CUY-90-14.90

PID 77332/85531

APPENDIX EX-40

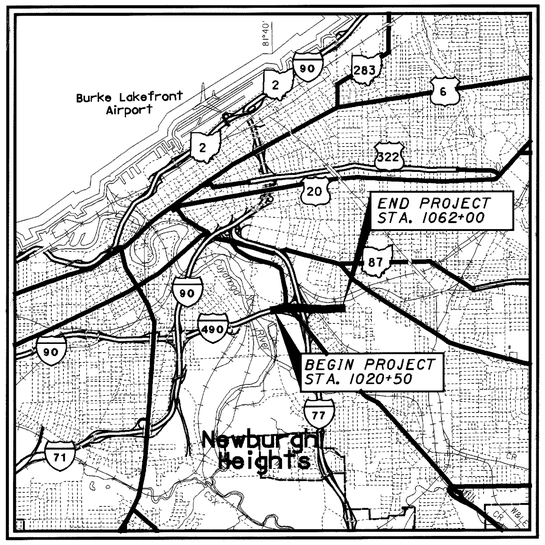
CUY-490-0165 PID 19512

(Reference Document)

State of Ohio
Department of Transportation
Jolene M. Molitoris, Director

Innerbelt Bridge
Construction Contract Group 1 (CCG1)

Revision Date: 2001



LOCATION MAP

LATITUDE: N41° 28′ 47″ LONGITUDE: W81° 39′ 42″

SCALE IN MILES

0 1 2 3 4

N

PORTION TO BE IMPROVED

INTERSTATE & DIVIDED HIGHWAY

UNDIVIDED STATE & FEDERAL ROUTES

OTHER ROADS

DESIGN DESIGNATION

CURRENT ADT (2001)	20779
DESIGN YEAR ADT (2021)	24104
DESIGN HOURLY VOLUME (2021)	10%
DIRECTIONAL DISTRIBUTION	62%
TRUCKS (24 HOUR B&C)	7%
DESIGN SPEED	60 MPH
LEGAL SPEED	60 MPH

DESIGN FUNCTIONAL CLASSIFICATION - URBAN FREEWAY

DESIGN EXCEPTIONS

NONE

UNDERGROUND UTILITIES
TWO WORKING DAYS
BEFORE YOU DIG
CALL 1-800-362-2764 (TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

PLAN PREPARED BY:

OHIO
DEPARTMENT OF TRANSPORTATION
DISTRICT TWELVE
PRODUCTION SECTION

ENGINEERS SEAL:

STATE OF OHIO
JON E. LORINCZ
E-61714
REGISTERED
PROFESSIONAL ENGINEER

JON E. LORINCZ

SIGNED: Jon E Lorincz

DATE: MAY 23, 2001

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

CUY-490-1.65

CITY OF CLEVELAND
CUYAHOGA COUNTY

INDEX OF SHEETS:

STANDARD CONSTRUCTION DRAWINGS

										SUPPLEMENTAL SPECIFICATIONS	
BP-1.1	7-28-00	GR-1.1M	10-21-97	DM-1.1M	10-21-97	MT-35.10M	1-30-95	TC-7.65M	2-1-94	806	9-9-97
BP-2.1	7-28-00	GR-1.2M	1-3-96	DM 1.2M	10-21-97	MT-35.11M	1-30-95	TC-18.24M	2-1-94	828	12-14-00
BP-2.2	7-28-00	GR-1.3M	11-30-94	DM-4.2M	6-30-95	MT-95.30M	4-25-94	TC-21.10M	12-10-96	830	10-21-98
BP-2.4	7-28-00	GR-2.1M	4-14-98	DM-4.3M	4-29-99	MT-95.40M	4-25-94	TC-21.40M	2-1-94	870	3-27-01
BP-2.5	7-28-00	GR-3.1M	10-21-97	DM-4.4M	4-29-99	MT-98.12M	6-24-93	TC-22.20M	2-1-94	877	4-13-99
BP-3.1	7-28-00	GR-3.2M	10-21-97			MT-98.13M	6-24-93	TC-31.21M	3-31-94		
BP-8.1	7-28-00	GR-4.2M	10-21-97			MT-98.14M	6-24-93	TC-32.10M	3-31-94		
BP-9.1	7-28-00					MT-98.15M	6-24-93	TC-32.11M	3-31-94		
		RM-4.2M	10-21-97			MT-98.16M	6-24-93	TC-51.11M	9-30-94		
		RM-4.5M	10-21-97			MT-98.19M	3-01-96	TC-65.10M	11-1-95	SPECIAL PROVISIONS	
						MT-101.60M	4-25-94	TC-65.11M	11-1-95		
						MT-102.10M	1-30-95	TC-71.10M	9-1-93		
						MT-105.10M	4-25-94	TC-72.20M	9-1-93		
F-1.1	7-28-00					MT-105.11M	4-25-94	TC-82.10	1-19-99		
F-3.1	7-28-00							TC-82.11	1-19-99		
F-3.2	7-28-00										

PROJECT DESCRIPTION

REPAIR AND UPGRADING OF INTERSTATE 490. APPROXIMATE PROJECT LIMITS ARE I-77 TO E. 55TH ST. PROJECT INCLUDES PAVEMENT REPLACEMENT, MINOR WIDENING OF RAMP NW/SW, GUARDRAIL REPLACEMENT, RESURFACING OF RAMPS AND PAVEMENT REPAIRS.

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

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 EXCEPT AS NOTED ON SHEET 12, AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

UNDER AUTHORITY OF SECTION 4511.21, DIVISION (I) OF THE OHIO REVISED CODE, THE REVISED PRIMA FACIE SPEED LIMITS AS INDICATED HEREIN ARE DETERMINED TO BE REASONABLE AND SAFE, AND ARE HEREBY ESTABLISHED FOR THE DURATION OF THIS PROJECT. THE PRIMA FACIE SPEED LIMIT OR LIMITS HEREBY ESTABLISHED SHALL BECOME EFFECTIVE WHEN APPROPRIATE SIGNS GIVING NOTICE THEREOF ARE ERECTED.

APPROVED _____
DATE 24 MAY 2001 DISTRICT DEPUTY DIRECTOR

APPROVED _____
DATE 6-11-01 DIRECTOR, DEPARTMENT OF TRANSPORTATION

FEDERAL PROJECT NO. TEA-GO10(557)

PID NO. 19512

CONSTRUCTION PROJECT NO.

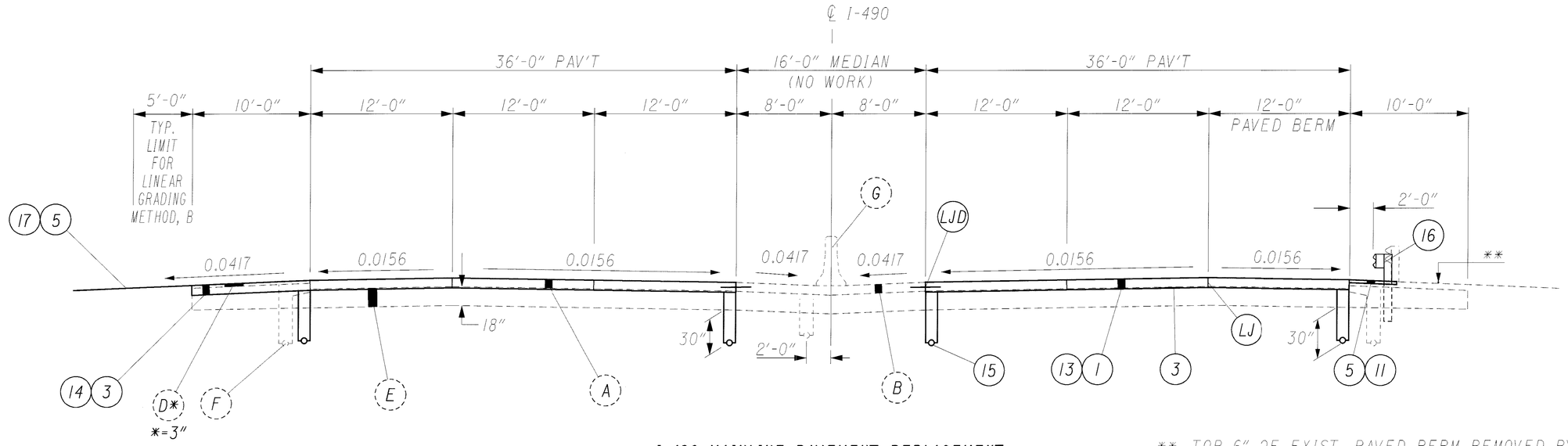
RAILROAD INVOLVEMENT NONE

CUY-490-1.65

1 / 57

CUY-IR 490-1.65
010402 PID-19512
Dist 12 9/5/01

I:\PROJECTS\Pid19512\dgn\19512gta.dgn 23-MAY-2001 12:17PM jlorincz



I-490 MAINLINE PAVEMENT REPLACEMENT

STA. 1040+50 TO STA. 1051+50 = 1100 L.F.

** TOP 6" OF EXIST. PAVED BERM REMOVED BY PREVIOUS CONTRACT FROM STA. 1040+50 TO STA. 1041+20 AND FROM STA. 1044+25 TO 1049+50, RIGHT SIDE ONLY.

NOTE:
EXIST. MEDIAN PAV'T EDGES NOT AT SAME ELEVATION.
(LOWER ELEV. OCCURS BOTH LEFT & RIGHT SIDES)

EXISTING LEGEND

- (A) 9" REINFORCED CONCRETE PAVEMENT
- (B) 9" PLAIN CONCRETE
- (C) 2½" ASPHALT OVERLAY (UNLESS OTHERWISE NOTED)
- (D) 6" ASPHALT SHOULDER
- (E) AGGREGATE BASE/SUBBASE
- (F) UNDERDRAIN
- (G) CONCRETE MEDIAN BARRIER

PROPOSED JOINT LEGEND

- (LJ) STANDARD LONGITUDINAL JOINT
- (LJD) TYPE D LONGITUDINAL JOINT

PROPOSED LEGEND

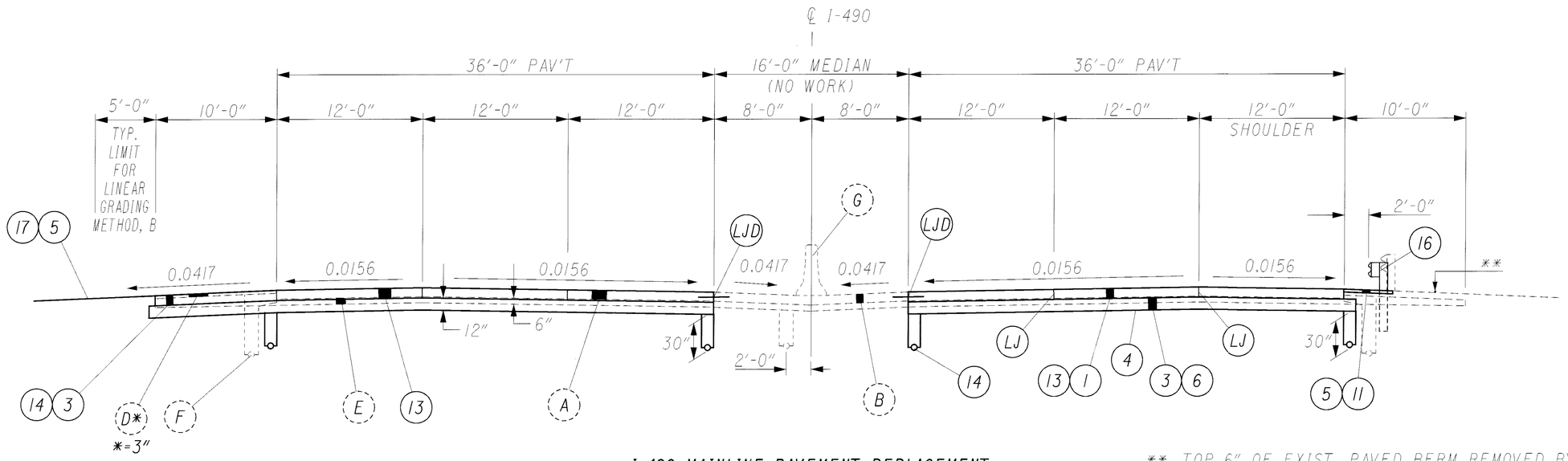
- (1) 202-PAVEMENT REMOVED
- (2) 202-WEARING COURSE REMOVED
- (3) 203-EXCAVATION, NOT INCLUDING EMBANKMENT CONSTRUCTION
- (4) 203-SUBGRADE COMPACTION
- (5) 203-LINEAR GRADING
- (6) 304-AGGREGATE BASE, AS PER PLAN
- (7) 305-9" CONCRETE BASE
- (8) 407-TACK COAT
- (9) 446-1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE 1H, AS PER PLAN
- (10) 446-1 3/4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG64-28
- (11) 448-3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22 (UNDER GUARDRAIL)
- (12) 451-9" REINFORCED CONCRETE PAVEMENT
- (13) 451-10" REINFORCED CONCRETE PAVEMENT
- (14) 452-10" PLAIN CONCRETE PAVEMENT
- (15) 605-6" SHALLOW PIPE UNDERDRAIN
- (16) 606-GUARDRAIL
- (17) 870-SEEDING AND MULCHING

CALCULATED JEL | CHECKED

TYPICAL SECTION AND LEGENDS

MAINLINE TYPICAL

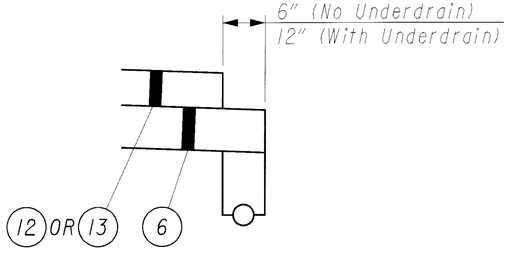
CUY-490-1.65



I-490 MAINLINE PAVEMENT REPLACEMENT

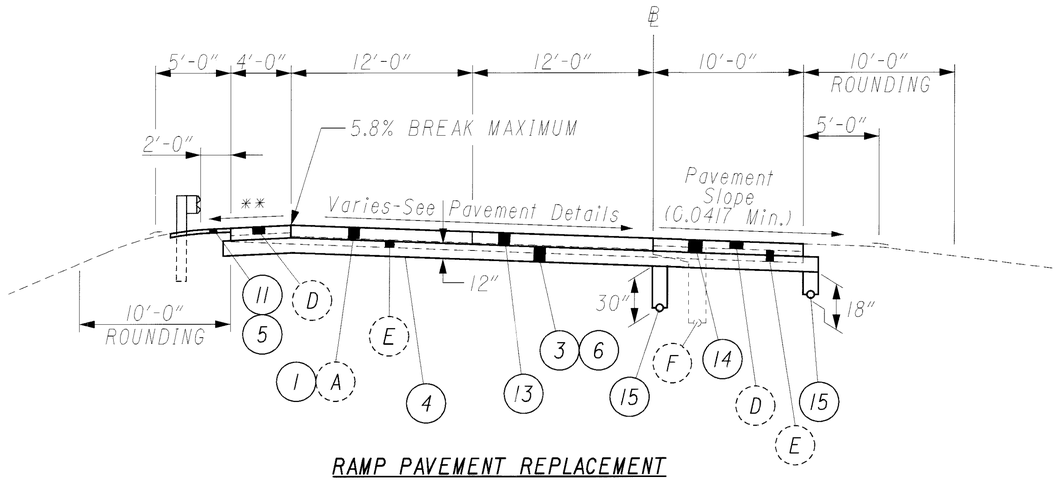
STA. 1051+50 TO STA. 1053+00 = 150 L.F.

** TOP 6" OF EXIST. PAVED BERM REMOVED BY PREVIOUS CONTRACT FROM STA. 1040+50 TO STA. 1041+20 AND FROM STA. 1044+25 TO 1049+50, RIGHT SIDE ONLY.



EDGE DETAIL

PAVEMENT REPLACEMENT AND WIDENING



RAMP PAVEMENT REPLACEMENT

RAMP N-E & S-E
RAMP E-S & E-N
> SEE PAVEMENT DETAILS FOR WORK LIMITS

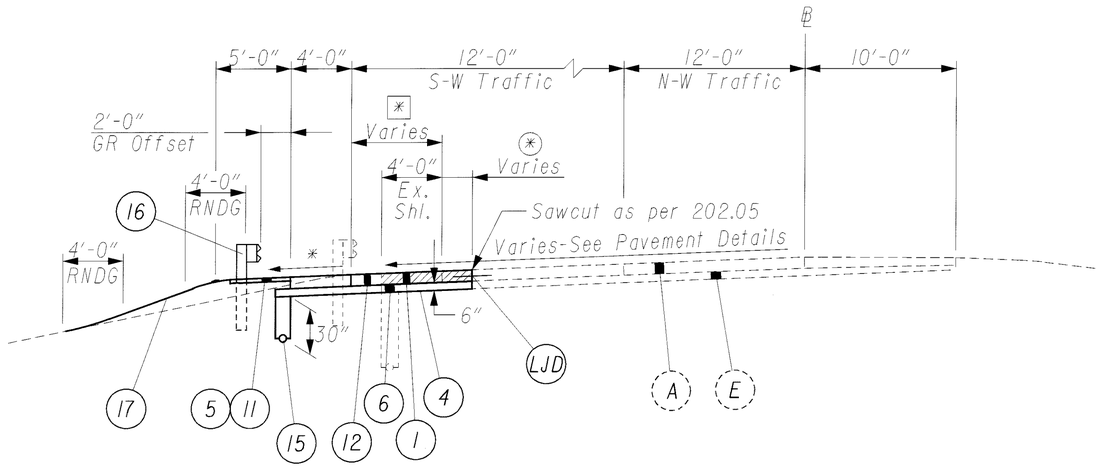
** - Varies 0.0417 to 0.0208 (Difference between Pavement Slope and 5.8%)

SEE SHEET 2 FOR LEGEND

CALCULATED JEL CHECKED

PAVEMENT REPLACEMENT TYPICALS

CUY-490-1.65



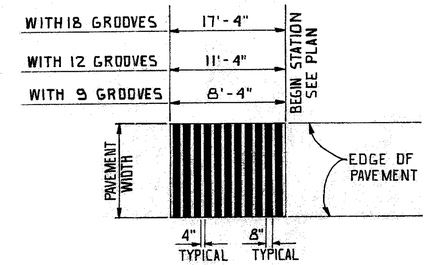
RAMP N-W/S-W WIDENING

RAMP N-W STA. 15+27 TO STA. 20+19

(*) - Varies 2' @ Sta. 15+27 to 0' @ sta. 16+43

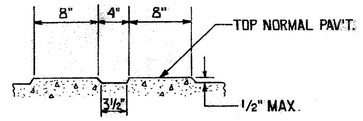
[*] - Varies 0' @ Sta. 15+27 to ±8' @ sta. 20+19

* - Pavement Cross slope (0.0417 minimum)

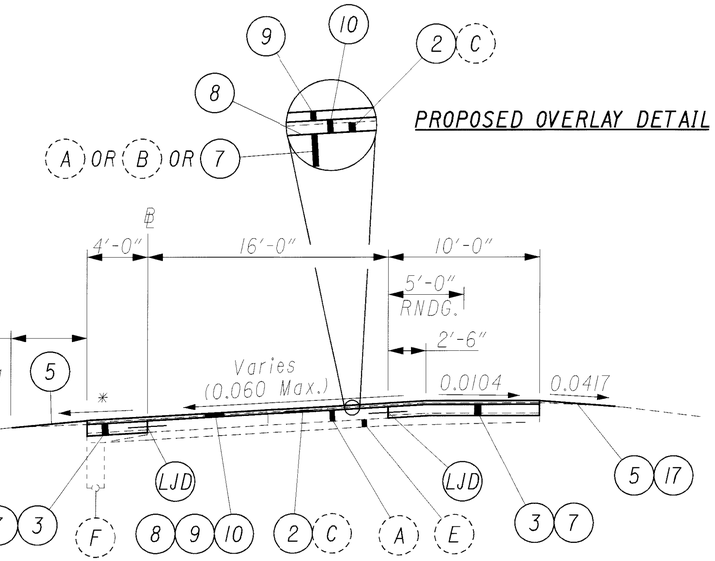


RUMBLE STRIPS
TYPICAL SECTIONS

CONTINUE GROOVES IN TO MEDIAN CONCRETE (ABOUT 8") AT PAV'T. SLOPE TO PROVIDE DRAINAGE.



RUMBLE STRIP SECTION



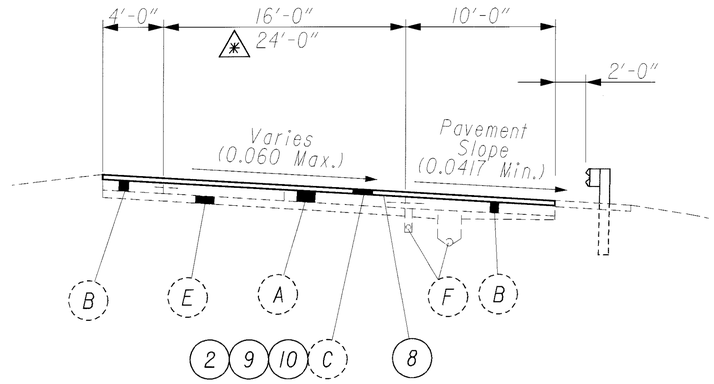
PROPOSED OVERLAY DETAIL

RAMP RESURFACING WITH SHOULDER REPLACEMENT

(C) — 1¼" Existing Asphalt Overlay

RAMP S-W
STA. 3+96.08 TO STA. 9+14.18 = 518.10 Lin. Ft.

RAMP W-N
STA. 10+03.23 TO STA. 14+45.40 = 442.17 Lin. Ft.



RAMP RESURFACING

RAMP E-S [*]
STA. 4+98.80 TO STA. 8+02.70
STA. 11+08.37 TO STA. 16+17.56

RAMP E-N
STA. 17+92.61 TO STA. 26+99.50

RAMP W-S
STA. 15+63.21 TO STA. 22+71.02

RAMP N-E
STA. 3+28.01 TO STA. 8+00.96
STA. 13+33.46 TO STA. 19+11.22

RAMP N-W
STA. 4+58.50 TO STA. 8+94.86

RAMP S-E [*]
STA. 5+82.84 TO STA. 24+19.00

SEE SHEET 2 FOR LEGEND

CALCULATED JEL
CHECKED

RAMP TYPICAL SECTIONS / RUMBLE STRIPS

CUY-490-1.65

PROFILE AND ALIGNMENT
THE PROPOSED PAVEMENT RESURFACING/REPLACEMENT SHALL FOLLOW THE ALIGNMENT AND PROFILE OF THE EXISTING PAVEMENT.

UTILITIES
LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

Ameritech
13630 Lorain Ave. - 4th Floor
Cleveland, Ohio 44111
Attn: Dick Taus
Phone: (216) 476-6134

Illuminating Co.
6896 Miller Road
Brecksville, OH 44141
Attn: Frank Dibbs
Phone: (440) 546-8748
Fax: (440) 546-8775

Cleveland Public Power (Melp)
1300 Lakeside Ave.
Cleveland, Ohio 44114
Attn: Dale Turkovich Ext. 115
Phone: (216) 664-4245
Fax: (614) 664-2777

City of Cleveland Division of Water Pollution Control
12302 Kirby Road
Cleveland, Ohio 44108
Attn: Rachid Zoghaib
Phone: (216) 664-2786

City of Cleveland Water Dept.
1201 Lakeside Ave.
Cleveland, Ohio 44114
Attn: Guy Singer
Phone: (216) 644-2444 Ext. 5555
Fax: 664-2378

East Ohio Gas Co.
1201 East 55th Street
Cleveland, Ohio 44103
Attn: Sam Mercurio
Phone: (216) 736-6675
Fax: (440) 736-6780

MCI-WORLDCOM
120 Ravine Street
Akron, Ohio 44303
Attn: Al Guest
Phone: (330) 253-8267

NEORSD
3826 Euclid Ave
Cleveland, Ohio 44115-2504
Attn: Richard Switalski
Phone: (216) 881-6600
Fax: (216) 881-2738

THERE ARE NO UNDERGROUND UTILITIES SHOWN ON THIS PLAN. THE NATURE OF THE WORK REQUIRED BY THIS PROJECT WILL NOT AFFECT ANY KNOWN UNDERGROUND UTILITIES THAT EXIST UNDER OR ADJACENT TO THE WORK AREA.

EXISTING TYPICAL SECTIONS
EXISTING TYPICAL SECTIONS HAVE BEEN TAKEN FROM THE RECORDS AND ARE BELIEVED TO REPRESENT THE EXISTING PAVEMENT CONDITIONS, BUT THE STATE OF OHIO WILL NOT GUARANTEE THE ACCURACY OF THE SAME.

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.

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.

CONVERSION OF STANDARD CONSTRUCTION DRAWINGS
THE METRIC STANDARD DRAWINGS REFERENCED IN THIS PLAN SHALL BE CONVERTED TO ENGLISH UNITS USING THE SI (METRIC) TO ENGLISH CONVERSION FACTORS PROVIDED IN SECTION 109.011 OF THE 1997 CONSTRUCTION AND MATERIALS SPECIFICATIONS. THE APPENDIX OF ASTM E 380 SHALL BE UTILIZED FOR ANY ADDITIONAL CONVERSION FACTORS REQUIRED. CONVERSIONS SHALL BE APPROPRIATELY PRECISE AND SHALL REFLECT STANDARD INDUSTRY ENGLISH VALUES WHERE SUITABLE.

ITEM 623-CONSTRUCTION LAYOUT STAKES, AS PER PLAN
THIS ITEM SHALL INCLUDE A FIELD VERIFICATION OF EXISTING PAVEMENT ELEVATIONS AND HORIZONTAL ALIGNMENT FOR ALL SECTIONS OF PAVEMENT THAT ARE SCHEDULED FOR REPLACEMENT AS PART OF THIS PROJECT. THIS SURVEY SHALL BE PERFORMED BY THE CONTRACTOR PRIOR TO THE REMOVAL OF ANY PAVEMENT.
THE PAVEMENT DETAILS PROVIDED IN THESE PLANS ARE FROM THE ORIGINAL CONSTRUCTION PLANS AND MAY OR MAY NOT REFLECT THE "AS BUILT" CONDITION. IT IS THE INTENT OF THIS PROJECT TO REPLACE THE DESIGNATED PAVEMENT USING THE "AS BUILT" ELEVATIONS AND HORIZONTAL ALIGNMENT.

RAISED CONCRETE GORE IN PAVEMENT REPLACEMENT AREA
A VISUAL SURVEY OF THE GORES IN THE PAVEMENT REPLACEMENT AREA REVEALED NO RAISED CONCRETE OR CONCRETE CURBING. THE RAISED CONCRETE AND CONCRETE CURBING SHOWN ON THE ORIGINAL CONSTRUCTION PAVEMENT DETAIL (SHEETS 38,39) SHALL NOT BE INSTALLED.

PAVEMENT REPAIRS
THESE WORK ITEMS ARE FOR USE AS DIRECTED BY THE ENGINEER FOR THE PURPOSE OF PAVEMENT REPAIR. THE DEPARTMENT ANTICIPATES THAT THE EXISTING PAVEMENT WILL REQUIRE EXTENSIVE BASE REPAIR. THE QUANTITIES PROVIDED BELOW WERE BASED ON 20-12'X6' FULL DEPTH REPAIRS AND 20-12'X1' PARTIAL DEPTH (3" MAX.) REPAIRS. ALL LABOR AND MATERIAL NECESSARY TO PERFORM THIS WORK ACCORDING TO SECTION 250 OF THE CMS SHALL BE INCLUDED FOR PAYMENT UNDER:

ITEM 251 - PARTIAL DEPTH (3" MAX.) PAVEMENT REPAIR	27 SQ.YD.
ITEM 255 - FULL DEPTH PAVEMENT REMOVAL AND RIGID REPLACEMENT, CLASS MS	160 SQ.YD.
ITEM 255 - FULL DEPTH PAVEMENT SAWING	480 LIN. FT.

CLEARING AND GRUBBING
ALTHOUGH THERE ARE NO TREES OR STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE LIMITS OF THE PROJECT, A LUMP SUM QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY FOR ITEM 201, CLEARING AND GRUBBING. ALL PROVISIONS AS SET FORTH IN THE SPECIFICATIONS UNDER THIS ITEM SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 201, CLEARING AND GRUBBING.

ITEM 203 - LINEAR GRADING, METHOD A
THIS ITEM OF WORK SHALL CONSIST OF EXCAVATING ALONG THE OUTSIDE EDGE OF THE PAVED SHOULDER, AS DETAILED ON THE TYPICAL SECTIONS, TO PREPARE THE GROUND SURFACE FOR PAVING UNDER GUARDRAIL. THIS ITEM SHALL BE USED TO PREPARE PROPOSED GUARDRAIL AND EXISTING GUARDRAIL RUNS.

ALL COLLECTED DEBRIS SHALL BE REMOVED AND DISPOSED OF AS SPECIFIED IN SECTION 203.05 OF THE CONSTRUCTION AND MATERIAL SPECIFICATION.

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT BID STATION PRICE FOR ITEM 203 - LINEAR GRADING, METHOD A AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO PERFORM THIS ITEM OF WORK.

ITEM 203-LINEAR GRADING, METHOD B
THIS ITEM OF WORK SHALL CONSIST OF GRADING ALONG THE OUTSIDE EDGE OF THE PAVED SHOULDER, AS DETAILED ON THE TYPICAL SECTIONS, TO ENSURE POSITIVE DRAINAGE.

ALL COLLECTED DEBRIS SHALL BE REMOVED AND DISPOSED OF AS SPECIFIED IN SECTION 203.05 OF THE CMS.

THIS ITEM SHALL BE MEASURED IN STATIONS PER EACH SIDE OF THE ROADWAY THAT THIS WORK IS PERFORMED.

PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT BID STATION PRICE FOR ITEM 203-LINEAR GRADING, METHOD B AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO PERFORM THIS WORK.

ITEM 203 - PROOF ROLLING, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF SECTION 203.14 OF THE CMS, THIS ITEM SHALL BE USED TO PROOF ROLL EXISTING AGGREGATE BASE COURSES SCHEDULED FOR REUSE. AN ESTIMATED QUANTITY FOR THIS ITEM HAS BEEN PROVIDED IN THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

THE FOLLOWING CONTINGENCY QUANTITIES HAVE BEEN PROVIDED IF THE PROOF ROLLING OPERATION REVEALS AN UNSTABLE BASE COURSE.

203, PROOF ROLLING	4 HOUR
203, EXCAVATION	500 C.Y.
203, EMBANKMENT	200 C.Y.
203, SUBGRADE COMPACTION	600 S.Y.
304, AGGREGATE BASE, AS PER PLAN	300 C.Y.

CONTRACTION JOINTS IN CONCRETE PAVEMENT OR BASE WIDENING
WHERE NEW CONCRETE IS PLACED ADJACENT TO EXISTING CONCRETE, CONTRACTION JOINTS SHALL BE PROVIDED IN THE NEW CONCRETE SO AS TO FORM CONTINUOUS JOINTS WITH THOSE IN THE EXISTING CONCRETE. THE MAXIMUM DISTANCE BETWEEN THE JOINTS IN THE NEW CONCRETE SHALL BE IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING BP-2.2, IF NECESSARY, ADDITIONAL JOINTS SHALL BE PROVIDED IN THE NEW CONCRETE AT APPROXIMATELY EQUAL INTERVALS BETWEEN EXISTING JOINTS THAT EXCEED THE MAXIMUM SPACING.

CALCULATED JEL
CHECKED XXX

GENERAL NOTES

CUY-490-1.65

ITEM 304 - AGGREGATE BASE, AS PER PLAN
THE ONLY SLAG MATERIALS PERMITTED FOR THIS ITEM SHALL BE CRUSHED AIR-COOLED BLAST FURNACE SLAG, A MIXTURE OF CRUSHED AND GRANULATED SLAGS, OR OPEN HEARTH SLAG FROM APPROVED SOURCES ON FILE AT THE LABORATORY.

ALL MATERIALS OR BLENDED MATERIALS SHALL MEET THE GRADATION REQUIREMENTS OF 304.02.

ANY GRANULATED SLAG MATERIAL USED SHALL MEET THESE GRADATION REQUIREMENTS IN LIEU OF 703.08.

ITEM 446-ASPHALT SURFACE COURSE, TYPE 1H, AS PER PLAN
ALL APPLICABLE SECTIONS OF THE CMS AND SUPPLEMENTAL SPECIFICATIONS SHALL APPLY TO THIS ITEM EXCEPT THAT THE COARSE AGGREGATE SHALL BE LIMITED TO AIR COOLED BLAST FURNACE SLAG OR LIMESTONE.

ITEM 451-REINFORCED CONCRETE PAVEMENT, MISC.: RUMBLE STRIP FINISH
THIS ITEM OF WORK IS PROVIDED TO INSTALL A RUMBLE STRIP FINISH IN THE PAVEMENT AS DETAILED IN THESE PLANS. SEE SHEETS 4 & 38 FOR DETAILS.

THE FOLLOWING QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:
451, REINFORCED CONCRETE PAVEMENT,
MISC.: RUMBLE STRIP TREATMENT ..... 142.5 S.Y.

PROTECTION OF RIGHT-OF-WAY LANDSCAPING
THE CONTRACTOR SHALL CONSTRICT ALL OF HIS/HER ACTIVITIES, EQUIPMENT STORAGE, AND STAGING TO WITHIN THE CONSTRUCTION LIMITS. UNLESS OTHERWISE IDENTIFIED IN THE PLANS OR PROPOSAL, THE CONSTRUCTION LIMITS ARE IDENTIFIED AS 30 FEET FROM THE EDGE OF PAVEMENT. SHOULD THE CONTRACTOR WISH TO USE ANY AREA OUTSIDE THESE LIMITS, A REQUEST IN WRITING MUST BE SUBMITTED TO THE PROJECT ENGINEER. THE DOCUMENT SUBMITTED MUST CLEARLY IDENTIFY THE AREA THAT THE CONTRACTOR PLANS TO USE AND EXPLAIN THE PROPOSED USE AND RESTORATION OF THE AREA. THE ENGINEER SHALL APPROVE THE REQUEST IN WRITING BEFORE THE CONTRACTOR HAS PERMISSION TO USE THE AREA. PRIOR TO BEGINNING WORK, THE CONTRACTOR, SUPERINTENDENT OR HIS REPRESENTATIVE, THE PROJECT ENGINEER, AND A REPRESENTATIVE OF THE MAINTAINING AGENCY SHALL REVIEW AND RECORD ALL LANDSCAPING ITEMS WITHIN THE RIGHT-OF-WAY (BOTH WITHIN AND OUTSIDE THE CONSTRUCTION LIMITS). A RECORD OF THIS REVIEW WILL BE KEPT IN THE PROJECT ENGINEER'S FILES. PRIOR TO FINAL ACCEPTANCE, A FINAL REVIEW OF LANDSCAPING ITEMS WILL BE MADE. ANY ITEMS DAMAGED BEYOND THE CONSTRUCTION LIMITS AS DEFINED ABOVE WILL BE REPLACED IN KIND OR AS DIRECTED BY THE PROJECT ENGINEER AT NO COST TO THE STATE OF OHIO.

TEMPORARY SOIL EROSION AND SEDIMENT CONTROL
THE FOLLOWING ESTIMATED QUANTITIES ARE TO BE PLACED BY THE CONTRACTOR WITH THE ENGINEERS CONCURRENCE FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES:

877, TEMPORARY SEEDING AND MULCHING	1000	SQ. YD.
877, TEMPORARY DITCH PROTECTION	200	S.Y.
877, TEMPORARY PERIMETER FILTER FABRIC FENCE	1000	LIN. FT.
877, TEMPORARY DITCH CHECK FILTER FABRIC FENCE	200	LIN. FT.
877, TEMPORARY INLET PROTECTION FILTER FABRIC FENCE	200	LIN. FT.
877, SEDIMENT REMOVAL	25	CU. YD.
870, COMMERCIAL FERTILIZER	0.05	TON
870, REPAIR SEEDING AND MULCHING	500	SQ. YD.
870, WATER	2.70	M. GAL.
601, ROCK CHANNEL PROTECTION, TYPE C (WITHOUT FILTER)	10	CU. YD.

ITEM 870 - SEEDING AND MULCHING
THE FOLLOWING QUANTITIES ARE PROVIDED TO PROMOTE GROWTH AND CARE OF PERMANENT SEEDED AREAS:

870, SEEDING AND MULCHING	6,500 SQ. YD.
870, AGRICULTURAL LIME	2.69 TON
870, COMMERCIAL FERTILIZER	0.88 TON
870, SOIL ANALYSIS TEST	2 EACH
870, WATER	35 MGAL
870, TOPSOIL	100 C.Y.
670, DITCH EROSION PROTECTION	500 S.Y.

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 SEEDING AND MULCHING, ARE BASED ON THESE LIMITS.

THE CONTRACTOR IS REQUIRED TO ESTABLISH A GOOD STAND OF GRASS OF UNIFORM COLOR AND DENSITY TO THE SATISFACTION OF THE ENGINEER.

REVIEW OF DRAINAGE FACILITIES
BEFORE ANY WORK IS STARTED ON THE PROJECT AND AGAIN BEFORE FINAL ACCEPTANCE BY THE STATE, REPRESENTATIVES OF THE STATE AND THE CONTRACTOR, ALONG WITH LOCAL REPRESENTATIVES, SHALL MAKE AN INSPECTION OF ALL EXISTING SEWERS WHICH ARE TO REMAIN IN SERVICE AND WHICH MAY BE AFFECTED BY THE WORK. THE CONDITION OF THE EXISTING CONDUITS AND THEIR APPURTENANCE SHALL BE DETERMINED FROM FIELD OBSERVATIONS. RECORDS OF THE INSPECTION SHALL BE KEPT IN WRITING BY THE STATE.

ALL NEW CONDUITS, INLETS, CATCH BASINS, AND MANHOLES CONSTRUCTED AS A PART OF THE PROJECT SHALL BE FREE OF ALL FOREIGN MATTER AND IN A CLEAN CONDITION BEFORE THE PROJECT WILL BE ACCEPTED BY THE STATE.

ALL EXISTING SEWERS INSPECTED INITIALLY BY THE ABOVE MENTIONED PARTIES SHALL BE MAINTAINED AND LEFT IN A CONDITION REASONABLY COMPARABLE TO THAT DETERMINED BY THE ORIGINAL INSPECTION. ANY CHANGE IN THE CONDITION RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE CORRECTED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER.

PAYMENT FOR ALL OPERATIONS DESCRIBED ABOVE SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE PERTINENT 603 CONDUIT ITEMS.

ITEM SPECIAL- MISCELLANEOUS METAL
EXISTING CASTINGS MAY PROVE TO BE UNSUITABLE FOR REUSE, AS DETERMINED BY THE ENGINEER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE CASTINGS OF THE REQUIRED TYPE, SIZE AND STRENGTH (HEAVY DUTY) FOR THE PARTICULAR STRUCTURE IN QUESTION. ALL MATERIAL SHALL MEET ITEM 604 OF THE SPECIFICATIONS AND SHALL HAVE THE PRIOR APPROVAL OF THE ENGINEER.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER.

SPECIAL, MISCELLANEOUS METAL 2500 POUNDS

THE CONTRACTOR IS CAUTIONED TO USE EXTREME CARE IN THE REMOVAL, STORAGE AND REPLACEMENT OF ALL EXISTING CASTINGS. CASTINGS DAMAGED BY THE NEGLIGENCE OF THE CONTRACTOR, AS DETERMINED BY THE ENGINEER, SHALL BE REPLACED WITH THE PROPER NEW CASTINGS AT THE EXPENSE OF THE CONTRACTOR.

603-6" CONDUIT, TYPE F, AS PER PLAN
THIS ITEM OF WORK IS PROVIDED FOR UNDERDRAIN OUTLET PIPES WHICH ARE TO BE INSTALLED UNDER THE EXISTING CONCRETE MEDIAN SHOULDER. THE EXISTING MEDIAN SHOULDERS ARE NOT SCHEDULED FOR ANY WORK AS PART OF THIS PROJECT. THE CONTRACTOR IS GIVEN THE OPTION OF INSTALLING THESE OUTLET PIPES BY OPEN TRENCH OR JACKING.

IF THE OPEN TRENCH METHOD IS SELECTED, THE EXISTING CONCRETE SHOULDER SHALL BE REMOVED ACCORDING TO SECTION 202.05(C) OF THE CMS. ALL REMOVALS OF THE EXISTING SHOULDER SHALL BE RECTANGULAR IN SHAPE AND PREFERABLY OCCUR AT AN EXISTING JOINT. THE CONTRACTOR SHALL REPLACE/RESTORE THE CONCRETE MEDIAN SHOULDER TO ITS EXISTING CONDITION UPON COMPLETION OF THE UNDERDRAIN OUTLET.

ALL LABOR AND ANY MATERIALS NECESSARY TO INSTALL THE MEDIAN OUTLETS, USING THE METHOD SELECTED BY THE CONTRACTOR, SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 603, 6" CONDUIT, AS PER PLAN.

EXISTING UNDERDRAINS
EXISTING UNDERDRAINS ENCOUNTERED DURING CONSTRUCTION, SHOULD BE PROVIDED A POSITIVE OUTLET, WHERE FEASIBLE. THE FOLLOWING CONTINGENCY QUANTITIES SHALL BE USED AS NEEDED TO PROVIDE POSITIVE OUTLETS. THESE ITEMS SHALL INCLUDE ANY ADDITIONAL WORK NECESSARY TO MODIFY THE PROPOSED DRAINAGE STRUCTURE TO ACCEPT THE ADDITIONAL UNDERDRAIN OUTLETS.

603, 6" CONDUIT, TYPE F	50 L.F.
605, 6" SHALLOW PIPE UNDERDRAIN WITH FABRIC WRAP	200 L.F.
605, 6" UNCLASSIFIED UNDERDRAIN, WITH FABRIC WRAP	200 L.F.

GUARDRAIL REPLACEMENT
NO HAZARD SHALL BE LEFT UNPROTECTED EXCEPT FOR THE ACTUAL TIME NECESSARY TO REMOVE THE EXISTING GUARDRAIL, PREPARE THE SITE, AND INSTALL NEW GUARDRAIL IN A CONTINUOUS OPERATION. THE REMOVAL OF ALL GUARDRAIL SHALL AT ALL TIMES BE AS DIRECTED BY THE ENGINEER. NO GUARDRAIL SHALL BE REMOVED UNTIL THE REPLACEMENT MATERIAL IS ON THE SITE, READY FOR INSTALLATION. FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL BE DEEMED SUFFICIENT CAUSE TO ORDER WORK SUSPENDED UNTIL SUCH TIME AS THE ENGINEER IS ASSURED OF COMPLIANCE.

ITEM 202 - GUARDRAIL REMOVED
THIS ITEM SHALL INCLUDE BOTH STANDARD AND BARRIER TYPE RAILS INCLUDING ANCHOR ASSEMBLIES AND TERMINAL ASSEMBLIES.

PAVING UNDER GUARDRAIL
THIS OPERATION SHALL INCLUDE PREPARATION OF THE GRADED SHOULDER USING ITEM 203 - LINEAR GRADING, METHOD A AND PAVING UNDER THE GUARDRAIL USING ITEM 448 - ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22, UNDER GUARDRAIL.

ITEM 203 - LINEAR GRADING, METHOD A SHALL CONSIST OF EXCAVATING TOPSOIL AND PLACING MATERIAL AS SPECIFIED IN THE PLANS AND IN ACCORDANCE WITH THE FOLLOWING:

ALL COLLECTED DEBRIS AND TOPSOIL, INCLUDING RHIZOMES, ROOTS AND OTHER VEGETATIVE PLANT MATERIAL SHALL BE REMOVED AND DISPOSED OF AS SPECIFIED IN 203.05.

THE REMOVED MATERIAL SHALL BE REPLACED WITH MATERIAL AS DETAILED ON THE TYPICAL SECTIONS OR AS APPROVED BY THE ENGINEER.

ALL EQUIPMENT, MATERIALS AND LABOR REQUIRED TO PERFORM THE WORK

CALCULATED JEL CHECKED XXX

GENERAL NOTES

CUY-490-1.65

PAVING UNDER GUARDRAIL (CONTINUED)
OUTLINED ABOVE SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 203 - LINEAR GRADING, METHOD A.

PAVING UNDER GUARDRAIL SHALL CONSIST OF PLACING ITEM 448 TO THE DEPTH SPECIFIED USING ONE OF THE FOLLOWING METHODS:

METHOD A:
1. SET GUARDRAIL POSTS
2. PLACE ITEM 448

METHOD B:
1. PLACE ITEM 448
2. BORE ASPHALT AT POST LOCATIONS (MAY BE OMITTED OF STEEL POSTS ARE USED
3. SET GUARDRAIL POSTS
4. PATCH AROUND POSTS. THE MATERIALS USED FOR PATCHING SHALL BE A BITUMINOUS CONCRETE APPROVED BY THE ENGINEER. PATCHING AREAS SHALL BE COMPACTED USING EITHER HAND OR MECHANICAL METHODS. FINISHED SURFACES SHALL BE SMOOTH AND SLOPED TO DRAIN AWAY FROM THE POSTS.

ALL EQUIPMENT, MATERIALS, AND LABOR REQUIRED TO PERFORM THE WORK OUTLINED ABOVE, WITH THE EXCEPTION OF SETTING GUARDRAIL POSTS, SHALL BE INCLUDED FOR PAYMENT UNDER ITEM 448 - ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22, UNDER GUARDRAIL.

GUARDRAIL PROTECTION
NO SIGN SUPPORTS SHALL BE ERECTED BEFORE THE NECESSARY GUARDRAIL PROTECTION IS IN PLACE. SIMILARLY, EXISTING GUARDRAIL WHICH PROTECTS AN OBSTRUCTION OR SLOPE WHICH IS TO BE UPGRADED TO ELIMINATE GUARDRAIL, SHALL NOT BE REMOVED UNTIL THAT WORK HAS BEEN COMPLETED. EXISTING GUARDRAIL WHICH IS SCHEDULED TO BE REPLACED WITH TYPE 5 GUARDRAIL, SHALL NOT BE REMOVED UNTIL THE NEW GUARDRAIL IS READY TO BE INSTALLED, UNDER NO CIRCUMSTANCES SHALL ANY HAZARD BE WITHOUT GUARDRAIL PROTECTION FOR MORE THAN 24 HOURS. (SEE PUBLIC SAFETY NOTE ON SHEET 9)

LOCATION OF GUARDRAIL
THE LOCATIONS OF THE GUARDRAIL RUNS, AS SHOWN IN THESE PLANS ARE SUBJECT TO ADJUSTMENT PRIOR TO FINAL ACCEPTANCE. THE ENGINEER SHALL BE SATISFIED THAT ALL INSTALLATIONS WILL AFFORD MAXIMUM PROTECTION FOR TRAFFIC.

CONNECTION BETWEEN EXISTING AND PROPOSED GUARDRAIL
WHEN IT IS NECESSARY TO SPLICE PROPOSED GUARDRAIL TO EXISTING GUARDRAIL, ONLY THE EXISTING GUARDRAIL SHALL BE CUT, DRILLED OR PUNCHED. THE CONNECTION SHALL BE MADE USING A "W-BEAM RAIL SPLICE" AS SHOWN ON STANDARD CONSTRUCTION DRAWING GR-1.1M. PAYMENT SHALL BE INCLUDED IN THE CONTRACT PRICE FOR THE RESPECTIVE GUARDRAIL ITEMS.

TYPE 5A GUARDRAIL POST SPACING
WHEN THE OFFSET BETWEEN THE FACE OF THE GUARDRAIL AND BRIDGE PIERS, MAJOR SIGNS, SIGN SUPPORTS, OR OTHER FIXED OBSTACLES IS LESS THAN 5 FEET 6 INCHES THE GUARDRAIL SHALL BE STIFFENED BY PROVIDING 3 FEET 1.5 INCH POST SPACING FROM 12.5 FEET IN ADVANCE OF THE OBSTRUCTION TO ITS END, AS PER STANDARD DRAWING GR-2.1M. THE COST SHALL BE INCLUDED IN THE TYPE 5A UNIT BID PRICE.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED, AS DIRECTED BY THE ENGINEER, IN PLACE OF TYPE 5 GUARDRAIL, AS OUTLINED ABOVE:

ITEM 606 - GUARDRAIL, TYPE 5A	100 LIN.FT.

ITEM 606 - ANCHOR ASSEMBLY, TYPE E-98
SEE NOTES AND DETAILS ON SHEET 48 FOR THIS ITEM.

FENCE LENGTHS
THE LENGTHS OF FENCE SHOWN IN THE PLANS ARE HORIZONTAL DIMENSIONS. MEASUREMENTS OF THE FINAL QUANTITIES SHALL BE MADE IN ACCORDANCE WITH ITEM 607.

ITEM 202 - FENCE REMOVED, AS PER PLAN
ITEM 607 - FENCE, TYPE CLT
ITEM 607 - GATE, TYPE CL
THE FOLLOWING ESTIMATED QUANTITIES SHALL BE USED TO REMOVE THE EXISTING FENCE AND SUBSEQUENTLY REPLACE IT WITH TYPE CLT FENCE IN ITS CURRENT LOCATION.

THE LIMITS FOR THE REMOVAL AND REPLACEMENT FOR NORTHBOUND IR-77 ARE AFTER STA.. 63+00+/- (BROADWAY AVE BRIDGE OVER IR-77) TO STA. 88+00+/- (KINGSBURY RUN BRIDGE OVER RAILROAD YARDS) INCLUDING ALL INTERCHANGES AND OVERPASSES.

THE LIMITS FOR THE REMOVAL AND REPLACEMENT FOR SOUTHBOUND IR-77 ARE AFTER STA. 88+00+/- (KINGSBURY RUN BRIDGE OVER RAILROAD YARDS) UP TO STA. 63+00+/- (BROADWAY AVE BRIDGE OVER IR-77) INCLUDING ALL INTERCHANGES AND OVERPASSES.

THE LIMITS FOR THE REMOVAL AND REPLACEMENT FOR EASTBOUND IR-490 ARE AFTER STA. 1025+00+/- (BROADWAY AVE BRIDGE OVER IR-490) UP TO STA. 1062+00+/- (E. 55TH STREET) INCLUDING ALL INTERCHANGES AND OVERPASSES.

THE LIMITS FOR THE REMOVAL AND REPLACEMENT FOR WESTBOUND IR-490 ARE STA. 1062+00+/- (E. 55TH STREET) UP TO (BROADWAY AVE BRIDGE OVER IR-490) INCLUDING ALL INTERCHANGES AND OVERPASSES.

THE EXISTING FENCE QUANTITIES IN THESE PLANS WERE OBTAINED FROM ORIGINAL CONSTRUCTION PLANS. THIS INFORMATION MAY NOT REFLECT ACTUAL FIELD CONDITIONS AND WAS PROVIDED FOR BIDDING PURPOSES ONLY.

THE LIMITS OF THE FENCE REPLACEMENT ARE SUBJECT TO APPROVAL BY THE ENGINEER.

THE CONTRACTOR SHALL STAKE ALL HORIZONTAL DEFLECTION POINTS OF THE EXISTING FENCE DURING REMOVAL FOR USE WHEN LAYING OUT THE PROPOSED FENCE. STAKING OF DEFLECTION POINTS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 202 - FENCE REMOVED, AS PER PLAN.

THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM 202 - FENCE REMOVED, AS PER PLAN.	9236	LIN.FT.
ITEM 607 - FENCE, TYPE CLT.	9236	LIN.FT.
ITEM 607 - GATE, TYPE CL	5	EACH

REMOVAL OF EXISTING ITEMS
ALL 630 REMOVAL ITEMS NOT SPECIFICALLY INCLUDING STORAGE OR RE-ERECTION SHALL BECOME THE PROPERTY OF THE CONTRACTOR. REMOVAL AND DISPOSAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

SIGN LOCATIONS
SIGN LOCATIONS OF EXISTING AND PROPOSED SIGNS ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR PRIOR TO ERECTION OF ALL SIGN SUPPORTS SHALL STAKE THE PROPOSED LOCATION, INCLUDING OFFSET. OVERHEAD SUPPORT LOCATIONS SHALL ALSO INCLUDE FOUNDATION ELEVATIONS. THE ENGINEER SHALL APPROVE ALL SUPPORT LOCATIONS AND MAY ADJUST THE LOCATION TO CORRECT SLOPE AND SUBSURFACE DIFFICULTIES, SIGN SIGHT DISTANCE OBSTRUCTIONS, IMPROVE SAFETY AND ELIMINATE OVERHEAD OBSTACLES.

ITEM 202-RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN
RAISED PAVEMENT MARKERS SHALL BE REMOVED FROM THE ROADWAY IN A MANNER THAT PREVENTS DAMAGE TO THE CASTINGS. REMOVED MARKERS SHALL BE COLLECTED, STORED IN 55 GALLON DRUMS (WITH AMOUNT CLEARLY MARKED) AND THEN DELIVERED TO THE ODOT WARRENSVILLE YARD, 25609 EMERY RD., WARRENSVILLE HTS., OHIO 44128 (SR 175 AT INTERSECTION OF I-271 AND EMERY RD.), BY THE CONTRACTOR, AS DIRECTED BY THE ENGINEER. THE PROJECT ENGINEER SHALL GIVE THE WARRENSVILLE TRAFFIC DEPARTMENT (292-5801) 48 HOUR NOTICE PRIOR TO ANY DELIVERIES. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR FURNISHING ALL NECESSARY TRANSFER/RECEIVING DOCUMENTATION TO THE YARD. ALL COSTS ASSOCIATED WITH THE REMOVAL, STORAGE AND DELIVERY OF THESE MARKERS SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 202-RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN.

APPROXIMATELY 32 CASTINGS AND REFLECTORS OF THE FOLLOWING QUANTITY ARE BEING REMOVED FROM THE THE EXISTING LANE LINE IN THE LANE CLOSURE AREA AND ARE NOT TO BE PUT BACK

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN INCLUDED IN THE GENERAL SUMMARY TO BE USED THROUGHOUT THIS PROJECT:

ITEM 202 - RAISED PAVEMENT MARKERS REMOVED FOR STORAGE, AS PER PLAN.....170 EACH

RAISED PAVEMENT MARKERS
MATERIALS SUPPLIED BY THE DEPARTMENT
FOR THIS PROJECT THE RPM CASTINGS SUPPLIED BY ODOT WILL COME WITH REFLECTORS ATTACHED.
ALL MATERIALS ARE TO BE CONTRACTOR FURNISHED, EXCEPT THAT THE DEPARTMENT SHALL SUPPLY RPM MATERIALS IN THE QUANTITIES SHOWN HEREIN TO THE CONTRACTOR. PAY ITEMS FOR THE DEPARTMENT SUPPLIED. MATERIALS SHALL BE INDICATED AS "INSTALLATION ONLY". THE TYPE OF DEPARTMENT SUPPLIED MATERIAL SHALL BE RAISED PAVEMENT MARKER CASTINGS.

THE CONTRACTOR SHALL PICK UP THE DEPARTMENT SUPPLIED RPM MATERIALS AT THE OPI WAREHOUSE IN COLUMBUS, OHIO. (SEE SUPPLEMENT 1082) THE CONTRACTOR SHALL PICK UP DEPARTMENT SUPPLIED RPM MATERIALS AT THE SPECIFIED LOCATION(S) FOR TRANSPORT TO THE WORK SITE OR TO THE CONTRACTOR'S STORAGE FACILITY. THE RECYCLED RAISED PAVEMENT MARKER (RPM) AUTHORIZATION FORM IS TO BE SIGNED BY THE DISTRICT CONSTRUCTION ENGINEER PRIOR TO PICK UP OF THE RPMS. THE CONTRACTOR SHALL NOTIFY THE DISTRICT AND / OR THE PARTIES LISTED ON THE AUTHORIZATION FORM IN WRITING AT LEAST FIVE (5) CALENDAR DAYS PRIOR TO PICK UP OF THE DEPARTMENT SUPPLIED MATERIALS. THE CONTRACTOR SHALL STORE THE RPMS WITHOUT DAMAGE OR CONTAMINATION WITH FOREIGN MATTER. A DEDUCTION IN THE AMOUNT OF THE ACTUAL COST TO THE DEPARTMENT SHALL BE MADE FOR MATERIALS DAMAGED BY THE CONTRACTOR OR FOR CASTINGS RECEIVED BY THE CONTRACTOR WHICH WERE NOT INSTALLED AND WERE NOT RETURNED TO THE DEPARTMENT.

CALCULATED JEL CHECKED XXX

GENERAL NOTES

CUY-490-1.65

RETURN OF NON-PERFORMED RAISED PAVEMENT MARKER MATERIALS SUPPLIED BY THE DEPARTMENT

RAISED PAVEMENT MARKER MATERIALS SUPPLIED BY THE DEPARTMENT, THAT ARE NON-PERFORMED SHALL BE CAREFULLY RE-PACKED OR PACKED IN THE BOXES IN THE SAME STYLE AND QUANTITY AS ORIGINALLY RECEIVED FROM THE DEPARTMENT. CASTING STYLES SHALL NOT BE MIXED WITHIN ANY ONE CONTAINER. THE CONTRACTOR SHALL CLEARLY MARK ON THE OUTSIDE OF EACH CONTAINER THE STYLE OF CASTING. BOXES SHALL BE PLACED ON SKIDS OR PALLETS IN THE SAME STYLE (LOW PROFILE OR CONVENTIONAL, REFLECTORISED OR NON-REFLECTORISED) AND NO MORE THAN 420 RPMS (OR 21 BOXES) ON ONE SKID.
ONLY USE THE BOXES SUPPLIED BY THE RAISED PAVEMENT MARKER RECYCLER. BOXES MUST BE MARKED WITH THE RECYCLER'S PART OR CATALOG NUMBER AND THE PROJECT NUMBER. THE RECYCLER'S CATALOG OR PART NUMBERS MAY BE OBTAINED FROM THE OFFICE OF TRAFFIC ENGINEERING IN COLUMBUS, OHIO OR FROM THE RECYCLER. BOXES NOT MARKED WITH THE PROPER RECYCLER'S CATALOG OR PART NUMBERS, AND THE DEPARTMENT'S PROJECT NUMBER WILL NOT BE ACCEPTED AT THE RECYCLER'S WAREHOUSE. NON PERFORMED MATERIALS WILL BE RETURNED TO THE LOCATION AS SPECIFIED BY THE DISTRICT CONSTRUCTION ENGINEER WITHIN 30 DAYS OF THE COMPLETION OF THE PROJECT. THE ABOVE WORK INCLUDING ALL LABOR, EQUIPMENT AND MATERIAL NEEDED TO PERFORM THE WORK, SHALL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE PAY ITEM.
IF THE DEPARTMENT HAS TO REPACKAGE THE RPMS CORRECTLY, THE CONTRACTOR WILL BE ASSESSED THE ACTUAL COST FOR REPACKAGING THE MATERIALS BY THE DEPARTMENT'S FORCES.

LOADING OF MATERIALS SUPPLIED BY THE DEPARTMENT AT THE RECYCLER'S WAREHOUSE
TRUCKS SHALL HAVE A LOADING HEIGHT OF 48 INCHES AND BE ABLE TO BACK UP FLUSH TO THE LOADING DOCK. TRUCKS SHALL NOT HAVE ANY OBSTRUCTIONS OR PROTRUSIONS THAT PREVENT THE LOADING BY A STANDARD FORKLIFT OR LIFT TRUCK.
SEMI TRUCKS OR 20 FOOT COMMERCIAL TRUCKS ARE THE MOST APPROPRIATE TRUCKS FOR LOADS IN EXCESS OF 4 PALLETS (ONE PALLET = 21 BOXES = 2100 LBS).
STAKE BODY TRUCKS ARE APPROPRIATE TO LOAD LESS THAN 4 PALLETS, PROVIDED THE TRUCK IS RATED FOR THE LOAD AND THE LOAD CAN BE SAFELY SECURED FOR TRANSPORT BY CHAINING OR STRAPPING DOWN AS NEEDED.
PICKUP TRUCKS ARE APPROPRIATE FOR LOADS OF APPROXIMATELY ONE PALLET, PROVIDED THE PICKUP TRUCK IS RATED FOR THE LOAD AND THE LOAD CAN BE SAFELY SECURED FOR TRANSPORT.
DUMP TRUCKS, TILT BED TRUCKS, AND NON COMMERCIAL MOVING VANS WILL NOT BE LOADED BY THE RECYCLERS WAREHOUSE.
THE WAREHOUSE SUPERVISOR WILL REFUSE TO LOAD ANY TRUCK THAT IS UNSAFE TO LOAD OR UNSUITABLE FOR THE LOAD BEING PLACED ON THE TRUCK.
THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY. THE CONTRACTOR SHALL INSTALL RECYCLED RAISED PAVEMENT MARKERS WITH PRISMATIC REFLECTORS:

ITEM 621-RAISED PAVEMENT MARKER, INSTALLATION ONLY. . . . . 142 EACH

SHOULDER RUMBLE STRIPS

THE FOLLOWING QUANTITY HAS BEEN PROVIDED TO INSTALL RUMBLE STRIPS ON THE OUTSIDE SHOULDER OF I-490 WESTBOUND FROM STATION 1021+75 TO STATION 1040+50. THESE RUMBLE STRIPS ARE INTENDED TO REINFORCE THE REVISED TRAFFIC CONTROL PATTERN IMPLEMENTED AS PART OF THIS PROJECT.

618, RUMBLE STRIPS, TYPE 2 (CONCRETE) . . . . . 1875 LIN. FT.

ITEM SPECIAL - DISCONNECT EXISTING CIRCUIT

THIS ITEM OF WORK SHALL CONSIST OF THE DISCONNECTION OF AN EXISTING LIGHT CIRCUIT AT A PULL BOX OR A LIGHT POLE OR JUNCTION BOX.

DISCONNECTION AT A PULL BOX SHALL INVOLVE CUTTING THE EXISTING CIRCUIT AND REMOVING ALL SPLICE KITS. ANY CABLE THAT IS TO BE ABANDONED SHALL BE TERMINATED IN A MANNER SUCH THAT NO CABLE IS LEFT REMAINING IN THE PULL BOX.

DISCONNECTION AT A LIGHT SHALL INVOLVE THE REMOVAL OF THE PART OF CABLE THAT IS TO BE ABANDONED FROM THE POLE. THOSE ENDS OF THE CONNECTOR KITS FROM WHICH THE ABANDONED CABLE IS REMOVED SHALL BE PLUGGED AND TAPED.

DISCONNECTION AT A MEDIAN JUNCTION BOX OR AT A MEDIAN MOUNTED LIGHT POLE SHALL INVOLVE THE CUTTING OF THE EXISTING CIRCUIT(S) AND THE REMOVING OF ALL CONNECTOR KITS.

ANY CABLE THAT IS TO BE REUSED IN A PULL BOX OR LIGHT POLE OR JUNCTION BOX SHALL BE CUT IN A MANNER SO THAT THERE IS SUFFICIENT LENGTH OF CABLE LEFT FOR RE-CONNECTION. CABLE SPLICE KITS AND CONNECTOR KITS WILL BE PAID FOR RESPECTIVELY UNDER EACH ITEM 625.

A CIRCUIT MAY REQUIRE CUTTING AND/OR DISCONNECTING AT VARIOUS LOCATIONS ALONG THE CIRCUIT WHETHER AT A LIGHT POLE, JUNCTION BOX OR PULL BOX. WHEN A CIRCUIT IS INITIALLY DISCONNECTED, PAYMENT FOR DISCONNECTION OF THAT CIRCUIT SHALL INCLUDE ALL OTHER DISCONNECTIONS AT VARIOUS LOCATIONS WITHIN THAT PARTICULAR CIRCUIT.

PAYMENT WILL BE MADE AT THE UNIT BID PRICE FOR EACH ITEM SPECIAL "DISCONNECT EXISTING CIRCUIT" AND SHALL BE FULL COMPENSATION INCLUDING ALL LABOR, MATERIALS, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK.

THIS ITEM IS PROVIDED AS A CONTINGENCY ITEM IN CASE THE EXISTING CIRCUITRY IS IN CONFLICT WITH THE PROPOSED WORK.

THE FOLLOWING ITEMS ARE PROVIDED FOR THIS WORK:

ITEM 202 - DISCONNECT EXISTING CIRCUIT	4	EA.
ITEM 625 - CONNECTOR KIT, TYPE II	5	EA.
ITEM 625 - CONNECTOR KIT, TYPE III	5	EA.
ITEM 625 - CABLE SPLICING KIT	10	EA.
ITEM 625 - 1-1/2" DUCT CABLE WITH TWO NO. 4, AWG 5000 VOLT CABLES	525	FT.
ITEM 625 - 1-1/2" DUCT CABLE WITH TWO NO. 2, AWG 5000 VOLT CABLES	525	FT.
ITEM 625 - TRENCH, 24" DEEP	1000	FT.

LIGHTING PLANS FOR EXISTING LIGHTING

THE LIGHTING PLANS FOR THE EXISTING LIGHTING CIRCUITS ARE ON FILE AT ODOT DISTRICT 12, GARFIELD HEIGHTS.

AT LEAST SEVEN WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS IN AN AREA WHICH MAY INVOLVE UNDERGROUND UTILITIES, THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND THE REGISTERED UTILITY PROTECTION SERVICE. THE OWNER OF THE UNDERGROUND UTILITY FACILITY SHALL, WITHIN FORTY-EIGHT HOURS, EXCLUDING SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS, AFTER NOTICE IS RECEIVED, STAKE, MARK, OR OTHERWISE DESIGNATE THE LOCATION OF THE UNDERGROUND UTILITY FACILITIES IN THE CONSTRUCTION AREAS IN SUCH A MANNER AS TO INDICATE THEIR COURSE TOGETHER WITH THE APPROXIMATE DEPTH AT WHICH THEY WERE INSTALLED.

THE LOCATION AND MARKINGS SHALL BE COORDINATED TO STAY APPROXIMATELY TWO DAYS AHEAD OF THE PLANNED CONSTRUCTION.
ATTN: BRYAN KRALL, DISTRICT LIGHTING SUPERVISOR
O.D.O.T. DISTRICT 12
RIVEREDGE MAINTENANCE YARD
(216) 676-5295

CALCULATED JEL CHECKED XXX

GENERAL NOTES

CUY-490-1.65

MAINTENANCE OF TRAFFIC

PUBLIC SAFETY
THE FOLLOWING PROVISIONS "A", "B",AND "C" SHALL APPLY WHEN THE LANE ADJACENT TO THE GUARDRAIL IS OPEN TO TRAFFIC:

THE PERIOD OF TIME THAT A HAZARD IS LEFT UNPROTECTED BY THE REMOVAL OF GUARDRAIL SHALL BE HELD TO AN ABSOLUTE MINIMUM AND IN NO CASE SHALL SUCH A PERIOD BE LONGER THAN ONE WORKING DAY. IF, AFTER ONE DAY, THE ENTIRE RUN OF GUARDRAIL CONSTRUCTION IS NOT COMPLETE THE FOLLOWING SHALL APPLY:

A.
IN AREAS WHERE EXISTING GUARDRAIL HAS BEEN REMOVED OR THE GUARDRAIL IS IN A PARTIAL STAGE OF COMPLETION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN DRUMS WITHIN THE LIMITS OF THE UNPROTECTED AREA. THE DRUMS SHALL BE PLACED AT 50' INTERVALS AND OFFSET AT LEAST TWO FEET FROM THE EDGE OF THE TRAVELED ROADWAY AND IN CLOSE PROXIMITY TO THE CONSTRUCTION. THE APPROACH END OF A PARTIALLY COMPLETED RUN OF GUARDRAIL SHALL BE FASTENED AT GROUND LEVEL TO A STEEL DRUM.

B.
DURING THE REPAIR OF WINGWALL PARAPETS OR IF THE EXISTING GUARDRAIL IS FOR THE PROTECTION OF AN OBSTACLE (I.E. SIGN SUPPORT, BRIDGE PARAPET, ETC.) THE CONTRACTOR SHALL ERECT PORTABLE CONCRETE BARRIER IN THE DIRECTION OF TRAFFIC. THE REQUIREMENTS OF PARAGRAPH "A" SHALL APPLY TO THE REMAINING GUARDRAIL WITHIN THE RUN. TEMPORARY BARRIER SHALL BE FLARED AT A 13:1 (MINIMUM) TAPER RATE AND SHALL INCLUDE A TEMPORARY END TERMINAL AS PER RM-4.2M.

C.
THE REQUIREMENTS STATED IN "A" SHALL APPLY FOR A PERIOD NOT TO EXCEED ONE WEEK. WHERE THE REBUILDING OR CONSTRUCTION OF ANY RUN OF GUARDRAIL CANNOT BE ACCOMPLISHED WITHIN ONE WEEK. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY CONCRETE BARRIER IN THE INTERIM TIME IT TAKES TO COMPLETE THE WORK THE APPROACH END OF THE PORTABLE CONCRETE BARRIER SHALL BE BE FLARED 10 FEET, (130 FEET @ 13:1 TAPER) AND SHALL INCLUDE A TEMPORARY END TERMINAL AS PER RM-4.2M. IN ADDITION, A TYPE II BARRICADE WITH TYPE B (HIGH INTENSITY FLASHER) WARNING LIGHT SHALL BE PLACED IN FRONT OF THIS INITIAL SECTION OF TEMPORARY BARRIERS TO PROVIDE FOREWARNING TO THE APPROACHING TRAFFIC.

WHEN THE LANE ADJACENT TO THE GUARDRAIL IS CLOSED TO TRAFFIC THE PROVISIONS OF PARAGRAPH "A" ABOVE SHALL APPLY AFTER 1 DAY. THE PROVISIONS OF PARAGRAPH "B" ABOVE SHALL APPLY AFTER 10 DAYS AND THE PROVISIONS OF PARAGRAPH "C" ABOVE SHALL APPLY AFTER 15 DAYS.

THE TERM "GUARDRAIL" AS USED HEREIN SHALL BE UNDERSTOOD TO COVER ALL TYPES OF GUARDRAIL, EXISTING OR PROPOSED FOR THE PROJECT, INCLUDING BARRIER DESIGN GUARDRAIL, BRIDGE WINGWALL PARAPETS, AND CONCRETE BARRIER.

THE COST OF COMPLYING WITH THESE SAFETY PROCEDURES SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 614, MAINTAINING TRAFFIC.

ITEM 614 - MAINTAINING TRAFFIC
GENERALLY THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS AS TO MAKE THE PROPOSED REPAIR WITH A MINIMUM OF HAZARD, DELAY AND INCONVENIENCE TO THE MOTORISTS USING THE HIGHWAY AFFECTED BY THE WORK DONE UNDER THIS CONTRACT: FURTHERMORE, IN ADDITION TO THE CONSTRUCTION AND MATERIAL SPECIFICATIONS, THE FOLLOWING SPECIFIC PROVISIONS ARE MANDATORY.

I. GENERAL

A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION SHALL BE MAINTAINED AT ALL TIMES, EXCEPT, WHEN THROUGH TRAFFIC MAY BE DETOURED AS DESCRIBED IN THE RAMP E-N AND RAMP N-E CLOSURE NOTES. LIQUIDATED DAMAGES SHALL BE ASSESSED AS DETAILED IN THE CLOSURE NOTES FOR EACH CALENDAR DAY THE ROADWAY REMAINS CLOSED TO TRAFFIC BEYOND THE SPECIFIED LIMIT.

ALL EXISTING LANES SHALL BE OPEN TO TRAFFIC BETWEEN NOVEMBER 15 AND APRIL 15 . NOVEMBER 15 SHALL BE CONSIDERED TO CONSTITUTE AN INTERIM COMPLETION DATE AND LIQUIDATED DAMAGES SHALL BE ASSESSED IN ACCORDANCE WITH 108.07 FOR EACH CALENDAR DAY THAT ALL LANES ARE NOT OPEN AND AVAILABLE TO TRAFFIC.

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 FOR USE AS DIRECTED BY THE ENGINEER FOR THE MAINTENANCE OF TRAFFIC.

642,	REMOVAL OF PAVEMENT MARKING	8800 L.F.
614,	WORK ZONE MARKING SIGN	40 EACH
410,	TRAFFIC COMPACTED SURFACE, TYPE A OR B	20 CU. YD.
410,	TRAFFIC COMPACTED SURFACE, TYPE C	20 CU. YD.
614,	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC	20 CU. YD.
616,	CALCIUM CHLORIDE	1 TON
616,	WATER	10 M. GAL.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 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 614, MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

II. NOTIFICATION

SINCE FUNCTIONAL TRAFFIC CONTROL IS A MAJOR CONCERN ON THIS PROJECT, IT IS ESSENTIAL THAT THE MOTORING PUBLIC BE ADEQUATELY FOREWARNED OF FUTURE LANE CLOSURES AND TRAFFIC CONSTRICTIONS. THEREFORE, THE CONTRACTOR SHALL SUBMIT A WRITTEN SCHEDULE TO THE ENGINEER, RESPONSIBLE LAW ENFORCEMENT AGENCIES, AND THE ODOT PUBLIC INFORMATION OFFICE (216-581-2333 EXT 244) INDICATING THE LOCATIONS AND DATES OF THE LANE CLOSURES AT LEAST 3 DAYS PRIOR TO THE IMPLEMENTATION OF ANY SUCH CLOSURES.

III. NIGHTTIME WORK (THE HOURS FROM SUNSET TO SUNRISE 7:00 PM - 6:00 AM)

NIGHTTIME WORK SHALL BE PERMITTED IN ACCORDANCE WITH THESE PLANS AND NOTES. THE CONTRACTOR SHALL PROVIDE FLOOD LIGHTING OF THE WORK AREA IN ORDER TO ASSURE THE SAFEST CONDITIONS DURING NIGHTTIME WORK. LIGHTING PLAN FOR NIGHT-TIME OPERATIONS SHALL BE PRESENTED TO AND APPROVED BY THE ENGINEER.

IV. RESTRICTIONS

SEE "PARAMETERS FOR MAINTAINING TRAFFIC CONTROL" NOTE ON SHEET 10.

V. MAINTENANCE OF TRAFFIC SYSTEMS
A. WHEN REQUIRED

WHENEVER ANY PART OF THE TRAVELED SURFACE IS BEING WORKED UPON OR IS OTHERWISE NOT SUITABLE FOR SAFE AND CONVENIENT USE BY VEHICLES, TRAFFIC CONTROL DEVICES SUFFICIENT TO PROTECT SUCH AREAS TO ASSURE THE SAFE AND CONVENIENT PASSAGE OF VEHICULAR TRAFFIC SHALL BE INSTALLED AND MAINTAINED. SUCH TRAFFIC CONTROL DEVICES AND THE MANNER IN WHICH THEY ARE USED SHALL BE CONSISTENT WITH THESE PLANS AND THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, HEREINAFTER REFERRED TO AS THE "MANUAL".

THE TRAFFIC CONTROL DEVICE SYSTEM SHALL CONSTITUTE THE MINIMUM PROVISIONS FOR TRAFFIC CONTROL FOR EACH PARTICULAR SITUATION. WHENEVER THE ENGINEER DEEMS IT NECESSARY ESPECIALLY WHERE A GRADE, CURVE, OR MERGE CONDITIONS EXISTS, HE MAY DIRECT THAT ADDITIONAL OR ALTERNATIVE DEVICES BE USED.

B. CONDITIONS
DURING ALL PARTS OF THIS PROJECT, SIGNING, BARRICADES, FLASHING ARROWS, ETC. SHALL BE LOCATED AS INDICATED IN THE MANUAL.

C. ADVANCE WARNING SIGNS
ALL ADVANCE WARNING SIGNS FOR ANY CONDITION WHICH RESTRICTS TRAFFIC SHALL BE ERECTED BEFORE ANY SUCH RESTRICTION IS PUT INTO EFFECT. ALL SUCH SIGNS SHALL BE COVERED OR REMOVED FROM THE VIEW OF TRAFFIC WHENEVER THEY ARE NOT APPLICABLE.

D. FLASHING ARROW REQUIREMENT
WHENEVER ANY PART OF THE TRAVELED SURFACE IS CLOSED, THE MOTORISTS SHALL BE WARNED AND DIRECTED BY THE CONTRACTOR THROUGH THE USE OF ONE FLASHING ARROW FOR EACH LANE CLOSED. ADDITIONALLY, THE PROVISIONS SET FORTH IN THE "MANUAL" AND THE APPLICABLE STANDARD CONSTRUCTION DRAWINGS SHALL BE MET.

E. PROTECTION OF PUBLIC
PERSONAL CARS SHALL NOT BE PARKED WITHIN THE L/A.

F. FAILURE TO COMPLY
IF THERE IS ANY FAILURE TO COMPLY WITH PROVISIONS FOR TRAFFIC CONTROL SET OUT IN THESE PLANS AND NOTES, OR WITH THE PROVISIONS OF THE "MANUAL", THE HIGHWAY IN THE VICINITY OF THE WORK AREA SHALL NOT BE CONSIDERED IN A CONDITION FOR THE SAFE AND CONVENIENT USE BY THE TRAVELING PUBLIC. ANY FAILURE TO KEEP THE HIGHWAY, IN THE VICINITY OF THE WORK AREA, IN A CONDITION FOR THE SAFE AND CONVENIENT USE BY THE TRAVELING PUBLIC SHALL BE CONSIDERED A BREACH OF THIS CONTRACT. WORK SHALL BE SUSPENDED UNTIL THE CONTRACTOR COMPLIES WITH THE PROVISIONS OF THE AFOREMENTIONED ITEMS.

VI. MAINTENANCE OF TRAFFIC MATERIALS

A. SIGNS
SIGN DIMENSIONS AND SPECIFICATIONS, INCLUDING LETTER SIZES SHALL BE AS PROVIDED IN THE "MANUAL", OR IN DESIGN DRAWINGS PROVIDED BY THE DEPARTMENT OF TRANSPORTATION. THE SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER PRIOR TO THE START OF THE PROJECT.

WHERE DIRECTED BY THE ENGINEER OR WHERE THE PLANS CALL FOR A PERMANENT SIGN TO BE COVERED, THE CONTRACTOR SHALL DO SO IN SUCH A MANNER AS TO AVOID DAMAGING THE PERMANENT SIGN WHEN THE COVER IS REMOVED. THE COVER SHALL BE TOTALLY OPAQUE. THE USE OF ADHESIVE TAPE APPLIED DIRECTLY TO A SIGN FACE IS STRICTLY PROHIBITED.

B. SIGN SUPPORTS
SIGN SUPPORTS SHALL BE OF SUFFICIENT SIZE AND HEIGHT AS TO SUPPORT THE SIGNS AT THE APPROPRIATE HEIGHT. SUPPORTS SHALL BE ADEQUATE IN MASS AND STABILITY TO PREVENT THE SIGNS FROM BEING BLOWN OVER BY WIND OR VEHICULAR GENERATED AIR TURBULENCE.

C. FLASHING ARROWS
WHENEVER ANY PART OF THE TRAVELED SURFACE IS CLOSED, THE MOTORIST SHALL BE WARNED AND DIVERTED BY THE CONTRACTOR THROUGH THE USE OF ONE FLASHING ARROW BARRICADE FOR EACH LANE CLOSED. THE CONTRACTOR SHALL REFER TO STANDARD CONSTRUCTION DRAWING MT-35.10M AND THE PROVISIONS SET FORTH IN THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS FOR ALL INFORMATION REGARDING FURNISHING, MAINTAINING, AND USE OF FLASHING ARROW BARRICADES.

WHEN FLASHING ARROW PANELS ARE REQUIRED, SOLAR, ELECTRIC, OR BATTERY POWERED EQUIPMENT SHALL BE EXCLUSIVELY UTILIZED WHEN LOCATED WITHIN 300 FEET OF ANY RESIDENCE. DIESEL OR GASOLINE POWERED GENERATORS SHALL NOT BE PERMITTED IN THESE AREAS EXCEPT WHEN USED INTERMITTENTLY FOR THE SOLE PURPOSE OF CHARGING INTERNAL BATTERIES WHICH PROVIDE THE PRIMARY POWER FOR THE EQUIPMENT.

PAYMENT FOR THE ABOVE SHALL BE INCLUDED IN THE LUMP SUM BID FOR ITEM 614-MAINTAINING TRAFFIC.

D. DRUMS
DRUMS SHALL BE IN ACCORDANCE WITH PERTINENT SECTIONS OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. ALL COSTS FOR INSTALLING, MAINTAINING AND SUBSEQUENT REMOVAL OF SAID DRUMS SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 614- MAINTAINING TRAFFIC.

E. FLASHERS
FLASHERS SHALL BE 12 VOLT BATTERY-OPERATED MODELS WITH 7 INCH DIAMETER YELLOW LENSES ILLUMINATED BY RAPID INTERMITTENT FLASHERS OF SHORT DURATION AND SHALL BE PLACED ON ALL SIGNS AT ALL TIMES.

VII. PAYMENT

PAYMENT FOR PROVIDING, ERECTING, MAINTAINING AND REMOVING TEMPORARY MAINTENANCE OF TRAFFIC CONTROL DEVICES SHALL BE MADE UNDER THE LUMP SUM PRICE BID FOR ITEM 614 - MAINTAINING TRAFFIC.

PARAMETERS FOR MAINTAINING TRAFFIC CONTROL

1. IT IS THE INTENTION TO PERFORM THE REQUIRED WORK WITH THE LEAST INCONVENIENCE TO, AND THE MAXIMUM SAFETY TO THE CONTRACTOR AND THE TRAVELING PUBLIC. ANY VARIANCES FROM THESE MAINTENANCE OF TRAFFIC NOTES MUST BE APPROVED IN ADVANCE BY ODOT EXCEPT AS MODIFIED BELOW OR AS SHOWN IN THE MAINTENANCE OF TRAFFIC PLANS. THE REQUIREMENTS FOR MAINTAINING TRAFFIC AS INDICATED IN THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, CURRENT EDITION WITH LATEST REVISIONS, APPLICABLE STANDARD DRAWINGS AND PERTINENT ITEMS OF THE SPECIFICATIONS AND PROPOSAL SHALL APPLY.

2. THE CONTRACTOR SHALL ARRANGE HIS OPERATIONS SO AS TO PREVENT ANY INTERFERENCE TO THE CONTINUOUS FLOW OF TRAFFIC. ALL VEHICLES, EQUIPMENT, MEN AND THEIR ACTIVITIES ARE RESTRICTED AT ALL TIMES TO ONE SIDE OF THE PAVEMENT. VEHICLE AND EQUIPMENT SHALL NOT PARK OR STOP EXCEPT WITHIN DESIGNATED WORK AREAS, AND SHALL ENTER AND LEAVE WORK AREAS IN A MANNER WHICH WILL NOT BE HAZARDOUS TO, OR INTERFERE WITH THE NORMAL TRAFFIC FLOW. PERSONAL VEHICLES WILL NOT BE PERMITTED TO PARK WITHIN THE RIGHT OF WAY EXCEPT IN SPECIFIC AREAS AS DESIGNATED BY THE ENGINEER.

3. A "ROAD CONSTRUCTION AHEAD" SIGN (OW-128) SHALL BE PLACED ON ALL RAMPS APPROACHING THE WORK AREAS. THERE SHALL BE AVAILABLE ON THE JOB, AT ALL TIMES, SPECIAL BLACK AND ORANGE "WATCH FOR STOPPED TRAFFIC" SIGNS (OW-166 48" X 48") WITH TYPE A FLASHING WARNING LIGHTS ON TOP. THERE SHALL BE TWO FOR EACH DIRECTION OF TRAFFIC. THESE SIGNS SHALL BE MOUNTED ON A PORTABLE BARRICADE AND ARE TO BE USED IN THE EVENT THAT TRAFFIC BACKS UP. THEY SHALL BE LOCATED APPROXIMATELY 1300 FT. IN ADVANCE OF THE BACKUP AND WILL BE MOVED BACK AS THE BACKUP INCREASES.

4. IN ANY INSTANCE WHERE EITHER THE ACCELERATION LANE OR THE DECELERATION LANE IS SHORTENED OR OBSTRUCTED DUE TO WORK AND/OR STANDARD LANE CLOSURES, SUCH WORK SHALL BE COMPLETED "AS SOON AS POSSIBLE" SO AS TO PERMIT THE LANE CLOSURES TO BE MOVED TO A LOCATION WHERE SAID ACCELERATION OR DECELERATION LANES ARE NO LONGER SHORTENED.

5. ONE 11' LANE(MINIMUM) SHALL BE MAINTAINED ON ALL ROADWAYS.

6. CHANGES IN TRAFFIC PATTERNS WILL NOT BE PERMITTED BETWEEN THE HOURS OF 6:00 A.M. TO 9:00 A.M., AND 3:00 P.M. TO 6:00 P.M. ON ANY WEEKDAY.

7. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE USED AS REQUIRED FOR THE PURPOSE OF ADVANCED WARNING.

8. BERMS AND SHOULDER AREAS MAY BE USED TO MAINTAIN TRAFFIC, IF APPROVED.

9. ALL OPERATIONS AFFECTING THE FLOW OF TRAFFIC SHALL BE RESTRICTED TO ONE SIDE OF DIRECTIONAL LANES UNLESS OTHERWISE APPROVED.

10. ALL NECESSARY TEMPORARY AN/OR PAVEMENT SIGNING AND PAVEMENT MARKING SHALL BE IN PLACE PRIOR TO REOPENING PAVEMENT TO TRAFFIC.

11. THE ADVISORY SPEED SHALL BE 50 MPH ON MAINLINE PAVEMENT.

12. A TAPERED END SECTION SHALL BE INSTALLED AT THE LEADING EDGE OF ALL PORTABLE CONCRETE BARRIER RUNS.

PROPOSED CONSTRUCTION SEQUENCE

THE FOLLOWING IS A GENERAL DESCRIPTION OF THE WORK AND PROPOSED MAINTENANCE OF TRAFFIC SCHEME FOR EACH MAJOR CONSTRUCTION PHASE SHOWN IN THESE PLANS:

PHASE 1
490
M.O.T. CLOSE MEDIAN LANE(S) OF 490.
MAINTAIN 1-12' LANE IN EACH DIRECTION USING THE OUTER LANE AND SHOULDER.
WORK BUILD MEDIAN LANE(S)
RAMP S-E/N-E
M.O.T. SHIFT TRAFFIC TO LEFT SIDE OF RAMP PAVEMENT.
MAINTAIN 1-12' LANE.
WORK CONSTRUCT RIGHT-HALF OF RAMP S-E AND RIGHT SHOULDER.

PHASE 2
490
M.O.T. MAINTAIN 1-12' LANE IN EACH DIRECTION USING THE MEDIAN SHOULDER AND NEW MEDIAN LANE CONSTRUCTED IN PHASE 1. SHOULDER RUMBLE STRIPS SHALL BE FILLED USING 614, BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC, AS PER PLAN.
WORK BUILD OUTER LANE(S) AND SHOULDER.
RAMP S-E/N-E
M.O.T. MAINTAIN 1-12' LANE USING THE NEW PAVEMENT AND SHOULDER CONSTRUCTED IN PHASE 1. RAMP N-E WILL REQUIRE CLOSURE TO TRAFFIC; SEE "RAMP N-E CLOSURE" NOTE ON SHEET 12.
WORK BUILD LEFT-HALF OF RAMP S-E AND LEFT SHOULDER.
RAMP E-N/E-S
M.O.T. CLOSE LEFT LANE. MAINTAIN 1-12' LANE OF TRAFFIC USING THE RIGHT LANE AND SHOULDER.
WORK BUILD LEFT LANE AND SHOULDER

PHASE 3A
RAMP E-N/E-S
M.O.T. MAINTAIN 1-12' LANE USING THE NEW PAVEMENT AND SHOULDER CONSTRUCTED IN PHASE 2. CLOSE RAMP E-N; SEE "RAMP E-N CLOSURE" NOTE ON SHEET 12.
WORK BUILD RIGHT-HALF OF RAMP E-S FROM ABOUT STA. 3+00 TO STA. 4+98. BUILD RAMP E-N FROM ABOUT STA. 16+00 TO STA. 17+92.61.

PHASE 3B
RAMP E-N/E-S
M.O.T. MAINTAIN TRAFFIC PATTERN ESTABLISHED IN PHASE 3A, EXCEPT, OPEN RAMP E-N TO TRAFFIC USING THE NEW PAVEMENT CONSTRUCTED IN PHASE 3A.
WORK BUILD RIGHT-HALF OF RAMP E-N/E-S AND SHOULDER FROM STA. 9+13.57 TO ABOUT STA. 16+00.

ITEM SPECIAL - REPLACEMENT SIGN
FLAT SHEET SIGNS FURNISHED BY THE CONTRACTOR IN ACCORDANCE WITH THE REQUIREMENTS OF THE PLANS, SPECIFICATIONS AND PROPOSAL WHICH BECOME DAMAGED BY TRAFFIC FOR REASONS BEYOND THE CONTROL TO THE CONTRACTOR SHALL BE REPLACED IN KIND WHEN ORDERED BY THE ENGINEER. REPLACEMENT SIGNS SHALL BE NEW. OTHER MATERIALS MAY BE IN USED BUT GOOD CONDITION SUBJECT TO APPROVAL BY THE ENGINEER. PAYMENT FOR THE NEW SIGNS SHALL BE MADE AT THE CONTRACT PRICE PER SQUARE METER FOR ITEM SPECIAL, REPLACEMENT SIGN, AND SHALL INCLUDE THE COST OF REMOVING AND DISPOSING OF DAMAGED SIGNS, HARDWARE AND SUPPORTS, AND PROVIDING THE NECESSARY REPLACEMENT HARDWARE, SUPPORTS, ETC. AN ESTIMATED QUANTITY OF 50 SQUARE FEET HAS BEEN PROVIDED IN THE GENERAL SUMMARY.

REPLACEMENT DRUM
DRUMS FURNISHED BY THE CONTRACTOR IN ACCORDANCE WITH THE REQUIREMENTS OF THE PLANS, SPECIFICATIONS AND PROPOSAL WHICH BECOME DAMAGED BY TRAFFIC FOR REASONS BEYOND THE CONTROL OF THE CONTRACTOR SHALL BE REPLACED IN KIND WHEN ORDERED BY THE ENGINEER. REPLACEMENT DRUMS SHALL BE NEW. PAYMENT FOR THE NEW DRUMS SHALL BE INCLUDED UNDER THE LUMP SUM BID FOR ITEM 614-MAINTAINING TRAFFIC, AND SHALL INCLUDE THE COST OF REMOVING AND DISPOSING OF THE DAMAGED DRUM, AND PROVIDING AND MAINTAINING THE REPLACEMENT DRUM IN ACCORDANCE WITH THE CONTRACT REQUIREMENTS FOR THE ORIGINAL DRUM.

CALCULATED JEL CHECKED GSS

MAINTENANCE OF TRAFFIC NOTES

CUY-490-1.65

ITEM 614 - WORK ZONE SPEED LIMIT SIGN
THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN, COVER DURING SUSPENSION OF WORK, AND SUBSEQUENTLY REMOVE WORK ZONE SPEED LIMIT SIGNS AND SUPPORTS (R-10) (50 SPEED LIMIT) WITHIN THE WORK LIMITS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS. THE CONTRACTOR SHALL COVER OR REMOVE ANY EXISTING SPEED LIMIT OR MINIMUM SPEED SIGNS WITHIN THE REDUCED SPEED ZONE. THESE SIGNS SHALL BE RESTORED DURING SUSPENSION OR TERMINATION OF THE REDUCED SPEED LIMIT. THE EXPENSE OF COVERING OR REMOVAL AND RESTORATION OF EXISTING SPEED LIMIT OR MINIMUM SPEED SIGNS SHALL BE INCLUDED IN THE PAY ITEM FOR THE WORK ZONE SPEED LIMIT SIGNS. THE WORK ZONE SPEED LIMIT SIGNS MAY BE ERECTED OR UNCOVERED NO MORE THAN 4 HOURS BEFORE THE ACTUAL START OF WORK. THE SIGNS SHALL BE REMOVED OR COVERED NO LATER THAN 4 HOURS FOLLOWING RESTORATION OF ALL LANES TO TRAFFIC WITH NO RESTRICTIONS, OR SOONER AS DIRECTED BY THE ENGINEER. (THE CONTRACTOR SHALL ERECT A WORK ZONE SPEED LIMIT SIGN IN ADVANCE OF ANY LANE RESTRICTION EXPECTED TO LAST AT LEAST 30 DAYS, OR AS DIRECTED BY THE ENGINEER. THE SIGN SHALL BE MOUNTED ON BOTH SIDES OF DIVIDED HIGHWAYS, 500 FEET IN ADVANCE OF THE LANE REDUCTION TAPER. THE SIGN SHALL BE MOUNTED ON THE RIGHT SIDE, 250 FEET IN ADVANCE OF THE LANE REDUCTION TAPER ON UNDIVIDED HIGHWAYS. THE SIGN SHALL BE REPEATED, ON THE SIDE NEAREST TRAFFIC, EVERY 1 MILE FOR 55 MPH ZONES AND EVERY ½ MILE FOR 50 MPH ZONES. THESE SIGNS SHALL ALSO BE ERECTED IMMEDIATELY AFTER EACH OPEN ENTRANCE RAMP WITHIN THE ZONE.) A SIGN(S) TO INDICATE THE RESUMPTION OF THE STATURORY SPEED LIMIT SHALL BE ERECTED AT THE END OF ANY REDUCED SPEED ZONE. R-10 SIGNS (SPEED LIMIT)SHALL BE USED ON UNDIVIDED ROADWAY. R-10 (SPEED LIMIT) AND R-9A SIGNS (SPEED LIMIT) SHALL BE USED ON DIVIDED ROADWAYS. WHEN USED THE R-10 AND R-9A SIGNS SHALL BE MOUNTED SIDE-BY-SIDE ON SEPARATE SUPPORTS. THE CONTRACTOR MAY USE SIGNS AND SUPPORTS IN USED BUT GOOD CONDITION PROVIDED THE SIGNS MEET CURRENT ODOT SPECIFICATIONS. SIGN FACES SHALL BE REFLECTORIZED WITH TYPE G SHEETING COMPLYING WITH THE REQUIREMENTS OF 730.19 AND U.S. DEPARTMENT OF TRANSPORTATION SUPPLEMENTAL SPECIFICATION FOR TYPE III-C SHEETING, FP-85. WORK ZONE SPEED LIMIT SIGNS SHALL BE MOUNTED ON TWO (2) ITEM 630 GROUND MOUNTED SUPPORTS, NO. 3 POSTS. WORK ZONE SPEED LIMIT SIGNS AND SUPPORTS WILL BE MEASURED AS THE NUMBER OF SIGN INSTALLATIONS, INCLUDING THE SIGNS AND NECESSARY SUPPORTS. IF A SIGN AND SUPPORT COMBINATION IS REMOVED AND REERECTED AT ANOTHER LOCATION WITHIN THE PROJECT DUE TO CHANGES IN THE SPEED ZONE DIRECTED BY THE ENGINEER, IT SHALL BE CONSIDERED ANOTHER UNIT. PAYMENT FOR ACCEPTED QUANTITIES, COMPLETE IN PLACE, WILL BE MADE AT THE CONTRACT UNIT PRICE. PAYMENT SHALL BE FULL COMPENSATION FOR ALL MATERIALS, LABOR, INCIDENTALS AND EQUIPMENT FOR FURNISHING, ERECTING, MAINTAINING, COVERING DURING SUSPENSION OF WORK, AND REMOVING THE SIGNS AND SUPPORTS.

THE FOLLOWING QUANTITY IS PROVIDED TO TEMPORARILY REPLACE THE EXISTING SPEED LIMIT SIGN ON I-90 W.B. NEAR STA. 1044+00.

614, WORK ZONE SPEED LIMIT SIGN 1 EACH

GUARDRAIL PROTECTION
NO SIGN SUPPORTS SHALL BE ERECTED BEFORE THE NECESSARY GUARDRAIL PROTECTION IS IN PLACE. SIMILARLY, EXISTING GUARDRAIL WHICH PROTECTS AN OBSTRUCTION OR SLOPE WHICH IS TO BE UPGRADED TO ELIMINATE GUARDRAIL, SHALL NOT BE REMOVED UNTIL THAT WORK HAS BEEN COMPLETED. EXISTING GUARDRAIL WHICH IS SCHEDULED TO BE REPLACED WITH TYPE 5 GUARDRAIL, SHALL NOT BE REMOVED UNTIL THE NEW GUARDRAIL IS READY TO BE INSTALLED, UNDER NO CIRCUMSTANCES SHALL ANY HAZARD BE WITHOUT GUARDRAIL PROTECTION FOR MORE THAN 24 HOURS. (SEE PUBLIC SAFETY NOTE ON SHEET 9)

ITEM 614 - BARRIER REFLECTORS AND/OR OBJECT MARKERS
BARRIER REFLECTORS AND/OR OBJECT MARKERS SHALL BE INSTALLED ON ALL PORTABLE CONCRETE BARRIER USED FOR TRAFFIC CONTROL. BARRIER REFLECTORS, OBJECT MARKERS AND THEIR INSTALLATION SHALL CONFORM TO THE APPROPRIATE PROPOSAL NOTE AND ITEM 626 EXCEPT THAT THE SPACING SHALL BE 25 FEET. AN ESTIMATED QUANTITY OF__500__ EACH OF ITEM 614 BARRIER REFLECTOR, TYPE B, AND _500_ EACH OF ITEM 614 OBJECT MARKERS HAVE BEEN PROVIDED AND CARRIED TO THE GENERAL SUMMARY.

