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&  
LIST OF STANDARDS  
SEE SHEET 2

# STATE OF VERMONT AGENCY OF TRANSPORTATION



## PROPOSED IMPROVEMENT BRIDGE PROJECT

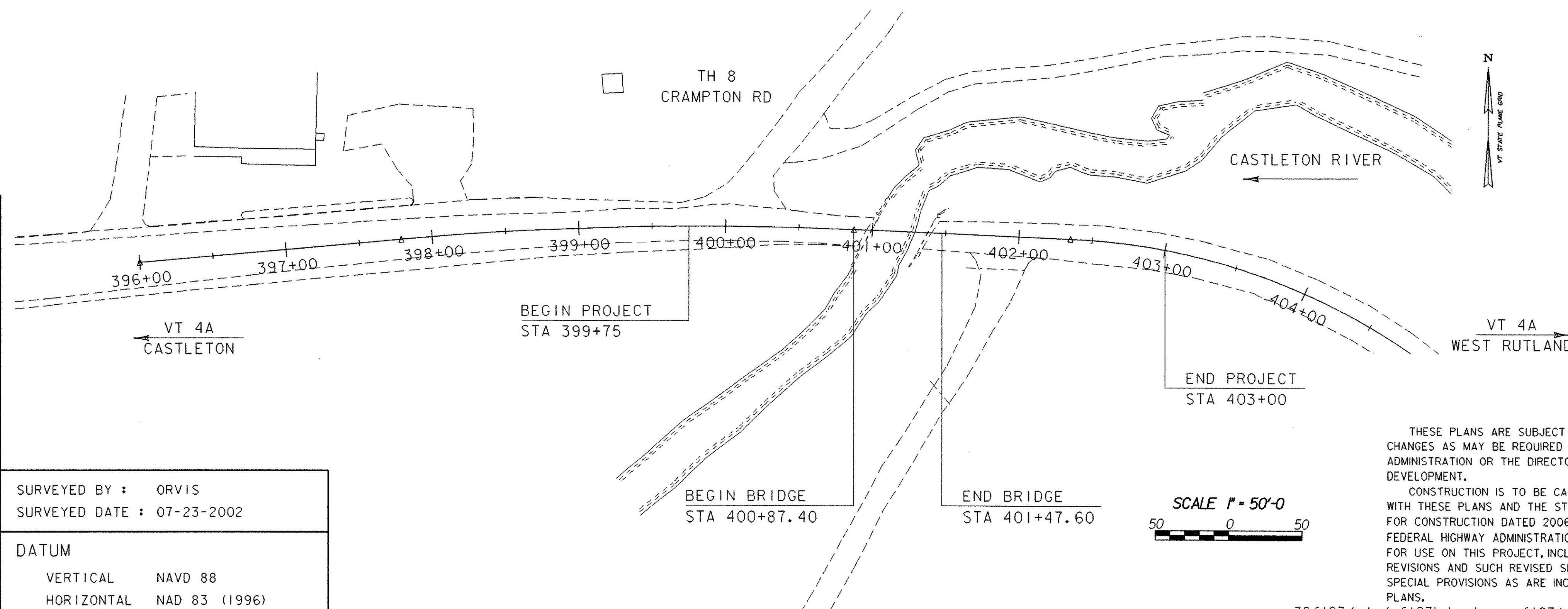
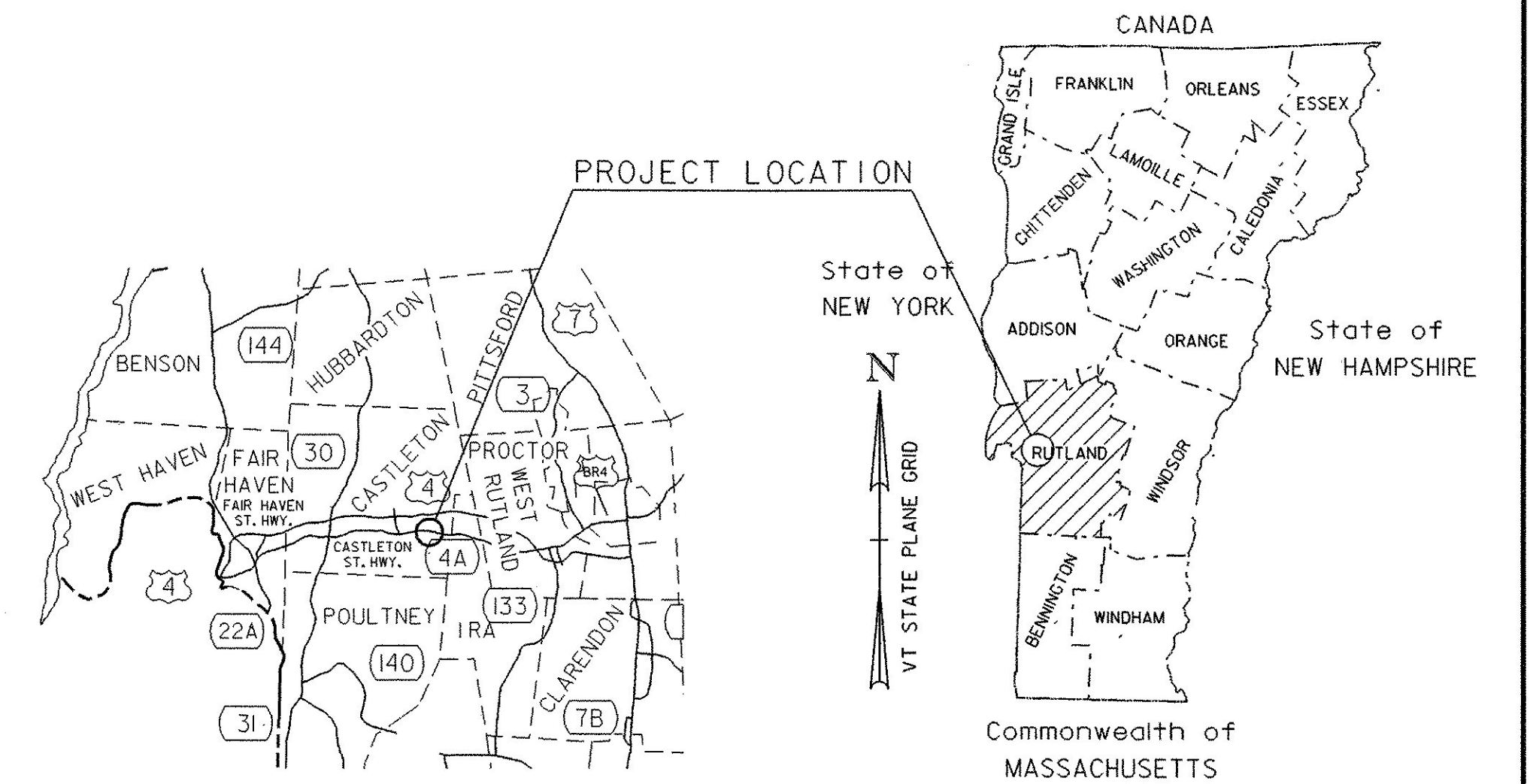
TOWN OF CASTLETON  
COUNTY OF RUTLAND

ROUTE NO : VT 4A                      BRIDGE NO : 8

PROJECT LOCATION : The Bridge is at MM 4.20 east from Fair Haven.  
The Project Limits are MM 4.17 and MM 4.23.

PROJECT DESCRIPTION : Replace bridge and approaches.

LENGTH OF STRUCTURE :                      60.20 FEET.  
LENGTH OF ROADWAY :                      264.80 FEET.  
LENGTH OF PROJECT :                      325.00 FEET.



CONVENTIONAL SYMBOLS	
COUNTY LINE	
TOWN LINE	
LIMITS OF ACCESS	
POINT OF ACCESS	
FENCE LINE	
STONE WALL	
TRAVELED WAY	
GUARD RAIL	
RAILROAD	
SURVEY LINE	
CULVERT	
POWER POLE	
TELEPHONE POLE	
TREES	
CONTROL OF ACCESS	
PROPERTY LINE	
R.O.W. TAKING LINE	
SLOPE RIGHTS	
TOP OF CUT	
TOE OF SLOPE	

SURVEYED BY : ORVIS  
SURVEYED DATE : 07-23-2002

DATUM  
VERTICAL    NAVD 88  
HORIZONTAL    NAD 83 (1996)

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2006, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JUNE 15, 2006 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

DIRECTOR OF PROGRAM DEVELOPMENT  
APPROVED DATE 1-25-07  
PROJECT MANAGER : R. WHITCOMB

PROJECT NAME : CASTLETON  
PROJECT NUMBER : RS 0142 (10)

SHEET 1 OF 68 SHEETS

# PRELIMINARY INFORMATION SHEET

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FINAL HYDRAULIC REPORT

**HYDROLOGIC DATA** Date: 9/14/04  
 DRAINAGE AREA : 32.9 square miles  
 CHARACTER OF TERRAIN : Rolling to mountainous  
 STREAM CHARACTERISTICS : Sinuous  
 NATURE OF STREAMBED : Cobbles, gravel, sand and silt

**PEAK FLOW DATA**  
 Q 2.33 = 900 cfs Q 50 = 2700 cfs  
 Q 10 = 1800 cfs Q 100 = 3100 cfs  
 Q 25 = 2300 cfs Q 500 = 4400 cfs

DATE OF FLOOD OF RECORD : Unknown  
 ESTIMATED DISCHARGE : Unknown  
 WATER SURFACE ELEV. : Unknown  
 NATURAL STREAM VELOCITY : @ Q50 = 4.5 fps  
 ICE CONDITIONS : Moderate  
 DEBRIS : Moderate  
 DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No  
 IS ORDINARY RISE RAPID? No  
 IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No  
 IF YES, DESCRIBE :

WATERSHED STORAGE : 3.0% HEADWATERS :  
 UNIFORM : x  
 IMMEDIATELY ABOVE SITE :

**EXISTING STRUCTURE INFORMATION**  
 STRUCTURE TYPE : Single span concrete thru girder bridge  
 YEAR BUILT : 1924  
 CLEAR SPAN(NORMAL TO STREAM) : 34'  
 VERTICAL CLEARANCE ABOVE STREAMBED : 12'  
 WATERWAY OF FULL OPENING : 348 sq. ft.  
 DISPOSITION OF STRUCTURE : Remove  
 TYPE OF MATERIAL UNDER SUBSTRUCTURE : Refer to borings

WATER SURFACE ELEVATIONS AT:  
 Q2.33 = 428.4 ft VELOCITY = 5.5 fps  
 Q10 = 431.0 ft " 7.6 fps  
 Q25 = 432.1 ft " 8.9 fps  
 Q50 = 433.1 ft " 9.8 fps  
 Q100 = 433.7 ft " 10.8 fps

LONG TERM STREAMBED CHANGES : Unknown

IS THE ROADWAY OVERTOPPED BELOW Q100 : Yes  
 FREQUENCY : Just above Q50  
 RELIEF ELEVATION : 433.2'  
 DISCHARGE OVER ROAD @Q100 : 131 cfs

**UPSTREAM STRUCTURE**  
 TOWN : Castleton DISTANCE : 1.53 mi.  
 HIGHWAY # : Vt. 4A STRUCTURE # : B11  
 CLEAR SPAN : 47' CLEAR HEIGHT : 7'  
 YEAR BUILT : 1988 FULL WATERWAY : 403 sq. ft.  
 STRUCTURE TYPE : Steel beam bridge

**DOWNSTREAM STRUCTURE**  
 TOWN : Castleton DISTANCE : 0.40 mi.  
 HIGHWAY # : Vt. 4A STRUCTURE # : B7  
 CLEAR SPAN : 65' CLEAR HEIGHT : 7'  
 YEAR BUILT : 1964 FULL WATERWAY : 340 sq. ft.  
 STRUCTURE TYPE : Steel beam bridge

**LOAD FACTOR - LOAD RATING (TONS)**

LOADING LEVELS	TRUCK						
	H	HS	3S2	6 AXLE	3A STR.	4A STR.	SA SEMI
INVENTORY	41	52					
POSTED	42	54	69		46	47	60
OPERATING		57	73	82	48	50	

COMMENTS : 0

**TRAFFIC DATA**

YEAR	ADT	DHV	% D	% T	ADTT
2006	2100	210	63	3	100
2026	2800	290	63	5	200

20 year ESAL for flexible pavement from 2006 to 2026 : 497000  
 40 year ESAL for flexible pavement from 2006 to 2046 : 1301000  
 Design Speed : 35 mph

**PROPOSED STRUCTURE**  
 STRUCTURE TYPE : Single Span Prestressed Concrete Voided Slab Bridge  
 CLEAR SPAN(NORMAL TO STREAM) : 50.6'  
 VERTICAL CLEARANCE ABOVE STREAMBED : 12.5'  
 WATERWAY OF FULL OPENING : 495 sq. ft.

WATER SURFACE ELEVATIONS AT:  
 Q2.33 = 428.4 ft VELOCITY = 5.0 fps  
 Q10 = 430.9 ft " 6.4 fps  
 Q25 = 431.9 ft " 7.4 fps  
 Q50 = 432.9 ft " 8.1 fps  
 Q100 = 433.5 ft " 8.8 fps

IS THE ROADWAY OVERTOPPED BELOW Q100 : Yes  
 FREQUENCY : Q75  
 RELIEF ELEVATION : 433.3'  
 DISCHARGE OVER ROAD @Q100 : 70 cfs

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE : 435.6'  
 VERTICAL CLEARANCE : @ Q50 = 2.7'

SCOUR : 4 ft maximum contraction scour at Q500  
 REQUIRED CHANNEL PROTECTION : Stone Fill, Type III

**PERMIT INFORMATION**  
 AVERAGE DAILY FLOW : 65 cfs DEPTH OR ELEVATION :  
 ORDINARY LOW WATER : 20 cfs Elevation = 424.0  
 ORDINARY HIGH WATER : 400 cfs Elevation = 426.0

**TEMPORARY BRIDGE REQUIREMENTS**  
 STRUCTURE TYPE : Single span bridge  
 CLEAR SPAN(NORMAL TO STREAM) : 35 ft (minimum)  
 VERTICAL CLEARANCE ABOVE STREAMBED : Bottom of beam elev. 432.0' (min.)  
 WATERWAY AREA OF FULL OPENING : 315 sq. ft. (minimum)

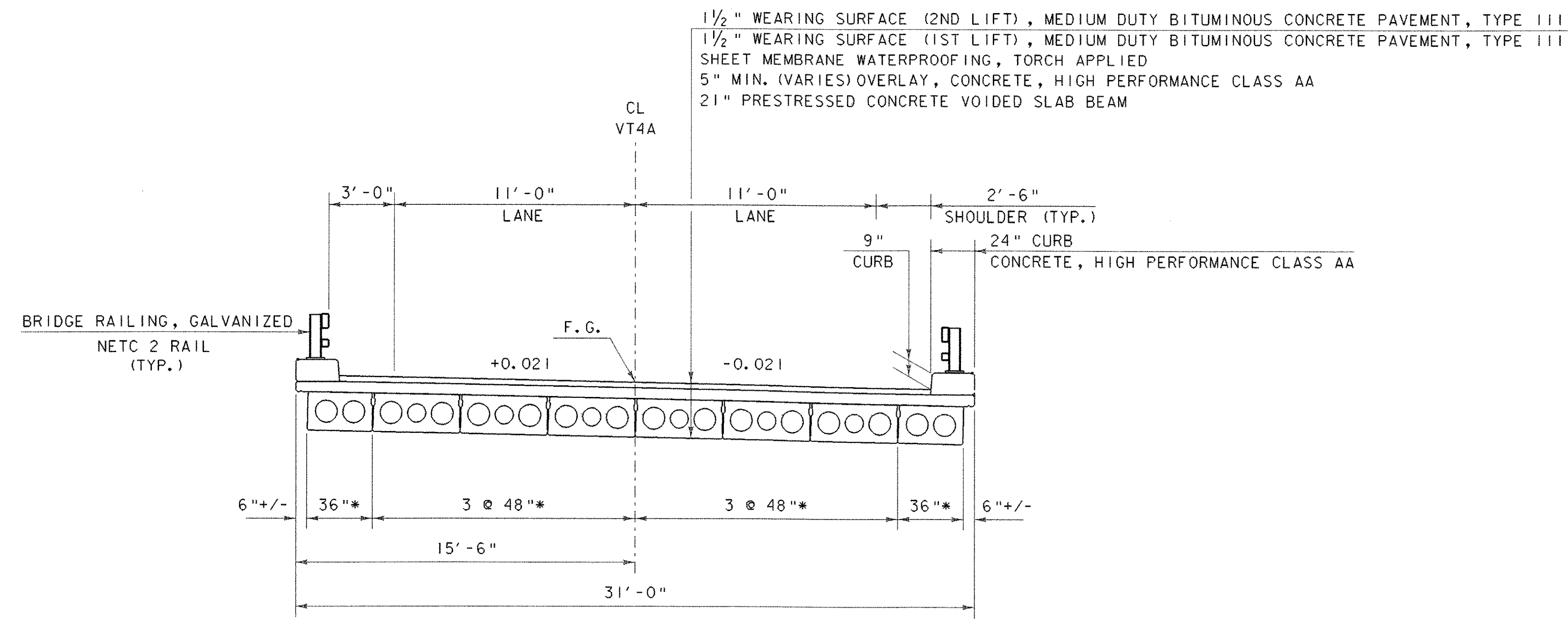
**ADDITIONAL INFORMATION**

- DESIGN CRITERIA**
- DESIGN LIVE LOAD AASHTO : HS-25-44
  - DESIGN SPAN : 57'
  - ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL : NA  
ON LEDGE : NA
  - ALLOWABLE LOAD FOR PILING : 184 kip  
TYPE : HP 12x84 GR 50  
ESTIMATED LENGTH : Abut 1 is approx 35'. Abut 2 is approx 40'.
  - STRUCTURAL STEEL AASHTO M270MM270 GRADE : 50W
  - REINFORCING STEEL GRADE : 60
  - CONCRETE, HIGH PERFORMANCE CLASS AA fc : 4000 psi  
CONCRETE, HIGH PERFORMANCE CLASS B fc : 3500 psi
  - DESIGN SOIL UNIT WEIGHT : 140 pcf
  - DESIGN LOAD FOR SPREAD FOOTINGS ON SOIL : NA

- TRAFFIC MAINTENANCE**
- IS TRAFFIC TO BE MAINTAINED? Yes  
IF YES, ON EXISTING STRUCTURE?  
OR ON TEMPORARY BRIDGE? Temporary Bridge  
ONE OR TWO-WAY TRAVEL? Two-way
  - TRAFFIC CONTROL SIGNALS REQUIRED? No
  - ARE SIDEWALKS REQUIRED? No  
IF SO, ON WHAT SIDE?

PROJECT NAME : Castleton  
 PROJECT NUMBER : RS 0142(10)

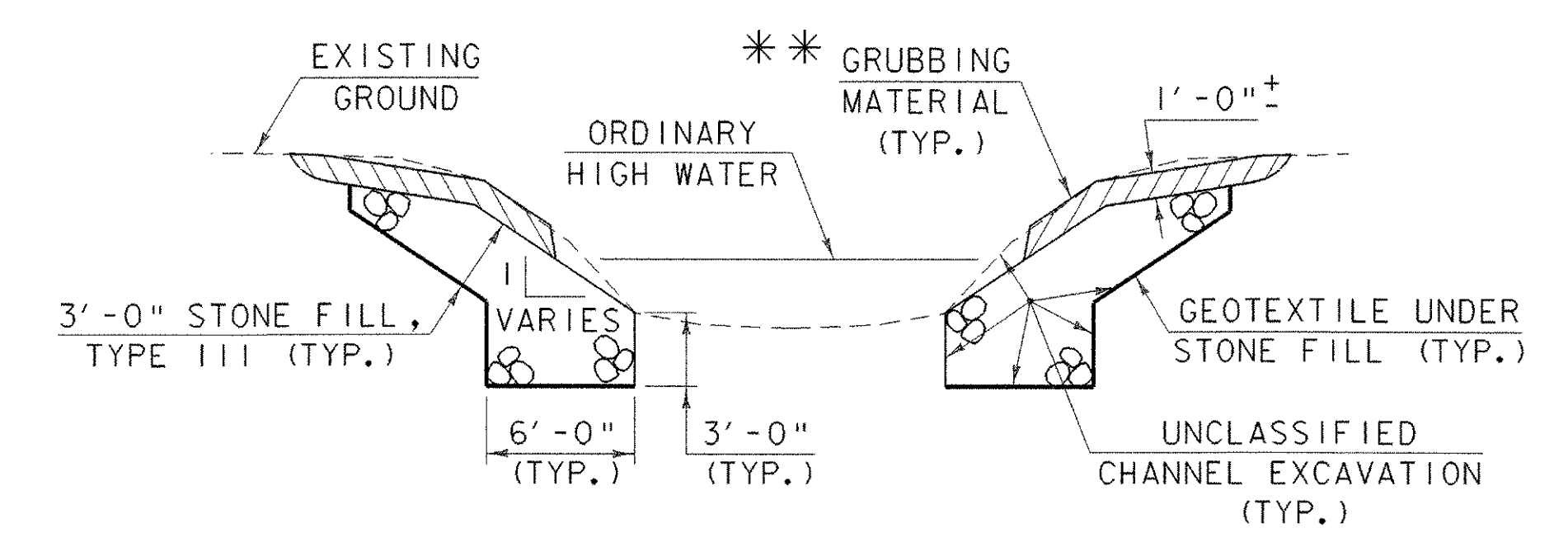
FILE NAME : sf193pi.xls PLOT DATE : 1/24/2007  
 PROJECT MANAGER : R. Whitcomb DRAWN BY : str3  
 DESIGNED BY : T. Lackey CHECKED BY : C. Carlson  
**PRELIMINARY INFORMATION SHEET #1** SHEET 2 OF 68



TYPICAL BRIDGE SECTION

\* NOMINAL PRESTRESSED UNIT WIDTHS.  
 ACTUAL WIDTHS VARY.

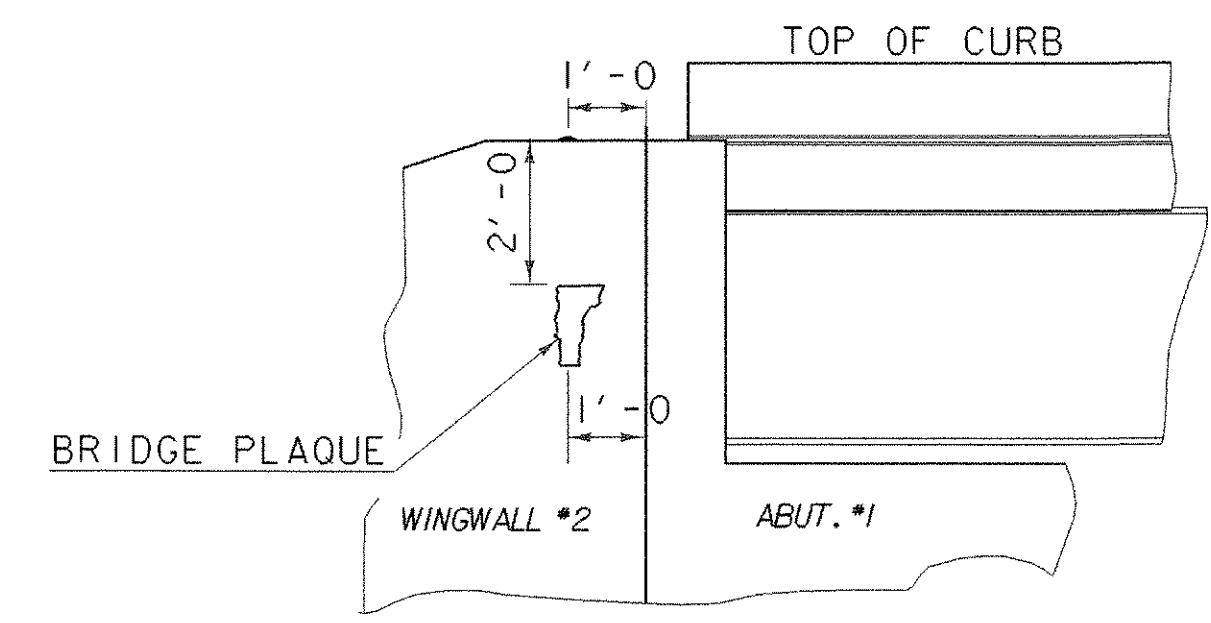
SCALE 1/4" = 1'-0"  
 1 0 2 4 6



CHANNEL TYPICAL SECTION

NOT TO SCALE

\*\* GRUBBING MATERIAL SHALL NOT BE PLACED ON THE STONE FILL IN THE AREA UNDER THE BRIDGE. WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

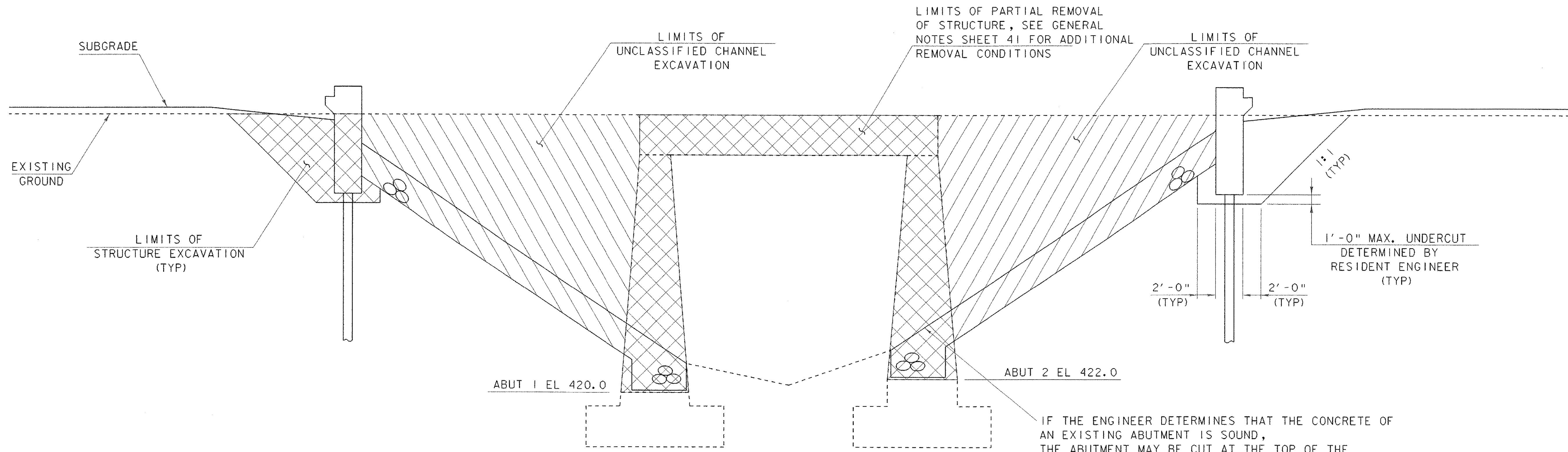


BRIDGE PLAQUE

THE BENCH MARK AND BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

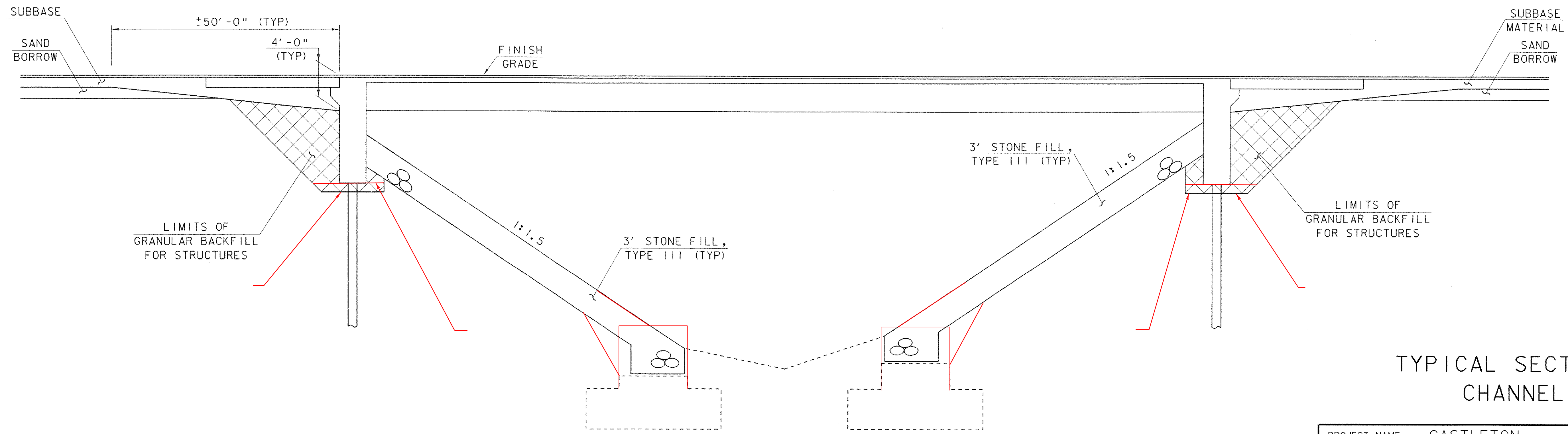
TYPICAL SECTIONS  
 BRIDGE

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193+xl1	CHECKED BY: R. WHITCOMB
PROJECT LEADER: R. WHITCOMB	SHEET 3 OF 68
DESIGNED BY: T. LACKEY	
78F193/str/sf193xsl.dgn	



**EXCAVATIONS & REMOVALS**  
(NOT TO SCALE)

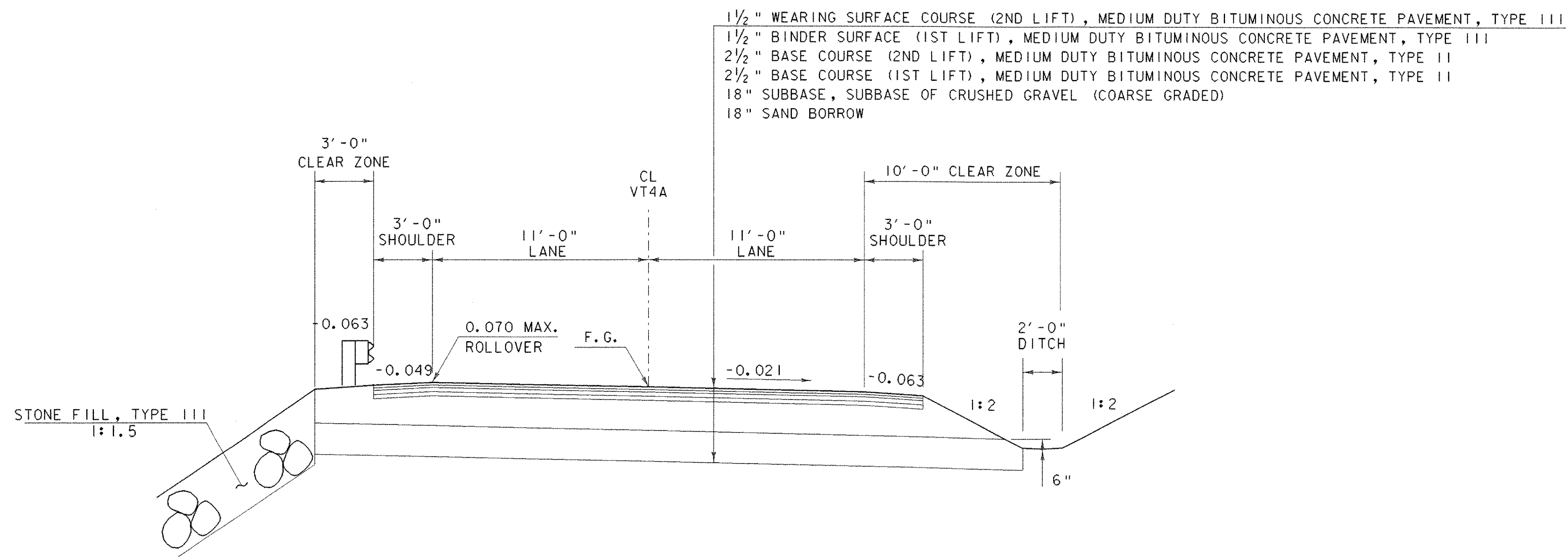
IF THE ENGINEER DETERMINES THAT THE CONCRETE OF AN EXISTING ABUTMENT IS SOUND, THE ABUTMENT MAY BE CUT AT THE TOP OF THE STONE FILL LINE AND LEFT IN PLACE INSTEAD OF STONE FILL. OTHERWISE CUT THE ABUTMENT TO THE INDICATED ELEVATIONS.



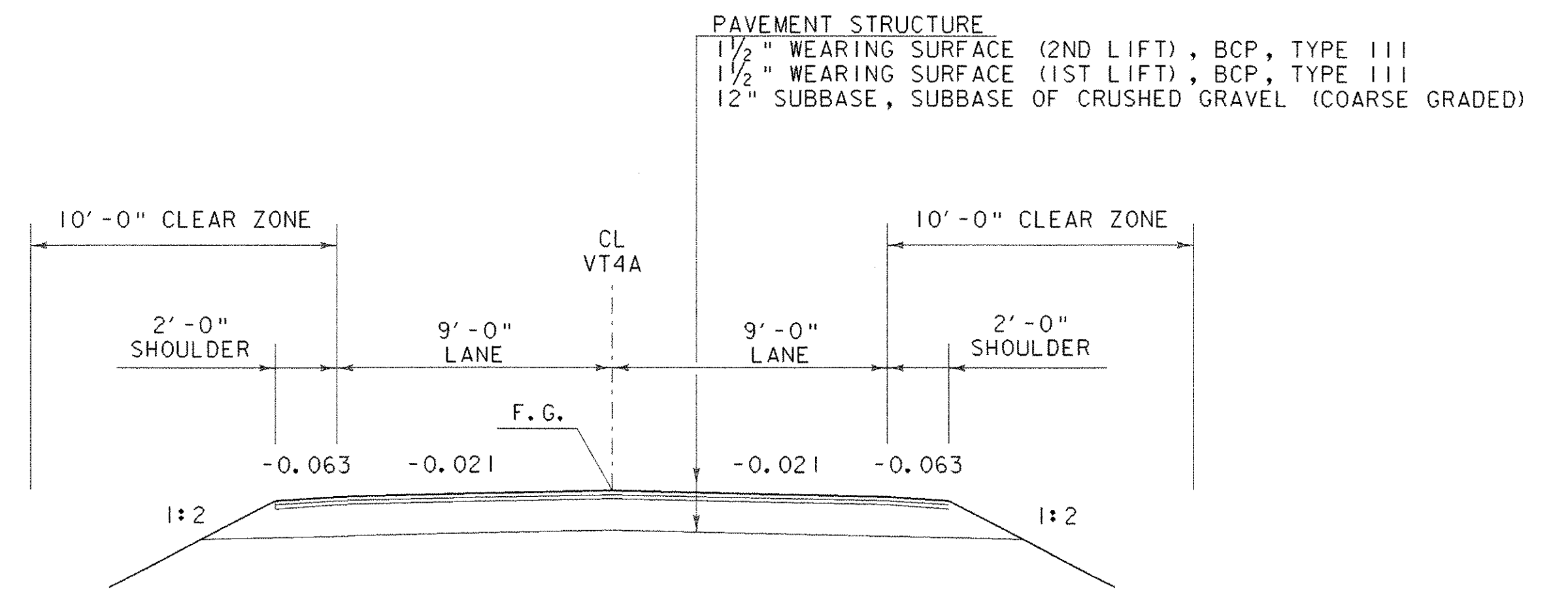
**FILLS**  
(NOT TO SCALE)

**TYPICAL SECTIONS CHANNEL**

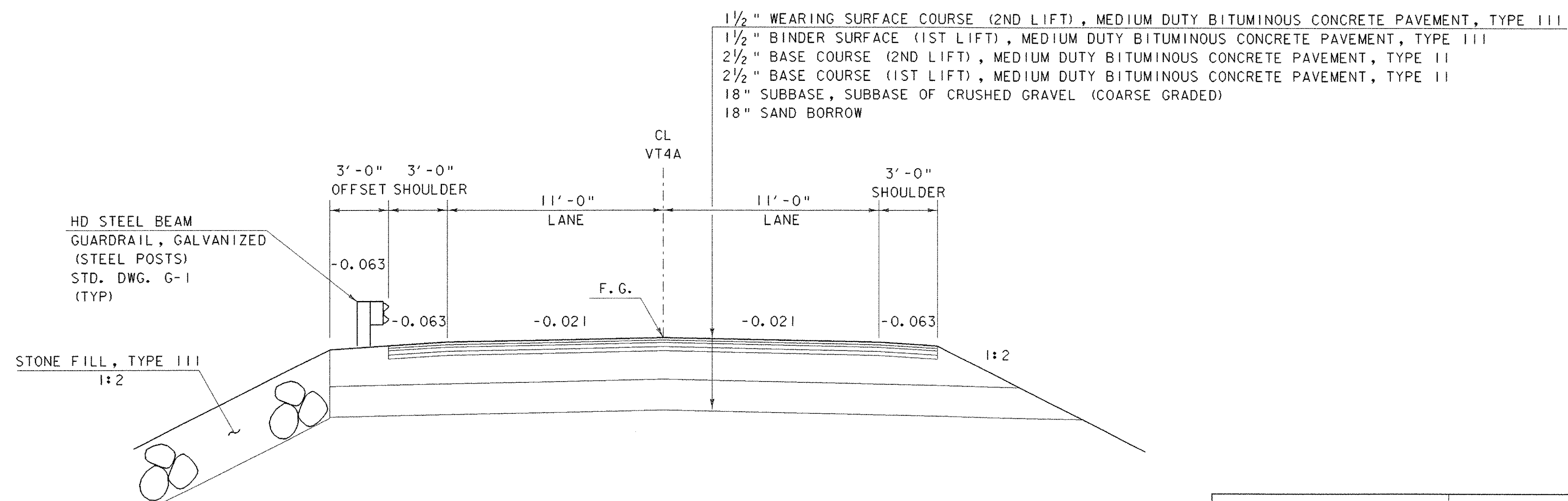
PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: sf193tx2.i	PLOT DATE: 09-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: T. LACKEY
DESIGNED BY: T. LACKEY	CHECKED BY: R. WHITCOMB
T8F193/str/sf193xsl.dgn	SHEET 4 OF 68



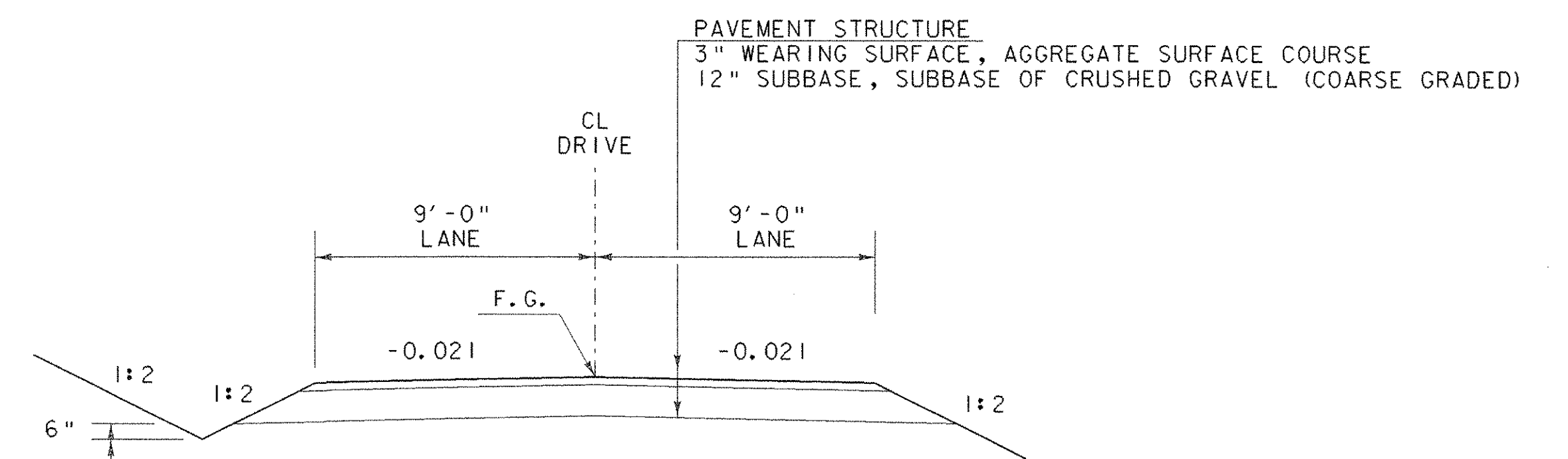
MAINLINE  
TYPICAL ROADWAY SECTION  
BANKED



TH 8  
TYPICAL ROADWAY SECTION  
NORMAL CROWN



MAINLINE  
TYPICAL ROADWAY SECTION  
NORMAL CROWN



DRIVE I  
TYPICAL ROADWAY SECTION  
NORMAL CROWN

TYPICAL SECTIONS  
ROADWAY

MATERIAL ITEM	TOLERANCE
PAVEMENT SURFACE COURSE	± 1/4" TOTAL THICKNESS
PAVEMENT BASE COURSE	± 1/2"
AGGREGATE SURFACE COURSE	± 1/2"
SUBBASE	± 1"
SAND BORROW	± 1"
GRANULAR BORROW	± 1"

SCALE 1/4" = 1'-0"  
1 0 2 4 6

PROJECT NAME: CASTLETON  
PROJECT NUMBER: RS 0142(10)  
FILE NAME: sf193+x3.1  
PROJECT MANAGER: R. WHITCOMB  
DESIGNED BY: T. LACKEY  
78F193/str/sf193xsl.dgn  
PLOT DATE: 09-FEB-2007  
DRAWN BY: T. LACKEY  
CHECKED BY: R. WHITCOMB  
SHEET 5 OF 68

# QUANTITY SHEET

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
DECK	ABUT 1	ABUT 2	APP SLAB 1	APP SLAB 2	CHANNEL	ROADWAY	EROSION CONTROL	BRIDGE	FULL E&C	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				EARTHWORKS SUMMARY
						1860				1860		CY	COMMON EXCAVATION	203.15				FILL REQUIRED
					490			490		490		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27		70	CY	COMMON FILL(1.15*61 CY)
						250				250		CY	EXCAVATION OF SURFACES AND PAVEMENTS	203.28				FILL AVAILABLE
						20				20		CY	EARTH BORROW	203.30				COMMON EXCAVATION(0.1*1606 CY)
						560				560		CY	SAND BORROW	203.31				TRENCH EXCAVATION OF EARTH(0.3*50 CY)
						50	20			70		CY	TRENCH EXCAVATION OF EARTH	204.20				STRUCTURE EXCAVATION(0.3*439 CY)
	230	220						450		450		CY	STRUCTURE EXCAVATION	204.25				UNCLASSIFIED CHANNEL EXCAVATION(0.3*484 CY)
	95	95						190		190		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				TOTAL
						400				400		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				FILL REQUIRED
						960	70			1030		CY	SUBBASE OF CRUSHED GRAVEL, COARSE GRADED	301.25				FILL AVAILABLE
						20				20		CY	AGGREGATE SURFACE COURSE	401.10				
						9				9		CWT	EMULSIFIED ASPHALT	404.65				TEMPORARY EROSION CONTROL ITEMS
						648				648		TON	MEDIUM DUTY BITUMINOUS CONCRETE PAVEMENT (PG 58-28)	406.27				204.20 TRENCH EXCAVATION OF EARTH
48								48		48		CY	CONCRETE, HIGH PERFORMANCE CLASS AA	501.32				301.25 SUBBASE OF CRUSHED GRAVEL, COARSE GRADED
	53	53	30	30				166		166		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34				608.25 ALL PURPOSE EXCAVATOR RENTAL, TYPE I
	1							1		1		LS	FURNISHING EQUIPMENT FOR DRIVING PILING	504.10				613.10 STONE FILL, TYPE I
	255	280						535		535		LF	STEEL PILING, HP 12 X 84	505.165				649.51 GEOTEXTILE FOR SILT FENCE
	1	1						2		2		EACH	DYNAMIC PILE LOADING TEST	505.45				649.61 GEOTEXTILE FOR FILTER CURTAIN
	5120	5150						10270		10270		LB	REINFORCING STEEL	507.15				651.17 SEED, WINTER RYE
5830	160	160	3050	3050				12250		12250		LB	EPOXY COATED REINFORCNG STEEL	507.17				652.10 EROSION & SEDIMENT CONTROL PLAN
120								120		120		LF	PRESTRESSED CONCRETE VOIDED SLABS (21" X 36")	510.22				652.20 MONITORING EROSION & SEDIMENT CONTROL PLAN
360								360		360		LF	PRESTRESSED CONCRETE VOIDED SLABS (21" X 48")	510.22				652.30 MAINTENANCE OF EPSC PLAN (N.A.B.I.)
420								420		420		LF	GROUTING SHEAR KEYS	510.24				653.15 HAY BALES
	29	29						58		58		LF	BRIDGE EXPANSION JOINT, ASPHALTIC PLUG	516.10				653.20 TEMPORARY EROSION MATTING
182								182		182		SY	SHEET MEMBRANE WATERPROOFING, TORCH APPLIED	519.20				653.25 TEMPORARY STONE CHECK DAM, TYPE I
164								164		164		LF	BRIDGE RAILING, GALVANIZED NETC 2 RAIL	525.33				653.35 VEHICLE TRACKING PAD
						1				1		LS	TWO-WAY TEMPORARY BRIDGE (Ø60 SF - EST.)	528.11				653.55 PROJECT DEMARCATION FENCE
100								100		100		SY	REMOVAL OF BRIDGE PAVEMENT	529.10				
1								1		1		EACH	PARTIAL REMOVAL OF STRUCTURE	529.20				
	16	16						32		32		EACH	BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD	531.11				
													BEGIN OPTION AA					
						50				50		LF	24" CSP .064 (2-2/3 X 1/2)	601.0025				
						50				50		LF	24" CAAP .060 (2-2/3 X 1/2)	601.0225				
						50				50		LF	24" PCCSP .064 (2-2/3 X 1/2)	601.0425				
						50				50		LF	24" CPEP(SL)	601.2620				
													END OPTION AA					
							2			2		HR	ALL PURPOSE EXCAVATOR RENTAL, TYPE I	608.25				
						1				1		MGAL	DUST CONTROL WITH WATER	609.10				
						1				1		TON	DUST AND ICE CONTROL WITH CALCIUM CHLORIDE	609.15				

REVISIONS

8-Mar-07 THL  
ITEM 519.20 SHEET MEMBRANE WATERPROOFING, TORCH APPLIED.  
REMOVED 49 SY FROM APP SLAB 1.  
REMOVED 49 SY FROM APP SLAB 2.

PROJECT NAME: CASTLETON  
PROJECT NUMBER: RS 0142(10)  
FILE NAME: 78F193frm.dgn VAOT\_quant.xls  
PROJECT MANAGER: R. WHITCOMB  
DESIGNED BY: W. LAMMER  
QUANTITY SHEET #1

PLOT DATE: 03/09/2007  
DRAWN BY: W. LAMMER  
CHECKED BY: T. LACKEY  
SHEET 6 OF 68

# QUANTITY SHEET

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
DECK	ABUT 1	ABUT 2	APP SLAB 1	APP SLAB 2	CHANNEL	ROADWAY	EROSION CONTROL	BRIDGE	FULL E&C	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							10	20		30		CY	STONE FILL, TYPE I	613.10				
	150	380						530		530		CY	STONE FILL, TYPE III	613.12				
						3				3		EACH	RELOCATE MAILBOX, SINGLE SUPPORT	617.10				
						288				288		LF	HD STEEL BEAM GUARDRAIL, GALVANIZED	621.21				
						1				1		EACH	MANUFACTURED TERMINAL SECTION, FLARED	621.50				
						2				2		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
						4				4		EACH	GUARDRAIL APPROACH SECTION, GALVANIZED NETC 2 RAIL	621.72				
						365				365		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
						230				230		LF	TEMPORARY TRAFFIC BARRIER	621.90				
						100				100		HR	UNIFORMED TRAFFIC OFFICERS	630.10				
						300				300		HR	FLAGGERS	630.15				
									1	1		LS	FIELD OFFICE, ENGINEERS	631.10				
									1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16				
									1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
									1	1		LU	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.25				
						1				1		LS	MOBILIZATION/DEMobilIZATION	635.11				
						1				1		LS	TRAFFIC CONTROL	641.10				
						1330				1330		LF	DURABLE 4 INCH WHITE LINE, THERMOPLASTIC	646.402				
						1330				1330		LF	DURABLE 4 INCH YELLOW LINE, THERMOPLASTIC	646.412				
						100				100		EACH	LINE STRIPING TARGETS	646.76				
	220	560						780		780		SY	GEOTEXTILE UNDER STONE FILL	649.31				
							180			180		SY	GEOTEXTILE FOR SILT FENCE	649.51				
							170			170		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				
							20			20		LB	SEED	651.15				
							10			10		LB	SEED, WINTER RYE	651.17				
							200			200		LB	FERTILIZER	651.18				
							1			1		TON	AGRICULTURAL LIMESTONE	651.20				
							1			1		TON	HAYMULCH	651.25				
							80			80		CY	TOPSOIL	651.35				
							420			420		SY	GRUBBING MATERIAL	651.40				
							1			1		LS	EPSC PLAN	652.10				
							30			30		HR	MONITORING EPSC PLAN	652.20				
							1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30				
							310			310		SY	TEMPORARY EROSION MATTING	653.20				
							810			810		SY	PERMANENT EROSION MATTING	653.21				
							30			30		CY	TEMPORARY STONE CHECK DAM, TYPE I	653.25				
							60			60		CY	VEHICLE TRACKING PAD	653.35				
							1030			1030		LF	PROJECT DEMARCATION FENCE	653.55				
							13			13		SF	TRAFFIC SIGNS, TYPE A	675.20				
							14			14		LF	FLANGED CHANNEL SIGN POST	675.301				

PROJECT NAME: **CASTLETON**  
 PROJECT NUMBER: **RS 0142(10)**  
 FILE NAME: 78F193frm.dgn VAOT\_quant.xls PLOT DATE: 02/01/2007  
 PROJECT MANAGER: R. WHITCOMB DRAWN BY: W. LAMMER  
 DESIGNED BY: W. LAMMER CHECKED BY: T. LACKEY  
 QUANTITY SHEET #2 SHEET 7 OF 68



# RIGHT - OF - WAY DETAIL SHEET

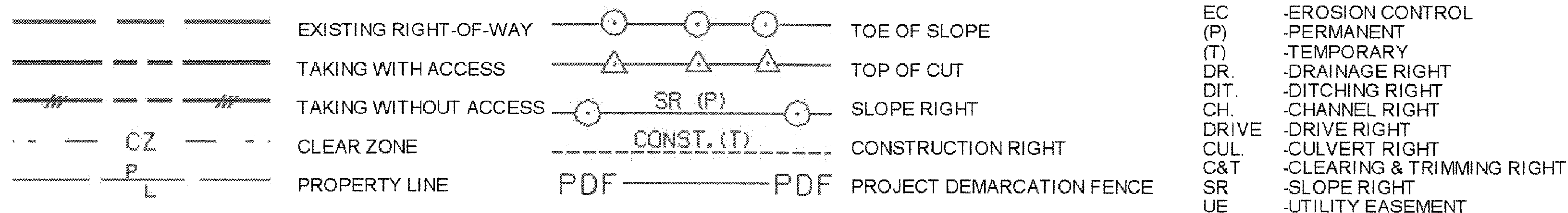
TABLE OF PROPERTY ACQUISITION

PARCEL NO.	PROPERTY OWNER	SHEET NO.	BEGINNING STATION	ENDING STATION	TAKE	REMAINDER	RIGHT			RECORDING DATA				REMARKS	
					AREA±	AREA±	TYPE	(T/P)	AREA ±	TITLE	DATE	TOWN / CITY	BOOK		PAGE
1A	BAILEY, CLAYTON A. JR.	14	398+96.8 LT. 399+37.5 LT. TH 8 501+80 LT.	400+08.0 LT. 399+79.7 LT.			INSTALL SLOPE INSTALL & MAINTAIN	(T) (T) (P)	920 SF 30 SF			CASTLETON		PDF GUY WIRE AND ANCHOR	
1B		14	398+97.24 LT.	400+11.16 LT.	2,800 SF		ALL R.T. & I							VT. RTE. 4A & TH 8 HWY. EASE.	
2	TOWN OF CASTLETON	14	399+79.08 LT. TH 8 500+28.39 CL 400+08.0 LT.	400+42.13 LT. TH 8 501+03 LT. TH 8 501+07 LT.	1,571 SF		ALL R.T. & I APPROACH INSTALL	(T) (T) (T)						VT. RTE. 4A PDF	
3A	DUMAS, ARLYN	14	400+42.13 LT. 400+53.8 LT. 400+76.9 LT. 401+38.2 LT.	400+47.8 LT. 401+21.4 LT. 401+15.8 LT. 402+75.8 LT.			SLOPE INSTALL CHANNEL UTILITY	(T) (T) (P) (P)	12 SF 760 SF 120 SF 0.10 A			CASTLETON		PDF & EROSION CONTROL 4,300 SF±; (30' WIDE)	
3B		14	400+11.05 LT.	401+23.97 LT.	2,620 SF		ALL R.T. & I							VT. RTE. 4A & TH 8 HWY. EASE.	
4A	SATTON, THOMAS J. & CYNTHIA	14	401+33.5 LT. 401+45.5 LT.	404+25.00 LT. 402+42.2 LT.			CONST. CHANNEL	(T) (P)	2,320 SF 940 SF	WD	08/28/06	CASTLETON	136	170	INCLUDES PDF & EROSION CONTROL
4B		14	401+13.78 LT.	404+25.00 LT.	0.18 A		ALL R.T. & I							VT. RTE. 4A HWY. EASE.; 7,770 SF±	
5A	WELCH, SCOTT T.	14	400+85.58 RT. 400+55.8 RT. 400+62.6 RT. 401+86.1 RT. 401+88.4 RT. 401+90 RT. 402+10.6 RT. 402+68.1 RT.	404+25.00 RT. 401+91.1 RT. 402+21.2 RT. 402+29.7 RT. 402+05.3 RT. 403+52.0 RT.	0.21 A±		DETOUR UTILITY INSTALL & MAINTAIN CONST. REMOVE & RESET CONST.	(T) (P) (P) (T) (T) (T)	2,420 SF 0.10 A 350 SF 450 SF			CASTLETON		9,200 SF± INCLUDES PDF & EROSION CONTROL 4,570 SF± GUY ANCHOR & WIRE INCLUDES PDF & EROSION CONTROL PAVED DRIVE; 18' WIDE; MM 0421 COMMERCIAL SIGN INCLUDES PDF	
5B		14	401+03.30 RT.	404+25.00 RT.	0.18 A		ALL R.T. & I							VT. RTE. 4A HWY. EASE.; 7,710 SF±	
6A	MORTON BUILDINGS, INC.	14	398+99.4 RT. 399+02.7 RT. 399+37.7 RT. 399+50.0 RT. 400+37.0 RT. 399+61 RT. 400+61.8 RT.	399+83.2 RT. 399+50.0 RT. 400+84.4 RT. 401+03.30 RT. 400+61.8 RT. 399+67.0 RT. 400+89.2 RT.			CONST. SLOPE UTILITY DETOUR SLOPE INSTALL & MAINTAIN CHANNEL	(T) (T) (P) (T) (P) (P)	800 SF 400 SF 3,450 SF 0.12 A 100 SF 200 SF					INCLUDES PDF INCLUDES EROSION CONTROL INCLUDES PDF & EROSION CONTROL; 5,270 SF± INCLUDES TEMPORARY EROSION CONTROL GUY WIRE & ANCHOR	
6B		14	398+98.32 RT.	401+13.78 RT.	0.12 A±		ALL R.T. & I							VT. RTE. 4A HWY. EASE.; 5,120 SF±	

TABLE OF REVISIONS

REVISION NO.	SHEET NO.	DESCRIPTION	DATE
1	12	PARCEL NO. 6, MORTON BUILDINGS INC. CHANGE TAKE AREA ON 6B FROM 0.18A TO 0.12A±. STA. CHANGE FOR GUY WIRE & ANCHOR-CHANGED ENDING STATION TO 399+67.0 RT. PER C.O. 9449 MADE BY: JB APPROVED BY: RD	03/06/06
2	12	PARCEL NO. 5, WELCH, SCOTT. ADD 450 SF TO CONST. (T) STA. 402+68.1 RT. PER C.O. 9450 MADE BY: JB APPROVED BY: RD	03/06/06

PLAN LEGEND



APPROVED: ROGER P. DUMAS DATE: 09-27-05  
CHIEF, PLANS & TITLES

PLOT DATE 12/28/06

PROJECT NAME: **CASTLETON**  
 PROJECT NUMBER: **RS 0142(10)**  
 FILE NAME: **RF193DET.XLS** PLOT DATE: **Date**  
 PROJECT LEADER: **R.WHITCOMB** DRAWN BY: **M.R.**  
 DESIGNED BY: **T.LACKEY** CHECKED BY: **E.P.**  
 R.O.W. SHEET 12 OF 14 SHEET 9 OF 68



BRIDGE RAILING, GALVANIZED NETC 2 RAIL

ML 400+87 TO 401+63 LT  
ML 400+76 TO 401+52 RT

GUARDRAIL APPROACH SECTIONS, GALVANIZED NETC 2 RAIL

ML 400+62 TO 400+87 LT  
ML 401+63 TO 401+88 LT  
ML 400+51 TO 400+76 RT  
ML 401+52 TO 401+73 RT

HD STEEL BEAM GUARDRAIL, GALVANIZED

ML 400+39 TO 400+62 LT  
ML 401+88 TO 403+59 LT  
ML 399+63 TO 400+51 RT

MANUFACTURED TERMINAL SECTION, FLARED

ML 399+26 TO 399+63 RT

ANCHOR FOR STEEL BEAM RAIL

ML 400+39 LT  
ML 401+73 RT

**BAILEY, CLAYTON A. JR.**

END MAINT. AGREE. ZONE  
TH#8 STA. 500+26.39 CL

BEGIN MAINT. AGREE. ZONE  
TH#8 STA. 500+11.00 CL  
LENGTH: 16.39'

BEGIN R.O.W. PROJECT  
STA. 398+96.8 33.5' LT.

BEGIN PROJECT  
ML 399+75

STATE OF VERMONT

REMOVAL & DISPOSAL OF GUARDRAIL

ML 400+54 TO 401+00 LT  
ML 401+46 TO 403+59 LT  
ML 400+16 TO 400+89 RT  
ML 401+35 TO 401+61 RT

COLD PLANING, BITUMINOUS PAVEMENT

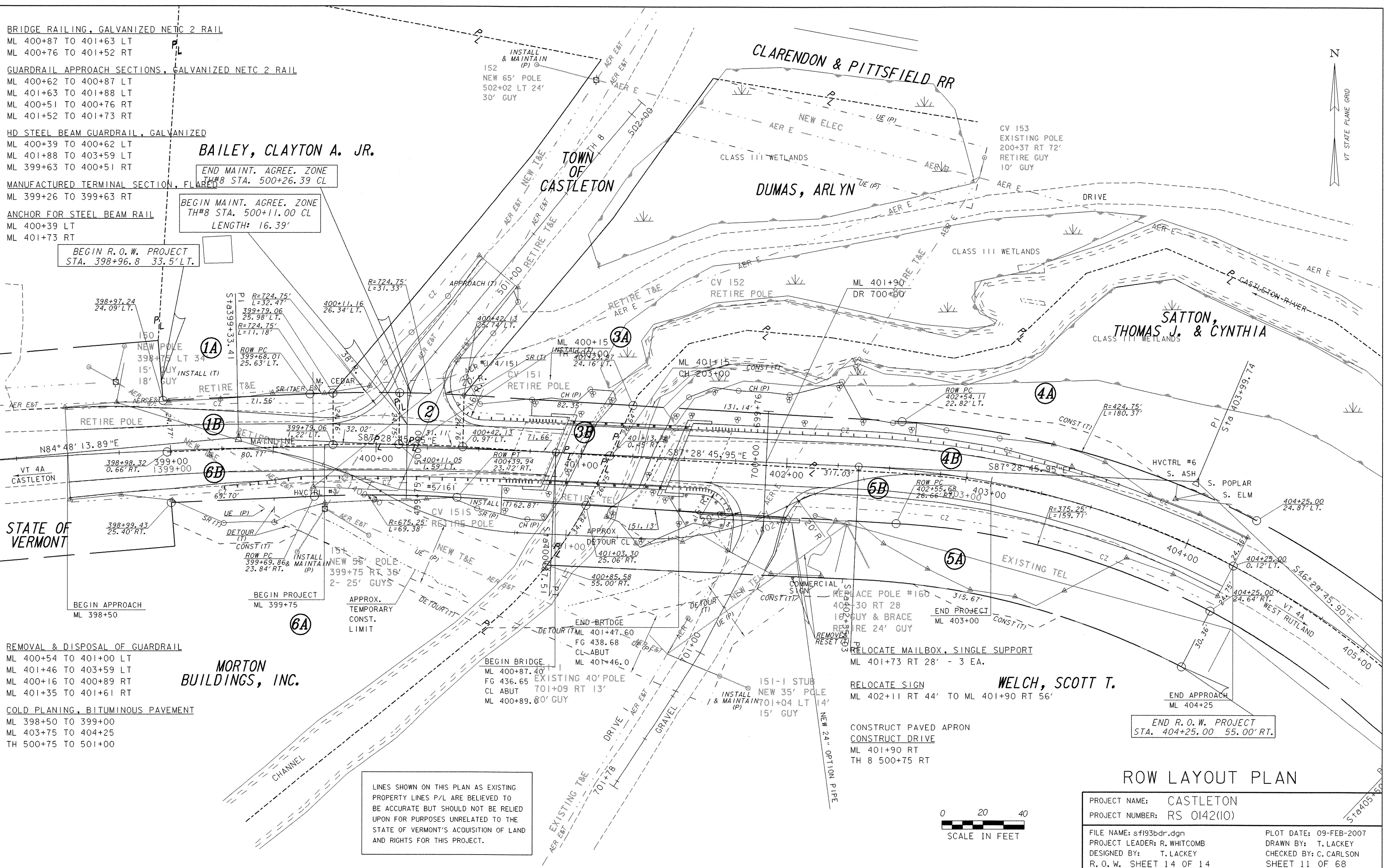
ML 398+50 TO 399+00  
ML 403+75 TO 404+25  
TH 500+75 TO 501+00

**MORTON BUILDINGS, INC.**

BEGIN BRIDGE  
ML 400+87.40  
FG 436.65  
CL ABUT 701+09 RT 13'  
ML 400+89.80' GUY

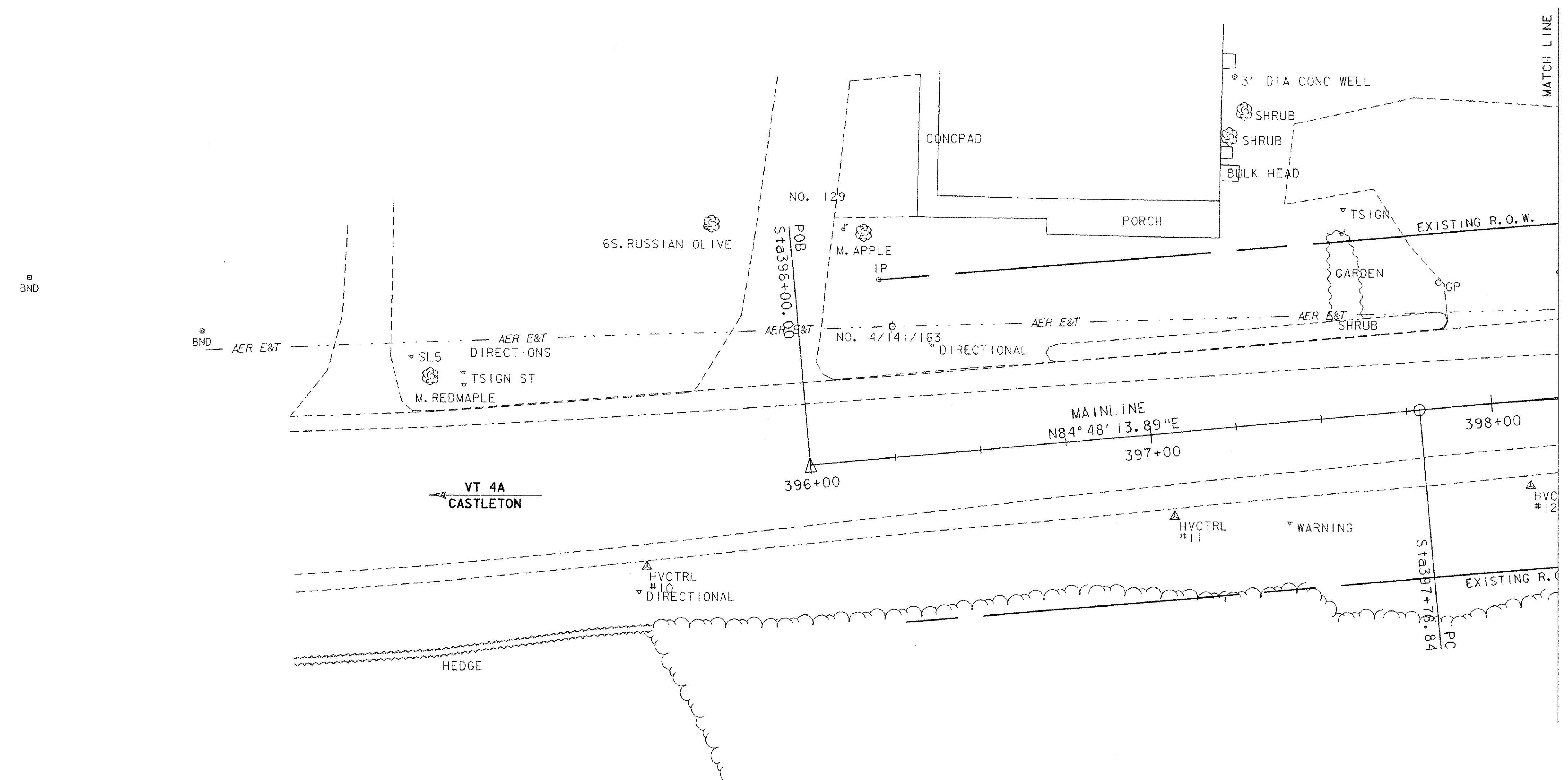
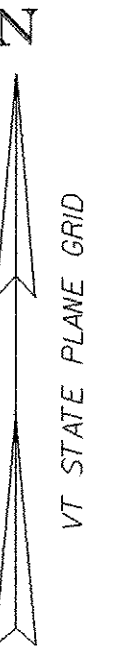
END BRIDGE  
ML 401+47.60  
FG 438.68  
CL ABUT ML 401+46.0  
EXISTING 40' POLE  
701+09 RT 13'  
ML 400+89.80' GUY

LINES SHOWN ON THIS PLAN AS EXISTING PROPERTY LINES P/L ARE BELIEVED TO BE ACCURATE BUT SHOULD NOT BE RELIED UPON FOR PURPOSES UNRELATED TO THE STATE OF VERMONT'S ACQUISITION OF LAND AND RIGHTS FOR THIS PROJECT.

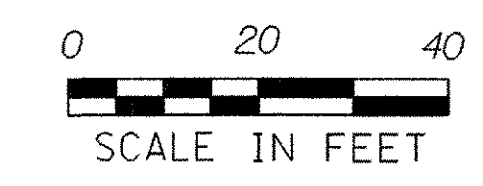


**ROW LAYOUT PLAN**

PROJECT NAME:	CASTLETON	FILE NAME:	sf193bdr.dgn	PLOT DATE:	09-FEB-2007
PROJECT NUMBER:	RS 0142(10)	PROJECT LEADER:	R. WHITCOMB	DRAWN BY:	T. LACKEY
		DESIGNED BY:	T. LACKEY	CHECKED BY:	C. CARLSON
		R.O.W. SHEET 14 OF 14		SHEET 11 OF 68	



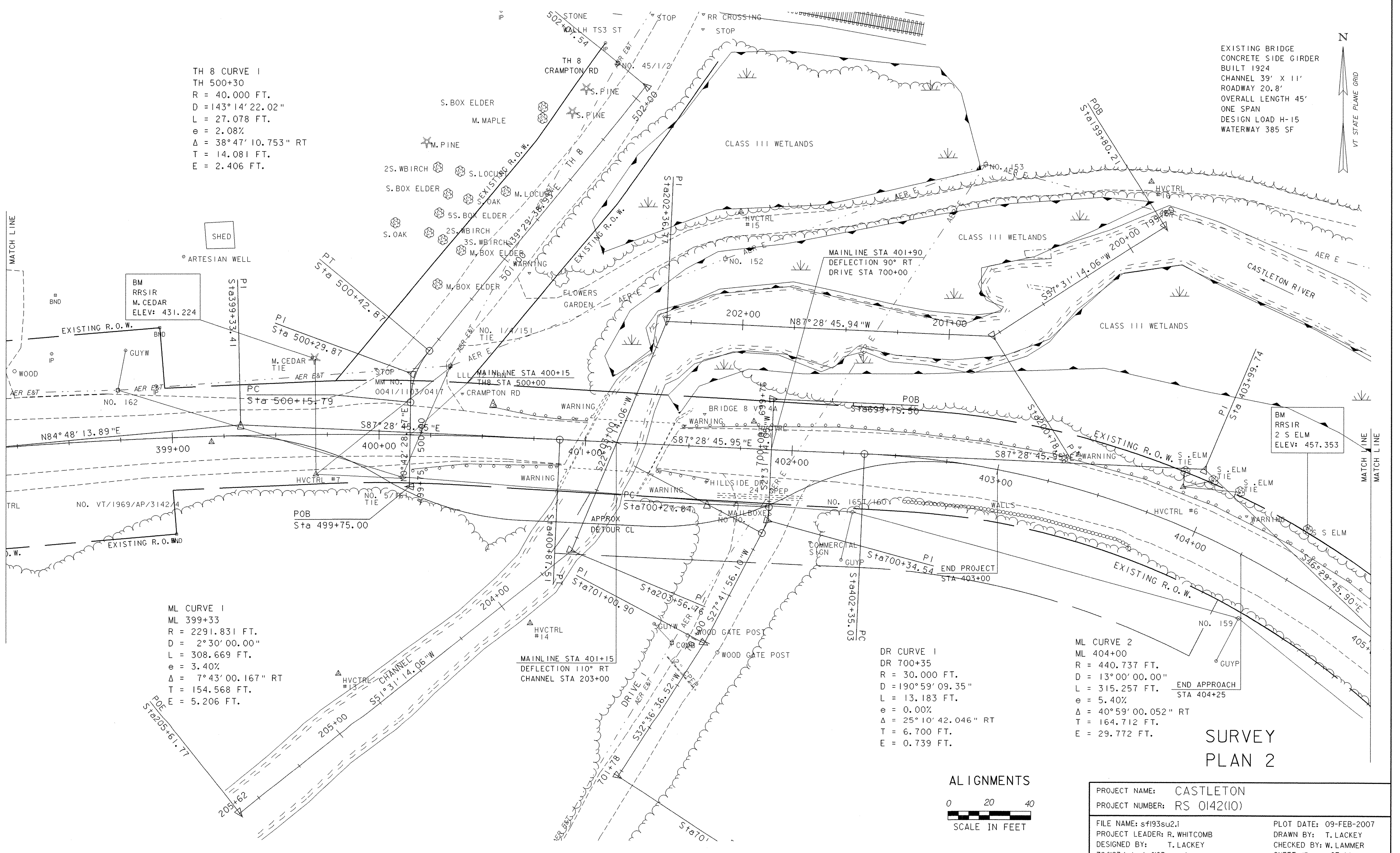
# SURVEY PLAN I



PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193sul1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 12 OF 68
DESIGNED BY: T. LACKEY	
78f193/str/sf193sur.dgn	

TH 8 CURVE 1  
 TH 500+30  
 R = 40.000 FT.  
 D = 143° 14' 22.02"  
 L = 27.078 FT.  
 e = 2.08%  
 Δ = 38° 47' 10.753" RT  
 T = 14.081 FT.  
 E = 2.406 FT.

EXISTING BRIDGE  
 CONCRETE SIDE GIRDER  
 BUILT 1924  
 CHANNEL 39' X 11'  
 ROADWAY 20.8'  
 OVERALL LENGTH 45'  
 ONE SPAN  
 DESIGN LOAD H-15  
 WATERWAY 385 SF

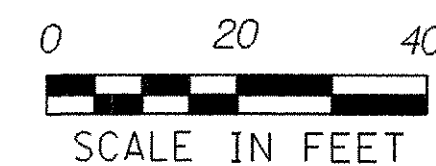


ML CURVE 1  
 ML 399+33  
 R = 2291.831 FT.  
 D = 2° 30' 00.00"  
 L = 308.669 FT.  
 e = 3.40%  
 Δ = 7° 43' 00.167" RT  
 T = 154.568 FT.  
 E = 5.206 FT.

DR CURVE 1  
 DR 700+35  
 R = 30.000 FT.  
 D = 190° 59' 09.35"  
 L = 13.183 FT.  
 e = 0.00%  
 Δ = 25° 10' 42.046" RT  
 T = 6.700 FT.  
 E = 0.739 FT.

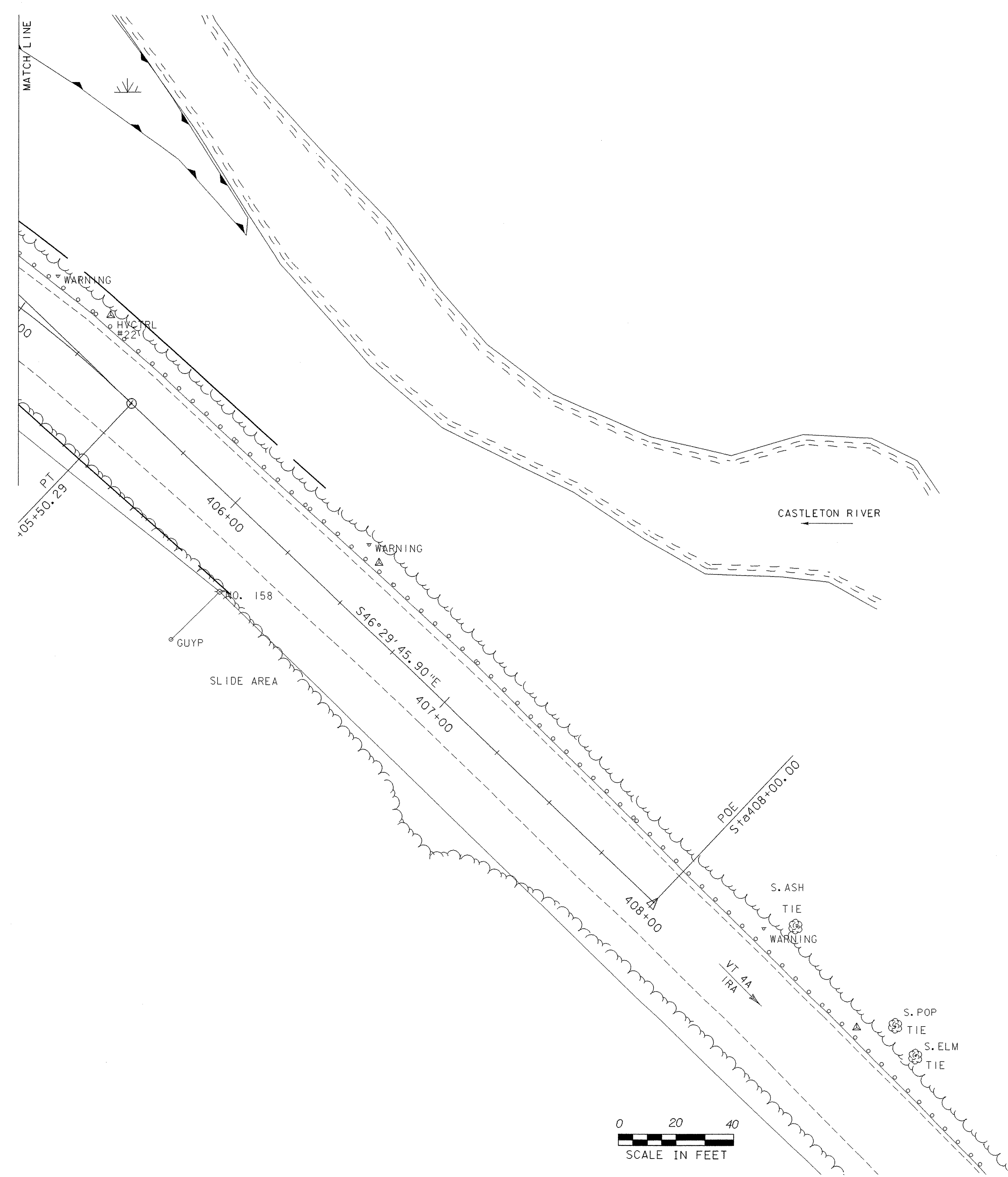
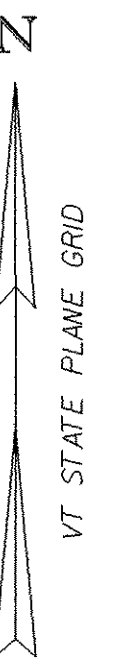
ML CURVE 2  
 ML 404+00  
 R = 440.737 FT.  
 D = 13° 00' 00.00"  
 L = 315.257 FT.  
 e = 5.40%  
 Δ = 40° 59' 00.052" RT  
 T = 164.712 FT.  
 E = 29.772 FT.

ALIGNMENTS



SURVEY  
 PLAN 2

PROJECT NAME:	CASTLETON	PLOT DATE:	09-FEB-2007
PROJECT NUMBER:	RS 0142(10)	DRAWN BY:	T. LACKEY
FILE NAME:	sf193su2.i	CHECKED BY:	W. LAMMER
PROJECT LEADER:	R. WHITCOMB	SHEET 13	OF 68
DESIGNED BY:	T. LACKEY		
78f193/str/sf193sur.dgn			



### SURVEY PLAN 3

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193su4.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 14 OF 68
DESIGNED BY: T. LACKEY	
78f193/str/sf193sur.dgn	

GPS CONTROL POINTS

HVCTRL # 1

STANDARD DISK STAMPED  
V 5

N = 406566.552  
E = 1466919.769  
ELEV. = 447.62

General Location, Castleton, VT access ownership, Greg Pratt, 358 Crampton Road, Castleton, VT 05735  
To reach from the intersection of VT route 4A and VT route 30 at Castleton Corners go east along route 4A for 2.2 mi to the intersection of East Hubbardton Road left. Continue straight ahead and go east along route 4A for 0.15 mi to the intersection of Crampton Road left. Turn left and go northeast and east along Crampton road for 0.4 mi to the end of the road at the intersection of a paved drive left leading to house no. 358. Park vehicle and walk south for about 50 m to the Delaware and Hudson Railway at pole no. 452/8/9. Turn left and walk east along the railway for about 80 m to the intersection of an old road grade crossing and the site of the mark on the right. The mark is set in the top of a 20 cm square concrete monument which projects 8 cm above the ground surface. It is 5.7 m south of and about level with the south rail of the tracks, 5.9 m east of the centerline of the road, 11.9 m northeast of pole no. 160, 3.5 m north of the right-of-way fence, and 0.3 m south of a steel witness post.

HVCTRL # 2

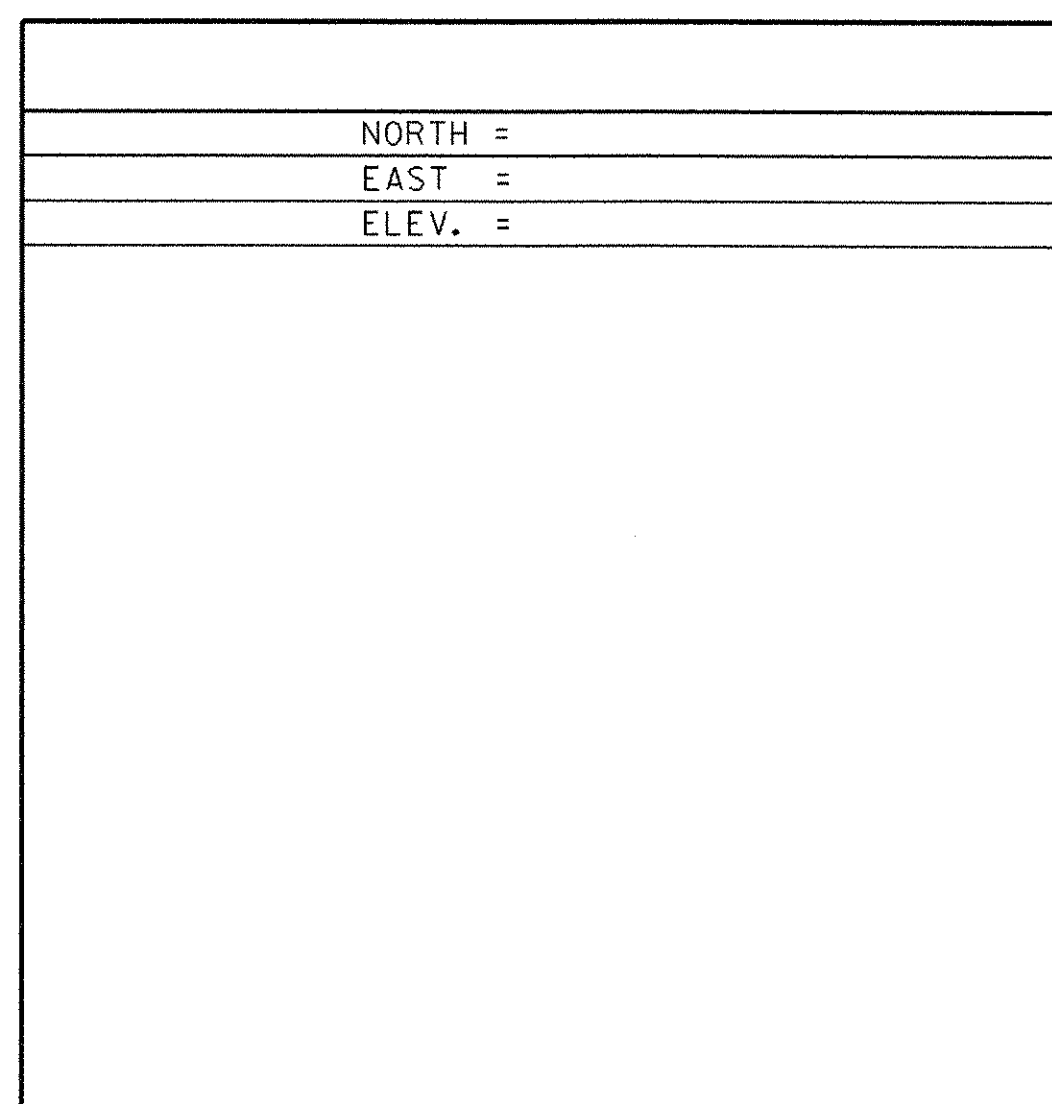
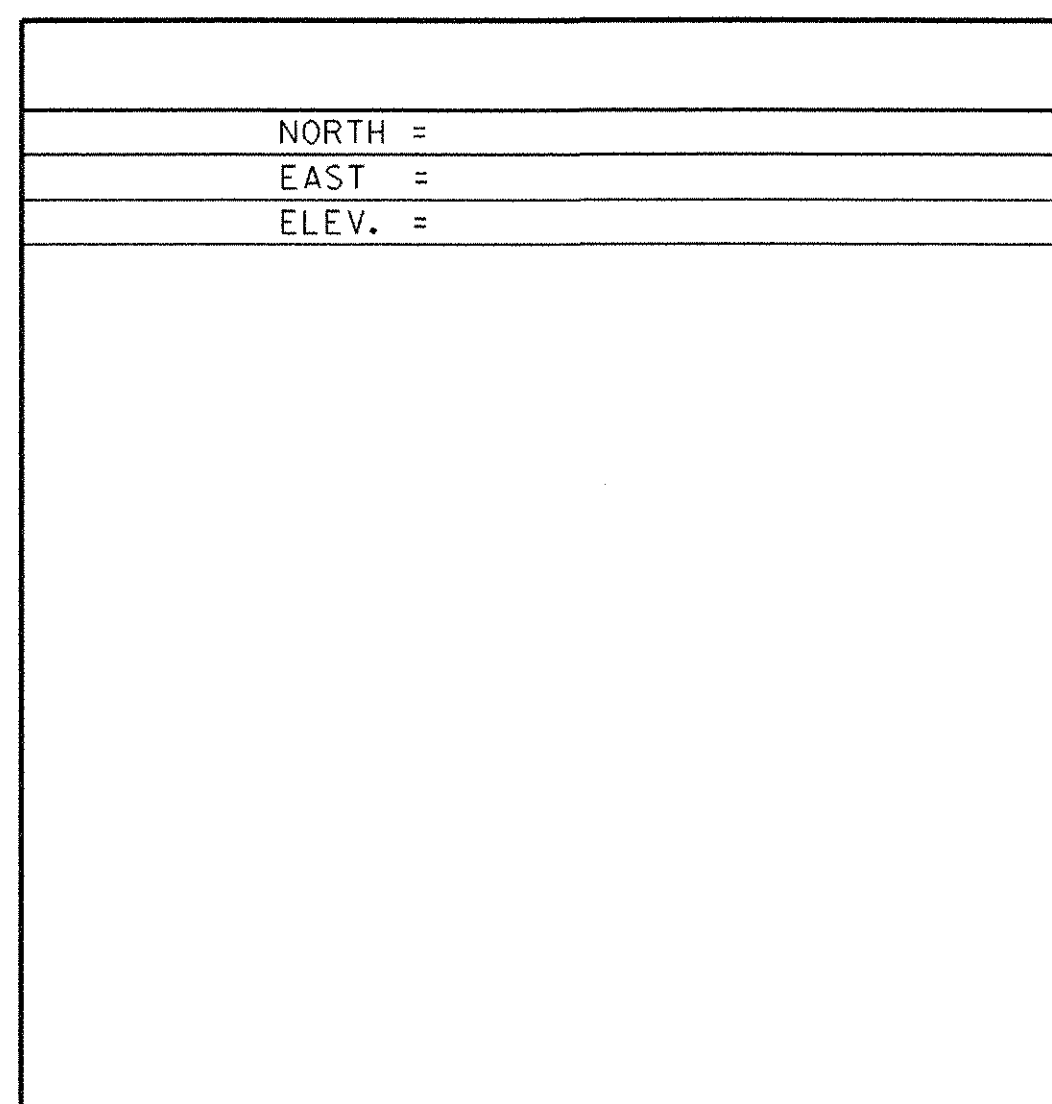
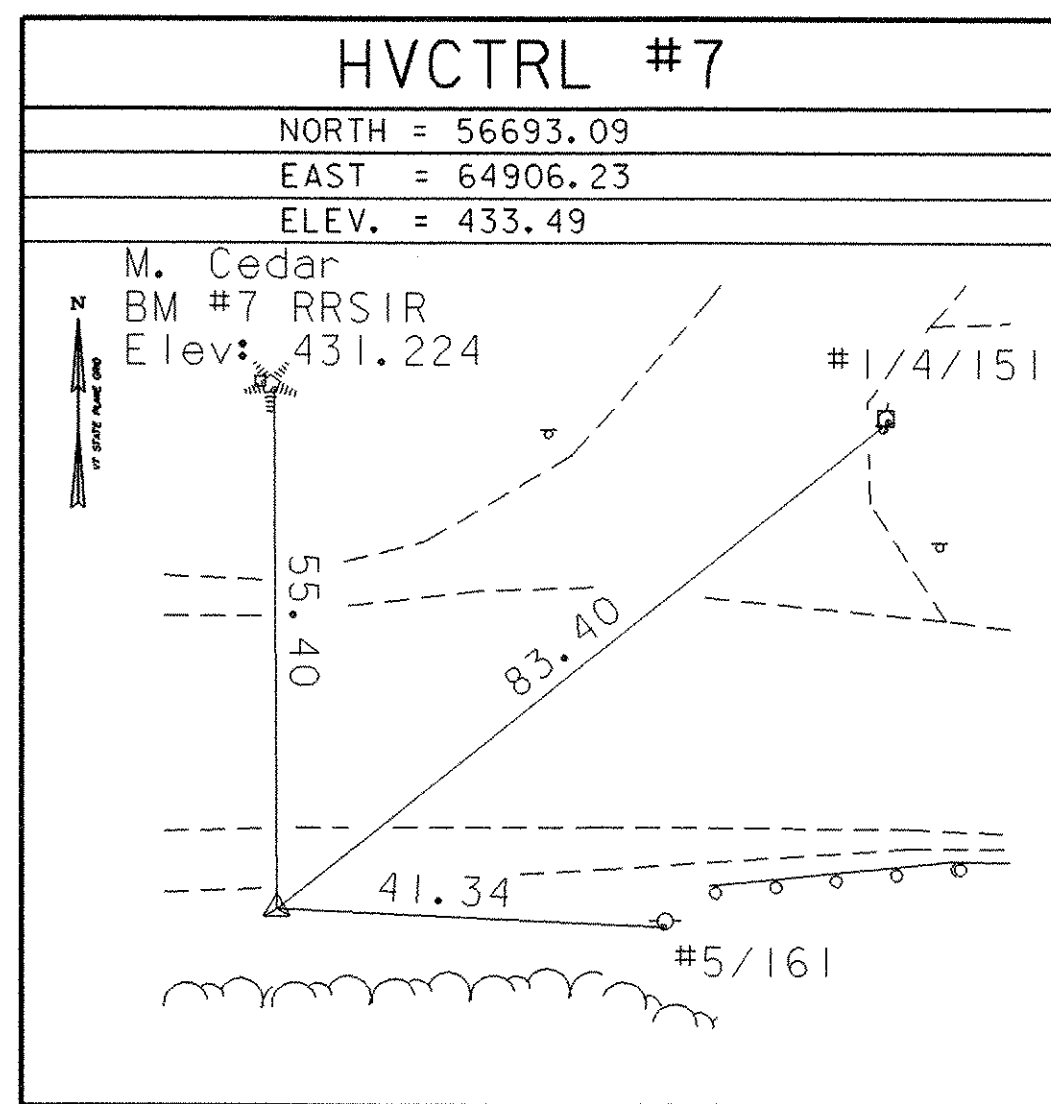
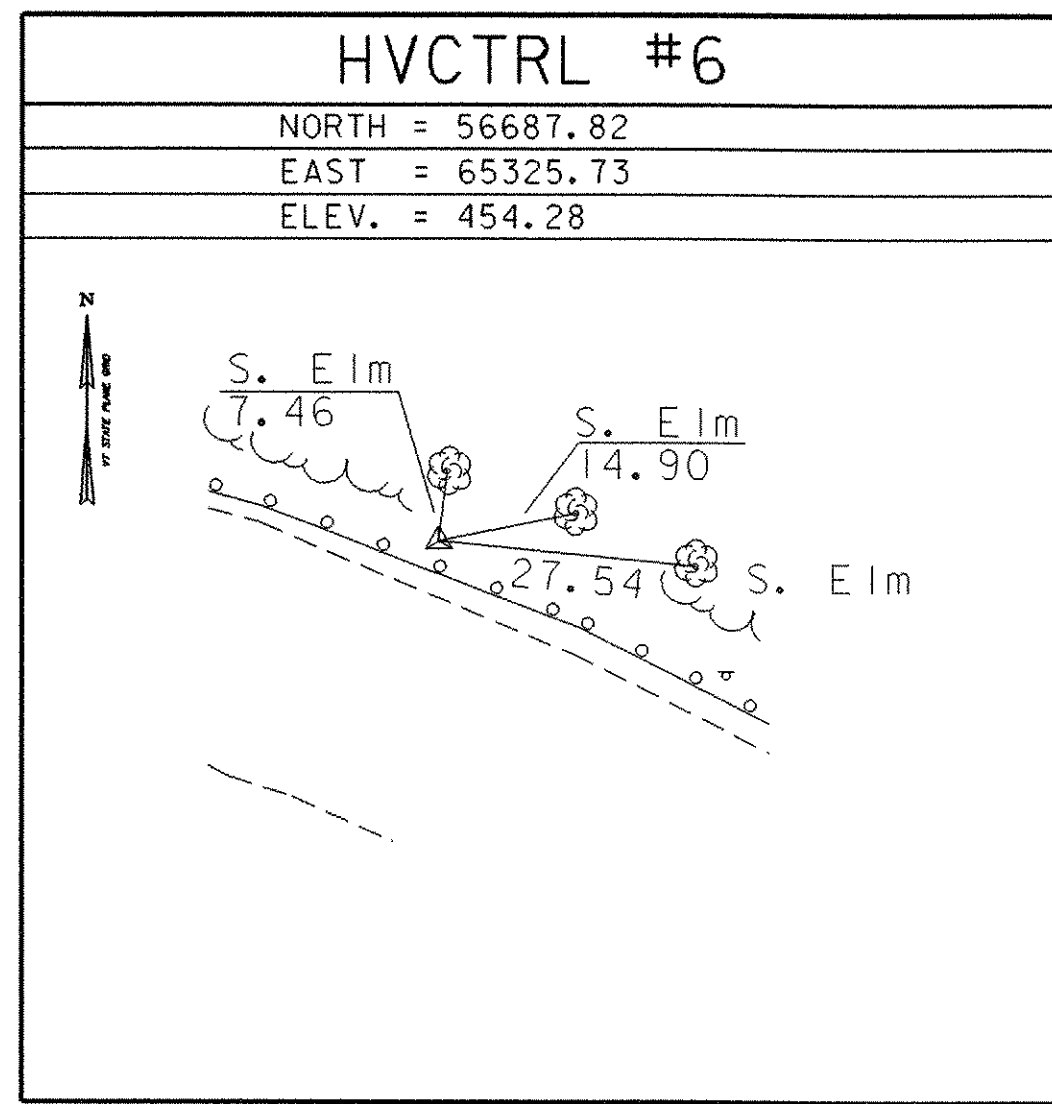
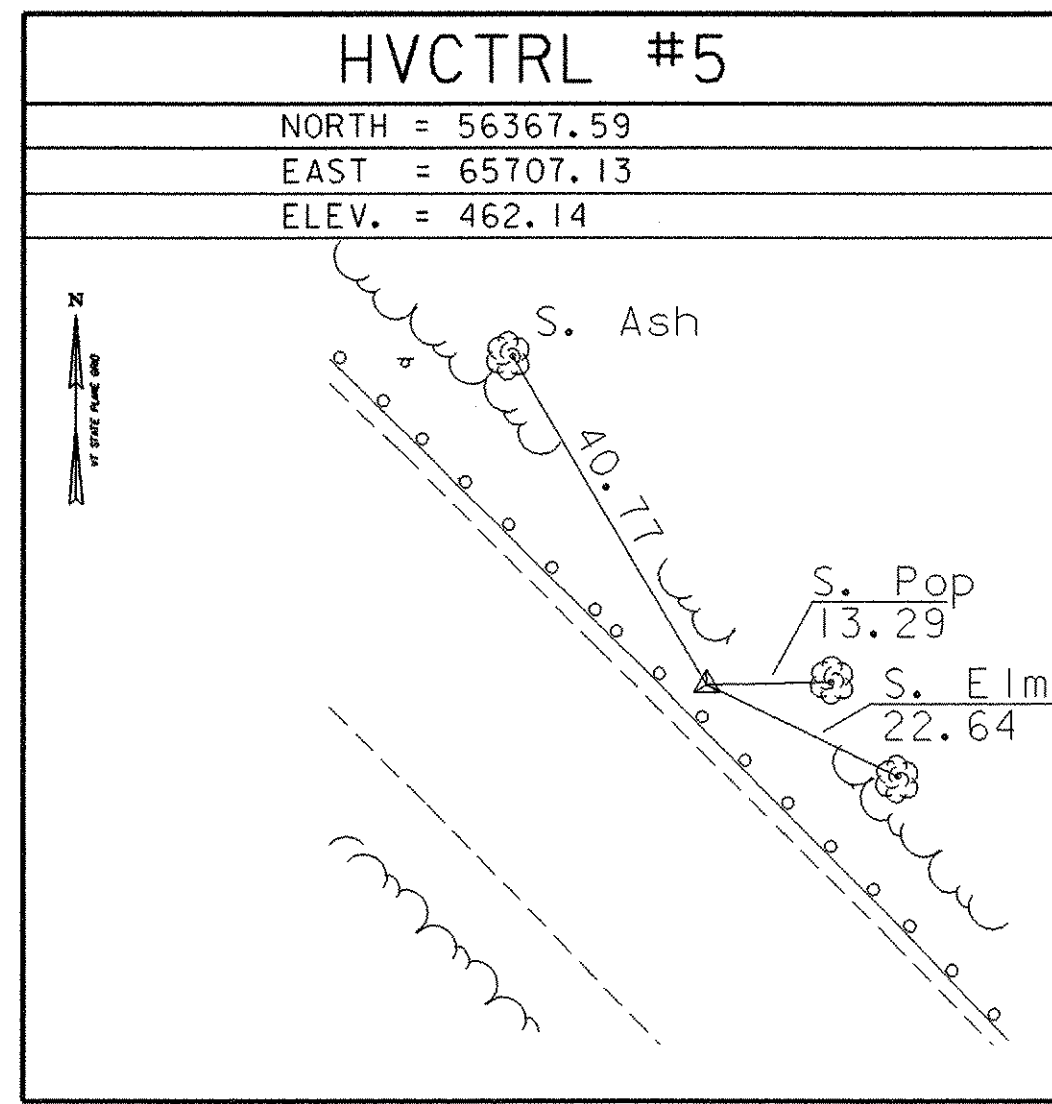
STANDARD DISK STAMPED  
Crampton

N = 406950.324  
E = 146513.224  
ELEV. = 435.637

General location, Castleton, VT.  
To reach from the intersection of VT route 4A and VT route 30 at Castleton Corners go east along route 4A for 2.2 mi to the intersection of east Hubbardton Road left. Continue straight ahead and go east along route 4A for 0.15 mi to the intersection of Crampton Road left. Turn and go northeast along Crampton Road for 0.05 mi to the intersection of the Delaware and Hudson Railway and the site of the mark on the right. The mark is set 2 cm below ground surface in the top of a feno style monument. It is 3.9 m southeast of and about 0.1 m lower than the centerline of Crampton Road, 7.1 m northeast of the northeast rail of the tracks, 25.9 m east northeast of pole no. 45/1/2, 1.7 m north of a stop sign, 0.5 m northwest of a fiberglass witness post.  
NOTE: Mark is intervisable with mark V5.

