SEE SHEET NO. 2
FOR INDEX OF SHEETS

FINAL PLANS

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		1
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

TDLR Inspection is Required

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT
FEDERAL AID PROJECT STP 99(413)MM
ROCKWALL COUNTY
FM 740

NET LENGTH OF PROJECT = 9376.00 FT. = 1.776 MI.

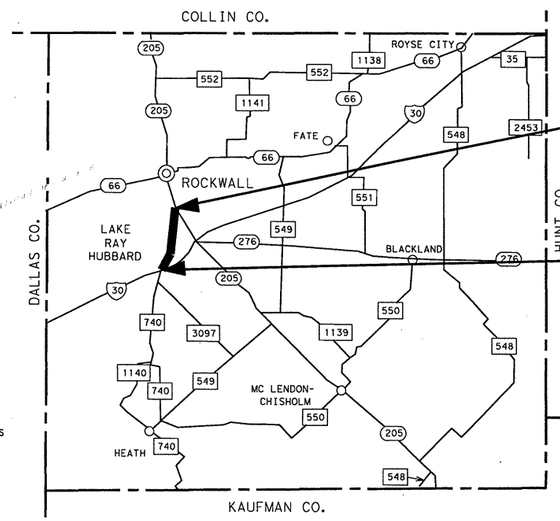
FROM: NORTH OF IH 30
TO: SOUTH OF SH 205

FOR THE CONSTRUCTION OF THE WIDENING OF A NON-FREEWAY FACILITY CONSISTING OF GRADING, DRAINAGE, ASPHALT CONCRETE PAVEMENT, LIME TREATED SUBGRADE, CONCRETE PAVEMENT, PAVEMENT MARKINGS & SIDEWALKS.

DESIGN SPEED = 40 MPH

NOTE:
SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, MARCH 1, 1993, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, DECEMBER, 1993)

THE CONTRACTOR SHALL PROVIDE AND ERECT BARRICADES AND WARNING SIGNS IN ACCORDANCE WITH BC-(1) THRU (9C)-1998 AT POINTS INDICATED AND AT OTHER POINTS AS DIRECTED BY THE ENGINEER.



END PROJECT
CONTROL 1014-03-033
STA 222+60.00
REF MKR 254-0.098

BEGIN PROJECT
CONTROL 1014-03-033
STA 128+84.00
REF MRK 256-0.322

NO EQUATIONS
NO EXCEPTIONS
RAILROAD CROSSINGS-DGNO

CITY OF ROCKWALL

CONCURRENCE 8-24 19 99

Julie Couch
CITY MANAGER

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING 8/16/19 99
David Lott, P.E.
PROJECT ENGINEER

RECOMMEND FOR LETTING 9-7 19 99
Charles R. Tucker, P.E.
DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT

RECOMMEND FOR LETTING 8-24 19 99
Jan M. Heady, P.E.
AREA ENGINEER

RECOMMEND FOR LETTING: 9/7 19 99
FOR [illegible], P.E.
DISTRICT ENGINEER

APPROVED FOR LETTING ____ 19 ____
, P.E.
DIRECTOR, TRAFFIC OPERATIONS

APPROVED FOR LETTING 10-21 19 99
Kamin L. Thomasian, P.E.
for DIRECTOR, DESIGN DIVISION

STATE OF TEXAS
JAN M. HEADY
68712
REGISTERED
PROFESSIONAL ENGINEER

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

David Lott, P.E. 8/16/99
DATE

ROCKWALL STP 99(413)MM

FINAL PLANS

LETTING DATE: **DECEMBER 7, 1999**
DATE WORK BEGAN: **APRIL 6, 2000**
DATE OF COMPLETION: **NOVEMBER 1, 2002**
DATE OF ACCEPTANCE: **NOVEMBER 4, 2002**

FIELD CHANGES:

1 ADDS SPECIAL RDSD SIGNS AS PER TEXAS HOUSE BILL 1425 & 2541/ ADDS PLAN SHEETS 202A, 205A, 210A & 211A
2 ADDS SEWER PIPE TO AVOID A UTILITY CONFLICT/ ADDS PLAN SHEETS 24A, 25A, 26A, 86A, 95A, 97A
3 RELOCATES SEWER PIPE TO AVOID UTILITY CONFLICT/ TIME EXTENSION NO. 1
4 ADDS INSTALLATION OF PREEMPTIVE SIGNAL/ TIME EXTENSION NO. 2
5 ALOWS CONTRACTOR TO ACCESS CTB AT LUNA RD. STOCKPILE/ TIME EXTENSION NO. 3
6 REMOVAL OND REGRADING AREA FOR RIPRAP/ TIME EXTENSION NO. 4
7 ADDS REMOVAL OF PAVEMENT MARKINGS TO CONTRACT (WORD)
8 TEMPORARY SPECIAL SHORING & TWO MONTHS BARRICADES/ TIME EXTENSION NO. 5
9 VOIDED/ INITALLY TIME EXTENSION NO. 6
10 ADDS ADDITIONAL STEEL TO SIDEWALKS NOT SHOWN ON PLANS/ TIME EXTENSION NO. 7
11 VOIDED/
12 COMPENSATION FOR PORTABLE MESSAGE BOARDS
13 ADDS MONO NOSE CONC. MEDIAN THAT WAS LEFT OFF OF THE PLANS
14 ADDS BASE REPAIR TO DRIVEWAYS THROUGHOUT PROJECT/ TIME EXTENSION NO. 8
15 COMPENSATION FOR DIFFERENT KIND OF RETINING WALL (DIFFERENT PRICE)/ TINE EXTENSION NO. 9
16 ADDS PUMP GROUT DUE TO EROSION/ TIME EXTENSION NO. 10
17 BRINGS SIGN MOUNTS UP TO STANDARDS
18 ADDS THREE MONTHS OF BARRICADES TO CONTRACT
19 ADDS ONE MONTH OF ADDITIONAL BARRICADES TO CONTRACT
20 COMPENSATION FOR OVERRUN ON (6") (CONCRETE DRIVEWAYS)

STATE OF TEXAS ★ JAN M. HEADY 69712 REGISTERED PROFESSIONAL ENGINEER

I CERTIFY THAT THE ENGINEERING PORTION OF THIS CONTRACT HAVE BEEN COMPLETED IN CONFORMANCE TO THE CONTRACT SPECIFICATIONS.

Jan M Heady
JAN M. HEADY, P.E.

12-12-02
DATE

Texas Department of Transportation

FED. RD. DIV. NO.				SHEET NO.
6	STP 99 (413) MM			1A
STATE	DIST.	COUNTY		
TEXAS	18	RocKwall		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

LEVELS DISPLAYED 1 2 3 ... 57 58 59 60 61 62 63
ACC: 10-14-97
FILE: us80typ.dgn

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17-26, 24A, 25A 26A	SUMMARY SHEETS
27-28	PROJECT LAYOUT
29-64	TRAFFIC CONTROL PLAN
65-73	PLAN PROFILE SHEETS
74-81	RETAINING WALLS
82-83	DRAINAGE AREA MAP
84-88 86A	HYDRAULIC COMPUTATIONS
89-103 95A, 97A	DRAINAGE SHEETS
104	MODIFIED WINGWALL DETAILS
105-107	RIPRAP AND SILL DETAILS
108-116	REMOVAL SHEETS
117-125	STRIPING, SIDEWALKS, CROSSWALKS AND IRRIGATION DETAILS
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163	TY C INLET DETAILS
164	TYPE I & II MANHOLE DETAILS
165	PRECAST CONCRETE BOX SEWER
166	PAVEMENT MARKINGS (WORDS & ARROWS)
167	CONTROLLER FOUNDATION DETAILS
168	LOOP DETECTOR INSTALLATION DETAILS
169	MA-D-96 (DAL)
170	SERVICE POLE DETAILS
171	SIGNS
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174	CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED SIGNALS (DAL)
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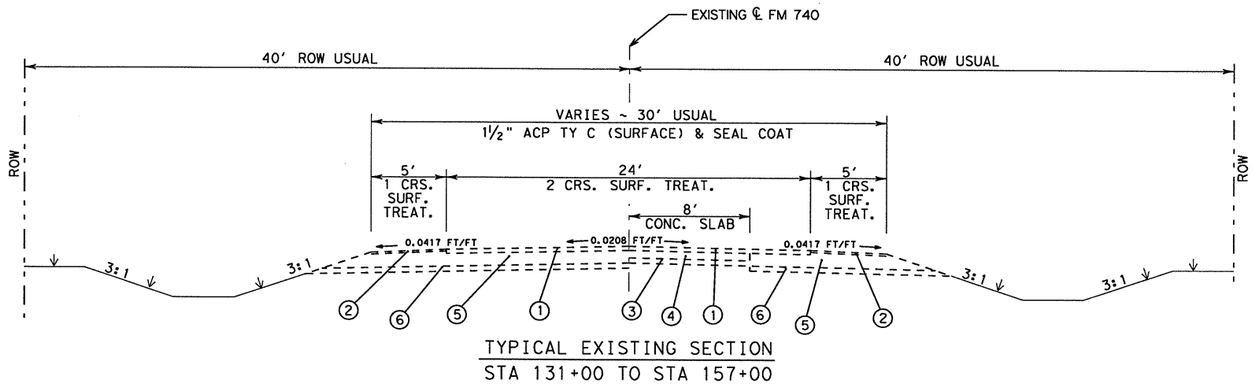
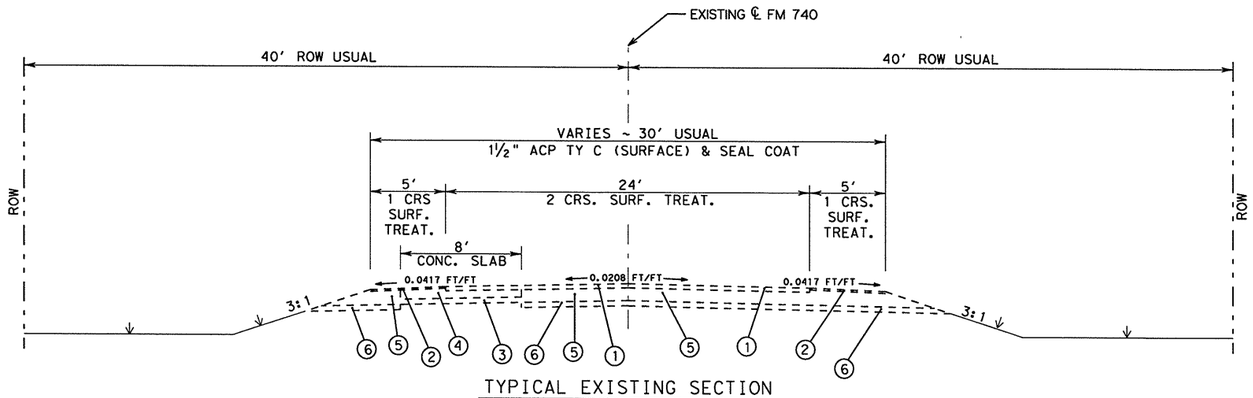
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



TYPICAL EXISTING SECTION
STA 131+00 TO STA 157+00

LEGEND

① EXIST. 2 COURSE SURFACE TREATMENT
② EXIST. 1 COURSE SURFACE TREATMENT
③ EXIST. 6" CONCRETE SLAB
④ EXIST. 6" COMPACTED FLEX BASE
⑤ EXIST. 10" COMPACTED FLEX BASE
⑥ EXIST. 4" LIME TREATED SUBGRADE



TYPICAL EXISTING SECTION
STA 174+00 TO STA 222+99.60

REFERENCE FILES | HORIZONTAL & VERTICAL ALIGNMENT | DRAINAGE | REMOVALS

DESIGN FILES
740TYP.DGN

1-14-98

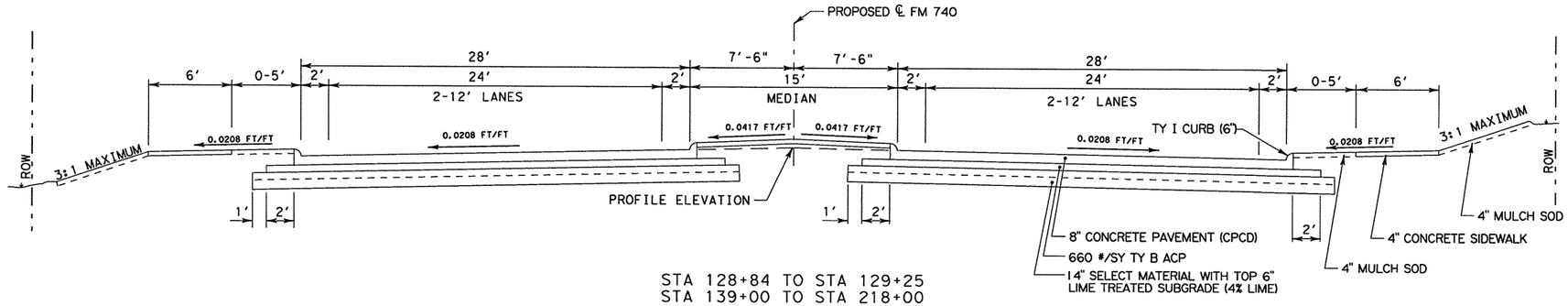
STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999
David Lott, P.E.

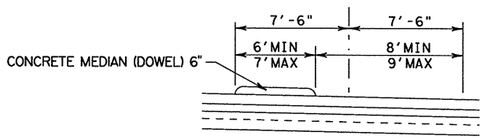
TYPICAL SECTIONS
SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		3
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

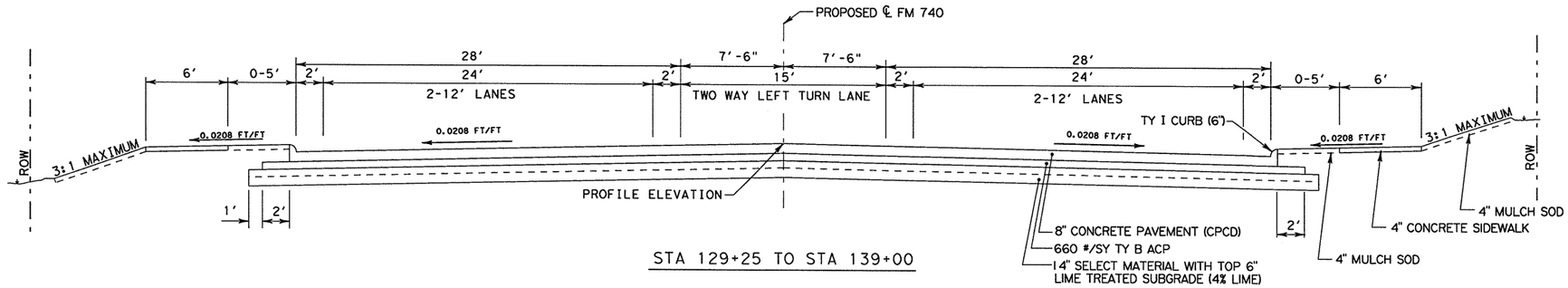
EXT 4410



STA 128+84 TO STA 129+25
STA 139+00 TO STA 218+00



TYPICAL MEDIAN SECTION
LEFT TURN LANE



STA 129+25 TO STA 139+00

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

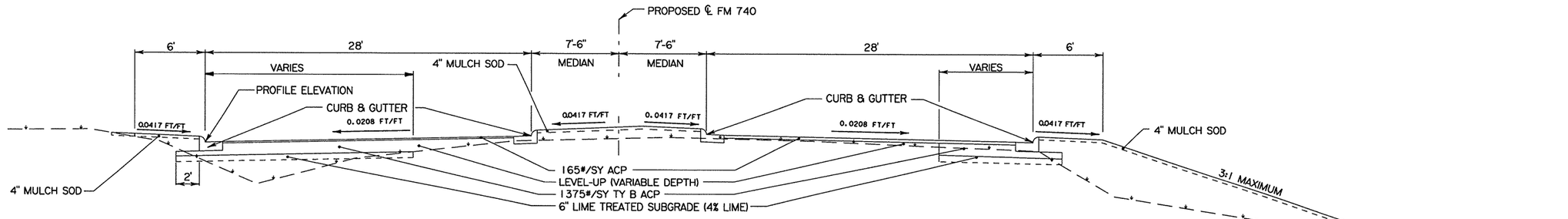
TYPICAL SECTIONS
SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		4
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

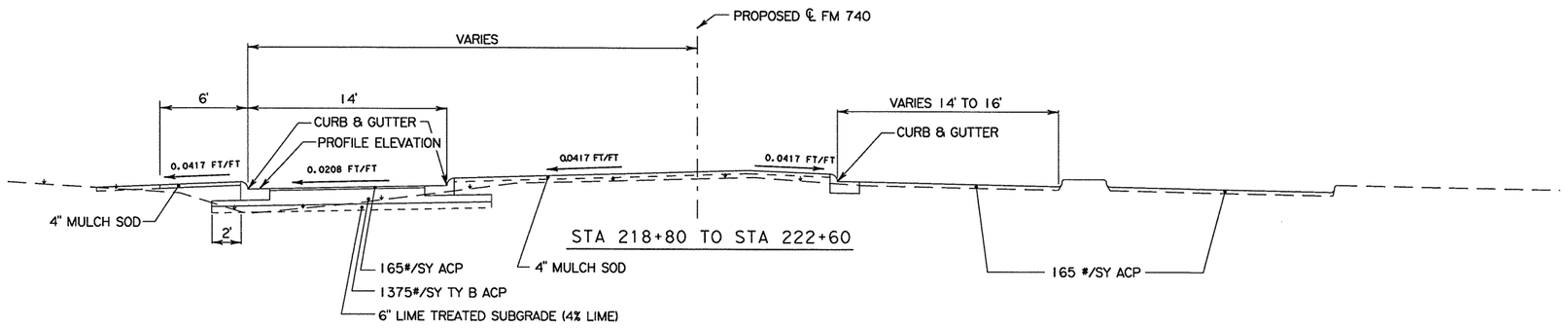
FXT 4409

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE	REMOVALS
DESIGN FILES	1		1
740TYP.DGN			

12-22-97



STA 218+00 TO STA 218+80



STA 218+80 TO STA 222+60

REMOVALS

DRAINAGE

HORIZONTAL & VERTICAL ALIGNMENT

REFERENCE FILES

DESIGN FILES

FM740TYP.DGN 1

12-22-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/99, 1999

David Lott, P.E.

TYPICAL SECTIONS
SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
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STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FXT 4409

GENERAL NOTES AND SPECIFICATION DATA--

ITEM	DESCRIPTION	GRADING REQUIREMENTS % RETAINED, SIEVES	CONSTANTS LL	CONSTANTS PI	BALL MILL MAX	NOTE
					MAX MIN MAX	
132	EMBK (TY C) (DC) (CL 3)			40 8		
132	EMBK (TY C) (MOD) (DC) (CL 3)			20 8		

MINIMUM COMPACTION REQUIREMENTS FOR BASE COURSES
% DENSITY AS DETERMINED BY COMPACTION RATIO (TEX-114-E)

ITEM	MATERIAL	ROADWAY COURSE	ROADWAY DENSITY	RAMPS COURSE	RAMPS DENSITY
260	LIME TREAT SUBGR	ALL	95	ALL	95

BASIS OF ESTIMATE FOR PERMANENT CONSTRUCTION

ITEM	DESCRIPTION	RATE	UNIT	QUANTITY
168	VEGETATIVE WATERING (SOD) (6 WK)	2.8 GAL/SY/WK	27186 SY	456.72 MG
260	LIME (TY A SLURRY) OR (TY B)	4% BY WT.	79503 SY	795.03 TON

F.R. DIV.6	TEXAS	STP 99(413)MM	SHEET 6
ROCKWALL	COUNTY	HWY FM 740	CONT 1014-3-33

GENERAL NOTES AND SPECIFICATION DATA--

BASIS OF ESTIMATE FOR TEMPORARY EROSION CONTROL ITEMS

ITEM	DESCRIPTION	RATE	UNIT	QUANTITY
164	BRDCST SEED (TEMP) (COOL)	SEE SPECS	-	27186. SY
168	VEGETATIVE WATERING (BRDCST SEED TEMP) (3 WK)	2.8 GAL/SY/WK	27186 SY	228.36 MG

GENERAL:

BENCH MARKS WILL BE SET BY THE TEXAS DEPARTMENT OF TRANSPORTATION FORCES PRIOR TO BEGINNING OF CONSTRUCTION.

PRIOR TO CONTRACT LETTING, REPRODUCIBLE EARTHWORK CROSS SECTIONS WILL BE AVAILABLE AT THE DISTRICT OFFICE.

THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THIS PROPOSED PROJECT WILL BE CONSISTENT WITH THE STATE IMPLEMENTATION PLAN AS PREPARED BY THE TEXAS NATURAL RESOURCES CONSERVATION COMMISSION (TNRCC).

THE DETERMINATION OF THE LIQUID LIMIT OF SOILS SHALL BE IN ACCORDANCE WITH TEST METHOD, TEX-104-E.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING AN ACCURATE VERTICAL AND HORIZONTAL CONTROL THROUGHOUT THE CONTRACT. SURVEY MONUMENTS, FURNISHED BY THE DEPARTMENT, SHALL BE PLACED BY THE CONTRACTOR AT POINTS INDICATED AND AS DETAILED IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL FURNISH THE AREA ENGINEER SURFACE COORDINATES AND THE ELEVATION OF THE SET MONUMENT AND AN AZIMUTH FROM THE MONUMENT TO SOME PROMINENT PHYSICAL FEATURE, PREFERABLY ANOTHER SURVEY MONUMENT ON THE PROJECT. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

IF AT ANY TIME DURING THE CONSTRUCTION OF THIS PROJECT THE CONTRACTOR FALLS MORE THAN 30 DAYS BEHIND HIS SCHEDULE SUBMITTED UNDER PROVISIONS OF ARTICLE 8.2, HE SHALL FURNISH THE ENGINEER WITH AN UPDATED REALISTIC CONSTRUCTION SCHEDULE.

GENERAL NOTES AND SPECIFICATION DATA--

GENERAL:, CONT'D

EXISTING ROADS WITHIN THE LIMITS OF THE PROJECT THAT ARE TO REMAIN TEMPORARILY FOR THE PURPOSE OF HANDLING TRAFFIC THROUGH THE PROJECT WILL BE MAINTAINED BY THE CONTRACTOR IN A MANNER THAT IS ACCEPTABLE TO THE ENGINEER. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

THE CONTRACTOR IS RESPONSIBLE FOR STABILIZING ALL UNPAVED AREAS OF THE PROJECT WITH A MINIMUM 70% DENSITY OF VEGETATIVE COVER. THIS IS TO BE ACCOMPLISHED UTILIZING THE ITEMS IN THIS CONTRACT.

THE ENVIRONMENTAL DOCUMENT PREPARED FOR THIS PROJECT BY THE DEPARTMENT IS AVAILABLE FOR ANYONE TO PURCHASE AND READ FROM THE DISTRICT OFFICE.

THE FOLLOWING STANDARD DETAIL SHEETS HAVE BEEN MODIFIED:

MA-D-96 SMA-80(1)-96 SMA-80(2)-96

THE CONTRACTOR SHALL EXCAVATE WITH CARE AROUND THE BASE OF THE TREE LT C/L STA 199+25 SO AS NOT TO DAMAGE THE ROOT SYSTEM.

A TEXAS DEPARTMENT OF TRANSPORTATION LABORATORY WILL PERFORM ONLY THE TEST REQUIRED BY THE "AREA ENGINEER'S AND INSPECTORS' CONTRACT ADMINISTRATION HANDBOOK - GUIDE SCHEDULE OF SAMPLING AND TESTING", OR AS SPECIFIED BY THE SPECIFICATIONS, AT DEPARTMENT EXPENSE. ADDITIONAL TESTING, IF REQUIRED AS THE RESULT OF A CHANGE OF MATERIAL SOURCES PROPOSED FOR USE BY THE CONTRACTOR, AN ADDITIONAL MIXTURE DESIGN PROPOSED FOR USE BY THE CONTRACTOR, INITIAL FAILURE TO MEET THE CONTRACT PLANS AND SPECIFICATIONS, OR ANY OTHER CAUSE UNDER THE CONTROL OF THE CONTRACTOR, SHALL BE AT THE CONTRACTOR'S EXPENSE. THE TEXAS DEPARTMENT OF TRANSPORTION LABORATORY WILL PERFORM TESTS AT A RATE THAT TXDOT IS CHARGED BY COMMERCIAL LABORATORY. THIS RATE WILL INCLUDE ALL HANDLING, PROCESSING AND TESTING EXPENSE. SUCH REIMBURSEMENTS WILL BE MADE TO THE DEPARTMENT BY MAKING DEDUCTIONS FROM ANY MONIES DUE OR TO BECOME DUE TO THE CONTRACTOR. A LIST OF PRICES CHARGED FOR EACH TEST CAN BE OBTAINED FROM THE DALLAS DISTRICT LABORATORY.

ITEM 6:

THE CONTRACTOR WILL BE REQUIRED TO FURNISH THE ENGINEER WITH A COPY OF CALCULATIONS AND MEASUREMENTS FOR ALL VEHICLES DESCRIBED IN ARTICLE 6.7 AS MAY BE NECESSARY TO ESTABLISH THE MAXIMUM LEGAL WEIGHT FOR EACH VEHICLE HAULING MATERIALS ON OR DELIVERING MATERIALS TO THE PROJECT.

F.R. DIV.6	TEXAS	STP 99(413)MM	SHEET 7
ROCKWALL	COUNTY	HWY FM 740	CONT 1014-3-33

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 6:, CONT'D

THESE WILL BE PROVIDED PRIOR TO THE UNLOADING OF THE VEHICLE INVOLVED AND WILL BE USED AS A BASIS FOR ENFORCING THE ACCEPTANCE PROVISIONS OF THIS ITEM FOR THE VEHICLE FOR THE DURATION OF THE PROJECT. THE MEASUREMENTS AND CALCULATIONS SHALL BE NEAT, LEGIBLE AND ON A GOOD GRADE OF PAPER SUITABLE FOR FILING FOR A PERMANENT RECORD. MEASUREMENTS AND CALCULATIONS SHALL, AS A MINIMUM, CONSIST OF: THE DATES MEASURED AND CALCULATED, THE NAMES AND SIGNATURES OF THE PERSONS MAKING THEM, THE LICENSE NUMBER OR OTHER IDENTIFYING MARK ON THE VEHICLE, AND A SKETCH OR DESCRIPTION OF THE VEHICLE. VEHICLES NOT OWNED, LEASED, HIRED OR OTHERWISE UNDER THE CONTROL OF THE CONTRACTOR OR HIS SUBCONTRACTORS USED FOR THE DELIVERY OF MATERIALS FROM COMMERCIAL SOURCES MAY BE EXEMPTED FROM THIS REQUIREMENT PROVIDED THE CONTRACTOR MAKES SUFFICIENT SPOT CHECKS OF VEHICLES FROM EACH SOURCE TO SATISFY THE ENGINEER THAT OVERLOADING IS NOT OCCURING. COPIES OF MEASUREMENTS AND CALCULATIONS WILL BE FURNISHED, AS DESCRIBED ABOVE, AS EVIDENCE OF SPOT CHECKS. FURNISHING OF THE ABOVE DESCRIBED MATERIALS BY THE CONTRACTOR WILL CONSTITUTE CERTIFICATION BY HIM AS TO THE ACCURACY OF THE MEASUREMENTS AND CALCULATIONS THEREON. FULLFILLING OF THE ABOVE REQUIREMENTS WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM 100:

THE LIMITS OF PREPARING RIGHT-OF-WAY WILL BE MEASURED FROM STA 129+00 TO STA 218+00 ALONG THE CENTERLINE OF CONSTRUCTION.

TIMBER SHALL BE CLEARED ONLY FROM THOSE AREAS DESIGNATED BY THE ENGINEER.

ALL MAILBOXES WITHIN THE PROPOSED CONSTRUCTION SHALL BE REMOVED AND RESET BY THE CONTRACTOR. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS WORK.

THE EXISTING ROADWAY SIGNS SHALL BE CAREFULLY REMOVED DURING CONSTRUCTION AND REPLACED WHEN CONSTRUCTION IS COMPLETED. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 104:

EXISTING CONCRETE PAVEMENT TO BE REMOVED SHALL BE SAWED ALONG NEAT LINES WHERE PORTIONS ARE TO BE LEFT IN PLACE. SAWING WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

ALL OF THE EXISTING OLD CONCRETE TO BE REMOVED ON THIS PROJECT WILL BECOME THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED OF BY HIM OUTSIDE THE LIMITS OF THE RIGHT-OF-WAY AT HIS OWN EXPENSE AND IN A MANNER APPROVED BY THE ENGINEER.

ITEM 110:

EXCAVATION FOR DRIVEWAYS AND INTERSECTIONS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

ALL EXCAVATION MATERIAL NOT NEEDED ELSEWHERE ON THE PROJECT WILL BECOME THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED OF BY HIM OUTSIDE THE LIMITS OF THE PROJECT.

ITEMS 110 AND 260:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING, MAINTENANCE AND STORAGE OF ONE NUCLEAR DENSITY GAUGE ON THE PROJECT DURING THE PLACEMENT OF THE LIME TREATED SUBGRADE, ACP AND EMBANKMENT.

ITEM 132:

THIS MATERIAL SHALL CONSIST OF SUITABLE EARTH MATERIAL SUCH AS LOAM, CLAY OR OTHER MATERIALS THAT WILL FORM A STABLE EMBANKMENT AND BE FREE FROM VEGETATION OR OTHER OBJECTIONABLE MATTER AND, WHEN TESTED BY TEXAS DEPARTMENT OF TRANSPORTATION METHODS, SHALL MEET THE SOIL CONSTANT REQUIREMENTS ON SHEET "A" IN ITS NATURAL STATE OR AFTER THE ADDITION OF LIME. FURNISHING, APPLICATION AND MIXING OF LIME WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

WHEN THE MOISTURE CONTENT OF THE EMBANKMENT EXCEEDS THE SPECIFIED OPTIMUM CONTENT, AS DETERMINED BY THE ENGINEER, IT SHALL BE AERATED BY DISKING, HARROWING, BLADING OR OTHER MEANS SATISFACTORY TO THE

F.R. DIV.6	TEXAS	STP 99(413)MM	SHEET 8
ROCKWALL COUNTY	HWY FM 740	CONT 1014-3-33	

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 132:, CONT'D

ENGINEER, TO REDUCE THE MOISTURE CONTENT TO THE OPTIMUM CONDITION BEFORE ROLLING COMMENCES. THE CONTRACTOR WILL NOT BE PERMITTED TO AERATE WET MATERIAL WITH COMPACTION EQUIPMENT SUCH AS SHEEPSFOOT ROLLERS OR OTHER DEVICES THAT TEND TO OVER-COMPACT THE PREVIOUS LAYER OF MATERIAL. SUCH AERATION WILL BE CONSIDERED AS SUBSIDIARY TO THIS ITEM AND WILL NOT BE PAID FOR DIRECTLY.

SHALE WILL NOT BE CONSIDERED AS SUITABLE MATERIAL. SHALEY CLAYS MAY NOT BE USED IN EMBANKMENTS UNLESS APPROVED IN WRITING BY THE ENGINEER.

ITEM 160:

THE CONTRACTOR WILL BE REQUIRED, WHERE POSSIBLE, TO ARRANGE THE SEQUENCE OF HIS OPERATIONS IN SUCH A MANNER THAT TOPSOIL WILL BE SALVAGED FROM ONE LOCATION AND PLACED DIRECTLY ON NEARBY SLOPE AREAS TO RECEIVE THIS ITEM. STOCKPILING OF TOPSOIL AND GRASS SOD SHALL BE KEPT TO A MINIMUM AND SHALL BE AS APPROVED BY THE ENGINEER.

TOP SOIL SHALL BE PLACED ON ALL UNSURFACED DISTURBED AREAS WITHIN THE LIMITS OF THE RIGHT-OF-WAY, AS DIRECTED BY THE ENGINEER.

ITEMS 162 AND 166:

BLOCK SOD (PRAIRIE BUFFALO) AND FERTILIZER SHALL BE PLACED ON ALL UNSURFACED DISTURBED AREAS WITHIN LIMITS OF RIGHT-OF-WAY, AS DIRECTED BY THE ENGINEER.

PERMANENT EROSION CONTROL ITEMS WILL BE PLACED ON APPROVED AREAS AS SOON AS POSSIBLE AT THE END OF EACH PHASE DURING THE WARM-SEASON. TEMPORARY EROSION CONTROL ITEMS WILL BE PLACED ON APPROVED AREAS AS SOON AS POSSIBLE AT THE END OF EACH PHASE DURING THE COOL-SEASON. SODDING WILL NOT BE DELAYED UNTIL THE END OF THE PROJECT. MULTIPLE MOVE-INS FOR SODDING WILL BE REQUIRED.

ITEM 204:

SPRINKLING, AS ORDERED BY THE ENGINEER TO CONTROL DUST ON THIS PROJECT, SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 260:

THE STANDARD PLATFORM TRUCK SCALES WILL BE REQUIRED FOR THIS PROJECT AND SHALL BE LOCATED AT A POINT APPROVED BY THE ENGINEER. CERTIFIED PUBLIC SCALES, WHEN APPROVED BY THE ENGINEER, MAY BE USED, PROVIDING THEY CONFORM TO THE REQUIREMENTS SET FORTH IN ARTICLE 520.3(1).

THE LIMITS OF PAYMENT FOR THIS ITEM SHALL BE TO THE NEAT LINES AS SHOWN ON THE TYPICAL SECTIONS.

UNLESS OTHERWISE DIRECTED BY THE ENGINEER IN WRITING, LIME SHALL BE CURED WITH MS-2 ASPHALT APPLIED AT A RATE OF 0.25 GAL/SY AND WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

THE FINISHED GRADE OF "LIME TREAT SUBGR (DENS CONT)" SHALL BE TO THE SECTION OF THE BOTTOM OF THE ASPHALTIC CONCRETE PAVEMENT AND CONCRETE PAVEMENT AS SHOWN ON THE PLANS, OR LOWER. PATCHING OF CURED BASE SECTIONS WILL NOT BE ALLOWED, BUT SHALL BE FILLED WITH EXTRA DEPTH ASPHALTIC CONCRETE PAVEMENT OR BE REWORKED COMPLETELY BY SCARIFYING, ADDING MATERIAL, APPLYING LIME SLURRY AND RECOMPACTING. NO ADDITIONAL COMPENSATION WILL BE MADE FOR THE WORK REQUIRED TO REWORK A SECTION OF SUBGRADE. THE EXTRA DEPTH ASPHALTIC CONCRETE PAVEMENT SHALL BE AT THE CONTRACTORS EXPENSE.

ITEMS 301 AND 3146:

TEST METHOD TEX-530-C SHALL BE THE EVALUATION PROCEDURE DURING PRODUCTION. THE PRODUCED MIXTURE SHALL NOT STRIP MORE THAN TEN (10) PERCENT.

WHEN LIQUID ANTISTRIPPING AGENT IS USED, TEST METHOD TEX-531-C WILL BE THE EVALUATAION PROCEDURE DURING MIXTURE DESIGN. THE PRODUCED MIXTURE SHALL NOT STRIP MORE THAN THE PERCENTAGE ESTABLISHED DURING MIXTURE DESIGN CORRELATION TESTING WITH TEST METHOD TEX-530-C.

THE EFFECTIVENESS OF THE ANTISTRIPPING AGENT WILL BE EVALUATED ONLY AT THE RATES SHOWN AS FOLLOWS:

LIME AT 1.5% OR 2% BY MASS OF THE INDIVIDUAL AGGREGATE OR AGGREGAATES SHALL BE PLACED IN SLURRY FORM.

LIQUID AGENTS ATA 0.5% OR 1% BY MASS OF THE ASPHALTS IN THE MIXTURE SHALL BE PLACED BUT SHALL NOT EXCEED THE AMOUNT RECOMMENDED BY THE

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ITEMS 301 AND 3146:, CONT'D
MANUFACTURER.

ITEM 305:

RECLAIMED ASPHALTIC PAVEMENT SHALL BE HAULED TO THE STOCKPILE SITE ON S.H. 205 JUST SOUTH OF S.H. 276 IN ROCKWALL COUNTY.

ITEM 360:

THE DOWEL SUPPORT ASSEMBLIES USED IN CONCRETE PAVEMENT SHALL BE CONSTRUCTED USING NO. 1/0 (0.306" DIAMETER) WIRE IN THE MAIN VERTICAL MEMBERS. DOWELS SHALL BE RIGIDLY SUPPORTED IN PARALLEL POSITIONS AND SHALL BE WELDED ON ONE END TO THE SUPPORT FRAME. THE WELD ATTACHMENT SHALL BE MADE ALTERNATELY ON OPPOSITE ENDS OF SUCCESSIVE DOWELS. THE SUPPORT ASSEMBLY SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

ALL CURBS SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE CONCRETE PAVEMENT. IF CONTINUOUS MONOLITHIC CURB HAS TO BE TEMPORARILY OMITTED FOR ANY REASON, THE CONTRACTOR WILL BE REQUIRED TO DOWEL ON PROPOSED CURBS AS DETAILED IN THE PLANS. AN APPROVED EPOXY RESIN SHALL BE APPLIED TO THE PAVEMENT TO RECEIVE THE CURB AS DIRECTED BY THE ENGINEER. THIS WORK AND MATERIALS SHALL BE SUBSIDIARY TO THIS ITEM AND WILL NOT BE PAID FOR DIRECTLY.

CONCRETE SHALL BE FURNISHED FROM A STATIONARY MIXER (CENTRAL MIX) OR PAVING MIXER (TRUCK MOUNTED) MEETING THE REQUIREMENTS OF ARTICLE 360.3(4).

CONCRETE AGGREGATES SHALL BE STOCKPILED AT THE PLANT SITE.

THE PAVEMENT ANCHOR JOINT, DETAILED IN THE PLANS, IS TO BE USED AT ALL LOCATIONS WHERE CONCRETE PAVEMENT IS TO BE PLACED ADJACENT TO EXISTING CONCRETE PAVEMENT. PAYMENT FOR INSTALLATION OF THESE JOINTS WILL NOT BE MADE DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

THE CURING MACHINE SHALL BE PROVIDED WITH RUBBER TIRES, OR ANOTHER ARRANGEMENT, APPROVED BY THE ENGINEER, SO THAT THE MACHINE WILL BRIDGE OVER OR SPAN THE PAVEMENT AND MONOLITHIC CURB OPERATIONS, IN A MANNER SATISFACTORY TO THE ENGINEER.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 360:, CONT'D

JOINTS 3/8" AND LESS IN WIDTH SHALL BE FILLED WITH RUBBER JOINT SEALING COMPOUND OR PREFORMED NEOPRENE COMPRESSION SEAL. JOINTS WIDER THAN 3/8" SHALL BE FILLED WITH TWO COMPONENT CLASS 1-A OR 1-B, SYNTHETIC POLYMER JOINT MATERIAL OR PREFORMED NEOPRENE COMPRESSION SEAL (CLASS 4).

THESE PLANS REQUIRE SAWED JOINTS. CONSTRUCTION, SAWED AND CONTRACTION JOINTS SHALL BE PLACED IN ACCORDANCE WITH THE PAVEMENT DETAIL SHEET AND AS DIRECTED BY THE ENGINEER. JOINT LOCATIONS, OTHER THAN AS SHOWN ON THE PLANS, SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

THE CONTRACTOR WILL BE REQUIRED TO SAW TRANSVERSE JOINTS ACROSS PAVEMENT AND CURBS.

THE CONTRACTOR WILL BE ALLOWED TO USE A DOWEL INSERTOR OF A DESIGN THAT HAS PROVEN EFFECTIVE AND PERFORMS IN A MANNER ACCEPTABLE TO THE ENGINEER. THE CONTRACTOR, IF HE ELECTS TO USE SUCH A DOWEL INSERTOR, WILL PROVIDE A DEVICE TO MEASURE THE DEPTH OF THE INSERTED DOWEL IN PLACE.

PAVEMENT LEAVEOUTS WILL BE REQUIRED ON THIS PROJECT AS NECESSARY TO PROVIDE FOR TRAFFIC AT DRIVEWAYS AND SIDE STREETS AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THE COST OF PROVIDING THESE LEAVEOUTS INCLUDING THE CONSTRUCTION OF A SUITABLE CROSSOVER CONNECTION AT EACH SITE WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

IF A TRAVELING FORM PAVER IS USED, IT SHALL BE EQUIPPED WITH AN ELECTRONICALLY OPERATED HORIZONTAL CONTROL DEVICE.

ANY AREA IN EXCESS OF THREE SQUARE YARDS WITH GROOVES LESS THAN 1/8" DEEP WILL BE SAW GROOVED BY THE CONTRACTOR AT HIS OWN EXPENSE.

TYPE "B" FLY ASH SHALL NOT BE USED WHEN TYPE II CEMENT IS USED.

ITEMS 360 AND 421:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PERSONNEL TO REMOVE THE TEST SPECIMENS FROM THE MOLDS AND TO TRANSPORT THEM TO THE PROPER CURING LOCATION AT THE SCHEDULE DESIGNATED BY THE ENGINEER AND IN ACCORDANCE WITH THE GOVERNING SPECIFICATION. FOR ALL CONCRETE ITEMS, THE CONTRACTOR SHALL HAVE A WHEELBARROW OR OTHER CONTAINER, ACCEPTABLE TO THE ENGINEER, AVAILABLE TO USE IN THE SAMPLING OF THE CONCRETE.

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GENERAL NOTES AND SPECIFICATION DATA--

ITEMS 360 AND 421:, CONT'D

ALL LABOR AND EQUIPMENT FURNISHED BY THE CONTRACTOR WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS AND WILL NOT BE PAID FOR DIRECTLY.

A WASHOUT PIT WILL BE REQUIRED FOR ALL CONCRETE DELIVERY VEHICLES, THE LOCATION OF THE PIT WILL BE APROVED, IN WRITING, BY THE ENGINEER PRIOR TO ANY USE OF THE PIT.

THE COARSE AGGREGATE FROM EACH SOURCE MUST COMPLY WITH THE SPECIFIED QUALITY TESTS.

ITEM 400:

ALL EXCAVATION NOT USED IN BACKFILL OR EMBANKMENT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF BY HIM OUTSIDE THE LIMITS OF THE RIGHT-OF-WAY.

ITEM 421:

TYPE II CEMENT WILL BE REQUIRED IN CLASS "S" AND "C" CONCRETE BUT WILL BE PERMITTED IN ALL CONCRETE.

ITEM 423:

THE FOLLOWING CONCRETE BLOCK RETAINING WALL SYSTEMS ARE APPROVED FOR THIS PROJECT:

KEYSTONE RETAINING WALLS
JEWELL CONCRETE PRODUCTS, INC.
P.O. BOX 7115
WACO, TEXAS 78716
(800) 792-3216

GENERAL NOTES AND SPECIFICATION DATA--

ANCHOR WALL SYSTEM
PAVESTONE COMPANY
P.O. BOX 1868
GRAPEVINE, TEXAS 76051
(817) 481-5802

VERSA-LOC RETAINING WALLS
TEXAS INDUSTRIES
1341 W. MOCKINGBIRD LANE
DALLAS, TEXAS 75247
(972) 647-3717

AMASTONE EARTH RETENTION SYSTEMS
BLOCKS AND WALLS, INC.
P.O. BOX 1157
DEL VALLE, TEXAS 78617
(512) 389-0270

PYRAMID BLOCKWALLS
THE REINFORCED EARTH COMPANY
1331 AIRPORT FREEWAY, SUITE 302
EULESS, TEXAS 76040-4150
(817) 283-5503

STONEWALL RETAINING WALLS
FEATHERLITE BUILDING PRODUCTS
P.O. BOX 1029
AUSTIN, TEXAS 78767
(512) 472-2424

MESA RETAINING WALL SYSTEM
TENSAR EARTH TECHOLOGIES, INC.
5775-B GLENRIDGE DRIVE, SUITE 450
ATLANTA, GEORGIA 30328
(404) 250-1290

ALLAN BLOCK RETAINING WALLS
EAGLE CONCRETE PRODUCTS
6415 HARDY STREET
HOUSTON, TEXAS 77022
(800) 933-5509

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T-BLOCK RETAINING WALL SYSTEM
T&B STRUCTURAL SYSTEMS
637 W. HURST BLVD., SUITE 2A
HURST, TEXAS 76053
(817) 280-9858

OMEGA WALLS
SHAW TECHNOLOGIES, INC.
P.O.BOX 654
COLLEYVILLE, TEXAS 76034
(817) 427-0997

THE TOP BLOCK SHALL BE FASTENED TO THE WALL WITH A CONSTRUCTION ADHESIVE. THE ADHESIVE SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.

SURFACE TEXTURE AND COLOR OF CONCRETE BLOCKS SHALL BE AS APPROVED BY THE ENGINEER. A SAMPLE BLOCK UNIT SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

ITEM 464:

ANY ABANDONED UTILITIES OR DRAINAGE STRUCTURES THAT ARE ENCOUNTERED BY THE CONTRACTOR SHALL BE REMOVED TO A MINIMUM OF ONE FOOT BELOW SUBGRADE AND PLUGGED WITH A CONCRETE PLUG OF A THICKNESS EQUAL TO 1-1/2 INCHES PER FOOT OF DIAMETER OF PIPE WITH A MINIMUM THICKNESS OF 3 INCHES. THE COST OF THE PLUGS SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

CONNECTIONS OF PIPES TO EXISTING STRUCTURES SHALL BE CONSTRUCTED AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE PRICE BID PER FOOT FOR "PIPE SEWER".

ITEM 471:

ALL INLET GRATES AND MANHOLE COVERS SHALL BE TACKWELDED TO THE FRAME WITH TWO 1-INCH WELDS. PAYMENT SHALL BE SUBSIDIARY TO THIS ITEM. NO PAINTING WILL BE REQUIRED FOR THE CAST IRON INLET GRATE AND FRAME OR FOR THE CAST IRON MANHOLE FRAME AND COVER.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 496:

MEASUREMENT AND PAYMENT FOR "REMOVING OLD STRUCTURES (SMALL)" SHALL INCLUDE ONLY THE STRUCTURES LISTED ON THE SUMMARY SHEET. THE COST OF REMOVAL OF ALL OTHER STRUCTURES AND PIPE SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ALL PIPE TO BE REMOVED AND NOT REPLACED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF BY HIM OUTSIDE THE LIMITS OF THE RIGHT-OF-WAY. EXISTING PIPE THAT IS LEFT IN PLACE SHALL BE PLUGGED WITH A CONCRETE PLUG OF THICKNESS EQUAL TO 1-1/2" PER FOOT OF DIAMETER OF PIPE WITH MINIMUM THICKNESS EQUAL TO 3 INCHES. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM AND NO DIRECT PAYMENT SHALL BE MADE.

ITEM 502:

SUBJECT TO THE APPROVAL OF THE ENGINEER, PORTIONS OF THIS PROJECT WHICH ARE NOT AFFECTED BY OR IN CONFLICT WITH THE PROPOSED METHOD OF HANDLING TRAFFIC OR UTILITY ADJUSTMENTS CAN BE CONSTRUCTED DURING ANY PHASE.

THE TRAFFIC CONTROL PLAN FOR THIS PROJECT SHALL CONSIST OF THE TRAFFIC CONTROL PLANS, TRAFFIC CONTROL TYPICAL SECTIONS, THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", STANDARD SHEETS BC (1)-98 THRU BC (9C)-98 AND AS DIRECTED BY THE ENGINEER. ANY VARIATION SHALL BE APPROVED BY THE ENGINEER.

TEMPORARY SIGNS WILL BE REQUIRED DURING CONSTRUCTION FOR THE EXISTING SIGNING WHICH INTERFERES WITH THE CONSTRUCTION. THE EXISTING SIGN FACES ON TEMPORARY SUPPORTS MAY BE USED FOR THE TEMPORARY SIGNS AS LONG AS THEY ARE REMOVED AND ERECTED ON TEMPORARY MOUNTS ON THE SAME DAY. THE WARNING AND REGULATORY SIGNS MUST BE IN PLACE AT ALL TIMES.

BARRICADES AND SIGNS SHALL BE PLACED IN SUCH A MANNER AS NOT TO INTERFERE WITH THE SIGHT DISTANCE OF DRIVERS ENTERING THE HIGHWAY FROM DRIVEWAYS OR SIDE STREETS. TO FACILITATE SHIFTING, BARRICADES AND SIGNS USED IN LANE CLOSURES OR TRAFFIC STAGING MAY BE ERECTED AND MOUNTED ON PORTABLE SUPPORTS. THE DESIGN OF THESE SUPPORTS ARE SUBJECT TO THE APPROVAL OF THE ENGINEER.

THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGMEN AT SUCH POINTS AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED TO PROVIDE FOR THE SAFETY AND CONVENIENCE OF PUBLIC TRAVEL AND CONTRACTOR'S PERSONNEL, AND AS

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ITEM 502:, CONT'D
SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

ITEM 504:

THE CONTRACTOR SHALL FURNISH ONE (1) FIELD OFFICE (TYPE E) AND LABORATORY (TYPE A) AT THE PROJECT SITE, ONE (1) FIELD LABORATORY (TYPE A) AT ALL CONCRETE BATCH PLANTS TO BE USED AND ONE (1) ASPHALT MIX CONTROL LABORATORY (TYPE D) AT ALL ASPHALT MIXING PLANTS TO BE USED.

THE TYPE "D" STRUCTURE AT THE ASPHALT MIXING PLANT(S) SHALL BE FOR THE EXCLUSIVE USE OF THE ENGINEER. IN ADDITION TO THE REQUIREMENTS OF ITEM 504, THIS STRUCTURE SHALL HAVE A MINIMUM HEIGHT OF EIGHT (8) FEET AND SHALL PROVIDE A MINIMUM OF ONE HUNDRED AND TWENTY (120) SQUARE FEET OF GROSS FLOOR AREA FOR PERANENTLY LOCATED ASPHALT PLANTS OR SIXTY FOUR (64) SQUARE FEET FOR TEMPORARY LOCATED PLANTS SERVING ONE (1) PROJECT. THE FLOOR AREA SHALL BE PARTITIONED INTO A MINIMUM OF TWO (2) INTERCONNECTED ROOMS, EACH ROOM FURNISHED WITH AN EXTERIOR DOOR AND A MINIMUM OF TWO (2) WINDOWS. THE FLOOR SHALL HAVE SUFFICIENT STRENGTH TO SUPPORT THE TESTING EQUIPMENT AND HAVE AN IMPERVIOUS COVERING.

THE TYPE "D" STRUCTURE SHALL BE ADEQUATELY AIR CONDITIONED AND SHALL BE FURNISHED WITH A MINIMUM OF ONE (1) DESK, THREE (3) CHAIRS, ONE (1) FILE CABINET, ONE (1) TELEPHONE AND ONE (1) BUILT-IN EQUIPMENT STORAGE CABINET FOR THE STORAGE OF NUCLEAR EQUIPMENT. THE CABINET SHALL BE A MINIMUM OF THREE (3) FEET WIDE BY TWO (2) FEET DEEP BY THREE (3) FEET HIGH AND SHALL HAVE PROVISIONS FOR LOCKING SECURELY. THE STRUCTURE SHALL BE PROVIDED WITH A TWO HUNDRED AND FORTY (240) VOLT ELECTRICAL ENTRANCE SERVICE UTILIZING A MINIMUM OF THREE (3) NO. 4 WIRES. THE SERVICE SHALL CONSIST OF A MINIMUM OF FOUR (4) ONE HUNDRED AND TWENTY (120) VOLT CIRCUITS WITH TWENTY (20) AMP BREAKERS AND NO MORE THAN TWO (2) GROUNDED CONVENIENCE OUTLETS PER CIRCUIT AND PROVISIONS FOR A MININUM OF TWO (2) TWENTY TWO (22) VOLT OVENS WITH VENTS TO THE OUTSIDE. THE STRUCTURE SHALL HAVE A MINIMUM OF TWO (2) CONVENIENCE OUTLETS PER WALL AND A UTILITY SINK WITH AN ADEQUATE CLEAN POTABLE WATER SUPPLY FOR TESTING. SPACE HEATERS FOR HEATING THE STRUCTURE ARE UNACCEPTABLE. PORTABLE STRUCTURES SHALL BE SUPPORT BLOCKED FOR STABILITY AND SHALL BE TIED DOWN.

THE ROOM TO CONTAIN THE IGNITION OVEN SHALL BE ADEQUATELY POWER VENTILATED AND CONTAIN A NEMA 6-50R (208/240 V, 50 A) OUTLET WITHIN THREE (3) FEET OF THE IGNITION OVEN LOCATION AND AN INDEPENDENT EXHAUST OUTLET TO THE OUTSIDE NO FURTHER THAN EIGHT (8) FEET FROM THE OVEN. THE SURFACE FOR THE IGNITION OVEN LOCATION SHALL BE LEVEL, STURDY AND

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 504:, CONT'D
FIREPROOF WITH AT LEAST SIX (6) INCHES CLEARANCE BETWEEN THE FURNACE AND OTHER VERTICAL SURFACES.

THE TYPE "E" FIELD OFFICE SHALL BE FOR THE EXCLUSIVE USE OF THE ENGINEER AND SHALL HAVE ADEQUATE HEATING/AIR CONDITIONING, AS DETERMINED BY THE ENGINEER, THERMOSTATICALLY CONTROLLED AND SHALL PROVIDE A MINIMUM OF EIGHT HUNDRED FORTY (840) SQUARE FEET OF CONTIGUOUS GROSS FLOOR AREA, WITH A MINIMUM CEILING HEIGHT OF EIGHT (8) FEET. THE FLOOR AREA SHALL BE PARTITIONED INTO A MINIMUM OF FOUR (4) OFFICES. TWO (2) OF THE OFFICES SHALL BE A MINIMUM OF ONE HUNDRED AND SEVENTY (170) SQUARE FEET, THE OTHER TWO (2) SHALL BE A MINIMUM OF ONE HUNDRED AND FIFTY (150) SQUARE FEET. EACH OFFICE SHALL HAVE A DOOR AND A MINIMUM OF TWO (2) WINDOWS IN EACH ROOM. ALL OFFICE SPACE SHALL BE ADEQUATELY FURNISHED AND MAINTAINED TO PERFORM ALL OFFICE FUNCTIONS. THESE FURNISHINGS INCLUDE ONE (1) FACSIMILE MACHINE, A COPIER CAPABLE OF REPRODUCING ELEVEN (11) INCH BY SEVENTEEN (17) INCH ORIGINALS AT A RATE ACCEPTABLE TO THE ENGINEER, ONE (1) LETTER QUALITY PRINTER CAPABLE OF PRODUCING ELEVEN (11) INCH BY SEVENTEEN (17) INCH ORIGINALS AND ONE (1) PERSONAL COMPUTER, EITHER DESKTOP OR LAPTOP, HAVING THE FOLLOWING SPECIFICATIONS AND SOFTWARE PRELOADED:

1. (LAPTOP ONLY) COLOR SCREEN (ACTIVE MATRIX).
2. (DESKTOP ONLY) 17 INCH SVGA COLOR MONITER OR BETTER.
3. PENTIUM PROCESSOR @ 233 MHZ OR EQUIVALENT OR BETTER.
4. 33600 BAUD FAX/MODEM OR BETTER.
5. 32 MB RAM OR BETTER.
6. COLORADO BACKUP TAPE OR EQUIVALENT.
7. SOFTWARE AND USER MANUALS FOR:
   A. WINDOWS 95 OR BETTER.
   B. MICROSOFT OFFICE PACKAGE
   C. SURETACK 1.50 FOR WINDOWS
8. E-MAIL CAPABILITIES

A NINETEEN (19) INCH TELEVISION WITH A VCR SHALL BE PROVIDED BY THE CONTRACTOR FOR USE BY THE STATE IN CONDUCTING SAFETY MEETINGS AT THE PROJECT SITE.

THE OFFICE AND ITS CONTENTS WILL BE SUBJECTED TO APPROVAL BY THE ENGINEER. ONCE THE PROJECT IS COMPLETE, THE COMPUTER SHALL BECOME THE PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE AND SUPPLIES (BOTH PERMANENT AND CONSUMABLE) FOR THE AFOREMENTIONED ELECTRONIC EQUIPMENT FOR THE DURATION OF THE PROJECT.

THE BUILDING SHALL HAVE TWO (2) EXTERIOR DOORS. FURNITURE FOR THE FIELD OFFICE SHALL, AS A MINIMUM, CONSIST OF A DESK AND CHAIR FOR EACH

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ITEM 504:, CONT'D
OFFICE SPACE, TWO (2) METAL FIVE (5) DRAWER FILE CABINETS, ONE (1) BUILD-IN OR PORTABLE REFERENCE TABLE WITH CHAIR, SIX (6) FOLDING TYPE CHAIRS AND HAVE THE FINAL APROVAL OF THE ENGINEER. ALL OFFICES SHALL BE KEYED ALIKE. IF THE FIELD OFFICE IS OF PORTABLE NATURE, IT SHALL HAVE A COVERED PORCH AREA AT THE ENTRANCE WITH A MINIMUM OF ONE HUNDRED (100) SQUARE FEET OF GRATED OR PLANK FLOORING. ALL WINDOWS SHALL BE CLEAR FOR VISIBILITY AND ADJUSTABLE BLINDS SHALL BE PROVIDED INSIDE TO COVER THE WINDOWS FOR SECURITY. THE FIELD OFFICE SHALL HAVE ALL WINDOWS AND DOORS SECURED WITH BURGLAR BARS OR OTHER SECURITY SYSTEM ACCEPTABLE TO THE ENGINEER.

THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS AND PAY ALL INSTALLATION CHARGES FOR ALL TELEPHONES AND TELEPHONE LINES FOR THE FIELD OFFICES AND FIELD LABORATORIES, WHICH SHALL HAVE A MINIMUM OF ONE (1) PHONE PER OFFICE SPACE, OPERATING WITH A MINIMUM OF TWO (2) LINES AND ROLLOVER CAPABILITIES. THE CONTRACTOR SHALL PROVIDE ALL TELEPHONE INSTRUMENTS, INCLUDING AN ANSWERING MACHINE WITH MINIMUM TWO (2) LINE CAPABILITY. THE TELEPHONE SERVICE SHALL BE IN THE NAME OF THE ENGINEER AND ALL CHARGES AFTER INSTALLATION SHALL BE BILLED TO AND PAID BY THE ENGINEER.

AN ALL WEATHER PARKING AREA FOR STATE VEHICLES SHALL BE PROVIDED ADJACENT TO THE FIELD OFFICE. THE ENTIRE AREA SHALL BE ENCLOSED IN A SIX (6) FOOT HIGH FENCE. A LOCKABLE VEHICLE GATE(S) SHALL BE PROVIDED AND SHALL BE KEYED ALIKE OR BE COMBINATION LOCKS.

BEAM CURING TANKS FURNISHED BY THE CONTRACTOR SHALL BE ELEVATED, AS DIRECTED BY THE ENGINEER, TO A MAXIMUM HEIGHT OF ONE (1) FOOT.

THE CONTRACTOR SHALL NOT COMMENCE WORK UNTIL THE TEXAS DEPARTMENT OF TRANSPORTATION FIELD OFFICE AND ALL APPURTENANCES ARE FUNCTIONAL TO THE SATISFACTION OF THE ENGINEER.

IT SHALL BE THE ENTIRE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN ALL FIELD OFFICES AS DIRECTED BY THE ENGINEER.

FOR ELECTRICAL WORK ON PUMP STATIONS, ELECTRICAL WORK INSIDE BUILDINGS (EXCEPT PRE-WIRED BUILDINGS), ELECTRICAL WORK ON VOLTAGES OVER 480 VOLTS (EXCEPT FOR THE PLACEMENT OF CONDUIT AND MAN-HOLES), AND ELECTRICAL WORK ON MOTOR CONTROL CENTERS, THE FOLLOWING ELECTRICAL LICENSE REQUIREMENTS SHALL BE MET:

ALL ELECTRICAL WORK SHALL BE PERFORMED BY QUALIFIED ELECTRICIANS, EACH HOLDING A VALID AND CURRENT JOURNEYMAN'S ELECTRICAL LICENSE ISSUED BY A CITY IN TEXAS WITH A POPULATION OF 50,000 OR MORE. LICENSES OUTSIDE OF

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 504:, CONT'D

TEXAS WILL BE CONSIDERED, BUT MUST BE APPROVED BY THE ENGINEER. THE ENGINEER'S DECISION WILL BE BASED ON SUFFICIENT WRITTEN EVIDENCE THAT THE LICENSE WAS ISSUED BY A COMPETENT AUTHORITY BASED ON THE INDIVIDUAL PASSING A WRITTEN EXAMINATION BASED ON THE NEC AND UPON SUFFICIENT COMMENSURATE ELECTRICAL EXPERIENCE.

ALL ELECTRICAL WORK SHALL BE SUPERVISED BY AN ELECTRICIAN HOLDING A CURRENT AND VALID MASTER ELECTRICIAN'S LICENSE. THE MASTER ELECTRICIAN'S LICENSED SHALL HAVE BEEN ISSUED BY A CITY IN TEXAS WITH A POPULATION OF 50,000 OR MORE. LICENSES OUTSIDE OF TEXAS WILL BE CONSIDERED, BUT MUST BE APPROVED BY THE ENGINEER. THE ENGINEER'S DECISION WILL BE BASED ON SUFFICIENT WRITTEN EVIDENCE THAT THE LICENSE WAS ISSUED BY A COMPETENT AUTHORITY BASED ON THE INDIVIDUAL'S PASSING A WRITTEN EXAMINATION BASED ON NEC AND UPON SUFFICIENT COMMENSURATE ELECTRICAL EXPERIENCE. MASTER ELECTRICIAN NEED NOT BE PRESENT ON THE JOB SITE.

APPRENTICES AND/OR TXDOT CERTIFICATE HOLDERS (SEE SPECIAL PROVISION 168 TO ITEM 8) MAY ASSIST THE JOURNEYMAN. AT NO TIME SHALL ANY NON-LICENSED PERSON WORK ON AN ENERGIZED CIRCUIT. A NON-LICENSED PERSON SHALL NOT WORK ALONE FOR AN EXTENDED PERIOD OF TIME. LABORERS OR UTILITY LABORERS MAY ASSIST IN NON-ELECTRICAL WORK.

THE LICENSE OF EACH INDIVIDUAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE BEGINNING OF ANY ELECTRICAL WORK OR BEFORE AN INDIVIDUAL MAY START WORK. THE ENGINEER WILL REVIEW THE LICENSES WITHIN FIVE (5) DAYS. A COPY OF ALL LICENSES SHALL BE STORED ON SITE BY THE INSPECTOR AND ON THE PERSON OF THE LICENSED INDIVIDUAL. ANY WORK PERFORMED BY AN INDIVIDUAL OR A CONTRACTOR BEFORE THE APPROVAL OF A LICENSE MAY BE REJECTED BY THE ENGINEER, BUT ONLY IF AN INSPECTION REVEALS DEFECTIVE WORKMANSHIP.

ITEM 512:

FOR THIS PROJECT 7640 LF OF TY 1 AND 840 LF TY 2 PORTABLE LOW PROFILE BARRIER SHALL BE PICKED UP BY THE CONTRACTOR AT I.H. 635 AND LUNA ROAD. WHEN THE PCTB IS NO LONGER REQUIRED ON THE PROJECT, IT SHALL BE STOCKPILED AT I.H. 635 AND LUNA ROAD AS DIRECTED BY THE ENGINEER. THE CONTRACTOR MUST CONTACT THE NORTHWEST MAINTENANCE SECTION, MR. DAN KENDRICK, AT 972-235-3051 TO GAIN ACCESS TO THE STORAGE AREA FOR PICKUP OR RETURN OF PCTB.

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ITEM 512:, CONT'D

ALL PCTB WILL BE NUMBERED AND REPAIRED TO THE ENGINEER'S SATISFACTION PRIOR TO ITS RETURN TO THE STOCKPILE. ANY DAMAGE DONE IN TRANSIT WILL BE REPAIRED AT THE STOCKPILE.

THE HARDWARE SHALL BE PLACED IN 55 GALLON DRUMS AND TAKEN TO THE NORTHSIDE MAINTENANCE YARD AT 12000 GREENVILLE AVE., DALLAS, TEXAS.

ITEM 530:

THE MONOLITHIC CURB TO BE CONSTRUCTED ON DRIVEWAYS WILL BE BUILT TO THE SAME DIMENSIONS AS "MONO CURB TY I". THIS CURB WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

DRIVEWAY LOCATIONS SHOWN ARE SUBJECT TO CHANGE TO SUIT ACTUAL FIELD CONDITIONS AT THE TIME OF CONSTRUCTION AND MAY BE SHIFTED AS DIRECTED BY THE ENGINEER.

ITEM 610: ROADWAY ILLUMINATION ASSEMBLIES

LUMINAIRE BALLASTS SHALL BE RATED FOR OPERATION AT 240 VOLTS.

WHEN LUMINAIRES ARE TO BE INSTALLED ON STEEL MAST ARM POLES, A SEPARATE TERMINAL STRIP IN THE SIGNAL POLE ACCESS COMPARTMENT SHALL BE PROVIDED. THE TERMINAL STRIP SHALL BE 4 CIRCUIT BUCHANAN TYPE 104SN OR KULKA TYPE 985-GP-4 OR EQUIVALENT.

THE CONDUCTORS FROM THE SERVICE POLE TO THE TERMINAL STRIP SHALL BE NO. 8 XHHW WIRE. THE CONDUCTORS FROM THE TERMINAL STRIP TO THE LUMINAIRE SHALL BE NO. 12 XHHW WIRE.

LUMINAIRES ON TIMBER POLES SHALL BE GROUNDED AS SHOWN ON CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED SIGNALS.

ITEM 618:

CONDUIT INSTALLED FOR FUTURE IRRIGATION SHALL BE CAPPED USING STANDARD WEATHER TIGHT CONDUIT CAPS AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 618:, CONT'D

A "X" SHALL BE CHISELED ON THE CURB ABOVE THE CONDUIT TO MARK ITS LOCATION.

THE CONTRACTOR SHALL SECURE PERMISSION FROM THE PROPER AUTHORITY AND THE APPROVAL OF THE ENGINEER BEFORE CUTTING INTO OR REMOVING ANY SIDEWALKS OR CURBS, WHICH MIGHT BE REQUIRED IN MAKING THE INSTALLATION.

THE LOCATION OF CONDUITS AND GROUND BOXES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.

CONDUIT SHALL BE PLACED UNDER EXISTING PAVEMENT BY AN APPROVED BORING METHOD UNLESS OTHERWISE DIRECTED BY THE ENGINEER. PITS FOR BORING SHALL NOT BE CLOSER THAN 2 FEET FROM THE EDGE OF THE PAVEMENT UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WATER JETTING WILL NOT BE PERMITTED.

WHEN BORING IS USED FOR UNDER PAVEMENT CONDUIT INSTALLATIONS, THE MAXIMUM ALLOWABLE OVERCUT SHALL BE 1" IN DIAMETER.

WHEN CONDUITS ARE BORED, THE VERTICAL AND HORIZONTAL TOLERANCES SHALL NOT EXCEED 18 INCHES AS MEASURED FROM THE INTENDED TARGET POINT.

THE USE OF A PNEUMATICALLY DRIVEN DEVICE FOR PUNCHING HOLES BENEATH THE PAVEMENT (COMMONLY KNOWN AS A "MISSILE") WILL NOT BE PERMITTED ON THIS PROJECT.

THE SAW CUT TRENCH DETAIL SHOWN ON THE PLANS FOR INSTALLATION OF CONDUIT UNDER EXISTING PAVEMENT SHALL ONLY BE USED AT LOCATIONS WHERE CONDUIT CANNOT BE BORED. THE USE OF THE SAW CUT TRENCH SHALL ONLY BE MADE AT LOCATIONS APPROVED BY THE ENGINEER.

THE CONTRACTOR SHALL INSTALL A NON-METALLIC PULL ROPE IN CONDUIT RUNS IN EXCESS OF 50 FEET.

A COLORED CLEANER-PRIMER SHALL BE USED ON ALL PVC TO PVC JOINTS BEFORE APPLICATION OF PVC CEMENT.

ALL PROPOSED CONDUIT SHALL BE PLACED BY THE OPEN TRENCH METHOD BELOW THE PROPOSED SUBGRADE, UNLESS OTHERWISE INDICATED IN THE PLANS. IF THE CONTRACTOR FAILS TO PLACE THE CONDUIT AS PROPOSED, THEN HE CAN CHOOSE OTHER METHODS SUCH AS BORING OR OPEN CUTTING NEW PAVEMENT AS APPROVED BY THE ENGINEER, AND AT NO ADDITIONAL COST TO THE STATE.

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GENERAL NOTES AND SPECIFICATION DATA--

ITEM 618:, CONT'D

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT CERTAIN EXISTING CONDUIT IS PROPOSED FOR REUSE. IF THE EXISTING CONDUIT CAN NOT BE USED, THE CONTRACTOR WILL BE REQUIRED TO REPAIR AND/OR REPLACE THIS CONDUIT AS DIRECTED BY THE ENGINEER. REPAIR OF THIS CONDUIT WILL BE PAID FOR AS "EXTRA WORK" ON A "FORCE ACCOUNT BASIS." THE CONTRACTOR SHALL PROBE THE EXISTING CONDUIT WHEN LOCATING DRILL SHAFTS SO THAT ITS CONDITION WILL BE KNOWN BEFORE IT IS NEEDED.

WHEN USING EXISTING CONDUIT, THE CONTRACTOR SHALL ENSURE THAT ALL CONDUIT HAVE BUSHINGS AND ARE CLEANED OF MUD AND DEBRIS. CONDUIT THAT IS BEING RELOCATED TO NEW TIMBER POLES SHALL BE RESTRAPPED AS IF IT WERE A NEW INSTALLATION. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 618.

WHEN THE SPECIFICATIONS FOR ELECTRICAL ITEMS REQUIRE UL LISTED PRODUCTS, IT WILL BE CONSTRUED TO MEAN UL LISTED OR CSA LISTED.

THE CONTRACTOR MAY, AT HIS/HER OPTION, SUBSTITUTE HDPE CONDUIT MEETING THE SPECIFICATIONS OF ITEM 622 FOR ALL BORES REQUIRING PVC SCHEDULE 40 CONDUIT AND, WHEN APPROVED BY THE ENGINEER, MAY SUBSTITUTE HDPE FOR SCHEDULE 80 BORED CONDUIT. HDPE SHALL BE THE SAME SIZE AS THE PVC CONDUIT SHOWN ON THE PLANS. HDPE SHALL BE TERMINATED WITH UL LISTED FITTINGS. HDPE MAY BE THREADED AND USED WITH THREADED PVC CONNECTORS OR COUPLINGS. HDPE SHALL BE EXTENDED THROUGH THE BORE IN ONE CONTINUOUS PIECE AND SHALL BE COUPLED TO RMC ELBOWS OR TO PVC CONDUIT AT THE BORE PITS PRIOR TO ENTERING GROUND BOXES (IF GROUND BOXES ARE REQUIRED BY THE PLANS). HDPE SHALL NOT CONTAIN CONDUCTORS DURING INSTALLATION IN THIS MANNER. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR WHEN HDPE IS SUBSTITUTED FOR THIS PURPOSE.

PVC CONDUIT SYSTEMS THAT SNAP OR LOCK TOGETHER WITHOUT GLUE THAT ARE DESIGNED AND UL LISTED TO BE USED FOR BORED PVC ELECTRICAL CONDUIT APPLICATIONS WILL BE ALLOWED FOR BORED PVC SCHEDULE 40, AND, WHEN APPROVED BY THE ENGINEER, WILL BE ALLOWED FOR BORED PVC SCHEDULE 80. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR WHEN THESE SPECIFIC PURPOSE CONDUIT SYSTEMS ARE SUBSTITUTED FOR THIS PURPOSE.

ITEM 624: GROUND BOX

WHEN USING EXISTING GROUND BOXES, THE CONTRACTOR SHALL ENSURE THAT THE GROUND BOXES ARE CLEAN, PROPERLY SECURED, AND HAVE A MINIMUM OF 9 INCHES OF GRAVEL AS A BASE AND THAT CONDUITS MEET THE REQUIREMENTS OF ED(2)-98. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 624: GROUND BOX, CONT'D
CONSIDERED SUBSIDIARY TO ITEM 624.

ALL GROUND BOXES USED FOR SIGNALS SHALL HAVE "TXDOT-SIGNALS" IMPRINTED ON THE COVER.

ALL GROUND BOXES USED FOR RAILROAD ADVANCED WARNING SHALL HAVE "RAILROAD" IMPRINTED ON THE COVER.

ITEM 627: TREATED TIMBER POLES

THE TIMBER POLE HEIGHTS SHOWN IN THE PLANS AND IN THE MATERIAL SUMMARY ARE TO BE USED FOR BIDDING PURPOSES ONLY. PRIOR TO CONSTRUCTION, THE CONTRACTOR IN COOPERATION WITH THE ENGINEER, SHALL MAKE FIELD MEASUREMENTS TO DETERMINE THE ACTUAL POLE HEIGHT NECESSARY TO ENSURE A VERTICAL CLEARANCE OF 17 FEET MINIMUM, 19 FEET MAXIMUM FROM THE HIGHEST POINT ON THE ROADWAY SURFACE TO THE SPAN. THESE FIELD MEASUREMENTS AND ELEVATIONS SHALL BE DETERMINED FROM THE ACTUAL FIELD LOCATION OF THE POLES, CONSIDERING ALL ABOVE AND BELOW GROUND AND THE EXISTING ROADWAY ELEVATIONS.

ITEM 628: ELECTRICAL SERVICES

CONCRETE FOR SERVICE POLE FOUNDATIONS, WHEN REQUIRED, SHALL BE CLASS A AND SHALL BE IN ACCORDANCE WITH ITEM 421, "PORTLAND CEMENT CONCRETE", EXCEPT THAT CONCRETE WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 628. REINFORCING STEEL FOR SERVICE POLE FOUNDATIONS, WHEN REQUIRED, SHALL BE IN ACCORDANCE WITH ITEM 440, "REINFORCING STEEL", EXCEPT THAT REINFORCING STEEL WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 628.

CONDUIT AND CONDUCTORS ATTACHED TO THE SERVICE POLE AND UNDERGROUND WITHIN 12 INCHES OF THE SERVICE POLE WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUDSIDIARY TO THIS ITEM.

SERVICE ENCLOSURE SHALL BE ATTACHED WITH GALVANIZED CHANNEL (UNISTRUT, KINDORF, OR EQUAL). THE POLE SHALL BE NOTCHED IN TWO PLACES TO PROVIDE FLAT SURFACES. ENDS OF THE CHANNEL SHALL BE PAINTED WITH ZINC RICH PAINT.

THE ELECTRICAL SERVICE FOR THIS PROJECT SHALL BE BILLED IN THE NAME OF THE STATE.

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ITEM 656: FOUND. FOR SIGNS, TRAFFIC SIGNALS & RDWY ILLUM ASSEMBLIES

THE TOP 2 INCHES OF DRILL SHAFTS SHALL BE FORMED OR PROVIDED A SMOOTH FINISH SATISFACTORY TO THE ENGINEER. THE COST OF THE WORK SHALL BE INCLUDED IN THE UNIT BID PRICE FOR THIS ITEM.

A 3/4 INCH CHAMFER SHALL BE FORMED ON THE TOP EDGE OF EACH SIGNAL POLE FOUNDATION.

THE CONTRACTOR SHALL PROBE BEFORE DRILLING FOUNDATIONS TO DETERMINE THE LOCATION OF UTILITIES AND STRUCTURES. FOUNDATIONS SHALL BE PAID FOR ONCE REGARDLESS OF EXTRA WORK CAUSED BY OBSTRUCTIONS. THE CONTRACTOR SHALL CALL THE DISTRICT UTILITY SECTION AT 214-320-6270 FOR STATE MAINTAINED UTILITY LOCATIONS.

ITEM 666:

ANY NECESSARY PILOT MARKINGS FOR ANY STRIPING OPERATION SHALL BE THE SAME COLOR AS THE PROPOSED STRIPE. PILOT MARKINGS SHALL BE LIMITED TO ONE 2" DIAMETER MARK FOR EACH 100' OF STRIPE. ALL PILOT MARKINGS SHALL BE TOTALLY OBLITERATED AFTER COMPLETION OF THE STRIPING OPERATION.

ITEM 680: INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

THIS PROJECT SHALL CONSIST OF FURNISHING AND INSTALLING ALL MATERIALS AND EQUIPMENT NECESSARY FOR A COMPLETE SIGNAL SYSTEM AT THE PROPOSED LOCATION. IN ADDITION TO THESE ITEMS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING:

1. INSTALLING ALL SIGNS FOR MOUNTING ON SIGNAL POLES AND MAST ARMS. STREET NAME SIGNS ARE TO BE RELOCATED FROM THE TEMPORARY SIGNALS. THESE SIGNS SHALL BE FURNISHED IN ACCORDANCE WITH ITEM 636, WILL NOT BE PAID FOR DIRECTLY, AND SHALL BE CONSIDERED SUBSIDIARY TO ITEM 680. SIGNS SHALL BE MOUNTED WITH ASTRO-SIGN BRAC OR SIGNFIX ALUMINUM CHANNEL OR EQUAL AS APPROVED BY THE ENGINEER.

2. SUBMITTAL LITERATURE SHALL BE PROVIDED FOR ALL TRAFFIC SIGNAL EQUIPMENT PRIOR TO INSTALLATION.

3. THE CONTRACTOR SHALL HAVE A QUALIFIED TECHNICIAN ON THE

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 680: INSTALLATION OF HIGHWAY TRAFFIC SIGNALS, CONT'D
PROJECT SITE TO PLACE THE TRAFFIC SIGNALS IN OPERATION.

4. DURING THE THIRTY DAY TEST PERIOD, THE CONTRACTOR SHALL UTILIZE QUALIFIED PERSONNEL TO RESPOND TO AND DIAGNOSE ALL TROUBLE CALLS. HE SHALL REPAIR ANY MALFUNCTIONS TO SIGNAL EQUIPMENT HE SUPPLIED ON THE PROJECT. TWO LOCAL TELEPHONE NUMBERS (NOT SUBJECT TO FREQUENT CHANGES) WHERE TROUBLE CALLS ARE TO BE RECEIVED ON A 24-HOUR BASIS SHALL BE PROVIDED TO THE ENGINEER BY THE CONTRACTOR. THE CONTRACTOR'S RESPONSE TIME TO REPORTED CALLS SHALL BE WITHIN A REASONABLE TRAVEL TIME FROM A DALLAS ADDRESS, BUT NOT MORE THAN TWO (2) HOURS MAXIMUM. APPROPRIATE REPAIRS SHALL BE MADE WITHIN 24 HOURS. THE CONTRACTOR SHALL PLACE A LOG BOOK IN EACH CONTROLLER CABINET AND KEEP A RECORD OF EACH TROUBLE CALL REPORTED. HE SHALL NOTIFY THE ENGINEER OF EACH TROUBLE CALL. THE ERROR LOG IN THE CONFLICT MONITOR SHALL NOT BE CLEARED DURING THE THIRTY DAY TEST PERIOD WITHOUT THE APPROVAL OF THE ENGINEER.

5. THE CONTRACTOR SHALL PLACE DUCT SEAL AT THE ENDS OF ALL CONDUIT WHERE CONDUCTORS AND/OR CABLES ARE PRESENT AND REQUIRED FOR THE INTENDED OPERATION OF THE TRAFFIC SIGNALS.

6. THE TIMER FOR THIS PROJECT SHALL BE A TS2 TYPE 2 TIMER.

7. THE CONTRACTOR'S ATTENTION IS BROUGHT TO THE FACT THAT AT FM 740 AND SH 205, HE IS TO ADD NEW CONDUIT, SERVICE POLE AND WIRES AS SHOWN ON THE PLANS.

8. THE CONTRACTOR SHALL INSTALL THE OPTICOM EQUIPMENT SUPPLIED BY THE CITY OF ROCKWALL. OPTICOM EQUIPMENT SHALL BE PLACED IN ITS OWN CABINET OUTSIDE OF THE TRAFFIC SIGNAL CABINET.

THE RELOCATION OF THE EXISTING FLASHING BEACON SIGNAL WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

A CONTINUOUS BARE OR GREEN INSULATED COPPER WIRE NO. 8 AWG OR LARGER SHALL BE INSTALLED IN EVERY CONDUIT THROUGHOUT THE ELECTRICAL SYSTEM IN ACCORDANCE WITH ITEM 680, THE ELECTRICAL DETAIL SHEETS AND THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.

ITEM 681: TEMPORARY TRAFFIC SIGNALS

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ITEM 681: TEMPORARY TRAFFIC SIGNALS, CONT'D
THIS PROJECT SHALL CONSIST OF FURNISHING AND INSTALLING ALL MATERIALS AND EQUIPMENT NECESSARY FOR THE COMPLETE SIGNAL SETUP AT THE PROPOSED LOCATION TO BE UTILIZED DURING ROADWAY CONSTRUCTION. IN ADDITION TO THESE ITEMS THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FOLLOWING:

1. ADJUSTMENT AND MAINTENANCE OF THE TEMPORARY TRAFFIC SIGNALS IN ACCORDANCE WITH THE LAYOUT SHEETS AND TRAFFIC CONTROL PLAN DURING THE ROADWAY CONSTRUCTION. THIS INCLUDES MAINTAINING THE TRAFFIC SIGNAL TIMING FOR THIS SAME PERIOD.

2. CONTRACTOR MAINTENANCE SHALL BEGIN WHEN PROJECT CONSTRUCTION BEGINS AND CONTINUE UNTIL THE PROJECT IS COMPLETED.

3. ALL SIGNAL HEADS SHALL BE REGUYED AND THE CABLE RESTRAPPED AFTER ADJUSTMENTS TO HEAD LOCATIONS HAVE BEEN MADE.

4. ALL SIGNAL HEADS THAT ARE TO BE RELOCATED SHALL BE DONE SO DURING THE SAME DAY. PORTABLE STOP SIGNS AT ALL APPROACHES WILL BE REQUIRED ANY TIME THE SIGNALS ARE INOPERABLE.

5. SUBMITTAL LITERATURE SHALL BE PROVIDED FOR ALL TRAFFIC SIGNAL EQUIPMENT PRIOR TO INSTALLATION.

6. A NEW EIGHT-PHASE NEMA CONTROLLER, MEETING THE REQUIREMENTS OF ITEM 6887, SHALL BE INSTALLED IN A POLE-MOUNTED CABINET AT THE INTERSECTION FOR TEMPORARY OPERATION. THIS CABINET SHALL BE APPROXIMATELY 38" WIDE, 54" HIGH, 26" DEEP, AND SHALL HAVE THREE BRACKETS FOR POLE MOUNTING. DISPLAY BOARDS WILL NOT BE REQUIRED FOR POLE MOUNTED CABINETS.

7. THE TIMER FOR THIS PROJECT SHALL BE A TS2 TYPE 2 TIMER.

8. THE CONTRACTOR SHALL HAVE A QUALIFIED TECHNICIAN ON THE PROJECT SITE TO PLACE THE SIGNALS WITH NEW CONTROLLER CABINETS IN OPERATION.

9. DURING THE ROADWAY CONSTRUCTION PERIOD, THE CONTRACTOR SHALL UTILIZE QUALIFIED PERSONNEL TO RESPOND TO AND DIAGNOSE ALL TROUBLE CALLS (INCLUDING SIGNAL TIMING). HE SHALL REPAIR ANY MALFUNCTIONS TO SIGNAL EQUIPMENT HE SUPPLIED ON THE PROJECT AS WELL AS TO MAKE TIMING ADJUSTMENTS DUE TO ALL COMPLAINTS RECEIVED. TWO LOCAL TELEPHONE NUMBERS (NOT SUBJECT TO FREQUENT CHANGES) WHERE TROUBLE CALLS ARE TO BE RECEIVED ON A 24-HOUR BASIS SHALL BE PROVIDED TO THE ENGINEER BY THE

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 681: TEMPORARY TRAFFIC SIGNALS, CONT'D
CONTRACTOR. THE CONTRACTOR'S RESPONSE TIME TO REPORTED CALLS SHALL BE WITHIN A REASONABLE TRAVEL TIME FROM A DALLAS ADDRESS BUT NOT MORE THAN TWO (2) HOURS MAXIMUM. APPROPRIATE REPAIRS SHALL BE MADE WITHIN 24 HOURS. TIMING ADJUSTMENTS SHALL BE MADE BEFORE THE NEXT WEEKDAY PEAK PERIOD UNLESS DEEMED AN EMERGENCY BY THE ENGINEER. THE CONTRACTOR SHALL PLACE A LOG BOOK IN EACH CONTROLLER CABINET AND KEEP A RECORD OF EACH TROUBLE CALL REPORTED. HE SHALL NOTIFY THE ENGINEER OF EACH TROUBLE CALL. THE ERROR LOG IN THE CONFLICT MONITOR SHALL NOT BE CLEARED WITHOUT THE APPROVAL OF THE ENGINEER.

10. FURNISHING AND INSTALLING ALL SIGNS FOR MOUNTING ON SPAN WIRES. SIGN R10-12 SHALL BE RELOCATED FROM EXISTING SIGNAL. THESE SIGNS SHALL BE FURNISHED IN ACCORDANCE WITH ITEM 636, WILL NOT BE PAID FOR DIRECTLY, AND SHALL BE CONSIDERED SUBSIDIARY TO ITEM 681. SIGNS SHALL BE MOUNTED WITH ASTRO-SIGN BRAC OR SIGNFIX ALUMINUM CHANNEL OR EQUAL AS APPROVED BY THE ENGINEER. FIVE (5) SETS OF SHOP DRAWINGS SHALL BE SUBMITTED FOR STREET NAME SIGNS.

11. INSTALLING AND MAINTAINING MICROWAVE DETECTOR AND ASSOCIATED EQUIPMENT, PROVIDED BY THE STATE, FOR MINOR-STREET VEHICLE DETECTION DURING CONSTRUCTION. AFTER CONSTRUCTION IS COMPLETED, THE MICROWAVE DETECTION EQUIPMENT (INCLUDING DETECTOR, INTERFACE PANEL AND DETECTOR WIRE) SHALL BE SALVAGED AND RETURNED TO THE DALLAS DISTRICT SIGNAL SHOP.

NO EXTRA COMPENSATION WILL BE ALLOWED FOR FULFILLING THE REQUIREMENTS STATED ABOVE.

ITEM 682: VEHICLE AND PEDESTRIAN SIGNAL HEADS

ALL SIGNAL HEAD ATTACHMENTS SHALL BE DESIGNED SUCH THAT THE WIRING TO EACH SIGNAL HEAD SHALL PASS FROM THE MAST ARM THROUGH THE SIGNAL HEAD BRACING OR ATTACHMENT HARDWARE TO THE SIGNAL HEAD. NO EXPOSED CABLE OR WIRING WILL BE PERMITTED.

THE SIGNAL HEAD-TO-MAST ARM CONNECTION MUST ALLOW FOR ADJUSTMENT ABOUT THE HORIZONTAL AND VERTICAL AXIS.

FOR THIS PROJECT, A PEDESTRIAN SIGNAL HEAD ASSEMBLY HAVING A ONE PIECE REFLECTOR ASSEMBLY AND A FLUSH, "EGGCRATED" OR "Z" PATTERN VISOR WILL

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ITEM 682: VEHICLE AND PEDESTRIAN SIGNAL HEADS, CONT'D
BE REQUIRED.

TRAFFIC SIGNAL HEADS FOR THIS PROJECT SHALL BE YELLOW ALUMINUM WITH BLACK POLYCARBONATE BACK PLATES. SIGNAL LENSES SHALL BE GLASS.

TRAFFIC SIGNAL LAMPS SHALL BE 135 WATT AND PEDESTRIAN SIGNAL LAMPS SHALL BE 69 WATT.

ALL MAST ARM MOUNTED SIGNAL HEADS SHALL BE TURNED DOWN AND ALL OTHER SIGNAL HEADS SHALL BE COVERED WITH BURLAP OR OTHER MATERIAL APPROVED BY THE ENGINEER UNTIL PLACED INTO OPERATION.

SIGNAL HEADS MOUNTED ON POLES AND MAST ARMS SHALL BE LEVEL AND PLUMB AND AIMED AS DIRECTED BY THE ENGINEER.

ALL FLASHING BEACON HEAD ATTACHMENTS SHALL BE DESIGNED SUCH THAT THE WIRING TO EACH SIGNAL HEAD SHALL PASS THROUGH THE SIGNAL HEAD BRACING ATTACHMENT HARDWARE TO THE SIGNAL HEAD.

FLASHING BEACON LAMPS SHALL BE 135 WATTS.

FLASHING BEACON HEADS FOR THIS PROJECT SHALL BE YELLOW ALUMINUM. SIGNAL LENSES SHALL BE GLASS.

ALL FLASHING BEACON HEADS SHALL BE COVERED WITH BURLAP OR OTHER MATERIAL APPROVED BY THE ENGINEER UNTIL PLACED INTO OPERATION.

BACKPLATES WILL NOT BE REQUIRED.

ITEM 684: TRAFFIC SIGNAL CABLES

THE TYPE C CABLE FOR LOOP DETECTOR LEAD-IN SHALL BE NO. 18 AWG WIRE.

THE CONDUCTORS IN THE TRAFFIC SIGNAL CABLE SHALL BE STRANDED FOR THIS PROJECT. INDIVIDUAL CONDUCTORS SHALL BE NO. 12 AWG.

THE MULTICONDUCTOR SIGNAL CABLE SHOWN ON THE PLANS SHALL BE TERMINATED ON THE TERMINAL STRIP IN THE HAND HOLE OF MAST ARM SIGNAL POLES.

A SEPARATE MULTICONDUCTOR CABLE (16 AWG) SHALL BE USED INSIDE PEDESTAL POLES AND MAST ARM SIGNAL POLES FROM THE TERMINAL STRIP TO EACH SIGNAL HEAD AS FOLLOWS:

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 684: TRAFFIC SIGNAL CABLES, CONT'D

HEAD TYPE	CONDUCTOR SIZE
H3/V3	5 CNDR
H5LT	7 CNDR
143C	5 CNDR (2 EA)
152A	5 CNDR

SPLICES IN THE CONDUCTORS FROM THE TERMINAL STRIP AT THE HAND HOLE TO THE SIGNAL HEADS WILL NOT BE PERMITTED IN THE POLE SHAFT OR IN THE MAST ARM.

EACH CABLE SHALL BE IDENTIFIED AS SHOWN ON THE PLANS (CABLE 1, ETC.) WITH PERMANENT MARKING LABELS (PANDUIT TYPE PLM STANDARD SINGLE MARKER TIE, THOMAS & BETTS TYPE 548M OR EQUIVALENT) AT EACH GROUND BOX, POLE BASE AND CONTROLLER.