FLOODLIGHTING
FLOODLIGHTING OF THE WORK SITE FOR OPERATIONS CONDUCTED DURING NIGHT TIME PERIODS SHALL BE ACCOMPLISHED SO THAT THE LIGHTS DO NOT CAUSE GLARE TO THE DRIVERS ON THE ROADWAY. TO ENSURE THE ADEQUACY OF THE FLOODLIGHT PLACEMENT, THE CONTRACTOR AND THE ENGINEER SHALL DRIVE THROUGH THE WORK SITE EACH NIGHT WHEN THE LIGHTING IS IN PLACE AND OPERATIVE PRIOR TO COMMENCING ANY WORK. IF GLARE IS DETECTED THE LIGHT PLACEMENT AND SHIELDING SHALL BE ADJUSTED TO THE SATISFACTION OF THE ENGINEER BEFORE WORK PROCEEDS. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR MAINTAINING TRAFFIC.

ITEM 614 - PORTABLE CHANGEABLE MESSAGE SIGN, BY CLASS,AS PER PLAN
THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN AND REMOVE, WHEN NO LONGER NEEDED, A CHANGEABLE MESSAGE SIGN, ON SITE, FOR THE DURATION OF THE PROJECT. THE SIGN SHALL BE OF A TYPE SHOWN ON THE LIST OF APPROVED PCMS UNITS MAINTAINED BY THE DIRECTOR. THE LIST CURRENTLY CONTAINS CLASS I UNITS WITH MINIMUM LEGIBILITY DISTANCES OF 1200 FT.

EACH SIGN SHALL BE TRAILER MOUNTED AND EQUIPPED WITH A FUNCTIONAL DIMMING MECHANISM TO DIM THE SIGN DURING DARKNESS AND A TAMPER AND VANDAL PROOF ENCLOSURE. EACH SIGN SHALL BE PROVIDED WITH APPROPRIATE TRAINING AND OPERATION INSTRUCTIONS TO ENABLE ON-SITE PERSONNEL TO OPERATE AND TROUBLESHOOT THE UNIT. THE SIGN SHALL ALSO BE CAPABLE OF BEING POWERED BY AN ELECTRICAL SERVICE DROP FROM A LOCAL UTILITY COMPANY.

THE LOCATIONS AND WORK LIMITS FOR THOSE LOCATIONS WILL BE AS DIRECTED BY THE ENGINEER. PLACEMENT, OPERATION, MAINTENANCE AND ALL ACTIVATION OF THE SIGNS BY THE CONTRACTOR SHALL BE AS DIRECTED BY THE ENGINEER. THE PCMS SHALL BE LOCATED IN A HIGHLY VISIBLE POSITION YET PROTECTED FROM TRAFFIC. THE CONTRACTOR SHALL, AT THE DIRECTION OF THE ENGINEER, RELOCATE THE PCMS TO IMPROVE VISIBILITY OR ACCOMMODATE CHANGED CONDITIONS. WHEN NOT IN USE, THE PCMS WILL BE OFF.

THE ENGINEER SHALL BE PROVIDED ACCESS TO EACH SIGN UNIT AND SHALL BE PROVIDED WITH APPROPRIATE TRAINING AND OPERATION INSTRUCTIONS TO ENABLE ODOT PERSONNEL TO OPERATE AND TROUBLESHOOT THE UNIT AND TO REVISE SIGN MESSAGES, IF NECESSARY.

THE PCMS UNIT SHALL BE MAINTAINED IN GOOD WORKING ORDER BY THE CONTRACTOR IN ACCORDANCE WITH THE PROVISIONS OF 614.03(C). THE CONTRACTOR SHALL, PRIOR TO ACTIVATING THE UNIT, MAKE ARRANGEMENTS WITH AN AUTHORIZED SERVICE AGENT FOR THE PCMS TO ASSURE PROMPT SERVICE IN THE EVENT OF FAILURE. ANY FAILURE SHALL NOT RESULT IN THE SIGN BEING OUT OF SERVICE FOR MORE THAN 12 HOURS INCLUDING WEEKENDS. FAILURE TO COMPLY MAY RESULT IN AN ORDER TO STOP WORK AND OPEN ALL TRAFFIC LANES AND/OR IN THE DEPARTMENT TAKING APPROPRIATE ACTION TO SAFELY CONTROL TRAFFIC AND THE ENTIRE COST TO CONTROL TRAFFIC ACCRUED BY THE DEPARTMENT WILL BE DEDUCTED FROM MONEYS DUE, OR TO BECOME DUE THE CONTRACTOR ON HIS CONTRACT.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR 24 HOURS PER DAY OPERATION AND MAINTENANCE OF THESE SIGNS ON THE PROJECT FOR THE DURATION OF THE PHASES WHEN THE PLAN REQUIRES THEIR USE. THE REQUIREMENT TO FURNISH, INSTALL, MAINTAIN AND REMOVE A PCMS UNIT ON THIS PROJECT SHALL NOT IN ANY WAY RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES AS OUTLINED IN 104.04.

PAYMENT FOR THE ABOVE DESCRIBED ITEM SHALL BE AT THE CONTRACT UNIT PRICE BID PER SIGN MONTH FOR EACH ITEM 614 PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN AND SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, FUELS, LUBRICATING OILS, SOFTWARE, HARDWARE AND INCIDENTALS TO PERFORM THE ABOVE DESCRIBED WORK.

ITEM 614 - PCMS, BY CLASS,AS PER PLAN(CONTINUED)
THE PCMS SHALL CONTAIN A CELLULAR TELEPHONE DATA LINK WHICH WILL (IN ACTIVE CELLULAR PHONE AREAS) ALLOW REMOTE SIGN ACTIVATION, DEACTIVATION, MESSAGE CHANGES, MESSAGE ADDITIONS AND REVISIONS TO TIME OF DAY PROGRAMS. THE SYSTEM SHALL ALSO PERMIT VERIFICATION OF CURRENT AND PROGRAMMED MESSAGES. ONE REMOTE DATA INPUT DEVICE

EACH PCMS SHALL BE EQUIPPED WITH A MYRAID SAFETY BEAM OR AN APPROVED EQUAL AS DETERMINED BY THE ENGINEER. THE MYRAID SAFETY BEAM SENDS OUT A SIGNAL THAT ACTIVATED RADAR DETECTORS AND THE BEAM IS APPROVED BY THE F.C.C.. THE MYRAID SAFETY BEAM SHALL USE THE SAME POWER SUPPLY AS THE PCMS. THE MYRAID SAFETY BEAM SHALL BE ABLE TO BE ACTIVATED WITH THE SIGN RUNNING OR NOT. THE MYRAID SAFETY BEAM IS DISTRIBUTED EXCLUSIVELY BY:

THE TRIPLEX GROUP, INC.
P.O. BOX 428
NEW HOPE, PA 18938
PHONE: (215) 862-5077

1. CLASS I PCMS ARE VISIBLE FROM 1200 FT.
2. THREE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE A CLASS I. THE CLASS I PCMS WILL BE AVAILABLE AT THE START OF THE PROJECT AND WILL BE USED FOR THE DURATION OF THE PROJECT.

IF THE PCMS ARE NOT BEING USED AS DETERMINED BY THE ENGINEER OR WHEN CONSTRUCTION HAS BEEN SUSPENDED FOR THE WINTER SEASON THE PROJECT ENGINEER MAY DIRECT THE CONTRACTOR TO REMOVE THE PCMS AND DISCONTINUE PAYMENTS FOR THIS TIME.

THE FOLLOWING ESTIMATED QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:

(ESTIMATED QUANTITY - 3 CLASS I SIGNS @ 9 MONTHS
EACH = 27 SIGN MONTHS)

ITEM 614 - PORTABLE CHANGEABLE MESSAGE SIGN, CLASS I, AS PER PLAN
27 SIGN MONTHS

CALCULATED JEL CHECKED GSS

MAINTENANCE OF TRAFFIC NOTES

CUY-490-1.65

ITEM 614- LAW ENFORCEMENT OFFICER WITH PATROL CAR
IN ADDITION TO THE REQUIREMENTS OF 614 AND THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD), A UNIFORMED OFFICER AND OFFICIAL PATROL CAR WITH WORKING TOP MOUNTED EMERGENCY FLASHING LIGHTS SHALL BE PROVIDED FOR CONTROLLING TRAFFIC FOR THE FOLLOWING TASKS:

1. FOR PERMANENT LANE CLOSURES FOR PHASE CONSTRUCTION: DURING INITIAL SET-UP PERIODS, TEAR DOWN PERIODS, SUBSTANTIAL SHIFTS OF A CLOSURE POINT OR WHEN NEW LANE CLOSURE ARRANGEMENTS ARE INITIATED.

2. FOR TEMPORARY LANE CLOSURES ONLY WHEN DIRECTED BY THE ENGINEER.

3. DURING THE ENTIRE ADVANCE PREPARATION AND CLOSURE SEQUENCE WHERE COMPLETE BLOCKAGE OF TRAFFIC IS REQUIRED.

LAW ENFORCEMENT OFFICERS (L.E.O.'S) SHOULD NOT BE USED WHERE THE OMUTCD INTENDS THAT FLAGGERS BE USED. THE LEO'S ARE CONSIDERED TO BE EMPLOYED BY THE CONTRACTOR AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR ACTIONS. ALTHOUGH THEY ARE EMPLOYED BY THE CONTRACTOR, THE PROJECT ENGINEER SHALL HAVE CONTROL OVER THEIR PLACEMENT. THE OFFICIAL PATROL CAR SHALL BE A PUBLIC SAFETY VEHICLE AS REQUIRED BY THE OHIO REVISED CODE.

THE CONTRACTOR SHALL MAKE ARRANGEMENT FOR THESE SERVICES WITH THE POLICE DEPARTMENT.

LAW ENFORCEMENT OFFICERS WITH PATROL CAR REQUIRED BY THE TRAFFIC MAINTENANCE TASKS A ABOVE SHALL BE PAID FOR ON A UNIT PRICE (HOURLY) BASIS UNDER ITEM 614- LAW ENFORCEMENT OFFICER WITH PATROL CAR. THE FOLLOWING QUANTITIES HAVE BEEN CARRIED FORWARD TO THE GENERAL SUMMARY:

ITEM 614- LAW ENFORCEMENT OFFICER WITH PATROL CAR 200 HOURS

THE HOURS SHALL INCLUDE MINIMUM SHOW-UP TIME REQUIRED BY THE LAW ENFORCEMENT AGENCY INVOLVED.

IF CONTRACTORS WISH TO UTILIZE LEO'S FOR FLAGGING AND TRAFFIC CONTROL OTHER THAN THAT REQUIRED IN THESE PLANS, THEY MAY DO SO AT THEIR OWN EXPENSE. PAYMENT FOR THE EXCESS ABOVE THE CONTRACT REQUIREMENTS WILL BE INCLUDED UNDER ITEM 614- MAINTAINING TRAFFIC.

NIGHT VEST
ALL OF THE CONTRACTORS AND SUB-CONTRACTORS PERSONNEL WORKING DURING THE HOURS OF DARKNESS SHALL WEAR A 100% SILVER REFLECTIVE VEST. THE SAFETY VEST SHALL BE PROVIDED BY THE CONTRACTOR. THE VEST MAY HAVE SEVERAL LIME OR ORANGE STRIPES ON IT.

RAMP N-E CLOSURE
PHASE 2 CONSTRUCTION OF RAMP N-E WILL REQUIRE A COMPLETE CLOSURE TO TRAFFIC AND DETOUR. THE CLOSURE SHALL BE ACCORDING TO STANDARD CONSTRUCTION DRAWING MT-98.19M. THE PROPOSED DETOUR WILL USE 490WB TO W. 7TH ST. EXIT. TRAFFIC WILL RE-ENTER 490EB FROM THE W. 7TH ST. ENTRANCE.

A CONSTRUCTION TIME WINDOW SHALL APPLY TO THIS WORK BECAUSE OF THE REQUIRED CLOSURE. UPON IMPLEMENTATION OF THE DETOUR, THE CONTRACTOR SHALL COMPLETE ALL PHASE 2 WORK AND OPEN RAMP N-E TO NORMAL TRAFFIC WITHIN 21 CALENDAR DAYS.

SHOULD THE CONTRACTOR FAIL TO COMPLETE THIS WORK IN THE SPECIFIED TIME LIMIT, THE CONTRACTOR SHALL BE ASSESSED LIQUIDATED DAMAGES IN THE AMOUNT OF $68.00 PER EACH MINUTE THESE REQUIREMENTS ARE NOT MET.

RAMP E-N CLOSURE
PHASE 3A CONSTRUCTION OF RAMP E-N WILL REQUIRE A COMPLETE CLOSURE TO TRAFFIC AND DETOUR. THE CLOSURE SHALL BE ACCORDING TO STANDARD CONSTRUCTION DRAWING MT-98.19M. THE PROPOSED DETOUR WILL USE 490 WB TO THE W. 7TH ST. EXIT. TRAFFIC WILL RE-ENTER 490EB FROM THE W. 7TH ST. ENTRANCE. TRAFFIC WILL TAKE THE I-77NB RAMP FROM 490 EB.

A CONSTRUCTION TIME WINDOW SHALL APPLY TO THIS WORK BECAUSE OF THE REQUIRED CLOSURE. UPON IMPLEMENTATION OF THE DETOUR, THE CONTRACTOR SHALL COMPLETE ALL PHASE 3A WORK AND OPEN RAMP E-N TO NORMAL TRAFFIC WITHIN 14 CALENDAR DAYS.

SHOULD THE CONTRACTOR FAIL TO COMPLETE THIS WORK IN THE SPECIFIED TIME LIMIT, THE CONTRACTOR SHALL BE ASSESSED LIQUIDATED DAMAGES IN THE AMOUNT OF $68.00 PER EACH MINUTE THESE REQUIREMENTS ARE NOT MET.

PROPOSED DETOURS
THE PROPOSED DETOURS DESCRIBED UNDER THE "RAMP N-E CLOSURE" AND "RAMP E-N CLOSURE" NOTES SHALL BE SIGNED ACCORDING TO THE O.M.U.T.C.D. AND ANY APPLICABLE STANDARD CONSTRUCTION DRAWINGS. ALTHOUGH THESE DETOURS ARE DESCRIBED UNDER THESE NOTES, NO ADDITIONAL DETAILS OF THE PROPOSED DETOURS ARE PROVIDED IN THESE PLANS. ALL SIGNS AND SIGN LOCATIONS ARE SUBJECT TO THE APPROVAL OF THE ENGINEER.

PAYMENT FOR ALL LABOR AND ALL MATERIALS NECESSARY TO PROPERLY SIGN THESE DETOURS SHALL BE INCLUDED IN THE LUMP SUM BID FOR 614, MAINTAINING TRAFFIC.

614, BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC, AS PER PLAN
THIS ITEM OF WORK IS PROVIDED TO FILL THE EXISTING RUMBLE STRIPS ON SHOULDERS THAT ARE TO BE USED FOR MAINTAINING TRAFFIC. WHEN THE SHOULDERS ARE NO LONGER NEEDED FOR MAINTAINING TRAFFIC, THE ASPHALT SHALL BE REMOVED AND THE RUMBLE STRIPS SHALL BE RESTORED TO THEIR EXISTING CONDITION. RUMBLE STRIPS IN THE PAVEMENT SHALL NOT BE DISTURBED.

PAYMENT FOR ALL LABOR AND ANY MATERIALS NECESSARY TO PERFORM THE ABOVE DESCRIBED WORK SHALL BE INCLUDED FOR PAYMENT IN THE UNIT BID FOR 614, BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC, AS PER PLAN.

THE FOLLOWING QUANTITY HAS BEEN CARRIED TO THE GENERAL SUMMARY:
614, BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC,
AS PER PLAN --------- 5 C.Y.

<u>WORKSITE TRAFFIC SUPERVISOR</u>

THE CONTRACTOR SHALL EMPLOY , SUBJECT TO THE APPROVAL OF THE ENGINEER/SUPERVISOR, A CERTIFIED WORKSITE TRAFFIC SUPERVISOR, (WTS). THE WTS SHALL BE CERTIFIED FROM ONE OF THE FOLLOWING ORGANIZATIONS:

1. AMERICAN TRAFFIC SAFETY SERVICE ASSOCIATION (ATSSA), PHONE (540) 368-1711, CERTIFIED TRAFFIC CONTROL SUPERVISOR, 2 DAY COURSE.

2. THE NATIONAL HIGHWAY INSTITUTE, DESIGN AND OPERATION OF WORK ZONE TRAFFIC CONTROL, 3 DAY COURSE, PHONE 1-877-558-6873.

THE WTS POSITION IS ESTABLISHED FOR THE PURPOSE OF SUPERVISING THE INSTALLATION OF THE WORK ZONE, MONITORING IT AND CORRECTING ANY DEFICIENCIES IN THE WORK ZONE. THE WTS SHALL OVERSEE ALL OPERATIONS THAT AFFECT THE MOVEMENT OF VEHICULAR AND PEDESTRIAN TRAFFIC THROUGH THE WORK ZONE.

THE WTS SHALL BE PRESENT WHEN THE CONTRACTOR OR SUBCONTRACTOR INSTALLS A TRAFFIC RESTRICTION, LANE CLOSURE ETC. IN LIEU OF THE WTS BEING PRESENT WHEN A SUBCONTRACTOR HAS A TRAFFIC CONTROL ZONE IN PLACE THE SUBCONTRACTOR MAY USE IS OWN PERSONNEL THAT IS A CERTIFIED WTS. THE CONTRACTOR AND SUBCONTRACTOR MUST PRESENT A COPY OF HIS WTS CERTIFICATE TO THE PROJECT ENGINEER. A WTS MUST BE PRESENT FOR ANY CLOSURE OR TRAFFIC RESTRICTION THAT TAKES PLACE ON THE PROJECT.

THE WTS MAY BE A PART OF THE WORKING CREW AND MUST BE IN CHARGE OF SETTING UP THE WORK ZONE. AFTER THE WORK ZONE IS IN PLACE THE WTS MAY RESUME OTHER DUTIES NOT RELATED TOWORK ZONE TRAFFIC CONTROL. IF THE RESTRICTIONS ARE SHORT TERM, THE WTS SHALL MONITOR THE ZONE FOR COMPLIANCE. TRAFFIC CONTROL WILL BE THE WTS'S MAIN DUTY DURING IMPLEMENTATION OF THE WORK ZONES. THE WTS SHALL HAVE THE AUTHORITY TO HAVE THE DEFICIENCIES CORRECTED AS SOON AS POSSIBLE. THE WTS SHALL PROVIDE THE PROJECT ENGINEER A SKETCH OF THE (TCP) TRAFFIC CONTROL PLAN EVERY DAY THERE IS TO BE A SHORT TERM TRAFFIC RESTRICTION, LANE CLOSURE ETC. THIS TCP SHALL SHOW HOW THE WORK ZONES ARE TO BE IMPLEMENTED.

DAILY, INCLUDING WEEKENDS AND HOLIDAYS THE WTS SHALL SPEND A MINIMUM OF ONE HOUR REVIEWING AND MAINTAINING THE WORK ZONE.

THESE HOURS MAY BE ADJUSTED BY THE ENGINEER BUT MUST BE PERFORMED ONCE A DAY DURING THE CONSTRUCTION SEASONS. THE HOURS MAY BE REDUCED DURING THE WINTER CONSTRUCTION SEASON IF DIRECTED BY THE ENGINEER. THE WTS SHALL INSPECT THE WORK ZONE AT THE BEGINNING AND END OF EACH WORK DAY AND ONE TIME PER WEEK DURING THE HOURS OF DARKNESS.

A RECORD OF EACH DAY'S REVIEW SHALL BE GIVEN TO THE PROJECT ENGINEER THE FOLLOWING WORKDAY, IN WRITING AND SHALL INCLUDE: TRAFFIC CONTROL DEVICE CONDITION, PLACEMENT, VISIBILITY, TRAFFIC FLOW CONDITIONS, INCIDENTS, ACCIDENTS, CONGESTION POINTS, ADEQUACY OF ADVANCED WARNING SIGNS BEYOND THE PROJECT LIMITS, INTERACTION OF WORK VEHICLES WITH TRAFFIC, PROPER STORAGE OF MATERIALS AND EQUIPMENT, ANY DEFICIENCIES AND RESOLUTIONS OF THE DEFICIENCIES ETC.

A 24-HOUR PHONE NUMBER SHALL BE MADE AVAILABLE TO THE PROJECT ENGINEER/SUPERVISOR IN ORDER TO CONTACT THE WTS. THE WTS SHALL HAVE A PAGER AND THE PHONE NUMBER PROVIDED TO THE PROJECT ENGINEER.

FAILURE OF THE CONTRACTOR TO COMPLY WITH ANY OF THE ABOVE, SHALL CONSTITUTE CAUSE FOR THE PROJECT ENGINEER / SUPERVISOR TO DEDUCT $500.00 PER DAY FROM MONEY DUE THE CONTRACTOR NOT AS A PENALTY BUT AS A LIQUIDATED DAMAGE.

PAYMENT FOR THE WTS SHALL BE INCLUDED UNDER THE LUMP SUM ITEM 614 MAINTAINING TRAFFIC.

CALCULATED JEL CHECKED GSS

MAINTENANCE OF TRAFFIC NOTES

CUY-490-1.65

ESTIMATED TEMPORARY PAVEMENT MARKINGS

LOCATION				A	B	C	D	E	F	G	H	I	J	PCB
				614	614	614	614	614	614	614	614	614	614	622
SIDE	STA	STA	PHASE	TEMPORARY EDGE LINES, 642 PAINT (WHITE)	TEMPORARY EDGE LINE, 642 PAINT (YELLOW)	TEMPORARY CHANNELIZING LINE, 642 PAINT	TEMPORARY LANE LINE, 642 PAINT	TEMPORARY DOTTED LINE, 642 PAINT	TEMPORARY EDGE LINE, 740.06, TYPE I (WHITE)	TEMPORARY EDGE LINE, 740.06, TYPE I (YELLOW)	TEMPORARY CHANNELIZING LINE, 740.06, TYPE I	TEMPORARY LANE LINE, 740.06, TYPE I	TEMPORARY DOTTED LINE, 740.06, TYPE I	PORTABLE CONCRETE BARRIER, 32"
				L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.
490 E.B.	1030+70	1036+80	I							610				
	1036+80	1037+60	I						80	80				
	1037+60	1040+50	I						290	290				290
	1040+50	1053+10	I	1260	1260									1260
490 W.B.	1039+00	1040+40	I						140					
	1040+40	1046+80	I	640	640									640
	1046+80	1050+50	I		370	740								370
	1050+50	1053+00	I		250	250								250
	1053+00	1054+00	I							100	100			100
	1054+00	1056+00	I							200				200
	1056+00	1058+50	I							250				
RAMP S-E	13+00	15+00	I	200	200									
	15+00	23+05		805	300									805
	23+05	24+30		125						125				125
	24+30	28+00								370				
PHASE 1 -	TOTAL			3030	3020	990			510	2025	100			4040
490 E.B.	1030+70	1036+80	2						610					
	1036+80	1037+60	2						80	80				
	1037+60	1040+50	2						290	290				290
	1040+50	1053+10	2						1260	1260				1260
490 W.B.	1020+30	1025+50	2	520										
	1025+50	1038+50	2	1300										
	1038+50	1039+00	2						50					
	1039+00	1040+40	2						140	140				
	1040+40	1053+00	2						1250	1250				1250
	1053+00	1055+00	2						200	200	400			400
	1055+00	1056+00	2								200			
	1056+00	1057+00	2								100			
PHASE 2 -	SUB TOTAL			1820					3880	3220	700			3200

ESTIMATED TEMPORARY PAVEMENT MARKINGS

LOCATION				A	B	C	D	E	F	G	H	I	J	PCB
				614	614	614	614	614	614	614	614	614	614	622
SIDE	STA	STA	PHASE	TEMPORARY EDGE LINES, 642 PAINT (WHITE)	TEMPORARY EDGE LINE, 642 PAINT (YELLOW)	TEMPORARY CHANNELIZING LINE, 642 PAINT	TEMPORARY LANE LINE, 642 PAINT	TEMPORARY DOTTED LINE, 642 PAINT	TEMPORARY EDGE LINE, 740.06, TYPE I (WHITE)	TEMPORARY EDGE LINE, 740.06, TYPE I (YELLOW)	TEMPORARY CHANNELIZING LINE, 740.06, TYPE I	TEMPORARY LANE LINE, 740.06, TYPE I	TEMPORARY DOTTED LINE, 740.06, TYPE I	PORTABLE CONCRETE BARRIER, 32"
				L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.	L.F.
RAMP S-E	13+00	15+00	2		200									
	15+00	17+00	2		200									200
	17+00	24+30	2						730	730				730
	24+30	28+00	2						370	370				
	1053+10	1054+10	2						100		100			
RAMP E-N	4+00	16+00	2	1200	1200									1200
RAMP E-S	3+00	5+09	2		210									210
RAMP E-S	5+09	5+59	2		50									
RAMP S-W	17+00	18+50	2							150				
RAMP S-W	18+50	20+00	2							150				150
RAMP N-W	15+05	20+30	2							530				530
PHASE 2 -	THIS COL.			1200	1860				1200	1930	100			3020
PHASE 2 -	PREVIOUS COL.			1820					3880	3220	700			3200
PHASE 2 -	TOTAL			3020	1860				5080	5150	800			6220
490 W.B.	1053+00	1055+50	3A						250					250
	1055+50	1058+00	3A						250					
RAMP E-N	4+00	6+40	3A						240					240
RAMP E-N	6+40	9+75	3A						335		335			335
RAMP E-N	9+75	16+00	3A						625	625				625
RAMP E-S	3+00	5+09	3A						210	210				210
RAMP E-S	5+09	6+09	3A						50	100				
PHASE 3A -	TOTAL								1960	935	335			1660
RAMP E-N	16+00	17+00	3B						100					10
PHASE 3B -	TOTAL								100					10
SUMMARY OF PHASE TOTALS:			1	3030	3020	990			510	2025	100			4040
			2	3020	1860				5080	5150	800			6220
			3A						1960	935	335			1660
			3B						100					10
				6050	4880	990			7650	8110	1235			11930
M.O.T. TOTALS				6050	4880	990			7650	8110	1235			11930
				10930= 2.07 MI.					15760= 2.98 MI.					

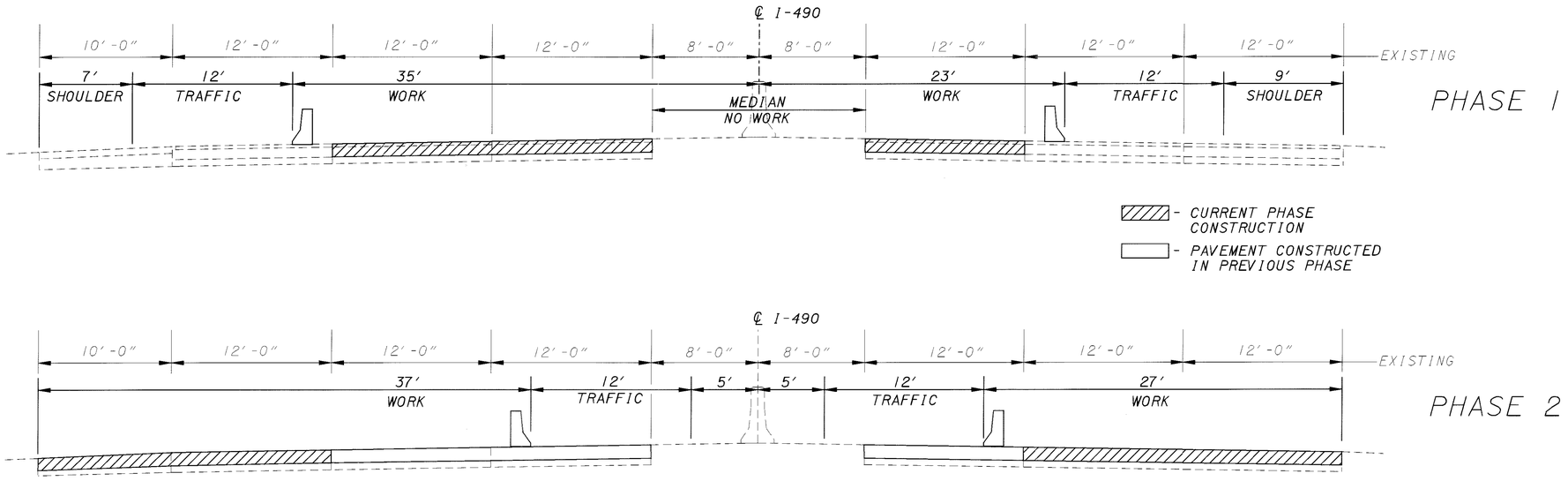
QUANTITIES CARRIED TO SHEET 28

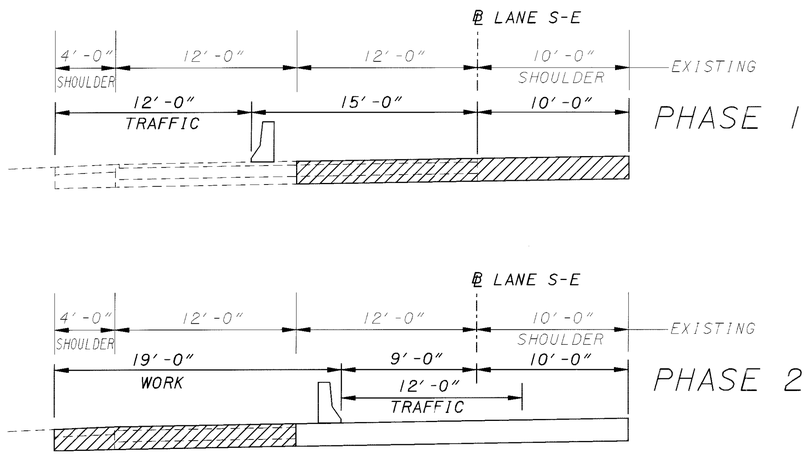
CALCULATED

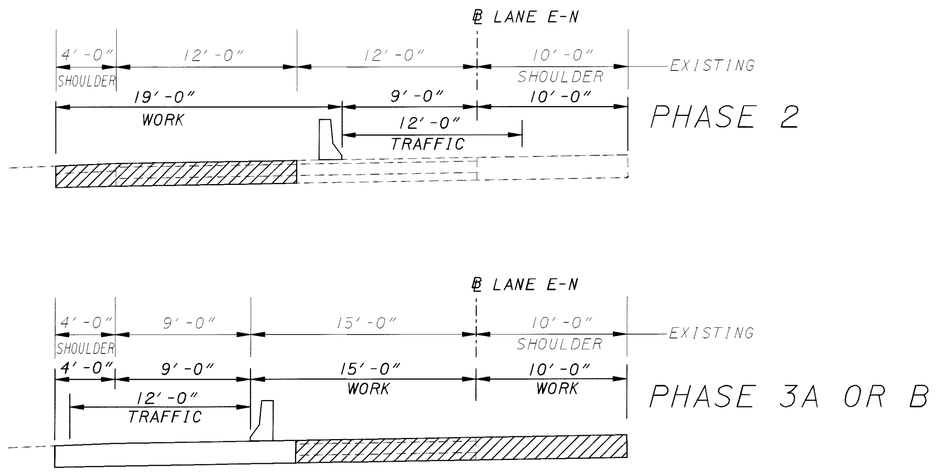
CHECKED

TEMPORARY PAVEMENT MARKINGS

CUY-490-1.65







MAINTENANCE OF TRAFFIC
TYPICAL SECTIONS
IR-490

CUY-490-1.65

14
57

CALCULATED XXX
CHECKED XXX

i:\PROJECTS\Pid19512\dgn\19512mda.dgn 21-MAY-2001 10:33AM jgrmovse

END SHEET
I.R.-77 STA. 82+00

RAMP N-W

RAMP N-E

80

RAMP W-N

RAMP E-N

EXISTING
PAVEMENT
JOINTS

16 RAMP S-W15

RAMP E-S

10 RAMP W-N

OW-138-36

1038+50
1037+50
1036+50

STA. 1039+00

I-490 1030

1035

1036+80

1030+70
BEGIN
LANE TAPER

EXISTING
LANE LINE REMOVED

DRUMS
@40' C/C

12'
LANE

MATCH LINE
I.R.-490 STA. 1040+00
SEE SHEET 16

I-77

RAMP S-W

RAMP N-E

1037+60
BEGIN PCB TAPER

1038+50
END LANE TAPER

E-S

MATCH LINE
I.R.-77 STA. 73+00
SEE SHEET 17

ADVANCE SIGNING
AS PER APPLICABLE
STANDARD CONSTRUCTION
DRAWINGS

TEMPORARY PAVEMENT MARKING LEGEND

- (A) - TEMPORARY EDGE LINE, CLASS I, 642 PAINT (WHITE)
- (B) - TEMPORARY EDGE LINE, CLASS I, 642 PAINT (YELLOW)
- (C) - TEMPORARY CHANNELIZING LINE, CLASS I, 642 PAINT
- (D) - TEMPORARY LANE LINE, CLASS I, 642 PAINT
- (E) - TEMPORARY DOTTED LINE, CLASS I, 642 PAINT
- (F) - TEMPORARY EDGE LINE, CLASS I, 740.06, TYPE I (WHITE)
- (G) - TEMPORARY EDGE LINE, CLASS I, 740.06, TYPE I (YELLOW)
- (H) - TEMPORARY CHANNELIZING LINE, CLASS I, 740.06, TYPE I
- (I) - TEMPORARY LANE LINE, CLASSI, 740.06, TYPE I
- (J) - TEMPORARY DOTTED LINE, CLASS I, 740.06, TYPE I
- (PCB) - PORTABLE CONCRETE BARRIER, 32"
- FLASHING ARROW BOARD
- TYPE A FLASHING WARNING LIGHT
- TIME RESTRICTED WORK ZONE (SEE NOTES)
- PAVEMENT REPLACEMENT WORK ZONE

HORIZONTAL SCALE IN FEET
0 50 100

CALCULATED | CHECKED

MAINTENANCE OF TRAFFIC
STA. 1028+00 TO STA. 1040+00

PHASE 1

CUY-490-1.65

15
57

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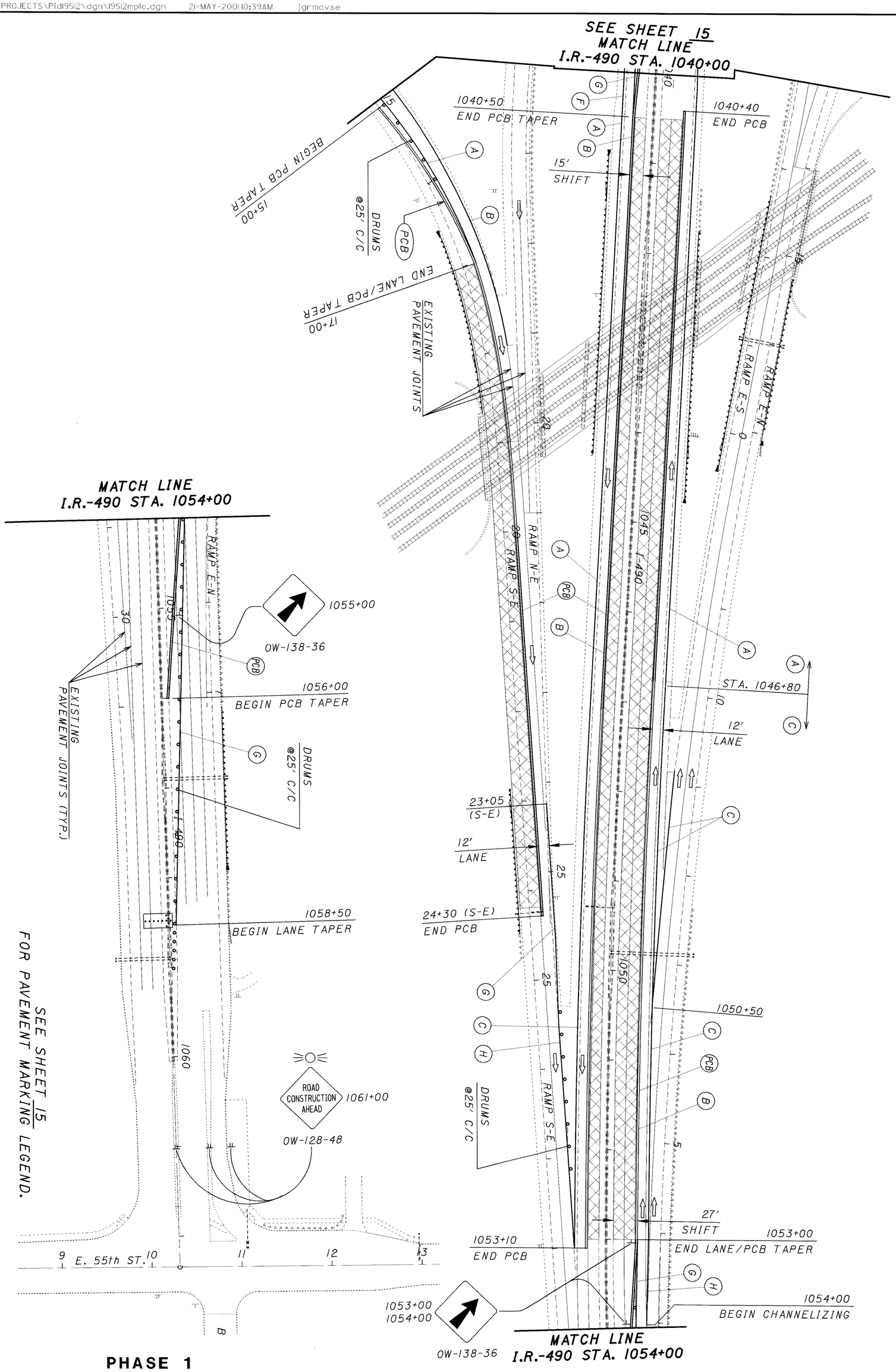
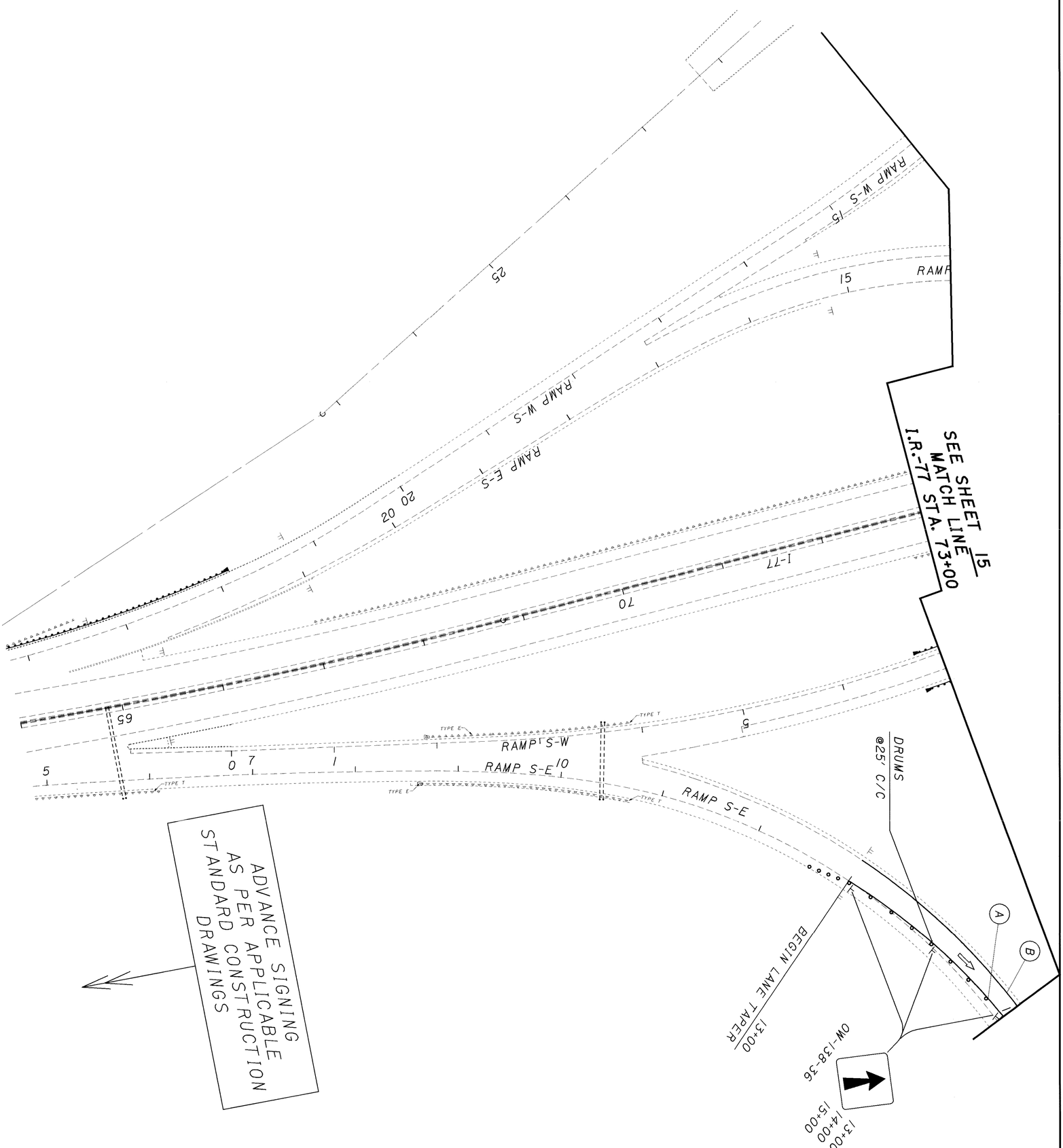


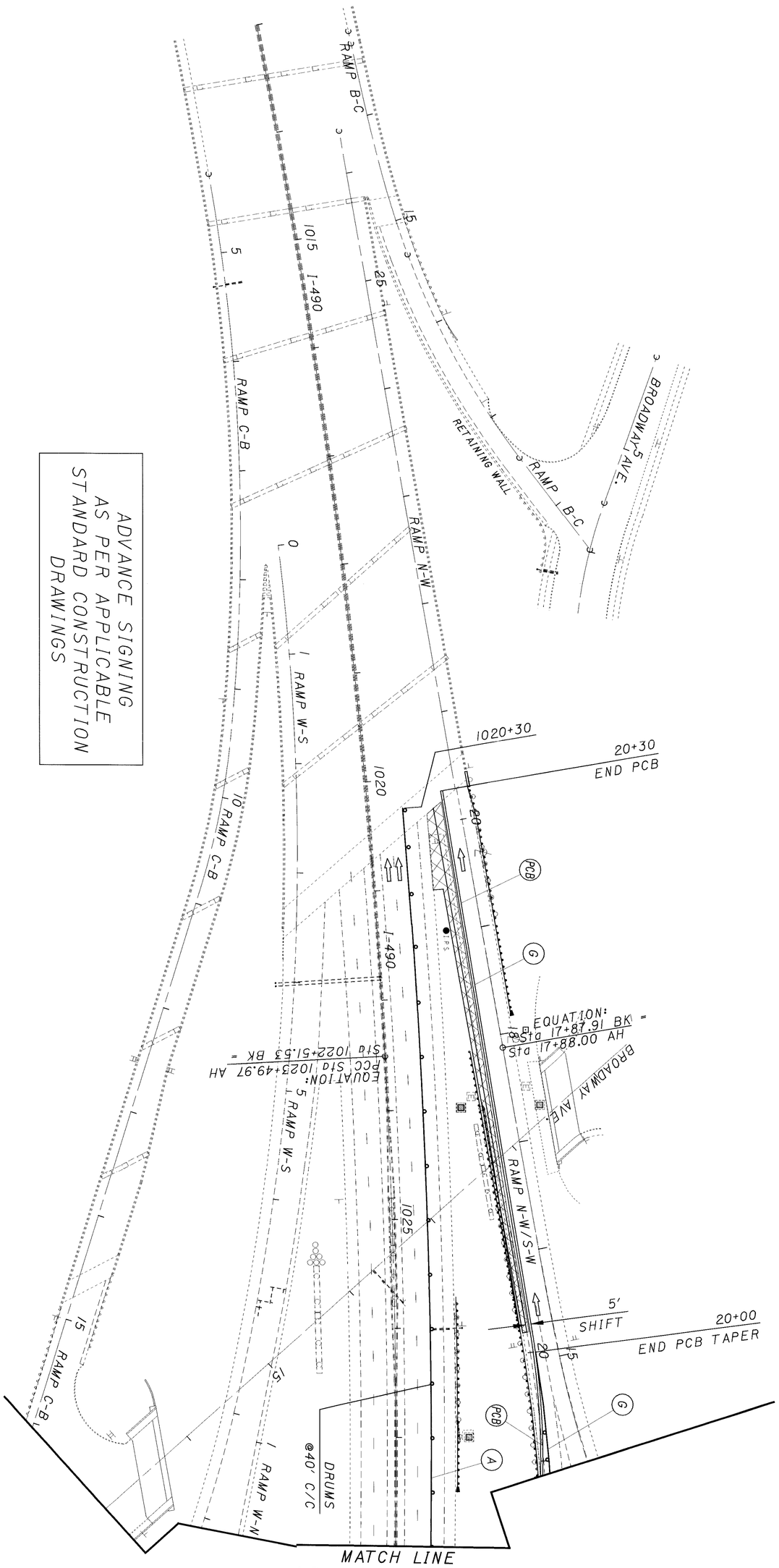
PHASE 1

16/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1040+00 TO STA. 1054+00	CALCULATED CHECKED 0 50 100 HORIZONTAL SCALE IN FEET N



PHASE 1

17/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 65+00 TO STA. 73+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET

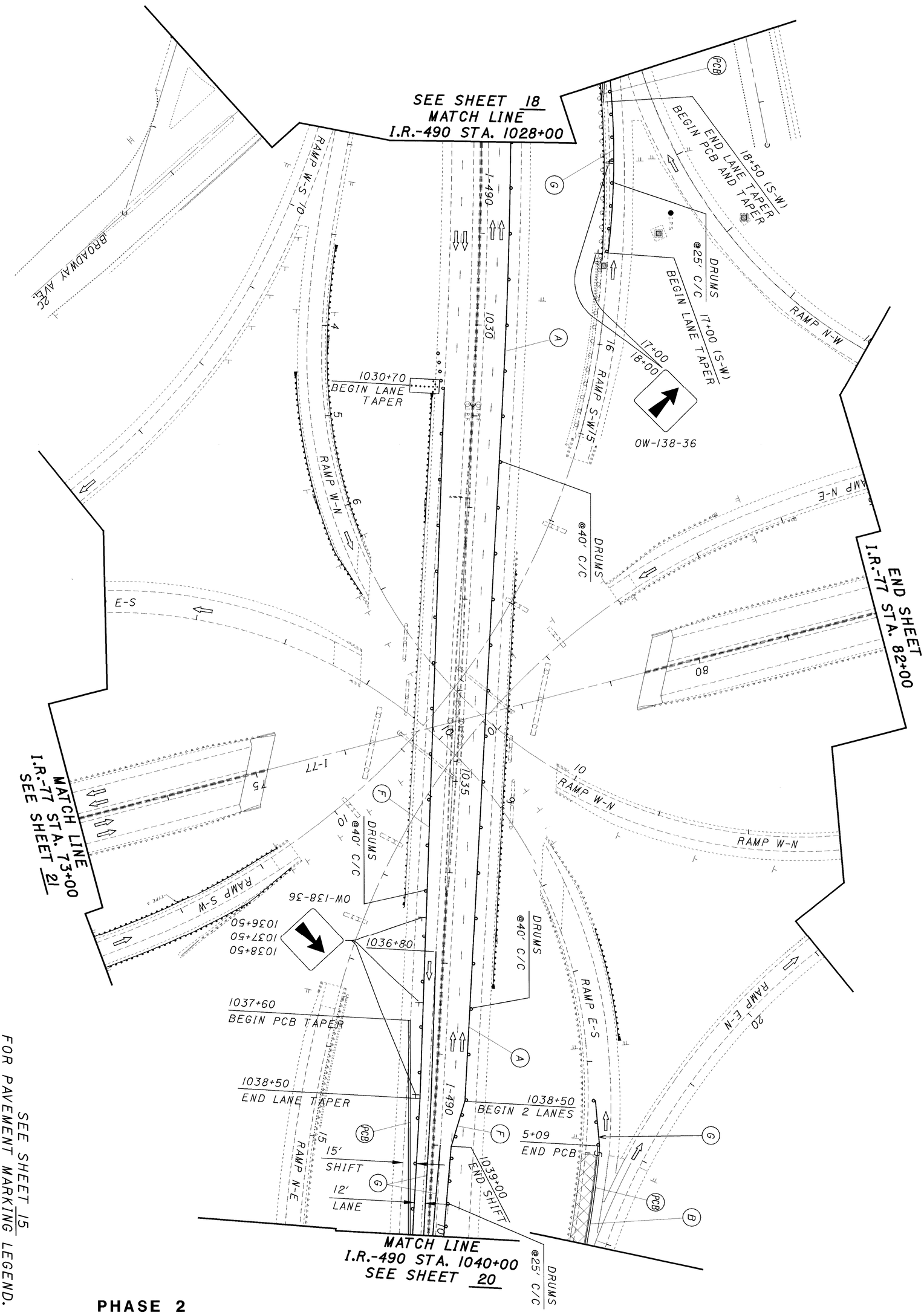


ADVANCE SIGNING
AS PER APPLICABLE
STANDARD CONSTRUCTION
DRAWINGS

SEE SHEET 15
FOR PAVEMENT MARKING LEGEND.

PHASE 2

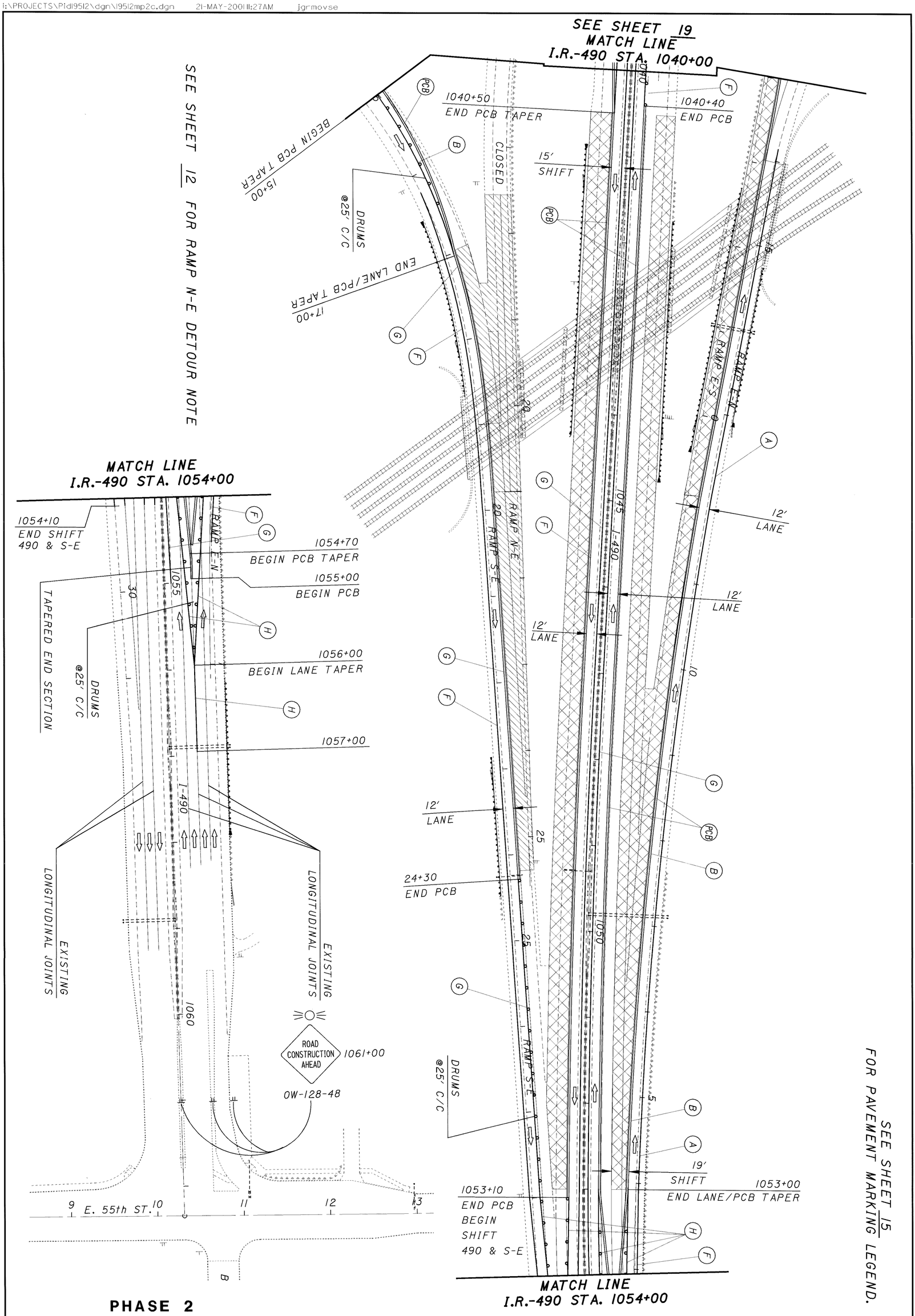
18/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1013+00 TO STA. 1028+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET



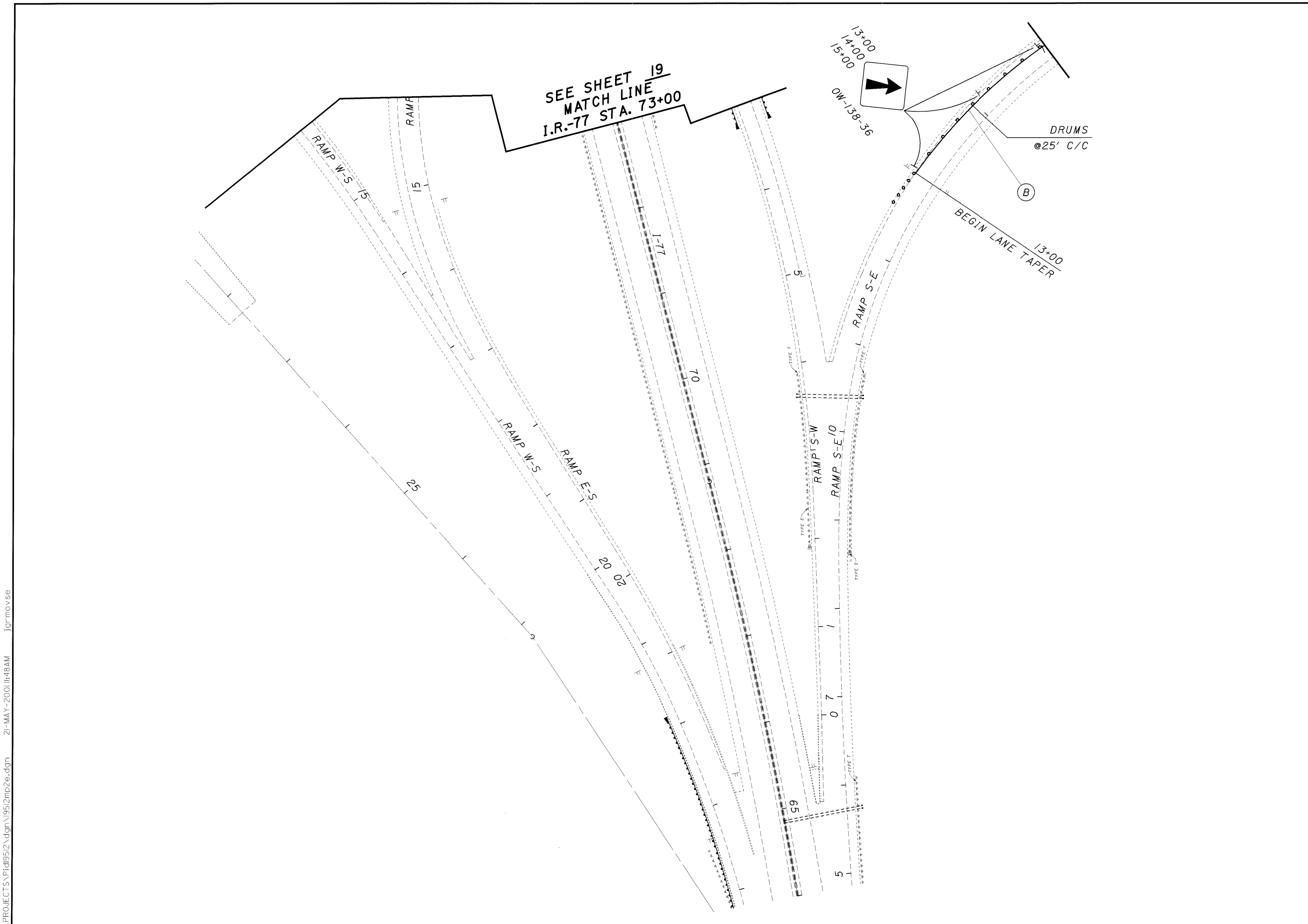
SEE SHEET 15
FOR PAVEMENT MARKING LEGEND.

PHASE 2

19 / 57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1028+00 TO STA. 1040+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET



20 / 57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1040+00 TO STA. 1054+00	CALCULATED / CHECKED 0 50 100 HORIZONTAL SCALE IN FEET N



HORIZONTAL SCALE IN FEET

0 50 100

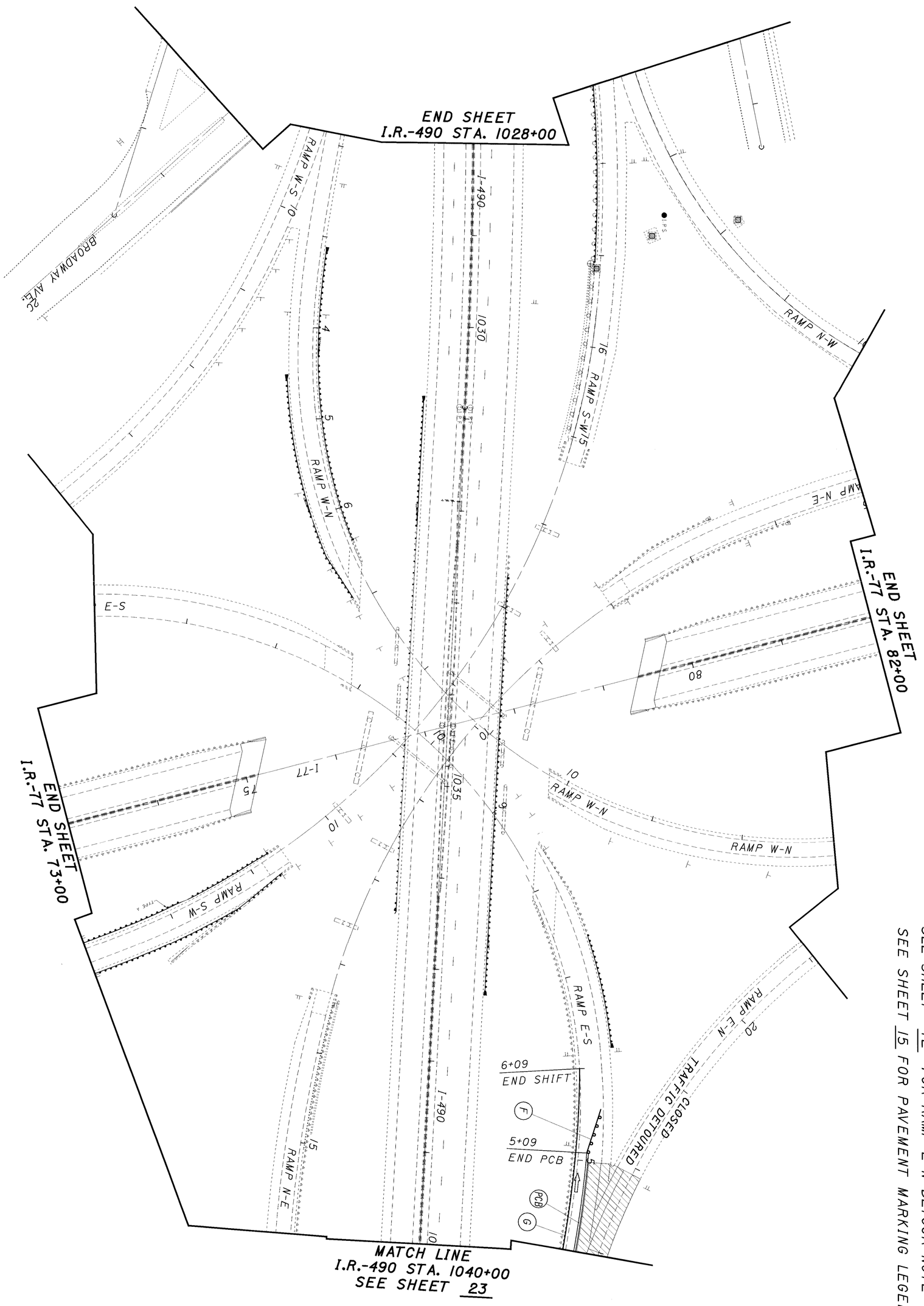
CALCULATED

CHECKED

MAINTENANCE OF TRAFFIC STA. 65+00 TO STA. 73+00

PHASE 2

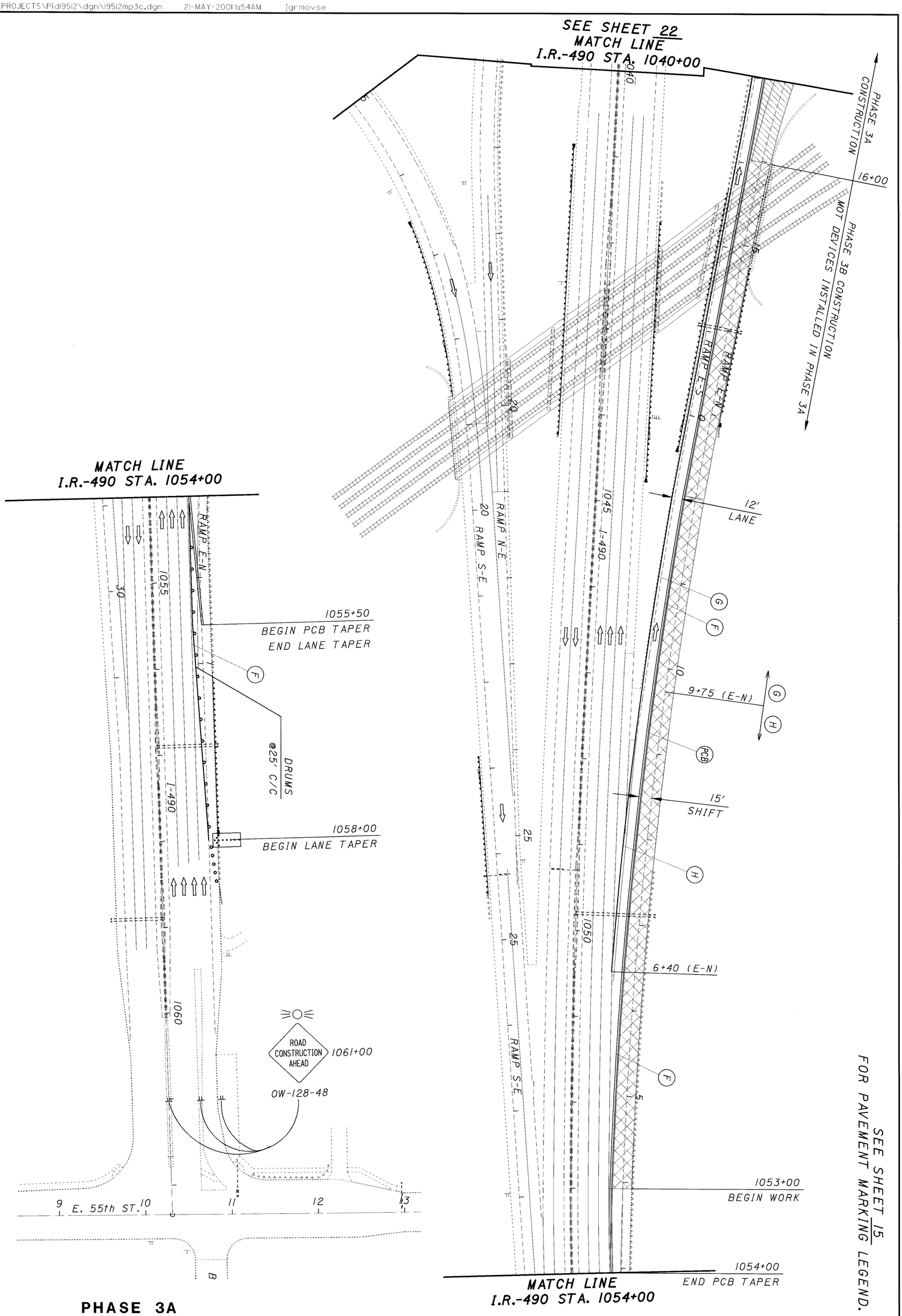
CUY-490-1.65



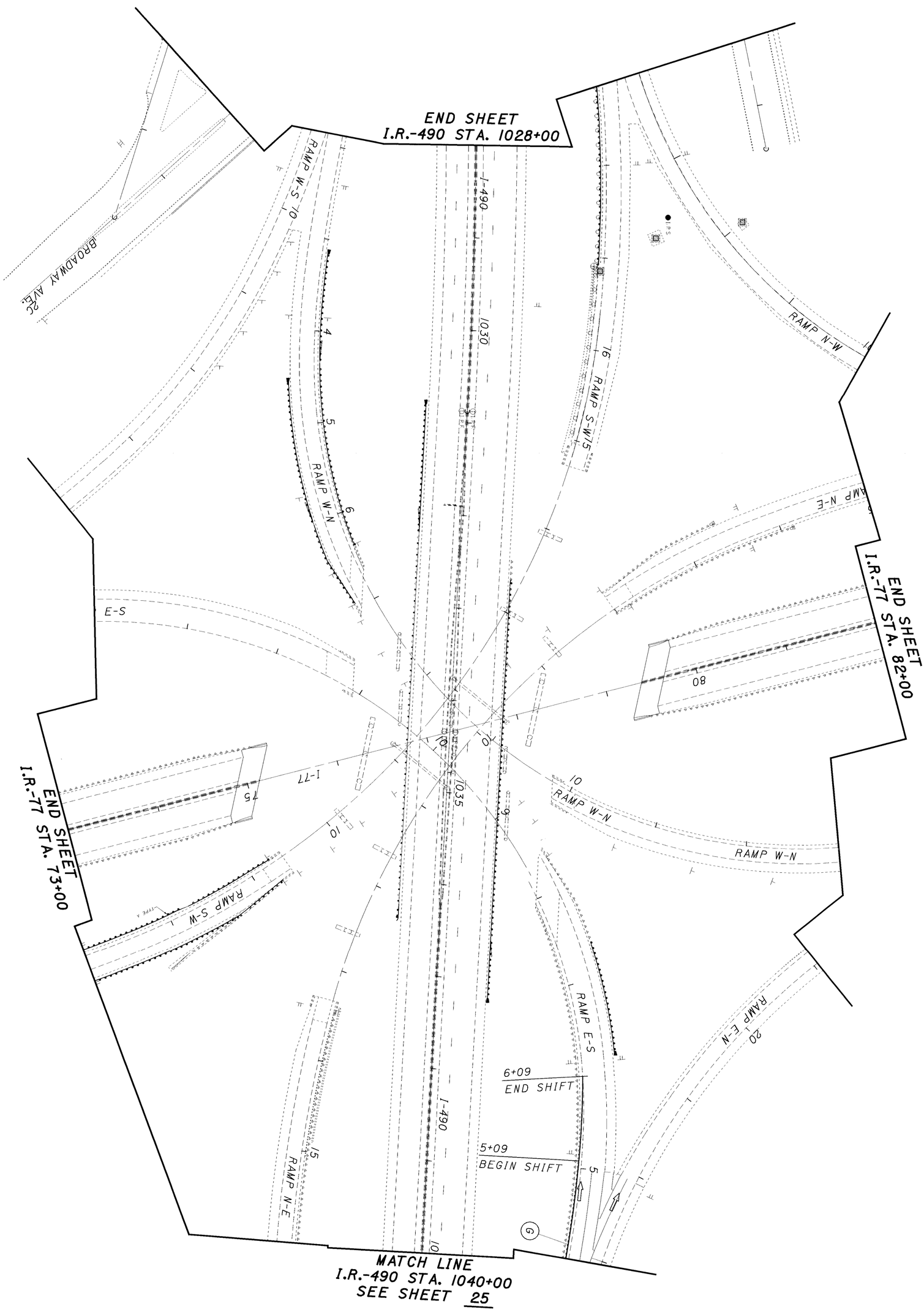
SEE SHEET 12 FOR RAMP E-N DETOUR NOTE
SEE SHEET 15 FOR PAVEMENT MARKING LEGEND

PHASE 3A

22/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1028+00 TO STA. 1040+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET	N

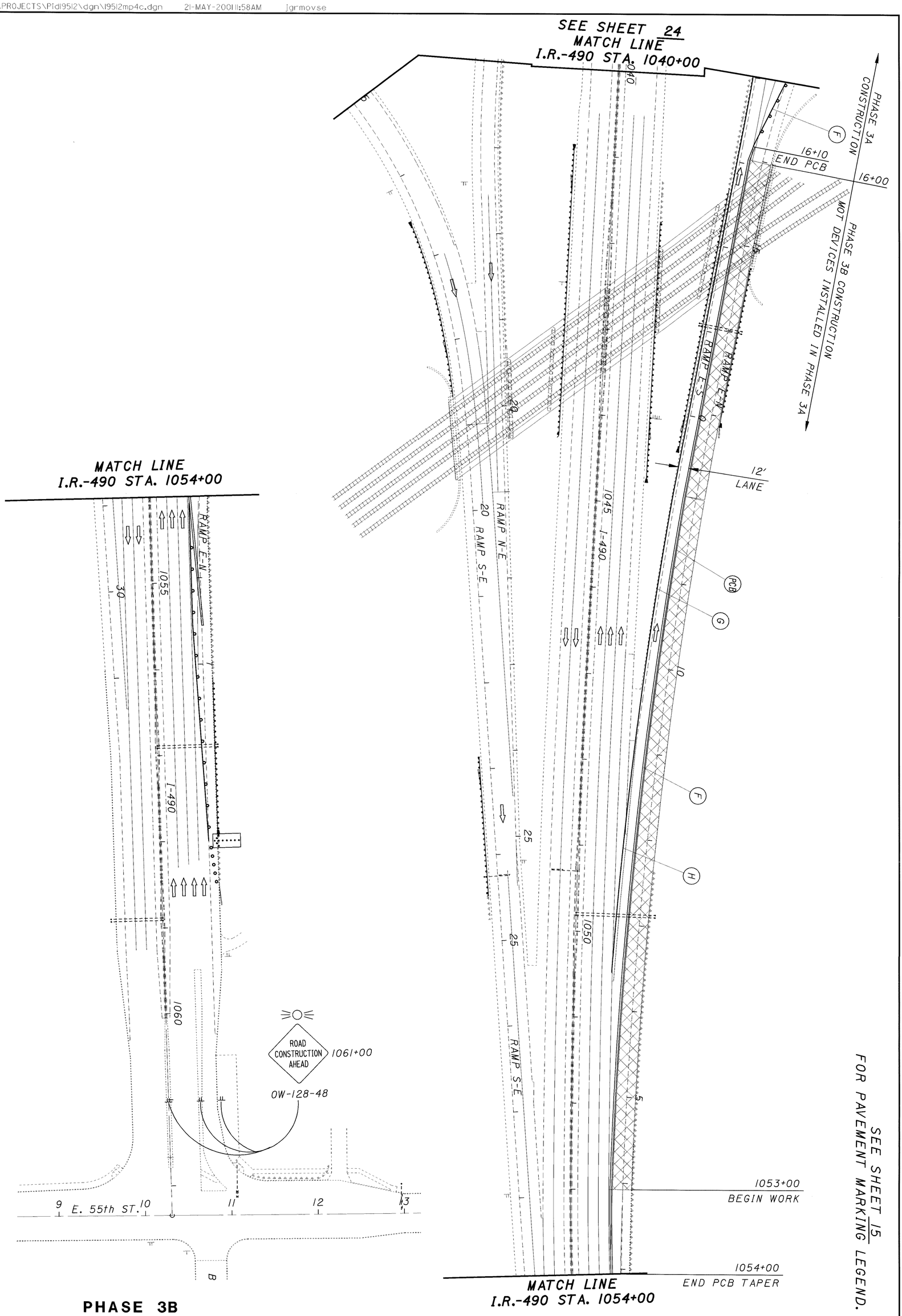


23/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1040+00 TO STA. 1054+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET



PHASE 3B

24/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1028+00 TO STA. 1040+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET



25/57	CUY-490-1.65	MAINTENANCE OF TRAFFIC STA. 1040+00 TO STA. 1054+00	CALCULATED CHECKED	0 50 100 HORIZONTAL SCALE IN FEET	N

SHEET NUMBER											ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
5	6	7	8	29	30		32									
															ROADWAY	
											201	11000	LUMP		CLEARING AND GRUBBING	
					19814						202	23000	19814	SQ YD	PAVEMENT REMOVED	
				24146							202	23500	24146	SQ YD	WEARING COURSE REMOVED	
							5950				202	38000	5950	LIN FT	GUARDRAIL REMOVED	
		170									202	54101	170	EACH	RAISED PAVEMENT MARKER REMOVED FOR STORAGE, AS PER PLAN	7
		9236									202	75001	9236	LIN FT	FENCE REMOVED, AS PER PLAN	7
			4								202	75800	4	EACH	DISCONNECT EXISTING CIRCUIT	
500				367.5	3098						203	12000	3966	CU YD	EXCAVATION NOT INCLUDING EMBANKMENT CONSTRUCTION	
200					66						203	20000	266	CU YD	EMBANKMENT	
4											203	45001	4	HOUR	PROOF ROLLING, AS PER PLAN	5
600					10541						203	50000	11141	SQ YD	SUBGRADE COMPACTION	
							68				203	60200	68	STATION	LINEAR GRADING, METHOD A	5
				19.2							203	60204	19.2	STATION	LINEAR GRADING, METHOD B	5
							5287.5				606	13000	5287.5	LIN FT	GUARDRAIL, TYPE 5	
		100					525				606	13050	625	LIN FT	GUARDRAIL, TYPE 5A	
							16				606	22010	16	EACH	ANCHOR ASSEMBLY, TYPE E-98	
							9				606	26500	9	EACH	ANCHOR ASSEMBLY, TYPE T	
							5				606	35000	5	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 1	
							2				606	35100	2	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 2	
							4				606	35141	4	EACH	BRIDGE TERMINAL ASSEMBLY, TYPE 4, AS PER PLAN	50
		9236									607	23000	9236	LIN FT	FENCE, TYPE CLT	
		5									607	50900	5	EACH	GATE, TYPE CL	
							14				622	90000	14	LIN FT	BARRIER, MISC.: CONCRETE BARRIER	49
															EROSION CONTROL	
	10										601	34200	10	CU YD	ROCK CHANNEL PROTECTION, TYPE C WITHOUT FILTER	
	500										670	40000	500	SQ YD	DITCH EROSION PROTECTION	
	2										870	00100	2	EACH	SOIL ANALYSIS TEST	
	100										870	00200	100	CU YD	PLACING TOPSOIL	
	6500				747						870	10000	7247	SQ YD	SEEDING AND MULCHING	
	500										870	14000	500	SQ YD	REPAIR SEEDING AND MULCHING	
	0.93										870	20000	0.93	TON	COMMERCIAL FERTILIZER	
	2.69										870	30000	2.69	TON	AGRICULTURAL LIME	
	37.7										870	35000	37.7	M GAL	WATER	
	1000										877	10000	1000	SQ YD	TEMPORARY SEEDING AND MULCHING	
	1000										877	30100	1000	LIN FT	TEMPORARY PERIMETER FILTER FABRIC FENCE	
	200										877	30200	200	LIN FT	TEMPORARY DITCH CHECK FILTER FABRIC FENCE	
	200										877	30300	200	LIN FT	TEMPORARY INLET PROTECTION FILTER FABRIC FENCE	
	200										877	55500	200	SQ YD	TEMPORARY DITCH PROTECTION	
	25										877	60000	25	CU YD	SEDIMENT REMOVAL	

CALCULATED

CHECKED

GENERAL SUMMARY

CUY-490-1.65

SHEET NUMBER										ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
5	6	8	9	29	30	31	32	51	52						
														DRAINAGE	
	50			369						603	01500	419	LIN FT	6" CONDUIT, TYPE F	
				60						603	01501	60	LIN FT	6" CONDUIT, TYPE F, AS PER PLAN	6
						535				603	05900	535	LIN FT	15" CONDUIT, TYPE B	
						110				603	06100	110	LIN FT	15" CONDUIT, TYPE C	
						483				603	07400	483	LIN FT	18" CONDUIT, TYPE B	
						700				603	07600	700	LIN FT	18" CONDUIT, TYPE C	
						155				603	09100	155	LIN FT	21" CONDUIT, TYPE C	
	2500									SPECIAL	60450000	2500	POUND	MISCELLANEOUS METAL	6
	200			8052						605	11110	8252	LIN FT	6" SHALLOW PIPE UNDERDRAIN WITH FABRIC WRAP	
	200			561						605	13410	761	LIN FT	6" UNCLASSIFIED PIPE UNDERDRAIN WITH FABRIC WRAP	
														PAVEMENT	
27										251	01000	27	SQ YD	PARTIAL DEPTH PAVEMENT REPAIR	
160										255	10150	160	SQ YD	FULL DEPTH PAVEMENT REMOVAL AND RIGID REPLACEMENT, CLASS MS	
480										255	20000	480	LIN FT	FULL DEPTH PAVEMENT SAWING	
300					3418					304	20001	3718	CU YD	AGGREGATE BASE, AS PER PLAN	6
				1471						305	13000	1471	SQ YD	9" CONCRETE BASE	
				2410						407	10000	2410	GALLON	TACK COAT	
				1813						407	14000	1813	GALLON	TACK COAT FOR INTERMEDIATE COURSE	
				1174						446	46040	1174	CU YD	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, PG64-28	
				1006						446	50001	1006	CU YD	ASPHALT CONCRETE SURFACE COURSE, TYPE 1H, AS PER PLAN	6
							263			448	46060	263	CU YD	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1, PG64-22 (UNDER GUARDRAIL)	
					526					451	14000	526	SQ YD	9" REINFORCED CONCRETE PAVEMENT	
					15796					451	15000	15796	SQ YD	10" REINFORCED CONCRETE PAVEMENT	
	142.5									451	20000	142.5	SQ YD	REINFORCED CONCRETE PAVEMENT, MISC.: RUMBLE STRIP FINISH	6
					5670					452	14000	5670	SQ YD	10" PLAIN CONCRETE PAVEMENT	
				11762						618	40100	11762	LIN FT	RUMBLE STRIPS, TYPE 2 (ASPHALT)	
		1875			6236					618	40200	8111	LIN FT	RUMBLE STRIPS, TYPE 2 (CONCRETE)	
					16					SPECIAL	45131000	16	LIN FT	PRESSURE RELIEF JOINT, TYPE B	
														LIGHTING	
		5								625	00500	5	EACH	CONNECTOR KIT, TYPE II	
		5								625	00600	5	EACH	CONNECTOR KIT, TYPE III	
		10								625	01500	10	EACH	CABLE SPLICING KIT	
		525								625	24100	525	LIN FT	1-1/2" DUCT CABLE WITH TWO NO. 4 AWG 5000 VOLT CABLES	
		525								625	24300	525	LIN FT	1-1/2" DUCT CABLE WITH TWO NO. 2 AWG 5000 VOLT CABLES	
		1000								625	29002	1000	LIN FT	TRENCH, 24" DEEP	

CALCULATED

CHECKED

GENERAL SUMMARY

CUY-490-1.65

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SHEET NUMBER											ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
8	9	10	11	12	13		32	51	52							
															TRAFFIC CONTROL	
142											621	00200	142	EACH	RAISED PAVEMENT MARKER, INSTALLATION ONLY	
							78				626	00100	78	EACH	BARRIER REFLECTOR, TYPE A	
									114.5		630	03100	114.5	LIN FT	GROUND MOUNTED SUPPORT, NO. 3 POST	
									69.5		630	06500	69.5	LIN FT	GROUND MOUNTED SUPPORT, W6X9 BEAM	
									64		630	80102	64	SQ FT	SIGN, FLAT SHEET, TYPE G	
									96		630	80204	96	SQ FT	SIGN, EXTRUSHEET, TYPE G	
									4		630	84500	4	EACH	GROUND MOUNTED BEAM SUPPORT FOUNDATION	
									5		630	84900	5	EACH	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	
									10		630	86002	10	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL	
	8800								4975		642	30000	13775	LIN FT	REMOVAL OF PAVEMENT MARKING	
								4.85			828	10000	4.85	MILE	EDGE LINE	
								1.21			828	10100	1.21	MILE	LANE LINE	
								3525			828	10300	3525	LIN FT	CHANNELIZING LINE	
								1270			828	10600	1270	LIN FT	TRANSVERSE LINE	
															MAINTENANCE OF TRAFFIC	
	20										410	12000	20	CU YD	TRAFFIC COMPACTED SURFACE, TYPE A OR B	
	20										410	13000	20	CU YD	TRAFFIC COMPACTED SURFACE, TYPE C	
				200							614	11100	200	HOUR	LAW ENFORCEMENT OFFICER WITH PATROL CAR	
	40										614	12460	40	EACH	WORK ZONE MARKING SIGN	
			1								614	12470	1	EACH	WORK ZONE SPEED LIMIT SIGN	
		50									SPECIAL	614 12500	50	SQ FT	REPLACEMENT SIGN	
	20										614	13000	20	CU YD	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC	
				5							614	13001	5	CU YD	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC, AS PER PLAN	12
			500								614	13300	500	EACH	BARRIER REFLECTOR, TYPE B	
			500								614	13350	500	EACH	OBJECT MARKER	
			27								614	18601	27	SIGN MNTH	PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN	11
					2.07						614	22100	2.07	MILE	TEMPORARY EDGE LINE, CLASS I, 642 PAINT	
					2.98						614	22200	2.98	MILE	TEMPORARY EDGE LINE, CLASS I, 740.06, TYPE I	
					990						614	23200	990	LIN FT	TEMPORARY CHANNELIZING LINE, CLASS I, 642 PAINT	
					1235						614	23400	1235	LIN FT	TEMPORARY CHANNELIZING LINE, CLASS I, 740.06, TYPE I	
	10										616	10000	10	M GAL	WATER	
	1										616	20000	1	TON	CALCIUM CHLORIDE	
					11930						622	40020	11930	LIN FT	PORTABLE CONCRETE BARRIER, 32"	
											614	11000	LUMP		MAINTAINING TRAFFIC	
											623	10000	LUMP		CONSTRUCTION LAYOUT STAKES	
											623	10001	LUMP		CONSTRUCTION LAYOUT STAKES, AS PER PLAN	5
											624	10000	LUMP		MOBILIZATION	
											806	16010	10	MONTH	FIELD OFFICE, TYPE B	

CALCULATED

CHECKED

GENERAL SUMMARY

CUY-490-1.65

UNDERDRAIN QUANTITIES

REFERENCE NO.	LOCATION	SIDE	STATION FROM	STATION TO	605 6" SHALLOW PIPE UNDERDRAIN L.F.	605 6" UNCLASSIFIED PIPE UNDERDRAIN L.F.	603 6" CONDUIT, TYPE F L.F.	603 6" CONDUIT, TYPE F, AS PER PLAN L.F.
U-1	I-490	LT	1040+50	1046+73	553	70	34	
U-2	I-490	LT	1040+50	1042+35	0	185		10
U-3	I-490	RT	1040+50	1042+35	0	185		10
U-4	I-490	RT	1040+50	1044+29	307	72	36	
U-5	I-490	LT	1042+35	1050+00	765			10
U-6	I-490	RT	1042+35	1050+00	765			10
U-7	I-490	RT	1044+40	1050+40	566	34	36	
U-8	I-490	LT	1050+00	1053+00	300			10
U-9	I-490	RT	1050+00	1053+00	300			10
U-10	RAMP EN	RT	17+90	14+30	360		28	
U-11	RAMP EN	RT	14+20	3+95	1025		28	
U-12	RAMP NE	LT	17+55	20+75	320		28	
U-13	RAMP SE	RT	17+00	20+00	600		28	
U-14	RAMP SE	RT	20+10	24+19	788	15	10	
U-15	RAMP WN	LT	10+10	14+40	430		15	
U-16	RAMP SW	LT	4+00	9+10	510		86	
U-17	RAMP NW	LT	15+27	17+30	203		20	
U-18	RAMP NW	LT	17+40	20+00	260		20	
TOTALS					8052	561	369	60

CONCRETE BASE SHOULDER QUANTITIES

STATION FROM	STATION TO	SIDE	LENGTH	AVG. WIDTH	203 EXCAVATION, NOT INCL. EMBK. CONST. C.Y.	203 LINEAR GRADING, METHOD B STA.		305 9" CONCRETE BASE S.Y.
S-W								
3+96.08	9+39.18	LT	543.10	4	60.3	5.4		241.4
4+96.08	8+75.00	RT	378.92	10	105.3	3.8		421
8+75.00	9+39.18	RT	64.18	9	16	0.6		64.2
W-N								
9+78.23	14+45.40	LT	467.17	4	51.9	4.7		207.6
9+78.23	10+50.00	RT	71.77	9	17.9	0.7		71.8
10+50.00	14+00.00	RT	350.00	10	97.2	3.5		388.9
14+00.00	14+45.40	RT	45.40	15	18.9	0.5		75.7
TOTALS					367.5	19.2		1470.6

RAMP RESURFACING QUANTITIES

STATION FROM	STATION TO	LIN. FT.	AVG. WIDTH	202 WEARING COURSE REMOVED S.Y.	407 TACK COAT GAL.	407 TACK COAT FOR INTERMEDIATE COURSE GAL.	446 1 1/2" ASPHALT SURFACE COURSE, TYPE 1H. APP C.Y.	446 1 3/4" ASPHALT INTERMED. COURSE, TYPE 2. PG64-28 C.Y.	618 RUMBLE STRIPS, TYPE 2 (ASPHALT) L.F.
W-S									
15+63.21	16+38.21	75.00	30	250.0	25	19	10.4	12.2	150
16+38.21	21+71.02	532.81	50.5	2989.7	299	224	124.6	145.3	1066
21+71.02	22+71.02	100.00	38	422.2	42	32	17.6	20.5	200
W-N									
9+78.23	10+03.23	25.00	26	72.2	7	5	3.0	3.5	50
10+03.23	14+45.40	442.17	30	1473.9	147	111	61.4	71.6	884
S-W									
3+96.08	4+96.08	100.00	31	344.4	34	26	14.4	16.7	200
4+96.08	9+14.18	418.10	30	1393.7	139	105	58.1	67.7	836
9+14.18	9+39.18	25.00	26	72.2	7	5	3.0	3.5	50
S-E									
5+82.84	6+82.84	100.00	39	433.3	43	33	18.1	21.1	200
6+82.84	9+92.00	309.16	45	1545.8	155	116	64.4	75.1	618
9+92.00	10+75.47	83.47	64	593.6	59	45	24.7	28.9	167
10+75.47	11+75.47	100.00	39	433.3	43	33	18.1	21.1	200
11+75.47	16+95.42	519.95	38	2195.3	220	165	91.5	106.7	1040
E-S									
4+98.80	5+98.80	100.00	39	433.3	43	33	18.1	21.1	200
5+98.80	8+02.70	203.90	38	860.9	86	65	35.9	41.8	408
11+08.37	16+17.56	509.19	38	2149.9	215	161	89.6	104.5	1018
E-N									
17+92.61	18+92.61	100.00	31	344.4	34	26	14.4	16.7	200
18+92.61	21+22.44	229.83	30	766.1	77	57	31.9	37.2	460
21+22.44	22+22.44	100.00	28	311.1	31	23	13.0	15.1	200
22+22.44	23+22.44	100.00	25	277.8	28	21	11.6	13.5	200
23+22.44	24+44.00	121.56	47.5	641.6	64	48	26.7	31.2	243
24+44.00	25+75.94	131.94	39	571.7	57	43	23.8	27.8	264
25+75.94	26+99.50	123.56	38	521.7	52	39	21.7	25.4	247
N-E									
3+28.01	4+28.01	100.00	31	344.4	34	26	14.4	16.7	200
4+28.01	8+00.96	372.95	30	1243.2	124	93	51.8	60.4	746
13+33.46	17+54.39	420.93	30	1403.1	140	105	58.5	68.2	842
N-W									
4+58.50	5+32.48	73.98	38	312.4	31	23	13.0	15.2	148
5+32.48	6+33.00	100.52	39	435.6	44	33	18.1	21.2	201
6+33.00	7+26.00	93.00	44	454.7	45	34	18.9	22.1	186
7+26.00	8+19.86	93.86	58	604.9	60	45	25.2	29.4	188
8+19.86	8+94.86	75.00	30	250.0	25	19	10.4	12.2	150
TOTALS				24146.4	2410	1813	1006.3	1173.6	11762

CALCULATED

CHECKED

UNDERDRAIN AND PAVEMENT SUB-SUMMARY

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PAVEMENT REPLACEMENT QUANTITIES

STATION FROM	STATION TO	LIN. FT.	AVG. WIDTH	202 PAVEMENT REMOVED S.Y.	203 EXCAVATION, NOT INCL. EMBK. CONST. C.Y.	203 SUBGRADE COMPACTION S.Y.	304 AGGREGATE BASE, AS PER PLAN C.Y.	451 10" REINFORCED CONCRETE PAVEMENT S.Y.
I-490 WB								
1040+50.00	1047+75.00	725.00	36	2900.0	80.6	-	-	2900.0
1047+75.00	1051+50.00	375.00	69.5	2895.8	80.4	-	-	2895.8
1051+50.00	1053+00.00	150.00	54.9	915.0	330.4	915	305.0	915.0
I-490 EB								
1040+50.00	1051+50.00	1100.00	24	2933.3	81.5	-	-	2933.3
1051+50.00	1053+00.00	150.00	24	400.0	144.4	400	133.3	400.0
RAMP E-N								
9+13.57	10+13.57	100.00	25	277.8	7.7	-	-	277.8
10+13.57	14+69.63	456.06	24	1216.2	33.8	-	-	1216.2
14+69.63	16+14.00	144.37	25	401.0	11.1	-	-	401.0
16+14.00	17+92.61	178.61	44	873.2	24.3	-	-	873.2
RAMP N-E								
17+54.39	19+11.22	156.83	16	278.8	100.7	278.8	92.9	278.8
19+11.22	20+00.00	88.78	22	217.0	78.4	217	72.3	217.0
20+00.00	24+50.00	450.00	10	500.0	180.6	500	166.7	500.0
RAMP S-E								
16+95.42	19+00.00	204.58	26	591.0	213.4	591	197.0	591.0
19+00.00	23+25.00	425.00	24	1133.3	409.3	1133.3	377.8	1133.3
23+25.00	24+19.00	94.00	25.25	263.7	95.2	263.7	87.9	263.7
TOTALS				15796.1	1871.8	4298.8	1432.9	15796.1

SHOULDER REPLACEMENT QUANTITIES

STATION FROM	STATION TO	SIDE	LIN. FT.	AVG. WIDTH	202 PAVEMENT REMOVED S.Y.	203 EXCAVATION, NOT INCL. EMBK. CONST. C.Y.	203 SUBGRADE COMPACTION S.Y.	304 AGGREGATE BASE, AS PER PLAN C.Y.	452 10" PLAIN CONCRETE PAVEMENT S.Y.	618 RUMBLE STRIPS, TYPE 2 (CONCRETE) L.F.
I-490 WB										
1040+50.00	1046+75.00	LT	625.00	10		424.4	694	231.5	694.4	625
1047+75.00	1053+00.00	LT	525.00	10		16.2	583	194.4	583.3	525
I-490 EB										
1040+50.00	1051+50.00	RT	1100.00	12	1466.7	40.7	1467	488.9	1466.7	1100
1051+50.00	1053+00.00	RT	150.00	12	200.0	72.2	200	66.7	200.0	150
RAMP E-N										
9+13.57	17+92.61	RT	879.04	10		27.1	977	325.6	976.7	879
9+13.57	12+94.04	LT	380.47	4		4.7	169	56.4	169.1	380
RAMP E-S										
0+0.00	4+98.80	LT	498.80	4		6.2	222	73.9	221.7	499
RAMP N-E										
17+54.39	18+55.00	RT	100.61	10		40.4	112	37.3	*111.8	101
18+55.00	19+11.22	RT	56.22	15		33.8	94	31.2	*93.7	56
17+54.39	25+37.96	LT	783.57	4		125.8	348	116.1	*348.3	784
RAMP S-E										
16+95.42	24+19.00	RT	723.58	10	2090.3	290.3	804	268.0	804.0	724
TOTALS					3757.0	1081.8	5670	1890.0	5669.7	5823

* - MAY REQUIRE MS CONCRETE

RAMP N-W/S-W WIDENING CALCULATIONS

202-PAVEMENT REMOVED

[1643-1527]*[[0+2]/2]]/9 = 12.9 S.Y.
[2019-1527]*4/9 = 218.7 S.Y.
[2019-1990]*[9]/9 = 29.0 S.Y.
TOTAL = 260.6 S.Y.

203-SUBGRADE COMPACTION

[[1643-1527]*2]/9 = 25.8 S.Y.
[[2019-1643]*[9+2]/2]/9 = 229.8 S.Y.
[[1940-1527]*5]/9 = 229.4 S.Y.
[[2019-1940]*[13+6.7]/2]/9 = 86.5 S.Y.
TOTAL = 571.5 S.Y.

304-6" AGGREGATE BASE, AS PER PLAN

[[1643-1527]*2*[6/12]]/27 = 4.3 C.Y.
[[2019-1643]*[[9+2]/2]*[6/12]]/27 = 38.3 C.Y.
[[1940-1527]*5*[6/12]]/27 = 38.2 C.Y.
[[2019-1940]*[[13+6.7]/2]*[6/12]]/27 = 14.4 C.Y.
TOTAL = 95.2 C.Y.

451-9" REINFORCED CONCRETE PAVEMENT

[[1643-1527]*2]/9 = 25.8 S.Y.
[[2019-1643]*[[9+2]/2]]/9 = 229.8 S.Y.
[[1940-1527]*4]/9 = 183.6 S.Y.
[[2019-1940]*[[13+6.7]/2]]/9 = 86.5 S.Y.
TOTAL = 525.7 S.Y.

203-EXCAVATION, NOT INCL. EMB. CONST.

SEE CROSS SECTION SHEETS

SHEET 41	34 C.Y.
SHEET 41	56 C.Y.
SHEET 42	54 C.Y.

TOTAL = 144 C.Y.

203-EMBANKMENT

SEE CROSS SECTION SHEETS

SHEET 41	23 C.Y.
SHEET 41	39 C.Y.
SHEET 42	4 C.Y.

TOTAL = 66 C.Y.

618-RUMBLE STRIPS, TYPE 2, CONCRETE

1940-1527 = 413 L.F.
TOTAL = 413 L.F.

SPEC-PRESSURE RELIEF JOINT, TYPE B

TOTAL = 16 L.F.

870-SEEDING AND MULCHING

SEE CROSS SECTION SHEETS

SHEET 41	336 S.Y.
SHEET 41	375 S.Y.
SHEET 42	36 S.Y.

TOTAL = 747 S.Y.

