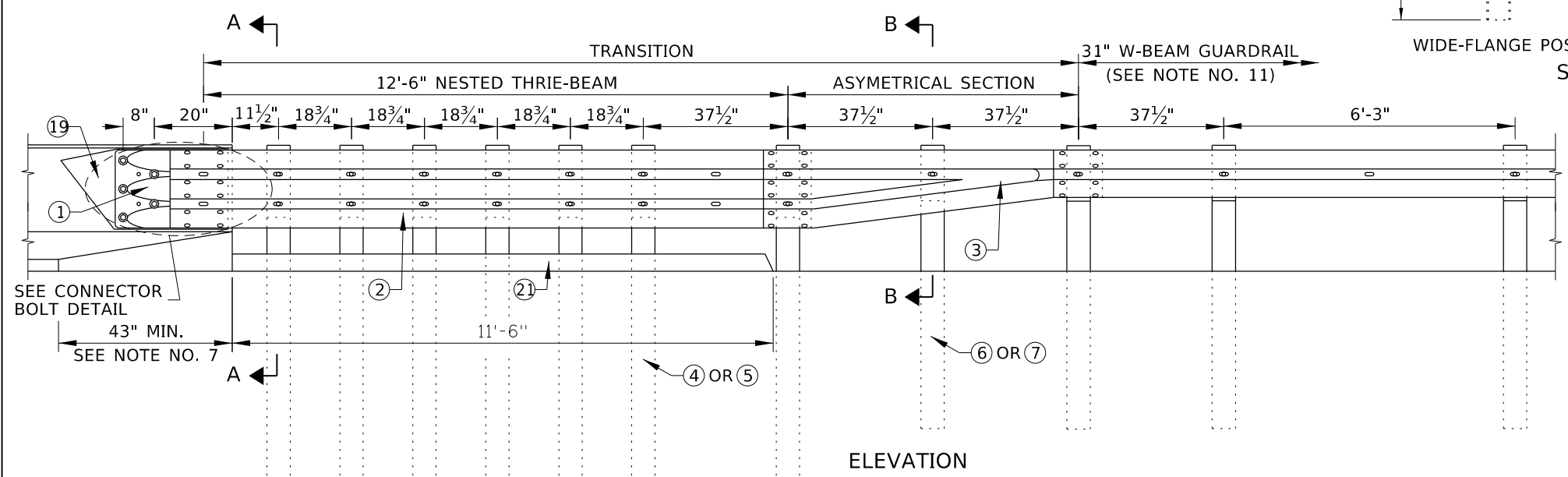
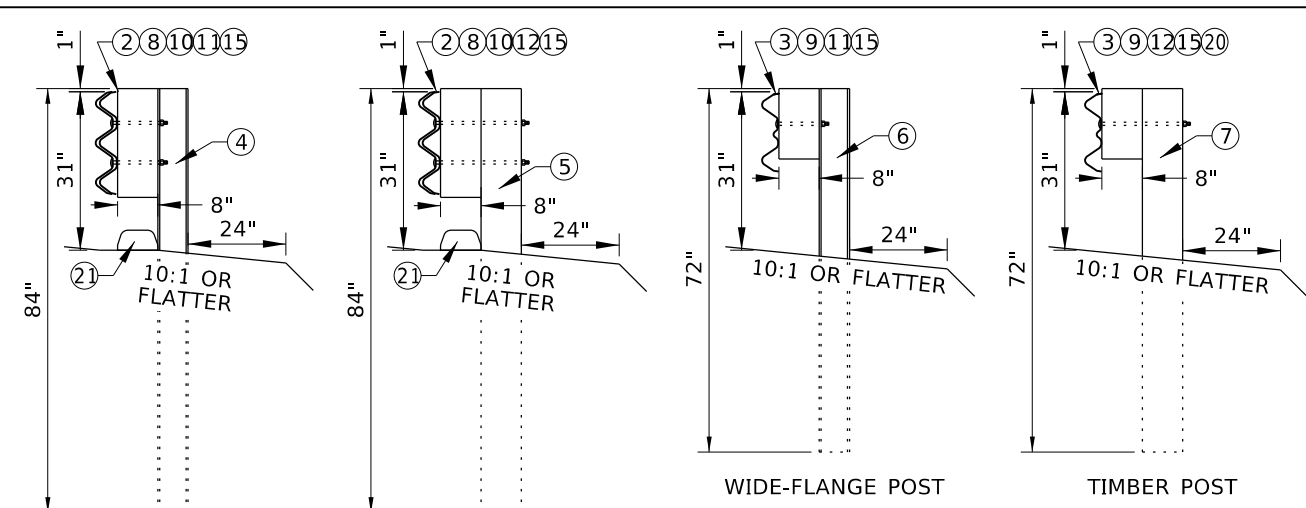
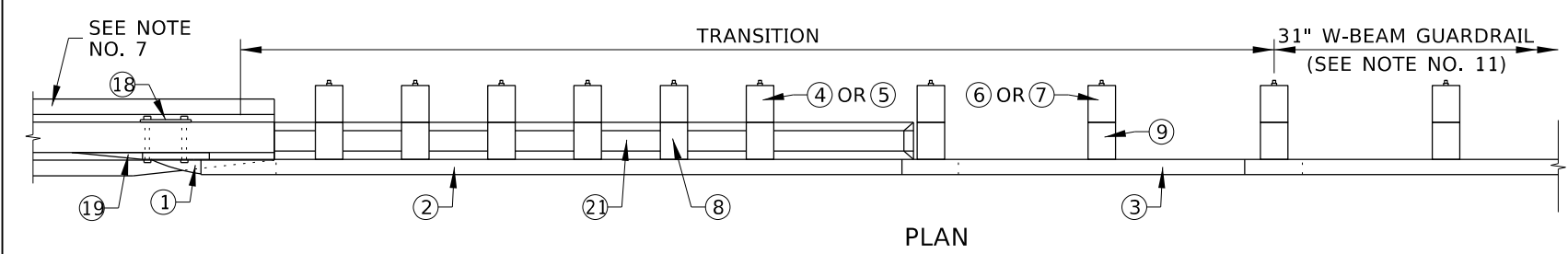
