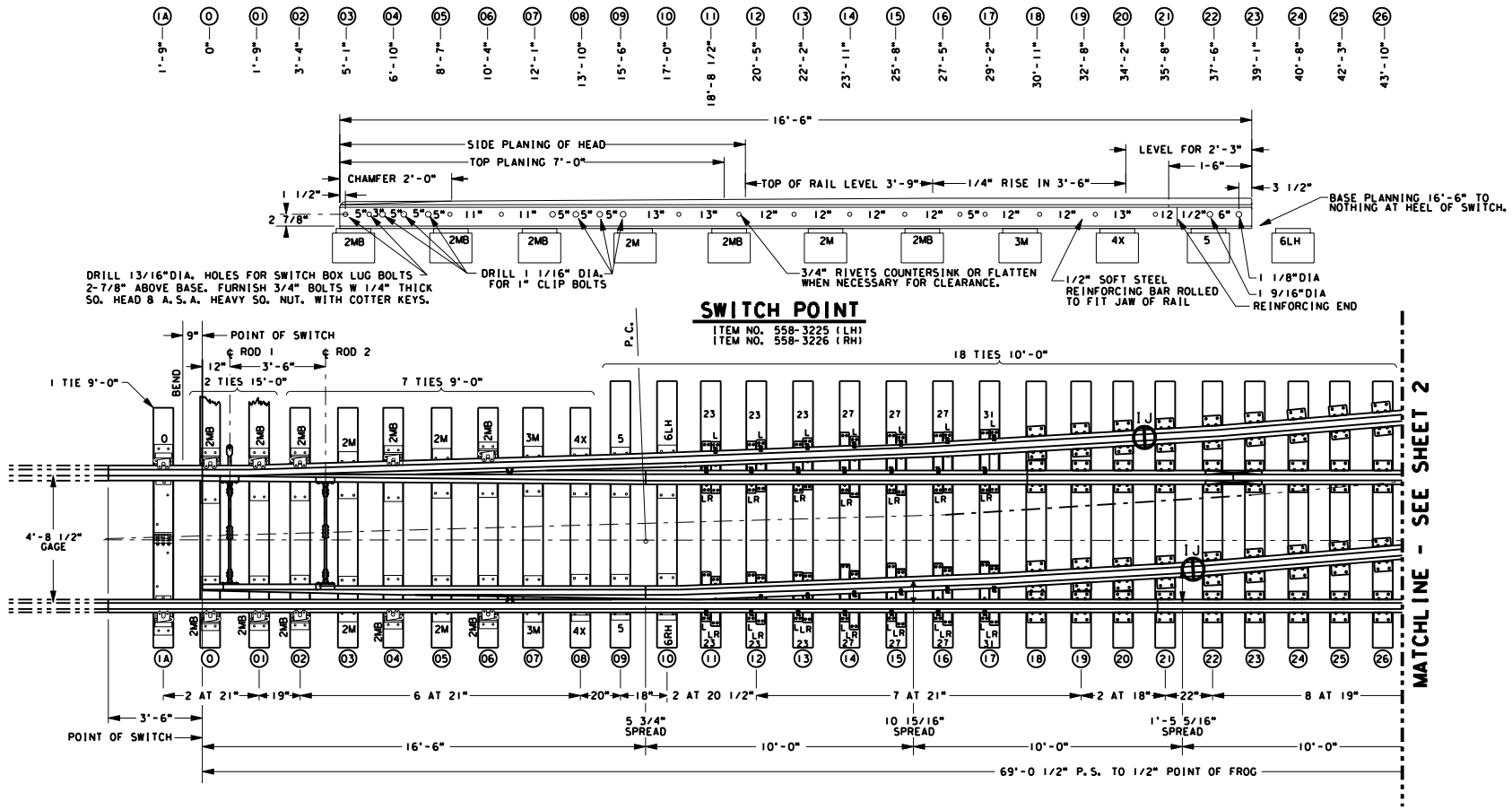
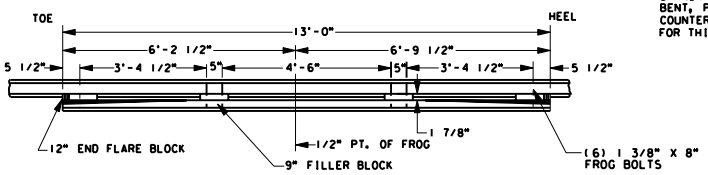
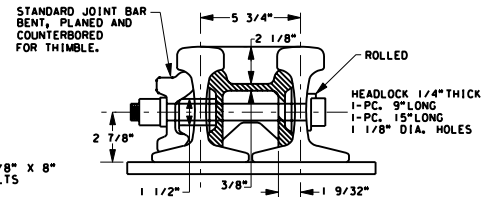
EXHIBIT "F-5"





13'-0" GUARD RAIL
ITEM NO. 556-4016



SECTION AT HEEL

THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. NOT TO BE USED FOR NEW CONSTRUCTION

UNION PACIFIC RAILROAD
Office of Chief Engineer Design

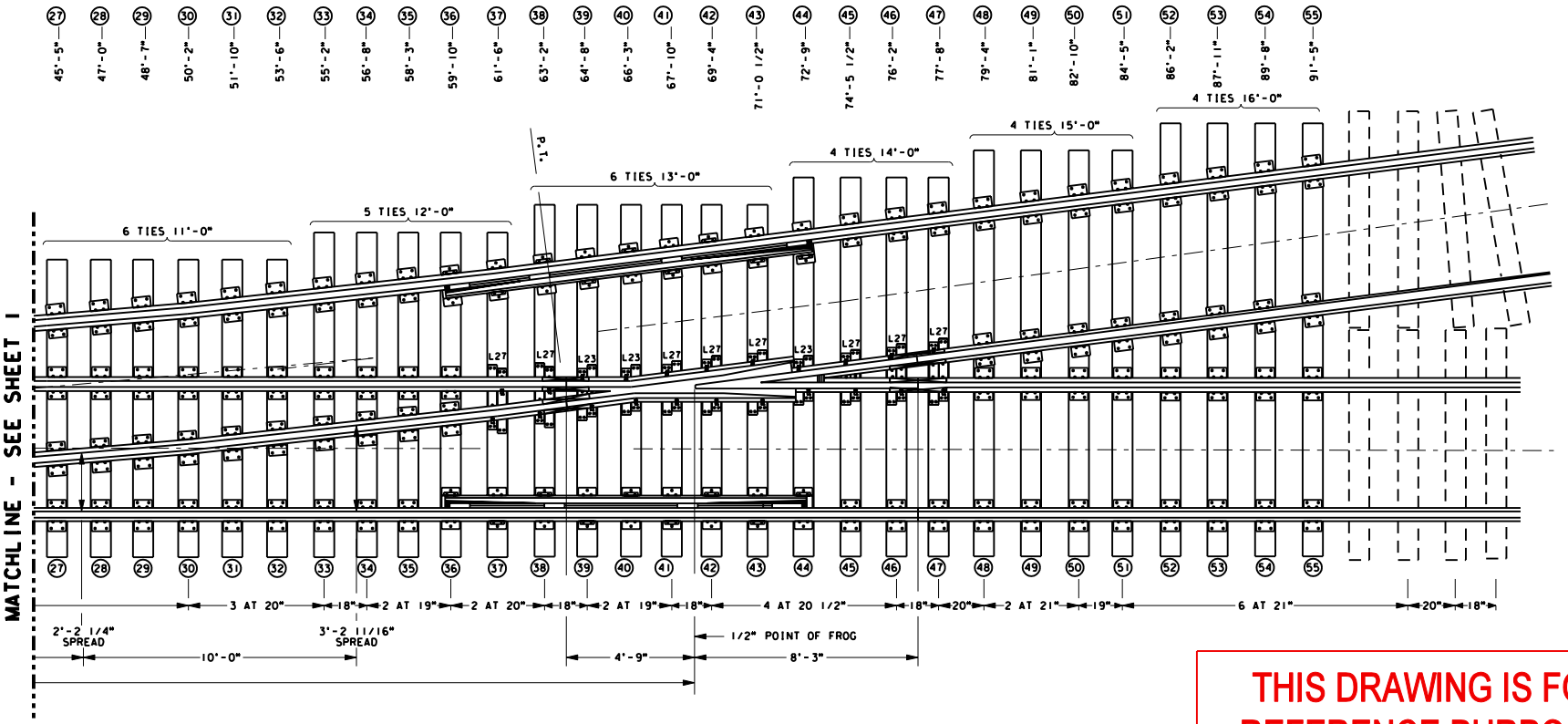
INDUSTRY STANDARDS

NO. 8 TURNOUT
SHEET 1 OF 2

ADOPTED: JAN. 1, 1980
REVISED: AUG. 4, 2003
FILE NO.: EXHIBIT F-5

EXHIBIT "F-5"

EXHIBIT "F-5"



THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. NOT TO BE USED FOR NEW CONSTRUCTION

THEORETICAL TURNOUT DESIGN DATA TABLE		
FROG	NUMBER	8
	ANGLE	7°-09'-10"
	TOE LENGTH	4'-9"
	HEEL LENGTH	8'-3"
	TOTAL LENGTH	13'-0"
LENGTH OF SWITCH (POINTS)		16'-6"
SWITCH ANGLE		1°-37'-40"
HEEL SPREAD		5 3/4"
STRAIGHT STOCK RAIL		39'-0"
BENT/CURVED STOCK RAIL		39'-0"
ACTUAL LEAD		69'-0 1/2"
STRAIGHT CLOSURE RAIL LENGTH		47'-6 1/2"
CENTRAL ANGLE - CLOSURE CURVE		5°-33'-40"
DEGREE OF CLOSURE CURVE ON ℄		11°-43'-34"
RADIUS OF CLOSURE CURVE ON ℄		489.4759'

BILL OF TIES	
QTY	DESCRIPTION
8	7" X 9" X 9'
18	7" X 9" X 10'
6	7" X 9" X 11'
5	7" X 9" X 12'
6	7" X 9" X 13'
4	7" X 9" X 14'
4	7" X 9" X 15'
4	7" X 9" X 16'
55	TOTAL BOARD FEET 3496.5

TURNOUT BILL OF MATERIAL	
QTY.	DESCRIPTION
1	16'-6" L.H. SWITCH POINT
1	16'-6" R.H. SWITCH POINT
1	13'-0" RIGID BOLTED FROG
2	13' -0" FROG GUARD RAIL WITH PLATES
1	39'-0" STRAIGHT STOCK RAIL
1	39'-0" BENT STOCK RAIL
229 FT.	115 LB. RAIL
1	SWITCH PACKAGE
1	HOOK PLATE PACKAGE

NOTES:
THIS PLAN IS BASED ON 115 LB. R.E. MATERIAL BUT MAY ALSO BE USED ON OTHER RAIL SECTIONS, SLIGHT DIFFERENCES WILL OCCUR IN FROG AND SWITCH PLATE DESIGNATIONS, FROG AND SWITCH TIE CENTERS, FROG LENGTHS, ECT., DEPENDING ON RAIL SECTION EMPLOYED.

ADJUSTABLE RAIL BRACES SHOWN ARE SYMBOLIC ILLUSTRATIONS ONLY. ACTUAL RAIL BRACES EMPLOYED ARE DEPENDENT ON THE MANUFACTURER.

INSTALL INSULATED JOINTS WHERE INDICATED ONLY WHEN REQUIRED BY SIGNAL CIRCUITS. ALL INSULATED JOINTS ARE TO BE SUSPENDED. THE LOCATION OF INSULATED JOINTS ON CROSSOVER RAILS AS SHOWN ARE BASED ON A MINIMUM 13' TRACK CENTERS. WHERE TRACK CENTERS ARE GREATER, CROSSOVER RAILS ARE TO BE EXTENDED, BUT INSULATED JOINTS MUST NOT BE STAGGERED OVER 4'-3".

ALL SWITCH RODS AND GAGE PLATES TO BE FURNISHED WITH SWITCH PACKAGE.

A MINIMUM 1" GAP MUST BE MAINTAINED BETWEEN THE ENDS OF METAL TIE PLATES LOCATED BEYOND THE CENTER OF INSULATED JOINTS IN THE SWITCH HEEL AREA TO PROVIDE PROPER TRACK CIRCUIT SEPERATION.

THE SETTING OF THE GUARD RAIL MUST BE 54 5/8" FROM GAGE SIDE OF THE FROG POINT TO THE STRAIGHT GUARDING FACE OF THE GUARD RAIL.

SELF GUARDED FROGS EQUALLY ACCEPTED IN YARDS.