CALCULATED
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PAVEMENT SUB-SUMMARY

CUY-490-1.65

REF NO.	SHEET NO.	STATION FROM	STATION TO	ROAD	SIDE		603 15", TYPE C LIN FT	603 15", TYPE B LIN FT	603 18", TYPE C LIN FT	603 18", TYPE B LIN FT	603 21", TYPE C LIN FT
P-1		1050+00 (490)	24+00 (RMP S-E)					150			
P-2		24+00 (RMP S-E)	20+25 (RMP S-E)						375		
P-3		20+25 (RMP S-E)	1044+60 (490)							125	
P-4		1042+80 (490)	1041+25 (490)								155
P-5		1042+35 (490)	1042+80 (490)					98			
P-6		18+15 (RMP S-E)	17+00 (RMP S-E)				110				
P-7		14+25 (RMP E-N)	1042+60 (490)					100			
P-8											
P-9		1042+60 (490)	1041+15 (490)						145		
P-10		1041+15 (490)	1041+25 (490)							158	
P-11		17+10 (RMP E-N)	1041+15 (490)					187			
P-12		1044+60 (490)	1042+80 (490)						180		
B-23		16+50 (RMP S-E)	1041+25 (490)							110	
B-24		17+00 (RMP S-E)	16+50 (RMP S-E)							90	
TOTALS CARRIED TO GENERAL SUMMARY							110	535	700	483	155

CALCULATED JEL CHECKED

DRAINAGE SUB-SUMMARY

CUY-490-1.65

* - SEE PLAN SHEETS FOR NON-STANDARD GUARDRAIL OFFSET

Ref. No.	Sheet No.	Existing Locations From	Existing Locations To	Proposed Locations From	Proposed Locations To	Roadway	Side (in Direction of Travel)	Length of Need (for Fixed Objects)	202 Guardrail Removed Lin Ft	606 Guardrail, Type 5 Lin Ft	606 Guardrail, Type 5A Lin Ft		622 Barrier Misc: Concrete Barrier Lin Ft	606 Anchor Assembly, Type T Each	606 Anchor Assembly, Type E-98 Each	606 Bridge Terminal Assembly, Type I Each	606 Bridge Terminal Assembly, Type 2 Each	606 Bridge Terminal Assembly, Type 4, As Per Plan Each		203 Linear Grading, Method A Station	448 Asphalt Concrete Intermediate Course, Type I, PG64-22 (Under Guardrail) Cu Yd		626 Barrier Reflector, Type A Each
		I-490 EASTBOUND																					
G-1		1025+36		NO WORK		I-490	RT																
G-2		1032+00	1036+28	1030+82	1035+82	I-490	RT	233	437.5	437.5				1	1					5	19.2		6
G-3		1041+25	1044+26	1040+87	1044+13	I-490	RT	200	300	262.5				1	1					3.3	12.7		4
G-4		NA	NA	1055+84	1058+96	I-490	RT	NA	NA	250				1	1					3.2	12.3		4
		I-490 WESTBOUND																					
G-5		1058+63	1049+22	1057+90	1049+53	I-490	RT	84	950	725	50			1	1					8.4	31.7		9
G-6 *		1044+24	1041+51	1044+66	1040+91	I-490	RT	153	275	200	112.5			1	1					3.8	14.6		4
G-7 *		1036+72	1032+50	1037+22	1032+85	I-490	RT	160	425	212.5	162.5			1	1					4.4	16.9		5
G-8		1027+04	1025+77	1027+38	1025+88	I-490	RT	126	137.5	87.5				1	1					1.5	6.3		2
		I-77 NORTHBOUND																					
G-9		63+87	65+25	NO WORK		I-77	RT																
		RAMP S-E EASTBOUND																					
G-10		8+65	10+65	NO WORK		RAMP S-E	RT																
G-11		8+68	10+68	NO WORK		RAMP S-E	LT																
G-12		17+40	18+66	15+91	18+66	RAMP S-E	RT	225	137.5	225					1	1				2.8	10.9		3
G-13 *		23+00	24+75	22+95	24+45	RAMP S-E	RT	116	175	62.5	25			1	1					1.5	6.3		2
		RAMP E-N NORTHBOUND																					
G-14		12+74	14+75	12+87	14+75	RAMP E-N	RT	95	212.5	112.5	25				1	1				1.9	7.6		2
		RAMP E-S SOUTHBOUND																					
G-15 *		0-30	7+80	0-32	7+80	RAMP E-S	LT	122	812.5	612.5	150				1	1				8.2	30.8		9
G-16		7+21	8+38	6+50	8+38	RAMP E-S	RT	171	125	137.5					1	1				1.9	7.6		2
		RAMP W-S SOUTHBOUND																					
G-17		23+46	24+37	NO WORK		RAMP W-S	RT																
		RAMP S-W NORTHBOUND																					
G-18		7+76	9+25	NO WORK		RAMP S-W	RT																
G-19		7+98	9+25	6+88	9+26	RAMP S-W	LT	221	137.5	187.5					1			1		2.4	9.5		3
G-20		14+92	22+38	14+92	22+17	RAMP S-W	LT	NA	750	712.5				1			1			7.3	29.4		8
		RAMP N-W WESTBOUND																					
G-21		19+05	20+43	19+16	20+43	RAMP N-W	RT	105	137.5	62.5			14		1	1				1.3	4.9		2
		RAMP W-N NORTHBOUND																					
G-22		5+75	7+00	4+75	7+00	RAMP W-N	RT	207	125	175					1			1		2.3	9		3
G-23		4+05	6+36	3+36	6+36	RAMP W-N	LT	279	237.5	250					1			1		3	11.8		4
		RAMP E-N NORTHBOUND																					
G-24		23+12	26+77	NO WORK		RAMP E-N	RT																
G-25		24+25	26+77	NO WORK		RAMP E-N	LT																
		RAMP N-W WESTBOUND																					
G-26		4+85	7+63	NO WORK		RAMP N-W	RT																
		RAMP N-E EASTBOUND																					
G-27		1+03	2+70	NO WORK		RAMP N-E	LT																
G-28		6+56	7+83	NO WORK		RAMP N-E	RT																
G-29		5+97	7+83	NO WORK		RAMP N-E	LT																
G-30		13+45	19+19	13+45	19+19	RAMP N-E	LT	NA	575	575							1	1		5.8	21.3		6
TOTALS CARRIED TO GENERAL SUMMARY									5950	5287.5	525		14	9	16	5	2	4		68	262.8		78

CALCULATED JAG
CHECKED JEL

Guardrail Quantities

CUY-490-1.65

32
57

CUY-490-1.65
BEGIN PROJECT
BEGIN WORK

20+19
END WIDENING

15+27
BEGIN WIDENING

UD-17
UD-18
G-21
G-8
G-20
G-1

C.B. NO.5
C.B. NO.3
C.B. NO.2-4 (NOT FND.)
C.B. NO.5 (NOT FND.)
M.H. NO.3
INLET 2-A-20
INLET 2-A

6"U.D.
12" S
15" S
18" S
24" S
27" S

1-3B50

MATCH LINE
I.R.-490 STA. 1028+00
SEE SHEET 34

SEE SHEETS 40-42 FOR RAMP N-W/S-W WIDENING DETAILS

SUB-SUMMARY INDEX	
UNDERDRAIN	29
DRAINAGE	31
GUARDRAIL	32

HORIZONTAL SCALE IN FEET
0 50 100

CALCULATED
CHECKED

PLAN SHEET - I.R.-490
STA. 1013+00 TO STA. 1028+00

CUY-490-1.65

33
57

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SEE SHEET 36
MATCH LINE
I.R.-77 STA. 82+00

SEE SHEET 33
MATCH LINE
I.R.-490 STA. 1028+00

MATCH LINE
I.R.-490 STA. 1040+00
SEE SHEET 35

MATCH LINE
I.R.-77 STA. 73+00
SEE SHEET 37

RESURFACE REPLACE

LANE E-N
LANE N-E
LANE E-S
LANE W-N
LANE W-S
LANE S-W

G-29 G-28 G-20 G-16 G-15 G-7 G-2 G-23 G-22 G-30 G-18 G-19 UD-15 UD-16 P-11

NO WORK

10' OFFSET

C.B. NO.5
M.H. NO.1
M.H. NO.2
JUNC. M.H.

8+00 9+78 8+02 17+93 4+99 11+08 9+40 13+33

1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039

6"U.D. I-3B50 I-3B50C I-3B50F

SUB-SUMMARY INDEX

UNDERDRAIN	29
DRAINAGE	31
GUARDRAIL	32

- EXISTING ASPHALT SHOULDERS TO BE REPLACED WITH CONCRETE BASE

HORIZONTAL SCALE IN FEET
0 50 100

CALCULATED
CHECKED

PLAN SHEET - I.R.-490
STA. 1028+00 TO STA. 1040+00

CUY-490-1.65

34
57

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BEGIN PAVEMENT REPLACEMENT STA. 1040+50

SEE SHEETS 38, 39 FOR ORIGINAL CONSTRUCTION PAVEMENT DETAILS OF THE REPLACEMENT AREA.

SUB-SUMMARY INDEX	
UNDERDRAIN	29
DRAINAGE	31
GUARDRAIL	32

END PAVEMENT REPLACEMENT STA. 1053+00

CONCRETE REPAIRS

SEE SHEET 34 MATCH LINE I.R.-490 STA. 1040+00

MATCH LINE I.R.-490 STA. 1054+00 SEE BELOW

UD-10 UD-1 UD-2 UD-3 UD-4 UD-5 UD-6 UD-7 UD-8 UD-9 UD-11 UD-12 UD-13 UD-14

P-7 P-9 P-11 P-10 P-5 P-12 P-3 P-4 P-1 P-2 P-6

G-14 G-15 5' OFFSET G-6 10' OFFSET G-3 G-30 G-13 10' OFFSET G-12 G-5 G-4

B-23 B-24

C.B. NO.5 C.B. NO.5 (BURIED) C.B. NO.5 (NOT FND.) C.B. NO.3A C.B. NO.3

M.H. NO.1 M.H. NO.3

INLET 2-A-14 INLET 2-A-6

LANE N-E

LANE S-E

RESURFACE REPLACE

REPLACE REPAIRS

RESURFACE PAVEMENT REPLACEMENT

17+54 16+95 24+19

CUY-490-1.65 END PROJECT END WORK

SEE ABOVE MATCH LINE I.R.-490 STA. 1054+00

HORIZONTAL SCALE IN FEET

CALCULATED CHECKED

PLAN SHEET - I.R.-490 STA. 1040+00 TO STA. 1054+00

CUY-490-1.65

35 / 57

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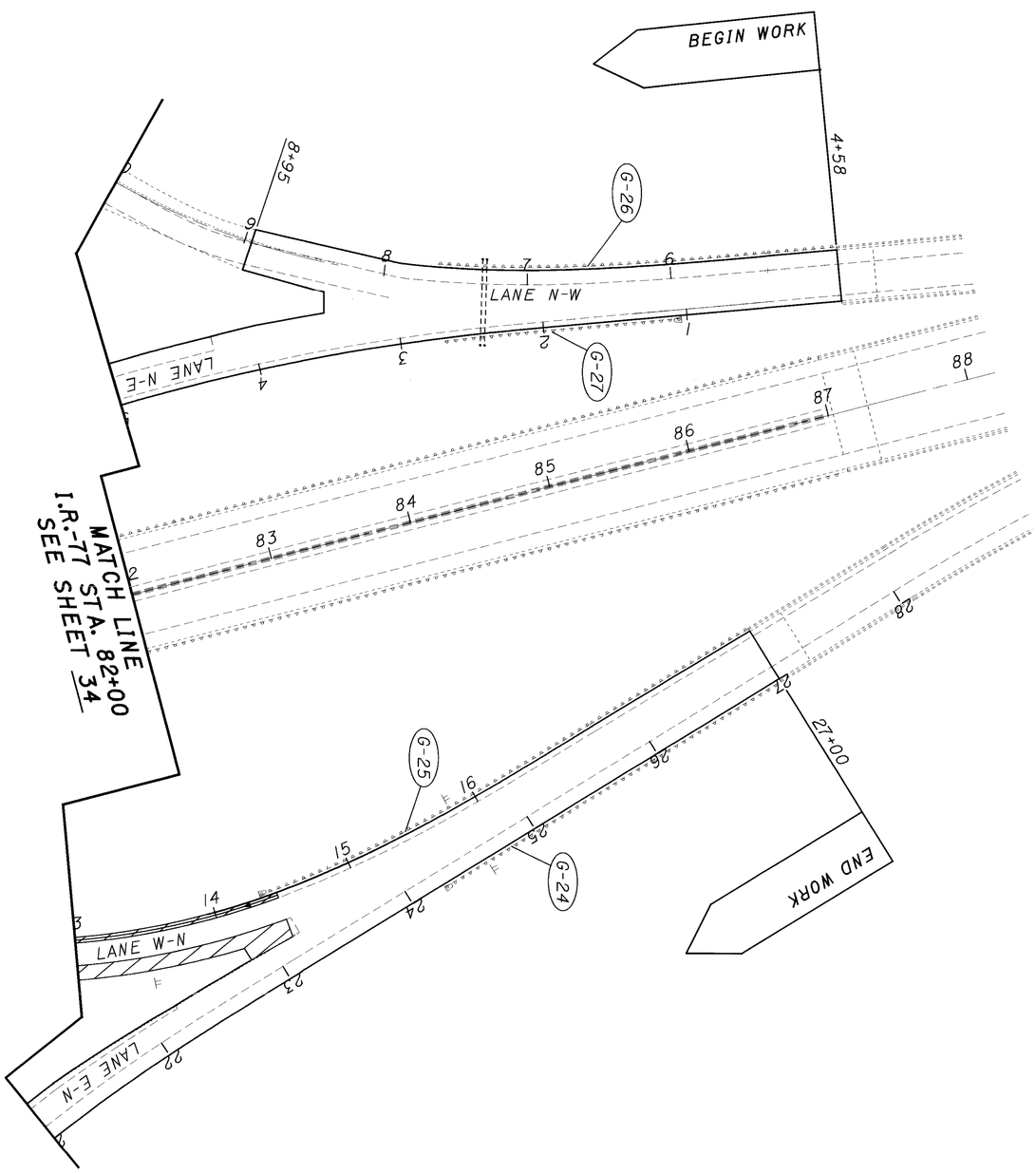
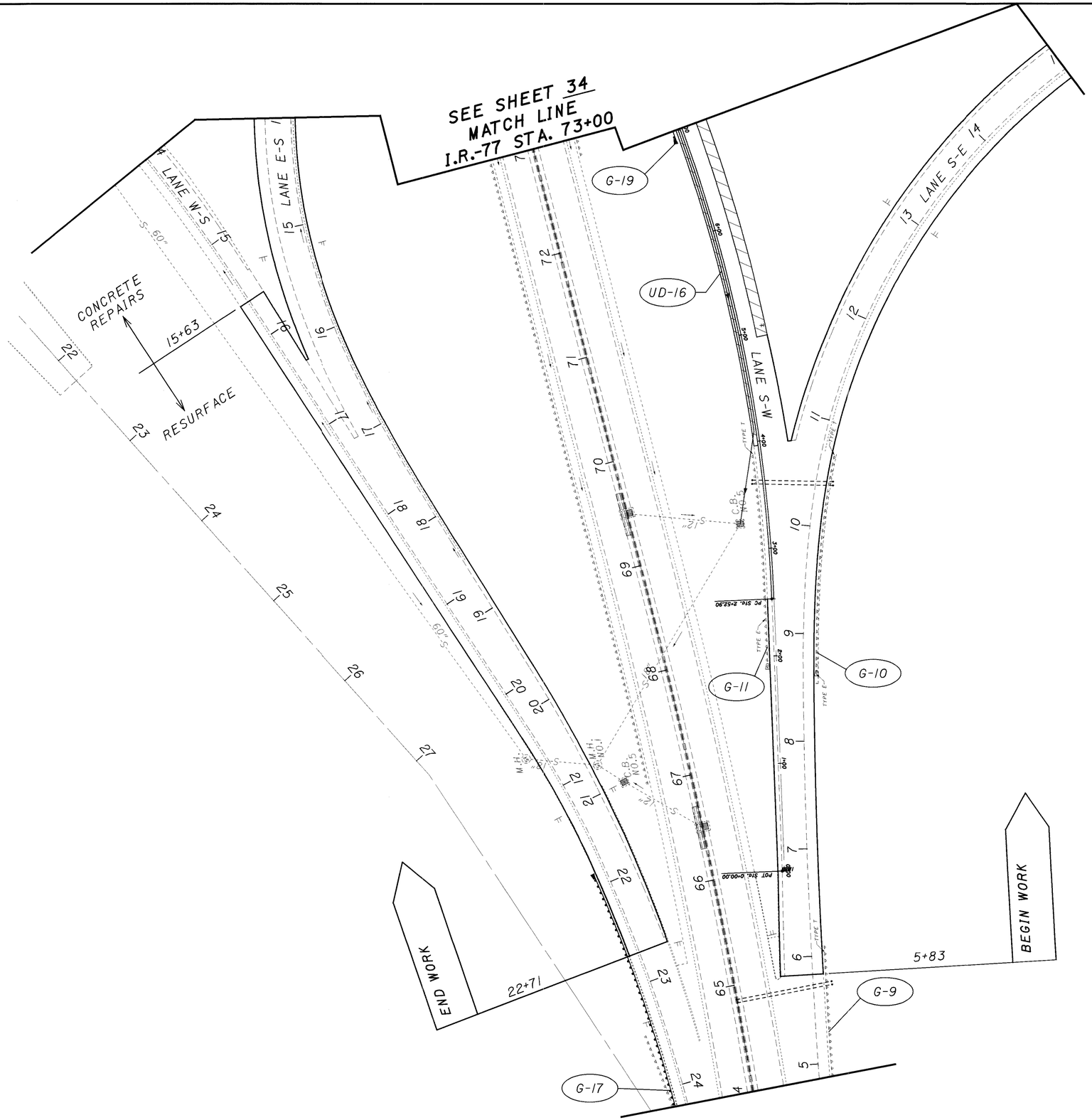


- EXISTING ASPHALT SHOULDERS TO BE REPLACED WITH CONCRETE BASE

SUB-SUMMARY INDEX	
UNDERDRAIN	29
DRAINAGE	31
GUARDRAIL	32



- EXISTING ASPHALT SHOULDERS TO BE REPLACED WITH CONCRETE BASE

SUB-SUMMARY INDEX	
UNDERDRAIN	29
DRAINAGE	31
GUARDRAIL	32

HORIZONTAL SCALE IN FEET

CALCULATED | CHECKED

PLAN SHEET - I.R.-77
STA. 65+00 TO STA. 73+00

CUY-490-1.65

37
57

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RESURFACE | REPLACE

MEET EXISTING PAVEMENT
N-E RAMP ℄ STA. 17+54.39 PT 22

PAVED BERM
6"1-22 UNDER BERM, THIS AREA

CUY-21-14.12
CONSTRUCTION

6"1-22 SUBBASE

MEET EXISTING PAVEMENT
S-E RAMP ℄ STA. 16+95.42
N-E RAMP ℄ STA. 17+00.74 C.S. 6

PAVT. TRANSITION AS INDICATED

S-E RAMP ℄ STA. 17+95.42 =
N-E RAMP ℄ STA. 19+11.22
END CURB

℄ STA. 19+00
END PAVT. TRANSITION

END RAISED BERM

PAVT. TRANSITION AS INDICATED

6"1-22 SUBBASE

N 88°-11'-30" E

CONSTRUCTION OR CONTRACTION JOINT

PAVED BERM

℄ STA. 20+00.74
S.T. 6

DIRECTION OF TRAFFIC

℄ N-E RAMP

℄ S-E RAMP

N 86°-11'-14" E

℄ STA. 22+50
S-E RAMP
MATCH LINE THIS SHEET

RESURFACE | REPLACE

REPLACE | REPAIR

1053+00

MATCH LINE THIS SHEET
S-E RAMP
℄ STA. 22+50

℄ N-E RAMP

PAVED

PAVT. TRANSITION AS INDICATED

BEGIN PAVT. TRANSITION AS INDICATED
℄ STA. 23+38.51
P.C. 7

SEE DETAIL BELOW

CONCRETE MEDIAN AND BARRIER
DO NOT DISTURB

+45 BEGIN TYPE 6 CURB & PAVED BERM

0" TO 6" CURB HEIGHT IN 10'

TYPE 6 CURB

END 30:1 PAVT TAPER
+33.20

I-490 STA. 1048+75
EXIST. R.P.C. CONC.

+74 RUMBLE STRIPS
18 GROOVES (SEE DETAIL SHEET)

W = TIP WIDTH OF CONC. BARRIER

I-490 M.I. ℄

1049+00
1050+00
1051+00
1052+00
1053+00
1054+00

D = 0°-28'-00"

ITEM 622 CONC. BARRIER

EXIST.

EDGE OF EXIST. PAVT.

CONCRETE PAVED BERM 9"

EXISTING R.P.C. CONC. PAVT

EXISTING CONSTRUCTION JOINT

ITEM 622

D = 2°-00'-00"

N 88°-12'-39" E

I-490

EXTEND EXIST. JOINTS THROUGH NEW PAVT

SAW CUT

MEET EXIST. PAVT.

CONC. MEDIAN

CONC. PAVEMENT

SEE ABOVE

PAVED BERM

1/2"/FT. SLOPE

RAMP S-E

N 85°11'14" E

+66 RUMBLE STRIPS
DO NOT DISTURB

+24 RUMBLE STRIPS
DO NOT DISTURB

9"-451

10"-451

MATCH LINE SEE SHT 34
STA. 1055+00

BEGIN PAVEMENT & BERM
STA. 24+19.2 MEET EXISTING
EXIST. CONTRACTION JOINT

STA. 24+37.06
℄ PT. EXIST. PAVT.

I-490 STA. 1053+00 60.34 RT. =
℄ RAMP S-E STA. 27+89.05

REPLACE | REPAIR
(490)

REPLACE | REPAIR
1053+00 (490)

LEGEND
- (LJ) STANDARD LONGITUDINAL JOINT
- (SC) STANDARD CONTRACTION JOINT
- (SJ) STANDARD EXPANSION BOLT JOINT
- (BJ) STANDARD BUTT JOINT
- (SE) STANDARD EXPANSION JOINT
- L.P. LIGHT POLE

SEE RUMBLE STRIP DETAIL ON SHEET 4

ORIGINAL CONSTRUCTION PAVEMENT DETAILS IR-490, STA. 1040+50 TO STA. 1053+00 N-E & S-E RAMPS

CALCULATED

CHECKED

CUY-490-1.65

38
57

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ORIGINAL CONSTRUCTION PAVEMENT DETAILS
IR-490. STA. 1040+50 TO STA. 1053+00
E-N & E-S RAMPS

CALCULATED | CHECKED

CUY-490-1.65

RESURFACE | REPLACE

END PROJECT ℄ STA. 1053+00
END PAVEMENT ℄ STA. 1053+00

6" I-22 SUBBASE | 18" I-22 SUBBASE TO STA. 1040+50

STA. 1051+50

℄ I.R. 490

MATCH LINE SEE SHEET

PAVED BERM

SEE TYPICAL SECTIONS FOR SLOPES

℄ E-N RAMP

T-31, 6"B-21, B-19 & I-22 PAVED BERM

MATCH LINE STA. 1049+00 SEE BELOW

DIRECTION OF TRAFFIC

MATCH LINE SEE SH. 1047

℄ I.R. 490

1046 TO BEGIN PAVEMENT REPLACEMENT ℄ STA. 1040+50

P.O.C. ℄ STA. 1047+75

SEE TYPICAL SECTIONS

PAVED BERM

I-11 CURB

16' 6" TO 2" CURB HGHT. TRANSITION

NOTES

FOR TRUE ELEVATIONS ADD 600.00' TO THOSE SHOWN. ELEVATIONS ARE GIVEN TO TOP OF FINISHED PAV'T. AND PAVED BERMS AT JOINTS, EDGES AND EVEN 25' STATIONS.

JOINT SYMBOLS

- (LJ) STANDARD LONGITUDINAL JOINT
- (KJ) STANDARD KEY JOINT WITHOUT TIE BARS
- (SE) STANDARD EXPANSION JOINT
- (CJ) STANDARD CONSTRUCTION JOINT
- (EJ) STANDARD EXPANSION JOINT WITHOUT TIE BARS
- (SC) STANDARD CONTRACTION JOINT

MATCH LINE THIS SHEET P.O.C. ℄ STA 9+13.57

P.O.C. ℄ STA. 10+13.57 END I-11 CURB

PAV'T TRANSITION AS INDICATED

18" I-22 SUBBASE

PAVED BERM

℄ E-N 44.50 RAMP

P.T. 12

E-N RAMP ℄ STA 12+94.04 "
E-S RAMP ℄ STA 0+00
MATCH LINE THIS SHEET

MATCH LINE THIS SHEET
E-N RAMP P.T. ℄ STA 12+94.04"
E-S RAMP P.T. ℄ STA 0+00

DIRECTION OF TRAFFIC

PAVED BEERM N 78°-58'-20"W

N 78°-58'-20"W

℄ E-N RAMP

2" HIGH 16' 6" HIGH

℄ STA 14+69.63 T.S. 13

T.S. 15 ℄ STA 3+20.09

℄ STA 17+00 BEGIN PAV'T. TRANSITION AS INDICATED

SC 13 ℄ STA 17+19.63

P.O.C. ℄ STA 17+92.61 MEET EXISTING PAVEMENT

1049 1048

MATCH LINE STA. 1049+00 SEE ABOVE

P.O.C. ℄ STA. 1047+75

DET. K SH. 4

PAV'T. TRANSITION AS INDICATED

P.O.C. ℄ STA. 8+00

P.O.C. ℄ STA. 9+13.57 MATCH LINE THIS SHEET

RESURFACE | REPLACE

PAV'T. TRANSITION AS INDICATED

P.O.S.S MEET E PAVEME

CUY-21-14.12 CONSTRUCTION

NOTES:

⊗ - MATCH EXISTING PAVEMENT CROSS SLOPE

△ - MATCH EXISTING PAVEMENT ELEVATION

△△ - SHOULDER CROSS-SLOPE TO MATCH PAVEMENT SLOPE (0.04'/FT MIN.)

▨ - CONCRETE REMOVAL

STA. 20+19
END TAPER (62.5:1)

EX. PRESSURE RELIEF JOINT

STA. 19+40
BEGIN GORE

G-21

19+00

20+00

S79°58'17"W

24'

4' SHOULDER

±9'

9'

IPS

UD-18

EQUATION:
Sta 17+87.91 BK =
Sta 17+88.00 AH

18+00

17+00

C.B. NO.5

RAMP N-W/S-W

STA. 16+43
BEGIN TAPER (62.5:1)

2' WIDENING

POT Sta. 16+25.00

ST Sta. 16+07.86

16+00

SAWCUT
AS PER 202.05

STA. 15+27
BEGIN WORK

2'

15+00

20+00

S79°58'17"W

4' SHOULDER

G-20

UD-17

PT Sta. 20+07.27

18" S

6"U.D.

SPEC, PRESSURE RELIEF JOINT, TYPE B - 16 L.F.

UNTIED LONG. JOINT

12" S

15" S

M.H. 15 NO.3

HORIZONTAL SCALE IN FEET
0 20 40

CALCULATED

CHECKED

RAMP N-W/S-W
WIDENING DETAILS

CUY-490-1.65

40
57

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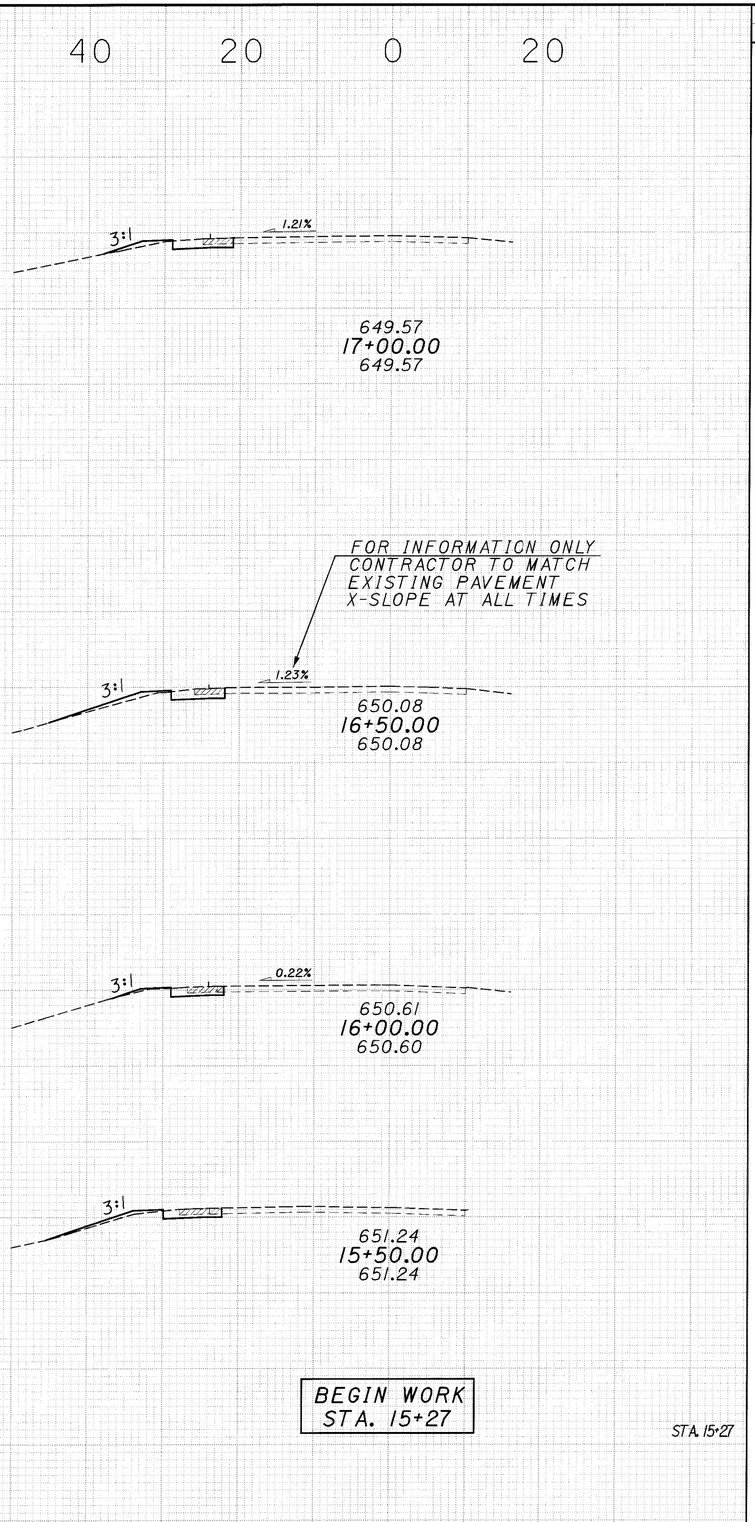
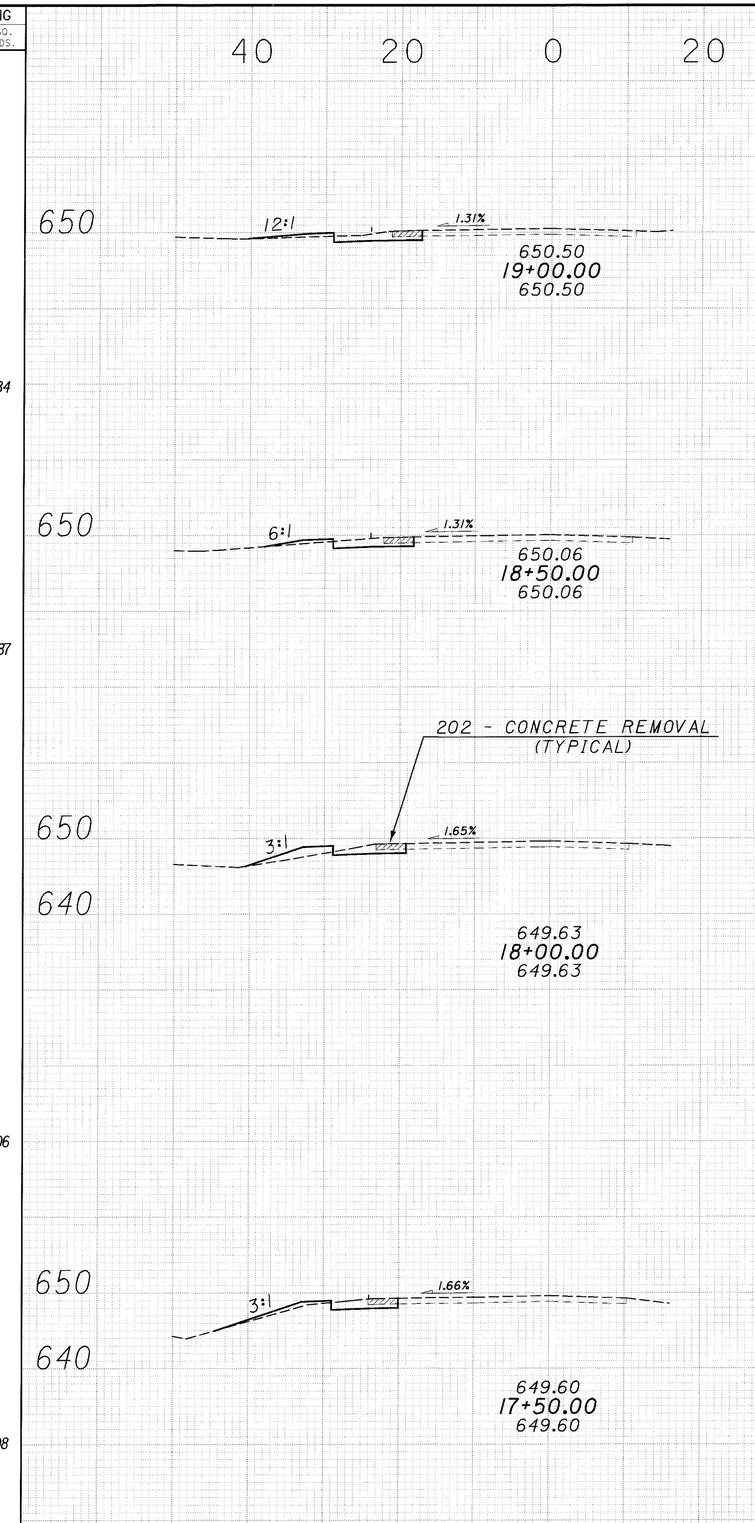
SEEDING END WIDTH	SEEDING SQ. YDS.	END AREA CUT	END AREA FILL	VOLUME CUT	VOLUME FILL
14					
	98	6	3	11	9
21		6	6		
	95			10	6
13		5	1		
	92			9	5
20		5	4		
	51			4	3
20		5	4		
	336			34	23



SHEET TOTAL

SEEDING END WIDTH	SEEDING SQ. YDS.	END AREA CUT	END AREA FILL	VOLUME CUT	VOLUME FILL
16					
	84	9	3		
14				16	6
	87	9	3		
17					
	106	7	9	13	14
21					
	98	8	5	13	8
14		6	3		
	375			56	39



SHEET TOTAL

CALCULATED

CHECKED

CROSS SECTIONS
RAMP N-W/S-W WIDENING

CUY-490-1.65

41
57

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SEEDING			END AREA		VOLUME		SEEDING			END AREA		VOLUME	
END WIDTH	SQ. YDS.		CUT	FILL	CUT	FILL	END WIDTH	SQ. YDS.		CUT	FILL	CUT	FILL
		40 20 0 20											
		END PAVEMENT WORK STA. 20+19							STA 20+19	9	0		
												6	0
0		650								9	0		
		652.58 20+00.00 652.58											
	0											27	0
		650 1.25%								20	0		
0		651.54 19+50.00 651.54											
	0											8	0
		BEGIN EXCAVATION FOR GORE STA. 19+40											
0		STA 19+40 (AHEAD)							STA 19+40 (AHEAD)	20	0		
	36	STA 19+40 (BACK)							STA 19+40 (BACK)	9	3		
												13	4
16		STA 19+00							STA 19+00	9	3		
	36	SHEET TOTAL							SHEET TOTAL			54	4

40 20 0 20

℄ RAMP N-W

SHEET TOTAL

SHEET TOTAL

CALCULATED

CHECKED

CROSS SECTIONS
RAMP N-W/S-W WIDENING

CUY-490-1.65

42
57

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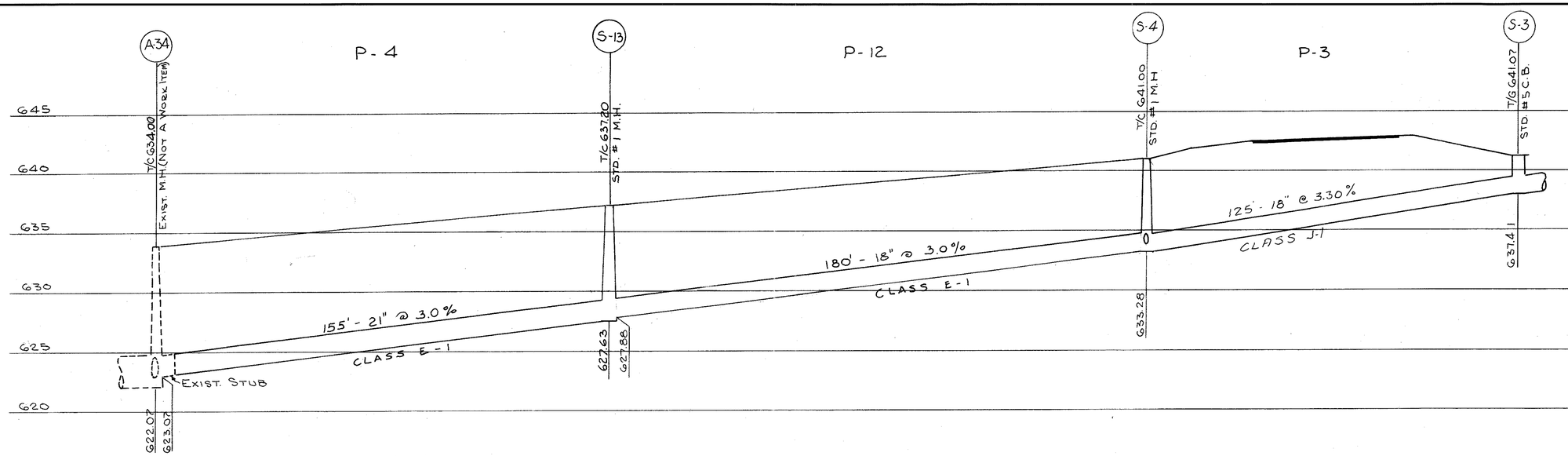
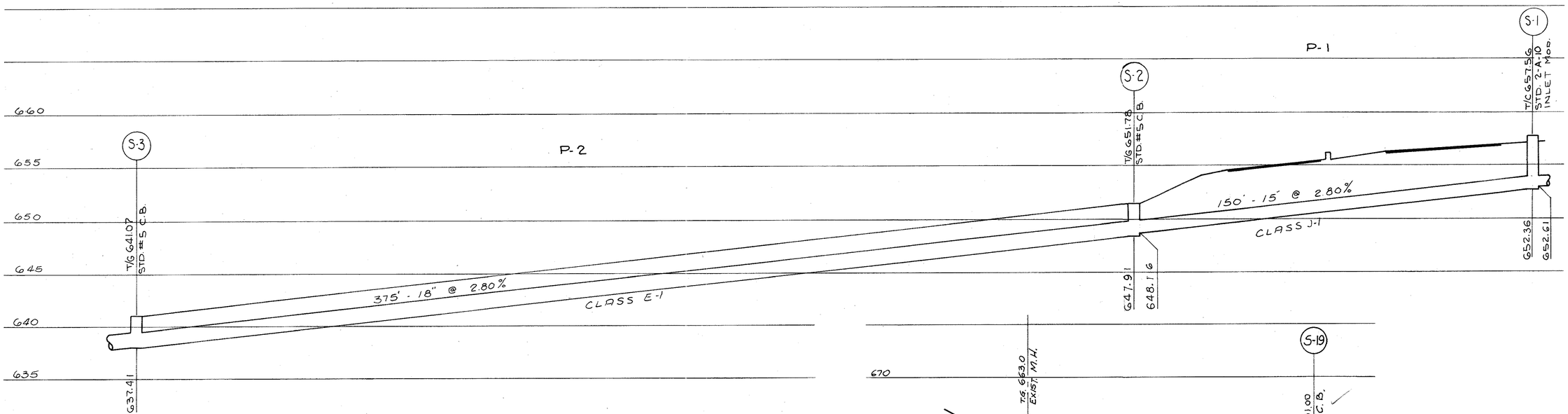
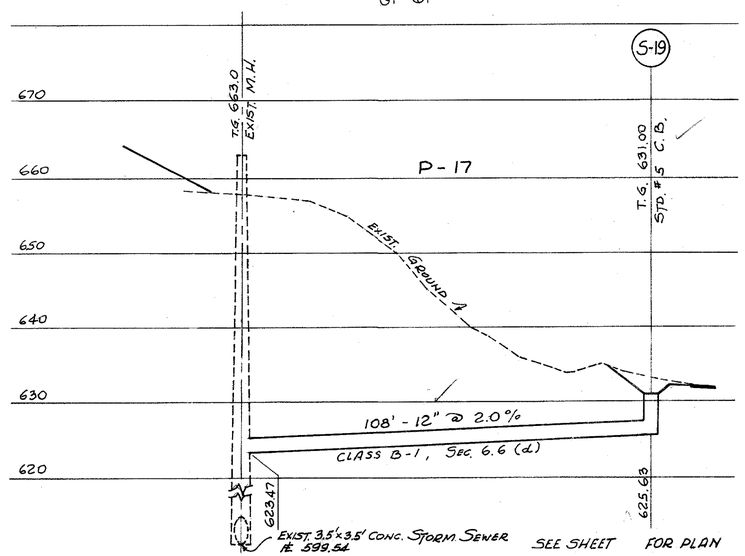






SEWER PROFILES

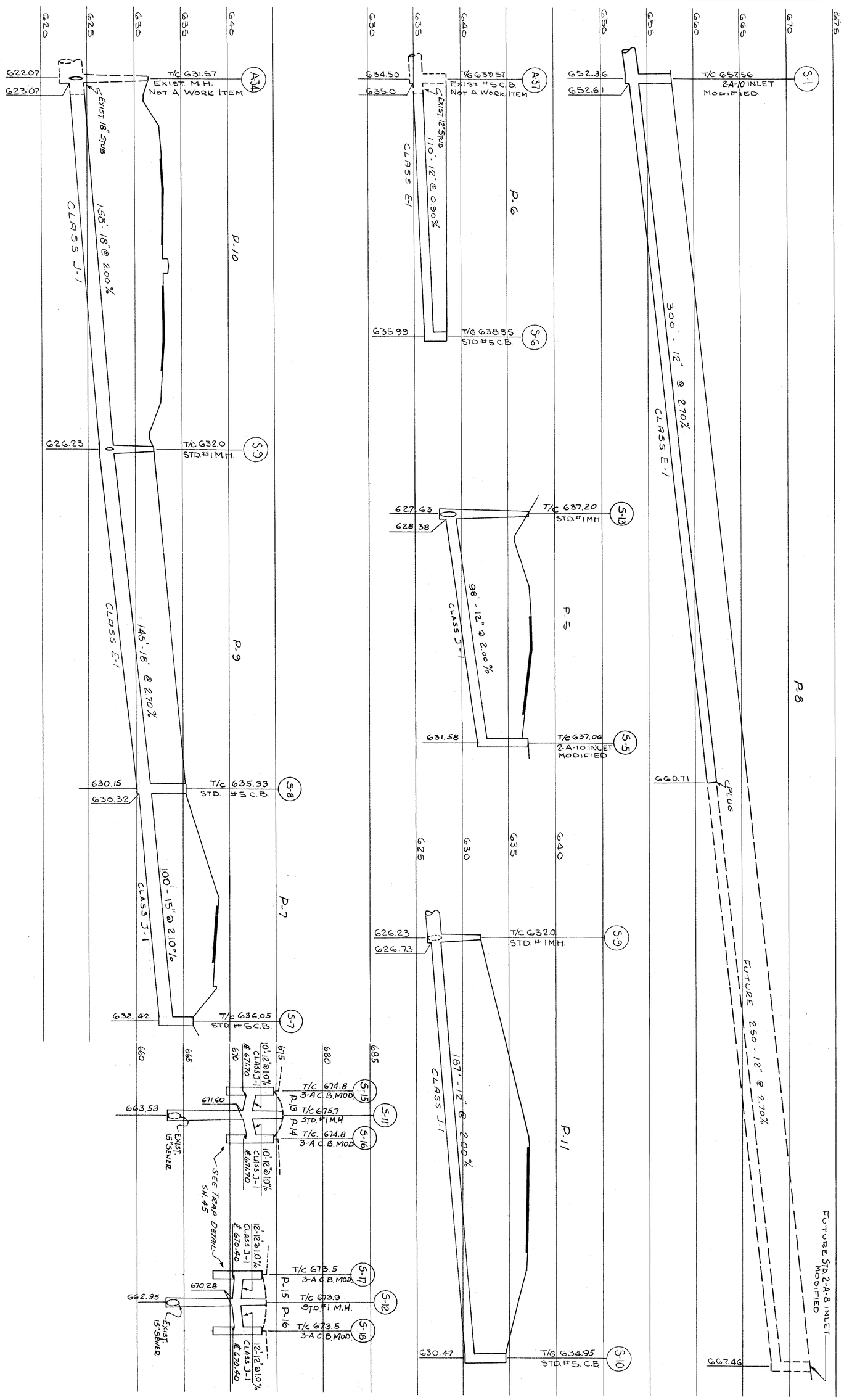
P-1 P-2 P-3 P-4 P-12

CALCULATED

CHECKED

CUY-490-1.65

43
57



44 / 57	CUY-490-1.65	SEWER PROFILES P-5 P-6 P-7 P-8 P-9 P-10 P-11	CALCULATED / CHECKED

CALCULATED

CHECKED

SEWER PROFILES

B-23 B-24

B-23

B-24

645

640

635

630

625

620

615

A-19

JUNCTION M.H.

T/G 628.59

A-34

T/G 634.0

STD. # M.H.

A-36

T/G 642.42

STD. # S.C.B.

A-37

T/G 639.57

STD. # S.C.B.

B-21

375'- 33" @ 1.00%

CLASS D-1

618.07

618.32

622.07

622.32

18" STUB

21" STUB

110'- 18" @ 8.94%

CLASS J-1 Sec. M-6.6(c)

633.15

634.50

635.0

90'- 18" @ 1.50%

12" STUB

CLASS J-1 Sec. M-6.6(c) or M-6.8(b)

CUY-490-1.65

45
57

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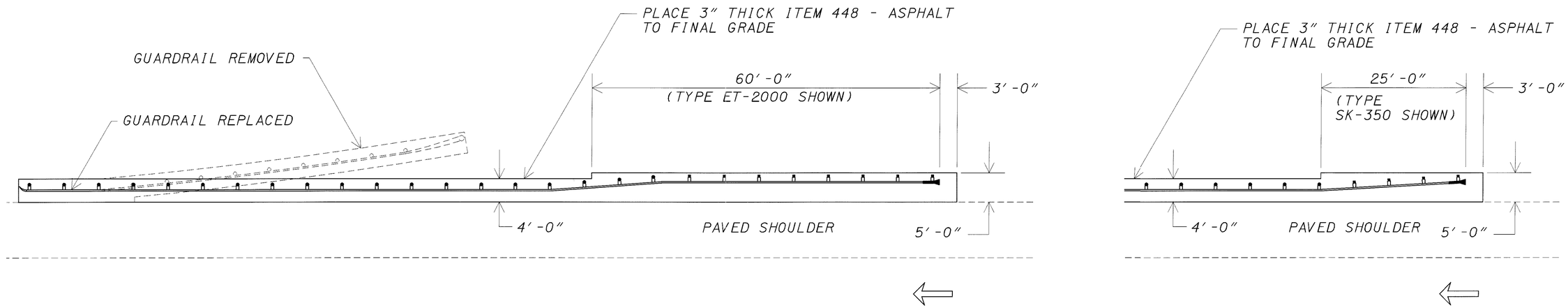
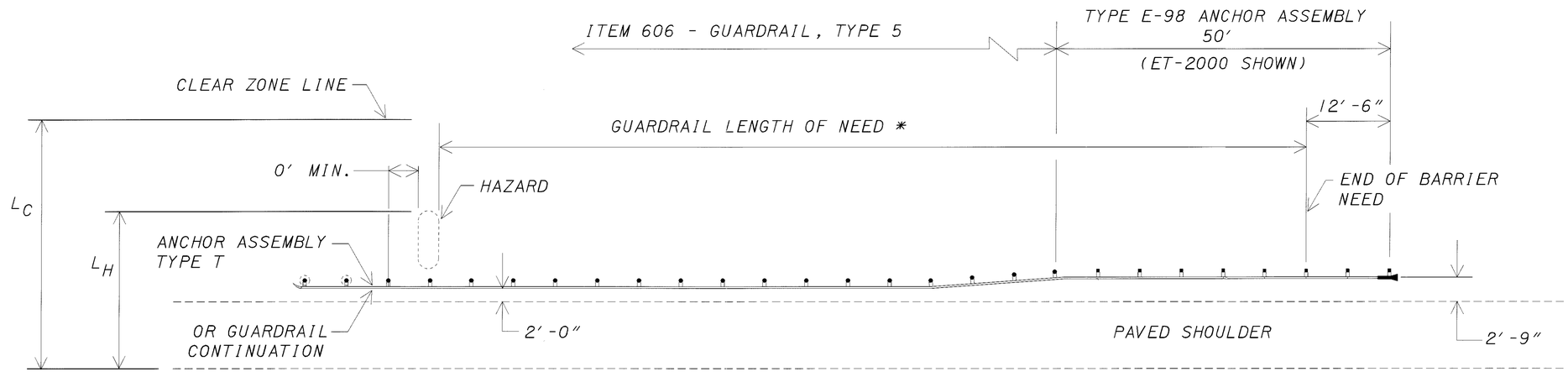


ITEM 448 FOR VEGETATION CONTROL WITH TYPE E-98 ANCHOR ASSEMBLY



TYPICAL GUARDRAIL PROTECTION OF HAZARDS

CALCULATED EMK
CHECKED LDH

GUARDRAIL

CUY-490-1.65

ITEM 606 - ANCHOR ASSEMBLY, TYPE E-98

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING EITHER OF THE FOLLOWING GUARDRAIL END TERMINALS.

1) THE ET-2000 (1997) MANUFACTURED BY
SYRO, INC.
1170 N. STATE STREET
GIRARD, OHIO 44420
TELEPHONE: (330) 545-4373.

THE LENGTH OF THE ET-2000 (1997) SYSTEM IS CONSIDERED TO BE 15.24 m (50 FT), INCLUSIVE OF TWO 7.62 m (25 FT) LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT THE LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON THE FOLLOWING PREAPPROVED SHOP DRAWING:

DWG. #	DRAWING NAME	DWG./REV. DATE	ODOT APPROVAL
SS265M	ET-2000 (1997) PLAN, ELEVATION & SECTIONS	6/20/97	3/6/98

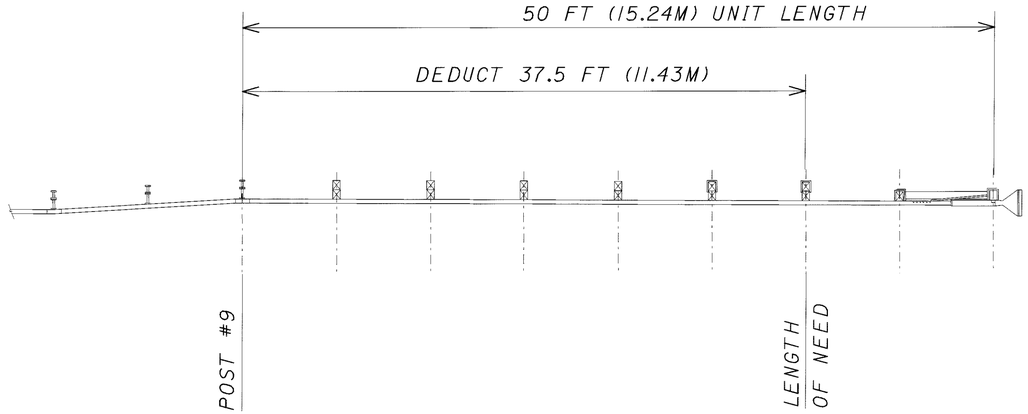
2) THE SKT-350 MANUFACTURED BY
ROAD SYSTEMS, INC.
NEW CASTLE DRIVE
FRANKFORT, IL 60423
TELEPHONE: (815) 464-5917.

THE LENGTH OF THE SKT-350 SYSTEM IS CONSIDERED TO BE 15.24 m (50 FT), INCLUSIVE OF FOUR 3.81 m (12.5 FT) LONG RAIL ELEMENTS. INSTALLATION SHALL BE AT LOCATIONS SPECIFIED IN THE PLANS, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AS DETAILED ON THE FOLLOWING PRE-APPROVED SHOP DRAWINGS:

DWG. #	DRAWING NAME	DWG./REV. DATE	ODOT APPROVAL
SKT-4M	SEQUENTIAL KINKING TERMINAL (SKT-350) ASSEMBLY WITH 4 FOUNDATION TUBES	12/11/97	3/6/98

A TYPE C DELINEATOR SHALL BE INSTALLED AT THE HEAD OF ALL TYPE E-98 UNITS LOCATED ON THE RIGHT SIDE OF THE THROUGH ROADWAY. A TYPE D DELINEATOR SHALL BE INSTALLED AT THE HEAD OF ALL TYPE E-98 UNITS LOCATED ON THE LEFT SIDE OF THE THROUGH ROADWAY. DELINEATORS SHALL COMPLY WITH STANDARD TRAFFIC DRAWING TC-61.10M.

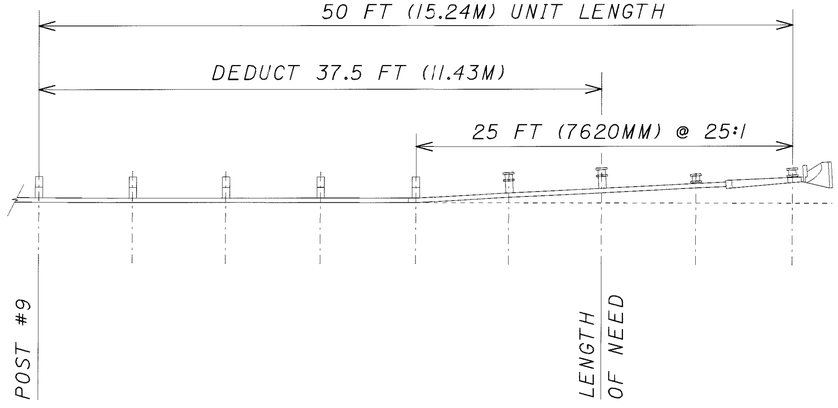
PAYMENT FOR THE ABOVE WORK SHALL BE MADE AT THE UNIT PRICE FOR ITEM 606, ANCHOR ASSEMBLY, TYPE E-98, EACH, AND SHALL INCLUDE ALL LABOR, TOOLS, EQUIPMENT AND MATERIALS NECESSARY TO CONSTRUCT A COMPLETE AND FUNCTIONAL ANCHOR ASSEMBLY SYSTEM; INCLUDING ALL RELATED TRANSITIONS, HARDWARE AND GRADING, NOT SEPARATELY SPECIFIED, AS REQUIRED BY THE MANUFACTURER.



POST #9 IS INCLUDED FOR PAYMENT WITH STANDARD GUARDRAIL

LENGTH OF NEED @ POST #3

ET-2000



POST #9 IS INCLUDED FOR PAYMENT WITH STANDARD GUARDRAIL

LENGTH OF NEED @ POST #3

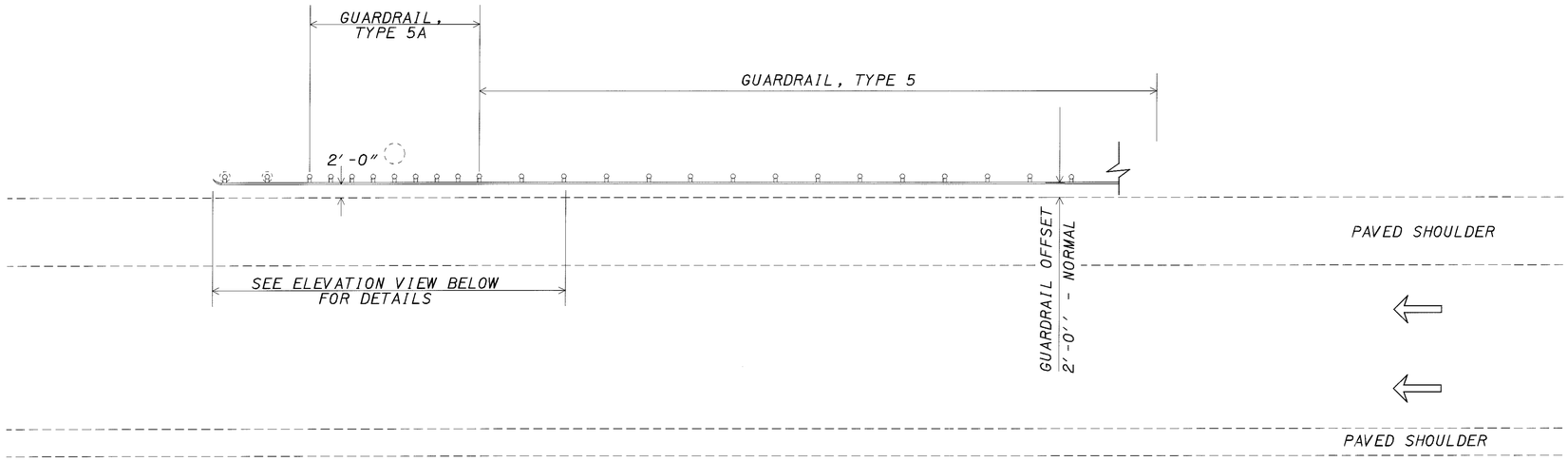
SKT-350

NCHRP REPORT 350 COMPLIANCE

CALCULATED EMK
CHECKED LDH

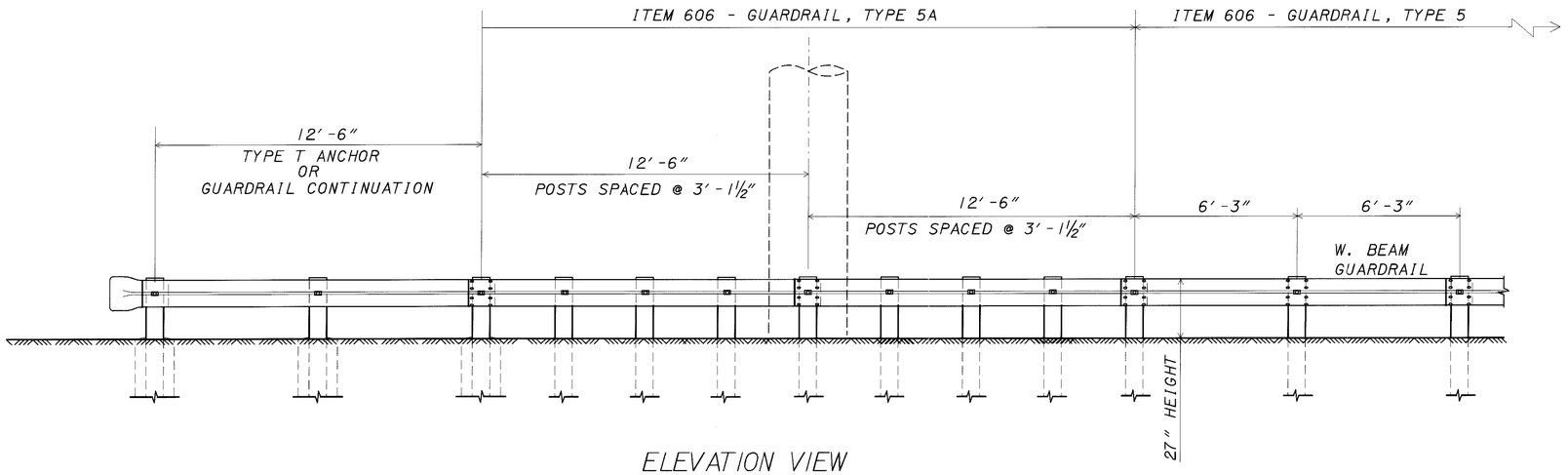
TYPE E-98 ANCHOR ASSEMBLY DETAILS

CUY-490-1.65



TYPE 5A GUARDRAIL PROTECTION FOR OVERHEAD SIGN SUPPORTS

REQUIRED WHEN FACE OF HAZARD IS BETWEEN 5′-6″ AND 3′-6″ OF FACE OF GUARDRAIL



ELEVATION VIEW

DRAWN LGM | REVISED XXX
CALCULATED EMK | CHECKED LDH

GUARDRAIL DETAILS TYPE 5A
PROTECTION AT OVERHEAD SIGN SUPPORTS

CUY-490-1.65

48
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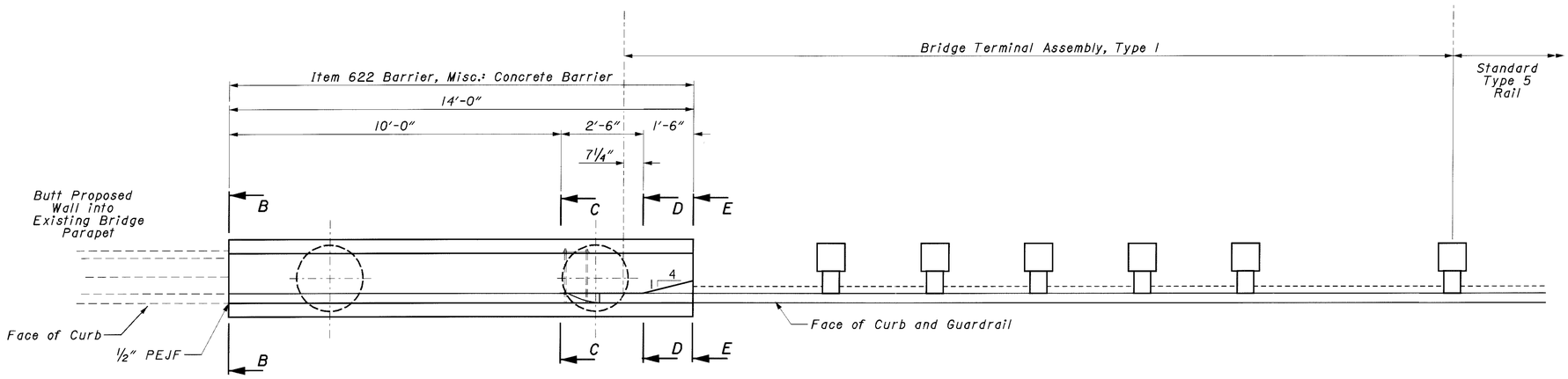
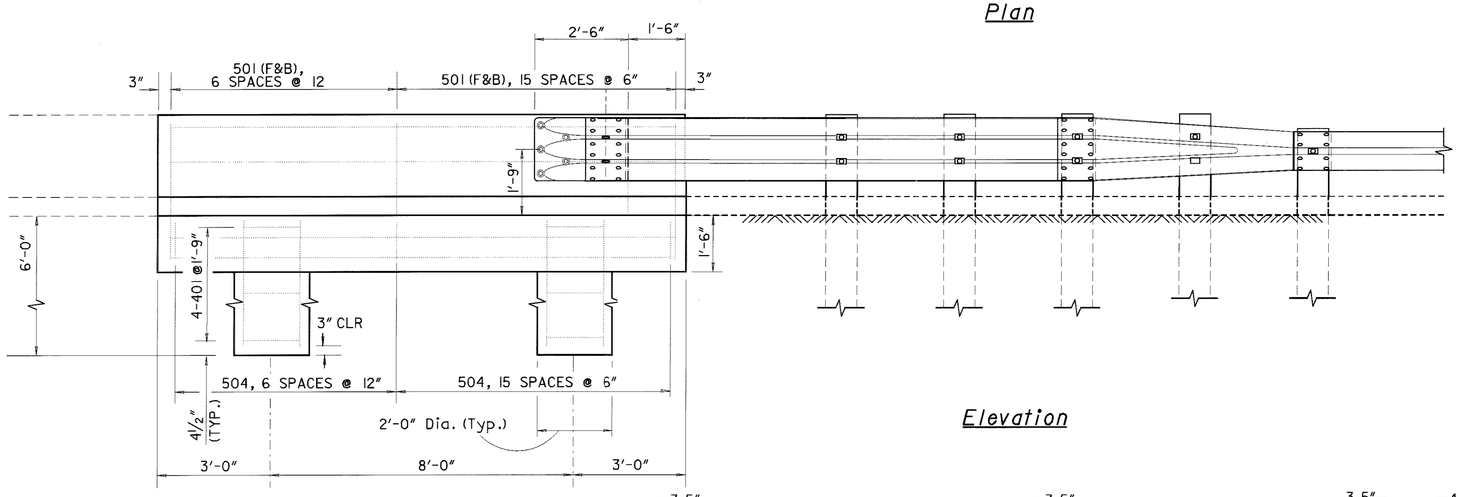
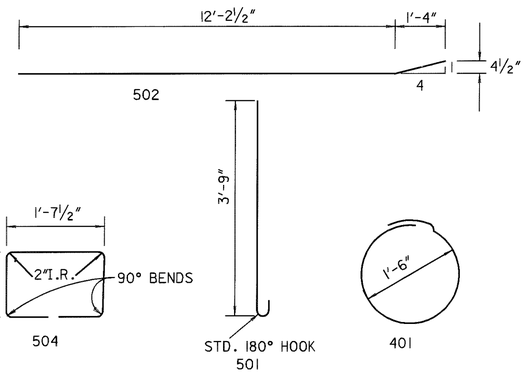


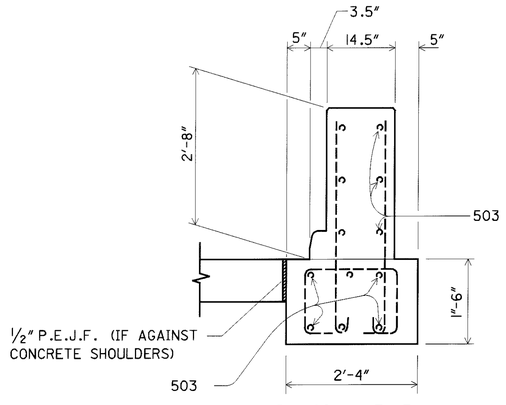
Plan



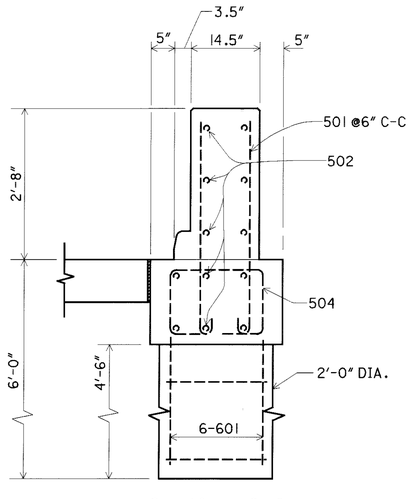
Elevation



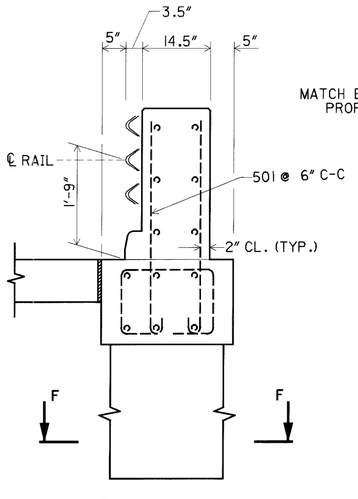
Bending Diagrams



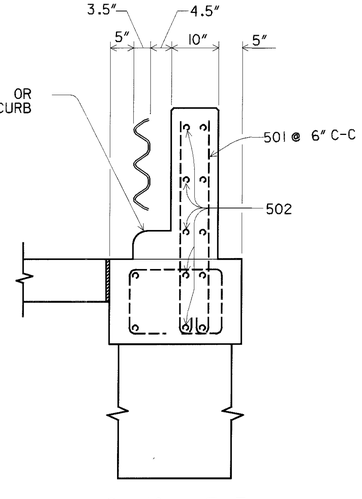
Section B-B



Section C-C



Section D-D



Section E-E

Item 622 Barrier, Misc.: Concrete Barrier

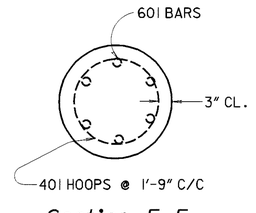
This item shall consist of constructing a 14' barrier transition as detailed. This item shall include all removals and excavation not itemized separately.

The intent of this item is to butt into existing 32" high parapet end terminals to accomodate a standard Type I Bridge Terminal Assembly.

Reinforcing Schedule (Info Only)

MARK	NO.	LENGTH	TYPE
401	8	6'-0"	BT.
501	44	4'-4"	BT.
502	5	13'-7"	BT.
503	7	13'-7"	STR.
504	22	5'-0½"	BT.
601	12	5'-6"	STR.

ALL REINFORCING BARS SHALL BE EPOXY COATED.



Section F-F

32" Guardrail-Barrier Transition, Vertical Face, with Curb

CUY-490-1.65

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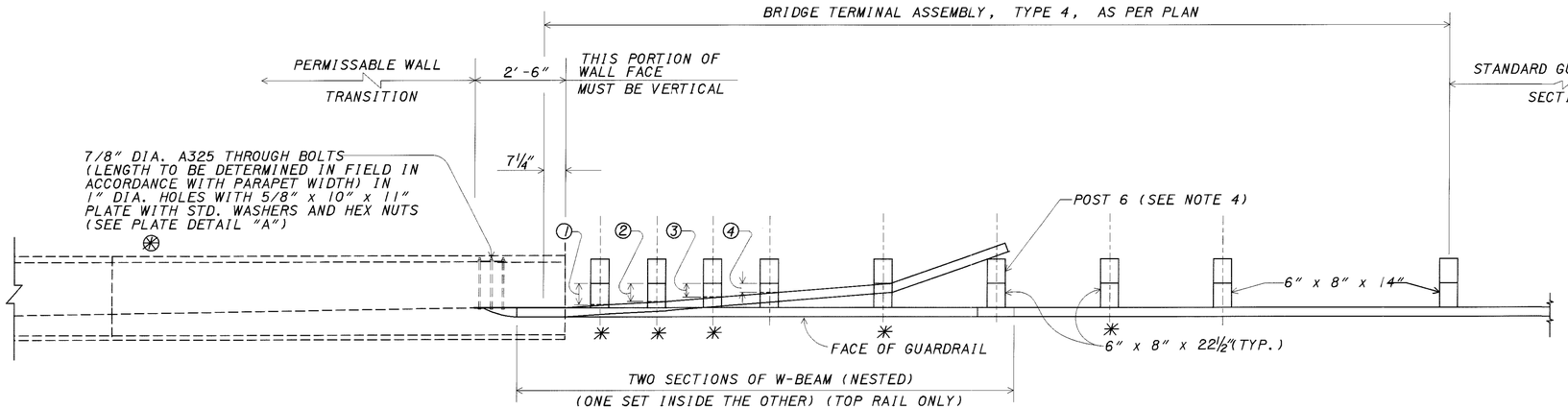


PLAN

⊛ FOR ATTACHMENT TO ABUTMENT WALLS, THIS ITEM REQUIRES THE USE OF POLYESTER RESIN ANCHORS WITH FEMALE THREADED INSERTS (10" LONG) TO ACCEPT 7/8" DIAMETER BOLTS. (PLATE DETAIL NOT REQUIRED)

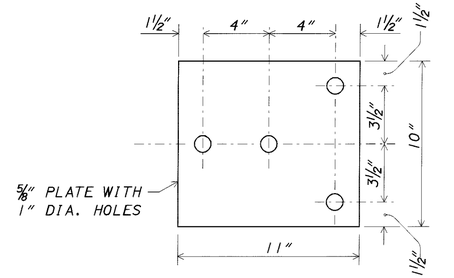
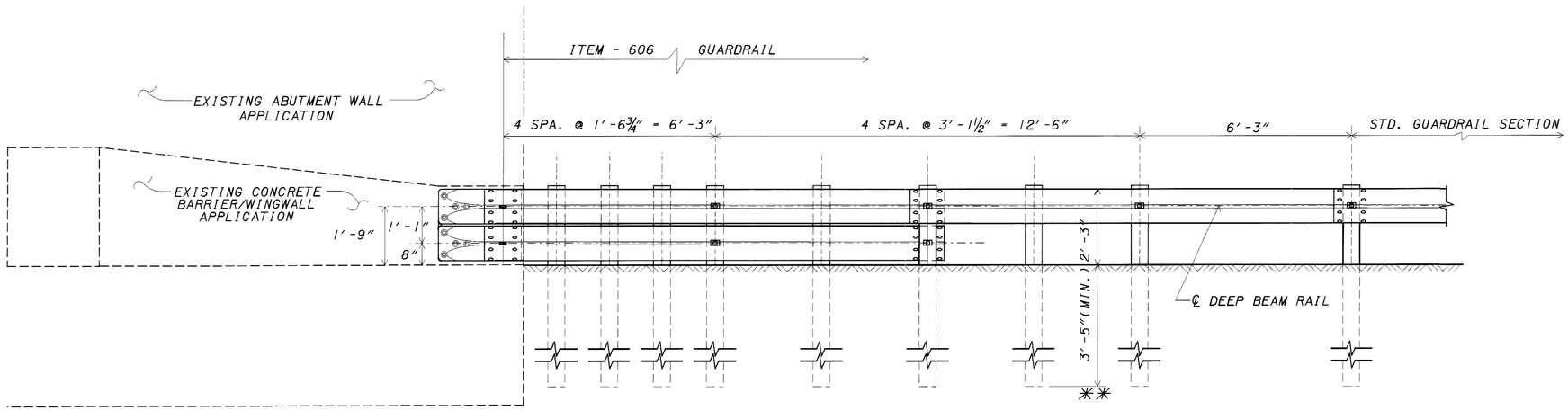


PLATE DETAIL "A"

✳ GUARDRAIL NOT ATTACHED TO POSTS. BLOCKOUT FASTENED TO POST WITH STD. POST BOLT.



ELEVATION

✳✳ SEE STD. CONSTRUCTION DRAWING GR-1.2 FOR ADDITIONAL POST EMBEDMENT DETAILS.

GENERAL NOTES

1. THIS GUARDRAIL TRANSITION IS APPROPRIATE FOR CONNECTION TO A VERTICAL CONCRETE SHAPE AND AND SHOULD NOT BE CONNECTED DIRECTLY TO A CONCRETE SAFETY SHAPE. CONCRETE SAFETY SHAPE BARRIERS SHOULD BE TRANSITIONED TO A VERTICAL SHAPE AT THE GUARDRAIL CONNECTION.
2. THE RUBRAIL MAY BE SHOP BENT IN THE LAST 3 FEET TO FACILITATE INSTALLATION.
3. BOTTOM WOOD BLOCKS, LOCATED ON POSTS 1,2,3, AND 4 ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS.
4. POSTS 1,2,3,4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR LOWER BEAM.
5. SEE STANDARD CONSTRUCTION DRAWINGS GR-1.2M AND GR-3.4M FOR ADDITIONAL DETAILS.

BLOCKOUT CHART BOTTOM BEAM WOOD BLOCKS 1'-2" X 6"	
POST	THICKNESS
①	7"
②	6"
③	4.5"
④	3"

THIS DETAIL MODIFIES A BRIDGE TERMINAL ASSEMBLY, TYPE 4 FOR CONNECTION TO A VERTICAL WALL.
ALL DIMENSIONS AND DETAILS SHOWN ARE IN AGREEMENT WITH THE APPROVED CRASHWORTHY GUARDRAIL TRANSITION FOUND IN "FHWA TECHNICAL ADVISORY T 5040.26" AND THE "ROADSIDE DESIGN GUIDE"

CALCULATED | CHECKED

BRIDGE TERMINAL ASSEMBLY, TYPE 4, AS PER PLAN

CUY-490-1.65

LOCATION	STATION		828												621			
			EDGE LINES		LANE LINES	CHANNELIZING LINES		TRANSVERSE LINES		DOTTED LINE, 4"	STOP LINES	CROSSWALK LINES	LANE ARROWS	WORD ON PAVEMENT, 72"	RAISED PAVEMENT MARKER, INSTALLATION ONLY			
			W	Y		GORE	*	W	Y						W	Y	W/R	Y/R
	FROM	TO	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.	LIN.FT.		LIN.FT.	LIN.FT.	LIN.FT.	EACH	EACH	EACH			
IR-490 WB	1014+50	1020+10	560		560	560									7		14	
	1020+10	1040+50	2040						200									
	1040+50	1046+70	620	620	1240										16			
	1046+70	1052+40	570	570	1710	1140		660							21		28	
IR-490 EB	1040+50	1050+40	990	990	990												12	
	1050+40	1053+30	290	290	290	290									4		7	
LANE N-W	4+58	7+40	282	282														
	7+40	8+40	100	100		200		150										
	8+40	8+95	55	55														
	14+45	15+25					80								1			
	15+25	17+60	235	235			235								3			
	17+60	19+40	180	180	180										2			
	19+40	20+30	90		90	90									1		2	
LANE E-N	10+10	17+25	715	715	715										9			
	17+25	17+95	70	70		145		70										
	17+95	23+15	520	520														
	24+20	27+00	280	280														
LANE N-E	3+50	19+15	1565	1565														
	19+15	22+70	710	355		355											8	
LANE S-E	5+83	9+50	367	367	367										4			
	9+50	10+75	125	125		250		190										
	10+75	16+90	615	615														
	16+90	17+90	100	100														
	21+50	24+20	270	270	270										3			
	24+20	25+30		110														
LANE W-N	9+75	14+45	470	470														
	14+45	15+40	95			95												
LANE S-W	3+95	9+40	545	545														
LANE W-S	15+60	16+40	80	80														
	16+40	17+25	160	85		85												
	17+25	22+71	546	546														
LANE E-S	5+00	16+15	1115	1115														
SUB-TOTAL			14360	11255	6412	3210	315	1070	200						71		71	
TOTAL			- 4.85 MILE		- 1.21 MILE	3525		1270							142			

QUANTITIES CARRIED TO THE GENERAL SUMMARY ON SHEET 28 .

CALCULATED FLK
CHECKED JEL

TRAFFIC CONTROL SUB-SUMMARY (1 OF 2)

CUY-490-1.65

51
57

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SIGN NO.	ELEVATION VIEW SHEET NO.	LOCATION	SIGN CODE NO.	SIGN SIZE	630 GROUND MOUNTED SUPPORT, NO. 3 POST	GROUND MOUNTED SUPPORT, NO. 4 POST	GROUND MOUNTED SUPPORT, W6 X 9 BEAM	SIGN, FLAT SHEET, TYPE G	SIGN, EXTRUSHEET, TYPE G	GROUND MOUNTED BEAM SUPPORT FOUNDATION	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL				
					LIN.FT.	LIN.FT.	LIN.FT.	SQ.FT.	SQ.FT.	EACH	EACH	EACH				
1		LANE N-W									1	2				
2		1020+50 IR-490 WB	W-50R-48	48"X 48"	14/14.5			16								
3		19+00 LANE N-W	W-50L-48	48"X 48"	14/14.5			16								
4		LANE N-W L/R									1	2				
5		13+10 LANE N-W	W-50L-48	48"X 48"	14/14.5			16								
6		LANE N-W L/R									1	2				
7		LANE N-W									1	2				
8		LANE S-W									1	2				
9		18+10 LANE S-W	W-50R-48	48"X 48"	14/15			16								
10	XX	1036+50 IR-490 WB	W-54C-48	144"X 48"			17/18		48	2						
11	XX	1041+00 IR-490 WB	W-54D-48	144"X 48"			17/17.5		48	2						
TOTAL					114.5		69.5	64	96	4	5	10				

STATION		642-REMOVAL OF PAVEMENT MARKING EDGE LINE	LANE LINE	CHANNELIZING LINE		
		LIN.FT.	LIN.FT.	LIN.FT.		
LANE N-W						
16+45	21+80	535				
21+80	25+00			320		
IR-490						
1015+40	1027+60	1220	1220			
1027+60	1036+00	840	840			
TOTAL		2595	2060	320		

QUANTITIES CARRIED TO THE GENERAL SUMMARY ON SHEET 28 .

CALCULATED FLK
CHECKED JEL

TRAFFIC CONTROL SUB-SUMMARY (2 OF 2)

CUY-490-1.65

52
57

Material Furnished by the Department Installation Only

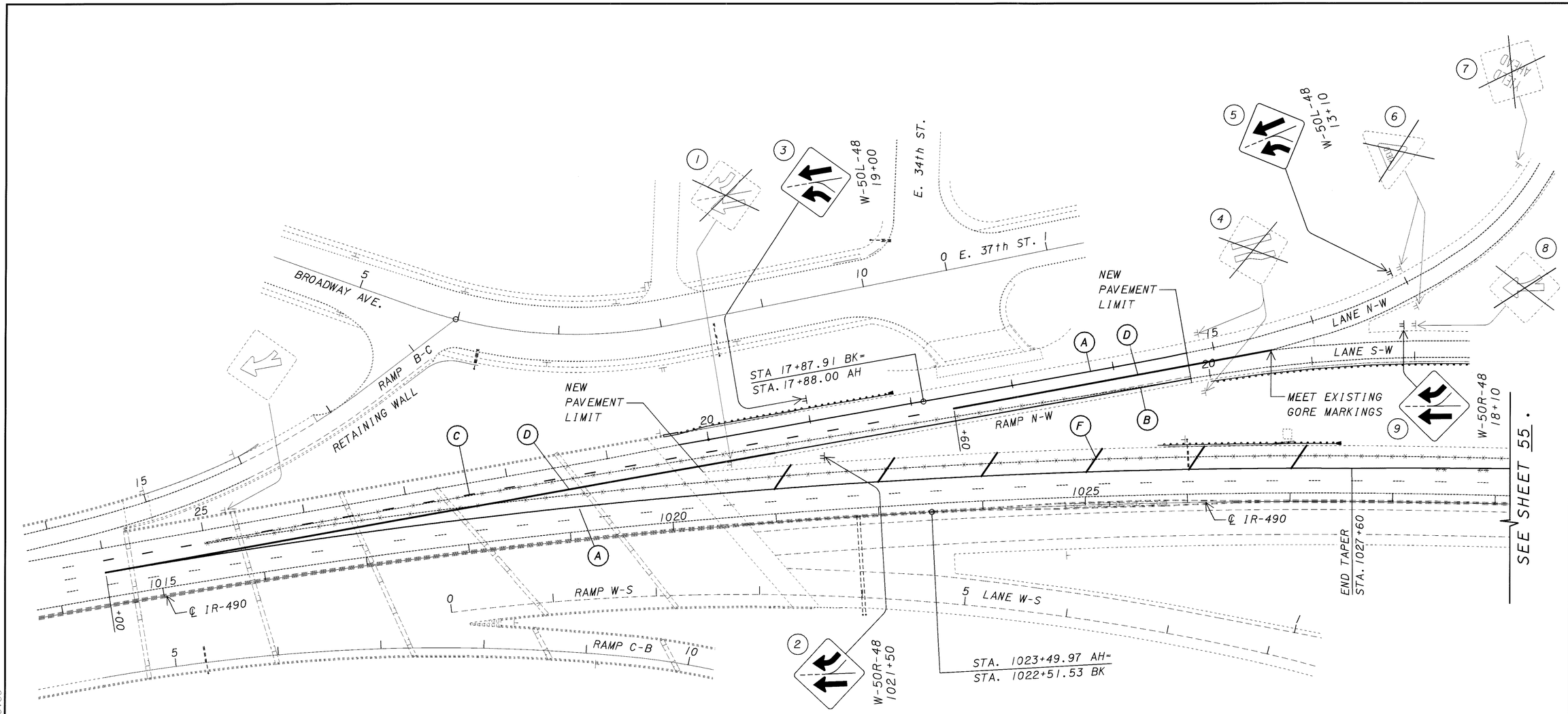
Description	One-Way White		One-Way Yellow		Two-Way White		Two-Way Yellow		Two-Way White-Red		Two-Way Yellow-Red	
	Cols.	Dist.	Cols.	Dist.	Cols.	Dist.	Cols.	Dist.	Cols.	Dist.	Cols.	Dist.
Raised Pavement Marker, Installation Only	71								71			
Total By Color	71								71			

	Total	Number of Conventional High Profile	Number of Tapered Low Profile	District Stored	Columbus Stored
Raised Pavement Marker, Installation Only	142		142		142
Raised Pavement Marker Casting, Installation Only					
Prismatic Retro-Reflectors					
Raised Pavement Marker Misc.: Replacement of Raised Pavement Marker					

CALCULATED FLK CHECKED JEL

MATERIALS SUPPLIED BY THE DEPARTMENT

CUY-490-1.65



LEGEND

- (A) EDGE LINE (WHITE)
- (B) EDGE LINE (YELLOW)
- (C) LANE LINE
- (D) CHANNELIZING LINE
- (E) TRANSVERSE LINE (WHITE), 12' c/c
- (F) TRANSVERSE LINE (WHITE), 100' c/c

------------* - PAVEMENT MARKING REMOVED

▨ - NEW PAVEMENT

SEE SHEETS 51-52 FOR TRAFFIC CONTROL SUB-SUMMARY

HORIZONTAL SCALE IN FEET
0 50 100

CALCULATED FLK
CHECKED JEL

TRAFFIC CONTROL PLAN SHEET
IR-490/IR-77 INTERCHANGE

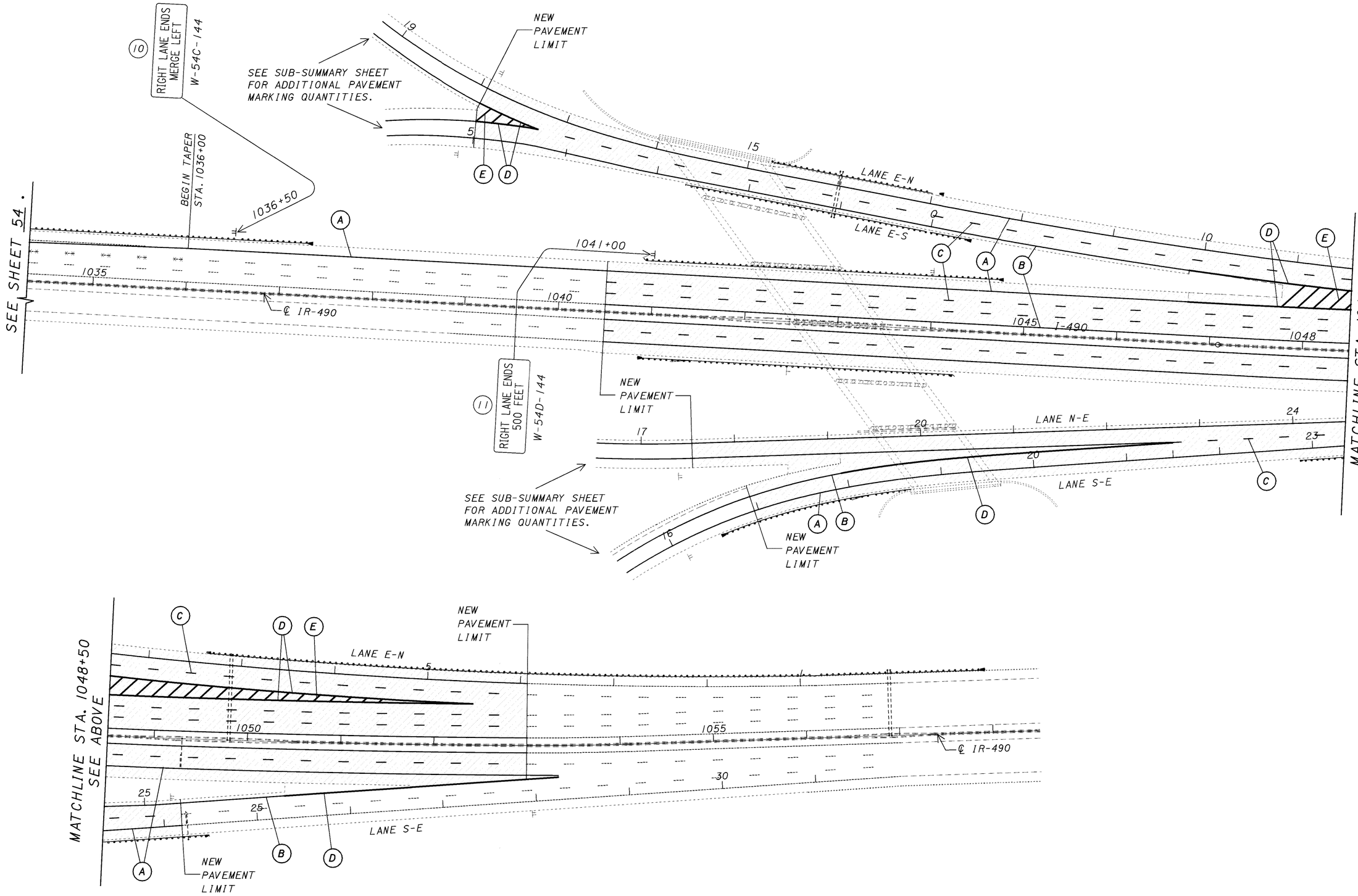
CUY-490-1.65

TRAFFIC CONTROL PLAN SHEET
IR-490/IR-77 INTERCHANGE

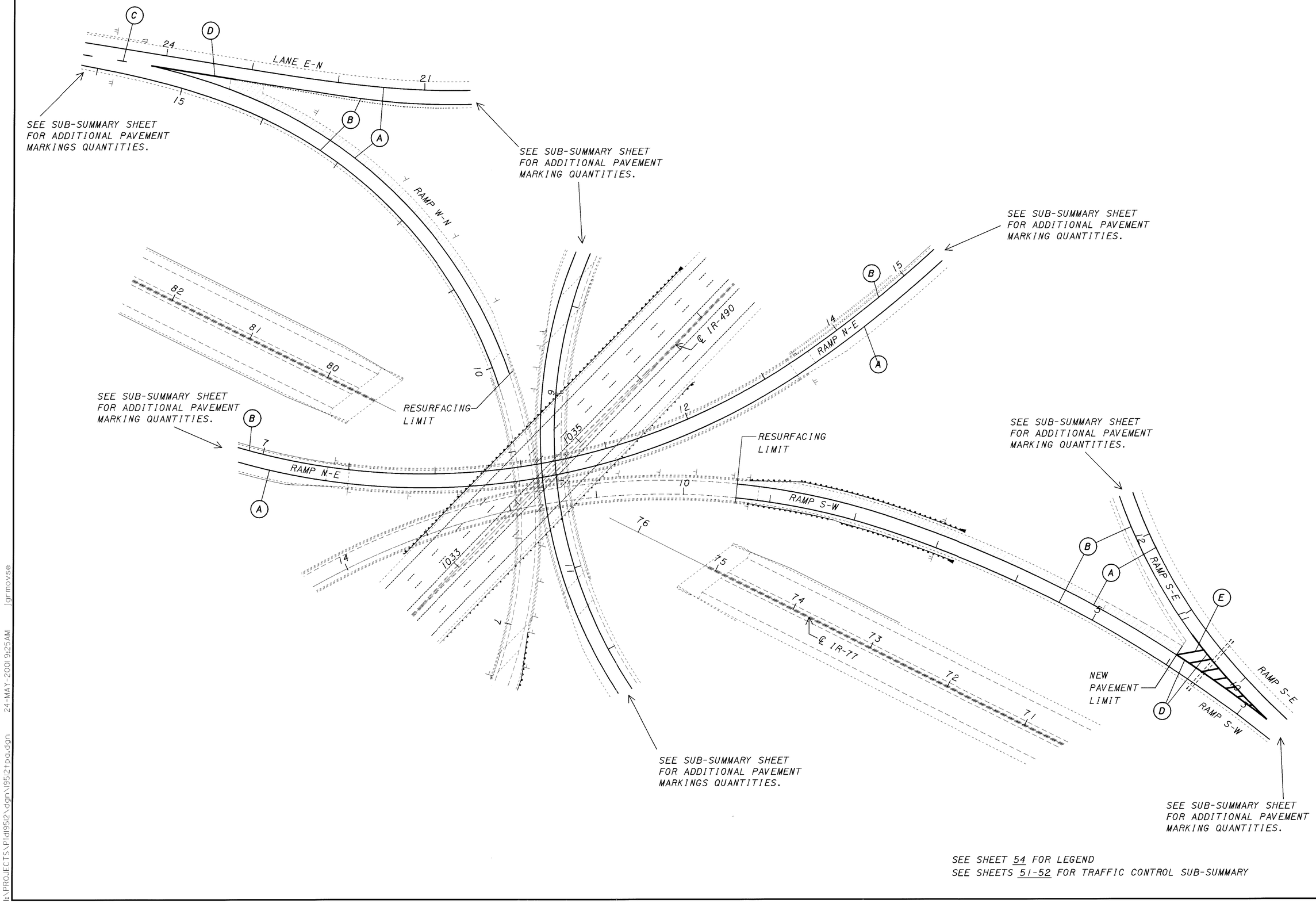
CALCULATED FLK
CHECKED JEL

HORIZONTAL SCALE IN FEET
0 50 100

CUY-490-1.65



SEE SHEET 54 FOR LEGEND
SEE SHEETS 51-52 FOR TRAFFIC CONTROL SUB-SUMMARY
SEE SHEET 57 FOR ELEVATION VIEWS



SEE SHEET 54 FOR LEGEND
SEE SHEETS 51-52 FOR TRAFFIC CONTROL SUB-SUMMARY

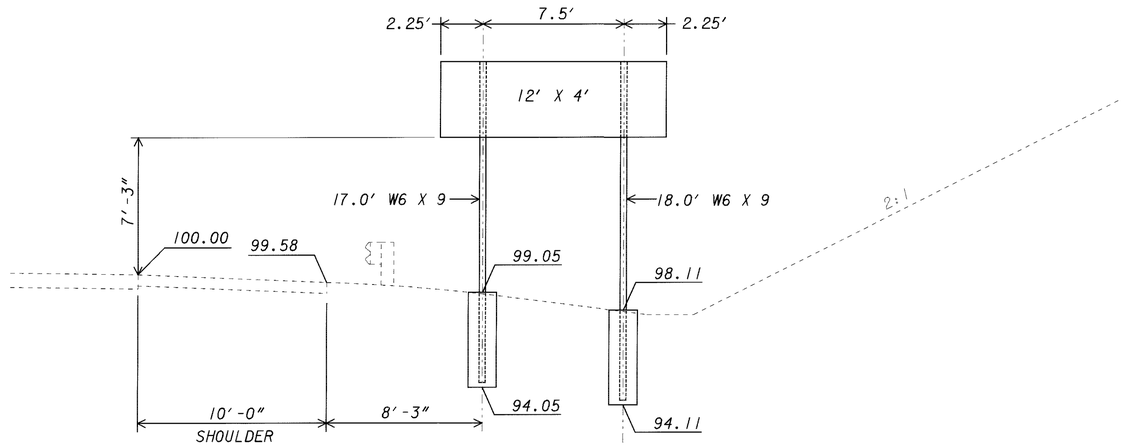
HORIZONTAL SCALE IN FEET
0 50 100

CALCULATED FLK
CHECKED JEL

TRAFFIC CONTROL PLAN SHEET
IR-490/IR-77 INTERCHANGE

CUY-490-1.65

56
57

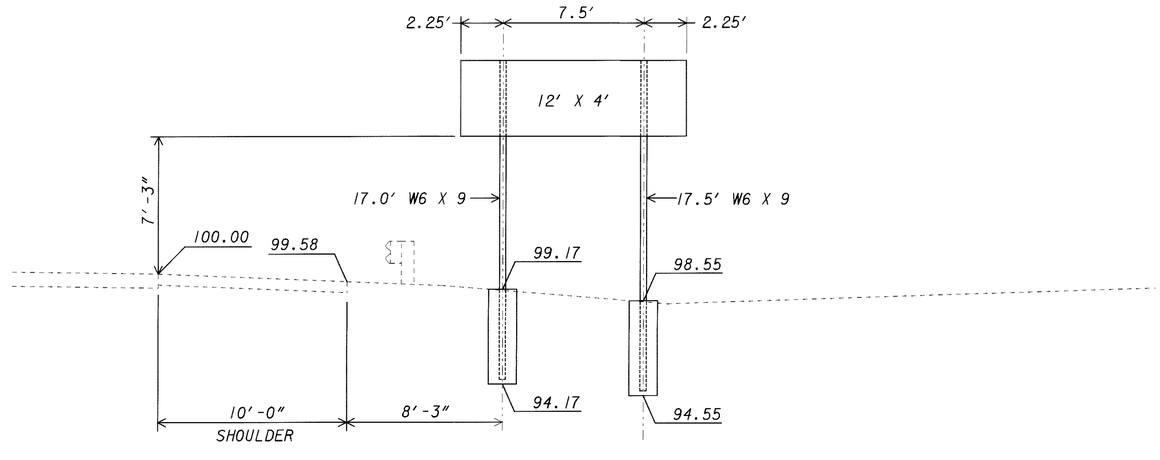


SIGN NO. 10
STA. 1036+50 IR-490 WB
2 - W6 X 9 GROUND MOUNTED
BEAM SUPPORTS

NOTES:

1. ALL ELEVATIONS SHOWN ARE FOR REFERENCE ONLY. THEY SHOULD BE FIELD VERIFIED TO INSURE PROPER ERECTION.

2. ALL ELEVATION VIEWS ARE SHOWN IN DIRECTION OF VIEWING SIGN FACES.



SIGN NO. 11
STA. 1041+00 IR-490 WB
2 - W6 X 9 GROUND MOUNTED
BEAM SUPPORTS

CALCULATED F.L.K
CHECKED J.F.L

ELEVATION VIEWS

CUY-490-1.65

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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 828
EPOXY PAVEMENT MARKING

July 28, 1998

828.01 Description. This work shall consist of furnishing and applying epoxy pavement markings in accordance with 641, 740 and the additional requirements described herein.