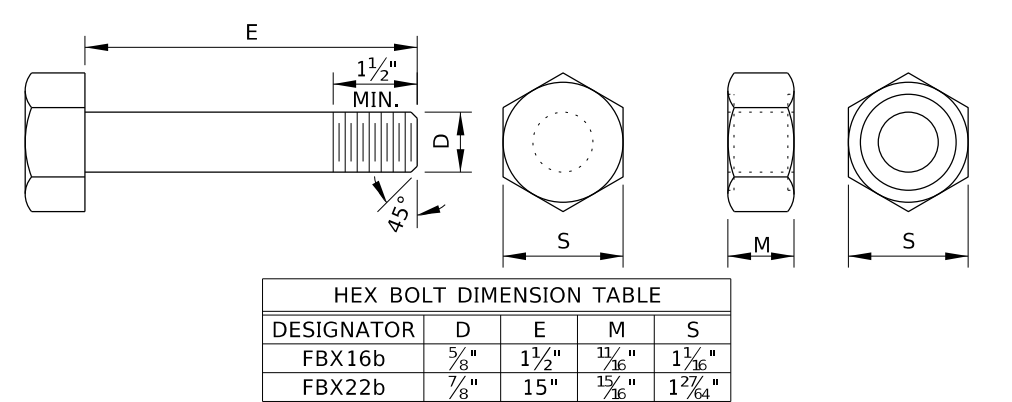
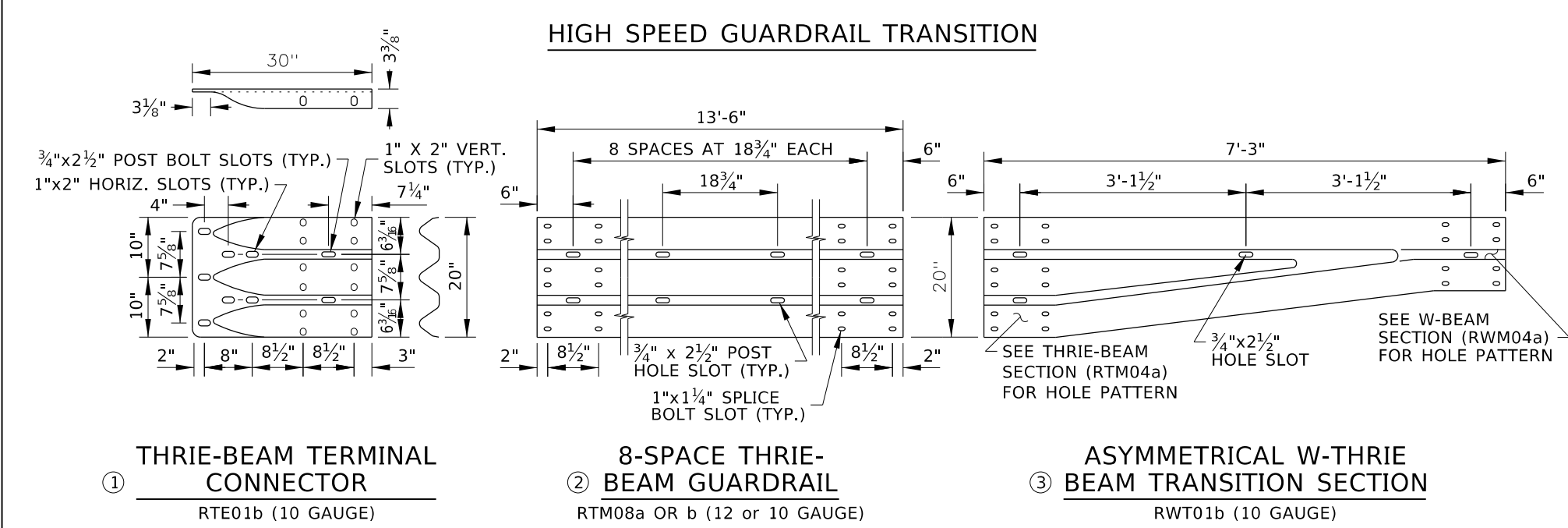


