

APPENDIX B

REFERENCE DRAWINGS

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Appendix B

Reference Drawings

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APPENDIX B1

ALBERTA WEAK POST AND STRONG POST W-BEAM GUARDRAIL

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Appendix B1

Alberta Weak Post and Strong Post W-Beam Guardrail

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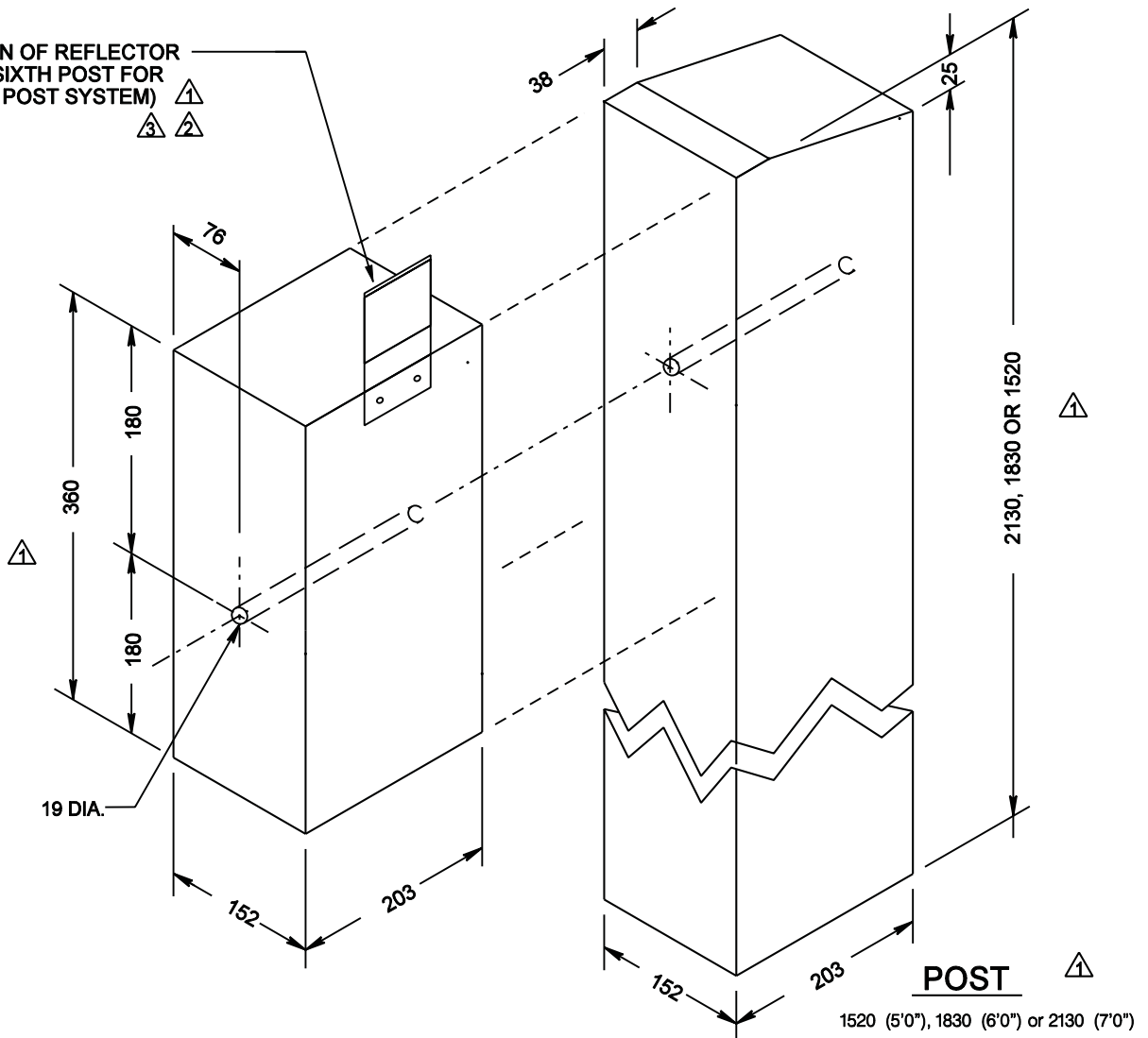
Appendix B1

Alberta Weak Post and Strong Post W-Beam Guardrail

TABLE OF CONTENTS

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LOCATION OF REFLECTOR
(EVERY SIXTH POST FOR
STRONG POST SYSTEM)



SPACER BLOCK

NOT REQUIRED FOR WEAK POST
W-BEAM GUARDRAIL SYSTEM

REFLECTOR

REFLECTOR COLOUR IS EITHER FLUORESCENT YELLOW OR WHITE SUCH THAT IT COMPLIES WITH THE PRINCIPLES FOR PAVEMENT EDGE LINES WITH RESPECT TO THEIR COLOUR.

REFLECTOR IS DOUBLE SIDED SHEETING 108mm x 76mm (MINIMUM) WHICH SHALL MEET ASTM D4956, TYPE X FOR LUMINANCE LEVEL. THE CONTRACTOR SHALL SELECT THE REFLECTOR FROM THE ALBERTA TRANSPORTATION PRODUCTS LIST.

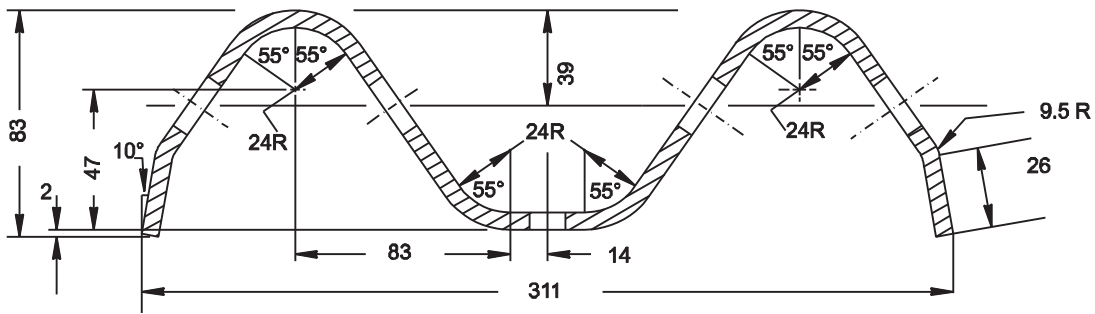
All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
3	Reflector Type and Note Added	P.M.	8 JUL 09
2	Drawing Title and Reflector	P.M.	5 JUN-07
1	Post and Spacer Block	B.K.	12/07/05

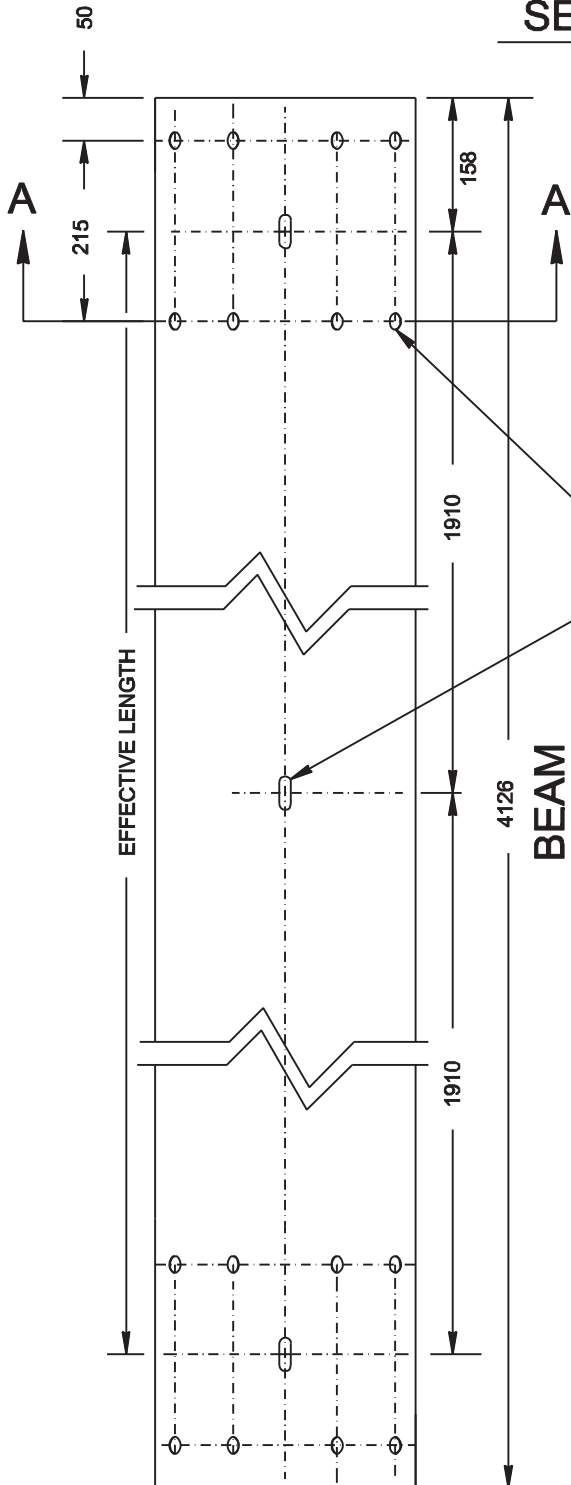
<p>Approved: Original approved by Traffic Engineering Section Roadway Engineering Branch Alberta Transportation and Utilities Executive Director, Technical Standards Branch</p>	
Date: NOVEMBER 11, 1992	

W - BEAM GUARDRAIL HARDWARE WOOD SPACER BLOCK AND POST STRONG POST SYSTEM

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.01
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SECTION A-A



16 - SLOTTED HOLES
23 X 29

3 - SLOTTED HOLES
19 X 63

EFFECTIVE LENGTH = 3820 (12' 6")

⚠ ⚠ ⚠ A FINISHED THICKNESS OF RAIL TO BE 2.82 mm
NOMINAL STEEL AND HOT DIPPED GALVANIZED
AFTER FABRICATION.

FOR 955 POST SPACING, SPECIFY RAIL ELEMENT
WITH HOLES AT 955 CENTRES.

⚠	Revised Note	B.K.	08/05/07
⚠	Steel Thickness	B.K.	01/03/06
⚠	Steel Thickness	B.K.	12/07/05
No.	REVISIONS	BY	DATE

Approved:
Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

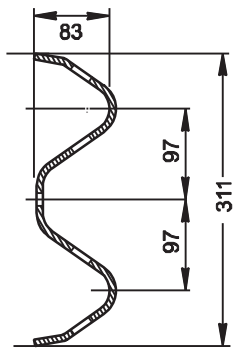


Date: NOVEMBER 11, 1992

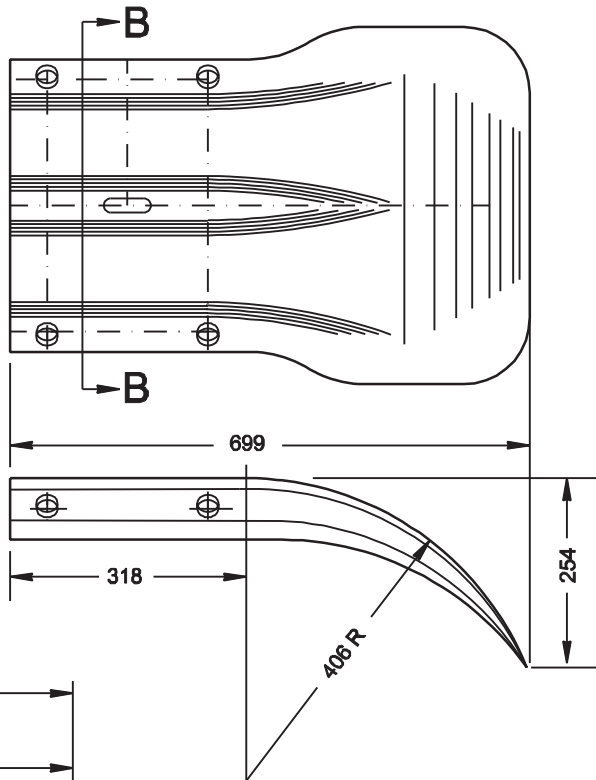
**W - BEAM GUARDRAIL
HARDWARE
RAIL DETAIL**

All dimensions are in millimetres unless otherwise indicated.

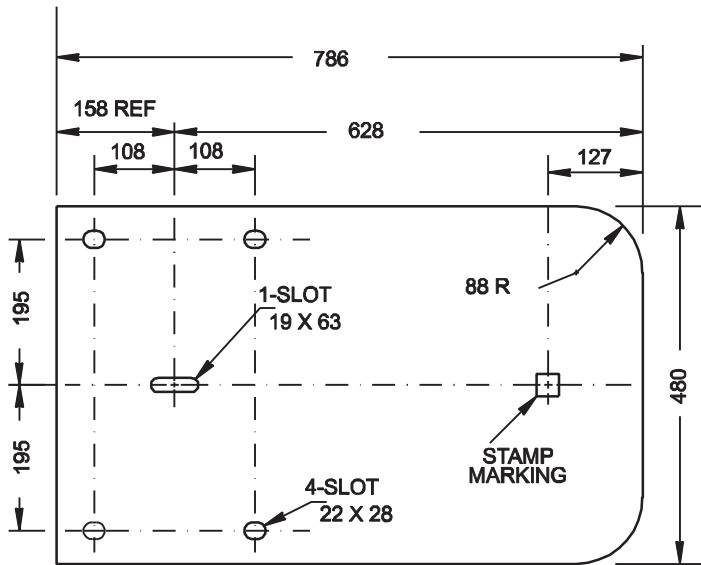
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.02
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SECTION B - B



END SECTION



BLANK LAYOUT

THICKNESS OF STEEL=2.82mm AFTER GALVANIZING



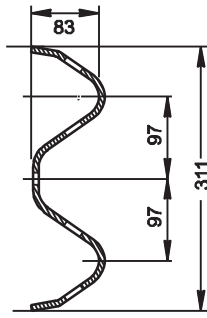
3	Galvanizing added	B.K.	08/05/07
2	Steel Thickness	P.M.	31/01/06
1	Steel Thickness	B.K.	12/07/05
No.	REVISIONS	BY	DATE

<p>Approved:</p> <p>Original approved by Traffic Operations Branch Alberta Transportation and Utilities</p> <p>Executive Director, Technical Standards Branch</p>	
<p>Date: NOVEMBER 11, 1992</p>	

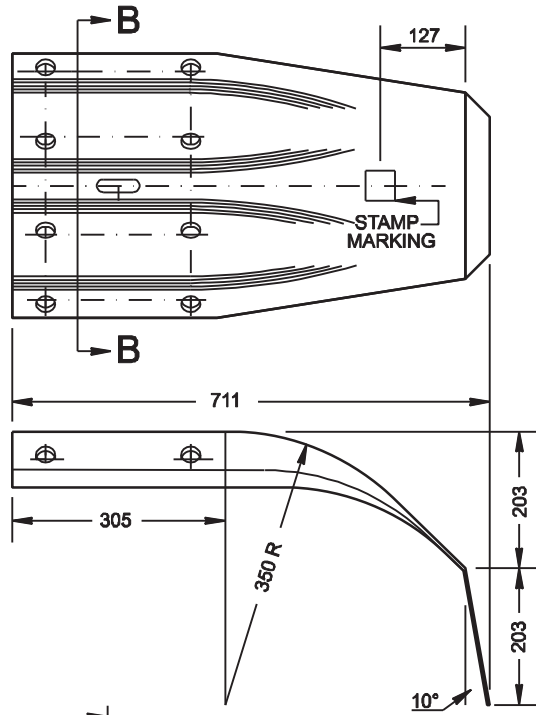
**W - BEAM GUARDRAIL
HARDWARE
END SECTION - WING**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.03
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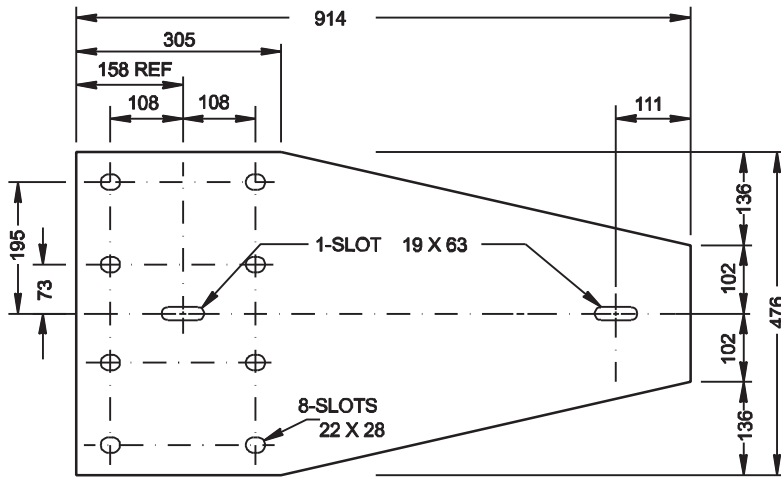
All dimensions are in millimetres unless otherwise indicated.



SECTION B - B



END SECTION



BLANK LAYOUT

NOTES:



1. THICKNESS OF STEEL=2.82mm AFTER GALVANIZING
2. THIS END SECTION IS USED IN THE STANDARD W-BEAM WEAK POST TURN DOWN END TREATMENT (SEE DWG TEB 3.12 SECTION D-D).

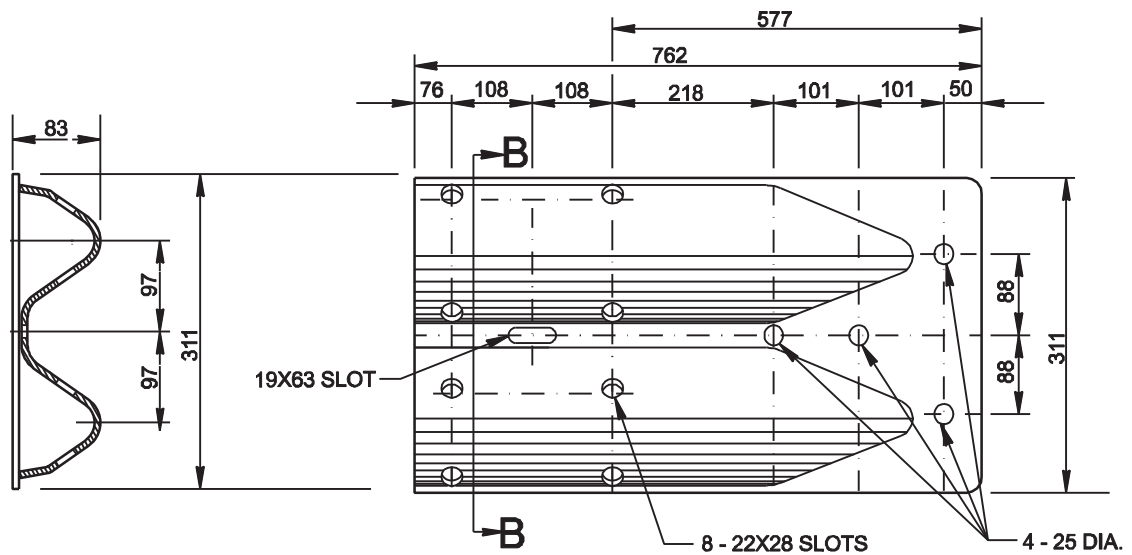
⚠	Galvanizing added	B.K.	08/05/07
⚠	Steel Thickness	P.M.	31/01/06
⚠	Notes	B.K.	12/07/05
No.	REVISIONS	BY	DATE

<p>Approved:</p> <p>Original approved by Traffic Operations Branch Alberta Transportation and Utilities</p> <p>Executive Director, Technical Standards Branch</p>	
Date: DECEMBER 11, 1992	

**W - BEAM GUARDRAIL
HARDWARE
END SECTION - BURIED**

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.04
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SECTION B - B



END SECTION

THICKNESS OF STEEL=3.43mm



	Steel Thickness	B.K.	12/07/05
No.	REVISIONS	BY	DATE

<p>Approved:</p> <p>Original approved by Traffic Operations Branch Alberta Transportation and Utilities</p> <p>Executive Director, Technical Standards Branch</p>	
<p>Date: DECEMBER 11, 1992</p>	

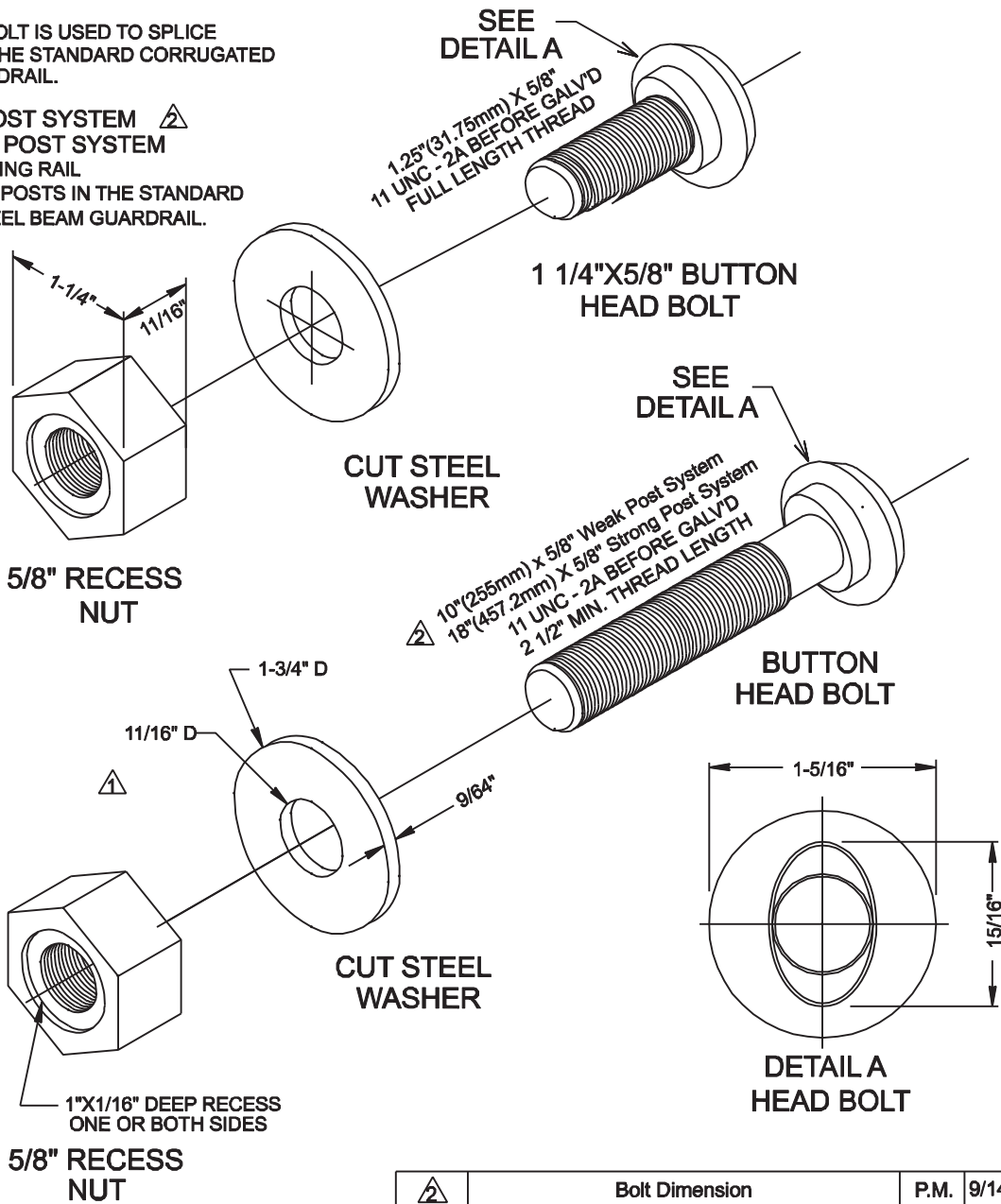
**W - BEAM GUARDRAIL
HARDWARE
TERMINAL CONNECTOR**

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.05
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(1-1/4" LENGTH) THIS BOLT IS USED TO SPLICE RAIL ELEMENTS USED IN THE STANDARD CORRUGATED SHEET STEEL BEAM GUARDRAIL.

(10" LENGTH) WEAK POST SYSTEM \triangle
 (18" LENGTH) STRONG POST SYSTEM
 THIS BOLT IS FOR FASTENING RAIL TO WOOD OR CONCRETE POSTS IN THE STANDARD CORRUGATED SHEET STEEL BEAM GUARDRAIL.



\triangle	Bolt Dimension	P.M.	9/14/05
\triangle	Rectangular Washer Removed	B.K.	12/07/05
No.	REVISIONS	BY	DATE

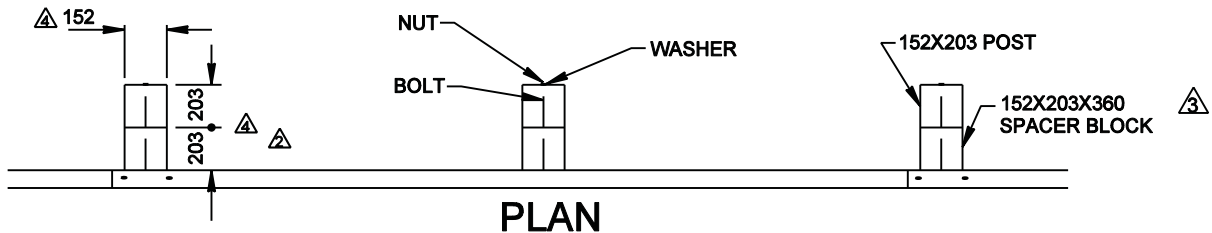
Approved: Original approved by Traffic Operations Branch Alberta Transportation and Utilities <hr/> Executive Director, Technical Standards Branch	
Date: DECEMBER 11, 1992	

**W - BEAM GUARDRAIL
 HARDWARE
 BOLT, NUT AND WASHER**

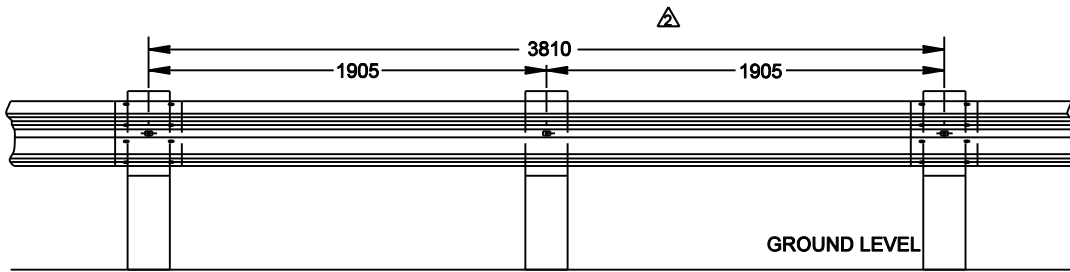
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.06
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BOLTS SHALL CONFORM TO THE REQUIREMENTS OF A.S.T.M A307 AND NUTS TO THE REQUIREMENT OF A.S.T.M A563, GRADE A OR BETTER, AND BE GALVANIZED IN ACCORDANCE WITH CSA G 164-M EXCEPT WHEN CORROSION RESISTANT STEEL IS REQUESTED IN WHICH CASE BOLTS AND NUTS SHALL BE MADE OF MATERIAL HAVING AN ATMOSPHERIC CORROSION RESISTANCE, APPROXIMATELY TWO TIMES THAT OF CARBON STRUCTURAL STEEL WITH COPPER AND SHALL NOT BE GALVANIZED.

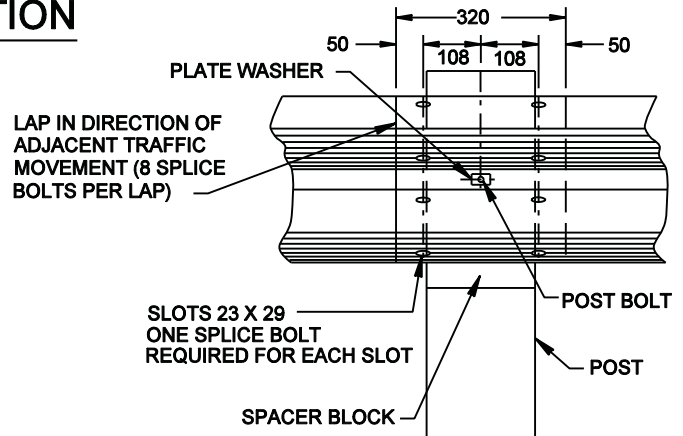
All dimensions are in millimetres unless otherwise indicated.



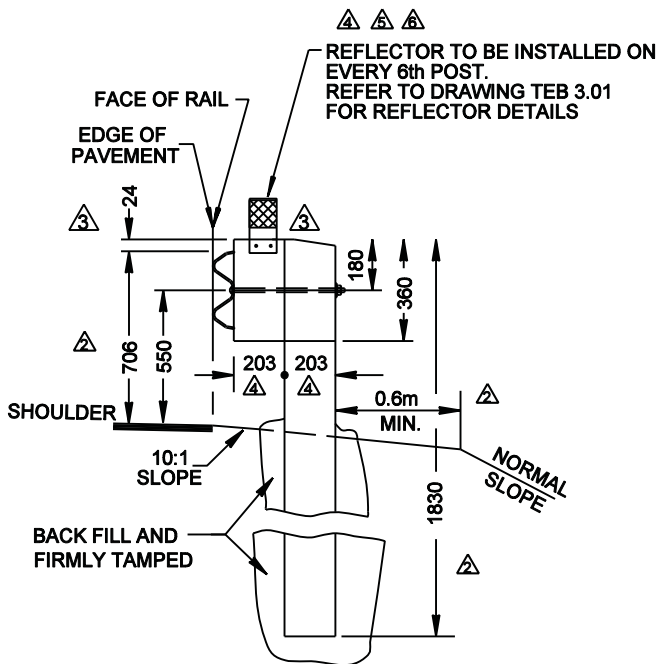
PLAN



ELEVATION



RAIL SPICE DETAIL



POST AND SPACER DETAILS

NOTE: THE STANDARD POST LENGTH FOR STRONG POST SYSTEM IS 1830mm (6'0"). OTHER POST LENGTHS MAY BE USED IF DIRECTED BY THE ENGINEER.

All dimensions are in millimetres unless otherwise indicated.

6	Reflector Note Revised	PM	8 JUL 09
5	Reflector Note Revised (Include Type IX)	BK	03/23/07
4	Reflector Note and Added Post Dimensions	BK	08/11/06
3	Dimensions and Reflector Detail	BK	12/07/05
2	Notes and Dimensions	BK	12-04
1			06-95
No.	REVISIONS	BY	DATE

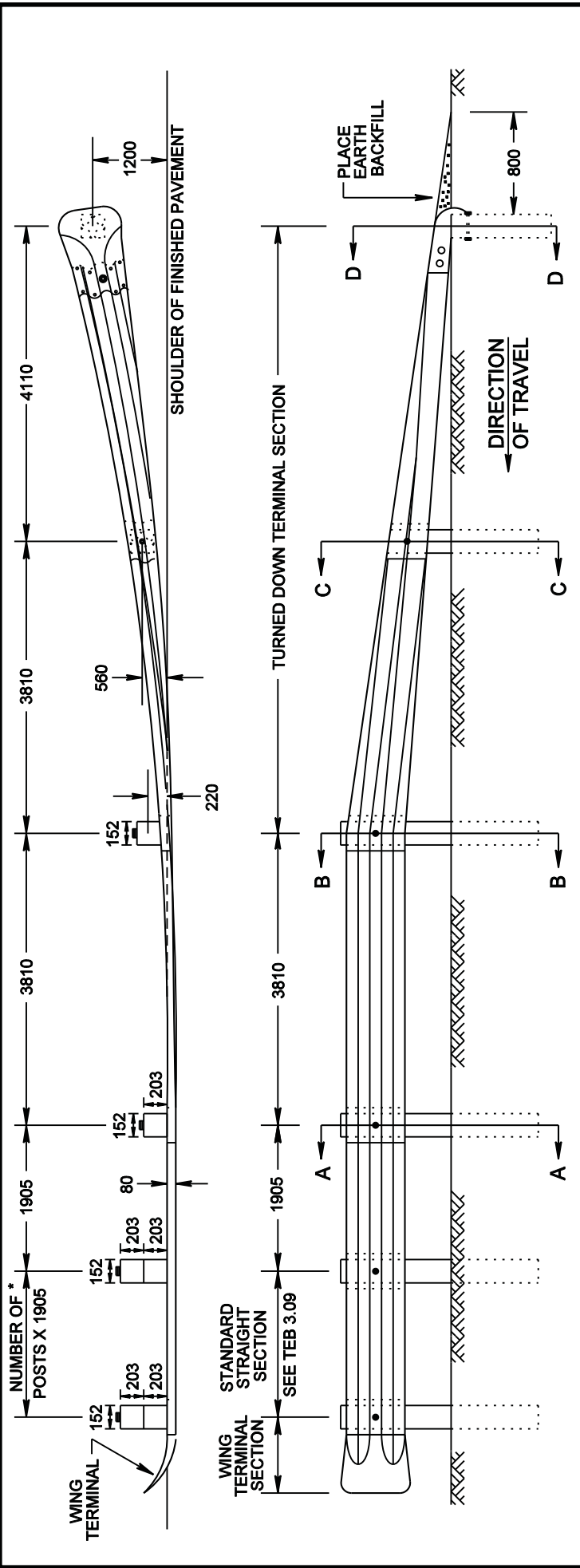
Approved:
Original signed by
A.D. Cherwenuk

Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

**STRONG POST W-BEAM
BLOCKED-OUT GUARDRAIL**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.09
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3	REFLECTOR NOTE REVISED	PM	8 JU 09
2	REFLECTOR NOTE REVISED	BK	5 JUN 07
1	REFLECTOR NOTE REVISED	BY	DATE
No.	REVISIONS		

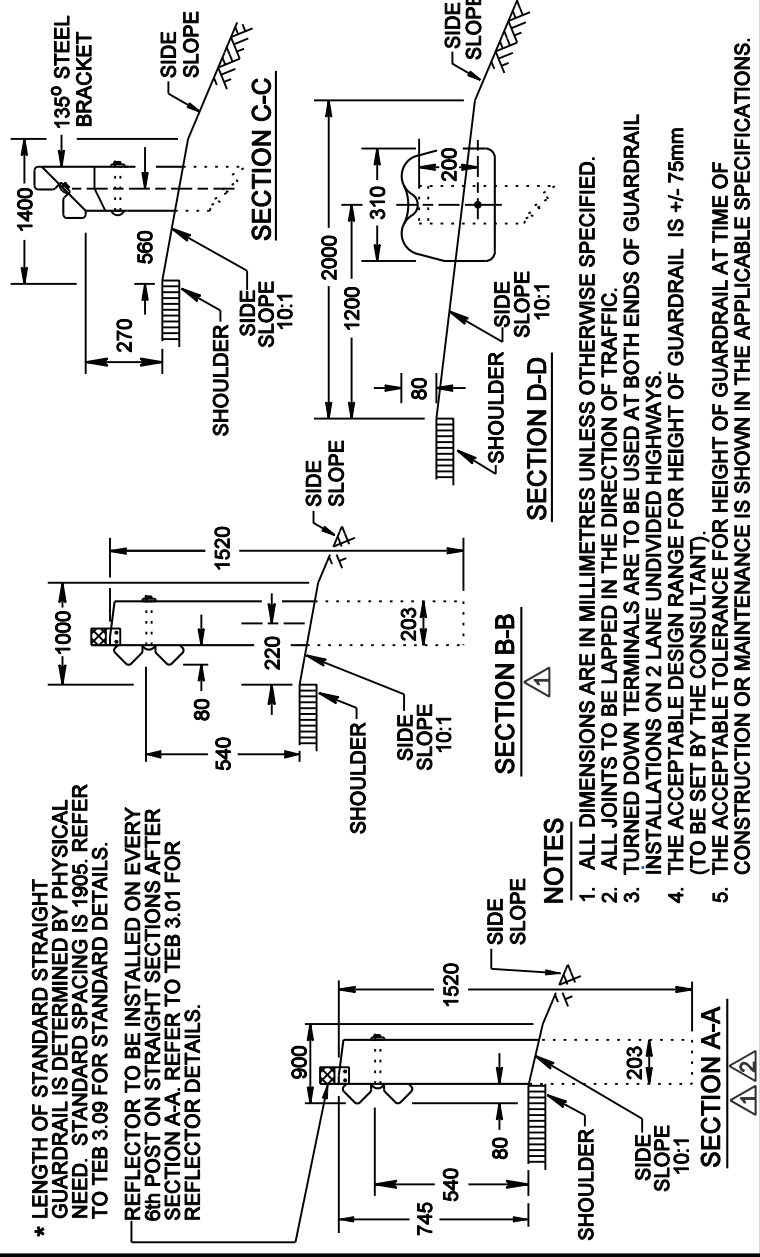
Approved: _____
 Executive Director,
 Technical Standards Branch

Date: July, 2006



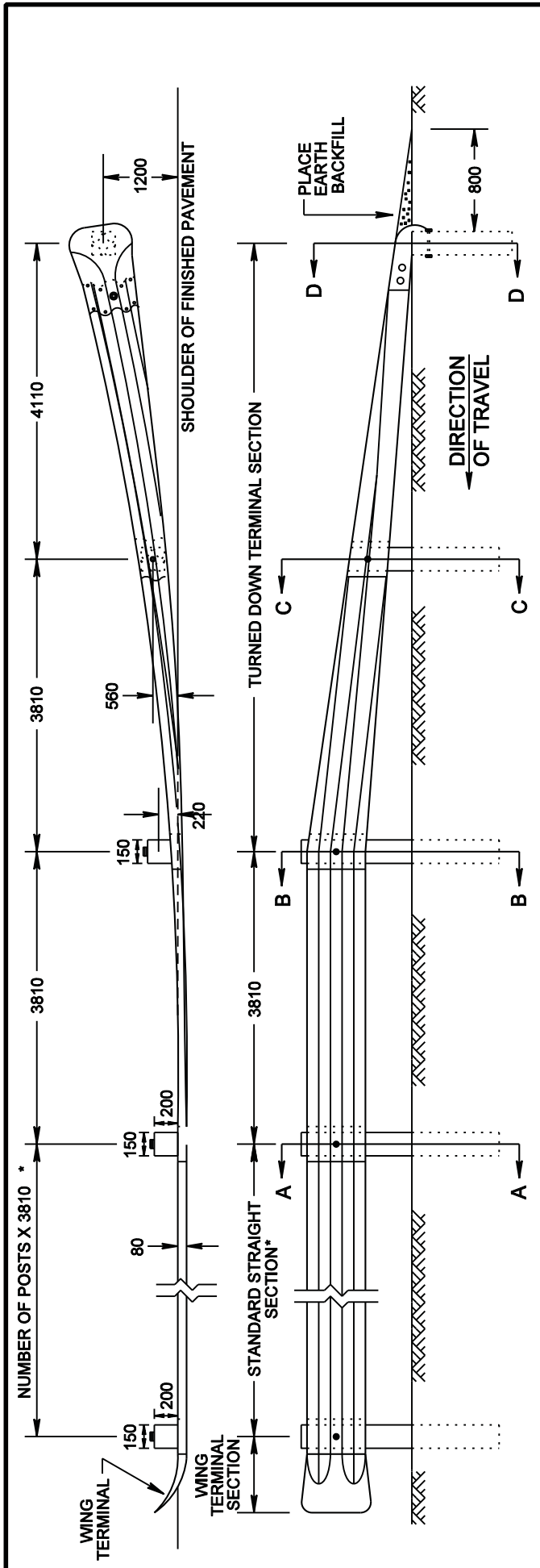
W - BEAM GUARDRAIL STRONG POST END TREATMENT TURN DOWN (1.9m SPACING - WITH BLOCKS)

Prepared By: G.E.C.	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.10
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* LENGTH OF STANDARD STRAIGHT GUARDRAIL IS DETERMINED BY PHYSICAL NEED. STANDARD SPACING IS 1905. REFER TO TEB 3.09 FOR STANDARD DETAILS.
 REFLECTOR TO BE INSTALLED ON EVERY 6th POST ON STRAIGHT SECTIONS AFTER SECTION A-A. REFER TO TEB 3.01 FOR REFLECTOR DETAILS.

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 2. ALL JOINTS TO BE LAPPED IN THE DIRECTION OF TRAFFIC.
 3. TURNED DOWN TERMINALS ARE TO BE USED AT BOTH ENDS OF GUARDRAIL INSTALLATIONS ON 2 LANE UNDIVIDED HIGHWAYS.
 4. THE ACCEPTABLE DESIGN RANGE FOR HEIGHT OF GUARDRAIL IS +/- 75mm (TO BE SET BY THE CONSULTANT).
 5. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE IS SHOWN IN THE APPLICABLE SPECIFICATIONS.

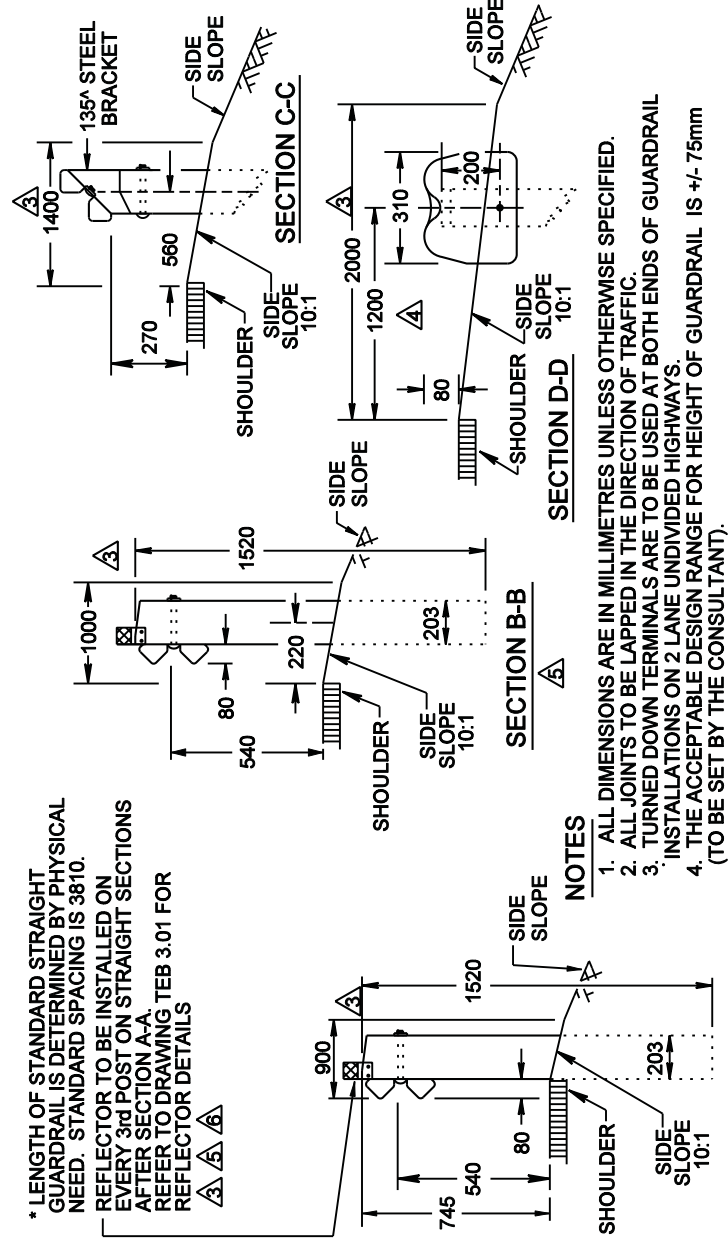


No.	REVISIONS	BY	DATE
1	ADDED NOTE No. 4	TDN	10/98
2	REVISED NOTE	RD	8/03
3	NOTES AND DIMENSIONS	BK	12/04
4	DIMENSION	BK	12/07/05
5	REFLECTOR NOTE REVISED	BK	5 JUN 07
6	REFLECTOR NOTE REVISED	PM	8 JUL 09

Approved: **Alberta** Transportation
 Executive Director,
 Technical Standards Branch
 Date: December, 1992

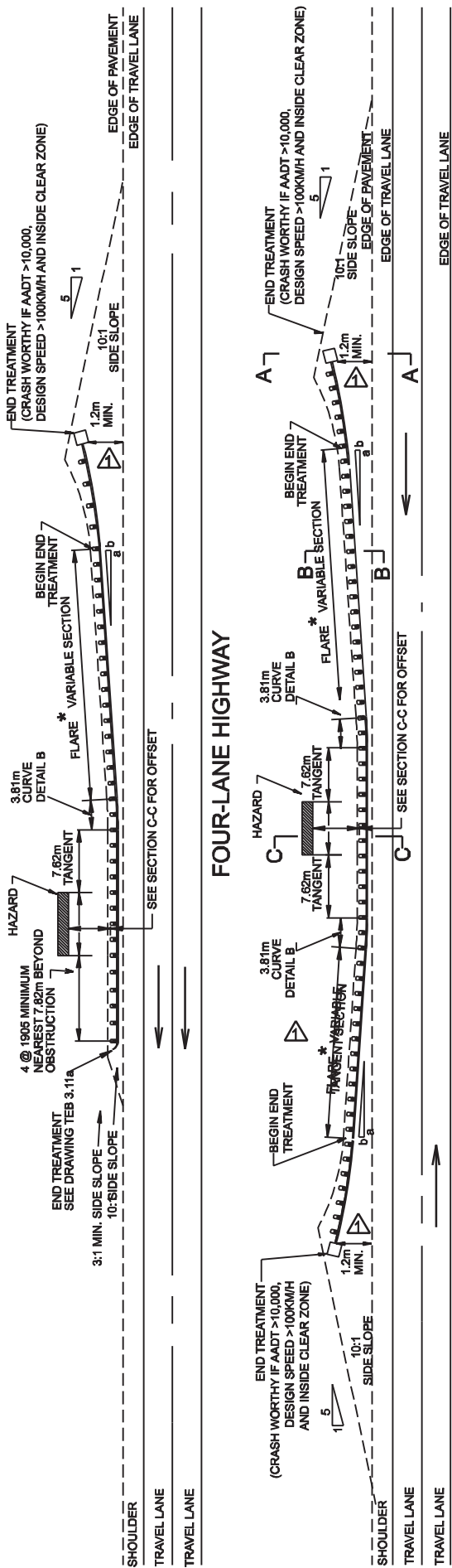
W - BEAM GUARDRAIL WEAK POST END TREATMENT TURN DOWN (3.8m SPACING - NO BLOCK)

Prepared By: T.S.	Checked By: B.K.	Scale: N.T.S.	Dwg No.: FEB 3.12
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- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
 2. ALL JOINTS TO BE LAPPED IN THE DIRECTION OF TRAFFIC.
 3. TURNED DOWN TERMINALS ARE TO BE USED AT BOTH ENDS OF GUARDRAIL INSTALLATIONS ON 2 LANE UNDIVIDED HIGHWAYS.
 4. THE ACCEPTABLE DESIGN RANGE FOR HEIGHT OF GUARDRAIL IS +/- 75mm (TO BE SET BY THE CONSULTANT).
 5. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE IS SHOWN IN THE APPLICABLE SPECIFICATIONS.

* LENGTH OF STANDARD STRAIGHT GUARDRAIL IS DETERMINED BY PHYSICAL NEED. STANDARD SPACING IS 3810.
 REFLECTOR TO BE INSTALLED ON EVERY 3rd POST ON STRAIGHT SECTIONS
 AFTER SECTION A-A
 REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS



END TREATMENT (CRASH WORTHY IF AADT >10,000, DESIGN SPEED >100KMH AND INSIDE CLEAR ZONE)

END TREATMENT (CRASH WORTHY IF AADT >10,000, DESIGN SPEED >100KMH AND INSIDE CLEAR ZONE)

END TREATMENT (CRASH WORTHY IF AADT >10,000, DESIGN SPEED >100KMH AND INSIDE CLEAR ZONE)

END TREATMENT (CRASH WORTHY IF AADT >10,000, DESIGN SPEED >100KMH AND INSIDE CLEAR ZONE)

HAZARD

HAZARD

HAZARD

HAZARD

HAZARD

HAZARD

HAZARD

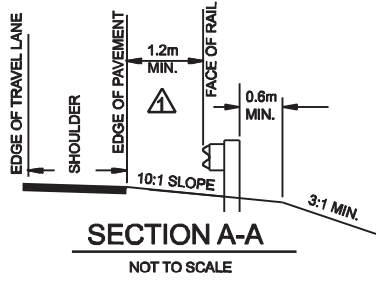
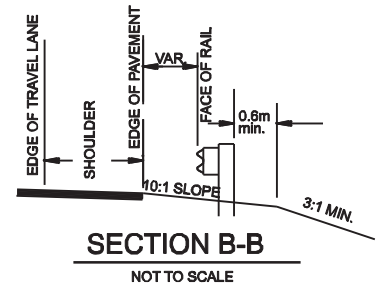
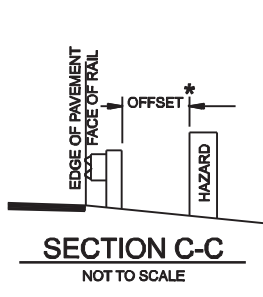
HAZARD

HAZARD

HAZARD

HAZARD

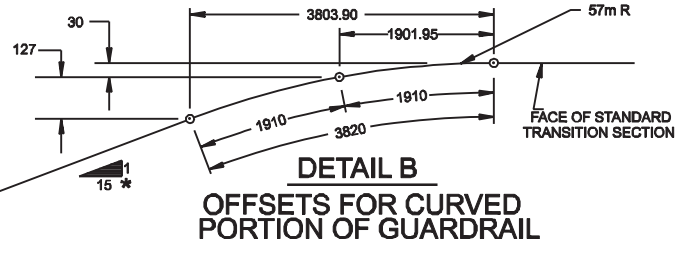
HAZARD



STRONG POST W-BEAM 0.9m

STRONG POST (PLASTIC) 1.5m

MODIFIED THRIE BEAM 0.9m



TWO-LANE HIGHWAY

* OFFSET FROM BACK OF BARRIER TO FACE OF OBSTRUCTION SHALL BE AT LEAST THE DESIGN DEFLECTION OF THE BARRIER SYSTEM AS FOLLOWS:

△			
△	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

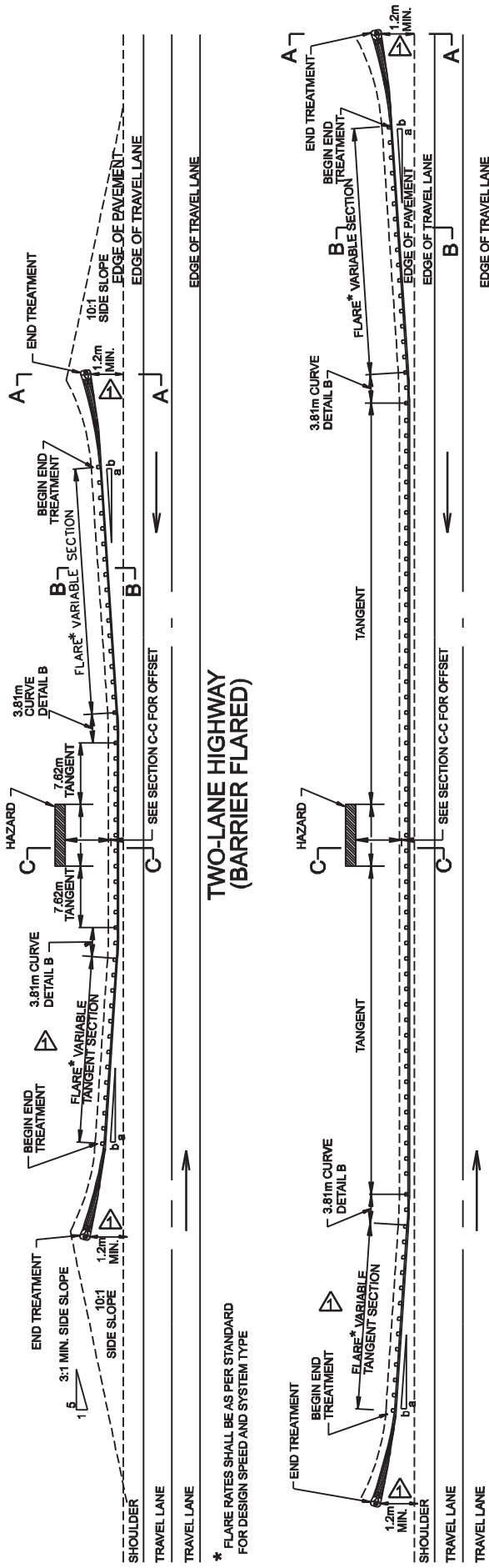
Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005

TYPICAL W-BEAM STRONG POST OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT ROADSIDE HAZARDS (TWO AND FOUR LANE HIGHWAYS)

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.15a
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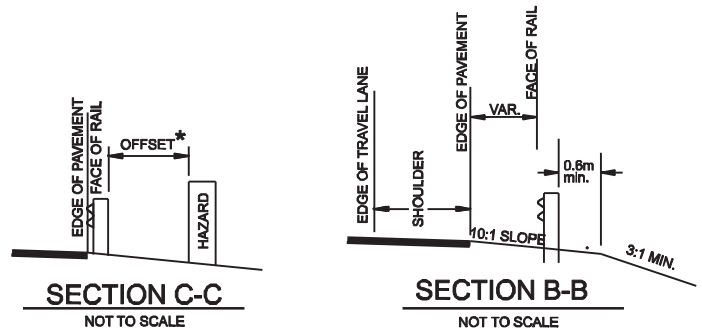
**TWO-LANE HIGHWAY
(BARRIER FLARED)**

**TWO-LANE HIGHWAY
(BARRIER ON TANGENT)**

* FLARE RATES SHALL BE AS PER STANDARD FOR DESIGN SPEED AND SYSTEM TYPE

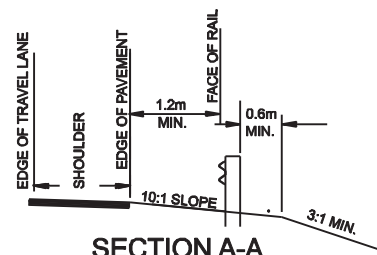
* OFFSET FROM BACK OF BARRIER TO FACE OF OBSTRUCTION SHALL BE AT LEAST THE DESIGN DEFLECTION OF THE BARRIER SYSTEM AS FOLLOWS:

- WEAK POST W-BEAM 2.5m (3.81m post spacing)
- 3-STRAND CABLE 3.0m (3.81m post spacing)

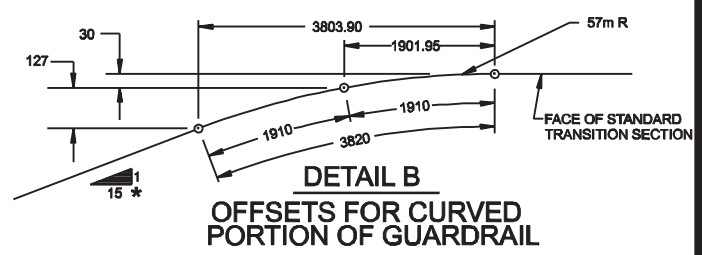


SECTION C-C
NOT TO SCALE

SECTION B-B
NOT TO SCALE



SECTION A-A
NOT TO SCALE



DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL

BARRIER MAY BE INSTALLED ON TANGENT OR WITH FLARING AT ONE OR BOTH ENDS. GUARDRAIL LENGTH MAY BE REDUCED BY FLARING. LENGTH IS TO BE DETERMINED BY PROTECTION ENVELOPE METHOD.

END TREATMENT BARRIER MAY BE TERMINATED WITH A TURN-DOWN NEAR SHOULDER (TEB 3.12), OR OTHER TREATMENT AS DETERMINED BY PROJECT ENGINEER IN EACH GIVEN SITUATION

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

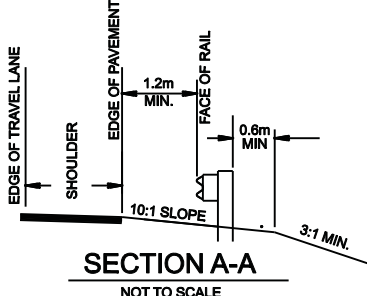
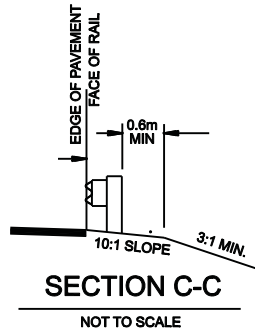
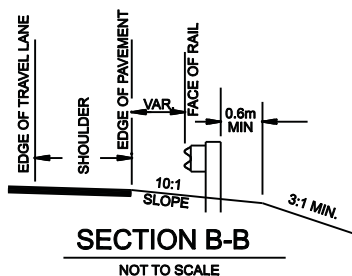
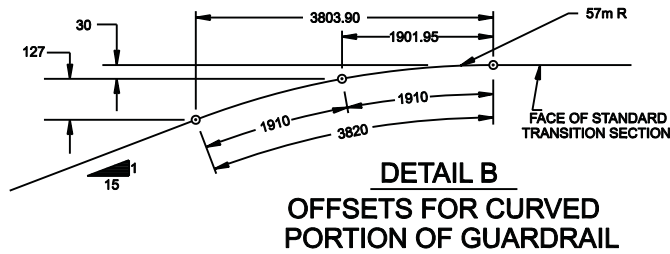
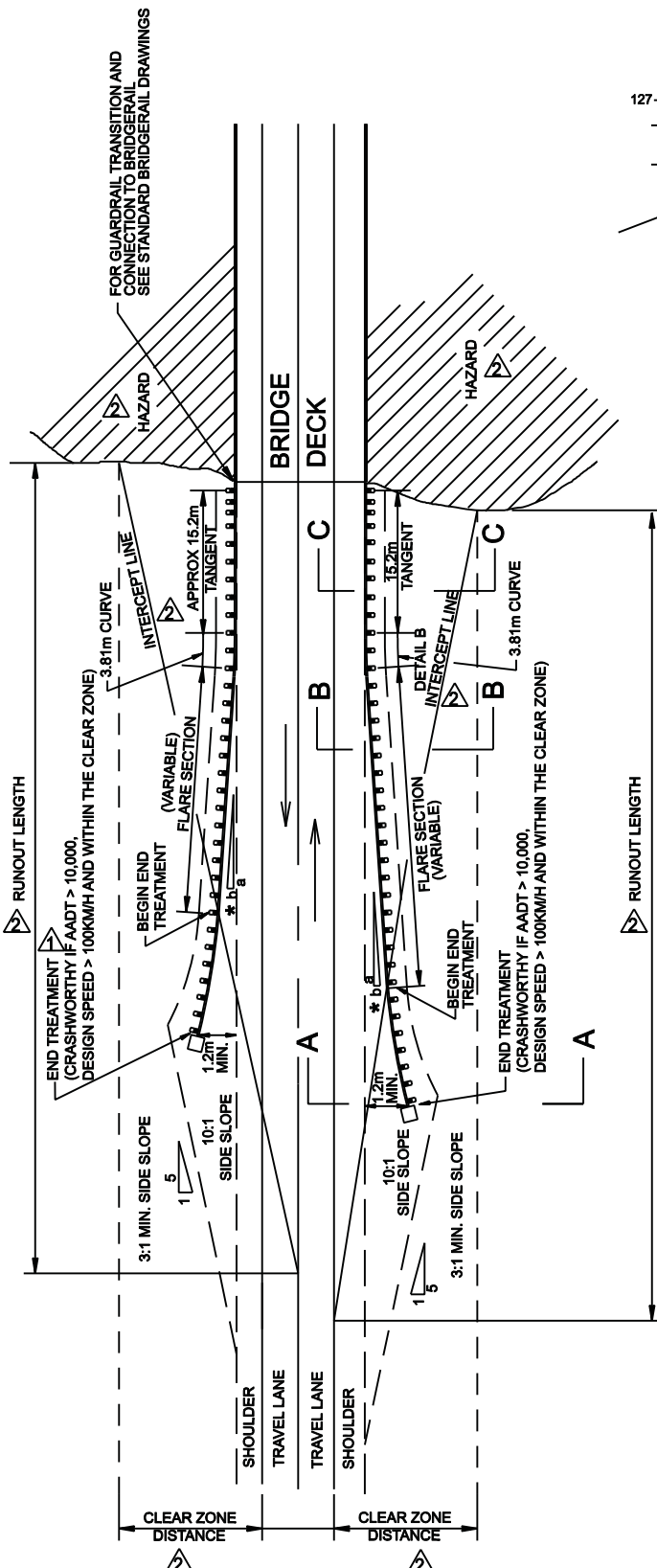
▲	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
Date: JULY 12, 2005



**TYPICAL W-BEAM WEAK POST
GUARDRAIL PLACEMENT
ROADSIDE HAZARDS**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.15b
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⚠	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
⚠	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

Approved:

Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005

**TYPICAL STRONG POST W-BEAM
OR MODIFIED THRIE BEAM GUARDRAIL
PLACEMENT AT BRIDGE APPROACHES
(TWO-LANE HIGHWAY)**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.16a
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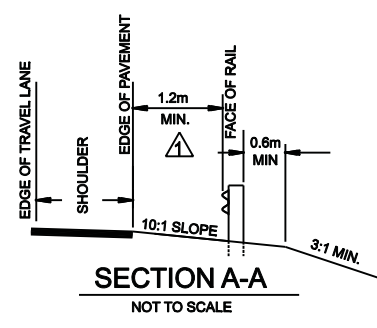
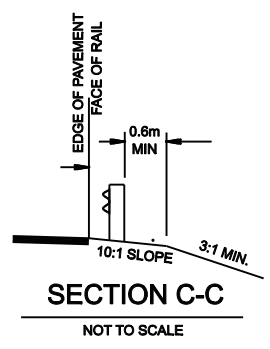
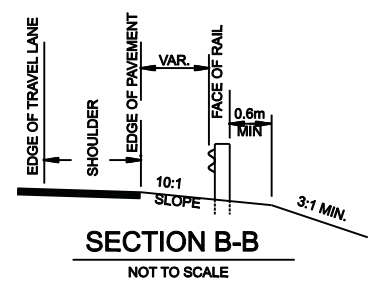
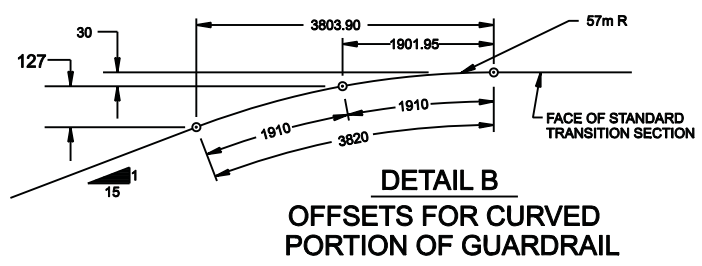
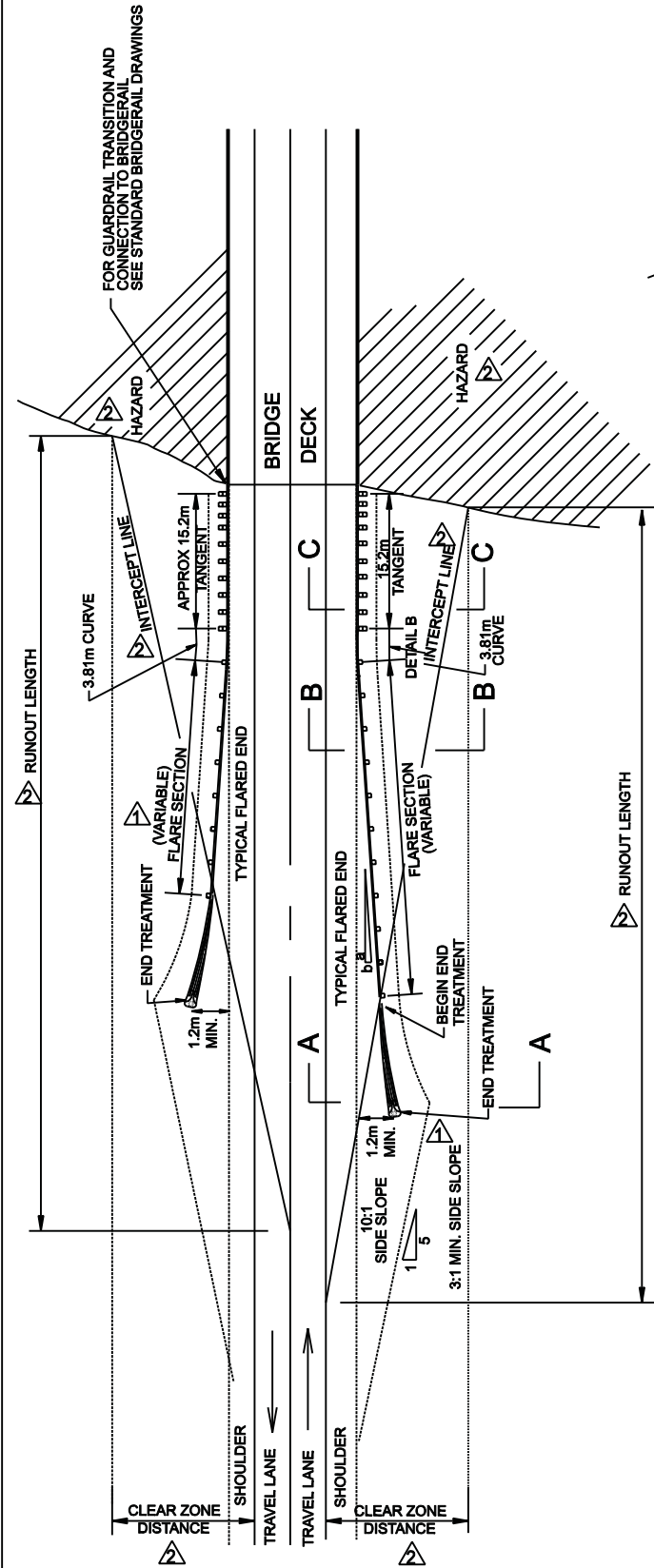
END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

* FLARE RATES AS PER STANDARD

⚠ RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE

LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD

All dimensions are in millimetres unless otherwise indicated.



