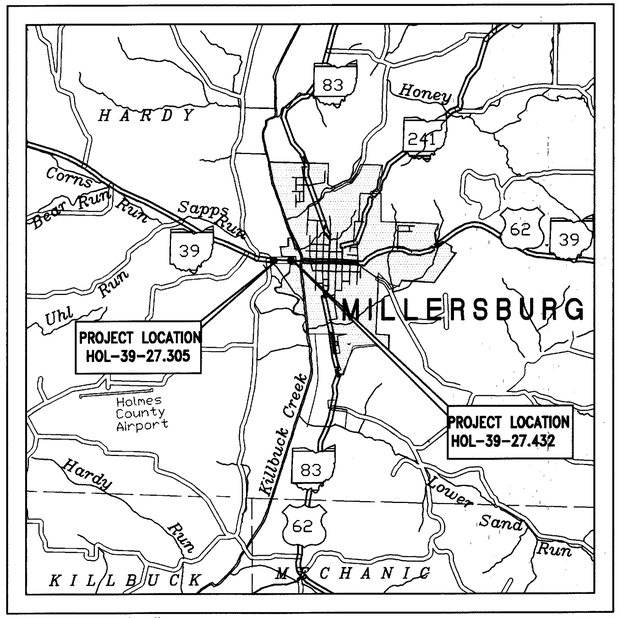
STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
HOL-39-(27.305)(27.432)
VILLAGE OF MILLERSBURG
HARDY TOWNSHIP
HOLMES COUNTY

metric units



LATITIDE 40°33'15" **LOCATION MAP** LONGITUDE 81°55'30"

Scale in Kilometers

0 1 2 4

PORTION TO BE IMPROVED
STATE & FEDERAL ROUTES
OTHER ROADS

N

DESIGN DESIGNATION

	HOL-39-27.305	HOL-39-27.432
Current ADT (1995)	7,570	7,740
Design Year ADT (2015)	12,110	10,830
DHV	1,211	1,083
D	55%	55%
T	4%	5%
V Design	90Km/h	90Km/h
V Legal	55mph (89km/h)	55mph (89km/h)
Functional Classification	RURAL ARTERIAL	

DESIGN EXCEPTIONS
NONE

APPROVAL DATE

PROJECT DESCRIPTION
HOL-39-(27.305)/(27.432)
REPLACE TWO EXISTING STRUCTURES ON SR-39 OVER KILLBUCK CREEK OVERFLOW AND ADJACENT APPROACH SLABS AND SHOULDERS LOCATED JUST WEST OF MILLERSBURG.
TRAFFIC TO BE MAINTAINED BY PART WIDTH CONSTRUCTION.

INDEX OF SHEETS

1997 SPECIFICATIONS
The standard specifications of the State of Ohio, Department of Transportation, including changes and supplemental specifications listed in the proposal shall govern this improvement.

I hereby approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenenace and safety of traffic will be as set forth on the plans and estimates.

Approved Michael D. Cope
Date 11/21/99 District Deputy Director

Approved Gordon Proctor, Jr.
Date 2-13-99 Director, Department of Transportation

UNDERGROUND UTILITIES
2 WORKING DAYS
BEFORE YOU DIG
CALL...800-362-2764(Toll Free)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

Plan Prepared By:
FRANKLIN CONSULTANTS, INC.
SUITE 500
2700 EAST DUBLIN-GRANVILLE ROAD
COLUMBUS, OHIO 43231

SUPPLEMENTAL PRINTS OF STANDARD CONSTRUCTION DRAWINGS

STD DWG No.	DATE	STD DWG No.	DATE	STD DWG No.	DATE	STD DWG No.	DATE	STD DWG No.	DATE
BP-3.1M	10-28-94	DM-4.3M	06-30-95	TC-41.20M	07-01-94	MT-96.11M	01-30-95		
		DM-4.4M	06-30-95	TC-52.10M	07-29-94	MT-96.20M	01-30-95		
GR-1.1M	10-21-97			TC-52.20M	07-29-94	MT-96.25M	01-30-95		
GR-1.2M	01-03-96	AS-1-81M	10-25-94			MT-97.10M	04-25-94		
GR-2.1M	04-14-98	CPA-5-94M	10-25-94						
GR-2.2M	10-21-97	CPP-2-94M	12-19-94			MT-101.20M	03-01-96		
GR-3.4M	10-21-97	CS-1-93M	06-30-95			MT-105.10M	04-25-94		
GR-4.2M	10-21-97	DRB-2-73M	08-18-95			MT-105.11M	04-25-94		
		DS-1-94M	12-15-94						
		PCB-91M	03-20-95						
RM-4.2M	10-21-97								

SUPPLEMENTAL SPECIFICATIONS

No.	DATE	No.	DATE
806	09-09-97		
842	01-06-99		
844	01-06-99		
899	10-21-98		
911	07-10-97		
954	09-09-97		

Special Provisions
Waterway Permit
NWP #14 Road Crossing's
5/1/98

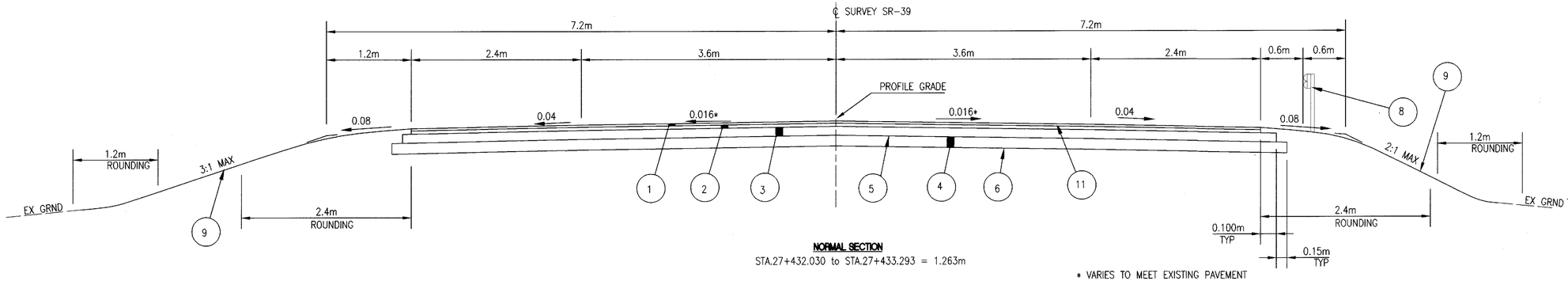
ENGINEERS SEAL
FOR ENTIRE PLAN

STATE OF OHIO
ROBERT O. BRENNER
33534
REGISTERED PROFESSIONAL ENGINEER

SIGNED: Robert O. Brenner
DATE: Feb 16 98

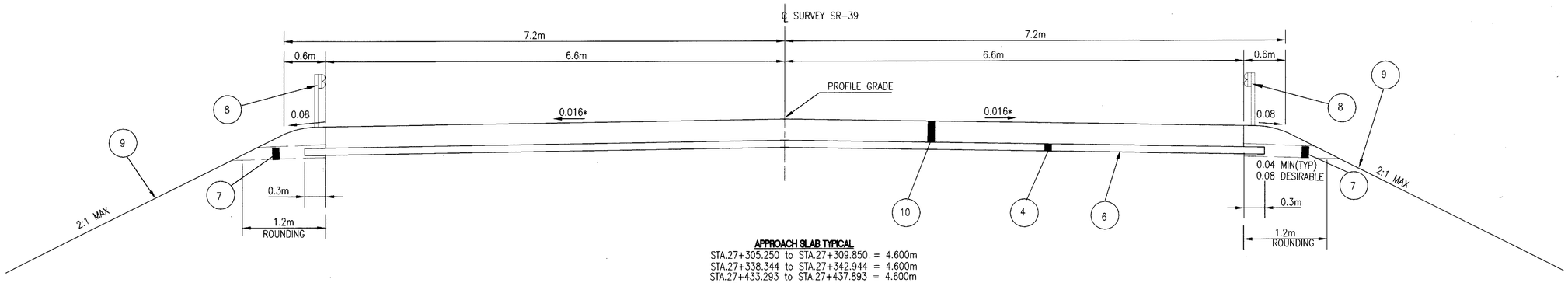
FEDERAL PROJECT No. TE21-G990(367)
PID No. 12866
CONSTRUCTION PROJECT No.
RAILROAD INVOLVMENT NONE
HOL-39-(27.305)(27.432)
1
31

HOL - 39 - (27.305)(27.432)
990347
DIST 11
PID# 12866
05-19-99

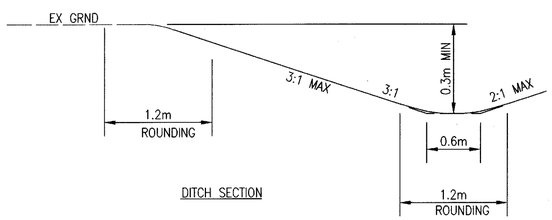


NORMAL SECTION
STA.27+432.030 to STA.27+433.293 = 1.263m

* VARIES TO MEET EXISTING PAVEMENT



APPROACH SLAB TYPICAL
STA.27+305.250 to STA.27+309.850 = 4.600m
STA.27+338.344 to STA.27+342.944 = 4.600m
STA.27+433.293 to STA.27+437.893 = 4.600m
STA.27+482.153 to STA.27+486.753 = 4.600m
TOTAL = 18.400m



DITCH SECTION

LEGEND

(1) ITEM 448 32mm ASPHALT CONCRETE SURFACE COURSE TYPE I, PG 64-22, **AS PER PLAN**
(2) ITEM 448 45mm ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG 64-22
(3) ITEM 301 225mm BITUMINOUS AGGREGATE BASE, PG 64-22
(4) ITEM 304 150mm AGGREGATE BASE
(5) ITEM 408 BITUMINOUS PRIME COAT APPLIED @ RATE OF 1.8 L/m2
(6) ITEM 203 SUBGRADE COMPACTION
(7) ITEM 605 AGGREGATE DRAIN
(8) ITEM 606 GUARDRAIL, TYPE 5
(9) ITEM 659 SEEDING & MULCHING
(10) ITEM 611 REINFORCED CONCRETE APPROACH SLAB(T=305m), AS PER PLAN
(11) ITEM 407 TACK COAT FOR INTERMEDIATE COURSE APPLIED @ RATE OF 0.34 L/m2

CALCULATED
CHECKED

TYPICAL SECTIONS

HOL-39-(27.305)(27.432)

GENERAL NOTES AND CALCULATIONS

ROUNDING
THE ROUNDING AT SLOPE BREAKPOINTS SHOWN ON THE TYPICAL SECTIONS APPLY TO ALL CROSS-SECTIONS EVEN THOUGH OTHERWISE SHOWN.

CONTINGENCY QUANTITIES
THE CONTRACTOR SHALL NOT ORDER MATERIALS OR PERFORM WORK FOR ITEMS DESIGNATED BY PLAN NOTE TO BE USED "AS DIRECTED BY THE ENGINEER" UNLESS AUTHORIZED BY THE ENGINEER. THE ACTUAL WORK LOCATIONS AND QUANTITIES USED FOR SUCH ITEMS SHALL BE INCORPORATED INTO THE FINAL CHANGE ORDER GOVERNING COMPLETION OF THIS PROJECT.

ELEVATION DATUM
ALL ELEVATIONS ARE BASED ON U.S.G.S. DATUM.

WORK LIMITS
THE WORK LIMITS SHOWN ON THESE PLANS ARE FOR PHYSICAL CONSTRUCTION ONLY. THE INSTALLATION AND OPERATION OF ALL TEMPORARY TRAFFIC CONTROL AND TEMPORARY TRAFFIC CONTROL DEVICES REQUIRED BY THESE PLANS SHALL BE PROVIDED BY THE CONTRACTOR WHETHER INSIDE OR OUTSIDE THESE WORK LIMITS.

REMOVAL OF TREES OR STUMPS
ALL TREES AND STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE CONSTRUCTION LIMITS SHALL BE REMOVED UNDER THE LUMP SUM BID FOR ITEM 201, CLEARING AND GRUBBING. THE FOLLOWING IS AN APPROXIMATE ESTIMATE OF THE NUMBER OF TREES AND STUMPS TO BE REMOVED:

SIZES No.	TREES	NO. STUMPS	TOTAL
450mm	NONE	NONE	
750mm			
1200mm			
1500mm			

ITEM 606, ANCHOR ASSEMBLY, TYPE E
THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING AN ET-2000, OPTION "B" GUARDRAIL END TERMINAL AS MANUFACTURED BY SYRO STEEL COMPANY, 1170 N. STATE STREET, GIRARD, OHIO 44420 (TELEPHONE 330-545-4373).

THE LENGTH OF THE ET-2000 SYSTEM IS CONSIDERED TO BE 15.24M, INCLUSIVE OF TWO 7.62M LONG RAIL ELEMENTS. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS, AND AT THE LOCATIONS SHOWN IN THE PLANS.

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE CONTRACT PRICE FOR ITEM 606, EACH, ANCHOR ASSEMBLY, TYPE E, AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT, AND MATERIALS NECESSARY TO CONSTRUCT A COMPLETE AND FUNCTIONAL ANCHOR ASSEMBLY SYSTEM, INCLUDING ALL RELATED HARDWARE, NOT SEPARATELY SPECIFIED, AS REQUIRED BY THE MANUFACTURER.

ITEM 659, SEEDING AND MULCHING
SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS OF EXPOSED SOIL BETWEEN THE RIGHT-OF-WAY LINES, AND WITHIN THE CONSTRUCTION LIMITS FOR AREAS OUTSIDE THE RIGHT-OF-WAY LINES COVERED BY WORK AGREEMENT OR SLOPE EASEMENT. QUANTITY CALCULATIONS FOR ITEM 659, SEEDING AND MULCHING, ARE BASED ON THESE LIMITS.

WATERING PERMANENT SEEDED AREAS
THE FOLLOWING ESTIMATED QUANTITIES ARE TO BE USED AS DIRECTED BY THE ENGINEER TO PROMOTE GROWTH AND TO CARE FOR PERMANENT SEEDED AREAS PER 659.09:

659, WATER _____5 m3

TEMPORARY SOIL EROSION AND SEDIMENT CONTROL
THE FOLLOWING ESTIMATED QUANTITIES ARE TO BE USED AS DIRECTED BY THE ENGINEER FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES:

ITEM 207, STRAW OR HAY BALES	50 EACH
ITEM 207, FILTER FABRIC FENCE	80 m

EROSION CONTROL
ITEM 601 IS PROVIDED IN THE PLANS FOR EROSION CONTROL. ROCK OF A STABLE NATURE SHALL NOT BE REMOVED IN ORDER TO PLACE THIS ITEM. THE ENGINEER SHALL CHECK AND NON-PERFORM QUANTITIES OR ADJUST LOCATIONS AND QUANTITIES OF THIS ITEM WHERE INDICATED BY FIELD CONDITIONS DURING CONSTRUCTION. IN ADDITION, THIS ITEM SHALL MEET THE REQUIREMENT OF 108.04.

ITEM 407, TACK COAT AND TACK COAT FOR INTERMEDIATE COURSE
THE RATE OF APPLICATION OF THE 407 TACK COAT SHALL BE SUBJECT TO ADJUSTMENT AS DIRECTED BY THE ENGINEER. PLAN QUANTITIES INDICATE AN AVERAGE APPLICATION RATE OF 0.34 LITERS PER SQUARE METER OF TACK COAT FOR ESTIMATING PURPOSES ONLY.

ITEM 605, AGGREGATE DRAINS
AGGREGATE DRAINS SHALL BE PLACED ON EACH SIDE OF THE APPROACH SLABS, STAGGERED SO THAT EACH DRAIN IS 3 METERS FROM THE ADJACENT DRAIN ON THE OPPOSITE SIDE.

ITEM 615, TEMPORARY PAVEMENT, CLASS B, AS PER PLAN
TEMPORARY PAVEMENT, CLASS B SHALL BE FLEXIBLE TYPE AND REMAIN IN PLACE AFTER CONSTRUCTION IS COMPLETED.

PAVEMENT MARKINGS
ALL PAVEMENT MARKINGS SHALL BE APPLIED IN ACCORDANCE WITH ITEM 642 OF "THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATIONS." THE FOLLOWING QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY FOR THE ABOVE MENTIONED WORK.
ITEM 642 100mm EDGE LINE(WHITE) ---------- 0.442Km
ITEM 642 100mm CENTER LINE, SINGLE, DASHED ------ 0.207Km
THE CENTERLINE AND EDGE LINES SHALL BEGIN AT STA.27+278.377 AND END AT STA.27+513.363. THE CENTERLINE AND LEFT EDGE LINE SHALL BE OMITTED BETWEEN STA. 27+343 AND STA. 27+371.

UTILITIES
LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS: NONE

THERE ARE NO KNOWN UNDERGROUND UTILITIES ON THIS PROJECT.

THE FOLLOWING UTILITY IS NEAR THE CONSTRUCTION LIMITS.

SPRINT
2025 AKRON RD.
WOOSTER, OH 4469
(330)264-2616

ITEM 622, PORTABLE CONCRETE BARRIER
IT IS ANTICIPATED THAT THE SAME BARRIER WILL BE USED IN VARIOUS PHASES OF CONSTRUCTION. MOVEMENT OF THE CONCRETE BARRIER BETWEEN PHASES SHALL BE ACCOMPLISHED IN ONE WORKING DAY. FLAGGERS SHALL BE UTLIZED FOR PROTECTION OF VEHICULAR TRAFFIC UNTIL MOVEMENT OF THE BARRIER IS COMPLETE.

ITEM 446, ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-28, AS PER PLAN
MATERIALS FURNISHED FOR FINE AND COARSE AGGREGATES USED IN THIS ITEM SHALL EXCLUDE ALL STONE AND CRUSHED CARBONATE STONE.

STREAM CHANNEL EXCAVATION
THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT ANY INCIDENTAL DISCHARGES ASSOCIATED WITH THE EXCAVATION AND HAULING OF MATERIAL FROM THE STREAM CHANNEL. THIS PERTAINS TO ANY EXCAVATION OPERATIONS SUCH AS, FOUNDATION PIER OR ABUTMENT EXCAVATION, CHANNEL CLEAN OUT, EXCAVATION FOR ROCK CHANNEL PROTECTION AND REMOVAL OF ANY TEMPORARY FILL ASSOCIATED WITH CONSTRUCTION OPERATIONS.

DEMOLITION DEBRIS

THE CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID AND/OR LIMIT DEMOLITION DEBRIS FROM ENTERING THE STREAM. ANY MATERIAL THAT DOES FALL INTO THE STREAM SHALL BE REMOVED AS SOON AS POSSIBLE.

ITEM 611 REINFORCED CONCRETE APPROACH SLAB T=305 MM, AS PER PLAN:

THE REINFORCING STEEL FOR THE APPROACH SLABS OF THIS STRUCTURE SHALL BE EPOXY COATED IN CONFORMANCE WITH 509 AND SHALL USE MECHANICAL CONNECTORS ON THE REINFORCING FOR THE PHASE CONSTRUCTION.

TWO SEPARATE THICKNESSES OF CLEAR OR OPAQUE POLYETHYLENE FILM, 705.06, SHALL BE PLACED ON THE PREPARED SUBBASE AND WHERE THE APPROACH SLAB IS TO BE CONSTRUCTED. THE POLYETHYLENE FILMS SHALL COMPLETELY COVER THE FULL LENGTH AND WIDTH OF THE SUBBASE BETWEEN THE SIDEWALL FORMS FOR THE APPROACH SLAB.

MATERIALS, LABOR AND INSTALLATION SHALL BE INCLUDED FOR WITH APPROACH SLABS FOR PAYMENT.

PAVEMENT CALCULATIONS
PAVEMENT AREA

(HOL-39-27.437)	(HOL-39-27.305)
A=1.263x12=15.156 m2	A=0
ITEM 448 ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG 64-22, AS PER PLAN	
V=(15.156x0.032)=0.49 m3	V=0.030x8.6x6.468=1.67m2
TOTAL ITEM 448 TO GENERAL SUMMARY..... 3m3	
ITEM 448 ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG 64-22	
V=15.156x0.045=0.682 m3	V=0
TOTAL ITEM 448 TO GENERAL SUMMARY 1m3	
ITEM 301 BITUMINOUS AGGREGATE BASE, PG 64-22	
V=1.263x12.2x0.225 =3.467 m3	V=0
TOTAL ITEM 301 TO GENERAL SUMMARY 4m3	
ITEM 304 AGGREGATE BASE	
V=(1.263x12.5x0.15)+(4.6x13.8)2x0.15= 21.412 m3	V=(4.6x13.8)2x0.15=19.044m3
TOTAL ITEM 304 TO GENERAL SUMMARY 41m3	
ITEM 408 BITUMINOUS PRIME COAT	
V=[1.263x12.2x1.80] =27.736L	V=0
TOTAL ITEM 408 TO GENERAL SUMMARY 28L	
ITEM 605 AGGREGATE DRAIN	
L=1.5x4 =6 m	L=1.5x4=6m
TOTAL TO GENERAL SUMMARY 12m	
ITEM 611 REINFORCED CONCRETE APPROACH SLAB, T=305mm	
A=(4.6x13.2x2)=121.44 m2	A=4.6x13.2x2=121.44m2
TOTAL ITEM 611 TO GENERAL SUMMARY 243m2	
ITEM 407 TACK COAT FOR INTERMEDIATE COURSE	
V=[(1.263x12)0.34=5.15L	V=0
TOTAL ITEM 407 TO GENERAL SUMMARY 5L	
ITEM 203 SUBGRADE COMPACTION	
A=(1.263x12)+(13.2x4.6)2=136.60m2	A=13.2x4.6x2=121.44m2
TOTAL ITEM 203 TO GENERAL SUMMARY 258m2	
ITEM 407 TACK COAT	
V=0	
TOTAL ITEM 407 TO GENERAL SUMMARY 19L	V=8.6X6.468X0.34=18.91L

CALCULATED PGB
CHECKED DBW

GENERAL NOTES and CALCULATIONS

HOL-39-(27.305)(27.432)

MAINTENANCE OF TRAFFIC
THE CONTRACTOR SHALL MAINTAIN TRAFFIC AT ALL TIMES IN ACCORDANCE WITH THE REQUIREMENTS OF SPECIFICATION 614 AND THE CONSTRUCTION SEQUENCE SHOWN ON THIS SHEET BY CONSTRUCTING THE NEW STRUCTURES IN TWO PHASES. A MINIMUM OF ONE LANE TRAFFIC SHALL BE MAINTAINED AT ALL TIMES BY USE OF EXISTING PAVEMENT, THE COMPLETED PAVEMENT, 615 TEMPORARY PAVEMENT, AND TEMPORARY SURFACES USING 404, 410, AND 616.

ALTERNATING ONE-WAY TRAFFIC SHALL BE MAINTAINED BY USE OF TEMPORARY SIGNALS(SEE STD DWGS MT-96.11M, MT-96.20M & MT-96.25M)AND AS SHOWN ON SHEETS 5 & 6 . TRAFFIC SHALL BE SEPARATED FROM THE WORK AREA BY MEANS OF ITEM 622 PORTABLE CONCRETE BARRIER AS SHOWN ON SHEETS 5 &6 AND ON STRUCTURE SHEETS 15 & 24.

LENGTH AND DURATION OF LANE CLOSURES AND RESTRICTIONS SHALL BE AT THE APPROVAL OF THE ENGINEER. IT IS THE INTENT TO MINIMIZE THE IMPACT TO THE TRAVELING PUBLIC. LANE CLOSURES OR RESTRICTIONS OVER SEGMENTS OF THE PROJECT IN WHICH NO WORK IS ANTICIPATED WITHIN A REASONABLE TIME FRAME, AS DETERMINED BY THE ENGINEER, SHALL NOT BE PERMITTED. THE LEVEL OF UTILIZATION OF MAINTENANCE OF TRAFFIC DEVICES SHALL BE COMMENSURATE WITH THE WORK IN PROGRESS.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED AS DIRECTED BY THE ENGINEER FOR THE MAINTENANCE OF TRAFFIC.
ITEM 404 BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC 10m3
ITEM 410 TRAFFIC COMPACTED SURFACE, TYPE A or B 10m3
ITEM 615 TEMPORARY PAVEMENT CLASS B (FLEXIBLE PAVEMENT), AS PER PLAN 525m2
ITEM 622 PORTABLE CONCRETE BARRIER, 813mm 434m

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH ITEM 614 AND OTHER APPLICABLE PORTIONS OF THE SPECIFICATIONS, AS WELL AS THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR ITEM 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

DUST CONTROL
THE CONTRACTOR SHALL FURNISH AND APPLY WATER AND CALCIUM CHLORIDE FOR DUST CONTROL AS DIRECTED BY THE ENGINEER. THE FOLLOWING CONTINGENCY QUANTITIES HAVE BEEN INCLUDED FOR DUST CONTROL PURPOSES.
ITEM 616 WATER 40m3
ITEM 616 CALCIUM CHLORIDE 1 METRIC TON

ITEM 614 BARRIER REFLECTORS
REFLECTORS AND THEIR MOUNTING SHALL CONFORM TO ITEM 626 EXCEPT THAT THE SPACING SHALL BE AT 7.6m.

ITEM 614 TEMPORARY PAVEMENT MARKINGS
THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED AS DIRECTED BY THE ENGINEER FOR TEMPORARY PAVEMENT MARKINGS.
ITEM 614 TEMPORARY CENTERLINE, CLASS I, 740.06 TYPE 1 184m
ITEM 614 TEMPORARY EDGE LINE, CLASS I, 740.06 TYPE 1 120m
ITEM 614 TEMPORARY STOP LINE, CLASS I, 740.06 TYPE 1 15.2m
ITEM 614 TEMPORARY RAISED PAVEMENT MARKERS 900 EA
ITEM 614 OBJECT MARKERS 62 EA

CONSTRUCTION SEQUENCE-PHASE I
THE CONSTRUCTION OF ONE BRIDGE STRUCTURE SHALL BE COMPLETED BEFORE CONSTRUCTION BEGINS ON THE OTHER STRUCTURE IN ORDER TO REDUCE THE TIME DELAY FOR ONE LANE TRAFFIC.

THE CONTRACTOR SHALL PLACE TEMPORARY PAVEMENT, CLASS B (FLEXIBLE PAVEMENT) ALONG THE SOUTH SIDE OF SR-39 AS SHOWN ON SHEET 5. FLAGGERS SHALL BE USED AS PER STD DWG MT-97.10M TO MAINTAIN TRAFFIC WHILE THIS OPERATION IS COMPLETE.

ONCE TEMPORARY PAVEMENT IS IN PLACE, TWO-WAY ONE LANE TRAFFIC SHALL BE MAINTAINED ON THE EXISTING EASTBOUND LANE OF SR-39 BY USE OF THE EXISTING ROADWAY AND STRUCTURES, THE TEMPORARY PAVEMENT AND BY TEMPORARY SIGNALS WHILE CONSTRUCTION OF THE WESTBOUND LANE, TEMPORARY SHOULDER, STRUCTURES AND ROADWAY ITEMS ARE COMPLETED AS SHOWN.

CONSTRUCTION SEQUENCE-PHASE II
ONCE PHASE I CONSTRUCTION IS COMPLETED, TWO-WAY ONE LANE TRAFFIC SHALL BE MAINTAINED ON THE COMPLETED WESTBOUND LANE OF SR-39 INCLUDING THE PAVEMENT, PAVED SHOULDER, STRUCTURES AND TEMPORARY PAVEMENT AS SHOWN ON SHEET 5 & 6, WHILE CONSTRUCTION IS COMPLETED ON THE WESTBOUND LANE OF SR-39 INCLUDING PAVEMENT,STRUCTURE AND ROADWAY ITEMS.

MOVEMENT OF THE PORTABLE CONCRETE BARRIERS, SIGNS, LIGHTS AND TEMPORARY PAVEMENT MARKINGS REQUIRED BETWEEN PHASES SHALL BE ACCOMPLISHED IN ONE WORKING DAY. FLAGGERS SHALL BE UTILIZED FOR THE PROTECTION OF VEHICULAR TRAFFIC UNTIL RELOCATION OF ALL TRAIFFIC CONTROL ITEMS INCLUDING THE PORTABLE CONCRETE BARRIER, SIGNS, LIGHTS, TEMPORARY PAVEMENT AND PAVEMENT MARKINGS IS COMPLETE.

ACCESS TO ALL PROPERTIES SHALL BE MAINTAINED AT ALL TIMES EXCEPT FOR THE FIELD DRIVE ON THE SOUTHSIDE OF SR-39 AND THE FAIRGROUNDS ACCESS DRIVE ON THE NORTHSIDE OF SR-39 BETWEEN THE STRUCTURES WHICH WILL BE BLOCKED DURING CONSTRUCTION WHEN ONE LANE TRAFFIC IS IN USE, NO WORK SHALL BE PERFORMED AND ALL EXISTING LANES SHALL BE OPEN TO TRAFFIC DURING THE FOLLOWING DESIGNATED EVENTS.

ANTIQUE FESTIVAL	OCT. 10-11, 1998 OCT. 9-10, 1999
HOLMES COUNTY FAIR	AUG. 18-22, 1998 AUG. 17-21, 1999

NO EXTENSIONS OF TIME SHALL BE GRANTED FOR DELAYS IN MATERIAL DELIVERIES. UNLESS SUCH DELAYS ARE INDUSTRY-WIDE, OR FOR LABOR STRIKES, UNLESS SUCH STRIKES ARE AREA-WIDE.

SHOULD THE CONTRACTOR FAIL TO MEET ANY OF THESE REQUIREMENTS, THE CONTRACTOR SHALL BE ASSESSED LIQUIDATED DAMAGES IN ACCORDANCE WITH 108.07.

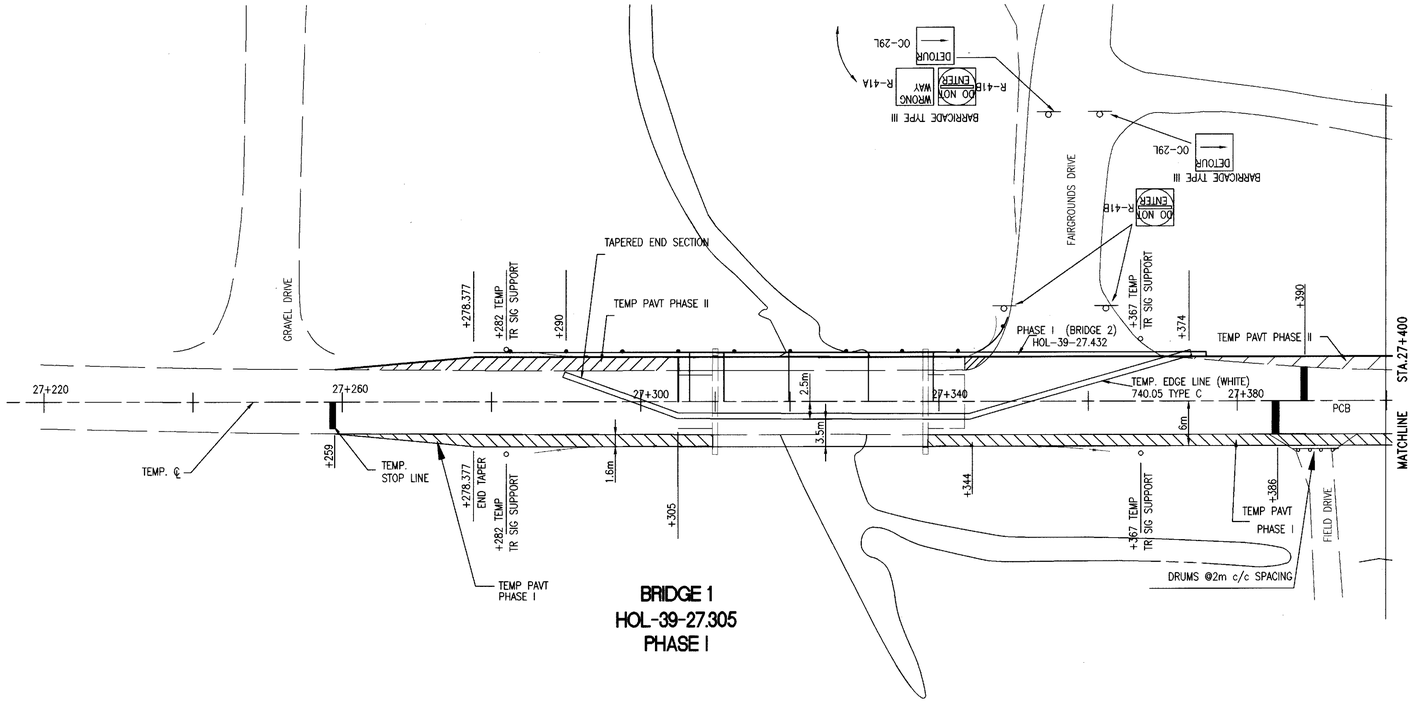
STATION TO STATION	PHASE	ITEM 614 TEMPORARY CENTERLINE, CLASS I	ITEM 614 TEMPORARY EDGELINE, CLASS I	ITEM 614 TEMPORARY STOP LINE, CLASS I		ITEM 614 OBJECT MARKER	ITEM 614 BARRIER REFLECTOR TYPE A2	ITEM 614 BARRIER REFLECTOR TYPE B2		622 PORTABLE CONCRETE BARRIER, 813mm		
BR. 1 PHASE I		m	m	m		EACH	EACH	EACH		m		
27+213 TO 27+259	Ldell	46										
27+259	Ldell			3.8								
27+290 TO 27+305	LT					3		3		15		
27+305 TO 27+344	LT					5		5		39		
27+344 TO 27+374	LT		30			4		4		30		
27+286 TO 27+362	RT						11					
27+390	Ldell			3.8								
27+390 TO 27+436	Ldell	46										
BR. 1 PHASE II												
27+275 TO 27+305	RT		30			4		4		30		
27+305 TO 27+344	RT					5		5		39		
27+344 TO 27+359	RT					3		3		15		
27+346 TO 27+376	LT					4		4		30		
27+280 TO 27+346	RT						9					
BR. 2 PHASE I												
27+340 TO 27+386	Ldell	46										
27+386	Ldell			3.8								
27+417 TO 27+432	LT					3		3		15		
27+432 TO 27+490	LT					8		8		58		
27+490 TO 27+520	LT		30			4		4		30		
27+536	Ldell			3.8								
27+536 TO 27+582	Ldell	46										
27+406 TO 27+513	RT						15					
BR. 2 PHASE II												
27+402 TO 27+432	RT		30			4		4		30		
27+432 TO 27+490	RT					8		8		58		
27+490 TO 27+505	RT					3		3		15		
27+346 TO 27+376	LT					4		4		30		
27+407 TO 27+513	RT						15					
		184	120	15.2		62	50	62		434		

ITEM 614 TEMPORARY RAISED PAVEMENT MARKERS								
STATIONING			SPACING	TYPE A				REMARKS
FROM	TO	SIDE	(M)	W	Y	Y/Y		(LINE TYPE)
BRIDGE 1 PHASE I								
27+305	27+344	LT.	1.5	27	27			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+259	27+305	RT.	1.5	32				EDGE LINE
27+305	27+390	RT.	1.5	57	57			EDGE LINE (2 COLORS) (WHITE/YELLOW)
BRIDGE 1 PHASE II								
27+305	27+344	RT.	1.5	27	27			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+259	27+344	LT.	1.5	57	57			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+344	27+390	LT.	1.5	32				EDGE LINE
BRIDGE 2 PHASE I								
27+432	27+490	LT.	1.5	39	39			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+386	27+432	RT.	1.5	32				EDGE LINE
27+432	27+536	RT.	1.5	70	70			EDGE LINE (2 COLORS) (WHITE/YELLOW)
BRIDGE 2 PHASE II								
27+432	27+490	RT.	1.5	39	39			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+386	27+490	LT.	1.5	70	70			EDGE LINE (2 COLORS) (WHITE/YELLOW)
27+490	27+536	LT.	1.5	32				EDGE LINE
				514	386			
			TOTALS	900				

CALCULATED PCB CHECKED LCB

MAINTENANCE OF TRAFFIC NOTES

HOL-39-(27.305)/(27.432)



BRIDGE 1
HOL-39-27.305
PHASE I

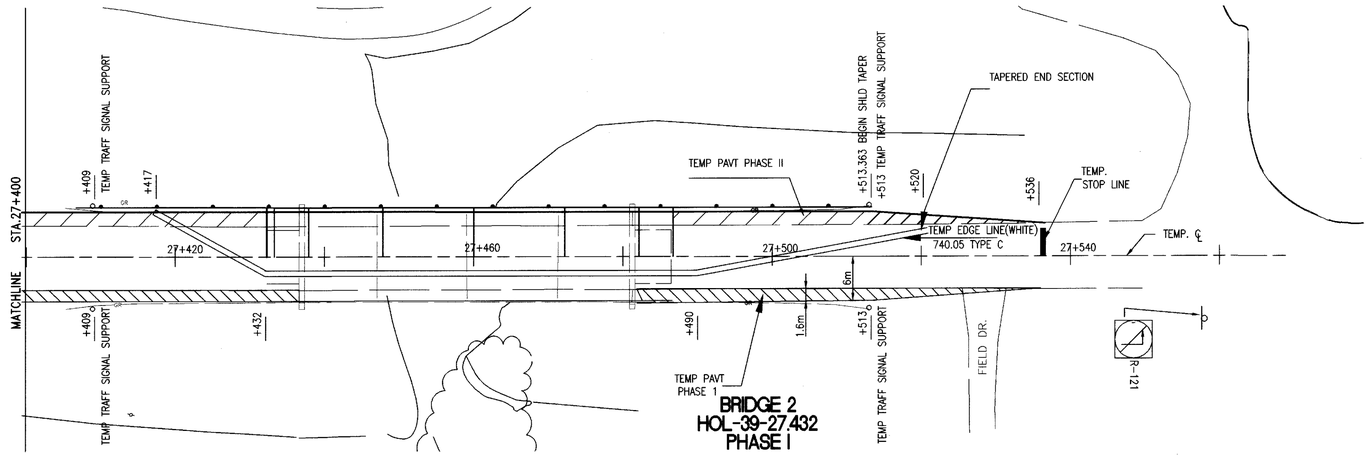
SIGNAL TIMING BRIDGES 1 & 2						
INTERVAL	1	2	3	4	5	6
TIME SEC.	16	40	4	16	40	4
	⊢⊣	⊢→	⊢⊣	⊢⊣	←⊣	⊢⊣

LEGEND

TEMPORARY PAVT, PHASE I

TEMPORARY PAVT, PHASE II

TEMPORARY PAVEMENT PHASE I
AREA=1.6(234.986−44.26−29.45)+1/2(1.6x19.377)+1/2(1.6x22.637) = 291.6m2



BRIDGE 2
HOL-39-27.432
PHASE I

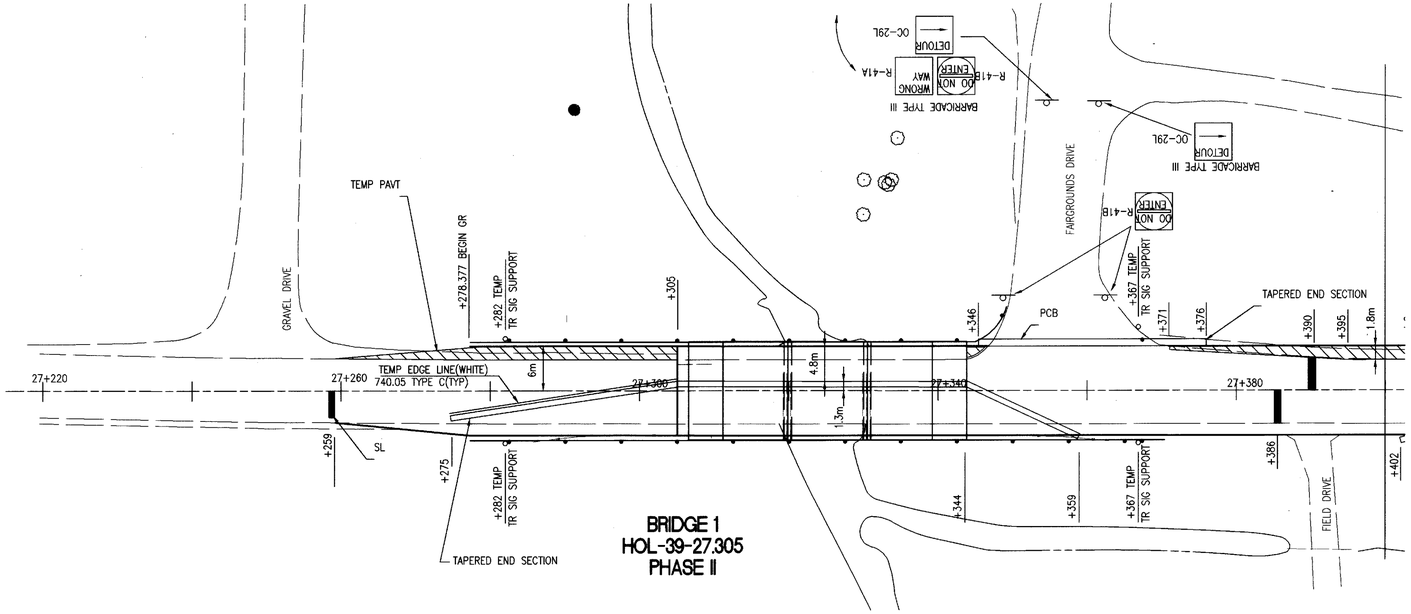
HORIZONTAL SCALE IN METERS 0 20

CALCULATED PCB CHECKED ABW

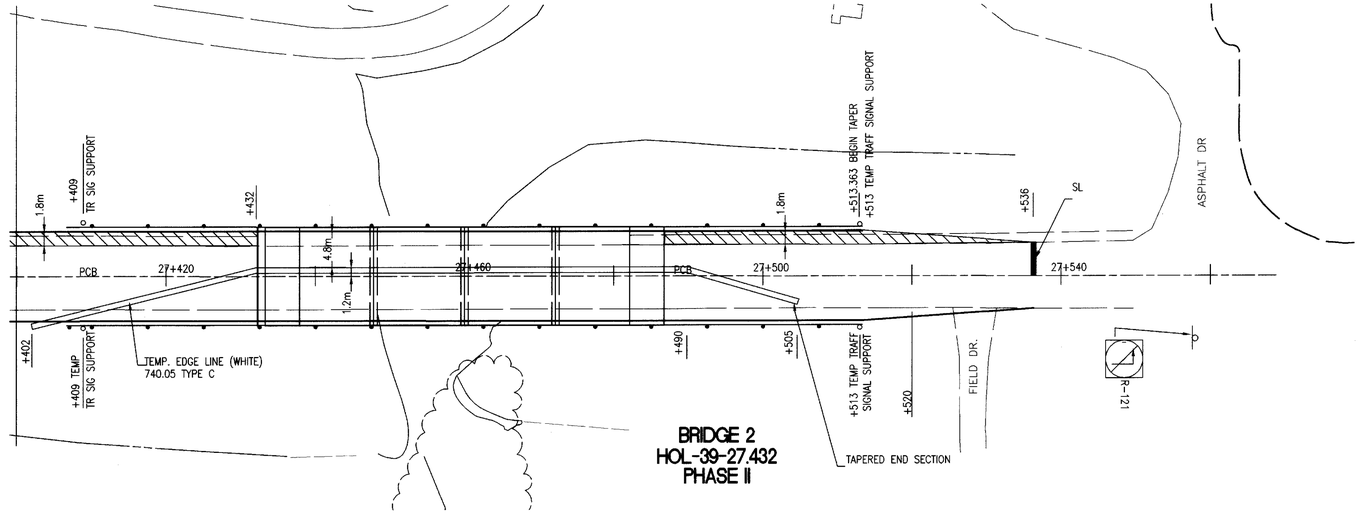
MAINTENANCE OF TRAFFIC

PHASE I

HOL-39-(27.305)/(27.432)



BRIDGE 1
HOL-39-27.305
PHASE II



BRIDGE 2
HOL-39-27.432
PHASE II

LEGEND

TEMPORARY PAVT, CLASS B (FLEXIBLE)

TEMPORARY PAVEMENT PHASE II

AREA=[1/2(1.8x19.377)+(1.8x26.873)
+1/2(0.5+3.0)1.8 + 1/2(0.6+1.8)24+(37.03x1.8)
+(26.61x1.8)+1/2(1.8x22.637)]= 232.69m2

HORIZONTAL SCALE IN METERS
0 20

CALCULATED PCB
CHECKED BDB

MAINTENANCE OF TRAFFIC
PHASE II

HOL-39-(27.305)/(27.432)

GENERAL SUMMARY

CALCULATED PSB | CHECKED RDB

SHEET NUMBER																		ITEMS	ITEM EXT.	GRAND TOTAL	UNITS	DESCRIPTION	SEE SH
													3	4		9	10	11	13						
																						ROADWAY	
													LUMP							201	11000	LUMP		CLEARING & GRUBBING	
																67	34	34		202	23000	135	SQ METER	PAVEMENT REMOVED	
																73	76	63		202	38000	212	METER	GUARDRAIL REMOVED	
																			294	203	12000	294	CU METER	EXCAVATION, NOT INCLUDING EMBANKMENT CONSTRUCTION	
																			97	203	20000	97	CU METER	EMBANKMENT	
													258							203	50000	258	SQ METER	SUBGRADE COMPACTION	
																56				254	01000	56	SQ METER	PAVEMENT PLANING, BITUMINOUS	
																52.573	35.057	30.48		606	13000	118.110	METER	GUARDRAIL, TYPE 5	
																2	3	2		606	26100	7	EACH	ANCHOR ASSEMBLY, TYPE E	
																4	2	2		606	35140	8	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 4	
																								EROSION CONTROL	
													80							207	30000	80	METER	FILTER FABRIC FENCE	
													50							207	70000	50	EACH	STRAW OR HAY BALES	
																102	41	41		601	32200	184	CU METER	ROCK CHANNEL PROTECTION, TYPE C WITH FILTER	
																			665	659	10000	665	SQ METER	SEEDING AND MULCHING	
													5							659	35000	5	CU METER	WATER	
																								DRAINAGE	
													12							605	31100	12	METER	AGGREGATE DRAIN	
																								PAVEMENT	
													4							301	46000	4	CU METER	BITUMINOUS AGGREGATE BASE, PG64-22	
													41							304	20000	41	CU METER	AGGREGATE BASE	
													19							407	10000	19	LITER	TACK COAT	
													5							407	14000	5	LITER	TACK COAT FOR INTERMEDIATE COURSE	
													28							408	10000	28	LITER	BITUMINOUS PRIME COAT	
													1							448	46050	1	CU METER	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2 PG64-22	
													3							448	47021	3	CU METER	ASPHALT CONCRETE SURFACE COURSE, TYPE 1 PG64-22, AS PER PLAN	
													243							611	10001	243	SQ METER	REINFORCED CONCRETE APPROACH SLAB, 305mm, AS PER PLAN	3
																6	5	6		626	00100	17	EACH	**TRAFFIC CONTROL** BARRIER REFLECTOR, TYPE A	
													0.44							642	00100	0.44	KILOMETER	EDGE LINE, TYPE I	
													0.21							642	00300	0.21	KILOMETER	CENTERLINE, TYPE I	

GENERAL SUMMARY

HOL-99-(27305)/(27432)

GENERAL SUMMARY

CALCULATED PCB | CHECKED RDB

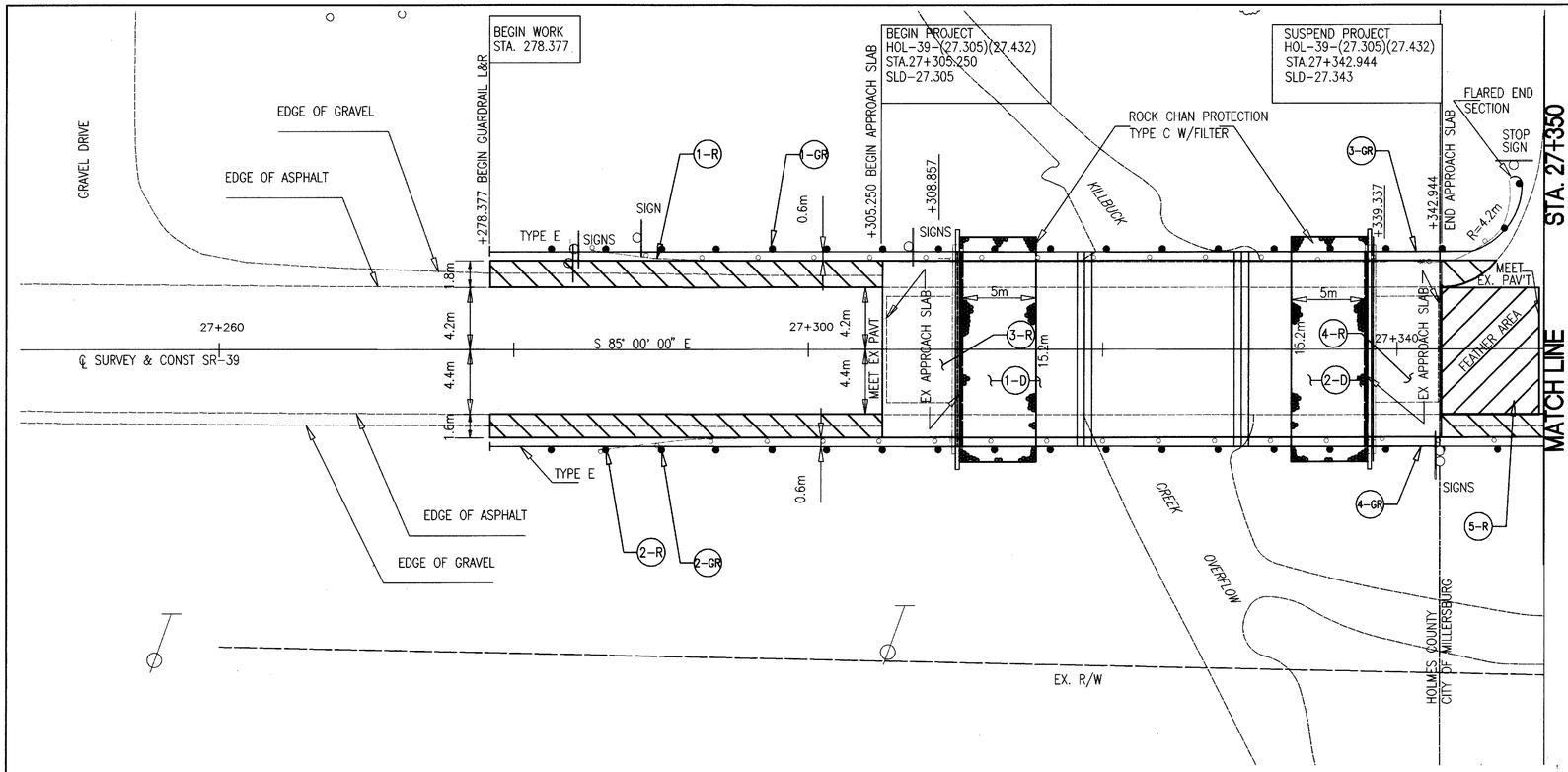
SHEET NUMBER													3	4		9	10	11	13	ITEMS	ITEM EXT.	GRAND TOTAL	UNITS	DESCRIPTION	SEE SH
																								MAINTENANCE OF TRAFFIC	
														10						410	12000	10	CU METER	TRAFFIC COMPACTED SURFACE, TYPE A or B	
														900						614	12800	900	EACH	TEMPORARY RAISED PAVEMENT MARKER	
														10						614	13000	10	CU METER	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC	
														50						614	13202	50	EACH	BARRIER REFLECTOR, TYPE A2	
														62						614	13302	62	EACH	BARRIER REFLECTOR, TYPE B2	
														62						614	13350	62	EACH	OBJECT MARKER	
														0.18						614	21200	0.18	KILOMETER	TEMPORARY CENTER LINE, CLASS I 740.06 TYPE I	
														0.12						614	22200	0.12	KILOMETER	TEMPORARY EDGE LINE, CLASS I 740.06 TYPE I	
														15.2						614	26400	15.2	METER	TEMPORARY STOP LINE, CLASS I 740.06 TYPE I	
														525						615	25001	525	SQ METER	TEMPORARY PAVEMENT, CLASS B, AS PER PLAN	3
														40						616	10000	40	CU METER	WATER	
														1						616	20000	1	METRIC TON	CALCIUM CHLORIDE	
														434						622	40020	434	METER	PORTABLE CONCRETE BARRIER, 813mm	
																								FOR STRUCTURE QUANTITIES SEE SHEETS 17 & 26	
														LUMP						614	11000	LUMP		MAINTAINING TRAFFIC	
																				623	10000	LUMP		CONSTRUCTION LAYOUT STAKES	
																				624	10000	LUMP		MOBILIZATION	
																				806	16000	12	MONTH	FIELD OFFICE, TYPE A	

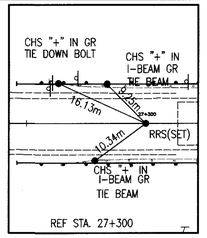
GENERAL SUMMARY

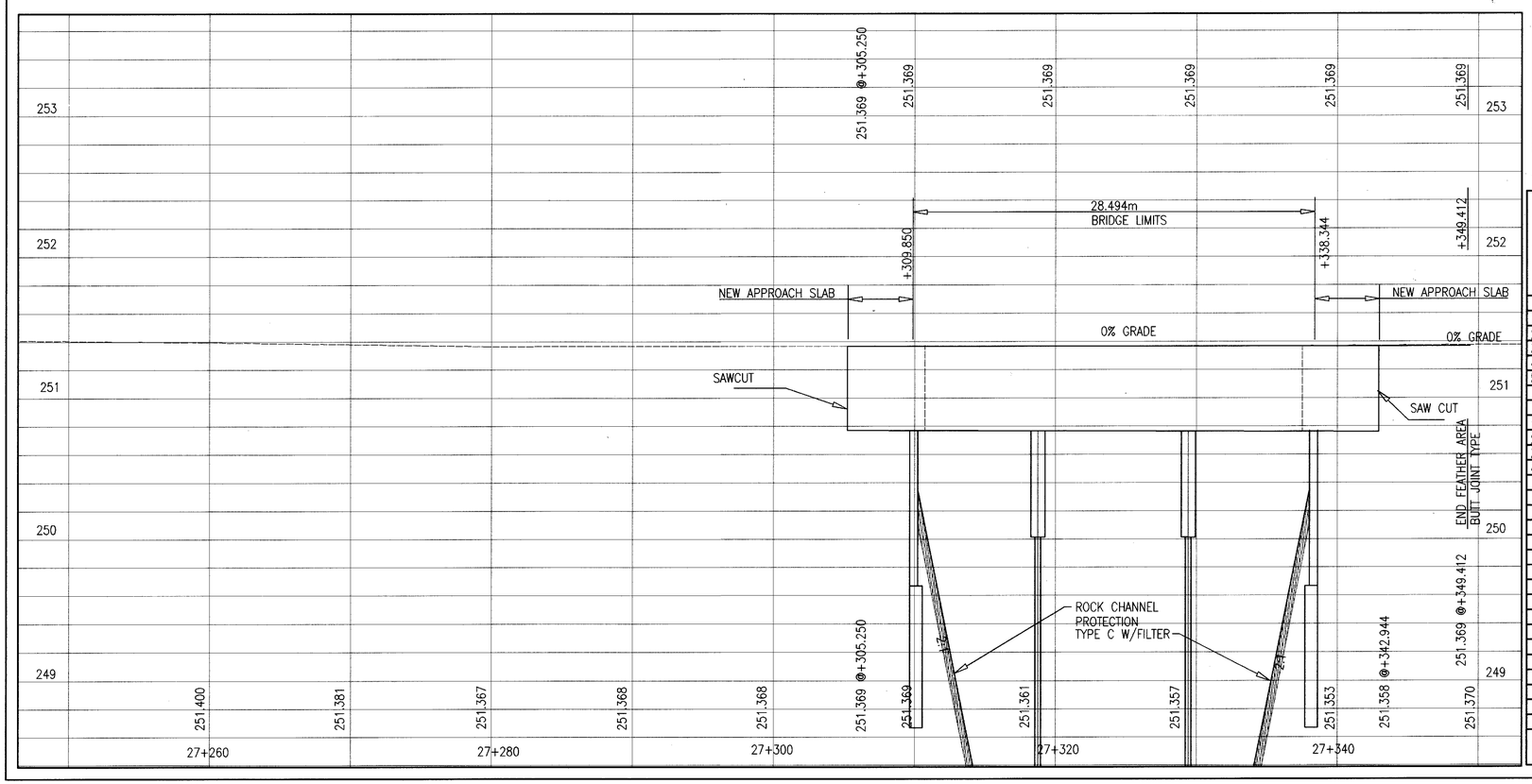
HOL-39-(27305)/(27432)

8
31

D:\JOBS\691\DWGS\691013Z.dwg - MAY 06, 1997 - 14:46:2







LEGEND

ITEM 615 TEMPORARY PAVEMENT, CLASS B (FLEXIBLE) (TO REMAIN)

FEATHER AREA(25mm MIN) ITEM 448 on 407

CALCULATIONS

1-D & 2-D	ITEM 601	0.6x(15.2x5)x1.12	= 51.07 m3
3-R & 4-R	ITEM 202	(4.572x7.3)	= 33.38 m2
5-R	ITEM 254	(8.6x6.468)	= 55.62 m2

EXISTING STRUCTURE	PROPOSED STRUCTURE
TYPE: CONTINUOUS REINFORCED CONCRETE SLAB WITH CAPPED PILE ABUTMENTS AND PIERS.	PROPOSED WORK: NEW CONTINUOUS REINF. CONC. SLAB AND REINF. CONC. CAPPED PILE ABUTMENTS AND PIERS ON EXISTING AND NEW PILES.
SPANS: 8534-10 668-8534 C/C EXISTING BRGS.	TYPE: CONTINUOUS REINF. CONC. SLAB ON CAPPED PILE SUBSTRUCTURES.
ROADWAY: 12 192 F/F OF GUARDRAILS	SPANS: 8723-10 668-8723 C/C BRGS.
LOADING: S-15-46	ROADWAY: 13 200 F/F GUARDRAILS
WEARING SURFACE: BITUMINOUS	LOADING: MS18 AND THE ALTERNATE MILITARY LOADING
SKEW: NONE	WEARING SURFACE: MONOLITHIC CONCRETE
APPROACH SLAB: 4572 LONG	SKEW: NONE
ALIGNMENT: TANGENT	APPROACH SLAB: AS-1-81M (4600 LONG)
STRUCTURE FILE NO. 3800458	ALIGNMENT: TANGENT
BUILT: 1952	CROWN: .016
DISPOSITION: EXISTING SUPERSTRUCTURE, ABUTMENTS AND PIER CAPS TO BE REMOVED.	ADT: 7570 (1995) 12110 (2015)

REF	STATION to STATION	SIDE	202 GUARDRAIL REMOVED	202 PAVEMENT REMOVED	254 PAVEMENT PLANING BITUMINOUS	601 ROCK CHAN PROT TYPE C W/FILTER	606 GUARDRAIL TYPE 5	606 ANCHOR ASSEMBLY TYPE E	606 BRIDGE TERMINAL ASSEMBLY TYPE 4	626 BARRIER DELINEATOR TYPE A
			m	m2	m2	m3	m	EA	EA	EA
1-R	27+285.2 TO 27+348.0	LT	37							
2-R	27+285.8 TO 27+350.0	RT	35.5							
3-R	27+305.43 TO 27+310.00	L&R		33.38						
4-R	27+338.19 TO 27+342.77	L&R		33.38						
5-R	27+342.944 TO 27+349.412	L&R			55.6					
1-GR	27+278.377 TO 27+308.857	LT					15.24	1	1	2
2-GR	27+278.377 TO 27+308.857	RT					15.24	1	1	2
3-GR	27+339.337 TO 27+349.2	LT					11.43		1	1
4-GR	27+339.337 TO 27+350	RT					10.663		1	1
1-D	27+310.2 TO 27+315.2	L&R				51.07				
2-D	27+333.0 TO 27+338.0	L&R				51.07				
	TOTAL		72.5	66.76	55.6	102.14	52.573	2	4	6

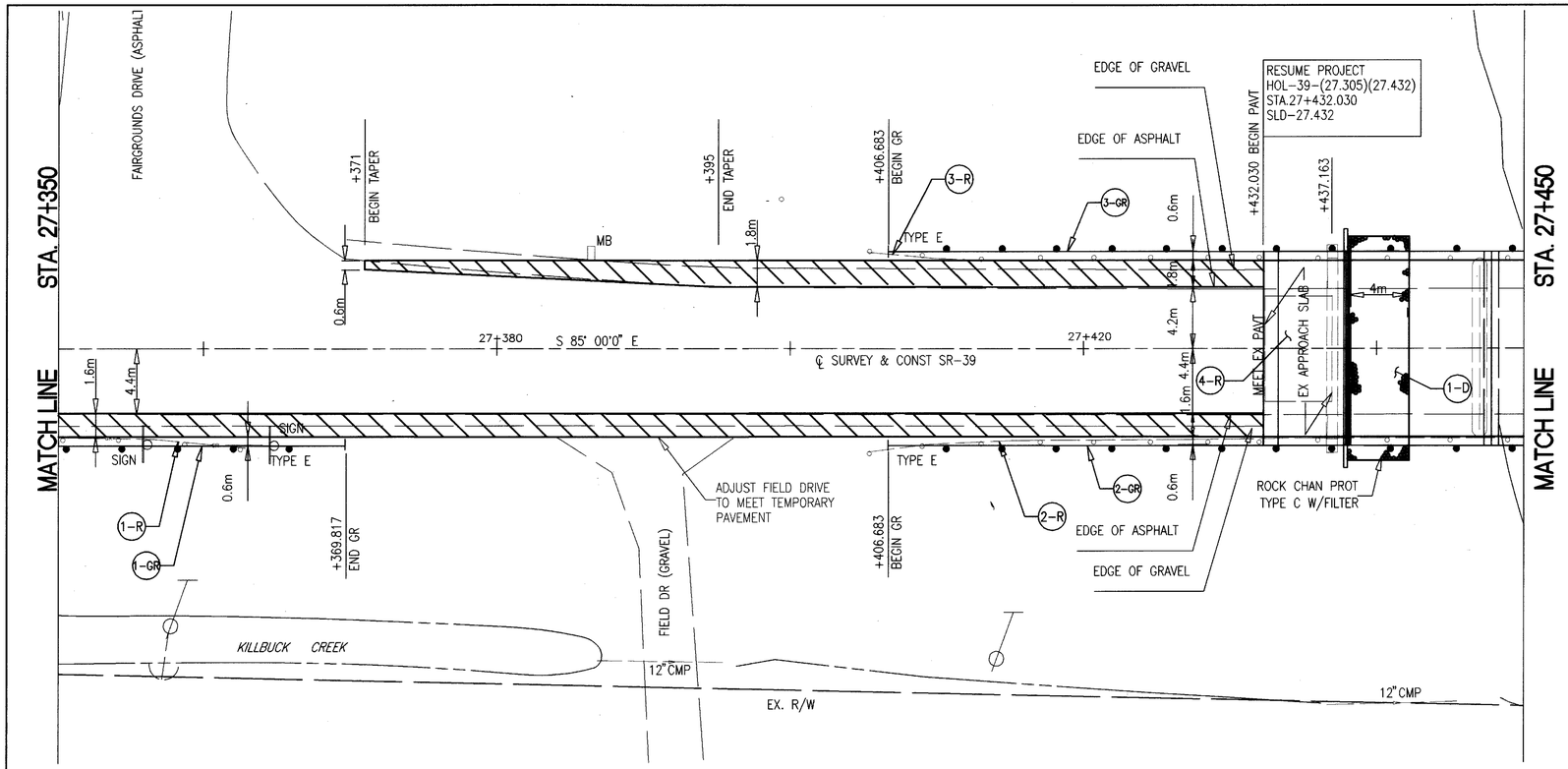
CALCULATED PCB CHECKED ABM

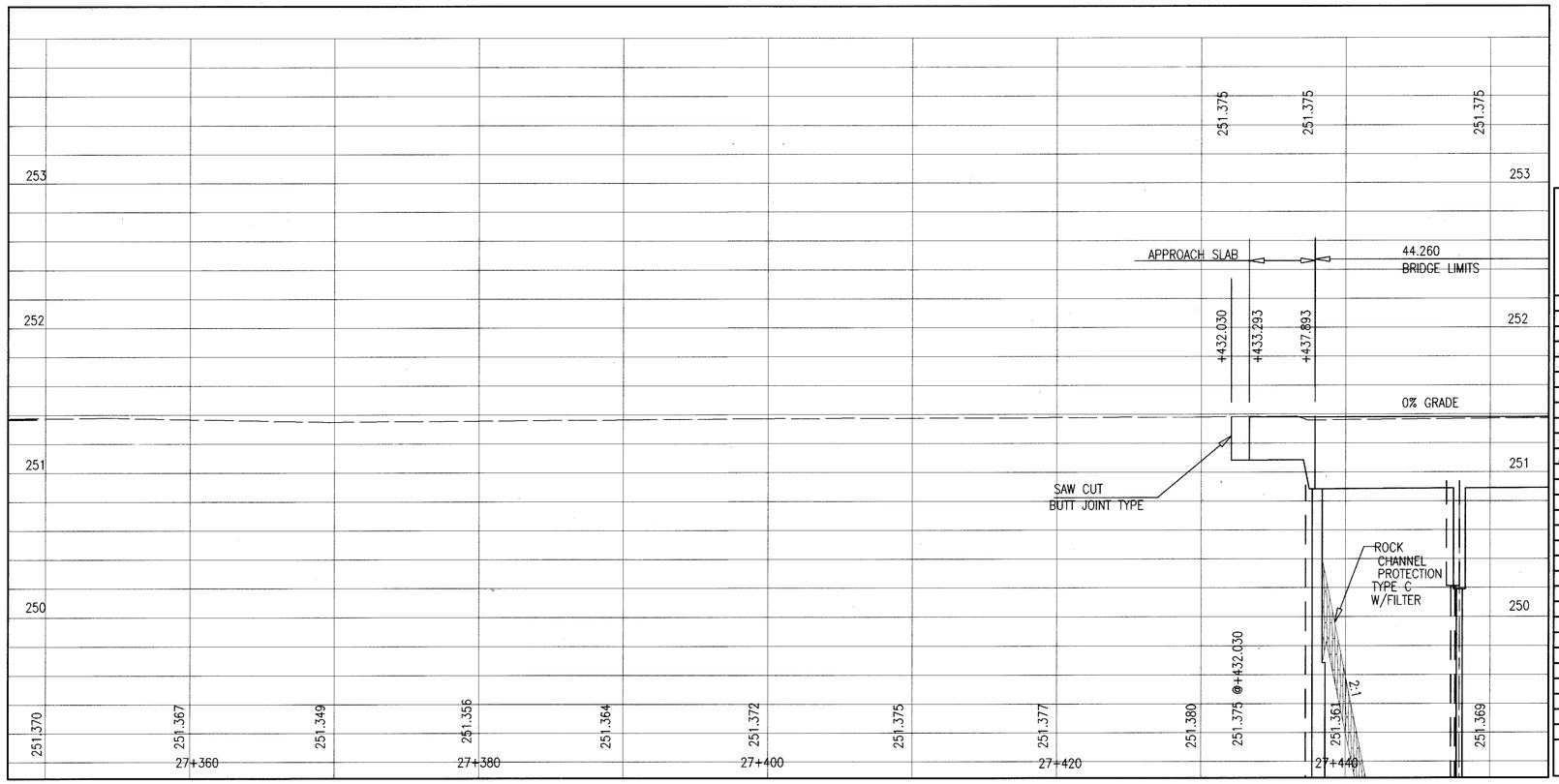
HORIZONTAL SCALE IN METERS 0 5 10

PLAN and PROFILE SHEET
STA 27+250 to STA 27+350

HOL-39-(27.305)(27.432)

9
31





LEGEND

ITEM 615 TEMPORARY PAVEMENT, CLASS B (FLEXIBLE) (TO REMAIN)

CALCULATIONS

1-D ITEM 601 0.6x(15.2x4)x1.12 = 40.86 m3
4-R ITEM 202 (4.572x7.3) = 33.38 m2

EXISTING STRUCTURE	PROPOSED STRUCTURE
TYPE: CONTINUOUS CONCRETE SLAB WITH CAPPED PILE PIERS AND ABUTMENTS.	TYPE: NEW CONTINUOUS CONCRETE SLAB ON REIN-FORCED CONCRETE CAPPED PILE ABUTMENT AND PIERS.
SPANS: 9753.6±-12 192±-12 192±-9753.6± C/C EXIST. BRGS.	SPANS: 9750-12 190-12 190-9750 C/C BRGS.
ROADWAY: 12 192± F/F GUARDRAILS	ROADWAY: 13 200 F/F GUARDRAILS
LOADING: S-15-46	LOADING: MS18 AND THE ALTERNATE MILITARY LOADING
WEARING SURFACE: BITUMINOUS	WEARING SURFACE: MONOLITHIC CONCRETE
SKEW: NONE	SKEW: NONE
APPROACH SLAB: 4572± LONG	APPROACH SLABS: AS-1-81M (4600 mm LONG)
ALIGNMENT: TANGENT	ALIGNMENT: TANGENT
CROWN: .016	CROWN: .016
STRUCTURE FILE NO. 3800482	N 40°33'15" LATITUDE
BUILT: JULY 1952	W 81°55'30" LONGITUDE
DISPOSITION: EXISTING STRUCTURE TO BE REMOVED AS PER CMS 202.	ADT: 7740 (1995) 10830 (2015)

REF	STATION to STATION	SIDE	202 GUARDRAIL REMOVED	202 PAVEMENT REMOVED	601 ROCK CHANNEL PROT TYPE C W/FILTER	606 GUARDRAIL TYPE 5	606 ANCHOR ASSEMBLY TYPE E	626 BRIDGE TERMINAL ASSEMBLY TYPE 4	626 BARRIER REFLECTOR TYPE A
			m	m2	m3	m	EA	EA	EA
1-R	27+350 TO 27+363	RT	13.0						
2-R	27+405.4 TO 27+436.5	RT	31.1						
3-R	27+405.4 TO 27+436.5	LT	31.1						
4-R	27+432.04 TO 27+437.0	L&R		33.38					
1-GR	27+350 TO 27+369.817	RT				4.577	1		1
2-GR	27+406.683 TO 27+437.163	RT				15.24	1	1	2
3-GR	27+406.683 TO 27+437.163	LT				15.24	1	1	2
1-D	27+438.3 TO 27+442.3	L&R			40.9				
	TOTAL		75.2	33.38	40.9	35.057	3	2	5

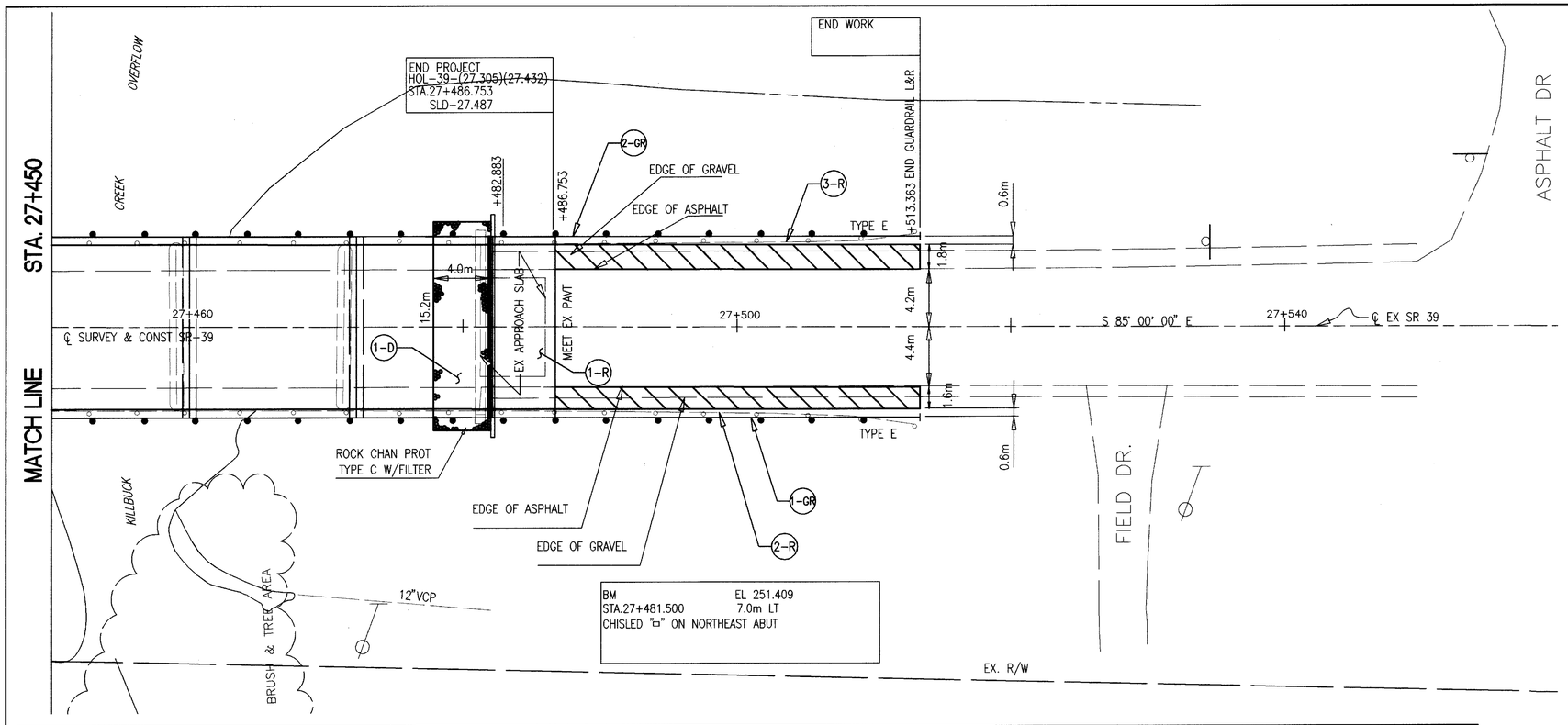
CALCULATED PCB CHECKED BDB

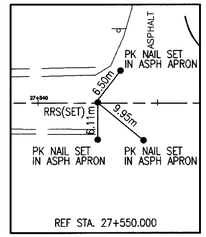
HORIZONTAL SCALE IN METERS 0 5 10

PLAN and PROFILE SHEET
STA 27+350 to STA 27+450

HOL-39-(27.305)(27.432)