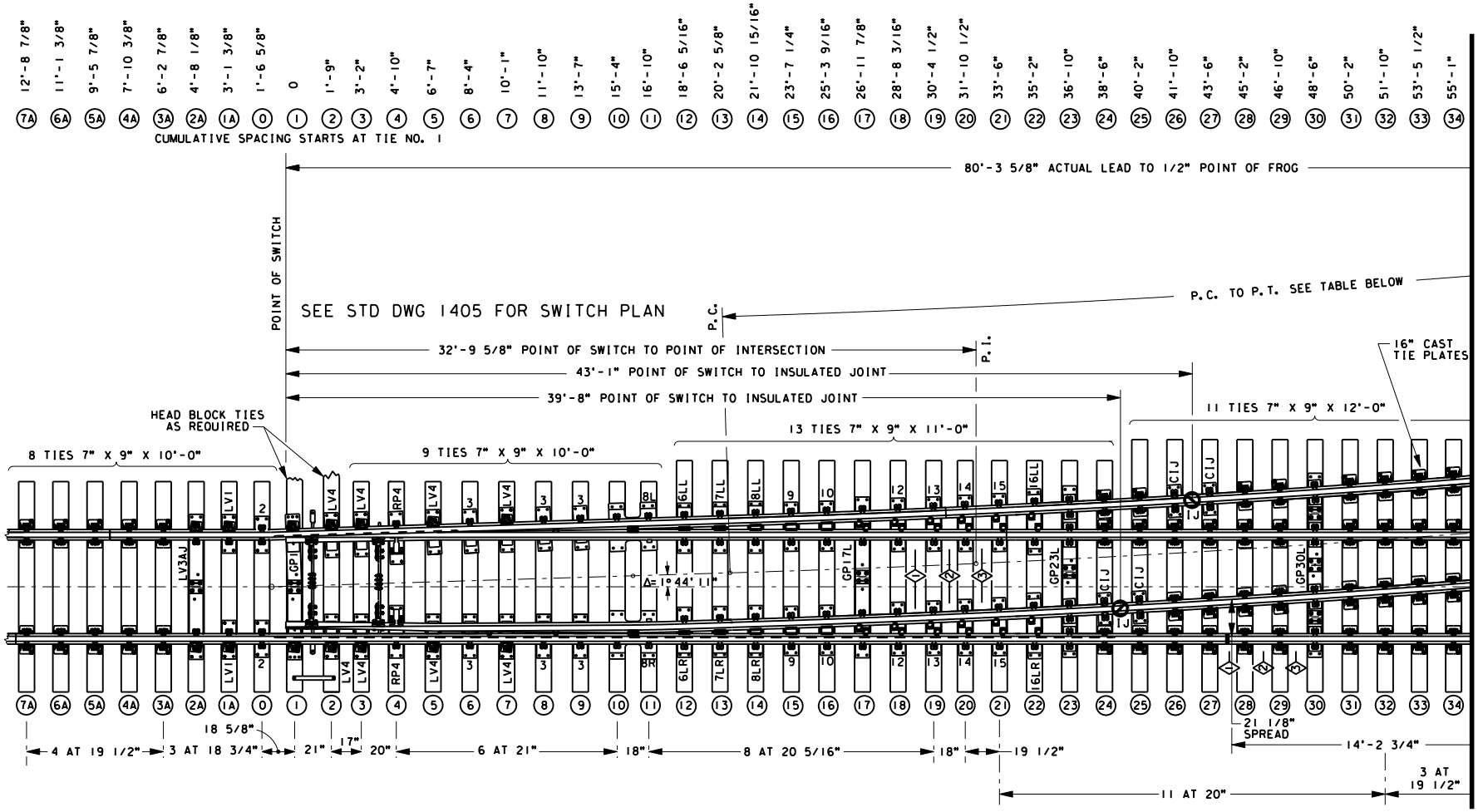
UNION PACIFIC RAILROAD
Office of Chief Engineer Design

INDUSTRY STANDARDS

NO. 8 TURNOUT
SHEET 2 OF 2

ADOPTED: JAN. 1, 1980
REVISED: AUG. 4, 2003
FILE NO.: EXHIBIT F-5

EXHIBIT "F-5"



LEGEND

(60) TIE NUMBERING (7A THRU 73)

◇ CROPPING LOCATIONS:

- ◇ (1) 1ST INSTALLATION
- ◇ (N) 1ST REPLACEMENT
- ◇ (M) 2ND REPLACEMENT

*ALL CROPPING DIMENSIONS ARE THEORETICAL AND DO NOT ALLOW FOR NECESSARY RAIL JOINT AND FIELD WELD GAPS. TURNOUT COMPONENTS SHOULD BE CROPPED TO THE NO. 1 LOCATION DURING ORIGINAL TURNOUT CONSTRUCTION TO ALLOW FOR LATER COMPONENT CHANGE OUTS WITHOUT ADDITIONAL RAIL.

NOTES:

SEE PAGES 2 AND 3 FOR THE REST OF THE DWG

FOR MAINTENANCE ONLY

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

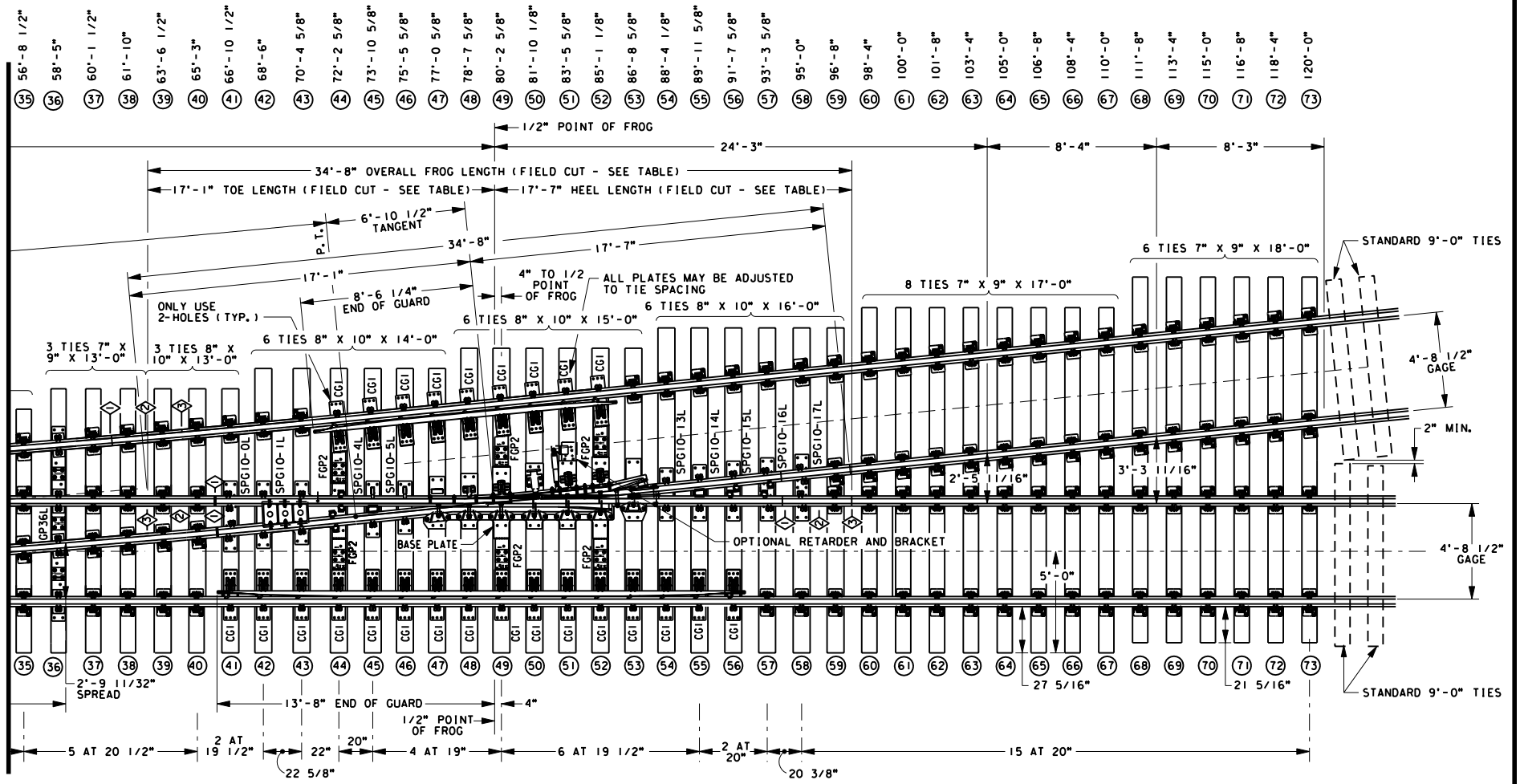
NO. 10 PREMIUM 133 LB. TURNOUT

UNION PACIFIC

ADOPTED: AUG. 21, 1968
REVISED: MAY 26, 2004
FILE NO.: 5025D

STD DWG 5025D PAGE 1 OF 3

STD DWG 5025D PAGE 1 OF 3



TRANSITION NOTES:
WHERE SPEED IS GREATER THAN 40MPH, TRANSITION ZONES ARE REQUIRED AHEAD OF POINT AND BEHIND LAST LONG TIE ON MAIN TRACK. ZONES TO CONSIST OF (24) 10' TIES WITH ELASTIC FASTENER PLATING AHEAD OF SWITCH POINT. ZONE BEHIND LAST LONG TIE CONSIST OF (24) 9' TIES WITH ELASTIC FASTENER PLATING.

NOTES:

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 10 PREMIUM 133 LB. TURNOUT

SEE PAGES 1 AND 3 FOR THE REST OF THE DWG

FOR MAINTENANCE ONLY

ADOPTED: AUG. 21, 1968
REVISED: MAY 26, 2004
FILE NO.: 5025D

NOTES:
NEW INSTALLATION OF TURNOUT REQUIRES A MINIMUM OF 6" OF CLEAN BALLAST UNDER THE TIES.

THIS PLAN IS BASED ON 133 LB. R.E. MATERIAL BUT MAY ALSO BE USED ON OTHER RAIL SECTIONS, SLIGHT DIFFERENCES WILL OCCUR IN FROG AND SWITCH PLATE DESIGNATIONS, FROG AND SWITCH TIE CENTERS, FROG LENGTHS, ETC., DEPENDING ON RAIL SECTION EMPLOYED.

STOCK RAILS OF 112 LB. OR HEAVIER RAIL SECTION ARE TO BE PRE-BENT BY THE MANUFACTURER.

ADJUSTABLE RAIL BRACES SHOWN ARE SYMBOLIC ILLUSTRATIONS ONLY. ACTUAL RAIL BRACES EMPLOYED ARE DEPENDENT ON THE MANUFACTURER.

INSTALL INSULATED JOINTS WHERE INDICATED ONLY WHEN REQUIRED BY SIGNAL CIRCUITS. ALL INSULATED JOINTS ARE TO BE SUSPENDED. THE LOCATION OF INSULATED JOINTS ON CROSSOVER RAILS AS SHOWN ARE BASED ON A MINIMUM 13' TRACK CENTERS. WHERE TRACK CENTERS ARE GREATER, CROSSOVER RAILS TO BE EXTENDED, BUT INSULATED JOINTS MUST NOT BE STAGGERED OVER 4'-3".

ALL SWITCH RODS AND GAGE PLATES TO BE FURNISHED WITH SWITCH PACKAGE.

FOR SPRING SWITCH INSTALLATIONS, TIE SPACING UNDER POINTS SHOULD BE 21", 17", 19", 18", 19", 4 AT 22.5", AND 9" TO END OF SWITCH POINTS TO AFFORD CLEARANCE REQUIRED FOR SWITCH ROD NO. 3.

USE 36EH OR 112E SWITCH STANDS FOR MAINLINE APPLICATION.

MAINLINE CROSSOVER INSTALLATIONS MUST HAVE BOTH MAINLINE AND SIDE TRACK AT CROSS LEVEL WITH EACH OTHER AND FOR 1500' IN ADVANCE OF EACH SWITCH. MAINLINE TURNOUT INSTALLATIONS MUST HAVE BOTH TRACKS AT CROSS LEVEL WITH EACH OTHER AND FOR 500' BEYOND THE SIGNAL LOCATION.

PLATES TO BE LAGGED TO TIES WITH 15/16" X 7" COACH SCREWS.

HAND THROW TURNOUT SHOWN. SEE STD DWG 1420 FOR POWER OPERATION.

ALL RAIL TO BE HEAD HARDENED.
ALL MATERIAL SHOWN TO BE FURNISHED WITH TURNOUT.