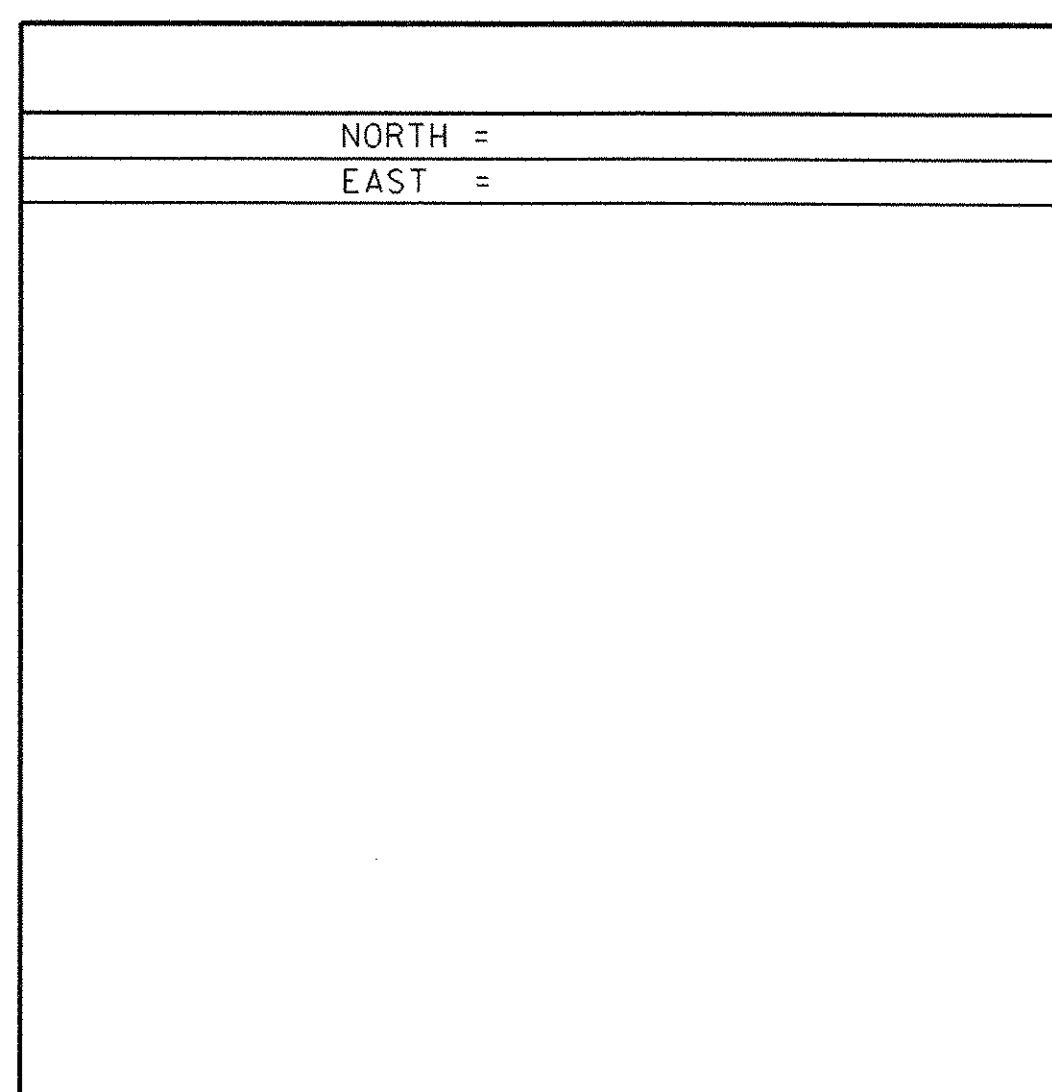
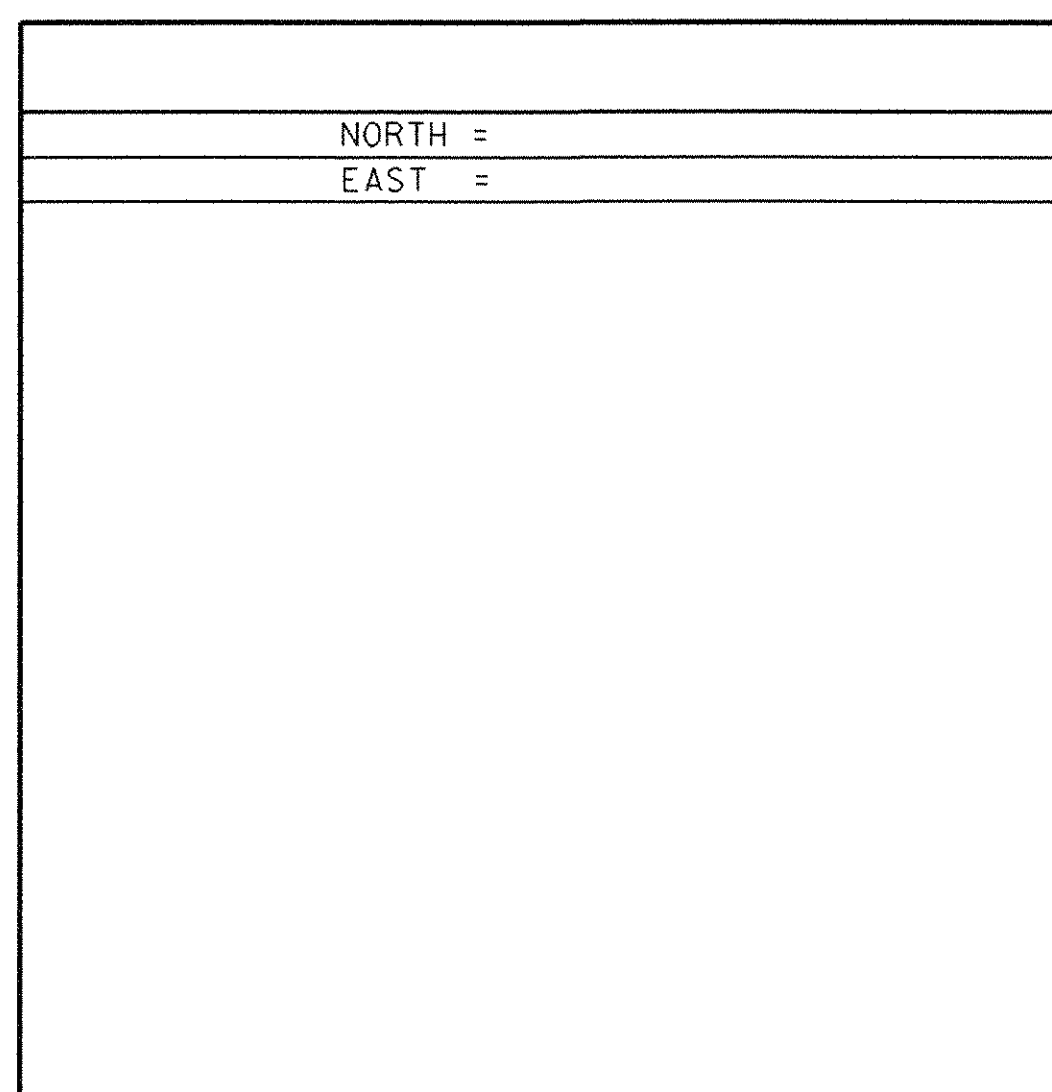
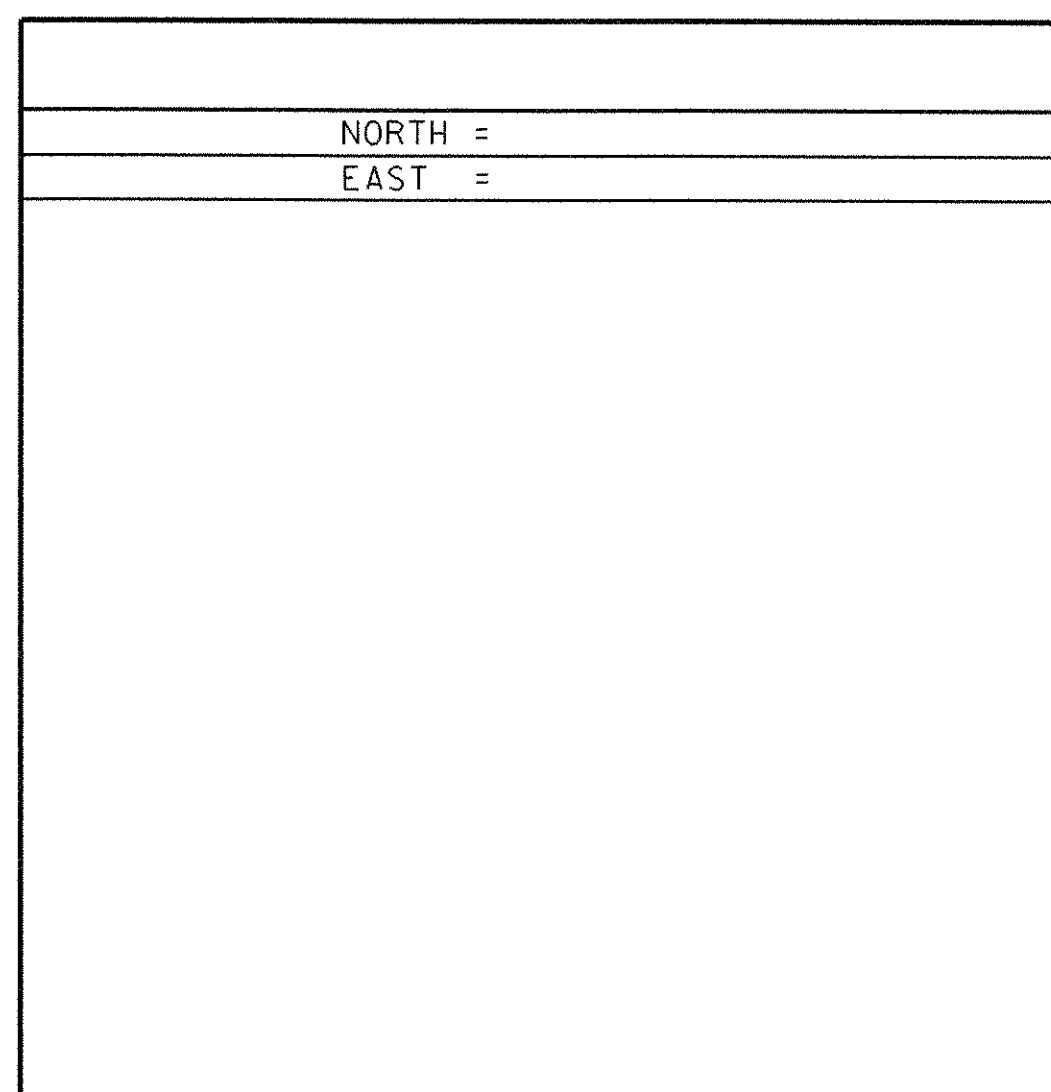
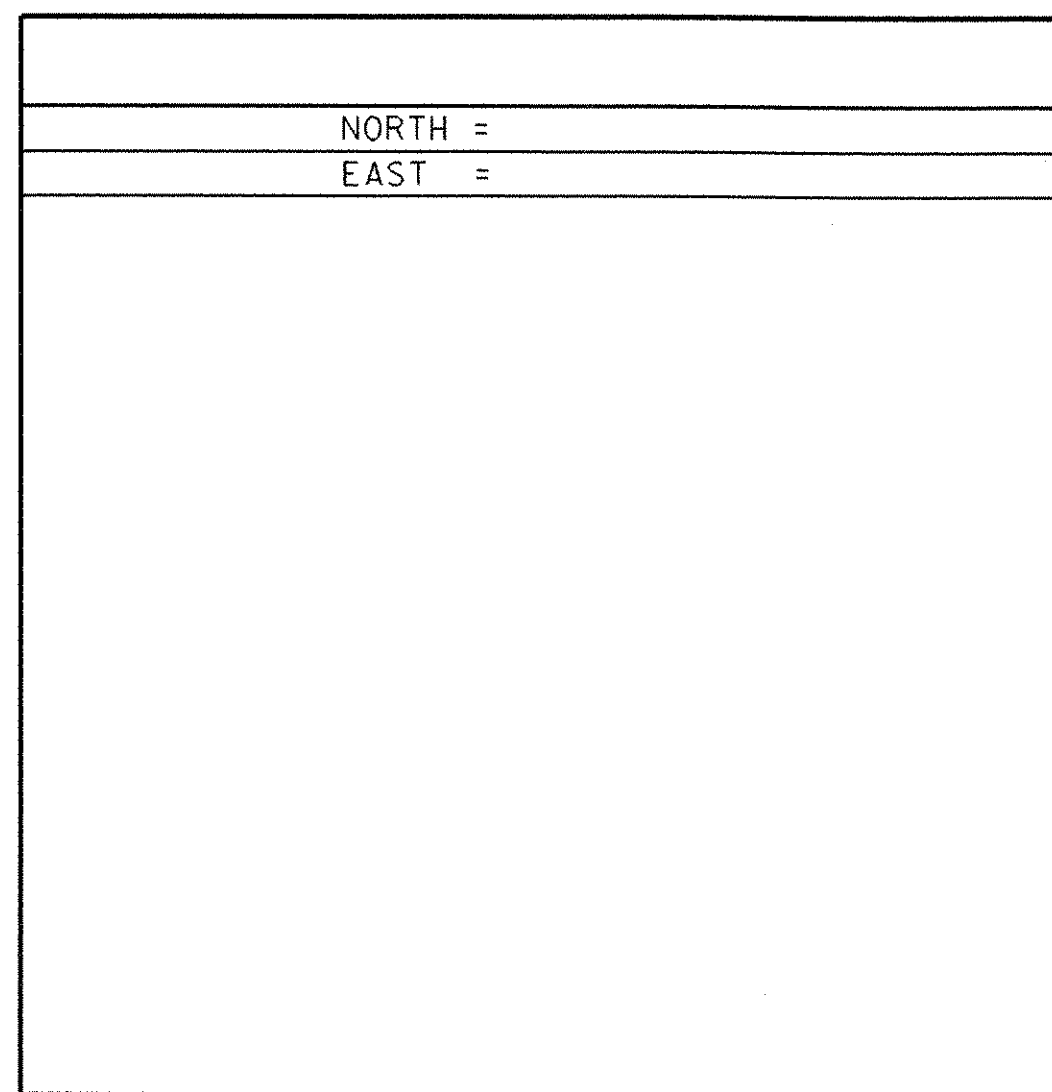
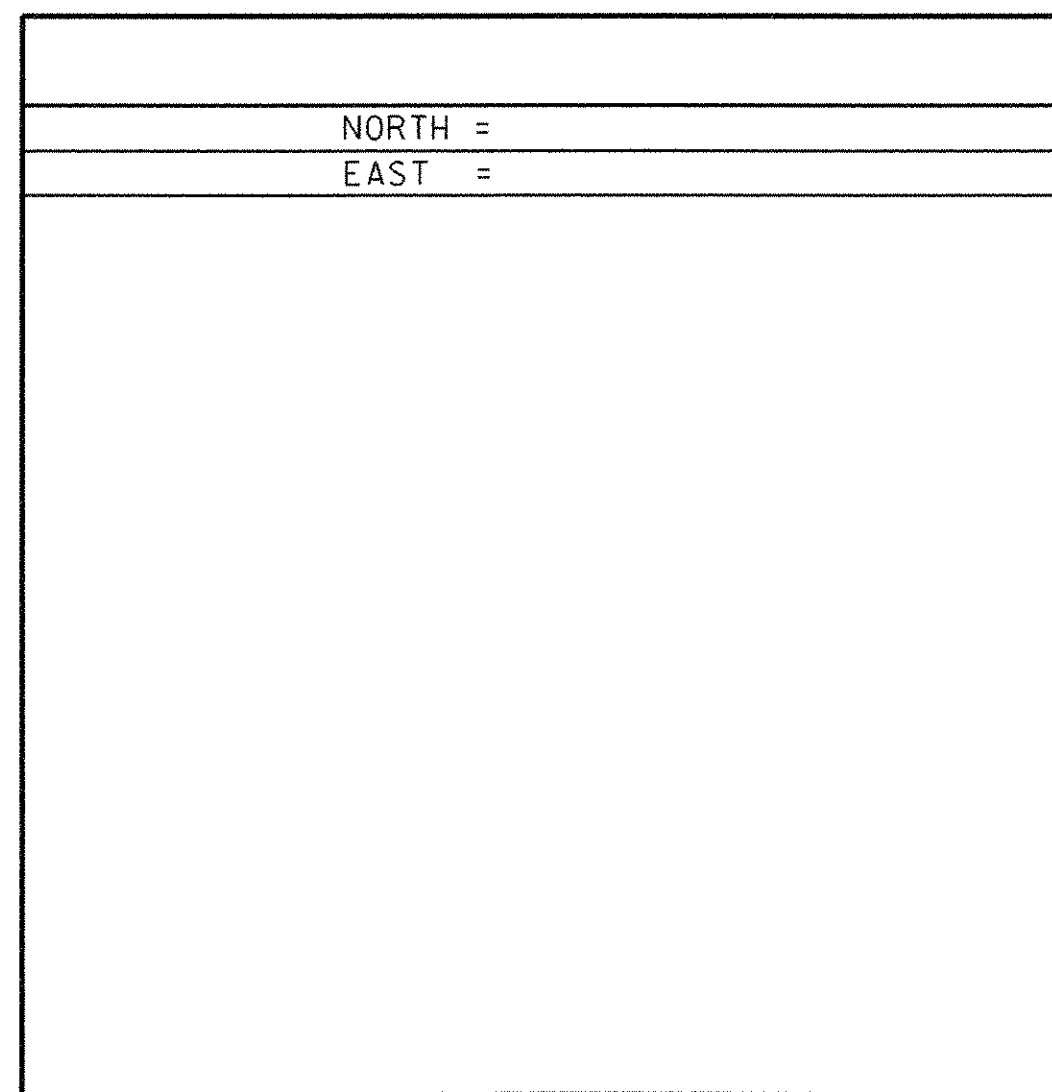
- DESCRIPTION PROVIDED BY VERMONT AGENCY OF TRANSPORTATION GEODETIC SURVEY UNIT
- TO ALLOW THE STATE PLANE COORDINATES TO FIT THE AGENCY DESIGN PLANE, SUBTRACT 350,000 FROM THE NORTHING AND SUBTRACT 1,400,000 FROM THE EASTING

TRAVERSE TIES



• MAIN TRAVERSE COMPLETED 07/23/02 by L. Orvis P.C. J. Hulett T. Wilson

ALIGNMENT TIES



• ALIGNMENT STAKED

DATUM

VERTICAL	NAVD 88
HORIZONTAL	NAD 83 (96)
ADJUSTMENT	NONE

SURVEY TIES

PROJECT NAME: Castleton  
PROJECT NUMBER: RS0142 (10)

FILE NAME: 78f193/survey/xf193t1.dgn  
PROJECT LEADER: R. WHITCOMB  
DESIGNED BY:  
78f193/str/sf193su5.i

PLOT DATE: 09-FEB-2007  
DRAWN BY: R. Bullock  
CHECKED BY:  
SHEET 15 OF 68

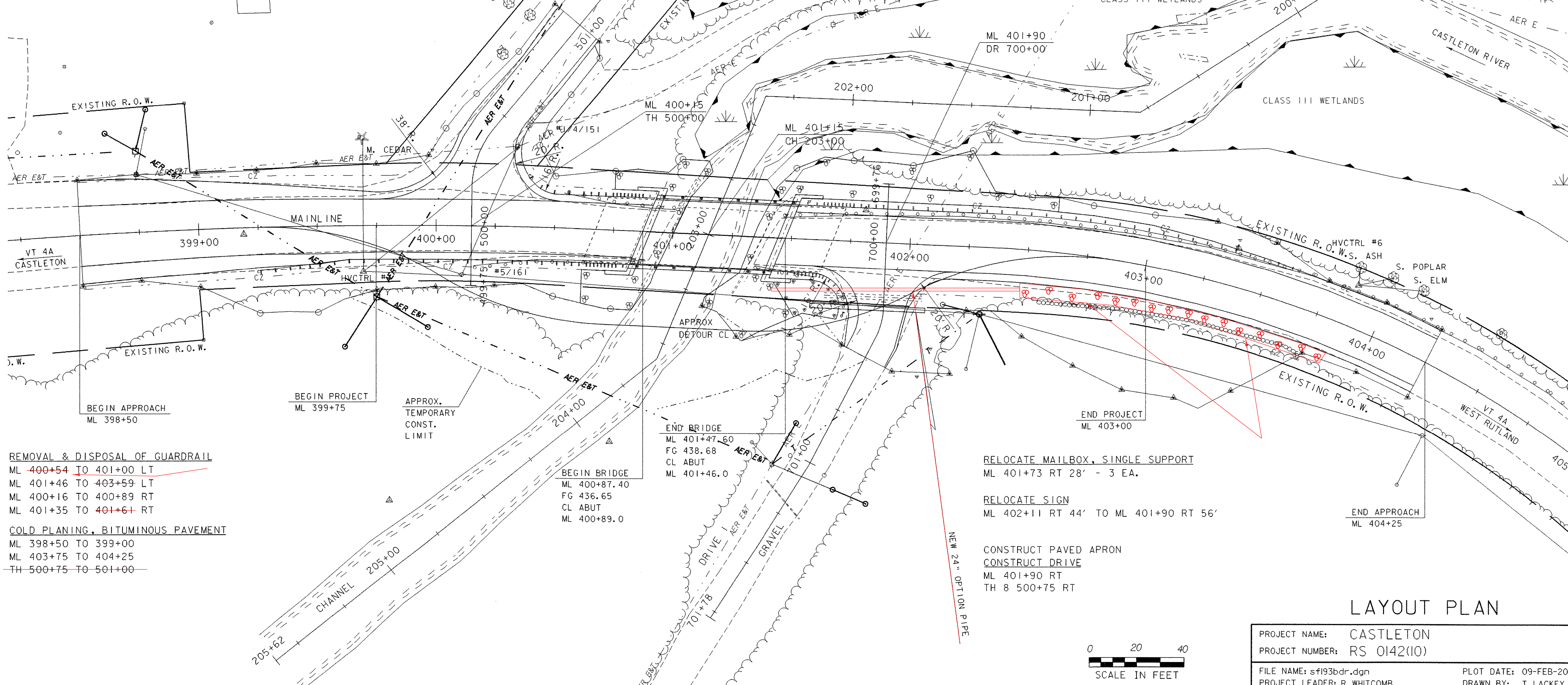
BRIDGE RAILING, GALVANIZED NETC 2 RAIL  
 ML 400+87 TO 401+63 LT  
 ML 400+76 TO 401+52 RT

GUARDRAIL APPROACH SECTIONS, GALVANIZED NETC 2 RAIL  
 ML 400+62 TO 400+87 LT  
 ML 401+63 TO 401+88 LT  
 ML 400+51 TO 400+76 RT  
 ML 401+52 TO 401+73 RT

HD STEEL BEAM GUARDRAIL, GALVANIZED  
 ML 400+39 TO 400+62 LT  
 ML 401+88 TO 403+59 LT  
 ML 399+63 TO 400+51 RT

MANUFACTURED TERMINAL SECTION, FLARED  
 ML 399+26 TO 399+63 RT

ANCHOR FOR STEEL BEAM RAIL  
 ML 400+39 LT  
 ML 401+73 RT



REMOVAL & DISPOSAL OF GUARDRAIL  
 ML 400+54 TO 401+00 LT  
 ML 401+46 TO 403+59 LT  
 ML 400+16 TO 400+89 RT  
 ML 401+35 TO 401+61 RT

COLD PLANING, BITUMINOUS PAVEMENT  
 ML 398+50 TO 399+00  
 ML 403+75 TO 404+25  
 TH 500+75 TO 501+00

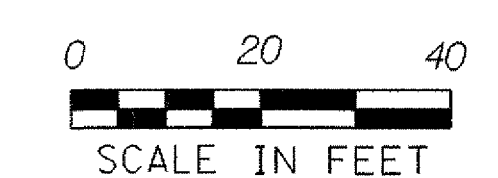
BEGIN BRIDGE  
 ML 400+87.40  
 FG 436.65  
 CL ABUT  
 ML 400+89.0

END BRIDGE  
 ML 401+47.60  
 FG 438.68  
 CL ABUT  
 ML 401+46.0

RELOCATE MAILBOX, SINGLE SUPPORT  
 ML 401+73 RT 28' - 3 EA.

RELOCATE SIGN  
 ML 402+11 RT 44' TO ML 401+90 RT 56'

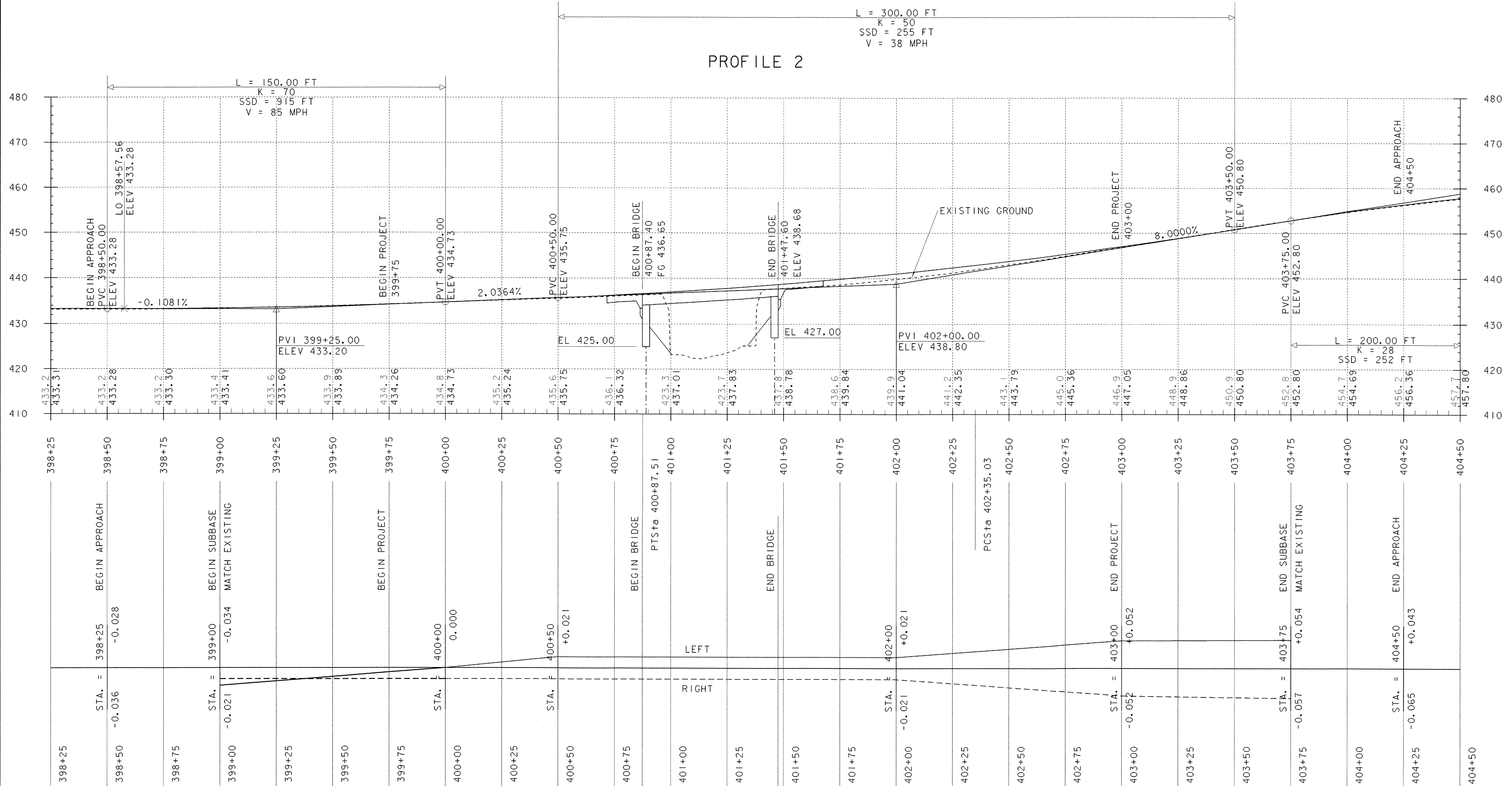
CONSTRUCT PAVED APRON  
 CONSTRUCT DRIVE  
 ML 401+90 RT  
 TH 8 500+75 RT



### LAYOUT PLAN

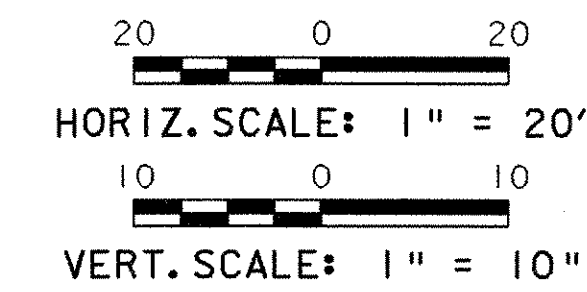
PROJECT NAME:	CASTLETON	PLOT DATE:	09-FEB-2007
PROJECT NUMBER:	RS 0142(10)	DRAWN BY:	T. LACKEY
FILE NAME:	sf193bdr.dgn	CHECKED BY:	C. CARLSON
PROJECT LEADER:	R. WHITCOMB	SHEET 16	OF 68
DESIGNED BY:	T. LACKEY		
78f193/structures/sf193p11			

# PROFILE 2



## SUPERELEVATION

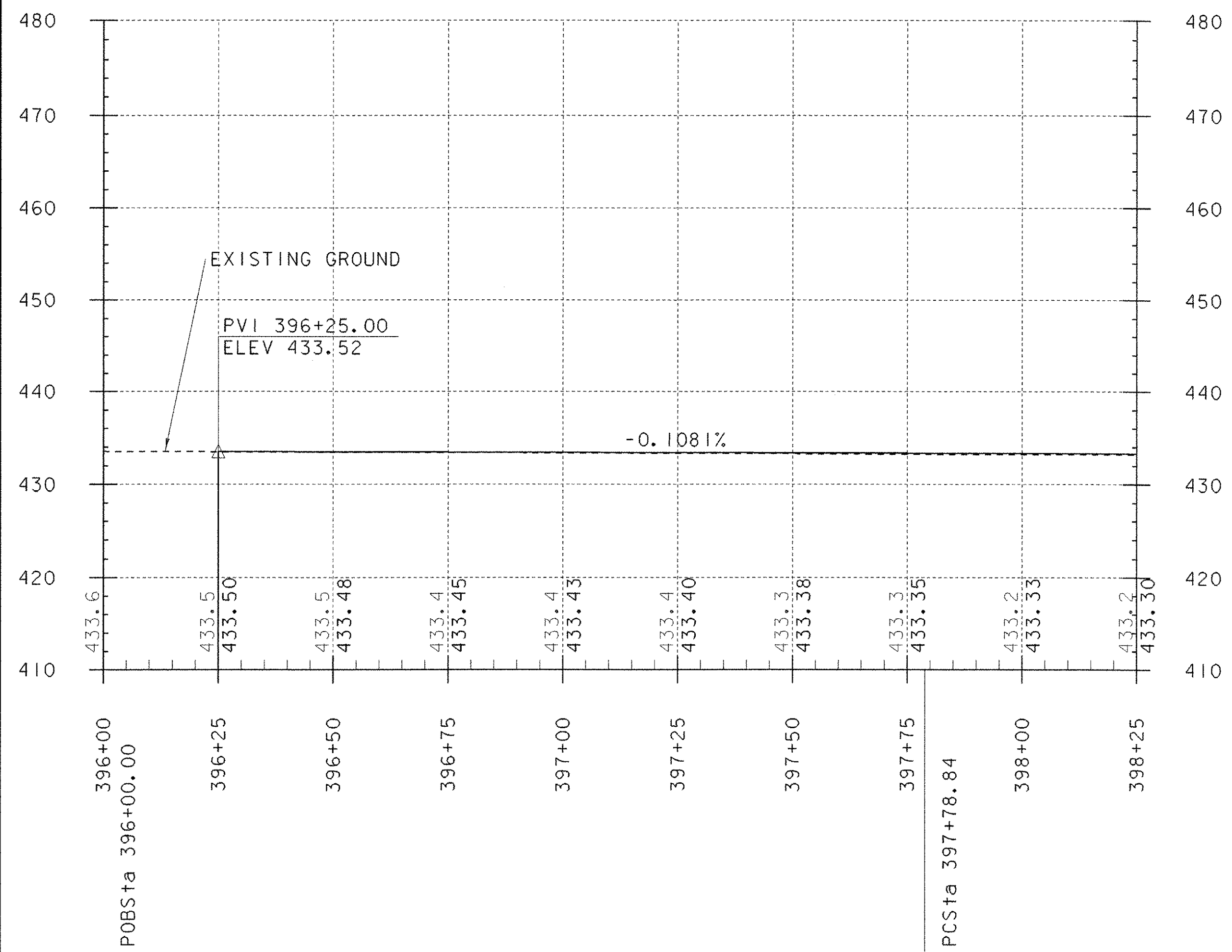
NOTE:  
 ELEVATIONS SHOWN TO THE NEAREST TENTH ARE  
 OLD GROUND ALONG THE PROPOSED ALIGNMENT.  
 ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE  
 FINISHED GRADES ALONG THE PROPOSED ALIGNMENT.



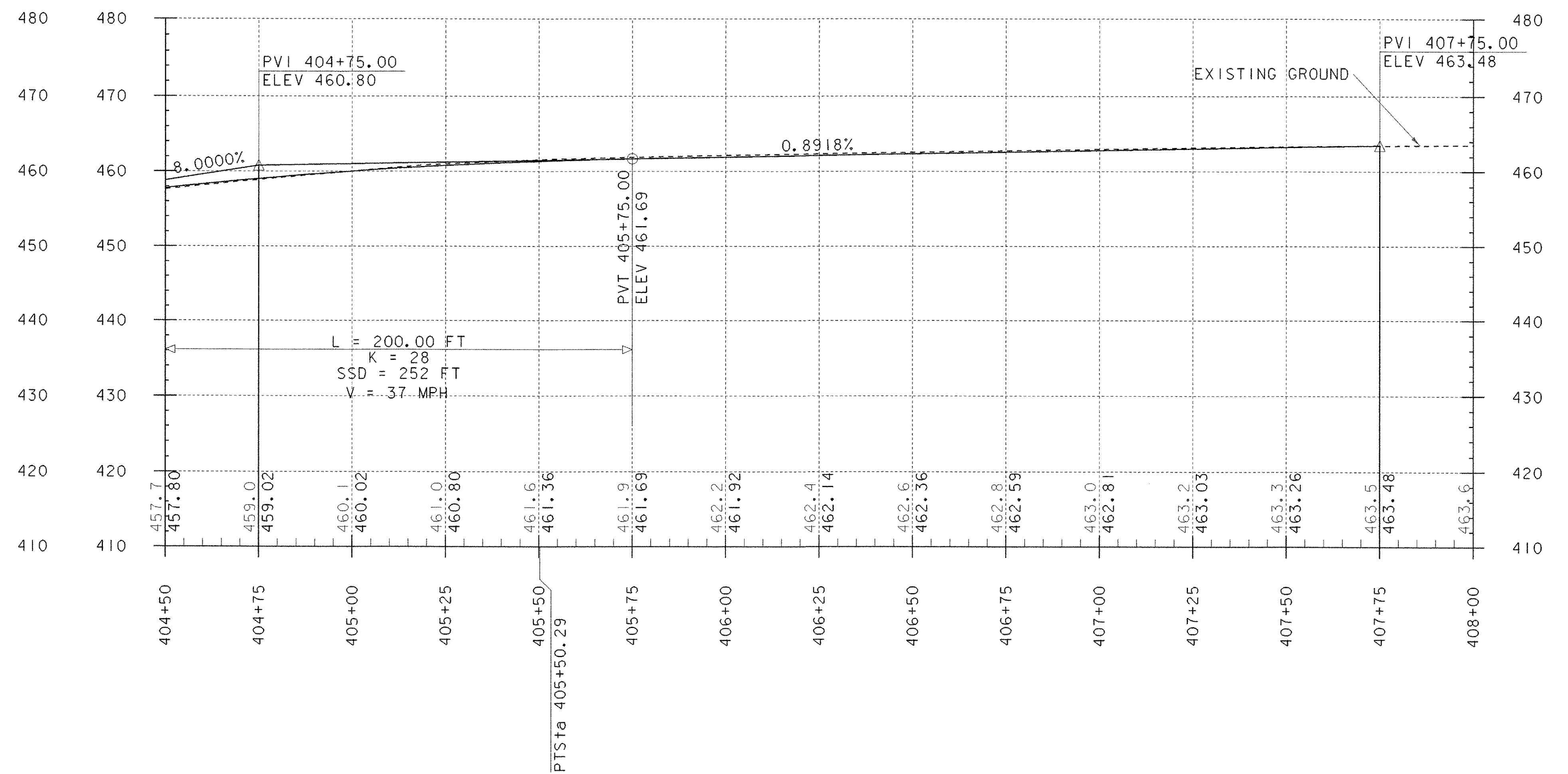
## PROFILE MAINLINE

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193pfl	CHECKED BY: R. WHITCOMB
PROJECT LEADER: R. WHITCOMB	SHEET 17 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	

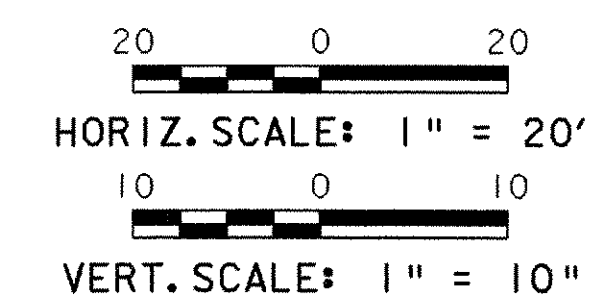
PROFILE 1



PROFILE 3

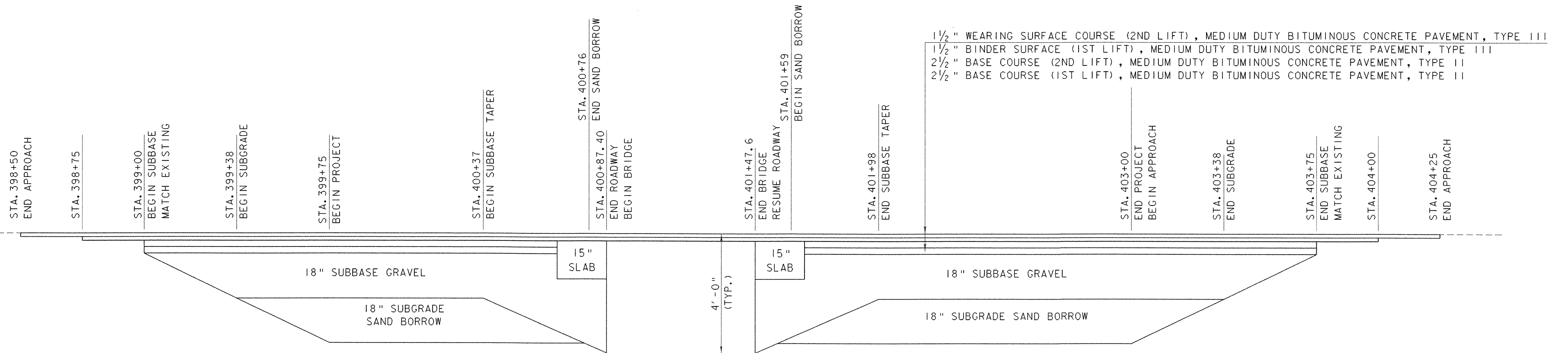


NOTE:  
 ELEVATIONS SHOWN TO THE NEAREST TENTH ARE  
 OLD GROUND ALONG THE PROPOSED ALIGNMENT.  
 ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE  
 FINISHED GRADES ALONG THE PROPOSED ALIGNMENT.



PROFILE  
 MAINLINE APPROACHES

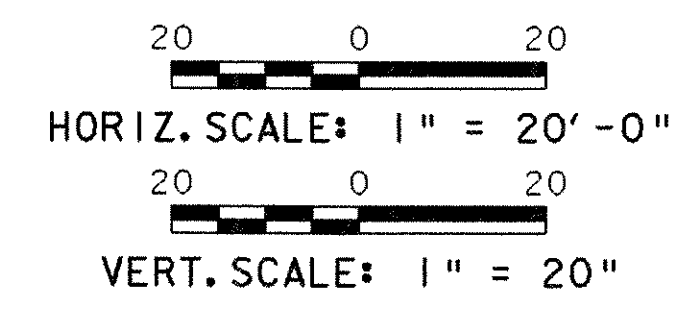
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193p2.1	CHECKED BY: R. WHITCOMB
DESIGNED BY: T. LACKEY	SHEET 18 OF 68
78f193/structures/sf193xsl.dgn	



**NOTES:**

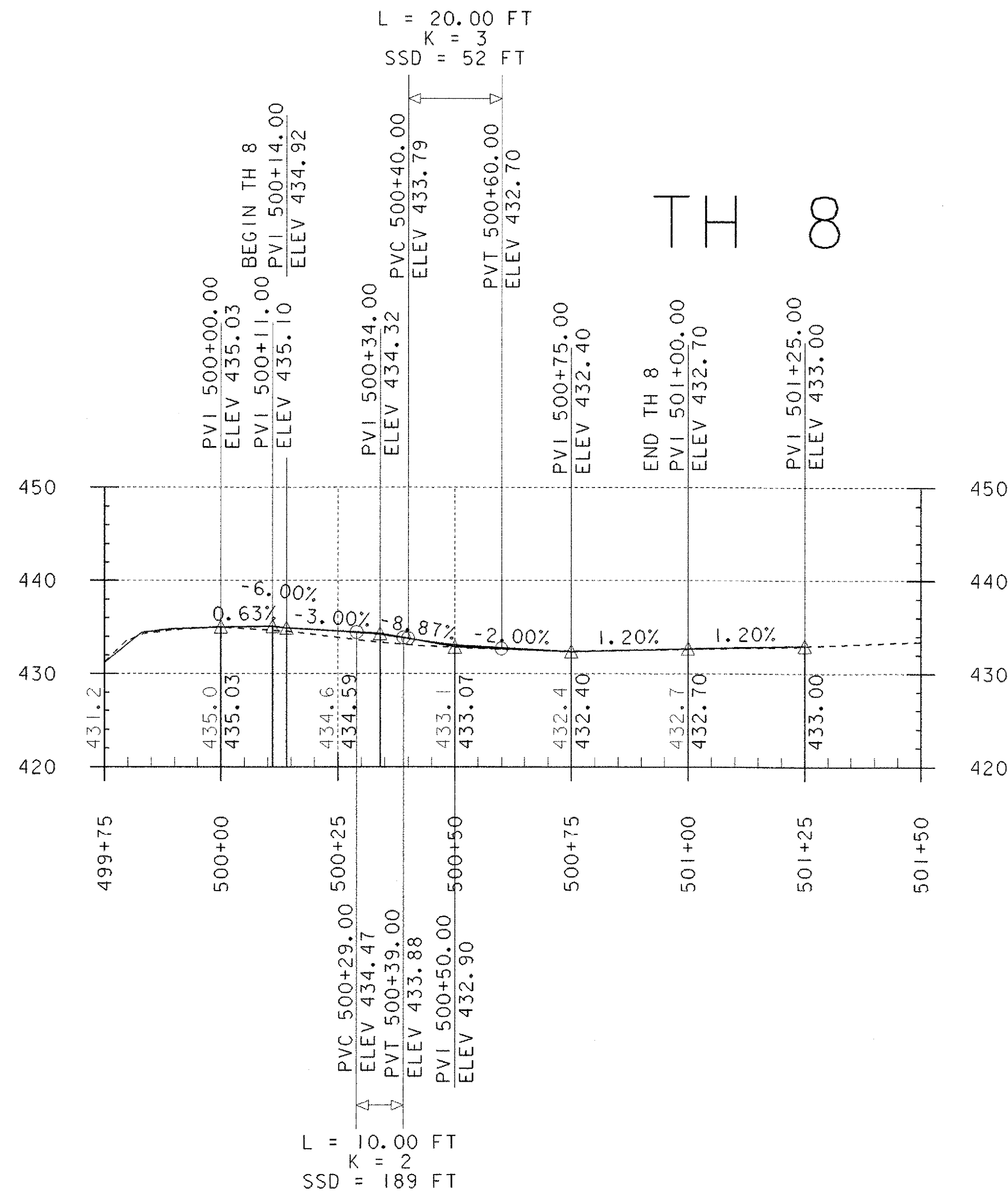
1. SEE SECTIONS TO DETERMINE CUT OR FILL.
2. SEE TYPICAL SECTIONS CHANNEL SHEET FOR ABUTMENT EARTHWORK DETAILS.

**MATERIAL TRANSITION DETAIL**

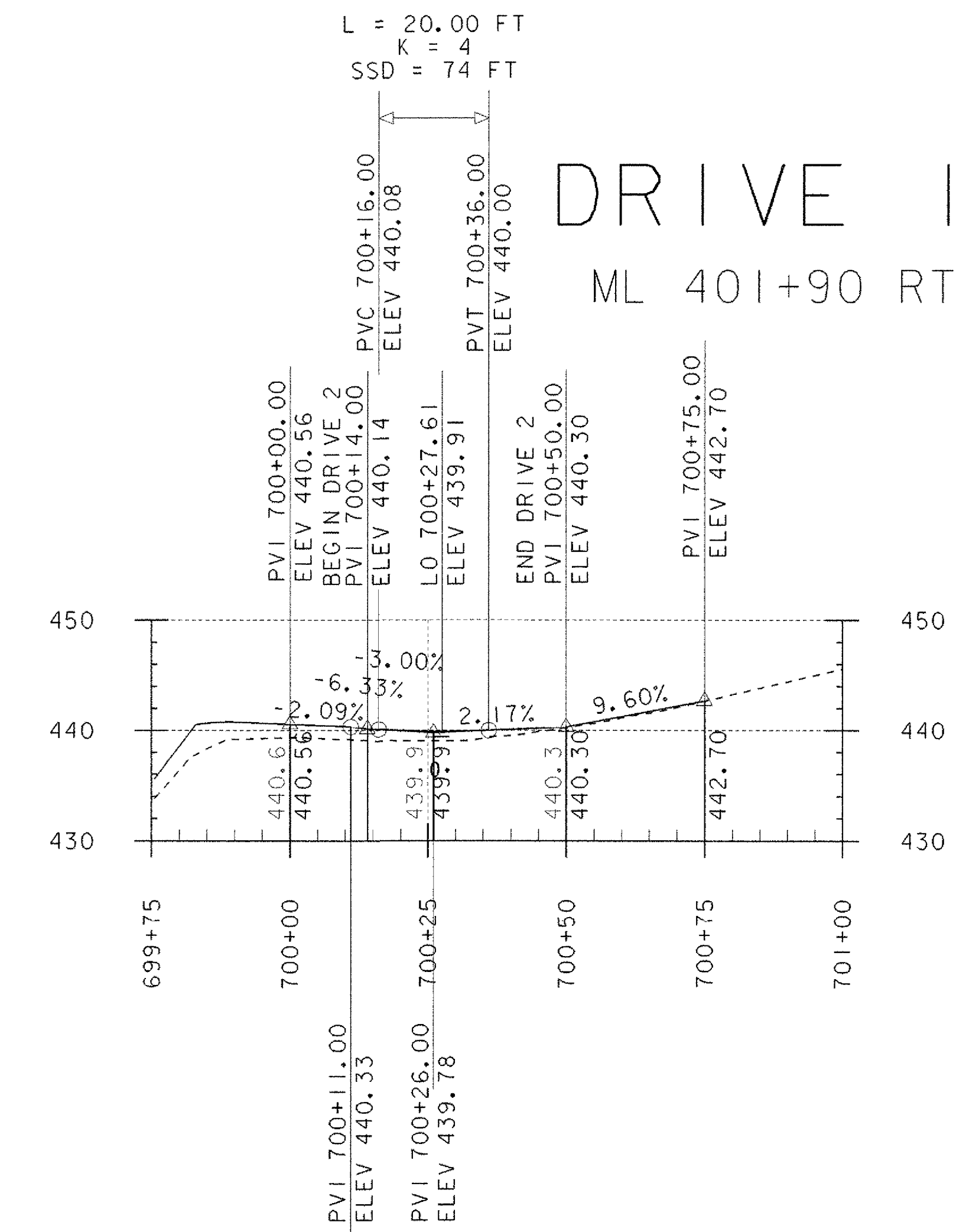
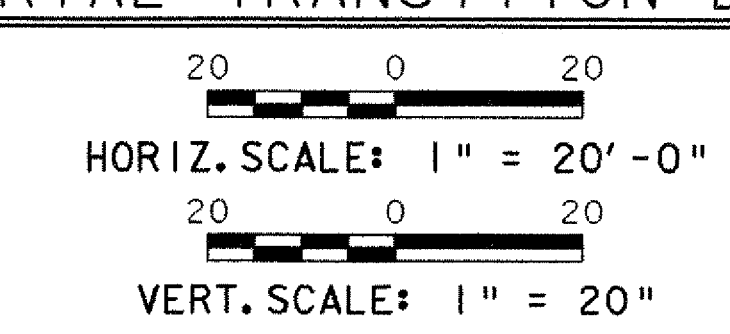
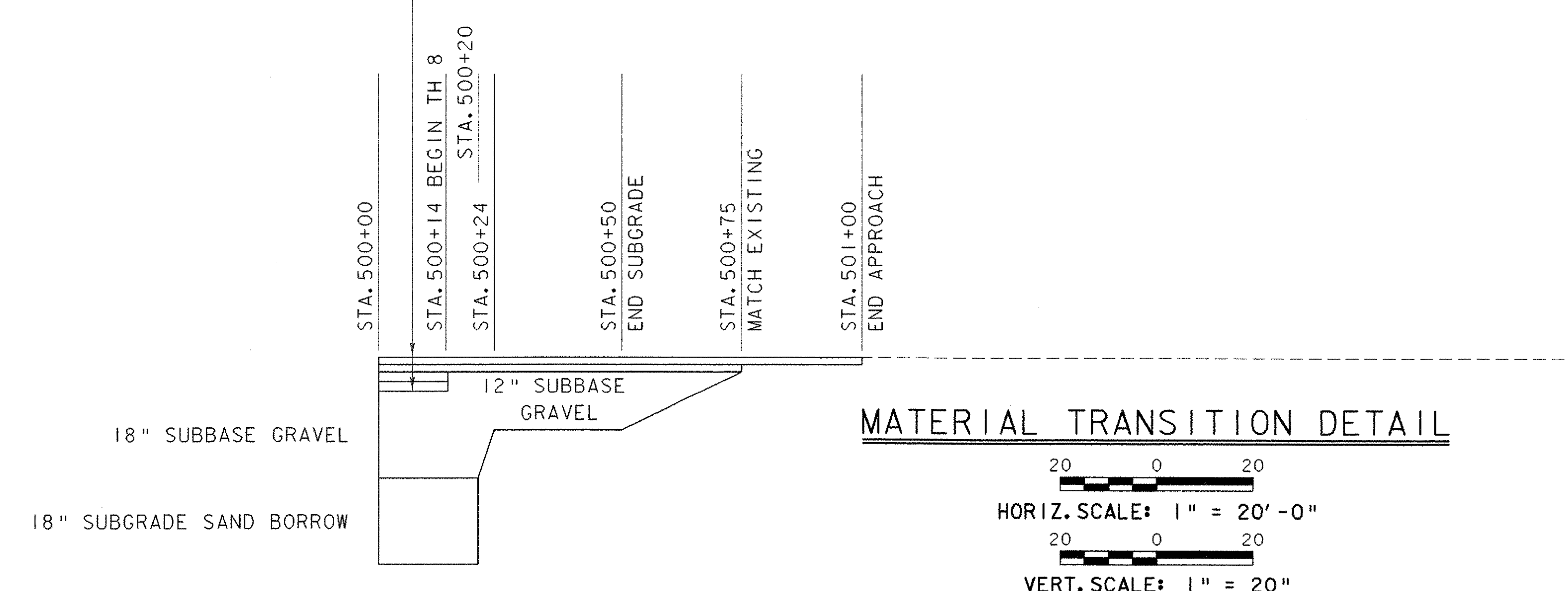


PROFILE  
MAINLINE  
MATERIAL TRANSITION DETAIL

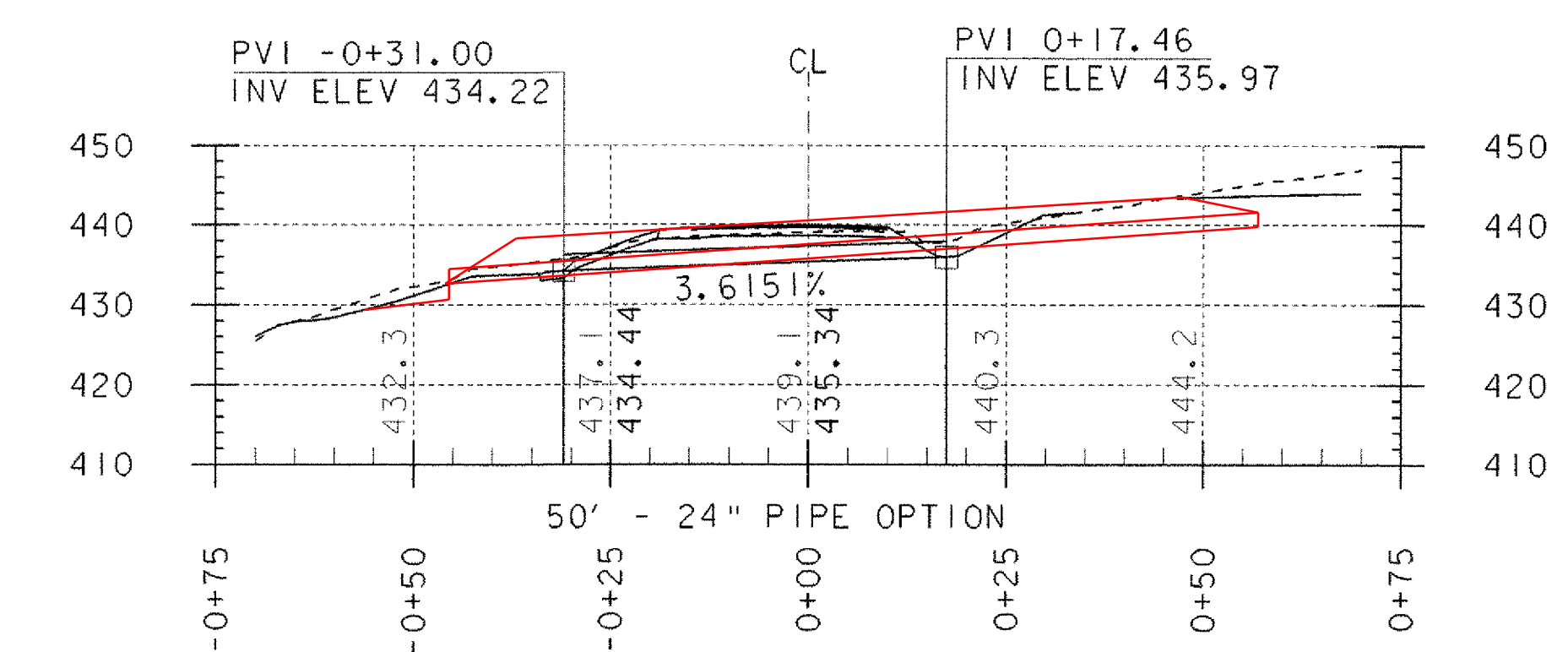
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PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193pf3.1	CHECKED BY: R. WHITCOMB
PROJECT LEADER: R. WHITCOMB	SHEET 19 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



- 1 1/2" WEARING SURFACE COURSE (2ND LIFT) BCP TYPE III (TYP.)
- 1 1/2" WEARING SURFACE COURSE (1ST LIFT) BCP TYPE III (TYP.)
- 2" BASE COURSE (2ND LIFT) BCP TYPE I OR II (TYP.)
- 2" BASE COURSE (1ST LIFT) BCP TYPE I OR II (TYP.)



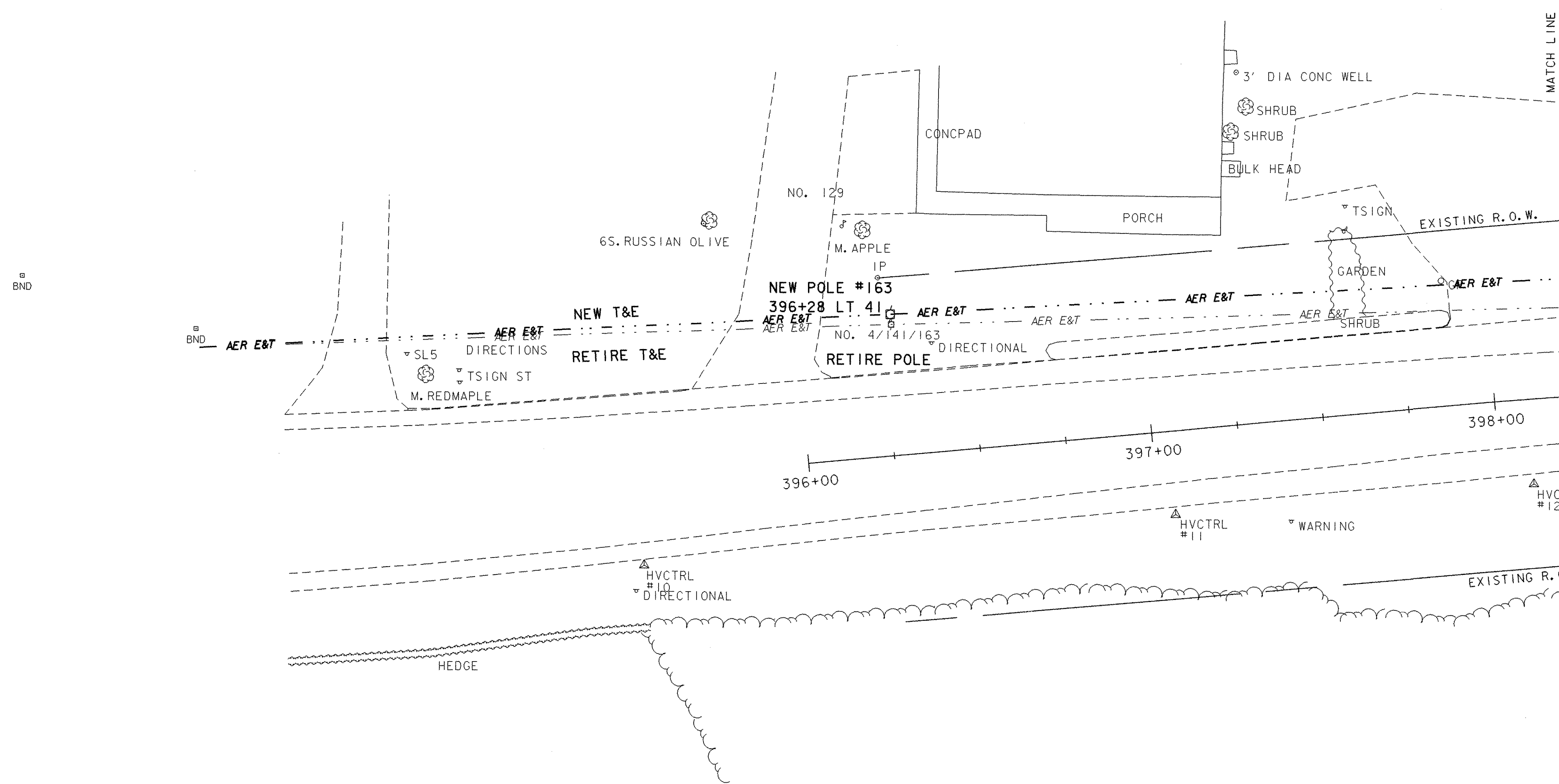
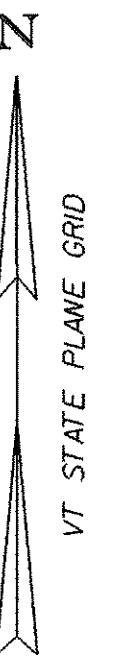
**DRIVE I CULVERT**  
DRI PC 700+27.84



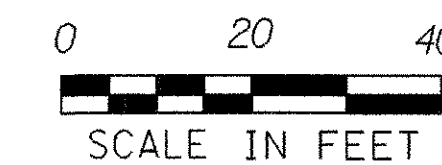
PROFILE  
TH 8 & DRIVE

NOTE:  
 ELEVATIONS SHOWN TO THE NEAREST TENTH ARE OLD GROUND ALONG THE PROPOSED ALIGNMENT.  
 ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE FINISHED GRADES ALONG THE PROPOSED ALIGNMENT.

PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: sf193p.f4.1	PLOT DATE: 09-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: T. LACKEY
DESIGNED BY: T. LACKEY	CHECKED BY: R. WHITCOMB
78f193/structures/sf193xsl.dgn	SHEET 20 OF 68

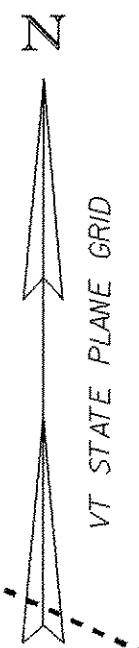
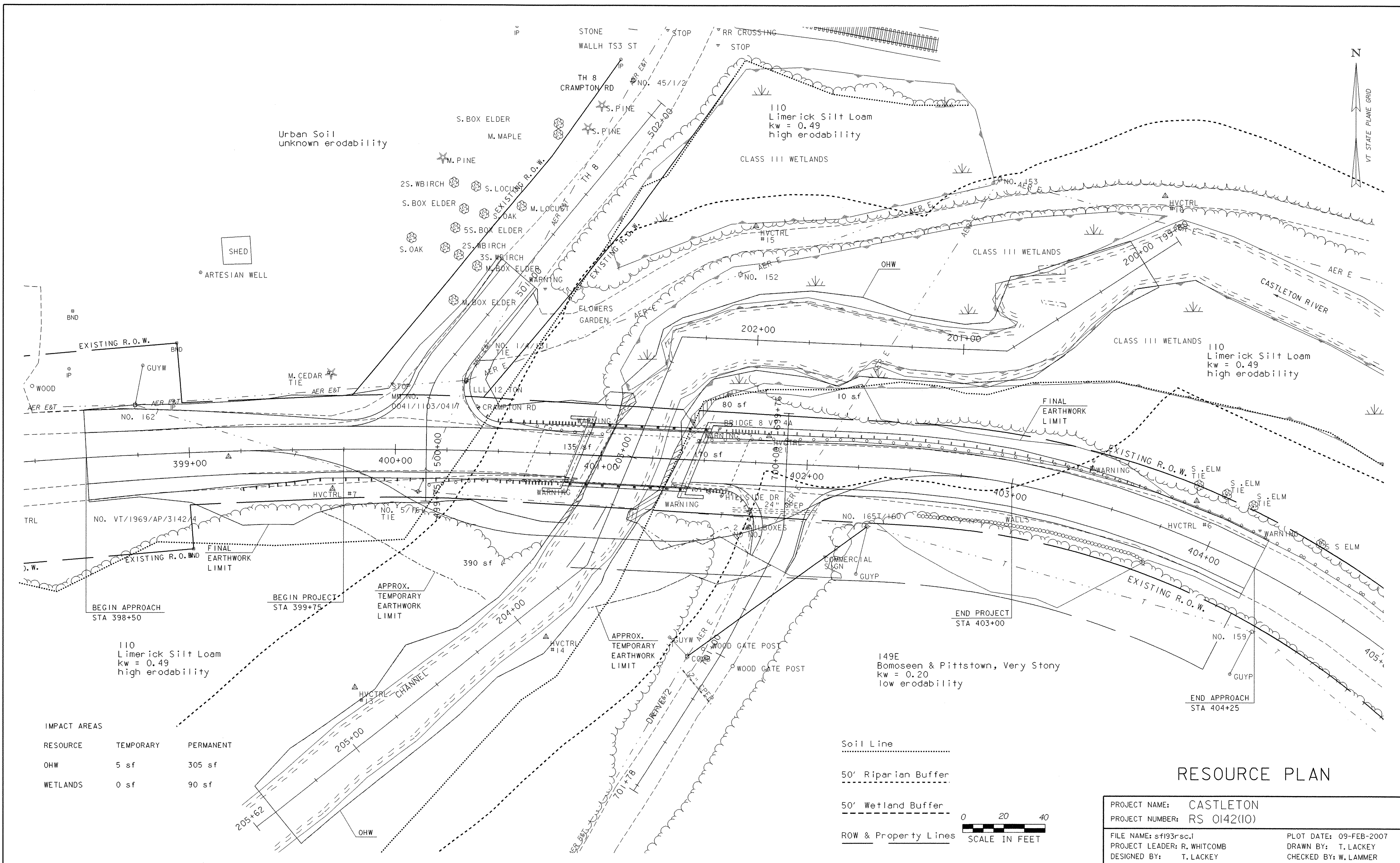


UTILITIES  
PLAN 1



PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193uti.i	CHECKED BY: T. GILMAN
PROJECT LEADER: R. WHITCOMB	SHEET 21 OF 68
DESIGNED BY: T. LACKEY	
78f193/str/sf193uti.dgn	





Urban Soil  
unknown erodability

110  
Limerick Silt Loam  
kw = 0.49  
high erodability

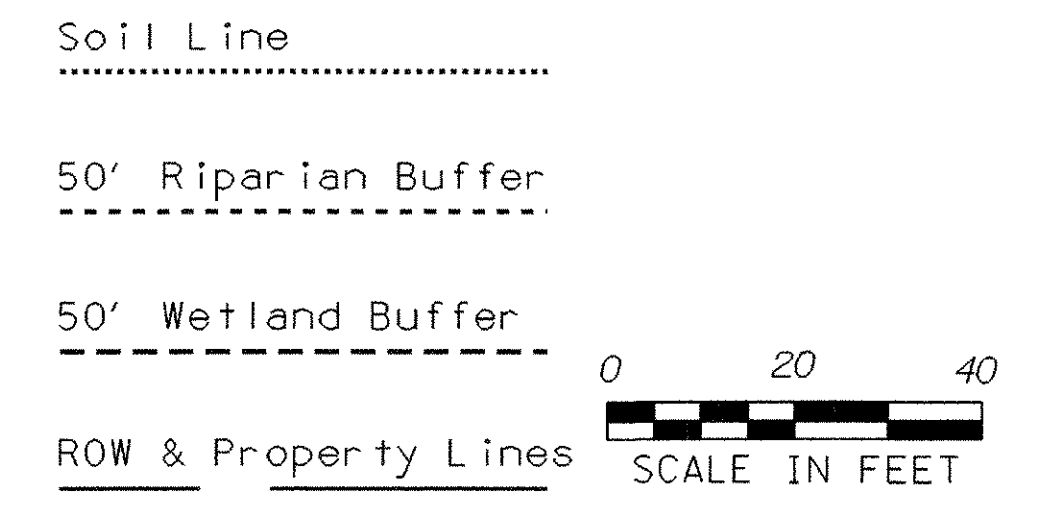
110  
Limerick Silt Loam  
kw = 0.49  
high erodability

110  
Limerick Silt Loam  
kw = 0.49  
high erodability

149E  
Bomoseen & Pittstown, Very Stony  
kw = 0.20  
low erodability

IMPACT AREAS

RESOURCE	TEMPORARY	PERMANENT
OHW	5 sf	305 sf
WETLANDS	0 sf	90 sf



### RESOURCE PLAN

PROJECT NAME:	CASTLETON	PLOT DATE:	09-FEB-2007
PROJECT NUMBER:	RS 0142(10)	DRAWN BY:	T. LACKEY
FILE NAME:	sf193rsc.d	CHECKED BY:	W. LAMMER
PROJECT LEADER:	R. WHITCOMB	SHEET	23 OF 68
DESIGNED BY:	T. LACKEY		
78f193/str/sf193rsc.dgn			

# EROSION CONTROL NARRATIVE

## EROSION PREVENTION & SEDIMENT CONTROL NARRATIVE

### 1. PROJECT DESCRIPTION

1.1. This project "Castleton RS 0142(10)" will replace Bridge 8 on VT 4A over the Castleton River in the Town of Castleton on existing alignment. It will reconstruct the nearby intersection with TH 8 (Crampton Road) east of the bridge. The new bridge will be a two lane, single span, voided concrete slab bridge. The project will maintain traffic on a temporary bridge downstream and south of the existing bridge during construction.

1.2. The total length of roadway work, including both approaches, drives and existing roadway is approximately 575 ft.

1.3. The total disturbed area (excluding waste, borrow and staging areas) is approx 0.9 ac. The temporary bridge will disturb approx 0.1 ac., work on the bridge and approaches will disturb approx. 0.8 ac. Should the area of disturbance changed from that proposed above and result in one or more acres of earth disturbance, or should the project become part of a common plan of development, then the contractor will be responsible for additional permitting with the Agency of Natural Resources.

1.4. This project should last one construction season. This Erosion Prevention and Sediment Control Plan is intended for use during the construction season. A separate winter plan shall be submitted for approval if work is to occur from Oct 15th to April 15th, or if vegetation has not been sufficiently established after the completion of construction and by Oct 15th.

### 2. SITE INVENTORY & ANALYSIS

2.1. Off Site Drainage Characteristics (Up And Down Gradient). The land in the project area is rolling former farmland. It consists of old fields and pasture growing in with brush, softwood and hardwood trees. The soil is "very deep, gently to very steep and excessively drained. The soils formed in gravelly, sandy, and loamy glacial deposits on stream terraces."

2.2. Drainage, Waterways, Bodies of Water. The bridges cross the Castleton River. The river is mostly flat and meandering in a river valley. The brook is typically 25 ft wide at the bottom and 35 ft wide at the top and 4 ft deep from top to bottom. The watershed area is 1200 ha.

### 2.3. Topography, Existing Roads, Buildings, Utilities.

2.3.1. Topography. The project site is a transition from a strip business area to an old winding road on a steep hillside.

2.3.2. Existing Roads. VT 4A is a Rural Collector State Highway. It parallels US 4, a principle arterial. TH 8 is a Class III paved town highway.

2.3.3. Buildings. A store is west of the bridge and outside the project area. TH 8 leads to a trailer park outside the project area. A driveway comes on to TH 8. Its home is out of sight of the project area. A second driveway intersects VT 4A on the SE side of the bridge. The home is out of sight of the project area too.

2.3.4. Utilities. Power and Utility poles run along the north side of VT 4A and TH 8 on the west side of the bridge. They run along the south side of VT 4A on the east side of the bridge.

2.4. Vegetation. The vegetation is lawns on the NW side, and riparian brush on the SW side of the bridge. The vegetation is large soft and hardwood on slopes of the NE side, and young softwood on the SE side of the bridge. Construction will replace some brush and trees. Stone Fill capped with grubbing material will stabilize slopes steeper than 66%. Seed & Mulch will stabilize slopes flatter than 66%.

2.5. Soils. The Soil Conservation Service "Soil Survey of Rutland County" identifies three soil types in the project site.

2.5.1. 110 Limerick Silt Loam. This soil is in the floodplain. It is very deep, poorly drained, and nearly level. It is frequently flooded for brief periods in late fall, winter and spring. The soil profile is typically: 0 to 7" brown silt loam; 7 to 60"+ gray silt loam. Its erodibility rating is High (kw = 0.49). The slope suggests low erodibility.

2.5.2. 149E Bomoseen & Pittstown Soils, 25 to 40% slopes. This soil is 40% Bomoseen, 40% Pittstown, and 20% other. Both soils are similar in use and management. This soil is on the steep hill on the east approach. It is moderately well drained and steep. It is shallow to moderately deep to dense basal till and very deep to bedrock. Flagstones are typically 5 to 25 ft apart. The soil profile is typically: 0 to 8" brown channery loam loam; 8 to 21" brown channery fine sandy loam; 21 to 60"+ olive channery silt loam. Its erodibility rating is low (kw = 0.20). The slope suggests high erodibility.

2.5.3. Urban Soils. This soil is in the northwest approach. The soil profile is probably similar to surrounding soils. Its erodibility rating is unknown. The slope is level and suggests low erodibility.

### 2.6. Sensitive Resource Areas.

2.6.1. The Castleton River runs through the project area. The project impacts it at the existing bridge and southern detour.

2.6.2. Class III Wetlands are in the riparian corridor upstream of the project impacts.

2.6.3. Trout are in the Castleton River. This part of the river is important trout habitat and has a high population of trout.

### 2.6.4. Non-Sensitive Resources

2.6.4.1. No Threatened & Endangered Species are present within the project area.

2.6.4.2. No Historic Features are located within the project area.

2.6.4.3. No Archaeologically Sensitive Areas are present within the project area.

### 2.7. Proximity to Natural or Man-Made Water Features.

2.7.1. Castleton River at the bridge.

2.7.2. Ditch on the SE side of the bridge.

2.7.3. Culvert at Drive 2 700+26.

### 3. GENERAL EROSION & SEDIMENT CONTROL GUIDELINES

3.1. The Erosion Prevention and Sediment Control Plans are guidelines for preventing erosion and controlling sediment transport throughout the life of the project. The purpose of the plan is to minimize soil loss and the pollution and sedimentation of receiving waters.

3.2. Coordinate the installation, use, and removal of erosion and sediment control measures with construction activities to ensure economical, effective and continuous erosion and sediment control. Employ temporary stabilization practices in incremental stages as construction proceeds. Plan construction sequence to minimize the area of erodible soil exposed at any one time. Within 48 hours of final grading, seed and mulch or use erosion control matting to stabilize the area. Use additional erosion control measures as necessary during the sequence of construction and as directed by the Engineer. See section 105.23 of the Vermont AOT Standard Specifications for Construction, dated 2006.

3.3. Maintain existing and planted vegetated buffers along stream banks, wetlands or other sensitive areas wherever possible.

3.4. Collect and route clean offsite runoff around or through the project site using diversion berms, diversion channels, culverts and/or temporary pipes. Control only sediment-laden runoff from the project site.

3.5. Install erosion and sediment control measures as shown in the Erosion Prevention and Sediment Control Plan or as directed by the Engineer. Do not modify the type, size or location of any control or practice without approval of the Engineer. Note any changes on the plans, in the weekly inspection report, and report them to the appropriate authority in a timely manner. Inspect all control measures weekly and after each rainfall event. Repair measures promptly once damage is discovered.

3.6. Preventing initial soil erosion is much more effective than treating eroded sediment. Therefore, stabilize all disturbed areas promptly after construction activity has temporarily or permanently ceased. Establish temporary vegetation if the disturbed area is to be without construction activity for a period of 14 days. Install perimeter control measures following clearing and before the start of any grubbing or grading activity. Install other temporary controls in incremental stages as construction proceeds.

3.7. Operate construction equipment only within perimeter control measures.

3.8. The contractor shall be responsible for ensuring that proposed waste and borrow areas meet the requirements of the General Permit, either separately under an existing plan, or as an addendum to this plan.

### 4. Sequence of Construction

#### 4.1. Phase I (Establish Perimeter Controls)

4.1.1. Prior to any construction or staging, construct vehicle tracking pads for entrances to staging areas and the project site to prevent tracking of sediment offsite. Coarse stone over filter fabric should be used where an existing stable entrance does not exist. The stone used for pads shall be monitored for sediment accumulation and replaced as necessary. Vehicle tracking pads shall also be established and maintained at offsite waste or borrow areas. The minimum size of a pad shall be 12 x 50 ft.

4.1.2. Prior to any clearing, grubbing, and excavation, construct perimeter controls to ensure that disturbed sediment does not leave the site. Use diversion swales to divert offsite drainage through the project site, as necessary. Those portions of the diversion channels that run along natural streambeds shall not be lined with plastic.

#### 4.2. Phase II (Intermediate Controls/Stabilization)

4.2.1. Apply intermediate controls (inlet protection and check dams) before rough grading and temporary pipe installation operations. Obtain the Engineer's approval before installing any controls not specified in the Erosion Prevention and Sediment Control Plan (this provision does not apply to emergency situations where the Engineer may not be immediately available). The Engineer may direct the installation of certain controls in order to forestall or mitigate potential or existing erosion problems or to respond to storm events or damage by construction operations. Clean erosion control measures (sediment traps, silt fences etc.) when 1/2 full of sediment.

4.2.2. Provide double silt fence around stockpiled excavated roadway material. Apply temporary mulch or temporary turf establishment to stockpiles remaining in place longer than 14 days or when directed by the Engineer.

4.2.3. Upon completion of temporary detour fill slopes, seed and mulch slopes to establish vegetation. Maintain silt fence at toe of slopes for added protection from sediment being transported to the Castleton River. See 'Seeding Formula for Rural Areas' on sheet 19.

#### 4.3. Phase III (Final Controls/Stabilization)

After completion of bridge and/or roadway construction, do the following as directed by the Engineer:

4.3.1. Finish grading, riprap and apply permanent turf establishment to channels if required.

4.3.2. Where necessary, replace damaged matting and reapply permanent turf establishment to disturbed areas where vegetation has not taken.

4.3.3. Remove silt fence only after all upslope areas are stabilized and vegetation is well established.

4.3.4. Remove all perimeter silt fence and sediment traps only after toe-of-fill ditches have stabilized and vegetation is well established.

4.3.5. Remove all other perimeter controls when directed by the Engineer. Backfill, regrade and apply permanent turf establishment.

### 5. TEMPORARY EROSION PREVENTION & SEDIMENT CONTROL

#### 5.1. Temporary Measures To Prevent Erosion include:

5.1.1. "Project Demarcation Fencing" will delineate the construction area for construction equipment. This measure limits the area that can be disturbed and exposed to erosion.

5.1.2. "Tracking & Mulching" will temporarily stabilize slopes. Use tracking for short term (two weeks) exposed slopes. Drive heavy equipment on the slopes to leave level tracks (small check dams) that will catch water flow. Stabilize slopes within 48 hours or sooner considering rain.

5.1.3. "Seeding & Mulching" will stabilize slopes ranging from 0% to 66%. Add biodegradable "Erosion Control Matting" (or equivalent) to slopes ranging from 33% to 66%. Use seeding for long term exposed slopes. Grass takes 2 weeks to establish itself. Stabilize slopes within 48 hours or sooner considering rain.

5.1.3.1. ML 398+50 to 404+25 left and right

5.1.3.2. TH8 500+25 to 501+00 left and right

5.1.4. "Stone Check Dams" placed in ditches will reduce flow velocities and prevent erosion. Place dams in ditches so that the elevation of the top of a check dam is level with the toe of the next upslope check dam. The check dams may be removed once the stone lining of the ditches is complete and the surrounding area stabilized.

5.1.4.1. ML 401+50 to 404+25 right

#### 5.2. Temporary Measures To Control Sediment Transport include:

5.2.1. "Silt Fence" placed level on slopes will control sheet flow sediment transport. Place level silt fence 5 to 10 ft from the toe of slopes. Turn the ends of silt fence slightly uphill to stop concentrated water from flowing around the ends. The maximum slope length between separate runs of silt fence is 100 ft. Place silt fence before beginning upslope earthwork.

5.2.2. "Sand Bags" placed around culvert inlets will control concentrated flow sediment transport. The bags create a temporary puddle for particles to settle out as water drains through the barrier. Install inlet protection before water flows through the structure. Fill the bags with clean, small diameter stone. Limit the height of the barrier so it is not an accident hazard. Get the Engineer's approval before using alternative inlet control measures.

5.2.3. "Vehicle Tracking Pads" will control tracking of sediment transport on to public roads. The pad is made of stabilized crushed stone located wherever construction vehicles leave construction areas. The sites include: the project site; staging areas; and waste and borrow areas. The minimum area is 12 x 50 ft. Pipe all surface water flowing to or diverted towards a construction entrance under the stone. Size pipes for their watersheds. The minimum pipe diameter is 6 inches.

5.3. Check measures (e.g. stone check dams, silt fence, and sand bags) regularly for accumulation of sediment. Remove sediment build-up when the level of sediment reaches one-half the height of the control measure. Dispose of sediments in an approved area where they will not be subject to erosion.

5.4. Hay Bales are unacceptable alternatives to silt fences, sand bags, or check dams.

### 6. FINAL EROSION CONTROL MEASURES

#### 6.1. Roadway Typical Section

6.1.1. "Bituminous Concrete Pavement" on the road surface will prevent erosion.

6.1.2. "Gravel or Crushed Stone Subbase" beneath the surface will prevent erosion.

6.1.3. "Sand" beneath the subbase will prevent erosion.

6.1.4. "Seeding & Mulching" will establish vegetation on side slopes less than 66% that will prevent erosion and control sediment transport. Add biodegradable "Erosion Control Matting" (or equivalent) to slopes ranging from 33% to 66%.

6.1.5. Roadway Ditches beside the road will control concentrated flows and prevent erosion.

6.1.5.1. "Stone Fill, Type I" in roadway ditches will prevent erosion and control sediment transport.

6.1.5.2. "Culverts" will convey concentrated flow under roads and prevent erosion.

6.1.6. "Stone Fill, Type I" at culvert outlets will dissipate water velocities and prevent erosion and control sediment transport.

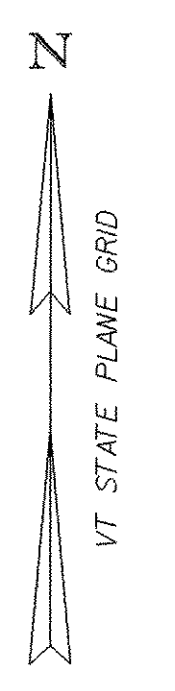
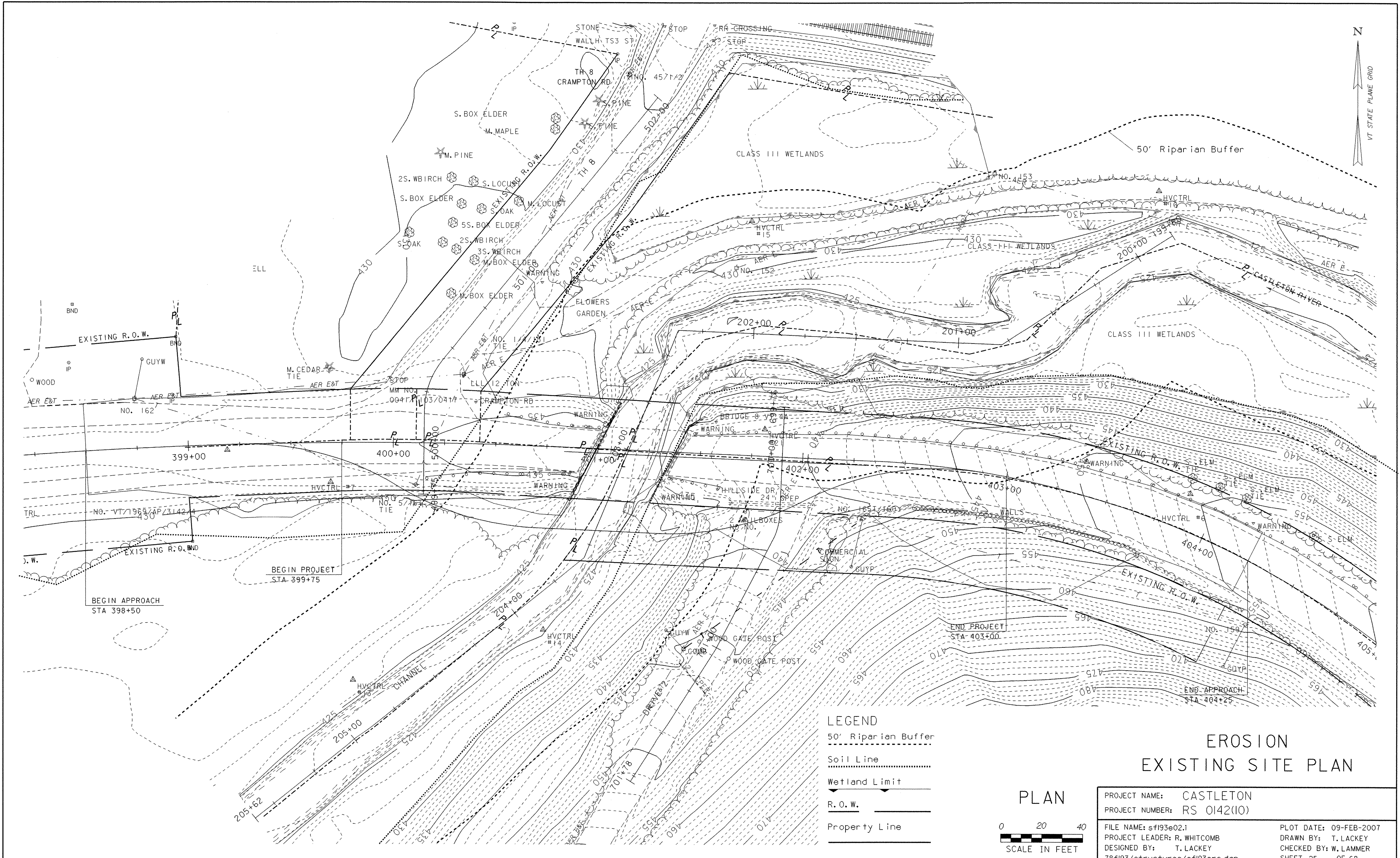
#### 6.2. Channel Typical Section

6.2.1. "Stone Fill, Type I" at the ends of the wing walls will prevent erosion and control sediment transport.

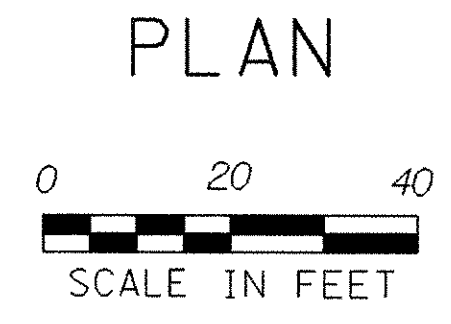
6.2.2. "Stone Fill, Type III" around the abutments on slopes greater than 66% will prevent erosion and control sediment transport.

6.2.3. "Geotextile under Stone Fill" will prevent erosion and control sediment transport.

PROJECT NAME:	<b>Castleton</b>	
PROJECT NUMBER:	<b>RS 0142(10)</b>	
FILE NAME:	sf193ero.dgn	PLOT DATE: 2/1/2007
PROJECT LEADER:	R. WHITCOMB	DRAWN BY: T. LACKEY
DESIGNED BY:	T. LACKEY	CHECKED BY: W. LAMMER
EROSION CONTROL NARRATIVE	SHEET 24	OF 68



- LEGEND**
- 50' Riparian Buffer
  - Soil Line
  - Wetland Limit
  - R.O.W.
  - Property Line



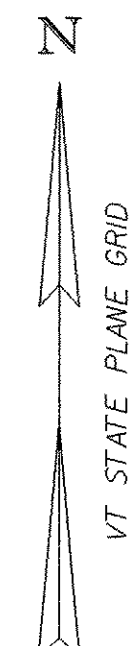
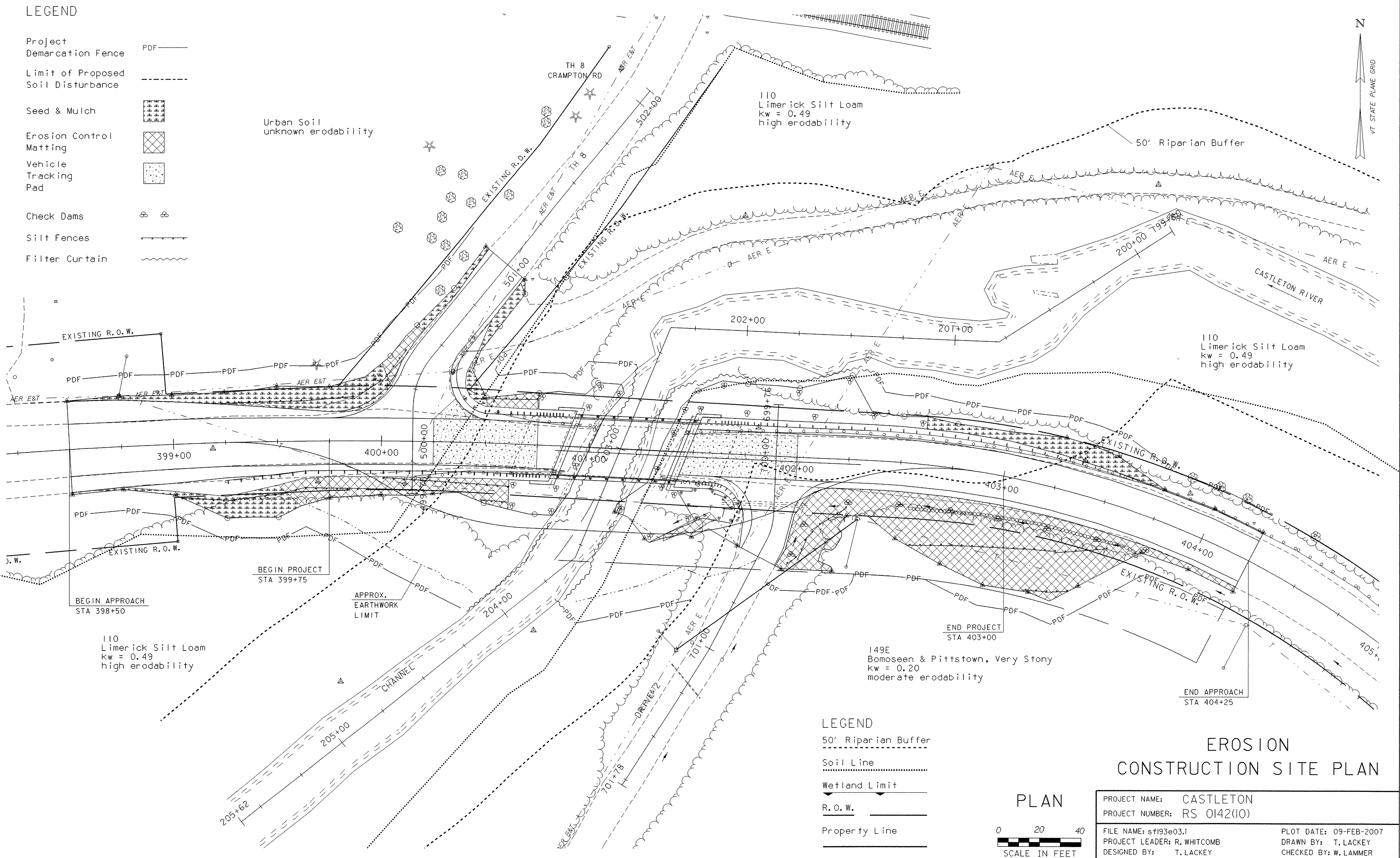
**EROSION  
EXISTING SITE PLAN**

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193e02.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 25 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193ero.dgn	

LEGEND

- Project Demarcation Fence PDF
- Limit of Proposed Soil Disturbance
- Seed & Mulch
- Erosion Control Matting
- Vehicle Tracking Pad
- Check Dams
- Silt Fences
- Filter Curtain

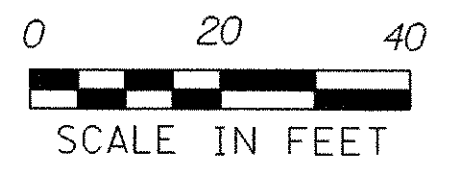
Urban Soil  
unknown erodability



LEGEND

- 50' Riparian Buffer
- Soil Line
- Wetland Limit
- R.O.W.
- Property Line



PLAN

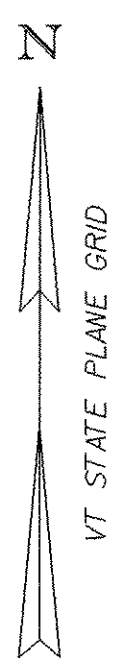
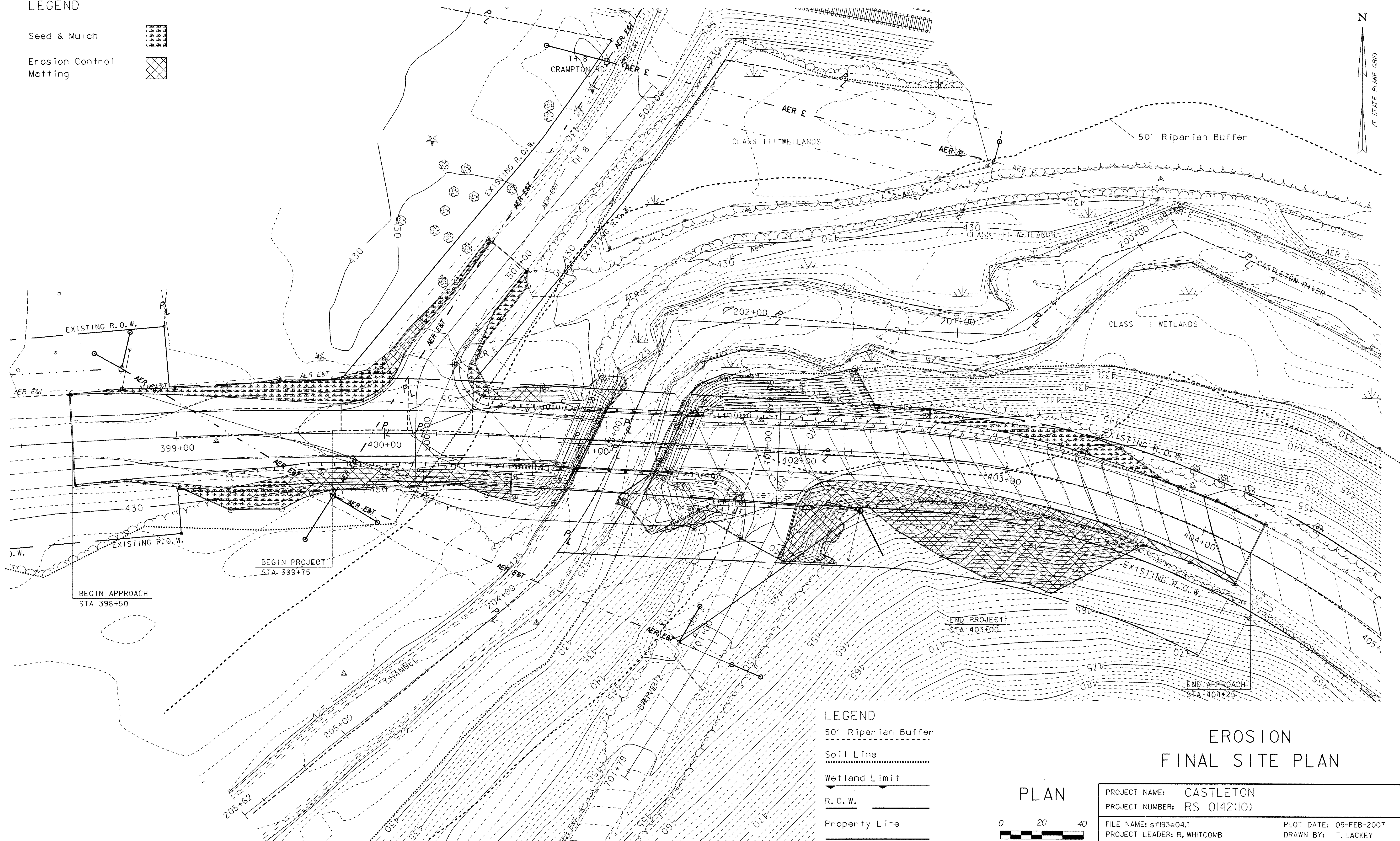


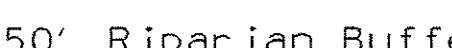

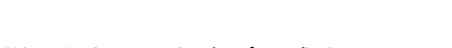

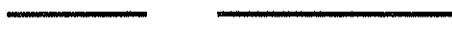
EROSION CONSTRUCTION SITE PLAN

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193e03.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 26 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193ero.dgn	

LEGEND

- Seed & Mulch 
- Erosion Control Matting 



- LEGEND
- 50' Riparian Buffer 
  - Soil Line 
  - Wetland Limit 
  - R. O. W. 
  - Property Line 



## EROSION FINAL SITE PLAN

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193e04.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 27 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193ero.dgn	

## SILT FENCE

### APPLICATION NOTES:

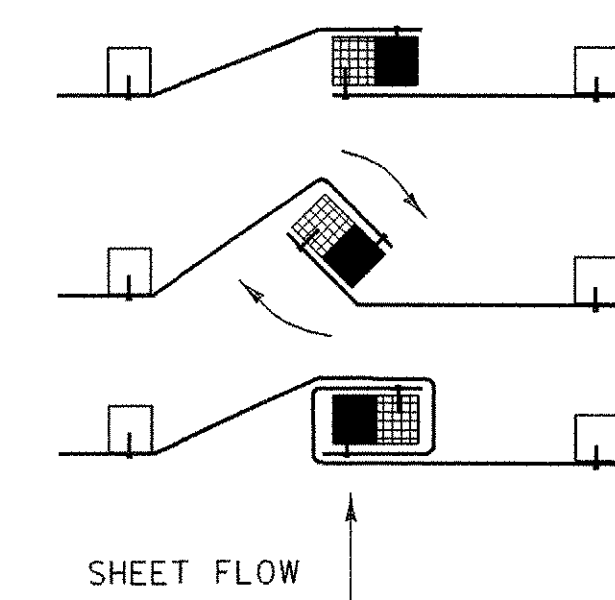
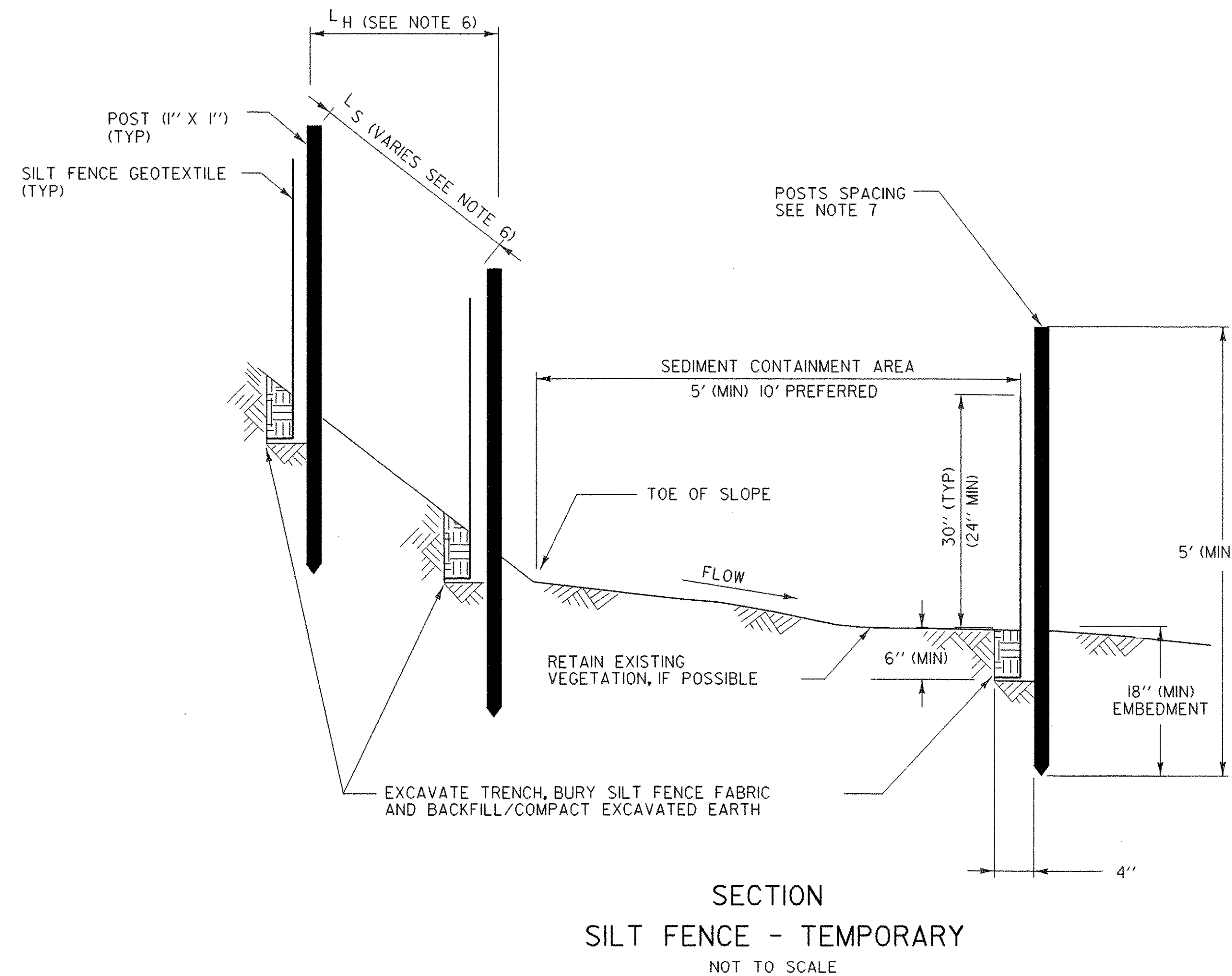
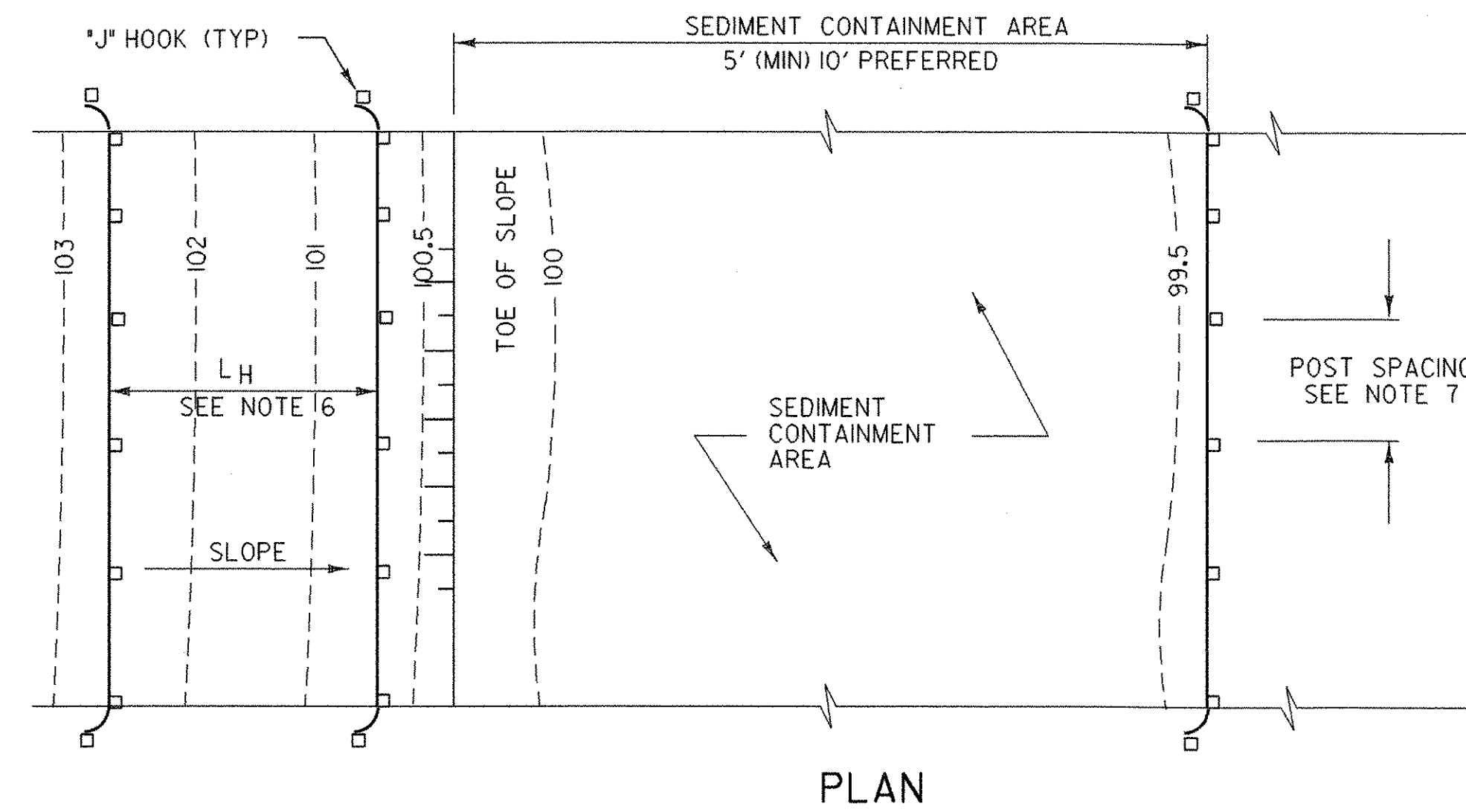
- A. THE PRIMARY PURPOSE OF SILT FENCE IS TO REDUCE RUNOFF VELOCITY AND TRAP SEDIMENT. VELOCITY IS REDUCED, WATER IS IMPOUNDED BEHIND THE MEASURE, AND SEDIMENT FALLS OUT OF SUSPENSION.
- B. SILT FENCE SHALL NOT BE USED ACROSS CONCENTRATED FLOW.