10
31



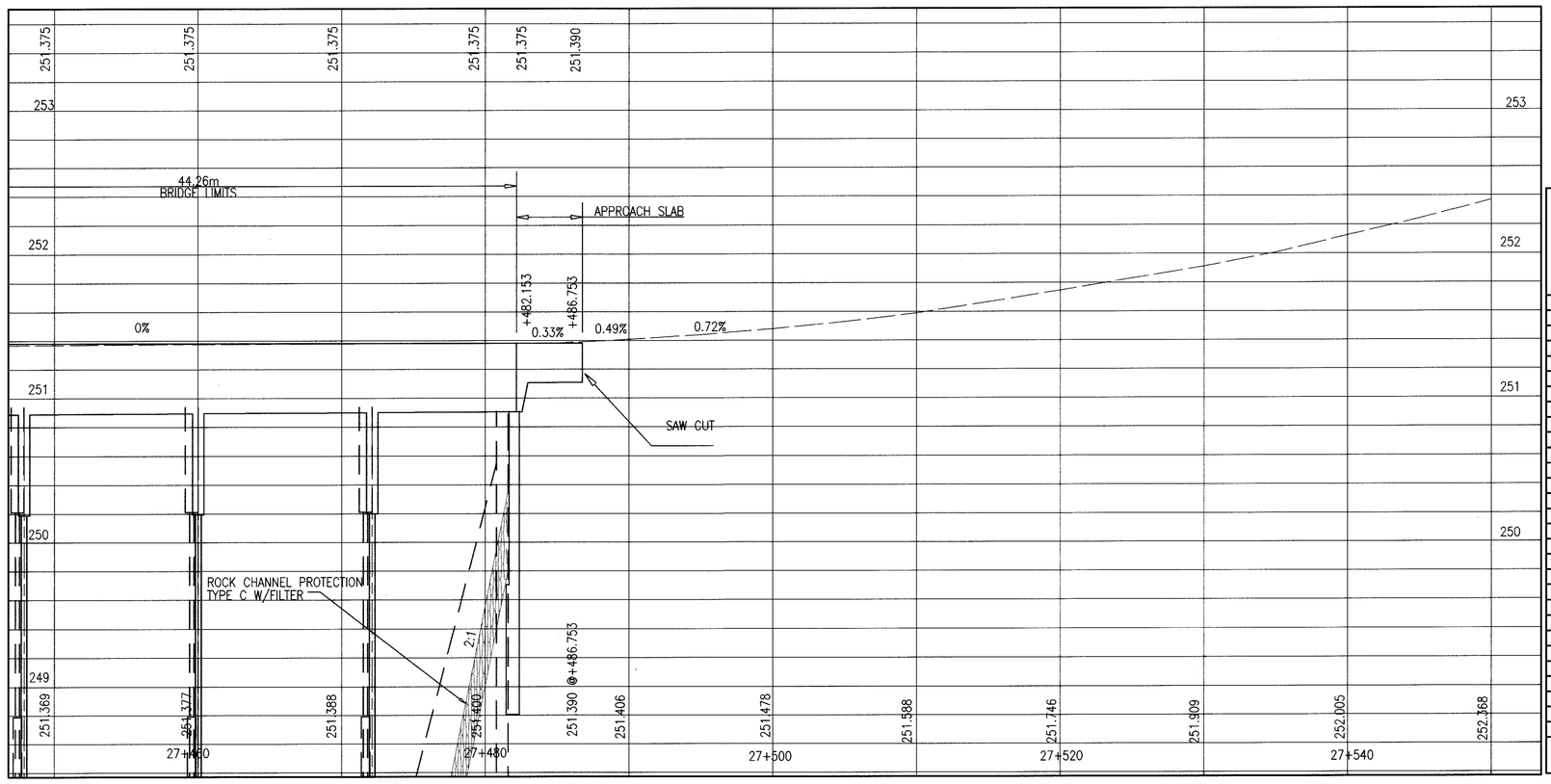


LEGEND

ITEM 615 TEMPORARY PAVEMENT, CLASS B (FLEXIBLE) (TO REMAIN)

CALCULATIONS

1-D ITEM 601 0.6x(15.2x4)x1.12 = 40.86 m3
1-R ITEM 202 (4.572x7.3) = 33.38 m2



REF	STATION to STATION	SIDE	202 GUARDRAIL REMOVED	202 PAVEMENT REMOVED	601 ROCK CHAN PROT TYPE C W/FILTER	606 GUARDRAIL TYPE 5	606 ANCHOR ASSEMBLY TYPE E	606 BRIDGE TERMINAL ASSEMBLY TYPE 4	626 BARRIER DELINEATOR TYPE A
			m	m2	m3	m	EA	EA	EA
1-R	27+481.3 TO 27+485.9	L&R		33.38					
2-R	27+481.6 TO 27+513	RT	31.4						
3-R	27+481.6 TO 27+513	LT	31.4						
1-GR	27+482.883 TO 27+513.363	RT				15.24	1	1	3
2-GR	27+482.883 TO 27+513.363	LT				15.24	1	1	3
1-D	27+477.8 TO 27+481.8	L&R			40.9				
	TOTAL		62.8	33.38	40.9	30.48	2	2	6

CALCULATED PCB
CHECKED BBW

HORIZONTAL SCALE IN METERS
0 5 10

PLAN and PROFILE SHEET
STA 27+400 to STA 27+500

HOL-39-(27.305)(27.432)

11
31

SEEDING END WIDTH	SEEDING m2
1.2	
	83.9
5.0	
	31.5
8.7	
	167.9
1.2	
6.5	11.0
0	

	END AREA CUT	END AREA FILL	VOLUME CUT	VOLUME FILL
+370	0			4.4
AHEAD +347	.38			
BACK +347	.6	0		
			0	2.43
+342.944 AHEAD	0	0.6		
BACK	1.8	0.6		
			7.57	7.5
+338.344 AHEAD	1.49	2.66		
BACK	0	2.66		
			0	3.12
+336 AHEAD	0	0		
			151	
+312 BACK	0	0		
			0	1.41
+309.85 AHEAD	0	1.31		
+309.85 BACK	1.35	1.31		
			6.51	4.71
+305.250 AHEAD	1.48	0.74		
BACK	0	0.74		
			0	22.84
+278.377	0	0.96		1.62
+275	0	0		

CUT UNDER BRIDGE
16(4.6 + 4.8)= 160.4m3

CALCULATED AS

CHECKED PCB

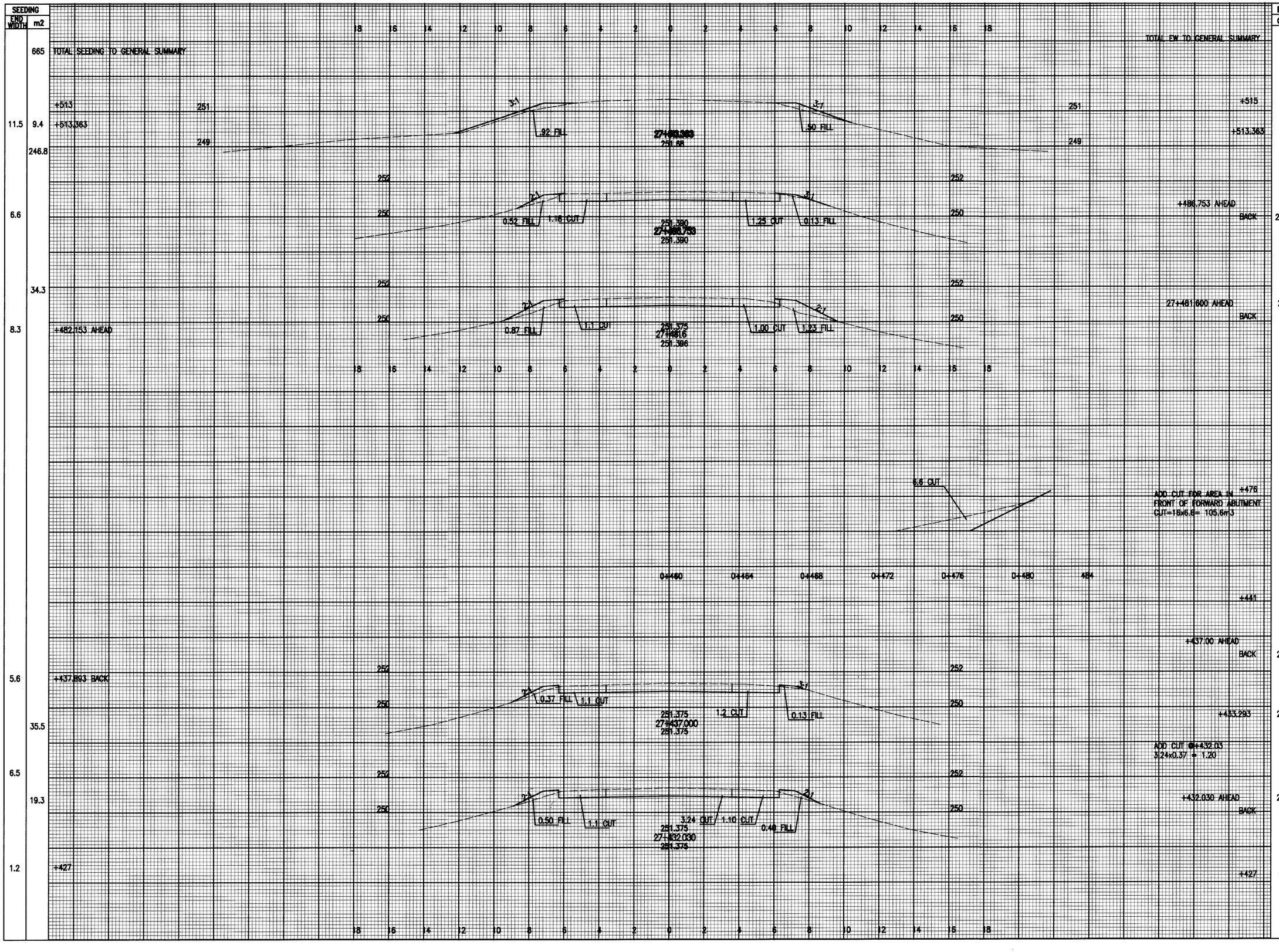
CROSS SECTIONS

STA. 27+305.250 TO STA. 27+342.944

HOL-39-(27.305)(27.432)

12
31

SEEDING END WIDTH	SEEDING m2	
	665	TOTAL SEEDING TO GENERAL SUMMARY
		+513
11.5	9.4	+513.363
	246.8	
6.6		
	34.3	
8.3		+482.153 AHEAD
5.6		+437.893 BACK
	35.5	
6.5		
	19.3	
1.2		+427



	END AREA CUT	END AREA FILL	VOLUME CUT	VOLUME FILL
TOTAL EW TO GENERAL SUMMARY			294	97
+515	0	0		
				1.2
+513.363	0	1.42		
			0	27.5
+486.753 AHEAD	0	0.65		
BACK	2.43	0.65		
			11.67	7.09
27+481.600 AHEAD	2.1	2.1		
BACK	0	2.1		
			0	5.88
+476	0	0		
			105.6	
+441	0	0		
			0	1.09
+437.00 AHEAD	0	0.5		
BACK	2.3	0.5		
			7.51	2.34
+433.293	2.2	0.9		
			2.78	1.14
			1.20	
+432.030 AHEAD	2.2	0.9		
BACK	0	0.9		
			0	2.25
+427	0	0		

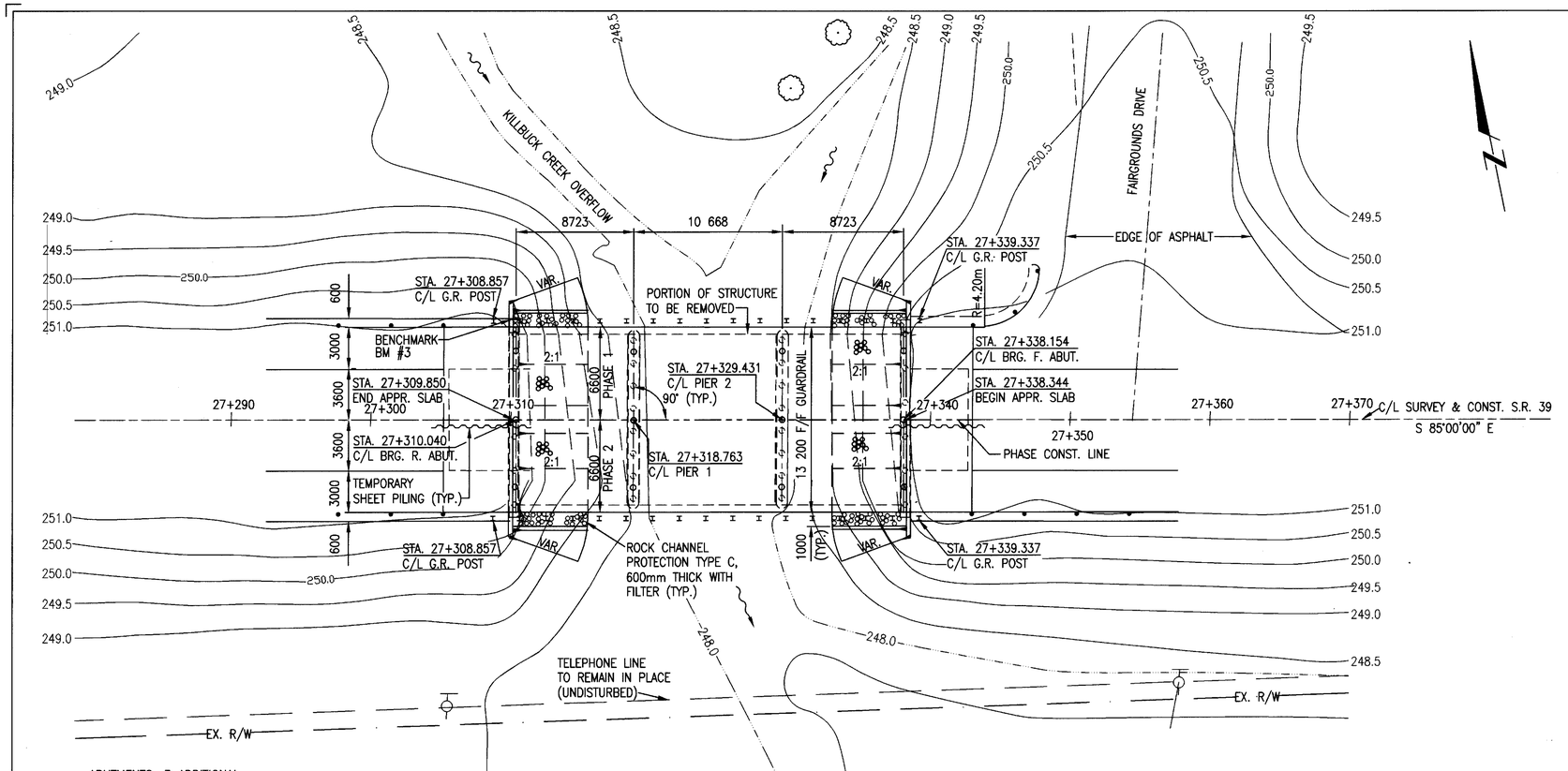
CALCULATED AS

CHECKED PCB

CROSS SECTIONS

STA. 27+432.030 TO STA. 27+486.753

HOL-99-(27305)(27.432)



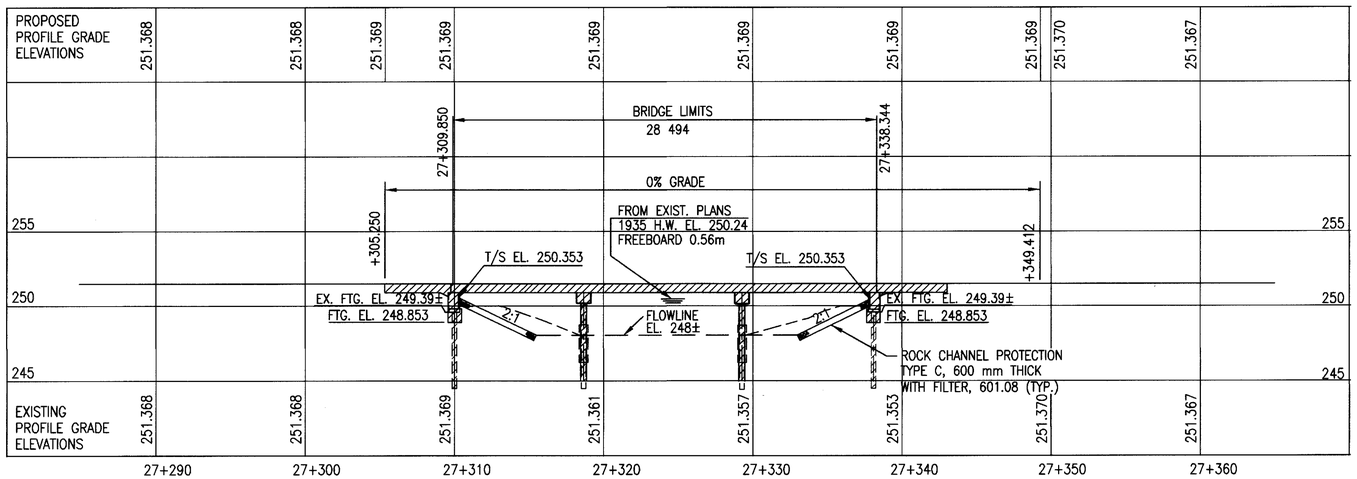
PLAN

ABUTMENTS: 3 ADDITIONAL
400 mm ø CAST-IN-PLACE REINFORCED CONCRETE PILES
ESTIMATED AVERAGE PAY LENGTH 14 METERS AND EXISTING PILES.

PIERS: 3 ADDITIONAL
400 mm ø CAST-IN-PLACE REINFORCED CONCRETE PILES
ESTIMATED AVERAGE PAY LENGTH 17 METERS AND EXISTING PILES.

EARTHWORK LIMITS SHOWN ARE
APPROXIMATE. ACTUAL SLOPES SHALL
CONFORM TO PLAN CROSS-SECTIONS.

NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. STATIONS AND ELEVATIONS ARE IN METERS.



PROFILE ALONG C/L SURVEY & CONST. S.R. 39

LEGEND
R/W = RIGHT OF WAY
APPR. = APPROACH
BRG. = BEARING
G.R. = GUARDRAIL
F.ABUT. = FORWARD ABUTMENT
R. ABUT. = REAR ABUTMENT
H.W. = HIGH WATER
T/S = TOP OF SLOPE
F/F = FACE TO FACE
C/C = CENTER TO CENTER

STRUCTURE PLANS REVIEWED
BY URS CONSULTANTS,
CBP&BKL DATE 3/17/98

BENCH MARK
B.M. #3 EL. 251.414
CHISELED "□" ON N.W. ABUTMENT
STA. 27+310.0 7.0m LT.

metric units

EXISTING STRUCTURE

TYPE: CONTINUOUS REINFORCED CONCRETE SLAB WITH CAPPED PILE ABUTMENTS AND PIERS.
SPANS: 8534-10 668-8534 C/C EXISTING BRGS.
ROADWAY: 12 192 F/F OF GUARDRAILS
LOADING: S-15-46
WEARING SURFACE: BITUMINOUS
SKEW: NONE
APPROACH SLAB: 4572 LONG
ALIGNMENT: TANGENT
STRUCTURE FILE NO. 3800458
BUILT: 1952
DISPOSITION: EXISTING SUPERSTRUCTURE, ABUTMENTS AND PIER CAPS TO BE REMOVED.

PROPOSED STRUCTURE

PROPOSED WORK: PART WIDTH CONSTRUCTION OF NEW CONTINUOUS REINFORCED CONCRETE SLAB AND REINF. CONC. CAPPED PILE ABUTMENTS AND PIERS ON EXISTING AND NEW PILES.
TYPE: CONTINUOUS REINF. CONC. SLAB ON CAPPED PILE SUBSTRUCTURES.
SPANS: 8723-10 668-8723 C/C BRGS.
ROADWAY: 13 200 F/F GUARDRAILS
LOADING: MS18 AND THE ALTERNATE MILITARY LOADING
WEARING SURFACE: MONOLITHIC CONCRETE
SKEW: NONE
APPROACH SLAB: AS-1-81M (4600 LONG)
ALIGNMENT: TANGENT
CROWN: .016
ADT: 7570 (1995) 12110 (2015)
N 40°33'15" LAT. W 81°55'30" LONG.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN MK | REVIEWED JM | DATE 6-6-97
CHECKED BCJ | REVISED | STRUCTURE FILE NUMBER 3800474

HOLMES COUNTY
STA. 27+309.850
STA. 27+338.344

SITE PLAN
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

1 / 9
14
31

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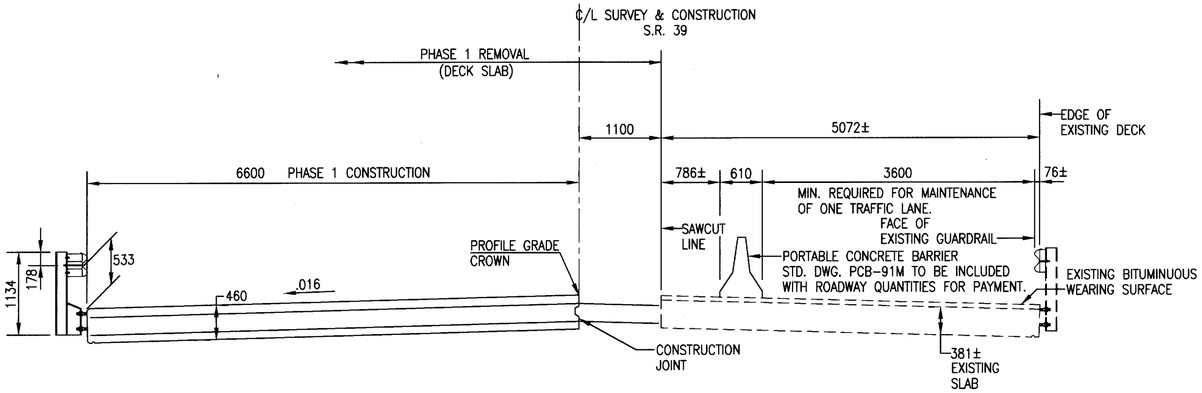
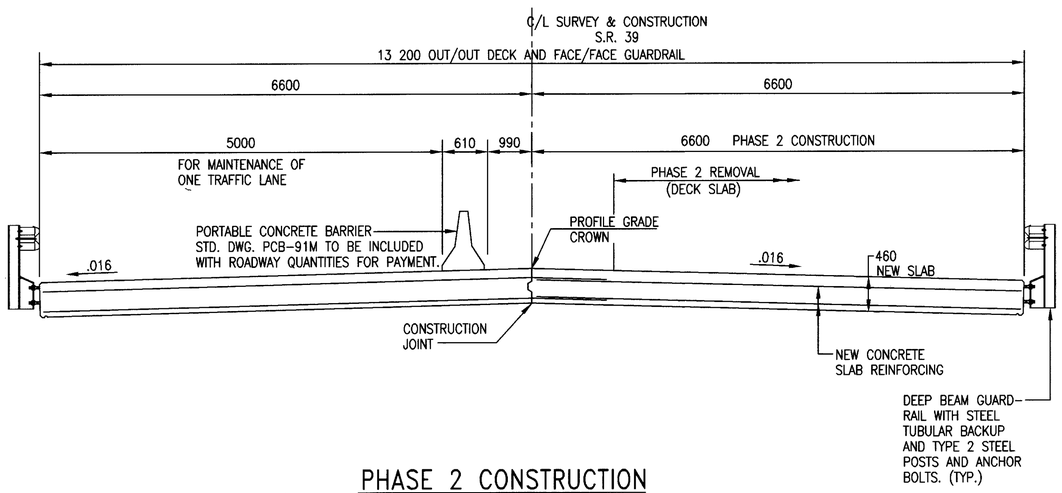
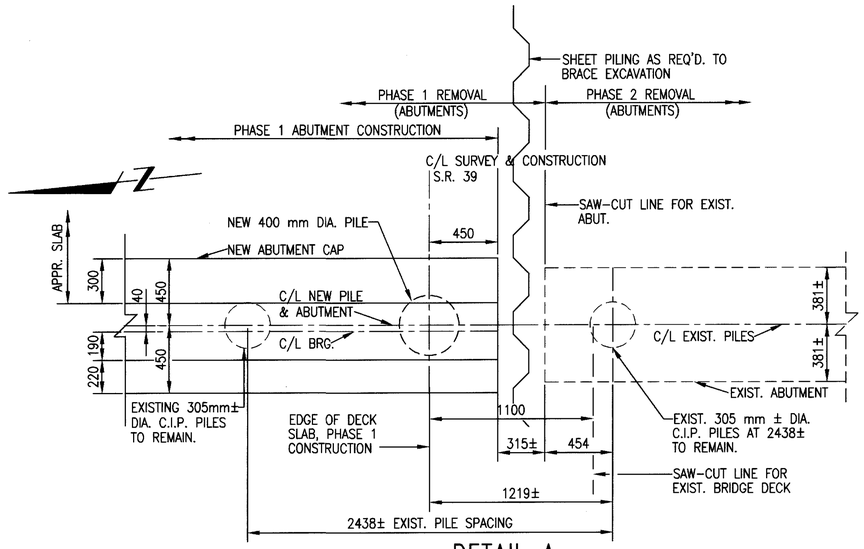


SEE ROADWAY PLANS FOR MAINTENANCE OF TRAFFIC PLANS
SHEETS 4, 5 AND 6/31

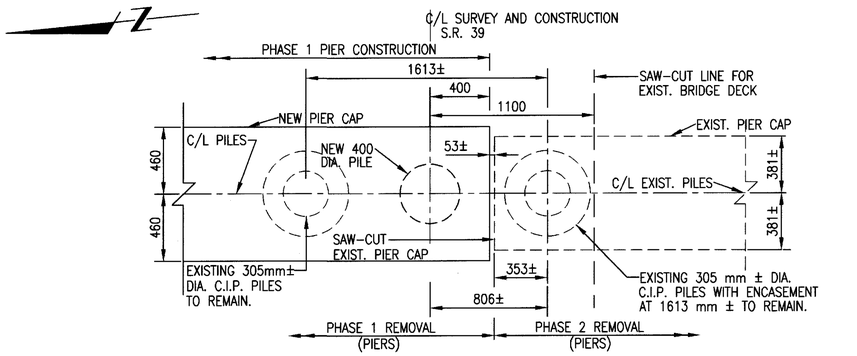
PHASE 1 CONSTRUCTION



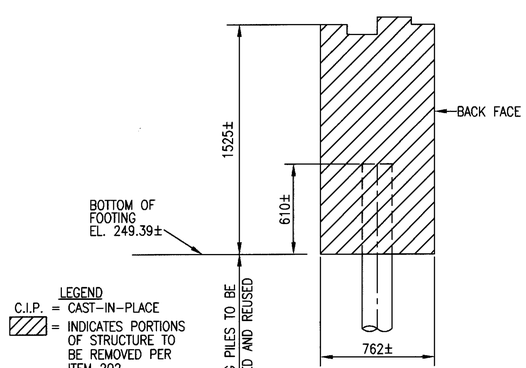
PHASE 2 CONSTRUCTION



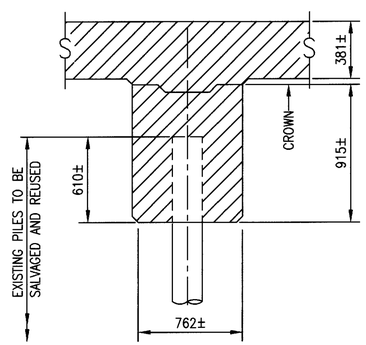
DETAIL A
PROPOSED & EXISTING ABUTMENTS DURING PHASE CONSTRUCTION



DETAIL B
PROPOSED & EXISTING PIERS DURING PHASE CONSTRUCTION



DETAIL C
EXISTING ABUTMENT REMOVAL



DETAIL D
EXISTING PIER REMOVAL

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	TLK	SM	5-6-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DBT		3800474	

PHASE CONSTRUCTION DETAILS
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

2 / 9

15
31

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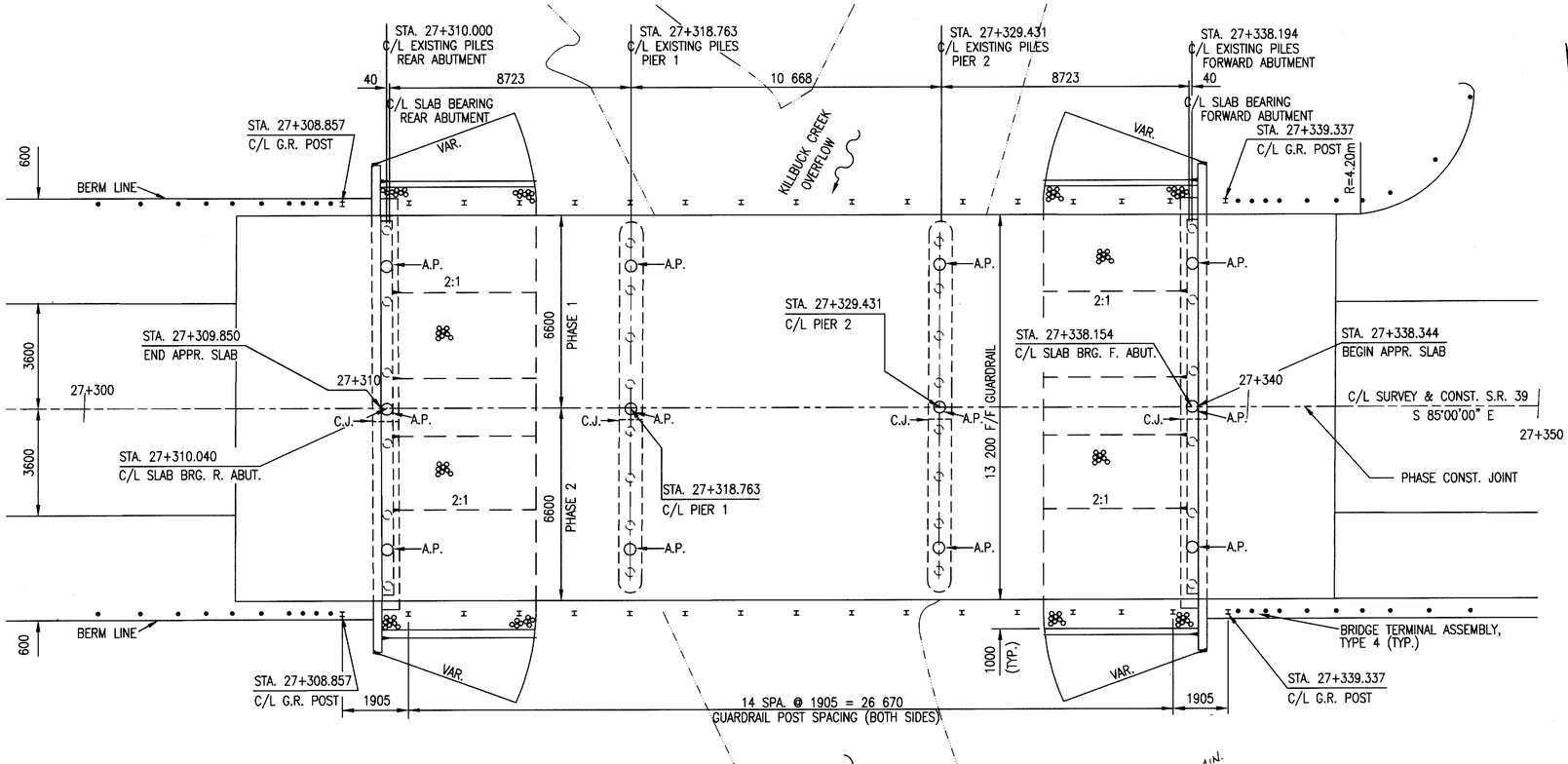
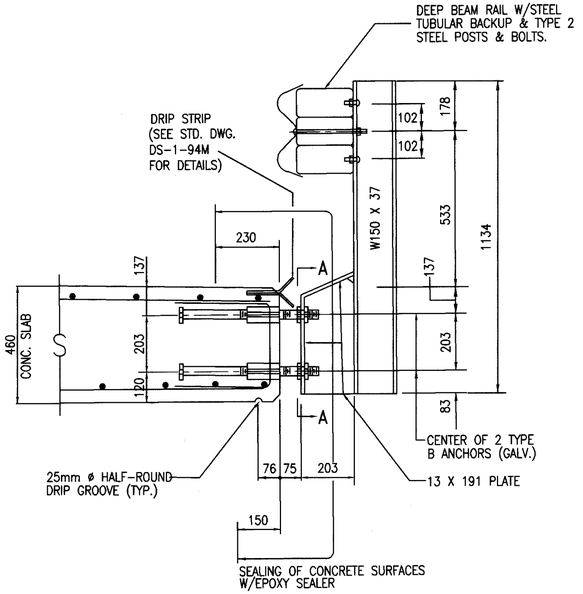
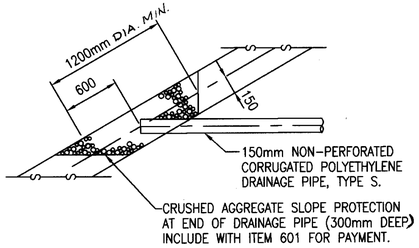


PLAN



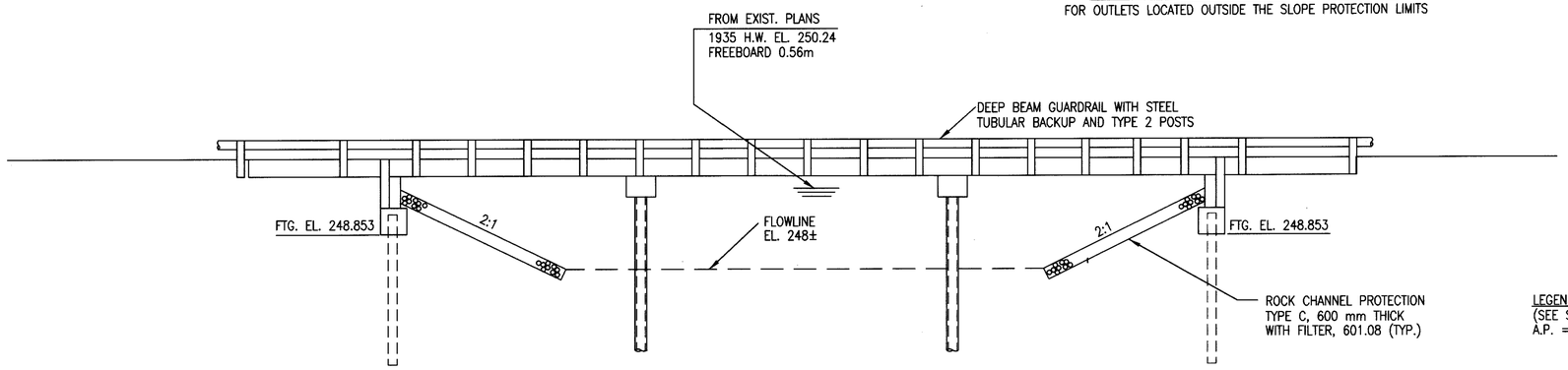
TYP. GUARDRAIL CONNECTION

TYPE 2 SEE STD. DWG. DBR-2-73M FOR INFO NOT SHOWN



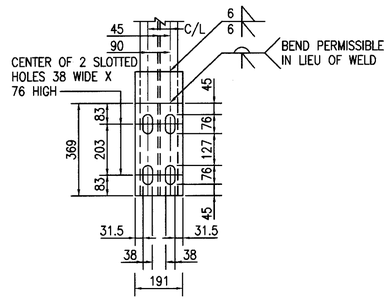
DRAIN PIPE OUTLET DETAIL

FOR OUTLETS LOCATED OUTSIDE THE SLOPE PROTECTION LIMITS



ELEVATION

LEGEND
(SEE SHT. 1/9)
A.P. = ADDED PILE



SECTION A-A

STAINLESS STEEL DRIP STRIP: PRIOR TO THE CONCRETE DECK PLACEMENT A BENT DRIP STRIP SHALL BE INSTALLED ALONG THE EDGES OF THE DECK BY ANCHORING TO THE TOP LAYER OF REINFORCING STEEL AND BEING BUTTED, WITH A 90 DEGREE BEND, AGAINST THE FORMWORK. AN ADDITIONAL 300mm LONG DRIP STRIP SHALL ALSO BE INSTALLED CENTERED ON EACH POST.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DATE 9-15-97
REVIEWED SM
STRUCTURE FILE NUMBER 3800474
DRAWN MK
REVISED
DESIGNED GAB
CHECKED BSM

GENERAL PLAN
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

3 / 9

16
31

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672GP02P 3-4-98 MK

GENERAL NOTES

REFERENCE SHALL BE MADE TO STANDARD DRAWINGS:

AS-1-81M ----- DATED ------- 10-25-94
CPA-5-94M ---- DATED ------- 10-25-94
CS-1-93M ----- REVISED ------ 6-30-95
DBR-2-73M ---- REVISED ------ 8-18-95
DS-1-94M ----- DATED ------- 12-15-94
PCB-91M ------- DATED ------- 3-20-95

AND TO SUPPLEMENTAL SPECIFICATIONS:
844 ---------- DATED ------- 9-9-97
954 ---------- DATED ------- 9-9-97
911 ---------- DATED ------- 7-10-97

DESIGN SPECIFICATIONS: THIS STRUCTURE CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996, AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN LOADING: MS-18 AND THE ALTERNATE MILITARY LOADING.
2.87 KN/m² FUTURE WEARING SURFACE

DESIGN DATA:
HIGH PERFORMANCE CONCRETE - COMPRESSIVE STRENGTH 31.0 MPa (SUPERSTRUCTURE)
HIGH PERFORMANCE CONCRETE - COMPRESSIVE STRENGTH 31.0 MPa (SUBSTRUCTURE)
REINFORCING STEEL - ASTM A615M, A616M OR A617M GRADE 400 MINIMUM YIELD STRENGTH 400 MPa
SPIRAL REINFORCEMENT MAY BE PLAIN BARS, ASTM A82M OR A615M

DECK PROTECTION METHOD: EPOXY COATED REINFORCING STEEL, 65mm CONCRETE COVER, STEEL DRIP STRIP, EPOXY SEALER.

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 25 mm THICK.

PORTIONS OF STRUCTURE REMOVED, AS PER PLAN SHALL INCLUDE THE EXISTING SUPERSTRUCTURE, ABUTMENTS, PIERS AND PORTIONS OF THE EXISTING PILES. ITEMS TO BE REMOVED INCLUDE ALL EXISTING MATERIALS BEING REPLACED BY NEW CONSTRUCTION AND MISCELLANEOUS ITEMS THAT ARE NOT SHOWN TO BE INCORPORATED INTO THE FINAL CONSTRUCTION AND ARE DIRECTED TO BE REMOVED BY THE ENGINEER. THE USE OF EXPLOSIVES, HEADACHE BALL AND\OR HOE-RAMS WILL NOT BE PERMITTED. ALL WORK SHALL BE DONE IN A MANNER THAT WILL NOT CUT, ELONGATE OR DAMAGE THE EXISTING CAST-IN-PLACE REINFORCED CONCRETE PILES TO BE PRESERVED. CHIPPING HAMMERS SHALL NOT BE HEAVIER THAN THE NOMINAL 41 KILOGRAM CLASS. PNEUMATIC HAMMERS SHALL NOT BE PLACED IN DIRECT CONTACT WITH REINFORCED CONCRETE PILES THAT ARE TO BE RETAINED IN THE REBUILT STRUCTURE.

PROTECTION OF TRAFFIC: PRIOR TO DEMOLITION OF ANY PORTIONS OF THE EXISTING SUPER-STRUCTURE, THE CONTRACTOR SHALL SUBMIT HIS PLANS FOR THE PROTECTION OF TRAFFIC ADJACENT TO THE STRUCTURE TO THE DIRECTOR FOR APPROVAL. THESE PLANS SHALL INCLUDE PROVISIONS FOR ANY DEVICES AND STRUCTURES THAT MAY BE NECESSARY TO ENSURE SUCH PROTECTION.

PAYMENT: THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE BID, WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK IN CONFORMANCE WITH THESE REQUIREMENTS, WITH PERTINENT PROVISIONS OF 202, AND TO THE SATISFACTION OF THE ENGINEER.

PILE DESIGN LOADS (ULTIMATE BEARING VALUE): THE ULTIMATE BEARING VALUE IS 838 kN PER PILE FOR THE 400 mm ABUTMENT PILES. THE ULTIMATE BEARING VALUE IS 1166 kN PER PILE FOR THE 400 mm PIER PILES.

ABUTMENT PILES:
6 PILES 14 METERS LONG ESTIMATED LENGTH
6 PILES OF ORDER LENGTH 15.5 METERS LONG
3 SPLICES

PIER PILES:
6 PILES 17 METERS LONG ESTIMATED LENGTH
6 PILES OF ORDER LENGTH 18 METERS LONG
3 SPLICES

ITEM 507 400mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, FURNISHED, AS PER PLAN,
PILE WALL THICKNESS: THE RESPONSIBILITY OF CHOOSING AND PROVIDING A SATISFACTORY PILE WALL THICKNESS FOR THIS PROJECT SHALL BE BORNE BY THE CONTRACTOR EXCEPT THAT THE PILE WALL THICKNESS SHALL NOT BE LESS THAN 6.0 mm. IF A PILE WALL THICKNESS GREATER THAN 6.0 mm IS NECESSARY TO RESIST THE PILE INSTALLATION DRIVING STRESS, THE CONTRACTOR SHALL MAKE THIS DETERMINATION AND SHALL FURNISH A PILE WITH AN ACCEPTABLE WALL THICKNESS. IF MONOTUBE PILES ARE USED, THE MINIMUM WALL THICKNESS SHALL BE 4.5 mm

ITEM 507 400mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, DRIVEN, AS PER PLAN,
PILE HAMMER: THE PILE HAMMER USED TO INSTALL THE 400mm PILES SHALL HAVE A STATE'S ENERGY RATING OF NOT LESS THAN 27000 JOULES. THIS REQUIREMENT DOES NOT RELIEVE THE CONTRACTOR FROM 108.05 WHICH STATES THAT THE CONTRACTOR IS TO PROVIDE SUFFICIENT EQUIPMENT FOR PROSECUTING THE REQUIRED WORK. REFER TO "ODOT'S MANUAL OF PROCEDURES FOR STRUCTURES" TO OBTAIN THE STATE'S ENERGY RATING.

PILE DRIVING CRITERIA: PILES SHALL BE DRIVEN TO THE PLAN ESTIMATED PAY LENGTH. IF PILE PENETRATION BECOMES DIFFICULT TO ACHIEVE, PILE DRIVING CAN BE TERMINATED AT AN ULTIMATE LOAD RESISTANCE OF 890 kN.

EXISTING PILING VERIFICATION: DETAILS AND DIMENSIONS SHOWN ON THESE PLANS PERTAINING TO THE EXISTING PILES HAVE BEEN OBTAINED FROM PLANS OF THE EXISTING STRUCTURE. CONSEQUENTLY, THEY ARE INDICATIVE OF THE EXISTING PILING AND THE PROPOSED WORK BUT THEY SHALL BE CONSIDERED TENTATIVE AND APPROXIMATE. THE CONTRACTOR IS REFERRED TO CMS SECTIONS 102.05 AND 105.02

CONTRACT BID PRICES SHALL BE BASED UPON A RECOGNITION OF THE UNCERTAINTIES DESCRIBED ABOVE AND UPON A PREBID EXAMINATION OF THE EXISTING PILES BY THE CONTRACTOR. HOWEVER, ALL PROJECT WORK SHALL BE BASED UPON ACTUAL DETAILS AND DIMENSIONS WHICH HAVE BEEN VERIFIED BY THE CONTRACTOR IN THE FIELD.

CALCULATED BY: CAB DATE: 6-97
CHECKED BY: BTJ DATE: 9-97

ESTIMATED QUANTITIES

ITEM	ITEM EXT.	TOTAL	UNIT	DESCRIPTIONS	SUPER	ABUT.	PIERS	GEN'L	AS PER PLAN REF. DWG. NO.
202	11203	LUMP		PORTIONS OF STRUCTURE REMOVED, OVER 6 METER SPAN, AS PER PLAN				LUMP	17
503	11100	LUMP		COFFERDAMS, CRIBS AND SHEETING				LUMP	
503	21300	LUMP		UNCLASSIFIED EXCAVATION		LUMP			
505	11100	LUMP		PILE DRIVING EQUIPMENT MOBILIZATION				LUMP	
507	00701	201	METER	400 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, DRIVEN, AS PER PLAN		93	108		17
507	00751	201	METER	400 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, FURNISHED, AS PER PLAN		93	108		17
507	50500	6	EACH	STEEL PILE SPLICES		3	3		
SPECIAL	50771200	48	METER	PILE ENCASEMENT			48		
512	44400	4	SQ. METER	TYPE B WATERPROOFING		4			
SPECIAL	51267502	75	SQ. METER	SEALING OF CONCRETE SURFACES (EPOXY)	48	20	7		
517	72300	60.96	METER	RAILING (DEEP BEAM RAIL WITH STEEL TUBULAR BACKUP AND TYPE 2 STEEL POSTS AND ANCHOR BOLTS)*	60.96				
518	21230	LUMP		POROUS BACKFILL WITH FILTER FABRIC		LUMP			
SPECIAL	51822300	66	METER	STEEL DRIP STRIP	66				
518	40000	34	METER	150 mm PERFORATED CORRUGATED PLASTIC PIPE, 707.33		34			
518	40010	14	METER	150 mm NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS, 707.33		14			
844	48000	193.7	CU METER	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (DECK)	175.3		18.4		
844	48040	43.4	CU METER	HIGH PERFORMANCE CONCRETE, SUBSTRUCTURE		43.4			
844	49000	LUMP		HIGH PERFORMANCE CONCRETE, TRIAL MIX				LUMP	
844	49010	LUMP		HIGH PERFORMANCE CONCRETE, TESTING				LUMP	

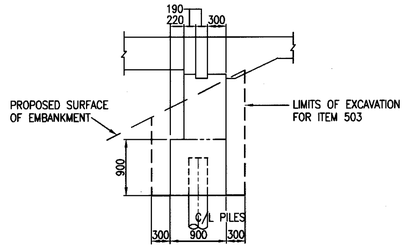
* DENOTES SEE PROPOSAL NOTES

ITEM SPECIAL 507 71200 PILE ENCASEMENT: THE EXISTING PIER PILES SHALL BE ENCASED PER SECTION C-C, SHT. 7/9 WITH CLASS S CONCRETE PER 507.06. LENGTH OF ENCASEMENT SHALL BE FROM BOTTOM OF PIER CAP TO 1000mm BELOW THE EXISTING GROUND SURFACE.

PROPOSED WORK:

PROPOSED SEQUENCE OF WORK (THE FOLLOWING NOTES REFER TO SHEET 2/9 PHASE CONSTRUCTION DETAILS.)

1. SET PORTABLE CONCRETE BARRIER AS SHOWN IN PHASE 1 OF PHASE CONSTRUCTION DETAILS AND INSTALL ALL OTHER NECESSARY TRAFFIC DEVICES TO MAINTAIN A SINGLE TRAFFIC LANE ON THE BRIDGE.
2. SAW-CUT EXISTING BRIDGE DECK AT LOCATION INDICATED IN DETAILS A AND B.
3. DEMOLISH NORTH SIDE OF THE EXISTING BRIDGE DECK PER ITEM 202.
4. INSTALL SHEET PILING AT ABUTMENTS BEFORE EXCAVATION BEGINS.
5. CUT EXISTING ABUTMENTS, PIER CAPS AND APPROACH SLABS AT LOCATION SHOWN ON DETAILS A AND B OF PHASE CONSTRUCTION DETAILS.
6. DEMOLISH NORTH SIDE OF EXISTING ABUTMENTS, PIER CAPS AND APPROACH SLABS. EXISTING PILES ARE TO REMAIN PER DETAILS C AND D.
7. EXCAVATE AS REQUIRED FOR CONSTRUCTION OF NEW PHASE 1 ABUTMENTS AND APPROACH SLABS.
8. DRIVE NEW PHASE 1 PILES.
9. CONSTRUCT PHASE 1 OF PROPOSED BRIDGE.
10. MOVE PORTABLE BARRIER TO PHASE 1 SIDE OF BRIDGE PER PHASE CON-STRUCTION DETAILS.
11. DEMOLISH REMAINING PORTION OF EXISTING BRIDGE PER ITEM 202 INCLUDING ABUTMENTS, PIER CAPS AND APPROACH SLABS. EXISTING PILES ARE TO REMAIN PER DETAILS C AND D.
12. DRIVE NEW PHASE 2 PILES.
13. CONSTRUCT PHASE 2 PORTION OF PROPOSED BRIDGE.
14. REMOVE PORTABLE CONCRETE BARRIER.



EXCAVATION DIAGRAM
SEE CMS 503.11 FOR ADDITIONAL DETAIL.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
2700 E. GRANVILLE RD.
COLUMBUS, OHIO 43231

DATE 9-15-97
REVIEWED JH
STRUCTURE FILE NUMBER 3800474
DRAWN MJK
REVISED
DESIGNED CAB
CHECKED BTJ

GENERAL NOTES AND ESTIMATED QUANTITIES
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.492)

4 / 9

17
31

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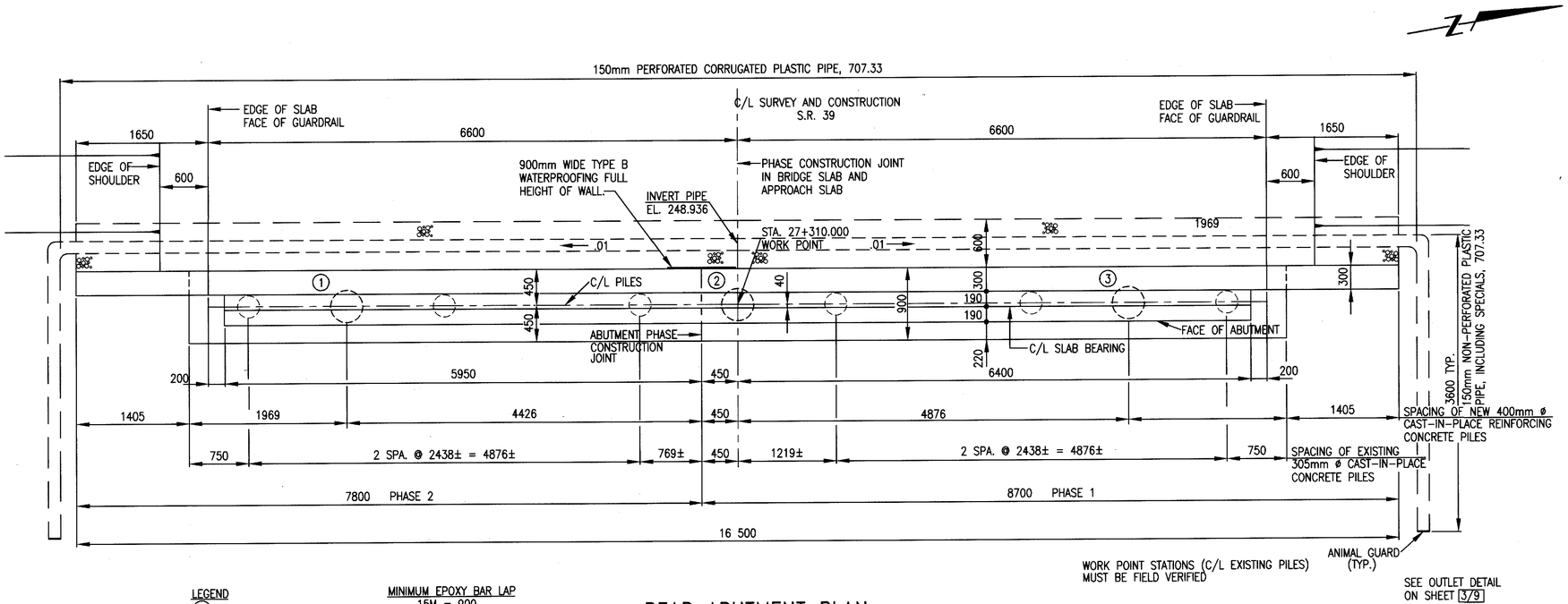
672GNRD MK 3-3-98

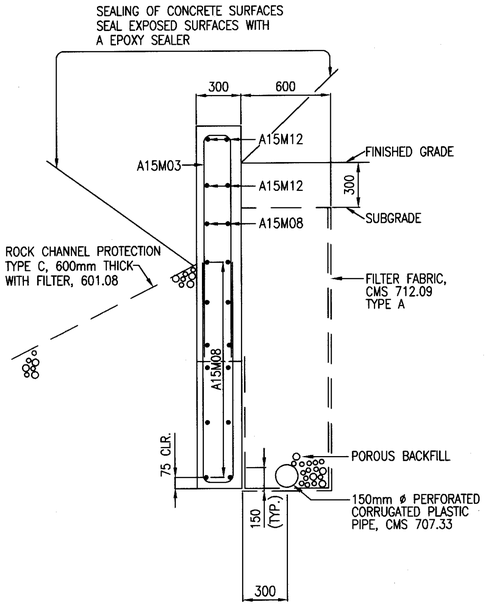


LEGEND
(NO) = PILE NUMBER
BRG. = BEARING
SPA. = SPACES

MINIMUM EPOXY BAR LAP
15M = 900
25M = 1800
30M = 2800

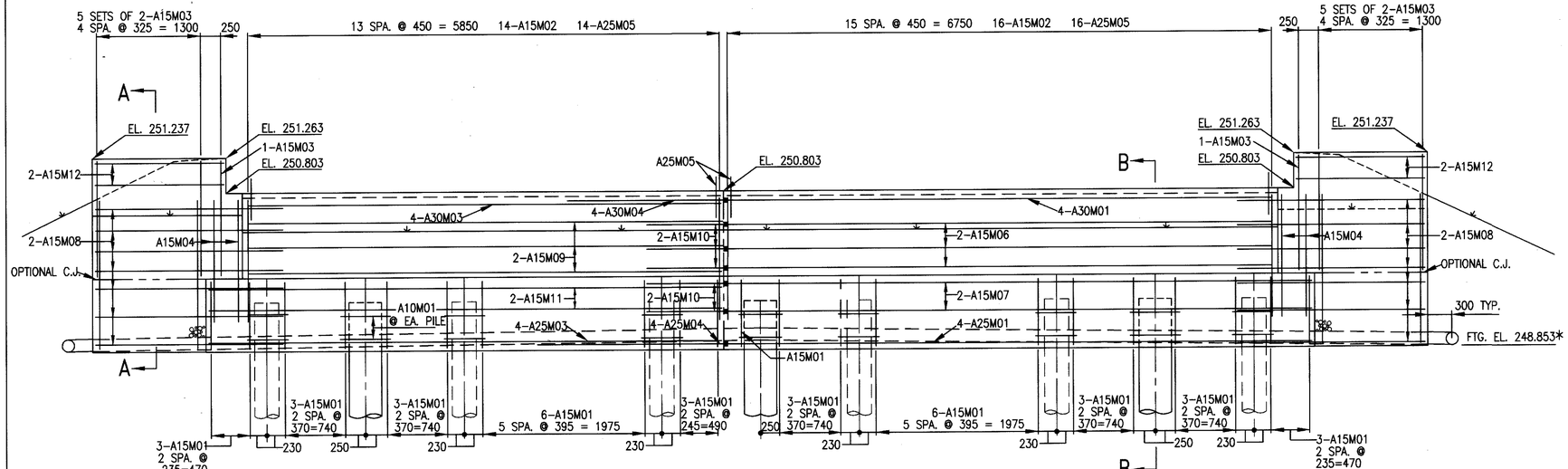
REAR ABUTMENT PLAN

FOR ADDITIONAL PILE DATA SEE GENERAL NOTES AND ESTIMATED QUANTITIES, SEE SHEET 4/9



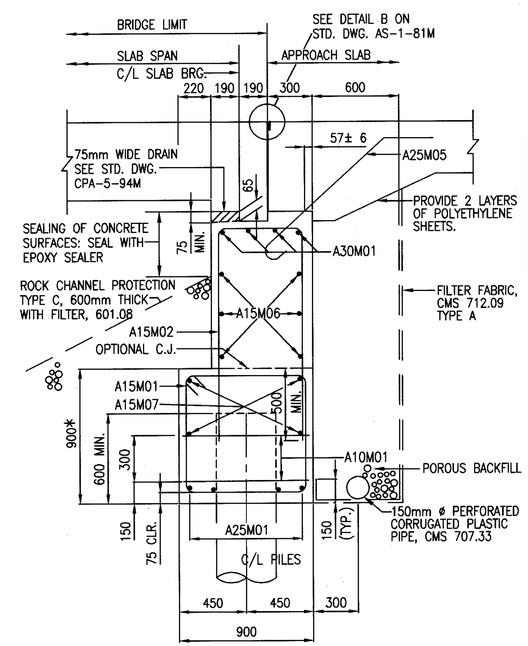
SECTION A-A

POROUS BACKFILL WITH FILTER FABRIC,
600mm THICK SHALL EXTEND UP TO THE PLANE OF THE SUBGRADE, TO 300 mm BELOW THE EMBANKMENT SURFACE, AND LATERALLY TO THE ENDS OF THE WINGWALLS.



REAR ELEVATION

NOTE: EXISTING PILES ARE DASHED.



*=DENOTES DIMENSION OR ELEVATION SHOWN MAY HAVE TO BE ADJUSTED TO INSURE THE PROPOSED AND REMAINING EXISTING PILES EXTEND A MINIMUM OF 600mm INTO PROPOSED FOOTING.

SECTION B-B

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MJR	JA	9-15-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DLH		38000474	

REAR ABUTMENT
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

5 / 9

18
31

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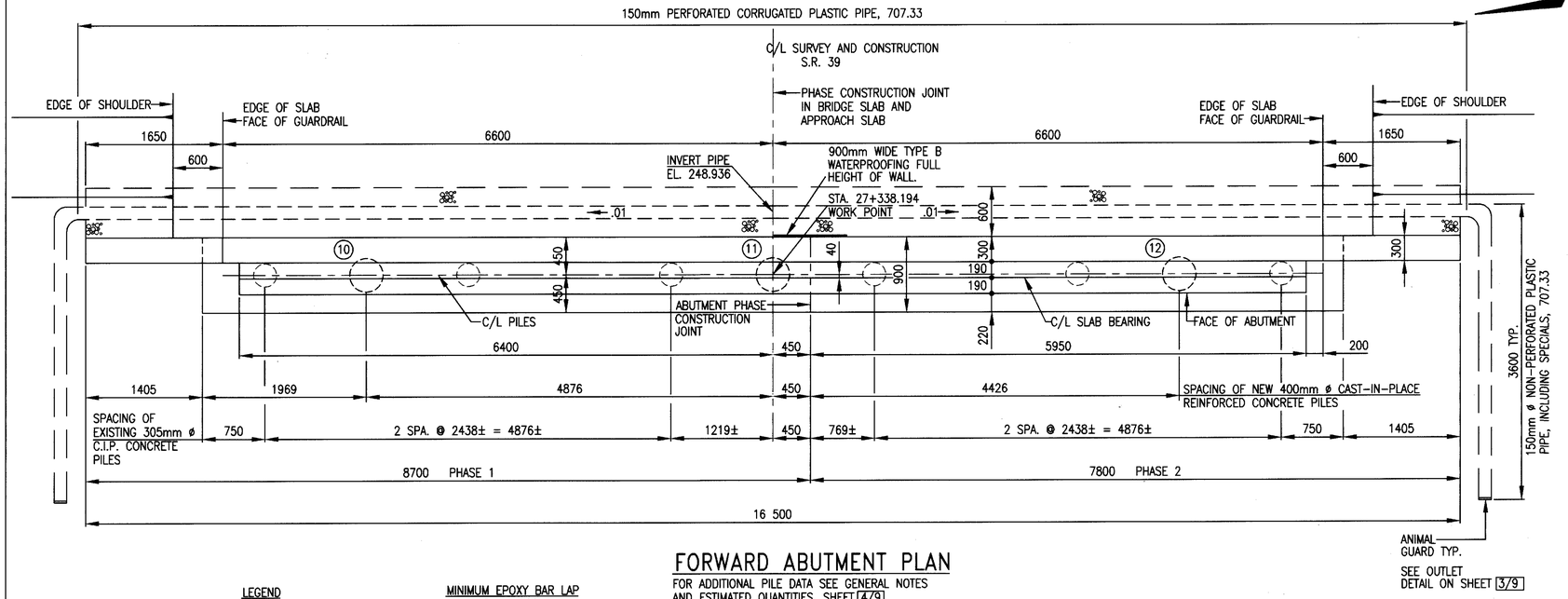
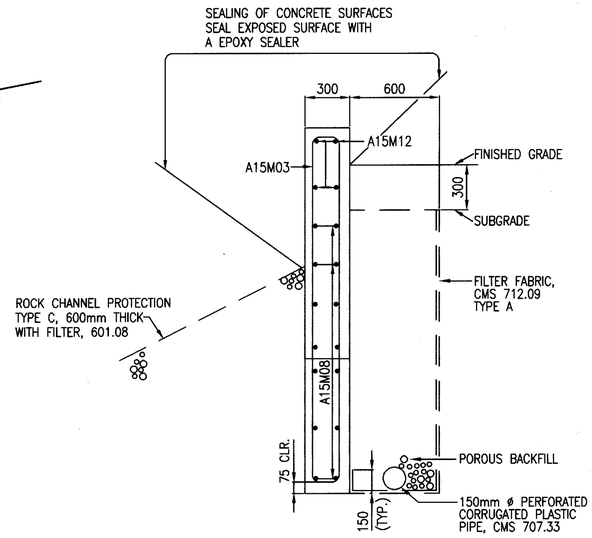


FORWARD ABUTMENT PLAN

FOR ADDITIONAL PILE DATA SEE GENERAL NOTES AND ESTIMATED QUANTITIES, SHEET 4/9

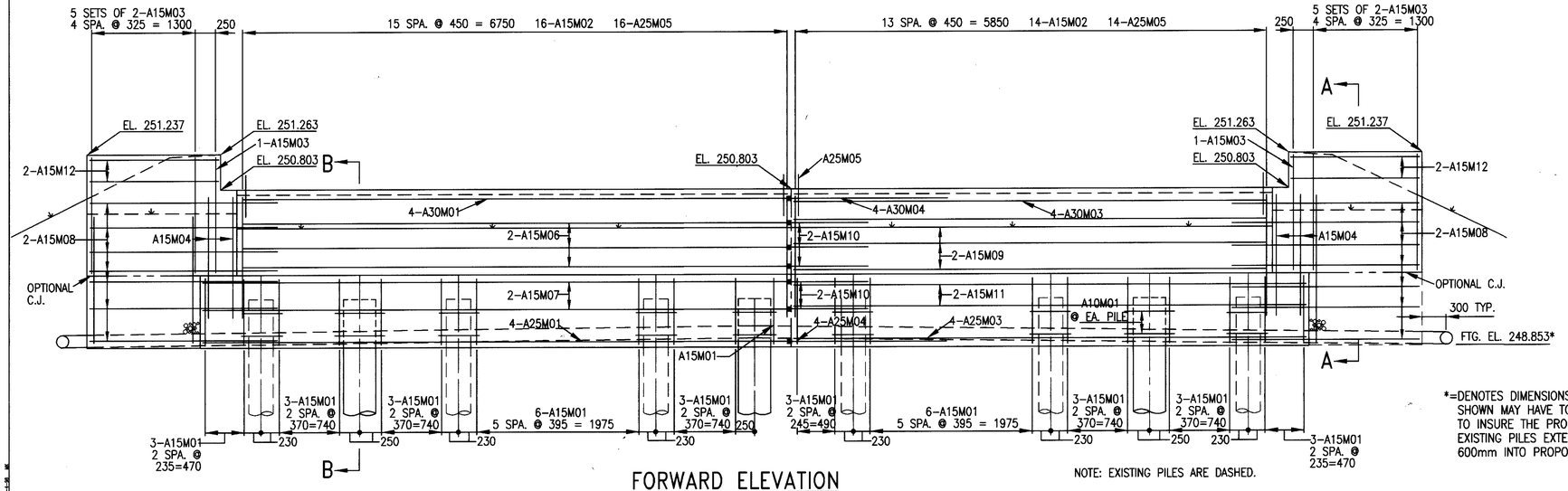
LEGEND
(NO) = PILE NUMBER
BRG. = BEARING
SPA. = SPACES
C.I.P. = CAST-IN-PLACE

MINIMUM EPOXY BAR LAP
15M = 900
25M = 1800
30M = 2800



SECTION A-A

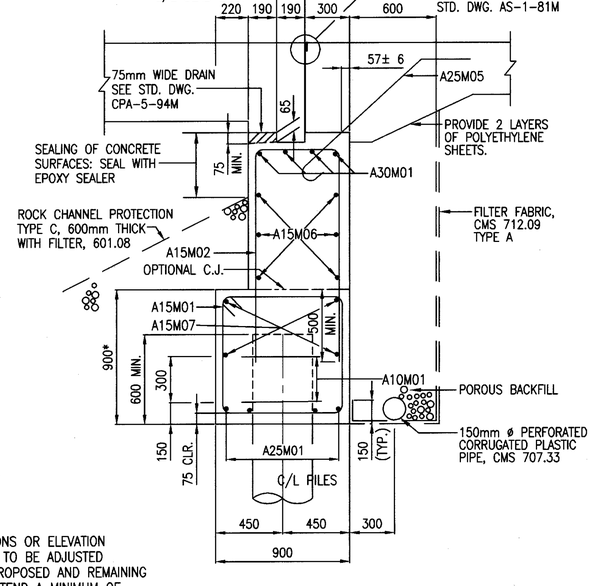
POROUS BACKFILL WITH FILTER FABRIC, 600mm THICK SHALL EXTEND UP TO THE PLANE OF THE SUBGRADE, TO 300 mm BELOW THE EMBANKMENT SURFACE, AND LATERALLY TO THE ENDS OF THE WINGWALLS.



FORWARD ELEVATION

NOTE: EXISTING PILES ARE DASHED.

*=DENOTES DIMENSIONS OR ELEVATION SHOWN MAY HAVE TO BE ADJUSTED TO INSURE THE PROPOSED AND REMAINING EXISTING PILES EXTEND A MINIMUM OF 600mm INTO PROPOSED FOOTING.



SECTION B-B

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN MK | REVIEWED SM | DATE 9-13-97
CHECKED DSM | REVISED | STRUCTURE FILE NUMBER 3800474

FORWARD ABUTMENT
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

6 / 9

19
31

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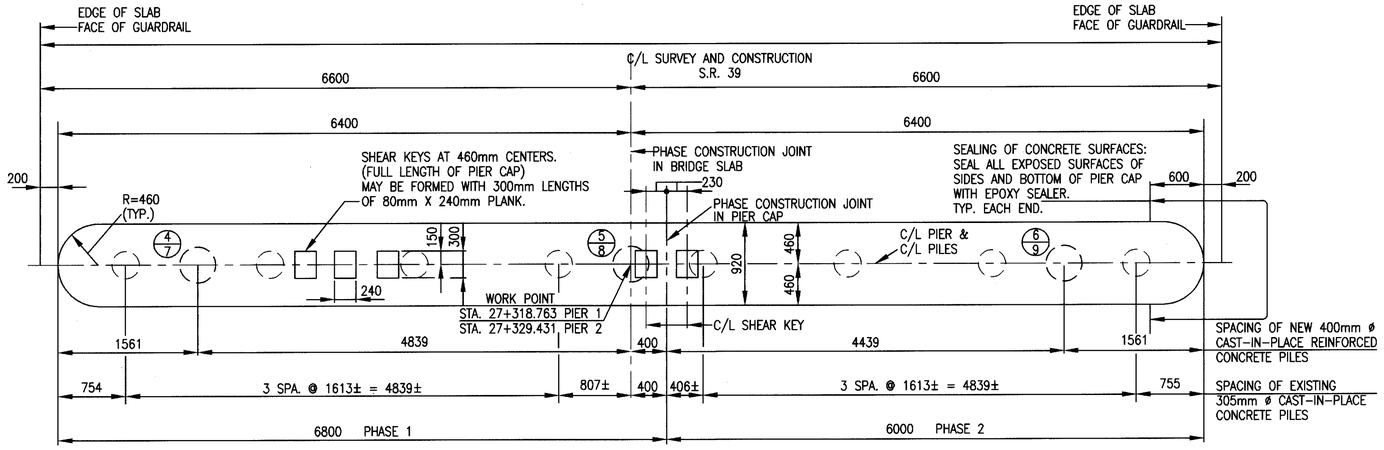
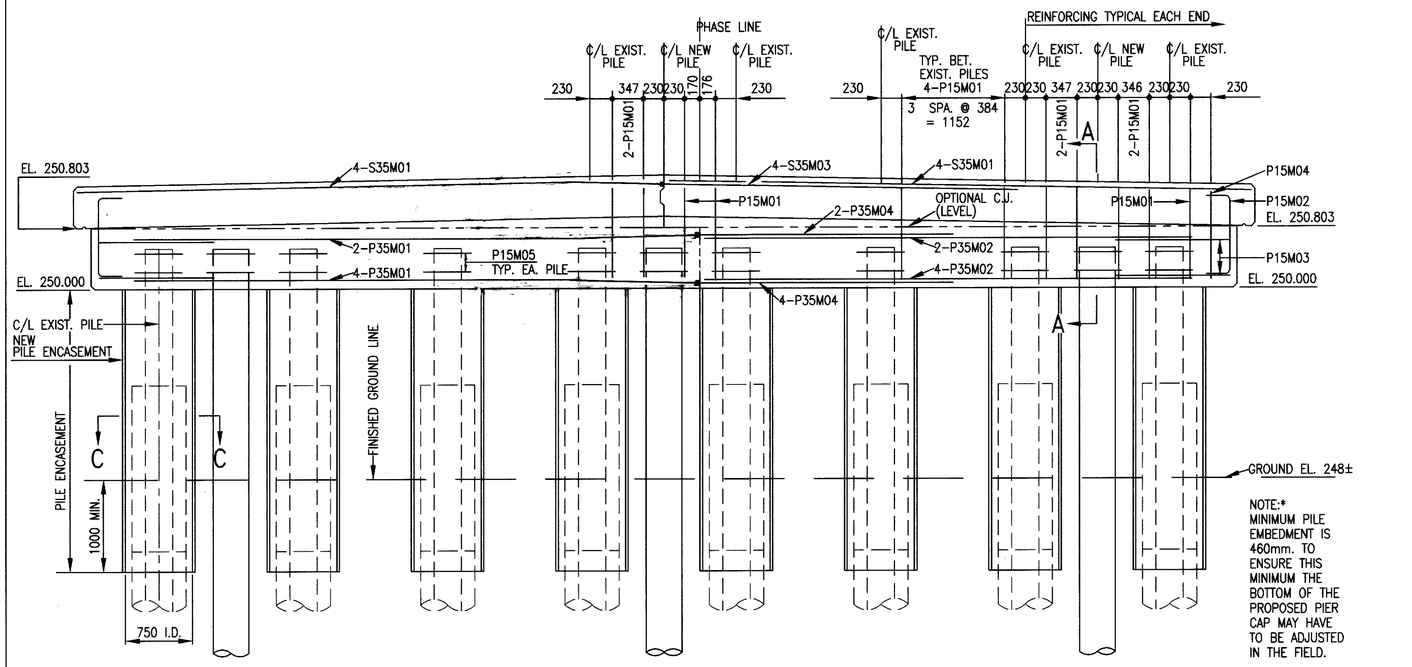


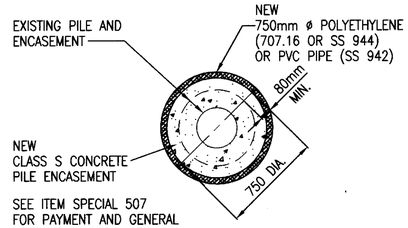
PIER PLAN



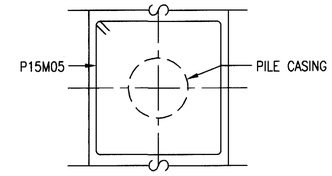
NOTE:*
MINIMUM PILE EMBEDMENT IS 460mm. TO ENSURE THIS MINIMUM THE BOTTOM OF THE PROPOSED PIER CAP MAY HAVE TO BE ADJUSTED IN THE FIELD.