REFERENCE THE FOLLOWING ASSOCIATED STD DWGS:

SWITCH PLAN	SEE STD DWG 1405
EXTENDED SPRING FROG	SEE STD DWG 3049
FROG GAGE PLATES	SEE STD DWG 3030
FROG GUARD RAILS	SEE STD DWG 4019
GUARD RAIL SETTINGS	SEE STD DWG 4090
STOCK RAIL DETAILS	SEE STD DWG 1100
SWITCH GAGE PLATES	SEE STD DWG 1005
MACHINE GAGE PLATES	SEE STD DWG 1025
SWITCH PLATES	SEE STD DWG 1900
TURNOUT PLATES	SEE STD DWG 1905
TURNOUT GAGE PLATES	SEE STD DWG 1906
E-CLIPS	SEE STD DWG 0411
SAFELOK CAST PLATE	SEE STD DWG 0434
SAFELOK CLIP #36800	SEE STD DWG 0409
SCREW SPIKES	SEE STD DWG 0450
INSULATED JOINT-PLUG RAIL	SEE STD DWG 0960

THEORETICAL TURNOUT DESIGN DATA TABLE AS FURNISHED			
FROG		NUMBER	10
		ANGLE	5°-43'-29"
		TOE LENGTH	13'-10"
		HEEL LENGTH	14'-2"
		TOTAL LENGTH	28'-0"
16'-6" SWITCH		LENGTH OF SWITCH (POINTS)	29'-11"
		HEEL SPREAD	6 1/4"
		STRAIGHT STOCK RAIL	54'-7"
		BENT STOCK RAIL	38'-3"
		HEEL ANGLE	1°-44'-11"
	TURNOUT POINT	THICKNESS AT POINT	1/4"
		ANGLE AT POINT	1°-44'-11"
		RADIUS (CLOSURE CURVE)	752.6641324'
		VERTEX DISTANCE	8 1/4"
	MAINLINE POINT	THICKNESS AT POINT	1/4"
		ANGLE AT POINT	1°-44'-11"
		RADIUS (CLOSURE CURVE)	NONE
		VERTEX DISTANCE	8 1/4"
		ACTUAL LEAD	80'-3 5/8"
		HIGH SIDE I-BOND	36'-8 5/8"
		LOW SIDE I-BOND	29'-10 1/2"
		RADIUS OF CENTERLINE	749.753945694'
TURNOUT CURVE		T =	26'-1 1/2"
		CENTRAL ANGLE - CLOSURE CURVE	3°-59'-18"
		DEGREE OF CURVE	7°-38'-31"

TURNOUT BILL OF MATERIAL	
QTY.	DESCRIPTION
136	16" SAFELOK PLATES
272	SAFELOK CLIPS #36800
544	COAH SCREWS
1	16'-6" L.H. SWITCH POINT EXTENDED TO 34'-3"
1	16'-6" R.H. SWITCH POINT EXTENDED TO 34'-3"
*1	34'-8" L.H. SPRING FROG
*1	26' -0" FROG GUARD RAIL
*1	15'-0" FROG GUARD RAIL
1	58'-6" STRAIGHT STOCK RAIL
1	39'-6" BENT STOCK RAIL
2	39'-0" I-BONDS MITRE CUT
270 FT.	133 LB. H.H. RAIL
1	SWITCH PLATE PACKAGE
*1	FROG PLATE PACKAGE
*1	TURNOUT PLATE PACKAGE
6	FROG GAGE PLATES

*INCLUDES CLIPS AND COACH SCREWS

QTY		BILL OF TIES
HAND	POWER	DESCRIPTION
17	16	7" X 9" X 10'
13	13	7" X 9" X 11'
11	11	7" X 9" X 12'
3	3	7" X 9" X 13'
3	3	8" X 10" X 13'
6	6	8" X 10" X 14'
6	6	8" X 10" X 15'
6	6	8" X 10" X 16'
*10	8	7" X 9" X 17'
6	6	7" X 9" X 18'
—	1	8" X 10" X 10'
—	2	8" X 10" X 14'-6"
81	81	TOTAL

*INCLUDES 2-HEADBLOCK TIES

NOTES:

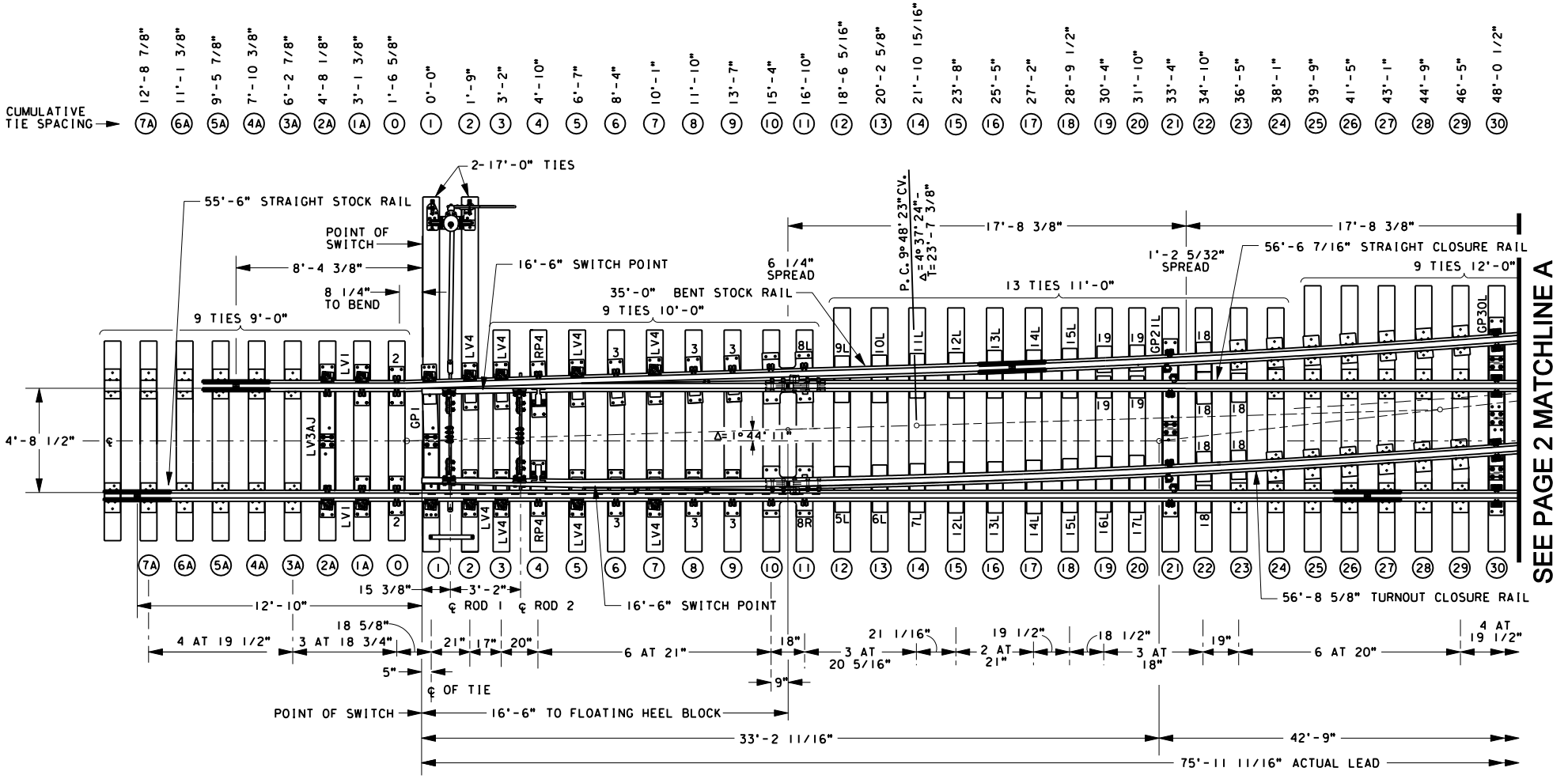
SEE PAGES 1 AND 2 FOR THE REST OF THE DWG

FOR MAINTENANCE ONLY

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 10 PREMIUM 133 LB. TURNOUT

ADOPTED: AUG. 21, 1968
REVISED: MAY 26, 2004
FILE NO.: 5025D



SEE PAGES 1 - 5 FOR COMPLETE TURNOUT INFORMATION

NOTES:

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 9 TURNOUT 133 LB AND CROSSOVER

ADOPTED: FEB. 26, 1982
REVISED: MAY 25, 2004
FILE NO.: 5015E

STD DWG 5015E PAGE 1 OF 5

STD DWG 5015E PAGE 1 OF 5

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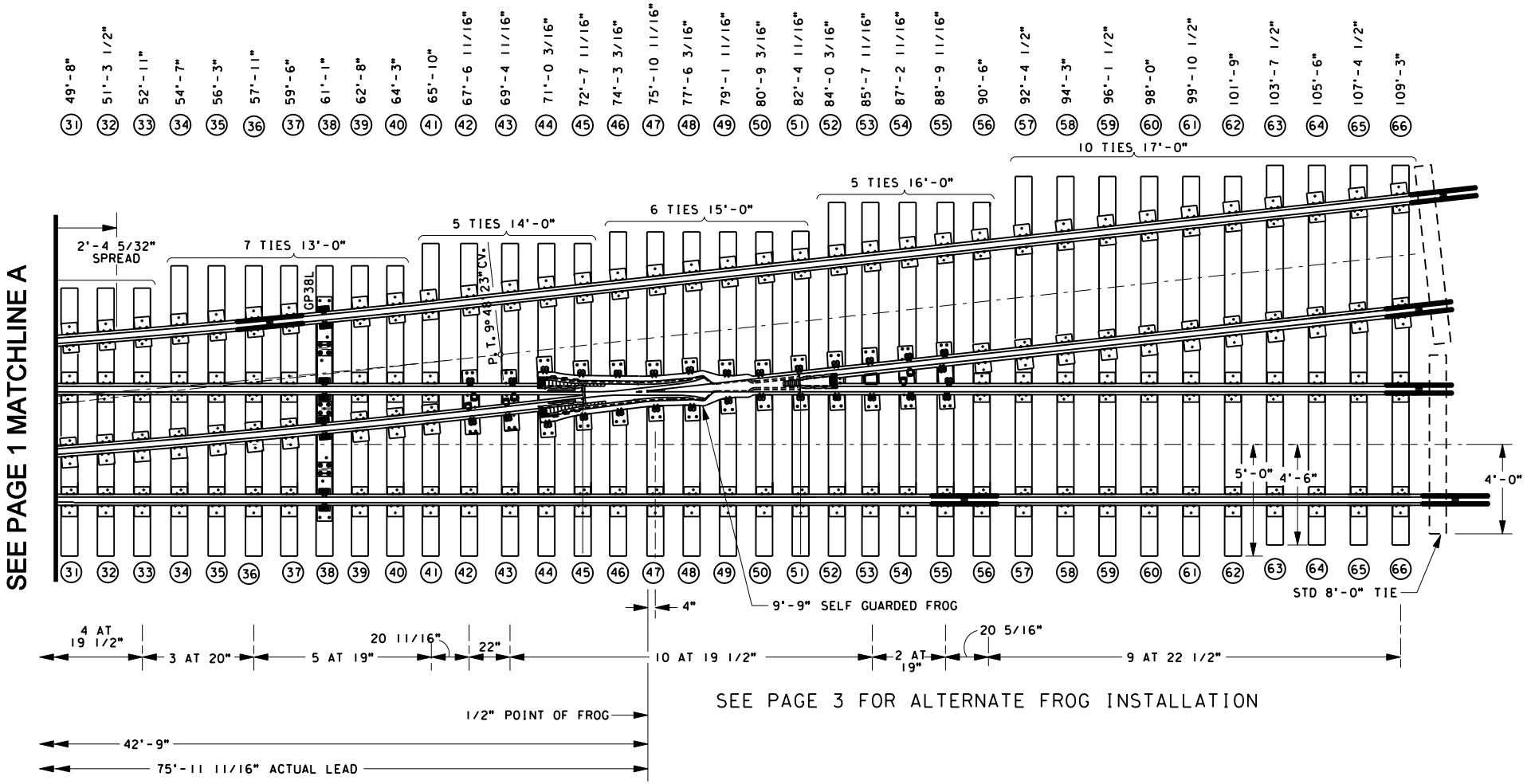

SEE PAGE 1 MATCHLINE A

SEE PAGE 3 FOR ALTERNATE FROG INSTALLATION

SEE PAGES 1 - 5 FOR COMPLETE TURNOUT INFORMATION

NOTES:

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 9 TURNOUT 133 LB AND CROSSOVER

ADOPTED: FEB. 26, 1982
REVISED: MAY 25, 2004
FILE NO.: 5015E

STD DWG 5015E PAGE 2 OF 5

STD DWG 5015E PAGE 2 OF 5

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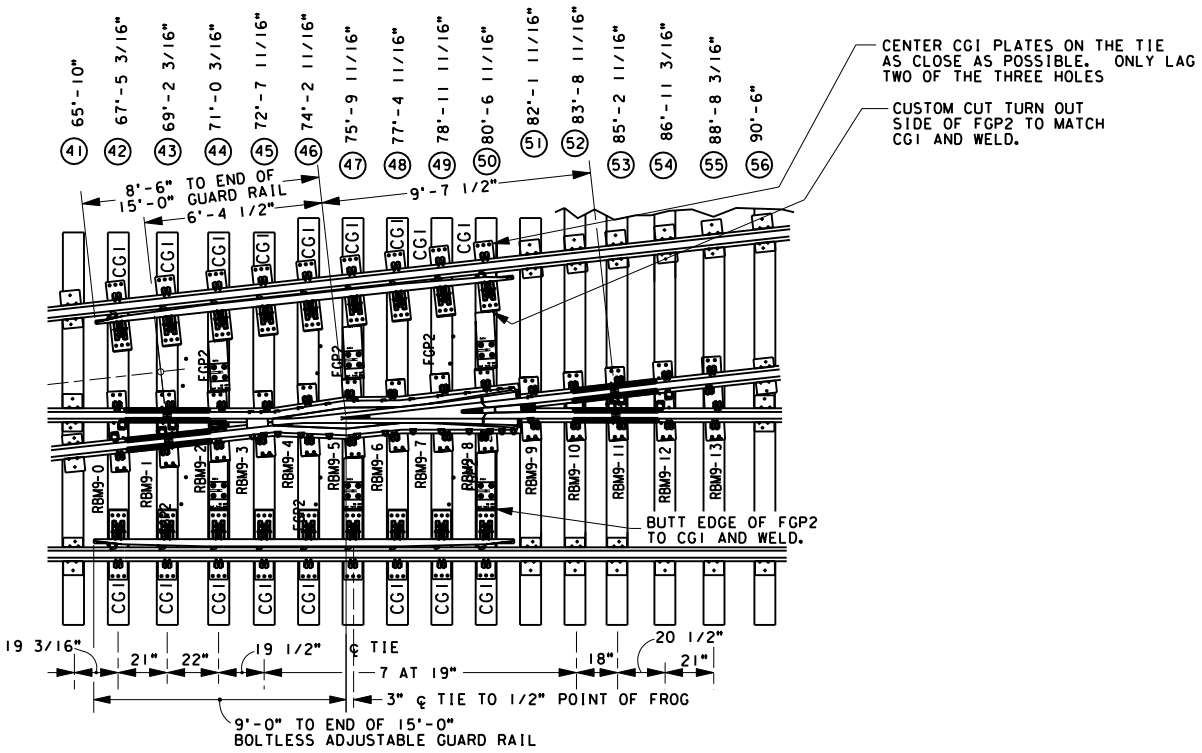


ALTERNATE NO. 9 RBM FROG

NOTES:

SEE PAGES 1 - 5 FOR COMPLETE TURNOUT INFORMATION

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 9 TURNOUT 133 LB AND CROSSOVER

ADOPTED: FEB. 26, 1982
REVISED: MAY 25, 2004
FILE NO.: 5015E

STD DWG 5015E PAGE 3 OF 5

FOR MAINTENANCE ONLY

NOTES:
NEW INSTALLATION OF TURNOUT REQUIRES A A MINIMUM OF 6" OF CLEAN BALLAST UNDER THE TIES.

THIS PLAN IS BASED ON 133 LB. R.E. MATERIAL BUT MAY ALSO BE USED ON OTHER RAIL SECTIONS, SLIGHT DIFFERENCES WILL OCCUR IN FROG AND SWITCH PLATE DESIGNATIONS, FROG AND SWITCH TIE CENTERS, FROG LENGTHS, ETC., DEPENDING ON RAIL SECTION EMPLOYED.

ALL RAIL TO BE HEAD HARDENED.

STOCK RAILS OF 112 LB. OR HEAVIER RAIL SECTION ARE TO BE PRE-BENT BY THE MANUFACTURER.

ADJUSTABLE RAIL BRACES SHOWN ARE SYMBOLIC ILLUSTRATIONS ONLY. ACTUAL RAIL BRACES EMPLOYED ARE DEPENDENT ON THE MANUFACTURER.

16'-6" SWITCH LAYOUTS USED WITH A NO. 9 TURNOUT HAVE DIFFERENT TURNOUT PLATE ARRANGEMENTS THAN THOSE USED WITH A NO. 7 OR NO. 10 TURNOUT.

INSTALL INSULATED JOINTS WHERE INDICATED ONLY WHEN REQUIRED BY SIGNAL CIRCUITS. ALL INSULATED JOINTS ARE TO BE SUSPENDED. THE LOCATION OF INSULATED JOINTS ON CROSSOVER RAILS AS SHOWN ARE BASED ON A MINIMUM 13' TRACK CENTERS. WHERE TRACK CENTERS ARE GREATER, CROSSOVER RAILS ARE TO BE EXTENDED, BUT INSULATED JOINTS MUST NOT BE STAGGERED OVER 4'-3".

ALL SWITCH RODS AND GAGE PLATES TO BE FURNISHED WITH SWITCH PACKAGE.

22E, 36E, 1003ARS, OR 1004ARS SWITCH STANDS TO BE USED ON ALL YARD TURNOUTS.

A MINIMUM 1/2" GAP MUST BE MAINTAINED BETWEEN THE ENDS OF METAL TIE PLATES LOCATED BEYOND THE CENTER OF INSULATED JOINTS IN THE SWITCH HEEL AREA TO PROVIDE PROPER TRACK CIRCUIT SEPARATION.

COACH SCREWS REQUIRED TO FASTEN FROG, GAGE PLATES AND GUARD RAILS TO TIES.

SWITCH PLAN	SEE STD DWG 1400
POWER SWITCH OPERATION	SEE STD DWG 1420
SELF GUARDED FROG	SEE STD DWG 3041
RBM FROG	SEE STD DWG 3040
FROG GAGE PLATES	SEE STD DWG 3030
FROG GUARD RAILS	SEE STD DWG 4019
FOR GUARD RAIL SETTINGS,	SEE STD DWG 4090
STOCK RAIL DETAILS	SEE STD DWG 1100
SWITCH PLATES	SEE STD DWG 1900
TURNOUT PLATES	SEE STD DWG 1904
TURNOUT GAGE PLATES	SEE STD DWG 1903
SWITCH GAGE PLATES	SEE STD DWG 1005
MACHINE GAGE PLATES	SEE STD DWG 1025
SAFELOK CLIP #36800	SEE STD DWG 0409
COACH SCREWS	SEE STD DWG 0450
INSULATED JOINT-PLUG RAIL	SEE STD DWG 0960

BILL OF TIES		7" x 9" SWITCH TIES														TAPERED 8" TO 10"x10"		TOTAL
LENGTH OF TIE		9'	10'	11'	12'	13'	14'	15'	16'	17'	23'	24'	25'	26'	27'	**	10'	14'-6"	
NO. 9 TURNOUT	HAND	9	9	13	9	7	5	6	5	12									75
	POWER	8	9	13	9	7	5	6	5	10							1	2	75
NO. 9 CROSS-OVER WITH 13' TRK CTRS	HAND	18	18	26	18	14					32					41			126
	POWER	16	18	26	18	10					32						2	4	126
NO. 9 CROSS-OVER WITH 14' TRK CTRS	HAND	18	18	26	18	14	10					28				46			132
	POWER	16	18	26	18	10	10					28					2	4	132
NO. 9 CROSS-OVER WITH 15' TRK CTRS	HAND	18	18	26	18	14	10	12					21			52			137
	POWER	16	18	26	18	10	10	12					21				2	4	137
NO. 9 CROSS-OVER WITH 16' TRK CTRS	HAND	18	18	26	18	14	10	12	10					17		57			143
	POWER	16	18	26	18	10	10	12	10					17			2	4	143
NO. 9 CROSS-OVER WITH 17' TRK CTRS	HAND	18	18	26	18	14	10	12	10	12					10	63			148
	POWER	16	18	26	18	10	10	12	10	12					10		2	4	148

FOR CROSS-OVERS ON 17'-6" OR GREATER TRACK CENTERS, THE BILL OF SWITCH TIE MATERIAL IS BASED ON THE USE OF TWO COMPLETE TURNOUTS.

**TIE NO. AT WHICH LONG TIES 23' AND OVER START

THEORETICAL TURNOUT DESIGN DATA TABLE AS FURNISHED			
SELF GUARDED FROG		NUMBER	9
		ANGLE	6°-21'-35"
		TOE LENGTH	2'-11"
		HEEL LENGTH	6'-10"
		TOTAL LENGTH	9'-9"
16'-6" SWITCH		LENGTH OF SWITCH (POINTS)	16'-6"
		HEEL SPREAD	6 1/4"
		STRAIGHT STOCK RAIL	55'-6"
		BENT STOCK RAIL	35'-0"
		HEEL ANGLE	1°-44'-11"
	TURNOUT POINT	THICKNESS AT POINT	1/4"
		ANGLE AT POINT	1°-44'-11"
		RADIUS (CLOSURE CURVE)	586.62428'
		VERTEX DISTANCE	8 1/4"
	MAINLINE POINT	THICKNESS AT POINT	1/4"
		ANGLE AT POINT	1°-44'-11"
		RADIUS (CLOSURE CURVE)	NONE
		VERTEX DISTANCE	8 1/4"
		ACTUAL LEAD	75'-11 11/16"
		RADIUS OF CENTERLINE	584.27011'

TURNOUT BILL OF MATERIAL	
QTY.	DESCRIPTION
150	16" TIE PLATES
450	SPIKES
1	16'-6" L.H. SWITCH POINT
1	16'-6" R.H. SWITCH POINT
1	9'-9" SELF GUARDED FROG
1	58'-6" STRAIGHT STOCK RAIL
1	39'-6" BENT STOCK RAIL
260 FT.	133 LB. RAIL
1	SWITCH PLATE PACKAGE
1	FROG PLATE PACKAGE

NOTES:

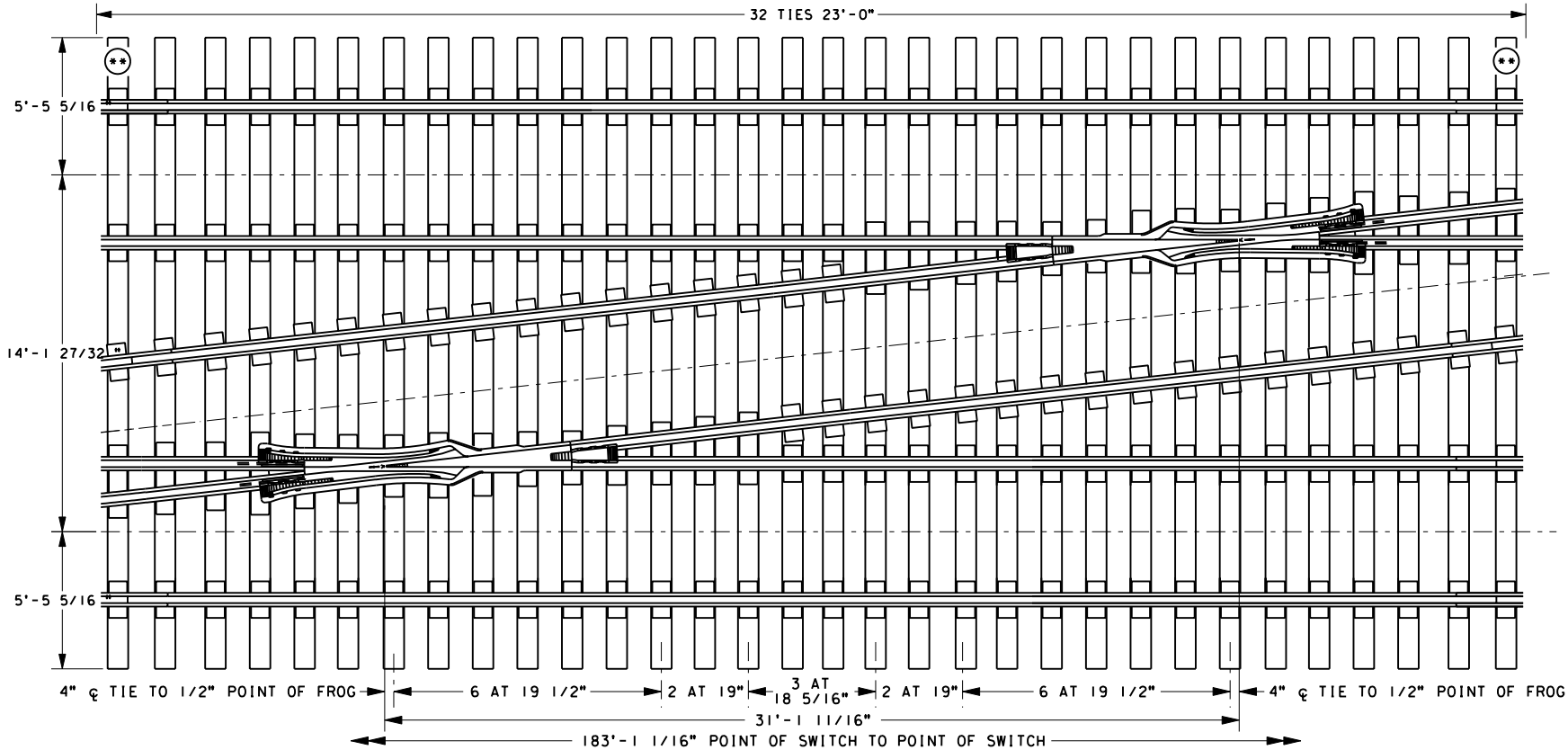
SEE PAGES 1 - 5 FOR COMPLETE TURNOUT INFORMATION