### GENERAL NOTES:

1. SILT FENCE SHALL GENERALLY BE PLACED A MINIMUM OF 5 FEET BEYOND TOE OF SLOPE, 10 FEET PREFERRED, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF SEDIMENT CONTAINMENT AREA.
2. SILT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION (CONTOUR). IT MAY BE INSTALLED AT INTERMEDIATE POINTS UP SLOPES AS WELL AS AT THE BOTTOM, AS SHOWN IN THE DETAIL.
3. ALL ENDS SHALL BE 'J' HOOKED TO TRAP SEDIMENT.
4. IN AREAS WITH TWO SLOPES, SILT FENCE SHALL BE USED TO ERECT A DAM AND TRAP SEDIMENT AT THE BASE OF THE STEEPER SLOPE.
5. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6 INCHES BELOW GROUND, AND KEYED IN 4 INCHES. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSTREAM SIDE OF THE FABRIC.
6. MAXIMUM DRAINAGE AREA TRIBUTARY TO 100 FEET OF SILT FENCE SHALL BE 0.25 ACRES.
7. THE FOLLOWING ARE MAXIMUM LENGTHS FOR SILT FENCE INSTALATIONS:

CONSTRUCTED SLOPE	SLOPE LENGTH (LS) FT	HORIZONTAL LENGTH (LH) FT
3H : 4V	80	75
4H : 4V	130	125
5H : 4V	200	200
> 5H : 4V	250	250

8. WHERE ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4 FEET. WHERE ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6 FEET.
9. SILT FENCE SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT GREAT ENOUGH TO CAUSE WATER TO LEAVE THE CONSTRUCTION SITE.
10. SILT FENCE SHALL BE CLEANED AND REPAIRED AS NEEDED. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE-HALF OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED WASTE SITE.
11. SILT FENCE SHALL BE REMOVED WHEN THE AREA HAS BEEN STABILIZED. AT TIME OF REMOVAL OF THE SILT FENCE, THE DISTURBED AREA SHALL BE REPAIRED AND STABILIZED.



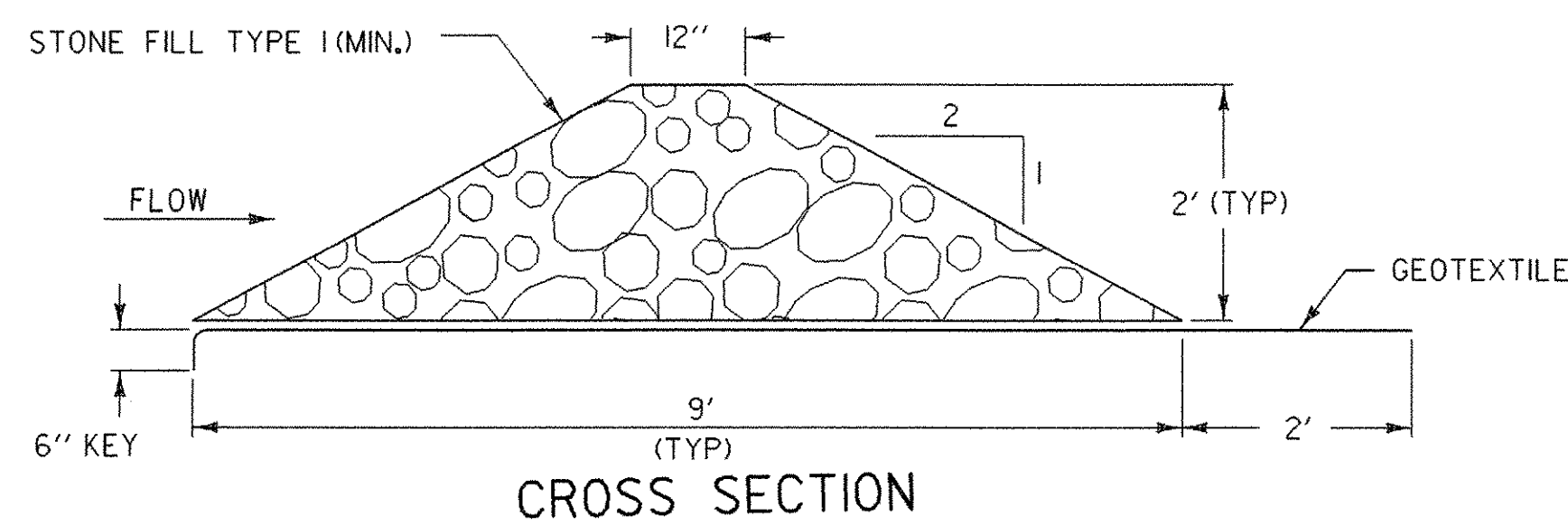
1. PLACE THE END POST OF ONE FENCE INSIDE THE END POST OF THE OTHER FENCE.
2. ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL
3. DRIVE BOTH POSTS 18 INCHES INTO THE GROUND AND BURY THE FLAP IN THE TRENCH.

SPlicing DETAIL  
NOT TO SCALE

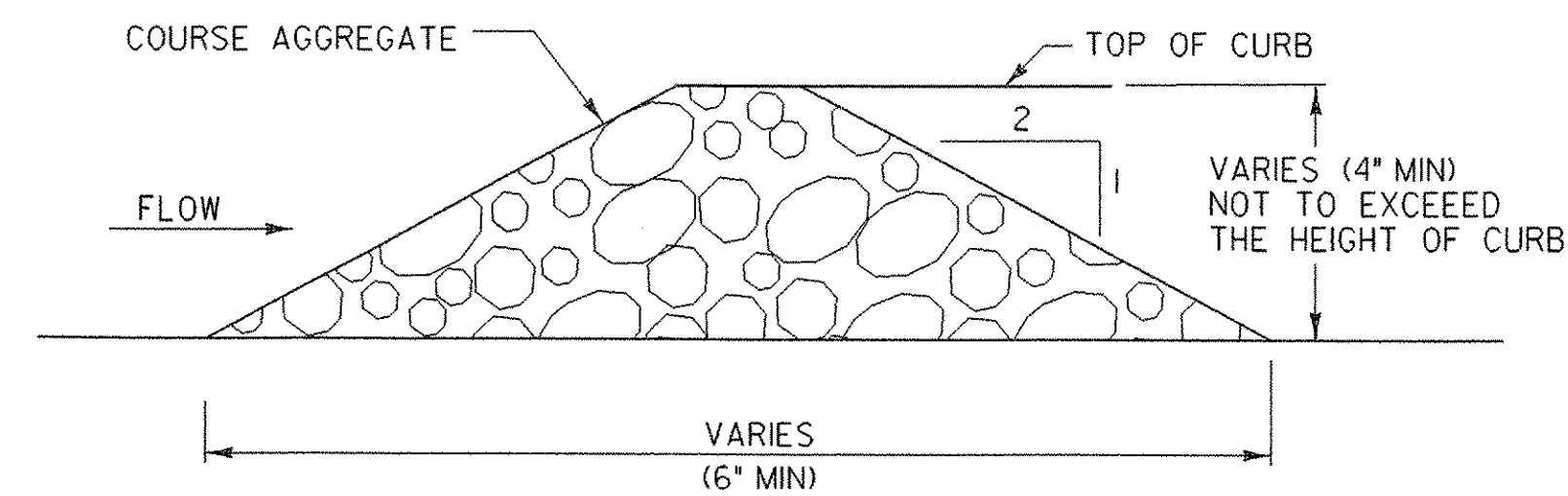
# EROSION PREVENTION & SEDIMENT CONTROL DETAILS SILT FENCE

## EROSION DETAILS I

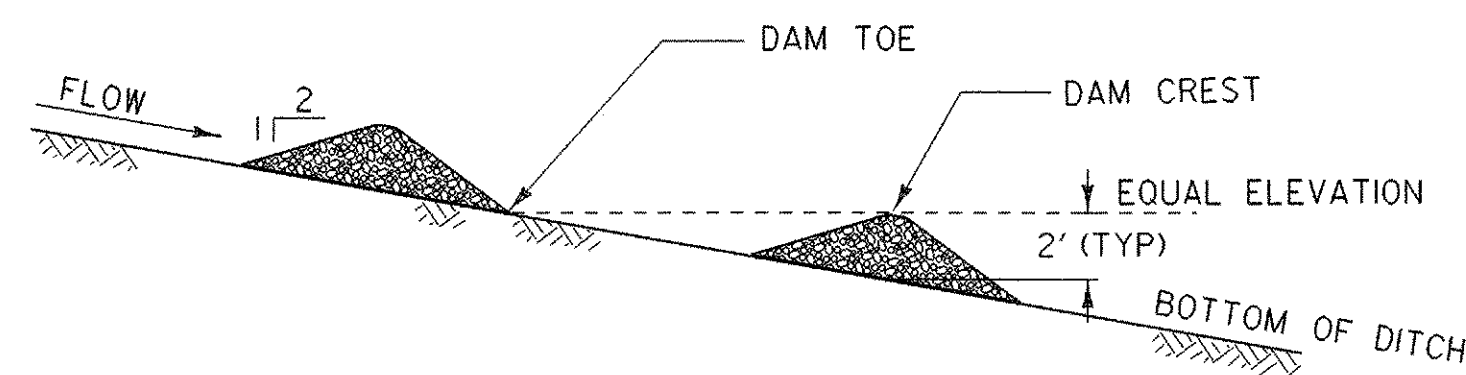
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: W. LAMMER
FILE NAME: /78f193/str/sf193ero.dgn	CHECKED BY: T. LACKEY
PROJECT LEADER: R. WHITCOMB	SHEET 28 OF 68
DESIGNED BY: W. LAMMER	
sf193e05.1	



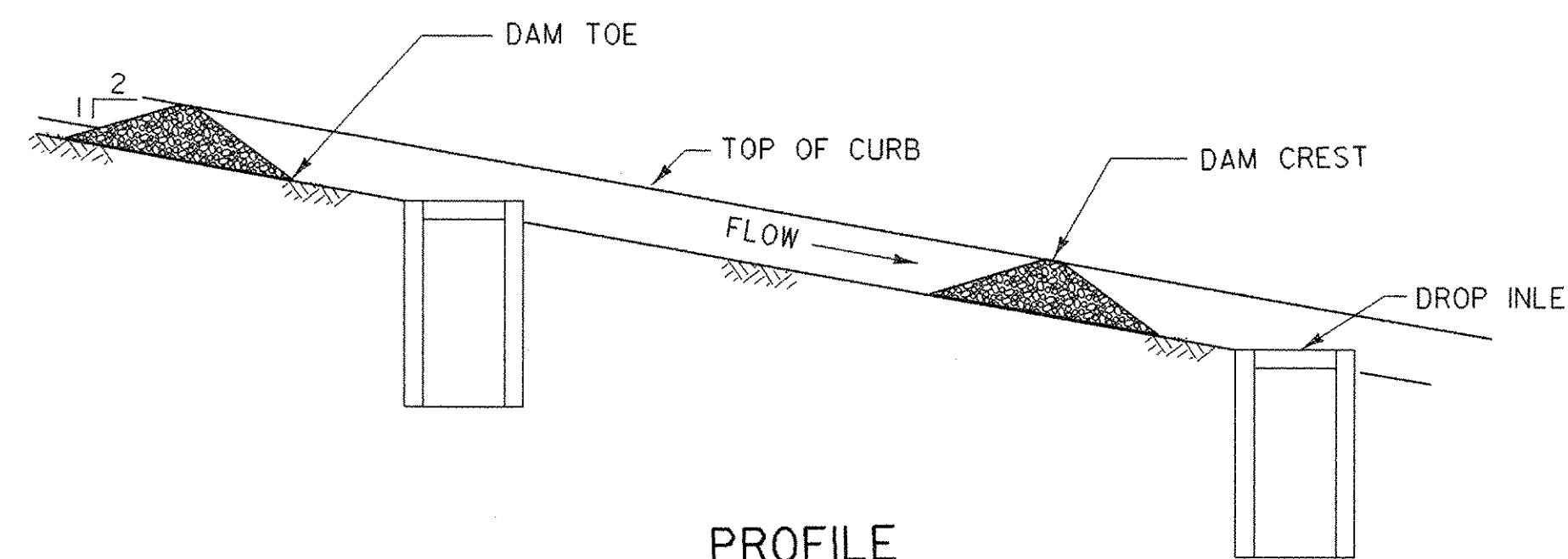
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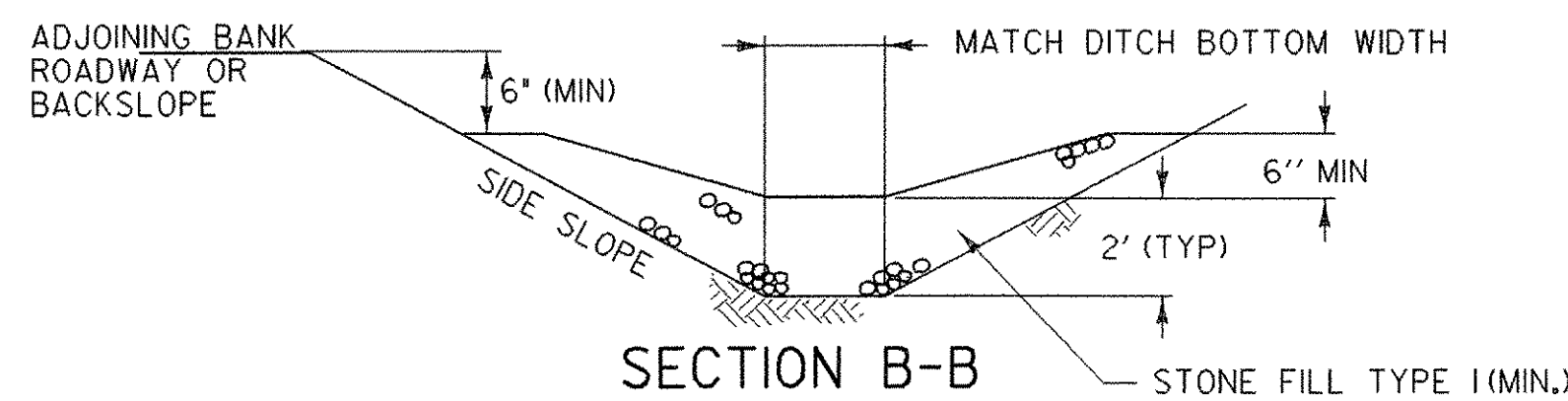
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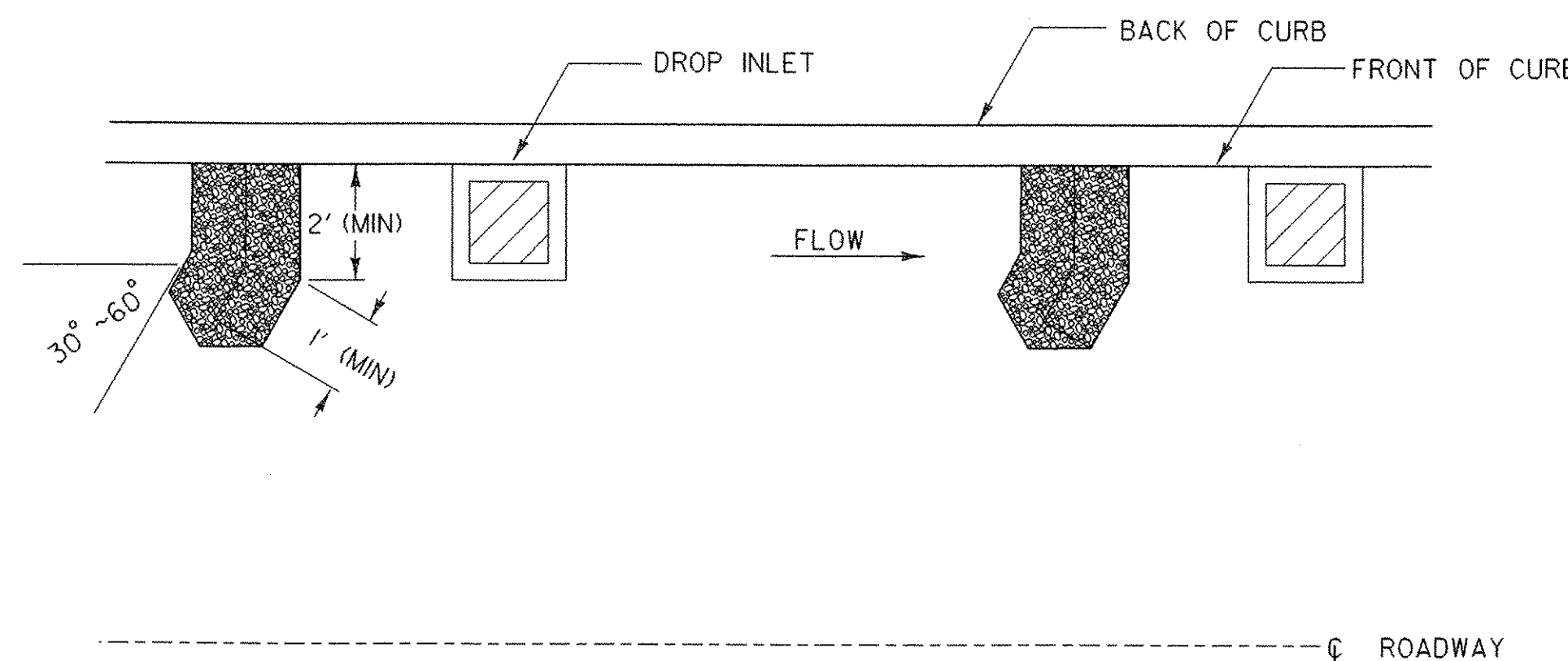
PROFILE



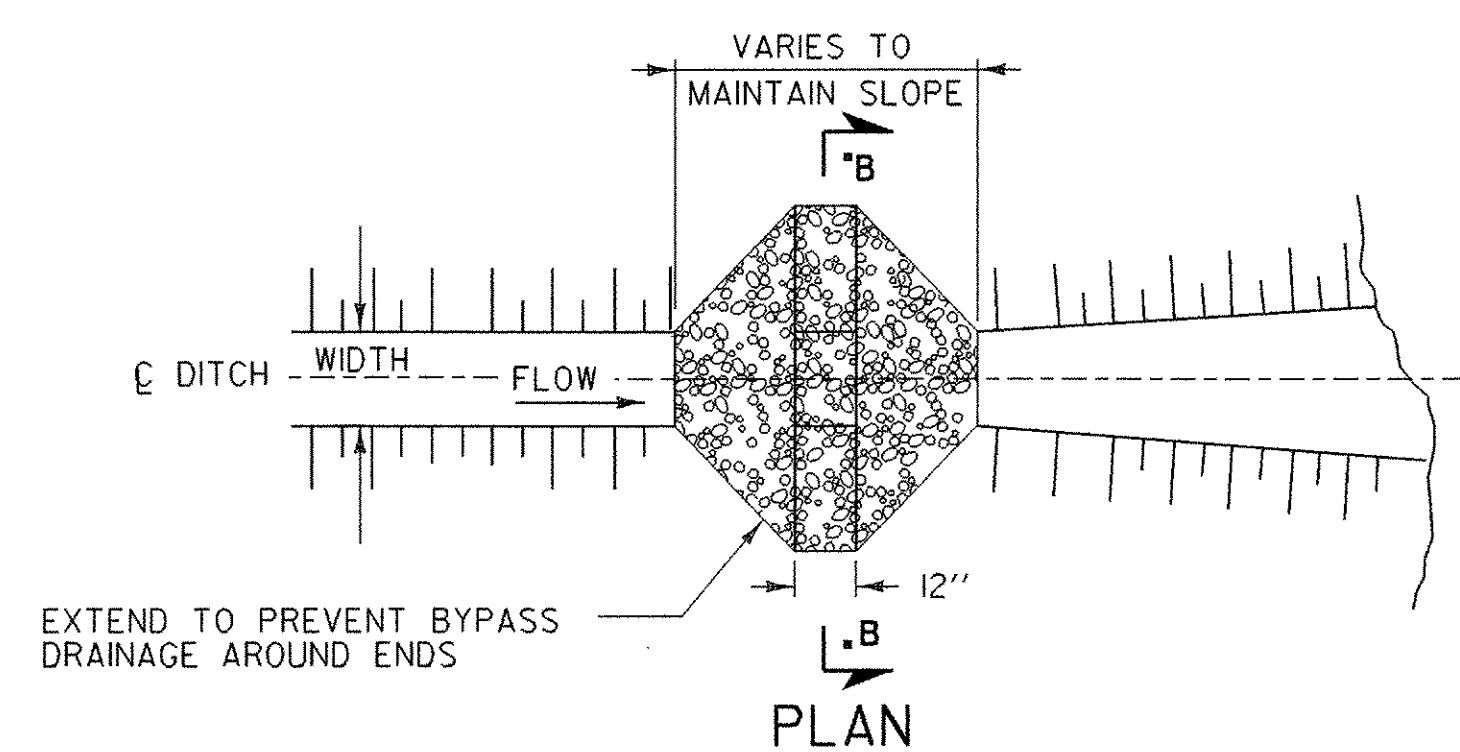
PROFILE



SECTION B-B



PLAN



PLAN

TEMPORARY STONE CHECK DAM  
TYPE I

NOT TO SCALE

TEMPORARY STONE CHECK DAM  
TYPE II

NOT TO SCALE

## TEMPORARY CHECK DAMS

### APPLICATION NOTES:

- TEMPORARY CHECK DAM TYPE I IS USED FOR CHANNEL FLOW, CHECK DAM TYPE II IS USED FOR FLOW ALONG A CURB.
- THE PRIMARY PURPOSE OF A TEMPORARY STONE CHECK DAM (TYPE I) IS TO REDUCE EROSION IN A CHANNEL BY REDUCING FLOW VELOCITY.
- THE PRIMARY PURPOSE OF A TEMPORARY STONE CHECK DAM (TYPE II) IS TO LIMIT THE AMOUNT OF SEDIMENT ENTERING A CLOSED DRAINAGE SYSTEM WITH STORMWATER RUNOFF.
- TEMPORARY CHECK DAMS WILL CAPTURE SEDIMENT THAT FALLS OUT OF SUSPENSION BEHIND THE CHECK DAMS DUE TO DECREASED VELOCITY. CHECK DAMS ARE NOT INTENDED TO FILTER SEDIMENT FROM STORMWATER.
- DETAILS SHOWN SHALL BE USED FOR TEMPORARY INSTALLATION ONLY.
- USE OF PREFABRICATED TEMPORARY CHECK DAMS SHALL BE AS APPROVED IN THE EPSCP.

### GENERAL NOTES:

- GEOTEXTILE SHALL BE INSTALLED UNDER TEMPORARY STONE CHECK DAMS TYPE I. IT SHALL BE KEYED IN ON THE UPHILL END AND SHALL EXTEND 2 FEET BEYOND THE STONE ON THE DOWNHILL END.
- STONE FOR TEMPORARY STONE CHECK DAMS SHALL MEET THE GRADATION REQUIREMENTS SPECIFIED IN THE CONTRACT DOCUMENTS.
- PREFABRICATED TEMPORARY CHECK DAMS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
- TEMPORARY CHECK DAMS SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT GREAT ENOUGH TO CAUSE WATER TO LEAVE THE CONSTRUCTION SITE.
- TEMPORARY CHECK DAMS SHALL BE CLEANED AND REPAIRED AS NEEDED. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE-HALF OF THE HEIGHT OR AS RECOMMENDED BY THE MANUFACTURER. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED WASTE SITE.
- AT TIME OF REMOVAL OF THE TEMPORARY CHECK DAM, THE DISTURBED AREA SHALL BE REPAIRED AND STABILIZED.

### STONE CHECK DAM PLACEMENT INTERVAL

DITCH SLOPE	PLACEMENT INTERVAL **
1%	200 FT
2%	100 FT
3%	65 FT
4%	50 FT
5%	40 FT
6%	30 FT
8%	25 FT
10%	20 FT

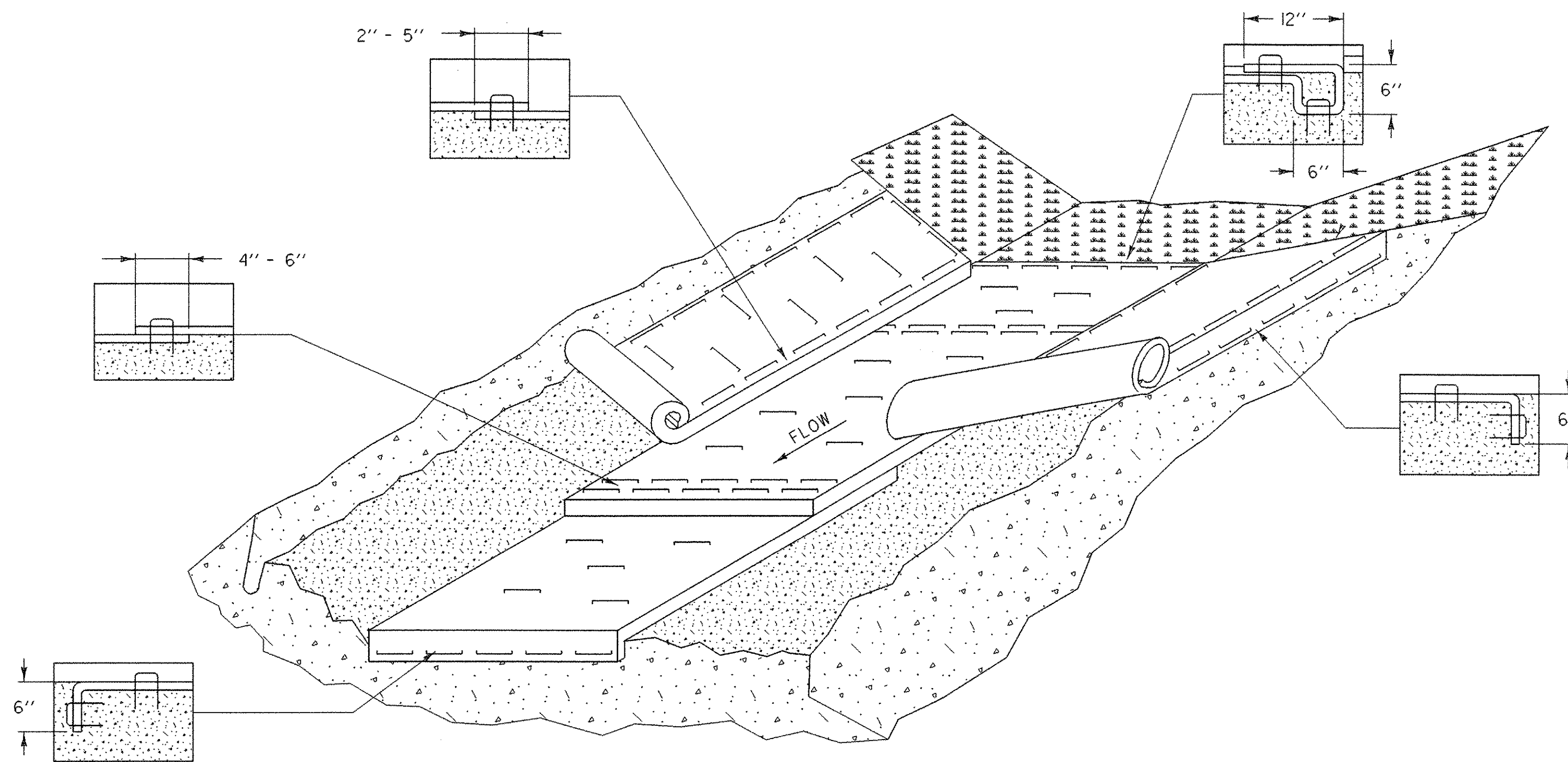
\*\* BASED ON 2' TYPICAL HEIGHT

## EROSION PREVENTION & SEDIMENT CONTROL DETAILS TEMPORARY CHECK DAMS

## EROSION DETAILS 2

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: W. LAMMER
FILE NAME: /78f193/str/sf193ero.dgn	CHECKED BY: T. LACKEY
PROJECT LEADER: R. WHITCOMB	SHEET 29 OF 68
DESIGNED BY: W. LAMMER	
sf193e06.i	





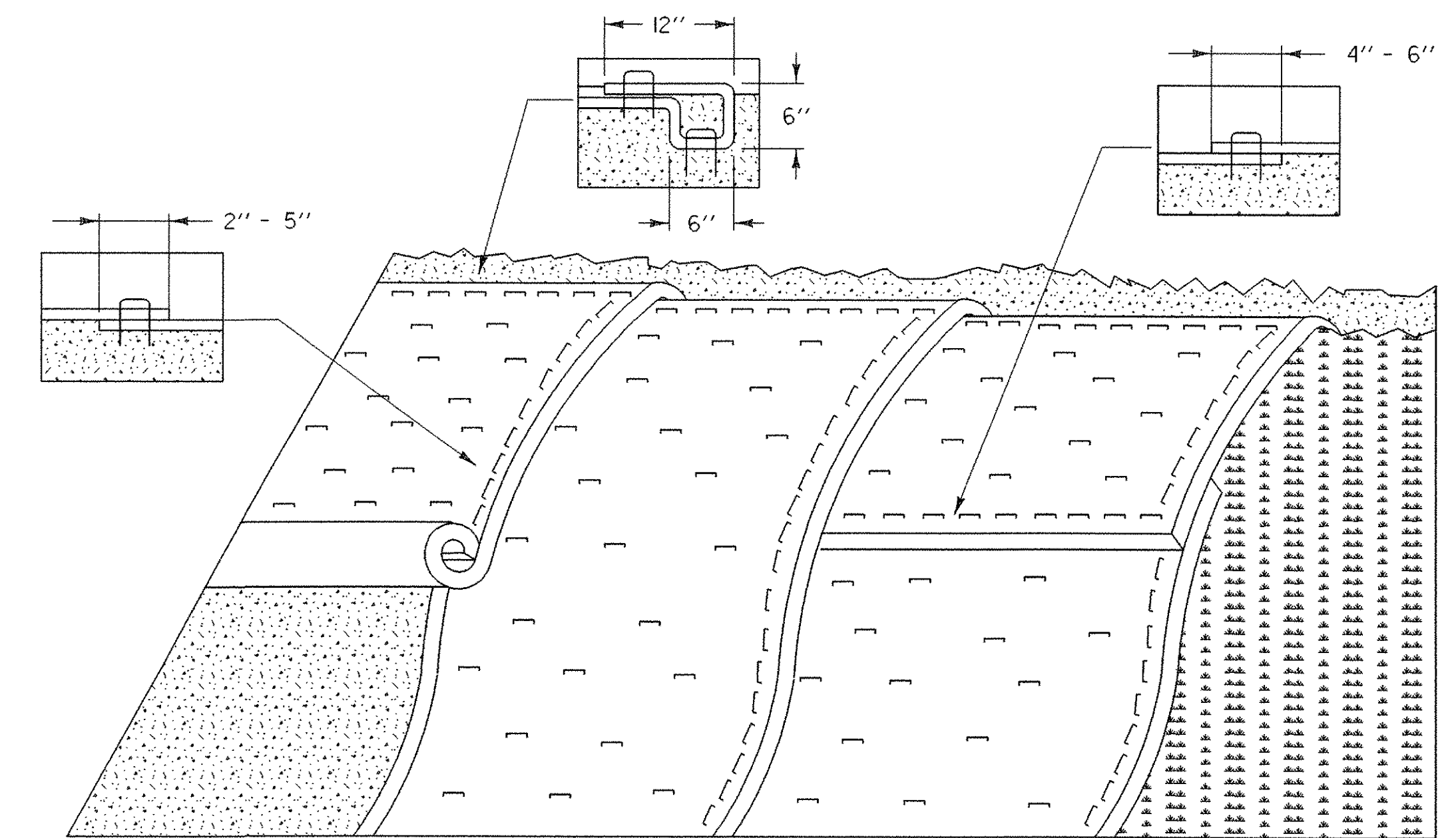
### EROSION MATTING FOR DITCHES

#### APPLICATION NOTES:

- A. THE PURPOSE OF LINING THE DITCH WITH EROSION MATTING IS TO REDUCE EROSION AND AID THE ESTABLISHMENT OF VEGETATION AT LOW VELOCITIES.
- B. TYPE OF EROSION MATTING TO BE USED SHOULD BE BASED ON FACTORS SPECIFIC TO EACH APPLICATION. SEE SPECIFICATIONS AND PRODUCT RECOMMENDATIONS FOR SUITABILITY.

#### GENERAL NOTES:

1. WATER MAY NEED TO BE DIVERTED TO ALLOW PROPER MATTING INSTALLATION.
2. GRADE AND SMOOTH CHANNEL TO PROVIDE GOOD MATTING TO SOIL SURFACE CONTACT.
3. APPLY FERTILIZER, LIME, AND SEED PRIOR TO PLACING MATTING.
4. INSTALL MATTING IN THE CENTER OF THE CHANNEL, IN THE DIRECTION OF THE WATER FLOW.
5. INSTALL MATTING ON THE SIDE SLOPES OF THE CHANNEL, OVERLAPPING THE CENTER MAT.
6. ANCHOR MATTING AS SHOWN, UTILIZING ANCHOR STAPLES. STAPLE PLACEMENT SHALL BE DETERMINED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
7. EROSION MATTING SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT GREAT ENOUGH TO CAUSE WATER TO LEAVE THE CONSTRUCTION SITE.
8. EROSION MATTING SHALL BE REPAIRED AND RESTAPLED AS NECESSARY TO ENSURE PROPER FUNCTION.



### EROSION MATTING FOR SLOPES

#### APPLICATION NOTES:

- A. THE PURPOSE OF EROSION MATTING ON SLOPES IS TO REDUCE EROSION AND AID THE ESTABLISHMENT OF VEGETATION
- B. EROSION CONTROL MATTING SHALL BE USED FOR THE FOLLOWING REASONS:
  - SLOPES > 3H:1V
  - AREAS WHERE SEED AND MULCH WILL NOT STAY IN PLACE ALONE
  - WHERE SEEDING IS OUTSIDE THE GROWING SEASON.

#### GENERAL NOTES:

1. GRADE AND SMOOTH THE SLOPE TO PROVIDE GOOD MATTING TO SOIL SURFACE CONTACT.
2. APPLY FERTILIZER, LIME, AND SEED PRIOR TO PLACING MATTING.
3. ANCHOR MATTING AS SHOWN, UTILIZING ANCHOR STAPLES. STAPLE PLACEMENT SHALL BE DETERMINED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
4. UNROLL EROSION MATTING VERTICALLY DOWN SLOPE IN THE DIRECTION OF WATER FLOW.
5. OVERLAP UPPER MATTING OVER LOWER MATTING AS SHOWN.
6. OVERLAP ADJACENT MATTING AS SHOWN.
7. CUT EXCESS MATTING AT END OF SLOPE AND ANCHOR THE END.
8. EROSION MATTING SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT GREAT ENOUGH TO CAUSE WATER TO LEAVE THE CONSTRUCTION SITE.
9. EROSION MATTING SHALL BE REPAIRED AND RESTAPLED AS NECESSARY TO ENSURE PROPER FUNCTION.

## EROSION PREVENTION & SEDIMENT CONTROL DETAILS EROSION MATTING FOR DITCHES & SLOPES

### EROSION DETAILS 4

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: W. LAMMER
FILE NAME: /78f193/str/sf193ero.dgn	CHECKED BY: T. LACKEY
PROJECT LEADER: R. WHITCOMB	SHEET 31 OF 68
DESIGNED BY: W. LAMMER	
sf193e08.i	

**SEEDING FORMULA  
RURAL AREAS**

٪ WT.	LBS./A.	NAME	PUR ٪	GERM ٪
37.5	22.5	CREEPING RED FESCUE	98	85
37.5	22.5	TALL FESCUE	95	90
5.0	3.0	RED TOP	95	90
15.0	9.0	BIRDSFOOT TREFOIL	98	85
5.0	3.0	ANNUAL RYEGRASS	95	85
100.0	60.0			

**GENERAL NOTES**

SEED MIXTURE: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.

SEED: TO BE APPLIED PER SEEDING FORMULAS OR AS DIRECTED BY THE ENGINEER.

FERTILIZER: FORMULA 10-20-10, TO BE USED WITH SEED, APPLIED AT THE RATE OF 500 LBS./ACRE. (HYDRO SEEDERS MAY USE 19-19-19 FORMULA).

AGRICULTURAL LIMESTONE: TO BE APPLIED AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.

HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.

TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.

MARKER POSTS: TO BE PLACED AS INDICATED OR AS DIRECTED BY THE ENGINEER.

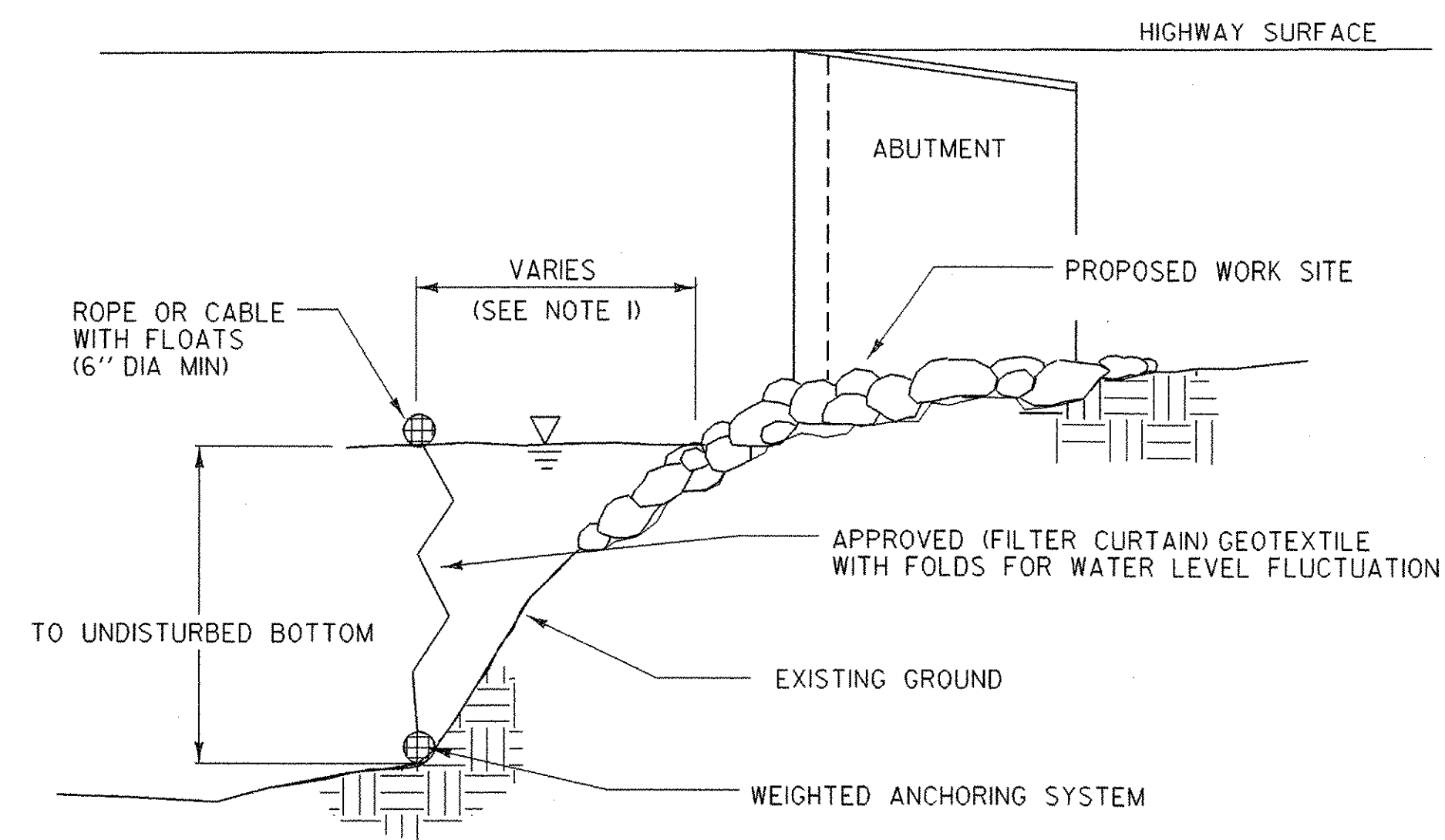
SLOPE ROUNDING: ALL CUT SLOPES TO BE ROUNDED IN ACCORDANCE WITH STANDARD SHEET B - 5.

TACK COAT: EMULSIFIED ASPHALT IS TO BE APPLIED AT THE RATE OF 0.015 GAL/SY BETWEEN SUCCESSIVE COURSES OF PAVEMENT AS DIRECTED BY THE ENGINEER.

EROSION PREVENTION &  
SEDIMENT CONTROL DETAILS  
SEEDING FORMULA

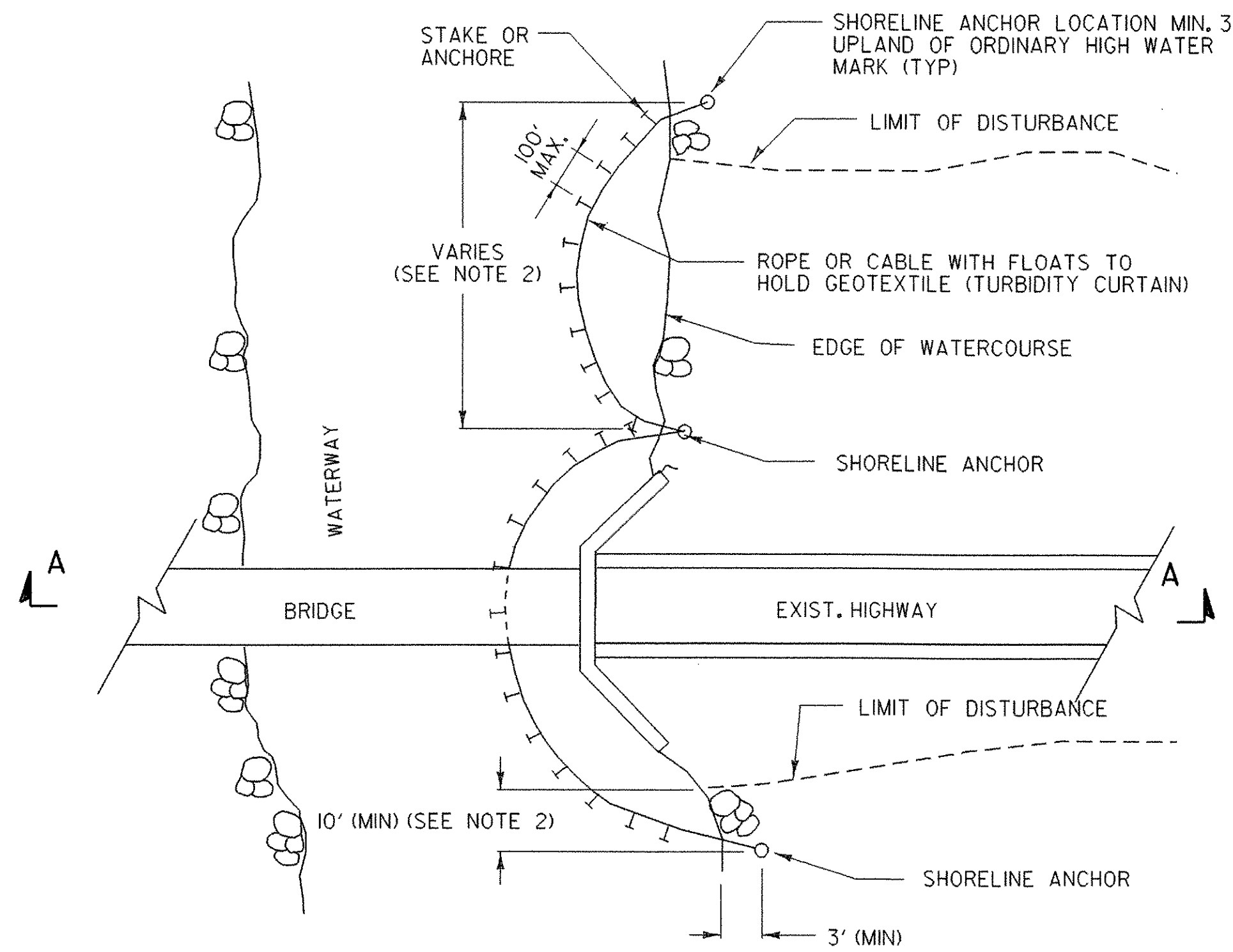
EROSION DETAILS 5

PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: /78f193/str/sf193ero.dgn	PLOT DATE: 09-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: W. LAMMER
DESIGNED BY: W. LAMMER	CHECKED BY: T. LACKEY
sf193e09.1	SHEET 32 OF 68



SECTION A-A

NOT TO SCALE



PLAN  
FILTER CURTAIN

NOT TO SCALE

## FILTER CURTAIN

### APPLICATION NOTES:

- THE PRIMARY PURPOSE OF A FILTER CURTAIN IS TO PROVIDE SEDIMENTATION PROTECTION FOR A WATERCOURSE FROM UP-SLOPE LAND DISTURBANCE OR FROM DREDGING OR FILLING WITHIN WATERCOURSE.
- FILTER CURTAINS SHALL NOT BE PLACED ACROSS A FLOWING WATERWAY, OR IN A WATERWAY WITH VELOCITIES GREATER THAN MANUFACTURER'S RECOMMENDATIONS.
- FILTER CURTAINS SHOULD NOT BE PLACED AT THE OUTLET OF A CULVERT OR DITCH UNLESS THE VELOCITY DOES NOT EXCEED 1.5 FT/SEC.
- DETAILS DEPICT WORK AT A BRIDGE LOCATION, BUT FILTER CURTAINS MAY BE APPLIED AT OTHER LOCATIONS.

### GENERAL NOTES:

- FILTER CURTAINS SHALL BE PLACED AS CLOSE TO THE WORK AS POSSIBLE WITHOUT INTERFERING WITH CONSTRUCTION OPERATIONS.
- FILTER CURTAINS SHALL BE A MAXIMUM OF 100 FEET LONG BETWEEN SHORELINE ANCHORS. LAST SECTION SHALL TERMINATE A MINIMUM OF 10 FEET BEYOND THE LIMIT OF DISTURBANCE.
- THE CONTRACTOR SHALL MONITOR THE FILTER CURTAIN, TAKING INTO ACCOUNT WEATHER PATTERNS AND PREVAILING WIND DIRECTIONS THAT MAY AFFECT WATER LEVELS, VELOCITY AND MOVEMENT OF THE TURBIDITY CURTAIN.
- SEAMS IN THE FILTER CURTAIN FABRIC SHALL BE EITHER VULCANIZED WELDED OR SEWN, AND SHALL DEVELOP THE FULL STRENGTH OF THE FABRIC.
- SOIL PARTICLES TRAPPED BY THE FILTER CURTAIN SHOULD ONLY BE REMOVED IF THERE HAS BEEN A SIGNIFICANT CHANGE IN THE ORIGINAL CONTOURS OF THE AFFECTED AREA IN THE WATERCOURSE.
- SOIL PARTICLES SHALL BE ALLOWED 6-12 HOURS TO SETTLE PRIOR TO THEIR REMOVAL OR THE REMOVAL OF THE FILTER CURTAIN.
- FILTER CURTAINS SHALL BE REMOVED BY SLOWLY PULLING TOWARDS THE SHORE TO MINIMIZE ESCAPE OF SEDIMENTS INTO THE WATERWAY.

## SEDIMENT SETTLING BASIN SIZING CRITERIA

PUMP FLOW RATE	REQUIRED SURFACE AREA	LENGTH WIDTH = 2:1					
		L (ft)	W (ft)	L (m)	W (m)		
Q (gpm)	Q (m <sup>3</sup> /s)	(ft <sup>2</sup> )	(m <sup>2</sup> )				
50	0.0032	595	55	35.0	17.0	10.6	5.3
100	0.0063	1200	111	49.0	24.5	15.0	7.5
150	0.0095	1776	165	59.6	29.8	18.2	9.1
200	0.0126	2368	220	68.8	34.4	21.0	10.5
250	0.0158	2970	276	77.0	38.5	23.4	11.7
300	0.0189	3560	330	84.4	42.2	25.8	12.9
350	0.0221	4155	386	91.2	45.6	27.8	13.9

Target Particle Size is 0.01 mm

# EROSION PREVENTION & SEDIMENT CONTROL DETAILS FILTER CURTAIN

## EROSION DETAILS 6

PROJECT NAME: CASTLETON  
PROJECT NUMBER: RS 0142(10)

FILE NAME: /78f193/str/sf193ero.dgn  
PROJECT LEADER: R. WHITCOMB  
DESIGNED BY: W. LAMMER  
sf193e10.1

PLOT DATE: 09-FEB-2007  
DRAWN BY: W. LAMMER  
CHECKED BY: T. LACKEY  
SHEET 33 OF 68

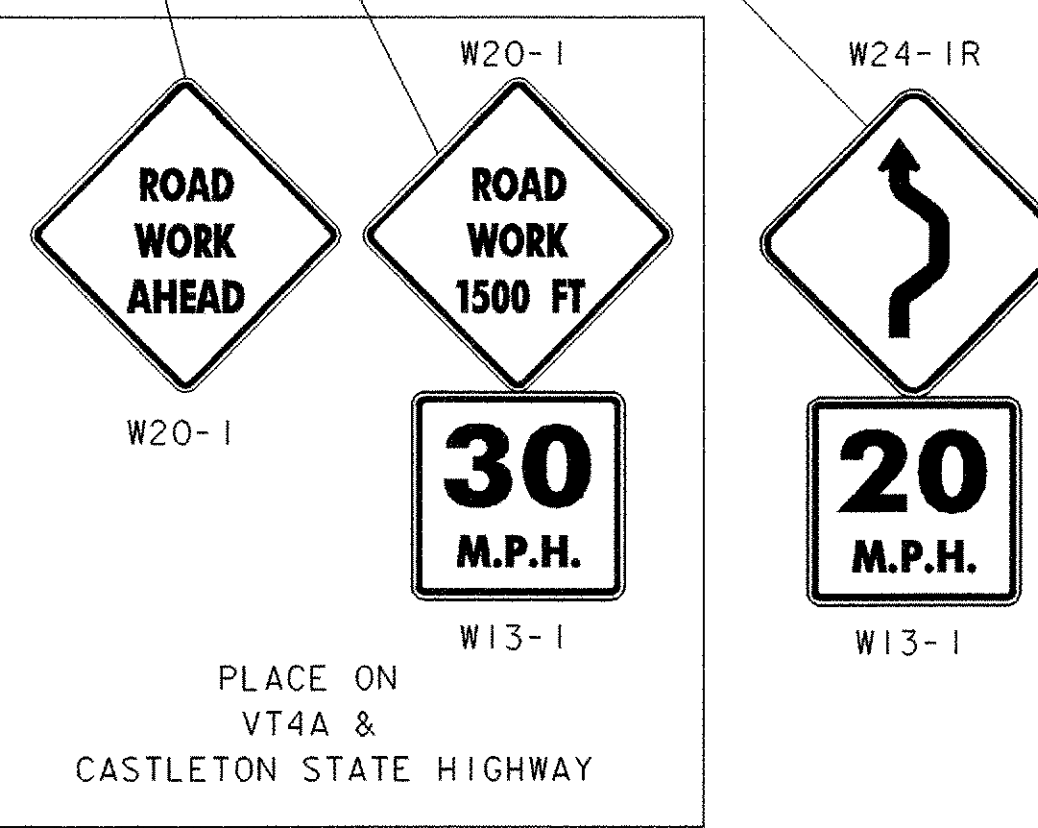
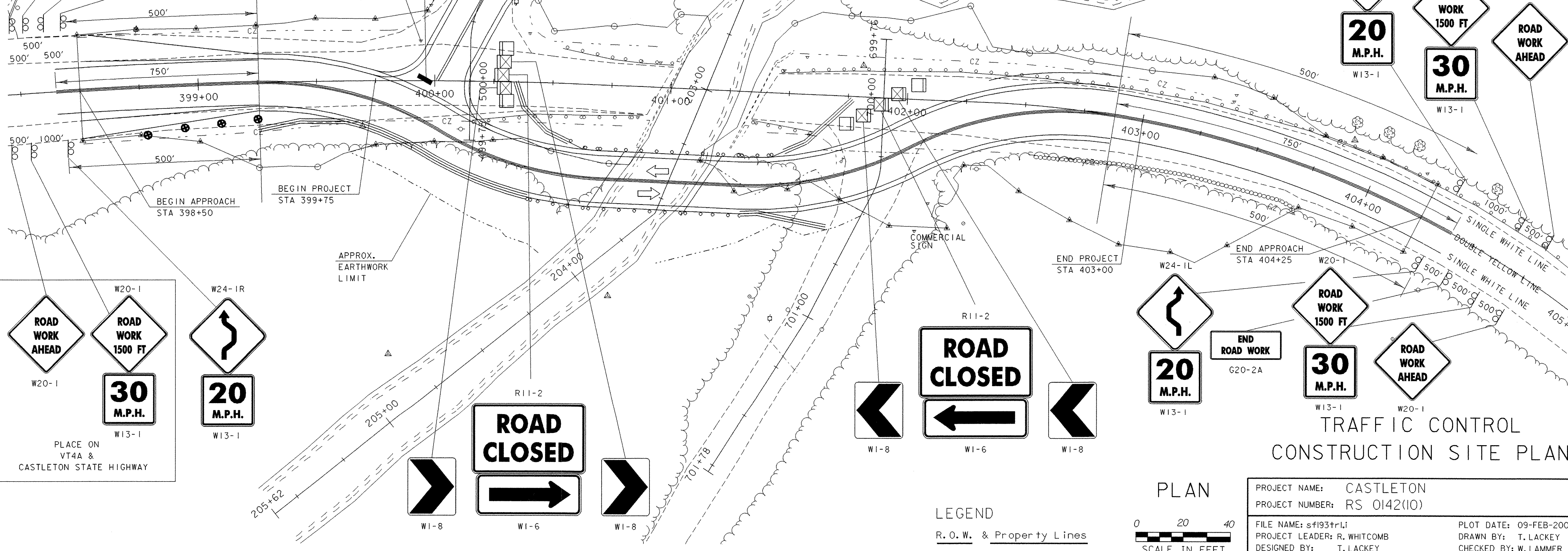
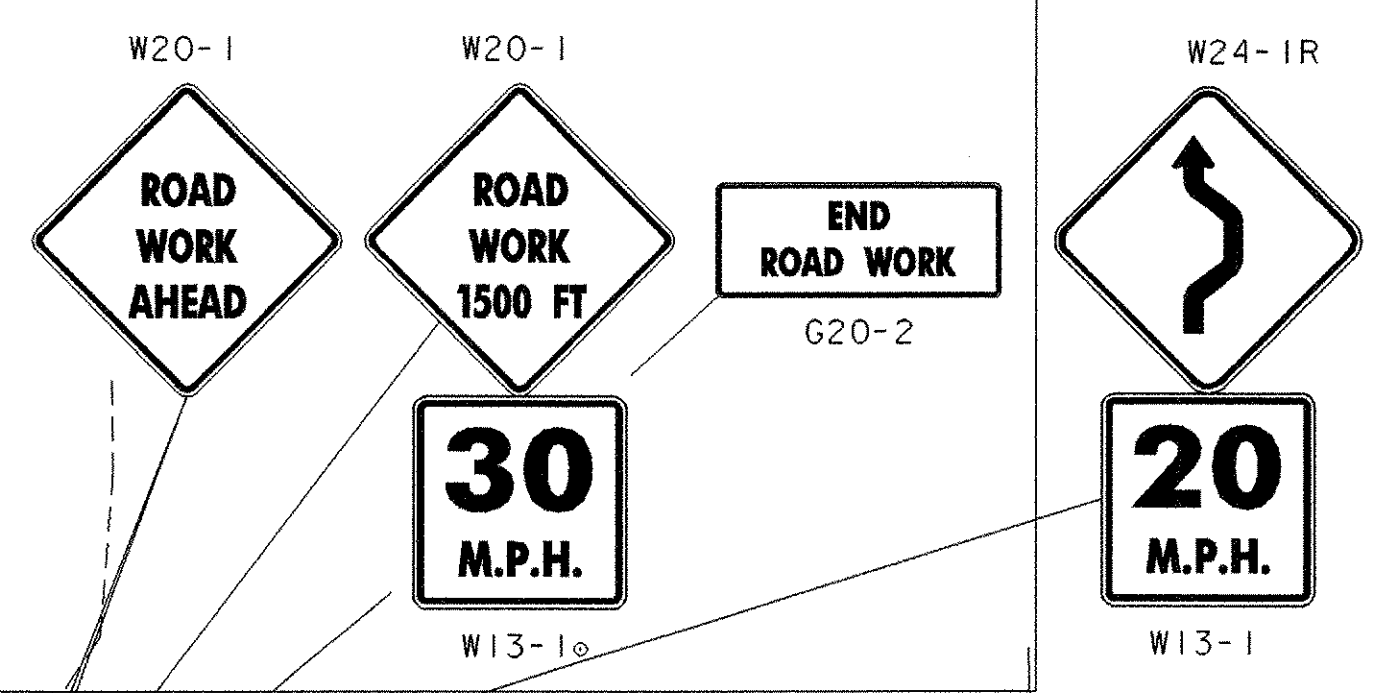
LEGEND

- SIGN AND POSTS
- TYPE III BARRICADES
- TYPE III BARRICADES (MOD.)
- REFLECTORIZED DRUM
- TEMP. TRAFFIC BARRIER
- INDICATES TRAFFIC DIRECTION

- NOTES:
1. RESIDENT ENGINEER, COORDINATE THE SIGN LAYOUT WITH VTRANS TRAFFIC OPERATIONS
  2. SEE ITEM 641.10 "TRAFFIC CONTROL".
  3. SEE ITEM 528.11 "TWO-WAY TEMPORARY BRIDGE".
  4. SEE STD E-100 "CONSTRUCTION APPROACH SIGNS".
  5. SEE STD E-107 "DELINEATION, BARRICADES & DETOURS FOR CONSTRUCTION AREAS"

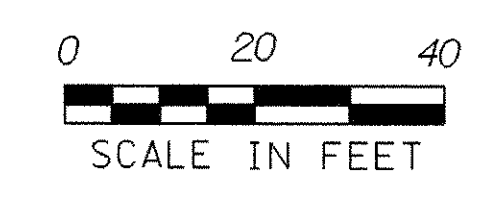
VT STATE PLANE GRID

PLACE ON VT4A & CASTLETON STATE HIGHWAY (INTERSECTION AT APPROX. ML 391+60)



TRAFFIC CONTROL CONSTRUCTION SITE PLAN

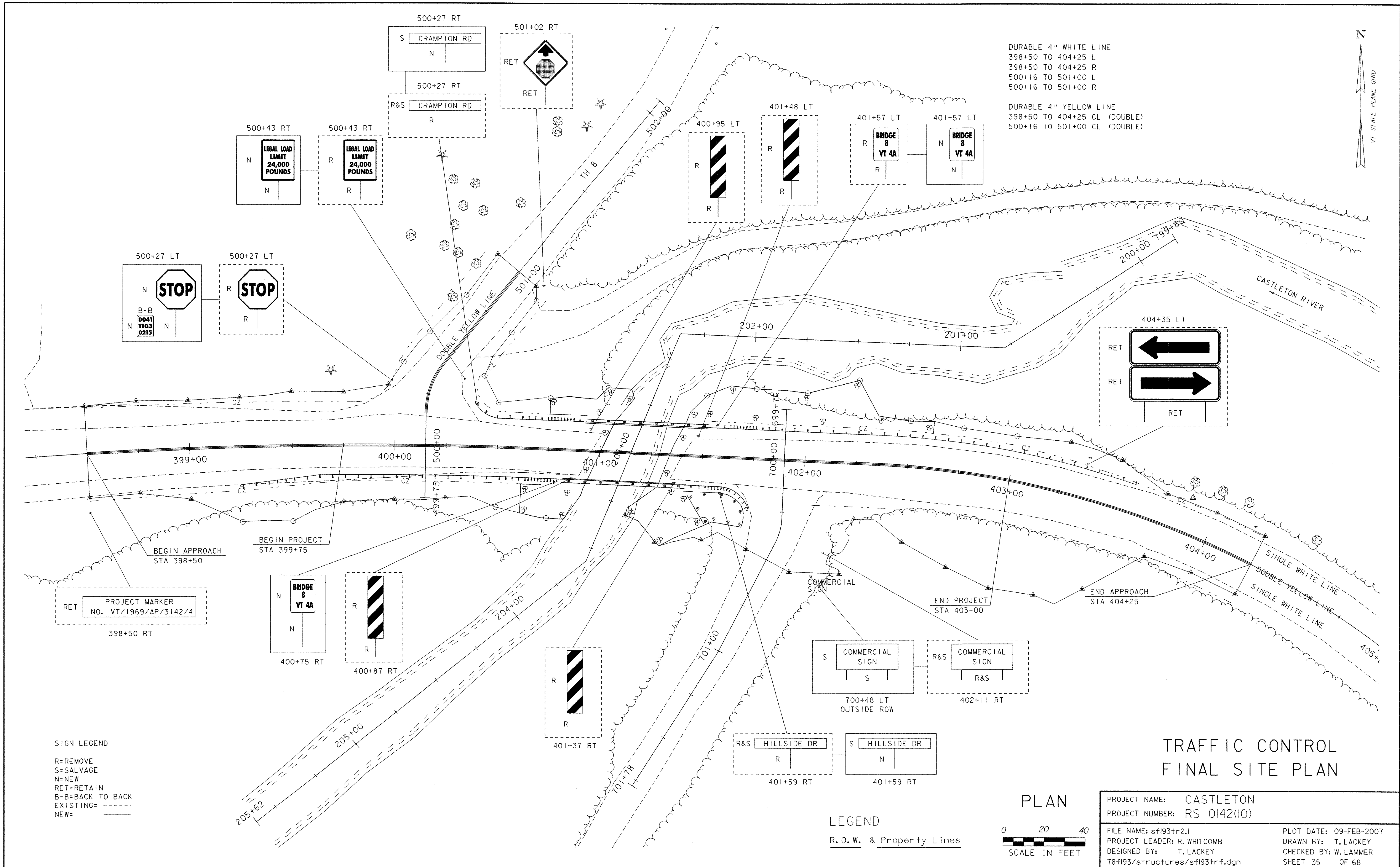
PLAN



LEGEND

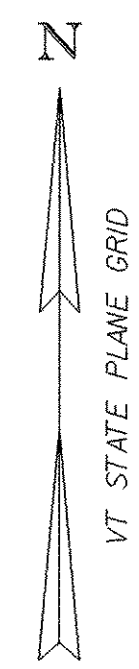
R. O. W. & Property Lines

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193tr1.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 34 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193trf.dgn	



DURABLE 4" WHITE LINE  
 398+50 TO 404+25 L  
 398+50 TO 404+25 R  
 500+16 TO 501+00 L  
 500+16 TO 501+00 R

DURABLE 4" YELLOW LINE  
 398+50 TO 404+25 CL (DOUBLE)  
 500+16 TO 501+00 CL (DOUBLE)



SIGN LEGEND  
 R=REMOVE  
 S=SALVAGE  
 N=NEW  
 RET=RETAIN  
 B-B=BACK TO BACK  
 EXISTING= - - - - -  
 NEW= \_\_\_\_\_

LEGEND  
 R.O.W. & Property Lines



### TRAFFIC CONTROL FINAL SITE PLAN

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193tr2.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 35 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193trf.dgn	



**SOIL CLASSIFICATION**

AASHTO

A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

**ROCK QUALITY DESIGNATION**

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

**SHEAR STRENGTH**

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

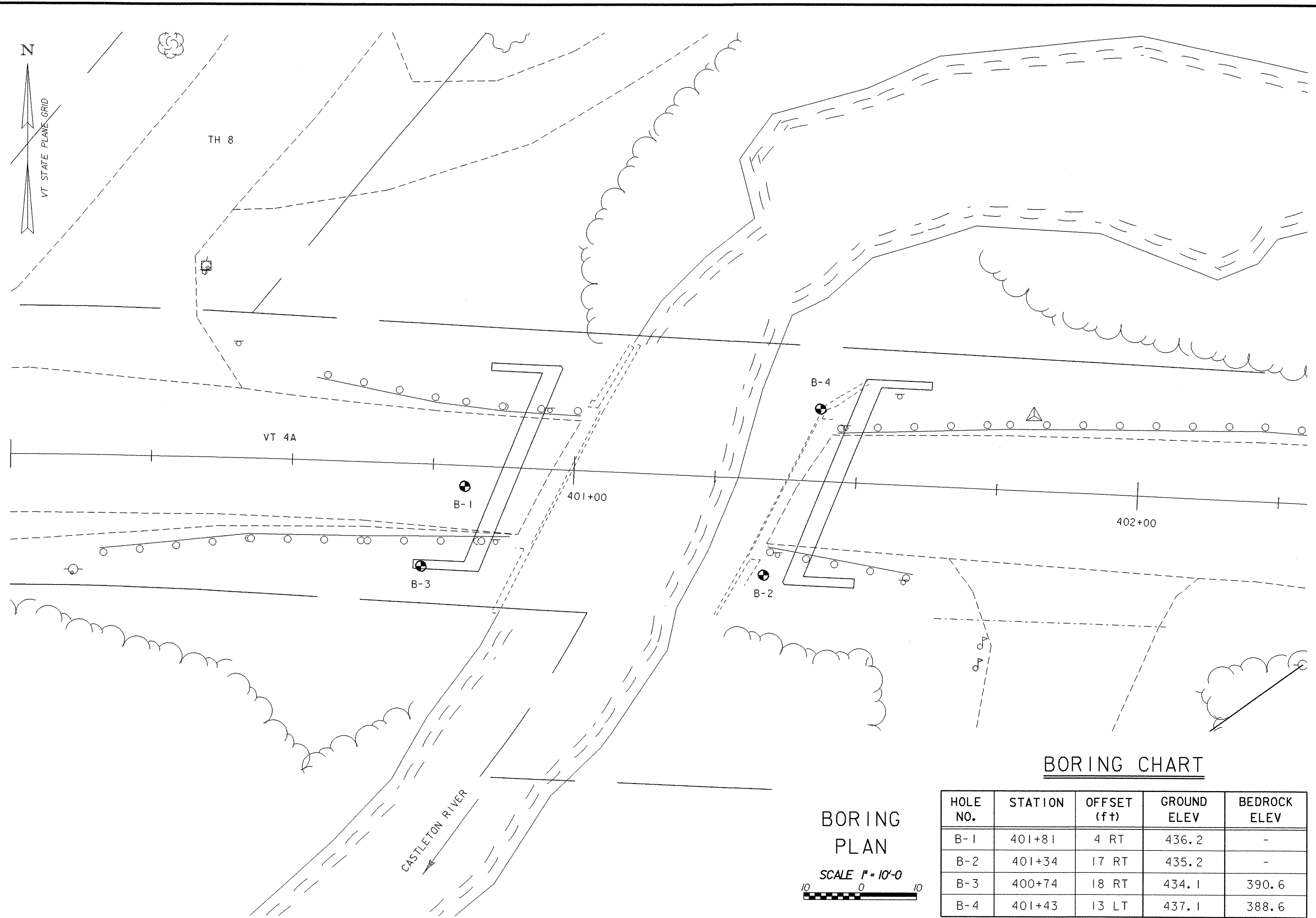
**CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY**

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

**COMMONLY USED SYMBOLS**

- ▼ Water Elevation
- ⊕ Standard Penetration Boring
- ⊙ Auger Boring
- Rod Sounding
- Sample
- N Standard Penetration Test
- Blow Count Per Foot For:
- 2" O.D. Sampler
- 1 3/8" I.D. Sampler
- Hammer Weight Of 140 Lbs.
- Hammer Fall Of 30"
- VS Field Vane Shear Test
- US Undisturbed Soil Sample
- B Blast
- DC Diamond Core
- MD Mud Drill
- WA Wash Ahead
- HSA Hollow Stem Auger
- AX Core Size 1 1/8"
- BX Core Size 1 3/8"
- NX Core Size 2 1/8"
- M Double Tube Core Barrel Used
- LL Liquid Limit
- PL Plastic Limit
- PI Plasticity Index
- NP Non Plastic
- w Moisture Content (Dry Wgt. Basis)
- D Dry
- M Moist
- MTW Moist To Wet
- W Wet
- Sat Saturated
- Bo Boulder
- Gr Gravel
- Sa Sand
- SI Silt
- Cl Clay
- HP Hardpan
- Le Ledge
- NLTD No Ledge To Depth
- CNPF Can Not Penetrate Further
- TLOB To Ledge Or Boulder
- NR No Recovery
- Rec. Recovery
- %Rec. Percent Recovery
- ROD Rock Quality Designation
- CBR California Bearing Ratio
- < Less Than
- > Greater Than
- R Refusal (N > 100)

COLOR			
blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



**BORING CHART**

HOLE NO.	STATION	OFFSET (ft)	GROUND ELEV	BEDROCK ELEV
B-1	401+81	4 RT	436.2	-
B-2	401+34	17 RT	435.2	-
B-3	400+74	18 RT	434.1	390.6
B-4	401+43	13 LT	437.1	388.6

**DEFINITIONS (AASHTO)**

- BEDROCK (LEDGE)** - Rock in its native location of indefinite thickness.
- BOULDER** - A rock fragment with an average dimension > 12 inches.
- COBBLE** - Rock fragments with an average dimension between 3 and 12 inches.
- GRAVEL** - Rounded particles of rock < 3" and > 0.075" (#10 sieve).
- SAND** - Particles of rock < 0.075" (#10 sieve) and > 0.0029" (#200 sieve).
- SILT** - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.
- CLAY** - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.
- VARVED** - Alternate layers of silt and clay.
- HARDPAN** - Extremely dense soil, cemented layer, not softened when wet.
- MUCK** - Soft organic soil (containing > 10% organic material).
- MOISTURE CONTENT** - Weight of water divided by dry weight of soil.
- FLOWING SAND** - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.
- STRIKE** - Angle from magnetic north to line of intersection of bed with a horizontal plane.
- DIP** - Inclination of bed with a horizontal plane.

**GENERAL NOTES**

- The subsurface explorations shown herein were made between and by the Agency.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgement was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgement by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
- Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.

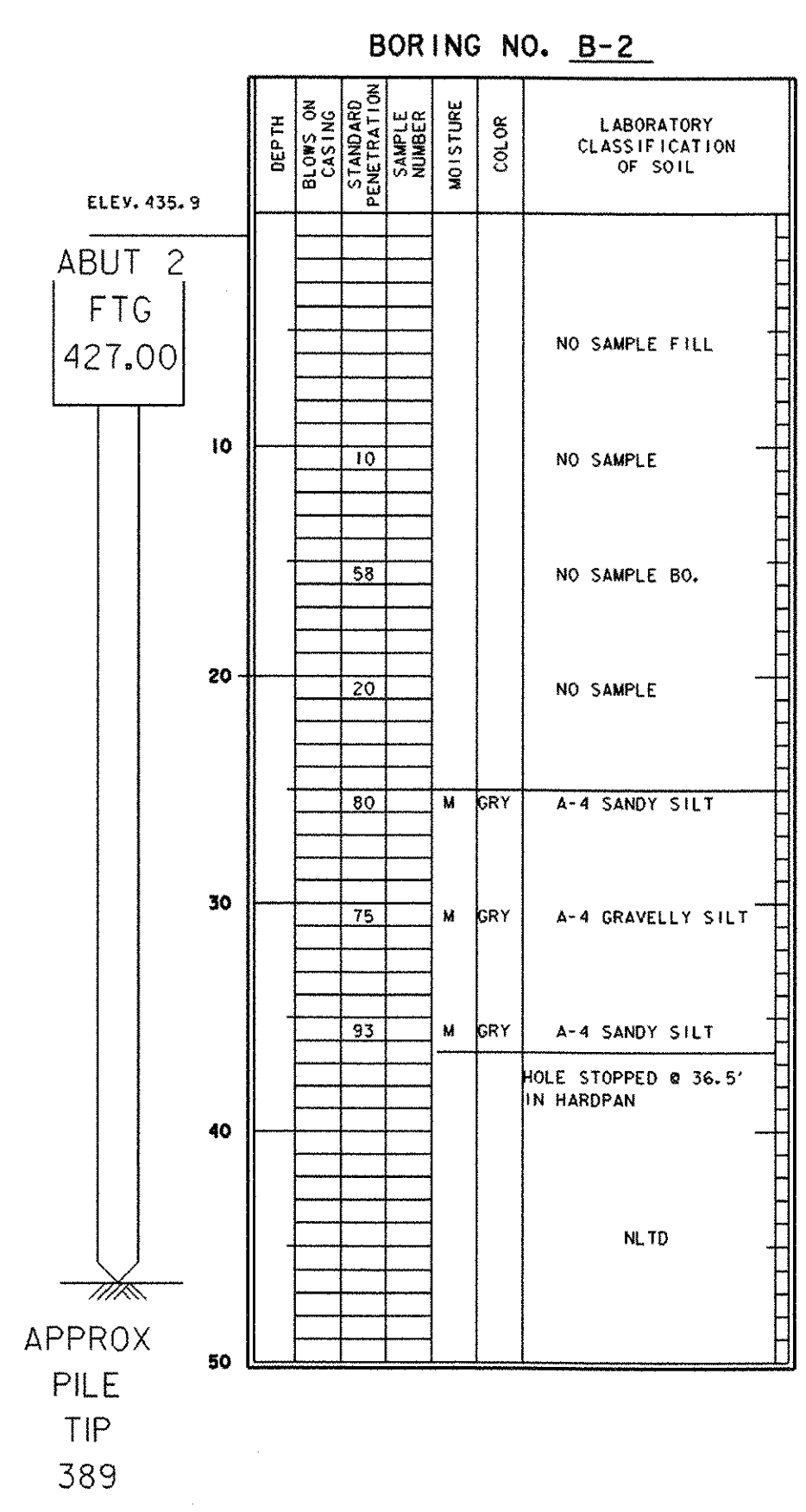
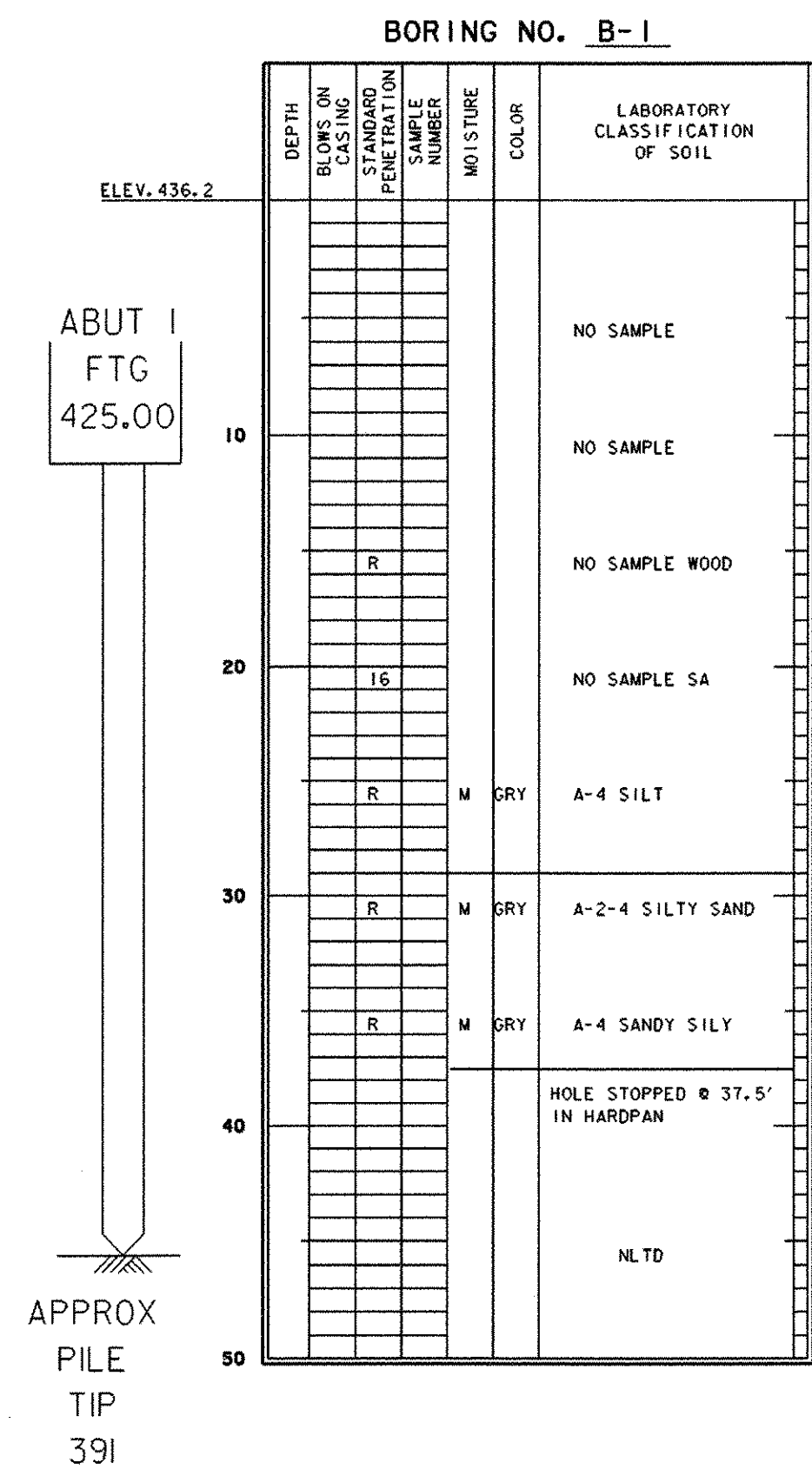
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09-FEB-2007

**STATE OF VERMONT AGENCY OF TRANSPORTATION**

Town Of	CASTLETON	Bridge No.	8
Highway No.	VT 4A	Log Sta.	221+83
		Surv. Sta.	401+00

**BORING INFORMATION SHEET**

Designed By	T. LACKEY	Drawn By	T. LACKEY
Checked By	Date	Bridge Design Supervisor	R. WHITCOMB Date
PROJECT	CASTLETON	PROJECT NO.	RS 0142 (10)
I.G.C. Info.			
Bridge Sheet No.		Sheet 37	of 68



**STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION**

HOLE NO.: B-3  
SHEET 1 OF 1  
DATE STARTED: 4/26/01  
DATE COMPLETED: 5/2/01

PROJECT NAME: CASTLETON  
SITE NAME: BR 8  
STATION: 219+80.00  
GROUND EL.: 434.07

PROJECT NUMBER: RS 0142 (10)  
SITE NO.: VT 4A  
OFFSET: 15.00  
G.W. DEPTH: See DRILLER'S NOTES

BORING CREW: CREW CHIEF: TALLMAN, DRILLER: TALLMAN, LOGGER: RUSSELL  
BORING RIG: SKID RIG  
BORING TYPE: WASH BORE  
SAMPLE TYPE: SPLIT BARREL

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
5		BXDC, 2.0'-4.5', Fill material.	R						
5-10		No Rec. Stone in Sample (barrel, Poss. Fill)	R						
10		BXDC, 7.5'-10.0', Boulders	R						
10-15		A-1-a, SaGr, brn, Boulders, No Rec.	R						
15		A-1-a, SaGr, brn, Moist, Rec. = 0.50'	6	13.2	58.7	29.8	11.5		
20		A-1-a, SaGr, brn, Moist, Rec. = 0.60'	13	12.2	61.4	32.2	6.4		
25		No Rec., Stone in end of sample barrel.	32						
30		BXDC, 29.0'-30.0'	R	8.3	31.1	28.1	40.8		
30-35		A-4, SaGrSi, gry, Dry, Rec. = 0.80'	R						
35		A-4, GrSaSi, gry, Dry, Rec. = 0.75'	R	9.8	26.3	28.3	45.4		
40		A-4, SaGrSi, gry, Moist, Rec. = 1.05'	R	10.6	31.1	21.6	47.3		
40-45		Top of bedrock @ 43.5'							
45		Run#1: BXMDC, 43.5'-48.5', Rec. = 1.35', See Geologist's Report.	1	27	27	85			
50		Run#2: BXMDC, 48.5'-53.5', Rec. = 1.50', See Geologist's Report.	2	30	30	85			
55		Run#3: BXMDC, 53.5'-58.5', Rec. = 3.00', See Geologist's Report.	3	60	60	85			
60		Hole stopped @ 58.5'							

**DRILLER'S NOTES:**  
1. 05/03/01 - No water table determined, Hole caved in at 10.0'.  
2. No seams encountered during coring.  
3. Coring time averaged 2hrs for every 5ft.

**GEOLOGIST'S REPORT:**  
Run#1: Light gray slate, Medium hard, Unweathered, Poor recovery and bad ROD due to difficulty drilling steeply dipping beds.  
Run#2: Same as Run#1, but quartz vein at top of Run, Poor recovery and ROD due to difficulty drilling steeply dipping beds.  
Run#3: Same as Run#1, Poor recovery and ROD due to difficulty drilling steeply dipping beds.

**STATE OF VERMONT AGENCY OF TRANSPORTATION MATERIALS & RESEARCH DIVISION SUBSURFACE INFORMATION**

HOLE NO.: B-4  
SHEET 1 OF 1  
DATE STARTED: 5/8/01  
DATE COMPLETED: 5/16/01

PROJECT NAME: CASTLETON  
SITE NAME: BR 8  
STATION: 220+50.00  
GROUND EL.: 437.07

PROJECT NUMBER: RS 0142 (10)  
SITE NO.: VT 4A  
OFFSET: -15.00  
G.W. DEPTH: 12.40

BORING CREW: CREW CHIEF: TALLMAN, DRILLER: TALLMAN, LOGGER: RUSSELL  
BORING RIG: SKID RIG  
BORING TYPE: WASH BORE  
SAMPLE TYPE: SPLIT BARREL

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	BLOWS PER FOOT	M.C. %	GRAVEL %	SAND %	FINES %	LL	PI
5		A-1-a, Gr, gry-brn, Dry, Rec. = 0.80', Possible Fill Material	7	4.8	74.9	18.6	6.5		
10		A-1-a, SaGr, brn, Moist, Rec. = 0.30'	8	12	60.7	27.7	11.6		
15		CONCRETE 13.0'-16.0', Visual Classification: Concrete Poss. Abutment Footing.							
20		BXDC, 18.5'-20.0', Cleanout casing	33	10.7	24.4	33.3	42.3		
25		A-4, GrSaSi HP, gry, Moist, Rec. = 1.0'	36	9.4	36.1	23	40.9		
30		A-4, GrSaSi HP, gry, Moist, Rec. = 1.25'	39	10.3	22	24.2	53.8	19	4
35		A-4, SaGrSi HP, gry, Moist, Rec. = 0.75'	84	10.5	29.9	23	47.1	20	5
40		A-4, GrSi HP, gry, Moist, Rec. = 0.65'	50	12.3	28.3	19.1	52.6	20	5
45		No Rec.	80						
45		Top of bedrock @ 48.5'							
50		Run#1: BXMDC, 48.5'-53.5', Rec. = 1.60', See Geologist's Report.	1	32	32	50			
55		Run#2: BXMDC, 53.5'-58.5', Rec. = 1.90', See Geologist's Report.	2	38	38	50			
60		Run#3: BXMDC, 58.5'-63.5', Rec. = 2.05', See Geologist's Report.	3	41	41	50			
65		Hole stopped @ 63.5'							

**DRILLER'S NOTES:**  
1. No seams encountered during coring.  
2. Coring time averaged 2hrs for every 5ft.

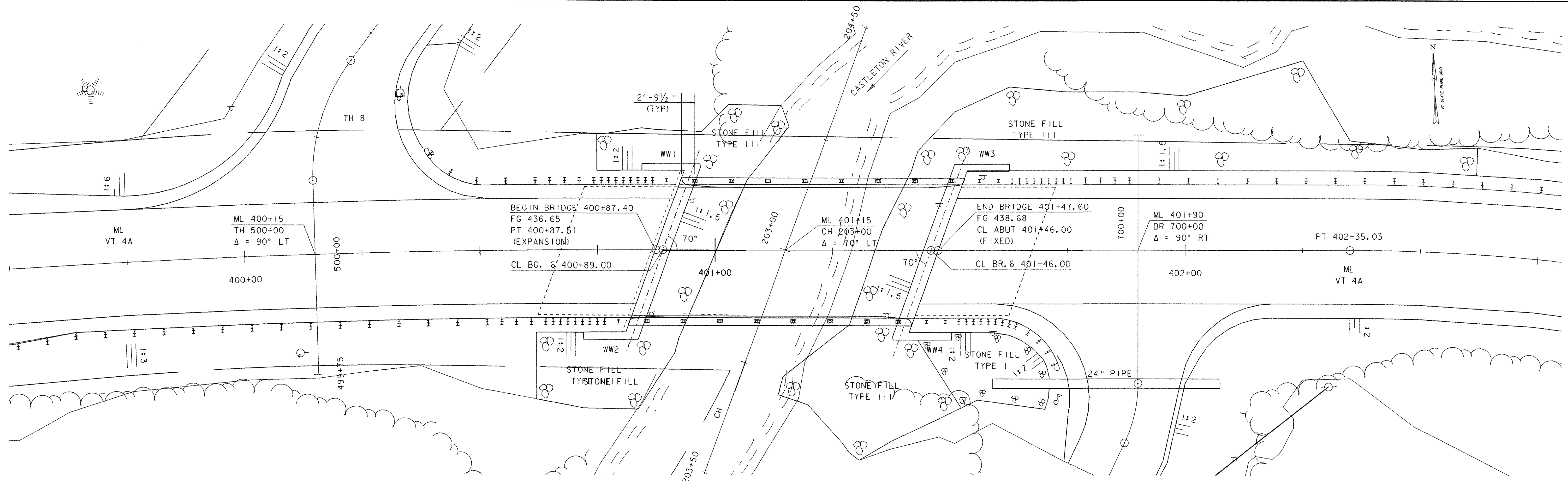
**GEOLOGIST'S REPORT:**  
Run#1: Purple slate, Medium hard, Unweathered, Poor recovery and ROD due to difficult drilling steeply dipping beds.  
Run#2: Same as Run#1, Poor recovery and ROD due to difficult drilling steeply dipping beds.  
Run#3: Same as Run#1, Poor recovery and ROD due to difficult drilling steeply dipping beds.

SURVEYED BY: J. TOUCHETTE DATE: 05/01  
DRAWN BY: J. TOUCHETTE DATE: 05/01  
SQUAD LEADER: C.C. BENDA  
DESIGN FILE NO.: /matres/78f193/mf193bor.dgn  
IPARM FILE: DATE PLOTTED: 09-FEB-2007

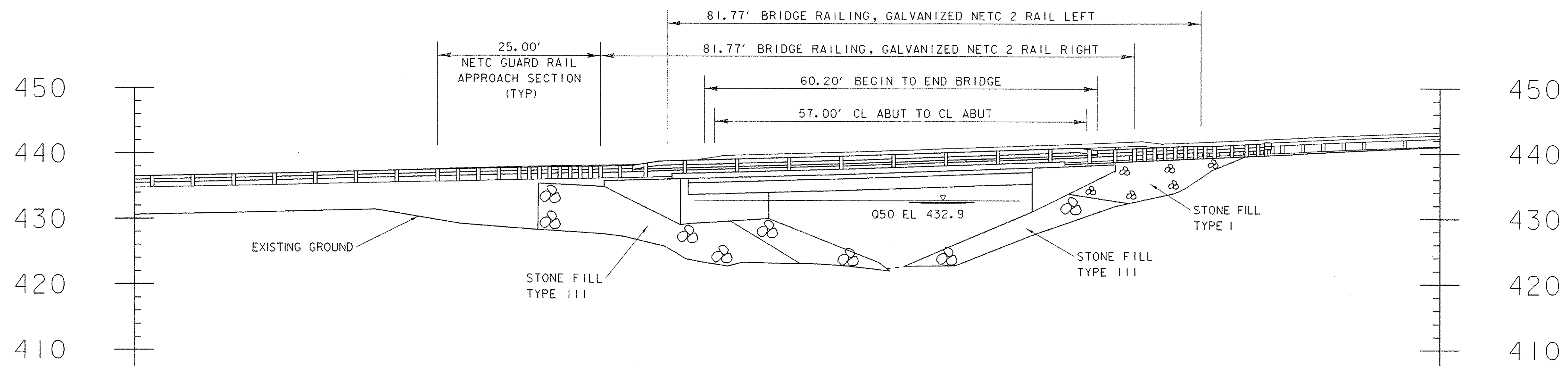
**BORING LOGS**

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PROJ. NAME: CASTLETON  
PROJ. NO.: RS 0142 (10)  
SHEET 38 OF 68 SHEETS



PLAN  
SCALE 1" = 10'-0"



ELEVATION  
SCALE 1" = 10'-0"

PLAN & ELEVATION

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193pe.i	CHECKED BY: R.WHITCOMB
PROJECT LEADER: R.WHITCOMB	SHEET 39 OF 68
DESIGNED BY: T. LACKEY	
78f193/str/sf193pe.dgn	

# GENERAL NOTES

GENERAL NOTES:

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO: THE STATE OF VERMONT AGENCY OF TRANSPORTATION 2006 STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2006 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND THEIR LATEST REVISIONS.

2. DIMENSIONS ARE HORIZONTAL OR VERTICAL IN FEET & INCHES AT 68 DEG F, UNLESS NOTED OTHERWISE.

DESIGN

1. THE BRIDGE IS DESIGNED FOR HS 25-44 LIVE LOAD WITH NO ALLOWANCE FOR FUTURE PAVEMENT.

CONSTRUCTION

1. WATER QUALITY. PREVENT POLLUTION, AND DISCHARGE OF SILT OR RAW CONCRETE IN TO THE WATERWAY AS DIRECTED BY THE RESIDENT ENGINEER.

2. IN-STREAM CONSTRUCTION. PERMITS DESIGNATE AND LIMIT THE PERIOD FOR IN-STREAM CONSTRUCTION. THE AGENCY OF NATURAL RESOURCES MUST APPROVE ANY DEVIATION FROM THIS PERIOD IN WRITING.

3. SLOPE STABILITY. THE HILLSIDE STARTING AT STA 402+25 LEFT HAD SLIDES IN THE 1960'S. IT IS POTENTIALLY UNSTABLE.

EARTHWORK

1. ITEM 529.20 "PARTIAL REMOVAL OF STRUCTURE". REMOVE THE ENTIRE SUPERSTRUCTURE. REMOVE ABUTMENTS TO THE LOWER LIMITS OF CHANNEL STONE FILL. REMOVE PARTS OF ABUTMENTS THAT WILL INTERFERE WITH DRIVING FILES.

2. ABUTMENT STONE FILL. PLACE STONE FILL UNDER THE BRIDGE BEFORE PLACING THE PRESTRESS UNITS.

STEEL

1. STEEL PILING. NO SUBSTITUTIONS FOR THE NUMBER, SIZE AND GRADE OF THE PILES WILL BE ALLOWED.

2. PILE HEAD TOLERANCE: DRIVE OR CUT OFF THE PILE HEAD TO WITHIN 1 INCH VERTICALLY AND 3 INCHES HORIZONTALLY OF THE POSITION SHOWN IN THE PLANS. IF A PILE IS DAMAGED DURING INSTALLATION OR DRIVEN OUT OF ITS PROPER LOCATION, WITHDRAW AND REPLACE IT WITH A NEW AND IF NECESSARY LONGER FILE, AS DESCRIBED IN VTRANS 505.04(A)(1).

STRUCTURAL CONCRETE

1. ITEM 501.32 "CONCRETE, HIGH PERFORMANCE CLASS AA". USE HFC AA FOR THE DECK OVERLAY AND CURBS.

2. ITEM 501.34 "CONCRETE, HIGH PERFORMANCE CLASS B". USE HFC B FOR THE APPROACH SLABS, ABUTMENTS, AND ALL OTHER COMPONENTS. INCLUDE INSTALLATION OF THE BRIDGE PLAQUE PROVIDED BY THE AGENCY.

3. ITEM 507.17 "EPOXY COATED REINFORCING STEEL". USE COATED REINFORCEMENT FOR THE DECK OVERLAY, CURBS, AND APPROACH SLABS.

4. ITEM 507.15 "REINFORCING STEEL". USE UNCOATED REINFORCEMENT FOR THE ABUTMENTS.

5. DETAIL AND FABRICATION. DETAIL AND FABRICATE ALL REINFORCING STEEL USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).

6. REINFORCEMENT PLACEMENT TOLERANCE. PLACE REINFORCEMENT TO WITHIN 1 INCH OF THE SPACING AND 1/4 INCH OF THE CONCRETE COVER SHOWN IN THE PLANS.

7. MINIMUM CONCRETE COVER. THE MINIMUM CONCRETE COVER FOR REINFORCING STEEL IS: 2 INCHES ON THE FACES OF WALLS AGAINST EARTH; AND 3 INCHES ELSEWHERE UNLESS OTHERWISE NOTED.

8. CONCRETE JOINTS. CONSTRUCT CONCRETE JOINTS AS INDICATED ON THE PLANS OR DIRECTED BY THE RESIDENT ENGINEER. CONSTRUCT SHEAR KEYS MONOLITHICALLY AND CONTINUOUSLY UNLESS OTHERWISE INDICATED. TERMINATE SHEAR KEYS 6 INCHES FROM ENDS OF JOINTS. PLACE SHEAR KEYS UPWARD IN HORIZONTAL JOINTS.

9. CHAMFERS. CHAMFER ALL EXPOSED EDGES OF CONCRETE WITH 1 BY 1 INCH CHAMFERS, UNLESS OTHERWISE NOTED. ROUND THE TOP INSIDE CORNER OF CURBS WITH A 5/8 INCH RADIUS.

10. SCORE MARKS. CONSTRUCT SCORE MARKS AS INDICATED ON THE PLANS OR AS DIRECTED BY THE RESIDENT ENGINEER.

11. ITEM 900.625 "SPECIAL PROVISION (WATER REPELLENT, SILANE)". APPLY REPELLENT TO ALL EXPOSED SURFACES OF CONCRETE ON THE BRIDGE, EXCEPT THE BOTTOM OF THE SUPERSTRUCTURE BETWEEN THE DRIP NOTCHES.

PRESTRESSED CONCRETE

1. ITEM 510.22 "PRESTRESSED CONCRETE VOIDED SLABS". PRESTRESSED PRECAST MEMBERS SHALL:

- A. CONFORM TO SECTION 510 "PRESTRESSED CONCRETE".
- B. BE 21 X 36 AND 21 X 48 INCH VOIDED SLABS.
- C. USE CONCRETE WITH  $f'c = 6,000$  PSI AND  $f_c = 4,000$  PSI.
- D. BE DESIGNED FOR AN AASHTO HS 25-44 LIVE LOAD.
- E. CONTAIN CONTINUOUS VOIDS EXCEPT AS SHOWN IN THE PLAN DETAIL.
- F. HAVE VOID DRAINS AT THE ENDS OF EACH VOID. THE VOID DRAINS SHALL BE 3/4 INCH DIAMETER, NON-FERROUS, AND CLEANED AFTER ERECTION.
- G. CONTAIN PRESTRESSING STRANDS WHICH ARE 0.6 INCH DIAMETER, 270 KSI, LOW RELAXATION STRANDS PULLED TO 75% OF THEIR YIELD.
- H. HAVE THE ENDS OF THE STRANDS RECESSED AND GROUTED ACCORDING TO STANDARD PRACTICE.
- I. HAVE THE TOP SURFACE RAKED TO UNIFORM ROUGHNESS WITH AVERAGE AMPLITUDE OF 1/4 INCH.
- J. INCLUDE COLD POURED JOINT FILLER, AND TRANSVERSE TENDONS AS DESCRIBED IN VTRANS 510.16.

2. THE FABRICATOR MAY, WITH THE APPROVAL OF THE STRUCTURES ENGINEER, ALTER THE DESIGN, AS DETAILED, TO MEET THE PLANT'S PRESTRESSING OPERATION AND MATERIAL REQUIREMENTS. AN ALTERNATE STRAND CONFIGURATION MAY BE SUBMITTED FOR APPROVAL PROVIDED THAT THE DESIGN IS STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF VERMONT AND THAT THE DESIGN MEETS ALL OF THE APPLICABLE DESIGN CRITERIA, LOADINGS AND CODES.

3. THE CONTRACTOR SHALL NOTIFY THE VTRANS MATERIALS & RESEARCH STRUCTURAL CONCRETE ENGINEER TWO WEEKS BEFORE THE PRESTRESS FABRICATOR CONSTRUCTS THE UNITS.

4. ITEM 510.22 "PRESTRESSED CONCRETE VOIDED SLABS". TRANSVERSE TENDONS.

- A. THE 1/2 INCH DIAMETER TRANSVERSE TENDONS SHALL BE POLYSTRAND OR EQUIVALENT.
- B. COVER TENDONS WITH A SEAMLESS POLYPROPYLENE SHEATH WITH CORROSION INHIBITOR GREASE BETWEEN SHEATH AND TENDON).
- C. THE 3/4 INCH TENDON PLATES SHALL CONFORM TO AASHTO M270/M270M GR 50.
- D. GALVANIZE PLATES AND CHUCKS AFTER FABRICATION ACCORDING TO AASHTOM232/M232M.
- E. INSTALL TRANSVERSE TENDONS BEFORE PLACING MORTAR AND CASTING THE CONCRETE DECK OVERLAY.

5. ITEM 510.24, "GROUTING SHEAR KEYS". FILL THE JOINTS BETWEEN THE VOIDED SLABS WITH MORTAR, TYPE IV, AS DESCRIBED IN VTRANS 510.13. INCLUDE MATERIALS, WORK, ETC. AS DESCRIBED IN VTRANS 510.16.

ASPHALTIC PLUG BRIDGE JOINT

1. INSTALLATION

- A. THE JOINT SHALL BE LOCATED CENTRALLY OVER THE DECK OVERLAY EXPANSION GAP OR FIXED JOINT MARKED OUT TO THE MANUFACTURER'S RECOMMENDED WIDTH.
- B. THE JOINT SHALL BE EXCAVATED AS SHOWN ON THE PLANS BY USE OF SAWS AND PNEUMATIC HAMMER OR A HAMMER AND CHISEL.
- C. THE JOINT AREA SHALL BE BLAST CLEANED OF DEBRIS AND ASPHALT. THE JOINT AREA SHALL BE THOROUGHLY DRIED USING HOT COMPRESSED AIR PRIOR TO APPLYING BINDER MATERIAL.
- D. SPALLED AND DEFECTIVE CONCRETE SHALL BE REPAIRED WITH AN APPROVED MATERIAL AS AGREED UPON BY THE ENGINEER.
- E. PROPERLY SIZED HEAT RESISTANT BACKER ROD SHALL BE PLACE IN THE MOVEMENT GAP ALLOWING FOR 1 INCH +/- OF BINDER ABOVE THE ROD.
- F. THE BINDER MATERIAL SHALL BE HEATED AND PLACED AS RECOMMENDED BY THE MANUFACTURER.
- G. PLACE 1/4 INCH THICK BY 8 INCH WIDE SECTIONS OF STEEL PLATE OVER THE CENTER OF THE MOVEMENT GAP. SECURE PLATES FROM MOVING BY INSERTING LOCATING PINS THROUGH THE PRESTAMPED HOLES INTO BACKER ROD AND COVER WITH HOT BINDER. THE STEEL PLATES MAY BE OMITTED WHERE THE APPROACH SLAB IS COVERED WITH A STONE BASE OR BITUMINOUS PAVEMENT AND VERTICAL MOVEMENT OF THE PLATES MIGHT OCCUR.
- H. THE BINDER MATERIAL AND AGGREGATE SHALL BE HEATED AND MIXED AS RECOMMENDED BY THE MANUFACTURER.
- I. THE INSTALLATION OF MATERIAL, COMPACTION, AND TOP COATING SHALL BE AS RECOMMENDED BY THE MANUFACTURER.
- J. IMMEDIATELY AFTER TOP COATING, AN ANTI-SKID MATERIAL SHALL BE CAST OVER THE JOINT TO REDUCE THE RISK OF TRACKING.
- K. JOINT SHALL BE PROTECTED FROM TRAFFIC UNTIL THE MATERIAL HAS COOLED TO 125 DEG F +/-.

2. WEATHER LIMITATIONS. BINDER MATERIAL SHALL BE APPLIED ONLY WHEN THE FOLLOWING CONDITIONS PREVAIL:

- A. THE AMBIENT AIR TEMPERATURE IS AT LEAST 50 DEG F AND RISING.
- B. THE ROAD SURFACE IS SUFFICIENTLY DRY.
- C. WEATHER CONDITIONS OR OTHER CONDITIONS ARE FAVORABLE AND ARE EXPECTED TO REMAIN SO FOR THE PERFORMANCE OF SATISFACTORY WORK.

CONSTRUCTION SEQUENCE FOR PRESTRESSED VOIDED SLABS

- 1. LAYOUT WORKING LINES.
  - A. LAY OUT WORKING LINES FOR THE ENTIRE BRIDGE WIDTH ON THE BEAM SEAT.
  - B. MEASURE ALL WORKING LINES FROM A COMMON WORKING POINT.
  - C. BASE THE WORKING LINES ON THE NOMINAL BEAM WIDTHS.

- 2. VERIFY BEAM SEAT ELEVATIONS
  - A. MEASURE ELEVATIONS AT BEAM SEATS.
  - B. IF SEATS ARE HIGH, GRIND TO CORRECT ELEVATIONS.
  - C. IF SEATS ARE LOW, SHIM TO CORRECT ELEVATIONS.
  - D. INSTALL BEARINGS.

- 3. ERECT BEAMS
  - A. PLACE BEAMS TO FIT WITHIN THE WORKING LINES.
  - B. AS WORK PROGRESSES, INSTALL HARDWOOD WEDGES BETWEEN ADJACENT BEAMS TO MAINTAIN PROPER JOINT OPENING (A MINIMUM OF ONE WEDGE AT EACH TRANSVERSE TENDON).
  - C. DRILL ANCHOR BOLT HOLES.
  - D. PLACE ANCHOR BOLTS.
  - E. GROUT ANCHOR BOLTS IN ABUTMENT.

- 4. INSTALL BACKER ROD
  - A. PLACE FILLER BELOW THE KEY'S BOTTOM AS SHOWN ON THE PLANS.