⚠	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
⚠	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005

**TYPICAL W-BEAM
WEAK POST GUARDRAIL
PLACEMENT AT BRIDGE APPROACHES
(TWO-LANE HIGHWAY)**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.16b
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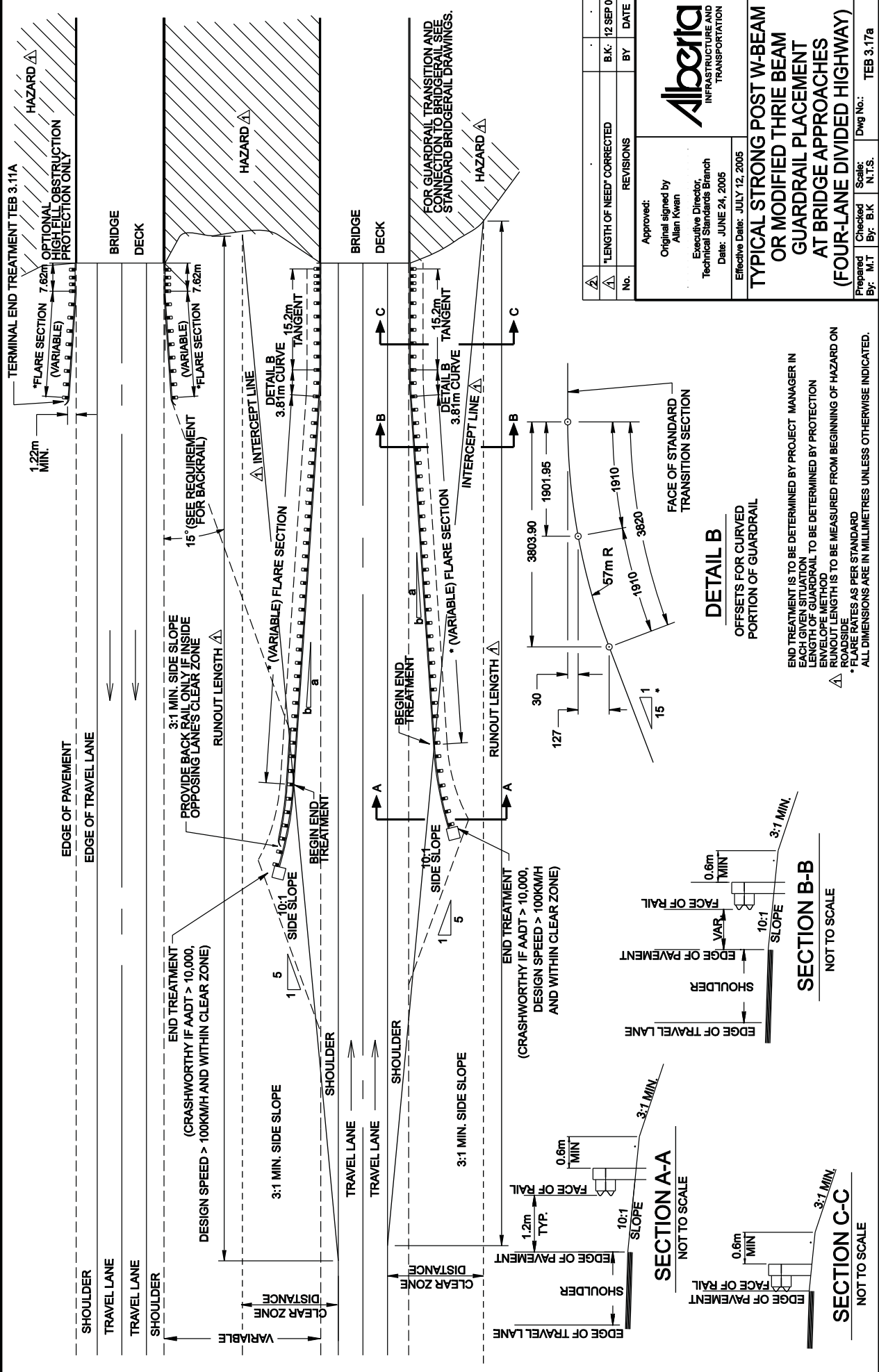
END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

BARRIER MAY BE INSTALLED ON TANGENT OR WITH FLARING AT ONE OR BOTH ENDS. GUARDRAIL LENGTH MAY BE REDUCED BY FLARING. LENGTH IS TO BE DETERMINED BY PROTECTION ENVELOPE METHOD.

⚠ RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE.

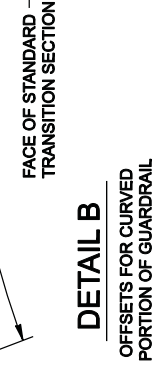
all dimensions are in millimetres unless otherwise indicated.

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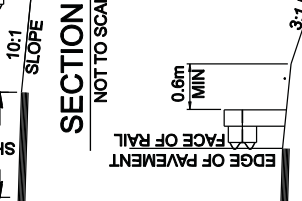
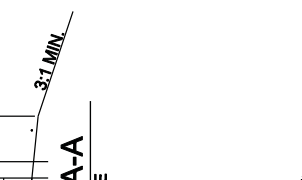
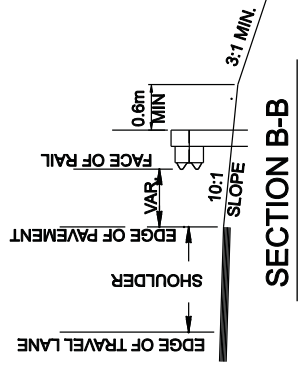
△	△	No.	REVISIONS	BY	DATE
			"LENGTH OF NEED" CORRECTED		B.K.: 12 SEP 07

Approved: Original signed by Allin Kwen Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005		TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (FOUR-LANE DIVIDED HIGHWAY)
Prepared By: M.T.	Checked By: B.K.	
		Scale: N.T.S.



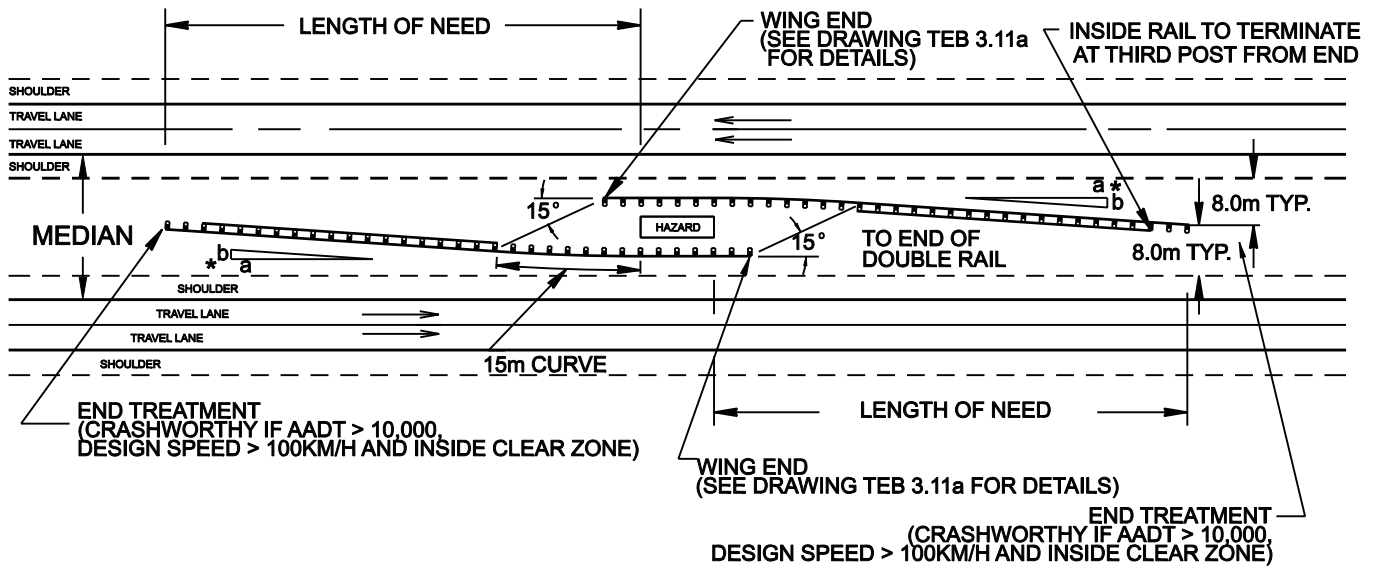
DETAIL B
 OFFSETS FOR CURVED
 PORTION OF GUARDRAIL

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION
 LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD
 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADWAY
 * FLARE RATES AS PER STANDARD
 ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

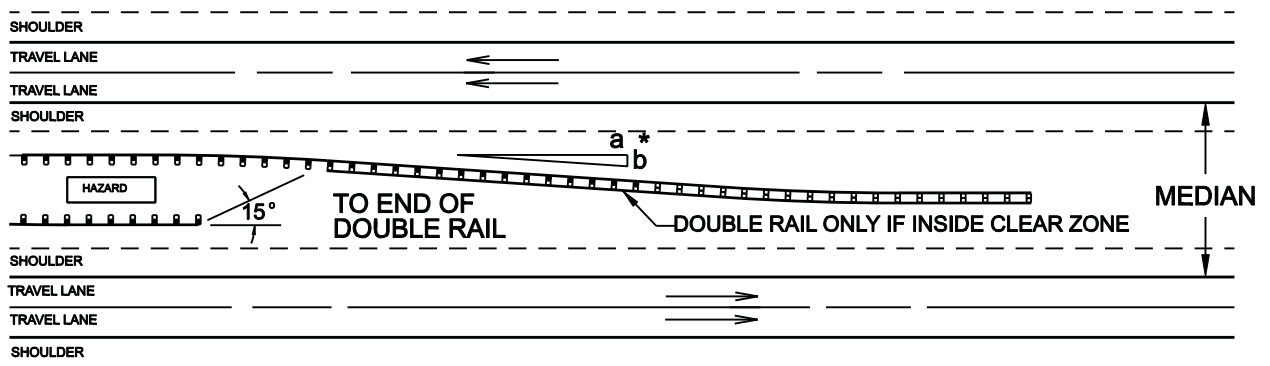


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INTRODUCED MEDIAN BARRIER



CONTINUOUS MEDIAN BARRIER



* FLARE RATE AS PER STANDARD FOR DESIGN SPEED.

CONSIDER ONLY WHERE MEDIAN WIDTH SUFFICIENT TO PROVIDE 8m MINIMUM FROM OPPOSING TRAVEL LANE TO BACK SIDE OF TERMINAL.

FOR NARROW MEDIAN, IMPACT SYSTEMS ARE REQUIRED.

THE LENGTH OF NEED SHALL BE BASED ON THE PROTECTION ENVELOPE.

CLEARANCE BETWEEN GUARDRAIL AND OBSTRUCTION:
 STRONG POST (WOOD AND STEEL POSTS) 0.9m
 THRIE BEAM 0.9m
 STRONG POST (PLASTIC POSTS) 1.5m

DATA FOR 15m CURVE
 D=383.0' R=225.0m
 SR=7.508m CL=15.0m

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER TO EACH GIVEN SITUATION.

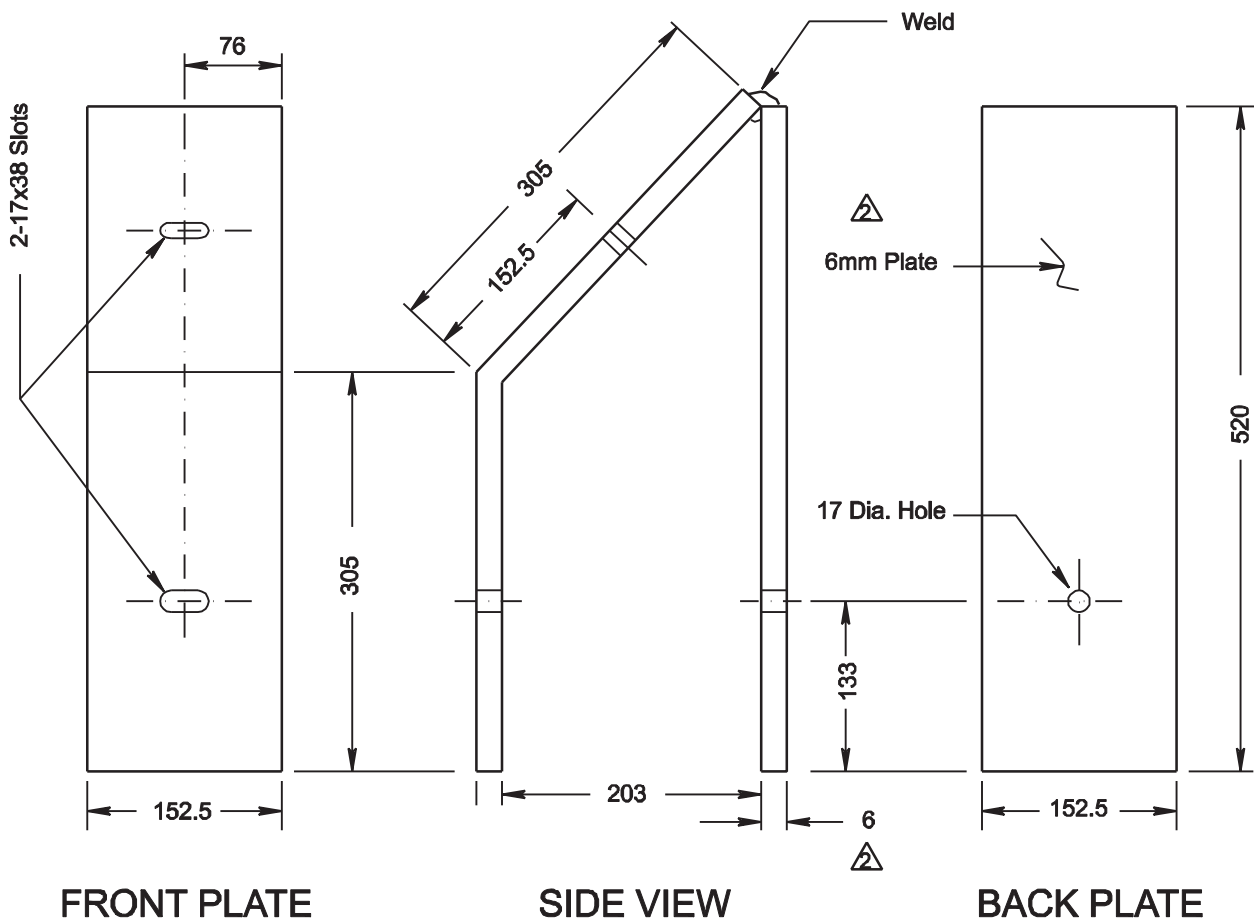
All dimensions are in millimetres unless otherwise indicated.

△			
△			
No.	REVISIONS	BY	DATE

Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005	
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TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT FOR MEDIAN HAZARDS

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.18a
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NOTES:
 THIS BRACKET IS REQUIRED FOR THE STANDARD W-BEAM
 GUARDRAIL WEAKPOST TURN DOWN END TREATMENT -
 SEE DRAWING TEB 3.12 SECTION C-C

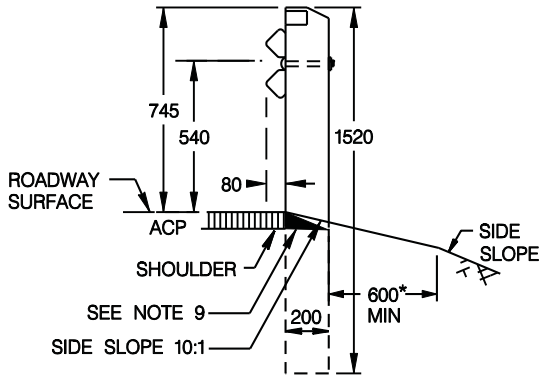
⚠	Plate Thickness and Notes	B.K.	12/07/05
⚠	N/A	.	06/95
No.	REVISIONS	BY	DATE

Approved: Original Approved by Alberta Transportation and Utilities Traffic Engineering Section Roadway Engineering Branch Executive Director, Technical Standards Branch	
Date: NOVEMBER 25, 1992	

W - BEAM GUARDRAIL TURN DOWN END HARDWARE

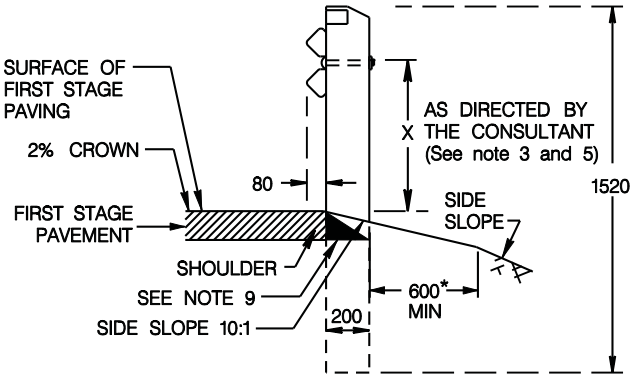
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.53
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All dimensions are in millimetres unless otherwise indicated.



SECTION A-A

STANDARD GUARDRAIL INSTALLATION
(W-beam, no blocks).



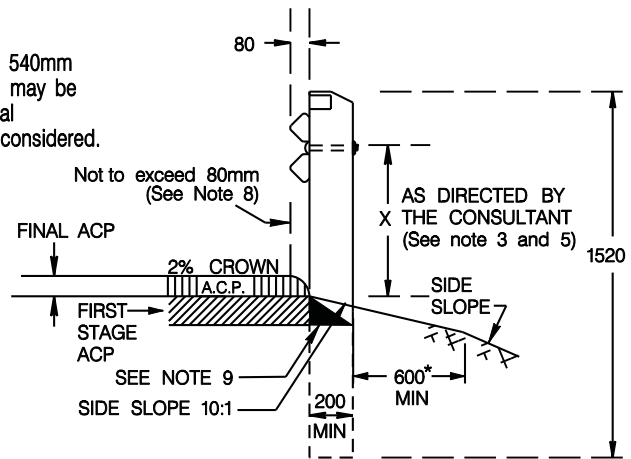
SECTION B-B

STAGE 1: FIRST STAGE PAVING

NOTES:

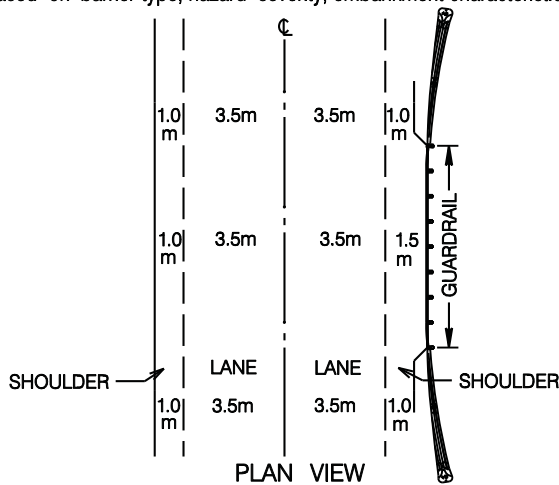
- Sections B-B and C-C show the special installation of guardrail that is suggested on projects where final paving is anticipated within 10 years.
- The standard height of guardrail from the road surface to the centre bolt is 540mm (Section A-A). The acceptable design range for height of guardrail installation is from 465mm to 615mm i.e. ± 75 mm
- The guardrail elevation 'x' is to be set by the consultant. An elevation between 540mm and 615mm is normally chosen for First Stage Paving projects. The elevation may be selected based on an estimate of the Final Pavement thickness. Where the final pavement thickness is not known, the highest permissible elevation should be considered.
- The acceptable tolerance for height of guardrail at time of construction or maintenance is shown in the applicable specification.
- By installing guardrail at the highest permissible elevation (Section B-B), the final pavement can be placed without the guardrail being removed or adjusted (Section C-C).
- All dimensions are in millimetres unless otherwise noted.
- Drawing is not to scale.
- Pavement drop-off line must not be more than 80mm from the guardrail post line. This is to prevent snagging.
- Installation of guardrail system normally requires post to be installed through ACP and GBC layers.

* The 600mm dimension may be exceeded if required by the consultant based on barrier type, hazard severity, embankment characteristics, etc.



SECTION C-C

STAGE 2: FINAL PAVING ON FIRST STAGE PAVING JOB



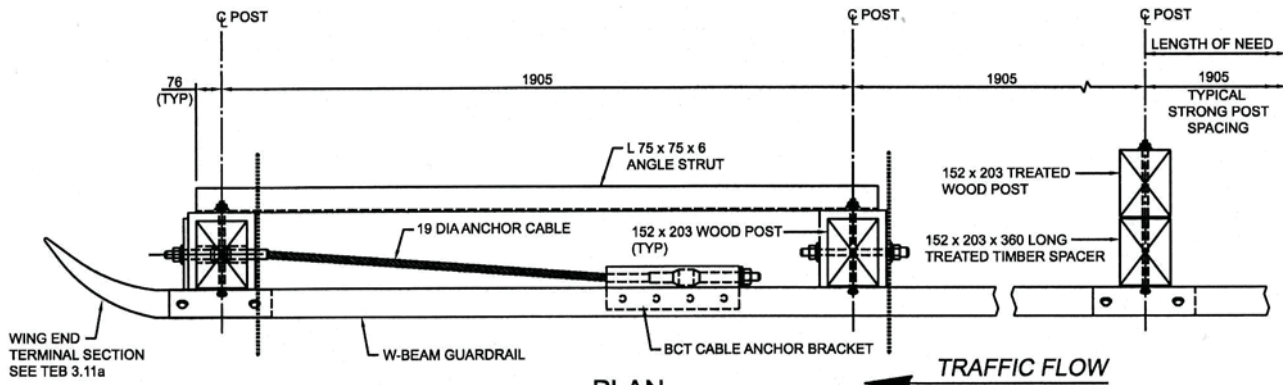
EXAMPLE SHOWING GUARDRAIL INSTALLATION
ON A TYPICAL RAU-209 ROADWAY AT STAGE 2

	Notes and Sections	P.M.	8 JUL 09
No.	REVISIONS	BY	DATE

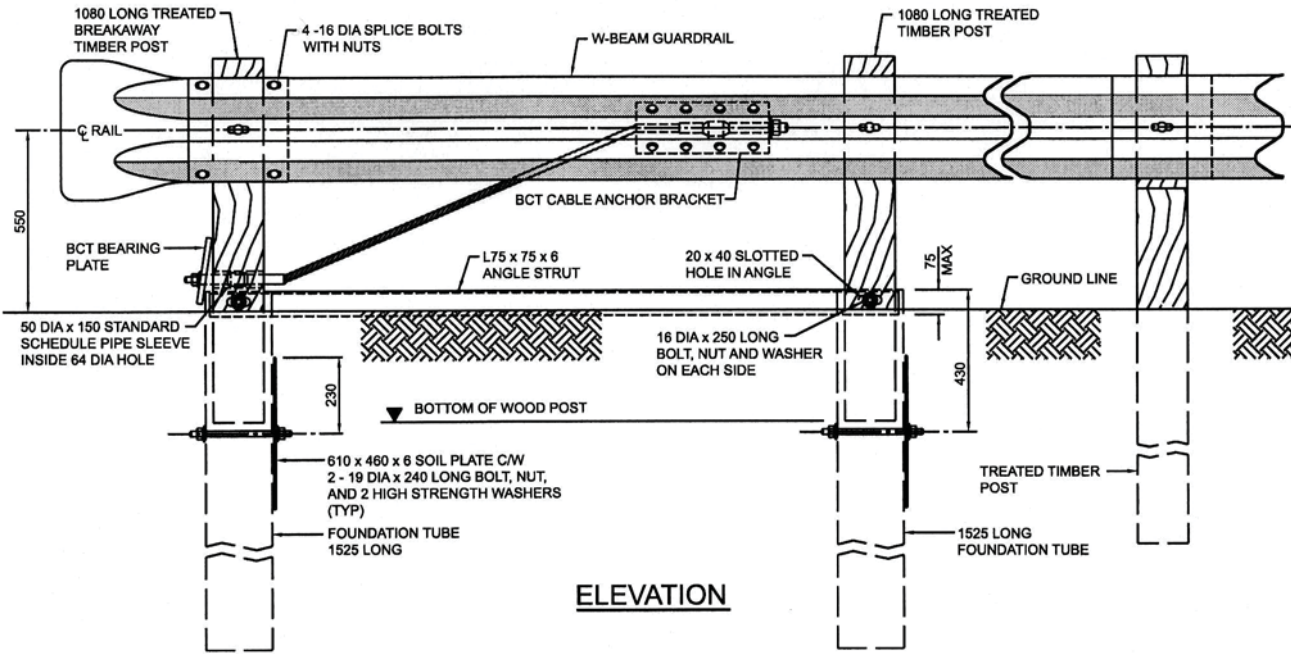
<p>Approved: Original approved by Alberta Transportation and Utilities Traffic Operations Branch</p> <p>Executive Director, Technical Standards Branch Date: JUNE 24, 2005</p> <p>Effective Date: JULY 12, 2005</p>	
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**WEAK POST W-BEAM
INSTALLATION ON
FIRST STAGE PAVING PROJECTS**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.56a
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PLAN



ELEVATION

NOTES:

1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RDG-B1.2 AND RDG-B1.3 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

▲			
▲			
No.	REVISIONS	BY	DATE

Approved:

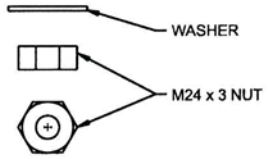
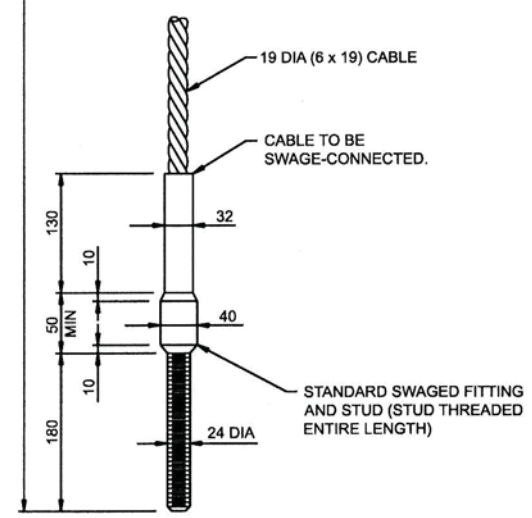
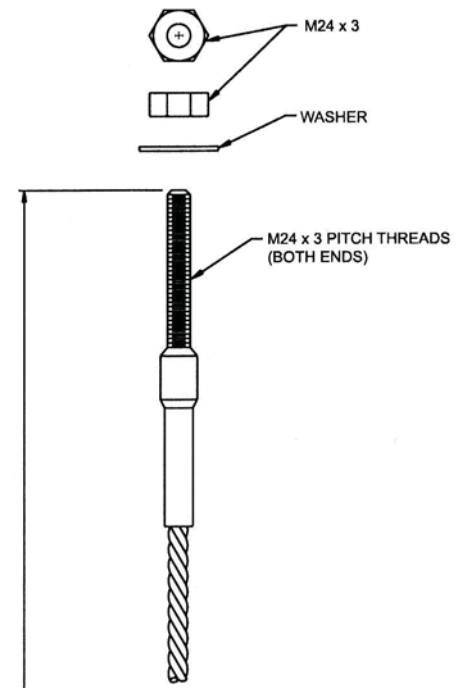
 Executive Director,
 Technical Standards Branch



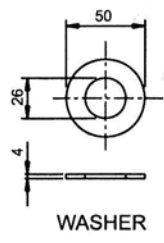
Date: NOVEMBER, 2007

**W-BEAM
 CABLE ANCHOR TERMINAL
 (EXIT END TREATMENT
 FOR DIVIDED HIGHWAYS)**

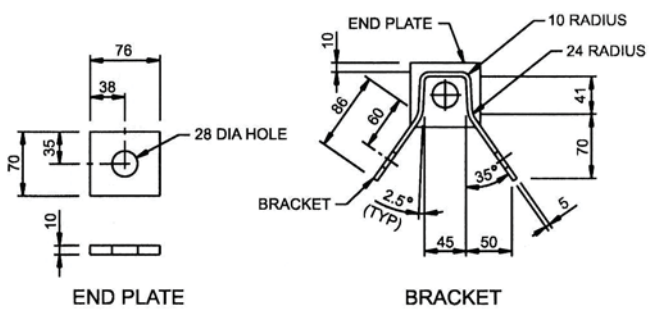
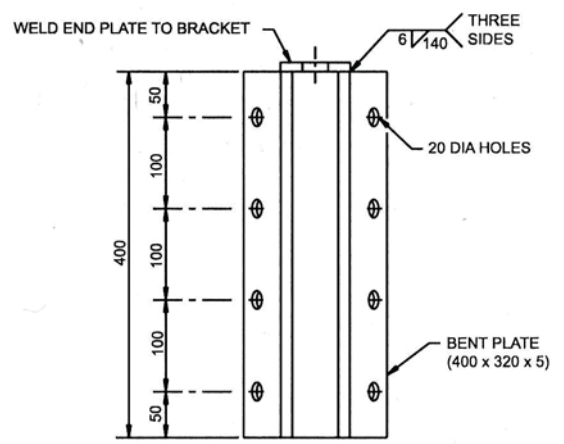
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.1
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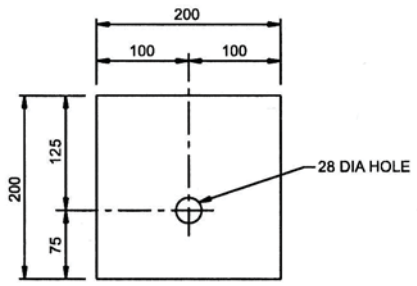
BCT CABLE ANCHOR ASSEMBLY



ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



BCT CABLE ANCHOR BRACKET



200 x 200 x 16 BCT BEARING PLATE

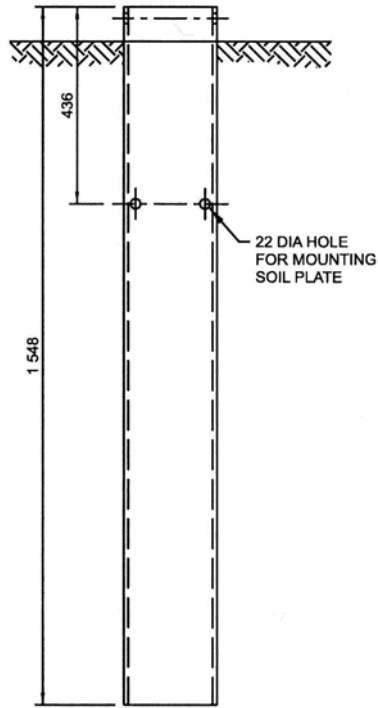
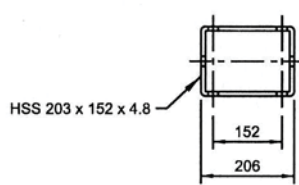
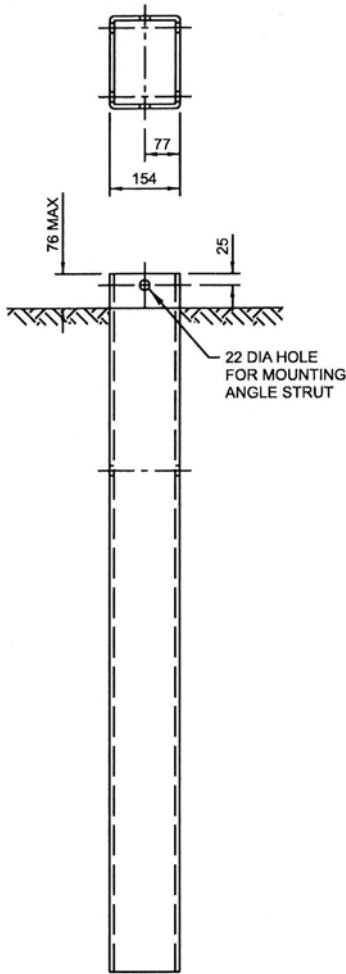
▲			
▲			
No.	REVISIONS	BY	DATE

Approved:
Allan Swan
Executive Director,
Technical Standards Branch
Date: NOVEMBER, 2007



**HARDWARE DETAILS
FOR W-BEAM AND
THRIE BEAM GUARDRAIL
CABLE ANCHOR TERMINAL**

Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B1.2
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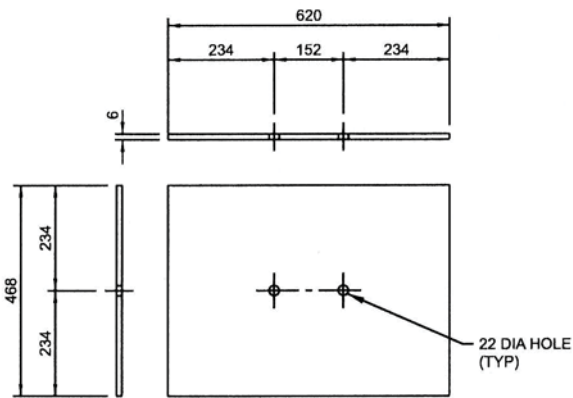
FRONT

SIDE

FOUNDATION TUBE

NOTE:

WOOD POST SHOULD BE ABLE TO SLIDE INTO THE TOP OF FOUNDATION TUBE SO THE ACTUAL INSIDE DIMENSIONS OF FOUNDATION TUBE CAN NOT BE LESS THAN 190x140.



FOUNDATION TUBE SOIL PLATE

△			
△			
No.	REVISIONS	BY	DATE

Approved:

 Executive Director,
 Technical Standards Branch

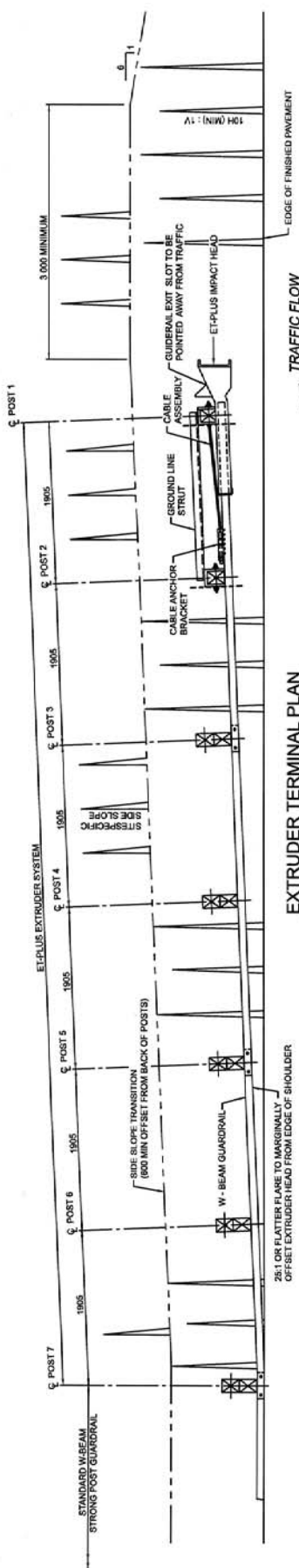


Date: NOVEMBER, 2007

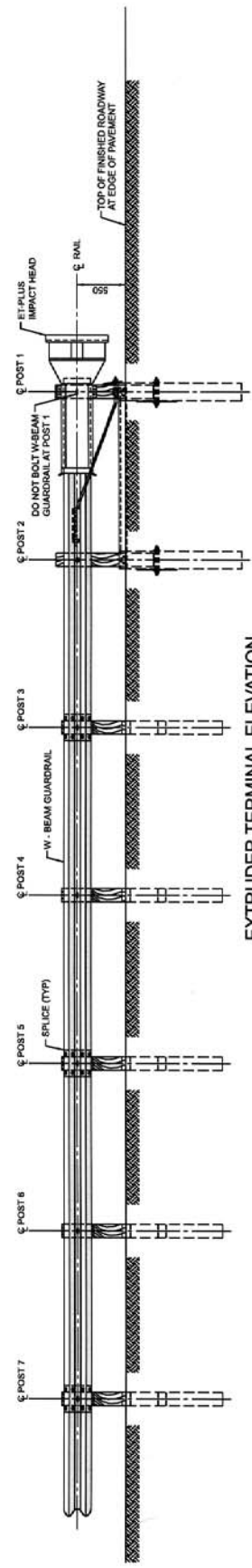
**FOUNDATION TUBE AND
 FOUNDATION TUBE SOIL PLATE
 DETAILS FOR W-BEAM AND THRIE
 BEAM CABLE ANCHOR TERMINAL**

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B1.3
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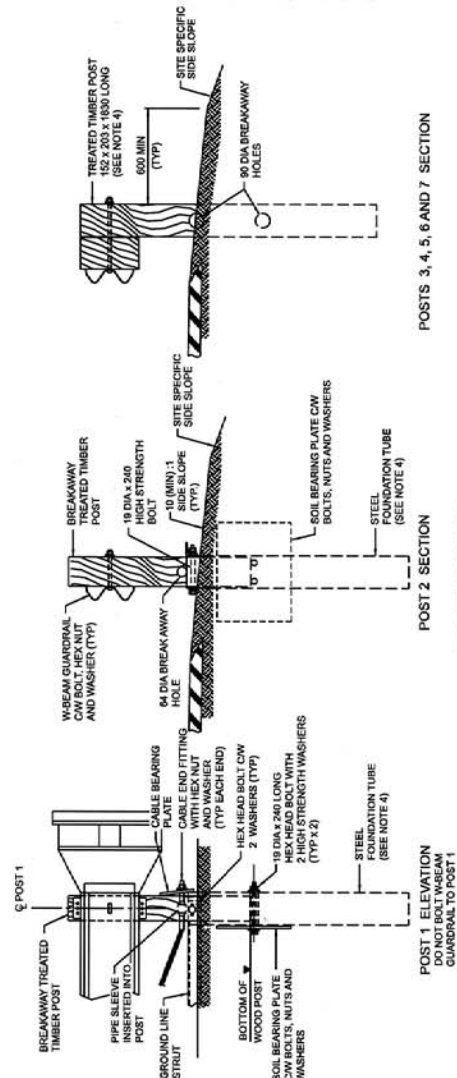
EXTRUDER TERMINAL PLAN



EXTRUDER TERMINAL ELEVATION

NOTES:

1. THE ET PLUS EXTRUDER SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC. AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE TRINITY SYSTEM SHALL BE AS PER THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
2. THIS DRAWING SHOWS THE INSTALLATION OF THE RIGHT SHOULDER EXTRUDER TERMINAL. INSTALLATION OF THE LEFT SHOULDER EXTRUDER TERMINAL IS INVERTED FOR APPLICATIONS TO THE LEFT.
3. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
4. ALTERNATE POST SIZES AND TYPES FOR POSTS 1 TO 7 INCLUSIVE MAY BE USED AS SPECIFIED IN THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
5. FOR INSTALLATION ON A CURVE, THE ET PLUS EXTRUDER SYSTEM SHALL BE INSTALLED ON THE INSIDE OF THE CURVE. REFER TO THE TRINITY INSTALLATION INSTRUCTIONS MANUAL FOR LIMITATIONS, INCLUDING MAXIMUM TERMINAL OFFSETS.
6. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETINGS ON THE IMPACT HEAD AND W-BEAM GUARDRAIL SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
7. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
8. POST 3 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
9. A MAXIMUM FLARE RATE OF 25 TO 1 IS ACCEPTABLE TO OFFSET THE IMPACT HEAD FROM THE EDGE OF SHOULDER AND GRADE.
10. THE IMPACT HEAD SHALL BE SET BETWEEN 64 AND 76 ABOVE THE TOP OF FINISHED ROADWAY.
11. THE TOP OF FINISHED ROADWAY AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE FINISHED SIDE SLOPE GRADE AT POST.



POST DETAILS

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

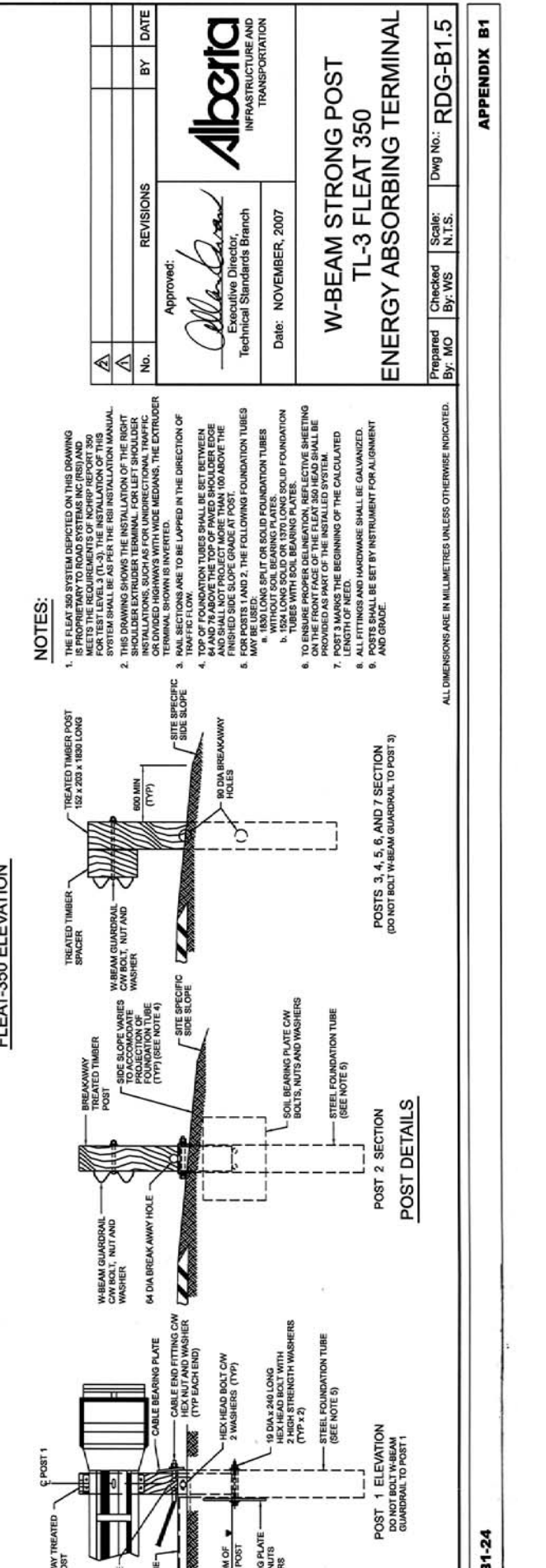
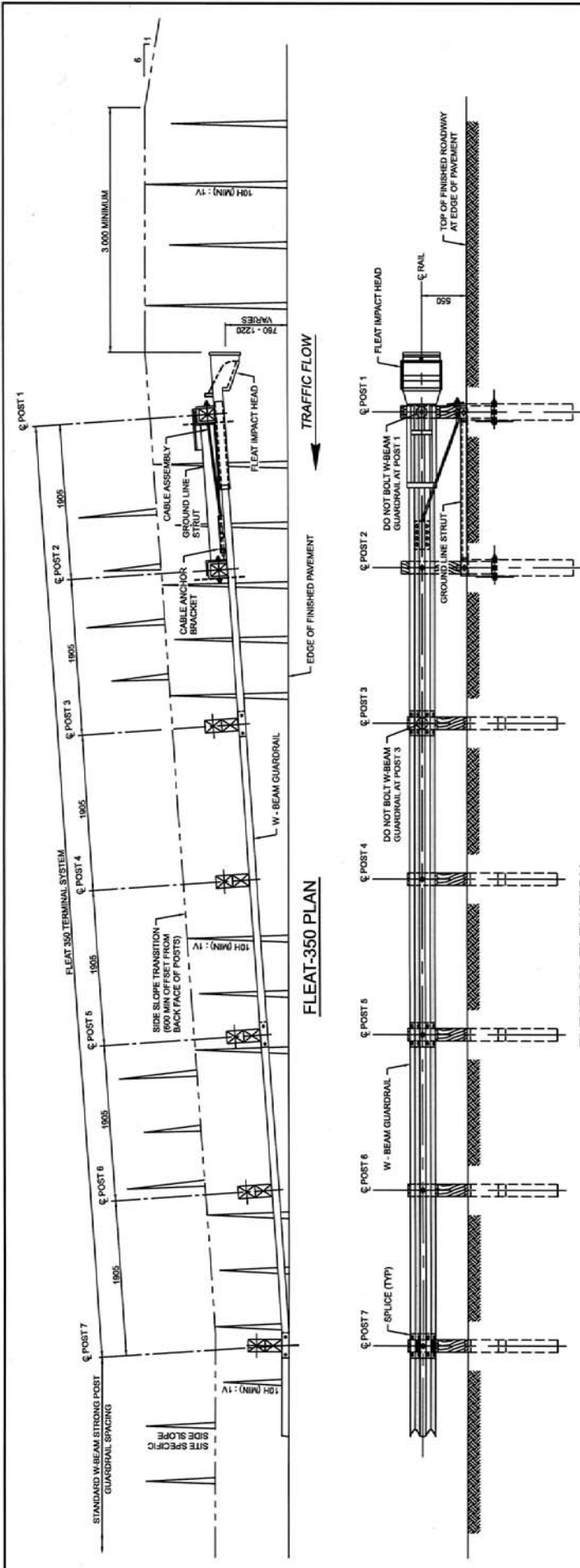
No.	REVISIONS	BY	DATE

Approved: *Colleen Kavan*
Executive Director,
Technical Standards Branch
TRANSPORTATION

Date: NOVEMBER, 2007

**W-BEAM STRONG POST
TL-3 ET-PLUS EXTRUDER
ENERGY ABSORBING TERMINAL**

Prepared By: MO Checked By: WS Scale: N.T.S. Dwg No.: RDG-B1.4



- NOTES:**
1. THE FLEAT 350 SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ROAD SYSTEMS INC (RSI) AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 WHICH IS REFERRED TO IN THE INSTALLATION MANUAL. THIS SYSTEM SHALL BE AS PER THE RSI INSTALLATION MANUAL.
 2. THIS DRAWING SHOWS THE INSTALLATION OF THE RIGHT SHOULDER EXTRUDER TERMINAL. FOR LEFT SHOULDER INSTALLATIONS, SUCH AS FOR UNIDIRECTIONAL TRAFFIC OR DIVIDED HIGHWAYS WITH WIDE MEDIANS, THE EXTRUDER TERMINAL SHOWN IS INVERTED.
 3. TRAFFIC FLOW IS TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
 4. TOP OF FOUNDATION TUBES SHALL BE SET BETWEEN 84 AND 76 ABOVE THE TOP OF PAVED SHOULDER EDGE AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE PAVED EDGE. SEE SLOPE SPECIFICATIONS IN THE RSI INSTALLATION MANUAL AND 2. THE FOLLOWING FOUNDATION TUBES MAY BE USED:
 - a. 1830 LONG SPLIT OR SOLID FOUNDATION TUBES WITHOUT SOIL BEARING PLATES
 - b. 1830 LONG SPLIT OR SOLID FOUNDATION TUBES WITH SOIL BEARING PLATES
 5. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING ON THE FRONT FACE OF THE FLEAT 350 HEAD SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
 6. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
 7. ALL DIMENSIONS SHALL BE TO THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
 8. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.

POSTS 3, 4, 5, 6, AND 7 SECTION
(DO NOT BOLT W-BEAM GUARDRAIL TO POST 3)

POST 2 SECTION
POST DETAILS

POST 1 ELEVATION
DO NOT BOLT W-BEAM GUARDRAIL TO POST 1

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE

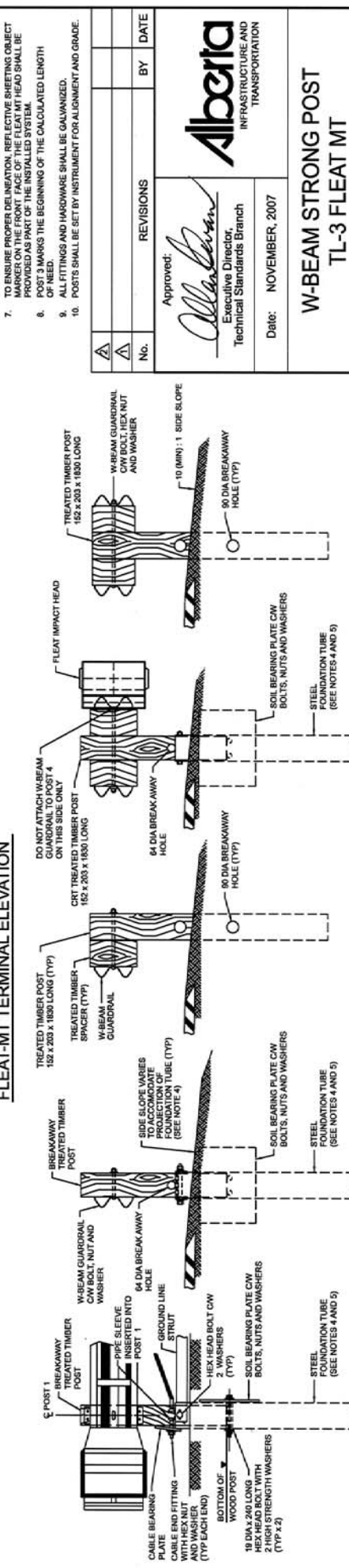
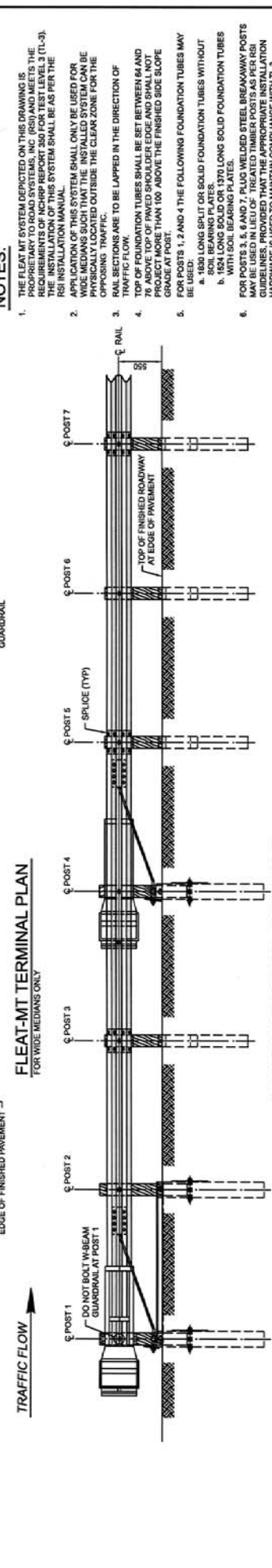
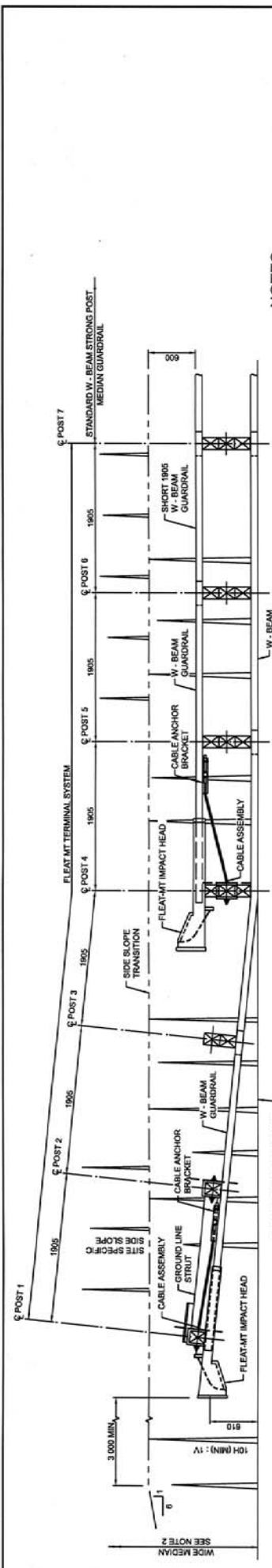
Approved: *[Signature]*
Executive Director,
Technical Standards Branch
INFRASTRUCTURE AND TRANSPORTATION

Date: NOVEMBER, 2007

**W-BEAM STRONG POST
TL-3 FLEAT 350
ENERGY ABSORBING TERMINAL**

Prepared By: MO Scale: N.T.S. Dwg No.: RDG-B1.5

APPENDIX B1



NOTES:

1. THE FLEAT MT SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ROAD SYSTEMS, INC (RSI) AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION MANUAL SHALL BE AS PER THE RSI INSTALLATION MANUAL.
2. APPLICATION OF THIS SYSTEM SHALL ONLY BE USED FOR WIDE MEDIANS SUCH THAT THE INSTALLED SYSTEM CAN BE PHYSICALLY LOCATED OUTSIDE THE CLEAR ZONE FOR THE OPPOSING TRAFFIC.
3. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC.
4. TOP OF FOUNDATION TUBES SHALL BE SET BETWEEN 64 AND 76 ABOVE TOP OF PAVED SHOULDER EDGE AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE FINISHED SIDE SLOPE GRADE AT POST.
5. FOR POSTS 1, 2 AND 4 THE FOLLOWING FOUNDATION TUBES MAY BE USED:
 - a. 1830 LONG SOLID OR 1370 LONG SOLID FOUNDATION TUBES WITH SOIL BEARING PLATES.
 - b. 1824 LONG SOLID OR 1370 LONG SOLID FOUNDATION TUBES WITH SOIL BEARING PLATES.
6. FOR POSTS 3, 5, 6 AND 7, PLUG WELDED STEEL BREAKAWAY POSTS SHALL BE USED. THE BREAKAWAY POSTS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPROPRIATE INSTALLATION GUIDELINES, PROVIDED THAT THE APPROPRIATE INSTALLATION HARDWARE IS USED TO MAINTAIN COMPLIANCE WITH TL-3.
7. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING OBJECT MARKER ON THE FRONT FACE OF THE FLEAT MT HEAD SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
8. POST 3 MARKS THE BEGINNING OF THE CALCULATED LENGTH.
9. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
10. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.

No.	REVISIONS	BY	DATE

Approved: *Allen [Signature]*
 Executive Director
 Technical Standards Branch

Date: NOVEMBER, 2007



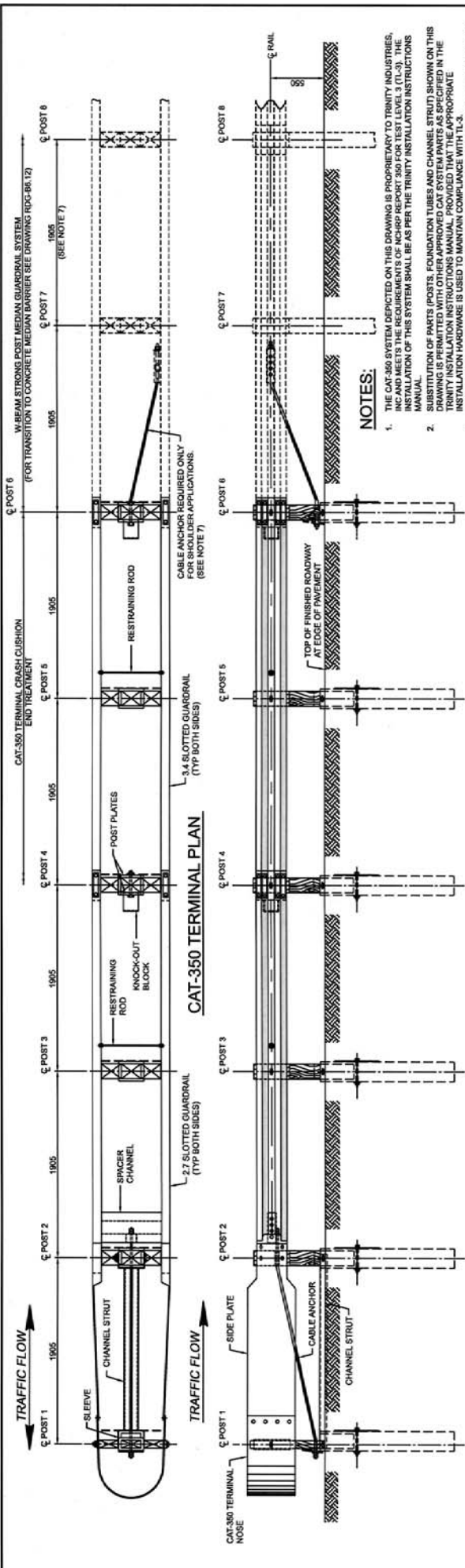
**W-BEAM STRONG POST
 TL-3 FLEAT MT
 ENERGY ABSORBING TERMINAL
 FOR MEDIAN APPLICATIONS**

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.6
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

POSTS 5, 6, AND 7 SECTION
 POST 4 SECTION
 POST 3 SECTION
 POST 2 SECTION
 POST 1 ELEVATION

POST DETAILS



NOTES:

1. THE CAT-350 SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION OF THIS SYSTEM SHALL BE AS PER THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
2. SUBSTITUTION OF PARTS, FOUNDATION TYPES AND CHANNEL STRUTS SHOWN ON THIS DRAWING SHALL BE APPROVED BY THE PROJECT ENGINEER AND SHALL BE IN ACCORDANCE WITH THE TRINITY INSTALLATION INSTRUCTIONS MANUAL, PROVIDED THAT THE APPROPRIATE INSTALLATION HARDWARE IS USED TO MAINTAIN COMPLIANCE WITH TL-3.
3. MAXIMUM PROJECTION OF FOUNDATION TUBE ABOVE FINISHED GRADE SHALL NOT EXCEED 100.
4. CAT RAIL SPLICE BOLTS SHALL BE USED AT POSTS 4 AND 6 TO ENSURE PROPER PERFORMANCE OF THE SYSTEM DURING IMPACT.
5. RAIL SECTIONS ARE TO BE APPLIED IN THE DIRECTION OF TRAFFIC FLOW.
6. DO NOT ATTACH RAIL ELEMENTS TO POSTS 3, 5 AND 6.
7. A 3810 LONG CAT-350 TAIL-END SECTION SHALL BE PROVIDED FROM POST 6 TO POST 8 WHEN LESS THAN 11.430 OF W-BEAM MEDIAN GUARDRAIL IS INSTALLED BEYOND POST 6. FOR SHOULDERS APPLICATIONS WHEN TRANSITIONING THE CAT-350 TERMINAL TO A SINGLE SIDED W-BEAM GUARDRAIL, A CABLE ATTACHMENT AND ANCHORAGE ASSEMBLY IS REQUIRED BETWEEN POSTS 6 AND 7. DETAILS FOR BOTH TYPES OF TRANSITIONS MAY BE OBTAINED FROM TRINITY.
8. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
9. POST 4 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
10. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING SHALL BE PLACED ON THE NOSE AND SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.

