DATE	DESIGN REVIEW	REV'D P.MGR	APPD P.DIR	PURPOSE OF ISSUE / AMENDMENT
B	27/08/09	TS	TB	TB	DRAWING AMENDED
A	08/06/09	RET	TB	TB	ISSUED FOR INFORMATION ONLY



CLIENT NEW ZEALAND TRANSPORT AGENCY			
PROJECT NGAURANGA TRIANGLE STRATEGY STUDY			
DRAWN RH	CHECKED RET	REVIEWED PROJECT MANAGER	APPROVED TEAM LEADER
DESIGNED TS	DESIGN REVIEW RET	TB	

TITLE CROSS VALLEY LINK UDY STREET WIGGLE			
SCALE 1:100	PROJECT No ZB00938	DRAWING No ZB00938-SK-0010	REV B

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