ITEM 686: TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL)

TERMINAL STRIPS IN THE SIGNAL POLE ACCESS COMPARTMENT SHALL BE 12 CIRCUIT BUCHANAN TYPE 112SN, KULKA TYPE 985-GP-12 OR EQUIVALENT. WHEN MORE THAN 12 CIRCUITS ARE REQUIRED, ADDITIONAL TERMINAL STRIPS OF 8 CIRCUITS EACH SHALL BE ADDED.

ALL POLE SHAFTS AND MAST ARMS FOR THIS PROJECT SHALL BE MARKED WITH THE IDENTIFICATION NUMBERS FROM THE LAYOUT SHEETS ON THE PLANS TO FACILITATE ASSEMBLY OF THESE ITEMS IN THE FIELD. THE IDENTIFICATION NUMBERS SHALL BE MARKED ON THE POLE SHAFTS AND MAST ARMS PRIOR TO SHIPMENT FROM THE FABRICATOR. FOR PROJECTS WITH MULTIPLE INTERSECTIONS, THE POLE SHAFTS AND MAST ARMS SHALL BE IDENTIFIED BY INTERSECTION.

POLES SHALL HAVE NUTS ON TOP AND BOTTOM (DOUBLE NUTS) OF THE BASE PLATE.

ANCHOR BOLTS FOR MAST ARM SIGNAL POLES SHALL BE SET SO THAT TWO ARE IN TENSION AND TWO ARE IN COMPRESSION.

THE TRAFFIC SIGNAL POLE HEIGHTS AND MAST ARM LENGTHS SHOWN ON THE PLANS AND IN THE MATERIAL SUMMARY ARE TO BE USED FOR BIDDING PURPOSES ONLY. PRIOR TO FABRICATION, THE CONTRACTOR, IN COOPERATION WITH THE ENGINEER, SHALL MAKE FIELD MEASUREMENTS TO DETERMINE THE ACTUAL POLE HEIGHT NECESSARY TO ENSURE A VERTICAL CLEARANCE OF 17 FEET MINIMUM, AND 19 FEET MAXIMUM FROM THE ROADWAY SURFACE TO THE BOTTOM OF THE LOWEST POINT

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ITEM 686: TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL), CONT'D

ON THE SIGNAL HEAD ASSEMBLY OR MAST ARM AND TO DETERMINE THE MAST ARM LENGTHS REQUIRED TO MOUNT THE TRAFFIC SIGNAL HEADS OVER THE TRAFFIC LANES. THE MAST ARMS SHALL BE STRAIGHT AND LEVEL IN THE AREA WHERE THE SIGNAL HEADS ARE ATTACHED. THESE FIELD MEASUREMENTS AND ELEVATIONS SHALL BE DETERMINED FROM THE ACTUAL FIELD LOCATION OF THE POLE FOUNDATIONS, CONSIDERING ALL ABOVE AND BELOW GROUND UTILITIES AND THE EXISTING ROADWAY ELEVATIONS AND LANE WIDTHS.

ALL STEEL MAST ARMS RANGING FROM 28' TO 48' IN LENGTH SHALL BE PROVIDED WITH VIBRATION DAMPERS. DAMPERS SHALL BE INSTALLED USING ASTRO-SIGN BRAC OR SIGNFIX ALUMINUM CHANNEL OR EQUAL, A MAXIMUM OF 3 FEET FROM THE END OF THE MAST ARM.

ITEM 688: TRAFFIC SIGNAL DETECTORS

THIS PROJECT REQUIRES THAT SEVERAL LOOPS IN THE STREET SHARE THE SAME GROUND BOX FOR CONNECTIONS TO THE LOOP LEAD-IN CABLE. THE LEAD-IN SAW CUTS FROM THE STREET TO THE GROUND BOX SHALL MAINTAIN A MINUMUM SEPARATION FROM OTHER LOOPS OF 12 INCHES AND A MINIMUM SEPARATION OF 6 INCHES FROM OTHER LEAD-IN SAW CUTS.

LOOP WIRE SHALL BE USED FOR CONCRETE PAVEMENT AND LOOP DUCT SHALL BE USED FOR HOT MIX ASPHALTIC CONCRETE PAVEMENTS.

ALL LOOP WIRE FROM THE LOOP IN THE STREET TO THE GROUND BOX SHALL BE TIGHTLY TWISTED A MINIMUM OF 5 TIMES PER FOOT AS IT IS PLACED IN THE LEAD-IN SAW CUT.

ON EXISTING SIGNAL POLES, THE CONTRACTOR WILL NOT BE REQUIRED TO INSTALL NEW CONDUCTORS FROM THE TEMINAL STRIP OR TRANSFORMER BASE INSIDE THE POLE TO THE SIGNAL HEADS.

GROUNDED SHIELDS ARE REQUIRED ON THE DETECTOR LEAD-IN CABLE AT THE CONTROLLER ONLY. DETECTOR LEAD-IN CABLES SHALL BE RUN CONTINUOUSLY WITHOUT SPLICES FROM THE CURBSIDE GROUND BOX TO THE CONTROLLER WHERE POSSIBLE. IF SPLICES MUST BE MADE, THEY SHOULD BE MADE IN A POLE BASE, IF POSSIBLE. SPLICES SHALL BE SOLDER CONNECTED (INCLUDING THE GROUND WIRE) AND THE SPLICE CONNECTION SHALL BE INSULATED WITH THERMO-SETTING MATERIALS. SPLICES AT THE CURB SIDE GROUND BOXES SHALL ALSO BE MADE IN THE SAME MANNER.

THE OUTER INSULATION OF THE DETECTOR LEAD-IN CABLES SHALL BE STRIPPED BACK A MINIMUM OF 16 INCHES. LEAD-IN WIRES SHALL BE TWISTED UP TO THE

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 688: TRAFFIC SIGNAL DETECTORS, CONT'D
POINT OF TERMINATION.

DETECTOR LEAD-IN CABLES SHALL BE IDENTIFIED AS SHOWN ON THE PLANS (PHASE 1, ETC.) WITH PERMANENT MARKING LABELS (PANDUIT TYPE PLM, THOMAS & BETTS TYPE 548M STANDARD SINGLE MARKER TIE OR EQUIVALENT) AT EACH GROUND BOX, POLE BASE, AND CONTROLLER. LABELS SHALL BE ATTACHED NO MORE THAN 152MM FROM WHERE THE OUTER INSULATION IS STRIPPED.

INSTALLATION OF THE LOOP DETECTORS SHALL BE MADE DURING OFF-PEAK TRAFFIC PERIODS.

PEDESTRIAN PUSH BUTTONS SHALL BE IN COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT.

PEDESTRIAN PUSH BUTTONS SHALL BE MOUNTED AT A HEIGHT OF 3'-6" ABOVE THE SIDEWALK AND SHALL BE OF THE TYPE THAT HAVE PERMANENT-TYPE SIGNS WITHIN THE DETECTOR UNIT WHICH EXPLAINS THEIR PURPOSE AND INDICATES WHICH CROSSWALK SIGNAL IS ACTUATED.

THE PUSH BUTTON SHALL BE ACTIVATED BY A MINIMUM OF 2" CONVEX PLUNGER. A PROTECTIVE SHROUD SHALL ENCIRCLE THE PLUNGER TO DETER VANDALISM. THE SHROUD SHALL BE CAST AS PART OF THE HOUSING COVER. THE PLUNGER SHALL PROTRUDE BEYOND THE PROTECTIVE SHROUD A DISTANCE ADEQUATE TO ACCOMMODATE THE SWITCH TRAVEL.

WHILE STAKING THE POLE LOCATIONS, THE CONTRACTOR, ALONG WITH THE ENGINEER, SHALL VERIFY THE LOCATION OF THE PUSH BUTTONS AND THE DIRECTION OF THE ARROWS ON THE SIGNS PRIOR TO INSTALLATION.

TESTING:

PRIOR TO TERMINATION OF THE SHIELDED, TWISTED PAIR LOOP LEAD-IN CABLES AT THE CONTROLLER CABINET, INSULATION TESTS SHALL BE MADE WITH AN INSULATION TEST SET APPLYING NOT LESS THAN 500 VOLTS D.C. TO THE COMPLETED LOOP DETECTOR. A MINIMUM RESISTANCE OF 50 MEGAOHM SHALL BE OBTAINED.

AFTER THE ABOVE INSULATION TESTS ARE COMPLETED AND THE LOOP LEAD-IN CABLE HAS BEEN TERMINATED IN THE CABINET, THE CONTRACTOR SHALL ASSIST THE ENGINEER IN DETERMINING THE LOOP INDUCTANCE OF EACH LOOP DETECTOR INSTALLATION. THE CONTRACTOR SHALL FURNISH A LOOP DETECTOR ANALYZER WHICH SHALL DETERMINE THE TOTAL INDUCTANCE OF THE LOOP IN THE PAVEMENT AND THE ASSOCIATED LEAD-IN CABLE AND SHALL ALSO BE USED IN DETERMINING

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GENERAL NOTES AND SPECIFICATION DATA--

TESTING:, CONT'D
THE PERCENTAGE SHIFT IN LOOP INDUCTANCE FOR VARIOUS SIZE VEHICLES THAT MAY BE ACTUATING THE DETECTOR.

ALL SIGNAL CABLES AND POWER CONDUCTORS SHALL BE CHECKED FOR INSULATION RESISTANCE UPON INSTALLATION AND PRIOR TO TERMINATION. THE TESTS SHALL BE MADE WITH A TEST SET OPERATING AT A MINIMUM OF 500 VOLTS D.C. APPLIED TO THE CONDUCTORS.

EACH CONDUCTOR IN THE MULTICONDUCTOR SIGNAL CABLES SHALL BE TESTED FOR INSULATION RESISTANCE RELATIVE TO EACH OTHER AND TO THE OUTER COVERING OF THE CABLE. THE MINIMUM ACCEPTABLE VALUE FOR INSULATION RESISTANCE SHALL BE 50 MEGAOHMS.

ITEM 3146:

LAYDOWN OPERATIONS FOR HOT MIX ASPHALTIC CONCRETE SHALL BE PERFORMED IN SUCH SEQUENCE THAT THE CENTER JOINT WILL BE CARRIED ALONG WITHOUT EXCESS DISTANCE OF LAPBACK, NOT TO EXCEED ONE DAY'S OPERATION.

FOR THIS PROJECT, THE ASPHALT BINDER SHALL BE PG 64-22.

COARSE AGGREGATE FOR SURFACE COURSE SHALL BE SURFACE AGGREGATE CLASSIFICATION "B".

THE UTILIZATION OF RAP FROM OFF PROJECT, STATE OWNED NON-DESIGNATED SOURCES CAN BE PROPOSED BY THE CONTRACTOR. THIS WILL BE CONSIDERED A VALUE ENGINEERING PROPOSAL AND HANDLED AS SUCH BY THE ENGINEER.

ALL SURFACE MIXTURES WILL REQUIRE LATEX MODIFIED ASPHALT CEMENT OR POLYMERS.

ASPHALT PAVEMENT TO BE REMOVED WITHIN THE LIMITS OF THE PROJECT AND ASPHALT PAVEMENT MATERIALS USED IN THE CONSTRUCTION OF DETOURS MAY BE USED AS RAP (RECLAIMED ASPHALT PAVEMENT) IN NONSURFACE COURSES IF THE MATERIAL MEETS ALL THE PHYSICAL REQUIREMENTS OF THE APPROPRIATE ITEM. THERE WILL BE NO COST TO THE CONTRACTOR FOR THE USE OF THIS MATERIAL. THE SAME WILL HOLD TRUE OF OTHER SOURCES DESIGNATED IN THE PLANS.

ITEM 5004:

THE SEDIMENTATION AND WATER POLLUTION PREVENTION PLAN (SW3P) FOR THIS PROJECT SHALL CONSIST OF USING THE FOLLOWING AS DIRECTED BY THE

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 5004:, CONT'D
ENGINEER.
ITEM 5012 EARTHWORK FOR EROSION CONTROL
ITEM 5249 TEMPORARY SEDIMENT CONTROL FENCE

ITEM 5326:

CONCRETE TO BE RUNNING BOND USED BRICK FORM WITH BROWN RED COLOR.

RUNNING BOND USED BRICK FORM TO BE STAMPED PERPENDICULAR TO THE CENTERLINE OF FM 740.

DOWELS (SMOOTH BARS) 1" X 18" SPACED AT 12" SHALL BE PLACED IN THE CONCRETE AT THE LEAVEOUTS FOR THE TEXTURIZED CONCRETE STREET CROSSWALK AREAS AT THE INTERSECTION OF FM 740 AND YELLOW JACKET LANE AND MEDIAN AREA FROM STA 129+85 TO STA 138+00.

ITEM 5519:

A MINIMUM OF TWO TRANSPORTABLE CELLULAR TELEPHONES WILL BE REQUIRED.

ITEM 6009: ROADSIDE FLASHING BEACON ASSEMBLIES

FLASHER HEADS WILL BE CONNECTED FROM THE FLASHER CONTROLLER BY THREE (3) NO. EIGHT XHHW WIRES AND ONE (1) NO. SIX BARE WIRE. THESE WIRES WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 6009.

A SOLID STATE TIME CLOCK WILL NOT BE REQUIRED ON THIS PROJECT.

ITEM 6010: SALVAGING TRAFFIC SIGNALS

THE EXISTING TRAFFIC SIGNALS AT FM 740 AND YELLOWJACKET LANE SHALL BE REMOVED AFTER THE TEMPORARY SIGNALS ARE FULLY OPERATIONAL. THE EQUIPMENT SHALL BE SALVAGED AND REMAIN THE PROPERTY OF THE STATE. EQUIPMENT TO BE SALVAGED SHALL CONSIST OF CABINETS, HEADS, SIGNS, SERVICE POLES OR EQUIPMENT, ALL ROADSIDE FLASHING BEACON HEADS, AND ANY OTHER EQUIPMENT AS DIRECTED BY THE ENGINEER. THIS EQUIPMENT SHALL BE

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GENERAL NOTES AND SPECIFICATION DATA--

ITEM 6010: SALVAGING TRAFFIC SIGNALS, CONT'D
STOCKPILED AT THE TXDOT MAINTENANCE YARD AT 592 EAST SH 121 IN LEWISVILLE. CONTACT LANNY SURRATT AT 214-320-6683 PRIOR TO TAKING THE SIGNALS TO THE STOCKPILE.

TIMBER POLES NOT SET IN CONCRETE, SHALL BE COMPLETELY REMOVED WITHOUT CUTTING OFF THE POLE. TIMBER POLES SET IN CONCRETE SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

ITEM 6887: CONTROLLER AND CABINET

THE CONTROLLER FOR THIS PROJECT SHALL BE NEMA TS2 TYPE 2 WITH A "D" MODULE. THE CONTROLLER SHALL MEET ALL OF THE FUNCTIONAL REQUIREMENTS OF THE SPECIFICATIONS 6887 AND SHALL BE INTERCHANGEABLE WITH NEMA TS1 CONTROLLER CURRENTLY IN OPERATION IN THE DALLAS DISTRICT.

THE LOAD SIDE OF THE MAIN CIRCUIT BREAKER SHALL BE PROTECTED BY AN EDCO MODEL SHA-1210-IRS LIGHTING SURGE SUPPRESSOR WITH LED INDICATION TO INDICATE PROPER OPERATION AND A SET OF DRY CONTACTS FOR ALARM CAPABILITIES. THE DRY CONTACTS SHALL BE WIRED TO ALARM INPUT 2 AND BE SET UP TO CALL THE CENTRAL OFFICE IF A FAILURE OCCURES.

ITEM 8174: SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS

THE CONTRACTOR SHALL FURNISH, INSTALL AND MAKE FULLY OPERATIONAL A SPREAD SPECTRUM RADIO SYSTEM TO PROVIDE COMMUNICATIONS FOR THE PROPOSED CLOSED LOOP SYSTEM AS DIRECTED BY THE ENGINEER.

THE SYSTEM SHALL BE INTERFACED AND INTEGRATED WITH AN EXISTING HARDWIRED CLOSED LOOP SYSTEM TO MAKE ONE CLOSED LOOP SYSTEM LINKED BY HARDWIRE AND WIRELESS (SPREAD SPECTRUM RADIO) COMMUNICATION MEDIA. SIGNAL MONITOR COMMUNICATIONS ARE PART OF THE CLOSED LOOP SYSTEM.

THE EXISTING HARDWIRED CLOSED LOOP SYSTEM CONSISTS OF TYPE PEEK 3000 TS1 CONTROLLERS. THE TRAFFIC SIGNALS ON THE EXISTING SYSTEM ARE LOCATED AT:

* FM 740 & IH-30 EAST BOUND FRONTAGE ROAD
* FM 740 & IH-30 WEST BOUND FRONTAGE ROAD
* FM 740 & FM 3097

GENERAL NOTES AND SPECIFICATION DATA--

ITEM 8174: SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS, CONT'D
THE COMMUNICATION BETWEEN THE EXISTING MASTER CONTROLLER UNIT AND ANY CONTROLLER LINKED BY HARDWIRE AND RADIO (WIRELESS) SHALL BE TRANSPARENT TO THE COMMUNICATION MEDIA.

THE CONTRACTOR SHALL UPGRADE ALL THE CONTROLLERS LINKED BY HARDWIRE AND RADIO WITH THE LATEST VERSION OF CLOSED LOOP SYSTEM SOFTWARE.

THE SPREAD SPECTRUM RADIO MASTER AND OMNI ANTENNA SHALL BE INSTALLED AT THE CONTROLLER HOUSE AT FM 740 AND IH 30. AT THE CONTROLLER HOUSE, A 10FT LENGTH OF 1-1/2 INCH RM CONDUIT SHALL BE FIRMLY ATTACHED VERTICALLY FROM THE GROUND ABOVE THE ROOF. THE ANTENNA SHALL BE ATTACHED TO THE TOP OF THIS CONDUIT. THE COAXIAL CABLE SHALL RUN FROM THE ANTENNA, DOWN THE CONDUIT AND INTO THE HOUSE AT THE TOP. IT MAY BE NECESSARY TO CUT THROUGH THE ROOF OVERHANG TO PLACE THE RM CONDUIT.

THE SECONDARY RADIO AND ANTENNA SHALL BE INSTALLED AT FM 740 AND YELLOW JACKET LANE. THE ANTENNA SHALL BE PLACED AT THE TOP OF POLE P3.

THE COAXIAL CABLE RUNNING FROM THE ANTENNA TO THE CONTROLLER SHALL NOT BE EXPOSED TO OUTDOOR ENVIRONMENT.

THE LATEST VERSION OF THE CLOSED LOOP CENTRAL SOFTWARE SHALL BE PROVIDED TO THE STATE ON 3-1/2" FLOPPY DISK(S). THIS SOFTWARE SHALL BE COMPATIBLE WITH THE EXISTING STATE'S LAPTOP AND DESKTOP COMPUTERS. THESE COMPUTERS HAVE THE FOLLOWING MINIMUM MAIN FEATURES AND ACCESSORIES:

A) 586 PROCESSOR, 133MHZ
B) 1.34GB HARD DISK DRIVE
C) 1.44MB, 3-1/2" FLOPPY DISK DRIVE
D) 1MB RAM VIDEO CARD
E) 8X INTERNAL CD-ROM
F) PARALLEL AND SERIAL PORTS
G) WINDOWS 95

THE CONTRACTOR SHALL INSTALL THE SOFTWARE IN ALL DESKTOP AND LAPTOP COMPUTERS IN THE DISTRICT SIGNAL SHOP, MAKE THE NECESSARY CONFIGURATION TO THE HARDWARE/SOFTWARE AND MAKE THE CLOSED LOOP SYSTEM OPERATIONAL.

WHEN INTERFACING THE EXISTING EQUIPMENT WITH THE NEW SPREAD SPECTRUM EQUIPMENT, IF SPLICES ARE TO BE MADE, THEY SHALL BE SOLDER CONNECTED AND INSULATED WITH THERMO-SETTING MATERIAL.

ALL TERMINALS AND EQUIPMENT NECESSARY FOR CLOSED LOOP SYSTEM OPERATION SHALL BE PROVIDED AND WIRED ON THE DETECTOR PANEL, INCLUDING TERMINALS

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GENERAL NOTES AND SPECIFICATION DATA--

ITEM 8174: SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS, CONT'D
FOR THE COMMUNICATIONS SYSTEM.

ALL CABLES NECESSARY TO PROVIDE COMPLETE CLOSED LOOP SYSTEM OPERATION AS STATED ABOVE SHALL BE PROVIDED AND INSTALLED.

THE CONTRACTOR SHALL NOTIFY THE TXDOT TRAFFIC SIGNAL MAINTENANCE OFFICE AT 214-320-6682 ONE WEEK PRIOR TO BEGINNING ANY WORK INVOLVING THIS PROJECT.

UP TO TWO DAYS OF TRAINING SHALL BE PROVIDED TO PERSONNEL OF THE CONTRACTING AGENCY IN THE OPERATION, SETUP AND MAINTENANCE OF THE SPREAD SPECTRUM SYSTEM. INSTRUCTION AND MATERIALS SHALL BE PROVIDED FOR A MAXIMUM OF 20 PERSONS AND SHALL BE CONDUCTED AT A LOCATION SELECTED BY THE CONTRACTING AGENCY. THE CONTRACTING AGENCY SHALL BE RESPONSIBLE FOR ANY TRAVEL, ROOM AND BOARD EXPENSES FOR ITS OWN PERSONNEL.

INSTRUCTION PERSONNEL ARE REQUIRED TO BE CERTIFIED BY THE EQUIPMENT MANUFACTURER. THE USER'S GUIDE IS NOT AN ADEQUATE SUBSTITUTE FOR PRACTICAL CLASSROOM TRAINING AND FORMAL CERTIFICATION BY AN APPROVED AGENCY.

FORMAL LEVELS OF FACTORY AUTHORIZED TRAINING ARE REQUIRED FOR INSTALLERS, CONTRACTORS AND SYSTEM OPERATORS. ALL TRAINING MUST BE CERTIFIED BY THE MANUFACTURER.

NO EXTRA COMPENSATION WILL BE ALLOWED FOR FULFILLING THE REQUIREMENTS STATED ABOVE.

GENERAL NOTES AND SPECIFICATION DATA--

THE LIST OF MATERIAL BELOW IS FOR THE CONTRACTOR'S INFORMATION ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL ITEMS AND QUANTITIES LISTED BELOW.

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680

DESCRIPTION	UNIT	QUANTITY
INTERSECTION DISPLAY BOARD	EA	1
SIGN R10-5	EA	1
8 PHASE NEMA CNTRL W/CABINET AND ACCESSORIES	EA	1
2 CHANNEL DETECTOR CARD	EA	7

LIST OF MATERIAL
SUBSIDIARY TO ITEM 681

DESCRIPTION	UNIT	QUANTITY
40' TIMBER POLE (CLASS 2 POLE)	EA	2
50' TIMBER POLE (CLASS 2 POLE)	EA	2
8' LUMINAIRE MAST ARM FOR WOOD POLE MOUNTING WITH 250 WATT HPS LUMINAIRE	EA	2
12 CIRCUIT DISCONNECT HANGER	EA	6
CABLE STRAPS	EA	433
3/8" STEEL GUY CABLE	LF	2268
GROUND ANCHORS	EA	8
YELLOW PLASTIC GUY GUARD	EA	8

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GENERAL NOTES AND SPECIFICATION DATA--

DESCRIPTION CONT'D	UNIT	QUANTITY
DOUBLE EYE ANCHOR ROD	EA	8
5/8" X 8' COPPERCLAD GND ROD/CLAMP	EA	2
8 PHASE NEMA CTRL W/POLE MT CABINET & ACCESS.	EA	1
3" WEATHERHEAD	EA	1
1 1/2" WEATHERHEAD	EA	2
STREET NAME SIGNS	EA	3
SIGN R10-12	EA	1
2" (RM) CONDUIT	LF	60
3" (PVC) CONDUIT	LF	15
NO. 6 BARE	LF	75
NO. 6 XHHW	LF	120
NO. 8 XHHW	LF	466
7 CONDUCTOR CABLE (12 AWG)	LF	599
3 SECTION BACK PLATE	EA	5
5 SECTION BACK PLATE	EA	1
12" VEHICLE SECTIONS	EA	20

LIST OF MATERIAL
SUBSIDIARY TO ITEM 681
TO BE SUPPLIED BY THE STATE

DESCRIPTION	UNIT	QUANTITY
MICROWAVE DETECTOR	EA	1
INTERFACE PANEL	EA	1
6 PAIR WIRE	LF	150

ESTIMATE SUMMARY

PROJECT STP 99(413)MM
CONTROL 1014-3-33
FM 740
ALL BID ITEMS

EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	ALT.	ITEM-CODE ITEM NO	DESC CODE	SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
								89.000			100	0502		PREP ROW	STA	89.000	
								8838.000			104	0501		REMOV CONC (PAV)	SY	8838.000	
								200.000			104	0505		REMOV CONC (MED)	SY	200.000	
								6603.000			104	0511		REMOV CONC (DRVWY)	SY	6603.000	
								630.000			104	0516		REMOV CONC (RETAIN WALL)	SY	630.000	
								956.000			104	0521		REMOV CONC (CURB OR C&G)	LF	956.000	
								89681.000			110	0501		EXCAVATION (RDWY)	CY	89681.000	
								32597.000			132	0509		EMBANK (DENS CONT) (TY C) (CL 3)	CY	32597.000	
								30840.000			132	0525		EMBANK (DENS CONT) (TY C MOD) (CL 3)	CY	30840.000	
								27186.000			160	0506		FURN AND PLAC TPSL (CL 2) (4 ")	SY	27186.000	
								27186.000			162	0507	001	BLOCK SOD (PRAIRIE BUFFALO)	SY	27186.000	
								27186.000			164	0519	002	BRDCST SEED (TEMP) (COOL)	SY	27186.000	
								456.720			168	0501		VEGETATIVE WATERING	MG	456.720	
								228.360			168	0502		VEG WATERING (TEMP EROSN CONTROL)	MG	228.360	
								79503.000			260	0505	001	LIME TREAT SUBGR (DC) (6 ")	SY	79503.000	
								795.030			260	0514	001	LIME (TY A SLURRY) OR (TY B)	TON	795.030	
								3161.000			305	0501		SALV, HAUL & STKPL RECLM ASPH PAV	CY	3161.000	
								28411.000			360	0523	028	MONO CURB (TY 1)	LF	28411.000	
								77446.000			360	0524	028	CONC PAV (CPCD) (8")	SY	77446.000	
								100.200			400	0507	001	CEM STABIL BKFL	CY	100.200	
								49.330			400	0510	001	CUT AND RESTORING PAV (ASPH)	SY	49.330	
								1833.000			402	0501		TRENCH EXCAV PROTECTION	LF	1833.000	
								4.270			420	0574	009	CL A CONC (SILL)	CY	4.270	
								3167.200			423	0505		RETAINING WALL (CONC BLOCK)	SF	3167.200	
								46.085			432	0501		RIPRAP (CONC) (CL B)	CY	46.085	
								3.840			432	0518		RIPRAP (CONC) (CL B) (FLUME)	CY	3.840	
								233.000			450	0683		RAIL (TY PR1)	LF	233.000	
								202.000			462	0534	003	CONC BOX CULV (10 FT X 7 FT)	LF	202.000	
								2727.500			464	0559	003	RC PIPE (SEWER) (CL III) (18 IN)	LF	2727.500	
								2858.500			464	0561	003	RC PIPE (SEWER) (CL III) (24 IN)	LF	2858.500	
								1595.000			464	0563	003	RC PIPE (SEWER) (CL III) (30 IN)	LF	1595.000	
								1690.000			464	0565	003	RC PIPE (SEWER) (CL III) (36 IN)	LF	1690.000	
								478.000			464	0566	003	RC PIPE (SEWER) (CL III) (42 IN)	LF	478.000	
								135.000			464	0568	003	RC PIPE (SEWER) (CL III) (54 IN)	LF	135.000	
								172.000			464	0571	003	RC PIPE (SEWER) (CL III) (72 IN)	LF	172.000	
								40.000			464	0589	003	RC PIPE (SEWER) (CL V) (42 IN)	LF	40.000	
								42.000			465	0509		INLET (COMPL) (TY I)	EA	42.000	
								57.000			465	0540		INLET EXT	EA	57.000	
								4.000			465	0555		MANH (COMPL) (TY 1)	EA	4.000	
								5.000			465	0587		MANH (COMPL) (TY II)	EA	5.000	
								2.000			465	0614		INLET (COMPL) (TY C 2 GRATE)	EA	2.000	
								3.000			465	0615		INLET (COMPL) (TY C 3 GRATE)	EA	3.000	
								5.000			465	0663		INLET (COMPL) (TY C (1-GRATE)	EA	5.000	
								8.000			465	0854		INLET (COMPL) (CURB & GRATE) (TY IV)	EA	8.000	
								1.000			465	0864		INLET (COMPL) (TY D 2 GRATE)	EA	1.000	
								1.000			465	0865		INLET (COMPL) (TY D 3 GRATE)	EA	1.000	
								9.000			465	0912		INLET EXT (COMPL) (TY IV)	EA	9.000	
								1.000			466	0508	001	WINGWALL (PW-N) (H= 7 FT)	EA	1.000	
								1.000			466	0675	001	HEADWALL (CH-11B) (H= 42 IN)	EA	1.000	
								1.000			466	0897	001	WINGWALL (PW-45) (H= 7 FT) (MOD)	EA	1.000	

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ESTIMATE SUMMARY

PROJECT STP 99(413)MM
CONTROL 1014-3-33
FM 740
ALL BID ITEMS

EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	ALT.	ITEM NO	DESC CODE	SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
								1.000			467	0674	003	SAFE END TRT (TY II) (30 IN) (RCP) (3: 1)	EA	1.000	
								1.000			467	0700	003	SAFE END TRT (TY II) (54 ") (RCP) (3: 1) (C)	EA	1.000	
								72.000			496	0502		REMOV OLD STR (SMALL)	EA	72.000	
								1.000			500	0501		MOBILIZATION	LS	1.000	
								23.000			502	0501	018	BARRICADES, SIGNS AND TRAF HANDLE	MO	23.000	
								65.400			508	0501		CONSTRUCT DETOURS (CL 1)	STA	65.400	
								2.000			508	0504		CONSTRUCT DETOURS (CL 4)	EA	2.000	
								8480.000			512	0509	001	PORT CTB (LOW PRF) (STKPL, INSTL & RETRN)	LF	8480.000	
								1020.000			512	0517	001	PORT CTB (LOW PRF) (MOVE & RESET)	LF	1020.000	
								1475.000			529	0504		CONC CURB & GUTTER (TY I)	LF	1475.000	
								584.000			529	0573		CONC CURB (DOWEL) (TY 1)	LF	584.000	
								4069.000			530	0501		DRVWYS (CONC) (6 ")	SY	4069.000	
								5794.000			531	0507		CONCRETE SIDEWALK (4 ")	SY	5794.000	
								1400.000			542	0501		REMOV METAL BEAM GUARD FENCE	LF	1400.000	
								8.000			542	0503		REMOV TERMINAL-ANCHOR SECTION	EA	8.000	
								16.000			618	0504		CONDUIT (RM) (1 1/2")	LF	16.000	
								80.000			618	0505		CONDUIT (RM) (2 ")	LF	80.000	
								2610.000			618	0511		CONDUIT (PVC) (SCHD 40) (2 ")	LF	2610.000	
								388.000			618	0513		CONDUIT (PVC) (SCHD 40) (3 ")	LF	388.000	
								3625.000			618	0514		CONDUIT (PVC) (SCHD 40) (4 ")	LF	3625.000	
								318.000			618	0534		CONDUIT (PVC) (SCHD 40) (3 ") (BORE)	LF	318.000	
								210.000			618	0545		CONDUIT (PVC) (SCHD 40) (1 ")	LF	210.000	
								2741.000			620	0504		ELEC CONDUCTOR (NO. 6) BARE	LF	2741.000	
								160.000			620	0507		ELEC CONDUCTOR (NO. 12) INSULATED	LF	160.000	
								2074.000			620	0509		ELEC CONDUCTOR (NO. 8) INSULATED	LF	2074.000	
								608.000			620	0510		ELEC CONDUCTOR (NO. 6) INSULATED	LF	608.000	
								20.000			624	0501		GROUND BOX TY A (122311) W/APRON	EA	20.000	
								2.000			624	0503		GROUND BOX TY C (162911) W/APRON	EA	2.000	
								6.000			628	0549		ELEC SERV TYS (120/240) 000 (NS) GS (T) TP (O)	EA	6.000	
								1.000			629	0501		REMOV SERV POLE	EA	1.000	
								1.000			644	0501		SMALL RDSD SGN ASSM (TY A)	EA	1.000	
								17.100			656	0510		FND FOR TRAF SIG (24 IN DRIL SHFT)	LF	17.100	
								22.600			656	0511		FND FOR TRAF SIG (30 IN DRIL SHFT)	LF	22.600	
								13.200			656	0512		FND FOR TRAF SIG (36 IN DRIL SHFT)	LF	13.200	
								1.400			656	0518		TRAF SIG CNTRL FND	CY	1.400	
								22.600			656	0521		FND FOR TRAF SIG (TY A) (30IN DR SH)	LF	22.600	
								44174.000			662	0501	005	WRK ZN PAV MRK REMOV (W) (4") (SLD)	LF	44174.000	
								180.000			662	0502	005	WRK ZN PAV MRK REMOV (W) (4") (BRK)	LF	180.000	
								1397.000			662	0507	005	WRK ZN PAV MRK REMOV (W) (8") (SLD)	LF	1397.000	
								67.000			662	0509	005	WRK ZN PAV MRK REMOV (W) (12") (SLD)	LF	67.000	
								132.000			662	0511	005	WRK ZN PAV MRK REMOV (W) (24") (SLD)	LF	132.000	
								5.000			662	0512	005	WRK ZN PAV MRK REMOV (W) (ARROW)	EA	5.000	
								4.000			662	0520	005	WRK ZN PAV MRK REMOV (W) (RR XING)	EA	4.000	
								42057.000			662	0523	005	WRK ZN PAV MRK REMOV (Y) (4") (SLD)	LF	42057.000	
								700.000			662	0524	005	WRK ZN PAV MRK REMOV (Y) (4") (BRK)	LF	700.000	
								112.000			662	0525	005	WRK ZN PAV MRK REMOV (Y) (4") (DOT)	LF	112.000	
								84.000			662	0530	005	WRK ZN PAV MRK REMOV (Y) (12") (SLD)	LF	84.000	
								54.000			662	0600	005	WRK ZN PAV MRK REMOV (W) (8") (DOT)	LF	54.000	
								15043.000			666	0501	018	REFL PAV MRK TY I (W) (4") (SLD)	LF	15043.000	
								4180.000			666	0502	018	REFL PAV MRK TY I (W) (4") (BRK)	LF	4180.000	

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ESTIMATE SUMMARY

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CONTROL 1014-3-33
FM 740
ALL BID ITEMS

EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	ALT.	ITEM-CODE ITEM NO	DESC CODE	SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
								5039.000			666	0506	018	REFL PAV MRK TY I (W) (8") (SLD)	LF	5039.000	
								142.000			666	0509	018	REFL PAV MRK TY I (W) (12") (SLD)	LF	142.000	
								144.000			666	0512	018	REFL PAV MRK TY I (W) (24") (SLD)	LF	144.000	
								19.000			666	0513	018	REFL PAV MRK TY I (W) (ARROW)	EA	19.000	
								3.000			666	0514	018	REFL PAV MRK TY I (W) (DBL ARROW)	EA	3.000	
								8.000			666	0517	018	REFL PAV MRK TY I (W) (WORD)	EA	8.000	
								4.000			666	0521	018	REFL PAV MRK TY I (W) (RR XING)	EA	4.000	
								5685.000			666	0524	018	REFL PAV MRK TY I (Y) (4") (SLD)	LF	5685.000	
								400.000			666	0525	018	REFL PAV MRK TY I (Y) (4") (BRK)	LF	400.000	
								15043.000			666	0535	018	REFL PAV MRK TY II (W) (4") (SLD)	LF	15043.000	
								4180.000			666	0536	018	REFL PAV MRK TY II (W) (4") (BRK)	LF	4180.000	
								5039.000			666	0539	018	REFL PAV MRK TY II (W) (8") (SLD)	LF	5039.000	
								142.000			666	0541	018	REFL PAV MRK TY II (W) (12") (SLD)	LF	142.000	
								144.000			666	0544	018	REFL PAV MRK TY II (W) (24") (SLD)	LF	144.000	
								19.000			666	0545	018	REFL PAV MRK TY II (W) (ARROW)	EA	19.000	
								3.000			666	0546	018	REFL PAV MRK TY II (W) (DBL ARROW)	EA	3.000	
								8.000			666	0549	018	REFL PAV MRK TY II (W) (WORD)	EA	8.000	
								4.000			666	0553	018	REFL PAV MRK TY II (W) (RR XING)	EA	4.000	
								5685.000			666	0556	018	REFL PAV MRK TY II (Y) (4") (SLD)	LF	5685.000	
								400.000			666	0557	018	REFL PAV MRK TY II (Y) (4") (BRK)	LF	400.000	
								42.000			672	0509	012	RAIS PAV MRKR CL B (REFL) TY II-A-A	EA	42.000	
								424.000			672	0510	012	RAIS PAV MRKR CL B (REFL) TY II-C-R	EA	424.000	
								64707.000			677	0501		ELIM EXT PAV MRK & MRKR (4")	LF	64707.000	
								600.000			677	0503		ELIM EXT PAV MRK & MRKR (8")	LF	600.000	
								109.000			677	0504		ELIM EXT PAV MRK & MRKR (12")	LF	109.000	
								10.000			677	0507		ELIM EXT PAV MRK & MRKR (ARROW)	EA	10.000	
								6.000			677	0512		ELIM EXT PAV MRK & MRKR (RR XING)	EA	6.000	
								659.000			677	0518		ELIM EXT PAV MRK & MRKR (RAIS PAV MRKR)	EA	659.000	
								25308.000			678	0501		PAV SURF PREP FOR MRKS (4")	LF	25308.000	
								5039.000			678	0503		PAV SURF PREP FOR MRKS (8")	LF	5039.000	
								142.000			678	0504		PAV SURF PREP FOR MRKS (12")	LF	142.000	
								144.000			678	0506		PAV SURF PREP FOR MRKS (24")	LF	144.000	
								19.000			678	0507		PAV SURF PREP FOR MRKS (ARROW)	EA	19.000	
								8.000			678	0508		PAV SURF PREP FOR MRKS (WORD)	EA	8.000	
								4.000			678	0512		PAV SURF PREP FOR MRKS (RR XING)	EA	4.000	
								3.000			678	0531		PAV SURF PREP FOR MRKS (DBL ARROW)	EA	3.000	
								1.000			680	0501	007	INSTAL OF HWY TRAF SIG (ISOLATED)	EA	1.000	
								1.000			680	0503	007	INSTAL OF HWY TRAF SIG (FLASH BEACON)	EA	1.000	
								1.000			681	0501		TEMP TRAF SIGNALS FOR CONSTRUCTION	EA	1.000	
								31.000			682	0502		VEH SIG SEC (12 IN)	EA	31.000	
								4.000			682	0505		PED SIG SEC (2 INDICATIONS IN 1 SEC)	EA	4.000	
								9.000			682	0509		BACK PLATE (3 SEC) (12 IN)	EA	9.000	
								9.000			682	0522		VEH SIG SEC (12 IN) RED LED	EA	9.000	
								2422.000			684	0503		TRAF SIG CBL (TY A) (3 CONDR) (12 AWG)	LF	2422.000	
								174.000			684	0507		TRAF SIG CBL (TY A) (7 CONDR) (12 AWG)	LF	174.000	
								484.000			684	0512		TRAF SIG CBL (TY A) (12 CONDR) (12 AWG)	LF	484.000	
								41.000			684	0516		TRAF SIG CBL (TY A) (16 CONDR) (12 AWG)	LF	41.000	
								2431.000			684	0546		TRAF SIG CBL (TY C) (2 CONDR) (18 AWG)	LF	2431.000	
								347.000			684	0553		TRAF SIG CBL (TY A) (5 CONDR) (16 AWG)	LF	347.000	
								112.000			684	0554		TRAF SIG CBL (TY A) (7 CONDR) (16 AWG)	LF	112.000	

ESTIMATE & QUANTITY SHEET

STATE DIST. NO	COUNTY	PROJECT NO.	SHEET NO.
18	ROCKWALL	STP 99(413)MM	15

ESTIMATE SUMMARY

PROJECT STP 99(413)MM
CONTROL 1014-3-33
FM 740
ALL BID ITEMS

EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	EST.	FINAL	ALT	ITEM-CODE ITEM NO	ITEM-CODE DESC CODE	ITEM-CODE SP NO	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
								1.000			686	0510	001	TRAF SIG POLE ASM (STL) 1 ARM (28 FT)	EA	1.000	
								1.000			686	0569	001	TRAF SIG POLE ASM (STL) 1 ARM (32 FT) LUM	EA	1.000	
								1.000			686	0570	001	TRAF SIG POLE ASM (STL) 1 ARM (36 FT) LUM	EA	1.000	
								1.000			686	0572	001	TRAF SIG POLE ASM (STL) 1 ARM (44 FT) LUM	EA	1.000	
								4.000			688	0501		PED DETECT (PUSH BTN)	EA	4.000	
								1355.000			688	0511		VEH DETECT (SAWCUT)	LF	1355.000	
								25715.000			3146	0502	001	HOT MIX (TY B)	TON	25715.000	
								103.000			3146	0520	001	HOT MIX (TY C) (SURF)	TON	103.000	
								45.000			5005	0501		ROCK FILTER DAMS (TY 1)	LF	45.000	
								45.000			5005	0502		ROCK FILTER DAMS (REMOV & REPLAC) (TY 1)	LF	45.000	
								45.000			5005	0503		ROCK FILTER DAMS (REMOV) (TY 1)	LF	45.000	
								25.000			5012	0511		BKH WRK OR FRNT END LDR WRK (EC) (CL 1)	HR	25.000	
								10947.000			5249	0501		TEMP SEDMT CONT FENCE	LF	10947.000	
								21894.000			5249	0502		TEMP SEDMT CONT FENCE (REMOVE & REPLAC)	LF	21894.000	
								10947.000			5249	0503		TEMP SEDMT CONT FENCE (REMOV)	LF	10947.000	
								1156.000			5326	0502		COLORED-TEXTURIZED CONCRETE (4")	SY	1156.000	
								2764.000			5326	0503		COLORED-TEXTURIZED CONCRETE (6")	SY	2764.000	
								1884.000			5326	0504		COLORED-TEXTURIZED CONCRETE (8")	SY	1884.000	
								1.000			6008	0501		PEDESTAL POLE ASSEM	EA	1.000	
								2.000			6009	0501		RDSD FLASH BEACON ASSEM	EA	2.000	
								1.000			6010	0501		SALV TRAF SIGNALS	EA	1.000	
								2.000			8174	0501		SPREAD SPECTRUM RADIO	EA	2.000	
								1.000			8174	0502		ANTENNA (UNIDIRECTIONAL)	EA	1.000	
								1.000			8174	0503		ANTENNA (OMNI-DIRECTIONAL)	EA	1.000	
								73.000			8174	0504		COAXIAL CABLE	LF	73.000	
														RAILROAD FORCE ACCOUNT WORK (PART)			
														SIGNALS, PLANKING & FLAGGING	LS	1.000	
														CONTRACTOR FORCE ACCOUNT WORK (PART)			
														TRANSPORTABLE CELLULAR TELEPHONES	LS	1.000	
														STATE FORCE ACCOUNT WORK			
														SIGNING	LS	1.000	

ESTIMATE & QUANTITY SHEET

STATE DIST. NO.	COUNTY	PROJECT NO.	SHEET NO.
18	ROCKWALL	STP 99(413)MM	16

SUMMARY OF REMOVAL ITEMS

ID	LOCATION	REMOVE OLD CONC--ITEM 104					ITEM 305	ITEM 496	ITEM 542		REMARKS
		MEDIAN SY	DRVWAY SY	PAVEMENT SY	CURB OR C&G LF	RETAIN WALL SY	SALV, HAUL & STOCKPILE RECLAIMABLE ACP CY	REMOVE OLD STR (SMALL) EA	MBGF LF	TAS EA	
R-1	RT STA 129+62							1			9' ~ 18" RCP, 47' ~ 18" CGMP
	LT STA 131+25		82								
	RT STA 131+85		155								
	LT STA 131+48 - STA 133+00		453								
	LT STA 133+00 - STA 135+63		783								
R-2	RT STA 134+ 28		177					1			93' ~ 18" RCP W/ SET (1)
	RT STA 135+20		29								
R-3	RT STA 136+00		199					1			68' ~ 18" RCP W/ SET, DROP INLET
R-4	LT STA 136+70							1			22' ~ 18" RCP
R-5	LT STA 138+29							1			52' ~ 24" RCP W/ SET
	LT STA 136+84		414								
R-6	RT STA 138+50		267					1			45' ~ 21" RCP, 15' ~ 30" RCP W/ SET
R-7	CL STA 142+20							1			(2) 68.6' ~ 30" RCP W/ HDWLS
R-8	RT STA 144+30							1			(2) 88.5' ~ 18" RCP W/ SET
	LT STA 145+20 TURTLE COVE			335							
R-9	RT STA 145+45		136					1			47' ~ 18" CGMP W/ SET
R-10	RT STA 146+32		153					1			50' ~ 24" CGMP W/ SET
R-11	RT STA 148+55 WHITE HILL			409				1			80' ~ 24" CGMP
	LT STA 148+50 - STA 149+50		324								
	LT STA 149+50 - STA 151+75		590								
R-12	RT STA 150+08		139					1			(2) 52' ~ 18" RCP W/ SET & CI
R-13	LT STA 150+40							1			52' ~ 15" CGMP W/ SET & GRATE INLET
R-14	LT STA 151+68							1			21' ~ 18" RCP
R-15	LT STA 152+95		59					1			25' ~ 18" CGMP W/ SET
R-16	RT STA 153+19		171					1			(2) 60' ~ 24" CGMP W/ SET & GRATE INLETS
R-17	RT STA 153+65		115					1			(2) 41' ~ 24" CGMP W/ SET
R-18	RT STA 154+08		138					1			(2) 46' ~ 24" CGMP W/SET
R-19	CL STA 156+90							1			69' ~ 30" RCP W/ HDWLS
R-20	LT STA 158+38							1			16' ~ 18" RCP
R-21	RT STA 159+15 YELLOW JACKET			970	220			1			116' ~ 18" RCP W/ SET
R-22	RT STA 161+06							1			ONE JOINT ~ 66" RCP
R-23	CL STA 161+06							1			92' ~ 54" RCP W/ HDWLS, RIPRAP
	RT STA 164+52						7				
R-24	RT STA 167+20							1			50' ~ 48" RCP W/ HDWLS, PLUG
R-25	CL STA 167+95							1			45' ~ 24" RCP
R-26	LT STA 169+00 LAKE SHORE DR.			275				1			60' ~ 24" CGMP
R-27	LT STA 170+70						10	1			36' ~ 24" RCP W/ HDWLS
R-28	LT STA 172+15		58					1			15' ~ 18" RCP W/ HDWLS
R-29	LT STA 174+60		37					1			20' ~ 18" CGMP
R-30	LT STA 176+40		54					1			20' ~ 18" CGMP
	LT STA 180+25		45								
R-31	LT STA 181+05		44					1			20' ~ 18" CGMP
R-32	LT STA 181+30		47					1			20' ~ 18" CGMP
	LT STA 182+44 BECKY LANE			158							
R-33	LT STA 183+68							1			25.5' ~ 15" RCP
	LT STA 183+52 - STA 184+05		103								
R-34	LT STA 183+95							1			16' ~ 15" CGMP
R-35	LT STA 185+00		37					1			16' ~ 12" RCP
R-36	LT STA 186+40							1			24.5' ~ 12" RCP
R-37	LT STA 189+00							1			25' ~ 12" RCP
R-38	RT STA 190+05							1			19' ~ 15" CGMP
R-39	LT STA 190+32		62					1			20' ~ 18" CGMP W/ FLARED HDWLS
R-40	RT STA 190+63							1			20' ~ 15" CGMP
R-41	LT STA 190+93		62					1			20' ~ 18" CGMP W/ FLARED HDWLS
R-42	LT STA 191+25		58					1			26' ~ 18" CGMP
R-43	LT STA 191+85		61					1			20' ~ 18" CGMP
R-44	LT STA 192+20		57					1			20' ~ 18" CGMP W/ RIPRAP ENDS
R-45	LT STA 193+05		59					1			20' ~ 18" CGMP W/ RIPRAP ENDS
R-46	LT STA 193+70		37					1			21' ~ 12" RCP
R-47	LT STA 195+75		46					1			21' ~ 12" RCP
R-48	LT STA 196+30		57					1			22' ~ 18" RCP W/ HDWLS
R-49	LT STA 197+50		59					1			21' ~ 18" RCP W/ HDWLS
R-50	LT STA 198+90		89					1			46' ~ 18" RCP W/ HDWL (1)

CONTINUED ON NEXT SHEET

SUMMARY SHEET

SHEET 1 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		17
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF REMOVAL ITEMS (CONTINUED)

ID	LOCATION	REMOVE OLD CONC--ITEM 104					ITEM 305	ITEM 496	ITEM 542		REMARKS
		MEDIAN SY	DRVWAY SY	PAVEMENT SY	CURB OR C&G LF	RETAIN WALL SY	SALV, HAUL & STOCKPILE RECLAIMABLE ACP CY	REMOVE OLD STR (SMALL) EA	MBGF LF	TAS EA	
R-51	RT STA 199+16		225					1			51.5' ~ 21" PVC
R-52	LT STA 200+20		42					1			49' ~ 18" RCP & CGMP
R-53	LT STA 201+80							1			24.5' ~ 15" RCP
	RT STA 202+50		336								
R-54	CL STA 203+20							1			61.3' ~ 18" RCP W/ HDWLS
	LT STA 203+50		22								
	LT STA 208+06		25								
	RT STA 208+44				104		13				
	LT STA 208+55		36								
R-55	LT STA 209+30		56					1			25' ~ 12" RCP
R-56	LT STA 209+92		33					1			16.5' ~ 15" RCP
R-57	LT STA 210+60							1			16' ~ 15" RCP
R-58	CL STA 211+05							1			59.5' ~ 24" RCP W/ HDWLS
R-59	LT STA 211+30		24					1			14.4' ~ 15" RCP
R-60	LT STA 211+58							1			21' ~ 12" RCP
R-61	LT STA 212+05		26					1			15' ~ 12" RCP
R-62	RT STA 212+16						6	1			50.4' ~ 18" RCP W/ FLARED HDWLS
R-63	LT STA 213+30		33					1			25' ~ 15" RCP
R-64	LT STA 214+08		33					1			20' ~12" RCP
R-65	LT STA 214+74		33					1			17' ~ 12" IRON PIPE
R-66	RT STA 214+76						3	1			28.5' ~ 18" RCP W/ FLARED HDWLS
R-67	LT STA 215+46		33					1			20' ~ 12" CGMP
	RT STA 215+57		93								
R-68	LT STA 216+06 SUMMIT RIDGE			282	66			1			87' ~ 15" CGMP W/ SET
	RT STA 216+52		97								
R-69	LT STA 217+55							1			19' ~ 15" CGMP
R-70	CL STA 217+95							1			(2) 71' ~ 18" RCP W/ SET, HDWL, RIPRAP
R-71	LT STA 219+56 GLENN RD			100	74		5	1			55' ~ 12" CGMP W/ SET
	RT STA 220+05 - STA 221+89				184						
	STA 219+12 - STA 222+50						25				
	CL STA 128+00 - MEDIAN	200			308						
	CL STA 129+00 - MEDIAN						4				
	STA 128+84 - STA 222+50						3088				
	STA 133+00 - STA 156+00			2044							
	STA 166+00 - STA 222+50			4265							
	STA 139+38 - STA 142+35					630					
	LT STA 158+75 - STA 166+25								725	2	
	RT STA 158+20 - STA 158+70								50	2	
	RT STA 160+00 - STA 164+30								450	2	
	RT STA 164+50 - STA 167+00								175	2	
R-72	RT STA 163+05							1			70' ~ 5' BOX CULVERT
	TOTALS	200	6603	8838	956	630	3161	72	1400	8	

SUMMARY SHEET

SHEET 2 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		18
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF SEDIMENT CONTROL FENCE

LOCATION	PLACE ITEM 5249 LF	REMOVE & REPLACE ITEM 5249 LF	REMOVE ITEM 5249 LF
LT STA 130+00	10	20	10
RT STA 130+00	35	70	35
LT STA 130+40	35	70	35
RT STA 135+00	10	20	10
RT STA 135+50	35	70	35
LT STA 135+65 TO 136+70	105	210	105
RT STA 137+00	35	70	35
RT STA 137+90	35	70	35
RT STA 138+05	35	70	35
LT STA 138+55 TO 144+00	560	1120	560
LT STA 139+50	10	20	10
RT STA 139+50	10	20	10
RT STA 140+00	35	70	35
RT STA 140+10	35	70	35
RT STA 141+30	35	70	35
LT STA 141+50	35	70	35
RT STA 141+85	35	70	35
LT STA 142+00	35	70	35
LT STA 142+10	40	80	40
LT STA 142+30	40	80	40
LT STA 142+50	35	70	35
RT STA 142+50	35	70	35
LT STA 144+00 TO 145+13	113	226	113
RT STA 145+50	40	80	40
LT STA 145+90 TO 148+50	264	528	264
RT STA 146+32	35	70	35
LT STA 147+00	10	20	10
RT STA 147+00	10	20	10
LT STA 150+90	35	70	35
LT STA 151+00	35	70	35
LT STA 151+75 TO 152+90	115	230	115
LT STA 152+00	10	20	10
RT STA 152+00	10	20	10
RT STA 152+90	30	60	30
LT STA 153+05 TO 155+00	205	410	205
LT STA 153+90	35	70	35
LT STA 154+00	35	70	35
LT STA 155+00 TO 166+00	1043	2086	1043
LT STA 156+00	10	20	10
RT STA 156+62	10	20	10
LT STA 156+90	35	70	35
RT STA 156+90	35	70	35
RT STA 158+47	10	20	10
RT STA 158+50	35	70	35
LT STA 160+00	10	20	10
LT STA 160+40	35	70	35
LT STA 160+88	35	70	35
LT STA 161+45	35	70	35
RT STA 163+00	40	80	40
LT STA 165+00	10	20	10
RT STA 166+20	10	20	10
RT STA 167+80	10	20	10
LT STA 168+00	10	20	10
RT STA 168+00	40	80	40
RT STA 168+35 TO 190+00	2150	4300	2150
RT STA 169+00	35	70	35
LT STA 169+35	30	60	30
LT STA 170+00	10	20	10
RT STA 170+00	10	20	10
RT STA 172+00	35	70	35
LT STA 174+00	10	20	10
RT STA 174+00	10	20	10
LT STA 175+00	35	70	35
LT STA 176+85	35	70	35
LT STA 176+60 TO 180+15	355	710	355
RT STA 179+05	35	70	35

CONTINUED

LOCATION	PLACE ITEM 5249 LF	REMOVE & REPLACE ITEM 5249 LF	REMOVE ITEM 5249 LF
LT STA 180+00	10	20	10
RT STA 180+00	10	20	10
LT STA 180+32 TO 180+94	62	124	62
LT STA 181+36 TO 182+21	92	184	92
LT STA 182+68 TO 183+60	100	200	100
LT STA 184+00 TO 184+90	90	180	90
LT STA 184+50	35	70	35
RT STA 184+50	35	70	35
LT STA 185+05 TO 186+28	120	240	120
LT STA 185+25	10	20	10
RT STA 185+25	10	20	10
LT STA 186+53 TO 188+85	230	460	230
LT STA 189+10 TO 190+00	90	180	90
LT STA 189+35	10	20	10
RT STA 189+35	10	20	10
LT STA 189+70	35	70	35
RT STA 189+70	35	70	35
RT STA 190+00 TO 198+85	890	1780	890
LT STA 194+50	10	20	10
RT STA 194+50	10	20	10
LT STA 195+00	35	70	35
RT STA 195+00	35	70	35
RT STA 199+35 TO 202+10	287	574	287
LT STA 199+50	10	20	10
RT STA 199+50	10	20	10
LT STA 199+90	35	70	35
RT STA 200+20	35	70	35
LT STA 203+00	35	70	35
RT STA 202+74 TO 208+03	535	1070	535
LT STA 204+00	10	20	10
RT STA 204+00	10	20	10
LT STA 206+00 TO 207+95	195	390	195
LT STA 207+30	35	70	35
RT STA 208+65 TO 212+03	338	676	338
LT STA 209+00	10	20	10
RT STA 209+00	10	20	10
RT STA 209+70	35	70	35
RT STA 210+00 TO 212+03	203	406	203
LT STA 210+80	35	70	35
LT STA 212+25	35	70	35
RT STA 212+50 TO 214+63	220	440	220
LT STA 213+60	35	70	35
LT STA 213+80	10	20	10
RT STA 213+80	10	20	10
LT STA 215+20	35	70	35
RT STA 216+75 TO 219+18	245	490	245
LT STA 218+00	30	60	30
LT STA 218+50	10	20	10
LT STA 219+25	35	70	35
LT STA 220+00	35	70	35
LT STA 221+00	35	70	35
TOTAL	10947	21894	10947

SUMMARY OF ROCK FILTER DAMS

LOCATION	ITEM 5005		
	ROCK FILTER DAMS TYPE 1 LF	ROCK FILTER DAMS (REMOVE & REPLACE) TYPE 1 LF	ROCK FILTER DAMS (REMOVE) TYPE1 LF
RT STA 141+45	15	15	15
RT STA 142+70	15	15	15
RT STA 160+65	15	15	15
TOTAL	45	45	45

SUMMARY OF IRRIGATION CONDUIT

LOCATION	ITEM 618 CONDUIT (PVC SCH-40) 4" LF
LT STA 129+75	50
LT STA 131+20	45
LT STA 131+75	45
RT STA 131+85	60
LT STA 132+55	45
LT STA 133+00	45
LT STA 133+60	45
LT STA 134+12	55
RT STA 134+28	45
LT STA 134+94	85
RT STA 136+00	40
LT STA 136+84	25
LT STA 138+26	65
RT STA 138+50	50
CL STA 141+50	50
RT STA 144+30	45
LT STA 145+20	45
RT STA 145+45	25
RT STA 146+32	30
RT STA 147+51	35
RT STA 148+55	50
LT STA 148+60	30
LT STA 149+30	35
RT STA 150+08	40
LT STA 150+40	55
LT STA 151+68	30
LT STA 152+95	20
RT STA 153+65	140
RT STA 155+50	40
CL STA 157+90	55
LT STA 158+38	25
CL STA 163+35	50
RT STA 164+00	50
CL STA 166+50	45
CL STA 167+45	50
LT STA 169+00	65
CL STA 170+10	50
LT STA 170+70	20
LT STA 172+15	20
CL STA 174+25	45
LT STA 174+60	20
LT STA 176+40	25
CL STA 178+75	45
LT STA 180+25	25
LT STA 181+05	50
LT STA 182+44	45
LT STA 183+68	50
CL STA 184+60	45
LT STA 185+00	20
LT STA 186+40	30
CL STA 187+15	45

CONTINUED

LOCATION	ITEM 618 CONDUIT (PVC SCH-40) 4" LF
LT STA 189+00	25
CL STA 189+75	45
LT STA 190+32	30
LT STA 190+93	65
LT STA 191+85	65
LT STA 193+05	30
LT STA 193+70	25
LT STA 195+75	25
LT STA 196+30	30
LT STA 197+50	30
LT STA 198+90	45
RT STA 199+16	55
LT STA 200+20	25
LT STA 200+50	20
CL STA 201+50	45
LT STA 201+80	20
RT STA 202+50	75
LT STA 203+50	20
LT STA 204+70	35
CL STA 205+90	45
LT STA 208+06	25
RT STA 208+44	75
LT STA 208+55	25
LT STA 209+30	25
LT STA 209+92	20
LT STA 210+60	20
LT STA 211+30	45
LT STA 212+05	20
RT STA 212+16	55
LT STA 213+30	20
LT STA 214+08	20
LT STA 214+74	20
RT STA 214+76	30
LT STA 215+46	20
LT STA 216+06	70
LT STA 217+55	25
CL STA 218+30	50
LT STA 219+56	55
LT STA 220+60	40
TOTAL	3625

SUMMARY SHEET

SHEET 3 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		19
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

GRADING SUMMARY

STATION	ITEM 110 ROADWAY EXCAVATION CY	ITEM 132 EMBANKMENT (DENS CONT) (TY C) (CL3) CY	ITEM 132 EMBANKMENT (DENS CONT) (TY C MOD) (CL3) CY	ITEM 160 FURNISH AND PLACE TOPSOIL (CL2) (4") SY
128+84.00				
129+00.00	261	11	65	72
130+00.00	1134	104	381	318
131+00.00	699	89	348	133
132+00.00	708	47	340	111
133+00.00	840	24	340	156
134+00.00	1032	16	339	184
135+00.00	1178	6	344	122
136+00.00	1352	57	343	211
137+00.00	1727	68	339	351
138+00.00	1995	14	339	361
139+00.00	1641	0	339	340
140+00.00	746	161	339	379
141+00.00	139	1047	322	488
142+00.00	25	2625	305	666
143+00.00	45	2934	304	741
144+00.00	31	1793	322	597
145+00.00	7	1192	340	524
146+00.00	272	688	339	393
147+00.00	738	175	339	271
148+00.00	1020	130	339	255
149+00.00	1115	78	339	194
150+00.00	1177	50	339	278
151+00.00	1054	20	339	388
152+00.00	685	8	340	309
153+00.00	425	52	340	215
154+00.00	212	353	339	326
155+00.00	97	754	344	468
156+00.00	262	764	369	460
157+00.00	693	682	407	449
158+00.00	1094	415	390	375
159+00.00	1263	123	486	277
160+00.00	895	304	510	306
161+00.00	313	1324	403	609
162+00.00	114	1772	396	824
163+00.00	39	2337	364	877
164+00.00	19	3156	348	936
165+00.00	116	2683	349	993
166+00.00	195	2217	323	960
167+00.00	303	1075	306	496
168+00.00	616	84	323	244
169+00.00	1005	37	337	295
170+00.00	1381	0	320	299
171+00.00	1707	0	322	319
172+00.00	1693	0	339	236
173+00.00	1561	0	339	186
174+00.00	1492	2	327	150
175+00.00	1366	23	325	138
176+00.00	1305	58	337	207
177+00.00	1430	77	340	294
178+00.00	1515	72	333	318
179+00.00	1341	43	316	214
180+00.00	1223	16	305	133
181+00.00	1175	22	320	139

CONTINUED

STATION	ITEM 110 ROADWAY EXCAVATION CY	ITEM 132 EMBANKMENT (DENS CONT) (TY C) (CL3) CY	ITEM 132 EMBANKMENT (DENS CONT) (TY C MOD) (CL3) CY	ITEM 160 FURNISH AND PLACE TOPSOIL (CL2) (4") SY
181+00.00				
182+00.00	1060	69	338	185
183+00.00	990	92	341	214
184+00.00	1029	63	339	189
185+00.00	1118	28	337	155
186+00.00	1232	19	339	135
187+00.00	1236	29	323	151
188+00.00	1268	18	322	166
189+00.00	1362	2	339	125
190+00.00	1270	6	322	118
191+00.00	1102	20	324	146
192+00.00	994	54	342	178
193+00.00	969	69	341	224
194+00.00	1064	37	341	200
195+00.00	1169	22	340	161
196+00.00	1139	79	340	202
197+00.00	1005	132	341	241
198+00.00	1071	89	340	194
199+00.00	1625	22	340	145
200+00.00	2034	1	339	131
201+00.00	1852	102	327	326
202+00.00	1566	101	311	289
203+00.00	1180	146	322	136
204+00.00	928	233	339	242
205+00.00	963	145	333	258
206+00.00	1066	91	316	247
207+00.00	1332	34	322	165
208+00.00	1622	0	339	76
209+00.00	1686	6	340	86
210+00.00	1500	28	340	135
211+00.00	1128	111	340	180
212+00.00	1028	97	340	131
213+00.00	1198	19	339	71
214+00.00	1302	14	339	102
215+00.00	1268	11	339	99
216+00.00	1055	9	339	50
217+00.00	750	28	339	33
218+00.00	511	179	339	214
219+00.00	304	298	217	423
220+00.00	97	161	64	360
221+00.00	45	53	35	272
222+00.00	53	63	35	281
222+60.00	44	31	21	168
TOTAL	89,681	32,597	30,840	27,186

SUMMARY SHEET

SHEET 4 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		20
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF DRIVEWAYS

LOCATION	WIDTH FT	LENGTH FT	RADIUS	ITEM 530 DRVWYS (CONC) (6") SY
LT STA 129+75	32	26.5	25 & 30	134
LT STA 131+25	32.8	10	10	44
LT STA 131+77	34.5	19	10	83
RT STA 131+85	46	16.5	10 & 5	95
LT STA 132+55	35.6	18	10	75
LT STA 133+00	34	18	10	75
LT STA 133+60	34.8	18	10 & 5	73
LT STA 134+12	45	18	5 & 10	94
RT STA 134+28	36	17	15	80
LT STA 134+94	30	18	10 & 6	64
LT STA 135+40	30	19	6 & 10	67
RT STA 136+00	34	31	15	117
LT STA 136+84	11.5	22	10	34
LT STA 138+26	55	23	15	148
RT STA 145+45	16	45	10	87
RT STA 146+32	18	45	10	97
RT STA 147+51	25	25	10	73
LT STA 148+60	20.3	24.5	10	60
LT STA 149+30	25	24	10	71
RT STA 150+08	28	44	15	147
LT STA 150+40	43.3	20	10	105
LT STA 151+68	16	22	10	56
LT STA 152+95	9	25	10	29
RT STA 153+19	25	26.5	15	83
RT STA 153+65	20	24.5	10	78
RT STA 154+08	25	24.5	10	78
RT STA 155+50	30	28	15	105
LT STA 158+38	12	27	10	41
RT STA 164+00	25	21.5	25	87
LT STA 170+70	10	49	15	71
LT STA 172+15	12	29	10	42
LT STA 174+60	10	20	10	21
LT STA 176+40	12	24	10	39
LT STA 180+25	16	12	10	25
LT STA 181+05	16	12	10 & 3	24
LT STA 181+30	13.4	12	5 & 10	21
LT STA 183+68	16	11.5	5 & 3.44	22
LT STA 183+95	14	11.5	3.44 & 5	19
LT STA 185+00	10	12	5	15
LT STA 186+40	21	10.5	5	25
LT STA 189+00	20	12	10	27
LT STA 190+32	20	12	10	31
LT STA 190+93	20	11.5	10	30

CONTINUED

LOCATION	WIDTH FT	LENGTH FT	RADIUS	ITEM 530 DRVWYS (CONC) (6") SY
LT STA 191+25	19	11.5	10	27
LT STA 191+85	20	12	10	30
LT STA 192+20	20	12	10	30
LT STA 193+05	20	12	10	30
LT STA 193+70	10	11.5	10 & 5	18
LT STA 195+75	10	11.5	4 &10	19
LT STA 196+30	19	11	10	30
LT STA 197+50	17	11	10	26
LT STA 198+90	20	21	10	51
LT STA 199+00	10	22	5	28
RT STA 199+16	45	18	10	90
LT STA 200+20	14	22.5	10	42
LT STA 200+50	10	22.5	10	30
LT STA 201+80	10	10.5	10	16
RT STA 202+50	60.6	23.5	25	186
LT STA 203+50	9	10.5	10	18
LT STA 204+70	24	10	10	32
LT STA 208+06	12	11	10	19
RT STA 208+44	57.4	20	25	154
LT STA 208+55	13	16.5	10	28
LT STA 209+30	17	17.5	10	38
LT STA 209+92	10	17.5	10	24
LT STA 210+60	10	14	10	20
LT STA 211+30	10	13.5	10 & 4	18
LT STA 211+58	14.5	13.5	4 & 5	23
LT STA 212+05	9	13.5	5	15
RT STA 212+16	42	14.5	10	73
LT STA 213+30	8	12	5	12
LT STA 214+08	9	11.5	5	11
LT STA 214+74	10	12	5	13
RT STA 214+76	20	12	10	32
LT STA 215+46	8	11	5	11
RT STA 215+57	40	7	5	31
RT STA 216+52	40	7	5	31
LT STA 217+55	12	12.5	10	21
TOTAL				4,069

SUMMARY OF SIDEWALK/ COLORED TEXTURIZED CONC.

LOCATION	ITEM 531 SIDEWALK 4" SY	COLOR-TEXTURIZED CONC--ITEM 5326 4"INTER WALKS, ISLANDS & RAMPS SY	6" MEDIAN SY	8" STREET SY
STA 128+84 - STA 222+60	5794	627		
STA 127+75			37	
STA 129+10			33	
STA 129+86 - STA 138+00				1390
STA 139+10 - STA 140+02			64	
STA 144+08 - STA 144+82			56	
STA 145+95 - STA 147+00			145	
STA 149+15 - STA 152+70			243	
STA 153+81 - STA 154+65			57	
STA 155+79 - STA 156+30			11	
STA 155+85 - STA 157+16			107	
STA 159+85 - STA 162+51			274	
STA 158+45		71		
@ YELLOW JACKET RD. INTER.		280		494
STA 163+65		54		
STA 164+50 - STA 164+80			50	
STA 167+81 - STA 168+55			50	
STA 169+50		31		
STA 170+64 - STA 171+75			76	
STA 172+55 - STA 173+39			56	
STA 175+12 - STA 176+00			58	
STA 176+80 - STA 177+67			59	
STA 181+10 - STA 181+93			56	
STA 183+00 - STA 183+86			58	
STA 185+13 - STA 186+00			58	
STA 186+84		31		
STA 187+73 - STA 188+60			58	
STA 189+45		31		
STA 190+90 - STA 191+77			58	
STA 192+57 - STA 195+25			191	
STA 196+05 - STA 198+65			177	
STA 199+65 - STA 200+61			65	
STA 201+85		31		
STA 203+00 - STA 204+70			119	
STA 206+95 - STA 206+89			66	
STA 208+95 - STA 211+86			216	
STA 212+66 - STA 215+35			187	
STA 216+90 - STA 218+00			79	
TOTAL	5,794	1,156	2,764	1,884

SUMMARY OF BASE AND PAVEMENT

LOCATION	ITEM 260 SUBGRADE LIME TREAT SUBGRADE (DC) (6") SY	ITEM 260 SUBGRADE LIME (TY A SLURRY) OR (TY B) TON	ITEM 360 CONCRETE PAVEMENT (CPCD) 8" SY	ITEM 360 MONO CURB TY I LF	ITEM 529 TY I DOWEL CURB 6" LF	ITEM 529 TY I CURB & GUTTER LF	ITEM 3116 ASPHALTIC CONCRETE PAVEMENT (TY C) (165 #/SY) TON	(TY B) (660 #/SY) TON	(TY B) (1375 #/SY) TON	RAILROAD (TY B) (1540 #/SY) TON
STA 127+76 TO 129+00-MEDIAN	0	0	0	0	364	0				
STA 128+84 TO STA 218+00	77,859	778.59	77,446	28,411	0	0	0	25,016	0	0
YELLOW JACKET	0	0	0	0	220	0	0	0	0	0
℄ STA 167+26	0	0	0	0	0	0	0	0	0	123
STA 218+00 TO STA 222+60	1,644	16.44	0	0	0	1,475	103	0	576	0
TOTAL	79,503	795.03	77,446	28,411	584	1,475	103	25,016	576	123

SUMMARY SHEET

SHEET 5 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		27
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF PERMANENT STRIPING

LOCATION	ITEM 666																						ITEM 672		ITEM 678							
	REFLECTIVE PAVEMENT MARKERS TY I											REFLECTIVE PAVEMENT MARKERS TY II											RAISED PAV MARKERS		PAVEMENT SURFACE PREP FOR MARKERS							
	WHITE									YELLOW		WHITE									YELLOW		CL B									
	4" (SLD) LF	4" (BRK) LF	8" (SLD) LF	12" (SLD) LF	24" (SLD) LF	ARROW EA	DBL ARROW EA	WORD EA	RR MRK EA	4" (SLD) LF	4" (BRK) LF	4" (SLD) LF	4" (BRK) LF	8" (SLD) LF	12" (SLD) LF	24" (SLD) LF	ARROW EA	DBL ARROW EA	WORD EA	RR MRK EA	4" (SLD) LF	4" (BRK) LF	TY II A-A EA	TY II C-R EA	4" LF	8" LF	12" LF	24" LF	ARROW EA	DBL ARROW EA	WORD EA	RR MRK EA
STA 128+84 TO YELLOW JACKET RD	4,229	1,510	894	49		8		1		5,310	400	4,229	1,510	894	49		8		1		5,310	400	42	156	11,449	894	49		8		1	
YELLOW JACKET RD	379	50	364	34		4	3	2		375		379	50	364	34		4	3	2		375			5	804	364	34		4	3	2	
YELLOW JACKET RD TO STA 222+60	10,435	2,620	3,781	59	144	7		5	4			10,435	2,620	3,781	59	144	7		5	4				263	13,055	3,781	59	144	7		5	4
TOTAL	15,043	4,180	5,039	142	144	19	3	8	4	5,685	400	15,043	4,180	5,039	142	144	19	3	8	4	5,685	400	42	424	25,308	5,039	142	144	19	3	8	4

SUMMARY OF WORK ZONE PAVEMENT MARKERS

LOCATION	ELIMINATE EXISTING PAV. MARKING-ITEM 677						WORK ZONE PAV. MARKINGS (REMOVABLE)--ITEM 662											
	4"	8"	12"	ARW	RR PAV. MRK	RAISED PAVEMENT MRKR	WHITE (4") SOLID	WHITE (4") BROKEN	WHITE (8") SOLID	WHITE (8") DOTTED	WHITE (12") SOLID	WHITE (24") SOLID	YELLOW (4") SOLID	YELLOW (4") BROKEN	YELLOW (4") DOTTED	YELLOW (12") **SOLID**	ARROW	RAILROAD PAVEMENT MARKERS
PHASE I																		
STA 128+84 TO STA 222+60	7312						6,257						1,102					
PHASE II																		
STA 122+60 TO STA 132+00	1030	150	11			16	1057		322	20			962	30				
STA 132+00 TO STA 147+00	3500					60	3000						3000					
STA 147+00 TO STA 177+50	9150				2	154	6018		178		20	66	5864		34		1	2
YELLOW JACKET RD	690	50					1120	180	236		47		1182					
STA 177+50 TO STA 222+60	12165	200	98	9		429	8590						8500	670		84	4	
PHASE IIIA																		
STA 124+53 TO STA 132+00	200	200		1			1151		84				1233					
STA 132+00 TO STA 147+00							2650						3000					
STA 147+00 TO STA 177+50					2		5537		218	34		66	5802					2
STA 177+50 TO STA 222+60	610						8110						8298		34			
PHASE IIIB																		
STA 127+45 TO STA 132+00	1600						133						980					
STA 132+00 TO STA 147+00	5650																	
STA 147+00 TO STA 177+50	8600				2				154				1158					
STA 177+50 TO STA 222+60	14200						551		205				976		44			
TOTAL	64707	600	109	10	6	659	44174	180	1397	54	**67**	132	42057	700	112	84	5	4

SUMMARY SHEET

SHEET 6 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		22
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

BLOCK SOD SUMMARY

LOCATION	ITEM 162 MULCH SOD (PRAIRIE BUFFALO) SY	ITEM 168 VEGETATIVE WATERING (MULCH) MG
STA 128+84 TO 222+60	27,186	456.72
TOTAL	27,186	456.72

SUMMARY OF CONSTRUCTION DETOURS

LOCATION	ITEM 508 CONSTRUCT DETOURS (CL 1) 100' STA	ITEM 508 CONSTRUCT DETOURS (CL 4) EA	ITEM 3116 TY B ACP 660 #/SY * TON	ITEM 132 EMBANKMENT DENS CONT (TYC) (CL 3) * CY	ITEM 260 LIME TY A SLURRY OR TY B (4%) * TON	ITEM 260 LIME TREAT SUBGRADE (DC) 6" * SY
PHASE II						
STA 130+50 TO STA 145+10	14.6		708.4	357.78	28.34	2146.67
STA 139+00 TO STA 144+00	5.0		88	44.44	3.52	266.67
STA 145+70 TO STA 168+70	23.0		915.2	462.22	36.61	2773.33
STA 169+30 TO STA 172+00	2.7		79.2	40	3.17	240.00
STA 201+00 TO STA 215+80	14.8		497.2	251.11	19.89	1506.67
STA 216+30 TO STA 219+20	2.9		165.26	83.46	6.61	500.78
STA 127+50 TO STA 129+30-MEDIAN	1.8		76.4	38.59	3.06	232.00
AT SUMMIT RIDGE RD		1.0	13.2	6.7	0.53	40.00
AT YELLOW JACKET RD		1.0	16.1	8.1	0.65	49.00
PHASE II						
STA 129+45 TO STA 130+05-RAMP	0.6		18.6	9.37	0.74	56.00
TOTAL	65.4	2.0	2577.6	1301.8	103.1	7811.1

* FOR BIDDERS INFORMATION ONLY

SUMMARY OF LOW PROFILE PORTABLE CONCRETE TRAFFIC BARRIER

PHASE	LOCATION	ITEM 512 STKPL, INSTL, RETURN TYPE 1 LF	ITEM 512 STKPL, INSTL, RETURN TYPE 2 LF	ITEM 512 MOVE & RESET LF
I	RT STA 140+00 TO STA 144+00	360	40	
I	LT STA 141+00 TO STA 143+00	160	40	
I	LT STA 167+20 TO STA 167+80	20	40	
II	RT STA 130+00 TO STA 131+40	100	40	
II	RT STA 132+20 TO STA 134+00	140	40	
II	RT STA 134+60 TO STA 138+20	340	40	
II	RT STA 138+80 TO STA 145+20	40		560
II	RT STA 145+60 TO STA 146+20	20	40	
II	RT STA 146+40 TO STA 148+40	160	40	
II	RT STA 148+80 TO STA 150+00	80	40	
II	RT STA 150+20 TO STA 153+00	240	40	
II	RT STA 153+40 TO STA 154+00	20	40	
II	RT STA 154+40 TO STA 159+20	420	40	60
II	RT STA 159+20 TO STA 161+00	100	20	80
II	RT @ YELLOW JACKET	20	40	60
II	RT STA 161+00 TO STA 164+00	280	20	
II	RT STA 164+40 TO STA 167+00	220	40	
II	RT STA 167+80 TO STA 199+00	3,100	40	
II	RT STA 199+40 TO STA 208+00	760	40	
II	RT STA 208+80 TO STA 212+00	280	40	
II	LT STA 212+60 TO STA 215+40	240	40	
II	RT STA 215+80 TO STA 219+30	320	40	
II	LT STA 220+00 TO STA 222+60	220	40	
IIIA	RT STA 158+40 TO STA 161+00			260
IIIA	RT STA 130+00 TO STA 158+40			
IIIA	RT STA 161+00 TO STA 222+00			
IIIB	RT STA 158+40 TO STA 161+00			
	TOTAL	7,640	840	1,020

SUMMARY OF TRENCH EXCAVATION PROTECTION AND CUT & RESTORE

LOCATION	ITEM 402 TRENCH EXCAVATION PROTECTION LF	ITEM 402 CUT & RESTORE SY
PHASE I		
STA 142+50 LINE "F"	25	
STA 161+20 LINE "I"	165	20.00
STA 218+00	100	16.00
PHASE II		
STA 156+90 LINE "H"	100	13.33
TOTAL	390	49.33

SUMMARY SHEET

SHEET 7 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		23
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF STORM SEWER LINES

LINE OR LATERAL	LOCATION		CLASS III							(42 IN) (RC) CLASS V	STORM SEWER EXCAV	CEMENT STAB BACKFILL	TRENCH PROTECT	REMARKS
	FROM	TO	18" LF	24" LF	30" LF	36" LF	42" LF	54" LF	72" LF	42" LF	CY	CY	LF	
C	CI-7	CI-6	83								31.80			
C	CI-6	MH 1C	67								25.00			
D	CI-8	CI-9	145								36.00			MH 1C AT EX 36" STA 129+29
D	CI-9	CI-10		84							49.60	0.6		
D	CI-10	CI-10A			6						2.20			
D	CI-10A	JCT 1D		198							145.40			
D	JCT 1D	JCT 2D				15					13.90		15	
LAT 2D	CI-11A	CI-11	6								1.20			
LAT 2D	CI-11	JCT 2D	6								1.40			
D	JCT 2D	JCT 3D				130					120.00		130	
LAT 3D	CI-12	JCT 3D	6								1.40			
D	JCT 3D	JCT 4D				45					41.50		45	
LAT 4D	CI-13	JCT 4D	6								1.40			
D	JCT 4D	JCT 3F				30					27.70		30	
E	DI-4	JCT 1E	101								41.20			
LAT 1E	DI-3	JCT 1E	16								5.30	1		
E	JCT 1E	JCT 2E	291								99.50			
E	JCT 2E	JCT 3E		5							4.60		5	
LAT 2F	DI-2	JCT 2F		4							2.16			
LAT 1F	DI-1	JCT 1F		4							2.16			
LAT 3E	CI-14	JCT 3E	6								1.40			
E	JCT 3E	JCT 4F		24							22.20		24	
LAT 5F	CI-15	CI-16	45								16.40			
LAT 5F	CI-16	JCT 5F	20								6.50	1.3		
LAT 6F	CI-17	JCT 6F	32								11.10	2		
F	54' RT	OUTFALL						135			270.00	14.9	40	
G	CI-18A	CI-18	11								1.60			
G	CI-18	CI-19		38							34.20		38	
G	CI-19A	CI-19	12								3.50			
G	CI-19A	CI-20A			271						224.30			
G	CI-20A	CI-20			6						2.20			
G	CI-20	JCT 1G			236.5						172.20			
LAT 1G	DI-5	JCT 1G	98								39.00			
G	JCT 1G	CI-21A			47.5						35.20			
G	CI-21A	CI-21			6						2.20			
G	CI-21	CI-22			285						224.9			
H	DI-6	CI-22				104					96.00	5.3		
G	CI-22	CI-24				342					312.90			
G	CI-24	CI-25				45					39.3			TIE INTO EX 66", REMOVE EX 54"
G	CI-25	LAT 2G				32					33.0	2		
LAT 1I	DI-7	JCT 1I		303							206.10		90	
I	63' RT	OUTFALL							172		713.50	64.6	90	
LAT 2I	CI-23	JCT 2I	28								5.30	0.9		
LAT 4I	CI-26	JCT 4I	30								17.20	1.9		
J	CGI-38	JCT 1J	39.5								15.80			
LAT 1J	CI-37	JCT 1J	74								33.70			
J	JCT 1J	MH 1J	262.5								99.90			
J	MH 1J	JCT 1	234.5								101.70			
J	CGI-36	JCT 1		7							4.00			
J	JCT 1	JCT 2J		42							24.40			
LAT 2J	CI-35	JCT 2J	74								39.30			
J	JCT 2J	MH 2J		220.5							136.50			
J	MH2J	JCT 2		254.5							131.00			
J	CGI-34	JCT 2		7							4.00			
J	JCT 2	JCT 3J		42							21.80			
LAT 3J	CI-33	JCT 3J	74								35.90			
J	JCT 3J	MH 3J		200.5							111.30			
J	MH 3J	JCT 3		294.5							152.50			
J	CGI-32	JCT 3		7							4.00			
J	JCT 3	MH 4J		253.5							149.10			
LAT 4J	CI-31	MH 4J	74								31.50			
J	MH 4J	JCT 5J		183.5							103.50			
LAT 5J	CI-30	JCT 5J	74								31.50			
J	JCT 5J	JCT 4		270							138.30			

CONTINUED ON NEXT SHEET

SUMMARY SHEET

SHEET 8 OF 10

STORM SEWER SUMMARY
SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99 (413)MM		24
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF STORM SEWER LINES

LINE OR LATERAL	LOCATION		CLASS III							JACK OR BOR PIPE (42 IN) (RC) CLASS IV	STORM SEWER EXCAV	CEMENT STAB BACKFILL	TRENCH PROTECT	REMARKS
			18"	24"	30"	36"	42"	54"	72"	42"				
	FROM	TO	LF	LF	LF	LF	LF	LF	LF	LF	CY	CY	LF	
C	CI-7	CI-6	83								31.80			
C	CI-6	MH 1C	67								25.00			
D	CI-8	CI-9	145								36.00			MH 1C AT EX 36" STA 129+29
D	CI-9	CI-10		84							49.60			
D	CI-10	CI-10A			6						2.20	0.6		
D	CI-10A	JCT 1D		198							145.40			
D	JCT 1D	JCT 2D				15					13.90		15	
LAT 2D	CI-11A	CI-11	6								1.20			
LAT 2D	CI-11	JCT 2D	6								1.40			
D	JCT 2D	JCT 3D				130					120.00		130	
LAT 3D	CI-12	JCT 3D	6								1.40			
D	JCT 3D	JCT 4D				45					41.50		45	
LAT 4D	CI-13	JCT 4D	6								1.40			
D	JCT 4D	JCT 3F				30					27.70		30	
E	DI-4	JCT 1E	101								41.20			
LAT 1E	DI-3	JCT 1E	16								5.30	1		
E	JCT 1E	JCT 2E	291								99.50			
E	JCT 2E	JCT 3E		5							4.60		5	
LAT 2F	DI-2	JCT 2F		4							2.16			
LAT 1F	DI-1	JCT 1F		4							2.16			
LAT 3E	CI-14	JCT 3E	6								1.40			
E	JCT 3E	JCT 4F		24							22.20		24	
LAT 5F	CI-15	CI-16	45								16.40			
LAT 5F	CI-16	JCT 5F	20								6.50	1.3		
LAT 6F	CI-17	JCT 6F	32								11.10	2		
F	54' RT	OUTFALL						135			270.00	14.9	40	
G	CI-18A	CI-18	11								1.60			
G	CI-18	CI-19		38							34.20		38	
G	CI-19A	CI-19	12								3.50			
G	CI-19A	CI-20A			271						224.30			
G	CI-20A	CI-20			6						2.20			
G	CI-20	JCT 1G			236.5						172.20			
LAT 1G	DI-5	JCT 1G	98								39.00			
G	JCT 1G	CI-21A			47.5						35.20			
G	CI-21A	CI-21			6						2.20			
G	CI-21	CI-22			285						224.9			
2 H	DI-6	CI-22			2 17	2 87					96.00	6.2 2		
G	CI-22	CI-24				342					312.90			
G	CI-24	CI-25				45					39.3			TIE INTO EX 66", REMOVE EX 54"
G	CI-25	LAT 2G				32					33.0	2		
LAT 1I	DI-7	JCT 1I		303							206.10		90	
I	63' RT	OUTFALL							172		713.50	64.6	90	
LAT 2I	CI-23	JCT 2I	28								5.30	0.9		
LAT 4I	CI-26	JCT 4I	30								17.20	1.9		
J	CGI-38	JCT 1J	39.5								15.80			
LAT 1J	CI-37	JCT 1J	74								33.70			
J	JCT 1J	MH 1J	262.5								99.90			
J	MH 1J	JCT 1	234.5								101.70			
J	CGI-36	JCT 1		7							4.00			
J	JCT 1	JCT 2J		42							24.40			
LAT 2J	CI-35	JCT 2J	74								39.30			
J	JCT 2J	MH 2J		220.5							136.50			
J	MH2J	JCT 2		254.5							131.00			
J	CGI-34	JCT 2		7							4.00			
J	JCT 2	JCT 3J		42							21.80			
LAT 3J	CI-33	JCT 3J	74								35.90			
J	JCT 3J	MH 3J		200.5							111.30			
J	MH 3J	JCT 3		294.5							152.50			
J	CGI-32	JCT 3		7							4.00			
J	JCT 3	MH 4J		253.5							149.10			
LAT 4J	CI-31	MH 4J	74								31.50			
J	MH 4J	JCT 5J		183.5							103.50			
LAT 5J	CI-30	JCT 5J	74								31.50			
J	JCT 5J	JCT 4		270							138.30			

CONTINUED ON NEXT SHEET

2 CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT

STORM SEWER SUMMARY
SHEET 1 OF 3

SUMMARY SHEET
SHEET 8 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99 (413)MM		24A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF STORM SEWER LINES (CONTINUED)

LINE OR LATERAL	LOCATION		CLASS III							(42 IN) (RC) CLASS V	STORM SEWER EXCAV	CEMENT STAB BACKFILL	TRENCH PROTECT	REMARKS
			18"	24"	30"	36"	42"	54"	72"	42"				
	FROM	TO	LF	LF	LF	LF	LF	LF	LF	LF	CY	CY	LF	
J	CGI-29	JCT 4		7							4.00			
J	JCT 4	JCT 6J			248						181.30			
LAT 6J	DI-10	CI-28	50								18.40			
LAT 6J	CI-28	JCT 6J	43								18.60			
J	JCT 6J	JCT 5			52						29.00			
J	CGI-27	JCT 5		7							4.00			
J	JCT 5	MH 5J			92.5						67.40			
J	MH 5J	JCT 7J					10				9.70			
LAT 7J	DI-9	JCT 7J			17						10.50			
J	JCT 7J	JCT 8J					398			40	869.20		398	
K	DI-8	JCT 1K		66							65.30		66	
L	CI-47	JCT 1L	233								95.00			
LAT 1L	CI-46	JCT 1L	73								34.10			
L	JCT 1L	MH 1L		133.5							48.90			
LAT 2L	CI-45	MH 1L	73								35.80			
L	MH 1L	JCT 3L			143.5						105.10			
LAT 3L	CI-44	JCT 3L	73								33.50			
L	JCT 3L	JCT 4L			74						47.90			
L	CGI-42	JCT 4L		5							4.60		5	
L	JCT 4L	MH 2L				210.5					220.10		155	
LAT 4L	CI-43	MH 2L	73								39.70			
L	MH 2L	MH 3L				491					501.50		205	
LAT 5L	CI-41	MH 3L	73								36.30			
L	MH 3L	CGI-40				245.5					216.60			
LAT 6L	CI-39	JCT 5L	73								37.10			
L	CGI-40	OUTFALL					70				134.80	5.7	35	
M	DI-12	CI-49	97								36.80			
M	CI-49	JCT 1M		89							47.20			
LAT 1M	CI-48	JCT 1M	18								7.70			
M	JCT 1M	JCT 2M		109							68.50			
LAT 2M	DI-11	JCT 2M			9						4.70			
M	JCT 2M	OUTFALL			101						108.30		72	
		TOTAL	2727.5	2858.5	1595	1690	478	135	172	40	*7654.92	100.2	1443	

* BIDDERS INFORMATION ONLY

SUMMARY SHEET

SHEET 9 OF 10

STORM SEWER SUMMARY
SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99 (413)MM		25
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF STORM SEWER LINES (CONTINUED)