The epoxy material and installation shall be in compliance with all the applicable EPA and local environmental regulations.

In general, the marking material shall consist of four components: Part A (White or Yellow), Part B, Size I Glass Beads, and Size II Glass Beads, as described below.

828.02 Epoxy Pavement Marking Material. Epoxy pavement markings shall be prequalified in accordance with Supplement 1047. Material supplied shall be a two-part epoxy system capable of being applied at ambient temperature down to 10ºC (50ºF). The material shall be capable of retaining reflective glass beads of the drop-on type or spray-on type.

Epoxy shall comply with the following requirements:

a. Formulation: The epoxy shall be formulated as a Long Life Pavement Marking System, capable of providing a minimum of 4 years of performance, free of any peroxides, and/or TMPTA (Trimethylolpropane triacrylate) and other such multi-functional monomers. The epoxy should be designed to provide simple volumetric mixing ratio of its components (such as 2:1) .

b. Viscosity: The viscosity of the various parts shall be as follows:

Part A White	19,000 - 20,000 cP
Part A Yellow	25,000 - 26,000 cP
Part B	1,950 - 2,050 cP

At the point of application the viscosity shall be within 10 percent of each other.

c. Weight: The weight of each part shall be as follows:

Part A White	1.41 kg/L ±.02 kg/L (11.8 ±.0.2 pounds/gallon)
Part A Yellow	1.53 kg/L ±.02 kg/L (12.8 ±.0.2 pounds/gallon)
Part B	1.15 kg/L ± .02 kg/L (9.6 ±.0.2 pounds/gallon).

d. Epoxide Number: The epoxide number of the epoxy resin shall be 0.51 ± 0.05 as determined by ASTM D 1652 for both white and yellow Part A on a pigment free basis.

e. Amine Number: The amine number of the curing agent (Part B) shall be 375 ± 50 as per ASTM D 2074 on a pigment free basis.

f. Toxicity: Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property. After curing the materials should be completely inert with all components fully reacted and environmentally safe.

g. Drying Time (Laboratory): The pavement marking material, when mixed in the proper ratio and applied at the properly prescribed wet film thickness at 24ºC ±0.5ºC (75ºF ±2ºF) and with the proper saturation of glass beads, shall exhibit a no tracking time of 40-45 minutes when tested according to ASTM D 711.

h. Drying Time (field): The pavement marking material shall have a setting time to a no-tracking condition of not more than 35 minutes. The line must be protected from tracking during the setting period by coning off or as specified in the plans.

i. Curing: The epoxy pavement marking material shall be capable of fully curing at a constant surface temperature of 7ºC (45ºF) or above.

j. Adhesion to Pavement(Portland Cement Concrete and Asphalt): The cured pavement marking materials, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified Portland cement concrete [compressive strength, 27,000 kPa (4,000 PSI) minimum] or asphalt surface such that there shall be a 100 percent substrate failure in the performance of this test. The prepared specimens shall be conditioned at room temperature 24ºC ±0.5ºC (75ºF ±2ºF) for a minimum of 24 hours and a maximum of 72 hours prior to the performance of the indicated test
.

k. Hardness: The epoxy pavement marking materials, when tested according to ASTM D 224, shall have a Shore D Hardness of between 70 and 90. Samples shall be allowed to cure at room temperature 24ºC ±0 .5ºC (75ºF ±2ºF) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated test.

l. Tensile Strength: When tested in accordance with ASTM D 638, the epoxy pavement marking materials shall have a tensile strength of not less than 34,000 kPa (5,000 psi). The Type IV specimens shall be cast in a suitable mold and pulled at a rate of 6 mm (1/4 inch) per minute, by a

suitable dynamic testing machine. The samples shall be allowed to cure at room temperature 24ºC ± 0.5ºC (75ºF ±2ºF) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated test.

m. Compressive Resistance: When tested according to ASTM D 695, a catalyzed epoxy pavement marking materials shall have a compressive strength of not less than 83,000 kPa (12,000 psi). The cast sample shall be conditioned at room temperature 24ºC ±0.5ºC (75ºF ±2ºF) for a minimum of 72 hours before performing the indicated test. The rate of compression for these samples shall be no more than 6 mm (1/4 inch) per minute.

n. Abrasion Resistance: The abrasion resistance shall be evaluated on a Taber Abrader with a 1.0 kg (2.2 pounds) load and CS-17 wheels. The duration of the test shall be 1,000 cycles. The wear index shall be calculated based on ASTM C 501 and the wear index for a catalyzed material shall not be more than 100 mg (0.02 pounds). The test shall be run on cured samples of materials which have been applied at a film thickness of 0.5 mm (20 mil) to code S-16 stainless steel plates. The samples shall be allowed to cure at 24ºC ±0.5ºC (75ºF ±2ºF) for a minimum of 24 hours and a maximum of 72 hours prior to performing the indicated test.

o. Impact Strength:

(1) Sample preparation: Properly mixed material shall be applied on a minimum of 28 days old clean concrete and shall be allowed to cure for 72 hours at 24ºC ±0.5ºC (75ºF ±2ºF). Film thickness of the material shall be at the appropriately prescribed thickness.

(2) Testing: At a temperature of 24ºC ±0.5ºC (75ºF ±2ºF) , a 0.9 kg (2 pound) round steel ball shall be dropped from a height of 1,200 mm (48 inches) on the cured sample. No cracking or chipping of the material shall take place .

p. Color: The mixed epoxy compound, both white and yellow, shall be applied to 2 sets of 76 mm x 152 mm (3 inches x 6 inches) aluminum panels at 0.5 mm (20 ± 1 mil) in thickness, one set with no glass beads and one set with glass beads (must ensure 50/50 distribution of Size I and Size II beads for this will impact the results of the test). Expose the prepared samples in a Q.U.V. Environmental Testing Chamber, as described in ASTM G 53, and they shall conform to the following requirements in alternating cycles:

The test shall be conducted for 75 hours at 50ºC (122ºF), 4 hours humidity and 4 hours U.V., in alternating cycles. The prepared panels shall be cured at 25ºC (77ºF) for 72 hours prior to exposure.

The color of the white epoxy material shall not be darker than the Federal Standard No. 595A-17855. The color of the yellow epoxy polymer material shall be same as Federal Standard No. 595A-13415.

q. Certificate of compliance: The material manufacturer shall furnish a notarized certification that the material complies with the provisions of this specification. It shall not be inferred that the provisions of a certification of compliance waives state inspection, sampling, or testing.

r. Laboratory samples: Promptly after execution of the contract, the Contractor shall notify the Engineer of the sources of material he expects to use. The material manufacturer shall furnish samples of the epoxy materials as may be required by the Engineer, a minimum of ten days before the date of intended use of these materials.

s. Infrared spectra: A copy of the infrared spectra of each component on each lot number shall be supplied by the manufacturer along with the certification papers. This infrared spectra will be on record with the Department to serve as a quality control measure for the future supply of this system to the State.

t. Manufacturer Qualifications : The manufacturer must have expertise and performance history including: Must have completed and passed the service test in accordance with Supplement 1047; verifiable installations; ample production capacity; proper facility; compliance with EPA regulations ; verifiable quality control program; in Ohio must have passed a minimum of 4 years of performance (durability and retroreflectivity) on concrete or asphalt surface.

u. Qualifying contractor: The Contractor shall demonstrate an ability to satisfactorily apply the material in the presence of the Engineer at a mutually agreed upon location, before commencement of the work. A previous statement of demonstrated ability to apply this material issued by any ODOT district will suffice as evidence of qualification.

828.03 Glass Beads. In addition to the requirements of 740.10, the following shall apply:

Glass bead packaging shall clearly indicate EPOXY - SIZE I or EPOXY SIZE II.

Inspection shall be done at the project site. Random samples shall be obtained from material delivered to the project site, or at other locations designated by the Laboratory.

The glass beads shall have the following gradation when tested in accordance with ASTM D 1214.

SIZE I Sieve Size	Percent Retained	SIZE II Sieve Size	Percent Retained
2.00 mm (No. 10)	0	850 µm (No. 20)	0-5
1.70 mm (No. 12)	0-5	600 µm (No. 30)	5-20
1.40 mm (No. 14)	5-20	300 µm (No. 50)	30-75
1.18 mm (No. 16)	40-80	180 µm (No. 80)	9-32
1.00 mm (No. 18)	10-40	150 µm (No. 100)	0-5
850 µm (No. 20)	0-5	pan	0-2
pan	0-2		

Reflective Media: The glass beads shall be smooth, clear, free from any air inclusions and scratches that might affect their functions as a retro-reflective media, and shall have the characteristics listed below.

Roundness (Percent by Weight): Not more than 20 percent of the glass beads shall be irregular or fused spheroids, and at least 80 percent of the beads shall be true beads.

Index of Refraction: The refractive index of the beads shall be a minimum of 1.50 as determined by the liquid immersion method at 25º C (77º F). The silica content of glass beads shall not be less than 60%.

Coating: The glass beads, Size I, shall be coated with a silane-type adherence coating to enhance its embedment in, and adherence to the applied binder film. The coated beads shall emit a yellow-green fluorescence when tested by the Dansyl Chloride test procedure. The Size II glass beads shall be treated with a moisture-proof coating. Both types of glass beads shall show no tendency to absorb moisture in storage and shall remain free of clusters and lumps. They shall flow freely from dispensing equipment at any time when surface and atmosphere conditions are satisfactory for marking operations.

The moisture-resistance of the glass beads shall be determined on the basis of the following test:

Place 1 kg (2.2 pounds) of beads in a washed cotton bag, having a thread count of 8 per square centimeter (50 per square inch) (warp and woof) and immerse the bag in a container of water for 30 seconds. Remove the bag and force the excess water from the sample by squeezing the bag. Suspend and allow to drain for two hours at room temperature (21º-22ºC) (70º-72ºF). After draining mix the sample in the bag by shaking thoroughly. Transfer a sample slowly to a clean, dry glass funnel having a stem 100 mm (4 inches) in length, with a 10 mm (3/8 inches) inside diameter stem entrance opening and a minimum exit opening of 6 mm (1/4 inches). The entire sample shall flow freely through the funnel without stoppage. When first introduced to the funnel, if the beads clog, it is permissible to tap the funnel to initiate flow.

828.04 Equipment. Equipment for applying the epoxy pavement marking shall be capable of mixing the components in proportions recommended by the manufacturer and applying glass beads at the time of the line placement. The equipment used shall be capable of applying epoxy material at the specified thickness, width and pattern. The Contractor shall provide a calibrated measuring device acceptable to the Engineer to measure the epoxy resin in the striper tanks.

The application equipment shall be a mobile, truck mounted and self contained pavement marking machine, specifically designed to spray the epoxy binder and reflective glass beads in continuous and skip line patterns. The application equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. In addition, the truck mounted unit shall be provided with accessories to allow for the marking of legends, symbols, crosswalks, and other special patterns.

The Engineer and the Material Manufacturer together may approve the use of a portable applicator in lieu of truck mounted accessories for use in applying special marking only, provided such equipment can demonstrate satisfactory application of reflectorized markings in accordance with these specifications.

The mobile applicator shall include the following features:

1. Individual material reservoirs, or space, for the storage of Part A and Part B of the epoxy binder.

2. Heating equipment of sufficient capacity to maintain the individual binder components at the manufacturer's recommended temperature and produce the required amount of heat at the mixing head & gun tip and maintain those temperatures with the tolerances recommended by the binder manufacturer for the spray application.

3. Adequate individual tanks for the storage and dispensing of Size I and Size II glass beads.

4. Individual dispensers for the simultaneous application of Size I and Size II glass beads respectively. Each dispenser shall be capable of applying beads at a rate up to 2.4 kg per liter (20 pounds per gallon).

5. Individual metering devices on the proportioning pumps (one indicator per pump) as well as stroke counters to monitor liter usage. All such devices shall be clearly visible.

6. All the necessary spray equipment mixers, compressors and other appurtenances to allow for the placement of reflectorized pavement marking systems in a simultaneous sequence of operations.

7. A minimum 600 mm (24 inches) long static mixer unit or an equivalent system that produces properly mixed material.

8. A completely enclosed flush and purge system to clean the lines and the guns without expelling any of the solution into the environment.

828.05 Cleaning and Surface Preparation. The contractor shall clean the surface to remove all debris, laitance oil and any other contaminants that may hinder the adhesion of the system to the surface. Whenever grinding, scarifying, sandblasting, shot blasting or other operations are performed, the debris generated shall be contained through vacuum type equipment or equivalent and the work shall be conducted in such a manner that the finished pavement surface is not damaged or unnecessarily scarred or left in a pattern that will mislead or misdirect the motorist. When these operations are completed, the pavement surface shall first be power broomed and then blown off with compressed air to remove residue and debris resulting from the cleaning work. All such debris shall be contained, and disposed of in the appropriate manner.

Cleaning and surface preparation work shall be conducted in such a manner as to control and minimize airborne dust, and similar debris.

Any new asphalt concrete pavement containing SBS, SBR latex, or SMA latex polymer modifiers shall be lightly abraded to the manufacturer's specifications to remove the polymer surface film to assure proper bonding. In no case shall the removal of the polymer surface film be less than that required for the epoxy to properly bond and adhere. On all other new asphalt pavements, no surface preparation is required.

For any other type of modified asphalt or for open graded friction course asphalts, the Contractor shall contact the manufacturer for surface preparation recommendations.

In all cases the manufacturer's recommendations for surface preparation shall be followed.

The cost of the light abrading, sandblasting or any surface preparation shall be included in the unit bid cost for each line or pavement marking.

Care shall be taken when performing the surface preparation and cleaning work to prevent damage to transverse and longitudinal joint sealers.

Limits of work: Surface preparation shall be confined to the surface area specified for the application

of pavement marking materials on the plans or as directed by the Engineer.

Surface preparation work includes cleaning for lines or cleaning for letters and symbols. Lines will be meant to include: Solid lines; Broken lines; Dotted lines; Channelizing lines; Stop lines and Crosswalk lines.

The area of preparation will be the width of the new pavement marking, or existing line, plus 25 mm (1 inch) on each side and the length of broken lines plus 300 mm (12 inches) on each end. When letters and symbols are cleaned the area of preparation will be sufficiently large to accommodate the new marking, or to remove the existing marking. No new markings, lines, crossbars or symbols shall be applied on any pavement that has not been properly prepared as per this specification.

On new Portland cement concrete pavements, cleaning operations shall not begin until a minimum of 30 days after the placement of concrete. The extent of the cleaning work shall be to prepare the concrete surface such that: (a) There is no visible evidence of curing compound on the concrete surface. (b) There are no heavy puddled deposits of curing compound in the valleys of the textured concrete surface. (c) All remaining curing compound is intact; all loose and flaking material is removed. (d)The peaks of the textured pavement surface are rounded in profile and free of sharp edges and irregularities. (e) The extent of the cleaning should be as such to insure the laitance is removed on both old as well as new concrete.

In the event that epoxy pavement marking is to be placed over existing pavement markings, the existing pavement marking shall be removed.

Pavement markings shall be removed to the extent that 95 to 100 percent of the existing marking is removed. Removal operations shall be conducted in such a manner that no more than moderate color and/or surface texture change results on the surrounding pavement surface.

828.06 Application. Epoxy marking material shall be applied only when the surface is clean and dry and when the pavement and air temperature are above 10ºC (50ºF). The Contractor shall transfer the entire contents of each material container to the striper tanks. The material shall be thoroughly mixed at all times during application.

Epoxy marking material shall be applied uniformly to the surface to be marked at the following rate in liters per kilometer (gallons per mile) of line. To achieve this rate the thickness of binder must be 20 mils ± 1 mil.

Liters per kilometer of line	**Width of line (mm)**				
	100	**150**	**200**	**300**	**600**
Solid line	52	78	103	155	310
Dashed line	13	20	26	40	80
Dotted line	17	26	35	52	103
Symbols, words	0.5 l/sq. meter				

Gallons per mile of line	Width of line (Inches)				
	4	**6**	**8**	**12**	**24**
Solid Line	22	33	44	66	132
Dashed line	5.5	8.3	11	17	33
Dotted Line	7.3	11	14.7	22	44
Symbols, Words	1.0 Gallon per 80 Square feet				

On open graded asphalts the above rate shall be increased by 25 percent to achieve the required thickness of 25 mils ± 1 mil.

Thinning is not permitted.

Glass beads shall be applied to the uncured epoxy material in sufficient quantity so that the beads completely fill the epoxy film from the film-pavement interface to the top surface of the film to the extent that there are loose beads on the surface of the uncured line. The rate of application shall not be less than 3 kg (25 pounds) of glass beads per liter (gallon) of epoxy material applied. Glass beads shall be dropped on in a double-drop system with the large gradation (Size I) first and the regular gradation (Size II) second in the same pass of the equipment. The beads shall be applied in equal amount by weight.

If the epoxy marking does not dry to a no-tracking condition consistently and shows a cyclical soft spot, the Contractor shall cease marking application until the problem is corrected.

828.07 Method of Measurement. In addition to the requirements of 641.12, the following shall apply:

1. The Contractor must submit certified documents from the manufacturer listing of the amount of epoxy (in liters) and glass beads (in kilograms) shipped for the particular project.

2. In the field the Contractor shall furnish a calibrated device to measure the quantity of materials used such as stroke counters mounted on the dispensing pumps. Stroke counter readings must be taken at the beginning and end of each day by the Engineer. Caution must be taken while re-circulating the material to turn off the stroke counter on the pump. Using the "dipping the tank" method is not sufficient.

3. The rate of application of materials shall be verified by comparing the amount of materials used with the computed amount needed for each section. Where short sections are involved and it is not practical or feasible to determine the quantities used on each and every short section, such sections may, by agreement between the Engineer and Contractor, be grouped together to verify the quantities used.

4. Removal of pavement markings must be indicated on the plans, and will be paid for in the units indicated in 828.09.

828.08 Final Acceptance: Pavement markings which are unacceptable, or become unacceptable prior to final acceptance, as determined by the Engineer, for causes such as, but not limited to, improper application, loss of adhesion to the pavement, non-uniform retroreflectivity, or non-retroreflectivity, shall be replaced by the Contractor with markings conforming to these specifications and requirements at his expense without delay, or the Contractor may request that the work be considered non-performed. The Contractor will receive no payment for unacceptable work which is considered non-performed.

828.09 Basis of Payment. Payment for accepted quantities complete in place will be made at the contract prices, or prices adjusted in accordance with 641.11 for:

Item	**Unit**	**Description**
828	Kilometer (mile)	Edge line
828	Kilometer (mile)	Lane line
828	Kilometer (mile)	Center line
828	Meter (linear foot)	Channelizing line
828	Meter (linear foot)	Stop line
828	Meter (linear foot)	Crosswalk line
828	Meter (linear foot)	Transverse line
828	Meter (linear foot)	Curb marking
828	Square meter (square foot)	Island marking
828	Each	Handicap symbol marking
828	Each	Railroad symbol marking
828	Each	School symbol marking, ___mm (in.)
828	Meter (linear foot)	Parking lot stall marking
828	Each	Lane arrow
828	Each	Word on pavement, ___mm (in.)
828	Meter (linear foot)	Dotted line
828	Each, meter(linear foot), square meter (square foot)	Removal of pavement marking
828	Lump sum	Two-way radio equipment

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

SUPPLEMENTAL SPECIFICATION 830
CURBING, CONCRETE MEDIANS AND TRAFFIC ISLANDS

October 21, 1998

830.01 Description. This work shall consist of furnishing and constructing curb, combination curb and gutter, medians and islands of the specified materials and types, in reasonably close conformity with the lines, grades and cross sections shown on the plans or established by the Engineer. This item shall also include necessary excavation and backfill, furnishing and installing joint materials, and the disposal of surplus excavation and discarded materials in accordance with 203.

830.02 Materials. Materials shall be:

Concrete (Class C)	499
Tie bar steel, epoxy coated	709.00, 709.01, 709.03, 709.05
Joint sealer	705.11, 705.04
Preformed filler	705.03
Coated dowel bars.	709.13

Sandstone shall be the best quality of Berea or Amherst gray sandstone, or sandstone of equal quality.

Asphalt curb shall meet 448 Intermediate Course, Type 1, designed for medium traffic, PG 64-22.

If a 448 mix is used, the asphalt concrete shall meet the composition requirements of 441 with the fine aggregate content set at the maximum permitted under this composition. Mineral filler meeting the requirements of 703.07 may be added provided the composition requirements of 441 are met. The method of introducing mineral filler shall be approved by the Laboratory.

830.03 Stone Curb. New sandstone curbs shall be as follows:

(a) Cutting and Dressing. Ninety-five percent of all straight curb shall be at least 5 feet (1.5

m) in length, with no piece less than 42 inches (1.1 m) except an occasional stone as short as 30 inches (0.8 m) may be used for closure. On curves of 50 feet (15 m) or greater radius, straight curb jointed radially may be used, in which case the lengths may be shorter than 42 inches (1.1 m) but not less than 36 inches (0.9 m). For curves and corners less than 50 feet (15 m) radius, the lengths shall be not less than 36 inches(0.9 m) and shall be dressed, jointed and set to the radii called for. All curb used for curves and corners shall be approximately uniform in length.

All curb shall be dressed to a straight edge on top and on the exposed face and ends to a depth below the gutter elevation of at least 6 inches (150 mm). The ends shall be dressed at right angles to the face for straight curb and radially for curb on curves. No slack or hollow joints shall be permitted. No projections shall remain after dressing the ends, which under expansion, would create contact with the end of the adjacent curb to cause spalling. The edge next to the gutter shall be cut to a 3 inch (75 mm) radius and the top dressed to a 1/4 inch (6 mm) bevel rising from the exposed face. All hand dressed curb shall be brought to the width called for by means of a pitching tool used on the edge at the back.

(b) Setting. The curb shall be set with a backward batter or incline from the vertical of 1 in 20 and on a thoroughly compacted subgrade. In clay soils or soils of a character that do not permit free drainage, a firm bed of porous material a minimum of 3 inches (75 mm) deep shall be placed as a foundation for curb. The curb shall be settled into place with a heavy rammer, and backed to a minimum width of 4 inches (100 mm) with porous backing to within 6 inches (150 mm) of the top. The balance of the backfill shall be brought to the level of the top of the curb for a distance of 2 feet (0.6 m) back, with soil or other acceptable material. Backing shall be thoroughly tamped in layers not exceeding 6 inches (150 mm) in thickness, loose measurement, with an approved tamper or rammer. As much of the backfilling and tamping as is consistent with alignment of the curb shall be done at the time the stone is first set. Circular curb shall be set in 499 Class C concrete when called for on the plans, 6 inches (150 mm) deep. The concrete shall be in a plastic state when the curb is placed. The concrete shall extend the width of the curb plus 6 inches (150 mm) behind the curb and shall be brought up behind the curb to within 4 inches (100 mm) of the top.

(c) Joints. The space between ends of adjacent sections of curbing below the dressed portion shall not be less than 1/8 inch (3 mm) at any point and shall not exceed 4 inches (100 mm). The joints between the dressed portion of adjacent sections of curbing shall be cushioned with 1/8-inch (3 mm) thick expansion joint material trimmed flush with the curbing on all edges.

If sandstone curb is placed after the pavement is placed, any joint remaining shall be filled with dry sand to within 2 inches (50 mm) of the surface of the pavement and the upper 2 inches (50 mm) shall be filled with bituminous material. Care shall be exercised in filling this joint so that no bituminous material comes in contact with the exposed surface of the curb.

(d) Resetting Curb. When specifically permitted by the plan, acceptable stone curb removed from the work under 202 may be used, to the extent available, in lieu of the furnishing of new stone curb. Such Salvaged curb shall be used continuously at locations designated by the Engineer. Interspersing of salvaged and new curb will not be permitted. Necessary storing and hauling of salvaged curb shall be a responsibility of the Contractor. All provisions for cutting and dressing, setting, and joints shall apply to salvaged curb.

830.04 Cast-in-Place Concrete Curb and Combination Curb and Gutter. These items

shall be as follows:

(a) Forms and joints. Curb forms shall be approved metal forms. They shall be securely braced and held to line and grade specified. Approved flexible forms of steel or wood may be used for construction of circular curb where radius is 200 feet (60 m), or less. The inner surface of the forms shall be clean and coated with a form release agent immediately before the concrete is placed.

All curb and combination curb and gutter not constructed integral with, or tied to, the base or pavement shall have 1/4-inch (6 mm) contraction joints constructed at 10 foot (3.0 m) intervals. The joint may be constructed with the use of metal separator plates, by the use of a grooving tool, or sawed in accordance with 451. The depth of joint shall average 2 inches (50 mm) or more for combination curb and gutter, and for curb shall average 1/5 or more of the curb height. Where expansion joints occur in the abutting pavement, they shall be provided for by separation of the section being placed with 1 inch (25 mm) 705.03 preformed filler.

When the curb is integral with, or tied to, the base or pavement, joints of the type used in the pavement shall be constructed in the curb and sealed with the same material. The joints shall be spaced identically with the joints in the base or pavement.

Curb forms shall be left in place for such length of time that the removal of same does not crack, shatter or otherwise injure the concrete.

Where the curbs built under this item are to later serve as a support for a finishing machine in the placing of a surface course, the alignment of the supporting edges shall be such that the distance between the curbs shall nowhere vary more than ½ inch (13 mm) from that specified.

(b) Placing. The concrete shall be placed in the forms, prepared as above described, and vibrated in such a manner as to eliminate all voids.

Concrete for curb which is to be integral with the concrete base or pavement shall be placed while the concrete is plastic, except when the presence of finishing equipment on the forms at the end of the day's run makes this impossible. When this condition prevails No. 5 (No. 15M) tie bars shall be placed vertically in the pavement at 1 foot (0.3 m) intervals and in a line 3 inches (75 mm) inside of and parallel to the edge forms. These tie bars shall extend to within 1 ½-inches (38 mm) of the subgrade or subbase and 2 inches (50 mm) above the pavement surface when placed. Immediately before the concrete curb is placed, the surface of the pavement or base on which the concrete curb is to be placed shall be flushed with mortar which contains one part cement to two parts sand. The mortar shall be worked into the surface cavities by brushing.

(c) Curb Machine. Concrete curb or curb and gutter may be placed with a self-propelled machine. The proper density and cross section shall be obtained by forcing the concrete through a mold of the proper cross section. Where a track is used the track on which the machine operates shall be set and held to the exact line and grade given by the Engineer. The concrete shall be of such consistency that it that it can be molded into the desired shape and then will remain as placed without slumping of the vertical faces.

(d) Finishing. The top of the curb shall be floated in such a manner to thoroughly compact the concrete and produce a smooth and even surface. The addition of extra mortar to secure this result will not be permitted. The edge of the curb shall be rounded by the use of a tool especially designed for the purpose. The exposed face of the curb shall be rubbed with a float immediately after removing the forms. Unnecessary tool marks shall be eliminated. The finished surface shall be free of irregularities and waves and shall be uniform in texture.

(e) Protection. Concrete curb, and combination curb and gutter shall be cured in accordance with 451 except that membrane cure shall be applied at a rate of not less than 1 gallon per 200 square feet (1 L/5m^2) of surface.

830.05 Asphalt Concrete Curb. The specified asphalt concrete material shall be furnished and placed to form a curb of the required cross section by one of the following methods or by any other method approved by the Engineer.

Method 1. After completion of the surface course, the area to be occupied by the curb shall be painted or sprayed with bituminous material meeting the requirements of 407.02 and applied at the rate of 0.15 gallons per square yard (0.7 L/m^2). Only the area to be occupied by the curb shall be so treated. The curb shall then be placed with a hand-operated or self-propelled machine consisting of a hopper and power-driven screw which forces the material through a tube by an extrusion method. The proper density and cross section of the curb shall be obtained by forcing the material through a die attached to the end of the extrusion tube.

Method 2. The material for the curb shall be placed as an independent operation preceding the final rolling of the surface course upon which the curb is to be placed. Loose material of sufficient height shall be placed and shaped by hand methods using suitable templates or by other means that will produce the specified cross section. The loose material shall then be compacted to final cross section dimensions by use of a hand-operated mechanical vibrating tamper equipped with a compacting shoe of such shape that will produce the specified cross section of the curb.

830.06 Concrete Median and Traffic Island. Concrete medians and traffic islands shall be constructed on the accepted, prepared subgrade, subbase or the completed and accepted base course or old pavement. These items shall be as follows:

(a) Forms and Joints. Forms shall be approved metal forms. They shall be securely braced and held to line and grade specified. Approved flexible forms of metal or wood may be used for construction of radii 200 feet (60 m) and less. The inner surface of the forms shall be clean and coated with a form release agent immediately before the concrete is placed.

All medians and traffic islands not anchored to the pavement shall have 1/4-inch (6 mm) contraction joints constructed at 10 foot (3.0 m) intervals. The joint may be constructed with the use of metal separator plates, by the use of a grooving tool, or sawed in accordance with 451. The depth of joint shall average 2 inches (50 mm) or more.

When the median or island is anchored to the pavement per the standard drawings, joints of the same type used in the pavement shall be constructed in the median or island. The joints shall be spaced identically with the joints in the pavement.

Forms shall be left in place for such length of time that the removal of same does not crack, shatter or otherwise injure the concrete.

(b) Placing. When placing the median or island on subgrade or subbase, the subgrade or subbase shall be sprinkled with water at such times and in such manner as directed by the Engineer so that it will be in a thoroughly moistened condition when the concrete is deposited thereon.

The concrete shall be placed in the forms and vibrated in such a manner as to eliminate all voids.

(c) Mechanical Placement. Medians and traffic islands may be placed with a self-propelled

machine. The proper density and cross section shall be obtained by forcing the concrete through a mold of the proper cross section. Where a track is used the track on which the machine operates shall be set and held to the exact line and grade given by the Engineer. The concrete shall be of such consistency that it can be molded into the desired shape and remain as placed without slumping of the vertical faces.

(d) Finishing. The top of the median or island shall be given a broom, turf, or similar texture. The addition of extra mortar to secure this result will not be permitted. The edges shall be rounded by the use of a tool especially designed for this purpose. The exposed faces shall be rubbed with a float immediately after removing the forms. Unnecessary tool marks shall be eliminated. The finished surface shall be free of irregularities and waves and shall be uniform in texture.

(e) Protection. Concrete medians and traffic islands shall be cured in accordance with 451 except that membrane cure shall be applied at a rate of not less than1 gallon per 200 square feet (1 L/5m^2) of surface.

830.07 Method of Measurement. The length of curb or combination curb and gutter measured will be the actual number of linear feet (meters) complete in place, measured along the front face of the curb section.

The quantity of concrete median or traffic island measured shall be the number of square yards (square meters) or the number of cubic yards (cubic meters) complete in place.

830.08 Basis of Payment. Payment for accepted quantities will be made at the contract price for:

Item	Unit	Description
830	Linear foot (meter)	Sandstone curb
830	Linear foot (meter)	Curb, Type_____
830	Linear foot (meter)	Combination curb and gutter, Type _____
830	Linear foot (meter)	Asphalt concrete curb, Type _____
830	Square yard or cubic yard (square meter or cubic meter)	Concrete traffic island
830	Square yard or cubic yard (square meter or cubic meter)	Concrete median

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 870
SEEDING AND MULCHING

August 10, 1999

870.01 Description. This work shall consist of placing topsoil, preparing the seed bed, furnishing all seed, agricultural lime, commercial fertilizer, mulching material and placing and incorporating as specified. Seeding and mulching shall be performed in stages as per Supplemental Specification 877.

The Contractor shall place the seed and mulch within 7 days of obtaining final grade. If it is anticipated that the areas will be disturbed by future work, the area shall be temporary seeded (Class 7) and mulched as per Supplemental Specification 877.

Areas to be seeded shall include all areas within the right of way and as described in the plans. All areas outside the specified limits where the vegetation has been disturbed or destroyed by the Contractor including those defined in CMS 104.06 shall be restored and seeded in accordance with these specifications by the Contractor at no additional cost to the Department.

870.02 Testing of Soil. Contractor shall have a Standard Test performed of the soil. This test measures soil acidity or alkalinity and will indicate if additional lime is required above the standard. The tests should be taken near final grade but prior to seeding. There shall be at least one test per 20 acres (8.1 hectares).

How to Take a Soil Sample: In a random pattern, 15-20 cores should be taken at a depth of 6 to 7 inches (150 to 180 mm). Cores should be mixed together with one pint retained for testing. Large sites having different soil conditions may require more than one test. Test results shall be made available to the Engineer. Corrections to any deficiencies in nutrients or pH shall be made by following the test report recommendations.

Ohio County Extension offices can provide the Contractor with a soil sample kit and testing locations.

870.03 Agricultural Lime. Agricultural lime shall be obtained by the Contractor from a dealer or manufacturer whose brands and grades are registered or licensed by the State of Ohio, Department of Agriculture.

870.04 Testing of Agricultural Liming Materials. Liming materials shall be tested in accordance with Supplement 1007.

870.05 Lime Application Rates. For the basis of quality control agricultural ground limestone, having a minimum total neutralizing power (TNP) of 90+ percent, at least 40 percent passing a No. 100 (150 μm)sieve and 95 percent passing a No. 8 (2.36 mm) sieve, 100 percent of Ag-ground shall be applied. Application shall be at 92 pounds per 1000 sq ft (2 ton/acre). This rate shall be standard grade.

Other available forms of liming materials may be applied depending on their potential to neutralize soil acidity. An increase or decrease in the application rates, depending on the form used, are determined from the Table 7-2 "Equivalent Amounts of Liming Materials" found in Bulletin 472, "Ohio Agronomy Guide", published by the Cooperative Extension Service, The Ohio State University.

Changes to the lime requirements will be determined by the pH test, as indicated on the soil analysis results. A slightly acid soil (pH 6.5) is recommended. Agricultural lime shall be applied to the surface.

870.06 Commercial Fertilizer. Commercial fertilizer shall be obtained by the Contractor from a dealer or manufacturer whose brands and grades are registered or licensed by the State of Ohio, Department of Agriculture.

Fertilizer may be dry or liquid in analysis specified or in the same ratio as specified. The standard application rate shall be 20 pounds per 1000 sq ft (0.1 kg/m^2) of 10-20-10. Another analysis in the same ratio (1:2:1) may be used by varying the application rate. The soil test results will recommend corrective fertilizer application rates if needed above and beyond the standard. Fertilizer shall be

applied in an even pattern over all areas.

870.07 Topsoil. Topsoil shall consist of loose, friable, loamy topsoil without admixture of subsoil or refuse. For topsoil to be considered loamy, Topsoil should be screened through a 3/4 inch to 1½ inch (19.0 to 37.5 mm) harp screen and shall contain no more than 40 percent clay.

Acceptable topsoil shall contain not less than 3 percent or more than 20 percent organic matter as determined by loss on ignition of samples oven dried to constant weight at 212^0 F (100^0 C).

870.08 Compost. Acceptable compost shall include Ohio EPA rated Class IV compost, EQS biosolids compost or approved equal. Compost shall have a Nitrogen content of 1.4 percent or above. Compost shall be obtained from an Ohio EPA approved facility. Contractor shall provide the Engineer with the facility name and location prior to delivery.

870.09 Seeds. All grass seed shall be obtained by the Contractor from a dealer or grower who is registered or licensed by the State of Ohio, Department of Agriculture.

All grass seed specified shall meet the current specifications on file with the Department as to percentage purity, weed seed and germination. All grass seed to be used under this item shall be on an approved list kept on file at the Laboratory, and shall meet the requirements of these specifications. Minimum germination rates for cool season turfgrass species are listed in Table 1.

GERMINATION RATES: TABLE 1

Species	Minimum Percent	High Quality Percent
Kentucky Bluegrass	80	85
Fine Fescue	85	90
Perennial Ryegrass	85	90
Annual Ryegrass	85	90
Tall Fescue	85	90
Creeping Red Fescue	85	90

Seed shall be dated within the last 9 months of testing. No seed will be accepted with a date of test exceeding 9 months prior to the date of sowing. The Department reserves the right to test, reject or approve all seed after delivery. All seeds are to be furnished as separate species and cultivars, packaged or bagged separately, and labeled, tagged or marked in accordance with ORC 907.03.

Cool season turf Classes 1, 2, and 3 as listed in Table 2 shall be composed of no less than two and no more than four cultivars of the same species. Newer improved cultivars should be used when possible.

870.10 Legumes. All leguminous seeds shall be inoculated or treated with the proper amount of pure nitrogen-fixing bacteria selected for maximum vitality, not more than one year old, and mixed with sufficient water to thoroughly wet the seed. All culture shall be subject to approval.

If sown hydraulically, the inoculant shall be 4 times the rate specified by the inoculant manufacturer. Inoculant and sticking agent shall be placed directly into the slurry and thoroughly mixed immediately before seeding. Seed shall be sown as soon as possible after inoculation. Seed left standing more than 24 hours shall be re-inoculated before sowing. All seed shall be mixed on the project.

Preinoculated seed will be considered as inoculated at not more than one time the rate specified by the inoculant manufacturer. Additional inoculation will be required on preinoculated seed to comply with the above specifications.

870.11 Native Grasses and Wildflowers. The seed quantities indicated per 1000 square feet (m^2) as listed in Table 2, Classes 4, 5 and 6 shall be the amounts of pure live seed (PLS) for each species listed. Seed which has actual pure live seed (PLS) yield according to tests less than the intended yield, will have the specified quantity adjusted to meet the intended PLS yields.

All seed supplied under Classes 4, 5 and 6 shall only be that which is grown from an approved midwest or northern grower. The states where seed may be obtained from are Ohio, Michigan, Illinois, Wisconsin, Indiana, Minnesota, Iowa, North Dakota or South Dakota. Native seed may be obtained outside this area with the Engineer's approval. Annual seed listed in Class 5A may be obtained from any commercial grower or dealer and shall have been produced within the continental US. If the listed varieties are not available, other varieties may be substituted only with prior approval from the Engineer.

Sixty days prior to seeding, the Contractor shall provide for approval, a written description for the Class 4, 5 and 6 mixtures showing the percentage by weight (mass) of each kind of seed. This description shall also include the following:

a. Name and location of the seed supplier.
b. Origin and date of harvest of each kind of seed.
c. A statement of the purity and germination of the seed.

SEED MIXTURES: TABLE 2

CLASS - TYPE	SEEDS	Lbs/1000 Sq Ft	Kg/1000 m²
1 Lawn Mixture	Kentucky Bluegrass (Poa pratensis) Creeping Red Fescue (Festuca rubra) Annual Ryegrass (Lolium multiflorum) Perennial Ryegrass, turf type (Lolium perenne)	1.5 1.5 1.0 1.0	7.32 7.32 4.88 4.88
2 Roadside Mixture	Kentucky Bluegrass (Poa pratensis) Kentucky 31 Fescue (Festuca arundinacea var. KY 31) Perennial Ryegrass (Lolium perenne)	1.5 2.0 1.5	7.32 9.76 7.32
3A Slope Mixture (flatter than or equal to 3:1)	Use Mixtures 2, 3B, 3C or 4B.		
3B Low Growing Slope Mixture (steeper than 3:1)	Hard Fescue (Festuca longifolia) Creeping Red Fescue (Festuca rubra) Annual Ryegrass (Lolium multiflorum)	1.3 0.8 0.23	6.35 3.90 1.12
3C Crown Vetch Mixture (steeper than 3:1)	Crown Vetch (Coronilla varia) Perennial Ryegrass (Lolium perenne) Annual Ryegrass (Lolium multiflorum)	0.9 1.8 0.3	4.39 8.79 1.46
4A Native Grass Mixture	Big Blue Stem (Andropogon gernadi) Indian Grass (Sorghastrum nutans) Switch Grass (Panicum virgatum) Annual Ryegrass (Lolium multiflorum)	0.07 0.09 0.02 0.11 (spring) 0.34 (fall)	0.34 0.44 0.097 0.54 (spring) 1.66 (fall)
4B Low Growing Native Grass	Little Blue Stem (Andropogon scoparius) Side-Oats Gramma (Boutelova curtipendula) Prairie Dropseed (Sporobolus heterolepsis) Annual Ryegrass (Lolium multiflorum)	0.18 0.04 0.04 0.11 (spring) 0.34 (fall)	0.88 0.19 0.19 0.54 (spring) 1.66 (fall)
5A Annual and Perennial Wildflower Mixture	Annual Mixture (below) Perennial Wildflower Mixture (below) Annuals Mixture - not exceeding 25% by weight of any one species of the following: Corn Poppy (Papaver rhoeas) Cosmos (Cosmos bipinnatus) Yellow Cosmos (Cosmos sulphureus) Cornflower (Centaurea cyanus) Rocket Larkspur (Delphinium ajacis) Indian Blanket (Gaillardia pulchella) Perennial Wildflower Mixture - not exceeding 5% by weight PLS of any one species of the following: Black-eyed Susan (Rudbeckia hirta) Purple Coneflower (Echinacea purpurea) Lance-leaved Coreopsis (Coreopsis lanceolata)	0.07 0.28	0.34 1.37

CLASS - TYPE	SEEDS	Lbs/1000 Sq Ft	Kg/1000 m²
5B Native Wildflower and Grass Mixture	Native Wildflower Mixture - not exceeding 5% by weight PLS of any one species of the following: Butterflyweed (Asclepias tuberosa) New England Aster (Aster novae-angliae) Partridge Pea (Cassia fasciculata) Purple Coneflower (Echinacea purpurea) Rattlesnake Master (Eryngium yuccifolium) Ox-eye Sunflower (Heliopsis helianthoides) Bergamot (Monarda fistulosa) Grey-headed Coneflower (Ratibida pinnata) Orange Coneflower (Rudbeckia fulgida) Prairie Dock (Silphium terebinthin) Whorled Rosinweed (Silphium trifolium) Stiff Goldenrod (Solidago rigida) Grass Mixture Big Blue Stem (Andropogan gerardii) Little Blue Stem (Schizachyrium scoparium) Indian Grass (Sorghastrum nutans) Annual Ryegrass (Lolium multiflorum)	0.34 0.046 0.069 0.023 0.92	1.66 0.224 0.337 0.112 4.49
6 Wildlife Mixture	Big Blue Stem (Andropogon gernadi) Little Blue Stem (Andropogon scoparius) Indian Grass (Sorghastrum nutans) Ox-eye Sunflower (Heliopsis helianthoides) Prairie Dock (Silphium terebinthinaceum) Purple Coneflower (Echinacea purpurea) Whorled Rosinweed (Silphium trifolium) Downy Sunflower (Hellanthus mollis) New England Aster (Aster novae-angliae) Annual Ryegrass (Lolium multiflorum)	0.13 0.18 0.13 0.18 0.18 0.18 0.11 0.07 0.07 0.11 (spring) 0.34 (fall)	0.63 0.88 0.63 0.88 0.88 0.88 0.54 0.34 0.34 0.54 (spring) 1.66 (fall)
7 Temporary Erosion Control Mixture	Annual Ryegrass (Lolium multiflorum)	2.02	9.86

870.12 Site Preparation. The Contractor shall complete all grading within the areas to be covered with the topsoil under this item necessary to bring the surface of the proposed grade to the lines indicated on the plans, and parallel to the proposed finished grade. These areas are to be free from rock or other foreign material of 3 inches (75 mm) or greater in any dimension, except for shale cuts.

870.13 Placing Topsoil. Topsoil shall be placed and spread over all the areas to a minimum depth of 2 inches. It should be incorporated into the existing soil at a depth of 2 to 4 inches (50 to 100 mm). Staging areas, temporary roads or heavily compacted areas are be disked to a depth of 4 to 6 inches (100 to 150 mm). The area shall be made smooth and uniform and shall be in accordance with the finished grade and cross section shown in the plans or otherwise designated. Such loosening will be required to ensure a bond of the topsoil with the surface on which it is put and to form a uniform blend. Soil shall not be tilled if wet or overtilled to achieve desired seed bed.

Fertilizer, lime or other soil amendments shall be applied separately to the site after the soil test results have been forwarded to the Engineer. Amendments may be incorporated by disk, harrow or rake, at a depth of 2 to 4 inches, in the same operation.

The prepared surface of topsoil and soil shall be free of gullies, rivulets, crusting, caking and satisfactorily shaped and finished as provided in 203. This work shall be performed prior to seeding.

All seed bed areas, including slopes flatter than 2 to 1 shall be free of rock and other foreign material 2 inches (50 mm) or greater in any dimension. All seed bed areas with 2 to 1 slopes or steeper shall be free of rock and other foreign material 3 inches (75 mm) or greater in any dimension but shall not be fine graded. After topsoil is placed, the area shall be tracked back and forth to achieve good contact between soil and slope surface. Surface shall be raked smooth prior to seeding.

All seed bed areas in front of residences, commercial properties, etc. between curb and sidewalks or as indicated on the plans, shall be free of all stones 1 inch (25 mm) or greater in any dimension. Seed bed shall have a smooth surface. Hand raking will be required if site is inaccessible to machines or if machines do not provide results equivalent to hand raking.

Topsoil is not required for shale cuts steeper than 2:1. Shale cuts steeper than 2:1 shall be allowed to deteriorate to a soil type surface texture prior to seeding.

870.14 Seeding Methods. Seeding operation shall not be performed unless the area is properly prepared. Except with permission of the Engineer, the Contractor shall seed cool season grasses between August 15 to October 30. If permanent seeding is necessary prior to these months, seeding rates shall be increased by 10 percent. All seeding performed between October 15 and March 15 shall be temporary seeding in accordance with Supplemental Specification 877. Permanent seeding may be performed with permission for projects completed within the same calendar year.

Seeding shall be done prior to or concurrently with 660, 667, 668 or 670.

Crown vetch seeding shall not be permitted during September or October.

Wildflower classes 5 and 6 shall be seeded in the fall (September - October). Spring seeding may be allowed with approval. Class 4 shall be seeded during the spring (March - May) when possible.

Seeding native grasses and wildflowers in Classes 4, 5 and 6 shall be done with a rangeland type or native seed grass drill. Seeding natives shall be performed as a split rate application with no less than two passes in different directions. Broadcast seeding shall only be allowed with approval of the Engineer. Cultipacking or rolling will be required when broadcast seeding.

All seed shall be thoroughly mixed and then evenly sown over the prepared areas at the rates listed in Table 2. No seed shall be sown during high winds. Equipment shall be operated in a manner to ensure complete coverage of the entire area to be seeded. Immediately after sowing, the area shall receive a light raking followed by rolling on flat surfaces or tracking by dozer on slopes to

insure good seed soil-contact.

Seed and fertilizer mixtures in Classes 1, 2, 3 and 7 shall be applied with a hydraulic seeder between March 1 and October 15.

870.15 Mulching Operation. Materials used for mulching shall be straw, wood fiber, organic compost, or biosolids compost. Materials shall be reasonably free of weed seed, foreign materials, or other injurious materials that would prohibit seed germination.

Within 24 hours after any given area is seeded, straw mulch shall be evenly placed over all seeded areas at the following rates:

Seeding from March 15 to October 15:	2 tons per acre (0.5 t/1000 m^2)
Seeding from October 15 to March 15:	3 tons per acre (0.7 t/1000 m^2)

Mulching materials shall be kept in place with asphalt emulsion applied at a minimum rate of 60 gallons per ton (250 L/t) of mulch or with tackifiers per the manufacturer's recommendations. An additional application at a rate of 30 gallons per ton (125 L/t) of mulch shall be applied to the shoulder area, starting at the berm edge and extending out for a distance of 10 feet (3m). Asphalt emulsion for vegetative mulch shall conform to 702.04. Emulsion shall be nontoxic to plants and shall be so prepared that will not change in transportation or storage.

Displaced mulch shall be replaced at once but only after all work proceeding the seeding operation or that which was damaged during the mulching operation has been acceptably repaired.

870.16 Wood Fiber Mulch. Fiber mulch shall consist of pure wood fibers manufactured expressly from clean wood chips. The chips shall be processed in such a manner as to contain no lead paint, varnish, printing ink, petroleum based compounds or seed germination inhibitors. Fiber shall not be produced from unknown origin recycled material such as sawdust, paper, cardboard or residue from chlorine bleached pulp and paper mills.

The cellulose wood fiber mulch must maintain uniform suspension in water under agitation and shall blend with grass seed, fertilizer and other additives to form a homogeneous slurry. Tackifiers shall be manufacturer approved.

Using standard hydraulic mulching equipment, pure wood fiber mulch, tackifier, seed and fertilizer slurry shall be applied evenly over the soil surface in a one-step operation. Hydraulic application shall occur from March 1 to October 15 only. Applications rates are as follows:

Flat surfaces:	35 pounds per 1000 sq ft (170 kg/1000 m^2)
Slopes 3:1 or less:	46 pounds per 1000 sq ft (225 kg/1000 m^2)

All slopes subject to windy conditions shall be seeded and mulched by hydraulic methods only.

870.17 Compost. Compost may be applied as a mulch instead of straw or wood fiber. Grass seed shall be thoroughly mixed with the compost and distributed over the prepared seed bed area using pneumatic equipment. Compost/seed mixture shall be applied to a minimum 1/4 inch (6 mm)

depth. Mulch covering with tackifier is not needed when using compost in this method. No additional compensation will be made for this substitutuion.

870.18 Watering. For permanent seeded areas (Classes 1 to 6) and all sodded areas, they shall be throughly watered, after seed has germinated, at the rate of 300 gallons per 1000 square feet (12.2 m^3/1000 m^2). The water shall be applied by means of a hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the mulch material. A second water application shall be made between 7 and 10 days after the first application, providing ½ inch (13 mm) or greater rainfall has not occurred within 7 days after the first application. When ½ inch (13 mm) or greater of rainfall has occurred within the first 7 day period, the second application may be delayed or omitted entirely, depending on weather conditions. Water shall be paid for and measured separately.

870.19 Maintenance. The Contractor shall maintain all seeded and mulched areas until final inspection. Damaged areas shall be repaired to the original condition and grade.

870.20 Mowing. Mowing may be required prior to permanent seeding and any time during the growing season following permanent seeding. The Contractor will be notified by the Engineer to begin mowing.

The Contractor shall use suitable equipment for mowing. Mowers shall be of the rotary, flail, disk or sickle type. Bunching or wind-rowing of mowed vegetation will not be permitted. The final cutting height shall be no less than 6 inches (150 mm). More than one pass may be required for each mowing.

870.21 Fertilization: 2nd Application. Permanently seeded areas shall be fertilized with an application of 12-12-12 no less than 3 months after installation. Fertilizer shall be broadcast evenly over the surface without incorporation at a rate of 10 pounds per 1000 sq ft (0.05 kg/m^2). This shall be performed after all repair seeding and mulching or inter-seeding has been completed.

870.22 Repair Seeding and Mulching. The Contractor shall repair all damage or erosion of the seeded and mulched areas. The Department will pay for these repairs.

The repairs shall be made prior to completion of the project by reworking or reshaping to grade. Reworking or reshaping of the slopes shall include bringing in additional material, if necessary and using whatever equipment that is necessary to restore slopes to grade. Area shall then be fertilized, seeded, and mulched as per the specifications. Such work will be measured and paid for as "Repair Seeding and Mulching."

When damage or erosion of these areas occurs as a result of fault or negligence of the Contractor, the areas shall be satisfactorily repaired, fertilized, seeded and mulched at no additional cost to the Department.

870.23 Inter-seeding. Inter-seeding is the practice of seeding existing thin and spotty growing turf with a slit or drill type seeder. This work shall only be performed from March 15 to May 15 and

September 1 to October 15. Mowing may be required prior to seeding to achieve good seed soil contact. Cut material shall not be wind-rowed or left in a bunched condition.

A slit or drill type seeder shall be used. Exceptions may be when seeding steep slopes or inaccessible areas. Broadcast or hydraulic seeding methods may be used in these instances. Commercial fertilizer of 12-12-12 shall be broadcast over affected areas as specified. Water shall be applied at the rate specified in these areas to aid in seed/soil contact.

870.24 Method of Measurement. Topsoil, organic compost or other approved equal required to meet the specification shall be paid for by the number of cubic yards (cubic meters) furnished and placed. The quantity will be paid based on the amount shown in the plans. In the measurement of topsoil, organic compost, etc., no adjustment of the plan quantities or recalculation of the volumes shall be made for any volumes found different by less than five percent from the plan quantity. The Contractor shall accept the plan quantity with authorized changes as payment in full unless revised by the Engineer. The burden of proof of a plan discrepancy greater than five percent is on the Contractor. The Contractor shall submit supporting documentation concerning the possible changes.

The quantity of commercial fertilizer and agricultural lime will be the number of tons (kilograms) of each quantity of furnished, spread and incorporated.

Seeding and mulching will be the number of square yards (square meters) of the area seeded and mulched in accordance with these specifications. In the measurement of seeding and mulching, no adjustment of the plan quantities or recalculation of the areas shall be made for any areas found different by less than five percent from the plan quantity. The Contractor shall accept the plan quantity with authorized changes as payment in full unless revised by the Engineer. The burden of proof of a plan discrepancy greater than five percent is on the Contractor. The Contractor shall submit supporting documentation concerning the possible changes.

The quantity of repair seeding and mulching will be the number of square yards (square meters) of damaged or eroded areas reshaped, seeded and mulched.

The quantity of water shall be the amount in thousands of gallons (cubic meters) applied in accordance with the requirements of this item and measured in tanks, tank wagons or trucks of predetermined capacity, or by means of meters of a type satisfactory to the Engineer and furnished and installed by the contractor at his own expense, or determined by weight conversion.

The quantity of inter-seeding will be the number of square yards (square meters) of the seeded area.

Mowing satisfactorily performed will be measured in 1000 square foot units (square meters).

The quantity of soil analysis tests will be the number of tests submitted to the Engineer.

870.25 Performance. The Department will inspect all seeded areas no earlier than six months and no later than 12 months after final seeding. The Contractor shall repair, regrade, overseed, and

fertilize any area this inspection identifies without a uniform density of at least 70 percent grass cover.

Seeded areas damaged by traffic or erosion, due to no fault or negligence of the Contractor, shall also be regraded, refertilized, reseeded and remulched.

The Contractor shall be compensated for the above work and mobilization and demobilization by supplemental agreement.

870.26 Basis of Payment. Payment for accepted quantities will be made at contract prices for:

Item	Unit	Description
870	Each	Soil analysis test
870	Cubic yard (cubic meter)	Placing topsoil
870	Ton (kilogram)	Commercial fertilizer
870	Ton (kilogram)	Agricultural lime
870	Square yard (square meter)	Seeding and mulching
870	Square yard (square meter)	Repair seeding and mulching
870	M Gallons (cubic meters)	Water
870	Square yard (square meter)	Inter-seeding
870	M Square feet (square meter)	Mowing

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 877
TEMPORARY SEDIMENT AND EROSION CONTROL

April 13, 1999

877.01 Description. This work shall consist of temporary control measures as detailed in the plans and/or general notes during the life of the contract to control sediment and erosion through the use of straw or hay bales, dikes, slope protection, sediment pits, basins and dams, slope drains, coarse aggregate, mulches, grasses, filter fabrics, ditch lining, inlet protection and other erosion control devices or methods.

The permanent control provisions contained in the contract shall be coordinated with the temporary erosion control features to the extent practical to assure economical, effective and continuous erosion control throughout the construction and post-construction period.

Temporary controls are required for construction work outside the right-of-way in areas such as borrow pit operations, haul roads, equipment and material storage sites, waste areas, and temporary plant sites. This work will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor, with costs included in the contract prices bid for the items to which they apply.

877.02 Materials. Commercial fertilizer shall be (10-20-10) and shall conform to Item 659.

Temporary seeding and mulching shall consist of annual ryegrass (*Lolium multifolium*). Seed and mulching materials shall be applied in accordance with Item 659.

Temporary filter fabric ditch checks shall consist of 30 inch [0.8m] wide filter fabric with sound wood supports with maximum spacing of 10 feet [3.0m] on centers. Temporary inlet filter barriers shall consist of 18 inch [0.5m] wide filter fabric fence with a securely nailed 2 x 4 wood frame.

Temporary bale filter dikes and perimeter filter fabric fence shall consist of straw or hay bales, or 30 inch [0.8m] wide filter fabric fence with sound wood supports with a maximum

spacing of 10 feet [3.0m] on centers. All the above filter fabric fence shall meet the requirements of 712.09, Type C.

Temporary dikes shall consist of suitable 203 material.

Temporary slope drains shall consist of pipe, pipe caps, coarse aggregate, riprap, rock channel protection, or other materials. Sediment pits are not paid for separately but are included as part of slope drain construction.

Pipe caps shall be included in the unit bid price for the pipe. Pipe caps shall have a minimum diameter of 1/4 inch (6.4mm) holes and be specifically designed to connect to the pipe. There will be a minimum of one hole per square inch (645 mm^2) of the cross sectional end area of the pipe cap.

Temporary sediment basins and dams shall be constructed by methods described in Item 203 Excavation and Embankment and Item 601 Rock Channel Protection, Type C or D with filter.

Temporary rock check dams shall be constructed of Item 601 Rock Channel Protection, Type C or D without filter.

Temporary ditch and slope protection shall meet the requirements of Item 670.

877.03 Construction Requirements. The Storm Water Pollution Prevention Plan (SWPPP) details the placement, location and description of the temporary and permanent erosion control items. The following descriptions shall be used to supplement the plan. The Contractor shall rearrange and modify the plan quantities to meet the field conditions and the National Pollutant Discharge Elimination System (NPDES) Permit.

When the plan does not have a SWPPP, the Contractor shall submit a plan detailing control feature locations and quantities at the pre-construction meeting.

In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal or State or local agencies, the more restrictive laws, rules, or regulations shall apply.

(A) Clearing and Grubbing. The Contractor shall limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, and borrow and fill operations as determined by the project conditions. The Contractor shall preserve existing vegetation where attainable and temporarily seed and mulch disturbed idle areas as stated.

Inactive cleared and grubbed areas that are scheduled to remain idle for more than 45 days shall be stabilized with vegetation (i.e. temporary seed and mulch) within 7 days following the clearing and grubbing operations. If an area is within 50 feet [15 m] of any water body (i.e. stream, river, pond, etc.), then it shall be vegetated within 2 days following

the clearing and grubbing operations.

(B) Installation of Control Features. Temporary erosion and sediment control items shall be installed as detailed and are to remain functional until the upper slope drainage areas are fully stabilized.

Temporary perimeter, ditch check or inlet filter fabric fence shall be constructed in accordance with Standard Drawing DM-4.4.

1. Temporary Perimeter Controls: Temporary perimeter filter fabric fence shall protect the following from sheet flow runoff: off right of way locations; off construction limit locations; around water bodies, wet lands or around other significant items designated on the plan.

Dikes shall be used to prevent flow from coming on to the project and to barren areas on the project.

The Contractor shall install perimeter filter fabric fence and dikes concurrent with the clearing and grubbing operations.

2. Inlet Protection: The Contractor shall use an 18 inch [0.5m] wide filter fabric fence supported around a storm drain inlet or manhole with securely nailed 2 x 4 inch (50 X 100 mm) lumber. The Contractor shall excavate a six inch (150 mm) trench around the inlet, and drive the posts six inches (150 mm) below the excavated trench bottom. The fabric shall be stretched around the frame, placing six inches of fabric in the trench and secure tightly. The fabric shall overlap on one side of the inlet so that the fabric ends are not attached to the same post. Backfill the excavated soil onto the fabric and compact tightly.

The Contractor shall construct the inlet protection as soon as the inlet is completed.

3. Temporary and Permanent Seeding: Use seed and mulch liberally during and after construction and before or during winter shut down. Temporary seeding areas shall be fertilized at one-half the specified rate of application in Item 659. Temporary seeding shall be annual ryegrass sown at 2 pounds per 1000 square feet [1 kg/100 m^2] and mulched in accordance with Item 659. When project conditions prevent the incorporation of fertilizer into the soil and preparation of the seed bed cannot be performed in accordance with Item 659, these requirements may be waived. Temporary seed shall not be placed on frozen ground.

The Contractor shall place the permanent seed on all barren areas within 7 days of obtaining final grade. The Contractor shall place the temporary seed and mulch as stated under clearing and grubbing.

4. Slopes: Dikes, slope drains and ditches shall be installed to divert water from bare soil and to protect cut and fill slopes. The Contractor shall place dikes at the top of fill slopes to protect the sides slopes from erosion.

The Contractor shall install dikes and slope drains when no filling activity occurs for three or more weeks and when slope height is greater than 8 feet [2.5m].

The Contractor shall construct a ditch at the top of cut slopes prior to the cutting of the slope to reduce runoff potential.

5. Ditch Checks: Filter fabric fence or rock checks are placed to protect ditches from erosion and to filter sediment from flowing water. The checks are placed across the width of the ditch.

Filter fabric fences are installed for 2 acres (8,000 m^2) or less of drainage area. Rock ditch checks are installed for 2 to 5 acres (8,000 to 20,000 m^2) of drainage area. When no rock quantities are denoted for rock checks, use the calculated rock quantities from basins for the rock checks.

Ditch checks shall be installed in conjunction with sediment basins and dams when the above drainage areas are not exceeded.

The Contractor shall place the ditch checks as soon as the ditch is cut.

6. Bale Filter Dikes: Bale filter dikes shall be installed a few feet (meters) from the toe of a slope to filter and/or divert sediment to an appropriate control before it enters a water body on or off the project limits.

It is used to collect sediment for a maximum of:

a) less than 1/4 acre [1,000 m^2] without an outlet
b) slope length of less than 100 feet [30 m] at a maximum slope of 2:1.
c) use outlet or pit every 100 feet [30 m] for a 2:1 slope. Use a greater spacing for flatter slopes.

Bale filter dikes shall be constructed in accordance with Standard Drawing DM- 4.3. When filter fabric is used for the bale filter dike, the location is accordance with Standard Drawing DM-4.3 and the construction details shown in Standard Drawing DM-4.4 are used.

The Contractor shall construct the bale filter dikes concurrent with the grubbing operations.

7. Sediment Dams or Basins: Basins and dams are placed and used at concentrated and critical flow locations to settle sediment out before leaving the project. Use basins at the bottom of a ravine, at a culvert inlet or outlet, along or at the end of the ditch and at any concentrated sediment exit point of the project. Use a basin quantity of 67 cubic yards for every acre of drainage area (125 m^3 per 10,000 m^2).

The Contractor shall construct sediment dams and basins at the first step of grading and within 7 days of commencing grubbing operations.

8. River, Stream and Water Body Protection: Protect all streams or water bodies passing through or on the project. Use filter fabric or bale filter dikes to line the water edges. Divert project sediment flow by using dike and slope protection. A combination of the above or other control features can be used.

The Contractor shall construct the above features concurrent with the grubbing operations.

a) Stream Relocation: Fully stabilize the new stream channel prior to diverting flow into the new channel.

b) Stream and River Crossing: Provide a means for construction equipment to cross water courses without causing erosion of streambanks or deposits in the channel. Plan and locate crossings well in advance of needing them. Disturbance to water bodies shall be kept to a minimum. Crossings shall be kept to a minimum and as narrow as practical. Crossings shall be made in shallow areas rather than deep pools where possible. Clearing, grubbing and excavation of streambanks, bed and approach sections shall be kept to a minimum.

The provisions for conveyance shall anticipate high flows and shall not impede the movement of aquatic life.

If culverts are used, the following minimums shall apply: Place culverts on the existing stream bed to avoid a drop in waterfall at the downstream end of the pipe. Culvert diameter shall be at least three times the depth of normal stream flow at the point of the crossing. The minimum size culvert to be used shall be 18 inches [0.5m]. There shall be sufficient number of culverts to completely cross the channel from stream bank to stream bank with no more than 12 inches [0.3m] between each culvert.

All fill and surface material placed in the channel, around the culverts or on the surface of the crossing shall be clean non toxic dump rock fill Type B, C, or D. Extend placed rock up slope from original stream bank to catch and remove erodible material from equipment.

Aggregate used does not need to be removed. Care should be taken to avoid any impoundment or restriction to fish passage. All pipes must be removed upon project completion.

The stream crossing work will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor, with costs included in the contract bid prices for the items to which they apply.

When the normal water elevation is shown on the plan, the Contractor shall construct crossings to accommodate a water elevation at least one foot (0.3m) above the stated normal water elevation. Fording in accordance with 107.21 is not allowed.

877.04 Maintenance. Temporary erosion control features shall be properly maintained.

The Contractor shall maintain these items with the concurrence of the Engineer. When the Contractor properly places the erosion control items in the contract in accordance with the contract documents, then the Department will pay for the additional cost to maintain or replace these items of work by the unit bid prices, agreed unit prices or by 109.04. Silt removed from erosion control features shall be disposed of in accordance with 203.05.

The Engineer or appointed inspector will check the temporary and permanent erosion control features every 7 days or within 24 hours of any rainfall of more than ½-inch (10 mm).

(A) Temporary Perimeter, Ditch Checks, Inlet Protection Filter Fabric Fence, Dikes and Bale Filter Dikes. Trapped sediment shall be removed and cleaned when it reaches half the height of the lowest section. The Contractor shall make the appropriate corrections when the above fail or become non functional. The Contractor shall maintain the items until the up slope permanent grass coverage is 70 percent or better. The Contractor shall remove the items when the up slope permanent grass coverage is 70 percent or better.

(B) Temporary and Permanent Seed: The seed bed shall be thoroughly watered in accordance with the requirements of Item 659. The quantity of water will be measured and paid for as Item 659 water. Seeded areas shall be maintained until 70 percent or better cover is established. Temporary seeded areas shall be mowed and paid for in accordance with Item 659.

(C) Sediment Dams and Basins: Deposited sediment shall be removed when the initial volume has been reduced one-half. The Contractor shall make the appropriate corrections when these items fail or non functional. The Contractor shall remove the dams and basins when the permanent seed and mulch is placed on the entire project.

877.05 Performance. The Contractor shall install additional erosion control features, make adjustments to meet the field conditions, anticipated future work or corrections based on the weekly storm water inspections with the concurrence of the Engineer. The type and quantity will be paid by the unit bid prices, agreed unit prices or by 109.04.

In the event that the Contractor or its agents refuse or fail to adhere to the requirements of the 404 Permit, the 401 Water Quality Certification and/or the NPDES Storm Water Permit and as a result an assessment or fine is made or levied against the Ohio Department of Transportation, the Contractor shall reimburse the Department within ten (10) calendar days of the assessment or fine or the Department may withhold the amount of the fine from the Contractor's next pay estimate and deliver that sum to the permitting agencies issuing the assessment or fine.

These fines are not to be construed as a penalty but are liquidated damages to recover costs assessed against the Department due to the Contractor's refusal or failure to comply with the permit requirements.

If proper sediment and erosion controls are not being provided by the Contractor, progress estimates shall be withheld until proper controls are placed.

All temporary erosion control items shall be removed before the project is accepted. Removed materials shall become the property of the Contractor and shall be disposed of in accordance with Item 203.

877.06 Method of Measurement. Temporary erosion and sediment control work, completed and accepted, will be measured as follows:

(A) All fertilized areas will be measured and paid for as Item 659 Commercial Fertilizer.

(B) Temporary seeding and mulching will be measured by the square yard (square meter) of seeded and mulched area completed in accordance with these specifications.

(C) Temporary slope drains will be measured by the linear foot (meter) complete in place.

(D) Temporary Perimeter, Inlet Protection, Ditch Check, Filter Fabric Fence will be measured per linear foot (meter) in place. Bale filter dike will be paid under temporary perimeter fabric fence.

(E) Rock required will be paid for under Item 601 Rock Channel Protection, Type C or D with or without filter.

(F) Temporary sediment dams, and basins will be measured by the cubic yard (cubic meter) of excavation and embankment complete in place.

(G) Temporary dikes will be measured by the cubic yard(cubic meter), of excavation and embankment complete in place.

(H) Temporary slope or ditch protection will be measured by the square yard (square meter), complete in place.

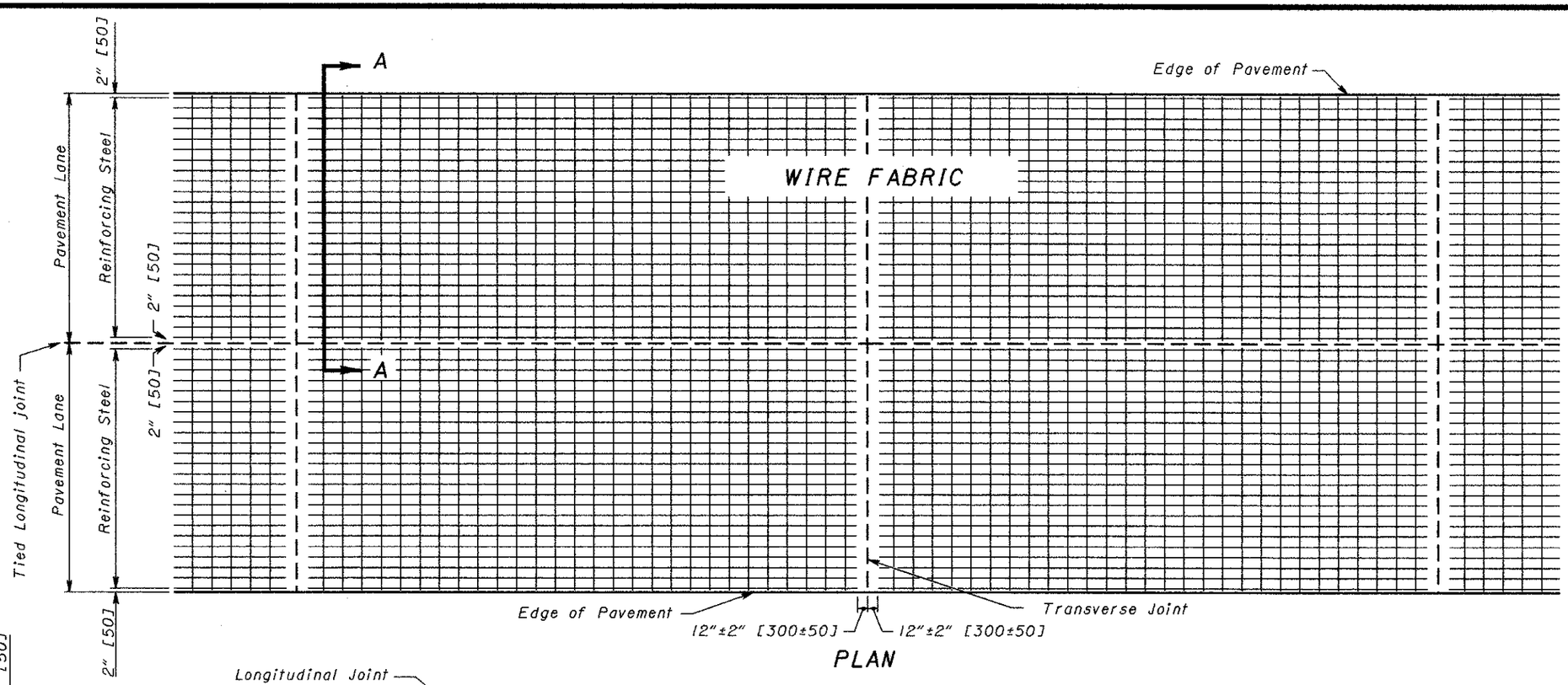
(I) Sediment Removal will be measured in cubic yards(cubic meters) completed in place. The sediment removed from dams, basins, inlet protection, ditch checks, perimeter filter fabric, bale filter dikes and all other types of filter fabrics, straw or hay bales or any other temporary sediment control items will be paid under this item.

In the event that temporary erosion and sediment control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled, such temporary work shall be performed by the Contractor at his expense.

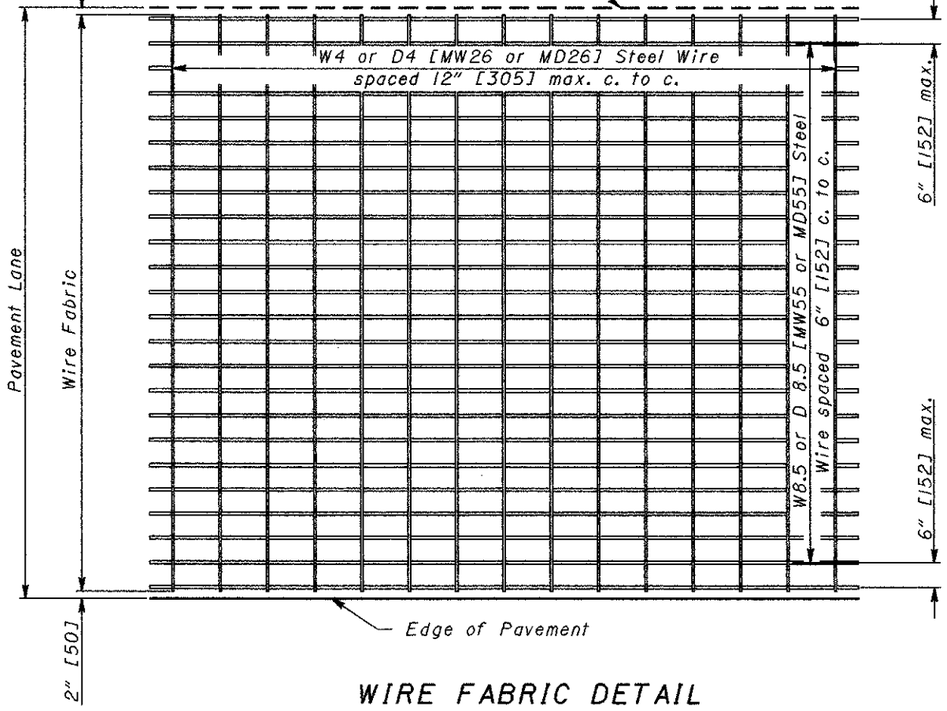
877.07 Basis of Payment: Accepted quantities of temporary sediment and erosion control

work placed and measured as provided above, will be paid for under:

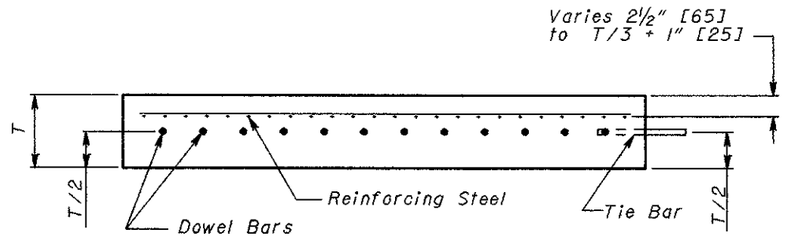
Item	Unit	Description
877	Square yard (square meter)	Temporary seeding and mulching
877	Linear foot (meter)	Temporary slope drains
877	Cubic yard (cubic meter)	Temporary sediment basins and dams
877	Linear foot (meter)	Temporary perimeter, ditch check or inlet protection filter fabric fence
877	Linear foot (meter)	Temporary perimeter filter fabric fence
877	Linear foot (meter)	Temporary ditch check filter fabric fence
877	Linear foot (meter)	Temporary inlet protection filter fabric fence
877	Cubic yard (cubic meter)	Temporary dikes
877	Square yard (square meter)	Temporary ditch protection
877	Square yard (square meter)	Temporary slope protection
877	Cubic yard (cubic meter)	Sediment removal



PLAN



WIRE FABRIC DETAIL



SECTION A-A

NOTES

STEEL REINFORCING: *In normal or wider lane widths, reinforcing may consist of two units with an approved longitudinal hinge. The hinge shall consist of W4 or D4 [MW26 or MD26] steel wires connecting the two units such that the longitudinal members on either side of the hinge will be properly spaced when the reinforcing is in the final position.*

Reinforcing steel in final position shall not touch either the dowels or tie bars.

THIS DRAWING REPLACES BP-1.1M DATED 10-28-94.

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER
7-28-00
DATE

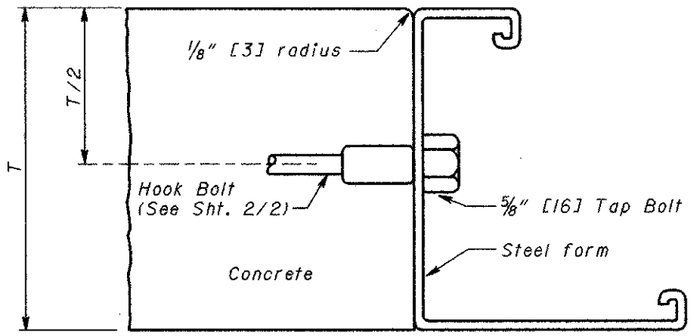
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

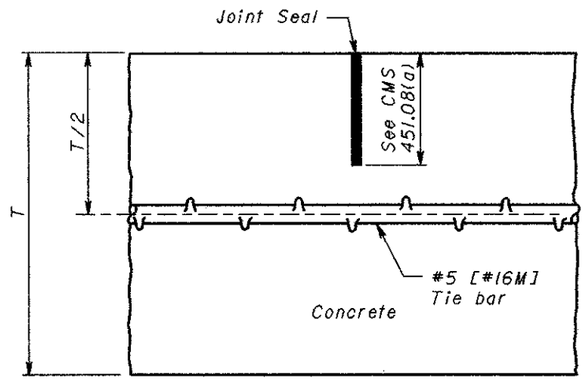
CONCRETE PAVEMENT REINFORCING

NUMBER BP-1.1

1 / 1



ACCEPTABLE METHOD OF FORMING JOINT



SAWED JOINT

NOTES

GENERAL: *Longitudinal joints shall be used when specified on the typical section and shall be constructed as shown on this drawing in Items 451 and 452 Pavement and Item 305 Base.*

The joint shall be on the centerline of the pavement unless otherwise shown on the plans. Where the pavement width exceeds 16' [5.0 m], an additional longitudinal joint shall be introduced into the jointing details as directed by the Engineer.

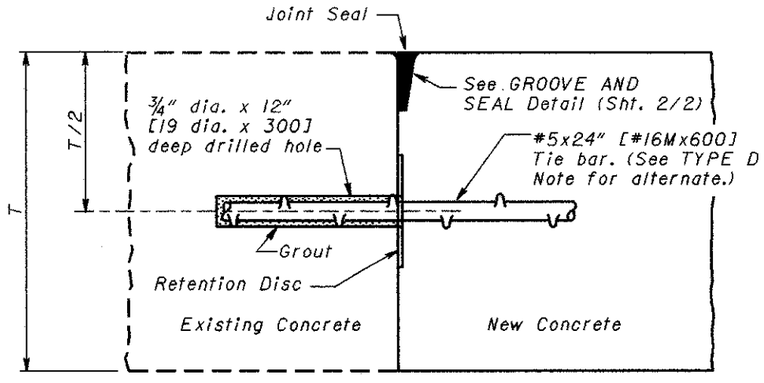
Tie bars shall be #5 [#16M] deformed bars. A satisfactory device shall be used to hold the tie bars in proper position or they may be installed by a mechanical installing device. Tie bars shall be centered on the longitudinal joint as nearly as practical.

BUTT JOINT: *The longitudinal joint between adjoining slabs poured in separate operations shall be a butt joint with hook bolts or tie bars, unless otherwise shown on the plans. Bent tie bars shall not be permitted.*

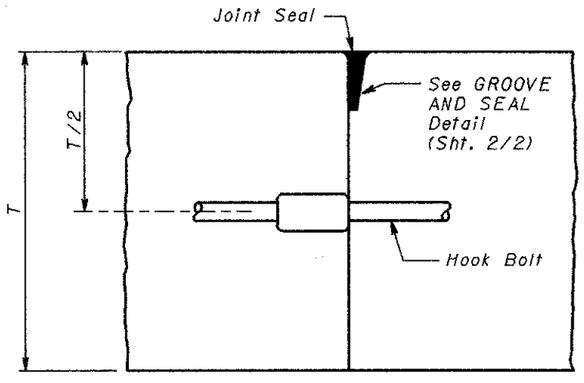
TYPE D (DRILLED TIED LONGITUDINAL) JOINT: *Type D joints shall be constructed in accordance with CMS 255.05. The nylon or plastic retention disc shall be clear or opaque white in color. Grout shall meet the requirements of CMS 255.02. 5/8" [16] expansion anchors, FF-S-325, Group VIII, Type 1 or Group II Type 4, Class 1 may be used lieu of the #5x24" [#16Mx600] deformed bar and shall be installed according to the manufacturer's recommendations.*

The use of self drilling expansion shield anchors, FF-S-325, Group III, Type 1 (a) and (c) shall not be permitted.

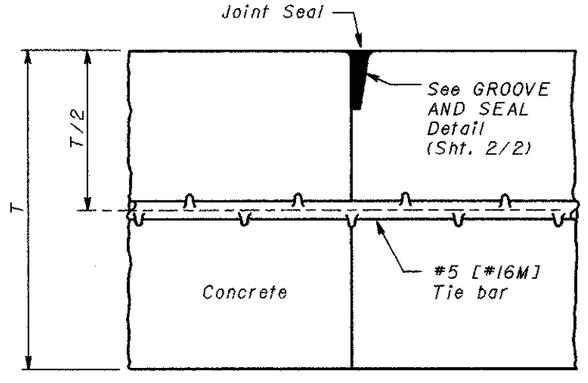
See Sheet 2/2 for additional details.



TYPE D (DRILLED TIED LONGITUDINAL) JOINT



BUTT JOINT
w/ HOOK BOLT



BUTT JOINT
W/ TIE BAR

THIS DRAWING REPLACES BP-2.1M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER
DATE 7-28-00

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

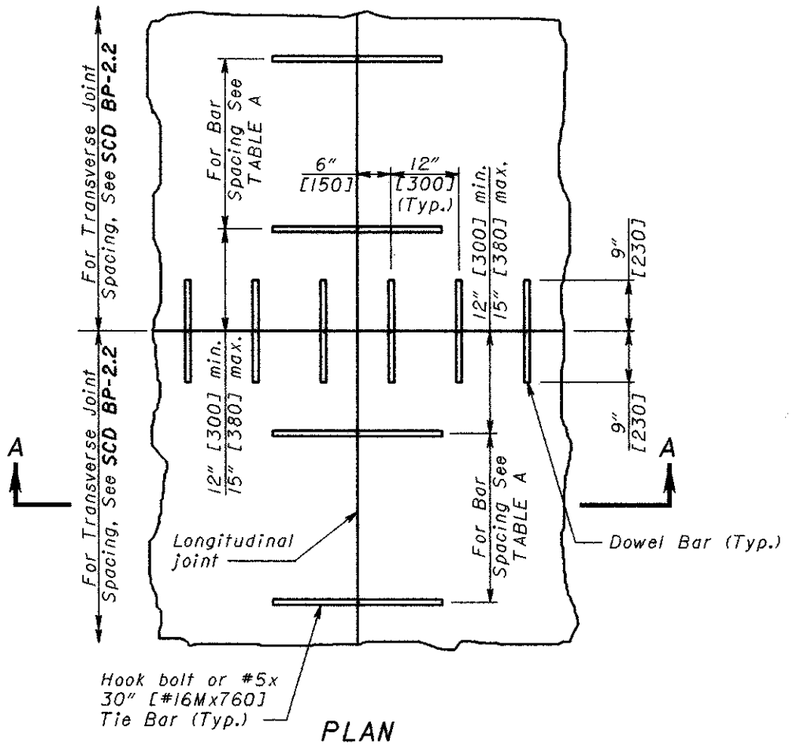
All metric dimensions [in brackets ( )] are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING
LONGITUDINAL PAVEMENT JOINTS

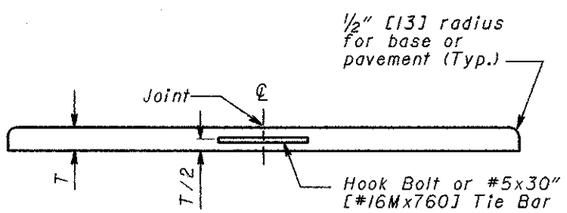
NUMBER BP-2.1

1 / 2



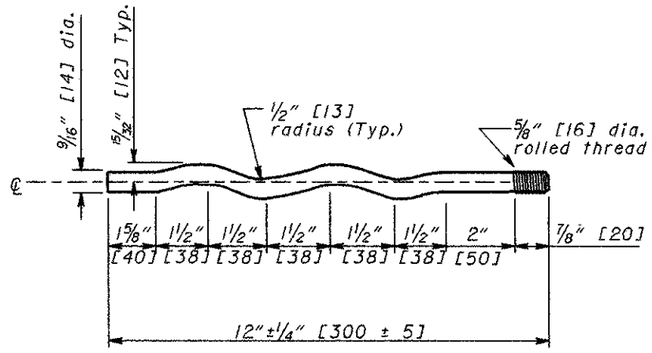
PLAN

TABLE A			
Thickness of Pavement	Transverse Joint Spacing	Number of Tie Bars per Slab	Max. spacing between Tie Bars
10" [250] or less	15' [4.6 m]	7	26" [660]
	21' [6.5 m]	10	26" [660]
Greater than 10" [250]	15' [4.6 m]	9	20" [508]
	21' [6.5 m]	13	20" [508]

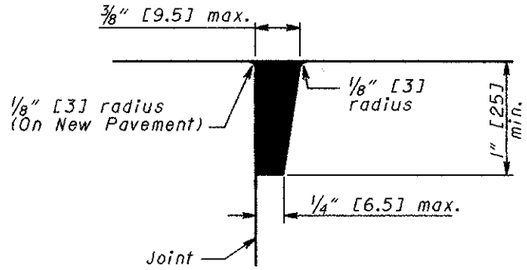


SECTION A-A

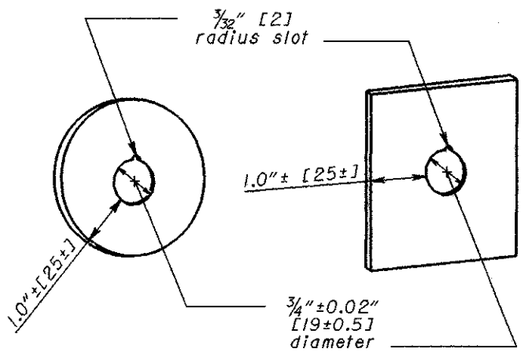
TIE BAR OR HOOK BOLT SPACING



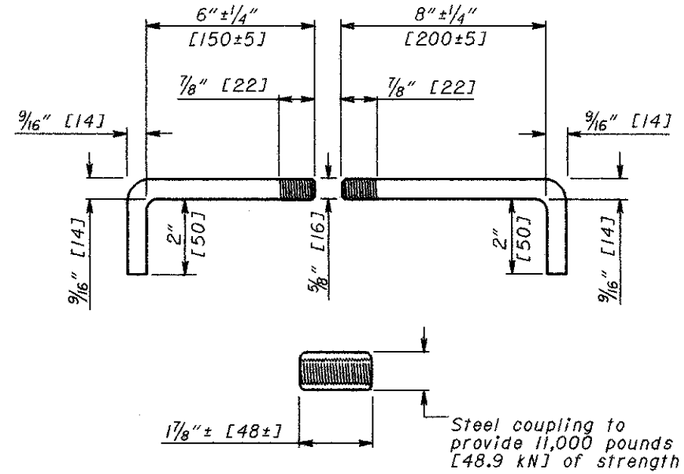
HOOK BOLT ALTERNATE



GROOVE AND SEAL DETAIL



NYLON OR PLASTIC
GROUT RETENTION DISCS
FOR DOWEL/TIE BARS
(1/16" [1.6] min. thick)



HOOK BOLT

NOTES

GROOVES: Grooves for sealing expansion bolt or butt joints in Item 451 or 452 pavements shall be formed by depressing a device or bar into the newly deposited concrete adjacent to the existing or previously poured lane. The device or bar shall be removed as soon as the concrete is in such condition as to preclude distortion of the concrete.

Adjoining slabs adjacent to grooved joints shall be edged with a thin metal edger having a radius of 1/8" [3]. Any impression left in the surface of the pavement by the flat part of the edging tool shall be eliminated.

In lieu of the above method the longitudinal joint may be constructed in accordance with CMS 451.08(a).

After the joint is formed it shall be protected from dirt and foreign matter until the joint seal is placed.

SEALING JOINTS: Sawed or hand-formed joints may be sealed with CMS 705.04 or 705.11 joint sealer.

HOOK BOLTS: Threaded hook bolts and alternates shall be turned to a tight fit when installed in couplings.

METAL STRENGTH: Tie bars, hook bolt assemblies and the hook bolt alternate shall have a minimum strength of 11,000 pounds [48.9 kN].

SPACING: Tie bars shall not be located within 12" [300] of any transverse joint.

THIS DRAWING REPLACES BP-2.1M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION — 1-28-00 — DATE
Paul D. Ballard — ROADWAY DESIGN ENGINEER

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

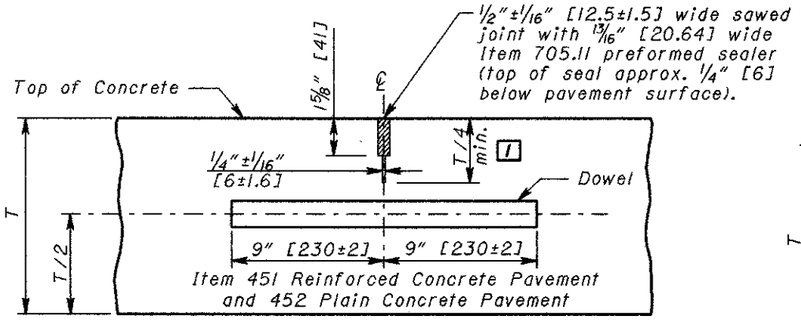
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

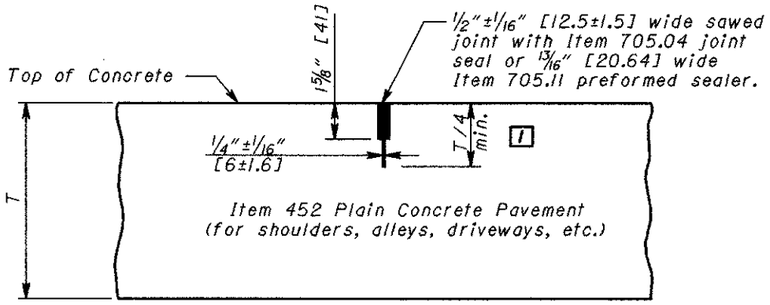
LONGITUDINAL PAVEMENT JOINTS

NUMBER BP-2.1

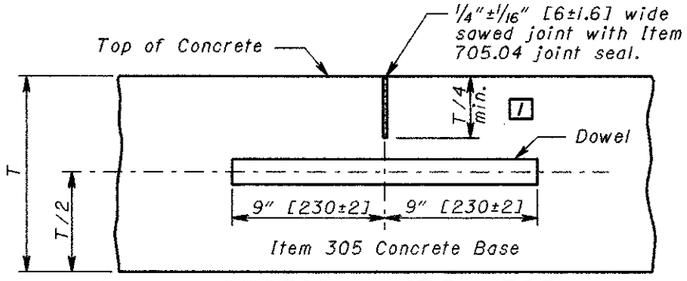
2 / 2



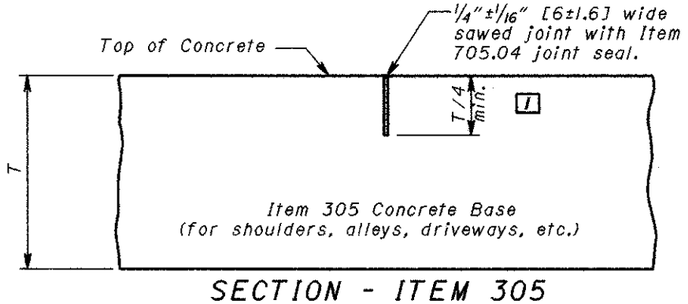
SECTION - ITEM 451 & 452



SECTION - ITEM 452

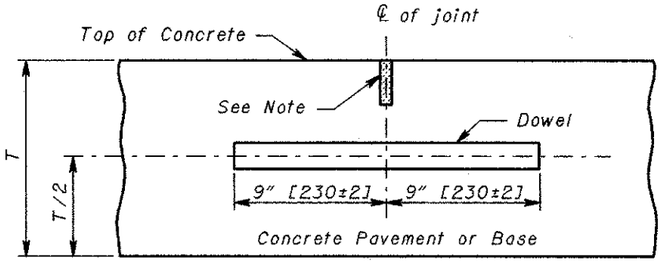


SECTION - ITEM 305



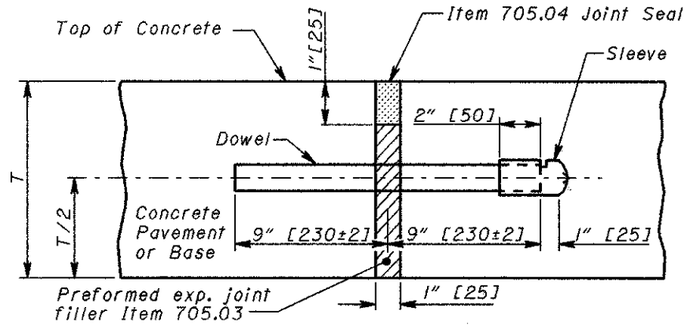
SECTION - ITEM 305

CONTRACTION JOINTS

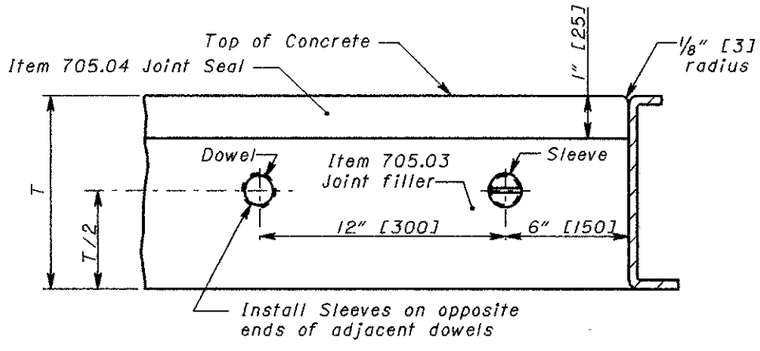


SECTION THROUGH CONSTRUCTION JOINT

CONSTRUCTION JOINT



SECTION THROUGH EXP. JOINT



SIDE ELEVATION OF EXP. JOINT
(through Concrete Pavement or Base)

EXPANSION JOINT

NOTES

GENERAL: *Notes and details shown on this drawing shall be considered in conjunction with and supplemental to the pertinent specifications for portland cement concrete pavement and bases, and related incidentals.*

JOINT COMPONENTS: *This drawing is intended for use with a uniform depth pavement. When the project involves the placing of variable depth pavement, the joint components shall be held in place in accordance with the method shown in the plans or as approved by the Engineer.*

CONTRACTION JOINTS: *Contraction joints in Item 305 Concrete Base shall be dowelled where they are located in mainline pavement, ramps, acceleration/deceleration lanes, or collector/distributor lanes, or in shoulders within 500' [150 m] of a pressure relief joint.*

Contraction joints in Item 305 Concrete Base shall not be dowelled in alleys, private drives, or commercial drives.

Contraction joints of the type specified shall be spaced in accordance with the CONTRACTION JOINT SPACING Table.