GUARDRAIL BOLT DIMENSION TABLE		
DESIGNATOR	L	T
FBB01	1 1/4"	1 1/8"
FBB03	10"	4"
FBB04	18"	4"

101112 GUARDRAIL BOLT AND RECESSED NUT
FBB01, FBB03, FBB04



HEX BOLT DIMENSION TABLE				
DESIGNATOR	D	E	M	S
FBX16b	5/8"	1 1/2"	11/16"	1 1/16"
FBX22b	7/8"	15"	15/16"	1 27/64"

1314 STRUCTURAL HEX BOLT AND NUT
FBX16b, FBX22b

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
7	09-03	MSM	12	11-06	MSM	17	06-17	RDL
8	11-03	MSM	13	05-07	MSM	18	08-18	RDL
9	06-04	MSM	14	11-08	JRV	19	03-19	RDL
10	11-04	MSM	15	09-10	PLR	20	02-20	RDL
11	04-06	MSM	16	08-11	RSC	21	04-26	RDL

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HIGHWAY DESIGN ENGINEER

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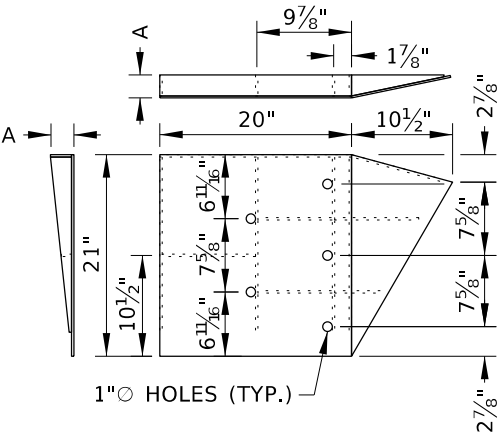
GUARDRAIL TRANSITION
HIGH SPEED