LINE OR LATERAL	LOCATION		CLASS III							(42 IN) (RC) CLASS V	STORM SEWER EXCAV	CEMENT STAB BACKFILL	TRENCH PROTECT	REMARKS
			18"	24"	30"	36"	42"	54"	72"	42"				
	FROM	TO	LF	LF	LF	LF	LF	LF	LF	LF	CY	CY	LF	
J	CGI-29	JCT 4		7							4.00			
J	JCT 4	JCT 6J			248						181.30			
LAT 6J	DI-10	CI-28	50								18.40			
LAT 6J	CI-28	JCT 6J	43								18.60			
J	JCT 6J	JCT 5			52						29.00			
J	CGI-27	JCT 5		7							4.00			
J	JCT 5	MH 5J			92.5						67.40			
J	MH 5J	JCT 7J					10				9.70			
LAT 7J	DI-9	JCT 7J			17						10.50			
J	JCT 7J	JCT 8J					398			40	869.20		398	
K	DI-8	JCT 1K		66							65.30		66	
L	CI-47	JCT 1L	233								95.00			
LAT 1L	CI-46	JCT 1L	73								34.10			
L	JCT 1L	MH 1L		133.5							48.90			
LAT 2L	CI-45	MH 1L	73								35.80			
L	MH 1L	JCT 3L			143.5						105.10			
LAT 3L	CI-44	JCT 3L	73								33.50			
L	JCT 3L	JCT 4L			74						47.90			
L	CGI-42	JCT 4L		5							4.60		5	
L	JCT 4L	MH 2L				210.5					220.10		155	
LAT 4L	CI-43	MH 2L	73								39.70			
L	MH 2L	MH 3L				491					501.50		205	
LAT 5L	CI-41	MH 3L	73								36.30			
L	MH 3L	CGI-40				245.5					216.60			
LAT 6L	CI-39	JCT 5L	73								37.10			
L	CGI-40	OUTFALL					70				134.80	5.7	35	
M	DI-12	CI-49	97								36.80			
M	CI-49	JCT 1M		89							47.20			
LAT 1M	CI-48	JCT 1M	18								7.70			
M	JCT 1M	JCT 2M		109							68.50			
LAT 2M	DI-11	JCT 2M			9						4.70			
M	JCT 2M	OUTFALL			101						108.30		72	
		TOTAL	2727.5	2858.5	2 1612	2 1673	478	135	172	40	*7654.92	2 101.1	1443	

* BIDDERS INFORMATION ONLY

2 CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT

SUMMARY SHEET
SHEET 9 OF 10

STORM SEWER SUMMARY
SHEET 2 OF 3

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99 (413)MM		25A
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF INLETS

INLET NO	LOCATION	HEIGHT FT	INLET WIDTH FT	INLET TY C 1 GR EA	INLET TY C 2 GR EA	INLET TY C 3 GR EA	INLET TY D 2 GR EA	INLET TY D 3 GR EA	INLET (CURB) TY I EA	TY I EXT EA	INLET (COMPL) (C&G) EA	INLET EXT (COMPL) (TY IV) EA
CI-6	35.84 ' RT STA 130+00	4.5	2.5						1	2		
CI-7	35.5' LT STA 130+40	4.5	2.5						1			
CI-8	35.5' RT STA 135+50	4.5	2.5						1	2		
CI-9	35.5' RT STA 137+00	5	3						1	2		
CI-10A	35.5' RT STA 138+00	5.5	3.5						1	1		
CI-10	35.5' RT STA 137+89	5.5	3.5						1	2		
CI-11A	35.5' RT STA 140+00	5	2.5						1	1		
CI-11	35.5' RT STA 140+11	5	2.5						1	2		
CI-12	35.5' RT STA 141+30	5	2.5						1			
CI-13	35.5' RT STA 141+85	5.5	2.5						1	2		
CI-14	35.5' RT STA 142+45	5.5	2.5						1			
DI-1	53.0' RT STA 142+10	5.5				1						
DI-2	53.0' RT STA 142+30	5.5				1						
CI-15	35.5' LT STA 141+50	6	2.5						1			
CI-16	35.5' LT STA 142+00	10	2.5						1	2		
CI-17	35.5' LT STA 142+50	9	2.5						1			
DI-3	45.0' RT STA 145+45	5						1				
DI-4	45.0' RT STA 146+32	6					1					
CI-18	84.0' RT STA 148+36	4.83	2.5						1	2		
CI-18A	100.0' RT STA 148+36	5	2.5						1	2		
CI-19	83.0' RT STA 148+74	6.5	3.5						1	2		
CI-19A	100.0' RT STA 148+74	6	2.5						1	2		
CI-20A	35.5' LT STA 150+89	5.5	3.5						1	1		
CI-20	35.5' LT STA 151+00	5.5	3.5						1	1		
DI-5	50.0' RT STA 152+90	4		1								
CI-21A	35.5' LT STA 153+89	5.5	3.5						1	1		
CI-21	35.5' LT STA 154+00	5.5	3.5						1	1		
CI-22	35.5' LT STA 156+90	5.46	3.5						1	2		
DI-6	69 RT STA 156+90	5			1							
DI-7	100.0' RT STA 158+35	3			1							
CI-23	20.5' RT STA 161+20	6	2.5						1	1		
CI-24	35.5' LT STA 160+37	9.63	3.5						1	1		
CI-25	35.5' LT STA 160+87	11.26	3.5						1	2		
CI-26	35.5' LT STA 161+47	10	2.5						1	1		
DI-8	92.0' RT STA 163+00	2.66		1								
DI-9	56.5' RT STA 168+00	3.17				1						
CGI-27	35.5' RT STA 169+00	5.5	3.0								1	1
DI-10	48.0' LT STA 169+35	3		1								
CI-28	7.5' LT STA 169+65	5	2.5						1	2		
CGI-29	35.5' RT STA 172+00	5.0	3.0								1	2
CI-30	35.5' LT STA 175+00	4.5	2.5						1	1		
CI-31	35.5' LT STA 176+85	4.5	2.5						1	2		
CGI-32	35.5' RT STA 179+10	5	3.0								1	1
CI-33	35.5' LT STA 184+50	4.5	2.5						1	1		
CGI-34	35.5' RT STA 184+50	5.5	3.0								1	1
CI-35	35.5' LT STA 189+70	4.5	2.5						1	1		
CGI-36	35.5' RT STA 189+70	6	3.0								1	1
CI-37	35.5' LT STA 195+00	4.5	2.5						1	1		
CGI-38	35.5' RT STA 195+00	5.17	3.0								1	1
CI-39	35.5' LT STA 199+90	4.5	2.5						1	1		
CGI-40	35.5' RT STA 200+19	7.5	3.0								1	1
CI-41	35.5' LT STA 203+00	4.5	2.5						1	1		
CGI-42	35.5' RT STA 209+70	5.0	3.0								1	1
CI-43	35.5' LT STA 207+70	4.5	2.5						1	1		
CI-44	35.5' LT STA 210+80	4.5	2.5						1	1		
CI-45	35.5' LT STA 212+25	4.5	2.5						1	2		
CI-46	35.5' LT STA 213+60	4.5	2.5						1	2		
CI-47	35.5' LT STA 215+20	4.5	2.5						1	2		
DI-11	46.0' LT STA 218+00	5.5		1								
CI-48	44.0' LT STA 219+27	3.5	2.5						1	2		
CI-49	30.5' LT STA 220+00	4	3.0						1	2		
DI-12	39.5' LT STA 221+00	3		1								
TOTAL				5	2	3	1	1	42	57	8	9

SUMMARY OF MANHOLES

NO	LOCATION	DIMENSIONS "X" ft	DIMENSIONS "Y" ft	HEIGHT ft	MANHOLE (COMPL) TY I ea	MANHOLE (COMPL) TY II ea
MH-1C	40.0' RT STA 129+26	3	3	5.85	1	
MH 5J	38.0' RT STA 168+00	4	4	7.45	1	
MH 4J	27.5' RT STA 176+49	3	3	7.68		1
MH 3J	27.5' RT STA 182+00	3	3	5.52		1
MH 2J	27.5' RT STA 187+00	3	3	6.07		1
MH 1J	27.5' RT STA 192+00	3	3	5.56		1
MH 3L	27.5' RT STA 202+64	4	4	6.49	1	
MH 2L	27.5' RT STA 207+58	4	4	7.86	1	
MH 1L	27.5' RT STA 211+89	3	3	5.99		1
	TOTALS				4	5

SUMMARY OF DRAINAGE STRUCTURES

LOCATION	SET TY II 30" RCP (3:1) EA	SET TY II 54" RCP (3:1) EA	CONC BOX CULV 10FT X 7FT LF	HEADWALL CH-11B (H=42 IN) EA	HEADWALL PW-N (H=7 FT) EA	HEADWALL PW-45 (MOD) (H=7 FT) EA	RIPRAP CONC (CL B) CY	CL A CONC (SILL) CY
STA 142+20		1						
STA 163 +05			202		1	1	46.85	4.27
RT STA 200+09				1				
RT STA 218+00	1							
TOTAL	1	1	202	1	1	1	46.85	4.27

SUMMARY OF RETAINING WALLS

LOCATION	RETAINING WALL (CONC BLOCK) SF	RIPRAP (CL B) FLUME CY	RAIL (TY PRI) LF
RETAINING WALL #1	716.40		
RETAINING WALL #2	766.00		
RETAINING WALL #3	584.80	3.84	
RETAINING WALL #4	1,500.00		233
TOTAL	3167.2	3.84	233

SUMMARY SHEET

SHEET 10 OF 10

STORM SEWER SUMMARY
SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP99(413)MM			26
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

SUMMARY OF INLETS

INLET NO	LOCATION	HEIGHT FT	INLET WIDTH FT	INLET TY C 1 GR EA	INLET TY C 2 GR EA	INLET TY C 3 GR EA	INLET TY D 2 GR EA	INLET TY D 3 GR EA	INLET (CURB) TY I EA	TY I EXT EA	INLET (COMPL) (C8G) EA	INLET EXT (COMPL) (TY IV) EA
CI-6	35.84 ' RT STA 130+00	4.5	2.5						1	2		
CI-7	35.5' LT STA 130+40	4.5	2.5						1			
CI-8	35.5' RT STA 135+50	4.5	2.5						1	2		
CI-9	35.5' RT STA 137+00	5	3						1	2		
CI-10A	35.5' RT STA 138+00	5.5	3.5						1	1		
CI-10	35.5' RT STA 137+89	5.5	3.5						1	2		
CI-11A	35.5' RT STA 140+00	5	2.5						1	1		
CI-11	35.5' RT STA 140+11	5	2.5						1	2		
CI-12	35.5' RT STA 141+30	5	2.5						1			
CI-13	35.5' RT STA 141+85	5.5	2.5						1	2		
CI-14	35.5' RT STA 142+45	5.5	2.5						1			
DI-1	53.0' RT STA 142+10	5.5				1						
DI-2	53.0' RT STA 142+30	5.5				1						
CI-15	35.5' LT STA 141+50	6	2.5						1			
CI-16	35.5' LT STA 142+00	10	2.5						1	2		
CI-17	35.5' LT STA 142+50	9	2.5						1			
DI-3	45.0' RT STA 145+45	5						1				
DI-4	45.0' RT STA 146+32	6					1					
CI-18	84.0' RT STA 148+36	4.83	2.5						1	2		
CI-18A	100.0' RT STA 148+36	5	2.5						1	2		
CI-19	83.0' RT STA 148+74	6.5	3.5						1	2		
CI-19A	100.0' RT STA 148+74	6	2.5						1	2		
CI-20A	35.5' LT STA 150+89	5.5	3.5						1	1		
CI-20	35.5' LT STA 151+00	5.5	3.5						1	1		
DI-5	50.0' RT STA 152+90	4		1								
CI-21A	35.5' LT STA 153+89	5.5	3.5						1	1		
CI-21	35.5' LT STA 154+00	5.5	3.5						1	1		
CI-22	35.5' LT STA 156+90	5.46	3.5						1	2		
② DI-6	69 RT STA 156+90	② 3.5			1							
DI-7	100.0' RT STA 158+35	3			1							
CI-23	20.5' RT STA 161+20	6	2.5						1	1		
CI-24	35.5' LT STA 160+37	9.63	3.5						1	1		
CI-25	35.5' LT STA 160+87	11.26	3.5						1	2		
CI-26	35.5' LT STA 161+47	10	2.5						1	1		
DI-8	92.0' RT STA 163+00	2.66		1								
DI-9	56.5' RT STA 168+00	3.17				1						
CGI-27	35.5' RT STA 169+00	5.5	3.0								1	1
DI-10	48.0' LT STA 169+35	3		1								
CI-28	7.5' LT STA 169+65	5	2.5						1	2		
CGI-29	35.5' RT STA 172+00	5.0	3.0								1	2
CI-30	35.5' LT STA 175+00	4.5	2.5						1	1		
CI-31	35.5' LT STA 176+85	4.5	2.5						1	2		
CGI-32	35.5' RT STA 179+10	5	3.0								1	1
CI-33	35.5' LT STA 184+50	4.5	2.5						1	1		
CGI-34	35.5' RT STA 184+50	5.5	3.0								1	1
CI-35	35.5' LT STA 189+70	4.5	2.5						1	1		
CGI-36	35.5' RT STA 189+70	6	3.0								1	1
CI-37	35.5' LT STA 195+00	4.5	2.5						1	1		
CGI-38	35.5' RT STA 195+00	5.17	3.0								1	1
CI-39	35.5' LT STA 199+90	4.5	2.5						1	1		
CGI-40	35.5' RT STA 200+19	7.5	3.0								1	1
CI-41	35.5' LT STA 203+00	4.5	2.5						1	1		
CGI-42	35.5' RT STA 209+70	5.0	3.0								1	1
CI-43	35.5' LT STA 207+70	4.5	2.5						1	1		
CI-44	35.5' LT STA 210+80	4.5	2.5						1	1		
CI-45	35.5' LT STA 212+25	4.5	2.5						1	2		
CI-46	35.5' LT STA 213+60	4.5	2.5						1	2		
CI-47	35.5' LT STA 215+20	4.5	2.5						1	2		
DI-11	46.0' LT STA 218+00	5.5		1								
CI-48	44.0' LT STA 219+27	3.5	2.5						1	2		
CI-49	30.5' LT STA 220+00	4	3.0						1	2		
DI-12	39.5' LT STA 221+00	3		1								
TOTAL				5	2	3	1	1	42	57	8	9

SUMMARY OF MANHOLES

NO	LOCATION	DIMENSIONS "X" ft	DIMENSIONS "Y" ft	HEIGHT ft	MANHOLE (COMPL) TY I ea	MANHOLE (COMPL) TY II ea
MH-1C	40.0' RT STA 129+26	3	3	5.85	1	
MH 5J	38.0' RT STA 168+00	4	4	7.45	1	
MH 4J	27.5' RT STA 176+49	3	3	7.68		1
MH 3J	27.5' RT STA 182+00	3	3	5.52		1
MH 2J	27.5' RT STA 187+00	3	3	6.07		1
MH 1J	27.5' RT STA 192+00	3	3	5.56		1
MH 3L	27.5' RT STA 202+64	4	4	6.49	1	
MH 2L	27.5' RT STA 207+58	4	4	7.86	1	
MH 1L	27.5' RT STA 211+89	3	3	5.99		1
	TOTALS				4	5

SUMMARY OF DRAINAGE STRUCTURES

LOCATION	SET TY II 30" RCP (3:1) EA	SET TY II 54" RCP (3:1) EA	CONC BOX CULV 10FT X 7FT LF	HEADWALL CH-11B (H=42 IN) EA	HEADWALL PW-N (H=7 FT) EA	HEADWALL PW-45 (MOD) (H=7 FT) EA	RIPRAP CONC (CL B) CY	CL A CONC (SILL) CY
STA 142+20		1						
STA 163 +05			202		1	1	46.85	4.27
RT STA 200+09				1				
RT STA 218+00	1							
TOTAL	1	1	202	1	1	1	46.85	4.27

SUMMARY OF RETAINING WALLS

LOCATION	RETAINING WALL (CONC BLOCK) SF	RIPRAP (CL B) FLUME CY	RAIL (TY PRI) LF
RETAINING WALL #1	716.40		
RETAINING WALL #2	366.00		
RETAINING WALL #3	584.80	3.84	
RETAINING WALL #4	1,500.00		233
TOTAL	3,167.20	3.84	233

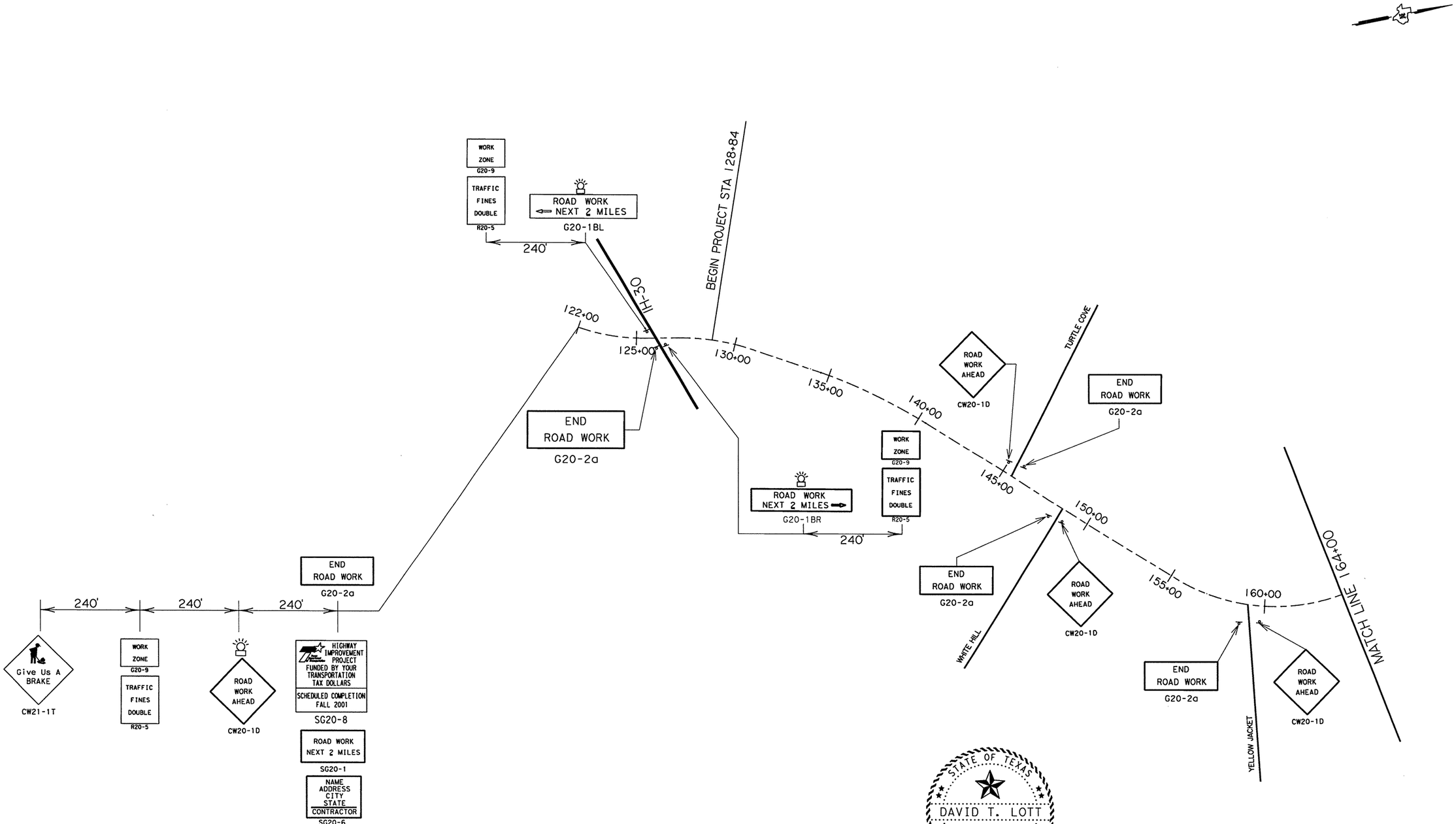
SUMMARY SHEET

SHEET 10 OF 10

② CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT

STORM SEWER SUMMARY
SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99(413)MM		26A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

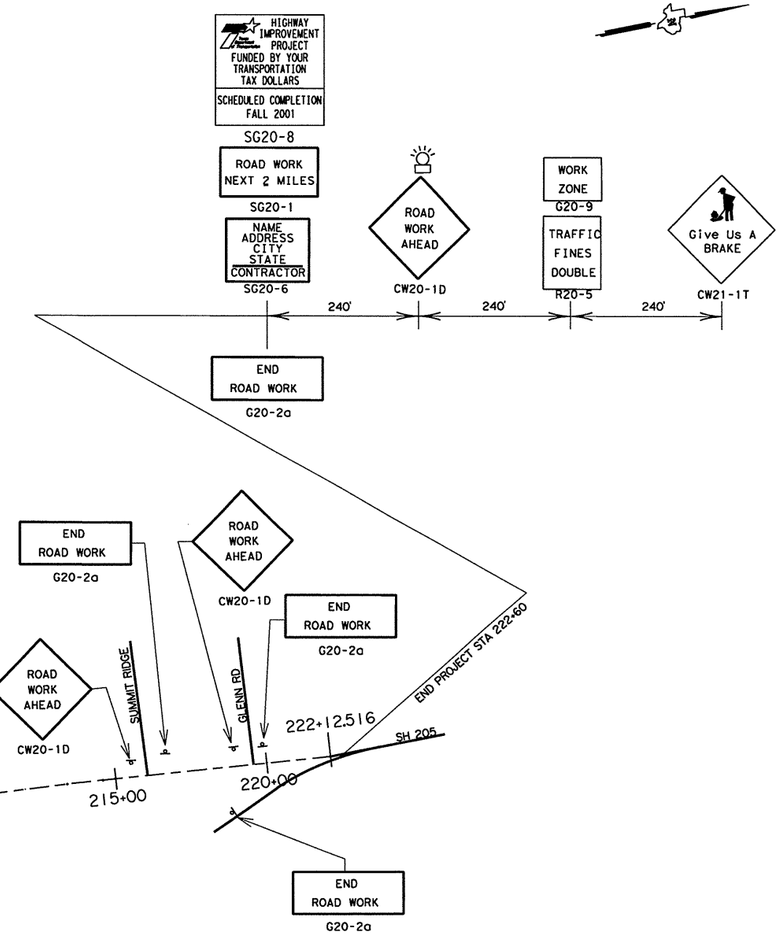
8/16/, 1999

David Lott, P.E.

PROJECT LAYOUT SHEET

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		27
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



STATE OF TEXAS
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8/16/, 1999

David Lott, P.E.

PROJECT LAYOUT SHEET

SHEET 2 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		28
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

PHASE I:

1. PLACE CHANNELIZING DEVICES AND WORK ZONE PAVEMENT MARKINGS TO THE RIGHT OF THE CENTERLINE BETWEEN STA 139+00 AND STA 144+00 AS SHOWN IN PHASE I OF TYPICAL SECTIONS OF THE TRAFFIC CONTROL PLAN.

2. CONSTRUCT DETOUR WIDENING TO THE RIGHT OF THE CENTERLINE BETWEEN STA 139+00 AND STA 144+00 CONSISTING OF EXCAVATION, EMBANKMENT, AND ASPHALTIC CONCRETE PAVEMENT WITH MAXIMUM SIDE SLOPE OF 2:1.

3. UPON COMPLETION OF DETOUR WIDENING TO THE RIGHT OF THE CENTERLINE, PLACE WORK ZONE PAVEMENT MARKINGS AND MARKERS. ELIMINATE MARKINGS THAT CONFLICT AND PLACE CHANNELIZING DEVICES TO THE LEFT OF THE CENTERLINE THE ROADWAY AS SHOWN IN PHASE I OF THE TCP TYPICAL SECTIONS.

4. REMOVE CONCRETE MEDIAN & ASPHALT NOSE AT INTERSECTION OF IH-30 AND FM 740.

5. REMOVE PORTION OF MEDIAN ON SUMMIT RIDGE ROAD AND REPLACE WITH TEMPORARY ASPHALTIC CONCRETE TO PROVIDE A DRIVING SURFACE DURING PHASE II.

6. TIE INTO THE 2 EXISTING 30" RCP STA 142+20 AND EXTEND WITH 50 FT OF TEMPORARY RCP. CONSTRUCT 72 LF OF DRAINAGE LINE "F" AND SAFETY END TREATMENT AS SHOWN ON TCP PHASE I.

7. REMOVE EXISTING HEADWALLS, RIPRAP AND ONE JOINT OF PIPE AT RT STA 161+06 . CONSTRUCT RCP DRAINAGE LINE "I". (THIS WILL REQUIRE CUT AND RESTORE OF THE EXISTING ACP). CONSTRUCT CULVERT EXTENSIONS ON BOTH SIDES OF FM 740. (SEE DRAINAGE SHEETS FOR DETAILS).

8. CONSTRUCT LINE "M" AT STA 218+00. (THIS WILL REQUIRE CUT AND RESTORE OF THE EXISTING ACP).

9. REMOVE PORTION OF MEDIAN AT YELLOW JACKET LANE AND REPLACE WITH TEMPORARY APHALTIC CONCRETE TO PROVIDE A DRIVING SURFACE DURING PHASE II.

10. CONSTRUCT DETOUR WIDENING TO THE LEFT OF THE CENTERLINE CONSISTING OF EXCAVATION, EMBANKMENT AND ASPHALTIC CONCRETE PAVEMENT WITH A MAXIMUM SIDE SLOPE OF 3:1. TEMPORARY PIPE MAY BE REQUIRED FOR DRAINAGE PURPOSES AT SOME OR ALL DRIVEWAYS ALONG DETOUR WIDENING WHICH IS SUBSIDIARY TO VARIOUS BID ITEMS. LOCATIONS TO BE DETERMINED BY THE ENGINEER.

PHASE II:

1. PLACE WORK ZONE PAVEMENT MARKINGS AND MARKERS ON FM 740, AS SHOWN ON PHASE II OF THE TRAFFIC CONTROL PLAN AND ELIMINATE EXISTING MARKINGS AND MARKERS THAT CONFLICT.

2. PLACE LOW PROFILE CONCRETE TRAFFIC BARRIER AND DRUMS ALONG FM 740, AS SHOWN ON PHASE II OF THE TRAFFIC CONTROL PLAN.

3. ROUTE NORTHBOUND FM 740 TRAFFIC TO THE LEFT OF THE CENTERLINE AS SHOWN ON PHASE II OF TRAFFIC CONTROL PLAN. SEE PHASE II TCP TYPICAL SECTIONS FOR DETAILS.

4. REMOVE EXISTING SIDE ROAD STRUCTURES, DRIVEWAYS, AND ASPHALTIC CONCRETE PAVEMENT AS NEEDED TO CONSTRUCT PHASE II.

5. CONSTRUCT ALL MANHOLES, CURB INLETS, DROP INLETS AND STORM SEWER DRAINAGE LINES (C, D, E, F, H, K, J, L) THAT RUN ALONG RIGHT SIDE OF FM 740 AS SHOWN ON TRAFFIC CONTROL PLAN SHEETS FOR PHASE II.

6. CONSTRUCT PROPOSED CONCRETE PAVEMENT TO THE RIGHT OF THE CENTERLINE. (SEE PHASE II OF TYPICAL SECTIONS AND TRAFFIC CONTROL PLANS FOR DETAILS)

7. CONSTRUCT THE PROPOSED ASPHALTIC CONCRETE PAVEMENT TO THE RIGHT AND LEFT OF THE CENTERLINE JUST SOUTH OF SH 205. (SEE PHASE II OF THE TRAFFIC CONTROL PLAN FOR DETAILS).

8. PLACE TOPSOIL AND BLOCK SOD (PRAIRE BUFFALO) (BIG ROLL).

PHASE IIIA:

1. PLACE CONSTRUCTION PAVEMENT MARKINGS AND MARKERS TO THE RIGHT OF THE CENTERLINE, ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS THAT CONFLICT. (SEE PHASE IIIA OF THE TRAFFIC CONTROL PLAN FOR DETAILS).

2. PLACE LOW PROFILE CONCRETE TRAFFIC BARRIER AND DRUMS ALONG FM 740 AS SHOWN ON PHASE IIIA OF THE TRAFFIC CONTROL PLAN.

3. ROUTE NORTHBOUND AND SOUTHBOUND TRAFFIC TO THE RIGHT SIDE OF THE CENTERLINE AS SHOWN ON PHASE IIIA OF THE TRAFFIC CONTROL PLAN. SEE PHASE IIIA OF THE TRAFFIC CONTROL PLAN.

4. REMOVE EXISTING SIDE ROAD STRUCTURES, DRIVEWAYS, AND ASPHALTIC CONCRETE PAVEMENT AS NEEDED TO CONSTRUCT PHASE IIIA.

5. CONSTRUCT ALL MANHOLES, CURB INLETS, DROP INLETS AND STORM SEWER DRAINAGE LINES (G, M) THAT RUN TO THE LEFT OF THE CENTERLINE AS SHOWN ON TRAFFIC CONTROL PLAN SHEETS FOR PHASE IIIA.

6. CONSTRUCT PROPOSED CONCRETE PAVEMENT AND MEDIANS TO THE LEFT SIDE OF THE CENTERLINE. (SEE PHASE IIIA OF THE TYPICAL SECTIONS AND TRAFFIC CONTROL PLAN FOR DETAILS).

7. CONSTRUCT THE PROPOSED ASPHALTIC CONCRETE PAVEMENT TO THE LEFT OF THE CENTERLINE JUST SOUTH OF SH 205.

PHASE IIIB:

1. PLACE WORK ZONE PAVEMENT MARKINGS AND PERMANENT PAVEMENT MARKINGS ON FM 740, ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS THAT CONFLICT. (SEE PHASE IIIB OF THE TRAFFIC CONTROL PLANS AND STRIPING PLANS FOR FURTHER DETAILS).

2. PLACE DRUMS ALONG FM 740 AS SHOWN ON PHASE IIIB OF THE TRAFFIC CONTROL PLAN.

3. CONSTRUCT PROPOSED CONCRETE PAVEMENT AND MEDIAN AT BEGINNING OF THE JOB. (SEE PHASE IIIB OF THE TYPICAL SECTIONS AND TRAFFIC CONTROL PLANS FOR DETAILS).

4. CONSTRUCT CONCRETE MEDIAN AT INTERSECTION OF YELLOW JACKET AND FM 740. (SEE PHASE IIIB OF THE TYPICAL SECTIONS AND TRAFFIC CONTROL PLANS FOR DETAILS).

5. CONSTRUCT MEDIANS AT THE END OF THE JOB AT INTERSECTION OF FM 740 AND SH 205. (SEE PHASE IIIB OF THE TYPICAL SECTIONS AND TRAFFIC CONTROL PLANS FOR DETAILS).

6. PLACE REMAINING PERMANENT PAVEMENT MARKINGS AND MARKERS AND OPEN REMAINING LANES TO TRAFFIC.

7. PLACE TOPSOIL AND BLOCK SOD (PRAIRIE BUFFALO) (BIG ROLL).

8. FINAL CLEAN UP.

NOTES:
DRIVEWAY ACCESS IS TO BE MAINTAINED AT ALL TIMES.
ALTERNATING TYPE "A" WARNING LIGHTS SHALL BE PLACED ON DRUMS IN LANE TAPERS, ALIGNMENT TRANSITIONS OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
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8/16/ , 1999

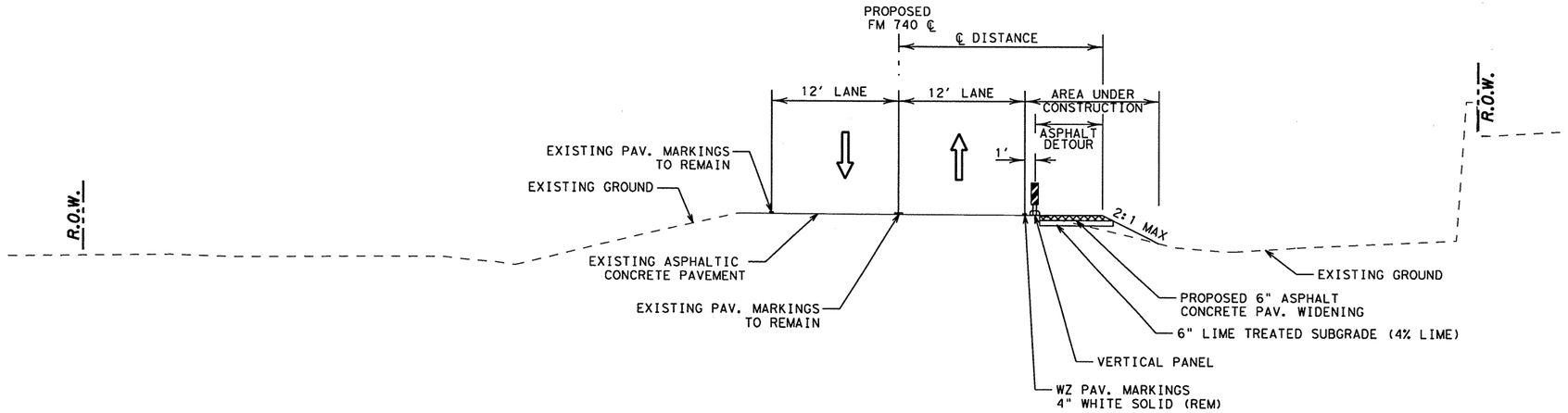
David Lott, P.E.

TRAFFIC CONTROL PLAN

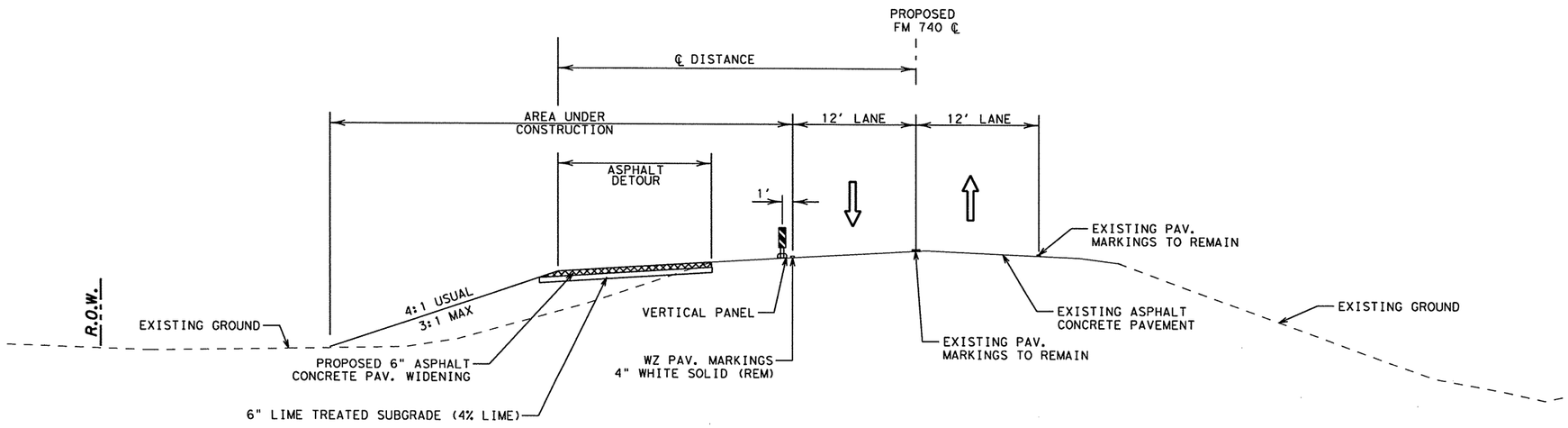
SEQUENCE OF CONSTRUCTION

SHEET 1 OF 1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		29
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



	℄ DISTANCE	ASPHALT DETOUR
STA 139+00 TO STA 141+00	VARIES 19'-21'	VARIES 2'-6'
STA 141+00 TO STA 143+00	21'	6'
STA 143+00 TO STA 144+00	VARIES 21'-19'	VARIES 6'-2'



	℄ DISTANCE	ASPHALT DETOUR
STA 130+50 TO STA 132+00	32'	5'
STA 132+00 TO STA 133+00	VARIES 32'-29'	5'
STA 133+00 TO STA 138+00	29'	VARIES 4'-14'

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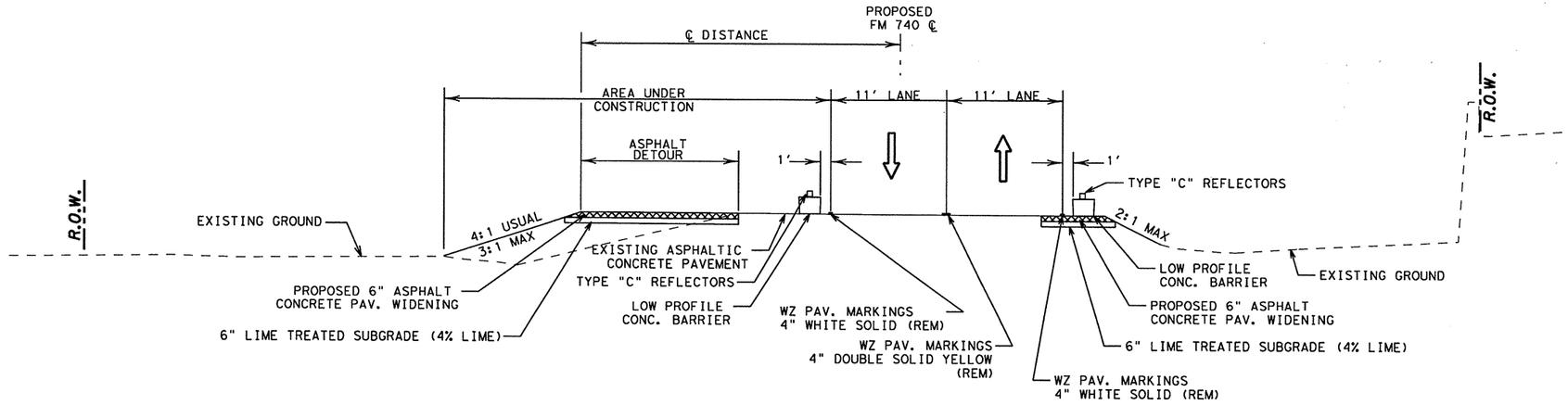
PHASE I
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

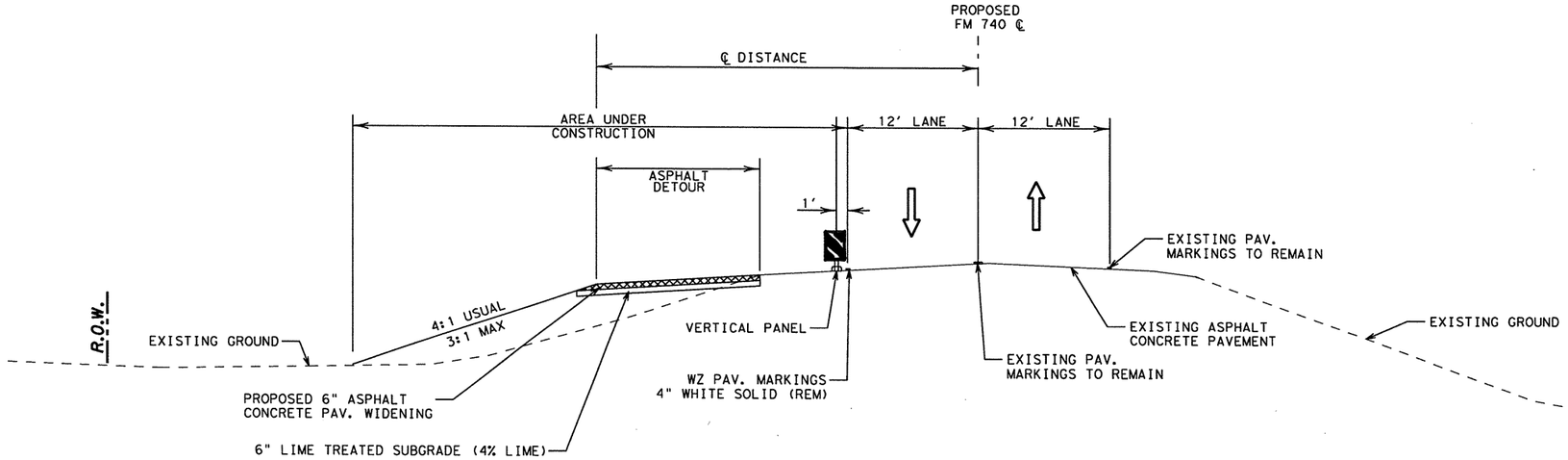
SHEET 1 OF 10

NTS

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		30
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



	℄ DISTANCE	ASPHALT DETOUR
STA 138+00 TO STA 141+00	VARIES 29'-39'	VARIES 14'-24'
STA 141+00 TO STA 143+00	39'	24'
STA 143+00 TO STA 146+00	VARIES 39'-26'	VARIES 24'-12'



	℄ DISTANCE	ASPHALT DETOUR
STA 146+00 TO STA 151+00	26'	VARIES 10'-7'
STA 151+00 TO STA 153+00	VARIES 26'-24'	7'
STA 153+00 TO STA 157+00	24'	VARIES 7'-13'
STA 163+00 TO STA 172+00	23'	8'

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PHASE I
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 10

NTS

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		3/
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

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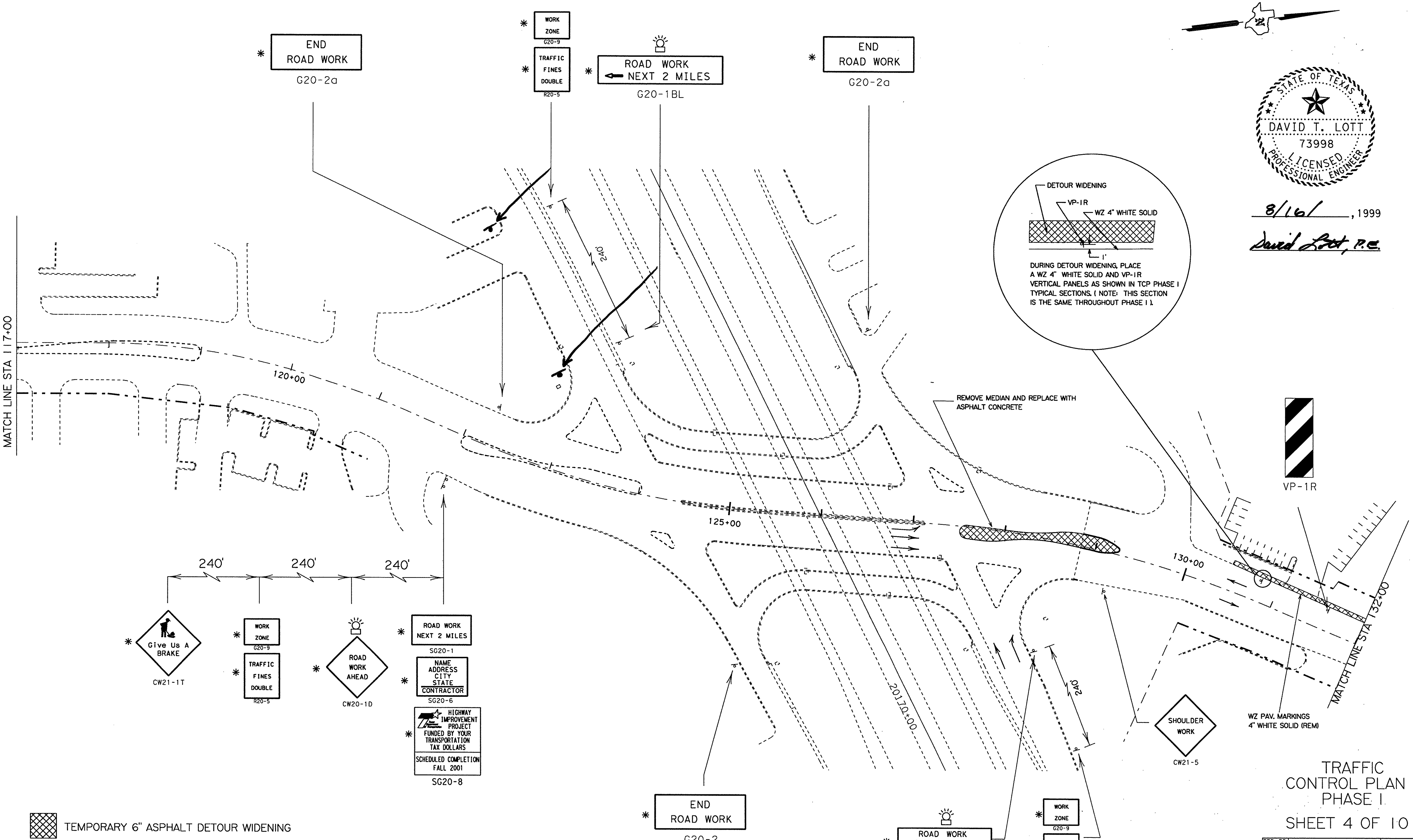
* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES OF CONSTRUCTION



TEMPORARY 6" ASPHALT DETOUR WIDENING

TYPE "A" WARNING LIGHTS

USERNAME: EXT 4409
FILE: TCP1A.DGN
DATE: 12-12-97
LEVELS: TCP PHASE 1
VIEW:

TRAFFIC CONTROL PLAN PHASE I

SHEET 4 OF 10

SCALE 1"=100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			33
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

12-12-97

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* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES OF CONSTRUCTION

PLACE VERTICAL PANELS VP-1R @ 80' C-C (TYPICAL)

VP-1R

* ROAD WORK AHEAD
CW20-1D

* END ROAD WORK
G20-2a

TIE IN 30' FROM END OF EXISTING 30" RCP (E.L. 501.5) AND ADD 50' TEMPORARY 30" RCP

DRUMS @ 10' C-C

LOW PROFILE CTB
160' TYPE I
40' TYPE II

CONSTRUCT 72 LF OF LINE "F" (TRENCH PROTECTION = 25 LF)

SAFETY END TREATMENT

DRUMS @ 10' C-C

STA 141+00

STA 143+00

TURTLE COVE

MATCH LINE STA 147+00

132+00

135+00

140+00

145+00

℄ FM740

EXISTING 30" RCP

LOW PROFILE CTB
360' TYPE I
40' TYPE II

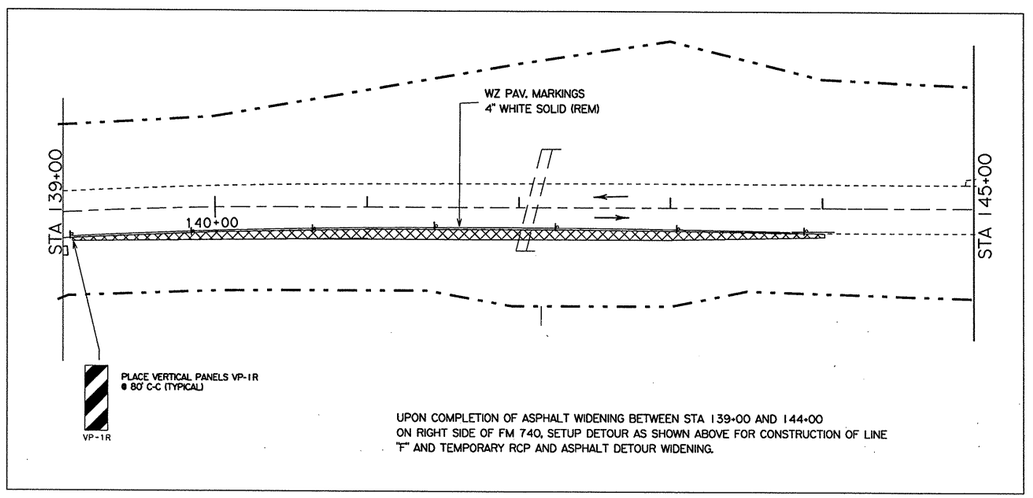
WZ PAV. MARKINGS
4" DOUBLE SOLID YELLOW (REM)

WZ PAV. MARKINGS
4" WHITE SOLID (REM)

MATCH LINE STA 132+00

WZ PAV. MARKINGS
4" WHITE SOLID (REM)

TEMPORARY 6" ASPHALT DETOUR WIDENING



UPON COMPLETION OF ASPHALT WIDENING BETWEEN STA 139+00 AND 144+00 ON RIGHT SIDE OF FM 740, SETUP DETOUR AS SHOWN ABOVE FOR CONSTRUCTION OF LINE "F" AND TEMPORARY RCP AND ASPHALT DETOUR WIDENING.

SCALE 1"=100'

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

TRAFFIC CONTROL PLAN PHASE I

SHEET 5 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			34
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

USERNAME: EXT 4409
FILE: TCP2A.DGN
DATE: 12-13-97
LEVELS: TCP PHASE I
VIEW:

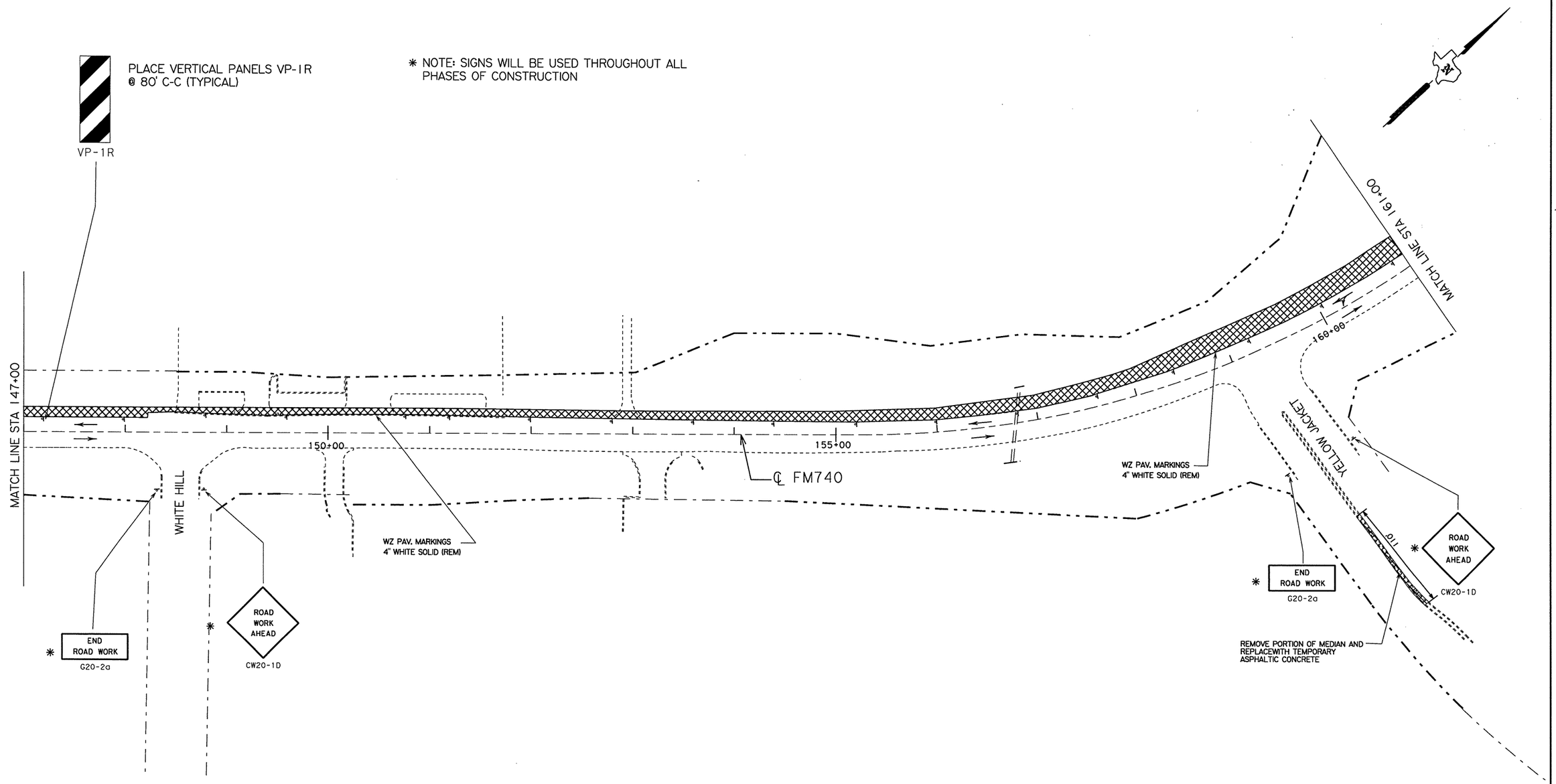
LEVELS DISPLAYED

12-13-97

PLACE VERTICAL PANELS VP-1R
@ 80' C-C (TYPICAL)

VP-1R

* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES OF CONSTRUCTION



TEMPORARY 6" ASPHALT DETOUR WIDENING

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SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE I

SHEET 6 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			35
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

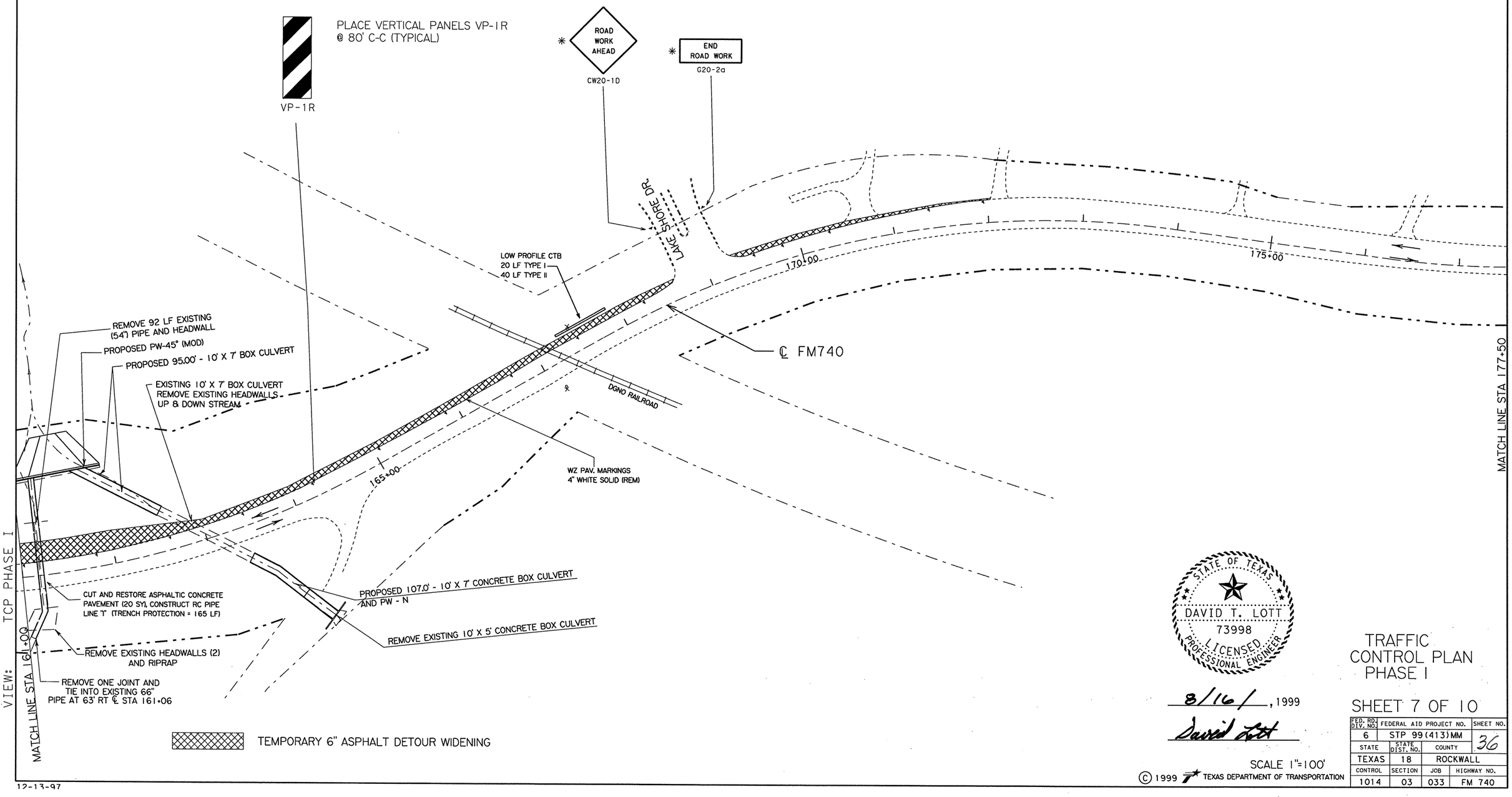
LEVELS DISPLAYED
1 2 3 | 22 | 28 | 40 | 56
41 42 43 | 49 50 | 58 59 60 61

USERNAME: EXT 4409
FILE: TCP2A.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE I

12-13-97

c:\engdata\fm740\tcp3a.dgn

* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES



"SERNAME: EXT 4409
LE: TCP3A.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE I

12-13-97

STATE OF TEXAS
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8/16/, 1999

David Lott

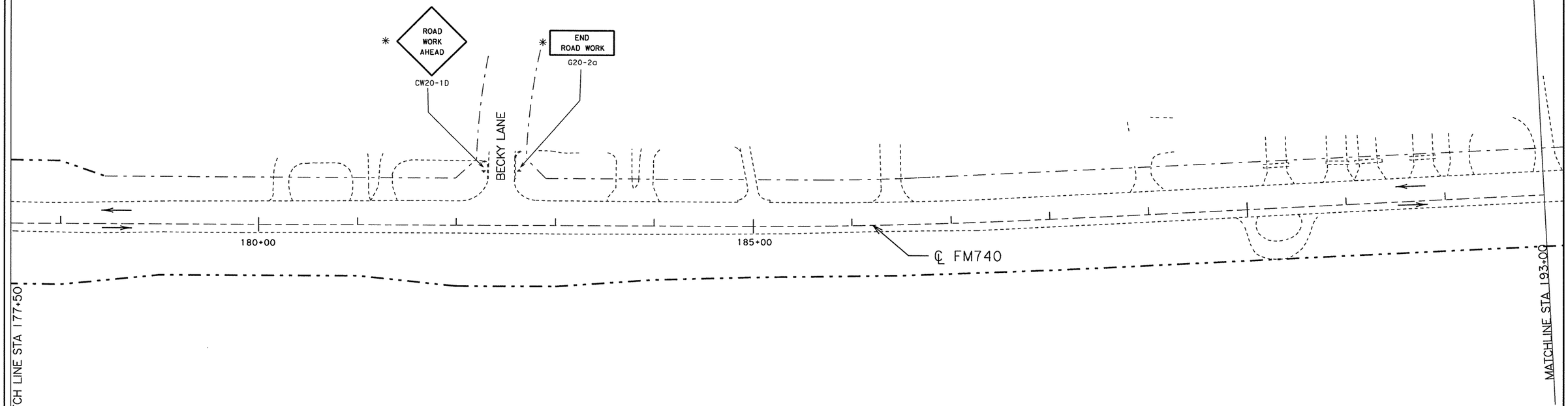
SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE I

SHEET 7 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		36
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES



USERNAME: EXT 4409
FILE: TCP3A.DGN
DATE: 12-13-97
LEVELS: TCP PHASE I
VIEW:

LEVELS DISPLAYED
1 2 3 10 40 47 41 45 58 59 60 61

12-13-97

STATE OF TEXAS
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SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE I

SHEET 8 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			37
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

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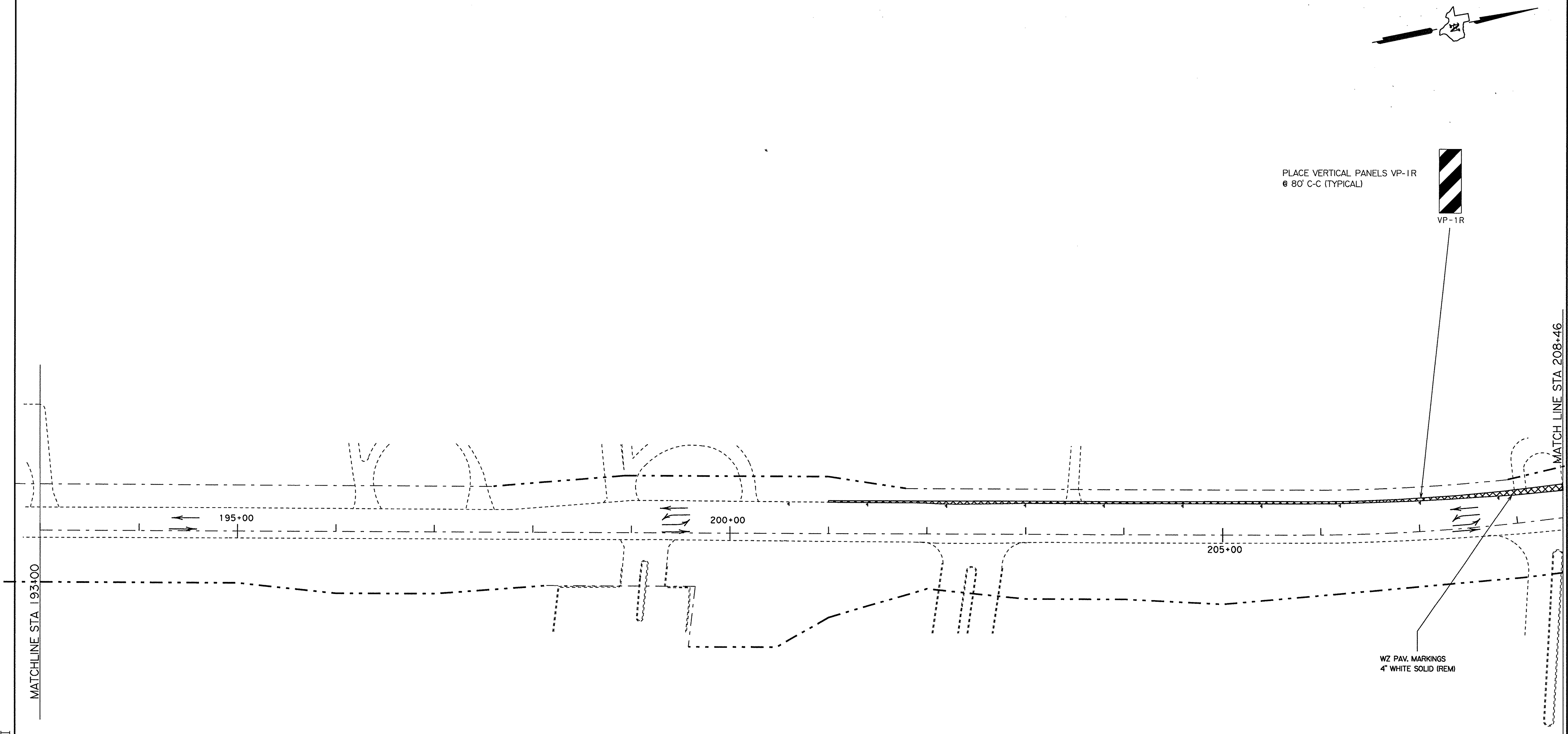

TEMPORARY 6" ASPHALT DETOUR WIDENING

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SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE I

SHEET 9 OF 10

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		38
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

USERNAME: EXT 4409
FILE: TCP4A.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE I

12-13-97

* NOTE: SIGNS WILL BE USED THROUGHOUT ALL PHASES OF CONSTRUCTION

PLACE VERTICAL PANELS VP-1R @ 80' C-C (TYPICAL)

VP-1R

MATCH LINE STA 208+46

* ROAD WORK AHEAD — CW20-1D

* END ROAD WORK — G20-2a

* ROAD WORK AHEAD — CW20-1D

* END ROAD WORK — G20-2a

* SHOULDER WORK — CW21-5

* HIGHWAY IMPROVEMENT PROJECT FUNDED BY YOUR TRANSPORTATION TAX DOLLARS / SCHEDULED COMPLETION FALL 2001 — SG20-8

* ROAD WORK NEXT 2 MILES — SG20-1

* NAME ADDRESS CITY STATE CONTRACTOR — SG20-6

* ROAD WORK AHEAD — CW20-1D

* WORK ZONE — G20-9

* TRAFFIC FINES DOUBLE — R20-5

* Give Us A BRAKE — CW21-1T

240' 240' 240'

SUMMIT RIDGE

GLENN

DI-1

30'

215+00

220+00

SH 205

WZ PAV. MARKINGS 4" WHITE SOLID (REM)

WZ PAV. MARKINGS 4" WHITE SOLID (REM)

REMOVE PORTION OF MEDIAN & REPLACE WITH ASHPALTIC CONCRETE

CUT & RESTORE ASPHALTIC CONCRETE PAVEMENT (1600 SY) CONSTRUCT RC PIPE (TRENCH PROTECTION = 100 LF)

* END ROAD WORK — G20-2a

TEMPORARY 6" ASPHALT DETOUR WIDENING

TYPE "A" WARNING LIGHT

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David Lott, P.E.

TRAFFIC CONTROL PLAN PHASE I

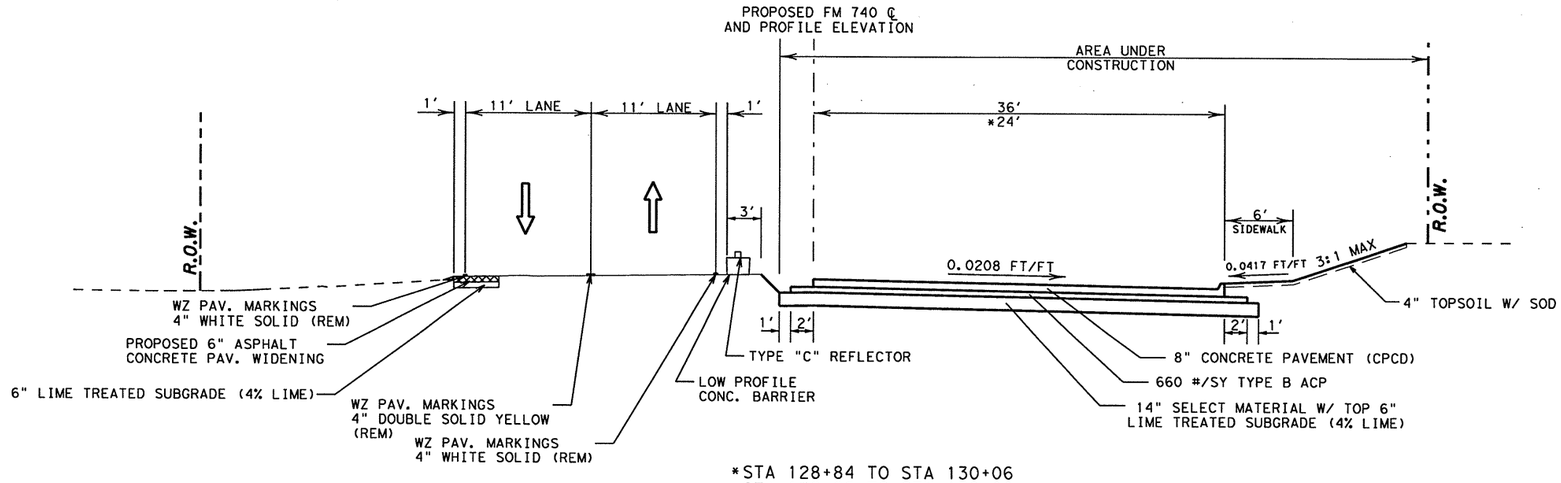
SCALE 1"=100'

SHEET 10 OF 10

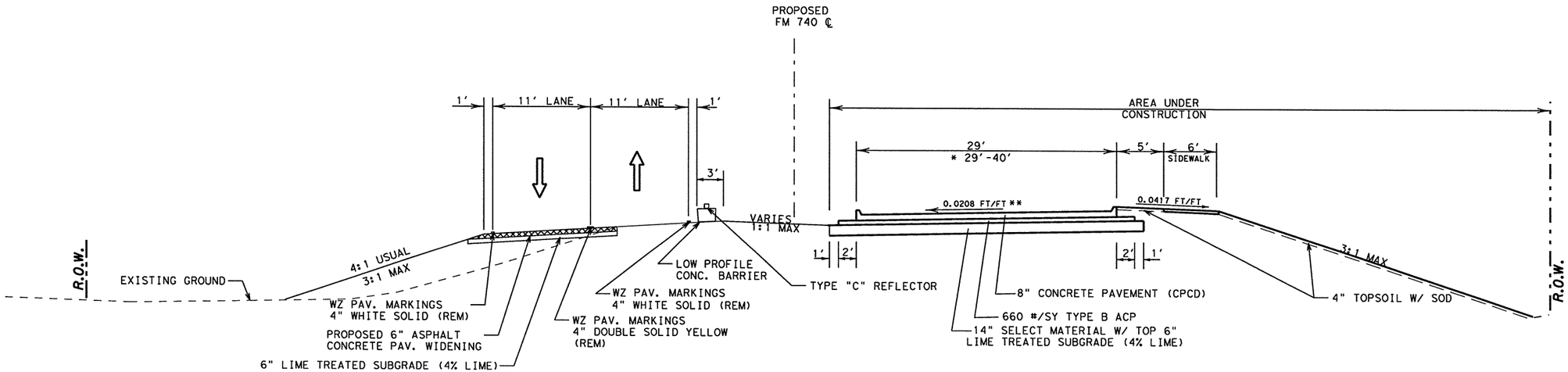
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		39
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

USERNAME: EXT 4409
FILE: TCP4A.DGN
DATE: 12-13-97
LEVELS: 1 2 3 40 41 45 58 59 66 61
VIEW: TCP PHASE I

12-13-97



*STA 128+84 TO STA 130+06
STA 130+06 TO STA 139+00



STA 139+00 TO STA 153+47
*STA 153+47 TO STA 156+33
STA 162+53 TO STA 198+00

**NOTE: USE A POSITIVE SLOPE THROUGHOUT
STA 139+00 TO STA 153+47

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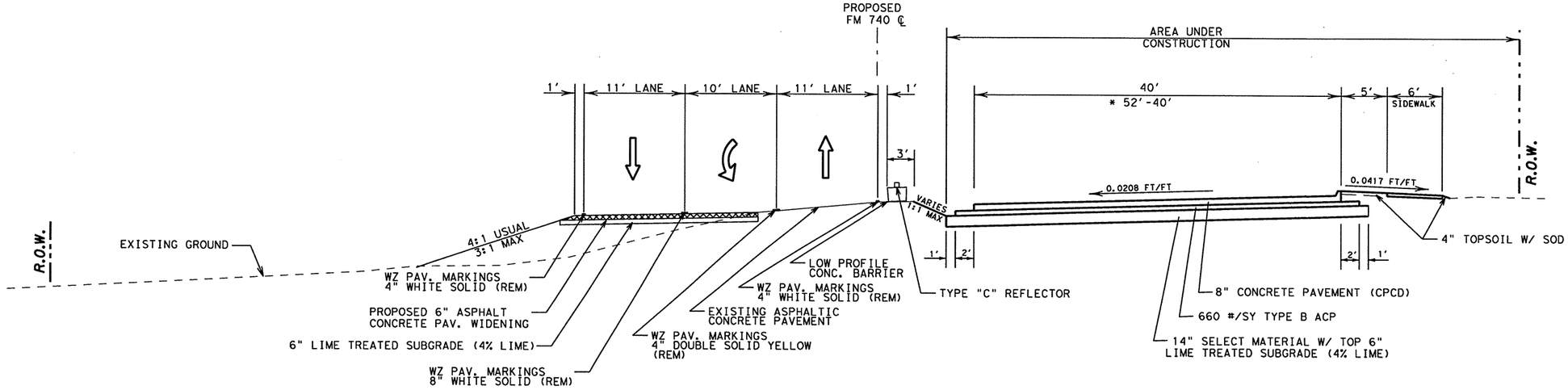
PHASE II
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

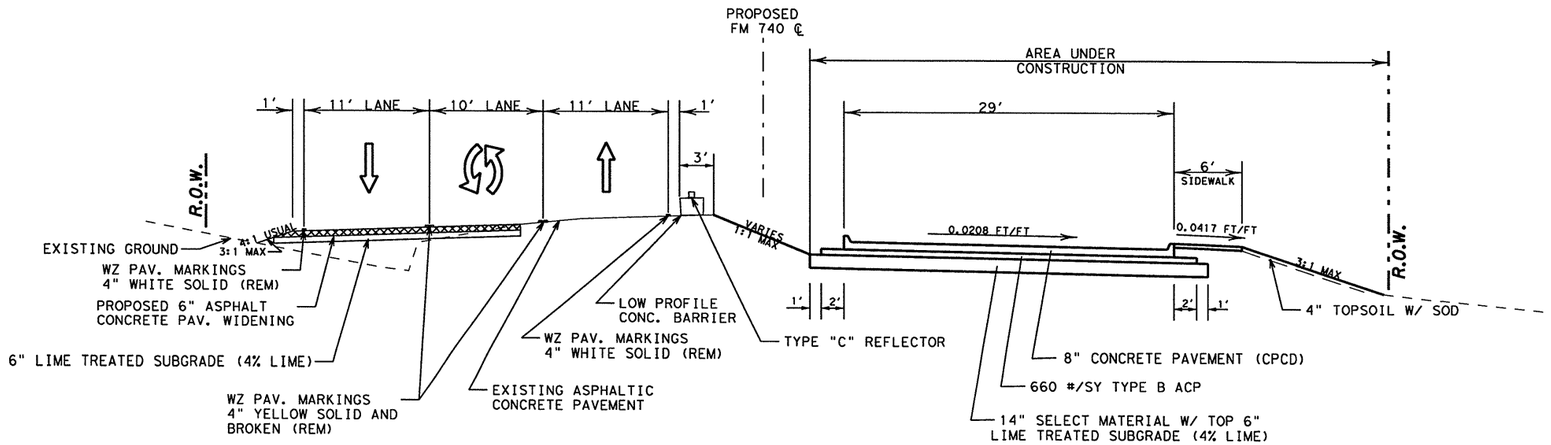
NTS

SHEET 1 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		40
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



STA 156+33 TO STA 158+31
*STA 158+31 TO STA 159+95
STA 159+95 TO STA 162+53



STA 198+00 TO STA 218+00

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PHASE II
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 2 OF 9

NTS

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		41
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

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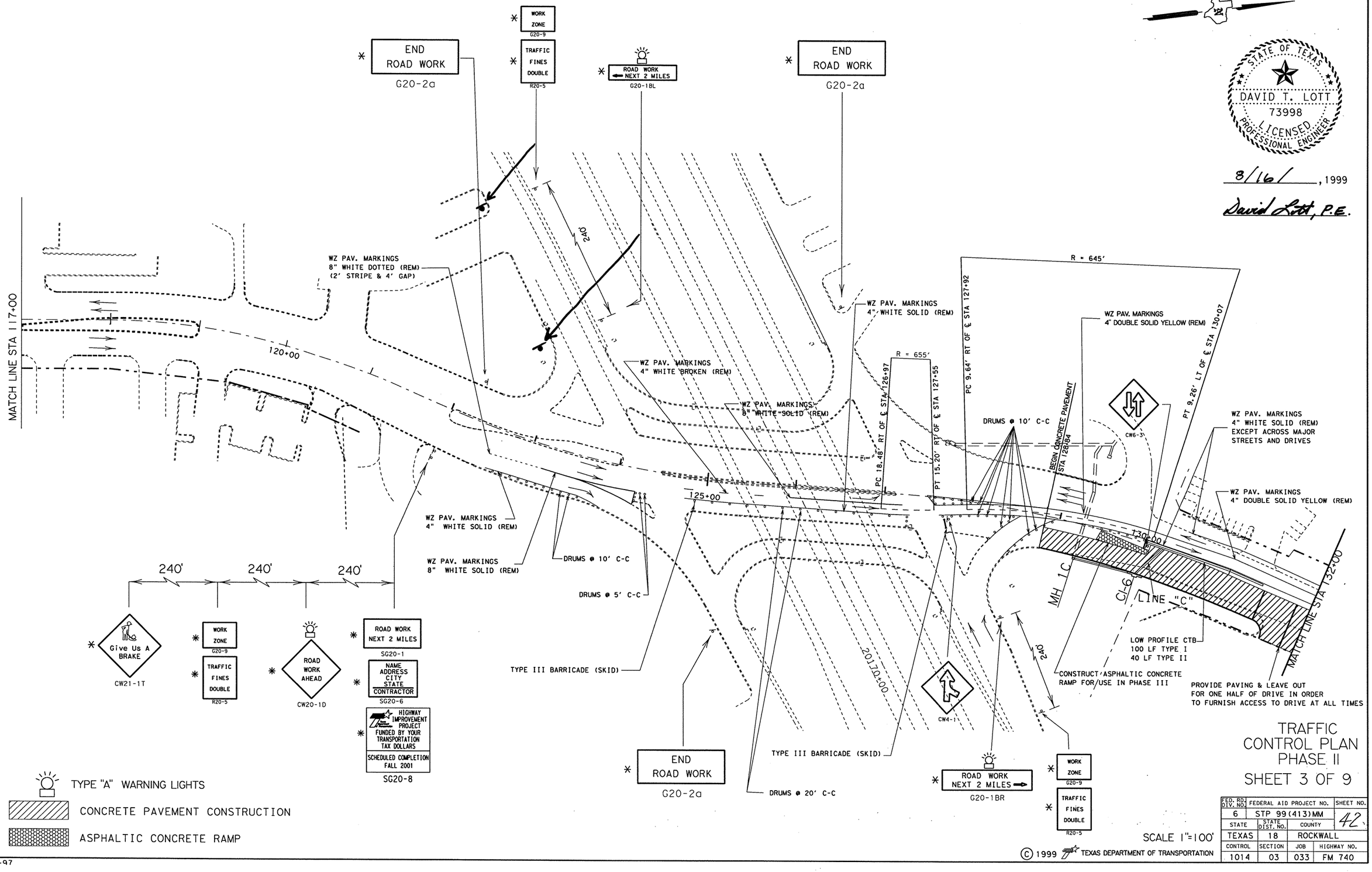
* NOTE: SIGNS FROM A PREVIOUS PHASE



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8/16/, 1999

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USERNAME: EXT 4409
FILE: TCP1B.DGN
DATE: 12-12-97
LEVELS: TCP PHASE II
VIEW:

LEVELS DISPLAYED

0	1	2	4	5	7			
12			19	20				
			33	34				
			41	42	43			
			49	50	51			
59			65	66	67			

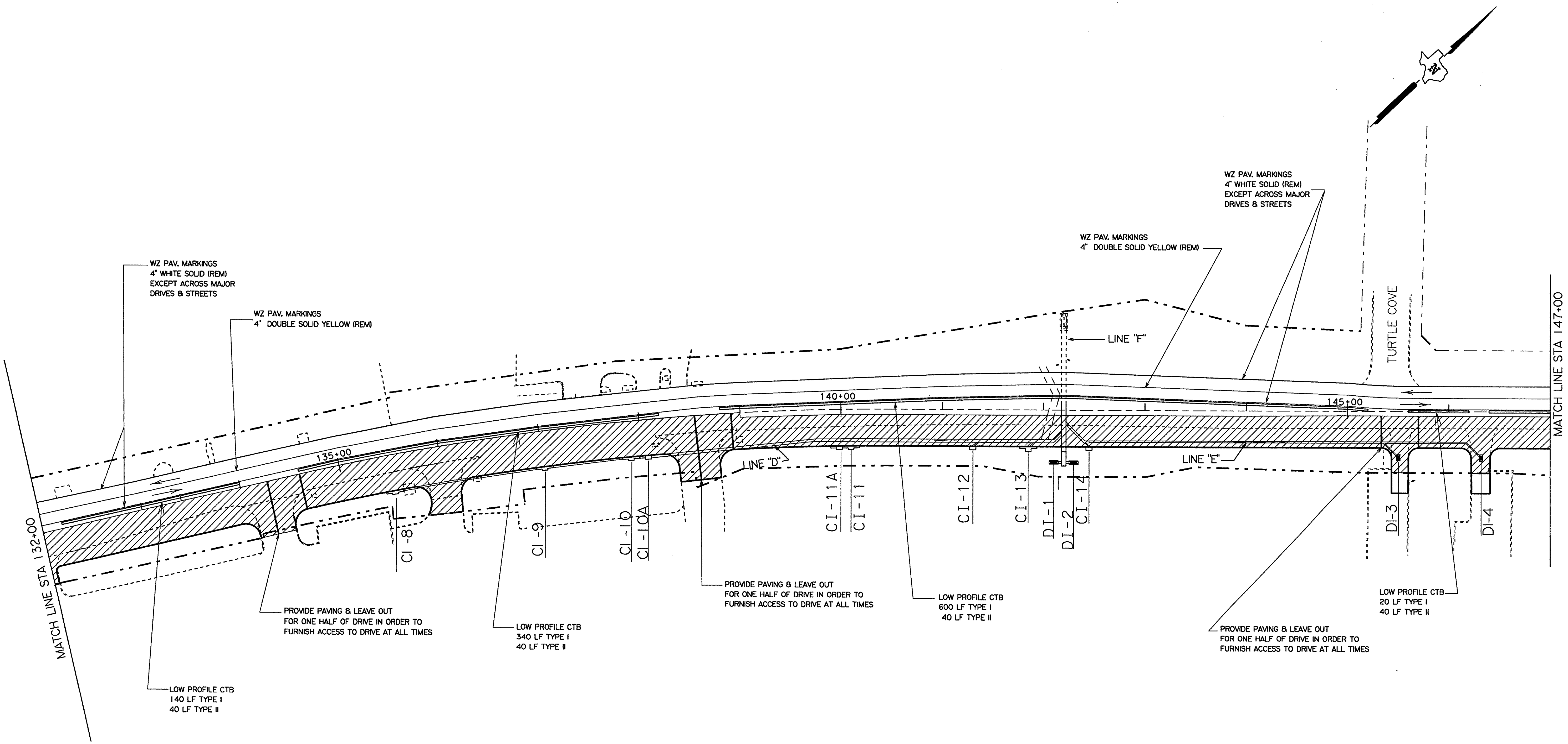
TRAFFIC CONTROL PLAN PHASE II

SHEET 3 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		42
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

SCALE 1"=100'

12-12-97


WZ PAV. MARKINGS
4" WHITE SOLID (REM)
EXCEPT ACROSS MAJOR
DRIVES & STREETS
WZ PAV. MARKINGS
4" DOUBLE SOLID YELLOW (REM)
WZ PAV. MARKINGS
4" DOUBLE SOLID YELLOW (REM)
WZ PAV. MARKINGS
4" WHITE SOLID (REM)
EXCEPT ACROSS MAJOR
DRIVES & STREETS
TURTLE COVE
LINE "F"
MATCH LINE STA 147+00
MATCH LINE STA 132+00
135+00
140+00
145+00
LINE "D"
LINE "E"
CI-8
CI-9
CI-10
CI-10A
CI-11A
CI-11
CI-12
CI-13
DI-1
DI-2
CI-14
DI-3
DI-4
PROVIDE PAVING & LEAVE OUT
FOR ONE HALF OF DRIVE IN ORDER TO
FURNISH ACCESS TO DRIVE AT ALL TIMES
LOW PROFILE CTB
340 LF TYPE I
40 LF TYPE II
PROVIDE PAVING & LEAVE OUT
FOR ONE HALF OF DRIVE IN ORDER TO
FURNISH ACCESS TO DRIVE AT ALL TIMES
LOW PROFILE CTB
600 LF TYPE I
40 LF TYPE II
LOW PROFILE CTB
20 LF TYPE I
40 LF TYPE II
PROVIDE PAVING & LEAVE OUT
FOR ONE HALF OF DRIVE IN ORDER TO
FURNISH ACCESS TO DRIVE AT ALL TIMES
LOW PROFILE CTB
140 LF TYPE I
40 LF TYPE II

USERNAME: EXT 4409
FILE: TCP2B.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE II

CONCRETE PAVEMENT CONSTRUCTION

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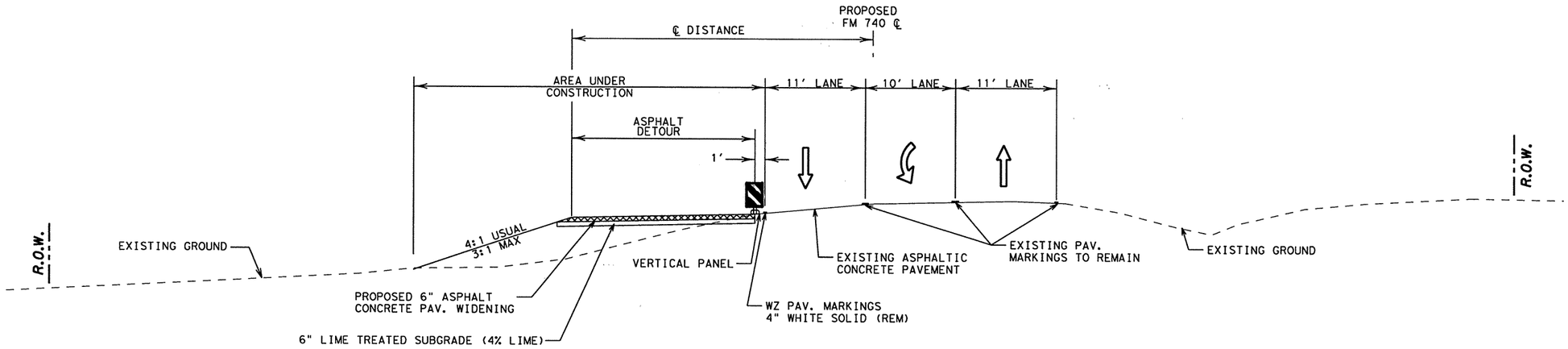
SCALE 1"=100'

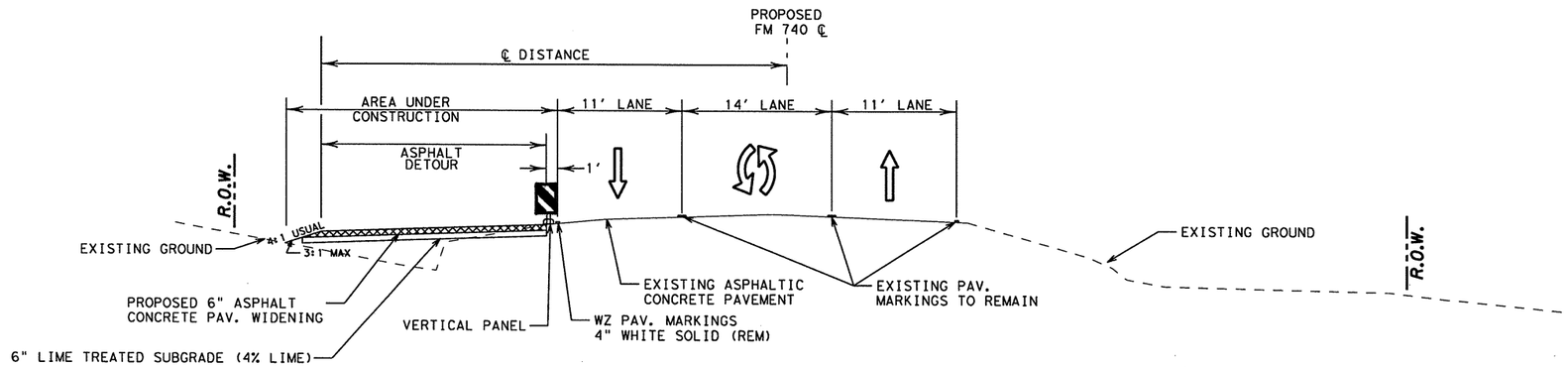
TRAFFIC CONTROL PLAN PHASE II

SHEET 4 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			43
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



	℄ DISTANCE	ASPHALT DETOUR
STA 157+00 TO STA 159+00	VARIES 24'-35'	VARIES 13'-20'
STA 159+00 TO STA 162+00	35'	20'
STA 162+00 TO STA 163+00	VARIES 35'-23'	VARIES 20'-8'



	℄ DISTANCE	ASPHALT DETOUR
STA 201+00 TO STA 210+00	34'	VARIES 2'-8'
STA 210+00 TO STA 214+00	VARIES 34'-40'	VARIES 8'-22'
STA 214+00 TO STA 217+00	40'	22'
STA 217+00 TO STA 219+26	VARIES 40'-14'	VARIES 22'-4'

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PHASE I
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

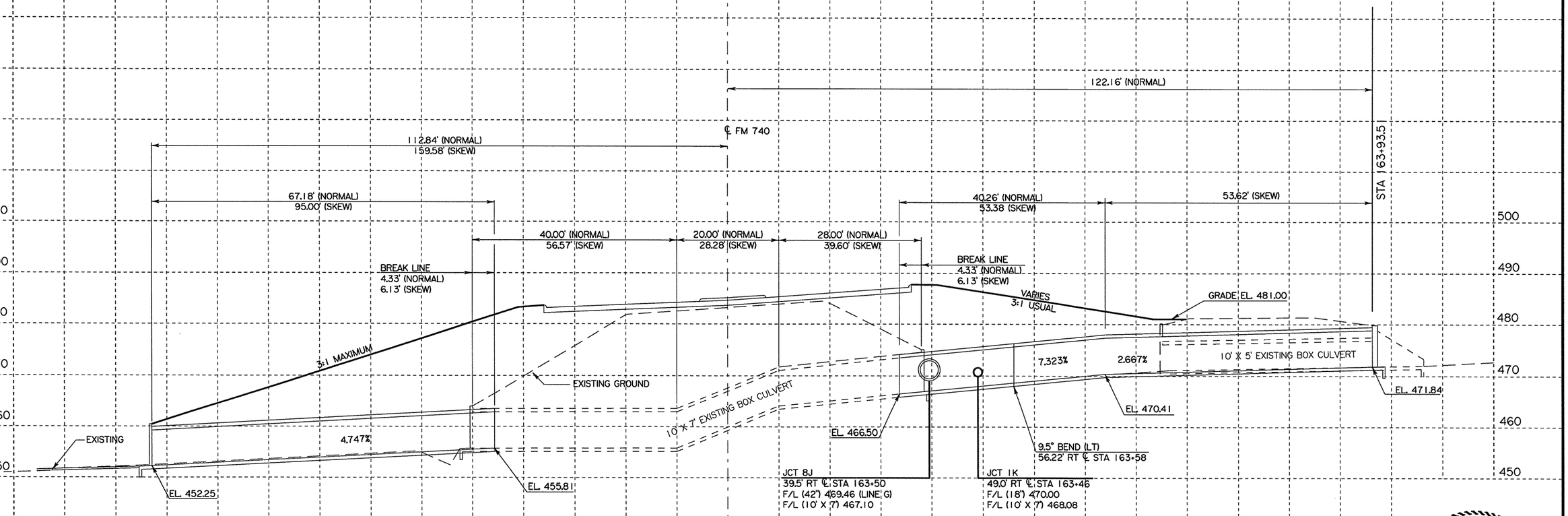
NTS

SHEET 3 OF 10

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO:		SHEET NO.
6	STP 99(413)MM		32
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SUMMARY OF ESTIMATED QUANTITIES

ITEM 462 CONC BOX CULV (10 FT X 7 FT)	202 LF
ITEM 466 WINGWALL (PW - N) (H = 7FT)	1 EA
ITEM 466 WINGWALL (PW - 45°) (MOD) (H = 7FT)	1 EA



(LEFT ℄) 1 - 10' X 7' X 95.00' CONCRETE BOX CULVERT EXTENSION
PC-5 (PRECAST) & PW-45°

(RIGHT ℄) 1 - 10' X 7' X 107.00' CONCRETE BOX CULVERT EXTENSION
PC-5 (PRECAST) & PW - N

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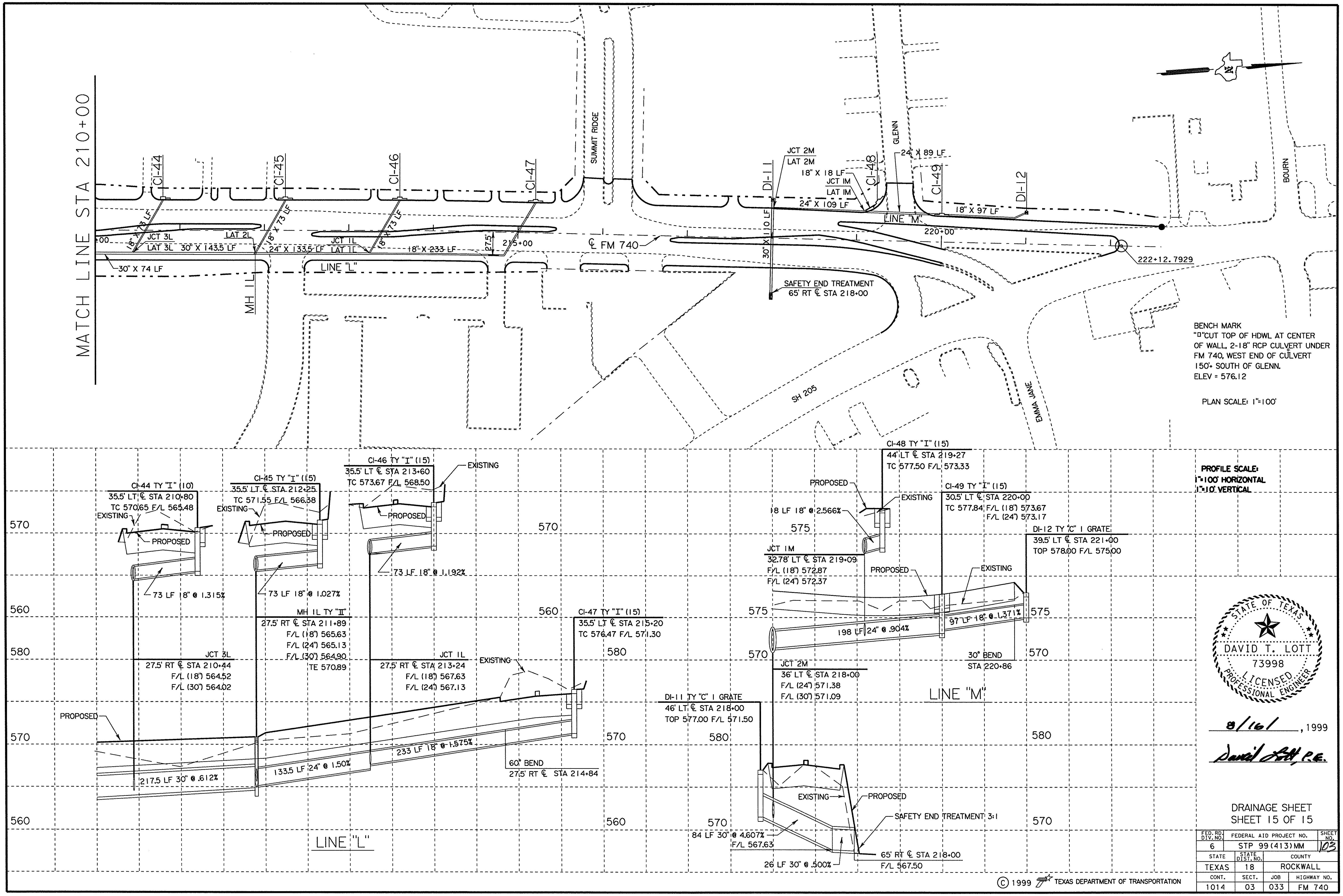
DRAINAGE SHEET
SHEET 10 OF 15
CULVERT LAYOUT
STA 163+05
SCALE 1" = 20'

FED. RD DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		98
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

74016305.dgn



MATCH LINE STA 210+00
CI-44
CI-45
CI-46
CI-47
SUMMIT RIDGE
JCT 3L
LAT 3L 30" X 143.5 LF
LAT 2L
24" X 133.5 LF
JCT 1L
LAT 1L
18" X 233 LF
18" X 73 LF
27.5'
215+00
30" X 74 LF
LINE "L"
MH 1L
℄ FM 740
JCT 2M
LAT 2M
18" X 18 LF
JCT 1M
LAT 1M
24" X 109 LF
DI-11
30" X 110 LF
CI-48
GLENN
24" X 89 LF
CI-49
DI-12
18" X 97 LF
LINE "M"
220+00
222+12.7929
SAFETY END TREATMENT
65' RT ℄ STA 218+00
BOURN
SH 205
EMMA JANE
BENCH MARK
"□"CUT TOP OF HDWL AT CENTER OF WALL, 2-18" RCP CULVERT UNDER FM 740, WEST END OF CULVERT 150± SOUTH OF GLENN.
ELEV = 576.12
PLAN SCALE: 1"=100'
PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL
CI-44 TY "I" (10)
35.5' LT ℄ STA 210+80
TC 570.65 F/L 565.48
EXISTING
PROPOSED
73 LF 18" @ 1.315%
CI-45 TY "I" (15)
35.5' LT ℄ STA 212+25
TC 571.55 F/L 566.38
73 LF 18" @ 1.027%
CI-46 TY "I" (15)
35.5' LT ℄ STA 213+60
TC 573.67 F/L 568.50
73 LF 18" @ 1.192%
MH 1L TY "II"
27.5' RT ℄ STA 211+89
F/L (18") 565.63
F/L (24") 565.13
F/L (30") 564.90
TE 570.89
CI-47 TY "I" (15)
35.5' LT ℄ STA 215+20
TC 576.47 F/L 571.30
JCT 3L
27.5' RT ℄ STA 210+44
F/L (18") 564.52
F/L (30") 564.02
JCT 1L
27.5' RT ℄ STA 213+24
F/L (18") 567.63
F/L (24") 567.13
233 LF 18" @ 1.575%
133.5 LF 24" @ 1.50%
217.5 LF 30" @ .612%
60° BEND
27.5' RT ℄ STA 214+84
LINE "L"
CI-48 TY "I" (15)
44' LT ℄ STA 219+27
TC 577.50 F/L 573.33
18 LF 18" @ 2.566%
CI-49 TY "I" (15)
30.5' LT ℄ STA 220+00
TC 577.84 F/L (18") 573.67
F/L (24") 573.17
DI-12 TY "C" 1 GRATE
39.5' LT ℄ STA 221+00
TOP 578.00 F/L 575.00
JCT 1M
32.78' LT ℄ STA 219+09
F/L (18") 572.87
F/L (24") 572.37
198 LF 24" @ .904%
97 LF 18" @ 1.371%
30° BEND
STA 220+86
JCT 2M
36' LT ℄ STA 218+00
F/L (24") 571.38
F/L (30") 571.09
LINE "M"
DI-11 TY "C" 1 GRATE
46' LT ℄ STA 218+00
TOP 577.00 F/L 571.50
SAFETY END TREATMENT 3:1
84 LF 30" @ 4.607%
F/L 567.63
26 LF 30" @ .500%
65' RT ℄ STA 218+00
F/L 567.50
570
560
580
575

STATE OF TEXAS
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8/16/, 1999

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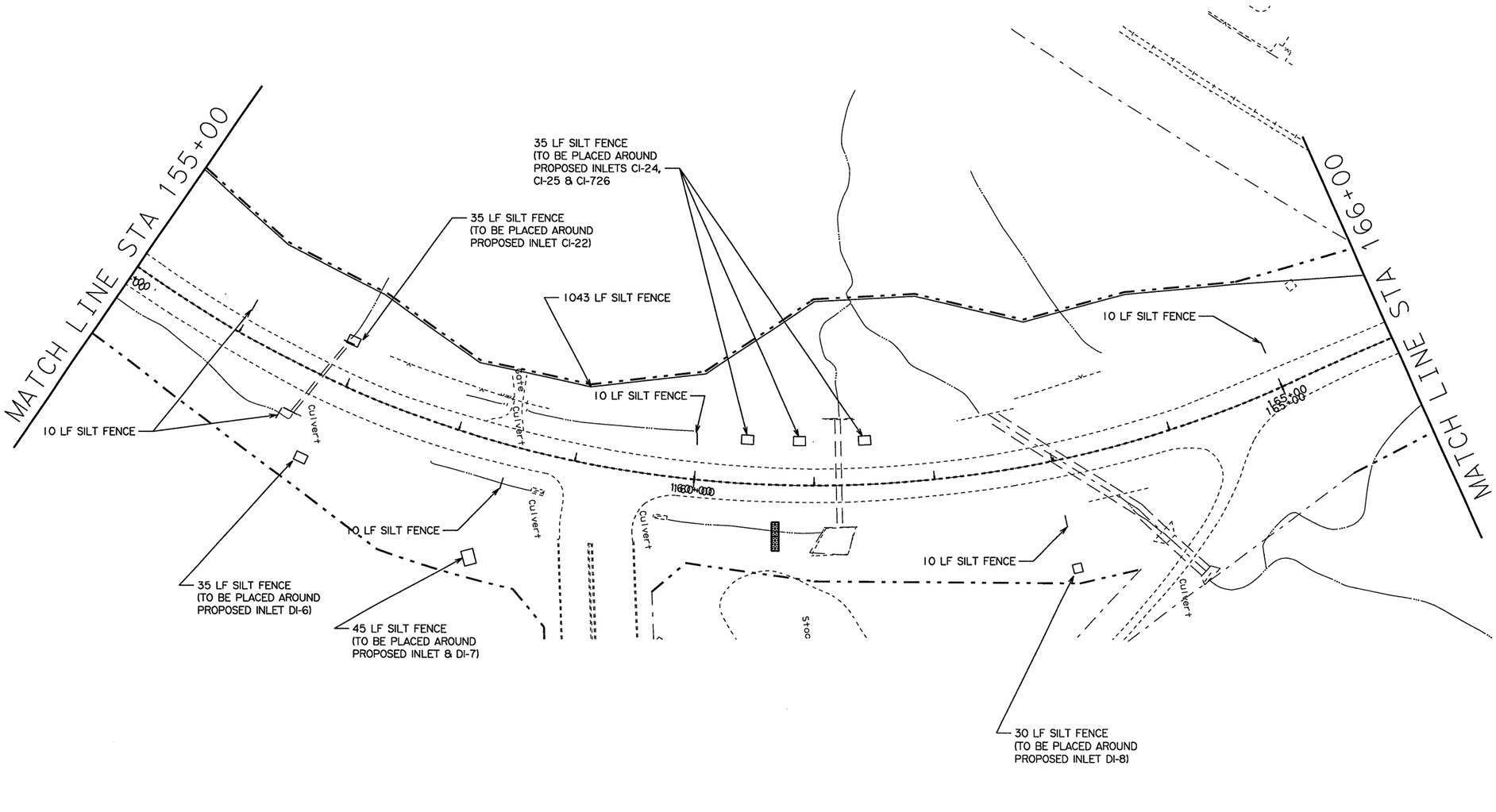
DRAINAGE SHEET
SHEET 15 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		103
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

REMOVALS	DRAINAGE		REFERENCE FILES	DESIGN FILES
	1,6,20,23,3_,47,49 / 2	1,6,23,34,40 - 43,47,49	FM_.DGN / FM7_.OPO.DGN	DRAIN9.DGN

$$$date$$$$

D:\ENGDATA\FM740\ECP4.DGN



ROCK FILTER DAM

PLAN SCALE 1" = 100'

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8/16/, 1999

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STORM WATER POLLUTION PREVENTION PLAN

SHEET 4 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		130
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FEBRUARY 9, 1998

DETAIL A

PROPOSED POWER POLE
4083080
364768

INSTALL ELECTRICAL SERVICE
TY S(120/240)000(NS)GS(T)TP(0)

P1

P2

P3

P4

P5

P6

FM 740

Ø2

Ø2-A
Ø2-B
Ø2-C
Ø2-D
Ø2-E

Ø1

Ø1-A
Ø1-B

Ø6

Ø6-A
Ø6-B
Ø6-C
Ø6-D

Ø8

Ø8-A
Ø8-B
Ø8-C

705 ft TO STOP BAR

170 ft TO STOP BAR

170 ft TO STOP BAR

INSTALL CONTROLLER CABINET AND FOUNDATION

EXISTING ELECTRICAL SERVICE

EXISTING LIGHT POLE TO REMAIN

SEE DETAIL A

POWER SOURCE
4083738
3648255

PROPOSED POWER POLE
4083447
3648839

INSTALL ELECTRICAL SERVICE
TY S(120/240)000(NS)GS(T)TP(0)

RAILROAD TRACKS
(800ft FROM STOP BAR)

770 ft TO STOP BAR

YELLOW JACKET LANE

0 10 20 30 40 50
SCALE (FT.)