CONTRACTION JOINT SPACING	
Types of Pavement or Base	***Maximum Spacing Between Joints***
Item 451 Reinforced Concrete Pavement	*21' [6.5 m]*
Item 452 Plain Concrete Pavement	*15' [4.6 m]*
Item 305 Concrete Base	*15' [4.6 m]*

CONSTRUCTION JOINTS: *In Item 305 Concrete Base, a construction joint shall not be located closer than than 6' [1.8 m] to another parallel joint.*

Kerf and seal conforming in all respects to details shown for contraction joints shall be provided at each construction joint in concrete pavement and base.

SEALING BASE CONTRACTION JOINTS: *All contraction joints for concrete base shall be sealed as detailed on this drawing and the cost included in the unit price bid for Item 305.*

LEGEND

1 *Where T > 10" [255], the sawcut depth shall be T/3.*

THIS DRAWING REPLACES BP-2.2M DATED 10-21-97.

OHIO DEPARTMENT OF TRANSPORTATION — 7-28-00
ROADWAY DESIGN ENGINEER — DATE

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

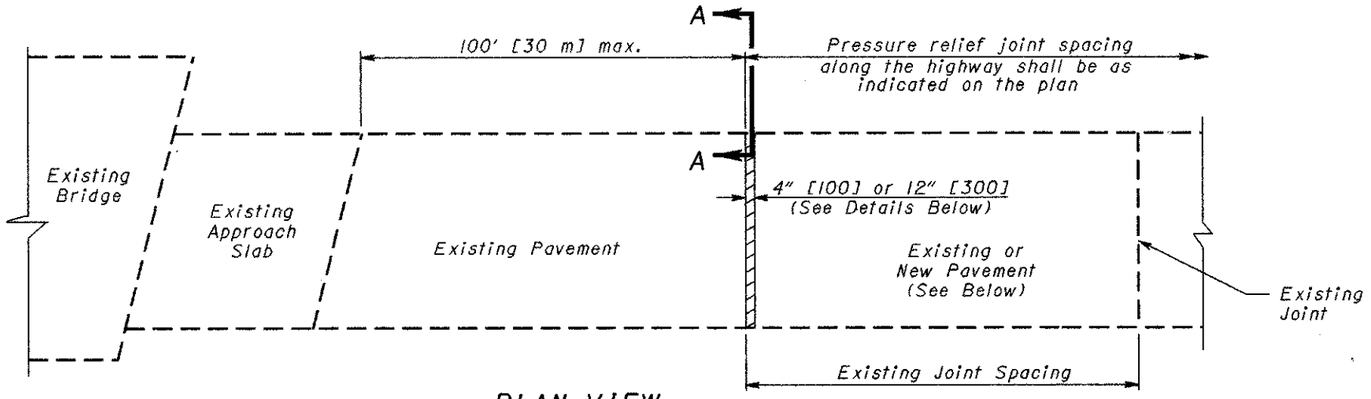
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

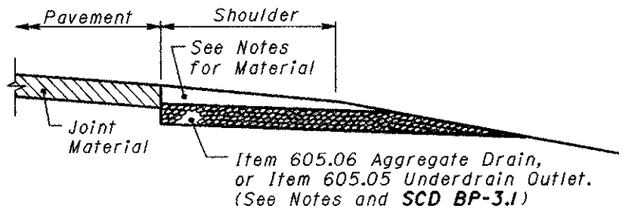
TRANSVERSE PAVEMENT JOINTS

NUMBER **BP-2.2**

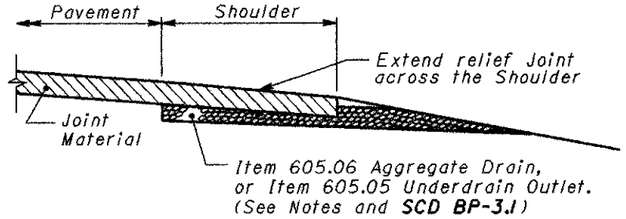
1 / 1



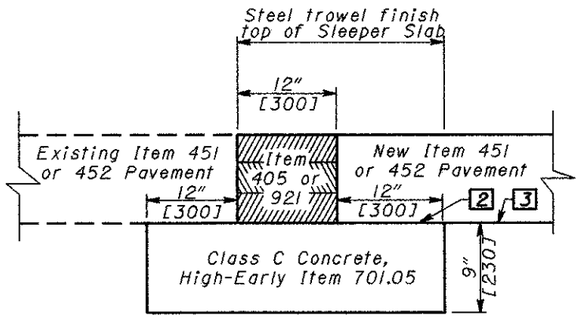
PLAN VIEW



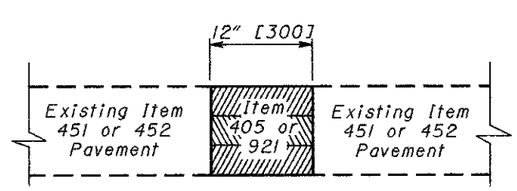
SECTION A-A
WITH ASPHALT SHOULDERS



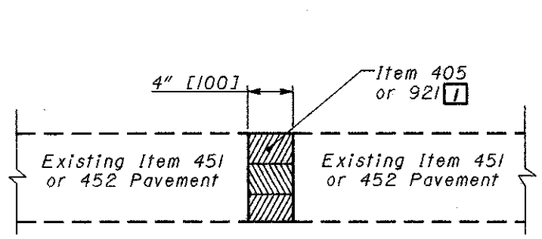
SECTION A-A
WITH CONCRETE SHOULDERS



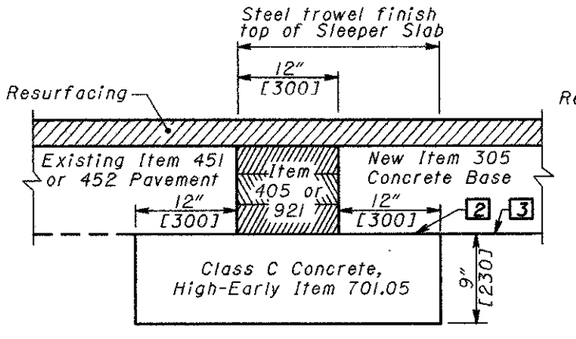
TYPE B



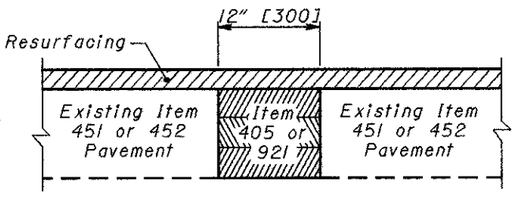
TYPE C



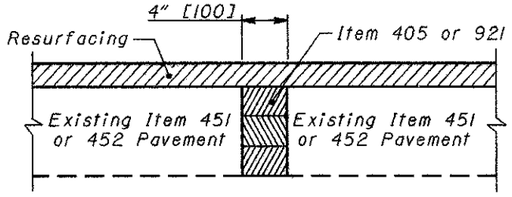
TYPE D



TYPE B
WITH RESURFACING



TYPE C
WITH RESURFACING



TYPE D
WITH RESURFACING

NOTES

JOINTS: Joints shall be located at existing transverse joints. All joints shall be sawed full depth, however, the cut may be made in two passes.
To reduce the possibility of saw binding, joints should be cut, if possible, on overcast days and/or when the temperature is less than 70° F [21° C].

CURBED PAVEMENTS: The pressure relief joint shall be cut through to the back of curb. After filling the joint, asphalt concrete shall be formed and tamped in place to conform to the adjacent curb.

PAVEMENTS WITH CONCRETE SHOULDERS: The pressure relief joint shall be cut through to the outer edge of the shoulder.

ANY OF THE PRESSURE RELIEF JOINT TYPES: shown may be filled with two or three lifts of loosely compacted Item 405 or 921 asphalt concrete.

AGGREGATE DRAINS: shall be provided from the low end (or ends) of each pressure relief joint to the embankment slope or ditch inslope.
A drain will be required at both ends of the joint if the pavement is crowned with transverse slopes toward both edges. If a feasible outlet is not available for aggregate drains, then metal pipe underdrains, with perforated pipe and aggregate backfill, shall be provided instead of aggregate drains and the pipe extended to a suitable outlet. The material above the filter aggregate of the drain in paved shoulder area may be the same as the shoulder pavement or may be the same as the asphalt material used in the pressure relief joint and included in Item 605 for payment.

MEASUREMENT: Pressure relief joint measurement for pay purposes shall be along the centerline of the joint, edge to edge of pavement when asphalt shoulders are used, edge to edge of shoulder work when concrete shoulders are used, or back to back of curbs. Payment shall be per Linear Foot [Meters] for **Item Special - Pressure Relief Joint Type ____**, which shall include all work and materials necessary to complete the joint except for the aggregate drains or pipe underdrains which shall be constructed and paid for as Item 605.

CEMENT: Cement other than the Item 701.05 specified may be used if approved by the Engineer, provided an accelerating admixture meeting the requirements of ASTM C494 Type C or E, and an air entraining admixture meeting the requirements of Item 705.10 is added at the mixer.

LEGEND

1. In pavement that is not to be resurfaced in the near future the Type D joint may be filled with material manufactured for pressure relief joints (in accordance with manufacturer's instructions), such as Meadow Sealtight Ceramar or Froth Pak urethane foam or approved equal.
2. A bond breaker, consisting of two 2-foot [0.6 m] wide sheets of clear or opaque polyethylene film, Item 705.06, shall be centered on top of the joint between the subbase and the sleeper slab. The film shall have a nominal thickness of 4 mils [0.1].
3. Care shall be taken to ensure the subbase or subgrade surface is smooth and constructed as high as or slightly higher than the top of the Sleeper Slab.

THIS DRAWING REPLACES BP-2.4M DATED 10-28-94.

OHIO DEPARTMENT OF TRANSPORTATION
Randy D. Southland 1-28-00
ROADWAY DESIGN ENGINEER — DATE

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

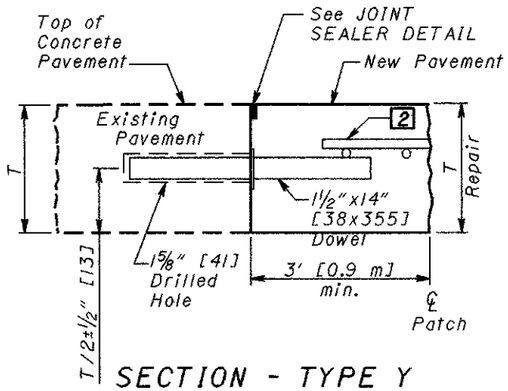
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

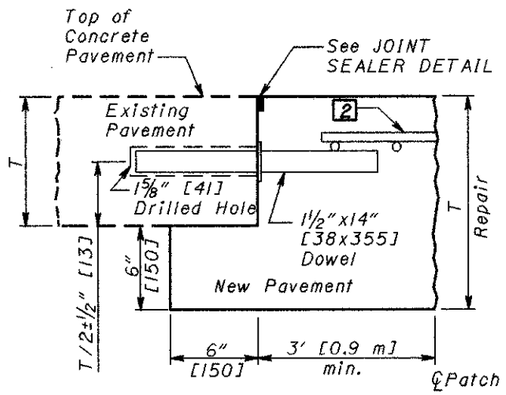
STANDARD ROADWAY CONSTRUCTION DRAWING
PRESSURE RELIEF JOINT
TYPES B, C, & D

NUMBER BP-2.4

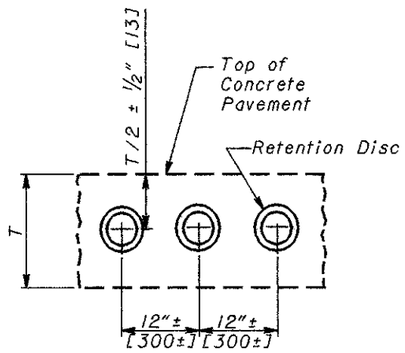
1 / 1



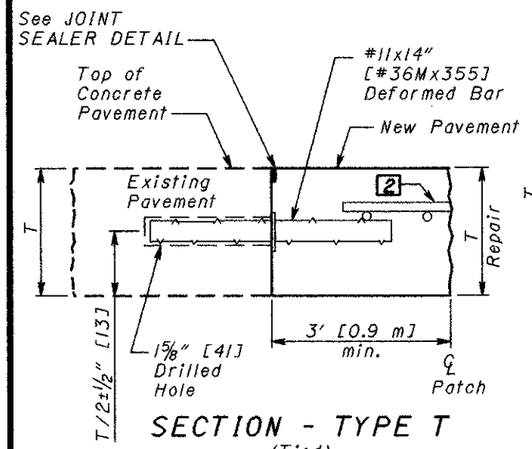
SECTION - TYPE Y
(Contraction)



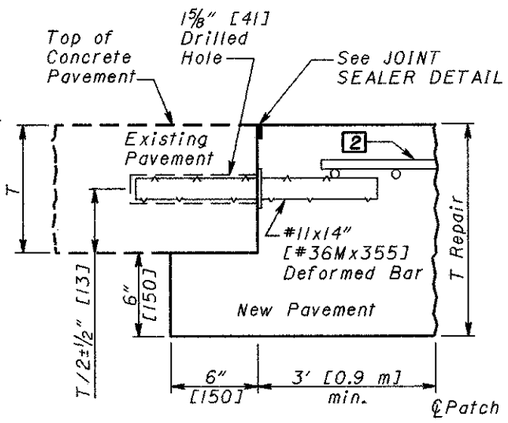
SECTION - TYPE YU
(Undercut : Contraction)



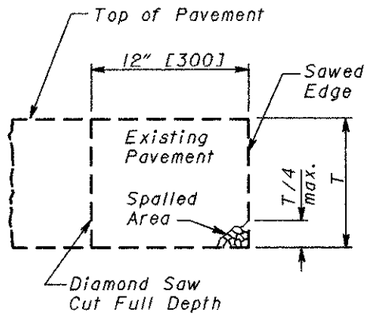
HOLE DRILLING DETAIL



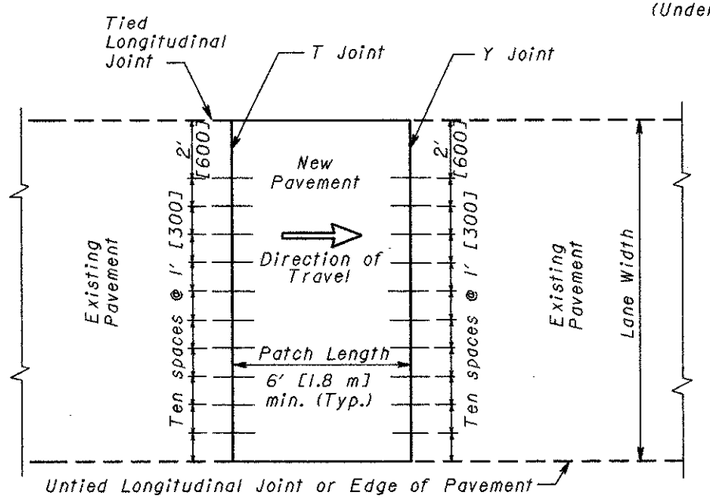
SECTION - TYPE T
(Tied)



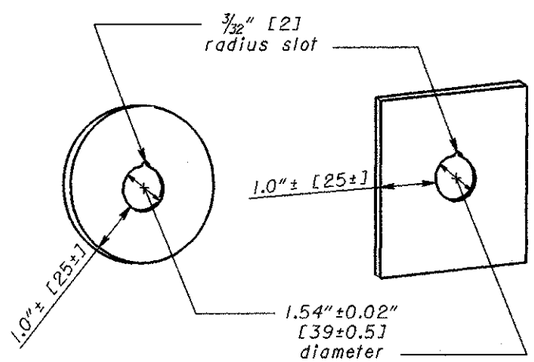
SECTION - TYPE TU
(Undercut : Tied)



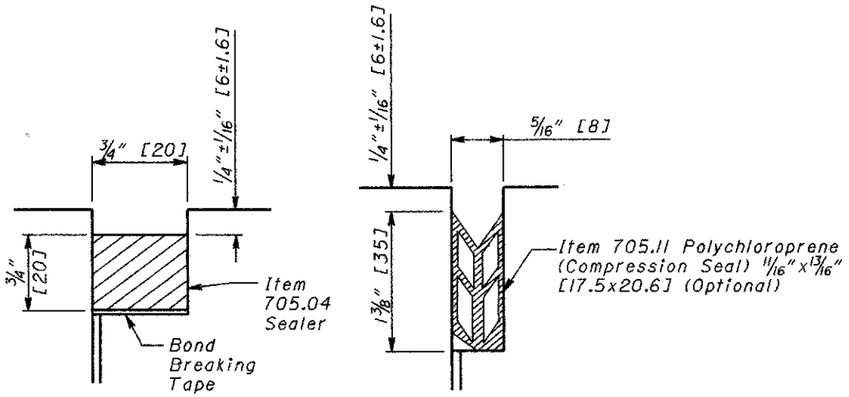
ADDITIONAL PAVEMENT REMOVALS



TIE / DOWEL BAR PLACEMENT DETAIL
(See [1] for Bar Placement)



NYLON OR PLASTIC GROUT RETENTION DISCS FOR DOWEL/TIE BARS [3]
(1/16" [1.6] min. thickness)



JOINT SEALER DETAIL

NOTES

GENERAL: *All joints shall be constructed normal to the centerline of the pavement lane unless otherwise specified in the plans.*

All dowel holes shall be drilled by a mechanical device that will allow independent adjustment of all drill shafts in the horizontal and vertical direction. The device shall be capable of drilling a minimum of three holes at a time.

All smooth dowels shall be coated with a thin layer of oil or other "bond-breaking" material after they have been installed in the existing pavement and just prior to placing the patch. All dowels shall be placed parallel to the pavement surface and the centerline of the pavement lane.

This standard drawing is intended for use in repairing both concrete and composite pavements. For clarity, asphalt overlays are not shown.

When Prefabricated Edge Drains are used, they shall be placed after joint repairs are completed.

TYPE N JOINT: *Joints referred to as Type N joints on the plan shall be constructed as contraction joints per* ***SCD BP-2.2.***

ADDITIONAL PAVEMENT REMOVAL: *If, after the sawing and removal of the pavement from the area to be repaired, the face of the remaining pavement is spalled or deteriorated for a height greater than one-fourth (1/4) the thickness of the rigid pavement, an additional saw cut shall be made as shown and as directed by the Engineer. This additional work shall be measured for additional payment for full depth pavement sawing, rigid pavement removal and replacement.*

LONGITUDINAL JOINT: *For patches 10' [3.0 m] or greater in length, the longitudinal joint shall be constructed per* ***SCD BP-2.1.***

The tie bars or hook bolts shall be spaced at no more than 30" [760] nor less than 24" [610] on center.

LEGEND

[1] *Bars shall be placed 2' [600] from the tied longitudinal joint and continue across with a 1' [300] spacing to the edge of pavement or an untied longitudinal joint. Where lane widths are between two tied longitudinal joints, begin bars 2' [600] from each tied longitudinal joint and continue across with a 1' [300] spacing.*

[2] *Reinforcement will be required for all repairs greater than 10' [3.0 m] in length or for repairs that will be opened to traffic within 24 hours of placement. The fabric shall consist of W8.5 or D8.5 [MW55 or MD55] longitudinal wires spaced 6" [150] c/c and W4 or D4 [MW26 or MD26] transverse wires spaced 12" [300] c/c. The clearance from the end of the wire fabric to the edge of pavement or new transverse joint shall be 4"±2" [100±50].*

[3] *Nylon or plastic grout retention discs shall be clear or opaque white in color.*

THIS DRAWING REPLACES BP-2.5M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION — DATE 7-28-00
ROADWAY DESIGN ENGINEER — Paul F. Ballard

REVISIONS	STDS. ENGR. M. Evans	DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

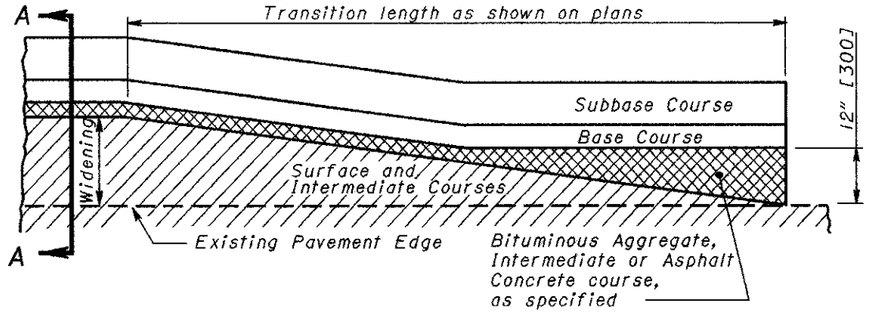
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

RIGID REPLACEMENT

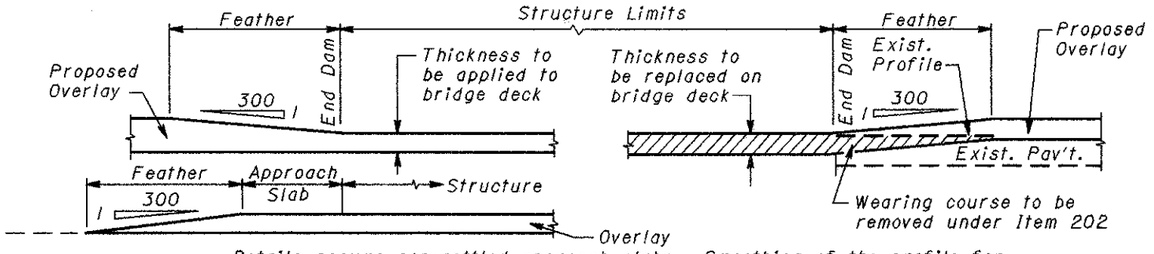
NUMBER **BP-2.5**

1 / 1



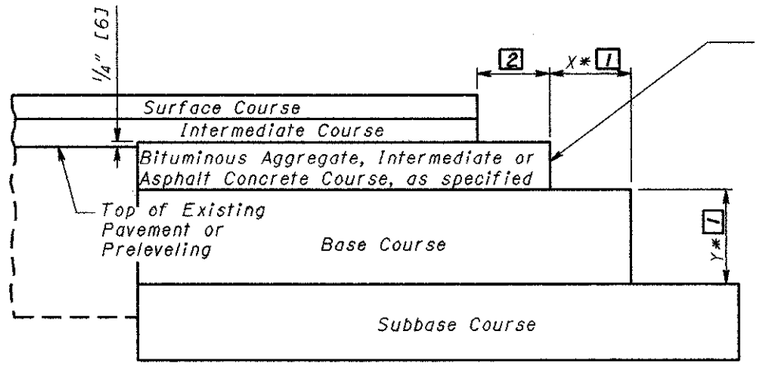
PLAN

MERGING EDGE OF PAVEMENT WIDENING WITH EDGE OF EXISTING PAVEMENT



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



The Bituminous Aggregate in the upper part of the base widening shall finish approximately 1/4" [6] 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 1/4" [6] above the preleveling.

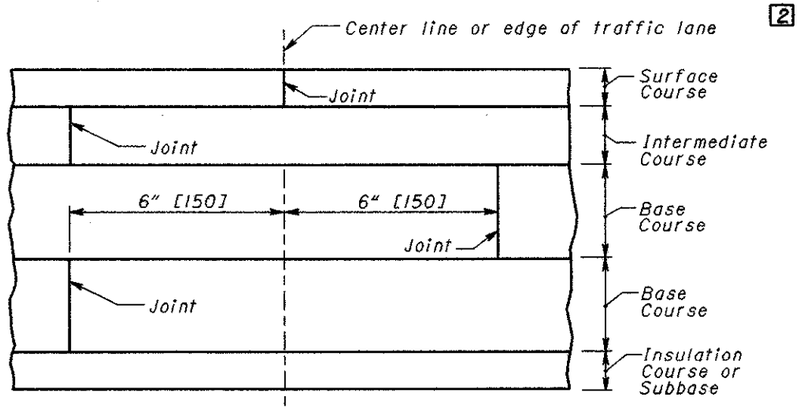
SECTION A-A

COURSE DETAIL FOR WIDENING

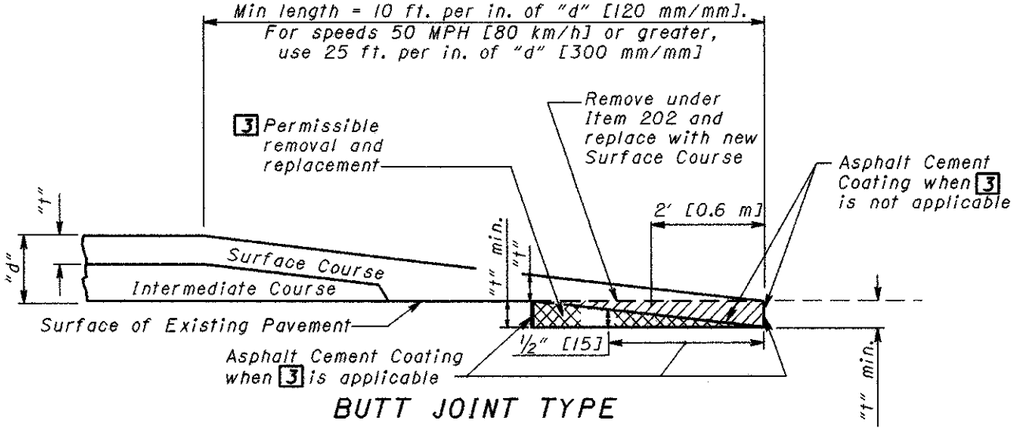
LEGEND

1 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.

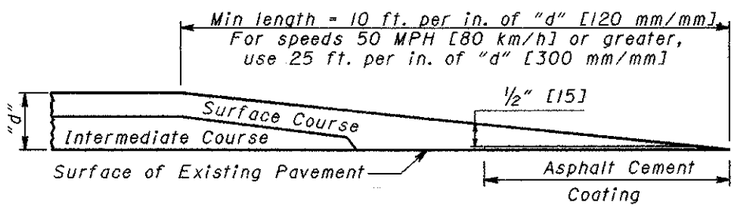
2 The extended width shall be equal to the thickness of the surface course plus the intermediate course, or 4 inches [100], whichever is greater.



LAPPING LONGITUDINAL JOINTS



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

Values for "t" and "d" are obtained from the plan.

THIS DRAWING REPLACES BP-3.1M DATED 10-28-94.

OHIO DEPARTMENT OF TRANSPORTATION — DATE: 7-28-00
ROADWAY DESIGN ENGINEER

REVISIONS	STDS. ENGR. M. Evans	DRAWN D. Focke

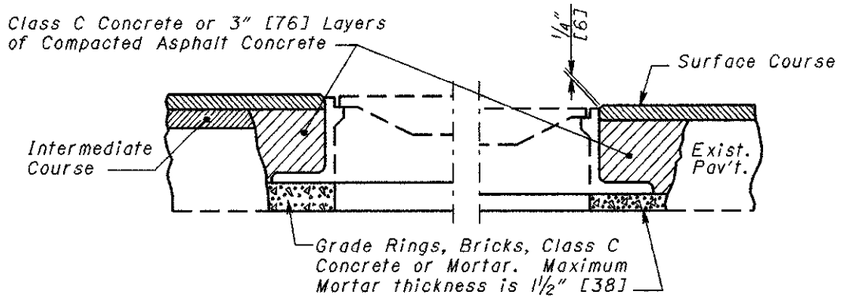
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

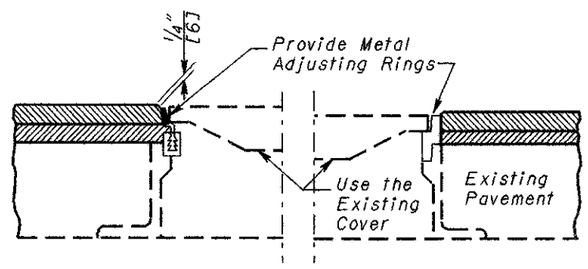
STANDARD ROADWAY CONSTRUCTION DRAWING

RESURFACING

NUMBER BP-3.1



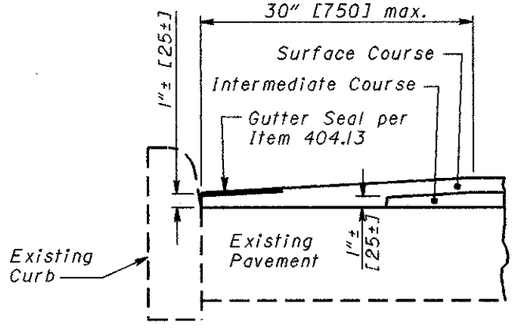
USING CONCRETE OR MORTAR



USING METAL ADJUSTING RINGS

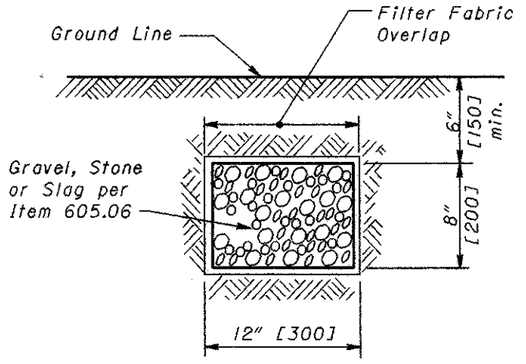
Metal adjusting rings shall:
(a) attach securely to the existing frame by welding or mechanical devices;
(b) consist either of cast metal having an integral rim and seat, or be fabricated metal with a sturdy connection between the seat and rim; and
(c) provide an even seat for the manhole cover.
In addition, 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



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

GUTTER FINISH



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

AGGREGATE DRAIN

THIS DRAWING REPLACES BP-3.1M DATED 10-28-94.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER — DATE 1-28-00

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

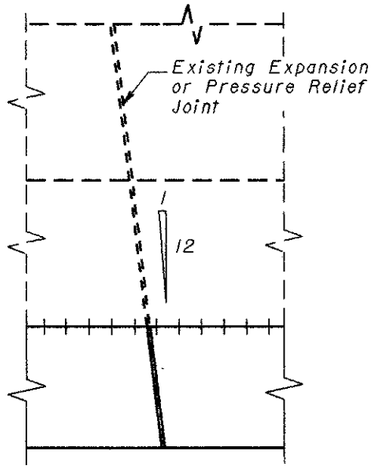
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

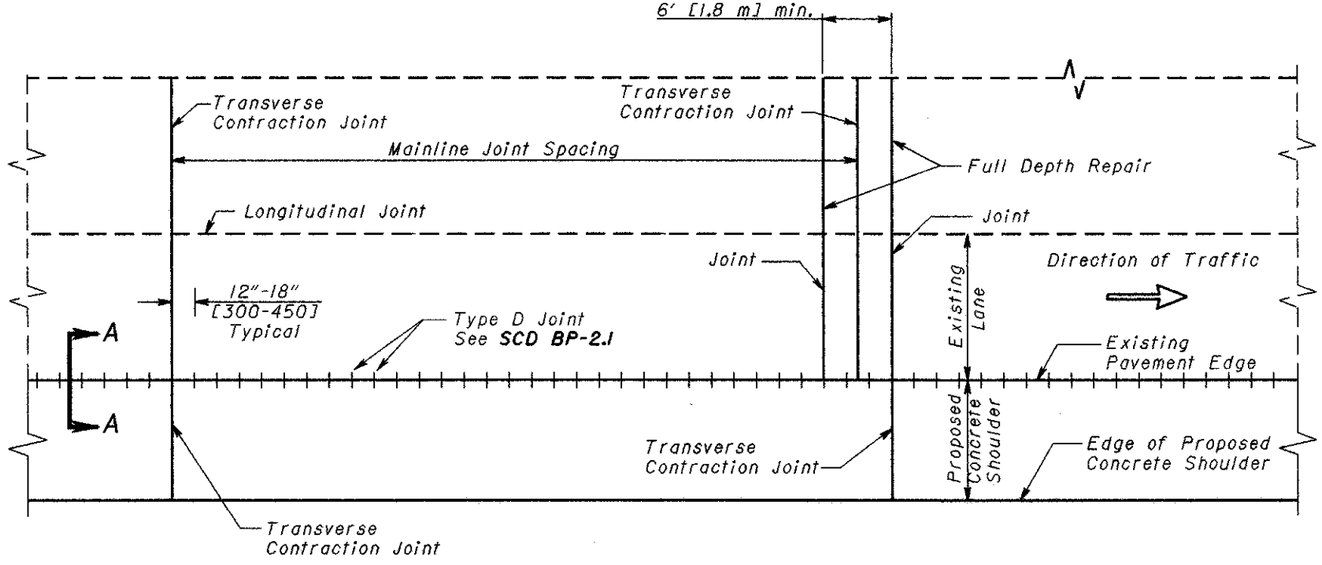
STANDARD ROADWAY CONSTRUCTION DRAWING
RESURFACING

NUMBER BP-3.1

2/2

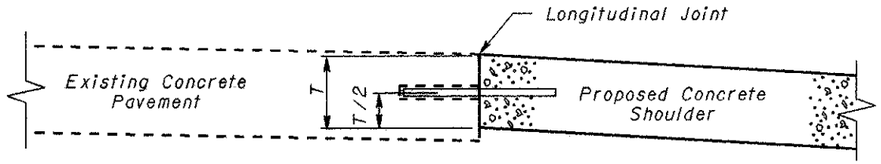


PRESSURE RELIEF OR EXPANSION JOINTS



NEW OR EXISTING TRANSVERSE JOINT

NEW OR EXISTING JOINT REPAIR



SECTION A-A

NOTES

SHOULDERS: *shall have the same joint spacing, sawing, and sealing requirements as the mainline pavement.*

EXPANSION, PRESSURE RELIEF AND CONTRACTION JOINTS: *Care shall be taken to make the expansion, pressure relief or contraction joints in the shoulder a straight line continuation of the new or existing expansion, pressure relief or contraction joints.*

For clarity, transverse joints have been shown normal to the centerline. When placed next to mainline pavement with skewed joints, the joints in the shoulder shall be skewed to match the skew of the mainline joints.

TIE BAR SPACING: *shall be per Table A on* **SCD BP-2.1** *and shall be based on the thickness of the concrete shoulder where it meets the existing concrete pavement. The number of tie bars per slab shall vary depending on the existing joint spacing, but the maximum spacing between tie bars shall not be exceeded.*

THIS DRAWING REPLACES BP-8.1M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION
ROADWAY DESIGN ENGINEER — DATE 1-28-00

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

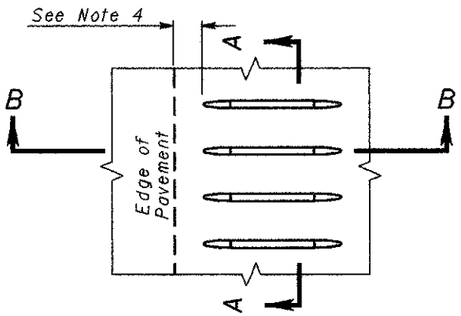
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING
CONCRETE SHOULDERS

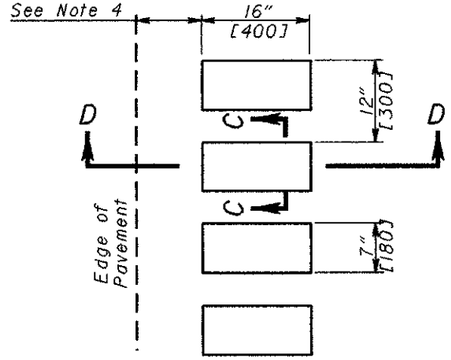
NUMBER BP-8.1

1 / 1



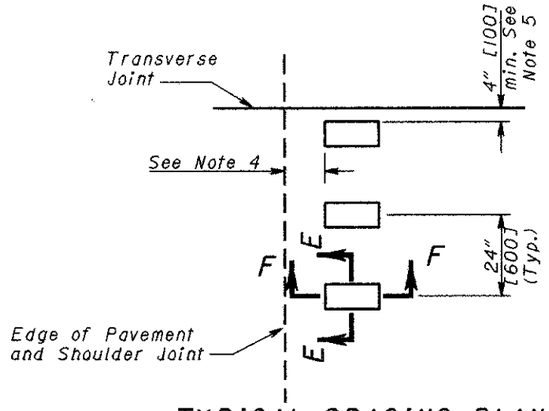
PLAN VIEW

TYPE 1



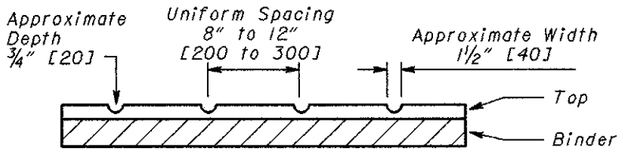
TYPICAL SPACING PLAN

TYPE 2

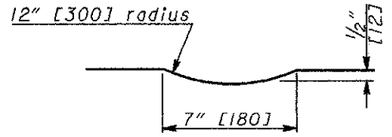


TYPICAL SPACING PLAN

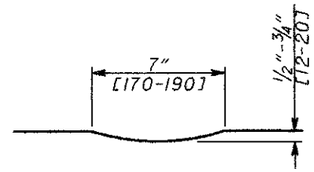
TYPE 3



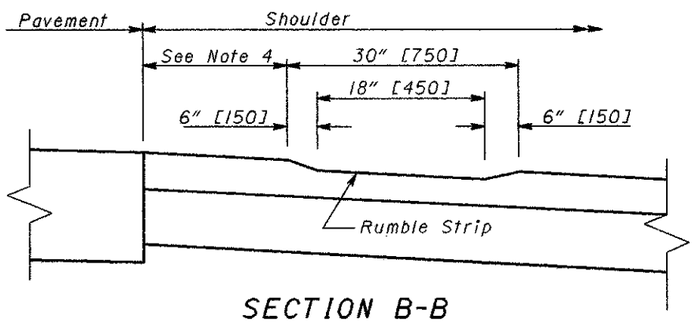
SECTION A-A



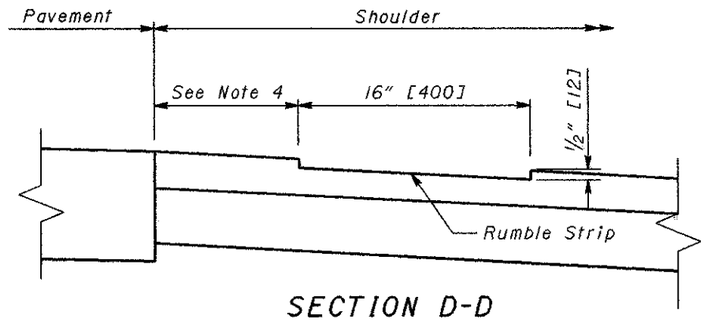
SECTION C-C



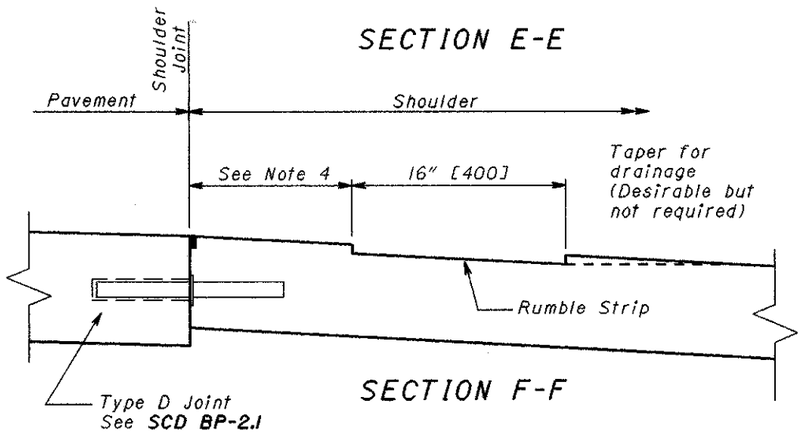
SECTION E-E



SECTION B-B



SECTION D-D



SECTION F-F

NOTES

1. Type 1 Rumble Strips are for use on freshly-paved asphalt shoulders. The pattern is designed so that the strips can be rolled or pressed into the asphalt material while it is still hot. See specifications for details.

2. Type 2 Rumble Strips are for use on new or existing asphalt or concrete shoulders. The pattern is designed so that it can be milled or ground into the shoulder material. See specifications for details.

3. Type 3 Rumble Strips are for use on freshly-paved concrete shoulders. The pattern is designed so that it may be formed into the concrete shoulder surface prior to the material hardening. See specifications for details.

4. See Sheet 2 of 2 for Offset Dimensions.

5. A rumble strip should not be closer than 4" [100] to any joint, transverse or longitudinal, in concrete shoulders.

OHIO DEPARTMENT OF TRANSPORTATION
1-29-99
DATE
ROADWAY DESIGN ENGINEER

REVISIONS
7-28-00

STDS. ENGR. M. Evans
DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

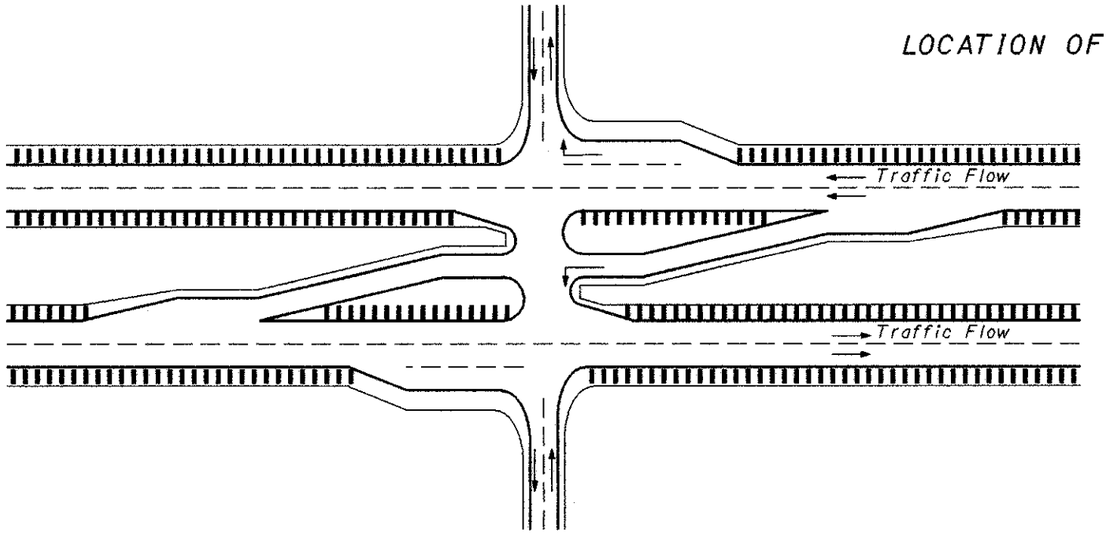
STANDARD ROADWAY CONSTRUCTION DRAWING

SHOULDER RUMBLE STRIPS

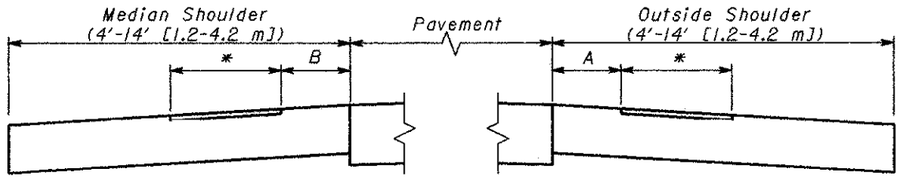
NUMBER BP-9.1

1/2

LOCATION OF RUMBLE STRIPS



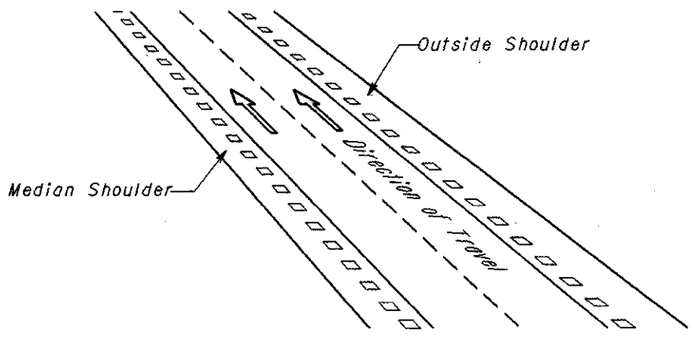
AT-GRADE INTERSECTIONS
(See Note 4.)



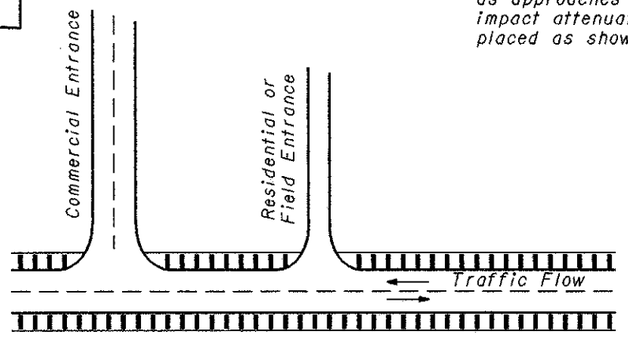
* See Sheet 1 of 2 for Rumble Strip details

OUTSIDE SHOULDER OFFSET (See Note 6.)
A = 6" [150] for 4' to 6' [1.2 to 1.8 m] shoulders
A = 10" [250] for shoulders greater than 6' [1.8 m]
MEDIAN SHOULDER OFFSET (See Note 2.)
B = 6" [150] for 4' to 6' [1.2 m to 1.8 m] shoulders
B = 10" [250] for 8' to 10' [2.4 to 3.0 m] shoulders
B = 5' [1.5 m] for 12' [3.6 m] shoulders
B = 6' [1.8 m] for 14' [4.2 m] shoulders

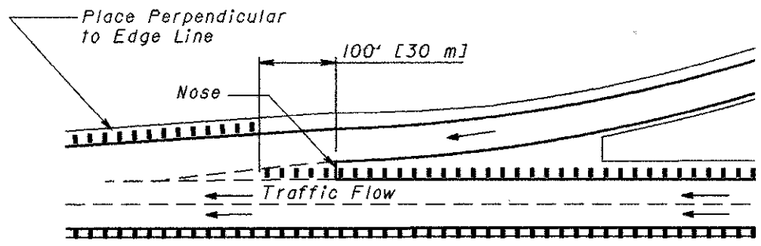
OFFSET DIMENSIONS



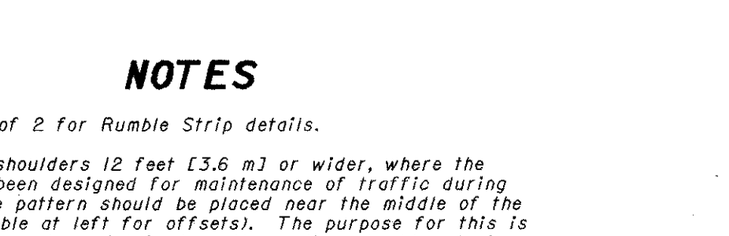
GENERAL ISOMETRIC VIEW - DIVIDED ROADWAY



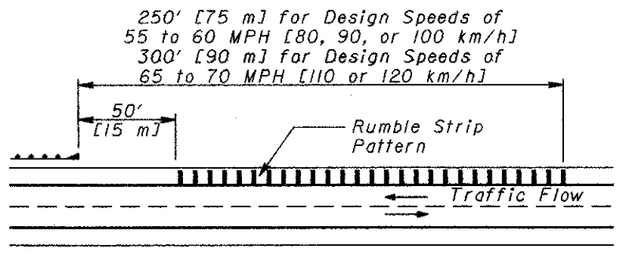
ACCESS POINTS ON ARTERIALS
(See Note 5)



ENTRANCE TERMINALS (See Note 3)



EXIT TERMINALS (See Note 3)



RUMBLE STRIPS LOCATIONS IN ADVANCE OF CRITICAL LOCATIONS
(See Note 7)

NOTES

1. See Sheet 1 of 2 for Rumble Strip details.

2. On median shoulders 12 feet [3.6 m] or wider, where the shoulders have been designed for maintenance of traffic during construction, the pattern should be placed near the middle of the shoulder (see table at left for offsets). The purpose for this is so that traffic can be maintained on the median shoulder during a "Phase 1" traffic maintenance sequence and straddle the pattern. "Phase 2" traffic can be maintained on the newly-paved outside shoulder prior to placement of the new rumble strip pattern.

3. At entrance and exit terminals, the outside shoulder pattern should be extended toward the ramp juncture as far as possible, and then shifted over to the outside shoulder of the terminal area. The "nose" of an entrance or exit terminal is a logical reference point. On either terminal, extend the pattern 100' [30 m] (150' [50 m] for Class II exit terminals) into the terminal area and then transfer to the outside shoulder.

4. The AT-GRADE INTERSECTION diagram shows a typical application for divided roadways, but the patterns on the outside shoulders are also applicable to undivided roadways.

5. Where rumble strips are used on the shoulders of arterial roadways, the pattern should be interrupted across residential or commercial drives.

6. In built-up residential areas where noise may be objectionable, this dimension may be increased, but should not exceed 24" [600].

7. Rumble strips, when used in advance of critical locations, such as approaches to narrow bridges, in gore areas, and ahead of impact attenuators or other barrier end treatments, should be placed as shown.

OHIO DEPARTMENT OF TRANSPORTATION
Paul R. Knuckles 4-29-99
ROADWAY DESIGN ENGINEER — DATE

REVISIONS
7-28-00

STDS. ENGR. M. Evans
DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

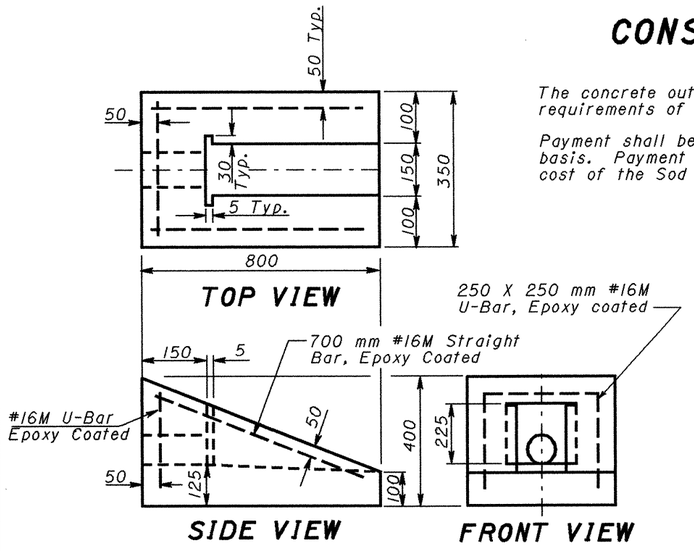
STANDARD ROADWAY CONSTRUCTION DRAWING

SHOULDER RUMBLE STRIPS

NUMBER BP-9.1

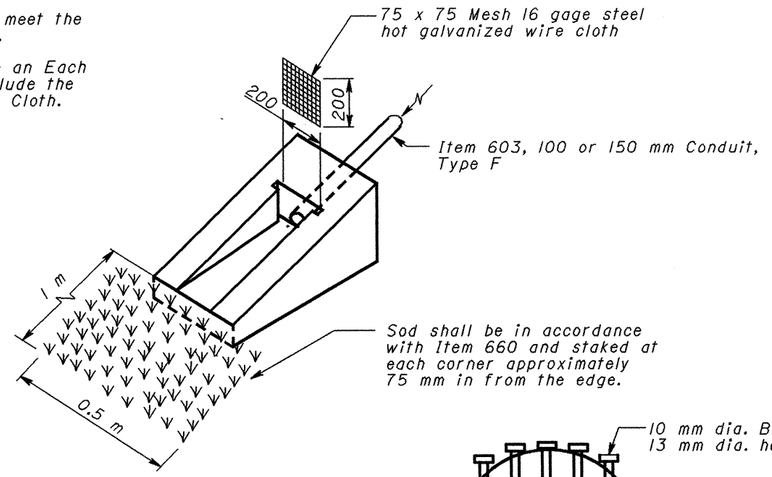
2/2

CONSTRUCTION METHODS

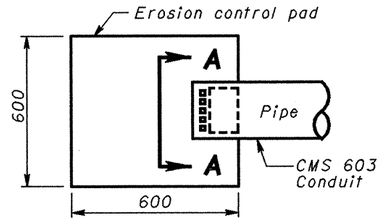


The concrete outlet shall meet the requirements of CMS 604.

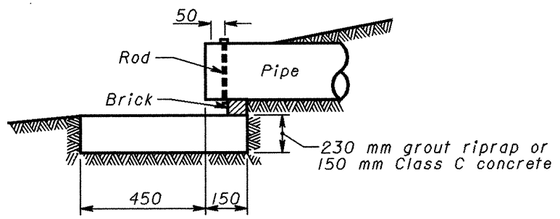
Payment shall be made on an Each basis. Payment shall include the cost of the Sod and Wire Cloth.



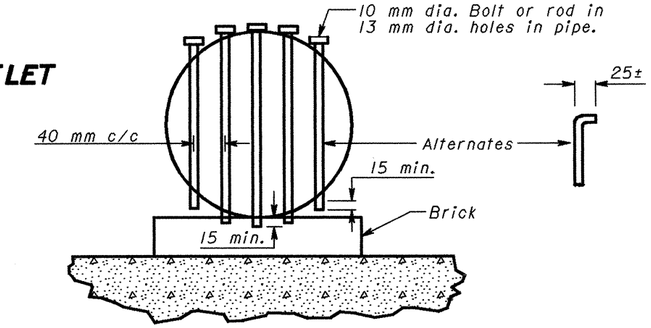
PRECAST REINFORCED CONCRETE OUTLET



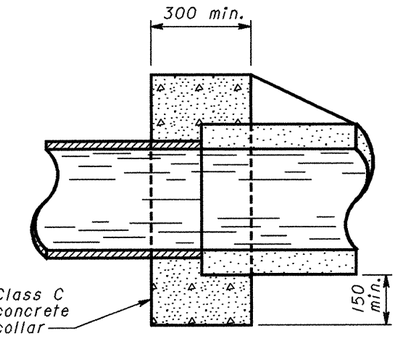
PLAN



PROFILE



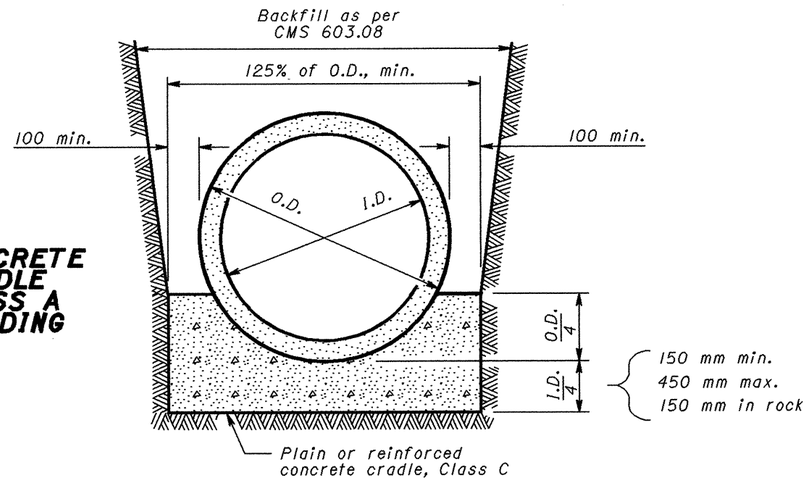
SECTION A-A



MASONRY COLLAR

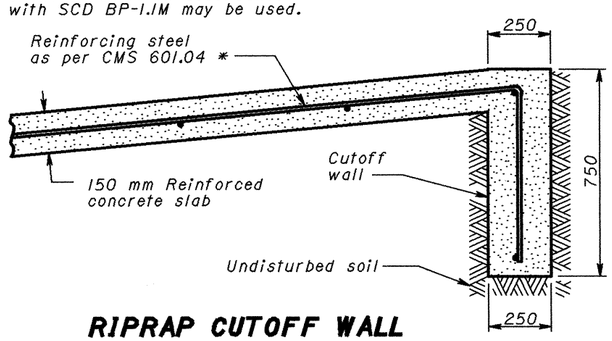
EROSION CONTROL PAD AND ANIMAL GUARD FOR OUTLET PIPE

Conduit Size (mm)	100	150	200	250	300	375	450
No. of Bolts	2	3	5	6	7	9	11



CONCRETE CRADLE CLASS A BEDDING

* If wire fabric is used in the slab, #10M bars at 600 mm overlapping the fabric. 300 mm, or wire fabric in accordance with SCD BP-1.1M may be used.



RIPRAP CUTOFF WALL

The cost of the cutoff wall shall be included in the unit price bid for Item 601 Riprap using 150 mm reinforced concrete slab

NOTES

MASONRY COLLARS: A masonry collar shall be provide where plans require that a pipe extension be joined to the end of an existing pipe with a butt joint. The cost shall be included in the unit price bid for the new conduit.

EROSION CONTROL PAD AND ANIMAL GUARDS: These items shall be provided at the outlet end of all farm drains except where they outlet into a drainage structure.
The steel bolts or rods for the animal guard shall be galvanized per CMS 710.06.
In lieu of drilling or punching the 13 mm diameter holes into the pipe, a metal collar meeting all of the above requirements may be clamped onto the pipe if approved by the Engineer.
Payment for the erosion control pads and animal guards shall be included in the unit price bid for Item 603 __ mm Conduit, Type __ .

All dimensions are in millimeters unless otherwise noted.

metric units

This Drawing Replaces MC-4.

OHIO DEPARTMENT OF TRANSPORTATION

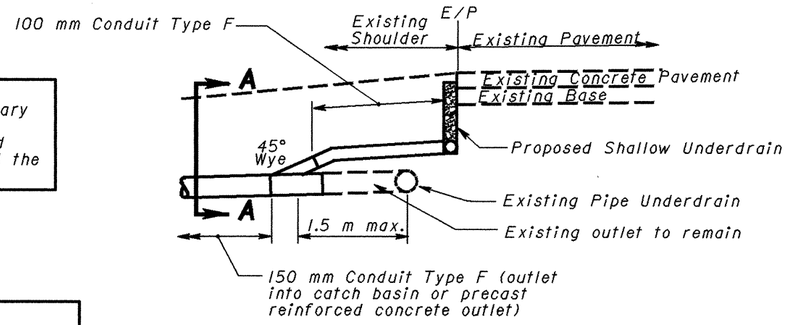
OUTLETS, DRAINS AND SEWERS

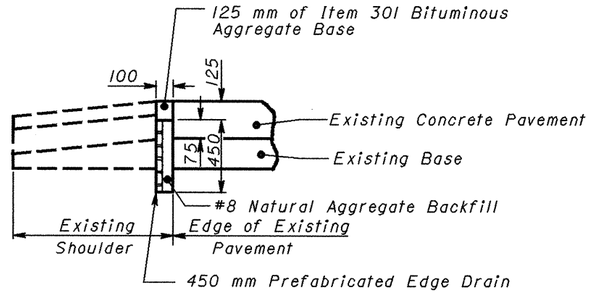
DATE: 6-30-95, 10-21-97

STANDARD CONSTRUCTION DRAWING **DM-1.1M**

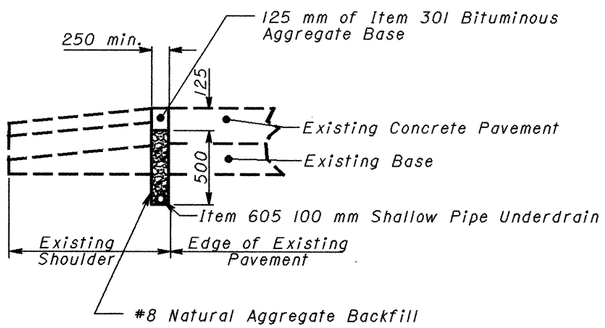
APPROVED Larry F. Sutherland

NOTE:
The cost of the 100 mm Conduit Type F and necessary pipe bends and branches needed to connect the existing and proposed underdrains shall be included with the cost of the 150 mm Conduit Type F beyond the existing underdrain.

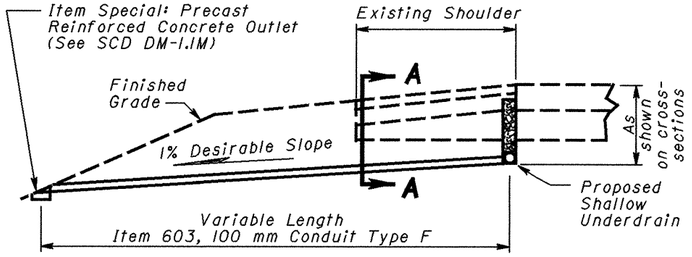


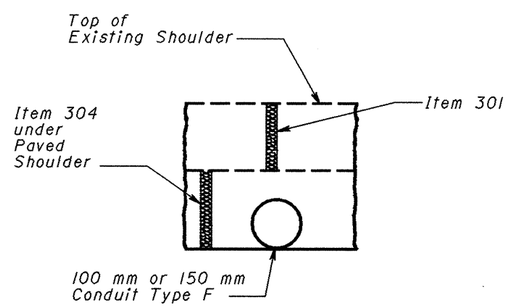


PREFABRICATED EDGE DRAIN SYSTEM



PIPE UNDERDRAIN SYSTEM





SECTION A-A

SHALLOW UNDERDRAIN SYSTEM

NOTES

DESCRIPTION: This item shall consist of furnishing and installing either a pipe underdrain system or a prefabricated edge drain system in accordance with the specifications and with the details on the plans or as directed by the Engineer.

MATERIALS: The underdrain shall either be a pipe underdrain system or a prefabricated edge drain system meeting the requirements of CMS 605.

BASIS OF PAYMENT FOR PIPE UNDERDRAIN SYSTEM ONLY: Work completed, accepted and measured under this item shall be paid for the contract unit price bid for Item 605 - 100 mm Shallow Pipe Underdrain. The price shall be full compensation for excavation and backfill; for furnishing materials, including materials for outlet fittings and Item 301; and for all labor, tools, equipment and incidentals necessary to complete the work.

BASIS OF PAYMENT FOR SHALLOW UNDERDRAIN SYSTEM: Work completed, accepted and measured under this item shall be paid for at the contract unit price bid for Item 605 - Shallow Underdrain. The price shall be full compensation for excavation and backfill; for removing and disposing of all surplus excavation in accordance with CMS 203; for furnishing materials, including materials for splices, outlet fittings, and Item 301; and for all labor, tools, equipment and incidentals necessary to complete the work associated with the installation of prefabricated edge drains or pipe underdrains.

BASIS OF PAYMENT FOR PREFABRICATED EDGE DRAIN SYSTEM: Work completed, accepted and measured under this item shall be paid for at the contract unit price bid for Item 605 - 450 mm Prefabricated Edge Drain. The price shall be full compensation for excavation and backfill; for removing and disposing of all surplus excavation in accordance with CMS 203; for furnishing materials, including materials for splices, outlet fittings, and Item 301; and for all labor, tools, equipment and incidentals necessary to complete the work associated with the installation of prefabricated edge drains or pipe underdrains.

All dimensions are in millimeters unless otherwise noted.

metric units

OHIO DEPARTMENT OF TRANSPORTATION

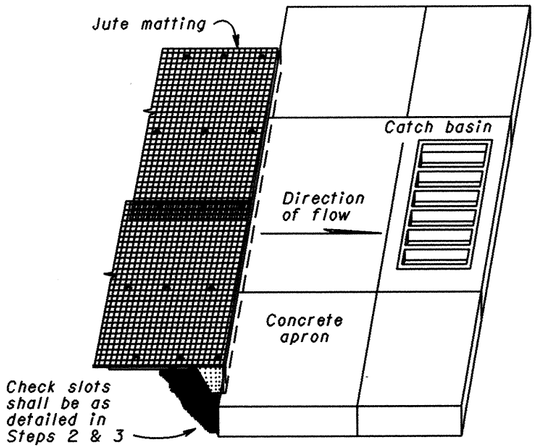
SHALLOW UNDERDRAINS

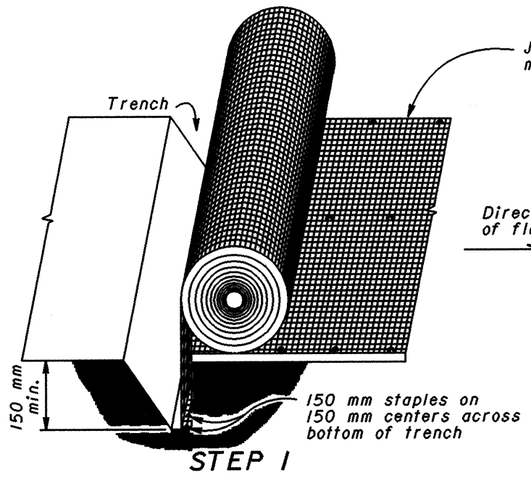
DATE
6-30-95
10-21-97

STANDARD CONSTRUCTION DRAWING **DM-1.2M**

APPROVED Larry F. Sutherland

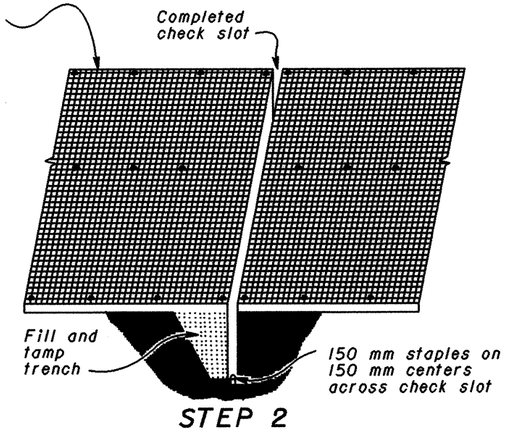
JUTE MATTING INSTALLATION





STEP 1

Direction of flow



STEP 2

NOTES

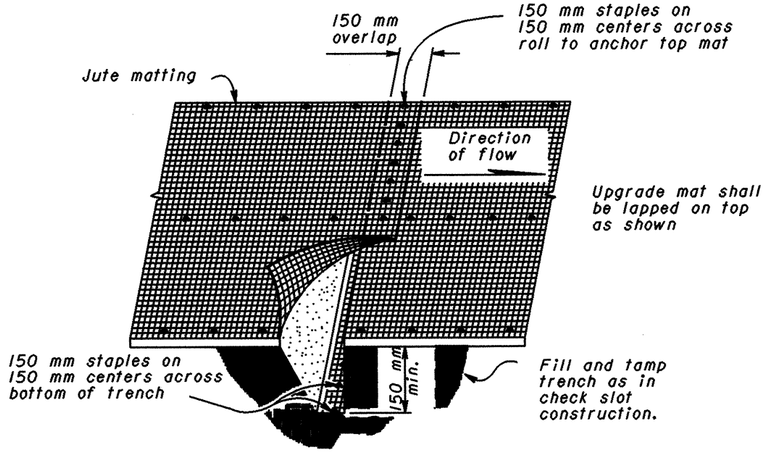
GENERAL: The details shown hereon shall govern the installation of jute and excelsior matting unless otherwise shown in the plan.

END OF RUN: Jute matting shall have a check slot and be stapled in the slot as shown in Step 4. Matting placed for ditch protection shall start from the downstream end, as shown in Step 1.

EXCELSIOR MATTING: Matting shall be stapled as detailed for jute matting except the roll ends and 50 mm end overlaps shall be stapled on 150 mm centers without a buried end; and a 150 mm overfold shall be placed across long rolls at intervals of 15 m or less and stapled on 150 mm centers.

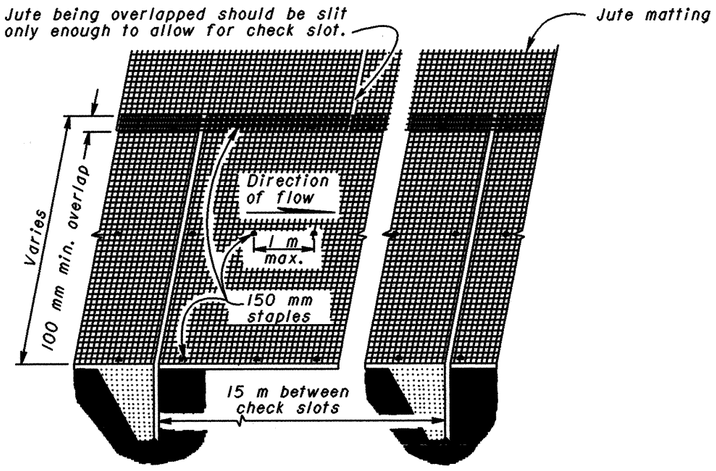
STAPLES: Staples shall be in accordance with CMS 667.02.

CHECK SLOT AT STRUCTURES

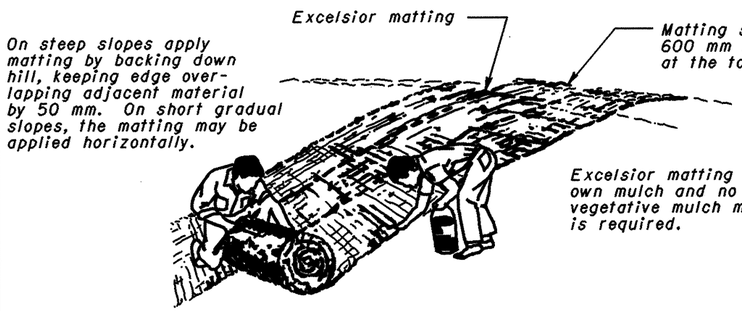


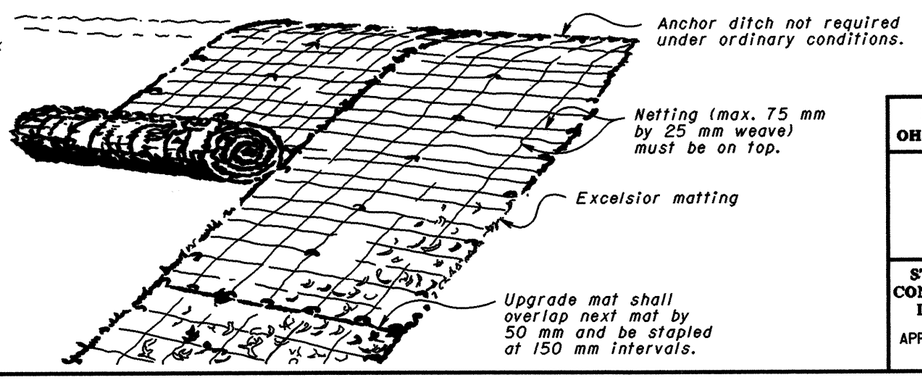
END OF ROLL OVERLAP

CHECK SLOT CONSTRUCTION DETAILS



TYPICAL INSTALLATION





EXCELSIOR MATTING INSTALLATION

metric units

This Drawing Replaces MC-10.

BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

JUTE & EXCELSIOR MATTING

DATE 6-30-95

STANDARD CONSTRUCTION DRAWING **DM-4.2M**

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

STRAW OR HAY BALES

BALE PLACEMENT: Bales shall be tightly placed adjacently and entrenched 2" [50] to 3" [75] before staking; or a small amount of loose soil shall be lightly compacted along the upstream edge of the bales.

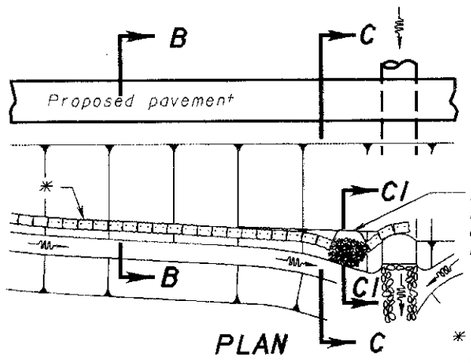
Each bale shall be firmly staked with a minimum of two stakes at least 3' [1 m] in length. Stakes shall be wooden 2"x2" [50x50], reinforcing bars or fence posts.

Loose straw or hay shall be wedged between and under staked bales.

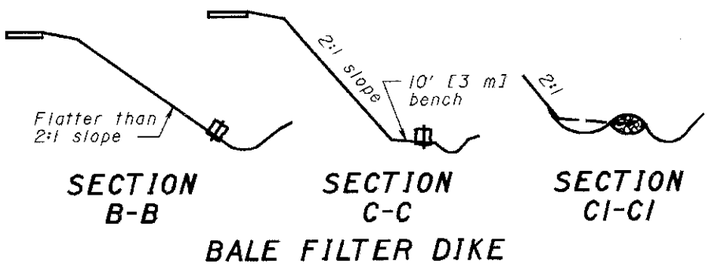
PITS: Sediment pits shall be provided and their cost included in the unit price bid for the adjacent SS 877 items.

MAINTENANCE: The maintenance or replacement will be paid for by the Department under unit bid prices, agreed unit price, or under 109.04.

BASIS OF PAYMENT: Straw or hay bale installation shall be paid for under **Item 877 - Temporary Perimeter Filter Fabric Fence.** Cost will include placing, staking and removing.

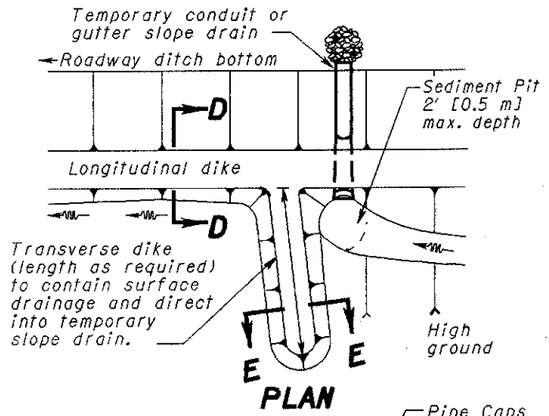


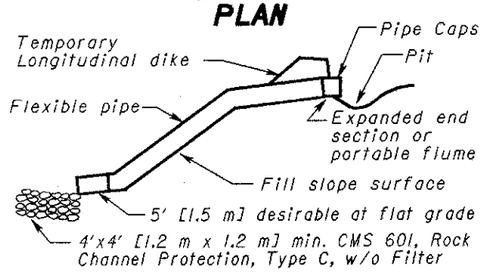
*Use Bales or Temporary Perimeter Filter Fabric Fence constructed per **SCD DM-4.4**



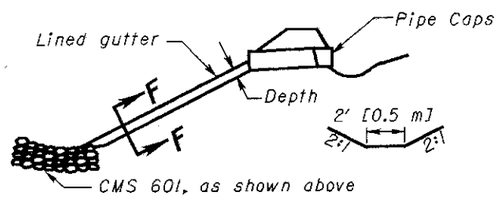
BALE FILTER DIKE

DIKES AND SLOPE PROTECTION

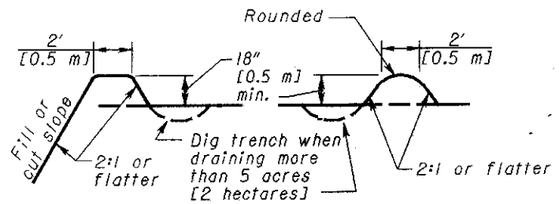




CONDUIT SLOPE DRAIN



SECTION F-F
GUTTER SLOPE DRAIN



SECTION D-D SECTION E-E

TEMPORARY SLOPE DRAINS RECOMMENDED SIZES				
Area in acres [hectares]	Pipe Sizes			Gutter depth
	Smooth	Corrugated	Half-round	
0-4 [0-1.6]	6" [150]	6" [150]	18" [450]	8" [200]
4-8 [1.6-3.2]	8" [200]	12" [300]	18" [450]	8" [200]
8-12 [3.2-4.9]	10" [250]	15" [375]	21" [525]	12" [300]

GENERAL: Dikes & drains shown shall be used when earthwork operations on slopes are higher than 8' [2.5 m] and fill operations are suspended for three weeks or more. 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.

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

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

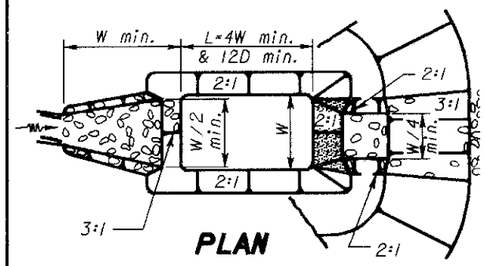
GUTTERS: Gutters for slope drains shall be lined with Type C rock channel protection, crushed aggregate slope protection, portland cement concrete, bituminous concrete, plastic sheeting (on slopes 4:1 max.), partial pipe sections or approved equal.

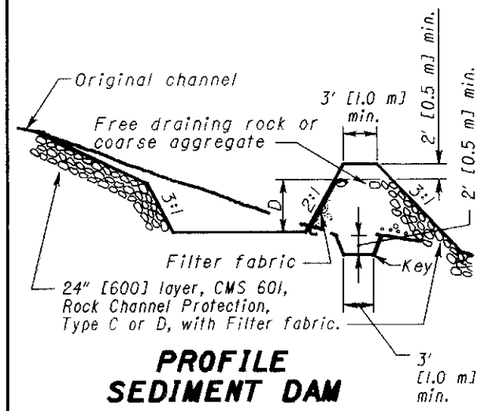
PITS: Sediment pits shall be provided and their cost included in the unit price bid for the adjacent items.

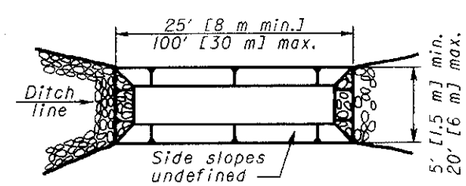
MAINTENANCE: Dikes and slope protection shall be acceptably maintained. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

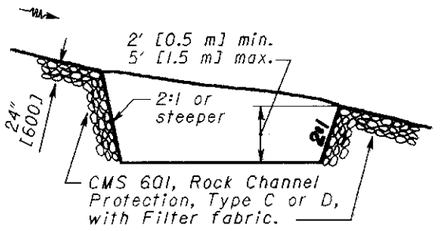
BASIS OF PAYMENT: Temporary dikes shall be paid for under **Item 877-Temporary Dikes.** Temporary slope drains shall be paid for under **Item 877-Temporary Slope Drains.** Rock required shall be paid for under **Item 601, Rock Channel protection, Type C, w/o Filter.**

SEDIMENT BASINS & DAMS









EMBANKMENT: Sediment basin embankment construction shall be as per CMS 203.

FILTERS: Filter fabric shall be per CMS 601.02 and installed per CMS 601.08 or as detailed here. Such fabrics may be cleaned in lieu of replacement. The cost of all filter fabric required to construct the sediment basin or dam shall be included in the cost of the Item 601, Rock Channel Protection, with Filter Fabric.

SIZE: The volume shown on the plans is the total storage volume required for the sediment basin or dam (67 cubic yards per acre [127 cubic meters per hectare]). A series of smaller basins or dams may be substituted for a larger basin or dam.

MAINTENANCE: Sediment pits, dams and basins shall be acceptably maintained. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

BASIS OF PAYMENT: Sediment Dams and Basins shall be paid for under **Item 877-Sediment Basin and Dams.** The pay quantity shall be the actual number of cubic yards [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 or D, with Filter.**

THIS DRAWING REPLACES DM-4.3M DATED 6-30-95.

OHIO DEPARTMENT OF TRANSPORTATION — DATE 4-29-99
ROADWAY DESIGN ENGINEER

REVISIONS

STDS. ENGR. W. EVANS — DRAWN D. FOCKE

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

DESIGN AGENCY: OFFICE OF PLANNING

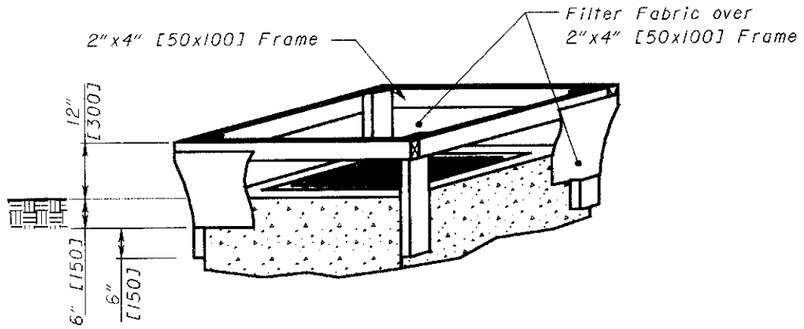
STANDARD ROADWAY CONSTRUCTION DRAWING

TEMPORARY EROSION CONTROL

NUMBER DM-4.3

1 / 1

TEMPORARY INLET PROTECTION FILTER FABRIC FENCE



MATERIALS: Filter Fabric shall meet the requirements of CMS 712.09, Type C. The framing wood shall be construction grade 2"x4" [50x100] lumber.

CONSTRUCTION: Excavate a 6" [150] deep trench around the inlet, then drive the 2"x4" [50x100] posts 6" [150] below the excavated trench. Construct the wooden frame using the overlap joint detail shown above. The filter fabric shall be stretched around the wooden frame and securely fastened. The filter fabric shall overlap across one side of the inlet such that the ends of the filter fabric are not attached to the same post. Backfill and compact the excavated soil. Other devices may be used with the approval of the Director.

MAINTENANCE: The filter fabric shall be maintained to be functional, This shall include removal of trapped sediment and required cleaning, repair, and/or replacement of the filter fabric. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or under CMS 109.04.

PAYMENT: The cost of all materials, construction and removal shall be paid for under **Item 877 - Temporary Inlet Protection Filter Fabric Fence, Linear Foot [Meter].**

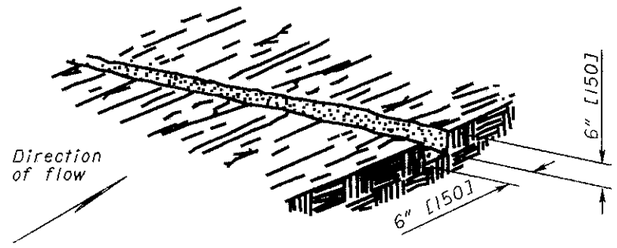
NOTES

MATERIALS: Filter fabric shall meet the requirements of CMS 712.09, Type C. Support stakes shall be a minimum of 1.5"x1.5" [38x38], nominal, and shall be hardwood of sound quality. The stakes shall be driven a minimum of 6" [150] below the bottom of the filter fabric. The maximum spacing between support stakes shall be 10' [3 m].

CONSTRUCTION: The bottom of the fabric shall be buried 6" [150] below the ground. The ends of adjacent sections of fence shall be overlapped with the end stake of each section wrapped together prior to installation. The ground elevation of the fence shall be held constant except that the end elevations shall be raised upslope to prevent flow around the end of the fence.

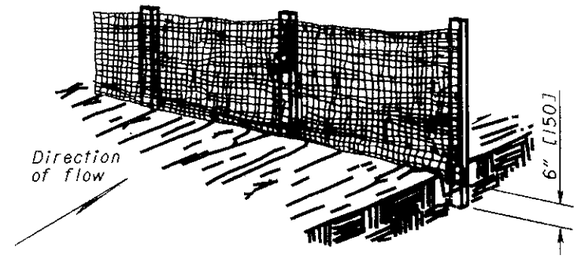
MAINTENANCE: The filter fabric fence shall be maintained to be functional. This shall include removal of trapped sediment and required cleaning, repair, and replacement of the filter fabric. The maintenance or replacement cost will be paid for by the Department under unit bid prices, agreed unit prices, or CMS 109.04.

PAYMENT: The cost of all materials, construction and removal shall be paid for under **Item 877 - Temporary Perimeter Filter Fabric Fence or Temporary Ditch Check Filter Fabric Fence, Linear Foot [Meter].**



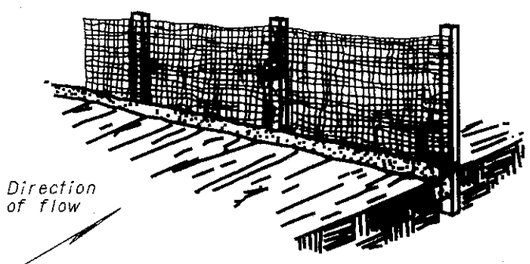
Excavate a 6"x6" [150x150] trench along the proposed fence line.

STEP 1



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

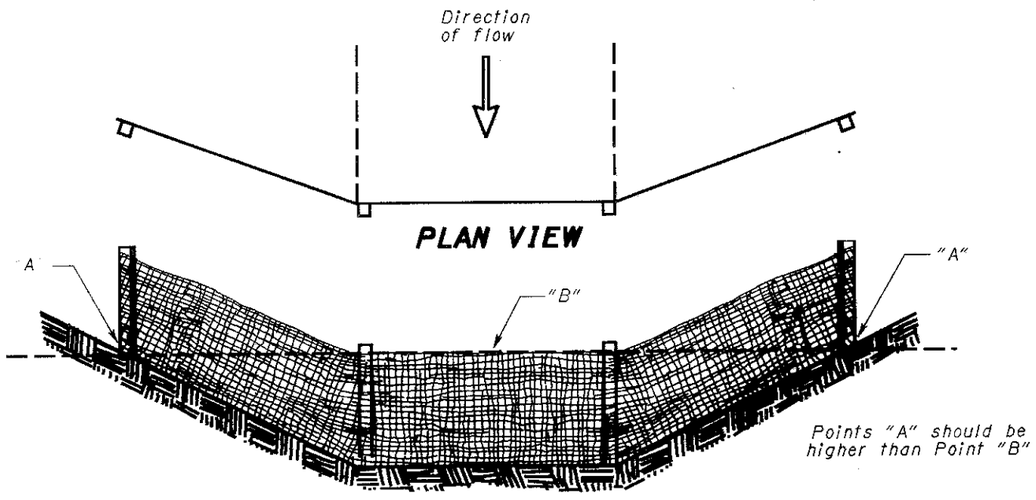
STEP 2



Backfill and compact the excavated soil.

STEP 3

PLACEMENT AND CONSTRUCTION OF PERIMETER FILTER FABRIC FENCE



PLACEMENT AND CONSTRUCTION OF DITCH CHECK FILTER FABRIC FENCE

THIS DRAWING REPLACES DM-4.4M DATED 6-30-95.

OHIO DEPARTMENT OF TRANSPORTATION
Randy St. Clair 4-29-99
ROADWAY DESIGN ENGINEER — DATE

REVISIONS

STDS. ENGR. M. EVANS
DRAWN D. FOCKE

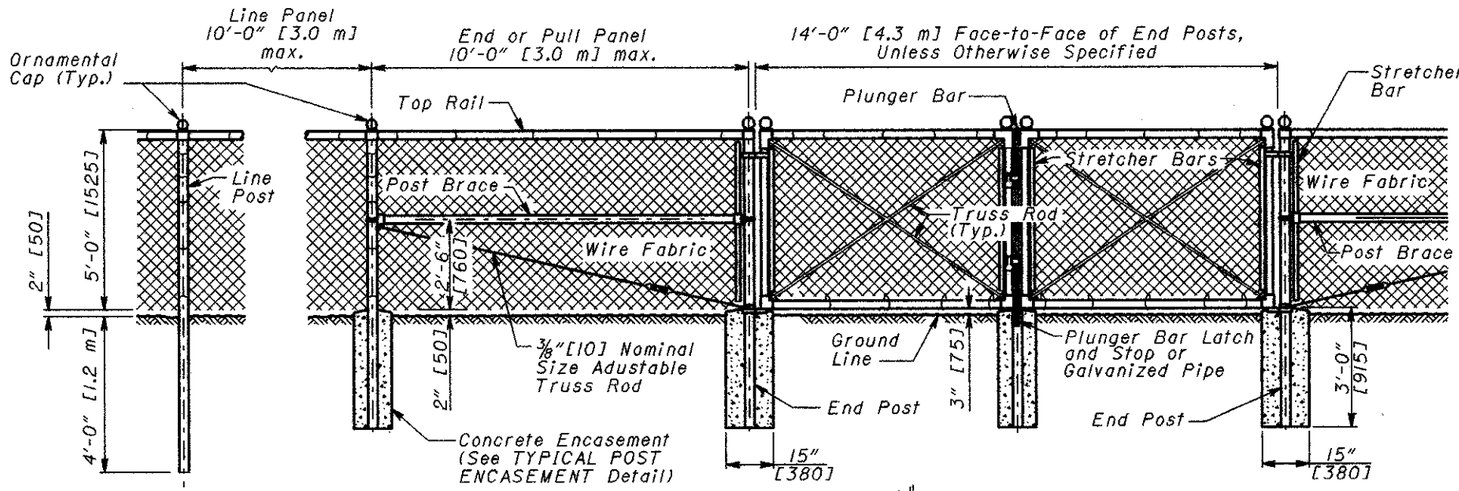
All metric dimensions [in brackets [ ]] are in millimeters unless otherwise noted.

DESIGN AGENCY
OFFICE OF PLANNING

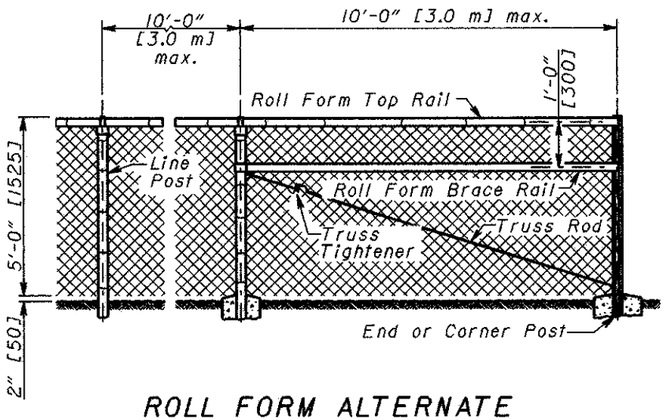
STANDARD ROADWAY CONSTRUCTION DRAWING
TEMPORARY EROSION CONTROL

NUMBER DM-4.4

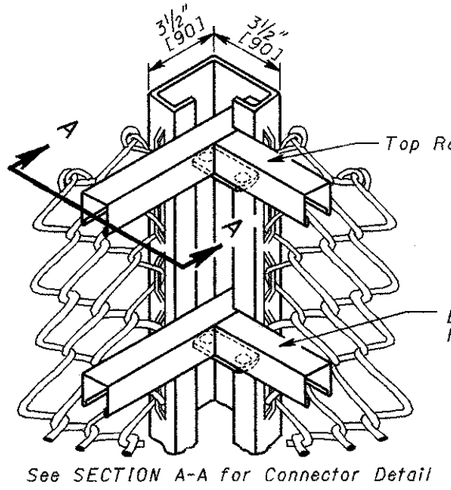
1 / 1



TYPE CL FENCE

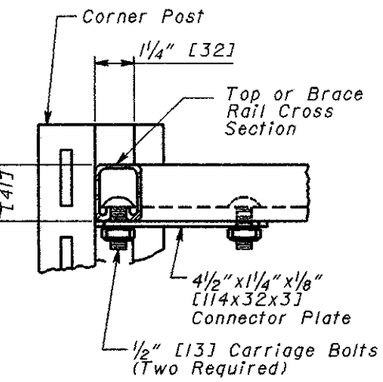


ROLL FORM ALTERNATE

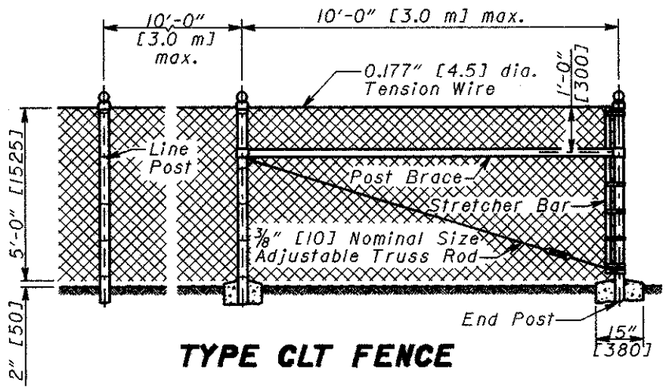


See SECTION A-A for Connector Detail

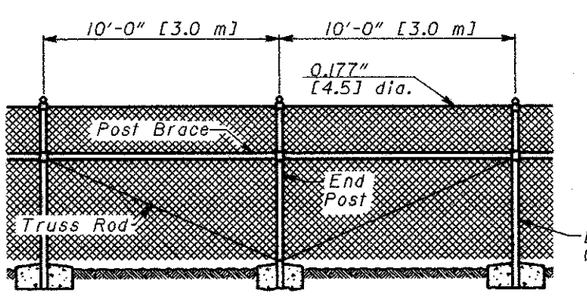
ROLL FORM ALTERNATE
CORNER POST
Fabric Outside



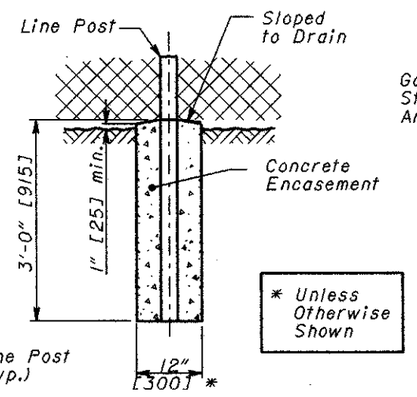
SECTION A-A



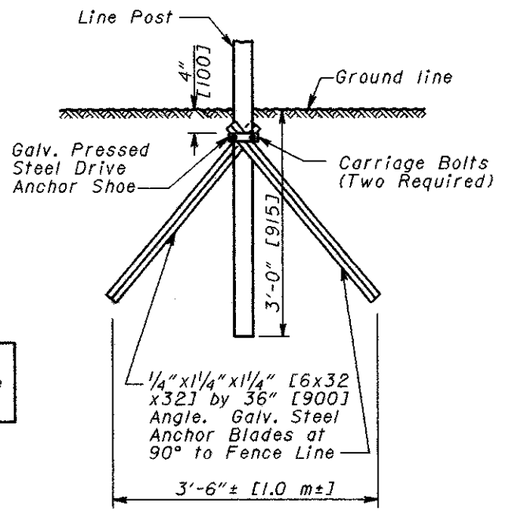
TYPE CLT FENCE



INTERMEDIATE ANCHOR POST ASSEMBLY
For Type CLT Fence



TYPICAL POST ENCASEMENT



DRIVE ANCHOR DETAIL
For Line Post Alternate

NOTES

STREAM CROSSINGS: *Where chain link fence is to be constructed continuously across streams, and stream crossing closures are required by the plans, the closure shall be constructed in accordance with the details shown on* ***SCD F-3.4,*** *modified as necessary to conform to chain link fence dimensions and details.*

TENSION WIRE: *Wire shall be used instead of the top rail when specified on the plans as Item 607 - Fence, Type CLT. The wire shall be stretched taut and fastened to or passed through the top fitting. The fence shall be fastened to the tension wire with fabric ties consisting of hog rings every 24" [600] or less.*

GATES: *Each gate shall be equipped with an approved padlock with a double locking bolt, a five-pin tumbler, a laminated steel case, and a brass cylinder, and shall be rust-proof. Where companion gates are installed on opposite sides of the highway, tumblers shall be identically set in each lock so that the same key will open each lock. Two keys shall be furnished with each padlock. The cost of the padlock and keys shall be included in the cost of the gate.*

POST ENCASEMENT: *Line posts shall normally be driven to an embedment depth of 48" [1.2 m]. Where soil or other conditions do not permit driving to this depth, post holes shall be dug or bored and the posts encased in concrete. Posts located in unconsolidated fills or other loose soils, in dips or other depressions in the ground surface, or installed with fabric exceeding 60" [1525] in height shall also be encased in concrete.*

Steel drive anchors may be used as an alternate to concrete encasement of line posts. All end, corner and pull panel posts shall be encased in concrete. See DRIVE ANCHOR DETAIL.