FOR MAINTENANCE ONLY

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 9 TURNOUT 133 LB AND CROSSOVER

ADOPTED: FEB. 26, 1982
REVISED: MAY 25, 2004
FILE NO.: 5015E



NO. 9 CROSSOVER BETWEEN YARD TRACKS 13'-0" TRACK CENTERS

CROSS-OVER DATA

DISTANCE BETWEEN 1/2" FROG POINTS		
TRACK CENTERS	MAIN TRACK	CROSS-OVER
13'-0"	31'-1 11/16"	31'-10 1/16"
14'-0"	40'-1 11/32"	40'-9 23/32"
15'-0"	49'-1"	49'-9 3/8"
16'-0"	58'-0 13/16"	58'-9 1/16"
17'-0"	67'-0 11/32"	67'-8 23/32"
1'-0" CHANGE	8.9721'	9.0277'
1" CHANGE	8.9721"	9.0277"

SEE PAGES 1 - 5 FOR COMPLETE TURNOUT INFORMATION

NOTES:

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 9 TURNOUT 133 LB AND CROSSOVER

ADOPTED: FEB. 26, 1982
REVISED: MAY 25, 2004
FILE NO.: 5015E

STD DWG 5015E PAGE 5 OF 5

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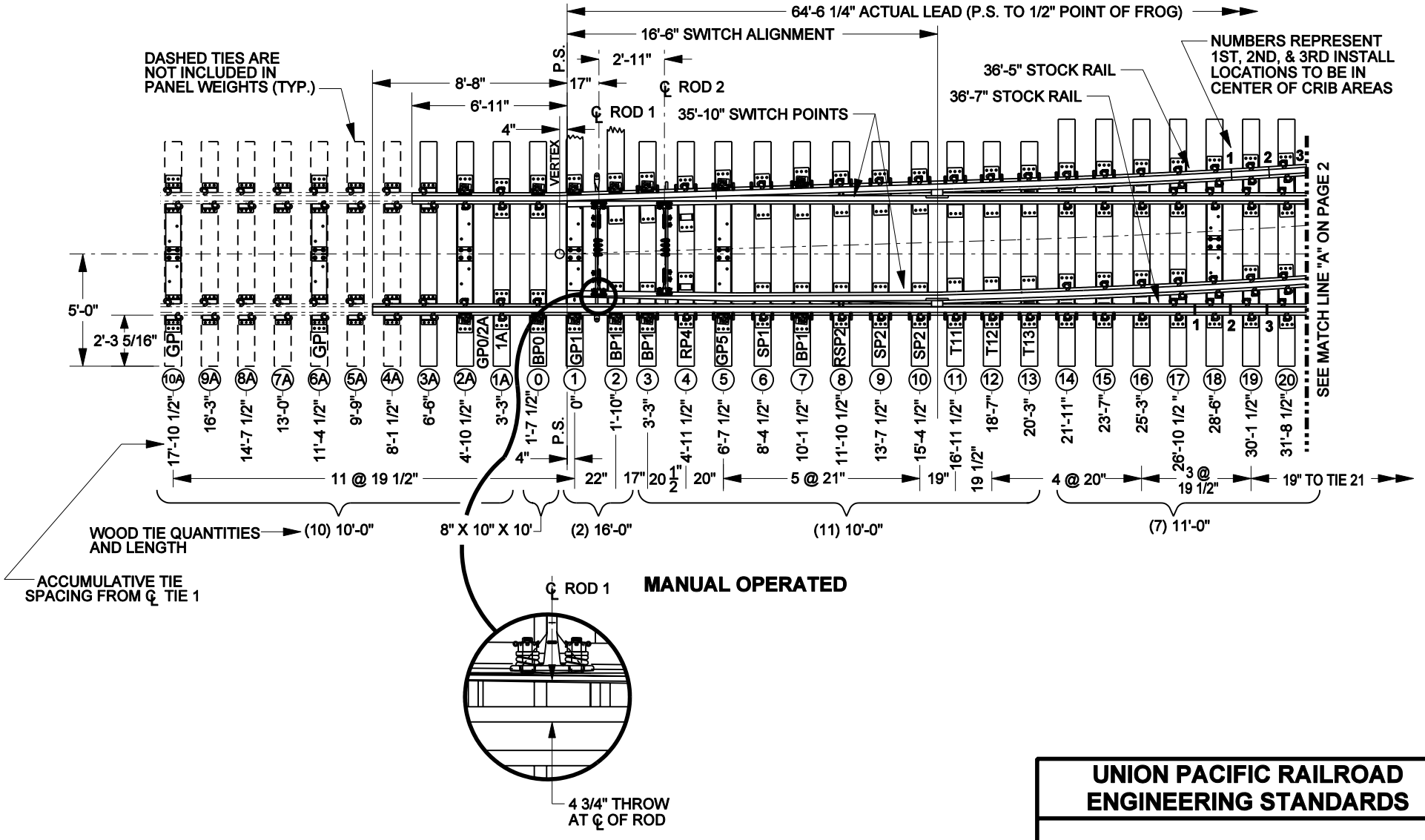
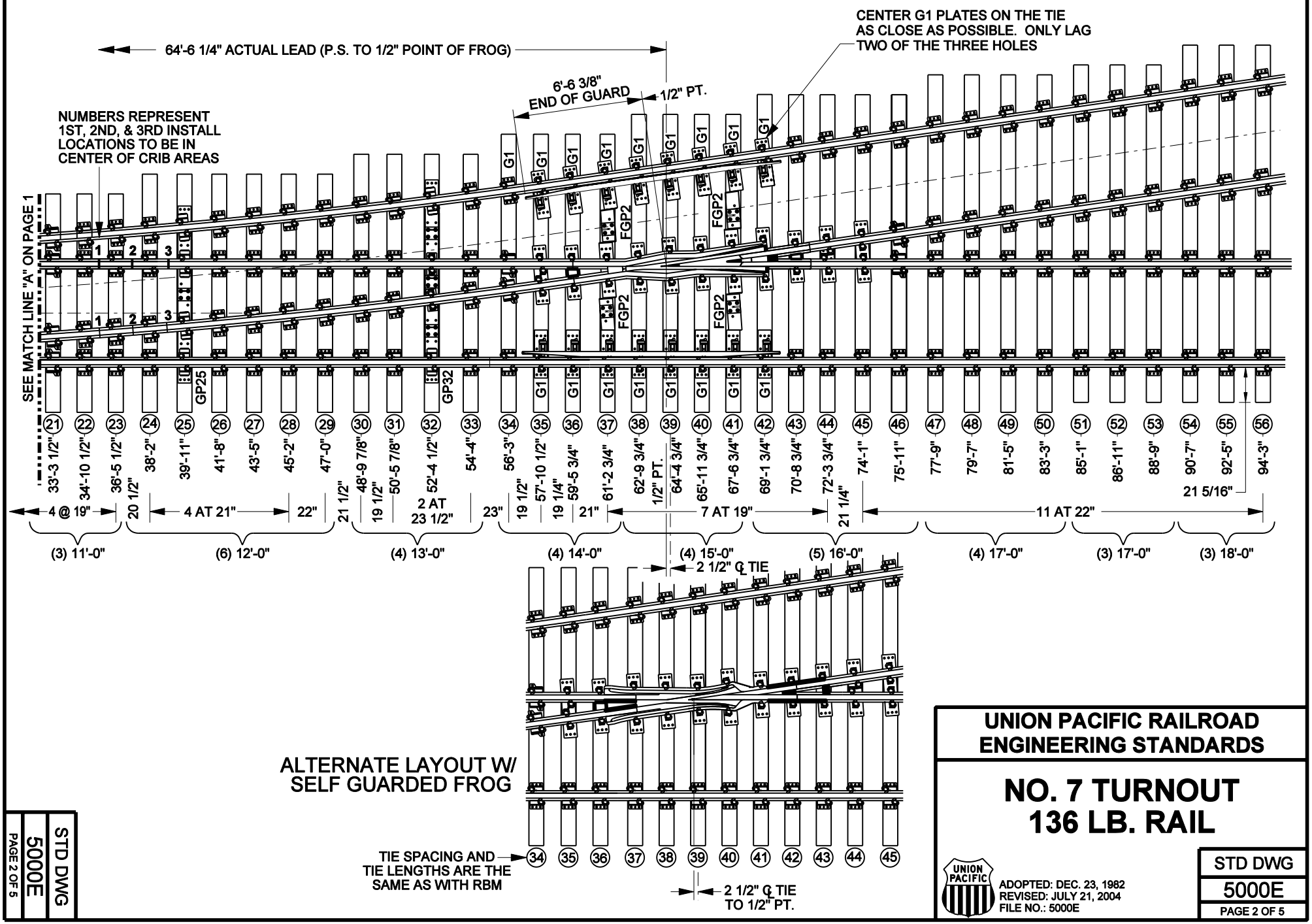


UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 7 TURNOUT 136 LB. RAIL

ADOPTED: DEC. 23, 1982
REVISED: JULY 21, 2004
FILE NO.: 5000E

STD DWG 5000E PAGE 1 OF 5

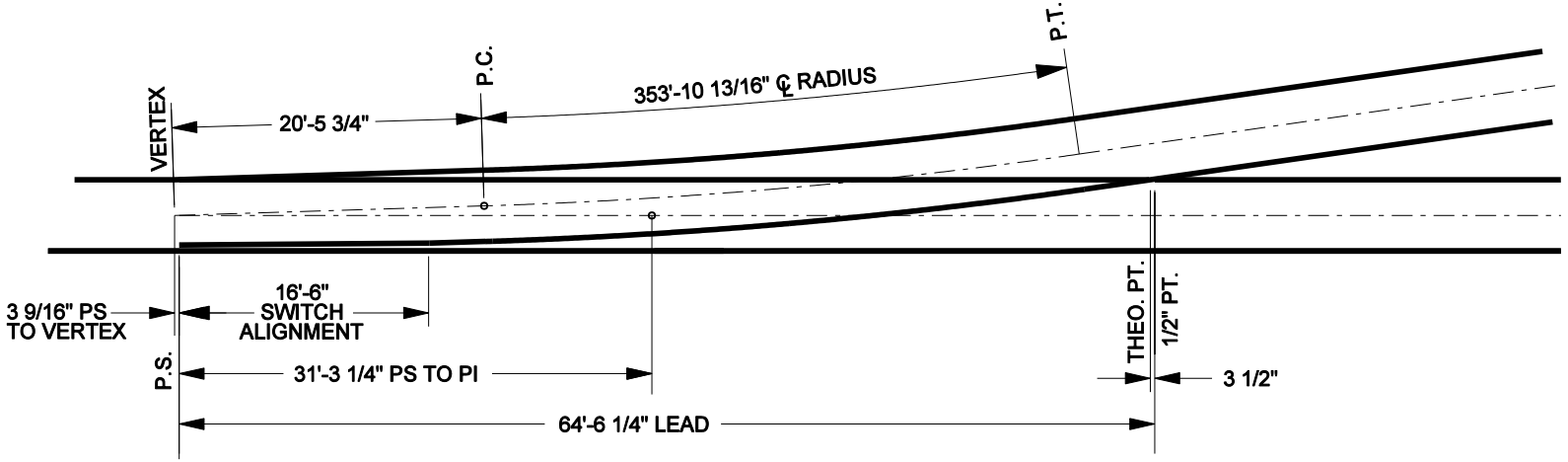


UNION PACIFIC RAILROAD ENGINEERING STANDARDS

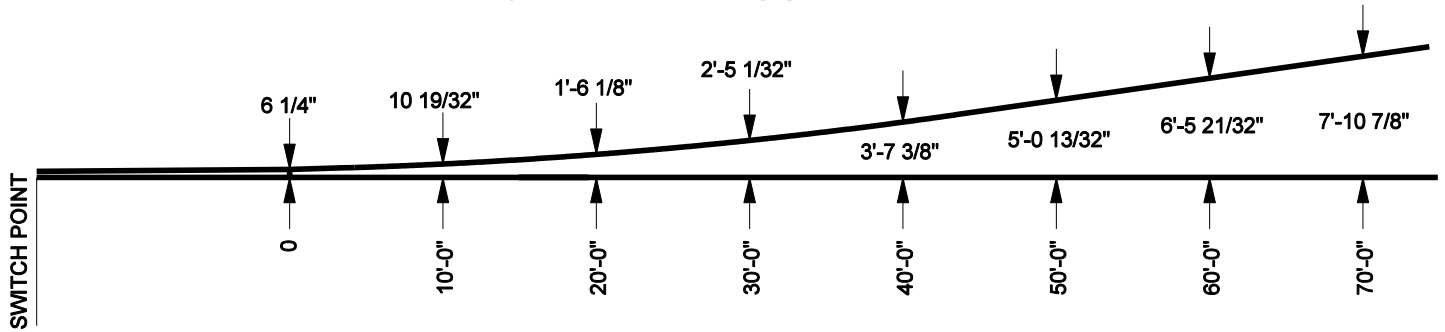
NO. 7 TURNOUT 136 LB. RAIL

ADOPTED: DEC. 23, 1982
REVISED: JULY 21, 2004
FILE NO.: 5000E

STD DWG 5000E PAGE 2 OF 5



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA	
SWITCH LENGTH	16'-6"
HEEL SPREAD	6 1/4"
HEEL ANGLE	1°-46'-22"
SWITCH ANGLE	1°-46'-22"
THROW AT ROD #1	4 3/4"
TURNOUT POINT — THICKNESS AT POINT	0"
TURNOUT POINT — RADIUS (CLOSURE CURVE)	616.3542'
TURNOUT POINT — VERTEX DISTANCE	7 1/16"

FROG DATA	
ANGLE	8°-10'-16"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	553.9'
T =	19'-10 11/16"
CENTRAL ANGLE - CLOSURE CURVE	6°26'05"
DEGREE OF CURVE	16°14'39"

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 7 TURNOUT 136 LB. RAIL

ADOPTED: DEC. 23, 1982
REVISED: JULY 21, 2004
FILE NO.: 5000E

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ITEMS USED IN HAND THROW #7 TURNOUTS

QTY.	COMPONENT DESCRIPTION	STD DWG
1	16'-6" (EXT. 35'-10") STRAIGHT SAMSON SWITCH POINT (NO TIP)	241100
1	16'-6" (EXT. 35'-10") STRAIGHT SAMSON SWITCH POINT (WITH TIP)	241100
1	36'-7" STRAIGHT SAMSON STOCK RAIL	241500
1	36'-5" BENT/CURVED SAMSON STOCK RAIL	241500
2	"BP0" PLATE FOR TIE 0	241306
1	"GP1" ADJUSTABLE BRACE GAGE PLATE FOR TIE 1	241300
2	"BP1" ADJUSTABLE BRACE SLIDE PLATE FOR TIE 2	241306
1 EA.	SWITCH ROD NO. 2	241600
2	"GP" GAGE PLATE FOR TIES 6A & 10A AHEAD OF POINT	241304
1	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIE 2A	241301
2	"1A" PLATE FOR TIE 1A	241307
1	"GP5 & GP9" ADJUSTABLE BRACE GAGE PLATE FOR TIES 5 & 9	241305
2	"RP4" ROLLER RISER PLATE	241309
2	ROLLER BEARING ASSEMBLY FOR "RP4" PLATE	241309
6	"BP1" ADJUSTABLE BRACE SLIDE PLATE	241306
2	"SP1" SLIDE PLATE	241306
2	"RSP2" RISER SLIDE PLATE FOR TIE 8	243309
4	"SP2" RISER SLIDE PLATE FOR TIES 9 AND 10	241306
2	TURNOUT PLATES T11 THRU T13	241307
1	"GP18" GAGE PLATE FOR TIE 18	N/A
1	"GP23" GAGE PLATE FOR TIE 23	N/A
1	"GP32" GAGE PLATE FOR TIE 32	N/A
1	TURNOUT PLATES T14 - T20	N/A
232	136 LB. RAIL (IN LINEAR FEET)	N/A
118	PANDROL TIE PLATE	263000
8	MODIFIED PANDROL TIE PLATE	263001
372	PANDROL ECLIP E-2055 (SUBTRACT 8 FOR INSULATED TURNOUT)	132500
776	15/16" DIA. X 6" LG. "RAILROAD APPROVED" SCREW SPIKES	130800
432	RAIL ANCHORS FOR UPRR	135010

OPTIONAL ITEMS

QTY.	FROGS	DWG #
1	RBM WITH PLATES	3035
1	SOLID MANGANESE SELF GUARDED FROG WITH PLATES	N/A
QTY.	**ITEMS REQUIRED FOR RBM FROGS**	**DWG #**
2	13'-0" BOLTLESS ADJUSTABLE GUARD BAR	160103
4	"FGP" FROG GAGE PLATE	156000

BILL OF TIES

QTY.	SIZE	TIE NUMBER
1	7" X 9" X 10'-0"	TIES 0 THRU 10A
2	7" X 9" X 16'-0"	TIES 1 AND 2
13	7" X 9" X 10'-0"	TIES 3 THRU 13
10	7" X 9" X 11'-0"	TIES 14 THRU 23
6	7" X 9" X 12'-0"	TIES 24 THRU 29
4	7" X 9" X 13'-0"	TIES 30 THRU 33
4	7" X 9" X 14'-0"	TIES 34 THRU 37
4	7" X 9" X 15'-0"	TIES 38 THRU 41
5	7" X 9" X 16'-0"	TIES 42 THRU 46
7	7" X 9" X 17'-0"	TIES 47 THRU 53
3	7" X 9" X 18'-0"	TIES 54 THRU 56

NOTES:
1. NEW INSTALLATION OF TURNOUT REQUIRES A A MINIMUM OF 6" OF CLEAN BALLAST UNDER THE TIES.
2. ALL RAIL TO BE HEAD HARDENED.
3. ADJUSTABLE RAIL BRACES SHOWN ARE SYMBOLIC ILLUSTRATIONS ONLY. ACTUAL RAIL BRACES EMPLOYED ARE DEPENDENT ON THE MANUFACTURER.
4. 16'-6" SWITCH LAYOUTS USED WITH A NO. 7 TURNOUT HAVE DIFFERENT TURNOUT PLATE ARRANGEMENTS THAN THOSE USED WITH A NO. 9 TURNOUT.
5. INSTALL INSULATED JOINTS WHERE INDICATED ONLY WHEN REQUIRED BY SIGNAL CIRCUITS. ALL INSULATED JOINTS ARE TO BE SUSPENDED. THE LOCATION OF INSULATED JOINTS ON CROSSOVER RAILS AS SHOWN ARE BASED ON A MINIMUM 13' TRACK CENTERS. WHERE TRACK CENTERS ARE GREATER, CROSSOVER RAILS ARE TO BE EXTENDED, BUT INSULATED JOINTS MUST NOT BE STAGGERED OVER 4'-3".
6. ALL SWITCH RODS AND GAGE PLATES TO BE FURNISHED WITH SWITCH PACKAGE.
7. 22E, 36E, 1003ARS, OR 1004ARS SWITCH STANDS TO BE USED ON ALL YARD TURNOUTS.
8. A MINIMUM 1/2" GAP MUST BE MAINTAINED BETWEEN THE ENDS OF METAL TIE PLATES LOCATED BEYOND THE CENTER OF INSULATED JOINTS IN THE SWITCH HEEL AREA TO PROVIDE PROPER TRACK CIRCUIT SEPARATION.

NOTES FOR MANUFACTURERS
1. ALL MATERIAL TO MEET OR EXCEED RAILROADS RELATED SPECIFICATIONS.
2. SIGNAL DEPARTMENT TO FURNISH PLATING FOR MACHINE MOUNTING.

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 7 TURNOUT 136 LB. RAIL

ADOPTED: DEC. 23, 1982
REVISED: JULY 21, 2004
FILE NO.: 5000E

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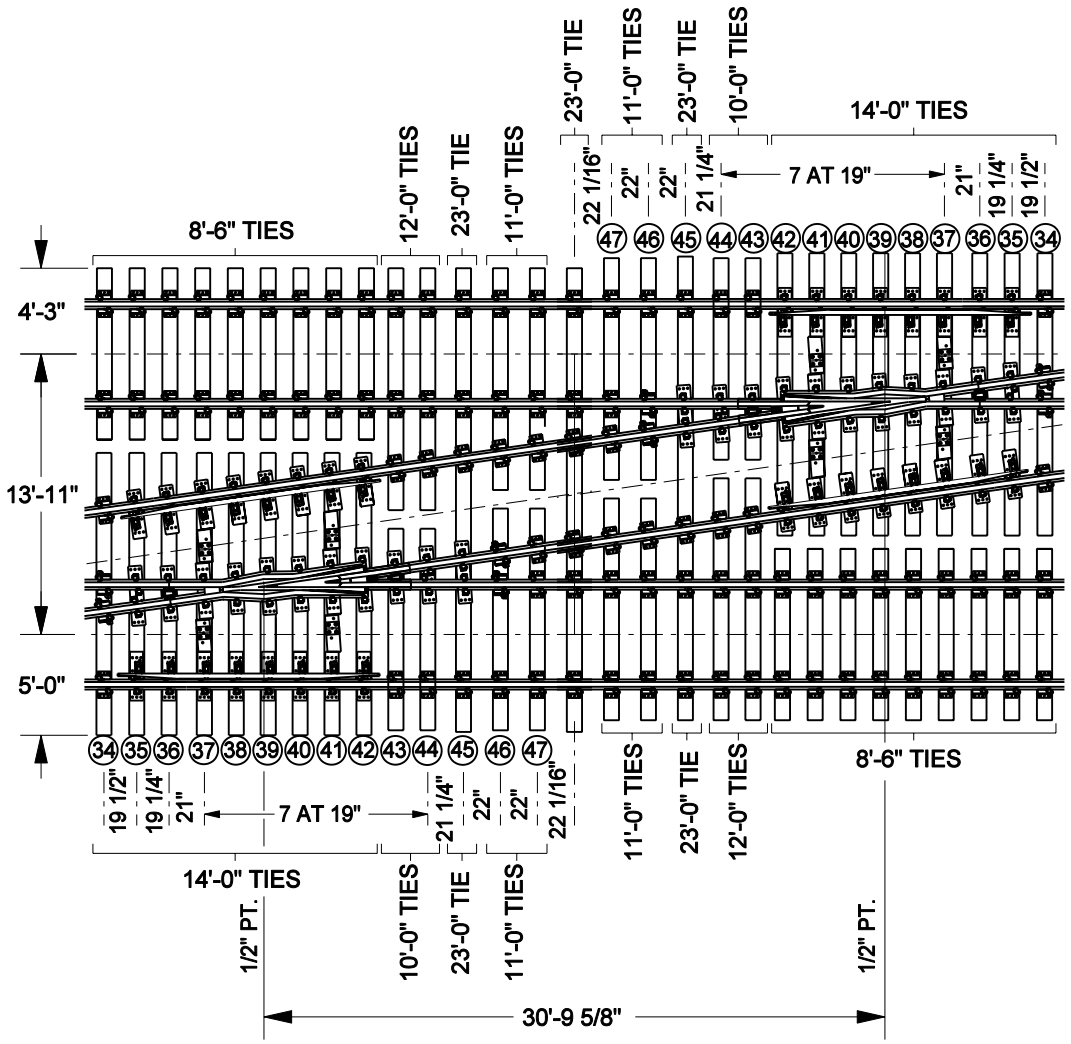