3ft typical

TYPICAL DETECTOR AND STOP LINE DETAIL

LEGEND

- GROUND BOX TYPE A
- GROUND BOX TYPE C
- TYPICAL MAST ARM COMBINATION SIGNAL WITH 250 WATT H.P.S. LUMINAIRE AND SIGNAL HEAD NUMBER
- OPTICOM DETECTOR
- EXISTING R.O.W.
- PROPOSED R.O.W.
- CONDUIT RUN
- CONDUIT RUN NUMBER
- LOOP DETECTOR
- S.S.R. ANTENNA
- CONTROLLER CABINET

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FILE: .DGN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maher M. Ghanayem, P.E. 63459, on 10/7, 1999

Maher M. Ghanayem

 Texas Department of Transportation

TRAFFIC SIGNAL LAYOUT

FM 740 at YELLOW JACKET

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		137
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

GENERAL NOTES

FOR TYPE III BARRICADES

Type III Barricades are to be used at each end of construction projects closed to all traffic.

Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided for, the chevron striping may slope downward in both directions from the center of the barricade.

Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope to the right.

Identification markings may be shown only on back side of barricade rails. Maximum height of letters shall be 1 inch.

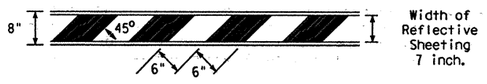
Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided (see BC(1)).

Barricades shall be made using pre-qualified materials. A list of compliant products and their sources may be obtained by writing or faxing:

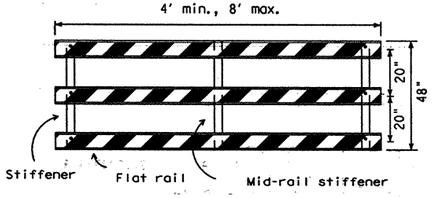
Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Barricades shall NOT be used as a sign support.

TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



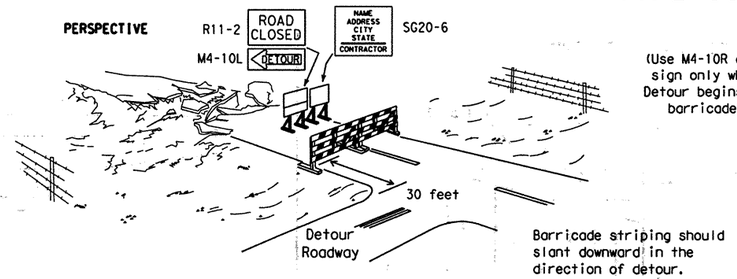
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



Stiffner may be inside or outside of support.

* For dimensions of components refer to TxDOT approved products list.

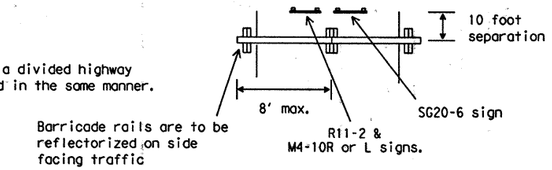
TYPE III BARRICADE (SKID)



(Use M4-10R or L sign only when Detour begins at barricade)

PLAN

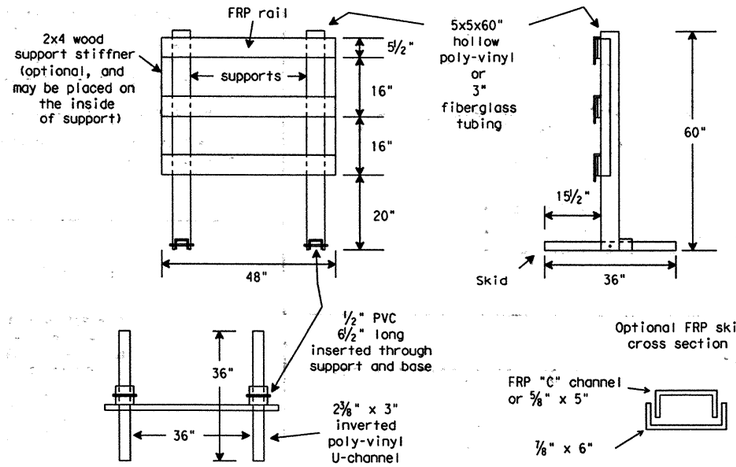
Each roadway of a divided highway shall be barricaded in the same manner.



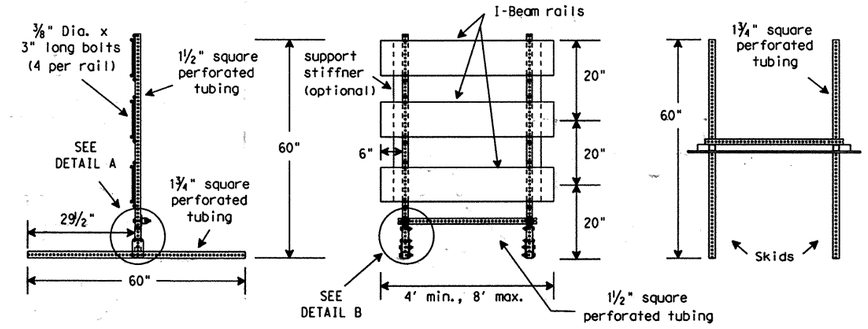
1). R11-2 and M4-10 signs should be mounted on independent supports at 7 foot mounting height in center of roadway.

2). Advance signing, including construction warning signs, and detour signing shall be as specified elsewhere in the plans.

PLASTIC/FIBERGLASS TYPE III BARRICADE OPTION

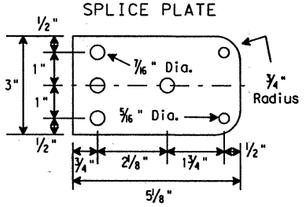


PERFORATED STEEL/WOOD/PLASTIC TYPE III BARRICADE OPTION

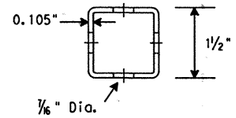


NOTE: If flat rails are used, refer to Wood/Plastic Option for vertical placement of rails

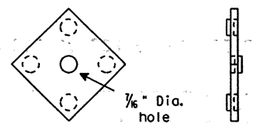
SPLICE PLATE



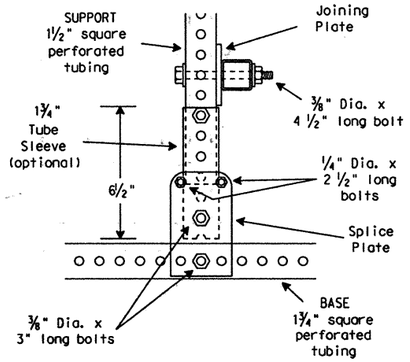
1½" PERFORATED SQUARE STEEL TUBE



JOINING PLATE

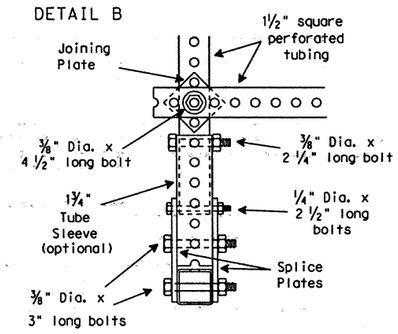


DETAIL A

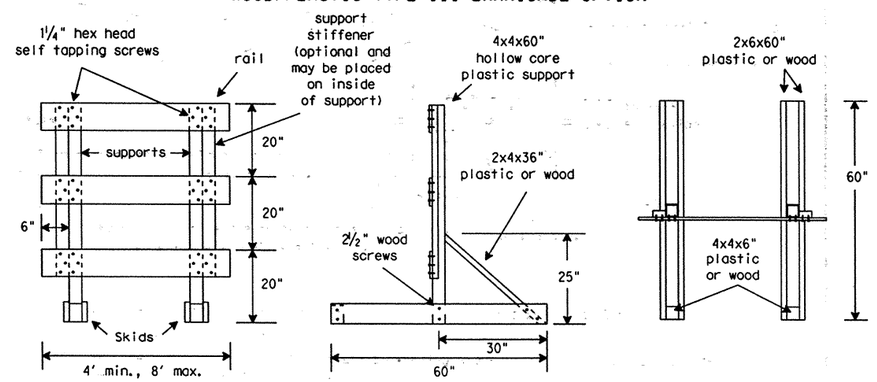


(Option: tube sleeve and base may be welded)

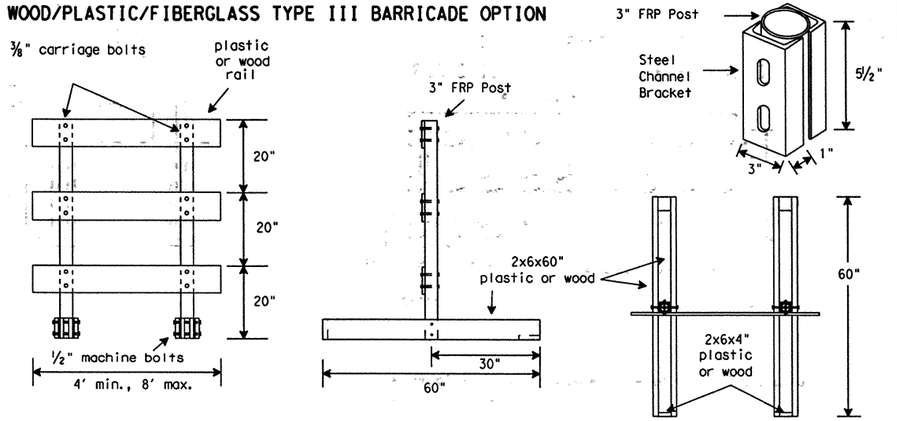
DETAIL B



WOOD/PLASTIC TYPE III BARRICADE OPTION



WOOD/PLASTIC/FIBERGLASS TYPE III BARRICADE OPTION



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

BARRICADES (SKID MOUNT TYPE) **BC(2)-98**

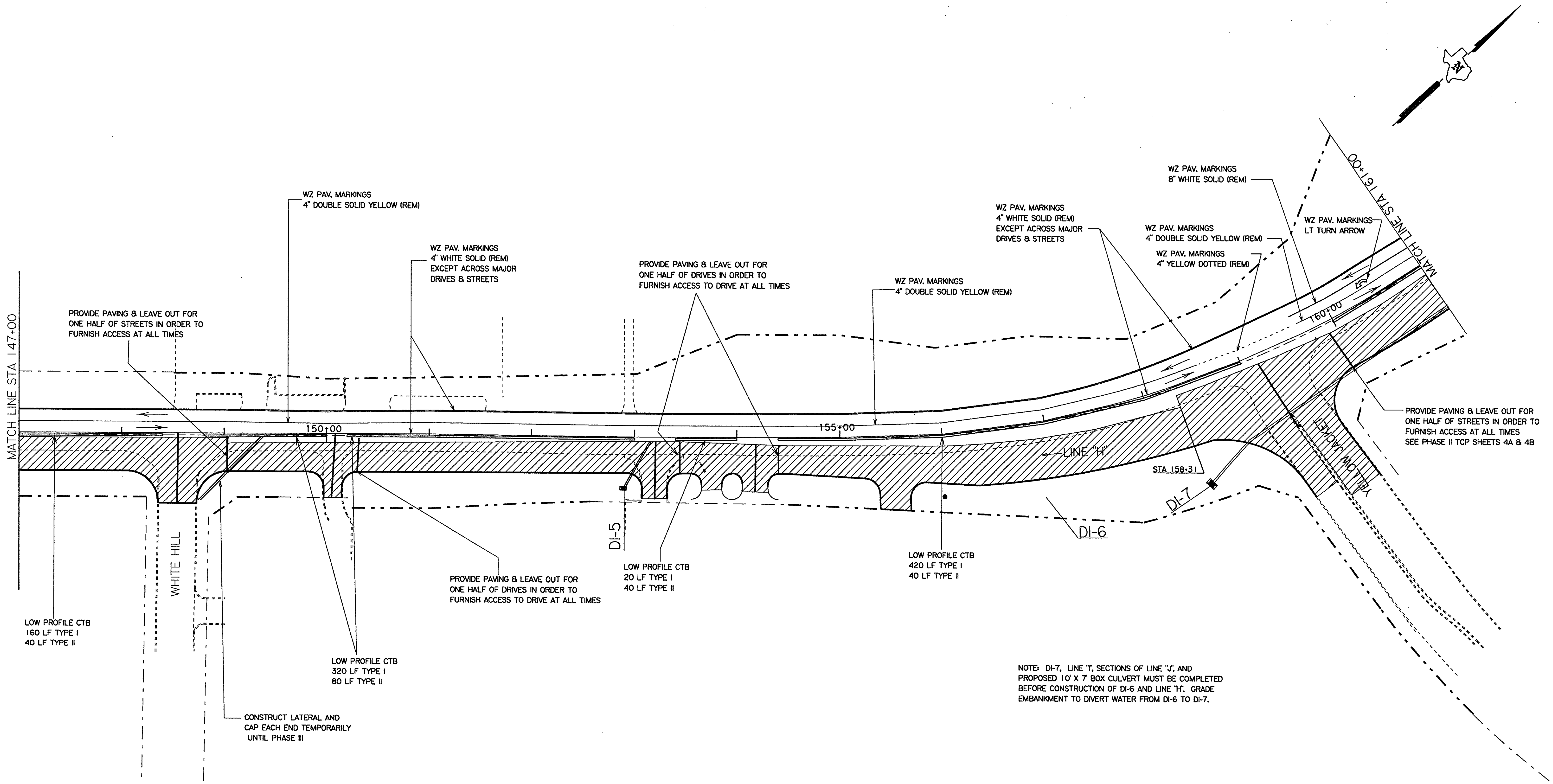
©TxDOT February 1998	DN: LR	CK: DTN	DW: DN	CK: GB	REQ NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	STP 99(413)MM		203
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

102

LEVEL	PLAYED
1 2 3 4 5 6	01 11 21 31 41 51 6
17 18 19 20 21 22 23	25 26 27 28 29 30 31 32
33 34 35 36 37 38 39	40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55	56 57 58 59 60 61 62 63

DN: CK: DW: CK: DATE: ACC: FILE:

c:\engdata\fm740\tcp2b.dgn



NOTE: DI-7, LINE 'I', SECTIONS OF LINE 'J', AND PROPOSED 10' X 7' BOX CULVERT MUST BE COMPLETED BEFORE CONSTRUCTION OF DI-6 AND LINE 'H'. GRADE EMBANKMENT TO DIVERT WATER FROM DI-6 TO DI-7.

CONCRETE PAVEMENT CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE II

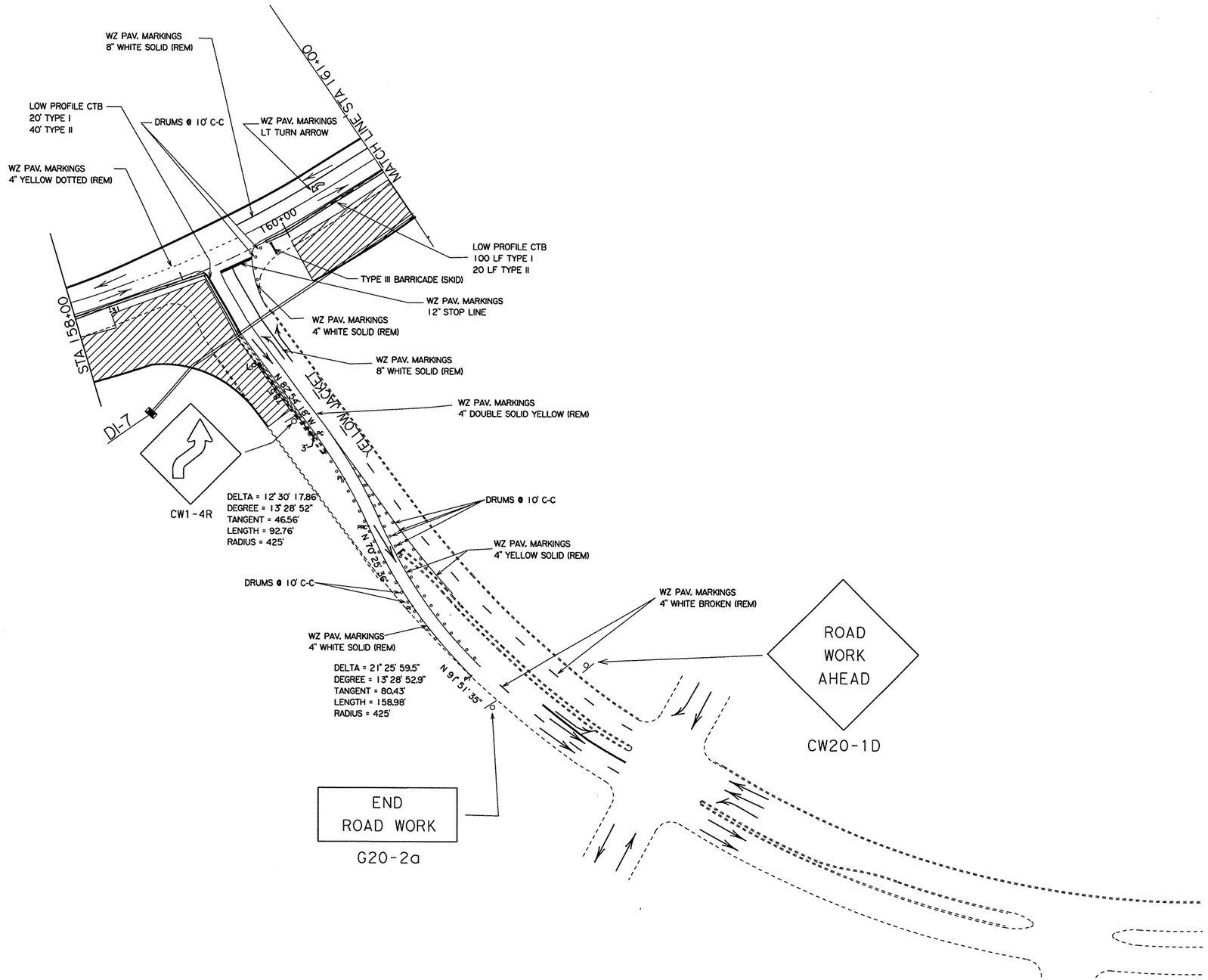
SHEET 5 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		44
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	

USERNAME: EXT 4409
FILE: TCP2B.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE II

LEVELS DISPLAYED

12-13-97



▨ CONCRETE PAVEMENT CONSTRUCTION

DAVID T. LOTT
73998

8/16/, 1999

David Lott, P.E.

SCALE 1"=100'

© 1999 TEXAS DEPARTMENT OF TRANSPORTATION

TRAFFIC
CONTROL PLAN
PHASE II

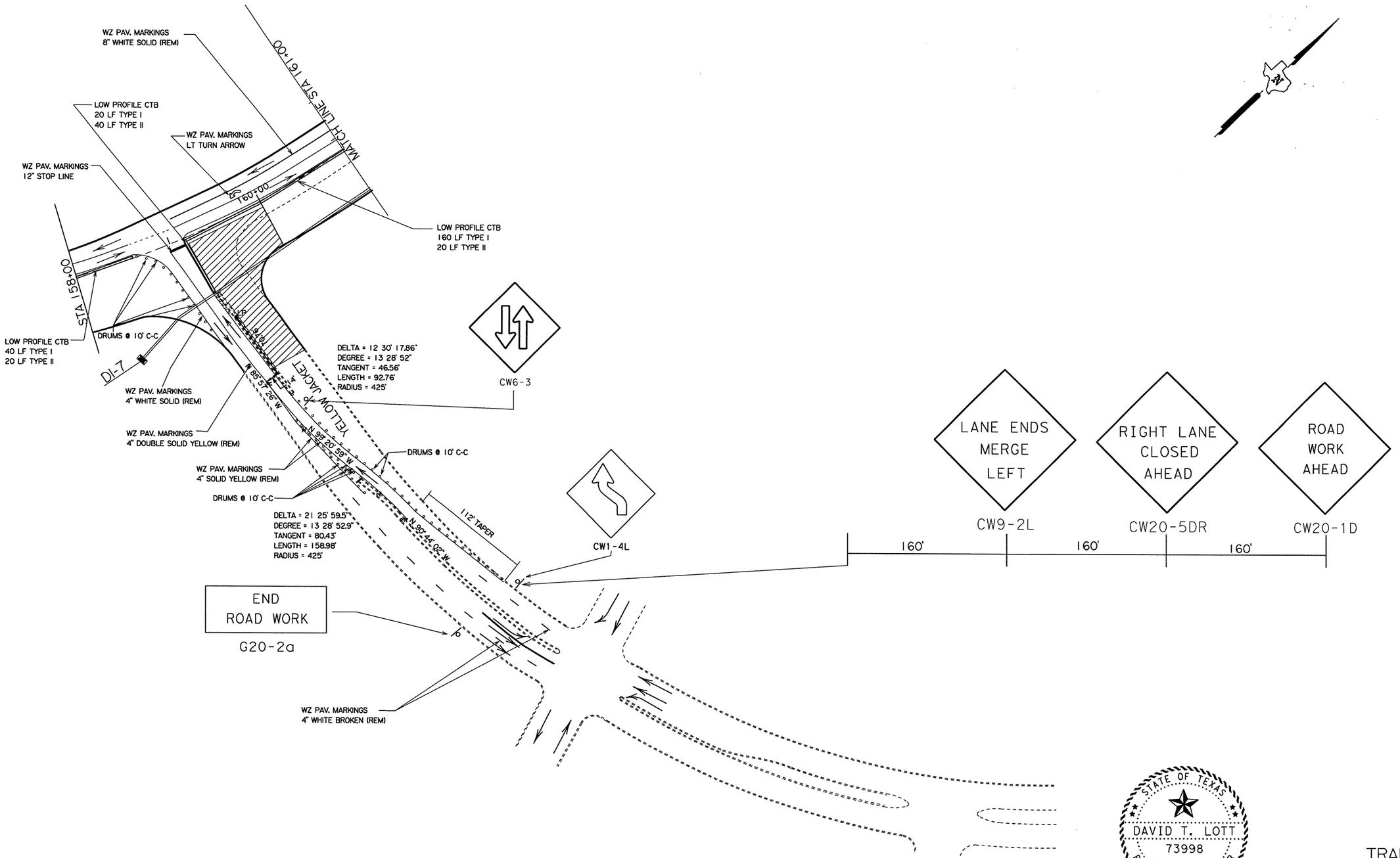
SHEET 5A OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		45
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

USERNAME: EXT 4409
FILE: TCP2B.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE II

LEVELS DISPLAYED

1	2	3	5		
19	20	22	23		
40					
41	42	43			
49	50				
57	59	60	61		



CONCRETE PAVEMENT CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

SCALE 1"=100'

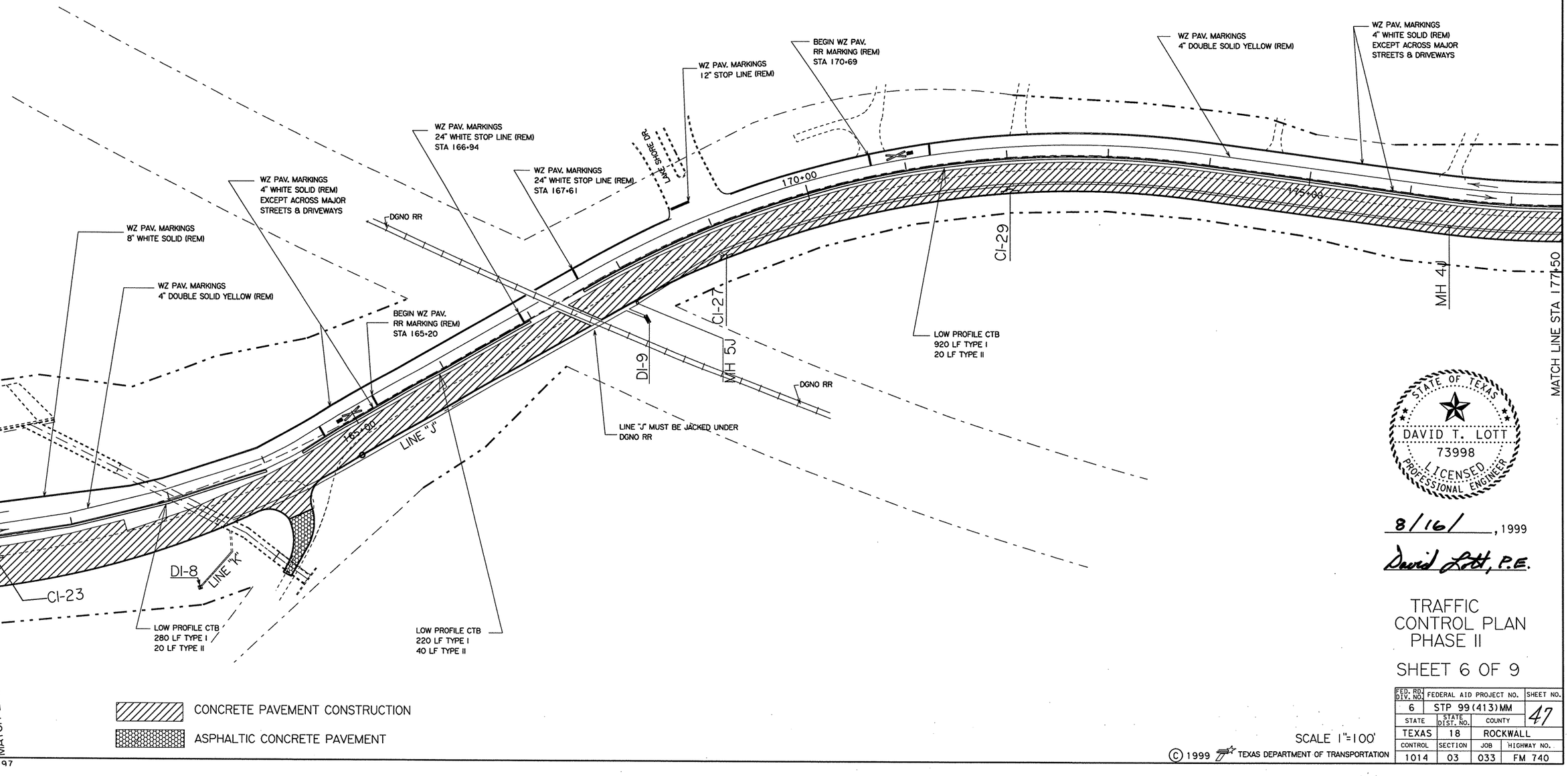
TRAFFIC CONTROL PLAN PHASE II

SHEET 5B OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		46
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

USERNAME: EXT 4409
FILE: TCP2B.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE II

LEVELS DISPLAYED
1 2 3 5
19 20 22 23 40
41 42 43
49 50
57 59 60 61



USERNAME: EXT 4409
FILE: TCP3B.DGN
DATE: 12-13-97
LEVELS: TCP PHASE II
VIEW:

12-13-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

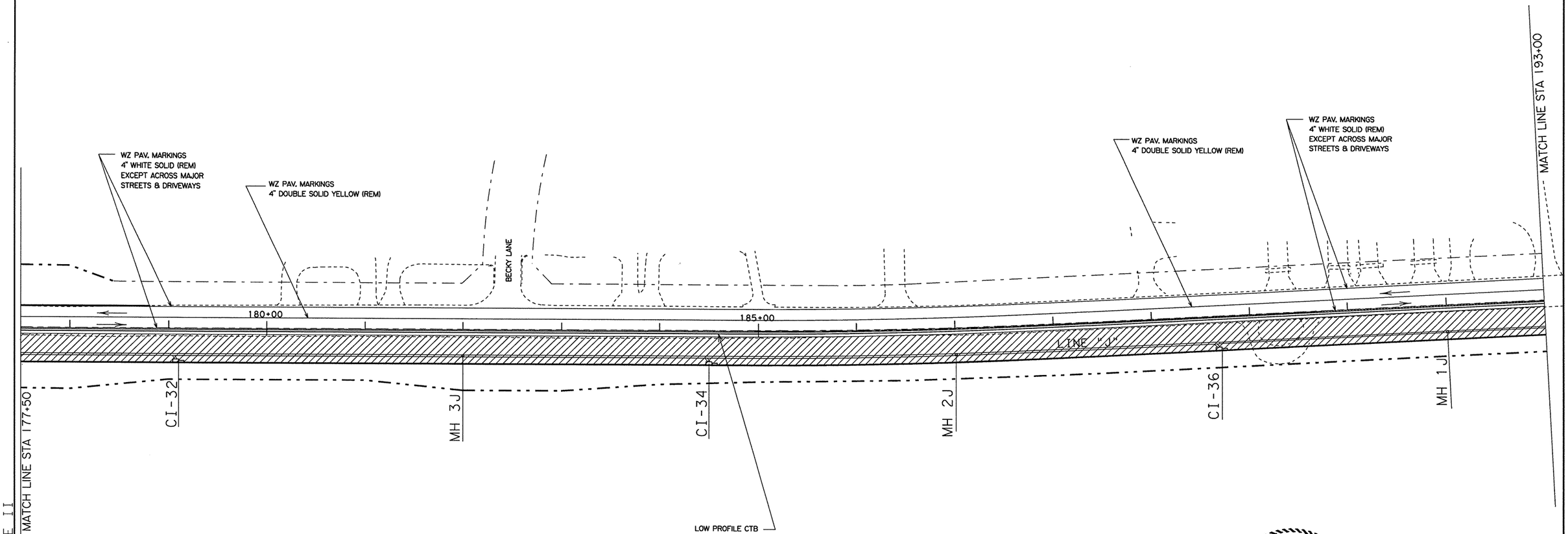
David Lott, P.E.

TRAFFIC CONTROL PLAN PHASE II

SHEET 6 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			47
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

SCALE 1"=100'



CONCRETE PAVEMENT CONSTRUCTION

SERNAME: EXT 4409
FILE: TCP3B.DGN
DATE: 12-13-97
LEVELS: TCP PHASE II
VIEW:

LEVELS DISPLAYED

12-13-97

STATE OF TEXAS
DAVID T. LOTT
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8/16/, 1999

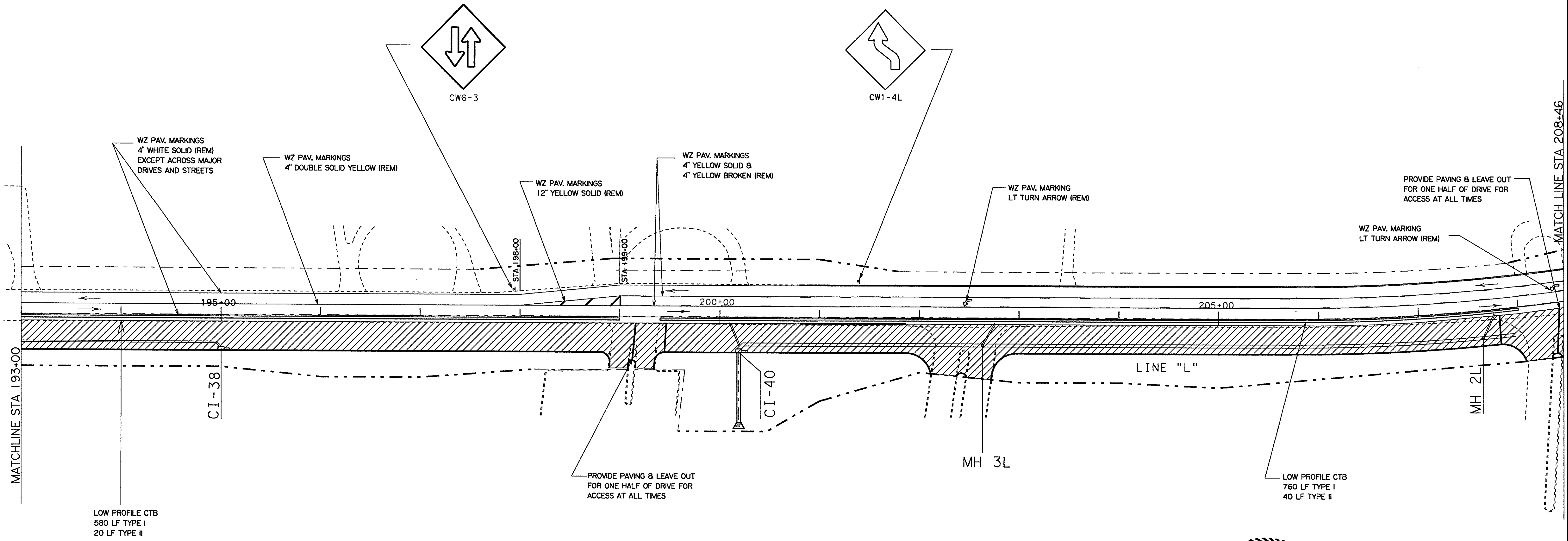
David Lott, P.E.

TRAFFIC CONTROL PLAN PHASE II

SHEET 7 OF 9

SCALE 1"=100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		48
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



USERNAME: EXT 4409
FILE: TCP4B.DGN
DATE: 12-15-97
LEVELS:
VIEW: TCP PHASE II

CONCRETE PAVEMENT CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

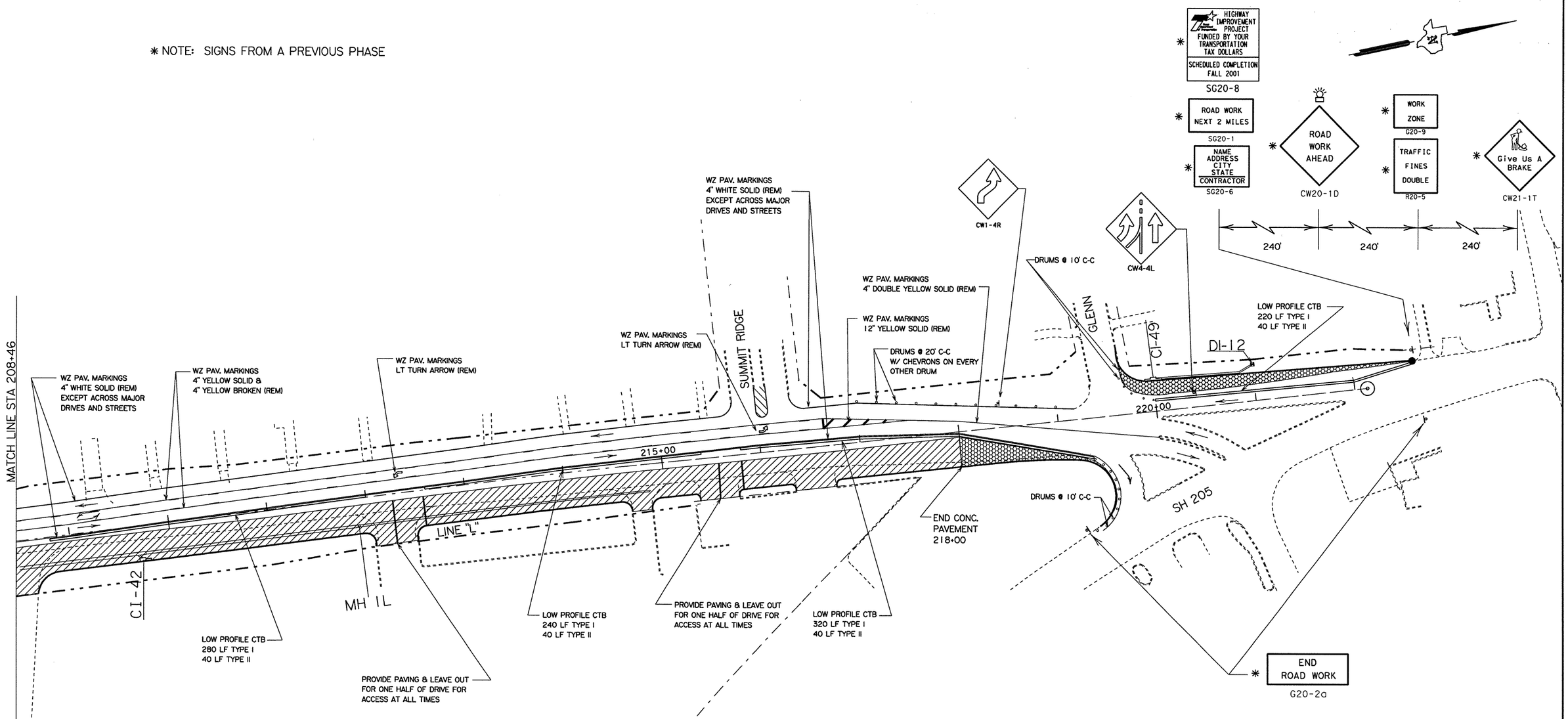
TRAFFIC CONTROL PLAN PHASE II

SHEET 8 OF 9

SCALE 1"=100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			49
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

* NOTE: SIGNS FROM A PREVIOUS PHASE



TYPE "A" WARNING LIGHT

CONCRETE PAVEMENT CONSTRUCTION

ASPHALTIC CONCRETE PAVEMENT CONSTRUCTION

USERNAME: EXT 4409
FILE: TCP4B.DGN
DATE: 12-15-97
LEVELS: TCP PHASE II
VIEW:

LEVELS DISPLAYED

12-15-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

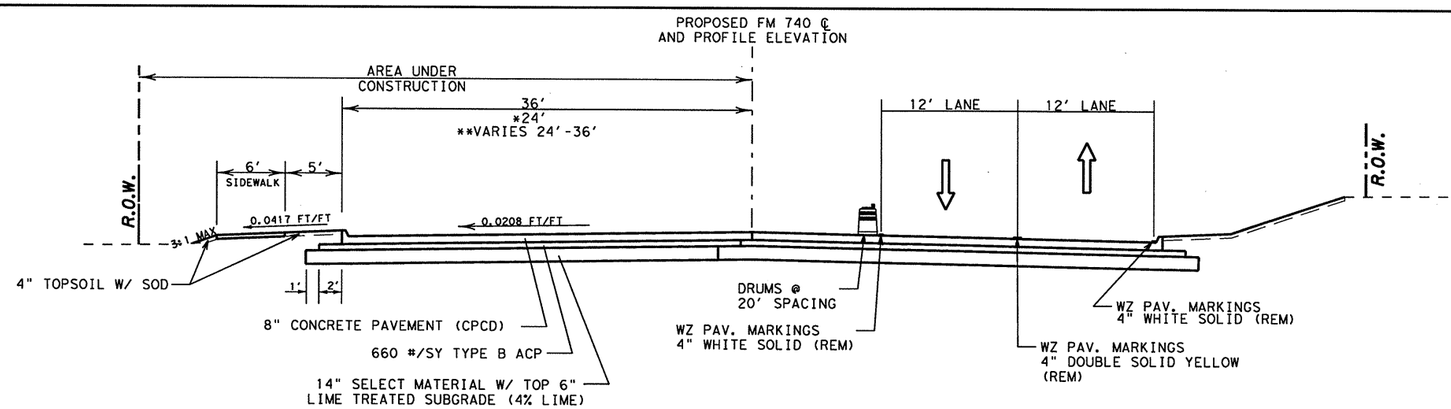
David Lott, P.E.

TRAFFIC CONTROL PLAN PHASE II

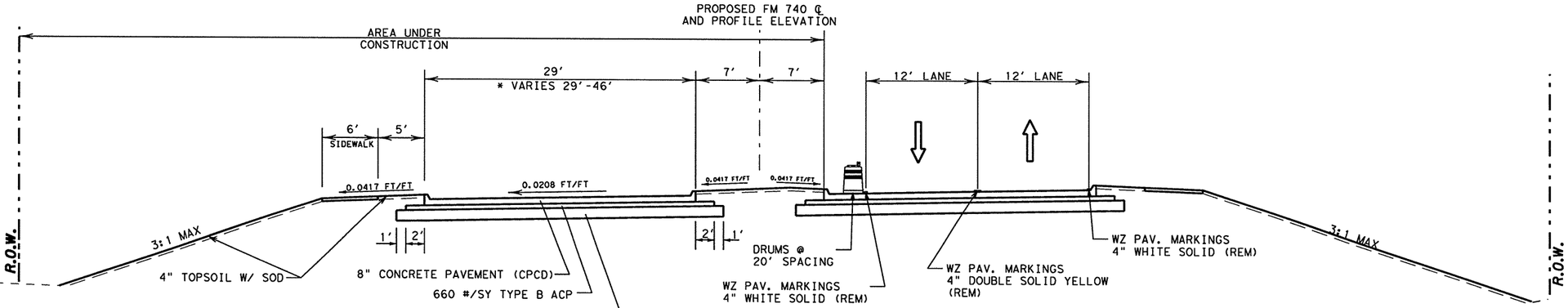
SHEET 9 OF 9

SCALE 1"=100'

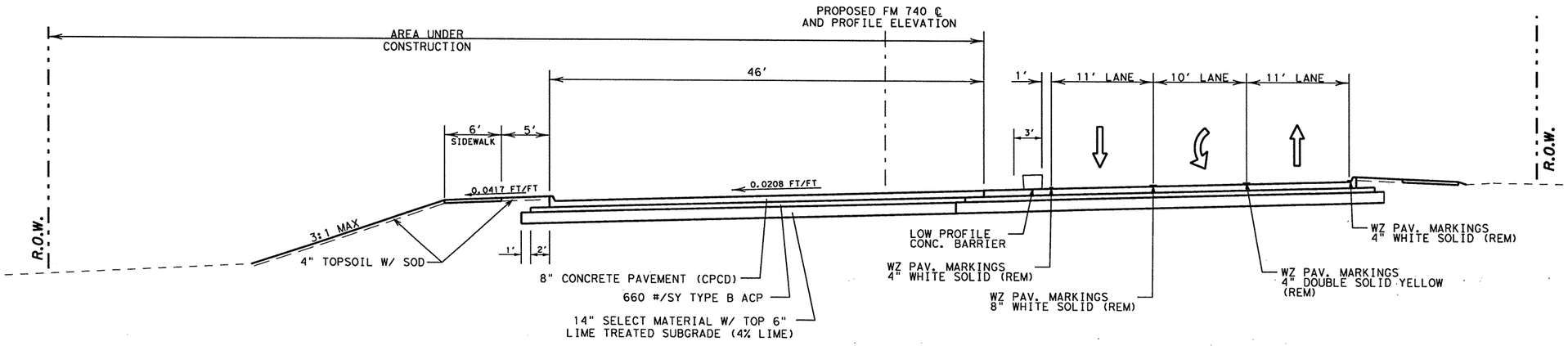
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			50
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



*STA 128+84 TO STA 129+28
**STA 129+84 TO STA 130+36
STA 130+36 TO STA 139+00



STA 139+00 TO STA 156+00
*STA 156+00 TO STA 158+31
STA 162+53 TO STA 218+00



STA 158+31 TO STA 162+53

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

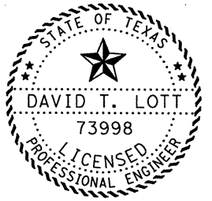
PHASE IIIA
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 8

NTS

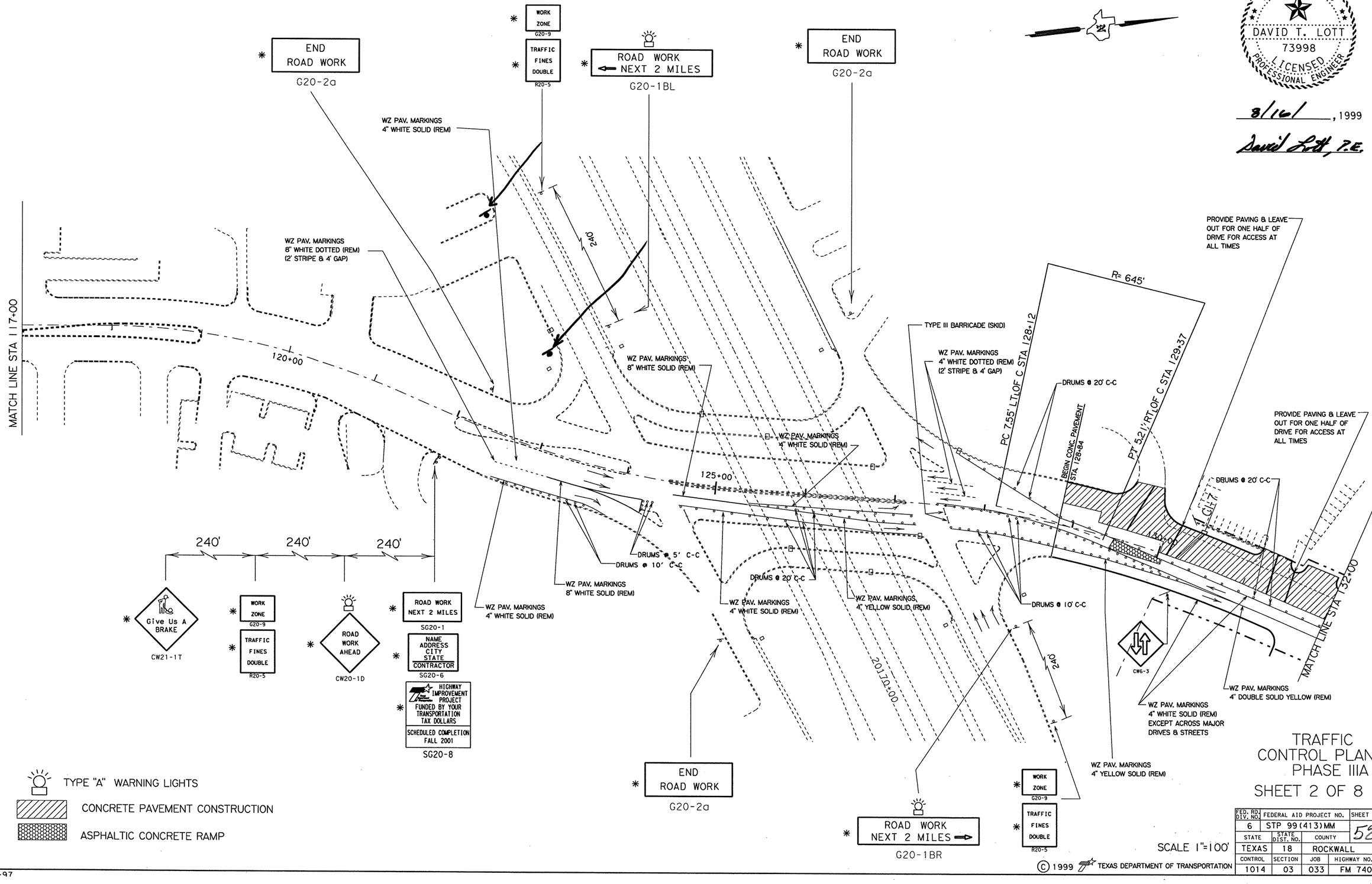
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		5/
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

* NOTE: SIGNS FROM A PREVIOUS PHASE



8/16/, 1999

David Lott, P.E.

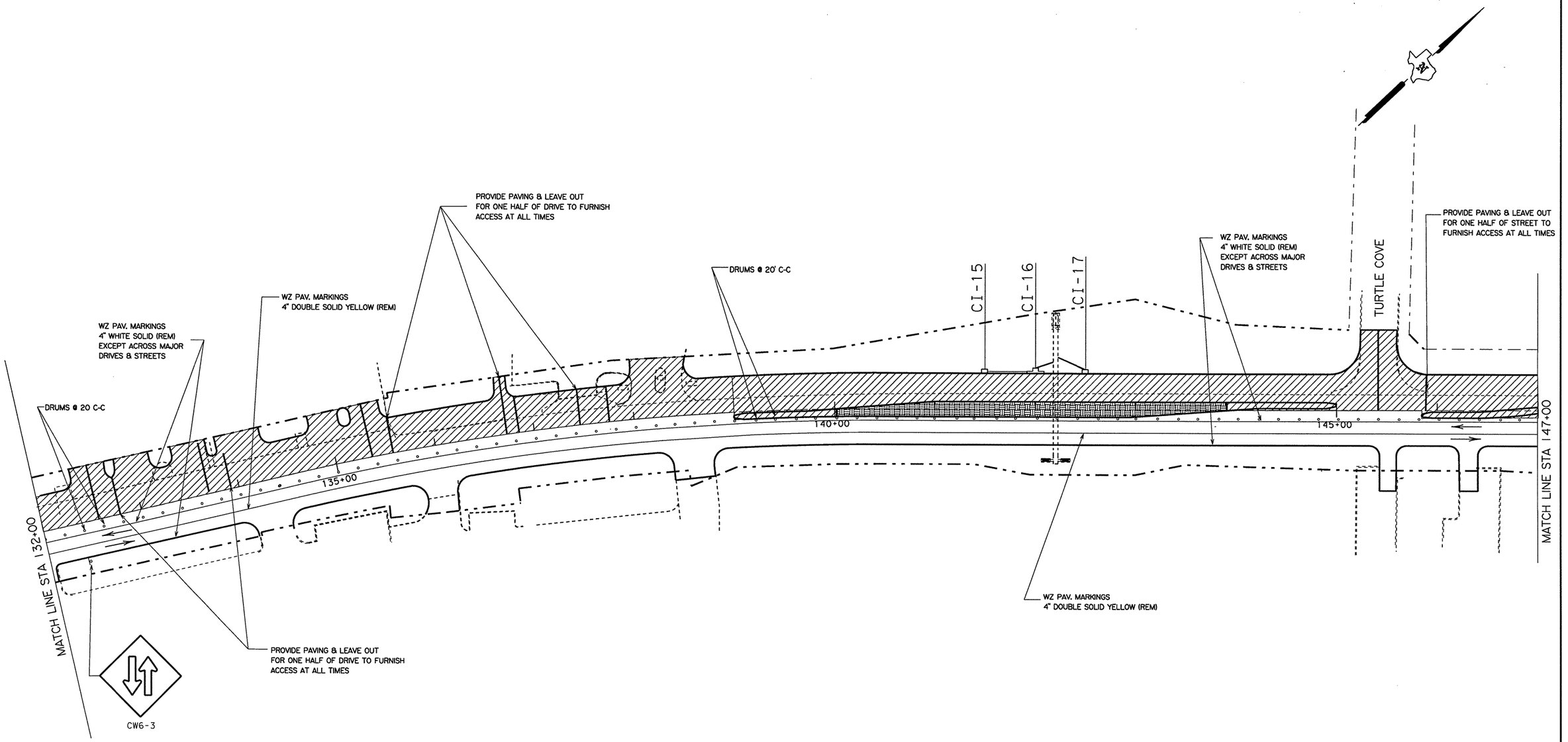


TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 2 OF 8

SCALE 1"=100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		52
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



CONCRETE PAVEMENT CONSTRUCTION

MEDIAN CONSTRUCTION

USERNAME: EXT 4409
FILE: TCP2C.DGN
DATE: 12-13-97
LEVELS: TCP PHASE IIIA
VIEW:

LEVELS DISPLAYED

1	2	3					10		
			20	22	23				
						40			
				41	42	43			
				49					
57			59	60	61	62			

12-13-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

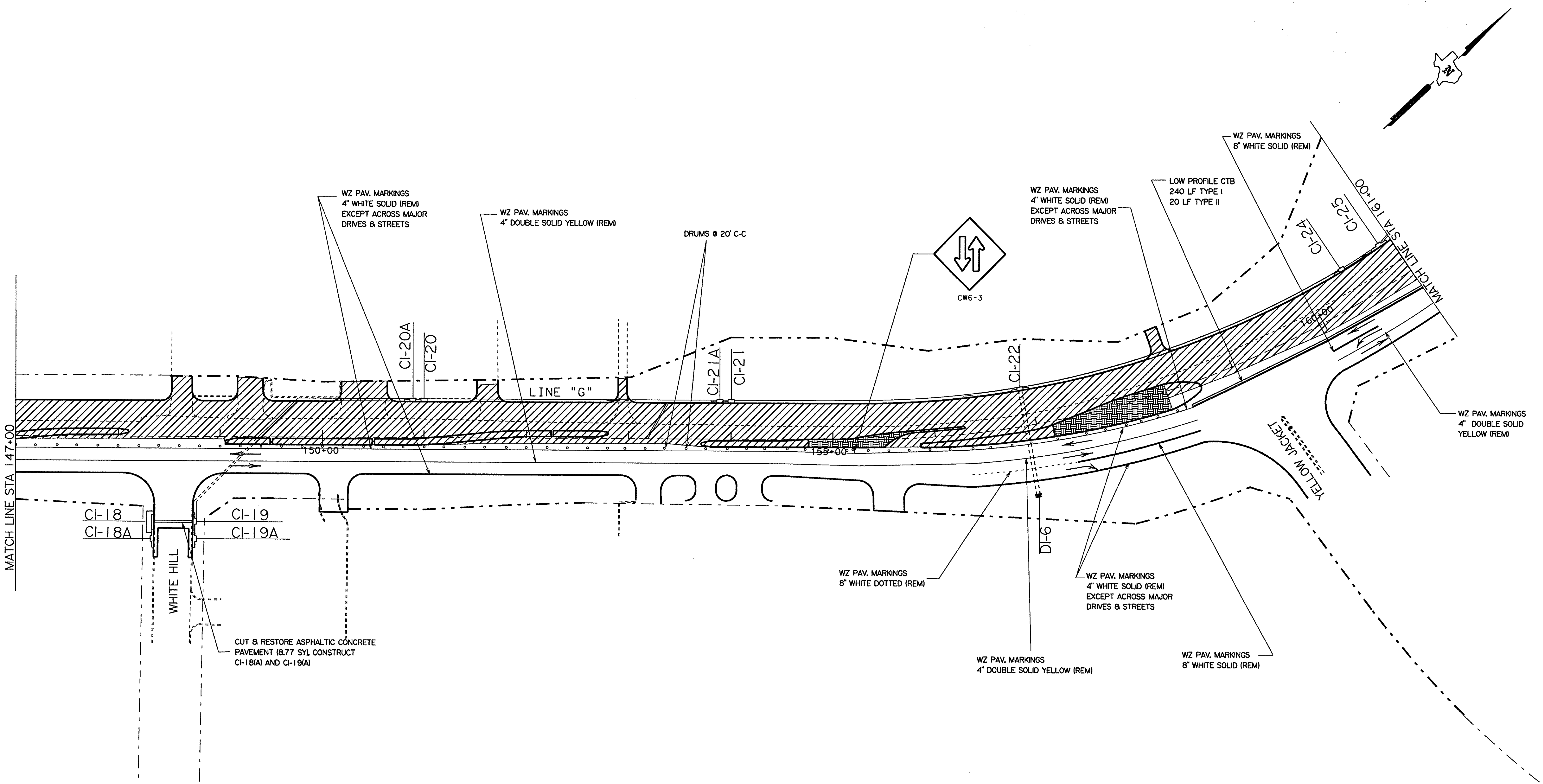
David Lott, P.E.

SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 3 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			53
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



USERNAME: EXT 4409
FILE: TCP2C.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE IIIA

CONCRETE PAVEMENT CONSTRUCTION

MEDIAN CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

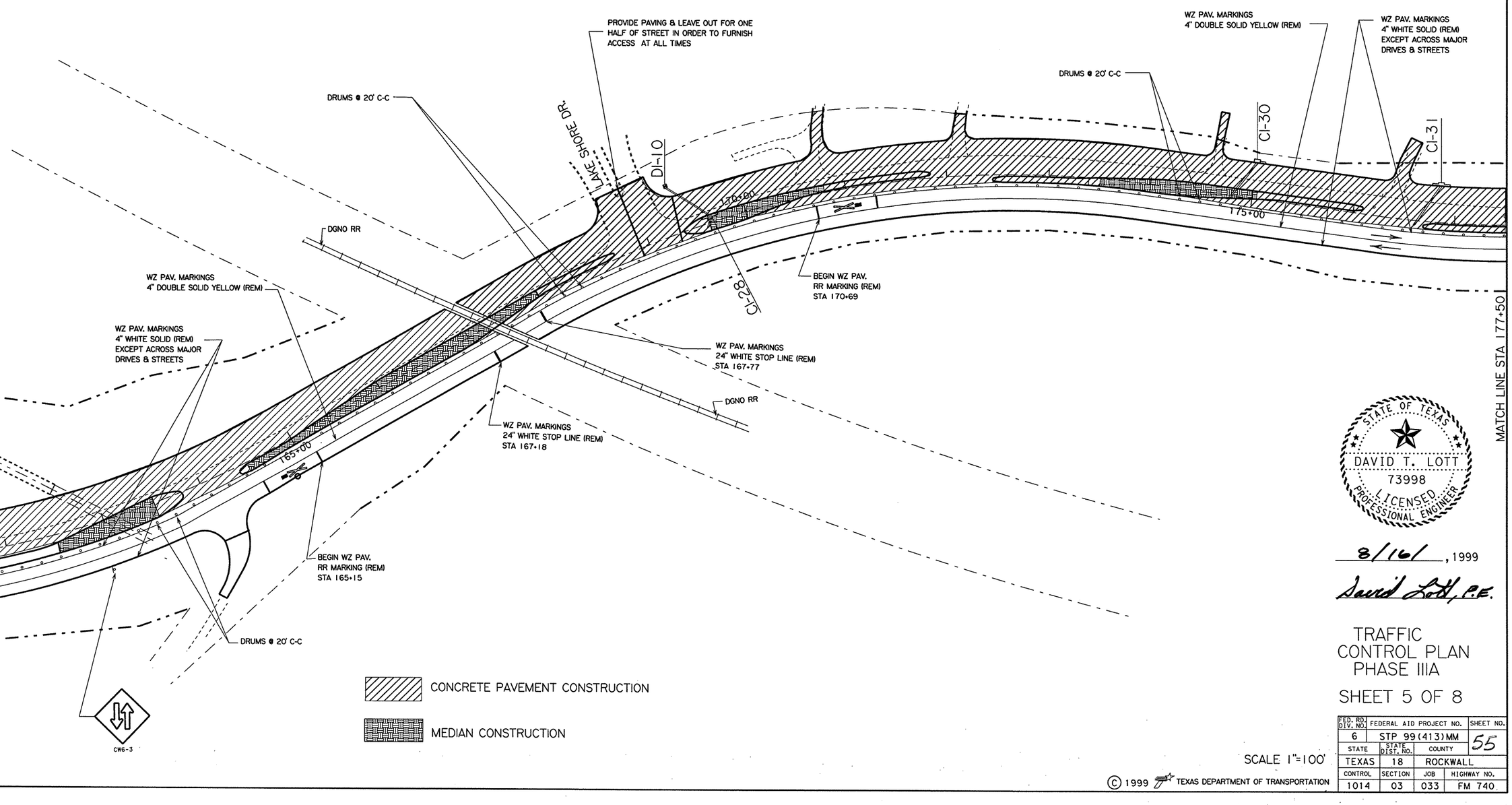
SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 4 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			54
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

12-13-97



USERNAME: EXT 4409
FILE: TCP3C.DGN
DATE: 12-13-97
VIEW: TCP PHASE IIIA

12-13-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

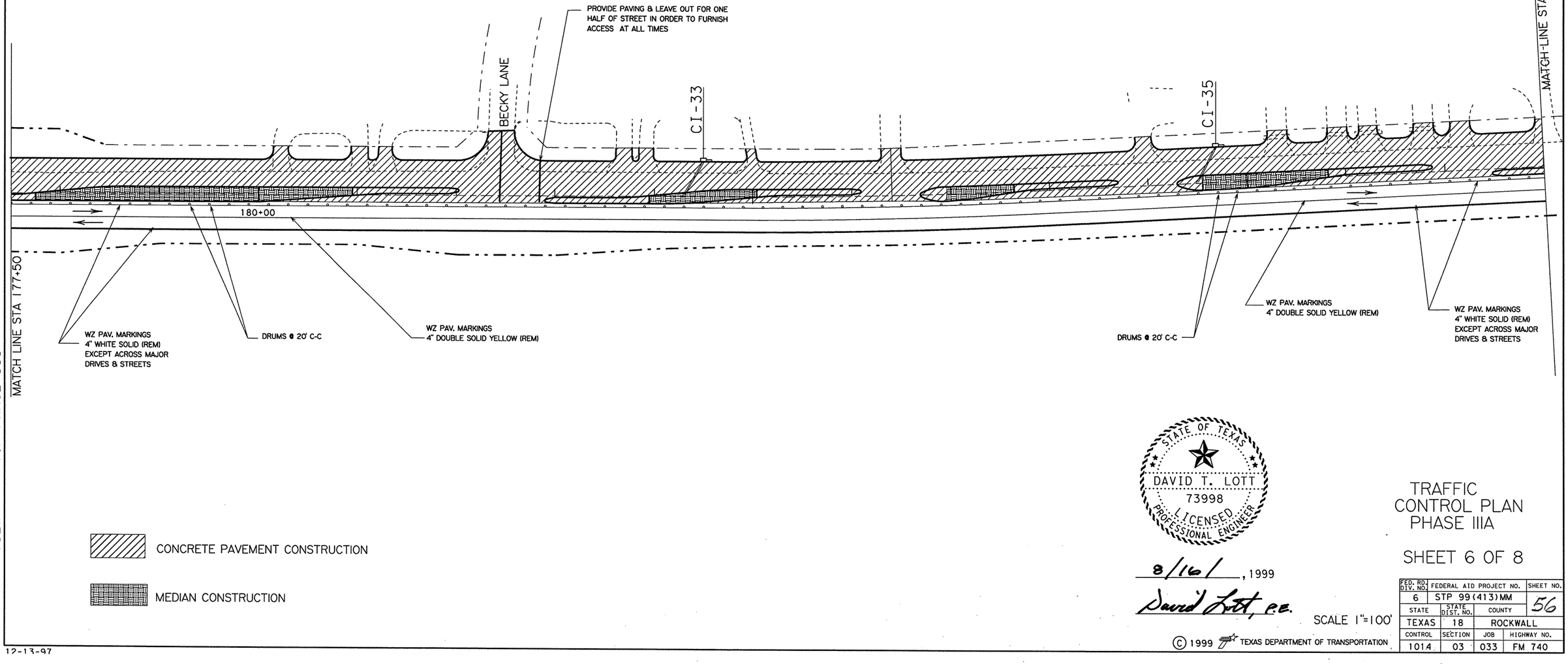
TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 5 OF 8

SCALE 1"=100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		55
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

d:\engdata\fm740\tcp3c.dgn



USERNAME: EXT 4409
FILE: TCP3C.DGN
DATE: 12-13-97
LEVELS:
VIEW: TCP PHASE III

CONCRETE PAVEMENT CONSTRUCTION

MEDIAN CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

SCALE 1"=100'

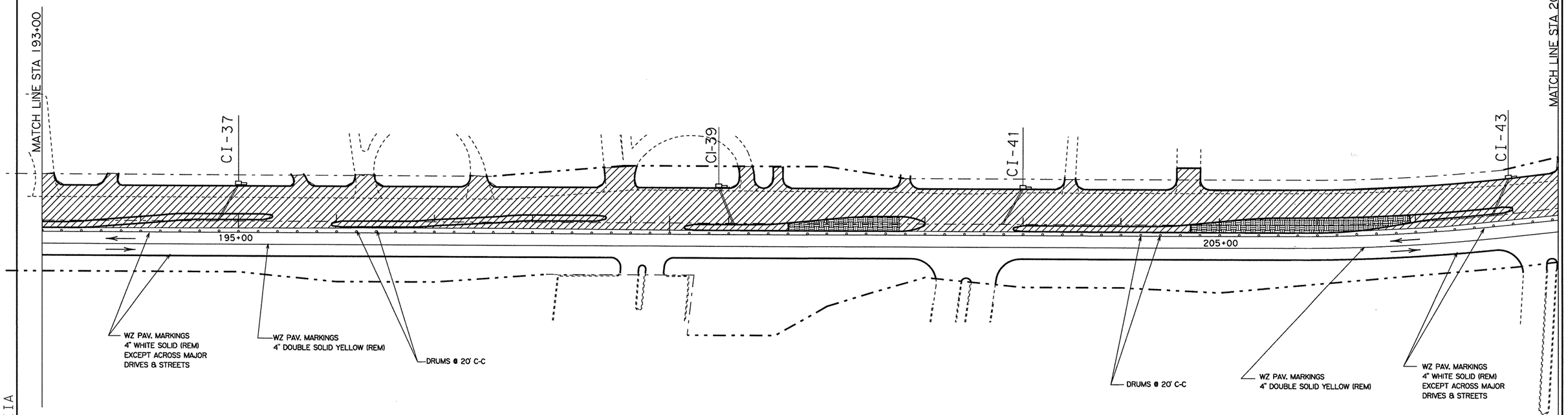
TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 6 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		56
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

12-13-97

d:\engdata\ftw\740\tcp4c.dgn



CONCRETE PAVEMENT CONSTRUCTION

MEDIAN CONSTRUCTION

USERNAME: EXT 4409
FILE: TCP4C.DGN
DATE: 12-15-97
LEVELS:
VIEW: TCP PHASE IIIA

12-15-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

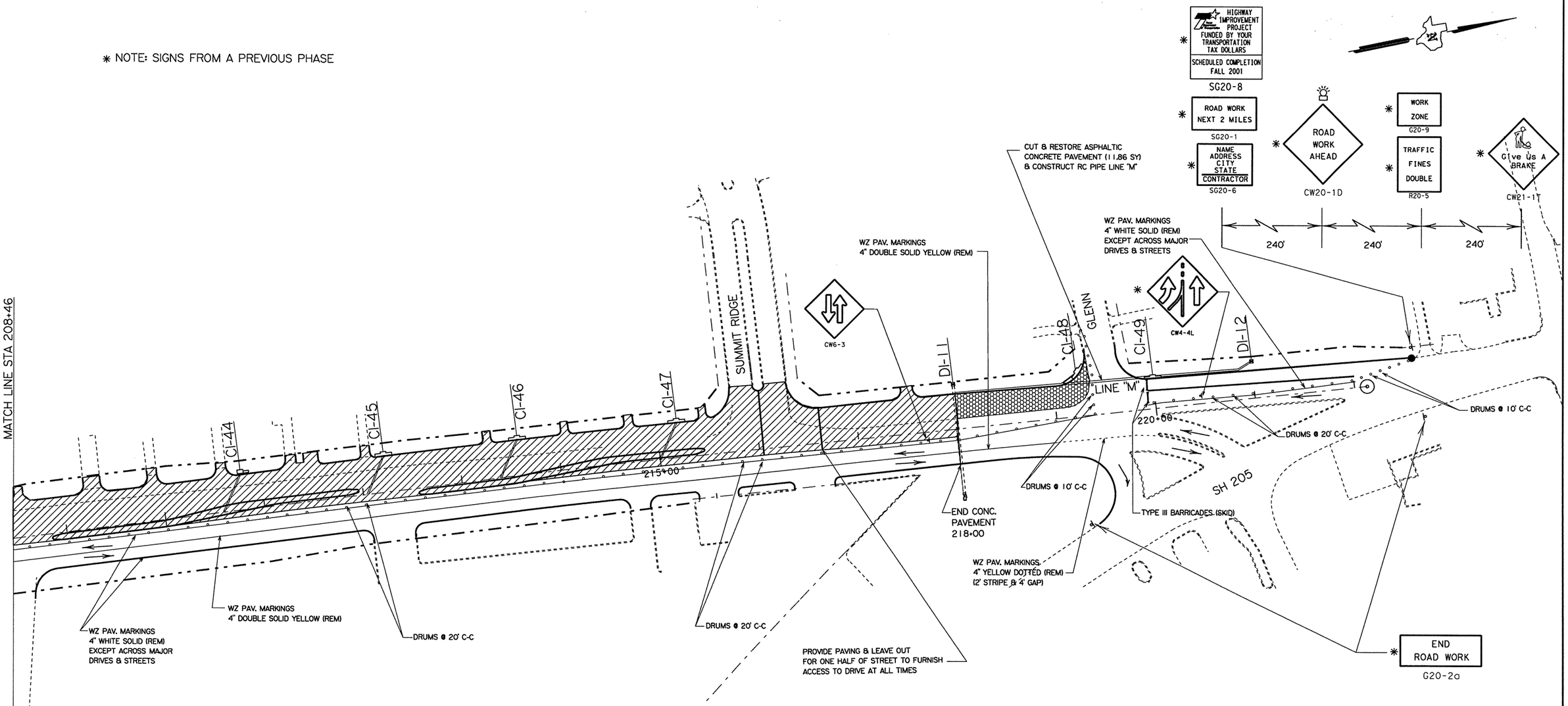
SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIA

SHEET 7 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		57
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

* NOTE: SIGNS FROM A PREVIOUS PHASE



TYPE "A" WARNING LIGHT

CONCRETE PAVEMENT CONSTRUCTION

ASPHALT CONCRETE CONSTRUCTION

USERNAME: EXT 4409
FILE: TCP4C.DGN
DATE: 12-15-97
LEVELS:
VIEW: TCP PHASE IIIA

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

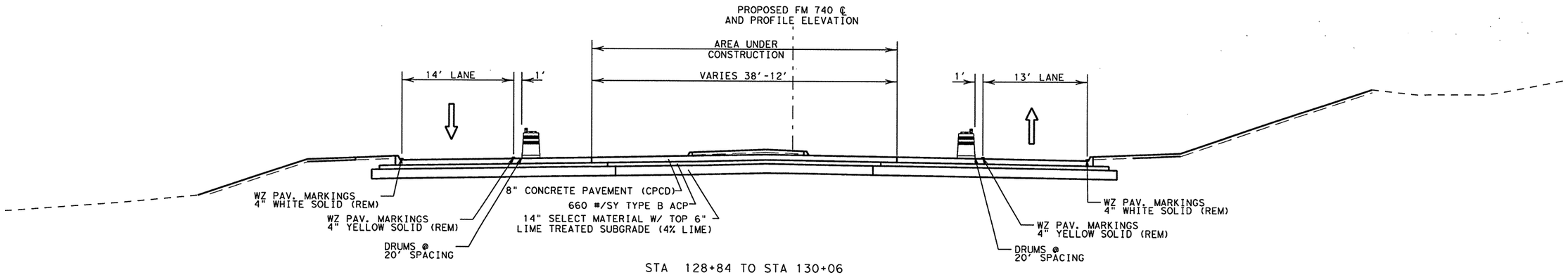
SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIA

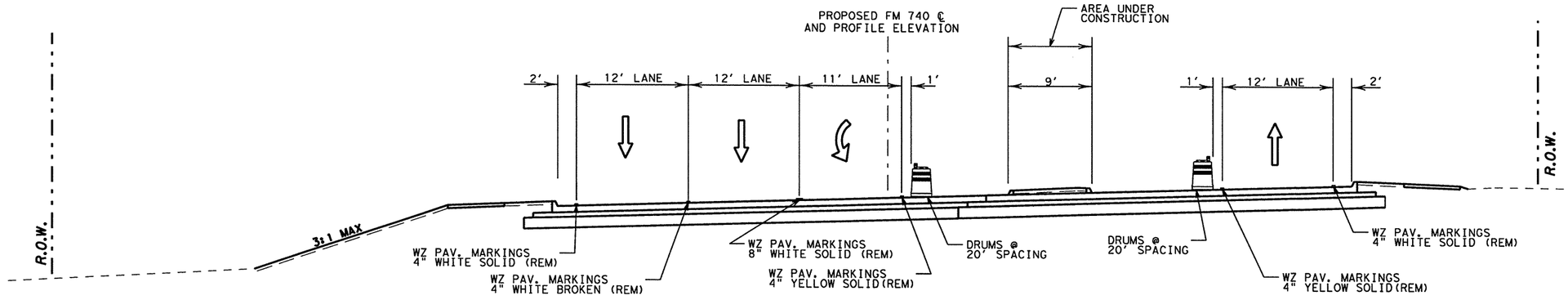
SHEET 8 OF 8

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		58
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

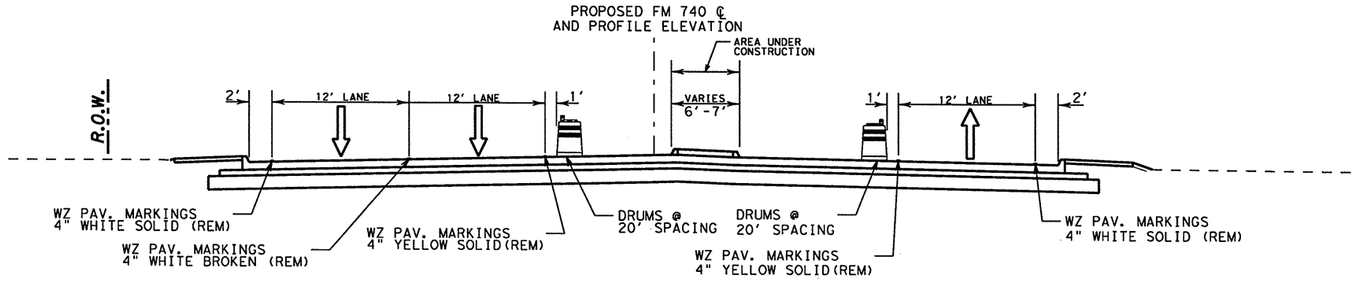
12-15-97



STA 128+84 TO STA 130+06



STA 159+75 TO STA 161+14



STA 216+80 TO STA 218+00

STATE OF TEXAS
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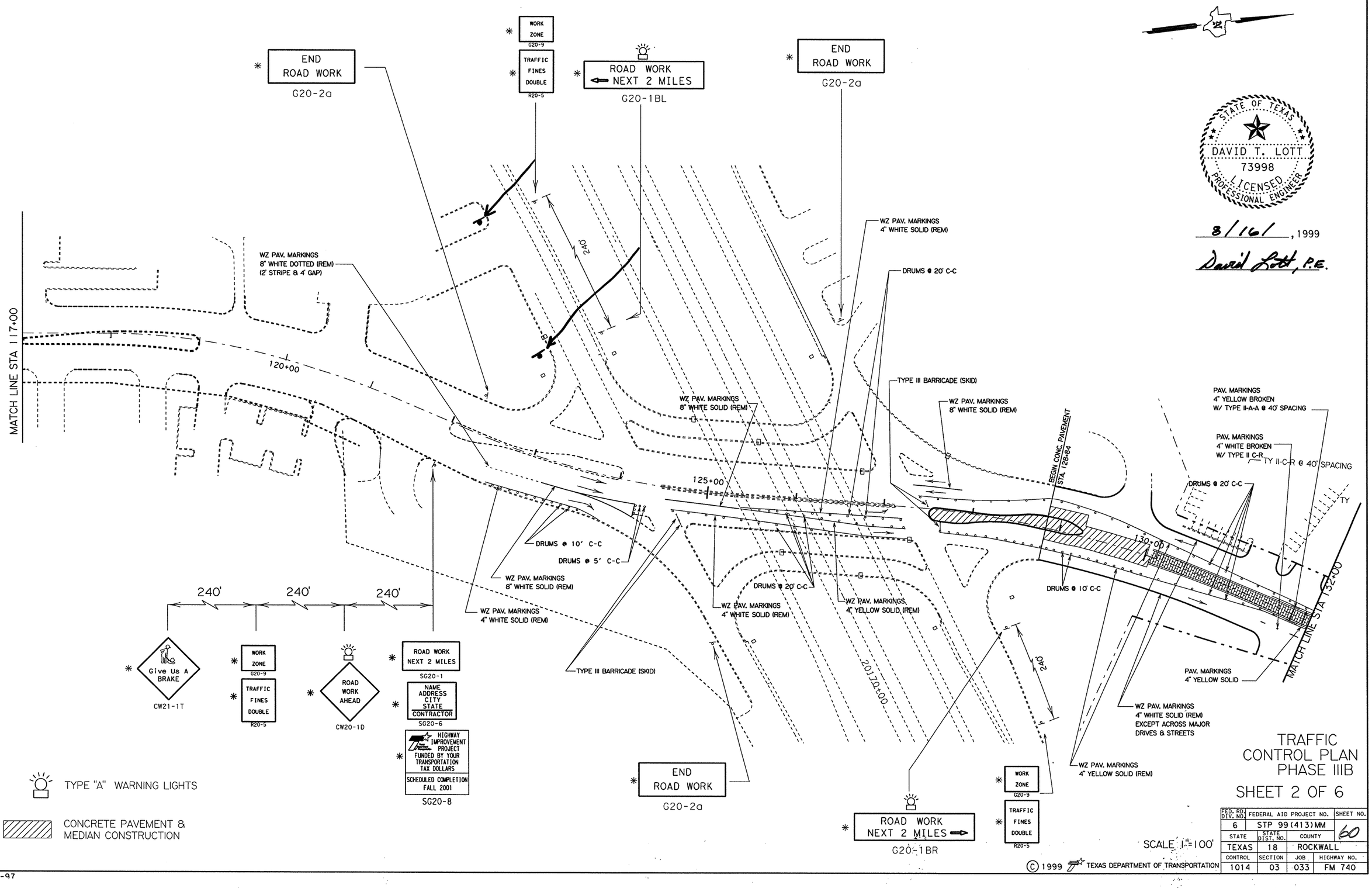
PHASE IIIB
TRAFFIC CONTROL PLAN
TYPICAL SECTIONS

SHEET 1 OF 6

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		59
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

NTS



STATE OF TEXAS
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8/16/, 1999

David Lott, P.E.