REVISIONS		BY	DATE

Approved: *Alberia*
 Executive Director
 Technical Standards Branch
 Date: NOVEMBER, 2007

**W-BEAM STRONG POST
 MEDIAN OR GORE AREA
 TERMINATION
 TL-3 CAT 350 TERMINAL**

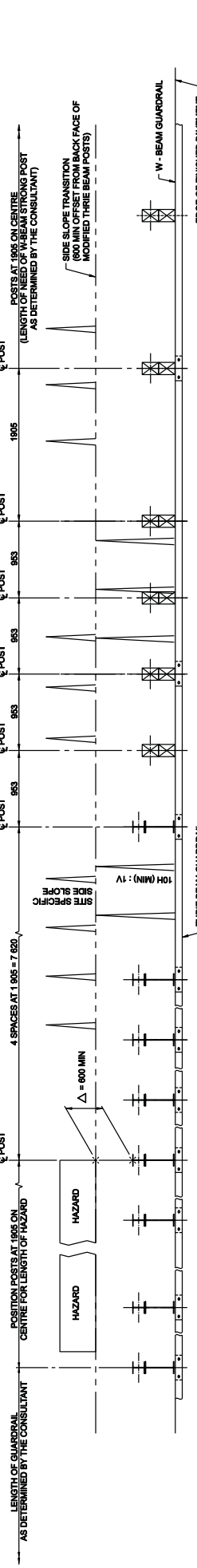
Prepared By: MO
 Checked By: WS
 Scale: N.T.S.
 Dwg No.: RDG-B1.7

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

LENGTH OF GUARDRAIL CENTRE FOR LENGTH OF HAZARD

POSITION POSTS AT 1905 ON CENTRE AS DETERMINED BY THE CONSULTANT

LENGTH OF NEED OF W-BEAM STRONG POST AS DETERMINED BY THE CONSULTANT

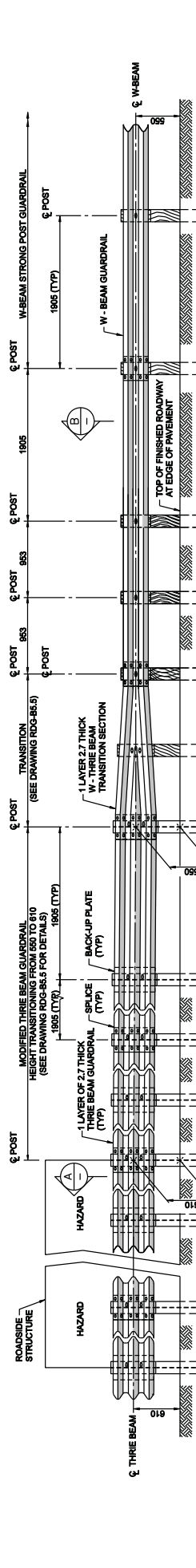


PLAN

HAZARD

HAZARD

HAZARD

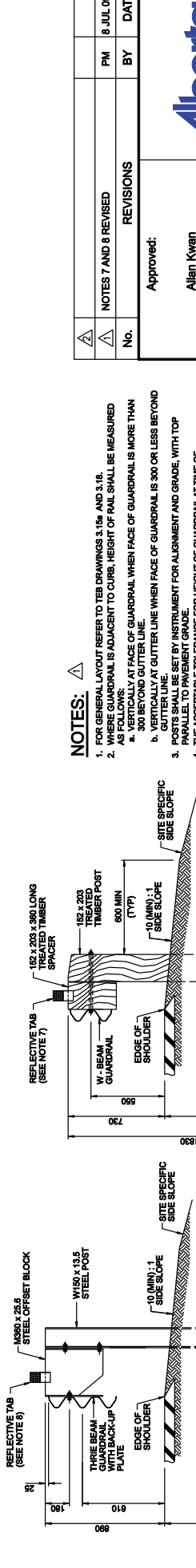


ELEVATION

REFLECTIVE TAB (SEE NOTE 6)

REFLECTIVE TAB (SEE NOTE 7)

REFLECTIVE TAB (SEE NOTE 7)



SECTION A (FOR DETAILS SEE TEB DRAWING 3.70)

SECTION B (FOR DETAILS SEE TEB DRAWING 3.08)

SECTION B (FOR DETAILS SEE TEB DRAWING 3.08)

POST DETAILS

NOTES:

- FOR GENERAL LAYOUT REFER TO TEB DRAWINGS 3.15a AND 3.16.
- WHERE GUARDRAIL IS ADJACENT TO CURB, HEIGHT OF RAIL SHALL BE MEASURED VERTICALLY AT FACE OF GUARDRAIL WHEN FACE OF GUARDRAIL IS MORE THAN 300 BEYOND GUTTER LINE.
- POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE, WITH TOP OF POST AT GUTTER LINE WHEN FACE OF GUARDRAIL IS 300 OR LESS BEYOND GUTTER LINE.
- THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
- LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
- POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE, WITH TOP OF POST AT GUTTER LINE WHEN FACE OF GUARDRAIL IS 300 OR LESS BEYOND GUTTER LINE.
- ADHESIVE ALONE WILL NOT BE ACCEPTED. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
- FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
- THIS TRANSITION SATISFIES NCHRP REPORT 390 REQUIREMENTS FOR TEST LEVEL 3 (TL3).

No.	REVISIONS	BY	DATE
△	NOTES 7 AND 8 REVISED	PM	8 JUL 09

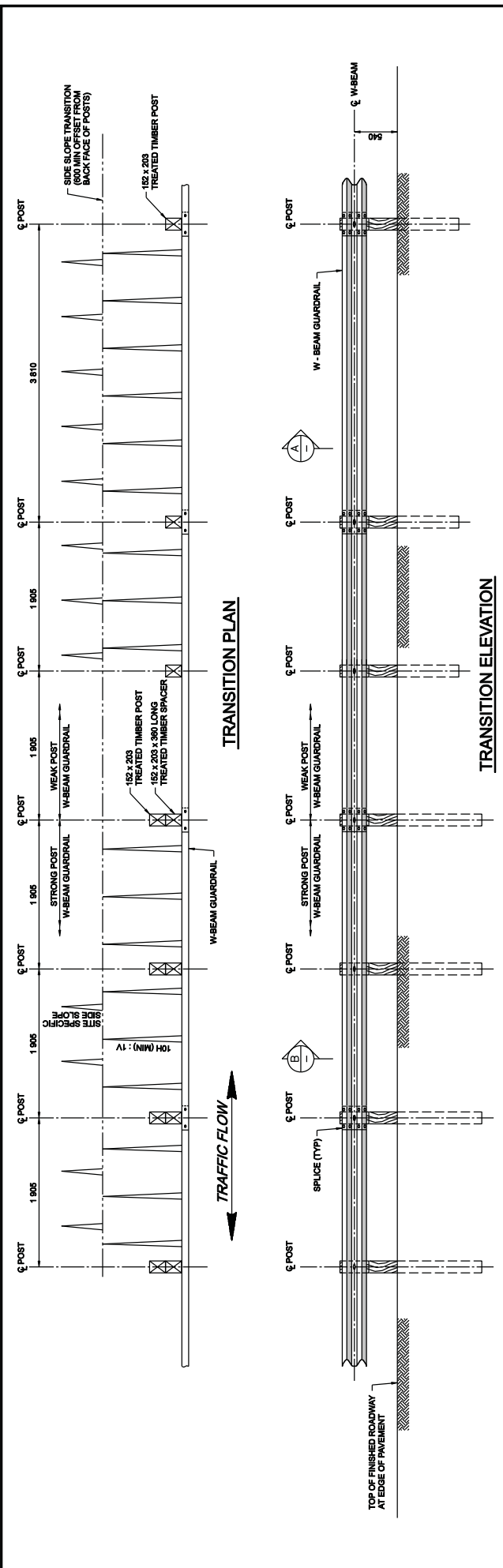
Approved: _____
 Allain Kwan
 Executive Director,
 Technical Standards Branch
 Date: NOVEMBER, 2007



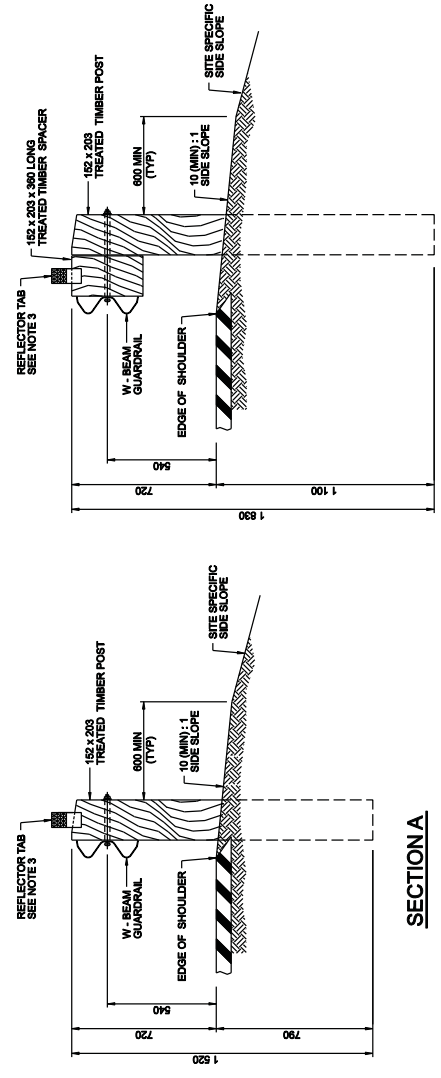
W-BEAM STRONG POST TO MODIFIED THRE BEAM GUARDRAIL TRANSITION AT ROADSIDE STRUCTURE

Prepared By: MC
 Checked By: WS
 Scale: N.T.S.
 Dwg No.: RDG-B1.8

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



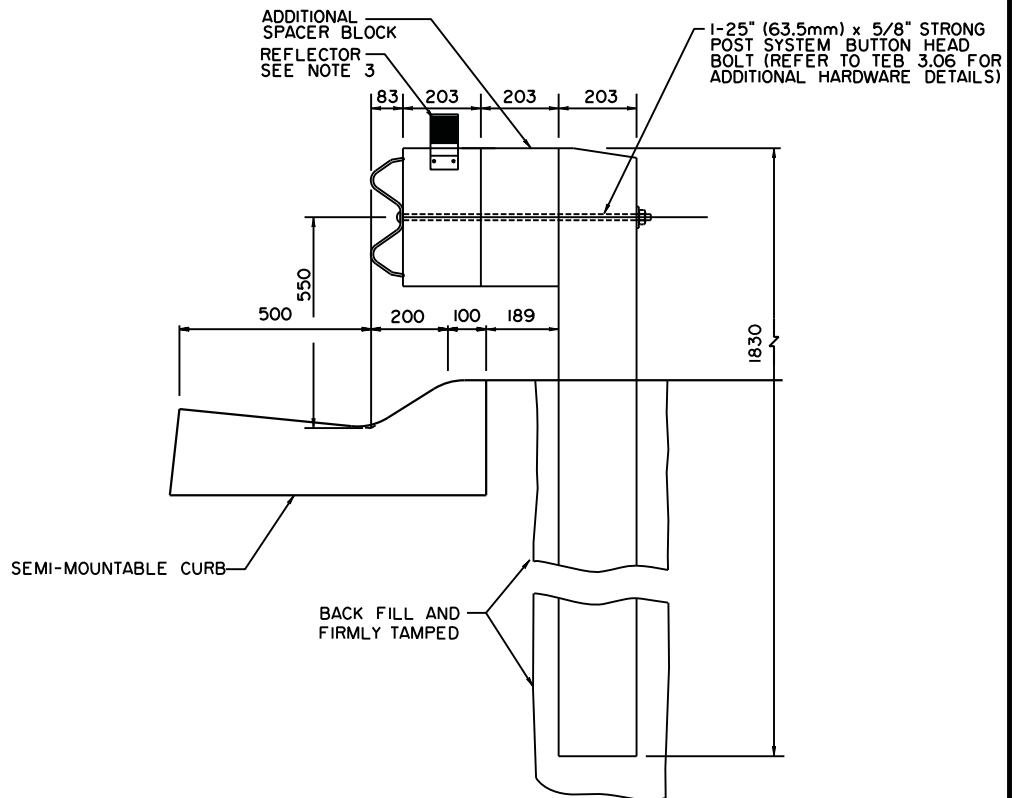
- GENERAL NOTES:**
1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC.
 2. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
 3. THE MOST RECENT SPECIFICATIONS SHALL BE REFERRED TO FOR REFLECTOR DETAILS.
 4. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
 5. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.



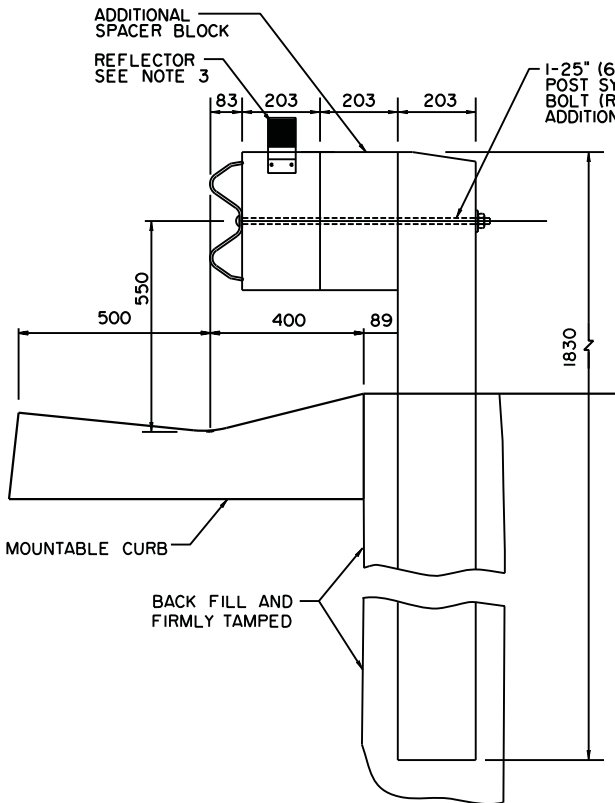
Approved:	PM	DATE
Allan Kwan Executive Director Technical Standards Branch	8 JUL 09	
Date: NOVEMBER, 2007	BY	
TRANSITION OF WEAK POST W-BEAM GUARDRAIL TO STRONG POST W-BEAM GUARDRAIL		
Prepared By: NSP	Checked By: WS	Dwg No.: RDG-B1.9
No.	REVISIONS	
NOTE 3 REVISED		

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.





**STRONG POST W-BEAM BLOCKED-OUT
(2 SPACER BLOCKS) GUARDRAIL
WITH SEMI-MOUNTABLE CURB**



**STRONG POST W-BEAM BLOCKED-OUT
(2 SPACER BLOCKS) GUARDRAIL
WITH MOUNTABLE CURB**

NOTES

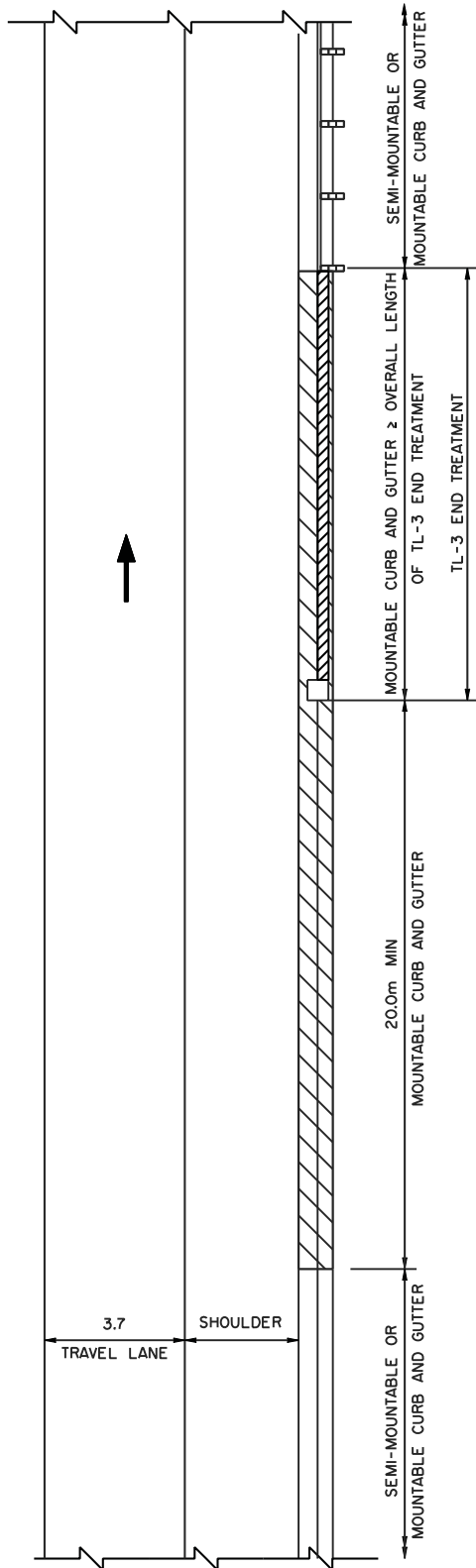
1. REFER TO CB6 STANDARD DRAWINGS FOR SEMI-MOUNTABLE AND MOUNTABLE CURB AND GUTTER DETAILS
2. REFER TO DRAWING TEB 3.09 STRONG POST W-BEAM BLOCKED-OUT GUARDRAIL FOR FURTHER DETAILS
3. REFLECTOR TO BE INSTALLED ON EVERY 6TH POST. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

▲			
▲			
No.	REVISIONS	BY	DATE

<p>Approved:</p> <p>Moh Lali</p> <p>Executive Director, Technical Standards Branch</p>	<p>Government of Alberta</p>
<p>Date: JULY, 2009</p>	<p>Transportation</p>

**STRONG POST
W-BEAM GUARDRAIL
FOR MOUNTABLE AND
SEMI-MOUNTABLE CURB**

Prepared By: GEC	Checked By: PM	Scale: NTS	Dwg No.: RDG-B1.10
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▲			
▲			
No.	REVISIONS	BY	DATE

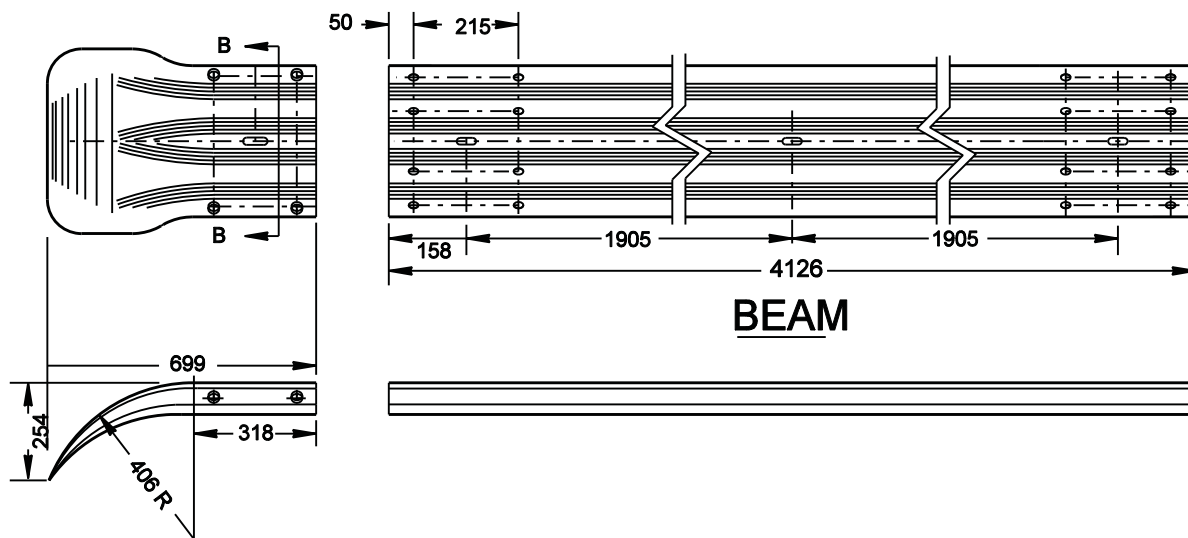
Approved:
 Moh Lali
 Executive Director,
 Technical Standards Branch

Date: JULY, 2009

Government of Alberta ■
Transportation

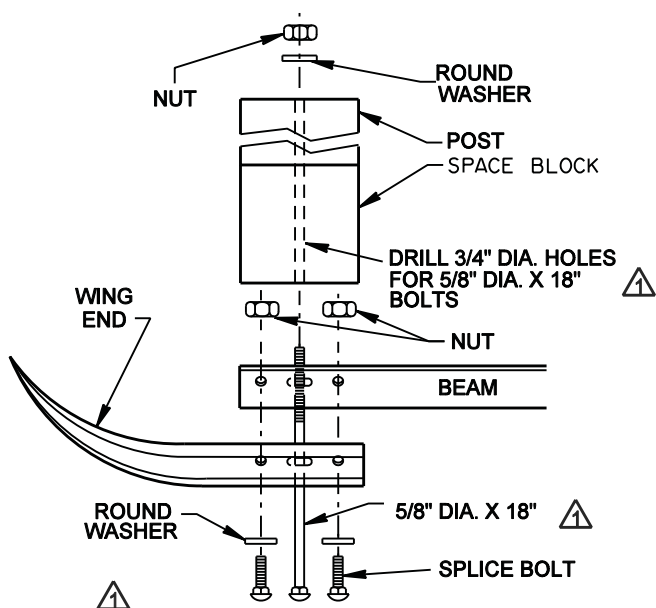
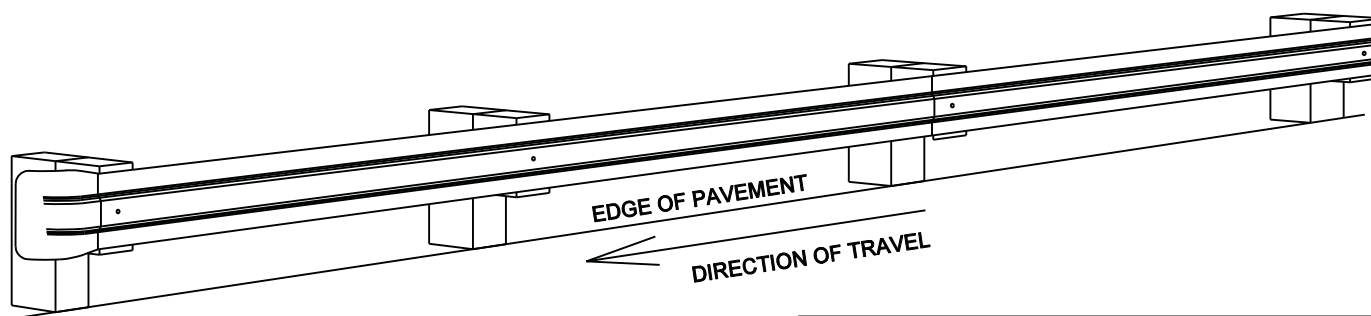
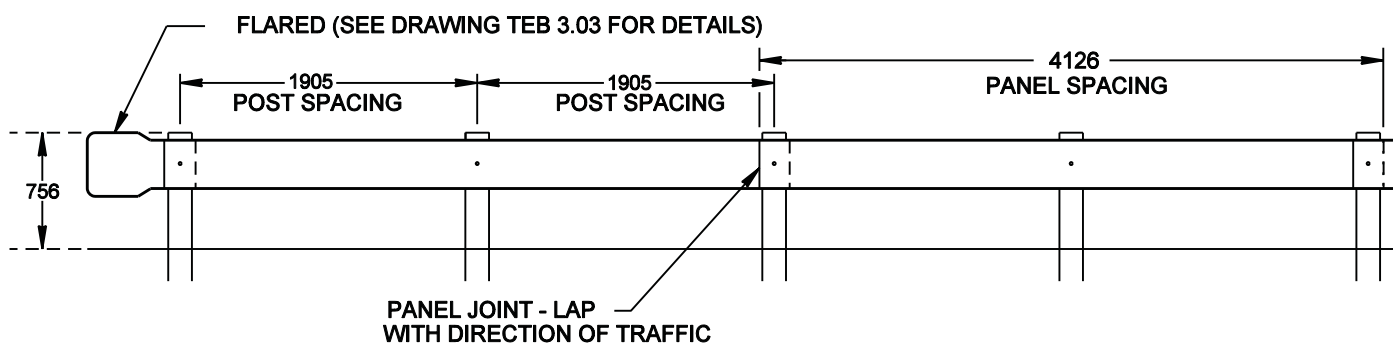
**TYPICAL STRONG POST
 W-BEAM GUARDRAIL TL-3 END
 TREATMENT WITH CURB AND
 GUTTER TRANSITION**

Prepared By: GEC Checked By: PM Scale: NTS Dwg No.: **RDG-B1.11**



END SECTION

BEAM



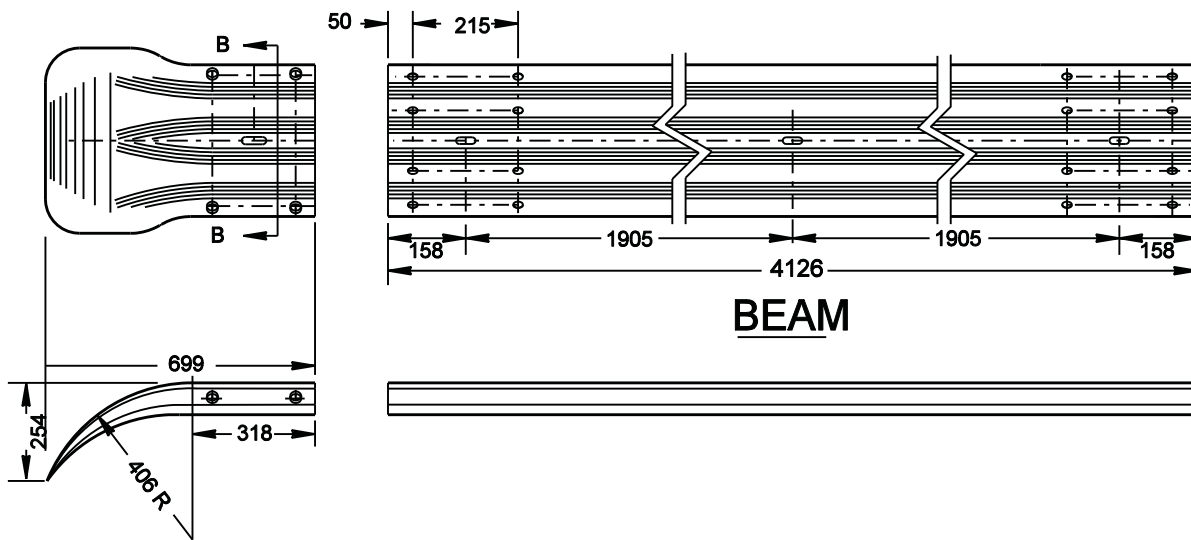
All dimensions are in millimetres unless otherwise indicated.

⚠			
⚠	Bolt and hole dimension, rectangular washer removed.	P.M.	9/14/05
No.	REVISIONS	BY	DATE

Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch Date: JUNE 24, 2005		
JULY 12, 2005		

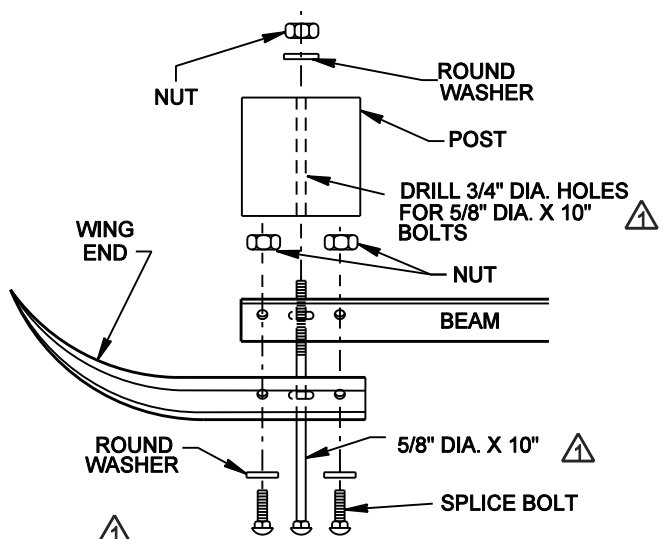
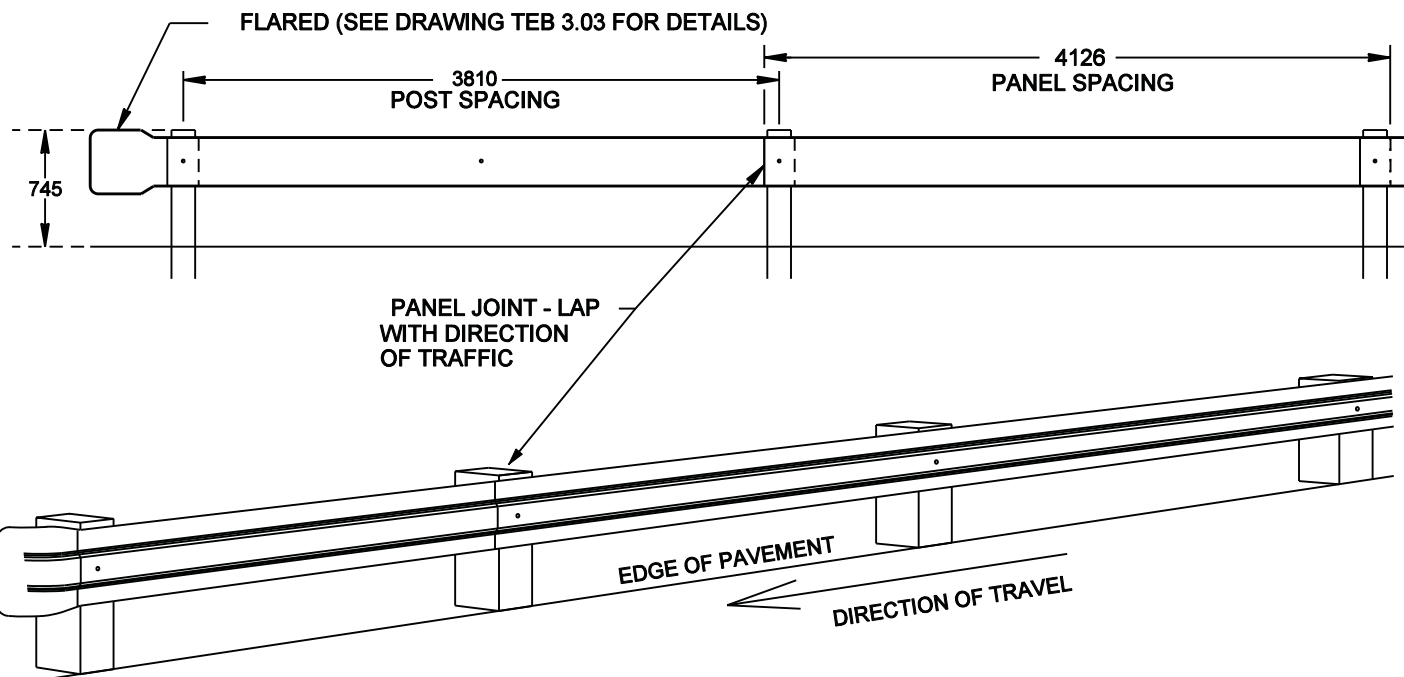
STRONG POST W-BEAM BLOCKED OUT TERMINAL END TREATMENT WING END

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.11a
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BEAM

END SECTION



All dimensions are in millimetres unless otherwise indicated.

⚠			
⚠	Bolt and hole dimension, rectangular washer removed.	P.M.	9/14/05
No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
JULY 12, 2005



**WEAK POST W-BEAM
TERMINAL END TREATMENT
WING END**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.11b
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APPENDIX B2

HIGH TENSION CABLE SYSTEM

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The links to the Standard Drawings for the High-Tension Cable Systems are available on the internet. The links for the three cable systems currently approved by Alberta Infrastructure and Transportation are:

Brifen Wire Rope Safety Fence:

<http://www.brifen.com/drawings.htm>

Trinity CASS Cable Guardrail Safety System:

<http://www.highwayguardrail.com/technical/default.html>

Gibraltar Cable Barrier System:

<http://www.gibraltartx.com/>

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APPENDIX B3

WEAK POST BOX BEAM GUARDRAIL

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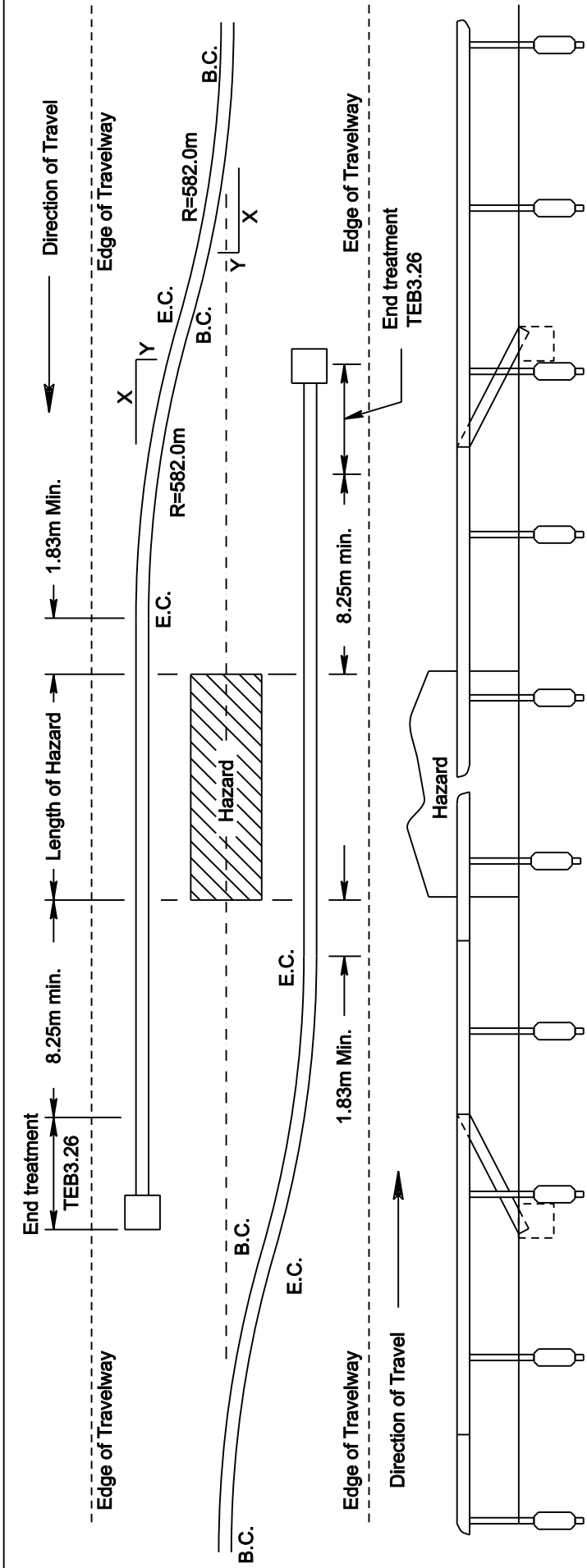
Appendix B3

Weak Post Beam Guardrail

TABLE OF CONTENTS

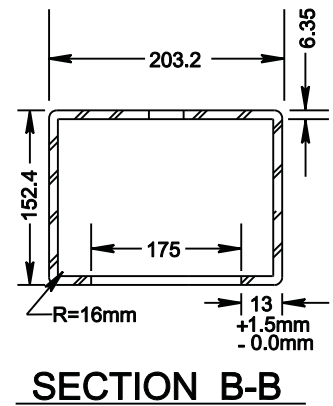
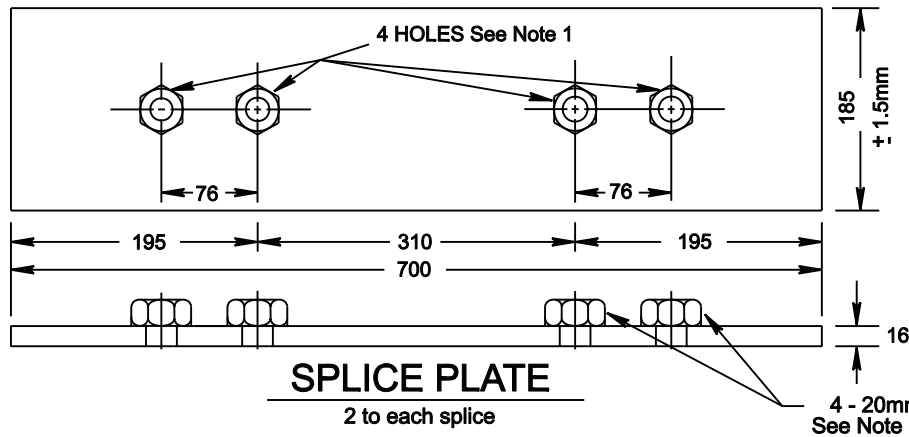
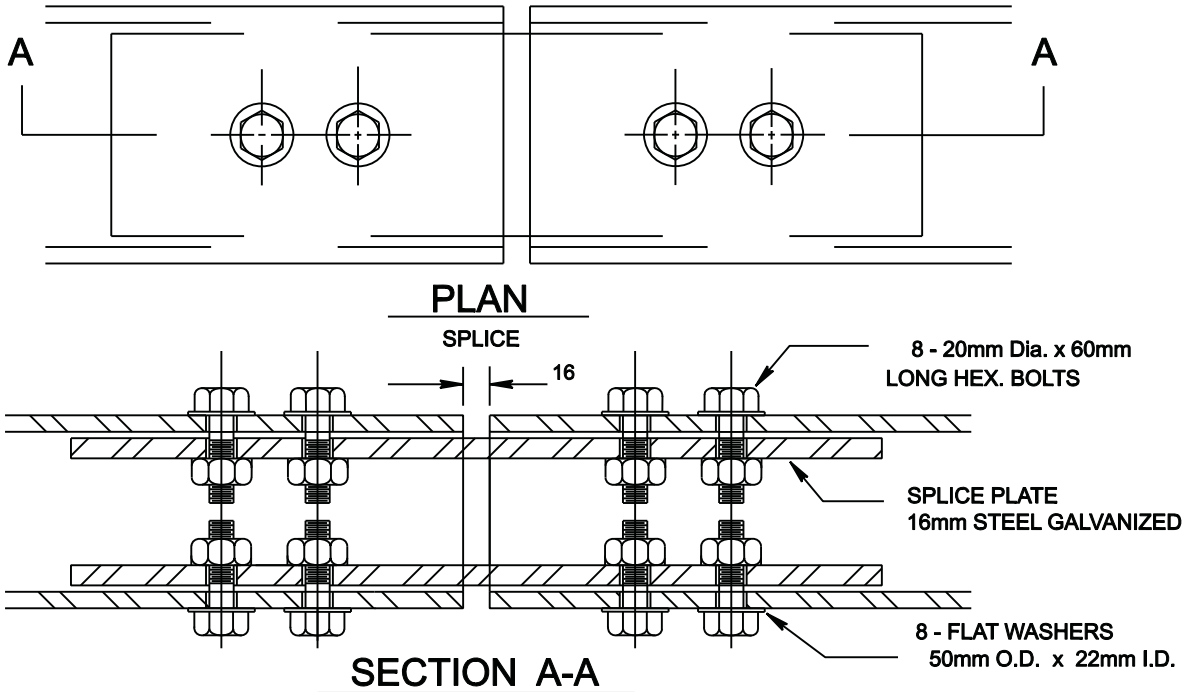
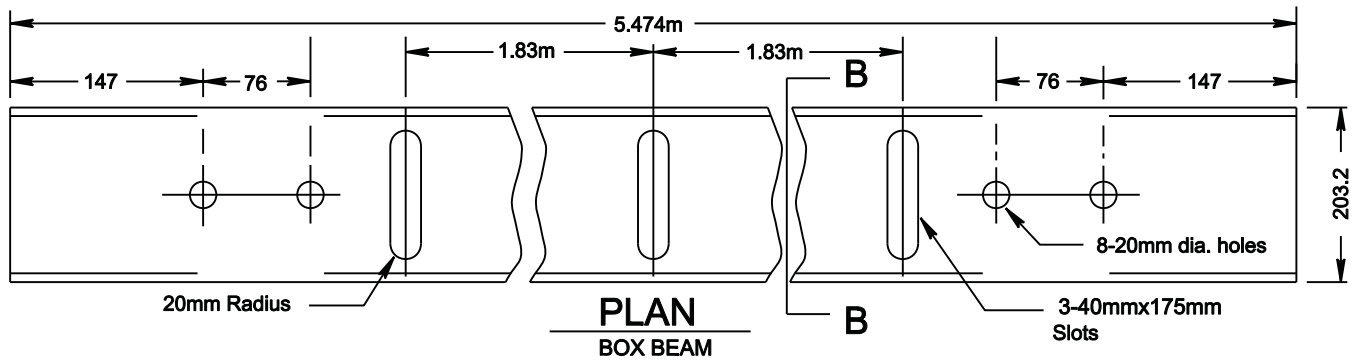
Table Number	Title	Page Number
TEB 3.22	Median Box Beam Barrier Installation Detail Treatment of Median Hazard	H-APP-B3-1
TEB 3.23	Median Box Beam Guardrail Rail and Splice Plate Detail	H-APP-B3-2
TEB 3.24	Median Box Beam Guardrail Post Detail	H-APP-B3-3
TEB 3.26	Median Box Beam Guardrail Installation Detail for End Treatment	H-APP-B3-4
TEB 3.27	Standard Box Beam Guardrail Detail of Splice Plate Used at End Treatment	H-APP-B3-5
TEB 3.27A	Median Box Beam Guardrail Detail of Splice Plate Used at End Treatment	H-APP-B3-6
TEB 3.28	Standard Box Beam Guardrail Retainer Assembly and Track Welding Details	H-APP-B3-7
TEB 3.28A	Median Box Beam Guardrail Retainer Assembly and Track Welding Details	H-APP-B3-8
TEB 3.30	Median Box Beam Guardrail Expansion Joint Splice Detail	H-APP-B3-9
TEB 3.33	Standard Box Beam Guardrail Post Detail	H-APP-B3-10
TEB 3.34	Standard Box Beam Guardrail Bracket Assembly Detail	H-APP-B3-11
TEB 3.35	Standard Box Beam Guardrail Rail and Splice Plate Detail	H-APP-B3-12
TEB 3.36	Standard Box Beam Guardrail Bent Splice Plate Detail	H-APP-B3-13
TEB 3.37	Standard Box Beam Guardrail Installation Detail for End Treatment	H-APP-B3-14
TEB 3.39	Standard Box Beam Guardrail Assembly for 0.915m and 1.83m Post Spacing	H-APP-B3-15
TEB 3.40	Standard Box Beam Guardrail Expansion Joint Splice Detail	H-APP-B3-16
TEB 3.46	Standard Box Beam Guardrail Bend Detail for Approach Road Radii	H-APP-B3-17

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Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.22
	Date	DEC.15/92
	Revision	
	Revision	

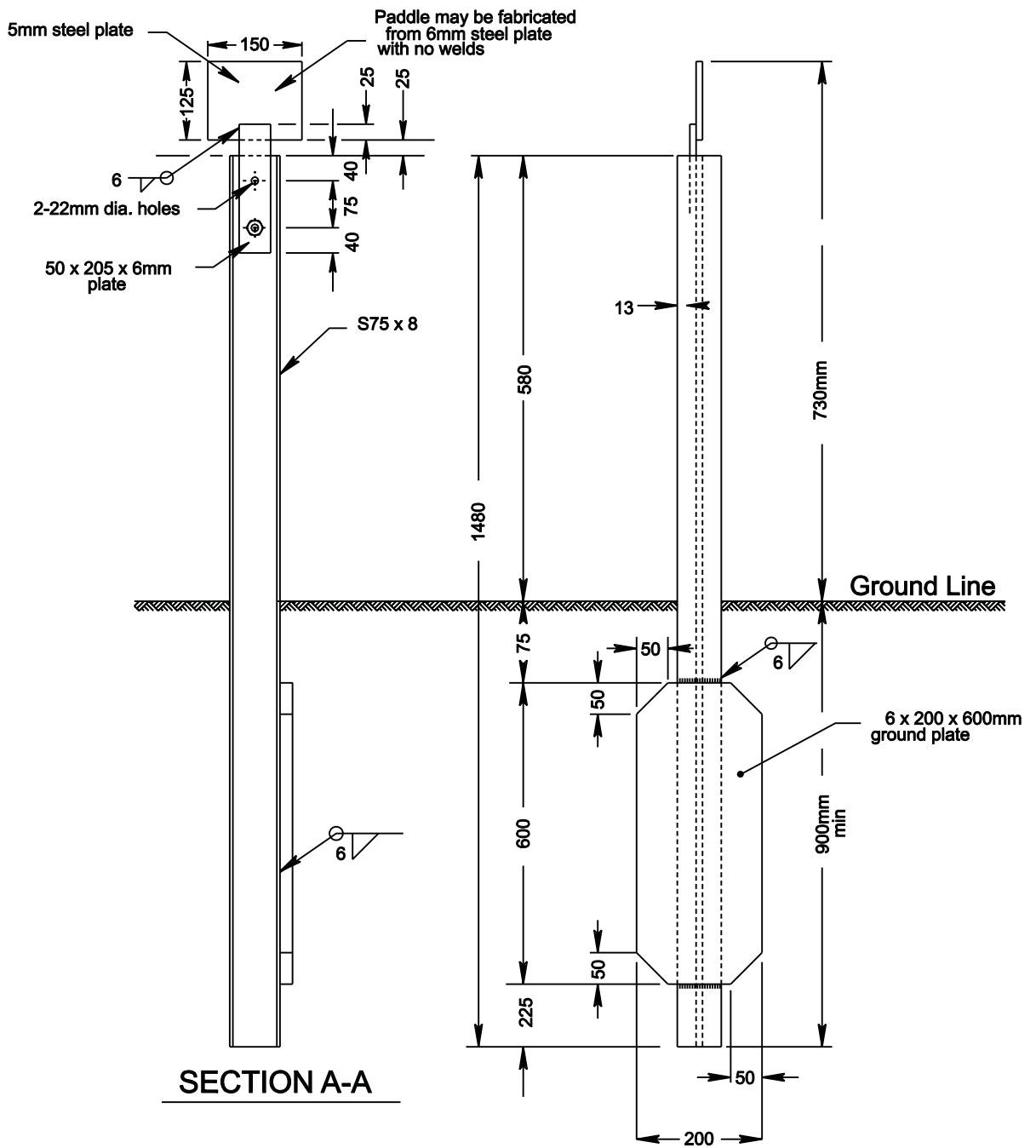
**MEDIAN BOX BEAM BARRIER
 INSTALLATION DETAIL
 TREATMENT OF MEDIAN HAZARD**



	DWG. No.	TEB 3.23
	Date	DEC. 21/92
	Revision	
	Revision	

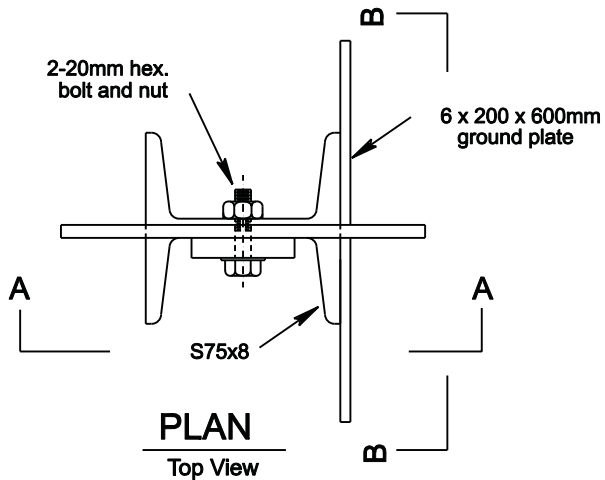
**MEDIAN BOX BEAM GUARDRAIL
RAIL AND SPLICE PLATE DETAIL**

Note 1: For details of nut attachment see TEB 3.28A
All dimensions are in millimetres unless otherwise indicated.



SECTION A-A

SECTION B-B

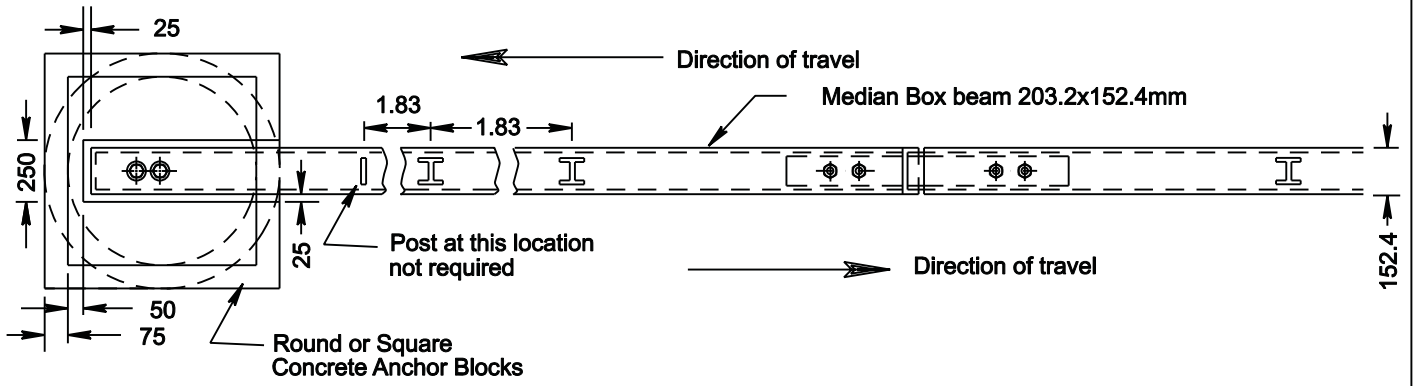


PLAN
Top View

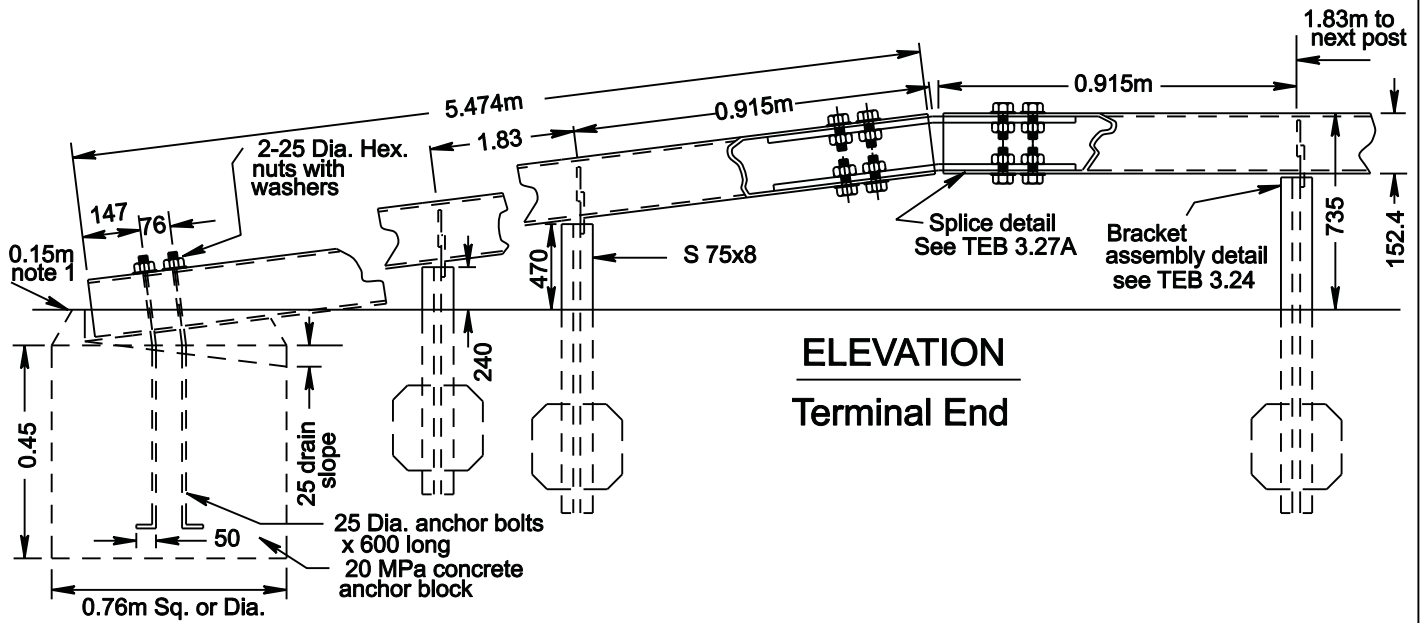
All dimensions are in millimetres unless otherwise indicated.

 Traffic Engineering Section Roadway Engineering Branch	DWG. No.	TEB 3.24
	Date	DEC. 21/92
	Revision	June 95
	Revision	

**MEDIAN BOX BEAM GUARDRAIL
POST DETAIL**



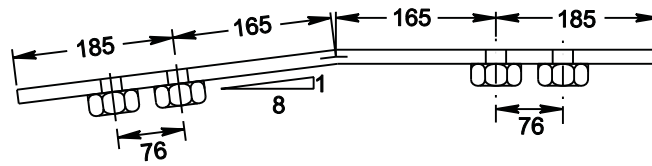
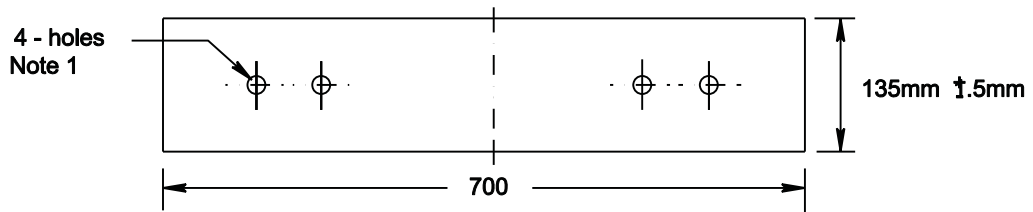
PLAN



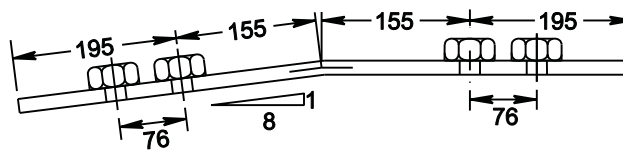
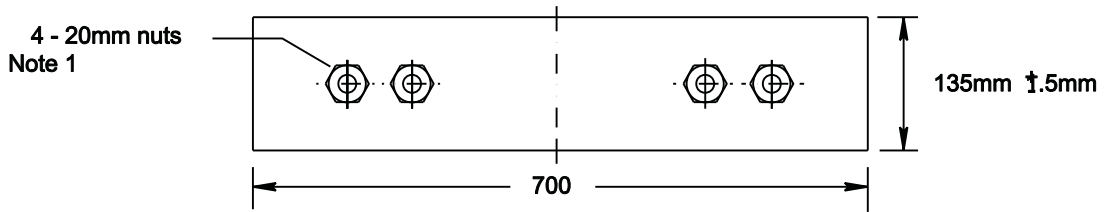
**ELEVATION
Terminal End**

	DWG. No.	TEB 3.26
	Date	DEC. 13/92
	Revision	
	Revision	

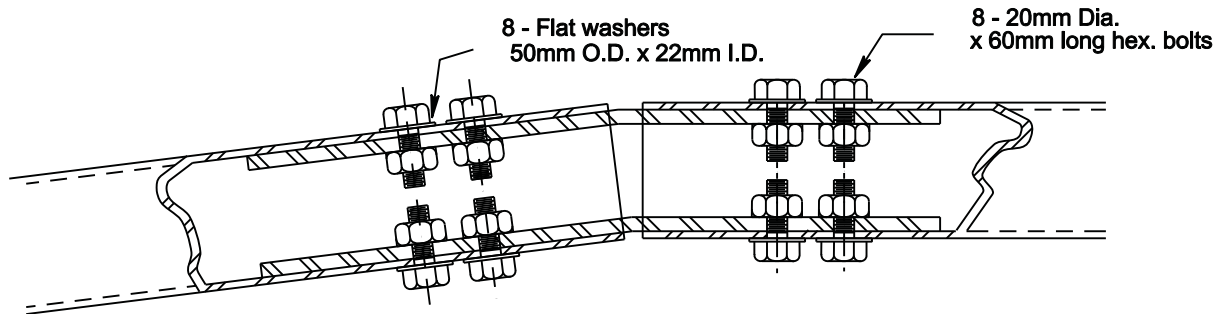
**MEDIAN BOX BEAM GUARDRAIL
INSTALLATION DETAIL FOR
END TREATMENT**



UPPER SPLICE PLATE
16mm galvanized steel plate



LOWER SPLICE PLATE
16mm galvanized steel plate



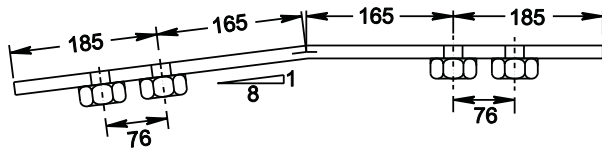
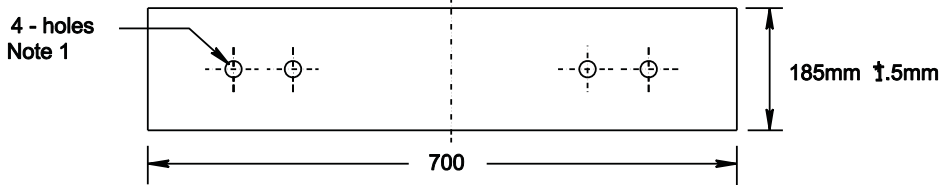
ASSEMBLY DETAIL

Note 1: For details of nut attachment see TEB 3.28.
All dimensions are in millimetres unless otherwise shown.

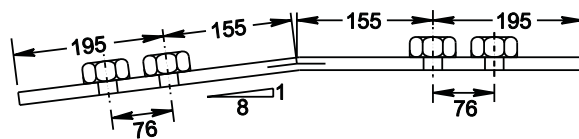
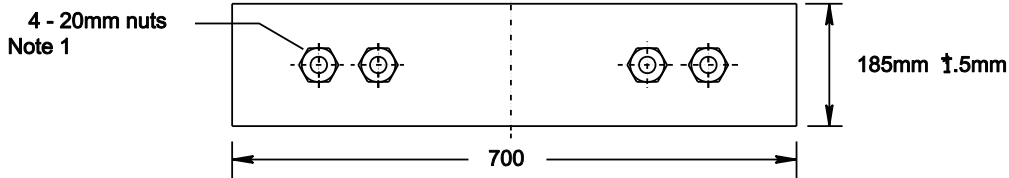
 Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.27
	Date	DEC 13/92
	Revision	_____
	Revision	_____

**STANDARD BOX BEAM GUARDRAIL
DETAIL OF SPLICE PLATE
USED AT END TREATMENT**

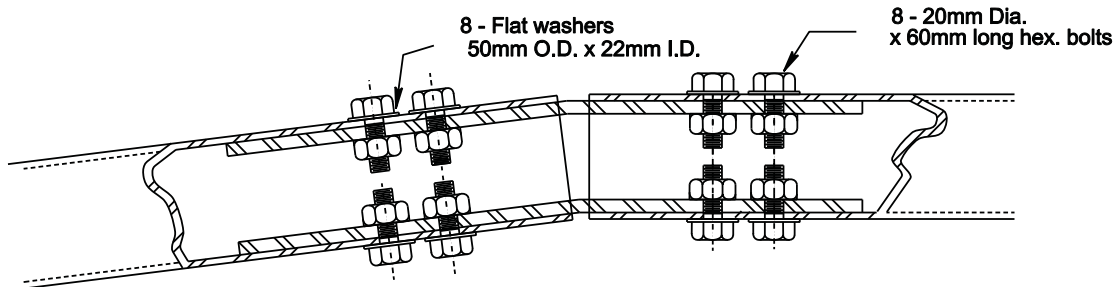
Original signed by:
A.D. Cherwenuk, Director



UPPER SPLICE PLATE
16mm galvanized steel plate



LOWER SPLICE PLATE
16mm galvanized steel plate

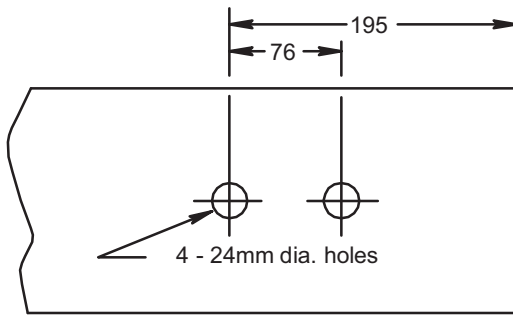


ASSEMBLY DETAIL

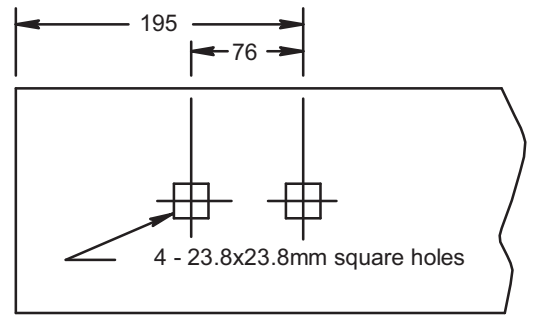
Note 1: For details of nut attachment see TEB 3.28A.
All dimensions are in millimetres unless otherwise shown.

 Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.27A
	Date	DEC 13/92
	Revision	
	Revision	

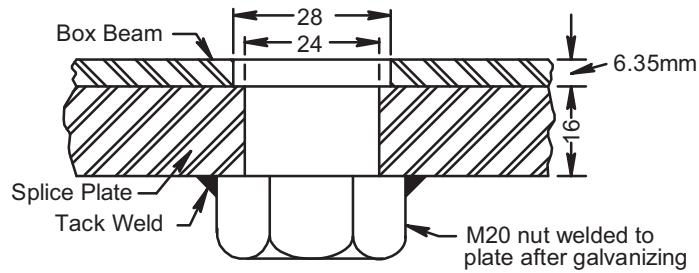
**MEDIAN BOX BEAM GUARDRAIL
DETAIL OF SPLICE PLATE
USED AT END TREATMENT**



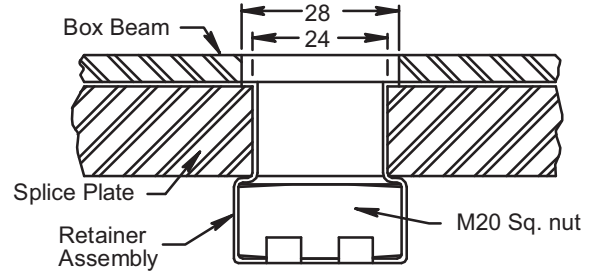
**SPLICE PLATE
FOR TACK WELDING**



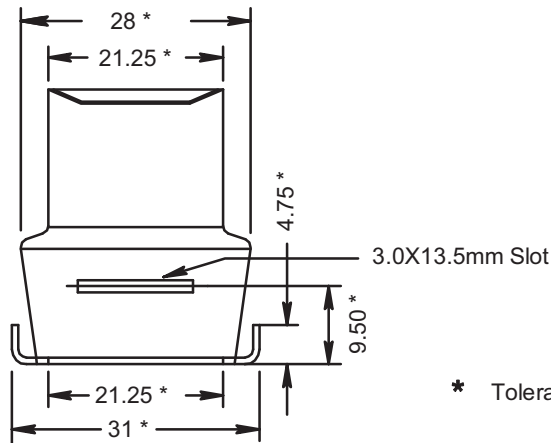
**SPLICE PLATE
FOR RETAINER ASSEMBLY**



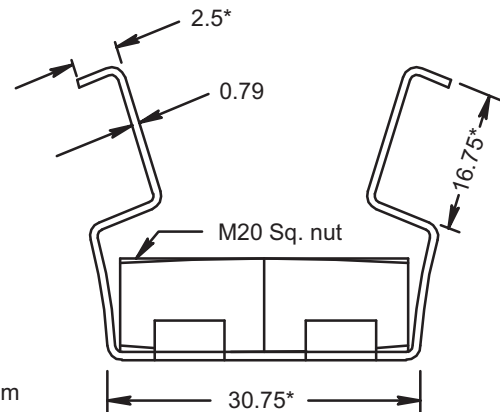
**NUT TACK WELDED
TO SPLICE PLATE**



**NUT CLIPPED
TO SPLICE PLATE**




FRONT VIEW



SIDE VIEW

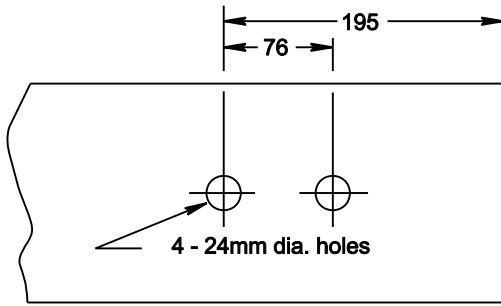
* Tolerance $\pm 0.24\text{mm}$

RETAINER ASSEMBLY DETAIL

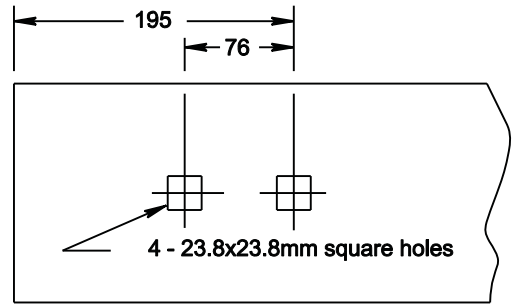
 Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.28
	Date	DEC 20/92
	Revision	_____
	Revision	_____

**STANDARD BOX BEAM GUARDRAIL
RETAINER ASSEMBLY AND
TRACK WELDING DETAILS**

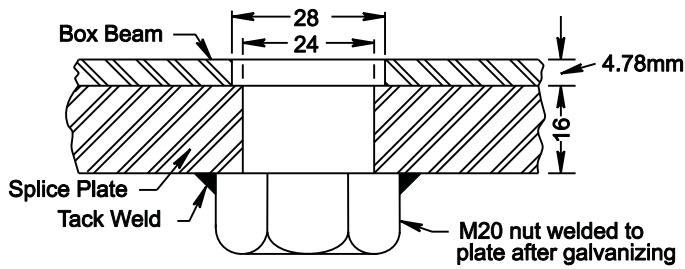
A.D. Cherwenuk, Director



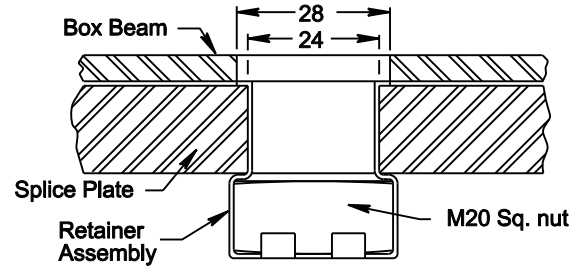
**SPLICE PLATE
FOR TACK WELDING**



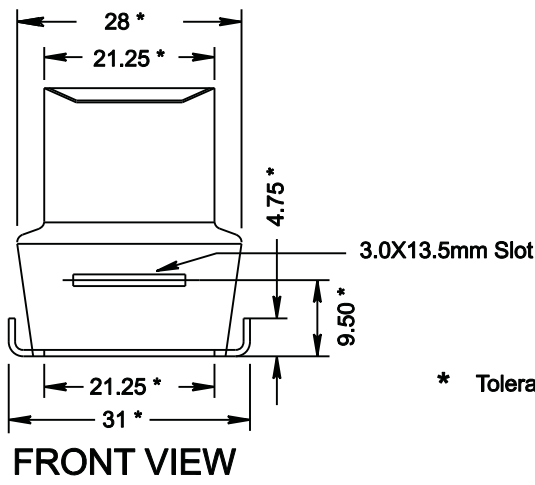
**SPLICE PLATE
FOR RETAINER ASSEMBLY**



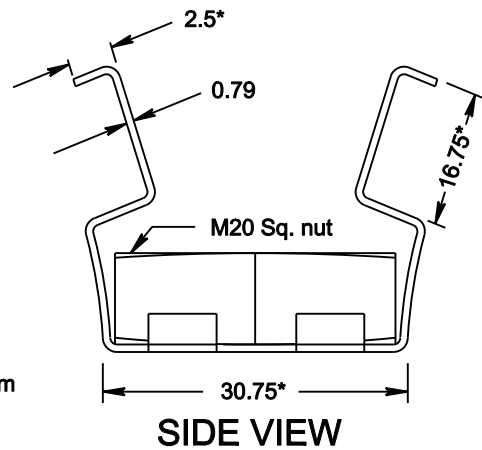
**NUT TACK WELDED
TO SPLICE PLATE**



**NUT CLIPPED
TO SPLICE PLATE**



FRONT VIEW



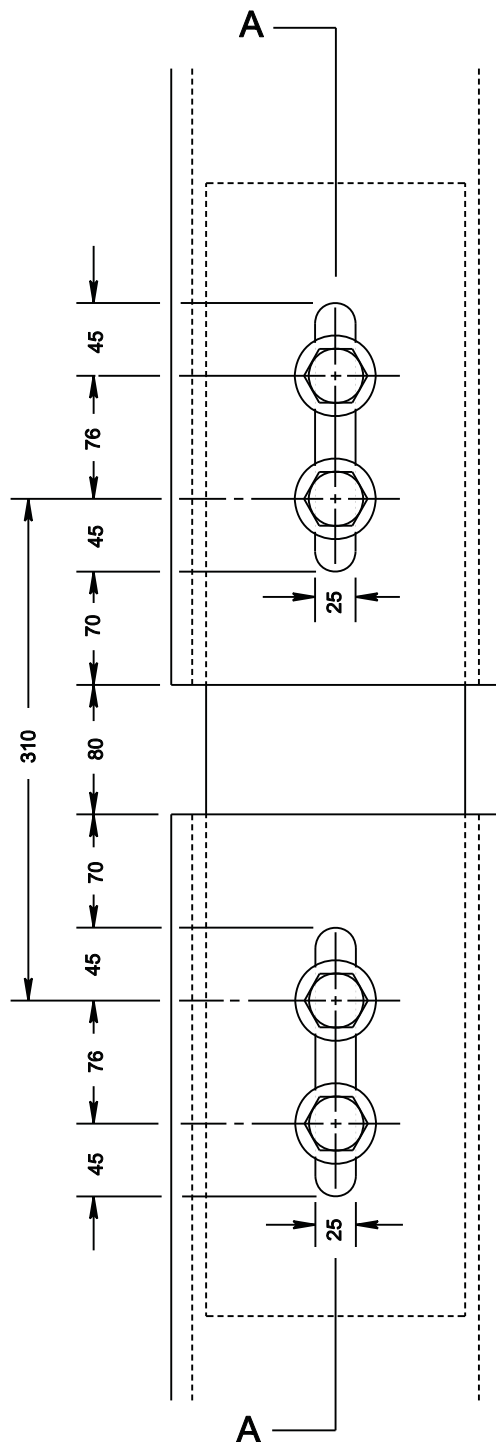
SIDE VIEW

* Tolerance $\pm 0.24\text{mm}$

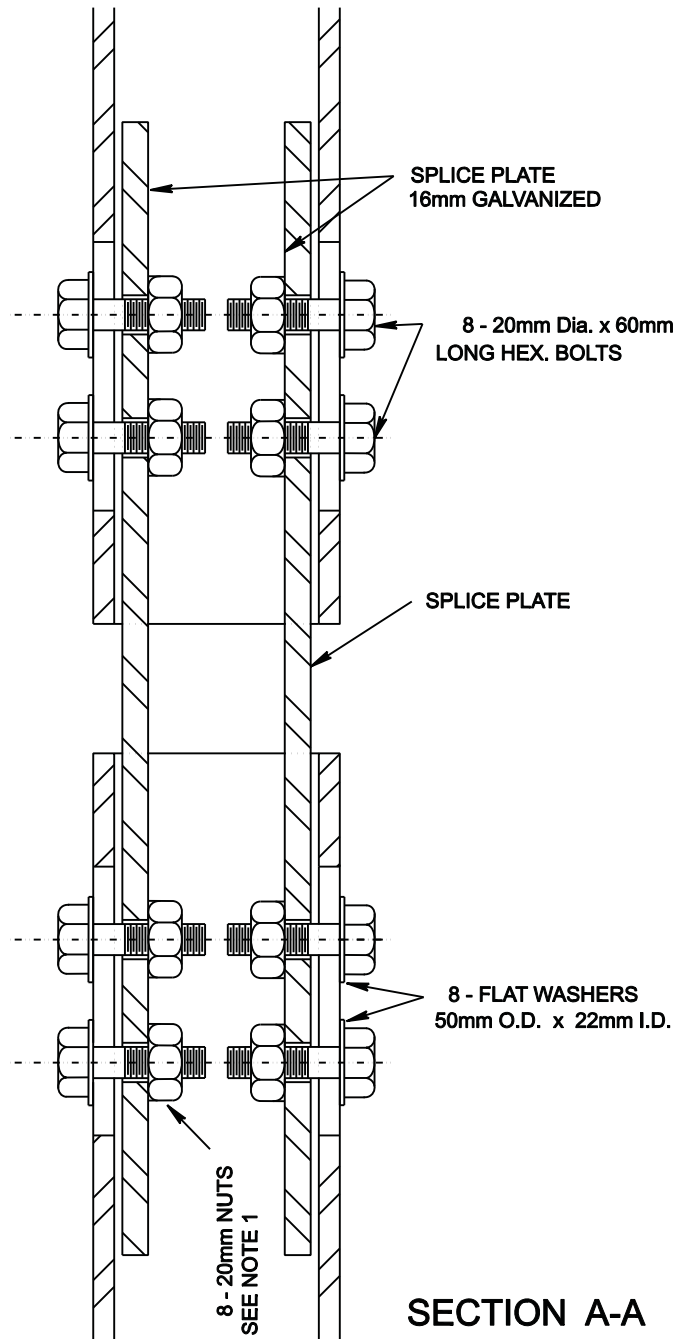
RETAINER ASSEMBLY DETAIL

	DWG. No.	TEB 3.28A
	Date	DEC 20/92
	Revision	
	Revision	

**MEDIAN BOX BEAM GUARDRAIL
RETAINER ASSEMBLY AND
TRACK WELDING DETAILS**



PLAN

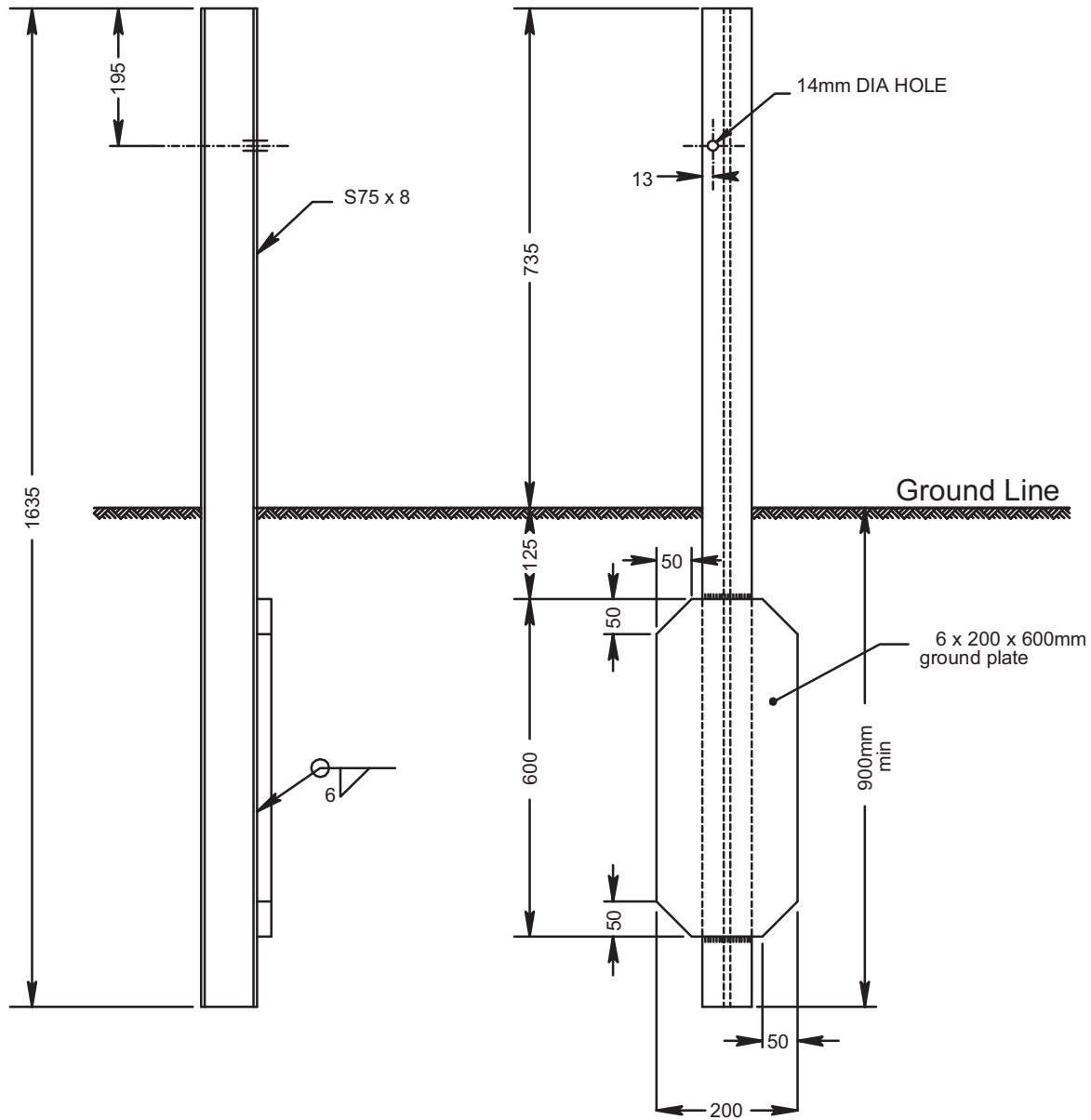


SECTION A-A

Note 1: For details of nut attachment see TEB 3.28A
 Field cut slots 25mm x 166mm
 Expansion joint shall be used at every tenth beam splice.
 Post spacing at expansion joint shall be 1.90m.
 All dimensions are in millimetres unless otherwise indicated.

	DWG. No.	TEB 3.30
	Date	DEC.11/92
	Revision	
	Revision	

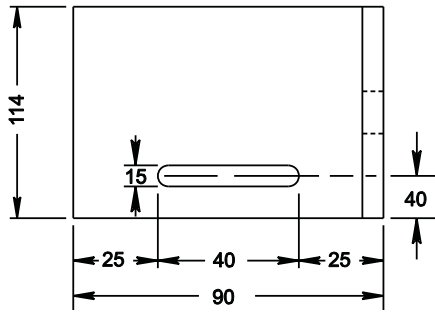
MEDIAN BOX BEAM GUARDRAIL EXPANSION JOINT SPLICE DETAIL



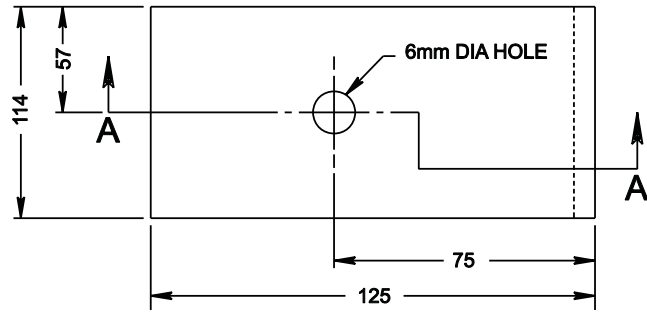
All dimensions are in millimetres unless otherwise indicated.

Alberta TRANSPORTATION AND UTILITIES Traffic Engineering Section Roadway Engineering Branch	DWG. No.	TEB 3.33
	Date	DEC.17/92
	Revision	June 95
	Revision	

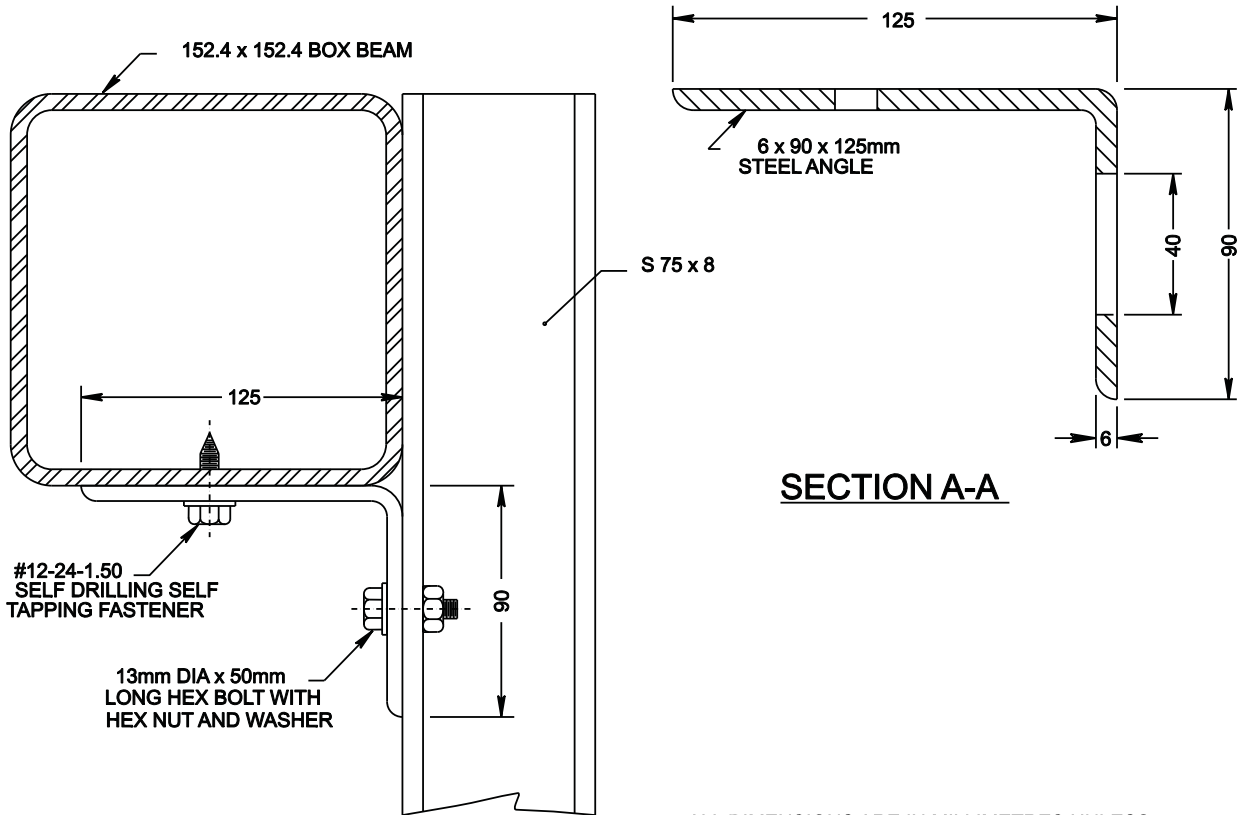
STANDARD BOX BEAM GUARDRAIL POST DETAIL



ELEVATION



PLAN

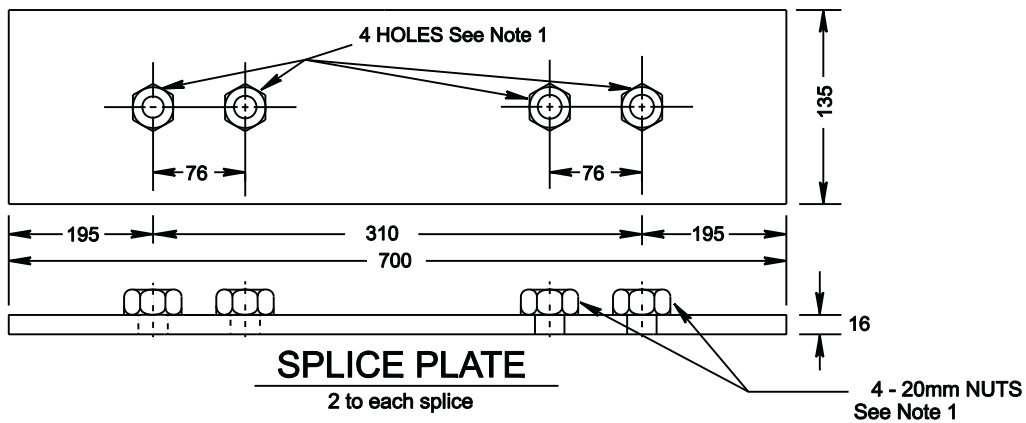
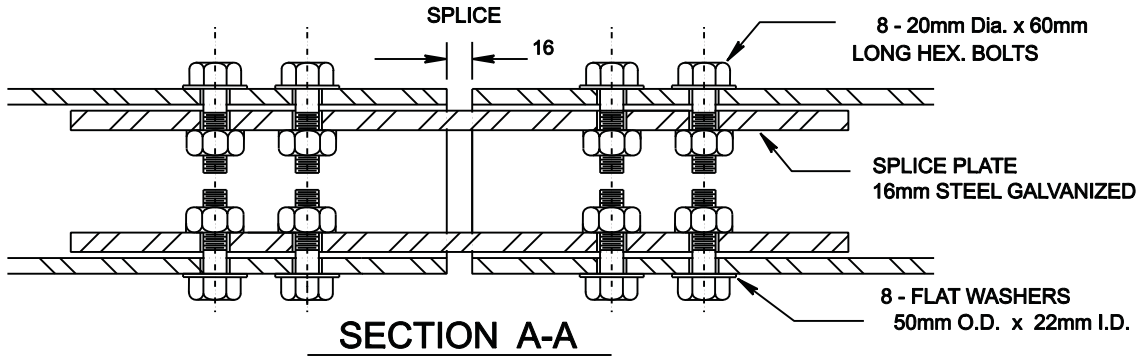
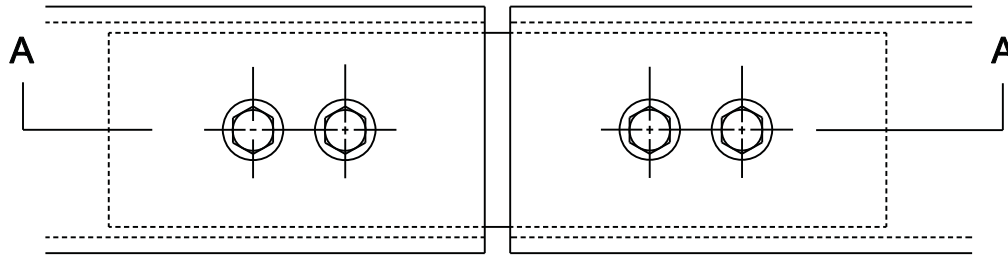
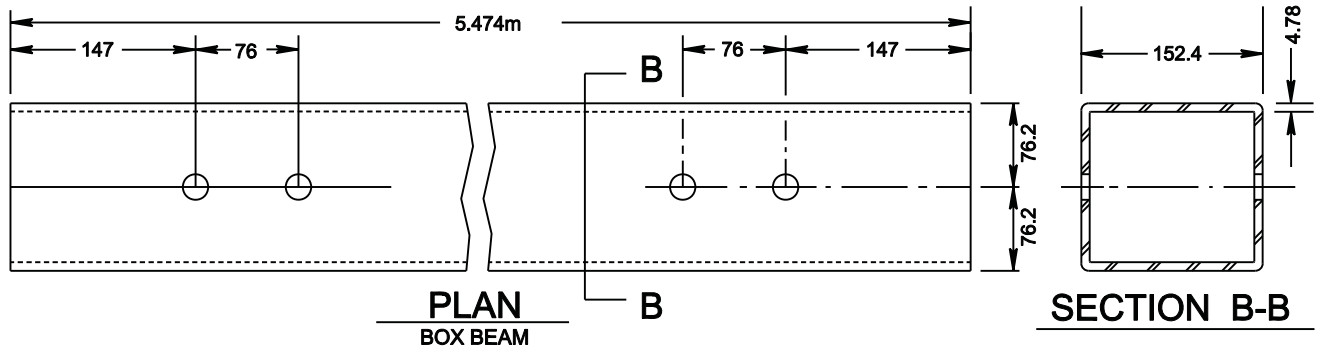


SECTION A-A

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

	DWG. No.	TEB 3.34
	Date	DEC. 29/92
	Revision	
	Revision	

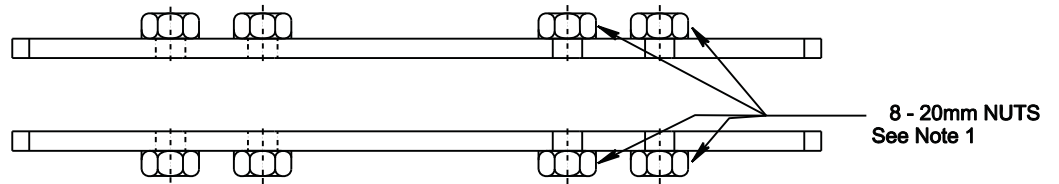
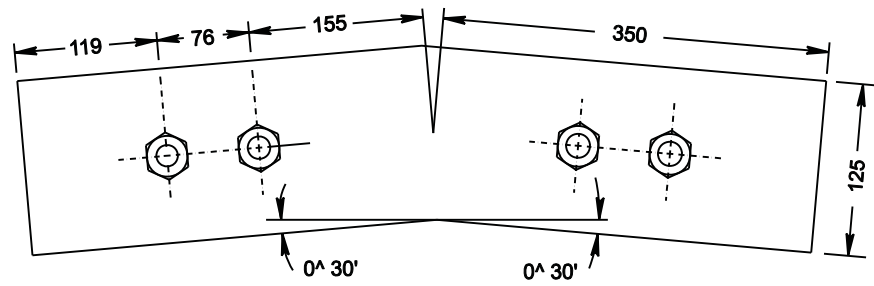
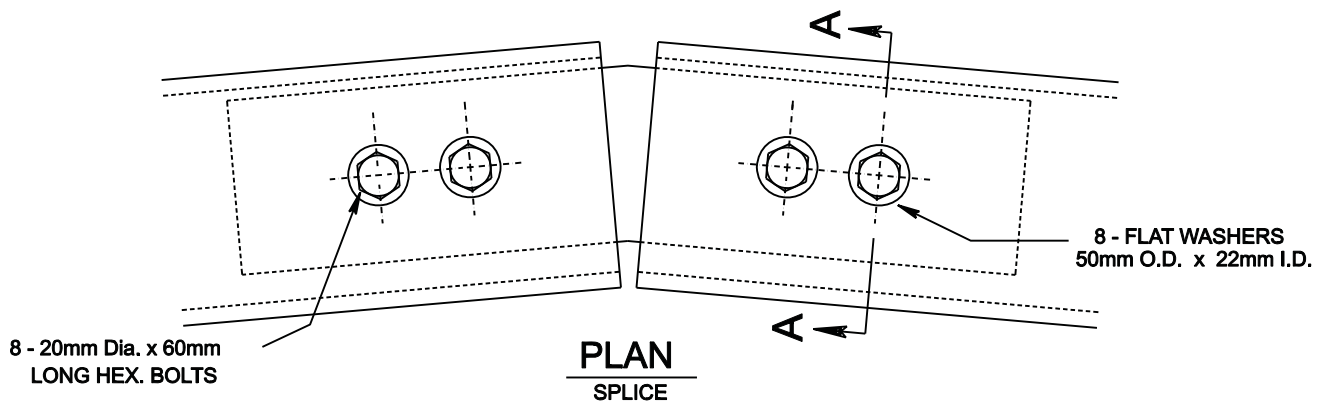
STANDARD BOX BEAM GUARDRAIL BRACKET ASSEMBLY DETAIL



Note 1: For details of nut attachment see TEB 3.28
All dimensions are in millimetres unless otherwise indicated.

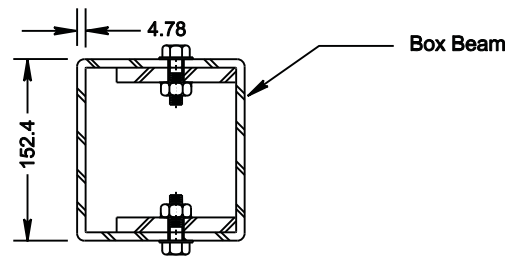
	DWG. No.	TEB 3.35
	Date	DEC.11/92
	Revision	
	Revision	

**STANDARD BOX BEAM GUARDRAIL
RAIL AND SPLICE PLATE DETAIL**



SPLICE PLATE

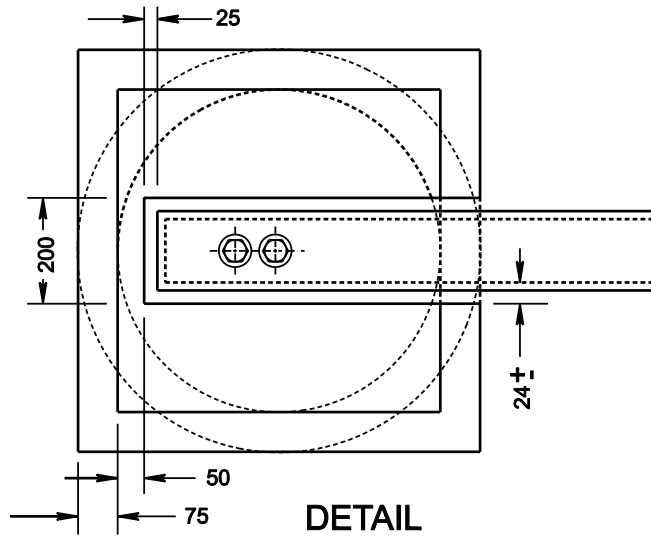
2 to each splice



SECTION A-A

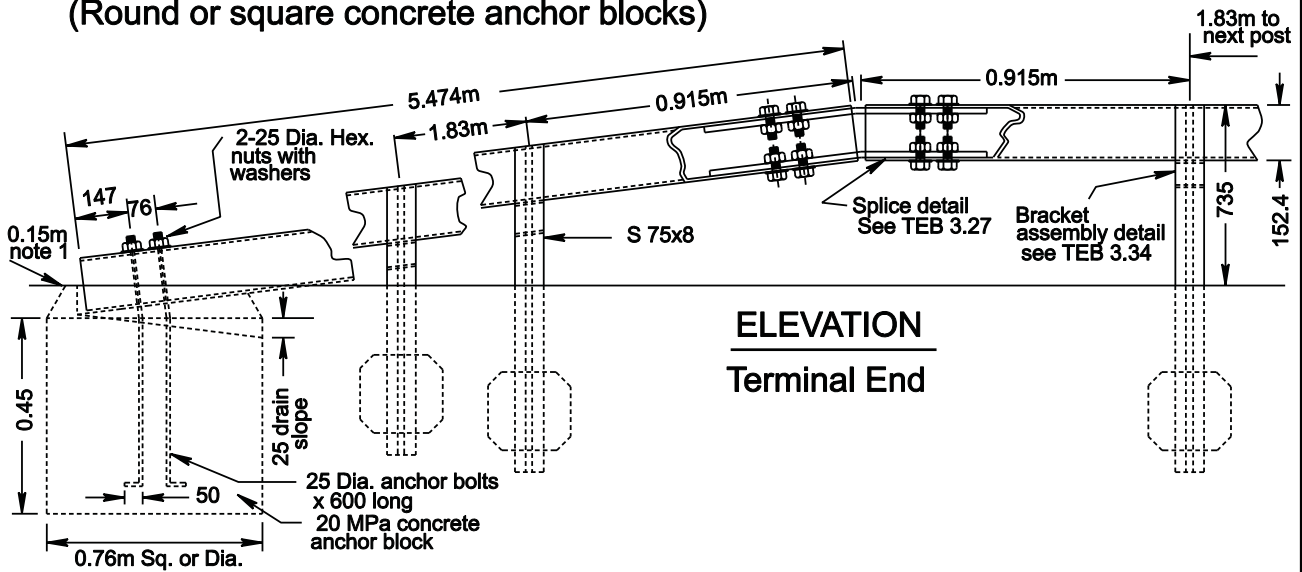
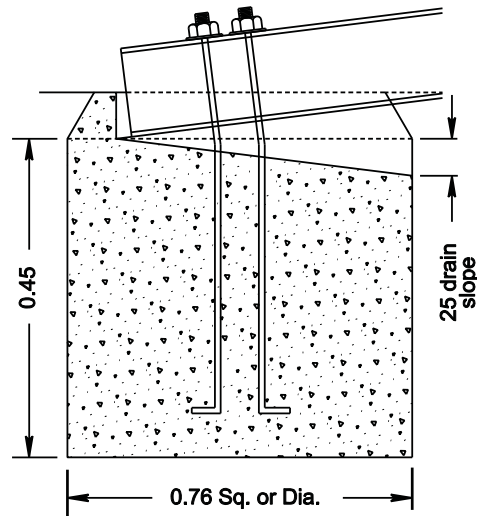
<p>Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch</p>	DWG. No.	TEB 3.36
	Date	DEC.20/92
	Revision	
	Revision	

**STANDARD BOX BEAM GUARDRAIL
BENT SPLICE PLATE DETAIL**

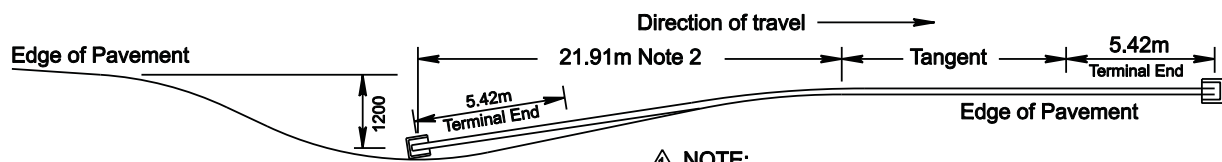


DETAIL

(Round or square concrete anchor blocks)



ELEVATION
Terminal End

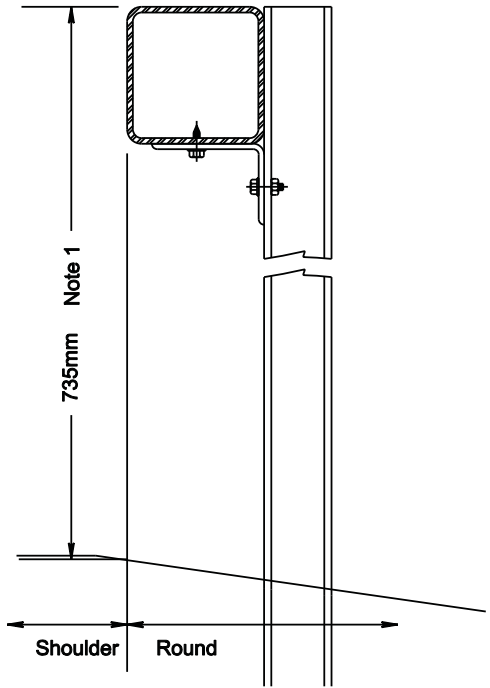
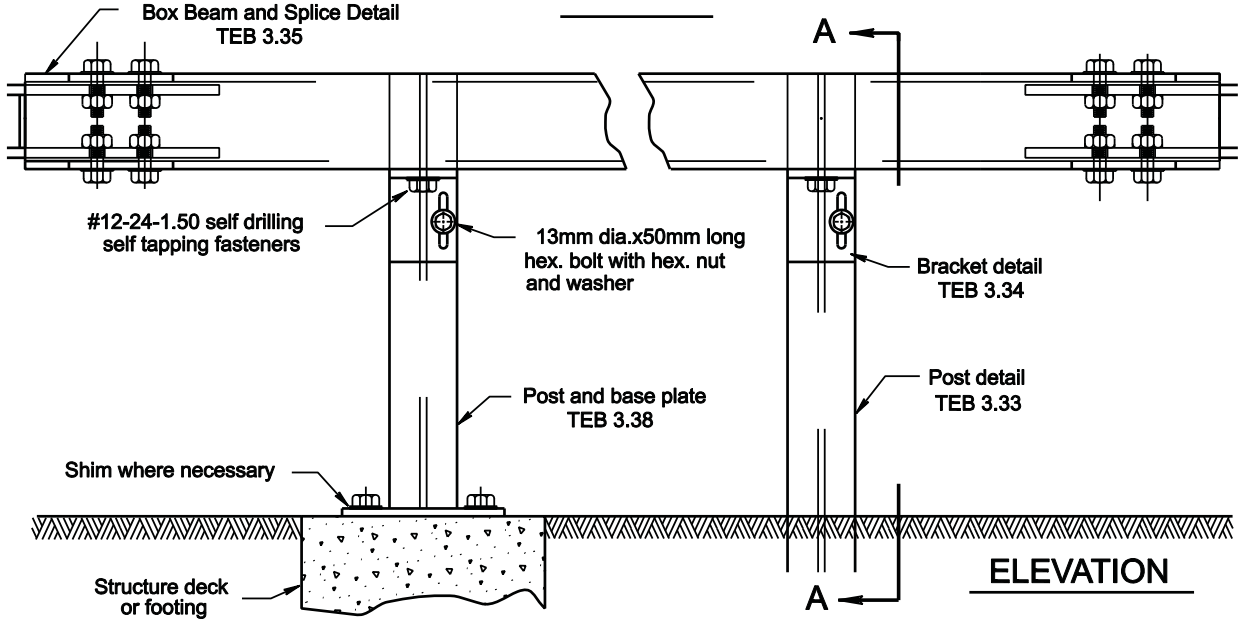
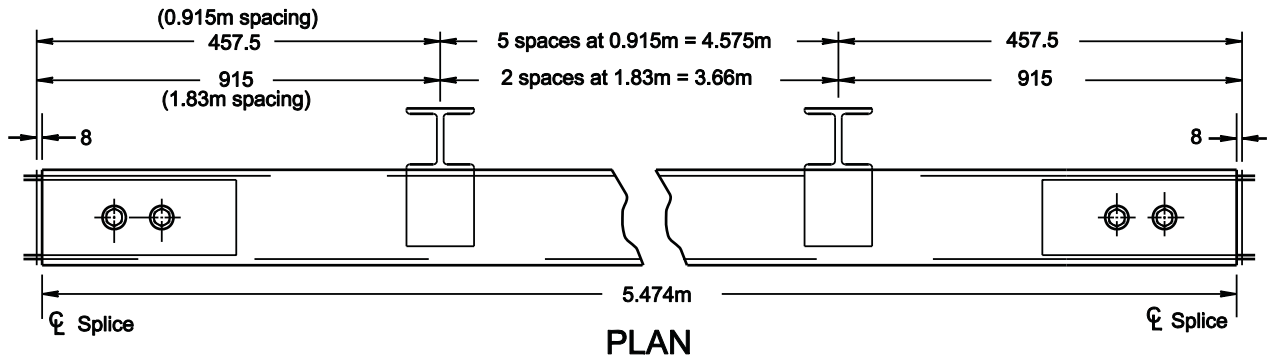


PLAN

NOTE:
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES
UNLESS OTHERWISE NOTED.

Alberta TRANSPORTATION AND UTILITIES Traffic Engineering Section Roadway Engineering Branch	DWG. No.	TEB 3.37
	Date	DEC. 13/92
	Revision	June 95
	Revision	April 07

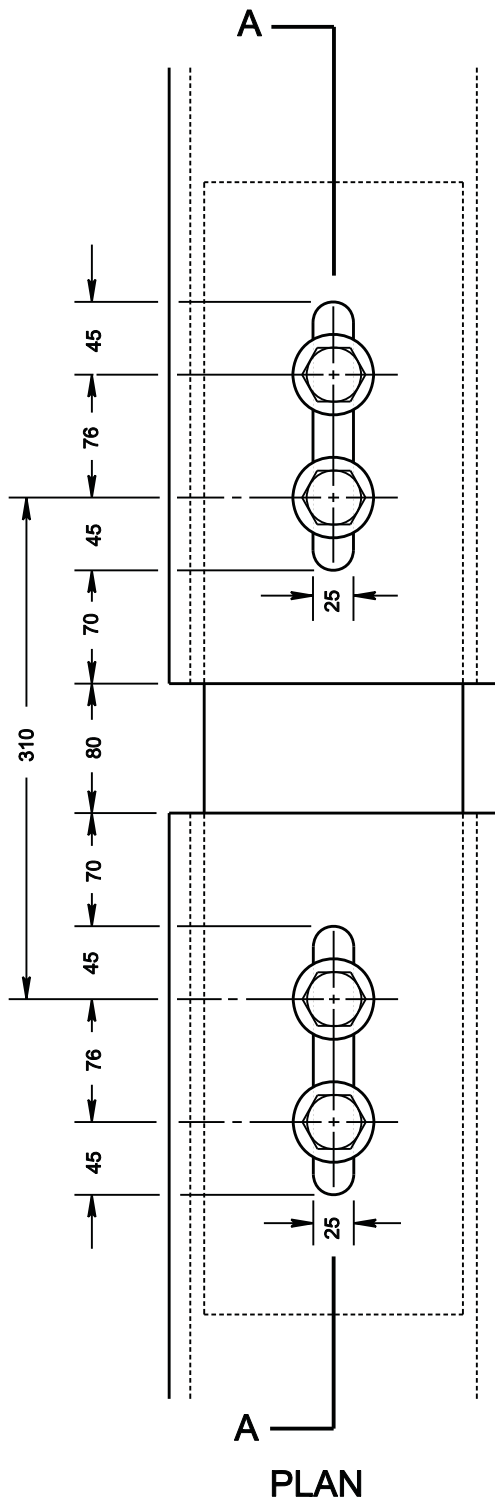
**STANDARD BOX BEAM GUARDRAIL
INSTALLATION DETAIL FOR
END TREATMENT**



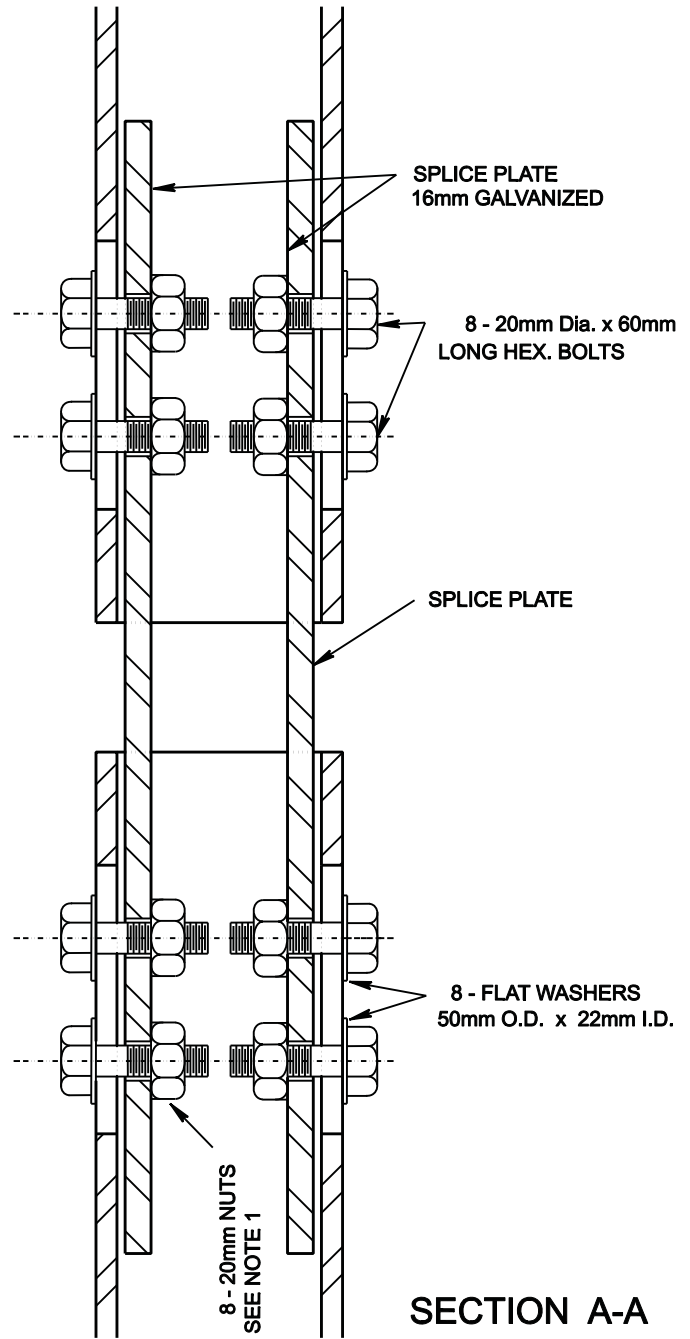
NOTE: ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

 Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.39
	Date	DEC. 20/92
	Revision	
	Revision	

**STANDARD BOX BEAM GUARDRAIL
 ASSEMBLY DETAIL FOR
 0.915m AND 1.83m POST SPACING**



PLAN

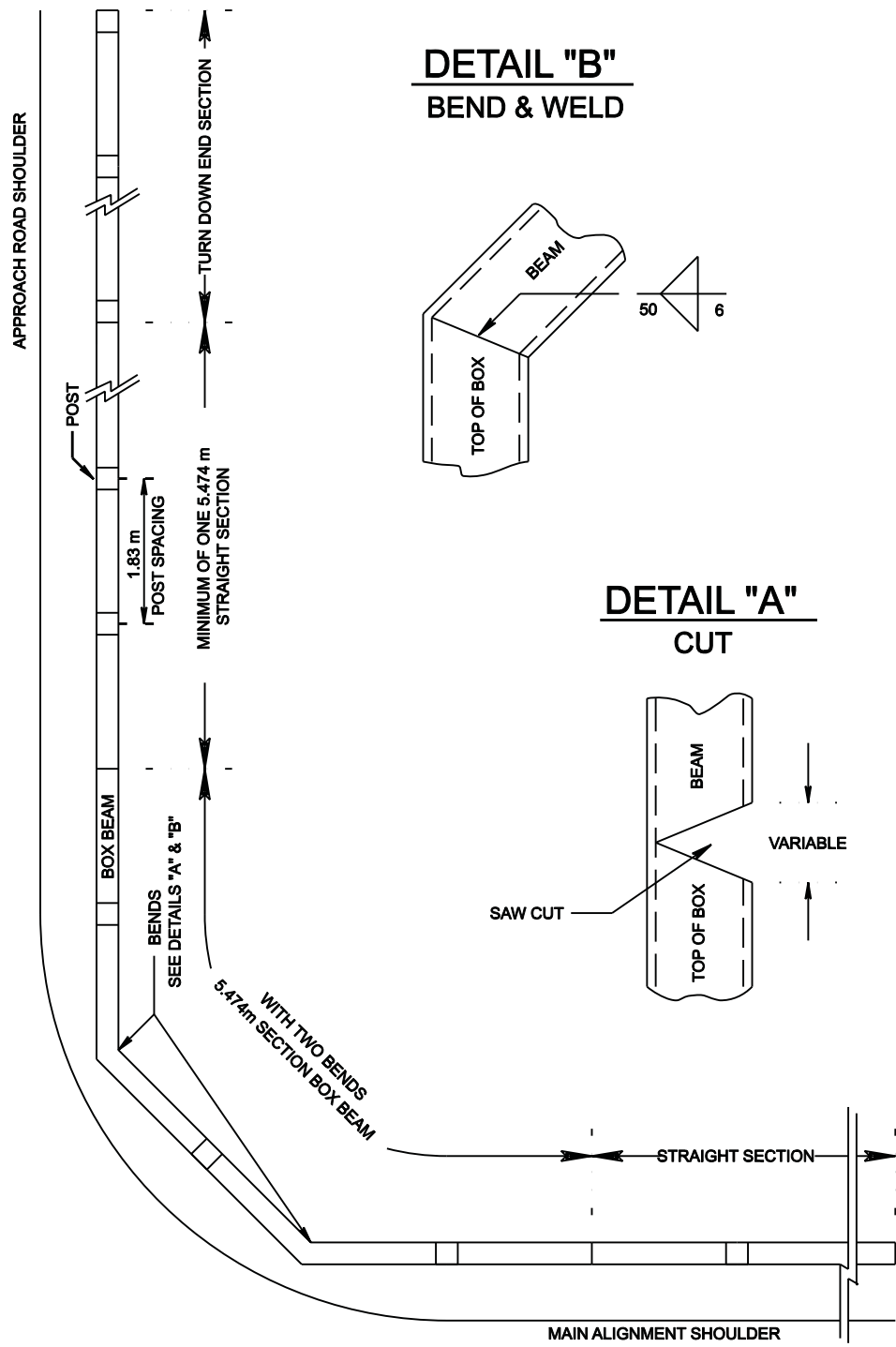


SECTION A-A

Note 1: For details of nut attachment see TEB 3.28.
 Field cut slots 25mm x 166mm.
 Expansion joint shall be used at every tenth beam splice.
 Post spacing at expansion joint shall be 1.90m.
 All dimensions are in millimetres unless otherwise indicated.

	DWG. No.	TEB 3.40
	Date	DEC.11/92
	Revision	
	Revision	

**STANDARD BOX BEAM GUARDRAIL
 EXPANSION JOINT SPLICE DETAIL**



PLAN VIEW
TOP VIEW

All dimensions are in millimetres unless otherwise indicated.

Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.46
	Date	DEC.11/92
	Revision	
	Revision	

**STANDARD BOX BEAM GUARDRAIL
BEND DETAIL
FOR APPROACH ROAD RADII**

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APPENDIX B4

**PRECAST F-SHAPE AND “NJ” SHAPE
CONCRETE BARRIERS**

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Appendix B4

Precast F-Shape and "NJ" Shape Concrete Barriers

TABLE OF CONTENTS

Table Number	Title	Page Number
CB6-4.2M16	Precast F-Shape Barrier NCHRP 350 Test Level 3	H-APP-B4-1
CB6-4.3M1A	Reinforced Concrete Median Barrier NJ Shape	H-APP-B4-2
CB6-4.3M12	Precast Concrete Barrier NJ Shape	H-APP-B4-3

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General Notes:

- The barrier is based on a design that has been crash tested and meets the requirements of NCHRP Test Level 3. The following deflection information is provided for guidance on the use of this barrier:

2000 kg pick-up truck test @ 100kph @ 25°	Approx deflection
Unanchored	1800 mm
Four 25 mm diameter by 1m long steel dowels per segment driven through holes provided	75 mm
Three 19 diameter anchor bolts c/w drop-in anchors in concrete slab on traffic side (failure is expected)	900 mm (deflection on top edge only)
Three 28 diameter A307 fully developed tension anchor bolts on traffic side	300 mm (deflection on top edge only)

When using this barrier, it is the responsibility of the user to ensure appropriate anchoring commensurate with the risks based on traffic and site conditions.

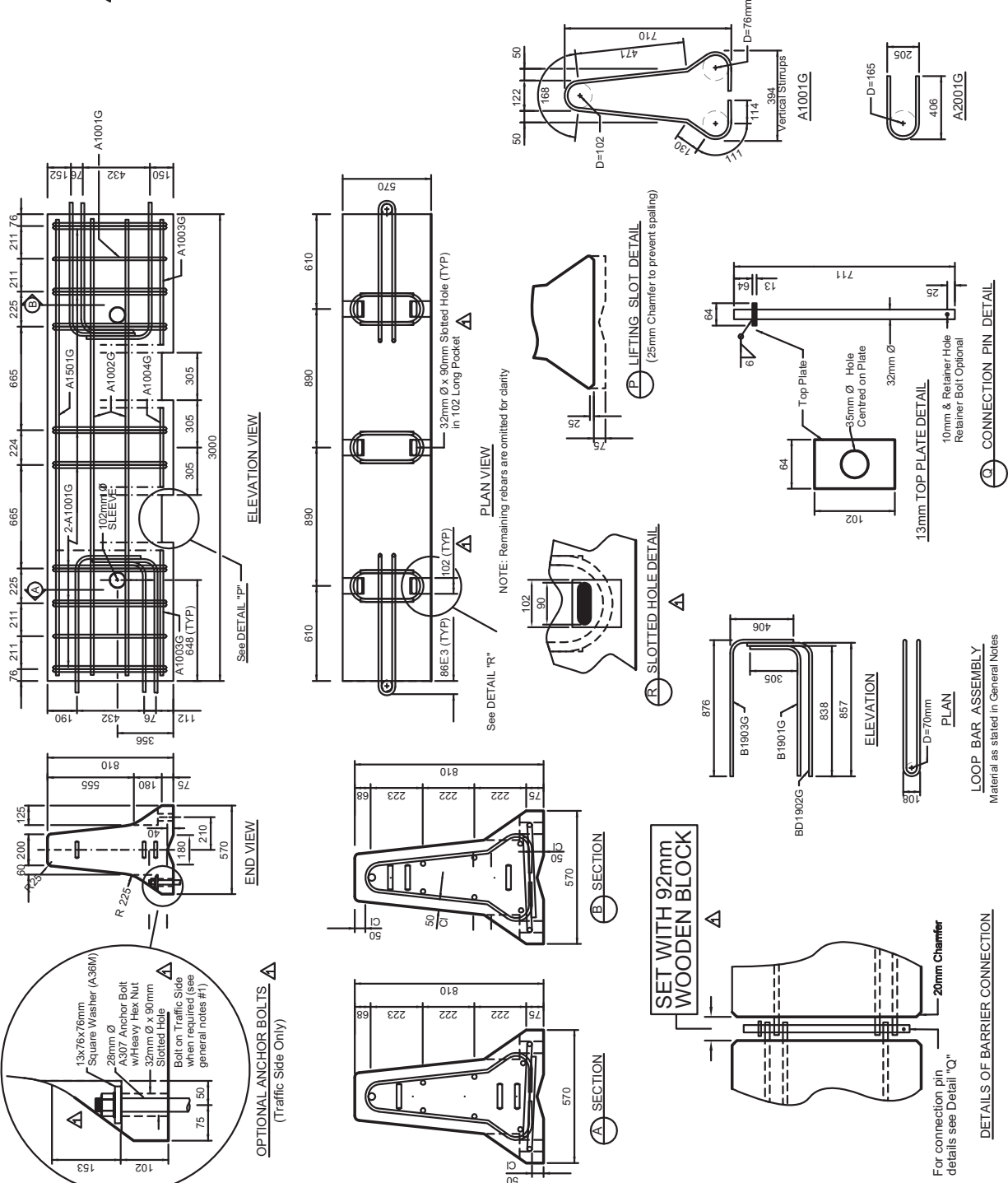
Materials:

- Reinforcing bars – Grade 400W.
- 19 mm diameter loop bars – Minimum yield 420 MPa, minimum tensile strength 550 MPa, minimum 14% elongation in 203 mm, pass a 180 degree bend test using a 150 mm bend diameter.
- All reinforcing bars and steel hardware to be hot-dip galvanized after fabrication to the requirements of CSA G164.
- Concrete strength shall be 40 MPa @ 28 days, and all requirements of Section 7 - Precast Concrete Units of the Specifications for Bridge Construction shall be met.

Handling and installation:

- At no time shall the barriers be lifted, moved, etc. by the use of the loop bars at the ends.
- For barriers placed on a paved surface, all loose dirt and sand shall be removed from the roadway just prior to placement of the barriers. Barriers can also be placed on a compacted base material with a minimum thickness of 100 mm and a minimum width of 1.2 m.
- Calculated mass of one segment = 1.8 tonnes

BAR LIST : 3000 SEGMENT						TOTAL Kg	550
Mark	Size	Shape	No.	Length	Mass		
A1001G	10		18	1820	26.0		
A2001G	20		6	898	13.0		
A1501G	15		1	2900	5.0		
A1002G	10		4	2900	9.1		
A1003G	10		4	790	2.0		
A1004G	10		2	510	1.0		



For connection pin details see Detail "Q"

Material as stated in General Notes

No.	Revisions	Notes and Details	BK	Sept/06
			BY	DATE

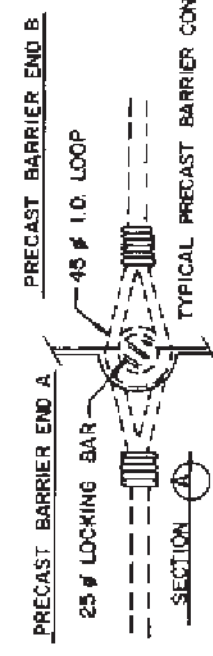
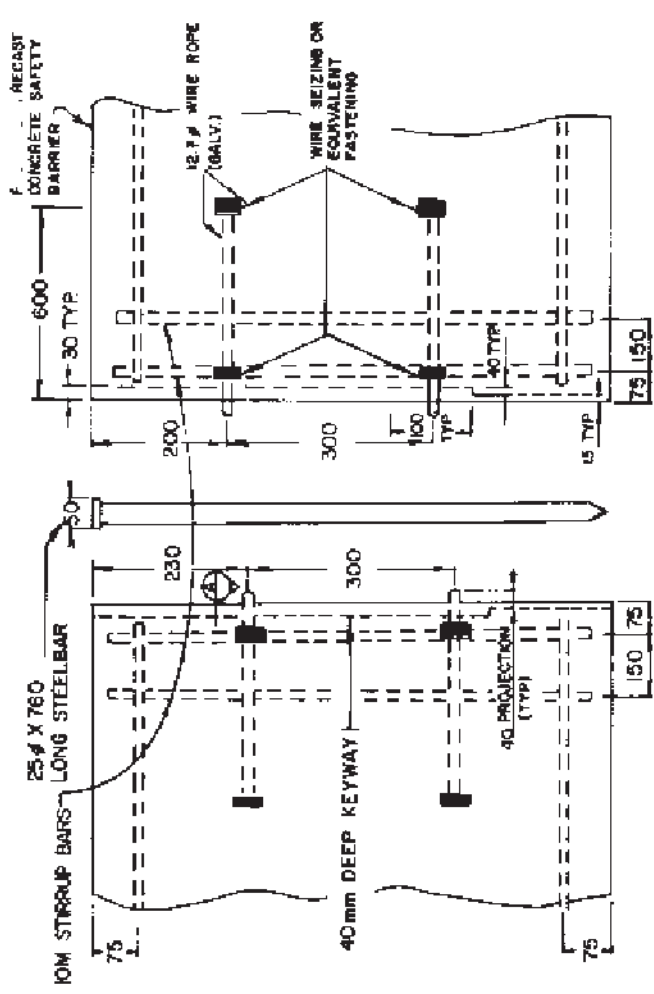
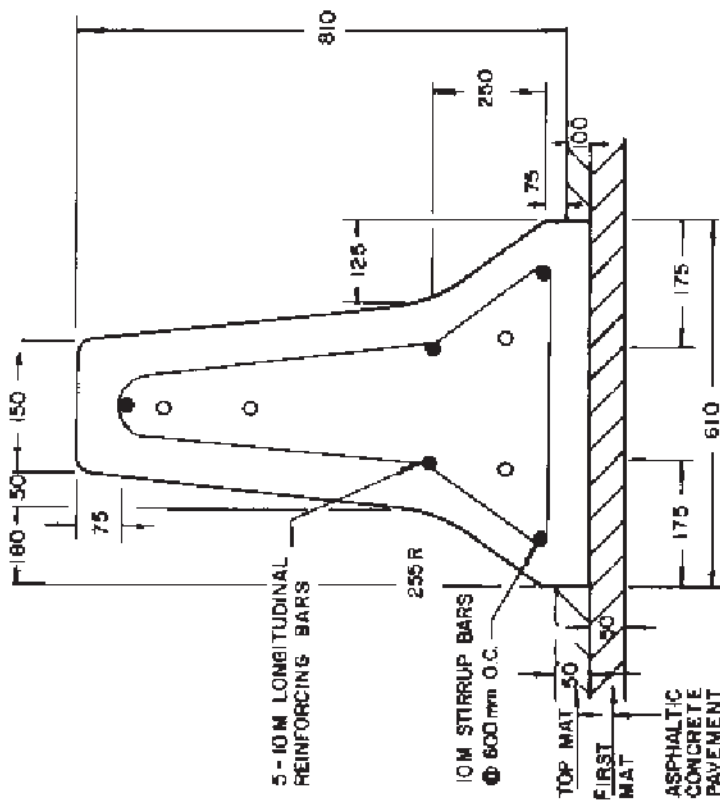
Approved:
Original signed by
Allan Kwan
Executive Director
Technical Standards Branch

Date: NOVEMBER 23, 2004



**PRECAST 'F' SHAPE BARRIER
NCHRP 350 TEST LEVEL 3**

Prepared By: M.T
Checked By: R.Y
Scale: N.T.S.
Dwg No.: CB6 4.2 M 16



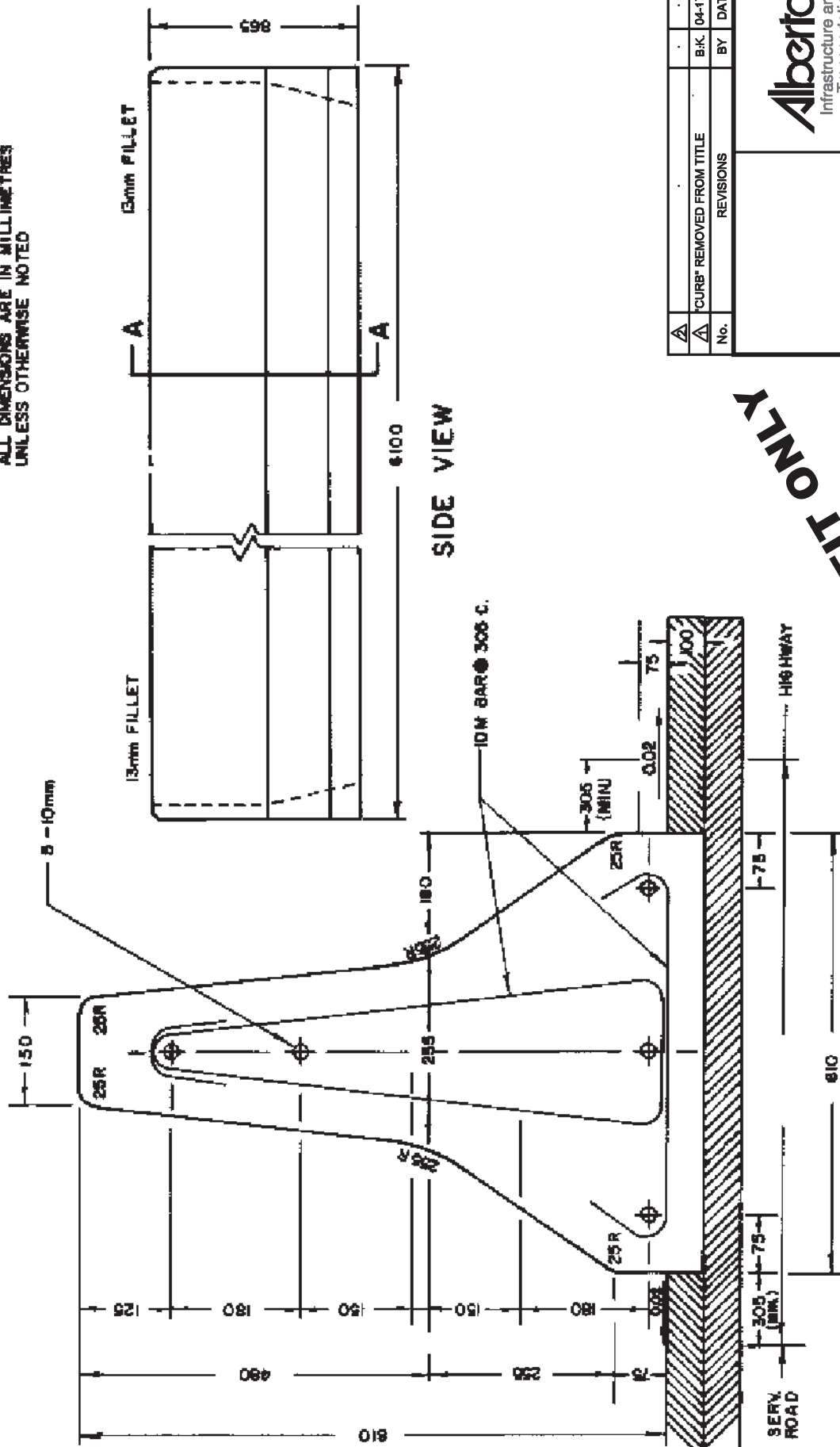
1. ALL CONCRETE SHALL BE 40 MPa AT 28 DAYS.
2. ALL REINFORCEMENT SHALL BE EPOXY COATED REINFORCING BARS.
3. ALL EXPOSED CONCRETE SHALL HAVE A SMOOTH SURFACE.
4. EXPOSED SURFACES SHALL HAVE 20mm CHAMFER OR FILLET OR AS OTHERWISE SPECIFIED.
5. ALL SURFACES SHALL BE FORMED WITH OILED PLYWOOD OR STEEL FORMED FINISH
6. ALL VOIDS ARE TO BE CAPPED AND WATERPROOFED
7. EXPOSED SURFACES SHALL HAVE AN APPROVED SEALING SOLUTION APPLIED

ALL DIMENSIONS ARE IN MILLEMETRES
UNLESS OTHERWISE NOTED

FOR RETROFIT ONLY

A	REMOVED FROM TITLE	BK.	04-17-07
	REVISIONS	BY	DATE
No.			
Effective Date: 1997			
REINFORCED CONCRETE MEDIAN BARRIER Δ NJ SHAPE			
Prepared By: N.N.	Checked By: B.K.	Scale: N.T.S.	Dwg No.: CB6-4.3M1A

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE NOTED



FOR RETROFIT ONLY

SECTION A-A VIEW

△	CURB* REMOVED FROM TITLE	B.K.	04-17-07
△	REVISIONS	BY	DATE
No.			