FOR ADDITIONAL PILE DATA, SEE SHEET 4/9 GENERAL NOTES

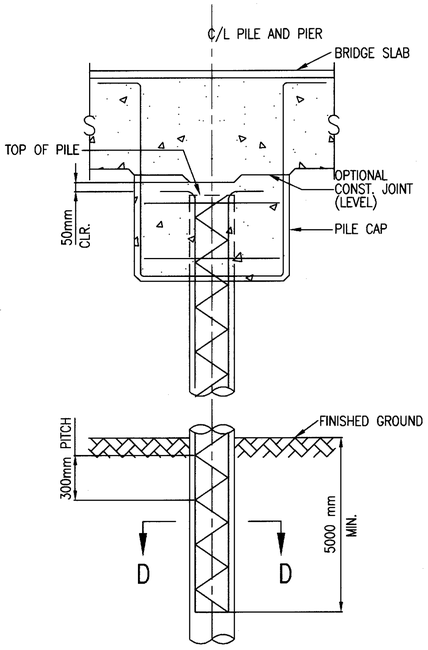
ELEVATION



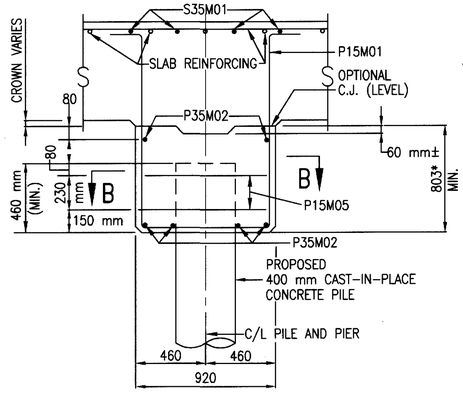
SECTION C-C
NEW ENCASEMENT FOR EXISTING PIER COLUMNS



SECTION B-B

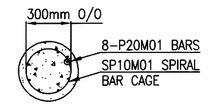


PROPOSED CONCRETE PILE
REINFORCEMENT



SECTION A-A

MINIMUM EPOXY BAR LAP
15M = 900
20M = 1150
35M = 2800



SECTION D-D
SHOWING PROPOSED 400 mm CAST-IN-PLACE REINFORCED CONCRETE PILE
(PILE ENCASEMENT SHALL NOT BE USED ON PROPOSED PILES)

LEGEND

P1/P2 = PILE NIMBERS

P1 = PIER 1
P2 = PIER 2
O/O = OUT TO OUT
F/F = FACE TO FACE

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MK	SM	9-15-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DBT		3800474	

PIER DETAILS
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27305)(27432)

7 / 9

20
31

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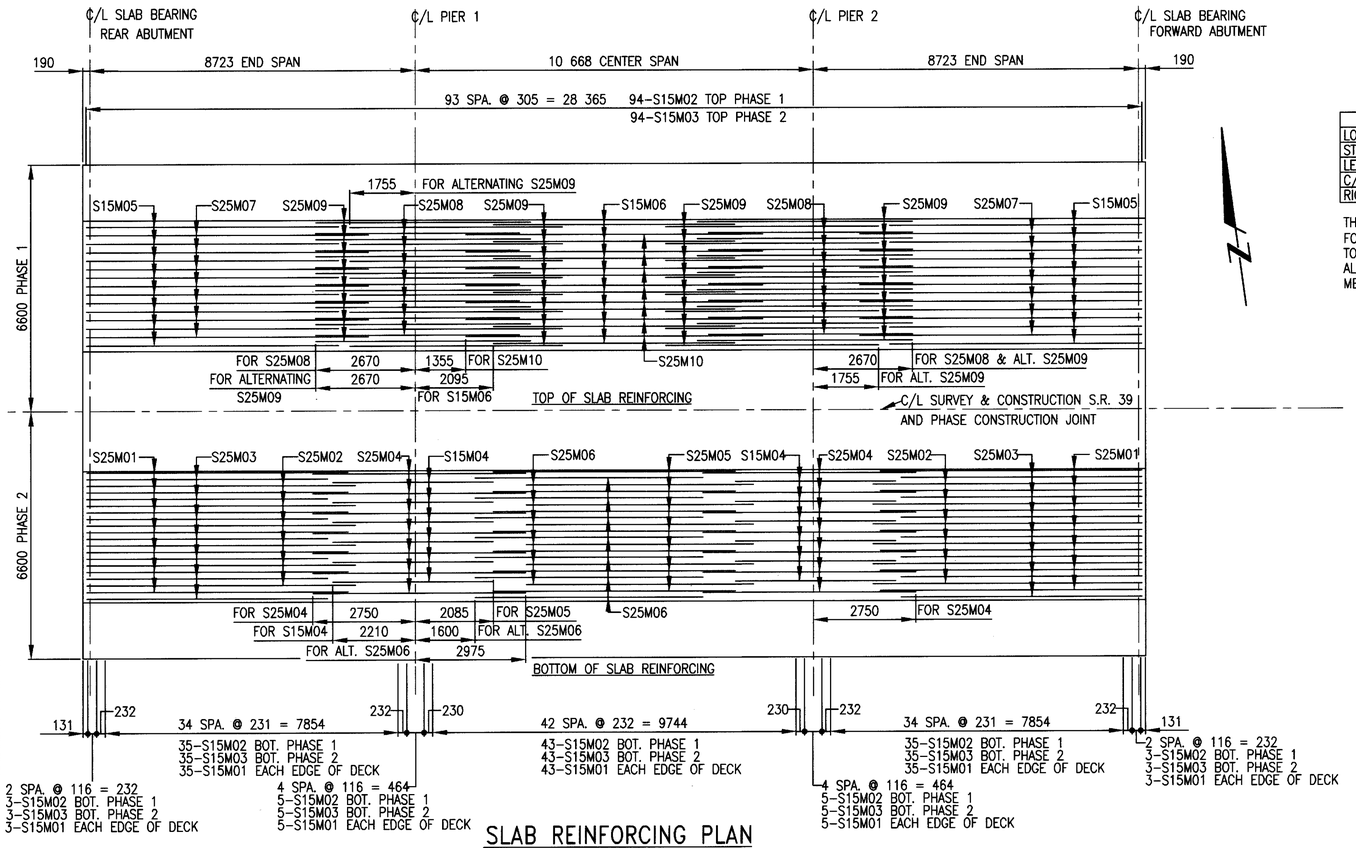
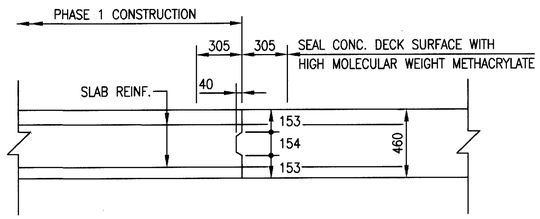


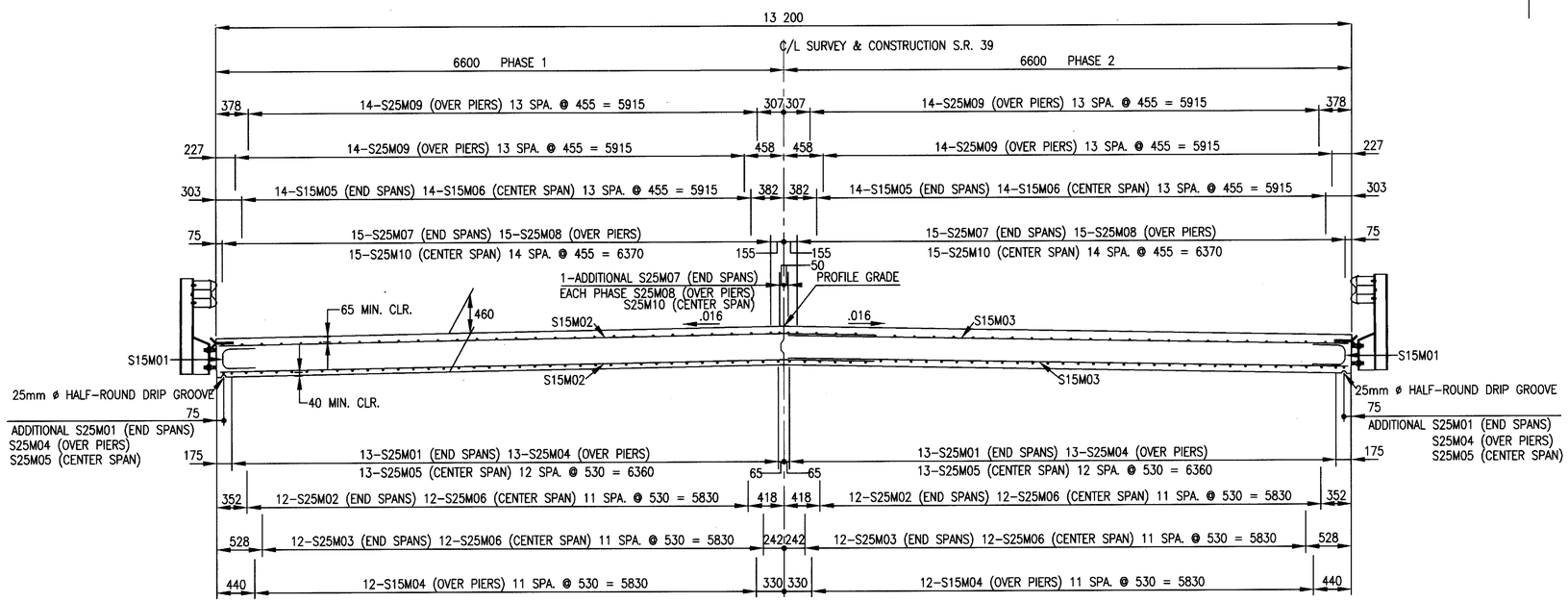
SLAB REINFORCING PLAN

FINISHED DECK ELEVATIONS							
LOCATION	C/L BRG RA	1/2 PT	C/L BRG.PIER 1	1/2 PT	C/L BRG PIER 2	1/2 PT	C/L BRG FA
STATION	27+309.850	27+314.307	27+318.763	27+324.097	27+329.431	27+333.888	27+338.344
LEFT EDGE OF DECK	251.263	251.263	251.263	251.263	251.263	251.263	251.263
C/L SURVEY & CONST.	251.369	251.369	251.369	251.369	251.369	251.369	251.369
RIGHT EDGE OF DECK	251.263	251.263	251.263	251.263	251.263	251.263	251.263

THE DECK SLAB SHALL BE CAMBERED AT THE MIDSPANS, +6mm
FOR THE END SPANS AND +13mm FOR THE CENTER SPAN,
TO COMPENSATE FOR THE DEAD LOAD DEFLECTIONS.
ALLOWANCE SHALL BE MADE FOR THE DEFLECTION OF ANY FALSEWORK
MEMBERS SUPPORTING THE ACTUAL CONCRETE DURING PLACEMENT.



PHASE CONSTRUCTION JOINT



TRANSVERSE SECTION

FOR ADDITIONAL DETAILS FOR RAILING & DRIP STRIP, SEE GENERAL PLAN AND ELEVATION, SHEET 3/9

FOR ADDITIONAL DETAILS AT PIERS AND ABUTMENTS, SEE STD. DWG. CS-1-93M

LEGEND
ALT. = ALTERNATING
BOT. = BOTTOM
SPA. = SPACES
CLR. = CLEARANCE

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN MK | REVIEWED SA | DATE 9-15-97
CHECKED BY | REVISED | STRUCTURE FILE NUMBER 3800474

SUPERSTRUCTURE DETAILS
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

8 / 9

21
31

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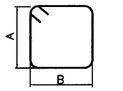

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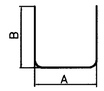
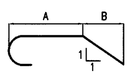


TYPE 2

TYPE 3



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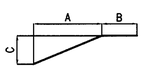

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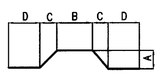

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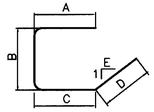
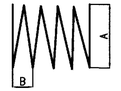
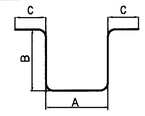


TYPE 7

TYPE 8



TYPE 9



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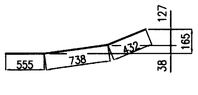

TYPE 11

TYPE 12

ABUTMENTS

MARK	TOTAL	RA	FA	LENGTH	WEIGHT ⊛	TYPE	A	B	C	D	E	REMARKS
A10M01	36	18	18	2645	75	1	730	530				
A15M01	74	37	37	3325	386	1	775	800				
A15M02	60	30	30	3370	317	2	580	1435				
A15M03	44	22	22	2890	200	2	200	1385				
A15M04	8	4	4	3120	39	2	200	1500				
A15M06	12	6	6	□ 6800	128	STR.						WITH MECH. CONNECTOR
A15M07	8	4	4	□ 7245	91	STR.						WITH MECH. CONNECTOR
A15M08	56	28	28	2820	248	STR.						
A15M09	12	6	6	□ 5850	110	STR.						WITH ONE END THREADED
A15M10	20	10	10	□ 1070	34	STR.						
A15M11	8	4	4	□ 6295	79	STR.						
A15M12	16	8	8	1550	39	STR.						
A25M01	8	4	4	□ 7245	227	STR.						WITH MECH. CONNECTOR
A25M03	8	4	4	□ 6295	198	STR.						
A25M04	8	4	4	□ 1900	60	STR.						WITH ONE END THREADED
A25M05	60	30	30	1760	414	4	1055	300				
					TOTAL	2970	KILOGRAMS					
A30M01	8	4	4	□ 6800	299	STR.						WITH MECH. CONNECTOR
A30M03	8	4	4	□ 5850	257	STR.						
A30M04	8	4	4	□ 2900	127	STR.						WITH ONE END THREADED
				TOTAL	3328	KILOGRAMS						

PIERS

MARK	TOTAL	P1	P2	LENGTH	WEIGHT ⊛	TYPE	A	B	C	D	E	REMARKS
SP10M01	6	3	3	7580	125	9	300	300				
P15M01	60	30	30	3260	307	10	810	1050	255			
P15M02	4	2	2	1480	9	2	1050	255				
P15M03	8	4	4	3020	38	12	1300	770				
P15M04	4	2	2	2890	18	10	760	890	255			
P15M05	44	22	22	2920	202	1	770	610				
P20M01	48	24	24	7900	893	3	250	7700				
P35M01	12	6	6	□ 6290	593	STR.						WITH MECH. CONNECTOR
P35M02	12	6	6	□ 5490	517	STR.						
P35M04	12	6	6	□ 2850	268	STR.						WITH ONE END THREADED
				TOTAL	2970	KILOGRAMS						

SUPERSTRUCTURE

MARK	NO.	LENGTH	WEIGHT ⊛	TYPE	A	B	C	D	E	REMARKS
S15M01	258	985	399	2	305	380				
S15M02	223	7600	2661	STR.						
S15M03	223	6500	2276	STR.						
S15M04	48	4345	327	STR.						
S15M05	56	6785	597	STR.						
S15M06	28	6480	285	STR.						
S25M01	56	7040	1547	STR.						
S25M02	48	7215	1359	STR.						
S25M03	48	6505	1226	8	6150					
S25M04	56	5715	1256	STR.						
S25M05	28	6510	715	STR.						
S25M06	48	6105	1150	STR.						
S25M07	64	7520	1889	STR.						
S25M08	64	5490	1379	STR.						
S25M09	112	5770	2536	STR.						
S25M10	32	7960	1000	STR.						
S35M01	16	□ 6500	816	STR.						WITH MECH. CONNECTORS
S35M03	8	□ 3970	249	STR.						WITH ONE END THREADED
		TOTAL	21667	KILOGRAMS						

⊛ THE REINFORCING BAR WEIGHT SHOWN IS FOR INFORMATION ONLY. THE COST OF REINFORCING IS INCLUDED WITH APPROPRIATE ITEM 848.

NOTE: ALL LENGTHS IN MILLIMETERS, ALL WEIGHTS IN KILOGRAMS, UNLESS OTHERWISE NOTED.

ALL DIMENSIONS MEASURED OUT TO OUT.

ALL BARS SHALL BE EPOXY COATED

50mm CLEARANCE FROM CONSTRUCTION JOINT WAS ASSUMED IN DETERMINING ALL BAR LENGTHS DESIGNATED WITH AN □ ADJUSTMENTS IN BAR LENGTHS DUE TO MECHANICAL SPLICING SHOULD BE MADE PRIOR TO FABRICATION.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTER INDICATES THE BAR LOCATION. NEXT TWO DIGITS AND LETTER INDICATES THE METRIC BAR SIZE DESIGNATION, AND THE REMAINING DIGITS ITS SEQUENCE NUMBER.
EXAMPLE: A35M01

1) A = LOCATION OF THE BAR IN THE STRUCTURE.
2) 35M = METRIC BAR SIZE DESIGNATION
3) 01 = SEQUENCE NUMBER.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN MJC | REVIEWED SA | CHECKED dfy | DATE 9-16-97 | REVISED | STRUCTURE FILE NUMBER 3800474

REINFORCING STEEL
BRIDGE NO. HOL-39-27310
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

9 / 9

22
31

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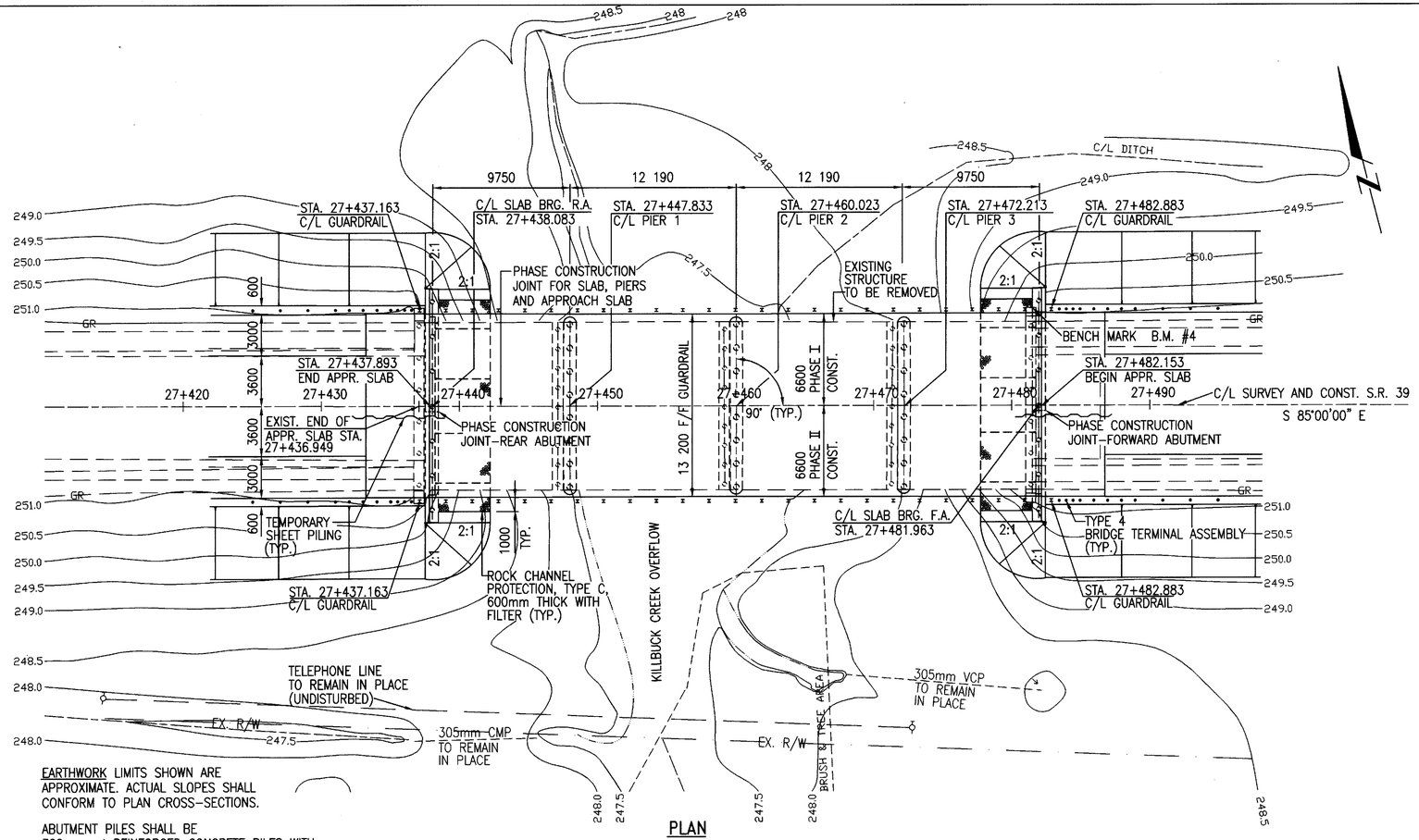
BENCH MARK

B.M. #4 EL. 251.409
CHISELED "□" ON NORTHEAST ABUTMENT.
STA. 27+481.5 7.0m LT.

metric units



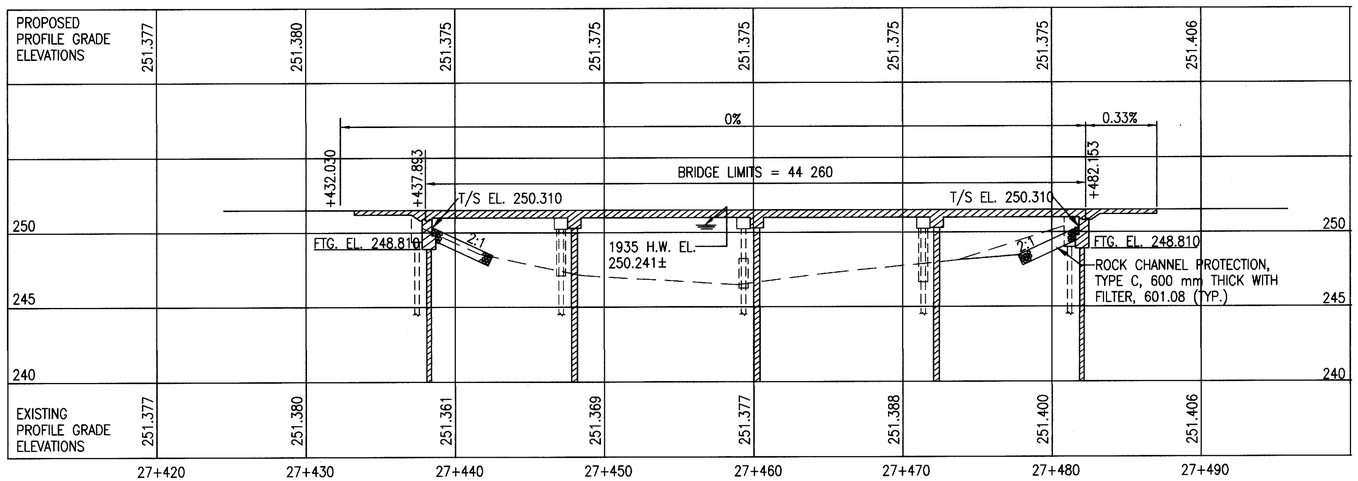
PLAN

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.

ABUTMENT PILES SHALL BE 300 mm ø REINFORCED CONCRETE PILES WITH ESTIMATED PAY LENGTH 17 METERS

PIER PILES SHALL BE 400 mm ø REINFORCED CONCRETE PILES WITH ESTIMATED PAY LENGTH 20 METERS

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. STATIONS AND ELEVATIONS ARE IN METERS.



PROFILE ALONG C/L SURVEY & CONST. S.R. 39

STRUCTURE PLANS REVIEWED BY URS CONSULTANTS,
CBP&BKL DATE 3/17/98

LEGEND
F/F = FACE TO FACE
R.A. = REAR ABUTMENT
F.A. = FORWARD ABUTMENT
BRG. = BEARING

EXISTING STRUCTURE

TYPE: CONTINUOUS CONCRETE SLAB WITH CAPPED PILE PIERS AND ABUTMENTS.
SPANS: 9753.6±-12 192±-12 192±-9753.6± C/C EXIST. BRGS.
ROADWAY: 12 192± F/F GUARDRAILS
LOADING: S-15-46
WEARING SURFACE: BITUMINOUS
SKEW: NONE
APPROACH SLAB: 4572± LONG
ALIGNMENT: TANGENT
CROWN: .016
STRUCTURE FILE NO. 3800482
BUILT: JULY 1952
DISPOSITION: EXISTING STRUCTURE TO BE REMOVED AS PER CMS 202.

PROPOSED STRUCTURE

TYPE: PART WIDTH CONSTRUCTION OF NEW CONTINUOUS CONCRETE SLAB ON REINFORCED CONCRETE CAPPED PILE ABUTMENT AND PIERS.
SPANS: 9750-12 190-12 190-9750 C/C BRGS.
ROADWAY: 13 200 F/F GUARDRAILS
LOADING: MS18 AND THE ALTERNATE MILITARY LOADING
WEARING SURFACE: MONOLITHIC CONCRETE
SKEW: NONE
APPROACH SLABS: AS-1-81M (4600 mm LONG)
ALIGNMENT: TANGENT
CROWN: .016
N 40°33'15" LATITUDE
W 81°55'30" LONGITUDE
ADT: 7740 (1995) 10830 (2015)

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MJK	SM	3-18-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BKL		3800490	

HOLMES COUNTY
STA. 27+437.893
STA. 27+482.153

SITE PLAN
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27305)(27.432)

1 / 9

23
31

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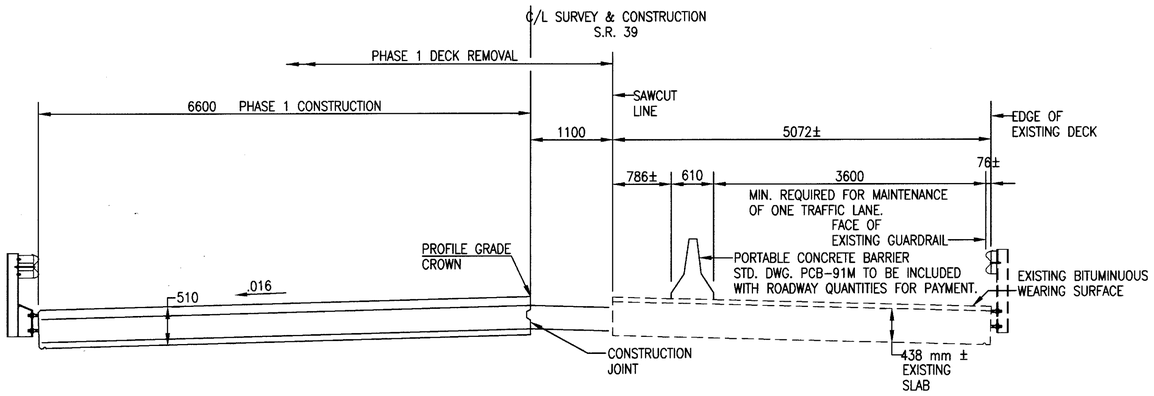
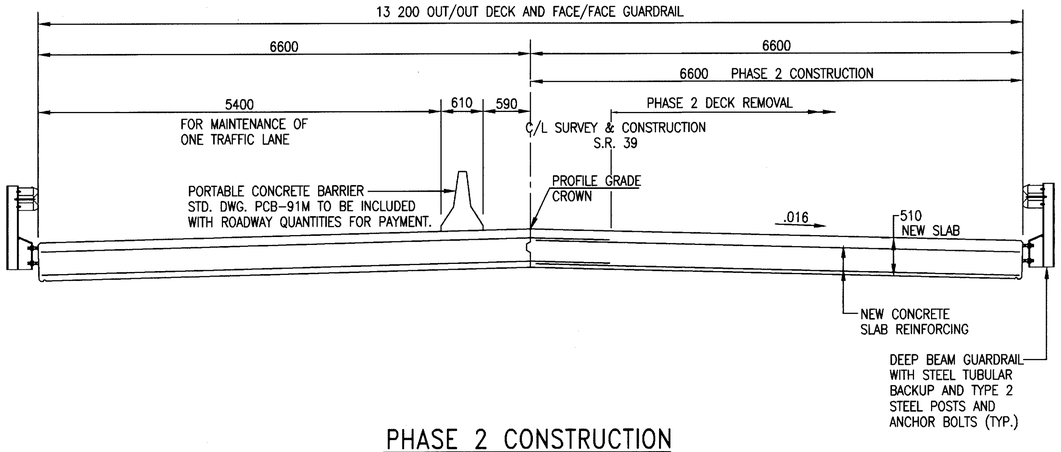
6/6/98SHL 2-4-98 MK

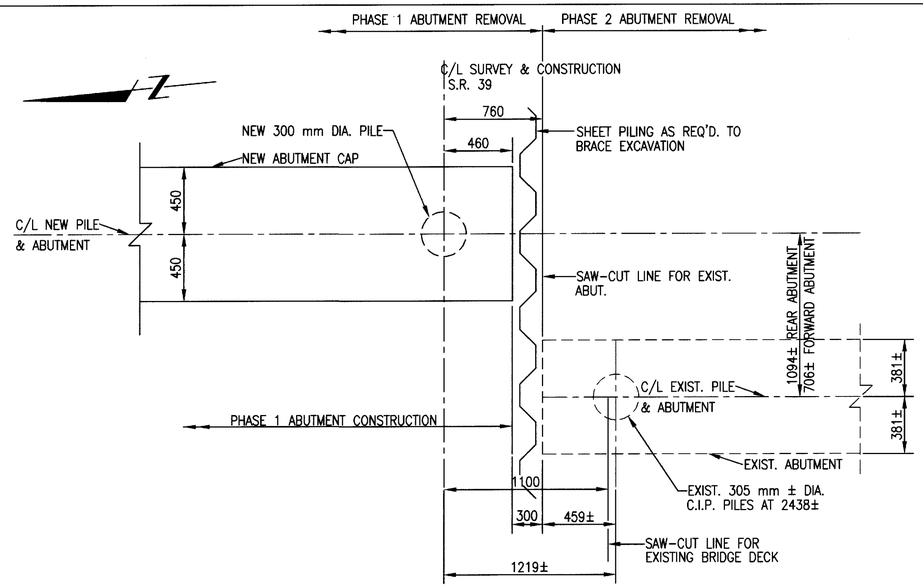


PHASE 1 CONSTRUCTION

FOR MAINTENANCE OF TRAFFIC
SEE ROADWAY PLANS SHEETS 4, 5 AND 6 OF 31

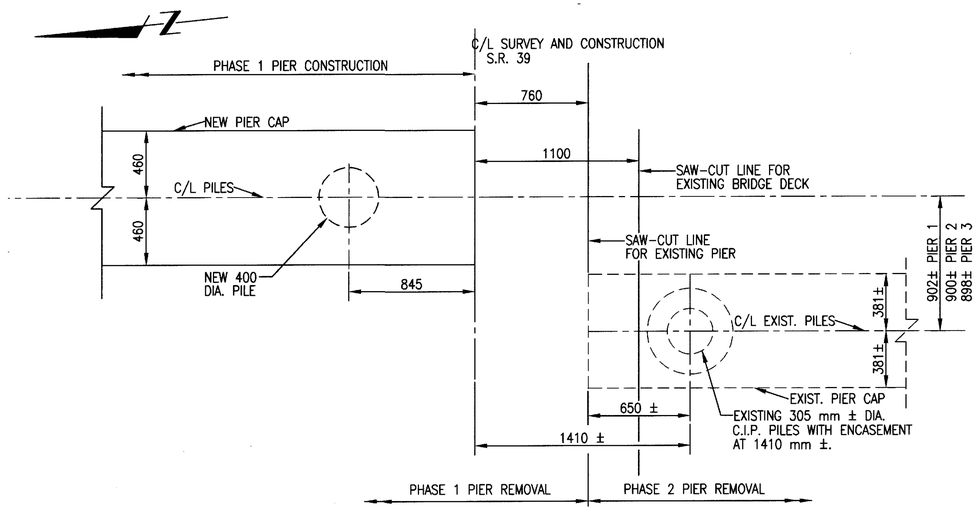


PHASE 2 CONSTRUCTION



PLAN

PROPOSED & EXISTING ABUTMENTS AT PHASE CONSTRUCTION JOINT



PLAN

PROPOSED & EXISTING PIERS AT PHASE CONSTRUCTION JOINT

LEGEND
C.J. = CONSTRUCTION JOINT

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MLK	SA	5-6-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BSY		3800490	

PHASE CONSTRUCTION DETAILS
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

2 / 9

24
31

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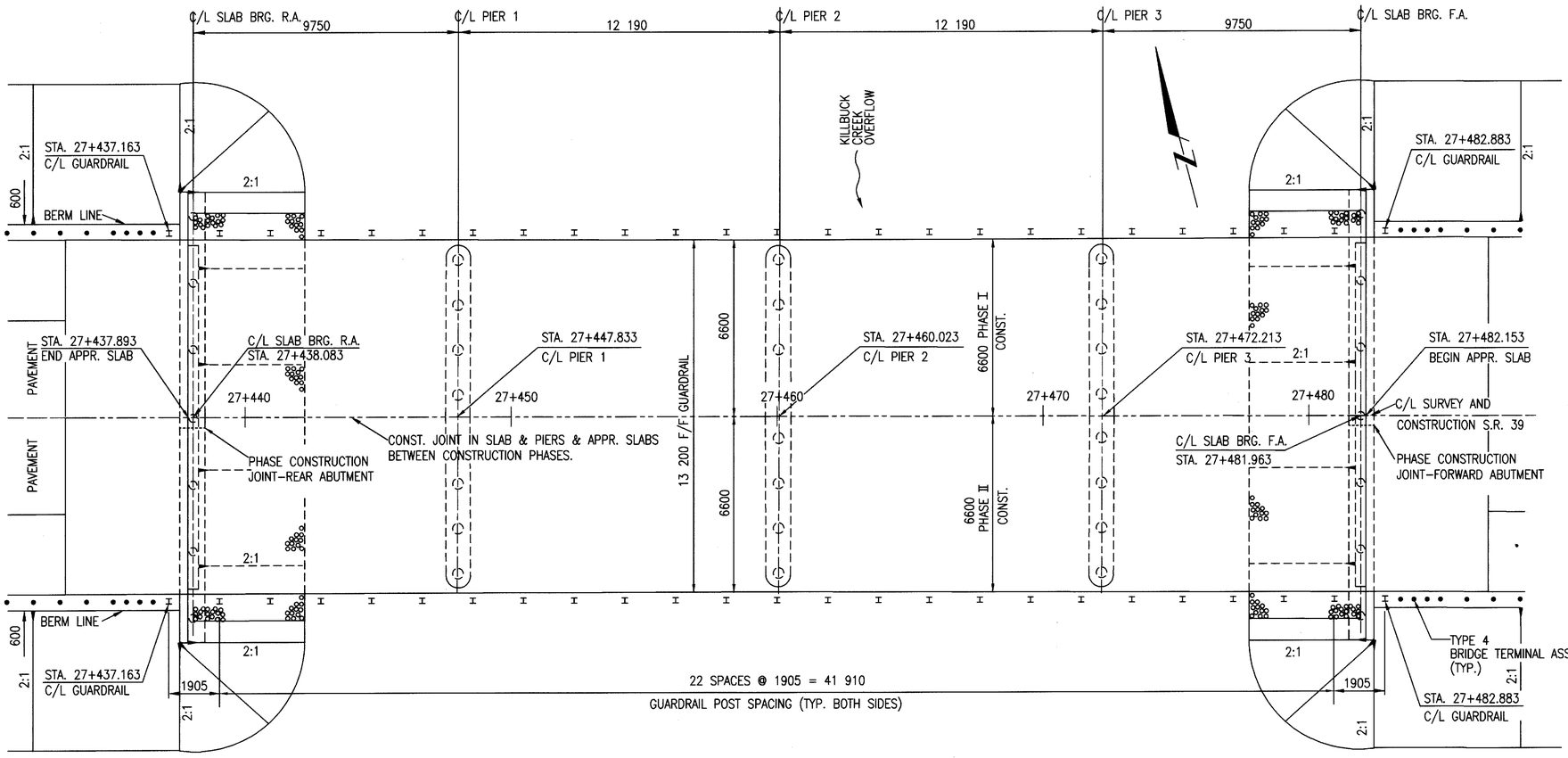
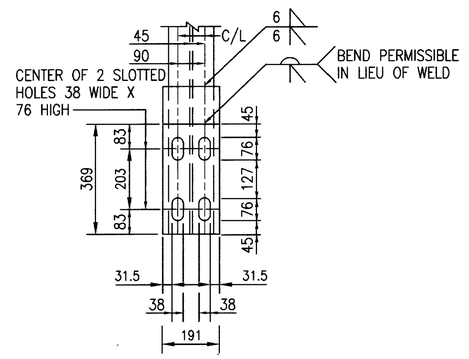
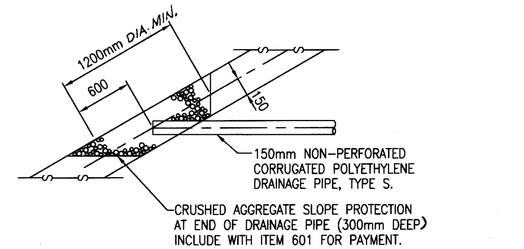


PLAN



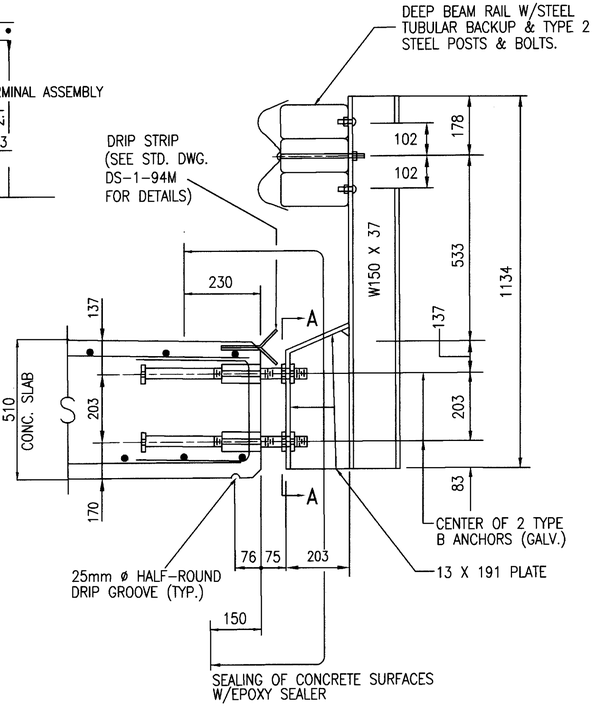
SECTION A–A

STAINLESS STEEL DRIP STRIP: PRIOR TO THE CONCRETE DECK PLACEMENT A BENT DRIP STRIP SHALL BE INSTALLED ALONG THE EDGES OF THE DECK BY ANCHORING TO THE TOP LAYER OF REINFORCING STEEL AND BEING BUTTED, WITH A 90 DEGREE BEND, AGAINST THE FORMWORK. AN ADDITIONAL 300mm LONG DRIP STRIP SHALL ALSO BE INSTALLED CENTERED ON EACH POST.



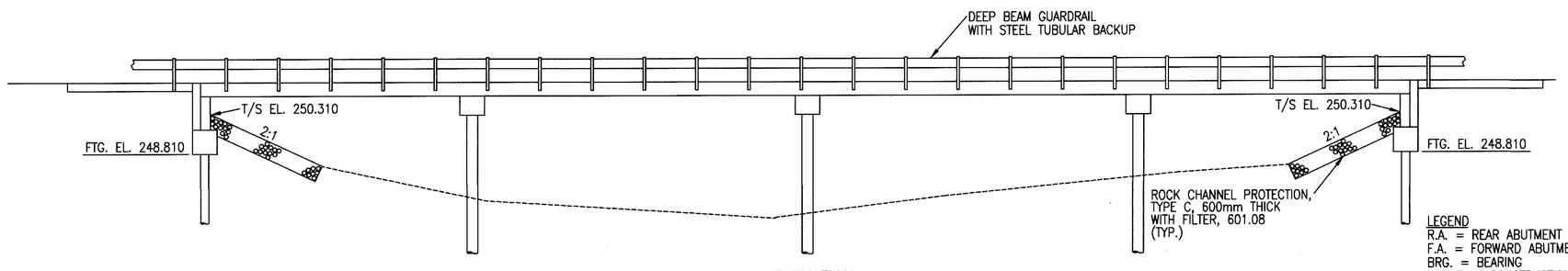
DRAIN PIPE OUTLET DETAIL

FOR OUTLETS LOCATED OUTSIDE THE SLOPE PROTECTION LIMITS



TYP. GUARDRAIL CONNECTION

SEE STD. DWG. DBR–2–73M FOR INFO NOT SHOWN



ELEVATION

LEGEND
R.A. = REAR ABUTMENT
F.A. = FORWARD ABUTMENT
BRG. = BEARING
CONST. = CONSTRUCTION

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MJK	SH	9-20-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BJY		3800490	

GENERAL PLAN
BRIDGE NO. HOL–39–27438
OVER
KILLBUCK CREEK OVERFLOW

HOL–39–(27305)(27.432)

3 / 9

25 / 31

C:\DATA\673\673gp.DWG Wed Mar 04 14:33:25 1998 MK

GENERAL NOTES

REFERENCE SHALL BE MADE TO STANDARD DRAWINGS:

AS-1-81M ----- DATED ------- 10-25-94
CPA-5-94M ----- DATED ------- 10-25-94
CPP-2-94M ----- DATED ------- 12-19-94
CS-1-93M ------ REVISED ------ 6-30-95
DBR-2-73M ----- REVISED ------ 8-18-95
DS-1-94M ------ DATED ------- 12-15-94
PCB-91M ------- DATED ------- 3-20-95

AND TO SUPPLEMENTAL SPECIFICATIONS:
844 ---------- DATED ------- 9-9-97
954 ---------- DATED ------- 9-9-97
911 ---------- DATED ------- 7-10-97

DESIGN SPECIFICATIONS: THIS STRUCTURE CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1996, AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN LOADING: MS-18 AND THE ALTERNATE MILITARY LOADING.
2.87 kN/m² FUTURE WEARING SURFACE

DESIGN DATA:

HIGH PERFORMANCE CONCRETE - COMPRESSIVE STRENGTH 31.0 MPa (SUPERSTRUCTURE)

HIGH PERFORMANCE CONCRETE - COMPRESSIVE STRENGTH 31.0 MPa (SUBSTRUCTURE)

REINFORCING STEEL - ASTM A615M, A616M OR A617M
GRADE 400 MINIMUM YIELD STRENGTH 400 MPa

SPIRAL REINFORCEMENT MAY BE PLAIN BARS, ASTM A82M OR A615M

DECK PROTECTION METHOD: EPOXY COATED REINFORCING STEEL, 65mm CONCRETE COVER, STEEL DRIP STRIP, NON-EPOXY SEALER.

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 25 mm THICK.

REMOVAL OF EXISTING STRUCTURE, AS PER PLAN: WHEN NO LONGER NEEDED TO MAINTAIN TRAFFIC THE EXISTING STRUCTURE INCLUDING THE EXISTING PILES SHALL BE REMOVED, PER PART-WIDTH CONSTRUCTION PLANS, UPON RECEIVING PERMISSION FROM THE ENGINEER.

PROTECTION OF TRAFFIC: PRIOR TO DEMOLITION OF ANY PORTIONS OF THE EXISTING SUPER-STRUCTURE, THE CONTRACTOR SHALL SUBMIT HIS PLANS FOR THE PROTECTION OF TRAFFIC ADJACENT TO THE STRUCTURE TO THE DIRECTOR FOR APPROVAL. THESE PLANS SHALL INCLUDE PROVISIONS FOR ANY DEVICES AND STRUCTURES THAT MAY BE NECESSARY TO ENSURE SUCH PROTECTION.

PAYMENT: THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE BID, WHICH PRICE AND PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS NECESSARY TO COMPLETE THE WORK IN CONFORMANCE WITH THESE REQUIREMENTS, WITH PERTINENT PROVISIONS OF 202, AND TO THE SATISFACTION OF THE ENGINEER.

PILE DESIGN LOADS (ULTIMATE BEARING VALUE): THE ULTIMATE BEARING VALUE IS 680 kN PER PILE FOR THE 300 mm ABUTMENT PILES. THE ULTIMATE BEARING VALUE IS 980 kN PER PILE FOR THE 400 mm PIER PILES.

ABUTMENT PILES:
14 PILES 17 METERS LONG ESTIMATED LENGTH
14 PILES OF ORDER LENGTH 18 METERS LONG
7 SPLICES

PIER PILES:
24 PILES 20 METERS LONG ESTIMATED LENGTH
24 PILES OF ORDER LENGTH 18 METERS LONG
24 PILES OF ORDER LENGTH 3.5 METER LONG
24 SPLICES

ITEM 507 400mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, FURNISHED, AS PER PLAN,
PILE WALL THICKNESS: THE RESPONSIBILITY OF CHOOSING AND PROVIDING A SATISFACTORY PILE WALL THICKNESS FOR THIS PROJECT SHALL BE BORNE BY THE CONTRACTOR EXCEPT THAT THE THIS PROJECT PILE WALL THICKNESS SHALL NOT BE LESS THAN 6.0 mm. IF A PILE WALL THICKNESS GREATER THAN 6.0 mm IS NECESSARY TO RESIST THE PILE INSTALLATION DRIVING STRESS, THE CONTRACTOR SHALL MAKE THIS DETERMINATION AND SHALL FURNISH A PILE WITH AN ACCEPTABLE WALL THICKNESS. IF MONOTUBE PILES ARE USED, THE MINIMUM WALL THICKNESS SHALL BE 4.5 mm

ITEM 507 400mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, DRIVEN, AS PER PLAN,
PILE HAMMER: THE PILE HAMMER USED TO INSTALL THE 400mm PILES SHALL HAVE A STATE'S ENERGY RATING OF NOT LESS THAN 27000 JOULES. THIS REQUIREMENT DOES NOT RELIEVE THE CONTRACTOR FROM 108.05 WHICH STATES THAT THE CONTRACTOR IS TO PROVIDE SUFFICIENT EQUIPMENT FOR PROSECUTING THE REQUIRED WORK. REFER TO "ODOT'S MANUAL OF PROCEDURES FOR STRUCTURES" TO OBTAIN THE STATE'S ENERGY RATING.

PILE DRIVING CRITERIA: PILES SHALL BE DRIVEN TO THE PLAN ESTIMATED PAY LENGTH. IF PILE PENETRATION BECOMES DIFFICULT TO ACHIEVE, PILE DRIVING CAN BE TERMINATED AT AN ULTIMATE LOAD RESISTANCE OF 890 kN.

UTILITY LINES: ALL EXPENSE INVOLVED IN RELOCATION (INSTALLING) THE AFFECTED UTILITY LINES SHALL BE BORNE BY THE UTILITY(IES). THE CONTRACTOR AND UTILITY(IES) ARE TO COOPERATE BY ARRANGING THEIR WORK IN SUCH A MANNER THAT INCONVENIENCE TO EITHER WILL BE HELD TO A MINIMUM.

CALCULATED BY: BTJ DATE: 5-97
CHECKED BY: CAB DATE: 6-97

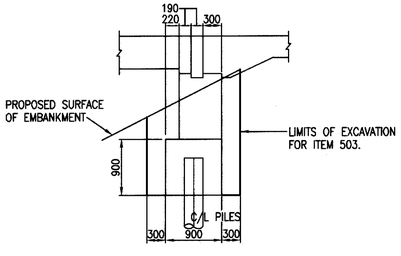
ESTIMATED QUANTITIES

ITEM	ITEM EXT.	TOTAL	UNIT	DESCRIPTIONS	SUPER	ABUT.	PIERS	GEN'L	AS PER PLAN REF. DWG. NO.
202	11003	LUMP		STRUCTURE REMOVED, OVER 6 METER SPAN, AS PER PLAN				LUMP	26
503	11100	LUMP		COFFERDAMS, CRIBS AND SHEETING				LUMP	
503	21300	LUMP		UNCLASSIFIED EXCAVATION		LUMP			
505	11100	LUMP		PILE DRIVING EQUIPMENT MOBILIZATION				LUMP	
507	00500	252	METER	300 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, DRIVEN		252			
507	00550	252	METER	300 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, FURNISHED		252			
507	00701	516	METER	400 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, DRIVEN, AS PER PLAN			516		26
507	00751	516	METER	400 mm CAST-IN-PLACE, REINFORCED CONCRETE PILES, FURNISHED, AS PER PLAN			516		26
507	50500	31	EACH	STEEL PILE SPLICES		7	24		
512	44400	4	SQ.METER	TYPE B WATERPROOFING		4			
SPECIAL	512.67502	110	SQ.METER	SEALING OF CONCRETE SURFACES (EPOXY)*	79	21	10		
517	72300	91.44	METER	RAILING (DEEP BEAM RAIL WITH STEEL TUBULAR BACKUP AND TYPE 2 STEEL POSTS AND ANCHOR BOLTS)*	91.44				
518	21230	LUMP		POROUS BACKFILL WITH FILTER FABRIC		LUMP			
SPECIAL	51822300	102	METER	STEEL DRIP STRIP *	102				
518	40000	35	METER	150 mm PERFORATED CORRUGATED PLASTIC PIPE, 707.33		35			
518	40010	16	METER	150 mm NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS, 707.33		16			
844	48000	321.5	CU METER	HIGH PERFORMANCE CONCRETE, SUPERSTRUCTURE (DECK)	301		20.5		
844	48040	48.6	CU METER	HIGH PERFORMANCE CONCRETE, SUBSTRUCTURE		48.6			
844	49000	LUMP		HIGH PERFORMANCE CONCRETE, TRIAL MIX				LUMP	
844	49010	LUMP		HIGH PERFORMANCE CONCRETE, TESTING				LUMP	

* SEE PROPOSAL NOTE

PROPOSED SEQUENCE OF WORK (THE FOLLOWING NOTES REFER TO SHEET 2/9 PHASE CONSTRUCTION DETAILS.)

1. SET PORTABLE BARRIER AS SHOWN IN PHASE 1 OF PHASE CONSTRUCTION DETAILS AND INSTALL ALL OTHER NECESSARY TRAFFIC DEVICES TO MAINTAIN A SINGLE TRAFFIC LANE ON THE BRIDGE.
2. SAW-CUT EXISTING BRIDGE DECK AT LOCATION INDICATED IN PHASE CONSTRUCTION DETAILS.
3. DEMOLISH NORTH SIDE OF THE EXISTING BRIDGE DECK PER ITEM 202.
4. INSTALL SHEET PILING AT ABUTMENTS BEFORE EXCAVATION BEGINS.
5. CUT EXISTING ABUTMENTS, PIER CAPS AND APPROACH SLABS AT LOCATION AS SHOWN ON PARTIAL PLANS OF PHASE CONSTRUCTION DETAILS.
6. DEMOLISH NORTH SIDE OF EXISTING ABUTMENTS, PIER CAPS AND APPROACH SLABS.
7. EXCAVATE AS REQUIRED FOR CONSTRUCTION OF NEW PHASE 1 ABUTMENTS AND APPROACH SLABS.
8. CONSTRUCT PHASE 1 OF PROPOSED BRIDGE.
9. MOVE PORTABLE BARRIER TO PHASE 1 SIDE OF BRIDGE PER PHASE CON-STRUCTION DETAILS.
10. DEMOLISH REMAINING PORTION OF EXISTING BRIDGE PER ITEM 202 INCLUDING ABUTMENTS, PIER CAPS AND APPROACH SLAB.
11. CONSTRUCT PHASE 2 PORTION OF PROPOSED BRIDGE.
12. REMOVE PORTABLE CONCRETE BARRIER.



EXCAVATION DIAGRAM
SEE CMS 503.11 FOR ADDITIONAL DETAIL.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
2700 E. GRANVILLE RD.
COLUMBUS, OHIO 43231

DATE 9-29-97
REVIEWED JA
STRUCTURE FILE NUMBER 3800490
DRAWN MK
REVISED
DESIGNED BTJ
CHECKED CAB

GENERAL NOTES AND ESTIMATED QUANTITIES
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.492)

4 / 9

26
31

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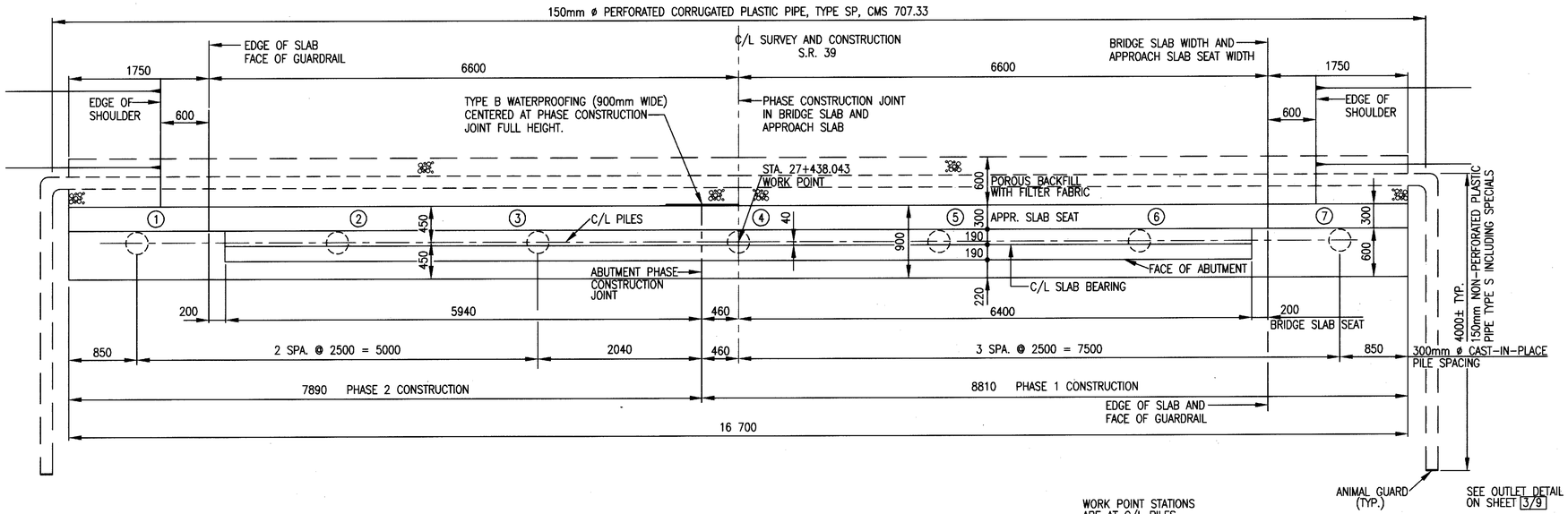
673V030RG MK 3-4-98



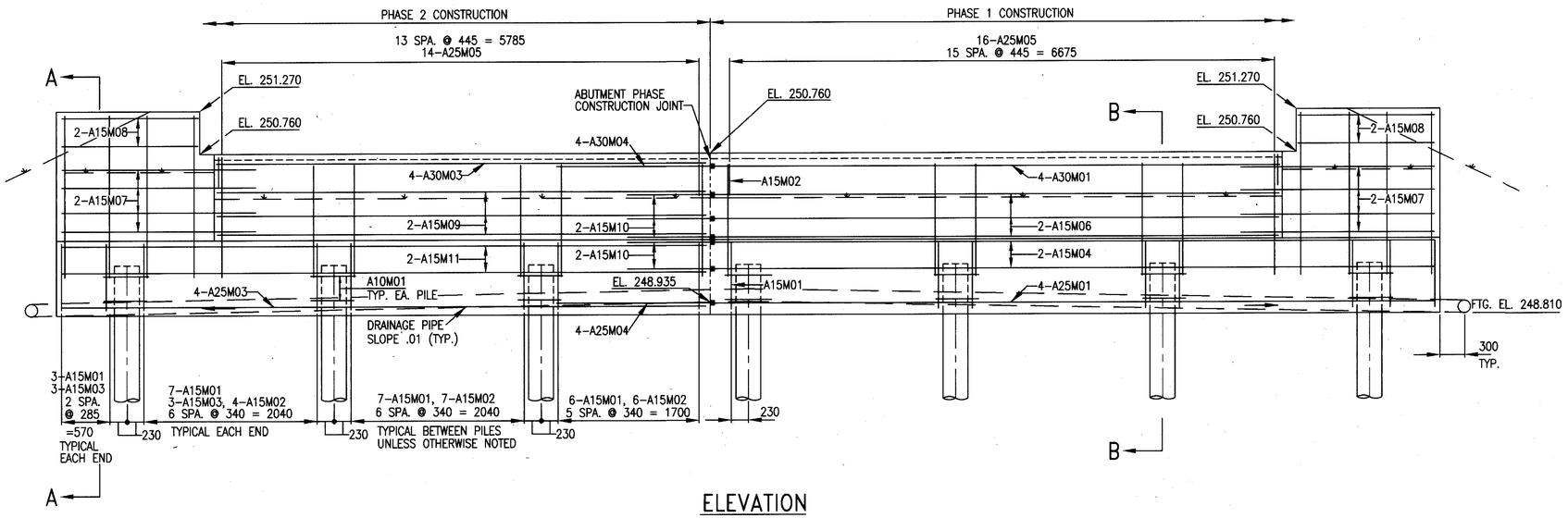
WORK POINT STATIONS ARE AT C/L PILES.

FOR ADDITIONAL PILE DATA, SEE GENERAL NOTE SHEET 4/9

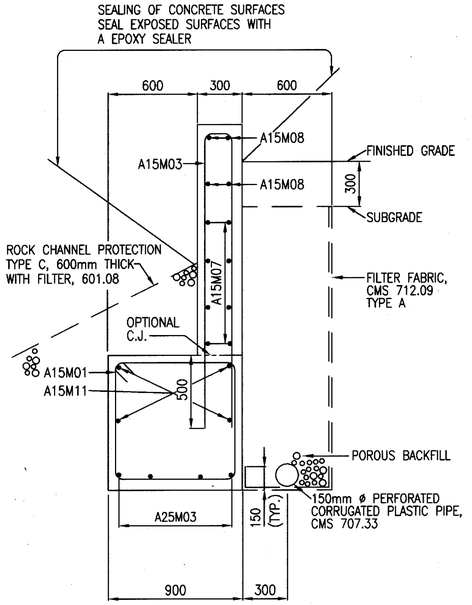
REAR ABUTMENT PLAN

LEGEND
(NO) = PILE NUMBER
BRG. = BEARING
SPA. = SPACES
C.J. = CONSTRUCTION JOINT

MINIMUM EPOXY BAR LAP
15M = 900
25M = 1800
30M = 2800

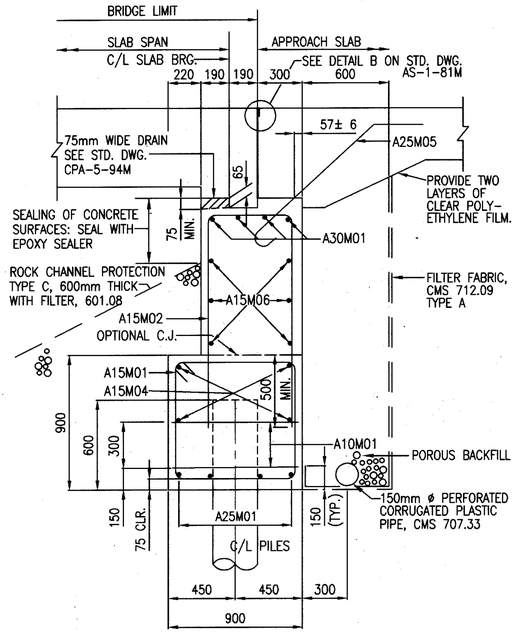


ELEVATION



SECTION A–A

POROUS BACKFILL WITH FILTER FABRIC,
600mm THICK SHALL EXTEND UP TO THE PLANE OF THE SUBGRADE, TO 300 mm BELOW THE EMBANKMENT SURFACE, AND LATERALLY TO THE ENDS OF THE WINGWALLS.



SECTION B–B

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB
DRAWN MK
CHECKED DBT
REVIEWED SM
DATE 9-29-97
STRUCTURE FILE NUMBER 3800490

REAR ABUTMENT
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

5 / 9

27
31

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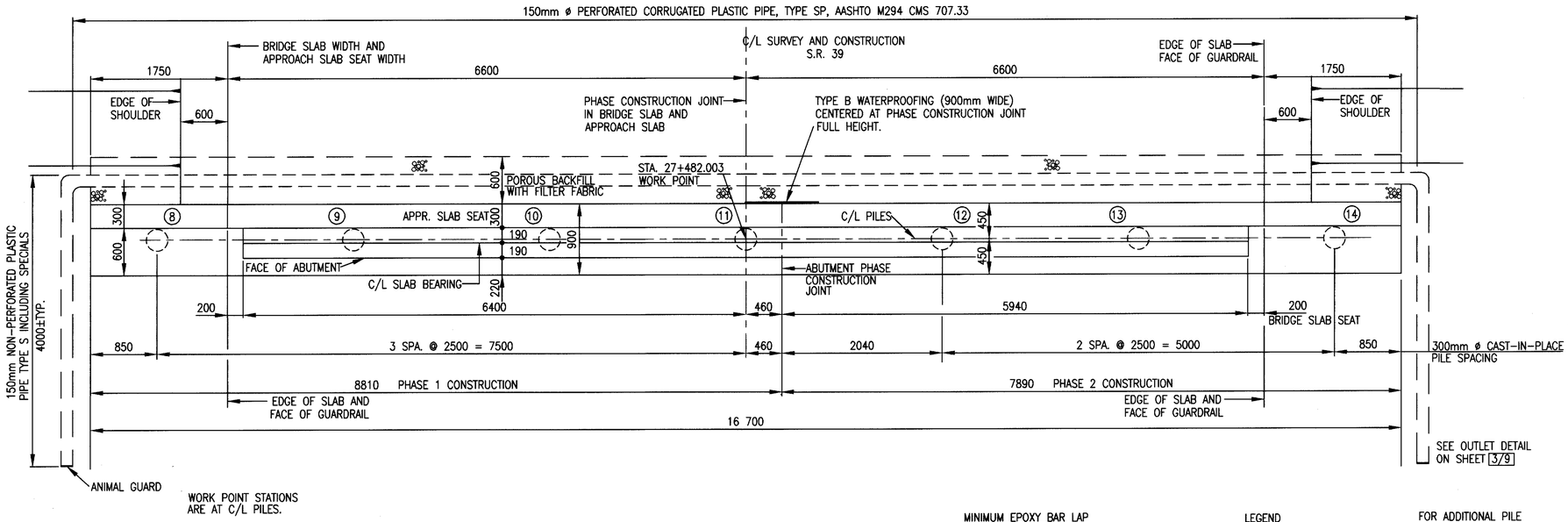
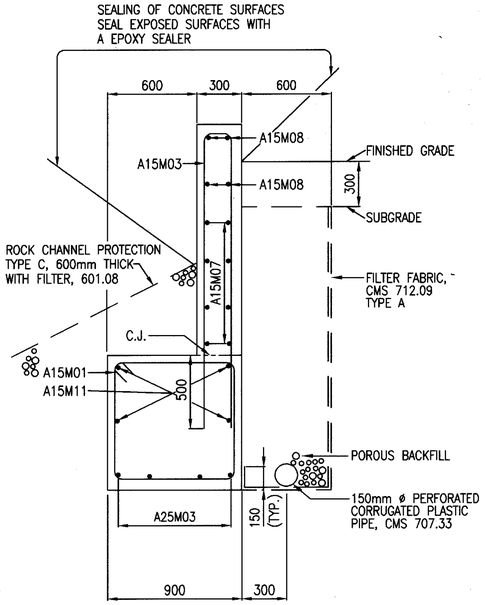


FORWARD ABUTMENT PLAN

MINIMUM EPOXY BAR LAP
15M = 900
25M = 1800
30M = 2800

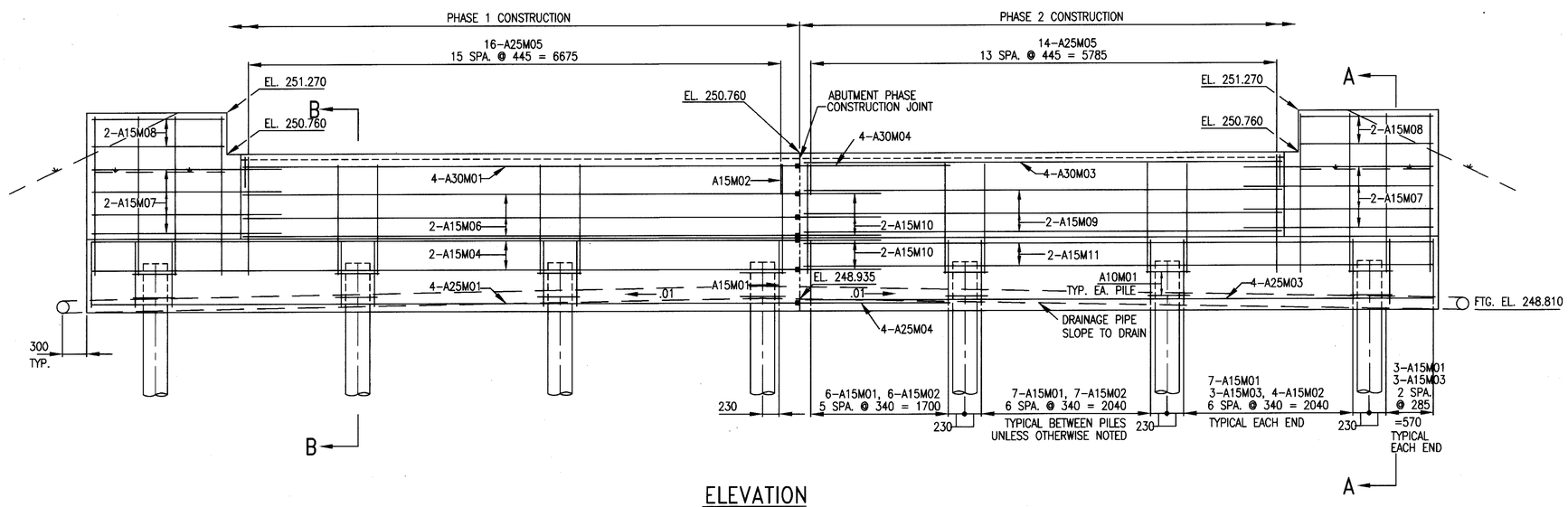
LEGEND
(NO) = PILE NUMBER
BRG. = BEARING
SPA. = SPACES
C.J. = CONSTRUCTION JOINT

FOR ADDITIONAL PILE DATA, SEE GENERAL NOTE, SEE SHEET 4/9

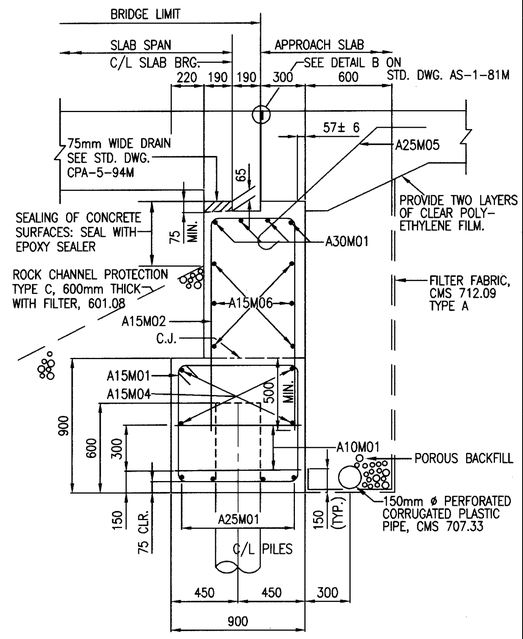


SECTION A-A

POROUS BACKFILL WITH FILTER FABRIC,
600mm THICK SHALL EXTEND UP TO THE PLANE OF THE SUBGRADE, TO 300 mm BELOW THE EMBANKMENT SURFACE, AND LATERALLY TO THE ENDS OF THE WINGWALLS.