USERNAME: EXT 4409
FILE: TCP1D.DGN
DATE: 12-8-97
LEVELS: TCP PHASE IV
VIEW:

LEVELS DISPLAYED

1	2	4	5	6	7				
17		19	20	21	22			40	
33		34				45		47	
49		50	51			55		60	
51									

12-08-97

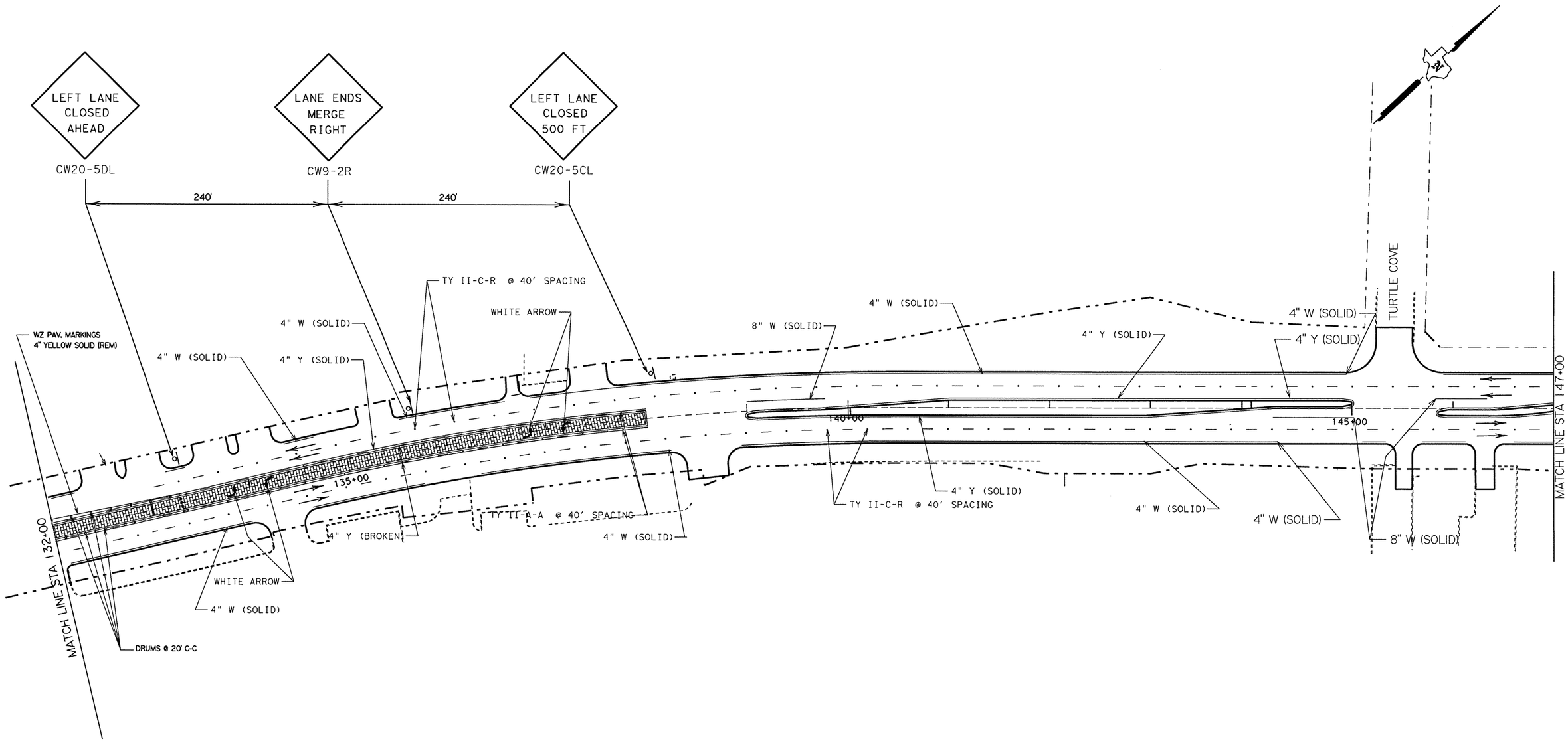
TRAFFIC CONTROL PLAN PHASE IIIB

SHEET 2 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		60
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

SCALE 1"=100'

d: \engdata\fm740\tcp2d.dgn



USERNAME: EXT 4409
FILE: TCP2D.DGN
DATE: 12-09-97
LEVELS:
VIEW: TCP PHASE IV

LEVELS DISPLAYED
1 2 3 20 222 49 50 60 61 62

12-09-97

STATE OF TEXAS
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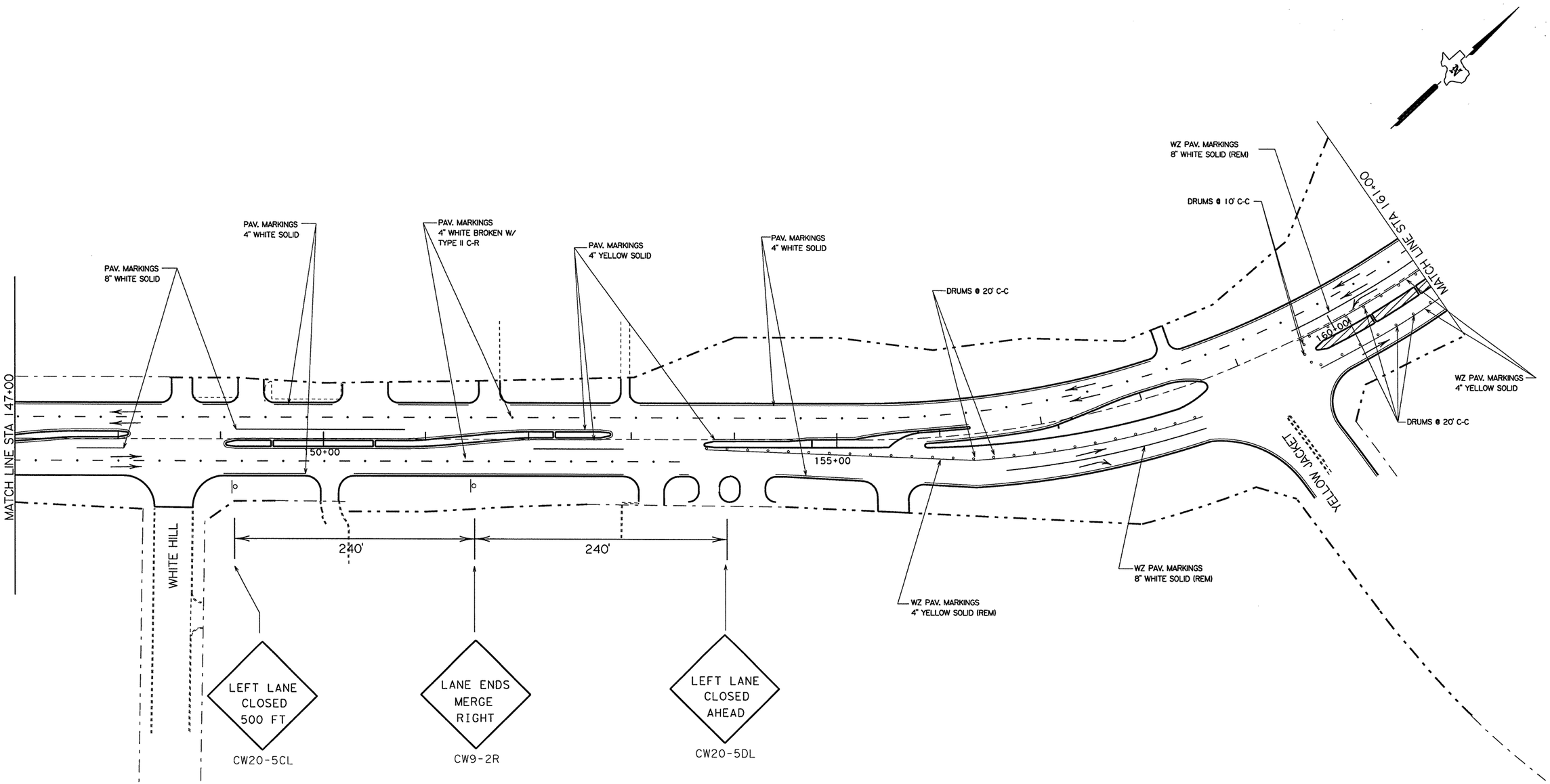
David Lott, P.E.

SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIB

SHEET 3 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			61
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



CONCRETE MEDIAN CONSTRUCTION

USERNAME: EXT 4409
FILE: TCP2D.DGN
DATE: 12-09-97
LEVELS: TCP PHASE IV
VIEW:

LEVELS DISPLAYED
1 2 3 20 22 23 49 50 60 61 62

12-09-97

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

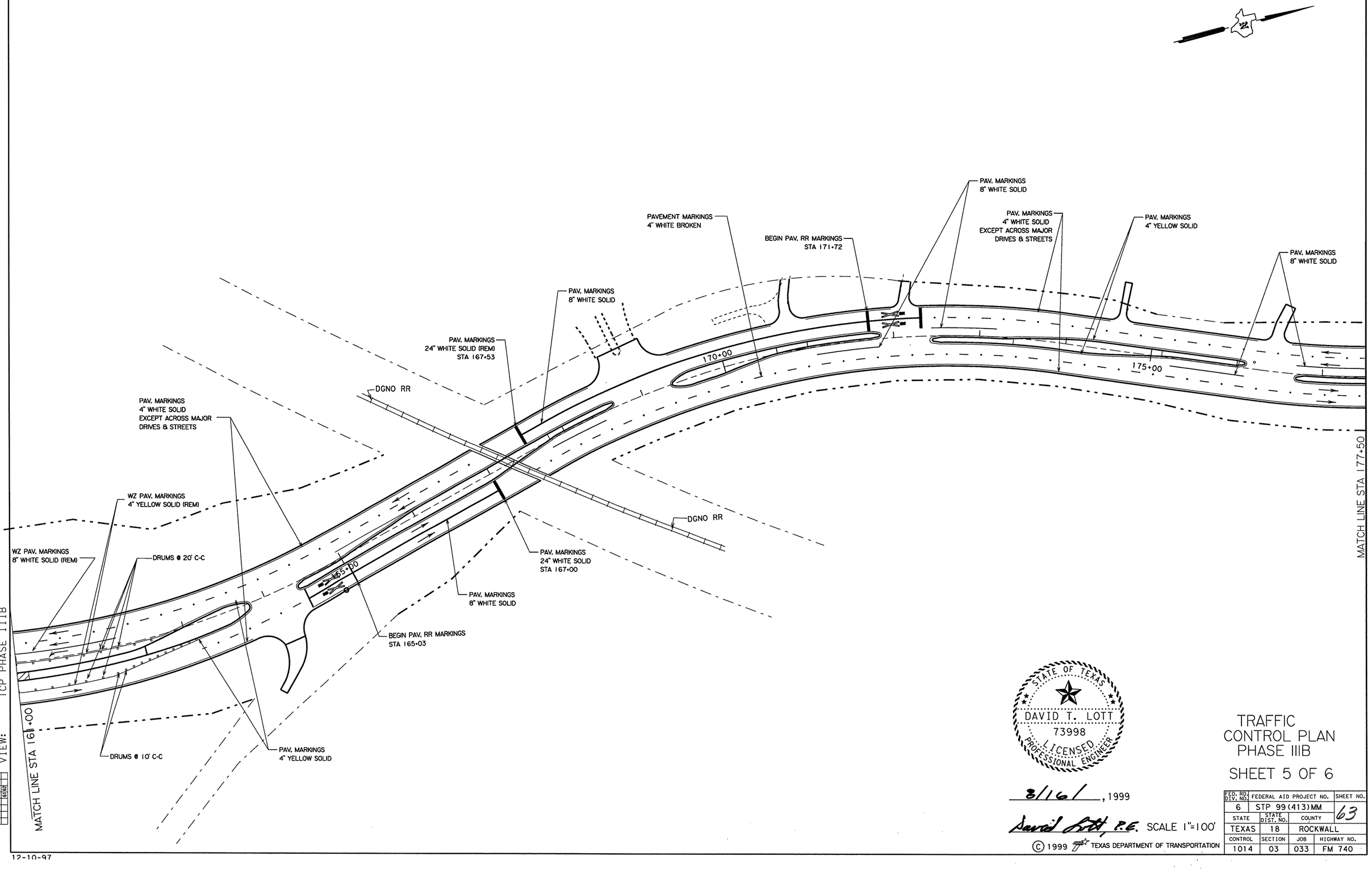
David Lott, P.E.

SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIB

SHEET 4 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		62
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



USERNAME: EXT 4409
FILE: TCP3D.DGN
DATE: 12-10-97
LEVELS:
VIEW: TCP PHASE IIIB

LEVELS DISPLAY

1	2	3						
10			20	22			40	
			27				47	
					41	42	43	45
					49	50		61

12-10-97

STATE OF TEXAS
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PROFESSIONAL ENGINEER

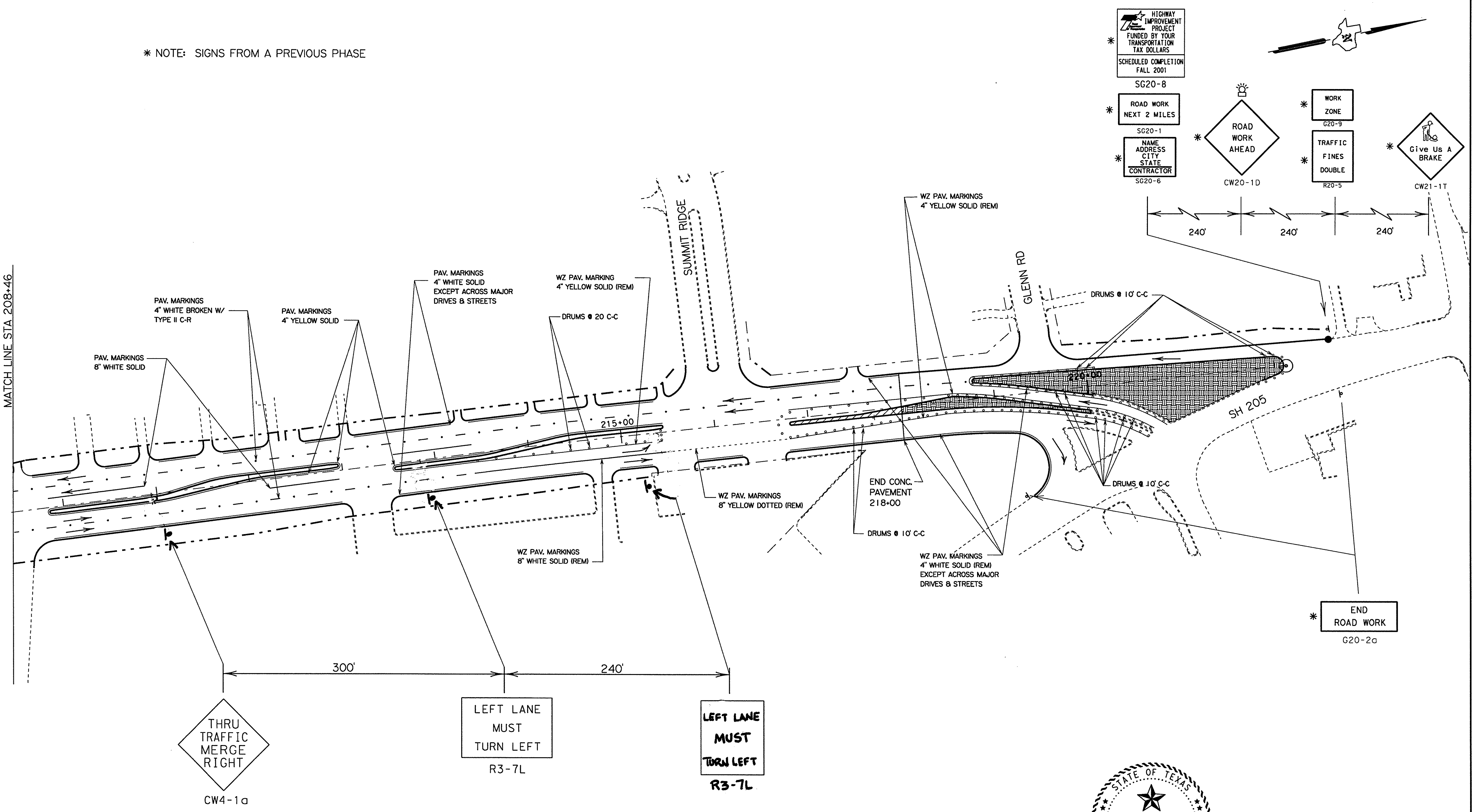
8/16/, 1999

David Lott, P.E. SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIB

SHEET 5 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			63
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



FILENAME: EXT 4409
FILE: TCP4D.DGN
DATE: 12-12-97
LEVELS:
VIEW: TCP PHASE IV

TYPE "A" WARNING LIGHT

CONCRETE CONSTRUCTION

MEDIAN CONSTRUCTION

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

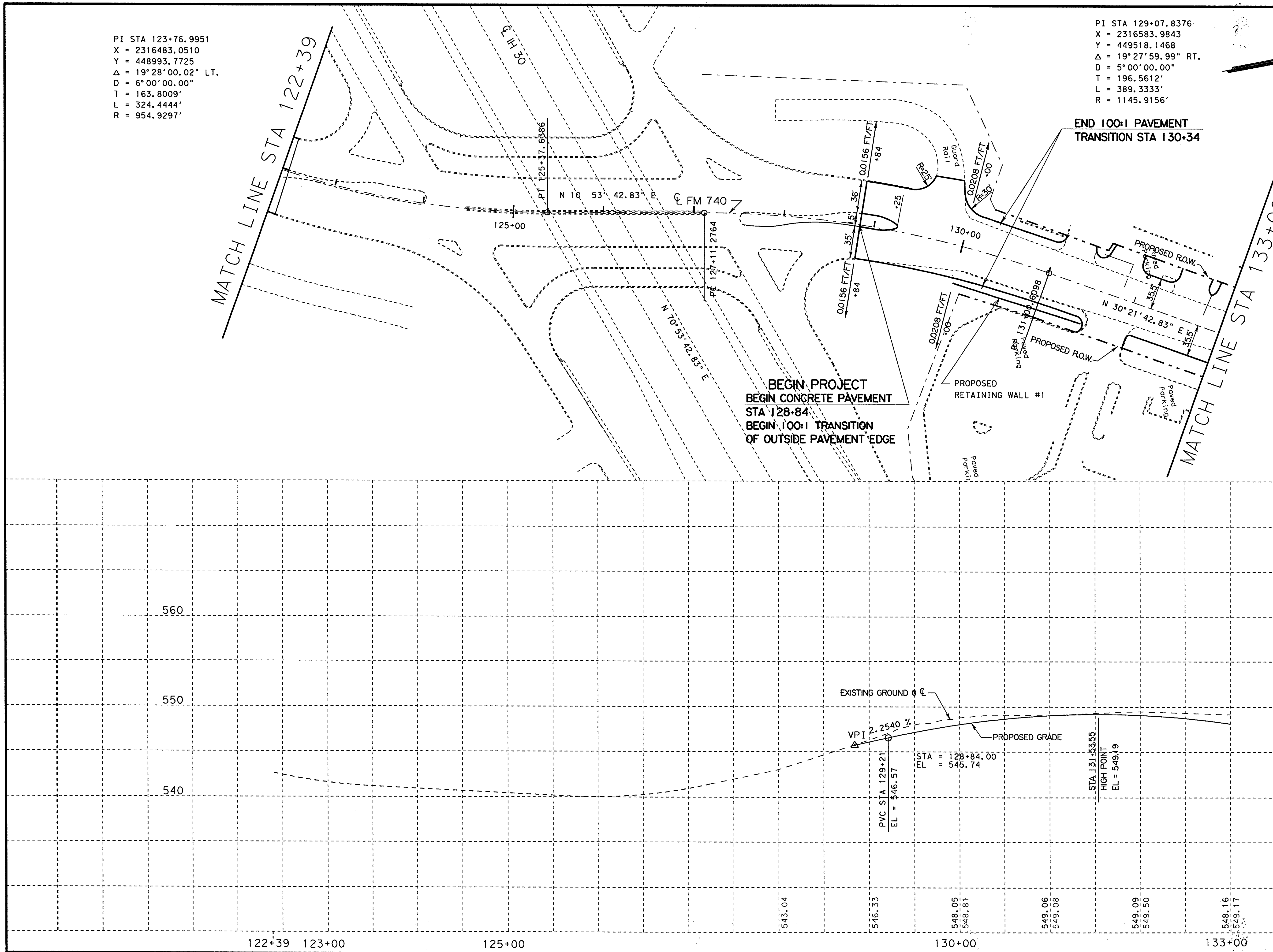
SCALE 1"=100'

TRAFFIC CONTROL PLAN PHASE IIIB

SHEET 6 OF 6

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		64
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

12-12-97



PI STA 123+76.9951
X = 2316483.0510
Y = 448993.7725
Δ = 19°28'00.02" LT.
D = 6°00'00.00"
T = 163.8009'
L = 324.4444'
R = 954.9297'
MATCH LINE STA 122+39
℄ IH 30
PT 125+37.6586
N 10° 53' 42.83" E
℄ FM 740
125+00
PC 127+11.2764
N 70°53'42.83" E
BEGIN PROJECT
BEGIN CONCRETE PAVEMENT
STA 128+84
BEGIN 100:1 TRANSITION
OF OUTSIDE PAVEMENT EDGE
0.0156 FT/FT +84
0.0208 FT/FT +00
Guard Rail
R25
R30
END 100:1 PAVEMENT
TRANSITION STA 130+34
130+00
PROPOSED R.O.W.
N 30°21'42.83" E
Paved Parking
PROPOSED RETAINING WALL #1
PI STA 129+07.8376
X = 2316583.9843
Y = 449518.1468
Δ = 19°27'59.99" RT.
D = 5°00'00.00"
T = 196.5612'
L = 389.3333'
R = 1145.9156'
MATCH LINE STA 133+00
NOTE:
MATCH EXISTING
CONCRETE PAVEMENT
STA 128+84
PLAN SCALE: 1"=100'
PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL
560
550
540
EXISTING GROUND @ ℄
VPI
2.2540 %
PROPOSED GRADE
STA = 128+84.00
EL = 545.74
PVC STA 129+21
EL = 546.57
STA 131+53.55
HIGH POINT
EL = 549.19
543.04
546.33
548.05
548.81
549.06
549.08
549.09
549.50
548.16
549.17
122+39
123+00
125+00
130+00
133+00

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/1999

David Lott, P.E.

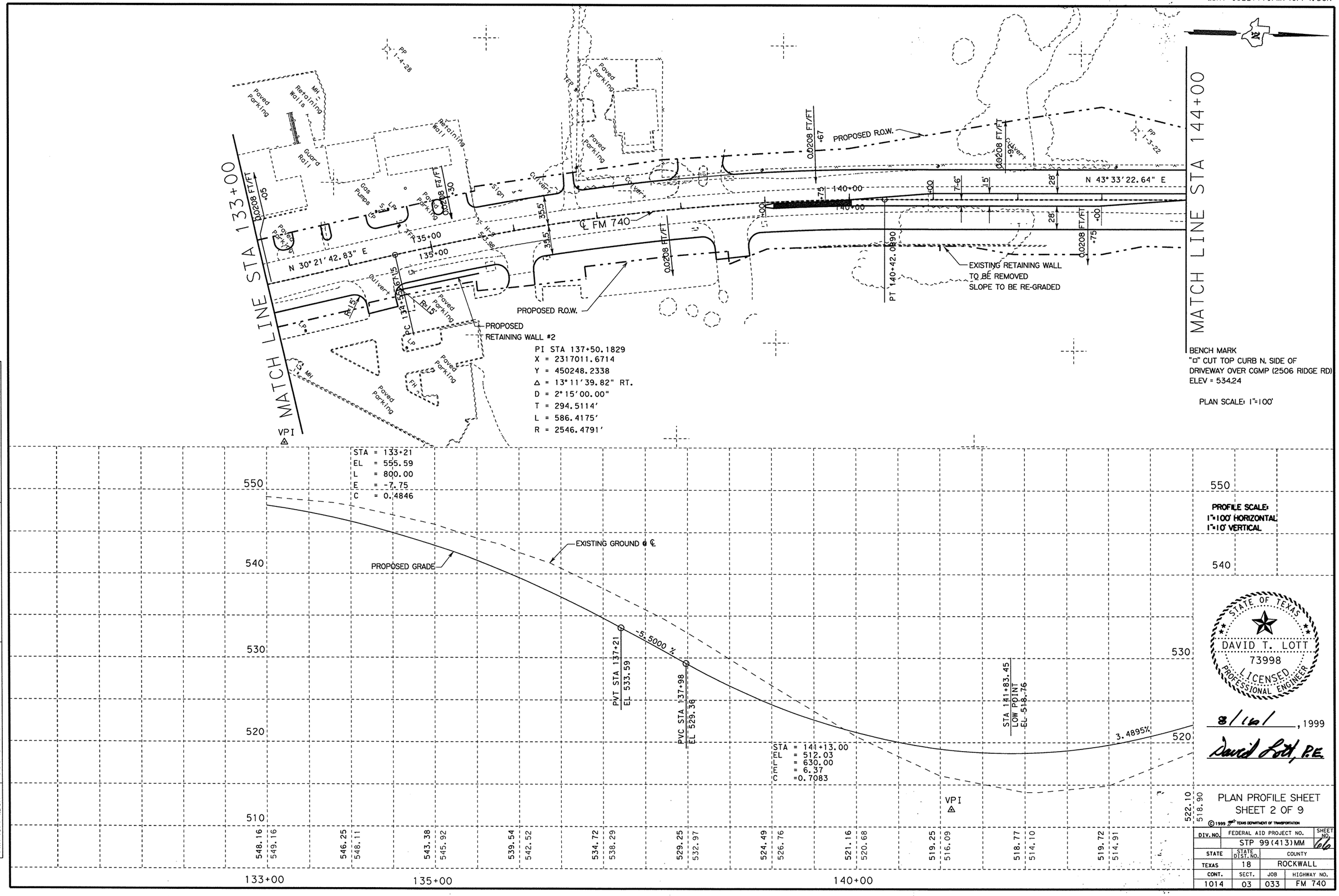
PLAN PROFILE SHEET

SHEET 1 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			65
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE	REMOVALS
FM7[illegible]2.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49	
FM7[illegible]0.DGN	1 - 30, 39 - 49	40	
911DONDGN	20,63	20,63	
911DRADGN	DISPLAY OFF	40	
FM740PP3.DGN	1,2,6,20,23,33,34,47,49	1,6,23,40 - 43,47,49	

$$$$date$$$$



REMOVALS	DRAINAGE
	1,6,20,23,34,40,47,49
	DISPLAY OFF
	1,6,23,40 - 43,47,49

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT
FM740' .DGN	1,6,20,23,33,34,47,49
FM740i .DGN	1 - 30, 39 - 49
DESIGN FILES	1,2,6,20,23,31,33,34,47,49
FM740PP4.DGN	

$$$$date$$$$

STATE OF TEXAS
DAVID T. LOTT
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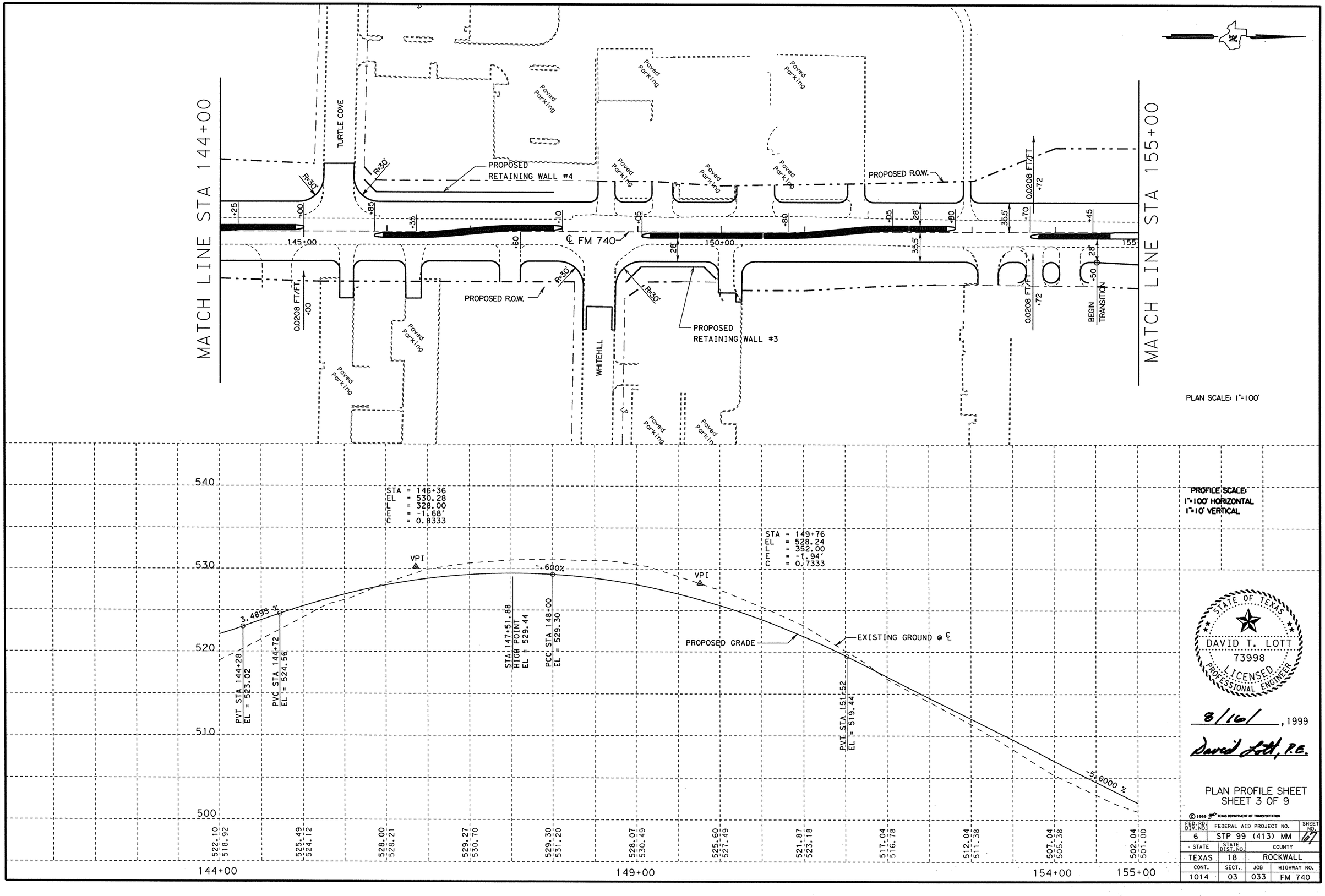
8/16/, 1999

David Lott, P.E.

PLAN PROFILE SHEET
SHEET 2 OF 9

DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
	STP 99(413)MM		6/6
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM, SPOD.DGN	1 - 30, 39 - 49	40
DESIGN FILES		
FM740PP5.DGN	1,2,6,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

REMOVALS

$$$$date$$$$

STATE OF TEXAS
DAVID T. LOTT
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PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

PLAN PROFILE SHEET
SHEET 3 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		67
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

PI STA 160+57.3078
X = 2318603.2300
Y = 451922.0901
Δ = 58°29'08.21" LT.
D = 6°00'00.00"
T = 534.6288'
L = 974.7602'
R = 954.9297'

MATCH LINE STA 155+00

PC STA 155+22.6790

PC STA 155+74.1415

0.028 FT/FT

VARIES

40'

R=50'

PROPOSED R.O.W.

℄ FM 740

160+00

28'

48'

VARIES

PI STA 160+75.2810
X = 2318642.6500
Y = 451912.0300
Δ = 58°29'08.21" LT.
D = 6°24'06.35"
T = 501.0765'
L = 913.5860'
R = 895.0'

R=100'

YELLOW JACKET LANE

R=375'

PROPOSED R.O.W.

R= 25'

R= 50'

R = 25'

0.028 FT/FT

PT STA 164+87.275

PT STA 164+97.4392

N 14° 55' 45.57" W

165+00

MATCH LINE STA 166+00

PLAN SCALE: 1"=100'

PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

-5.0000%

PVC STA 157+20
EL = 491.04

PROPOSED GRADE

STA 160+87.23
LOW POINT
ELEV 481.86

4.5307 %

PVT STA 164+20
EL = 489.40

PVC STA 164+25
EL = 489.62

EXISTING GROUND @ ℄

VPI

STA = 160+70
EL = 473.54
L = 700.00'
CM = 8.34'
C = 0.6808

STA = 165+75
EL = 496.42
L = 300.00
E = 1.70'
C = 0.7551

510
500
490
480
470

502.04 500.99
497.04 497.49
492.04 493.89
487.48 490.18
484.25 485.39
482.38 482.89
481.87 481.20
482.72 481.20
484.94 483.01
488.52 486.52
492.60 492.31
495.24 495.11

155+00
160+00
165+00

REMOVALS

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM_B_3_.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,40,47,49
FM_JPO.DGN	1 - 30, 39 - 49	DISPLAY
DESIGN FILES		
FM740PP6.DGN	1,26,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

$$$$date$$$$

STATE OF TEXAS
DAVID T. LOTT
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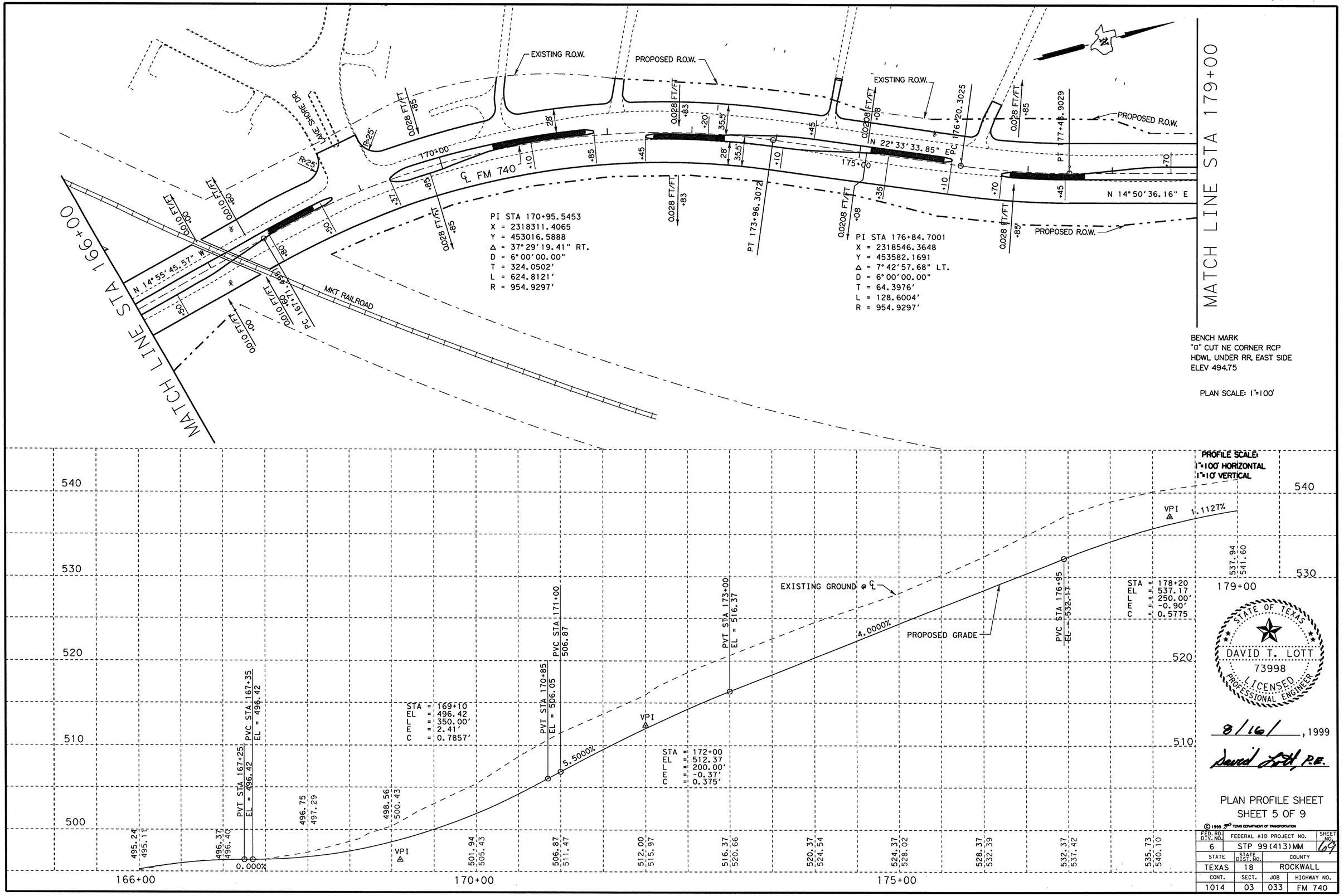
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

PLAN PROFILE SHEET
SHEET 4 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
	STP 99(413)MM		68
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM740_03.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,40,47,49
FM740PO.DGN	1 - 30, 39 - 49	10
DESIGN FILES		
FM740PP7.DGN	1,2,6,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

REMOVALS

$$$$date$$$$

STATE OF TEXAS
DAVID T. LOTT
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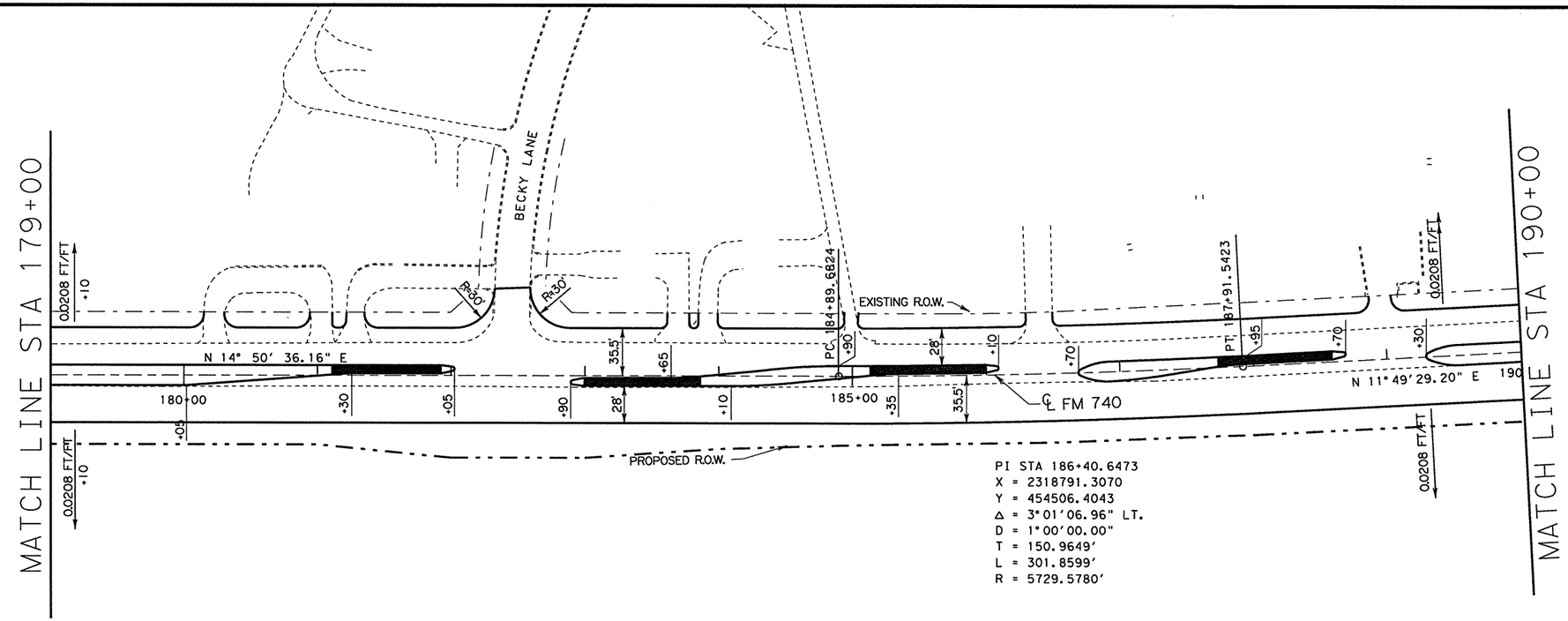
8/16/, 1999

David Lott, P.E.

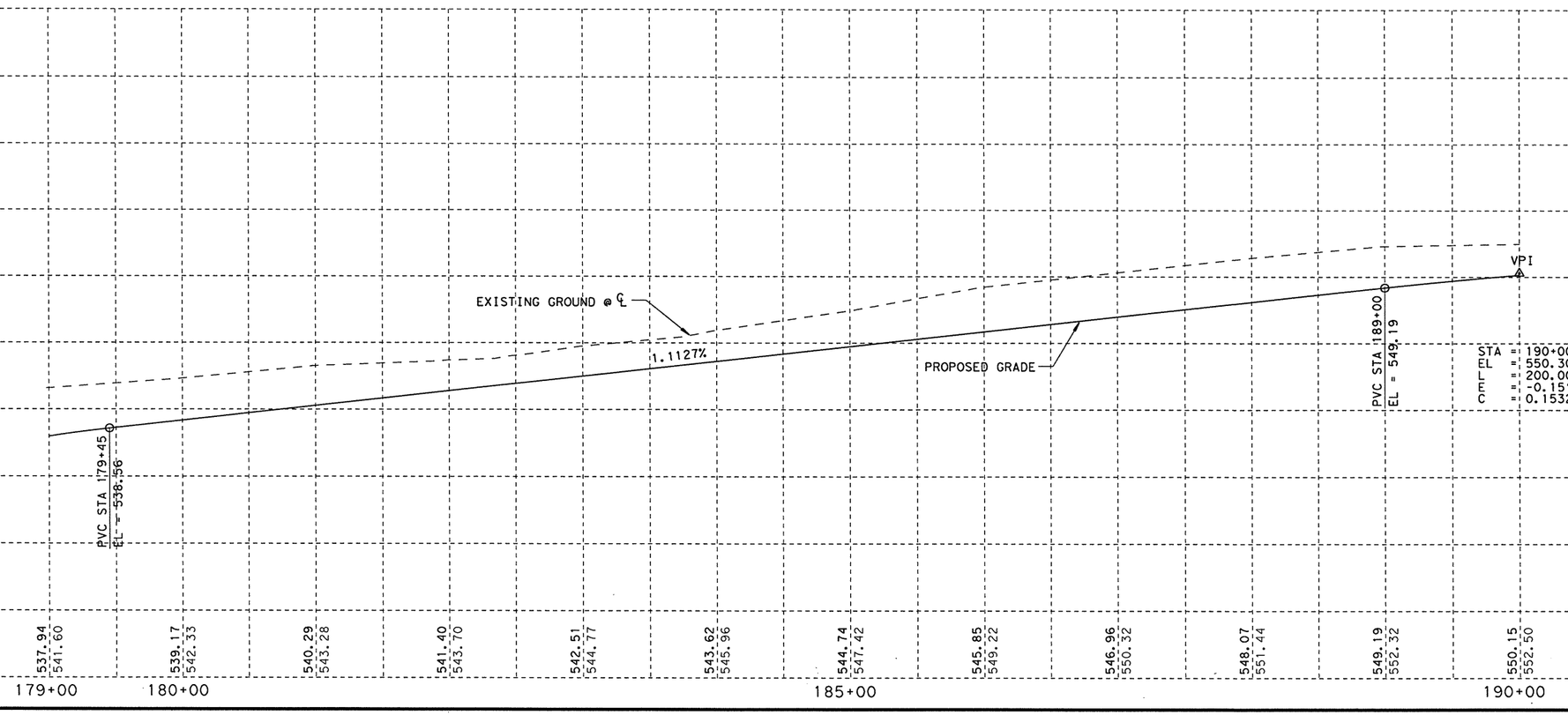
PLAN PROFILE SHEET
SHEET 5 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		69
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



BENCH MARK
"□" CUT AT BEGIN T.C.
SOUTH SIDE BECKY LANE,
WEST SIDE OF FM 740.
ELEV = 540.78

PLAN SCALE: 1"=100'



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM740DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM740PO.DGN	1 - 30, 39 - 49	DISPLAY

DESIGN FILES	
FM740PP8.DGN	1,2,6,20,23,31,33,34,47,49

REMOVALS	
	1,6,23,40 - 43,47,49

$$$$date$$$$

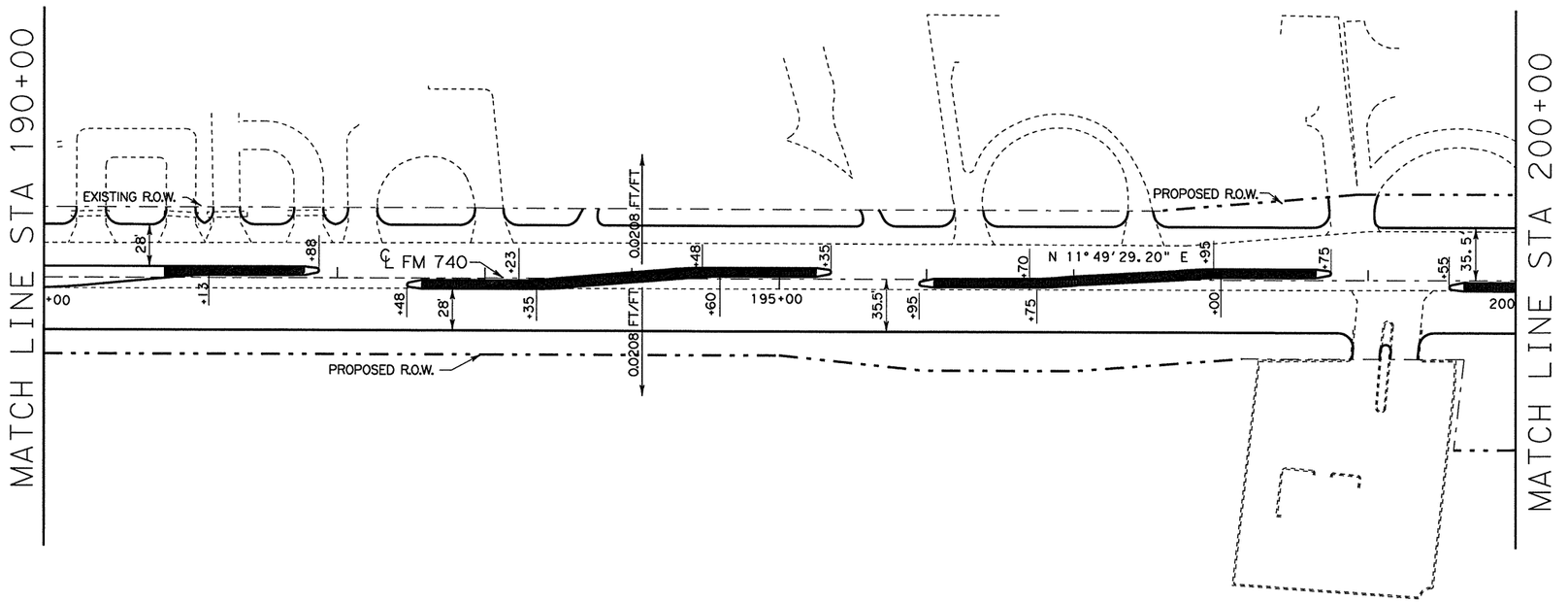
STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

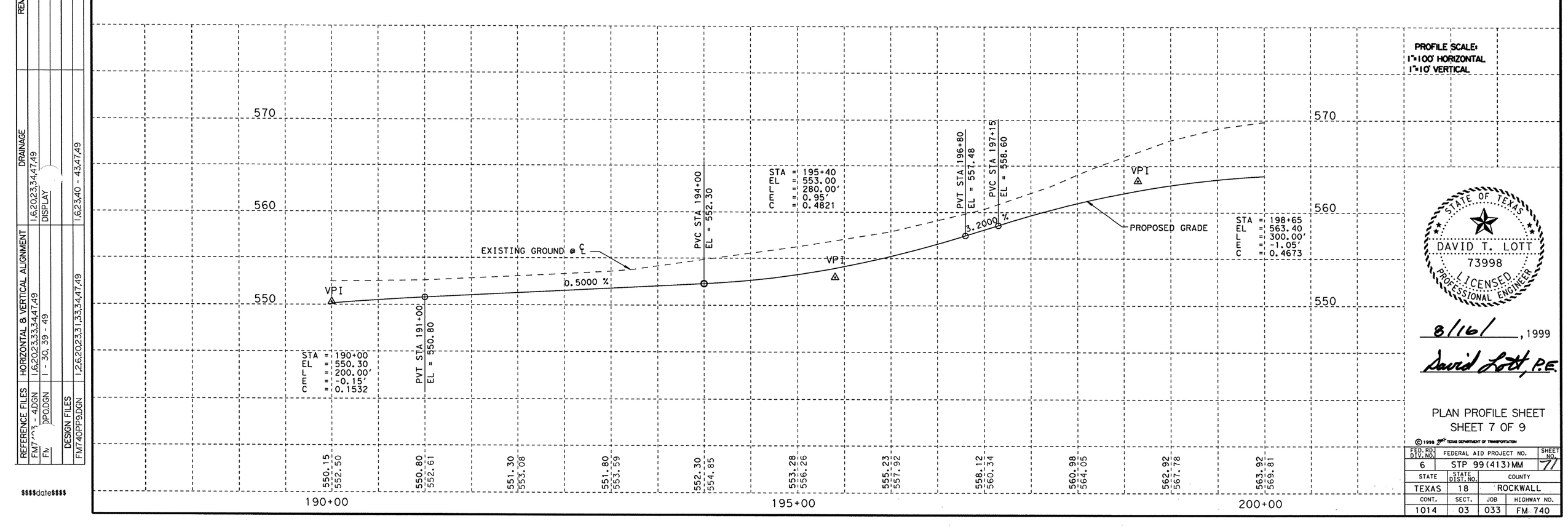
David Lott, P.E.

PLAN PROFILE SHEET
SHEET 6 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		10
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



PLAN SCALE: 1"=100'



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM7^^3 - 4.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM7^^3 - PO.DGN	1 - 30, 39 - 49	DISPLAY
DESIGN FILES		
FM740PP9.DGN	1,2,6,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

$$$$date$$$$

STATE OF TEXAS
DAVID T. LOTT
73998
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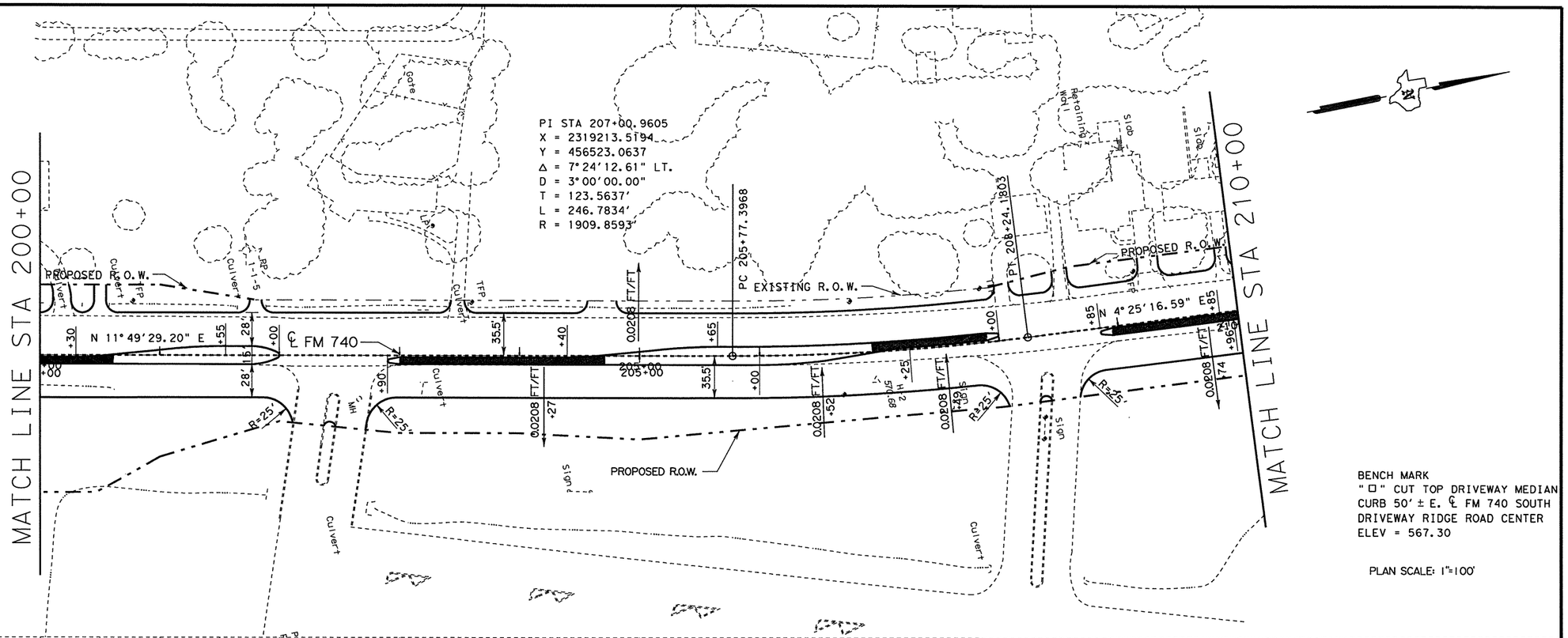
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

PLAN PROFILE SHEET
SHEET 7 OF 9

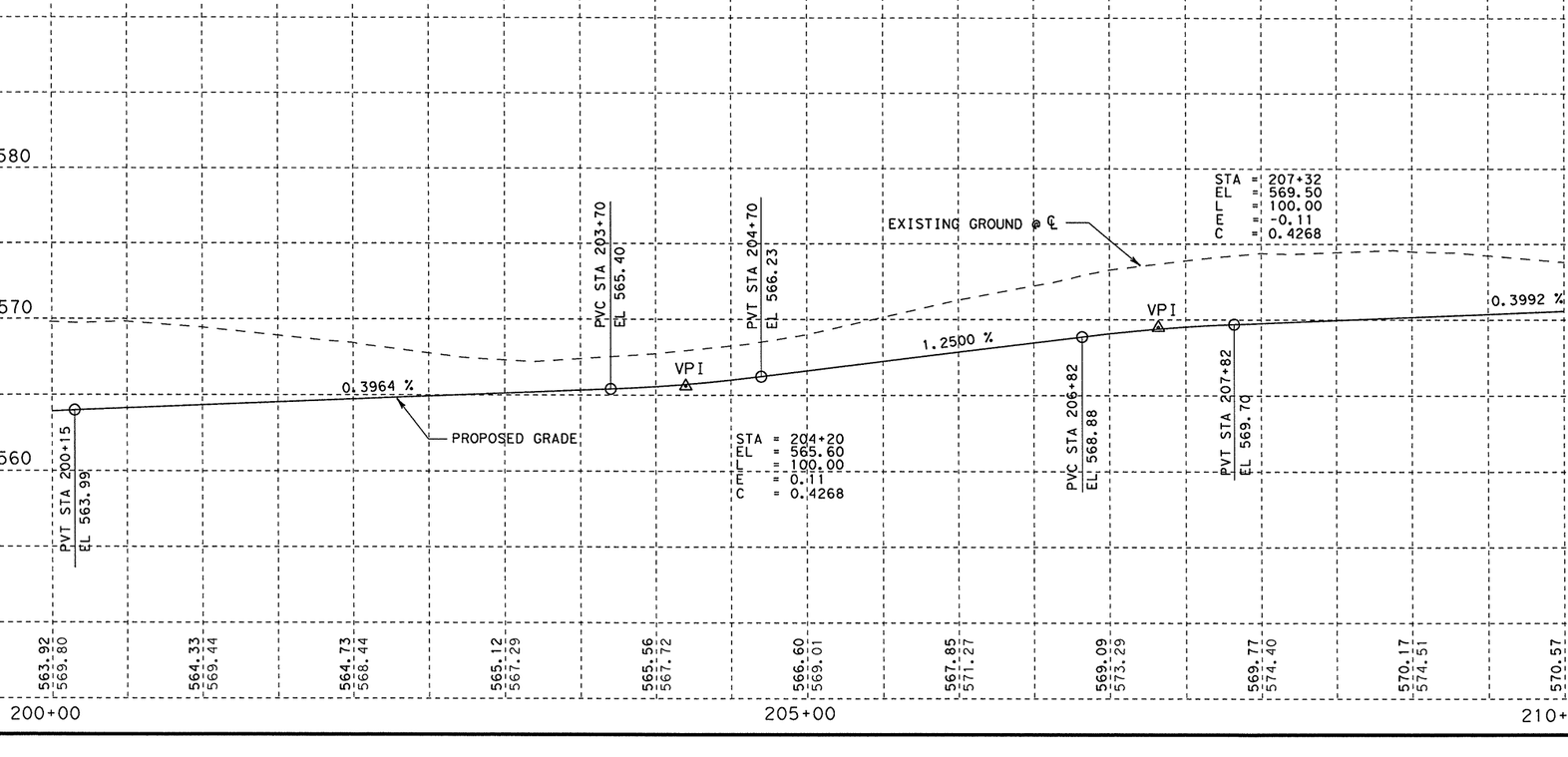
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		7
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



BENCH MARK
"□" CUT TOP DRIVEWAY MEDIAN CURB 50' ± E. ℄ FM 740 SOUTH DRIVEWAY RIDGE ROAD CENTER
ELEV = 567.30

PLAN SCALE: 1"=100'

PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM7 *.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM]PO.DGN	1 - 30, 39 - 49	DISPLAY
DESIGN FILES		
FM740PP10.DGN	1,2,6,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

REMOVALS

$$$$date$$$$

STATE OF TEXAS
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PLAN PROFILE SHEET
SHEET 8 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		72
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

MATCH LINE STA 210+00

N 4°25'16.59" E

PROPOSED R.O.W.

SUMMIT RIDGE

℄ FM 740

PC STA 213+40.1332

PT STA 214+59.6146

215+00

0.0208 FT/FT

0.0208 FT/FT

PI STA 213+99.8760
X = 2319267.4248
Y = 457220.2423
Δ = 1°11'41.33" RT.
D = 1°00'00.00"
T = 59.7429'
L = 119.4814'
R = 5729.5780'

END CONCRETE PAVEMENT
STA 218+00.00

R=763.94'

R=603.11'

R=617.11'

R=35'

C&G

EXISTING C&G

SH 205

GLENN

PROPOSED R.O.W.

40:1 TAPER

END OF PROJECT
STA 222+60.00

220+00

N 5°36'57.92" E

R=10'

24' LT

℄ STA 222+60

222+12.7929

PI STA 222+12.7929
X = 2319346.9792
Y = 458029.2614

BOURN

EMMA JANE

BENCH MARK
"D"CUT TOP OF HDWL AT CENTER
OF WALL, 2-18" RCP CULVERT UNDER
FM 740, WEST END OF CULVERT
150± SOUTH OF GLENN.
ELEV = 576.12

PLAN SCALE: 1"=100'

PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

STA = 219+60
EL = 576.49
L = 160'
E = 0.51'
C = 0.7969

35.5' LT
℄ STA 218+00

PVC STA 218+80
EL 577.09

PVT STA 220+40
EL 577.93

-0.75%

1.80%

PVI

STA 219+27.06
LOW POINT
EL 576.91

STA = 212+33
EL = 571.50
L = 200.00'
E = 0.37'
C = 0.3747

STA = 215+00
EL = 576.57
L = 200.00'
E = -0.17'
C = 0.1675

STA = 217+00
EL = 579.03
L = 200.00'
E = -0.46'
C = 0.4576

PVC STA 211+33
EL 571.10

PVT STA 213+33
EL 573.40

EXISTING GROUND ℄

0.3992%

1.8989 %

1.2300 %

-0.6000 %

PROPOSED GRADE

VPI

PVC STA 214+00
EL 574.67

PCC STA 216+00
EL 577.80

STA 217+34.79
HIGH POINT
EL 578.63

PVT STA 218+00
EL 578.43

580
570

570.57 573.82
570.97 573.22
571.54 573.80
572.81 575.44
574.67 577.66
576.40 578.78
577.80 579.26
578.57 578.57
578.43 578.14
577.69
576.97
577.51
577.34
578.25
579.01
580.81

210+00
215+00
220+00

STATE OF TEXAS
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8/16/, 1999

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PLAN PROFILE SHEET
SHEET 9 OF 9

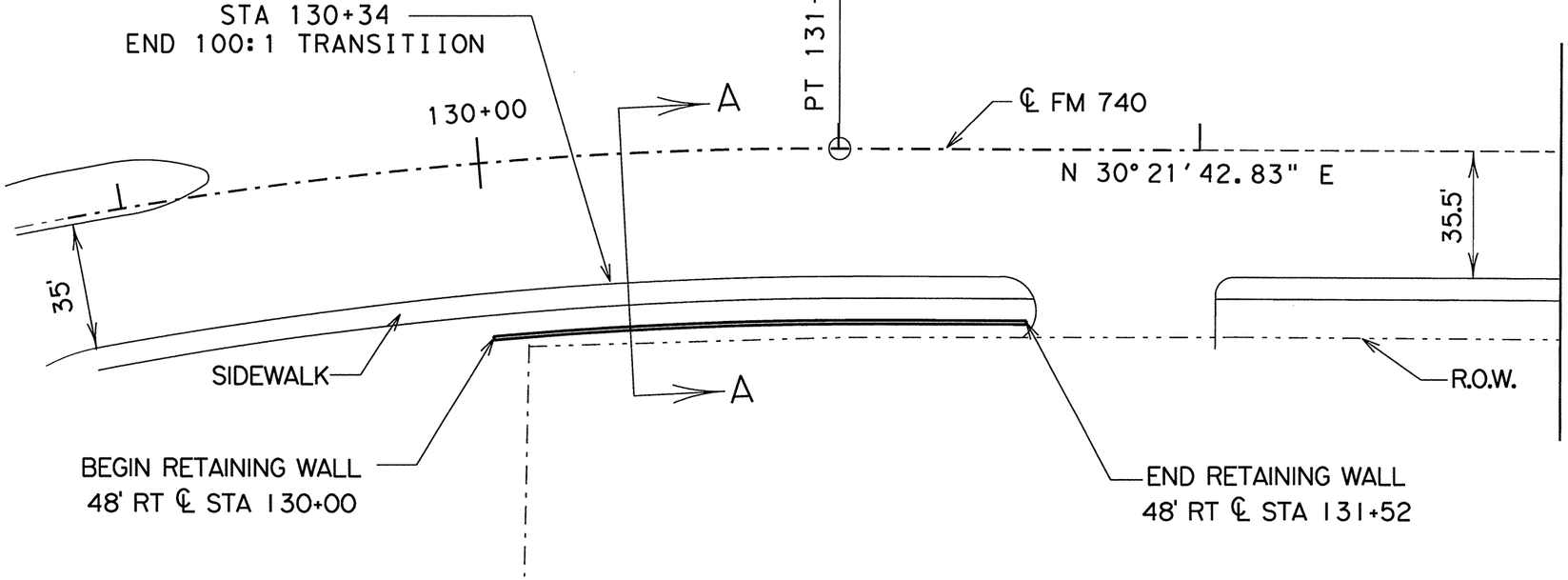
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		75
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

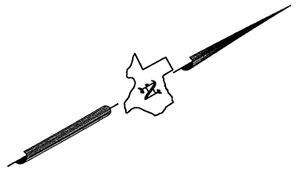
REMOVALS

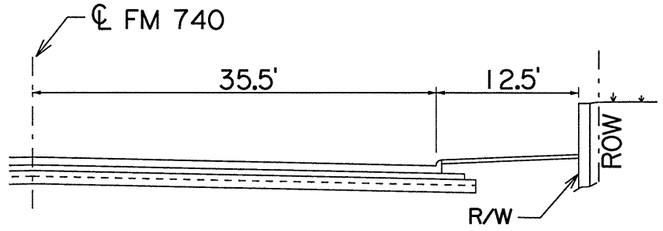
REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM DGN	1,6,20,23,33,34,47,49	1,6,20,23 * 47,49
FM)PO.DGN	1 - 30, 39 - 49	DISPLAY
DESIGN FILES		
FM740PP11.DGN	1,2,6,20,23,31,33,34,47,49	1,6,23,40 - 43,47,49

$$$date$$$$

PI STA 129+07.8376
Δ = 19°27'59.99" RT.
D = 5°00'00.00"
R = 1145.9156'



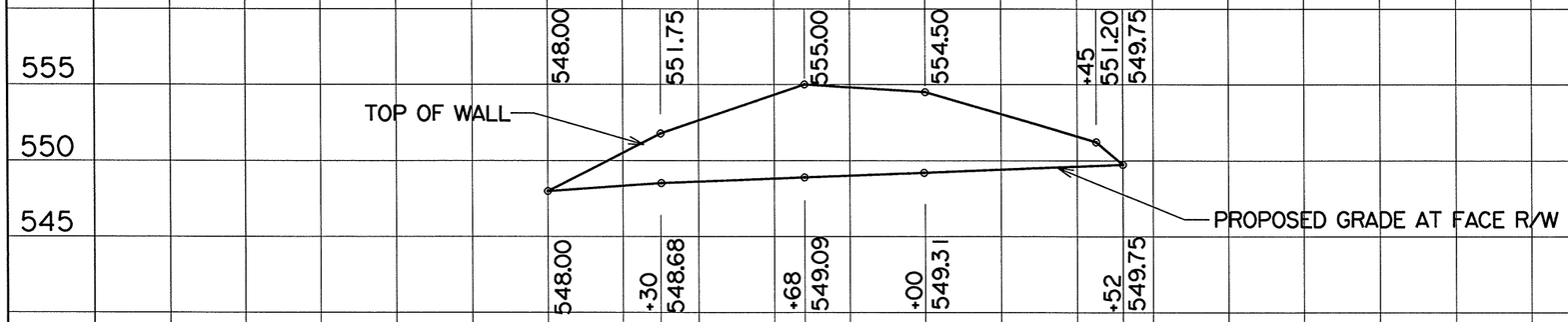




SECTION A-A

ESTIMATED QUANTITIES

ITEM 423	RETAINING WALL (CONC. BLOCK)	716.4 SF



SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

SCALE: 1"=40' HORIZ
1"=10' VERT

STATE OF TEXAS
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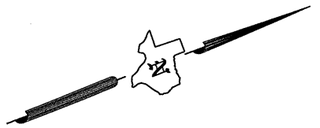
8/16/, 1999

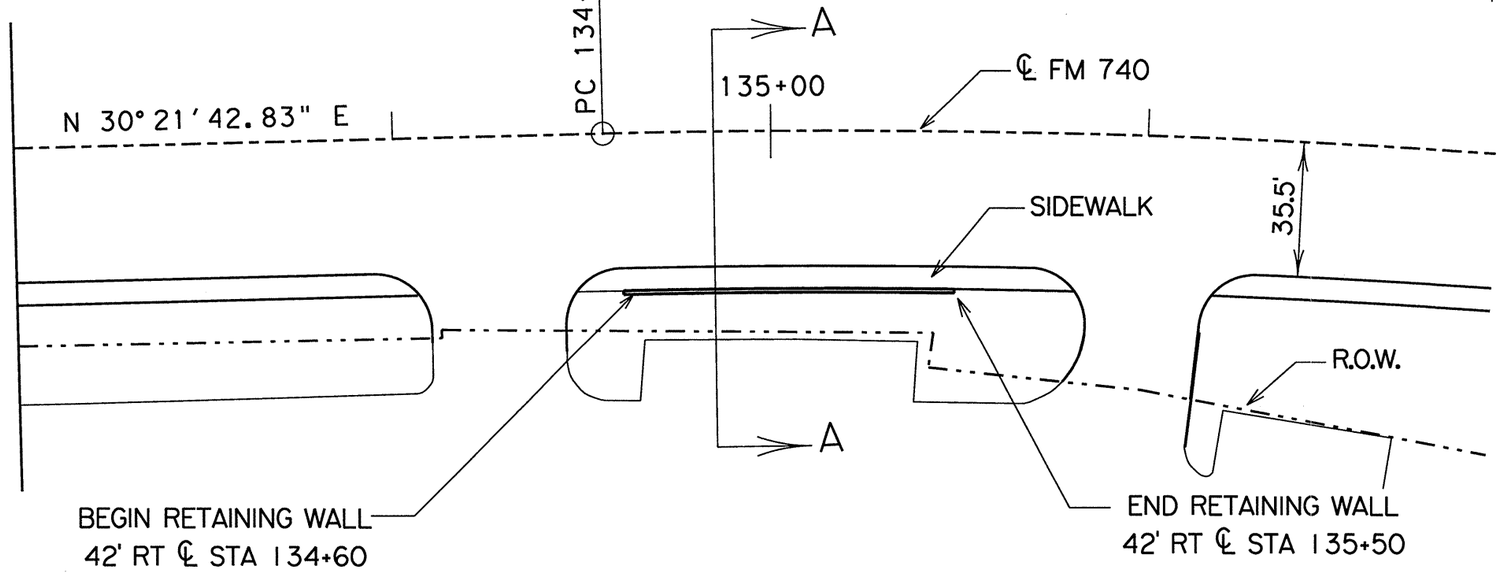
David Lott, P.E.

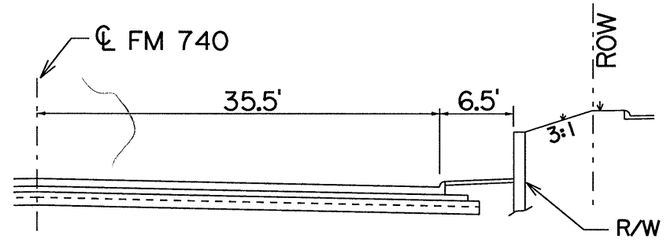
RETAINING WALL #1

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		74
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

PI STA 137+50.1829
Δ = 13° 11' 39.82" RT.
D = 2° 15' 00.00"
R = 2546.4791'



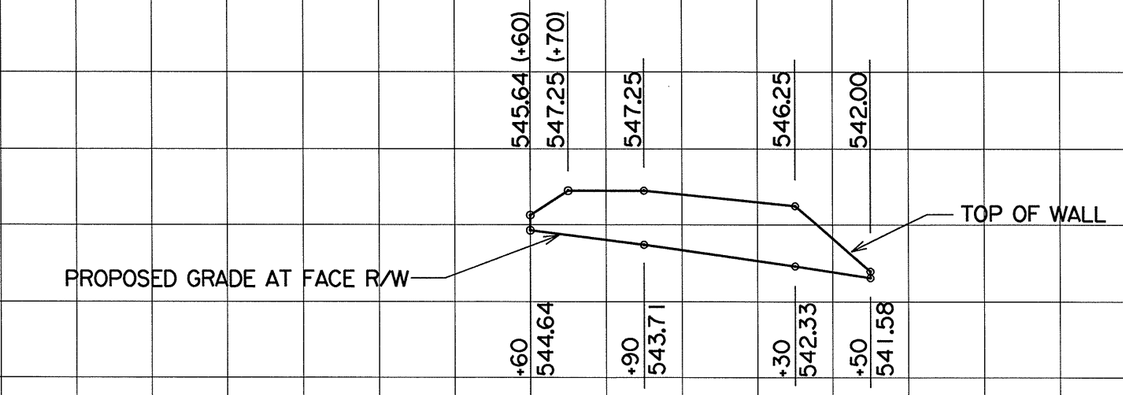




SECTION A-A

ESTIMATED QUANTITIES

ITEM 423	RETAINING WALL (CONC. BLOCK)	366.00 SF



SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

SCALE: 1"=40' HORIZ
1"=10' VERT

STATE OF TEXAS
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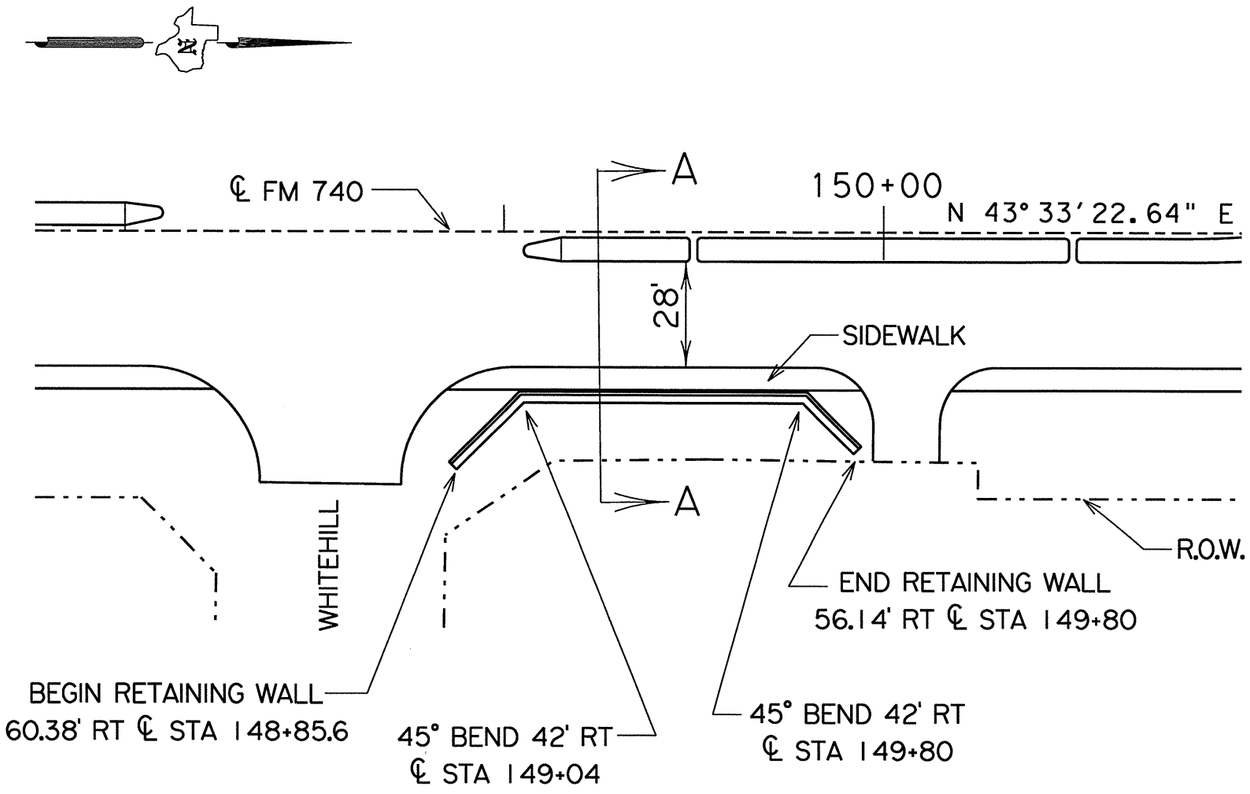
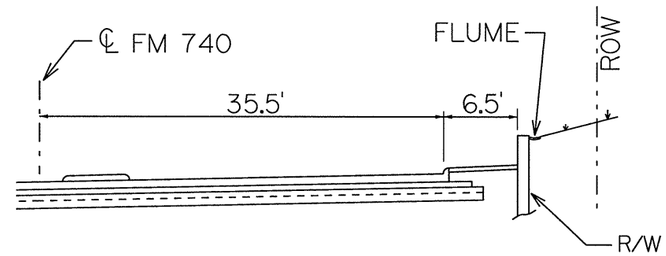
9/27/, 1999
David Lott, P.E.

RETAINING WALL #2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		75
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

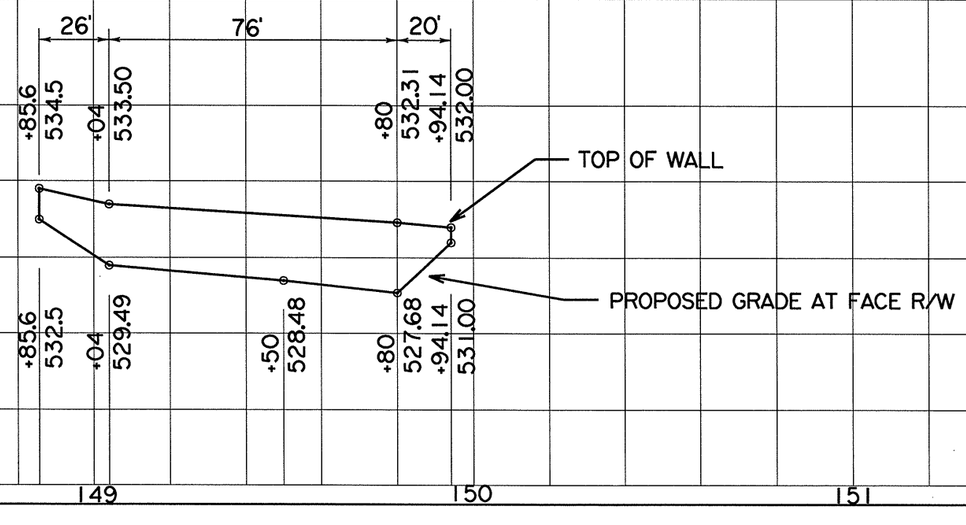




SECTION A-A

ESTIMATED QUANTITIES

ITEM 423	RETAINING WALL (CONC. BLOCK)	584.8 SF
ITEM 423	RIPRAP CONCRETE (CL B)(FLUME)	3.84 CY



SCALE: 1"=40' HORIZ
1"=10' VERT

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

STATE OF TEXAS
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8/16/, 1999

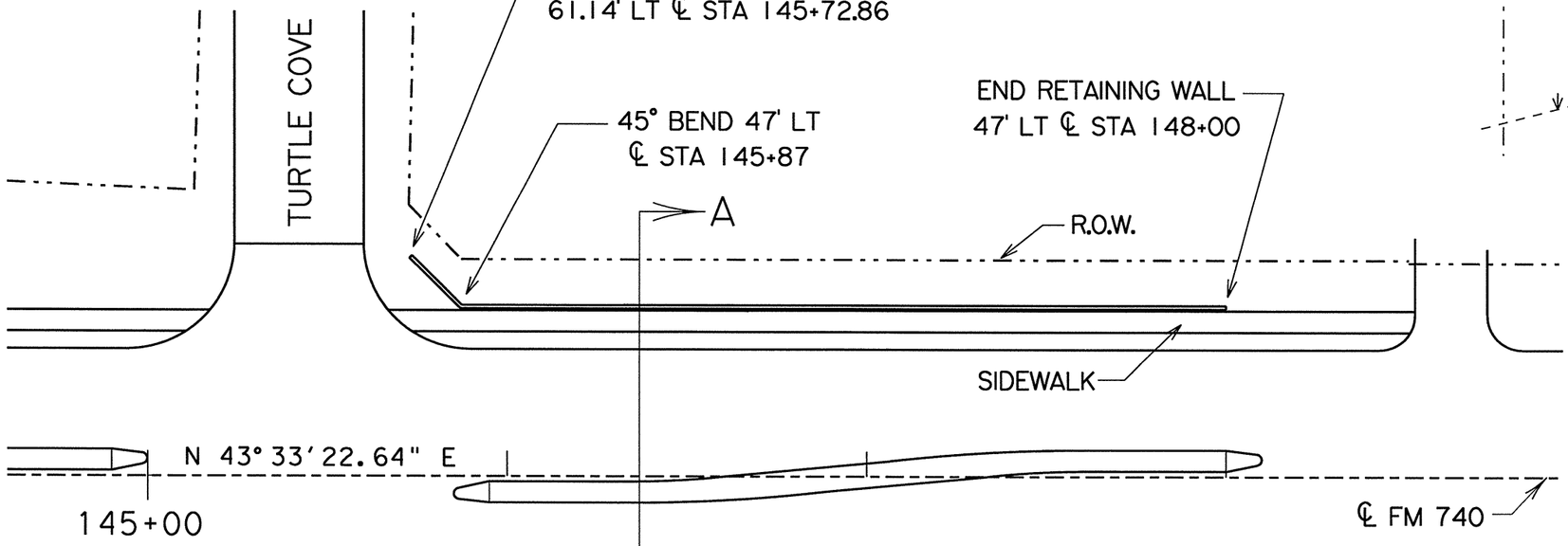
David Lott, P.E.

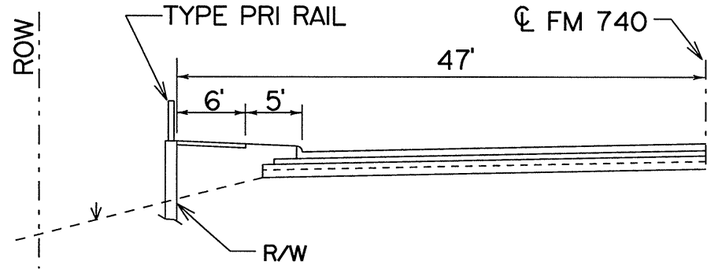
RETAINING WALL #3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6	STP 99(413)MM	76

STATE	STATE DIST. NO.	COUNTY
TEXAS	DAL	ROCKWALL

CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

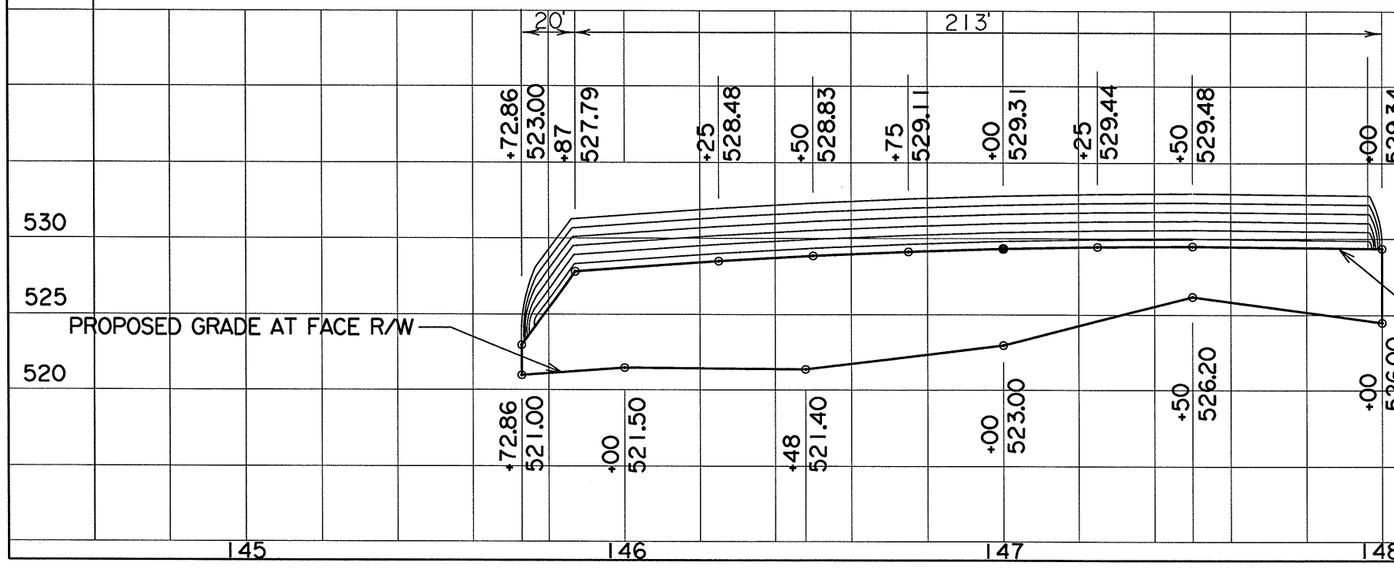




SECTION A-A

ESTIMATED QUANTITIES

ITEM 423	RETAINING WALL (CONC. BLOCK)	1500 SF
ITEM 450	RAIL (TY PRI)	233 LF



SCALE: 1"=40' HORIZ
1"=10' VERT

SHEET TOTALS			
EST.	FINAL	UNIT	DESCRIPTION

STATE OF TEXAS
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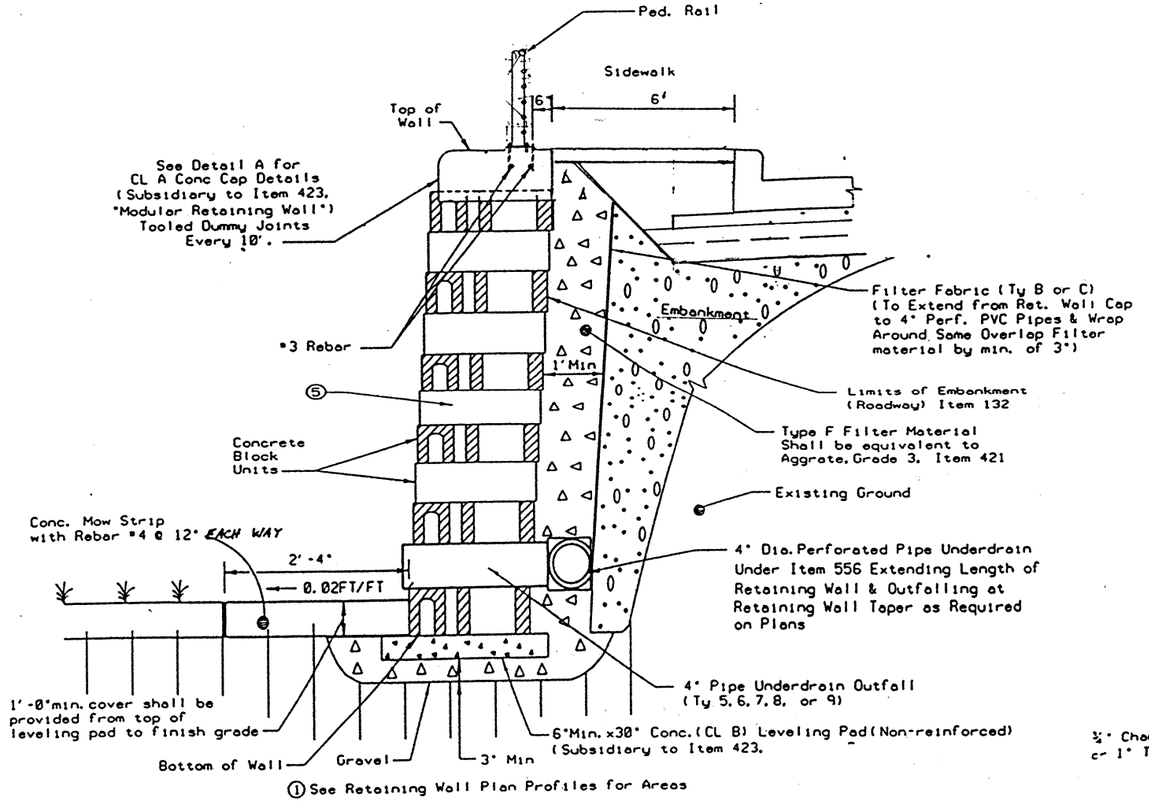
David Lott, P.E.

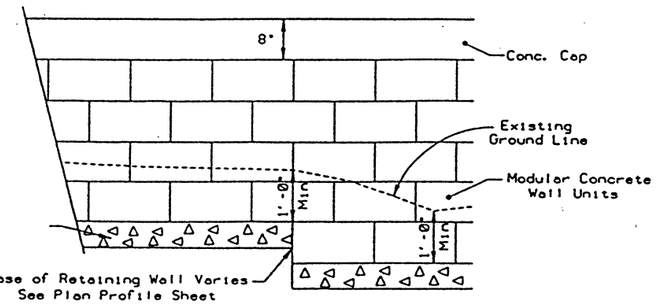
RETAINING WALL #4

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		77
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

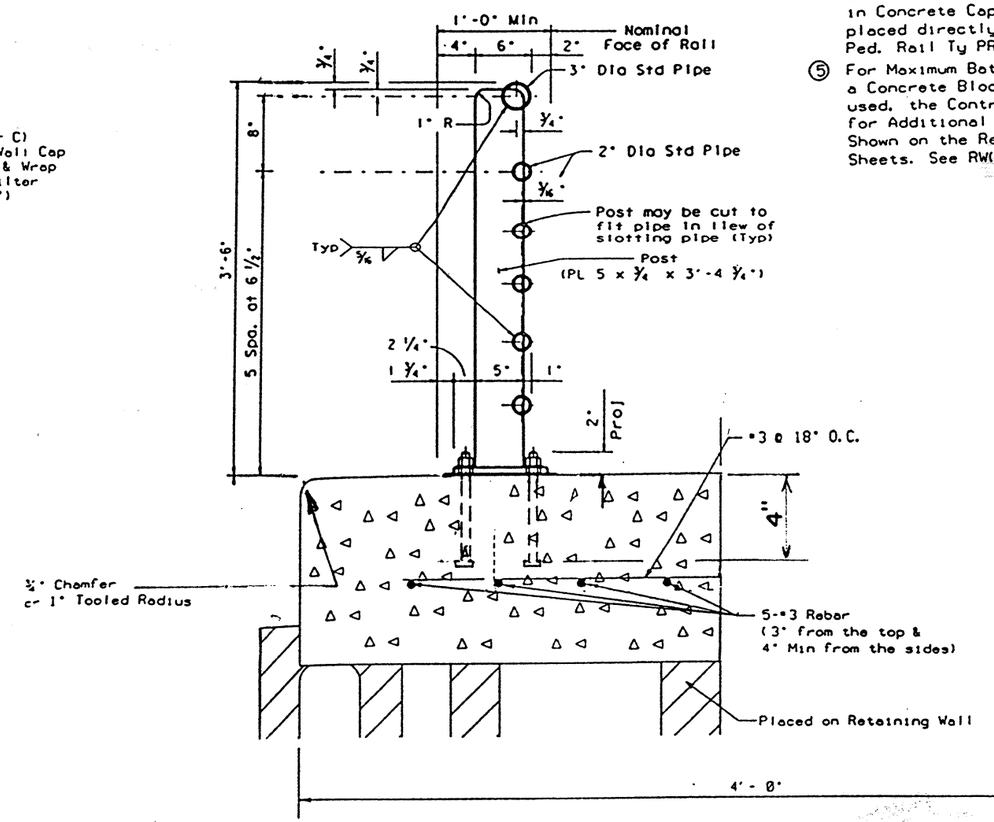


① See Retaining Wall Plan Profiles for Areas

FILL SECTION



ELEVATION OF RETAINING WALL DETAILS



DETAIL A

Detail for Concrete Cap and Rail Footing

NOTES:

① See RW(CB) standard for earth reinforcement, stability, criteria, design parameters, and general notes.

② Retaining Wall to be built per manufacturer's specifications. Face of Wall Units shall be earth brown in color, and have a Rock Face Pattern.

③ Rail (TY PR1) shall stop a distance of 10' from proposed driveways and shall terminate with a post.

④ Permissible Construction Joints Shall be Placed on 30' C-C Maximum Spacing in Concrete Cap. Joints shall not be placed directly beneath rail posts for Ped. Rail Ty PR

⑤ For Maximum Batter in the Case where a Concrete Block Retaining Wall may be used, the Contractor will not be paid for Additional Wall Heights Above those Shown on the Retaining Wall Plan Profile Sheets. See RW(CB) Standard.