TRACK CENTER	1/2" PT. TO 1/2" PT.
13'-0"	24'-5"
13'-1"	25'-0"
13'-2"	25'-6 15/16"
13'-3"	26'-1 7/8""
13'-4"	26'-8 7/8"
13'-5"	27'-3 13/16"
13'-6"	27'-10 13/16""
13'-7"	28'-5 3/4"
13'-8"	29'-0 3/4"
13'-9"	29'-7 11/16"
13'-10"	30'-2 5/8"
13'-11"	30'-9 5/8"

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

NO. 7 CROSSOVER 13'-0" TO 13'-11" TRACK CENTERS 136 LB. RAIL

ADOPTED: DEC. 23, 1982
REVISED: JULY 21, 2004
FILE NO.: 5000E

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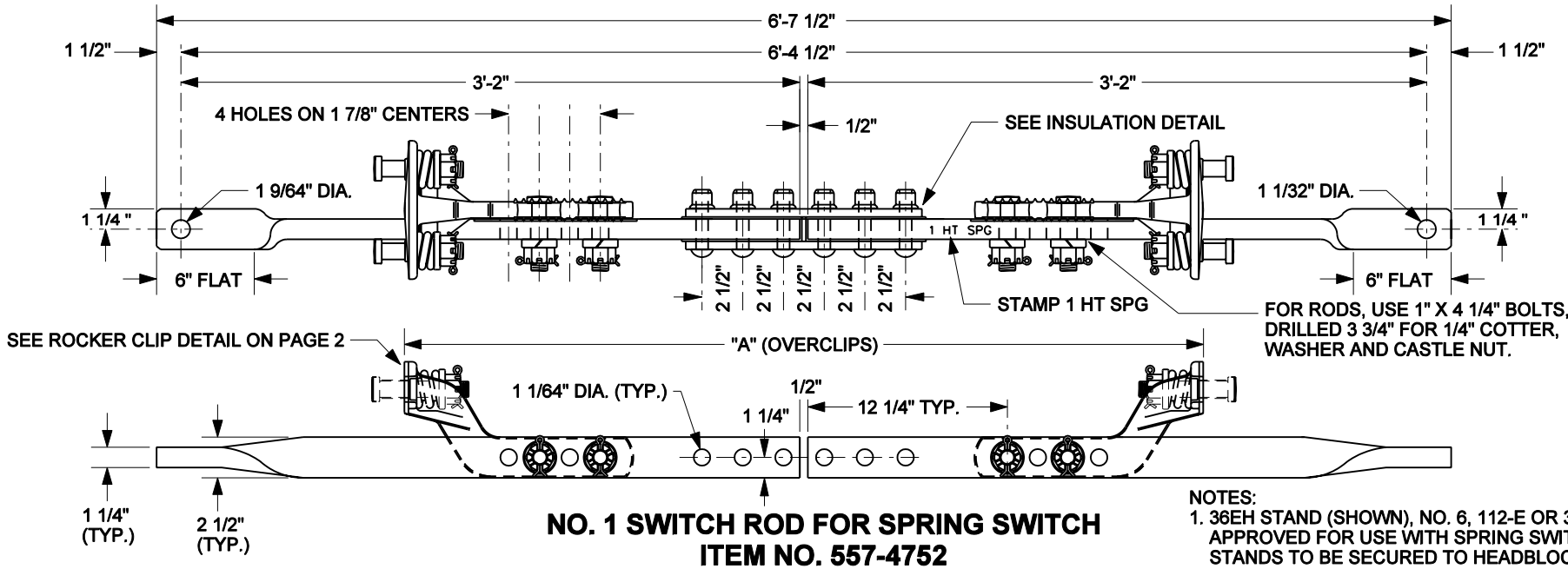
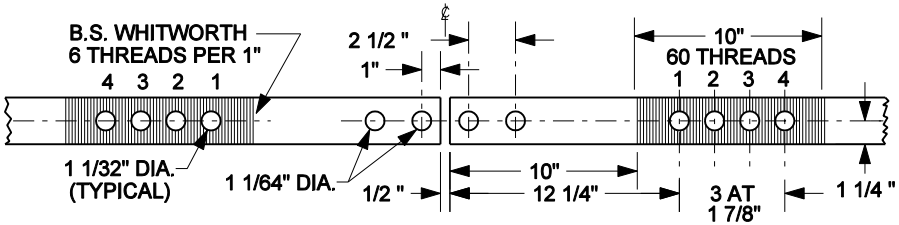
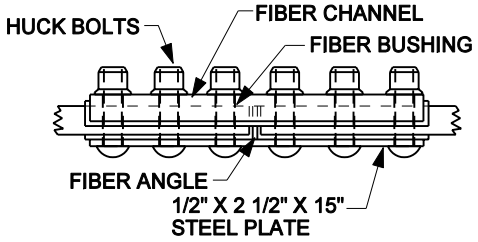


NO. 1 SWITCH ROD FOR SPRING SWITCH ITEM NO. 557-4752

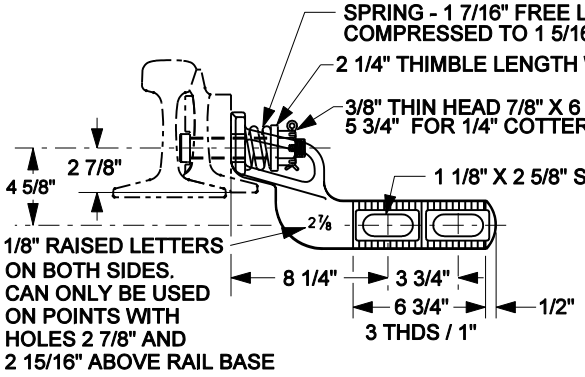


TYPICAL ROD WITH SERRATION



TYPICAL INSUTION DETAIL

INSULATION MATERIAL PER SRI-38
WITH 3/4" HUCK PIN AND COLLAR



REINFORCED SPRING SWITCH AND ROCKER CLIP ASSEMBLY DETAIL

NOTES:

1. 36EH STAND (SHOWN), NO. 6, 112-E OR 36H STANDS APPROVED FOR USE WITH SPRING SWITCHES. STANDS TO BE SECURED TO HEADBLOCKS WITH MOUNTING KIT ITEM NO. 557-7387. DISTANCE FROM C/L OF TRACK TO SWITCH STAND DEPENDENT ON BUFFER LENGTH FURNISHED. CONNECTING EYE ON BUFFER MUST MATCH STAND TYPE FURNISHED.
2. ONLY DOUBLE REINFORCED SWITCH POINTS AND A SPECIAL ROD TO BE USED ON SPRING SWITCHES.
3. SEE UP DWG 2235 FOR RODS 2-4 (ITEM NO 557-5583).
4. PALE SEMAPHORE OIL (ITEM NO. 310-6651) OR MANUFACTURER RECOMMENDED FLUID TO BE USED IN SPRING SWITCH BUFFER DEVICE. FLUID SHOULD BE CHECKED MONTHLY.
5. REFER TO GCOR 9.23.1 CONCERNING BLOCKING SPRING SWITCHES WHEN OPERATING IN OTHER THAN SIGNALED DIRECTION.

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

SPRING SWITCH COMPONENTS

ADOPTED: DEC. 15, 1928
REVISED: APR. 19, 2007
FILE NO.: 2200F

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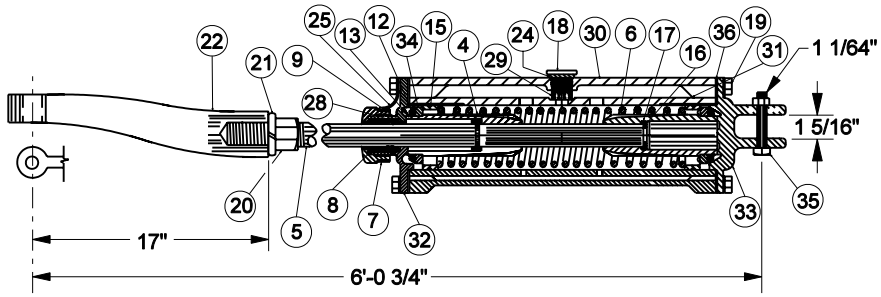
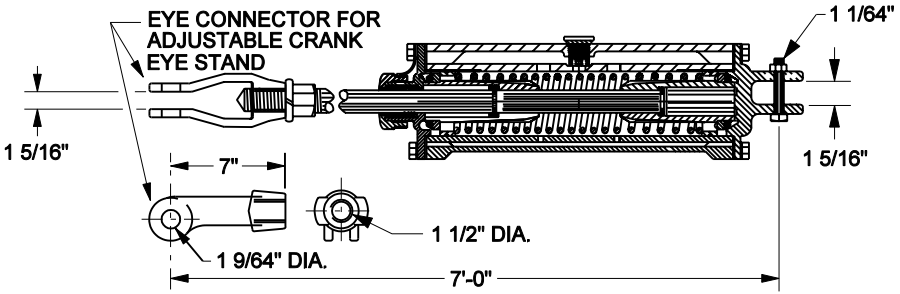
SWITCH LTH RAIL SIZE	OVERCLIP "A" DIMENSION				SPRING SWITCH POINTS			SWITCH PLATE PKG
	ROD #1	ROD #2	ROD #3	ROD #4	TYPE	ITEM NUMBERS		
						LH	RH	ITEM NO.
115# 16'-6"	4'-0 1/16"	4'-0 7/16"	NA	NA	KNIFE	558-3420	558-3454	-
115# 26'-0"	4'-0 7/16"	4'-1"	4'-1 11/16"	4'-2 13/16"	SAMSON	558-3621	558-3624	-
133# 16-'6"	4'-0 1/8"	4'-1 5/16"	NA	NA	KNIFE	558-5198	558-5232	557-0754
133# 16-'6"	4'-0 1/8"	4'-1 5/16"	NA	NA	SAMSON	558-5658	558-5659	557-0754
133# 24'-0"	4'-0 1/8"	4'-0 7/8"	4'-1 5/8"	4'-2 3/8"	KNIFE	558-5539	558-5574	557-1010
133# 24'-0"	4'-0 1/8"	4'-0 7/8"	4'-1 5/8"	4'-2 3/8"	EXT. SAMSON	558-5677	558-5678	557-1010
136# 16'-6"	4'-0"	4'-0 3/8"	NA	NA	KNIFE	558-6018	558-6052	-

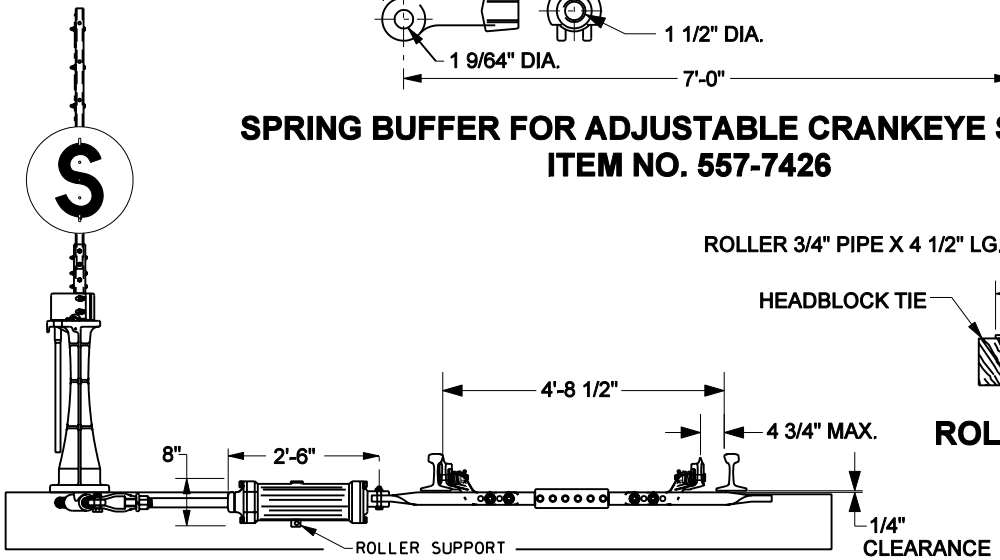


SPRING BUFFER FOR NO. 6 STANDS
ITEM NO. 557-7404 (FOR MAINTENANCE ONLY)

"MECHANICAL SWITCHMAN-MODEL B"		
PART	DESCRIPTION	REQ'D
3	ROLLER	1
4	PISTON	2
5	PISTON ROD-STAINLESS STEEL	1
6	SPRING 19/32" WIRE 24 1/4" FREE 4 3/8" O.D.	1
7	PACKING NUT	1
8	PACKING NUT BUSHING	1
9	FRONT CAP BUSHING	1
12	VALVE SPRING	2
13	VALVE SPRING RETAINER	2
15	PISTON RING-1/4" X 5/32" X 4 5/8"	2
16	SHOULDER RETAINER (1/2)	4
17	PISTON ROD SHOULDER	2
18	FILLER PLUG	1
19	5/8" X 1 1/2" HEX. CAP SCREWS	16
20	1 1/2" DIA. JAM NUT	1
21	1 1/2" DIA. SPRING WASHER	1
22	EYE CONNECTION	1
24	GASKET (FIBRE)	2
25	PACKING.NUT ADJ. RETAINER	1
28	PACKING. (5 RINGS 5/16" X 1 1/2" I.D. 2 1/8" O.D.	1 SET
29	OIL STRAINER	1
30	HOUSING	1
31	CYLINDER	1
32	FRONT CAP	1
33	BACK CAP	1
34	VALVE	2
35	CONN.ROD BOLTS-1" X 4 5/8" H.C.H.T	1
36	GASKET-(LEAD)	2



SPRING BUFFER FOR ADJUSTABLE CRANKEYE STANDS
ITEM NO. 557-7426



ELEVATION-MODEL "B"

NOTE: WHEN NECESSARY TO REFILL BUFFERS, USE PALE SEMAPHORE OIL.