ELEVATION



SECTION B-B

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MLK	SM	9-20-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
DBT		3800490	

FORWARD ABUTMENT
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27305)(27432)

6 / 9

28
31

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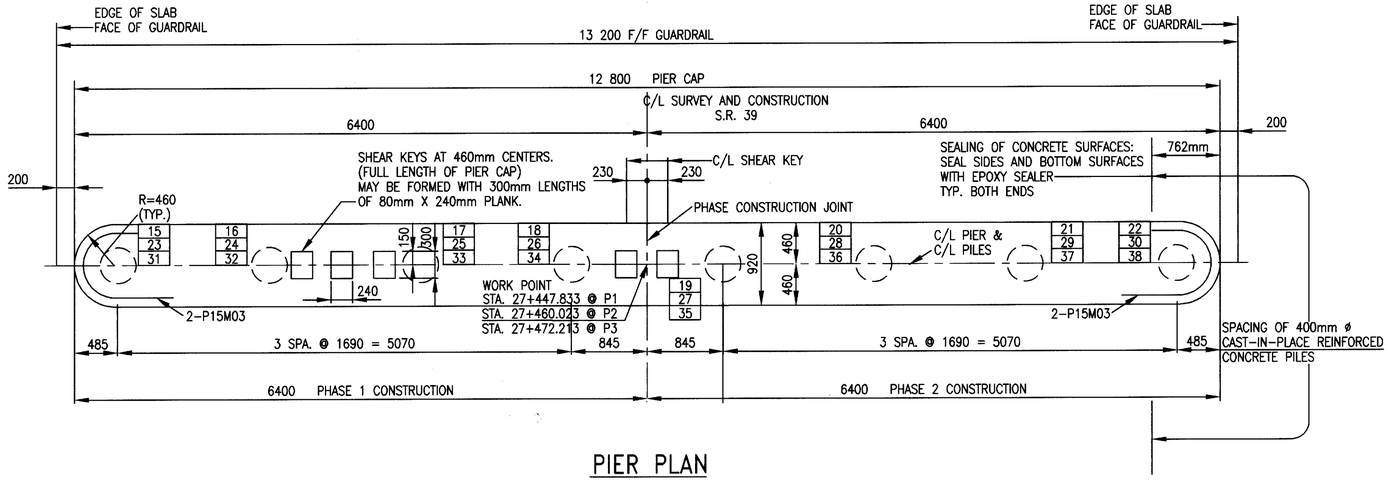
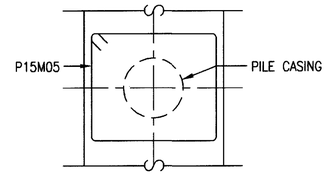
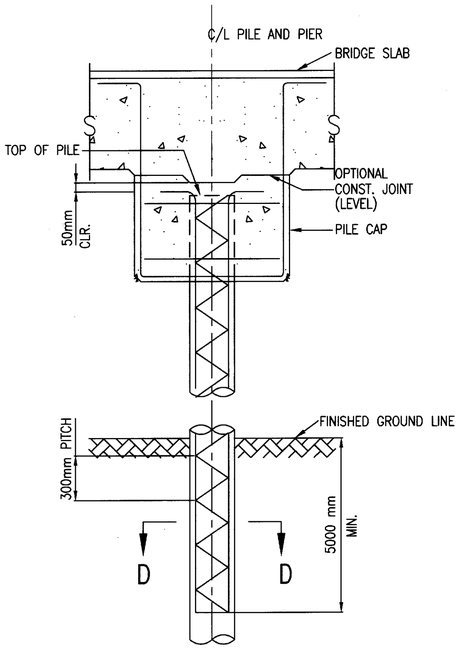


PIER PLAN



SECTION B-B

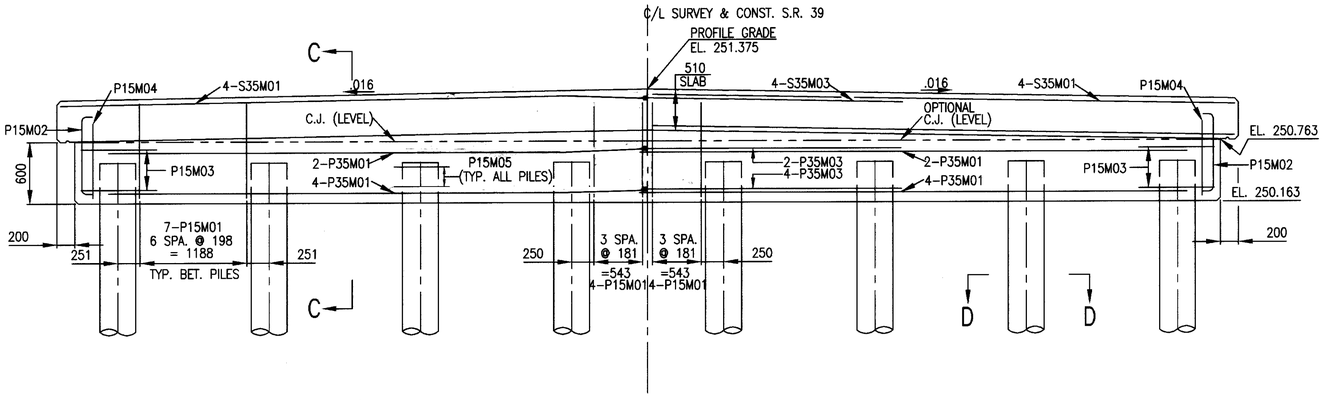


PROPOSED CONCRETE PILE REINFORCEMENT

FOR NOTES AND ADDITIONAL DETAILS, SEE STD. DWG. CPP-2-94M
FOR ADDITIONAL PILE DATA, SEE GENERAL NOTES SHEET 4/9

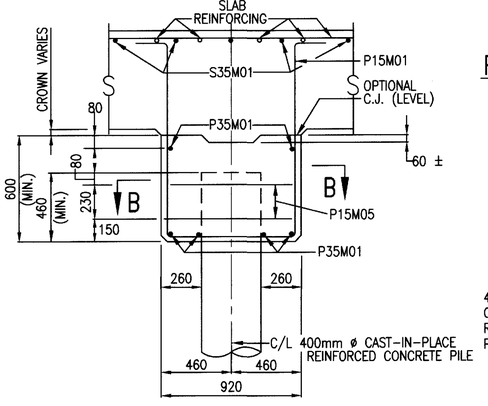
LEGEND
C.J. = CONSTRUCTION JOINT
P1 = PIER NUMBER
F/F = FACE TO FACE
SPA. = SPACES

21		PIER 1
29	= PILE NO. DESIGNATION FOR	PIER 2
36		PIER 3

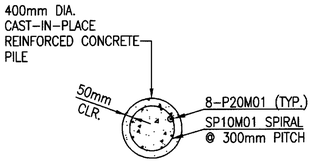


ELEVATION

MIN. BAR LAP
15M = 900
30M = 2450
35M = 2800



SECTION C-C



SECTION D-D

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED	DRAWN	REVIEWED	DATE
CAB	MK	SA	9-29-97
CHECKED	REVISED	STRUCTURE FILE NUMBER	
BCT		3800490	

PIER DETAILS
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

7 / 9

29
31

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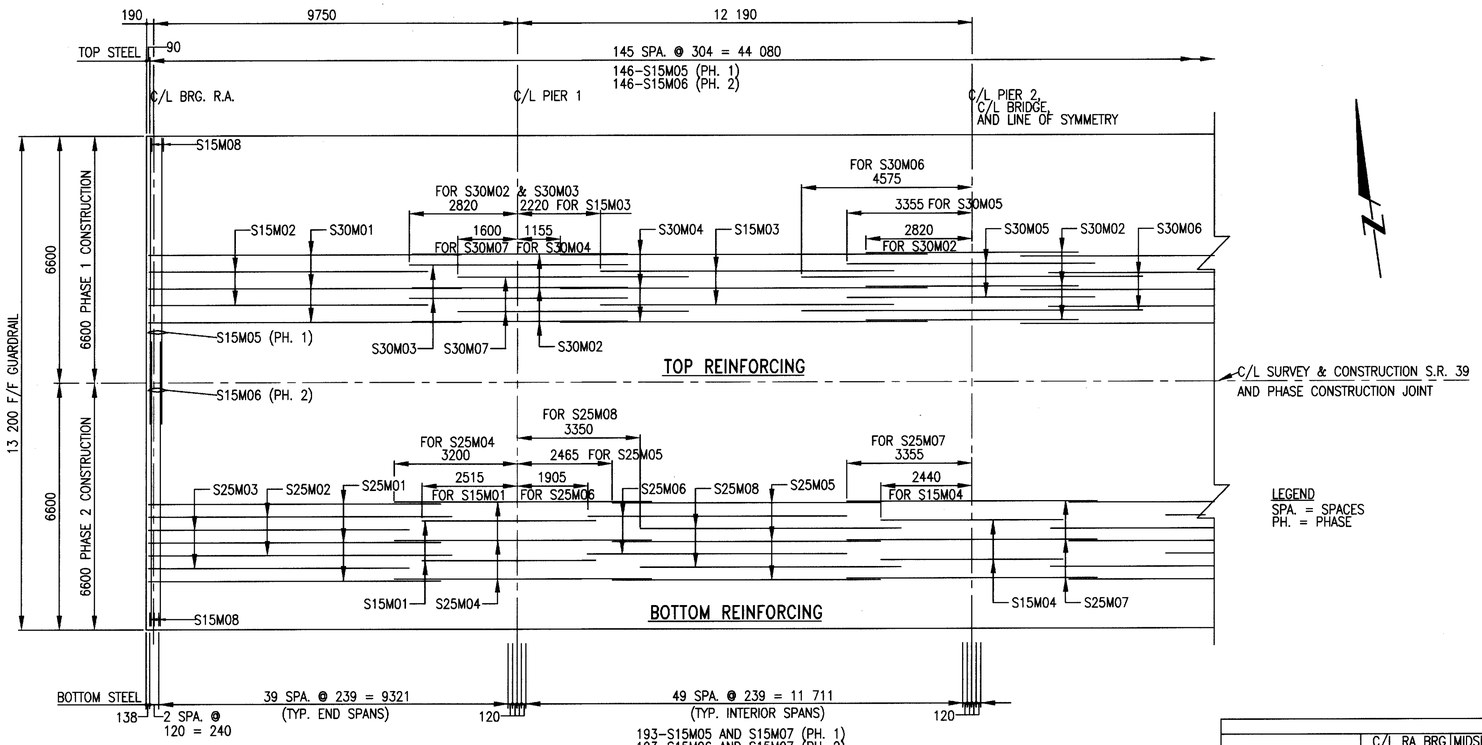
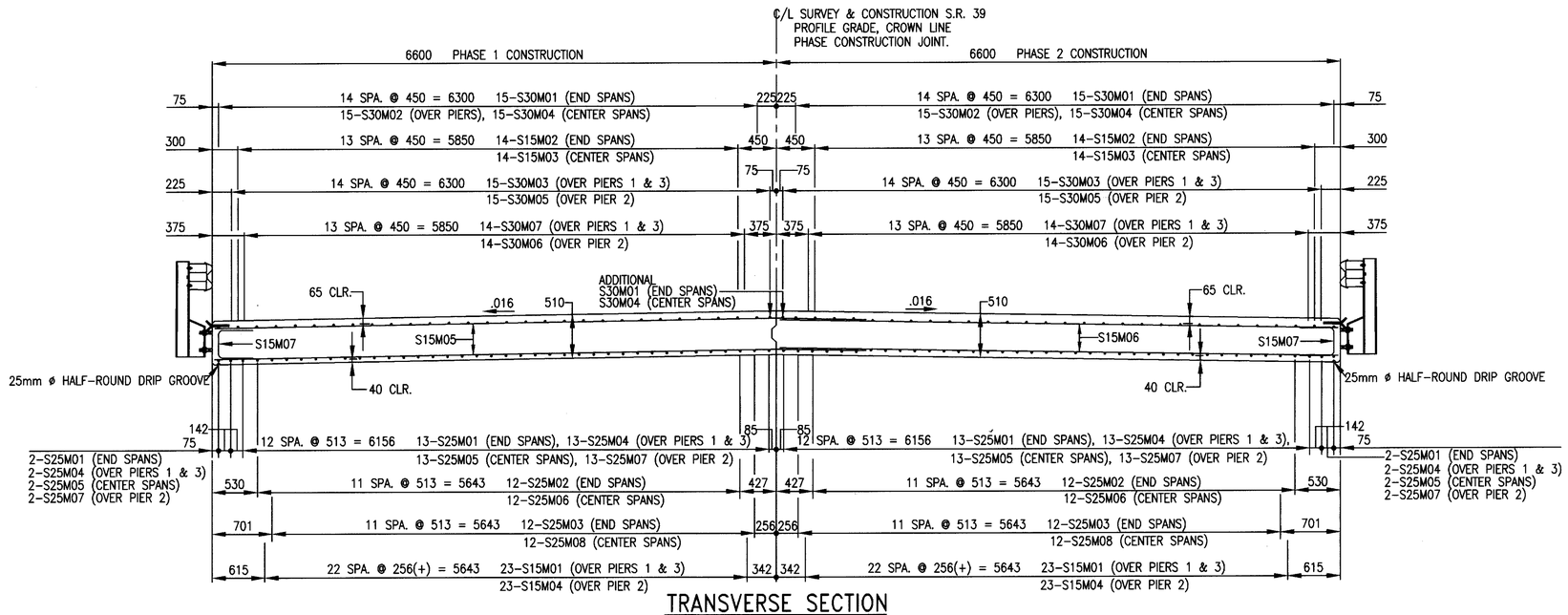


SLAB REINFORCING PLAN

	FINAL DECK ELEVATIONS								
	C/L RA BRG	MIDSPAN 1	C/L PIER 1 BRG	MIDSPAN 2	C/L PIER 2 BRG	MIDSPAN 3	C/L PIER 3 BRG	MIDSPAN 4	C/L FA BRG
LEFT EDGE OF DECK	251.269	251.269	251.269	251.269	251.269	251.269	251.269	251.269	251.269
PROFILE GRADE	251.375	251.375	251.375	251.375	251.375	251.375	251.375	251.375	251.375
RIGHT EDGE OF DECK	251.269	251.269	251.269	251.269	251.269	251.269	251.269	251.269	251.269

CAMBER OF 13mm AT MIDSPAN OF ALL SPANS SHALL BE PROVIDED TO COMPENSATE FOR THE DEAD LOAD DEFLECTIONS.
ALLOWANCE SHALL BE MADE FOR THE DEFLECTION OF ANY FALSEWORK MEMBERS SUPPORTING THE ACTUAL CONCRETE DURING PLACEMENT.

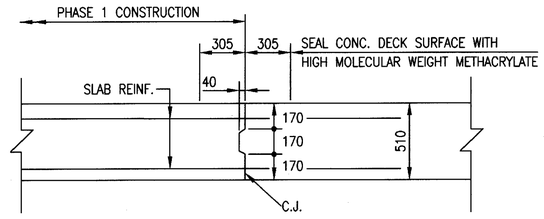


TRANSVERSE SECTION

FOR ADDITIONAL DETAILS
AT PIERS AND ABUTMENTS,
SEE STD. DWG. CS-1-93M

FOR DETAILS OF GUARDRAIL
SEE STD. DWG. DBR-2-73M

FOR ADDITIONAL DETAILS OF DRIP
STRIP AND GUARDRAIL CONNECTION
SEE GENERAL PLAN SHEET 3/9



PHASE CONSTRUCTION JOINT

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN MK | REVIEWED SM | DATE 9-29-97
CHECKED DJ | REVISED | STRUCTURE FILE NUMBER 3800490

SUPERSTRUCTURE DETAILS
BRIDGE NO. HOL-30-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

8 / 9
30
31

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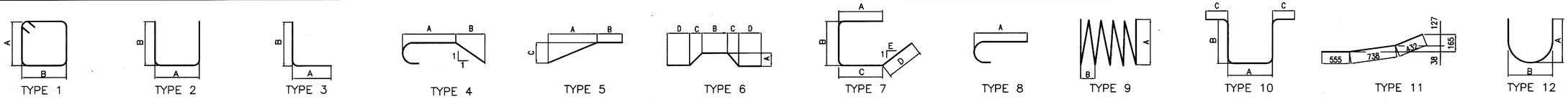


ABUTMENTS												
MARK	TOTAL	RA	FA	LENGTH	WEIGHT	TYPE	A	B	C	D	E	REMARKS
A10M01	28	14	14	2645	58	1	730	530				
A15M01	96	48	48	3325	501	1	775	800				
A15M02	72	36	36	3370	381	2	580	1435				
A15M03	24	12	12	4140	156	2	200	2010				
A15M04	8	4	4	□ 8760	110	STR.						WITH MECH. CONNECTOR
A15M06	12	6	6	□ 6810	128	STR.						WITH MECH. CONNECTOR
A15M07	32	16	16	2800	141	STR.						
A15M08	16	8	8	1650	41	STR.						
A15M09	12	6	6	□ 5840	110	STR.						
A15M10	20	10	10	□ 1000	31	STR.						WITH ONE END THREADED
A15M11	8	4	4	□ 7790	98	STR.						
A25M01	8	4	4	□ 8760	275	STR.						WITH MECH. CONNECTOR
A25M03	8	4	4	□ 7790	245	STR.						
A25M04	8	4	4	□ 1900	60	STR.						WITH ONE END THREADED
A25M05	60	30	30	1835	432	4	1125	305				
A30M01	8	4	4	□ 6810	299	STR.						WITH MECH. CONNECTOR
A30M03	8	4	4	□ 5840	257	STR.						
A30M04	8	4	4	□ 2900	127	STR.						WITH ONE END THREADED
				TOTAL	3450	KILOGRAMS						

PIERS												
MARK	TOTAL	P1	P2	P3	LENGTH	WEIGHT	TYPE	A	B	C	D	E	REMARKS
SP10M01	24	8	8	8	9125	593	9	300	300				
P15M01	150	50	50	50	3040	716	10	810	940	255			
P15M02	6	2	2	2	1370	13	2	940	255				
P15M03	12	4	4	4	3020	57	12	1300	770				
P15M04	6	2	2	2	2990	28	10	760	940	255			
P15M05	48	16	16	16	2920	220	1	770	610				
P20M01	192	64	64	64	9420	4259	3	260	9210				
P35M01	36	12	12	12	□ 5890	1665	STR.						WITH MECH. CONNECTOR
P35M03	8	6	6	6	□ 2850	403	STR.						WITH ONE END THREADED
					TOTAL	7954	KILOGRAMS						

SUPERSTRUCTURE											
MARK	NO.	LENGTH	WEIGHT	TYPE	A	B	C	D	E	REMARKS
S15M01	92	4955	716	STR.						
S15M02	56	7645	672	STR.						
S15M03	56	7750	681	STR.						
S15M04	46	4880	352	STR.						
S15M05	339	7620	4056	STR.						
S15M06	339	6500	3459	STR.						
S15M07	386	1030	624	2	350	380				
S25M01	60	7595	1789	STR.						
S25M02	48	7925	1493	STR.						
S25M03	48	7065	1331	8	6710					
S25M04	60	6555	1544	STR.						
S25M05	60	7265	1711	STR.						
S25M06	48	6935	1307	STR.						
S25M07	30	6710	790	STR.						WITH MECH. CONNECTOR
S25M08	48	6935	1307	STR.						
S30M01	64	8715	3065	STR.						
S30M02	90	5640	2789	STR.						
S30M03	60	6175	2036	STR.						
S30M04	64	9880	3475	STR.						
S30M05	30	6710	1106	STR.						
S30M06	28	9150	1408	STR.						
S30M07	56	6175	1900	STR.						
S35M01	24	□ 6500	1225	STR.						WITH MECH. CONNECTOR
S35M03	12	□ 3970	374	STR.						WITH ONE END THREADED
		TOTAL	39 210	KILOGRAMS						

THE REINFORCING BAR WEIGHT SHOWN IS FOR INFORMATION ONLY. THE COST OF REINFORCING IS INCLUDED WITH APPROPRIATE ITEM 844.

NOTE: ALL LENGTHS IN MILLIMETERS, ALL WEIGHTS IN KILOGRAMS, UNLESS OTHERWISE NOTED.

ALL DIMENSIONS MEASURED OUT TO OUT.

ALL BARS SHALL BE EPOXY COATED

50mm CLEARANCE FROM CONSTRUCTION JOINT WAS ASSUMED IN DETERMINING ALL BAR LENGTHS DESIGNATED WITH AN □ ADJUSTMENTS IN BAR LENGTHS DUE TO MECHANICAL SPLICING SHOULD BE MADE PRIOR TO FABRICATION.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTER INDICATES THE BAR LOCATION. NEXT TWO DIGITS AND LETTER INDICATES THE METRIC BAR SIZE DESIGNATION, AND THE REMAINING DIGITS ITS SEQUENCE NUMBER.
EXAMPLE: A35M01

1) A = LOCATION OF THE BAR IN THE STRUCTURE.
2) 35M = METRIC BAR SIZE DESIGNATION
3) 01 = SEQUENCE NUMBER.

DESIGN AGENCY
FRANKLIN CONSULTANTS, INC.
CONSULTING ENGINEERS
COLUMBUS, OHIO

DESIGNED CAB | DRAWN TMK | REVIEWED JA | DATE 9-29-97
CHECKED BJ | REVISED | STRUCTURE FILE NUMBER 3800490

REINFORCING STEEL
BRIDGE NO. HOL-39-27438
OVER
KILLBUCK CREEK OVERFLOW

HOL-39-(27.305)(27.432)

9 / 9

31 / 31

C:\DATA\673\673rs.DWG Wed Mar 04 14:35:40 1998 MK
8/28/98 S-4-98 MK

SPECIAL PROVISIONS

WATERWAY PERMITS
FOR

CRS: HOL-39-27.432

U.S. ARMY CORPS OF ENGINEERS
PERMIT NUMBER: NWP #14

OHIO EPA
PERMIT NUMBER:_____

DATE: 5/1/98

14. Road Crossings. Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided the activity meets all of the following criteria:

a. The width of the fill is limited to the minimum necessary for the actual crossing;

b. The fill placed in waters of the United States is limited to a filled area of no more than 1/3 acre. Furthermore, no more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;

c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;

d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,

e. For fills in special aquatic sites, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

This NWP may not be combined with NWP 18 or NWP 26 for the purpose of increasing the footprint of the road crossing. Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, District Engineers will define the term "expected high flows" for the purpose of establishing applicability of this NWP. (Sections 10 and 404)

The Ohio State Certification General Conditions apply to this nationwide permit.

OHIO STATE CERTIFICATION GENERAL CONDITIONS FOR NATIONWIDE PERMITS.

The following general conditions apply to Nationwide Permits 3, 4, 5, 6, 7, 12, 13, 14, 15, 16, 18, 19, 20, 22, 23, 25, 26, 27, 29, 30, 31, 32, 33, 34, 36, 37, 38, and 40.

Steps shall-be taken, upon completion of the projects, to ensure bank stability. This may include, but is not limited to, the placement of riprap or bank seeding.

Any damages to the immediate environment of the project by equipment needed for construction or hauling will be repaired immediately.

Care must be employed throughout the course of this project to avoid the creation of unnecessary turbidity which may degrade water quality or adversely affect aquatic life outside the project areas.

For Nationwide Permits 14, 21, 26 (1-3 acres), 29, 33, 37, and 38, that require Agency coordination, in accordance with the Nationwide Permit General Condition entitled "Notification", Number 13(e)(i), the Corps shall submit a pre-construction notification to Ohio EPA for review and comment.

NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS:

The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. No activity may cause more than a minimal adverse effect on navigation.

2. Proper maintenance. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. Erosion and siltation controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. Aquatic life movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity @ s primary purpose is to impound water.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and case-by-case conditions. The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e) and with any case specific conditions added by the Corps or by the State or tribe in its section 401 water quality certification.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. Tribal rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water quality certification. In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c).

10. Coastal zone management. In certain states, an individual State coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)

11. Endangered Species.

(a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at http://www.fws.gov/~r9endspp/endspp.html and http://kingfish.spp.mnfs.gov/tmcintyr/prot_res.html#ES and Recovery, respectively.

12. Historic properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g).

13. Notification.

(a) Timing: Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity: (1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division

Engineer; or (2) If notified by the District or Division Engineer that an individual permit is required; or (3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs S 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f);

(5) For NWP 21 - Surface Coal Mining Activities, the PCN must include an OSM or State approved mitigation plan.

(6) For NWP 29-Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permittee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description cf the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f);

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee t s spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31 Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(I) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;
(ii) A delineation of any affected special aquatic sites, including wetlands; and,
(iii) Location of the dredged material disposal site.
(8) For NWP 33-Temporary Construction, Access, and Deterring, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic sources.

(c) Form of Notification: The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) District Engineer's Decision: In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative-adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(i) For NWP 14, 21, 26 (between l and 3 acres of impact), 29, 33, 37, and 38. The District Engineer will, upon receipt of a notification, provide immediately, e.g., facsimile transmission, overnight mail or other expeditious manner, a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have S calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days (16 calendar days for NWP 26 PCNs) before making a decision on ,the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.
(ii) Optional Agency Coordination For NWPs 5, 7, 12, 13, 17, 18, 27, 31, and 34, where a Regional Administrator of EPA, a Regional Director of USFWS, or Regional Director of NMFS has formally requested general notification from the District Engineer for the activities covered by any of these NWPs, the Corps will provide the requesting agency with notification on the particular NWPs. However, where the agencies have a record of not generally submitting substantive comments on activities covered by any of these NWPs, the Corps district may discontinue providing notification to those regional agency offices The District Engineer will coordinate with the resources agencies to identify which activities involving a PCN that the agencies will provide substantive comments to the Corps The District Engineer may also request comments from the agencies on a case by case basis when the District Engineer determines that such comments would assist the Corps in reaching a decision whether effects are more than minimal either individually or cumulatively.
(iii) Optional Agency Coordination, 401 Denial. For NWP 26 only, where the State has denied its 401 water quality certification for activities with less than I acre of wetland impact, the EPA regional administrator may request agency coordination of PCNs between 1/3 and I acre. The request may only include acreage limitations within the 1/3 to 1 acre range for which the state has denied water quality certification. In cases where the EPA has requested coordination of projects as described here, the Corps will forward the PCN to EPA only. The PCN will then be forwarded to the Fish and Wildlife Service and the National Marine Fisheries Service by EPA under agreements among those agencies. Any agency receiving the PCN will be bound by the time frames for providing comments to the Corps.

(f) Wetlands Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:
(I) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;
(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees~ to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a I acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. Compliance certification. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:

a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;
b. A statement that any required mitigation was completed in accordance with the permit conditions;
c. The signature of the permittee certifying the completion of the work and mitigation .

15. Multiple use of Nationwide permits. In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

SECTION 404 ONLY CONDITIONS:

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. Water supply intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. Suitable material. No discharge of dredged or fill material may consist of unsuitable material (e.g. trash, debris, car bodies, asphalt, etc.) and material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

5. Spawning areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. Adverse effects from impoundments. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of temporary Fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 806

FIELD OFFICE
September 9, 1997

806.01 Description. This item shall consist of providing, maintaining and subsequently removing a field office for the exclusive use of the Department for the duration of the contract at a location approved by the Engineer. The field office will be designated as Type A, B or C.

806.02 General. The field office shall be available and completely functional at a time directed by the Engineer. The office shall have a minimum ceiling height of 2.1 m (7 feet) and have provisions for maintaining room temperature between 20 and 27 C (68 and 80 F). The Type C field office shall have a separate enclosed room for the Engineer. The Contractor shall provide and maintain telephone and electric service. One phone shall be connected to a recorded answering device. One speaker phone shall be required for Type B or Type C facilities. All field office types shall have one copying machine ;the copier shall be provided with all necessary maintenance and paper supplies, and be capable of producing multiple copies of documents up to 216 by 356 mm (8 1/2 by 14-inch) in size. The Type B and Type C field offices shall have a facsimile machine.

The office shall be provided with potable hot and cold water. The office shall also have neat, sanitary, enclosed toilet accommodations; associated lavatory and sanitary supplies shall be furnished. Portable facilities may be provided with the approval of the Engineer.

On all projects requiring moisture and density control of construction materials, the field office shall contain a storage box for a nuclear density gauge in accordance with drawings on file with the Director.

Additional requirements for field office and office equipment are as specified in the following table:

FIELD OFFICE

Item	Type A	Type B	Type C
Floor Space, m^2 (sq. ft.).....	14 (150)	46 (500)	93 (1000)
Telephone	2	4	4
Base Radio & 4-Hand Held Units[1]	--	--	1
10 Column Electronic Calculator with Tape	1	2	3
Desk and Chair Set	1	3	5
Work Tables, 750 by 1800 mm (30 by 72-inch)	1	2	3
4 Drawer, Legal Size, Lockable Metal File Cabinet	--	1	2
2 Drawer, Metal File Cabinet ...	1	2	2
Portable Fire Extinguishers - Type 2A10BC-5#	1	1	2
All Weather Parking Spaces ...	4	8	10
Plan Rack[2]	1	1	2

1. Units shall be capable of transmitting and receiving voice communication between office and any area on the project site.
2. Capable of handling the breakdown of 559x864 mm (22x34 inch) sized plans in to 10 sections.

The preceding requirements for the field office may be modified only upon written approval of the Engineer.

806.03 Computer Equipment for Field Office. Where required, the Contractor shall furnish, install, and maintain the following computer hardware and software in the field office required by this item for the life of the contract. All computer hardware and software furnished shall be for the exclusive use of the Engineer and staff and shall be operable at the same time as the field office.

This system shall not experience down time exceeding 48 hours from notification by the Engineer. The Contractor shall replace stolen, vandalized, or units otherwise inoperable within 48 hours after notification by the Engineer. Upon completion of the contract, the hardware and software furnished by the Contractor shall remain the property of the Contractor.

Computer Hardware

(1) One IBM PC compatible computer with an Intel Pentium processor (or equal) operating at a minimum 200 MHz. The computer shall be provided with the following **minimum** requirements:

a. 2.1 Gigabyte hard disk
b. 32 Megabytes RAM

c. one 3.5 inch., 1.44 MB floppy drive
d. one 8x CD-ROM drive
e. 101 key keyboard
f. 15 inch Hi-Res Super VGA Color Monitor 1024 X 768 resolution with .28 dot pitch and Hi-Res Super VGA Card with 2 Megabytes of Video RAM.
g. 2 Button Microsoft compatible mouse with appropriate software, compatible with required software.
h. At least 1 parallel port and 1 serial interface port and 1 mouse port.
I. one 56K firmware upgradeable 3Com compatible modem

(2) Hewlett Packard LaserJet compatible (PCL3 emulation) 6 page per minute printer or approved equal and parallel printer cable.

(3) Surge Protector. 15 amp six outlet with circuit breaker control, phone line circuit surge protection and a surge indicator light.

Computer Software

The Contractor shall furnish, load, and maintain the following software on the computers provided in the field offices: Microsoft Windows 95 (with games removed) and the Corel Professional Edition Office Suite Version 8.

All computer hardware and software shall be maintained by the Contractor during the life of the contract. Information for proposed "equal" equipment shall be submitted to the Engineer and be approved prior to use.

Along with the furniture under 806.02, the Contractor shall also provide the necessary stands, tables, etc. to accommodate the computer system.

806.04 Basis of Payment. The field office will be paid for at the contract price bid, which price shall be full compensation for furnishing, maintaining and subsequently removing the field office and all incidentals necessary to complete this item. The field office and any required computer equipment shall be paid on a monthly basis. The contract bid price shall be full compensation for furnishing, setting up, maintaining, and subsequently removing the specified computer hardware and software from the field office.

Item	Unit	Description
806	Month	Field office, Type_____
806	Month	Computer equipment for field office

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 842

CONCRETE FOR STRUCTURES

January 6, 1999

842.01 Description. This item shall consist of furnishing and placing portland cement concrete including reinforcing steel in accordance with these specifications and in reasonably close conformity with the lines, grades and dimensions shown on the plans. This item shall also include all costs associated with saw cutting grooves into the surface of superstructure concrete after the concrete has cured. Falsework and forms shall be in accordance with 508.

For prestressed concrete, see Supplemental Specification 865.

Concrete for structures shall met the requirements of Supplemental Specification 899 (Concrete - General), except as modified herein.

842.02 Materials. Materials shall conform to 899.02 except as follows:

Aggregate; all concrete above the ground line in a given substructure unit or all concrete for any given superstructure shall be made of aggregates of the same kind and colors, except upon permission of the Engineer.

Reinforcing materials; 509.02.

Curing materials; 705.05, 705.06 (white opaque), 705.07 Type 1 or 1D.

Joint filler;1/4 inch (6 mm) gray sponge 711.28, or preformed filler 705.03.

Seals; preformed elastomeric compression joint seals, 705.11.

842.03 Proportions. Concrete for structures shall be proportioned according to 899.03, using Class C or Class S as specified.

842.04 Concrete Test Specimens. On structures over 20 foot (6.1 m) span, two test cylinders will be made from each 200 cubic yards (150 m^3), or fraction thereof, of concrete that is incorporated each day in the work. On structures of 20 foot (6.1 m) span or less, not less than two cylinders will be made for each 50 cubic yards (35 m^3) of concrete.

When necessary to permit early removal of falsework or to permit backfilling, concrete test beams shall be made and tested according to standard methods on file in the office of the Director.

842.05 High-Early-Strength Concrete. The use of high-early-strength concrete shall be in accordance with 899.03. Curing and loading shall be in accordance with 842.14.

842.06 Mixing of Concrete. Mixing shall be according to 899.09.

When mixed, all concrete shall have a temperature of not more than 90 ºF (32 ºC), and the concrete shall be maintained under this temperature until deposited in the work.

When an air temperature of 60 ºF (16 ºC) or higher prevails at the time of placing concrete in a bridge superstructure over 20 foot (6.1 m) span, the Contractor shall add an approved chemical admixture (705.12, Type B or D) to the concrete.

842.07 Slump. Concrete shall have a slump such that it will be workable in the required position. It shall be of such a consistency that it will flow around reinforcing steel, but individual particles of coarse aggregate, when isolated, shall show a coating of mortar containing its proportionate amount of sand.

The slump of concrete placed by the vibration method shall be in accordance with 899.03, the slump being determined according to ASTM C 143.

842.08 Placing Concrete. The Contractor shall submit according to 501.06, a description of the procedures he proposes to use and notify the Engineer at least 24 hours in advance of placing concrete.

Superstructure concrete shall be placed only when the surface evaporation rate determined by using Figure 1 in ACI 308 is equal to or less than 0.2 lb./sq. ft./hour(1.0 kg/m^2/hour). The Contractor shall determine and document the ambient air temperature, concrete temperature, deck surface temperature, relative humidity, and wind velocity, subject to verification by the Engineer. No superstructure concrete shall be placed if the ambient air temperature is 85 ºF(30 ºC) or higher or predicted to go above 85 ºF(30 ºC)

during the concrete placement regardless of the surface evaporation rate.

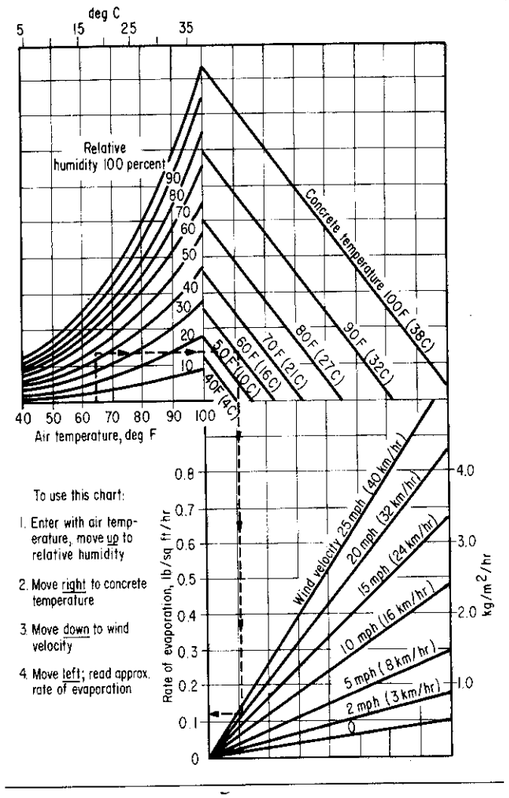
When a concrete deck is to be placed on continuous steel beams or girders, the placing of the concrete deck in any span shall not be started until all of the main beam or girder splices have been completed at least two piers beyond the pier or piers supporting the span in question.

Concrete for backwalls with steel expansion joints shall not be placed until the abutments have been backfilled to within 1 foot (0.3 m) of the bridge seat elevation and all structural steel or prestressed concrete beams have been erected, unless a different procedure is approved by the Director. The steel expansion joint shall serve as a template for the top of the backwall. If temporary bolts are used to support the backwall portion of an expansion device during the placing of the backwall concrete, these bolts shall be removed after the concrete has taken its initial set and before a change in temperature causes superstructure movement sufficient to damage the backwall.

In order that the concrete will be finished during daylight hours, the time of starting the concreting operations shall be subject to the approval of the Engineer.

The Contractor shall furnish assurance to the Engineer of an adequate and uniform source of supply of concrete to permit proper placing and finishing, and of the availability of coverings for protection in case of rain, before work will be permitted to start.

Figure1 ACI 308-81



Before placing the concrete, all forms and structural steel which will be in contact with the concrete shall be thoroughly cleaned and the space to be occupied by the concrete shall be free from all laitance, silt, dirt, shavings, sawdust, loose and built-up rust and other debris. The methods of depositing shall be such as to insure that all reinforcing steel is completely enveloped in concrete mortar and such that this condition can be verified by inspection. The method or device used for conveying the concrete from the mixer to its place in the work shall be such as to insure against separation of the coarse aggregate from the mortar. When concrete is being deposited in shallow members, such as slabs, it shall be placed with as short a vertical drop as practicable. The concrete shall be deposited so as to maintain a surface practically horizontal over the section being placed.

When a chute is used, its slope shall be such as to allow concrete of the proper consistency to flow readily without segregation. Concrete shall be deposited as near as possible to its final position.

Concrete shall not be dropped into the forms a distance of more than 5 feet (1.5 m). Drop chutes shall be used to limit free fall to 5 feet (1.5 m) and the delivery ends shall be as nearly vertical as practicable.

The use of mortar topping for concrete railing caps and other similar surfaces shall not be permitted.

The use of the vibration method of placing all concrete, in structures is required. The Contractor shall furnish and have in use sufficient vibration equipment of an approved type and size to properly compact each batch immediately after it is placed in the forms.

The vibrators shall generally be of a type that is applied directly to the concrete and have a frequency of at least 4500 impulses per minute, but where inaccessibility precludes this method of vibration, the vibrators shall be applied externally to the forms.

The concrete shall be deposited as near its final position as possible and shall not be caused to flow long distances by vibrators. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. Vibrators shall be inserted into and withdrawn from the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but not continued so as to cause segregation. Care must be used not to disturb partially hardened concrete.

Such spading as is necessary to insure smooth surfaces and dense concrete shall be done along form surfaces and in corners and locations impossible to reach with the vibrators, The Engineer shall with the collaboration of the Contractor closely observe the results obtained on the first concrete placed and such alterations shall be made in the mix, as permitted by these specifications, as are necessary to secure the best results.

The surface of the finished concrete shall be covered immediately with wet burlap.

842.081 Slipform Construction of Bridge Railing. Unless the plans eliminate the use of slipforming for this project, the Contractor is permitted the option of slipforming the bridge parapets and medians If the Contractor elects to slipform, the finished concrete shall meet the following tolerances from plan dimensions:

Reinforcing steel cover	-½ inch (-13mm) + ½ inch (+ 13 inch)
Top width dimension	-0 + 1/4 inch (+ 6 mm)
Bottom width dimension	-0 + ½ inch (+ 13mm)
Surface flatness	1/4 inch in 10 feet (6 mm in 3 meters)
Vertical alignment (Deviation from a line parallel to the grade line)	½ inch in 20 feet (13 mm in 6 meters)

All reinforcing steel joints and/or splices in the bridge railing steel shall be tied. A dry run to check for reinforcing clearance and rigidity of the reinforcing cages shall be required before any concrete is placed. The Contractor shall verify reinforcing clearances and make any adjustments to the cage to establish the required clearances during the dry run. Reinforcing steel cages are to be rigid (defined as no movement during the slipforming dry run). If the Engineer determines the cages are not rigid, the Contractor must stabilize the cages before any slipforming is performed. The Contractor may add any additional diagonal reinforcing steel between the front and rear vertical reinforcing faces to establish the required rigidity. Any additional reinforcing steel required to adequately stabilize the cages shall be the Contractor's expense.

Honeycombing, cracking, tearing and other defects shall be repaired or patched immediately upon exit from the slipform equipment. Defects shall be completely filled with concrete. The use of water to smooth or close the surface is not acceptable

Control Joints shall be constructed by sawing 1 1/4 inches (32 mm) deep into the perimeter of the parapet, after the concrete has taken its initial set but before any shrinkage cracks develop. Generally initial set is within 6 hours of batching of the concrete. All joints shall be sawed within 24 hours of placement. Joints shall be sawed by using an edge guide, fence or jig to insure that the joint is straight, true and aligned on all faces of the parapet. The joint width shall be the width of the saw blade, a nominal 1/4 inch (6 mm). The control joints shall be caulked with a polyurethane or polymeric material meeting Federal Specification TT-S-00227E

Slip formed concrete will require different slumps than those listed in 899 or other plan specified concrete. The consistency of the concrete should be such that the concrete exiting the slipform does not pull but is stiff enough to prevent waviness and sags in the finished surfaces. Method A, Water Curing, 842.14 is required. As slipformed concrete has a low water/cement ratio, timely application of the water cure is critical in helping control shrinkage cracks.

No water shall be added or applied to the concrete after it has left the truck.

The Contractor shall furnish all necessary platforms to protect against falling debris during the slipforming operation, to allow access for completing the finishing operation and to allow the inspector access.

The Engineer will inspect the slipformed surface for horizontal cracking no earlier than 21 days after completion of the slipforming operation. All horizontal cracks shall be repaired by epoxy injection. If a concrete sealer has been applied, any damage to the sealer shall be repaired after the epoxy injection has been completed. The aforementioned repairs shall be made at no additional cost to the State

842.09 Construction Joints. When construction joints are shown on the plans, all concrete between consecutive joints shall be placed in a continuous operation. Concrete shall not be placed against the side of any joint for at least 12 hours, or as required by 842.14.

Approval of the Director must be obtained for placing any construction joint not shown on the plans or permitted by 842.08 and 842.16.

The plans on which a day's work is to terminate shall be predetermined before depositing of concrete begins. They shall in general be perpendicular to the lines of principal stress and in regions of small shear. Horizontal joints will not be permitted in concrete girders and beams. Slabs acting with concrete beams or girders shall be deposited continuously with them unless composite construction is specified.

All construction joints shall be made with bulkheads provided with keys which clear all exposed surfaces approximately one-third the thickness of the joint.

Horizontal joints in piers, abutments and retaining walls generally shall be avoided and, when they are used, shall not be located within 2 feet (0.6 m) of the normal water level.

Construction joints not shown on the plans and above ordinary low water, in abutments, and in retaining walls that retain earth fills shall be waterproofed on the back with a 36 inch (1 m) strip of Type B waterproofing according to 512 at the Contractor's expense.

Joints in cantilevered members shall be avoided.

Horizontal construction joints shall have the surface of the concrete below the joint dampened immediately prior to placing adjoining concrete.

Horizontal construction joints between bridge slabs and superimposed curbs, parapets, sidewalks and median strips, shall be placed and protected the same as the remainder of the slab. They shall be cured in accordance with 842.14.

Care shall be exercised to avoid disturbing the bond of curb reinforcing steel protruding from the concrete. If the curb areas are used by workers when placing the deck concrete, the reinforcing steel shall be tied and/or braced to prevent its movement.

Where walls or columns support slabs or beams, the concrete in the vertical member shall be deposited up to the bottom of the supported member and a period of at least 2 hours shall elapse for settlement before placing concrete in the horizontal member.

842.10 Emergency. When the work is unexpectedly interrupted by break-downs, storms or other causes and the concrete as placed would produce an improper construction joint, the Contractor shall rearrange the freshly deposited concrete to provide a suitable construction joint. When such a joint occurs at a section on which there is shearing stress, he shall provide an adequate mechanical bond across the joint by forming a key, inserting reinforcing steel or by some other means satisfactory to the Engineer, which will prevent a plane of weakness.

842.11 Depositing Concrete Under Water. No concrete except for cofferdam seals shall be deposited under water, unless by special permission of the Director. If such permission is granted, care shall be exercised to prevent the formation of laitance.

Concrete shall not be deposited until any laitance, which may have formed on concrete previously placed, has been removed. Pumping shall be discontinued while depositing foundation concrete if it results in a flow of water inside of forms. If concrete other than cofferdam seals is deposited under water, the proportion of cement used shall be increased at least 10 percent at no extra expense to the State, to compensate for losses due to water. Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket or other approved method and shall not be disturbed after being deposited.

842.12 Depositing and Curing Concrete During Cold Weather. When an atmospheric temperature of 32 ºF (0 ºC) or less exists at the time concrete is placed, or is predicted by weather forecasts to occur during the curing period, the following procedures shall apply:

The water or aggregate or both shall be heated as necessary to make the temperature of the concrete not less than 50 ºF (10 ºC) nor more than 70 ºF (21 ºC) when placed.

Concrete shall not be placed in contact with materials having a temperature of less than 32 ºF (0 ºC). If necessary, the forms, reinforcing steel and foundation materials shall be heated before the concrete is placed.

The concrete shall be protected from freezing and specified temperatures for curing shall be maintained by a heated enclosure, insulated forms or by either of these used in combination with flooding, except that insulation alone may not be used to protect and cure deck slabs less than 10 inches (250 mm) thick.

The heated enclosure shall surround the top, sides and bottom of the concrete to be placed during cold weather except that concrete surfaces which have been flooded need not be enclosed.

The concrete shall be cured by maintaining the surface temperature between 50 ºF and 100 ºF (10 ºC and 38 ºC) for a period of not less than five days except as modified below for concrete flooded with water. At the end of this curing period, the temperature shall be reduced at a rate not to exceed 20 ºF (11 ºC) in 24 hours until it is within 20 ºF (11 ºC) of atmospheric temperature.

Sufficient high-low thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. For deck slabs, the surface temperature shall include deck bottoms, deck facia and deck top surfaces.

Removal of falsework and opening to traffic shall be not earlier than specified by 842.14.

(a) When a heated enclosure is used. The enclosure and heating devices shall be as nearly complete before any concrete is placed as the placing will permit. Throughout the entire concreting operation, the completion of enclosures and the application of heat shall follow the placing of concrete as closely as possible.

Heat may be supplied by any method which will maintain the required temperature continuously with a reasonable degree of uniformity in all parts of the enclosure without discoloring the concrete.

Combustion-type heating units shall be vented from the enclosure.

If dry heat, other than free steam, is used with method (a) curing, all exposed concrete shall be covered with two thicknesses of burlap as soon after placing the concrete as it can be done without marring the surface. The burlap shall be wetted and kept continuously wet and shall not be removed during the heating period, except as required for rubbing. Wood forms without liners, left in place more than two days after the placing of concrete, shall be thoroughly wet at least once each day for the remainder of the heating period. If forms are removed during the heating period, the concrete shall be thoroughly drenched with water and covered with burlap as noted above for the remainder of the heating period.

Enclosures shall be strong and wind proof, and provide adequate space to allow free circulation of air around the forms and deposited concrete.

(b) When insulation is used. Sufficient thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. Whenever the surface temperature, as indicated by the thermometer readings, approaches 100 ºF (38 ºC), the forms or insulation shall be loosened or otherwise vented to keep the surface temperature within the specified limits. If the thermometer readings indicate that the minimum required temperature is not maintained, the structure shall be promptly enclosed and heated as provided above or flooded as specified below.

The insulating material shall be wind and water resistant. Precautions shall be taken at edges and corners to insure that such points of extreme exposure are adequately protected. The top surface of the concrete shall be protected by a tarpaulin, or other approved waterproof cover, placed over the insulation.

(c) When the concrete is to be flooded with water. The concrete may be flooded as soon as it can be done without damaging it. Flooding water shall be heated to a temperature of not less than 50 ºF (10 ºC) nor more than 100 ºF (38 ºC). The heated flood water may be discontinued after 48 hours if the concrete remains flooded to a depth of 1 foot (0.3 m) above its highest elevation for at least the subsequent 120-hour period.

842.13 Removal of Forms. In order to facilitate finishing, forms on vertical surfaces which are to receive a rubbed surface finish shall be removed as soon as the concrete has hardened sufficiently that it will not be damaged.

842.14 Curing and Loading. Concrete for structures shall have the falsework removed and be opened to traffic in not less time than is specified by the following table:

		Age of Concrete in Days	
	Span (a)	**No Beam Test**	**Beam Test (b)**
Removing Falsework	Over 10' (3.0 m)	14	5
	10' (3.0 m) or less and all pier caps	7	3
Traffic	Any	14	7

(a) Span in this circumstance is defined as the horizontal distance between faces of the supporting elements when measured parallel to the primary reinforcement.

(b) Applicable only when the average modulus of rupture for two tests is not less than 650 psi (4.5 MPa).

When the temperature of the air surrounding the concrete is above and maintained above 32 ºF (0 ºC) and below 50 ºF (10 ºC) and the provisions of 842.12 are not in force, the duration of the cure shall be based on a beam test, except that the curing time shall not be less than tabulated above.

When a beam test is not performed, the time specified above for removing falsework and opening to traffic shall be extended one day for each day the temperature of the air surrounding the concrete is below 50 ºF (10 ºC).

All superstructure concrete, all concrete which is to have a sealer applied, and all construction joints shall be cured in accordance with Method (a) Water Curing. All other concrete shall be cured either by Method (a) Water Curing or Method (b) Membrane Curing. However, if Method (b) is used on areas to be waterproofed, the membrane shall be removed.

Compression rings are not to be installed on pier columns or similar items of construction for the purpose of supporting falsework or subsequent construction until after a 72-hour curing period.

No load shall be applied or other work conducted that will damage new concrete or interfere with its curing. Where work is necessary on new concrete to complete a structure, such as building forms on a footing, workers and materials shall be kept off such concrete until such time as it will not be damaged by the work in progress, but in no case shall the elapsed time between placing the concrete and working on same be less than 36 hours. No work that will interfere with the curing shall be done on concrete placed during cold weather unless insulating material to retain the heat in the mix is placed during periods in the day when the presence of workers will not interfere with the normal curing procedure. When this is done, the normal protection shall be resumed immediately after work is suspended. Proper curing shall have preference and, if necessary, workers shall be kept off so that the concrete may be thoroughly wetted and kept wet until the curing is completed.

Method (a) Water Curing. All surfaces not covered by forms shall be protected immediately after brooming or final finishing with two thicknesses of wet burlap and kept wet by the continuous application of water for a period of not less than 7 days. Formed surfaces shall, after the removal of forms, be cured in like manner for the remainder of the curing period with the entire surface of the concrete being thoroughly drenched with water and covered immediately after forms are removed.

In lieu of continuous sprinkling, wet burlap covered with white polyethylene sheeting or plastic coated burlap blankets 705.06 may be used. They shall be placed wet with the burlap side against the concrete. Adjoining plastic coated blankets or polyethylene sheets used to cover wet burlap shall be lapped sufficiently and held securely in place at laps and edges so that positive moisture seal is provided. White polyethylene sheeting or plastic coated blankets containing holes or tears shall be covered with an additional covering of sheeting or blankets as directed.

Method (b) Membrane Curing. Immediately after the free water has disappeared on

surfaces not protected by forms and immediately after the removal of forms, if such are removed before the end of the 7-day curing period, the concrete shall be sealed by spraying as a fine mist a uniform application of the curing material 705.07, Type 1 or 1D, in such manner as to provide continuous, uniform, water impermeable film without marring the surface of the concrete.

The membrane curing shall be applied in one or more separate coats at the rate of at least 1 gallon per 200 square feet (1 L/5m^2) of surface. To assure that the proper amount of the curing material is applied, the number of gallons (liters) of curing material in the spray container shall be noted, and the correct area for that volume laid off so that the area of concrete surface to be covered will be such that the approved application rate will be secured. Curing material shall be thoroughly agitated immediately previous to use. If the film is broken or damaged at any time during the specified curing period, the area or areas affected shall be given a complete duplicate treatment of the curing material applied at the same rate as the first treatment.

Unless adequate precautions are taken to protect the surface of the membrane, workers, materials and equipment shall be kept off the membrane for the duration of the curing period.

842.15 Surface Finish. Immediately after the removal of forms, all cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges and other defects shall be cleaned, dampened and completely filled, pointed or trued with a mortar of the same proportions as used in the concrete being finished. Exposed surfaces which are not satisfactory to the Engineer because of excessive patching and/or other corrective work, shall be grout cleaned or rubbed as required by the Engineer. Other contiguous exposed surfaces on the structure shall be finished in a similar manner to the extent required to produce a uniform appearance.

On all exposed surfaces, all fins and irregular projections shall be removed with a stone or power grinder, care being taken to avoid contrasting surface textures. Sufficient white cement shall be substituted for the regular cement in the filling of holes and other corrective work to produce finished patches of the same color as the surrounding concrete.

Grout Cleaning. Where grout cleaning is called for on the plans or is necessary for corrective work, the surface, after wetting, shall be uniformly covered with a grout consisting of one part cement to 1 1/2 parts fine sand, 703.03 and sufficient water to produce a consistency of thick paint. White portland cement shall be used for all or part of the cement in the grout, as directed by the Engineer, to give the color required to match the concrete. The grout shall be uniformly applied with brushes or a spray gun, and all air bubbles and holes shall be completely filled. Immediately after the application of the grout, the surface shall be vigorously scoured with a cork or other suitable float. While the grout is still plastic the surface shall be finished with a sponge rubber or other suitable float removing all excess grout. The finishing shall be done at the time when grout will not be pulled from the holes or depressions. After being allowed to thoroughly dry, the surface shall be vigorously rubbed with a dry burlap to completely remove any dried grout. There shall be no visible film of grout remaining on the surface after this rubbing and the entire cleaning operations of any area must be completed on the day it is started. If any dark spots or streaks remain after this operation, they shall be removed with a fine grained

silicon carbide stone, but the rubbing shall not be sufficient to change the texture of the surface. Unless otherwise directed by the Engineer, grout cleaning shall be delayed until the final clean up of the project.

Rubbed Finish. Forms shall be removed, if possible, within two days after concrete is placed. Corrections shall be made as outlined above. Rubbing of concrete shall be started as soon as the conditions will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of two hours. Sufficient time shall have elapsed before wetting down to allow the mortar used in pointing insert holes and defects to be thoroughly set. Surfaces to be finished shall be rubbed with a medium coarse silicon carbide stone until all form marks, projections and irregularities have been removed, all voids filled and a uniform surface has been attained. The paste produced by rubbing shall be left in place at this time. No additional material other than water shall be applied to the surface. After all concrete above the surface being finished has been placed, the final finish shall be obtained by rubbing with a fine silicon carbide stone and water. This rubbing shall be continued until the entire surface is of a smooth texture and uniform in color. Any surfaces which have been given a rubbed finish, shall be protected from subsequent construction operations. Any surfaces which are not protected shall be cleaned and again rubbed, if necessary, to secure a uniform and satisfactory surface.

No extra payment will be made for any type of surface finish, the cost being considered as included in the price bid for concrete.

842.16 Roadway Finish. Concrete deck slabs shall be finished in accordance with the requirements of 451.12 except that construction joints shall not be edged, and a strip of surface 9 to 12 inches (220 to 300 mm) wide adjacent to curbs and barriers shall not be grooved. The use of a broom drag on concrete deck slabs may be in the longitudinal or transverse direction. The requirement for use of a finishing machine may be waived by the Engineer for small bridges where their use is impractical.

The finishing machine shall be approved by the Engineer. It shall be self-propelled and equipped with forward and reverse drive mechanisms that enable precision velocity control of the machine while moving in either direction. It shall be equipped with one or more rotating rollers, leveling augers and either a vibrating pan or vibrating rollers. Vibrating frequency for pans or rollers shall be variable from 1500 to 5000 pulses per minute. The Contractor shall furnish the necessary verification of these frequencies. The finishing machine shall be capable of finishing transversely while traveling in either direction across the deck. Screeds shall have provisions for raising them above the concrete surface. The finishing machine shall be of sufficient size to finish the full width of the decks between curbs or parapet walls. The wheels of the finishing machine shall run on temporary riding rails adequately supported on structural steel or falsework. The rail and rail supports shall be made of steel and shall be arranged so that the weight of the finishing machine and the operator cause zero vertical deflection while traveling across the deck. Rail shall be straight with no sections exceeding a tolerance of 1/8 inch in 10 feet (3 mm in 3.0 m) in any direction. All support rails shall be elevated a sufficient distance above the slab to permit the simultaneous finishing by hand of any portions not finished by the machine. Any rail supports shall be fabricated and installed in such manner

as to permit their removal to at least 2 inches (50 mm) below the top of the slab. Holes formed by the removal of such supports shall be filled during the final finishing of the slab. The concrete shall be delivered and distributed at a uniform and adequate rate ahead of the finishing machine by suitable mechanical equipment. Concrete shall be placed no more than 10 feet (3m) directly in front of the finishing machine.

Bridge decks that are to be waterproofed with a membrane shall be given a burlap drag finish.

842.161 Bridge Deck Grooving. After the concrete has cured, transverse grooves shall be sawed into the deck. The grooving shall conform to the following requirements:

Grooving shall be done utilizing diamond blades, mounted on a multi blade arbor on a self-propelled machine which has been built for grooving of concrete surfaces. The groove machine shall have a depth control device which will detect variations in the pavement surface and adjust the cutting head height to maintain the depth of the groove specified. The grooving machine will be provided with devices to control alignment. Flailing or impact type grooving equipment will not be permitted.

Grooves shall begin and end approximately one foot from any curb, parapet toe or deck edge and shall be perpendicular to the bridge center line.

The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimension, and grooving of the surface.

Grooves shall run in a continuous pattern across the surface. The grooving shall be terminated a minimum of 1 foot (300mm) from any device in place in a bridge deck, such as scuppers or expansion joints. The grooves shall be a random pattern spaced at 3/8 to 1 3/4 inch (10 to 45 mm), with 50 percent of spacings being less than 1 inch (25 mm). The grooves shall be approximately 0.15 inches (4 mm) deep and 0.10 inches (3 mm) wide.

At the beginning of each work shift, all grooving machines shall be equipped with a full complement of grooving blades that are capable of cutting grooves of the specified width, depth and spacing.

If during the course of work, a single grooving blade on any individual grooving machine becomes incapable of cutting a groove, work will be permitted to continue for the remainder of the work shift and the Contractor will not be required to otherwise cut the groove omitted because of the failed blade. Should two or more grooving blades on any individual grooving machine become incapable of cutting grooves, the Contractor shall cease operating such equipment until it is repaired.

The removal of all slurry and any remaining residue resulting from the grooving operation shall be continuous. The bridge deck surface shall be left in clean condition, free of all slurry and residue. Residue from grooving operations shall not be permitted to flow across shoulders or lanes occupied by public traffic or flow into gutters or other drainage facilities. Solid residue, resulting from grooving operations, shall be removed from the surface before such residue is blown by the action of traffic or wind.

The Contractor shall be responsible for providing water as necessary to perform the specified grooving in accordance with the specifications.

842.17 Sidewalk Finish. The concrete shall be struck off after placing with a template and finished with a float to produce a sandy texture.

842.18 Method of Measurement. The volume shall be the number of cubic yards (cubic meters) determined by calculations from plan dimensions, in place, completed and accepted.

Reinforcing steel, supports, mechanical connectors, and tie wires shall be incidental in the price bid for structural concrete.

No deduction will be made for the volume of the reinforcing steel, conduits or structural steel other than beam flanges embedded in deck slabs. No deduction will be made for the volume of any embedded timber or concrete piles.

Superstructure concrete includes the concrete in deflective parapets not having a metallic railing.

Deck concrete may be measured by either volume or area. The area of concrete shall be based on plan dimensions.

842.19 Basis of Payment. Payment will be made at contract prices for:

Item	Unit	Description
842	Cubic yard (cubic meter)	Class ___ concrete, _____
842	Cubic yard (Cubic meter), Square yard (square meter)	Class ___ concrete, bridge deck

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 844

HIGH PERFORMANCE CONCRETE FOR STRUCTURES

May 5, 1998

844.01 DESCRIPTION. This item consists of supplying and placing a high performance concrete that is workable, finishable, and when necessary, pumpable.

The probability of higher than normal dosage rates of Type F or G admixtures is likely. The need for chemical admixtures or aggregates or both, different from the Contractor's normal sources is a distinct possibility.

All provisions of Item 511-Class S concrete will remain in effect, except as modified herein.

844.02 MATERIAL. The maximum sodium sulfate soundness loss for coarse aggregate will be 10 percent.

Fly ash will meet 705.13 Class C.

Ground granulated blast furnace (GGBF) slag will meet ASTM C 989, grade 100 minimum (manufacturer's certification is required). The one day cube strength results of ASTM C 1073 may be used in lieu of the 7 and 28 day cube strengths required by ASTM C 989.

Only one source of fly ash or GGBF slag will be used in any one structure, unless otherwise authorized by the Engineer. Bulk fly ash or GGBF slag will be stored in waterproof bins.

Micro-silica admixture will meet ASTM C 1240 and be from a source approved by the Office of Materials Management, 1600 W. Broad Street, Columbus, Ohio.

Cement will be Type 1 only (701.04); only one brand, grade or kind shall be used in any given superstructure except upon permission of the Engineer.

High molecular weight methacrylate resin sealer shall meet the requirements of Supplemental Specification 954.

The Contractor will obtain a written statement from the manufacturers of the chemical admixtures verifying the compatibility of the combination of materials and the sequence in which they are combined. The manufacturers will further designate a technical representative from its company or the ready-mix supplier to be in charge of the dispensing of the admixture products. The technical representatives will act in an advisory capacity and will report to the Contractor and the Engineer any operations and procedures which are considered by the representative as being detrimental to the integrity of the placement. The manufacturer's technical representative will be present during concrete placement unless his presence is waived by the Engineer.

844.03 PROPORTIONING. The proportioning options of 499.031 will not be permitted.

At least 3 days prior to placing the test slab, the Contractor will submit in writing the specific mix design and batching sequence for the project. This design is for the Engineer's information and review and only subject to approval for meeting the specification proportions.

If any proportioning or batching sequence modifications are needed, the Contractor will submit a revised mix design or batching sequence to the Engineer and perform another test slab at no additional cost to the State. A successful test slab pour, as determined by the Engineer, must be completed before any concrete is placed.

844.031 PROPORTIONING, SLIPFORMING. The Contractor is allowed the option of slipforming bridge parapets. A mix will be developed and a 6m (20 foot) section of parapet will be slipformed as a test section. Up to two thirds of the No. 8 Size coarse aggregate may be replaced with No. 57 Size coarse aggregate. The Engineer will approve the test section before any additional parapet concrete is allowed to be slipformed. The approved slipform concrete mix design will be submitted to The Office of Materials Management for record purposes.

Dimensional Tolerances and Acceptance Criteria.

Dimensions will not be in excess of the construction tolerances listed below:

Reinforcing steel cover	-13 (- ½ inch) + 13 mm (+ ½ inch)

Top width dimension	-0 + 6 mm (+ 1/4 inch)
Bottom width dimension	-0 + 13 mm (+ ½ inch)
Surface flatness	6 mm in 3 meters(1/4 inch in 10 feet)
Vertical alignment	13 mm in 6 meters
(Deviation from a line parallel	(½ inch in 20 feet)
to the grade line)	

All reinforcing steel joints and/or splices in the bridge railing steel shall be tied. A dry run to check for reinforcing clearance and rigidity of the reinforcing cages shall be required before any concrete is placed. The Contractor shall verify reinforcing clearances and make any adjustments to the cage to establish the required clearances during the dry run. Reinforcing steel cages are to be rigid (defined as no movement during the slipforming dryrun). If the Engineer determines the cages are not rigid, the Contractor must stabilize the cages before any slipforming is performed. The Contractor may add any additional diagonal reinforcing steel between the front and rear vertical reinforcing faces to establish the required rigidity. Any additional reinforcing steel required to adequately stabilize the cages shall be the Contractor's expense.

Honeycombing, cracking, tearing and other defects shall be repaired or patched immediately upon exit from the slipform equipment. Defects shall be completely filled with concrete.

Control Joints shall be constructed by sawing 32 mm (1 1/4 inches) deep the perimeter of the parapet, after the concrete has taken its initial set but before any shrinkage cracks develop. Generally initial set is within 6 hours of batching of the concrete. All joints shall be sawed within 24 hours of placement. Joints shall be sawed by using an edge guide, fence or jig to insure that the joint is straight, true and aligned on all faces of the parapet. The joint width shall be the width of the saw blade, a nominal 6 mm (1/4 inch).

Slip formed concrete will require different slumps than those listed in 499 or other plan specified concrete. The consistency of the concrete should be such that the concrete exiting the slipform does not pull but is stiff enough to prevent waviness and sags in the finished surfaces. Method A, Water Curing, 511.14 is required. As slipformed concrete has a low water-cement ratio, timely application of the water cure is critical in helping control shrinkage cracks.

No water shall be added or applied to the concrete after it has left the truck.

The Contractor shall furnish all necessary platforms to protect against falling debris during the slipforming operation, to allow access for completing the finishing operation and to allow the inspector access.

Concrete control joints will be sawed 35mm (1½ inch) into the concrete by use of an edge guide, fence or jig to assure the cut joint is straight, true and aligned on all faces of the parapet. the Joint will be a saw blade wide, (nominal 6mm (¼ inch)). The perimeter of the control joint will be caulked with a polyurethane or polymeric material meeting Federal Specification TT-S-00227E.

844.04 MIX OPTIONS. Unless specific concrete mixes are specified in the pay item descriptions, the following provisions will apply:

All superstructure concrete except for parapet concrete will consist of mix 3 or mix 4. If mix 3 is used for the deck, then all other concrete will be mix 1 or mix 3 concrete. If mix 4 is used for the deck, then all other concrete will be mix 2 or mix 4 concrete.

Any 499 calendar time restrictions regarding the use of fly ash will be waived for this concrete.

The following proportions will used as a starting mix design.

CONCRETE TABLE
Quantities Per Cubic Meter
Aggregates (SSD)

Mix 1 (Fly Ash)

Aggregate Type	Fine Aggregate (kg)	#8 Course Aggregate (kg)	Total (kg)	Cement Content (kg)	Fly Ash (kg)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	783	878	1661	314	101	0.38	7
Limestone	783	887	1670	314	101	0.38	7
Slag	783	771	1554	314	101	0.38	7

Mix 2 (GGBF Slag)

Aggregate Type	Fine Aggregate (kg)	#8 Course Aggregate (kg)	Total (kg)	Cement Content (kg)	GGBF Slag (kg)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	792	878	1670	291	125	0.38	7
Limestone	792	887	1679	291	125	0.38	7
Slag	792	768	1560	291	125	0.38	7

Mix 3 (Fly Ash + Microsilica)

Aggregate Type	Fine Aggregate (kg)	#8 Course Aggregate (kg)	Total (kg)	Cement Content (kg)	Fly Ash (kg)	Micro-Silica (kg)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	804	875	1679	285	89	18	0.40	7
Limestone	804	884	1688	285	89	18	0.40	7
Slag	804	768	1572	285	89	18	0.40	7

Mix 4 (GGBF Slag + Microsilica)

Aggregate Type	Fine Aggregate (kg)	#8 Course Aggregate (kg)	Total (kg)	Cement Content (kg)	GGBF Slag (kg)	Micro-Silica (kg)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	813	875	1688	261	113	18	0.40	7
Limestone	813	884	1697	261	113	18	0.40	7
Slag	813	768	1581	261	113	18	0.40	7

200mm maximum slump at placement for all mixes.

CONCRETE TABLE
Quantities Per Cubic Yard
Aggregates (SSD)

Mix 1 (Fly Ash)

Aggregate Type	Fine Aggregate (lb)	#8 Course Aggregate (lb)	Total (lb)	Cement Content (lb)	Fly Ash (lb)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	1320	1480	2800	530	170	0.38	7
Limestone	1320	1495	2815	530	170	0.38	7
Slag	1320	1300	2620	530	170	0.38	7

Mix 2 (GGBF Slag)

Aggregate Type	Fine Aggregate (lb)	#8 Course Aggregate (lb)	Total (lb)	Cement Content (lb)	GGBF Slag (lb)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	1335	1480	2815	490	210	0.38	7
Limestone	1335	1495	2830	490	210	0.38	7
Slag	1335	1295	2630	490	210	0.38	7

Mix 3 (Fly Ash + Microsilica)

Aggregate Type	Fine Aggregate (lb)	#8 Course Aggregate (lb)	Total (lb)	Cement Content (lb)	Fly Ash (lb)	Micro-Silica (lb)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	1355	1475	2830	480	150	30	0.40	7
Limestone	1355	1490	2845	480	150	30	0.40	7
Slag	1355	1295	2650	480	150	30	0.40	7

Mix 4 (GGBF Slag + Microsilica)

Aggregate Type	Fine Aggregate (lb)	#8 Course Aggregate (lb)	Total (lb)	Cement Content (lb)	GGBF Slag (lb)	Micro-Silica (lb)	Water to Cementitious Ratio	Max Air Content +/-2%
Gravel	1370	1475	2845	440	190	30	0.40	7
Limestone	1370	1490	2860	440	190	30	0.40	7
Slag	1370	1295	2665	440	190	30	0.40	7

8 inch maximum slump at placement for all mixes.

The weights specified in the concrete table were calculated for materials of the following bulk specific gravities (SSD): natural sand and gravel 2.62, limestone sand 2.68, limestone 2.65, slag 2.30, fly ash 2.65, GGBF slag 2.90, Microsilica solids 2.20, and Portland cement 3.15. For aggregates of specific gravities differing more than plus or minus 0.02 from these, the weights in the table will be corrected.

If, during the progress of work, the specific gravity of one or both of the aggregates changes, the batch weight will be adjusted to conform to the new specific gravity.

The water cement ratio will be calculated based upon the total cementitious material. Cementitious material will include Portland cement, fly ash, GGBF slag and Microsilica (solids).

The proportions of coarse and fine aggregate will be adjusted to provide the maximum amount of coarse aggregate possible and still provide a workable and +finishable mix. The Contractor may modify the mixes shown by adjusting the coarse and fine aggregates up to 50.0 kg.(100 pounds) each, unless otherwise approved by the Engineer.

844.05 PROVISIONS. An approved high range water reducer (Type F or G) will be used to achieve the desired workability level at the specified water cementitious ratio. These chemical admixtures will conform to 705.12 (ASTM C 494) Type F or G and be approved by the Office of Materials Management. The majority of these admixtures will be added at the plant.

Type A or D chemical admixture conforming to 705.12 (ASTM C494) will be added to the concrete at the plant. The addition of these admixtures will supersede the concrete temperature requirements under items 499.03 and 511.06. The trial batch, as specified below, will be repeated until the mix exhibits the necessary finishability characteristics.

The moisture content of the coarse aggregate will be above the saturated surface dry (SSD) condition immediately prior to being incorporated into the mix.

The cementitious content will be maintained and the maximum water cementitious ratio will not be exceeded. The Type F or G admixture will be added and mixed in accordance with the manufacturer's recommendations. The Contractor will furnish a volumetric dispenser for the Type F or G or have a gage on each truck-mounted Type F or G dispensing tank. After discharging concrete and prior to reloading, all wash water will be removed, by reversing each truck drum at the plant.

If Type F or G admixture is added at the job site, the load will be mixed a minimum of 5 minutes at mixing speed.

If during discharge any mechanical balling or microsilica balling whatsoever is

observed, the load shall be rejected and the mixing process revised to prevent further balling.

If slump loss occurs before placement of the concrete, the concrete may be "replasticized" with the admixture to restore plasticity. The slump range and air content will be rechecked to ensure conformance to the specifications. If the consistency of the load after "replasticizing" is such as to cause segregation of the components, this will be cause for rejection of the load. Discharge will be complete within 90 minutes after the combining of the water and the cementitious material.

The Contractor will perform sufficient advance testing to ensure conformance with these specifications prior to placement of the concrete.

Sampling and testing for entrained air content and slump will be measured at the point of placement. For deck pours, this will be at the point of placement on the deck.

The Contractor will make one or more trial batches of concrete meeting these specifications, of the size to be hauled, at least four days before the deck concrete is to be placed. The Contractor will cast one or more test slabs, 2.4m (8 feet) x 1.2m (4 feet) x 0.1m (4 inches), finished and textured in accordance with these requirements. The Contractor will not be required to saw the texture unless the deck texture is required to be sawn. If the workability of the trial batch is not acceptable, the Contractor will modify the mix design or batching sequence and retest as per 844.03. Payment for the trial batch or batches and test slabs will be at the lump sum price bid for High Performance Concrete Trial Mix.

844.06 PLACEMENT LIMITATION. Concrete deck pours will begin only when favorable atmospheric conditions exist and are predicted to stay favorable for the duration of the pour.

Favorable atmospheric conditions exist when the surface evaporation rate, as affected by the ambient air temperature, concrete temperature, relative humidity, and wind velocity is 0.49 kg per square meter per hour (0.1 pounds per square foot per hour) or less. Figure 1 ACI 308 (see Item 511.08) will be used to determine graphically the surface evaporation rate.

To meet favorable atmospheric conditions, the Contractor may be required to place concrete at night. Actual measurement of data required in Figure 1 will be within 3m (10 ft.) of the area where the concrete is to be placed. For piers, abutments, and poured parapets, Figure 1 will not apply. Figure 1 will apply for slip formed parapets.

If placement is to be made at night, the Contractor will submit a plan which provides adequate lighting for the work area at least 15 calendar days in advance, and

receive written approval from the Engineer before placing the concrete. The lights will be so directed that they do not affect or distract approaching traffic.

The Contractor will insure that concrete pumping lines do not displace reinforcing steel during placement.

844.07 EQUIPMENT FOR BRIDGE DECKS. Concrete will be mixed in a central mixing plant or by a ready-mixed truck capable of discharging concrete having a maximum water cementitious ratio of 0.38. Mixing equipment will meet the requirements of 499.04(b). Admixtures will be introduced into the concrete in such a manner as to facilitate dispersion throughout entire load. Batch plants will meet the requirements of 499.04(a) and will be located such that the maximum time required from start of mixing to completion of discharge of the concrete at the site will not exceed 90 minutes.

An approved self-propelled finishing machine will be used. The finishing machine will be equipped with forward and reverse drive mechanisms that enable precise velocity control of the machine while it is moving in either direction. It will be equipped with two or more rotating rollers. It will be equipped with augers and either a vibrating pan or vibrating rollers. Vibrating frequency for pan or rollers will vary from 1500 to 5000 pulses per minute. The Contractor will furnish the necessary verification of these vibration frequencies. Screeds will have provisions for raising above the finished concrete surface. Roller tampers attached to finishing machines to mechanically depress aggregate are not allowed.

The placing and finishing equipment will be designed so that the elapsed time between depositing concrete and final finishing will not exceed 10 minutes.

Standard hand vibration equipment shall be used. Because high performance concretes are more cohesive, more vibration is required for proper consolidation than for Class C and S mixes. Vibration, often between each rebar, will be required to adequately consolidate a bridge deck even though the surface appears well consolidated.

Finishing machines will be supported by rail and supports made of steel. Rail will be furnished in sections not less that 3m (10 feet) in length and be sufficient cross-section so that the weight of the finishing machine causes zero vertical deflection while in motion. Rail will be straight with no sections exceeding a tolerance of 3mm (1/8 inch) in 3.05m (10 feet) in any direction. Rail supports will be screw-type adjustable saddles and will be of sufficient number under the rail so that zero vertical deflection occurs under the weight of the finishing machine.

A flexible blue steel blade with rounded edges is recommended for finishing.

844.08 SUPERSTRUCTURE DECK CURING AND TEXTURING. Within 3m (10

feet) of the completed tining operation, the finished surface will be covered with a single layer of clean wet burlap. The burlap will be kept wet by a continuous flow of water through soaker hoses and covered with a 100 μm (4 mils) white opaque polyethylene film or a wet burlap - white opaque polyethylene sheet for 7 days. At the end of 7 days, the deck will be allowed to surface dry (joints and cracks sealed as per 844.10 below). Within 12 hours, membrane cure as per 511.14 method(b).

When pouring under provision of 511.12 methods which retard evaporation may be used, but the deck will be kept continuously wet with hoses and the curing will be 7 days with the surface being maintained between 10 ºC (50 ºF) and 38 ºC (100 ºF) as specified. At the end of 7 days, the deck will be allowed to surface dry (joints and cracks sealed as per 844.10). Within 12 hours, membrane cure as per 511.14 method(b).

At the Contractor's option, the Contractor may saw texture the deck instead of texturing as per 511. If the texture as required by 511 is not met, the Contractor will saw texture the deck at no cost to the State.

The texture operation will follow as closely as possible behind the placement.

Immediately after finishing, the Contractor will spray an evaporation retardant on the fresh concrete as per manufacturer's written recommendations. Only products specifically marketed for such usage will be utilized. This material will not be finished into the plastic concrete at any time. Application in a stream will not be allowed. The Contractor is not limited in spraying additional evaporation retardant to concrete surfaces.

844.09 CURING AND LOADING. Curing and loading will be per 511.14, except that the deck will not be opened to traffic until the 7 day water cure is completed and the membrane curing compound has been applied and allowed to dry for the minimum time recommended by the manufacturer. Superstructure deck concrete placed between October 15 and March 15 will not be opened to traffic for a minimum of 30 days after placement.

844.10 SEALING JOINTS AND CRACKS. After the water curing period has been completed and prior to the application of the membrane cure, the following areas will be sealed with a high molecular weight methacrylate (HMWM) sealer meeting SS 954: transverse joints in the deck; joints between the concrete deck and steel end dams; longitudinal joints in the deck; and longitudinal joints between the deck and safety curb, barriers, and parapets, etc. Payment for the material and placement of the HMWM sealer will be included in this item.

Prior to opening the deck to traffic, the deck will be checked on the top and bottom surfaces. Any cracking will be sealed from above with same HMWM product, in

accordance with the manufacturer's recommendations.

All costs for sealing in accordance with above, will be included with the appropriate concrete item. No separate payment for sealing will be made.

844.11 CHLORIDE RESISTANCE, DRYING SHRINKAGE, AND HEAT OF HYDRATION TESTING. When included as a separate pay item, the Contractor will perform rapid chloride permeability tests (AASHTO T 227) for every bridge deck placed using this concrete. A minimum of 3 tests will be made for decks containing less than 75 cubic meters (100 cubic yards) of superstructure concrete. For all other decks, 6 tests will be required. These tests will be made on the deck superstructure concrete samples obtained from the actual concrete used. The same number of drying shrinkage tests will be performed as per ASTM C 157.