STATE OF TEXAS
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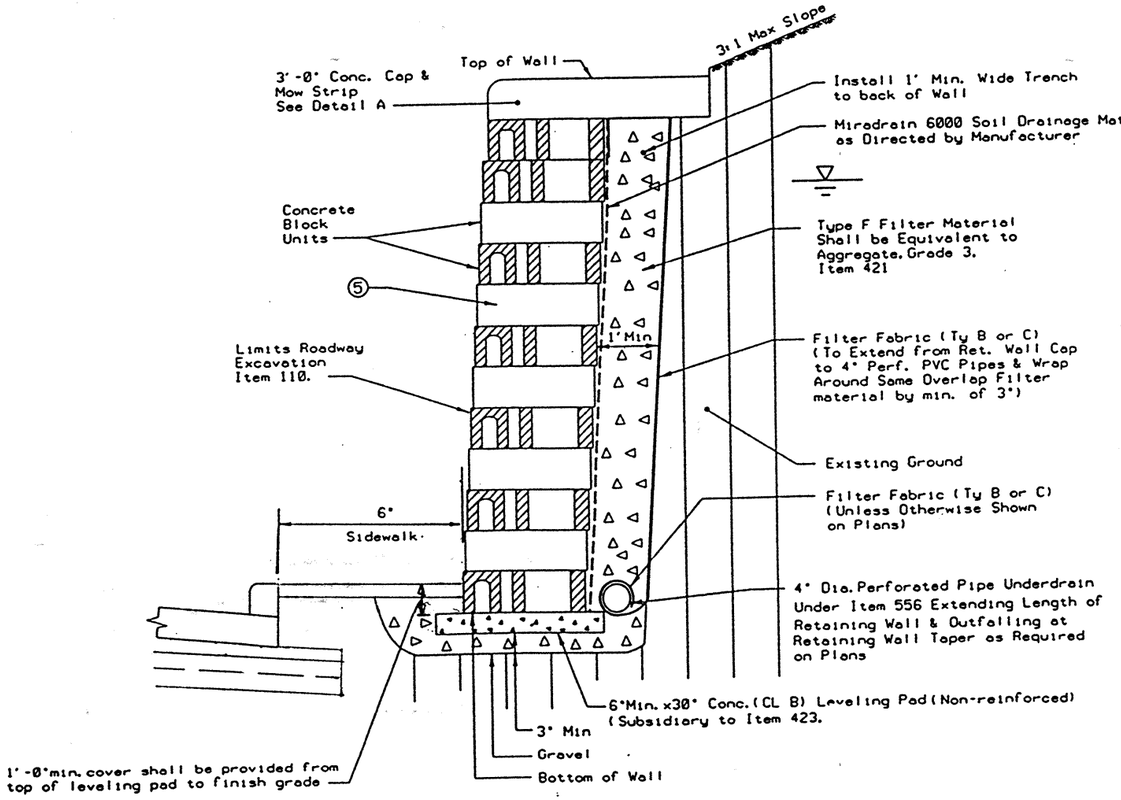
8/16/99

CONCRETE BLOCK RETAINING WALL DETAIL

SHEET 1 OF 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		78
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



CUT SECTION

NOTES:

1. See RW(CB) standard for earth reinforcement, stability, criteria, design parameters, and general notes.
2. Retaining Wall to be built per manufacturer's specifications. Face of Wall Units shall be earth brown in color, and have a Rock Face Pattern.
3. Rail (TY PR1) shall stop a distance of 10' from proposed driveways and shall terminate with a post.
4. Permissible Construction Joints Shall be Placed on 30' C-C Maximum Spacing in Concrete Cap. Joints shall not be placed directly beneath rail posts for Ped. Rail Ty PR
5. For Maximum Batter in the Case where a Concrete Block Retaining Wall may be used, the Contractor will not be paid for Additional Wall Heights Above those Shown on the Retaining Wall Plan Profile Sheets. See RW(CB) Standard.

STATE OF TEXAS
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8/16/99

CONCRETE BLOCK RETAINING WALL DETAIL

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		79
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1019	03	033	FM 740

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY:	ROCKWALL	STRUCTURE:	RETAINING WALL BORING	THD DIST.:	18
HIGHWAY NO.:	F.M. 740	HOLE NO.:	CH-2	DATE:	6/2/98
CONTROL:	1014-03-033	STATION:	147+23.38	GRD. ELEV.:	529.0'
IPE:		LOCATION:	22.500' Left of Centerline	GRD. WATER ELEV. AT COMPLETION:	DRY

ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
529	0				CLAY, silty, tan, stiff, moist	0	
	5		14	18		2	
519	10		14	16	LIMESTONE, gray, soft to hard, dry	4	
514	15		50@2 1/4"	50@1 1/2"	BORING TERMINATED AT 15'		
	20					6	

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY:	ROCKWALL	STRUCTURE:	RETAINING WALL BORING	THD DIST.:	18
HIGHWAY NO.:	F.M. 740	HOLE NO.:	CH-4	DATE:	6/1/98
CONTROL:	1014-03-033	STATION:	150+23.56	GRD. ELEV.:	529.9'
IPE:		LOCATION:	49.433' Right of Centerline	GRD. WATER ELEV. AT COMPLETION:	DRY

ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
529.9	0				CLAY, silty, tan and gray, stiff, moist	0	
524.9	5		50@3 3/4"	50@2 1/4"	CLAY, shaley, silty, gray, hard, moist	2	
520.9	10		50@1/4"	50@1/2"	LIMESTONE, gray, hard to very hard, dry	4	
514.9	15		50@1"	50@3/4"	BORING TERMINATED AT 15'		
	20					6	

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY:	ROCKWALL	STRUCTURE:	RETAINING WALL BORING	THD DIST.:	18
HIGHWAY NO.:	F.M. 740	HOLE NO.:	CH-3	DATE:	6/1/98
CONTROL:	1014-03-033	STATION:	149+05.25	GRD. ELEV.:	533.2'
IPE:		LOCATION:	44.296' Right of Centerline	GRD. WATER ELEV. AT COMPLETION:	DRY

ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
533.2	0				CLAY, silty, tan, stiff, moist	0	
	5		12	14		2	
525.2	10		50@3/4"	50@3/4"	LIMESTONE, gray, hard to very hard, dry	4	
518.2	15		50@1 1/2"	50@1 1/4"	BORING TERMINATED AT 15'		
	20					6	

STATE OF TEXAS
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73998
REGISTERED PROFESSIONAL ENGINEER

David Lott, P.E.
8/16/99

RETAINING WALL CORE HOLES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)99		80
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY: ROCKWALL | STRUCTURE: RETAINING WALL BORING | THD DIST.: 18
HIGHWAY NO.: F.M. 740 | HOLE NO.: CH-18 | DATE: 7/15/98
CONTROL: 1014-03-033 | STATION: 130+08.44 | GRD. ELEV.: 550.5'
IPE: | LOCATION: 55.737' Right of Centerline | GRD. WATER ELEV. AT COMPLETION: DRY

ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
550.5	0				CLAY, silty, tan, stiff, moist	0	
545.5	5		18	22	CLAY, tan and gray, hard, moist	2	
	10		35	50@5"			
537.5					LIMESTONE, gray, hard to very hard, dry	4	
	15		50@1 1/4"	50@1"			
530.5	20		50@1/2"	50@1/4"	BORING TERMINATED AT 20'	6	

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY: ROCKWALL | STRUCTURE: RETAINING WALL BORING | THD DIST.: 18
HIGHWAY NO.: F.M. 740 | HOLE NO.: CH-17 | DATE: 7/15/98
CONTROL: 1014-03-033 | STATION: 131+13.77 | GRD. ELEV.: 554.0'
IPE: | LOCATION: 48.876' Right of Centerline | GRD. WATER ELEV. AT COMPLETION: DRY

ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
553.95	0				CLAY, tan, stiff to hard, moist	0	
	5		18	20		2	
	10		35	50@5 1/2"			
539.95						4	
	15		50@1"	50@1 1/2"	LIMESTONE, gray, hard to very hard, dry		
537.95					CLAY, tan, hard, moist		
534.95							
	20		50@1 1/4"	50@1/2"	LIMESTONE, gray, hard to very hard, dry	6	
528.95	25		50@1 1/2"	50@3/4"			
					BORING TERMINATED AT 25'	8	

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

COUNTY: ROCKWALL | STRUCTURE: RETAINING WALL BORING | THD DIST.: 18
HIGHWAY NO.: F.M. 740 | HOLE NO.: CH-1 | DATE: 6/2/98
CONTROL: 1014-03-033 | STATION: 146+02.30 | GRD. ELEV.: 525.7'
IPE: | LOCATION: 26.934' Left of Centerline | GRD. WATER ELEV. AT COMPLETION: DRY

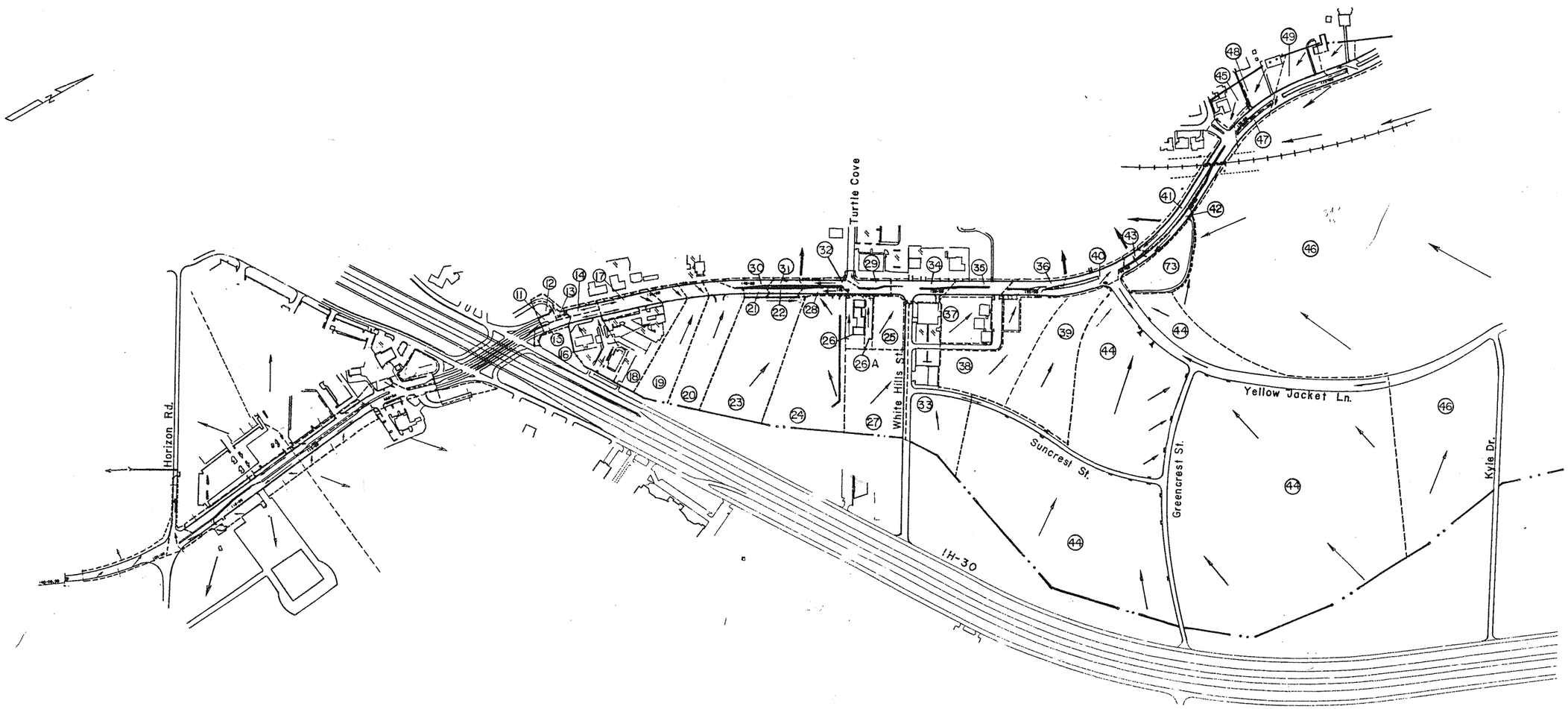
ELEV. FT.	DEPTH FT.	LOG	THD PEN. TEST NO. OF BLOWS 1st 6"	2nd 6"	DESCRIPTION OF MATERIAL	DEPTH M	ELEV. M
525.7	0				CLAY, silty, tan, stiff, moist	0	
	5		16	18		2	
517.7					LIMESTONE, gray, soft to hard, dry		
	10		50@3 1/2"	50@2 1/2"		4	
510.7	15		50@2"	50@2"	BORING TERMINATED AT 15'		
	20					6	

STATE OF TEXAS
DAVID T. LOTT
73998
REGISTERED PROFESSIONAL ENGINEER
David Lott, P.E.
8/16/99

RETAINING WALL CORE HOLES

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)99		B1
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

EXT 407



STATE OF TEXAS
DAVID T. LOTT
73998
REGISTERED PROFESSIONAL ENGINEER

David Lott, P.E.
8/16/99

DRAINAGE AREA MAP

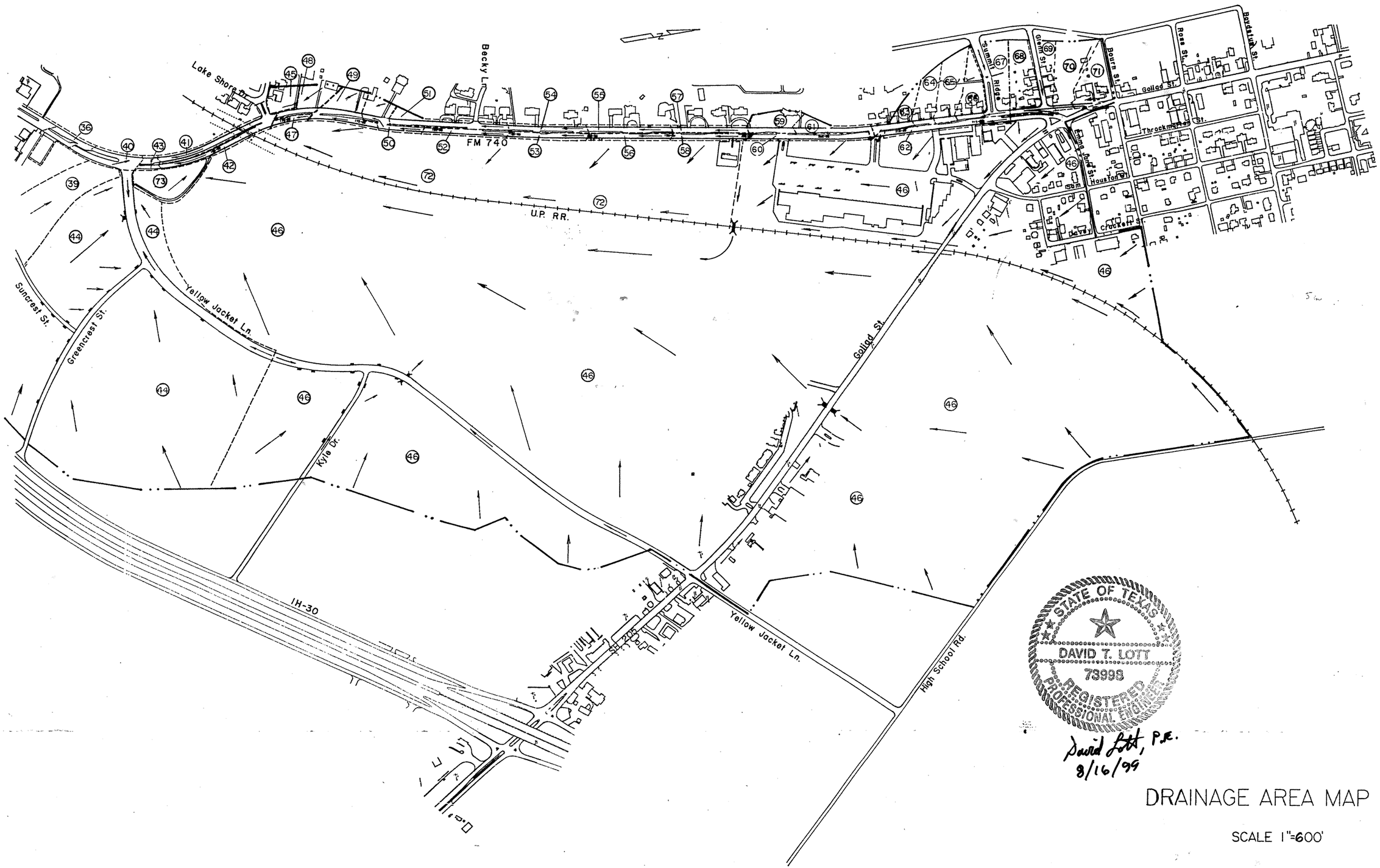
SCALE 1"=600'

SHEET 1 of 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99(413)MM		82
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

EXT 401

QSA7(322171)FM740DR2



STATE OF TEXAS
DAVID T. LOTT
73998
REGISTERED PROFESSIONAL ENGINEER

David Lott, P.E.
8/16/99

DRAINAGE AREA MAP

SCALE 1"=600'

SHEET 2 of 2

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			83
STATE	STATE U-S-L NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

RUNOFF CALCULATIONS

ACRES-DRAINED						TOTAL CA	TIME OF CONCENTRATION (MIN)	FREQ. (YEARS)	I 5 (IN/HR)	Q 5 (CFS)	REMARKS
DRAINAGE AREA NO.	AC.	PAVT. C=0.9	R.O.W. (avg) C=0.5	COMM. INDUST C=0.7	RESID C=0.5						
11	0.19	0.19				0.17	200/(3.0X60)=1.11	5	6.93	1.19	DRAINS INTO EAX CI-15 ON IH30 PROJECT
12	0.17		0.17			0.09	80/(1.6X60)=0.83	5	6.93	0.59	DRAINS INTO EX DI 25 ON IH30 PROJECT
13	0.3	0.24	0.06			0.25		5	6.93	1.70	DRAINS INTO OUTFALL W. OF FM740
14	0.19	0.17	0.02			0.16	200/(2.2X60)=1.52	5	6.93	1.13	
15	0.26	0.26				0.23	200/(3.0X60)=1.11	5	6.93	1.62	DRAINS INTO EX CI 18 ON IH30 PROJECT
16	1.53	1.22	0.31			1.25	450/(2.4X60)=3.13	5	6.93	8.68	
17	0.73	0.66	0.07			0.63	350/(3.5X60)=1.67	5	6.93	4.36	
18	2.5	0.5	0.5	1.5		1.75	600/(2.3X60)=4.35	5	6.93	12.13	
19	2.22	0.22	0.22	1.78		1.55	660/(2.1X60)=5.24	5	6.93	10.77	
20	2.7	0.27	0.27	2.16		1.89	730/(1.5X60)=8.11	5	6.93	13.10	
21	0.13	0.13				0.12	120/(3.0X60)=0.67	5	6.93	0.81	
22	0.22	0.22				0.20	100/(1.3X60)=1.28	5	6.93	1.37	
23	5.04			5.04		3.53	820/(2.8X60)=4.88	5	6.93	24.45	
24	5.34			5.34		3.74	750/(2.8X60)=4.46	5	6.93	25.90	
25	1			1		0.70	320/(3.7X60)=1.44	5	6.93	4.85	
26	0.7	0.49		0.21		0.59	200/(5.0X60)=0.67	5	6.93	4.07	
26A	0.3	0.3				0.27	280/(5.0X60)=0.93	5	6.93	1.87	
27	3.59	3.59		2.51		2.73	750/(2.0X60)=6.25	5	6.93	18.91	
28	0.29	0.29				0.26	220/(2.0X60)=1.83	5	6.93	1.81	
29	0.32	0.32				0.29	300/(3.4X60)=1.47	5	6.93	2.00	DRAINS TO EX CI ON TURTLE COVE
30	0.3	0.3				0.27	200/(2.0X60)=1.67	5	6.93	1.87	
31	0.22	0.22				0.20	90/(1.5X60)=1.00	5	6.93	1.37	
32	0.54	0.54				0.49	350/(3.4X60)=1.72	5	6.93	3.37	
33	4.72	1.33		3.09		3.36	900/(3.5X60)=4.29	5	6.93	23.28	
34	0.76	0.61		0.15		0.65	330/(3.5X60)=1.57	5	6.93	4.53	
35	1.28	1.15		0.13		1.13	640/(4.5X60)=2.37	5	6.93	7.80	
36	0.9	0.81		0.09		0.79	420/(4.5X60)=1.56	5	6.93	5.49	
37	1.54	1.23		0.31		1.32	380/(3.9X60)=1.62	5	6.93	9.18	
38	3.57	0.36		3.21		2.57	800/(5.0X60)=2.67	5	6.93	17.82	
39	4.4			4.4		3.08	830/(1.7X60)=8.14	5	6.93	21.34	
40	0.92	0.83	0.09			0.79	500/(3.7X60)=2.25	5	6.93	5.49	
41	0.81	0.73	0.08			0.70	600/(3.5X60)=2.86	5	6.93	4.83	
42	0.56	0.5	0.06			0.48	600/(3.5X60)=2.86	5	6.93	3.33	
43	0.3	0.3				0.27	140/(3.0X60)=0.78	5	6.93	1.87	
44	65.7			65.7		45.99	2100/(2.0X60)=17.5	5	6.93	318.71	Q IS IN EX 66" RCP
45	0.76				0.76	0.38	250/(1.7X60)=2.45	5	6.93	2.63	
46											
47	0.28	0.25	0.03			0.24	280/(4.1X60)=1.14	5	6.93	1.66	
48	1.06	0.21			0.85	0.61	470/(2.3X60)=3.41	5	6.93	4.26	
49	1.4	0.7			0.7	0.98	420/(2.3X60)=3.04	5	6.93	6.79	
50	0.96	0.48			0.48	0.67	440/(3.2X60)=2.29	5	6.93	4.66	
51	1.09	0.76			0.33	0.85	760/(2.6X60)=4.87	5	6.93	5.88	
52	0.64	0.58	0.06			0.55	540/(2.1X60)=4.29	5	6.93	3.83	
53	0.61	0.55	0.06			0.53	530/(2.0X60)=4.42	5	6.93	3.64	
54	0.61	0.55	0.06			0.53	530/(2.0X60)=4.42	5	6.93	3.64	
55	0.67	0.6	0.07			0.58	550/(1.5X60)=6.11	5	6.93	3.98	
56	0.67	0.6	0.07			0.58	550/(1.5X60)=6.11	5	6.93	3.98	
57	0.51	0.46	0.05			0.44	500/(2.8X60)=2.98	5	6.93	3.04	
58	0.51	0.46	0.05			0.44	500/(2.8X60)=2.98	5	6.93	3.04	
59	0.96	0.27			0.69	0.59	250/(1.4X60)=2.98	5	6.93	4.07	
60	0.7	0.7				0.63	790/(1.8X60)=7.31	5	6.93	4.37	
61	0.85	0.51			0.34	0.63	500/(1.95X60)=4.27	5	6.93	4.36	
62	0.72	0.72				0.65	745/(2.1X60)=5.91	5	6.93	4.49	
63	0.83	0.33			0.5	0.55	480/(1.0X60)=8.0	5	6.93	3.79	
64	1.02	0.15			0.87	0.57	420/(0.9X60)=7.61	5	6.93	3.95	
65	1.55	0.16			1.39	0.84	500/(1.1X60)=7.58	5	6.93	5.81	
66	1.2	0.18			1.02	0.67	450/(1.0X60)=7.50	5	6.93	4.66	
67	2	0.8			1.2	1.32	500/(1.35X60)=6.17	5	6.93	9.15	
68	1.75				1.75	0.88	420/(1.0X60)=7.00	5	6.93	6.06	
69	1.4	0.49			0.91	0.90	400/(2.0X60)=3.33	5	6.93	6.21	
70	1.95	0.2			1.75	1.06	500/(1.2X60)=6.94	5	6.93	7.31	
71	1.55	0.16			1.39	0.84	450/(1.2X60)=6.25	5	6.93	5.81	
72	28.1				28.1	14.05	3300/(1.0X60)=55.0	5	6.93	37.37	
73	1.86		1.86			0.93	350/(1.2X60)=4.86	5	6.93	6.44	

STATE OF TEXAS
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LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

HYDRAULIC CALCULATIONS

SHEET 1 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		94
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

INLET CALCULATIONS

ID	INLET LOCATION	DA NO	Q cfs	CO cfs	Qa cfs	Z	Z/N	S ft/ft	y ft	P ft	a ft	qL cfs	Lr curb ft	"E" Slot	Lr Slot ft	La ft	La/Lr	a/y	Curg QI/Qa Curg	QI/Qa Slot	QI cfs	QI-Qa cfs	Carry-over to:	Remarks
CI-7	LT STA 130+40	14	1.13		1.13	48	3200	0.11	0.15	7.05	0.25	0.3	3.77			5								
EXIST	CI-18 IH 30 PROJECT	15	1.62																					
CI-6	RT STA 130+00	16	8.68		8.68	48	3200	0.015	0.3	14.3	0.25	0.45	19.29			15	0.78	0.83	0.87		7.55	1.13		EXIST CI-18 IH30 PROJ.
CI-8	RT STA 135+50	17	4.36		4.36	48	3200	0.043	0.19	9.06	0.25	0.36	12.11			15								
CI-9	RT STA 137+00	18	12.13		12.13	48	3200	0.053	0.27	12.79	0.25	0.42	28.88			15	0.52	0.93	0.65		7.88	4.25	CI-10	
CI-10 & 10A	RT STA 137+89	19	10.77	4.25	15.02	48	3200	0.054	0.29	13.81	0.25	0.045	33.38			25	0.075	0.86	0.85		12.77	2.25	CI-11	
CI-11 & 11A	RT STA 14000	20	13.1	2.25	15.35	48	3200	0.0265	0.33	15.91	0.25	0.49	31.33			25	0.08	0.76	0.89		13.66	1.69	CI-12	
CI-12	RT STA 141+30	21	0.81	1.69	2.5	48	3200	0.0075	0.21	10.21	0.25	0.38	6.58			10								
CI-15	LT STA 141+50	30	1.87		1.87	77	5133	0.005	0.17	13.27	0.25	0.34	5.5			5	0.91	1.47	0.94		1.76	0.11	CI-16	
DI-4	RT STA 146+32	26A	1.87		1.87																			2-GR Q=2.84 h=0.1 TY C
DI-3	RT STA 145+45	26	4.07		4.07																			3-GR Q=4.26 h=0.1 TY C
DI-2	RT STA 142+30	24	25.9		25.9																			3-GR Q=30.9 h=1.0 TY C
DI-1	RT STA 142+10	23	24.45		24.45																			3-GR Q=30.9 h=1.0 TY C
CI-14	RT STA 142+45	28	1.81		1.81	48	3200	0.009	0.18	8064	0.25	0.35	5.17			5	0.97	1.39	0.98		1.77	0.04	CI-13	
CI-13	RT STA 141+85	22	1.37	0.04	1.41	L=0.324(1.41)/(0.5)1.5 =						1.29	2.58			15								SAG
CI-17	LT STA 142+50	32	3.37		3.37	48	3200	0.0095	0.23	11.04	0.25	0.4	8.43			5	0.59	1.09	0.71		2.39	0.98	CI-16	
CI-16	LT STA 142+00	31	1.37	1.09	2.46	L=0.324(2.46)/(0.5)1.5 =						2.25	4.51			15								SAG
CI-18 & 18A	RT STA 184+36	27	18.91		18.91	48	3200	0.072	0.297	14.26	0.25	0.045	42.02			30	0.69	0.84	0.81		15.32	3.59	CI-20	
CI-19 & 19A	RT STA 148+24	33	23.28		23.28	48	3200	0.072	0.321	15.42	0.25	0.47	49.5			30	0.61	0.78	0.74		17.23	6.05	CI-20	
CI-20 & 20A	LT STA 151+00	34	4.53	9.64	14.17	48	3200	0.044	0.292	14.04	0.25	0.45	31.49			20	0.64	0.85	0.77		10.91	3.26	CI-21	
CI -21 & 21A	LT STA 154+00	35	7.8	3.26	11.06	46.1	3073	0.05	0.264	12.18	0.25	0.42	26.33			20	0.76	0.95	0.85		9.4	1.66	CI-22	
CI-22	LT STA 156+90	36	5.49	1.66	7.15	35.7	2380	0.05	0.0246	8.82	0.25	0.4	17.88			15	0.84	1.01	0.91		6.51	0.64	CI-24	
DI-5	RT STA 152+90	37	9.18		9.18																			1-GR Q=9.0 h=0.5 TY C
DI-6	RT STA 156+90	38	17.82		17.82																			2-GR Q=21.9 h=1.0 TY C
DI-7	RT STA 158+35	39	21.34		21.34																			2-GR Q=21.9 h=1.0 TY C
CI-24	LT STA 160+37	40	5.49	0.64	6.13	35.7	2380	0.007	0.336	12.02	0.25	0.419	12.561			10	0.8	0.741	0.89		5.46	0.67	CI-25	
CI-25	LT STA 160+87	43	1.87	0.81	2.68	35.7	2380									15								LOW POINT SAG
CI-38	RT STA 195+00	58	3.04		3.04	48	3200	0.01	0.022	10.14	0.25	0.38	8			10								
CI-37	LT STA 195+00	57	3.04		3.04	48	3200	0.01	0.22	10.14	1.25	0.38	8			10								
CI-36	RT STA 189+70	56	3.98		3.98	48	3200	0.01	0.24	11.51	0.25	0.4	9.95			10								
CI-35	LT STA 189+70	55	3.98		3.98	48	3200	0.01	0.24	11.51	0.25	0.4	9.95			10								
CI-34	RT STA 184+50	53	3.64		3.64	48	3200	0.01	0.23	11.14	0.25	0.4	9.1			10								
CI-33	LT STA 184+50	54	3.64		3.64	48	3200	0.01	0.23	11.14	0.25	0.4	9.1			10								
CI-32	RT STA 179+10	52	3.83		3.83	48	3200	0.02	0.21	9.97	0.25	0.38	10.08			10	0.99	1.19	0.99		3.79	0.04	CI-30	
CI-31	LT STA 176+85	51	5.88		5.88	36	2400	0.04	0.24	8.59	0.25	0.4	14.7			15								
CI-30	LT STA 175+00	50	4.66	0.04	4.7	48	3200	0.04	0.2	9.42	0.25	0.37	12.7			10	0.79	1.25	0.87		4.09	0.61	CI-29	
CI-29	RT STA 172+00	49	6.79	0.61	7.4	36	2400	0.05	0.25	8098	0.25	0.41	18.05			15	0.83	1	0.9		6.66	0.74	CI-27	
DI-10	LT STA 169+35	45	2.63		2.63																			1-GR Q=0.90 h=0.5 TY C
CI-28	LT STA 169+65	48	4.26		4.26	41	2700	0.04	0.2	8.25	0.25	0.37	11.51			15								
CI-27	RT STA 169+00	47	1.66	0.74	2.4	73	4900	0.03	0.14	10.07	0.25	0.31	7.74			10								
DI-9	RT STA 168+00	72	37.37		37.37																			3-GR Q=37.6 h=1.5 TY C
CI-23	RT STA 161+20	42	3.33		3.33	36	2400	0.01	0.25	9	0.25	0.41	8.12			10								
CI-26	LT STA 161+47	41	4.83		4.83	36	2400	0.01	0.29	10.44	0.25	0.45	10.73			10	0.93	0.86	0.97		4.69	0.14	CI-25	
DI-12	LT STA 221+00	71	5.81		5.81																			1-GR Q=9.0 h=0.5 TY C
CI-49	LT STA 220+00	70	7.31		7031	48	3200	0.012	0.29	13.92	0.25	0.45	16.24			15	0.92	0.83	0.96		7.02	0.29	CI-48	
CI-48	LT STA 219-27	69	6.21	0.29	6.5	L=0.324(6.50)/(0.5)1.5=						5.96	11.91			15								SAG
DI-11	LT STA 218+00	68	6.06		6.06																			1-GR Q=9.0 h=0.5 TY C
CI-47	LT STA 215+20	67	9.15		9.15	48	3200	0.015	0.29	13.82	0.25	0.45	20.33			15	0.74	0.86	0.84		7.69	1.45	CI-46	
CI-46	LT STA 213+60	66	4.66	1.46	6.12	48	3200	0.02	0.25	11.88	0.25	0.41	14.93			15								
CI-45	LT STA 212+25	65	5.81		5.81	48	3200	0.01	0.28	13.27	0.25	0.45	12.91			15								
CI-44	LT STA 210+80	64	3.95		3.95	48	3200	0.004	0.28	13.63	0.25	0.45	8.78			10								
CI-43	LT STA 207+70	63	3.79		3.79	48	3200	0.004	0.28	13.42	0.25	0.45	8.42			10								
CI-42	RT STA 209+70	62	4.49		4.49	50	3333	0.004	0.29	14.67	0.25	0.45	9.98			10								
CI-41	LT STA 203+00	61	4.36		4.36	48	3200	0.004	0.29	14.15	0.25	0.45	9.69			10								
CI-40	RT STA 200+19	60	4.37		4.37	48	3200	0.004	0.3	14.16	0.25	0.45	9.71			10								
CI-39	LT STA 199+90	59	4.07		4.07	48	3200	0.006	0.26	12.77	0.25	0.41	9.93			10								
DI-8	RT STA 163+00	73	6.44		6.44																			1-GR Q=9.0 h=0.5 TY C

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LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

HYDRAULIC CALCULATIONS

SHEET 2 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		85
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

STORM SEWER CALCULATIONS SHEET 1 OF 2

FROM	TO	DA NO.	TOTAL DA (AC)	TOTAL CA	LENGTH (FT)	TIME OF CONCENTRATION ALONG SEWER LINE	TIME OF CONCENTRATION INLET TIME	TIME OF CONCENTRATION USED IN DESIGN	I (IN/HR)	Q (CFS)	DESIGN DIA. PIPE	DESIGN SLOPE (%) PIPE		DESIGN CAP. (CFS)		DESIGN VEL. (FT/S)
LINE	"C"															
CI-7	CI-6	14	0.19	0.16	83		1.52	10	6.93	1.13	18	0.639		8.8		3.70
CI-6	MH-IC	14,16	1.72	1.41	67	1.52+83/3.7X60=1.89	3.13	10	6.93	9.81	18	1.500		13.5		8.30
LINE	"D"															
CI-8	CI-9	17	0.73	0.63	145		1.67	10	6.93	4.37	18	5.276		25.5		11.00
CI-9	CI-10	17,18	3.23	2.38	84	1.67+145/11X60=1.89	4.35	10	6.93	16.49	18	5.798		27		16.00
CI-10	CI-10A	17,18,19/2	4.24	3.14	6	4.35+84/16X60=4.37	5.24	10	6.93	21.76	30	10.000		140		21.00
CI-10A	JCT-1D	17,18,19	5.45	3.93	198	5.24+6/21X60=5.24	5.24	10	6.93	27.23	30	3.420		80		15.00
JCT-1D	JCT-2D	17,18,19	5.45	3.93	145	5.24+198/15X60=5.46	5.46	10	6.93	27.23	36	0.983		70		9.50
CI-11A	CI-11	20	2.7	1.89	6		8.11	10	6.93	13.1	18	4.667		24		14.00
CI-11	JCT-2D	20	2.7	1.89	6	8.11+6/14X60=8.13	8.13	10	6.93	13.1	18	6.167		27		16.20
JCT-2D	JCT-3D	17 - 20	8.15	5.82	30	8.13+6/16.2X60=8.13	8.11	10	6.93	40.33	36	0.983		70		11.50
CI-12	JCT-3D	21	0.13	0.12	6		0.67	10	6.93	0.84	18	6.333		28		4.80
JCT-3D	JCT-4D	17 - 21	8.28	5.94	45	8.13+30/11.5X60=8.17	8.11	10	6.93	41.16	36	0.983		70		10.50
CI-13	JCT-4D	22	0.220	0.200	6		1.28	10	6.93	1.39	18	3.667		21		7.00
JCT-4D	JCT-1F	17 - 22	8.50	6.14	29	8.17+45/10.5X60=8.19	8.11	10	6.93	42.55	36	0.983		70		11.00
LINE	"E"															
DI-4	JCT-1E	26A	0.3	0.27	101		0.933	10	6.93	1.87	18	2.955		19		7
DI-3	JCT-1E	26	0.7	0.59	16		0.667	10	6.93	4.09	18	13.625		40		15
JCT-1E	JCT -2E	26,26A	1	0.86	291	0.933+101/7X60=1.17		10	6.93	5.96	18	2.740		18		7
JCT-2E	JCT-3E	26,26A	1	0.86	5	1.17+291/97X60=1.86		10	6.93	5.96	24	1.595		31		4.5
CI-14	JCT-3E	28	0.29	0.26	6			10	6.93	1.8	18	2.167		16		6.5
JCT-3E	JCT-4F	26A,26,28	1.29	1.12	19	1.86+5/4.5X60=1.88		10	6.93	7.76	24	1.595		31		8.2
LAT 5F																
CI-15	CI-16	30	0.3	0.27	45			10	6.93	1.87	18	9.644		34		11
CI-16	JCT 5F	30-31	0.52	0.47	20			10	6.93	3.26	18	24.300		55		8.5
LAT 6F																
CI-17	JCT 6F	32	0.54	0.49	32			10	6.93	3.4	18	19.250		50		16
LINE	"F"															
DI-1	JCT 1F	23	5.04	3.53	4			10	6.93	24.26	24	3.640		46		15.5
DI-2	JCT 2F	24	5.34	3.74	4			10	6.93	25.92	24	3.640		46		17
JCT 2F	OUTFALL	17-24,26A,26,28,30-32	21.23	15.49	108			10	6.93	107.35	54	0.500	H.G.	150	d/D	10
LINE	"G"															
CI-18	CI-19	25,27	4.59	3.43	18		3.91	10	6.93	23.77	24	3.316		44		9.00
CI-19	CI-20	25,27,33	9.31	6.79	271	3.91+38/9X60=3.98	4.28	10	6.93	47.05	30	3.398		85		17.00
CI-20	JCT-1G	25,27,33,34	10.07	7.4	236.5	4.28+271/17X60=4.55		10	6.93	51.28	30	5.035		100		21.00
DI-5	JCT-1G	37	1.54	1.32	98			10	6.93	9.15	18	3.867		22		12.00
JCT-1G	CI-21	25,27,33,34,37	11.61	8.72	53.5	4.55+236.5/21X60=4.74		10	6.93	60.43	30	5.035		100		22.00
CI-21	CI-22	25,27,33-35,37	12.89	9.89	286	4.74+53.5/22X60=4.78		10	6.93	68.54	30	5.326		105		21.50
DI-6	CI-22	38	3.57	2.57	104		7.35	10	6.93	17.81	36	2.60		115		12.00
CI-22	CI-24	25,27,33-38	17.36	13.22	342	7.35+104/12X60=7.49		10	6.93	91.61	36	4.00		150		22.00
CI-24	CI-25	25,27,33-38,40	18.28	13.97	45	7.49+342/20X60=7.78		10	6.93	96.81	36	4.00		150		22.00
CI-25	JCT-3I	25,27,33-38,40,43	18.58	14.24	32	7.78+45/22X60=7.81		10	6.93	98.68	36	25.44		350		44.00
LINE	"I"															
DI-7	JCT-1I	39	4.4	3.08	303		8.33	10	6.93	21.34	24	3.178		44		14.00
CI-23	JCT-2I	42	0.56	0.48	28			10	6.93	3.33	18	23.390		120		17.00
CI-26	JCT 4I	41	0.81	0.7	30			10	6.93	4.85	18	29.500		65		21.00
EX. 66"	OUTFALL	25,27,33-44	90.05	64.49	102	8.33+303/14X60=8.69		10	6.93	624.05	72	1.50		* 624.05		23.00

* FULL FLOW HG=2.0%

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

HYDRAULIC CALCULATIONS

SHEET 3 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		86
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

STORM SEWER CALCULATIONS SHEET 1 OF 2

FROM	TO	DA NO.	TOTAL DA (AC)	TOTAL CA	LENGTH (FT)	TIME OF CONCENTRATION ALONG SEWER LINE	TIME OF CONCENTRATION INLET TIME	TIME OF CONCENTRATION USED IN DESIGN	I (IN/HR)	Q (CFS)	DESIGN DIA. PIPE	DESIGN SLOPE (%) PIPE		DESIGN CAP. (CFS)		DESIGN VEL. (FT/S)
LINE	"C"															
CI-7	CI-6	14	0.19	0.16	83		1.52	10	6.93	1.13	18	0.639		8.8		3.70
CI-6	MH-IC	14,16	1.72	1.41	67	1.52+83/3.7X60=1.89	3.13	10	6.93	9.81	18	1.500		13.5		8.30
LINE	"D"															
CI-8	CI-9	17	0.73	0.63	145		1.67	10	6.93	4.37	18	5.276		25.5		11.00
CI-9	CI-10	17,18	3.23	2.38	84	1.67+145/11X60=1.89	4.35	10	6.93	16.49	18	5.798		27		16.00
CI-10	CI-10A	17,18,19/2	4.24	3.14	6	4.35+84/16X60=4.37	5.24	10	6.93	21.76	30	10.000		140		21.00
CI-10A	JCT-1D	17,18,19	5.45	3.93	198	5.24+6/21X60=5.24	5.24	10	6.93	27.23	30	3.420		80		15.00
JCT-1D	JCT-2D	17,18,19	5.45	3.93	145	5.24+198/15X60=5.46	5.46	10	6.93	27.23	36	0.983		70		9.50
CI-11A	CI-11	20	2.7	1.89	6		8.11	10	6.93	13.1	18	4.667		24		14.00
CI-11	JCT-2D	20	2.7	1.89	6	8.11+6/14X60=8.13	8.13	10	6.93	13.1	18	6.167		27		16.20
JCT-2D	JCT-3D	17 - 20	8.15	5.82	30	8.13+6/16.2X60=8.13	8.11	10	6.93	40.33	36	0.983		70		11.50
CI-12	JCT-3D	21	0.13	0.12	6		0.67	10	6.93	0.84	18	6.333		28		4.80
JCT-3D	JCT-4D	17 - 21	8.28	5.94	45	8.13+30/11.5X60=8.17	8.11	10	6.93	41.16	36	0.983		70		10.50
CI-13	JCT-4D	22	0.220	0.200	6		1.28	10	6.93	1.39	18	3.667		21		7.00
JCT-4D	JCT-1F	17 - 22	8.50	6.14	29	8.17+45/10.5X60=8.19	8.11	10	6.93	42.55	36	0.983		70		11.00
LINE	"E"															
DI-4	JCT-1E	26A	0.3	0.27	101		0.933	10	6.93	1.87	18	2.955		19		7
DI-3	JCT-1E	26	0.7	0.59	16		0.667	10	6.93	4.09	18	13.625		40		15
JCT-1E	JCT -2E	26,26A	1	0.86	291	0.933+101/7X60=1.17		10	6.93	5.96	18	2.740		18		7
JCT-2E	JCT-3E	26,26A	1	0.86	5	1.17+291/97X60=1.86		10	6.93	5.96	24	1.595		31		4.5
CI-14	JCT-3E	28	0.29	0.26	6			10	6.93	1.8	18	2.167		16		6.5
JCT-3E	JCT-4F	26A,26,28	1.29	1.12	19	1.86+5/4.5X60=1.88		10	6.93	7.76	24	1.595		31		8.2
LAT 5F																
CI-15	CI-16	30	0.3	0.27	45			10	6.93	1.87	18	9.644		34		11
CI-16	JCT 5F	30-31	0.52	0.47	20			10	6.93	3.26	18	24.300		55		8.5
LAT 6F																
CI-17	JCT 6F	32	0.54	0.49	32											
								10	6.93	3.4	18	19.250		50		16
LINE	"F"															
DI-1	JCT 1F	23	5.04	3.53	4			10	6.93	24.26	24	3.640		46		15.5
DI-2	JCT 2F	24	5.34	3.74	4			10	6.93	25.92	24	3.640		46		17
JCT 2F	OUTFALL	17-24,26A,26,28,30-32	21.23	15.49	108			10	6.93	107.35	54	0.500	H.G.	150	d/D	10
LINE	"G"															
CI-18	CI-19	25,27	4.59	3.43	18		3.91	10	6.93	23.77	24	3.316		44		9.00
CI-19	CI-20	25,27,33	9.31	6.79	271	3.91+38/9X60=3.98	4.28	10	6.93	47.05	30	3.398		85		17.00
CI-20	JCT-1G	25,27,33,34	10.07	7.4	236.5	4.28+271/17X60=4.55		10	6.93	51.28	30	5.035		100		21.00
DI-5	JCT-1G	37	1.54	1.32	98			10	6.93	9.15	18	3.867		22		12.00
JCT-1G	CI-21	25,27,33,34,37	11.61	8.72	53.5	4.55+236.5/21X60=4.74		10	6.93	60.43	30	5.035		100		22.00
CI-21	CI-22	25,27,33-35,37	12.89	9.89	286	4.74+53.5/22X60=4.78		10	6.93	68.54	30	5.326		105		21.50
2 CI-22	CI-24	25,27,33-38	17.36	13.22	342	7.38+87/12X60=7.50		10	6.93	91.61	36	4.00		150		22.00
2 CI-24	CI-25	25,27,33-38,40	18.28	13.97	45	7.50+342/22X60=7.79		10	6.93	96.81	36	4.00		150		22.00
2 CI-25	JCT-3I	25,27,33-38,40,43	18.58	14.24	32	7.79+45/22X60=7.82		10	6.93	98.68	36	25.44		350		44.00
LINE	"H"															
2 DI-6	JCT 1H	38	3.57	2.57	17		7.35	10	6.93	17.81	30	2.16		65		11.20
2 JCT 1H	CI-22	38	3.57	2.57	87	7.35+17/11.2X60=7.38		10	6.93	17.81	36	2.60		115		12.00
LINE	"I"															
DI-7	JCT-1I	39	4.4	3.08	303		8.33	10	6.93	21.34	24	3.178		44		14.00
CI-23	JCT-2I	42	0.56	0.48	28			10	6.93	3.33	18	23.390		120		17.00
CI-26	JCT 4I	41	0.81	0.7	30			10	6.93	4.85	18	29.500		65		21.00
EX. 66"	OUTFALL	25,27,33-44	90.05	64.49	102	8.33+303/14X60=8.69		10	6.93	624.05	72	1.50		*624.05		23.00

* FULL FLOW HG=2.0%

2 CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT

The seal appearing on this document was authorized by G. K. WETZIG, P.E. 80322, on 7/19, 2000.

G. K. Wetzig
for Change Order No. 2

HYDRAULIC CALCULATIONS
SHEET 3 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		86A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

STORM SEWER CALCULATIONS SHEET 2 OF 2

FROM	TO	DA NO.	TOTAL DA (AC)	TOTAL CA	LENGTH (FT)	TIME OF CONCENTRATION ALONG SEWER LINE	TIME OF CONCENTRATION INLET TIME	TIME OF CONCENTRATION USED IN DESIGN	I (IN/HR)	Q (CFS)	DESIGN DIA. PIPE	DESIGN SLOPE (%) PIPE	DESIGN CAP. (CFS)	DESIGN VEL. (FT/S)
LINE	"J"													
CGI-38	JCT-1J	58	0.51	0.44	39.5		2.98	10	6.93	3.05	18	0.762	9.5	4.80
CI-37	JCT-1J	57	0.51	0.44	74		2.98	10	6.93	3.05	18	1.081	11.5	5.50
JCT-1J	MH-1J	57,58	1.02	0.88	262.5	2.98+74/5.5X60=3.20		10	6.93	6.1	18	0.762	9.5	6.00
MH-1J	JCT 1	57,58	1.02	0.88	234.5	3.20+262.5/6X60=3.93		10	6.93	6.1	18	0.733	9.5	6.00
JCT 1	JCT-2J	56-58	1.69	1.46	42	3.93+234.5/6X60=4.58		10	6.93	10.12	24	1.000	25	7.50
CI-35	JCT-2J	55	0.67	0.58	74			10	6.93	4.02	18	1.959	15.5	7.50
JCT-2J	MH-2J	55-58	2.36	2.04	220.5	4.58+42/7.5X60=4.67		10	6.93	14.14	24	1.000	25	8.00
MH-2J	JCT 2	55-58	2.36	2.04	254.5	4.67+220.5/8X60=5.13		10	6.93	14.14	24	1.014	25	8.00
JCT 2	JCT-3J	53,55-58	2.97	2.57	42	5.13+254.5/8X60=5.66		10	6.93	17.81	24	1.000	25	9.70
CI-33	JCT-3J	54	0.61	0.53	74			10	6.93	3.67	18	1.297	12	6.00
JCT-3J	MH-3J	53-58	3.58	3.1	200.5	5.66+42/9.7X60=5.73		10	6.93	21.48	24	1.000	25	8.30
MH-3J	JCT 3	53-58	3.58	3.1	294.5	5.73+200.5/8.3X60=6.13		10	6.93	21.48	24	1.059	26	9.00
JCT 3	MH-4J	52-58	4.22	3.65	253.5	6.13+294.5/9X60=6.68		10	6.93	25.29	24	4.129	50	16.50
CI-31	MH-4J	51	1.09	0.85	74			10	6.93	5.89	18	2.068	15.5	9.20
MH-4J	JCT-5J	51-58	5.31	4.5	183.5	6.68+253.5/16.5X60=6.94		10	6.93	31.19	24	4.062	50	17.00
CI-30	JCT-5J	50	0.96	0.67	74			10	6.93	4.64	18	2.554	17.5	8.50
JCT-5J	JCT 4	50-58	6.27	5.17	270	6.94+183.5/17X60=7.12		10	6.93	35.83	24	4.062	50	17.00
JCT 4	JCT-6J	49-58	7.67	6.15	248	7.12+270/17X60=7.38		10	6.93	42.62	30	2.735	95	12.50
DI-10	CI-28	45	0.76	0.38	50			10	6.93	2.63	18	1.320	13	6.00
CI-28	JCT-6J	45,48	1.82	1.23	43			10	6.93	8.52	18	1.907	16.5	10.00
JCT-6J	JCT 5	45,48-58	9.49	7.38	52	7.38+248/12.5X60=7.71		10	6.93	51.14	30	2.736	80	16.00
JCT 5	MH-5J	45,47-58	9.77	7.62	92.5	7.71+52/16X60=7.76		10	6.93	52.81	30	1.646	60	12.00
MH-5J	JCT-7J	45,47-58	9.77	7.62	8	7.76+92.5/12X60=7.89		10	6.93	52.81	42	4.547	95	10.50
DI-9	JCT-7J	72	28.1	14.05	17		47	47	2.95	41.45	30	1.941	65	13.00
JCT-7J	JCT-8J	45,47-58,72	37.87	21.67	448	7.89+8/10.5X60=7.90		10	6.93	150.17	42	4.547	240	24.00
LINE	"K"													
DI-8	JCT 1K	73	1.86	0.93	66			10	6.93	6.44	24	2.030	35	9.50
LINE	"L"													
CI-47	JCT-1L	67	2	1.32	233		6.17	10	6.93	9.15	18	1.575	14.0	8.50
CI-46	JCT-1L	66	1.2	0.67	73		7.5	10	6.93	6.64	18	1.192	12.0	7.00
JCT-1L	MH-1L	66-67	3.2	1.99	133.5	7.5+73/6X60=7.70		10	6.93	13.79	24	1.500	29	9.50
CI-45	MH 1L	65	1.55	0.84	73		7.58	10	6.93	5.82	18	1.027	11	6.70
MH 1L	JCT-3L	65-67	4.75	2.83	143.5	7.70+133.5/6.7X60=8.03		10	6.93	19.61	30	0.612	35	7.00
CI-44	JCT-3L	64	1.02	0.57	73		7.61	10	6.93	3.95	18	1.315	12.5	6.50
JCT-3L	JCT 4L	64-67	5.77	3.4	74	8.03+143.5/7X60=8.37		10	6.93	23.56	30	0.612	35	7.50
JCT 4L	MH-2L	62,64-67	6.49	4.05	210.5	8.37+74/7.5X60=8.54		10	6.93	28.07	36	0.732	60	9.50
CI-43	MH-2L	63	0.83	0.55	73		8.03	10	6.93	3.81	18	1.658	14	7.00
MH-2L	MH-3L	62-67	7.32	4.6	491	8.54+210.5/9.5X60=8.91		10	6.93	31.88	36	0.735	60	9.00
CI-41	MH-3L	61	0.85	0.63	73		4.27	10	6.93	4.37	18	1.000	11	6.00
MH-3L	CGI-40	61-67	8.17	5.23	245.5	8.91+491/9X60=9.82	9.97	10	6.93	36.24	36	0.741	63	9.00
CI-39	JCT 5L	59	0.96	0.59	73		2.98	10	6.93	4.09	18	1.137	11.5	6.00
CGI-40	HW-2	59-67	9.83	6.45	70			10	6.93	44.7	42	0.400	70	7.50
LINE	"M"													
DI-12	CI-49	71	1.55	0.84	97		6.25	10	6.93	5.82	18	1.371	13	7.20
CI-49	JCT-1M	70-71	3.5	1.9	89	6.25+97/7.2X60=6.47	6.94	10	6.93	13.17	24	0.904	24	7.80
CI-48	JCT-1M	69	1.4	0.9	18			10	6.93	6.24	18	2.566	18	9.50
JCT-1M	JCT 2M	69-71	4.9	2.8	109	6.94+8.9/7.8X60=7.13		10	6.93	19.4	24	0.904	24	8.50
DI-11	SET	68-71	6.65	3.68	110	7.13+109/8.5X60=7.34		10	6.93	25.5	30	0.500	32	7.00

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

HYDRAULIC CALCULATIONS

SHEET 4 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)99		57
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

THYSYS

TEXAS HYDRAULICS SYSTEM

```
$ PROJECT: FM 740
$ CSJ NO.: 1014-03-033
$ STATION: 163+05
$
HYDRO     DA        355ACRES                                     10YR
METHOD    USGS
USGS      REGION = 2          SLOPE =    80.5FT/MI
ENDATA
```

HYDRO

USGS PROCEDURE

REGION = 2

FREQUENCY = 10 YR.

DRAINAGE AREA = 355.00 ACRES

SLOPE = 80.5 FEET PER MILE

SECTION SPECIFICATIONS FOR SECTION "C" AT STATION 100.00
DOWNSTREAM

DRAINAGE AREA RATIO 1.000

COORDINATE INFORMATION

X	Y
.00	469.47
50.00	468.07
88.00	468.07
100.00	467.67
108.00	463.27
120.00	455.37
122.00	451.87
134.00	451.37
142.00	466.87
150.00	466.37
200.00	468.17

'N' VALUE INFORMATION

FROM X	TO X	'N' BELOW	ELEVATION	'N' ABOVE
.00	200.00	.060	469.47	.060

SECTION SPECIFICATIONS FOR SECTION "4" AT STATION 560.00
UPSTREAM

DRAINAGE AREA RATIO 1.000

COORDINATE INFORMATION

X	Y
.00	487.67
10.00	487.27
21.00	485.57
30.00	482.37
42.00	477.17
51.00	475.37
56.00	473.77
66.00	473.77
69.00	473.27
70.00	471.77
75.00	471.17
80.00	473.77
86.00	475.27
97.00	475.27
114.00	477.97
139.00	483.47
181.00	483.87
236.00	484.37

'N' VALUE INFORMATION

FROM X	TO X	'N' BELOW	ELEVATION	'N' ABOVE
.00	236.00	.040	487.67	.040

RESULTS OF TWO SECTION METHOD CALCULATIONS

	DOWNSTREAM "C"	UPSTREAM "4"	AT SITE
SECTION STATION	100.00	560.00	175.00

DESIGN Q (CFS)	SLOPE (FT/FT)	VELOCITY (FT/SEC) DOWNSTREAM	VELOCITY (FT/SEC) UPSTREAM	WATER SURFACE ELEVATION AT SITE
680.	.04184	10.26	10.89	459.26
1311.	.03913	11.83	11.45	461.30

```
CULBRG                  ANALYSIS              CULVERT   SINGLE
CLVRT 710                           BOX       CONCRETE
CLVRT 710               BROKEN BK                                NORMAL KE=0.50
CLVRT 710 OUTLT STA      314.08     EL 452.25 INLET STA      0.00  EL 471.84
CLVRT 710 BREAK STA      140.35     EL 464.17 BREAK STA    168.63  EL 456.16
CLVRT 710 DIMENSIONS                          HIGH=    7 WIDE=  10   BARRELS=     1

RD PROFILEX    15500 Y  502.04 X    15600 Y  497.04 X    15700 Y  492.04
RD PROFILEX    15800 Y  487.48 X    15900 Y  484.25 X    16000 Y  482.38
RD PROFILEX    16100 Y  481.87 X    16200 Y  482.72 X    16300 Y  484.94
RD PROFILEX    16400 Y  488.52 X    16500 Y  492.60 X    16600 Y  495.24
```

ANALYZE SINGLE OPENING BROKEN BACK CULVERT

CULVERT ID = 710 JOB NUMBER = FM 740

INLET STATION = 0 ELEVATION = 471.84

OUTLET STATION = 314 ELEVATION = 452.25

PROFILE	SHAPE	INLET TYPE	KE	MATERIAL	'N'
BROKN BK	BOX	NORMAL	.50	CONCRETE	.012

BROKEN BACK CULVERT CONFIGURATION

UNIT	SLOPE	LENGTH	UPSTREAM STA.	UPSTREAM ELEV.	DOWNSTREAM STA.	DOWNSTREAM ELEV.
1	.05465	140	0	471.84	140	464.17
2	.28324	28	140	464.17	168	456.16
3	.02688	145	168	456.16	314	452.25

CRITICAL SLOPE = .00000

FLOW = 679.9 CFS FREQUENCY = 10 YEAR

TAILWATER = 459.26

H U N D R E D   Y E A R   F L O O D   A N A L Y S I S

CULVERT 710 1 - 0 X 0 X 314.08

BASIC FLOOD APPLIED (100 YEAR FREQ) = 1311.4 CFS

HUNDRED YEAR VELOCITY AT STRUCTURE OUTLET =33.48

HUNDRED YEAR TAILWATER ELEVATION = 461.30

ELEVATION OF WATER SURFACE OVER ROAD = 483.02

LOW ELEVATION OF ROAD PROFILE = 481.87

GREATEST DEPTH OF FLOW OVER ROAD = 1.15

PERCENTAGE OF BASIC FLOOD OVER ROAD = 36.35%

STATE OF TEXAS
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REGISTERED PROFESSIONAL ENGINEER

David Lott, P.E.
8/16/99

HYDRAULIC CALCULATIONS

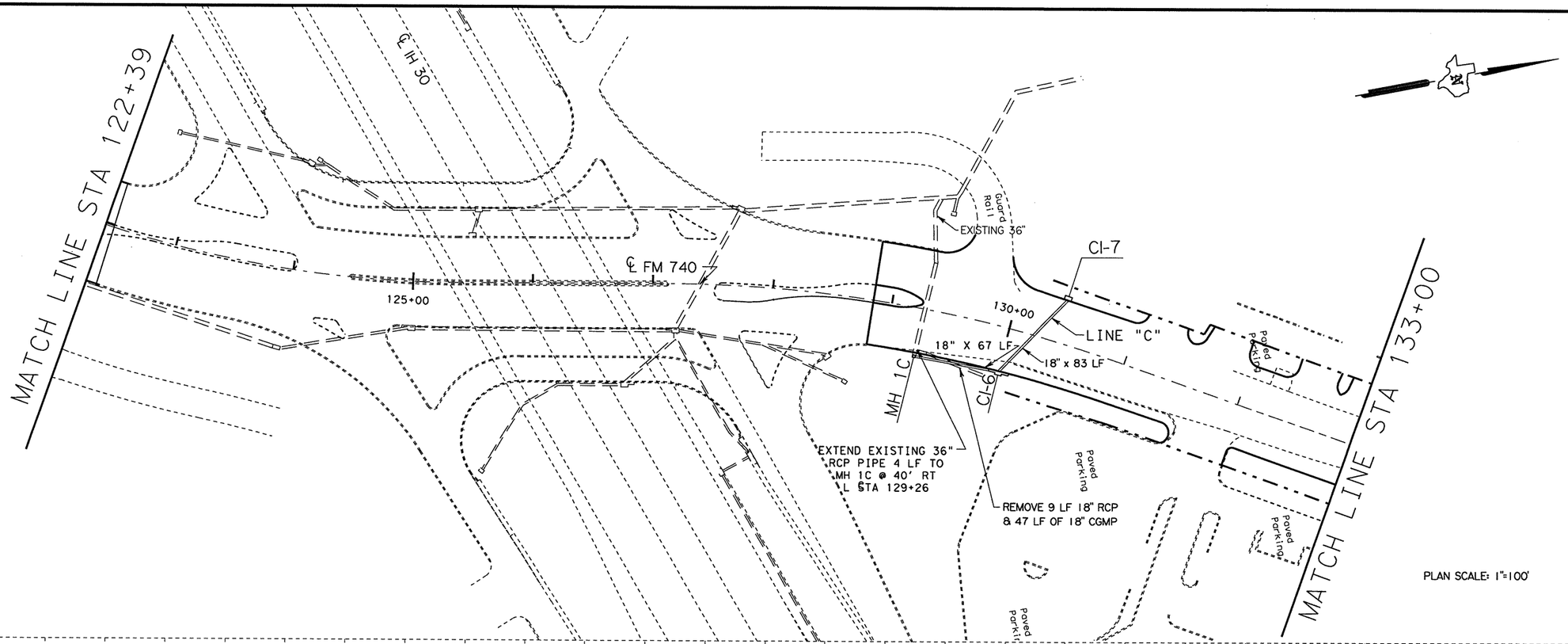
SHEET 5 OF 5

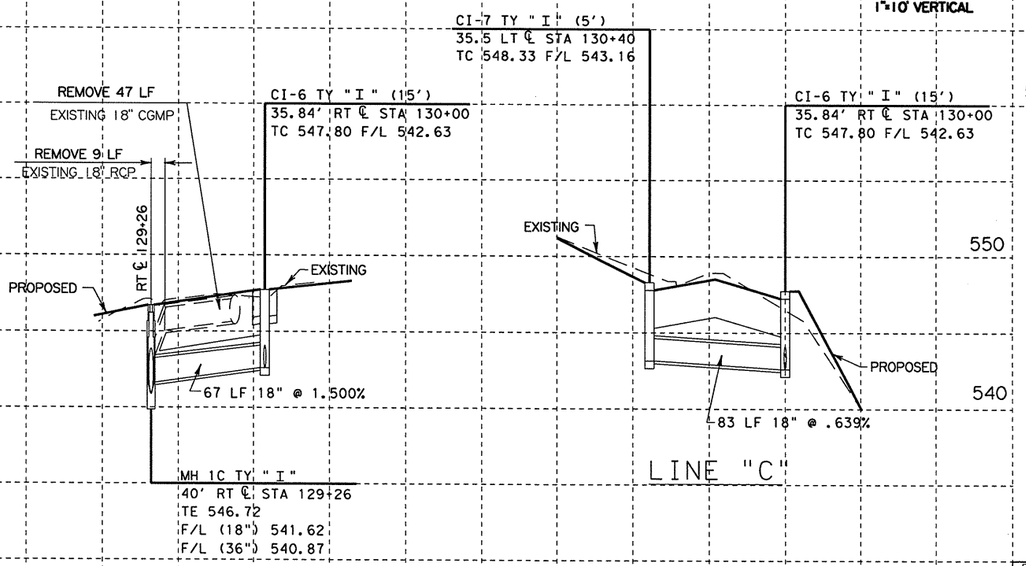
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)99		88
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

REMOVALS

REFERENCE FILES	DRAINAGE
FM7/ 2.DGN	1,6,19-20,23,34,47,49,51
FM7 70.DGN	2,40
911DUN.DGN	20,63
911DRA.DGN	40
DRAIN1.DGN	1,6,23,40 - 43,47,49

$$$$date$$$$





STATE OF TEXAS
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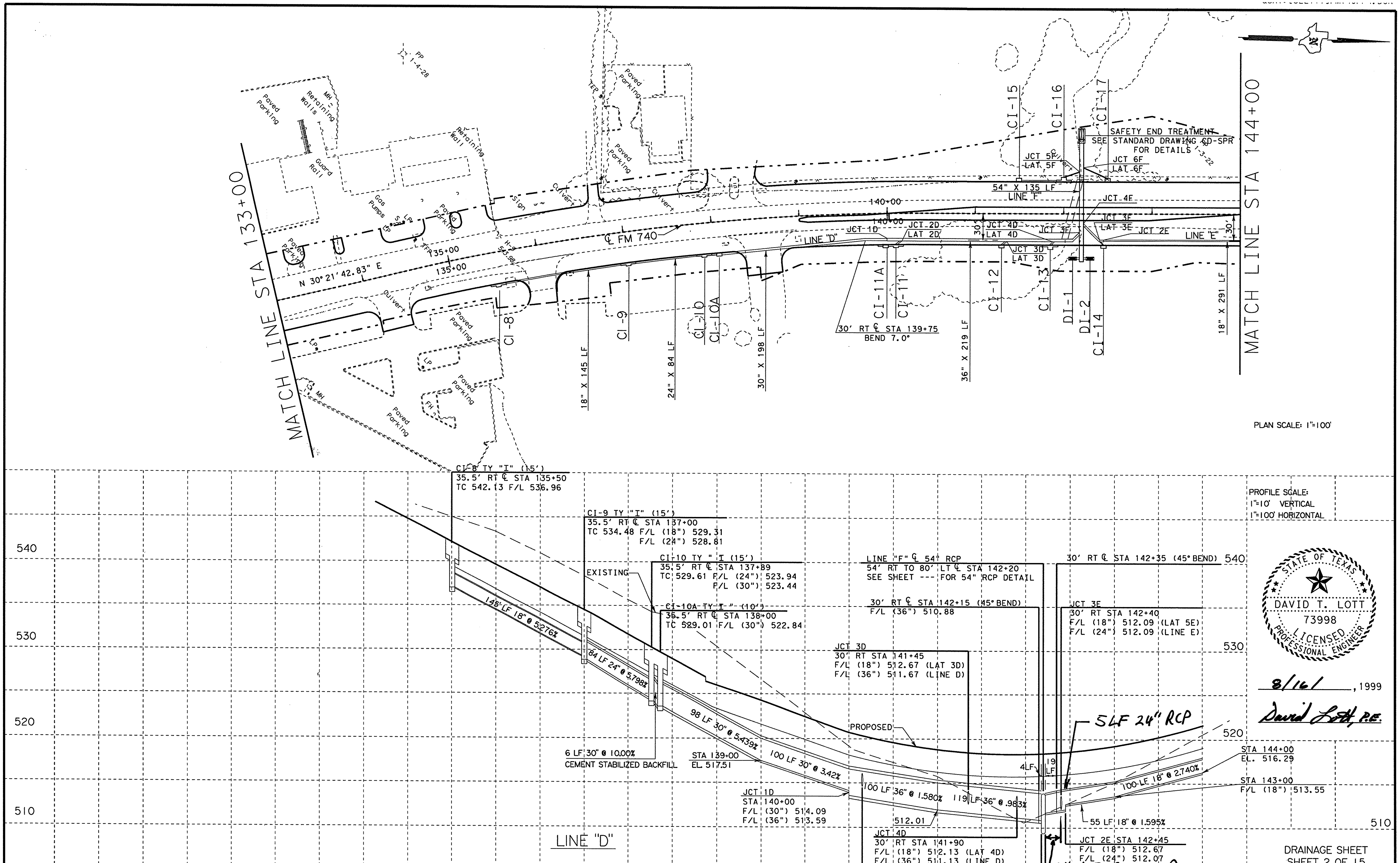
8/16/, 1999

David Lott, P.E.

DRAINAGE SHEET
SHEET 1 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		89
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



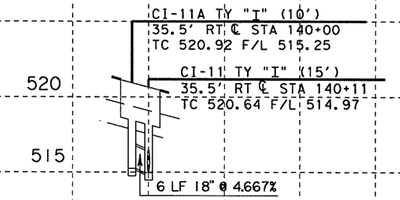
MATCH LINE STA 133+00
MATCH LINE STA 144+00
N 30° 21' 42.83" E
℄ FM 740
135+00
140+00
LINE "D"
LINE "E"
LINE "F"
54" X 135 LF
SAFETY END TREATMENT
SEE STANDARD DRAWING CD-SPR
FOR DETAILS
JCT 5F
LAT 5F
JCT 6F
LAT 6F
JCT 4F
JCT 3F
LAT 3E
JCT 2E
JCT 1D
JCT 2D
LAT 2D
JCT 4D
LAT 4D
JCT 3D
LAT 3D
30' RT ℄ STA 139+75
BEND 7.0°
CI-8
CI-9
CI-10
CI-10A
CI-11A
CI-11
CI-12
CI-13
CI-14
CI-15
CI-16
CI-17
DI-1
DI-2
18" X 145 LF
24" X 84 LF
30" X 198 LF
36" X 219 LF
18" X 291 LF
Paved Parking
Retaining Walls
Guard Rail
Gas Pumps
Culvert
PLAN SCALE: 1"=100'
PROFILE SCALE:
1"=10' VERTICAL
1"=100' HORIZONTAL
CI-8 TY "I" (15')
35.5' RT ℄ STA 135+50
TC 542.13 F/L 536.96
CI-9 TY "I" (15')
35.5' RT ℄ STA 137+00
TC 534.48 F/L (18") 529.31
F/L (24") 528.81
CI-10 TY "I (15')
35.5' RT ℄ STA 137+89
TC 529.61 F/L (24") 523.94
F/L (30") 523.44
CI-10A TY "I" (10')
36.5' RT ℄ STA 138+00
TC 529.01 F/L (30") 522.84
EXISTING
PROPOSED
145 LF 18" @ 5.276%
84 LF 24" @ 5.798%
98 LF 30" @ 5.439%
100 LF 30" @ 3.42%
100 LF 36" @ 1.580%
119 LF 36" @ .983%
100 LF 18" @ 2.740%
55 LF 18" @ 1.595%
6 LF 30" @ 10.00%
CEMENT STABILIZED BACKFILL
STA 139+00
EL 517.51
JCT 1D
STA 140+00
F/L (30") 514.09
F/L (36") 513.59
JCT 2D
30' RT STA 140+15
F/L (18") 514.60 (LAT 2D)
F/L (36") 513.35 (LINE D)
512.01
JCT 3D
30' RT STA 141+45
F/L (18") 512.67 (LAT 3D)
F/L (36") 511.67 (LINE D)
JCT 4D
30' RT STA 141+90
F/L (18") 512.13 (LAT 4D)
F/L (36") 511.13 (LINE D)
LINE "F" ℄ 54" RCP
54' RT TO 80' LT ℄ STA 142+20
SEE SHEET --- FOR 54" RCP DETAIL
30' RT ℄ STA 142+15 (45° BEND)
F/L (36") 510.88
JCT 3F
27.25' RT ℄ STA 142+20
F/L (36") 510.84 (LINE D)
F/L (54") 509.34 (LINE F)
30' RT ℄ STA 142+35 (45° BEND)
JCT 3E
30' RT STA 142+40
F/L (18") 512.09 (LAT 5E)
F/L (24") 512.09 (LINE E)
JCT 2E STA 142+45
F/L (18") 512.67
F/L (24") 512.07
JCT 4F
16.75' RT ℄ STA 142+20
F/L (24") 511.71 (LINE E)
F/L (54") 509.21 (LINE F)
4LF
19 LF
54 LF 24" RCP
24 LF 24" RCP
STA 144+00
EL. 516.29
STA 143+00
F/L (18") 513.55
LINE "D"
540
530
520
510
STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER
8/16/, 1999
David Lott, P.E.

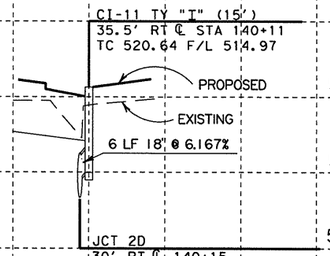
DRAINAGE SHEET
SHEET 2 OF 15

DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
	STP 99(413)MM		90
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

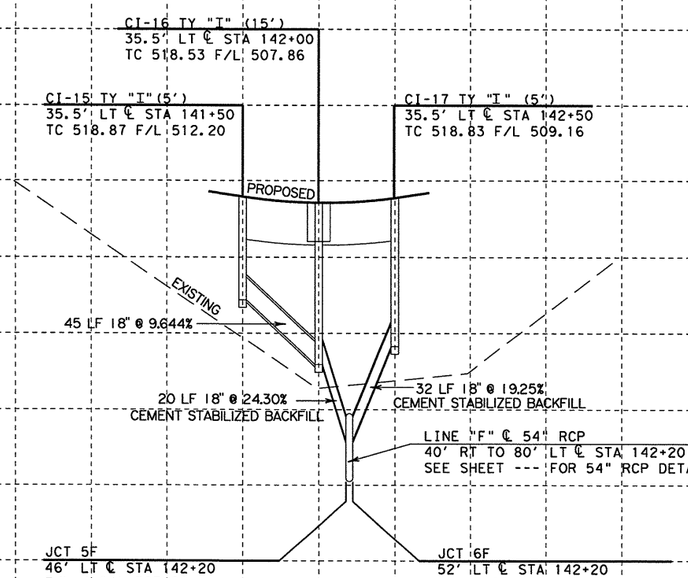
REMOVALS	
DRAINAGE	1,6,20,22,23,34,40,47,49
	1-30, 39-49
	1,6,23,40 - 43,47,49
REFERENCE FILES	FM740 ... DGN
	FM740
DESIGN FILES	DRAIN2.DGN

$$$$date$$$$



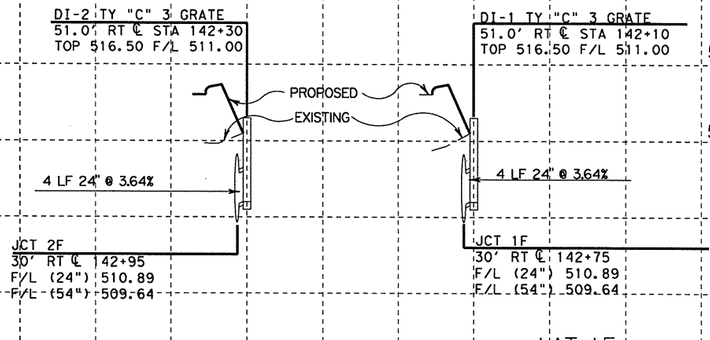


LAT 2D



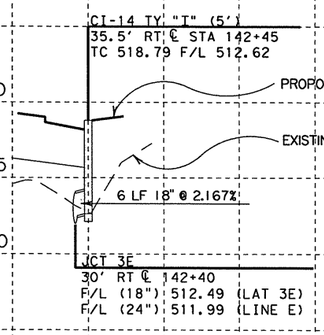
LAT 5F

LAT 6F

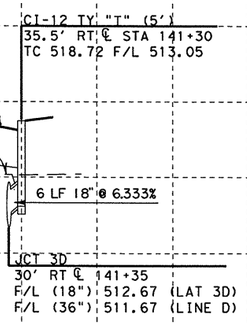


LAT 2F

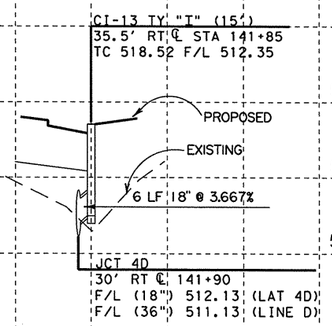
LAT 1F



LAT 3E



LAT 3D



LAT 4D

STATE OF TEXAS
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8/16/, 1999

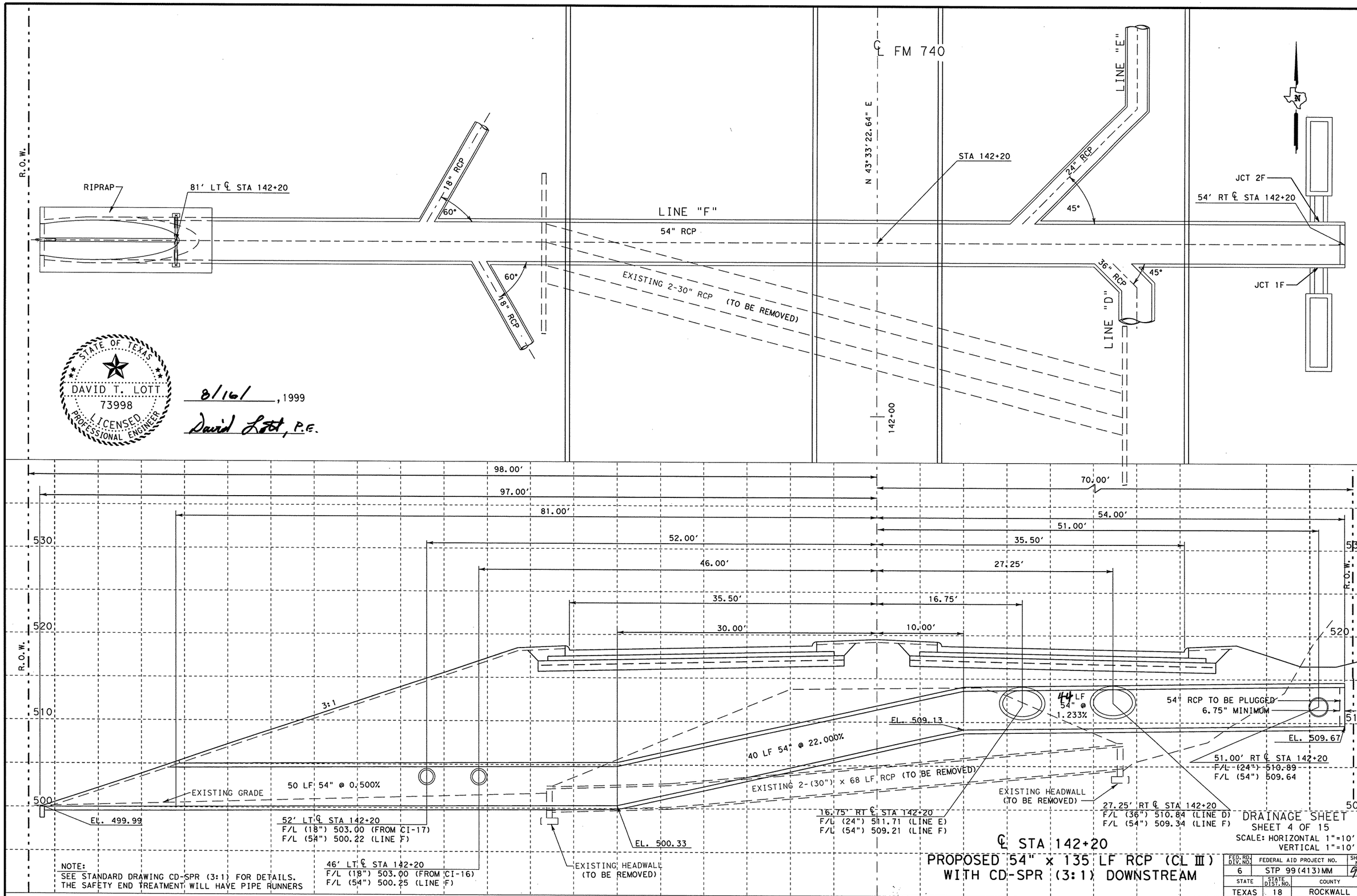
David Lott, P.E.

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

DRAINAGE SHEET
SHEET 3 OF 15

DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		09
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

$$$$date$$$$



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David Lott, P.E.

NOTE:
SEE STANDARD DRAWING CD-SPR (3:1) FOR DETAILS.
THE SAFETY END TREATMENT WILL HAVE PIPE RUNNERS

℄ STA 142+20
PROPOSED 54" x 135 LF RCP (CL III) WITH CD-SPR (3:1) DOWNSTREAM

DRAINAGE SHEET
SHEET 4 OF 15
SCALE: HORIZONTAL 1"=10'
VERTICAL 1"=10'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		92
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

$$$date$$$$

fm74054.dgn

REMOVALS

DRAINAGE
1,6,20,22,2 x 44,47,49
2,40
1,6,23,40 - 43,47,49

REFERENCE FILES
FM_ _DGN
FM_ _JPO.DGN

DESIGN FILES
DRAIN3.DGN

$$$$date$$$$

MATCH LINE STA 144+00

TURTLE COVE

Paved Parking

DI-4 TY "D" 2 GRATES
45' RT ℄ STA 146+32
TOP 530.60 F/L 18" 524.60

EXISTING

PROPOSED

112 LF 18" @ 2.95%

125 LF 18" @ 4.0%

STA 146+17
45° BEND

STA 145+25
EL 521.29

STA 144+00
EL 516.29

LINE "E"

JCT 1E
30' RT ℄ STA 145+36
F/L 18" 521.62

EXISTING

DI-3 TY "D" 3 GRATES
45' RT ℄ STA 145+45
TOP 528.80 F/L 523.80

PROPOSED

16 LF 18" @ 13.625%

LAT 1E

145+00

18" x 291 LF

LINE "E"

18" x 101 LF

45° BEND

18" x 16 LF
LAT 1E
JCT 1E

DI-4

DI-3

℄ FM 740

150+00

CI-18
CI-18A

CI-19
CI-19A

24" x 38 LF

WHITEHILL

CI-18 TY "I" (15)
84' RT ℄ STA 148+36
TC 535.81 F/L (18") 530.81
F/L (24") 530.31

CI-19 TY "I" (15)
83' RT ℄ STA 148+74
TC 535.72 F/L (18") 529.55
F/L (24") 529.05
F/L (30") 528.55

38 LF 24" @ 3.316%

65.5' RT ℄ STA 148+74
45° BEND

58 LF 30" @ 9.414%

BREAK
35.5' RT ℄
STA 149+04
F/L 523.10

37.6' LT ℄ STA 149+77
45° BEND

30" x 213 LF

213 LF 30" @ 3.366%

6 LF 30" @ 7.833%

CI-20A TY "I" (10)
35.5 LT ℄ STA 150+89
TC 522.10 F/L 515.93

CI-20 TY "I" (10)
35.5 LT ℄ STA 151+00
TC 521.63 F/L 515.46

EXISTING

PROPOSED

284 LF 30" @ 5.035%

6 LF 30" @ 9.333%

CI-20A

CI-20

30" x 236.5 LF

LINE "G"

45° BEND

30" x 47.5 LF

CI-21A

CI-21

30" x 285 LF

JCT 1G
LAT 1G

37.6'

18" x 38 LF

155

CURB OPENINGS (2) SEE MISCELLANEOUS DETAILS

NOTE: CURB OPENINGS AT APPROXIMATE STATIONS 149+50, 150+50, 152+25. CENTER OPENING WITH SAW JOINT

DI-5

MATCH LINE STA 155+00

JCT 1G
35.5' LT ℄ STA 153+39
F/L (18") 504.21 (LAT 2G)
F/L (30") 503.55 (LINE G)

CI-21A TY "I" (10)
35.5 LT ℄ STA 153+89
TC 507.33 F/L 501.16

CI-21 TY "I" (10)
35.5 LT ℄ STA 154+00
TC 506.77 F/L 500.60

285 LF 30" @ 5.326%

LINE "G"

530
520
510
500

PLAN SCALE: 1"=100'

PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

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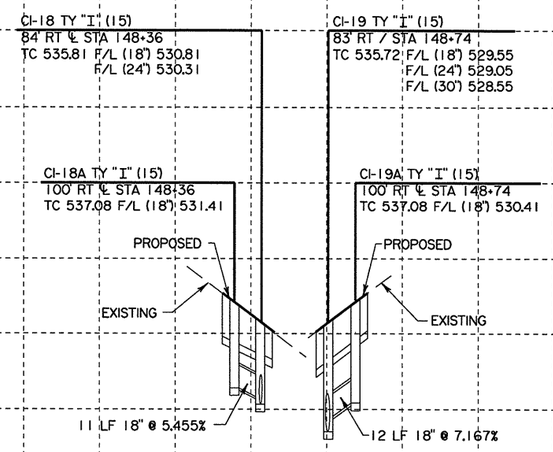
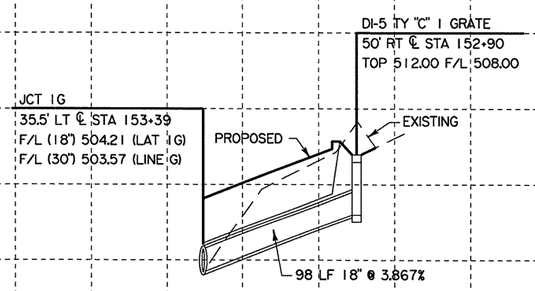
8/16/, 1999

David Lott, P.E.

DRAINAGE SHEET
SHEET 5 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		93
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740





LAT 1G

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8/16/, 1999

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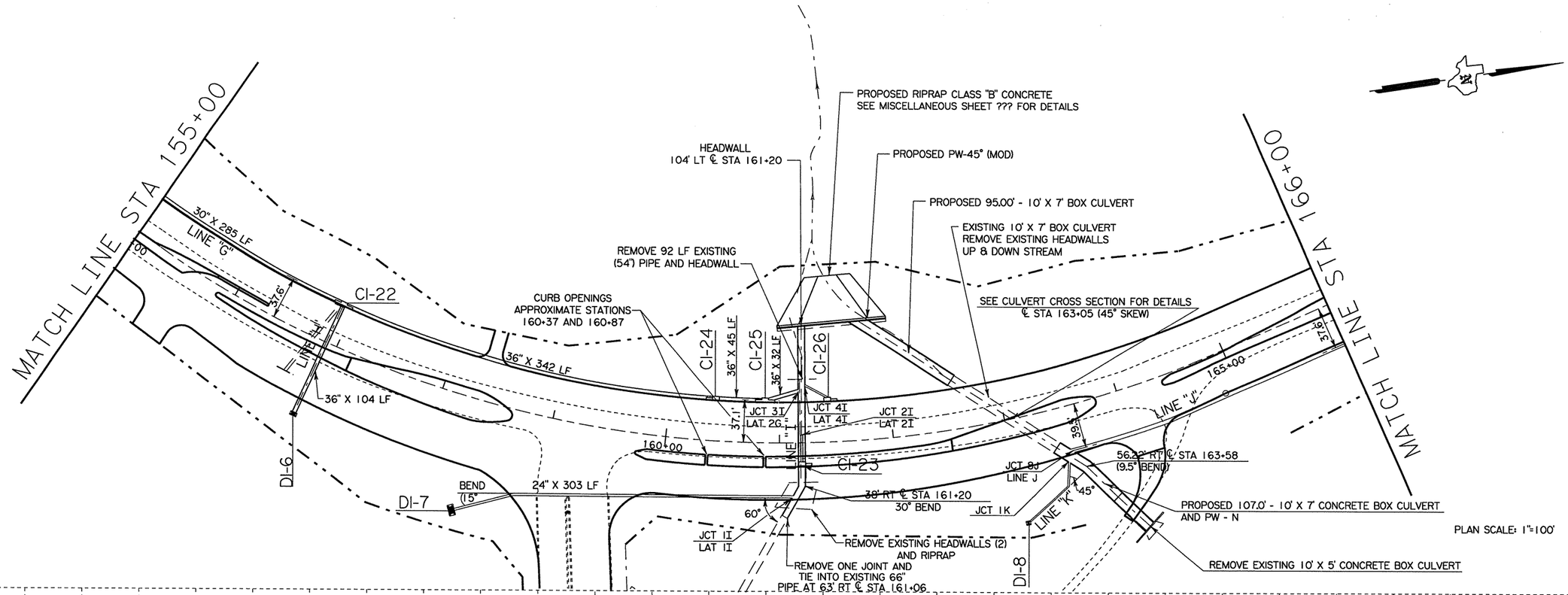
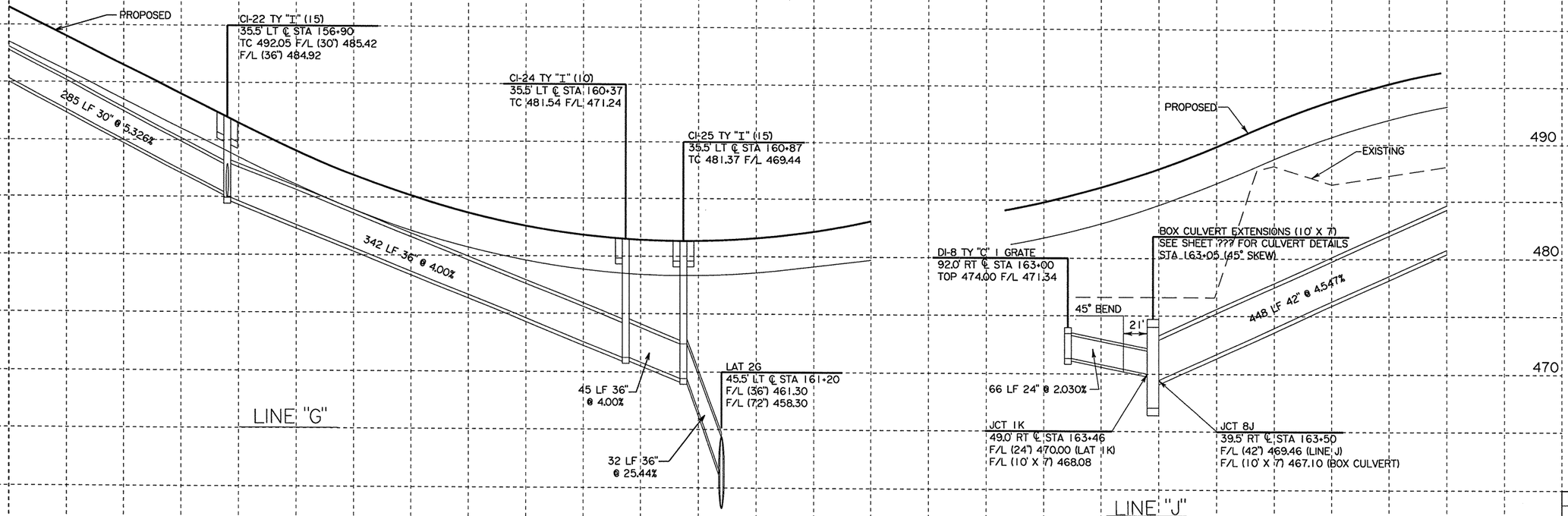
SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

DRAINAGE SHEET
SHEET 6 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		94
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

$$$$date$$$$





PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

REMOVALS	
DRAINAGE	1,6,20,23,34 40,47,49 2 / 1,6,23,40 - 43,47,49
REFERENCE FILES	
FM 83_DGN	
FM JPO.DGN	
DESIGN FILES	
DRAIN4.DGN	

$$$$date$$$$

STATE OF TEXAS
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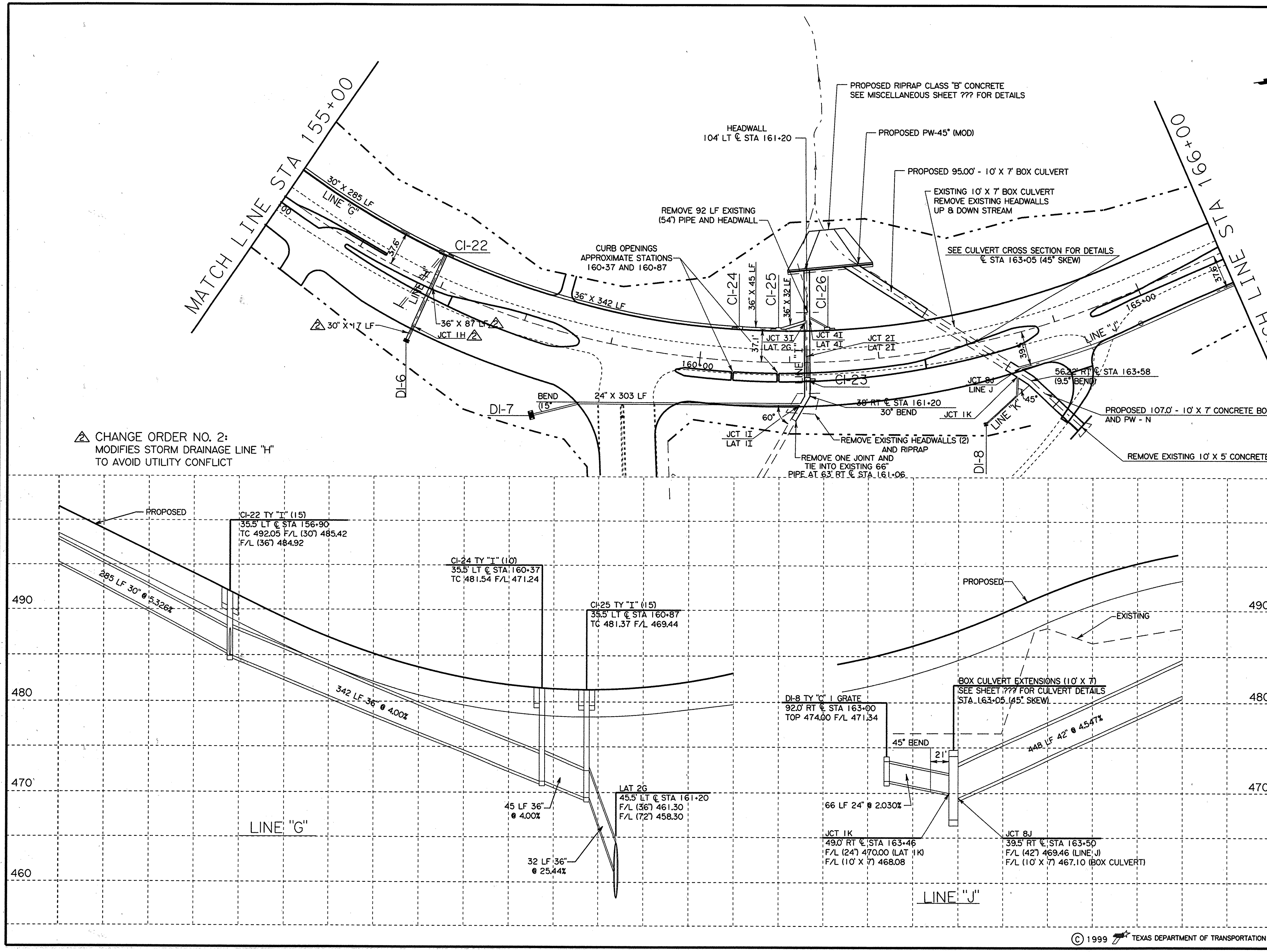
8/16/, 1999

David Lott, P.E.