ROLLER SUPPORT

UNION PACIFIC RAILROAD ENGINEERING STANDARDS

SPRING SWITCH COMPONENTS

ADOPTED: DEC. 15, 1928
REVISED: APR. 19, 2007
FILE NO.: 2200F

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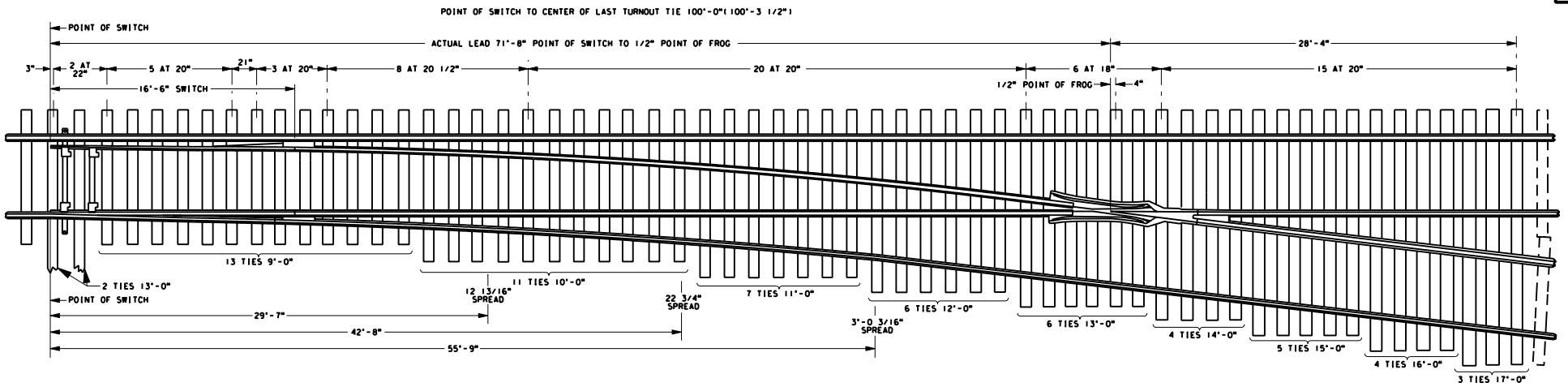
EXHIBIT "F-6"



THEORETICAL TURNOUT DESIGN DATA TABLE		
FROG	NUMBER	8 1/2
	ANGLE	6°-43'-59"
	TOE LENGTH	2'-11"
	HEEL LENGTH	6'-5"
	TOTAL LENGTH	9'-4"
	TOE SPREAD	3 5/8"
	HEEL SPREAD	9 9/16"
LENGTH OF SWITCH (POINTS)		16'-6"
SWITCH ANGLE		1°-46'-22"
HEEL SPREAD		6 1/4"
STRAIGHT STOCK RAIL		39'-0"/58'-6"
BENT STOCK RAIL		39'-0"
ACTUAL LEAD		71'-8"
STRAIGHT CLOSURE RAIL LENGTH		52'-3"
CENTRAL ANGLE - CLOSURE CURVE		4°-57'-37"
DEGREE OF CLOSURE CURVE ON ℄		9°-30'-30"
RADIUS OF CLOSURE CURVE ON ℄		603.28'

NOTES:
THIS PLAN IS BASED ON 115 LB. R.E. MATERIAL BUT MAY ALSO BE USED ON OTHER RAIL SECTIONS, SLIGHT DIFFERENCES WILL OCCUR IN FROG AND SWITCH PLATE DESIGNATIONS, FROG AND SWITCH TIE CENTERS, FROG LENGTHS, ETC., DEPENDING ON RAIL SECTION EMPLOYED.

16'-6" SWITCH LAYOUTS USED WITH A NO. 8 1/2 TURNOUT HAVE DIFFERENT PLATE ARRANGEMENTS THAN THOSE USED WITH A NO. 7, 9 OR NO. 10 TURNOUT.

INSTALL INSULATED JOINTS WHERE INDICATED ONLY WHEN REQUIRED BY SIGNAL CIRCUITS. ALL INSULATED JOINTS ARE TO BE SUSPENDED. THE LOCATION OF INSULATED JOINTS ON CROSSOVER RAILS AS SHOWN ARE BASED ON A MINIMUM 13' TRACK CENTERS. WHERE TRACK CENTERS ARE GREATER, CROSSOVER RAILS ARE TO BE EXTENDED, BUT INSULATED JOINTS MUST NOT BE STAGGERED OVER 4'-3".

ALL SWITCH RODS AND GAGE PLATES TO BE FURNISHED WITH SWITCH PACKAGE.

22E, 36E, 1003ARS, OR 1004ARS SWITCH STANDS TO BE USED ON ALL YARD TURNOUTS.

A MINIMUM 1" GAP MUST BE MAINTAINED BETWEEN THE ENDS OF METAL TIE PLATES LOCATED BEYOND THE CENTER OF INSULATED JOINTS IN THE SWITCH HEEL AREA TO PROVIDE PROPER TRACK CIRCUIT SEPARATION.

THIS DRAWING IS FOR REFERENCE PURPOSES ONLY. NOT TO BE USED FOR NEW CONSTRUCTION

UNION PACIFIC RAILROAD
Office of Chief Engineer Design

INDUSTRY STANDARDS

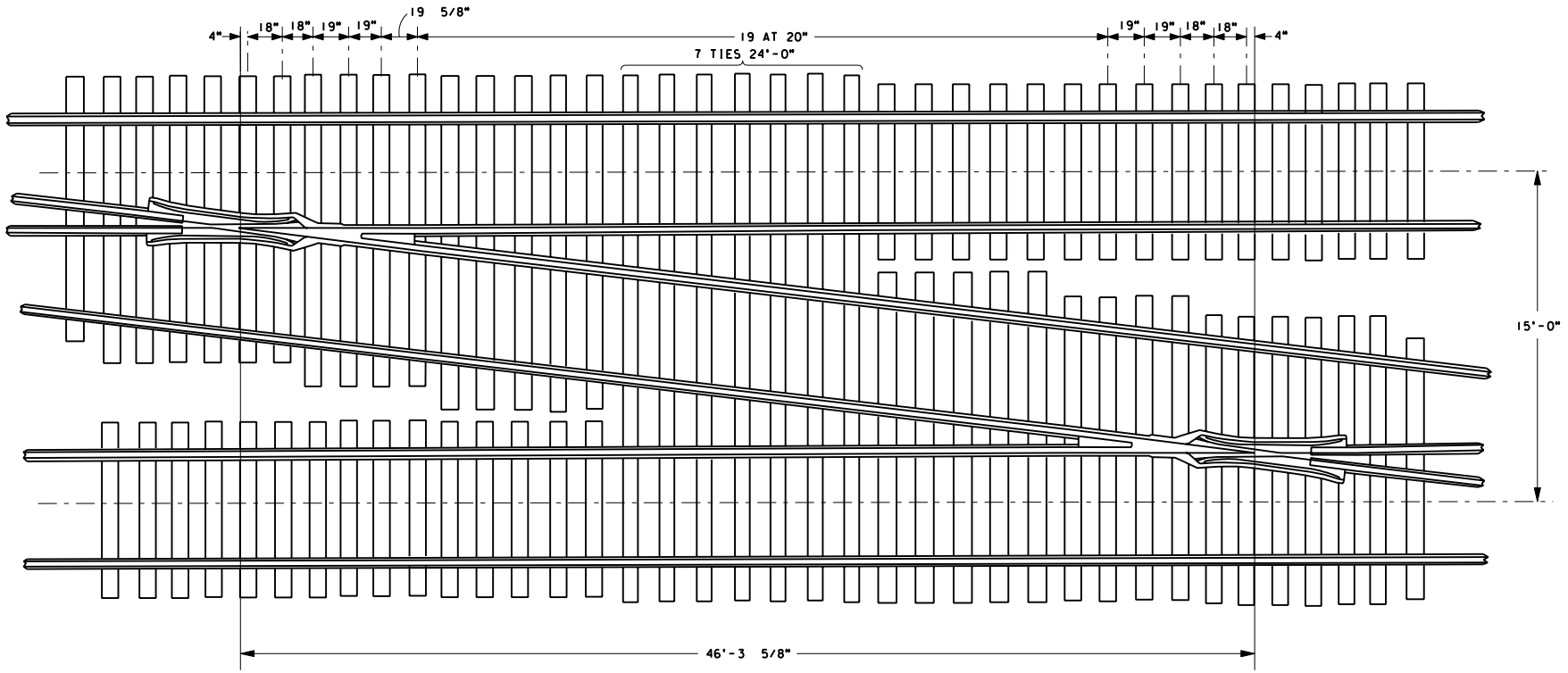
NO. 8 1/2 TURNOUT AND CROSSOVER

SHEET 1 OF 2

ADOPTED: JUNE 1, 1975
REVISED: AUG. 4, 2003
FILE NO.: EXHIBIT F-6

EXHIBIT "F-6"

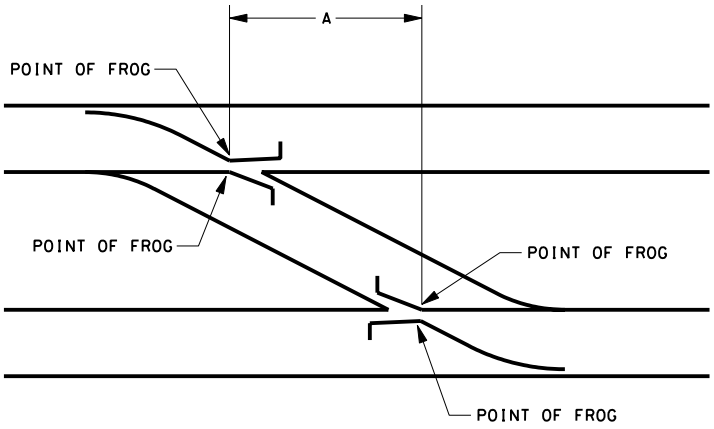
EXHIBIT "F-6"



CROSSOVER - TRACKS 15'-0"

BILL OF TIES				
LENGTH	TURNOUT	CROSSOVER CENTERS		
		13'	14'	15'
9'	13	26	26	26
10'	11	22	22	22
11'	7	14	14	14
12'	6	12	12	12
13'	8	16	16	16
14'	4	—	8	8
15'	5	—	—	10
16'	4	—	—	—
17'	3	—	—	—
22'	—	17	—	—
23'	—	—	10	—
24'	—	—	—	7

CROSSOVER DISTANCES		
TRACK CENTERS	A	B
13'-0"	29'-4 3/8"	30'-1 1/2"
14'-0"	37'-10"	38'-7 7/8"
15'-0"	46'-3 5/8"	47'-2 1/4"
16'-0"	54'-9 3/8"	55'-8 5/8"
FOR 1'-0" CHANGE	8.4704'	8.5292'
FOR 1" CHANGE	8.4704"	8.5292"



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UNION PACIFIC RAILROAD
Office of Chief Engineer Design

INDUSTRY STANDARDS

NO. 8 1/2 TURNOUT AND CROSSOVER

SHEET 2 OF 2

ADOPTED: JUNE 1, 1975
REVISED: AUG. 4, 2003
FILE NO.: EXHIBIT F-6

EXHIBIT "F-6"