Results of rapid chloride permeability tests will be shown at 28, 56 and 90 days. Results of drying shrinkage tests will be shown at 4, 7, 14, 28, 56 and 90 days.

Concrete heat of hydration testing will be performed to determine the potential for length change due to thermal expansion and contraction. Starting immediately after the placement of the deck, concrete temperatures will be taken and tabulated. A location will be chosen on the deck which is accessible for hourly readings and representative of the overall deck pour. The temperatures will be taken by installing three thermometers into the fresh concrete. The bulb of the thermometers will be located at 25mm (1 inch) below the surface of the concrete, at approximately mid-slab and at 25mm (1 inch) above the bottom deck form. The thermometers will be left in place throughout the testing time. Thermometers may be lubricated and placed in a thin plastic sheath to facilitate eventual removal. After removal, the holes remaining will be drilled out and filled as approved by the Engineer.

The following temperature intervals will be used:

Test Intervals	Time
2 hour	first 12 hours
3 hours	second 12 hours
4 hours	second day
8 hours	third thru fifth day

Ambient air temperatures will also be noted when each concrete temperature is taken. All testing will be performed by a testing laboratory regularly inspected by the "Cement and Concrete Reference Laboratories" (CCRL). A copy of the last CCRL inspection report will be furnished to the Engineer prior to the test slab pour.

If the Contractor uses mix 1 or mix 2 concrete for the parapets or substructures, the Contractor will make an additional 3 chloride permeability and drying shrinkage tests for that concrete. If used for the parapets, the Contractor will also test for heat of hydration as described above with one thermometer located at 25mm (1 inch) below

the top of the parapet and second thermometer located 500mm (19 inches) below the top of the parapet, approximately midway between the front and back faces of the parapet. For units constructed with the same concrete mix option as the deck, no additional testing will be required.

The results of all tests shall be tabulated on the attached form and forwarded to the following address no later than 10 days following the completion of the tests:

The Office of Structural Engineering
Ohio Department of Transportation, Room 516
25 South Front Street
Columbus, Ohio 43215

All costs of testing as outlined above will be paid for under the lump sum bid price for High Performance Concrete Testing.

844.12 METHOD OF MEASUREMENT. The quantity will be measured as per 511.18 and will included all labor, material, equipment and incidentals necessary to complete this item of work.

Payment for High Performance Concrete Testing will not be made until the Office of Structural Engineering has received the results of all tests.

844.13 BASIS OF PAYMENT. Payment for the above completed and accepted quantities will be made at the contract bid price for:

Item	Units	Description
844	Cubic meter (cubic yard)	High performance concrete superstructure (deck)
844	Square meter (square yard)	High performance concrete superstructure (deck)
844	Cubic meter (cubic yard)	High performance concrete superstructure (parapet)
844	Cubic meter (cubic yard)	High performance concrete substructure
844	Lump sum	High performance concrete trial mix
844	Lump sum	High performance concrete testing

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 899

CONCRETE - GENERAL

October 21, 1998

899.01 Description. This work shall consist of proportioning and mixing portland cement concrete.

899.02 Materials. Materials shall be:

Fine aggregate*	703.02
Fly ash	705.13
Coarse aggregate	703.02, 703.13***
Portland cement	701.01, 701.02, 701.03
	701.04, 701.05****
Ground granulated blast furnace slag	ASTM C 989, grade 100 or 120
Air entraining admixture.	705.10
Chemical admixture for concrete.	705.12**

*703.02 natural sand is required in 255, 451, 452, 453, 611, and 511 deck slabs.

**Admixtures shall contain no more than 50 parts per million chloride ions by weight of cement.

*** Applies only to 451, 452 and 453.

**** Use of Slag-Modified Portland Cement meeting ASTM C 595M, Type I(SM) is permitted; acceptance shall be in accordance with 701 and Supplement 1028. Type I(SM) may be used only between April 1 to October 1, and when 705.10 Air-Entraining Admixture is added at the mixer. Type I(SM) may not be used with Options 1 and 3.

Water used in concrete shall be free from sewage, oil, acid, strong alkalies or vegetable matter, and also shall be free from clay and loam. Water which is potable is satisfactory for use in concrete.

899.03 Proportioning. Proportioning shall be based on pre-determined cement content. Except as otherwise provided herein, each cubic yard (cubic meter) of concrete shall contain the specified weight of cement as determined by the yield calculation. The yield shall be within ± 1 percent of the theoretical yield of 27.00 cubic feet (1 m^3). The water-cement ratio shall not exceed the maximum specified. Below this limit, the quantity of water shall be adjusted to meet the slump requirements.

Concrete shall contain 6 ± 2 percent of total air, except as noted herein.

Slump shall be maintained within the range shown as nominal slump in the following table. No concrete shall be used in the work that has a slump greater than that shown as maximum in the table. When the slump is found to exceed the limit of nominal slump but is within the maximum limit, occasional loads of concrete may be used, provided an immediate adjustment is made in the mixture to reduce the slump of succeeding loads to within the nominal range shown.

Type of Work	Nom. Slump inch (mm)*	Max. Slump inch (mm)**
Concrete pavement (305, 451, 452, 453, 611, 615)	1-3 (25-75)	4 (100)
Structural Concrete (511, 610, 622)	1-4 (25-100)	5 (125)
Superstructure concrete (511)	2-4 (50-100)	4 (100)
Non-reinforced concrete (601, 602 603, 604, 608, 609, 612, 622)	1-4 (25-100)	5 (125)

*This slump may be increased to 6 inches (150 mm) provided the increase is achieved by the addition of a chemical admixture meeting the requirements of 705.12, Type F or G.

**This slump may be increased to 7 inches (180 mm) provided the increase is achieved by the addition of a chemical admixture meeting the requirements of 705.12, Type F or G.

Tests on the plastic concrete for pavement shall be made at the paving site or at a location designated by the Engineer. Tests for structure concrete shall be made at the site of the work at the point of placement.

The weights of fine and coarse aggregate shall be determined by the Engineer from the weights given in the Concrete Table. If high early strength concrete is specified, the Contractor may use high-early strength cement, additional cement, approved chemical admixtures, or a combination of these materials to achieve a modulus of rupture of 600 psi (4.2 MPa) in three days or less. If high-early-strength concrete is not specified, but is desirable to expedite the work, the Contractor may use these same materials at no additional cost to the state.

The weights specified in the Concrete Table were calculated for aggregates of the following bulk specific gravities: natural sand and gravel 2.62, limestone sand 2.68, limestone 2.65, and slag 2.30. The assumed specific gravities of fly ash and ground granulated blast furnace slag are 2.30 and 2.90, respectively. For aggregates of specific gravities differing more than plus or minus 0.02 from these, the weights in the table shall be corrected as indicated in paragraph (c).

CONCRETE TABLE

Quantities Per Cubic Yard (Meter)

Type of Coarse Aggregate	Dry Aggregates: Fine Aggregate lb (kg)	Dry Aggregates: Coarse Aggregate lb (kg)	Dry Aggregates: Total lb (kg)	Cement Content lb (kg)	Water-Cement Ratio Maximum
CLASS C (Using No. 57 or No. 67 Size)					
Gravel	1160 (688)	1735(1029)	2895(1717)	600 (356)	0.5
Limestone	1285(762)	1630(967)	2915(1729)	600(356)	0.5
Slag	1350(801)	1360(807)	2710(1608)	600(356)	0.5
CLASS F (Using No. 57 or No. 67 Size)					
Gravel	1270(753)	1810(1074)	3080(1827)	470(288)	0.55
Limestone	1345(798)	1730(1026)	3075(1824)	470(288)	0.55
Slag	1380(819)	1470(872)	2850(1691)	470(288)	0.55
CLASS S (Using No. 57 or No. 67 Size)					
Gravel	1125(667)	1735(1029)	2860(1697)	715(424)	0.44
Limestone	1260(747)	1530(908)	2790(1655)	715(424)	0.44
Slag	1280(759)	1370(813)	2650(1572)	715(424)	0.44

On projects specifying 451, 452, or 453, the following requirements shall apply. If No. 57 or 67 Size is approved, the quantities per cubic yard (cubic meter) will be in accordance with the above concrete table. If sizes No. 7, 78, or 8 are approved, the concrete shall contain 8 plus or minus 2 percent air, and the quantities will be in accordance with the following table:

Quantities Per Cubic Yard (Meter)

Type of Coarse Aggregate	Dry Aggregates: Fine Aggregate lb (kg)	Dry Aggregates: Coarse Aggregate lb (kg)	Dry Aggregates: Total lb (kg)	Cement Content lb (kg)	Water-Cement Ratio Maximum
CLASS C (Using No. 7, 78, or No. 8 Size)					
Gravel	1320(783)	1460(866)	2780(1649)	600(356)	0.5
Limestone	1380(819)	1410(837)	2790(1656)	600(356)	0.5

At any time during the construction period, the relative weights of fine and coarse aggregate as determined from the above table may be varied by the Engineer in order to insure a workable mix within the slump range and to control the yield. However, the total weight of aggregate per cubic yard (cubic meter) shall not be changed except as provided in the preceding paragraph as for the following conditions or both.

(a) For batch weights, the weights determined as described above shall be corrected to compensate for moisture contained in the aggregates at the time of use.

(b) If it is found impossible to prepare concrete of the proper consistency without exceeding the maximum water/cement ratio specified, a water reducing admixture conforming to requirements of 705.12 shall be used or the cement content shall be increased. However, the Contractor shall not be compensated for the admixture or additional cement which may be required by reason of such adjustment.

(c) If, during the progress of the work, the specific gravity of one or both of the aggregates changes, the batch weight shall be adjusted to conform to the new specific gravity.

(d) Unit weight determinations shall be made and the yield shall be calculated and maintained in accordance with ASTM C 138. Based on these determinations, the batch weights will be adjusted when necessary. However, the specified cement content shall be maintained within a tolerance of ± 1 percent and the maximum water-cement ratio shall not be exceeded.

(e) The amount of mixing water shall be adjusted for the moisture contained in the aggregate and for the moisture which they will absorb, in order to determine the amount of water to be added at the mixer.

(f) An approved set retarding admixture meeting the requirements of 705.12, Type B or Type D shall be required for concrete when the concrete temperature exceeds a nominal temperature of 75° F (24° C).

899.04 Proportioning Options. The Contractor may substitute one of the following options for all concrete items: The dry weights specified in these tables were calculated using the same specific gravities used in 899.03. The specific gravity used for ground granulated blast furnace (GGBF) slag is 2.90. Adjustments shall be made to the mix design due to specific gravities differing by more than 0.02. Other adjustments may be made as allowed in 899.03 and approved by the Engineer.

The requirements for Proportioning Option 1 are as follows. The cement content may be reduced as much as 15 per cent by weight with the substitution of an equivalent weight of fly ash meeting the requirements of 705.13. The water/cement ratio shall be based on the combined weight of cement and fly ash. Proportioning Option 1 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter).

Type of Coarse Aggregate	Dry Aggregates: Fine Aggregate lb (kg)	Dry Aggregates: Coarse Aggregate lb (kg)	Dry Aggregates: Total lb (kg)	Cement Content lb (kg)	Fly Ash lb (kg)	Water-CM Ratio Maximum
CLASS C Option 1 (Using No. 57 or No. 67 Size)						
Gravel	1140(676)	1700(1009)	2840(1685)	510(303)	90(53)	0.50
Limestone	1260(748)	1595(946)	2855(1694)	510(303)	90(53)	0.50
Slag	1320(783)	1330(789)	2650(1572)	510(303)	90(53)	0.50
CLASS F Option 1(Using No. 57 or No. 67 Size)						
Gravel	1260(748)	1800(1068)	3060(1815)	400(237)	70(42)	0.55
Limestone	1350(801)	1730(1026)	3080(1827)	400(237)	70(42)	0.55
Slag	1380(819)	1475(875)	2855(1694)	400(237)	70(42)	0.55
CLASS S Option 1 (Using No. 57 or No. 67 Size)						
Gravel	1060(629)	1640(973)	2700(1602)	608(361)	107(63)	0.44
Limestone	1230(730)	1490(884)	2720(1614)	608(361)	107(63)	0.44
Slag	1220(724)	1300(771)	2520(1495)	608(361)	107(63)	0.44
CLASS C Option 1 (Using No. 7, 78 or 8 Size)						
Gravel	1310(777)	1440(854)	2750(1631)	510(303)	90(53)	0.50
Limestone	1350(801)	1410(837)	2760(1638)	510(303)	90(53)	0.50

The requirements for Proportioning Option 2 are as follows. The cement content may be reduced as much as 50 pounds per cubic yard(30 kg/ m3), with the substitution of an equivalent volume of aggregate, provided the Contractor uses an approved water reducing admixture meeting the requirements of 705.12; Type A or Type D. Proportioning Option 2 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter).

Type of Coarse Aggregate	Dry Aggregates: Fine Aggregate lb (kg)	Dry Aggregates: Coarse Aggregate lb (kg)	Dry Aggregates: Total lb (kg)	Cement Content lb (kg)	Water-Cement Ratio Maximum
CLASS C Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1190(706)	1785(1059)	2975(1765)	550(326)	0.50
Limestone	1320(783)	1675(994)	2995(1777)	550(326)	0.50
Slag	1385(822)	1395(828)	2780(1649)	550(326)	0.50
CLASS F Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1315(780)	1880(1115)	3195(1896)	420(249)	0.55
Limestone	1410(837)	1810(1074)	3220(1910)	420(249)	0.55
Slag	1445(857)	1540(914)	2985(1771)	420(249)	0.55
CLASS S Option 2 (Using No. 57 or No. 67 Size)					
Gravel	1120(664)	1710(1015)	2830(1679)	665(395)	0.44
Limestone	1290(765)	1560(926)	2850(1691)	665(395)	0.44
Slag	1270(753)	1370(813)	2640(1566)	655(395)	0.44
CLASS C Option 2 (Using No. 7, 78 or No. 8 Size)					
Gravel	1370(813)	1510(896)	2880(1709)	550(326)	0.50
Limestone	1420(842)	1480(878)	2900(1720)	550(326)	0.50

The requirements for Proportioning Option 3 are as follows. The Portland cement content may be reduced as much as 50 pounds per cubic yard(30 kg/m3) with the substitution of an equivalent volume of aggregate, provided the Contractor uses an approved water-reducing admixture meeting the requirements of 705.12, Type A or D. The cementitious materials content shall consist of a combination, by weight, of a minimum of 70 percent Type I or Type IA Portland cement (701.04 or 701.01), and a maximum of 30 percent ground granulated blast furnace slag, ASTM C 989, grade 100 or 120. Proportioning Option 3 shall meet the following Mix Design Concrete Table:

Quantities Per Cubic Yard (Cubic Meter).

Type of Coarse Aggregate	Dry Aggregates: Fine Aggregate lb (kg)	Dry Aggregates: Coarse Aggregate lb (kg)	Dry Aggregates: Total lb (kg)	Cement Content lb (kg)	GGBF Slag lb (kg)	Water-CM Ratio Maximum
CLASS C Option 3 (Using No. 57 or No. 67 Size)						
Gravel	1185(703)	1775(1053)	2960(1756)	385(228)	165(98)	0.50
Limestone	1310(777)	1670(991)	2980(1768)	385(228)	165(98)	0.50
Slag	1385(822)	1385(822)	2770(1644)	385(228)	165(98)	0.50
CLASS F Option 3(Using No. 57 or No. 67 Size)						
Gravel	1320(783)	1870(1109)	3190(1892)	294(174)	126(75)	0.55
Limestone	1400(831)	1810(1074)	3210(1905)	294(174)	126(75)	0.55
Slag	1440(854)	1535(911)	2975(1765)	294(174)	126(75)	0.55

CLASS S Option 3 (Using No. 57 or No. 67 Size)

Gravel	1105(656)	1715(1017)	2820(1673)	465(276)	200(119)	0.44
Limestone	1280(759)	1555(923)	2835(1682)	465(276)	200(119)	0.44
Slag	1270(753)	1360(807)	2630(1560)	465(276)	200(119)	0.44

CLASS C Option 3 (Using No. 7, 78 or No. 8 Size)

Gravel	1370(813)	1500(890)	2870(1703)	385(228)	165(98)	0.50
Limestone	1410(837)	1480(878)	2890(1715)	385(228)	165(98)	0.50

GGBF = ground granulated blast furnace slag; CM = cementitious material.

The use of coarse aggregate in Portland cement concrete pavements is restricted by 703.13, as modified by the proposal.

Approval of Optional Mix Designs. A request to use any option design must be submitted to the Engineer for approval.

All admixtures used in the concrete mixture must be compatible and shall be dispensed in accordance with the manufacturer's recommendations.

If Portland cement with fly ash as an additive is used as described under Option 1 or ground granulated blast furnace slag is used under Option 3, the mix design shall be used only between April 1 and October 15, unless otherwise authorized by the Director. If Option 1 is used, an approved set retarding admixture meeting the requirements of 705.12, Type B or Type D shall be used if the concrete temperature exceeds a nominal temperature of 75° F (24° C) . If Option 2 or 3 is used, an approved water reducing set retarding admixture meeting the requirements of 705.12, Type D shall be used if the concrete temperature exceeds a nominal temperature of 75° F (24° C).

The proportioning adjustments under Options 1, 2 or 3 shall be the responsibility of the Contractor, and shall be in accordance with the ACI Standard "Recommended Practice for Selecting Proportions for Normal Weight Concrete" (ACI 211.1). The proportioning shall be based on developing an average compressive strength at 28 days of 4000 psi (28.0 MPa) for Class C, 3000 psi (21.0 Mpa) for Class F or 4500 psi (31.0 MPa) for Class S.

Optional mixes are not permitted with concrete bridge deck overlays using microsilica. For mixes used in latex modified and superplasticized dense concrete bridge deck overlays (Supplemental Specifications 847 and 848), and using Option 1 and 2, certified test data shall be provided for all requirements in accordance with Supplement 1045. Option 3 may not be used with concrete bridge deck overlays (Supplemental Specifications 847 and 848). The testing for Absorption, Scaling Resistance, and Volume Change will not be required for mixes used in dense concrete bridge deck overlays.

Only one source of fly ash shall be used in any one structure unless otherwise authorized by the Director. Bulk fly ash shall be stored in waterproof bins.

No option mixes shall be permitted in concrete mixes designed or intended to obtain high early strength.

899.05 Additional Classes of Concrete for Rigid Replacement.

Class FS. This mixture is a fast-setting Portland cement concrete for accelerated setting and strength development. The minimum cement content shall be 900 pounds per cubic yard (534 kg/m^3) and the maximum water -- cement ratio shall be 0.40. The rigid replacement may be opened to traffic after four hours provided test beams have attained a modulus of rupture of 400 psi (2.8 MPa).

The concrete shall be kept plastic by means of a Type B or D admixture until the surface has been textured. The Type B or D admixture shall be used in accordance with the manufacturer's recommendations.

Calcium chloride shall be added and mixed with each batch of concrete just prior to placement. If calcium chloride with 94-97 percent purity is used, the addition rate shall be 1.6 percent by weight of the cement. If calcium chloride with 70-80 percent purity is used, the addition rate shall be 2.0 percent by weight of the cement. When calcium chloride in a water solution is used, the water used shall be considered as part of the concrete mixing water and appropriate adjustments shall be made for its inclusion in the total concrete mixture.

Any other approved accelerating admixture may be used at the rate recommended by the manufacturer, provided it will produce the required strength in the allotted time.

Immediately after the curing compound has been applied, the replacements shall be covered with polyethylene sheeting and further covered with building board as specified in ASTM C 208. The building board shall be wrapped in a black polyethylene sheeting and placed tight against the surrounding concrete and weighted down to protect the fresh concrete from the weather.

Class MS. This mixture is a moderate-setting portland cement concrete for accelerated strength development. The rigid replacement may be opened to traffic after 24 hours provided test beams have attained a modulus of rupture of 400 psi (2.8 MPa). The minimum cement content shall be 800 pounds per cubic yard (475 kg/m3) and the maximum water-cement ratio shall be 0.43.

The proportioning of the concrete materials to meet the requirements of each class of rigid replacement concrete specified shall be the responsibility of the Contractor. The coarse aggregate may be any one of the following sizes: No. 57, No. 6, No. 67, or No. 8. When No. 8 size is used, the entrained air content shall be 8 ±2 percent. Otherwise, the entrained air content shall be 6 ±2 percent.

The Engineer's approval of the concrete mix design will be based on the Contractor's submitted proportions and the foregoing information.

899.06 Equipment. Equipment shall be as follows:

(a) Batching Plants. Each plant shall be constructed and operated so that no intermingling of materials occurs prior to batching. The plant shall have weighing mechanisms which provide either a visible means of checking weights or a printed record. Dispensing mechanisms for water and admixtures shall have a visible means of checking quantities or shall produce a printed record.

Weighing mechanisms used for cement and aggregates shall weigh to an accuracy such that the weight indicated on the scale or printed ticket is within ± 0.5 percent of the correct weight. Devices for weighing or metering water shall measure to an accuracy of ± 1.0 percent throughout the range used.

All weighing and metering devices shall have been checked and their accuracy attested to within the 12-month period immediately prior to their use. This service may be performed by the Sealer of Weights and Measures or a scale servicing company. In lieu of the preceeding requirements, the concrete batch facilities may be approved if a Certificate of Performance has been issued by the National Ready Mixed Concrete Association.

To reach a capacity of 500 pounds (227 kg), ten standard test weights or the services of a scale servicing company shall be readily available for testing the weighing devices at the batch plant. All weights used in testing the weighing devices shall be sealed every 3 years by the Ohio Department of Agriculture.

Weighing and dispensing devices shall be tested as often as the Engineer may deem necessary to assure their continued accuracy.

(b) Mixers. Mixers and agitators shall conform to paragraphs 10, 11.2, 11.5 and 11.6 of AASHTO M 157, except that mechanical counters are permitted.

When a truck mixer is used for complete mixing, each batch of concrete shall be mixed for not less than 70 revolutions of the drum or blades at the rate of rotation designated on the metal plate on the mixer as mixing speed.

Bodies of nonagitating hauling equipment for concrete shall be smooth, mortartight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. Covers shall be provided when required by the Engineer. Trucks having dump bodies with rounded corners and no internal ribs or projections will be permitted for nonagitating hauling.

899.07 Handling, Measuring and Batching Materials. Aggregates from different sources and of different gradings shall not be stockpiled together. Aggregates that have become segregated, or mixed with earth or foreign material, shall be reworked or cleaned as directed by the Engineer, or rejected. Coarse aggregate shall be maintained with a uniform moisture content.

The fine aggregate and coarse aggregate shall be separately weighed in the respective amounts set by the Engineer as outlined in 899.03. Separate weighing devices shall be used for weighing the cement.

Batching shall be so conducted as to result in the weights of each material required within a tolerance of ± 1.0 percent for cement and ± 2.0 percent for aggregates. Water shall be measured by weight or volume to within a tolerance of ± 1.0 percent. Admixtures shall be dispensed to within ± 3.0 percent of the desired amount.

Methods and equipment for adding air-entraining agent or other admixture into the batch, when required, shall be approved by the Engineer.

899.08 Concrete Batch Plant Tickets. The Contractor shall furnish the Engineer a concrete batch

plant ticket for each load of concrete delivered for use on the project. Batch tickets may be computer-generated, handwritten, or a combination. The ticket shall include, at a minimum, the information listed in Table I:

TABLE I - EVERY BATCH TICKET	
Name of ready-mix batch plant	
Batch Plant No	
Batch Plant Location	
Serial number of ticket	
Date	
Truck Number	
Class of Concrete	
JMF#	
Time the load was batched	
Size of Batch [cu yd (cu m)]	
Actual weights of cementitious material:	
Cement [lbs(kg)]	
Fly ash [lbs(kg)]	
Ground granulated blast furnace slag [lbs(kg)]	
Micro-silica [lbs(kg)]	
Other	
Actual weights of aggregates:	
Coarse [lbs(kg)]	
Fine [lbs(kg)]	
Other	
Actual weight of water [lbs(kg)]	
Actual volume of admixtures:	
Air entrainer [fl. oz. (mL)]	
Superplasticizer [fl. oz. (mL)]	
Water reducer [fl. oz.(mL)]	
Retarder [fl. oz. (mL)]	
Other	
Aggregate moisture contents (%):	
Coarse Aggregate	
Fine Aggregate	
Water Cement Ratio, leaving the plant	

Batch tickets for each day's first load of concrete, for each JMF, shall also include the information in Table II below. The Table II information may be either included on the batch ticket or furnished on a separate form. The separate form may be computer-generated or handwritten, but the form must be physically attached to the batch ticket.

If during the concrete manufacturing process any of the information listed in Table II changes, the information in Table II shall be resubmitted with the first concrete batch ticket supplied with the changed concrete.

TABLE II - FIRST TICKET EACH DAY, EACH JMF	
Cementitious Sources and Grade or Type:	
Cement	
Micro - Silica	
Ground granulated Blast Furnace slag	
Fly Ash	
Other	
Admixtures - Brand and Type:	
Air entrainer	
Retarder	
Water reducer	
Superplasticizer	
Other	

Concrete batch ticket information conforms to ASTM C 94, section 13.
Supporting data may be required by the Engineer to validate the basis for the furnished aggregate moisture contents.
Cost for generating and supplying the information and the concrete batch tickets shall be included in the individual concrete items.

899.09 Mixing Concrete. The concrete may be mixed in a central mix plant or in truck mixers. The mixer shall be of an approved type.

When mixed in central mixers, the mixing time shall not be less than 60 seconds. Mixing time begins when all materials are in the drum and ends when the discharge begins. Transfer time in multiple drum mixers is included in mixing time. The contents of an individual mixer drum shall be removed before a succeeding batch is emptied therein.

Ready-mixed concrete shall be mixed and delivered in accordance with 899.04(b). Mixed concrete from the central mixers shall be transported in truck mixers, truck agitators, or trucks having nonagitating bodies. The concrete shall be delivered to the site of the work and discharge shall be completed within one hour after the combining of the water and the cement. If an approved set-retarding (705.12, Type B) or a water-reducing and set-retarding (705.12, Type D or G) admixture is used at the Contractor's expense, discharge shall be completed within 90 minutes after the combining of the water and the cement.

When concrete is delivered in transit mixers or agitators, additional water within the limits specified may be added and sufficient mixing performed to adjust the slump and to regenerate the specified air content throughout the batch, provided all these operations are performed prior to discharging any of the batch and within the above time limitations. When making these adjustments, the concrete shall be mixed a minimum of 30 revolutions at mixing speed.

Retempering after the start of discharge is permitted by the use of approved admixtures (705.12, Type F or G) when approved by the Engineer.

Admixtures containing more than 50 parts per million chloride by weight of cement will be permitted only when provided for in the contract, or upon written permission of the Director.

The procedure for making and testing of concrete beams shall be in accordance with the requirements of Supplement 1023 on file in the Office of the Director.

When mixed, all concrete shall have a temperature of not more than 90° F (32° C), and the concrete shall be maintained under this temperature until deposited in the work.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 911
PLASTIC SUPPORTS FOR REINFORCING STEEL
July 10, 1997

This specification covers the material requirements for plastic support chairs for reinforcing steel used with Item 509, Reinforcing Steel. All plastic chair designs shall be capable of supporting at least 150 kg(330 pounds) without any recorded deformation, breakage or damage at a temperature of at least 38 C (110 F). No plastic chair designs shall have sharp protrusions or edges that could damage or penetrate coatings on the reinforcing steel. All chair designs shall be capable of permitting a No. 57 coarse aggregate to flow either through or around the reinforcing steel support without binding or causing a void in the finished concrete. No plastic chair designs shall be supported on a footprint of greater than 1300 sq mm (2 sq inches). Plastic chair designs shall be manufactured from material chemically inert to concrete. Reinforcing steel support chairs that have passed the testing and acceptance procedures in Supplement 1081 shall be approved for use and included on an approved list of plastic chair supports for reinforcing steel..

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

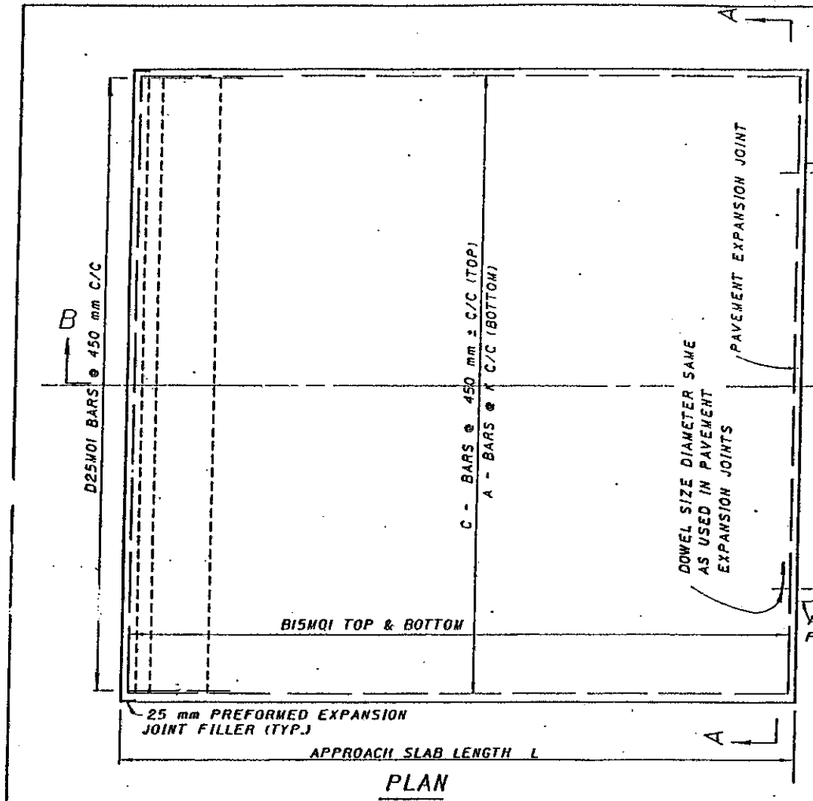
SUPPLEMENTAL SPECIFICATION 954
HIGH MOLECULAR WEIGHT METHACRYLATE (HMWM) RESIN

September 9, 1997

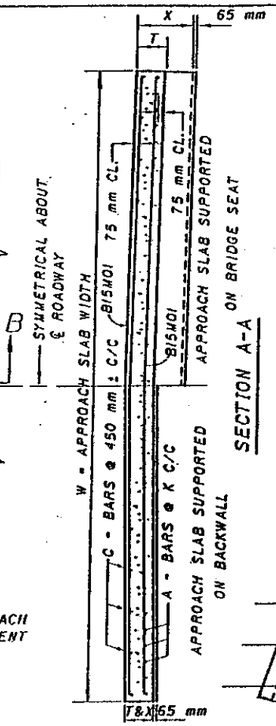
The high molecular weight methacrylate (HMWM) resin shall be low viscosity, non-fuming, conforming to the following:

Viscosity	Less than 25 cps (brookfield viscometer, Model RVT with UL adaptor or Model LVF, # spindle and UL adaptor C@ 25 ºC (77 ºF) (ASTM D 2849)
Density	Greater than 8.4 lbs/gal Ca 25 ºC (77 ºF) (ASTM D 2849)
Flash Point	Greater than 93 ºC (200 ºF) (PenskyMartens CC) (ASTM D 93)
Vapor Pressure	Less than 1.0 mm Hg C@ 25 ºC (77 ºF) (ASTM D 323)
TG (DSC)	Greater than 58 ºC (135 º F) (ASTM D3418)
Shelf Life	Must be 1 year minimum at manufacturers recommended environmental considerations.
Gel Time	Greater than 40 min - 100 g mass (ASTM D 2471) (thin film)
Percent Solids	Greater than 90% by weight
Bond Strength	Greater than 10.5MPa (1500 psi) (ASTM C 882)

The resin shall be from the approved list in the Office of Materials Management.

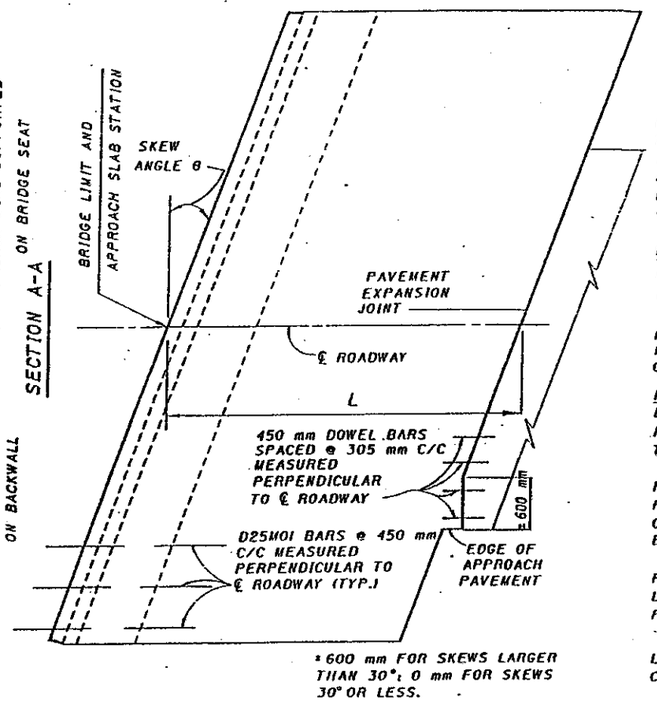


PLAN

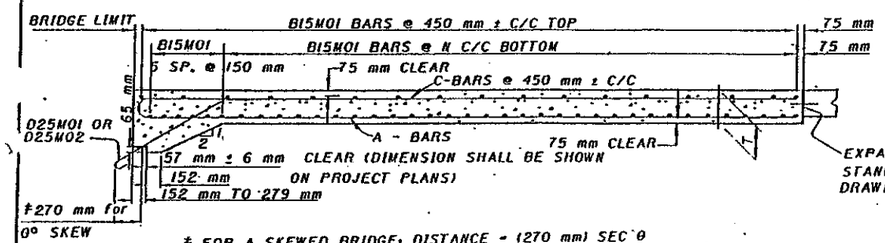


SECTION A-A

NOTE: X SHALL NEVER BE LESS THAN T



* 600 mm FOR SKEWS LARGER THAN 30°; 0 mm FOR SKEWS 30° OR LESS.



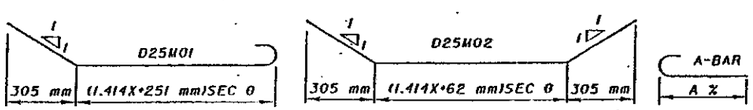
‡ FOR A SKEWED BRIDGE, DISTANCE = (270 mm) SEC θ

SECTION B-B

REINFORCING STEEL (FOR ONE APPROACH SLAB)

LENGTH L mm	THICKNESS T mm	A-BARS SP'C'G K	A-BARS MARK	A-BARS LENGTH mm	A-BARS DIMENSION A mm	A-BARS NO. REQ'D.	B15M01 (BOTTOM) * LENGTH	B15M01 (BOTTOM) SP'C'G N	B15M01 (BOTTOM) NO. REQ'D.	B15M01 (TOP) * LENGTH	B15M01 (TOP) NO. REQ'D.	C-BARS MARK	C-BARS LENGTH mm	C-BARS NO. REQ'D.	D25M01 OR D25M02 NO. REQ'D.
4600	305	255	A35M01	4880	4450	W-150 / K	@ (W-150)sec θ	230	22	@ (W-150)sec θ	11	C15M01	4425	W-150 / 450	W-150 / 450
6100	330	190	A35M02	6380	5950			200	31		14	C15M02	5950		
7600	380	180	A35M03	7880	7450			200	39		18	C15M03	7450		
9150	430	165	A35M04	9430	9000			215	44		21	C15M04	9000		

W = APPROACH SLAB WIDTH, OUT TO OUT, IN mm
θ = ANGLE OF SKEW
K = A-BAR SPACING IN mm
N = B-BAR SPACING IN mm
X = APPROACH SLAB THICKNESS AT ABUTMENT END IN mm
% = OUT TO OUT



APPROACH SLAB FOR SKEWED STRUCTURE

GENERAL: THIS DRAWING PROVIDES DESIGN AND GENERAL CONSTRUCTION DETAILS. THE PROJECT PLANS WILL SHOW LENGTH, SKEW, CURBS (IF ANY), ESTIMATED QUANTITY (SQUARE METER), AND SPECIAL NOTES AND DETAILS WHERE NECESSARY. FOR CONDITIONS OTHER THAN THOSE INDICATED HEREON, THE APPROACH SLAB SHALL BE ADAPTED TO FIT THE ENDS OF THE BRIDGE AND THE APPROACH PAVEMENT.

ANCHOR BARS D25M01 OR D25M02 SHALL BE DETAILED FOR A SPECIFIC BRIDGE AND SHALL BE INCLUDED WITH ITEM 509 UNDER ABUTMENTS OR SUPERSTRUCTURE FOR PAYMENT. D25M01 BARS CANNOT BE USED AS SHOWN WHERE APPROACH SLABS ARE SUPPORTED ON BACKWALLS LESS THAN 350 mm THICK. D25M02 BARS SHALL BE USED ON PRESTRESSED CONCRETE BOX BEAM BRIDGES WHERE THE APPROACH SLAB IS SUPPORTED ON AN 280 mm THICK BACKWALL.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTER IDENTIFIES THE BAR LOCATION, NEXT TWO DIGITS AND LETTER INDICATES THE METRIC BAR SIZE DESIGNATION, AND THE REMAINING DIGITS ITS SEQUENCE NUMBER.

EXAMPLE : A35M01
1) A - LOCATION OF THE BAR IN THE STRUCTURE
2) 35M - METRIC BAR SIZE DESIGNATION
3) 01 - SEQUENCE NUMBER

* AT THE OPTION OF THE CONTRACTOR, B15M01 BARS MAY BE LAPPED 500 mm MINIMUM AT THE CENTERLINE OF ROADWAY, OR WHERE REQUIRED FOR LONGITUDINAL CONSTRUCTION JOINTS.

DESIGN SPECIFICATIONS: THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1977, INCLUDING THE 1978, 1979, 1980 AND 1981 INTERIM SPECIFICATIONS AND THE OHIO "SUPPLEMENT" TO THESE SPECIFICATIONS.

DESIGN DATA

DESIGN LOADING: MS18 AND THE ALTERNATE MILITARY LOADING.

CONCRETE CLASS C : COMPRESSIVE STRENGTH 28 MPa

REINFORCING STEEL: ASTM A615M, A616M OR A617M-GRADE 400; MINIMUM YIELD STRENGTH OF 400 MPa AND SHALL BE EPOXY COATED.

REINFORCING STEEL: FOR SKEWED BRIDGES THE A AND C BARS SHALL BE PLACED PARALLEL TO THE CENTER LINE OF ROADWAY AND THE B BARS SHALL BE PLACED PARALLEL TO THE ABUTMENTS.

PREFORMED EXPANSION JOINT FILLER, TYPE "A" WATER PROOFING, AND SEALER AT THE CORNERS AND SIDES OF THE APPROACH SLAB SHALL BE INCLUDED IN THE PRICE BID PER SQUARE METER FOR THE APPROACH SLAB.

PREFORMED ELASTOMERIC JOINT SEALER SHOWN AT THE BRIDGE LIMIT END OF THE APPROACH SLAB SHALL BE INCLUDED IN THE PRICE BID PER SQUARE METER FOR THE APPROACH SLAB.

LONGITUDINAL CONSTRUCTION JOINTS REQUIRED FOR STAGE CONSTRUCTION SHALL BE AS PER 511.09.

CURBS, BRIDGES WITH SIDEWALKS : FOR BRIDGES CONSTRUCTED WITH RAISED SIDEWALKS, DEFLECTOR PARAPETS OR OTHER TYPES OF CONSTRUCTION WHICH RETAIN ROADWAY SURFACE DRAINAGE, THE APPROACH SLABS SHALL EITHER INCLUDE INTEGRAL CURBS OR BE CONSTRUCTED IN CONJUNCTION WITH BRIDGE CURBS. CURB HEIGHT SHALL BE TRANSITIONED UNIFORMLY BETWEEN BRIDGE CURB HEIGHT AND APPROACH CURB HEIGHT IN A LENGTH AS FOLLOWS: WHERE WINGWALL EXTENDS BEYOND END OF APPROACH SLAB, USE A MINIMUM LENGTH OF 3000 mm BEYOND END OF WINGWALL. WHERE THE APPROACH SLAB EXTENDS BEYOND THE END OF WINGWALL, TRANSITION IN THIS LENGTH. HOWEVER, THE TRANSITION LENGTH SHALL NOT BE LESS THAN 3000 mm AND THE TRANSITION SHALL EXTEND BEYOND THE END OF APPROACH SLAB IF NECESSARY.

APPROACH SLAB WIDTH (W): APPROACH SLABS SHALL BE THE SAME WIDTH AS THE BRIDGE ROADWAY.

THE LENGTH OF APPROACH SLABS SHOULD BE BASED ON FACTORS SUCH AS THE SIZE AND AMOUNT OF EXCAVATION BEHIND THE ABUTMENTS, NEW OR EXISTING EMBANKMENTS AND SKEW OF THE BRIDGE.

CROWN SHALL CONFORM TO THAT OF THE APPROACH PAVEMENT AND BRIDGE DECK. IF THE RATE OF CROWN OF THE BRIDGE DECK DIFFERS FROM THAT OF THE APPROACH PAVEMENT, A SMOOTH TRANSITION SHALL BE PROVIDED WITHIN THE LIMITS OF THE APPROACH SLAB.

WEARING SURFACE: GENERALLY APPROACH SLABS SHALL HAVE AN ASPHALT CONCRETE WEARING SURFACE ONLY WHEN BOTH THE APPROACH PAVEMENT SURFACE AND THE BRIDGE WEARING SURFACE ARE ASPHALT CONCRETE.

EXPANSION JOINT DETAILS AT THE APPROACH PAVEMENT END OF THE APPROACH SLAB ARE USED ONLY IN CONJUNCTION WITH CONCRETE PAVEMENT OR CONCRETE BASE COURSE. PAYMENT FOR THE EXPANSION JOINT, INCLUDING DOWEL BARS, PREFORMED EXPANSION JOINT FILLER AND JOINT SEALER, IS INCLUDED IN THE PRICE BID PER SQ. METER FOR THE APPROACH SLAB.

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES
11-25-94
DATE

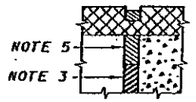
REVISIONS

DESIGNED	DRAWN	CHECKED	REVIEWED
JFF	JFF	JAH	LWH

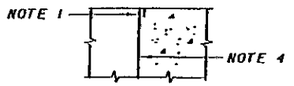
AS-1-81M

STANDARD
REINFORCED CONCRETE
APPROACH SLAB - METRIC

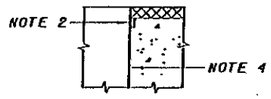
1/3



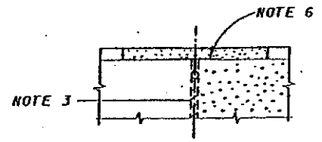
DETAIL A



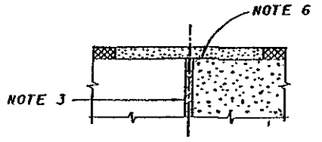
DETAIL B



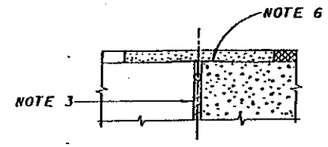
DETAIL C



DETAIL D



DETAIL E

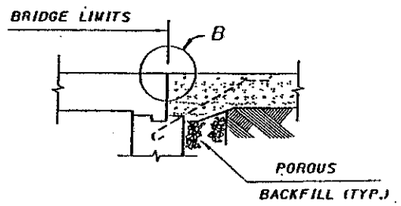


DETAIL F

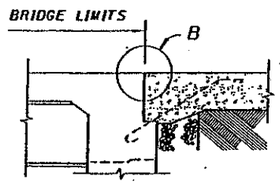
CONCRETE WEARING SURFACE ON BRIDGE DECK AND APPROACH SLAB

CONCRETE WEARING SURFACE ON BRIDGE DECK AND APPROACH SLAB

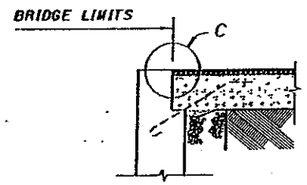
CONCRETE WEARING SURFACE ON BRIDGE DECK ONLY



ON SLAB BRIDGES

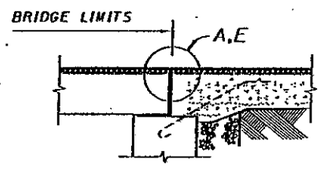


ON BRIDGES WITH INTEGRAL CONSTRUCTION

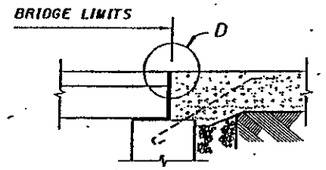


APPROACH SLAB SUPPORTED ON ABUTMENT BACKWALL

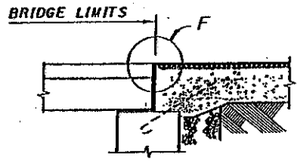
ASPHALT CONCRETE WEARING SURFACE ON BRIDGE DECK AND APPROACH SLAB



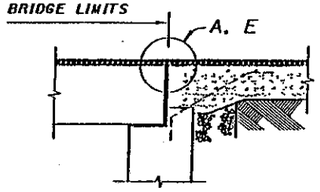
ON PRESTRESSED CONCRETE BOX BEAM BRIDGES



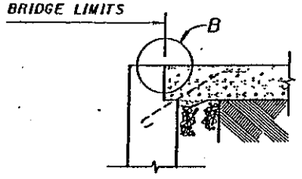
ON PRESTRESSED CONCRETE BOX BEAM BRIDGES



ON PRESTRESSED CONCRETE BOX BEAM BRIDGES



APPROACH SLAB SUPPORTED ON ABUTMENT BACKWALL



APPROACH SLAB SUPPORTED ON ABUTMENT BACKWALL

NOTE : APPROACH SLAB SEAT ON PRESTRESSED CONCRETE BOX BEAM BRIDGES IS SHOWN AT SAME ELEVATION AS BEAM SEAT. HOWEVER, IT MAY ACTUALLY BE HIGHER OR LOWER THAN THE BEAM SEAT DEPENDING ON BOX BEAM DEPTH.

NOTE 1 : PREFORMED ELASTOMERIC JOINT SEALER 705.11 (32 mm FOR 13 mm JOINT) DEPRESSED 3 mm BELOW ROADWAY, PLACED IN 13 mm x 55 mm GROOVE.

NOTE 2 : PREFORMED ELASTOMERIC JOINT SEALER 705.11 (32 mm FOR 13 mm JOINT) PLACED IN 13 mm x 55 mm GROOVE.

NOTE 3 : 25 mm PREFORMED EXPANSION JOINT FILLER 705.03

NOTE 4 : TYPE "A" WATERPROOFING.

NOTE 5 : SEE PLAN INSERT SHEET, ABUTMENT JOINTS IN BITUMINOUS CONCRETE BOX BEAM BRIDGES.

NOTE 6 : SEE PLAN INSERT SHEET, POLYMER MODIFIED ASPHALT EXPANSION JOINT SYSTEM.

TYPE "A" WATERPROOFING SHALL NOT EXTEND ABOVE THE BOTTOM OF THE GROOVE INTO WHICH THE PREFORMED ELASTOMERIC JOINT SEALER IS TO BE PLACED. IT SHALL BE APPLIED TO THE ENTIRE AREA OF THE ABUTMENT OR SUPERSTRUCTURE WHICH COMES INTO CONTACT WITH THE APPROACH SLAB.

FOR PRESTRESSED CONCRETE BOX BEAM BRIDGES WITH ASPHALT CONCRETE ON BOTH BRIDGE DECK AND APPROACH SLAB, THE TOP OF APPROACH SLAB AT THE BRIDGE END SHALL BE CONSTRUCTED TO THE LEVEL OF THE TOP OF THE BEAMS TO FACILITATE WATERPROOFING OF THE JOINT. THE THICKNESS OF ASPHALT CONCRETE AT THE APPROACH END SHALL BE THE THICKNESS OF ASPHALT CONCRETE USED ON THE ROADWAY PAVEMENT. THE THICKNESS OF ASPHALT CONCRETE SHALL VARY UNIFORMLY, IF NECESSARY, IN THE LENGTH OF THE APPROACH SLAB. THE BASE SHALL BE GRADED TO PERMIT THE BOTTOM OF THE APPROACH SLAB TO BE PARALLEL TO THE TOP.

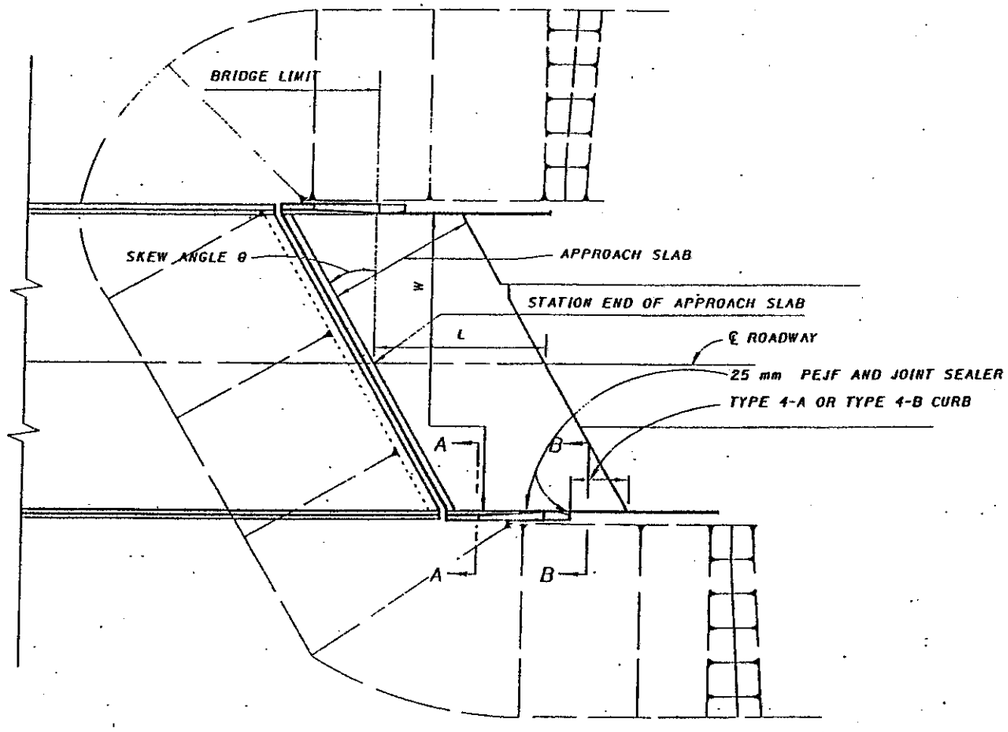
FOR STRUCTURES HAVING ASPHALT CONCRETE WEARING SURFACE ON BOTH BRIDGE DECK AND APPROACH SLABS AND WHERE NO DECK EXPANSION DEVICES ARE PROVIDED, THE DECK MEMBRANE WATERPROOFING SHALL EXTEND BEYOND THE BRIDGE LIMITS A DISTANCE OF 600 mm.

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES
12-26-94
DATE

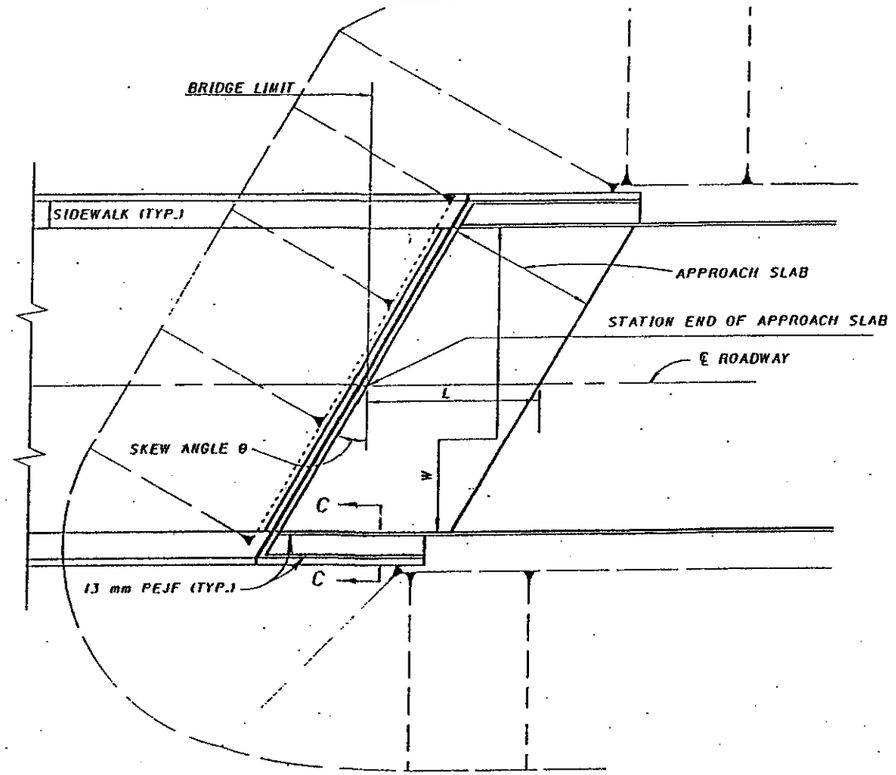
REVISIONS	DESIGNED JFF	CHECKED JAM	REVIEWED LMW
	DRAWN JFF		AS-1-81M

STANDARD
REINFORCED CONCRETE APPROACH SLAB - METRIC



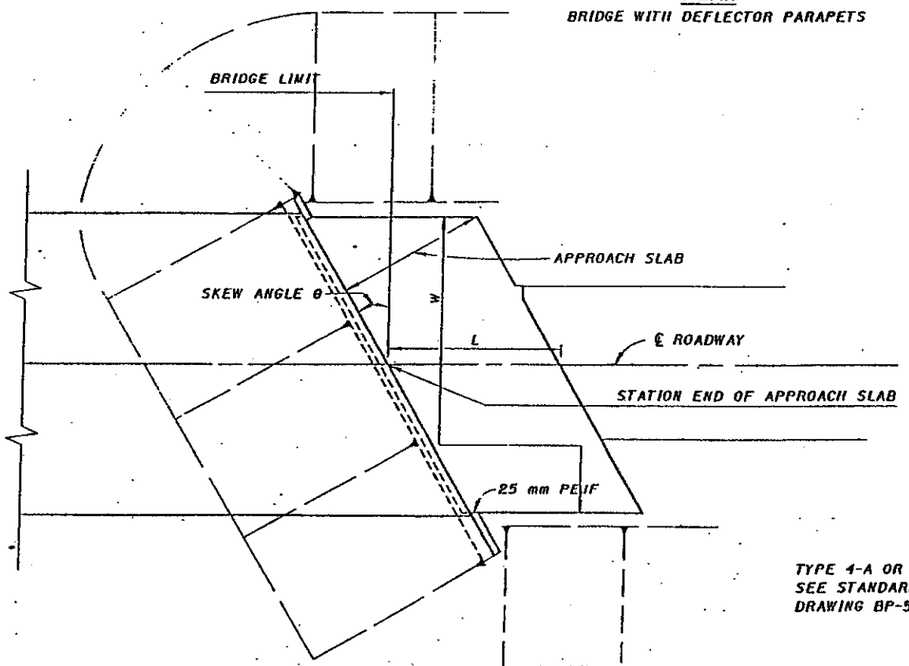
PLAN

BRIDGE WITH DEFLECTOR PARAPETS



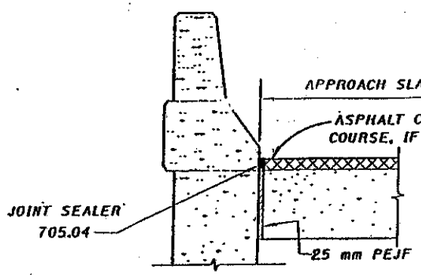
PLAN

BRIDGE WITH SIDEWALKS

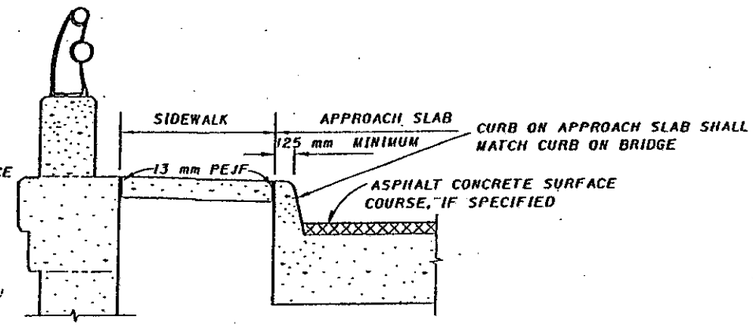


PLAN

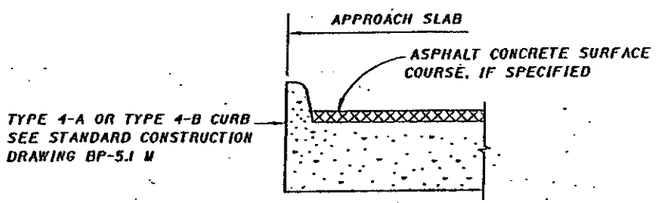
BRIDGE WITHOUT CURBS



SECTION A-A



SECTION C-C



SECTION B-B

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

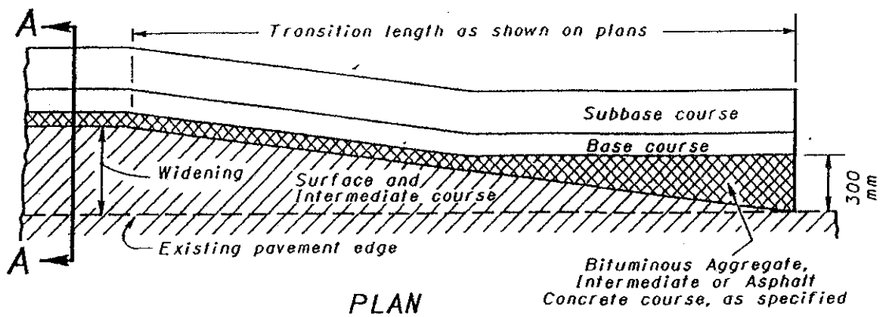
10-25-94
DATE

ENGINEER OF BRIDGES

REVISIONS	DESIGNED	CHECKED	REVIEWED
	JFF	JAM	LMW
	DRAWN JFF		AS-1-81M

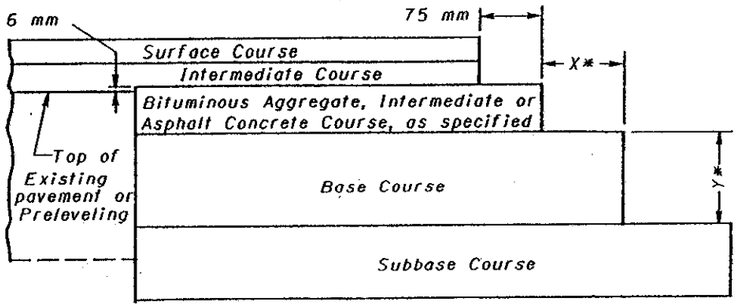
STANDARD
REINFORCED CONCRETE
APPROACH SLAB - METRIC

3 / 3



PLAN

MERGING EDGE OF PAVEMENT WIDENING WITH EDGE OF EXISTING PAVEMENT

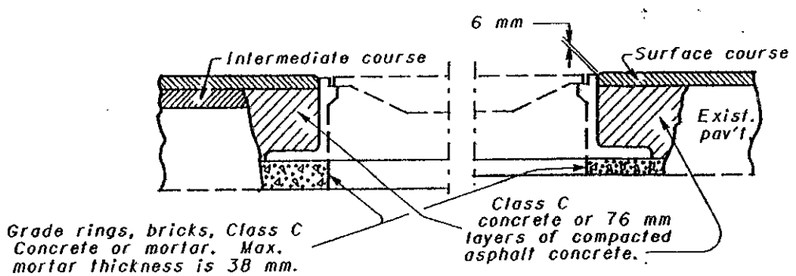


The Bituminous Aggregate in the upper part of the base widening shall finish approximately 6 mm above the edge of the existing pavement where no preleveling is used. Where a preleveling (using intermediate course material) is specified it shall be placed prior to excavation of the widening trench and the upper course of the base widening shall finish approximately 6 mm above the preleveling.

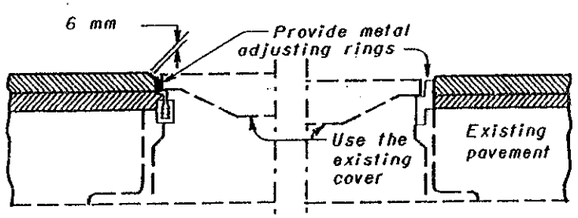
*The extended width (X) of a base or subbase course shall be equal to the depth (Y) of that particular course. unless otherwise specified in the plans.

SECTION A-A

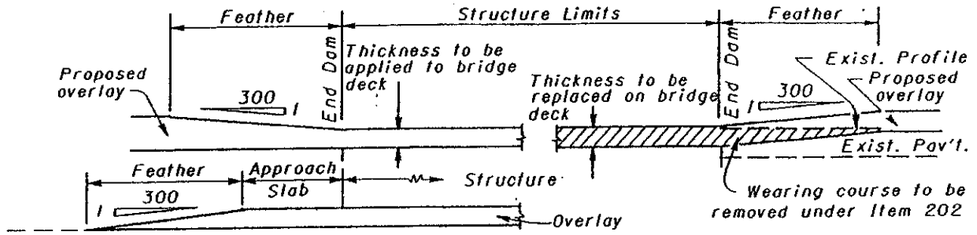
COURSE DETAIL FOR WIDENING



USING CONCRETE OR MORTAR

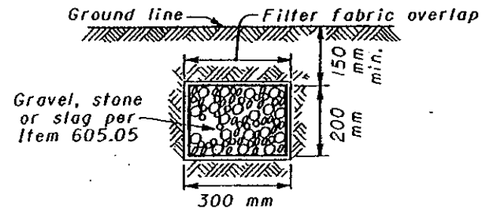


USING METAL ADJUSTING RINGS



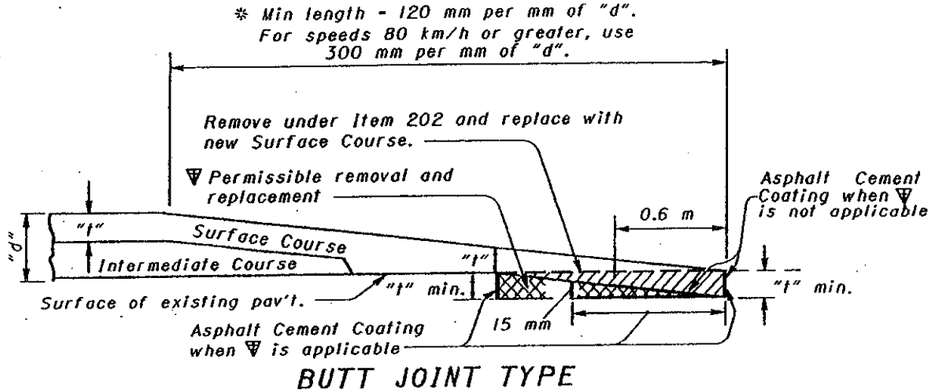
Details assume non-settled approach slabs. Smoothing of the profile for settlement is required per plan grades or as directed by the Engineer.

FEATHERING AT STRUCTURES

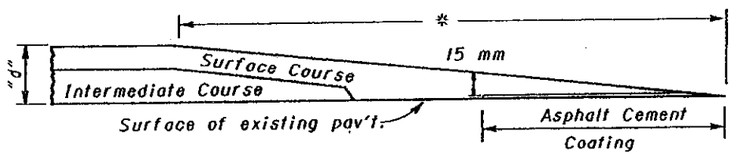


Aggregate drains to be placed where and as directed by Engineer. Provide filter fabric when specified as a separate pay item.

AGGREGATE DRAIN



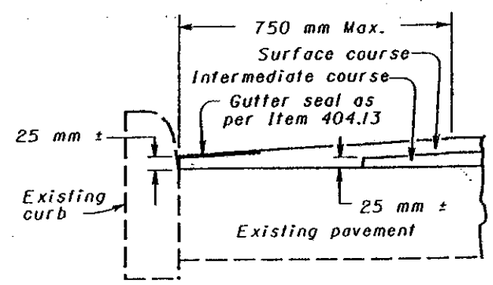
BUTT JOINT TYPE



TAPER EDGE TYPE

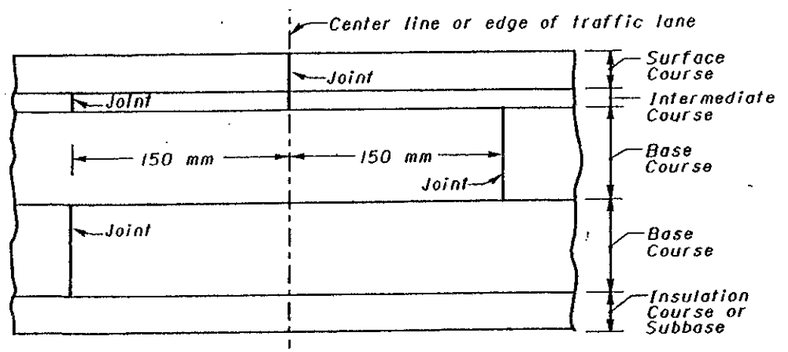
NOTE: Either butt or taper type may be used unless type is specified by the plan.

PLACING FEATHERED AREAS



Special care shall be taken during construction to obtain maximum compaction of bituminous concrete in gutters.

GUTTER FINISH



LAPPING LONGITUDINAL JOINTS

Metal adjusting rings shall: (a) attach securely to the existing frame by welding or mechanical devices; (b) consist either of cast metal having an integral rim and seat, or be fabricated metal with a sturdy connection between the seat and rim; and (c) provide an even seat for the manhole cover. In addition, the adjusting ring type shall be a design acceptable to the local governmental agency responsible for street and sewer maintenance. Any installation unacceptable to the Engineer shall be replaced by the Contractor at his expense.

MANHOLES ADJUSTED TO GRADE

metric units

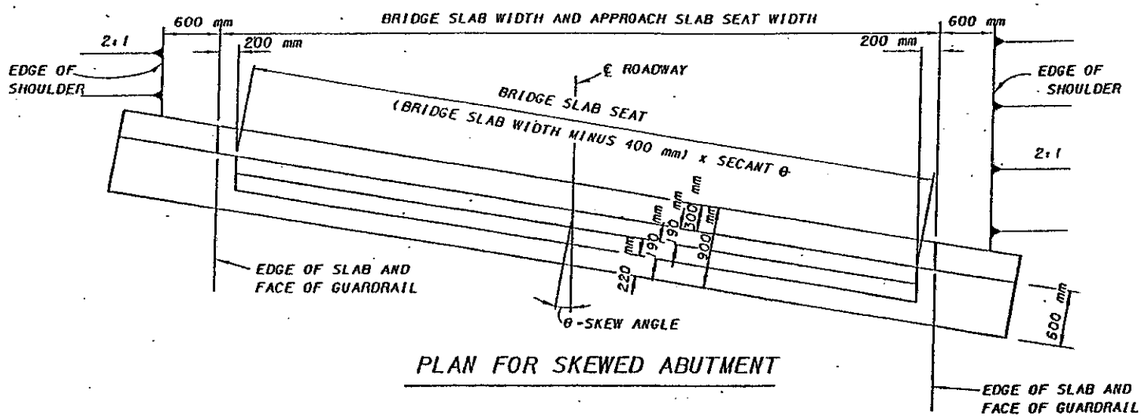
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

RESURFACING

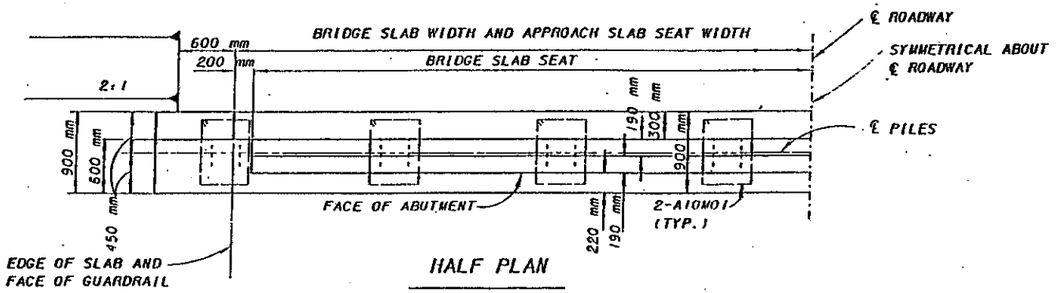
DATE 10-28-94

STANDARD CONSTRUCTION DRAWING **BP-3.1M**

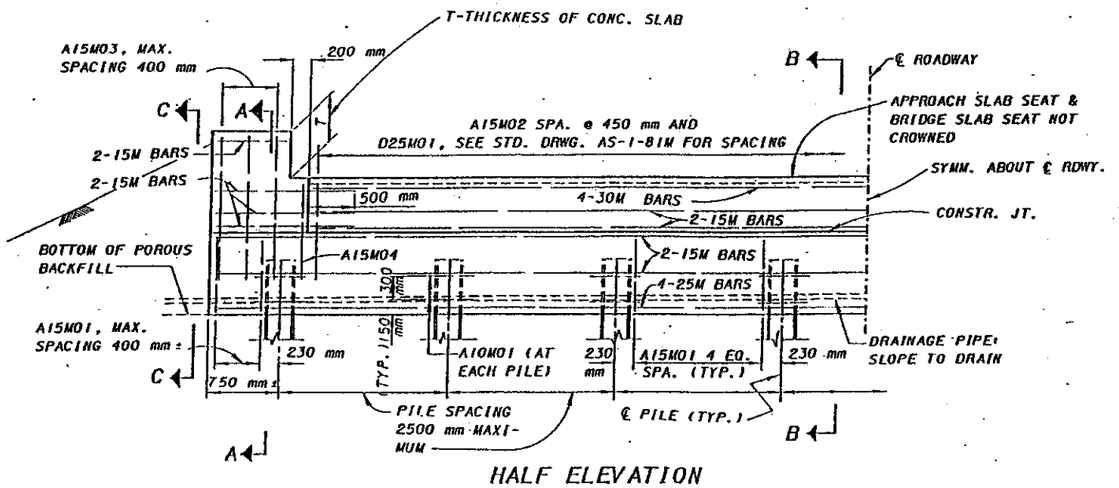
APPROVED W. K. Hukman
ENGR., L & D



PLAN FOR SKEWED ABUTMENT

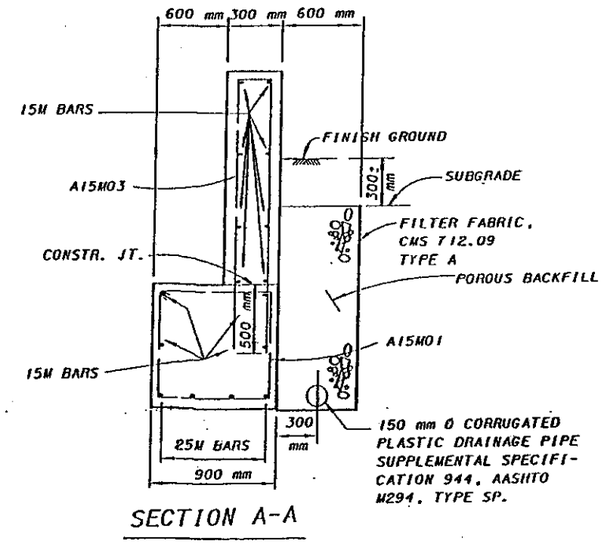


HALF PLAN

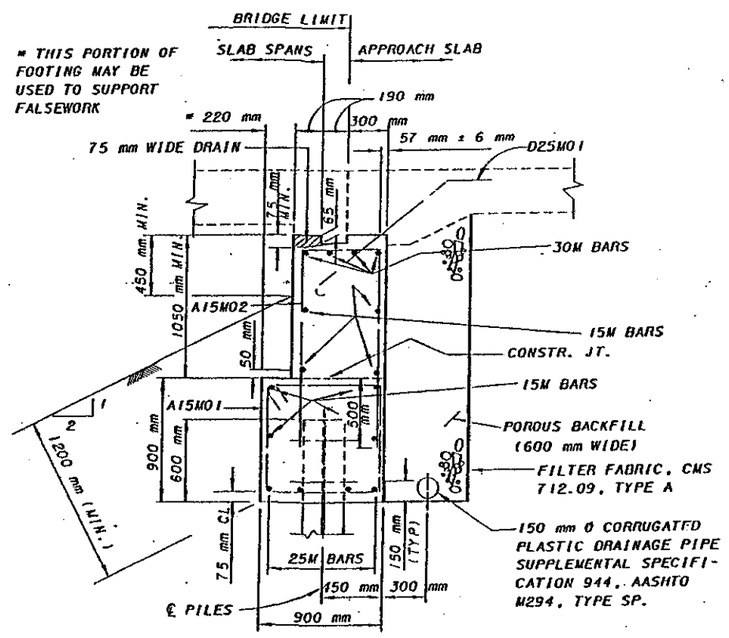


HALF ELEVATION

SEE SHEET 2/2 FOR SECTION C-C



SECTION A-A



SECTION B-B

SEE SHEET 2/2 FOR DRAIN DETAILS

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES
10-25-94
DATE

REVISIONS	DESIGNED JAH	CHECKED SAM	REVISED LAW
	DRAWN BDB	CPA-5-94M	

STANDARD
CAPPED PILE ABUTMENT - METRIC

1/2

GENERAL NOTES

DESIGN SPECIFICATIONS: THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS. 1992. INCLUDING THE 1993 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL.