- 5. INSTALL TRANSVERSE TENDONS
  - A. FEED TENDONS THROUGH DUCTS.
  - B. VERIFY THAT HARDWOOD WEDGES ARE IN PLACE AS REQUIRED TO PREVENT SLIPPAGE OF BEAMS.
  - C. POST-TENSION TENDONS USING A CALIBRATED JACK TO APPROXIMATELY 5,000 KIP TO REMOVE SAG IN THE TENDON AND TO SEAT THE CHUCK.

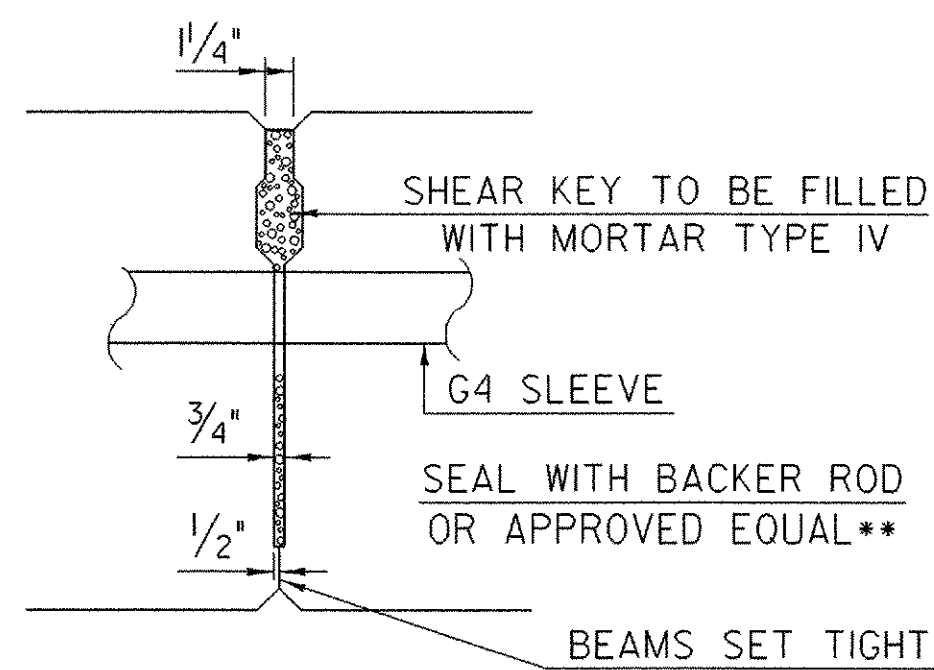
- 6. GROUT SHEAR KEYS
  - A. CLEAN JOINTS WITH AN OIL FREE AIR-BLAST IMMEDIATELY BEFORE GROUT PLACEMENT. VERIFY THAT THE BACKER ROD IS STILL IN PLACE.
  - B. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR ADDITIONAL JOINT PREPARATION AND GROUT PLACEMENT.
  - C. CAREFULLY ROD JOINTS TO ELIMINATE ANY POSSIBILITY OF VOIDS.

- 7. POST-TENSION TRANSVERSE TENDONS
  - A. GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1,500 PSI, BASED ON THE MANUFACTURER'S RECOMMENDATIONS, PRIOR TO STRESSING.
  - B. PROVIDE APPROPRIATE CUBE MOLDS AS DESCRIBED IN AASHTO T106 FOR 3 SETS OF 3 DAY CUBES, 3 SETS OF 28 DAY CUBES AND AT A MINIMUM OF 3 MORE CUBES TO TEST FOR THE 1,500 PSI MINIMUM COMPRESSIVE STRENGTH.
  - C. POST-TENSION TENDONS TO 30 KIP USING A CALIBRATED JACK OPERATED BY QUALIFIED PERSONNEL.

- 8. END DETAILS
  - A. GROUT ANCHOR BOLT ENDS AT THE FIXED ENDS AT BRIDGE SEATS.
  - B. BEFORE GROUT CURES, PLACE WASHER PLATE AND INSTALL HOLD DOWN NUTS.
  - C. ON THE FIXED END, TIGHTEN NUT.
  - D. ON THE EXPANSION END, HAND TIGHTEN NUT AND LOOSEN BY 1/2 TURN.
  - E. GROUT OVER NUT AND BOLT ON FIXED END, PLACE COLD POURED JOINT SEALER OVER NUT AND BOLT ON EXPANSION END.
  - F. PLACE COLD POURED JOINT SEALER AT EXPANSION END

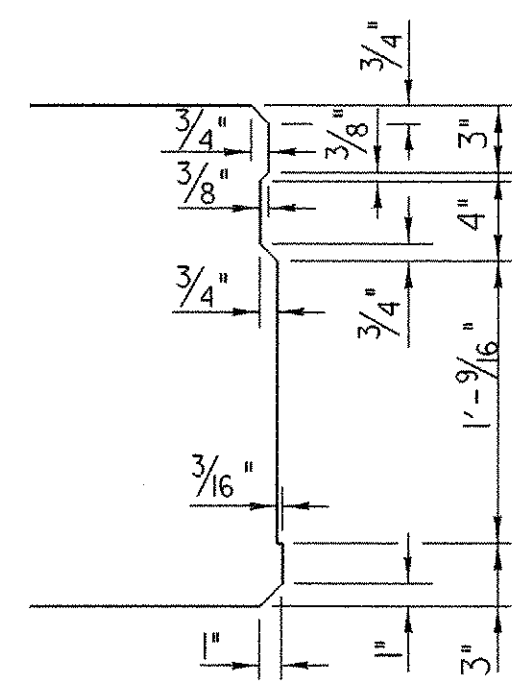
- 9. FINISH WORK
  - A. REMOVE WEDGES, AND PATCH DECK OVERLAY AND FASCIA BEAMS AT TRANSVERSE TENDONS.
  - B. SATURATE THE PRESTRESSED UNITS WITH WATER FOR TWELVE HOURS PRIOR TO PLACING OF THE CONCRETE DECK OVERLAY.
  - C. REMOVE ANY FREESTANDING WATER IMMEDIATELY BEFORE PLACING THE DECK OVERLAY.

PROJECT NAME:	CASTLETON	
PROJECT NUMBER:	RS 0142(10)	
FILE NAME:	sf193sup.dgn sf193gen.i	PLOT DATE: 1/29/2007
PROJECT LEADER:	R. Whitcomb	DRAWN BY: T. Lackey
DESIGNED BY:	T. Lackey	CHECKED BY: C. Carlson
GENERAL NOTES SHEET #1		SHEET 40 OF 68

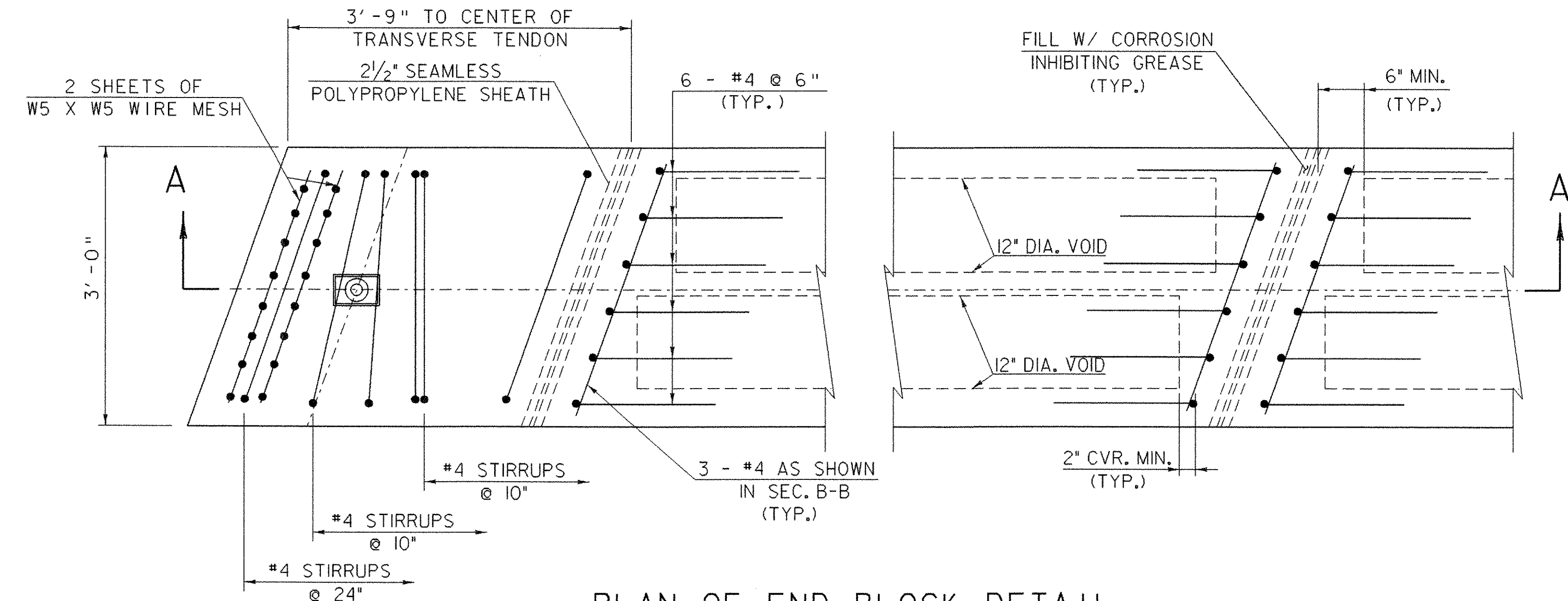


**SHEAR KEY SECTION FOR VOIDED SLAB**  
NTS

\*\*NOTE: INSTALL OAKUM AFTER UNITS HAVE BEEN PLACED

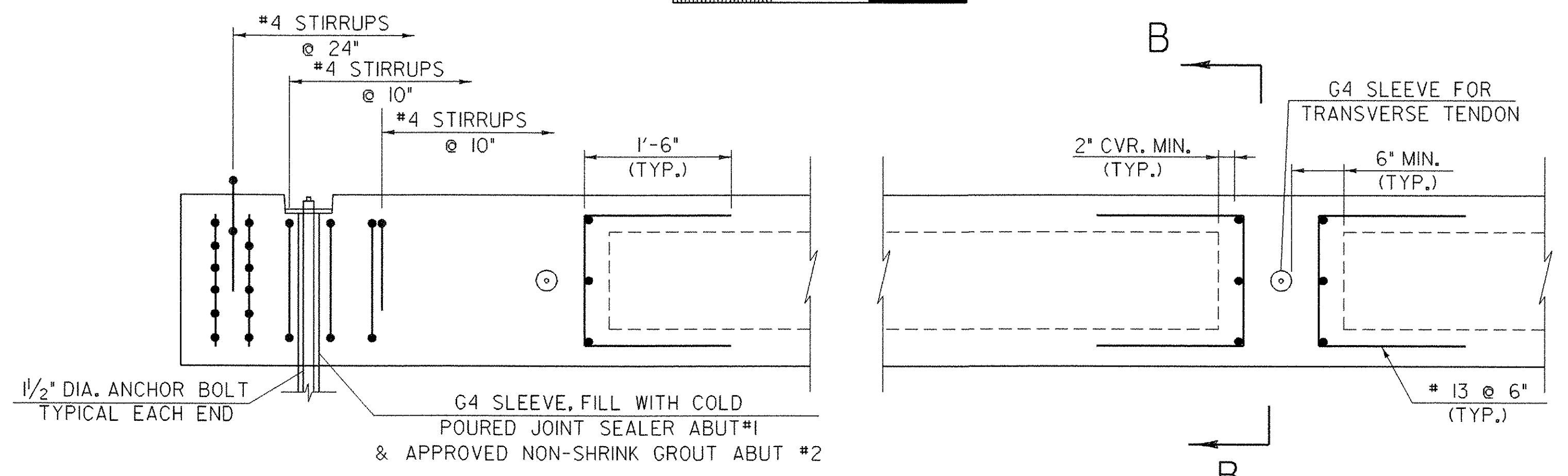


**SHEAR KEY DETAIL FOR VOIDED SLAB**  
NTS



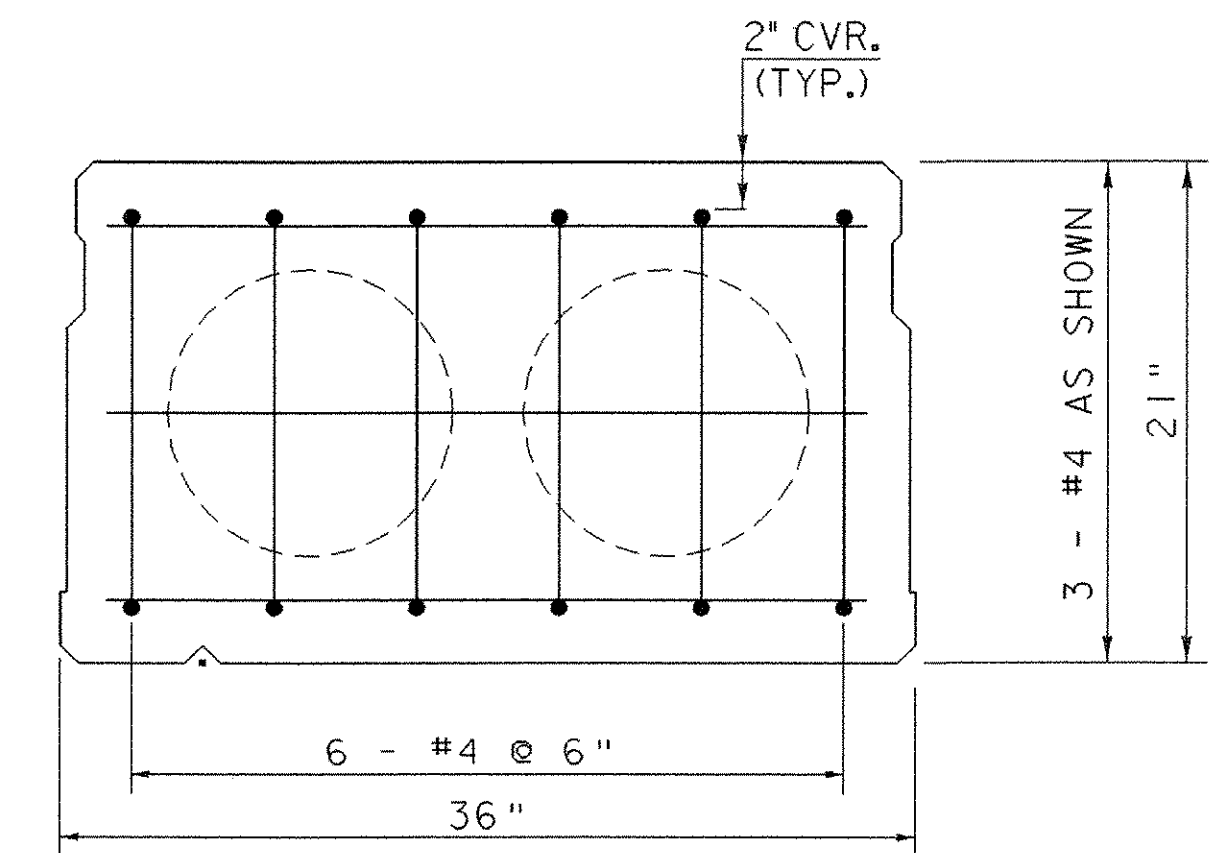
**PLAN OF END BLOCK DETAIL**

SCALE 1" = 1'-0"  
1 9 6 3 0 1 2



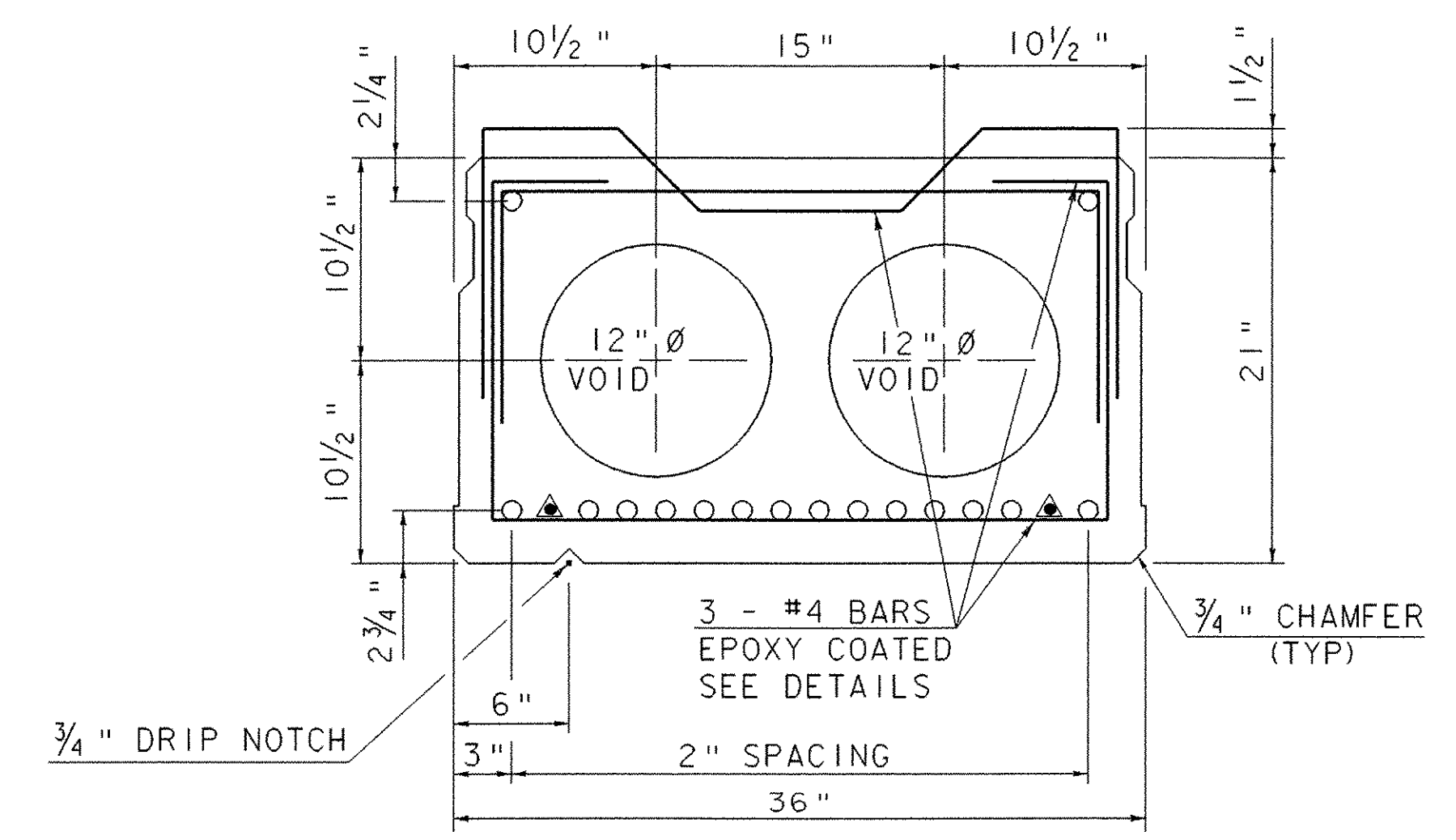
**VOIDED SLAB SECTION A-A**

SCALE 1" = 1'-0"  
1 9 6 3 0 1 2



**SECTION B-B**

SCALE 1 1/2" = 1'-0"  
1 9 6 3 0 1



**21" X 36" VOIDED SLAB**

SCALE 1 1/2" = 1'-0"  
1 9 6 3 0 1

▲ = STRAND DEBONDED 4'-0" EACH END  
\*\* = STOP DRIP NOTCH 5'-0" FROM ENDS OF UNIT AND OUTLET AT 45° TO FASCIA.

MAX NUMBER OF STRANDS FOR 21" SLAB

ROW*	NO. OF STRANDS
1 @ 2 3/4"	16 STRANDS
2 @ 18 3/4"	2 STRANDS

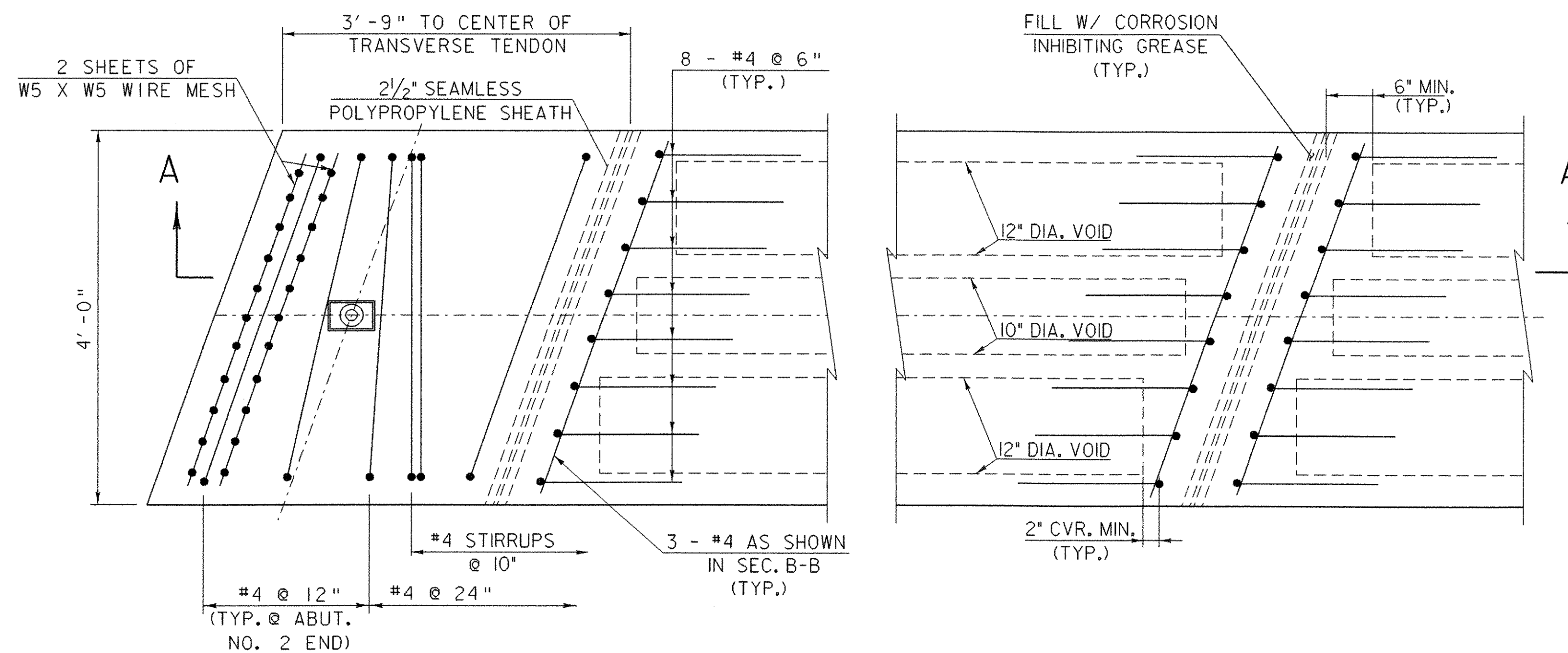
\*ROWS ARE ALWAYS AT SPECIFIED DISTANCES FROM BOTTOM OF UNIT

**SERVICE LOADS**

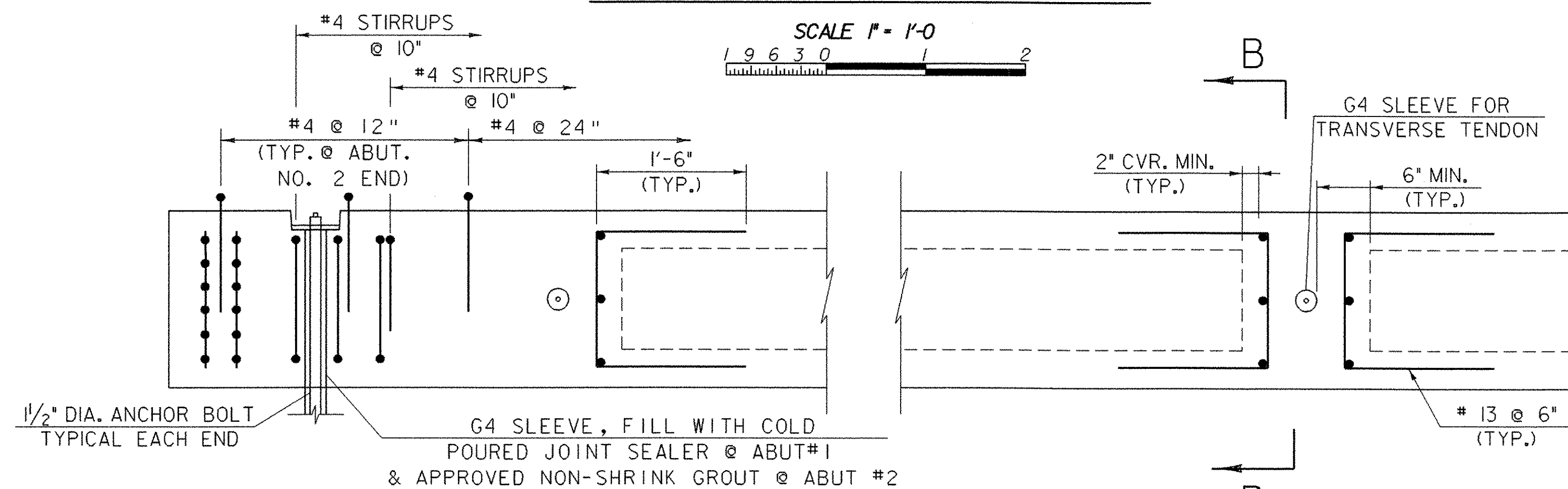
GIRDER	21" X 36"
MEMBER MOMENT	228.5 FT KIP
DECK MOMENT	115.5 FT KIP
SUPERIMPOSED DEAD LOAD MOMENT	59.4 FT KIP
LIVE LOAD & IMPACT MOMENT	301.3 FT KIP
DEAD LOAD REACTION	28 KIP
LIVE LOAD & IMPACT REACTION	52 KIP
TOTAL REACTION	80 KIP
CAMBER UNDER DEAD LOADS AT ERECTION	1.51 IN
CAMBER UNDER DEAD LOADS AT LONG TERM	0.00 IN

**SUPERSTRUCTURE DETAILS  
21" X 36" VOIDED SLAB**

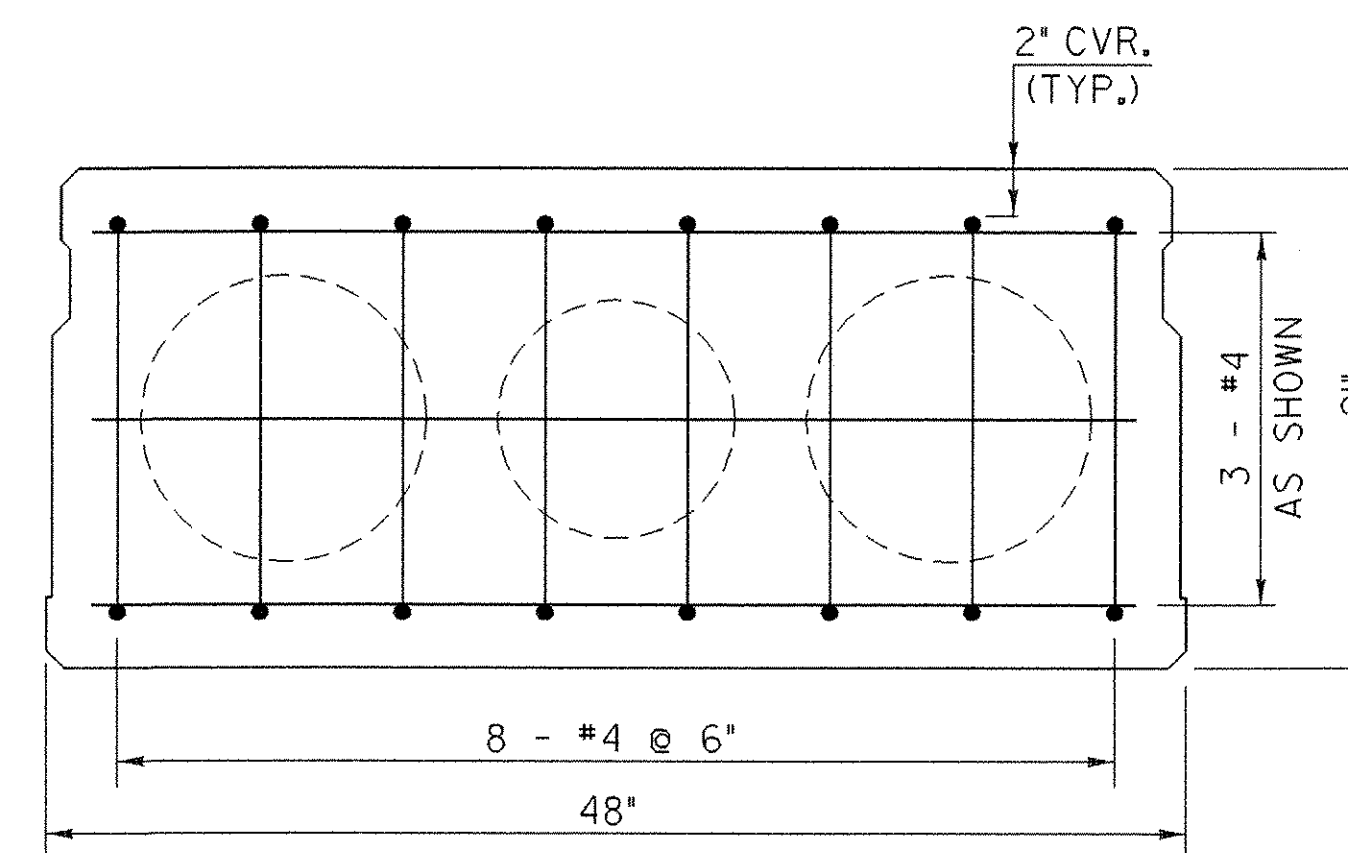
PROJECT NAME:	CASTLETON	PLOT DATE:	16-FEB-2007
PROJECT NUMBER:	RS 0142(10)	DRAWN BY:	L. BULLOCK
FILE NAME:	PW/78f193/sf193sup.dgn	DESIGNED BY:	M. HALE
PROJECT LEADER:	R. WHITCOMB	CHECKED BY:	C. CARLSON
78f193/str/sf193vsl1			SHEET 41 OF 68



PLAN OF END BLOCK DETAIL

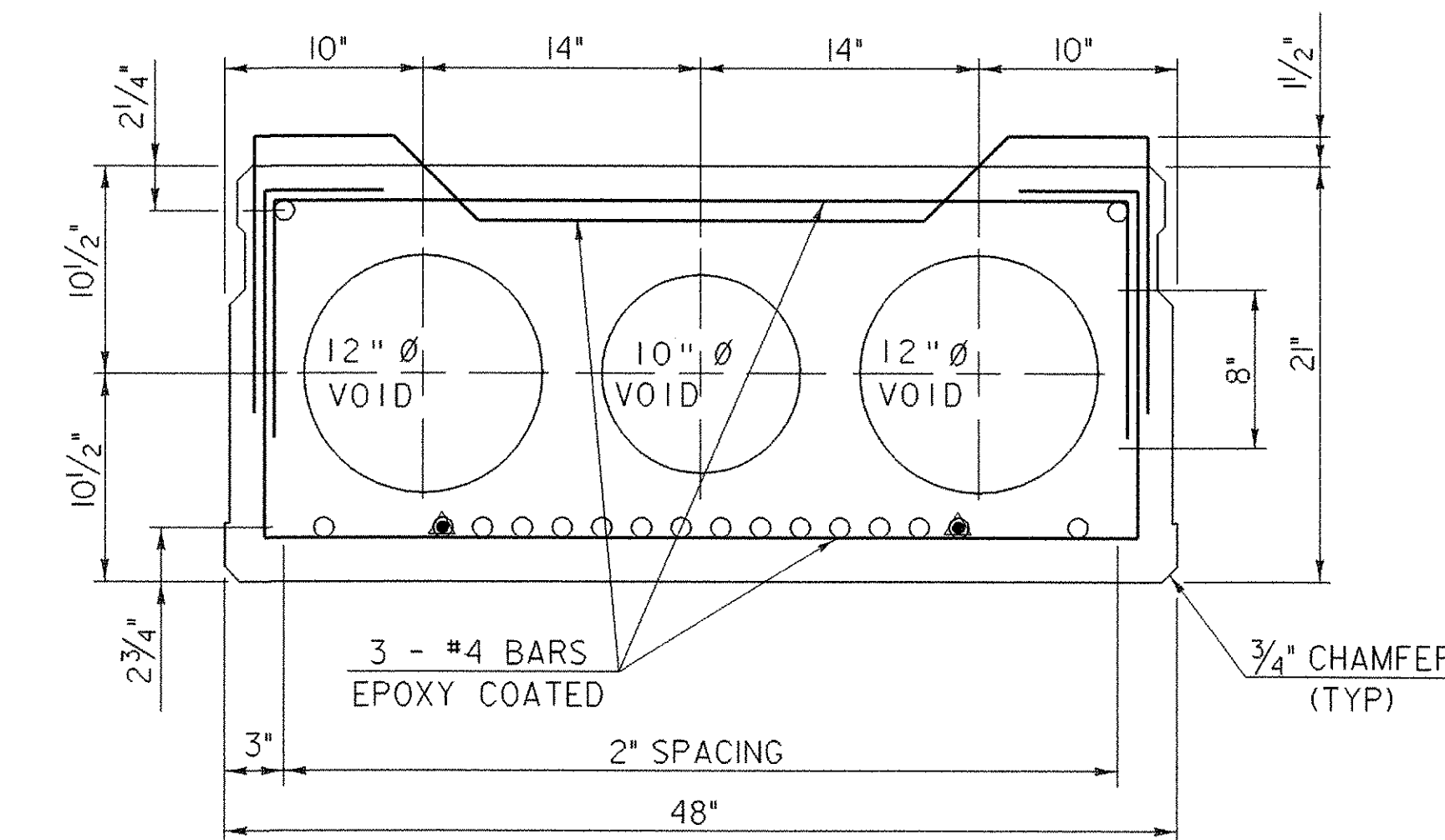


VOIDED SLAB SECTION A-A



SECTION B-B

SCALE 1 1/2" = 1'-0"  
1 9 6 3 0 1



21" X 48" VOIDED SLAB

SCALE 1 1/2" = 1'-0"  
1 9 6 3 0 1

▲ = STRAND DEBONDED 4'-0" EACH END  
●● = STOP DRIP NOTCH 5'-0" FROM ENDS OF UNIT AND OUTLET AT 45° TO FASCIA.

SERVICE LOADS

GIRDER	
MEMBER MOMENT	21" X 48"
DECK MOMENT	388.6 FT KIP
SUPERIMPOSED DEAD LOAD MOMENT	171.6 FT KIP
LIVE LOAD & IMPACT MOMENT	77.2 FT KIP
DEAD LOAD REACTION	872.3 FT KIP
LIVE LOAD & IMPACT REACTION	35 KIP
TOTAL REACTION	33 KIP
CAMBER UNDER DEAD LOADS AT ERECTION	68 KIP
CAMBER UNDER DEAD LOADS AT LONG TERM	0.23 IN

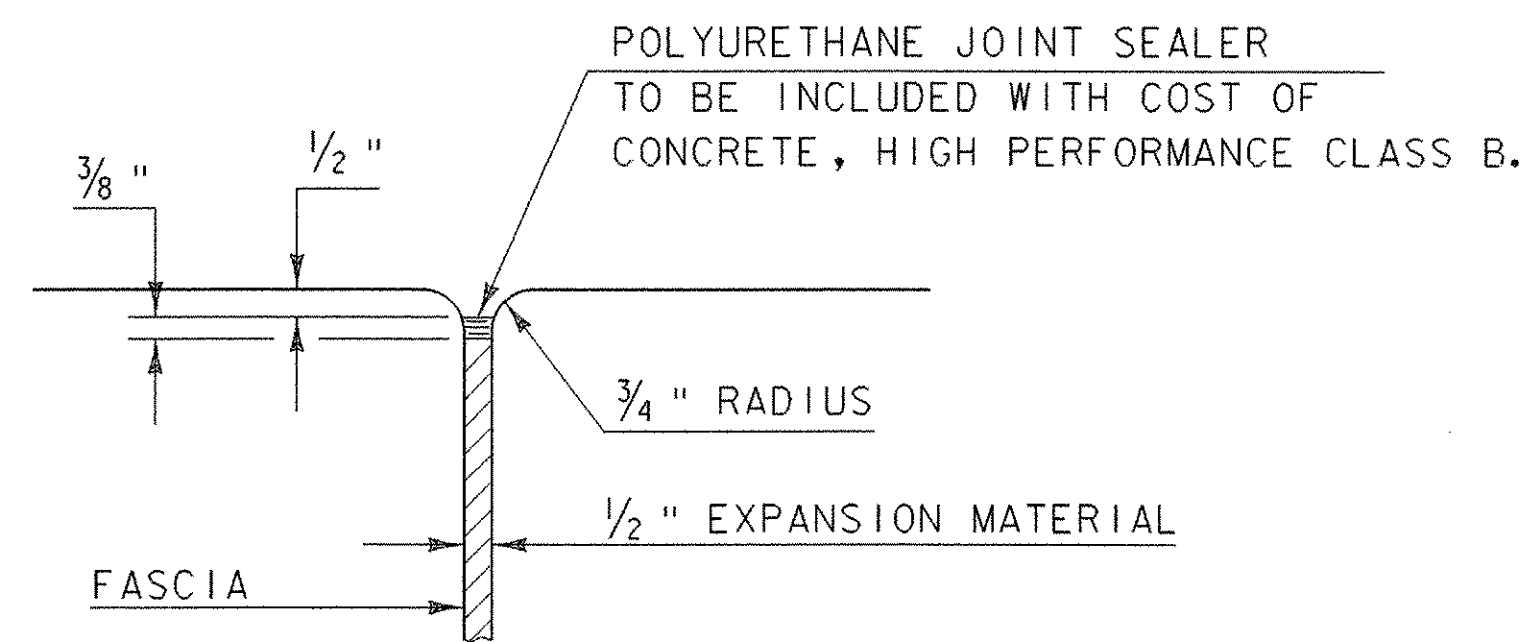
MAX NUMBER OF STRANDS FOR 21" SLAB

ROW*	NO. OF STRANDS
1 @ 2 3/4"	16 STRANDS
2 @ 18 3/4"	2 STRANDS

\* ROWS ARE ALWAYS AT SPECIFIED DISTANCES FROM BOTTOM OF UNIT

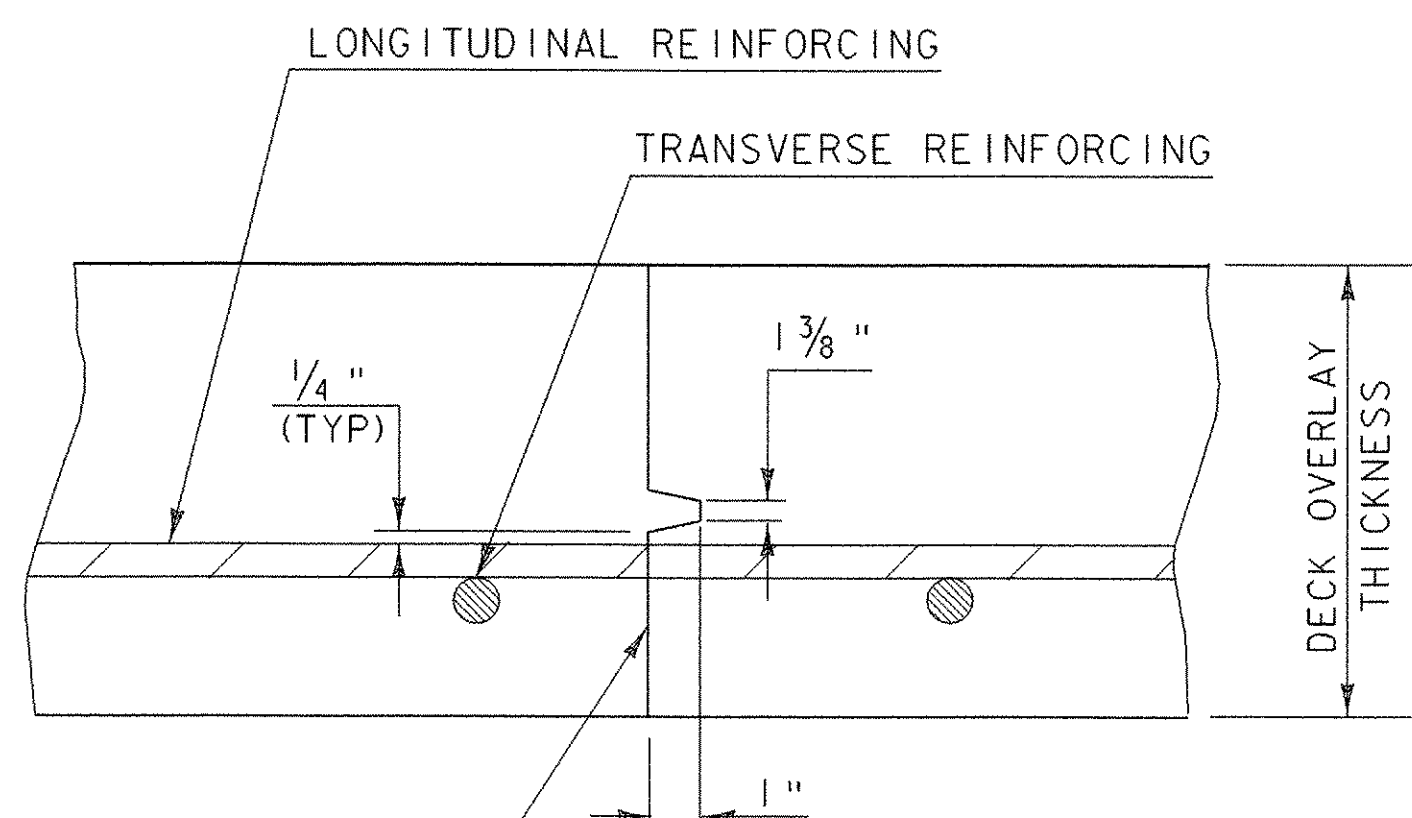
SUPERSTRUCTURE DETAILS  
21" X 48" VOIDED SLAB

PROJECT NAME: CASTLETON	PLOT DATE: 16-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: L. BULLOCK
FILE NAME: PW/78f193/sf193sup.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 42 OF 68
DESIGNED BY: M. HALE	
78f193/str/sf193vs2.1	



**JOINT BETWEEN FASCIA AND WINGWALL**

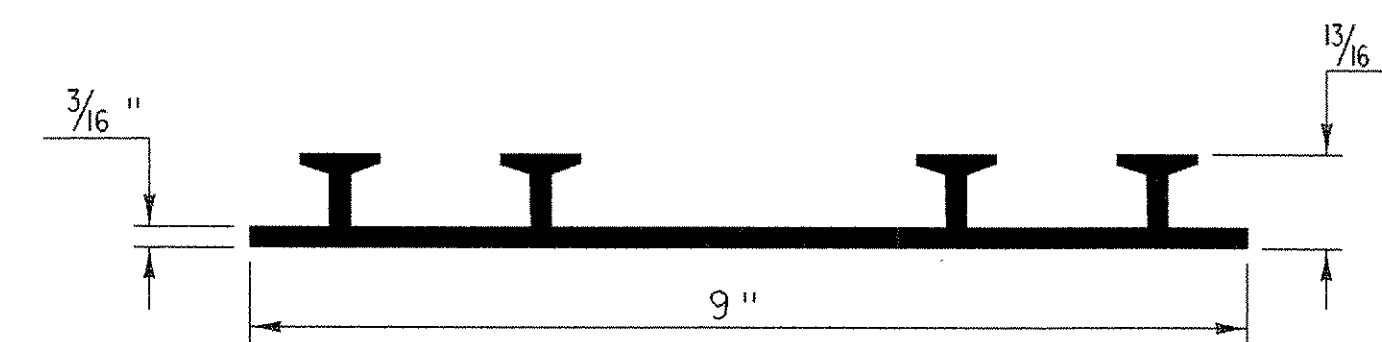
NTS



**TRANSVERSE BRIDGE SLAB CONSTRUCTION JOINT DETAILS**

NTS

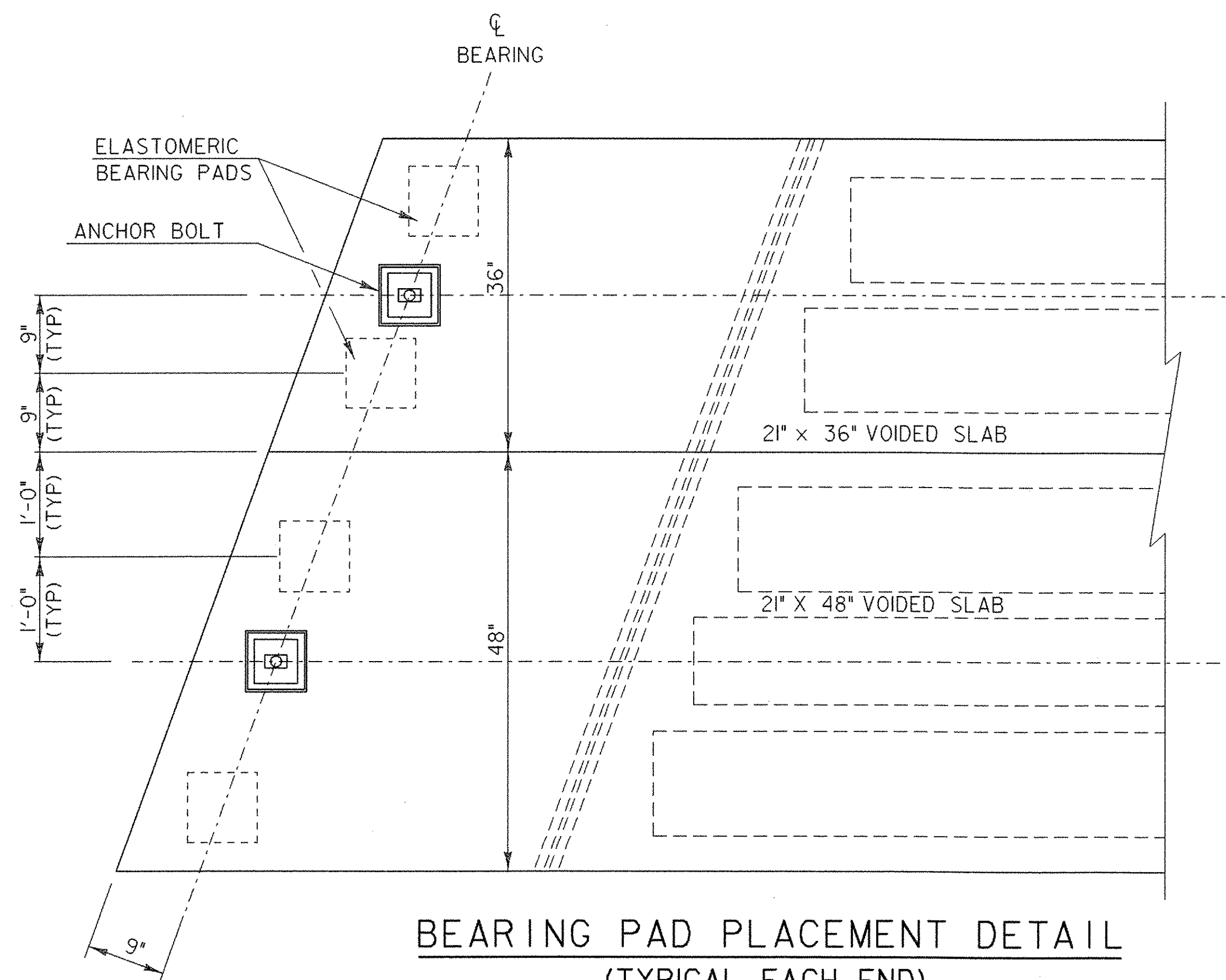
APPLY EPOXY BONDING COMPOUND BEFORE PLACING NEW CONCRETE. INCLUDE WITH COST BID FOR CONCRETE, HIGH PERFORMANCE CLASS AA



**P.V.C. WATERSTOP FOR CONSTRUCTION JOINTS**

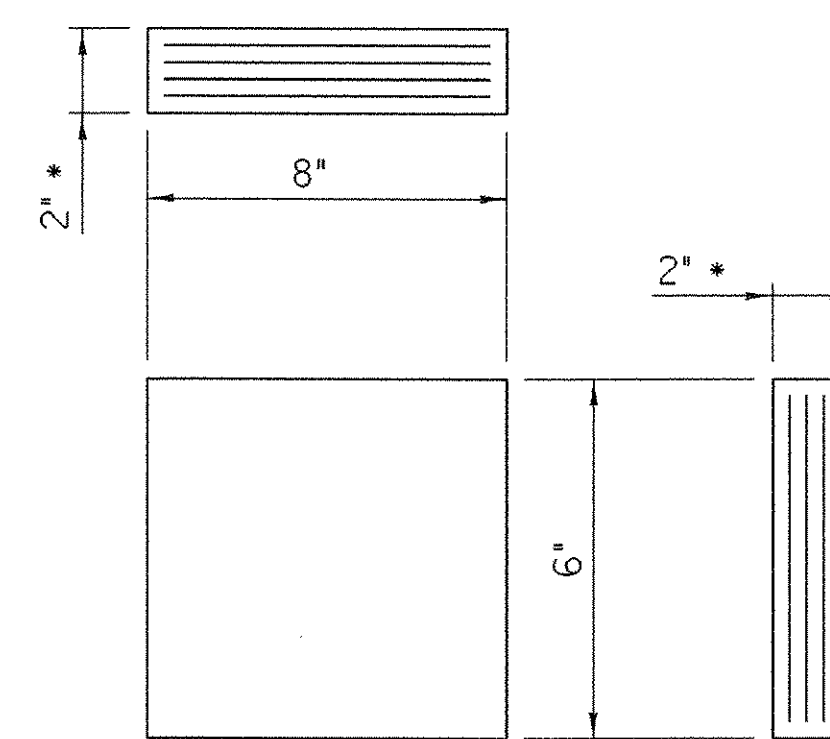
NTS

INCLUDE THE COSTS FOR P.V.C. WATERSTOP IN THE UNIT PRICE BID FOR CONCRETE, HIGH PERFORMANCE CLASS B. OTHER CONFIGURATIONS MAY BE USED UPON APPROVAL OF THE STRUCTURES ENGINEER.



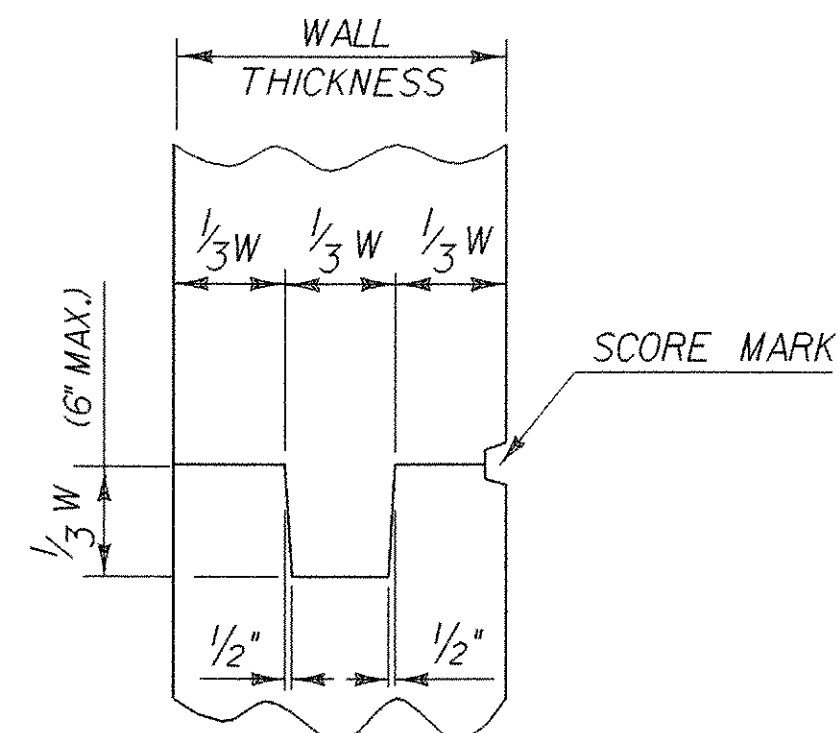
**BEARING PAD PLACEMENT DETAIL**

(TYPICAL EACH END)  
SCALE 1" = 1'-0"  
1 9 6 3 0 1 2



**ELASTOMERIC BEARING DETAIL**

\* 3 - 3/8" LAYERS OF ELASTOMERIC ALTERNATING WITH 4 - 14 GAGE STEEL REINFORCING PLATES



**TYPICAL CONCRETE CONSTRUCTION JOINT**

NTS

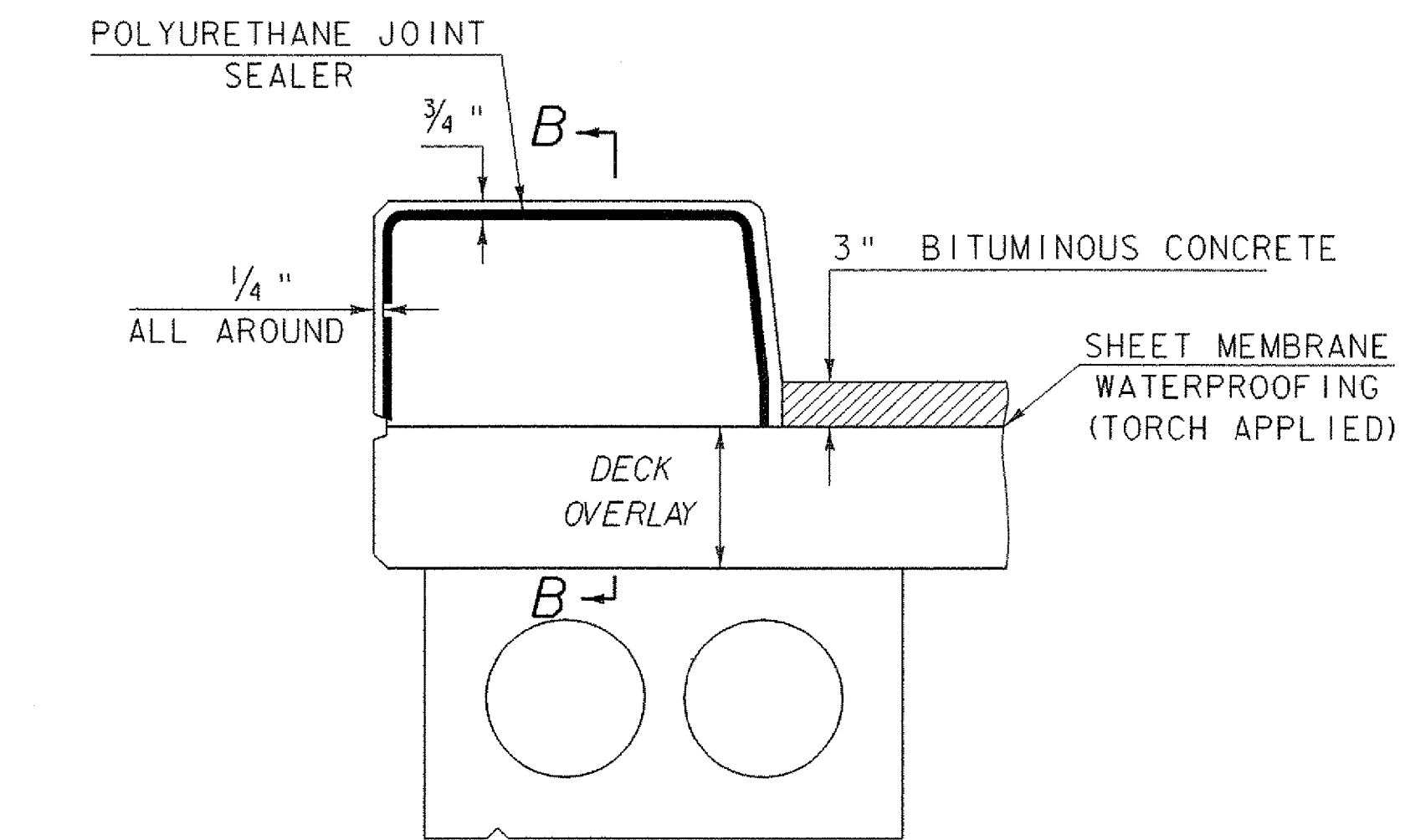
**NOTES**

- ITEM 531.11, "BEARING DEVICE ASSEMBLY, ELASTOMERIC PAD" IS THE PAY ITEM FOR THE BEARINGS.
- ALTERNATE CONFIGURATIONS FOR ELASTOMERIC BEARINGS MAY BE SUBMITTED FOR APPROVAL. ANY ALTERNATE BEARING SUBMITTED SHALL BE DESIGNED AND CERTIFIED TO MEET THE LOADS AND CRITERIA SHOWN ON THIS SHEET AND MAINTAIN THE ANCHORAGE SYSTEM SHOWN. THE BEARINGS SHALL BE DESIGNED ACCORDING TO AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 2002 EDITION AND ITS LATEST REVISIONS.
- THE BEARING SHAPE FACTOR SHALL BE BETWEEN 5.0 AND 12.0.
- ALL REINFORCEMENT BETWEEN LAYERS OF ELASTOMERIC SHALL BE STEEL GRADE 60. NO FABRIC REINFORCEMENT WILL BE PERMITTED.
- ELASTOMERIC BEARINGS REINFORCED WITH STEEL SHALL HAVE A 1/8" EDGE SEAL OF ELASTOMERIC INTEGRAL WITH THE BEARING OVER ALL PLATES.
- ALL MATERIALS AND FABRICATION SHALL BE PER AASHTO DIVISION II SECTION 18.2 AND AASHTO MATERIAL SPECIFICATION M251.
- DESIGN CRITERIA:
  - A. TEMPERATURE RANGE: 80 F
  - B. 60 DUROMETER ELASTOMERIC
  - C. MAXIMUM BEARING STRESS: 1000 psi
  - D. DESIGN ROTATION: 0.016 rad
  - E. REACTION/BEAM:
 

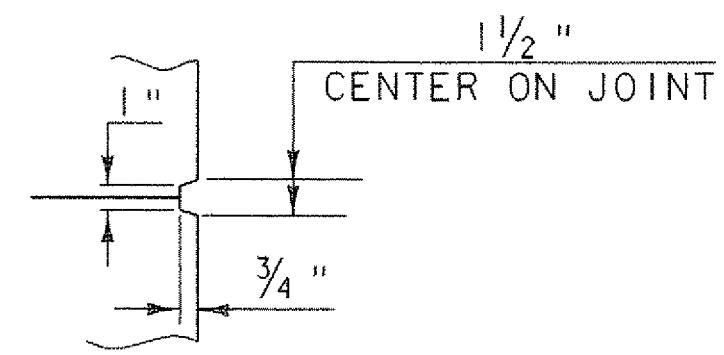
	36"	48"
RDL:	28 kips	35 kips
RLL+I:	25 kips	33 kips
- COMPRESSIBLE SEALER. THE FABRICATOR SHALL SUPPLY A SELF ADHESIVE COMPRESSIBLE SEALER BETWEEN THE BOTTOM OF THE UNITS AND THE BRIDGE SEAT. THIS COMPRESSIBLE SEALER SHALL SURROUND THE 2 1/2" DIA SLEEVE IN THE UNIT. THE PURPOSE OF THE SEALER IS TO FACILITATE PLACEMENT OF THE "MORTAR OR JOINT SEALER" AROUND THE ANCHOR BOLTS.

**SUPERSTRUCTURE DETAILS  
BRIDGE END & BEARINGS**

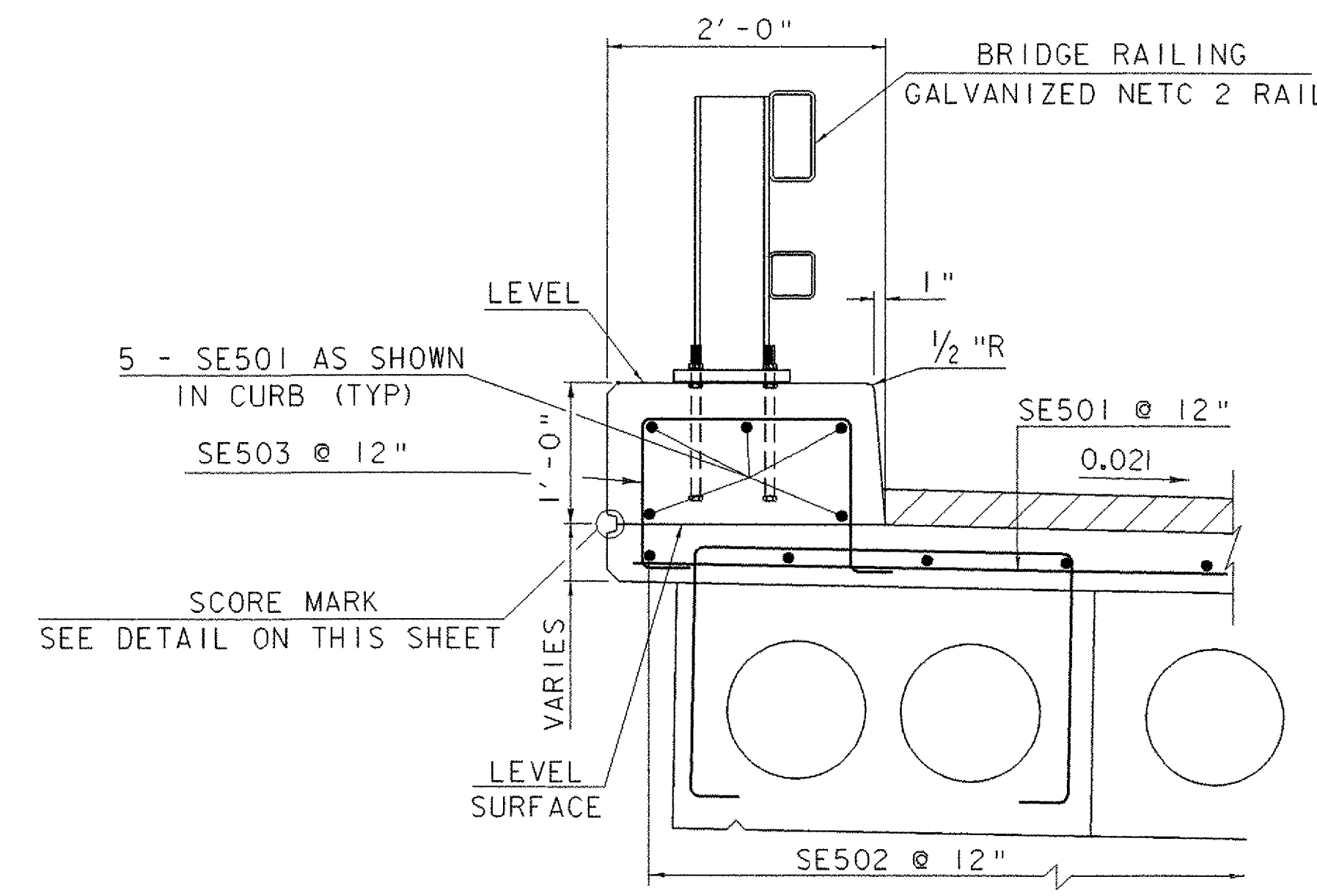
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR 3
FILE NAME: PW/78f193/sf193sup.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 43 OF 68
DESIGNED BY: M. HALE	
78f193/str/sf193brg.i	



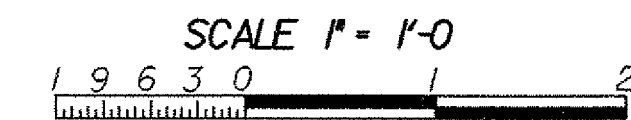
**TYPICAL SECTION THROUGH CONCRETE CURB CONSTRUCTION JOINT**  
NTS



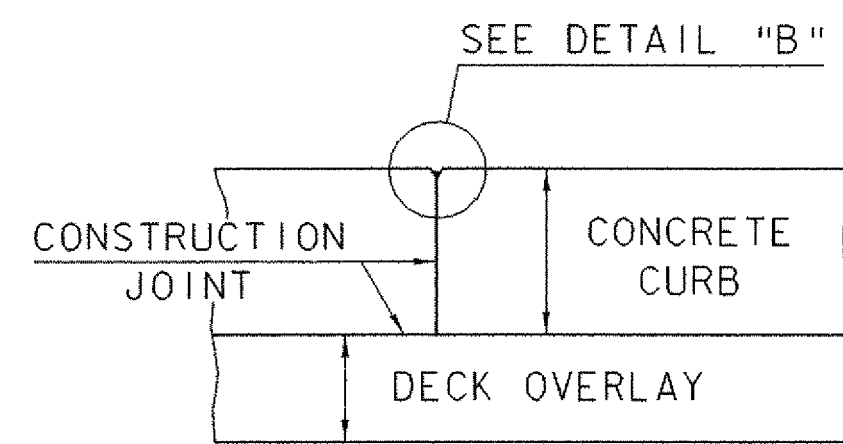
**SCORE MARK DETAIL**  
NTS



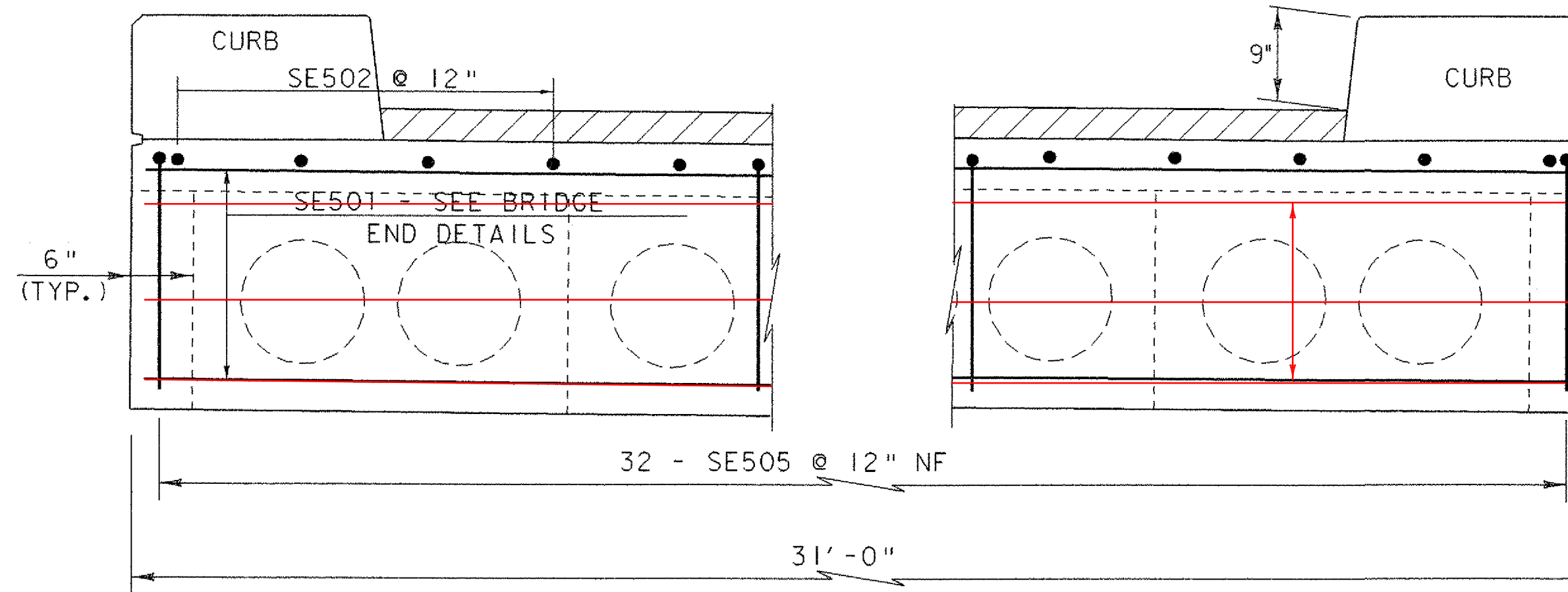
**CURB AND RAIL SECTION**



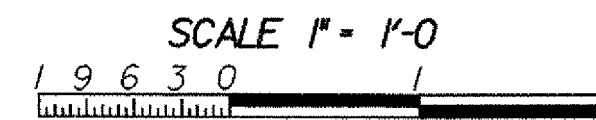
\*\*FOR ADDITIONAL BRIDGE RAILING DETAILS SEE VAOT STD DRAWING SB-R6-82



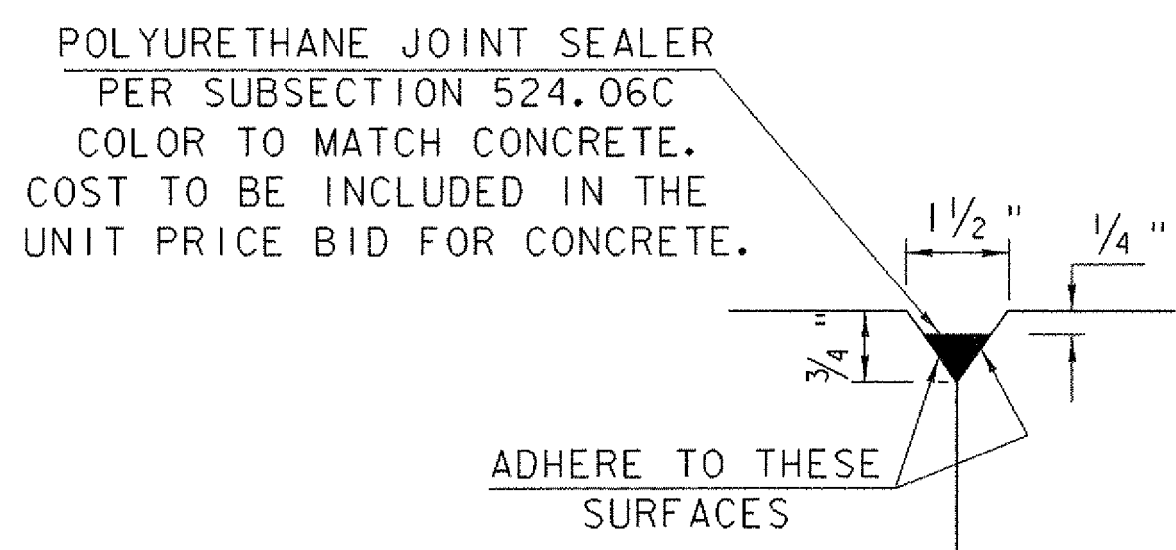
**SECTION B-B**  
NTS



**CURTAIN WALL DETAIL**



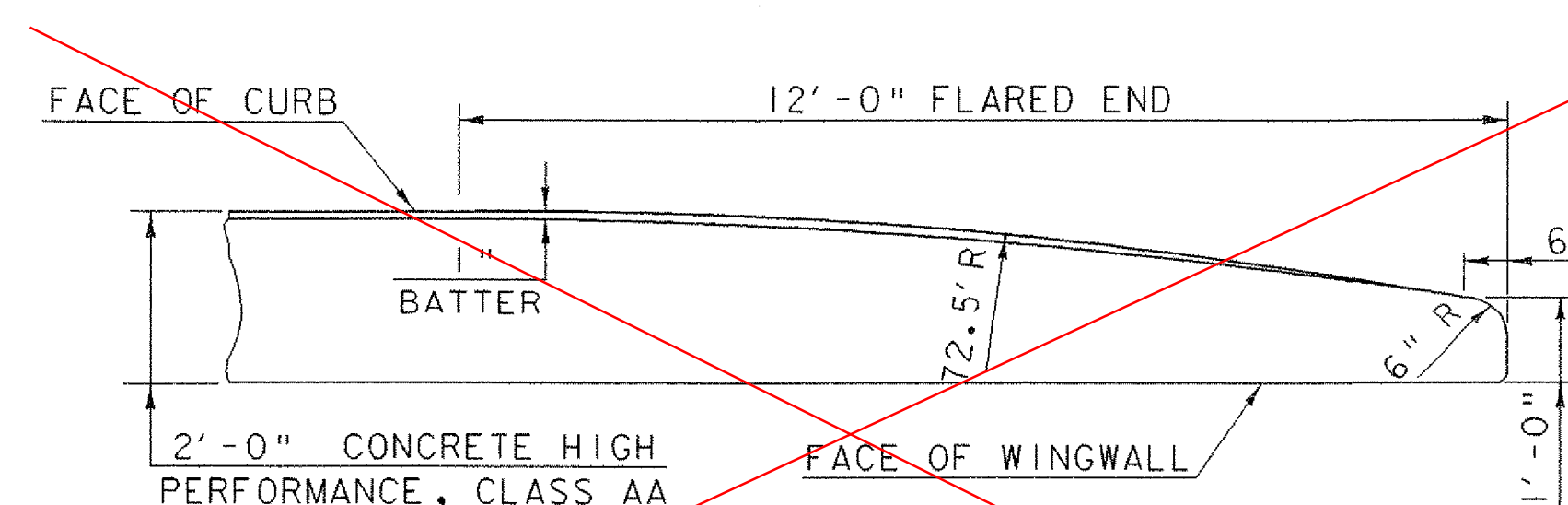
\* CURTAIN WALL LENGTH MATCHES THE FASCIA TO FASCIA WIDTH.



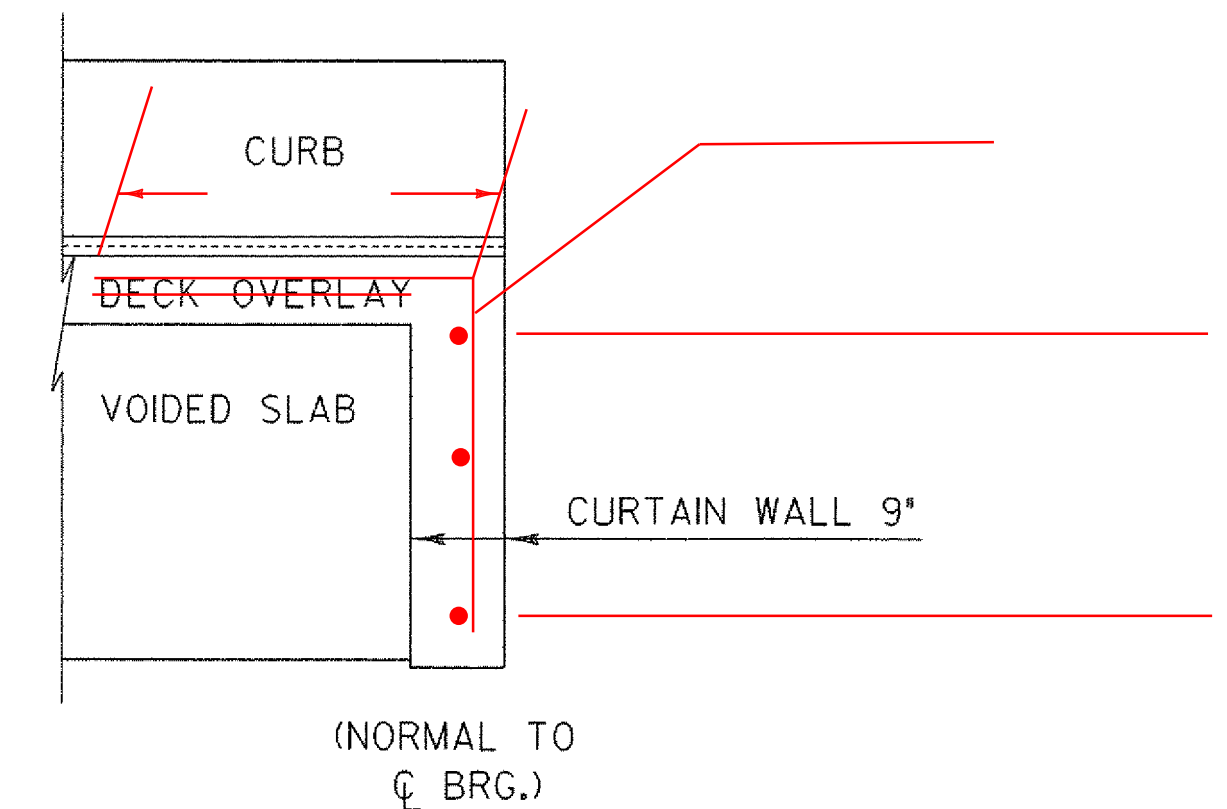
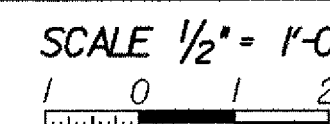
**DETAIL "B"**  
NTS

NOTES:

1. CONCRETE CURBS MAY BE POURED IN ONE CONTINUOUS POUR.
2. IF CONSTRUCTION JOINTS THROUGH CONCRETE CURBS ARE USED, THEY SHALL BE 1'-6" MINIMUM FROM THE CENTER OF THE NEAREST BRIDGE RAIL POST, AND SHALL BE PLACED IN ALTERNATING SECTIONS WITH A MINIMUM OF 48 HOURS DELAY BETWEEN ADJACENT POURS.
3. LONGITUDINAL REINFORCING SHALL PASS THROUGH CONCRETE CURB CONSTRUCTION JOINTS.

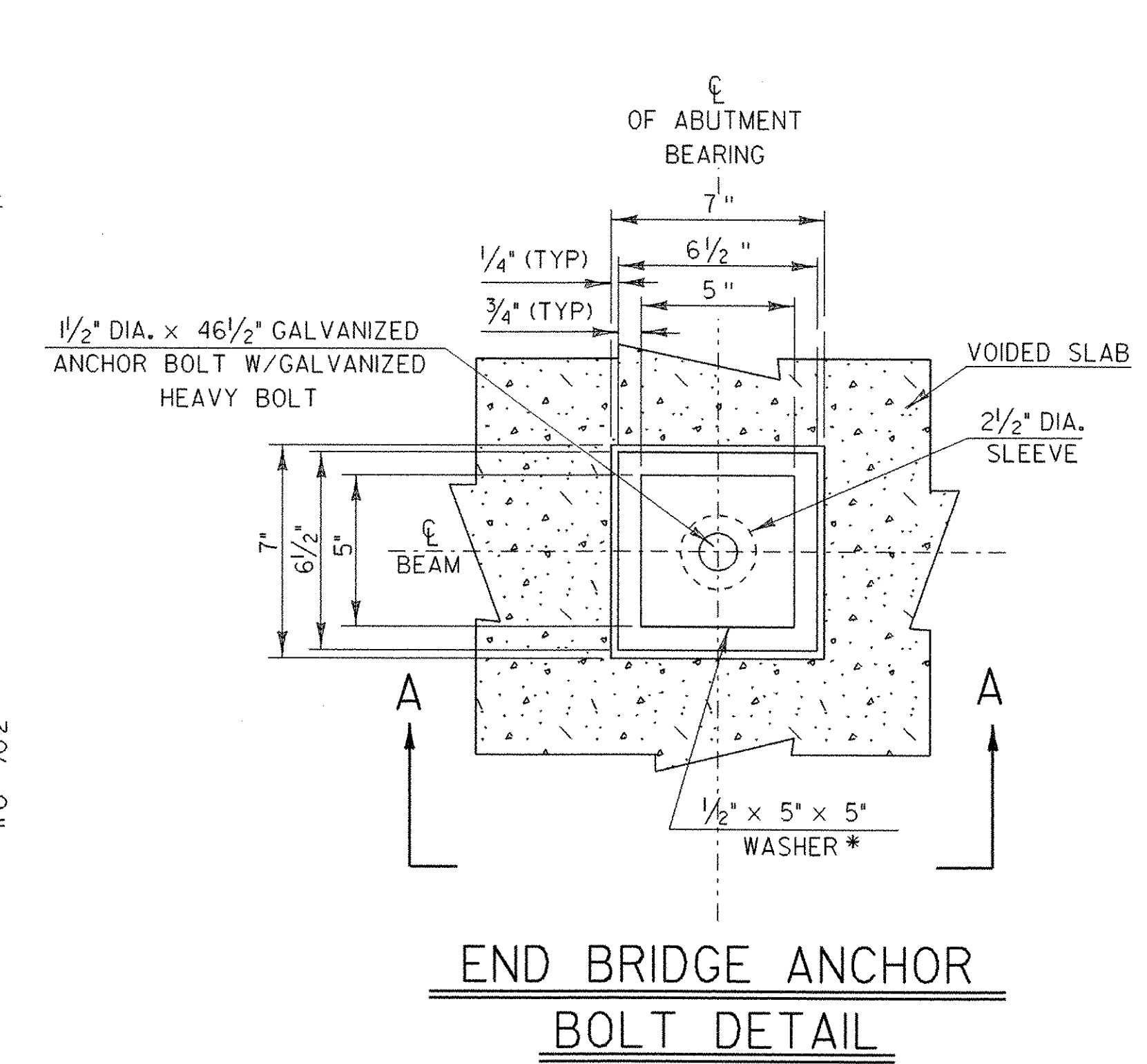
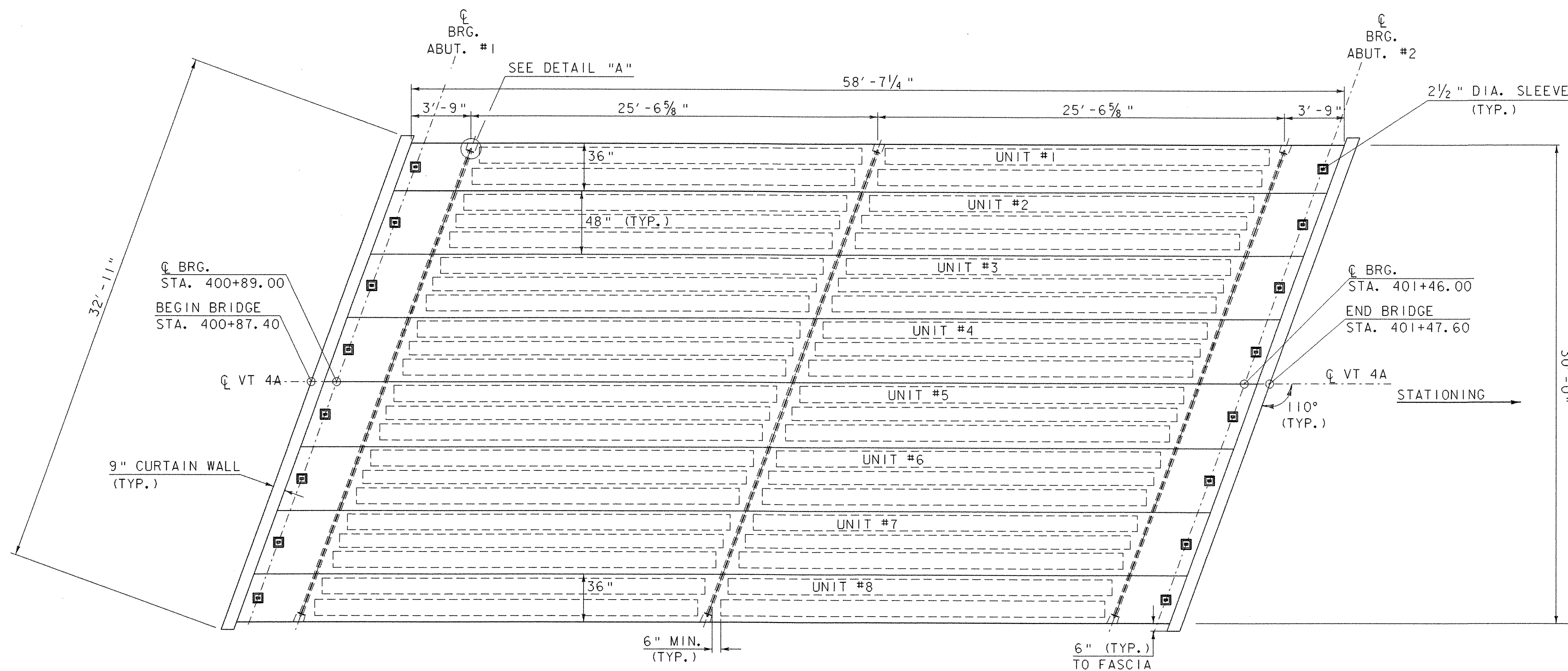


**FLARED END DETAIL FOR 2'-0" CURB**

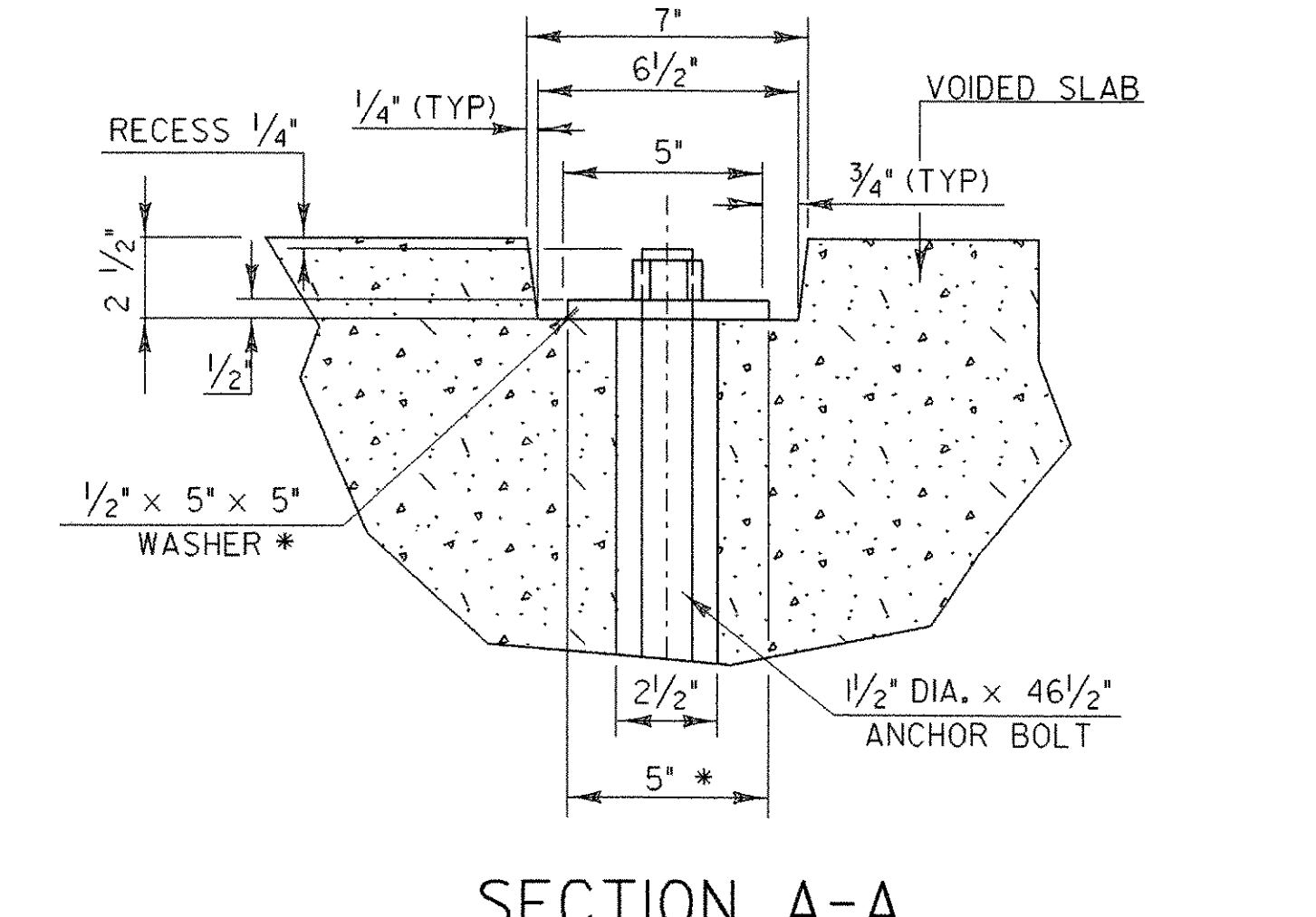


**SUPERSTRUCTURE DETAILS CURB AND RAIL**

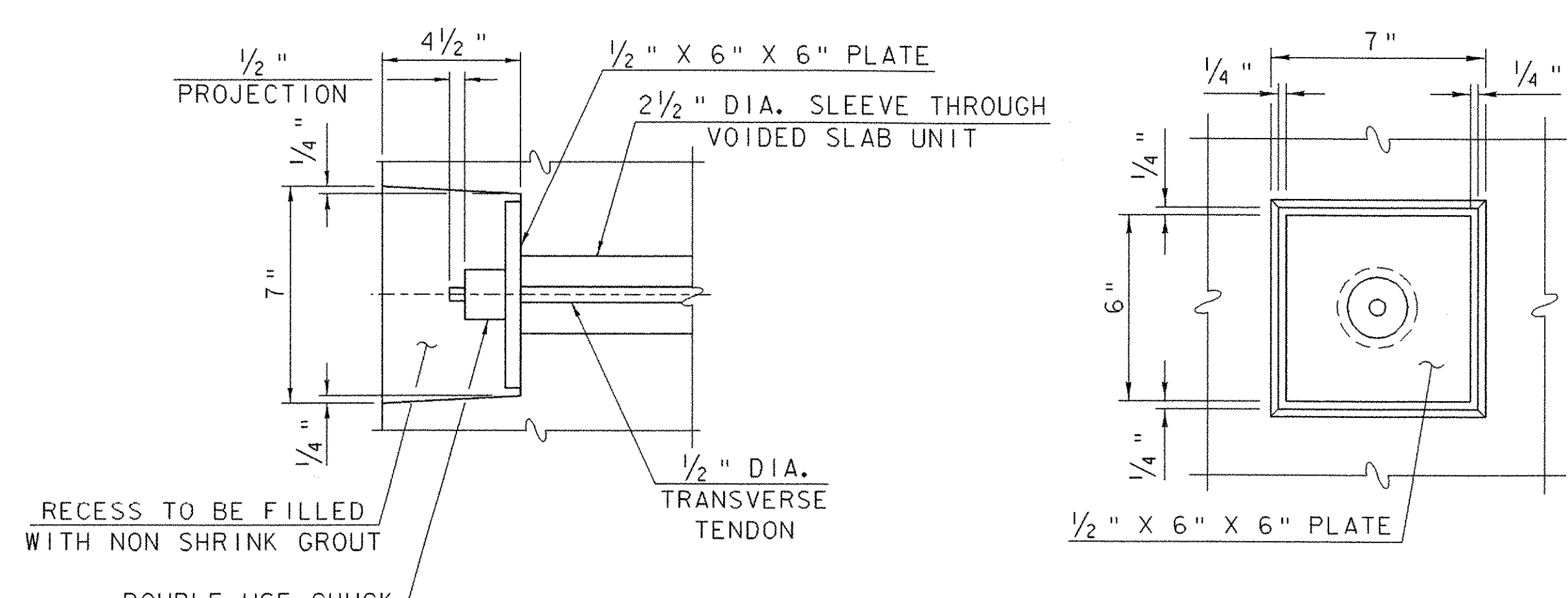
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: L. BULLOCK
FILE NAME: PW/78f193/sf193sup.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 44 OF 68
DESIGNED BY: M. HALE	
78f193/sr/sf193crb.i	



NOTE:  
 SEE VAOT SPECIFICATION 714.08 FOR ANCHOR BOLTS & NUTS  
 \* 1/2" x 5" x 5" WASHER WITH 1/2" DIA. HOLE (GALVANIZED)



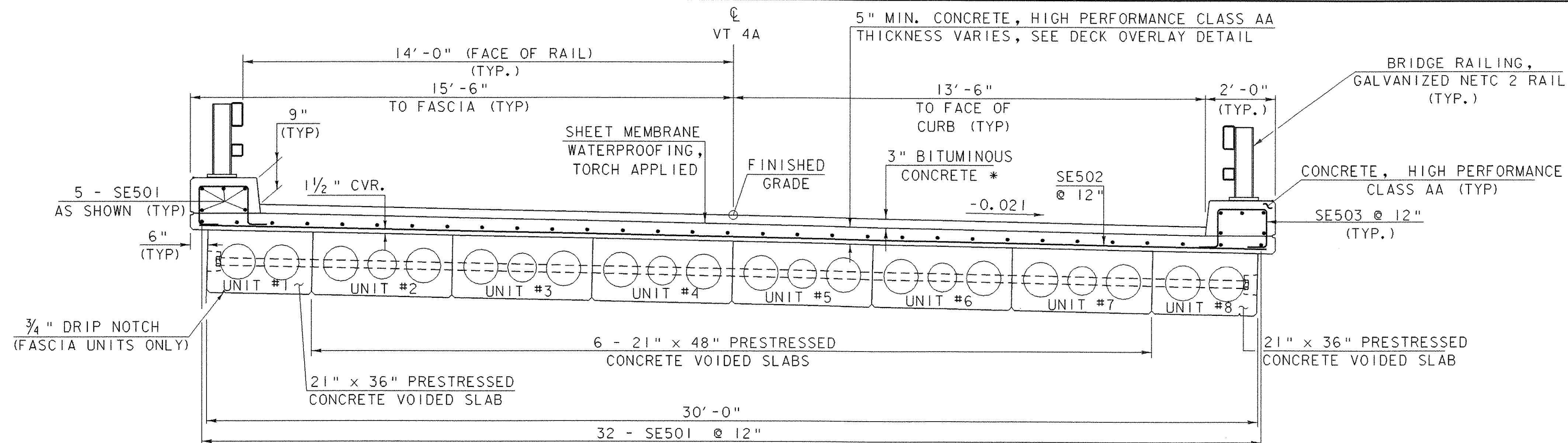
NOTES  
 1. TRANSVERSE TENDONS SHALL BE COVERED BY SEAMLESS POLYPROPYLENE SHEATH (WITH CORROSION INHIBITOR GREASE BETWEEN SHEATH AND TENDON) FOR THE LENGTH OF TENDON, EXCEPT AT ANCHORAGE LOCATIONS. TENDONS SHALL BE TENSIONED TO 30000#.  
 2. THE 1/2" PLATE SHALL CONFORM TO AASHTO M270 GRADE 50. THE PLATE AND CHUCK SHALL BE GALVANIZED ACCORDING TO AASHTO M111.