Date: MAY, 1985

PRECAST CONCRETE
BARRIER △
NJ SHAPE

Prepared By: N.N.	Checked By: B.K.	Scale: N.T.S.	Dwg No.: CB6-4.3M12
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APPENDIX B5

THREE BEAM GUARDRAIL

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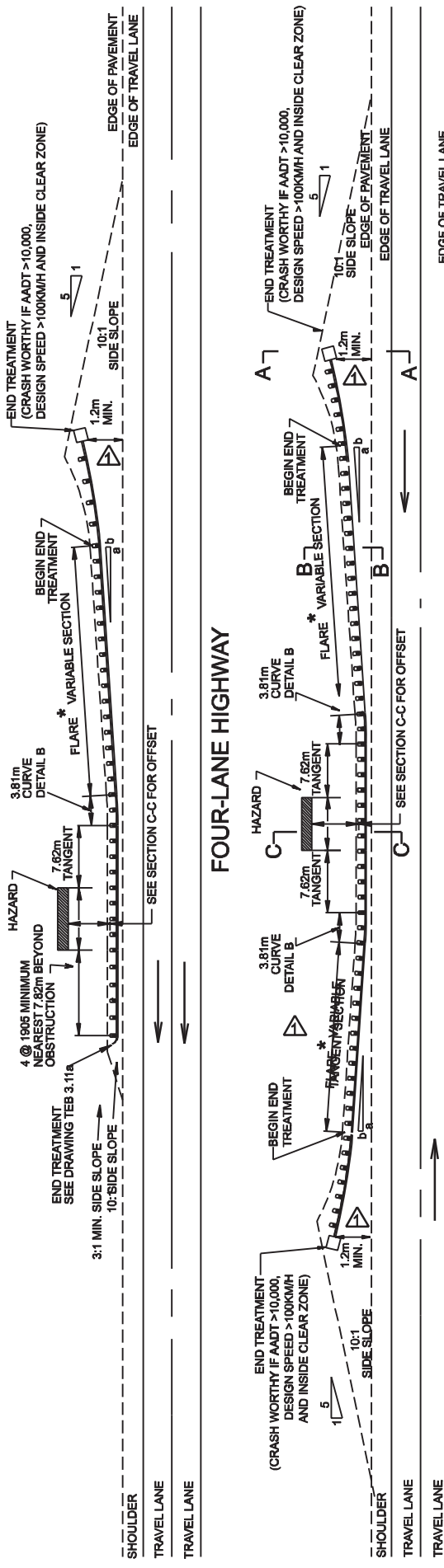
Appendix B5

Thrie Beam Guardrail

TABLE OF CONTENTS

Dwg. No.	Title	Page Number
TEB 3.15a	Typical W-Beam Strong Post or Modified Thrie Beam Guardrail Placement Roadside Hazards (Two and Four Lane Highways)	H-APP-B5-1
TEB 3.16a	Typical Strong Post W-Beam or Modified Thrie Beam Guardrail Placement at Bridge Approaches (Two-Lane Highway)	H-APP-B5-2
TEB 3.17a	Typical Strong Post W-Beam or Modified Thrie Beam Guardrail Placement at Bridge Approaches (Four-Lane Divided Highway)	H-APP-B5-3
TEB 3.18a	Typical Strong Post W-Beam or Modified Thrie Beam Guardrail Placement for Median Hazards	H-APP-B5-5
TEB 3.60-1	Bullnose Guardrail System Protection of Piers in Medians	H-APP-B5-7
TEB 3.60-2	Bullnose Guardrail System Protection of Piers in Medians	H-APP-B5-8
TEB 3.60-3	Bullnose Guardrail System Cable Anchor	H-APP-B5-9
TEB 3.60-4	Bullnose Guardrail System Posts & Blocks	H-APP-B5-10
TEB 3.60-5	Bullnose Guardrail System Rail Section 1	H-APP-B5-11
TEB 3.60-6	Bullnose Guardrail System Rail Section 2	H-APP-B5-12
TEB 3.60-7	Bullnose Guardrail System Rail Section 3	H-APP-B5-13
TEB 3.60-8	Bullnose Guardrail System Plates and Cable Assembly	H-APP-B5-14
TEB 3.60-9	Bullnose Guardrail System Thrie Beam and Cable Length	H-APP-B5-15
TEB 3.70	Modified Thrie Beam Guardrail	H-APP-B5-17
RDG-B5.1	Modified Thrie Beam Cable Anchor Terminal with Wing End (Exit End Treatment for Divided Highways)	H-APP-B5-18
RDG-B5.2	Bullnose Guardrail System Standard Thrie Beam Cable Anchor Terminal with Wing End (Exit End Treatment for Divided Highways)	H-APP-B5-19
RDG-B5.3	Hardware Details for W-Beam and Thrie Beam Guardrail Cable Anchor Terminal	H-APP-B5-20
RDG-B5.4	Foundation Tube and Foundation Tube Soil Plate Details for W-Beam and Thrie Beam Cable Anchor Terminal	H-APP-B5-21
RDG-B5.5	TL-3 Transition from Modified Thrie Beam Guardrail to W-Beam Strong Post Guardrail	H-APP-B5-23
RDG-B5.6	Thrie Beam Bullnose Guardrail General Layouts	H-APP-B5-24
RDG-B5.7	Thrie Beam Bullnose Guardrail General Layouts	H-APP-B5-25
RDG-B5.8	Thrie Beam Bullnose Guardrail Detailed Plans	H-APP-B5-26
RDG-B5.9	Thrie Beam Bullnose Guardrail Detailed Plans	H-APP-B5-27
RDG-B5.10	W-Beam Strong Post to Modified Thrie Beam Guardrail Transition at Roadside Structure	H-APP-B5-28

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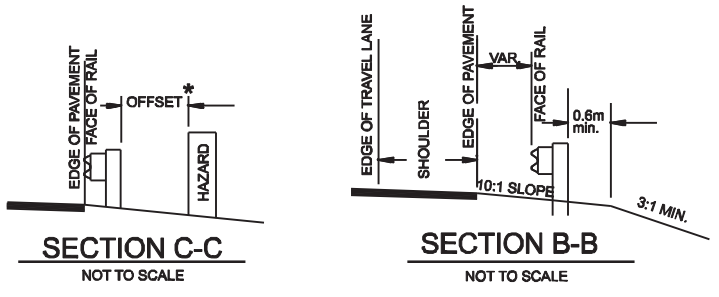


FOUR-LANE HIGHWAY

TWO-LANE HIGHWAY

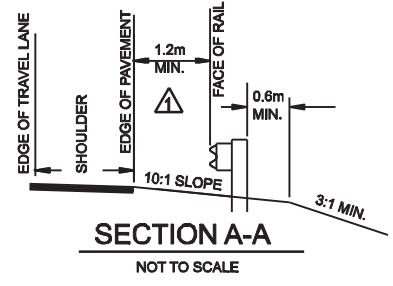
- STRONG POST W-BEAM 0.9m
- STRONG POST (PLASTIC) 1.5m
- MODIFIED THRIE BEAM 0.8m

* OFFSET FROM BACK OF BARRIER TO FACE OF OBSTRUCTION SHALL BE AT LEAST THE DESIGN DEFLECTION OF THE BARRIER SYSTEM AS FOLLOWS:

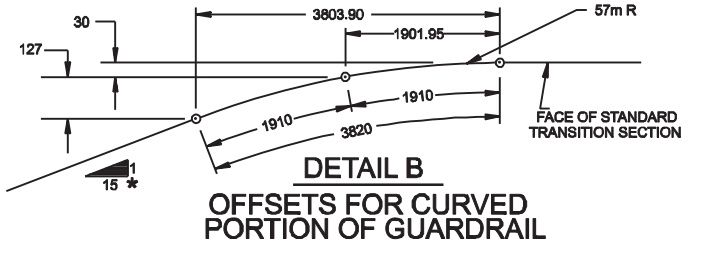


SECTION C-C
NOT TO SCALE

SECTION B-B
NOT TO SCALE



SECTION A-A
NOT TO SCALE



DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL

⚠			
⚠	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan

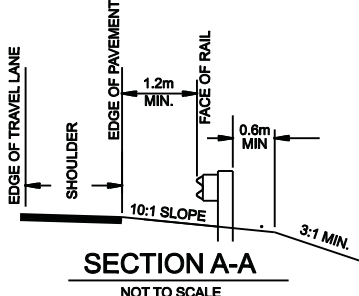
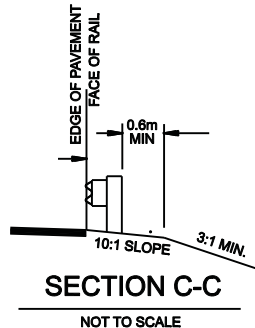
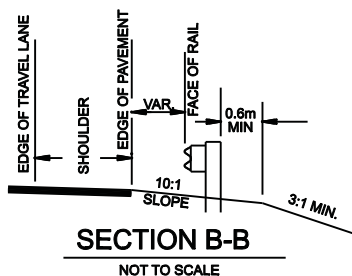
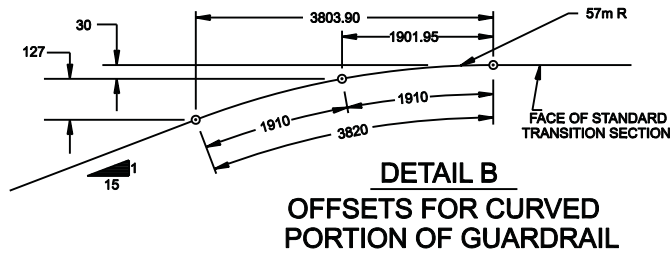
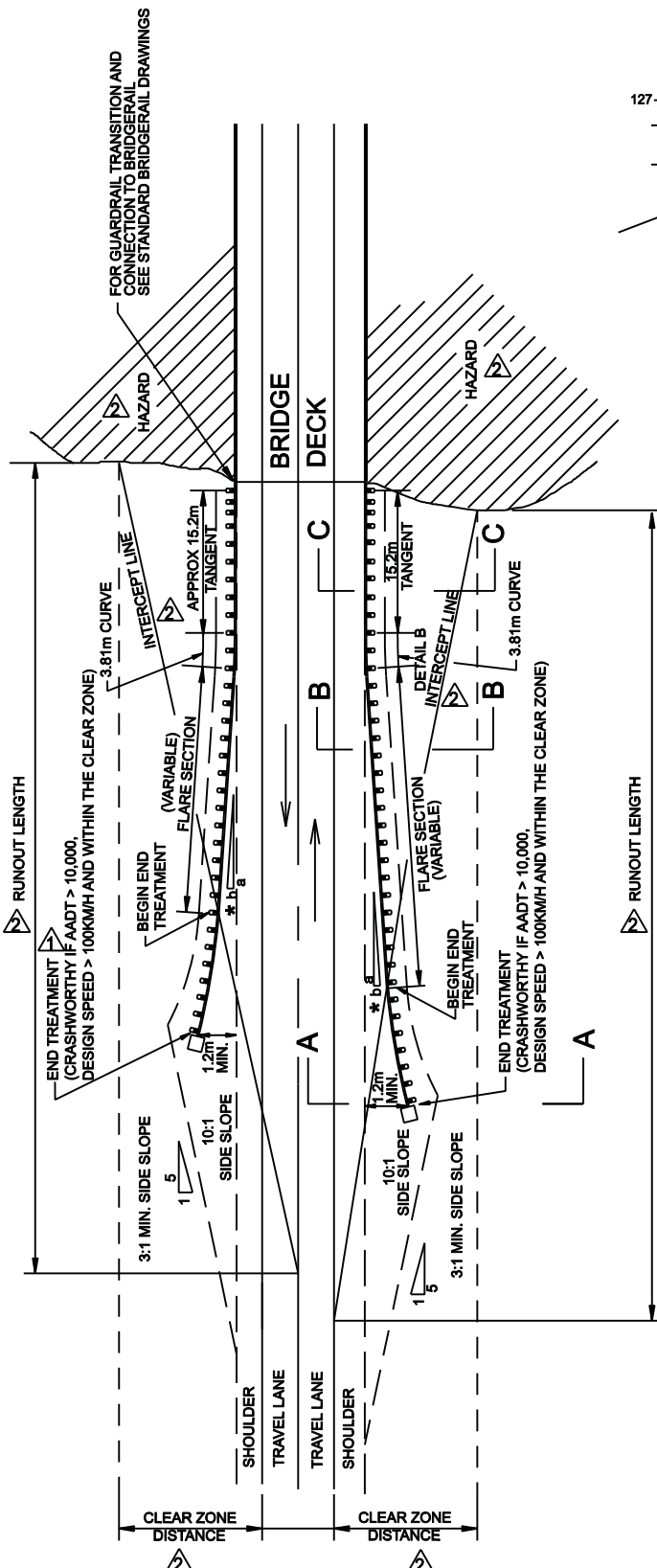
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005



TYPICAL W-BEAM STRONG POST OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT ROADSIDE HAZARDS (TWO AND FOUR LANE HIGHWAYS)

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.15a
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⚠	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
⚠	END TREATMENT NOTES	B.K.	12/01/05
No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
Date: JULY 12, 2005



TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (TWO-LANE HIGHWAY)

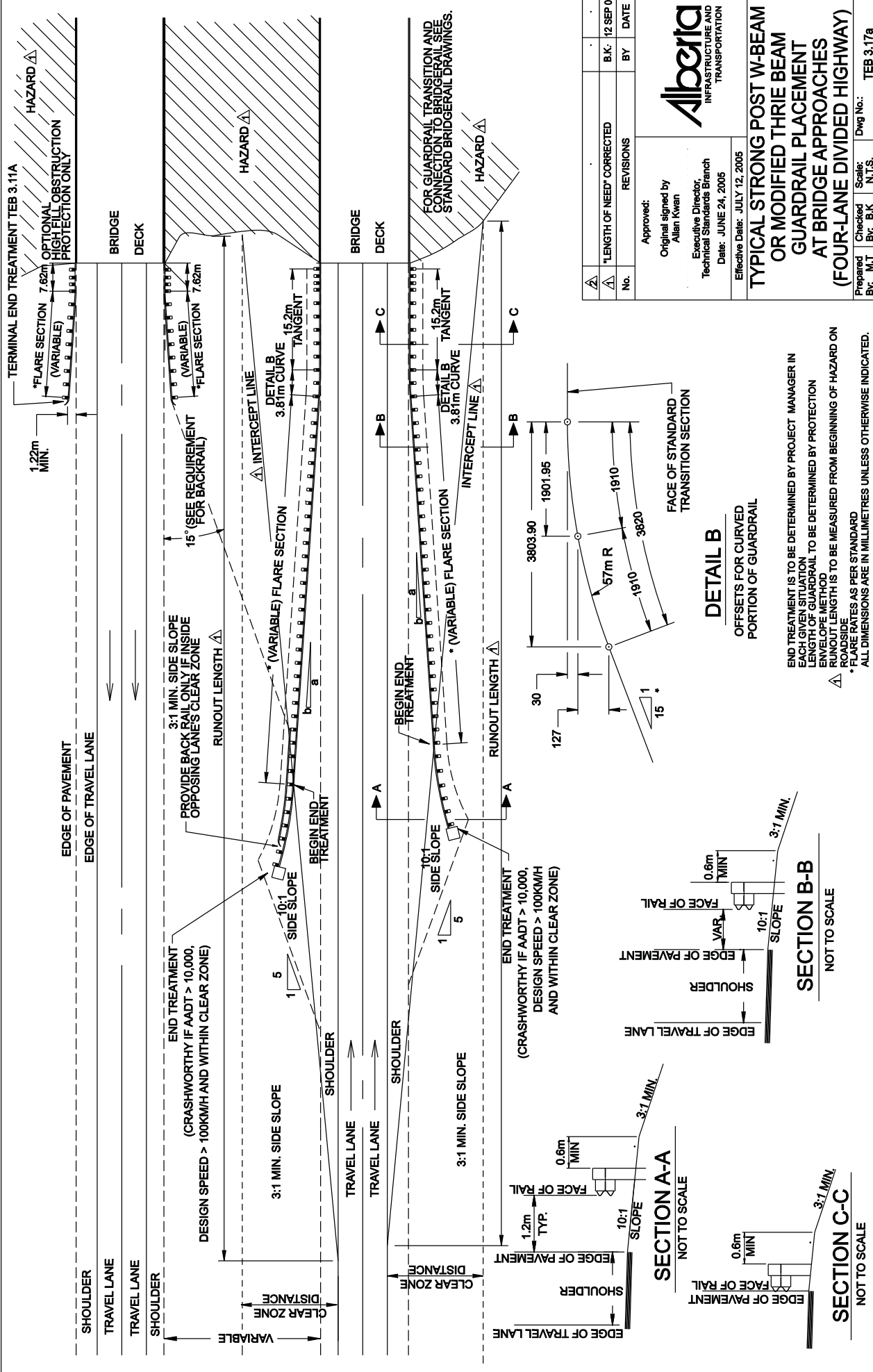
END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

* FLARE RATES AS PER STANDARD
RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE

LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.16a
------------------	-----------------	---------------	--------------------

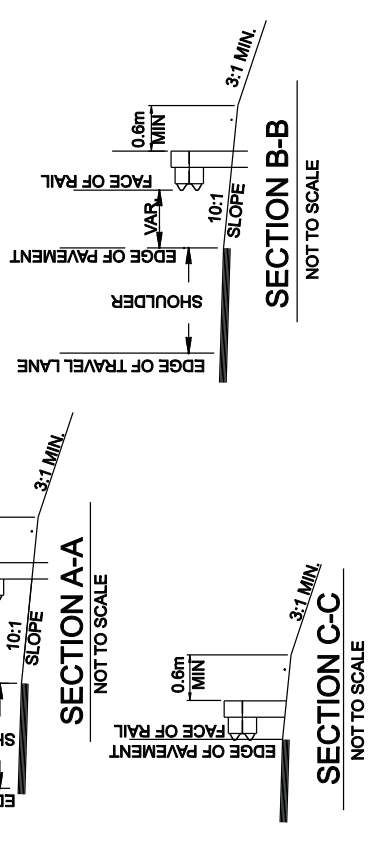


△	△	No.	REVISIONS	BY	DATE
			"LENGTH OF NEED" CORRECTED	B.K.	12 SEP 07

Approved: Original signed by Allin Kwen Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005		TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (FOUR-LANE DIVIDED HIGHWAY)
Prepared By: M.T.	Checked By: B.K.	
Scale: N.T.S.		Dwg No.: TEB 3.17a

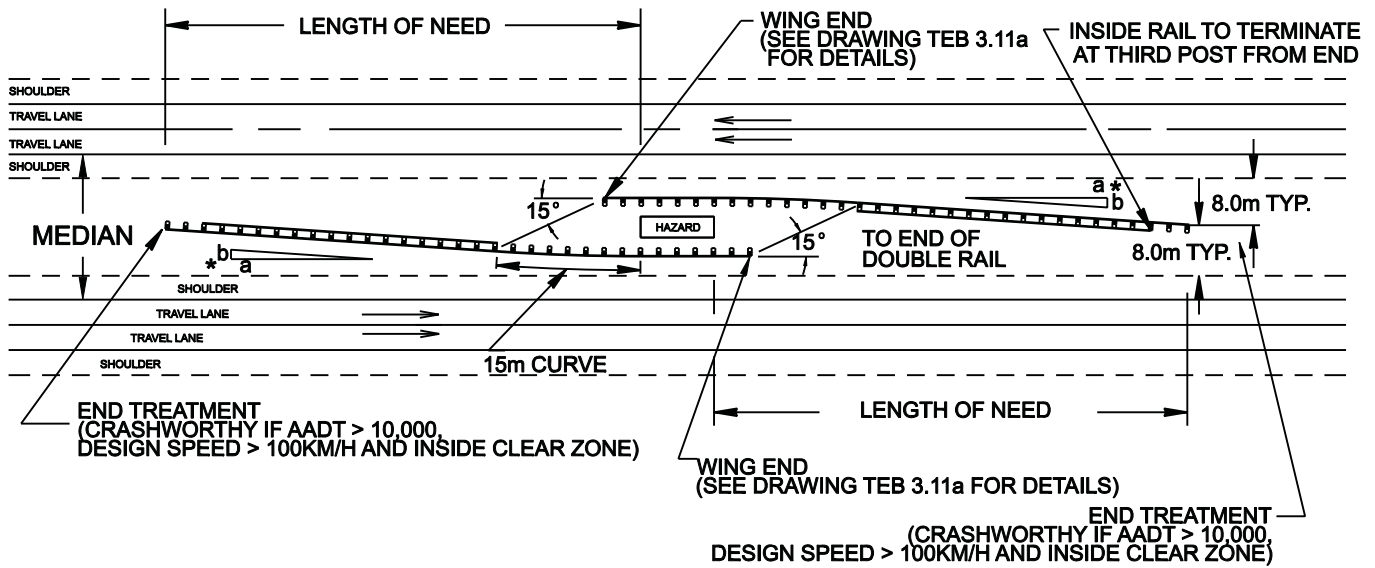


END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION
 LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD
 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADWAY
 * FLARE RATES AS PER STANDARD
 ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

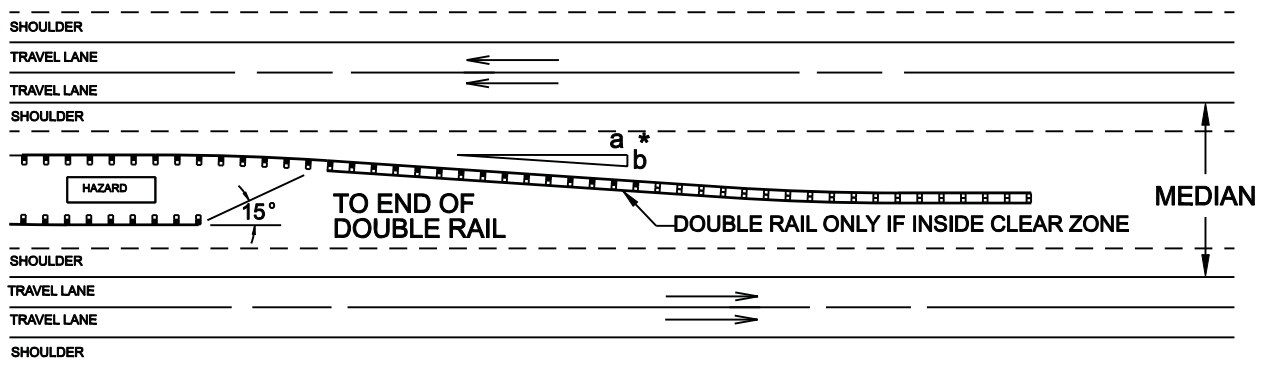


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INTRODUCED MEDIAN BARRIER



CONTINUOUS MEDIAN BARRIER



* FLARE RATE AS PER STANDARD FOR DESIGN SPEED.

CONSIDER ONLY WHERE MEDIAN WIDTH SUFFICIENT TO PROVIDE 8m MINIMUM FROM OPPOSING TRAVEL LANE TO BACK SIDE OF TERMINAL.

FOR NARROW MEDIAN, IMPACT SYSTEMS ARE REQUIRED.

THE LENGTH OF NEED SHALL BE BASED ON THE PROTECTION ENVELOPE.

CLEARANCE BETWEEN GUARDRAIL AND OBSTRUCTION:
 STRONG POST (WOOD AND STEEL POSTS) 0.9m
 THRIE BEAM 0.9m
 STRONG POST (PLASTIC POSTS) 1.5m

DATA FOR 15m CURVE
 D=383.0' R=225.0m
 SR=7.508m CL=15.0m

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER TO EACH GIVEN SITUATION.

All dimensions are in millimetres unless otherwise indicated.

⚠			
⚠			
No.	REVISIONS	BY	DATE

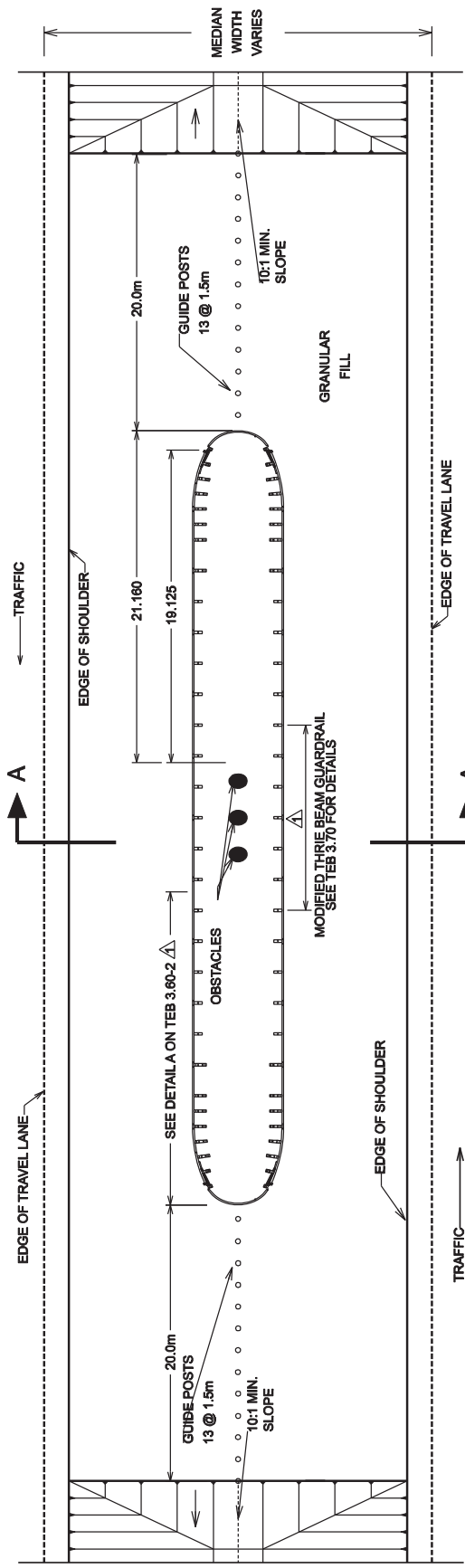
Approved:
 Original signed by
 Allan Kwan
 Executive Director,
 Technical Standards Branch
 Date: JUNE 24, 2005
 Effective Date: JULY 12, 2005



TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT FOR MEDIAN HAZARDS

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.18a
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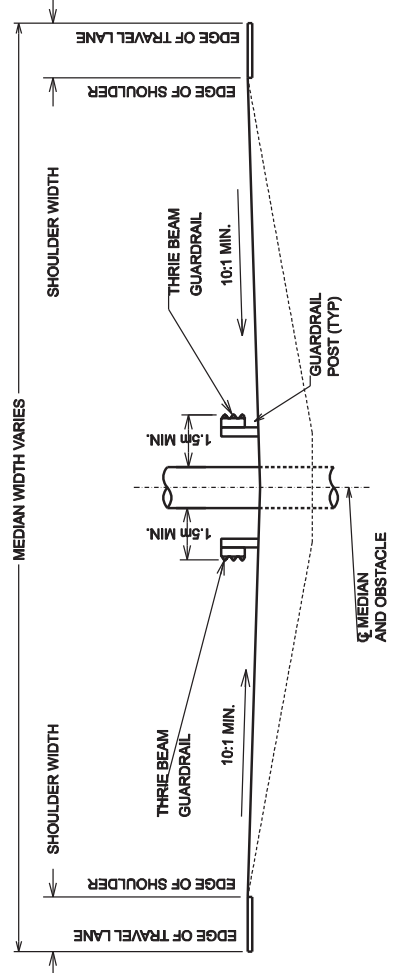


**PIER AT C OF MEDIAN
PLAN VIEW**

NOTES:

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.



SECTION A-A

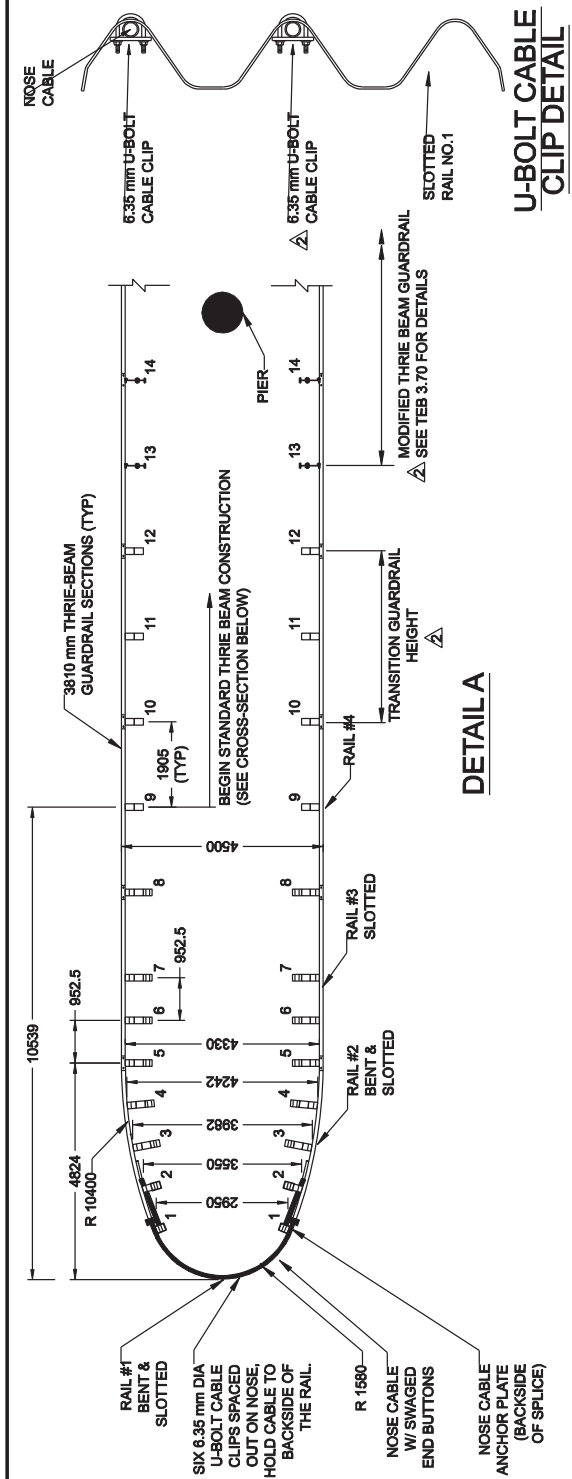
No.	REVISIONS	BY	DATE
1	THIRIE BEAM ADDED AND TITLE REVISED	B.K.	18 JUN 07
2	DWG. REFERENCE	B.K.	06/15/06

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
Effective Date: JULY 12, 2005



**BULLNOSE GUARDRAIL SYSTEM
PROTECTION OF PIERS
IN MEDIANS**
SHEET 1 of 9

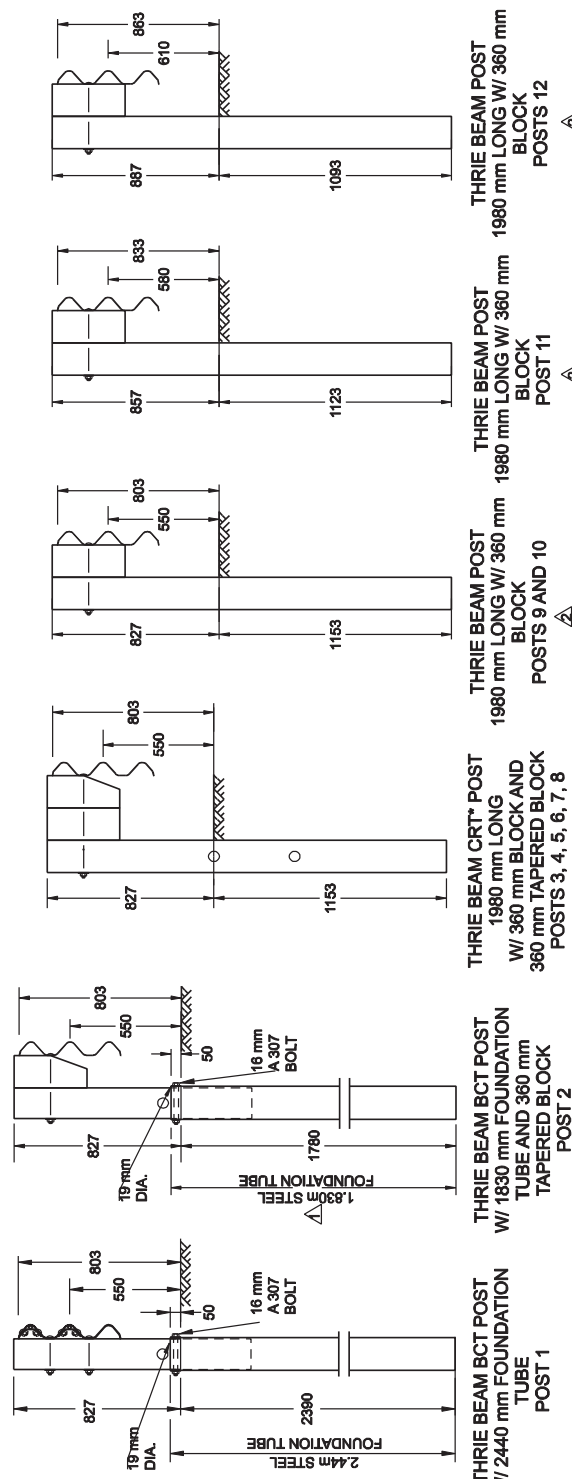
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-1
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DETAIL A

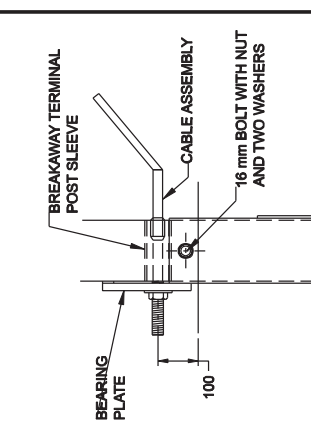
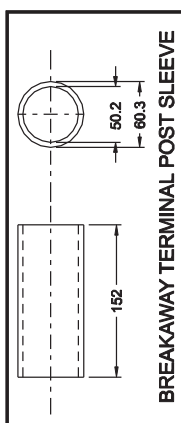
U-BOLT CABLE CLIP DETAIL

POST 1 DETAIL



POST DETAILS

* CRT DENOTES CONTROLLED RELEASE TERMINAL



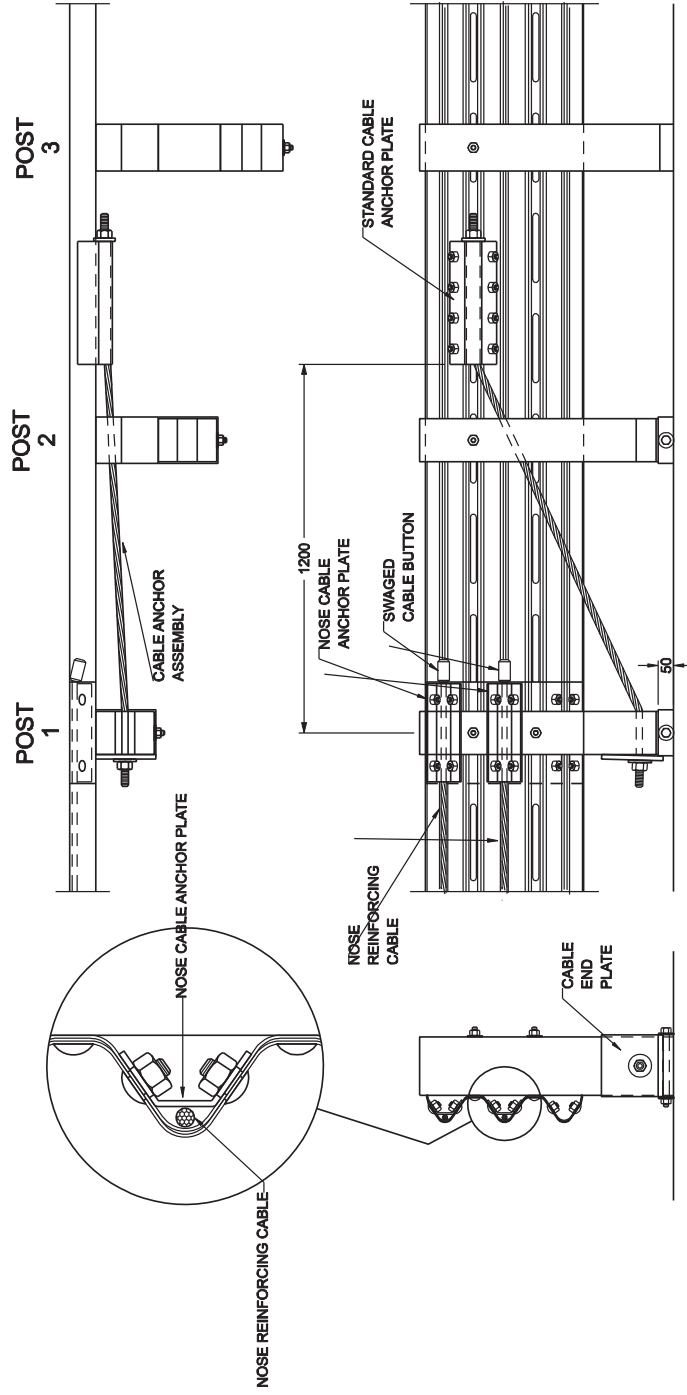
NOTES:
THRIE BEAM BASE METAL THICKNESS = 2.7mm
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
1	POST DETAILS AND TITLE REVISED AND CRT NOTE ADDED	B.K.	18 JUN 07
2	FOUNDATION TUBE LENGTH	B.K.	11/04/05

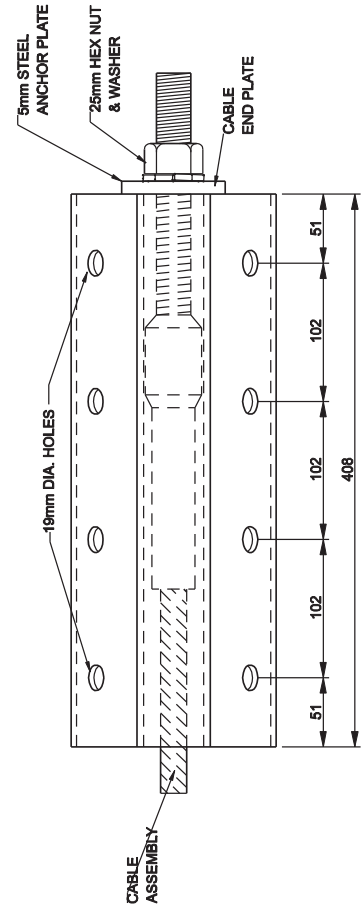
Approved:
Original signed by
Allen Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
JULY 12, 2005

**BULLNOSE GUARDRAIL SYSTEM
PROTECTION OF PIERS
IN MEDIANS
SHEET 2 of 9**

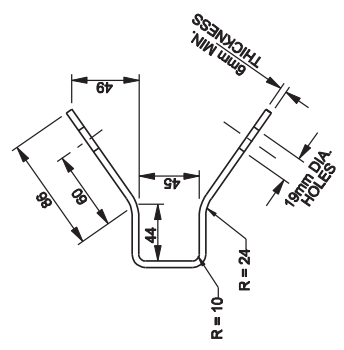
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-2
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DETAIL 'B'



**DETAILS OF
STANDARD CABLE ANCHOR PLATE**



END VIEW

NOTE:
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

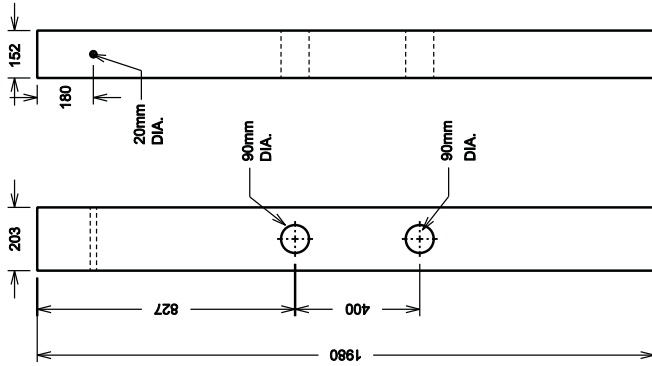
No.	TITLE	REVISED	B.K	18 JUN 07
	REVISIONS		BY	DATE

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
Effective Date: JULY 12, 2005



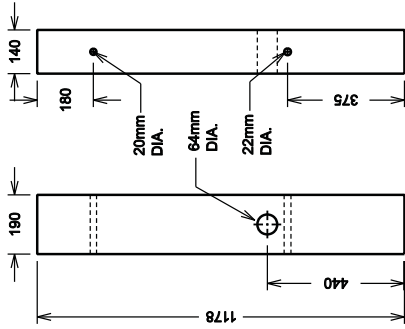
**BULLNOSE GUARDRAIL SYSTEM
CABLE ANCHOR
SHEET 3 of 9**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-3
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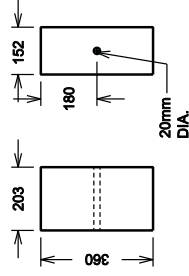


THRIE BEAM CRT* POSTS

* CRT DENOTES CONTROLLED RELEASE TERMINAL



THRIE BEAM ANCHOR POSTS



**POSTS 3 THROUGH 12
STANDARD BLOCKS**

NOTES:

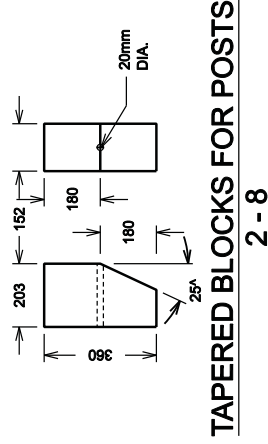
CRT, ANCHOR AND BLOCK POSTS ARE WOOD.
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005
Effective Date: JULY 12, 2005

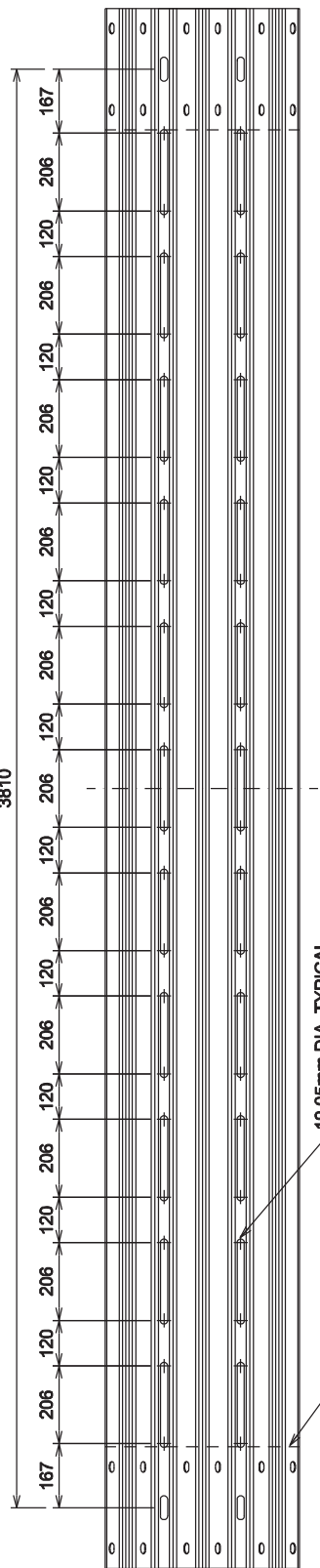
**BULLNOSE GUARDRAIL SYSTEM
POSTS & BLOCKS
SHEET 4 of 9**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-4
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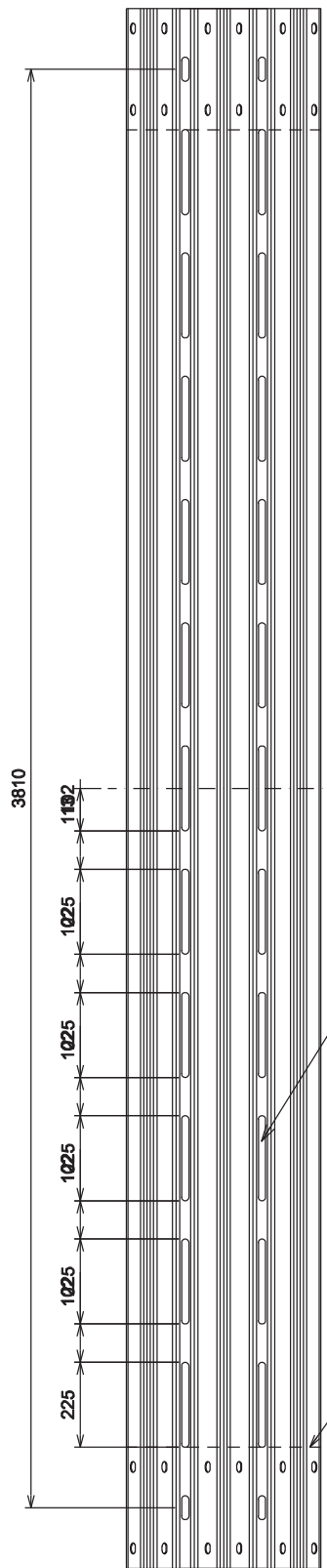


TAPERED BLOCKS FOR POSTS

2 - 8



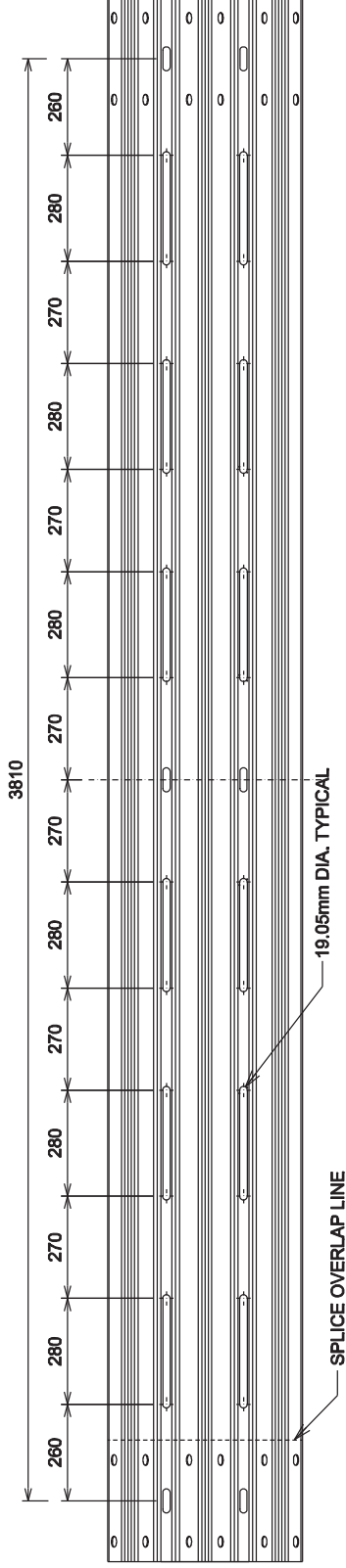
RAIL SECTION 2



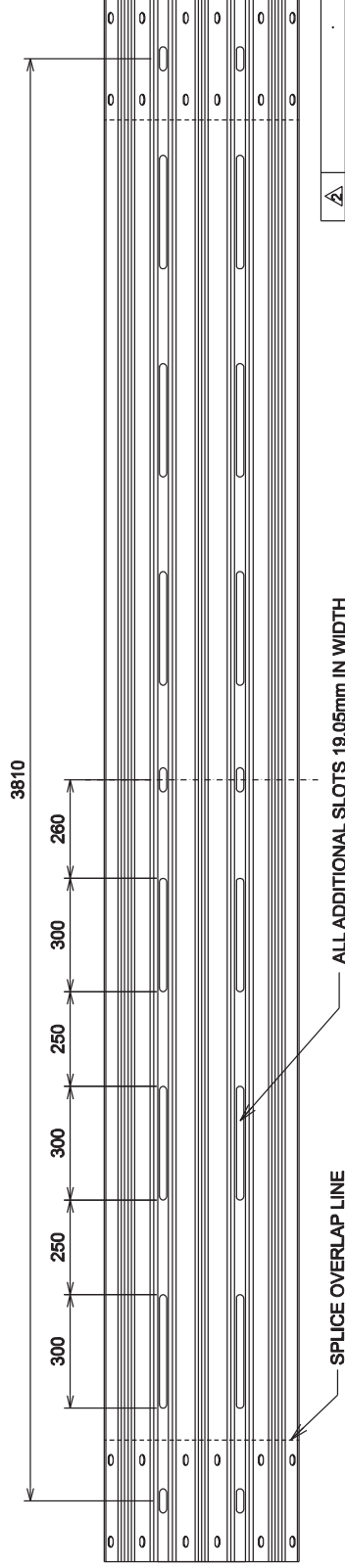
RAIL SECTION 2

NOTE:
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

	TITLE REVISED B.K. 18 JUN 07	REVISIONS BY DATE
	Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005	
BULLNOSE GUARDRAIL SYSTEM RAIL SECTION 2 SHEET 6 of 9		
Prepared By: M.T.	Checked By: B.K.	Scale: N.T.S.
Dwg No.: TEB 3.60-6		APPENDIX B5



RAIL SECTION 3



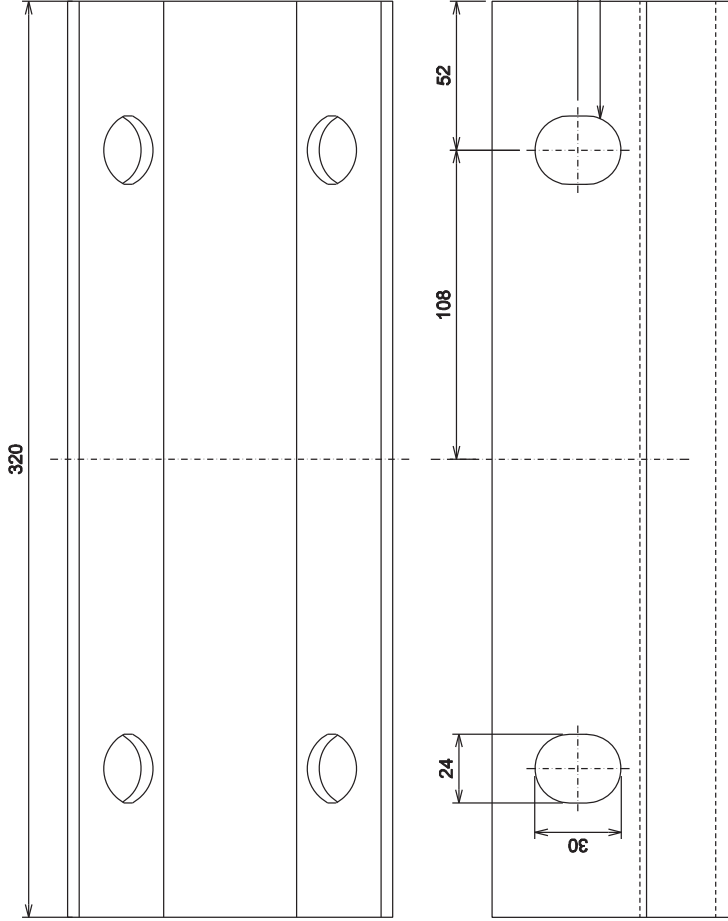
RAIL SECTION 3

NOTE:
 ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

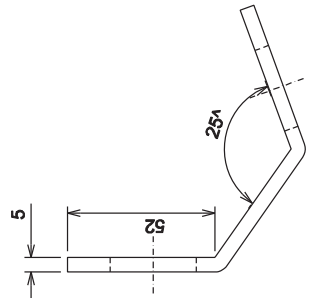
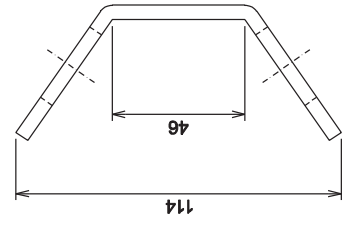
Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005	TITLE REVISED REVISIONS No. BY DATE	
	B.K.: 18 JUN 07 BY DATE	Alberta INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM RAIL SECTION 3 SHEET 7 of 9

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-7
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STEEL PLATE, A306
320 mm x 150 mm x 5 mm



NOTE:

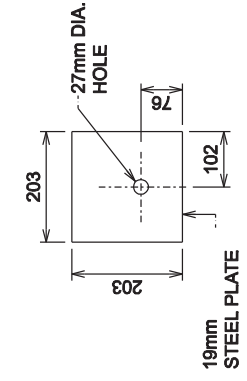
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES
 UNLESS OTHERWISE NOTED.

NO.	TITLE REVISED	REVISIONS	BY	DATE
1			B.K.	10 JUN 07

Approved:
 Original signed by
 Allan Kwan
 Executive Director,
 Technical Standards Branch
 Date: JUNE 24, 2005
 Effective Date: JULY 12, 2005

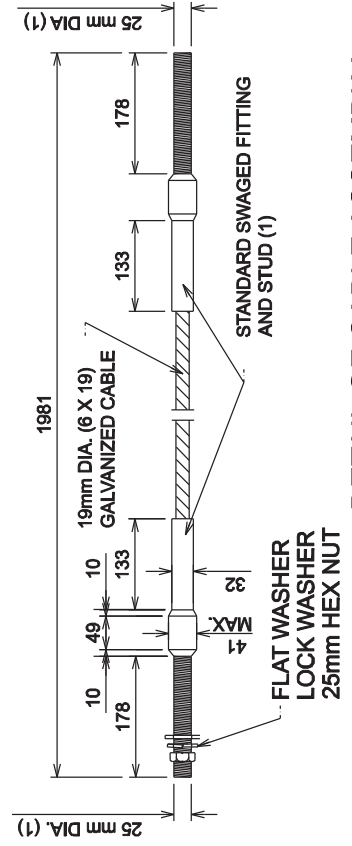
BULLNOSE GUARDRAIL SYSTEM
PLATES AND CABLE ASSEMBLY
SHEET 8 of 9

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.00-8
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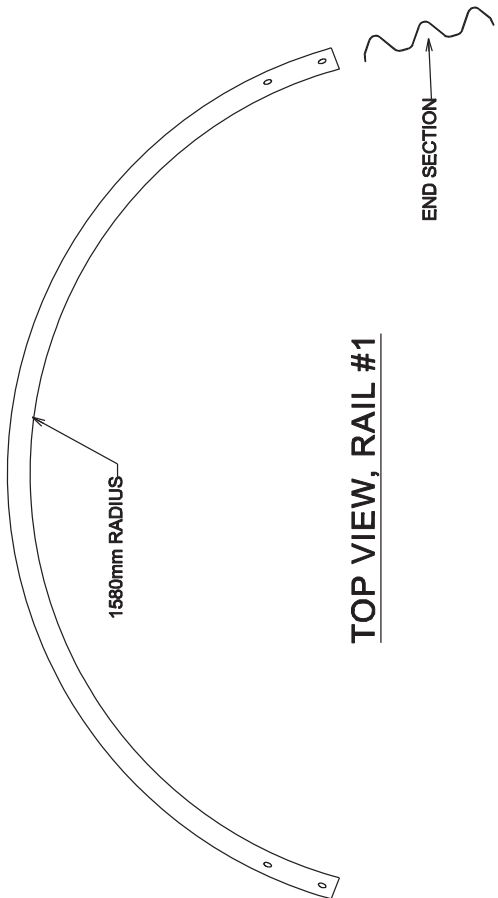


DETAIL OF
STEEL BEARING PLATE

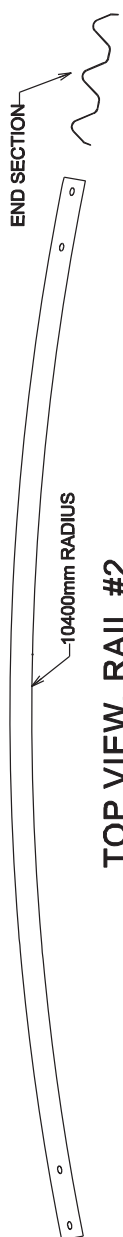
(1) STUD, THREADED ENTIRE LENGTH.



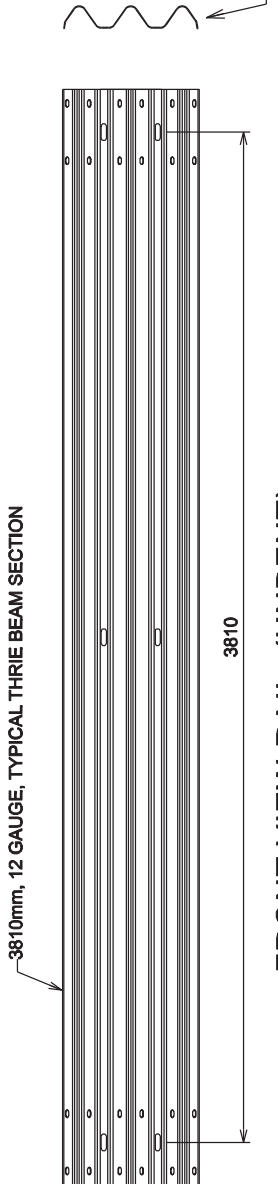
DETAIL OF CABLE ASSEMBLY



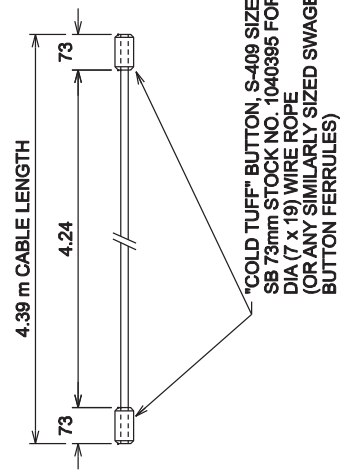
TOP VIEW, RAIL #1



TOP VIEW, RAIL #2



FRONT VIEW RAIL (UNBENT)



"COLD TUFF" BUTTON, S-409 SIZE NO. 12
 SB, 73mm STOCK NO. 1040395 FOR 15.9mm
 DIA (7 x 19) WIRE ROPE
 (OR ANY SIMILARLY SIZED SWAGE-GRIP
 BUTTON FERRULES)

NOTE:
 ALL DIMENSIONS SHOWN ARE IN MILLIMETRES
 UNLESS OTHERWISE NOTED.