DESIGN LOADING: MS18 AND THE ALTERNATE MILITARY LOADING

DESIGN DATA: CONCRETE CLASS C - COMPRESSIVE STRENGTH 28 MPa (SUBSTRUCTURE)
REINFORCING STEEL - ASTM A615M, A616M OR A617M, GRADE 400 WITH A MINIMUM YIELD STRENGTH OF 400 MPa AND SHALL BE EPOXY COATED.

POROUS BACKFILL : POROUS BACKFILL 600 mm THICK WITH FILTER FABRIC SHALL EXTEND UPWARD TO THE PLANE OF THE SUBGRADE, TO 300 mm BELOW THE EMBANKMENT SURFACE, AND LATERALLY TO THE SURFACE OF THE EMBANKMENT SLOPES. GEOTEXTILE FABRIC SHALL CONFORM WITH 712.09, TYPE A. THE BOTTOM OF THE POROUS BACKFILL SHALL BE SLOPED (1 : 12 MINIMUM) LATERALLY TO DRAIN. GEOTEXTILE FABRIC IS INCLUDED WITH POROUS BACKFILL FOR PAYMENT.

ANIMAL GUARD : ANIMAL GUARD SHALL BE PROVIDED AT THE OUTLET END OF THE DRAINAGE PIPE. SEE STANDARD CONSTRUCTION DRAWING MC-4.1M FOR DETAILS. PAYMENT FOR THE ANIMAL GUARD SHALL BE INCLUDED WITH THE DRAINAGE PIPE BID ITEM.

DESIGN INSTRUCTIONS

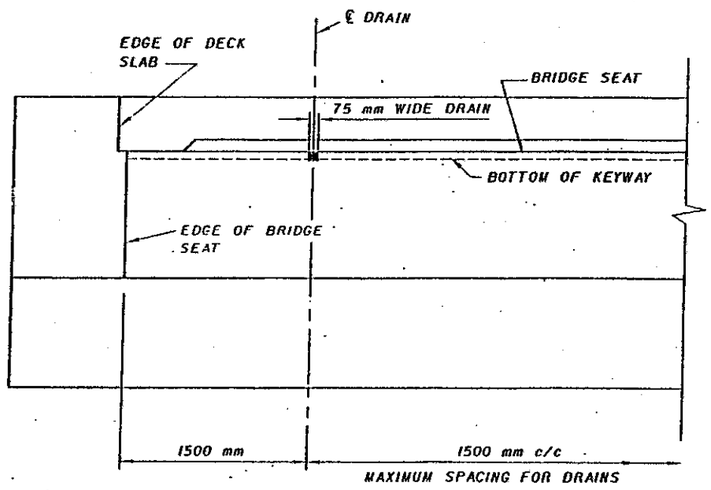
GENERAL : THIS DRAWING PROVIDES DESIGN AND GENERAL CONSTRUCTION DETAILS. THE PROJECT PLANS FOR EACH STRUCTURE SHALL SHOW STATIONS, SPAN LENGTHS, ROADWAY WIDTH, SKEW, CURVE AND SUPERELEVATION DATA (IF ANY), ELEVATIONS, SUPERSTRUCTURE DETAILS, ESTIMATED QUANTITIES, REINFORCING STEEL LIST, AREAS OF SEALING, TYPE OF SEALER AND OTHER NECESSARY DETAILS AND SPECIAL NOTES.

PILE TYPE, SIZE AND ESTIMATED PAY LENGTHS SHALL BE SHOWN ON THE PROJECT PLANS (USUALLY AS 310 mm OR 360 mm DIAMETER CAST-IN-PLACE REINFORCED CONCRETE, OR AS 250 mm OR 310 mm STEEL "H" PILES). SPACING SHALL NOT EXCEED 2500 mm. THE PILE DESIGN LOADS SHALL BE GIVEN IN THE STRUCTURE GENERAL NOTES.

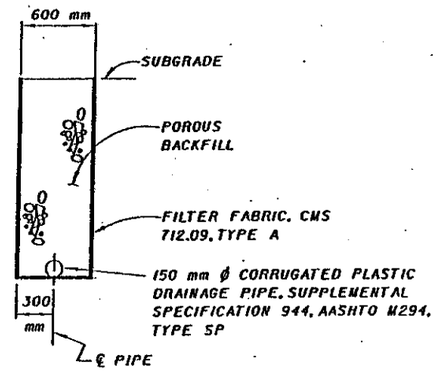
REINFORCING STEEL: THE LONGITUDINAL 30M, 25M AND 15M BARS AT THE OPTION OF THE CONTRACTOR, MAY BE FURNISHED EITHER IN ONE LENGTH AS SHOWN HEREON, OR SPLICED. IF THE SPLICE OPTION IS CHOSEN, THE 30M BAR SHALL BE LAPPED 2800 mm, THE 25M BAR SHALL BE LAPPED 1800 mm AND THE 15M BAR SHALL BE LAPPED 900 mm. A STAGGERED LAP SPLICE ARRANGEMENT SHALL BE USED. QUANTITY TO INCLUDE BAR WEIGHTS FURNISHED TO PROVIDE LAP SPLICES.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTER IDENTIFIES THE BAR LOCATION; NEXT TWO DIGITS AND LETTER INDICATES THE METRIC BAR SIZE DESIGNATION; AND THE REMAINING DIGITS IT'S SEQUENCE NUMBER.
EXAMPLE: A15M01
a) A = LOCATION OF THE BAR IN THE STRUCTURE
b) 15M = METRIC BAR SIZE DESIGNATION
c) 01 = SEQUENCE NUMBER

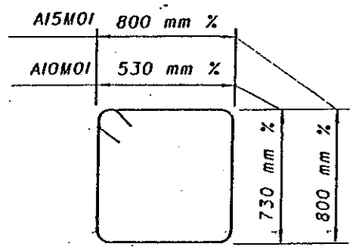
LEGEND
% - OUT TO OUT



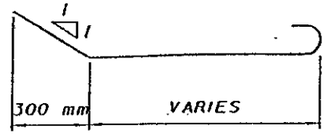
PART ELEVATION
SHOWING DRAIN DETAILS
(SEE SECTION B-B, SHEET 1/2 FOR ADDITIONAL DETAILS)



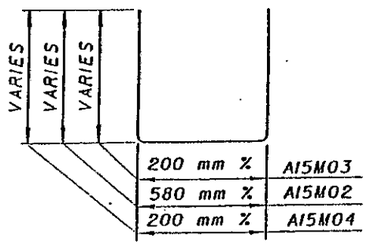
SECTION C-C
SEE SHEET 1/2 FOR LOCATION OF SECTION C-C



A15M01 LENGTH = 3375mm
A10M01 LENGTH = 2645mm



D25M01



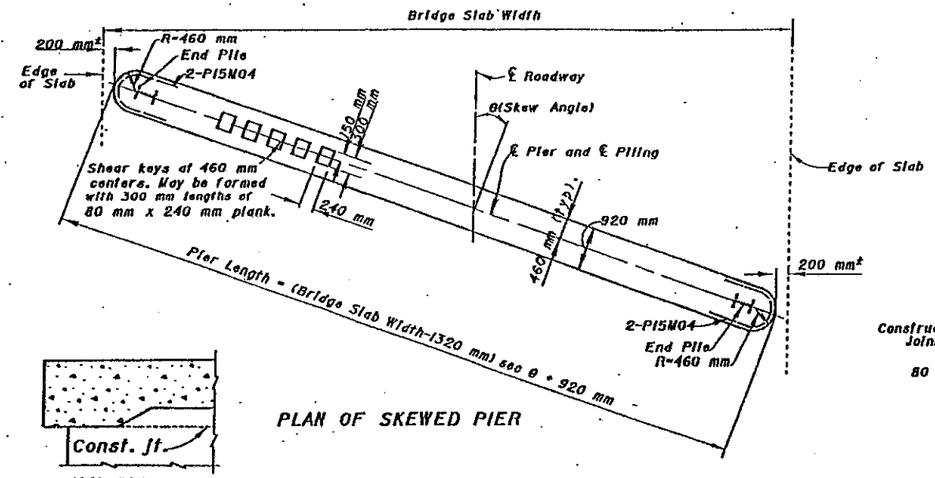
DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO, DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES — DATE 10-22-94

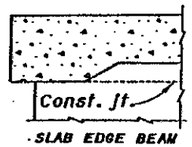
REVISIONS	DESIGNED	CHECKED	REVISED
..	JAH	SAM	LMW
	DRAWN BDB		CPA-5-94M

STANDARD
CAPPED PILE ABUTMENT - METRIC

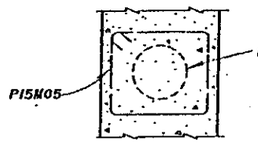
2/2



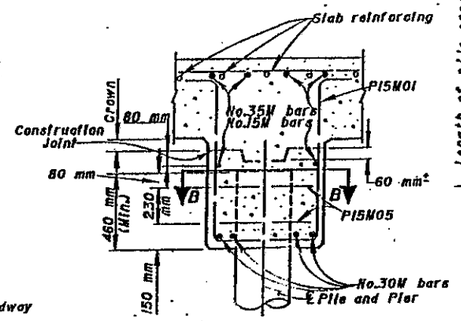
PLAN OF SKEWED PIER



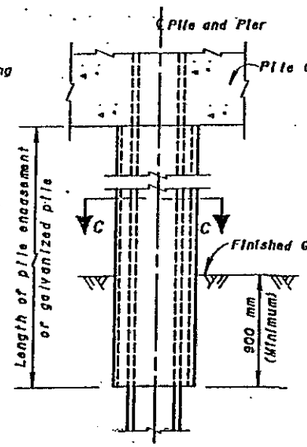
SLAB EDGE BEAM



SECTION B-B

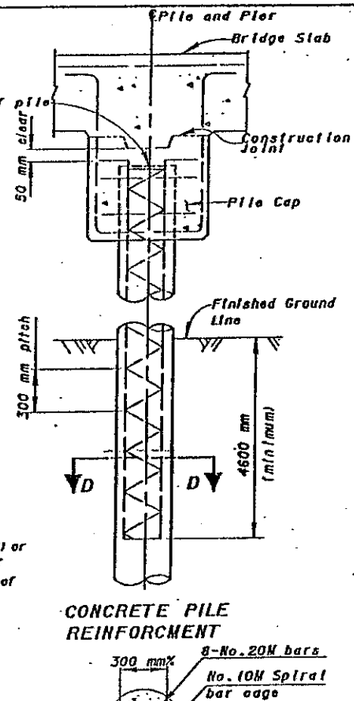


SECTION A-A
SHOWING 400 mm CAST-IN-PLACE CONCRETE PILE

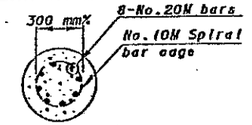


PILE ENCASEMENT

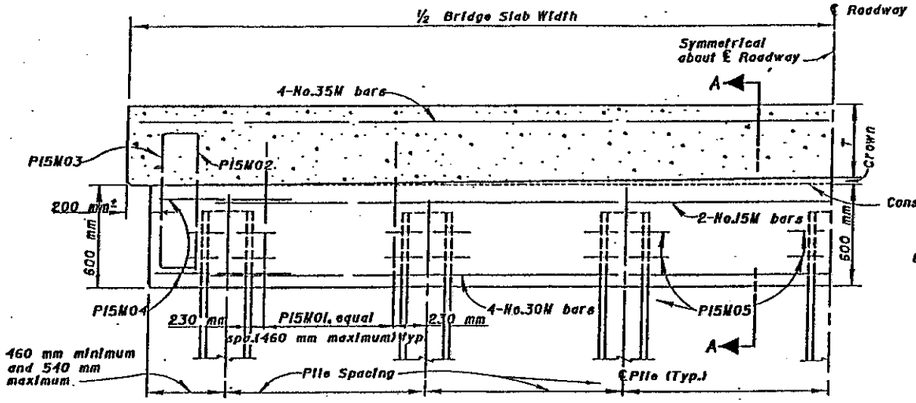
SECTION C-C
SHOWING STEEL PILE, HP 310 x 79



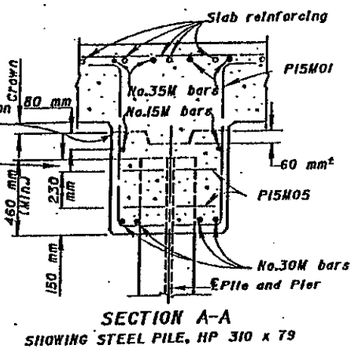
CONCRETE PILE REINFORCMENT



SECTION D-D
SHOWING 400 mm CAST-IN-PLACE REINFORCED CONCRETE PILE (PILE ENCASEMENT SHALL NOT BE USED)

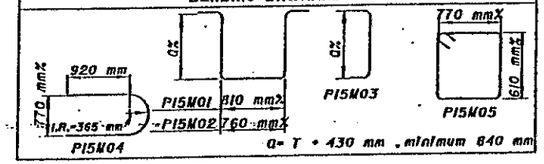


HALF ELEVATION



SECTION A-A
SHOWING STEEL PILE, HP 310 x 79

BENDING DIAGRAMS



GENERAL NOTES

DESIGN SPECIFICATION: This Standard Drawing conforms to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway and Transportation Officials, 1992, including the 1993 interim specifications and the ODOT Bridge Design Manual.

DESIGN LOADING: MS18 and the Alternate Military Loading.

DESIGN DATA:

CONCRETE CLASS "S" - Compressive Strength 31 MPa

REINFORCING STEEL- ASTM A615M, A616M, or A617M Grade 400, with a minimum yield strength of 400 MPa and shall be epoxy coated.

SPIRAL REINFORCMENT may be plain bars, ASTM A82M or A615M and shall be epoxy coated.

ITEM SPECIAL- PILE ENCASEMENT: All steel H piles shall be encased or galvanized as shown.

The encasement option shall consist of a pipe filled with either class C or class S concrete as per 507.06.

The galvanizing option shall be as per 711.02. The galvanizing coating minimum thickness shall be 100 micrometers. Gouges, scrapes,

GENERAL NOTES (CONTINUED)

scratches or other surface imperfections caused by handling or driving of the H pile shall be repaired to the satisfaction of the Engineer. Additional galvanizing length beyond plan dimensions shall be at the contractor's expense.

The length of pile encasement shall be measured in meters along the length of the pile. This item shall include all work and materials necessary to furnish the required encasement.

Payment for pile encasement or galvanizing will be made at the the contract unit price per linear meter as Item Special, Pile Encasement.

FALSEWORK SUPPORT: Attachment of the falsework support members to pier piles will be permitted if the attachment is made to the portion of pile encased in the pier cap. There shall be no eccentric loads produced in the piles by attached falsework support members.

DESIGN INSTRUCTIONS

GENERAL: This drawing provides general construction details. The project plans for each structure shall show Stations, Span Lengths, Roadway Width, Skew, Curve and Superelevation (if any) Elevations, Superstructure Details, Estimated Quantities, Reinforcing Steel List, Pile Encasement and other necessary details and special notes.

REINFORCING STEEL: The longitudinal No.35M, No.30M and No.15M bars, at the option of the Contractor, may be furnished either

DESIGN INSTRUCTIONS

in one length as shown hereon, or spliced. If the splice option is chosen, the No.35M bar shall be lapped 2800 mm, the No.30M bar shall bar shall be lapped 2450 mm and the No.15M bar shall be lapped 900 mm. A staggered lap splice arrangement should be used.

Payment for reinforcing shall be the plan quantity. Do not adjust the plan to include bar weights furnished to provide lap splices.

PILE TYPE AND SIZE: The pile type and size shall be specified on the project plans. For example a 400 mm diameter cast-in-place reinforced concrete pile as shown in section D-D or a HP 310 x 79 pile.

PILE DESIGN LOADS: The pile design loads and estimated pay lengths shall be given in the Structure General Notes. Pile spacing shall not exceed 2300 mm.

SLAB THICKNESS: See Slab Standard Drawing for value of "T".

LIMITS OF DESIGN: This Standard Drawing should not be used for any bridge in which the following limits are exceeded.

(a) Skew angle equals 35°.
(b) Exposed pile height equals 6000 mm (consider scour depths and soil density)
(c) To support a continuous span arrangement greater than 17 000 mm.
(d) Slope embankment, debris or ice flow loads which would cause appreciable horizontal force against the pile bent.
(e) Rock or other firm material would prevent driving piles at least 3000 mm below finished ground line.

Bar Size is indicated in the bar mark. The first letter indentifies the bar location; next two digits and letter indicates the metric bar size designation; and the remaining digits its sequence number.

Example: P15M01
a) P= Location of the bar in the structure
b) 15M = Metric bar size designation
c) 01 = Sequence

Legend:

I.R. = Inside Radius
℄ = Out to Out
R = Radius
T = Slab Thickness

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

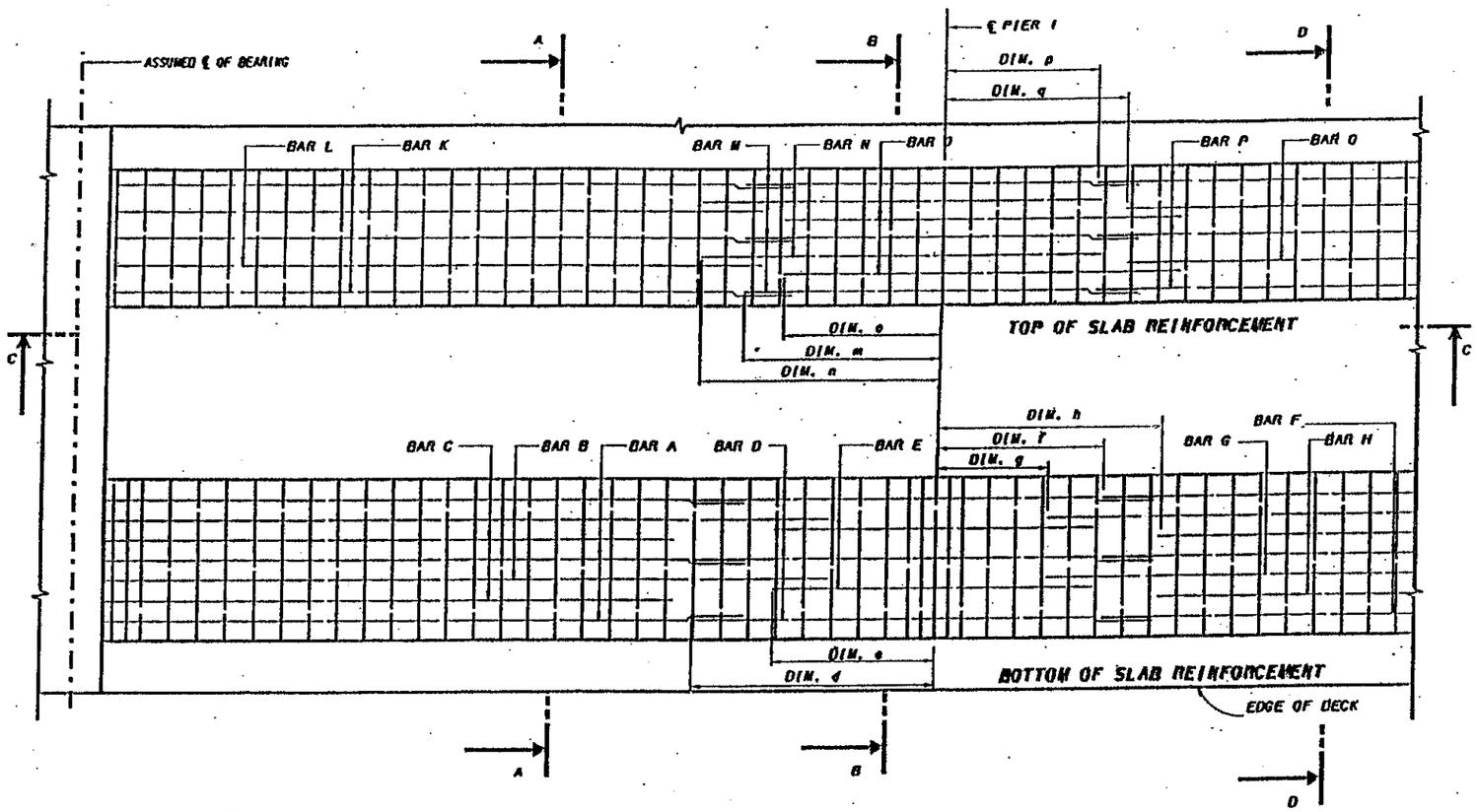
STATE OF OHIO DEPARTMENT OF TRANSPORTATION
ENGINEER OF BRIDGES
12-17-94
DATE

REVISIONS
PREPARED JAM
CHECKED SAM
REVIEWED LMW
DRAWN GFJ

CPP-2-94M

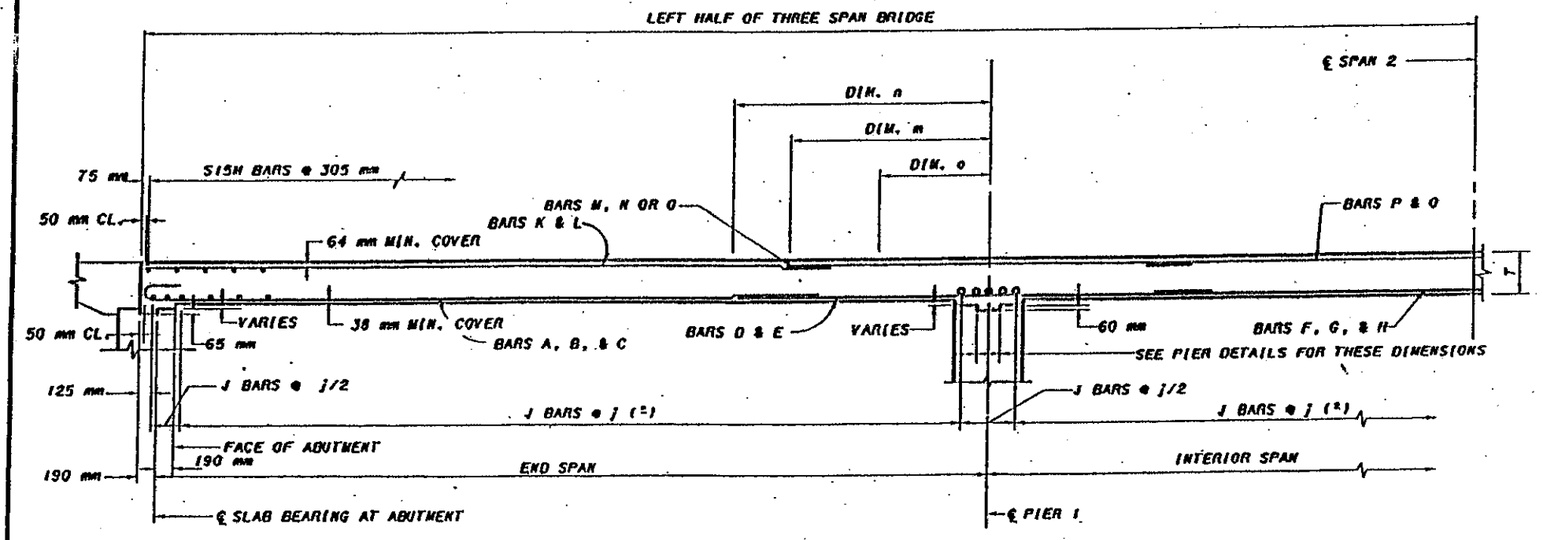
STANDARD
CAPPED PILE PIER
FOR CONTINUOUS SLAB BRIDGES-METRIC

1/1



SEE SHEET NO. 2 /3 FOR SECTIONS A - A, B - B AND D - D

PARTIAL PLAN VIEW



SECTION C - C

GENERAL NOTES

GENERAL:
THIS STANDARD DRAWING PROVIDES DESIGN AND GENERAL CONSTRUCTION DETAILS FOR THREE SPAN SLAB BRIDGES. THE PROJECT PLANS FOR EACH STRUCTURE WILL SHOW SPAN LENGTHS, ROADWAY WIDTHS, SKEW, CURVE, AND SUPERELEVATION (IF ANY), ELEVATIONS, SLAB REINFORCEMENT DETAILS IN PLAN AND CROSS SECTIONS, SUBSTRUCTURE DETAILS, ESTIMATED QUANTITIES, REINFORCING STEEL LIST AND OTHER NECESSARY DETAILS AND SPECIAL NOTES.

ADDITIONAL INTERIOR SPANS OF THE SAME LENGTH AS THE MIDDLE SPAN OF THE THREE SPAN SLAB BRIDGE DESIGN WITH AN 0.8 END SPAN RATIO MAY BE INCORPORATED INTO THE STRUCTURE WITHOUT CHANGE IN SLAB THICKNESS OR REINFORCEMENT. ADDITIONAL INTERIOR SPANS OF THE SAME LENGTH AS THE MIDDLE SPAN OF THE THREE SPAN SLAB BRIDGE WITH 0.7 END SPAN RATIOS REQUIRE A 25% INCREASE IN THE NEGATIVE REINFORCEMENT (TOP DECK STEEL) AT THE PIERS CLOSEST TO THE ABUTMENTS.

DESIGN SPECIFICATIONS: THIS STANDARD DRAWING CONFORMS TO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 1992, AND THE OHIO BRIDGE DESIGN MANUAL.

DESIGN METHOD: LOAD FACTOR DESIGN
DESIGN LOADING: MS18 AND THE ALTERNATE MILITARY LOADING
SUPERIMPOSED DEAD LOADS: 366.93 kg/m²
DESIGN STRESSES:
CONCRETE CLASS S - COMPRESSIVE STRENGTH 31MPa
REINFORCING STEEL - ASTM A615M, A616M, A617M GRADE 400 MINIMUM YIELD STRENGTH 400MPa
WEARING SURFACE: MONOLITHIC CONCRETE - 25 mm
DECK PROTECTION METHOD - EPOXY COATED REINFORCING STEEL, TOP AND BOTTOM MATS

SKEW:
FOR BRIDGES WITH SKEW, LONGITUDINAL BARS SHALL BE PLACED PARALLEL TO CENTERLINE OF THE ROADWAY AND TRANSVERSE BARS PARALLEL TO PIERS AND ABUTMENTS. THIS STANDARD SHALL NOT BE USED FOR SKEWS GREATER THAN 30°.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST LETTER IDENTIFIES THE BAR LOCATION; THE NEXT TWO DIGITS AND LETTER INDICATE THE METRIC BAR SIZE DESIGNATION; AND THE REMAINING DIGITS ITS SEQUENCE NUMBER.

EXAMPLE: U15M01
1. U - LOCATION OF THE BAR IN THE STRUCTURE
2. 15M - METRIC BAR SIZE DESIGNATION
3. 01 - SEQUENCE NUMBER

ADOPTED AUGUST 1992
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

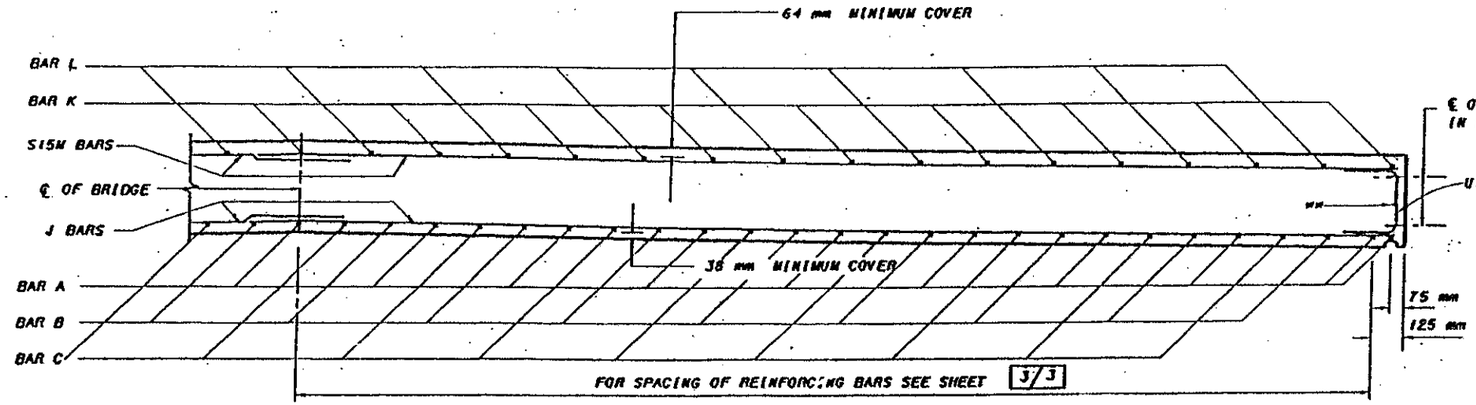
STATE OF OHIO DEPARTMENT OF TRANSPORTATION
Ed Sparkman 10-15-94
ENGINEER OF BRIDGES DATE

REVISIONS	DESIGNED	DRAWN	CHECKED
6-30-95	MGP	JFF	LMW
	BDB		

STANDARD CONTINUOUS SLAB BRIDGE METRIC

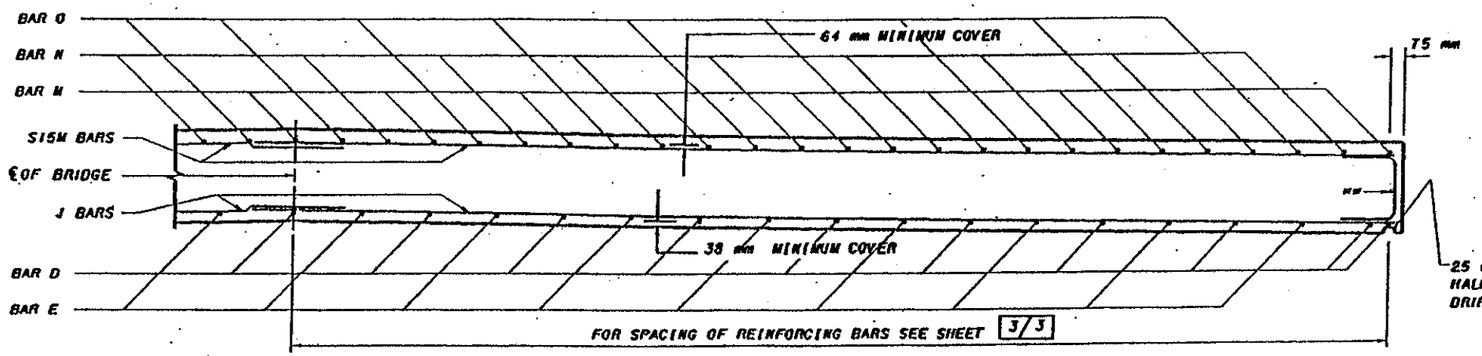
CS-1-93M

1/3

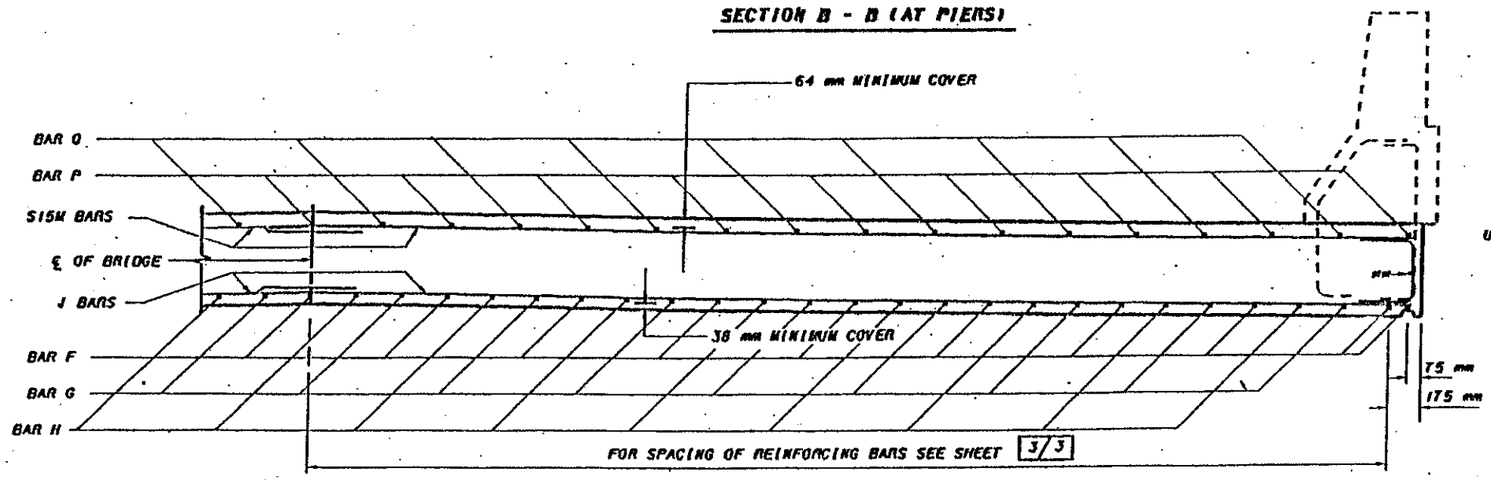


SECTION A - A (END SPAN)

** USE T15M01 BAR ONLY WITH T GREATER THAN 533mm



SECTION B - B (AT PIERS)



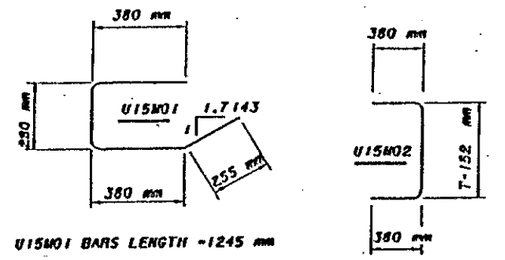
SECTION D - D (INTERIOR SPAN(S))

CONSTRUCTION JOINTS:
PLACEMENT OF THE CONCRETE DECK SLAB SHALL BE CONTINUOUS. CONSTRUCTION JOINTS SHALL BE PROVIDED ONLY IF A DECK POUR CANNOT BE COMPLETED DUE TO INCLEMENT CONDITIONS. THE CONSTRUCTION JOINT SHALL CONFORM TO THE REQUIREMENTS OF 511 OF THE CMS.

CAMBER:
CAMBER AS SHOWN IN THE SLAB AND REINFORCING TABLES SHALL BE PROVIDED TO COMPENSATE FOR THE DEAD LOAD DEFLECTIONS IN ADDITION TO ANY CAMBER REQUIRED FOR CONFORMANCE WITH THE PROFILE OF THE HIGHWAY.
ALLOWANCE SHALL BE MADE FOR THE DEFLECTION OF ANY FALSEWORK MEMBERS SUPPORTING THE ACTUAL CONCRETE DURING PLACEMENT.

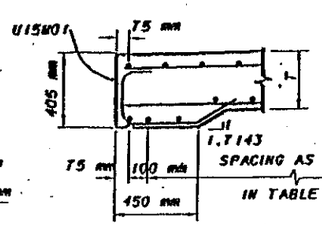
EDGE BEAM OPTION:
IN LIEU OF FORMING AN EDGE BEAM, THE CONTRACTOR MAY FURNISH A 405 mm SLAB OR A SLAB VARYING IN THICKNESS FROM 405 mm AT THE EDGE TO "T" AT THE CENTER OF THE ROADWAY AT NO ADDITIONAL COST TO THE OWNER.

EXPANSION:
PROVISIONS SHALL BE MADE FOR EXPANSION WHEN THE BRIDGE LENGTH EXCEEDS 76 200 mm OR WHEN A RIGID SUBSTRUCTURE (OTHER THAN A SINGLE LINE OF PILES) IS EMPLOYED.

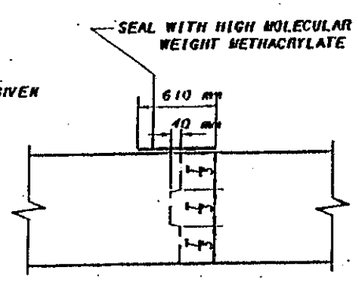


U15M01 BARS LENGTH = 1245 mm

U15M02 BARS LENGTH = T+559 mm



EDGE BEAM DETAIL
FOR T < 406 mm



CONSTRUCTION JOINT

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGES AND STRUCTURAL DESIGN
ENGINEER OF BRIDGES — DATE: 10-25-94

APPROVED	LAW	
CHECKED	JFF	CS-1-93M
DESIGNED	MGP	
DETAILED	BDB	
REVISIONS	6-30-95	

STANDARD
CONTINUOUS SLAB BRIDGE METRIC

2/3

THREE SPAN SLAB DATA

SPANS (mm) (SPAN RATIOS 0.7-1-0.7)	T (mm)	BAR SIZES (NUMBER) BARS A,B C,D E,F,G	BARS K,M H,O P	BARS E,L Q	BAR J	BAR SPACINGS (mm) BARS A,B C,D,E F,G,H	BARS K,L M,N,O P,Q	BAR J	BAR LENGTHS AND DIMENSIONS (mm) BAR A LENGTH	BAR B LENGTH	BAR C LENGTH	BAR C DIM. c	BAR D LENGTH	BAR D DIM. d	BAR E LENGTH	BAR E DIM. e	BAR F LENGTH	BAR F DIM. f	BARS G AND H DIM. g	BARS G AND H DIM. h	BAR K LENGTH	BAR L LENGTH	BAR M LENGTH	BAR M DIM. m	BARS N AND O LENGTH	BARS N AND O DIM. n	BARS N AND O DIM. o	BAR P LENGTH	BAR P DIM. p	BAR Q LENGTH	BAR Q DIM. q	REQ'D. DEAD LOAD CAMBER AT MIDSPAN SPANS 1 & 3 (mm)	REQ'D. DEAD LOAD CAMBER AT MIDSPAN SPAN 2 (mm)	NUMBER OF J BARS	NUMBER OF S15M BARS	NUMBER OF T15M BARS	LENGTH OF T15M BARS (mm)	NUMBER OF U15M01 OR U15M02 BARS
4260-6090-4260	305	25M	20M	15M	15M	475	455	190	3962	3734	3581	3277	2819	1143	2591	1219	4115	990	3581	838	1676	2896	2616	4877	2362	5105	2362	1753	2819	1638	2261	1917	0	6	85	50			170
4790-6850-4790	330	25M	25M	15M	15M	455	515	190	4191	3962	3810	3505	3200	1295	2896	1372	4420	1219	3962	990	1905	3429	2997	4877	2362	5156	2362	2362	3835	1511	2997	1930	0	6	93	55			186
5334-7620-5334	355	25M	25M	15M	15M	440	495	190	4572	4420	4191	3886	3734	1600	3200	1600	4724	1448	4420	1067	2134	4039	3507	4877	2438	5182	2438	1753	4750	1435	3912	1854	0	6	98	62			196
5860-8360-5860	380	25M	25M	15M	15M	440	455	200	4877	4801	4496	4191	4039	1829	3505	1753	5334	1524	4953	1219	2210	4648	4216	4724	2362	5055	2362	1676	5664	1359	4826	1778	0	6	107	68			214
6390-9140-6390	405	25M	25M	15M	15M	530	535	200	5613	5334	5080	4724	4420	1829	3658	1753	5740	1702	5182	1372	2591	5334	4597	4877	2515	5283	2515	1600	7036	1054	5563	1791	0	13	116	74			232
6930-9900-6930	430	25M	25M	15M	15M	650	535	215	5918	5639	5385	5029	4648	2057	3962	1981	6502	1702	5867	1448	2591	5944	5207	4724	2438	5131	2438	1524	7950	976	6477	1715	0	13	118	80			236
7460-10660-7460	460	25M	25M	15M	15M	550	455	230	6223	6020	5690	5334	5029	2286	4191	2134	6960	1854	6401	1524	2743	6553	5817	4572	2362	5004	2362	1448	8665	902	7391	1638	0	13	120	86			240
8000-11430-8000	480	25M	25M	15M	15M	530	455	230	6528	6378	5994	5639	5486	2515	4572	2362	7264	2083	6782	1676	2972	7315	6579	4572	2134	5029	2134	1219	9169	1130	7696	1867	0	19	128	92			256
8533-12190-8533	510	25M	30M	15M	15M	530	515	230	6833	6706	6299	5944	5791	2743	4877	2515	7874	2159	7315	1829	3200	7772	6731	5182	2515	5715	2515	1295	10185	1003	8052	2070	0	19	136	98			272
9060-12950-9060	535	25M	30M	15M	15M	530	475	240	7214	7087	6680	6325	6096	2896	5105	2667	8331	2311	7849	1905	3200	8255	7188	5334	2591	5893	2591	1372	10795	1080	8661	2146	6	25	137	104			274
9600-13710-9600	560	25M	35M	15M	15M	515	550	240	7518	7468	6985	6629	6553	3124	5410	2819	8636	2540	8230	2057	3429	8839	7341	5944	2972	6655	2972	1448	11938	889	8941	2388	6	25	144	110	4	16967	288
10130-14470-10130	585	25M	35M	15M	15M	515	515	240	7823	7849	7290	6934	6934	3353	5715	2972	9093	2692	8687	2210	3581	9296	7798	6096	3048	6807	3048	1524	12546	965	9550	2464	6	32	152	116	4	17882	304
10660-15240-10660	610	25M	35M	15M	15M	495	475	240	8128	8153	7595	7391	7391	3581	6096	3200	9398	2921	9068	2362	3810	9754	8255	6248	3124	6985	3124	1600	13157	1041	10160	2692	6	32	160	122	6	12649	320
11200-16000-11200	635	25M	35M	15M	15M	475	515	240	8433	8458	7899	7544	7772	3810	6477	3429	9855	3073	9525	2515	3962	10287	8331	7163	3581	8052	3581	1676	13970	1016	10033	2985	6	38	167	128	6	13259	334
11690-16700-11690	660	25M	35M	15M	15M	455	515	230	8814	8839	8280	7925	8153	3962	6782	3581	10160	3302	9906	2667	4191	10744	8788	7315	3658	8230	3658	1753	14580	1092	10643	3054	6	38	184	134	6	13868	368

THREE SPAN SLAB DATA

SPANS (mm) SPAN RATIOS (0.8-1-0.8)	T (mm)	BAR SIZES (NUMBER) BARS A,B C,D E,F,G	BARS K,M H,O P	BARS E,L Q	BAR J	BAR SPACINGS (mm) BARS A,B C,D,E F,G,H	BARS K,L M,N,O P,Q	BAR J	BAR LENGTHS AND DIMENSIONS (mm) BAR A LENGTH	BAR B LENGTH	BAR C LENGTH	BAR C DIM. c	BAR D LENGTH	BAR D DIM. d	BAR E LENGTH	BAR E DIM. e	BAR F LENGTH	BAR F DIM. f	BARS G AND H LENGTH	BARS G AND H DIM. g	BARS G AND H DIM. h	BAR K LENGTH	BAR L LENGTH	BAR M LENGTH	BAR M DIM. m	BARS N AND O LENGTH	BARS N AND O DIM. n	BARS N AND O DIM. o	BAR P LENGTH	BAR P DIM. p	BAR Q LENGTH	BAR Q DIM. q	REQ'D. DEAD LOAD CAMBER AT MIDSPAN SPANS 1 & 3 (mm)	REQ'D. DEAD LOAD CAMBER AT MIDSPAN SPAN 2 (mm)	NUMBER OF J BARS	NUMBER OF S15M BARS	NUMBER OF T15M BARS	LENGTH OF T15M BARS (mm)	NUMBER OF U15M01 OR U15M02 BARS
4260-5334-4260	280	25M	20M	15M	15M	475	455	290	3962	3734	3581	3277	2743	1143	2515	1219	3505	914	2972	762	1600	2819	2540	5029	2438	5258	2438	1829	1905	1715	1346	1994	0	0	55	48			110
4870-6090-4870	305	25M	20M	15M	15M	440	440	290	4267	4191	3886	3581	3277	1448	2819	1372	3810	1143	3353	914	1829	3505	3226	4877	2362	5105	2362	1753	2819	1638	2261	1892	0	6	62	54			124
5480-6850-5480	330	25M	25M	15M	15M	440	495	200	4648	4648	4267	3962	3658	1676	3048	1524	4267	1295	3886	991	1981	4115	3683	5029	2515	5309	2515	1829	3835	1511	2997	1930	0	6	95	61			192
6090-7620-6090	355	25M	25M	15M	15M	530	455	190	5385	5182	4851	4496	4039	1753	3277	1600	4826	1397	4191	1143	2286	4801	4369	4877	2438	5182	2438	1753	4750	1435	3912	1854	6	6	112	67			224
6700-8380-6700	380	25M	25M	15M	15M	550	535	215	5766	5715	5232	4877	4343	1981	3429	1676	5436	1473	4801	1219	2362	5563	4826	5182	2591	5563	2591	1676	3817	1283	4343	2019	6	6	109	74			218
7310-9140-7310	405	25M	25M	15M	15M	530	535	215	6147	6096	5613	5258	4877	2210	3810	1905	5588	1778	5105	1372	2667	5944	5207	5334	2819	5740	2819	1905	6731	1206	5258	1943	6	6	118	80			236
7920-9900-7920	430	25M	25M	15M	15M	530	475	230	6528	6553	5994	5639	5258	2438	4115	2057	6045	1930	5563	1524	2819	6629	5893	5334	2743	5740	2743	1829	7341	1283	5867	2019	6	6	121	87			242
8520-10660-8520	460	25M	25M	15M	15M	530	455	230	6833	7010	6299	5944	5715	2743	4343	2210	6502	2083	6096	1600	2972	7315	6579	5486	2667	5766	2667	1753	7950	1359	6477	2096	6	13	129	93			258
9140-11430-9140	485	25M	30M	15M	15M	515	495	230	7214	7468	6680	6325	6172	2972	4724	2362	6807	2311	6401	1829	3200	8026	6960	5639	2972	6147	4420	1676	9271	1080	7137	2146	6	13	136	100			276
9750-12190-9750	510	25M	30M	15M	15M	515	455	240	7595	7925	7061	6706	6553	3200	4953	2515	7264	2464	6934	1905	3353	8712	7645	5639	2819	6172	2819	1600	9881	1156	7747	2223	13	13	139	106			278
10360-12950-10360	535	25M	35M	15M	15M	515	550	240	7976	8382	7442	7087	6934	3429	5258	2667	7722	2616	7391	2057	3505	9525	8026	6096	3048	6782	3048	1524	11024	965	8026	2464	13	19	148	113			296
10960-13710-10960	560	25M	35M	15M	15M	515	515	255	8433	8915	7899	7544	7239	3581	5486	2743	8179	2769	7849	2210	3658	10211	8712	5944	2972	6655	2972	1448	11938	889	8941	2388	13	19	148	119	4	18288	296
11570-14470-11570	585	25M	35M	15M	15M	495	475	255	8738	9296	8204	7849	7772	3810	5867	2972	8484	2921	8230	2362	3886	10744	9246	6096	3048	6807	3048	1524	12548	965	9550	2464	19	25	156	126	6	13005	312
12190-15240-12190	610	25M	35M	15M	15M	495	515	255	9195	9754	8661	8306	8077	4039	6172	3124	8941	3150	8687	2515	4039	11354	9398	7010	3505	7823	3505	1600	13360	940	9423	2908	19	25	164	132	6	13665	328
12800-16000-12800	635	25M	35M	15M	15M	495	475	265	9728	10287	9195	8839	8230	4115	6401	3175	9550	3226	9220	2667	4115	11887	9931	7163	3581	8052	3581	1676	13970	1016	10033	2985	19	25	164	139	6	14326	328
13360-16700-13360	660	25M	35M	15M	15M	475	475	280	10109	10668	9576	9220	8687	4343	6706	3353	9855	3454	9601	2819	4343	12421	10439	7315	3658	8230	3658	1753	14580	1092	14249	3061	19	32	180	145	6	14986	360

DIMENSION C

BAR C

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
Ed Sandusky
ENGINEER OF BRIDGES
10-25-94
DATE

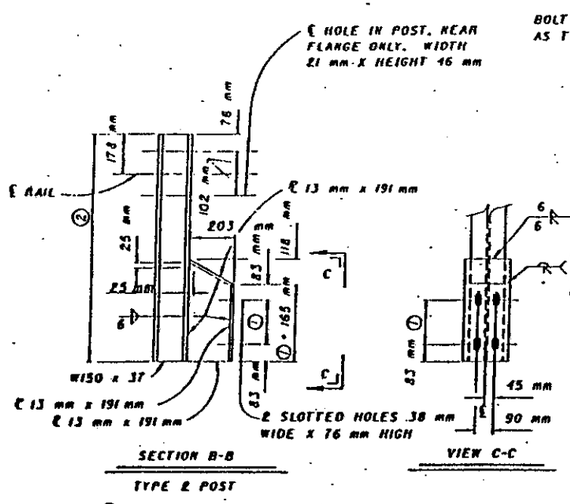
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STANDARD CONTINUOUS SLAB BRIDGE METRIC

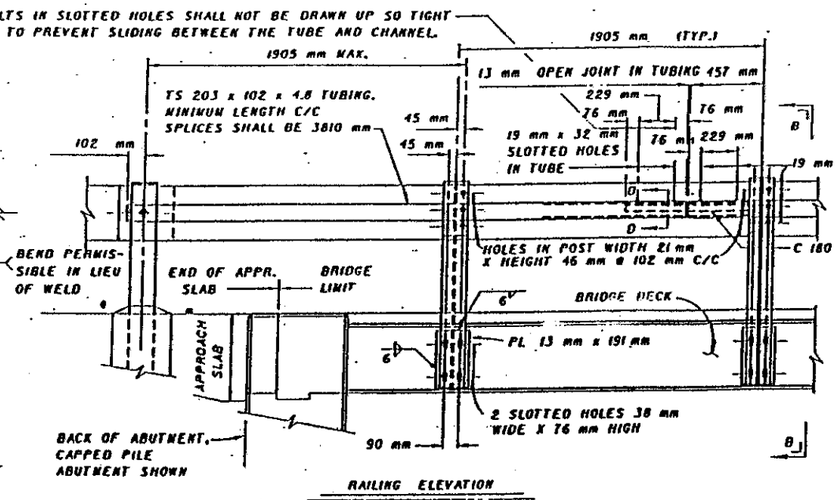
REVISIONS	DESIGNED	DRAWN	CHECKED	REVISED
6-30-95	MGP	BDB	JFF	LAW

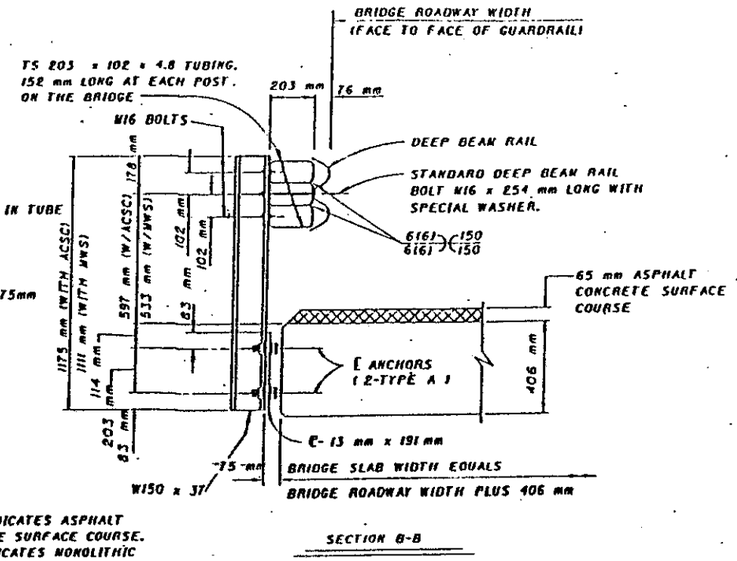
CS-1-93M

3/3

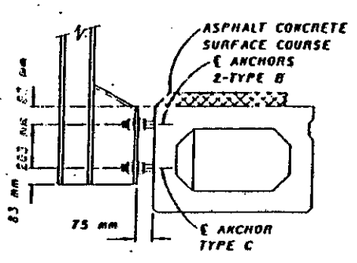


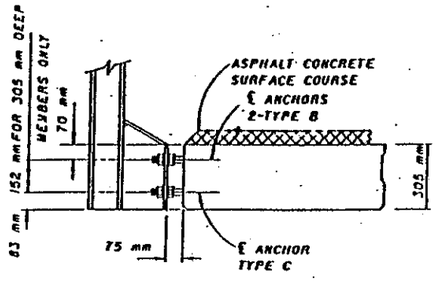
DIMENSION ① IS 152 mm OR 203 mm DEPENDING ON BOX BEAM DEPTH. SEE PROJECT PLANS AND POST ANCHORAGE DETAILS, PRESTRESSED CONCRETE BOX BEAMS. FOR DIMENSION ② SEE PROJECT PLANS. (FOR USE WITH PRESTRESSED CONCRETE BOX BEAMS)





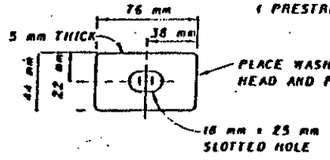
ACSC INDICATES ASPHALT CONCRETE SURFACE COURSE. MWS INDICATES MONOLITHIC WEARING SURFACE.



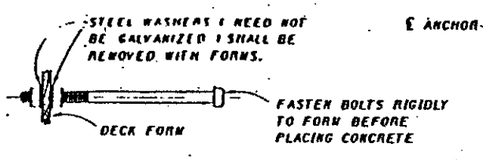


POST ANCHORAGE DETAILS

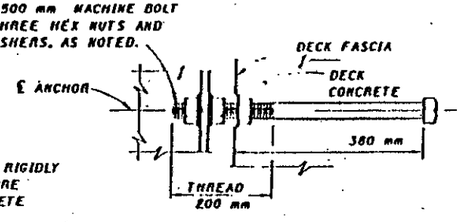
(PRESTRESSED CONCRETE BOX BEAMS)



SPECIAL WASHER

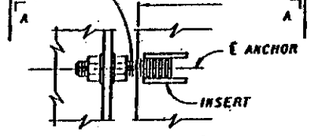


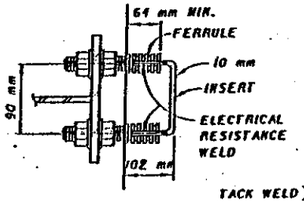
TYPE A ANCHORS SUPPORTED BY FORMS



TYPE A ANCHOR DETAIL

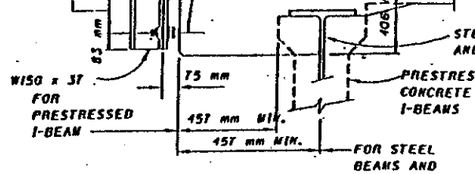
TYPE A ANCHORS SHOULD ONLY BE USED ON PROJECTS WHERE THE ORIGINAL ANCHORS WERE TYPE A AND ALL ANCHORS ON ANY SINGLE STRUCTURE ARE NOT BEING REMOVED OR REPLACED



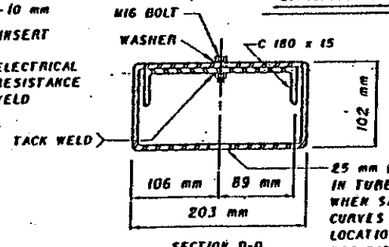


SECTION A-A

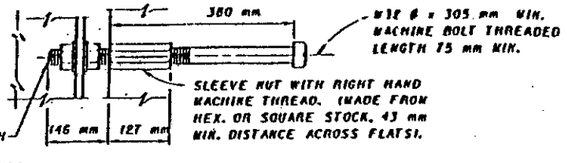
TYPE C ANCHOR DETAIL



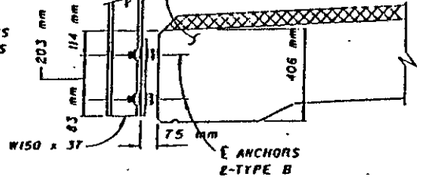
LONGITUDINAL BEAM BRIDGES



SECTION D-D



TYPE B ANCHOR DETAIL



CONCRETE SLABS

POST ANCHORAGE DETAILS

(NOT FOR USE WITH PRESTRESSED BOX BEAMS)

MATERIAL : ALL NUTS SHALL CONFORM TO THE PHYSICAL PROPERTIES OF ASTM-A325M. THE CHEMICAL PROPERTIES ARE WAIVED FOR ALL BOLTS, ANCHOR BOLTS, NUTS AND STUDS.

M16 BOLTS SHALL BE ASTM-A325M.

M32 ANCHOR BOLTS AND STUDS SHALL CONFORM TO THE FOLLOWING PHYSICAL PROPERTIES:

A) ELONGATION SHALL BE 10%
B) THREAD PITCH IS 3.6mm
C) STRESS AREA IS 643mm²
D) PROOF LOAD LENGTH MEASUREMENT METHOD IS 386kN
E) PROOF LOAD YIELD STRENGTH METHOD IS 424kN
F) MINIMUM TENSILE STRENGTH IS 534kN
G) PRODUCT HARDNESS IS ROCKWELL C23 MINIMUM AND C34 MAXIMUM.

STEEL TUBING SHALL BE AS PER ITEM 707.10. ALL GUARDRAIL POSTS SHALL BE ASTM A36M.

GALVANIZING : ALL GUARDRAIL POSTS, TUBES, HARDWARE AND ACCESSORIES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 OR ASTM A153, EXCEPT AS OTHERWISE NOTED.

TYPE C ANCHOR INSERTS OF A DIFFERENT TYPE MAY BE PROVIDED IF APPROVED BY THE DIRECTOR.

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGES AND STRUCTURAL DESIGN
ENGINEER OF BRIDGES
10-25-94 DATE
DESIGN AGENCY

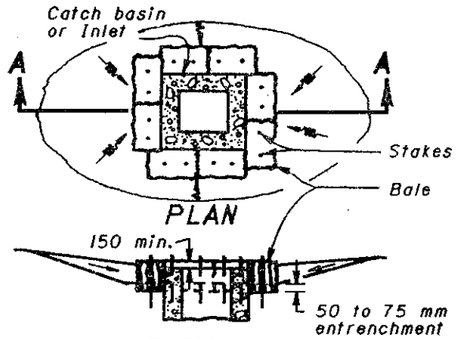
STANDARD
DEEP BEAM BRIDGE GUARDRAIL - METRIC

REVISIONS	DESIGNED	DRAWN	CHECKED	CHECKED	APPROVED
8-18-95	JFF	REF	JAW		LUW

DBA-2-73M

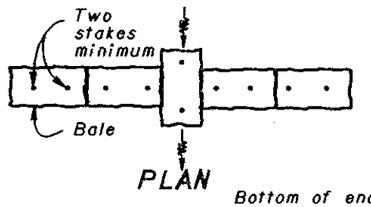
1 / 1

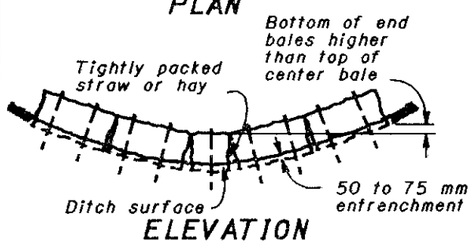
STRAW OR HAY BALES



SECTION A-A

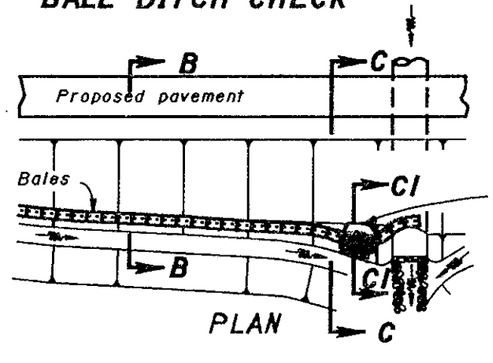
BALE INLET FILTER



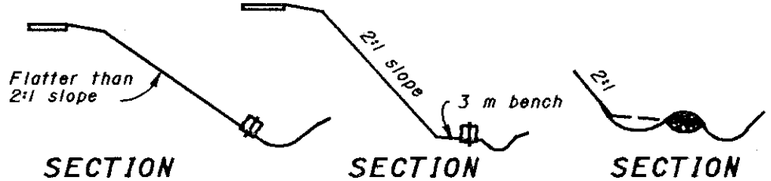


ELEVATION

BALE DITCH CHECK



Sediment pit, 0.5 m max. depth with sand and gravel outlet filter, 0.3 m min. height



SECTION B-B | SECTION C-C | SECTION C1-C1

BALE FILTER DIKE

BALE PLACEMENT: Bales shall be tightly placed adjacently and entrenched 50 mm to 75 mm before staking; or a small amount of loose soil shall be lightly compacted along the upstream edge of the bales.

Each bale shall be firmly staked with a minimum of two stakes at least 1 m in length.

Stakes shall be wooden 50 x 50 mm, reinforcing bars or fence posts, as approved by the Engineer.

Loose straw or hay shall be scattered for a distance of 3 m on the upstream side of each ditch check, and shall be wedged between and under staked bales.

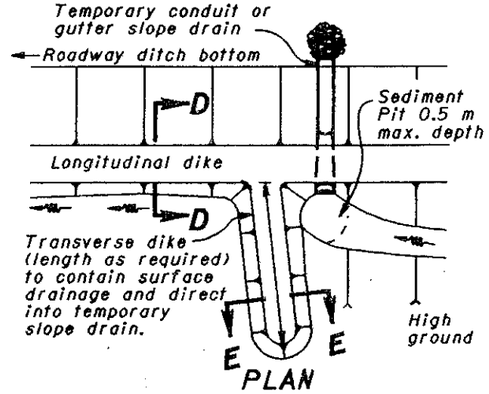
PITS: Sediment pits shall be provided where directed by the Engineer, and their cost included in the unit price bid for the adjacent CMS 207 items.

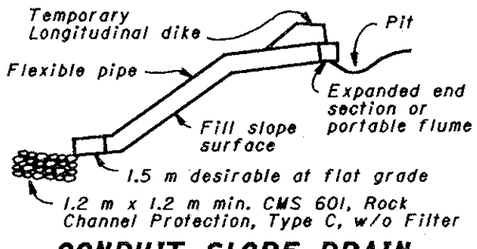
MAINTENANCE: Sediment shall be removed when its depth reaches half the height of the exposed portion of the lowest bale.

BASIS OF PAYMENT: Straw or hay bale installation shall be paid for under Item 207, Straw or Hay Bales.

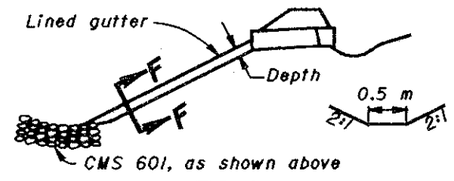
Cost will include placing, staking, maintaining and removing.

DIKES AND SLOPE PROTECTION



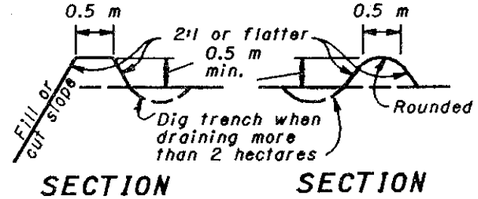


CONDUIT SLOPE DRAIN



SECTION F-F

GUTTER SLOPE DRAIN



SECTION D-D | SECTION E-E

TEMPORARY SLOPE DRAINS RECOMMENDED SIZES				
Area (hectares)	Pipe Sizes (mm)			Gutter depth (mm)
	Smooth	Corrugated	Half-round	
0-1.6	150	150	450	200
1.6-3.2	200	300	450	200
3.2-4.9	250	375	525	300

GENERAL: Dikes & drains shown shall be used when earthwork operations on slopes higher than 2.5 m are suspended for three weeks or more and/or as directed by the Engineer. Smaller dikes used at the end of a day's operation shall be considered as part of the earthwork. Temporary slope drains shall be suitably positioned and anchored to prevent movement or undermining, as directed by the Engineer.

LONGITUDINAL DIKES: shall be constructed of suitable material as per CMS 203 and compacted to 85% maximum density.

CONDUITS: Conduits for slope drains shall be corrugated steel pipe, corrugated or smooth plastic pipe, rubber conduit, or an approved equal.

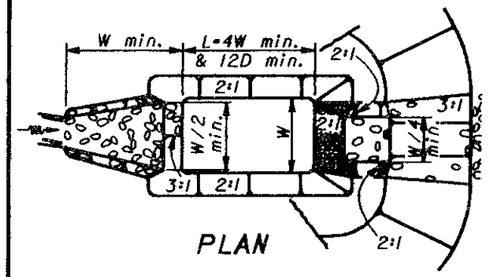
GUTTERS: Gutters for slope drains shall be lined with Type C rock channel protection, crushed aggregate slope protection, portland cement concrete, bituminous concrete, plastic sheeting (on slopes 4:1 max.), partial pipe sections or approved equal.

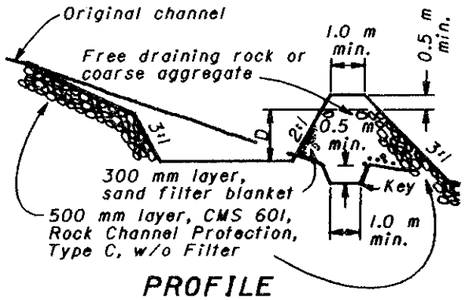
PITS: Sediment pits shall be provided where directed by the Engineer and their cost included in the price bid for adjacent CMS 207 items.

BASIS OF PAYMENT: Temporary dikes shall be paid for under Item 207, Temporary Dikes.

Temporary slope drains shall be paid for under Item 207, Temporary Slope Drains. Rock required shall be paid for under Item 601, Rock Channel protection, Type C, w/o Filter.

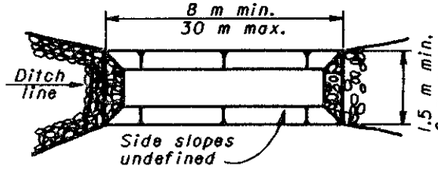
SEDIMENT BASINS & DAMS



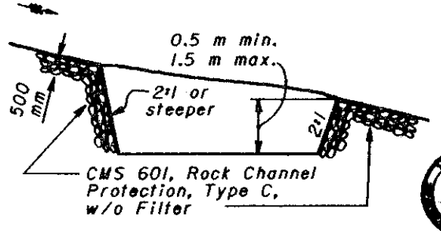


PROFILE

SEDIMENT DAM



PLAN



PROFILE

SEDIMENT BASIN

EMBANKMENT: Sediment basin embankment construction shall be as per CMS 203 compacted as directed by the Engineer.

MAINTENANCE: Sediment pits, dams and basins shall be acceptably maintained. Deposited sediment shall be removed when the initial volume has been reduced one-half.

The sand filter blanket on sediment basins shall be replaced when deposited sediment is removed.

The cost of maintenance shall be included in the unit price bid for the appropriate CMS 207 item.

FILTERS: Plastic filter fabric, as approved by the Engineer, may be substituted for the sand filter blanket on sediment dams. Such fabrics may be cleaned in lieu of replacement, when approved by the Engineer.

SIZE: The volume shown on the plans is the total storage volume required for the sediment basin or dam. A series of smaller basins or dams may be substituted for a larger basin or dam when approved by the Engineer.

BASIS OF PAYMENT: Sediment Dams and Basins shall be paid for under Item 207, Temporary Benches, Dams and Sediment Basins.

The pay quantity shall be the acutal number of cubic cubic meters of excavation and embankment required to construct the basin or dam.

Rock required shall be paid for under Item 601, Rock Channel Protection, Type C, w/o Filter.

metric units

This Drawing Replaces MC-11.

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

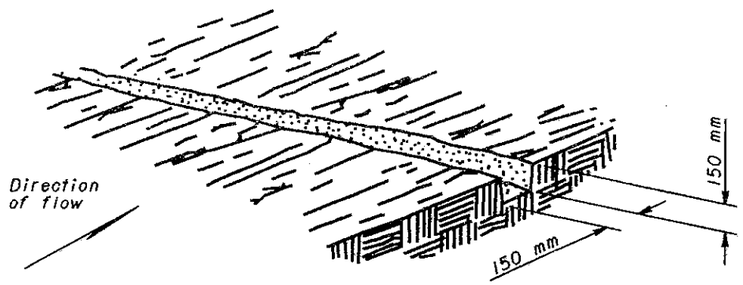
TEMPORARY EROSION CONTROL

DATE 6-30-95

STANDARD CONSTRUCTION DRAWING **DM-4.3M**

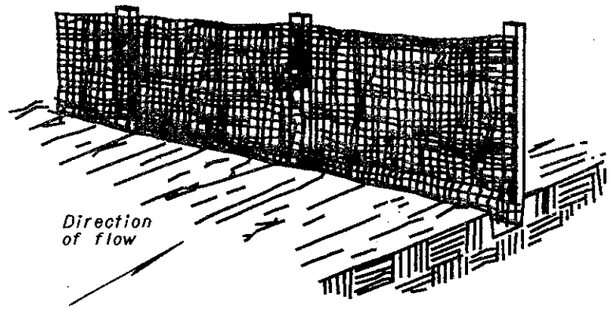
APPROVED W.K. Hulman

ENGR. L & D



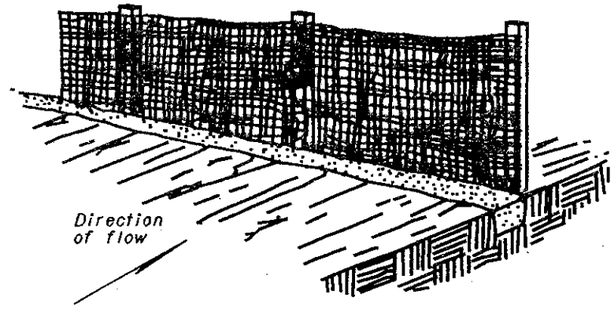
Excavate a 150 mm by 150 mm trench along the proposed fence line.

STEP 1



Place fabric and support stakes and extend fabric into the trench.

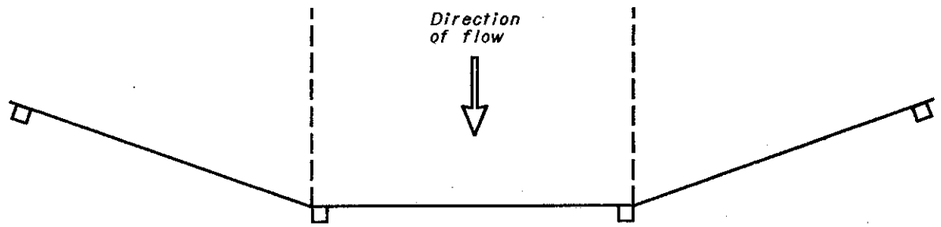
STEP 2



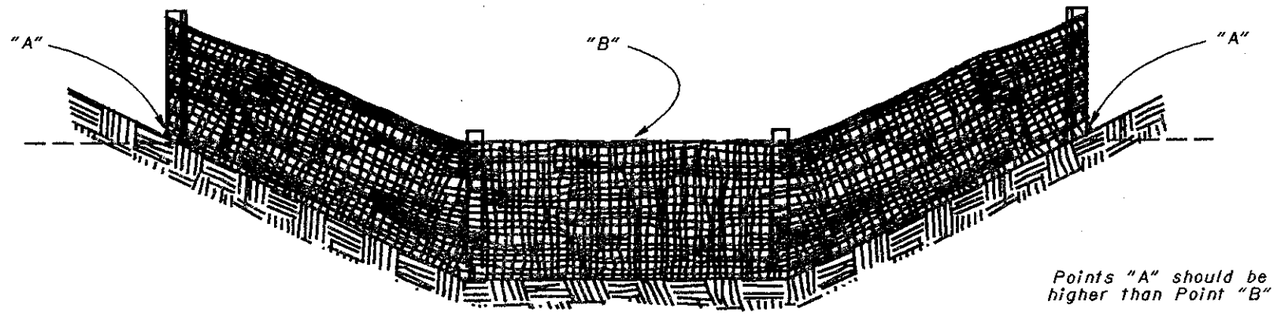
Backfill and compact the excavated soil.

STEP 3

CONSTRUCTION OF A FILTER BARRIER



PLAN VIEW



Points "A" should be higher than Point "B"

ELEVATION VIEW

PROPER PLACEMENT OF A FILTER BARRIER IN A DRAINAGE WAY

NOTES

MATERIALS: Filter fabric shall meet the requirements of CMS 207.02.

CONSTRUCTION: The bottom of the fabric shall be buried 150 mm below the ground. The fabric shall be high enough to retain sediment-laden water and adequately supported to prevent collapse or bursting. The ground elevation of the fence shall be held constant except that the end elevations shall be raised to prevent flow around the end of the fence.

MAINTENANCE: The filter fabric fence shall be maintained to be functional, at the direction of the Engineer. This shall include removal of trapped sediment and required cleaning, repair, and/or replacement of the filter fabric. Sediment shall be removed when its depth reaches half the height of the lowest section of fence.