DETAIL "A"  
 SCALE 1/4" = 1'-0"  
 1 0 2 4 6

PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: PW/78f193/sf193sup.dgn	PLOT DATE: 16-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: L. BULLOCK
DESIGNED BY: M. HALE	CHECKED BY: C. CARLSON
78f193/str/sf193dck.i	SHEET 45 OF 68

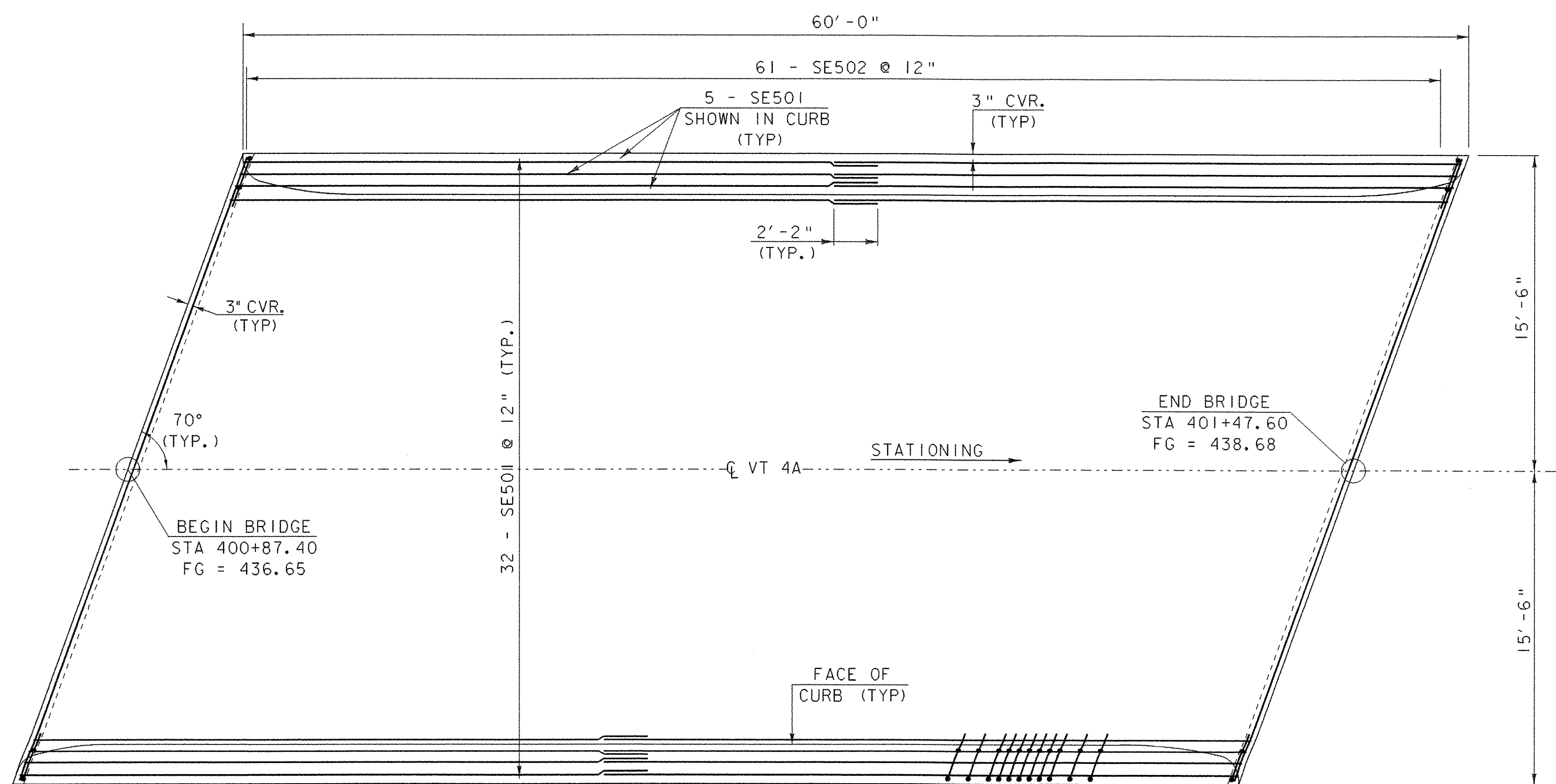
SUPERSTRUCTURE DETAILS  
 DECK OVERLAY



\* TWO LIFTS: 1 1/2" BITUMINOUS CONCRETE PAVEMENT, TYPE III

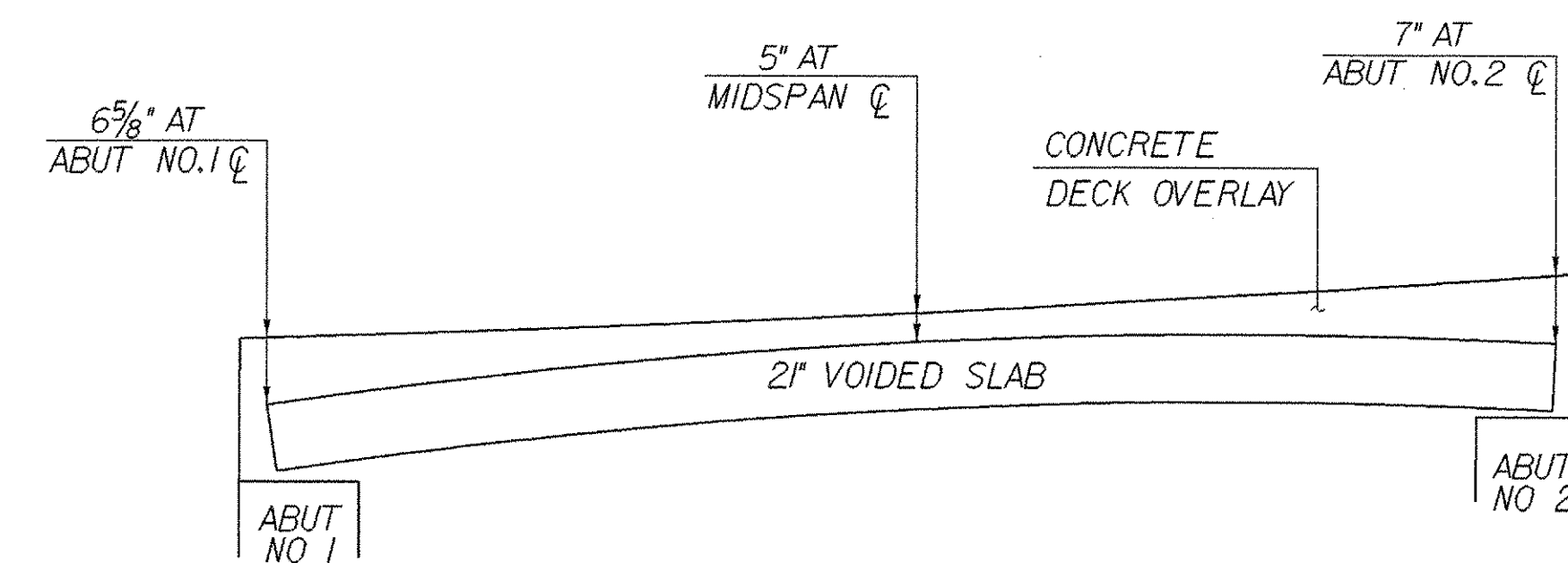
TYPICAL SECTION AT MIDSPAN

SCALE 1/2" = 1'-0"



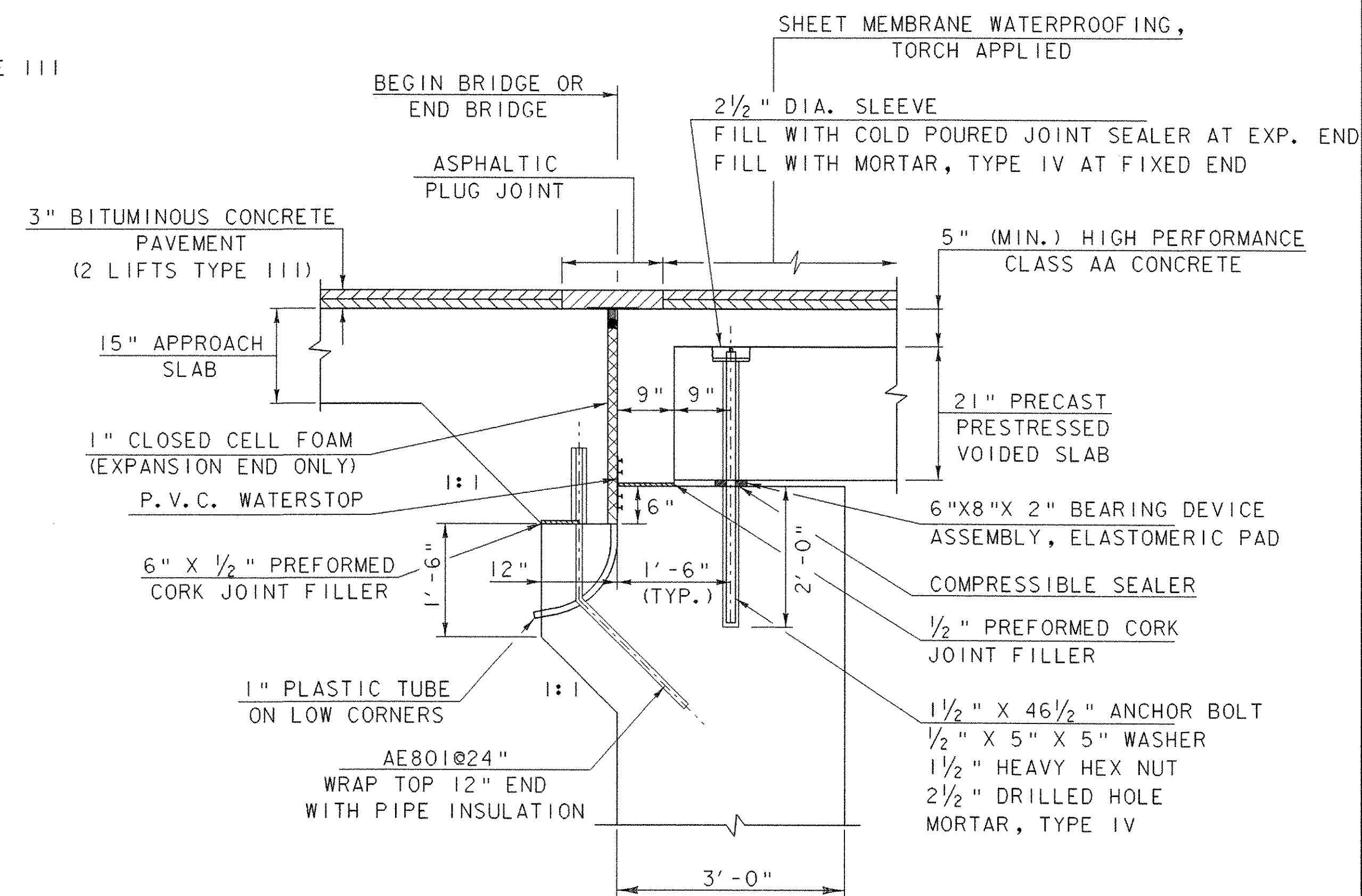
DECK OVERLAY REINFORCING

SCALE 1/4" = 1'-0"



DECK OVERLAY DETAIL

NTS

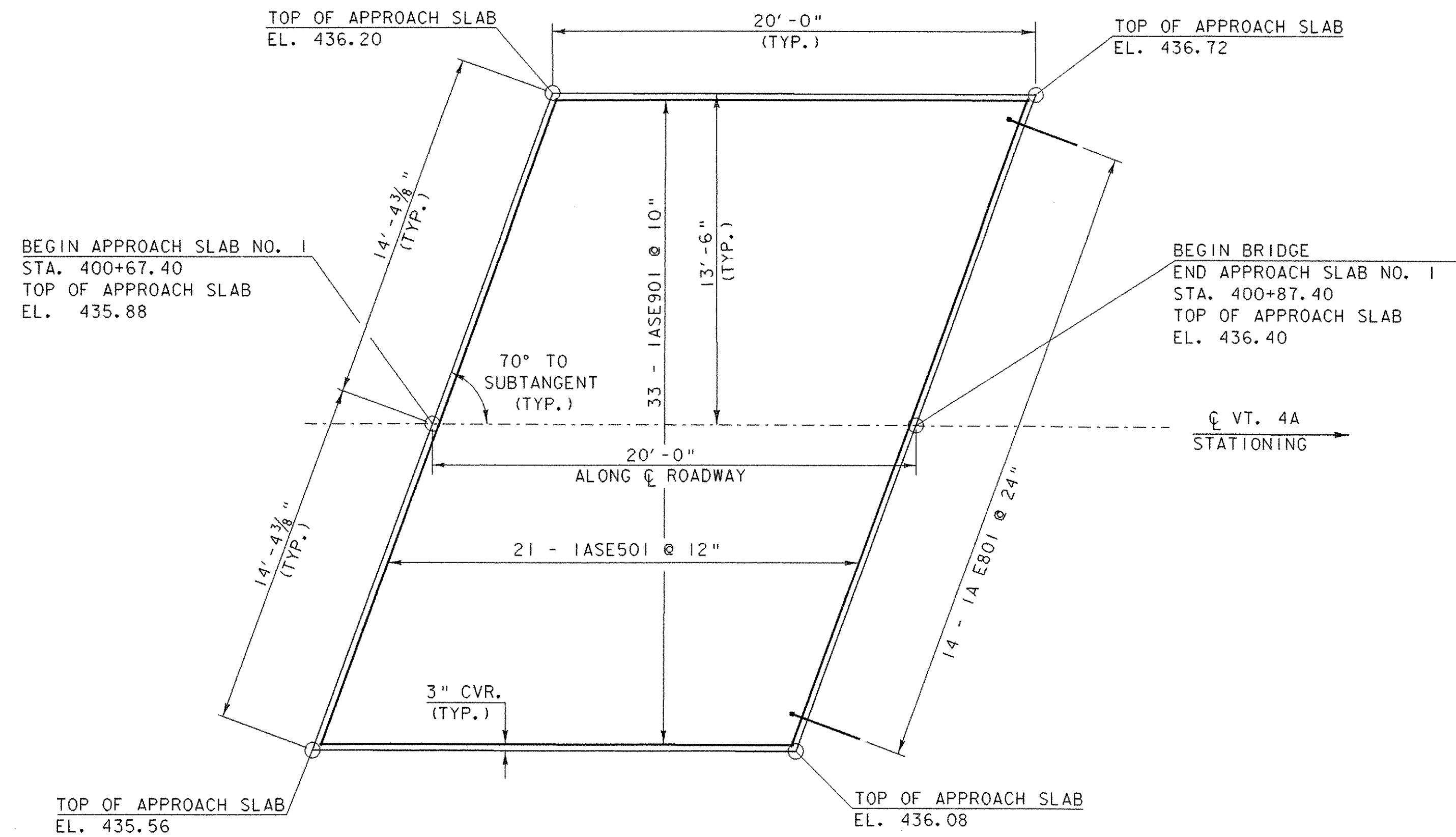


BRIDGE END DETAIL @ ABUTMENTS (NORMAL TO CL BEARING)

SCALE 3/4" = 1'-0"

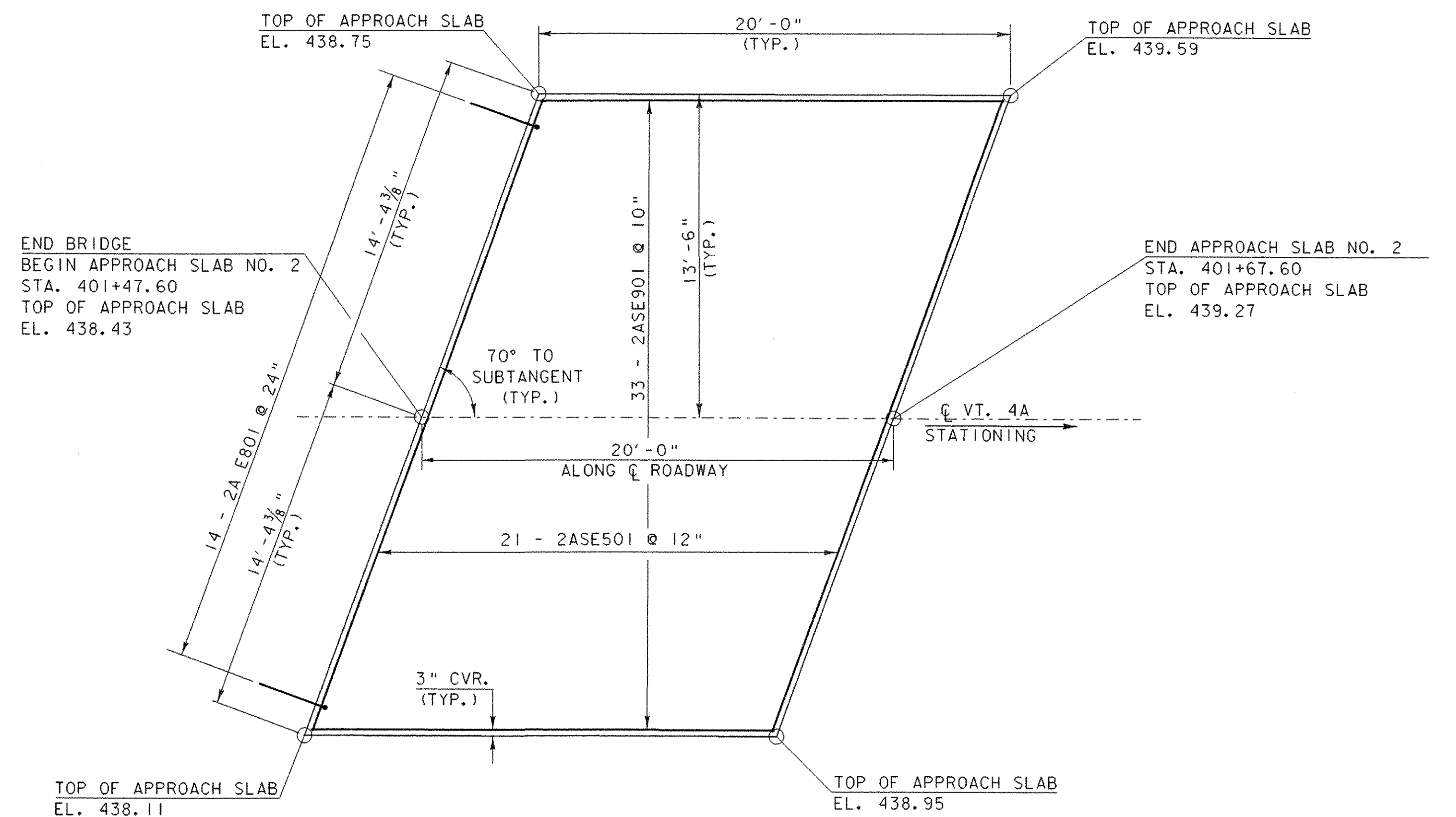
SUPERSTRUCTURE DETAILS  
TYPICAL SECTION &  
DECK OVERLAY REINFORCING

PROJECT NAME: CASTLETON	PLOT DATE: 16-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: L. BULLOCK
FILE NAME: PW/78f193/sf193sup.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 46 OF 68
DESIGNED BY: M. HALE	
78f193/str/sf193typ.1	



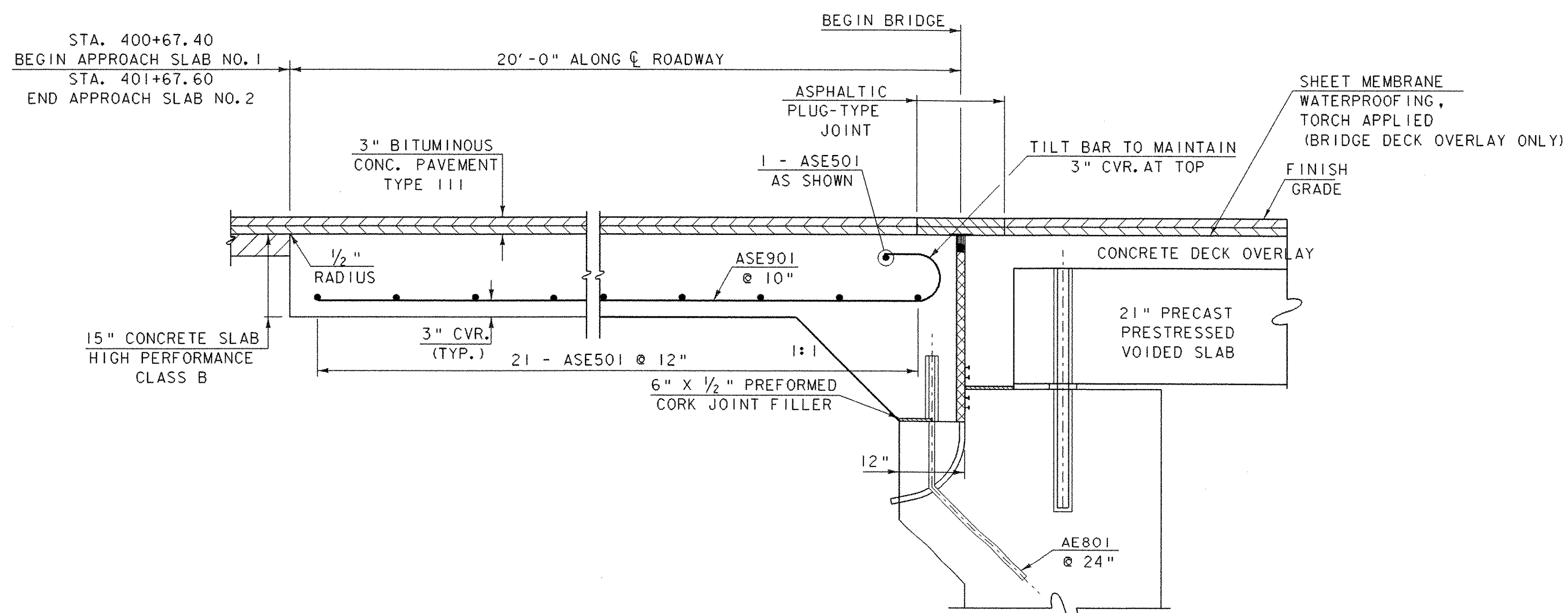
APPROACH SLAB NO. 1 PLAN

SCALE 1/4" = 1'-0"  
1 0 2 4 6



APPROACH SLAB NO. 2 PLAN

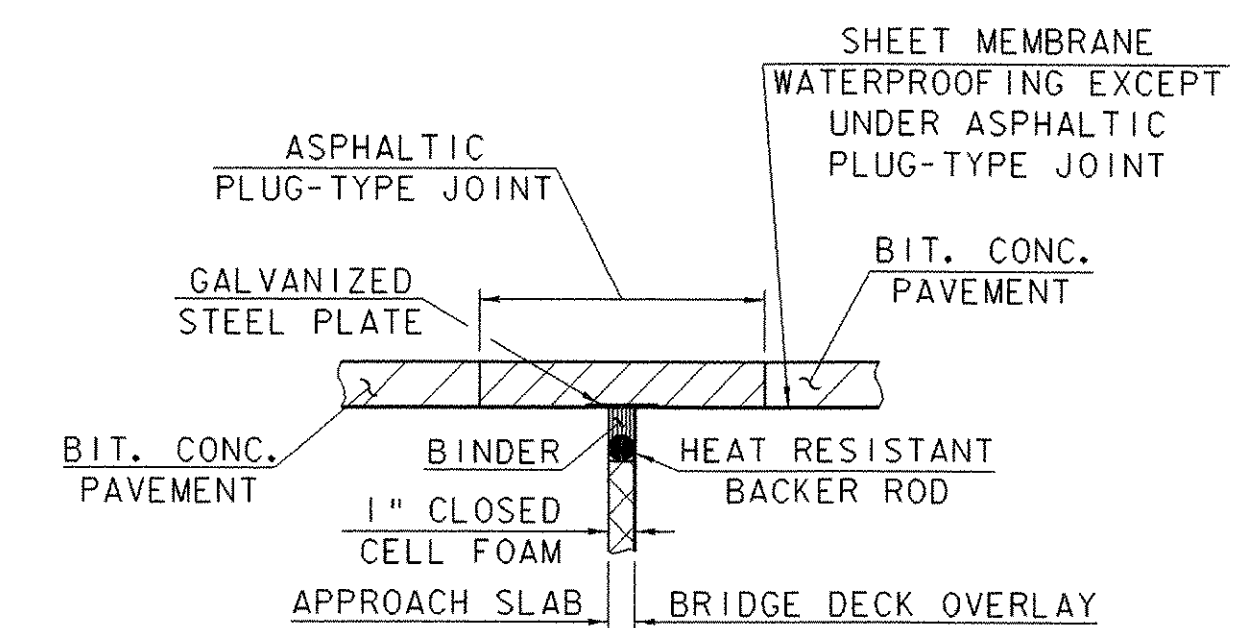
SCALE 1/4" = 1'-0"  
1 0 2 4 6



APPROACH SLAB NO. 1 DETAIL  
(NORMAL TO C)

(APPROACH SLAB NO. 2 SIMILAR)

SCALE 1" = 1'-0"  
1 9 6 3 0 1 2

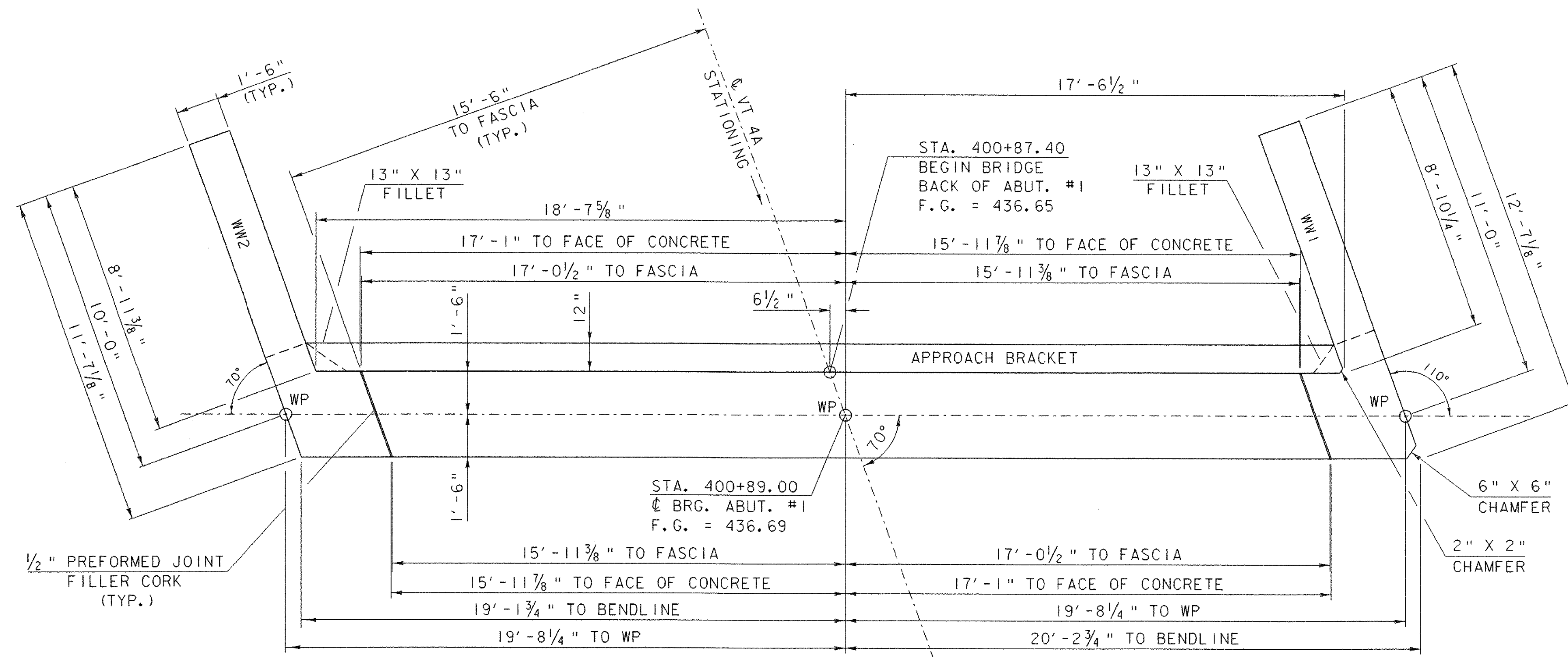


ASPHALTIC PLUG-TYPE  
JOINT DETAIL

NTS

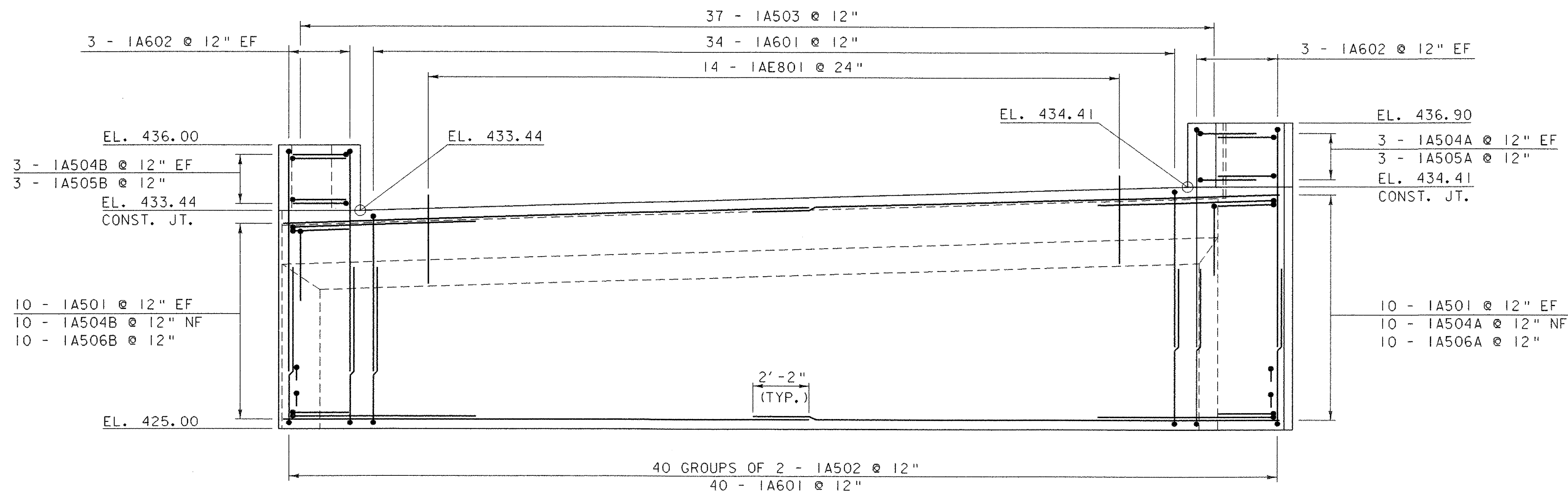
SUPERSTRUCTURE DETAILS  
APPROACH SLAB DETAILS

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR 3
FILE NAME: T8f193/str/sf293sup.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 47 OF 68
DESIGNED BY: M. HALE	
/T8f193/str/sf193as.I	



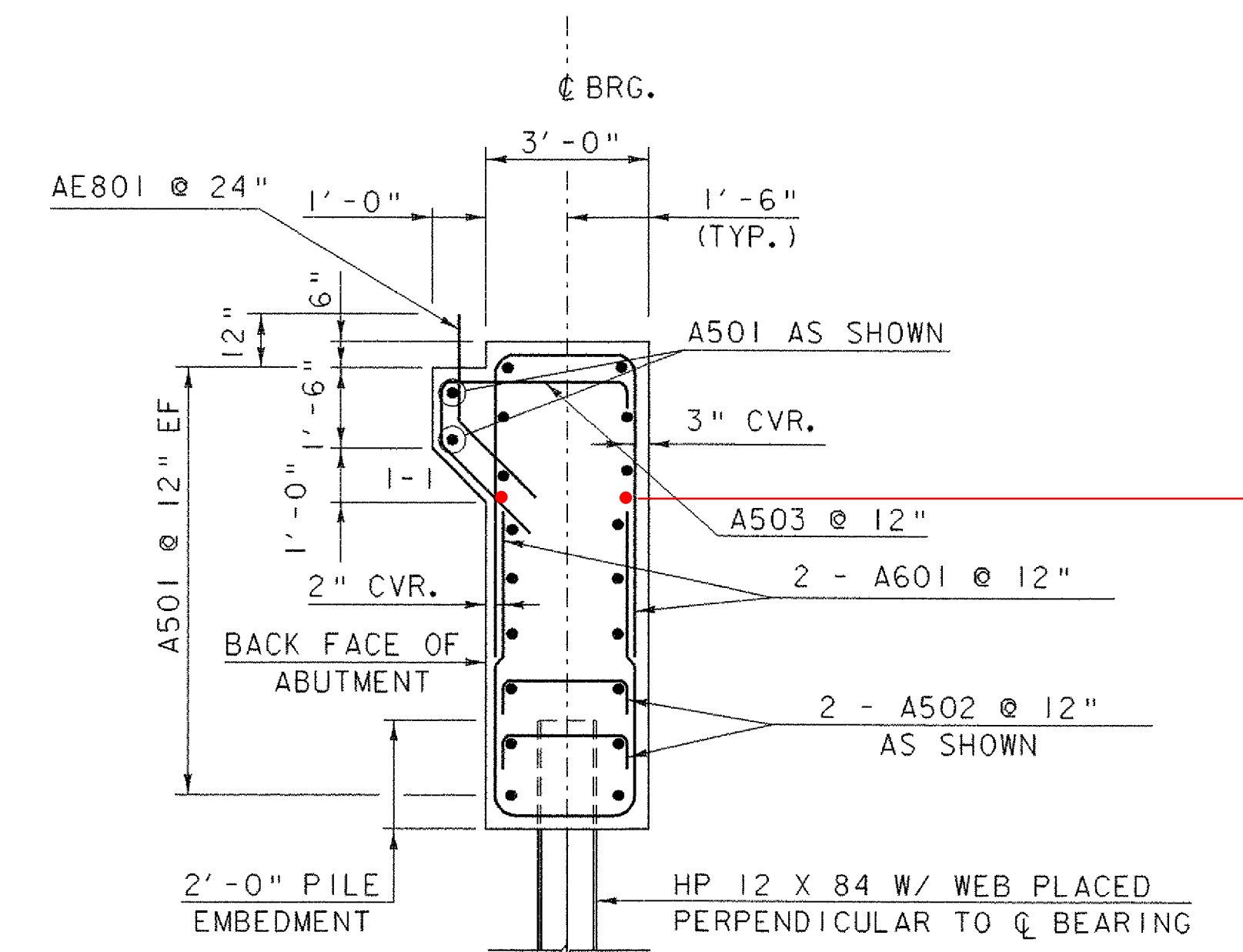
ABUTMENT NO. 1 PLAN

SCALE 3/8" = 1'-0"  
 1 0 1 2 3 4



ABUTMENT NO. 1 ELEVATION

SCALE 3/8" = 1'-0"  
 1 0 1 2 3 4



ABUTMENT TYPICAL

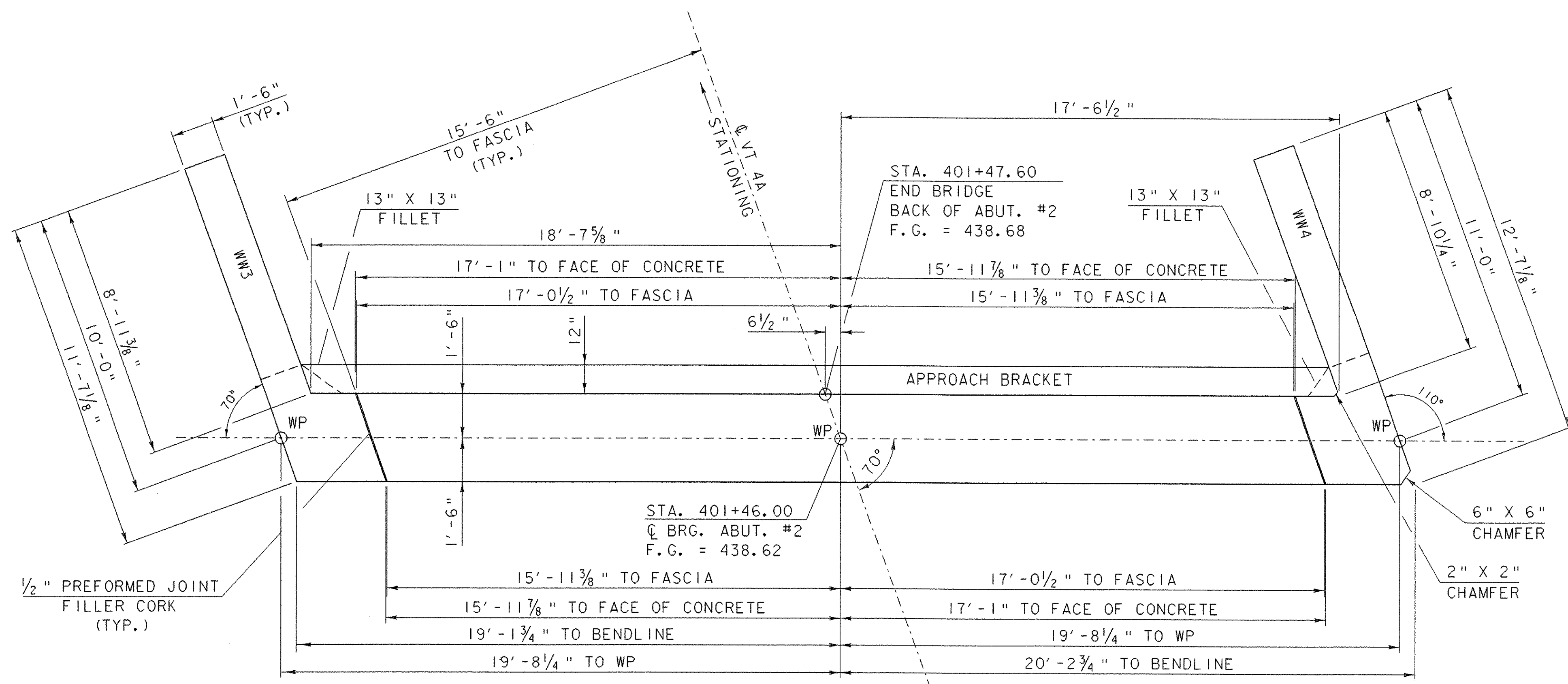
SCALE 3/8" = 1'-0"  
 1 0 1 2 3 4

**NOTE:**

- NF = NEAR FACE
- FF = FAR FACE
- EF = EACH FACE
- ▲ = CUT TO FIT IN FIELD
- 3" CVR. UNLESS OTHERWISE SPECIFIED ON THE PLANS.

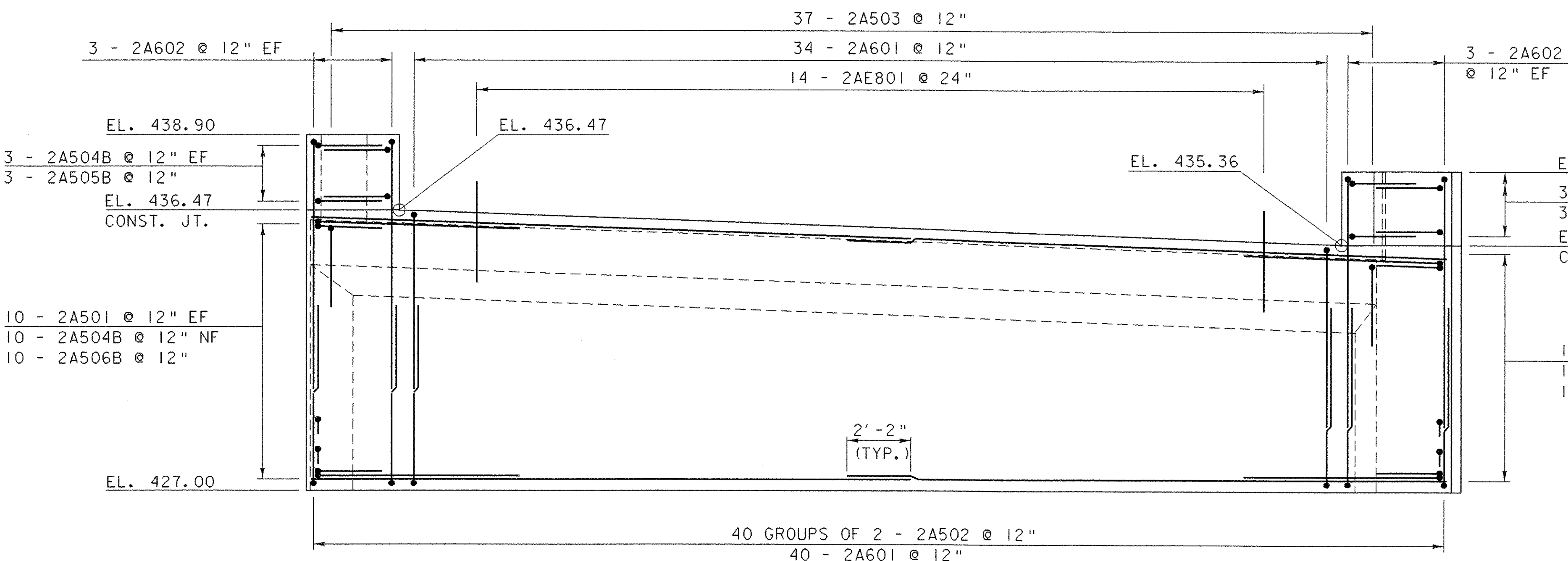
SUBSTRUCTURE DETAILS  
 ABUTMENT NO. 1

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR 3
FILE NAME: 78f193/sf193sub.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 48 OF 68
DESIGNED BY: J. PERRIGO	
78f193/str/sf193abl.i	



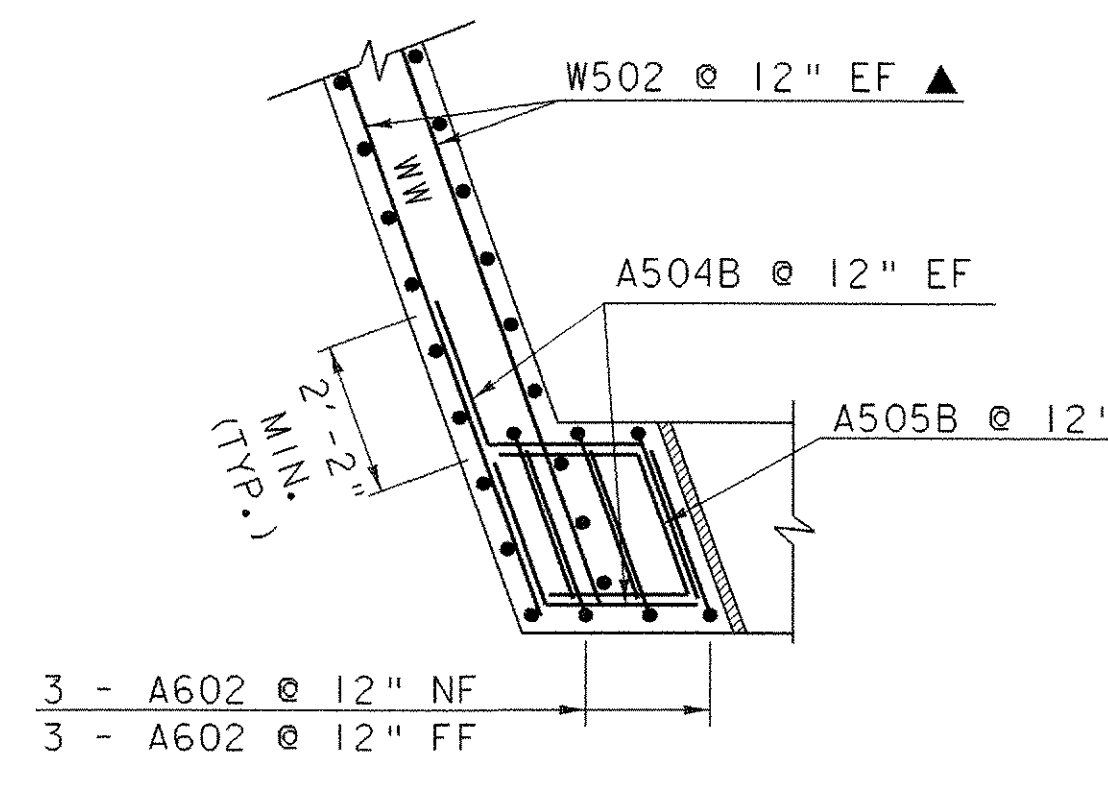
ABUTMENT NO. 2 PLAN

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



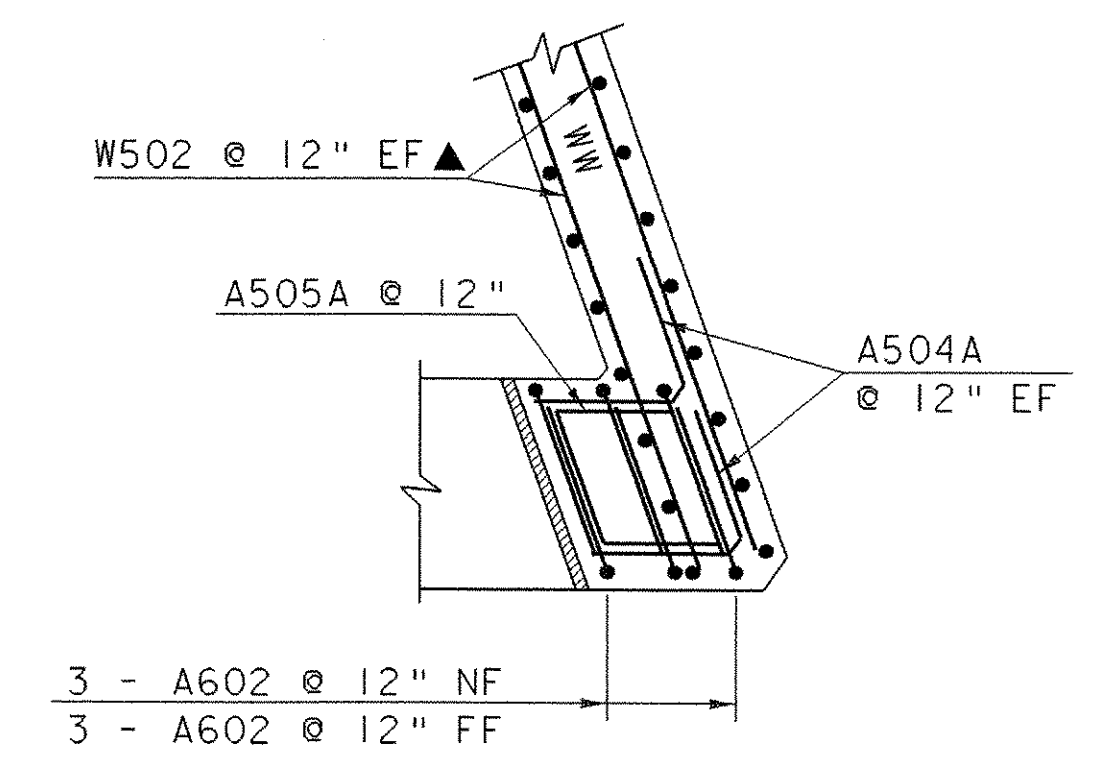
ABUTMENT NO. 2 ELEVATION

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



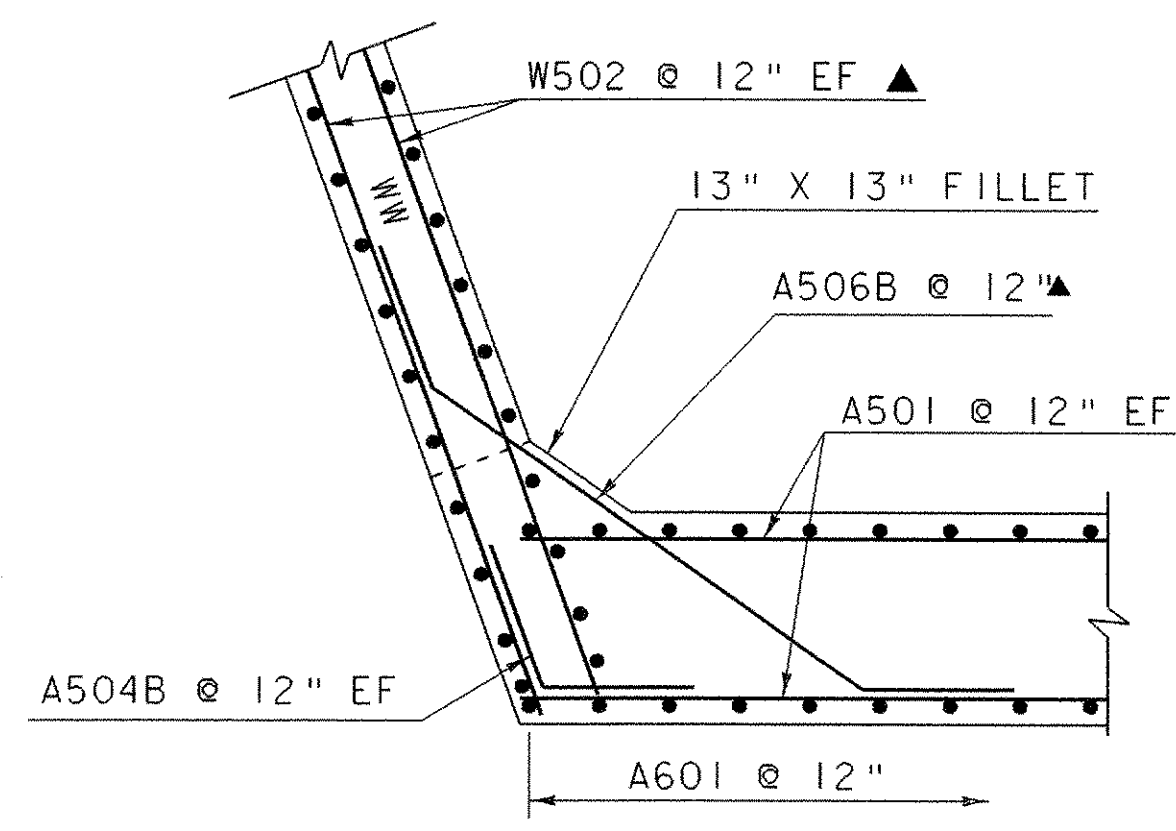
WINGWALL NO. 2 & NO. 3  
(ABOVE BRIDGE SEAT)

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



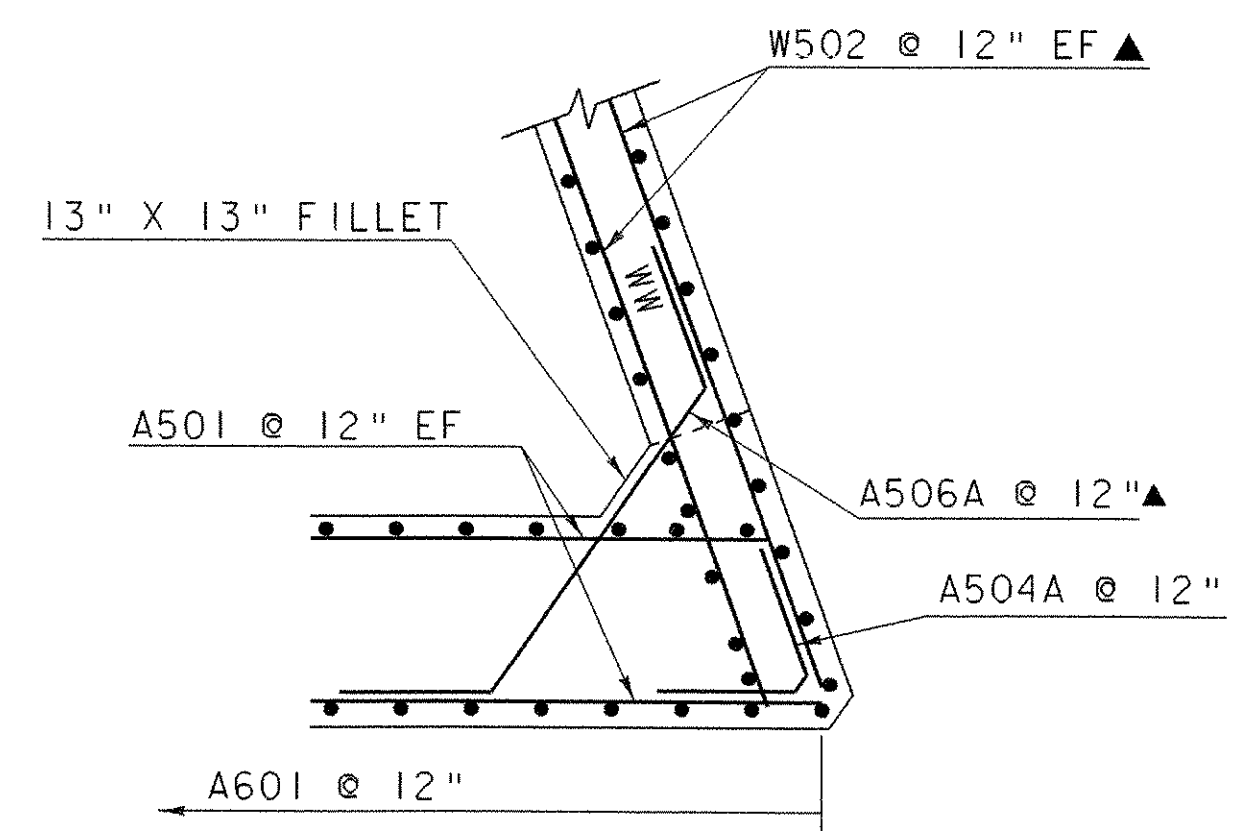
WINGWALL NO. 1 & NO. 4  
(ABOVE BRIDGE SEAT)

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



WINGWALL NO. 2 & NO. 3  
(BELOW BRIDGE SEAT)

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



WINGWALL NO. 1 & NO. 4  
(BELOW BRIDGE SEAT)

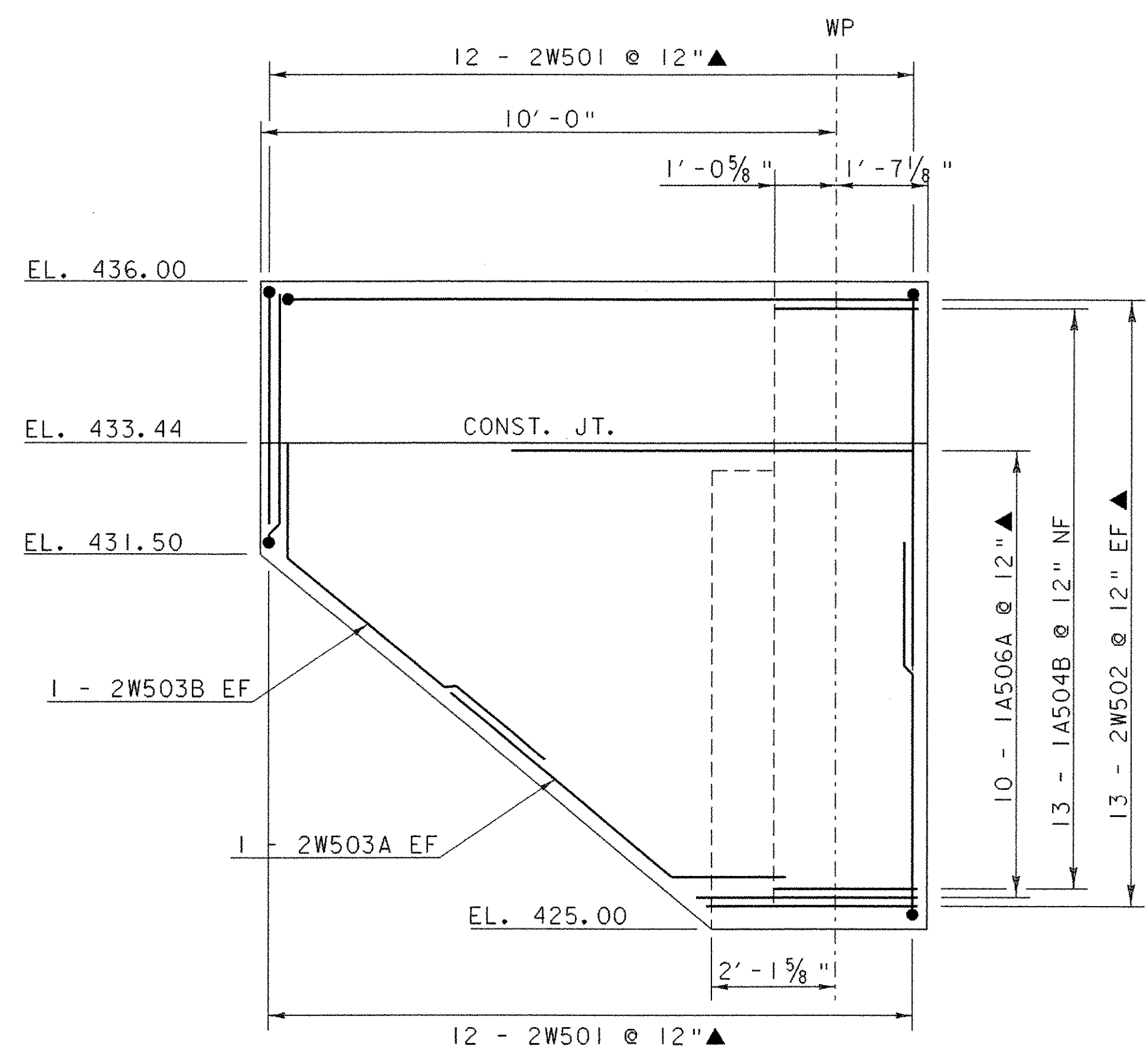
SCALE 3/8" = 1'-0"  
1 0 1 2 3 4

**NOTE:**

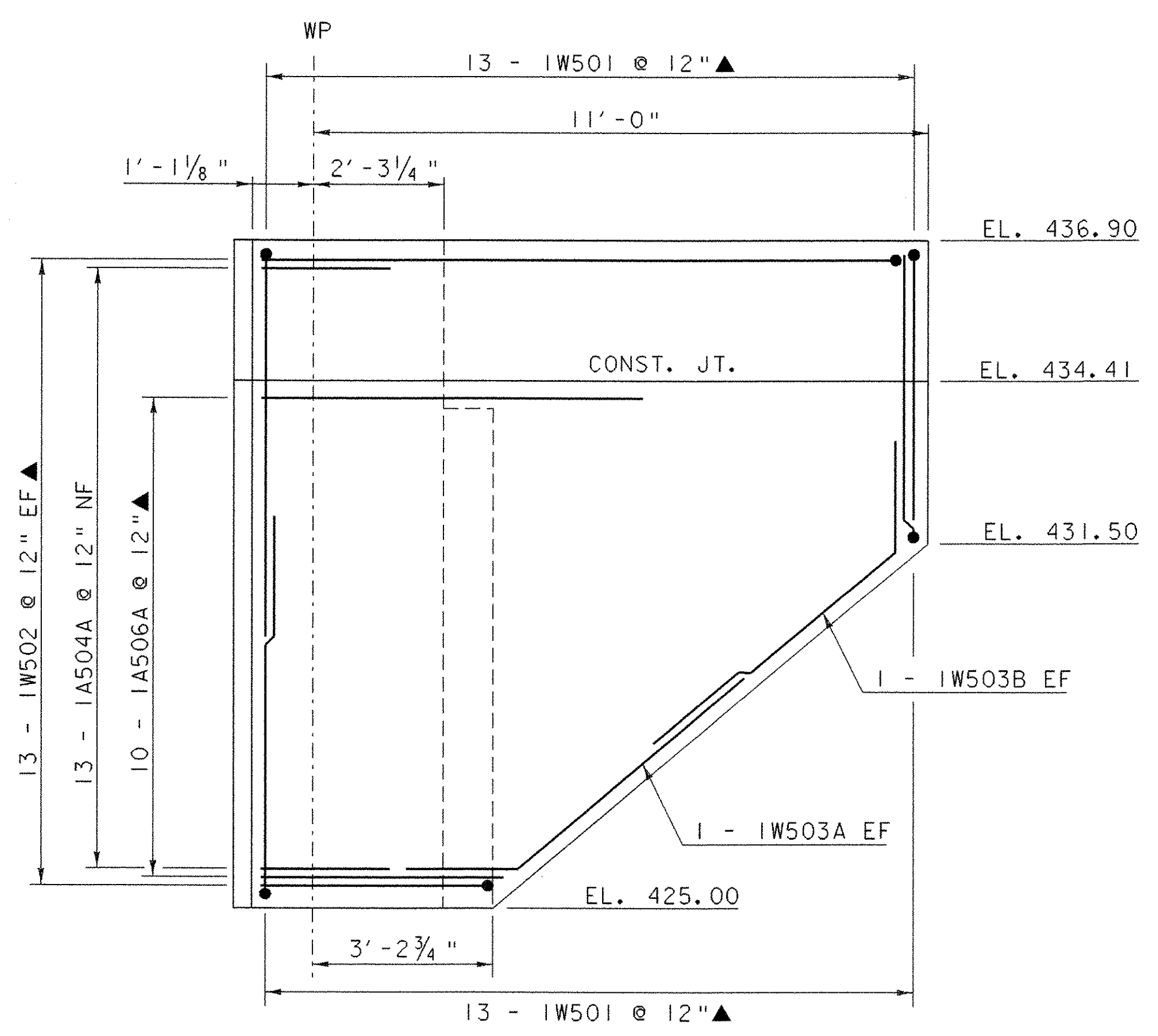
- NF = NEAR FACE
- FF = FAR FACE
- EF = EACH FACE
- ▲ = CUT TO FIT IN FIELD
- 3" CVR. UNLESS OTHERWISE SPECIFIED ON THE PLANS.

SUBSTRUCTURE DETAILS  
ABUTMENT NO. 2

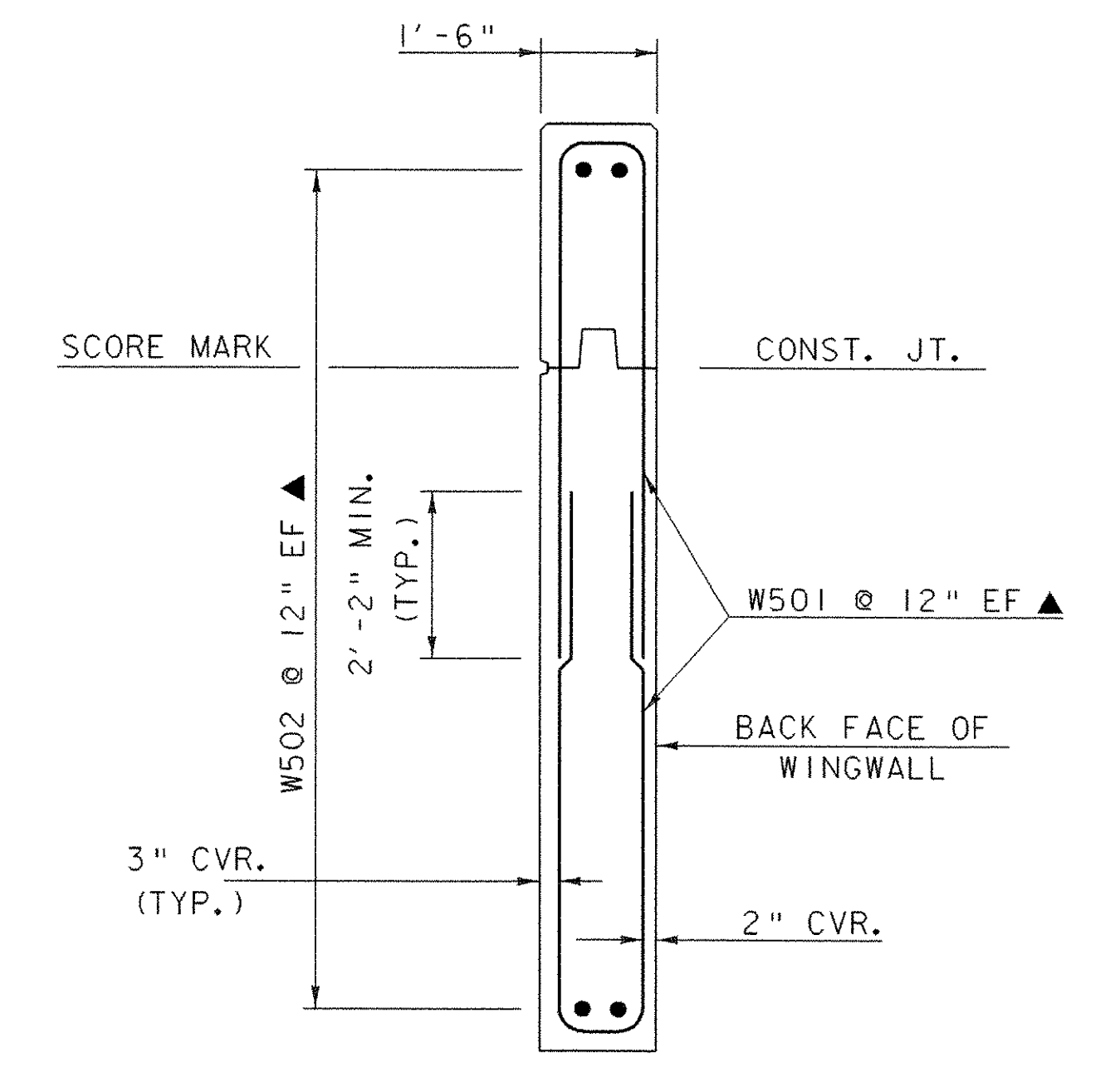
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR 3
FILE NAME: 78f193/sf193sub.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 49 OF 68
DESIGNED BY: J. PERRIGO	
78f193/str/sw193ab2.i	



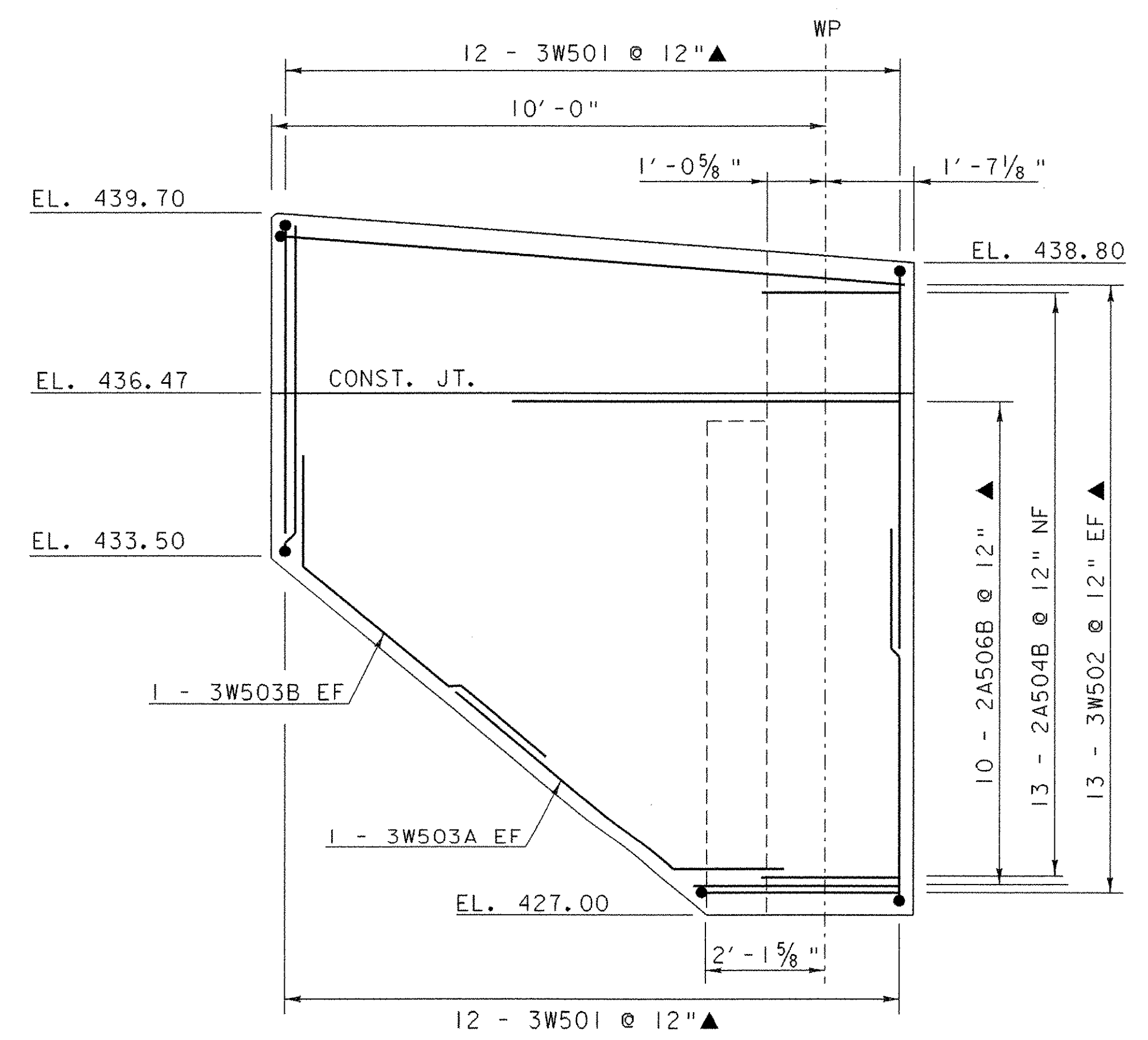
WINGWALL NO. 2 ELEVATION



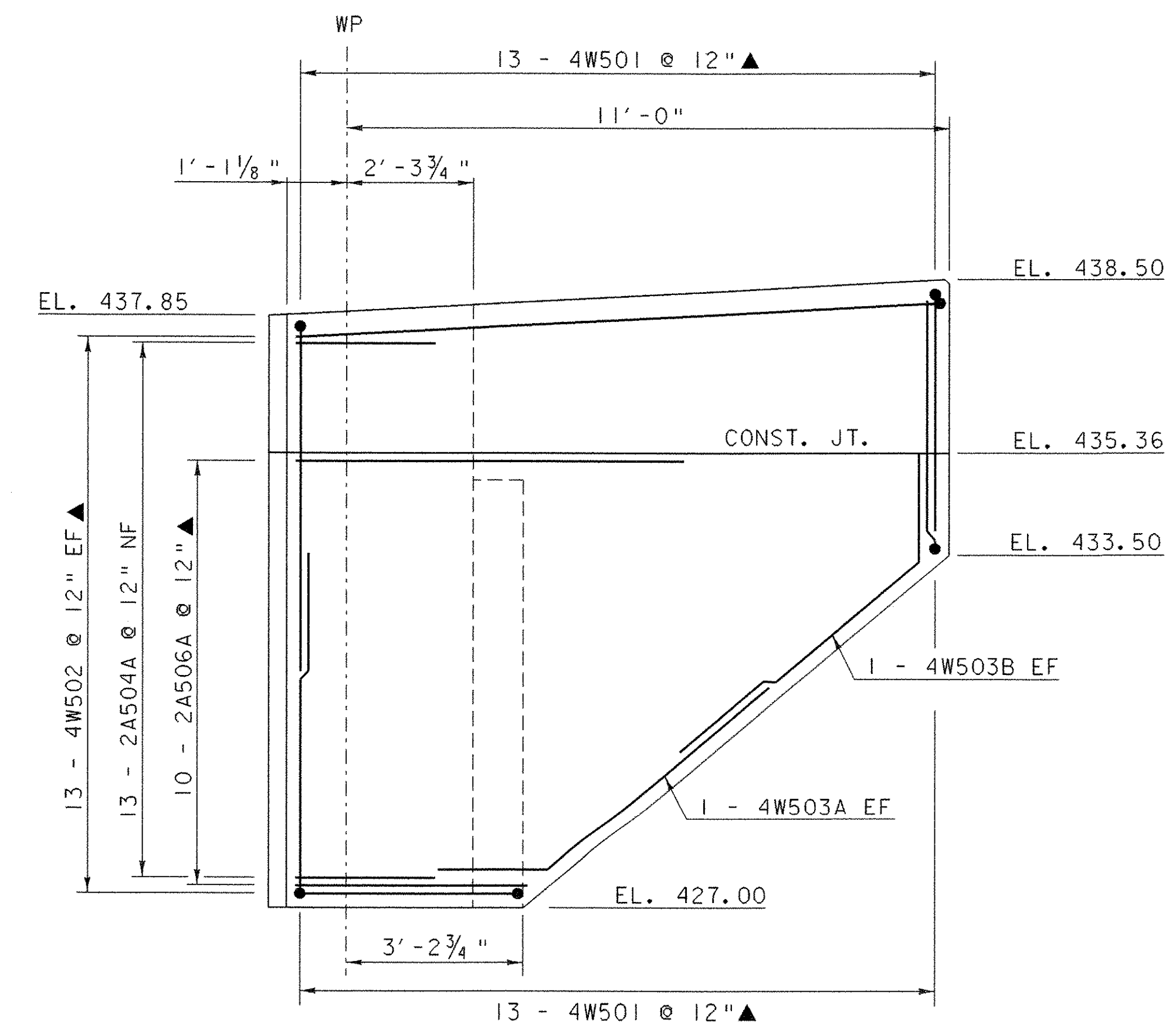
WINGWALL NO. 1 ELEVATION



WINGWALL TYPICAL



WINGWALL NO. 3 ELEVATION

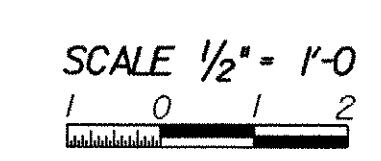


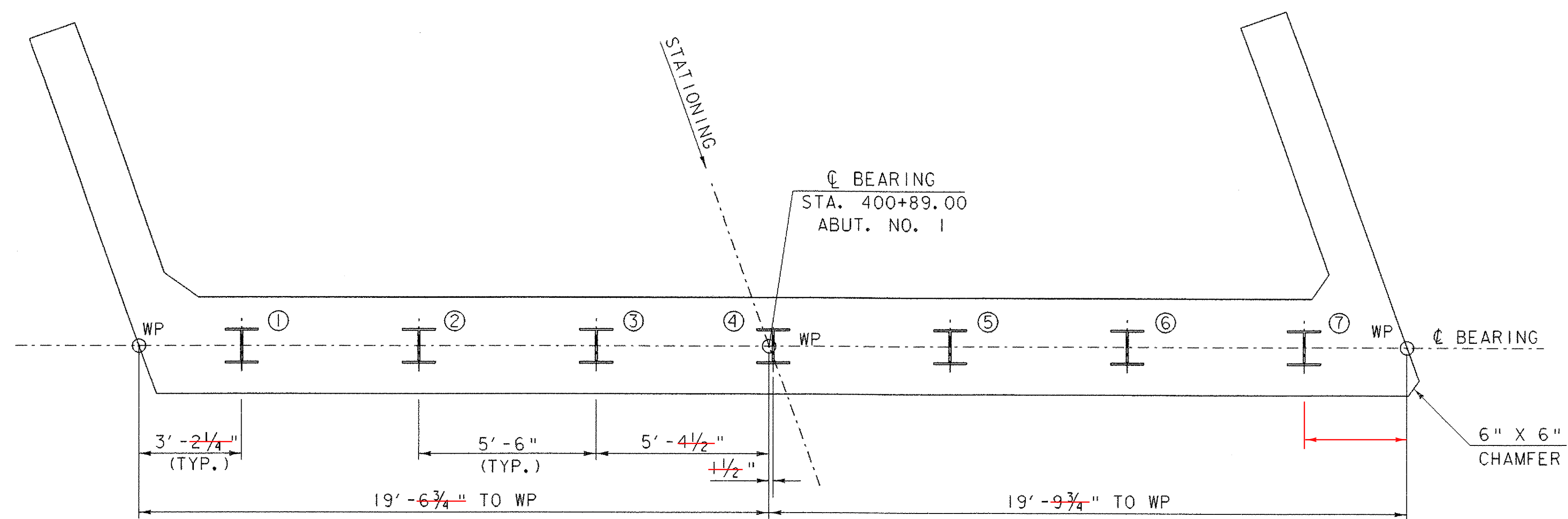
WINGWALL NO. 4 ELEVATION

**NOTE:**  
 NF - NEAR FACE  
 FF - FAR FACE  
 EF - EACH FACE  
 ▲ - CUT TO FIT IN FIELD  
 3" CVR. UNLESS OTHERWISE SPECIFIED ON THE PLANS.

SUBSTRUCTURE DETAILS  
 WINGWALLS

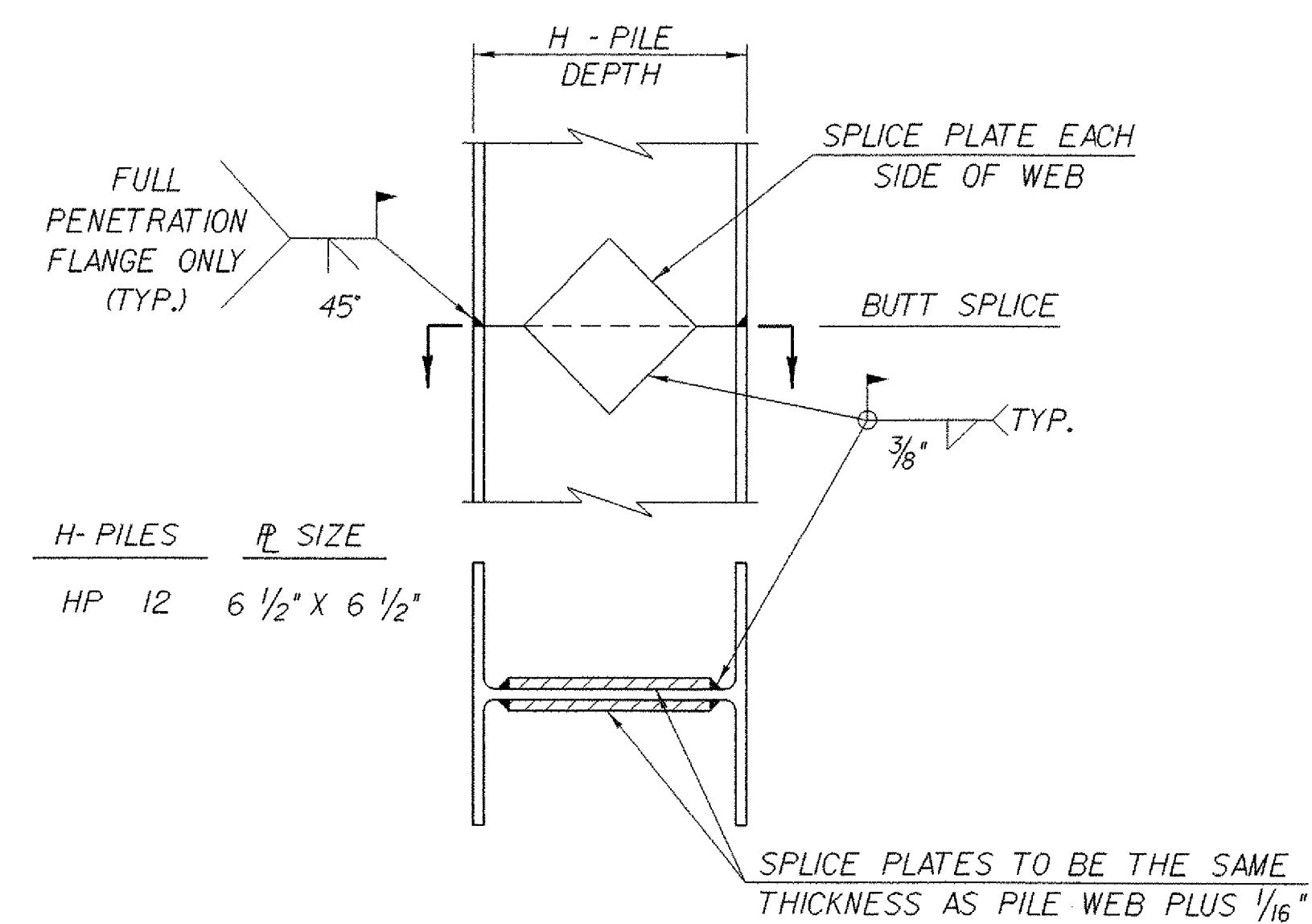
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR 3
FILE NAME: 78f193/sf193sub.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 50 OF 68
DESIGNED BY: J. PERRIGO	
78f193/str/sf193ww.i	





ABUTMENT NO. 1 PILE LAYOUT  
(ABUTMENT NO. 2 SIMILAR)

SCALE 3/8" = 1'-0"  
1 0 1 2 3 4



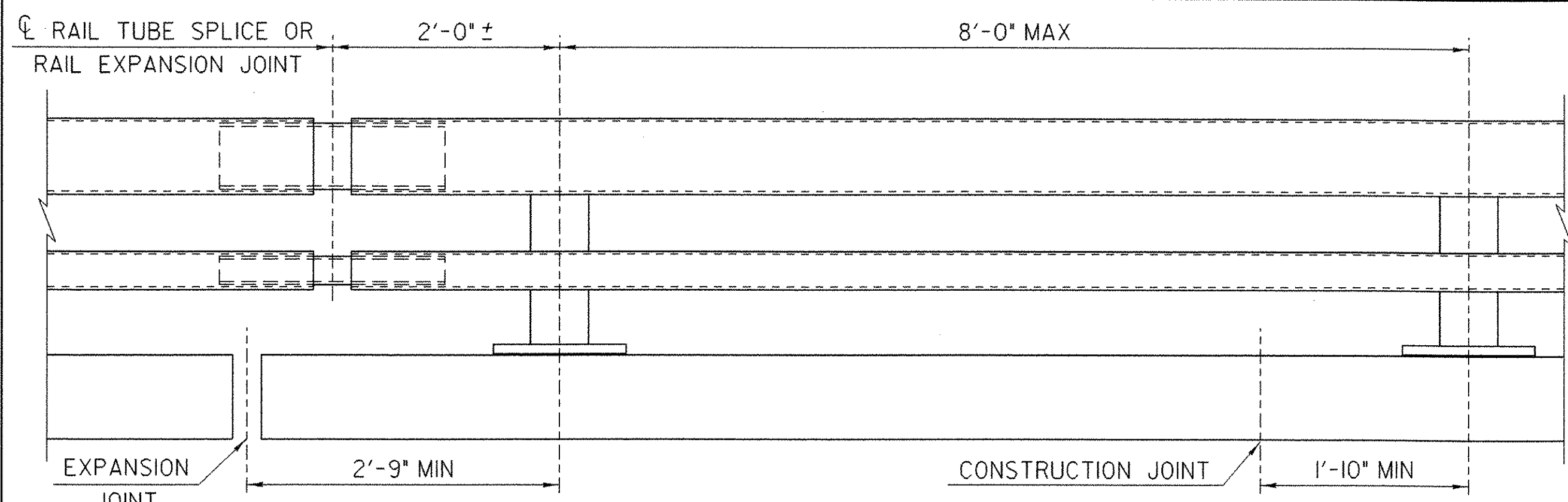
DETAIL OF PILE SPLICE  
NTS

PILE NOTES

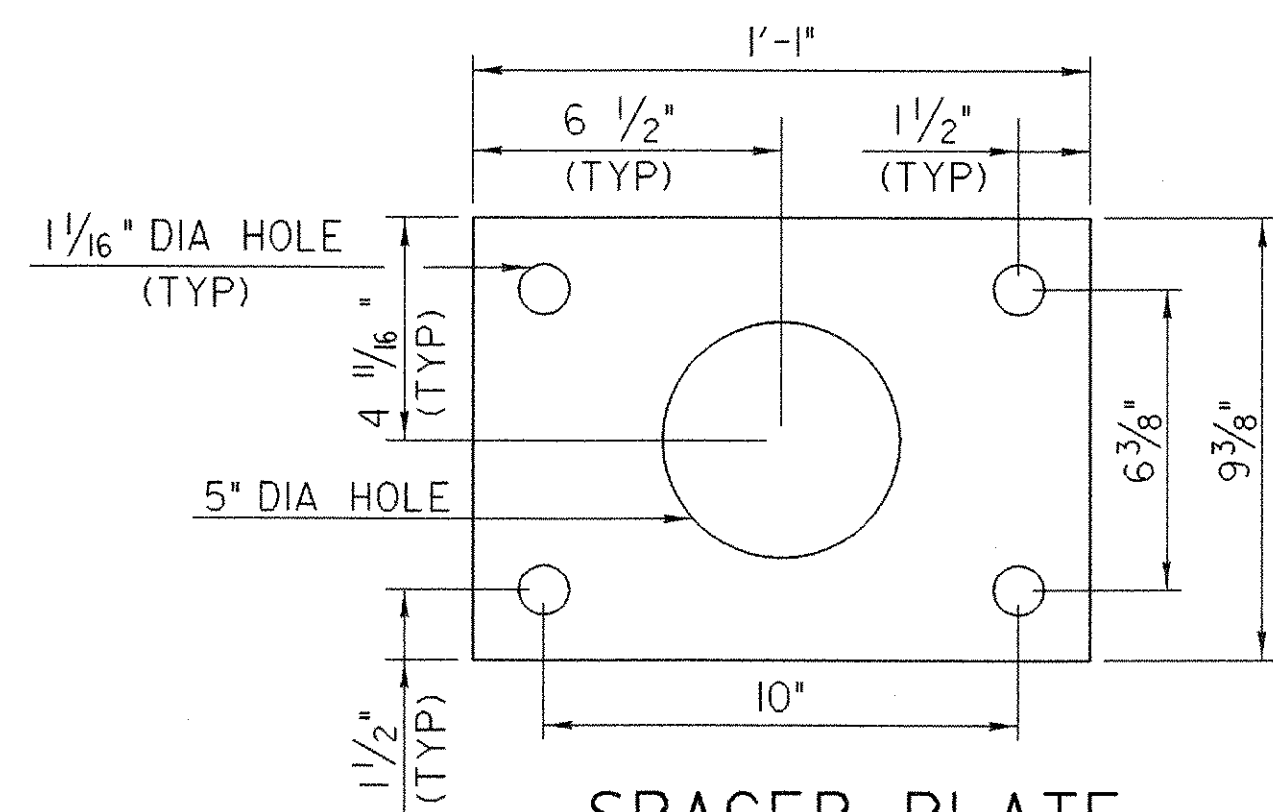
1. H - INDICATES LOCATION OF A VERTICAL H-PILE.
2. PILE SIZE: HP 12 X 84
3. PILE STEEL: AASHTO M270 GRADE 50
4. WELDING PROCEDURES TO BE APPROVED BY THE STRUCTURES ENGINEER PRIOR TO WELDING.


SUBSTRUCTURE DETAILS  
PILES

PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: L. BULLOCK
FILE NAME: 78f193/sf193sub.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 51 OF 68
DESIGNED BY: J. PERRIGO	
78f193/str/sf193pile.i	



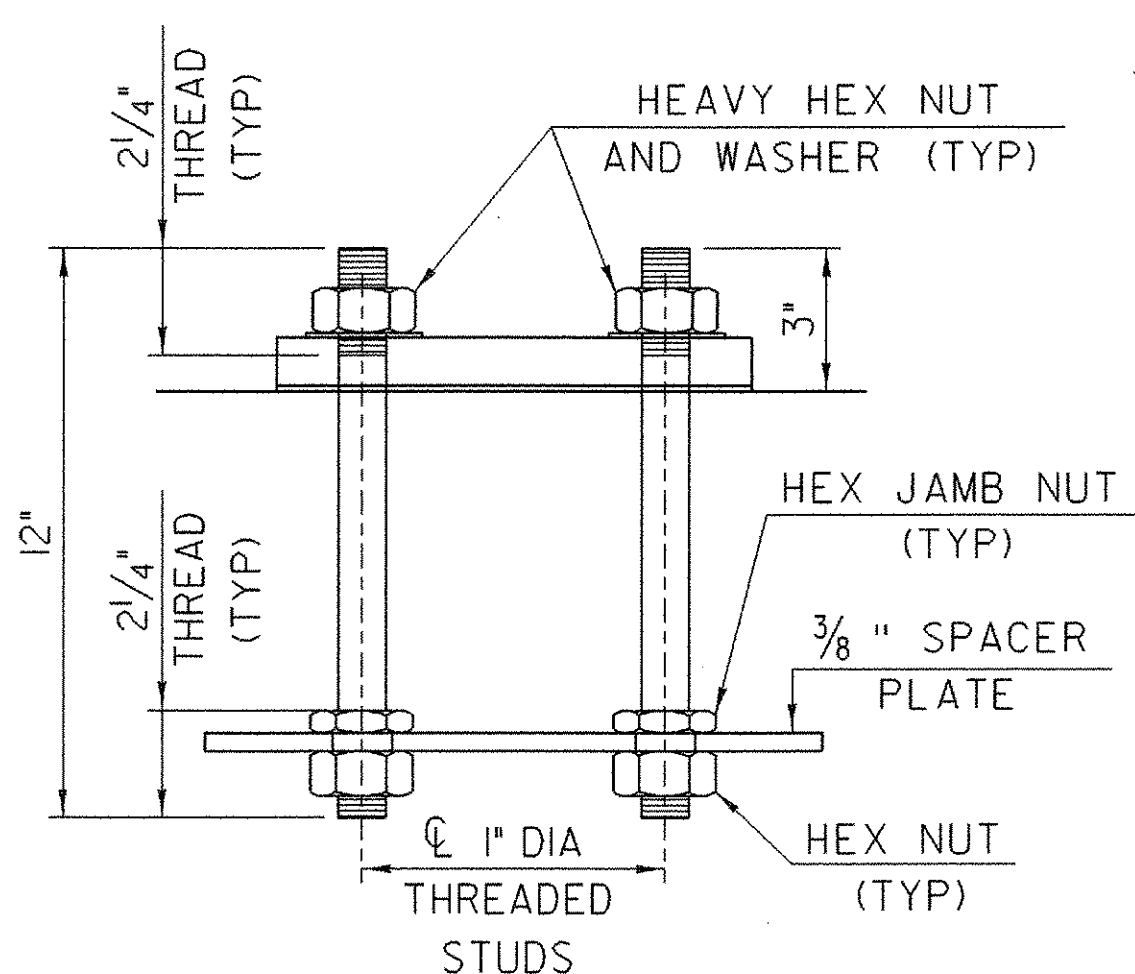
**BRIDGE RAILING ELEVATION**



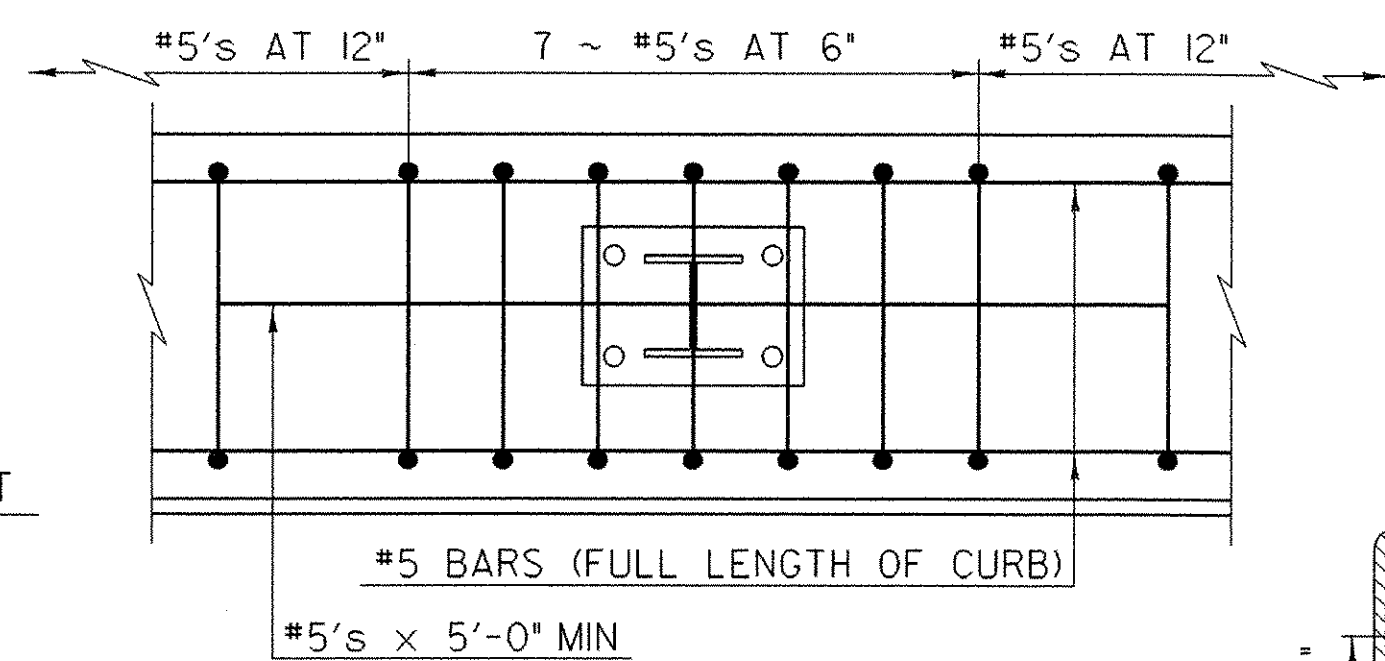
**SPACER PLATE**

**NOTES**

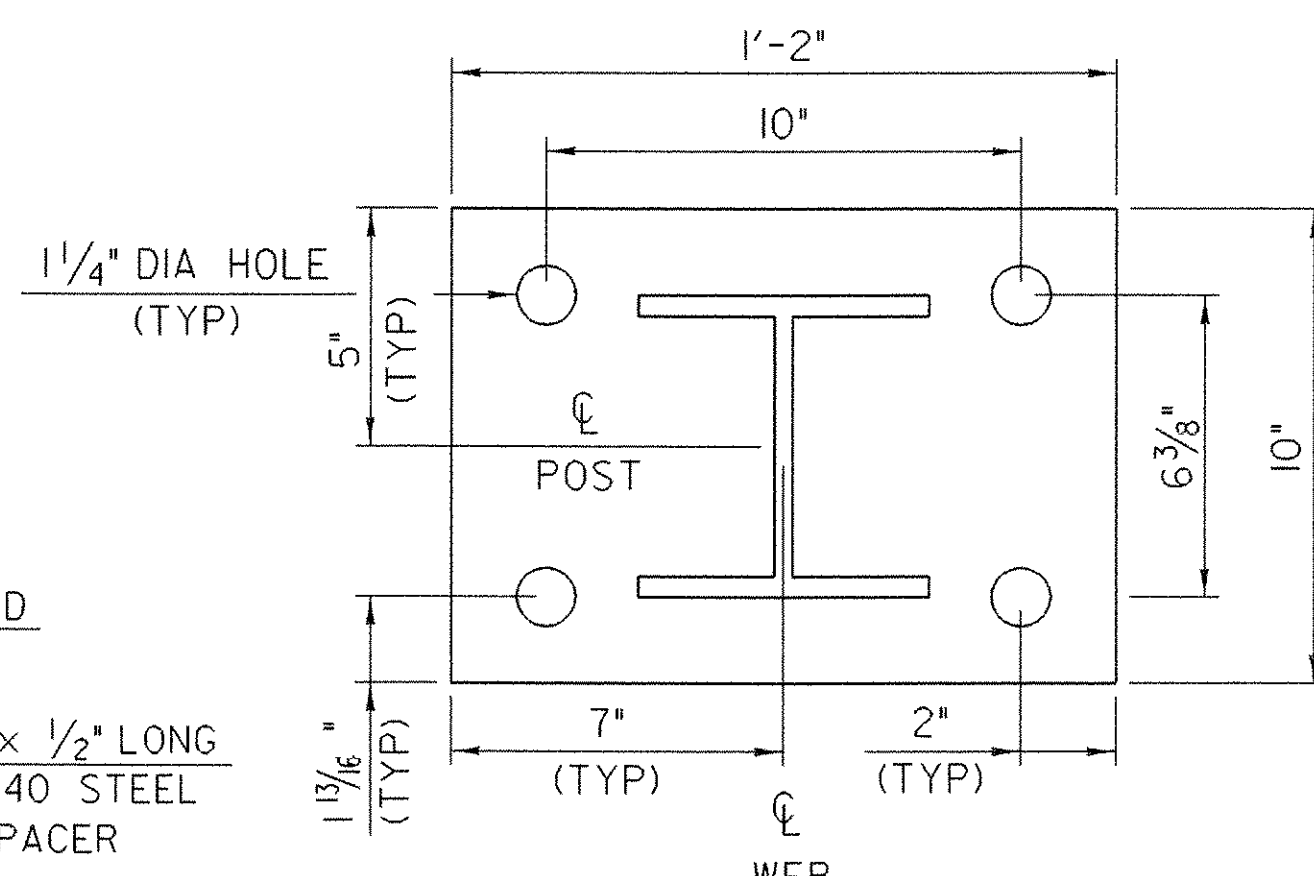
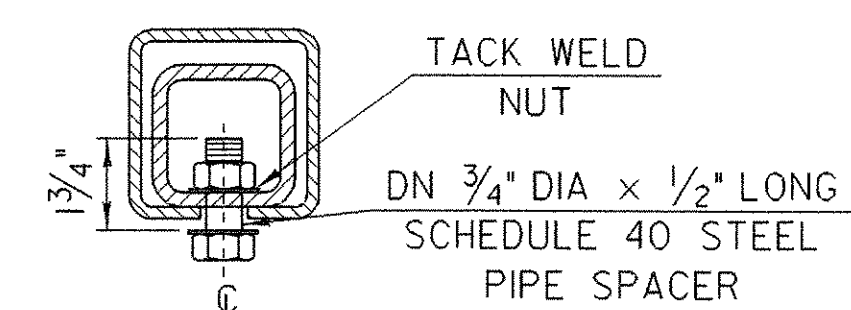
1. ALL WORK AND MATERIALS SHALL CONFORM TO THE PROVISIONS OF SECTION 525, "METAL RAILINGS" OF THE 2006 STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. TUBING AND POSTS SHALL MEET THE REQUIREMENTS OF SECTION 732, "RAILING MATERIALS" OF THE 2006 STANDARD SPECIFICATIONS FOR CONSTRUCTION EXCEPT THE DROP-WEIGHT TEAR TEST IN SECTION 732 SHALL NOT APPLY TO THE STRUCTURAL TUBING IN THIS STANDARD.
3. ALL EXPOSED CUT OR SHEARED EDGES SHALL BE ROUNDED TO A 1/16" RADIUS AND BE FREE OF BURRS.
4. RAIL POSTS SHALL BE SET NORMAL TO GRADE.
5. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO (2) RAIL POSTS AND PREFERABLY TO AT LEAST FOUR (4) POSTS.
6. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING A SUPERSTRUCTURE EXPANSION JOINT. EXPANSION JOINT WIDTH SHALL BE "X" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
7. ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111, EXCEPT THAT HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M232.
8. RAIL POSTS ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE-EIGHTH TURN.
9. RAIL TUBES SHALL BE ATTACHED USING 3/4" FULL DIAMETER BODY AASHTO M164 (TYPE 1) ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE 1/16" LARGER THAN THE BOLT SIZE.
10. HOLES IN RAILS FOR RAIL TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO ERECTION.
11. IF THERE IS A CONFLICT BETWEEN THESE STANDARD DETAILS AND THE DESIGN, THE REQUIREMENTS OF THE DESIGN DRAWINGS SHALL BE FOLLOWED.
12. ANY BENDING OF RAIL SHALL BE BY SHOP PROCEDURE ONLY.
13. THE FABRICATOR SHALL SUBMIT SHOP DRAWINGS INCLUDING WELDING PROCEDURES TO THE STRUCTURES SECTION FOR APPROVAL IN ACCORDANCE WITH THE PROVISION OF 506.04, SHOP DRAWINGS. ALL WELDING SHALL CONFORM WITH SECTION 506.10.
14. RAIL POSTS AND BASE PLATES SHALL BE TESTED FOR IMPACT PROPERTIES IN ACCORDANCE WITH ASTM A-370 CHARPY IMPACT TESTING USING TYPE A SPECIMEN.



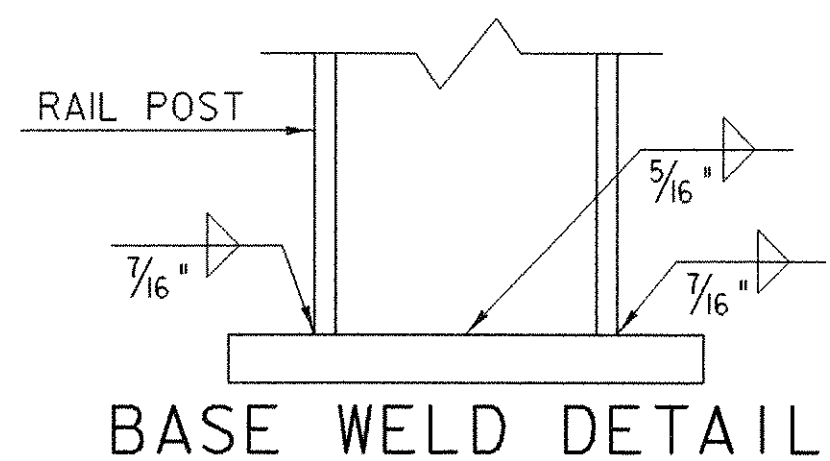
**RAIL POST ANCHORAGE**



**CURB REINFORCING PLAN**



**POST AND BASE PLATE**



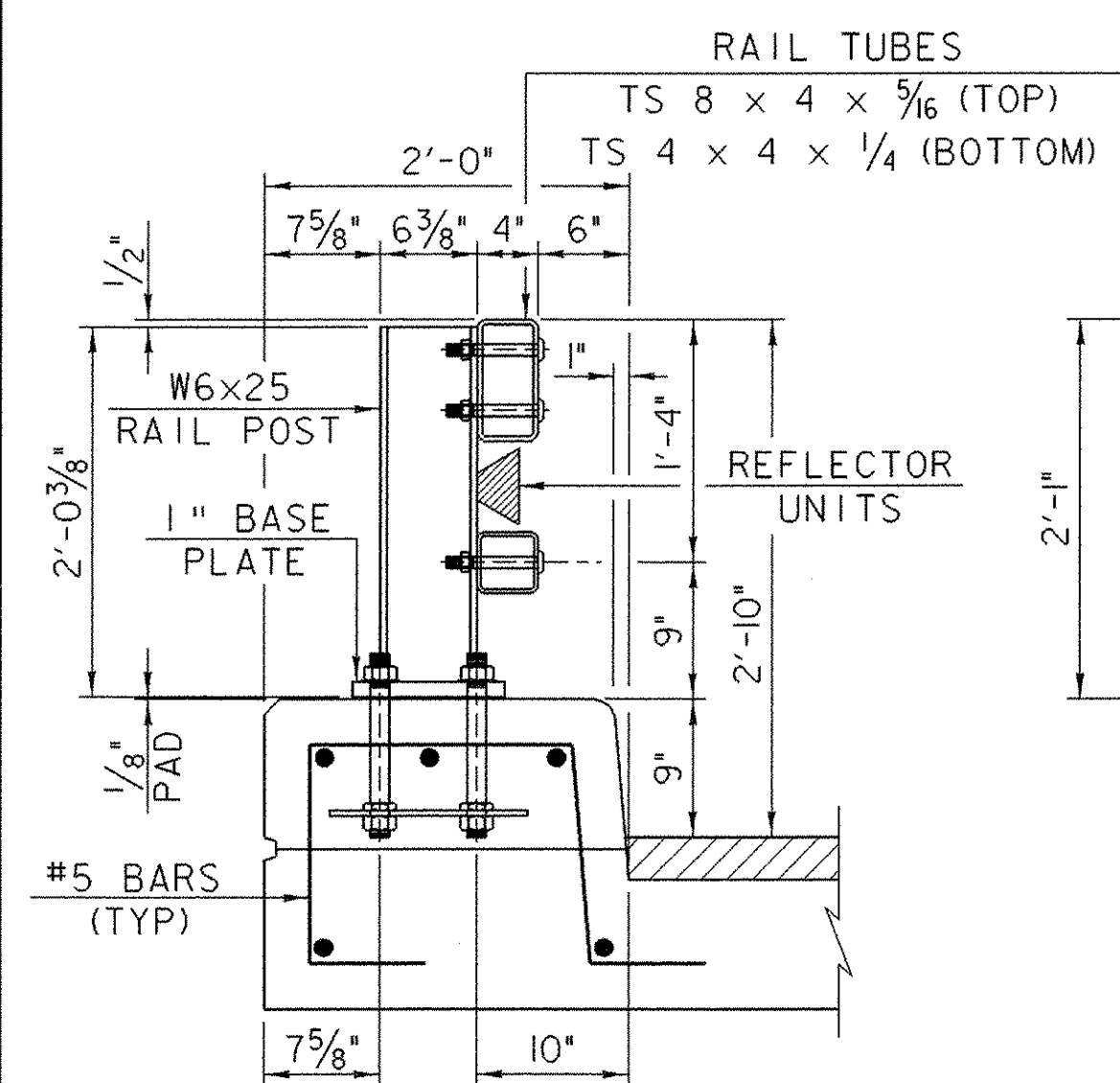
**BASE WELD DETAIL**

**EXPANSION JOINT SECTION**

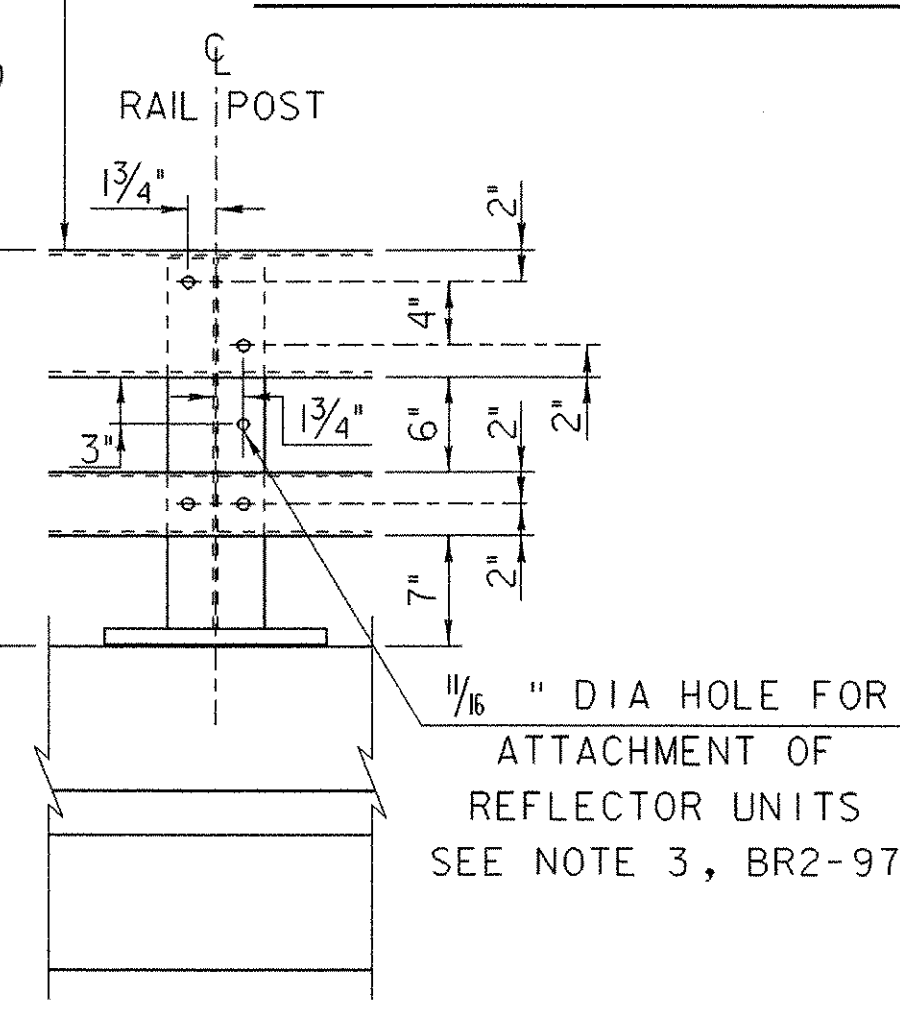
FOR DETAILS NOT SHOWN, SEE "RAIL TUBE SPLICE SECTION."