FRAMEWORK AND FABRIC: *Materials may be any type permitted by CMS 710.03.*

FENCE GROUNDING: *When needed for overhead electrical lines, grounding is to be in accordance with the* ***Office of Traffic Engineering's SCD HL-50.11.***

THIS DRAWING REPLACES F-1.1M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION
Paul F. Sturgeon 7-28-00
ROADWAY DESIGN ENGINEER — DATE

REVISIONS

STDS. ENGR. M. Evans
DRAWN D. Focke

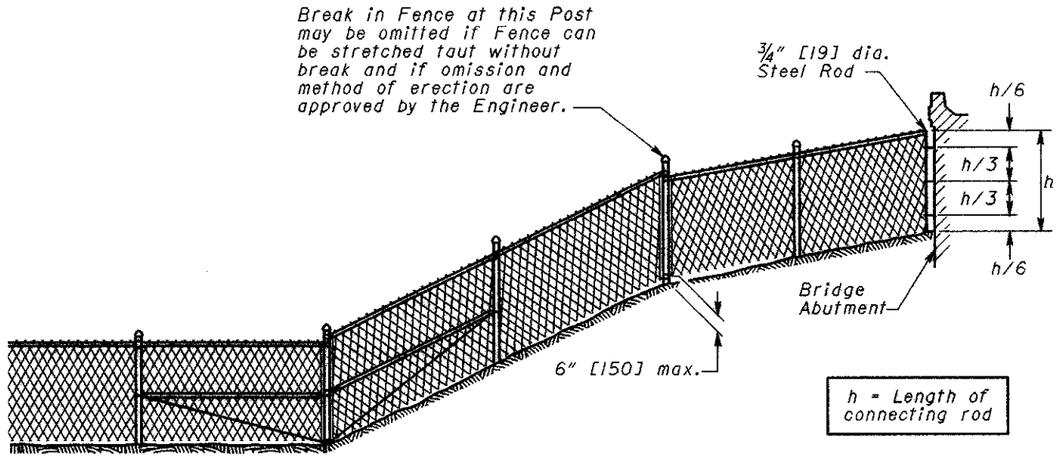
All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

ROADWAY ENGINEERING SERVICES

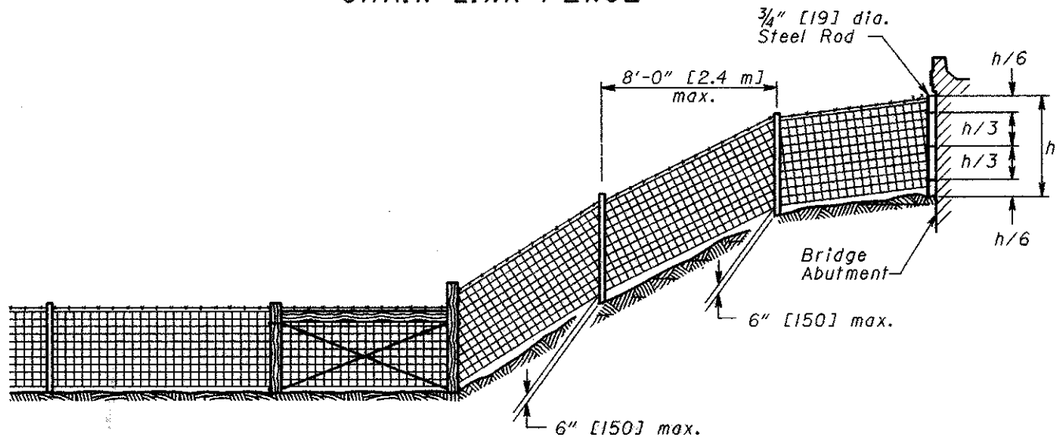
STANDARD ROADWAY CONSTRUCTION DRAWING
CHAIN LINK FENCE

NUMBER F-1.1

1 / 1

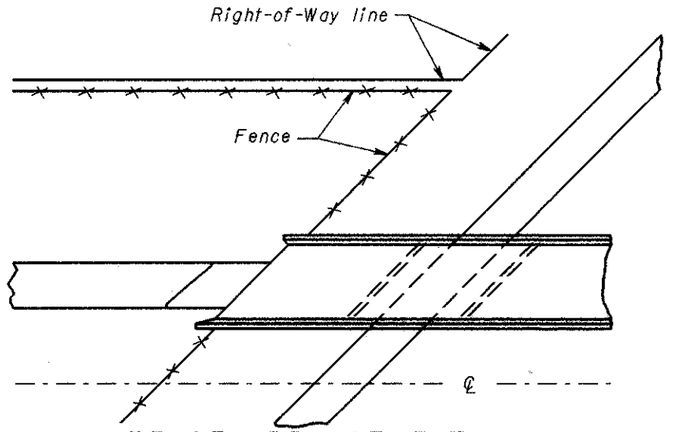


CHAIN LINK FENCE

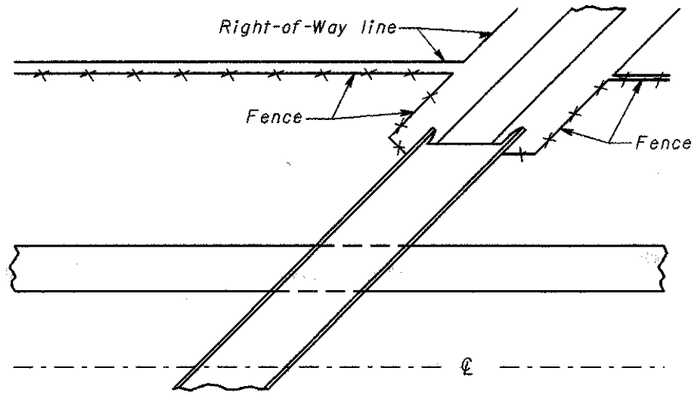


WOVEN WIRE FENCE

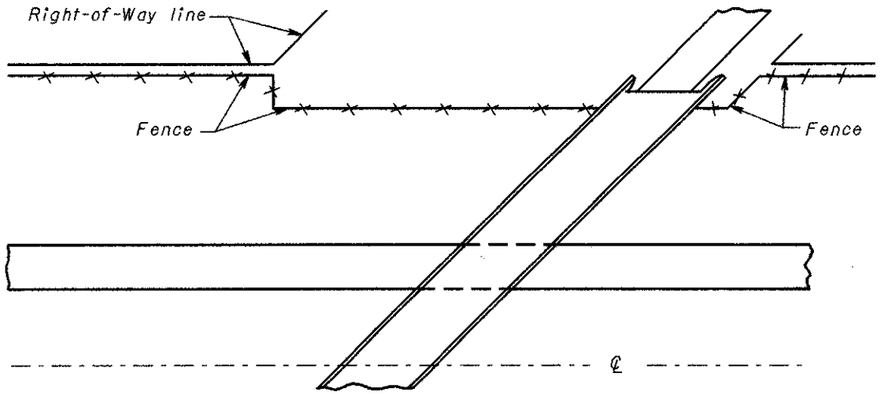
ABUTMENT CONNECTION



FENCE ARRANGEMENT AT FREEWAY OVERPASS



FENCE ARRANGEMENT CROSS ROAD ON ORIGINAL PROFILE



FENCE ARRANGEMENT CROSS ROAD ON HIGH FILL

NOTES

GENERAL: Details shown hereon shall be used with **SCD F-1.1** and **SCD F-2.1.**

ABUTMENT CONNECTION: The cost of furnishing and installing connecting rods, eyebolts, and anchors shall be included in the unit price bid per Linear Foot [Meter] of fence. Where needed to clear deck projections or other irregularities, the shaft length of the eyebolt may vary.

ANCHORS: Self-drilling anchors shall conform to CMS 712.01. Threaded steel inserts may be cast-in-place when the structure is constructed instead of using using self-drilling anchors.

EYEBOLTS: The steel shall be in accordance with ASTM A 489, except that the bend test is waived. The eyebolt shall be galvanized in accordance with ASTM A 153.

CLEARANCE: On embankments approaching bridges, the clearance of the lower fence wires may vary from 0 to 6" [150].

THIS DRAWING REPLACES F-3.1M DATED 4-21-95.

OHIO DEPARTMENT OF TRANSPORTATION
Paul L. Sheldon 1-28-00
ROADWAY DESIGN ENGINEER — DATE

REVISIONS	STDS. ENGR. M. Evans	DRAWN D. Focke

All metric dimensions [in brackets [ ]] are in millimeters unless otherwise noted.

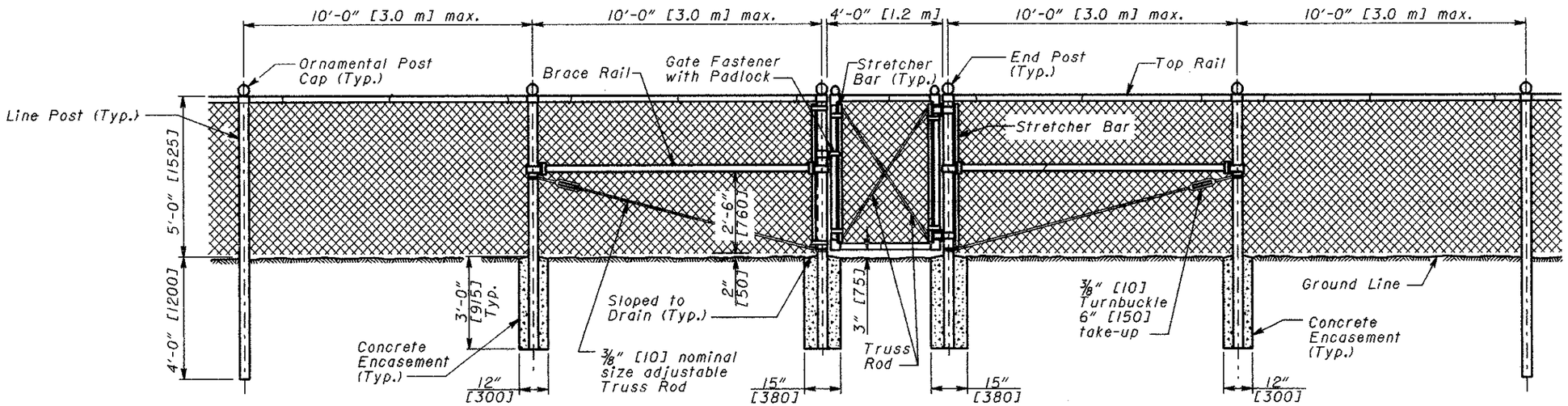
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

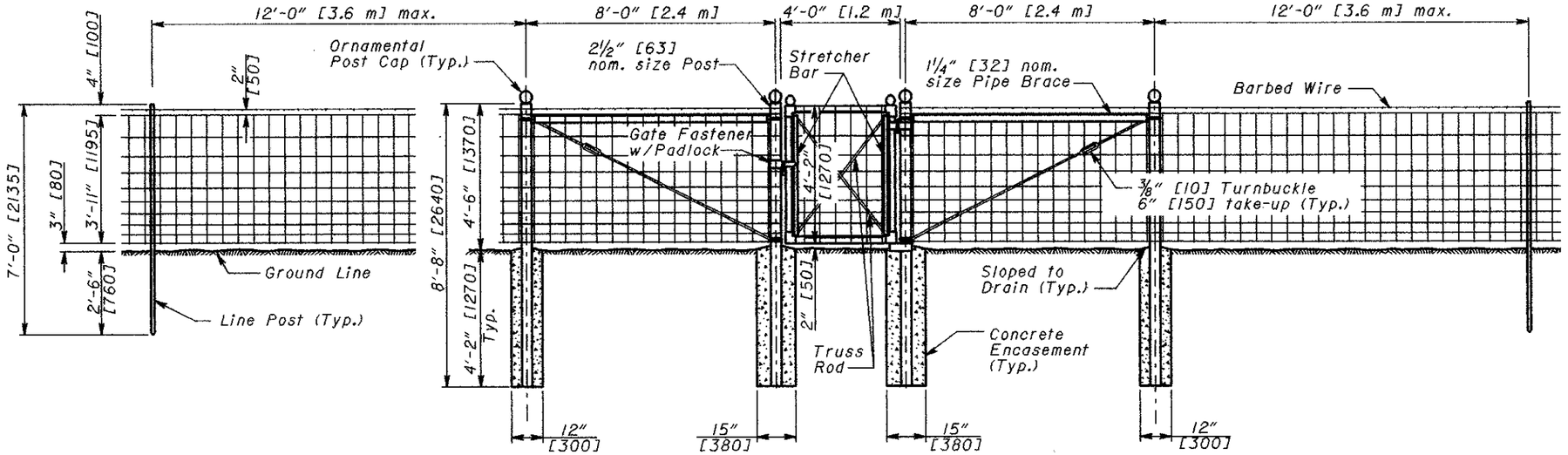
FENCE DETAILS AT BRIDGES

NUMBER F-3.1

1 / 1



CHAIN LINK WALK GATE



TYPE 47 WALK GATE

NOTES

GATES: Each gate shall be equipped with an approved padlock with a double locking bolt, a five-pin tumbler, a laminated steel case, and a brass cylinder, and shall be rust-proof. Where companion gates are installed on opposite sides of the highway, tumblers shall be identically set in each lock so that the same key will open each padlock. The cost of the padlock and keys shall be included in the cost of the gate.

TRUSS RODS: Rods may be omitted from gate frames if welded joints are furnished.

TYPE 47 WALK GATE: Walk gate and end post assemblies at gate openings shall conform to CMS 607, except as shown otherwise on this drawing.

THIS DRAWING REPLACES F-3.2M DATED 4-8-97.

OHIO DEPARTMENT OF TRANSPORTATION
Paul F. Sutherland — 7-28-00
ROADWAY DESIGN ENGINEER — DATE

REVISIONS	STDS. ENGR. M. Evans	DRAWN D. Focke

All metric dimensions (in brackets [ ]) are in millimeters unless otherwise noted.

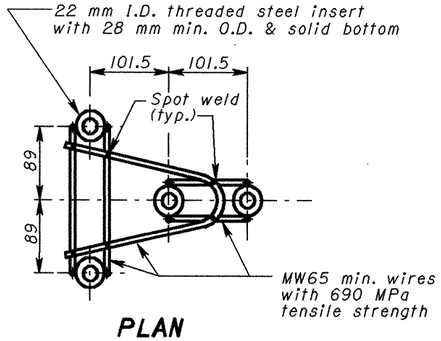
ROADWAY ENGINEERING SERVICES

STANDARD ROADWAY CONSTRUCTION DRAWING

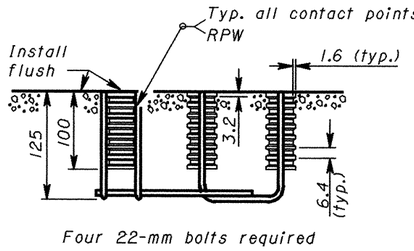
WALK GATES

NUMBER F-3.2

1 / 1



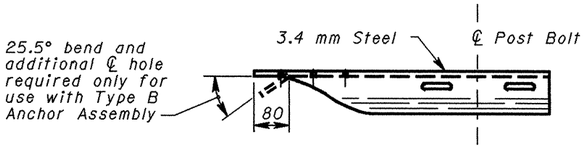
PLAN



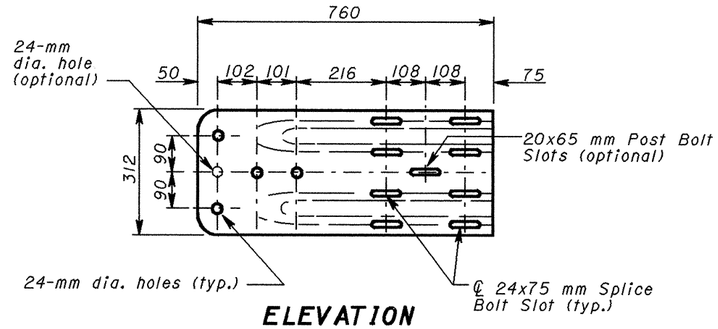
Four 22-mm bolts required

ELEVATION

CONCRETE INSERT ANCHOR ASSEMBLY (W-BEAM ONLY)

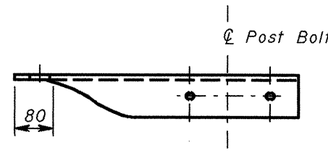


PLAN

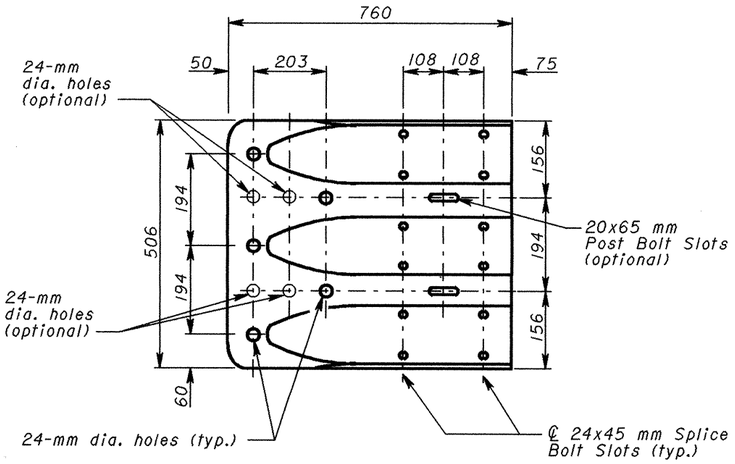


ELEVATION

W-BEAM TERMINAL CONNECTOR

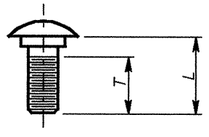


PLAN



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

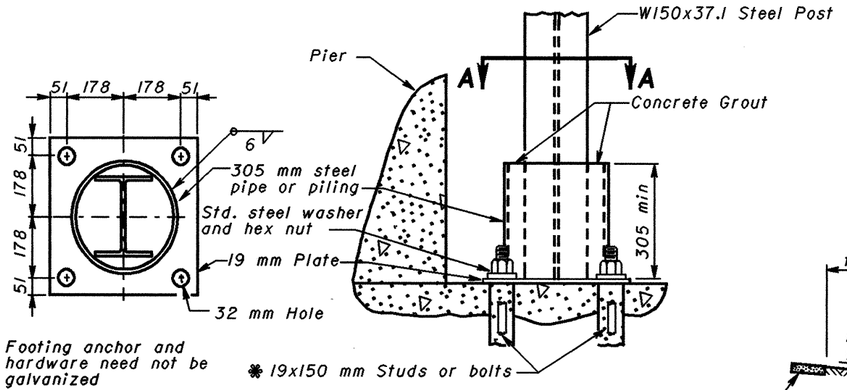
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL DETAILS

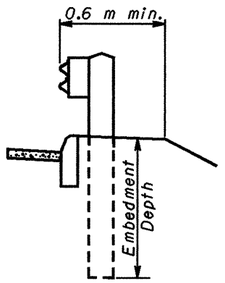
DATE
11-30-94
10-21-97

STANDARD CONSTRUCTION DRAWING GR-1.1M

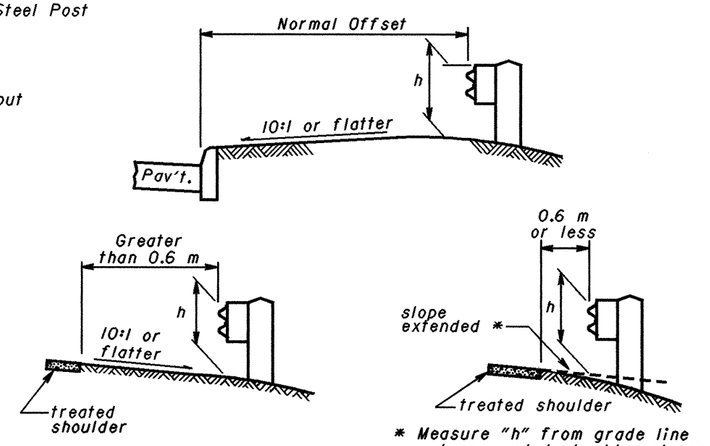
APPROVED Larry F. Sutherland



FOOTING ANCHOR

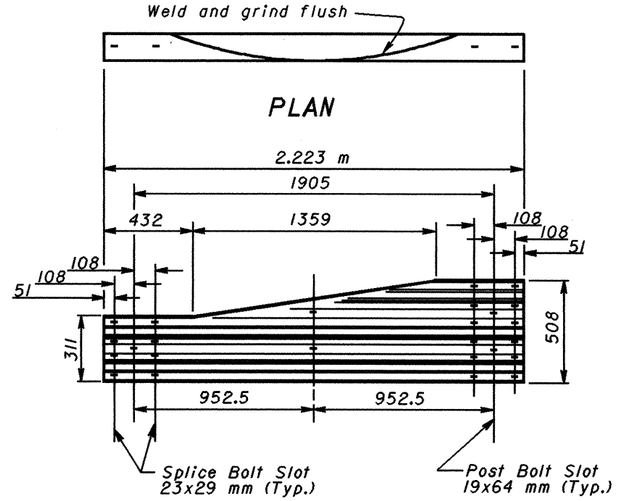


DETAIL A



h = Standard height (Tolerance ±25 mm)

MEASURING GUARDRAIL HEIGHT



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.

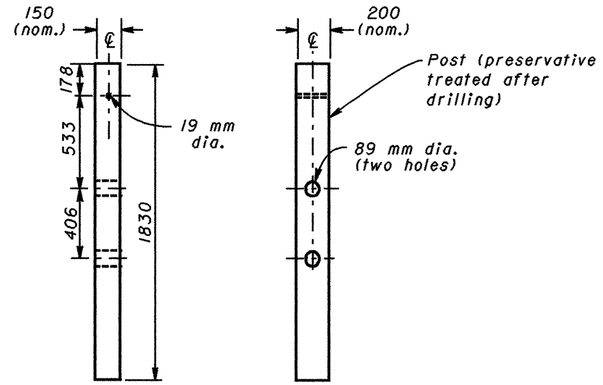
OFFICE OF ROADWAY ENGINEERING
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL DETAILS

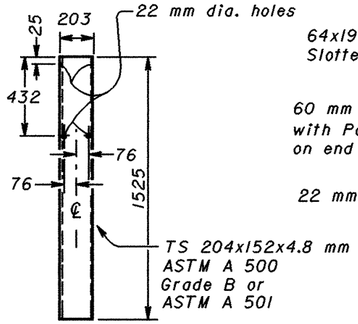
DATE 1-3-96

STANDARD CONSTRUCTION DRAWING **GR-1.2M**

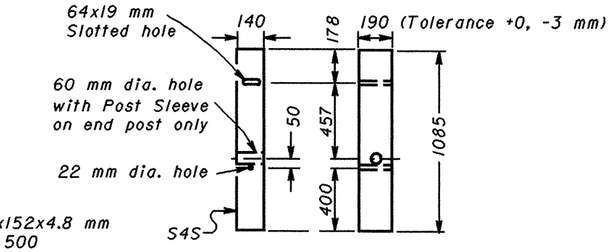
APPROVED D. K. Hulman, P.E.
ADMINISTRATOR



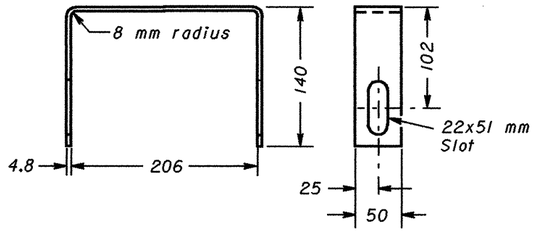
TYPE I BREAKAWAY POST



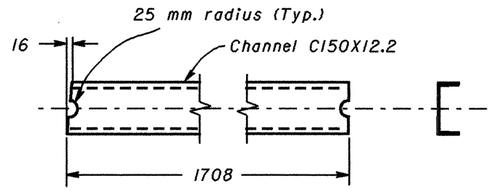
STEEL TUBE



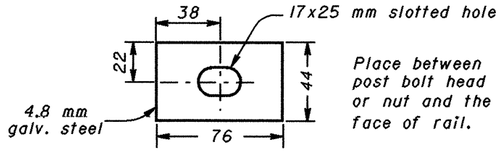
TYPE 2 BREAKAWAY POST



YOKE DETAILS

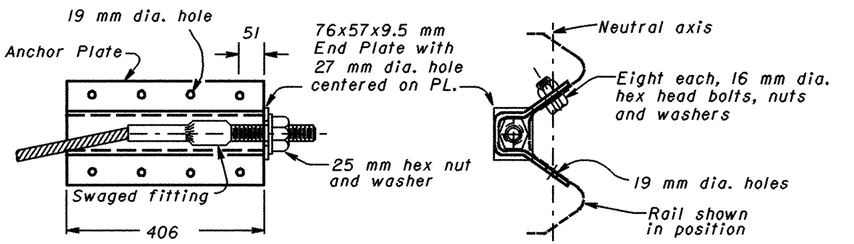


STRUT DETAILS

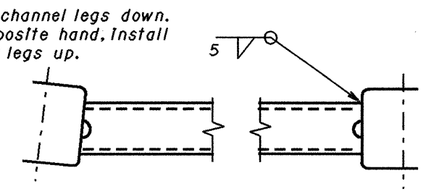


RECTANGULAR WASHER

(Not to be used in typical Type 4, 5 or 5A guardrail installations. Use only where specified.)

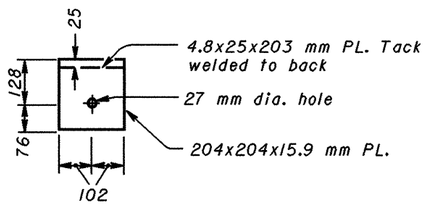


ANCHOR PLATE ASSEMBLY DETAILS

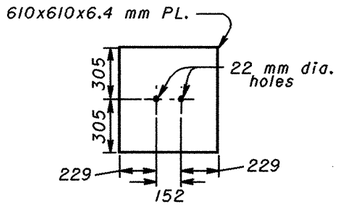


STRUT AND YOKE ASSEMBLY

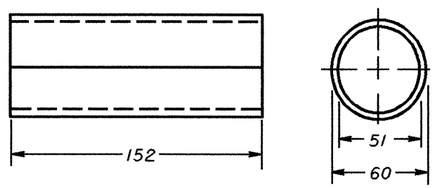
All dimensions are in millimeters unless otherwise noted.



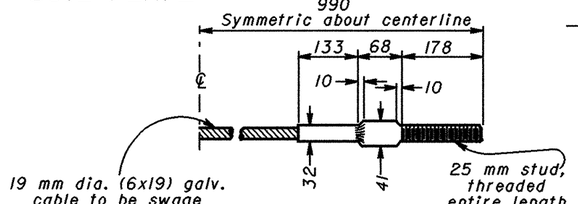
BEARING PLATE



SOIL PLATE

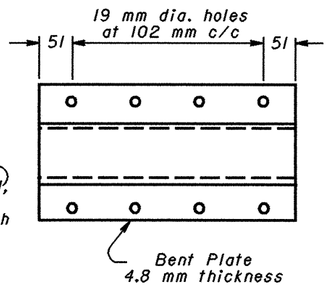


POST SLEEVE

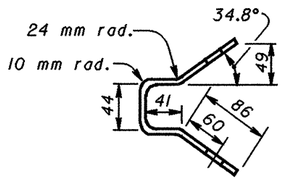


STANDARD SWAGED FITTING AND STUD

CABLE ASSEMBLY



ANCHOR PLATE



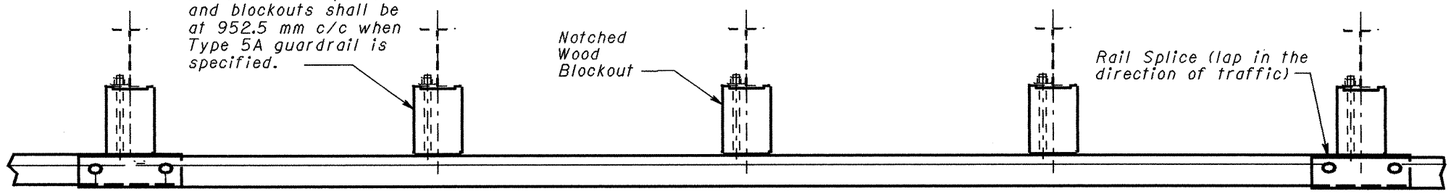
BUREAU OF LOCATION AND DESIGN
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL DETAILS

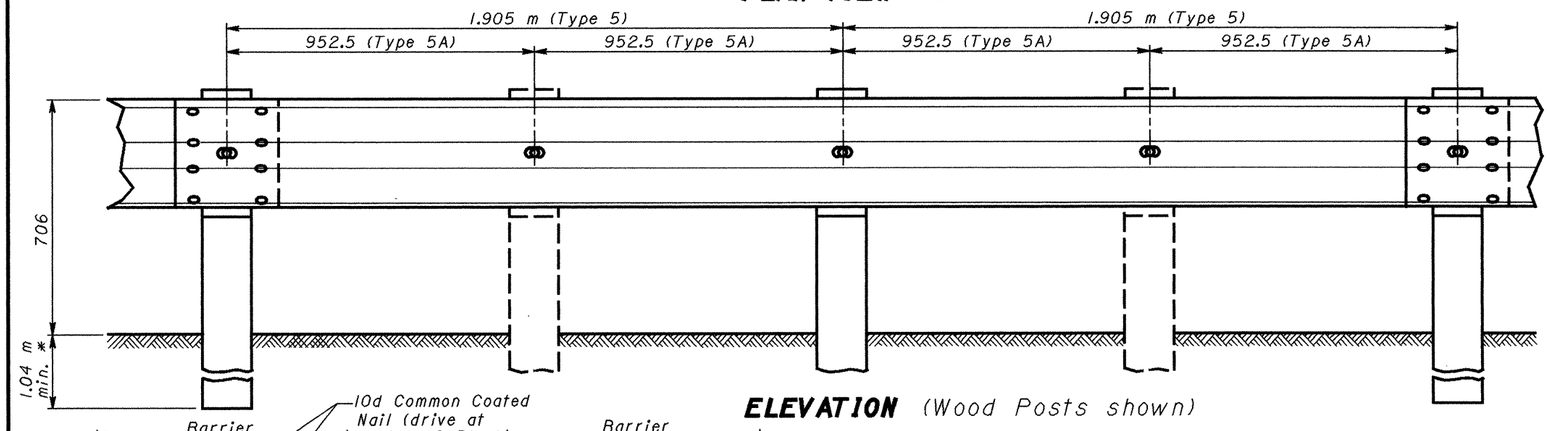
DATE 11-30-94

STANDARD CONSTRUCTION DRAWING **GR-1.3M**

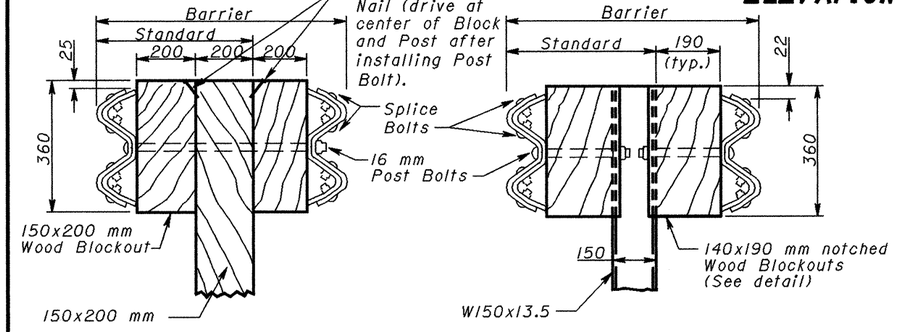
APPROVED R. K. Huhman
ENGR., L & D



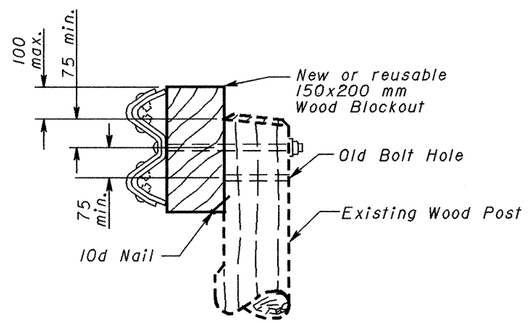
PLAN VIEW (Steel Posts shown)



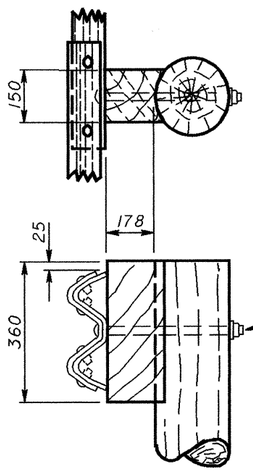
ELEVATION (Wood Posts shown)



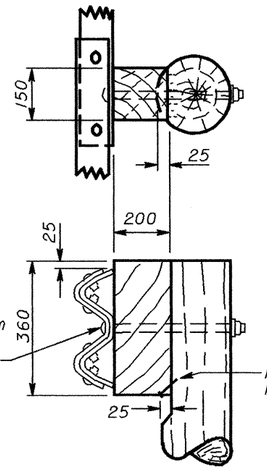
SQUARE WOOD POST **STEEL POST**



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

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.

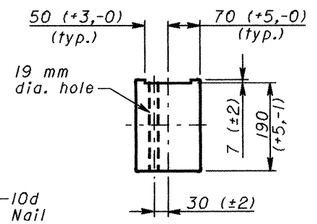
Sec. 12 Beams that have imperfections repaired by welding shall not be accepted for use in Item 606.

Sec. 13 Random samples shall be tested by the Department from materials delivered to the project site or other locations designated by the Laboratory.

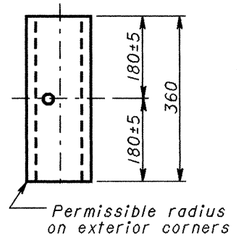
* ***POST EMBEDMENT DEPTH:*** *For specific depth requirements, see SCD GR-1.2M.*

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

All dimensions are in millimeters unless otherwise noted.

metric units

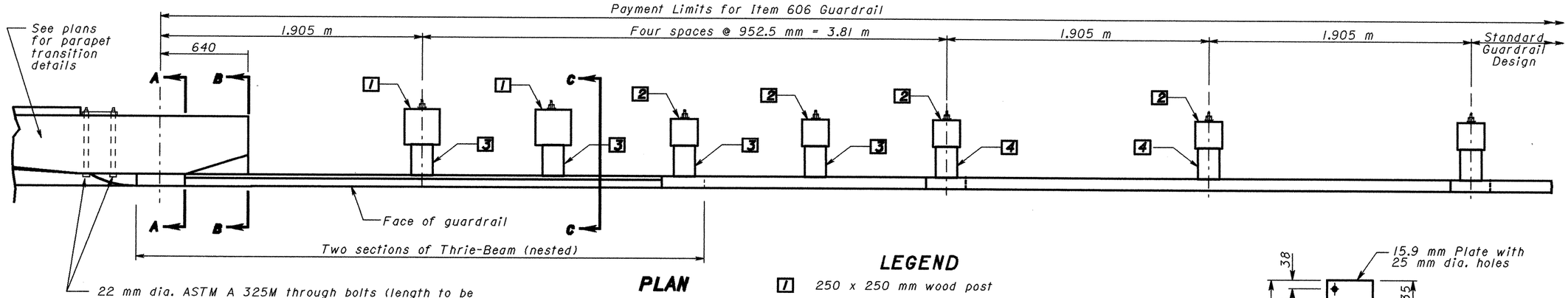
OHIO DEPARTMENT OF TRANSPORTATION

GUARDRAIL TYPE 5 & 5A

DATE
11-30-94
10-21-97
4-14-98

STANDARD CONSTRUCTION DRAWING **GR-2.1M**

APPROVED Leroy F. Sutherland

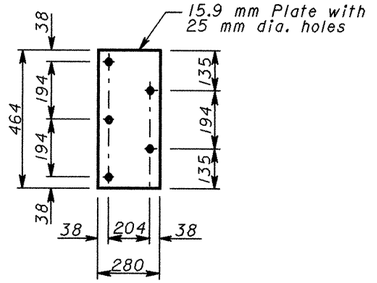


PLAN

22 mm dia. ASTM A 325M through bolts (length to be determined in field in accordance with parapet width) in 25 mm dia.holes with 464 x 280 x 15.9 mm plate with standard washers and hex nuts (See Detail A)

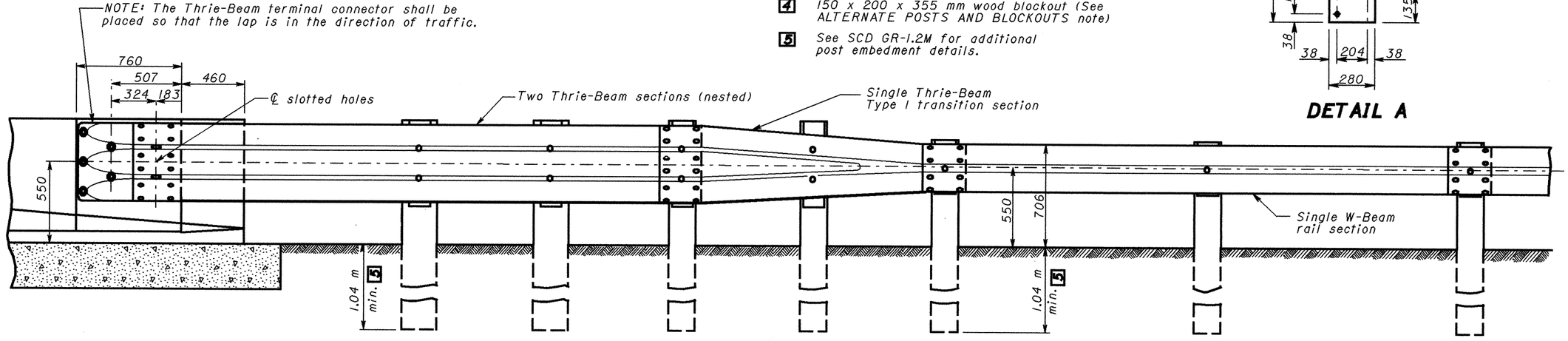
LEGEND

1. 250 x 250 mm wood post
2. 200 x 200 mm wood post
3. 150 x 200 x 570 mm wood blockout (See ALTERNATE POSTS AND BLOCKOUTS note)
4. 150 x 200 x 355 mm wood blockout (See ALTERNATE POSTS AND BLOCKOUTS note)
5. See SCD GR-1.2M for additional post embedment details.



DETAIL A

NOTE: The Thrie-Beam terminal connector shall be placed so that the lap is in the direction of traffic.



ELEVATION

All dimensions are in millimeters unless otherwise noted.

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 I Bridge Terminal Assembly shall be used to connect guardrail runs to bridges having concrete deflector parapet railing. It shall be used to connect guardrail runs to the approach end of bridge parapets or other concrete barrier installations and to anchor guardrail runs to the trailing end of bridge parapets or other concrete barrier installations on undivided, bidirectional highways.

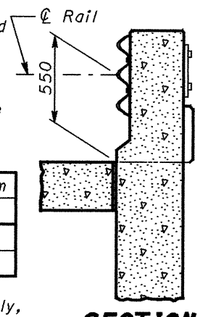
POSTS:
GENERAL - Posts may be set in drilled holes or driven to grade.

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.

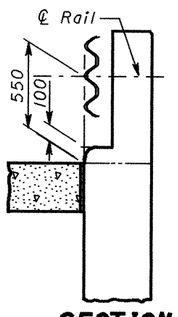
ALTERNATE POSTS AND BLOCKOUTS for Type I Bridge Terminal Assemblies may be furnished according to the following chart. Plastic blockouts shall not be permitted for Type I Bridge Terminal Assemblies.

Wood Posts & Blockouts	250x250 mm	200x200 mm
Steel Posts	W200x35.9	W150x37.1
Wood Blockouts	150x200 mm	
Steel Blockouts	W150x13.5	

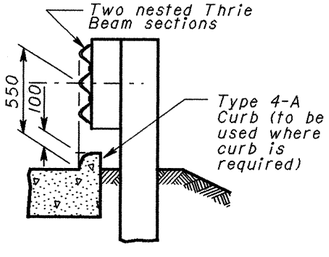
PAYMENT:
Payment for Item 606 - Each, Bridge Terminal Assembly, Type I, shall include the extra cost, in excess of normal guardrail cost, for additional and different type posts and blockouts, nested Thrie-Beam sections, terminal connector, Thrie-Beam transition section, steel plate, bolts, hex nuts, washers, and other hardware.



SECTION A - A



SECTION B - B



SECTION C - C

metric units

This Drawing Replaces GR-3.1.

OHIO DEPARTMENT OF TRANSPORTATION

BRIDGE TERMINAL ASSEMBLY, TYPE 1

DATE
11-30-94
10-21-97

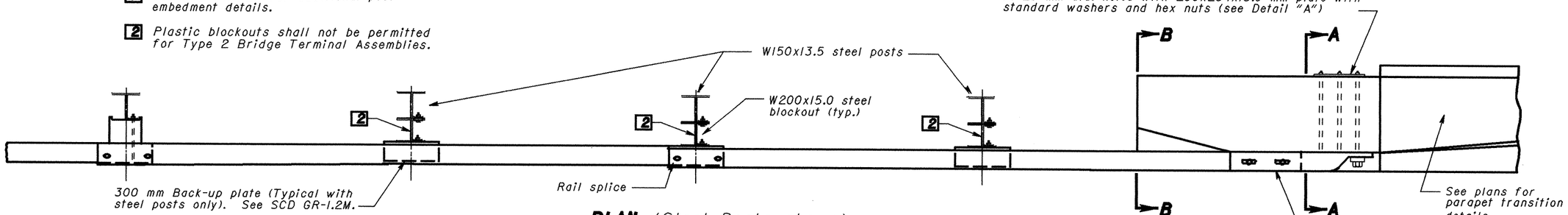
STANDARD CONSTRUCTION DRAWING **GR-3.1M**

APPROVED Dwight F. Rutherford

LEGEND

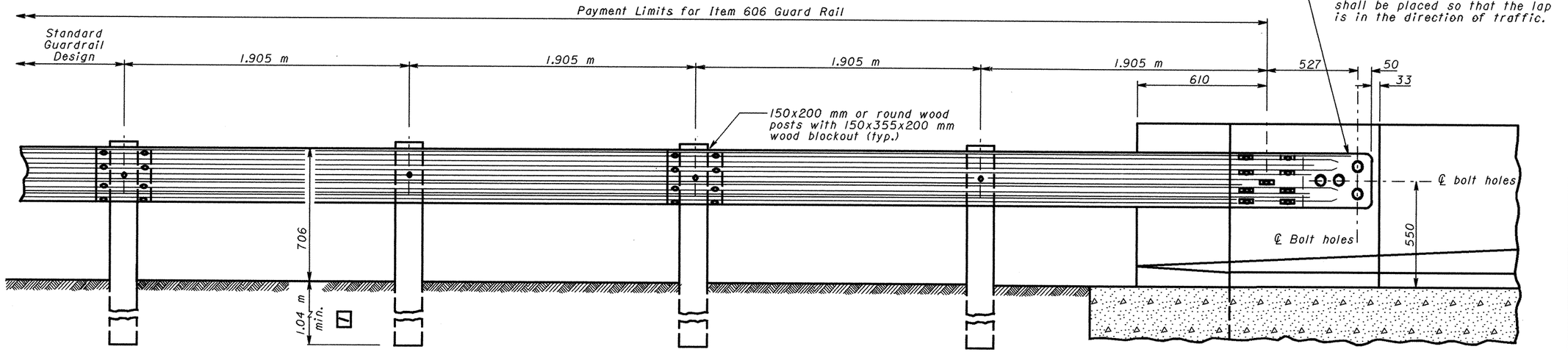
[1] See SCD GR-1.2M for additional post embedment details.

[2] Plastic blockouts shall not be permitted for Type 2 Bridge Terminal Assemblies.



PLAN (Steel Posts shown)

The W-Beam terminal connector shall be placed so that the lap is in the direction of traffic.



ELEVATION (Wood Posts shown)

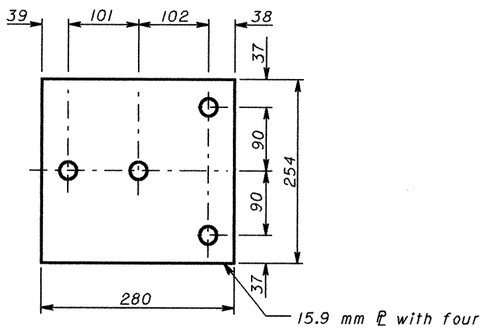
NOTES

GENERAL:
For additional details, see SCD's GR-1.1M, GR-1.2M and other drawings pertaining to the design of specific guardrail types.

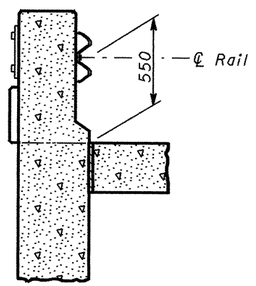
APPLICATION:
The Type 2 Bridge Terminal Assembly shall be used to connect guardrail runs to the trailing end of bridge parapets or other concrete barrier installations on one-direction roadways.

POSTS:
Posts shall be of standard size and material specified for the appropriate type of guardrail to be installed leaving the bridge or barrier.

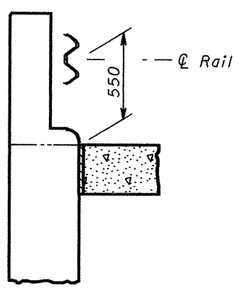
PAYMENT:
Payment for Item 606 - Each, Bridge Terminal Assembly, Type 2 shall include the extra cost, in excess of normal guardrail cost, for the terminal connector, steel blockouts, plates, bolts, hex nuts, washers and other hardware.



DETAIL A



SECTION A - A



SECTION B - B

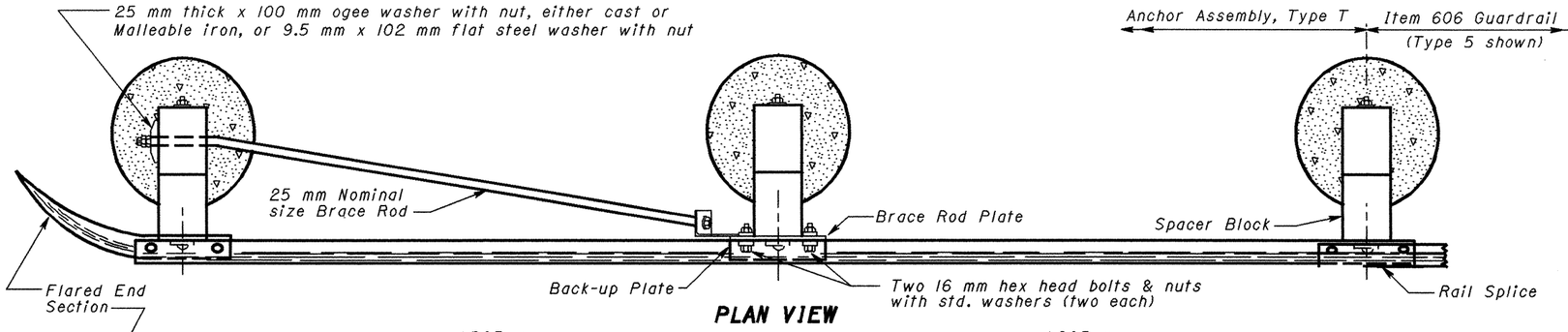
All dimensions are in millimeters unless otherwise noted.

metric units

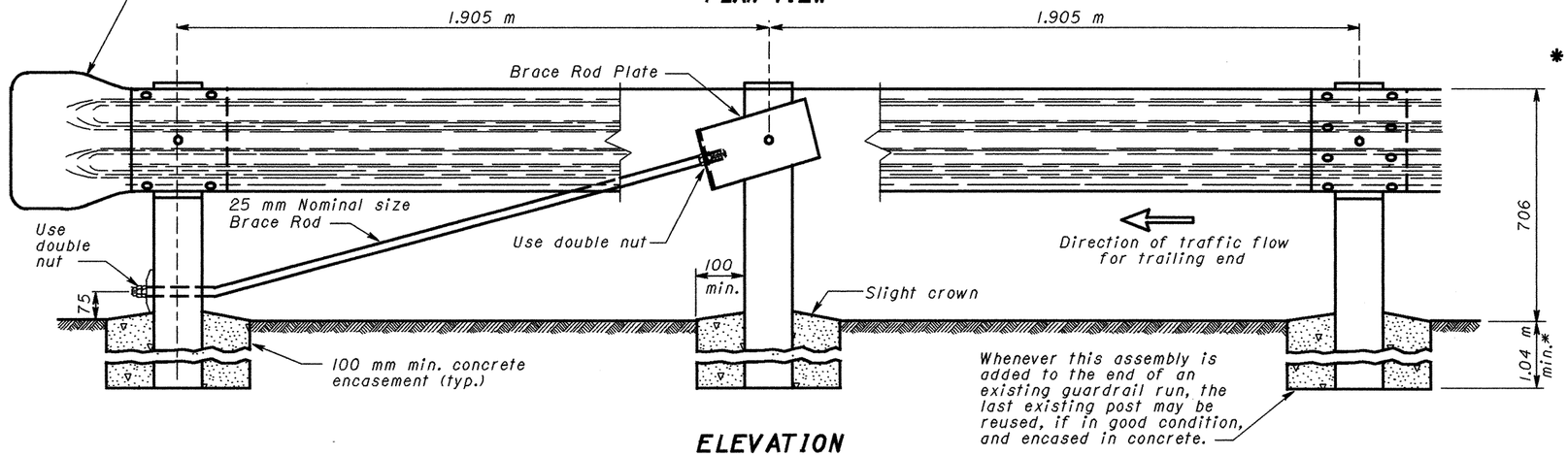
This Drawing Replaces GR-3.2.

OHIO DEPARTMENT OF TRANSPORTATION

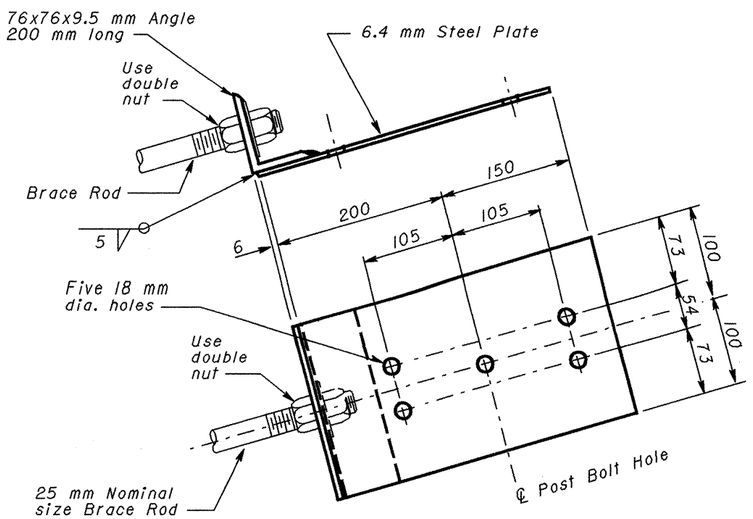
BRIDGE TERMINAL ASSEMBLY, TYPE 2	DATE: 11-30-94, 10-21-97
STANDARD CONSTRUCTION DRAWING GR-3.2M	
APPROVED: Gary F. Sutherland	



PLAN VIEW

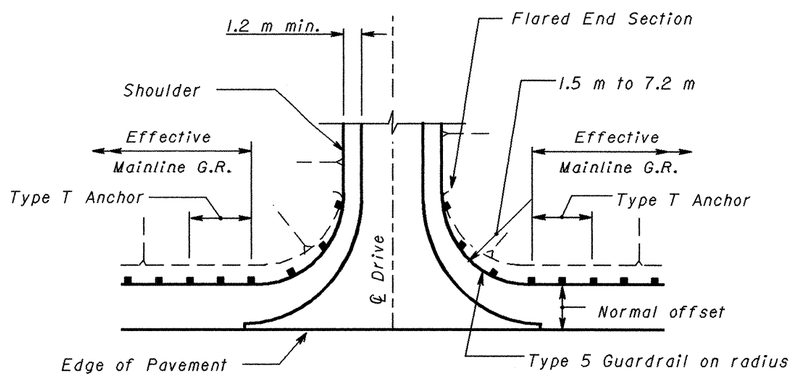


ELEVATION



BRACE ROD PLATE

TYPE T



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.

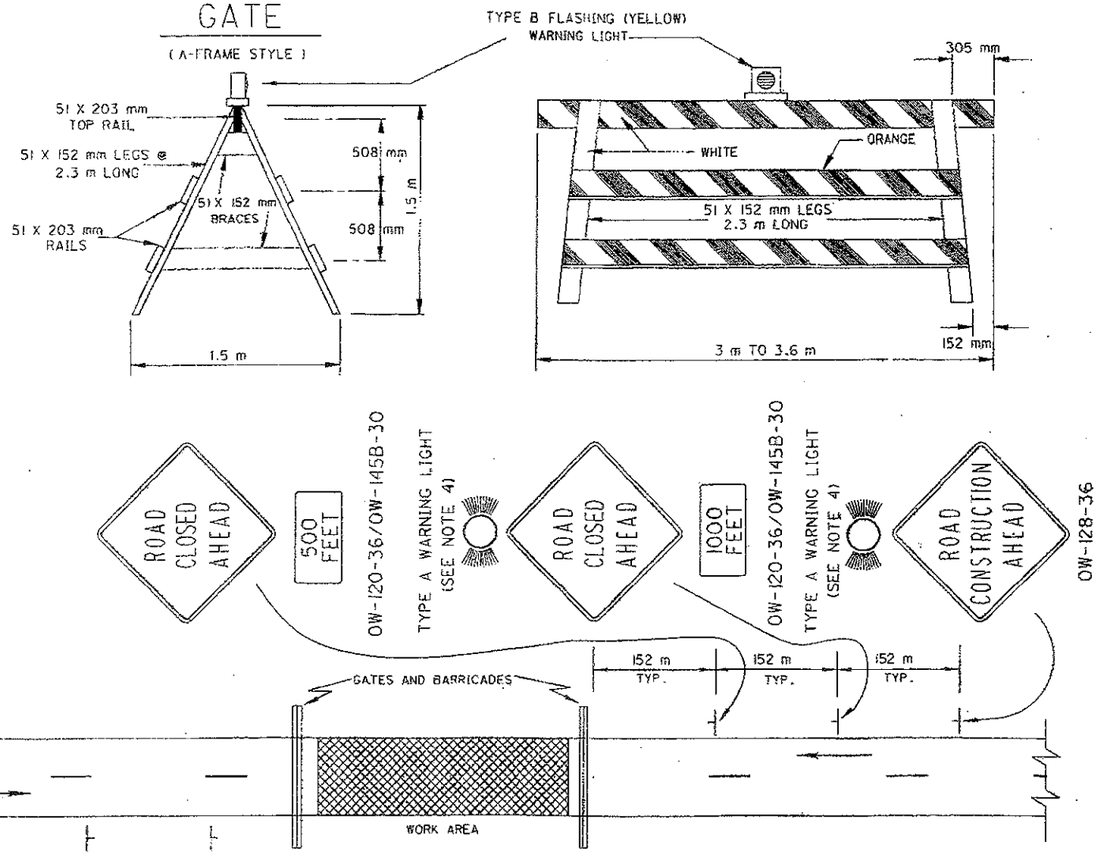
BRACE ROD ASSEMBLY: Rods shall be galvanized and develop a tensile strength of at least 178 kN.

* **FOR SPECIFIC POST EMBEDMENT:** See SCD GR-1.2M for depth requirements.

All dimensions are in millimeters unless otherwise noted.

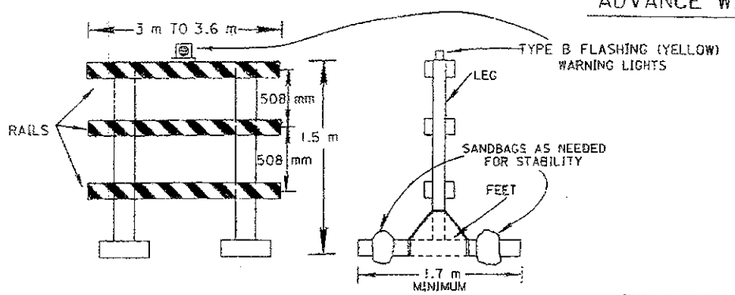
metric units

OHIO DEPARTMENT OF TRANSPORTATION	
TYPE T ANCHOR ASSEMBLY	DATE 4-21-95 10-21-97
STANDARD CONSTRUCTION DRAWING GR-4.2M APPROVED Larry F. Shuppland	

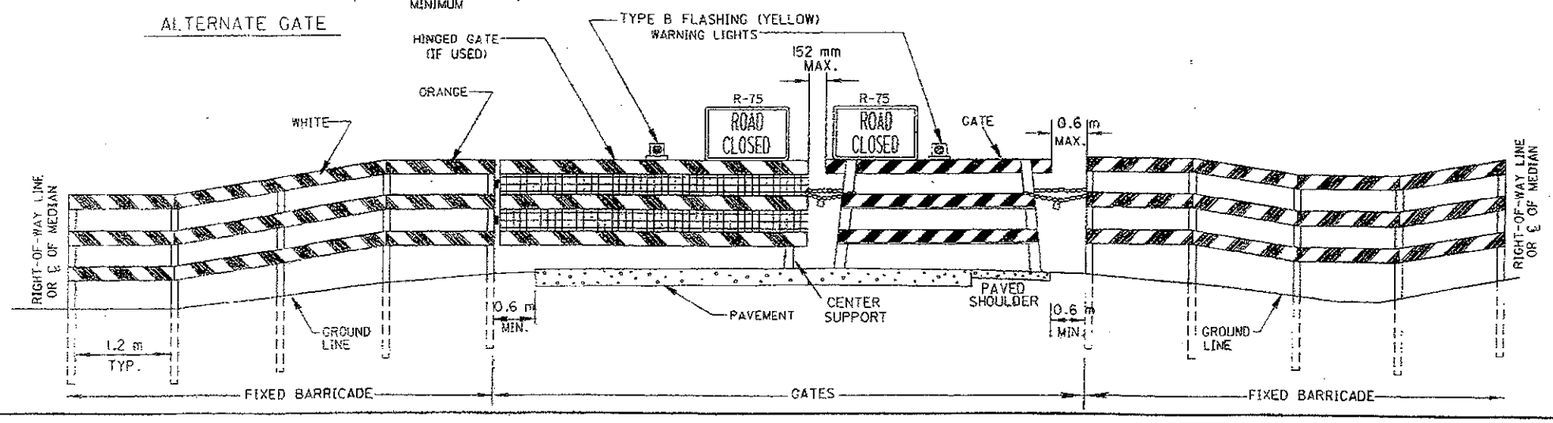


ADVANCE WARNING SIGNS FOR CLOSURE

(SEE NOTE 6)



ALTERNATE GATE



GENERAL NOTES

1. BARRICADES: BARRICADES SHALL BE CONSTRUCTED ACCORDING TO DETAILS SHOWN. WHEN THE ROAD IS CLOSED TO TRAFFIC, BARRICADES AND GATES SHALL BE USED TO EFFECTIVELY CLOSE THE ENTIRE ROADWAY INCLUDING THE MEDIAN OF DIVIDED HIGHWAYS. IN URBAN AREAS AND AT LOCATIONS WHERE IT IS IMPRACTICAL TO EXTEND THE BARRICADE TO THE RIGHT-OF-WAY LINE BECAUSE OF A SIDEWALK WHICH IS TO REMAIN OPEN OR OTHER OBSTRUCTION, THE ENDS OF THE BARRICADE SHALL BE LOCATED AS DIRECTED BY THE ENGINEER TO EFFECT THE DESIRED CLOSING OF THE HIGHWAY.

2. PAINTING AND REFLECTORIZATION: ON CONSTRUCTION OR MAINTENANCE AREAS ALL RAILS OF THE BARRICADES AND GATES SHALL BE REFLECTORIZED WITH ORANGE AND WHITE REFLECTORIZED TYPE G SHEETING IN 152 mm WIDE ALTERNATE STRIPES WHICH SLOPE DOWNWARD TOWARD THE CENTER LINE OF THE ROAD AT AN ANGLE OF 45°. THE TOP RAIL OF THE A-FRAME AND ALL THREE RAILS OF THE HINGED GATE SHALL BE STRIPED ON BOTH SIDES. ALL POST, BRACES, GATE LEGS, AND ANY UNSTRIPED RAILS SHALL BE PAINTED WHITE. (GATES AND BARRICADES USED IN PERMANENT OR SEMIPERMANENT APPLICATION SHALL DIFFER ONLY IN THAT THEY SHALL USE RED AND WHITE STRIPES).

3. GATES: ONE GATE SHALL BE ERECTED FOR EACH TRAFFIC LANE. GATES SHALL BE CHAINED AND PADLOCKED TO ONE ANOTHER AND TO ADJACENT POST OF THE BARRICADES. CHAINS SHALL BE 6.4 mm STOCK OR LARGER WITH WELDED LINKS. A HINGED GATE MAY BE USED AND SHALL BE SUPPORTED AT THE CENTER IN AN APPROVED MANNER.

4. TYPE A FLASHING WARNING LIGHTS:
TYPE A FLASHING WARNING LIGHTS ARE REQUIRED ON THE OW-128 AND THE FIRST OW-120 SIGNS.

5. TYPE B FLASHING WARNING LIGHTS:
EACH GATE SHALL BE EQUIPPED WITH A TYPE B FLASHING WARNING LIGHT, CONSPICUOUSLY VISIBLE AT ALL DISTANCES UP TO 305 m UNDER NORMAL ATMOSPHERIC CONDITIONS. THE LIGHT SHALL BE IN OPERATION AT ALL TIMES DURING THE PERIOD THE HIGHWAY IS CLOSED.

6. SIGNS: WHERE THE ROAD IS CLOSED TO TRAFFIC BY THE ERECTION OF GATES AND BARRICADES, R-75 SIGNS SIGNS SHALL BE MOUNTED ON THE GATES AS SHOWN. THE ADVANCE WARNING SIGNS SHOWN ON THIS DRAWING WILL NOT BE REQUIRED WHEN ALL TRAFFIC HAS BEEN DIRECTED FROM THE ROADWAY AT OR JUST IN ADVANCE OF THE GATES AND BARRICADES SUCH AS ON A LIMITED ACCESS HIGHWAY OR WHEN A TEMPORARY RUNAROUND SIMILAR TO FIGURE C-24 OF THE OHIO MANUAL IS USED. ADVANCE WARNING SIGNS SHALL BE REQUIRED IN ALL OTHER SITUATIONS AND WHEN REQUIRED IN THE PLANS. ADVANCE WARNING SIGNS ON AN APPROACH SHALL CONSIST OF TWO OW-120 SIGNS WITH DISTANCE PLAQUES PLACED ABOUT 152 m AND 305 m FROM THE CLOSURE AND A OW-128 PLACED ABOUT 457 m FROM CLOSURE, THE SIGNS SHALL BE PLACED ON BOTH SIDES OF THE ROAD (DUALLED) FOR 4-LANE DIVIDED HIGHWAYS OR WHEN REQUIRED BY THE PLANS.

7. OPERATION: ON A 2-LANE 2-WAY ROADWAY THE CONTRACTOR WILL NORMALLY OPEN ONLY THE LEFT HAND GATE AS NECESSARY TO ALLOW VEHICLES TO ENTER AND IMMEDIATELY CLOSE IT. BOTH GATES WILL NOT NORMALLY BE OPENED AT THE SAME TIME. THE CONTRACTOR SHALL ASSIGN AN EMPLOYEE TO ASSURE THAT GATES ARE CLOSED AND CHAINED SHUT AT THE END OF EACH WORKDAY.

8. MATERIALS: GATES OR BARRICADES SHALL BE FABRICATED OF THE FOLLOWING MATERIALS:

FIXED BARRICADE:
- POST: - 102 X 102 mm SQUARE OR 127 mm DIA. (MAXIMUM) WOOD (MAY BE TREATED)
  - NO. 3, DRIVE POST (712.20)
  - UP TO 51 mm SQUARE, 14 GAUGE PUNCHED STEEL TUBING
- RAILS: - 25 X 203 mm OR 51 X 203 mm COMMON LUMBER
  - 203 X (16 TO 25 mm) THICK EXTERIOR PLYWOOD
  - EXTRUDED PLASTIC OR FORMED SHEET METAL WITH A 203 mm WIDE SURFACE AND OF SUFFICIENT STIFFNESS TO RESIST TYPICAL WIND LOADS OF UP TO 1436 pascals, BUT HAVING A WEIGHT OF NOT MORE THAN 7.5 kg/m.
- FASTENERS: - SPIKES (OF SUFFICIENT LENGTH TO CLINCH)
  - SCREWS/BOLTS (8 mm MIN. DIA.) METAL GUSSETT PLATES AND FORMED OR WELDED METAL JOINTS OF SUFFICIENT SIZE AND QUANTITY TO RESIST THE WIND LOAD SPECIFIED ABOVE. ALL SLIPFIT CONNECTIONS SHALL ALSO BE BOLTED TO PREVENT UNAUTHORIZED DISASSEMBLY

GATES:
- LEGS: - 51 X 152 mm COMMON LUMBER ("A FRAME" ONLY)
  - 102 X 102 mm WOOD
  - UP TO 51 mm SQUARE, 14 GAUGE PUNCHED STEEL TUBING
  - NO. 3 DRIVE POST (712.20)
- RAILS - 51 X 203 mm COMMON LUMBER
- FASTENERS: (SAME AS BARRICADES ABOVE)
- FEET: - 152 X 152 mm WOOD
  - NO. 3 DRIVE POST (712.20)
  - UP TO 57 mm SQUARE, 12 GAUGE PUNCHED STEEL TUBING
- BRACES: - 51 X 152 mm (MAXIMUM) COMMON LUMBER
  - 102 mm WIDE X 19 mm THICK PLYWOOD STRIPS
  - NO. 2 DRIVE POST (712.20)

HINGED GATE:
- GATE: - 3.6 m X 1.2 m STEEL FRAME, FARM GATE
- RAILS: (SAME AS FIXED BARRICADES ABOVE)
- HARDWARE: - HINGED SCREWHOOKS FOR HANGING GATE TO POST

9. LUMBER: LUMBER USED IN THE CONSTRUCTION OF GATES AND BARRICADES SHALL BE COMMON YELLOW PINE OR COMMON DOUGLAS FIR, SURFACED ON FOUR SIDES STANDARD, ALL SIZES ARE NOMINAL.

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

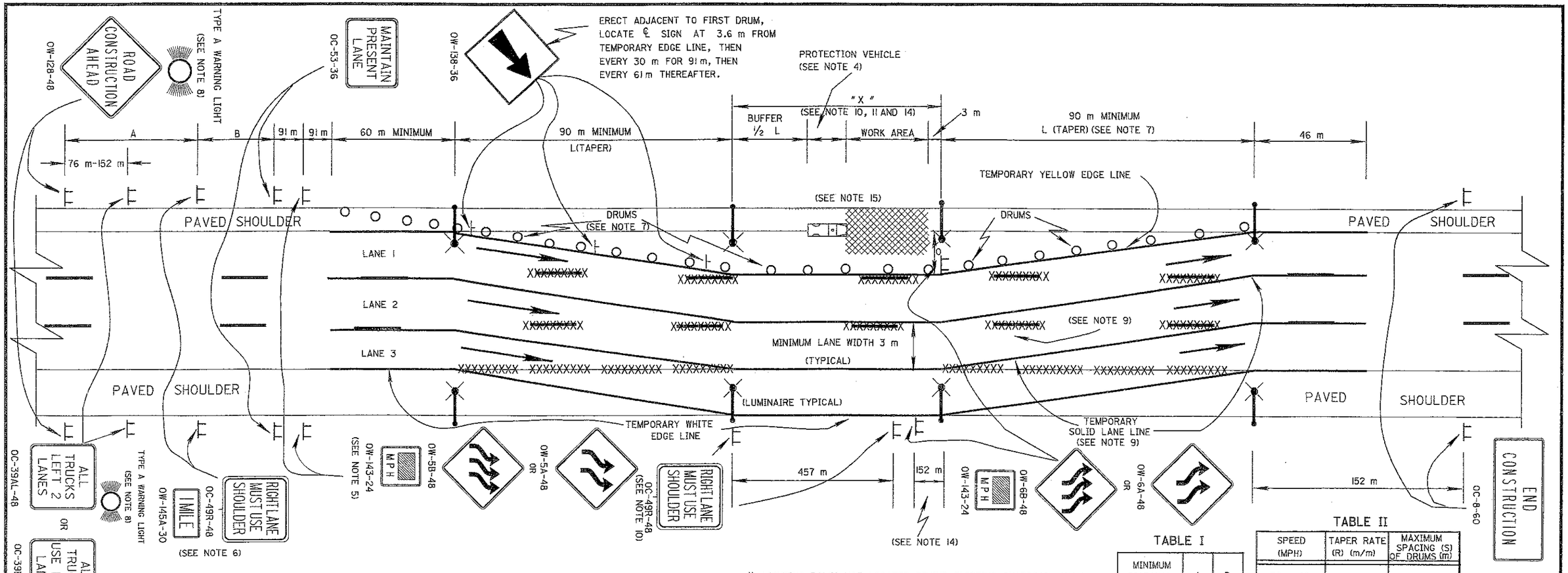
DATE 04/25/94

GATES AND BARRICADES IN POSITION

STANDARD CONSTRUCTION DRAWING MT-101.60M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THE LOCATION OF THE TRANSITION TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THIS TRAFFIC CONTROL PLAN SHOULD BE USED WHEN THE WORK AREA EXTENDS INTO EITHER THE RIGHT OR LEFT HAND LANE OF A MULTIPLE LANE DIVIDED HIGHWAY AND IT IS NOT DESIRABLE, FOR CAPACITY REASONS, TO REDUCE THE NUMBER OF AVAILABLE LANES. THE MINIMUM RESULTANT WIDTH OF ANY LANE IS 3 m. THE PLAN SHOWN IS FOR A LEFT-LANE CLOSURE. WHEN THERE IS A RIGHT-LANE CLOSURE, MAKE THE FOLLOWING SIGN SUBSTITUTIONS: AN OC-49L, FOR THE OC-49R: AN OC-39AR, FOR THE OC-39AL: AN OW-6A OR OW-6B FOR THE OW-5A OR OW-5B: AND AN OW-5A OR OW-5B FOR THE OW-6A OR OW-6B.

4. 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 VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER 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 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 400 m.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE PAVEMENT TAPER (L). DISTANCES LESS THAN 1 MILE MAY BE EXPRESSED IN FEET.

7. THE TAPER RATE OF DRUMS SHALL BE BASED UPON THE AVERAGE APPROACH SPEED OR SPEED LIMIT WHICHEVER IS GREATER AND SHALL BE (R) AS SHOWN IN TABLE II. EXCEPT THAT THE RESULTING LENGTH OF TAPER SHOULD NOT BE LESS THAN 90 m MIN. THE TAPER (L) SHALL EQUAL THE TAPER RATE (R) MULTIPLIED BY THE OFFSET (O). A MINIMUM OF FIVE CHANNELIZING DEVICES SHALL BE USED TO FORM TAPER ON THE SHOULDER.

8. THE TYPE A FLASHING WARNING LIGHTS SHOWN ON OW-128 SIGNS AND OC-39AL SIGNS ARE REQUIRED.

9. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPM'S) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY LINES SHALL BE APPLIED. TEMPORARY 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, TEMPORARY MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED.

10. THE MAXIMUM SPACING OF THE OC-49R, NEAR THE WORK AREA IS 457 m. WHEN THE DISTANCE "X" IS LESS THAN 518 m THE SECOND OC-49R SHOULD BE DELETED. ALSO IF IT WOULD BE WITHIN 61 m OF THE OW-6A OR OW-6B SIGN THE OC-49R SIGN SHOULD BE DELETED.

11. LIGHTING POLES NOT LOCATED BEHIND EXISTING GUARDRAIL SHALL BE SET BACK 12.0 m FROM EDGE OF THE NEAREST TRAFFIC LANE (INCLUDING ANY SHOULDER OR TEMPORARY PAVEMENT USED AS A TRAFFIC LANE). WHERE LOCAL CONDITIONS PREVENT THE 12.0 m SET BACK, IT MAY BE REDUCED TO 9.0 m WITH THE APPROVAL OF THE ENGINEER. WHEN LOCATED BEHIND EXISTING GUARDRAIL, LIGHT POLES SHALL BE A MINIMUM OF .9 m CLEAR FROM BACK OF GUARDRAIL POST TO FACE OF POLE. ANY POLES PROVIDED FOR POWER SERVICE SHALL BE SET BACK AT LEAST AS FAR AS THE LIGHTING POLES. SPACING AND TYPE OF LUMINAIRES SHALL PROVIDE AN AVERAGE ILLUMINATION OF 10.8 lux TO 12.9 lux WITH MAXIMUM UNIFORMITY RATIOS OF 4:1 AVERAGE TO MINIMUM AND 10:1 MAXIMUM TO MINIMUM THROUGHOUT THE LIGHTED AREA. WHEN TAPERS ARE REQUIRED TO BE LIGHTED AND DIMENSION "X" IS LESS THAN 610 m LIGHTING SHALL BE CONTINUOUS BETWEEN TAPERS.

12. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

14. IF DISTANCE "X" IS LESS THAN 305 m, PLACE THE OW-6A OR OW-6B SIGN AT THE MID POINT OF DISTANCE "X".

15. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	A	B
MAJOR STANDARD	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488

TABLE II

SPEED (MPH)	TAPER RATE (R) (m/m)	MAXIMUM SPACING (S) OF DRUMS (m)
30 - 40	14:1	12
45 - 55	28:1	12
60 - 65	33:1	18

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

TRANSITION PLAN FOR USE OF SHOULDER WITH DRUMS

STANDARD CONSTRUCTION DRAWING **MT-102.20M**

APPROVED Gary L. Cassar ENGR. OF DESIGN SERVICES

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 51mm 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)

METRIC

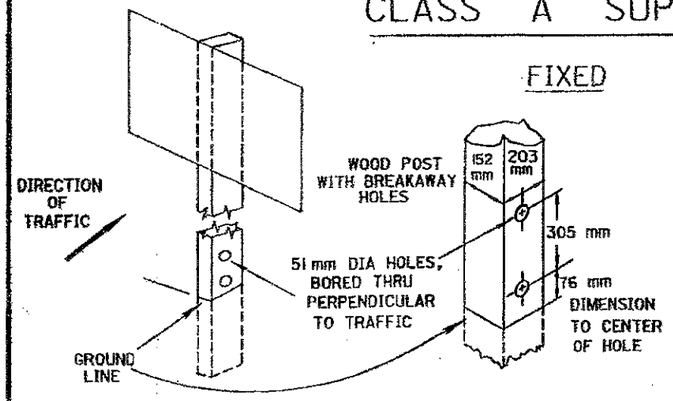
BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

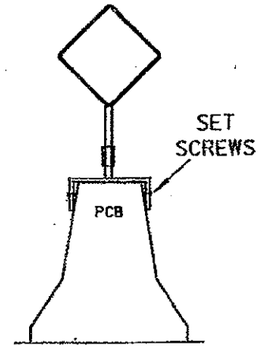
MAINTENANCE OF TRAFFIC	DATE 04/25/94
TEMPORARY SIGN SUPPORT	
STANDARD CONSTRUCTION DRAWING MT-105.10M	
APPROVED Jay Braga ENGR. OF DESIGN SERVICES	

WCC

CLASS A SUPPORTS

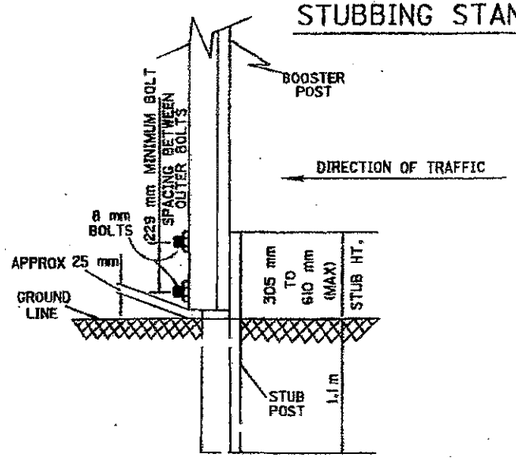
FIXED





CLASS A SUPPORTS

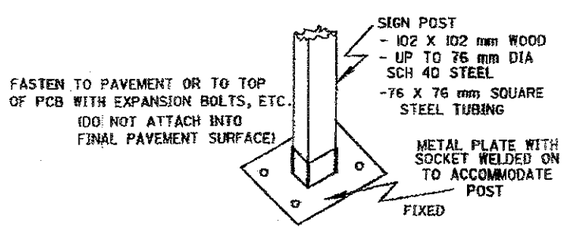
STUBBING STANDARD

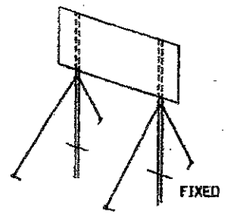


NOTES

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

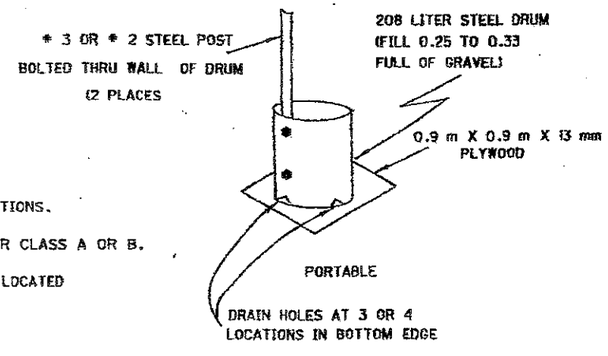
CLASS B SUPPORTS





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).

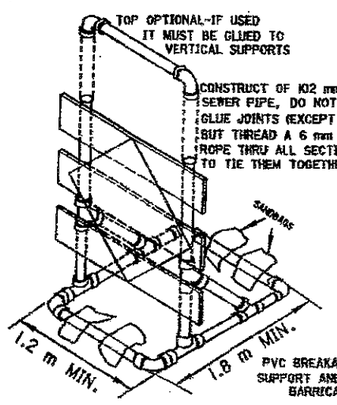
CLASS C SUPPORTS

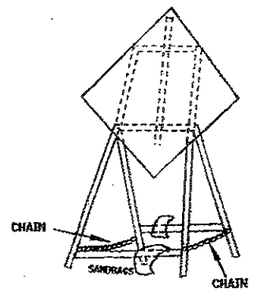


1. ALL BEAM TYPE SUPPORTS WITHOUT BREAKAWAY CONNECTIONS.
2. SUPPORTS SIMILAR TO BUT LARGER THAN PERMITTED FOR CLASS A OR B.
3. THE STEEL DRUM(S) SHOWN BELOW MAY BE USED ONLY WHEN LOCATED BEHIND GUARDRAIL OR BARRIER.

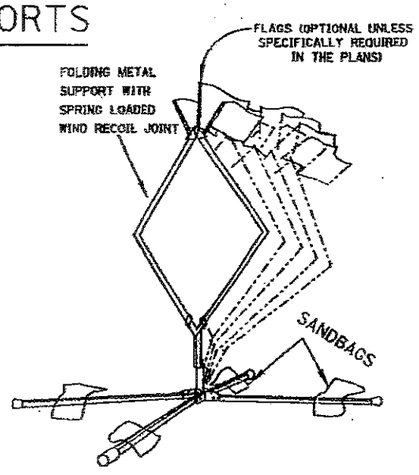
CLASS A SUPPORTS

PORTABLE





EASEL



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

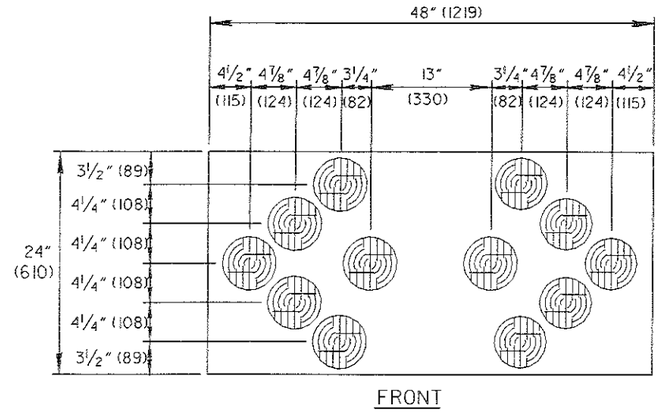
DATE 04/25/94

TEMPORARY SIGN SUPPORT

STANDARD CONSTRUCTION DRAWING MT-105.11M

APPROVED Daryl Cuse ENGR. OF DESIGN SERVICES

WCC



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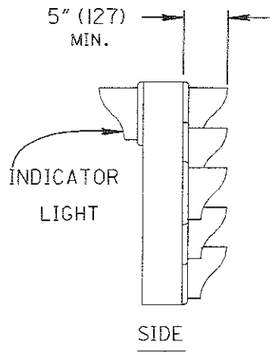
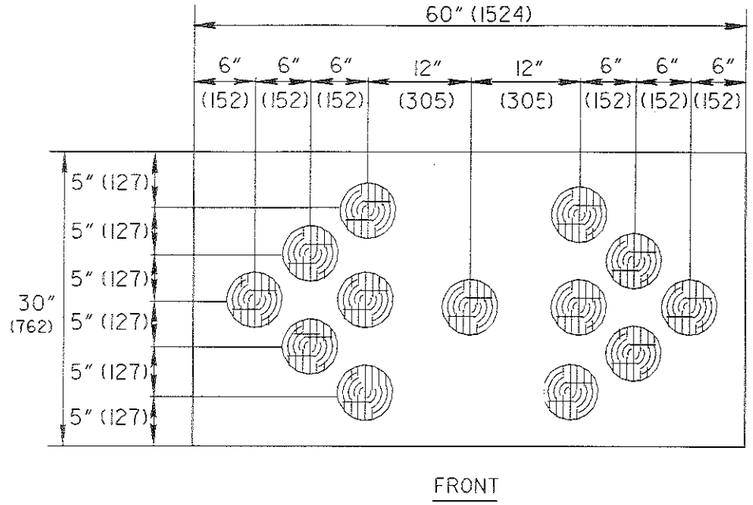
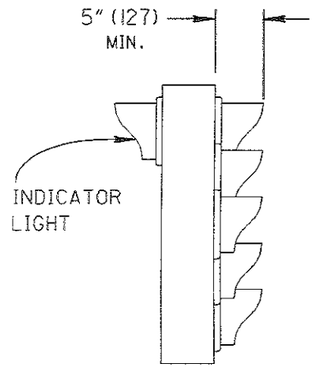


SIDE

TYPE A PANEL

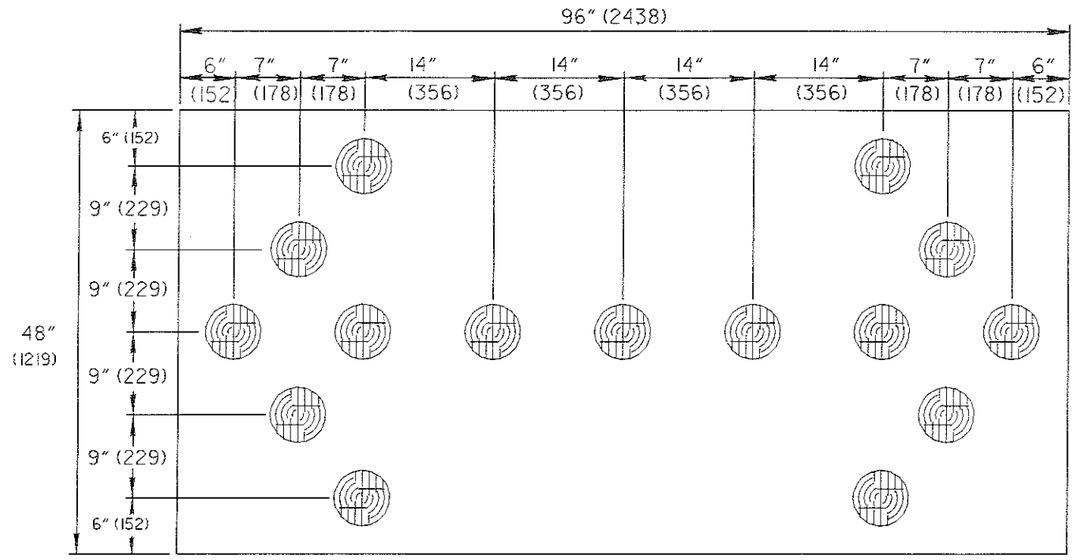


FRONT



SIDE

TYPE B PANEL



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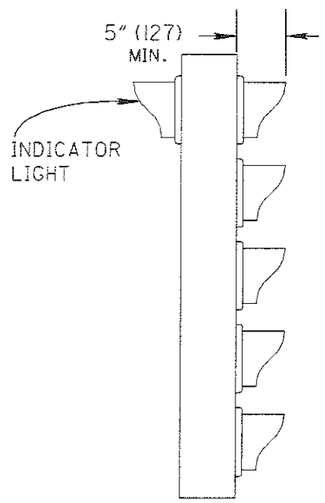


SIDE

TYPE C PANEL

ALL DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

4-20-01

FLASHING ARROW PANEL

OFFICE OF TRAFFIC ENGINEERING

MT-35.10

FLASHING ARROW PANEL

The flashing arrow panel shall consist of the following components:

A. flasher panel

B. lamps

C. controls

D. power supply

E. mounting

A. Flasher panel

The flasher panel shall be of exterior type plywood or corrosion resistant metal construction of adequate design and strength. The panel finish shall be flat black.

A flasher panel shall be one of three sizes. The type A panel shall be a nominal 24" (610 mm) high by 48" (1219 mm) wide. Type B shall be a nominal 30" (762 mm) high by 60" (1524 mm) wide. Type C shall be a nominal 48" (1219 mm) high by 96" (2438 mm) wide.

Flashing arrow panels shall normally utilize high output (4412A and 4415A) lamps powered by an engine driven generator when permitted by the plans. The contractor may also furnish units powered by a solar array and batteries or only batteries. However, these units shall not be used where the approaching traffic would be on a horizontal curve in excess of 3 degrees. These units shall not be used if the approaching traffic, closer tha 1 mile (1.6 km) [1/2 mile (.8 km) where speed limits are less than 40 MPH], is more than 5½ degrees horizontally or 2 degrees vertically from the central axis of the lens units.

B. Lamps

For engine powered generator units, lamps shall be ANSI Number 4412a (PAR 46) for type B and C and 4415a (PAR 36) for type A. The lamp shall be fitted with an upper hood of not less than 180° at least 5 " (127 mm) long. Arrow panels may use a lower power (wattage) lamp than the standard arrow panels. The lamps shall be approximately 5" (127 mm) diameter with a parabolic reflector. The lamp shall provide improved light distribution control by means of high quality reflectors and refractors. The light output from each lamp of the arrow shall not be less than shown in figure 1 when operating at full daytime brightness.

The lamps shall be securely mounted and positioned in the panel perpendicular to the panel face and oriented so that the lamp location lug (on back of the lamp) is on the horizontal center line through the lens. The lug will be on the right side of the lamp as viewed from the front.

The lamps shall be wired in circuits that can be switched to display any one of the folowing messages: left arrow, right arrow, left and right, and caution bar. A minimum of three indicator lights shall be placed on the back of the panel to indicate which message mode is in operation.

Each panel shall contain the following number of lamps as a minimum: type A-12 lamps, type B-13 lamps, type C-15 lamps.

CANDLE POWER CHART

				100					4°
		100	150	200	150	100			2°
100	150	200	250	350	250	200	150	100	0° HORIZONTAL
		100	150	200	150	100			- 2°
				100					- 4°
10°	7.5°	5°	2.5°	0°	2.5°	5°	7.5°	10°	
LEFT				CENTER				RIGHT	

(1) Measurements expressed in candela.
(2) Color of output light shall be yellow to light yellow.

Figure 1

C. Controls

Each flashing arrow panel shall contain a flasher control and a dimmer control unit housed in a cabinet which can be locked.

1. Flasher control

The flash rate for the sign panel shall be 25 to 40 flashes per minute. The flasher shall not cause electromagnetic interference. The lamps shall have a minimum "on time" of 50% and a maximum of 66%.

2. Dimmer control

Lamp intensity shall be variable by means of a photoelectrically controlled circuit which shall reduce lamp output during low ambient light conditions. Lamp intensity shall be at the nighttime level whenever the ambient illumination is in or below the range 2 foot-candle (21 lux) to 5 foot-candle (54 lux) and shall be at daytime level when ambient illumination is in or above the range 5 foot-candle (54 lux) to 10 foot-candle 108 (lux). If controls provide for continuous adjustment of lamp intensity with respect to ambient illumination, then lamp intensity shall increase linearly from nightime intensity at 5 foot-candle (54 lux) to daytime intensity at 3250 foot-candle (35,000 lux). A time delay shall be built into the control to prevent false operation due to light flashes. The photoelectric control shall contain a switch which shall override the photoelectric control.

D. Power supply

The flashing arrow panel shall operate from power sources capable of continuously furnishing the proper voltage to the lamps a minimum of 24 hours without attendance.

D. Cont.

Motor generators, if used shall be of modern design to provide low emission of pollutants and shall be properly muffled. The motor generator shall be enclosed in a mesh enclosure which can be locked. The fuel tank shall have a cap which can be locked. Motor generators supplying power to a flashing arrow sign shall not be used to supply power to other equipment. Gasoline fueled engines shall not be used.

Battery and solar/battery units shall have a no-charge-life of not less than 15 days. No-charge-life is the number of consecutive days that the system can continue to function (double arrow mode, normal dimming during 12 hour night, full output during 12 hour day) starting with a full battery charge and with no additional charge being provided by the solar cells. The no-charge-life may be based upon calculations providing that manufacturer's ratings and efficiency calculations are furnished for each major component.

E. Mounting

The flashing arrow panel may be trailer or vehicle mounted or mounted on a rigid supporting device suitable for maintaining it in the designated position. Each of the mounting methods shall be suitably stable such as to prevent movement due to high winds or passage of large vehicles.

When a trailer is used, construction shall be such as to transport the flashing arrow panel and appurtances adequately and legally as well as support them properly during operation. The trailer shall be equipped with devices which shall provide leveling and stability during operation.

Minimum arrow panel mounting height shall be 7 feet (2.1 m) above the pavement surface (measured to the bottom of the panel).

Use and operation

The flashing arrow panel shall be located as shown in the maintainence of traffic drawings or as directed by the Engineer and operated continuously during traffic maintained periods. The Contractor shall supply all fuel, lubricants and parts necessary to obtain continuous operation and shall provide all service. The Contractor shall inspect the operation of the unit daily, including weekends and holidays. The Contractor shall arrange with the Engineer, an acceptable method of obtaining service for a malfunctioning panel within 30 minutes of a reported malfunction. Lamp intensity shall be adjusted to provide minimum legibility distances of ½ mile (.8 km) type A, ¾ mile (1.21 km) type B and 1 mile (1.6 km) type C.

Type C panels shall be used for stationary operations on high speed 55 MPH or greater, high volume roadways. Type B shall be used for stationary operations on intermediate speed 40-50 MPH facilities, and type A on low speed 20-35 MPH facilities.

In addition, type B panels shall be used for moving operations on freeways and expressways and type A for moving operations on other facilities.

Battery and solar/battery units shall be fully charged when first set up. They shall have gauges to indicate approximate battery charge remaining. The Contractor shall verify daily that the unit is operating satisfactorily and the remaining battery charge is sufficient for at least 2 more days.

Flashing arrow panels are not to be used on two lane-two way roadways.

When left unattended the control cabinet, motor generator enclosure and fuel tank shall be locked.

Type A and type B panels used in moving operations may be powered by the vehicle's electrical system but shall not be left unattended when so powered.

When not in use, the flashing arrow panel shall be stored at a location which will not be hazardous to traffic or pedestrians.

The panels shall be designed for operation in 100% humidity and temperatures from -20 to + 130 degrees Fahrenheit (-29 to + 54 degrees Celsius).

FLASHING ARROW PANEL

THE FLASHING ARROW PANEL SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FLASHER PANEL

B. LAMPS

C. CONTROLS

D. POWER SUPPLY

E. MOUNTING

A. FLASHER PANEL

THE FLASHER PANEL SHALL BE OF EXTERIOR TYPE PLYWOOD BY CORROSION RESISTANT METAL CONSTRUCTION OF ADEQUATE DESIGN AND STRENGTH. THE PANEL FINISH SHALL BE FLAT BLACK.

A FLASHER PANEL SHALL BE ONE OF THREE SIZES. THE TYPE A PANEL SHALL BE A NOMINAL 610 MILLIMETERS HIGH BY 1219 MILLIMETERS WIDE. TYPE B SHALL BE A NOMINAL 762 MILLIMETERS HIGH BY 1524 MILLIMETERS WIDE. TYPE C SHALL BE A NOMINAL 1219 MILLIMETERS HIGH BY 2438 MILLIMETERS WIDE.

FLASHING ARROW PANELS, SHALL NORMALLY UTILIZE HIGH OUTPUT (4412A AND 4415A) LAMPS POWERED BY AN ENGINE DRIVEN GENERATOR WHEN PERMITTED BY THE PLANS. THE CONTRACTOR MAY ALSO FURNISH UNITS POWERED BY A SOLAR ARRAY AND BATTERIES OR ONLY BATTERIES; HOWEVER THESE UNITS SHALL NOT BE USED WHERE THE APPROACHING TRAFFIC WOULD BE ON A HORIZONTAL CURVE IN EXCESS OF 3 DEGREES. THESE UNITS SHALL NOT BE USED IF THE APPROACHING TRAFFIC, CLOSER THAN 1.6 km (.8 km WHERE SPEED LIMITS ARE LESS THAN 64 km/h), IS MORE THAN 5½ DEGREES HORIZONTALLY OR 2 DEGREES VERTICALLY FROM THE CENTRAL AXIS OF THE LENSE UNITS.

B. LAMPS

FOR ENGINE POWERED GENERATOR UNITS, LAMPS SHALL BE ANSI NUMBER 4412A (PAR 46) FOR TYPE B AND C AND 4415A (PAR 36) FOR TYPE A. THE LAMP SHALL BE FITTED WITH AN UPPER HOOD OF NOT LESS THAN 180° AT LEAST 127 MILLIMETERS LONG. ARROW PANELS MAY USE A LOWER POWER (WATTAGE) LAMP THAN THE STANDARD ARROW PANELS. THE LAMPS SHALL BE APPROXIMATELY 127 MILLIMETER DIAMETER WITH A PARABOLIC REFLECTOR. THE LAMP SHALL PROVIDE IMPROVED LIGHT DISTRIBUTION CONTROL BY MEANS OF HIGH QUALITY REFLECTORS AND REFRACTORS. THE LIGHT OUTPUT FROM EACH LAMP OF THE ARROW SHALL NOT BE LESS THAN SHOWN IN FIGURE I WHEN OPERATING AT FULL DAYTIME BRIGHTNESS:

THE LAMPS SHALL BE SECURELY MOUNTED AND POSITIONED IN THE PANEL PERPENDICULAR TO THE PANEL FACE AND ORIENTED SO THAT THE LAMP LOCATION LUG (ON BACK OF THE LAMP) IS ON THE HORIZONTAL CENTER LINE THROUGH THE LENS. THE LUG WILL BE ON THE RIGHT SIDE OF THE LAMP AS VIEWED FROM THE FRONT.

THE LAMPS SHALL BE WIRED IN CIRCUITS THAT CAN BE SWITCHED TO DISPLAY ANY ONE OF THE FOLOWING MESSAGES: LEFT ARROW, RIGHT ARROW, LEFT AND RIGHT, AND CAUTION BAR. A MINIMUM OF THREE INDICATOR LIGHTS SHALL BE PLACED ON THE BACK OF THE PANEL TO INDICATE WHICH MESSAGE MODE IS IN OPERATION.

EACH PANEL SHALL CONTAIN THE FOLLOWING NUMBER OF LAMPS AS A MINIMUM: TYPE A-12 LAMPS, TYPE B-13 LAMPS, TYPE C-15 LAMPS.

LUX POWER CHART

		215	215	215			4°
108	1076	1614	2152	1614	1076	108	2°
215	2152	4304	5380	4304	2152	215	0° HORIZONTAL
108	1076	1614	2152	1614	1076	108	- 2°
		215	215	215			- 4°
7.5°	5°	2.5°	0°	2.5°	5°	7.5°	

LEFT CENTER RIGHT

FIGURE 1

(1) MEASUREMENTS EXPRESSED IN LUX.

(2) COLOR OF OUTPUT LIGHT SHALL BE YELLOW TO LIGHT YELLOW.

C. CONTROLS

EACH FLASHING ARROW PANEL SHALL CONTAIN A FLASHER CONTROL AND A DIMMER CONTROL UNIT HOUSED IN A CABINET WHICH CAN BE LOCKED.

1. FLASHER CONTROL

THE FLASH RATE FOR THE SIGN PANEL SHALL BE 25 TO 40 FLASHES PER MINUTE. THE FLASHER SHALL NOT CAUSE ELECTROMAGNETIC INTERFERENCE. THE LAMPS SHALL HAVE A MINIMUM "ON TIME" OF 50% AND A MAXIMUM OF 66%.

2. DIMMER CONTROL

LAMP INTENSITY SHALL BE VARIABLE BY MEANS OF A PHOTOELECTRICALLY CONTROLLED CIRCUIT WHICH SHALL REDUCE LAMP OUTPUT DURING LOW AMBIENT LIGHT CONDITIONS. THE PHOTOELECTRIC CONTROL SHALL BE CALIBRATED TO ACTUATE A LAMP DIMMING CIRCUIT AT 22 TO 54 AMBIENT LUX AND TO RESTORE THE LIGHTS TO NORMAL AT 54 TO 108 AMBIENT LUX. A TIME DELAY SHALL BE BUILT INTO THE CONTROL TO PREVENT FALSE OPERATION DUE TO LIGHT FLASHES. THE PHOTOELECTRIC CONTROL SHALL CONTAIN A SWITCH WHICH SHALL OVERRIDE THE PHOTOELECTRIC CONTROL. THE DIMMING CIRCUIT SHALL BE EXTERNALLY ADJUSTABLE SUCH THAT THE LIGHT OUTPUT MAY BE ADJUSTED WITHIN THE RANGE OF 50% TO 100% OF THE NORMAL LAMP OUTPUT. IT SHALL NORMALLY BE SET AT 50% UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

D. POWER SUPPLY

THE FLASHING ARROW PANEL SHALL OPERATE FROM POWER SOURCES CAPABLE OF CONTINUOUSLY FURNISHING THE PROPER VOLTAGE TO THE LAMPS A MINIMUM OF 24 HOURS WITHOUT ATTENDANCE.