PAYMENT: The cost of all materials, construction, maintenance and removal shall be paid for under Item 207, Meter, Filter Fabric Fence.

metric units

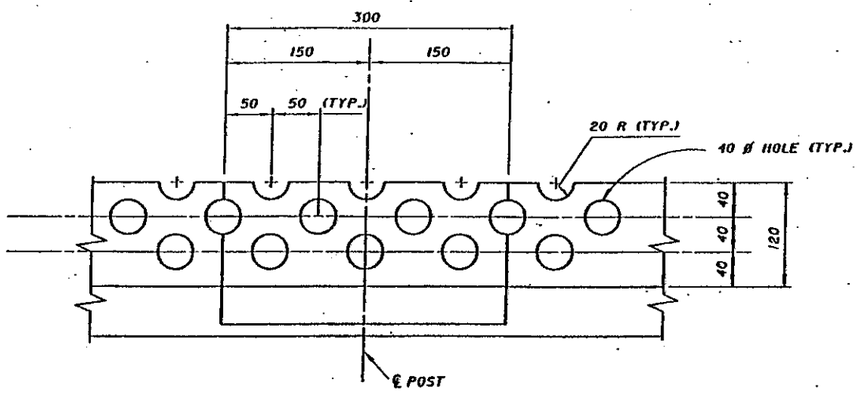
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION CONTROL

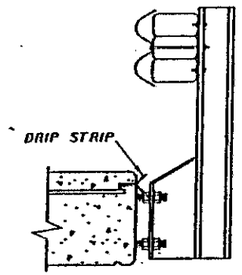
DATE 6-30-95

STANDARD CONSTRUCTION DRAWING **DM-4.4M**

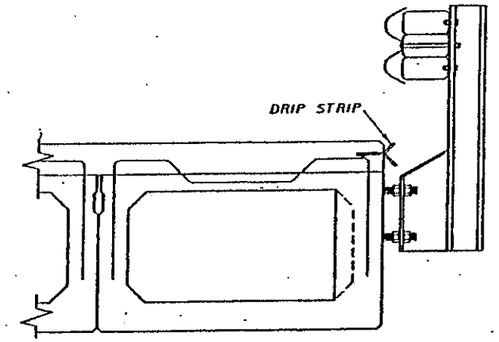
APPROVED W. K. Hulman
ENGR., L & D



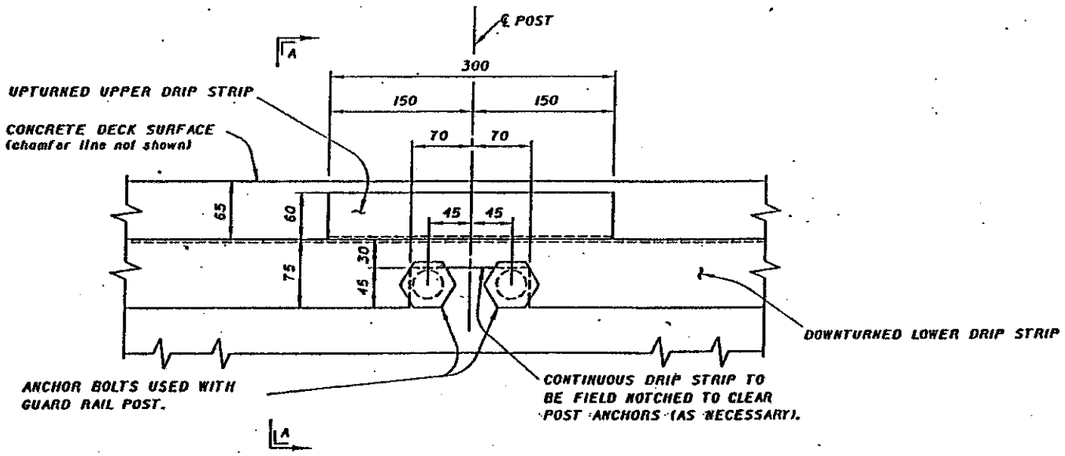
PARTIAL PLAN



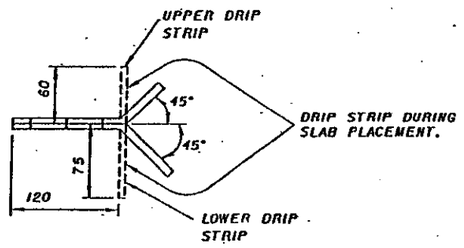
SECTION AT EDGE OF CONCRETE DECK SLAB



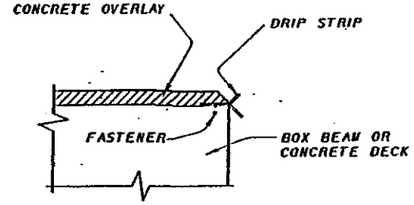
SECTION AT EDGE OF COMPOSITE PRESTRESSED BOX BEAM DECK



ELEVATION



SECTION A-A



✡ SECTION AT EDGE OF ASPHALT OR CONCRETE OVERLAY

✡ PRIOR TO PLACING AN ASPHALT OR CONCRETE OVERLAY, THE BENT DRIP STRIPS SHALL BE INSTALLED ALONG THE EDGE OF THE SLAB OR PRESTRESSED BOX BEAM AS SHOWN. THE DRIP STRIPS SHALL BE FASTENED WITH (32 mm length, 3 mm shank diameter) BUTTON HEAD SPIKES WITH DEFORMED SHANKS OR EXPANSION ANCHORS AT 450 mm C/C MAX. ALL INSTALLATION DEVICES SHALL EITHER BE GALVANIZED OR STAINLESS STEEL.

OTHER SIMILAR DEVICES WHICH WILL NOT DAMAGE THE CONCRETE MAY BE USED SUBJECT TO THE APPROVAL OF THE ENGINEER.

DRIP STRIP NOTES:

LOWER STAINLESS STEEL DRIP STRIP, AS DETAILED, SHALL BE INSTALLED ALONG THE FULL LENGTH OF EACH SIDE OF THE BRIDGE. IF SPLICES ARE REQUIRED IN THE LOWER DRIP STRIP, THE INDIVIDUAL PIECES SHALL BE BUTTED TIGHTLY TOGETHER, NOT LAPPED. A 300 mm LONG UPPER DRIP STRIP SHALL BE INSTALLED AT EACH RAILING POST. STRIPS SHALL BE BENT UP AT 90° AGAINST THE INSIDE FACE OF THE FORMS BEFORE CONCRETE IS PLACED. AFTER THE FORMS ARE REMOVED, THE DRIP STRIPS SHALL BE BENT TO A FINAL POSITION OF 45° AS SHOWN IN SECTION A-A.

STAINLESS STEEL SHALL BE A MINIMUM OF 0.8 mm ASTM A167, TYPE 304, MILL FINISH.

CARE SHALL BE USED WHEN STRIPPING FORMWORK SO AS NOT TO DAMAGE OR WRINKLE THE STAINLESS STEEL DRIP STRIP. TO FURTHER ENSURE THAT WRINKLING OF THE STRIPS DOES NOT OCCUR, AN ADEQUATE LENGTH BACKUP BAR SHALL BE USED DURING THE BENDING OUT OPERATION.

TOTAL QUANTITY FOR BID ITEM SHALL INCLUDE LINEAR FOOTAGE OF BOTH LOWER AND UPPER DRIP STRIPS.

PAYMENT SHALL BE AT THE CONTRACT PRICE BID FOR ITEM SPECIAL, LIN. FT. STEEL DRIP STRIP AND SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS AND INCIDENTALS NECESSARY TO COMPLETE THIS ITEM.

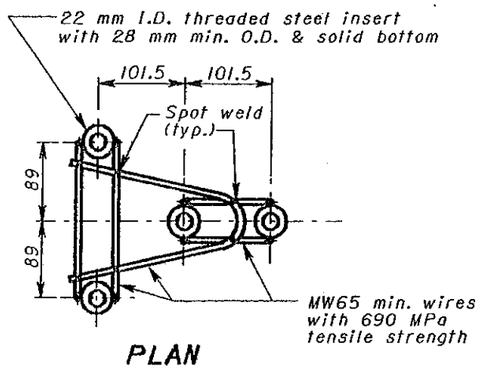
DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
Richard L. Engel
ENGINEER OF BRIDGES
12-15-94
DATE

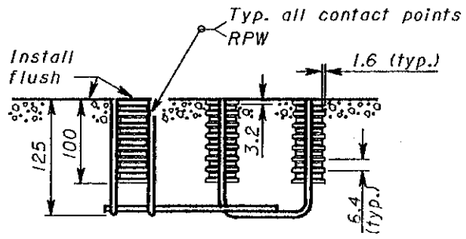
REVISIONS	DESIGNED REZA	DRAWN REZA	CHECKED JS	REVISED LWH	DS-1-94M

STANDARD
DRIP STRIP DETAIL
FOR STRUCTURES WITH
OVER THE SIDE DRAINAGE

1 / 1



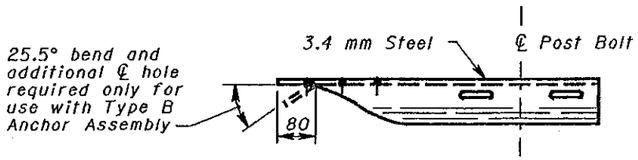
PLAN



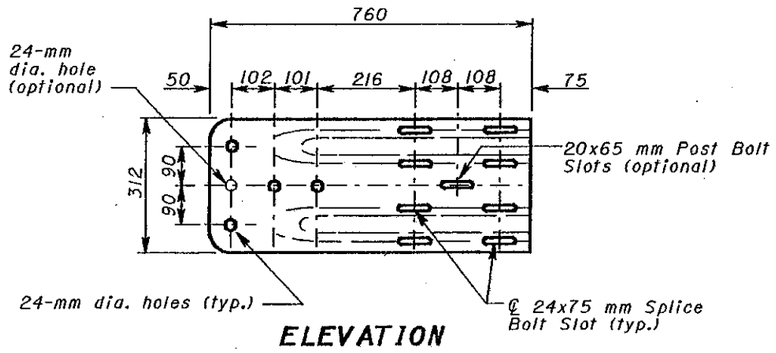
Four 22-mm bolts required

ELEVATION

CONCRETE INSERT ANCHOR ASSEMBLY (W-BEAM ONLY)

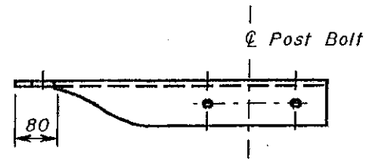


PLAN

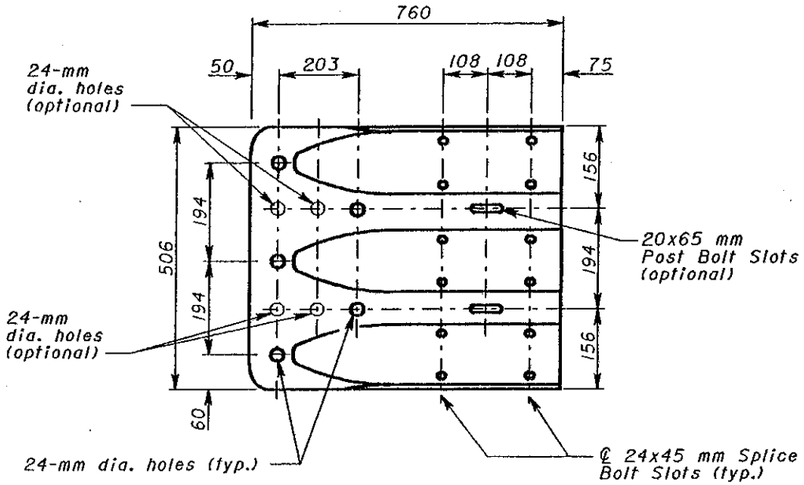


ELEVATION

W-BEAM TERMINAL CONNECTOR

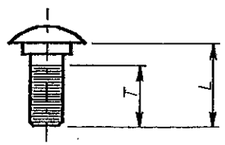


PLAN



ELEVATION

THRIE-BEAM TERMINAL CONNECTOR



L (mm)	T min. (mm)	Bolt Use
455 (Standard Rail)	85	Type 5: WP/WB, PB
660 (Barrier Rail)		
255	60	Type 4: WP Type 5: SP/WB, PB
50	35	Type 4: SP
32	Full	Splice Bolt

WP- wood post WB- wood blockout
SP- steel post PB- plastic blockout
Longer bolt may be needed for round WP larger than 200 mm dia.

BUTTON HEAD BOLT

(For post and splice bolts)

NOTE

Refer to AASHTO M 180 for dimensional details of W-Beam and Thrie-Beam rail elements, related buffer and end sections, beam splices, post and splice bolts and nuts, and Type 1 W-Beam to Thrie-Beam Transition section.

All dimensions are in millimeters unless otherwise noted.

metric units

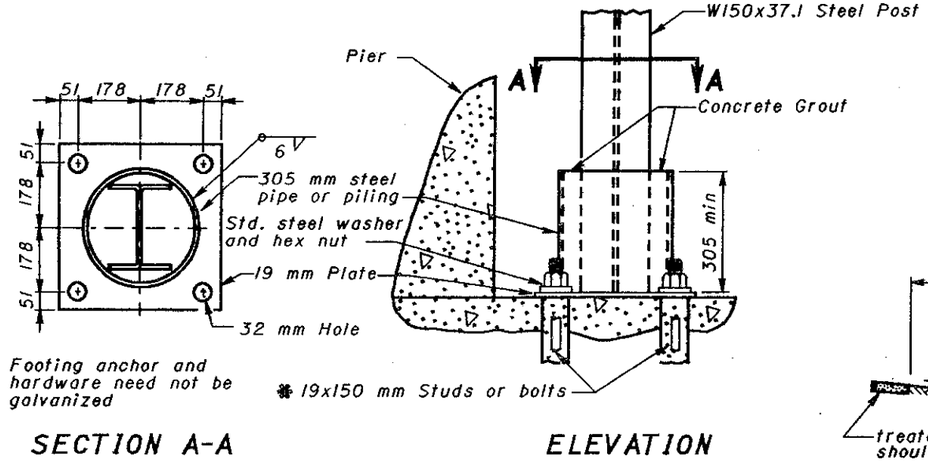
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL DETAILS

DATE
11-30-94
10-21-97

STANDARD CONSTRUCTION DRAWING GR-1.1M

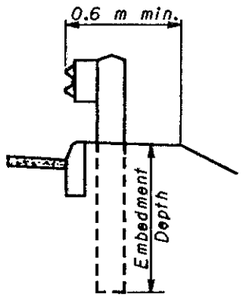
APPROVED Gary F. Sutherland



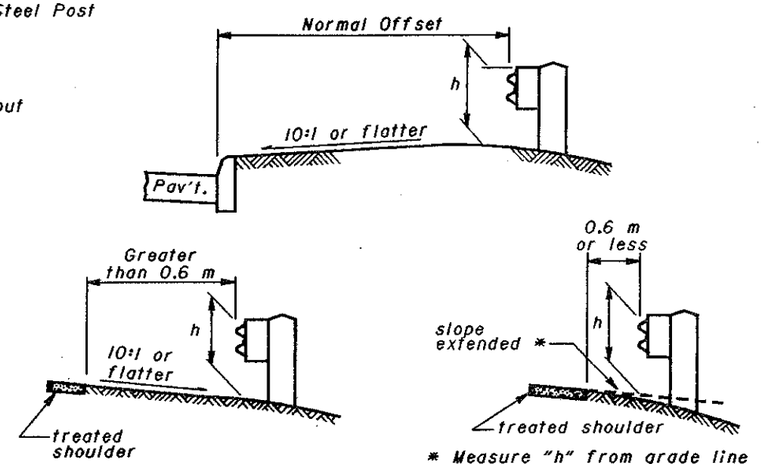
Footing anchor and hardware need not be galvanized

SECTION A-A ELEVATION

FOOTING ANCHOR

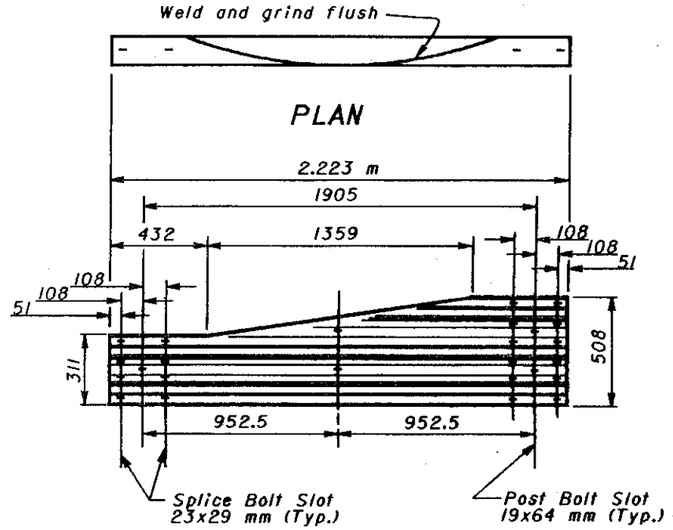


DETAIL A



h = Standard height (Tolerance ±25 mm)

MEASURING GUARDRAIL HEIGHT



ELEVATION

TYPE 2 TRANSITION SECTION *

(W-Beam to Thrie-Beam)

* For details of Type 1 Transition Section, refer to AASHTO M 180, Figure 4.

NOTES

BEAM RAIL ELEMENTS: Elements shall be 3.81 m effective length, unless otherwise specified, with 19x64 mm post bolt slots on 1.905 m centers regardless of post spacing. Field punching or drilling of bolt holes or slots for irregularly spaced posts shall be according to CMS 606.05.

BEAM RAIL SPLICE between two rail elements or between a rail and terminal connector shall be lapped in the direction of traffic. The buffer or flared end sections shall lap on the traffic face. A 305 mm length of beam rail (Back-up Plate), with a 19 mm diameter bolt hole or a 19x64 mm slot, shall be provided at steel posts not having a rail splice.

EMBEDMENT DEPTH: Where less than 0.6 m of graded shoulder width (10:1 or flatter) exists, measured from the face of the guardrail (see Detail "A"), longer posts shall be used so that a minimum of 1.65 m embedment depth is provided. Payment for the longer posts will be made at the unit price bid per Each, Item 606 - Guardrail Post, 2.75 m.

PROTECTIVE COATING: In lieu of the requirements of CMS 710.06, expansion shields, anchors and insert anchor assemblies installed (embedded) in concrete shall be coated in accordance with ASTM A 153 or be of stainless steel. Any bolts screwed into these embedded devices shall meet CMS 710.06.

SPECIAL POST MOUNTINGS:

Posts located over a drainage inlet or structure shall be encased or anchored per the details shown on Standard Construction Drawing GR-2.2M.

Posts located over a footing with a cover of less than 0.75 m shall be installed with a footing anchor as detailed hereon. (A plate, as detailed on Section B-B of Standard Construction Drawing GR-2.2M, may be used as an alternate attachment method.) Where the cover is between 0.75 m and 1.04 m, the footing anchor may be omitted and the post encased instead with 100 mm (min.) of concrete.

Posts located over a culvert with less than 1.3 m of cover shall not be driven, but shall be set in drilled or dug holes. Where the available post embedment depth is less than 1.04 m, the post shall be encased with 100 mm (min.) of concrete.

All costs associated with special post mountings shall be included in the unit price bid for 606 Guardrail of the type specified in the plans.

*** ANCHORS:** Holes and grouting shall comply with CMS 510. Either cement or nonshrink, nonmetallic grout may be used.

Expansion shield anchors conforming to CMS 712.01 may be substituted except where concrete deterioration has occurred, as determined by the Engineer. The same bolt diameter specified shall be required. Where self-drilling anchors are used, the holes shall be drilled with the expansion shield (not by a drill bit) and the shield installed flush with the concrete surface.

All dimensions are in millimeters unless otherwise noted.

metric units

This Drawing Replaces GR-1.2.

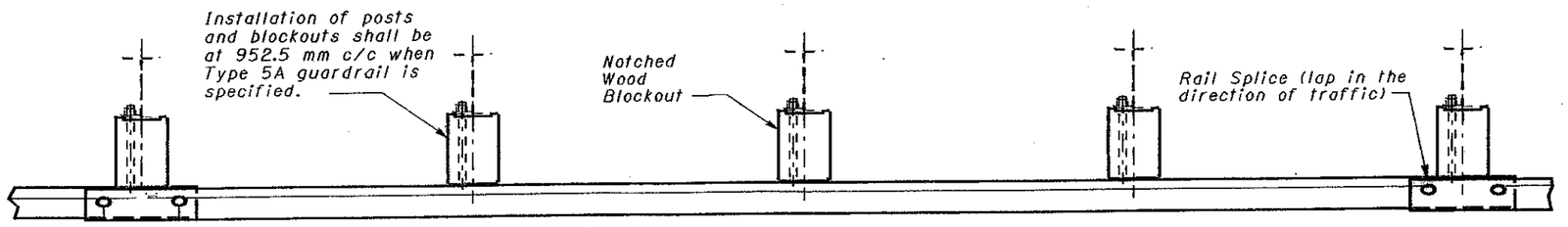
OFFICE OF ROADWAY ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL DETAILS

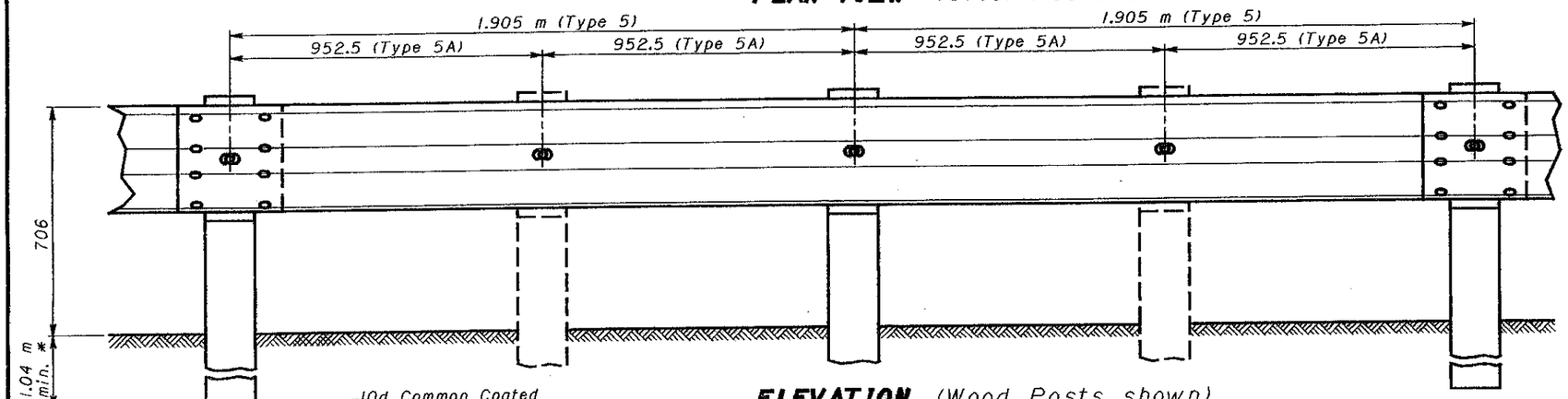
DATE 1-3-96

STANDARD CONSTRUCTION DRAWING **GR-1.2M**

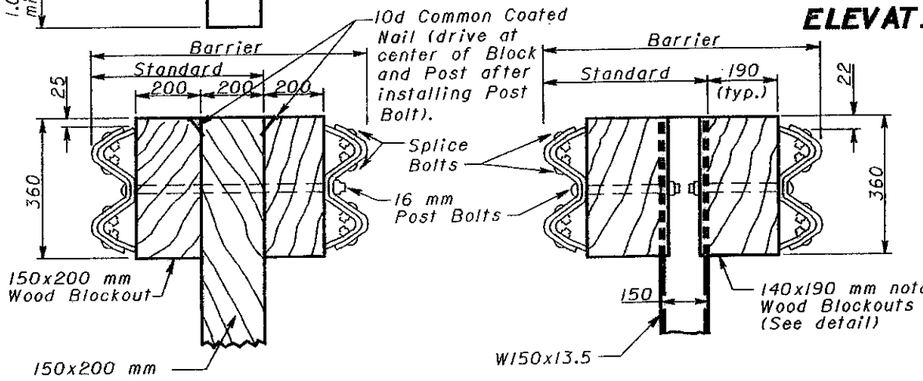
APPROVED R.K. Huelman, P.E.
ADMINISTRATOR



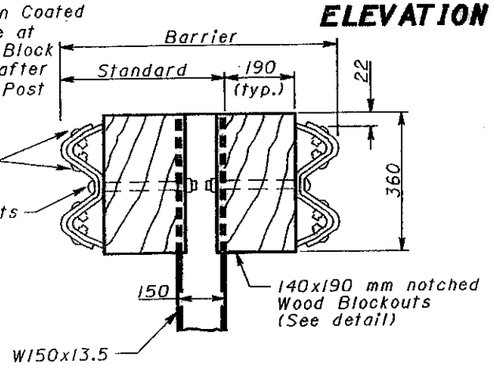
PLAN VIEW (Steel Posts shown)



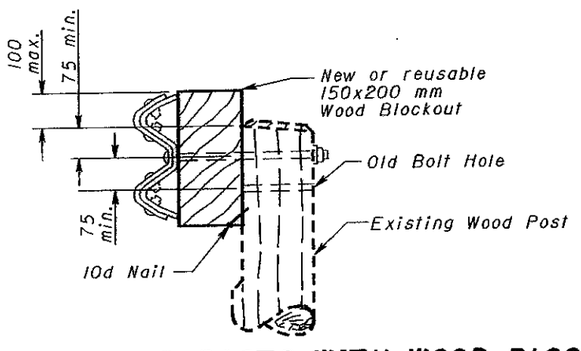
ELEVATION (Wood Posts shown)



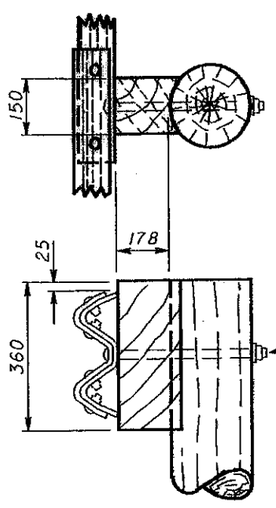
SQUARE WOOD POST



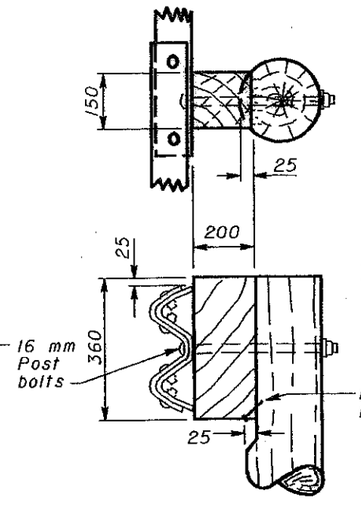
STEEL POST



WOOD POSTS WITH WOOD BLOCK RAISING EXISTING GUARDRAIL HEIGHT



METHOD 1



METHOD 2

Alternate methods of placing the blockouts on round posts may be submitted for consideration and approved by the Engineer.

ROUND WOOD POSTS

All dimensions are in millimeters unless otherwise noted.

metric units

NOTES

POSTS: Posts may be round (standard single rail only) or 150x200 mm square-sawed pressure-treated wood or W150x13.5 galvanized steel. The same type post shall be used throughout the length of the project unless otherwise required by the plans or permitted by the Engineer. Round posts shall be 200 mm ± 25 mm in diameter at the top and not more than 75 mm larger at the butt with a uniform taper. Post may be set in drilled holes or may be driven to grade.

Wood posts shall be fabricated with square ends. Posts and blockouts shall be pressure-treated per CMS 710.14. Bolt holes shall be bored and the tops of posts shall be trimmed as shown, if required, after posts are set.

ALTERNATE BLOCKOUTS: Approved plastic blockouts may be used in lieu of the wood blockouts shown. The approved list is maintained by the Office of Materials Management.

WASHERS: Standard galvanized steel washers of the appropriate size shall be installed on the nut side of bolts through wood posts.

WELDED BEAMS: Welded beam guardrail posts may be used for Item 606, Guardrail, provided the web and flange sizes are as shown hereon. Welding of the web to the flanges shall conform to ASTM A 769M, Class I using Grade 36 steel (250 MPa yield point) with the following exceptions:

Sec. 7.2 Test reports of tensile properties for each lot shall accompany each shipment.

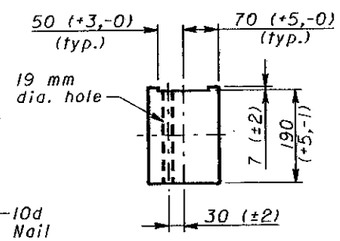
Sec. 12 Beams that have imperfections repaired by welding shall not be accepted for use in Item 606.

Sec. 13 Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

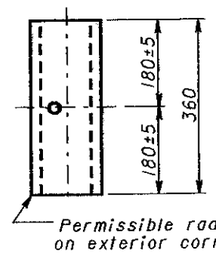
* **POST EMBEDMENT DEPTH:** For specific depth requirements, see SCD GR-1.2M.

STEEL BEAM POSTS				
Size	Beam depth	Flange width	Flange thickness	Web thickness
Rolled W150x12.6	148 mm	100 mm	4.9 mm	4.3 mm
Rolled W150x13.5	150 mm	100 mm	5.5 mm	4.3 mm
Welded 150x12.6	152 mm	100 mm	4.9 mm	4.3 mm
Welded 150x13.5	152 mm	100 mm	5.5 mm	4.3 mm

MISCELLANEOUS: For details not shown see SCD's GR-1.1M and GR-1.2M.



PLAN



ELEVATION

NOTCHED BLOCKOUTS FOR STEEL POSTS

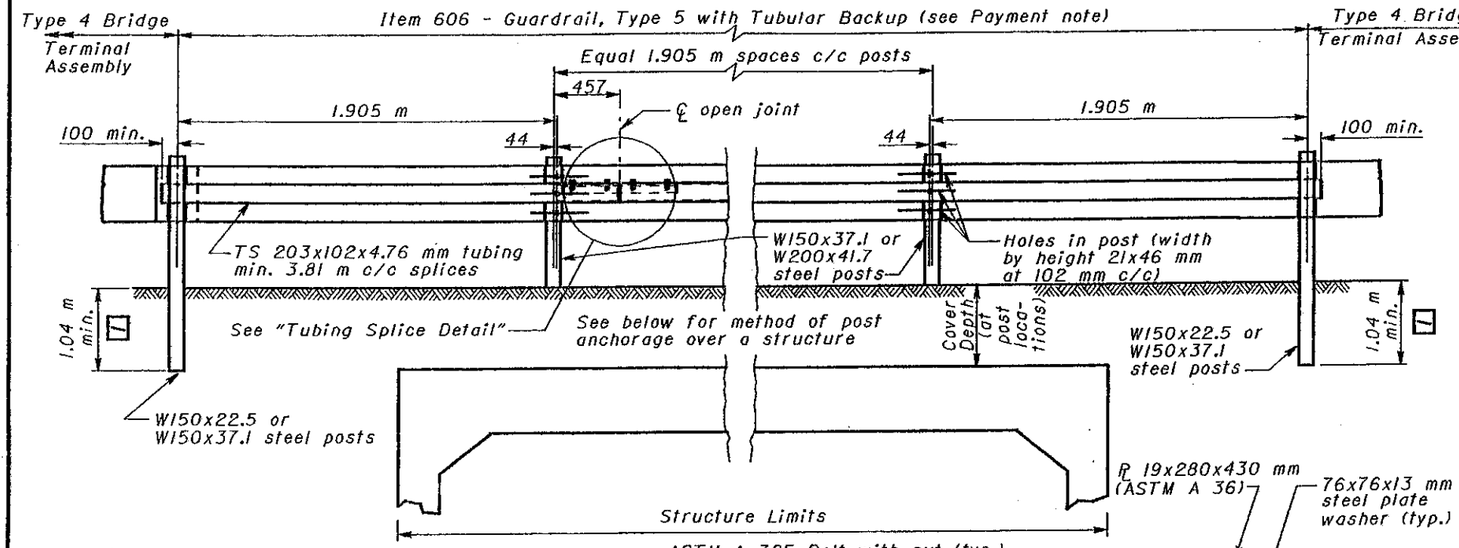
OHIO DEPARTMENT OF TRANSPORTATION

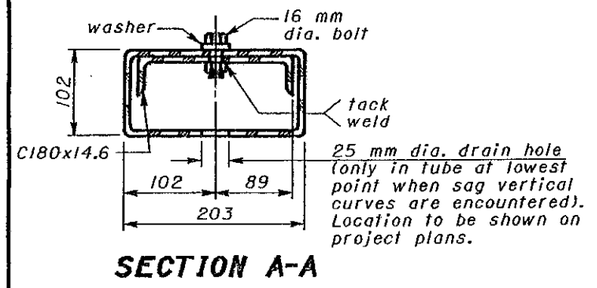
GUARDRAIL TYPE 5 & 5A

DATE
11-30-94
10-21-97
4-14-98

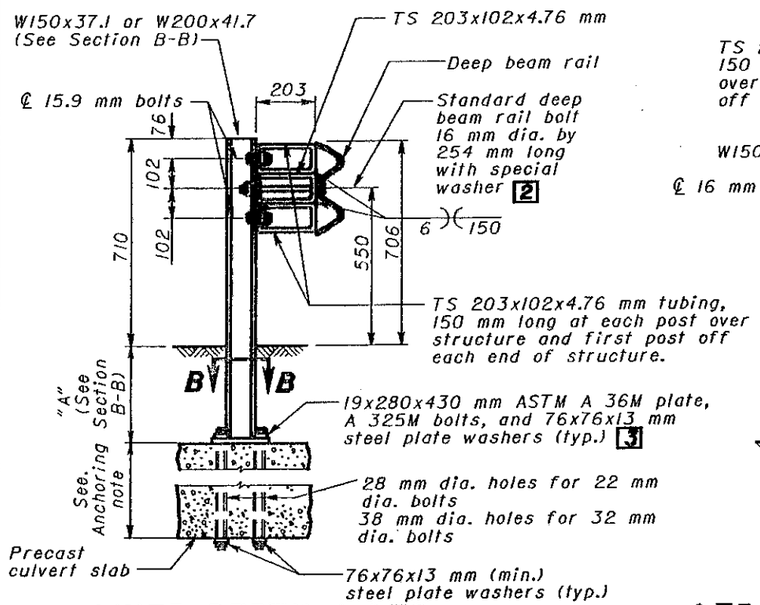
STANDARD CONSTRUCTION DRAWING **GR-2.1M**

APPROVED Larry F. Sutherland

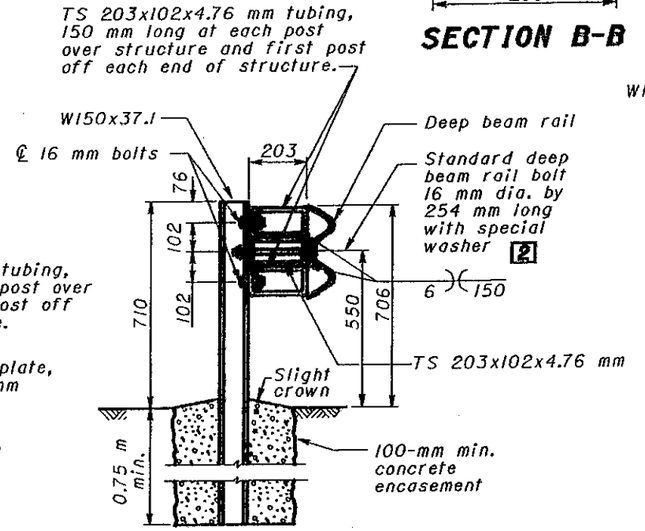




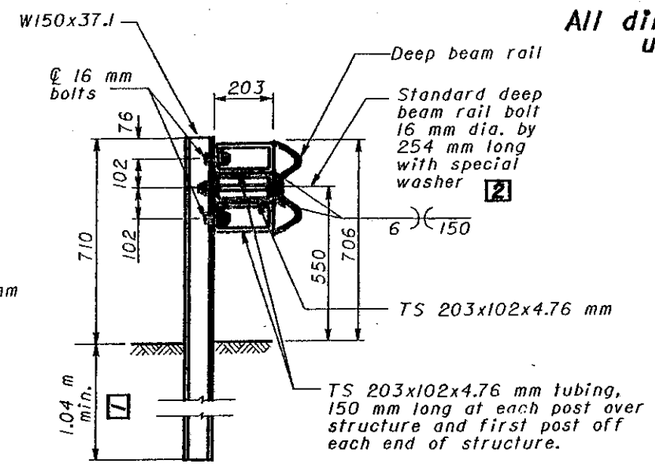
SECTION A-A



COVER DEPTH < 0.75 m



0.75 m ≤ COVER DEPTH < 1.04 m



COVER DEPTH ≥ 1.04 m

NOTES

PAYMENT: Item 606, Guardrail, Type 5 with Tubular Backup shall be in Meters for the length specified in the plans and shall include tubular backup as per Item 707.10, rails, posts and all other hardware, materials and labor required to construct the guardrail as shown. The specified lengths should be for full panels, i.e. evenly divisible by 3.81 m.

GALVANIZING: Rails, posts, baseplates, bolts, nuts, washers and tubular backup shall be galvanized as per Item 711.02.

ANCHORING: Partial-depth anchoring is preferred to through-bolting.

Partial depth anchoring shall use nonshrink, non-metallic grout per 705.20. Minimum embedment depths shall be 230 mm for 22 mm bolts and 250 mm for 32 mm bolts.

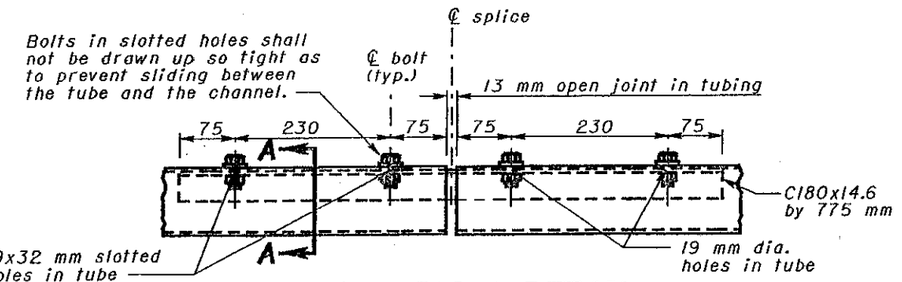
Through-bolting: Drilling methods that cause spalling of the concrete where the bit passes through the underside of the slab shall not be permitted. In haunches 6:1 or flatter, beveled plate washers shall be used on the bottom surface to compensate for the slope. Through-bolting shall not be permitted in haunch areas with a slope greater than 6:1.

SIDE-MOUNTED POST ANCHORAGES TO STRUCTURES: Anchorages shall be installed according to the Office of Structural Engineering's Standard Drawing DBR-2-73M and shall be paid for under Item 517, Railing.

[1] **FOR DETAILS NOT SHOWN:** See SCD's GR-1.1M and GR-1.2M. See GR-1.2M regarding post embedment depth.

[2] For details of special washer, see AASHTO M 180.

[3] Embed plate in sealant as per Federal Specification TT-S-00230C, Type II.



TUBING SPLICE DETAIL

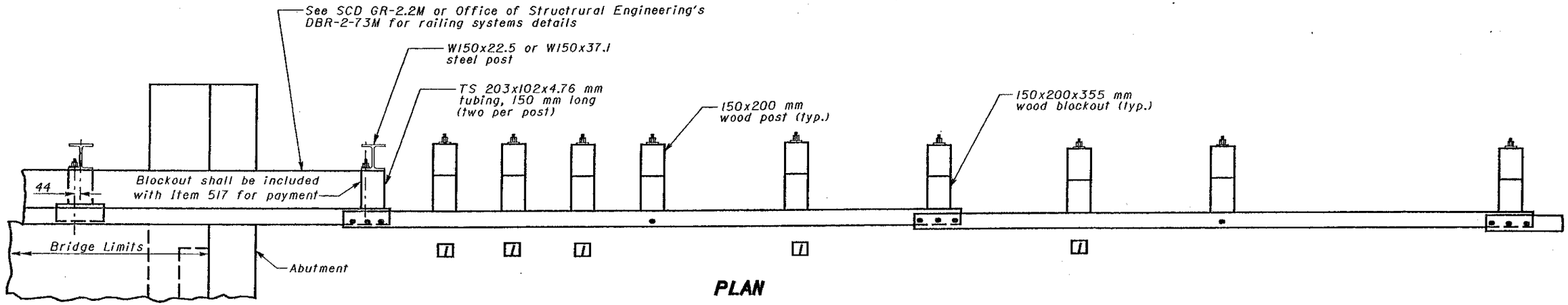
All dimensions are in millimeters unless otherwise noted.

metric units

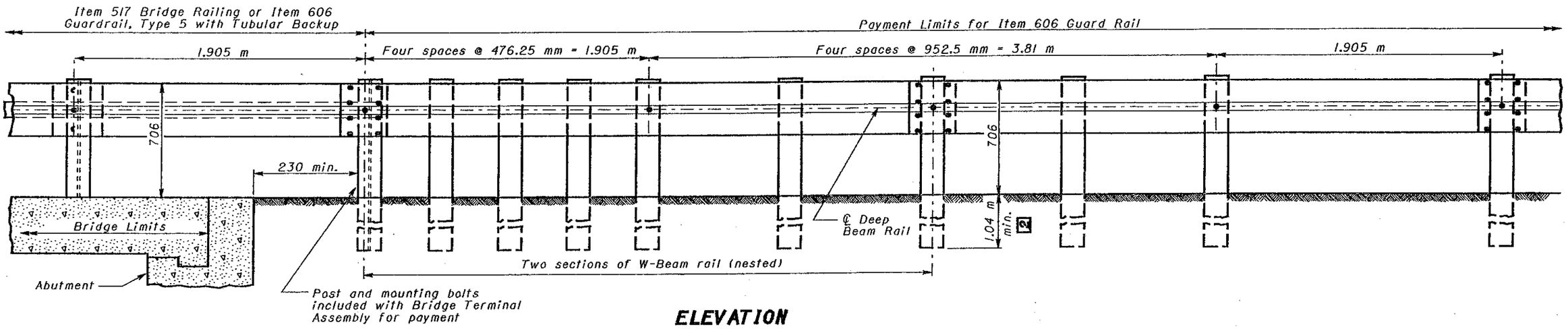
This Drawing Replaces GR-2.2.

OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL TYPE 5 WITH TUBULAR BACKUP	DATE 1-3-96 10-21-97
STANDARD CONSTRUCTION DRAWING GR-2.2M	
APPROVED Gayle F. Sutherland	



PLAN



ELEVATION

All dimensions are in millimeters unless otherwise noted.

[1] Guardrail not attached to posts. Blockout fastened to post with standard post bolt.

[2] See SCD GR-1.2M for additional post embedment details.

NOTES

GENERAL: For additional details, see SCD's GR-1.1M, GR-1.2M and other Drawings pertaining to the design of specific guardrail types.

APPLICATION: The Type 4 Bridge Terminal Assembly shall be used to connect guardrail runs to bridges having W-Beam railing with Tubular Backup.

DETAIL INFORMATION: The first post off the bridge shall be steel (W150x22.5 or W150x37.1). All holes in the off-structure end of the approach panel W-Beam rail section that spans the abutment shall be slotted 19x64 mm and the bolts shall be tightened as specified for expansion joints in Item 606.05.

POSTS: General - Posts may be set in drilled holes or driven to grade.

Wood Posts shall be square-sawed pressure treated wood, as per CMS 710.14, and fabricated with square ends. Bolt holes shall be bored and tops of posts trimmed, if required, after posts are set.

Steel Posts and Blockouts for Type 4 Bridge Terminal Assemblies may be furnished as an alternate. The steel alternate for the 150 mm by 200 mm wood posts and blockouts shall be W150x13.5.

PAYMENT: Payment for Item 606 - Each, Bridge Terminal Assembly, Type 4, shall include the extra cost, in excess of normal guardrail costs, for additional posts and other hardware. The TS 203x102 mm spacers and tubular back-up rail extending to the first post off the bridge shall be included with Item 517 - Railing, or Item 606 - Guardrail, Type 5, with Tubular Backup, for payment.

metric units

This Drawing Replaces GR-3.4.

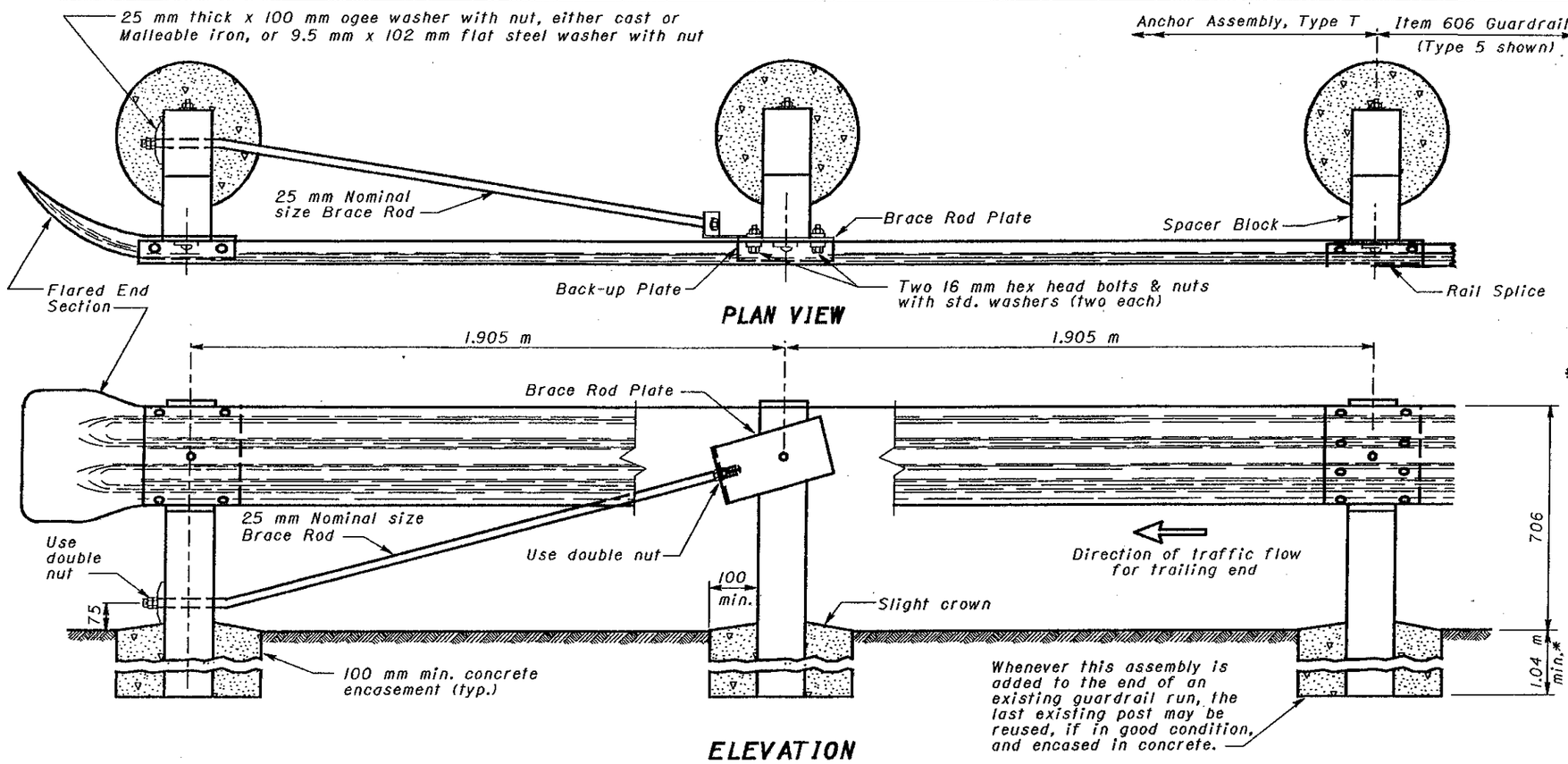
OHIO DEPARTMENT OF TRANSPORTATION

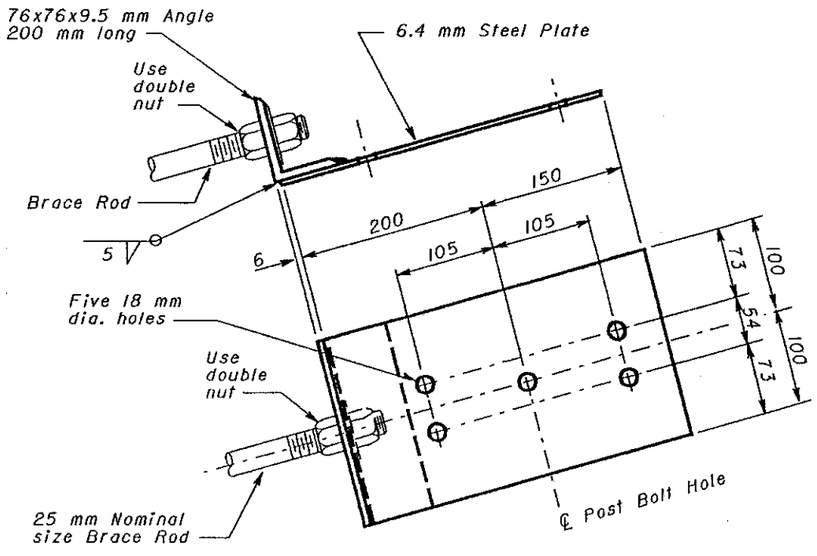
BRIDGE TERMINAL ASSEMBLY, TYPE 4

DATE
1-3-96
10-21-97

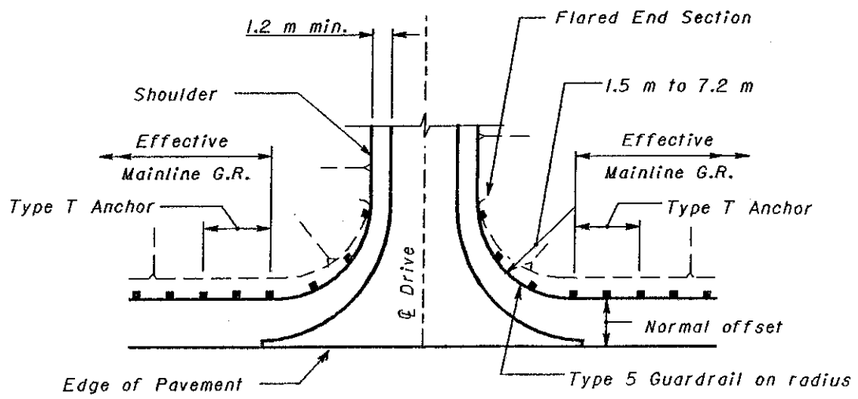
STANDARD CONSTRUCTION DRAWING **GR-3.4M**

APPROVED Gary F. Sutherland





BRACE ROD PLATE



DRIVEWAY OPENING

NOTES

FOR DETAILS NOT SHOWN: See SCD's GR-1.1M, GR-1.2M and other Drawings pertaining to design of specific guardrail types.

WASHERS: All washers indicated are standard galvanized steel of the appropriate size.

POSTS: Posts shall be the same as used on the adjacent guardrail, with 100 mm minimim concrete encasement.

SPACER BLOCKS: Blocks may be notched in the field, in a manner satisfactory to the Engineer, to accommodate the installation of the brace rod plate 16 mm attachment bolts.

BRACE ROD ASSEMBLY: Rods shall be galvanized and develop a tensile strength of at least 178 kN.

* **FOR SPECIFIC POST EMBEDMENT:** See SCD GR-1.2M for depth requirements.

All dimensions are in millimeters unless otherwise noted.

metric units

OHIO DEPARTMENT OF TRANSPORTATION

TYPE T ANCHOR ASSEMBLY

DATE
4-21-95
10-21-97

STANDARD CONSTRUCTION DRAWING **GR-4.2M**

APPROVED Dwight F. Sutherland

614 TEMPORARY RAISED PAVEMENT MARKERS

GENERAL

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING, INSTALLING, MAINTAINING AND SUBSEQUENTLY REMOVING TEMPORARY RAISED PAVEMENT MARKERS (TRPM'S). THE MARKERS SHALL BE YELLOW OR WHITE, AS DESCRIBED IN THE PLAN.

MATERIAL

ALL MARKERS AND RETROREFLECTORS SHALL BE OF SUFFICIENT STRENGTH AND PROPERLY SHAPED SO AS NOT TO BE DISLODGED OR BROKEN, BY IMPACTS FROM VEHICLES TIRES, INCLUDING THOSE OF HIGH PRESSURE TRUCK TIRES LOADED TO 2043 KILOGRAMS.

RETROREFLECTORS SHALL BE PROVIDED IN ONE OR TWO DIRECTIONS ON EACH MARKER AS REQUIRED BY THE USAGE AND SHALL RETURN WHITE OR YELLOW LIGHT AS IS APPROPRIATE FOR THE APPLICATION.

THE REFLECTOR SHALL HAVE AN EFFECTIVE AREA OF 225 SQUARE MILLIMETERS FOR TYPE A OR 1935 SQUARE MILLIMETERS FOR TYPE B. ITS BRIGHTNESS OR SPECIFIC INTENSITY (WHEN TESTED AT 0.2 DEGREE ANGLE OF OBSERVATION AND THE FOLLOWING ANGLES OF INCIDENCE) SHALL MEET OR EXCEED THE FOLLOWING:

SPECIFIC INTENSITY

TYPE A

INCIDENCE ANGLE (DEGREES)	WHITE	YELLOW
0	1.0	0.6
20	0.4	0.24
45	—	—

TYPE B

	WHITE	YELLOW
0	3.0	1.8
20	1.2	0.72
45	0.3	0.2

ANGLE OF INCIDENCE FORMED BY A RAY FROM LIGHT SOURCE TO THE MARKER AND THE NORMAL TO THE LEADING EDGE OF THE MARKER FACE (ALSO HORIZONTAL ENTRANCE ANGLE).

ANGLE OF OBSERVATION FORMED BY A RAY FROM LIGHT SOURCE TO THE MARKER AND THE RETURNED RAY FROM THE MARKER TO THE MEASURING RECEPTOR.

SPECIFIC INTENSITY IS THE MEAN CANDLEPOWER OF THE REFLECTED LIGHT (AT GIVEN INCIDENCE AND DIVERGENCE ANGLES) FOR EVERY 10.7 LUX AT THE REFLECTOR (ON A PLANE PERPENDICULAR TO THE INCIDENT LIGHT).

TYPE A MARKERS ARE INTENDED TO PROVIDE HIGH VISIBILITY BOTH DAY AND NIGHT. THEIR DAYTIME VISIBILITY SHALL BE ASSURED BY SIZE, SHAPE AND COLOR AS FOLLOWS:

1) THE MARKERS SHALL BE A HIGH VISIBILITY YELLOW OR WHITE COLOR WHICH WILL NOT DEGRADE SUBSTANTIALLY DUE TO TRAFFIC WEAR AND WHICH WILL MATCH THE COLOR OF THE REFLECTOR.

2) WHEN VIEWED FROM ABOVE, THE MARKERS SHALL HAVE A VISIBLE AREA OF NOT LESS THAN 9030 SQUARE MILLIMETERS.

3) WHEN VIEWED FROM THE FRONT, PARALLEL TO THE PAVEMENT, AS FROM APPROACHING TRAFFIC, THE MARKER SHALL HAVE A WIDTH OF APPROXIMATELY 100 MILLIMETERS AND A VISIBLE AREA OF NOT LESS THAN 970 SQUARE MILLIMETERS.

TYPE B MARKERS ARE INTENDED TO PROVIDE HIGH VISIBILITY AT NIGHT BY RETROREFLECTING LIGHT FROM AUTOMOTIVE HEADLIGHTS BACK TO THE DRIVER.

INSTALLATION

TEMPORARY RAISED PAVEMENT MARKERS SHALL BE ATTACHED TO CLEAN, DRY PAVEMENT BY A BUTYL ADHESIVE PAD, A BITUMINOUS ADHESIVE OR OTHER CONSTRUCTION GRADE ADHESIVES (SUCH AS FRANKLIN PANEL AND METAL ADHESIVE) SUITABLE TO ANCHOR THE MARKER UNDER THE ABOVE CONDITIONS. WHEN IT IS NECESSARY TO ATTACH MARKERS TO NEW CONCRETE PAVEMENT WITH CURING COMPOUND REMAINING, THE CURING COMPOUND MEMBRANE SHALL BE REMOVED BY SANDBLASTING OR OTHER MECHANICAL CLEANING METHOD. MARKERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL IMMEDIATELY REPLACE, AT HIS EXPENSE, ANY MARKERS WHICH FAIL (BROKEN HOUSING, HOUSING WORN TO THE EXTENT THAT DAYTIME VISIBILITY IS SIGNIFICANTLY DIMINISHED OR OF AN UNACCEPTABLE COLOR, DETACHED OR BROKEN REFLECTOR, HOUSING DETACHED FROM ADHESIVE).

MARKERS ARE LIKELY TO BE REMOVED BY SNOW PLOWING OPERATIONS, THUS THEY ARE NOT CONSIDERED SUITABLE FOR USE DURING THE PERIOD FROM OCTOBER 15 UNTIL APRIL 30. THE CONTRACTOR IS ADVISED TO SCHEDULE HIS WORK AND/OR THE USE OF THESE DEVICES TO AVOID THIS PERIOD. SHOULD THE CONTRACTOR CHOOSE TO USE TRPM'S DURING THIS PERIOD AND THEY ARE SUBSEQUENTLY REMOVED OR DESTROYED BY SNOW AND ICE CONTROL ACTIVITIES. THE CONTRACTOR SHALL IMMEDIATELY, AT HIS EXPENSE, PROVIDE A SUBSTITUTE TRAFFIC GUIDANCE SYSTEM EFFECTIVE DURING DAY AND NIGHT AND WHICH IS ACCEPTABLE TO THE ENGINEER.

THE MARKERS SHALL BE PLACED ACCURATELY TO DEPICT STRAIGHT OR UNIFORMLY CURVING LINES. WHEN USED TO SUPPLEMENT TEMPORARY PAVEMENT MARKINGS, THEY SHALL BE PLACED ON OR IMMEDIATELY ADJACENT TO THE PAVEMENT MARKING. LOCATIONS SHALL BE ADJUSTED UP TO 300 MILLIMETERS LONGITUDINALLY OR 150 MILLIMETERS LATERALLY TO AVOID PLACEMENT ON JOINTS, OR ON CRACKED OR DETERIORATED PAVEMENT. MARKERS SHALL NOT BE PLACED DIRECTLY ON PAVEMENT MARKINGS IF THIS DETRACTS FROM THEIR ABILITY TO REMAIN ATTACHED TO THE PAVEMENT.

APPLICATION

1) WHEN REQUIRED TO SUPPLEMENT PAVEMENT MARKING, TEMPORARY RAISED PAVEMENT MARKERS SHALL BE PLACED AS FOLLOWS:

LINE	TYPE	SPACING
EDGE LINE	A OR B	6 m C/C
LANE LINE	A OR B	12 m C/C*
CENTER LINE (SINGLE BROKEN)	A OR B	12 m C/C*
CENTER LINE (DOUBLE/SOLID)	A OR B	2 UNITS SIDE BY SIDE 100 mm APART 6 m C/C
CHANNELIZING LINE (INCLUDES EXIT GORE NOSE)	A OR B	3 m C/C

* CENTERED IN GAP

2) WHEN USED TO SUBSTITUTE FOR (REPLACE) PAVEMENT MARKING, TEMPORARY RAISED PAVEMENT MARKERS SHALL BE PLACED AS FOLLOWS:

LINE	TYPE	SPACING
EDGE LINE	A	1.5 m C/C
LANE LINE	A	4 @ 0.75 m C/C 9 m GAP (12 m CYCLE)
CHANNELIZING LINE (INCLUDES EXIT GORE NOSE)	A	1.5 m C/C
EDGE LINE (TWO COLOR) (WHITE/YELLOW)	A	BACK TO BACK 1.5 m C/C

YELLOW MARKERS USED TO SEPARATE OPPOSITE FLOWS OF TRAFFIC (CENTER LINES) SHALL INCLUDE RETROREFLECTORS FOR BOTH DIRECTIONS. ALL OTHER YELLOW AND WHITE MARKERS SHALL PROVIDE RETROREFLECTIVITY FOR ONE DIRECTION ONLY.

REMOVAL

REMOVAL SHALL BE ACCOMPLISHED IN A MANNER SUCH THAT LITTLE OR NONE OF THE ADHESIVE REMAINS ON THE PAVEMENT. PERMANENT PAVEMENT SURFACES SHALL NOT BE SCARRED, BROKEN OR ROUGHENED SIGNIFICANTLY.

PAYMENT

BASIS OF PAYMENT SHALL BE AT THE CONTRACT UNIT PRICE PER EACH MARKER AND SHALL INCLUDE ALL LABOR, EQUIPMENT, HARDWARE AND INCIDENTALS REQUIRED TO PERFORM THE WORK. IT SHALL ALSO INCLUDE REPLACEMENT AT NO ADDITIONAL COST OF ALL TEMPORARY RAISED PAVEMENT MARKERS WHICH, IN THE JUDGEMENT OF THE ENGINEER, FAIL FOR ANY REASON, EXECPT DUE TO FAILURE OF THE PAVEMENT TO WHICH THEY ARE ATTACHED.

ITEM	UNIT	DESCRIPTION
614	EACH	TEMPORARY RAISED PAVEMENT MARKER

metric units

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 03/01/96

TEMPORARY RAISED PAVEMENT MARKERS

STANDARD CONSTRUCTION DRAWING MT-101.20M

APPROVED [signature] ADMINISTRATOR

TEMPORARY SIGN SUPPORT REQUIREMENTS

A. PLACEMENT OF SIGNS WHICH WILL REMAIN MORE THAN ONE DAY:

1) LATERAL PLACEMENT TO NEAREST EDGE OF SIGNS SHALL BE AS FOLLOWS:

   a) ON THE RIGHT SIDE OF THE ROAD FOR APPROACHING TRAFFIC (EXCEPT FOR DUAL MOUNTED SIGNS AND SIGNS DESIGNATED IN THE PLANS FOR LEFT SIDE MOUNTING).

   b) CURBED ROADWAY - MINIMUM 0.6 m BEHIND FACE OF CURB.

   c) UNCURBED ROADWAY- 3.7 m FROM EDGE OF TRAFFIC LANE OR 1.8 m FROM EDGE OF PAVED OR USEABLE SHOULDER, WHICHEVER IS GREATER.

   d) BEHIND GUARDRAIL OR BARRIER - PREFERABLY 0.6 m BEHIND FACE OF GUARDRAIL (MINIMUM 0.3 m) FOR SIGNS ON CLASS A SUPPORTS: 1.2 m FOR CLASS B OR C SUPPORTS: 0.3 m BEHIND FACE OF CONCRETE BARRIER UNLESS BARRIER TOP MOUNTING IS REQUIRED BY THE PLAN.

2) VERTICAL CLEARANCE OF SIGNS, MEASURED ABOVE ROADWAY ELEVATION; SHALL BE AS FOLLOWS:

   a) RURAL - 1.5 m WHEN PARKED CARS, CONSTRUCTION EQUIPMENT, ETC WILL NOT OBSCURE SIGN VISIBILITY.

   b) RURAL AREAS WITH PARKED CARS OR CONSTRUCTION EQUIPMENT - 2.1 m

   c) URBAN - 2.1 m

   d) CARE SHALL BE TAKEN TO ASSURE THAT SIGNS WILL NOT BE OBSCURED BY CONSTRUCTION EQUIPMENT, TREES, WEEDS OR OTHER OBSTACLES. BRUSH, WEEDS OR GRASS WITHIN THE RIGHT OF WAY SHALL BE TRIMMED AS NECESSARY. SIGNS SHALL NORMALLY BE VISIBLE TO TRAFFIC 122 m TO 183 m IN ADVANCE OF THE SIGN.

3) SUPPORTS FOR SIGNS WHICH WILL REMAIN IN PLACE MORE THAN ONE DAY SHALL BE FIXED RATHER THAN PORTABLE EXCEPT IN SITUATIONS WHERE THE SIGN MUST REST ON PERMANENT PAVEMENT OR OTHER SURFACE WHICH WOULD BE DAMAGED BY INSERTION OF POST TYPE SUPPORTS.

B. PLACEMENT OF SIGNS WHICH WILL REMAIN FOR ONE DAY OR LESS:

1) SAME AS A-1 ABOVE EXCEPT THAT SIGNS MAY BE PLACED ON THE ROADWAY ONLY IF THEY DO NOT INTRUDE INTO A TRAFFIC LANE IN USE.

2) MINIMUM OF 0.3 m ABOVE ROADWAY

C. CLASSES OF SUPPORTS:

ALL TEMPORARY SIGN SUPPORTS SHALL BE OF THE FOLLOWING TYPES:

1) CLASS A:

SUPPORTS SHALL BE USED FOR EXPOSED LOCATIONS ON HIGHWAYS WHERE TRAFFIC APPROACH SPEEDS OF 40 MPH AND HIGHER ARE ENCOUNTERED. THEY ARE ALSO SUITABLE FOR USE IN ALL OTHER LOCATIONS.

2) CLASS B:

SUPPORTS SHALL BE USED FOR EXPOSED LOCATIONS ON HIGHWAYS WHERE TRAFFIC APPROACH SPEEDS OF LESS THAN 40 MPH ARE ENCOUNTERED. THEY ARE ALSO SUITABLE FOR USE IN ALL APPLICATIONS DEFINED FOR CLASS C SUPPORTS.

3) CLASS C:

SUPPORTS MAY ONLY BE USED WHERE FULLY PROTECTED BY GUARDRAIL, CONCRETE BARRIER AND IN LOCATIONS POSITIVELY PROTECTED FROM TRAFFIC SUCH AS ON RETAINING WALLS OR WHERE TRAFFIC APPROACH SPEEDS ARE LESS THAN 25 MPH.

D. TRAFFIC APPROACH SPEEDS:

TRAFFIC APPROACH SPEEDS SHALL BE THE LOCALLY POSTED SPEED (NOT ADVISORY SPEED SIGNS) OR THE MEASURED ACTUAL (85TH PERCENTILE) SPEED (IF AVAILABLE) OF APPROACHING TRAFFIC, WHICHEVER IS HIGHER, ADJACENT TO THE SIGN LOCATION.

TABLE

APPROACH SPEED (MPH)	COMPLETELY PROTECTED BY GUARDRAIL OR BARRIER	PARTLY PROTECTED BY GUARDRAIL OR BARRIER *	GREATER THAN 9 m FROM EDGE OF PAVEMENT	WITHIN 9 m FROM EDGE OF PAVEMENT
40 AND HIGHER	A, B OR C	A OR B	A OR B **	A ONLY
26 TO 39	A, B OR C	A OR B	A OR B	A OR B
0 TO 25	A, B OR C	A, B OR C	A, B OR C	A, B OR C

* IF SUPPORTS ARE BEHIND GUARDRAIL BUT NOT FULLY 1.7 m BEHIND FACE OF RAIL OR IF SIGN IS NOT 0.3 m BEHIND FACE OF CONCRETE BARRIER.

** 9 m CRITERION IS BASED UPON STRAIGHT ROADWAY AND A SLOPE OF 6 to 1 OR FLATTER. SUPPORTS ON THE OUTSIDE OF CURVES OR LOCATED DOWN A SLOPE (STEEPER THAN 6 : 1) WILL REQUIRE USE OF CLASS A SUPPORTS.

E. BALLASTING

BALLASTING OF PORTABLE SUPPORTS SHALL BE WITH SANDBAGS PLACED WITHIN 0.3 m OF THE GROUND. IN NO CASE SHALL HARD OBJECTS BE USED FOR BALLAST.

F. STRENGTH OF SIGN SUPPORTS

THE CONTRACTOR SHALL CHOOSE SIGN SUPPORTS OF ADEQUATE STRENGTH AND WITH ADEQUATE FOUNDATIONS AND ANCHORAGE TO SUPPORT THE SIGN SIZES ERECTED. PROPRIETARY DEVICES SHALL NOT BE LOADED BEYOND THE LIMITS RECOMMENDED BY THE MANUFACTURER. SLIP BASE TYPE BREAKAWAY BEAM CONNECTIONS SHALL BE AT LEAST PARTIALLY EMBEDDED IN CONCRETE CONSISTING OF A 0.3 m DEEP BY 0.3 m DIAMETER COLLAR. SIGN SUPPORTS WHICH FAIL UNDER TYPICAL WIND LOAD CONDITIONS SHALL BE IMMEDIATELY MODIFIED OR REPLACED WITH A SUPPORT OF ADEQUATE STRENGTH.

G. PROHIBITED SUPPORTS

THE FOLLOWING SUPPORT TYPES SHALL NOT BE PERMITTED ON PROJECTS:

1) SUPPORTS FABRICATED FROM AUTOMOTIVE AXLE DIFFERENTIAL ASSEMBLIES AND SIMILARLY HEAVY ASSEMBLIES WHICH CANNOT BE CONSIDERED BREAKAWAY TYPE.

2) SUPPORTS CONSISTING OF VERTICAL POSTS WITH ANGLED BRACES MADE FROM DRIVEPOST OR OTHER RIGID ELEMENTS.

CLASS A SUPPORTS

FIXED SUPPORTS

1) ALL #2 AND #3 POST WHEN INSTALLED SINGLY OR IN PAIRS (SIDE BY SIDE) ACCORDING TO THE DETAILS OF TC-41.20M. THE NUMBER OF SUPPORTS SHALL BE AS SHOWN ON TC-52.10M AND TC-52.20M.

2) THE FOLLOWING POST TYPES, WHEN INSTALLED SINGLY, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m.

   a) - UP TO 102 X 102 mm WOOD.

   b) - UP TO 51 mm DIAMETER SCHEDULE 40 STEEL PIPE.

   c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.

   d) - UP TO 56.4 mm SQUARE, 12 GAUGE WALL, PUNCHED STEEL POST.

   e) - UP TO 152 X 203 mm WOOD WITH BREAKAWAY HOLES SHOWN BELOW.

3) THE FOLLOWING POST TYPES WHEN INSTALLED IN PAIRS (SIDE BY SIDE) WITH LESS THAN 2 m BETWEEN POSTS, BY IMBEDMENT OR DRIVING INTO EARTH TO A DEPTH OF ABOUT 1.1 m :

   a) - UP TO 102 X 102 mm WOOD.

   b) - UP TO 51 mm DIAMETER SCHEDULE 40 STEEL PIPE.

   c) - UP TO 76 mm DIAMETER SCHEDULE 40 ALUMINUM PIPE.

   d) - UP TO 51 mm SQUARE, 14 GAUGE WALL, PUNCHED STEEL POST.

4) FIXED TYPE III BARRICADES:

5) ALL BREAKAWAY CONNECTION BEAM SUPPORTS, WHEN INSTALLED ACCORDING TO THE PROPER DETAILS SHOWN ON TC-41.10M WITH A MINIMUM CLEAR DISTANCE BETWEEN SUPPORTS OF 2.1 m FOR SUPPORTS LARGER THAN W6 X 9.

6) ANY BREAKAWAY POST OR POST AND CONNECTION WHICH HAS BEEN CRASH TESTED AND APPROVED BY THE FHWA AS SATISFYING THE BREAKAWAY CRITERIA DESCRIBED IN 630.06.

(CONTINUED ON MT-105.11M)

M E T R I C

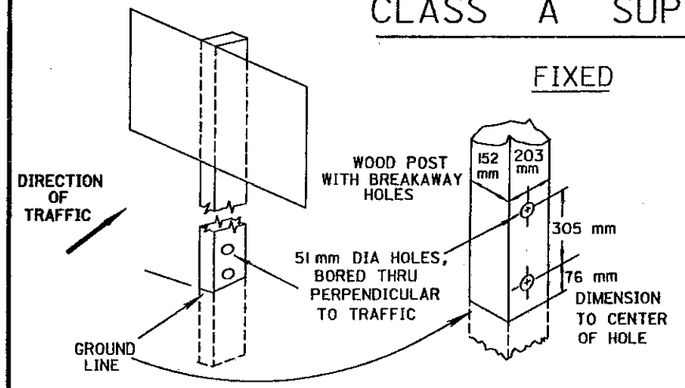
BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

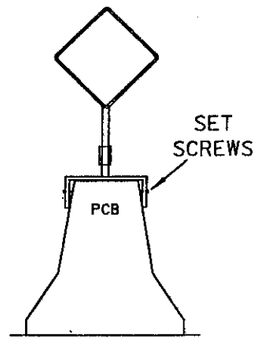
MAINTENANCE OF TRAFFIC	DATE
TEMPORARY SIGN SUPPORT	04/25/94
STANDARD CONSTRUCTION DRAWING MT-105.10M	
APPROVED Jay Ortage ENGR. OF DESIGN SERVICES	

WCC

CLASS A SUPPORTS

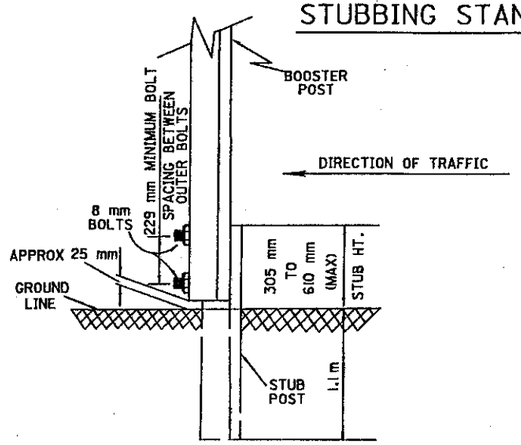
FIXED





CLASS A SUPPORTS

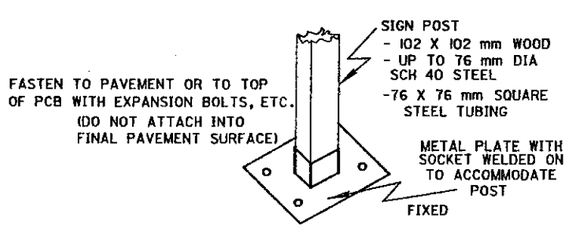
STUBBING STANDARD

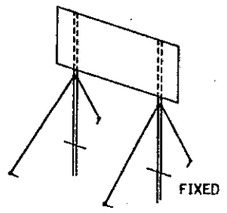


NOTES

1. FOR USE WITH #3 POST OR SMALLER ONLY
2. BOLTS SHALL BE STEEL OR ALUMINUM
3. A MINIMUM OF TWO FASTENERS SHALL BE USED PER ASSEMBLY
4. BOOSTER POST SHALL BE MOUNTED BEHIND STUB POST
5. BOOSTER POST SHALL BE THE SAME OR 1.5 kg/m LESS THAN STUB POST

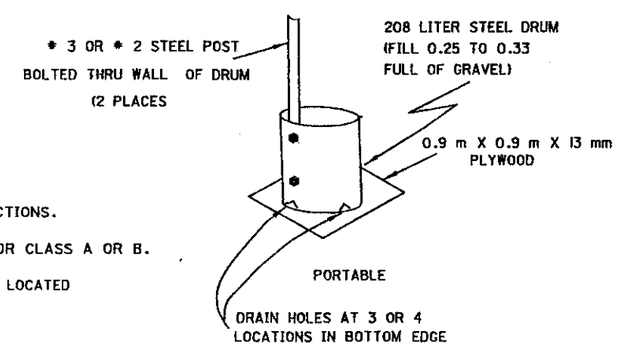
CLASS B SUPPORTS





ANY CLASS A SIGN POST WITH GUY WIRES ADDED TO INCREASE SIGN CARRYING ABILITY. (GUY WIRES SHALL NOT BE HEAVIER THAN 3.2 mm DIA. BRAIDED CABLE. GUY ANCHORS SHALL NOT EXTEND MORE THAN 152 mm ABOVE GROUND SURFACE).