SPLICE TABLE					
T	A	B	C	L	X
N/A	4"	2"	--	20"	3/4"
EXPANSION JOINT TABLE					
<4"	4"	2"	2 1/2"	20"	2 1/2"
>4" <6 1/2"	5 1/2"	2 3/8"	3 1/2"	23 3/4"	4"
>6 1/2" <9"	6 1/2"	3 3/8"	9"*	27 3/4"	5"
>9" <13"	8 1/2"	4 3/8"	11"*	33 3/4"	7"

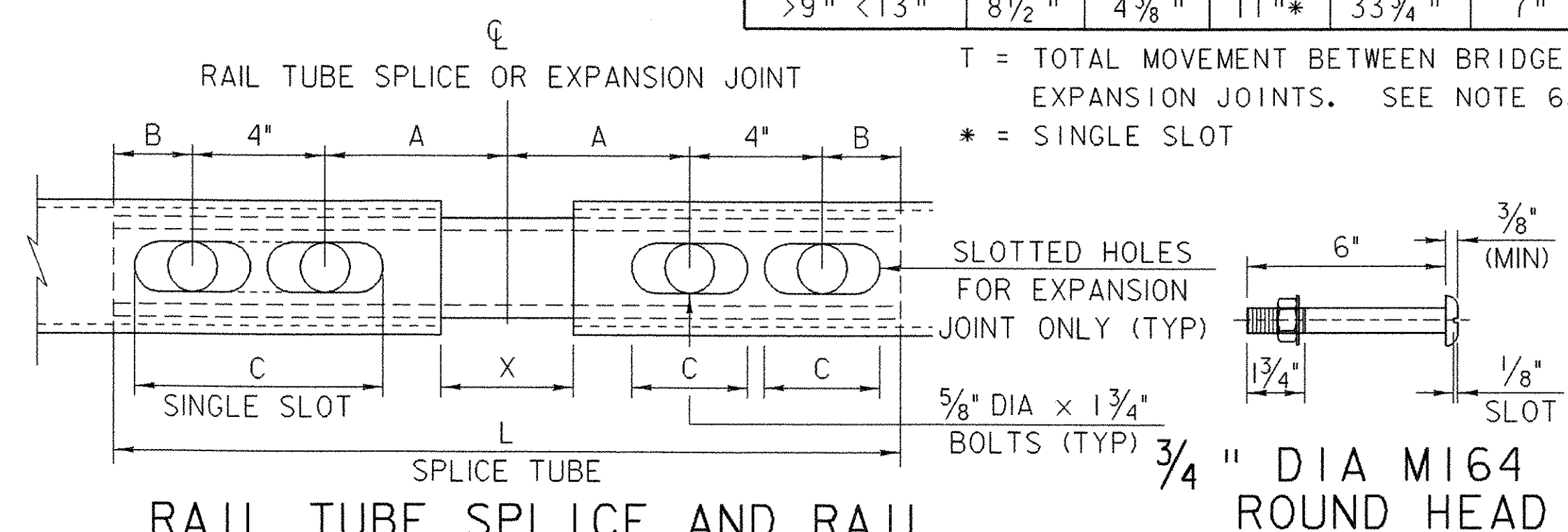
T = TOTAL MOVEMENT BETWEEN BRIDGE EXPANSION JOINTS. SEE NOTE 6.  
\* = SINGLE SLOT



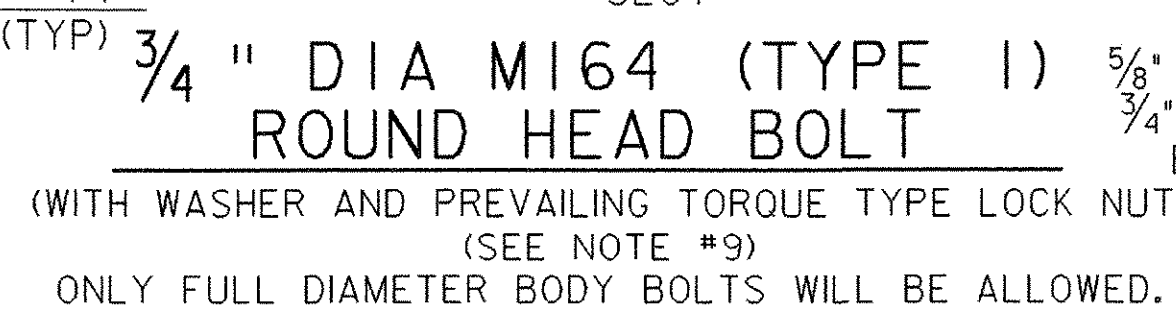
**TYPICAL SECTION**



**ELEVATION**



**RAIL TUBE SPLICE AND RAIL EXPANSION JOINT DETAIL (BOTTOM VIEW)**



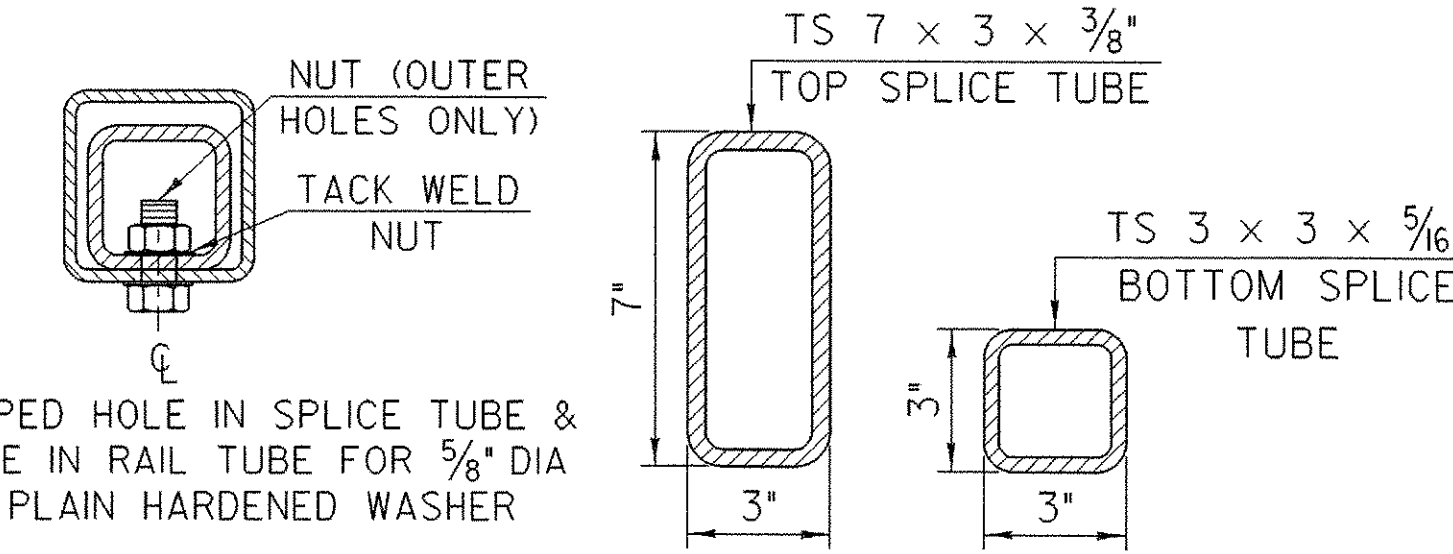
**MATERIALS**

RAIL TUBES.....ASTM A500, GRADE B OR ASTM A501  
RAIL POSTS AND BASE PLATES.....ASTM A709A709M, GRADE 50  
ALL OTHER SHAPES AND PLATES.....ASTM A709/A709M, GRADE 36  
ANCHOR STUDS.....ASTM A449  
ALL OTHER BOLTS (UNLESS NOTED).....AASHTO M164, TYPE 1

NUTS FOR AASHTO M164 (ASTM A325) BOLTS AND FOR ANCHOR STUDS SHALL COMPLY WITH AASHTO M291 (ASTM A563).

WASHERS SHALL COMPLY WITH AASHTO M293 (ASTM F436) SPECIFICATIONS.

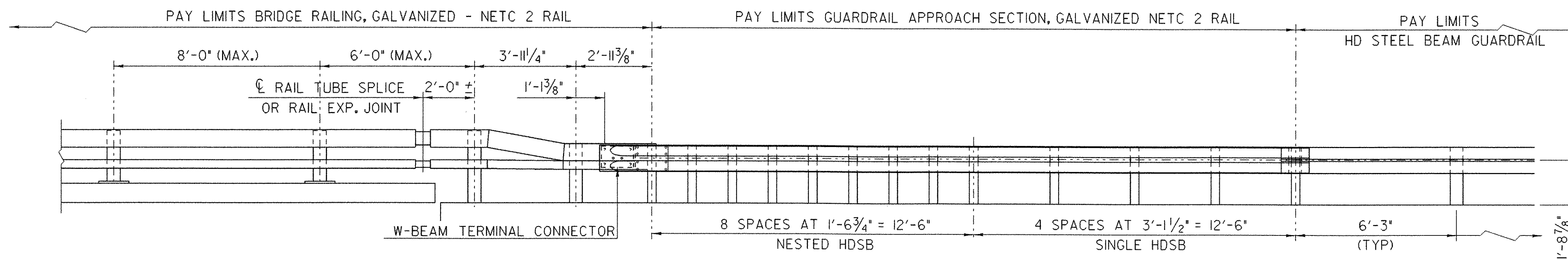
1/8" PAD SHALL COMPLY WITH STANDARD SPECIFICATION SUBSECTION 731.01 OR 731.02.



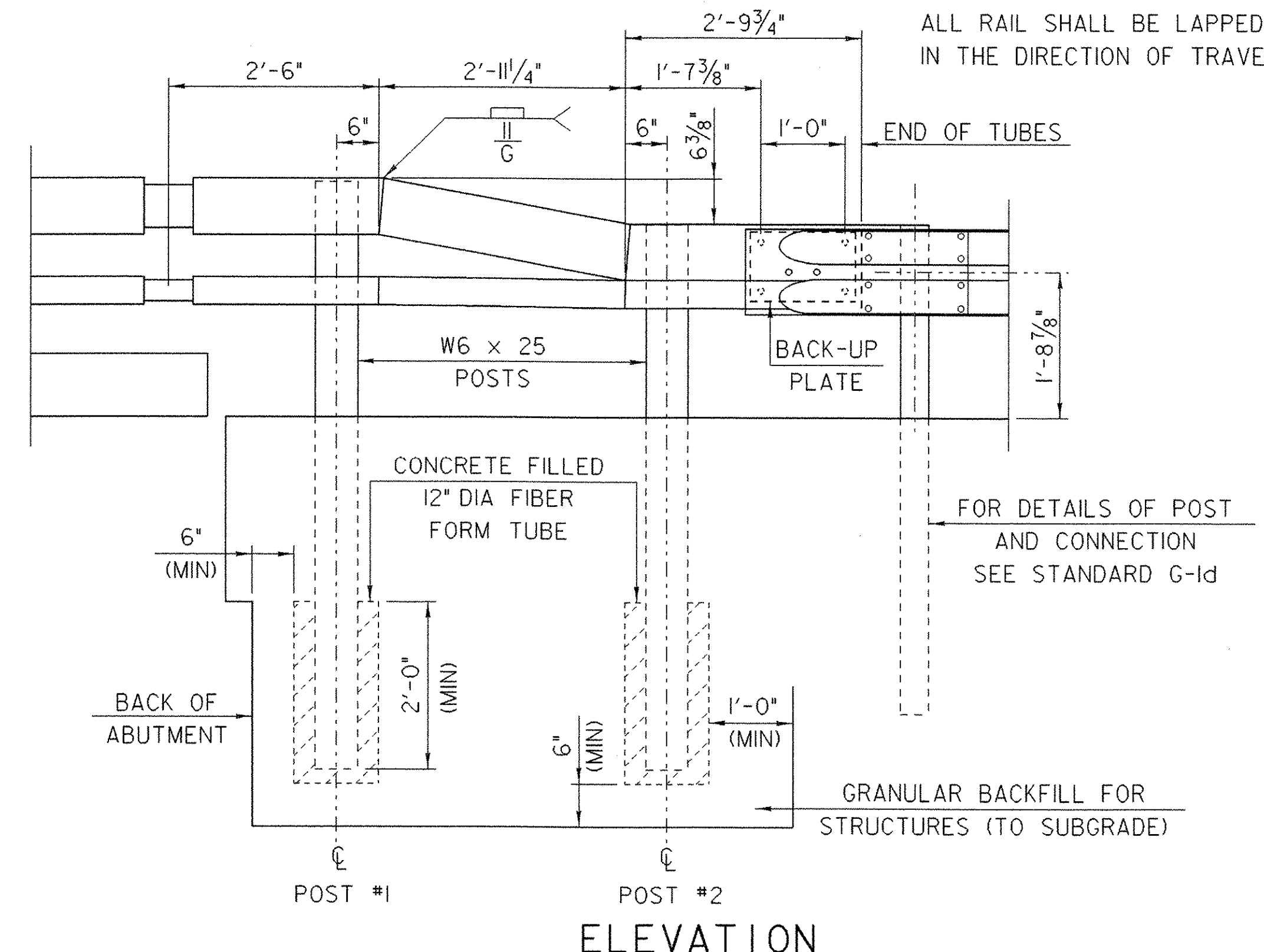
**RAIL TUBE SPLICE SECTION**

**BRIDGE RAILING N.E.T.C. 2 RAIL**

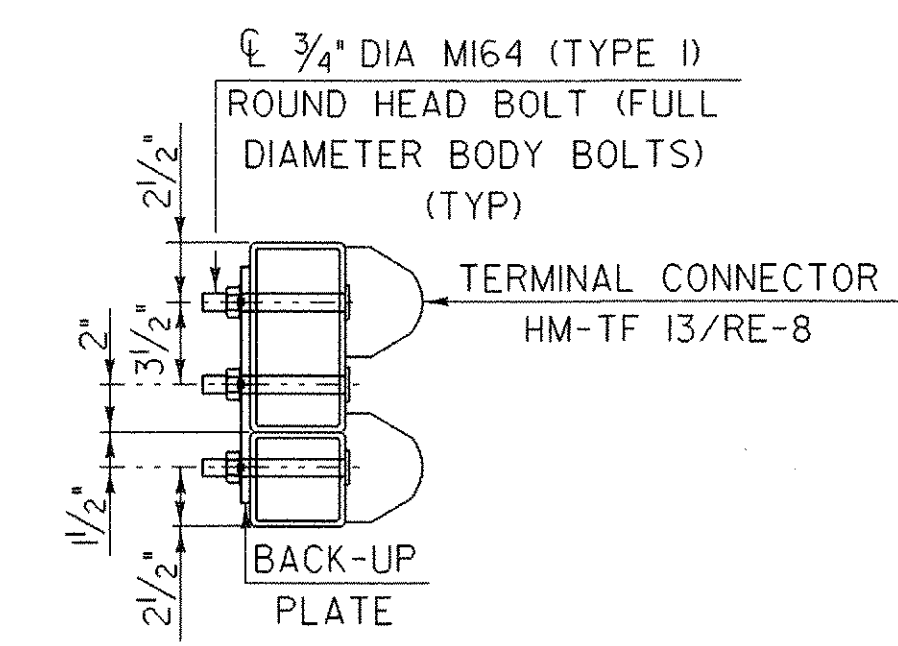
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR
FILE NAME: /78f193/str/sf193netc.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 52 OF 68
DESIGNED BY: STR	
78f193/str/sf193netcl.l	



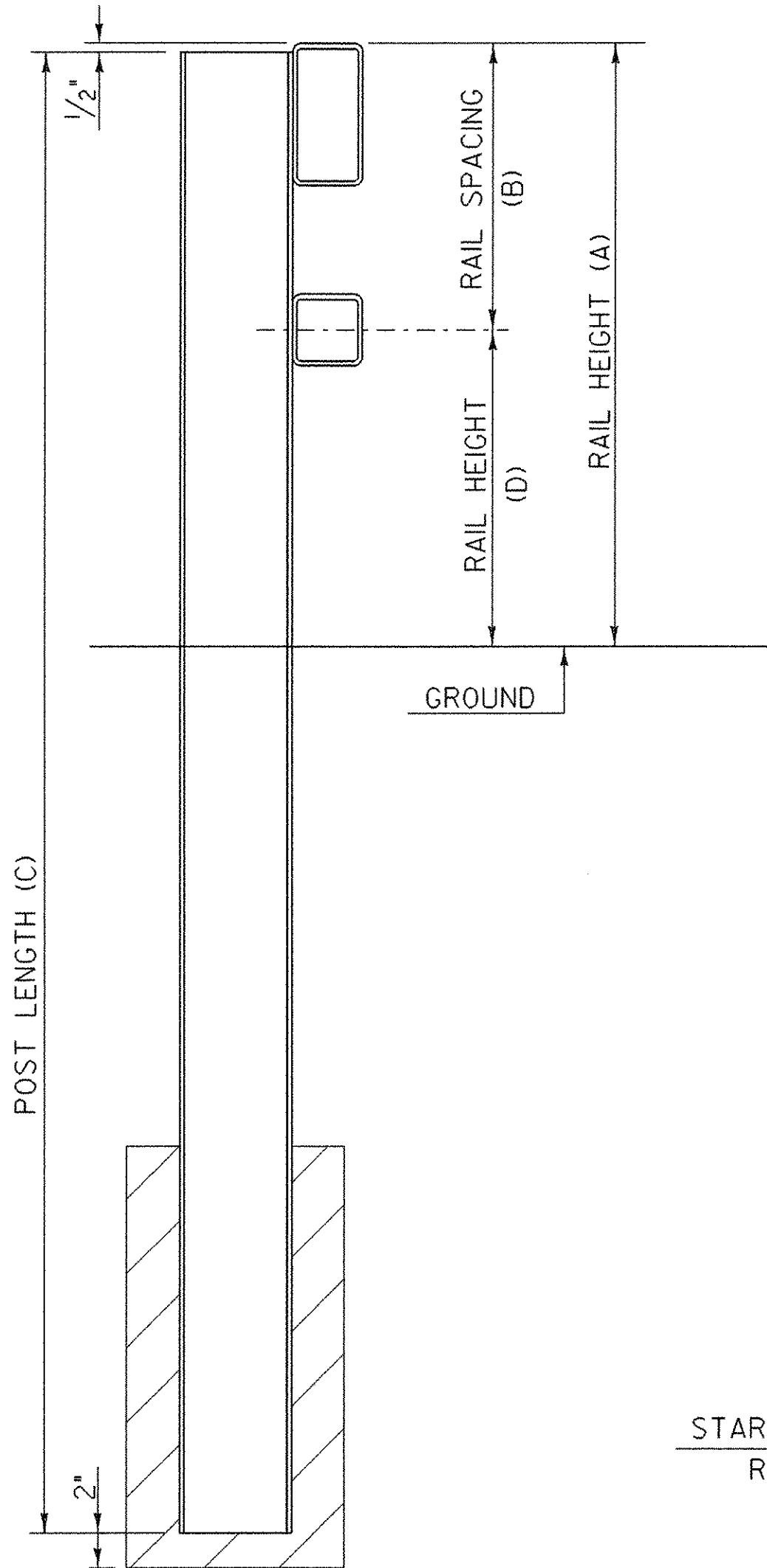
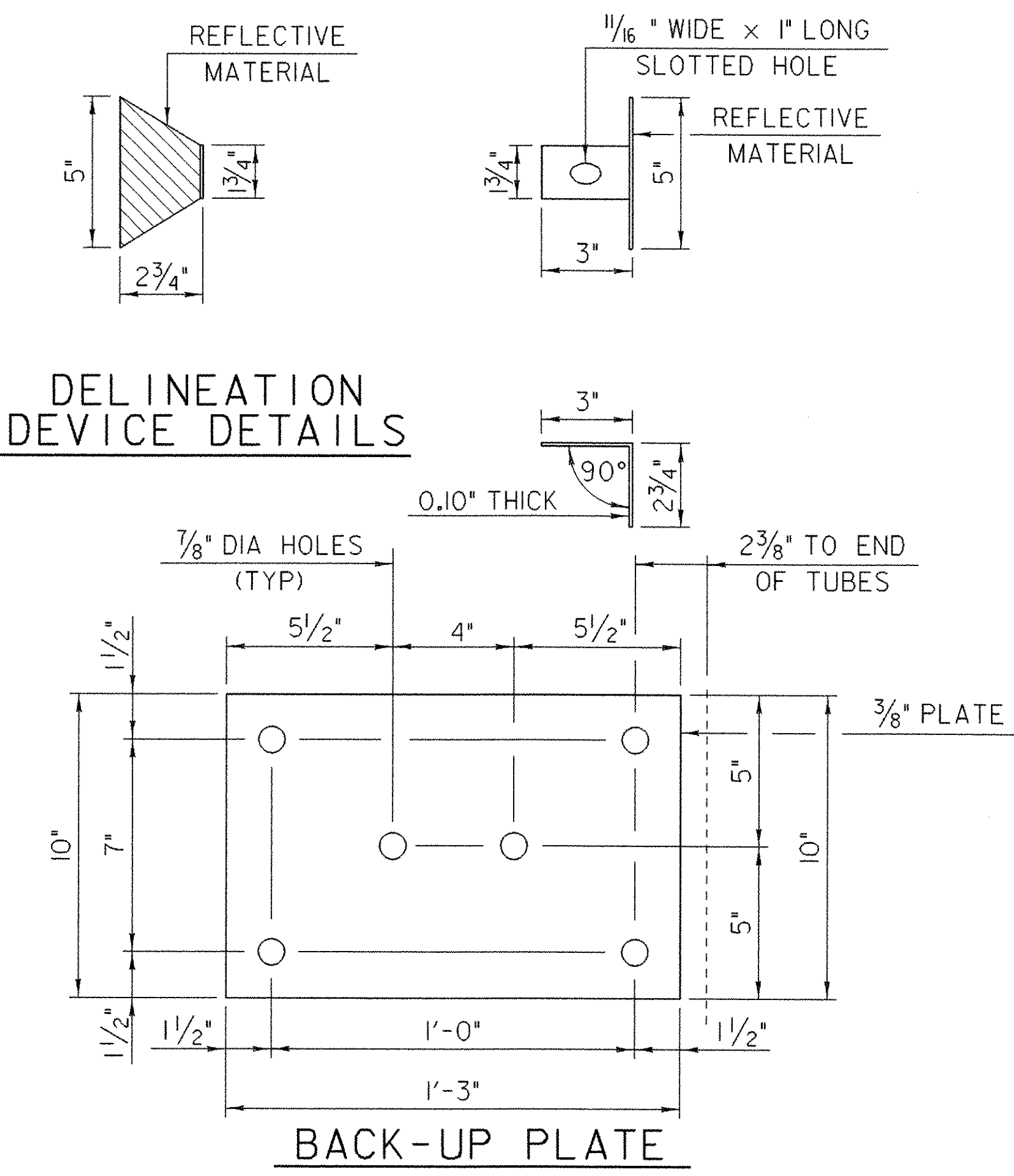
**RAILING TRANSITION ELEVATION**



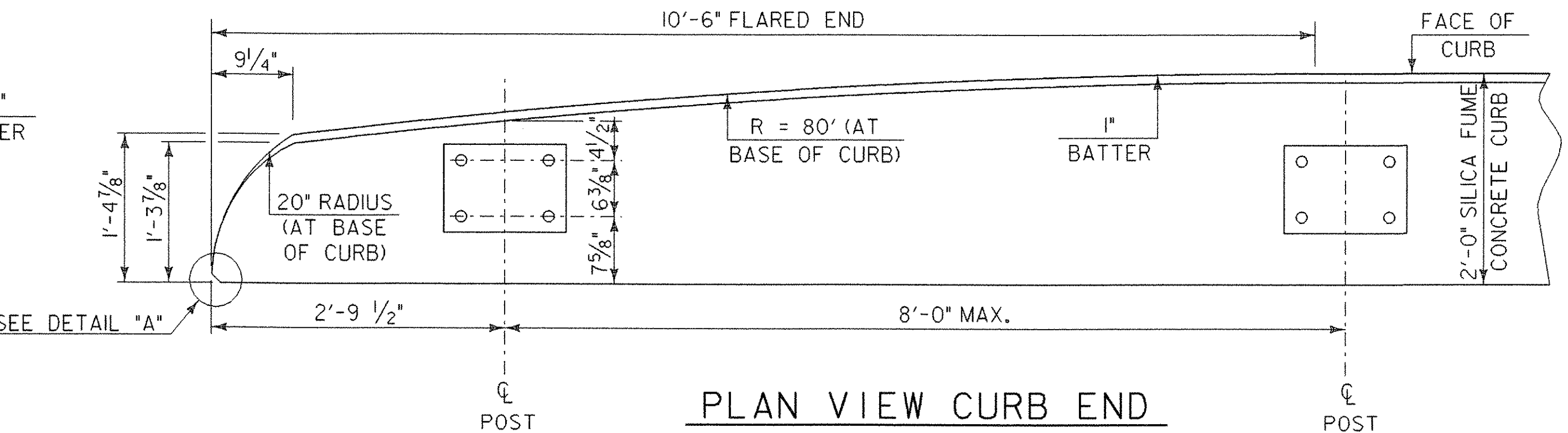
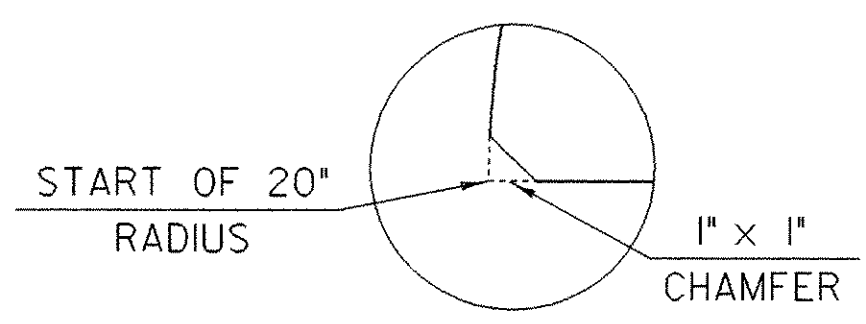
**SECTION THROUGH GUARD RAIL CONNECTION AT TERMINAL CONNECTOR**



**DELINEATION DEVICE DETAILS**



**DETAIL "A"**



POST NUMBER	RAIL HEIGHT (A)	RAIL SPACING (B)	POST LENGTH (C)	RAIL HEIGHT (D)
1	2'-10"	1'-4"	7'-0"	1'-6"
2	2'-3 <sup>5</sup> / <sub>8</sub> "	10"	6'-5"	1'-5 <sup>5</sup> / <sub>8</sub> "

- Notes:**
1. SEE "BRIDGE RAILING - N.E.T.C. 2 RAIL" SHEET FOR ADDITIONAL DETAILS, NOTES AND MATERIAL SPECIFICATIONS.
  2. SET POSTS LOOSELY INTO FIBER FORM TUBES WHILE ASSEMBLING TRANSITION PARTS. BACKFILL POST HOLES WITH A CONCRETE MIX APPROVED BY THE ENGINEER. PAYMENT FOR COMPONENTS (INCLUDING BACKUP PLATE AND END TERMINAL CONNECTOR FOR GUARD RAIL, AUGERING, FIBER FORM TUBES AND CONCRETE, AND INSTALLATION) SHALL BE INCIDENTAL TO "BRIDGE RAILING, GALVANIZED NETC 2 RAIL".
  3. ERECT REFLECTORIZED ALUMINUM DELINEATORS EVERY 30' (OR CLOSEST POST) WITH A 5/8" DIAMETER BOLT. DELINEATORS SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.
  4. REFLECTIVE MATERIAL SHALL MEET REQUIREMENTS OF SUBSECTION 750.08 AND SHALL BE OF ENCAPSULATED LENS SILVER OR AMBER. INSTALL AMBER ON THE DRIVER'S LEFT AND SILVER ON THE RIGHT.
  5. ON BRIDGES WITH A SIDEWALK, DELINEATORS ARE NOT TO BE INSTALLED ON THE SIDEWALK SIDE OF THE BRIDGE (I.E. DELINEATORS INSTALLED ONLY ON THE CURB SIDE AND ON THE APPROACH ON THE CURB SIDE). PAYMENT SHALL BE SUBSIDIARY TO ALL OTHER ITEMS.
  6. LAP APPROACH RAIL SPLICES IN THE DIRECTION OF TRAFFIC FLOW.
  7. SEE STANDARD G-1 AND G-1d FOR ADDITIONAL INFORMATION.

**BRIDGE RAILING  
N.E.T.C. 2 RAIL  
STEEL BEAM APPROACH RAIL**

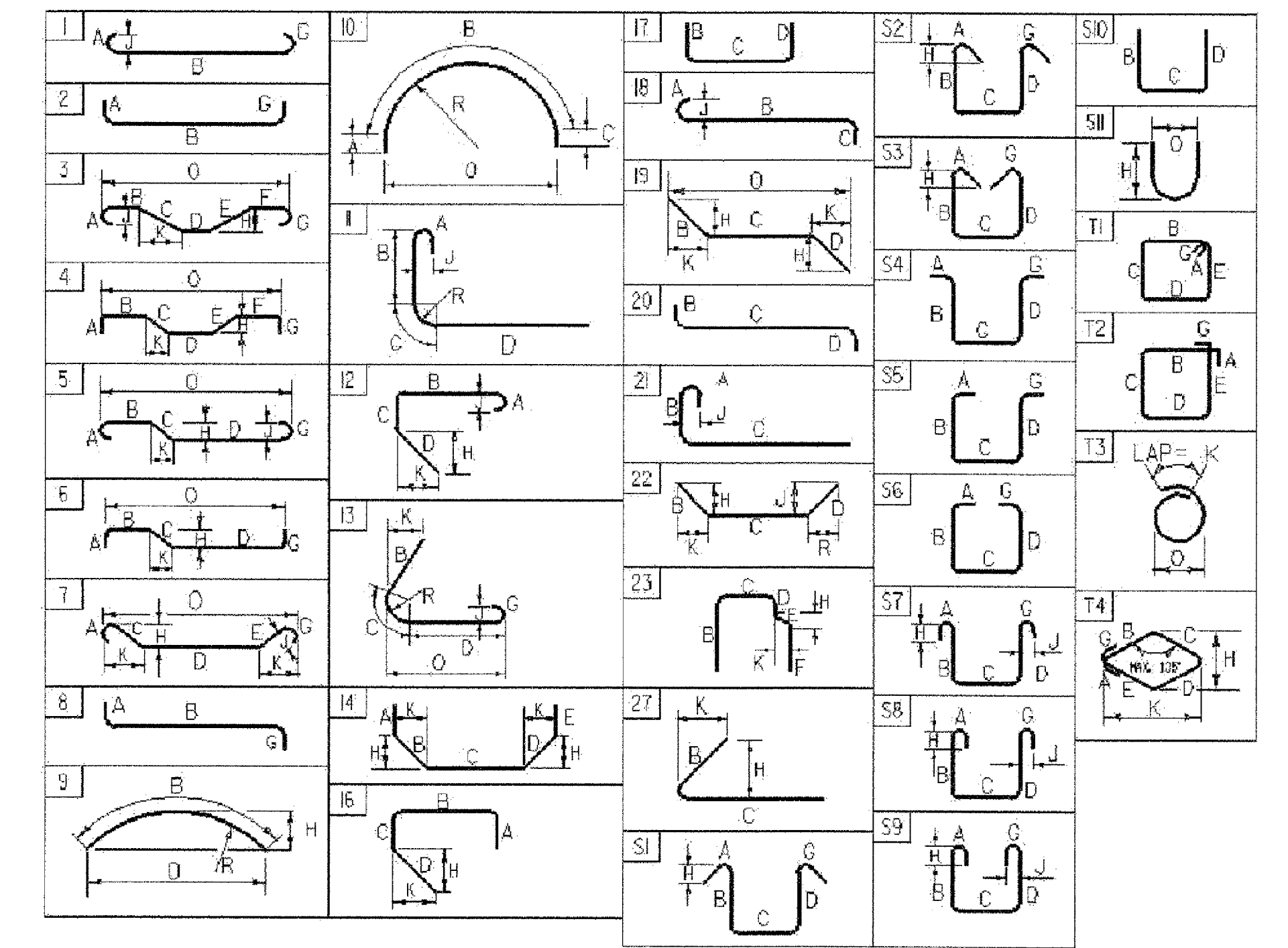
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: STR
FILE NAME: /78f193/str/sf193netc.dgn	CHECKED BY: C. CARLSON
PROJECT LEADER: R. WHITCOMB	SHEET 53 OF 68
DESIGNED BY: STR	
78f193/str/sf193netc2.1	

# REINFORCING STEEL SCHEDULE

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O	ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O			
<b>DECK</b>																																						
*	85	5	30'- 10"	SE501	STR	30'- 10"																																
	61	5	32'- 5"	SE502	STR	32'- 5"																																
	170	5	5'- 10"	SE503	S5	1'- 0"	1'- 2"	1'- 6"	1'- 2"			1'- 0"																										
<b>APPROACH SLAB #1</b>																	<b>APPROACH SLAB #2</b>																					
*	22	5	28'- 2"	1ASE501	STR	28'- 2"												*	22	5	28'- 2"	2ASE501	STR	28'- 2"														
*	34	9	20'- 9"	1ASE901	1	1'- 3"	19'- 6"					0'- 0"						*	34	9	20'- 9"	2ASE901	1	1'- 3"	19'- 6"				0'- 0"									
<b>ABUTMENT #1</b>																	<b>ABUTMENT #2</b>																					
*	41	5	20'- 6"	1A501	STR	20'- 6"												*	41	5	20'- 6"	2A501	STR	20'- 6"														
	80	5	3'- 7"	1A502	17		0'- 6"	2'- 7"	0'- 6"										80	5	3'- 7"	2A502	17		0'- 6"	2'- 7"	0'- 6"											
	37	5	7'- 5"	1A503	16	0'- 6"	3'- 7"	1'- 2"	2'- 2"				1'- 6"		1'- 6"				37	5	7'- 5"	2A503	16	0'- 6"	3'- 7"	1'- 2"	2'- 2"			1'- 6"		1'- 6"						
	16	5	4'- 6"	1A504A	22		2'- 1"	0'- 4"	2'- 1"				1'- 9"	1'- 9"	1'- 2"	1'- 2"			16	5	4'- 6"	2A504A	22		2'- 1"	0'- 4"	2'- 1"			1'- 9"	1'- 9"	1'- 2"	1'- 2"					
	16	5	4'- 4"	1A504B	22		2'- 2"	2'- 2"	0'- 0"				2'- 0"	0'- 0"	2'- 0"	0'- 0"			16	5	4'- 4"	2A504B	22		2'- 2"	2'- 2"	0'- 0"			2'- 0"	0'- 0"	2'- 0"	0'- 0"					
	3	5	6'- 9"	1A505A	T4		2'- 0"	2'- 9"	2'- 0"				2'- 7"	2'- 7"	2'- 11"	2'- 11"			3	5	6'- 9"	2A505A	T4		2'- 0"	2'- 9"	2'- 0"			2'- 7"	2'- 7"	2'- 11"	2'- 11"					
	3	5	6'- 9"	1A505B	T4		2'- 0"	2'- 9"	2'- 0"				2'- 7"	2'- 7"	2'- 11"	2'- 11"			3	5	6'- 9"	2A505B	T4		2'- 0"	2'- 9"	2'- 0"			2'- 7"	2'- 7"	2'- 11"	2'- 11"					
	10	5	10'- 1"	1A506A	22		2'- 2"	5'- 9"	2'- 2"				1'- 9"	1'- 9"	1'- 3"	1'- 3"			10	5	10'- 1"	2A506A	22		2'- 2"	5'- 9"	2'- 2"			1'- 9"	1'- 9"	1'- 3"	1'- 3"					
	10	5	12'- 4"	1A506B	22		2'- 2"	8'- 0"	2'- 2"				1'- 3"	1'- 3"	1'- 9"	1'- 9"			10	5	12'- 4"	2A506B	22		2'- 2"	8'- 0"	2'- 2"			1'- 3"	1'- 3"	1'- 9"	1'- 9"					
*	75	6	14'- 7"	1A601	17		6'- 0"	2'- 7"	6'- 0"									*	75	6	14'- 7"	2A601	17		6'- 0"	2'- 7"	6'- 0"											
	12	6	7'- 1"	1A602	17		4'- 6"	2'- 7"	0'- 0"										12	6	7'- 1"	2A602	17		4'- 6"	2'- 7"	0'- 0"											
*	15	8	4'- 0"	1AE801	22		2'- 0"	2'- 0"	0'- 0"				1'- 5"	0'- 0"	1'- 5"	0'- 0"		*	15	8	4'- 0"	2AE801	22		2'- 0"	2'- 0"	0'- 0"			1'- 5"	0'- 0"	1'- 5"	0'- 0"					
<b>WINGWALL #1</b>																	<b>WINGWALL #3</b>																					
▲	26	5	14'- 7"	1W501	17		6'- 9"	1'- 1"	6'- 9"									▲	24	5	14'- 7"	3W501	17		6'- 9"	1'- 1"	6'- 9"											
▲	13	5	24'- 0"	1W502	17		11'- 6"	1'- 0"	11'- 6"									▲	13	5	24'- 0"	3W502	17		11'- 6"	1'- 0"	11'- 6"											
	2	5	10'- 0"	1W503A	22		2'- 0"	6'- 0"	<del>2'- 0"</del>				1'- 6"	1'- 3"	1'- 3"	1'- 6"			2	5	10'- 0"	3W503A	22		2'- 0"	6'- 0"	<del>2'- 0"</del>			1'- 6"	1'- 3"	1'- 3"	1'- 6"					
	2	5	10'- 0"	1W503B	22		2'- 0"	6'- 0"	<del>2'- 0"</del>				1'- 3"	1'- 6"	1'- 6"	1'- 3"			2	5	10'- 0"	3W503B	22		2'- 0"	6'- 0"	<del>2'- 0"</del>			1'- 3"	1'- 6"	1'- 6"	1'- 3"					
<b>WINGWALL #2</b>																	<b>WINGWALL #4</b>																					
▲	24	5	13'- 9"	2W501	17		6'- 4"	1'- 1"	6'- 4"									▲	26	5	14'- 7"	4W501	17		6'- 9"	1'- 1"	6'- 9"											
▲	13	5	23'- 0"	2W502	17		11'- 0"	1'- 0"	11'- 0"									▲	13	5	24'- 0"	4W502	17		11'- 6"	1'- 0"	11'- 6"											
	2	5	10'- 0"	2W503A	22		2'- 0"	6'- 0"	<del>2'- 0"</del>				1'- 6"	1'- 3"	1'- 3"	1'- 6"			2	5	10'- 0"	4W503A	22		2'- 0"	6'- 0"	<del>2'- 0"</del>			1'- 6"	1'- 3"	1'- 3"	1'- 6"					
	2	5	10'- 0"	2W503B	22		2'- 0"	6'- 0"	<del>2'- 0"</del>				1'- 3"	1'- 6"	1'- 6"	1'- 3"			2	5	10'- 0"	4W503B	22		2'- 0"	6'- 0"	<del>2'- 0"</del>			1'- 3"	1'- 6"	1'- 6"	1'- 3"					

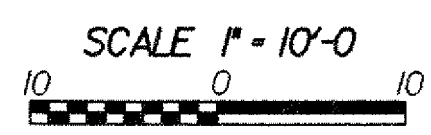
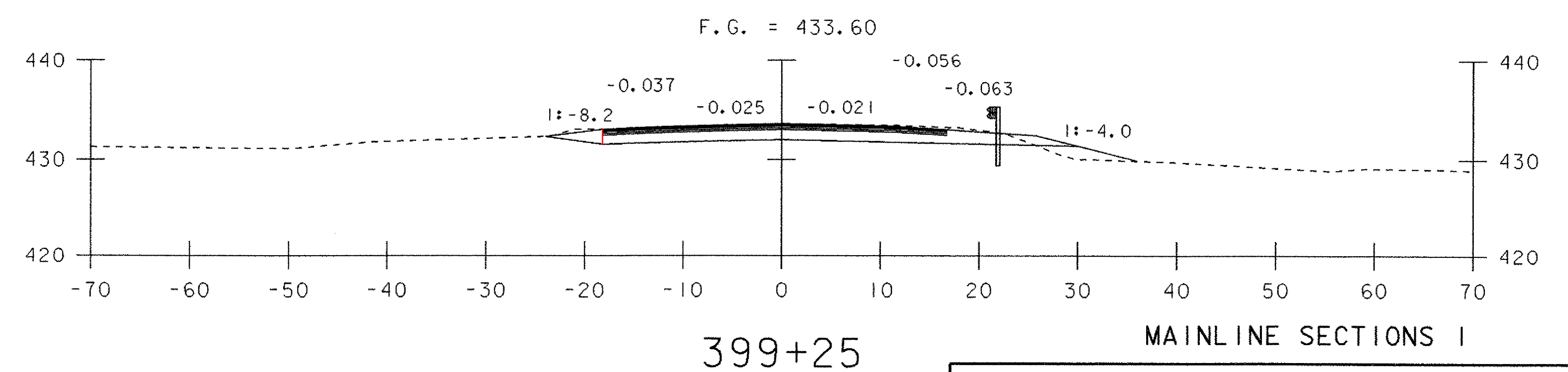
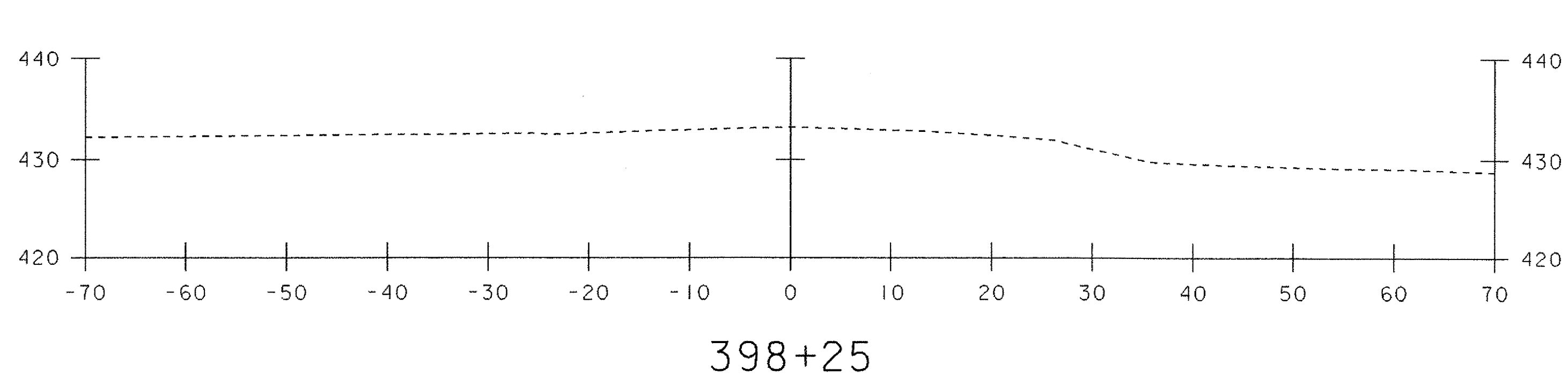
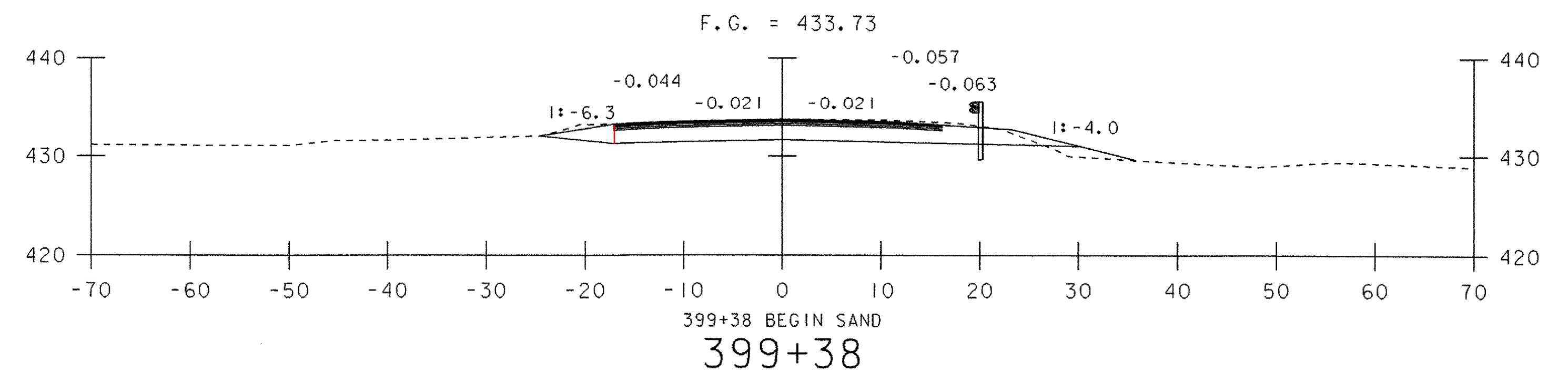
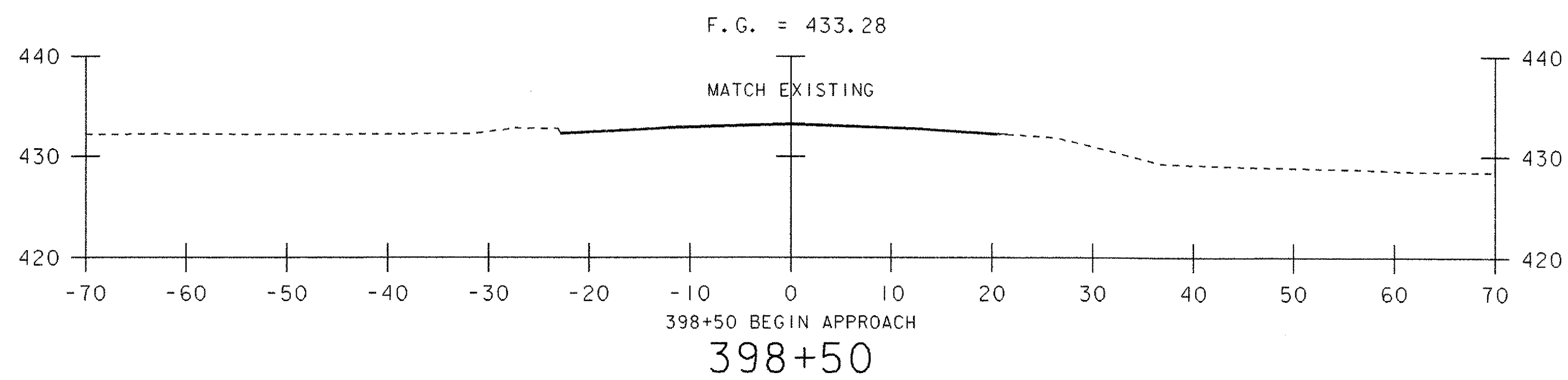
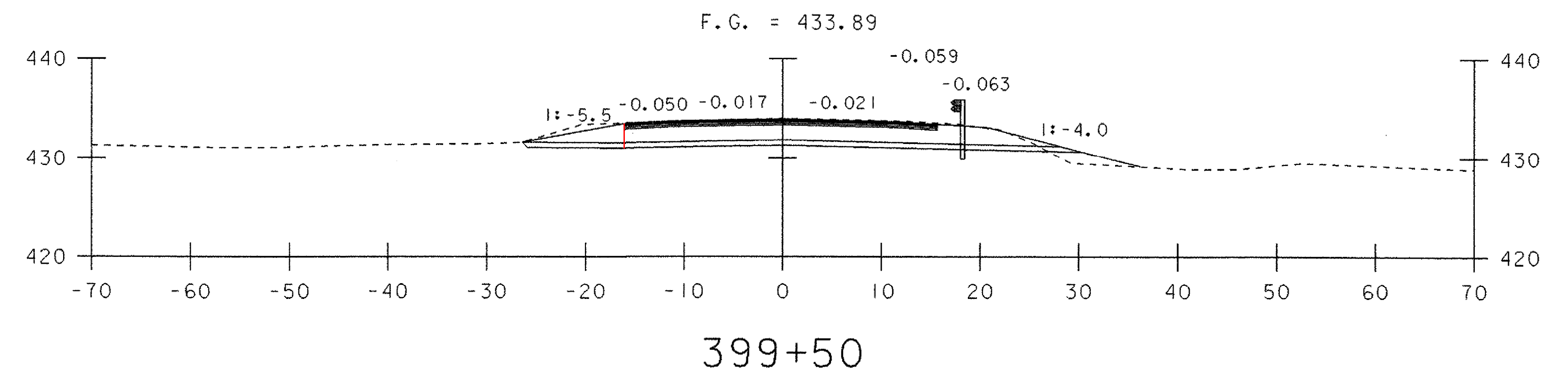
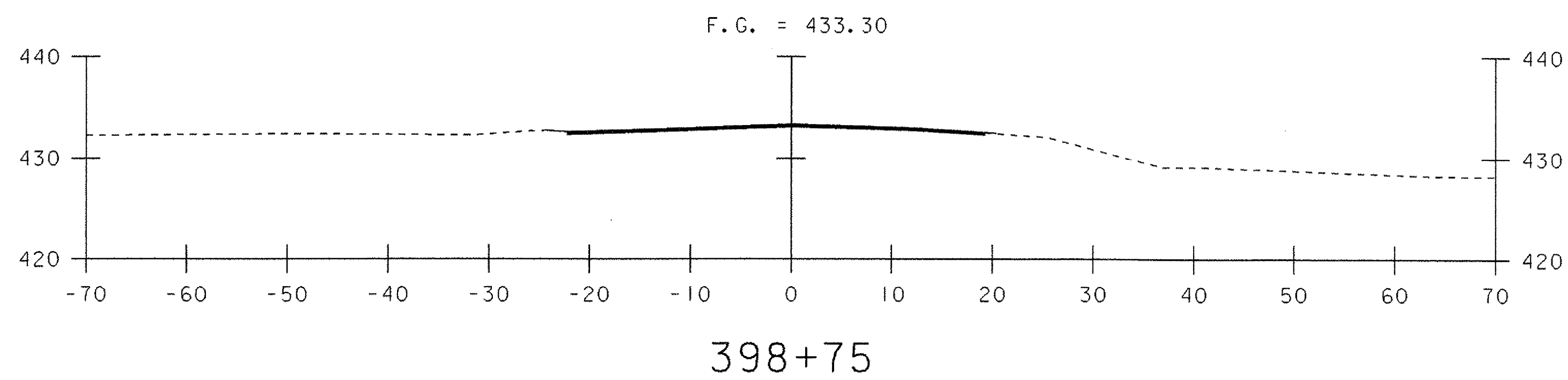
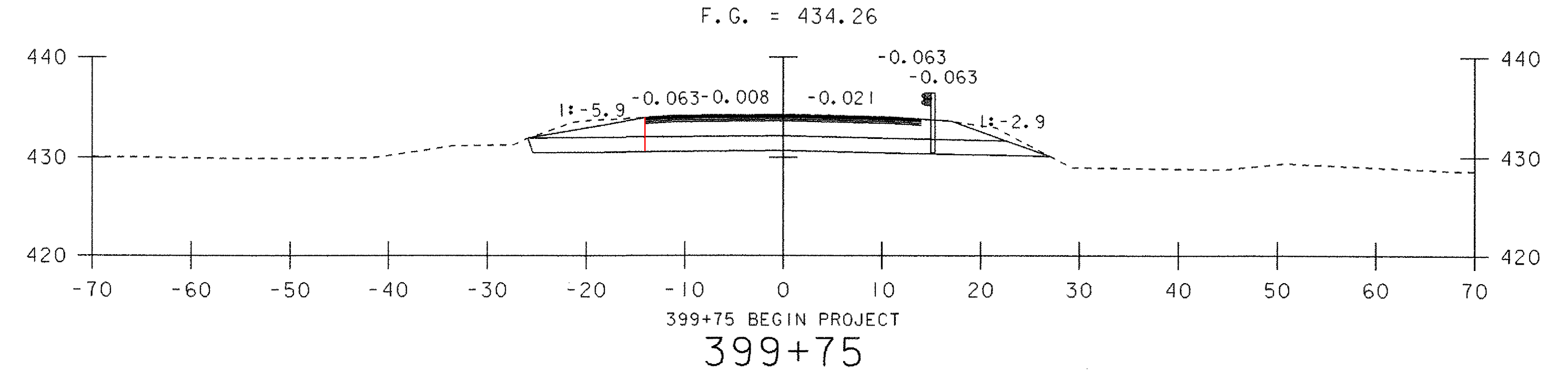
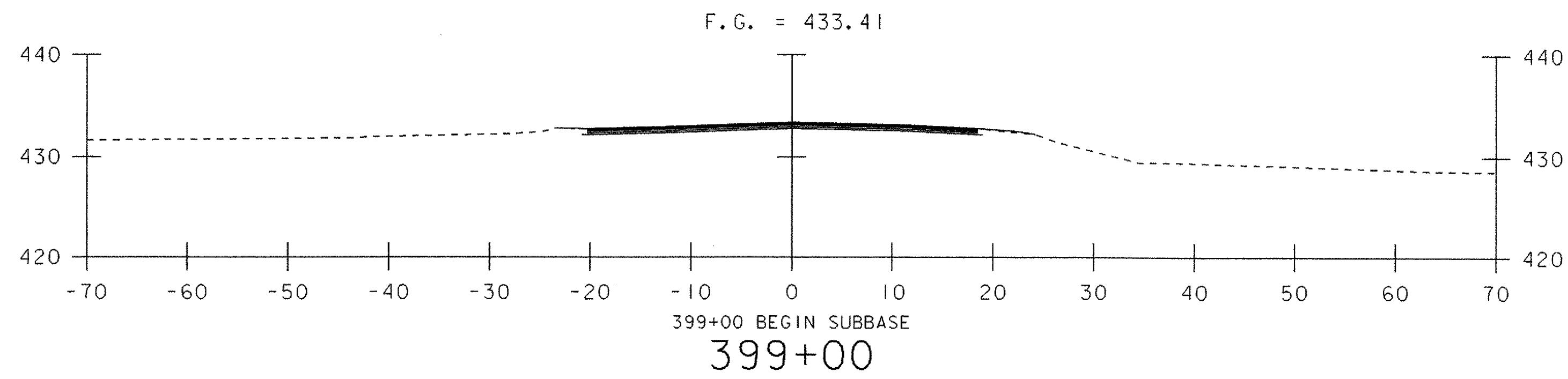
~ NOTES ~

- UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M31 (ASTM A615-S). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
- FOR TYPICAL BENDING DETAILS, RECOMMENDED PN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE".
- BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
- ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
- "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
- "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
- WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
- ▲ DENOTES BARS TO BE CUT IN FIELD.
- \* DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
- △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
- E N BAR MARK PREFIX DENOTES EPOXY COATED REINFORCING STEEL.



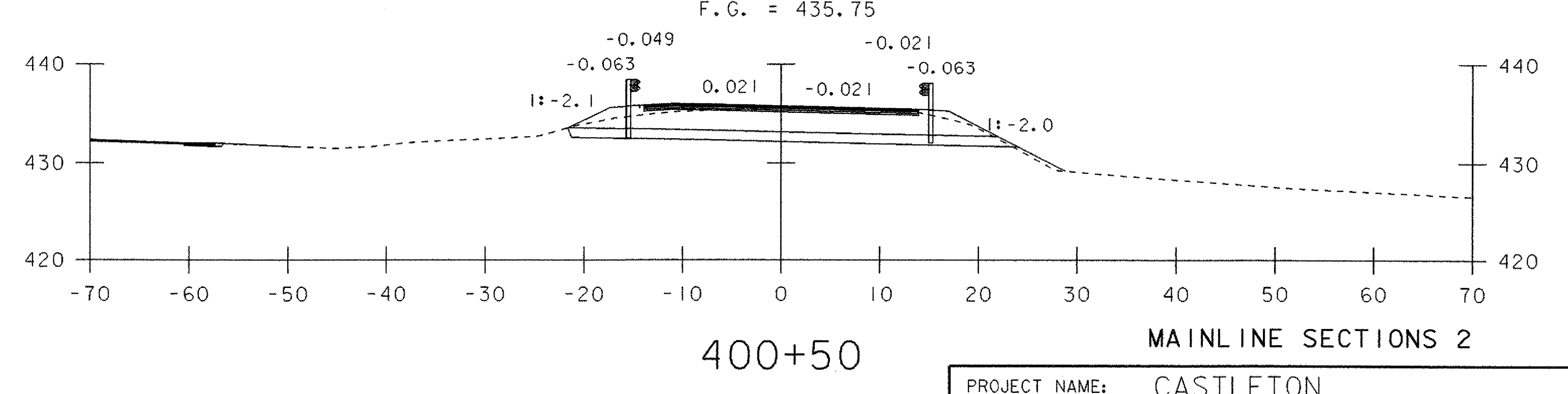
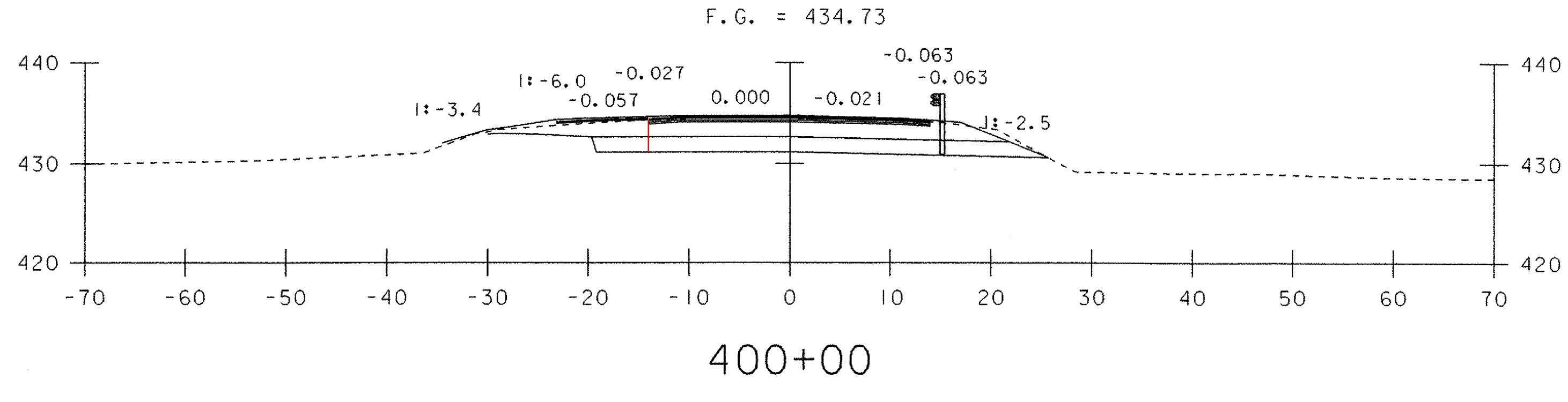
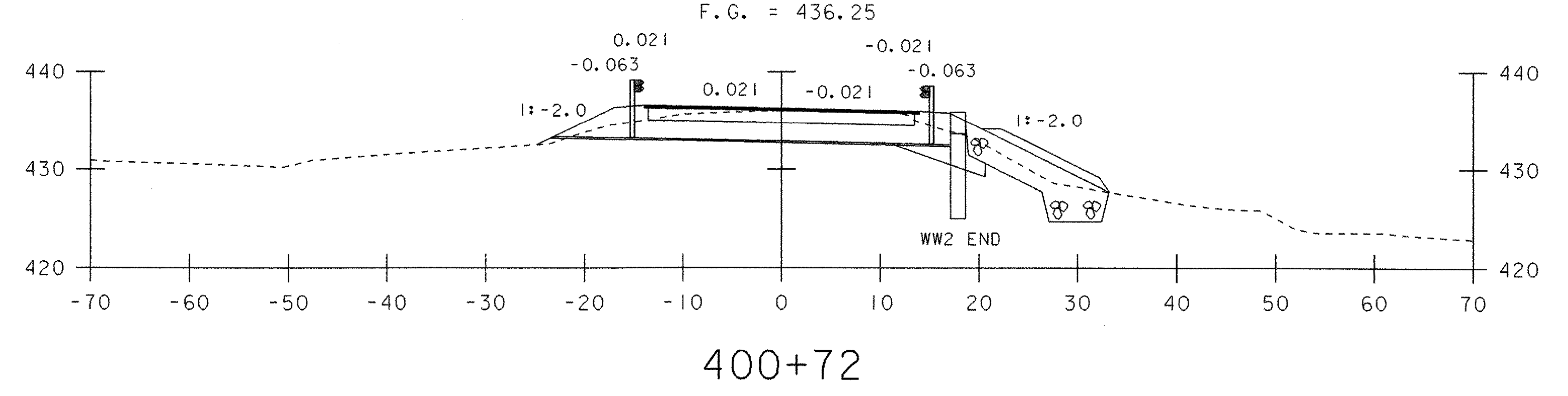
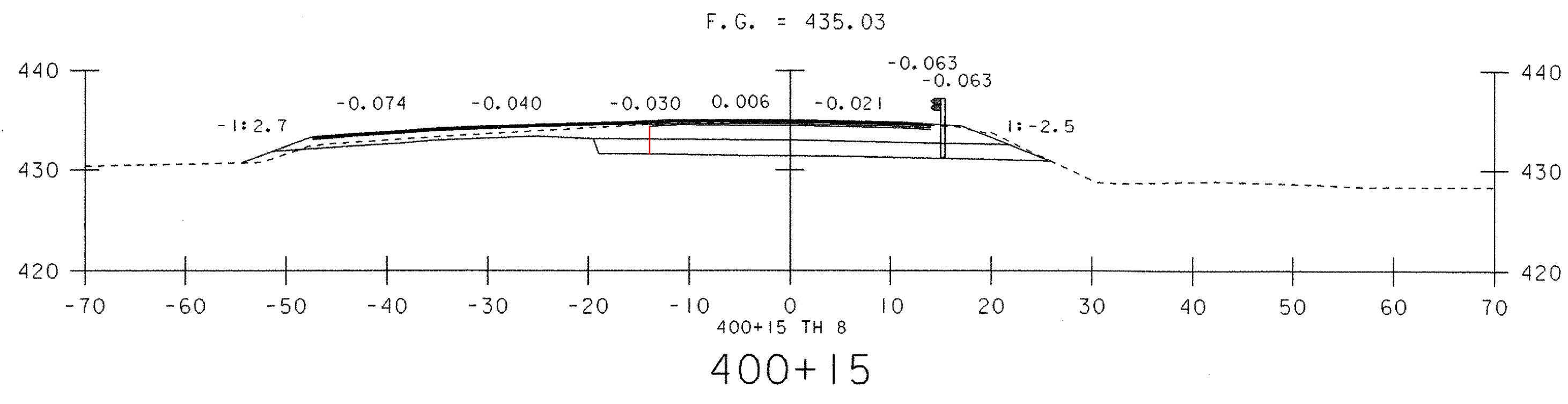
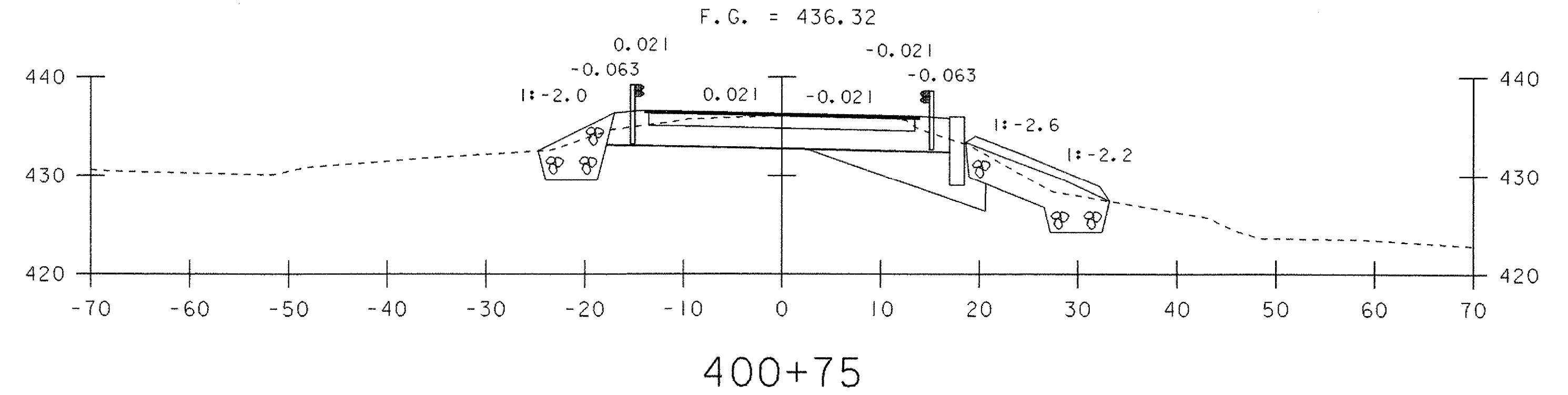
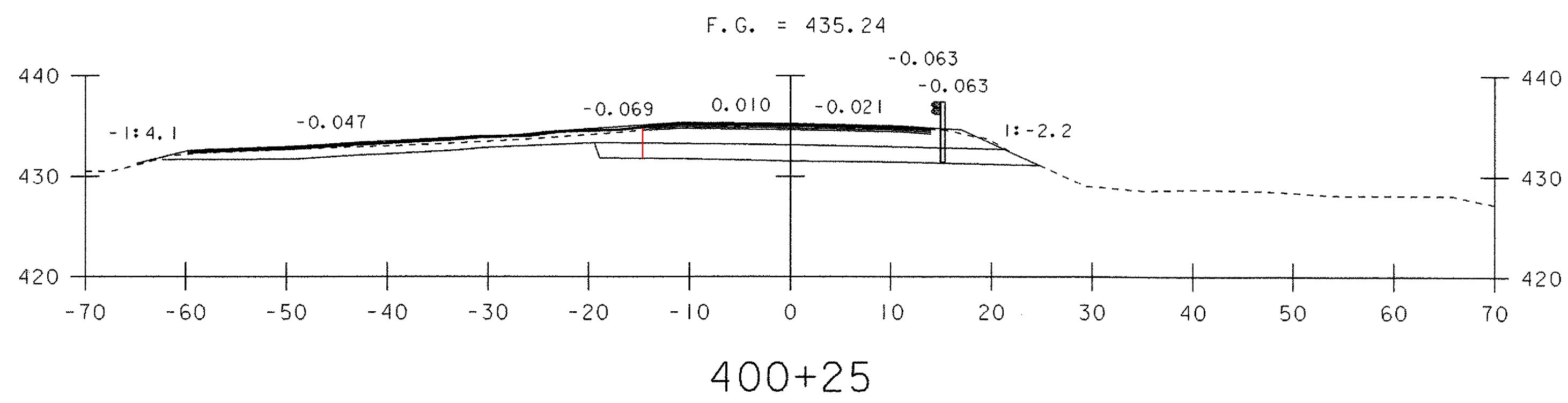
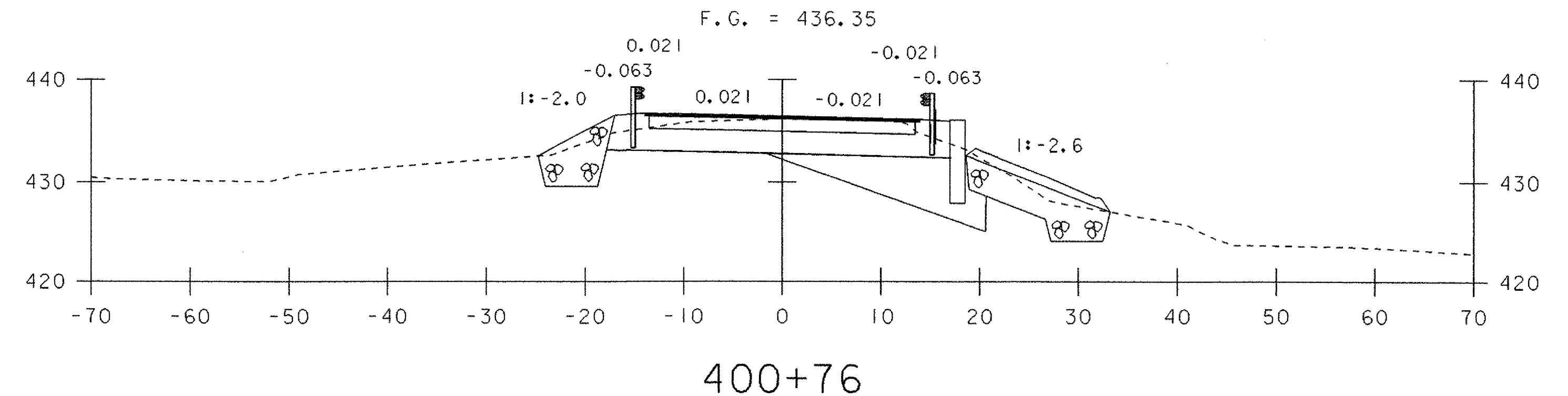
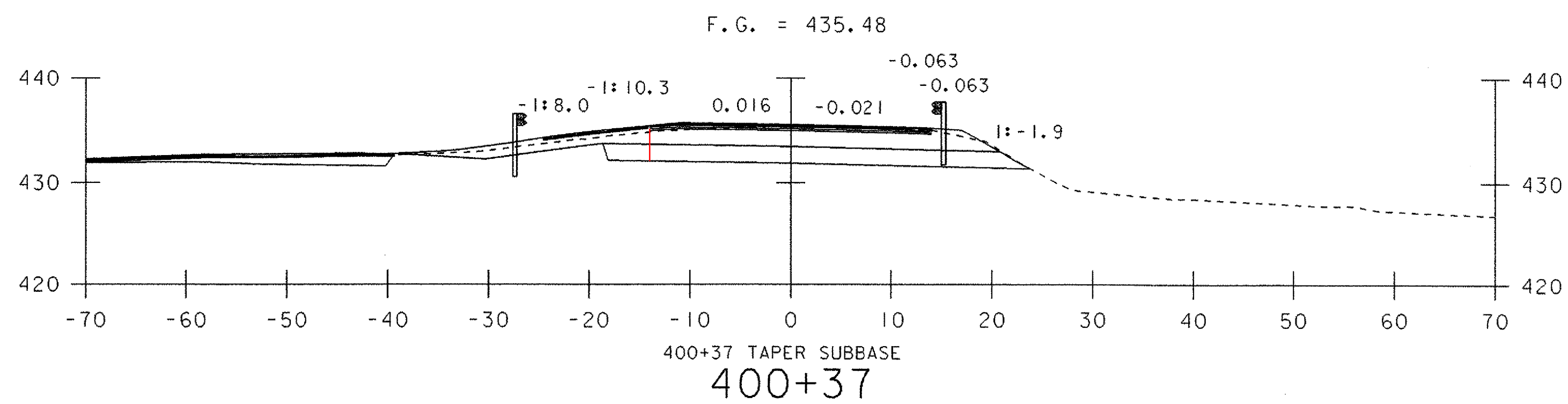
ASTM STANDARD REINFORCING BARS				
BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION		
		DIAMETER INCHES	AREA INCHES <sup>2</sup>	PERIMETER INCHES
#3	0.376	0.375	0.11	1.178
#4	0.668	0.500	0.20	1.571
#5	1.043	0.625	0.31	1.963
#6	1.502	0.750	0.44	2.356
#7	2.044	0.875	0.60	2.749
#8	2.670	1.000	0.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.65	1.693	2.25	5.32
#18	13.60	2.257	4.00	7.09

PROJECT NAME: **Castleton**  
 PROJECT NUMBER: **RS 0142 (10)**  
 FILE NAME: sf193sub.dgn sf193rss.l PLOT DATE: 1/24/2007  
 PROJECT MANAGER: R. Whitcomb DRAWN BY: T. Lackey  
 DESIGNED BY: T. Lackey CHECKED BY: W. Lammer  
 REINFORCING STEEL SCHEDULE SHEET #1 SHEET 54 OF 68

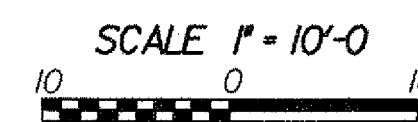


MAINLINE SECTIONS I

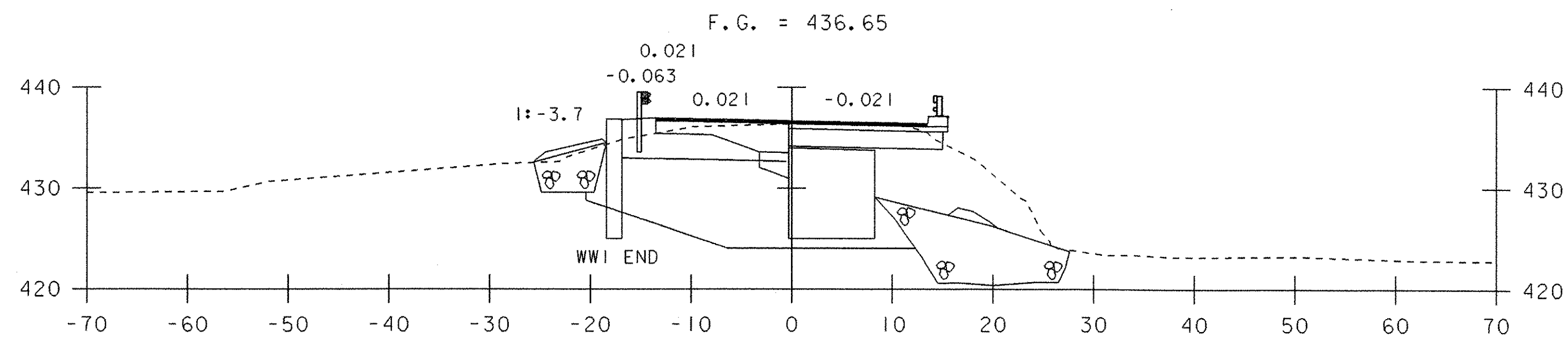
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sfi93m01.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 55 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sfi93xsl.dgn	



MAINLINE SECTIONS 2

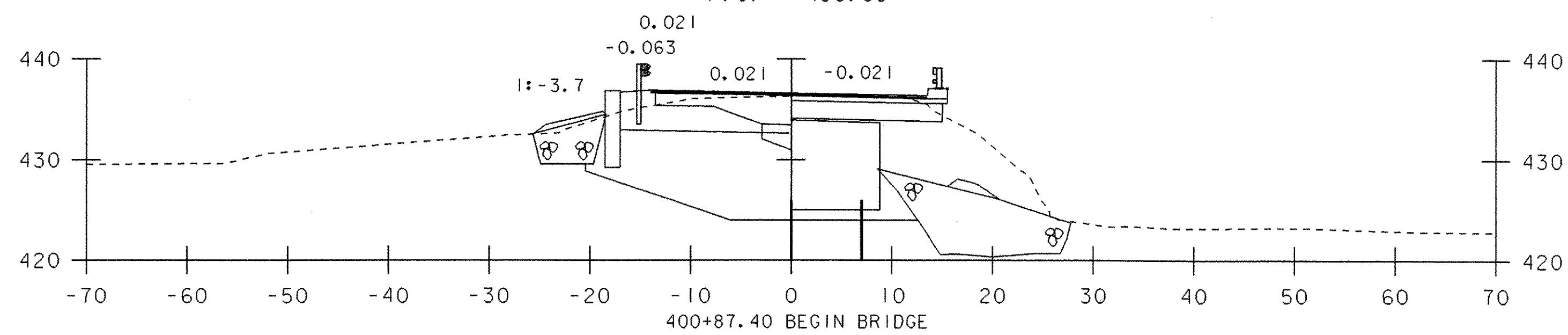


PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m02.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 56 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



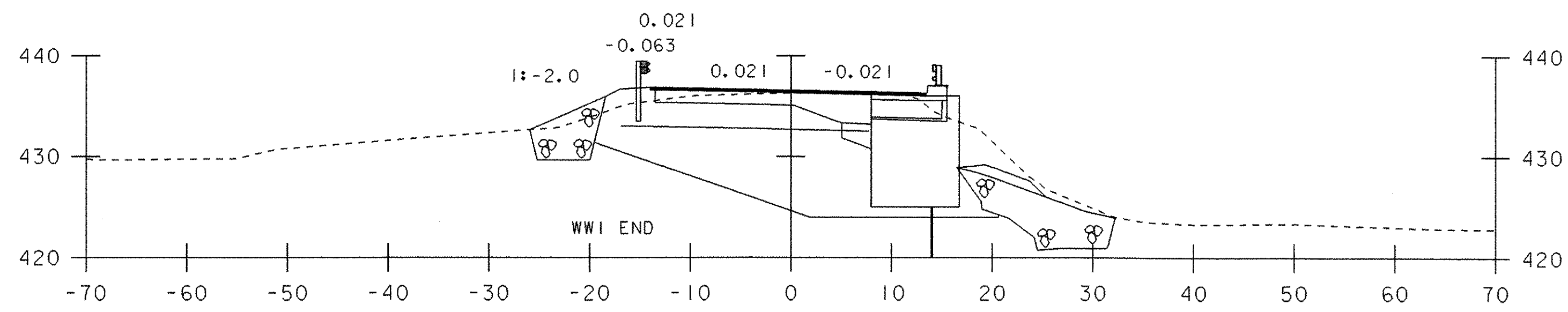
400+88

F.G. = 436.65



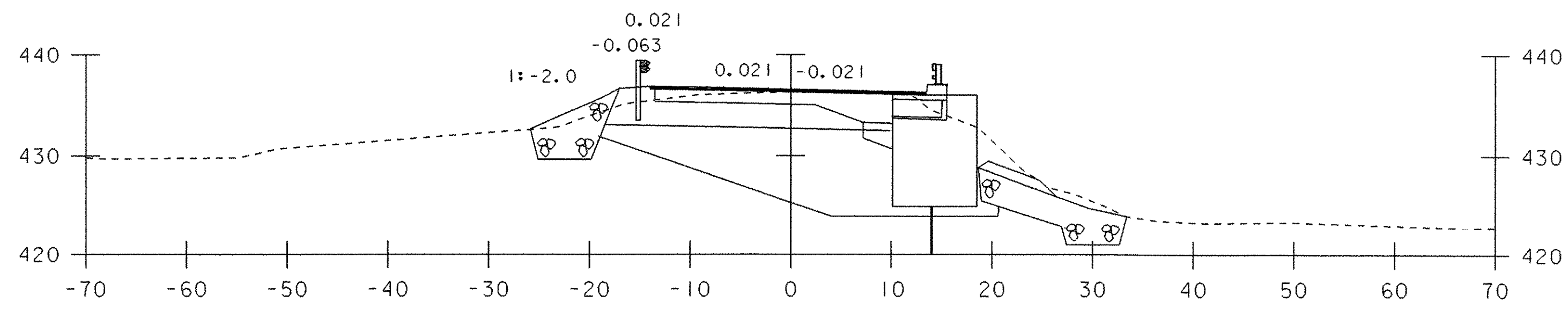
400+87

F.G. = 436.57

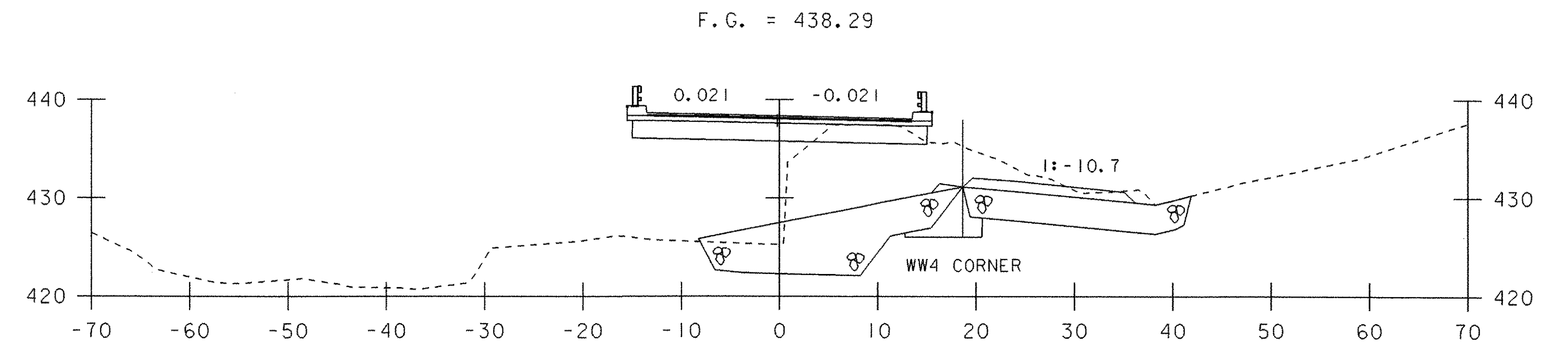


400+84

F.G. = 436.55

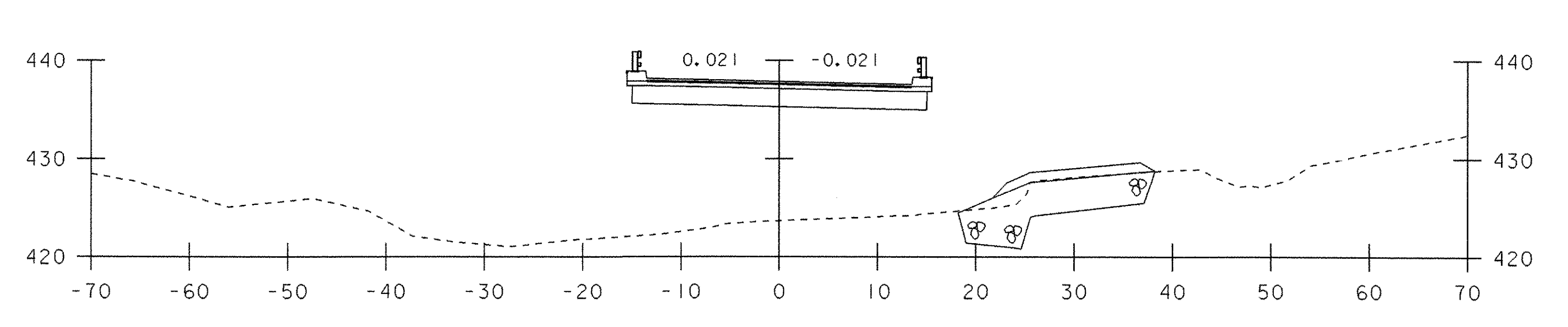


400+83



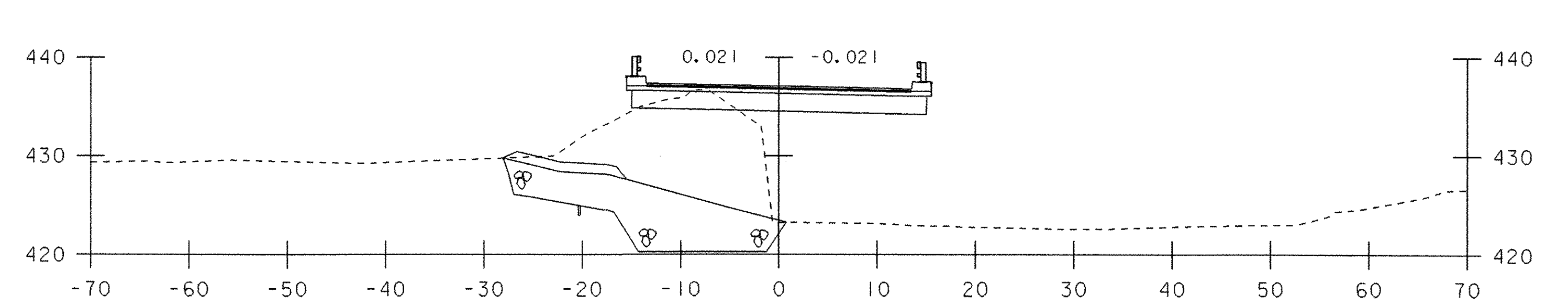
401+38

F.G. = 437.83



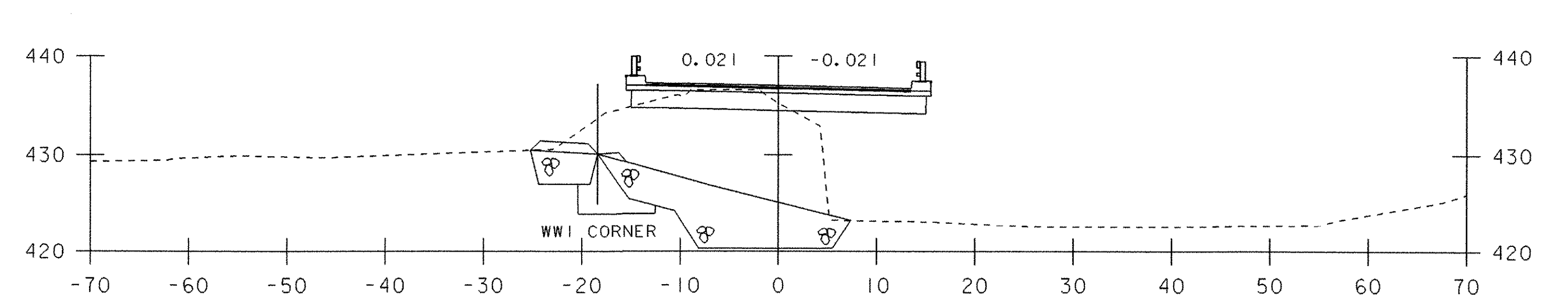
401+25

F.G. = 437.01



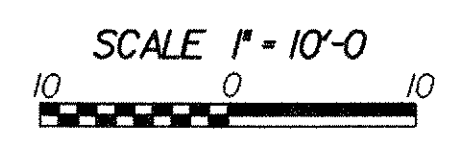
401+00

F.G. = 436.93



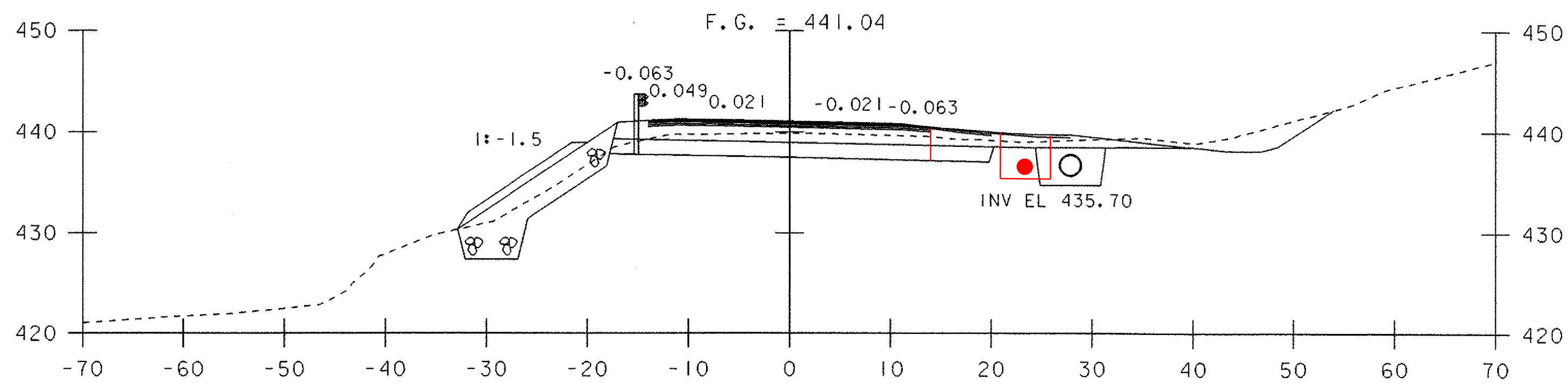
400+97

MAINLINE SECTIONS 3

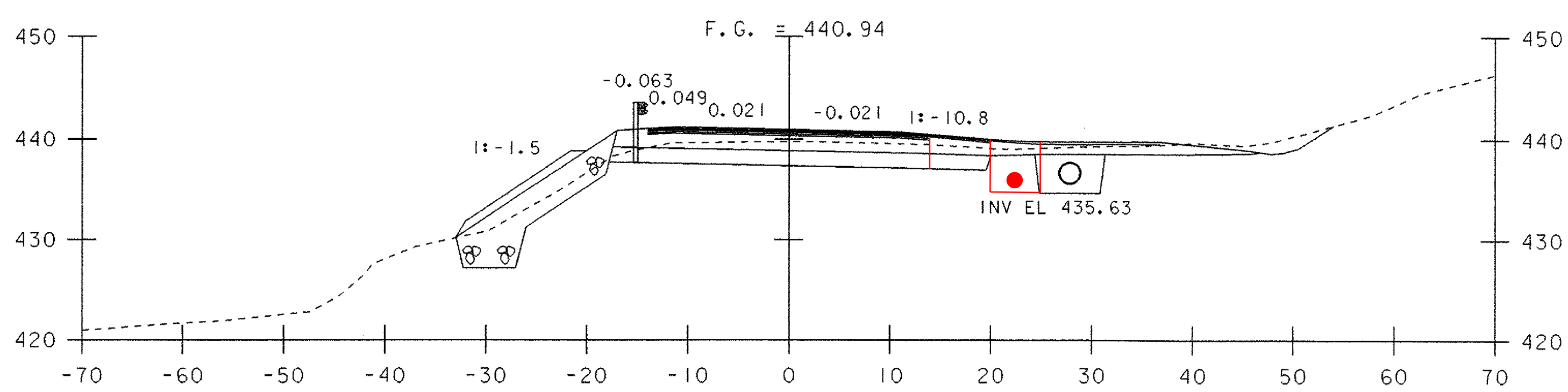


PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m03.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 57 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	

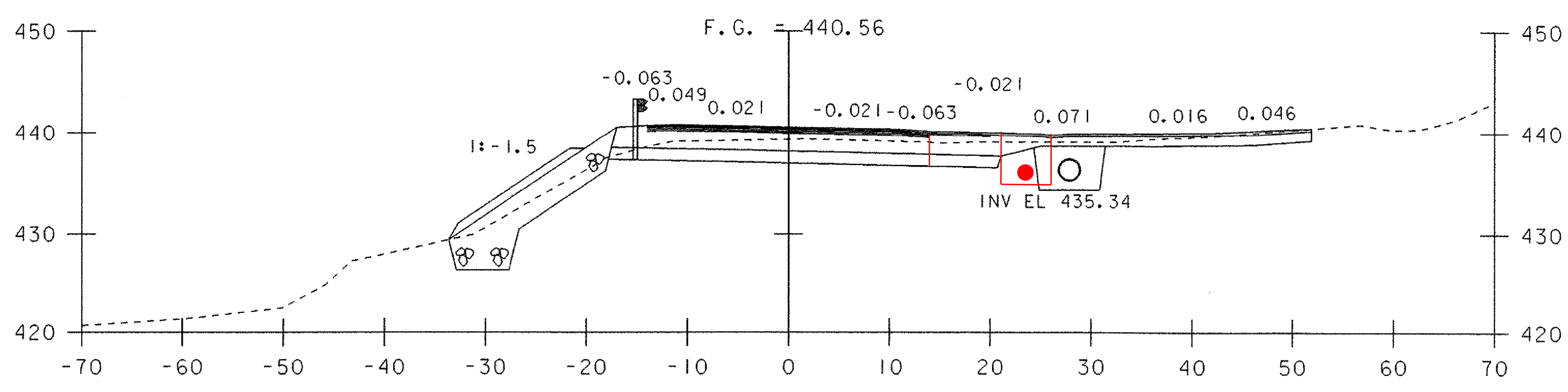




402+00

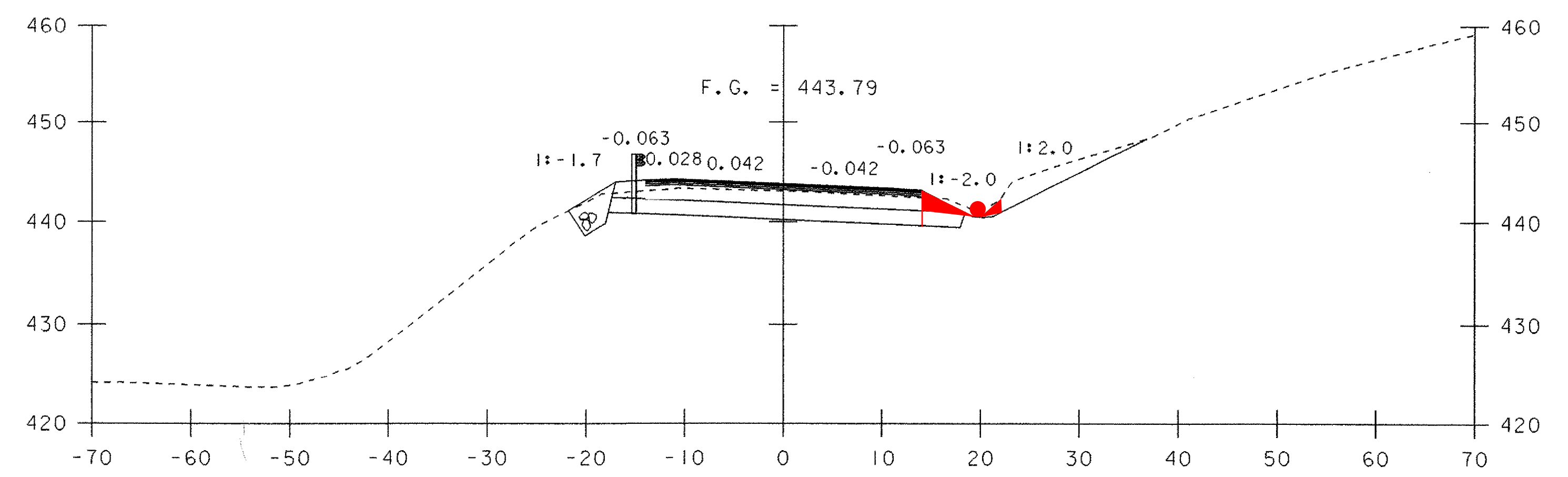
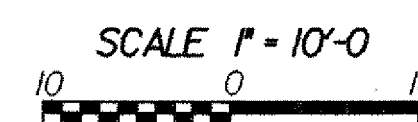


401+98

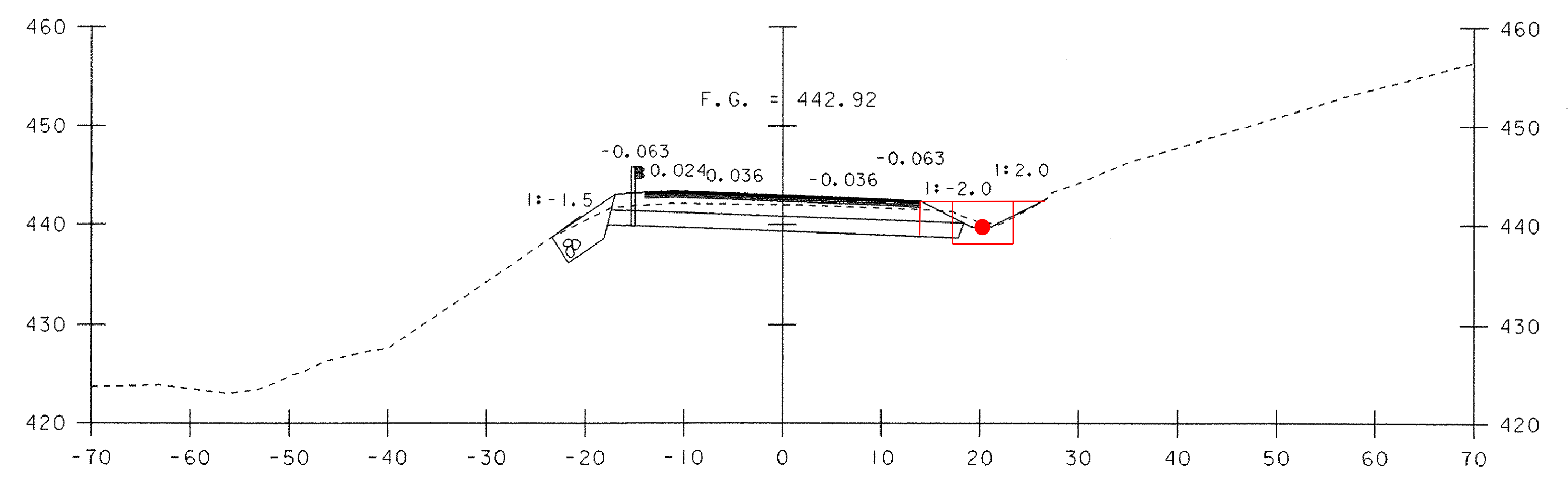


401+90

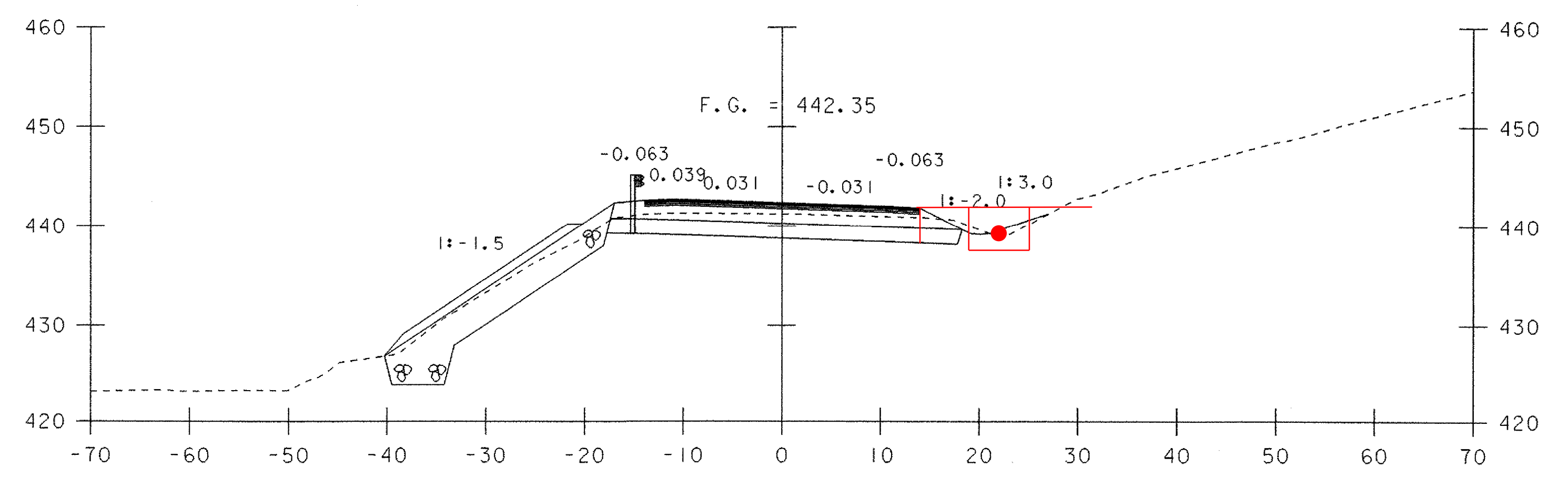
401+90 DRIVE 2  
401+90 TAPER SUBBASE



402+50



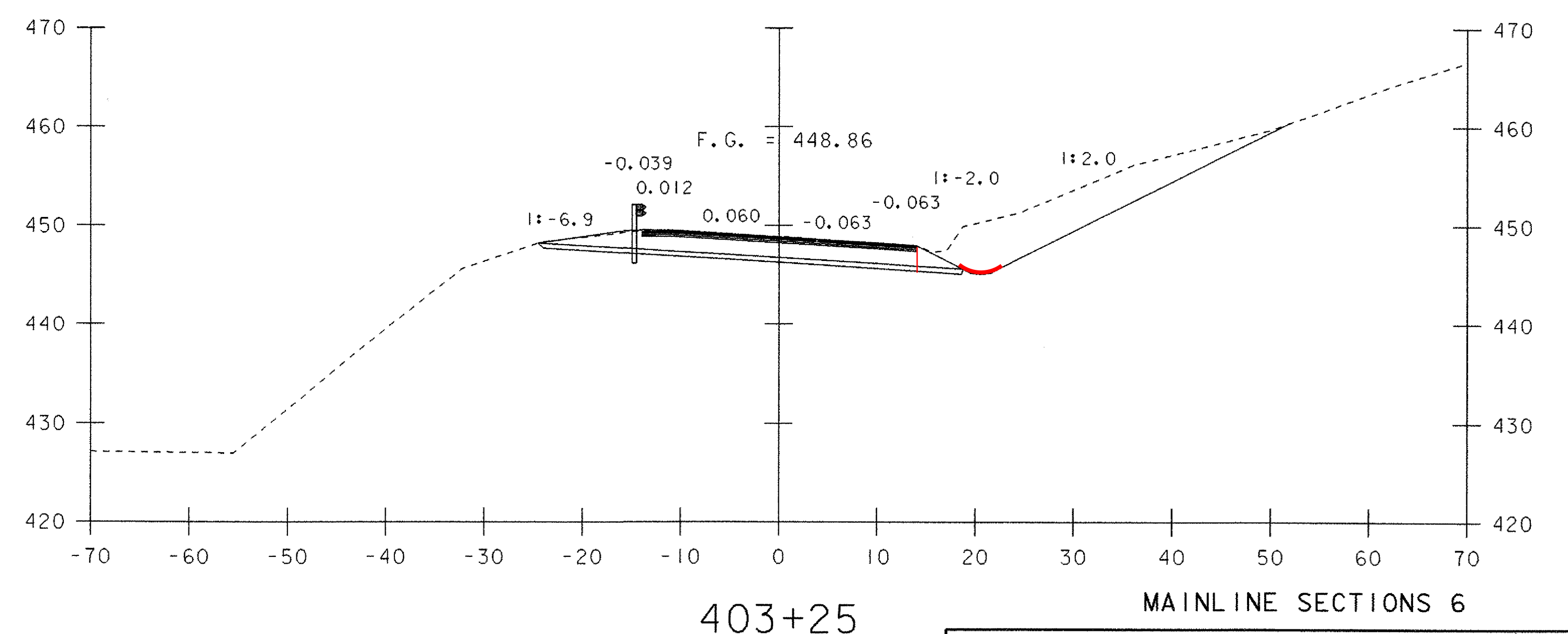
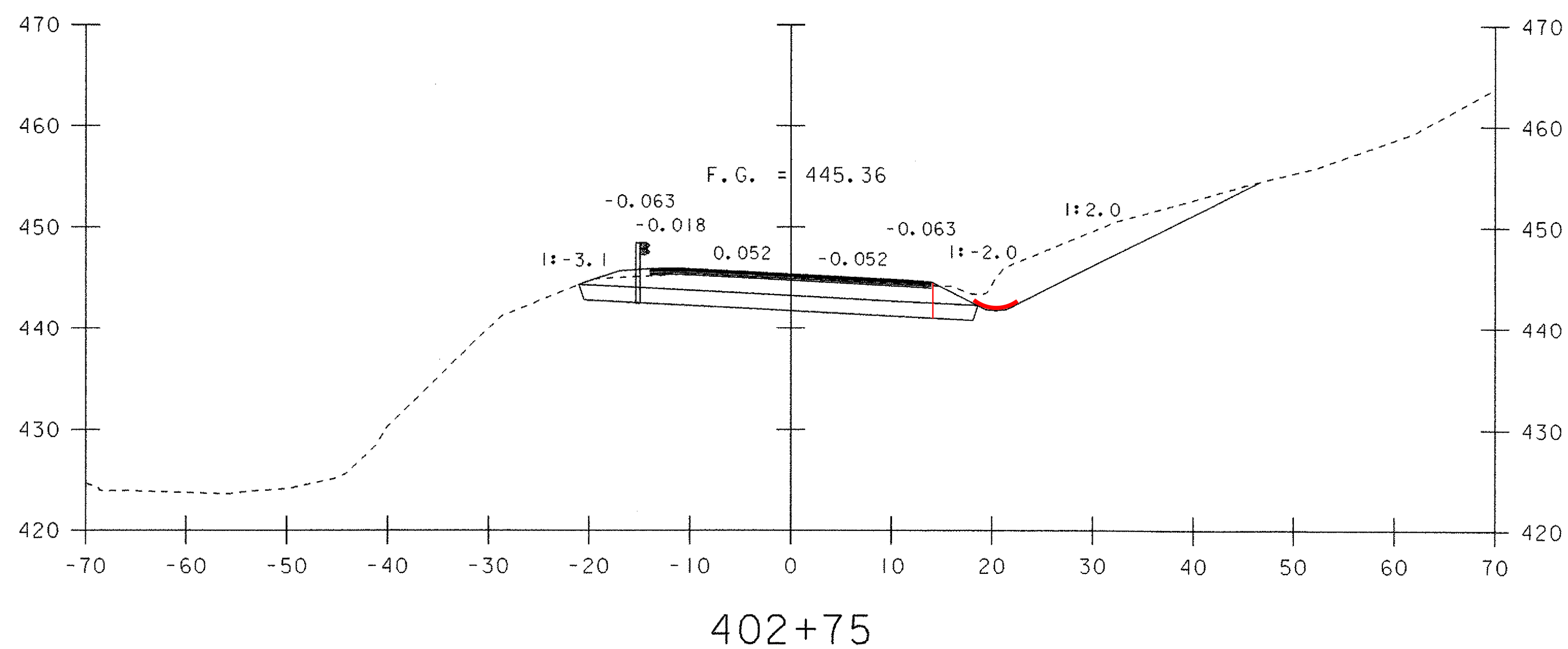
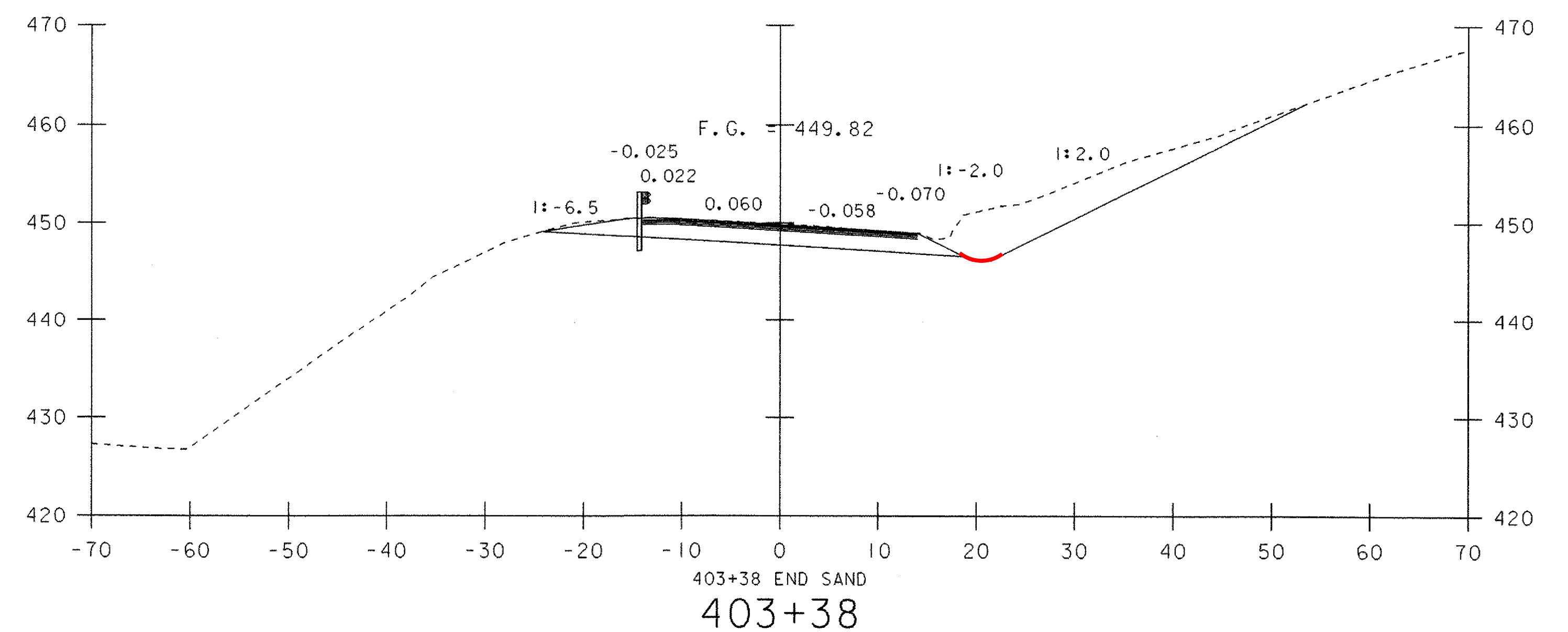
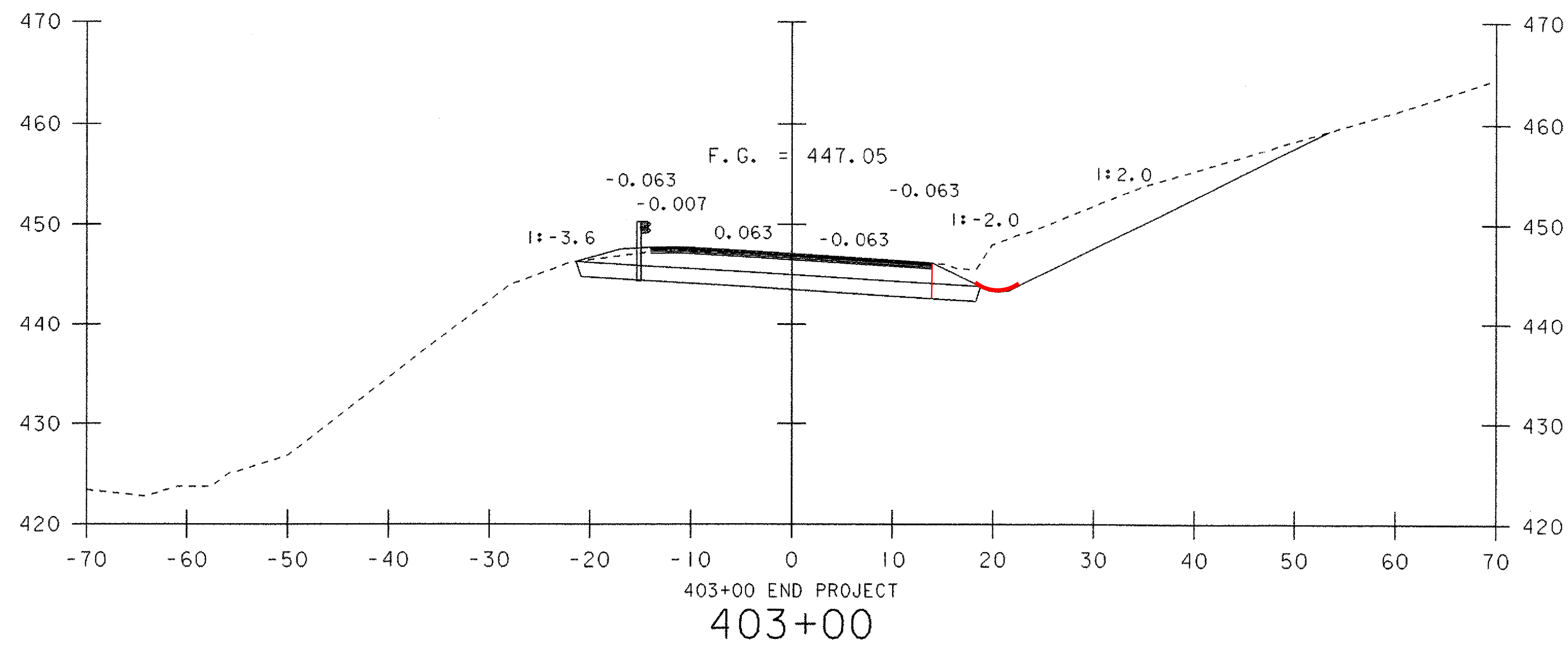
402+35