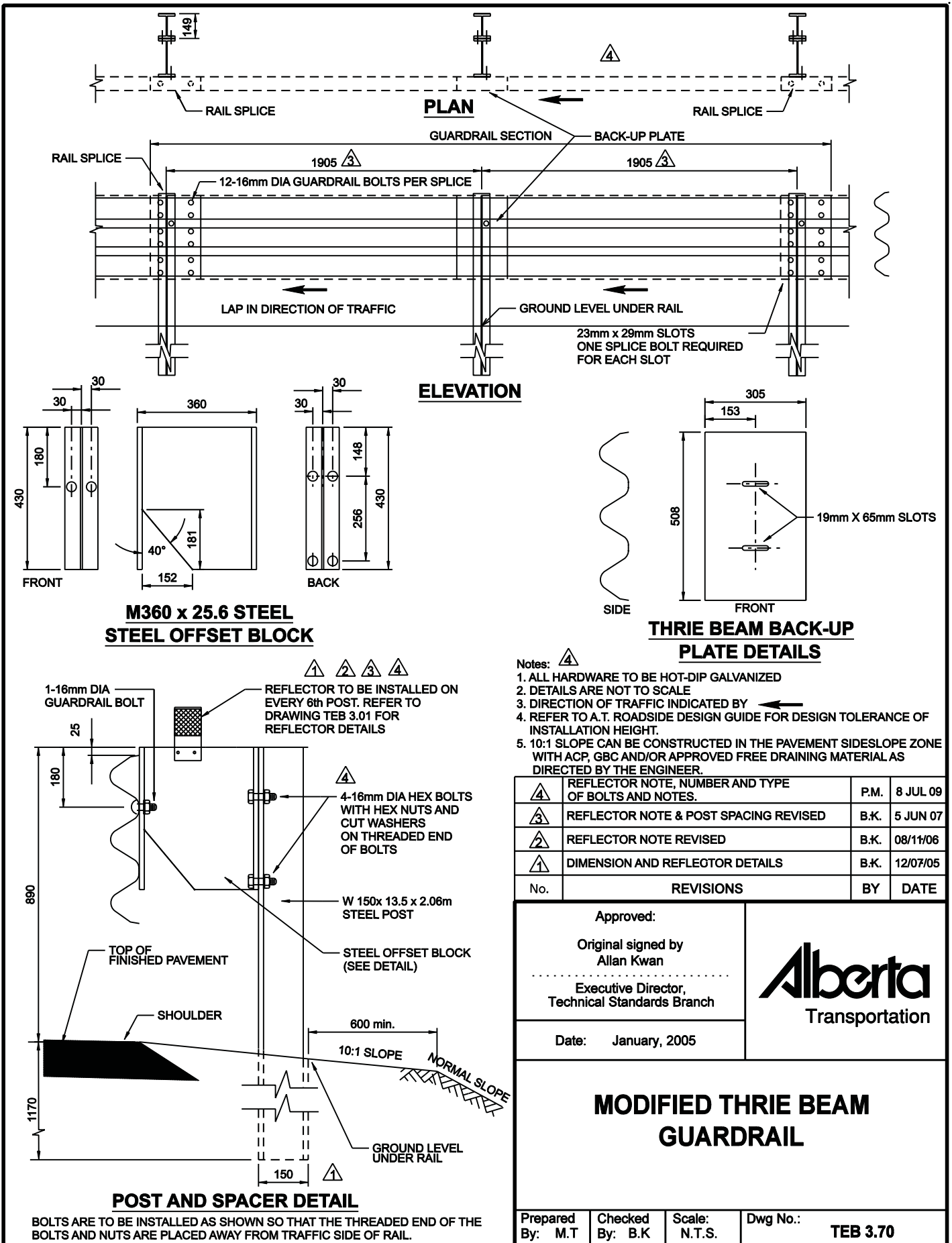
No.	TITLE REVISED	B.K.	18 JUN 07
	REVISIONS	BY	DATE
Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch Date: JUNE 24, 2005 Effective Date: JULY 12, 2005			

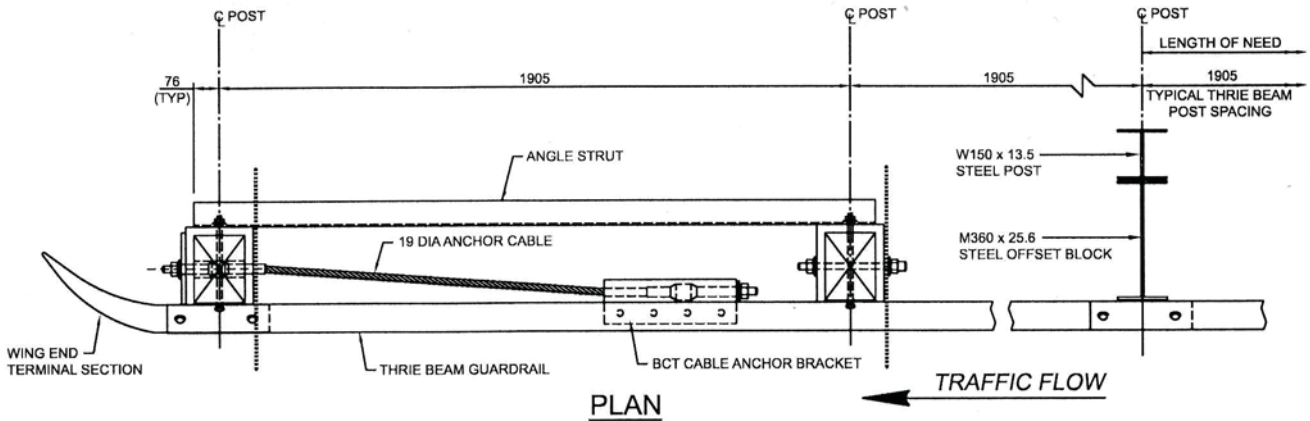


**BULLNOSE GUARDRAIL SYSTEM
 THRIE BEAM AND CABLE LENGTH
 SHEET 9 of 9**

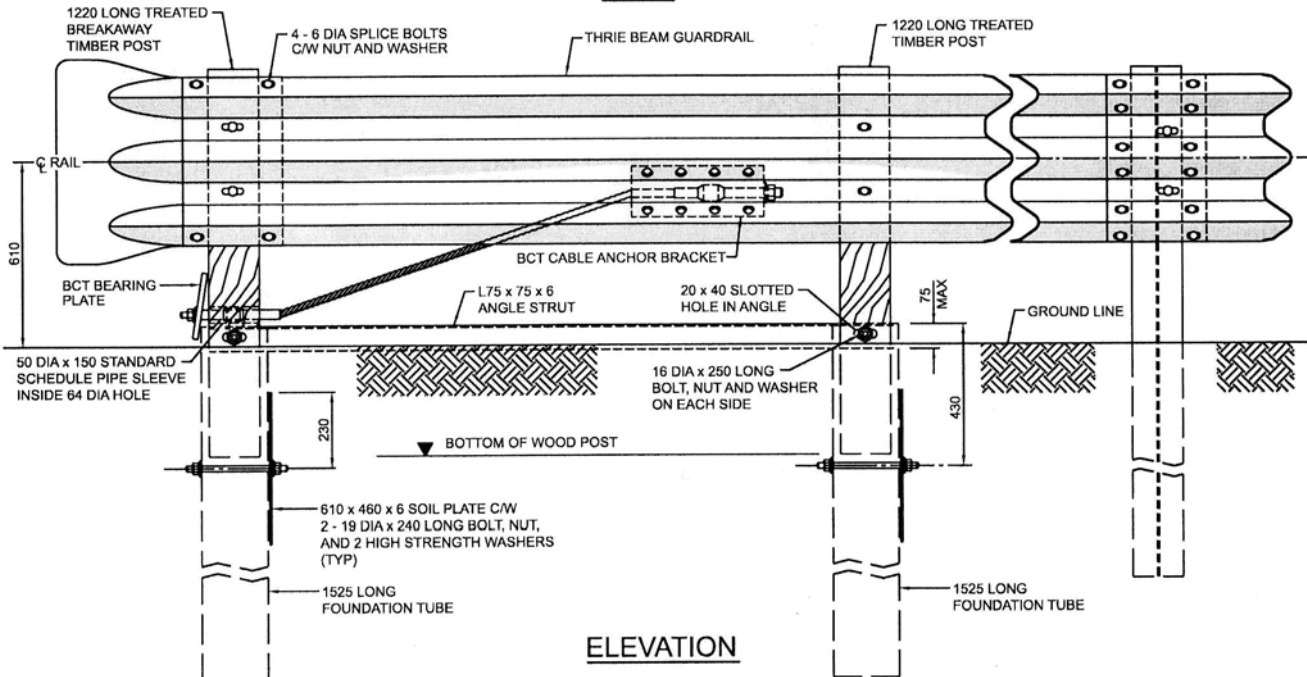
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-9
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PLAN

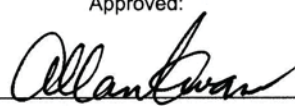



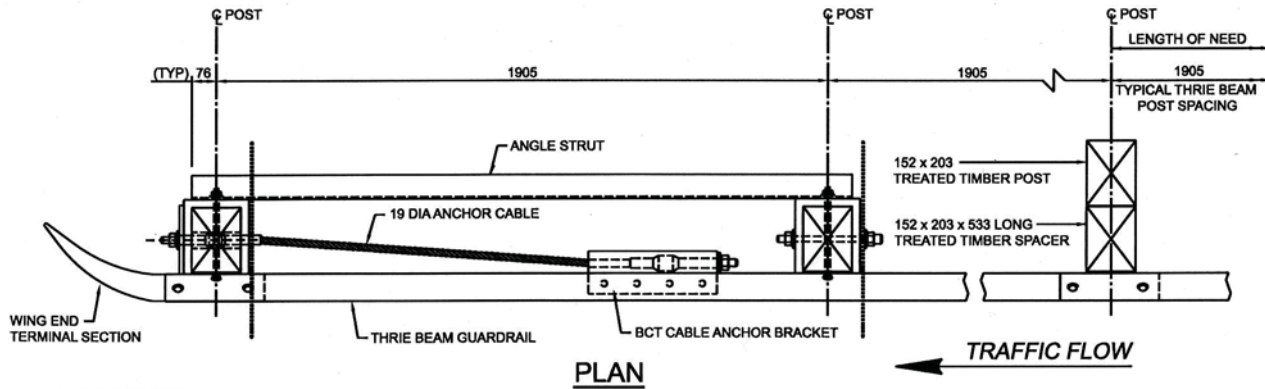
ELEVATION

NOTES:

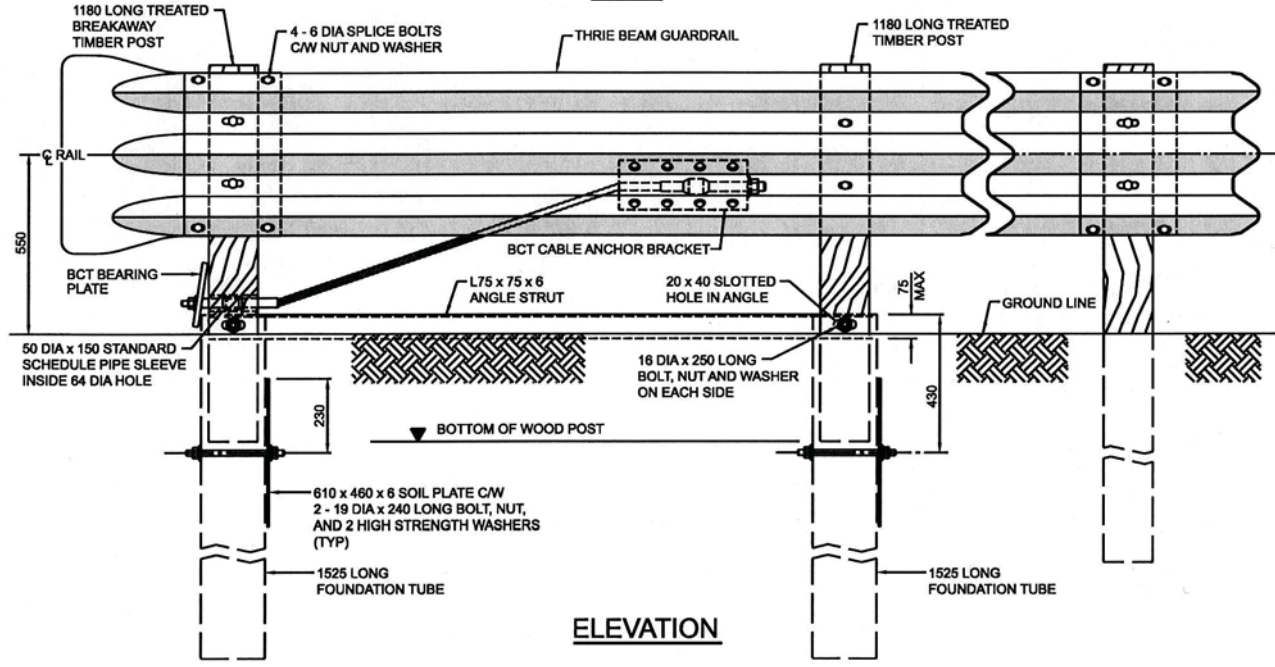
1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RDG-B5.3 AND RDG-B5.4 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

⚠				
⚠				
No.	REVISIONS	BY	DATE	
Approved:  Executive Director, Technical Standards Branch				
Date: NOVEMBER, 2007				
MODIFIED THRIE BEAM CABLE ANCHOR TERMINAL WITH WING END (EXIT END TREATMENT FOR DIVIDED HIGHWAYS)				
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.1	



PLAN



ELEVATION

NOTES:

1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RDG-B1.2 AND RDG-B1.3 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS		BY	DATE

Approved:

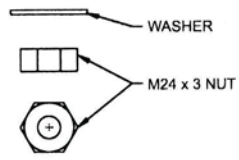
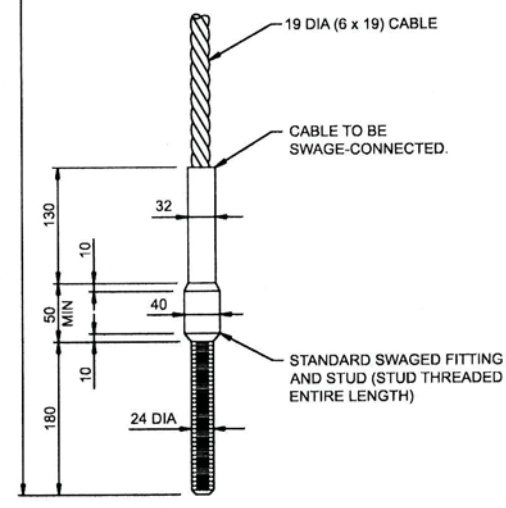
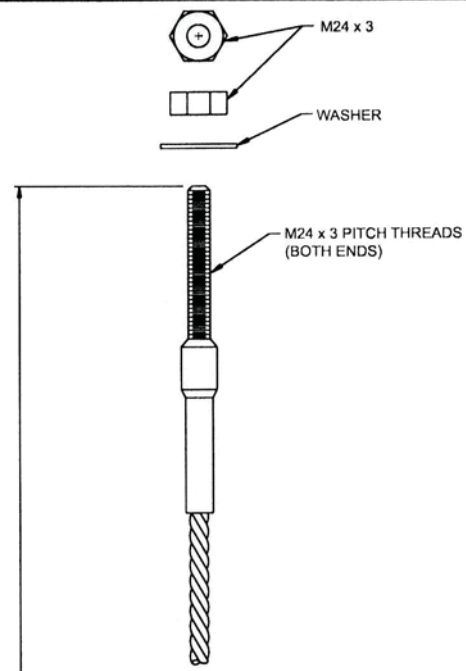
Allan Kwan
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

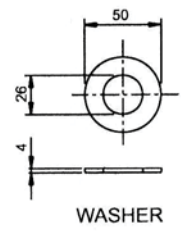
Alberta
 INFRASTRUCTURE AND
 TRANSPORTATION

STANDARD THRIE BEAM CABLE
 ANCHOR TERMINAL WITH WING END
 (EXIT END TREATMENT
 FOR DIVIDED HIGHWAYS)

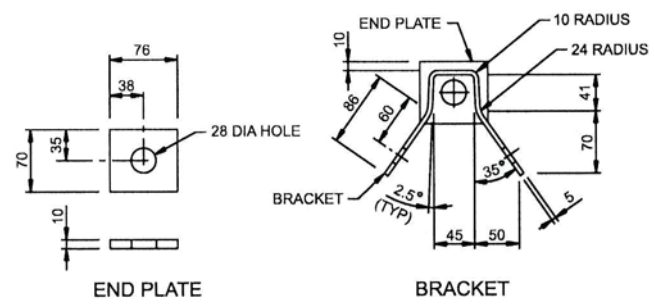
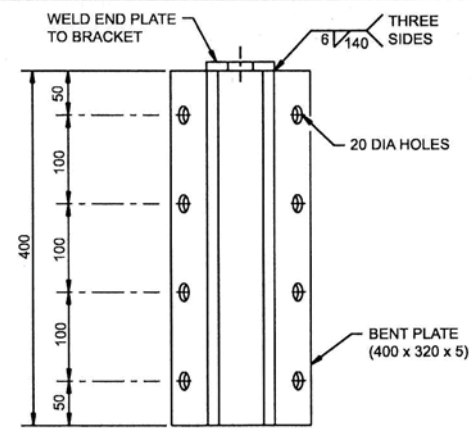
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.2
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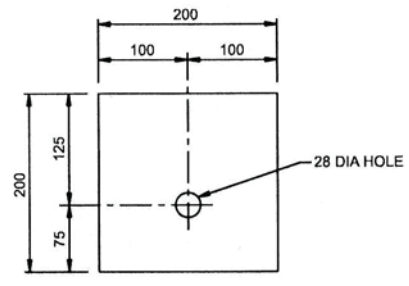
BCT CABLE ANCHOR ASSEMBLY



ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



BCT CABLE ANCHOR BRACKET



200 x 200 x 16 BCT BEARING PLATE

△			
△			
No.	REVISIONS	BY	DATE

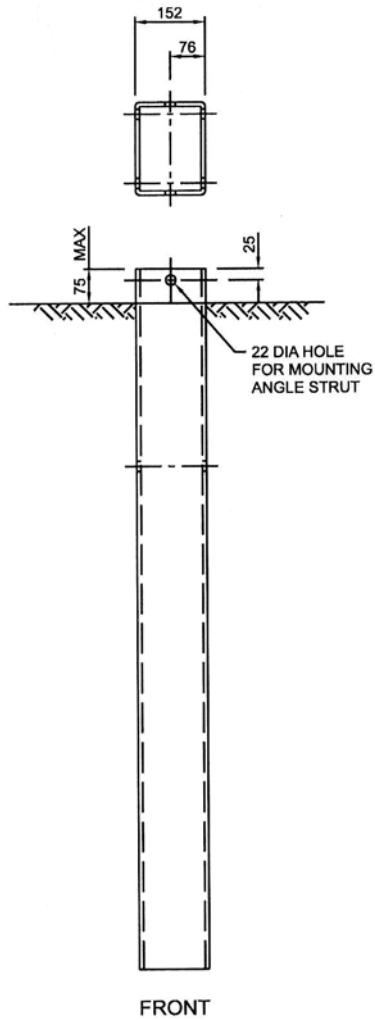
Approved:
Allan Swan
Executive Director,
Technical Standards Branch



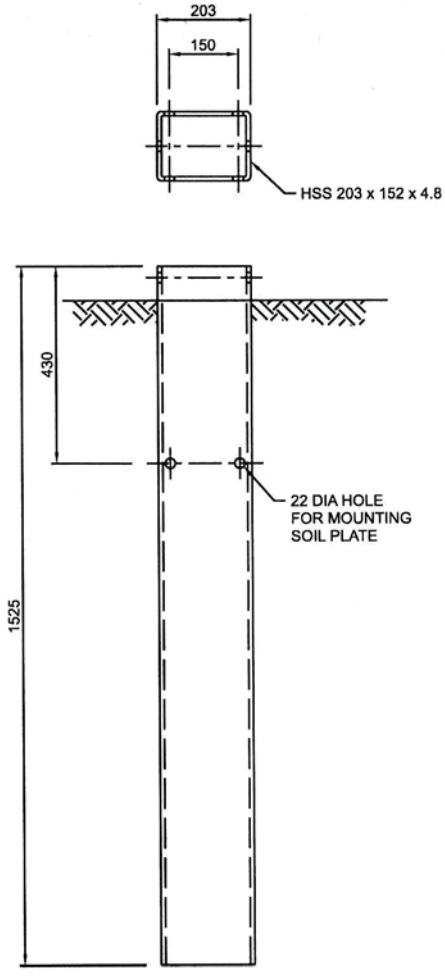
Date: NOVEMBER, 2007

**HARDWARE DETAILS
FOR W-BEAM AND
THRIE BEAM GUARDRAIL
CABLE ANCHOR TERMINAL**

Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B5.3
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FRONT

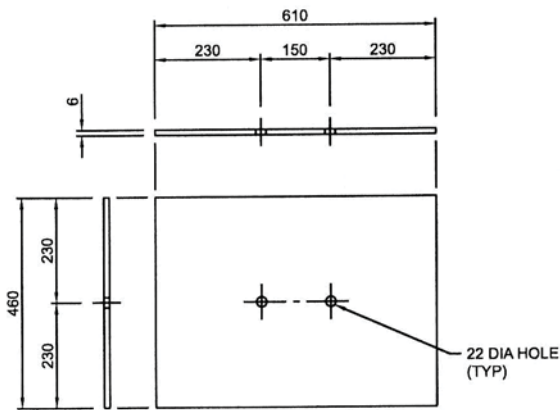


SIDE

FOUNDATION TUBE

NOTE:

WOOD POST SHOULD BE ABLE TO SLIDE INTO THE TOP OF FOUNDATION TUBE SO THE ACTUAL INSIDE DIMENSIONS OF FOUNDATION TUBE CAN NOT BE LESS THAN 190x140.



FOUNDATION TUBE SOIL PLATE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

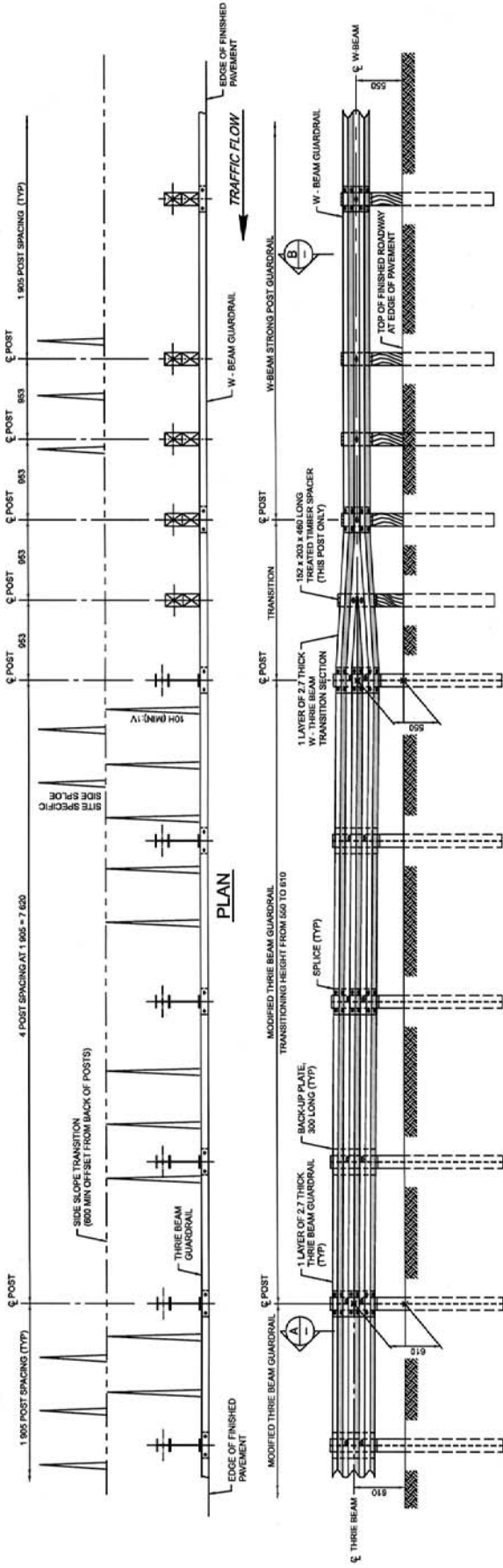
△			
△			
No.	REVISIONS	BY	DATE

<p>Approved:</p> <p><i>Allan Kwan</i></p> <p>Executive Director, Technical Standards Branch</p>	
<p>Date: NOVEMBER, 2007</p>	

FOUNDATION TUBE AND FOUNDATION TUBE SOIL PLATE DETAILS FOR W-BEAM AND THRIE BEAM CABLE ANCHOR TERMINAL

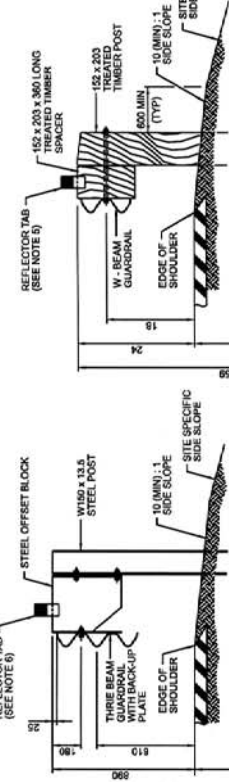
Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B5.4
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- NOTES:**
1. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
 2. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT EDITIONS OF THE CANADIAN ROAD DESIGN HANDBOOK.
 3. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
 4. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
 5. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM TOP OF EVERY SIXTH GUARDRAIL STRONG POST BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED.
 6. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM TOP OF EVERY SIXTH GUARDRAIL STRONG POST BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED.
 7. THIS DESIGN MAY BE CONSIDERED TO MEET INCRHP REPORT 360 TL-3 EVALUATION CRITERIA.

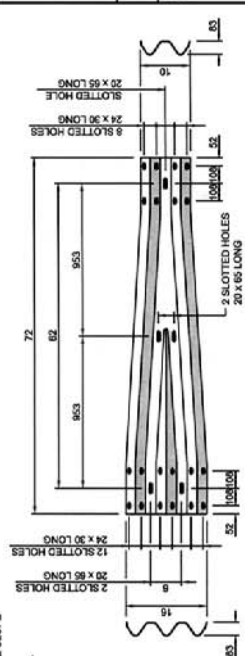
POST DETAILS



SECTION A
(FOR DETAILS SEE T&E DRAWING 3.70)



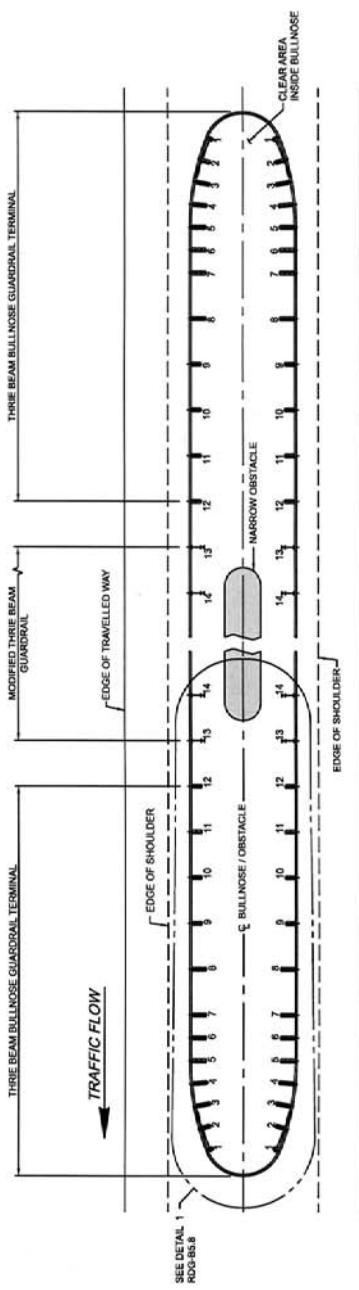
SECTION B
(FOR DETAILS SEE T&E DRAWING 3.09)



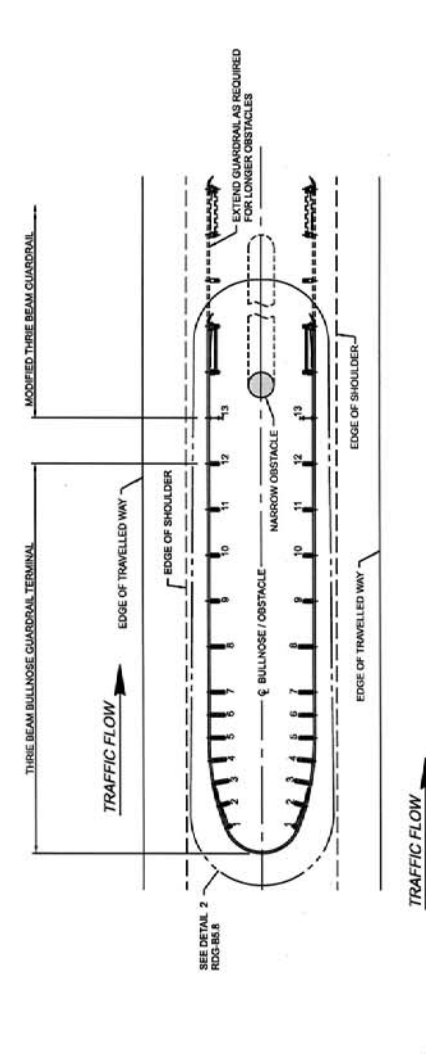
W - THIRIE BEAM TRANSITION SECTION

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

REVISIONS	BY	DATE
No.		
Approved: <i>Allan Khan</i> Executive Director, Technical Standards Branch		
Date: NOVEMBER, 2007		
TL-3 TRANSITION FROM MODIFIED THIRIE-BEAM GUARDRAIL TO W-BEAM STRONG POST GUARDRAIL		
Prepared By: MO	Checked By: WS	Scale: N.T.S.
Dwg No.: RDG-B5.5		



LAYOUT A - NARROW OBSTACLE - BIDIRECTIONAL TRAFFIC



LAYOUT B - NARROW OBSTACLE - UNIDIRECTIONAL TRAFFIC

- NOTES:**
1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
 2. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
 3. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
 4. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
 5. FLARE RATE SHALL BE SPECIFIED WITHIN THE LIMITS SET BY THE MANUFACTURER OF THE CHOSEN CRASH WORTHY END TERMINAL TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3).
 6. THE BULLNOSE GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.

No.	REVISIONS	BY	DATE
△			
△			

Approved: *Alta Khan*
 Executive Director,
 Technical Standards Branch

Date: NOVEMBER, 2007



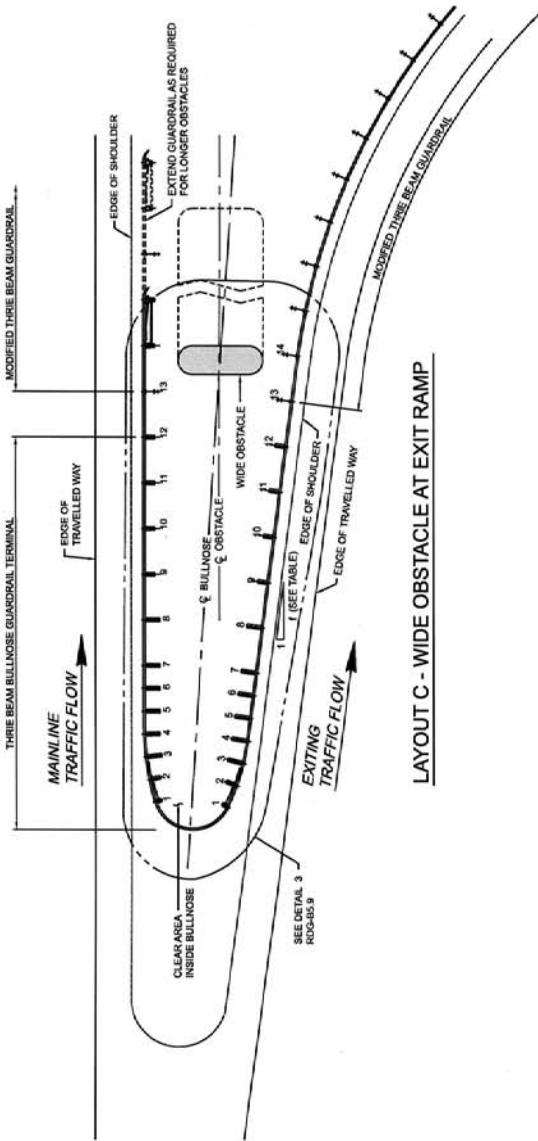
THREE BEAM BULLNOSE
 GUARDRAIL
 GENERAL LAYOUTS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.6
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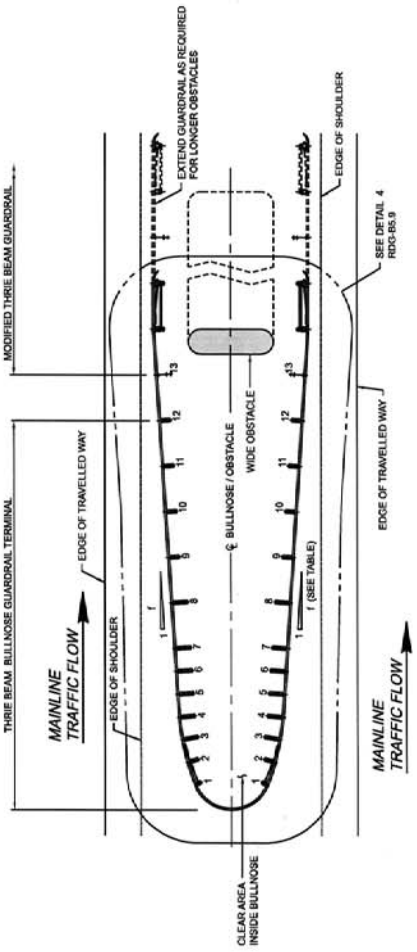
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

NOTES:

- LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
- THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
- ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
- FLARE RATE SHALL BE SPECIFIED WITHIN THE LIMITS SET BY THE MANUFACTURER OF THE GUARDRAIL AND TERMINAL TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3).
- THE BULLNOSE GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
- FLARE RATES SHOWN ARE RELATIVE TO OBSTACLE CENTRELINE WHICH IS ALIGNED PARALLEL TO MAINLINE TRAFFIC FLOW. FLARING OF GUARDRAIL BEGINS AT POST 5.



LAYOUT C - WIDE OBSTACLE AT EXIT RAMP



LAYOUT D - WIDE OBSTACLE - UNIDIRECTIONAL TRAFFIC

DESIGN SPEED (km/h)	FLARE RATE
130	15:1
120	16:1
110	15:1
100	14:1
90	12:1
80	11:1
70	10:1
60	8:1
50	7:1

FLARE RATES ADOPTED FROM ASHTO 2008 NCHRP DESIGN GUIDE

No.	REVISIONS	BY	DATE

Approved:

Alta Loran
Executive Director,
Technical Standards Branch

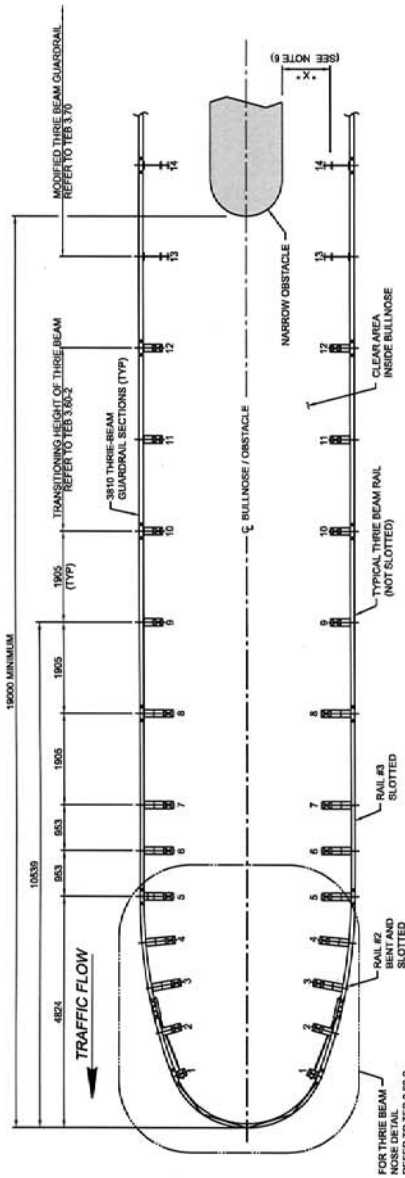
Date: NOVEMBER, 2007



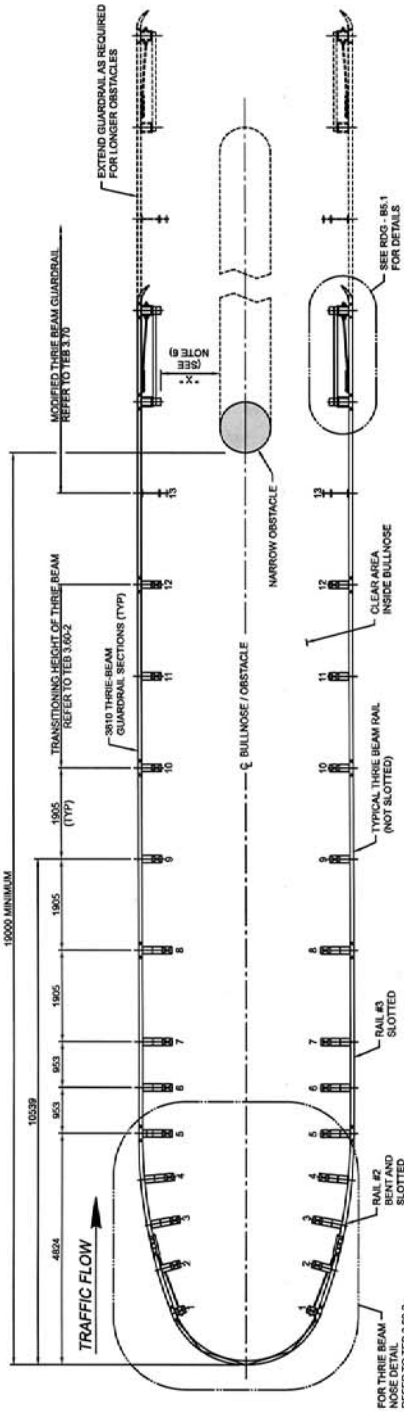
THREE BEAM BULLNOSE
GUARDRAIL
GENERAL LAYOUTS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.7
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



DETAIL 1 - NARROW OBSTACLE - BIDIRECTIONAL TRAFFIC



DETAIL 2 - NARROW OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. HORIZONTAL DISTANCE BETWEEN CROSSWISE POSTS ARE MEASURED PERPENDICULAR FROM THE CENTRELINE OF BULLNOSE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION SHALL BE AS PER TEB 3.60-2.
5. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. OFFSET DISTANCE "X" MEASURED FROM BACK FACE OF THREE BEAM GUARDRAIL POST TO FACE OF OBSTACLE SHALL NOT BE LESS THAN 760 HOWEVER 1000 IS PREFERRED.
7. THIS GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.

No.	REVISIONS	BY	DATE

Approved: *Allan Lewis*
Executive Director
Technical Standards Branch

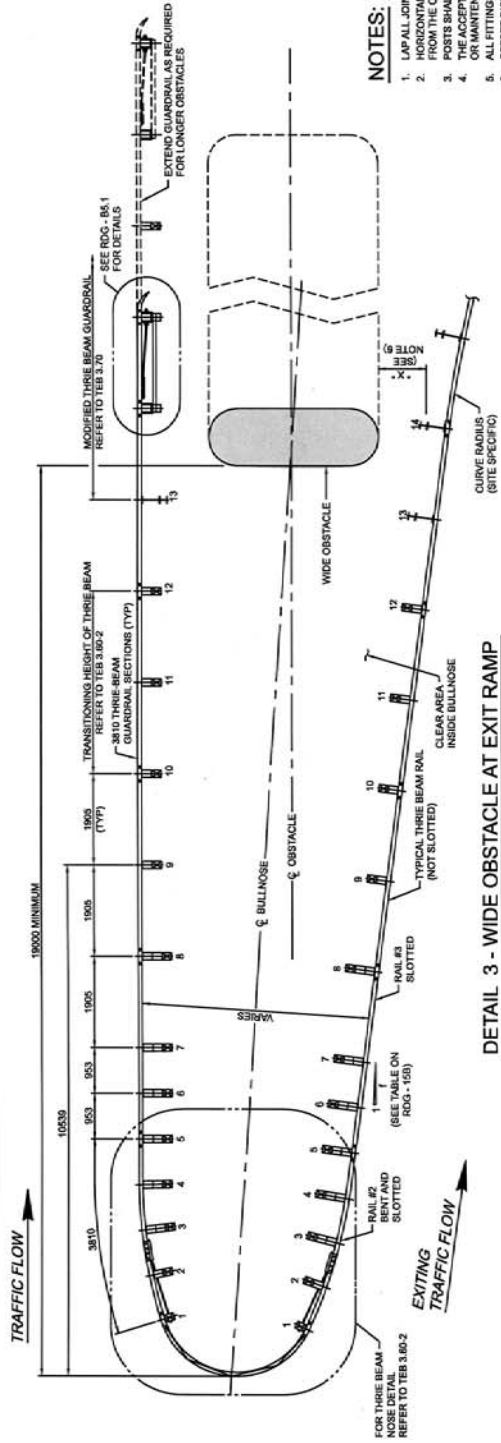
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

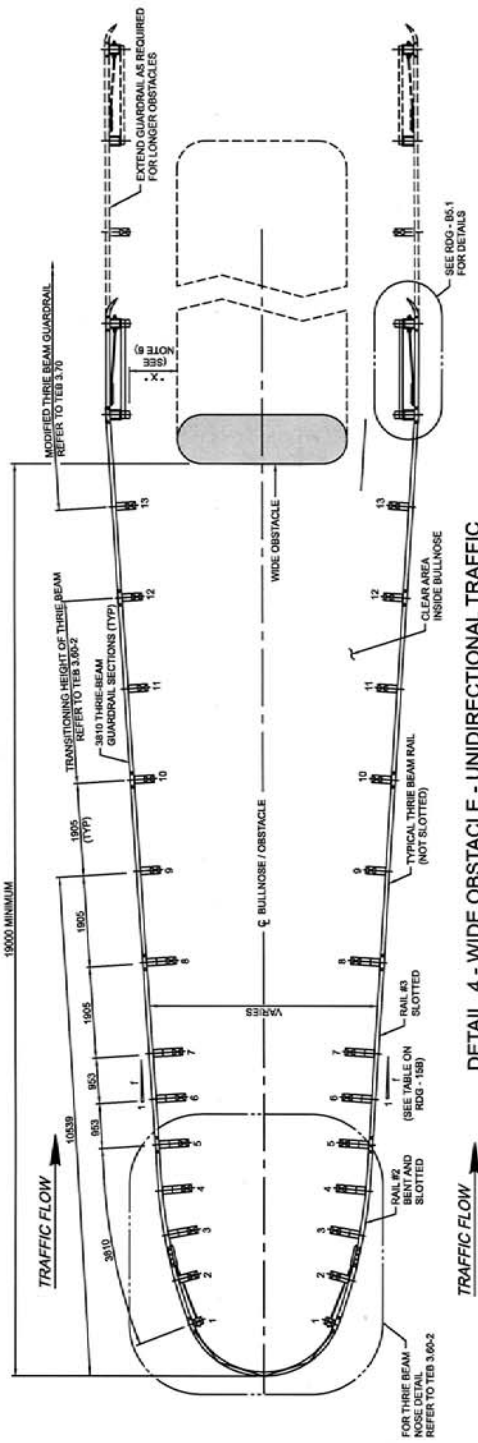
**THREE BEAM BULLNOSE
GUARDRAIL
DETAILED PLANS**

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.8
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



DETAIL 3 - WIDE OBSTACLE AT EXIT RAMP



DETAIL 4 - WIDE OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. HORIZONTAL DISTANCE BETWEEN CROSSWISE POSTS ARE MEASURED PERPENDICULAR FROM THE CENTRELINE OF BULLNOSE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
5. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. THE BEAM GUARDRAIL SHALL NOT BE LESS THAN 760 HOWEVER 1000 IS PREFERRED.
7. THIS GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
8. DOWN SLOPE RELATIVE TO OBSTACLE CENTRELINE WHICH IS ALIGNED PARALLEL TO MAJOR TRAFFIC FLOW PLANNING OF GUARDRAIL BEGINS AT POST 1.

No.	REVISIONS	BY	DATE

Approved: *Alexander*
Executive Director,
Technical Standards Branch

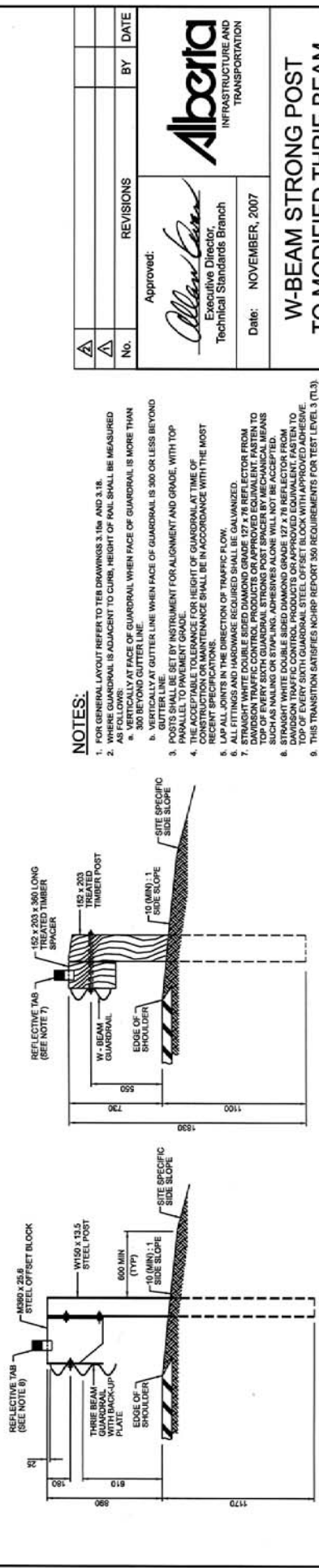
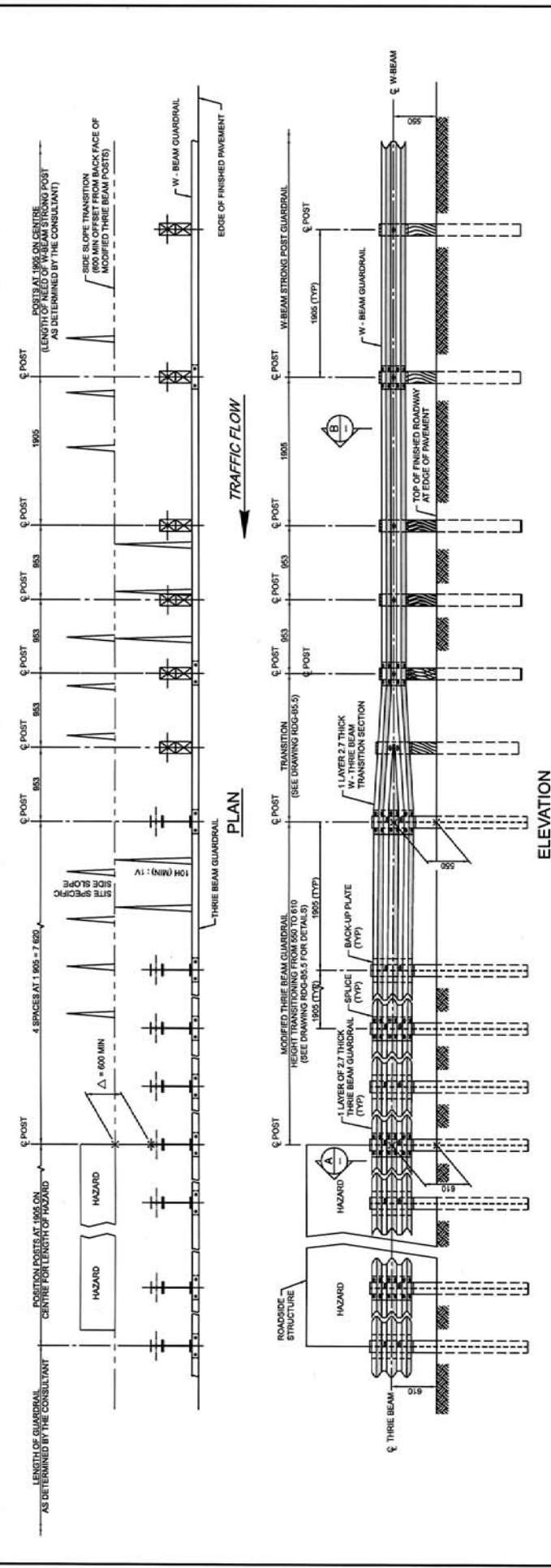
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

THREE BEAM BULLNOSE
GUARDRAIL
DETAILED PLANS

Prepared By: MO
Checked By: WS
Scale: N.T.S.
Dwg No.: RDG-B5.9

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



NOTES:

- FOR GENERAL LAYOUT REFER TO T&E DRAWINGS 3.106 AND 3.18.
- WHEN GUARDRAIL IS ADJACENT TO CURB, HEIGHT OF POLE SHALL BE MEASURED VERTICALLY AT FACE OF GUARDRAIL WHEN FACE OF GUARDRAIL IS MORE THAN 300 BEYOND GUTTER LINE.
- VERTICALLY AT GUTTER LINE WHEN FACE OF GUARDRAIL IS 300 OR LESS BEYOND PARALLEL TO PAVEMENT GRADE.
- THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
- LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
- ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
- STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM TOP OF GUARDRAIL SHALL BE SPACED AT 1500 MM ON CENTER TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST SPACER BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED.
- STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM TOP OF GUARDRAIL SHALL BE SPACED AT 1500 MM ON CENTER TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE.
- THIS TRANSITION SATISFIES NCHRP REPORT 350 REQUIREMENTS FOR TEST LEVEL 3 (T.3).

No.	REVISIONS	BY	DATE

Approved: *Allan Khan*
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

W-BEAM STRONG POST TO MODIFIED THRIE BEAM GUARDRAIL TRANSITION AT ROADSIDE STRUCTURE

Prepared By: MO Checked By: WS Scale: N.T.S. Dwg No.: RDG-B5.10

APPENDIX B5

H-APP-B5-28

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

POST DETAILS

SECTION A (FOR DETAILS SEE T&E DRAWING 3.70)

SECTION B (FOR DETAILS SEE T&E DRAWING 3.09)

APPENDIX B6

CAST-IN-PLACE OR EXTRUDED F-SHAPE CONCRETE BARRIER AND SINGLE SLOPE CONCRETE BARRIER

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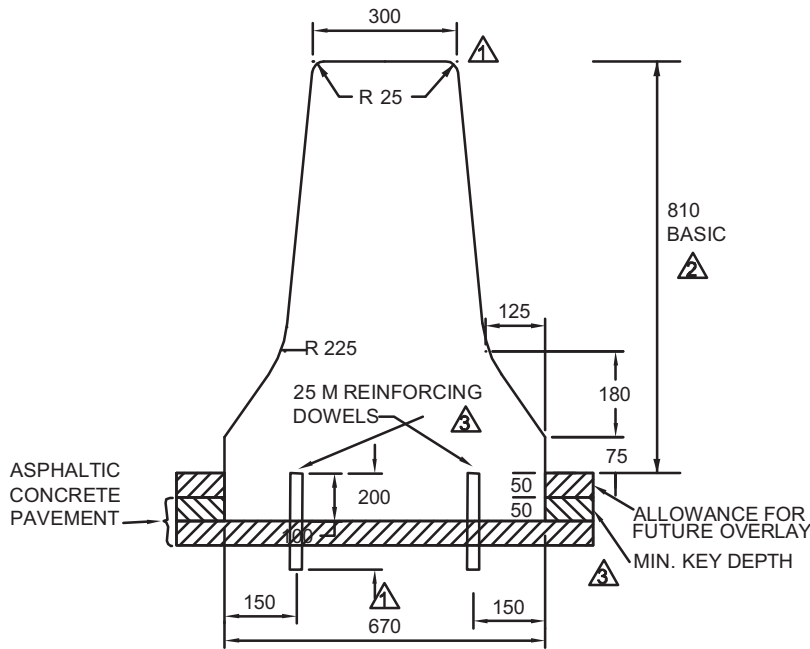
Appendix B6

Cast-In Place Or Extruded F-Shape Concrete Barrier and Single Slope Concrete Barrier

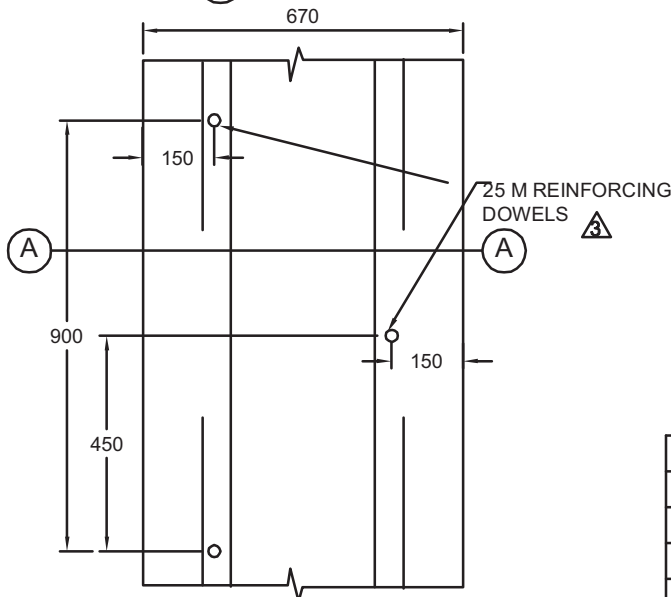
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CB6-4.3M3A	Slip-formed Concrete Barrier Half F-Shape	H-APP-B6-2
4.3 M4	Transition End Section for Reinforced Concrete Median Barrier Curb F-Shape	H-APP-B6-3
4.3 M5	Isometric View of Transition End Section for Reinforced Concrete Median Barrier Curb	H-APP-B6-4
RDG-B6.1	TL-4 Standard Single Slope Concrete Barrier Details	H-APP-B6-5
RDG-B6.3	TL-4 Single Slope Concrete Median Barrier Transition Around Existing/New Bridge Pier – Sheet 1 of 2	H-APP-B6-7
RDG-B6.4	TL-4 Single Slope Concrete Median Barrier Transition Around Existing Bridge Pier – Sheet 2 of 2	H-APP-B6-8
RDG-B6.5	TL-4 Single Slope Concrete Median Barrier Transition Around New Bridge Pier – Sheet 1 of 3	H-APP-B6-9
RDG-B6.6	TL-4 Single Slope Concrete Median Barrier Transition Around New Bridge Pier – Sheet 2 of 3	H-APP-B6-10
RDG-B6.7	TL-4 Single Slope Concrete Median Barrier Transition Around Existing/New Bridge Pier – Sheet 3 of 3	H-APP-B6-11
RDG-B6.8	TL-2 and TL-3 Concrete Median Barrier Termination TRACC Crash Cushion System (Bidirectional)	H-APP-B6-12
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RDG-B6.11	Quadguard and TRACC Crash Cushion Systems Concrete Pad Foundation	H-APP-B6-15
RDG-B6.12	Transition of TL-4 Single Slope Concrete Barrier to W-Beam Median Guardrail – Sheet 1 of 2	H-APP-B6-16
RDG-B6.13	Transition of TL-4 Single Slope Concrete Barrier to W-Beam Median Guardrail – Sheet 2 of 2	H-APP-B6-17
RDG-B6.14	TL-4 Single Slope Concrete Barrier Transition to PL-2 Standard Bridge Concrete Barrier	H-APP-B6-18
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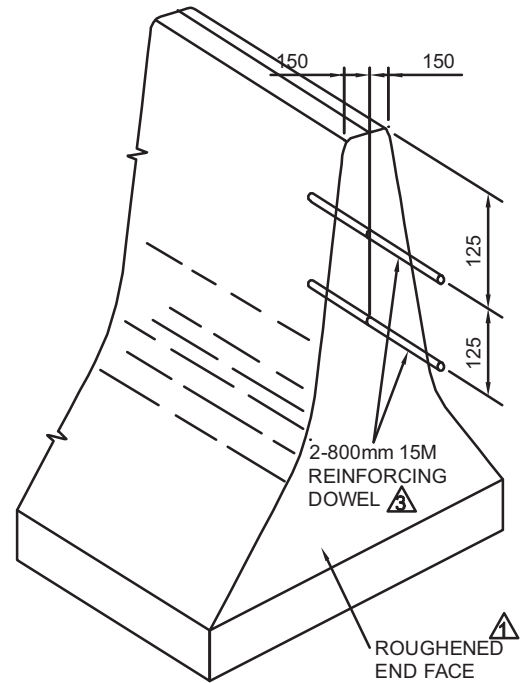
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(A) SECTION



PLAN VIEW



CONSTRUCTION JOINT DETAIL

GENERAL NOTES

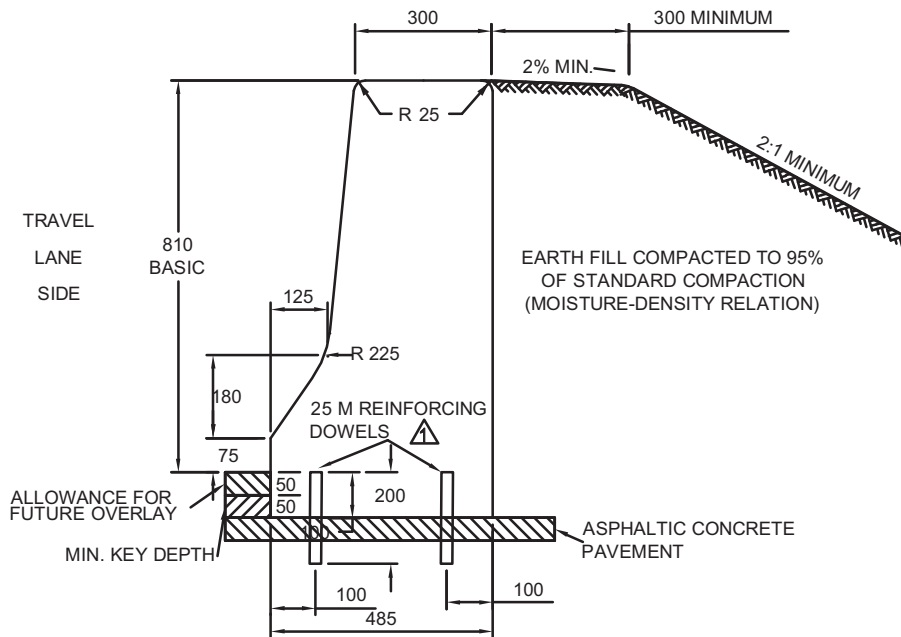
1. All concrete shall meet the requirements of the Specifications for Bridge Construction Section 4 Modified, Class C, except that slump shall be $\pm 1^* \text{mm}$ and minimum cement content shall be 335 kg/m^3 .
2. All reinforcement dowels shall be epoxy coated.
3. All exposed concrete shall be finished to a smooth, uniform and closed texture.
4. Exposed surfaces shall have an approved sealer applied in accordance with manufacturer's recommendations.
5. No longitudinal reinforcement required.
6. Tooled or saw cut all around every 3m (min. 50mm deep x 3-6mm wide).
7. No joint sealer required.

No.	REVISIONS	BY	DATE
1	REVISIONS TO NOTES 1 AND 3	BK	16/06/05
2	BASE DETAILS AND NOTES	BK	08/04
3	HEIGHT DIMENSION	BK	12/03
4	TOP WIDTH AND JOINT SPACING	BK	10/03

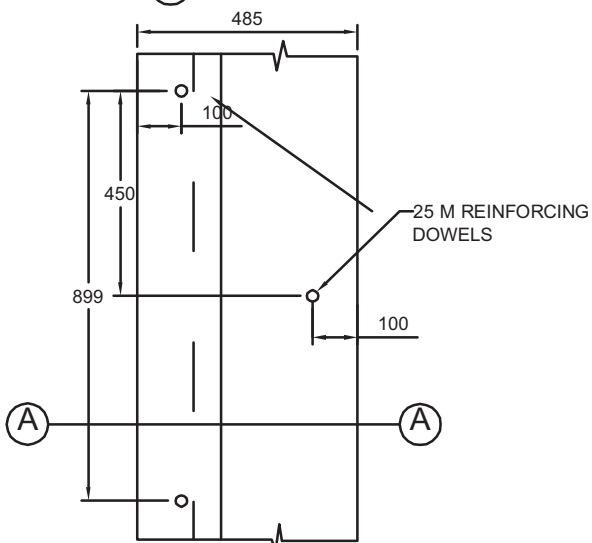
Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch	
Date: APRIL, 1986	

**SLIP-FORMED MEDIAN BARRIER
F-SHAPE**

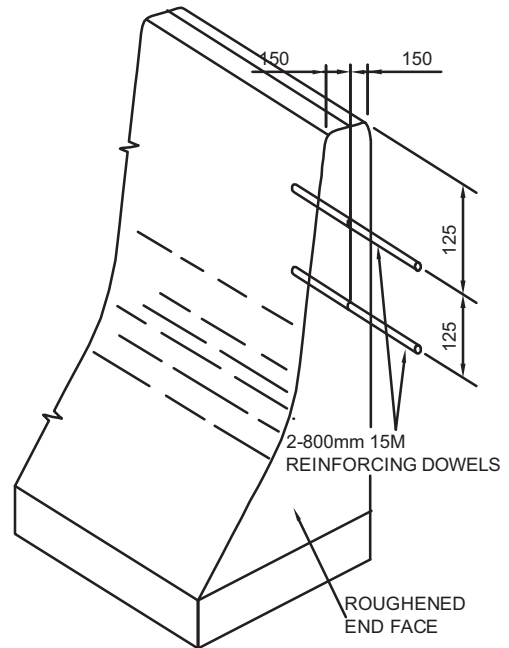
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M3
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(A) SECTION



PLAN VIEW



CONSTRUCTION JOINT DETAIL

All dimensions in millimetres unless otherwise noted.

GENERAL NOTES

1. All concrete shall meet the requirements of the Specifications for Bridge Construction Section 4, Modified Class C, except that slump shall be 20± 10mm and minimum cement content shall be 335 kg/m³.
2. All reinforcement dowels shall be epoxy coated.
3. All exposed concrete shall be finished to a smooth, uniform and closed texture.
4. Exposed surfaces shall have an approved sealer applied in accordance with manufacturer's recommendations.
5. Half F barrier is for use with earth fill as shown.
6. No longitudinal reinforcement required.
7. Tooled or saw cut all around every 3m (min. 50mm deep x 3-6mm wide).
8. No joint sealer required.
9. Earth fill shall be suitable material as indicated under 2.3.2 of the Standard Specification for Highway Construction.

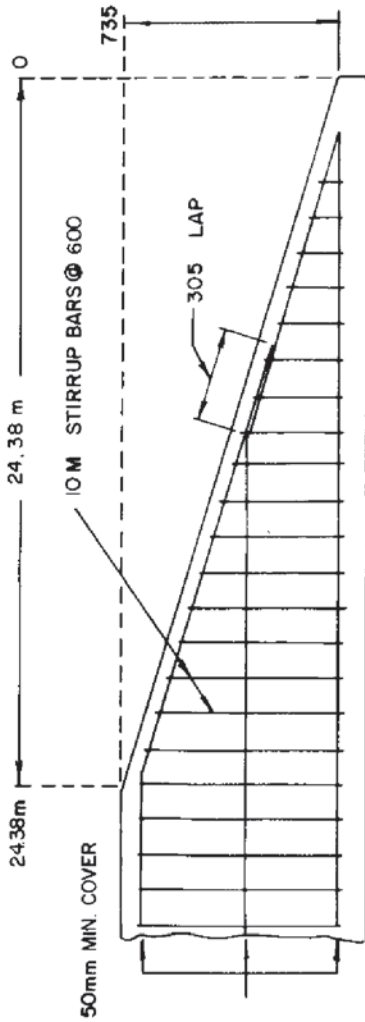
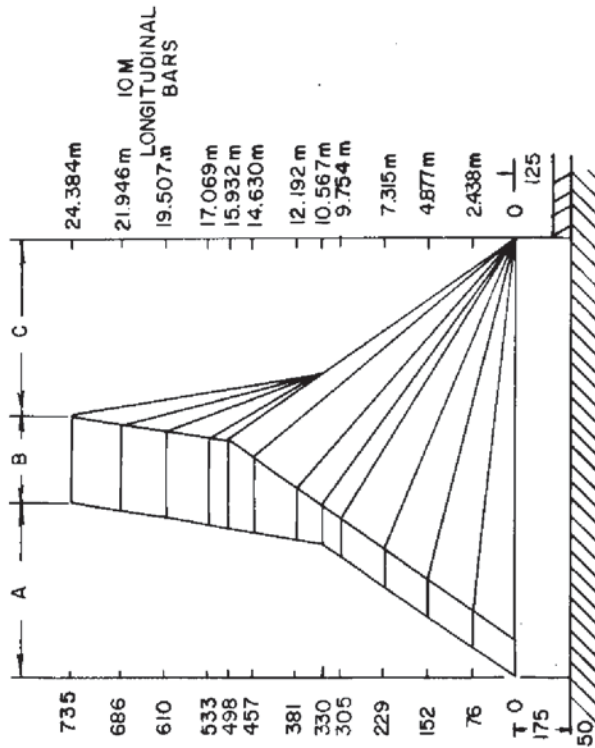
△			
△	REVISIONS TO NOTES 1 AND 3	BK	06/16/05
No.	REVISIONS	BY	DATE

Approved: Original signed by Allan Kwan Executive Director, Technical Standards Branch	
Date: SEPTEMBER, 2004	

**SLIP-FORMED CONCRETE BARRIER
HALF F-SHAPE**

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M3A
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JP WIDTH OF MEDIAN
 B-OFFSET FROM REFERENCE LINE ON
 SIDE OF TRAFFIC GOING AWAY.
 C-OFFSET FROM REFERENCE LINE ON
 SIDE OF APPROACHING TRAFFIC.



1. ALL CONCRETE SHALL BE 40MPa AT 28 DAYS.
2. ALL REINFORCEMENT SHALL BE EPOXY COATED REINFORCING BARS.
3. ALL EXPOSED CONCRETE SHALL HAVE A SMOOTH SURFACE.
4. EXPOSED SURFACES SHALL HAVE 20mm CHAMFER OR FILLET OR AS OTHERWISE SPECIFIED.
5. ALL SURFACES SHALL BE FORMED WITH OILED PLYWOOD OR STEEL FORMED FINISH.
6. ALL VOIDS ARE TO BE CAPPED AND WATERPROOFED.
7. EXPOSED SURFACES SHALL HAVE AN APPROVED SEALING SOLUTION APPLIED.