D. CONT.

MOTOR GENERATORS, IF USED SHALL BE OF MODERN DESIGN TO PROVIDE LOW EMISSION OF POLLUTANTS AND SHALL BE PROPERLY MUFFLED. THE MOTOR GENERATOR SHALL BE ENCLOSED IN A MESH ENCLOSURE WHICH CAN BE LOCKED. THE FUEL TANK SHALL HAVE A CAP WHICH CAN BE LOCKED. MOTOR GENERATORS SUPPLYING POWER TO A FLASHING ARROW SIGN SHALL NOT BE USED TO SUPPLY POWER TO OTHER EQUIPMENT. GASOLINE FUELED ENGINES SHALL NOT BE USED.

BATTERY AND SOLAR/BATTERY UNITS SHALL HAVE A NO-CHARGE-LIFE OF NOT LESS THAN 15 DAYS. NO-CHARGE-LIFE IS THE NUMBER OF CONSECUTIVE DAYS THAT THE SYSTEM CAN CONTINUE TO FUNCTION (DOUBLE ARROW MODE, NORMAL DIMMING DURING 12 HOUR NIGHT, FULL OUTPUT DURING 12 HOUR DAY) STARTING WITH A FULL BATTERY CHARGE AND WITH NO ADDITIONAL CHARGE BEING PROVIDED BY THE SOLAR CELLS. THE NO-CHARGE-LIFE MAY BE BASED UPON CALCULATIONS PROVIDING THAT MANUFACTURER'S RATINGS AND EFFICIENCY CALCULATIONS ARE FURNISHED FOR EACH MAJOR COMPONENT.

E. MOUNTING

THE FLASHING ARROW PANEL MAY BE TRAILER OR VEHICLE MOUNTED OR MOUNTED ON A RIGID SUPPORTING DEVICE SUITABLE FOR MAINTAINING IT IN THE DESIGNATED POSITION. EACH OF THE MOUNTING METHODS SHALL BE SUITABLY STABLE SUCH AS TO PREVENT MOVEMENT DUE TO HIGH WINDS OR PASSAGE OF LARGE VEHICLES.

WHEN A TRAILER IS USED, CONSTRUCTION SHALL BE SUCH AS TO TRANSPORT THE FLASHING ARROW PANEL AND APPURTANCES ADEQUATELY AND LEGALLY AS WELL AS SUPPORT THEM PROPERLY DURING OPERATION. THE TRAILER SHALL BE EQUIPPED WITH DEVICES WHICH SHALL PROVIDE LEVELING AND STABILITY DURING OPERATION.

MINIMUM ARROW PANEL MOUNTING HEIGHT SHALL BE 2.1 m ABOVE THE PAVEMENT SURFACE (MEASURED TO THE BOTTOM OF THE PANEL).

USE AND OPERATION

THE FLASHING ARROW PANEL SHALL BE LOCATED AS SHOWN IN THE MAINTAINENCE OF TEAFFIC DRAWINGS OR AS DIRECTED BY THE ENGINEER AND OPERATED CONTINUOUSLY DURING TRAFFIC MAINTAINED PERIODS. THE CONTRACTOR SHALL SUPPLY ALL FUEL, LUBRICANTS AND PARTS NECESSARY TO OBTAIN CONTINUOUS OPERATION AND SHALL PROVIDE ALL SERVICE. THE CONTRACTOR SHALL INSPECT THE OPERATION OF THE UNIT DAILY, INCLUDING WEEKENDS AND HOLIDAYS. THE CONTRACTOR SHALL ARRANGE WITH THE ENGINEER, AN ACCEPTABLE METHOD OF OBTAINING SERVICE FOR A MALFUNCTIONING PANEL WITHIN 30 MINUTES OF A REPORTED MALFUNCTION. LAMP INTENSITY SHALL BE ADJUSTED TO PROVIDE MINIMUM LEGIBILITY DISTANCES OF .8 km (TYPE A), 1.2 km (TYPE B) AND 1.6 km (TYPE C).

TYPE C PANELS SHALL BE USED FOR STATIONARY OPERATIONS ON HIGH SPEED (88 km/h OR GREATER), HIGH VOLUME ROADWAYS. TYPE B SHALL BE USED FOR STATIONARY OPERATIONS ON INTERMEDIATE SPEED (64-80 km/h) FACILITIES, AND TYPE A ON LOW SPEED (32-56 km/h) FACILITIES.

IN ADDITION, TYPE B PANELS SHALL BE USD FOR MOVING OPERATIONS ON FREEWAYS AND EXPRESSWAYS AND TYPE A FOR MOVING OPERATIONS ON OTHER FACILITIES.

BATTERY AND SOLAR/BATTERY UNITS SHALL BE FULLY CHARGED WHEN FIRST SET UP. THEY SHALL HAVE GAUGES TO INDICATE APPROXIMATE BATTERY CHARGE REMAINING. THE CONTRACTOR SHALL VERIFY DAILY THAT THE UNIT IS OPERATING SATISFACTORILY AND THE REMAINING BATTERY CHARGE IS SUFFICIENT FOR AT LEAST 2 MORE DAYS.

FLASHING ARROW PANELS ARE NOT TO BE USED ON TWO LANE-TWO WAY ROADWAYS.

WHEN LEFT UNATTENDED THE CONTROL CABINET, MOTOR GENERATOR ENCLOSURE AND FUEL TANK SHALL BE LOCKED.

TYPE A AND TYPE B PANELS USED IN MOVING OPERATIONS MAY BE POWERED BY THE VEHICLE'S ELECTRICAL SYSTEM BUT SHALL NOT BE LEFT UNATTENDED WHEN SO POWERED.

WHEN NOT IN USE, THE FLASHING ARROW PANEL SHALL BE STORED AT A LOCATION WHICH WILL NOT BE HAZARDOUS TO TRAFFIC OR PEDESTRIANS.

THE PANELS SHALL BE DESIGNED FOR OPERATION IN 100% HUMIDITY AND TEMPERATURES FROM -29 TO + 54 DEGREES CELCIUS.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

DATE 01/30/95

FLASHING ARROW PANEL NOTES

STANDARD CONSTRUCTION DRAWING MT-35.11M

APPROVED Roy Krueger ENGR. OF DESIGN SERVICES

WCC

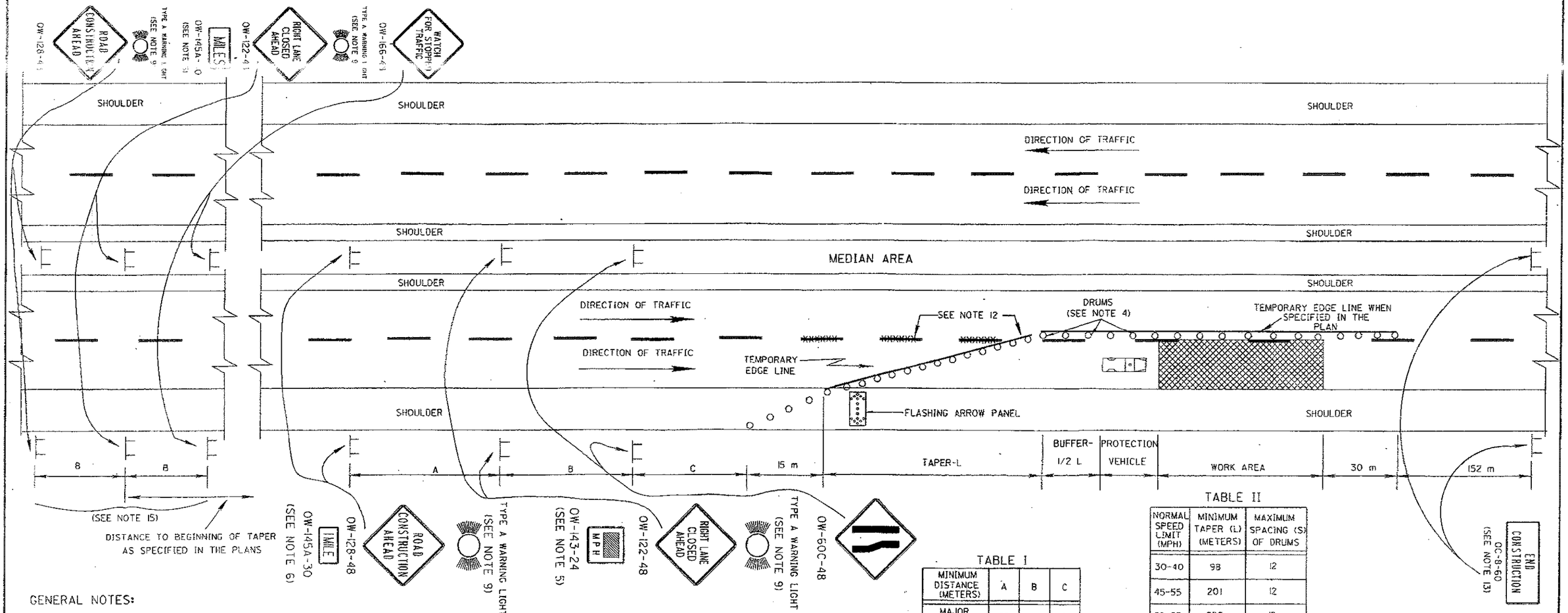


TABLE I

MINIMUM DISTANCE (METERS)	A	B	C
MAJOR STANDARD	152	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

TABLE II

NORMAL SPEED LIMIT (MPH)	MINIMUM TAPER (L) (METERS)	MAXIMUM SPACING (S) OF DRUMS
30-40	98	12
45-55	201	12
60-65	238	18

GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER, THE BUFFER AREA AND FOR THE FIRST 305 m OF THE WORK AREA AND AT OTHER HAZARDOUS LOCATIONS AS DIRECTED BY THE ENGINEER. THE MAXIMUM DRUM SPACING FOR THE BALANCE OF THE WORK AREA IS TO BE TWO TIMES THE SPACING (S) IN TABLE II. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.

4. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

5. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

6. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE MERGING TAPER (L). DISTANCES LESS THAN ONE MILE MAY BE EXPRESSED IN FEET. THE PLAQUE MAY BE OMITTED IF EXTRA ADVANCE SIGN GROUPS ARE NOT USED.

7. THE PROTECTION VEHICLE, LOCATED CLOSE TO THE WORK, SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

8. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

9. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW-122 - (123) SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY

10. WHEN WORK IS BEING PERFORMED IN THE LANE ADJACENT TO THE MEDIAN ON A DIVIDED HIGHWAY, OW-123 SIGNS SHALL BE SUBSTITUTED FOR THE OW-122 SIGNS AND OW-60D SIGNS SHALL BE SUBSTITUTED FOR THE OW-60C SIGNS.

11. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

12. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY EDGE LINES WHICH WOULD CONFLICT WITH FINAL TRAFFIC LANES SHALL BE REMOVABLE (740.05 TYPE C) TAPE UNLESS

12. CONT. 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.

13. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

14. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ON EACH SIDE ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

15. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERECTED AT THE DIRECTION OF THE ENGINEER.

16. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

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

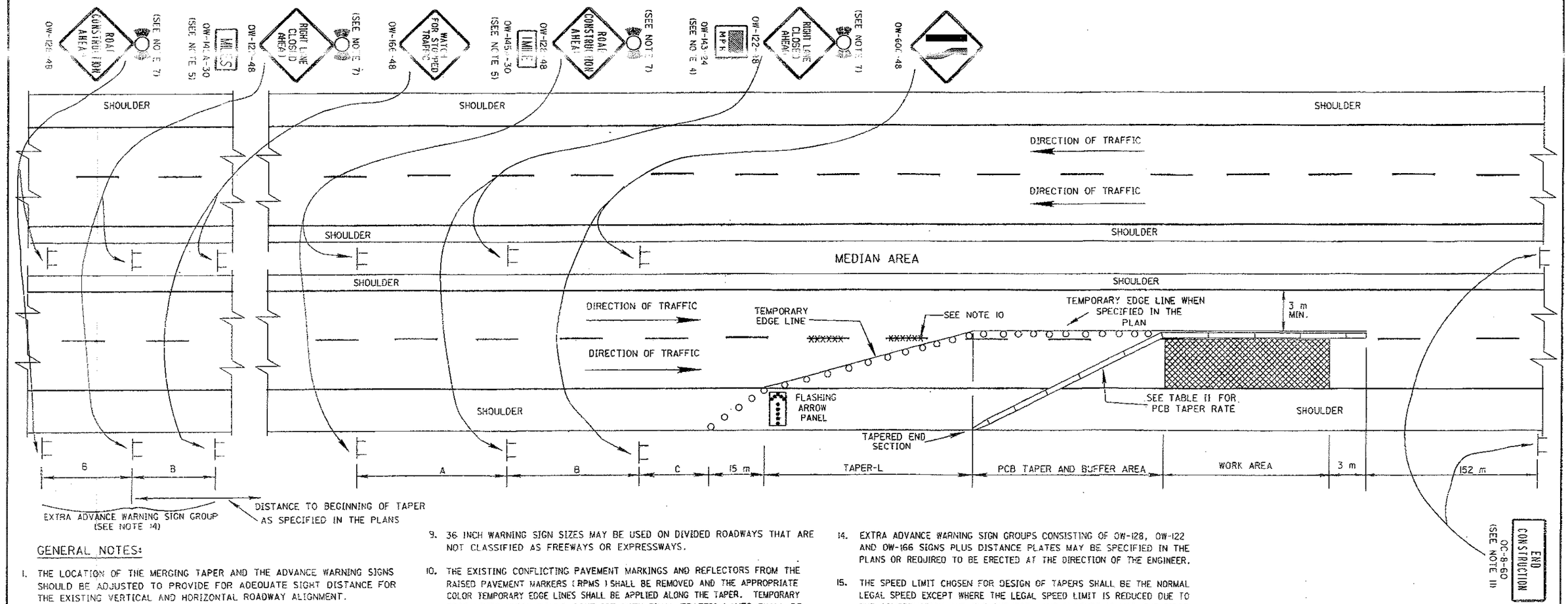
DATE 04/25/94

CLOSING RIGHT OR LEFT LANE OF A MULTI-LANE DIVIDED HIGHWAY WITH DRUMS

STANDARD CONSTRUCTION DRAWING MT-95.30M

APPROVED _____ ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THE LOCATION OF THE MERGING TAPER AND THE ADVANCE WARNING SIGNS SHOULD BE ADJUSTED TO PROVIDE FOR ADEQUATE SIGHT DISTANCE FOR THE EXISTING VERTICAL AND HORIZONTAL ROADWAY ALIGNMENT.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. THE TAPER LENGTH (L) AND SPACING (S) OF DRUMS SHALL CONFORM TO TABLE II. DRUM SPACING (S) SHALL BE USED FOR THE MERGING TAPER AND THE BUFFER AREA. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER.

4. THE ADVISORY SPEED SIGN OW-143 SHALL BE USED WHEN SPECIFIED IN THE PLAN.

5. THE DISTANCE PLATE OW-145A SHALL INDICATE THE DISTANCE TO THE BEGINNING OF THE MERGING TAPER (L). DISTANCES LESS THAN ONE MILE MAY BE EXPRESSED IN FEET THE PLAQUE MAY BE OMITTED IF EXTRA ADVANCE SIGN GROUPS ARE NOT USED.

6. THE FLASHING ARROW PANEL SHALL MEET REQUIREMENTS OF STANDARD CONSTRUCTION DRAWING TC-35.10M.

7. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OW122 (123) SIGNS ARE REQUIRED.

8. WHEN WORK IS BEING PERFORMED IN THE LANE ADJACENT TO THE MEDIAN ON A DIVIDED HIGHWAY, OW-123 SIGNS SHALL BE SUBSTITUTED FOR THE OW-122 SIGNS AND OW-60D SIGNS SHALL BE SUBSTITUTED FOR THE OW-60C SIGNS.

9. 36 INCH WARNING SIGN SIZES MAY BE USED ON DIVIDED ROADWAYS THAT ARE NOT CLASSIFIED AS FREEWAYS OR EXPRESSWAYS.

10. THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. 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.

11. THE OC-8 SIGNS MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

12. PCB SHALL BE DELINEATED AS FOLLOWS:

PCB TYPE	DELINEATION
813 mm HIGH WITHOUT GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C (MAX.) TOP MOUNTED OBJECT MARKERS (229 X 381mm) @ 7.6 m C-C (MAX.)
813 mm HIGH WITH GLARE SCREEN	BARRIER REFLECTORS @ 7.6 m C-C VERTICAL STRIPES ON PADDLES 51X 305 mm) @ 3.8 m C-C (MAX.)
1270 mm HIGH	BARRIER REFLECTORS @ 3.8 m C- C (MAX.)
TAPERED END SECTION AND EXPOSED END	OBJECT MARKERS (229 X 381mm) TOP MOUNTED @ EACH END

13. OW-128 SIGNS SHALL BE PROVIDED ON ENTRANCE RAMPS AND/OR SIDE ROADS LOCATED WITHIN THE WORK LIMITS OR THE ADVANCE WARNING SIGN GROUP. WITHIN THE LENGTH OF CLOSURE, PROVISION SHALL BE MADE TO CONTROL TRAFFIC ENTERING FROM INTERSECTING STREETS AND DRIVEWAYS. THREE DRUMS SHALL BE PLACED ACROSS THE CLOSED LANE AT EACH INTERSECTION AND DRIVEWAY.

14. EXTRA ADVANCE WARNING SIGN GROUPS CONSISTING OF OW-128, OW-122 AND OW-166 SIGNS PLUS DISTANCE PLATES MAY BE SPECIFIED IN THE PLANS OR REQUIRED TO BE ERECTED AT THE DIRECTION OF THE ENGINEER.

15. THE SPEED LIMIT CHOSEN FOR DESIGN OF TAPERS SHALL BE THE NORMAL LEGAL SPEED EXCEPT WHERE THE LEGAL SPEED LIMIT IS REDUCED DUE TO THE CONSTRUCTION AND THE SUBJECT LANE CLOSURE IS NOT THE FIRST ACTIVE CONSTRUCTION AREA ENCOUNTERED BY TRAFFIC WITHIN THE PROJECT.

16. NO EQUIPMENT OR MATERIAL SHALL BE LOCATED OTHER THAN BEHIND THE PCB.

LEGEND

DRUMS	○ ○ ○ ○ ○ ○
PORTABLE CONCRETE BARRIER (PCB)	
REMOVE EXISTING MARKINGS	XXXXXXXXX

TABLE I

MINIMUM DISTANCE METERS	A	B	C
MAJOR STANDARD	152	152	152
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

TABLE II

SPEED LIMIT (MPH) *	MINIMUM DRUM TAPER (L) METERS	MAXIMUM SPACING (S) OF DRUMS METERS	PCB TAPER RATE
30-40	98	12	11 : 1
45-55	201	12	16 : 1
60-65	238	18	19 : 1

* SEE NOTE (15)

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 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.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

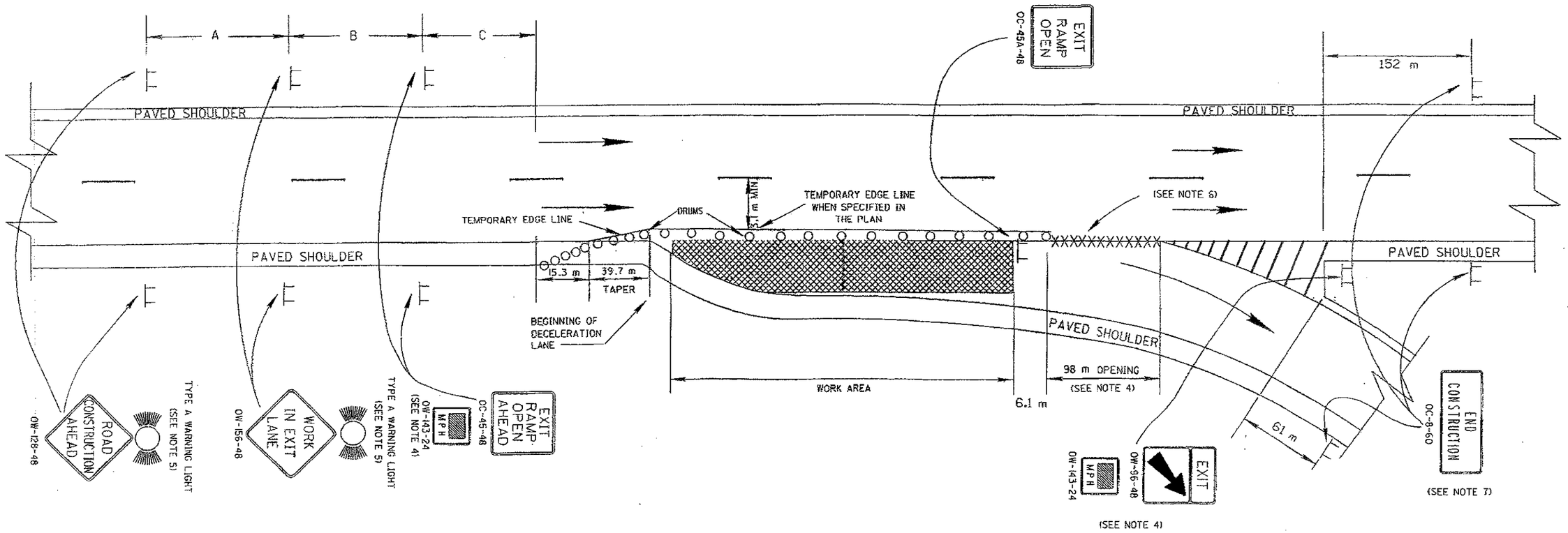
CLOSING RIGHT OR LEFT LANE OF A MULTI-LANE DIVIDED HIGHWAY WITH PORTABLE CONCRETE BARRIER

STANDARD CONSTRUCTION DRAWING MT-95.40M

APPROVED _____ ENGR. OF DESIGN SERVICES

DATE 04/25/94

WCC



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.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS, EXCEPT THE OW-96-48 SIGN WHICH MAY BE ADJACENT TO THE GF SIGN IN THE GORE.

3. ALONG THE CLOSURE DRUMS SHALL BE SPACED AT 6.1 m CENTER TO CENTER. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

4. THE OPENING TO THE RAMP SHALL BE 98 m OR MORE, WHENEVER POSSIBLE. A LESSER OPENING MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. WHEN A LESSER OPENING IS PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING	ADVISORY SPEED
88 m	80 km/h - 50 MPH
79 m	72 km/h - 45 MPH
70 m	64 km/h - 40 MPH
35 m	56 km/h - 35 MPH

IF A 61 m OPENING CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

4. CONT. THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 16 km/h OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.

5. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE "ROAD CONSTRUCTION AHEAD" AND "WORK IN EXIT LANE" SIGNS ARE REQUIRED WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.

6. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. 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.

7. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

8. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	A	B	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

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

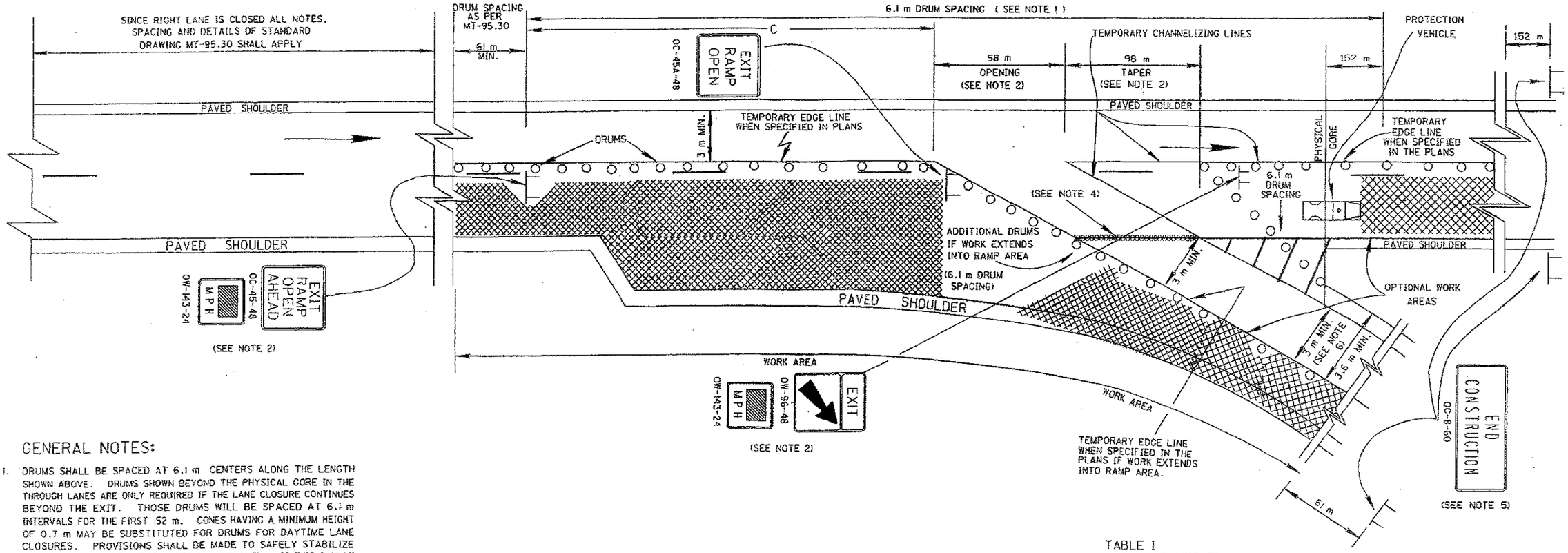
LANE CLOSURE IN DECELERATION LANE

DATE 06/24/93

STANDARD CONSTRUCTION DRAWING MT-98.12M

APPROVED Doyle Cooper ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. DRUMS SHALL BE SPACED AT 6.1 m CENTERS ALONG THE LENGTH SHOWN ABOVE. DRUMS SHOWN BEYOND THE PHYSICAL GORE IN THE THROUGH LANES ARE ONLY REQUIRED IF THE LANE CLOSURE CONTINUES BEYOND THE EXIT. THOSE DRUMS WILL BE SPACED AT 6.1 m INTERVALS FOR THE FIRST 152 m. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

2. THE OPENING TO THE RAMP AND THE TAPER ACROSS THE CLOSED LANE SHOULD EACH BE 98 m OR MORE WHENEVER POSSIBLE. A LESSER OPENING AND/OR TAPER MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. THE OPENING SHALL NEVER BE LESS THAN THE TAPER, BUT MAY BE MORE. WHEN LESSER OPENING AND/OR TAPER LENGTHS ARE PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING/TAPER	ADVISORY SPEED
88 m	80 km/h - 50 MPH
79 m	72 km/h - 45 MPH
70 m	64 km/h - 40 MPH
61 m	56 km/h - 35 MPH

IF 61 m MINIMUM DIMENSIONS CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 16.1 km/h OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.

3. THE PROTECTION VEHICLE LOCATED CLOSE TO THE WORK SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

4. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND a) TEMPORARY CHANNELIZING LINES SHALL BE APPLIED AND b) THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED WHEN SPECIFIED IN THE PLANS. TEMPORARY CHANNELIZING LINES AND 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.

5. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

6. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD.

7. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	
	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305
RURAL FREEWAY & EXPRESSWAY	305

METRIC

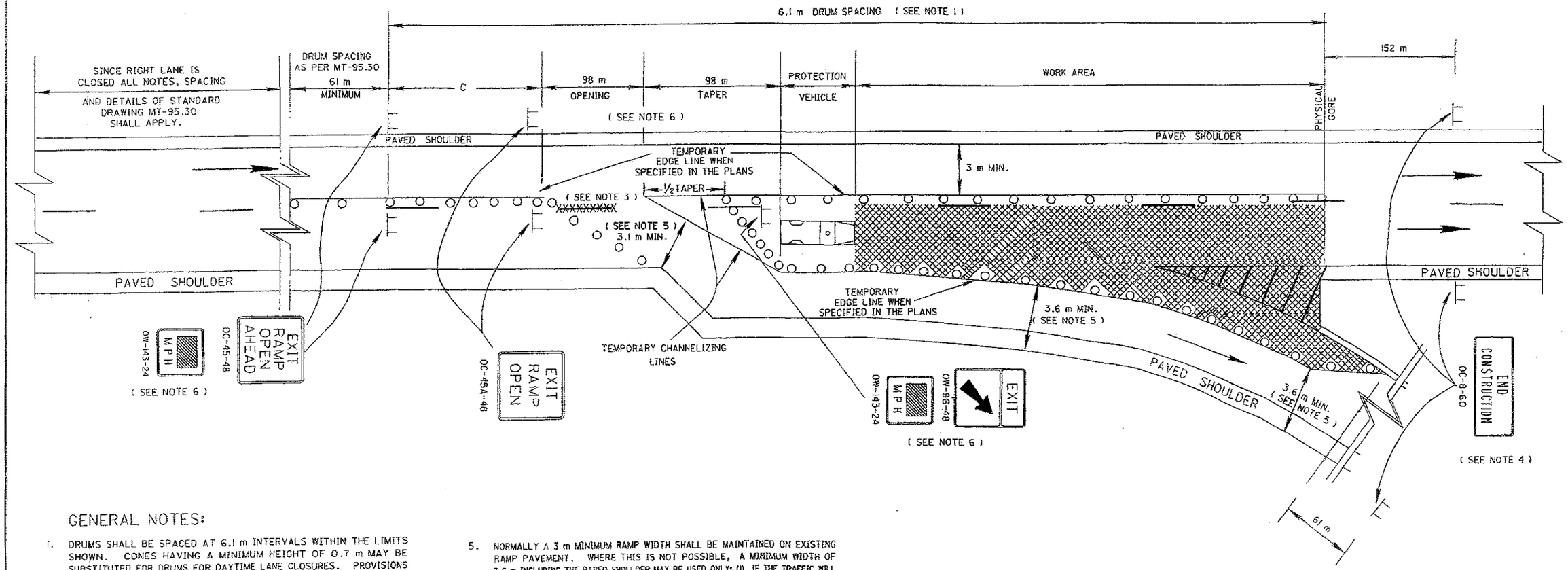
ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH 614 AND OTHER APPLICABLE PORTIONS OF THE C & M SPECIFICATIONS AS WELL AS IN ACCORDANCE WITH PART 7 OF OMUTCD. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS TO PROVIDE THIS METHOD OF TRAFFIC CONTROL SHALL BE INCLUDED IN THE LUMP SUM BID 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 06/24/93
LANE CLOSURE BEFORE EXIT GORE	
STANDARD CONSTRUCTION DRAWING MT-98.13M	

APPROVED Larry D Cooper ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. DRUMS SHALL BE SPACED AT 6.1 m INTERVALS WITHIN THE LIMITS SHOWN. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

2. THE PROTECTION VEHICLE LOCATED CLOSE TO THE WORK SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON CLEARLY VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

3. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND a) TEMPORARY CHANNELIZING LINES SHALL BE APPLIED AND b) THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED WHEN SPECIFIED IN THE PLANS. TEMPORARY CHANNELIZING LINES AND 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. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

5. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD.

6. THE OPENING TO THE RAMP AND THE TAPER IN ADVANCE OF THE CLOSED LANE SHOULD EACH BE 98 m OR MORE WHENEVER POSSIBLE. A LESSER OPENING AND/OR TAPER LENGTH MAY BE PROVIDED IF NO OTHER ALTERNATIVE IS AVAILABLE. THE OPENING SHALL NEVER BE LESS THAN THE TAPER, BUT MAY BE MORE. WHEN LESSER OPENING AND/OR TAPER LENGTHS ARE PROVIDED, ADVISORY SPEED PLAQUES (OW-143) SHALL BE ADDED TO THE OW-96 AND OC-45 SIGNS AS FOLLOWS:

OPENING/TAPER	ADVISORY SPEED
88 m	80 km/h - 50 MPH
79 m	72 km/h - 45 MPH
70 m	64 km/h - 40 MPH
61 m	56 km/h - 35 MPH

IF 61 m MINIMUM DIMENSION CANNOT BE PROVIDED, THE RAMP SHOULD BE CLOSED.

THE ADVISORY SPEED DISPLAYED SHALL NOT BE GREATER THAN WOULD OTHERWISE BE REQUIRED TO ACCOMMODATE THE PERMANENT RAMP GEOMETRY NEAR THE EXIT.

ADVISORY SPEEDS WITHIN 16.1 km/h OF THE LEGAL SPEED LIMIT NEED NOT BE DISPLAYED.

7. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

MINIMUM DISTANCE (METERS)	
	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305
RURAL FREEWAY & EXPRESSWAY	305

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

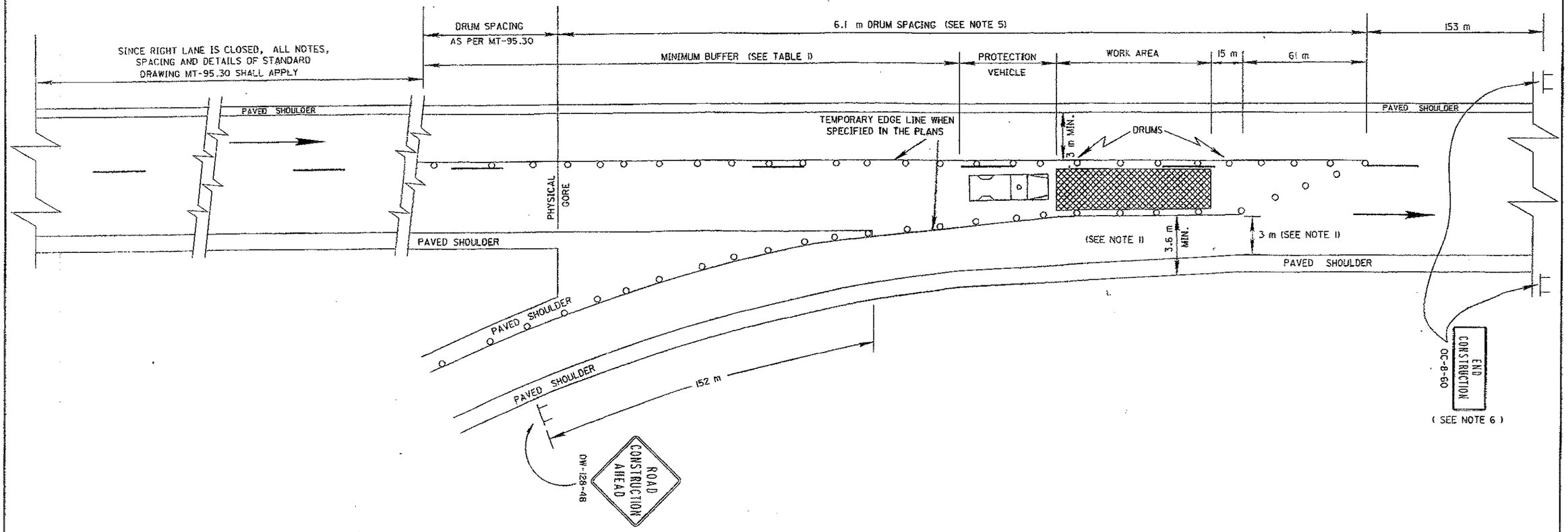
DATE 06/24/93

LANE CLOSURE
AT EXIT GORE

STANDARD CONSTRUCTION DRAWING MT-98.14M

APPROVED Daryl Creyer ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES:

1. THIS WORK AREA TRAFFIC CONTROL APPLICATION SHALL BE EMPLOYED ONLY WHEN THE LATERAL CLEARANCE BETWEEN THE CHANNELIZING DEVICES AT THE RIGHT EDGE OF THE WORK AREA AND THE EDGE OF THE RAMP PAVEMENT IS 3 m OR MORE. NORMALLY A 3 m MINIMUM RAMP WIDTH SHALL BE MAINTAINED ON EXISTING RAMP PAVEMENT. WHERE THIS IS NOT POSSIBLE, A MINIMUM WIDTH OF 3.6 m INCLUDING THE PAVED SHOULDER MAY BE USED ONLY: (1) IF THE TRAFFIC WILL BE ON THE SHOULDER LESS THAN ONE DAY AND THE SHOULDER IS IN GOOD CONDITION, OR (2) IF THE SHOULDER PAVEMENT IS STRENGTHENED TO HOLD THE ANTICIPATED LOAD. WHEN THE RAMP IS CLOSED APPROPRIATE DETOUR SIGNS SHALL BE PROVIDED.

2. WHEN THE RAMP IS NOT LONG ENOUGH TO ALLOW SIGN PLACEMENT AS SPECIFIED ABOVE, THEY MAY BE SPACED PROPORTIONATELY WITHIN THE SPACE AVAILABLE AS DETERMINED BY THE ENGINEER (A 61 m MINIMUM SPACING MUST BE MAINTAINED).

3. THE PROTECTION VEHICLE LOCATED CLOSE TO THE WORK AREA SHALL BE IN PLACE AND UNOCCUPIED WHENEVER WORKERS ARE IN THE WORK AREA. THIS VEHICLE SHALL BE REMOVED FROM THE PAVEMENT WHENEVER WORKERS ARE NOT IN THE WORK AREA. THE VEHICLE SHALL BE EQUIPPED WITH A 360 DEGREE ROTATING OR FLASHING AMBER BEACON VISIBLE A MINIMUM OF 402 m. OTHER PROTECTIVE DEVICES MAY BE USED IN LIEU OF THE PROTECTION VEHICLE SHOWN WHEN APPROVED BY THE ENGINEER.

4. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AND THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED WHEN SPECIFIED IN THE PLANS. 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.

5. DRUMS SHALL BE SPACED AT 6.1 m INTERVALS ON BOTH SIDES OF THE WORK AREA WITHIN THE LIMITS SHOWN. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

6. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

7. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

TABLE I

NORMAL SPEED LIMIT		MINIMUM BUFFER
(MPH)	(km/h)	(METERS)
45 - 50	72 - 88	101
60 - 65	96 - 104	119

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

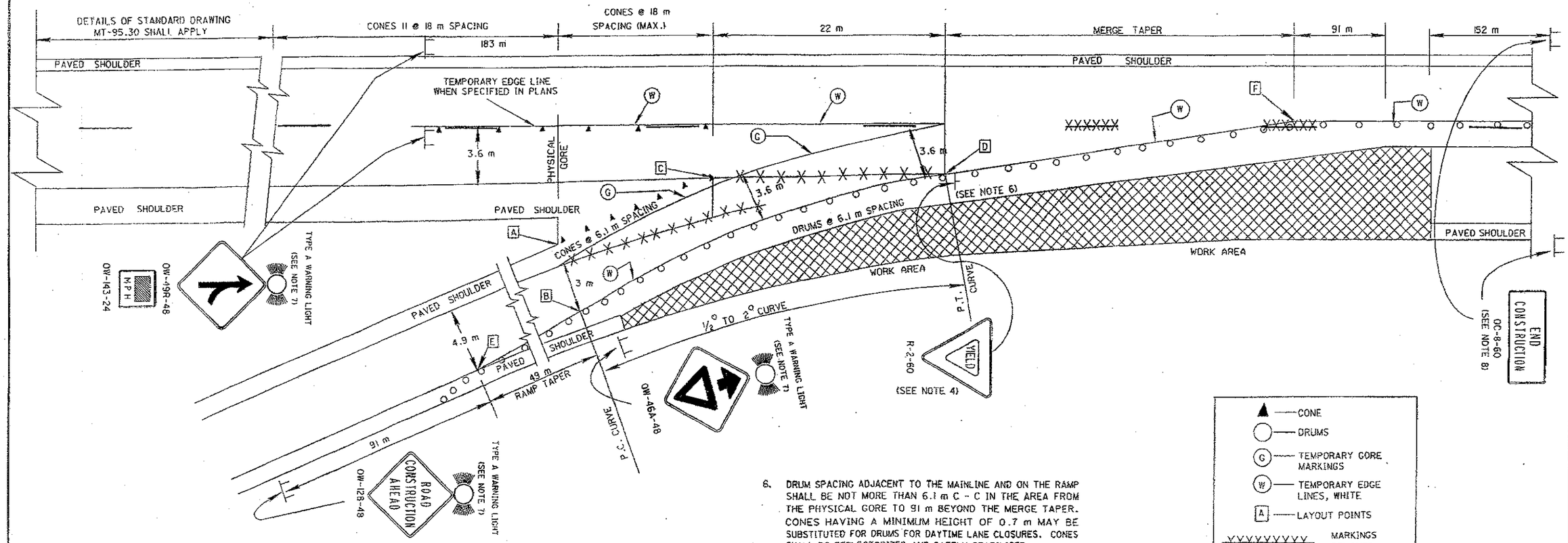
LANE CLOSURE AT
ENTRANCE RAMP: PLAN A

DATE 06/24/93

STANDARD CONSTRUCTION DRAWING MT-98.15M

APPROVED Roy Krueger ENGR. OF DESIGN SERVICES

WCC



GENERAL NOTES :

1. THIS WORK AREA TRAFFIC CONTROL APPLICATION SHALL BE EMPLOYED WHEN: (1) THE LATERAL CLEARANCE BETWEEN CHANNELIZING DEVICES AT THE RIGHT EDGE OF THE WORK AREA AND THE EDGE OF PAVEMENT IS LESS THAN 3 m (3.6 m IF THE SHOULDER PAVEMENT IS USED) AS SHOWN ON DRAWING MT-98.15, AND (2) THE REQUIRED RAMP TAPERS AND CURVES CAN BE PROVIDED AS SHOWN EXCEPT AS DESCRIBED IN NOTE 4. IN THE EVENT THE WORK ZONE CONDITION WOULD PERMIT THE USE OF EITHER MT-98.15 OR MT-98.16, MT-98.15 SHALL BE USED. THIS TRAFFIC CONTROL MEASURE SHALL NOT BE PLACED IN EFFECT UNTIL IMMEDIATELY BEFORE THE CONTRACTOR IS FULLY PREPARED TO PERFORM THE WORK ON THE RAMP OR LANE ADJACENT TO IT. ONCE THIS MEASURE IS PLACED INTO EFFECT, THE CONTRACTOR SHALL EXPEDITIOUSLY PURSUE THE WORK (WORKING CONTINUOUSLY WITH FULL CREW IN THE RAMP AREA ON ALL NORMAL WORKING DAYS) UNTIL IT IS COMPLETED AND SHALL IMMEDIATELY OPEN THE AREA TO NORMAL TRAFFIC OR, AS A MINIMUM, REVERT TO THE METHODS SHOWN ON MT-98.15. IT IS THE INTENT THAT THE LONGEST MERGING TAPER LENGTH POSSIBLE SHALL BE CHOSEN, COMMENSURATE WITH THE REQUIREMENTS OF CONSTRUCTION.

2. THE RAMP TAPER SHALL DESIRABLY BE LOCATED TO PROVIDE A 3 m MINIMUM PATH BETWEEN DRUMS AND THE PAVED SHOULDER IN THE GORE. THE RAMP TRAFFIC MAY BE PLACED ON THE PAVED GORE AS SHOWN ABOVE ONLY IF: (1) THE TRAFFIC WILL USE THE PAVED SHOULDER PAVEMENT LESS THAN ONE DAY AND THE SHOULDER PAVEMENT IS IN GOOD CONDITION AND IS LEVEL AND SMOOTH OR (2) IF THE SHOULDER PAVEMENT IS ADEQUATELY STRENGTHENED, LEVELED AND SMOOTHED TO CARRY THE ANTICIPATED LOAD. A MINIMUM OF 3 DRUMS SHALL BE USED TO CLOSE THE RAMP SHOULDER.

3. WHEN THE RAMP IS NOT LONG ENOUGH TO ALLOW SIGN PLACEMENT AS SPECIFIED ABOVE, THEY MAY BE SPACED PROPORTIONATELY WITHIN THE SPACE AVAILABLE AS DETERMINED BY THE ENGINEER (A 61 m MINIMUM SPACING MUST BE MAINTAINED).

4. IT WILL BE NECESSARY TO MOVE THE LOCATION OF ANY EXISTING YIELD SIGN. IN THESE CASES, THE PERMANENT R-2 SIGN INSTALLATION SHALL BE REMOVED (AND SUBSEQUENTLY RESTORED) AND THE TEMPORARY INSTALLATION SHALL BE MOUNTED APPROPRIATELY. IF THE REQUIRED DISTANCES (RAMP TAPER, CURVE AND MERGE TAPER) CANNOT BE OBTAINED, THE ENGINEER MAY APPROVE SLIGHTLY LOWER VALUES FOR A SHORT TIME, IN WHICH CASE THE YIELD SIGN SHALL BE REMOVED AND A 1.2 m STOP SIGN PLACED APPROPRIATELY TO BE VISIBLE TO RAMP TRAFFIC BUT NOT BE OBTRUSIVE TO MAINLINE TRAFFIC.

5. IF THE CONSTRUCTION OPERATION REQUIRES THE LANE CLOSURE FOR MORE THAN ONE DAY THEN THE EXISTING CONFLICTING PAVEMENT MARKINGS AND REFLECTORS FROM THE RAISED PAVEMENT MARKERS (RPMS) SHALL BE REMOVED AT NO ADDITIONAL COST. THE APPROPRIATE COLOR TEMPORARY EDGE LINES SHALL BE APPLIED ALONG THE TAPER. TEMPORARY PAVEMENT MARKINGS 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, TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IN ACCORDANCE WITH 641.10 AND THE ORIGINAL MARKINGS AND RAISED PAVEMENT MARKER REFLECTORS SHALL BE RESTORED AT NO ADDITIONAL COST.

6. DRUM SPACING ADJACENT TO THE MAINLINE AND ON THE RAMP SHALL BE NOT MORE THAN 6.1 m C - C IN THE AREA FROM THE PHYSICAL GORE TO 91 m BEYOND THE MERGE TAPER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. CONES SHALL BE REFLECTORIZED AND SAFELY STABILIZED.

7. TYPE A FLASHING WARNING LIGHTS ARE REQUIRED ON THE ROAD CONSTRUCTION AHEAD (OW-128-48), MERGE (OW-49R-48) AND THE YIELD AHEAD (OW-46-48) SIGNS WHENEVER A NIGHT LANE CLOSURE IS NECESSARY.

8. THE OC-8 SIGNS ARE ONLY REQUIRED FOR LANE CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

9. FROM THE END OF THE GORE AREA GRADED SHOULDER (POINT A), LOCATE THE PC OF THE CURVE BY MEASURING PERPENDICULAR TO THE RAMP CENTERLINE 3 m OF RAMP PAVEMENT, NOT INCLUDING PAVED SHOULDER WIDTH (POINT B). FROM THE END OF THE GORE AREA PAVED SHOULDER (POINT C), LOCATE THE PT OF THE CURVE BY MEASURING 22 m FROM POINT C ALONG THE EDGE OF PAVEMENT EXTENDED (POINT D).

10. PLACEMENT OF DRUMS SHALL BEGIN AT (POINT E) 49 m UPSTREAM FROM THE PREVIOUSLY LOCATED PC (POINT B) AND AT THE RIGHT EDGE OF RAMP PAVEMENT. FROM THIS POINT A DRUM TAPER SHALL BE PLACED TO THE PC (POINT B) AND THEN ALONG A CURVE AS SHOWN TO THE PT (POINT D) WHERE A 48 m (MIN.) MERGE TAPER SHALL MEET MAINLINE TRAFFIC CONTROL (POINT F).

11. ALL MATERIAL AND EQUIPMENT SHALL BE REMOVED FROM THE CLOSURE AND THE WORK AREA WHEN NO WORK IS BEING DONE.

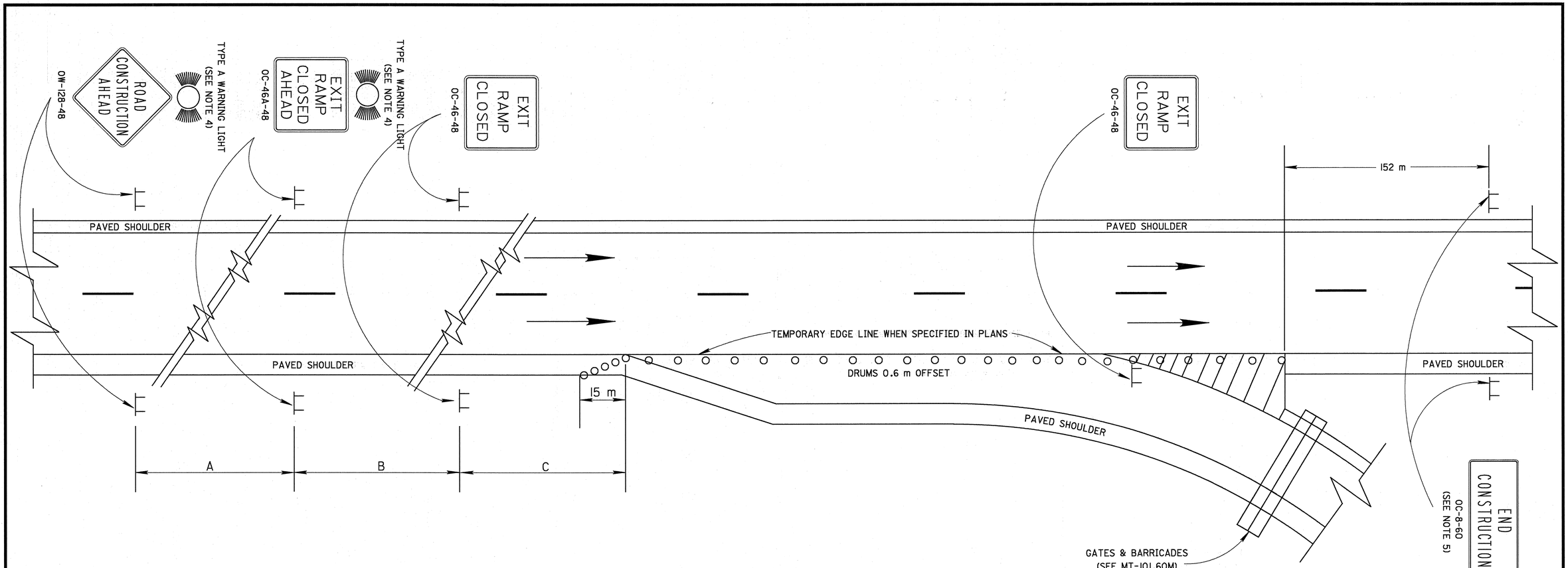
METRIC

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 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.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC	DATE 06/24/93
LANE CLOSURE AT ENTRANCE RAMP: PLAN B	
STANDARD CONSTRUCTION DRAWING MT-98.16M	
APPROVED ENGR. OF DESIGN SERVICES	

WCC



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.

2. THE SPACING BETWEEN PROPOSED SIGNS SHOULD BE ADJUSTED TO NOT CONFLICT WITH AND TO PROVIDE A MINIMUM OF 61 m CLEARANCE TO EXISTING SIGNS.

3. ALONG THE CLOSURE, DRUMS SHALL BE SPACED AT 6.1 m CENTER TO CENTER. A MINIMUM OF 5 DRUMS SHALL BE USED TO CLOSE THE SHOULDER. CONES HAVING A MINIMUM HEIGHT OF 0.7 m MAY BE SUBSTITUTED FOR DRUMS FOR DAYTIME LANE CLOSURES. PROVISIONS SHALL BE MADE TO SAFELY STABILIZE THE CONES TO PREVENT THEM FROM BLOWING OVER. IF THIS CANNOT BE ACHIEVED, DRUMS SHALL BE USED.

4. TYPE A FLASHING WARNING LIGHTS SHOWN ON THE OW-128 AND OC-46A SIGNS ARE REQUIRED WHENEVER A NIGHT CLOSURE IS NECESSARY.

5. THE OC-8 SIGNS ARE ONLY REQUIRED FOR RAMP CLOSURES OF MORE THAN ONE DAY AND MAY BE OMITTED IF THEY FALL WITHIN THE LIMITS OF A CONSTRUCTION PROJECT.

TABLE I

MINIMUM DISTANCE (METERS)			
	A	B	C
URBAN FREEWAY & EXPRESSWAY	152 TO 305	152 TO 305	152 TO 305
RURAL FREEWAY & EXPRESSWAY	792	488	305

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.

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

MAINTENANCE OF TRAFFIC

EXIT RAMP CLOSURE

DATE 03/01/96

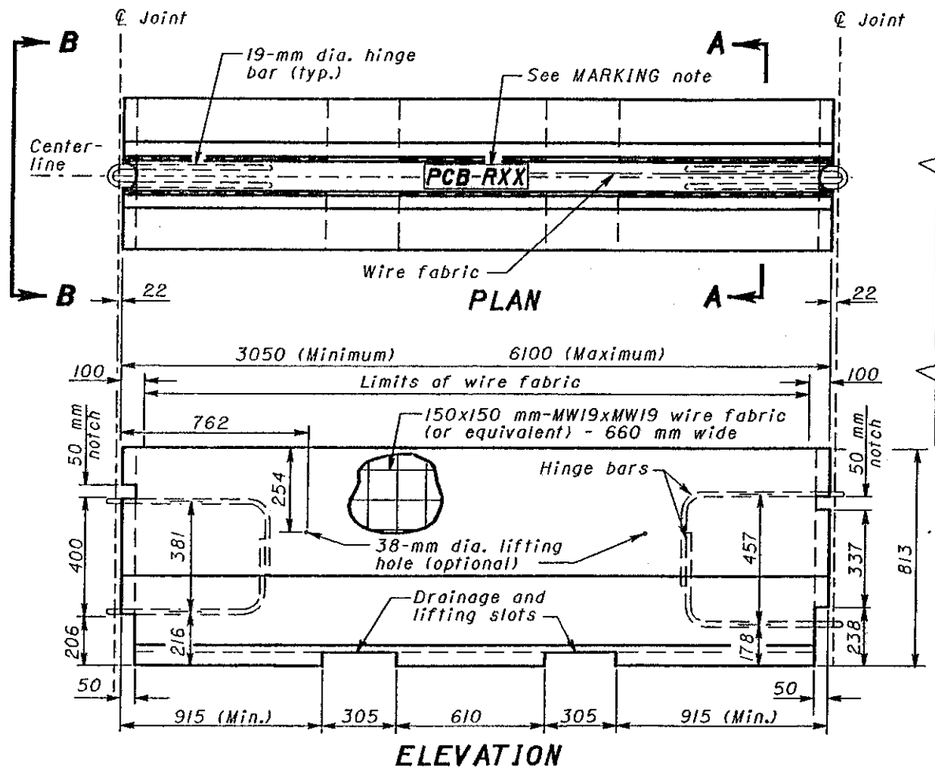
STANDARD CONSTRUCTION DRAWING MT-98.19M

APPROVED _____ ADMINISTRATOR

STATE OF OHIO DEPARTMENT OF TRANSPORTATION

metric units

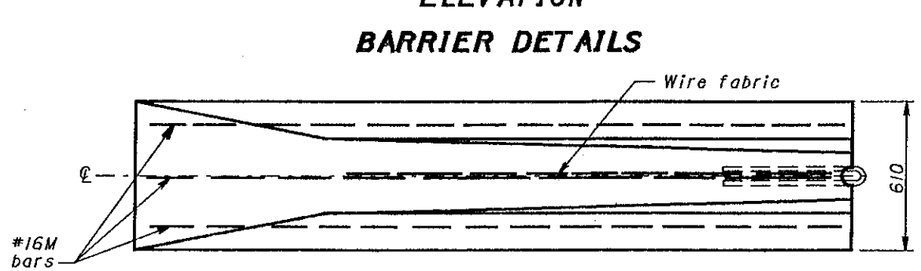
WCC



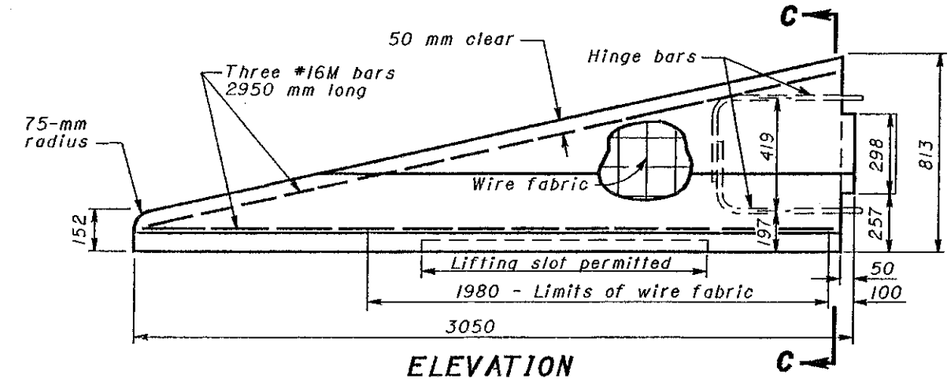
PLAN

ELEVATION

BARRIER DETAILS

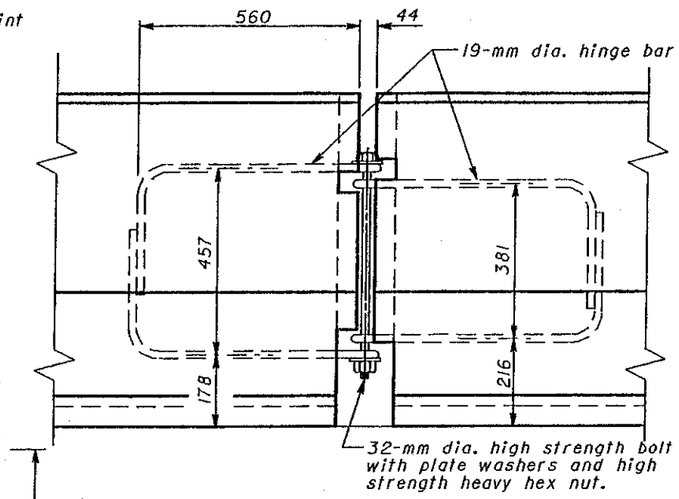


PLAN

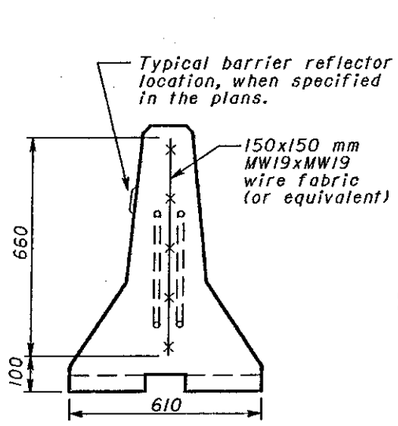


ELEVATION

TAPERED END SECTION DETAILS

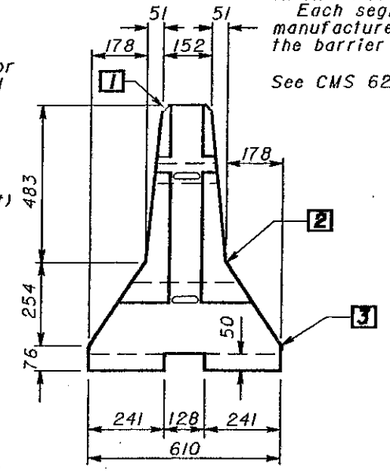


DETAIL AT HINGED CONNECTION

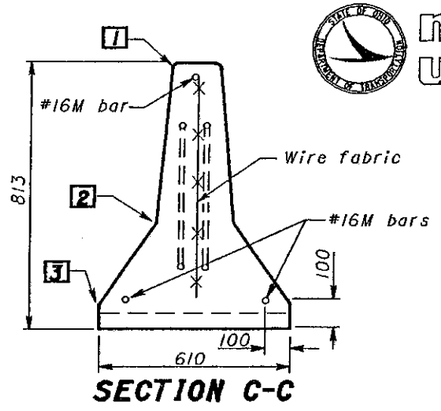


Vertical edges on keyway and drainage slots may be battered. Depth 50±6 mm.

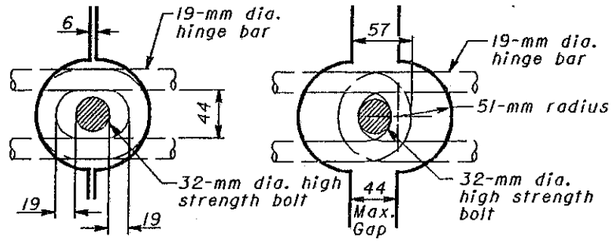
SECTION A-A



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

All dimensions are in millimeters unless otherwise noted.

This Drawing Replaces MC-9.2.

LEGEND

1. 25-mm radius or 19-mm chamfer, all top and end corners.
2. Permissible 250-mm radius.
3. Permissible 25-mm radius.

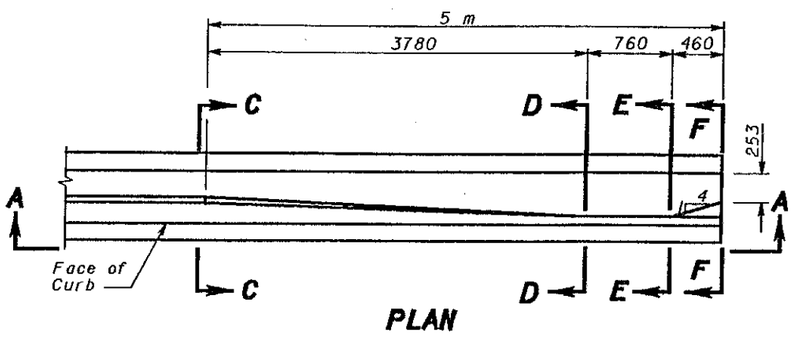
OHIO DEPARTMENT OF TRANSPORTATION

813-mm PORTABLE CONCRETE BARRIER

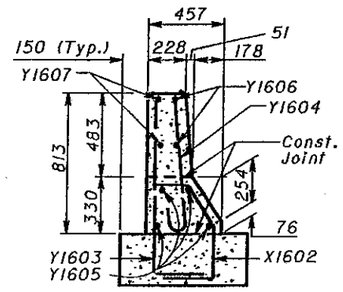
DATE: 6-30-95, 10-21-97

STANDARD CONSTRUCTION DRAWING **RM-4.2M**

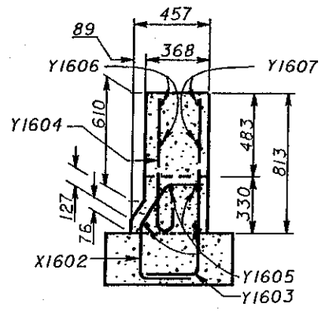
APPROVED Roger F. Sutherland



PLAN



SECTION C-C



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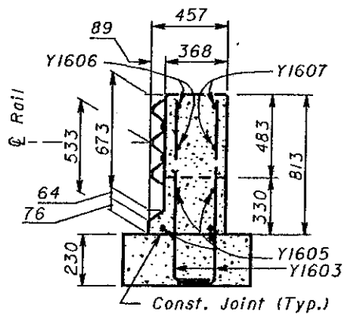

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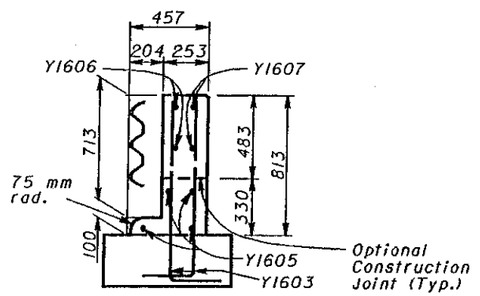
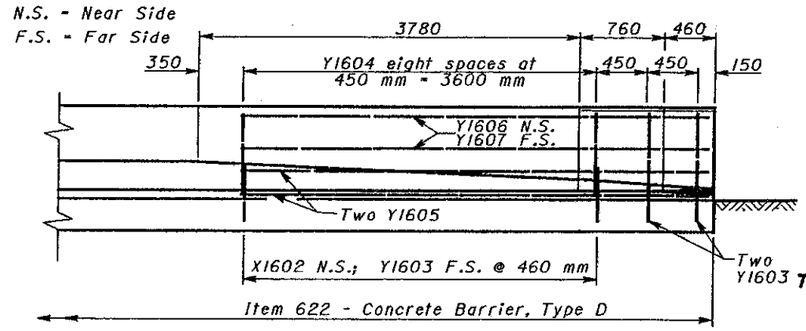


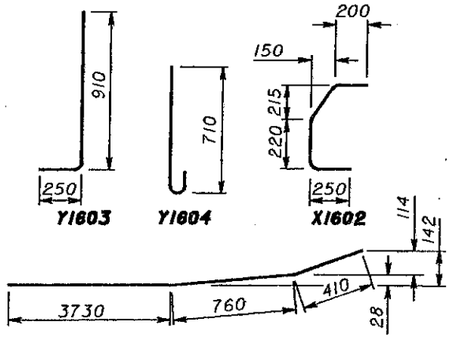
SECTION F-F



SECTION A-A

REINFORCING BAR LIST

MARK	LENGTH (mm)	SHAPE	NO.	MASS (kg)
X1602	850	Bent	9	12
Y1603	1120	Bent	13	23
Y1604	880	Bent	9	13
Y1605	4900	Str.	4	31
Y1606	4900	Bent	2	15
Y1607	4900	Str.	2	15
TOTAL MASS (For info. only)				109



BENDING DIAGRAMS

NOTES

LOCATION: Concrete barrier at obstructions shall be constructed with the toe of the barrier slope at the normal guardrail offset from the roadway. Installations within continuous runs shall be constructed so that no approach or trailing guardrail tapers are required to connect to the barrier.

Installations that cannot be constructed at the normal guardrail offset and are to be connected to approach or trailing guardrail runs shall have a 25:1 guardrail taper to meet the existing or normal guardrail offset.

Installations that are not to be connected to approach or trailing guardrail runs shall include the standard guardrail flare as per SCD GR-5.1M.

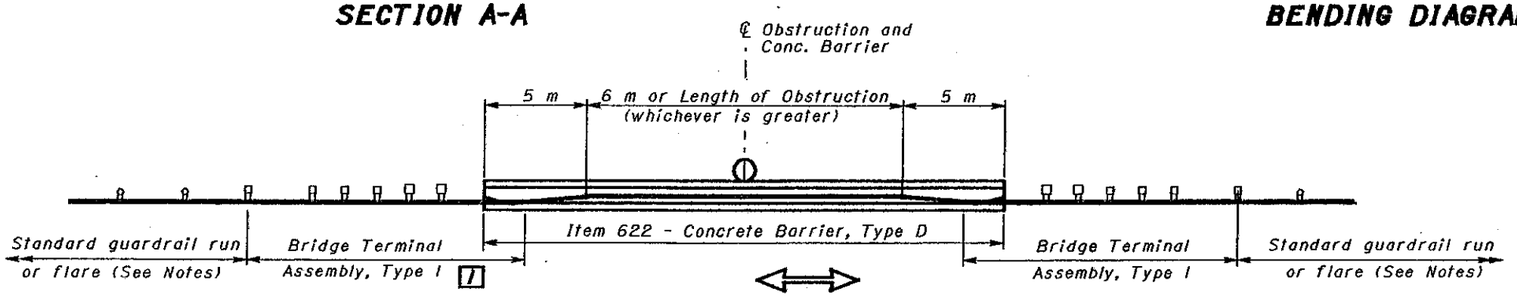
INCORPORATED INSTALLATIONS: For barrier installations that cannot be constructed at the normal guardrail offset, the incorporated installations shown may be installed at vertical walls. piers or other similar obstructions. For pier-incorporated installations the contractor may use the optional treatment, forming the back face of the Type D Concrete Barrier to the location shown (between piers only), with any additional cost being included in the cost of Item 622.

REINFORCING: All reinforcing bars shall be epoxy coated and shall meet the requirements of CMS 509.

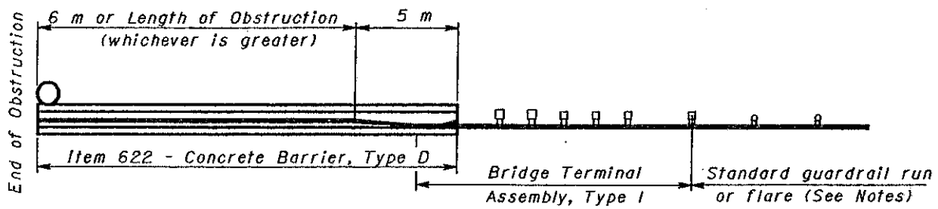
MISCELLANEOUS: For Bridge Terminal Assembly, Type 1 and Type 2 details and connections, see SCD's GR-3.1M and GR-3.2M, respectively. For Type D Concrete Barrier details see SCD RM-4.3M.

PAYMENT: Payment for Item 622, Concrete Barrier, Type D shall include all materials, labor and reinforcing steel required to construct the barrier as shown.

All dimensions are in millimeters unless otherwise noted.



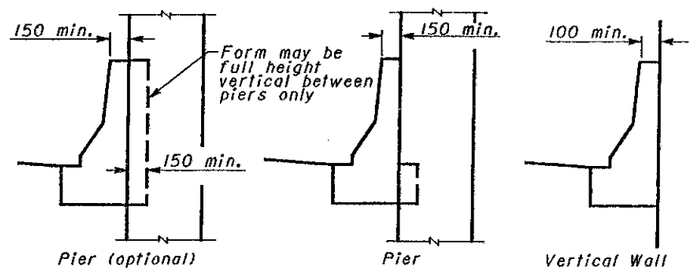
Bi-directional Travel or Directional Travel where trailing guardrail is used.



1 Bridge Terminal Assembly, Type 2 shall be used for directional roadways where trailing guardrail is used and is out of the clear zone of opposite direction traffic.

Directional Travel where no trailing guardrail is used.

TYPICAL INSTALLATIONS



INCORPORATED INSTALLATIONS

metric units

This Drawing Replaces GR-8J.

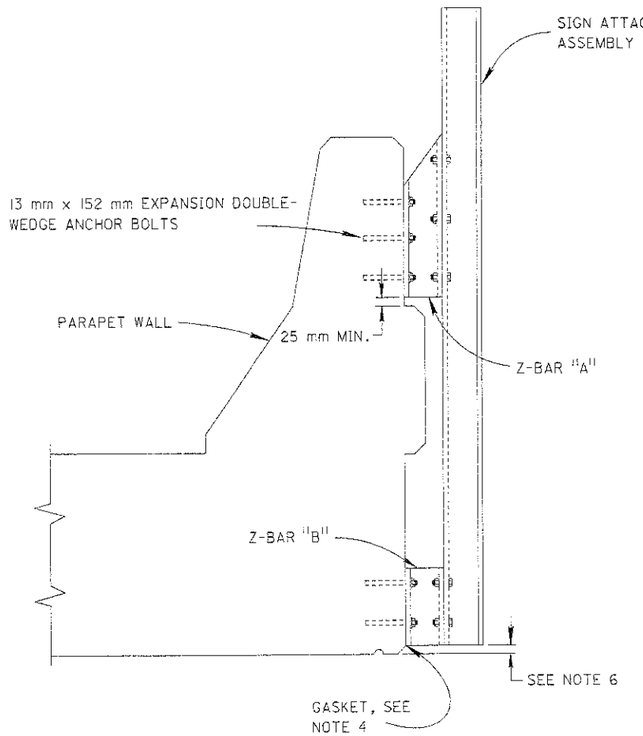
OHIO DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER AT OBSTRUCTIONS

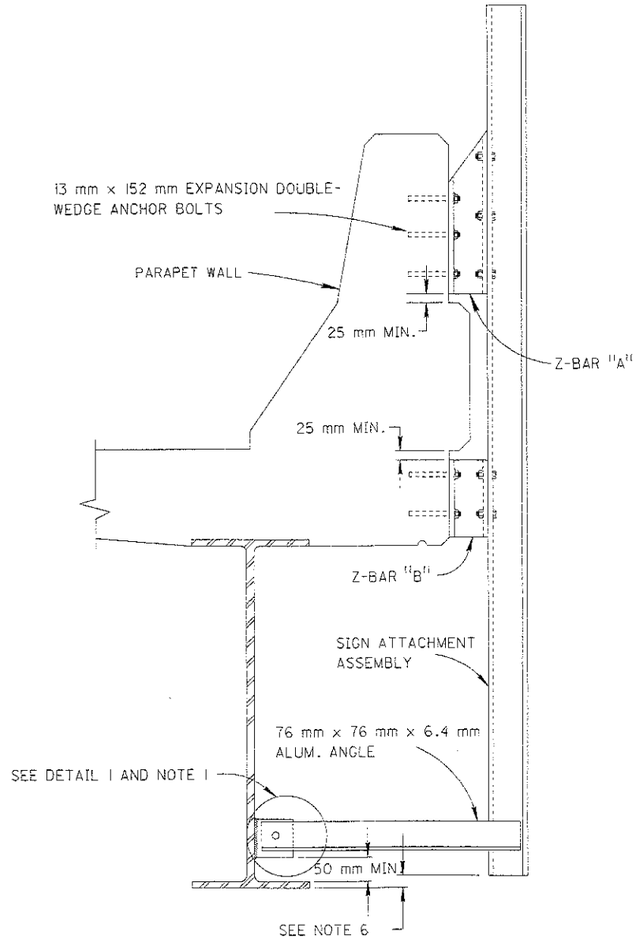
DATE: 6-30-95, 10-21-97

STANDARD CONSTRUCTION DRAWING **RM-4.5M**

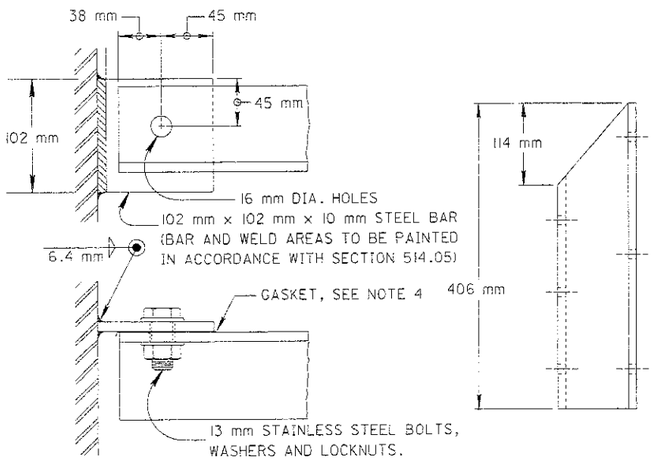
APPROVED: Lowell F. Sutherland



SLAB BRIDGE MOUNT

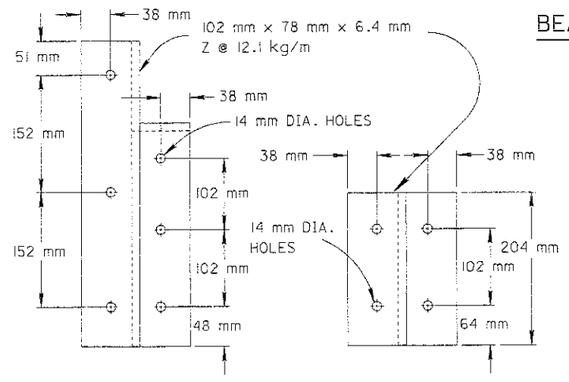


BEAM BRIDGE MOUNT



DETAIL I

Z-BAR "A" (GALVANIZED STEEL)



Z-BAR "B"

NOTES

1. ON PRE-CAST BEAM BRIDGES, CHANGE THE 102 mm x 102 mm x 10 mm BAR IN DETAIL I TO A 102 mm x 102 mm x 152 mm ANGLE AND USE 2-13 mm x 152 mm EXPANSION BOLTS TO FASTEN TO CONCRETE. THE PROPOSED LOCATIONS OF ANCHORS IN PRESTRESSED BEAMS SHALL BE APPROVED BY THE ENGINEER PRIOR TO ANY FIELD DRILLING.
2. FOR SIGN ATTACHMENT ASSEMBLIES TO BE FURNISHED WITH THIS SUPPORT, SEE DRAWING TC-22.20M.
3. ALL HARDWARE, INCLUDING EXPANSION BOLTS, SHALL BE STAINLESS STEEL.
4. CONTACT BETWEEN ALUMINUM AND GALVANIZED PARTS SHALL BE PREVENTED WITH A MINIMUM 1.6 mm THICK CHLOROPRENE GASKET OR APPROVED EQUAL. A GASKET SHALL ALSO BE INSTALLED BETWEEN GALVANIZED STEEL AND CONCRETE.
5. ALL SIGN BRACKETS SHALL BE INSTALLED AT THE SAME ELEVATION, BY ADJUSTING THEIR POSITION ON Z-BAR "A" AND "B", REGARDLESS OF BRIDGE SLOPE.
6. FOR BRIDGE CLEARANCE ABOVE ROADWAY OF LESS THAN 5.2 m THE CLEARANCE ABOVE BOTTOM OF BRIDGE SHALL BE 75 mm MINIMUM WITHOUT, OR 400 mm MINIMUM WITH SIGN LIGHTING FIXTURES.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

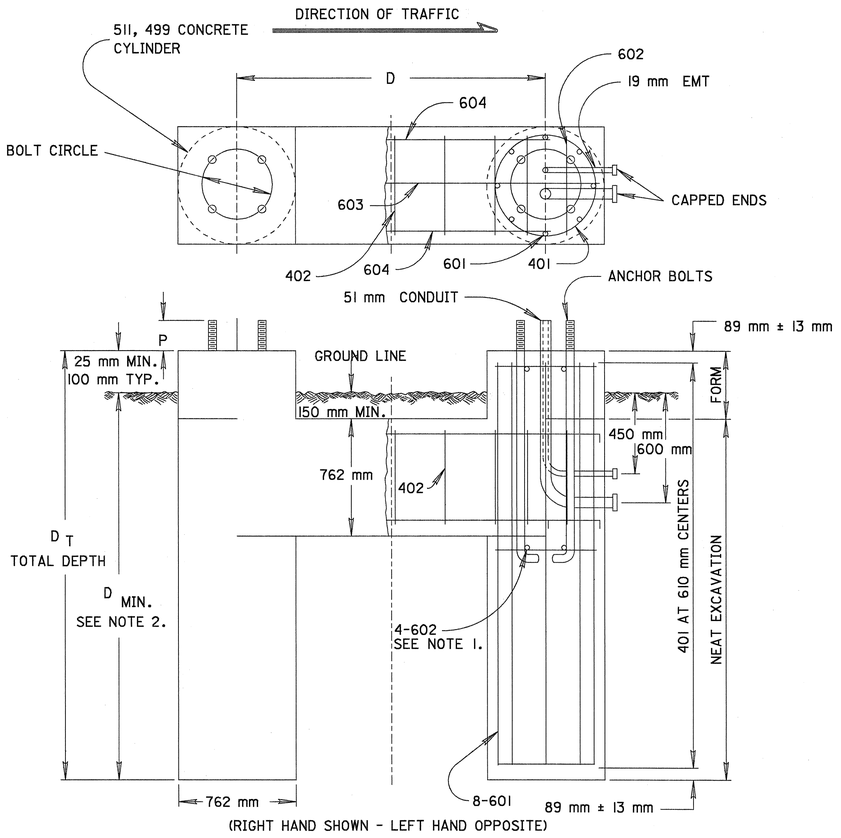
DATE 02/01/94

FLUSH STRUCTURE MOUNTED SIGN SUPPORT

STANDARD CONSTRUCTION DRAWING TC-18.24M

APPROVED Gary Creager ENGR. OF DESIGN SERVICES

WCC

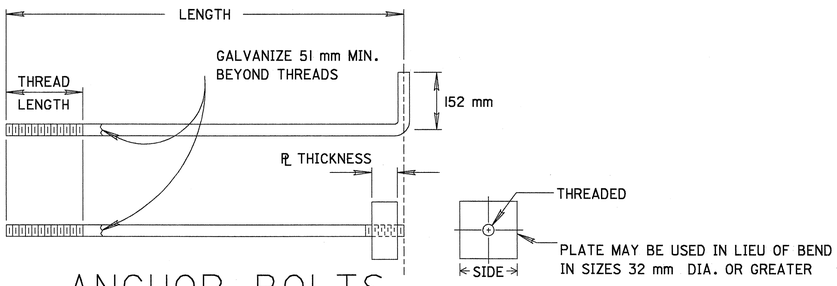


ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

SUPPORT TYPE	TRUSS BOX SIZE	"D"	"$D_{MIN.}$"	ANCHOR BOLTS							
				CIRCLE	DIA.	LENGTH	THREAD LENGTH	P	PL THICK	PL SIDE	THREAD
7.65 AND 7.2-7.6 (AL. TRUSS)	0.91 m	1.35 m	3.35 m	279	32	1067	203	127	38	102	32 - 3.6
	1.22 m	1.70 m									
	1.52 m	2.01 m									
15.115 AND 15.8 (ST. TRUSS)	1.02 m ±	1.60 m	3.66 m	318	38	1372	229	152	38	102	38 - 4.2
	1.52 m	2.01 m									

NOTES

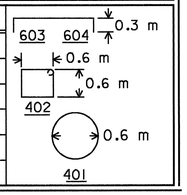
1. ANCHOR BOLTS SHALL BE TIED TO REBAR CAGE NEAR THE TOP AND BOTTOM OF THE ANCHOR BOLTS.
2. "D MIN." MAY BE DEEPER AS REQUIRED IN THE PLANS.
3. WHEN REQUIRED BY LOCAL CONDITIONS AND APPROVED BY THE ENGINEER, ALTERNATE FOUNDATION DESIGNS ARE ACCEPTABLE.
4. ALL ANCHOR BOLTS SHALL BE PROVIDED WITH ATANDARD STEEL HEX NUTS, LEVELING NUTS, PLAIN AND LOCKWASHERS. THE NUTS SHALL BE CAPABLE OF DEVELOPING THE FULL STRENGTH OF THE ANCHOR BOLTS.



ANCHOR BOLTS

REINFORCEMENT SCHEDULE
(FOR EACH FOUNDATION)

MARK	NO.	LENGTH	TYPE
401	610 mm c/c	2.29 m	401
402	305 mm c/c	2.59 m	402
601	16	D_T - 152 mm	STR.
602	8	0.6 m	STR.
603	2	D + 1.2 m	603
604	4	D + 0.6 m	604



metric units

OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

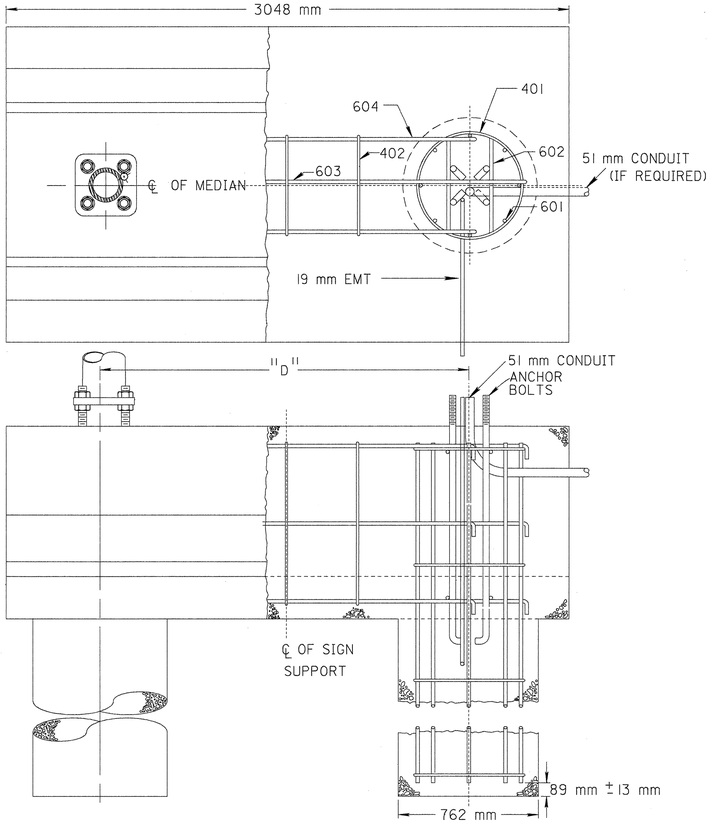
SIGN SUPPORT FOUNDATIONS

STANDARD CONSTRUCTION DRAWING TC-21.10M

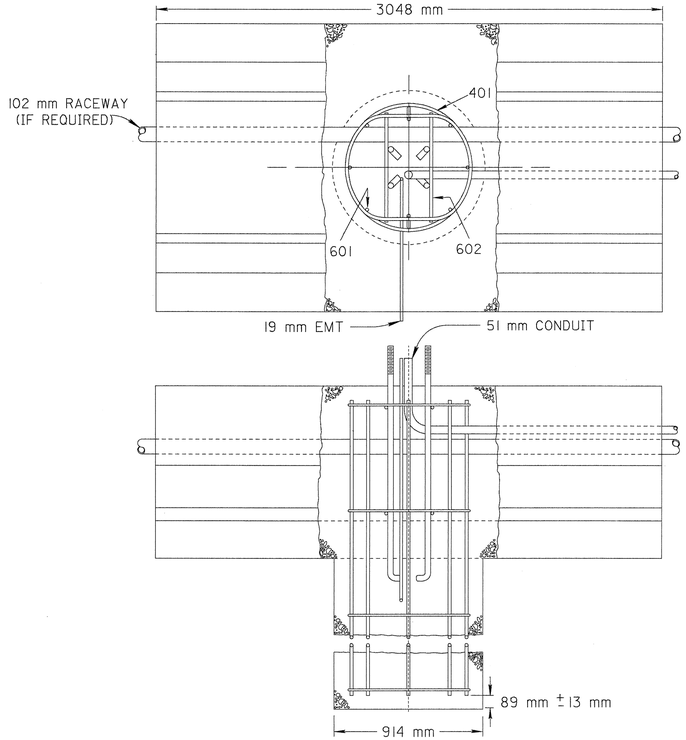
APPROVED _____ ADMINISTRATOR

DATE
02/01/94
12/10/96

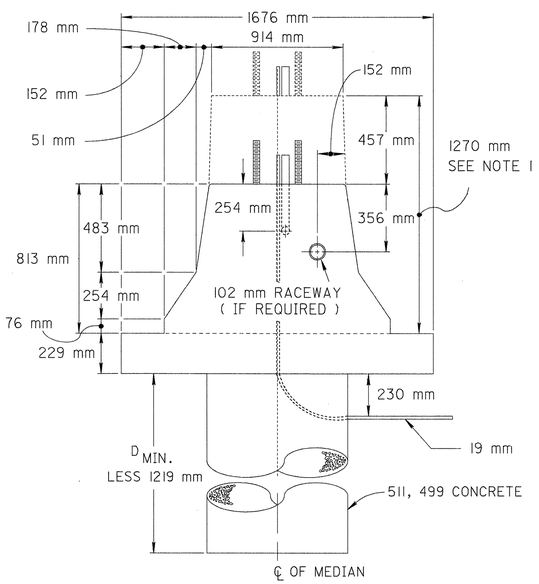
WCC



SPAN TYPE



CANTILEVER, BUTTERFLY OR CENTER MOUNT TYPE



NOTES

1. IF A 1270 mm WALL IS REQUIRED THE REINFORCING STEEL AND ANCHOR BOLTS SHALL REMAIN IN THE SAME POSITION, RELATIVE TO THE TOP OF THE WALL, AS IN THE 813 mm WALL.

2. REFER TO DRAWINGS TC-21.10M AND TC-32.10M FOR TYPICIAL DIMENSIONS WITH THE FOLLOWING MODIFICATIONS TO THE REINFORCEMENT SCHEDULES:

   813 mm WALL

   MARK 601 LENGTH = D MIN. - 330 mm
   MARK 603 NUMBER = 3
   MARK 604 NUMBER = 6
   MARK 402 VERTICAL DIMENSION = 864 mm

   1270 mm WALL

   MARK 601 LENGTH = D MIN. + 127 mm
   MARK 603 NUMBER = 4
   MARK 604 NUMBER = 8
   MARK 402 VERTICAL DIMENSION = 1321 mm

3. FOR INFORMATION REGARDING THE TRANSITION SECTIONS OF THE BARRIER WALL, SEE DRAWING MC-9.4.

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL	DATE 02/01/94
CONCRETE BARRIER MEDIAN OVERHEAD SIGN SUPPORT FOUNDATIONS	
STANDARD CONSTRUCTION DRAWING TC-21.40M	
APPROVED Lloyd J. Cruze ENGR. OF DESIGN SERVICES	

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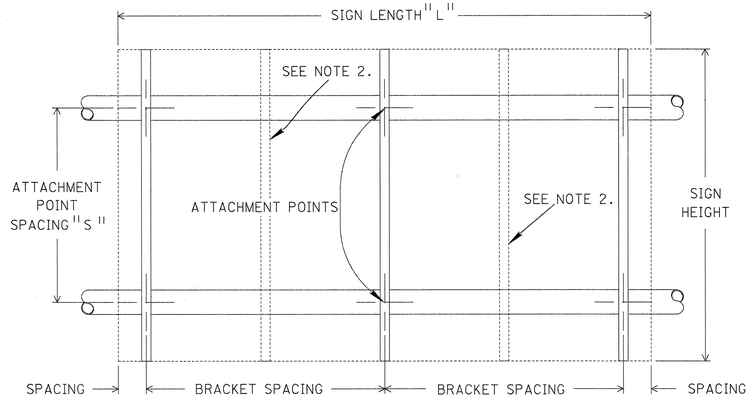
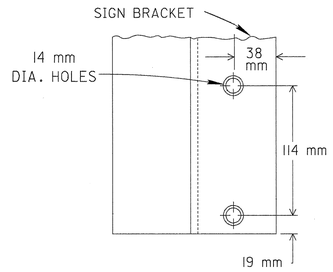
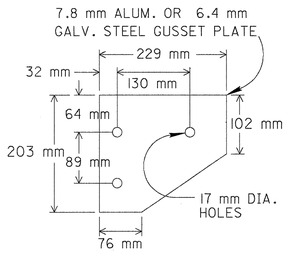


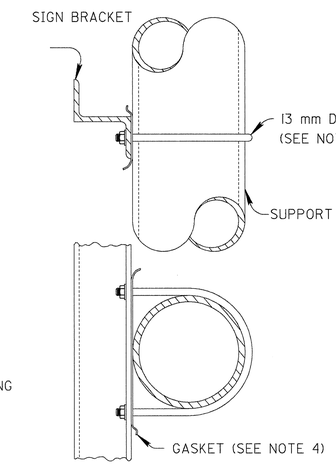


DETAIL C

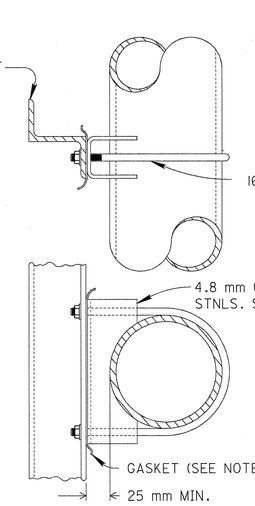
(SEE NOTE 7)



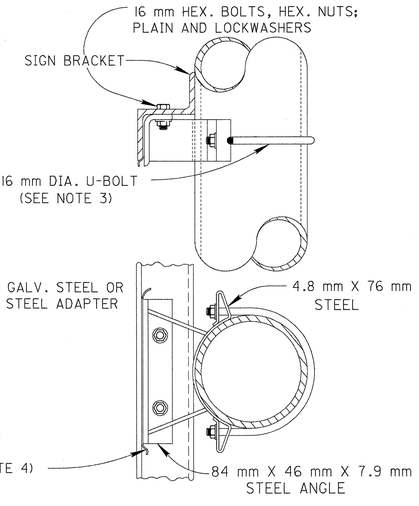
GUSSET PLATE



DOUBLE CHORDS



SINGLE ARM

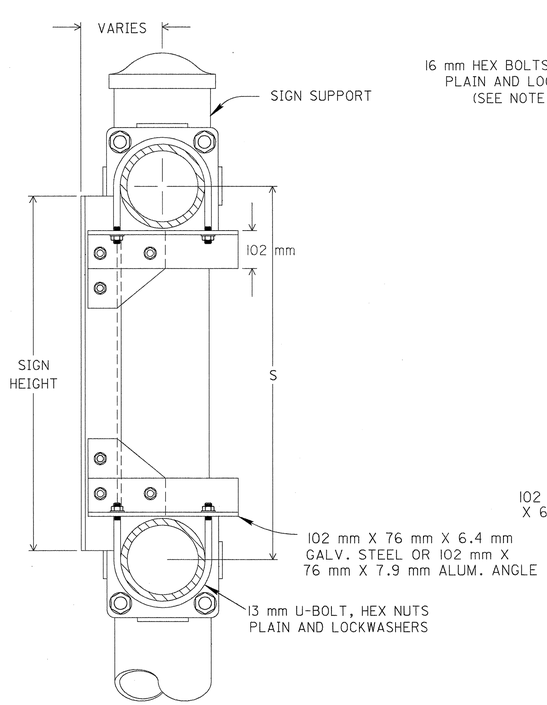


ALTERNATE CLAMP

NOTES

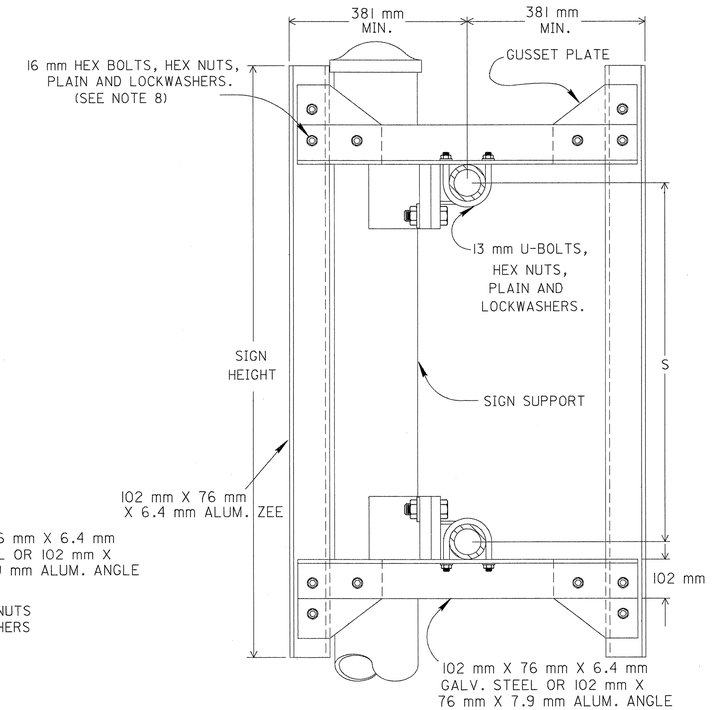
1. SIGN BRACKETS SHALL BE A 102 mm X 76 mm X 6.4 mm ALUMINUM ZEE AT 4.23 kg/m.
2. INTERMEDIATE SIGN BRACKETS SHALL BE PROVIDED IF THE SIGN EXTENDS MORE THAN 1.2 m ABOVE OR BELOW AN ATTACHMENT POINT.
3. U-BOLTS, OTHER BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL FOR USE WITH ALUMINUM CHORDS. WHEN USED WITH GALVANIZED SIGN STRUCTURES THE U-BOLTS ONLY MAY BE GALVANIZED STEEL.
4. CONTACT BETWEEN ALUMINUM AND GALVANIZED PARTS SHALL BE PREVENTED WITH A MINIMUM 1.6 mm THICK CHLOROPRENE GASKET OR APPROVED EQUAL.
5. TYPE A SHALL BE FOR SUPPORTS WHERE THE SIGN HEIGHT IS LESS THAN 0.3 m GREATER THAN THE ATTACHMENT POINT SPACING.
6. TYPE B SHALL BE FOR BACK TO BACK MOUNTED SIGNS.
7. DETAIL C - FIXTURE SUPPORT ARM MOUNTING FOR MERCURY VAPOR LIGHTED SIGNS COMPLYING WITH TC-31.21M.
8. GUSSET PLATES MAY BE ATTACHED BY BOLTING OR WELDING.