402+25

MAINLINE SECTIONS 5

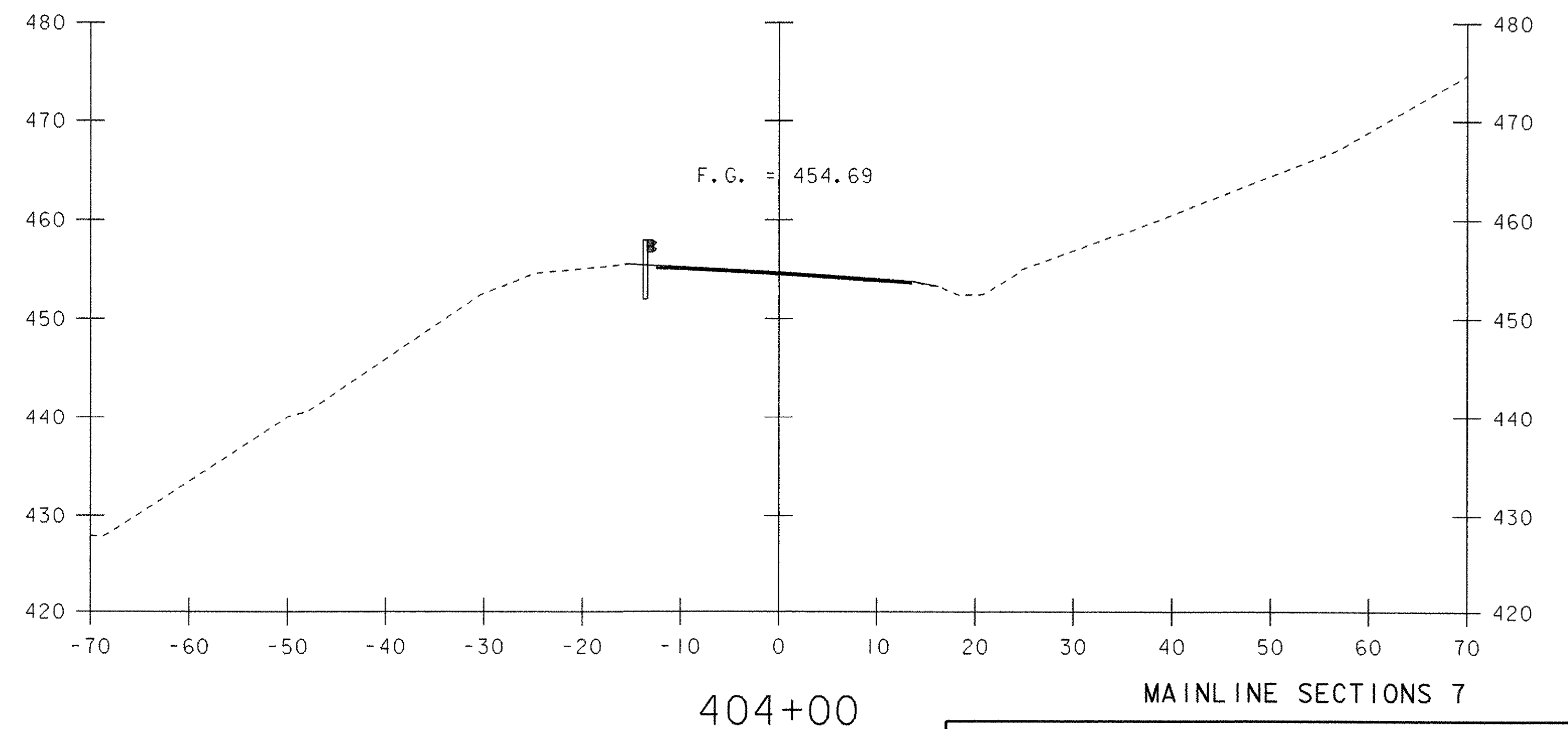
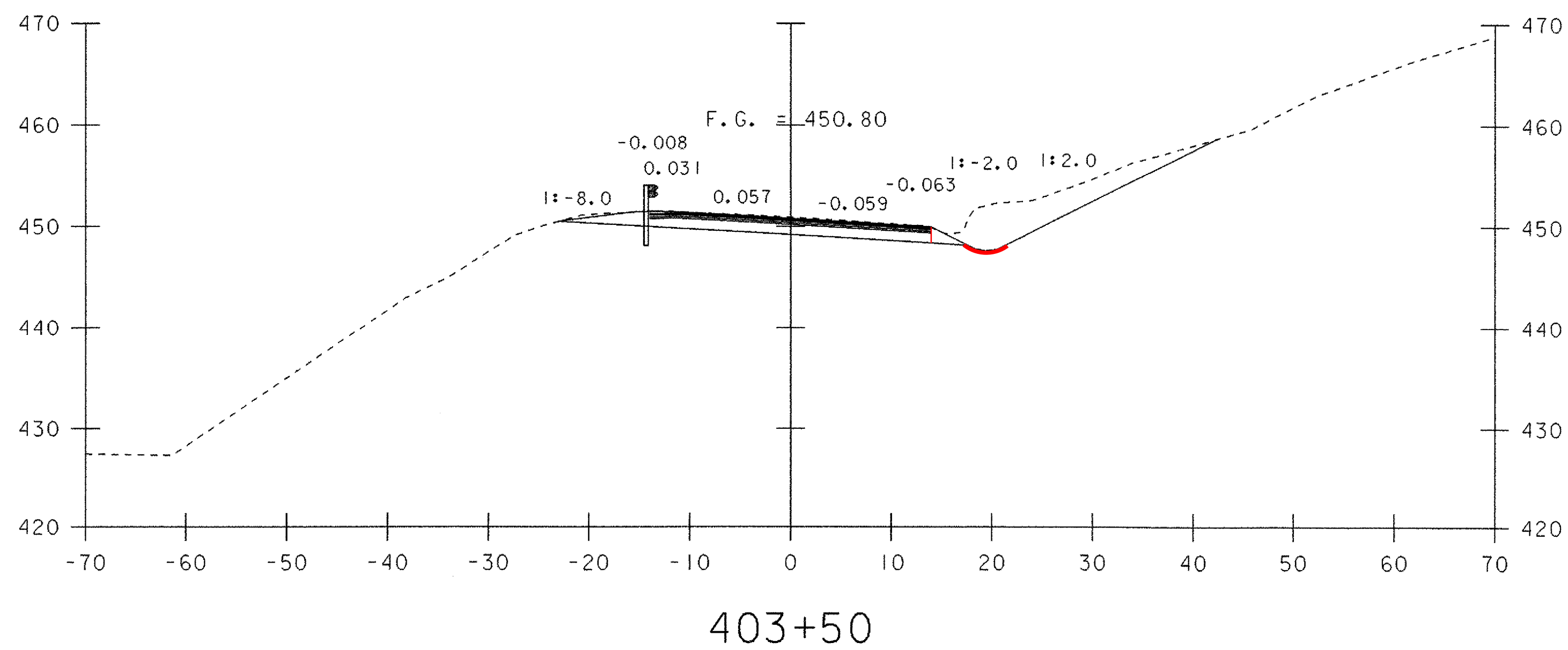
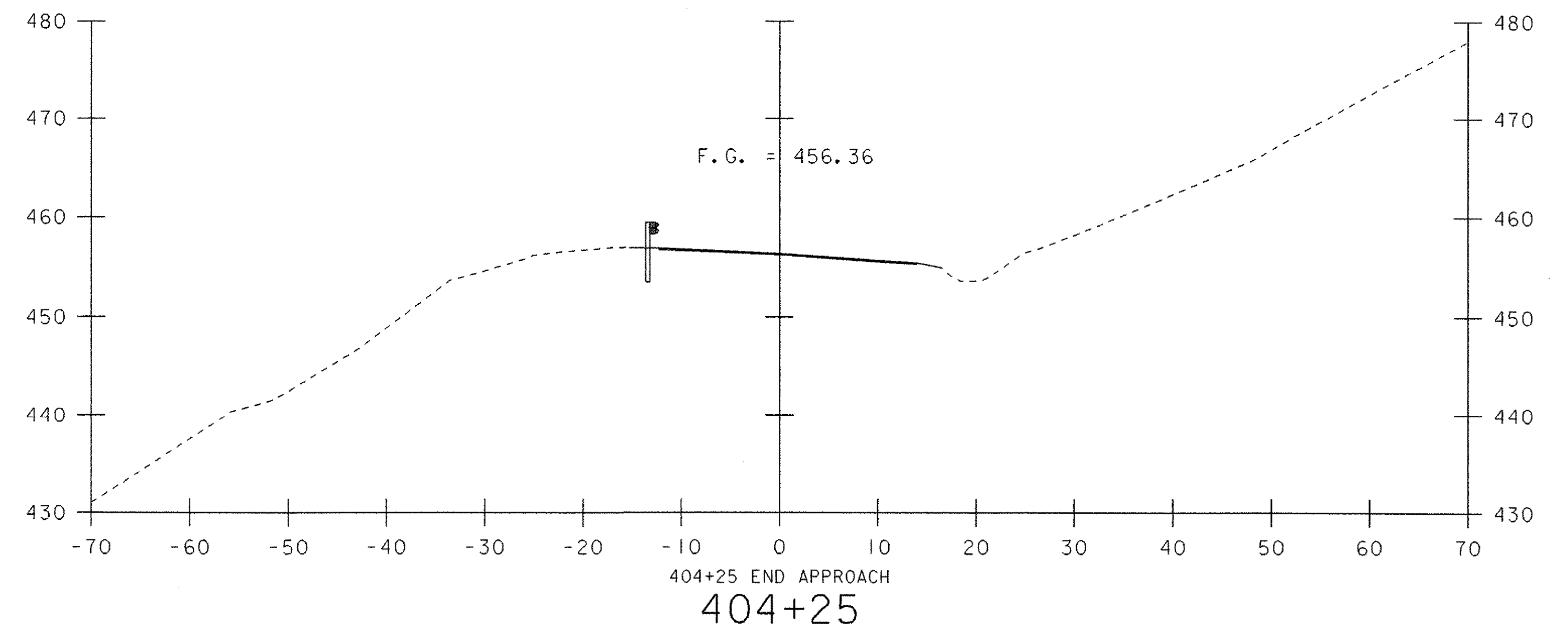
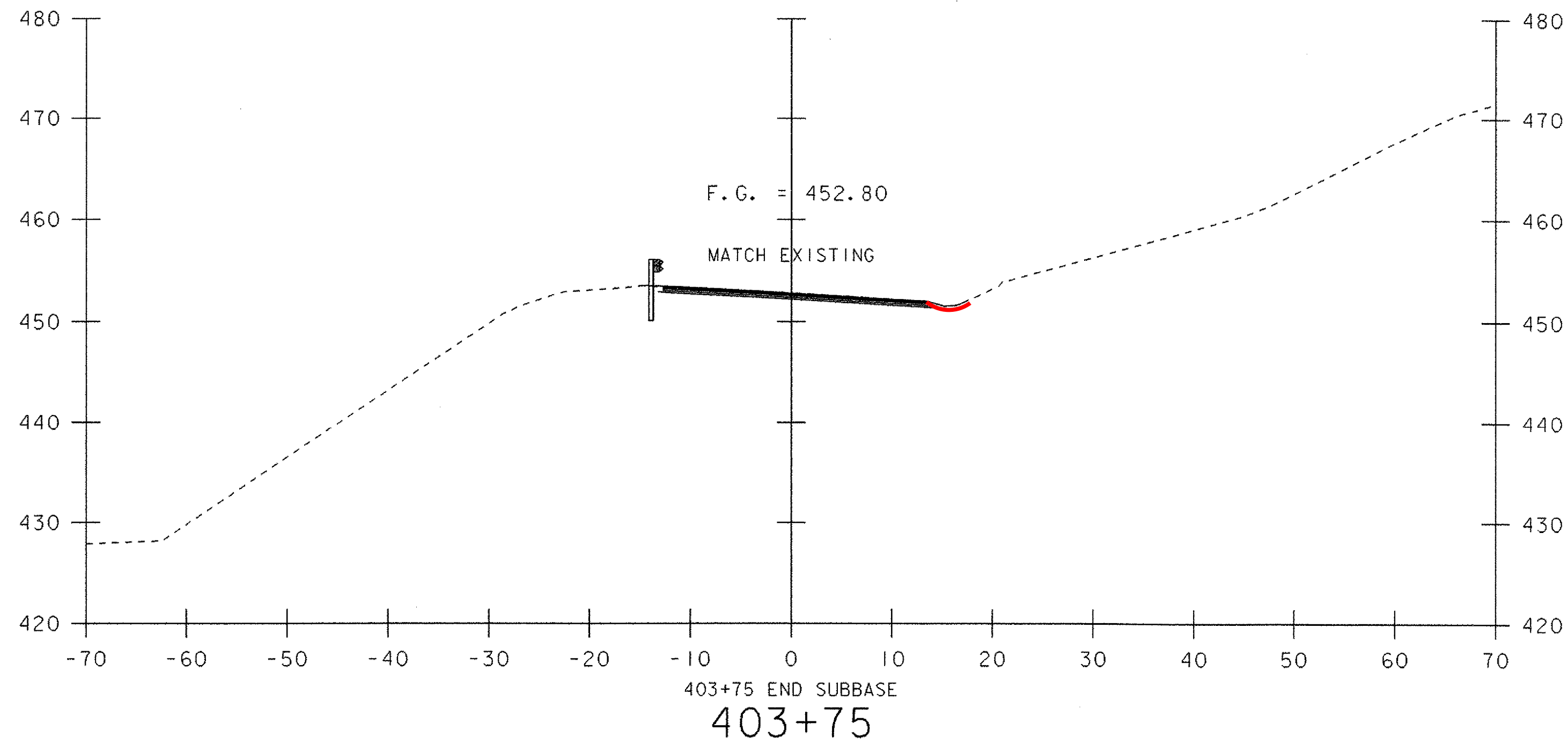
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m05.1	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 59 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



MAINLINE SECTIONS 6

SCALE 1" = 10'-0"

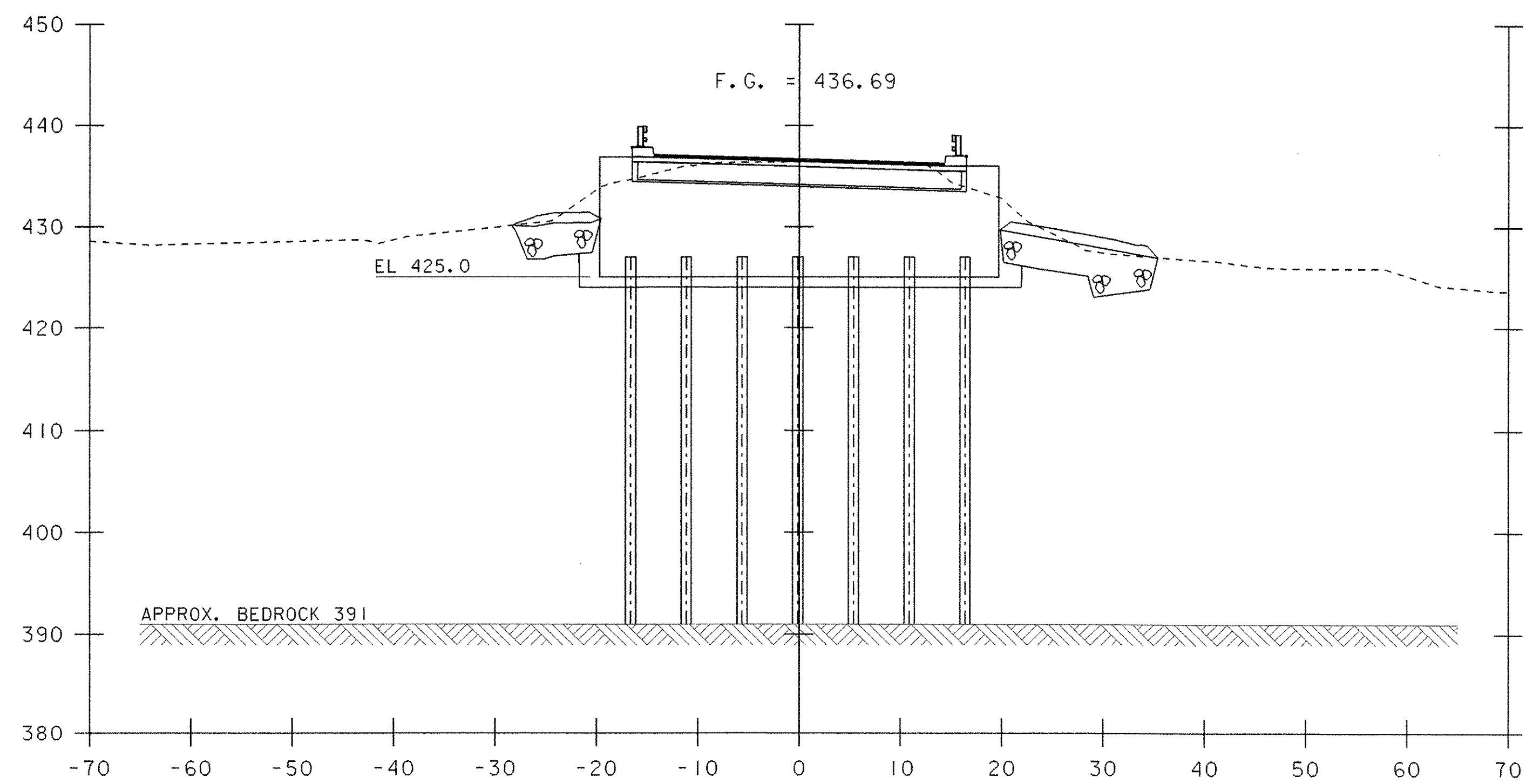
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m06.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 60 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



MAINLINE SECTIONS 7

SCALE 1" = 10'-0"  
10 0 10

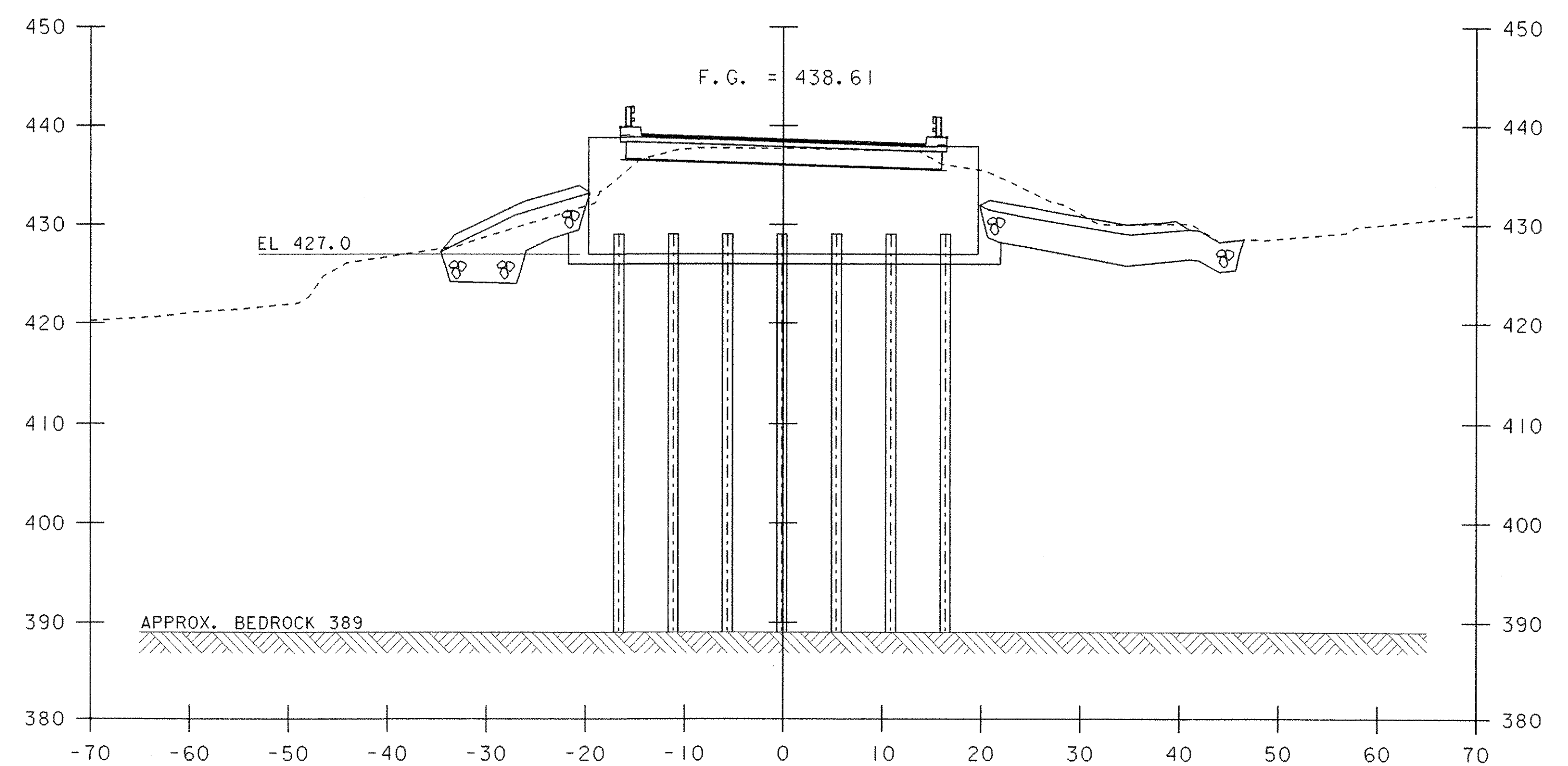
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m07.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 61 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



400+89

CL ABUTMENT 1  
SKEW 20° RT

SCALE 1" = 10'-0"  
10 0 10

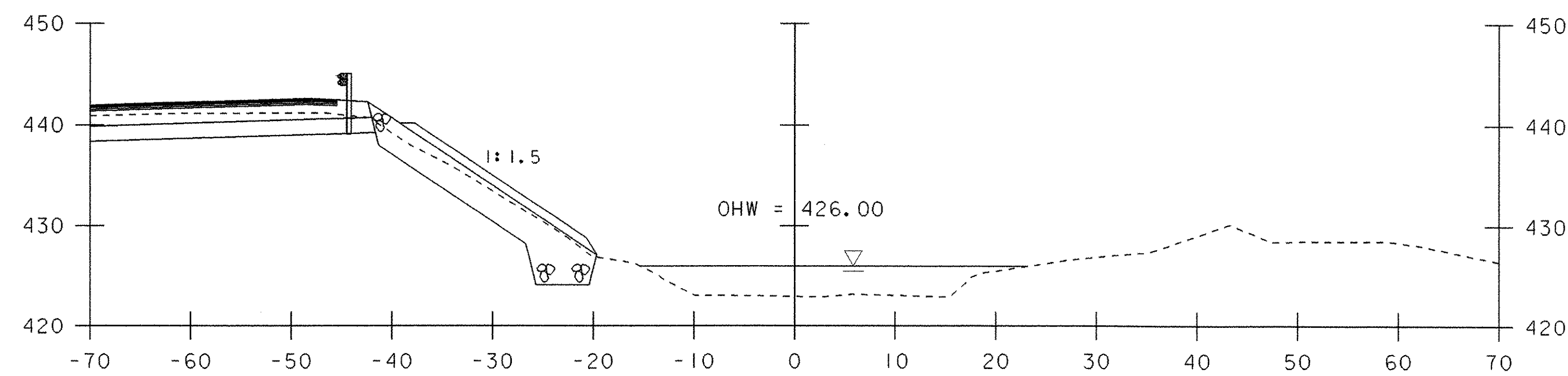


401+46

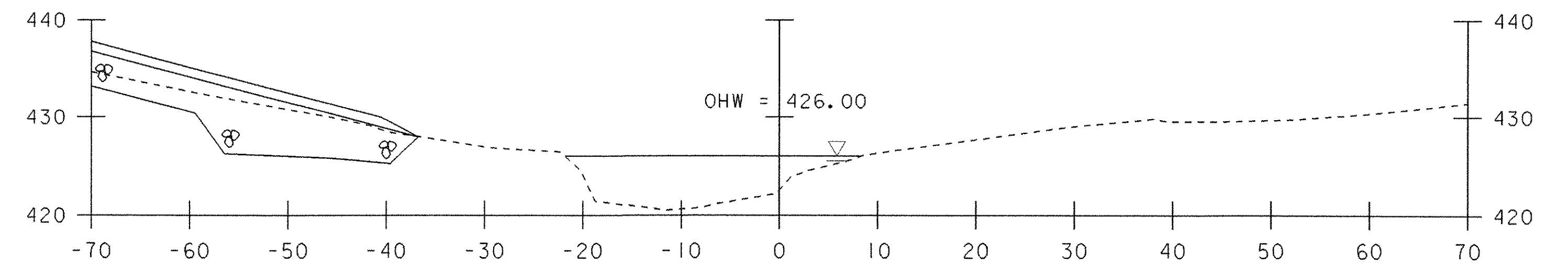
CL ABUTMENT 2  
SKEW 20° RT

MAINLINE SECTIONS ABUTMENTS

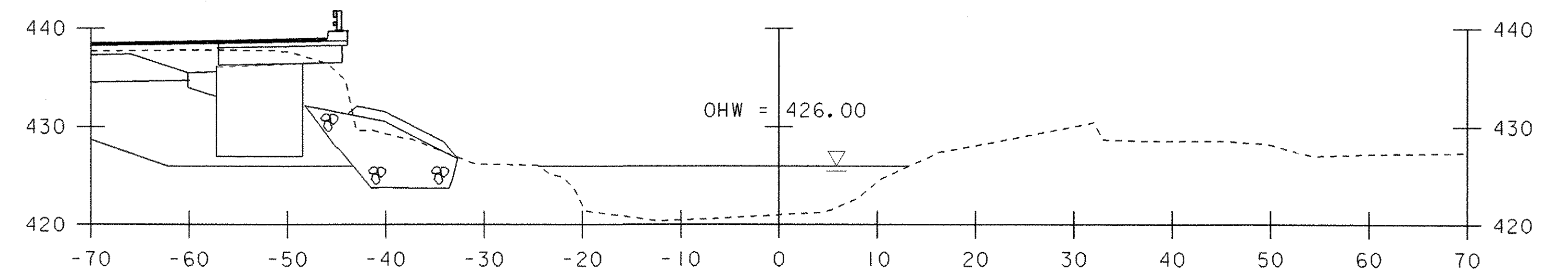
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: sf193m1.i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 62 OF 68
DESIGNED BY: T. LACKEY	
78f193/structures/sf193xsl.dgn	



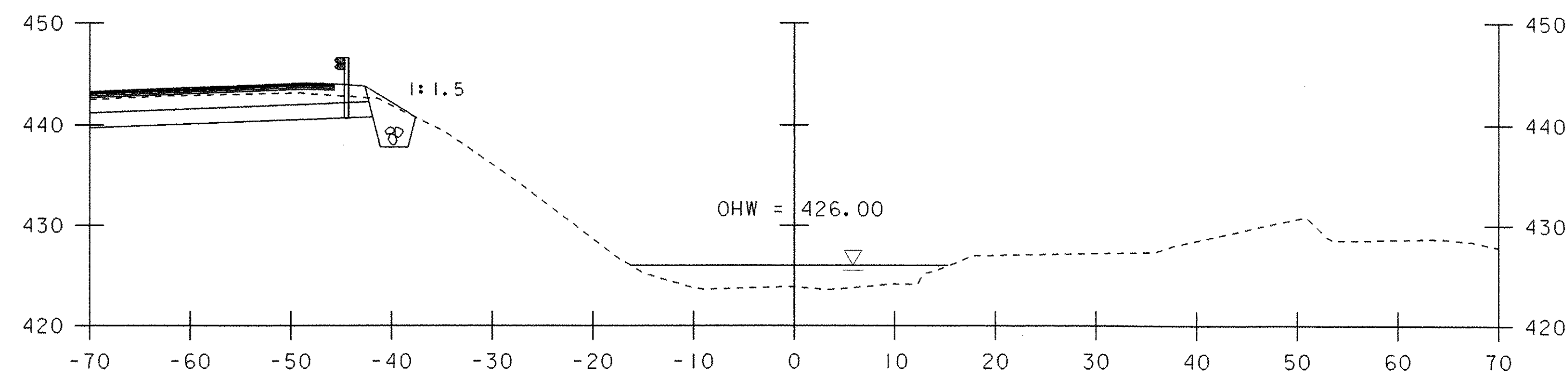
201+50



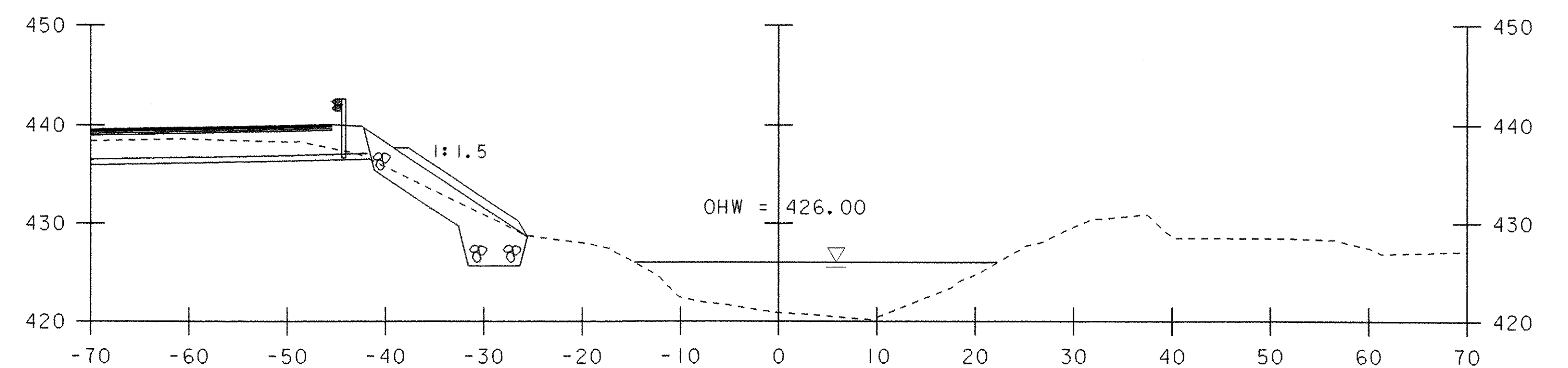
202+50



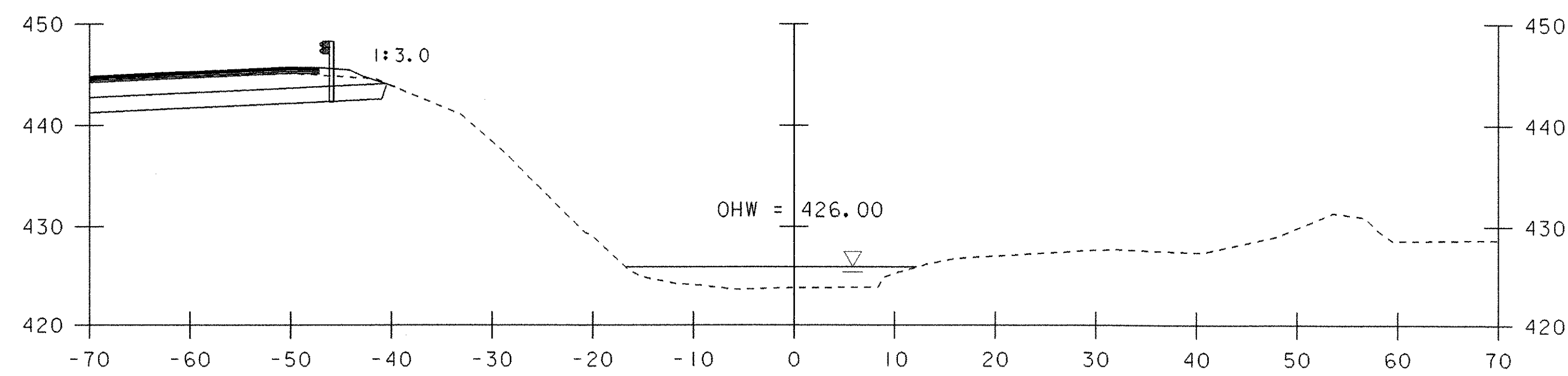
202+25



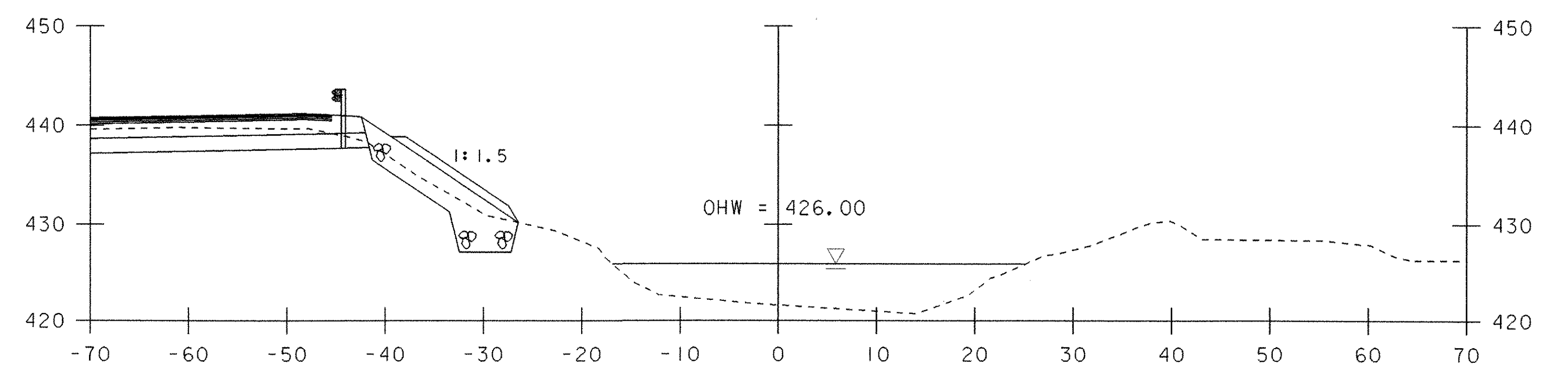
201+25



202+00

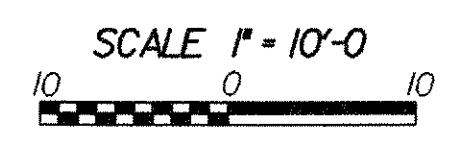


201+00



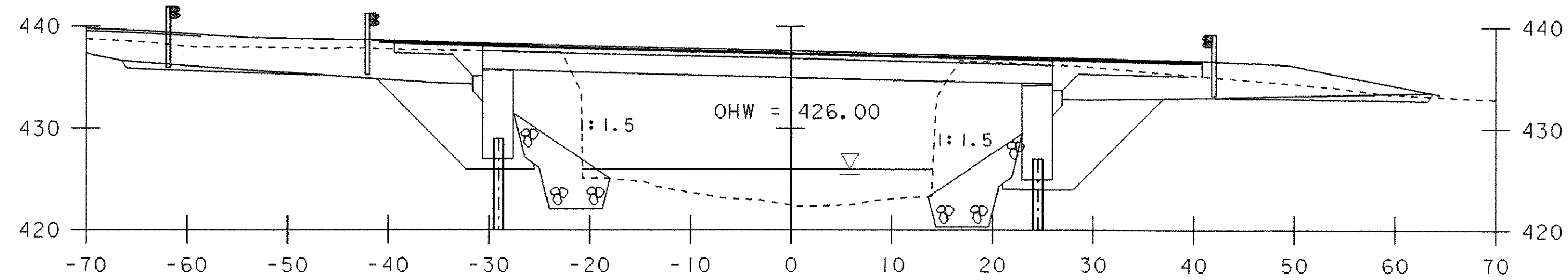
201+75

201+11 LT BEGIN  
UNCLASSIFIED CHANNEL EXCAVATION  
GEOTEXTILE FOR STONE FILL  
STONE FILL, TYPE III  
GRUBBING MATERIAL

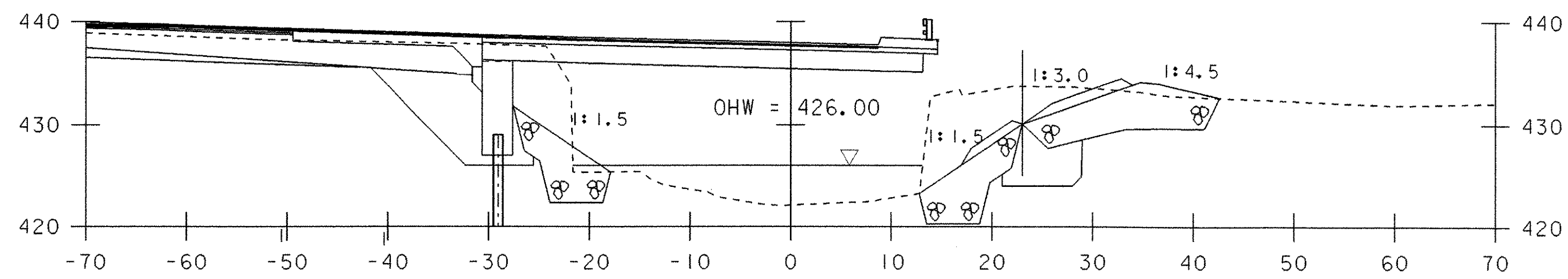


CHANNEL SECTIONS I

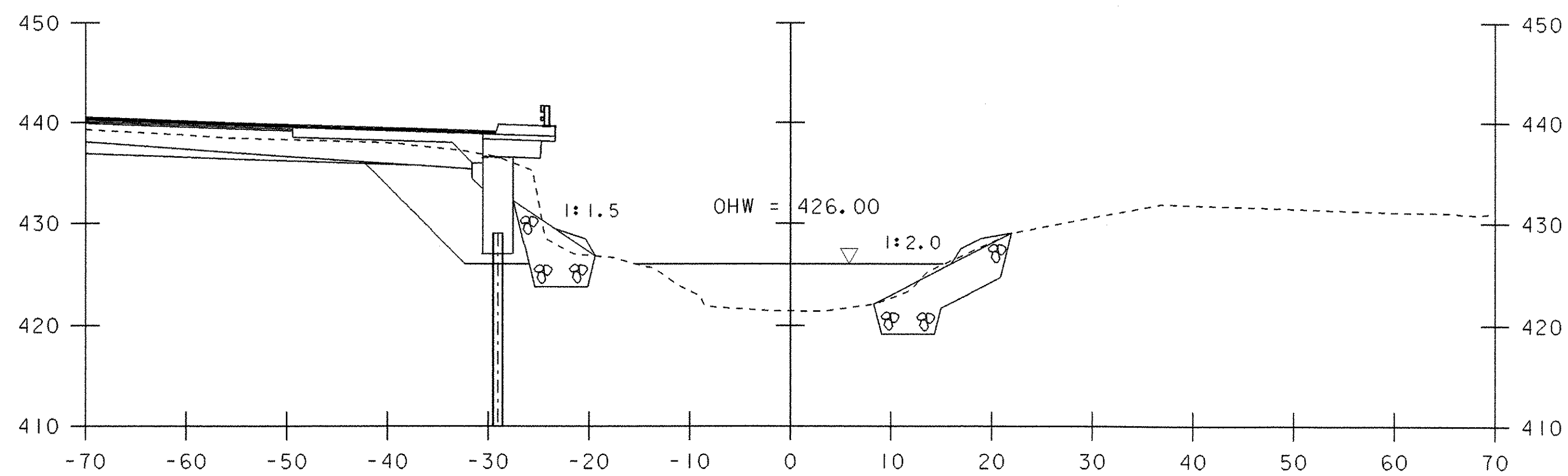
PROJECT NAME: CASTLETON	PLOT DATE: 09-FEB-2007
PROJECT NUMBER: RS 0142(10)	DRAWN BY: T. LACKEY
FILE NAME: s:f193c01i	CHECKED BY: W. LAMMER
PROJECT LEADER: R. WHITCOMB	SHEET 63 OF 68
DESIGNED BY: T. LACKEY	
78:f193/structures/s:f193xsl.dgn	



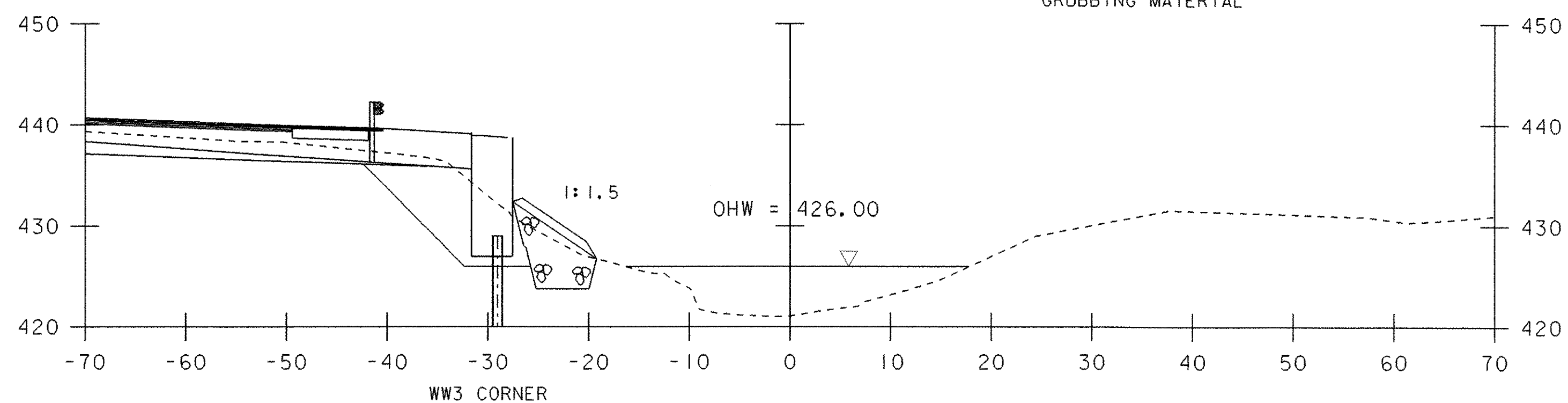
203+00



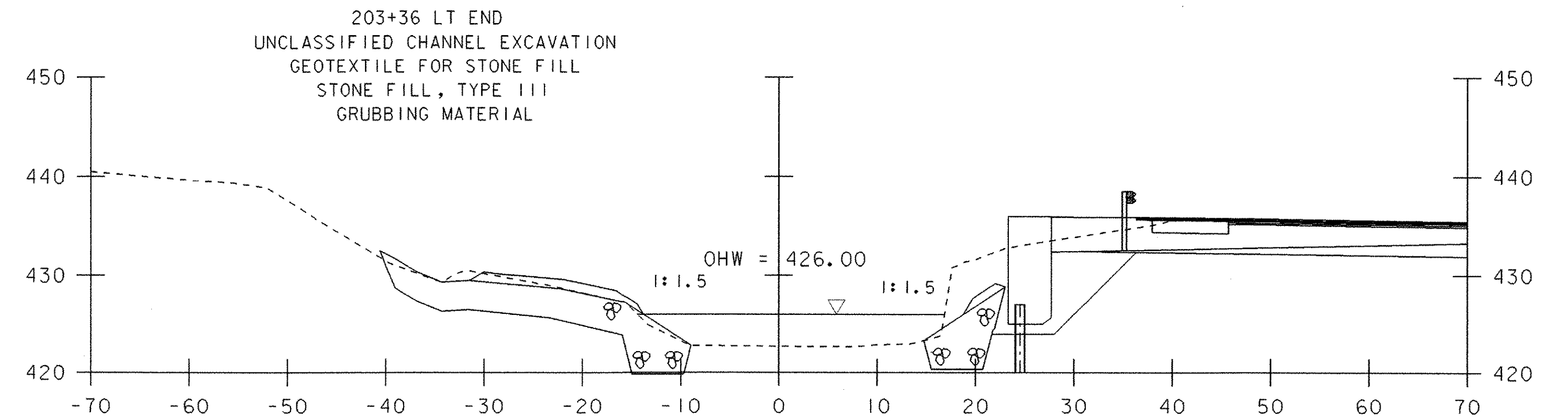
202+89



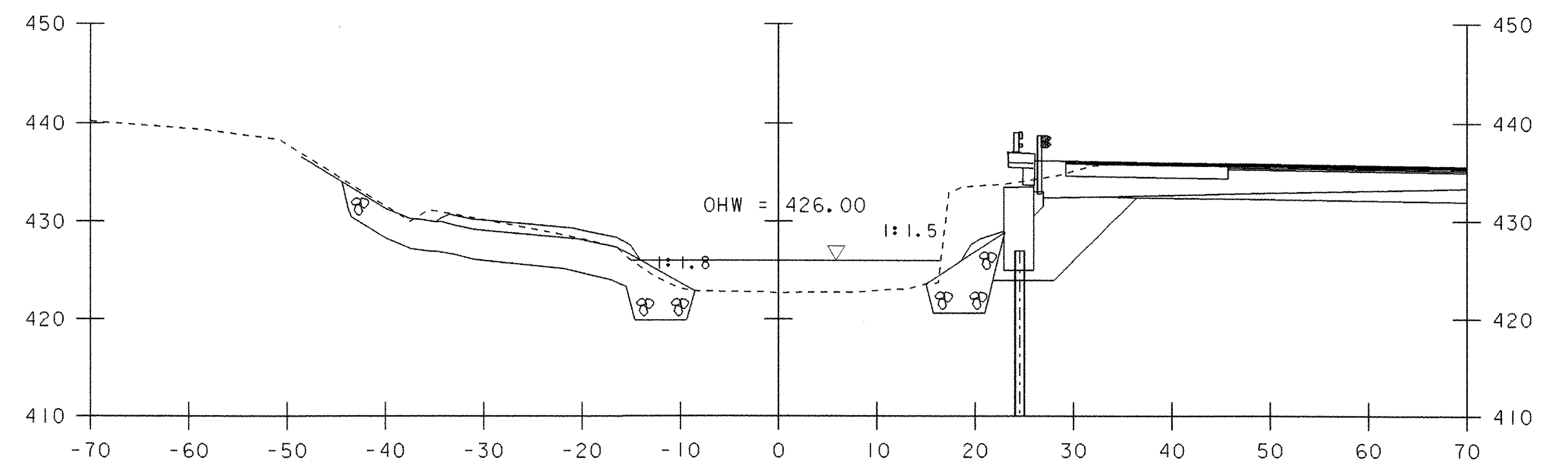
202+75



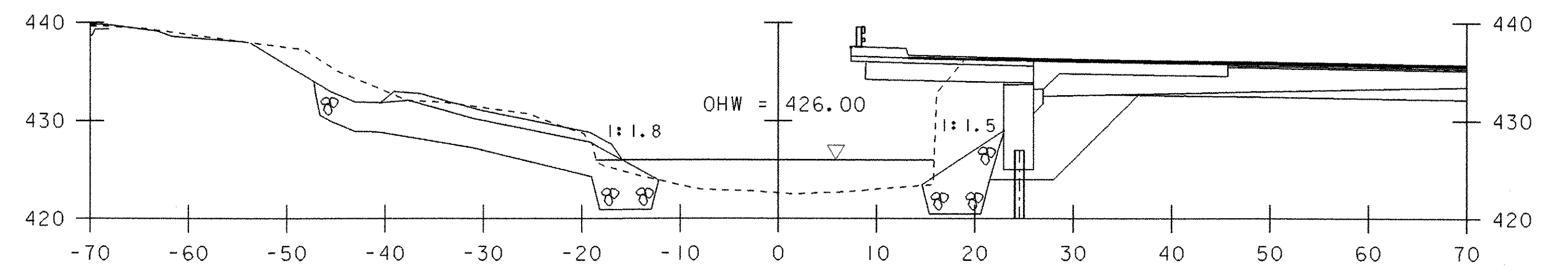
202+70



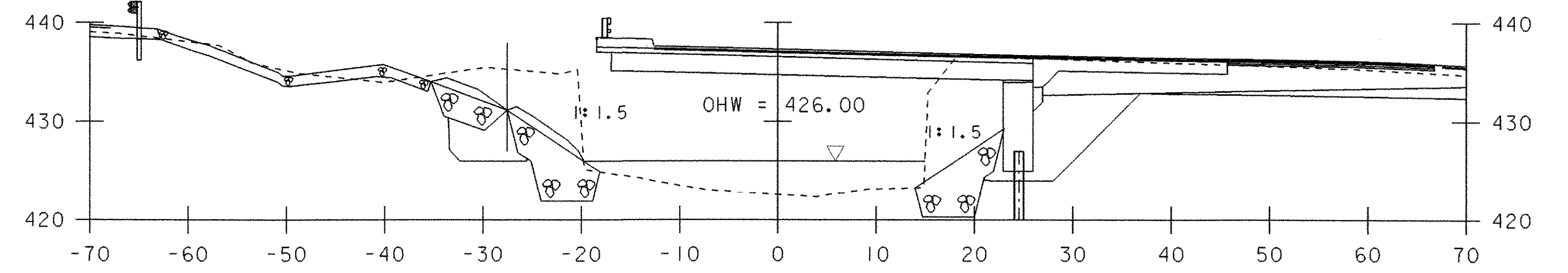
203+28



203+25



203+19

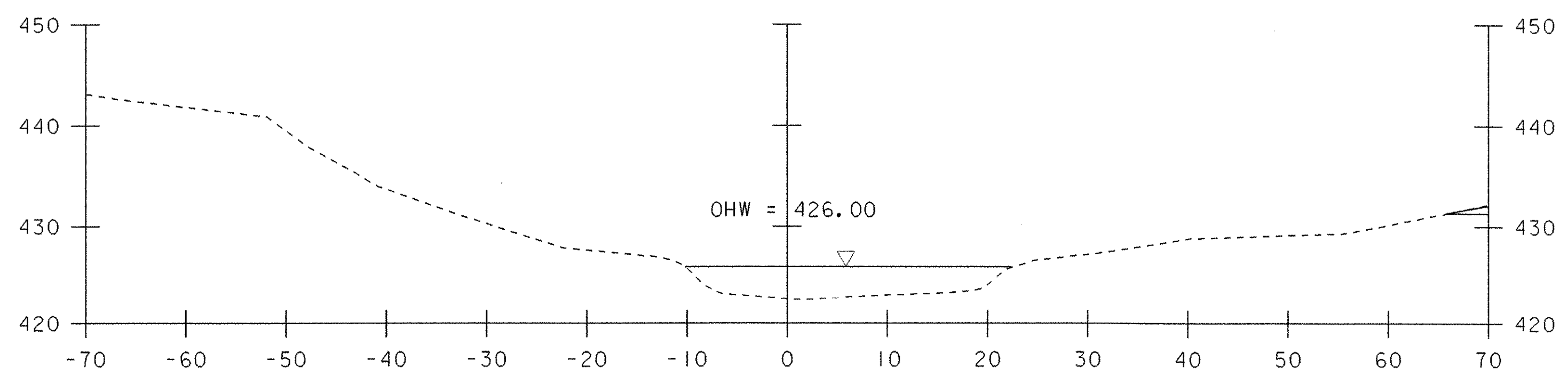


203+10

CHANNEL SECTIONS 2

SCALE 1" = 10'-0"

PROJECT NAME:	CASTLETON	PLOT DATE:	09-FEB-2007
PROJECT NUMBER:	RS 0142(10)	DRAWN BY:	T. LACKEY
FILE NAME:	sf193c02.i	CHECKED BY:	W. LAMMER
PROJECT LEADER:	R. WHITCOMB	SHEET	64 OF 68
DESIGNED BY:	T. LACKEY		
78f193/structures/sf193xsl.dgn			



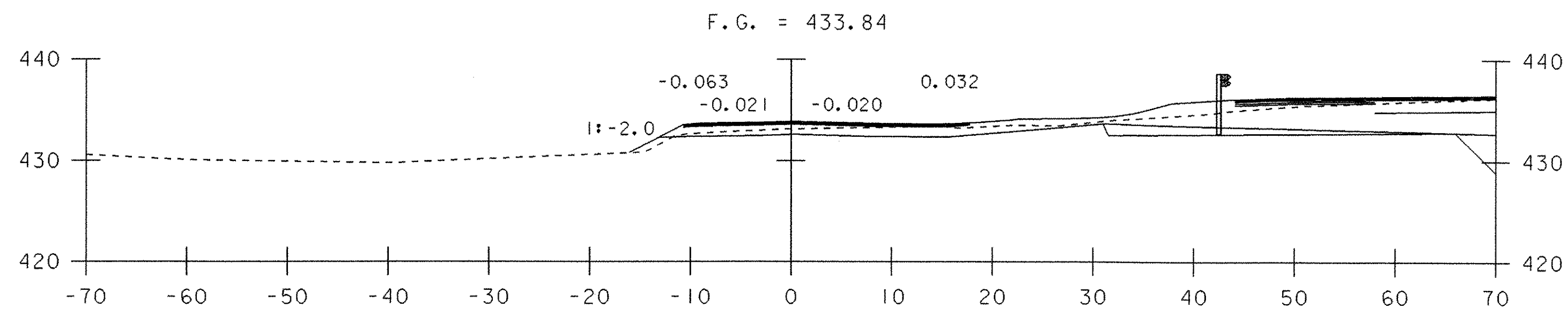
203+50

203+48 RT END  
 UNCLASSIFIED CHANNEL EXCAVATION  
 GEOTEXTILE FOR STONE FILL  
 STONE FILL, TYPE III  
 GRUBBING MATERIAL

SCALE 1" = 10'-0"

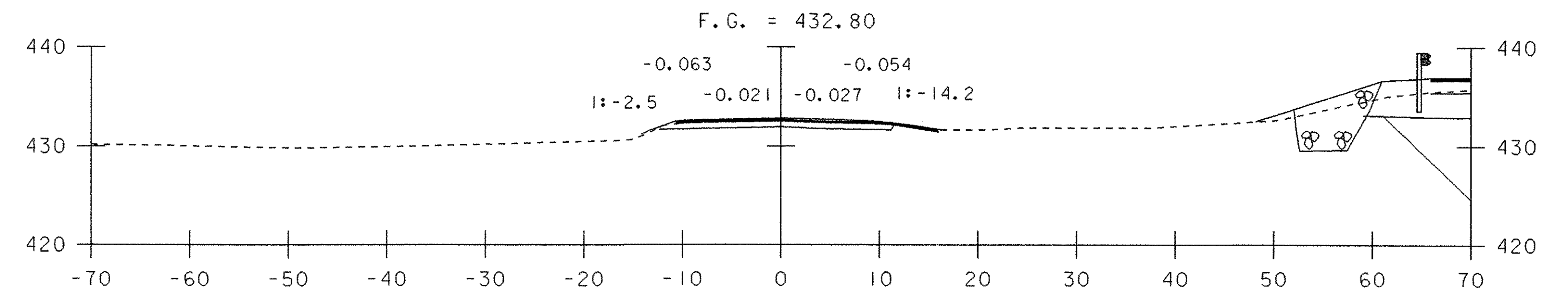
CHANNEL SECTIONS 3

PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: sf193c03.i	PLOT DATE: 09-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: T. LACKEY
DESIGNED BY: T. LACKEY	CHECKED BY: W. LAMMER
78-f193/structures/sf193xsl.dgn	SHEET 65 OF 68



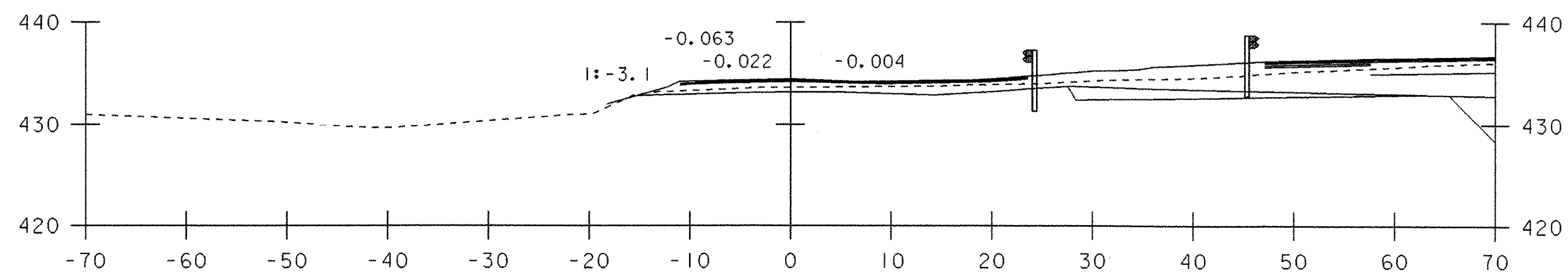
500+39

F.G. = 433.84



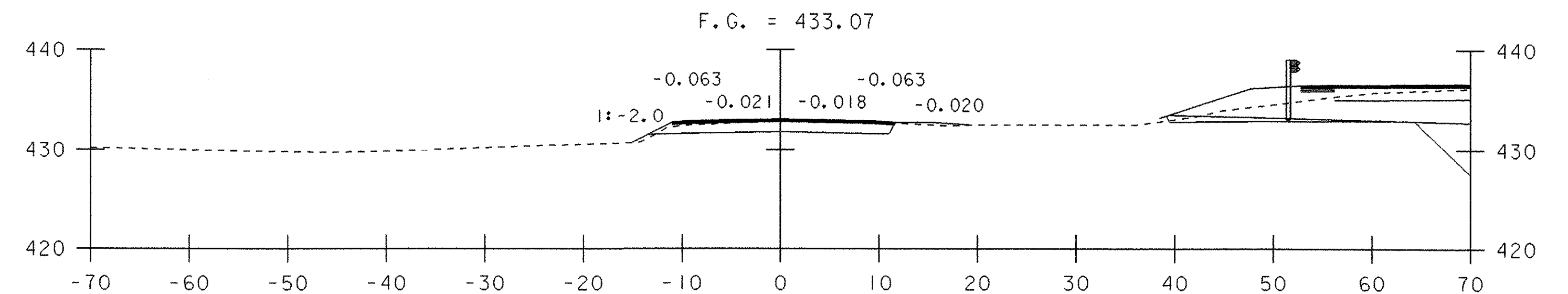
500+60

F.G. = 432.80



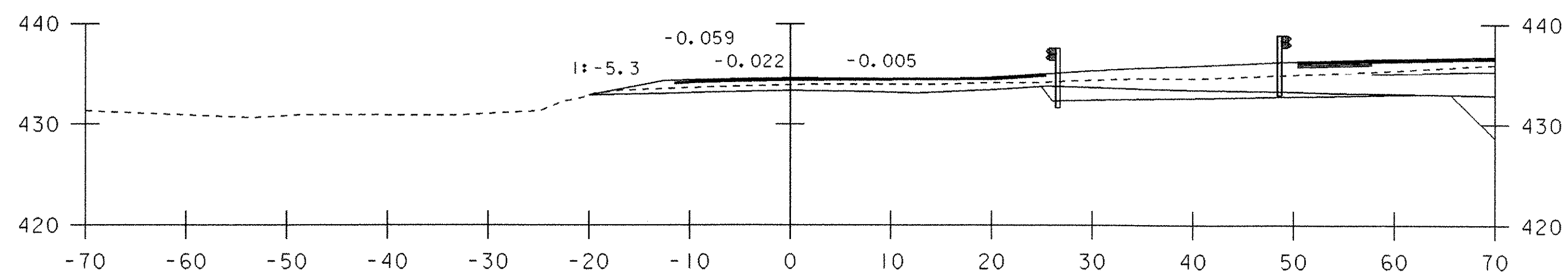
500+29

F.G. = 434.43



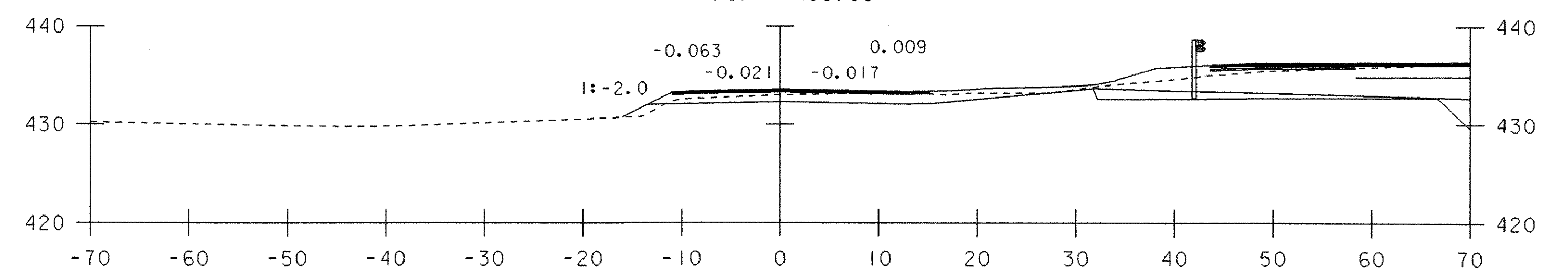
500+50

F.G. = 433.07



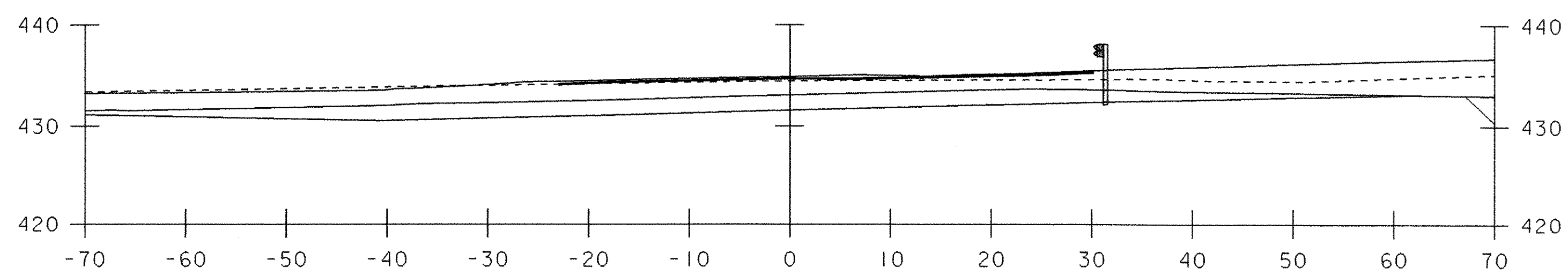
500+25

F.G. = 434.59



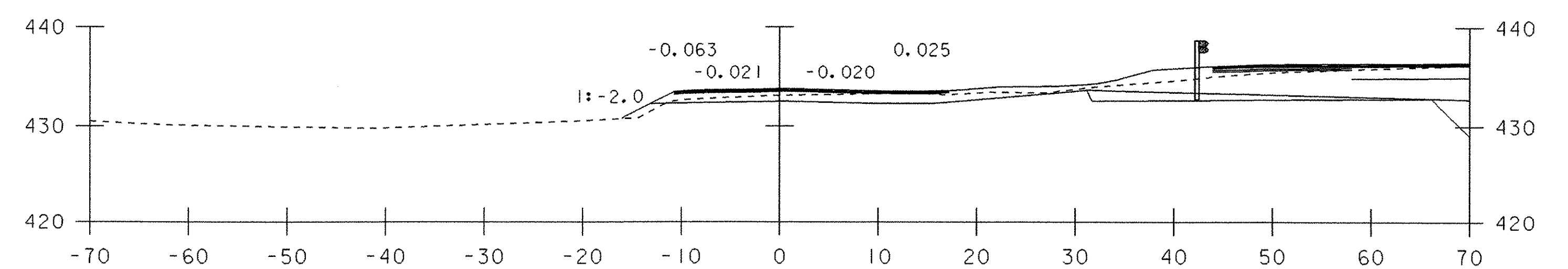
500+43

F.G. = 433.55



500+16

F.G. = 434.86



500+40

F.G. = 433.77

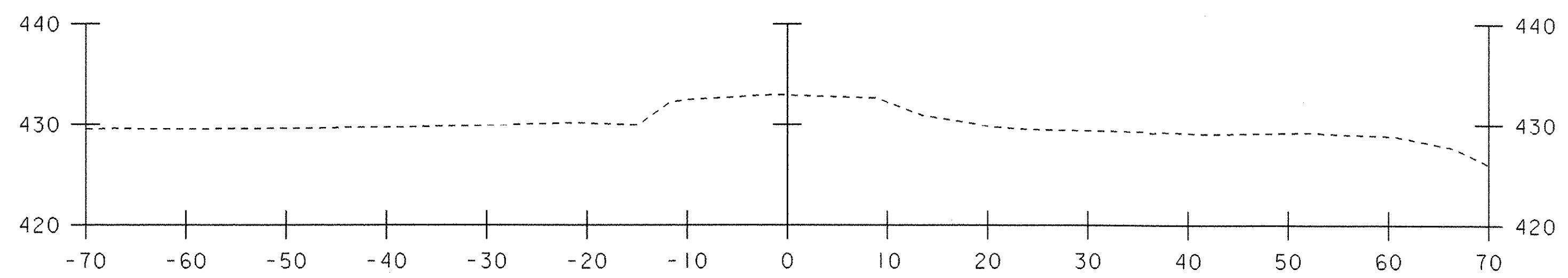
TH 8 SECTIONS 1

SCALE 1" = 10'-0"

PROJECT NAME: CASTLETON  
PROJECT NUMBER: RS 0142(10)

FILE NAME: sf193+01.1  
PROJECT LEADER: R. WHITCOMB  
DESIGNED BY: T. LACKEY  
78f193/structures/sf193xsl.dgn

PLOT DATE: 09-FEB-2007  
DRAWN BY: T. LACKEY  
CHECKED BY: W. LAMMER  
SHEET 66 OF 68



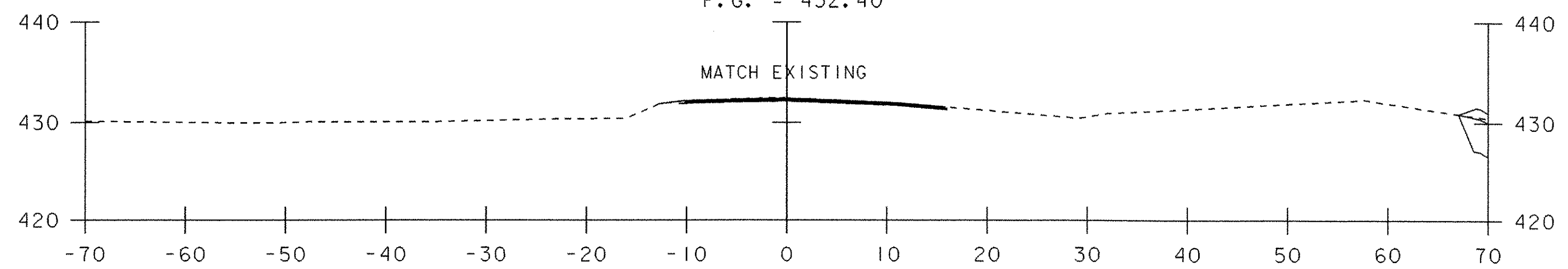
501+25



501+00

501+00 END TH 8

F. G. = 432.40



500+75

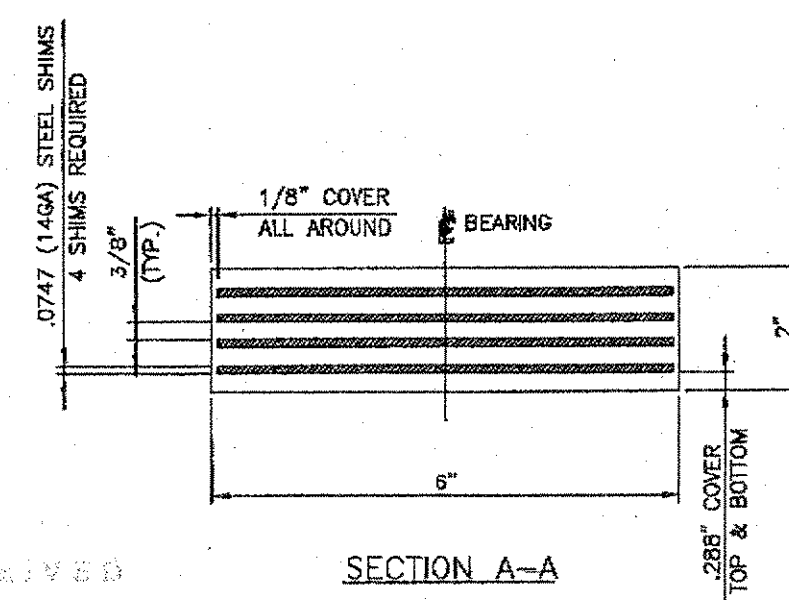
SCALE 1" = 10'-0"

TH 8 SECTIONS 2

PROJECT NAME: CASTLETON  
PROJECT NUMBER: RS 0142(10)

FILE NAME: sf193+02.1  
PROJECT LEADER: R. WHITCOMB  
DESIGNED BY: T. LACKEY  
78f193/structures/sf193xsl.dgn

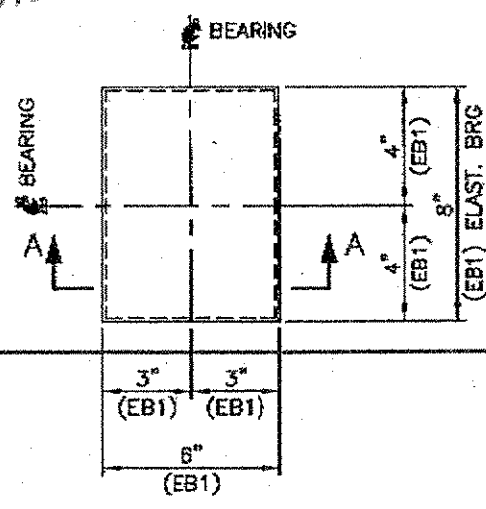
PLOT DATE: 09-FEB-2007  
DRAWN BY: T. LACKEY  
CHECKED BY: W. LAMMER  
SHEET 67 OF 68



**32 LAMINATED ELASTOMERIC BEARING PADS, EB1**  
 LAMINATED ELASTOMERIC BEARING 2" x 6" x 8"  
 IN ACCORDANCE WITH THE STATE OF VERMONT AGENCY OF  
 TRANSPORTATION THE BEARINGS SHALL MEET AASHTO M251  
 STANDARD SPECIFICATION FOR HIGHWAY BRIDGES  
 ELASTOMER - 60 DUROMETER NEOPRENE GR. 3  
 SHIMS - AASHTO M284 GR. 50  
 BEARINGS THICKNESS TOLERANCE OF  $\pm 1/4$ "  
 TEMPERATURE RANGE: 50°F  
 MAXIMUM BEARING STRESS: 1000 psi  
 DESIGN ROTATION: 0.016 rad

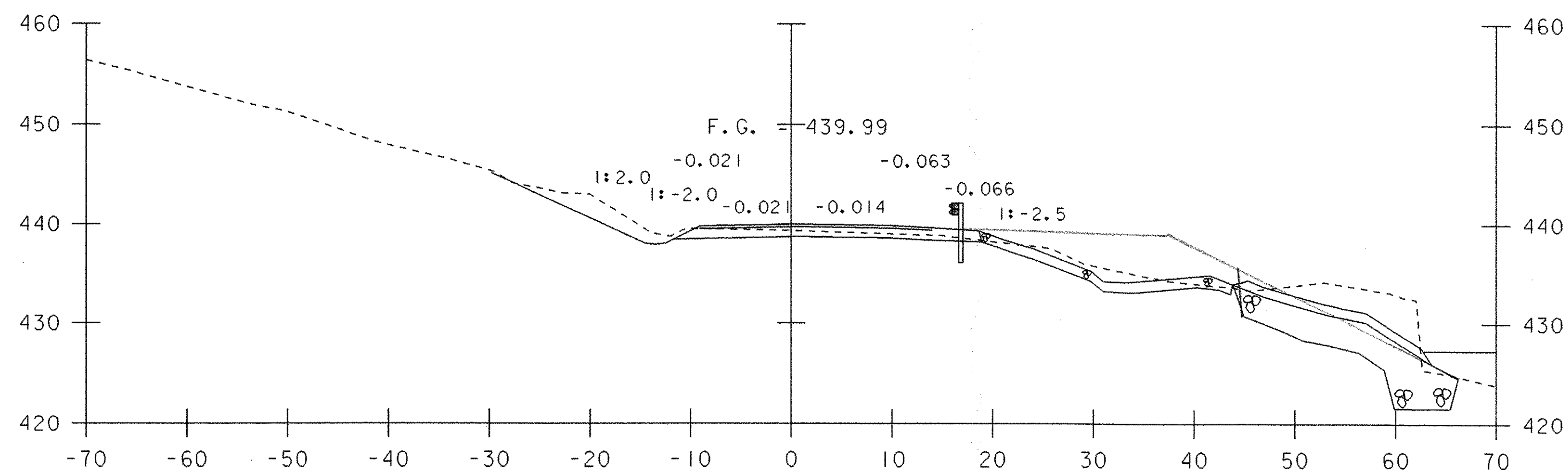
RDL: 28kips 48"  
 RLL4: 25kips 33kips

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 JUL 1 2007  
 AS NOTED  
 R/W 8/307

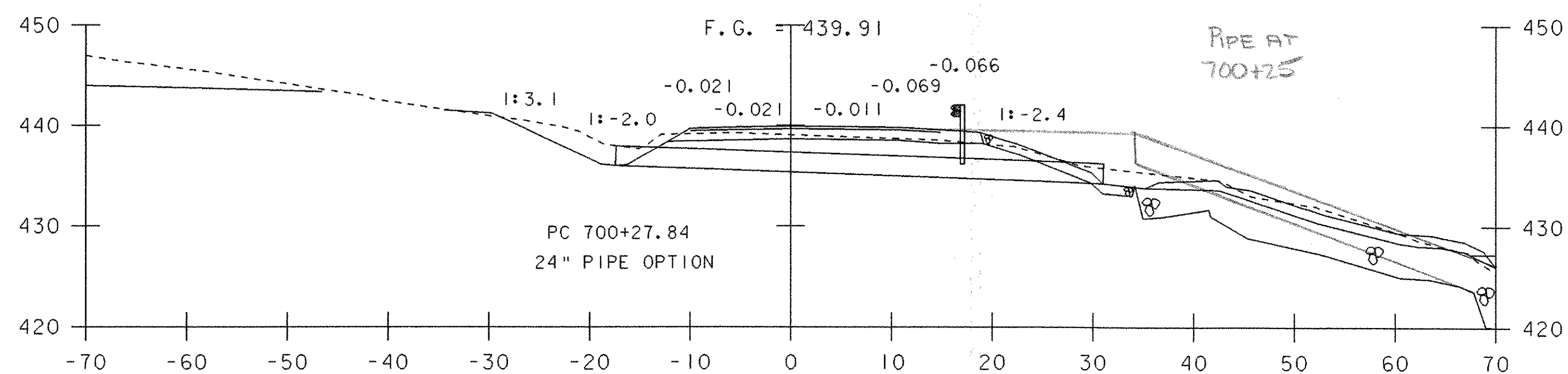


ELASTOMERIC BEARINGS		
TYPE: LAMINATED		
ROUTE NO. VT 4A		
OVER CASTLETON RIVER		
STATE	COUNTY	BRIDGE NO.
VT	RUTLAND	8
PROJECT NO.: RS 0142 (10)		
DYNAMIC RUBBER		1501 ROCKY HIDE RD.
A DIVISION OF COSMEC, INC.		ATKINS, TX 75751
SCALE: NONE	DRAWN BY: K/W	CHECKED BY: S/W
	DATE: 7/2/2007	DATE: 7/2/2007
SHEET 1 OF 1	DRP NO. 9512	
CUSTOMER	DRAWING NUMBER	REV.
F.W. WHITCOMB CONSTRUCTION	9512-D1	0

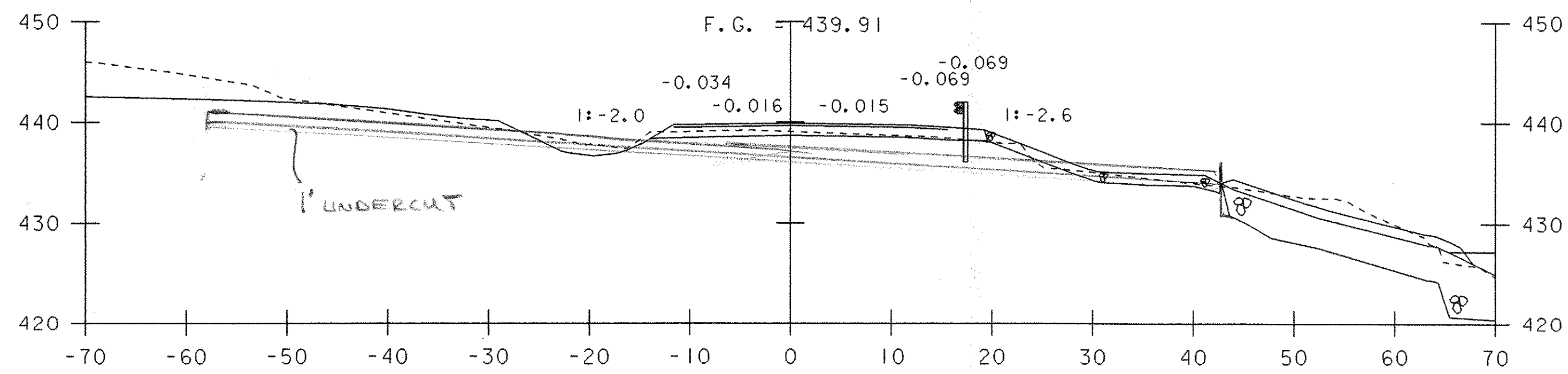
067bb



700+36

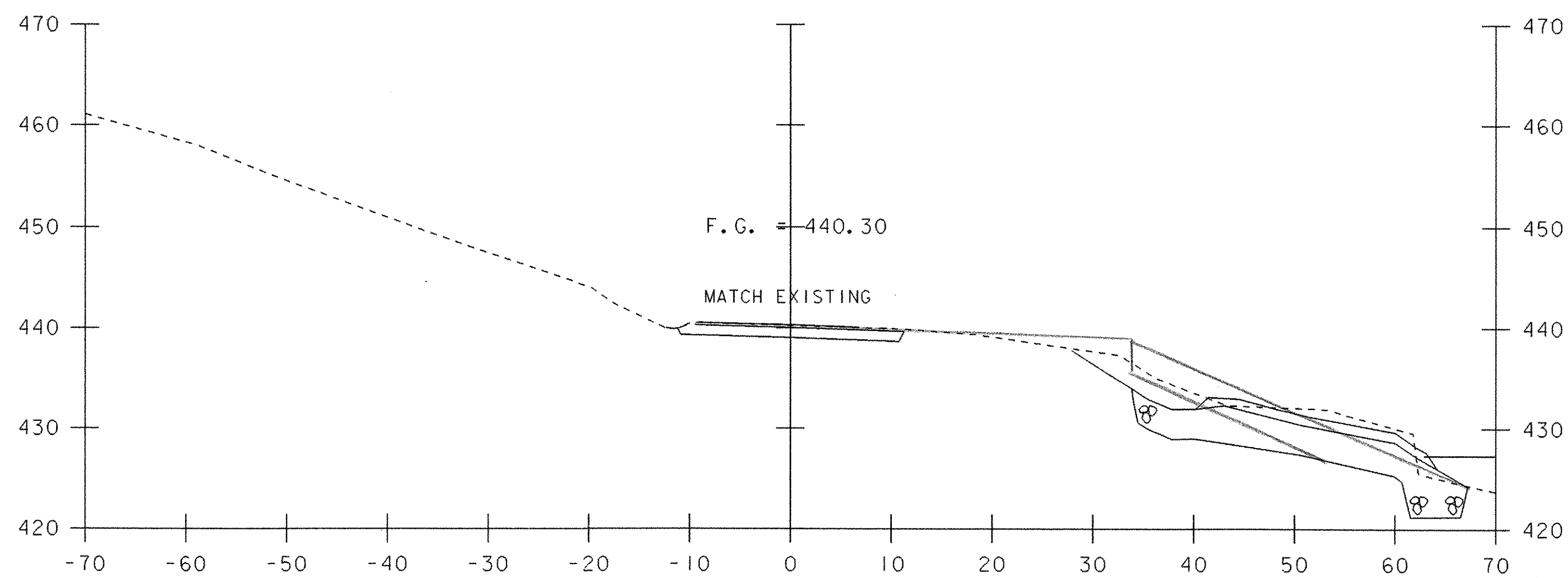
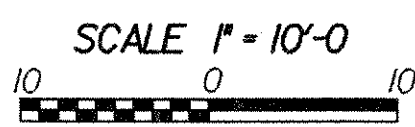


700+28



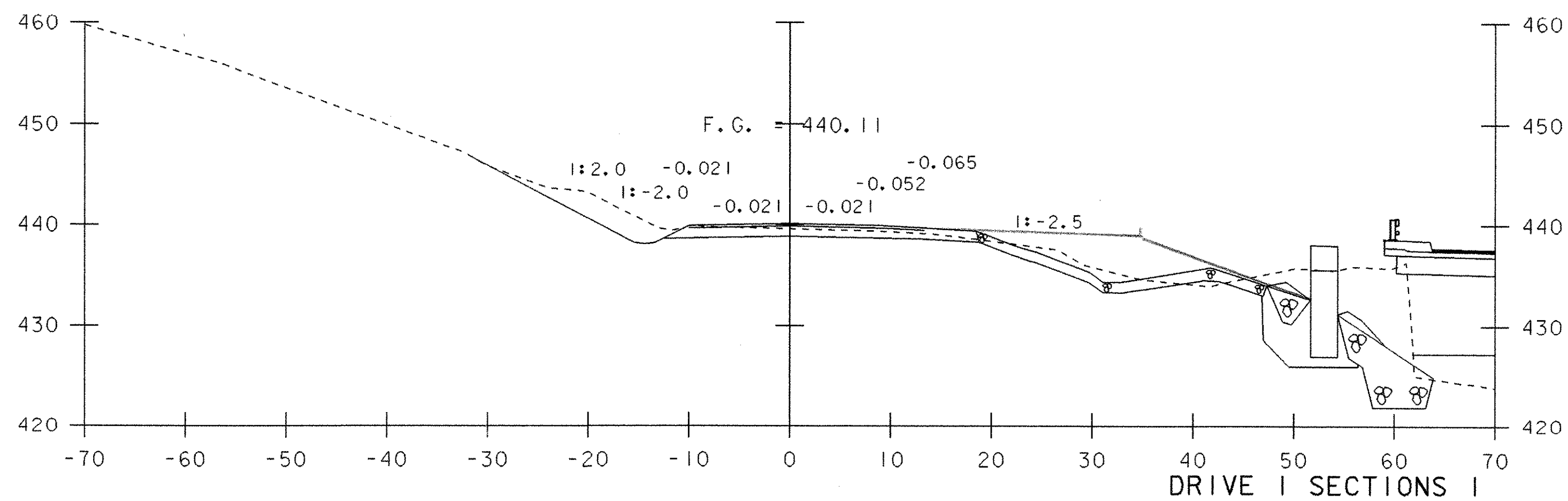
700+25

700+14 BEGIN DRIVE 2



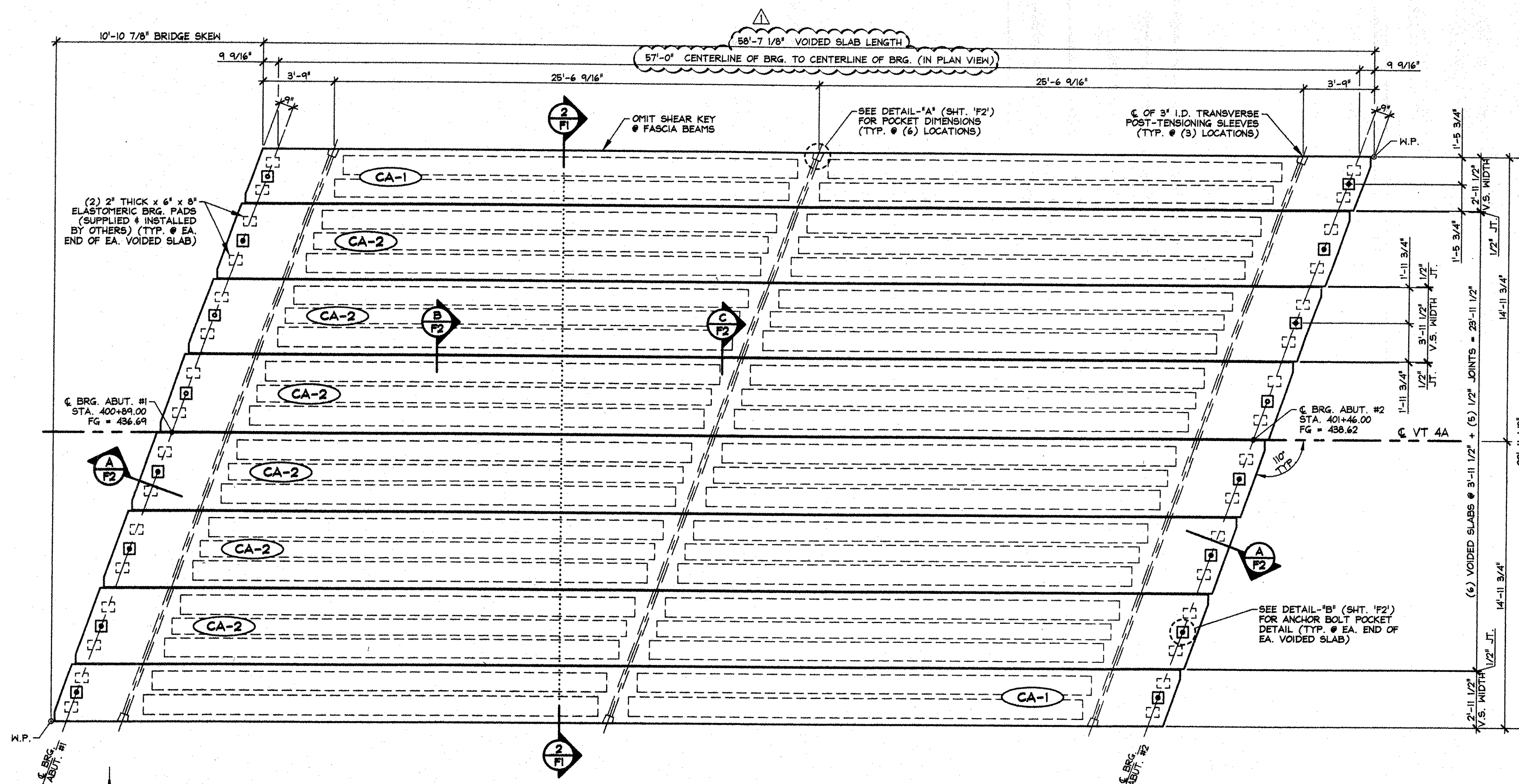
700+50

700+50 END DRIVE 2



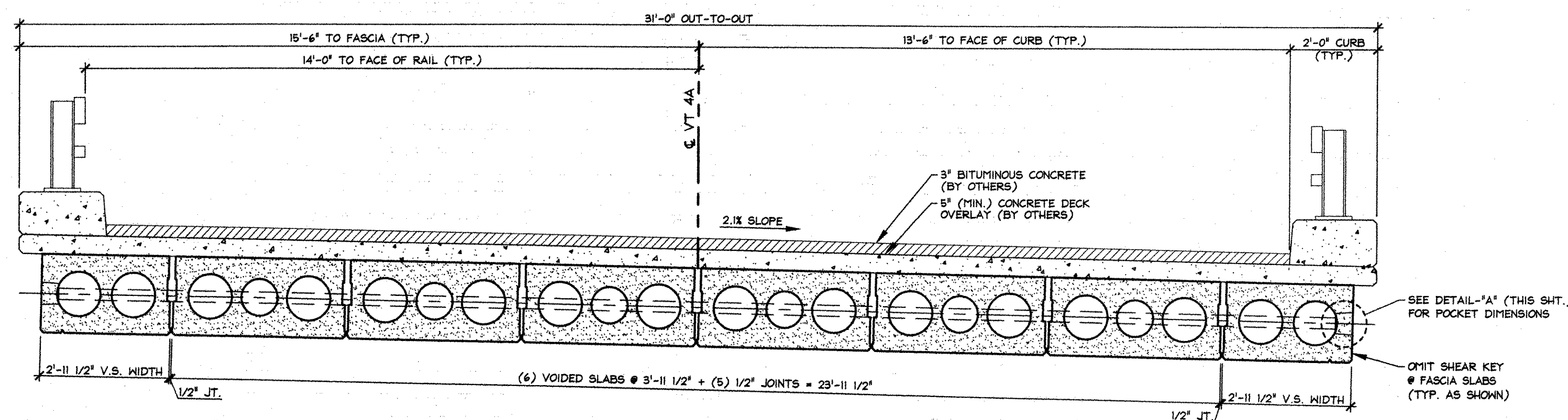
700+41

PROJECT NAME: CASTLETON	
PROJECT NUMBER: RS 0142(10)	
FILE NAME: sf193d01.i	PLOT DATE: 16-FEB-2007
PROJECT LEADER: R. WHITCOMB	DRAWN BY: T. LACKEY
DESIGNED BY: T. LACKEY	CHECKED BY: W. LAMMER
78f193/structures/sf193xsl.dgn	SHEET 68 OF 68



**1 PRESTRESSED VOIDED SLAB LAYOUT**  
1/4" = 1'-0"

DESIGN LOAD: HS 25-44



**2 TRANSVERSE SECTION**  
1/2" = 1'-0"

**GENERAL NOTES**

- MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 6,000 PSI.
- MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 4,000 PSI.
- REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M61) AND SHALL BE EPOXY COATED.
- PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M208) AND SHALL CONSIST OF 0.60" x 270 KSI 7-WIRE LOW RELAXATION STRANDS.
- PRESTRESSING STRANDS SHALL EACH BE PULLED TO HAVE A NET TENSION SHALL BE VERIFIED BY MEASURING STRAND ELONGATION. (SEE EXAMPLE ELONGATION CALCULATION AND TENSIONING PROCEDURE, THIS SHEET.)
- ENDS OF PRESTRESSING STRANDS SHALL BE CUT, RECESSED & GROUTED FLUSH WITH END OF BOX BEAMS.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
- THE TOP OF BEAMS SHALL RECEIVE A RAKE FINISH ROUGHENED TO 1/4" APLITUDE.
- SHEAR KEY SURFACES SHALL BE BLASTED CLEAN.
- BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. THE MINIMUM SLING ANGLE FROM THE HORIZONTAL SHALL BE 60°. BEAMS SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 2'-0" OF THE BEAM ENDS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
- MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. PS10.02 AND PS10.05 RESPECTIVELY. DESIGN MIX: J.P.C. BRIDGE MIX 430 MHD8CC
- QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
- THE VOIDS MUST BE VENTED DURING CURING PERIOD.
- CURING METHOD: AS SOON AS THE TOP OF BEAM IS FINISHED, A COVER OF POLY AND A LAYER OF HOPSOTITE (OR BLUE BOARD) WILL BE PLACED OVER THE BEAM. THE DESIRED CURING TEMPERATURE RANGE SHALL NOT DROP BELOW 70°. THE TEMPERATURE SHALL BE RECORDED BY AUTOMATIC SENSOR INSTRUMENTS ON GRAPH CHARTS, SPACED NOT MORE THAN 100' APART AND WILL CONTINUE UNTIL RELEASE STRENGTH IS ACHIEVED. (NATURAL CURE WITH NO EXTERNAL HEAT APPLIED). EACH CHART SHALL BE MARKED.
- TRANSVERSE POST-TENSIONING SEQUENCE:
  - ONCE VOIDED SLABS ARE ERECTED, POST-TENSION TENDONS TO APPROXIMATELY 5,000 LBS.
  - GROUT SHEAR KEYS.
  - ONCE SHEAR KEY GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI, POST TENSION TENDONS TO 30,000 LBS.

**EXAMPLE PRESTRESSING STRAND ELONGATION CALC. AND TENSIONING**  
(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60" x 270 KSI  
 AREA: 0.217 IN<sup>2</sup>  
 TENSION: 44,000 LB. EACH STRANDS  
 GRIP-TO-GRIP: 192'-9 3/4" = 192.813'  
 $E_s = 28,600,000$  PSI (ASSUMED FOR THESE CALCULATIONS; VALUE TO BE OBTAINED FOR STRAND SPOOL ACTUALLY USED)  
 EXAMPLE:  
 $\Delta = \frac{PL}{AE} = \frac{(44,000 - 3,000) \times 192.813 \times 12}{0.217 \times 28,600,000} = 15.29'$   
 THEREFORE: (TOLERANCES  $\pm 5\%$ )  
 $\Delta$  UPPER LIMIT =  $1.05 \times 15.29' = 16.05' = 16$  1/16"  
 $\Delta$  LOWER LIMIT =  $0.95 \times 15.29' = 14.53' = 14$  1/2"  
 EXTRA FORCE REQUIRED TO COMPENSATE FOR 1/2" CHUCK SLIPPAGE:  
 $\Delta P = 0.5 \times \frac{44,000}{15.29} = 1,341$  LBS.  
 TOTAL TENSIONING FORCE = 44,000 + 1,341 = 45,341 LBS.

**STRAND TENSIONING PROCEDURE:**

- PULL EACH STRAND INITIALLY TO 3,000+ LBS. AND MARK STRAND.
- THEN PULL EACH STRAND TO A TOTAL TENSION OF 45,341+ LBS. AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 14 1/2" & 16 1/16".

\* NOTE: FORCES READ ON STRESSING JACK GAUGES MUST BE MADE TO CORRESPOND TO ABOVE VALUES BASED ON CALIBRATION DATA FOR SPECIFIC JACK USED.