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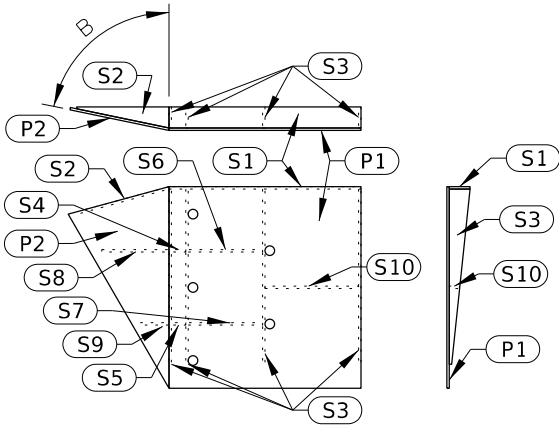
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PROFESSIONAL ENGINEER
RYAN D. LANCASTER
13683
APR 22, 2023
STATE OF IDAHO



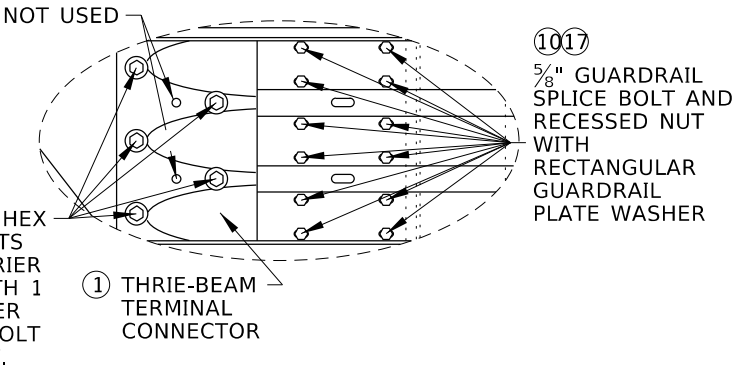
LEFT-HAND VERSION



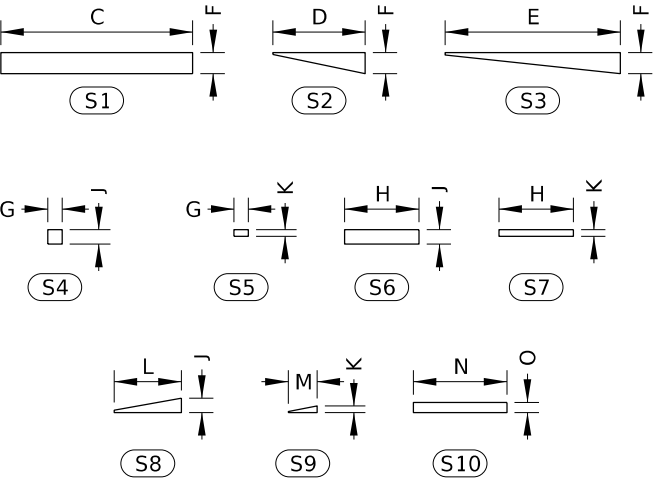
RIGHT-HAND VERSION

**19 CONCRETE BARRIER TO THRIE-BEAM
TRANSITION CONNECTOR PLATE**

FPB--, ASTM A36, SEE NOTE NO. 8