DRAINAGE SHEET
SHEET 7 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
	STP 99(413)MM		95
STATE	STATE DIST. NO.	COUNTY	
TEXAS.	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



MATCH LINE STA 155+00
MATCH LINE STA 166+00
PROPOSED RIPRAP CLASS "B" CONCRETE
SEE MISCELLANEOUS SHEET ??? FOR DETAILS
HEADWALL
104' LT ℄ STA 161+20
PROPOSED PW-45° (MOD)
PROPOSED 95.00' - 10' X 7' BOX CULVERT
EXISTING 10' X 7' BOX CULVERT
REMOVE EXISTING HEADWALLS
UP & DOWN STREAM
REMOVE 92 LF EXISTING
(54") PIPE AND HEADWALL
SEE CULVERT CROSS SECTION FOR DETAILS
℄ STA 163+05 (45° SKEW)
CURB OPENINGS
APPROXIMATE STATIONS
160+37 AND 160+87
30" X 285 LF
LINE "G"
CI-22
36" X 342 LF
CI-24
CI-25
CI-26
36" X 45 LF
36" X 32 LF
JCT 3I
LAT 2G
JCT 4I
LAT 4I
JCT 2I
LAT 2I
LINE "J"
165+00
160+00
CI-23
30" X 17 LF
36" X 87 LF
JCT 1H
DI-6
DI-7
BEND
(15°)
24" X 303 LF
38' RT ℄ STA 161+20
30° BEND
JCT 8J
LINE J
56.22' RT ℄ STA 163+58
(9.5° BEND)
JCT 1K
LINE "K"
45°
PROPOSED 107.0' - 10' X 7' CONCRETE BOX CULVERT
AND PW - N
PLAN SCALE: 1"=100'
JCT 1I
LAT 1I
60°
REMOVE EXISTING HEADWALLS (2)
AND RIPRAP
REMOVE ONE JOINT AND
TIE INTO EXISTING 66"
PIPE AT 63' RT ℄ STA 161+06
REMOVE EXISTING 10' X 5' CONCRETE BOX CULVERT
DI-8
CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT
PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL
PROPOSED
CI-22 TY "I" (15)
35.5' LT ℄ STA 156+90
TC 492.05 F/L (30") 485.42
F/L (36") 484.92
CI-24 TY "I" (10)
35.5' LT ℄ STA 160+37
TC 481.54 F/L 471.24
CI-25 TY "I" (15)
35.5' LT ℄ STA 160+87
TC 481.37 F/L 469.44
285 LF 30" @ 5.326%
342 LF 36" @ 4.00%
45 LF 36" @ 4.00%
32 LF 36" @ 25.44%
LAT 2G
45.5' LT ℄ STA 161+20
F/L (36") 461.30
F/L (72") 458.30
LINE "G"
490
480
470
460
EXISTING
BOX CULVERT EXTENSIONS (10' X 7')
SEE SHEET ??? FOR CULVERT DETAILS
STA 163+05 (45° SKEW)
DI-8 TY "C" 1 GRATE
92.0' RT ℄ STA 163+00
TOP 474.00 F/L 471.34
45° BEND
21'
448 LF 42" @ 4.547%
66 LF 24" @ 2.030%
JCT 1K
49.0' RT ℄ STA 163+46
F/L (24") 470.00 (LAT 1K)
F/L (10' X 7') 468.08
JCT 8J
39.5' RT ℄ STA 163+50
F/L (42") 469.46 (LINE J)
F/L (10' X 7') 467.10 (BOX CULVERT)
LINE "J"

STATE OF TEXAS
G. K. WETZIG
80322
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by G. K. WETZIG, P.E. 80322, on 7/19, 2000.

G. K. Wetzig
for Change Order No. 2

DRAINAGE SHEET
SHEET 7 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
	STP 99(413)MM			95A
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

REMOVALS	DRAINAGE		
	1,6,20,23,30,47,49	2	1,6,23,40 - 43,47,49

REFERENCE FILES: FM7402 ... N, FM740TOP...N
DESIGN FILES: DRAIN4.DGN

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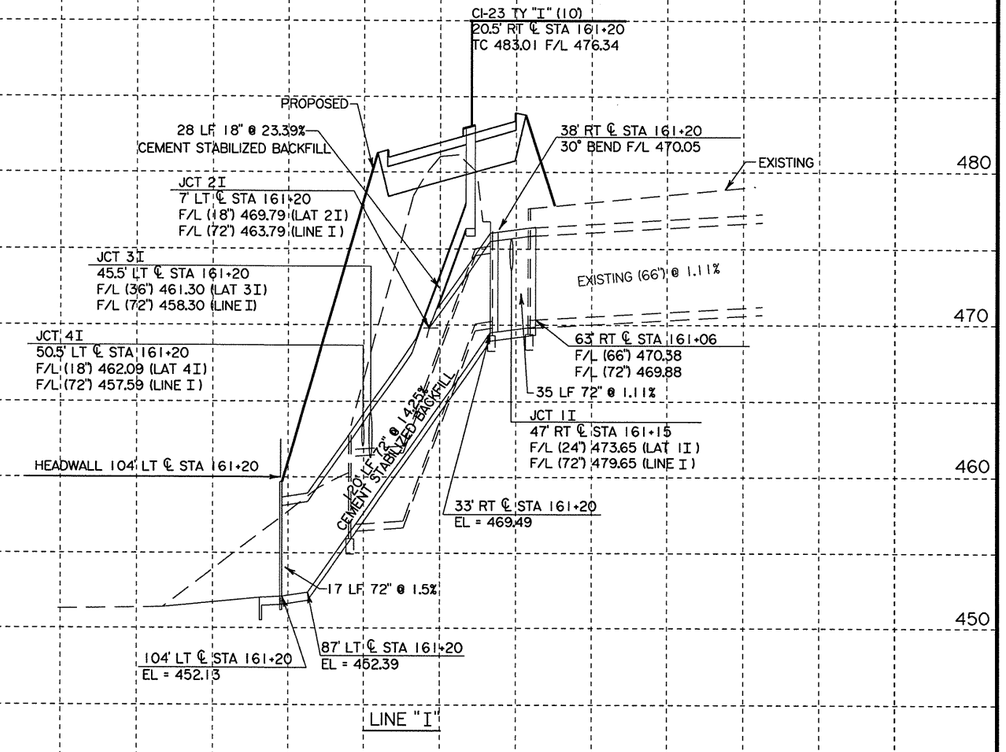
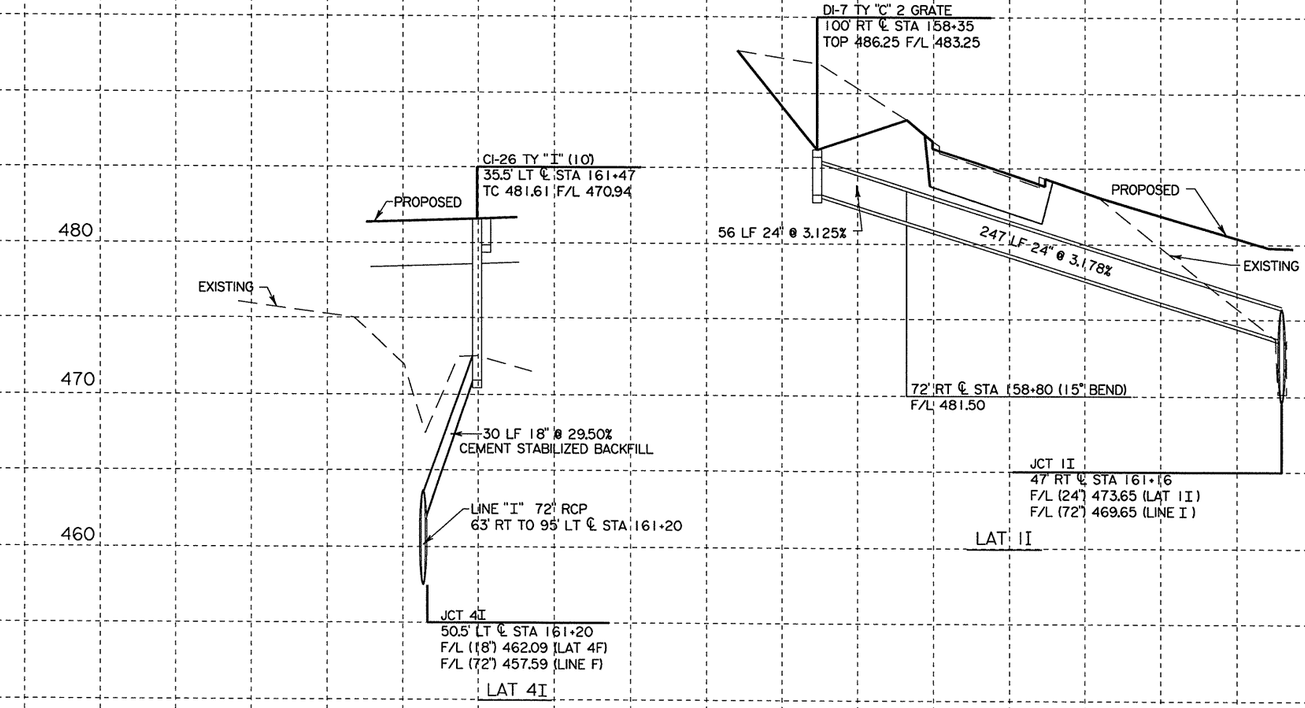
106A





STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

DRAINAGE SHEET
SHEET 8 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
	STP 99(413)MM		96
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

℄ FM 740

36" RCP

30" RCP

157+00

STA 156+90

LINE "H"

36" RCP

EXISTING 30" RCP (TO BE REMOVED)

69.00'

68.00'

53.00'

EXISTING GROUND

CI-22 TY "I" (1.5)
35.5' LT ℄ STA 156+90
TC 492.05 F/L (30") 485.42
F/L (36") 484.92

35.5'

5.50'

10.00'

4:1

3:1 MAX

3:1

EXISTING 30" x 69 LF (TO BE REMOVED)

104 LF 36" @ 2.60%

EL 484.92

EXISTING HEADWALL
(TO BE REMOVED)

DI-6 TY "C" 2 GRATE
69' RT ℄ STA 156+90
TOP 492.62 F/L 487.62

F/L (30") 485.42

EXISTING HEADWALL
(TO BE REMOVED)

LINE "H"

500

490

480

470

460

℄ FM 740

℄ STA 156+90
PROPOSED 36" x 104 LF RCP (CL III)
WITH DI-6 UPSTREAM

STATE OF TEXAS
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8/16/, 1999

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DRAINAGE SHEET
SHEET 9 OF 15
SCALE:HORIZONTAL 1"=10'
VERTICAL 1"=10'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		97
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

7403642A.dgn

$$$date$$$$

℄ FM 740

36" RCP

30" RCP

157+00

2 JCT 1H
51' RT L STA 156+90

STA 156+90

LINE "H"

36" RCP

30" RCP

EXISTING 30" RCP (TO BE REMOVED)

69.00'

68.00'

53.00'

43.00' 2

8.00' 2

17.00' 2

EXISTING GROUND

CI-22 TY "I" (15)
35.5' LT ℄ STA 156+90
TC 492.05 F/L (30") 485.42
F/L (36") 484.92

35.5'

5.50'

10.00'

4:1

3:1 MAX

3:1

EXISTING 30" x 69 LF (TO BE REMOVED)

2 79 LF 36" @ 2.60%

8 LF 36" @ 16.00%

2 17 LF 30" @ 2.16%

CEMENT STABILIZED BACKFILL

EL 484.92

EXISTING HEADWALL (TO BE REMOVED)

F/L 486.97 2

DI-6 TY "C" 2 GRATE
69' RT ℄ STA 156+90
TOP 492.62 F/L 489.12 2

JCT 1H
51' RT L STA 156+90
F/L (30") 488.75
F/L (36") 488.25

F/L (30") 485.42

EXISTING HEADWALL (TO BE REMOVED)

LINE "H"

500

490

480

470

460

2 CHANGE ORDER NO. 2:
MODIFIES STORM DRAINAGE LINE "H"
TO AVOID UTILITY CONFLICT

℄ FM 740

℄ STA 156+90
PROPOSED 36" x 87 LF RCP (CL III)
& 30" x 17 LF RCP (CL III)
WITH DI-6 UPSTREAM

STATE OF TEXAS
G. K. METZIG
80322
REGISTERED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by G. K. METZIG, P.E. 80322, on 7/19, 2000.

G.K. Metzig
for Change Order No. 2

DRAINAGE SHEET
SHEET 9 OF 15
SCALE: HORIZONTAL 1"=10'
VERTICAL 1"=10'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		97A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

$$$date$$$$

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108A

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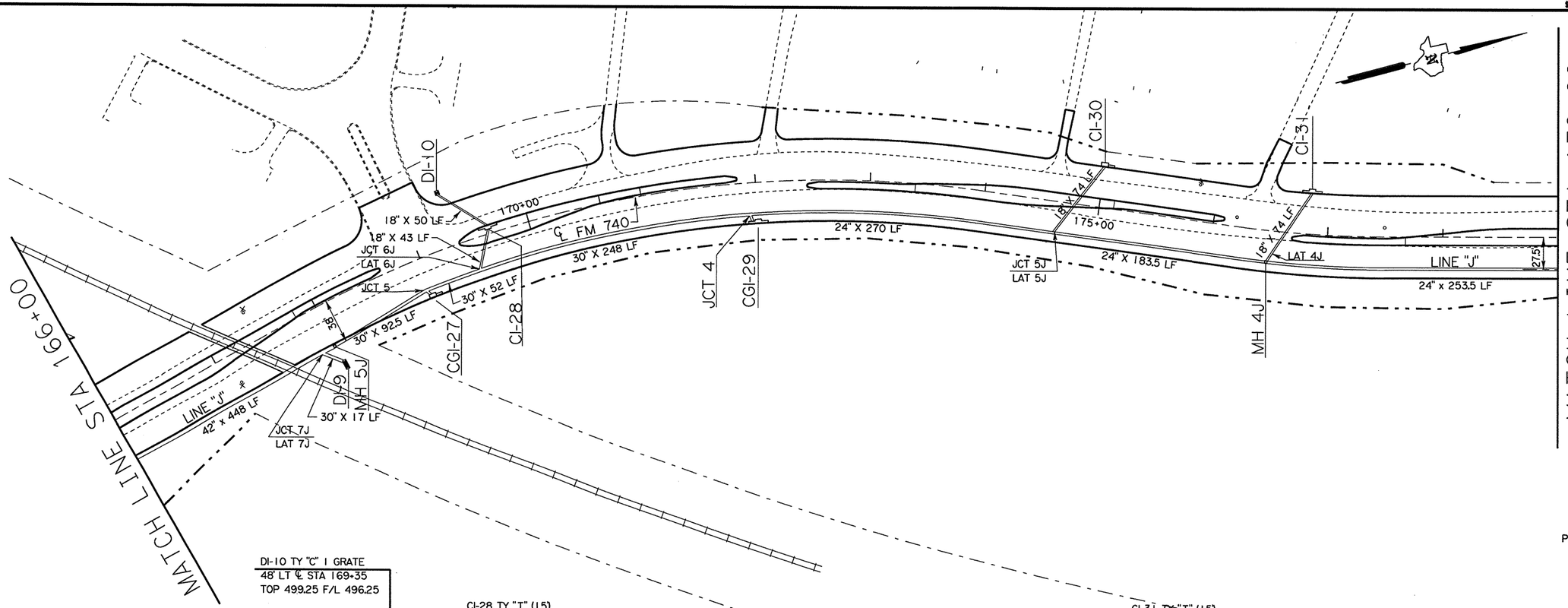

DI-10 TY "C" 1 GRATE
48' LT ℄ STA 169+35
TOP 499.25 F/L 496.25

CI-28 TY "I" (15)
7.5' LT ℄ STA 169+65
TC 501.26 F/L 495.59

CGI-27 TY "IV" (10)
35.5' RT ℄ STA 169+00
TC 498.58 F/L 492.58

CI-31 TY "I" (15)
35.5' LT ℄ STA 176+85
TC 531.28 F/L 526.11

CI-30 TY "I" (10)
35.5' LT ℄ STA 175+00
TC 524.19 F/L 519.02

DI-9 TY "C" 3 GRATE
56.5' RT ℄ STA 168+00
TOP 493.5 F/L 490.33

JCT 7J
37.6' RT ℄ STA 167+90
F/L (30") 490.00 (LAT 7J)
F/L (42") 489.34 (LINE J)

JCT 6J
27.5' RT ℄ STA 169+46
F/L (18") 494.77 (LAT 6J)
F/L (30") 493.77 (LINE J)

MH 5J TY "II"
38' RT ℄ STA 168+00
F/L (30") 490.83
F/L (42") 489.83
TE 497.28

JCT 5J
27.5' RT ℄ STA 174+64
F/L (18") 517.13 (LAT 5J)
F/L (24") 516.63 (LINE J)

MH 4J TY "II"
27.5' RT ℄ STA 176+49
F/L (18") 524.58 (LAT 4J)
F/L (24") 524.08 (LINE J)
TE 529.76

CGI-29 TY "IV" (15)
35.5' RT ℄ STA 172+00
TC 511.51 F/L 506.01

JCT 4
27.5' RT ℄ STA 171+94
F/L (24") 505.66
F/L (30") 505.16

JCT 5
27.5' RT ℄ STA 168+94
F/L 492.35

STA 170+00
EL 495.25

STA 178+00
EL 530.50

40 LF 42" RCP (CL V)
38' RT ℄ STA 167+35 TO 167+75
MKT RAILROAD

PROPOSED
EXISTING

17 LF 30" @ 1.941%
50 LF 18" @ 1.320%
43 LF 18" @ 1.907%
7 LF 24" @ 3.286%
7 LF 24" @ 5.00%
74 LF 18" @ 2.068%
74 LF 18" @ 2.554%
92.5 LF 30" @ 1.646%
106 LF 30" @ 2.736%
194 LF 30" @ 5.109%
398 LF 42" @ 4.547%
149.5 LF 24" @ 4.129%
453.5 LF 24" @ 4.062%
104 LF 24" @ 1.625%

LINE "J"
LINE "J"

PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

STATE OF TEXAS
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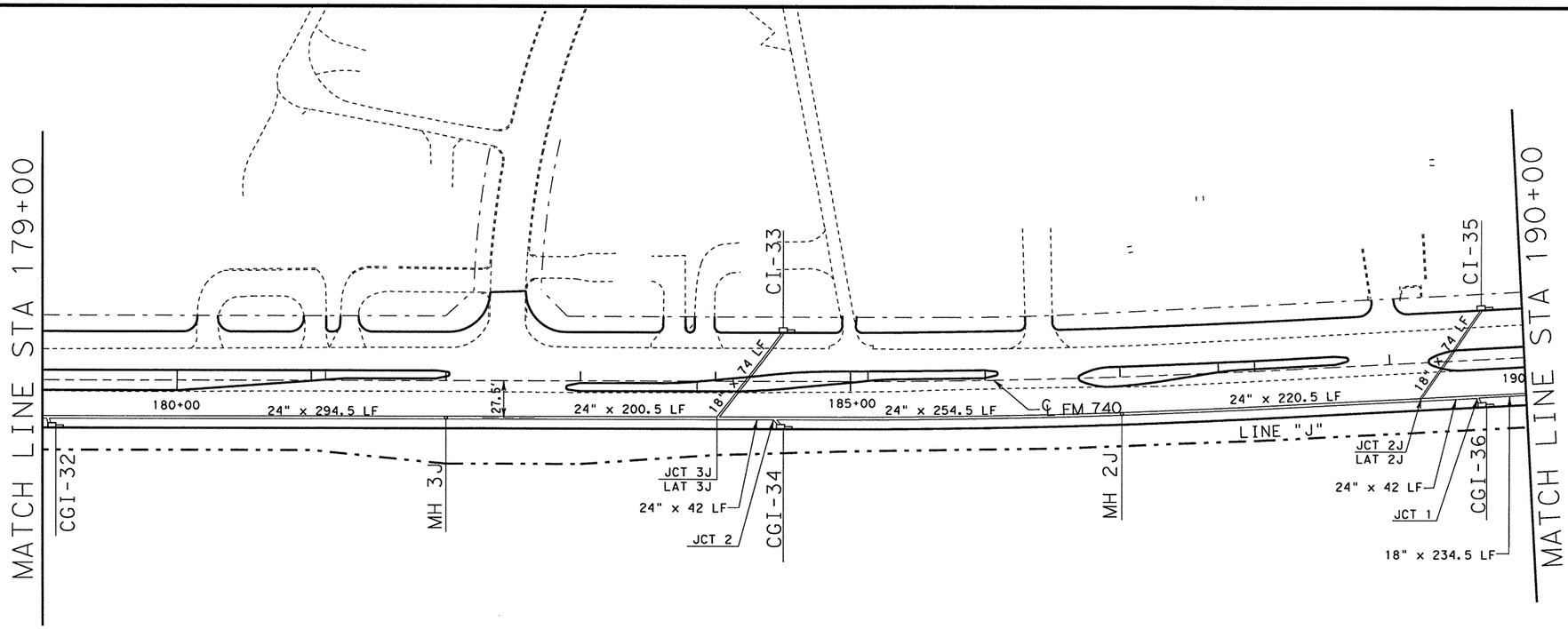
DRAINAGE SHEET
SHEET 11 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		99
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

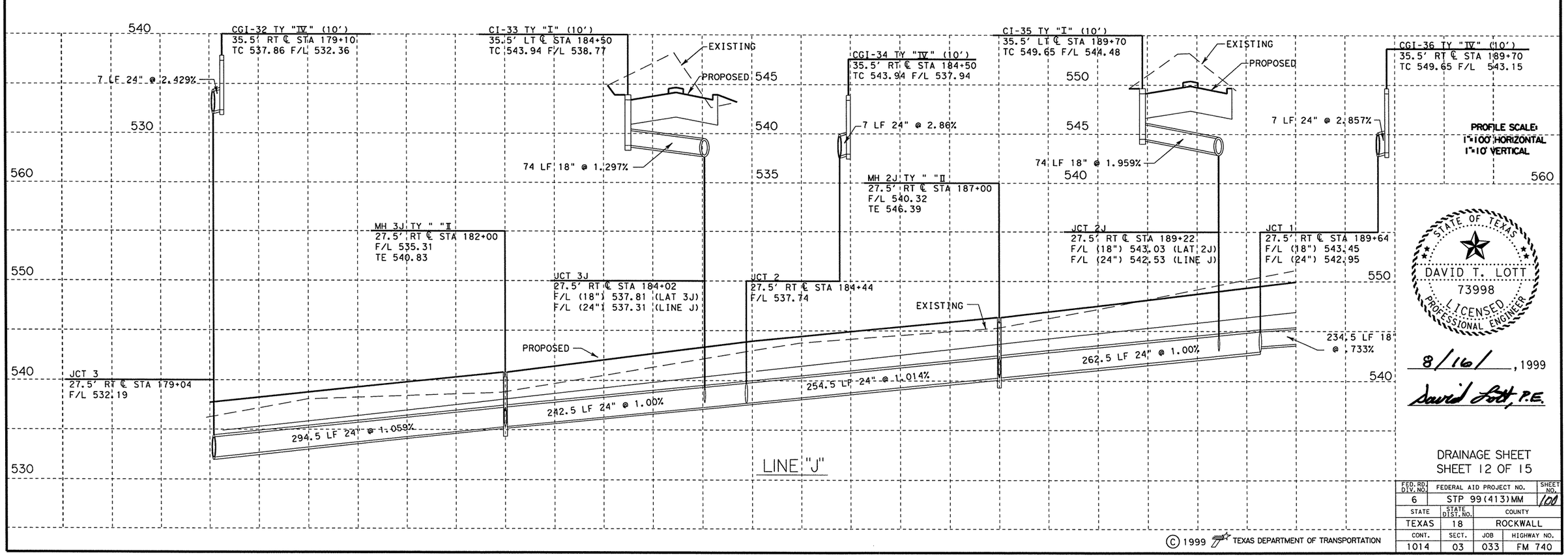
REMOVALS

DRAINAGE	6,20,22,23,34,40,47,49
	2,10
	16,23,40 - 43,47,49
REFERENCE FILES	
FM_____DGN	
FM_____JPO.DGN	
DESIGN FILES	
DRAINS.DGN	

$$$$date$$$$



PLAN SCALE: 1"=100'



PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

REMOVALS

DRAINAGE
6,20,22,23,44,47,49
2
1,6,23,40 - 43,47,49

REFERENCE FILES
FM IGN
FM7...0P0.DGN

DESIGN FILES
DRAING.DGN

$$$$date$$$$

STATE OF TEXAS
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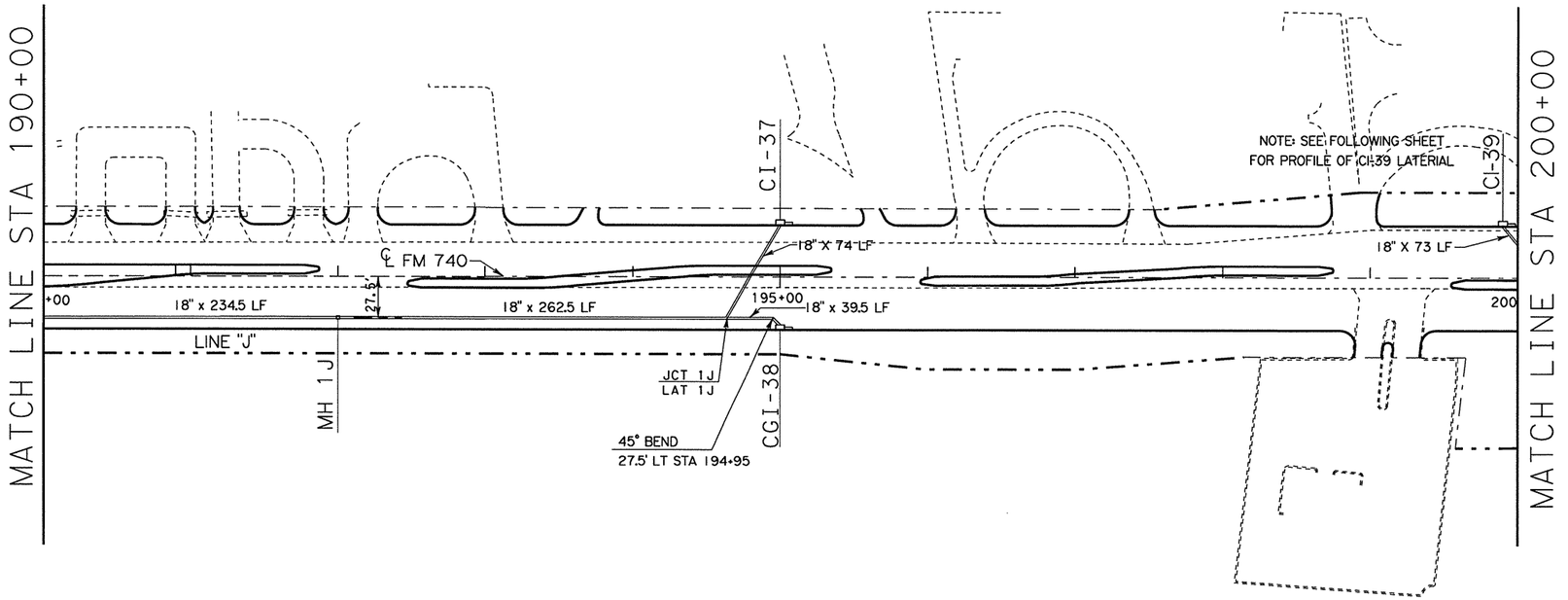
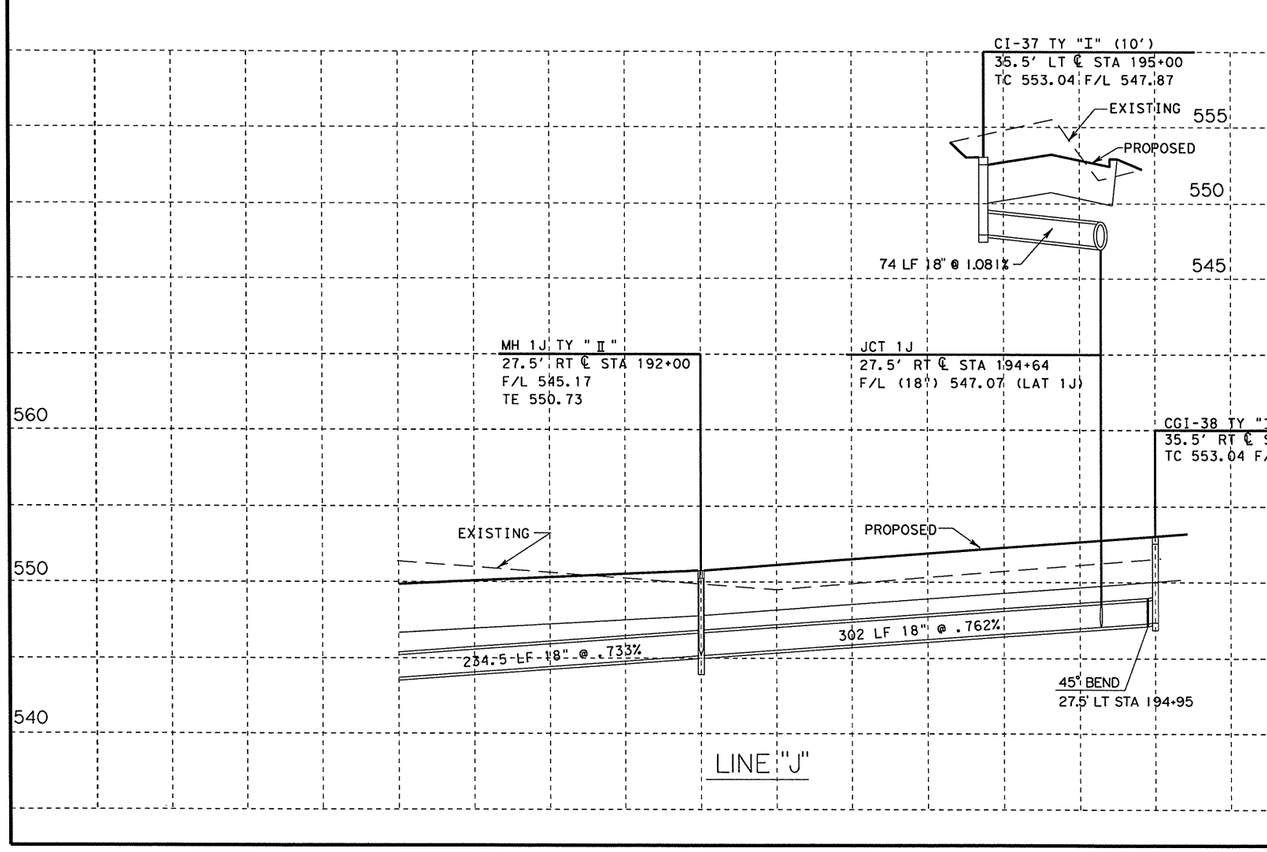
DRAINAGE SHEET
SHEET 12 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		100
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



PLAN SCALE: 1"=100'



PROFILE SCALE:
1"=100' HORIZONTAL
1"=10' VERTICAL

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DRAINAGE SHEET
SHEET 13 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		101
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

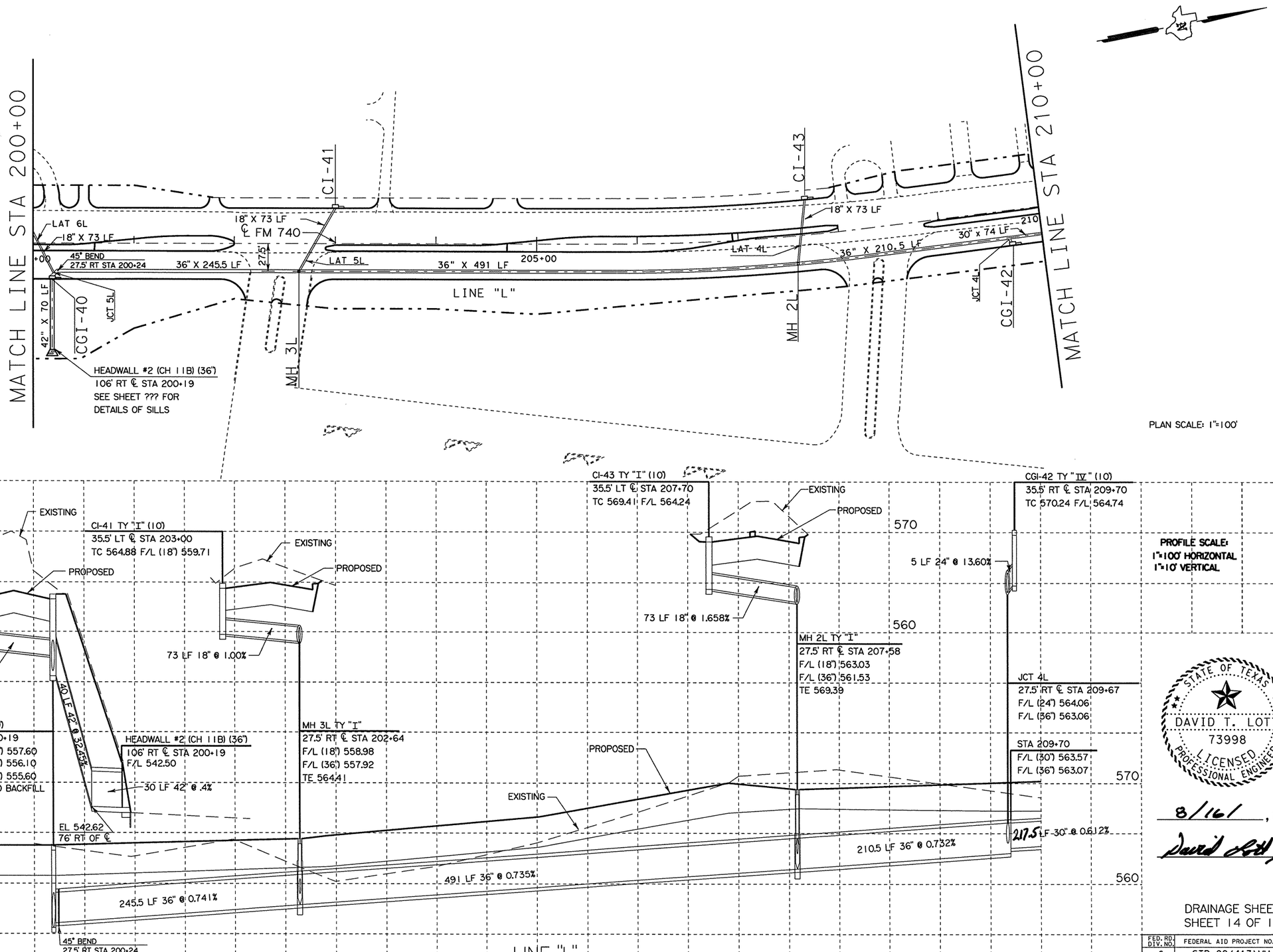
REMOVALS

DRAINAGE	1,6,20,22,23,34,47,49
	2
	1,6,23,40 - 43,47,49

REFERENCE FILES	
FM	4.DGN
FM7	OPO.DGN
DESIGN FILES	
DRAIN7.DGN	

$$$$date$$$$

$$$$$$$$$$$$$$$$$dgnspec$$$$$$$$$$$$$$$$$$



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DRAINAGE SHEET
SHEET 14 OF 15

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		102
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

REMOVALS

DRAINAGE	6,20,22,23,34,47,49
	2
	1,6,23,40 - 43,47,49
REFERENCE FILES	
FM_ _DGN	
FM7 _JPO.DGN	
DESIGN FILES	
DRAIN8.DGN	

$$$$date$$$$

SCHEDULE OF REINFORCING STEEL
FOR MODIFIED WINGWALL

BAR	NO.	SIZE	SPACING	LENGTH	WEIGHT
B	3	#4	12" ±	57'-10"	116
R	140	#6	5"	11'-4"	2383
S	140	#6	5"	10'-1"	2120
T2	12	#4	18"	57'-10"	464
U2	12	#4	18"	6'-0"	48
W	14	#4	12" ±	67'-9"	634
P	40	#4	18"	8'-9"	234
TOTAL					** 5999 LBS.

** FOR BIDDERS INFORMATION ONLY

ESTIMATED QUANTITIES

PW-45° (MOD)	1 EA
RIPRAP (CL B)	46.85 CY
CL A CONC. (SILL)	4.27 CY
* REINF. STL. (WINGWALL)	5,999 LBS
* REINF. STL. (SILL)	958 LBS
* CONC. (PW-45°)	39.7278 CY

* FOR BIDDERS INFORMATION ONLY

TABLE OF DIMENSIONS

CULVERT SIZE	SLAB	MODIFIED WING						
S X H	T	Z	L	R	W	V	D	Y
10' X 7'	8 1/2"	8'-8 1/2"	58.21'	8 1/2"	9'-0"	9 1/2"	6'-3 1/2"	1'-11"

SCALE 1"=5'

* NOTE: TIE STORM SEWER PIPE STEEL
TO HEADWALL STEEL

SECTION A-A

SECTION B-B

BARS R

BARS S1

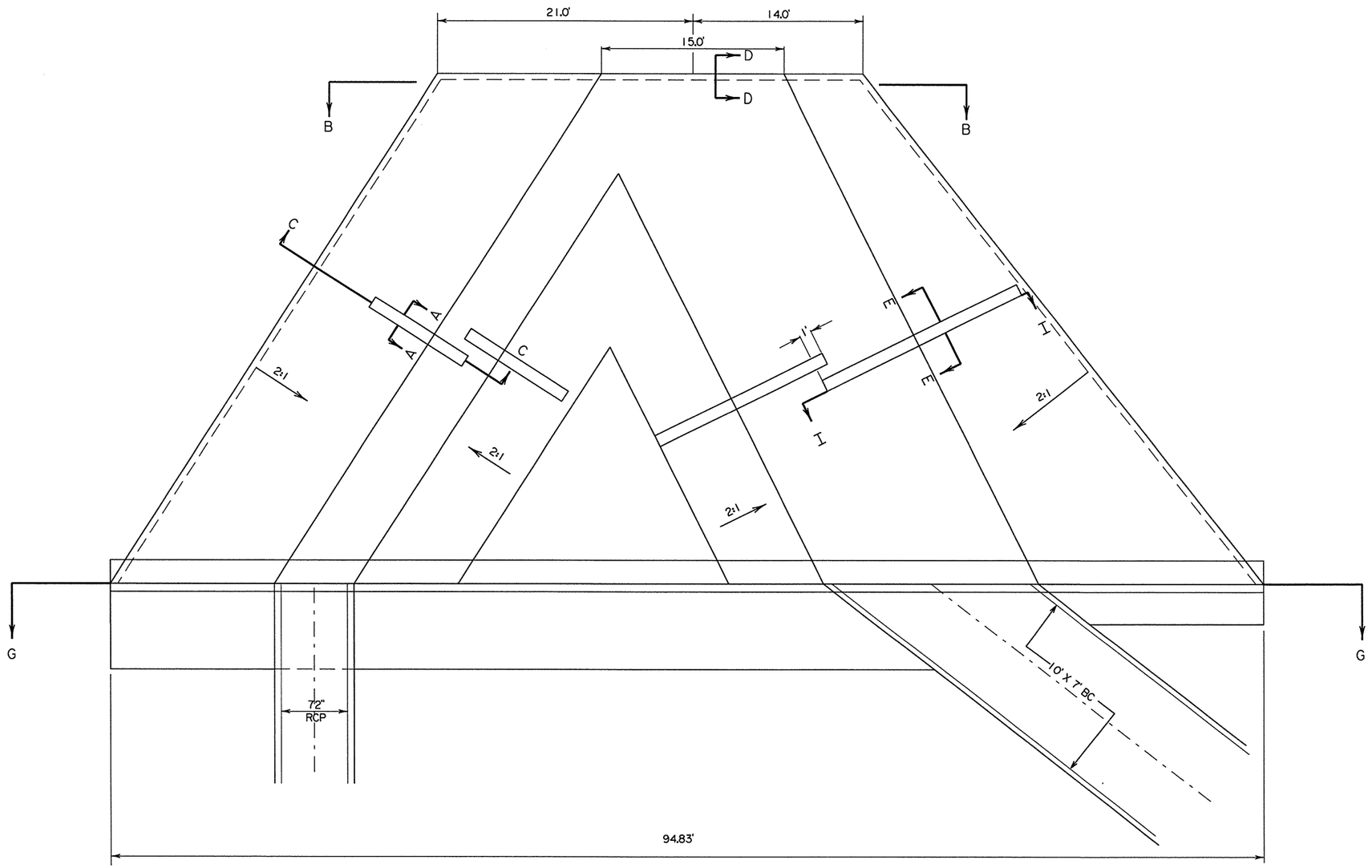
DAVID T. LOTT
73998

8/16/, 1999

David Lott, P.E.

MODIFIED PARALLEL WINGWALL WITH A
10' X 7' BOX CULVERT AT A 45° SKEW AND
A 72" RCP NORMAL

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			104
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONTROL	SECTION	JOB	HIGHWAY NO.	
1014	03	033	FM 740	



SECTION G-G REFER TO SHEET XX FOR DETAILS OF WINGWALL
REFER TO SHEET 2 OF 2 FOR SECTIONS
SCALE 1"=5'

NOTE:
THE PROPOSED HEADWALL, APRON AND RIPRAP WILL BE DOWELED TOGETHER WITH ½" X 2' BARS AT 2' SPACING

740rip.dgn(5)

STATE OF TEXAS
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8/16/, 1999

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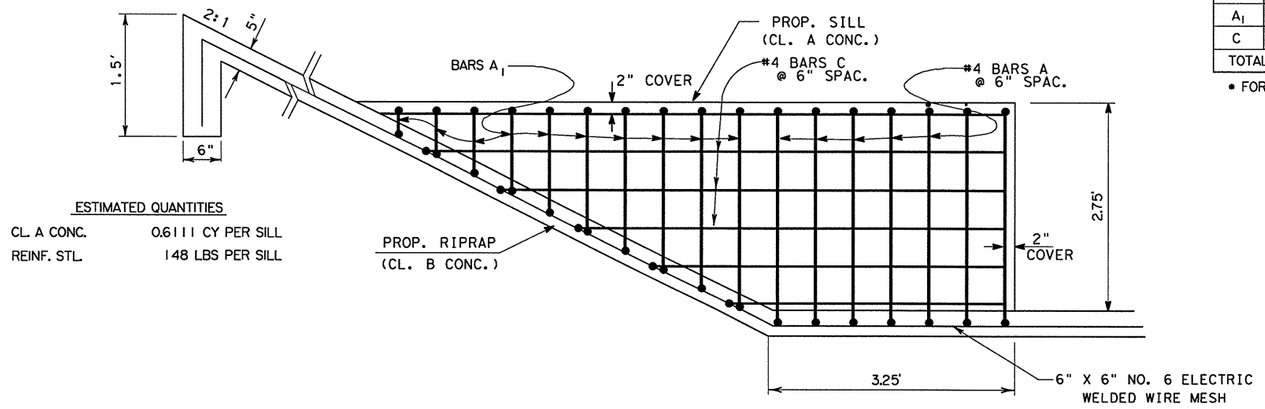
RIPRAP AND SILL DETAILS
STA 163+05
SHEET 1 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		105
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SCHEDULE OF REINFORCING STEEL FOR ONE SILL

BAR	NO.	SIZE	SPACING	LGTH (AVG.)	WEIGHT
A	7	4	6"	10'-2"	48
A_1	10	4	6"	7'-8"	52
C	12	4	6"	6'-0"	48
TOTAL				*	148

* FOR BIDDERS INFORMATION ONLY

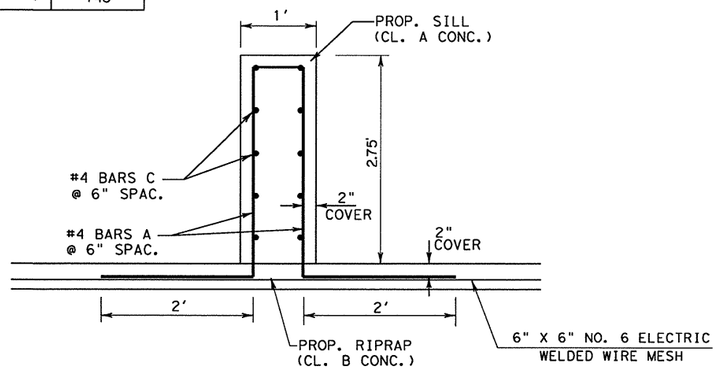


ESTIMATED QUANTITIES

CL. A CONC.	0.6111 CY PER SILL
REINF. STL.	148 LBS PER SILL

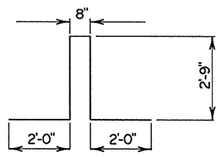
SECTION C-C

SCALE 1" = 1'



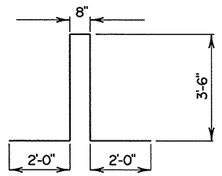
SECTION A-A

SCALE 1" = 1'



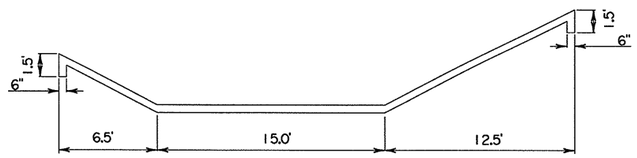
BAR A

N.T.S.



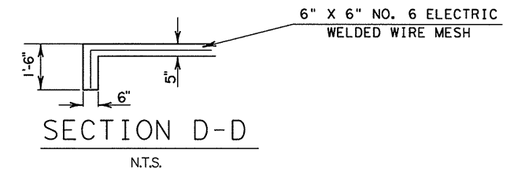
BAR B

N.T.S.



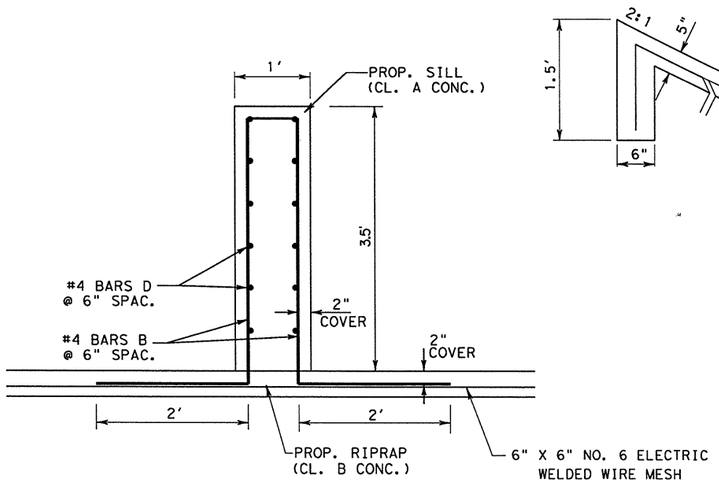
SECTION B-B

SCALE 1" = 5'



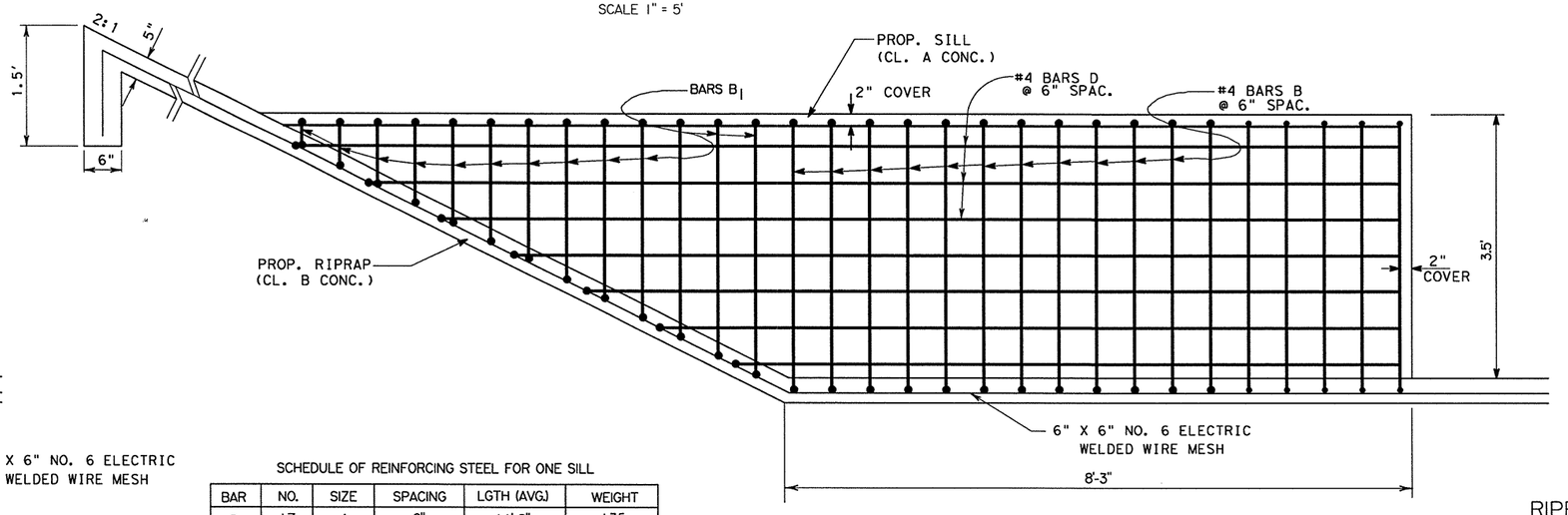
SECTION D-D

N.T.S.



SECTION E-E

SCALE 1" = 1'



SECTION I-I

SCALE 1" = 1'

SCHEDULE OF REINFORCING STEEL FOR ONE SILL

BAR	NO.	SIZE	SPACING	LGTH (AVG.)	WEIGHT
B	17	4	6"	11'-8"	135
B_1	13	4	6"	8'-3"	72
D	16	4	6"	11'-7"	124
TOTAL				*	331

* FOR BIDDERS INFORMATION ONLY

ESTIMATED QUANTITIES

CL. A CONC.	1.5231 CY PER SILL
REINF. STL.	331 LBS PER SILL

STATE OF TEXAS
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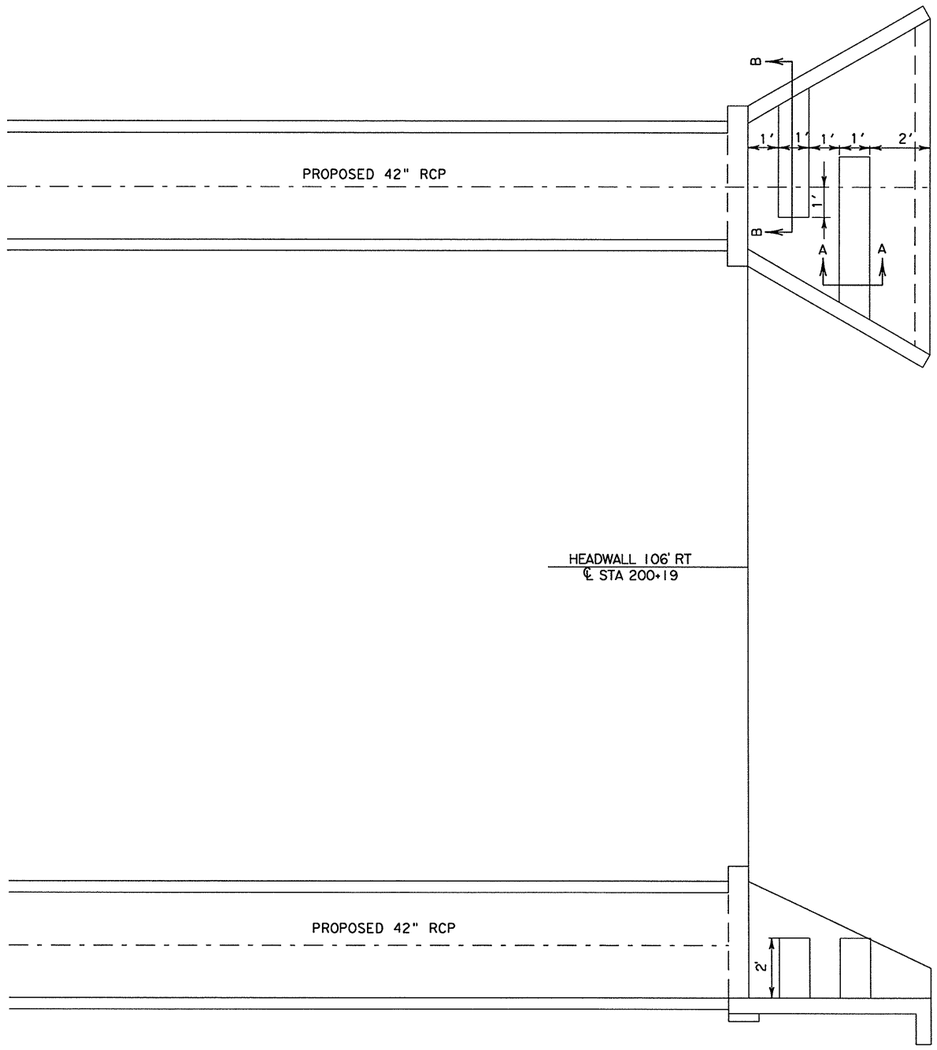
8/16/, 1999

David Lott, P.E.

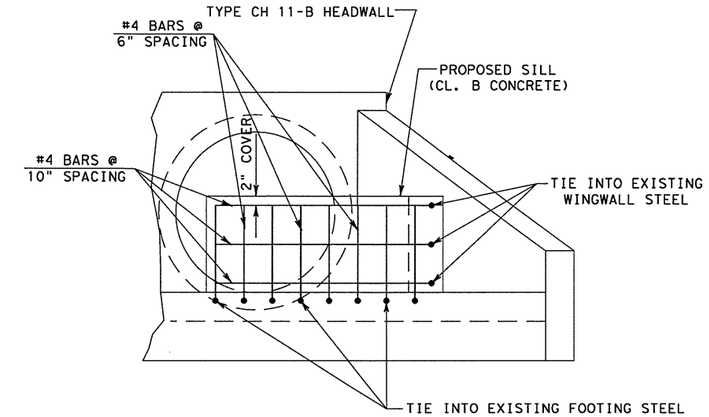
RIPRAP AND SILL DETAILS
STA 163+05
SHEET 2 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		106
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

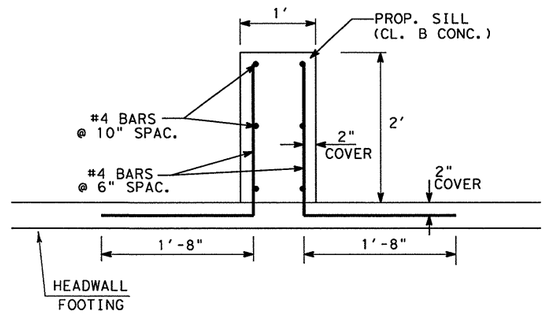
$$$$date$$$$



HEADWALL 106' RT
℄ STA 200+19



SECTION B-B



SECTION A-A

STATE OF TEXAS
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8/16/, 1999

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RIPRAP AND SILL DETAILS
STA 200+19
SHEET 3 OF 3

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)M		107
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

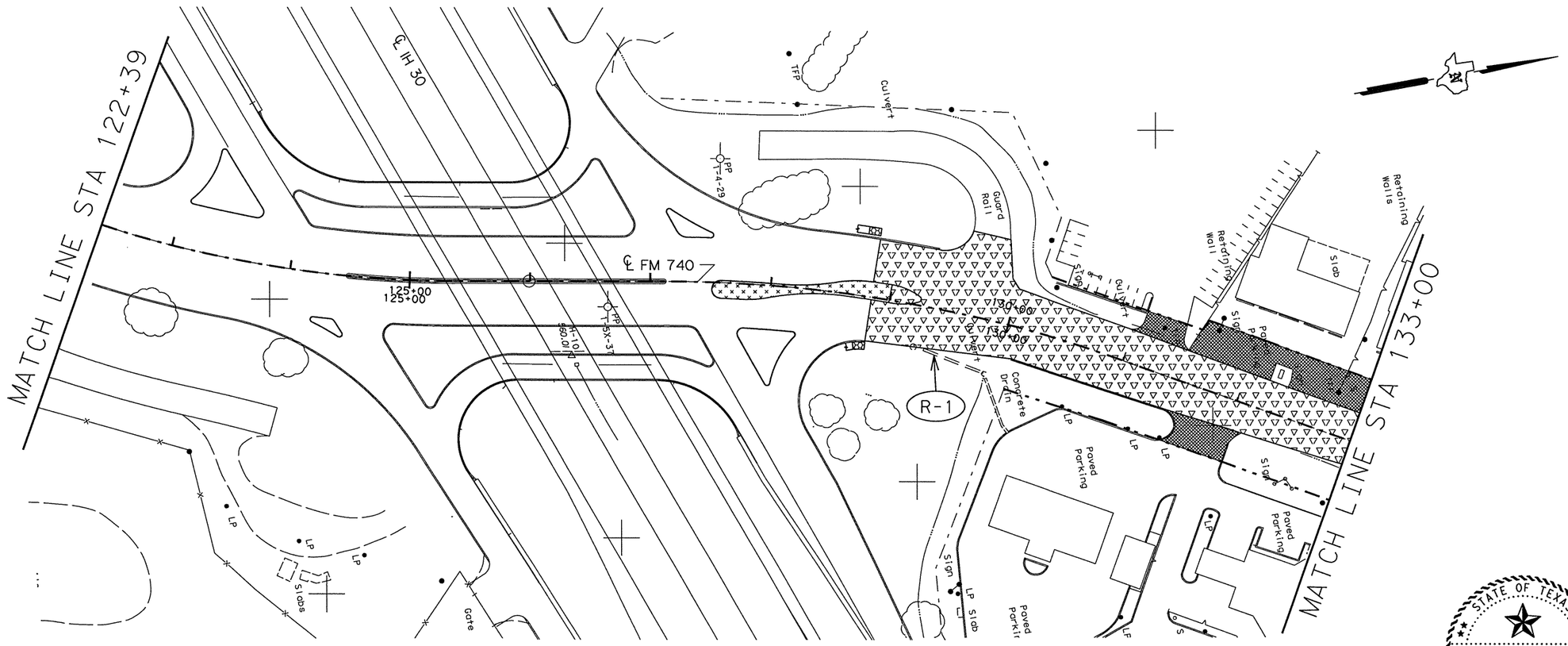
REMOVALS

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM JGN		
FM7~_.OPO.DGN		
911DON.DGN		
DESIGN FILES		
FM740MISC.DGN	1	

$$$date$$$

740rip.dgn(3)

EXT 4409



REMOVALS	DRAINAGE	HORIZONTAL & VERTICAL ALIGNMENT	REFERENCE FILES
1,6,7,22,23,34,47,49,51	1,6,20,23,34,47,49	1,6,20,23,33,34,47,49	FM7401 - 2.
1 - 30, 36 - 49	40	1 - 30, 39 - 49	FM740TOPOL...
20,63	20,63	20,63	911DONDGN
			DESIGN FILES
6,28,29	1,6,23,40 - 43,47,49	1,2,6,20,23,33,34,47,49	FM740PP3.DGN

LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT
- REMOVE OLD CONCRETE (SIDEWALK)
- REMOVE OLD CONCRETE (MEDIAN)

SCALE 1"= 100'

STATE OF TEXAS
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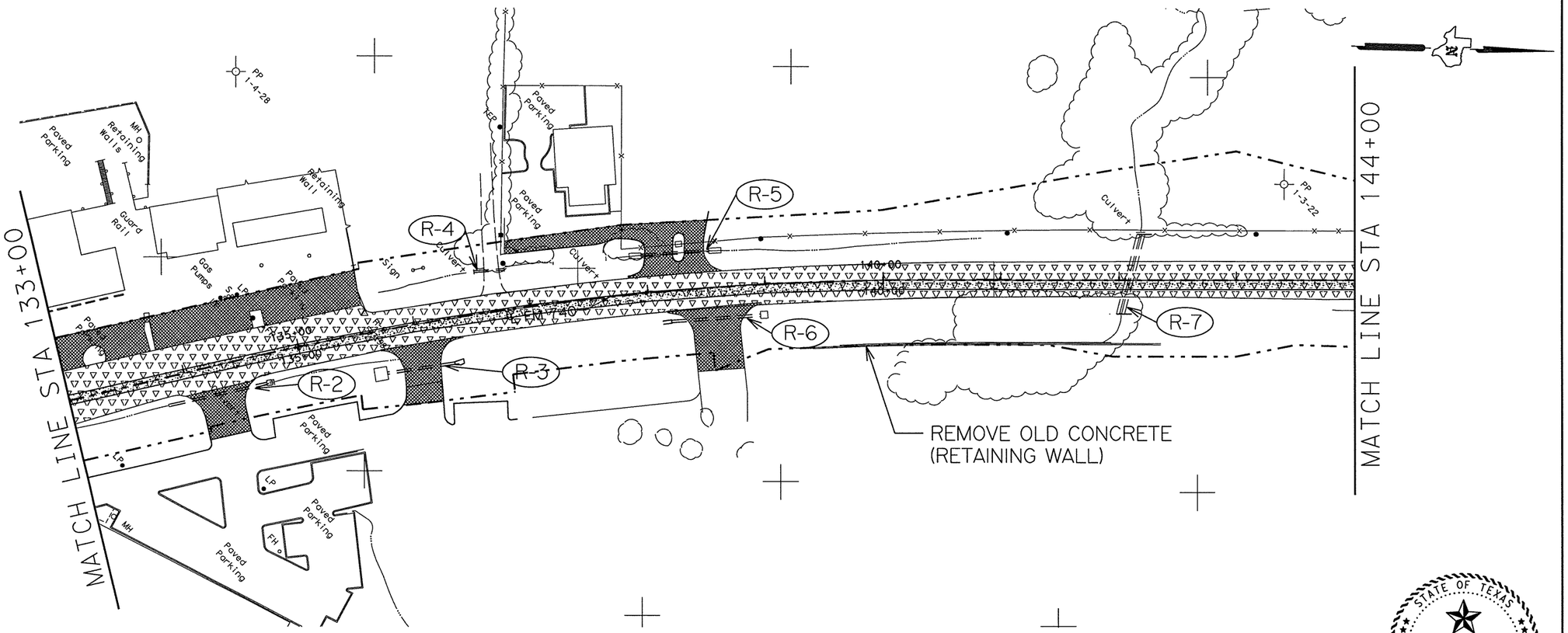
REMOVAL SHEET
SHEET 1 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		108
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

AUGUST 28, 1998

EXT 4409



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE	REMOVALS
FM7402.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,40,47,49	1,6,20,22,23,34,47,49
FM740TOPO.DGN	1 - 30, 39 - 49	DISPLAY OFF	1 - 30, 36 - 49
DESIGN FILES			
FM740PP4.DGN	1,2,6,20,23,33,34,47,49	1,6,23,40 - 43,47,49	6,28,29

SCALE 1"= 100'

STATE OF TEXAS
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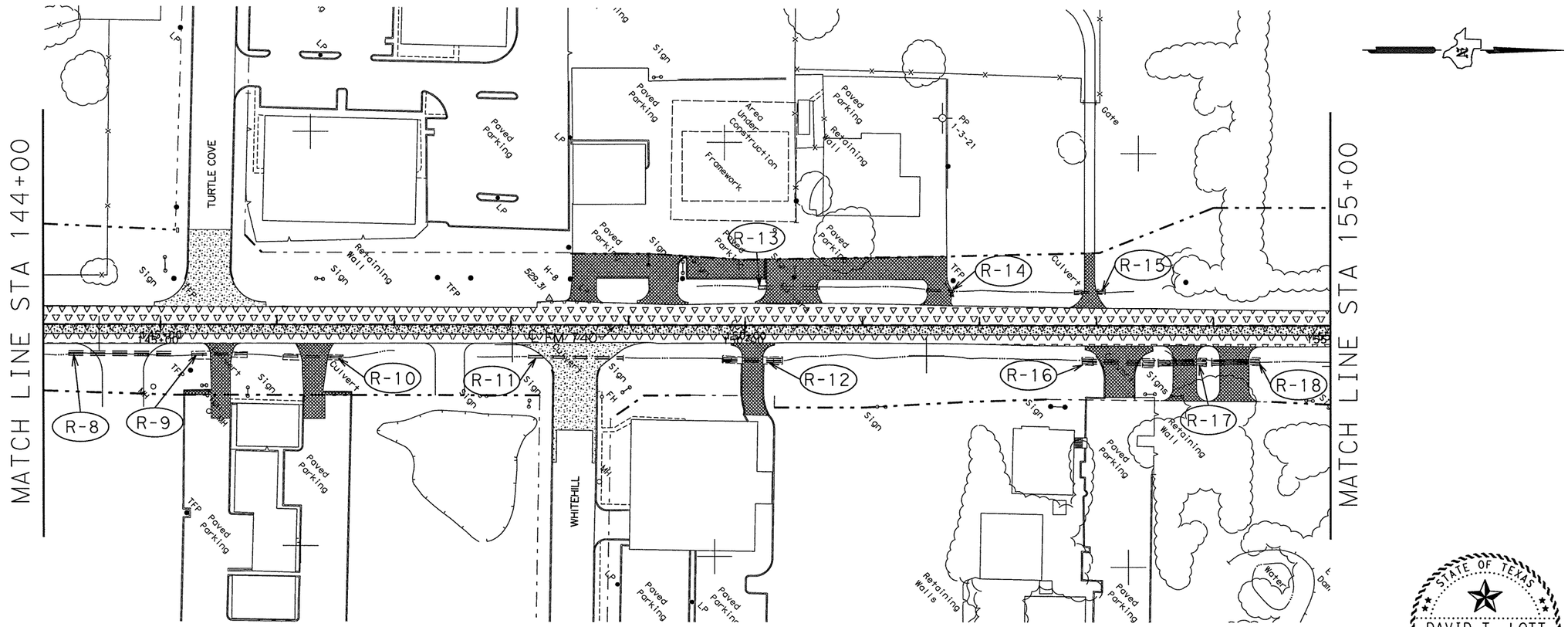
REMOVAL SHEET
SHEET 2 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		109
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

AUGUST 03, 1999

EXT 407



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	REMOVALS
FM7402	1,6,20,23,33,34,47,49	1,6,22,23,34,47,49
FM740TL.DGN	1 - 30, 39 - 49	1 - 30, 36 - 49
	DRAINAGE	
	1,6,20,23,34,47,49	
	DISPLAY OFF	
DESIGN FILES		
FM740PP5.DGN	1,2,6,20,23,33,34,47,49	1,6,23,40 - 43,47,49 / 6,28,29

SCALE 1"= 100'

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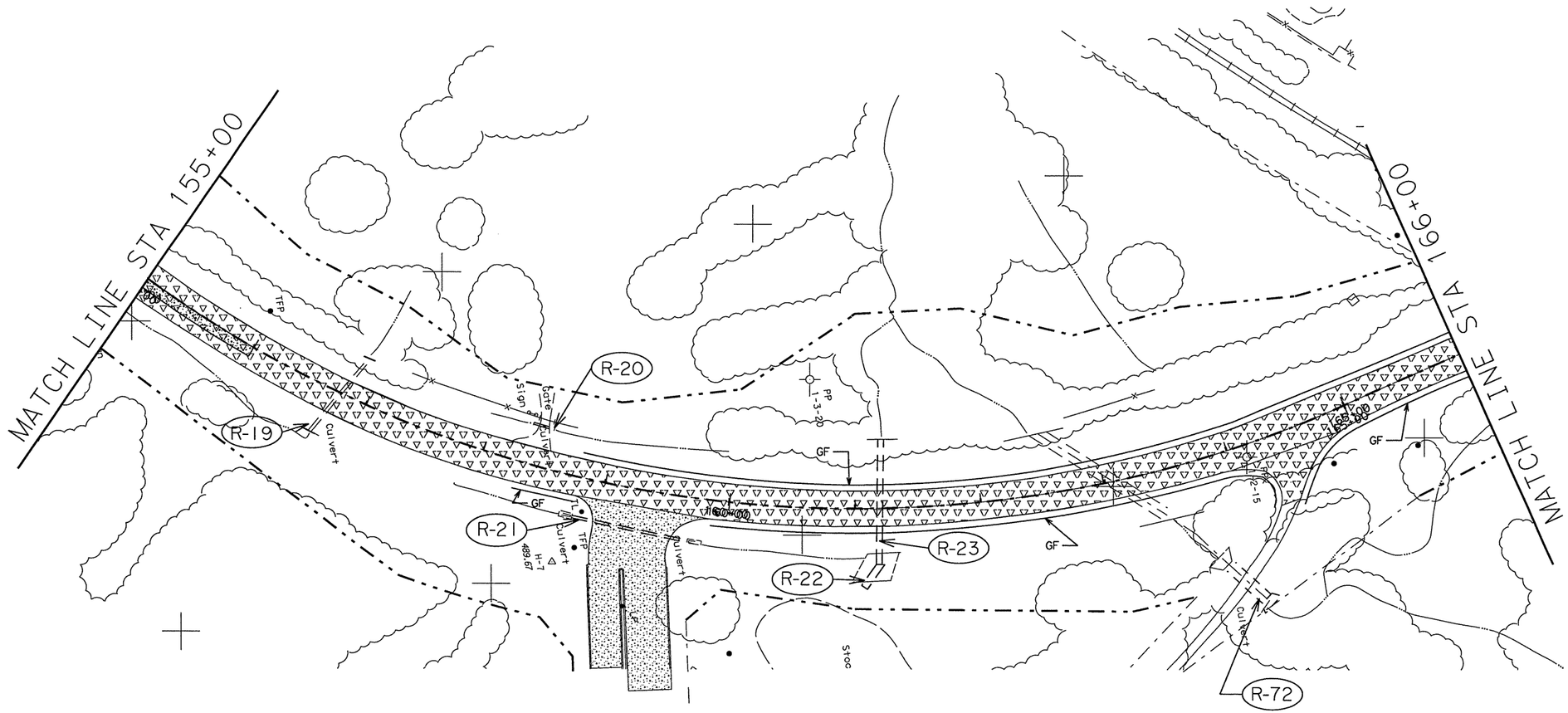
REMOVAL SHEET
SHEET 3 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		110
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

$$$$date$$$$

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM740 .DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM7401 .DGN	1 - 30, 39 - 49	DISPLAY OFF
DESIGN FILES		
FM740PP6.DGN	1,2,6,20,23,33,34,47,49	1,6,23,40 - 43,47,49

REMOVALS
1,6,22,23,34,47,49
1 - 30, 36 - 49
6,28,29



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

SCALE 1"= 100'

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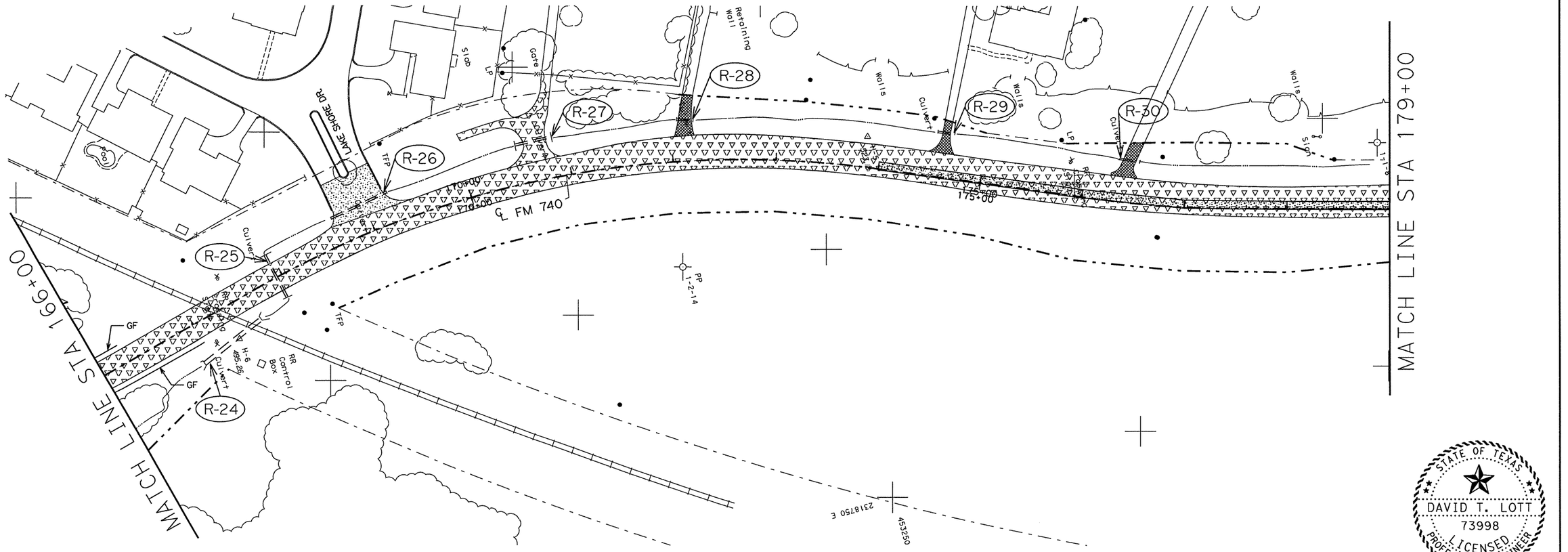
REMOVAL SHEET
SHEET 4 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		///
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

EXT 401



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE	REMOVALS
FM74C.DGN	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49	6,22,23,34,47,49
FM740.DGN	1 - 30, 39 - 49	DISPLAY OFF	1 - 30, 36 - 49
DESIGN FILES			
FM740PP7.DGN	1,2,6,20,23,33,34,47,49	1,6,23,40 - 43,47,49	6,28,29

$$$$date$$$$

SCALE 1"= 100'

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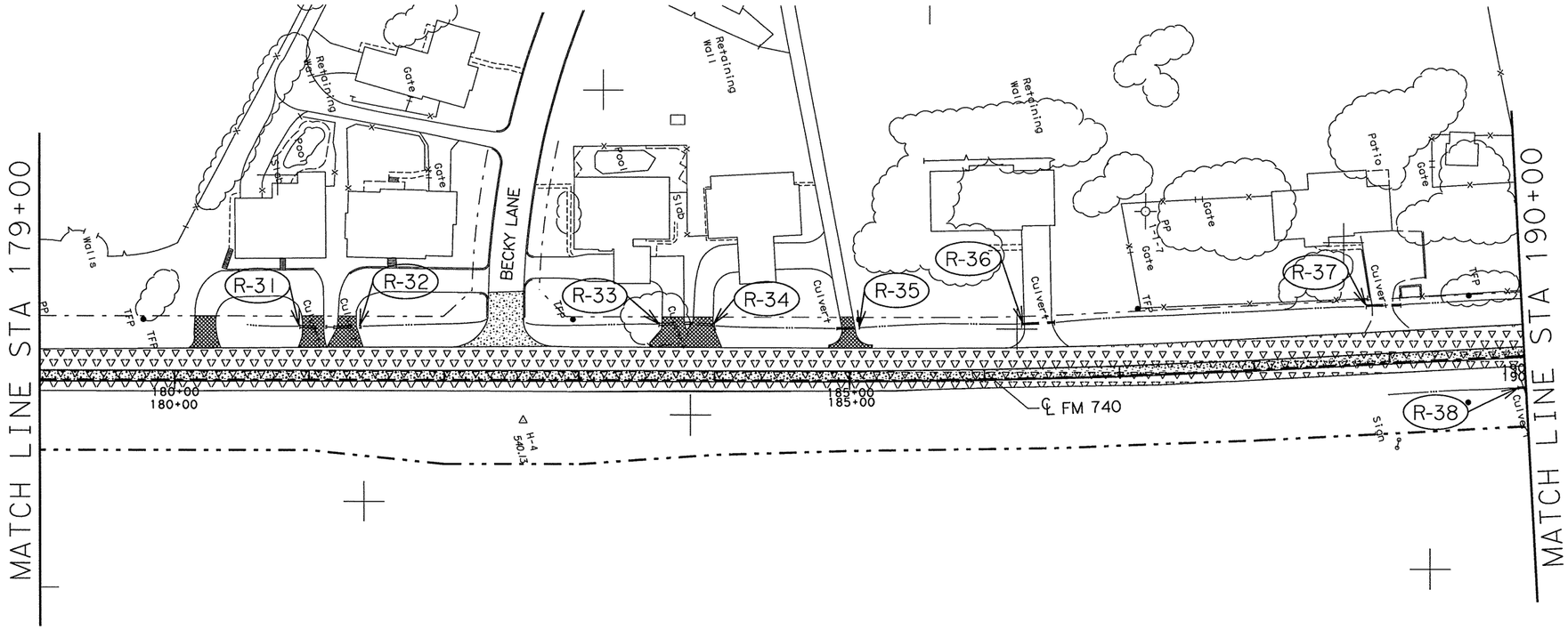
REMOVAL SHEET
SHEET 5 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		112
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

REMOVALS
6,22,23,34,47,49
1-30,36-49
6,28,29

DRAINAGE
1,6,20,23,34,47,49
DISPLAY -

HORIZONTAL & VERTICAL ALIGNMENT
1,6,20,23,33,34,47,49
1 - 30, 39 - 49

DESIGN FILES
1,2,6,20,23,33,34,47,49
1,6,23,40 - 43,47,49

REFERENCE FILES
FN 3.DGN
FL OPQ.DGN
FM740PP&.DGN

\$\$\$\$date\$\$\$\$

STATE OF TEXAS
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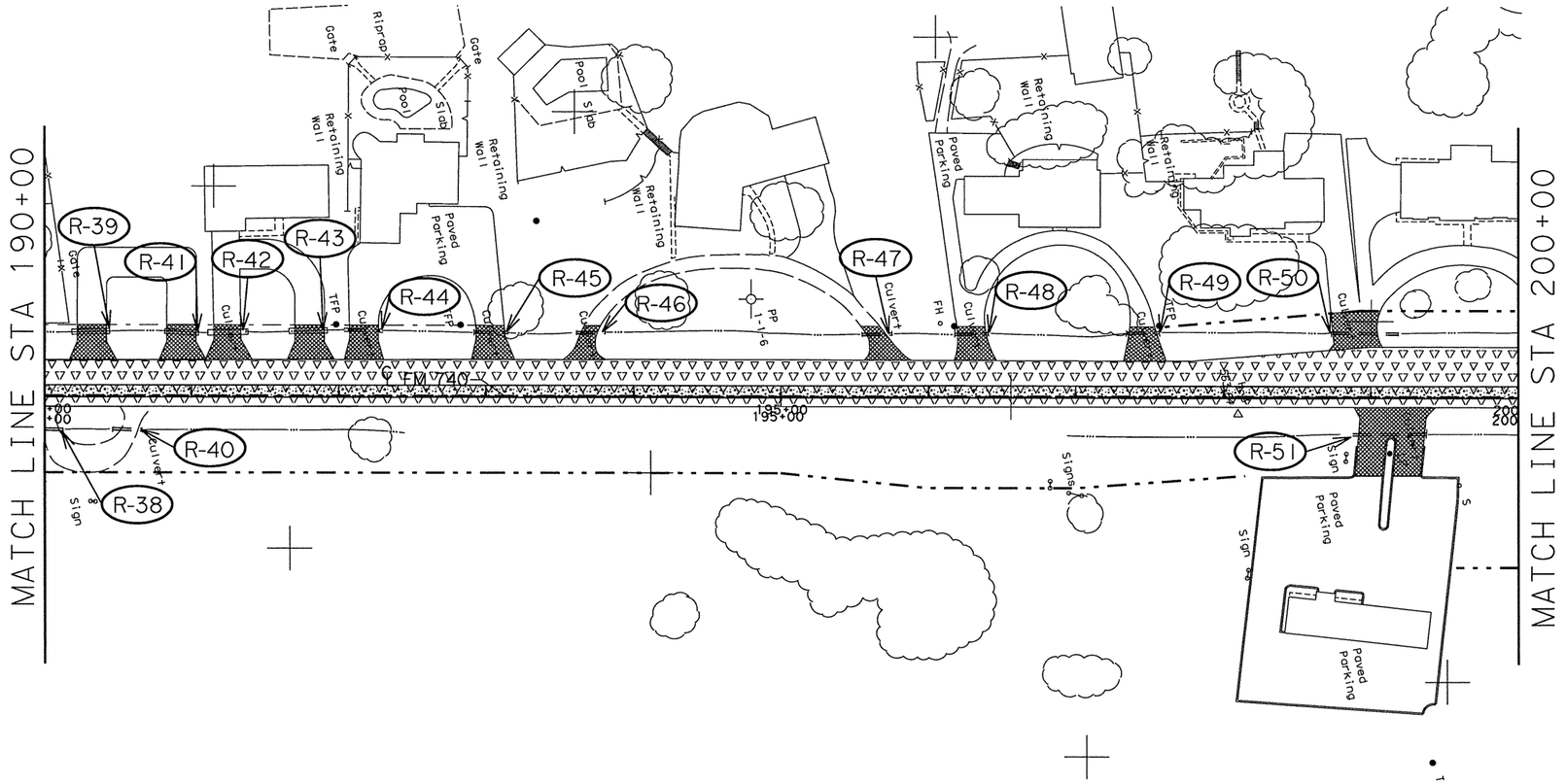
REMOVAL SHEET
SHEET 6 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		113
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

SCALE 1"= 100'



REMOVALS	
DRAINAGE	6,22,23,34,47,49
HORIZONTAL & VERTICAL ALIGNMENT	1-30,36-49
REFERENCE FILES	
FM740N.DGN	1,6,20,23,33,34,47,49
FM740DISPLAY.DGN	DISPLAY C
FM740ALIGN.DGN	1 - 30, 39 - 49
DESIGN FILES	
FM740PP9.DGN	1,2,6,20,23,33,34,47,49
	6,28,29
	1,6,23,40 - 43,47,49

LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

$$$$date$$$$

SCALE 1"= 100'

STATE OF TEXAS
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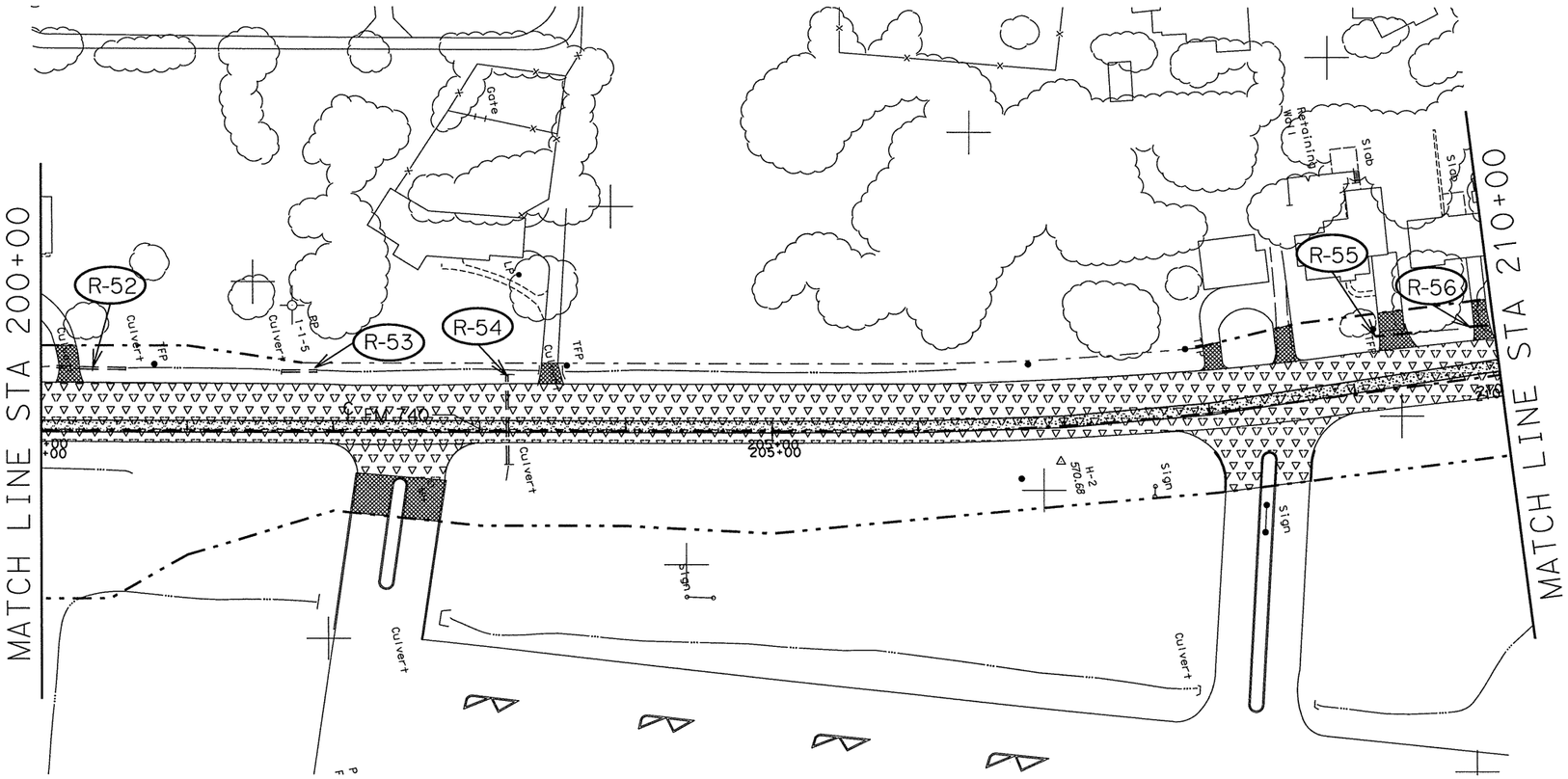
REMOVAL SHEET
SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		114
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM74 N	1,6,20,23,33,34,47,49	1,6,20,23,34,47,49
FM74 0.DGN	1 - 30, 39 - 49	1 - 30, 36 - 49
		DISPLAY 0f
DESIGN FILES		
FM740PP10.DGN	1,26,20,23,33,34,47,49	1,6,23,40 - 43,47,49
		6,28,29

REMOVALS
6,22,23,34,47,49

LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

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REMOVAL SHEET
SHEET 8 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		115
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

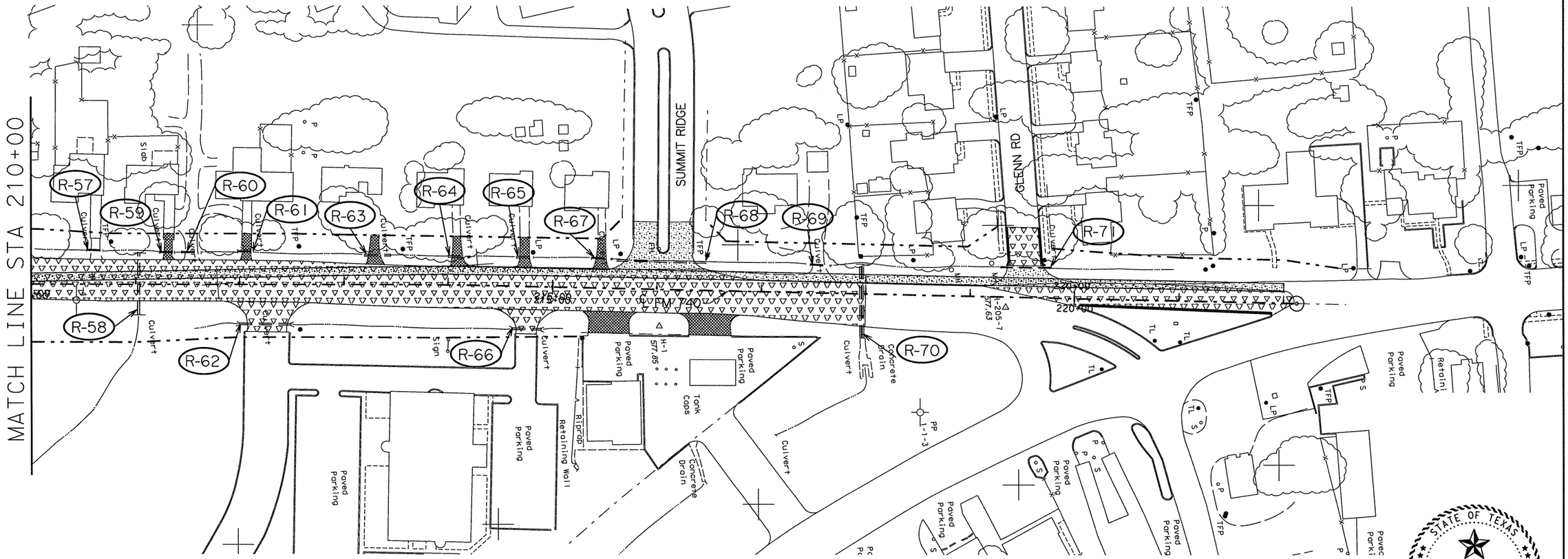
SCALE 1"= 100'

GUST 28, 1998

REMOVALS	
REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT
FM7404.r	1,6,20,23,33,34,47,49
FM740TO1.JN	1 - 30, 39 - 49
DESIGN FILES	
FM740PP11.DGN	1,2,6,20,23,33,34,47,49

DRAINAGE
1,6,20,23,34,47,49
DISPLAY OFF
1,6,23,40 - 43,47,49

$$$$date$$$$



LEGEND

- REMOVE OLD CONCRETE (PAV)
- REMOVE OLD CONCRETE (DRVWY)
- REMOVE OLD CONCRETE (CURB OR C & G)
- REMOVE ASPHALT

SCALE 1"= 100'

STATE OF TEXAS
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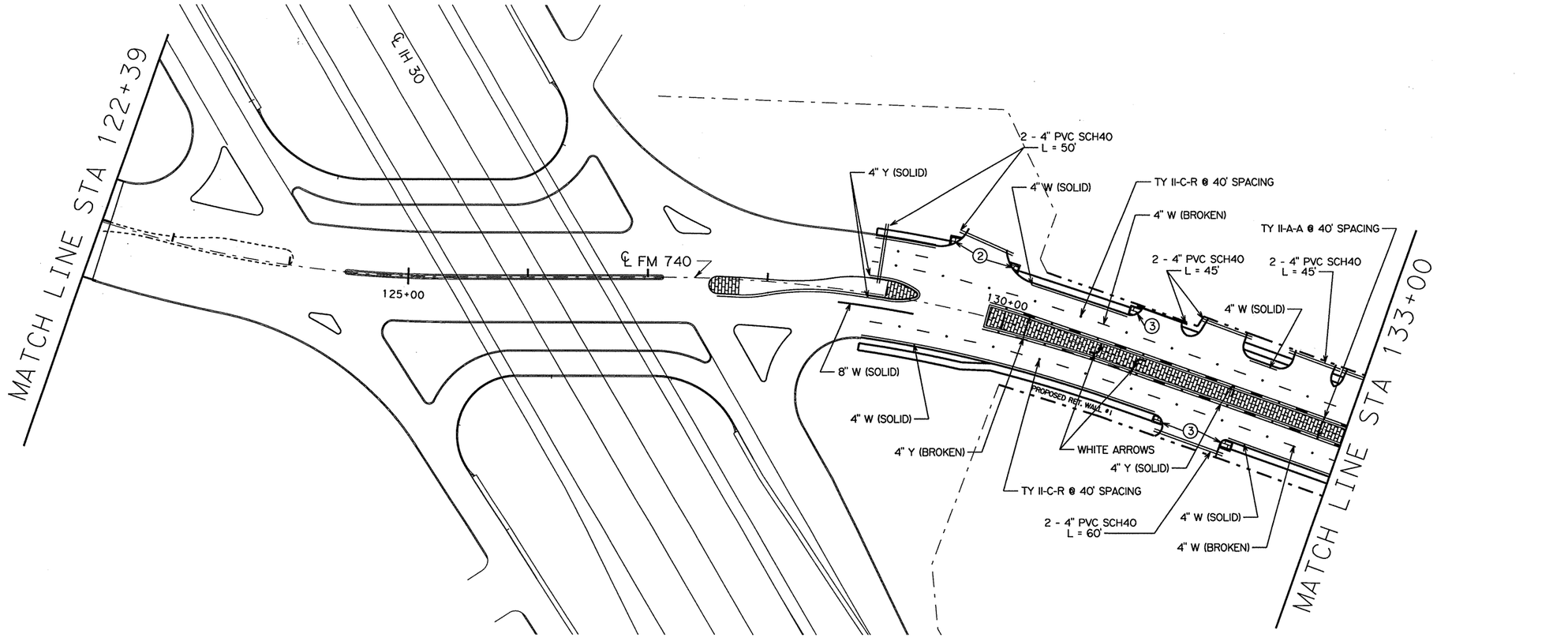
8/16/, 1999

David Lott, P.E.