ATTACHMENT POINT SPACING			SIGN BRACKET						
SUPPORT TYPE	DESIGN	S (meter)	L (meter)	NUMBER OF BRACKETS	BRACKET SPACING (millimeters)				
7.2	1	0.7	1.2	2	150	900	150		
	2	0.9	1.5		150	1200	150		
	3	1.2	1.8		150	1500	150		
7.3	1 & 2	0.9	2.1		150	1800	150		
	3 & 4	1.2	2.4		250	1900	250		
7.4	1	0.9	2.7		400	1900	400		
7.5	2 & 3	1.2	3.0		250	2500	250		
7.6	4	1.5	3.3		400	2500	400		
7.65	6 & 6 ALT.	0.9	3.6	3	150	1650	1650	150	
	8 & 8 ALT.	1.5	3.9		150	1800	1800	150	
9.12	SINGLE ARM		4.2		200	1900	1900	200	
9.24	1 THRU 4	1.2	4.5		350	1900	1900	350	
10.48	1 THRU 5	1.2	4.8		200	1900	2500	200	
	6 THRU 8	1.8	5.1		350	1900	2500	350	
11.08	SINGLE ARM		5.4		200	2500	2500	200	
12.24	1 THRU 4	1.2	5.7		350	2500	2500	350	
	5 THRU 8	1.8	6.0	4	150	1900	1900	1900	150
12.30	1 THRU 4 ALT.	1.2	6.3		300	1900	1900	1900	300
	5 THRU 12 ALT.	1.8	6.6		150	1900	1900	2500	150
15.8	ALL	0.9	6.9		300	1900	1900	2500	300
15.115	ALL	1.5	7.2		150	1900	2500	2500	150
16.10	SINGLE ARM		7.5		300	1900	2500	2500	300
			7.8		150	2500	2500	2500	150
			8.1		300	2500	2500	2500	300



TYPE A

(SEE NOTE 5)



TYPE B

(SEE NOTE 6)

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

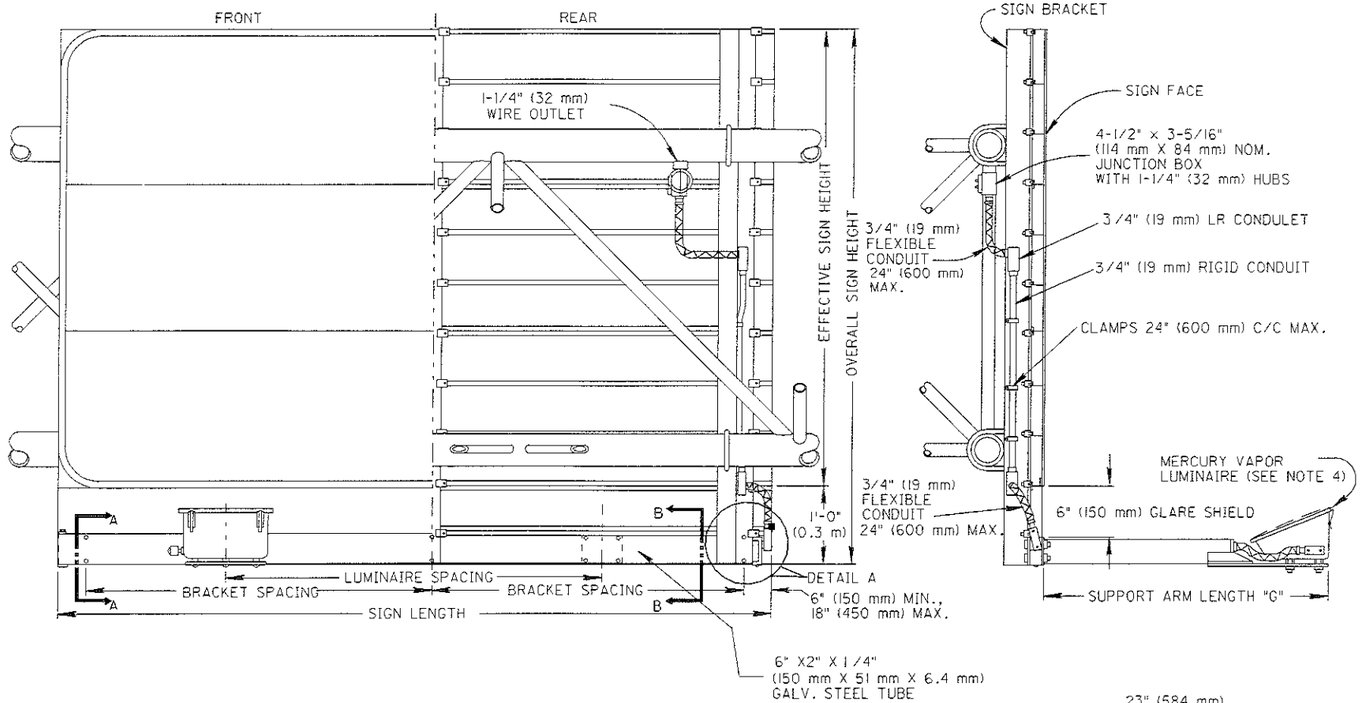
DATE 02/01/94

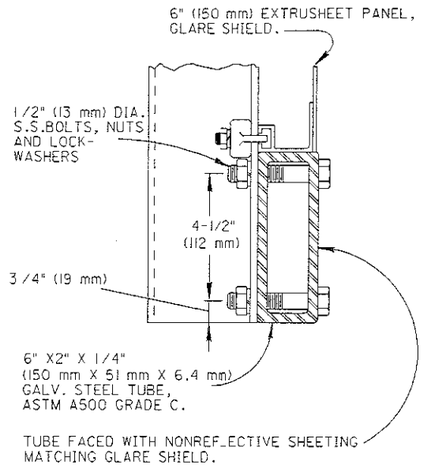
SIGN ATTACHMENT ASSEMBLIES

STANDARD CONSTRUCTION DRAWING TC-22.20M

APPROVED Dary L Craig ENGR. OF DESIGN SERVICES

WCC

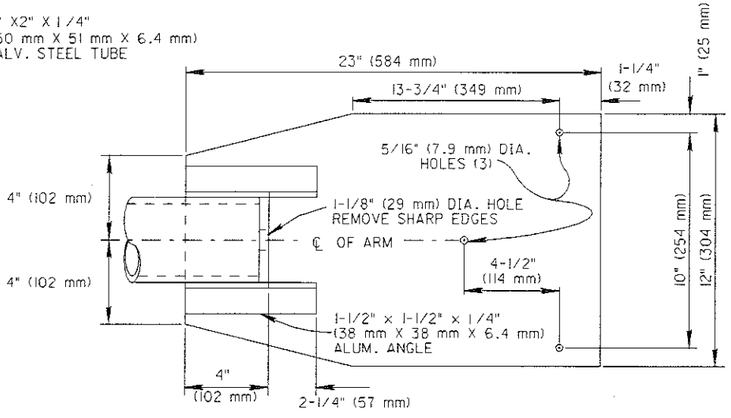


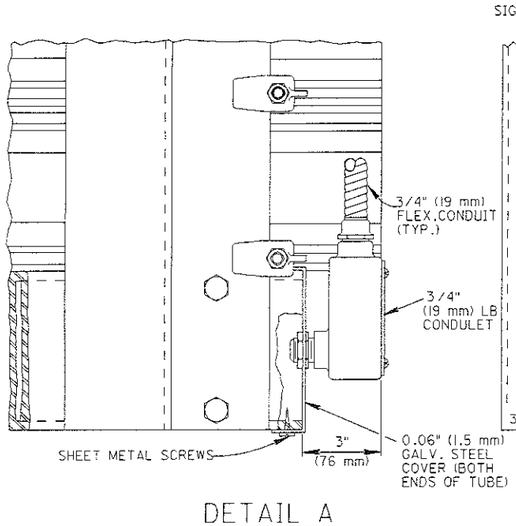


SECTION A-A

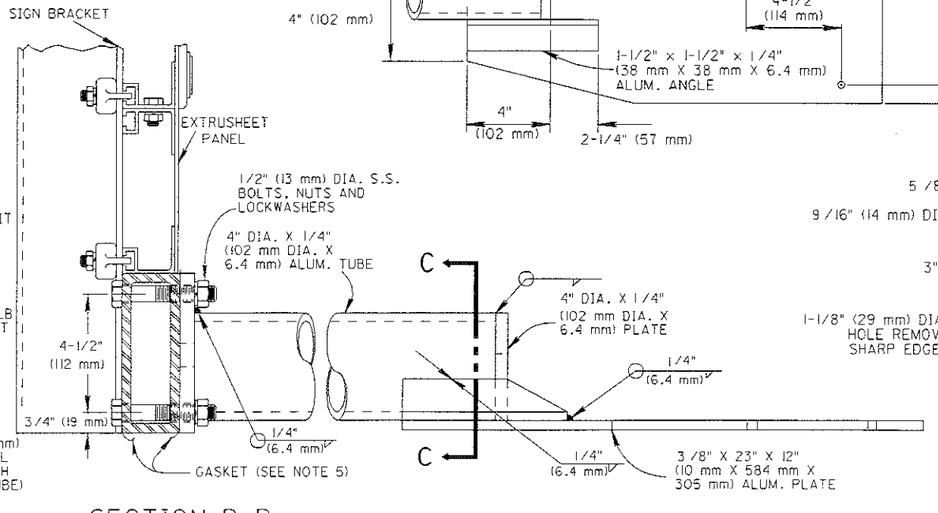
NOTES

1. Use two wire outlets for installations of more than two luminaires per sign.
2. For miscellaneous overhead sign support details, see drawing TC-22.10.
3. The exit panel, attached at the sign top, shall not be considered part of the overall sign height.
4. Adjust luminaires to proper aiming angle according to the manufacturer's instructions.
5. Prevent contact between aluminum and galvanized parts with a minimum 1/16" (1.6 mm) thick chloroprene gasket or approved equal.

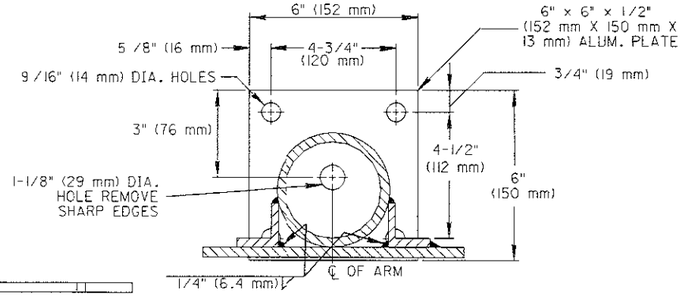




DETAIL A



SECTION B-B



SECTION C-C

4-20-01

MERCURY VAPOR SIGN LIGHTING DETAILS

OFFICE OF TRAFFIC ENGINEERING

TC-31.21

1/2

LAM

OVERALL SIGN HEIGHT	SUPPORT ARM LENGTH "G"	LAMP WATTS	ANSI LAMP CODE	BALLAST TYPE
5'-0" TO 6'-0"	2'-9"	100	H38HT-100	CMRI-100(a)
6'-6" TO 7'-6"	3'-3"	175	H39KB-175	CMRI-175(a)
8'-0" TO 11'-0"	4'-3"	175	H39KB-175	CMRI-175(a)
11'-6" TO 14'-0"	5'-9"	250	H37KB-250	CMRI-250(a)

(a)=OPERATING VOLTAGE

SIGN LENGTH (FEET)	NUMBER OF LUMINAIRES	LUMINAIRE & SUPPORT ARM SPACING (INCHES)					NUMBER OF BRACKETS	SIGN BRACKET SPACING (INCHES)				
4	1	24	24				2	6	36	6		
5		30	30					6	48	6		
6		36	36					6	60	6		
7		42	42					6	72	6		
8		48	48					12	72	12		
9		54	54					12	84	12		
10		60	60					12	96	12		
11		66	66					18	96	18		
12	2	36	72	36			3	6	66	66	6	
13		42	72	42				6	72	72	6	
14		48	72	48				12	72	72	12	
15		54	72	54				18	72	72	18	
16		48	96	48				12	84	84	12	
17		54	96	54				18	84	84	18	
18		48	120	48				12	96	96	12	
19		54	120	54				18	96	96	18	
20	3	48	72	72	48		4	12	72	72	72	12
21		54	72	72	54			18	72	72	72	18
22		48	84	84	48			6	84	84	84	6
23		54	84	84	54			12	84	84	84	12
24		48	96	96	48			18	84	84	84	18
25		54	96	96	54			6	96	96	96	6
26	4	48	72	72	72	48		12	96	96	96	12
27		54	72	72	72	54		18	96	96	96	18

OVERALL SIGN HEIGHT	SUPPORT ARM LENGTH "G"	LAMP WATTS	ANSI LAMP CODE	BALLAST TYPE
1.5 m TO 1.8 m	825 mm	100	H38HT-100	CMRI-100(a)
1.95 m TO 2.25 m	975 mm	175	H39KB-175	CMRI-175(a)
2.4 m TO 3.45 m	1275 mm	175	H39KB-175	CMRI-175(a)
3.6 m TO 4.2 m	1725 mm	250	H37KB-250	CMRI-250(a)

(a)=OPERATING VOLTAGE

SIGN LENGTH (METERS)	NUMBER OF LUMINAIRES	LUMINAIRE & SUPPORT ARM SPACING (mm)					NUMBER OF BRACKETS	SIGN BRACKET SPACING (mm)				
1.2	1	600	600				2	150	900	150		
1.5		750	750					150	1200	150		
1.8		900	900					150	1500	150		
2.1		1050	1050					150	1800	150		
2.4		1200	1200					300	1800	300		
2.7		1350	1350					300	2100	300		
3.0		1500	1500					300	2400	300		
3.3		1650	1650					450	2400	450		
3.6	2	900	1800	900			3	150	1650	1650	150	
3.9		1050	1800	1050				150	1800	1800	150	
4.2		1200	1800	1200				300	1800	1800	300	
4.5		1350	1800	1350				450	1800	1800	450	
4.8		1200	2400	1200				300	2100	2100	300	
5.1		1350	2400	1350				450	2100	2100	450	
5.4		1200	3000	1200				300	2400	2400	300	
5.7		1350	3000	1350				450	2400	2400	450	
6.0	3	1200	1800	1800	1200		4	300	1800	1800	1800	300
6.3		1350	1800	1800	1350			450	1800	1800	1800	450
6.6		1200	2100	2100	1200			150	2100	2100	2100	150
6.9		1350	2100	2100	1350			300	2100	2100	2100	300
7.2		1200	2400	2400	1200			450	2100	2100	2100	450
7.5		1350	2400	2400	1350			150	2400	2400	2400	150
7.8	4	1200	1800	1800	1800	1200		300	2400	2400	2400	300
8.1		1350	1800	1800	1800	1350		450	2400	2400	2400	450

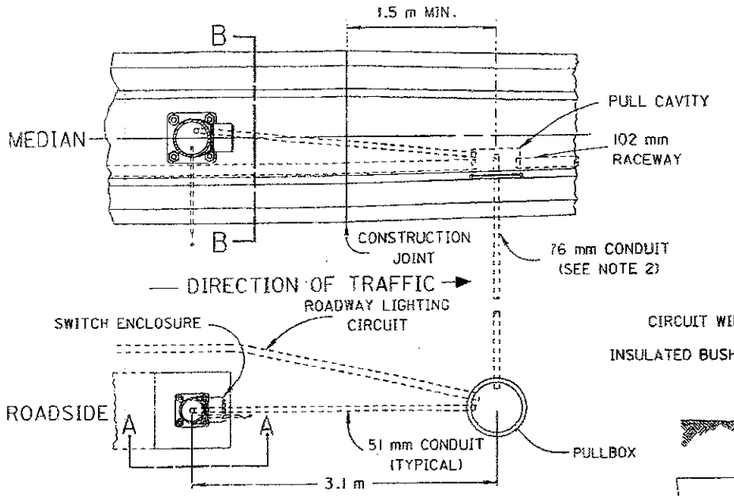
MERCURY VAPOR SIGN LIGHTING DETAILS

OFFICE OF TRAFFIC ENGINEERING

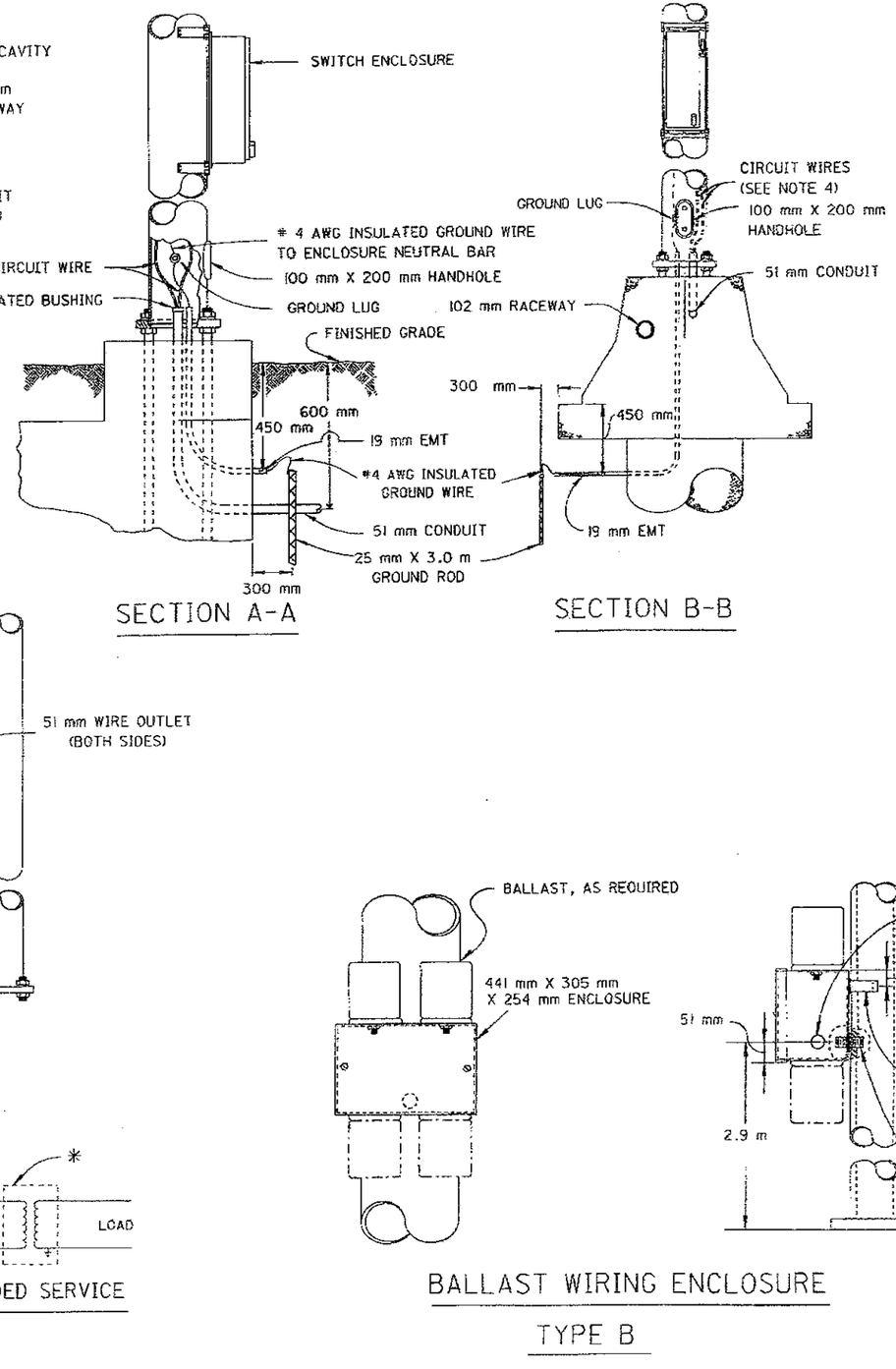
4-20-01

TC-31.21

LAM

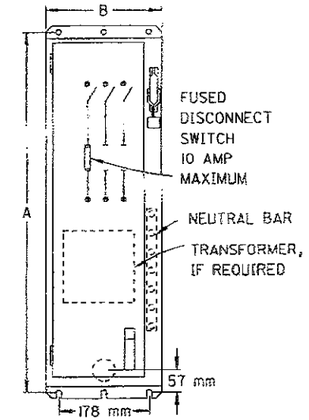


SIGN SERVICE



SECTION A-A

SECTION B-B



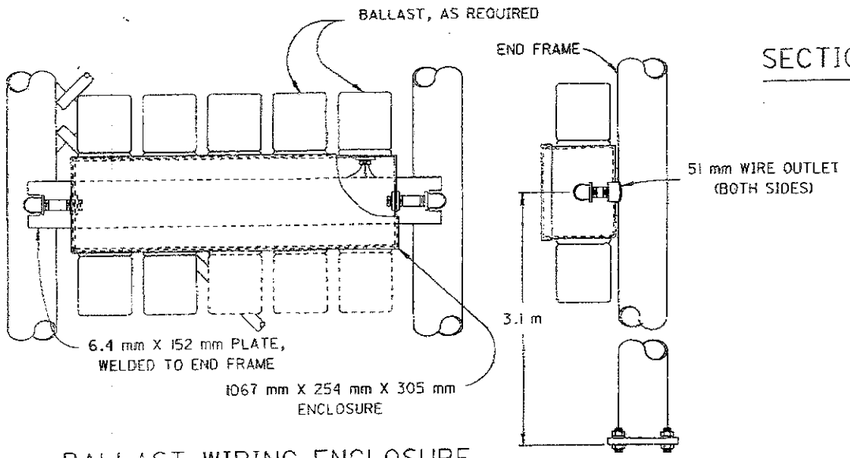
SWITCH ENCLOSURE

NOMINAL DIMENSIONS

TYPE	A	B	DEPTH
X	406 mm	228 mm	168 mm

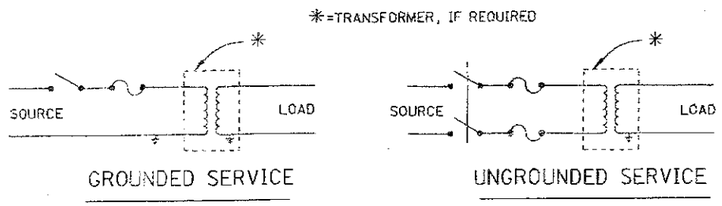
NOTES

1. ELECTRICAL SERVICE FOR OVERHEAD SIGN SUPPORTS SHALL, WHENEVER POSSIBLE, BE PROVIDED FROM A ROADWAY LIGHTING PULLBOX.
2. 76 mm CONDUIT SHALL BE USED TO PROVIDE CROSSOVER ACCESS BETWEEN SIGN SUPPORT AND LIGHTING CIRCUITS.
3. GROUND ONLY THE TRANSFORMER SECONDARY SIDE WITH UNGROUNDED SERVICE.
4. THE CIRCUIT WIRE FROM PULLBOX TO DISCONNECT SWITCH SHALL BE THE SAME AS THE LIGHTING CIRCUIT WIRE.



BALLAST WIRING ENCLOSURE

TYPE A



GROUNDED SERVICE

UNGROUNDED SERVICE

ENCLOSURE WIRING

BALLAST WIRING ENCLOSURE

TYPE B

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

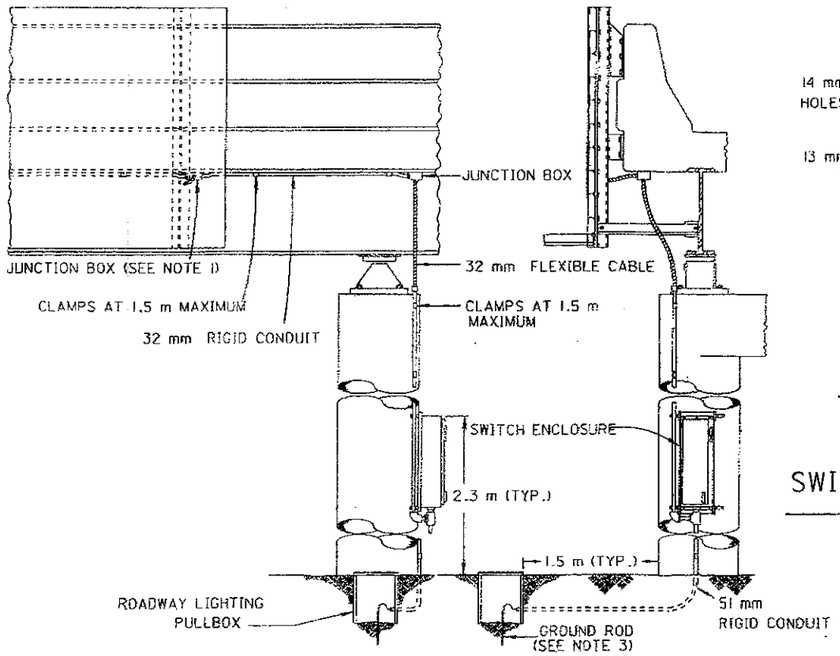
DATE 03/31/94

SIGN SERVICE
DETAILS I

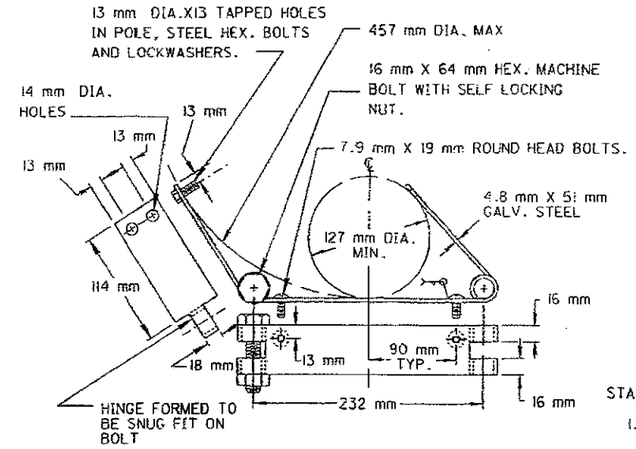
STANDARD CONSTRUCTION DRAWING TC-32.10M

APPROVED Greg Lucas ENGR. OF DESIGN SERVICES

WCC

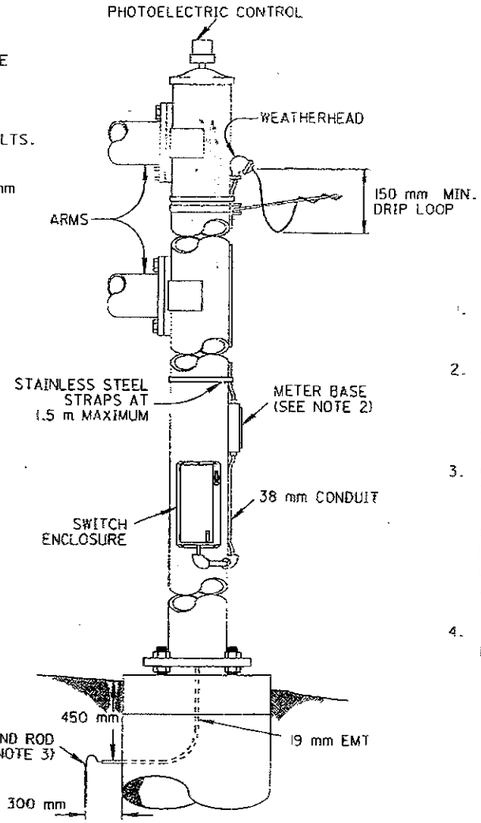


OVERPASS STRUCTURE MOUNTED SIGN



SWITCH ENCLOSURE MOUNTING BRACKET

OVERHEAD SIGN SUPPORT

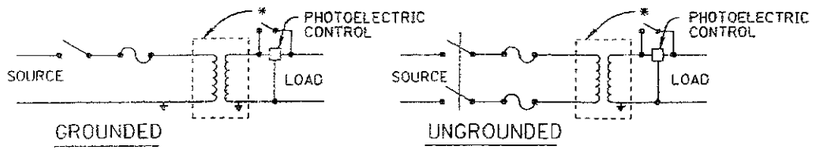


DIRECT DROP SERVICE

NOTES

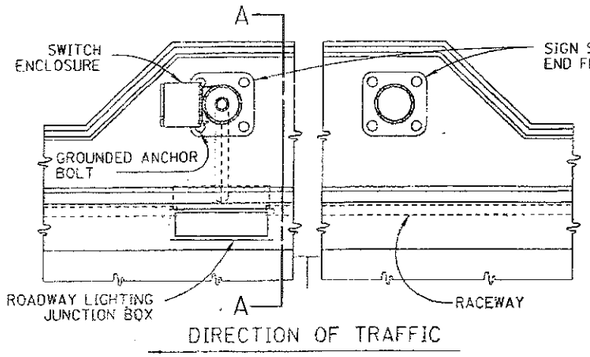
1. WIRING FROM THE JUNCTION BOX BEHIND THE SIGN TO THE LUMINAIRES SHALL BE AS SHOWN ON DRAWING TC-31.21M.
2. THE METER BASE SHALL BE FURNISHED BY THE POWER SUPPLYING AGENCY AND SHALL BE INSTALLED BY THE CONTRACTOR WHEN METERING IS REQUIRED. THE TOP OF THE METER BASE SHALL NOT EXCEED 1.8 METERS ABOVE THE GROUND.
3. GROUNDING SHALL BE ACCOMPLISHED BY USE OF A #4 INSULATED GROUND WIRE FROM THE SWITCH ENCLOSURE NEUTRAL BAR TO THE GROUND ROD OR STRUCTURE GROUNDING SYSTEM WITH CONNECTION TO THE GROUNDING LUG ON POLE TYPE SUPPORTS. ALL CONDUITS OR SUPPORT MEMBERS CONTAINING CIRCUIT WIRE SHALL BE INSTALLED TO PROVIDE A CONTINUOUS GROUND TO THE NEUTRAL BAR.
4. THE ALTERNATE GROUND CONNECTION SHALL BE USED FOR BRIDGES WITHOUT STEEL BEAMS.

* = TRANSFORMER, IF REQUIRED

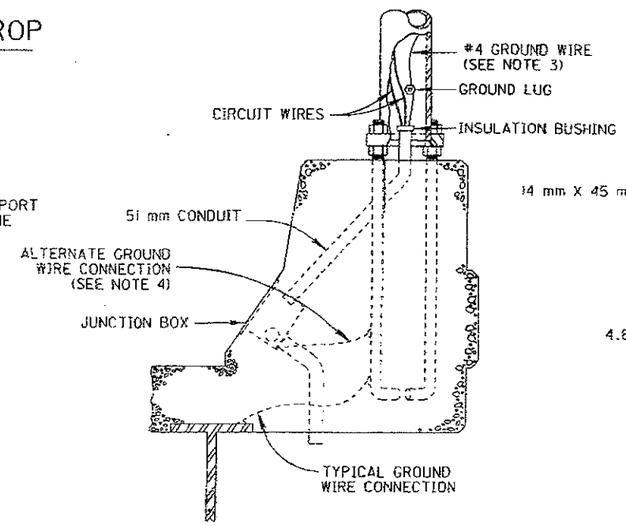


WIRING FOR DIRECT DROP

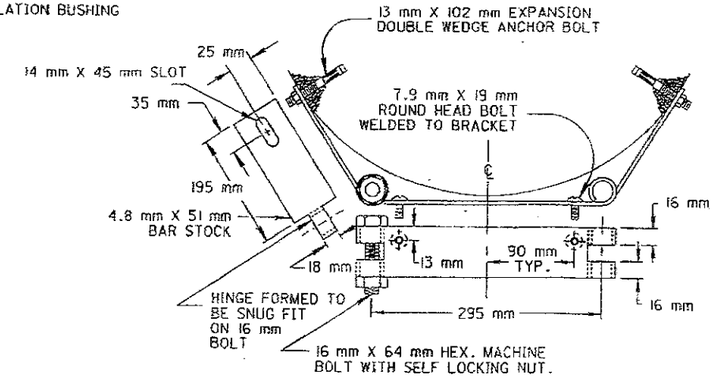
(UNCONTROLLED SERVICE)



OVERHEAD SIGN ON PARAPET



SECTION A-A



SWITCH ENCLOSURE MOUNTING BRACKET

BRIDGE

METRIC

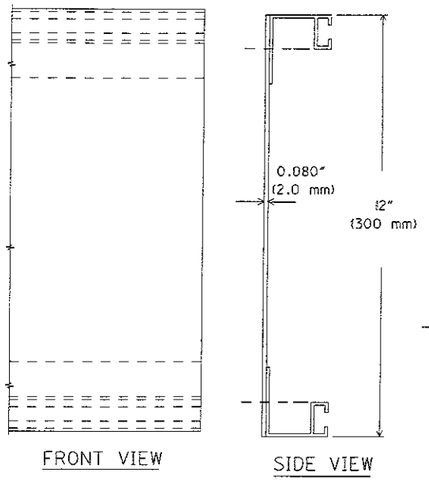
BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL	DATE 03/31/94
SIGN SERVICE DETAILS II	
STANDARD CONSTRUCTION DRAWING TC-32.11M	

APPROVED _____ ENGR. OF DESIGN SERVICES

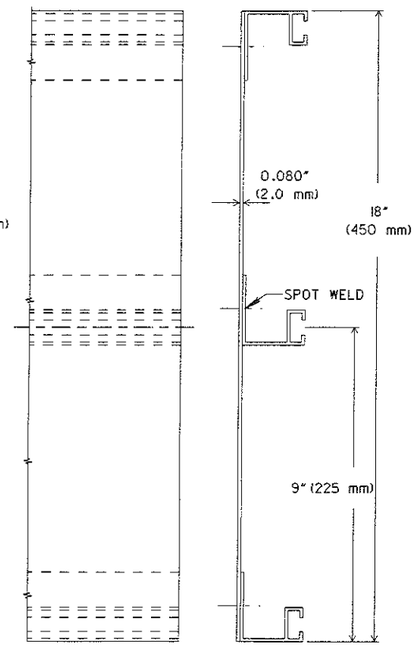
WCC

12" (300 mm) BOLTED EXTRUSHEET PANEL



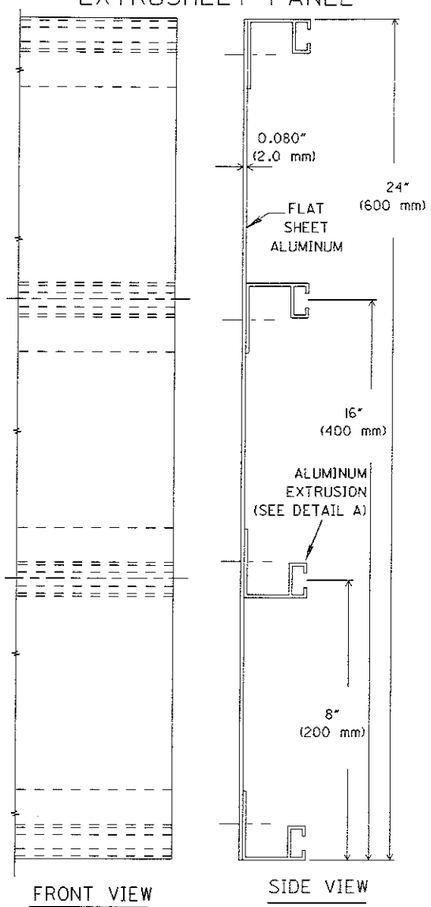
FRONT VIEW SIDE VIEW

18" (450 mm) BOLTED EXTRUSHEET PANEL

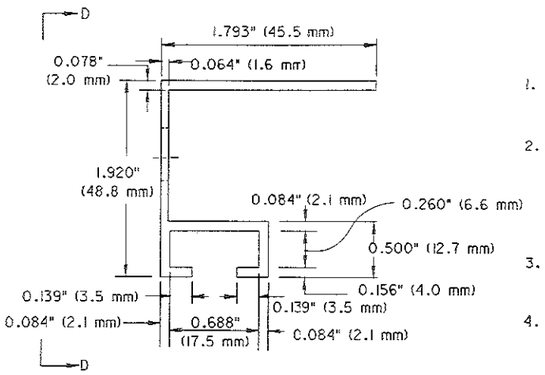


FRONT VIEW SIDE VIEW

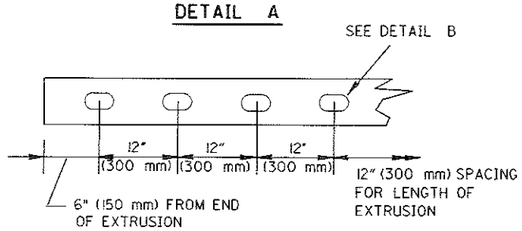
24" (600 mm) BOLTED EXTRUSHEET PANEL



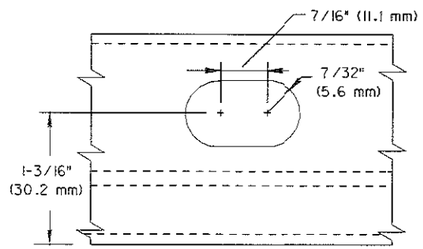
FRONT VIEW SIDE VIEW



DETAIL A



SECTION D-D

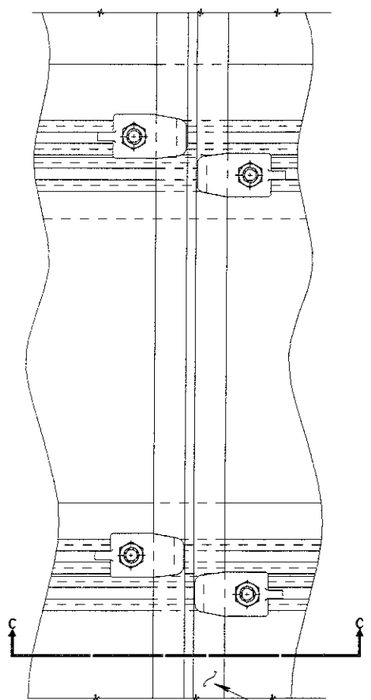


DETAIL B

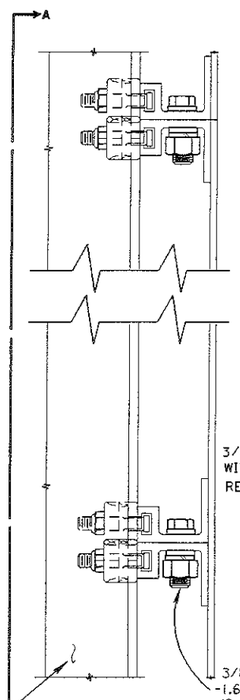
NOTES

1. Spot weld aluminum extrusions to flat sheet aluminum at a maximum center-to-center spacing of 4" (100 mm).
2. Use a combination of 12", 18" and 24" (300 mm, 450 mm and 600 mm) panels erected horizontally to attain required sign height. The use of 30", 36", 42" and 48" (750 mm, 900 mm, 1050 mm and 1200 mm) panels is optional.
3. Bolt panels together 6" (150 mm) from each end, and at a maximum center-to-center spacing of 24" (600 mm) between end bolts.
4. Fasten panels to each vertical structural beam support with mounting clips, alternately at each horizontal extrusion, both sides at each joint, and both sides at the top and bottom edges of the sign.
5. Fasten panels to each vertical z-bar support with mounting clips at each horizontal extrusion, at each joint and at the top and bottom edges of the sign.
6. For 6" (150 mm) glare shield extrusheet panel, change the 12" (300 mm) dimension in the 12" (300 mm) bolted extrusheet panel detail to 6" (150 mm). All other details remain the same.

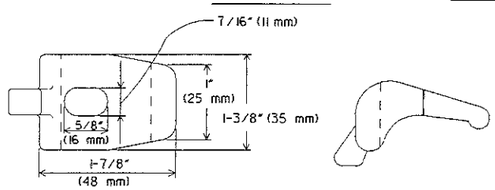
PANEL HEIGHT		NO. OF STIFFENERS
INCHES	MILLIMETERS	
6	150	2
12	300	2
18	450	3
24	600	4
30	750	4
36	900	5
42	1050	6
48	1200	7



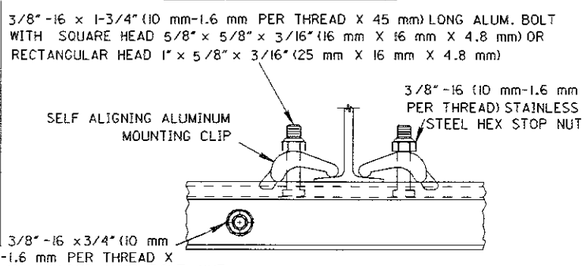
SECTION A-A



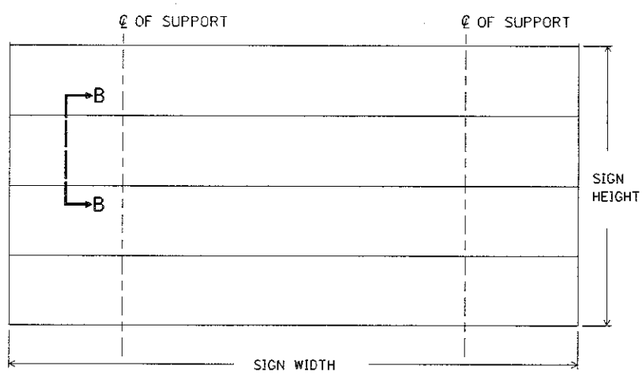
SECTION B-B



MOUNTING CLIP DETAIL



SECTION C-C



GENERAL ARRANGEMENT

ALUMINUM BOLTED EXTRUSHEET PANEL SIGN

4-20-01

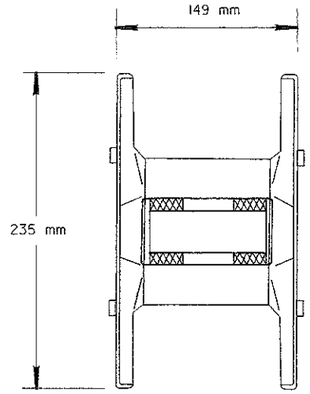
OFFICE OF TRAFFIC ENGINEERING

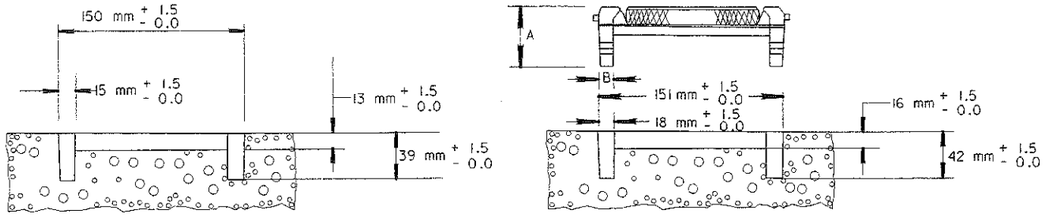
TC-51.11

1 / 1

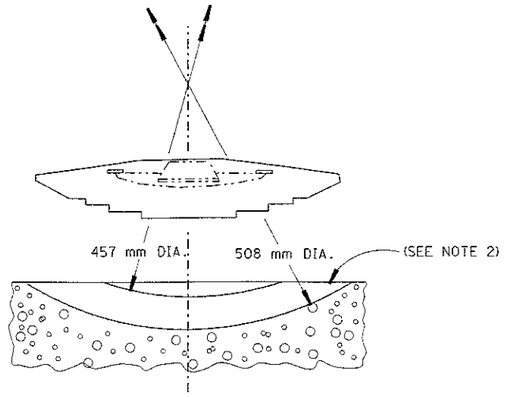
lam

	CONVENTIONAL TYPE	LOW PROFILE TYPE
A	44 mm	43 mm
B	12 mm	15 mm





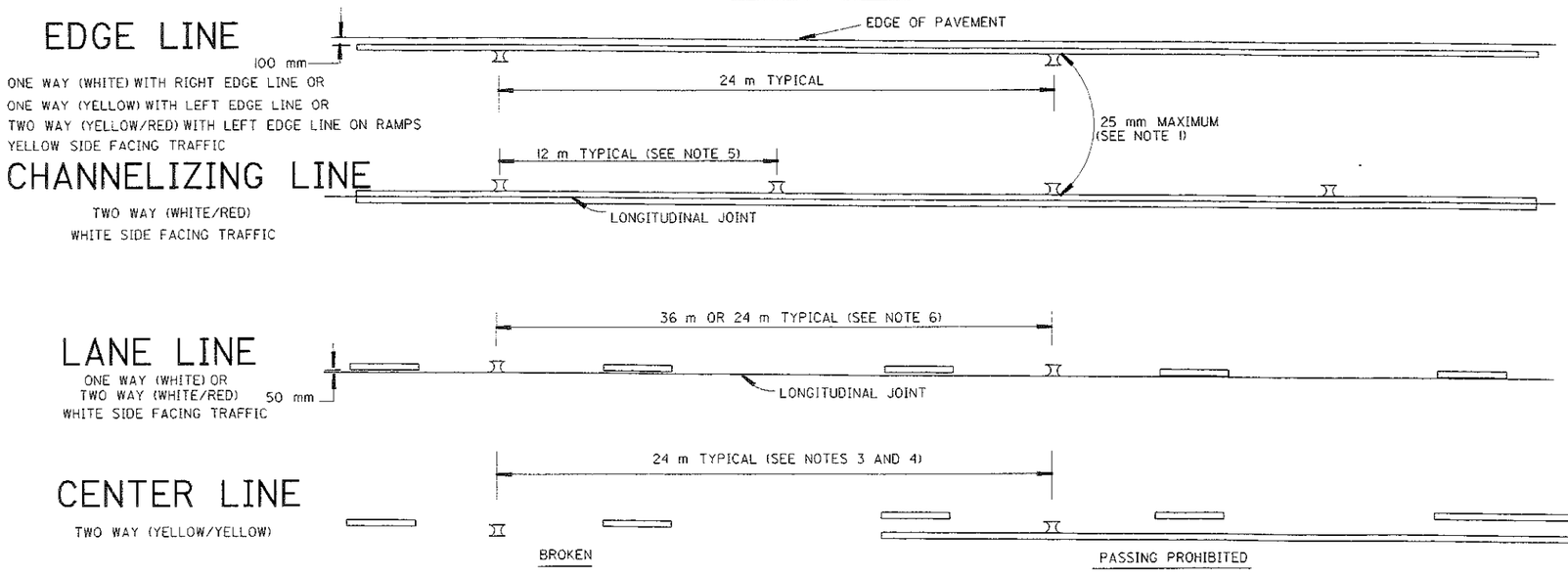
OPTIONAL FOR CONVENTIONAL TYPE



NOTES

1. CENTER LINE MARKERS SHALL BE PLACED BETWEEN THE TWO LINES. MARKERS INSTALLED ALONG AN EDGE LINE OR CHANNELIZING LINE SHALL BE PLACED SO THAT THE CASTING IS NO MORE THAN 25 mm FROM THE NEAR EDGE OF THE LINE. MARKERS INSTALLED ALONG A LANE LINE OR DASHED YELLOW CENTER LINE SHALL BE PLACED BETWEEN AND IN LINE WITH THE DASHES. MARKERS SHALL NOT BE PLACED OVER THE LINES EXCEPT WHERE THE LINES DEVIATE VISIBLY FROM THEIR CORRECT ALIGNMENT, AND THEN ONLY WITH THE APPROVAL OF THE ENGINEER.
2. TO FACILITATE THE CUTTING OF THE TWO PARALLEL SLOTS AND INTERVENING CONCAVED SURFACE SIMULTANEOUSLY, IT IS RECOMMENDED THAT AN ARBOR AND SAW BLADES ASSEMBLY BE USED. FOR ADDITIONAL DETAILS AND TOLERANCES OF THE CASTING AND ARBOR-SAW ASSEMBLY CONTACT THE CASTING MANUFACTURE.
3. FOR HORIZONTAL CURVE RADIUS OF 380 METERS OR LESS, THE SPACING OF THE CENTER LINE MARKERS SHALL BE REDUCED TO 12 m BETWEEN P.C. OR T.S. AND P.T. OR S.T.
4. FOR HORIZONTAL CURVE RADIUS OF 250 METERS OR LESS, THE SPACING OF THE CENTER LINE MARKERS MAY BE REDUCED TO 6 m BETWEEN P.C. OR T.S. AND P.T. OR S.T. WHEN USING 6m SPACING, 12 RAISED PAVEMENT MARKERS AT 12 m SPACING SHALL BE INSTALLED ON EACH END OF THE 6 m SPACING.
5. WHEN A CHANNELIZING LINE IS LESS THAN 24 m IN LENGTH, ONE RAISED PAVEMENT MARKER SHALL BE PLACED AT EACH END OF THE LINE AND ONE SHALL BE PLACED IN THE CENTER OF THE LINE.
6. RAISED PAVEMENT MARKERS ON LANE LINES ON FREEWAYS SHALL BE ONE WAY WHITE SPACED AT 36 METERS. ALL OTHER RAISED PAVEMENT MARKERS ON LANE LINES ON MULTILANE OR DIVIDED ROADWAYS SHALL BE TWO WAY RED/WHITE SPACED AT 24 METERS.

CASTING AND SAW CUT DETAILS



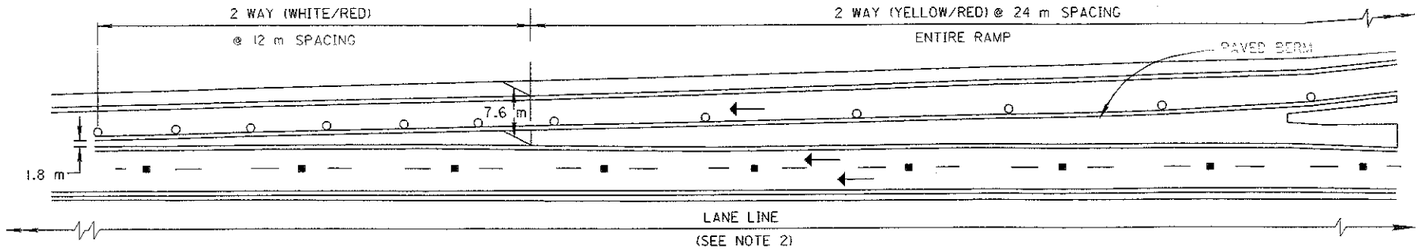
TYPICAL RAISED PAVEMENT MARKER PLACEMENT WITH LONGITUDINAL PAVEMENT MARKINGS

metric units

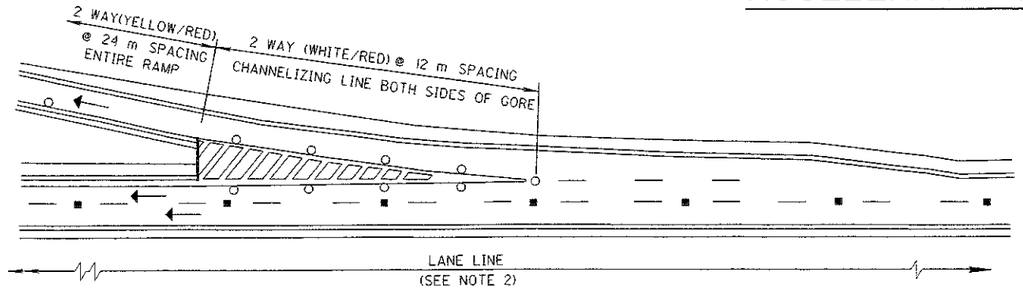
OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL	DATE 11/03/93 11/01/95
RAISED PAVEMENT MARKER INSTALLATION DETAILS	
STANDARD CONSTRUCTION DRAWING TC-65.10M	
APPROVED ADMINISTRATOR	

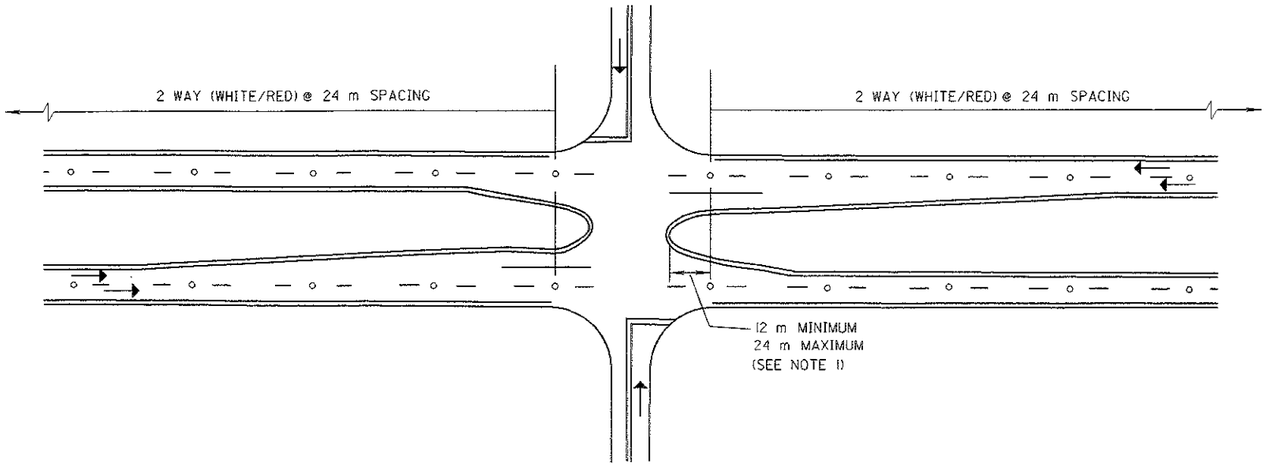
WCC



ACCELERATION LANE

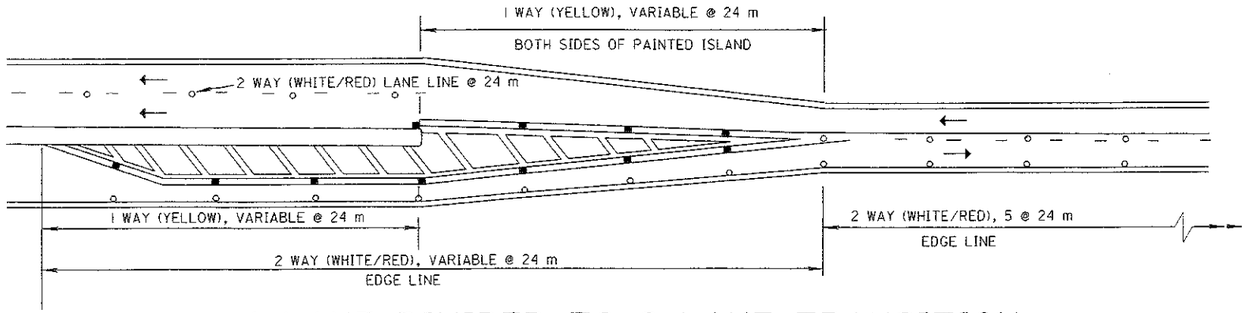


DECELERATION LANE

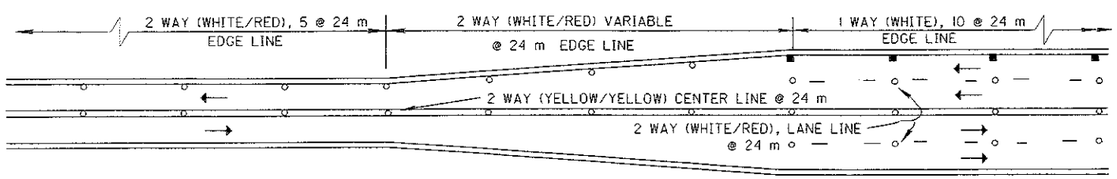


MULTILANE DIVIDED-CONTROLLED ACCESS

(SEE NOTE 2)



4 LANE DIVIDED TO 2 LANE TRANSITION



4 LANE UNDIVIDED TO 2 LANE TRANSITION

NOTES

1. RAISED PAVEMENT MARKERS SHALL NOT BE PLACED IN THE DIRECTIONAL ROADWAYS WITHIN THE INTERSECTION AREA.
2. RAISED PAVEMENT MARKERS ON LANE LINES ON FREEWAYS SHALL BE ONE WAY WHITE SPACED AT 36 METERS. ALL OTHER RAISED PAVEMENT MARKERS ON LANE LINES ON MULTILANE OR DIVIDED ROADWAYS SHALL BE TWO WAY RED/WHITE SPACED AT 24 METERS.

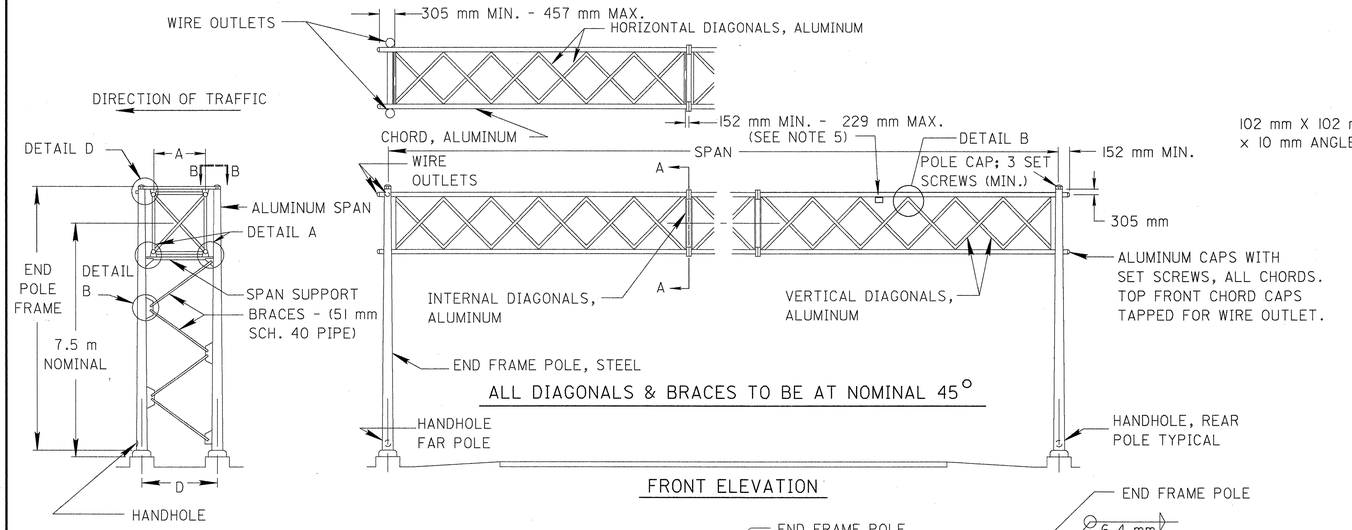
LEGEND

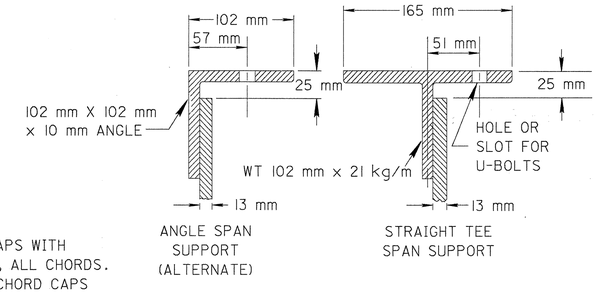
- ■ 1 WAY REFLECTORS
- ○ 2 WAY REFLECTORS

metric units

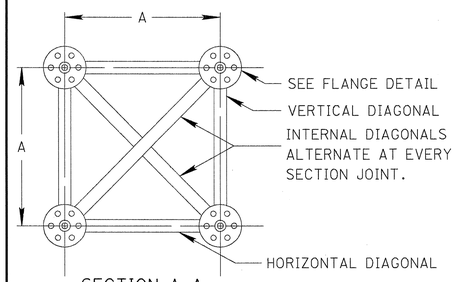
OFFICE OF TRAFFIC ENGINEERING
DIVISION OF ENGINEERING POLICY
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL	DATE 11/03/93 11/01/95
RAISED PAVEMENT MARKER DETAILS 1	
STANDARD CONSTRUCTION DRAWING TC-65.11M	
APPROVED ADMINISTRATOR	

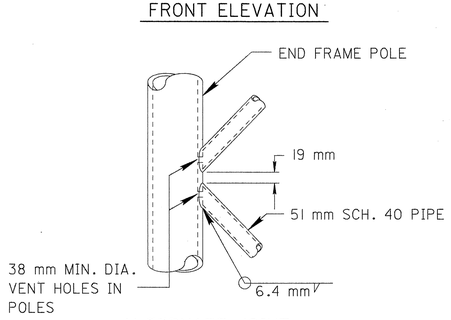




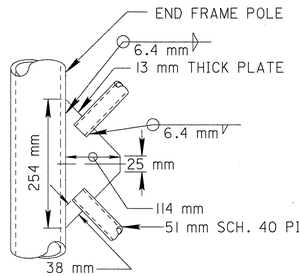
SECTION D-D



SECTION A-A

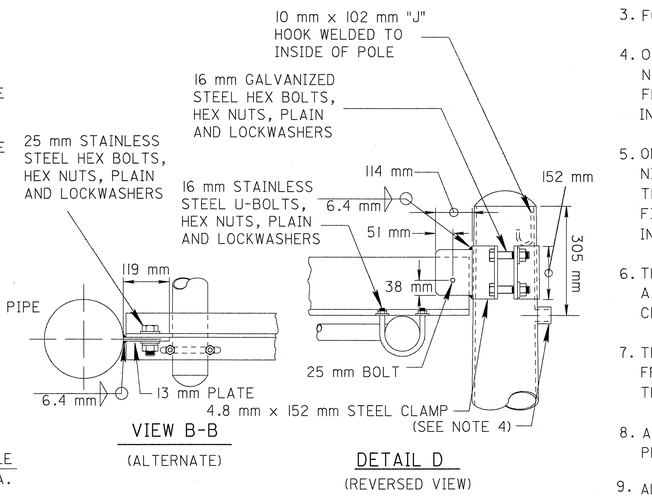


ALTERNATE JOINT



DETAIL B

(SEE NOTE 7)



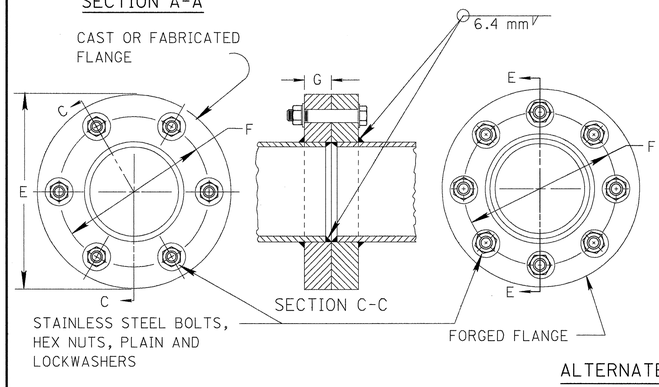
VIEW B-B

(ALTERNATE)

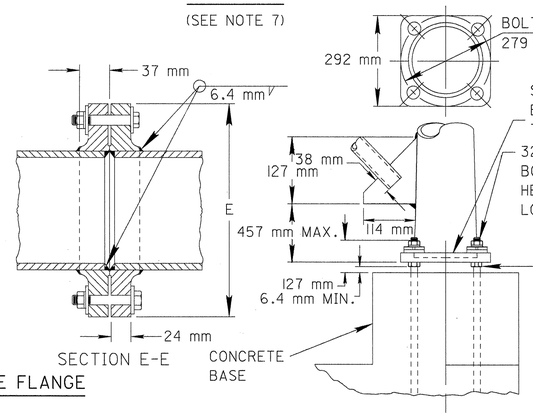
DETAIL D

(REVERSED VIEW)

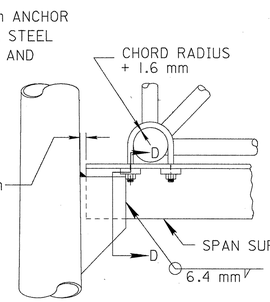
UPPER SPAN SUPPORT

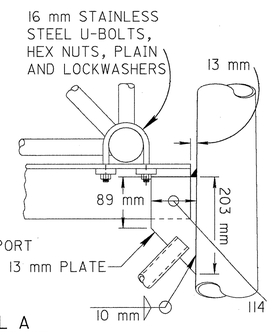


ALTERNATE FLANGE



POLE BASE DETAIL





DETAIL A

LOWER SPAN SUPPORT

FLANGE DETAILS

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED										
DESIGN & ALT. NO.	A	END FRAME		TRUSS		FLANGE			STAINLESS STEEL FLANGE BOLTS	
		D	POLE SIZES	CHORD SIZES	DIAGONALS	E	F	G	NUMBER	DIAMETER
DESIGN 6	0.9 m	1.4 m	7.9 m x 203 x 111 x 6	121 x 4.8	51 x 4.8	235	189	35	6	19
ALT. DES. 6	0.9 m	1.4 m	7.9 m x 168 x 11	114 x 6	48 x 5	229	191		8	16
DESIGN 8	1.5 m	2.0 m	8.4 m x 203 x 105 x 6	140 x 6.4	64 x 4.8	279	216	38	6	19
ALT. DES. 8	1.5 m	2.0 m	8.4 m x 168 x 11	141 x 6.6	60 x 5.5	254	216		8	19

NOTES

1. UNLESS OTHERWISE NOTED, DIMENSIONS AND INSTRUCTIONS APPLY TO BOTH THE STANDARD AND ALTERNATE DESIGNS.
2. FOR SIGN ATTACHMENT ASSEMBLIES TO BE FURNISHED WITH THIS SUPPORT, CONSTRUCTION DETAILS AND LOCATION OF HANDHOLES AND SWITCH ENCLOSURE MOUNTING BRACKETS. SEE DRAWINGS TC-22.10M AND TC-22.20M.
3. FOR FOUNDATION DETAILS, SEE DRAWING TC-21.10M.
4. ONE THREADED STEEL 32 mm PIPE COUPLING OR SHORT NIPPLE SHALL BE WELDED TO THE OUTSIDE OF EACH END FRAME POLE AS SHOWN IN DETAIL "D". ALL SHARP EDGES INSIDE THE POLE AND PIPE COUPLING SHALL BE REMOVED.
5. ONE THREADED ALUMINUM 32 mm PIPE COUPLING OR SHORT NIPPLE SHALL BE WELDED TO THE FRONT TOP CHORD OF THE TRUSS APPROXIMATELY 300 mm OUTBOARD OF THE FIRST SIGN BRACKET FOR EACH SIGN. ALL SHARP EDGES INSIDE THE CHORD AND PIPE COUPLING SHALL BE REMOVED.
6. THE TRUSS SHALL BE CAMBERED A MINIMUM OF 25 mm FOR A SPAN OF 15.2 m OR LESS. THE CAMBER SHALL BE INCREASED 6.4 mm FOR EACH 1.5 m OF SPAN OVER 15.2 m.
7. THE ALTERNATE JOINT CONFIGURATION SHOWN FOR THE END FRAME (DETAIL B) SHALL ALSO BE USED FOR ASSEMBLING THE ALUMINUM TRUSS MEMBERS.
8. ALL UNUSED STEEL COUPLINGS AND WIRE OUTLETS SHALL BE PROVIDED WITH A REMOVABLE GALVANIZED CAST IRON PLUG.
9. ALL UNUSED ALUMINUM COUPLINGS AND WIRE OUTLETS SHALL BE PROVIDED WITH A REMOVABLE ALUMINUM PLUG.
10. CONTACT BETWEEN ALUMINUM AND GALVANIZED PARTS SHALL BE PREVENTED WITH A MINIMUM 1.6 mm THICK CHLOROPHENE GASKET OR APPROVED EQUAL.

METRIC

BUREAU OF DESIGN SERVICES
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OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

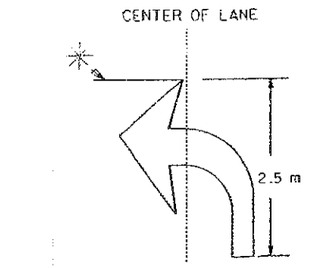
DATE 02/01/94

ALUMINUM TRUSS OVERHEAD SIGN SUPPORT

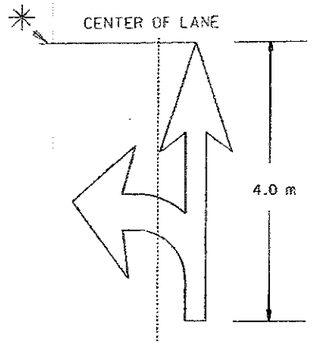
STANDARD CONSTRUCTION DRAWING TC-7.65M

APPROVED Gary L. Craager ENGR. OF DESIGN SERVICES

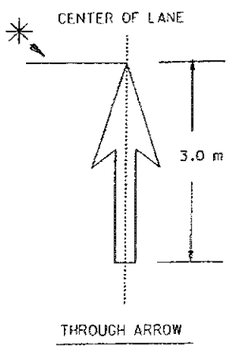
WCC



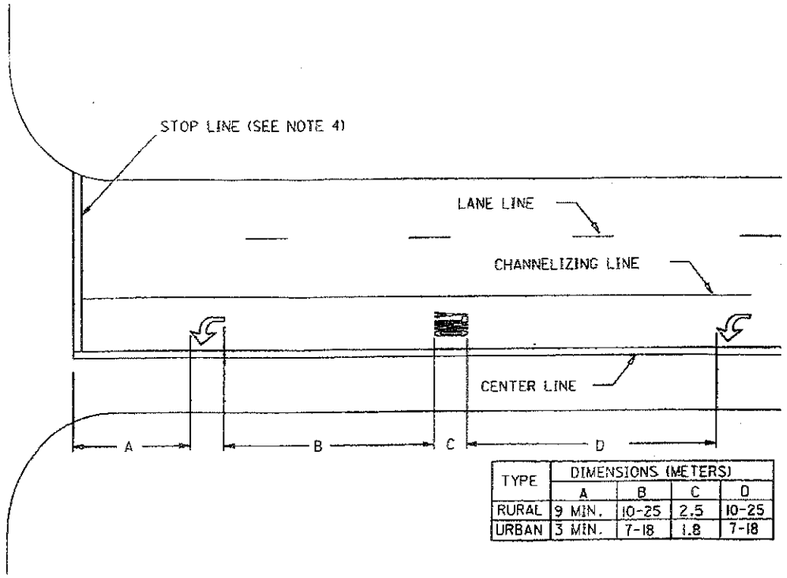
TURN ARROW
(LEFT ARROW SHOWN
RIGHT ARROW OPPOSITE)



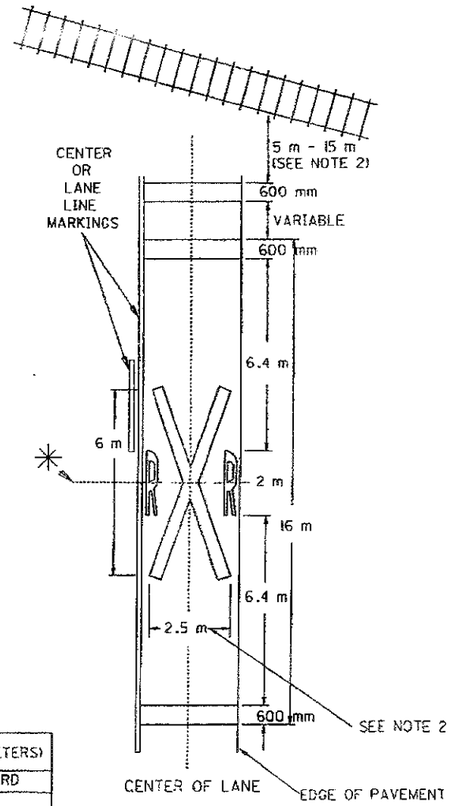
COMBINED ARROW
(THREE HEAD DIRECTIONAL ARROWS
CAN BE ACHIEVED BY THE COMBINATION
OF TURN ARROWS.)

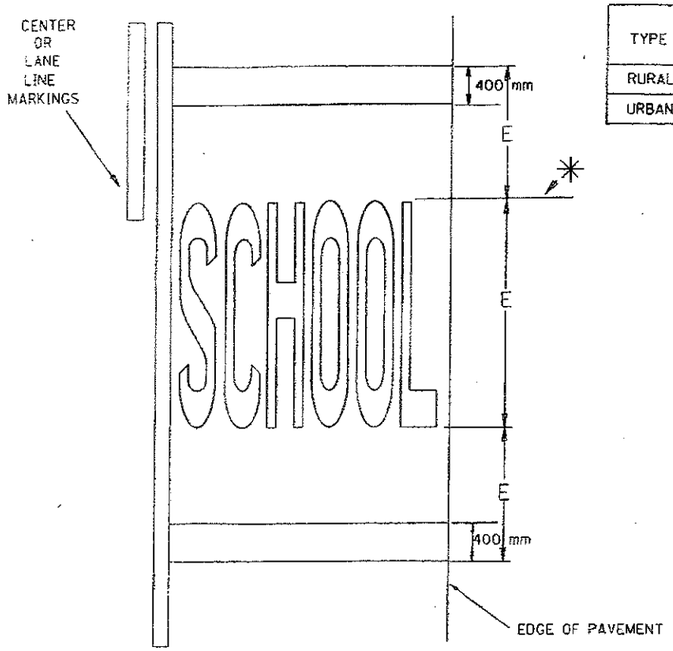


THROUGH ARROW



TYPE	DIMENSIONS (METERS)			
	A	B	C	D
RURAL	9 MIN.	10-25	2.5	10-25
URBAN	3 MIN.	7-18	1.8	7-18





TYPE	E (MILLIMETERS)
	STANDARD
RURAL	2500
URBAN	1800

NOTES

1. ON MULTI-LANE APPROACHES, THE TRANSVERSE LINES USED WITH THE RAILROAD SYMBOLS SHALL EXTEND ACROSS ALL APPROACH LANES AND SYMBOLS SHALL BE PLACED IN EACH APPROACH LANE.

2. THE RAILROAD SYMBOL SHALL BE LOCATED SO THAT THE W-94, "RAILROAD ADVANCE WARNING SIGN", IS WITHIN THE TWO TRANSVERSE BOUNDARY LINES OF THE RAILROAD SYMBOL. THE STOP LINE SHALL BE LOCATED FOR BEST SIGHT DISTANCE WITHIN 5 METERS TO 15 METERS OF THE NEAR EDGE OF THE TRACKS. WIDTH OF "X" MAY VARY ACCORDING TO LANE WIDTH. STOP LINES SHALL BE APPROXIMATELY 2.4 METERS FROM A GATE (IF PRESENT).

3. PREFERABLY, THE WORD "SCHOOL" SHOULD BE CONTAINED IN A SINGLE LANE. ON ONE LANE APPLICATIONS, THE TRANSVERSE LINES SHALL EXTEND ACROSS THE LANE WHICH APPROACHES THE ZONE WITH THE WORD "SCHOOL" CENTERED ACROSS THAT LANE. FOR TWO APPROACH LANES, EACH LANE SHOULD HAVE A SEPARATE WORD "SCHOOL" CENTERED ACROSS IT. ON TWO LANE, TWO WAY ROADWAYS WITH INSUFFICIENT PAVEMENT WIDTH, THE WORD AND TRANSVERSE LINES SHALL EXTEND ACROSS BOTH LANES OF TRAFFIC. ON FOUR LANE, TWO WAY ROADWAYS WITH INSUFFICIENT PAVEMENT WIDTH, THE WORD AND TRANSVERSE LINES SHALL EXTEND ACROSS BOTH LANES ENTERING THE SCHOOL ZONE. CENTER OR LANE LINES SHALL NOT PASS THROUGH THE "SCHOOL" MARKING.

4. THE STOP LINE SHOULD BE PLACED WHERE CROSS-CORNER VISION IS MAXIMUM, IN NO CASE MORE THAN 9.1 METERS OR LESS THAN 1.2 METERS FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY. FOR NORMAL INTERSECTIONS A MAXIMUM DISTANCE OF 3 METERS IS RECOMMENDED.

   IF A MARKED CROSSWALK IS PRESENT, THE STOP LINE SHOULD BE PLACED 1.2 METERS IN ADVANCE OF AND PARALLEL TO THE NEAREST CROSSWALK LINE.

5. FOR TRAFFIC PAINT AND POLYESTER APPLICATION, TEMPLATE GAPS SHALL BE FILLED WITH MARKING MATERIAL IN ACCORDANCE WITH 641.03. FOR EXTRUDED THERMOPLASTIC MATERIAL, THESE GAPS MAY REMAIN UNFILLED IN ACCORDANCE WITH 644.03.

6. USE STANDARD DIMENSIONS CONFORMING TO REQUIREMENTS OF OMUTCD SECTIONS 3B-40, 3B-41 AND 3B-43 WHICH CONFORMS TO THE 1977 METRIC EDITION STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKING WITH ERRATA.

✳ - INDICATES STATION REFERENCE POINT

METRIC

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL

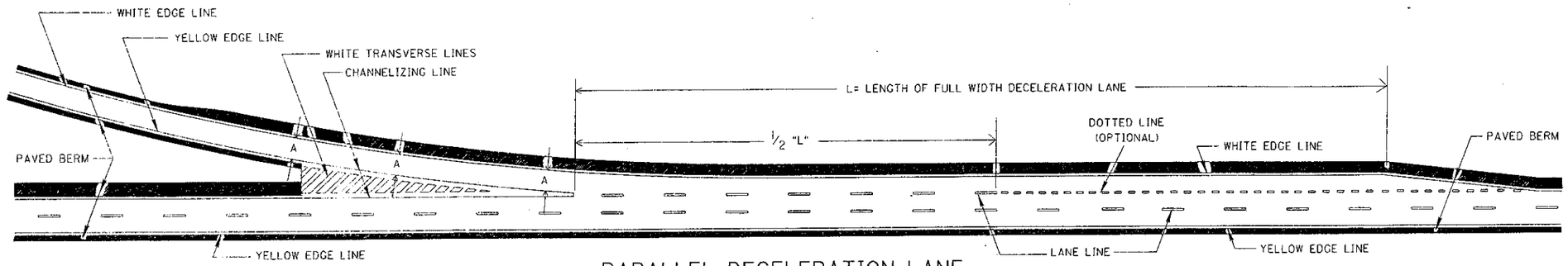
DATE 09/01/93

WORDS , SYMBOLS
AND ARROWS

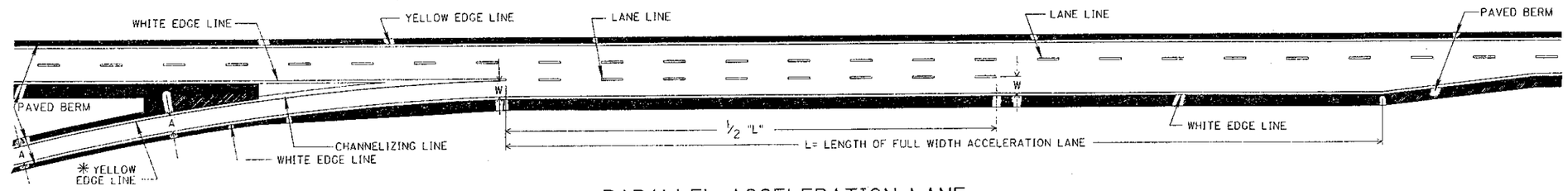
STANDARD CONSTRUCTION DRAWING TC-71.10M

APPROVED _____ ENGR. OF DESIGN SERVICES

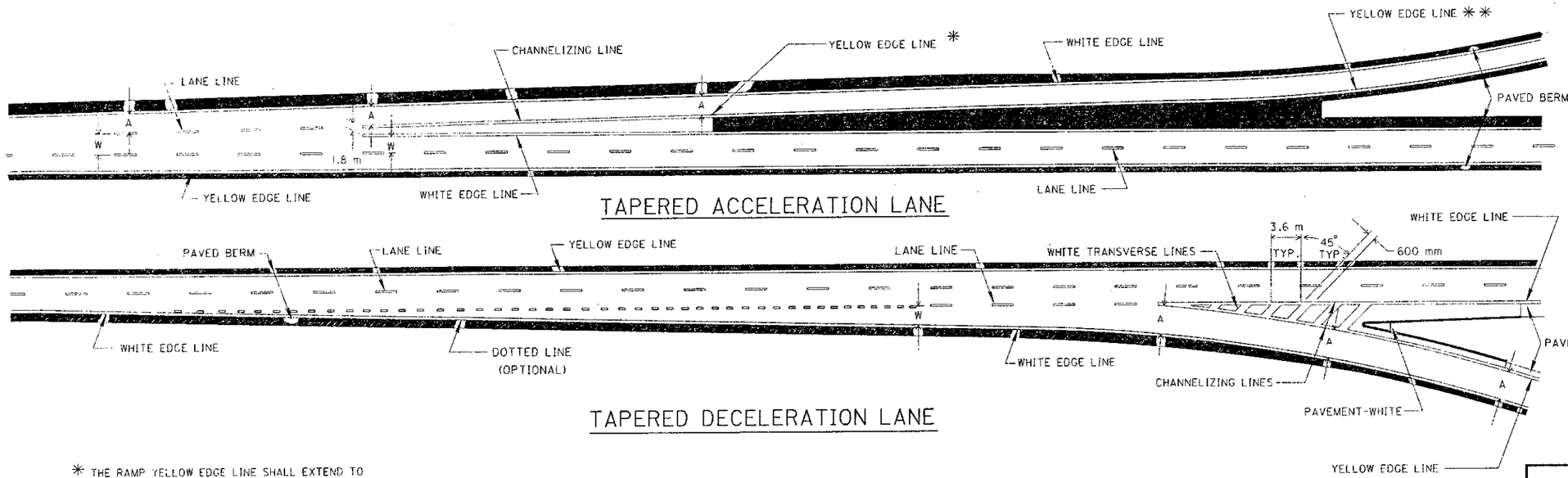
WCC



PARALLEL DECELERATION LANE



PARALLEL ACCELERATION LANE



TAPERED ACCELERATION LANE

TAPERED DECELERATION LANE

✳ THE RAMP YELLOW EDGE LINE SHALL EXTEND TO WHERE THE PAVED BERM ENDS.

✳✳ ANY EXISTING CURB SHALL BE PAINTED WHITE.

A = UNIFORM RAMP WIDTH

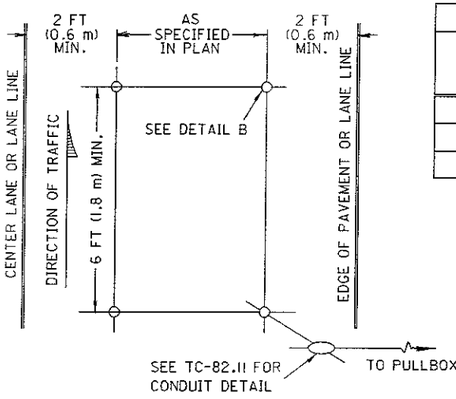
W = LANE WIDTH

METRIC

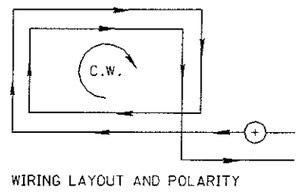
BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL	DATE 09/01/93
FREEWAY ENTRANCE AND EXIT MARKINGS	
STANDARD CONSTRUCTION DRAWING TC-72.20M	
APPROVED D. J. Mrega ENGR. OF DESIGN SERVICES	

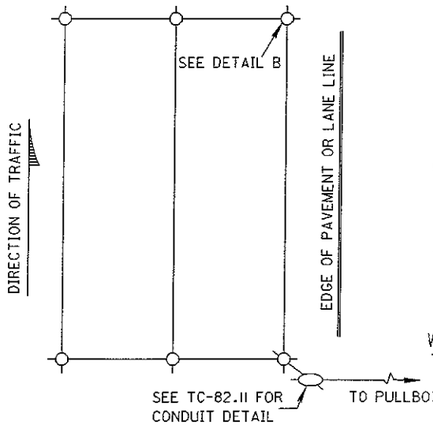
WCC



LOOP CONSTRUCTION	
LOOP PERIMETER	NUMBER OF TURNS
LESS THAN 40 FT (12 m)	4
40 FT (12 m) TO 160 FT (49 m)	3
OVER 160 FT (49 m)	2



TYPICAL DETECTOR LOOP DETAILS



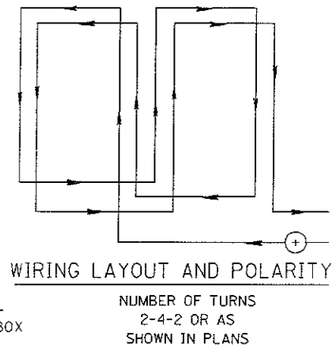
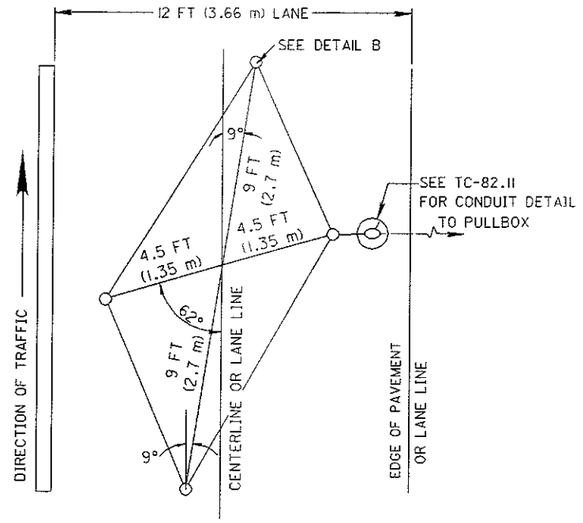
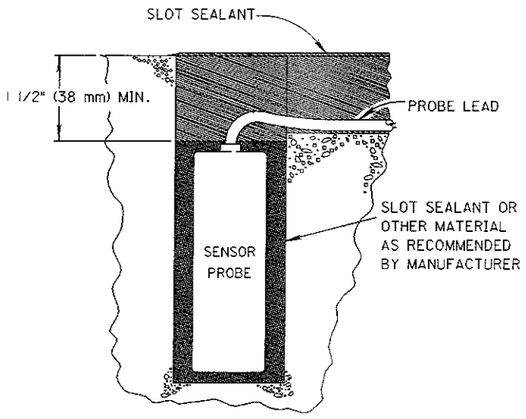


FIGURE 8 (QUADRUPOLE) LOOP DETAILS



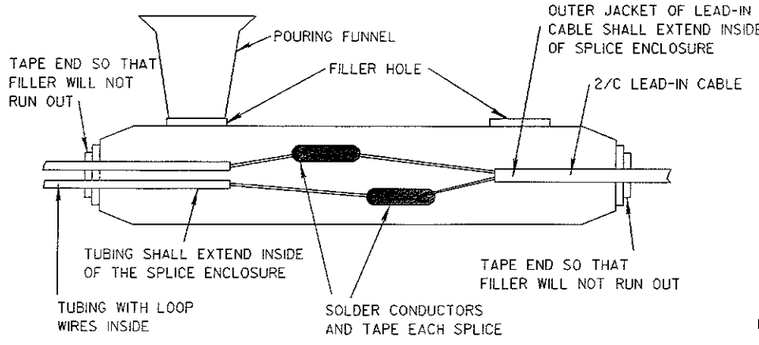
OTHER SIZES CAN BE DESIGNATED AS LONG AS THE ANGLES REMAIN THE SAME AS SHOWN AND THE DIMENSION RATIO REMAINS 2:1.

ANGULAR DESIGN DETECTION LOOP DETAIL



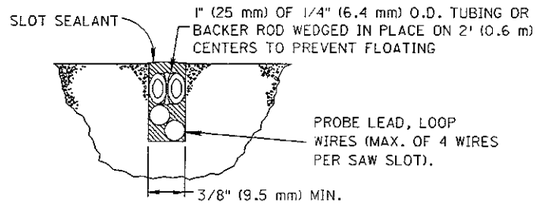
THE MAGNETOMETER HOLE SIZE SHALL BE APPROXIMATELY 3/4" (19 mm) LARGER THAN THE DETECTOR PROBE DIAMETER AND A DEPTH AS RECOMMENDED BY THE MANUFACTUER OR AS DIRECTED BY THE ENGINEER.

MAGNETOMETER SENSOR PROBE DETAIL



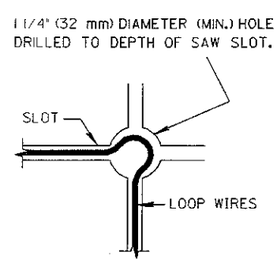
1. LOOP DETECTOR WIRE TO LEAD-IN CABLE SPLICES WITHIN THE ENCAPSULATED SPLICE ENCLOSURE SHALL BE SOLDERED.
2. IF A PULLBOX IS NOT SPECIFIED IN THE PLANS, THE WATERPROOF SPLICE ENCLOSURE SHALL BE LOCATED IN THE FIRST ENTERED POLE OR PEDESTAL, EXCEPT IF THE CONTROLLER CABINET IS MOUNTED ON THAT POLE OR PEDESTAL, IN WHICH CASE THE LOOP WIRES SHALL BE ROUTED DIRECTLY INTO THE CABINET.
3. VISIBLE AIR BUBBLES (VOIDS) OF 1/4" (6 mm) OR GREATER MAY BE CAUSE FOR REJECTION OF THE SPLICE.

SPLICE ENCLOSURE DETAIL



1. MINIMUM SAW SLOT DEPTH: ASPHALT 4" (100 mm), CONCRETE 2" (50 mm)
2. LOOP DETECTOR WIRE IN TUBING SHALL BE AS SPECIFIED IN CMS TABLE 732.19.
3. LOOP DETECTOR SEALANT SHALL BE A PREQUALIFIED PRODUCT IN ACCORDANCE WITH SUPPLEMENT 1048.
4. SAW SLOTS AND PROBE HOLES SHALL BE THOROUGHLY CLEANED AND DRIED PRIOR TO INSTALLATION OF SEALANT.
5. WIRE INSTALLATIONS IN NEW ASPHALT MAY BE SAWED AND EMBEDDED WITH SEALANT IN A SUB-SURFACE COURSE WITH SUBSEQUENT COVERING BY THE SURFACE COURSE, SUBJECT TO APPROVAL OF THE ENGINEER.

SLOT DETAIL



DETAIL B

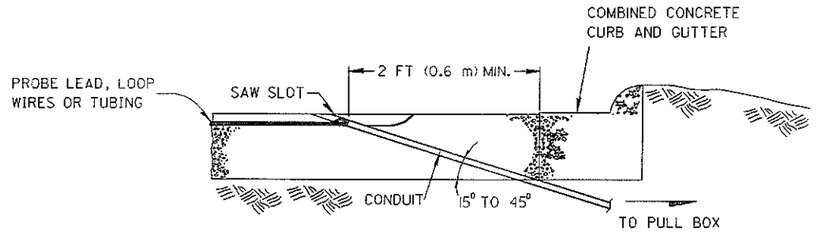
VEHICLE DETECTOR INSTALLATION DETAILS

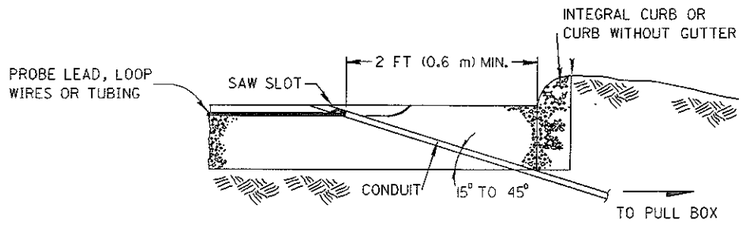
01-19-01

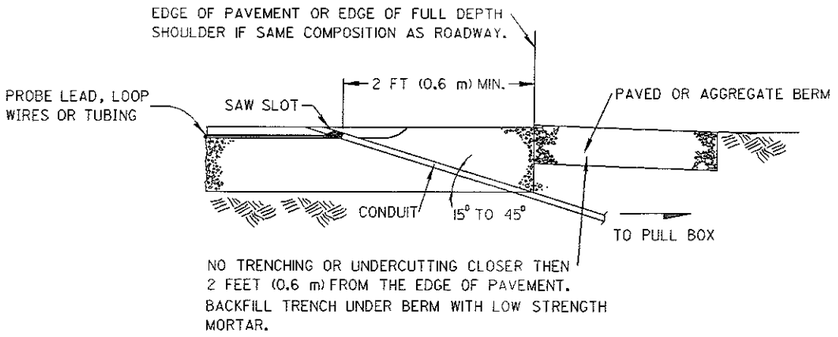
OFFICE OF TRAFFIC ENGINEERING

TC-82.10

JAM

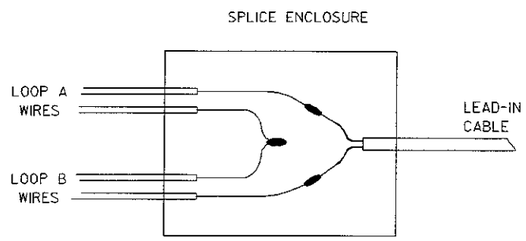






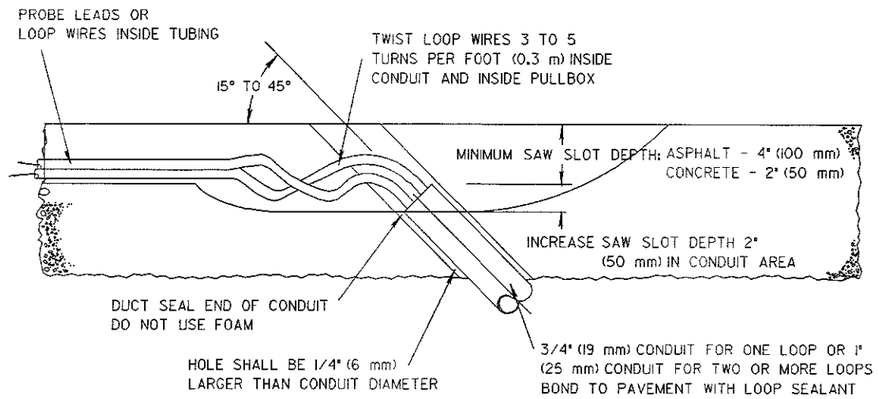
1. THE DRILLED HOLE SHALL BE LOCATED AS SHOWN ABOVE AND WITHIN THE FULL DEPTH PAVEMENT. IT SHALL NOT BE DRILLED OR CUT THROUGH THE PAVED BERM, CURB OR CURB AND GUTTER SECTION.
2. IN AREAS OF POOR PAVEMENT CONDITION, THE SAW SLOT DEPTH SHALL BE INCREASED TO INSURE ADEQUATE WIRE EMBEDMENT. ALL FIELD ADJUSTMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

TYPICAL DRILLED HOLE LOCATIONS

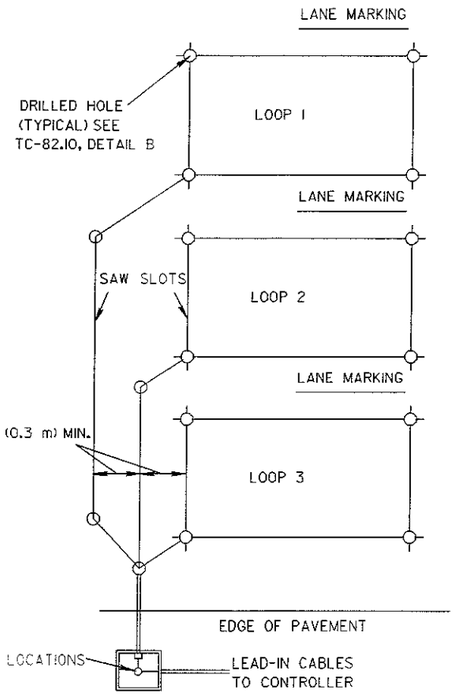


1. WHERE MULTIPLE LOOPS USE A SINGLE LEAD-IN CABLE, SERIES CONNECTIONS SHALL BE USED.
2. A MAXIMUM OF 2 LOOPS (3 WIRE SPLICES) SHALL BE USED IN ANY ENCAPSULATED SPLICE KIT.

SERIES CONNECTIONS

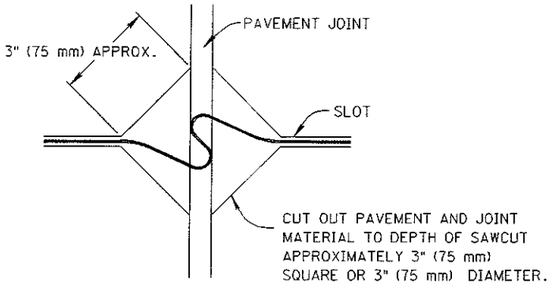


CONDUIT DRILLED HOLE DETAIL



1. ONLY ONE SET OF LOOP WIRES SHALL BE RUN IN A SAW SLOT OVER TO THE CONDUIT HOLE LOCATION.
2. ALL ADJACENT SAW SLOTS SHALL HAVE A MINIMUM DISTANCE OF 1FOOT (0.3 m) BETWEEN THEM. NO SAW SLOT SHALL BE LOCATED WITHIN 1FOOT (0.3 m) OF A LONGITUDINAL OR TRANSVERSE JOINT IN P.C.C. PAVEMENTS IF THE SLOT IS PARALLEL TO THE JOINT.

MULTIPLE LOOP LAYOUT



JOINT CROSSING DETAIL IN P.C.C. PAVEMENTS

01-19-01

VEHICLE DETECTOR INSTALLATION DETAILS

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