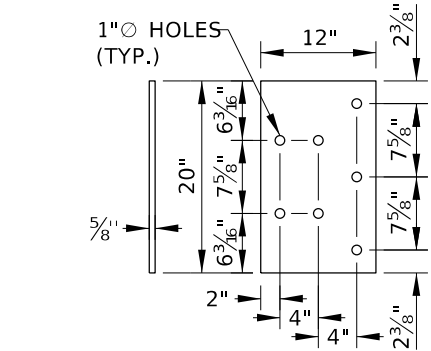
CONNECTOR BOLT DETAIL



CONNECTOR PLATE STIFFENER DETAIL

SEE NOTE NO. 8

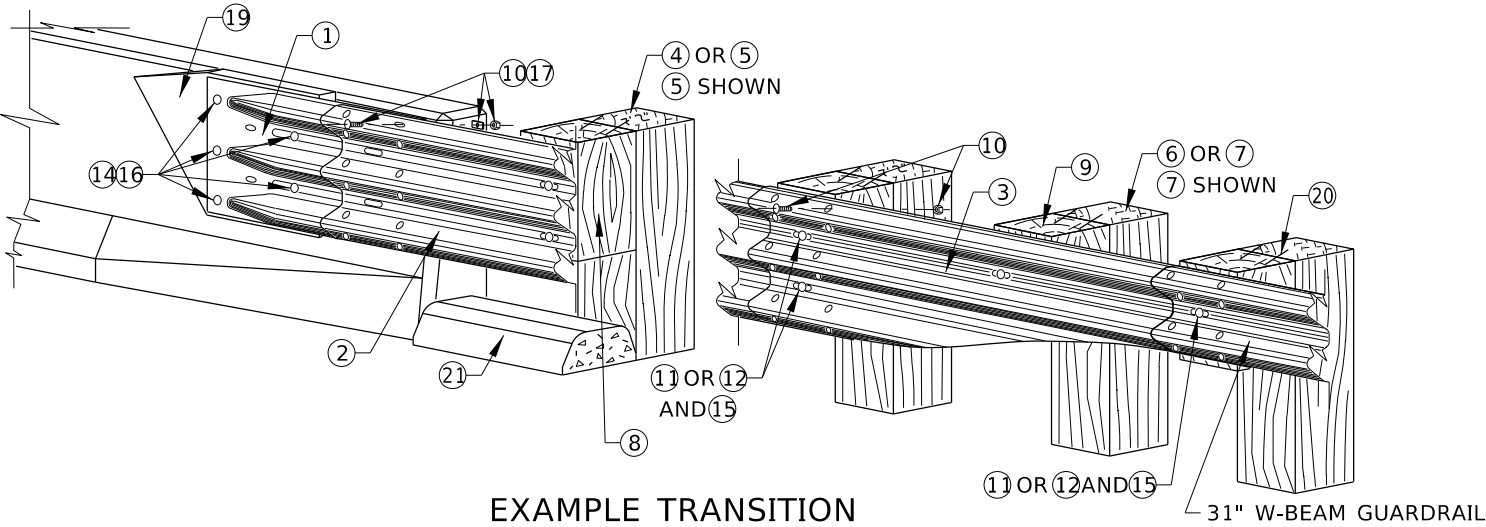
STIFFENER DIMENSION TABLE		
DIM.	F-SHAPE / NJ SHAPE	SINGLE SLOPE SHAPE
A	2"	4"
B	78 ³³ / ₆₄ "	69 ³³ / ₆₄ "
C	20"	20"
D	9"	9"
E	18 ⁵⁷ / ₆₄ "	18 ⁵⁷ / ₆₄ "
F	2"	3"
G	1 ⁵⁹ / ₆₄ "	1 ⁵⁹ / ₆₄ "
H	7 ⁶¹ / ₆₄ "	7 ⁶¹ / ₆₄ "
J	1 ⁵⁹ / ₆₄ "	2"
K	1"	1"
L	7"	7"
M	3"	3"
N	9 ⁶¹ / ₆₄ "	9 ⁶¹ / ₆₄ "
O	1"	1"