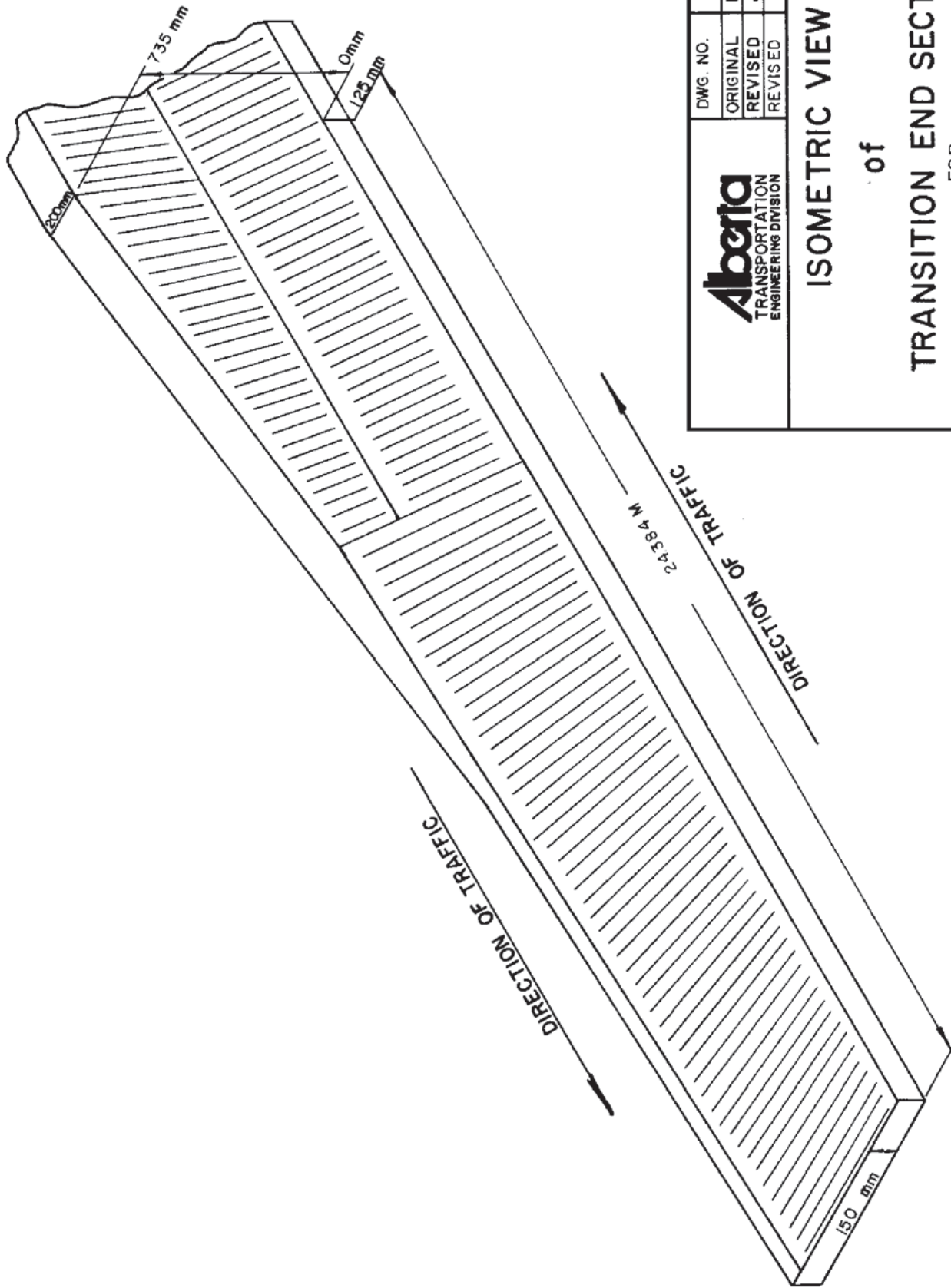
LENGTH FROM END	RISE	A	B	C
m	mm	mm	mm	mm
24.384	735	200	280	280
21.946	686	200	268	292
19.507	610	200	257	303
17.069	533	200	244	316
15.932	498	200	239	321
14.630	457	172	233	348
12.192	381	118	221	398
10.567	330	82	209	431
9.754	305	82	193	447
7.315	229	82	141	497
4.877	152	82	97	546
2.438	76	82	49	595
0	0	82	0	645

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.



CB-6	4.3 M4
PLAN NO.	DATE
WORK	MAY 1985
CHART REV.	JUNE 1986
	OCT. 1986

TRANSITION END SECTION
 FOR
 REINFORCED CONCRETE MEDIAN BARRIER CURB
F SHAPE



Alberta TRANSPORTATION ENGINEERING DIVISION	DWG. NO.	4.3 M 5
	ORIGINAL	NOV. 1977
	REVISED	JUNE 1983
	REVISED	OCT. 1986

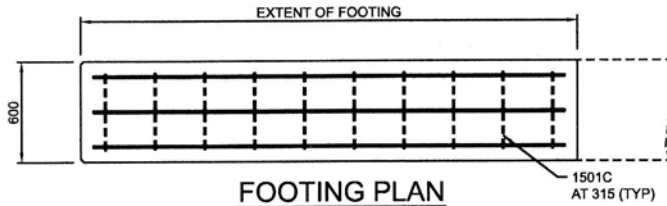
ISOMETRIC VIEW

of

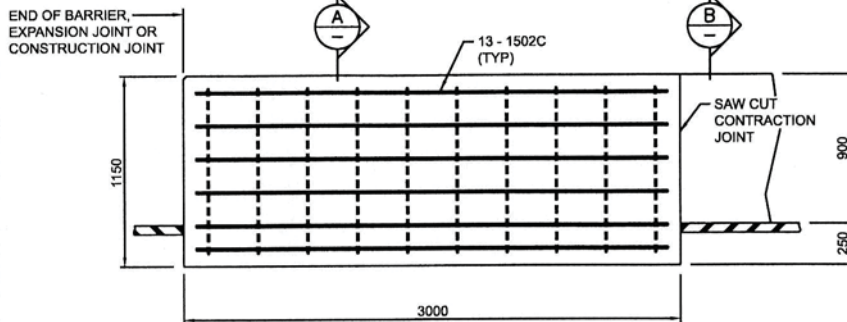
TRANSITION END SECTION

FOR

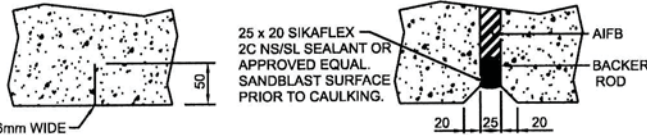
REINFORCED CONCRETE MEDIAN BARRIER CURB



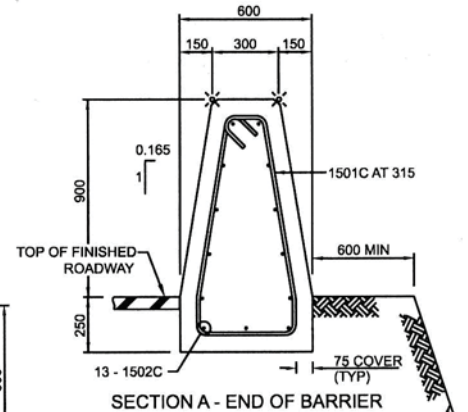
FOOTING PLAN



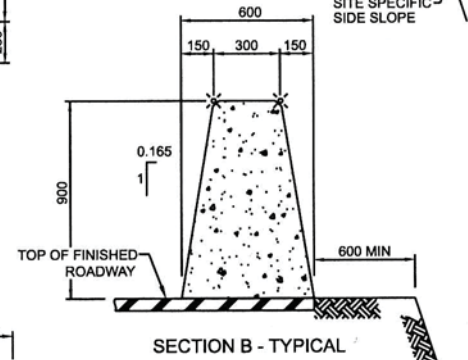
SECTION



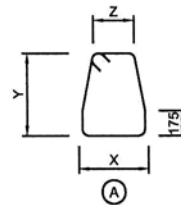
JOINT DETAILS



SECTION A - END OF BARRIER



**SECTION B - TYPICAL
BARRIER SECTIONS**



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1501C	15	10	A	450	1 000	125	2 840	45
1502C	15	13	STR	-	-	-	2 850	58

EPOXY COATED TOTAL kg = 103

NOTES:

- ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
- PROVIDE 20 mm CHAMFER AT TOP EDGES OF BARRIER AND AROUND ALL EXPOSED EDGES OF EXPANSION AND CONSTRUCTION JOINTS.
- CONCRETE SHALL BE MODIFIED CLASS C UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).
- BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
- BARRIER FOOTINGS SHALL BE PLACED ON EITHER SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS, AS WELL AS AT BARRIER ENDS.
- PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED.
- PLACEMENT OF FUTURE OVERLAYS ARE PERMITTED PROVIDED THAT THE HEIGHT OF BARRIER IS MAINTAINED AT LEAST 800 ABOVE FINISHED PAVEMENT.
- CONTRACTION JOINTS SHALL BE FORMED EVERY 3 METRES EXCEPT WHERE SHORTER SPACING IS NECESSARY FOR CLOSURES.
- BARRIER SHALL BE PLACED BY INSTRUMENT FOR ALIGNMENT AND GRADE.
- THIS BARRIER MEETS THE CRASH TEST REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE ACCEPTABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
- TERMINATING THE SINGLE SLOPE CONCRETE BARRIER WITH A BLUNT END, AS SHOWN IN THIS DRAWING, IS RESTRICTED TO THE FOLLOWING APPLICATIONS:
 - ON THE LEAVING END OF BARRIERS INSTALLED ON THE ROADSIDE.
 - ON THE APPROACH END OF BARRIERS INSTALLED ON THE ROADSIDE, PROVIDED THAT THE BARRIER IS TERMINATED AT OR BEYOND THE CLEAR ZONE.
 - ON THE LEAVING END OF BARRIERS INSTALLED IN THE MEDIAN, PROVIDED THAT THE BARRIER IS TERMINATED AT OR BEYOND THE CLEAR ZONE FOR THE FLOW OF TRAFFIC IN THE OPPOSING DIRECTION.
- WHEN THE CONDITIONS STATED IN NOTE 11 CANNOT BE MET, THE BLUNT END OF THE BARRIER SHALL BE SHIELDED USING AN APPROVED ENERGY ABSORBING END TERMINAL.
- TAPERED END TREATMENTS ARE NOT CONSIDERED TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 TL-3 AND SHOULD THEREFORE NOT BE USED WITHIN THE CLEAR ZONE.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

△			
△			
No.	REVISIONS	BY	DATE

Approved:

Allan Kwan
Executive Director,
Technical Standards Branch

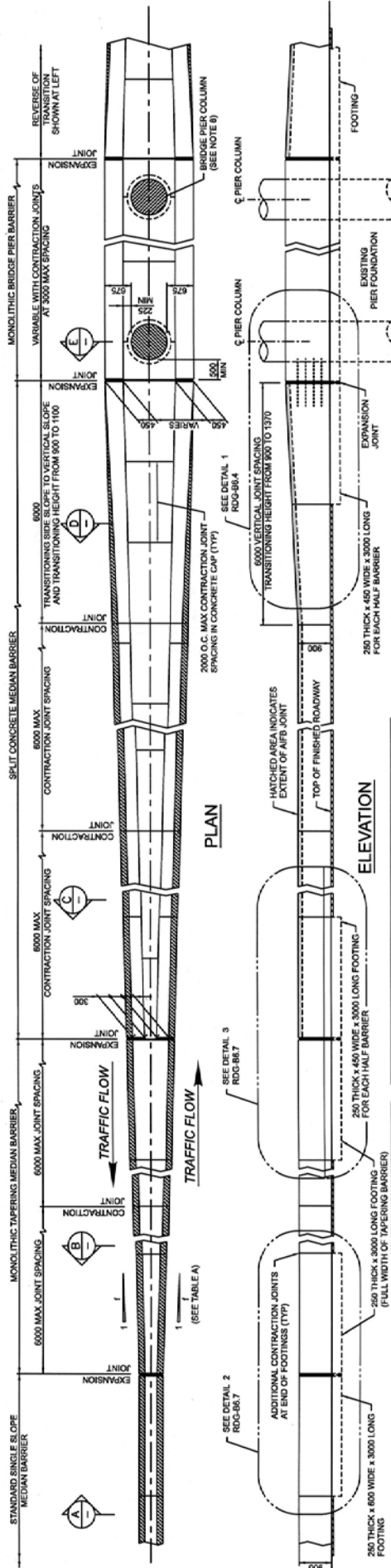
Alberta
INFRASTRUCTURE AND
TRANSPORTATION

Date: NOVEMBER, 2007

**TL-4 STANDARD
SINGLE SLOPE
CONCRETE BARRIER
DETAILS**

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.1
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NOTES:

1. ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
2. PROVIDE 20 CHAMFER AT TOP EDGES OF BARRIER AND AROUND ALL EXPOSED EDGES OF EXPANSION AND CONTRACTION JOINTS.
3. CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa), UNLESS OTHERWISE SPECIFIED.
4. BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
5. REFER TO RDG-864 AND RDG-87 FOR DETAILS ON GEOMETRY AND REINFORCING AT THESE LOCATIONS.
6. PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED. SHALL EXTEND TO BASE OF FOOTING.
7. EXPANSION JOINTS SHALL CONSIST OF A SINGLE LAYER OF 25 ASPHALT IMPREGNATED FIBREBOARD (AFB) APPLIED TO FULL CROSS SECTION OF BARRIER AND SHALL EXTEND TO BASE OF FOOTING.
8. ACTUAL SHAPE OF PIER COLUMNS MAY VARY AS PER SITE SPECIFIC DRAWINGS.
9. PROVIDE ADDITIONAL CONTRACTION JOINTS AS DETERMINED BY THE CONSULTANT TO ACCOMMODATE PIER COLUMN GEOMETRY.
10. ADJUST HEIGHT OF CONCRETE BARRIER ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF BARRIER.
11. THIS TRANSITION DRAWING PROVIDES ALLOWANCE FOR A FUTURE OVERLAY.
12. SHOULDER WIDTHS AT PIER COLUMNS ARE PERMITTED BUT SHOULD BE AVOIDED WHERE POSSIBLE. SEE TABLE B FOR MAXIMUM SHOULDER WIDTH REDUCTIONS.

TABLE B
REDUCTION LIMITS TO INSIDE SHOULDER WIDTH FOR NARROW MEDIAN (URBAN ROADWAYS)

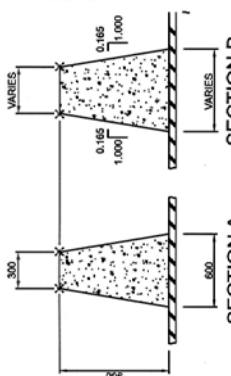
NUMBER OF LANES IN ROADWAY DIRECTION	ROADWAY CROSS SECTION REFERENCE	NORMAL INSIDE SHOULDER WIDTH	MINIMUM INSIDE SHOULDER WIDTH
2	UF2-411 & 10280	2500	1800**
3	UF3-411 & 10280	2500	2000**
4	UF4-411 & 10280	3000	2500***

- * ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1000.
- ** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1800.
- *** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1600.

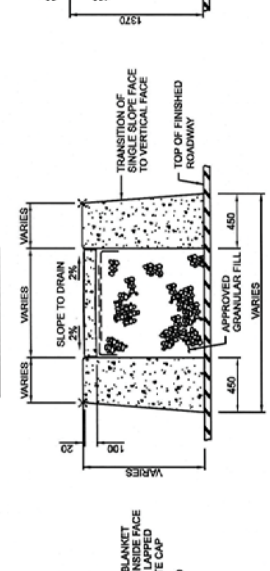
TABLE A
FLARE RATE

DESIGN SPEED (km/h)	FLARE RATE
50	1:10
60	1:12
70	1:14
80	1:16
90	1:18
100	1:20
110	1:22
120	1:24
130	1:26
140	1:28
150	1:30

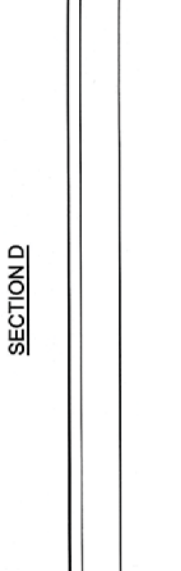
FLARE RATES ADOPTED FROM ASHTO 2002 ROADSIDE DESIGN GUIDE



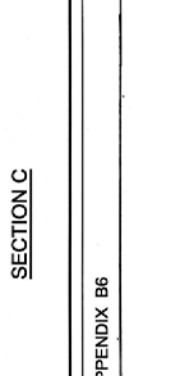
JOINT DETAILS



SECTION D



SECTION E



No.	REVISIONS	BY	DATE

Approved: *Altaf Khan*
Executive Director
Technical Standards Branch

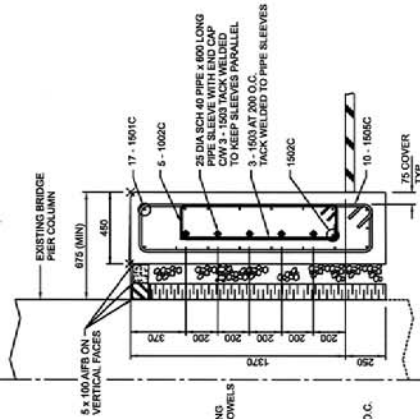
Date: NOVEMBER, 2007

TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION PIER - SHEET 1 OF 2

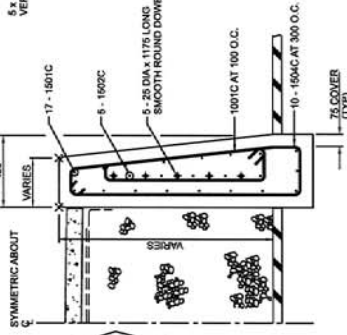
Prepared By: MO
Checked By: WS
Scale: N.T.S.
Dwg No.: RDG-B6.3

H-APP-B6-7

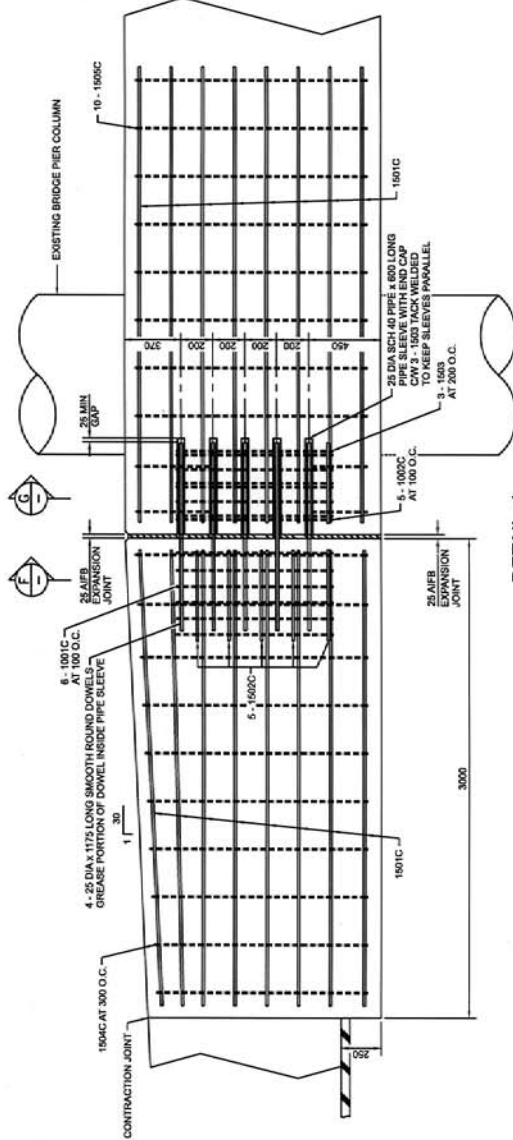
SYMMETRIC ABOUT



SECTION G
MONOLITHIC BRIDGE PIER BARRIER



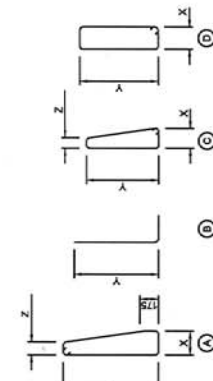
SECTION F
SPLIT MEDIAN BARRIER



DETAIL 1

BAR LIST: BARRIER						
MARK	SIZE	NO.	TYPE	X	Y	Z
1001C	10	8	C	200	750	85
1002C	10	5	D	200	750	2 140
1001C	15	34	STR			2 650
1002C	15	6	STR			560
1503	15	3	B		750	600
1604C	15	10	A	LENGTH: X = 300 Y = VARIES FROM 1100 TO 1190 IN INCREMENTS OF 10 Z = 0 TO 287 IN INCREMENTS OF 14		
1005C	15	10	D	300	1 200	2 760
						TOTAL kg = 268
						TOTAL lb = 593

PLAIN
EPOXY COATED



BAR LIST NOTES:

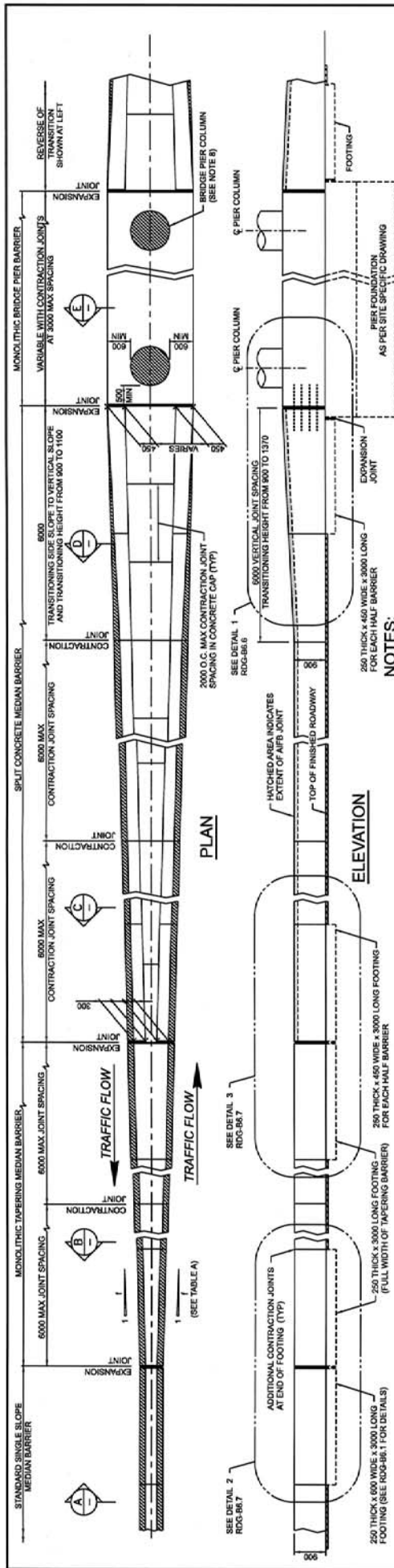
- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET" STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 600 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A5K OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- ALL REINFORCING STEEL SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

CONSTRUCTION NOTES:

1. THE 3 - 1003 SHAPED DOWELS SHALL BE SHOP WELDED TO THE 25 DIA X 40 PIPE SLEEVES WITH END CAPS, TO ENSURE THE SLEEVES ARE MAINTAINED PARALLEL.
2. A 25 DIA X 20 LONG COMPRESSIBLE PLAG, SUCH AS POLYSTYRENE, SHALL BE INSERTED INTO EACH PIPE SLEEVE PRIOR TO SLIDING THE 25 DIA SMOOTH ROUND DOWELS INSIDE THE SLEEVES.
3. DURING PLACEMENT OF THE BARRIER CONCRETE SHOWN IN SECTION G, THE 25 DIA SMOOTH ROUND DOWELS SHALL BE TIED TO THE 1001C AIRB EXPANSION JOINT. THE DOWELS SHALL BE TIED SECURELY TO THE 1001C STRUTS TO PREVENT THE DOWELS FROM SLIDING OUT DURING CONCRETE PLACING AND VIBRATING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

<p>Alberia INFRASTRUCTURE AND TRANSPORTATION</p>	<p>Approved: <i>Allen Karim</i> Executive Director, Technical Standards Branch</p>	<p>Date: NOVEMBER, 2007</p>
	<p>Prepared By: NS/MC</p>	<p>Checked By: WS</p>
<p>Revisions:</p>	<p>By:</p>	<p>Date:</p>
<p>Project: TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION AROUND EXISTING BRIDGE PIER - SHEET 2 OF 2</p>		<p>Dwg No.: RDG-B6.4</p>



- NOTES:**
- ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
 - CONCRETE SHALL BE CLASS C AND ALL EXPOSED EDGES OF EXPANSION AND CONSTRUCTION JOINTS SHALL BE FINISHED TO A MINIMUM CLASS C FINISH.
 - BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
 - BARRIER FOOTINGS SHALL BE PLACED ON EITHER SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS, AS WELL AS AT BARRIER ENDS.
 - REFER TO RDG-B6.6 AND RDG-B6.7 FOR DETAILS ON GEOMETRY AND REINFORCING AT THESE LOCATIONS.
 - PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED.
 - EXPANSION JOINTS SHALL CONSIST OF A SINGLE LAYER OF 25 ASPHALT IMPREGMATED FIBREBOARD (AFB) APPLIED TO FULL CROSS SECTION OF BARRIER AND SHALL EXTEND TO BASE OF FOOTING.
 - PROVIDE ADDITIONAL CONTROL JOINTS AS DETERMINED BY THE CONSULTANT TO ACCOMMODATE PIER COLUMN GEOMETRY.
 - EXTEND PIER COLUMN CONCRETE REINFORCING THROUGH BARRIER AND INTO CONCRETE PIER FOUNDATION AS PER SITE SPECIFIC DRAWINGS.
 - ADJUST HEIGHT OF CONCRETE BARRIER ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF BARRIER.
 - THIS TRANSITION DRAWING PROVIDES ALLOWANCE FOR A 100 FUTURE OVERLAY.
 - REDUCED INSIDE SHOULDER WIDTHS AT PIER COLUMNS ARE PERMITTED BUT SHOULD BE AVOIDED WHERE POSSIBLE. SEE TABLE B FOR MAXIMUM SHOULDER WIDTH REDUCTIONS.

TABLE A

DESIGN SPEED (km/h)	FLARE RATE
130	50:1
120	40:1
110	30:1
100	20:1
90	15:1
80	10:1
70	7:1
60	5:1

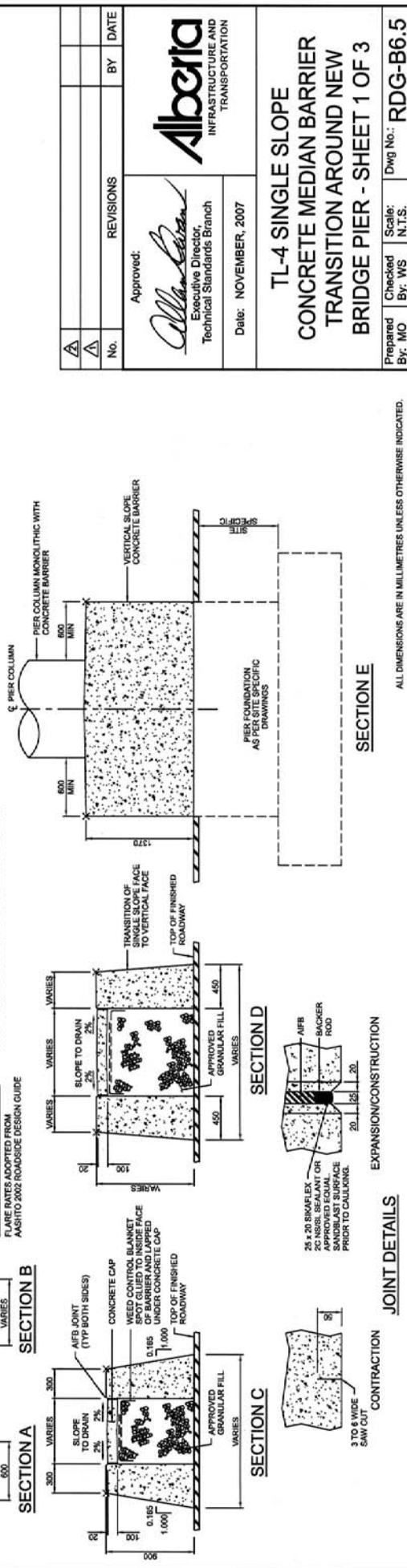
FLARE RATES ADOPTED FROM AASHTO 2002 ROADSIDE DESIGN GUIDE

TABLE B

REDUCTION LIMITS TO INSIDE SHOULDER WIDTH FOR NARROW MEDIAN (URBAN ROADWAYS)

ROADWAY CROSS SECTION REFERENCE	NORMAL INSIDE SHOULDER WIDTH	MINIMUM INSIDE SHOULDER WIDTH
UFD-411.9-100/80	2500	1900 *
UFD/DAAD-616.8-110/100/80	2500	2500 **
UFD/DAAD-620.9-120/110/100	3000	2500 ***

* ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1600.
 ** (NO REDUCTION IN SHOULDER WIDTH REQUIRED)
 *** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1600.



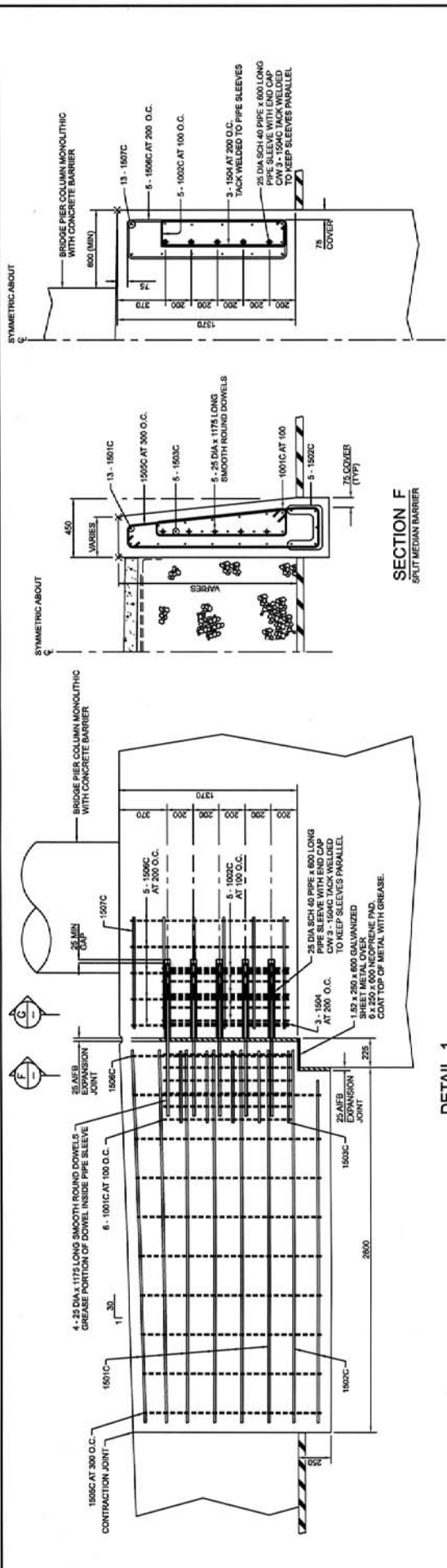
APPROVED: *Alta L...*
 Executive Director,
 Technical Standards Branch
 Date: NOVEMBER, 2007

ALBERTA
 INFRASTRUCTURE AND
 TRANSPORTATION

**TL-4 SINGLE SLOPE
 CONCRETE MEDIAN BARRIER
 TRANSITION AROUND NEW
 BRIDGE PIER - SHEET 1 OF 3**

Prepared By: MO Checked By: WS Scale: N.T.S.
 Dwg No.: RDG-B6.5

H-APP-B6-9

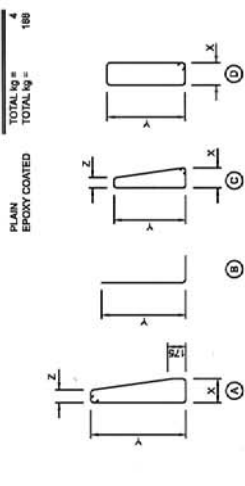


SECTION F
SPLIT MEDIAN BARRIER

SECTION G
MONOLITHIC BRIDGE PIER BARRIER

DETAIL 1

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1001C	10	6	C	220	750	95	2 025	10
1002C	10	5	D	220	750		2 140	8
1501C	15	13	STR				2 650	58
1502C	15	5	STR				2 625	21
1503C	15	5	STR				560	4
1504	15	3	R	750			630	4
1505C	15	9	A				3105 (AVG)	44
1506C	15	6	D	300	650		2 780	26
1507C	15	13	STR				650	17



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCEMENT SHALL BE IN ACCORDANCE WITH CAN/CSA-A305:18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- * C * DENOTES EPOXY COATED REINFORCEMENT.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A36, OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- CONCRETE SHALL BE MODIFIED CLASS C MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa, UNLESS OTHERWISE SPECIFIED.
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

CONSTRUCTION NOTES:

- THE 3 - 1504 L-SHAPED DOWELS SHALL BE SHOP WELDED TO THE 25 DIA X 40 SCHEDULE PIPE SLEEVES, COMPLETE WITH END CAP TO ENSURE THE SLEEVES ARE MAINTAINED PARALLEL.
- 25 DIA X 25 LONG SMOOTH ROUND DOWELS SHALL BE SET 100mm FROM EACH END OF THE 25 DIA X 40 SCHEDULE PIPE SLEEVES TO SLIDING JOINTS.
- DURING PLACEMENT OF THE BARRIER CONCRETE SHOWN IN SECTION G, THE 25 DIA SMOOTH ROUND DOWELS SHALL BE SET 675 FROM FACE OF THE 25 DIA SCHEDULE PIPE SLEEVES. THE DOWELS SHALL BE TIED SECURELY TO THE 1001C STRIPS TO PREVENT THE DOWELS FROM SLIDING OUT DURING CONCRETE PLACING AND VIBRATING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

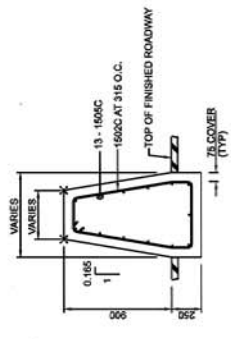
Approved: Executive Director, Technical Standards Branch	REVISIONS	BY	DATE
	No.		

Alberia
 INFRASTRUCTURE AND TRANSPORTATION

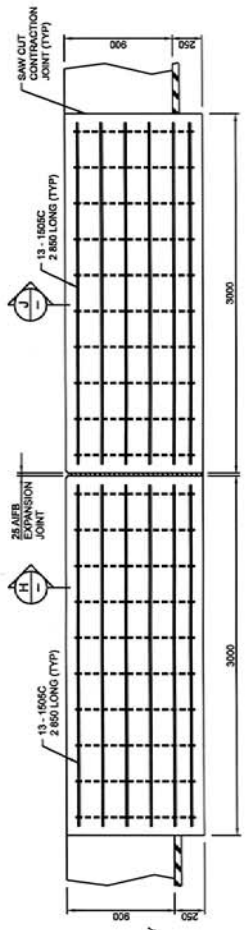
Date: NOVEMBER, 2007

**TL-4 SINGLE SLOPE
 CONCRETE MEDIAN BARRIER
 TRANSITION AROUND NEW
 BRIDGE PIER - SHEET 2 OF 3**

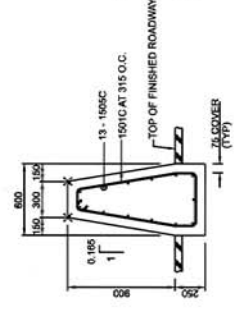
Prepared By: MO
 Checked By: WS
 Scale: N.T.S.
 Dwg No.: RDG-B6.6



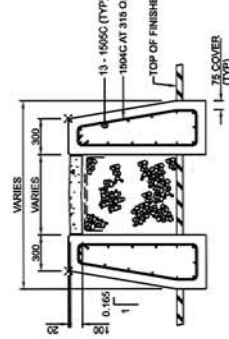
SECTION J



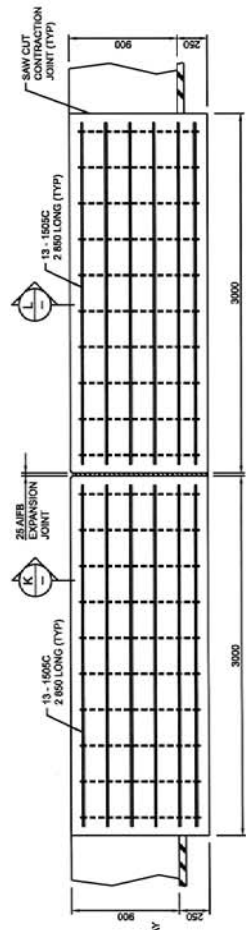
DETAIL 2



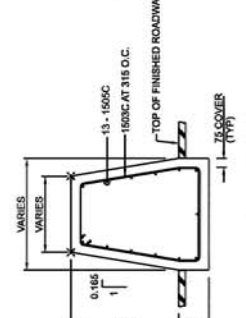
SECTION H



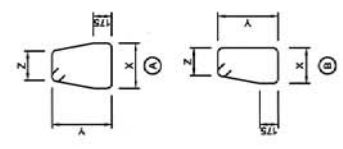
SECTION L



DETAIL 3



SECTION K



MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1501C	15	10	A	450	1 000	178	2 930	46
1500C	15	10	A	LENGTH: VARIES FROM 450 TO (450 + 57000) IN INCREMENTS OF 6300 Y = 1 000 Z = VARIES FROM 178 TO (178 + 57000) IN INCREMENTS OF 6300			46.00 * 2 930 * 89.40F	
1503C	15	10	A	LENGTH: VARIES FROM (188 - 57000) TO 1188 IN INCREMENTS OF 6300 Y = 1 000 Z = VARIES FROM (793 - 57000) TO 793 IN INCREMENTS OF 6300			4 283 * 5 700F	66.77 * 89.40F
1504C	15	20	B	LENGTH: VARIES FROM 164 TO (164 + 26500) IN INCREMENTS OF 6300 Y = 1 000 Z = VARIES FROM 314 TO (314 + 26500) IN INCREMENTS OF 6300			2 489 * 2 850F	39.10 * 44.10F
1505C	15	65	STR				2 850	291
							TOTAL	443 * 44.0F

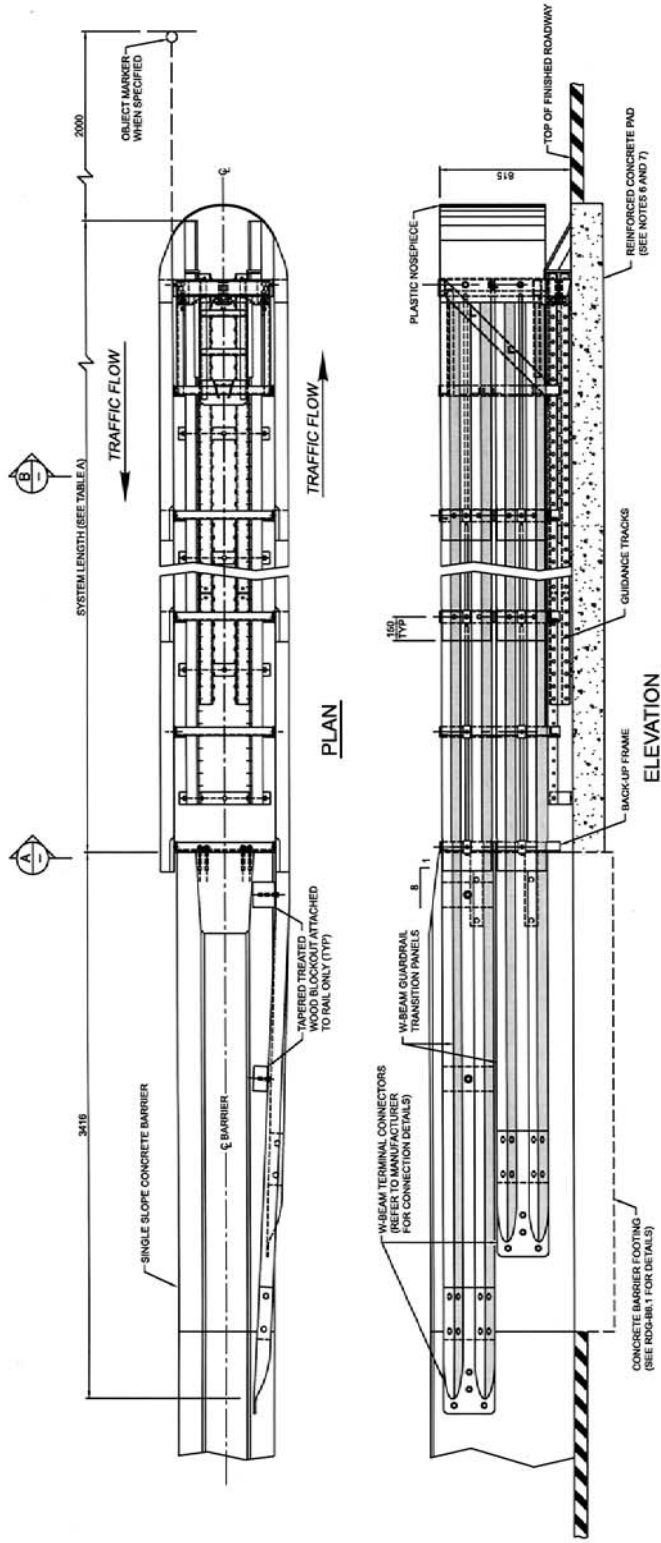
BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION, 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.
- "F" DENOTES FLARE RATE VALUE "F" IS DEFINED IN TABLE A ON RDG B6.3 AND RDG B6.5.

Approved:	Alberta INFRASTRUCTURE AND TRANSPORTATION
Executive Director, Technical Standards Branch	Date: NOVEMBER, 2007
By: AK/MO	Checked: N.T.S.
By: WS	Scale: N.T.S.
Dwg No.: RDG-B6.7	

TL-4 SINGLE SLOPE CONCRETE
BARRIER TRANSITION AROUND
EXISTING/NEW BRIDGE PIER -
SHEET 3 OF 3

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



NOTES:

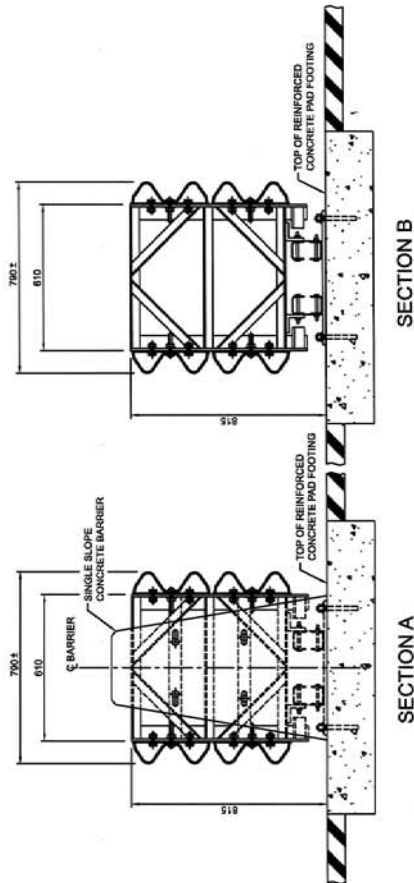
1. THE TRINITY ATTENUATING CRASH CUSHION (TRACC) SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC.
2. THE TRACC SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
3. THE APPROACH AREA IN FRONT OF THE INSTALLED UNIT SHALL BE GRADED TO A SLOPE NOT EXCEEDING 12:1 IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 12:1.
4. THE ENTIRE LENGTH OF THE TRACC SYSTEM CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
5. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 OF THE TRACC SYSTEM. THE TRACC SYSTEM SHALL NOT BE ALLOWED TO ALLOW THE SIDE PANELS OF THE TRACC TO DETRACT DURING AN END-ON IMPACT.
6. THE TRACC SYSTEM SHALL BE ANCHORED TO A CONCRETE PAD FOUNDATION AS PER THE INSTALLATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER. SEE DRAWING RDG-86.11 FOR DETAILS.
7. FOR TEMPORARY APPLICATIONS, THE TRACC SYSTEM MAY BE ANCHORED INTO 150 X 150 X 150 CONCRETE PADS WITH 10 Ø25 X 460 LONG ANCHOR STUDS AS PER THE MANUFACTURER'S INSTRUCTIONS.

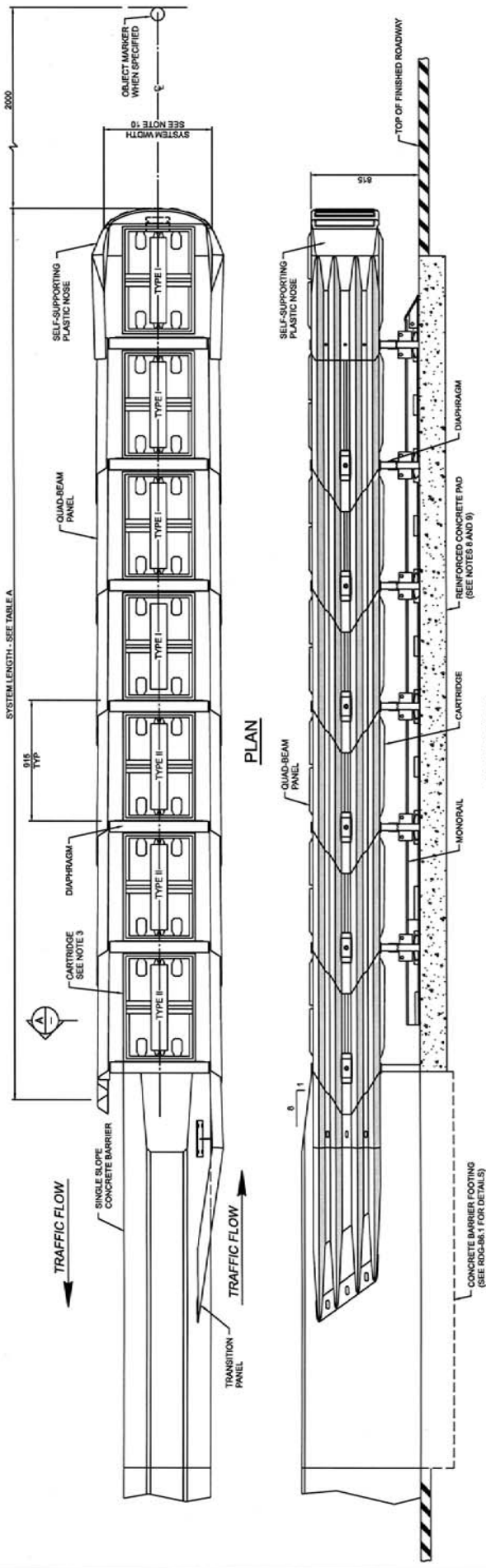
TABLE A

POSTED SPEED km/h	< 70	≥ 70
NCHRP REPORT 350 TEST LEVEL	TL-2	TL-3
SYSTEM LENGTH	4750	6857

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

 Infrastructure and Transportation	Approved: Executive Director Technical Standards Branch	REVISIONS No. BY DATE
	Date: NOVEMBER, 2007	Title: TL-2 AND TL-3 CONCRETE MEDIAN BARRIER TERMINATION TRACC CRASH CUSHION SYSTEM (BIDIRECTIONAL)
Prepared By: MO	Checked By: WS	Scale: N.T.S.
Dwg No.: RDG-B6.8		APPENDIX B6



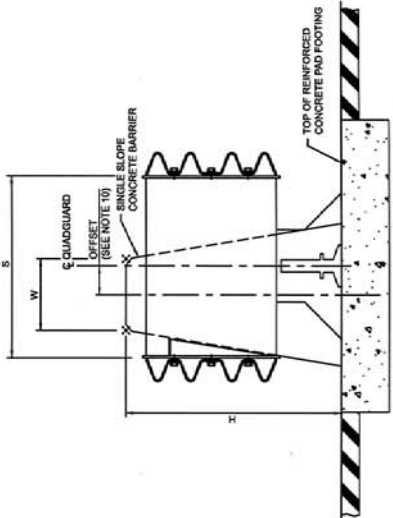


NOTES:

1. THE QUADGUARD SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ENERGY ABSORPTION SYSTEMS, INC. THE SYSTEM IS NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE MANUFACTURER.
2. A TRANSITION STRUT BACKUP MAY BE USED AS PER THE MANUFACTURER'S INSTRUCTIONS WHEN A CONCRETE BACKUP IS NOT PROVIDED DIRECTLY BEHIND THE QUADGUARD SYSTEM. FOR EXAMPLE, WHEN THE END OF THE CONCRETE BARRIER IS TRANSITIONED USING THREE BEAM AND/OR W-BEAM BEFORE TERMINATING WITH THE QUADGUARD SYSTEM.
3. SEE TABLE A FOR NUMBER OF CARTRIDGE TYPES REQUIRED BASED ON POSTED SPEED.
4. THE QUADGUARD SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
5. THE ENTIRE LENGTH OF THE QUADGUARD SYSTEM SHALL EXCEED 121'. THE CROSS SLOPE SHALL NOT EXCEED 12% IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 12% IN THE OPPOSITE DIRECTION.
6. THE ENTIRE LENGTH OF THE QUADGUARD SYSTEM LESS 500 CM CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
7. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 OF THE END OF THE ADJOINING CONCRETE BARRIER. THIS IS TO ALLOW THE FENDER PANELS OF THE QUADGUARD TO RETRACT DURING ERGON IMPACT.
8. FOR TEMPORARY APPLICATIONS, THE QUADGUARD SYSTEM IS AVAILABLE IN A CZ CONFIGURATION AND MAY BE USED IN ACCORDANCE WITH THE INSTRUCTIONS PROVIDED BY THE MANUFACTURER. SEE DRAWING ROAD-98.11 FOR DETAILS.
9. FOR MEDIAN INSTALLATIONS IN BIDICTIONAL TRAFFIC FLOW AND WHEN CONNECTING DIRECTLY TO A SINGLE SLOPE CONCRETE BARRIER, A TRANSITION PANEL SHALL BE INSTALLED TO FACE OF BARRIER. THE OFFSET BETWEEN CENTERLINE OF QUADGUARD SYSTEM WIDTH, 'S' AND CENTERLINE OF THE BARRIER SHALL BE DETERMINED USING $W + (0.30W \cdot S - 10 \cdot \text{OFFSET})$ (mm).
10. FOR MEDIAN INSTALLATIONS IN BIDICTIONAL TRAFFIC FLOW AND WHEN CONNECTING DIRECTLY TO A SINGLE SLOPE CONCRETE BARRIER, A TRANSITION PANEL SHALL BE INSTALLED TO FACE OF BARRIER. THE OFFSET BETWEEN CENTERLINE OF QUADGUARD SYSTEM WIDTH, 'S' AND CENTERLINE OF THE BARRIER SHALL BE DETERMINED USING $W + (0.30W \cdot S - 10 \cdot \text{OFFSET})$ (mm).


TABLE A

POSTED SPEED (km/h)	< 70	≥ 70
NR/RP	TL-2	TL-3
REPORT 350	TL-2	TL-3
TRUCK LEVEL	3	6
TYPE I CARTRIDGES	3	4
TYPE II CARTRIDGES	1	3
SYSTEM LENGTH	4000	5740



SECTION A

No.	REVISIONS	BY	DATE

Approved: 

Executive Director,
Technical Standards Branch
INFRASTRUCTURE AND
TRANSPORTATION

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

**TL-2 AND TL-3 CONCRETE
MEDIAN BARRIER TERMINATION
QUADGUARD CRASH CUSHION
SYSTEM (BIDICTIONAL)**

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.9
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

SYSTEM LENGTH - SEE TABLE A

2000

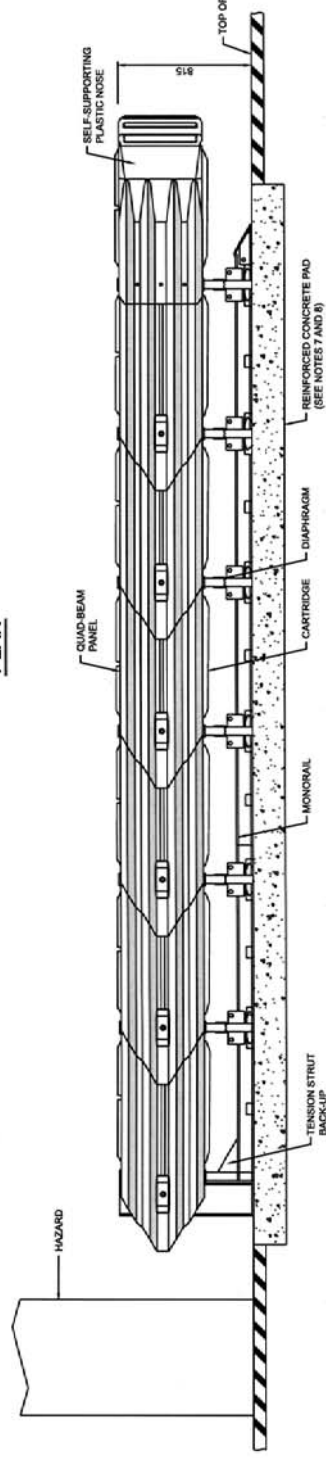
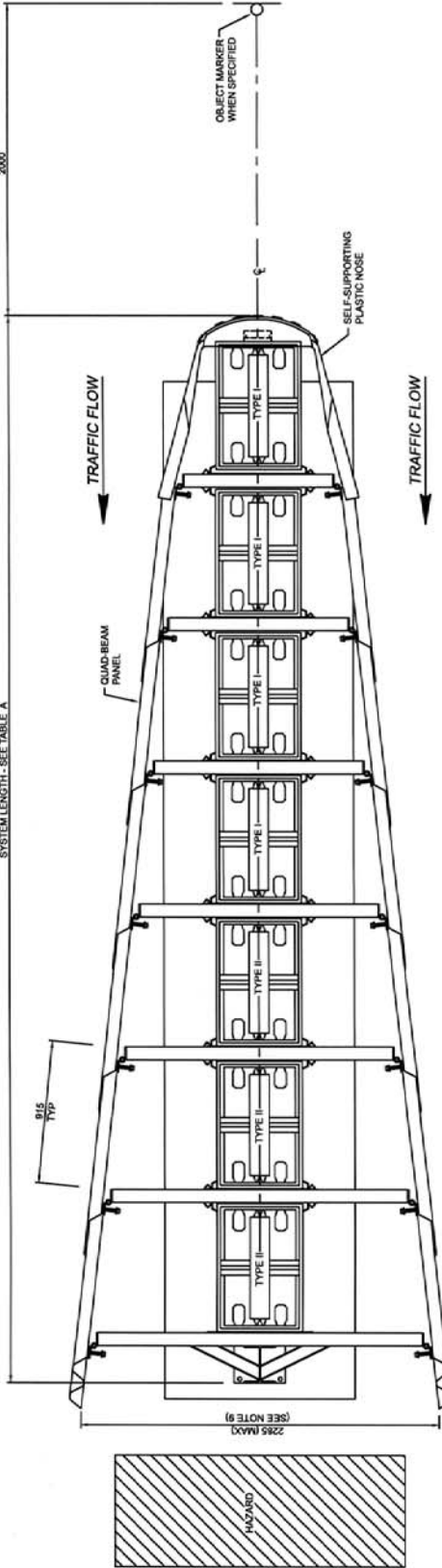


TABLE A

POSTED SPEED KMH	NCHRP TEST LEVEL	BAYS	TYPE I CARTRIDGES FRONT	TYPE II CARTRIDGES	SYSTEM LENGTH
4-70	TL-2	3	3	1	4000
≥ 70	TL-3	6	4	3	6740

NOTES:

1. THE QUADGUARD SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ENERGY ABSORPTION SYSTEMS, INC. THE SYSTEM SHOWN IS FOR A PERMANENT APPLICATION WITH A TENSION STRUT PROVIDING BACK-UP.
2. SEE TABLE A FOR NUMBER OF CARTRIDGE TYPES REQUIRED BASED ON POSTED SPEED.
3. THE QUADGUARD SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
4. THE APPROACH AREA IN FRONT OF THE INSTALLED SYSTEM SHALL BE GRADED TO A SLOPE NOT EXCEEDING 10:1 IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 1%.
5. IF THE QUADGUARD SYSTEM LESS 500 CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
6. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 DIRECTLY BEHIND THE END OF THE FENDER PANELS. THIS IS TO ALLOW THE FENDER PANELS OF THE QUADGUARD TO RETRACT DURING END-ON IMPACT.
7. THE QUADGUARD SYSTEM SHALL BE ANCHORED TO A CONCRETE PAD FOUNDATION AS PER THE INSTALLATION MANUAL.
8. FOR TEMPORARY APPLICATIONS, THE QUADGUARD SYSTEM IS AVAILABLE IN A CZ CONFIGURATION AND MAY BE ANCHORED INTO 150 OF ASPHALT UNDERLAIN WITH AT LEAST 150 OF COMPACTED SUBBASE USING 16 DIA X 450 LONG ANCHOR STUDS AS PER THE MANUFACTURER'S INSTRUCTIONS.
9. THE QUADGUARD SYSTEM IS AVAILABLE IN 6 NOMINAL WIDTHS: 810, 760, 615, 1785 AND 2285. UNLESS OTHERWISE WARRANTED BY REQUIREMENTS, SELECTION OF THE NARROWEST WIDTH THAT ADEQUATELY SHIELDS THE PADGUARD IS RECOMMENDED.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
A			
Δ			

Approved: *Alan ...*
 Executive Director,
 Technical Standards Branch

Date: NOVEMBER, 2007

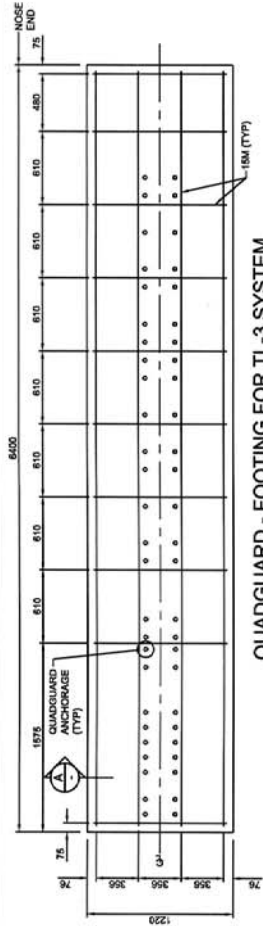


**TL-2 AND TL-3
 UNIDIRECTIONAL QUADGUARD
 CRASH CUSHION SYSTEM
 FOR WIDE MEDIAN HAZARDS**

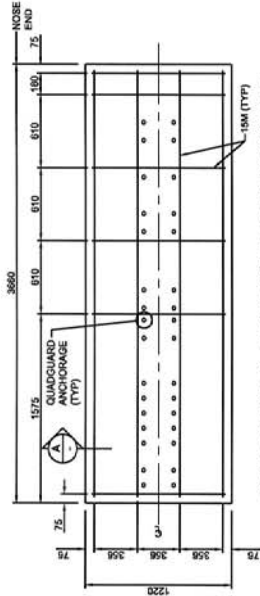
Prepared By: MO
 Checked By: WS
 Scale: N.T.S.
 Dwg No.: RDG-B6.10

NOTES:

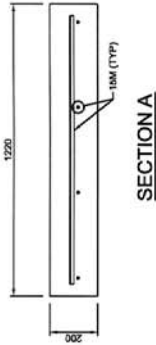
1. THIS DRAWING IS APPLICABLE FOR PERMANENT APPLICATIONS OF QUADGUARD AND TRACC SYSTEMS. FOR TEMPORARY APPLICATIONS, ALTERNATE FOUNDATIONS MAY BE USED AS APPROVED BY THE MANUFACTURER. FOR MORE INFORMATION, REFER TO THE COMPLIANCE WITH INCRHP REPORT 286 FOR TEST LEVEL 3 (TL-3).
2. CONCRETE FOOTINGS SHALL BE PLACED ON WELL COMPACTED GRANULAR BASE TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
3. CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 30 MPa).
4. PROVIDE 75 mm END COVER AND 75 mm BOTTOM COVER AS PER THE CONTRACT SPECIFICATIONS.
5. CONCRETE REINFORCING STEEL SHALL BE EPOXY COATED.
6. PROVIDE 75 mm END COVER AND 75 mm BOTTOM COVER FOR ALL CONCRETE REINFORCEMENT.
7. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ANCHORAGE DETAILS.