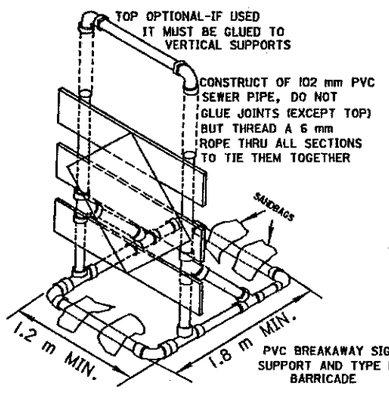
CLASS C SUPPORTS

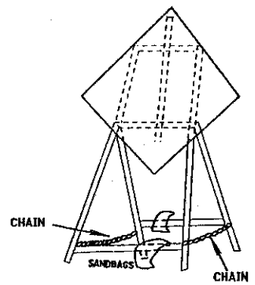


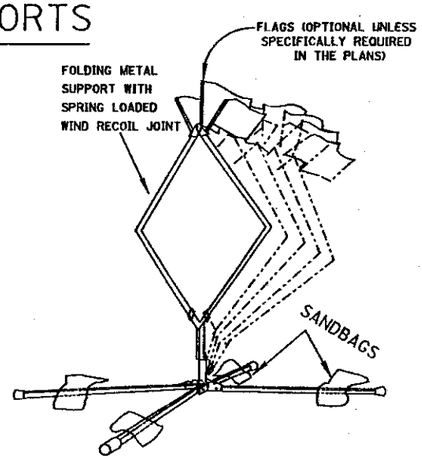
1. ALL BEAM TYPE SUPPORTS WITHOUT BREAKAWAY CONNECTIONS.
2. SUPPORTS SIMILAR TO BUT LARGER THAN PERMITTED FOR CLASS A OR B.
3. THE STEEL DRUM(S) SHOWN BELOW MAY BE USED ONLY WHEN LOCATED BEHIND GUARDRAIL OR BARRIER.

CLASS A SUPPORTS

PORTABLE







NOTES

RAIL MATERIALS:
25 X 203 mm OR 51 X 203 mm COMMON LUMBER
203 mm X (16 mm TO 25 mm) THICK EXTERIOR PLYWOOD
EXTRUDED PLASTIC OR FORMED SHEET METAL WITH A 203 mm WIDE SURFACE AND OF SUFFICENT STIFFNESS TO RESIST TYPICAL WIND LOADS OF UP TO 147 kg/m², BUT HAVING A WEIGHT OF NOT MORE THAN 7.5 kg/m.

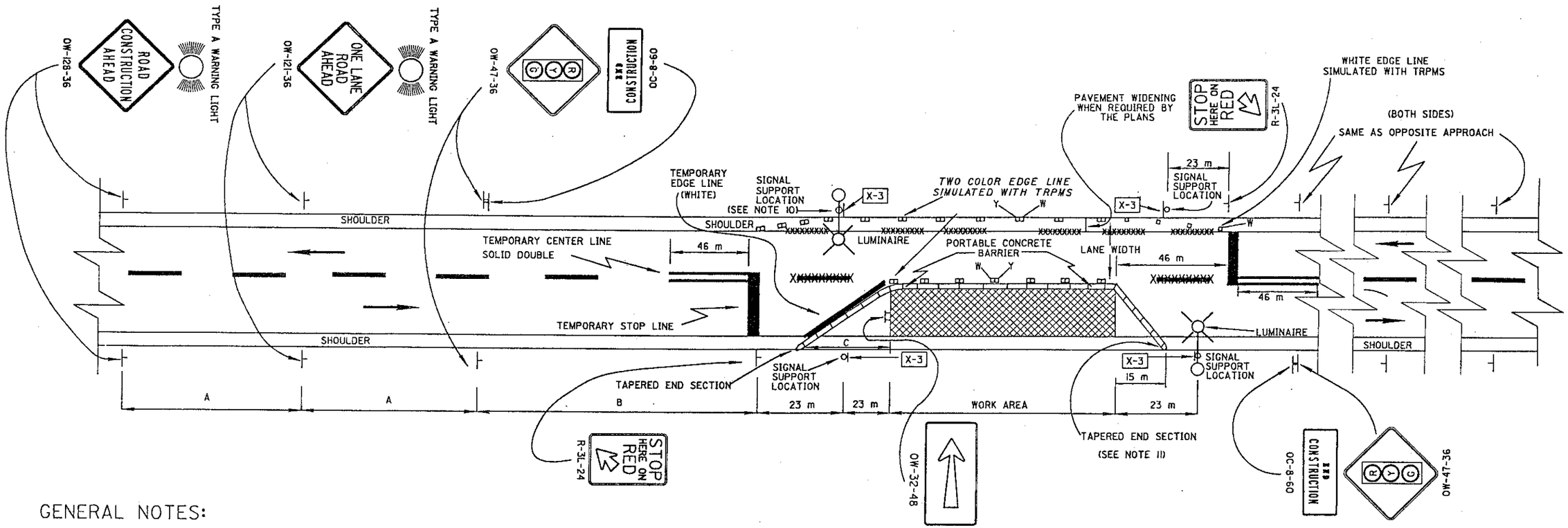
ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF THE OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC	DATE 04/25/94
TEMPORARY SIGN SUPPORT	
STANDARD CONSTRUCTION DRAWING MT-105.11M	

APPROVED Daryl Cuyo ENGR. OF DESIGN SERVICES



GENERAL NOTES:

1. INITIAL SIGNAL TIMING AND PHASING SHALL BE AS SHOWN IN THE PLANS. CHANGES SHALL BE APPROVED BY THE ENGINEER.

2. SIGNALS SHALL BE INSTALLED AND OPERATED IN ACCORDANCE WITH THE REQUIREMENTS OF PART 6 OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

3. TEMPORARY CENTER LINE, SOLID, DOUBLE, SHALL BE INSTALLED AND MAINTAINED WHEN EXISTING CENTER LINE , SOLID DOUBLE IS NOT IN PLACE. 305 mm STOP LINES SHALL BE INSTALLED. TEMPORARY RAISED PAVEMENT MARKERS (TRPMS) TO SIMULATE A TWO COLOR EDGE LINE SHALL BE PROVIDED. EXISTING CONFLICTING PAVEMENT MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE REMOVED. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS THE AREA WILL BE RESURFACED IN THE NEXT WORK PHASE. AFTER COMPLETION OF THE WORK, PAVEMENT MARKINGS OTHER THAN 740.05 TYPE C SHALL BE REMOVED IN ACCORDANCE WITH 641.10. THE ORIGINAL MARKINGS AND PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

4. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C (MAX.) ALTERNATED WITH TOP MOUNTED OBJECT MARKERS (229 X 381 mm) AT 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS AT 7.6 m C-C VERTICAL ORANGE REFLECTORIZED STRIPES ON PADDLES (305 X 305 mm) AT 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS AT 3.8 m C-C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381 mm) TOP MOUNTED AT EACH END

5. THE HORIZONTAL OR VERTICAL ALIGNMENT OF THE ROADWAY MAY REQUIRE ADJUSTMENTS IN THE LOCATION OF THE ADVANCE WARNING SIGNS OR THE SIGNAL HEADS. TREE OR BRUSH TRIMMING TO PROVIDE ADEQUATE SIGHT DISTANCE TO SIGN AND SIGNALS SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER. THE DISTANCES SHOWN FOR ADVANCE WARNING SIGN SPACINGS ARE MINIMUM.

6. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

7. ALL TRAFFIC SIGNAL AND LIGHTING EQUIPMENT USED IN THIS INSTALLATION, SUCH AS SIGNAL OR LIGHTING CABLE, SIGNAL HEADS, LUMINAIRES OR SIGNAL CONTROLLER SHALL BE IN CONFORMANCE WITH SPECIFICATION ITEMS 625, 632, 633, 713, 732 AND 733. HOWEVER, THE PERFORMANCE TESTS OF 625.22E AND 632.27(6), THE WORKING DRAWING REQUIREMENTS OF 625.04, 632.03 AND 633.03, THE WIRING DIAGRAM AND SERVICE MANUAL REQUIREMENT OF 633.04 AND THE TESTING AND PREQUALIFICATION REQUIREMENT OF 633.05 ARE WAIVED. ALSO THE REQUIREMENTS OF 733.01 CONCERNING EXPANSIBLE 3-DIAL UNITS AND TWELVE SIGNAL CIRCUITS ARE WAIVED. USED EQUIPMENT IS ACCEPTABLE. CONFLICT MONITORS SHALL BE USED EXCEPT WITH ELECTROMECHANICAL PRETIMED CONTROLLERS WITH CAMSHAFT.

8. IF THE SIGNAL IS CHANGED TO FLASHING OPERATION, RED SHALL BE FLASHED TO ALL APPROACHES ON ALL SIGNAL HEADS.

9. EXISTING BARRIER BETWEEN TEMPORARY STOP LINES SHALL BE DELINEATED WITH ITEM 614-BARRIER REFLECTORS.

10. FOR SIDE MOUNTED SIGNALS, SEE MT-96.20M. FOR OVERHEAD MOUNTED SIGNALS, SEE MT-96.21M.

11. DURING WORKING HOURS ONLY A LENGTH OF BARRIER SUFFICIENT TO PROVIDE A 3.0 m ACCESS ON THE SHOULDER AND PART OF ROADWAY, MAY BE REMOVED FOR ACCESS. A SIMILAR BARRIER REMOVAL AT THE OPPOSITE END OF THE WORK AREA MAY ALSO BE PERMITTED ONLY WHEN NECESSARY.

DISTANCE (METERS)	A	B
URBAN	61	107
RURAL	152	229

XXXXXXXXX —— EXISTING MARKINGS REMOVED

W —— TRPM, WHITE, 1-WAY

Y —— TRPM, YELLOW, 1-WAY

Y — Y —— TRPM, YELLOW, 2-WAY

Y — W —— TWO TRPM'S BACK TO BACK

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 01/30/95

SIGNALIZED CLOSING
1 LANE OF A 2 LANE
HIGHWAY WITH PCB

STANDARD CONSTRUCTION DRAWING **MT-96.11M**

APPROVED Mary J. Cragon ENGR. OF DESIGN SERVICES

AREA ILLUMINATION SHALL BE PROVIDED BY USING 150 WATT MINIMUM HIGH PRESSURE SODIUM LUMINAIRES OR 250 WATT MINIMUM MERCURY LUMINAIRES

SUPPORT POLE

MINIMUM MOUNTING HEIGHT 8.2 m. LUMINAIRE TO EXTEND TO AT LEAST THE EDGE OF PAVEMENT.

POWER IN SHALL BE AN INDIVIDUAL CIRCUIT DIRECTLY FROM POWER TRANSFORMER

ON BRIDGE PROJECT CABLE MAY ALSO BE ROUTED UNDER BRIDGE IF PROPERLY SUPPORTED. SEE DETAIL "C"

4.6 m MINIMUM

ALL 305 mm LENSES

R Y G

0.6 m TO 3.0 m

STEEL STRAP OR BANDING (TYPICAL)

MINIMUM CLEARANCE 5.5 m

2.4 m TO 4.6 m ABOVE PAVEMENT GRADE AT CENTERLINE

0.6 m TO 3.1 m

102 X 102 mm SQUARE OR 114 mm DIA. NO. 1 TREATED YELLOW PINE OR DOUGLAS FIR.

METER (IF REQUIRED)

3.6 m MINIMUM W/O GUARDRAIL

3.6 m MINIMUM

30 AMP DISCONNECT SWITCH SEE DETAIL "A"

CONTROLLER CABINET

1.5 m NOMINAL

NO. 4 GROUND WIRE

0.8 m MIN. 1.2 m MAX.

2.0 m MIN.

SHOULDER

EXISTING GUARDRAIL

GROUND ROD

EDGE OF PAVEMENT

SHOULDER

1.1 m

LOCATE POLES BEHIND DITCH WHERE POSSIBLE

38.1 mm CONDUIT
WEATHERPROOF CONNECTOR
METER BASE (IF REQUIRED)
WEATHERPROOF CONNECTOR
2-15A SINGLE POLE CIRCUIT BREAKERS
DISCONNECT SWITCH ENCLOSURE
LIGHTING CIRCUIT
SIGNAL CIRCUIT
TO GROUND ROD

DETAIL "A"

CABLES WITHIN REACH OF PEDESTRIANS SHALL BE PLACED IN CONDUIT. CABLE RUNS WITHOUT CONDUIT SHALL BE SUPPORTED AT 3.0 m INTERVALS.

ALTERNATE CABLE ROUTING

DETAIL "C"

INTERVAL	1	2	3	4	5	6

USING A PRETIMED CONTROL

OR

	ALL RED					ALL RED		
	Ø1G	Ø1Y	Ø2G	Ø2Y	Ø3G	Ø3Y	Ø4G	Ø4Y

WHEN CALLED FOR IN THE PLANS, Ø2 GREEN AND Ø4 GREEN SHALL BE ACTUATED BY DETECTORS AT APPROACH TO THE WORK ZONE. Ø1 & Ø3 ARE DUMMY PHASES TO TIME ALL RED INTERVAL. TIMING INITIALIZES ON PHASE ONE.

USING A 4 PHASE ACTUATED CONTROL

DETAIL "B"
SIGNAL PHASING

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

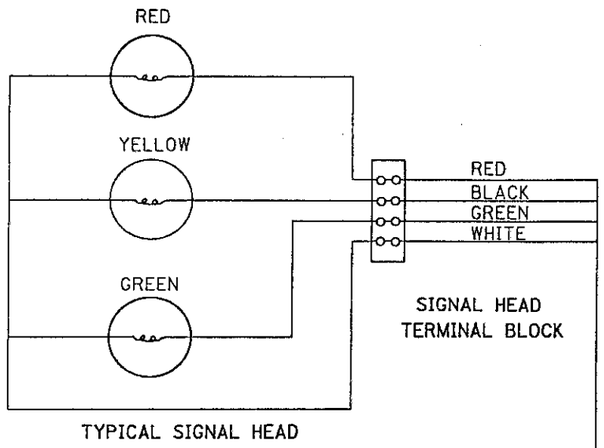
DATE 01/30/95

DETAILS FOR SIGNALIZED CLOSING 1 LANE OF A 2 LANE HIGHWAY -SIDE MOUNTED

STANDARD CONSTRUCTION DRAWING MT-96.20M

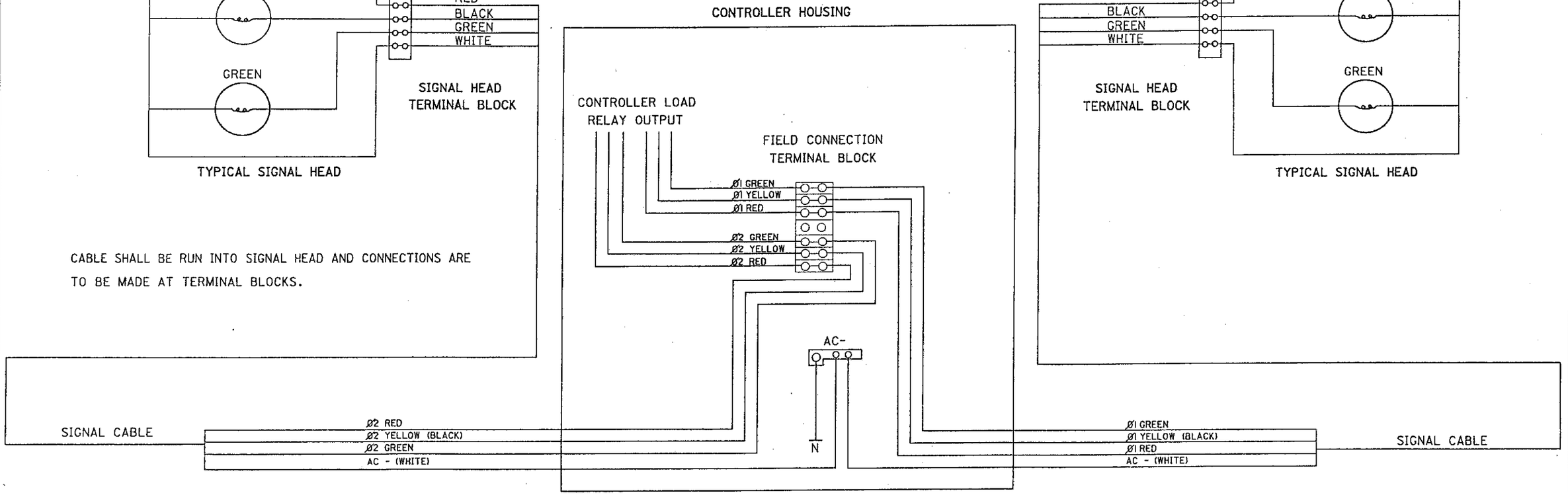
APPROVED Maynard Cooper ENGR. OF DESIGN SERVICES

WCC

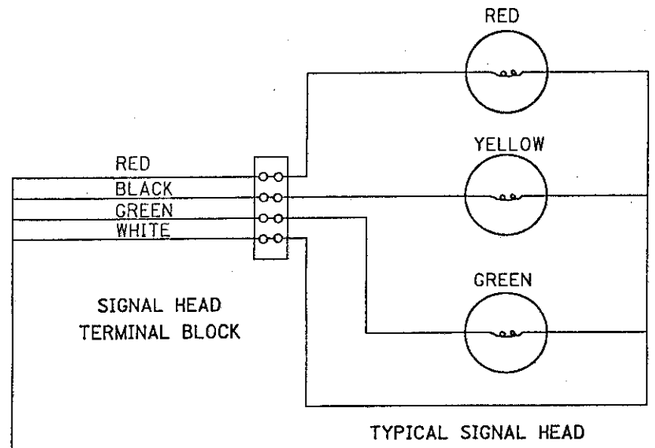


TYPICAL SIGNAL HEAD

CABLE SHALL BE RUN INTO SIGNAL HEAD AND CONNECTIONS ARE TO BE MADE AT TERMINAL BLOCKS.



TYPICAL SIGNAL HEAD HOOK-UP



TYPICAL SIGNAL HEAD

GENERAL NOTES:

1. LIGHTNING PROTECTION, AS REQUIRED IN 733.04 SHALL BE PROVIDED FOR SOLID STATE ELECTRONIC CONTROLLERS AND DETECTORS.

2. SIGNAL CABLE SHALL BE 5/C NO. 14 AWG AS SPECIFIED IN 732.19. ALL ELECTRICAL CONNECTIONS TO BE MADE AT TERMINAL BLOCKS USING LOCK FORK TERMINALS. SPLICES IN SIGNAL CABLE SHOULD BE AVOIDED BUT IF NECESSARY SPLICE KITS SHALL BE USED. ALL CONNECTIONS AT SPLICE POINTS SHALL BE SOLDERED.

3. SIGNAL TIMING SETTINGS SHALL BE AS SHOWN IN THE PLANS OR PROVIDED TO THE CONTRACTOR BY THE ENGINEER PRIOR TO IMPLEMENTATION OF SIGNAL CONTROL. THE CONTRACTOR SHALL PERIODICALLY MONITOR THE SIGNAL OPERATION TO DETERMINE FAILURE OR INEFFICIENT OPERATION.

   ALL EQUIPMENT FAILURES INCLUDING TIMING MECHANISMS AND DETECTORS SHALL BE REPORTED TO THE ENGINEER AND FULLY REPAIRED BY THE CONTRACTOR AS SOON AS POSSIBLE, BUT IN NO CASE LONGER THAN 8 HOURS FOLLOWING NOTIFICATION OF THE CONTRACTOR BY THE ENGINEER. ALL FAILURES RESULTING IN UNSAFE OPERATIONS OF THE SIGNAL (i.e., SIGNAL OR LAMP FAILURE, SHORT-TIMING OF YELLOW OR ALL RED INTERVALS, MIS-AIMED SIGNALS, CONFLICTIONG DISPLAYS) SHALL RESULT IN THE CONTRACTOR 2-WAY RADIOS, TO CONTROL TRAFFIC THROUGH THE WORK AREA UNTILL THE SIGNAL IS FULLY REPAIRED. FAILURES SHALL INCLUDE SITUATIONS CAUSED BY TRAFFIC ACCIDENTS, ACTS OF GOD OR ANY OTHER CAUSE WHETHER UNDER THE CONTROL OF THE CONTRACTOR OR NOT.

   IF THE ENGINEER DETERMINES THAT THE SIGNAL OPERATION, ALTHOUGH IN ACCORDANCE WITH THE PLANS AND PREVIOUS ORDERS, IS NOT PROVIDING ACCEPTABLE SAFE AND EFFICIENT MOVEMENT OF TRAFFIC, THE ENGINEER SHALL ORDER THAT APPROPRIATE CHANGES SUCH AS TIMING ALTERATIONS, SIGNAL OR DETECTOR RELOCATIONS, ETC. BE MADE TO REMEDY THE SITUATION, AT NO ADDITIONAL COST TO THE STATE. TIMING CHANGES AND SIGNAL RELOCATIONS SHALL BE IMPLEMENTED WITHIN FOUR HOURS, DETECTOR RELOCATIONS AND CHANGES WITHIN 24 HOURS. FAILURE TO MAKE REQUIRED CHANGES WITHIN THESE TIME LIMITS SHALL RESULT IN THE ASSESSMENT OF LIQUIDATED DAMAGES OF $100.00 PER CALENDAR DAY UNTILL THE CHANGES ARE COMPLETED.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

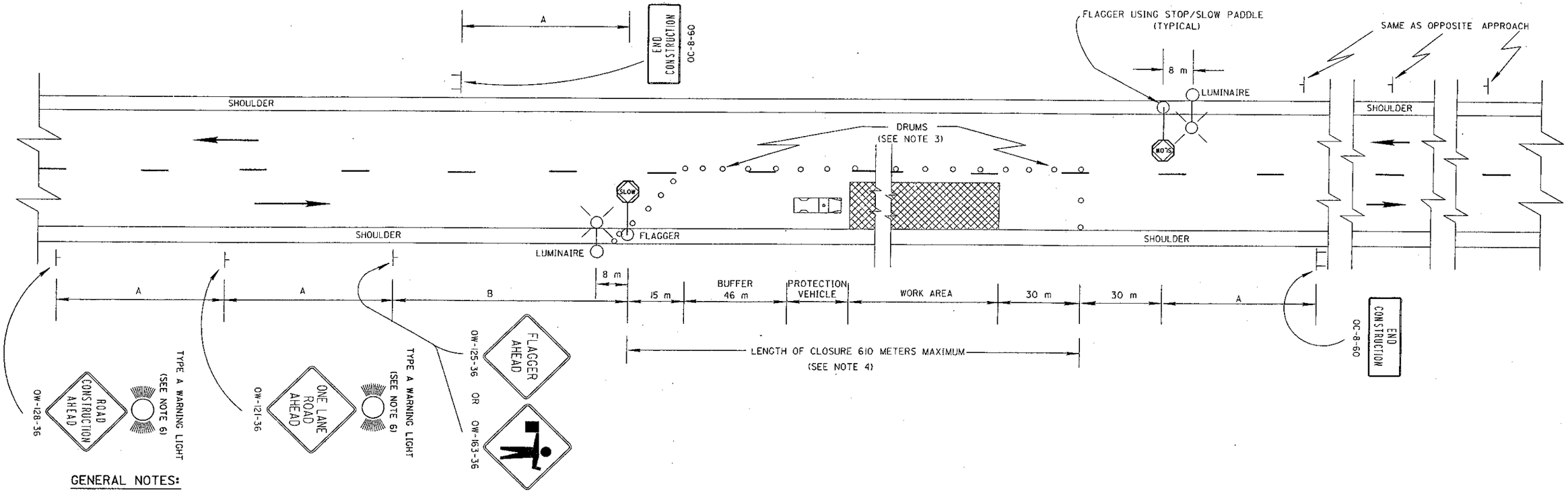
MAINTENANCE OF TRAFFIC

DATE 01/30/95

PRE-TIMED-WIRING DIAGRAM
FOR SIGNALIZED CLOSING 1 LANE
OF A 2 LANE HIGHWAY

STANDARD CONSTRUCTION DRAWING **MT-96.25M**

APPROVED _____ ENGR. OF DESIGN SERVICES



GENERAL NOTES:

1. THE LOCATION OF THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT. THE DISTANCES SHOWN ARE MINIMUMS. DISTANCE B MAY ALSO BE INCREASED, PRIOR TO IMPLEMENTATION OF THE CLOSURE OR AFTER IT IS IN EFFECT, AS DIRECTED BY THE ENGINEER FOR SUCH OCCURENCES AS LONG TRAFFIC BACKUPS.

2. FLAGGERS, ONE FOR EACH DIRECTION SHALL BE USED TO CONTROL TRAFFIC CONTINUOUSLY FOR AS LONG AS A ONE LANE OPERATION IS IN EFFECT. THE FLAGGERS SHALL BE ABLE TO COMMUNICATE WITH EACH OTHER AT ALL TIMES.

3. DRUMS SHALL BE SPACED AT 15 m CENTER TO CENTER ALONG THE CLOSURE. DRUMS ON THE ADVANCE TAPER SHALL BE SPACED AT 3 m CENTER TO CENTER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER.

4. SEVERAL SMALL WORK AREAS CLOSE TOGETHER SHALL BE COMBINED INTO ONE WORK ZONE. HOWEVER, THE CLOSURE SHALL NOT BE MORE THAN 610 m LONG UNLESS APPROVED BY THE ENGINEER. THE MINIMUM LENGTH BETWEEN CLOSURES SHALL BE 610 m ONLY ONE SIDE OF THE ROAD SHALL BE CLOSED IN ANY ONE WORK ZONE.

5. THE PROTECTION VEHICLE SHOWN AT THE BEGINNING OF THE WORK AREA SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS PROTECTION VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHEN WORKERS ARE NOT IN THE WORK AREA. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER. THE VEHICLE SHALL BE EQUIPPED WITH A 360° ROTATION OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m.

6. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND THE OW-121 SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.

7. ADEQUATE AREA ILLUMINATION OF EACH FLAGGER STATION SHALL BE PROVIDED AT NIGHT BY USING 150 WATT MINIMUM HIGH PRESSURE SODIUM LUMINAIRES OR 250 WATT MINIMUM MERCURY LUMINAIRES. LUMINAIRES SHALL BE LOCATED ADJACENT TO ONE FLAGGER STATION FOR EACH DIRECTION OF TRAFFIC AS SHOWN ABOVE. THE MOUNTING HEIGHT FOR LUMINAIRES SHALL BE A MINIMUM OF 8.2 m ABOVE THE PAVEMENT AND MOUNTED ON A SUPPORT OF ADEQUATE STRENGTH TO PROVIDE A SATISFACTORY INSTALLATION. THE OVERHEAD CONDUCTOR CLEARANCE SHALL BE A MINIMUM OF 5.5 m ABOVE THE PAVEMENT. THE LUMINAIRE ARM SHALL BE OF SUFFICIENT LENGTH TO EXTEND TO THE EDGE OF THE PAVEMENT. POLES SHALL BE ERECTED A MINIMUM OF 1.7 m BEHIND FACE OF GUARDRAIL WHERE EXISTING, OR 3.6 m FROM THE EDGE OF PAVEMENT. WHERE POSSIBLE LOCATE BEHIND DITCH. LIGHTING MATERIAL SHALL COMPLY WITH SPECIFICATION 713.

8. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND MAJOR DRIVES AS NECESSARY TO PREVENT WRONG WAY MOVEMENTS AND TO KEEP VEHICLES OFF OF NEW PAVEMENT NOT READY FOR TRAFFIC. THE METHOD OF CONTROL SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

MINIMUM DISTANCE (METERS)	A	B
URBAN	61	61
RURAL	152	152

METRIC

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCIDENTAL TO THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

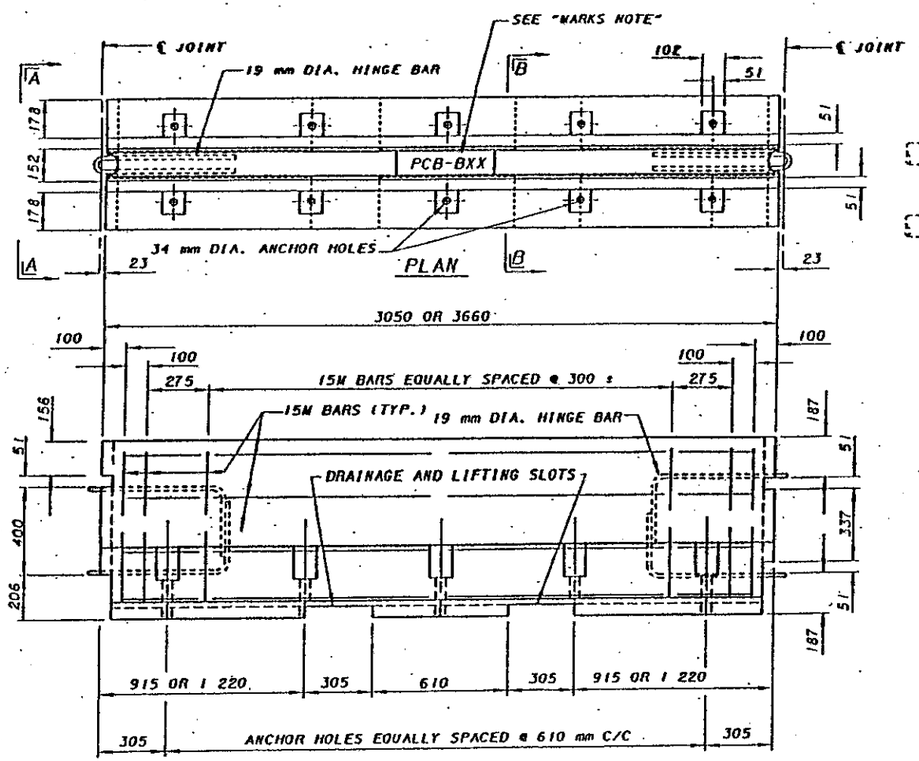
DATE 04/25/94

FLAGGERS CLOSING
1 LANE OF A 2 LANE HIGHWAY
STATIONARY OPERATION

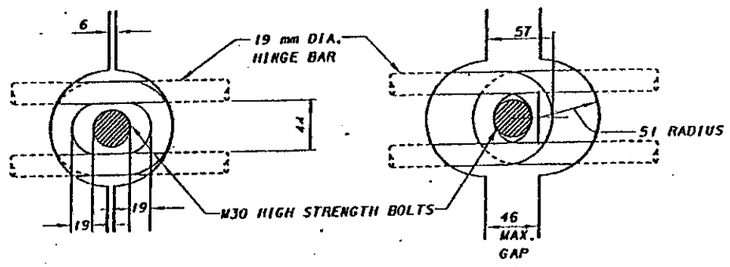
STANDARD CONSTRUCTION DRAWING MT-97.10M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



ELEVATION

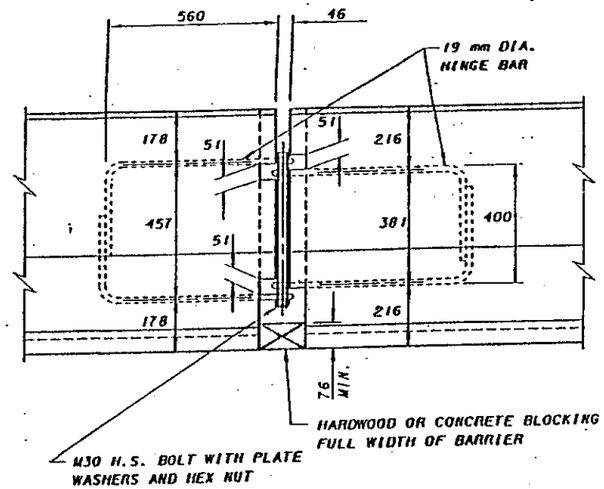


① CLOSED JOINT ② OPEN JOINT

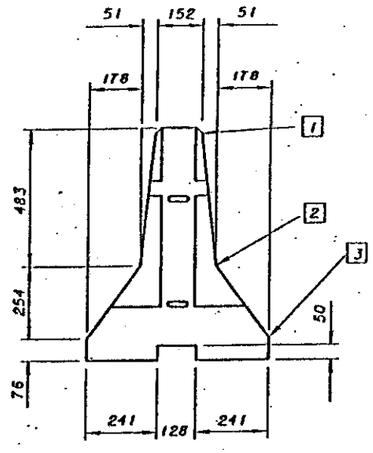
JOINT CONNECTION DETAILS

① BARRIER SHALL INITIALLY BE PLACED CLOSER TOGETHER SO BOLTS CAN BE EASILY INSERTED THROUGH HINGE BAR LOOPS.

② BARRIER JOINTS SHALL BE FULLY OPEN BEFORE NUT IS TIGHTENED ONTO BOLT AND OPENING IS SNUGGLY BLOCKED.



DETAIL AT HINGED CONNECTION

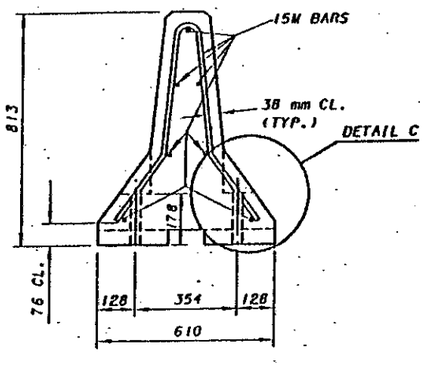


VIEW A-A

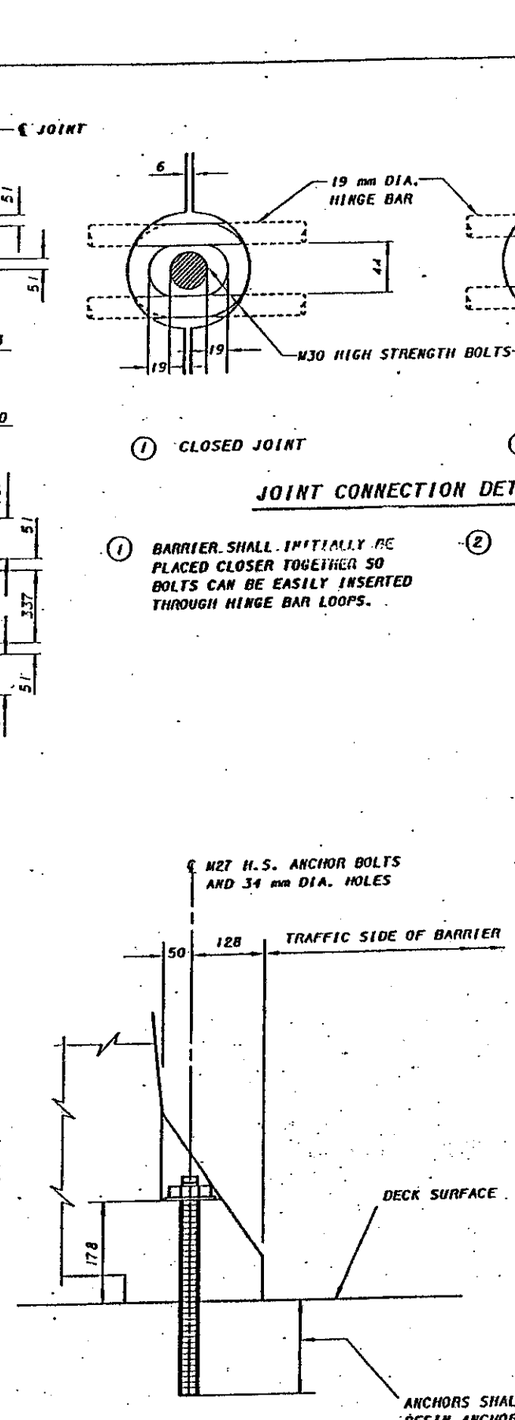
[1] 25 mm RADIUS OR 19 mm CHAMFER, ALL TOP AND END CORNERS.

[2] PERMISSIBLE 250 mm RADIUS.

[3] PERMISSIBLE 25 mm RADIUS.



SECTION B-B



DETAIL C

GENERAL NOTES

HARDWARE:
BOLTS, DECK ANCHORING BOLTS AND ALL NUTS AND WASHERS SHALL CONFORM TO ASTM A325M. THEY SHALL BE GALVANIZED IN ACCORDANCE WITH CMS 711.02.

REINFORCING STEEL:
ALL REINFORCING STEEL (INCLUDING THE 19 mm DIAMETER HINGE BARS) SHALL MEET THE REQUIREMENTS OF CMS 509.02. HINGE BARS SHALL BE GALVANIZED AFTER FABRICATION.

CONCRETE:
PORTABLE CONCRETE BARRIER SEGMENTS SHALL BE CONSTRUCTED OF CLASS C CONCRETE WITH A MINIMUM COMPRESSIVE STRESS OF 28 MPa.

BRIDGE DECK SURFACE PREPARATION:
THE SURFACE AREA ON WHICH THE PORTABLE CONCRETE BARRIER WILL REST SHALL BE CLEAR OF ALL LOOSE SAND, GRAVEL, DIRT AND DEBRIS.

ANY IRREGULARITIES IN THE BRIDGE DECK AREAS, UNLESS JUDGED BY THE ENGINEER TO BE INCONSEQUENTIAL, SHALL BE LEVELED WITH GROUT AND/OR ASPHALT.

ASPHALT ROLL ROOFING SHALL BE PLACED ON THOSE BRIDGE DECK AREAS, AS JUDGED BY THE ENGINEER, TO HAVE A SURFACE ROUGHNESS WHICH WOULD INHIBIT FRICTION CONTACT BETWEEN BARRIER SEGMENTS AND DECK.

MARKS:
ALL BARRIER SEGMENTS SHALL BE CLEARLY MARKED, WHERE "XX" IS THE YEAR IN WHICH THE BARRIER WAS CAST. EACH SHALL ALSO HAVE, ON IT'S TOP SURFACE, A UNIQUE IDENTIFICATION OF THE MANUFACTURER AND, SOMEWHERE ON THE BARRIER, THE DAY AND MONTH THE BARRIER WAS CAST.

ALL MARKINGS SHALL BE PERMANENTLY IMPRINTED ON THE BARRIER USING A MINIMUM OF 50 mm HIGH LETTERING.

HANDLING DEVICES MAY BE USED IN LIEU OF THE LIFTING SLOTS FOR MOVING THE BARRIER. THEY MAY BE OF ANY DESIGN SUFFICIENT TO HANDLE THE WEIGHT OF THE SECTION BEING LIFTED. NO REMAINING HANDLING DEVICES SHALL PROTRUDE ABOVE THE BARRIER SURFACE.

THE PROJECT PLANS SHALL INDICATE THE NUMBER OF ANCHORS PER SEGMENT, AS WELL AS THE BARRIER LOCATION ON THE BRIDGE DECK, AND ANY SPECIAL ANCHORAGE REQUIREMENTS.

DESIGN AGENCY
BUREAU OF BRIDGES AND STRUCTURAL DESIGN

STATE OF OHIO DEPARTMENT OF TRANSPORTATION
Richard L. Engel
ENGINEER OF BRIDGES
5-28-98
DATE

ADVISORY COMMITTEE
LAW

CHECKED WTF/JS

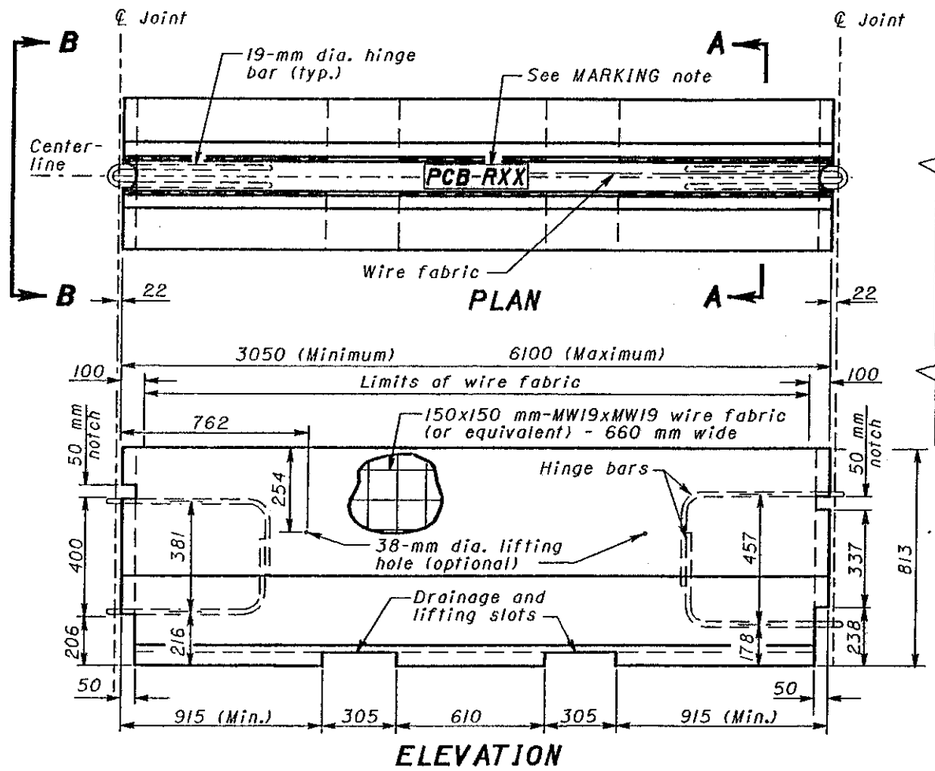
DESIGNED AJM
DRAWN GFI/TDB

PCB-91M

REVISIONS

STANDARD PORTABLE CONCRETE BARRIER DETAILS

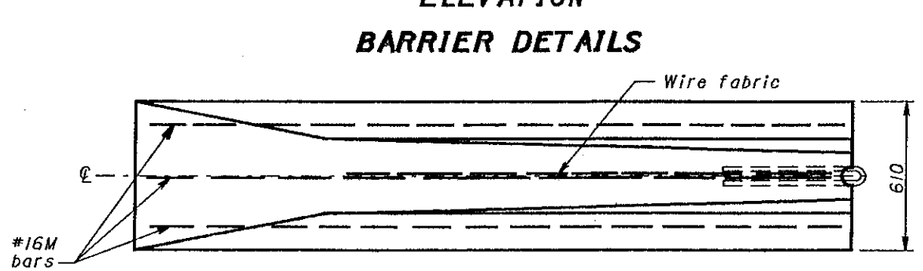
1 / 1



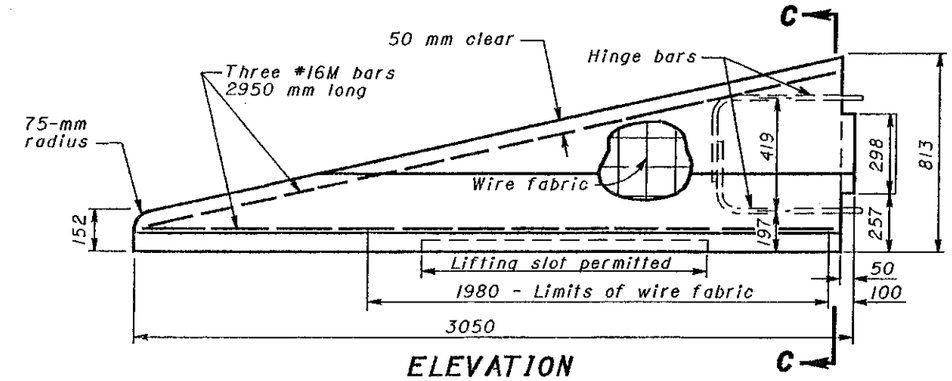
PLAN

ELEVATION

BARRIER DETAILS

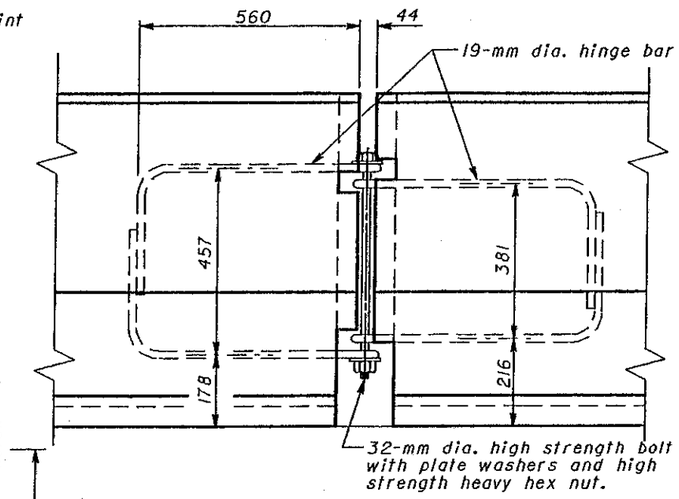


PLAN

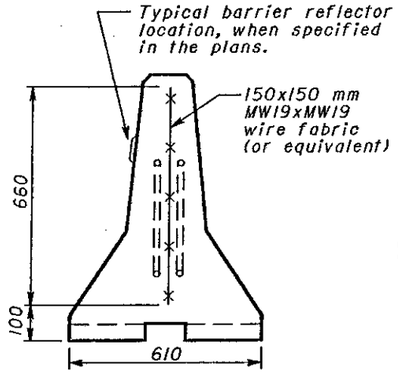


ELEVATION

TAPERED END SECTION DETAILS

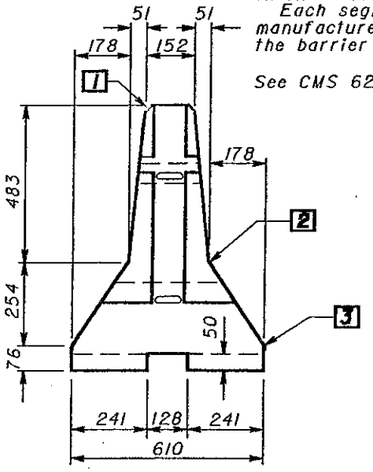


DETAIL AT HINGED CONNECTION

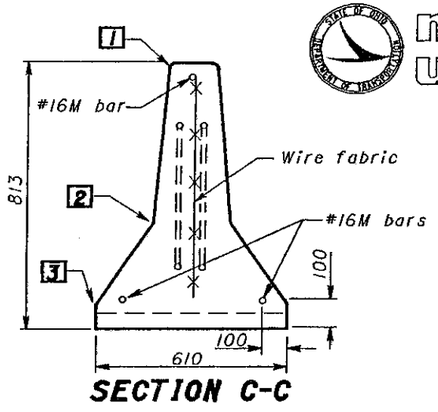


Vertical edges on keyway and drainage slots may be battered. Depth 50±6 mm.

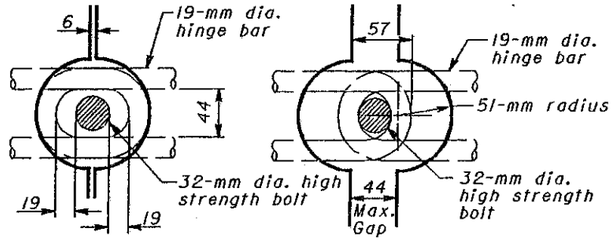
SECTION A-A



VIEW B-B



SECTION C-C



CLOSED JOINT

Barriers shall initially be placed close together so that bolts can be easily inserted through hinge bar loop.

OPEN JOINT

Barrier joints shall be fully open before the nut is tightened onto bolt.

JOINT CONNECTION DETAILS

NOTES

PORTABLE CONCRETE BARRIER (PCB): PCB, as shown, shall not be used on bridge deck edges. PCB, Bridge Mounted, shall be used at such locations in accordance with the Office of Structural Engineering's Standard Drawing PCB-91M.

WIRE FABRIC: Shall meet the requirements of CMS 709.10.

CONNECTING HARDWARE: Bolts, washers and hex nuts shall be galvanized after fabrication as per CMS 711.02 and shall meet the requirements of CMS 711.09 except that the Rotational Capacity test specified in ASTM A 325M shall be waived.

In lieu of the pin and loop connections detailed on this Standard Construction Drawing, barrier sections with "J-J Hooks" end connections may be utilized.

Transition barrier sections with pin and loop connections on one end and "J-J Hooks" on the other shall be used to connect runs of "J-J Hooks" barrier to other permitted barrier types. The heights of the transition sections shall be the same as the barrier runs being connected.

"J-J Hooks" is a trademark of Easi-Set Industries, P.O. Box 300, Midland, VA 22728, (540) 439-8911 or (800) 547-4045.

HINGE AND REINFORCING BARS: The 19-mm hinge bars and #16M reinforcing bars shall meet the requirements of CMS 509.

HANDLING DEVICES: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.

MARKING: All barrier segments shall be marked as shown, where XX indicates the year cast. These markings shall be permanently impressed in the barrier using a minimum of 50-mm high lettering.

Each segment shall have, on its top, a unique identification as to its manufacturer and, somewhere on the barrier, the day and month that the barrier was manufactured.

See CMS 622 for additional information.

metric units

LEGEND

1. 25-mm radius or 19-mm chamfer, all top and end corners.
2. Permissible 250-mm radius.
3. Permissible 25-mm radius.

All dimensions are in millimeters unless otherwise noted.

This Drawing Replaces MC-9.2.

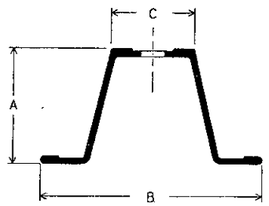
OHIO DEPARTMENT OF TRANSPORTATION

813-mm PORTABLE CONCRETE BARRIER

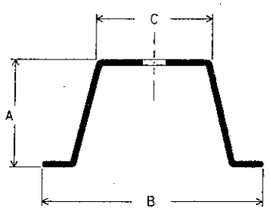
DATE: 6-30-95, 10-21-97

STANDARD CONSTRUCTION DRAWING **RM-4.2M**

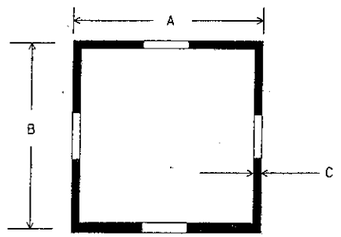
APPROVED: Roger F. Sutherland



TYPE P

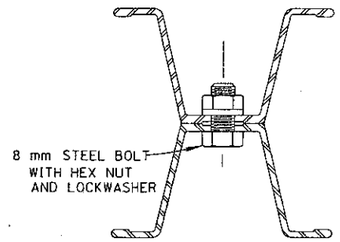


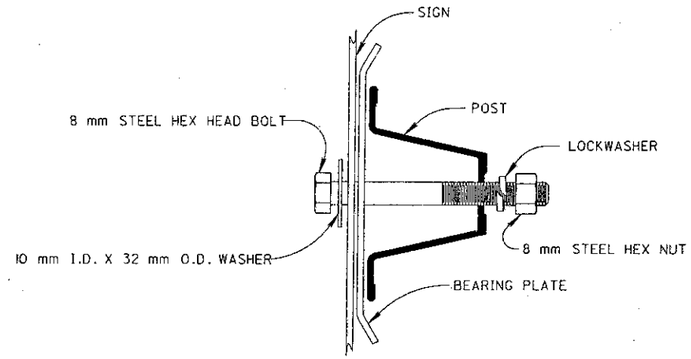
TYPE F



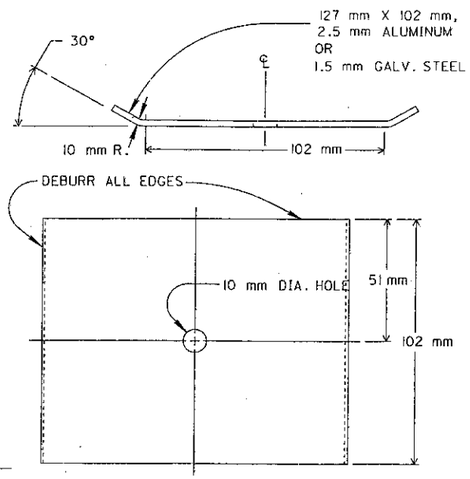
TYPE S

POST NO.	TYPE	Kg/m	POST DIMENSIONS MILLIMETERS A	B	C	ANCHOR DIMENSIONS A	B	C	NUMBER OF POSTS PERMITTED IN SEVEN FOOT PATH IN EXPOSED LOCATIONS
1	F	1.7	22	52	21				
2	P	3.0	37	78	33				2
	F	3.0	39	79	32				2
	S		51	51	2.1	57	57	2.7	2
3	P	4.5	48	89	33				2
	F	4.5	44	89	41				2
	S		51	51	2.1	57	57	2.7	2
4	P	6.0	TWO NO.2 POST						0
	F	6.0	TWO NO.2 POST						0
	S		63	63	2.7	76	76	4.8	1
6	P	9.0	TWO NO.3 POST						0
	F	9.0	TWO NO.3 POST						0

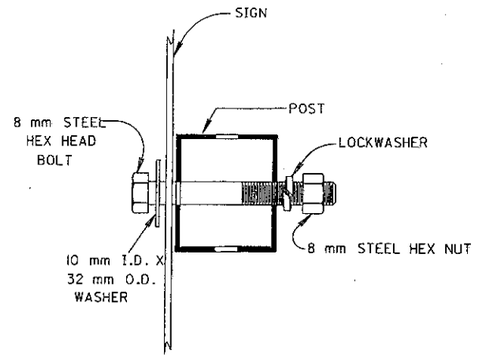




U - CHANNEL
SIGN ATTACHMENT DETAIL



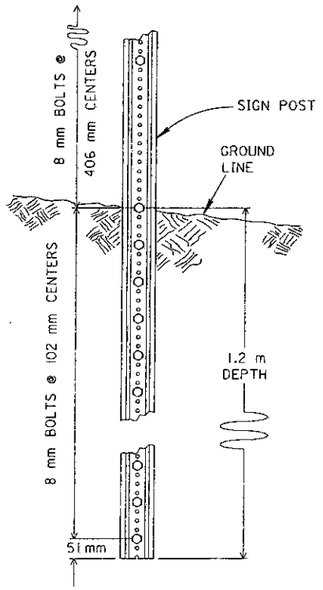
BEARING PLATE



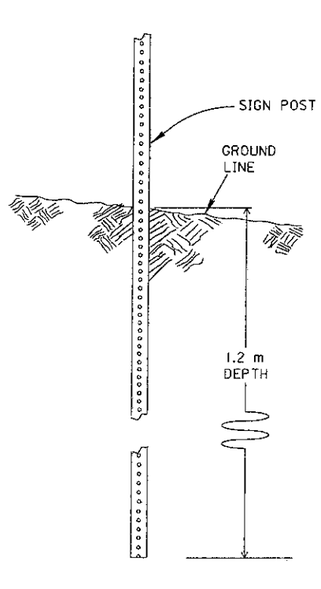
SQUARE POST
SIGN ATTACHMENT DETAIL

NOTES

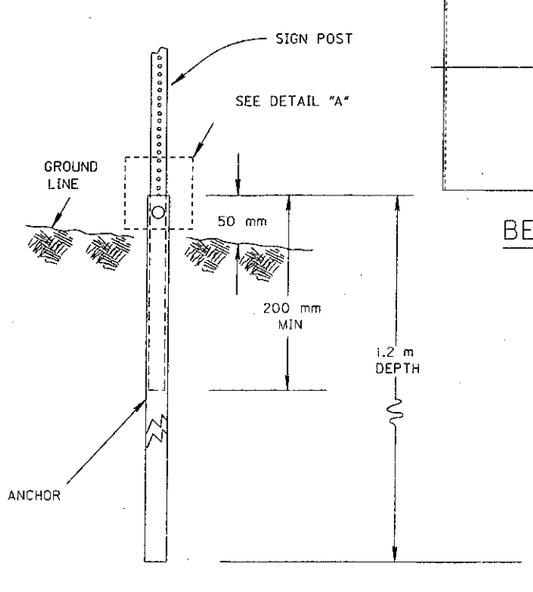
1. NUMBER 4 TYPE P AND F POST, AND NUMBER 6 TYPE P AND F POST, SHALL ONLY BE INSTALLED IN PROTECTED LOCATIONS (e.g. BEHIND GUARDRAIL). TWO POST INSTALLATIONS OF NUMBER 4 TYPE S POST SHALL BE INSTALLED IN PROTECTED LOCATIONS.
2. USE OF ANCHOR BASE WITH SQUARE POST IS OPTIONAL.
3. SQUARE POST MAY HAVE DIE-CUT KNOCKOUTS OR OPEN HOLES.



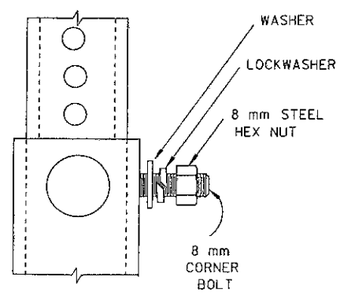
TYPICAL U - CHANNEL
DRIVEN INSTALLATION



TYPICAL SQUARE POST
DRIVEN INSTALLATION



TYPICAL SQUARE POST ANCHOR
BASE INSTALLATION



DETAIL "A"

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

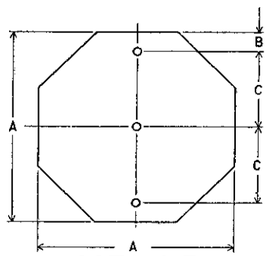
DATE 07/01/94

YIELDING POST

STANDARD CONSTRUCTION DRAWING TC-41.20M

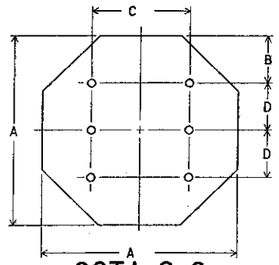
APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



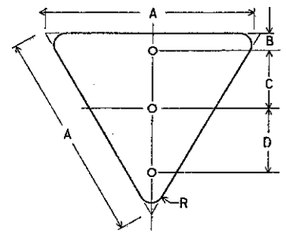
OCTA-1-3

A	B	C	THICKNESS	m^2
750	75	300	2.0	0.56
900	150	300	2.0	0.81



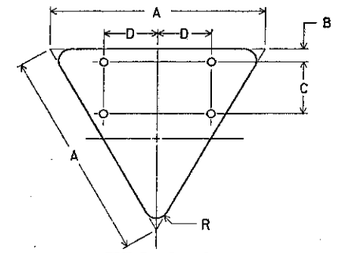
OCTA-2-6

A	B	C	D	THICKNESS	m^2
1200	300	600	300	2.5	1.44



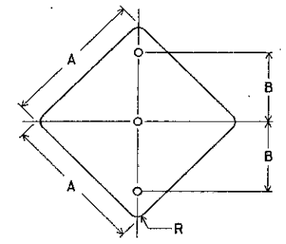
TRI-1-3

A	B	C	D	R	THICKNESS	m^2
900	75	250	275	50	2.5	0.35



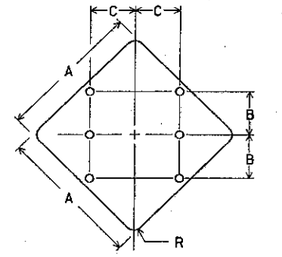
TRI-2-4

A	B	C	D	R	THICKNESS	m^2
1200	75	300	300	75	2.5	0.62
1500	75	450	375	100	2.5	0.97



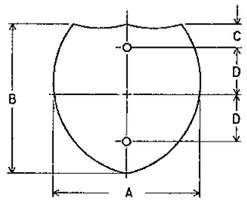
DIA-1-3

A	B	R	THICKNESS	m^2
600	300	38	1.6	0.36
750	375	48	2.0	0.56
900	450	57	2.0	0.81



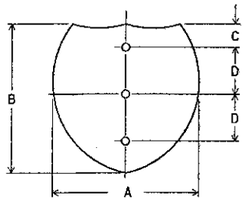
DIA-2-6

A	B	C	R	THICKNESS	m^2
1200	375	375	75	2.5	1.44
1500	450	450	95	2.5	2.25



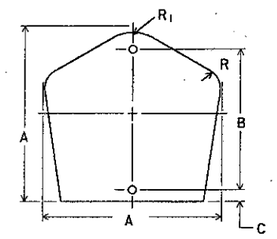
I.S.-1-2

A	B	C	D	THICKNESS	m^2
600	600	75	225	1.6	0.36
750	600	75	225	2.0	0.45
750	750	75	300	2.0	0.56
1000	750	75	300	2.0	0.75



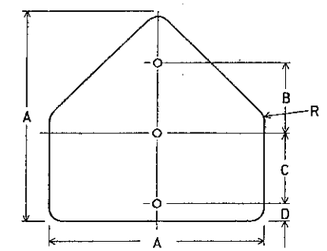
I.S.-1-3

A	B	C	D	THICKNESS	m^2
900	900	150	300	2.0	0.81
1200	900	150	300	2.5	1.08



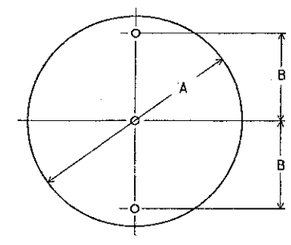
CO-1-2

A	B	C	R_1	R	THICKNESS	m^2
450	375	25	125	50	1.6	0.20
600	450	50	135	68	1.6	0.36
750	600	50	168	86	2.0	0.56



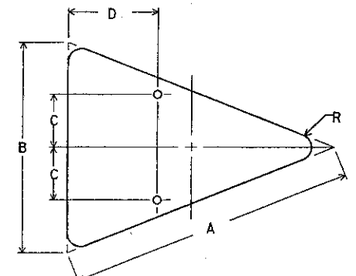
PENT-1-3

A	B	C	D	R	THICKNESS	m^2
750	250	275	75	48	2.0	0.56
900	300	300	75	57	2.0	0.81
1050	350	325	100	64	2.5	1.10



CIR-1-3

A	B	THICKNESS	m^2
750	300	1.6	0.56
900	375	2.0	0.81

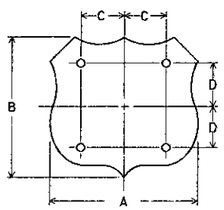


ISOS-1-2

A	B	C	D	R	THICKNESS	m^2
1000	750	187	300	48	2.0	0.35
1200	900	225	375	57	2.5	0.50

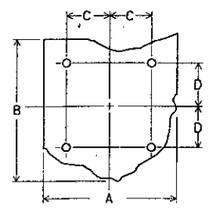
ROUTE SHIELDS

(FOR GUIDE SIGNS ONLY)



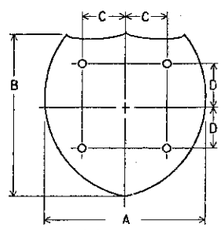
M-1C-

A	B	C	D
610	600	175	175
750	600	200	200
750	750	225	225
937	750	225	225
900	900	250	250
1125	900	375	250



M-2C-

A	B	C	D
600	600	175	175
750	600	200	200
750	750	225	225
937	750	225	225
900	900	250	250
1125	900	375	250



M-5C-

A	B	C	D
600	600	175	175
750	600	200	200
750	750	225	225
1000	750	225	225
900	900	250	250
1200	900	375	250

ALL SHIELDS SHALL BE 1.6 mm THICK

SHAPE — OCTA-2-6 — NO. BOLTS REQUIRED

NO. SUPPORTS REQUIRED

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL BOLT HOLES SHALL BE 10 MILLIMETERS IN DIAMETER, AND MAY BE DRILLED OR PUNCHED TO FINISHED SIZE.
3. DIMENSIONS BETWEEN BOLT HOLES SHALL BE TO TOLERANCE OF ± 0.8 MILLIMETER.
4. FOR ADDITIONAL BLANK DETAILS, SEE SIGN LAYOUT DRAWING.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

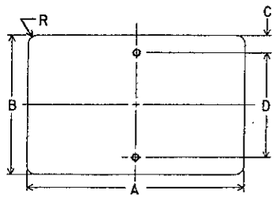
DATE 07/29/94

SIGN BLANK DETAILS I

STANDARD CONSTRUCTION DRAWING TC-52.10M

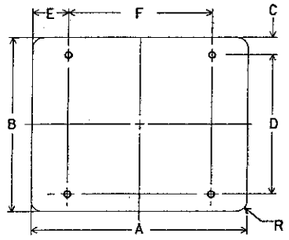
APPROVED Gary Brugger ENGR. OF DESIGN SERVICES

WCC



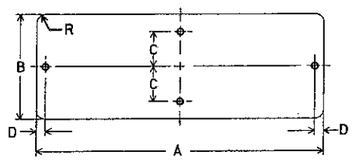
H-REC-1-2

A	B	C	D	R	THICKNESS	m^2
300	150	37.5	75	38	1.6	0.05
450	150	37.5	75	38	1.6	0.07
450	300	37.5	225	38	1.6	0.14
525	375	37.5	300	38	1.6	0.20
525	450	75	300	38	1.6	0.24
600	150	37.5	75	38	1.6	0.09
600	200	37.5	125	38	1.6	0.12
600	250	37.5	175	38	1.6	0.15
600	300	37.5	225	38	1.6	0.18
600	450	75	300	38	1.6	0.27
750	200	37.5	125	38	1.6	0.15
750	250	37.5	175	38	1.6	0.19
750	300	37.5	225	38	2.0	0.23
750	375	37.5	300	38	2.0	0.28
750	400	37.5	325	38	2.0	0.30
750	450	75	300	38	2.0	0.34
750	600	75	450	38	2.0	0.45
900	150	37.5	75	38	2.0	0.14
900	300	37.5	225	38	2.0	0.27
900	375	37.5	300	38	2.0	0.34
900	450	75	300	38	2.0	0.41
900	600	75	450	38	2.0	0.54
937	750	75	600	38	2.0	0.70
1050	375	37.5	300	38	2.0	0.39
1200	500	75	350	38	2.0	0.60



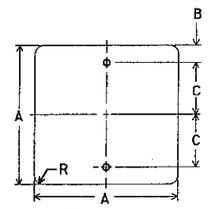
H-REC-2-4

A	B	C	D	E	F	R	THICKNESS	m^2
900	600	75	450	150	600	38	2.0	0.54
900	750	75	600	150	600	48	2.0	0.68
1000	500	75	350	150	700	38	2.0	0.50
1050	900	150	600	225	600	57	2.5	0.95
1125	900	150	600	225	675	57	2.5	1.01
1200	200	37.5	125	225	750	38	2.0	0.24
1200	212	37.5	137	225	750	38	2.0	0.25
1200	350	37.5	275	225	750	38	2.0	0.42
1200	400	37.5	325	225	750	38	2.0	0.48
1200	450	75	300	225	750	38	2.0	0.54
1200	600	75	450	225	750	48	2.5	0.72
1200	750	75	600	225	750	48	2.5	0.90
1200	900	150	600	225	750	57	2.5	1.08
1200	1050	150	750	225	750	57	2.5	1.26
1400	200	37.5	125	300	800	38	2.5	0.28
1500	300	37.5	225	300	900	38	2.0	0.45
1500	600	75	450	300	900	38	2.5	0.90
1500	750	75	600	300	900	48	2.5	1.13
1500	900	150	600	300	900	57	2.5	1.35
1500	1000	150	700	300	900	57	2.5	1.50
1600	200	37.5	125	300	1000	38	2.5	0.32
1650	600	75	450	300	1050	38	2.5	0.99
1650	900	150	600	300	1050	57	2.5	1.49
1800	300	37.5	225	300	1200	38	2.5	0.54
1800	450	75	300	300	1200	38	2.5	0.81
1800	600	75	450	300	1200	38	2.5	1.08
1800	900	75	600	300	1200	38	2.5	1.62



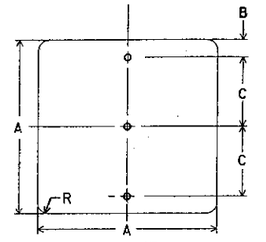
H-REC-1-4 (ONE WAY)

A	B	C	D	R	THICKNESS	m^2
900	300	100	25	38	2.0	0.27
1200	450	150	38	38	2.5	0.54



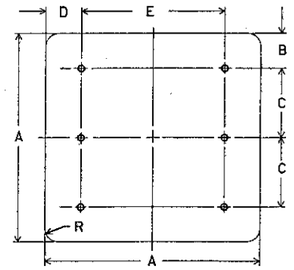
SQ-1-2

A	B	C	R	THICKNESS	m^2
375	75	112.5	38	1.6	0.14
450	75	150	38	1.6	0.20
600	75	225	38	1.6	0.36



SQ-1-3

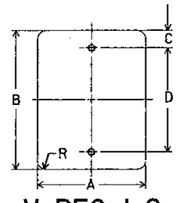
A	B	C	R	THICKNESS	m^2
750	75	300	48	2.0	0.56
900	150	300	57	2.0	0.81



SQ-2-6

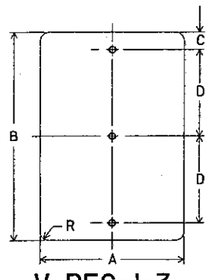
	A	B	C	D	E	R	THICKNESS	m^2
*	900	150	300	150	600	57	2.0	0.81
	1200	150	450	225	750	75	2.5	1.44

* "DO NOT ENTER" SIGN.



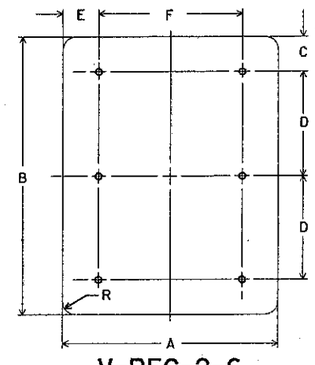
V-REC-1-2

A	B	C	D	R	THICKNESS	m^2
200	650	125	400	38	1.6	0.13
225	300	37.5	225	38	1.6	0.07
300	450	37.5	375	38	1.6	0.14
300	600	75	450	38	1.6	0.18
450	600	75	450	38	1.6	0.27



V-REC-1-3

A	B	C	D	R	THICKNESS	m^2
150	1350	225	450	38	2.0	0.20
300	900	75	375	38	1.6	0.27
300	1200	150	450	38	2.0	0.36
600	750	75	300	38	2.0	0.45
600	900	75	375	38	2.0	0.54
600	1200	225	375	38	2.5	0.72
750	900	75	375	48	2.0	0.68
750	950	75	400	38	2.0	0.68
750	1050	225	300	38	2.0	0.79
900	1050	225	300	57	2.5	0.95



V-REC-2-6

A	B	C	D	E	F	R	THICKNESS	m^2
900	1200	150	450	150	600	57	2.0	1.08
900	1350	150	525	150	600	57	2.5	1.22
900	1500	150	600	150	600	57	2.5	1.35
900	1800	225	675	150	600	57	2.5	1.62
1200	1350	150	525	225	750	75	2.5	1.62
1200	1500	150	600	225	750	75	2.5	1.80
1200	2400	300	900	225	750	75	2.5	2.88

SHAPE — H-REC-2-4 — NO. BOLTS REQUIRED

NO. SUPPORTS REQUIRED

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
2. ALL BOLT HOLES SHALL BE 10 MILLIMETERS IN DIAMETER, AND MAY BE DRILLED OR PUNCHED TO FINISHED SIZE.
3. DIMENSIONS BETWEEN BOLT HOLES SHALL BE TO TOLERANCE OF ± 0.8 MILLIMETER.
4. FOR ADDITIONAL BLANK DETAILS SEE SIGN LAYOUT DRAWINGS.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

DATE 07/29/94

SIGN BLANK DETAILS II

STANDARD CONSTRUCTION DRAWING TC-52.20M

APPROVED Dayl Creager ENGR. OF DESIGN SERVICES

WCC