**18 THRIE-BEAM TRANSITION
CONNECTOR PLATE**

FPB07

EXAMPLE TRANSITION



HIGH SPEED GUARDRAIL TRANSITION HARDWARE COMPONENTS TABLE				
ITEM NO.	COMPONENT DESCRIPTION	QTY.	WIDE-FLANGE POST	TIMBER POST
1	THRIE-BEAM TERMINAL CONNECTOR	1	RTE01b	RTE01b
2	8-SPACE NESTED THRIE-BEAM GUARDRAIL	2	RTM08a OR b	RTM08a OR b
3	ASYMMETRICAL W-THRIE BEAM TRANSITION SECTION	1	RWT01b	RWT01b
4	84" WIDE-FLANGE GUARDRAIL POST	7	PWE--	-
5	84" TIMBER GUARDRAIL POST	7	-	PDE--
6	72" WIDE-FLANGE GUARDRAIL POST	2	PWE01	-
7	72" TIMBER GUARDRAIL POST	2	-	PDE02
8	MODIFIED THRIE-BEAM BLOCKOUT	7	PDB-- OR POLYETHYLENE	PDB--
9	W-BEAM BLOCKOUT	2	PDB01b OR POLYETHYLENE	PDB01a
10	5/8" X 1 1/4" GUARDRAIL SPLICE BOLT AND RECESSED NUT	32	FBB01	FBB01
11	5/8" X 10" GUARDRAIL BOLT AND RECESSED NUT	16	FBB03	-
12	5/8" X 18" GUARDRAIL BOLT AND RECESSED NUT	16	-	FBB04
13	5/8" X 1 1/2" STRUCTURAL HEX BOLT & NUT	14	FBX16b	-
14	7/8" X 15" STRUCTURAL HEX BOLT & NUT	5	FBX22b	FBX22b
15	5/8" PLAIN ROUND WASHER	16	FWC16a	FWC16a
16	7/8" HARDENED ROUND WASHER	10	FWC22b	FWC22b
17	RECTANGULAR GUARDRAIL PLATE WASHER	12	FWR03	FWR03
18	THRIE-BEAM TRANSITION CONNECTOR PLATE	1	FPB07	FPB07
19	CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE	1	FPB--	FPB--
20	16D GALVANIZED NAIL	4	-	N/A
21	CURB	1	N/A	N/A

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
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HIGHWAY DESIGN ENGINEER

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**GUARDRAIL TRANSITION
HIGH SPEED**

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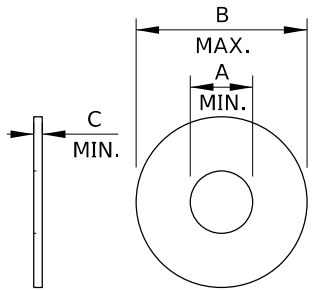
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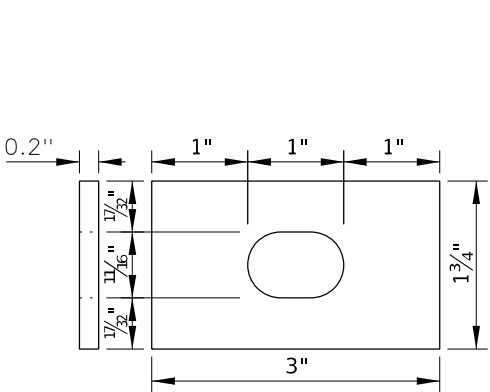




WASHER DIMENSION TABLE			
DESIGNATOR	A	B	C
FWC16a	0.649"	1.780"	0.090"
FWC22b	0.938"	1.780"	0.136"