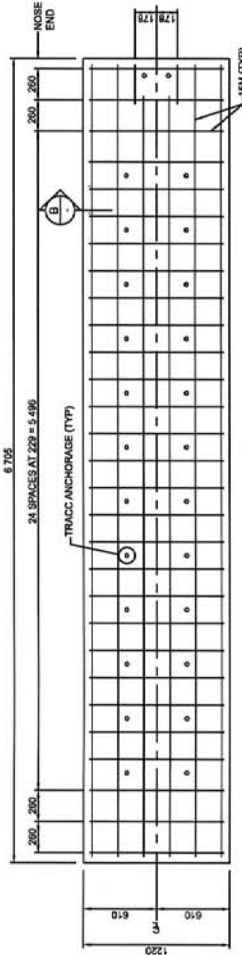
QUADGUARD - FOOTING FOR TL-3 SYSTEM



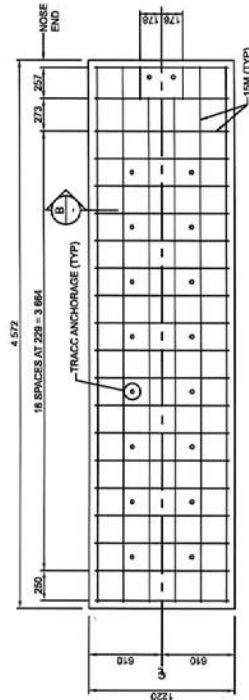
QUADGUARD - FOOTING FOR TL-2 SYSTEM



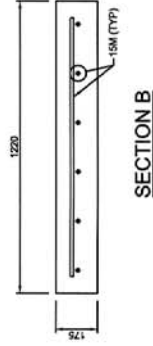
SECTION A



TRACC - FOOTING FOR TL-3 SYSTEM



TRACC - FOOTING FOR TL-2 SYSTEM



SECTION B

No.	REVISIONS	BY	DATE

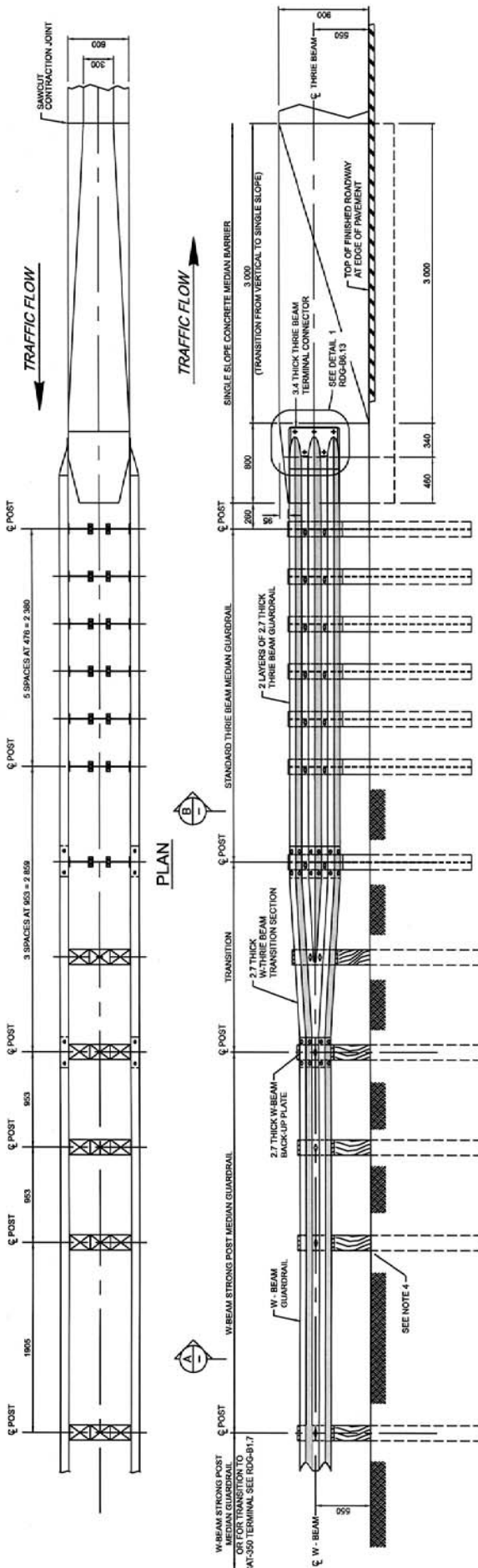
Approved:	 Executive Director, Technical Standards Branch
Date:	

Prepared By:	AK	Checked By:	WS	Scale:	N.T.S.	Dwg No.:	RDG-B6.11
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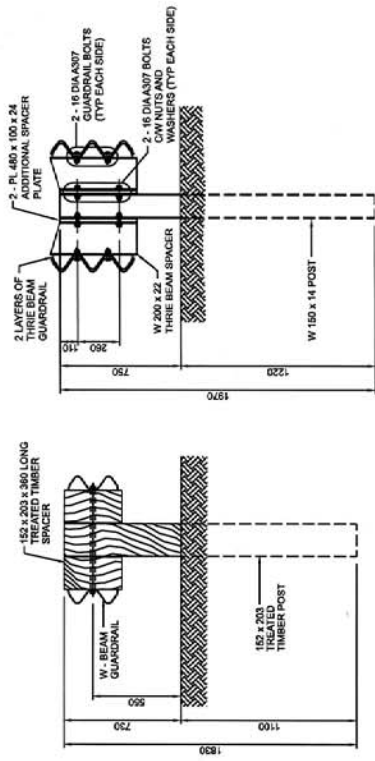
**QUADGUARD AND TRACC
CRASH CUSHION SYSTEMS
CONCRETE PAD FOUNDATION**

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



ELEVATION

- NOTES:**
1. LAP GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
 2. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
 3. LINE AND ELEVATION OF BARRIER SHALL BE SET BY INSTRUMENT.
 4. POSTS SHALL BE PROVIDED AROUND GUARDRAIL OR SPACERS AS SPECIFIED ON DRAWING.
 5. THIS TRANSITION MAY BE CONSIDERED TO SATISFY NCHRP REPORT 350 REQUIREMENTS FOR TEST LEVEL 4 (TL4)

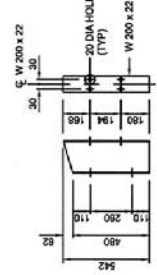


SECTION A
(SEE TEB DRAWING 3.09 FOR DETAILS)

SECTION B

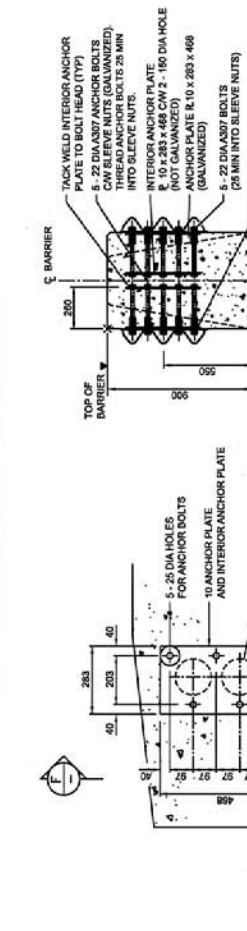
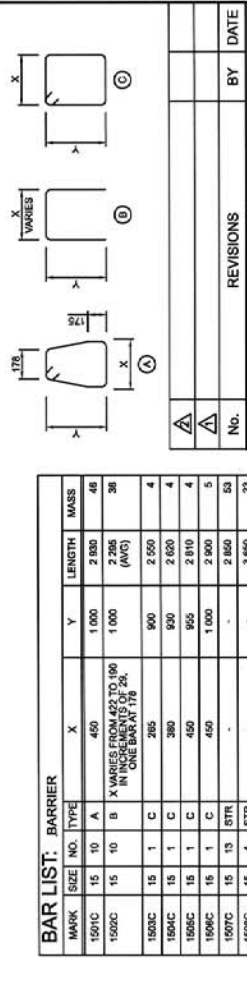
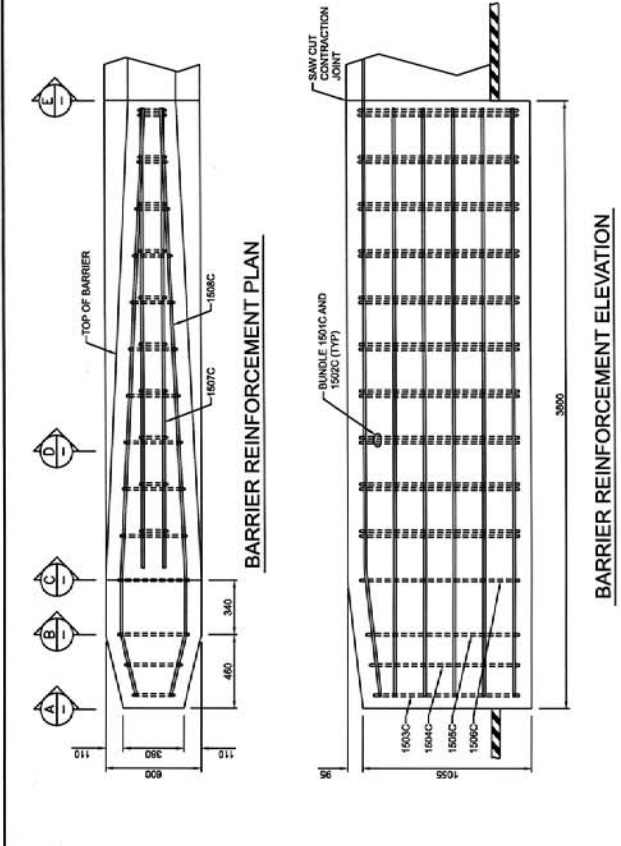
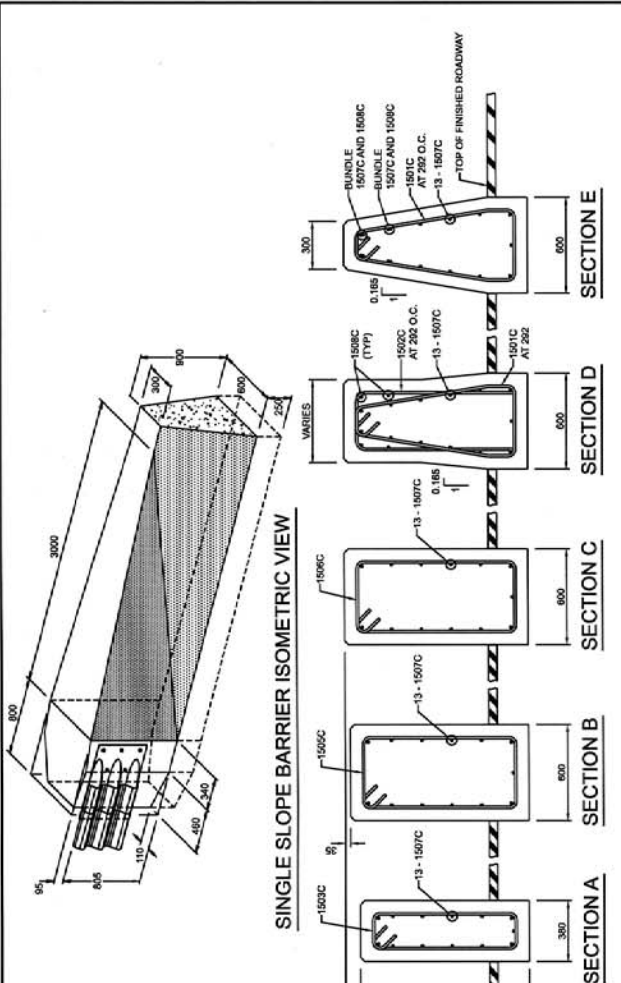
POST DETAILS

THREE BEAM SPACER DETAIL



ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

<p>Alberia INFRASTRUCTURE AND TRANSPORTATION</p>	<p>Approved: <i>Allen Chan</i> Executive Director Technical Standards Branch</p>	<p>Date: NOVEMBER, 2007</p>				
	<p>TRANSITION OF TL-4 SINGLE SLOPE CONCRETE BARRIER TO W-BEAM MEDIAN GUARDRAIL SHEET 1 OF 2</p>	<p>Prepared By: MC</p>	<p>Checked By: WS</p>	<p>Scale: N.T.S.</p>	<p>Dwg No.: RDG-B6.12</p>	
<p>REVISIONS</p>	<p>BY</p>	<p>DATE</p>				



MARK	SIZE	NO.	TYPE	X	Y	LENGTH	MASS
1501C	15	10	A	450	1000	2 830	46
1502C	15	10	B	X VARIES FROM 452 TO 100 IN INCREMENTS OF 26, ONE BAR AT 176	1000	2 295 (AVG)	38
1503C	15	1	C	265	900	2 550	4
1504C	15	1	C	390	900	2 650	4
1505C	15	1	C	450	950	2 810	4
1506C	15	1	C	450	1000	2 800	5
1507C	15	13	STR	-	-	2 800	50
1508C	15	4	STR	-	-	3 650	23

EPOXY COATED TOTAL kg = 175

BAR LIST NOTES:

- DIMENSIONS OF ALL BARS AND DETAILS OF ALL JOINTS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M02 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.
- ALL CONCRETE SHALL BE MODIFIED CLASS C UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

Approved:

Executive Director
Technical Standards Branch

Date: NOVEMBER, 2007

TRANSITION OF TL-4 SINGLE SLOPE CONCRETE BARRIER TO W-BEAM MEDIAN GUARDRAIL

SHEET 2 OF 2

No.	REVISIONS	BY	DATE

Prepared By: MO

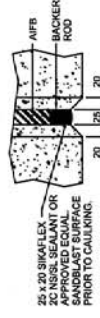
Checked By: WS

Scale: N.T.S.

Dwg No.: RDG-B6.13

NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL BE IN ACCORDANCE WITH THE CANADIAN STANDARD FOR REINFORCING STEEL, CAN/CSA S10.18, 2005, AND THE CANADIAN STANDARD FOR REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA G30.18M/2.
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A36, OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- ALL REINFORCEMENT SHALL BE EPOXY COATED.
- ROADSIDE CONCRETE BARRIER SHALL BE MODIFIED CLASS C (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 1/2 CLEAR COVER UNLESS NOTED OTHERWISE.



EXPANSION/CONSTRUCTION JOINT DETAIL



CONTRACTION JOINT DETAIL

* WORK THIS DRAWING WITH S-1659-00

No.	REVISIONS	BY	DATE

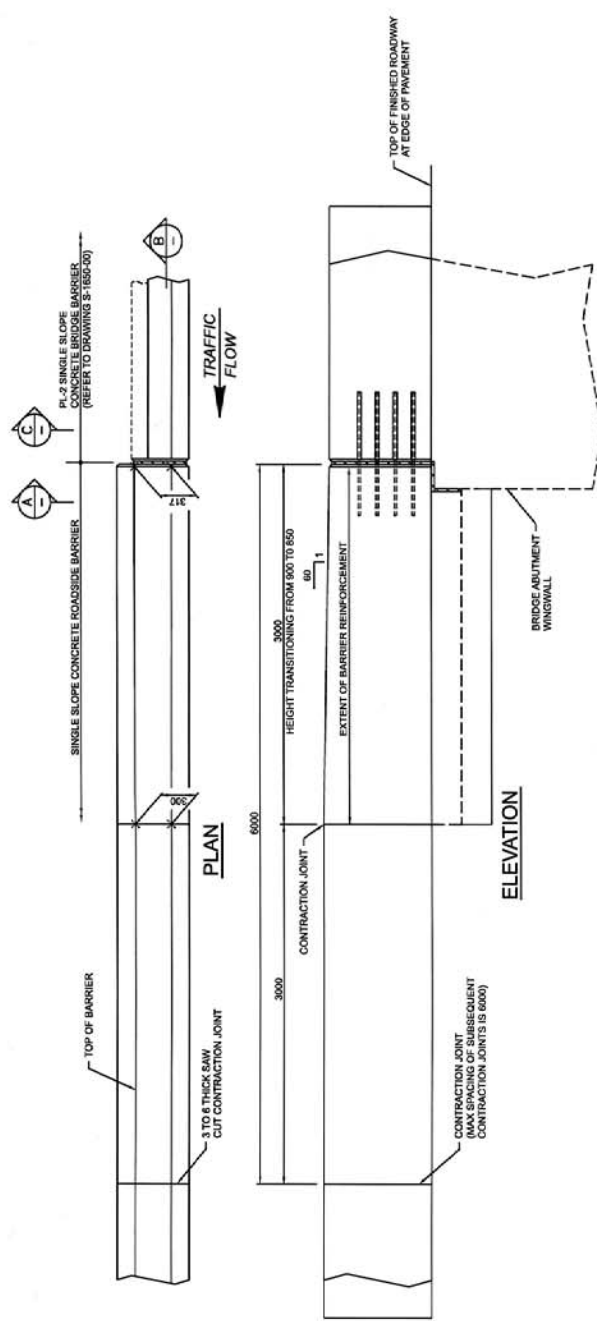
Approved: *Allen*
Executive Director
Technical Standards Branch

Date: NOVEMBER, 2007

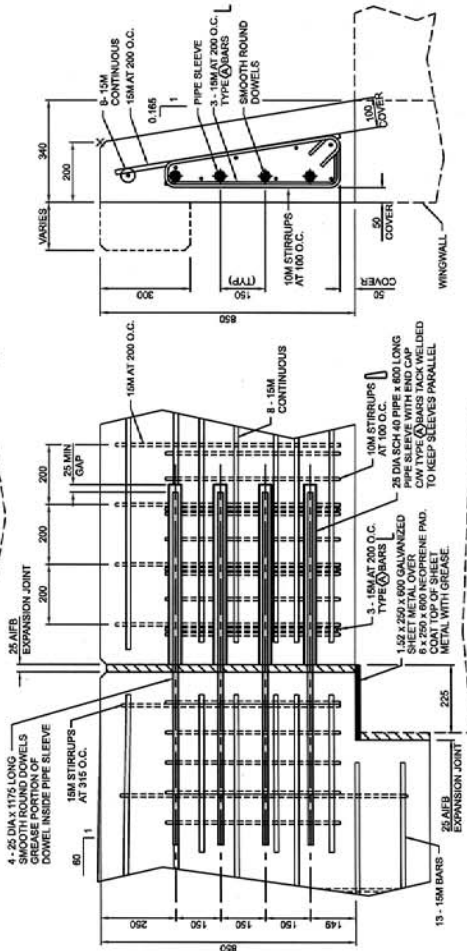
ALBERTA
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION TO PL-2 STANDARD BRIDGE CONCRETE BARRIER

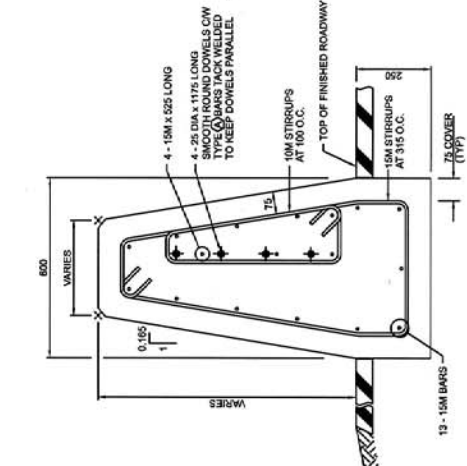
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Checked By: WS
Scale: N.T.S.
Dwg No.: RDG-B6.14



ELEVATION

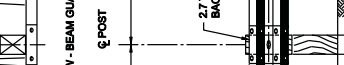
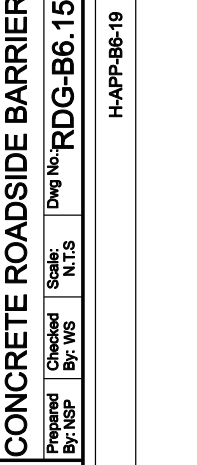
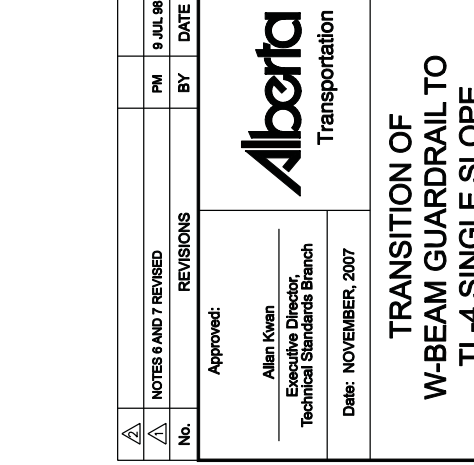
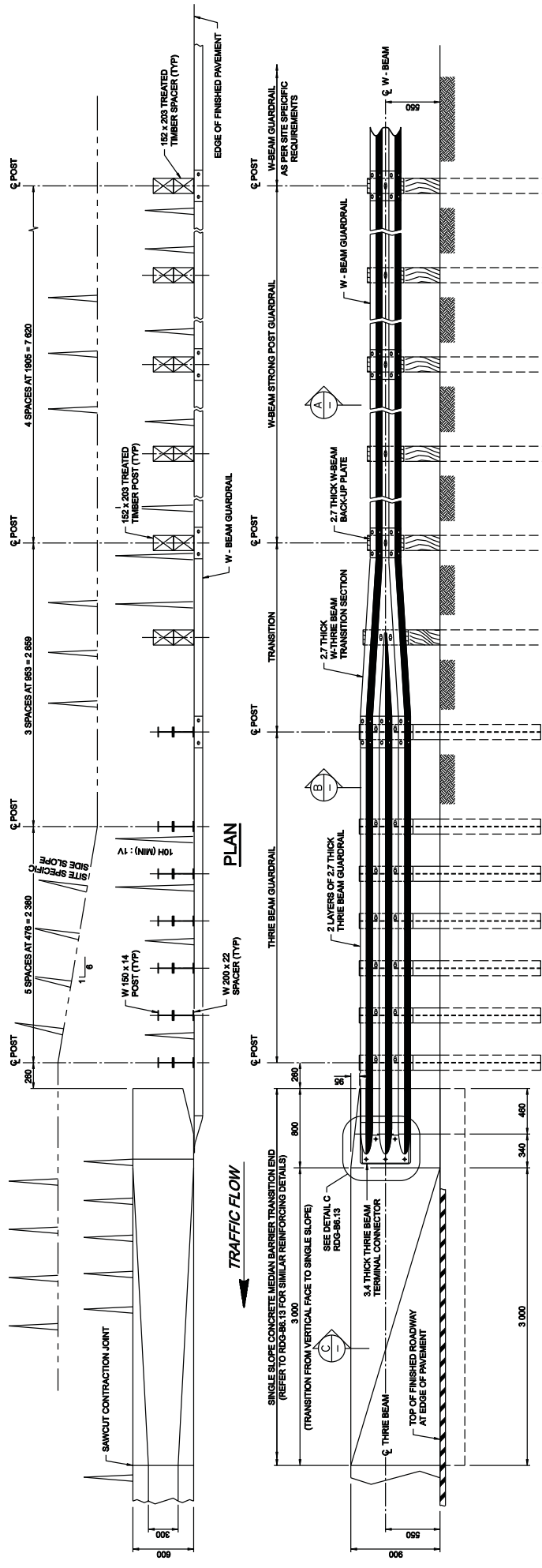


SECTION C
BRIDGE BARRIER



SECTION A
ROADSIDE CONCRETE BARRIER

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



NOTES:

- LAP GUARDRAIL SECTION IN THE DIRECTION OF TRAFFIC FLOW.
- ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
- LINE AND ELEVATION OF BARRIER SHALL BE SET BY INSTRUMENT.
- AD OR GRANULAR BASE COURSE MAY BE PROVIDED AROUND GUARDRAIL POSTS AS PER SITE SPECIFIC REQUIREMENTS.
- CONSTRUCTION SHALL BE TO SATISFY ICHORD REPORT 380 REQUIREMENTS FOR TEST LEVEL 4 (TL4).
- FASTEN REFLECTORS TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST SPACER BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVE ALONE WILL NOT BE ACCEPTED. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
- FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.

No.	REVISIONS	BY	DATE
Δ	NOTES 6 AND 7 REVISED	PM	9 JUL 98

Approved: **Alberta Transportation**
 Allan Kwan
 Executive Director,
 Technical Standards Branch
 Date: NOVEMBER, 2007

TRANSITION OF W-BEAM GUARDRAIL TO TL-4 SINGLE SLOPE CONCRETE ROADSIDE BARRIER

Prepared By: NSP	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.15
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

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APPENDIX B7

MISCELLANEOUS DRAWINGS

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Appendix B7 Miscellaneous Drawings

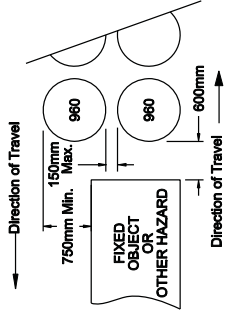
TABLE OF CONTENTS

Dwg. No.	Drawing Title	Page Number
TEB 3.19	Sand Barrel Cushion System	H-APP-B7-1
TEB 3.51	Guide Post Delineation for Guardrail	H-APP-B7-3
TEB 1.81	Typical Breakaway Wood Post	H-APP-B7-4
RDG-B7.1	TL-3 W-Beam Guardrail Placement at Minor Structures and Box Culverts	H-APP-B7-5
RDG-B7.2	TL-4 Single Slope Concrete Barrier Transition at Median Light Standard – Sheet 1 of 2	H-APP-B7-6
RDG-B7.3	TL-4 Single Slope Concrete Barrier Transition at Median Light Standard – Sheet 2 of 2	H-APP-B7-7
RDG-B7.4	Placement and Protection of Overhead Sign Supports for Divided Roads – Sheet 1 of 2	H-APP-B7-8
RDG-B7.5	Placement and Protection of Overhead Sign Supports for Divided Roads – Sheet 2 of 2	H-APP-B7-9

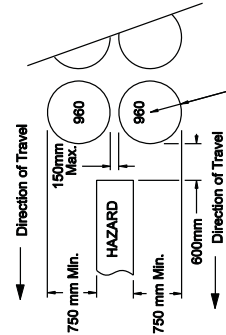
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General notes:

- Only crash tested components meeting NCHRP 350 requirements shall be used. The systems currently available are:
 - Energylite Inertia Barrier System by Quixote Transportation Safety Inc.
 - Fitch Sand Barrel System by Quixote Transportation Safety Inc.
 - TraFFix Impact Attenuator Sand Barrels by TraFFix Devices Inc.
- The sand mass shall be clearly marked on each barrel.
- For permanent installations, the Fitch System shall be used.
- The systems shall be installed strictly in accordance with manufacturer's recommendations.
- The sand barrel systems are non-directive and break up during impact. The vehicle speed is slowed by transfer of its momentum to the sand, allowing for safe, steady deceleration. Sand and plastic parts from the system will scatter in the direction of impact.
- Fill sand shall conform to ASTM C-33 - washed concrete sand or approved equal. Moisture content of sand shall be three percent or less to minimize caking. The sand shall be mixed with an appropriate percentage of rock salt when use during freezing temperature is expected.
- Barrels shall be set as far from the traveled way as possible to minimize the number of brush or nuisance hits.
- Barrel layout shall conform with the configuration for the appropriate posted highway speed.
- In the case of work zone installations, the design speed shall be at least equal to the speed posted through the work zone.

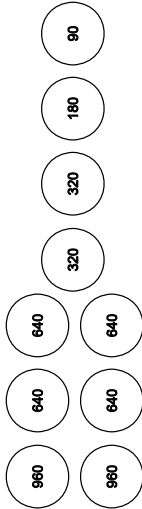


TWO DIRECTION TRAFFIC

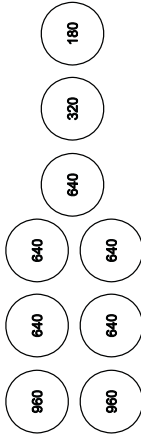


ONE DIRECTION TRAFFIC

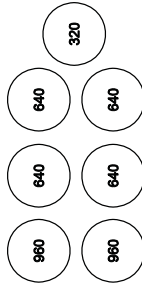
Numbers indicate sand mass in kg
Approximate Barrel Diameter = 1000 mm (TYP)



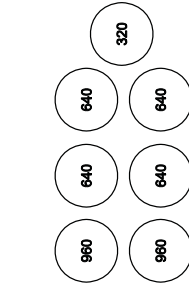
BARREL ARRAY - 80km/h



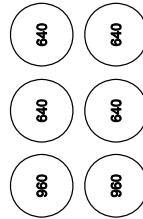
BARREL ARRAY - 70km/h



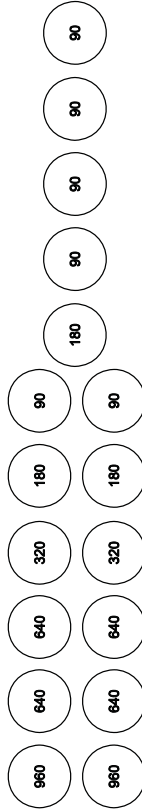
BARREL ARRAY - 60km/h



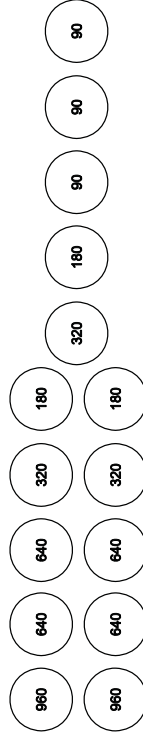
BARREL ARRAY - 50km/h



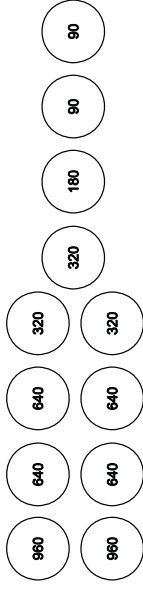
BARREL ARRAY - 40km/h



BARREL ARRAY - 110km/h



BARREL ARRAY - 100km/h



BARREL ARRAY - 90km/h

No.	REVISIONS	BY	DATE

Approved:
Original signed by
Allan Kwain

Executive Director
Technical Standards Branch

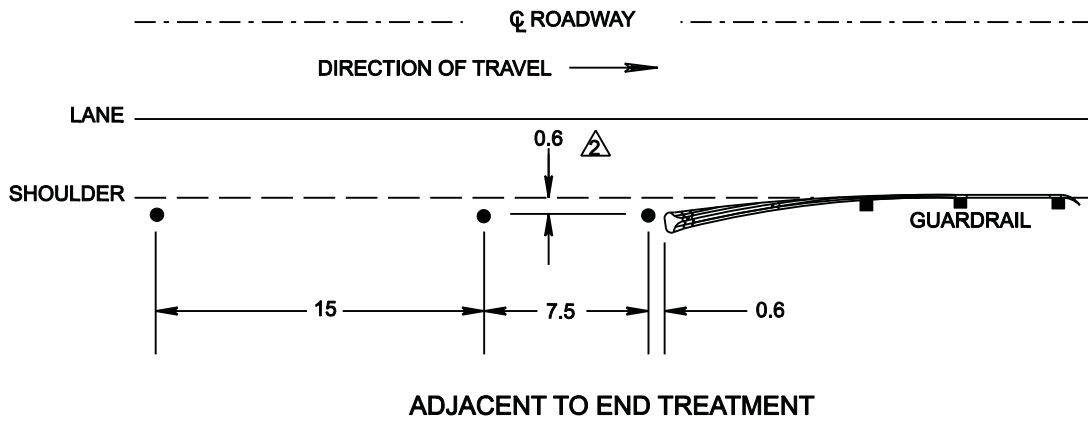
Date: NOVEMBER 23, 2004



**SAND BARREL
CUSHION SYSTEM**

Prepared By: M.T.	Checked By: R.Y.	Scale: N.T.S.	Dwg No.: TEB 3.19
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LEGEND:

- DELINEATOR GUIDEPOST

NOTE:

VARIOUS TYPES OF END TREATMENTS MAY BE USED AS PER PROJECT REQUIREMENTS.

	Post Offset	B.K.	01 Nov 07
	Note added	B.K.	12/07/05
No.	REVISIONS	BY	DATE

Approved:
Original approved by
Alberta Transportation and Utilities
Traffic Operation Branch

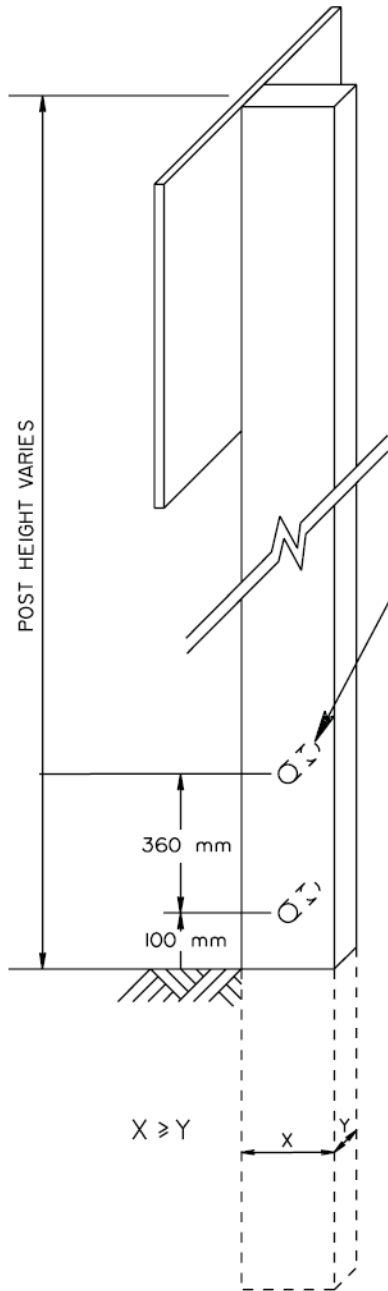
Executive Director,
Technical Standards Branch



Date: DECEMBER 11, 1992

GUIDE POST DELINEATION FOR GUARDRAIL

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.51
---------------------	--------------------	------------------	----------------------



2-38 mm DIA. HOLES TREATED WITH AN APPROVED WOOD PRESERVATIVE.

FILL EACH HOLE WITH A SINGLE PIECE OF CLOSED CELL INSULATION (E.G., EXPANDING STYROFOAM) CUT FLUSH WITH FACE OF POST.

THE ORIENTATION OF THE POSTS FOR THE SIGN MOUNTING SHALL BE IN ACCORDANCE WITH X AND Y AS SHOWN.

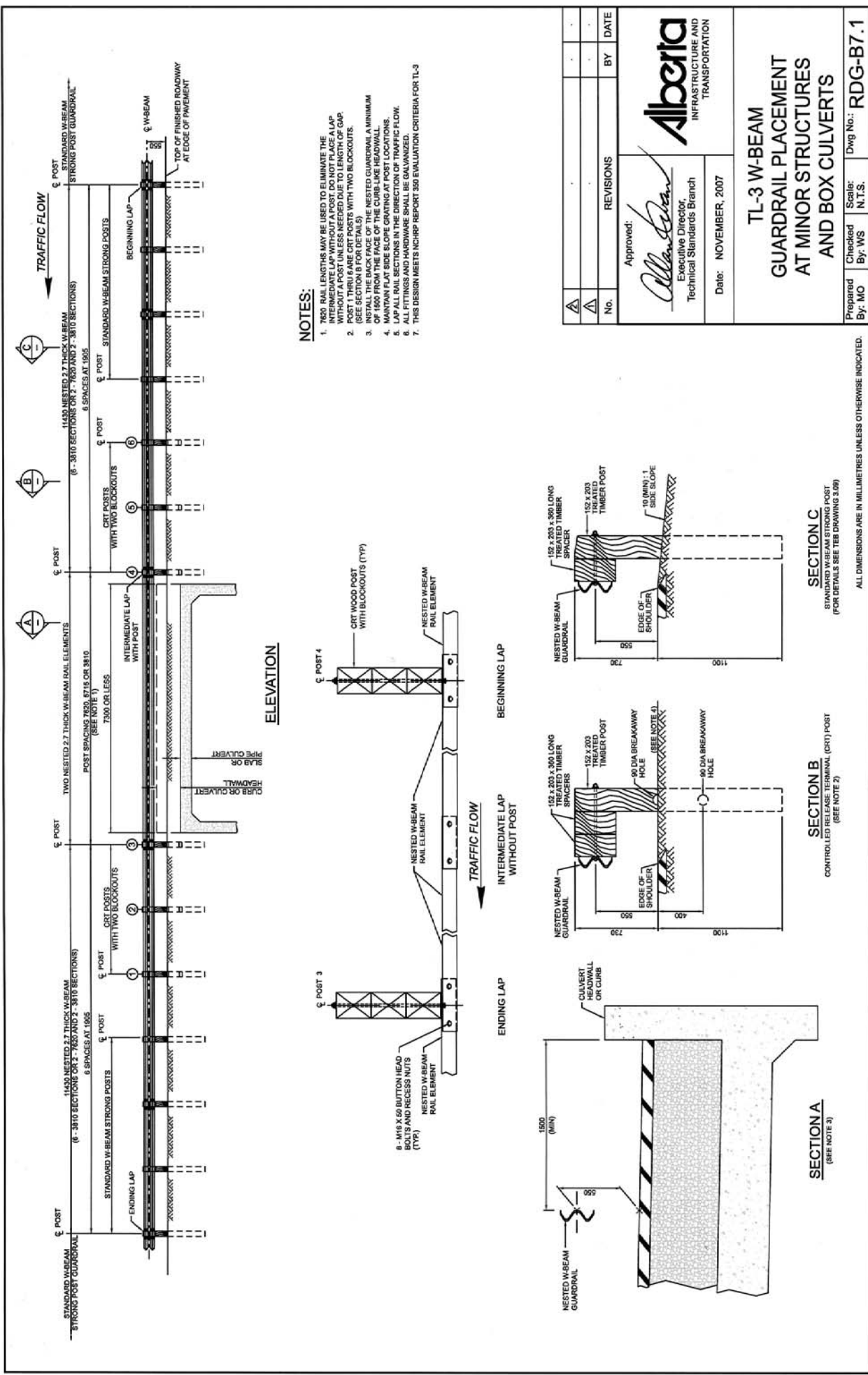
HOLES ARE TO BE DRILLED PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.

DIRECTION OF TRAFFIC FLOW →

NOTE:
 THE BREAKAWAY FEATURE FOR WOOD POSTS WITH CROSS-SECTIONAL DIMENSIONS GREATER THAN 100 mm X 100 mm IS REQUIRED FOR POSTS LOCATED WITHIN THE CLEAR ZONE AND DESIRABLE FOR POSTS LOCATED OUTSIDE THE CLEAR ZONE (WITHIN HIGHWAY RIGHT-OF-WAY).

	DWG. No.	TEB 1.81
	Date	JUNE 13/08
	Revision	
	Revision	

TYPICAL
 BREAKAWAY WOOD POST



NOTES:

1. 7620 RAIL LENGTHS MAY BE USED TO MINIMIZE THE INTERMEDIATE LAP WITHOUT A POST. DO NOT PLACE A LAP WITHOUT A POST UNLESS NEEDED DUE TO LENGTH OF GAP (SEE SECTION 8 FOR DETAILS)
2. POST 1, THRU 6 ARE CRT POSTS WITH TWO BLOCKOUTS.
3. POST 7 IS AN INTERMEDIATE LAP WITHOUT A POST. A MINIMUM OF 1500 FROM THE FACE OF THE CURBLINE HEADWALL.
4. MAINTAIN FLAT SIDE SLOPE GRATING AT POST LOCATIONS.
5. LAP ALL RAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
6. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
7. THIS DESIGN MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TL-3

ELEVATION

REVISIONS		BY	DATE

Approved: *Allyson Green*
Executive Director
Technical Standards Branch

Date: NOVEMBER, 2007

Alberia
INFRASTRUCTURE AND TRANSPORTATION

**TL-3 W-BEAM
GUARDRAIL PLACEMENT
AT MINOR STRUCTURES
AND BOX CULVERTS**

Prepared By: MO
Checked By: WS
Scale: N.T.S.
Dwg No.: RDG-B7.1

APPENDIX B7

H-APP-B7-5

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

SECTION A
(SEE NOTE 3)

SECTION B
CONTROLLED FLEXIBILITY TERMINAL (CRT) POST
(SEE NOTE 2)

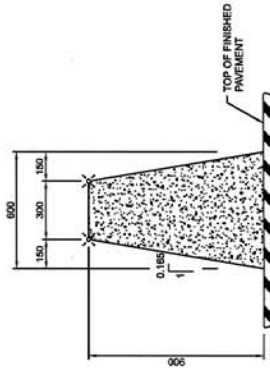
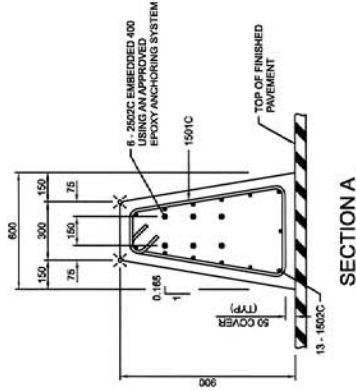
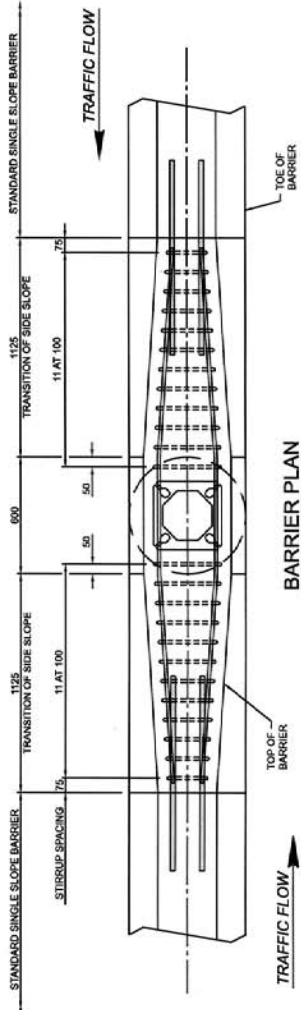
SECTION C
STANDARD W-BEAM STRONG POST
(FOR DETAILS SEE TEB DRAWING 3.09)

NOTES:

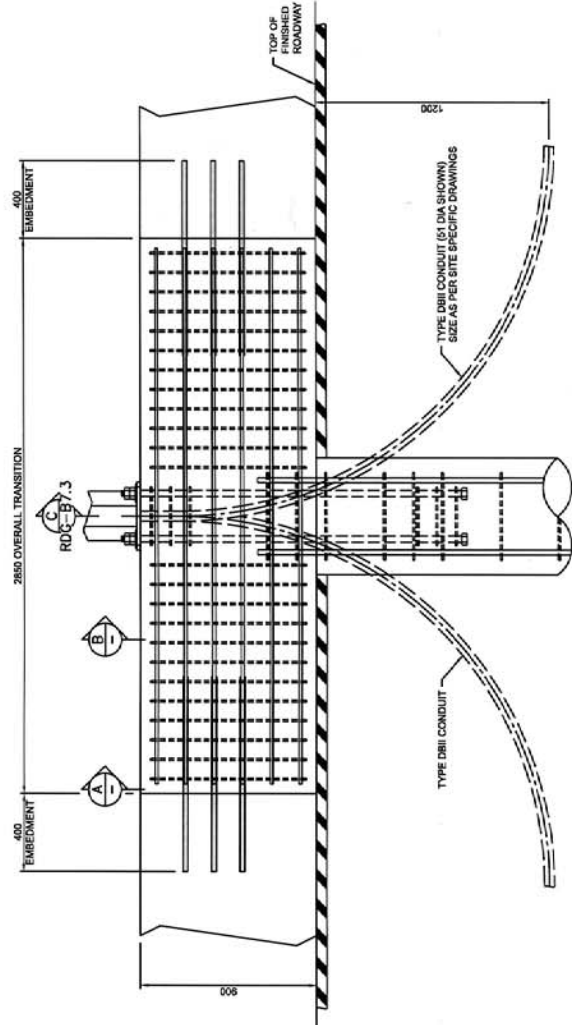
1. PROVIDE 20mm CHAMFER AT TOP EDGES OF BARRIER.
2. CONCRETE FOR PILES SHALL BE CLASS "PILE" UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 25 MPa).
3. CONCRETE FOR BARRIER SHALL BE CLASS "BARRIER" UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).

CONSTRUCTION NOTES:

1. PLACING CONCRETE FOR THE BARRIER TRANSITION MAY BE DONE BY:
 - i. REMOVING THE 285mm LONG SECTION OF PILE AND DRILLING AND CASTING CONCRETE FOR THE BARRIER TRANSITION.
 - ii. CONSTRUCTION JOINTS DURING CONCRETE PLACEMENT OF THE STANDARD SINGLE SLOPE BARRIER.
2. EXCAVATIONS MADE THROUGH THE ACP AND SUPPORTING ROAD BASE MATERIAL TO EXPOSE THE ELECTRICAL CONDUIT SHALL BE MADE ONLY WITHIN THE 2850 X 600 FOOTPRINT OF THE TRANSITION BARRIER. LIGHT WEIGHT MATERIAL SUCH AS COARSE SAND OR GRAVEL SHOULD BE USED TO PROVIDE LONGITUDINAL SAW CUTS THROUGH ACP ALONG BOTTOM EDGE OF BARRIER PRIOR TO DRILLING OF PILE HOLE. SAW CUTS SHALL BE OF SUFFICIENT LENGTH AND DEPTH TO PREVENT CHIPPING DURING PILE HOLE DRILLING.
3. ALLOW PILE CONCRETE TO CURE AT LEAST 3 DAYS PRIOR TO PLACING BARRIER CONCRETE.
4. SIZE AND LOCATION OF CONDUIT MAY VARY AS PER SITE SPECIFIC DRAWINGS. MODIFICATIONS TO THIS DRAWING SHALL BE MADE AT THE CONSULTANT'S RISK AND WITHOUT THE CONSULTANT'S PERMISSION.
5. PLACEMENT OF THE CONDUIT SHALL NOT BE MADE WITHOUT THE CONSULTANT'S PERMISSION.



STANDARD SINGLE SLOPE BARRIER



BARRIER ELEVATION

No.	REVISIONS	BY	DATE

Approved: *[Signature]*
 Executive Director
 Technical Standards Branch

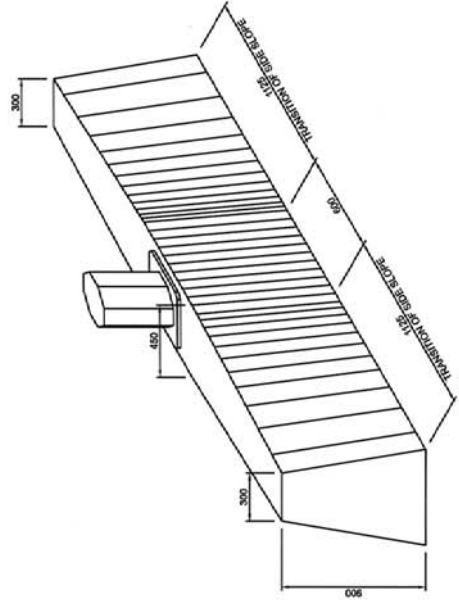
Date: NOVEMBER, 2007



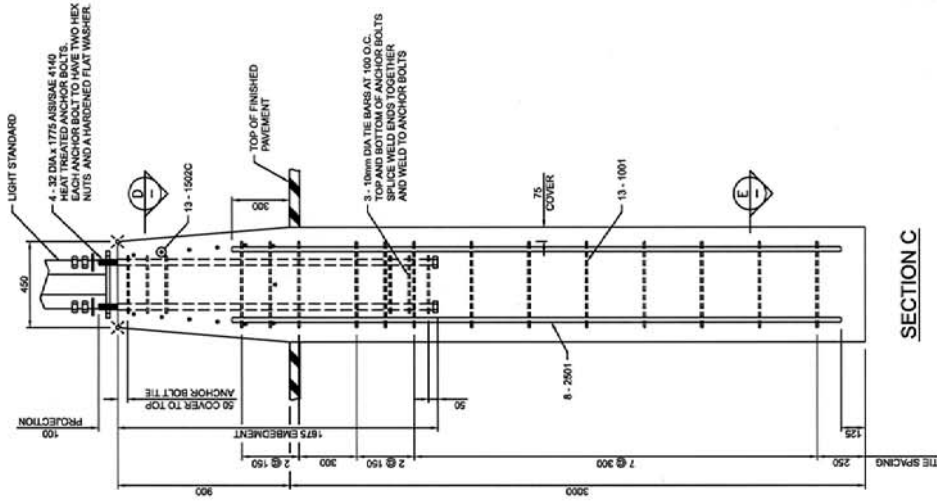
**TL-4 SINGLE SLOPE
 CONCRETE BARRIER TRANSITION
 AT MEDIAN LIGHT STANDARD
 SHEET 1 OF 2**

Prepared By: NVS	Checked By: WS	Scale: N.T.S.	Dwg No: RDG - B7.2
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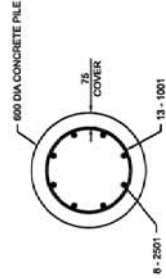
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



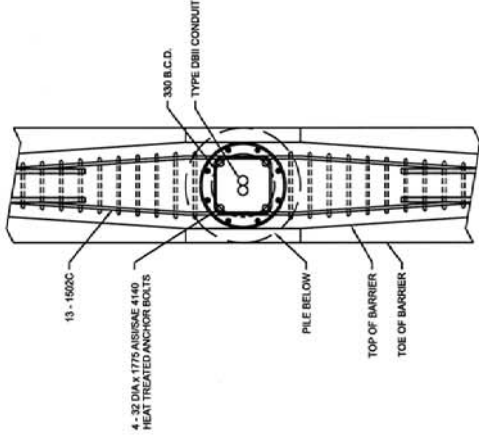
SINGLE SLOPE MEDIAN BARRIER TRANSITION ISOMETRIC



SECTION C



SECTION E



SECTION D

BAR LIST: TRANSITION BARRIER								
MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1501C	10	13	A	450	-	-	1 750	18
1501C	15	24	B	LENGTH: X = 480 Y = 480 Z = VARIES FROM 210 TO 353 IN INCREMENTS OF 13			2 660 (AVG)	100
**1502C	15	13	51TR	-	-	-	2 750	56
2501	25	8	51TR	-	-	-	3 175	100
2502C	25	12	51TR	-	-	-	1 000	47
						PLAIN	TOTAL Lg =	116
						EPOXY COATED	TOTAL Lg =	250
							TOTAL Lg =	300

**FIELD BEND TO SUIT

BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL BE IN ACCORDANCE WITH CANADIAN STANDARD FOR STEEL REINFORCING IN CONCRETE, FIRST CANADIAN EDITION 1982, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92
- "BILLET" STEEL BARS FOR CONCRETE REINFORCEMENT.
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.

Approved:	REVISIONS	BY	DATE
<i>Colleen...</i> Executive Director Technical Standards Branch			
Date:	NOVEMBER, 2007		
TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION AT MEDIAN LIGHT STANDARD SHEET 2 OF 2			
Prepared By: NVS	Checked By: WS	Dwg No: RDG - B7.3	
		Scale: N.T.S.	

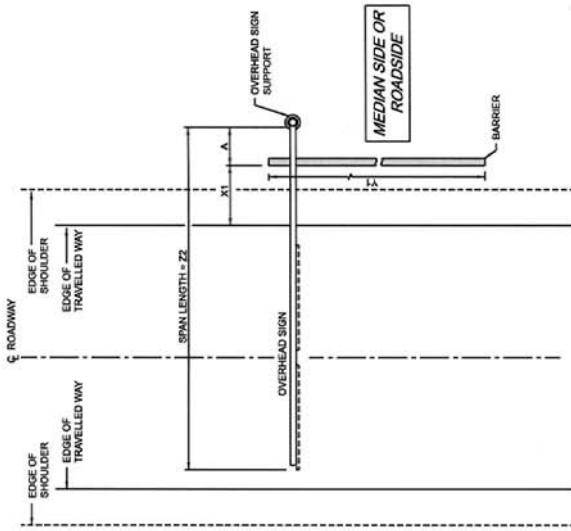
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

NOTES:

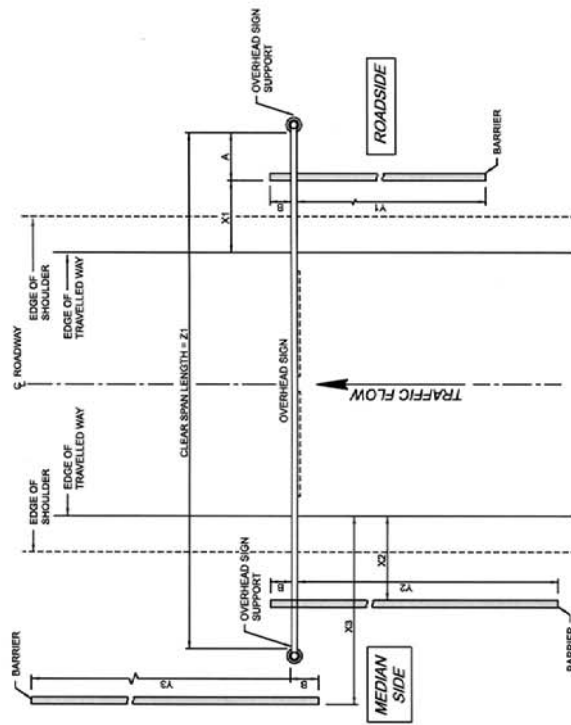
1. APPLICABLE FOR URBAN AND RURAL CROSS SECTIONS BASED ON BENEFIT-COST ANALYSIS WITH CONSIDERATIONS FOR COLLISION COSTS, CANTILEVER SIGN STRUCTURES ARE GENERALLY PREFERRED OVER OVERHEAD SIGN BRIDGE STRUCTURES, UP TO THE SPECIFIED MAXIMUM CANTILEVER SPAN. LENGTH PROVIDED IN TABLES 2 AND 3.
2. THE USE OF SAND BARRELS (SEE AT STANDARD DRAWING TEB 3.19) IS RECOMMENDED WHEN OVERHEAD SIGN SUPPORTS ARE LOCATED IN BEAM ZONE BEHIND BARRIER PROTECTION.
3. OVERHEAD SIGN SUPPORTS SHOULD BE LOCATED IN BEAM ZONE BEHIND BARRIER PROTECTION, WHEN A BARRIER SYSTEM IS WARRANTED. THE BEAM BULLNOSE BARRIER SYSTEM IS GENERALLY RECOMMENDED, PROVIDED THAT THERE IS SUFFICIENT SPACE IN THE MEDIAN OR SHOULDER FOR PROPER INSTALLATION. REFER TO RDG-85.8 AND RDG-85.7 FOR THREE BEAM BULLNOSE GENERAL LAYOUTS.
4. ANALYSE BARRIER SYSTEMS SHOWN IN TABLE 1 MAY BE USED IF PROVEN BY BENEFIT-COST VARIANCES FROM TABLES 2 AND 3 MAY BE REQUIRED ON A SITE SPECIFIC BASIS TO MAINTAIN CLEARANCE IN BEAM ZONE BEHIND BARRIER PROTECTION. REFER TO BARRIERS, OPES, AND ROAD CANTILEVER IN SIGN CHARTER FOR SITE SPECIFIC BENEFIT-COST ANALYSIS MAY BE REQUIRED TO DETERMINE THE OPTIMUM OVERHEAD SIGN SPAN AND BARRIER SYSTEM CONFIGURATION.
5. THE LENGTH OF NEED (LON) SHOWN IN TABLES 2 AND 3 ARE BASED ON ALIGNING THE BARRIER WITH THE OVERHEAD SIGN SUPPORT. REFER TO THE DEPARTMENT'S ROADSIDE DESIGN GUIDE FOR MAXIMUM FLARE RATES.
6. SUPPORTS FOR CANTILEVER SIGNS IN URBAN AREAS WITH NARROW MEDIANS WITH CONTINUOUS MEDIAN CONCRETE BARRIER ARE GENERALLY PREFERRED IF PLACED ON THE CONCRETE MEDIAN BARRIER AS OPPOSED TO THE SUPPORT BEING LOCATED ON THE SHOULDERS.
7. SUPPORTS FOR CANTILEVER SIGNS IN RURAL AND URBAN AREAS IN WIDER MEDIANS (WITHOUT CONTINUOUS CONCRETE MEDIAN BARRIER) ARE MORE ECONOMICAL IF PLACED ON THE ROADSIDE.
8. THE MINIMUM SETBACK DISTANCE "X" PROVIDER ALLOWANCE FOR THE MAXIMUM DYNAMIC DEFLECTION OF THE BARRIER.
9. REFER TO SECTION H.5.4.4 FOR ZONE OF INTRUSION CONSIDERATIONS.

ASSUMPTIONS

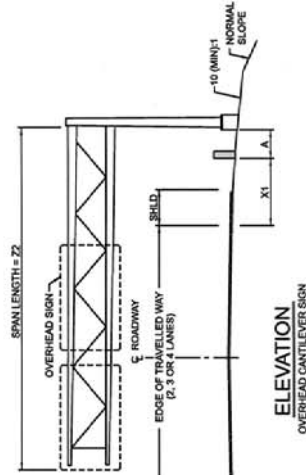
1. CLEAR ZONE DISTANCES USED IN THE DEVELOPMENT OF THIS STANDARD DRAWING WERE BASED ON THE ASSUMPTION OF FULL SIDE SLOPES OF 6:1 OR FLATTER UNLESS OTHERWISE INDICATED.
2. THE MAXIMUM WIND SPEED ASSUMED FOR THE DEVELOPMENT OF THIS STANDARD DRAWING WERE ASSUMED TO BE 10 000 VPD, 30 000 VPD, AND 50 000 VPD FOR 4-LANE, 6-LANE, AND 8-LANE DIVIDED HIGHWAYS, RESPECTIVELY.
3. COLLISION COSTS FOR BENEFIT-COST ANALYSIS WERE OBTAINED USING THE COMPUTER PROGRAM RSP (ROADSIDE SAFETY ANALYSIS PROGRAM).



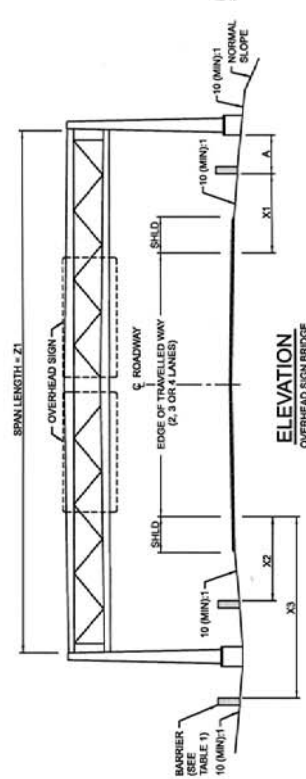
PLAN VIEW
OVERHEAD CANTILEVER SIGN



PLAN VIEW
OVERHEAD SIGN BRIDGE



ELEVATION
OVERHEAD CANTILEVER SIGN



ELEVATION
OVERHEAD SIGN BRIDGE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE

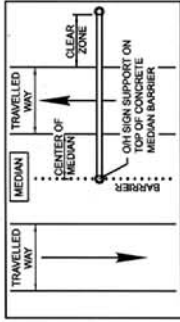
Approved: *Alta Selman*
Executive Director
Technical Standards Branch

Date: NOVEMBER, 2007

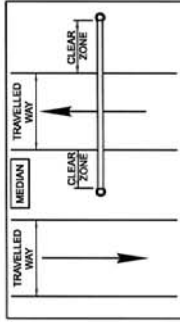
Alberta
INFRASTRUCTURE AND TRANSPORTATION

PLACEMENT AND PROTECTION OF OVERHEAD SIGN SUPPORTS FOR DIVIDED ROADS
SHEET 1 OF 2

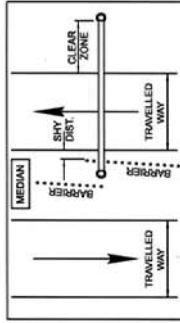
Prepared By: MC Checked By: WS Scale: Dwg No.: RDG-B7.4



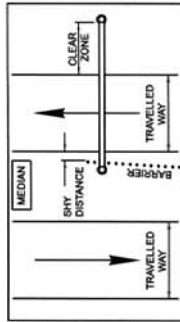
A4



A3



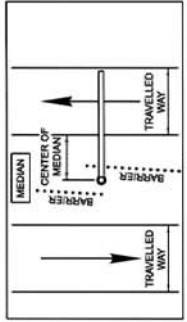
A2



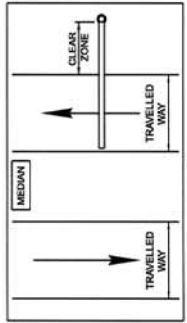
A1

NOTES:

1. SETBACK DISTANCE "X" INCLUDES WIDTH OF BARRIER PLUS A DYNAMIC DEFLECTION ALLOWANCE.
2. FOR RIGID BARRIERS, REFER TO SECTION H.6.5 OF THE ROADSIDE DESIGN GUIDE FOR ZONE OF INTRUSION CONSIDERATIONS.
3. "P" INDICATES THE OVERHEAD SIGN SUPPORT DIAMETER.
4. "C" INDICATES SITE SPECIFIC CLEARANCE DISTANCE. REFER TO SECTION H.3.21 OF THE ROADSIDE DESIGN GUIDE FOR OBSTACLE CLEARANCE DISTANCE.
5. "Y" INDICATES THE DISTANCE FROM THE CENTER OF THE OBSTACLE TO THE OVERHEAD SIGN SUPPORT OR BARRIER, WHICHEVER IS CLOSER TO THE TRAVELLED WAY. IF THE OBSTACLE IS AN OVERHEAD SIGN SUPPORT, "Y" SHALL BE GREATER THAN THE SIGN SUPPORT DIAMETER. "Y" SHALL BE GREATER THAN THE SIGN SUPPORT DIAMETER UNLESS OTHERWISE DICTATED BY UNIQUE SITE SPECIFIC CIRCUMSTANCES.



B2



B1

CANTILEVER SIGN SCENARIOS

TABLE 1 - MINIMUM BARRIER SETBACK AND EXTENSION

ROADWAY FACILITY (No. of Lanes)	DESIGN SPEED (km/hr)	OBSTACLE OFFSET** X1 (m)	OBSTACLE OFFSET** X2 (m)	OBSTACLE OFFSET** X3 (m)	LENGTH OF NEED Y1 (m)	LENGTH OF NEED Y2 (m)	LENGTH OF NEED Y3 (m)	EXTENSION, B (mm)
4	60	C	C	C	150	150	150	10000
4	110	C	2.8	2.8 * 2A * P	150	150	150	9000
4	110	C	2.8	2.8 * 2A * P	150	150	150	4000 *
4	110	C	2.8	2.8 * 2A * P	150	150	150	4000 *
4	130	C	C	C	150	150	150	4000
4	130	C	C	C	150	150	150	3000

* WHEN ANCHORED WITH A CABLE ANCHOR TERMINAL (REFER TO RDG-B1.1 AND RDG-B5.1)

TABLE 2 - BARRIER GEOMETRIC PARAMETERS FOR "RURAL" CROSS SECTIONS

AT	ROADWAY FACILITY (No. of Lanes)	DESIGN SPEED (km/hr)	OBSTACLE OFFSET** X1 (m)	OBSTACLE OFFSET** X2 (m)	OBSTACLE OFFSET** X3 (m)	LENGTH OF NEED Y1 (m)	LENGTH OF NEED Y2 (m)	LENGTH OF NEED Y3 (m)	OVERHEAD SIGN BRIDGE SCENARIO REFERENCE	CANTILEVER SIGN CLEAR SPAN	SCENARIO REFERENCE
RDG-410.4-90	4	90	C	C	C	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
RDG-410.4-100	4	100	C	2.8	2.8 * 2A * P	150	150	150	9.8 * C * A	MAX 7.4 * C (ROADSIDE)	B1
RDG-410.4-110	4	110	C	2.8	2.8 * 2A * P	150	150	150	10.2 * C * A	MAX 7.4 * C (ROADSIDE)	B1
RDG-411.4-90	4	90	C	2.8	2.8 * 2A * P	150	150	150	9.8 * C * A	MAX 7.4 * C (ROADSIDE)	B1
RDG-411.4-100	4	100	C	2.8	2.8 * 2A * P	150	150	150	10.2 * C * A	MAX 7.4 * C (ROADSIDE)	B1
RDG-412.4-120	4	120	C	C	C	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
RDG-412.4-130	4	130	C	C	C	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
RDG-412.4-130	6	130	C	C	C	150	150	150	11.1 * 2C	MAX 11.1 * C (ROADSIDE)	B1

** SEE NOTE 9

TABLE 3 - BARRIER GEOMETRIC PARAMETERS FOR "URBAN" CROSS SECTIONS

AT	ROADWAY FACILITY (No. of Lanes)	DESIGN SPEED (km/hr)	OBSTACLE OFFSET** X1 (m)	OBSTACLE OFFSET** X2 (m)	OBSTACLE OFFSET** X3 (m)	LENGTH OF NEED Y1 (m)	LENGTH OF NEED Y2 (m)	LENGTH OF NEED Y3 (m)	OVERHEAD SIGN BRIDGE SCENARIO REFERENCE	CANTILEVER SIGN CLEAR SPAN	SCENARIO REFERENCE
URD-208.2-80	4	80	C	C	C	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
URD-410.4-90	4	90	C	2.8	2.8 * 2A * P	150	150	150	9.8 * C * A	MAX 7.4 * C (ROADSIDE)	B1
URD-410.4-100	4	100	C	2.8	2.8 * 2A * P	150	150	150	10.2 * C * A	MAX 7.4 * C (ROADSIDE)	B1
URD-411.4-90	4	90	C	2.8	2.8 * 2A * P	150	150	150	9.8 * C * A	MAX 7.4 * C (ROADSIDE)	B1
URD-411.4-100	4	100	C	2.8	2.8 * 2A * P	150	150	150	10.2 * C * A	MAX 7.4 * C (ROADSIDE)	B1
URD-411.4-110	4	110	C	2.8	2.8 * 2A * P	150	150	150	10.2 * C * A	MAX 7.4 * C (ROADSIDE)	B1
URD-412.4-100	4	100	C	2.8	2.8 * 2A * P	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
URD-412.4-110	4	110	C	2.8	2.8 * 2A * P	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
URD-412.4-120	4	120	C	2.8	2.8 * 2A * P	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
URD-412.4-130	4	130	C	2.8	2.8 * 2A * P	150	150	150	7.4 * 2C	MAX 7.4 * C (ROADSIDE)	B1
URD-412.4-130	6	130	C	2.8	2.8 * 2A * P	150	150	150	11.1 * 2C	MAX 11.1 * C (ROADSIDE)	B1

** SEE NOTE 5

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
Δ			
Δ			

Approved: *Alan Kwan*
 Executive Director,
 Technical Standards Branch

Date: NOVEMBER, 2007

ALBERTA
 INFRASTRUCTURE AND
 TRANSPORTATION

**PLACEMENT AND PROTECTION
 OF OVERHEAD SIGN SUPPORTS
 FOR DIVIDED ROADS**
SHEET 2 OF 2

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B7.5
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