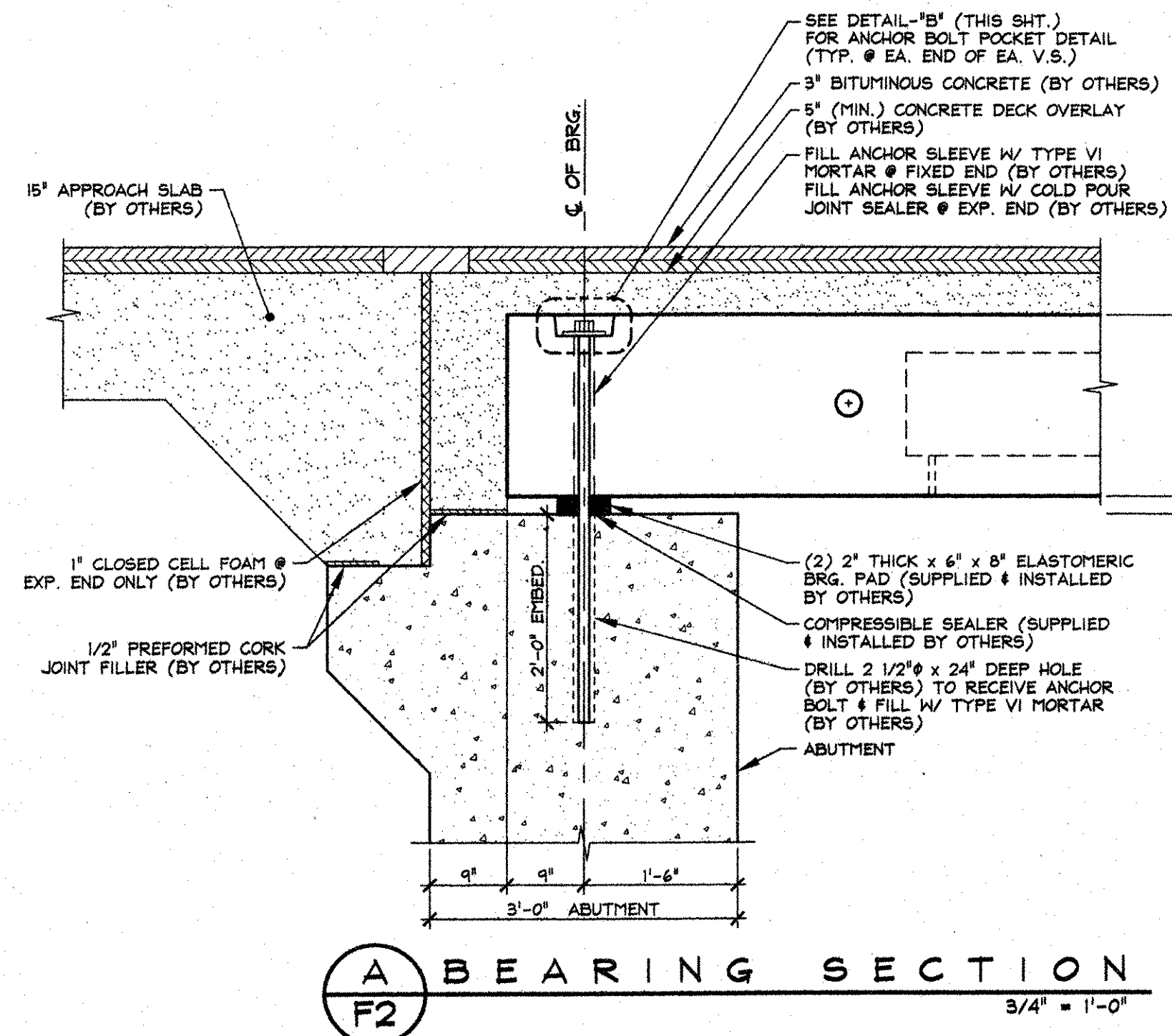
*Structures*

6-11-07 REVISED AS NOTED

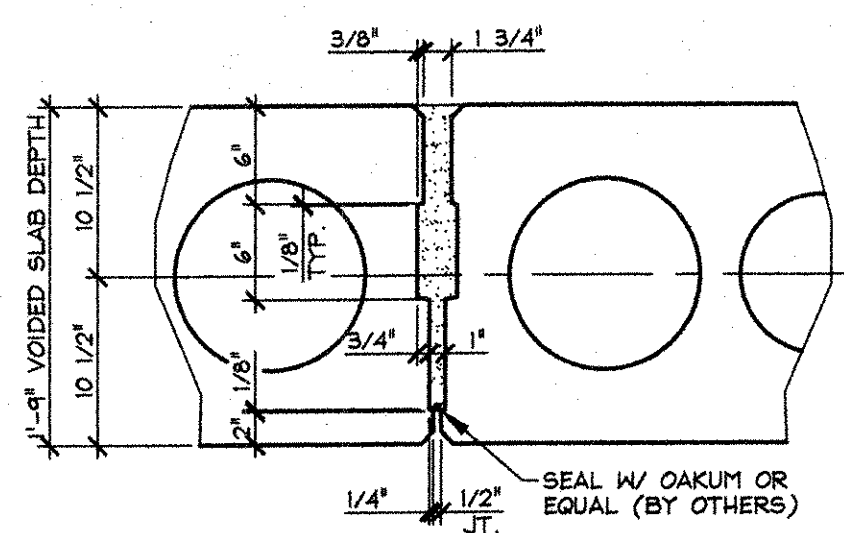
APPROVAL STAMP:

RECEIVED  
 JUN 11 2007  
 DATE 6/14/07

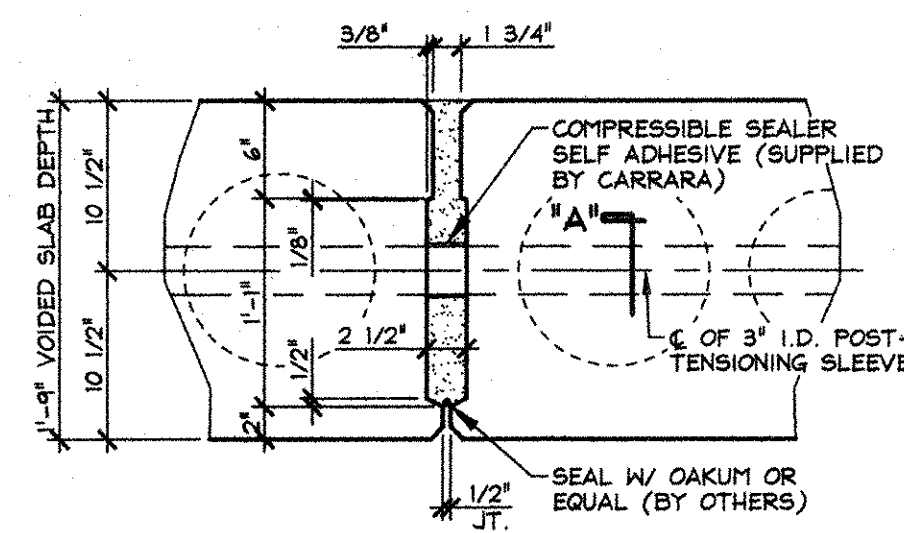
<b>J.P. CARRARA &amp; SONS INC.</b> Precast & Prestress Manufacturer 2484 CASE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010		<b>FRANK WHITCOMB CONSTRUCTION</b> CONTRACTOR WALPOLE, NEW HAMPSHIRE	
STATE OF VERMONT A.O.T. COUNTY OF RUTLAND		DATE: MAY 15, 2007 SCALE: NOTED	
TOWN OF CASTLETON VERMONT ROUTE 4A BRIDGE NO.: 8 PROJECT NO.: RS 0142(10)		CHKD: - DFTM: B.L. JOB NO: 23256-07	
SUPERSTRUCTURE PLAN & SECTION		DWG. NO: <b>F1</b>	



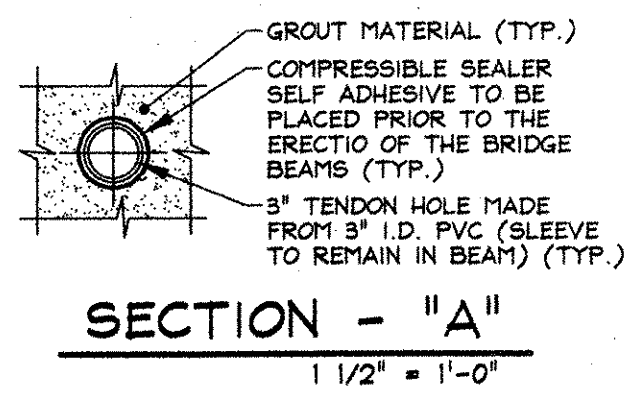
**A BEARING SECTION**  
 F2 3/4" = 1'-0"



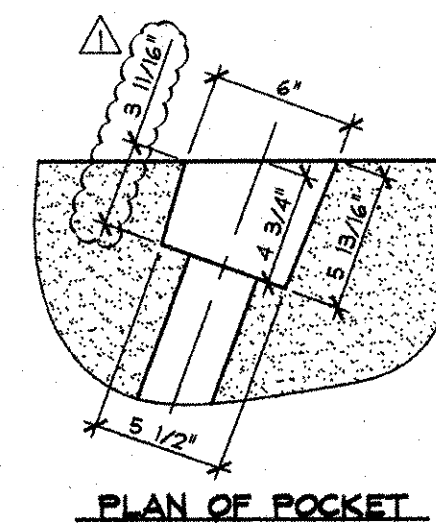
**B TYP. SHEAR KEY SECTION**  
 F2 1" = 1'-0"



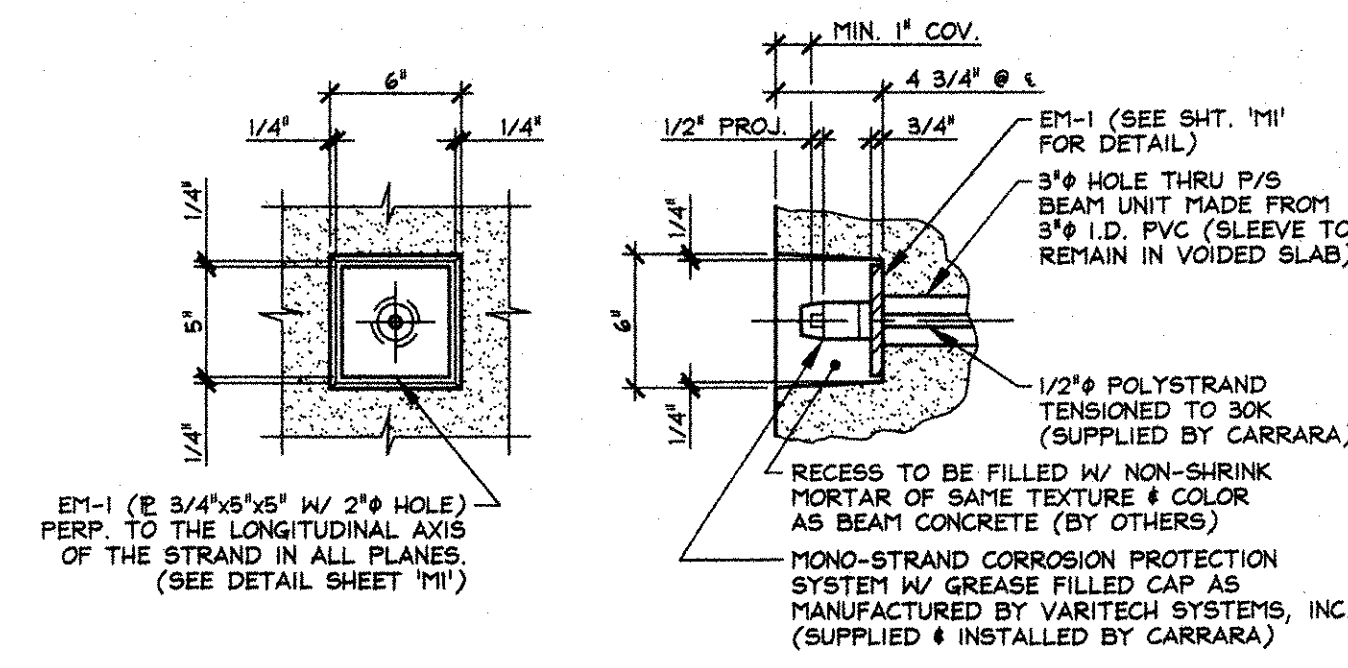
**C SHEAR KEY SECTION @ P.T. SLEEVE**  
 F2 1" = 1'-0"



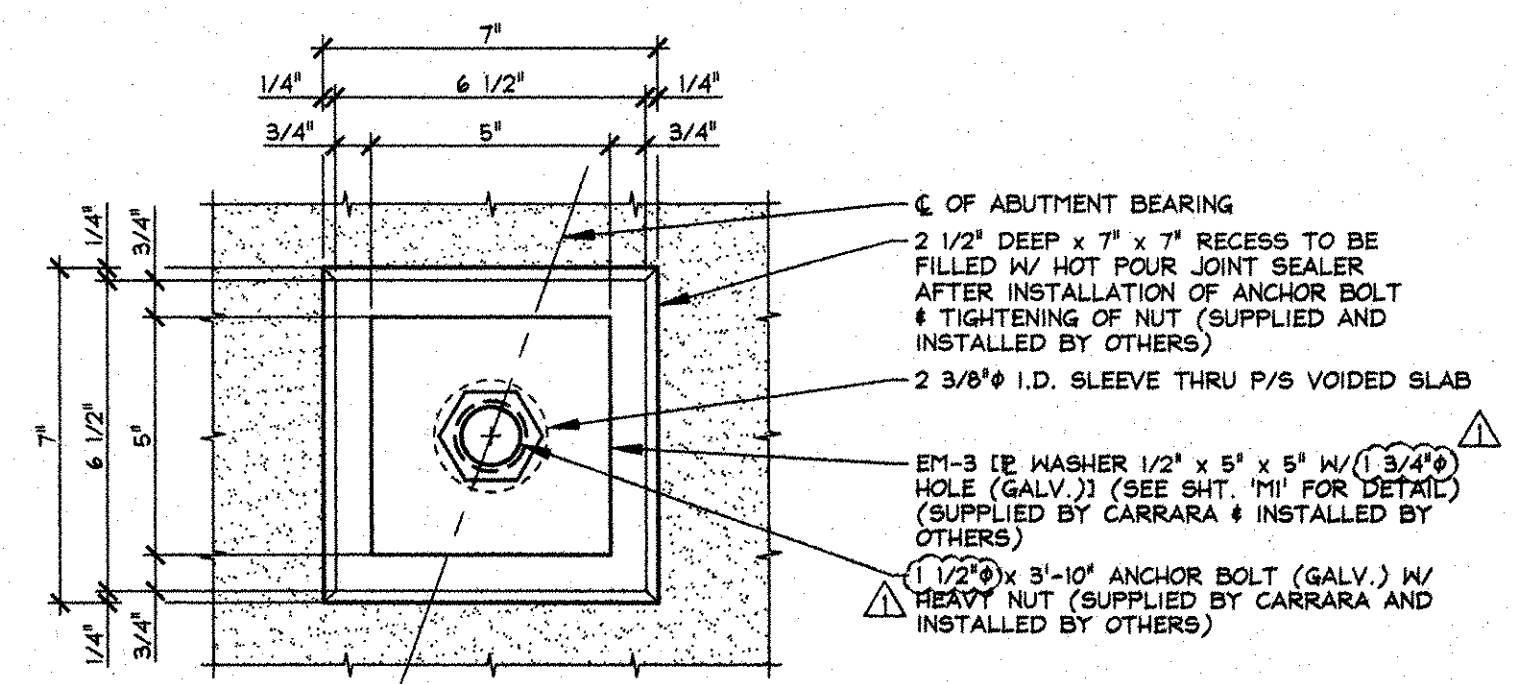
**SECTION - "A"**  
 1 1/2" = 1'-0"



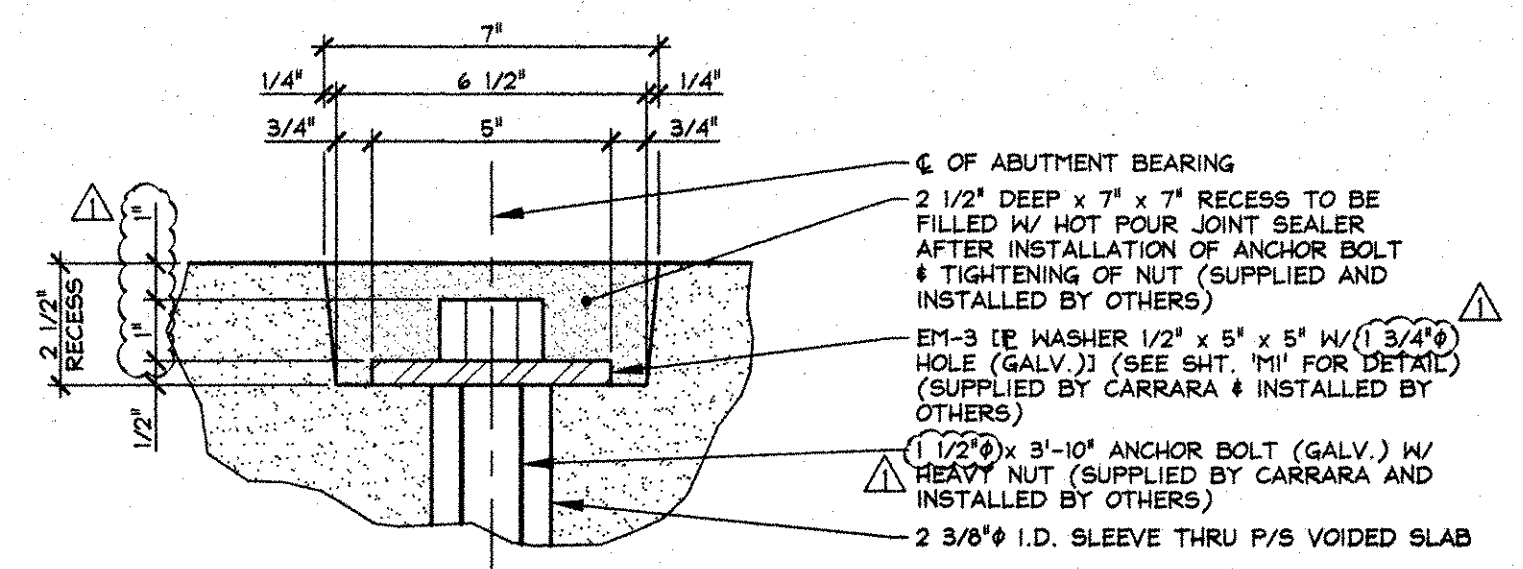
**PLAN OF POCKET**



**FASCIA ELEVATION**  
**SECTION AT CENTERLINE**  
 1 1/2" = 1'-0"



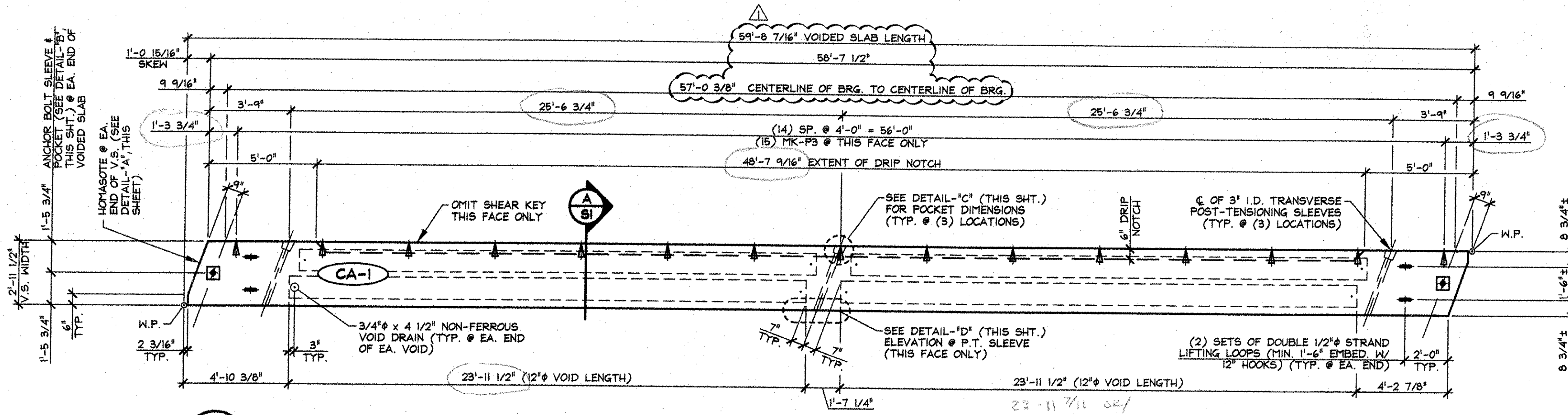
**PLAN @ BOX BEAM C**



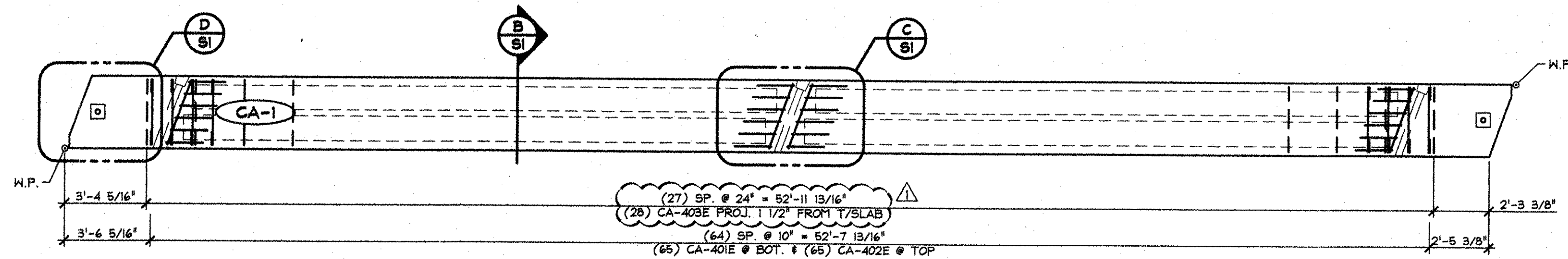
**SECTION @ BOX BEAM C**  
**DETAIL - "B"**  
 3" = 1'-0"

6-11-07 REVISED AS NOTED

APPROVAL STAMP:  RECEIVED CKD BY T.H.L. OK'D BY <i>me</i> JUN 11 2007 RESUBMIT APPROVED <i>[initials]</i> BY <i>[initials]</i> DATE 6/14/07	<b>J.P. CARRARA &amp; SONS INC.</b> Precast & Prestress Manufacturer <small>244 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010</small>		<b>FRANK WHITCOMB CONSTRUCTION</b> CONTRACTOR <small>WALPOLE, NEW HAMPSHIRE</small>	
	STATE OF VERMONT A.O.T. COUNTY OF RUTLAND		DATE: MAY 15, 2007 SCALE: NOTED	
	TOWN OF CASTLETON VERMONT ROUTE 4A BRIDGE NO.: 8 PROJECT NO.: RS 0142(10)		CHKD: - DFTM: B.L. JOB NO: 23256-07	
	<b>SUPERSTRUCTURE DETAILS</b>		DWG. NO: <b>F2</b>	

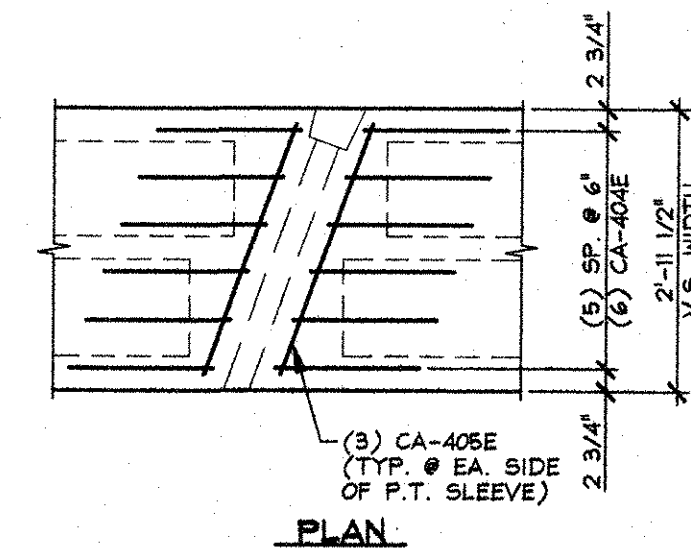


1 DIMENSIONAL PLAN VIEW IN FORM  
1/4" = 1'-0"

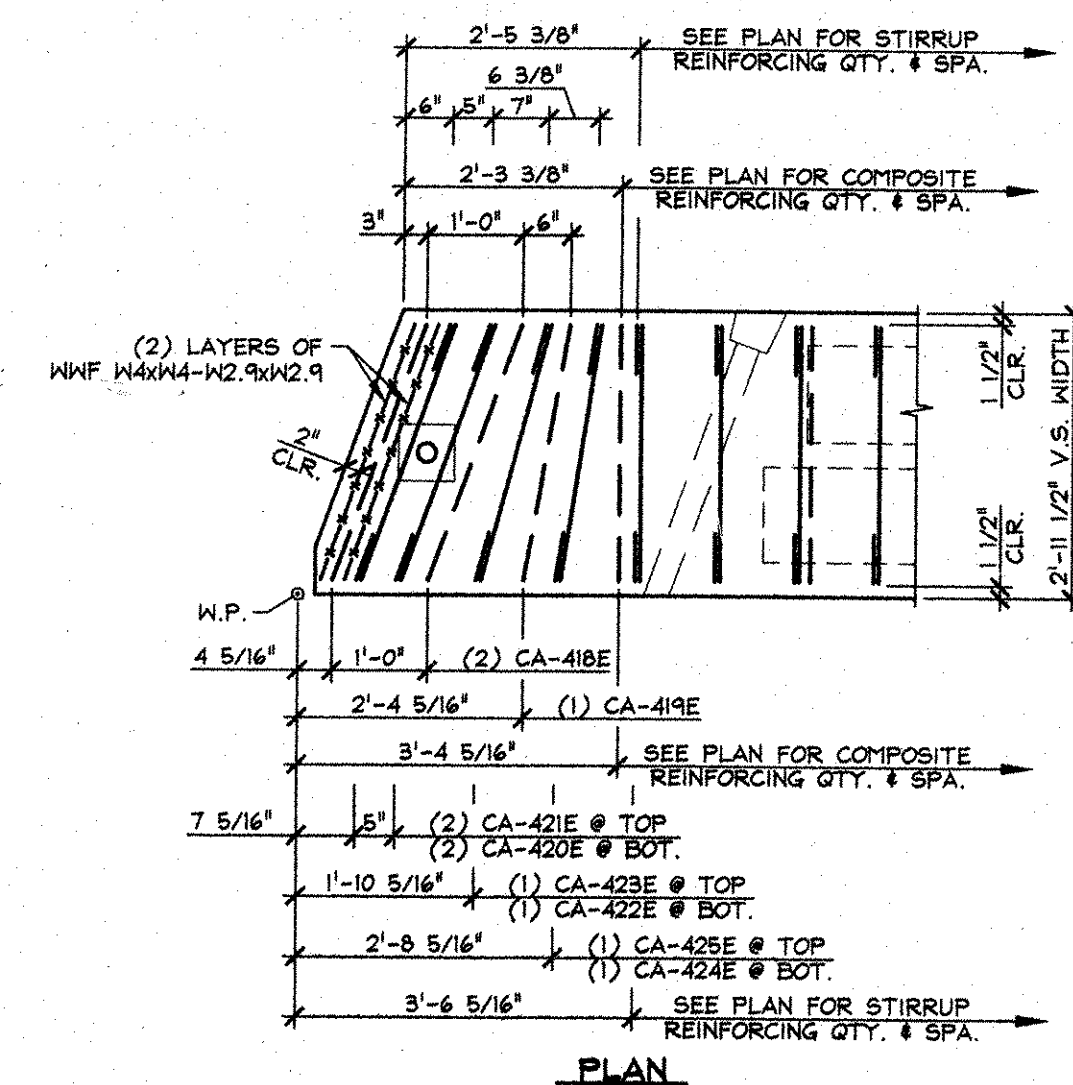


2 REINFORCING PLAN VIEW IN FORM  
1/4" = 1'-0"

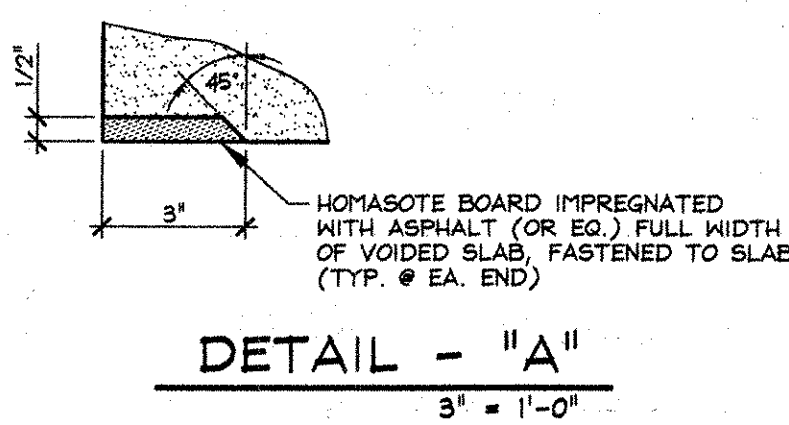
SHOP NOTE:  
ADJUST REINFORCING SPACING AS REQUIRED TO CLEAR P.T. SLEEVES, INSERTS, ETC.



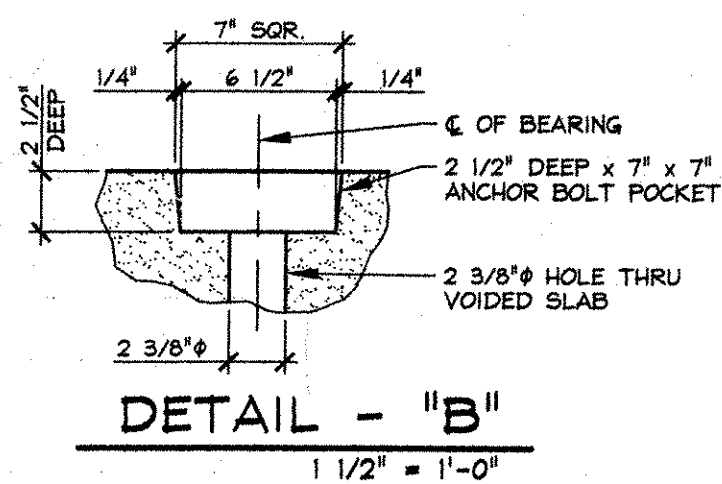
C TENDON REINF. DETAIL  
1/2" = 1'-0"



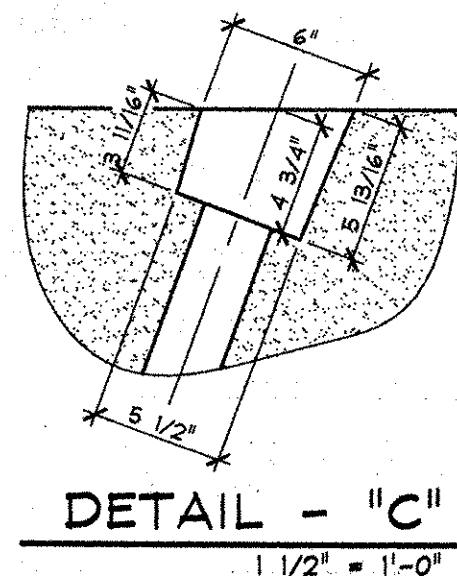
D END BLOCK REINF. DETAIL  
1/2" = 1'-0"



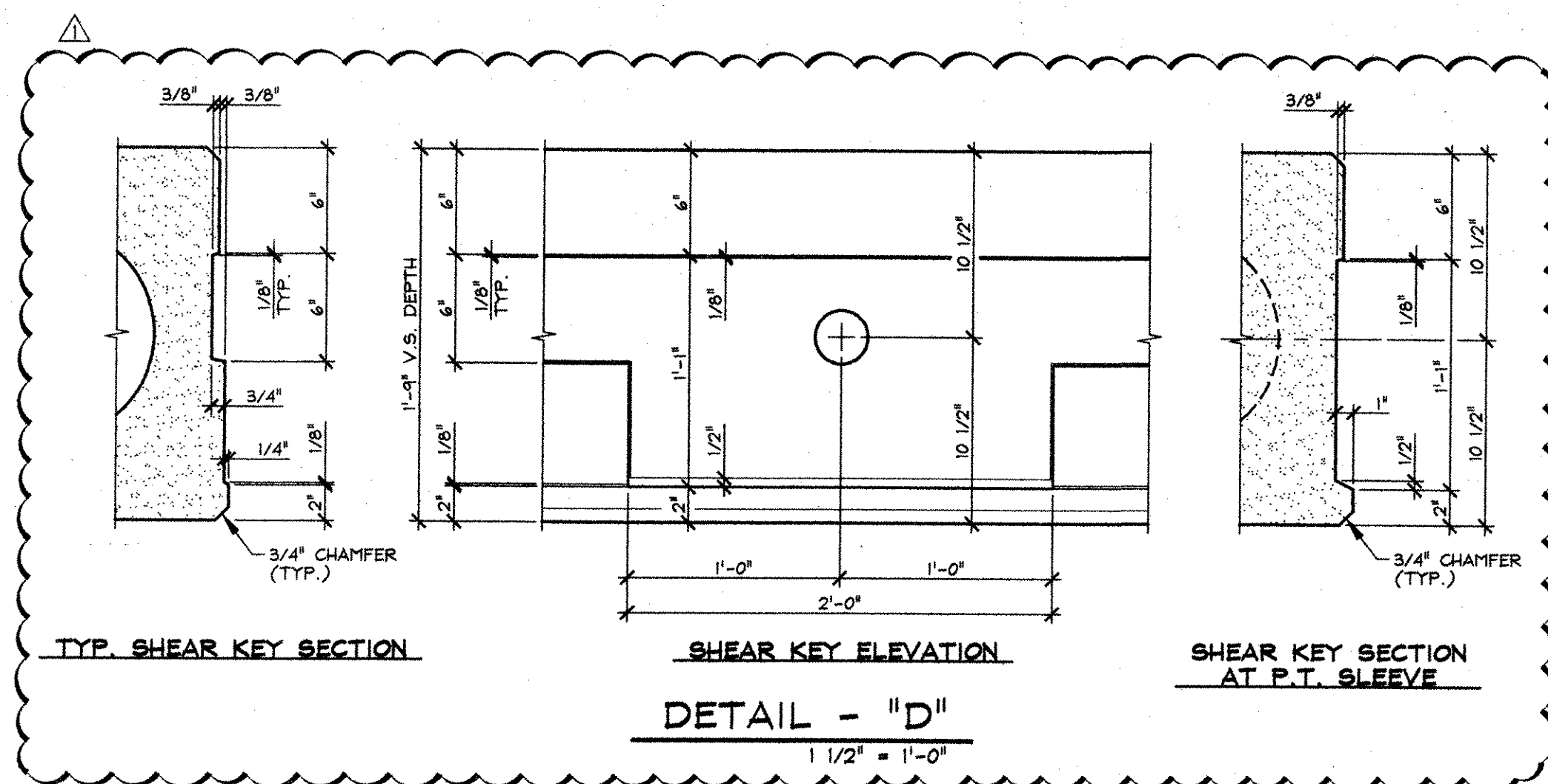
DETAIL - "A"  
3" = 1'-0"



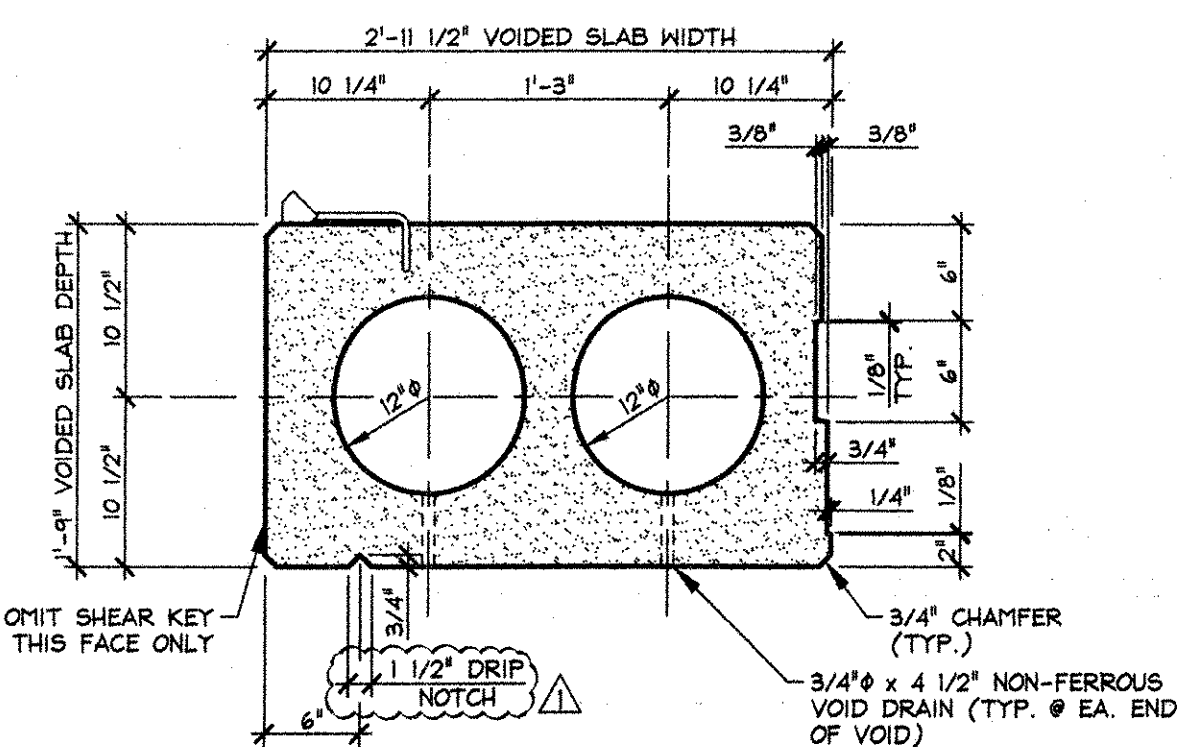
DETAIL - "B"  
1 1/2" = 1'-0"



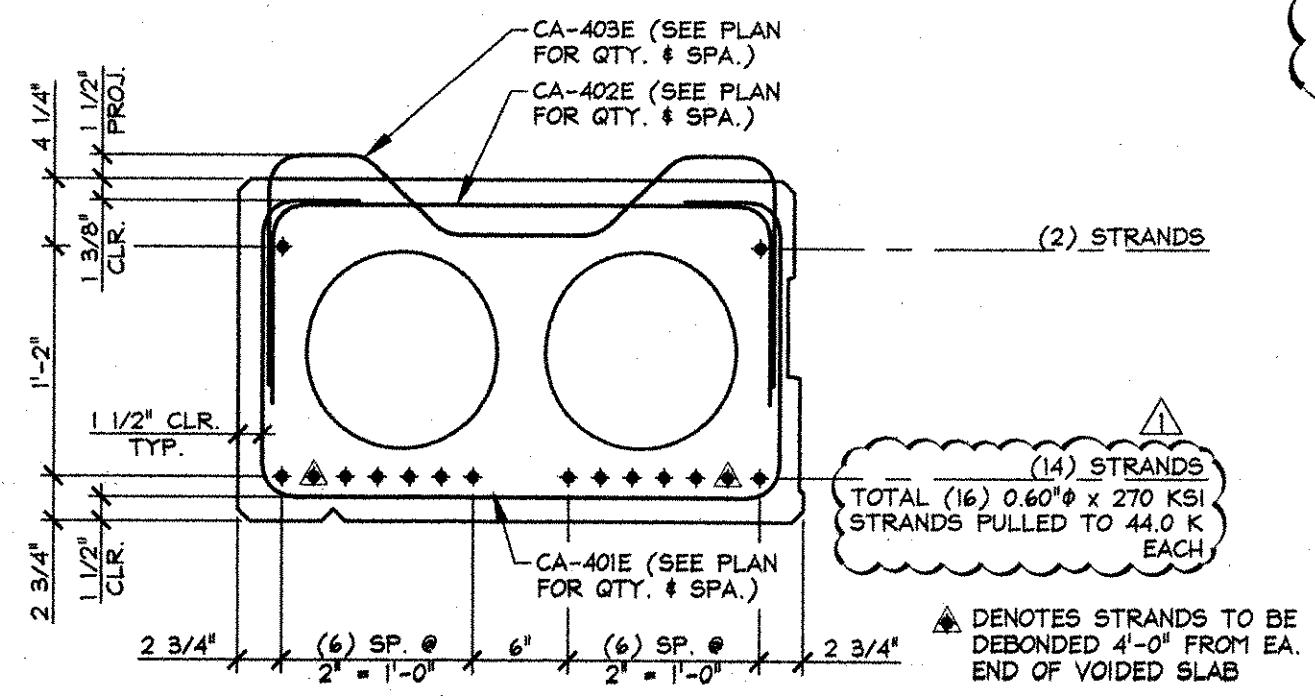
DETAIL - "C"  
1 1/2" = 1'-0"



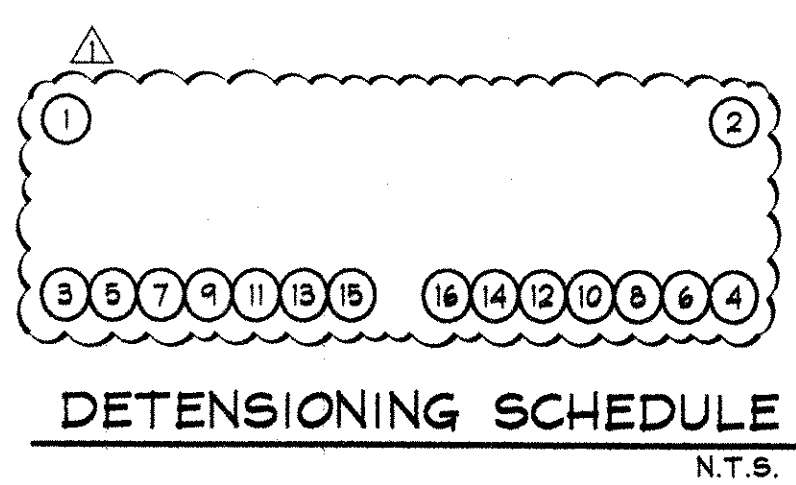
DETAIL - "D"  
1 1/2" = 1'-0"



A DIMENSIONAL SECTION  
1" = 1'-0"



B REINFORCING SECTION  
1" = 1'-0"



DETENSIONING SCHEDULE  
N.T.S.

MARK: CA-1		QTY.: 2	WT.: 16.72 T	VOL.: 8.26 cy
MATERIAL LIST / VOIDED SLAB				
ITEM	MARK	DESCRIPTION	QTY.	
1	401E	#4 BENT BAR (EPOXY COATED)	65	
2	402E	#4 BENT BAR (EPOXY COATED)	65	
3	403E	#4 BENT BAR (EPOXY COATED)	25	
4	404E	#4 BENT BAR (EPOXY COATED)	24	
5	405E	#4 x 2'-9 1/2" (EPOXY COATED)	12	
6	418E	#4 BENT BAR (EPOXY COATED)	4	
7	419E	#4 BENT BAR (EPOXY COATED)	2	
8	420E	#4 BENT BAR (EPOXY COATED)	4	
9	421E	#4 BENT BAR (EPOXY COATED)	4	
10	422E	#4 BENT BAR (EPOXY COATED)	2	
11	423E	#4 BENT BAR (EPOXY COATED)	2	
12	424E	#4 BENT BAR (EPOXY COATED)	2	
13	425E	#4 BENT BAR (EPOXY COATED)	2	
14		W4WF W4xW4-W2.9xW2.9 [1'-5" x 2'-9 1/2"] (E.C.)	4	
15	MK-P3	DAYTON C-24 TYPE 4-APR PRESS-STEEL PRECAST HALF HANGER (GALV.)	15	
16		(12" x 25'-11 1/2" VOID)	4	
17		3/4" x 4 1/2" NON-FERROUS VOID DRAINS	8	
18		DOUBLE 1/2" STRANDS LIFTING LOOPS	4	
19				

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APPROVAL STAMP:

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 CKD BY: JHL  
 JUN 11 2007  
 RESUBMIT: [initials]  
 APPROVED: [initials]  
 DATE: 6/14/07

J.P. CARRARA & SONS INC. Frank Whitcomb Construction  
 Precast & Prestress Manufacturer  
 2844 DASH ST., WOODVILLE, VERMONT 05753 Phone: (802)388-8381 Fax: (802)388-8010  
 WALPOLE, NEW HAMPSHIRE

STATE OF VERMONT A.O.T. COUNTY OF RUTLAND  
 DATE: MAY 15, 2007  
 SCALE: NOTED

TOWN OF CASTLETON VERMONT ROUTE 4A  
 BRIDGE NO.: 8 PROJECT NO.: RS 0142(10)  
 CHKD: - DFTM: B.L.  
 JOB NO: 23256-07

P/S VOIDED SLAB DETAILS  
 DWG. NO: S1

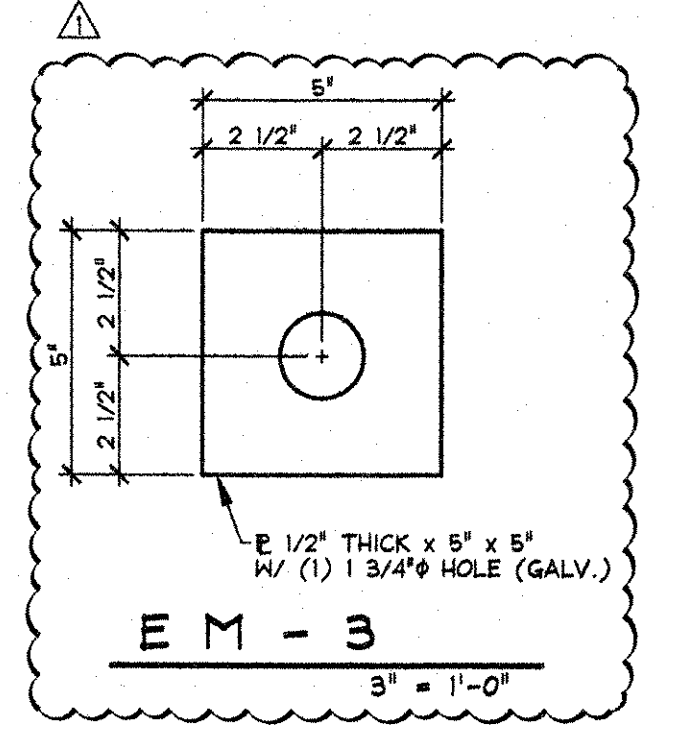
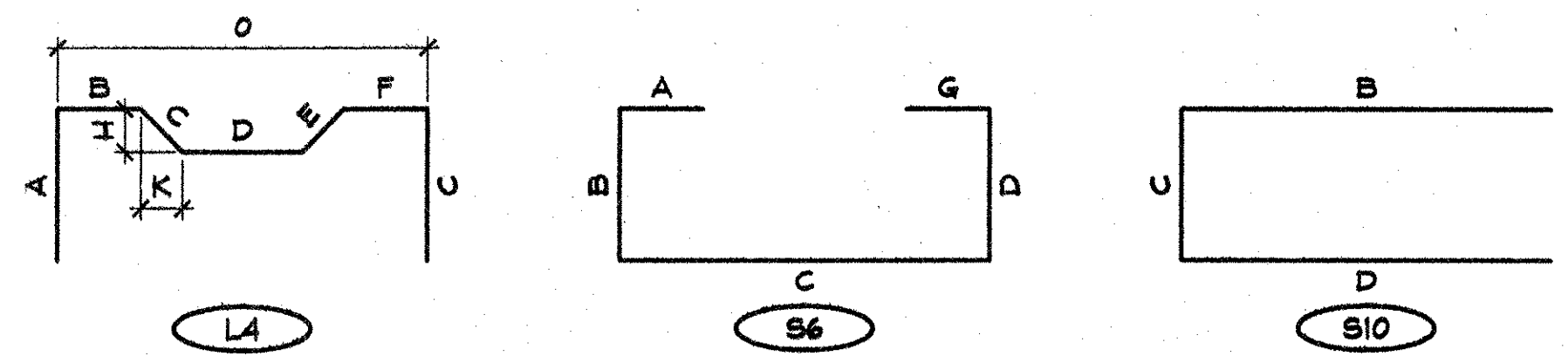
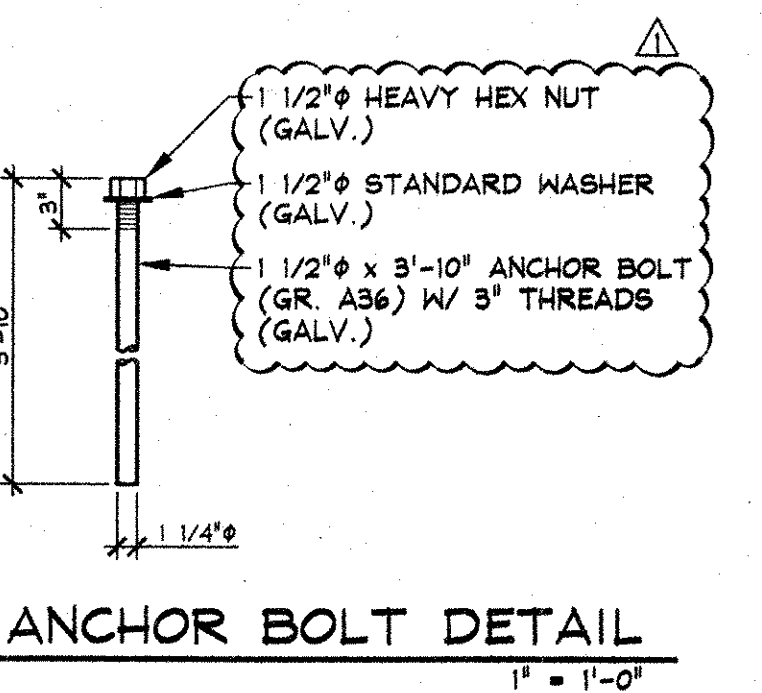
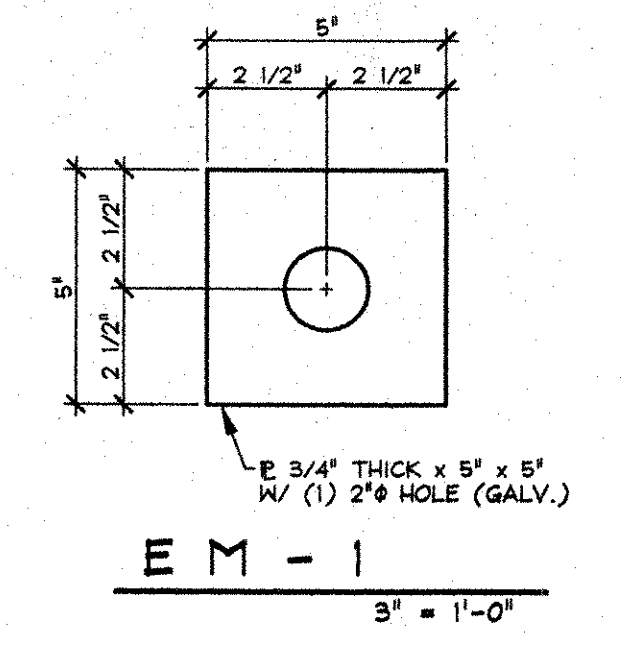


**BENT BARS, TIES, & STIRRUPS**

ITEM	MARK	QTY.	SIZE	LENGTH	TYPE	A	B	C	D	E	F/R	G	H	J	K	O	GRADE	REMARKS
1	401E	130	#4	6'-4"	S6	6"	1'-5 3/4"	2'-8 1/2"	1'-5 3/4"			6"					60	EPOXY COATED
2	402E	130	#4	4'-5 3/4"	S10		1'-0"	2'-7 3/4"	1'-0"								60	EPOXY COATED
3	403E	56	#4	5'-3 3/4"	L4	1'-4"	6"	7"	9 3/4"	7"	6"	1'-4"	5"		5"	2'-7 3/4"	60	EPOXY COATED
4	404E	240	#4	4'-1 1/4"	S10		1'-6"	1'-3 1/4"	1'-6"								60	EPOXY COATED
5	405E	24	#4	2'-9 1/2"	STR.												60	EPOXY COATED
6	406E	390	#4	7'-3 1/4"	S6	6"	1'-5 3/4"	3'-7 3/4"	1'-5 3/4"			6"					60	EPOXY COATED
7	407E	390	#4	5'-5 3/4"	S10		1'-0"	3'-7 3/4"	1'-0"								60	EPOXY COATED
8	408E	168	#4	6'-3 3/4"	L4	1'-4"	6"	7"	1'-9 3/4"	7"	6"	1'-4"	5"		5"	3'-7 3/4"	60	EPOXY COATED
9	409E	72	#4	3'-10 1/4"	STR.												60	EPOXY COATED
10	410E	24	#4	6'-6 1/2"	L4	1'-4"	6"	7"	2'-0 1/2"	7"	6"	1'-4"	5"		5"	3'-10 1/2"	60	EPOXY COATED
11	411E	12	#4	6'-4 1/2"	L4	1'-4"	6"	7"	1'-10 1/2"	7"	6"	1'-4"	5"		5"	3'-8 1/2"	60	EPOXY COATED
12	412E	24	#4	7'-6"	S6	6"	1'-5 3/4"	3'-10 1/2"	1'-5 3/4"			6"					60	EPOXY COATED
13	413E	24	#4	5'-8 1/2"	S10		1'-0"	3'-10 1/2"	1'-0"								60	EPOXY COATED
14	414E	12	#4	7'-4 3/4"	S6	6"	1'-5 3/4"	3'-9 1/4"	1'-5 3/4"			6"					60	EPOXY COATED
15	415E	12	#4	5'-7 1/4"	S10		1'-0"	3'-9 1/4"	1'-0"								60	EPOXY COATED
16	416E	12	#4	7'-3 1/2"	S6	6"	1'-5 3/4"	3'-8"	1'-5 3/4"			6"					60	EPOXY COATED
17	417E	12	#4	5'-6"	S10		1'-0"	3'-8"	1'-0"								60	EPOXY COATED
18	418E	8	#4	5'-5 3/4"	L4	1'-4"	6"	7"	11 3/4"	7"	6"	1'-4"	5"		5"	2'-9 3/4"	60	EPOXY COATED
19	419E	4	#4	5'-4 1/2"	L4	1'-4"	6"	7"	10 1/4"	7"	6"	1'-4"	5"		5"	2'-8 1/4"	60	EPOXY COATED
20	420E	8	#4	6'-6 1/8"	S6	6"	1'-5 3/4"	2'-10 5/8"	1'-5 3/4"			6"					60	EPOXY COATED
21	421E	8	#4	4'-7 3/4"	S10		1'-0"	2'-9 3/4"	1'-0"								60	EPOXY COATED
22	422E	4	#4	6'-5 1/4"	S6	6"	1'-5 3/4"	2'-9 3/4"	1'-5 3/4"			6"					60	EPOXY COATED
23	423E	4	#4	4'-6 7/8"	S10		1'-0"	2'-8 7/8"	1'-0"								60	EPOXY COATED
24	424E	4	#4	6'-4 3/8"	S6	6"	1'-5 3/4"	2'-8 7/8"	1'-5 3/4"			6"					60	EPOXY COATED
25	425E	4	#4	4'-6 1/8"	S10		1'-0"	2'-8 1/8"	1'-0"								60	EPOXY COATED
26																		
27																		
28																		
29																		
30																		

**MISCELLANEOUS MATERIALS**

ITEM	MARK	QTY.	DESCRIPTION	REMARKS
1	EM-1	6	E 3/4" x 5" x 5" W/ (1) 2" HOLE (GALV.)	FOR ERECTION, SEE DETAIL THIS SHEET
2		6	SINGLE USE STRESSING CHUCK	FOR ERECTION
3		3	1/2" POLYSTYRENE x 3'-8"	FOR ERECTION
4		16	1 1/2" x 3'-10" GALV. ANCHOR BOLT	FOR ERECTION, SEE DETAIL THIS SHEET
5	EM-3	16	E 1/2" x 5" x 5" W/ (1) 3/4" HOLE (GALV.)	FOR ERECTION, SEE DETAIL THIS SHEET
6				
7				
8				
9	MK-P3	30	DAYTON C-24 TYPE 4-APR PRESS-STEEL PRECAST HALF HANGER	GALVANIZE
10		32	{12" x 23'-11 1/2" VOID}	
11		12	{10" x 23'-11 1/2" VOID}	
12		64	3/4" x 4 1/2" NON-FERROUS VOID DRAIN	
13		24	3/4" x 5 1/2" NON-FERROUS VOID DRAIN	
14		32	DOUBLE 1/2" STRAND LIFTING LOOPS	
15		8	W4F W4XW4-W2.9XW2.9 [1'-5" x 2'-9 1/2"]	EPOXY COATED
16		24	W4F W4XW4-W2.9XW2.9 [1'-5" x 3'-10"]	EPOXY COATED
17				
18				
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29				
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6-11-07 REVISED AS NOTED

APPROVAL STAMP:

RECEIVED  
 CK'D BY: TRL OK'D BY: [Signature]  
 JUN 11 2007  
 RESUBMIT APPROVED: [Signature]  
 BY: [Signature] DATE: 6/14/07

**J.P. CARRARA & SONS INC.**  
 Precast & Prestress Manufacturer  
 2444 CASE ST., WOODBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010

**FRANK WHITCOMB CONSTRUCTION**  
 CONTRACTOR  
 WALPOLE, NEW HAMPSHIRE

DATE: MAY 15, 2007  
 SCALE: NOTED

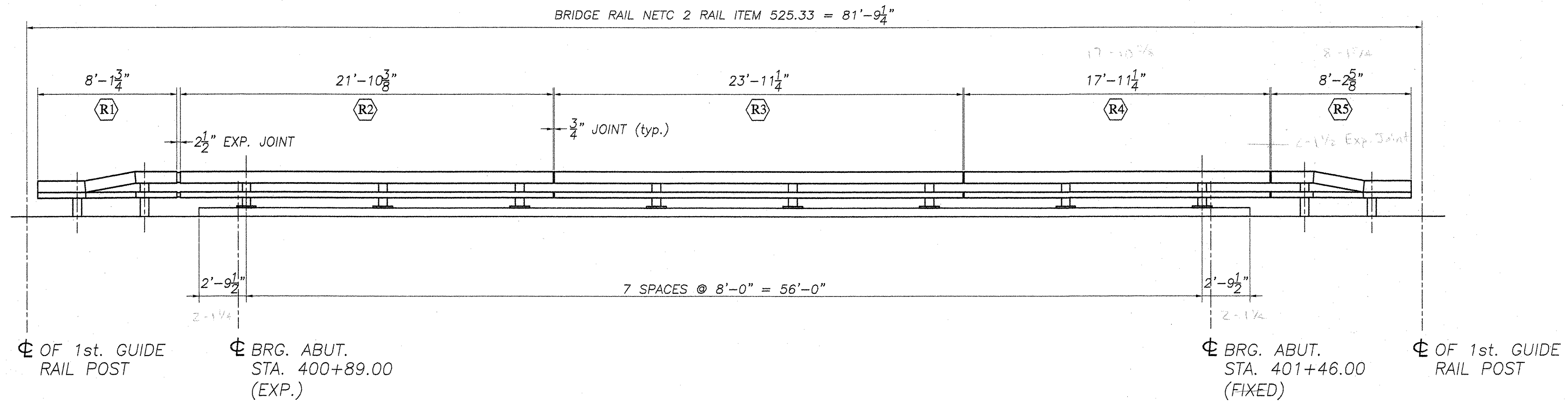
STATE OF VERMONT A.O.T.  
 COUNTY OF RUTLAND

TOWN OF CASTLETON  
 VERMONT ROUTE 4A  
 BRIDGE NO.: 8 PROJECT NO.: RS 0142(10)

CHKD: - DFTM: B.L.  
 JOB NO: 23256-07

MATERIALS LIST  
 DWG. NO: M1

073 PCC



BILL OF MATERIAL (BOTH SIDES OF BRIDGE)			
Mark #	Qty.	Description	Material
	16	W6x25 POST W/BASEPLATE (2'-0.375") OAL	A709 Gr. 36
	4	W6x25 DRIVEN POST (7'-0") OAL	A709 Gr. 36
	4	W6x25 DRIVEN POST (6'-5") OAL	A709 Gr. 36
(R1)	2	DROP END TOP RAIL TS 8 x 4 x 0.313" (8'-1.75") OAL	A500 Gr. B
	2	BOTTOM RAIL TS 4 x 4 x 0.25" (8'-1.75") OAL	A500 Gr. B
(R2)	2	TOP RAIL TS 8 x 4 x 0.313" (21'-10.375") OAL	A500 Gr. B
	2	BOTTOM RAIL TS 4 x 4 x 0.25" (21'-10.375") OAL	A500 Gr. B
(R3)	2	TOP RAIL TS 8 x 4 x 0.313" (23'-11.25") OAL	A500 Gr. B
	2	BOTTOM RAIL TS 4 x 4 x 0.25" (23'-11.25") OAL	A500 Gr. B
(R4)	2	TOP RAIL TS 8 x 4 x 0.313" (17'-11.25") OAL	A500 Gr. B
	2	BOTTOM RAIL TS 4 x 4 x 0.25" (17'-11.25") OAL	A500 Gr. B
(R5)	2	DROP END TOP RAIL TS 8 x 4 x 0.313" (8'-2.625") OAL	A500 Gr. B
	2	BOTTOM RAIL TS 4 x 4 x 0.25" (8'-2.625") OAL	A500 Gr. B
	8	TS 7 x 3 x .375" SPLICE TUBE 20" LONG	A500 Gr. B
	8	TS 3 x 3 x .25" SPLICE TUBE 20" LONG	A500 Gr. B
	16	.125" BEARING PAD	NEOPRENE
	4	BACK UP PLATE	A709 Gr. 36
	4	TERMINAL CONNECTOR	M180 B2
	120	.75" # ROUND HEAD BOLT, 6" LONG	M164
	120	.75" # HEX NUT	A563 DH
	120	.75" # WASHER	F436
	64	.625" # SPLICE BOLT, 1.75" LONG	M164
	64	.625" # PLAIN HARDENED WASHER	F436
	32	.625" # NUT WELDED TO SPLICE TUBE	A563A
	32	.75" # x .5" SCH. 40 PIPE SPACER	A53 Gr. B
	64	1" # ANCHOR STUD, 12" LONG	A449
	64	1" # WASHER	F436
	64	1" # JAMB NUT	A563 DH
	128	1" # HEX NUT	A563 DH
	16	SPACER PLATE	A36

NOTES:  
1. ITEMS MARKED "\*" ARE NOT SUPPLIED BY HIGHWAY SAFETY CORPORATION, AND THEY ARE SHOWN ONLY FOR REFERENCE.

REVISIONS		
No.	Remarks	Date
0	Initial submittal	

RECEIVED  
CHK'D BY: *JHC* OK'D BY: *luc*  
JUL 12 2007  
RESUBMIT: \_\_\_\_\_ APPROVED: *AS* DATE: \_\_\_\_\_

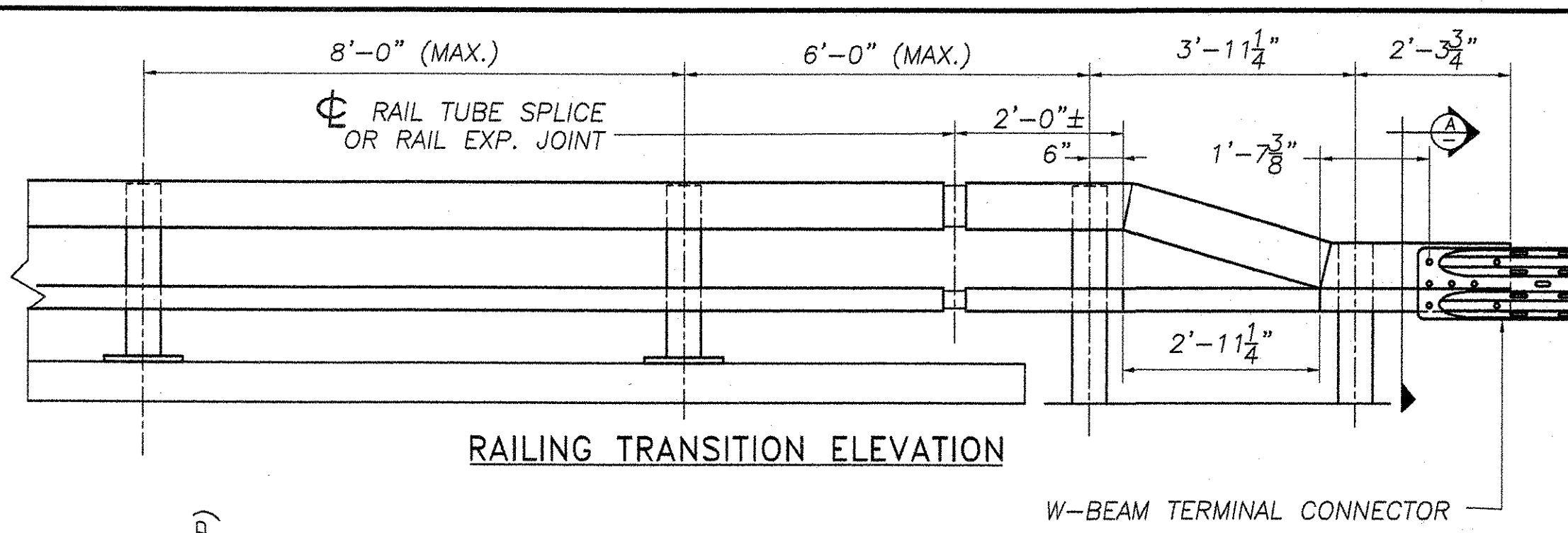
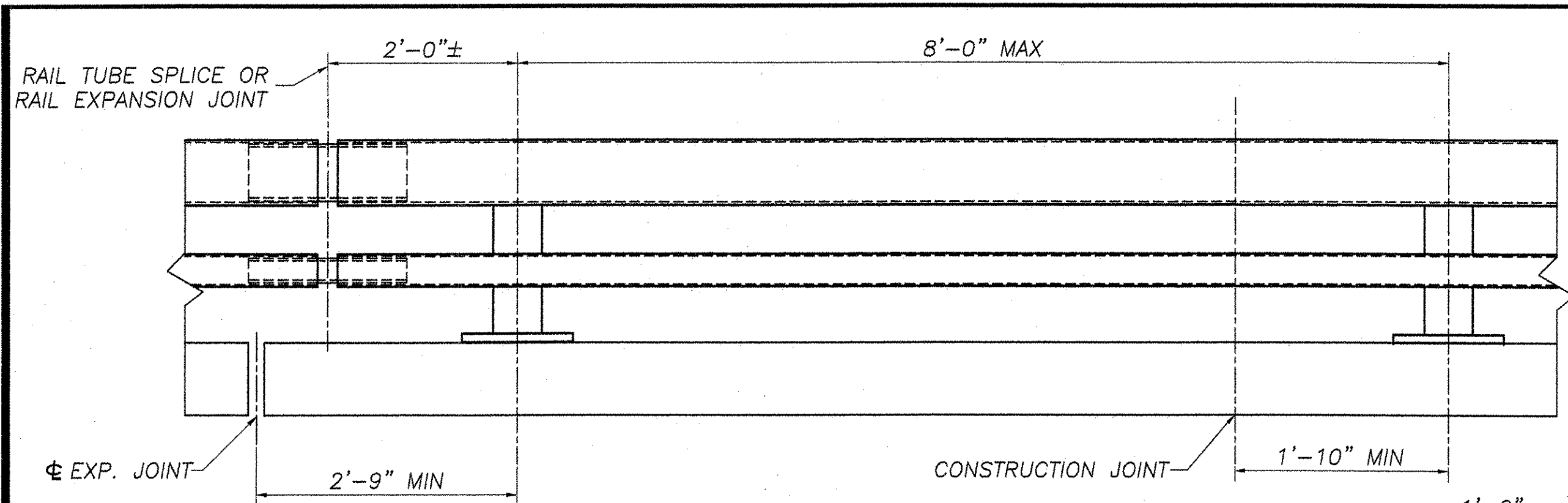
**HIGHWAY SAFETY CORP.**  
GLASTONBURY, CT

ITEM 525.33 - BRIDGE RAILING-NETC 2 RAIL  
PROJECT No. RS 0142(10)  
TOWN OF CASTLETON COUNTY OF RUTLAND  
ROUTE No. VT 4A  
BRIDGE No. : 8

GENERAL CONTRACTOR: \_\_\_\_\_  
SUB CONTRACTOR: F.R. LAFAYETTE, INC.

DATE: 6/28/07  
SCALE: NONE  
HSD REFERENCE NO.: 1598  
SIZE: D REVISION: 0  
SHEET NO.: 1 of 2



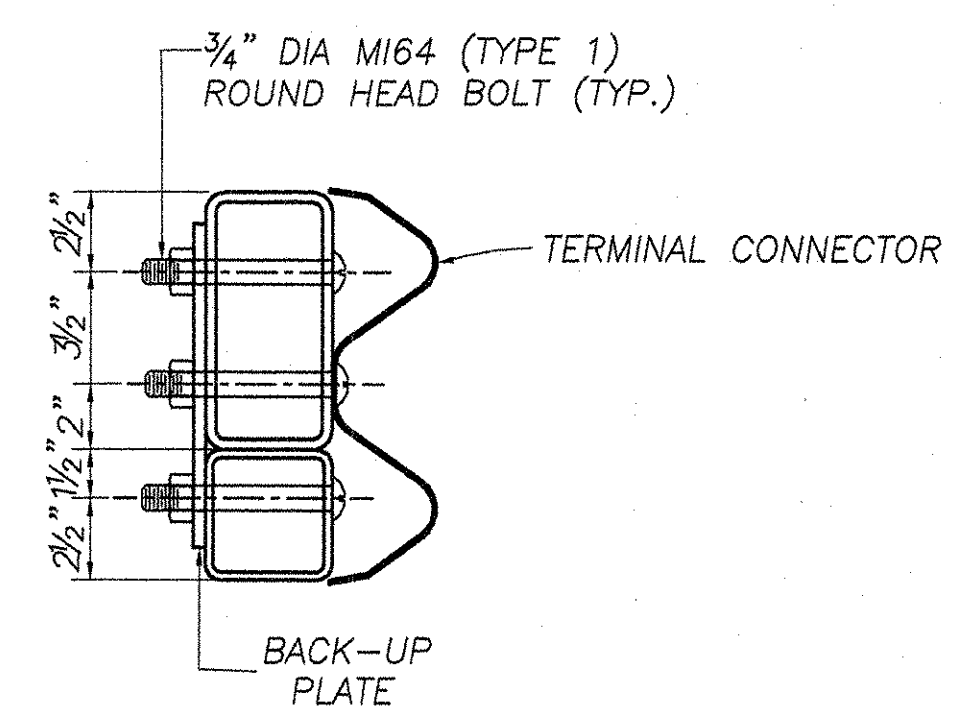
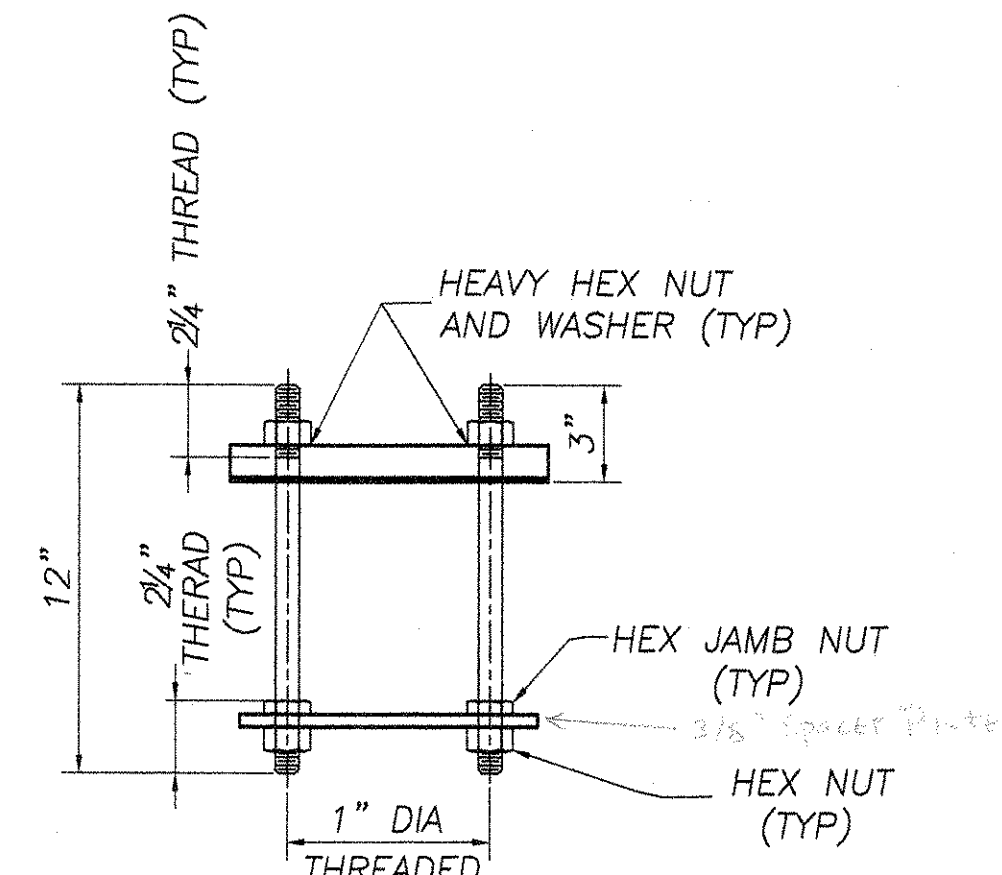
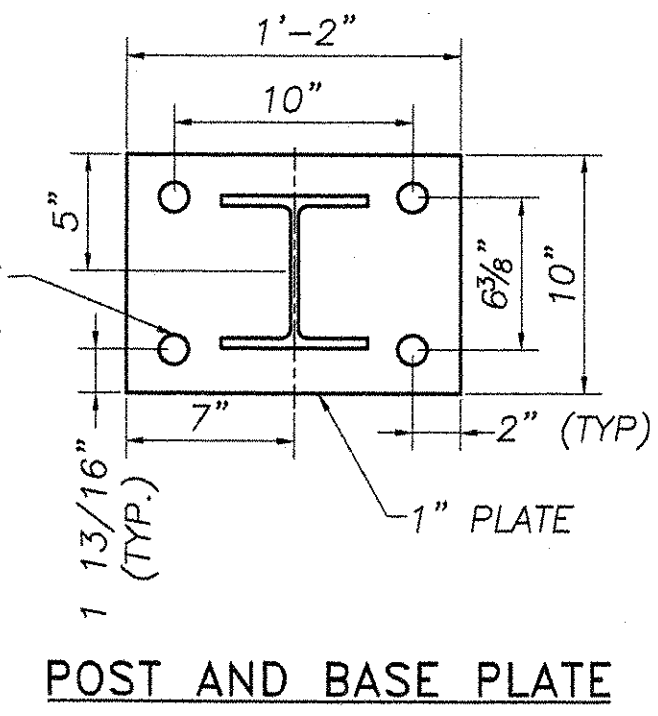
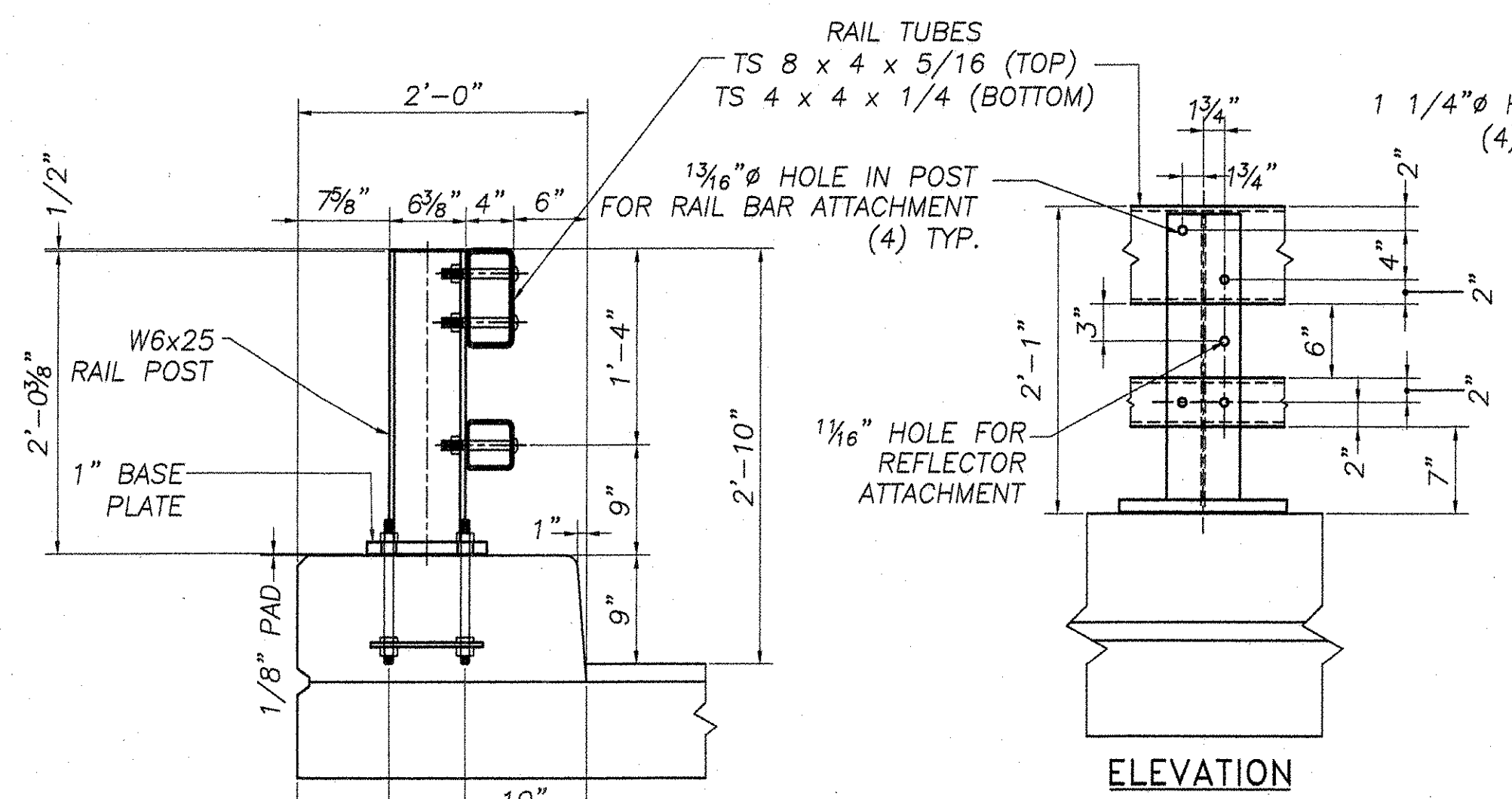


- NOTES:**
- ALL RAILINGS AND MATERIALS SHALL CONFORM TO THE PROVISIONS OF SECTION 525 - "RAILINGS" OF THE STANDARD SPECIFICATION FOR CONSTRUCTION.
  - TUBING AND POSTS SHALL MEET THE REQUIREMENTS OF SECTION 732, "RAILINGS MATERIALS" OR THE STANDARD SPECIFICATION OF CONSTRUCTION EXCEPT THE DROP-WEIGHT TEAR TEST IN SECTION 732 SHALL NOT APPLY TO THE STRUCTURAL TUBING SHOWN ON THIS SHEET.
  - PRIOR TO GALVANIZING, ALL EXPOSED CUT OR SHEARED EDGES SHALL BE ROUNDED TO A 1/16" RADIUS AND BE FREE OF BURRS.
  - RAIL POSTS SHALL BE SET NORMAL TO GRADE.
  - SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO (2) RAIL POSTS AND PREFERABLY TO AT LEAST FOUR (4) POSTS.
  - RAIL TUBE EXPANSION JOINT SHALL BE PROVIDED IN ANY RAIL BAY SPANNING A SUPERSTRUCTURE EXPANSION JOINT. EXPANSION JOINT WIDTH SHALL BE "X" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
  - ALL PARTS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111, EXCEPT HARDWARE, WHICH SHALL MEET THE REQUIREMENTS OF AASHTO M232.
  - RAIL POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE-EIGHTH TURN.
  - RAIL TUBES SHALL BE ATTACHED USING 3/4" FULL DIAMETER BODY AASHTO M164 (TYPE 1) ROUND HEAD BOLT INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE 1/16" LARGER THAN THE BOLT SIZE.
  - HOLES IN RAILS FOR RAIL TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO ERECTION.
  - IF THERE IS A CONFLICT BETWEEN THE DETAILS SHOWN ON THIS SHEET AND THE DESIGN, THE REQUIREMENTS OF THE DESIGN DRAWINGS SHALL BE FOLLOWED.
  - ANY BENDING OF RAIL SHALL BE BY SHOP PROCEDURE ONLY.
  - THE FABRICATOR SHALL SUBMIT SHOP DRAWINGS, INCLUDING WELDING PROCEDURES TO THE STRUCTURES SECTION FOR APPROVAL IN ACCORDANCE WITH SUBSECTION 506.04 OF THE STANDARD SPECIFICATIONS. ALL WELDING SHALL CONFORM WITH SUBSECTION 506.10.
  - RAIL POSTS AND BASE PLATES SHALL BE TESTED FOR IMPACT PROPERTIES IN ACCORDANCE WITH ASTM A-370 CHARPY IMPACT TESTING USING TYPE A SPECIMEN.
  - TO FACILITATE FIELD FIT - UP OF THE TRANSITION RAILING, POSTS SHALL BE SET LOOSELY INTO FIBER FORM TUBES WHILE TRANSITION PARTS ARE BEING ASSEMBLED. POST HOLES SHALL BE BACK FILLED WITH A CONCRETE MIX APPROVED BY THE ENGINEER. PAYMENT FOR COMPONENTS, INCLUDING BACKUP PLATE AND END TERMINAL CONNECTOR FOR GUARD RAIL ALBERING, FIBER FORM TUBES AND CONCRETE, AND INSTALLATION SHALL BE CONSIDERED INCIDENTAL TO BRIDGE RAILING - NETC 2 RAIL.
  - ALL APPROACH RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.

**BRIDGE RAILING ELEVATION**

**RAILING TRANSITION ELEVATION**

**W-BEAM TERMINAL CONNECTOR**



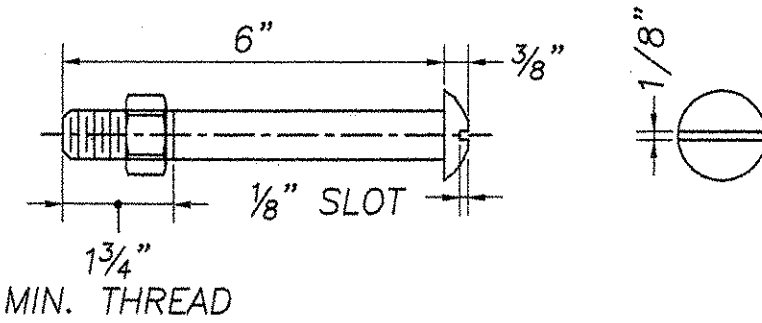
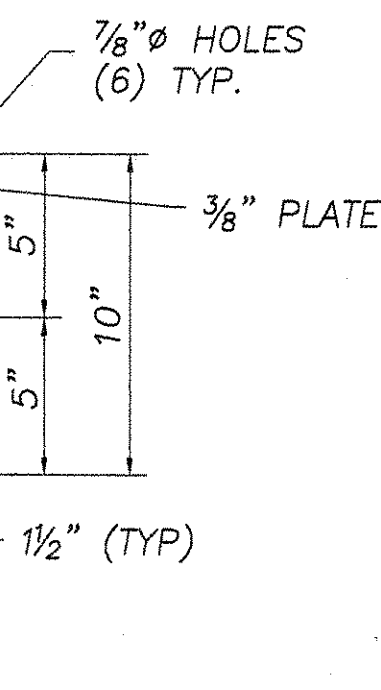
**POST AND BASE PLATE**

**RAIL AND POST ANCHORAGE**

**A SECTION**

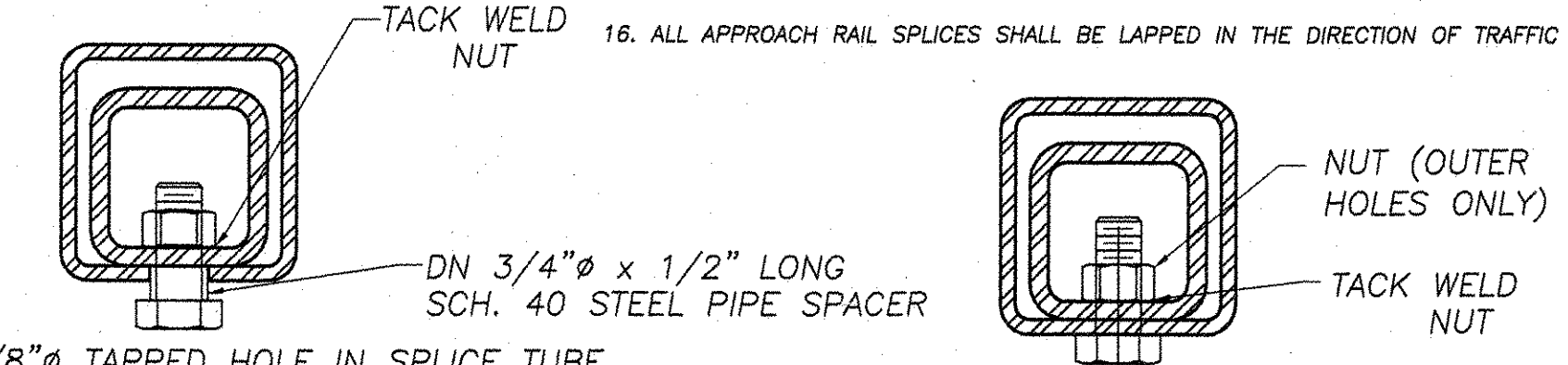
**TYPICAL SECTION**

**ELEVATION**



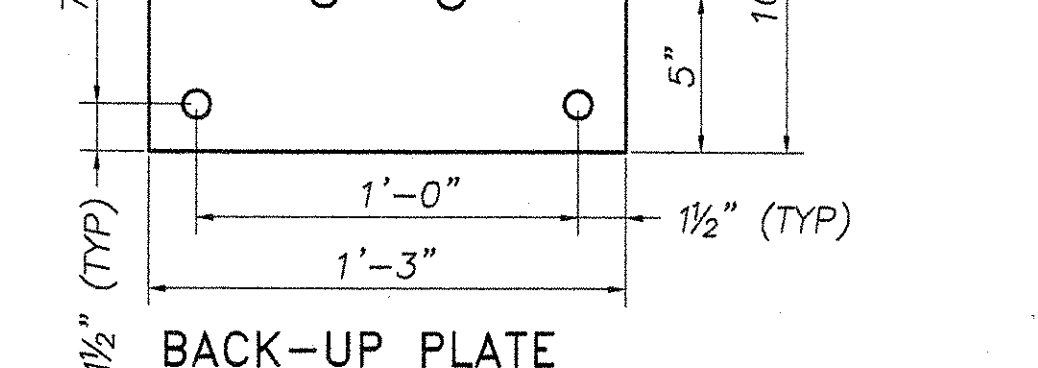
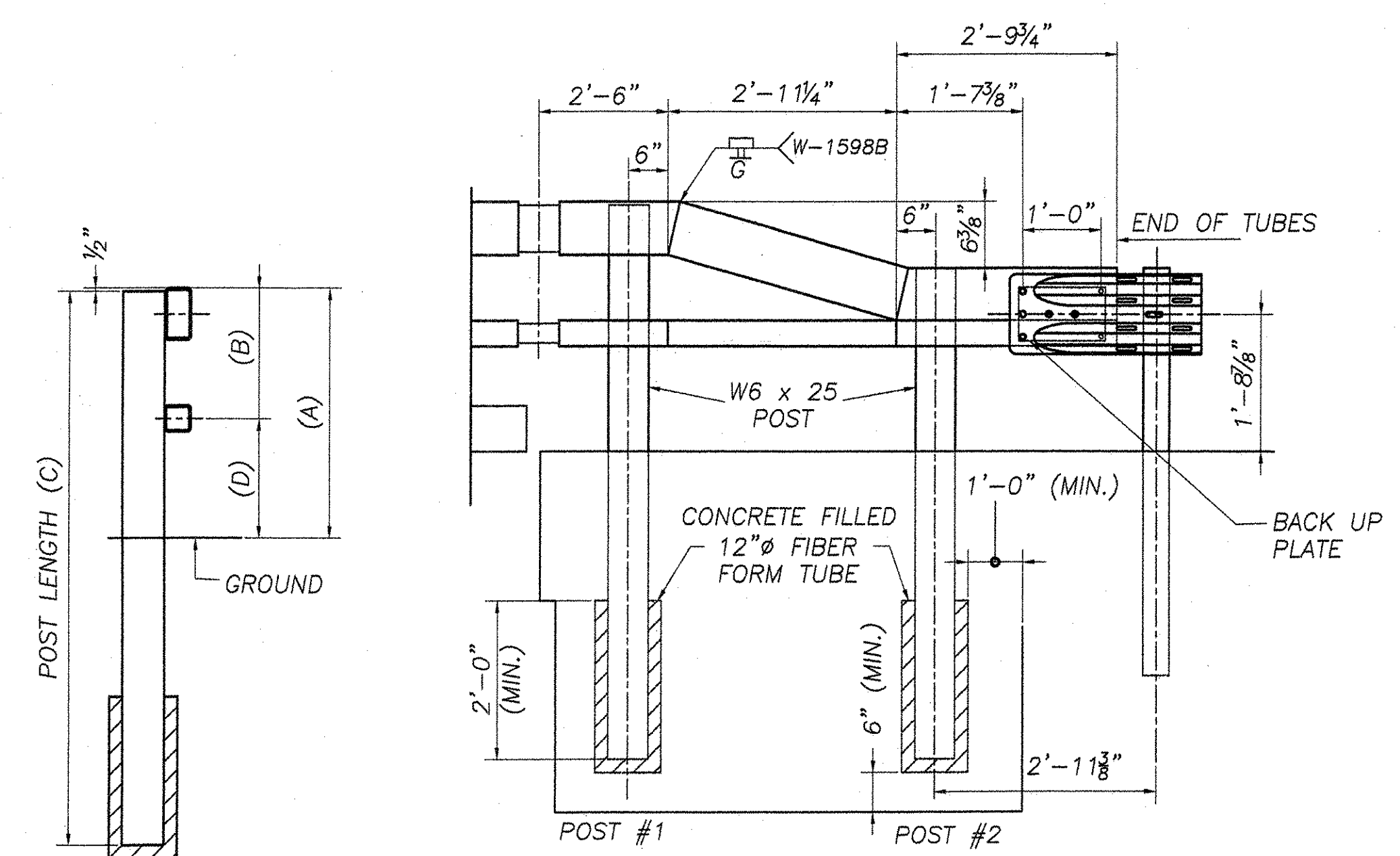
**3/4" DIA. M164 (TYPE 1) ROUND HEAD BOLT**  
(WITH WASHER AND PREVAILING TORQUE TYPE LOCK NUT)  
(SEE NOTE #9)  
ONLY FULL DIAMETER BODY BOLTS WILL BE ALLOWED.

**EXPANSION JOINT SECTION**  
FOR DETAILS NOT SHOWN, SEE "RAIL TUBE SPLICE SECTION."

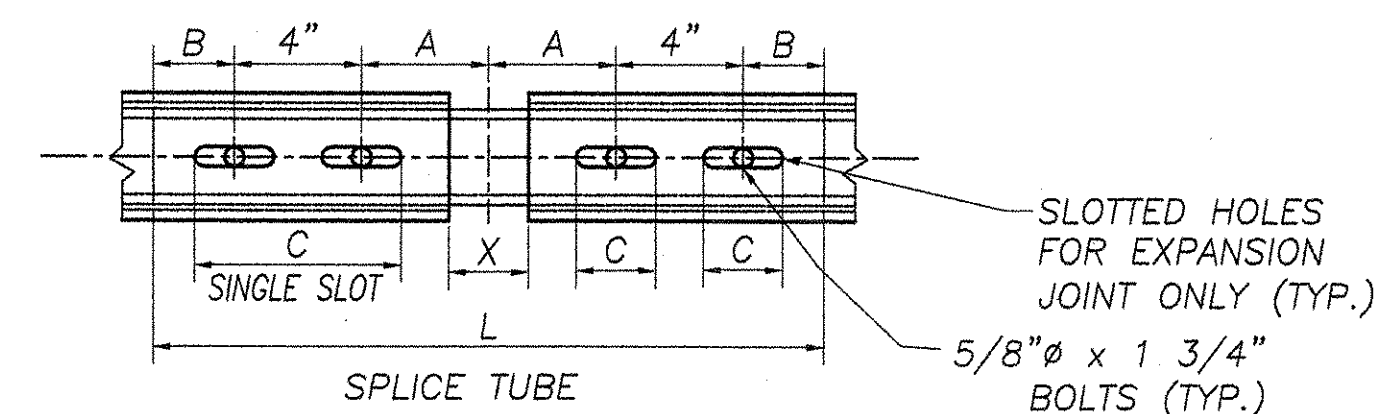


5/8" TAPPED HOLE IN SPLICE TUBE AND 1 1/8" x 'C' SLOT IN RAIL TUBE FOR BOLT AND PLAIN HARDENED WASHER

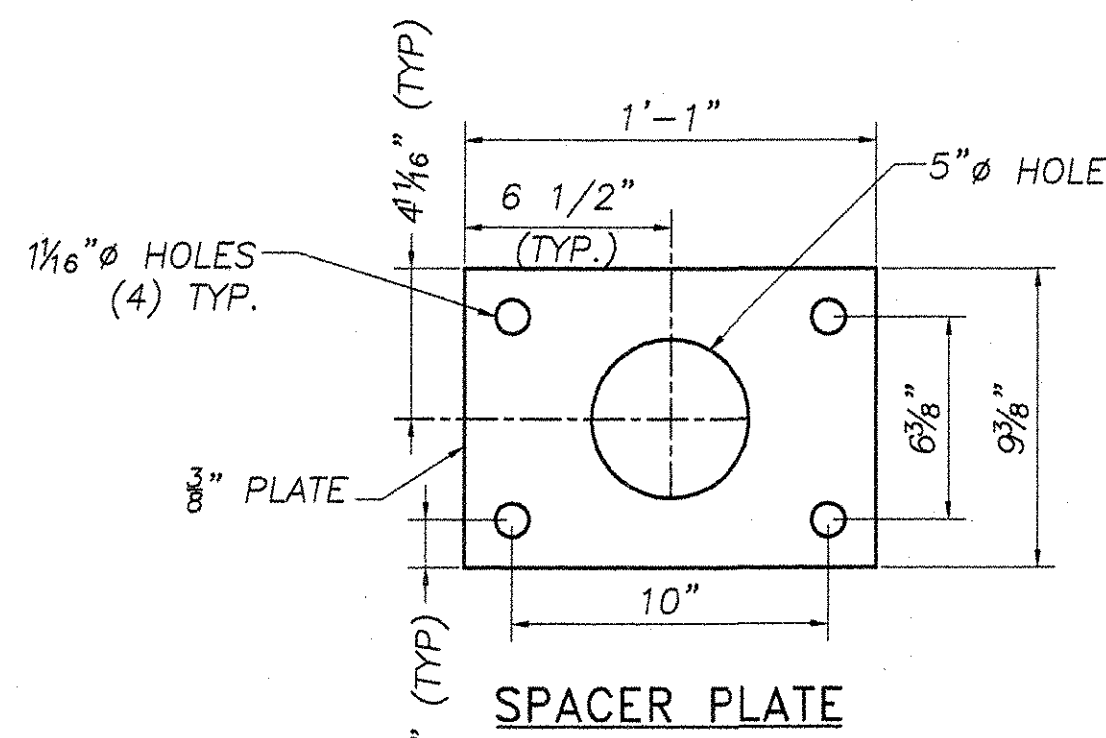
5/8" TAPPED HOLE IN SPLICE TUBE & 3/4" HOLE IN RAIL TUBE FOR BOLT & PLAIN HARDENED WASHER



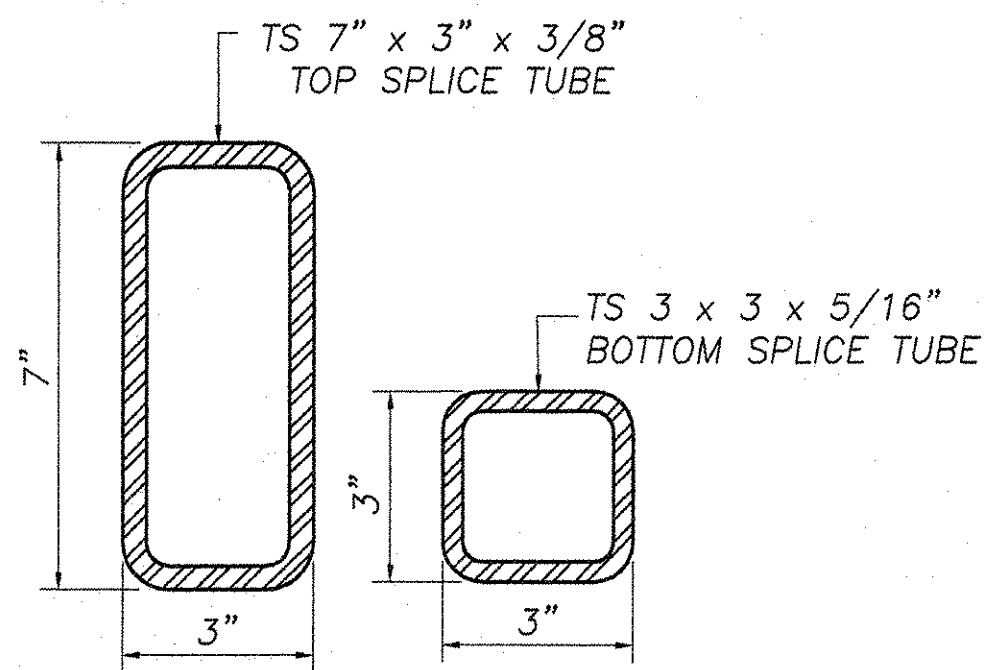
**BACK-UP PLATE**



**RAIL TUBE SPLICE AND RAIL EXPANSION JOINT DETAIL**



**SPACER PLATE**



**RAIL TUBE SPLICE SECTION**

**MATERIALS**

RAIL TUBES.....ASTM A500, GRADE B OR ASTM A501  
 RAIL POSTS AND BASE PLATES.....ASTM A709A709M, GRADE 50  
 RAIL OTHER SHAPES AND PLATES.....ASTM A709/A709M, GRADE 50  
 ANCHOR STUDS.....ASTM A449  
 ALL OTHER BOLTS (UNLESS NOTED).....AASHTO M164, TYPE 1

NUTS FOR AASHTO M164 BOLTS AND FOR ANCHOR STUDS SHALL COMPLY WITH AASHTO M291 (ASTM A563).

WASHERS SHALL COMPLY WITH AASHTO M293 (ASTM F436) SPECIFICATIONS.

1/8" PAD SHALL COMPLY WITH STANDARD SPECIFICATION SUBSECTION 731.01 OR 731.02.



**TYPICAL SECTION**

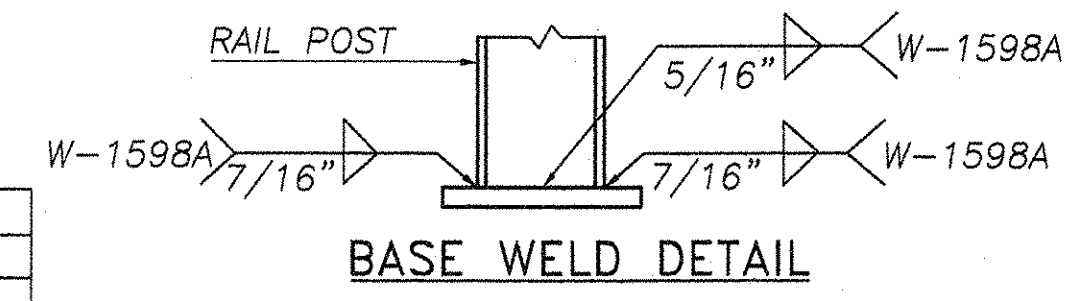
**ELEVATION**

POST NUMBER	RAIL HEIGHT (A)	RAIL SPACING (B)	POST LENGTH (C)	RAIL HEIGHT (D)
1	2'-10"	1'-4"	7'-0"	1'-6"
2	2'-3 5/8"	10"	6'-5"	1'-5 5/8"

SPLICE TABLE					
T	A	B	C	L	X
N/A	4"	2"	--	20"	3/4"
EXPANSION JOINT TABLE					
<4"	4"	2"	2 1/2"	20"	2 1/2"

T = TOTAL MOVEMENT BETWEEN BRIDGE EXPANSION JOINTS. SEE NOTE 6

\* = SINGLE SLOT



**BASE WELD DETAIL**

REVISIONS		
No.	Remarks	Date
0	Initial submittal	

RECEIVED  
 OK'D BY [Signature]  
 JUL 12 2007  
 RESUBMIT APPROVED  
 BY [Signature] DATE

**HIGHWAY SAFETY CORP.**  
 GLASTONBURY, CT

ITEM 525.33 - BRIDGE RAILING-NETC 2 RAIL	DRAWN	MMH
PROJECT No. RS 0142(10)	CHECKED	P. Radice
TOWN OF CASTLETON COUNTY OF RUTLAND	DATE	6/28/07
ROUTE No. VT 4A	SCALE	NONE
BRIDGE NO. : 8	HSC REFERENCE NO.	1598
GENERAL CONTRACTOR	SIZE	D REVISION 0
SUB CONTRACTOR	SHEET NO.	2 of 2
F.R. LAFAYETTE, INC.		

075BR