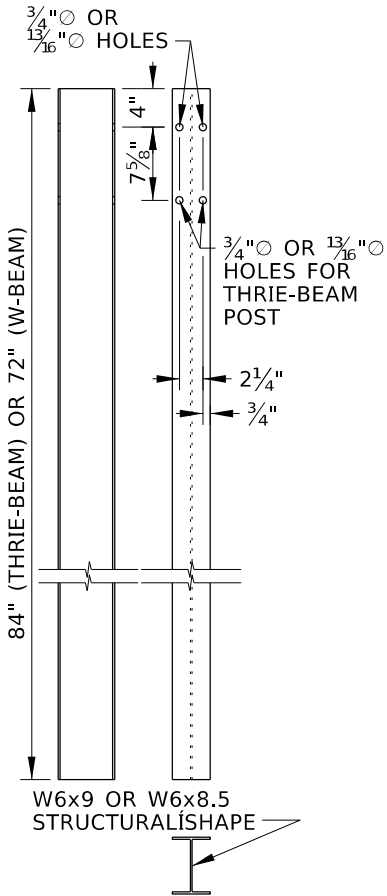
1516 ROUND WASHERS

FWC16a, FWC22b

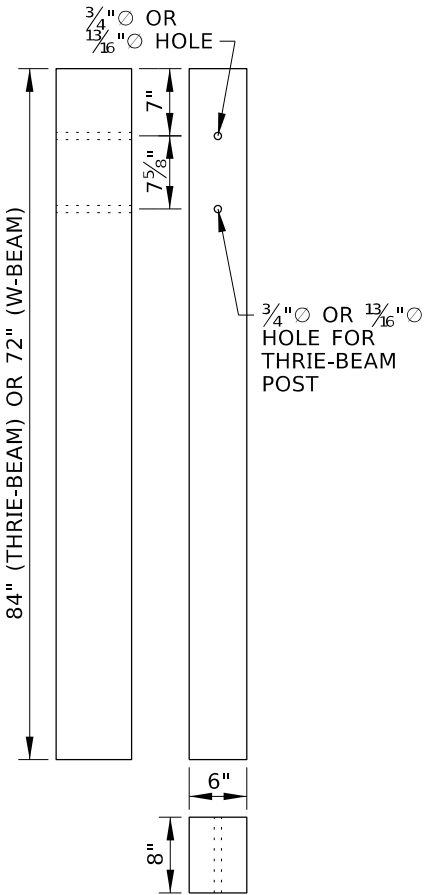


17 RECTANGULAR GUARDRAIL
PLATE WASHER

FWR03
SEE NOTE NO. 12

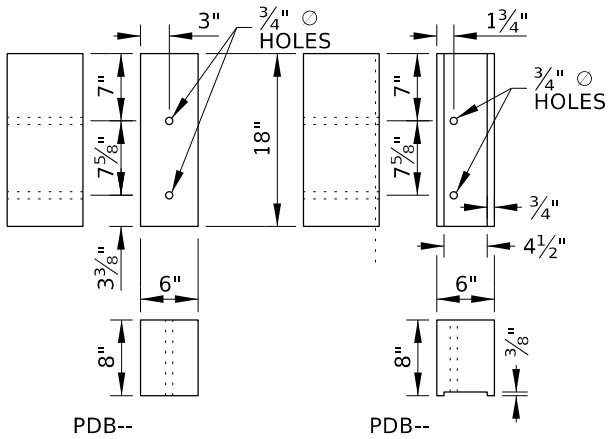


46 WIDE-FLANGE
PWE--, PWE01

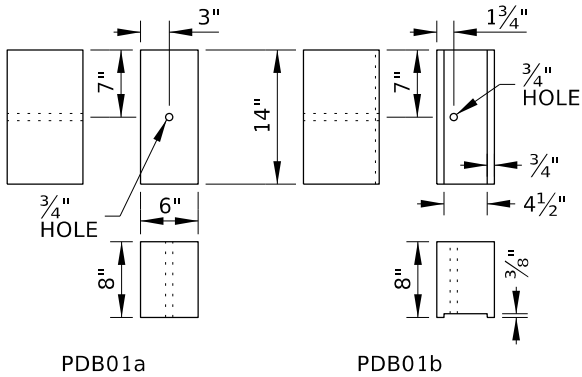


57 TIMBER
PDE--, PDE02

TRANSITION POSTS



8 MODIFIED THRIE-BEAM
TIMBER BLOCKOUTS



9 W-BEAM TIMBER BLOCKOUTS

NOTES

- USE THE TRANSITION ON HIGHWAYS WHERE THE POSTED SPEED LIMIT IS 45 MPH OR HIGHER AND WHERE 31" W-BEAM GUARDRAIL JOINS A BRIDGE RAIL OR PARAPET, CAST-IN-PLACE CONCRETE BARRIER, OR PRECAST CONCRETE BARRIER. THE GUARDRAIL TRANSITION SHOWN IS CONSIDERED TO BE A MASH TEST LEVEL 3 TRANSITION.
- PROVIDE BARRIER HARDWARE AS SHOWN AND AS SPECIFIED IN THE PUBLICATION "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE." WHERE THE GUIDE AND PLANS CONFLICT, PROVIDE HARDWARE COMPONENTS AS SHOWN ON THE PLANS.
- WIDE-FLANGE OR TIMBER POSTS MAY BE USED UNLESS OTHERWISE INDICATED. USE THE SAME POST MATERIAL AS IN THE ADJOINING 31" W-BEAM GUARDRAIL.
- USE TIMBER OR POLYETHYLENE BLOCKOUTS WITH WIDE-FLANGE POSTS. USE TIMBER BLOCKOUTS WITH TIMBER POSTS. USE THE SAME BLOCKOUT MATERIAL AS IN THE ADJOINING 31" W-BEAM GUARDRAIL. NAIL W-BEAM TIMBER BLOCKOUTS TO TIMBER POSTS TO RESTRICT BLOCK ROTATION.
- WHEN WIDE-FLANGE POSTS ARE USED AND WHEN PRACTICAL, INSTALL THE BOLTS (FBB02) ON THE UPSTREAM SIDE OF THE POST IN RELATION TO THE ADJACENT TRAFFIC.
- CONSTRUCT CURB TYPE 5 BENEATH THE THRIE-BEAM SECTION AS SHOWN. THE CURB CAN BE CAST-IN-PLACE OR PRECAST.
- THE FOLLOWING APPLY TO VARYING BARRIER CONNECTIONS:
 - BRIDGE RAIL OR PARAPET: SEE BRIDGE PLANS.
 - CAST-IN-PLACE CONCRETE BARRIER: USE THE CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE.
 - PRECAST CONCRETE BARRIER:
 - USE THE CONCRETE BARRIER TO THRIE-BEAM TRANSITION CONNECTOR PLATE.
 - CHAMFER THE FIRST 43 1/2" OF THE BARRIER THAT EXTENDS BEYOND THE FACE OF THE CURB BENEATH THE TRANSITION.
 - USE ANCHOR PINS TO PIN DOWN THE FIRST THREE BARRIER SECTIONS.
- THE FOLLOWING APPLY TO THE CONCRETE BARRIER TO THRIE-BEAM TERMINAL CONNECTOR PLATE:
 - USE ASTM A36 STEEL.
 - USE 3/16" THICK STEEL FOR PLATES P1 AND P2. USE 1/4" THICK STEEL FOR STIFFENERS S1 THROUGH S10.
 - WELD COMPONENTS WITH E60 ROD.
 - WELD STIFFENERS LOCATED ON THE OUTSIDE EDGES OF THE COVER PLATES WITH 3/16" CONTINUOUS BACK WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
 - WELD STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATES WITH 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
 - WELD RECTANGULAR AND TRIANGULAR COVER PLATES TOGETHER WITH A 3/16" CONTINUOUS BACK WELD ON BOTH SIDES.
 - GALVANIZE CONNECTOR PLATES AFTER PUNCHING AND ASSEMBLY.
- GALVANIZE THE THRIE-BEAM TERMINAL CONNECTOR PLATE.
- OVERLAP SPLICES SO THE EXPOSED W-BEAM EDGE IS DOWNSTREAM OF THE ADJACENT TRAFFIC.
- PROVIDE A MINIMUM OF 12'-6" OF 31" W-BEAM GUARDRAIL BETWEEN THE GUARDRAIL TRANSITION AND A GUARDRAIL TERMINAL OR ANCHOR.
- INSTALL RECTANGULAR GUARDRAIL PLATE WASHERS UNDER GUARDRAIL NUTS AT THE SPLICE BETWEEN THE THRIE-BEAM GUARDRAIL AND THRIE-BEAM TERMINAL CONNECTOR.
- DELINEATE THE TRANSITION WITH TYPE 9 DELINEATORS. SEE THE DELINEATOR STANDARD DRAWING FOR DELINEATOR SPACING.
- DRAWING NOT TO SCALE.

REVISIONS								
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
7	09-03	MSM	12	11-06	MSM	17	06-17	RDL
8	11-03	MSM	13	05-07	MSM	18	08-18	RDL
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HIGH SPEED

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