REMOVAL SHEET
SHEET 9 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		116
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

D:\ENGDATA\FM740\STRIPE1.DGN



LEGEND

(2) (3) (Ramp Detail See Sh 154-156)

STATE OF TEXAS
DAVID T. LOTT
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8/16/, 1999

David Lott, P.E.

SHEET 1 OF 9

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

PLAN SCALE 1" = 100'

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		117
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

APRIL 7, 1998

EST 4410

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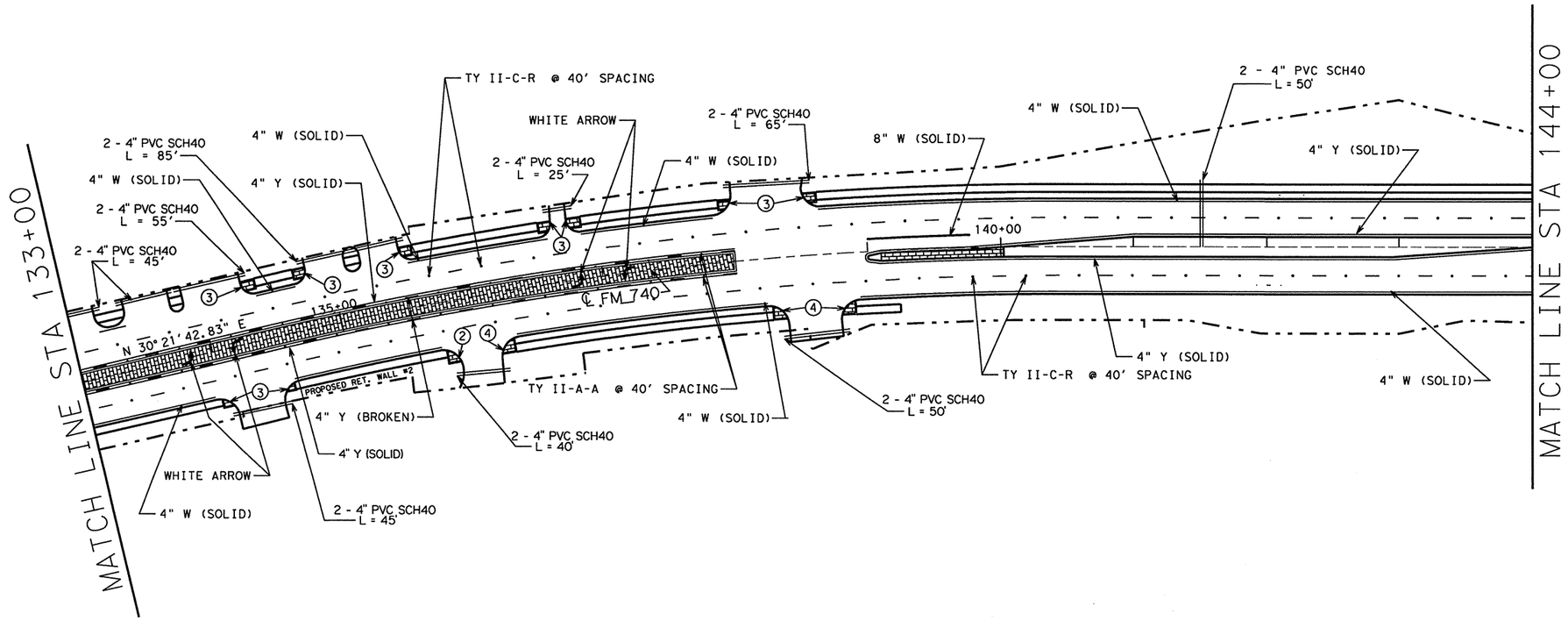

LEGEND

(2) (3) (4) (Ramp Detail See Sheets 154-156)

PLAN SCALE 1" = 100'

STATE OF TEXAS
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David Lott, P.E.

SHEET 2 OF 9

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		118
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

APRIL 7, 1998

ET 4410

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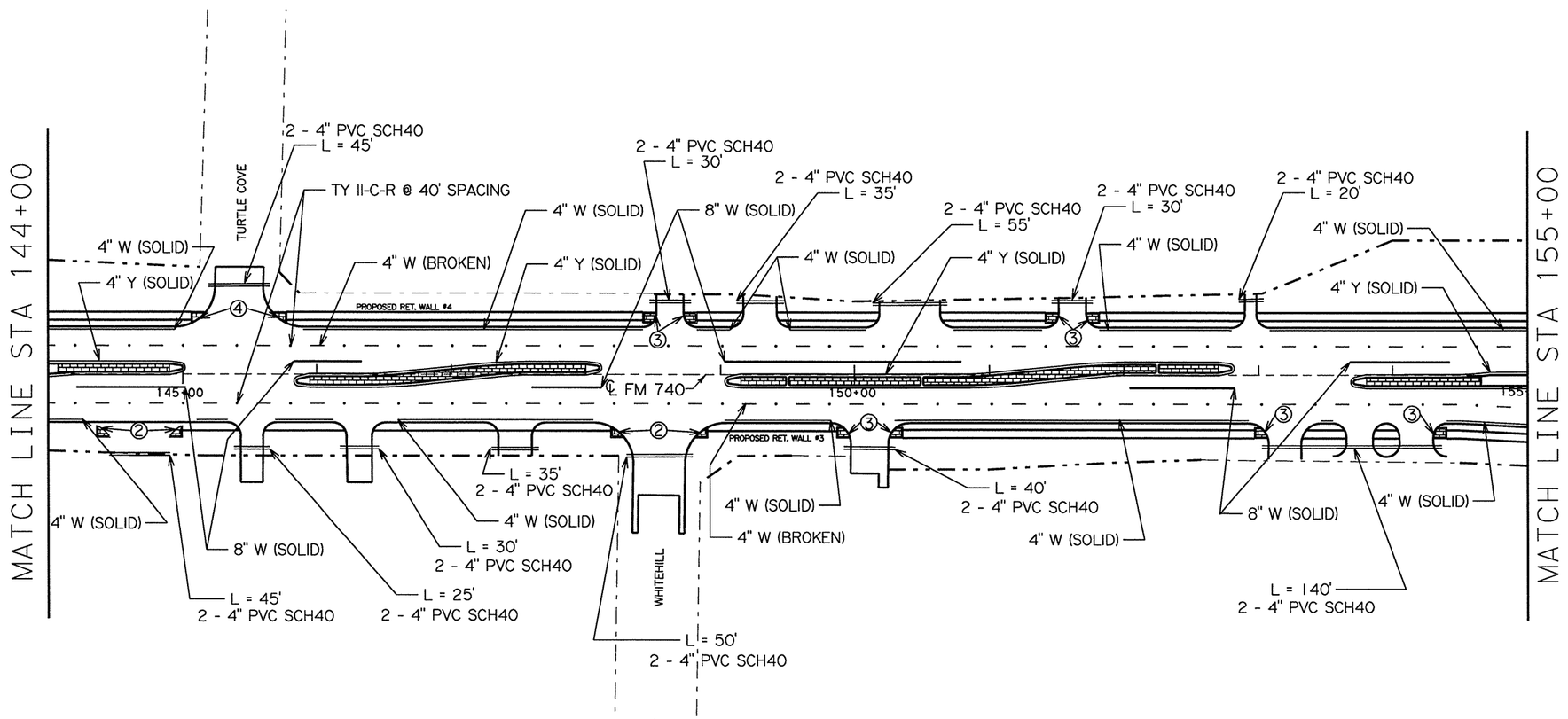

PLAN SCALE 1" = 100'

LEGEND

②③④ (Ramp Detail See Sheets 154-156)

STATE OF TEXAS
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8/16/, 1999

David Lott, P.E.

SHEET 3 OF 9

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		119
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

APRIL 9, 1998

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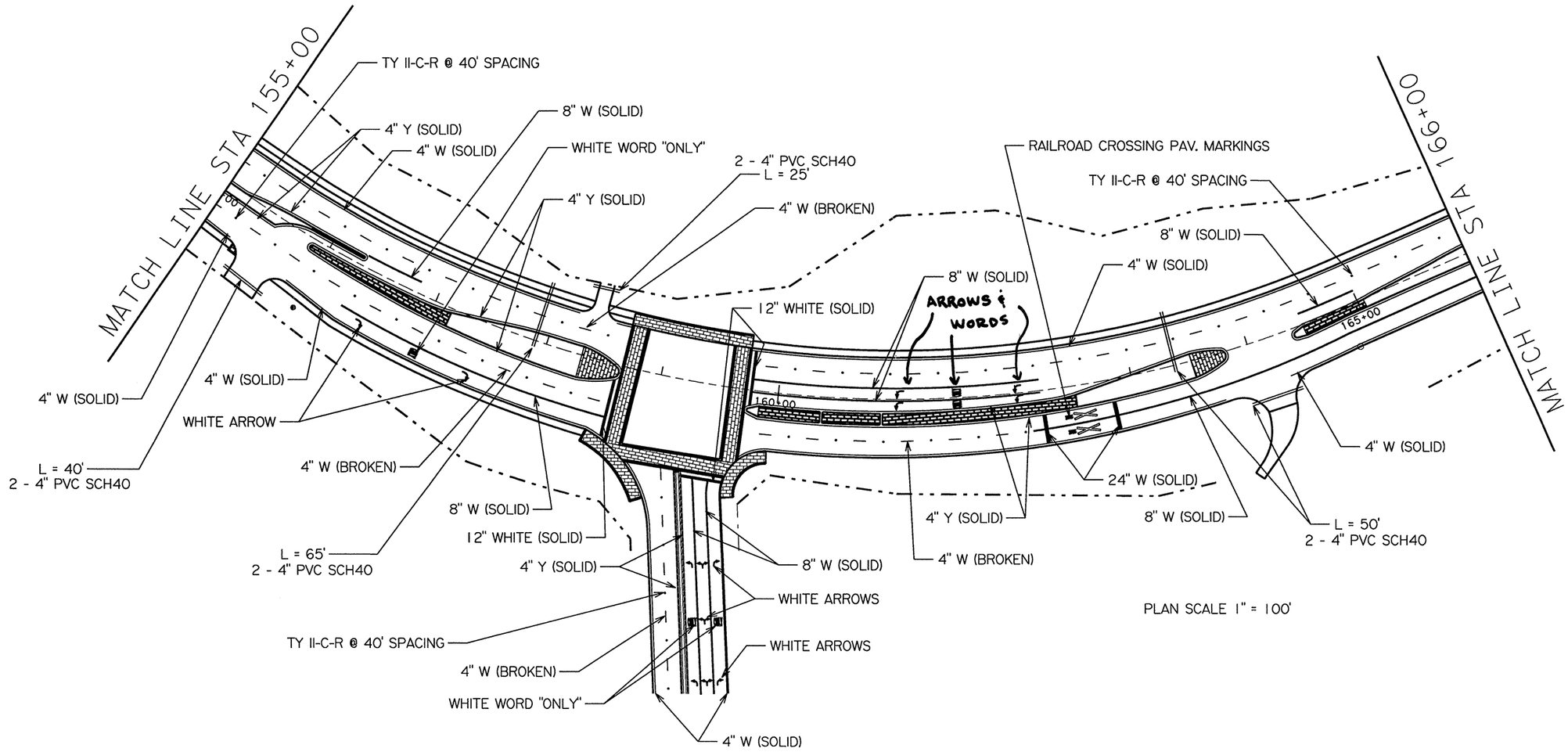

PLAN SCALE 1" = 100'

STATE OF TEXAS
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8/16/, 1999

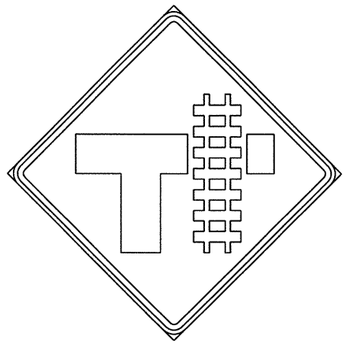
David Lott, P.E.

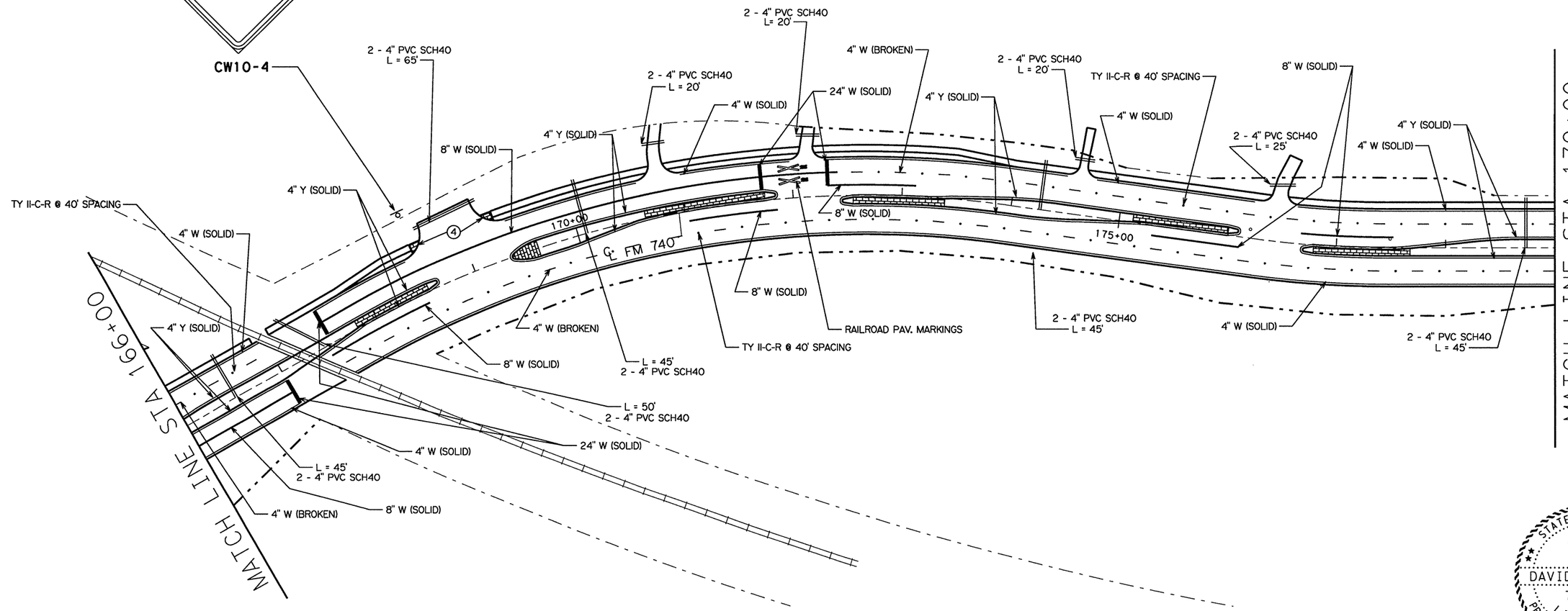
SHEET 4 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		120
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

APRIL 9, 1998





PLAN SCALE 1" = 100'

LEGEND

④ (Ramp Detail See Sh 154-156)

STATE OF TEXAS
DAVID T. LOTT
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LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

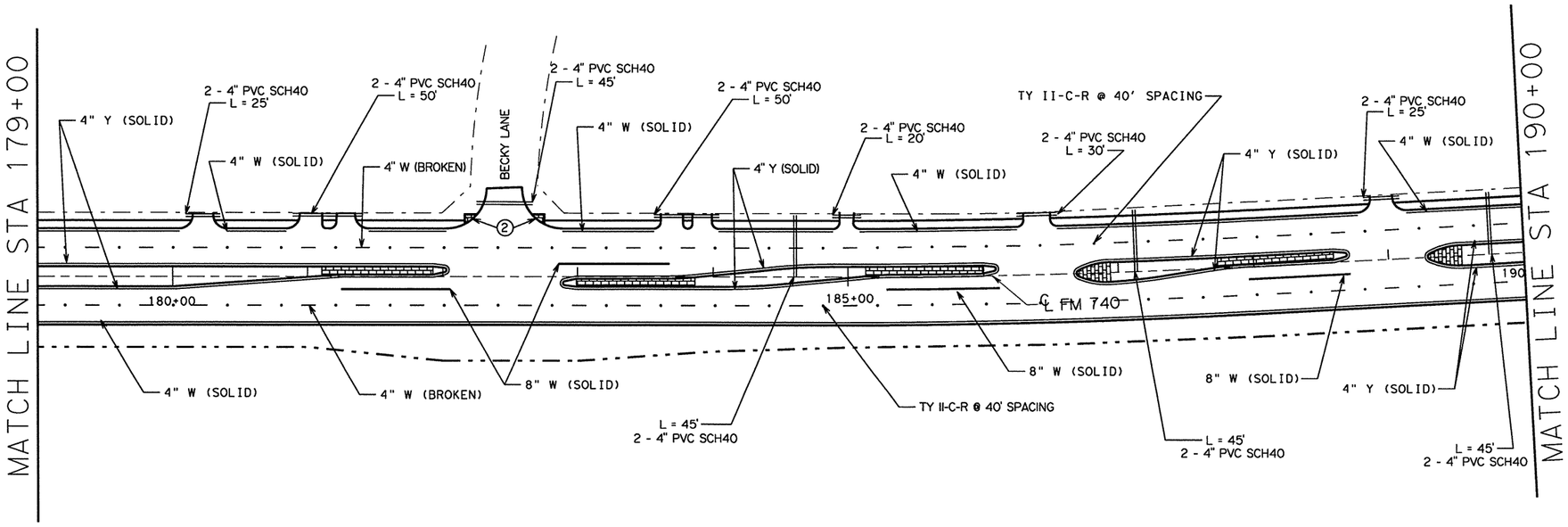
STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

SHEET 5 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		121
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

EXT 4410

APRIL 10, 1998



LEGEND

(2) (Ramp Detail See Sh 154-156)

PLAN SCALE 1" = 100'

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

SHEET 6 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		122
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FXT 4410

APRIL 10, 1998

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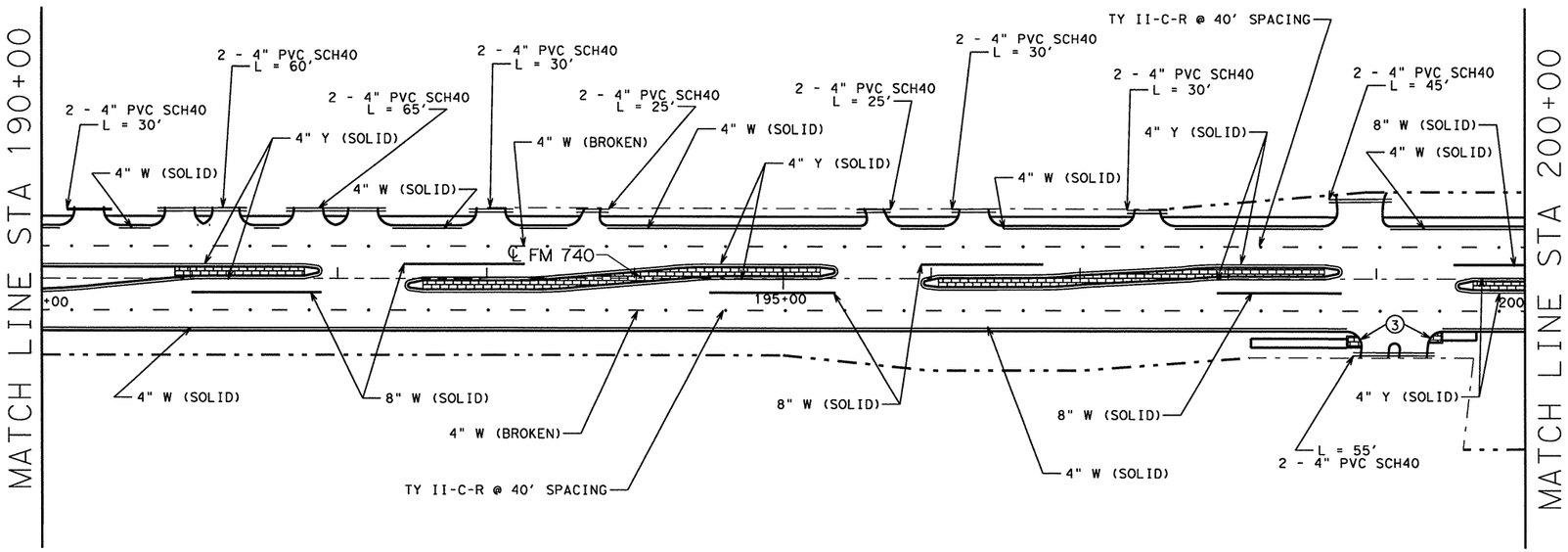

LEGEND

(3) (Ramp Detail sec sh 154-156)

PLAN SCALE 1" = 100'

APRIL 10, 1998

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

STATE OF TEXAS
DAVID T. LOTT
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PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		123
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FXT 4410

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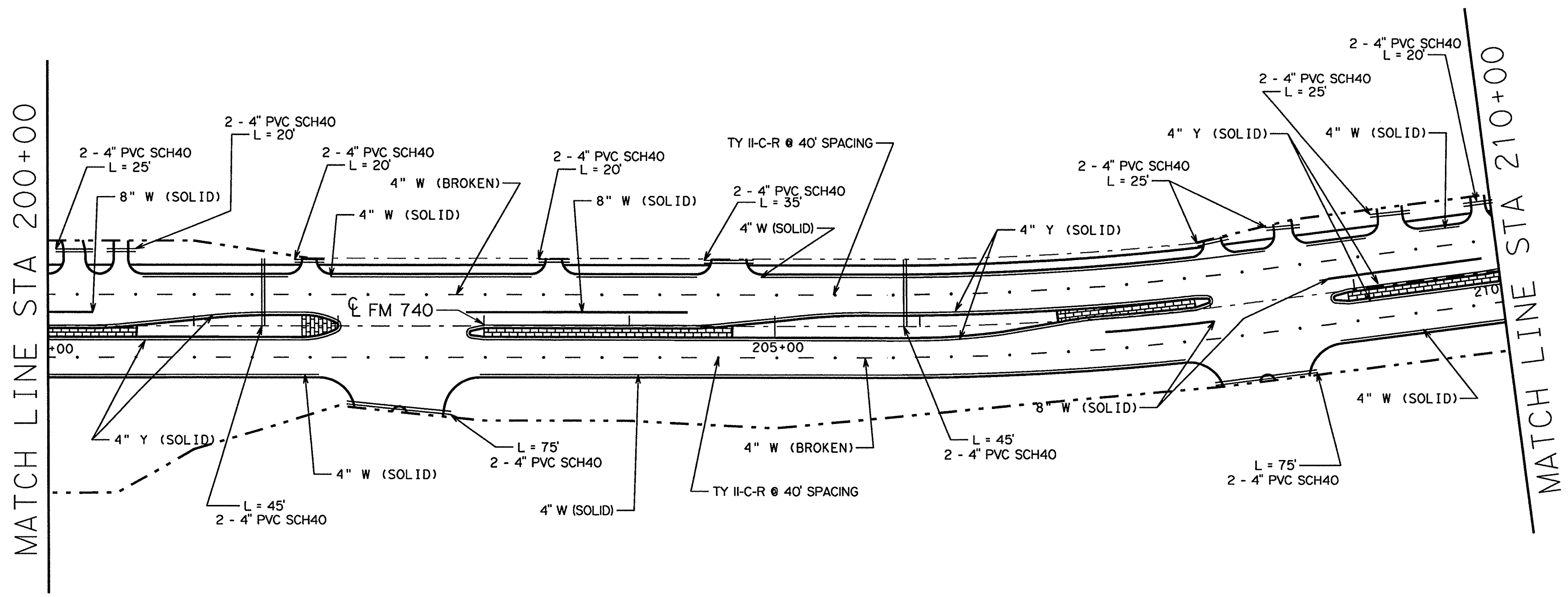

PLAN SCALE 1" = 100'

STATE OF TEXAS
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David Lott, P.E.

SHEET 8 OF 9

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		124
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

APRIL 13 1998

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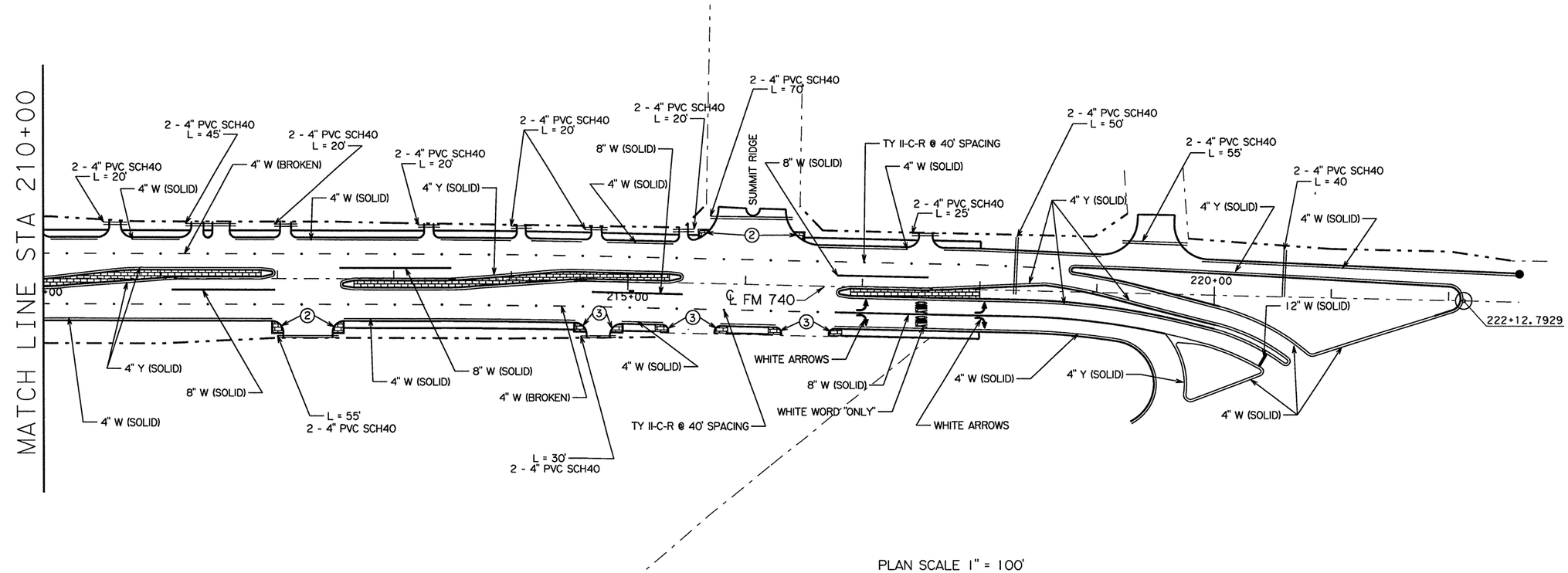

PLAN SCALE 1" = 100'

Legend

② ③ (Ramp Detail see Sheets 154-156)

STRIPING, SIDEWALKS, CROSSWALKS & IRRIGATION DETAILS

STATE OF TEXAS
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8/16/, 1999

David Lott, P.E.

SHEET 9 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		125
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

APRIL 13, 1998

EXT 4410

SITE DESCRIPTION

PROJECT LIMITS: FROM NORTH OF IH 30 TO SH 205

PROJECT DESCRIPTION: FOR THE CONSTRUCTION OF THE WIDENING OF A NON-FREEWAY FACILITY CONSISTING OF GRADING, DRAINAGE, LIME TREATED SUBGRADE, ASPHALT CONCRETE PAVEMENT, CONCRETE PAVEMENT, PAVEMENT MARKINGS & SIDEWALKS.

MAJOR SOIL DISTURBING ACTIVITIES: SOIL DISTURBING ACTIVITIES WILL INCLUDE: PREPARING THE R.O.W., GRADING, EXCAVATION AND EMBANKMENT FOR ROADWAYS, REMOVAL OF OLD CONCRETE AND CORRUGATED METAL, EROSION AND SEDIMENT CONTROLS, AND TOPSOIL WORK FOR FINAL PLANTING AND SEEDING.

TOTAL PROJECT AREA: 23.0 ACRES

TOTAL AREA TO BE DISTURBED: 23.0 ACRES

WEIGHTED RUNOFF COEFFICIENT (AFTER CONSTRUCTION): 0.70

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER: PREDOMINANT SOIL TYPES THAT EXIST ALONG THE PROJECT ARE TAN, YELLOWISH BROWN, AND LIGHT GREY CLAYS WITH A TRACE OF CALICHE. VARIOUS GRASSES COVER 95% OF THE EXISTING SOIL.

NAME OF RECEIVING WATERS: THE SOUTH END OF THE PROJECT DRAINS TO THE EXISTING IH 30 STORM SEWER WHICH OUTFALLS INTO AN UNNAMED TRIBUTARY WHICH DRAINS INTO LAKE RAY HUBBARD (TRINITY RIVER) AT STREAM SEGMENT 0820. THE REMAINDER OF THE PROJECT FLOWS INTO ANOTHER UNNAMED TRIBUTARY WHICH FLOWS INTO LAKE RAY HUBBARD (TRINITY RIVER) ALSO AT STREAM SEGMENT 0820.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT PLANTING, SODDING, OR SEEDING
- [ ] MULCHING
- [ ] SOIL RETENTION BLANKET
- [ ] BUFFER ZONES
- [ ] PRESERVATION OF NATURAL RESOURCES

OTHER:

STRUCTURAL PRACTICES:

- [X] SILT FENCES
- [ ] HAY BALES
- [ ] ROCK FILTER DAMS
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- [ ] DIVERSION DIKE AND SWALE COMBINATIONS
- [ ] PIPE SLOPE DRAINS
- [ ] PAVED FLUMES
- [ ] ROCK BEDDING AT CONSTRUCTION EXIT
- [ ] TIMBER MATTING AT CONSTRUCTION EXIT
- [ ] CHANNEL LINERS
- [ ] SEDIMENT TRAPS
- [ ] SEDIMENT BASINS
- [ ] STORM INLET SEDIMENT TRAP
- [ ] STONE OUTLET STRUCTURES
- [X] CURBS AND GUTTERS
- [X] STORM SEWERS
- [ ] VELOCITY CONTROL DEVICES

OTHER:

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:

1. INSTALL SEDIMENT CONTROLS AS SHOWN ON PLANS. THESE SEDIMENT CONTROLS SHOULD BE PLACED PRIOR TO ANY CLEARING, PAVEMENT REMOVAL, EMBANKMENT AND EXCAVATION ON WORK SITE.

2. INTALL SILT FENCE AROUND TOPSOIL STOCKPILES AND AT EMBANKMENT AND EXCAVATION AREAS. THE TOPSOIL STOCKPILES WILL BE USED THROUGHOUT THE PROJECT TO STABILIZE AND COVER DISTURBED AREAS.

3. PROVIDE SILT FENCE AROUND CURB AND DROP INLETS AS SHOWN ON PLANS. REMOVE AND REPLACE SEDIMENT CONTROL DEVICES AS NEEDED.

4. WHEN CONSTRUCTION ACTIVITIES ARE COMPLETE AND THE SITE IS STABILIZED AND APPROVED BY THE ENGINEER, REMOVE ALL TEMPORARY CONTROLS AND RESEED ANY AREAS DISTURBED BY THEIR REMOVAL.

STORM WATER MANAGEMENT:

STORM WATER DRAINAGE WILL BE PROVIDED BY CURB INLETS, DROP INLETS, THE STORM SEWER SYSTEM AND DITCHES. THESE SYSTEMS WILL CARRY DRAINAGE WITHIN THE R.O.W. TO THE NEAREST CULVERT OR STREAM. PERMANENT EROSION CONTROLS INCLUDE A GRADING DESIGN GENERALLY CONSISTING OF 4:1 SLOPES OR FLATTER WITH PERMANENT VEGETATIVE COVER.

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE: ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER. IF A REPAIR IS NECESSARY, IT WILL BE DONE AT THE EARLIEST DATE POSSIBLE, BUT NO LATER THAN 7 CALENDAR DAYS AFTER THE SURROUNDING EXPOSED GROUND HAS DRIED SUFFICIENTLY TO PREVENT FURTHER DAMAGE FROM HEAVY EQUIPMENT. THE AREAS ADJACENT TO CREEKS AND DRAINAGEWAYS SHALL HAVE PRIORITY. THE CONTRACTOR WILL MAINTAIN ALL EROSION AND SEDIMENT CONTROLS FOR THE DURATION OF THE PROJECT OR AS DIRECTED BY THE ENGINEER. SHOULD THE ENGINEER NOT AGREE WITH THE LEVEL OF MAINTENANCE, THE ENGINEER SHALL HAVE THE OPTION OF WITHHOLDING THE MONTHLY PAY ESTIMATE UNTIL SUCH TIME AS SATISFACTION IS REACHED.

INSPECTION: AN INSPECTION WILL BE PERFORMED BY A TXDOT INSPECTOR EVERY WEEK AS WELL AS AFTER EVERY HALF INCH OR MORE OF RAIN (AS RECORDED ON A RAIN GAUGE TO BE LOCATED AT THE PROJECT SITE). AN INSPECTION AND MAINTENANCE REPORT WILL BE MADE PER EACH INSPECTION. BASED ON THE INSPECTION RESULTS, THE CONTROLS SHALL BE REVISED PER THE INSPECTION REPORT.

WASTE MATERIALS: ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER WILL MEET ALL STATE, COUNTY AND LOCAL CITY SOLID WASTE MANAGEMENT REGULATIONS. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION, AND THE TRASH WILL BE HAULED TO A LOCAL DUMP. NO CONSTRUCTION WASTE MATERIAL WILL BE BURIED ON SITE. ALL STATE, COUNTY AND LOCAL CITY REGULATIONS WILL BE PROVIDED BY THE CONTRACTOR AT THE ENGINEER'S REQUEST.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING): AT A MINIMUM, ANY PRODUCTS IN THE FOLLOWING CATAGORIES ARE CONSIDERED TO BE HAZARDOUS: PAINTS, ACIDS FOR CLEANING MASONARY SURFACES, CLEANING SOLVENTS, ASPHALT PRODUCTS, CHEMICAL ADDITIVES FOR SOIL STABILIZATION, OR CONCRETE CURING COMPOUNDS AND ADDITIVES. IN THE EVENT OF A SPILL WHICH MAY BE HAZARDOUS OR THE DISCOVERY OF ANY HAZARDOUS MATERIAL, THE DISTRICT ENVIRONMENTAL SECTION SHALL BE NOTIFIED IMMEDIATELY.

SANITARY WASTE: ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS NECESSARY OR AS REQUIRED BY LOCAL REGULATION BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR. ALL REGULATIONS WILL BE PROVIDED BY THE CONTRACTOR AT THE ENGINEER'S REQUEST.

OFFSITE VEHICLE TRACKING:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [X] EXCESS DIRT ON ROAD REMOVED DAILY
- [ ] STABILIZED CONSTRUCTION ENTRANCE

OTHER:

REMARKS: DISPOSAL AREAS, STOCKPILES, AND HAUL ROADS SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE AND CONTROL THE AMOUNT OF SEDIMENT THAT MAY ENTER RECEIVING WATERS. DISPOSAL AREAS SHALL NOT BE LOCATED IN ANY WETLAND, WATERBODY OR STREAMBED.

CONSTRUCTION STAGING AREAS AND VEHICLE MAINTENANCE AREAS SHALL BE CONSTRUCTED BY THE CONTRACTOR IN A MANNER TO MINIMIZE THE RUNOFF OF POLLUTANTS.

ALL WATERWAYS SHALL BE CLEARED AS SOON AS PRACTICABLE OF TEMPORARY EMBANKMENT, TEMPORARY BRIDGES, MATTING, FALSEWORK, PILING, DEBRIS OR OTHER OBSTRUCTIONS PLACED DURING CONSTRUCTION OPERATIONS THAT ARE NOT A PART OF THE FINISHED WORK.

STATE OF TEXAS
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PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		126
STATE	STATE DISTRICT	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

EXT 4410

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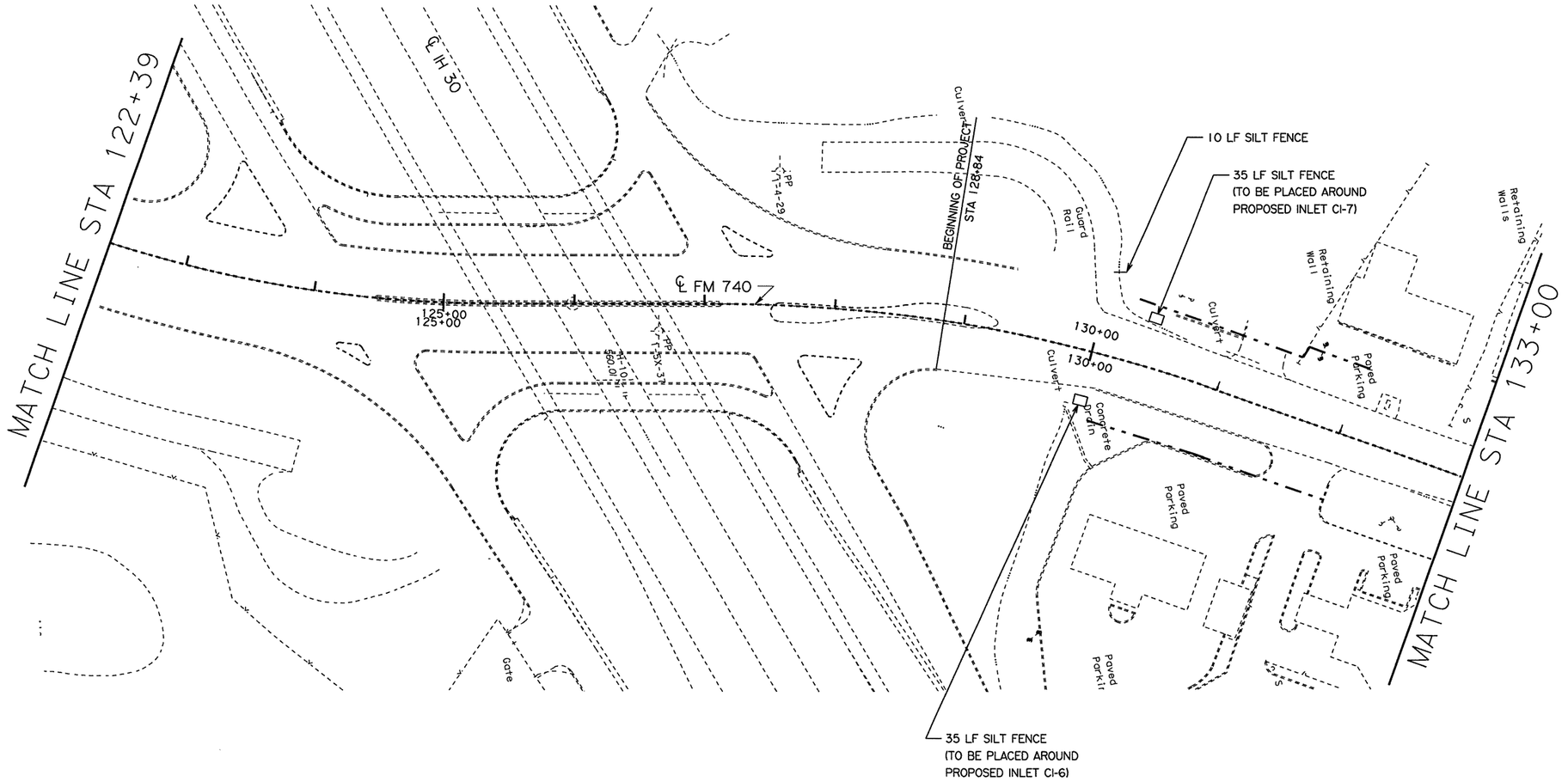

PLAN SCALE 1" = 100'

STATE OF TEXAS
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PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

SHEET 1 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		127
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FEBRUARY 9, 1998

EVT 4410

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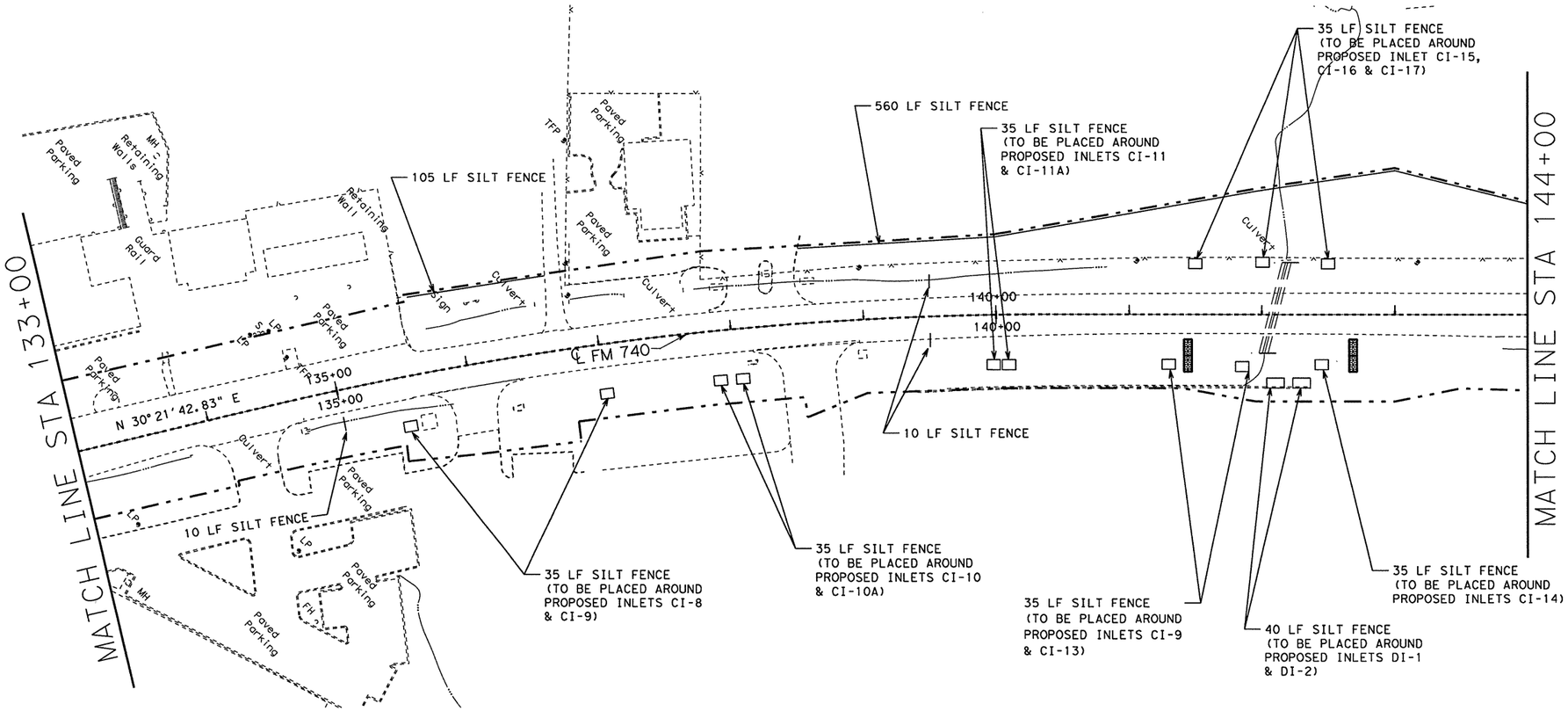

PLAN SCALE 1" = 100'

STATE OF TEXAS
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8/16/, 1999

David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

SHEET 2 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			128
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

EXT 143

FEBRUARY 9, 1998

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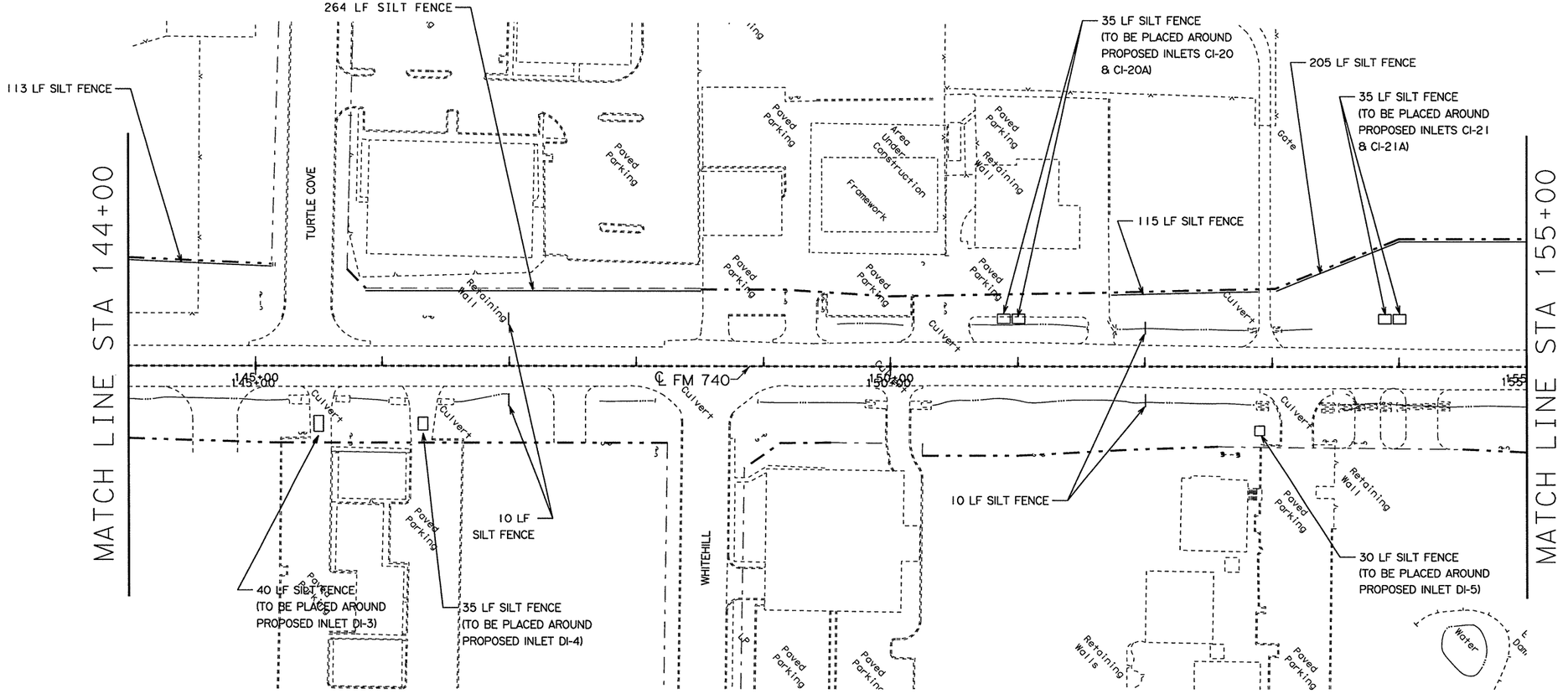

PLAN SCALE 1" = 100'

STATE OF TEXAS
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8/16/, 1999

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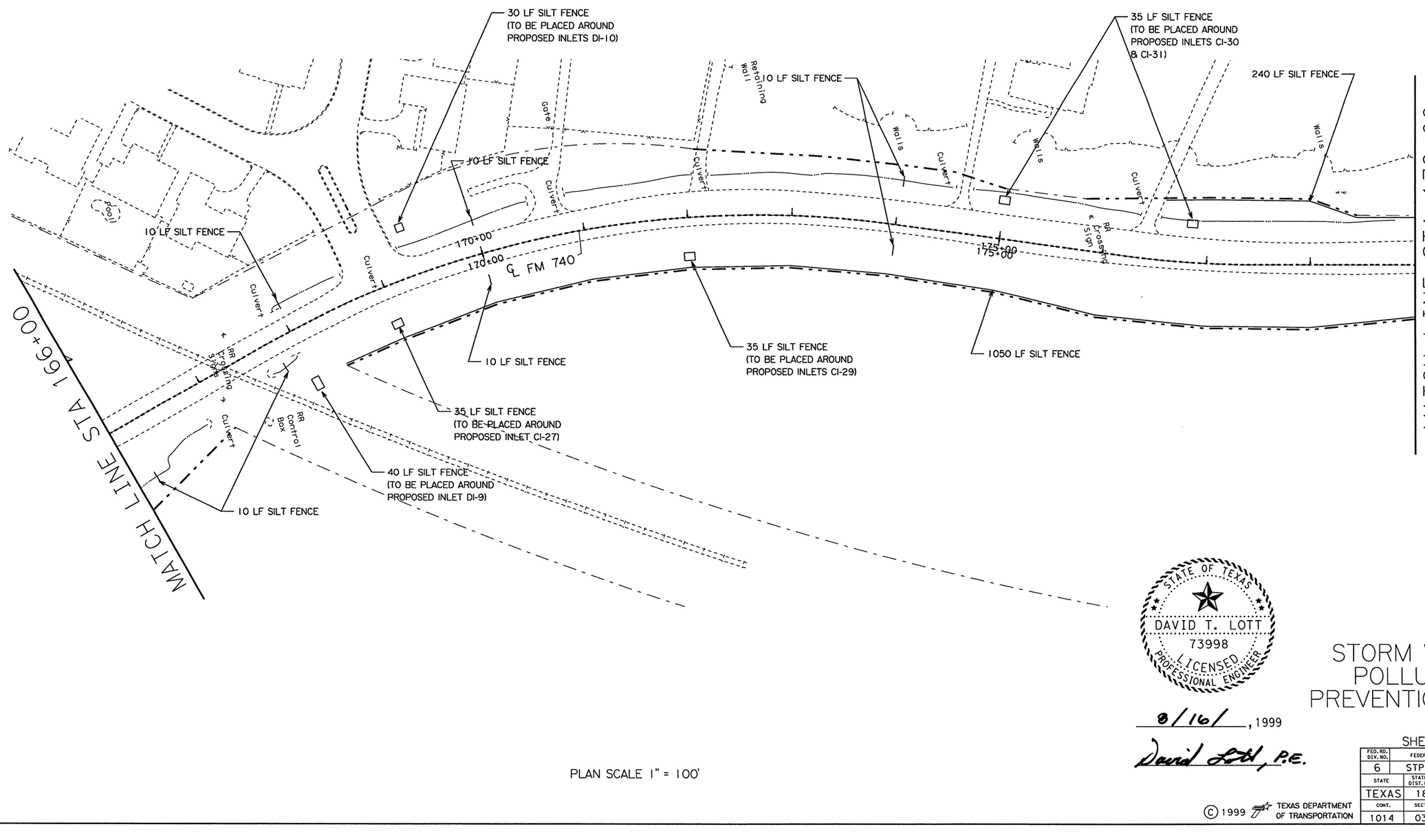
STORM WATER POLLUTION PREVENTION PLAN

SHEET 3 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			129
STATE	STATE DIST.NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

FEBRUARY 9, 1998



PLAN SCALE 1" = 100'

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8/16/, 1999

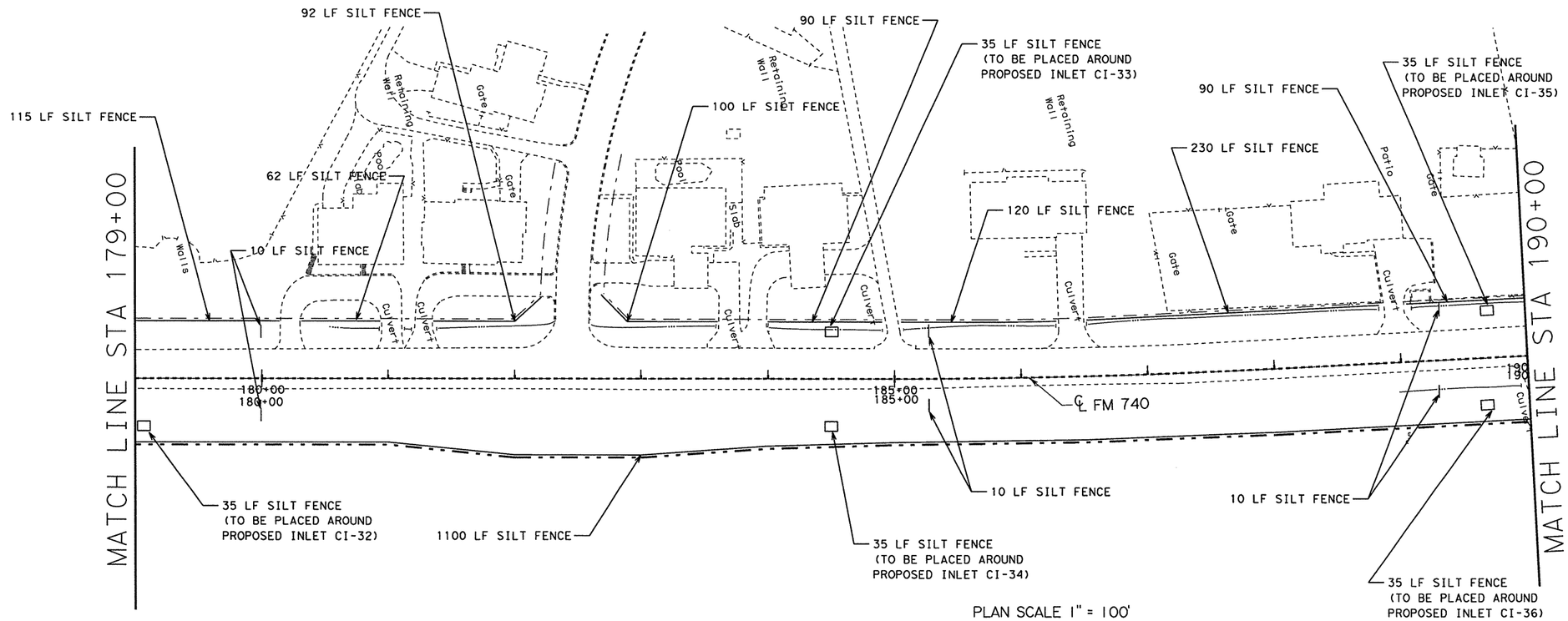
David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

SHEET 5 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		13
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

EXT 4410



PLAN SCALE 1" = 100'

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8/16/, 1999

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STORM WATER POLLUTION PREVENTION PLAN

SHEET 6 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		132
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FXT 4410

FEBRUARY 9, 1998

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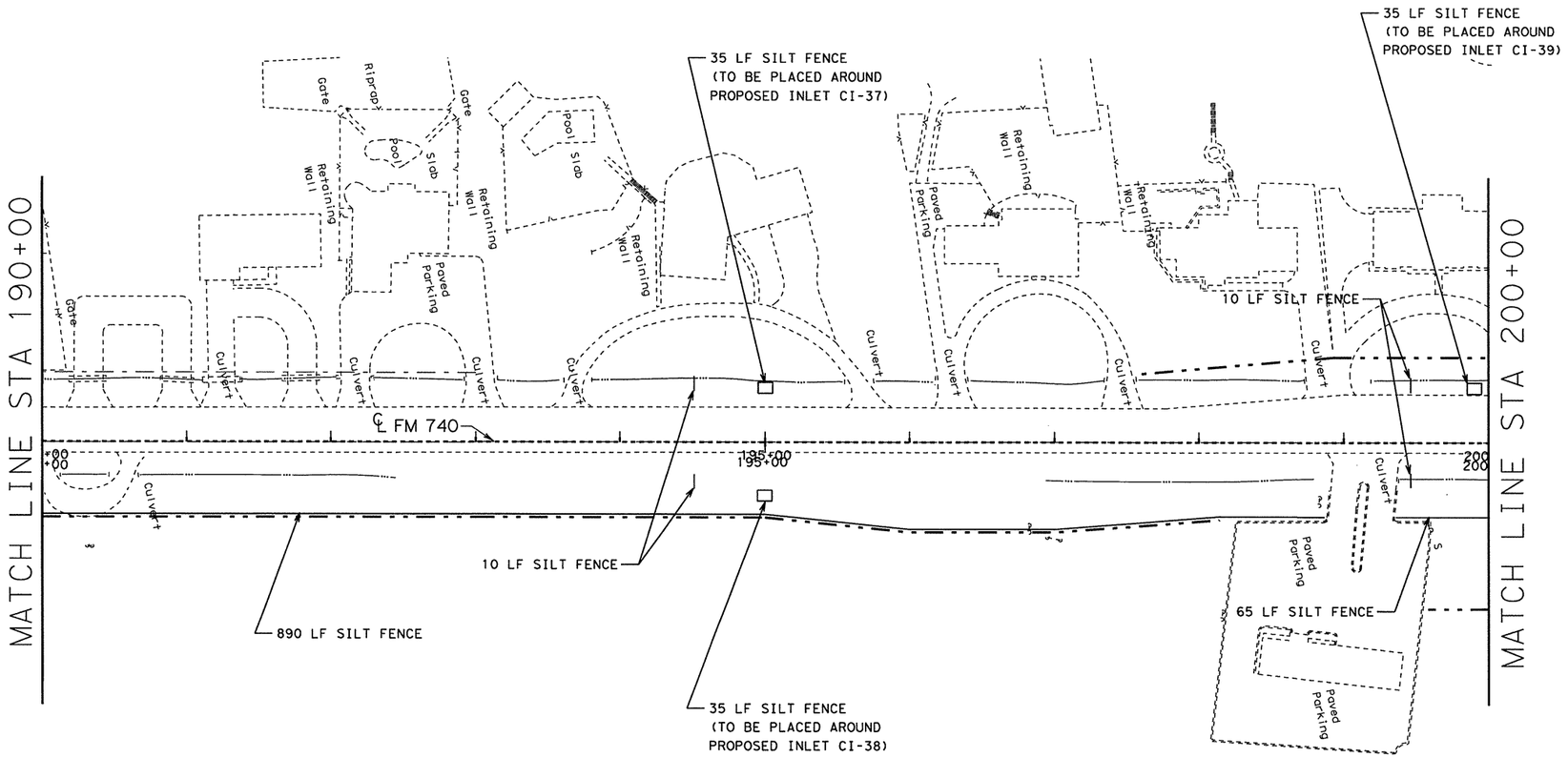

PLAN SCALE 1" = 100'

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8/16/, 1999

David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

SHEET 7 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		133
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FXT 4410

FEBRUARY 9, 1998

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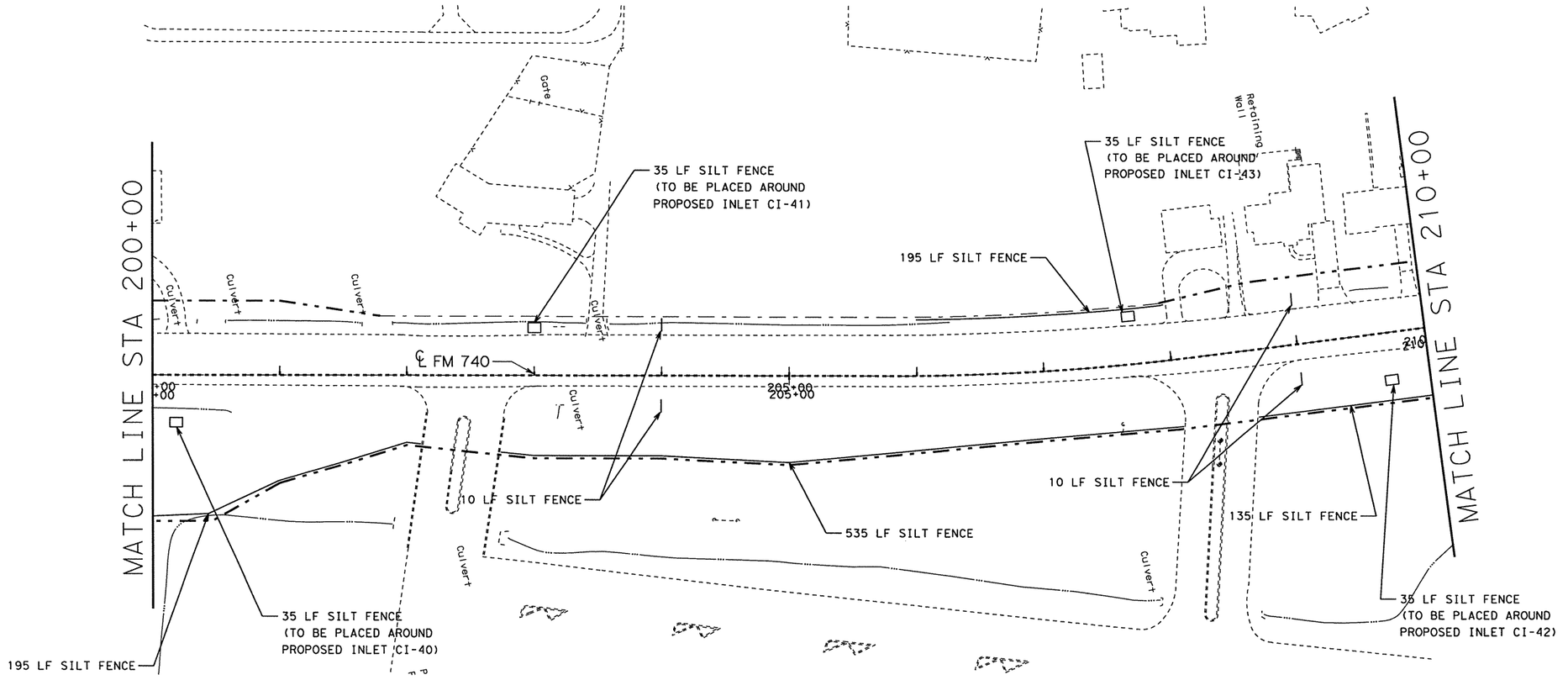

PLAN SCALE 1" = 100'

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8/16/, 1999

David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

SHEET 8 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		134
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FEBRUARY 9 1998

PXT 441C

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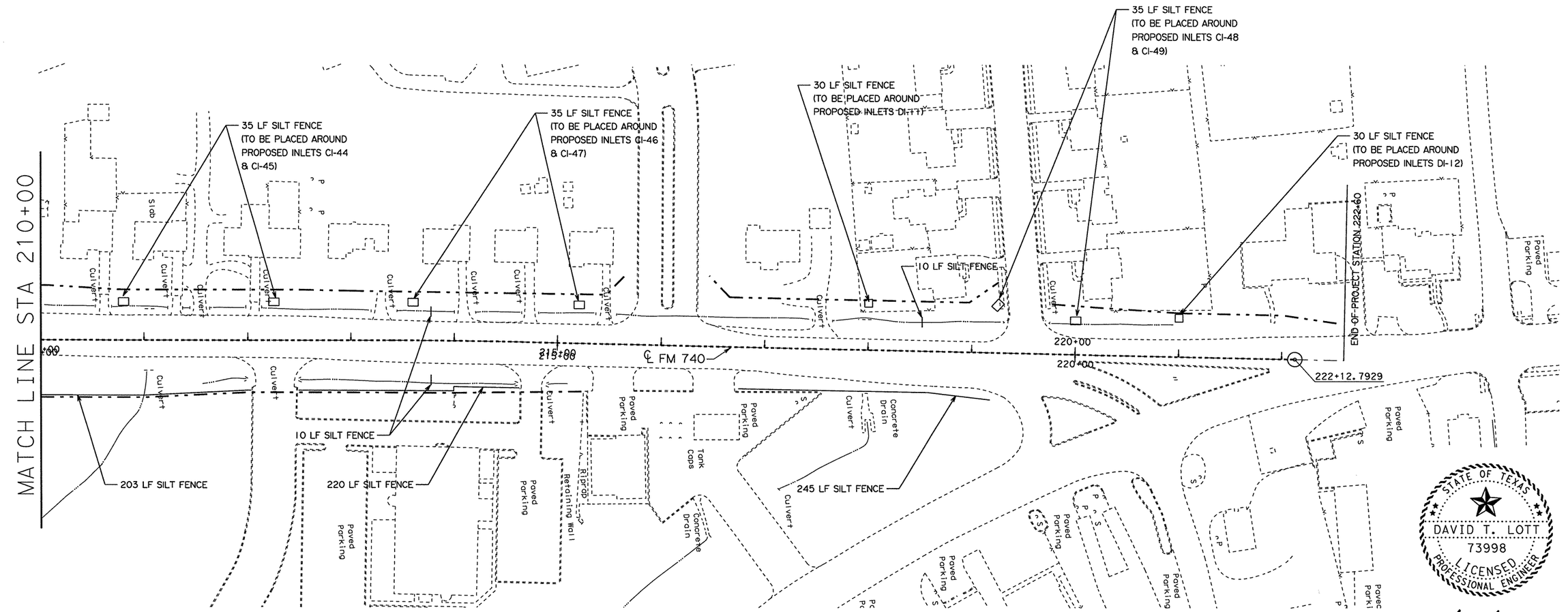

PLAN SCALE 1" = 100'

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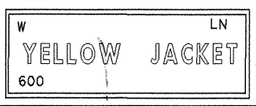
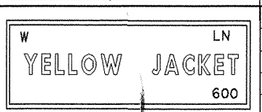
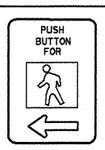
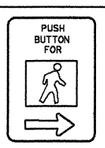
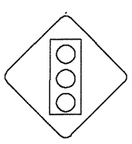
STORM WATER POLLUTION PREVENTION PLAN

SHEET 9 OF 9

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			134A
STATE	STATE DIST. NO.	COUNTY		
TEXAS	18	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

FEBRUARY 10, 1998

SUMMARY OF SMALL SIGNS

SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLYWOOD TYPE A	ALUMINUM TYPE A	TYPE OF MOUNT																		
							Type 1	Type 2	A	A-1	B	C	D-1	D-2	D-3	D-4	D-5	D-6	F	F (MOD)	*F (SPL)		MP	MW
		FM 740 AT YELLOWJACKET LN.																						
D	ER10-5		1 EACH 30x36in	A		X	MOUNT ON P1 MASTARM																	
1			1 EACH 8.5 x 1.25 ft	C		X	MOUNT ON POLE P2 MASTARM																	
2			1 EACH 14 x 1.25 ft	C		X	MOUNT ON POLE P1 MASTARM																	
3			1 EACH 13.5 x 1.25 ft	C		X	MOUNT ON P3 MASTARM																	
C	R9 3a		2 EACH 18x18in	A		X	MOUNT ON POLE P1, P4																	
A	R10-4bL		2 EACH 9x12in	A		X	MOUNT ON POLE P2,P3																	
B	R10-4bR		2 EACH 9X12in	A		X	MOUNT ON POLE P3,P4																	
E	W3-3		2 EACH 36X36in	C		X	ROADSIDE FLASHING BEACON ASSEMBLY																	
A (Temp)	R10-5		1 EACH 30x36in	A		X	MOUNT ON SPAN P1-P4																	

GENERAL NOTES:

SIGN LOCATIONS SHOWN ON THE PLANS ARE DIAGRAMATIC. SIGNS WILL BE PLACED IN CONFORMANCE WITH THE 1980 TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.

THE CONTRACTOR, IN COOPERATION WITH THE ENGINEER WILL STAKE EACH SIGN LOCATION BEFORE TAKING ELEVATIONS FOR FABRICATION OF SIGN POST.

SIGN POST LENGTHS SHALL BE VERIFIED WITH THE ENGINEER BEFORE FABRICATION.

REFLECTIVE SHEETING WILL BE DESIGNATED AS:

TYPE A = ENGINEER GRADE
TYPE B = SUPER ENGINEER GRADE
TYPE C = HIGH SPECIFIC INTENSITY

ALL SIGNS ON THIS SHEET SHALL BE SUBSIDIARY TO ITEM 680 EXCEPT AS SHOWN.

SUMMARY OF SMALL SIGNS

SHEET 1 OF 1

FEDERAL REGION	STATE	FEDERAL AID PROJECT	HIGHWAY
6	TEXAS	STP 943(M)	FM 740
STATE DISTRICT	COUNTY	CONTROL SECTION	JOB	SHEET
DAL	ROCKWALL	1014	03	033	135

CELL NAME: SMLSUM

ITEM 618 CONDUIT SUMMARY

SHEET	LOCATION	TYPE				
		1in PVC	2in PVC	2in RM	3in PVC	3in PVC (BORE)
		FT	FT	FT	FT	FT
	FM 740 & YELLOWJACKET	210	448	40	311	98
	FM 740 & SH 205		118		22	48
	FM 740 & IH30			10		
	PROJECT TOTALS	210	566	50	333	146

ITEM 620 ELECTRICAL CONDUCTOR SUMMARY

SHEET	LOCATION	NO. 6 AWG BARE	NO. 6 AWG XHHW	NO. 8 AWG XHHW	NO. 12 AWG XHHW
		FT	FT	FT	FT
	FM 740 & YELLOWJACKET	573	186	648	160
	FM 740 & 205	196	392	376	
	PROJECT TOTALS	769	578	1024	160

ITEM 624 GROUND BOX SUMMARY

SHEET	LOCATION	TYPE A	TYPE C
		EA	EA
	FM 740 & YELLOWJACKET	7	1
	PROJECT TOTALS	7	1

ITEM 628 ELECTRICAL SERVICES

SHEET	LOCATION	TYPE
		TY S (120/240)000(NS)GS(T)TP(O)
		EA
	FM 740 & YELLOWJACKET	3
	FM 740 & 205	1
	PROJECT TOTALS	4

ITEM 629 REMOVING SERVICE POLES

SHEET	LOCATION	EA
	FM 740 & YELLOWJACKET	
	FM 740 & SH 205	1
	PROJECT TOTALS	1

ITEM 656 FOUNDATIONS SUMMARY

SHEET			DRILLED SHAFT LENGTH			CONTROLLER FOUNDATION
			24 in DIA.	30 in DIA.	36 in DIA.	
			FT	FT	FT	YD3
	FM 740 & YELLOWJACKET	P-1			13.2	
		P-2		11.3		
		P-3		11.3		
		P-4	5.7			
		P-5	5.7			
		P-6	5.7			
	PROJECT TOTALS		17.1	22.6	13.2	1.4

ITEM 682 VEHICLE AND PEDESTRIAN SIGNAL HEADS

SHEET	LOCATION	SIGNAL HEAD				BACKPLATE		
		12 in VEH. SECTION	*12 in VEH. SEC., RED LED	12 in PED. SECTION	8 in VEH. SECTION	3 SECTION	4 SECTION	5 SECTION
		EA	EA	EA	EA	EA	EA	EA
	FM 740 & YELLOWJACKET	31	9	4	-	9	-	-
	FM 740 & 205	-	-	-	-	-	-	-
	PROJECT TOTALS	31	9	4	-	9	-	-

* LED SIGNAL LAMPS PROVIDED BY STATE

ITEM 684 TRAFFIC SIGNAL CABLE SUMMARY

SHEET	LOCATION	TYPE A					TYPE C
		7 CNDR. #12 AWG	12 CNDR. #12 AWG	6 CNDR. #12 AWG	5 CNDR. #16 AWG	7 CNDR. #16 AWG	DET. CABLE #18 AWG
		FT	FT	FT	FT	FT	FT
	FM 740 & YELLOWJACKET	174	484	41	270	112	2431
	PROJECT TOTALS	174	484	41	270	112	2431

ITEM 686/6008 SIGNAL POLE ASSEMBLIES

SHEET	LOCATION	POLE #	TYPE			
			PED POLE	1 ARM 28ft	1 ARM 36ft W/LUM	1 ARM 44ft W/LUM
			EA	EA	EA	EA
	FM 740 & YELLOWJACKET	P1				1
		P2		1		
		P3			1	
		P4	1			
	PROJECT TOTALS		1	1	1	1

ITEM 688 TRAFFIC SIGNAL DETECTORS

SHEET	LOCATION	SAW CUT	*PED PUSH BUTTON
		FT	EA
	FM 740 & YELLOWJACKET	1355	4
	PROJECT TOTALS	1355	4

ITEM 8174 SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS

LOCATION	ANTENNA (OMNI-DIRL)	ANTENNA (UNI-DIRL)	RADIO RECEIVER	RADIO MASTER	COAXIAL CABLE
	EA	EA	EA	EA	FT
FM 740 & YELLOWJACKET	0	1	1	0	53
FM 740 & IH30	1	0	0	1	20
TOTAL	1	1	1	1	73

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FILE: .DGN

TRAFFIC SIGNAL PROJECT SUMMARY
FM 740 at YELLOW JACKET

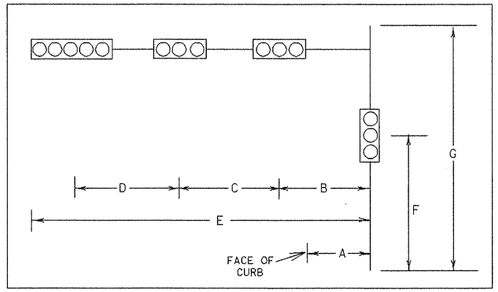
DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		136
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 FROM P1 TO CNTRL. 12 CNDR.	CABLE 2 FROM P2 TO CNTRL. 12 CNDR.	CABLE 3 FROM P3 TO CNTRL. 16 CNDR.	CABLE 4 FROM P4 TO CNTRL. 7 CNDR.
BLACK	SPARE	P.B. COMMON	P.B. COMMON	P.B. COMMON
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 3,4 R	SH 5,6 R	SH 7,8 R	SH 13 DW
GREEN	SH 3,4 G	SH 5,6 G	SH 7,8 G	SH 13 W
ORANGE	SH 3,4 Y	SH 5,6 Y	SH 7,8 Y	Ø2 PED CALL
BLUE	SPARE	SPARE	SH 11 DW	SPARE
WHITE/ BLACK	SPARE	SPARE	SH 11 W	SPARE
RED/ BLACK	SH 1,2 R	SH 10 DW	SH 12 DW	
GREEN/ BLACK	SH 1,2 ~~G~~	SH 10 W	SH 12 W	
ORANGE/ BLACK	SH 1,2 ~~Y~~	Ø8 PED CALL	Ø8 PED CALL	
BLUE/ BLACK	SPARE	SPARE	Ø2 PED CALL	
BLACK/ WHITE	SPARE	SPARE	SPARE	
RED/ WHITE			SH 9 R	
GREEN/ WHITE			SH 9 G	
BLUE/ WHITE			SH 9 Y	
BLACK/ RED			SPARE	

SIGNAL HEAD

NO.	TYPE	BACK PLATE 3 SEC	BACK PLATE 5 SEC	12" VEH SECTION	RED LED SECTION	PED SECTION
1	H3	1		3	1	
2	H3	1		3	1	
3	H3	1		3	1	
4	V3	1		3	1	
5	H3	1		3	1	
6	H3	1		3	1	
7	H3	1		3	1	
8	H3	1		3	1	
9	V3	1		3	1	
10	152A					1
11	143C					1
12	143C					1
13	152A					1
14				1		
15				1		
16				1		
17				1		
TOTAL (EA)		9		31	9	4



CONDUIT RUNS (FEET)

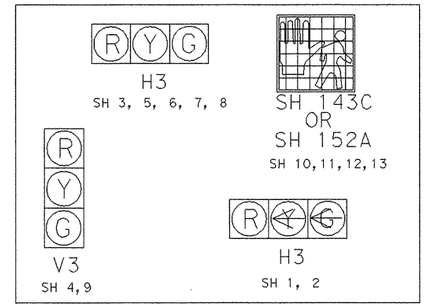
RUN NO.	CONDUIT TYPE (ITEM 618) 2 in PVC	2 in RM	3 in PVC	3 in BORE	WIRE SIZE AND TYPE (EA.) CONDUCTORS (ITEM 620) NO. 6 XHHW	NO. 6 BARE	NO. 8 XHHW	SIGNAL CABLE (ITEM 684) TY-A (12AWG) 7 CNDR CABLE	12 CNDR CABLE	16 CNDR CABLE	TY-C DET. CABLE	COAXIAL CABLE	OPTICOM*	TOTAL LENGTH OF RUN
1			2@18		2	1		1	2	1	14		3	18
2	23					1	2			1		1	1	23
3	15				2	1	2							15
4			68			1			1		6		1	68
5	33					1			1				1	33
6			20	98		1	2	1	1		5		1	147
7			76			1	2		1				1	76
8	9					1		1						9
9	13					1	2		1				1	13
10	175										2			175
11	160										2			160
12	10	20			2	1								30
13	10	20			2	1								30
14			50			1	2		1				1	50
15			61			1			1		6		1	61
TOTAL	448	40	311	98	186	573	648	174	484	41	2431	23	525	

* TO BE SUPPLIED BY THE CITY OF ROCKWALL
FOR CONTRACTOR'S INFORMATION ONLY

POLE DETAILS

POLE NUMBER	A	B	C	D	E	F	G	DRILL SHAFT 24 in DIA	DRILL SHAFT 30 in DIA	DRILL SHAFT 36 in DIA	CONDUCTORS/CABLES INSIDE POLES NO. 12 XHHW	5 CNDR 16 AWG	7 CNDR 16 AWG	COAXIAL CABLE	OPTICOM*
P1	9	19	12	12	44	10	30			13.2	80	58	112		45
P2	-	14	12	-	28	-	19		11.3			88			38
P3	7	24	12	-	36	10	30		11.3		80	104		30	43
P4	6	PEDESTAL POLE						5.7				20			
							TOTAL (LF)	5.7	22.6	13.2	160	270	112	30	126

* TO BE SUPPLIED BY THE CITY OF ROCKWALL
FOR CONTRACTOR'S INFORMATION ONLY



DETECTOR DETAILS

LOOP	DIMENSION	TURNS	CARD RACK POSITION	DETCTR	MODE	DEL INH	SAW CUT & LEAD IN (ft)	1in PVC (ft)
Ø1-A	6X40	2	P1-A	Ø1-1	PRES.	Ø1G	120	8
Ø1-B	6X40	2					132	8
Ø2-A	6X40	2	P2-A	Ø2-1	PRES.	Ø2R	97	20
Ø2-B	6X40	2	P3-A	Ø2-2	PRES.	Ø2G	130	20
Ø2-C	6X40	2					141	20
Ø2-D	6X6	5	P4-A	Ø2-3	PULSE	Ø2G	41	12
Ø2-E	6X6	5					54	12
Ø6-A	6X40	2	P1-B	Ø6-1	PRES.	Ø6R	96	8
Ø6-B	6X40	2					108	8
Ø6-C	6X6	5	P3-B	Ø6-2	PULSE	Ø6G	30	8
Ø6-D	6X6	5					42	8
Ø8-A	6X40	2	P6-B	Ø8-1	PRES.	Ø8G	94	26
Ø8-B	6X40	2	P8-B	Ø8-2	PRES.	Ø8G	129	26
Ø8-C	6X40	2	P9-B	Ø8-3	PRES.	Ø8G	141	26
						PROJECT TOTAL	1355	210

ALL LOOPS SHALL BE LOOP WIRE

CONNECT LOOP Ø1-A AND Ø1-B IN SERIES TO ONE DETECTOR UNIT AT THE CONTROLLER
CONNECT LOOP Ø2-B AND Ø2-C IN SERIES TO ONE DETECTOR UNIT AT THE CONTROLLER
CONNECT LOOP Ø2-D AND Ø2-E IN SERIES TO ONE DETECTOR UNIT AT THE CONTROLLER
CONNECT LOOP Ø6-A AND Ø6-B IN SERIES TO ONE DETECTOR UNIT AT THE CONTROLLER
CONNECT LOOP Ø6-C AND Ø6-D IN SERIES TO ONE DETECTOR UNIT AT THE CONTROLLER

SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS

	ANTENNA (OMNI-DIRL)	ANTENNA (UNI-DIRL)	RADIO RECEIVER	RADIO MASTER	COAXIAL CABLE
	EA	EA	EA	EA	FT
	0	1	1	0	53
TOTAL	0	1	1	0	53

CNDR/CABLE SUMMARY

CONDUCTOR/ CABLE	TOTAL LENGTH (ft)
NO. 6 BARE	573
NO. 6 XHHW	186
NO. 8 XHHW	648
NO. 12 XHHW	160
5 CNDR CABLE (16 AWG)	270
7 CNDR CABLE (16 AWG)	112
7 CNDR CABLE (12 AWG)	174
12 CNDR CABLE (12 AWG)	484
16 CNDR CABLE (12 AWG)	41
NO. 18 LEAD IN	2431

CONDUIT SUMMARY

CONDUIT TYPE	TOTAL LENGTH (ft)
1in PVC	210
2in PVC	448
2in RM	40
3in PVC	311
3in BORE	98
4in PVC	

GROUND BOXES

TYPE	EA
A	7
C	1

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:
FILE: .DGN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maher M. Ghanayem, P.E. 63459, on 7/7, 1999

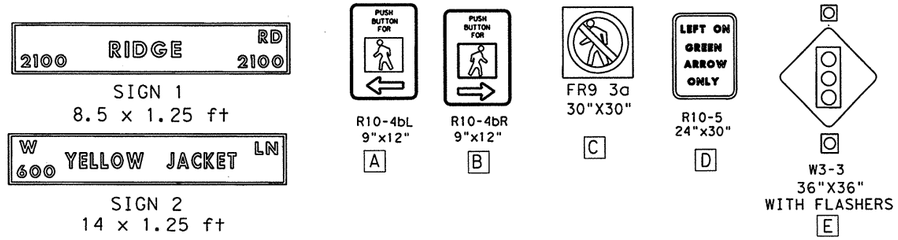
Maher M. Ghanayem

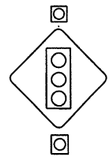
 Texas Department of Transportation

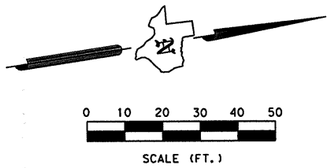
TRAFFIC SIGNAL LAYOUT
FM 740 at YELLOW JACKET

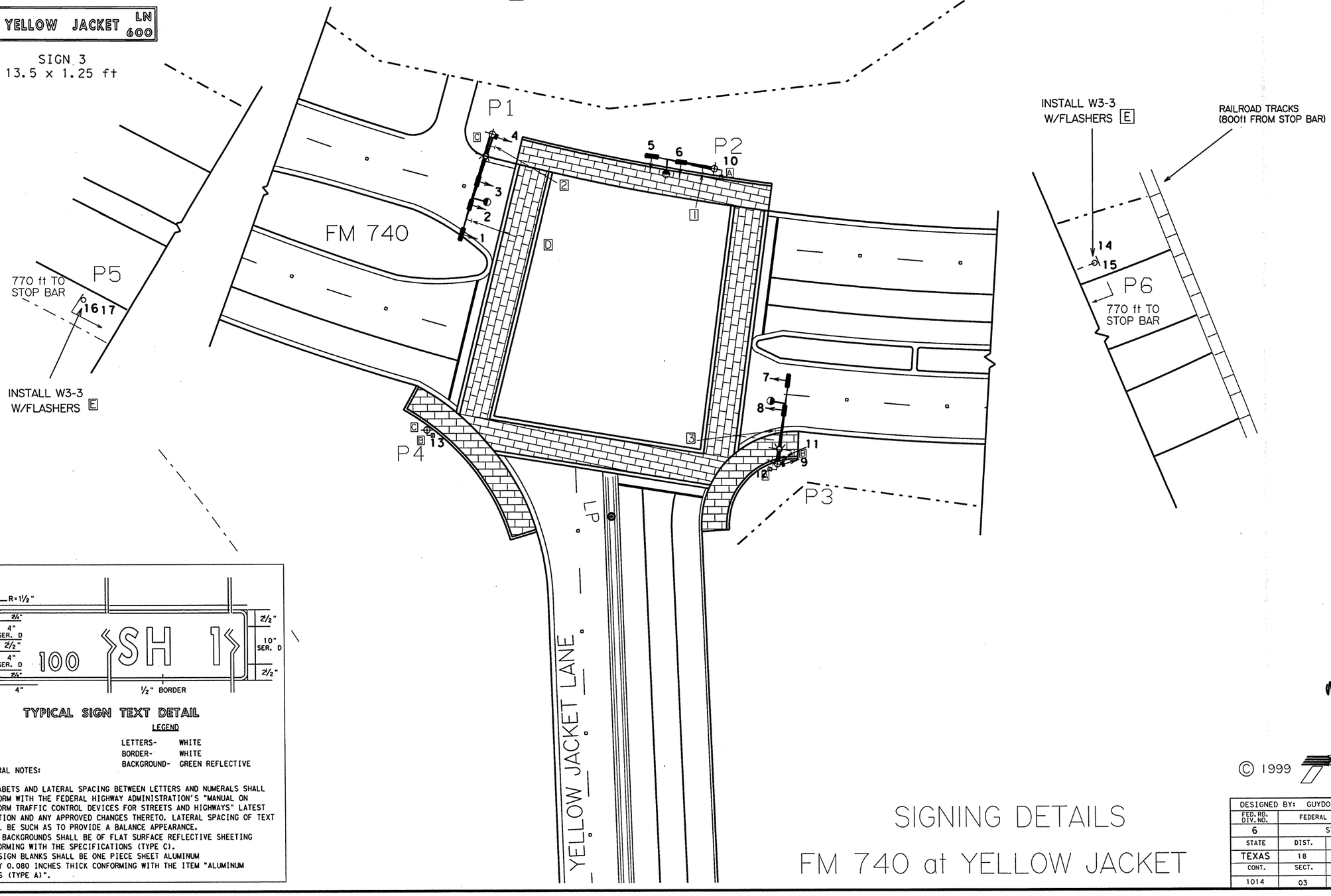
DESIGNED BY: GUYDOSH	REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO. 6	FEDERAL AID PROJECT NO. STP 99(413)MM	SHEET NO. 13B
STATE TEXAS	DIST. 18	COUNTY ROCKWALL
CONT. 1014	SECT. 03	JOB 033
		HIGHWAY NO. FM 740

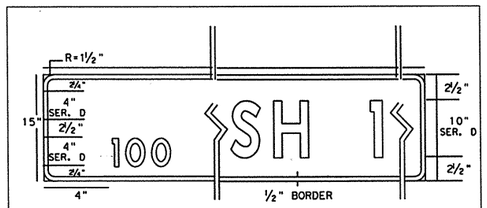
X4497











TYPICAL SIGN TEXT DETAIL

LEGEND

LETTERS- WHITE
BORDER- WHITE
BACKGROUND- GREEN REFLECTIVE

GENERAL NOTES:

ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" LATEST ADDITION AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCE APPEARANCE.
SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING CONFORMING WITH THE SPECIFICATIONS (TYPE C).
THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.080 INCHES THICK CONFORMING WITH THE ITEM "ALUMINUM SIGNS (TYPE A)".

MAHER M. GHANAYEM
63459

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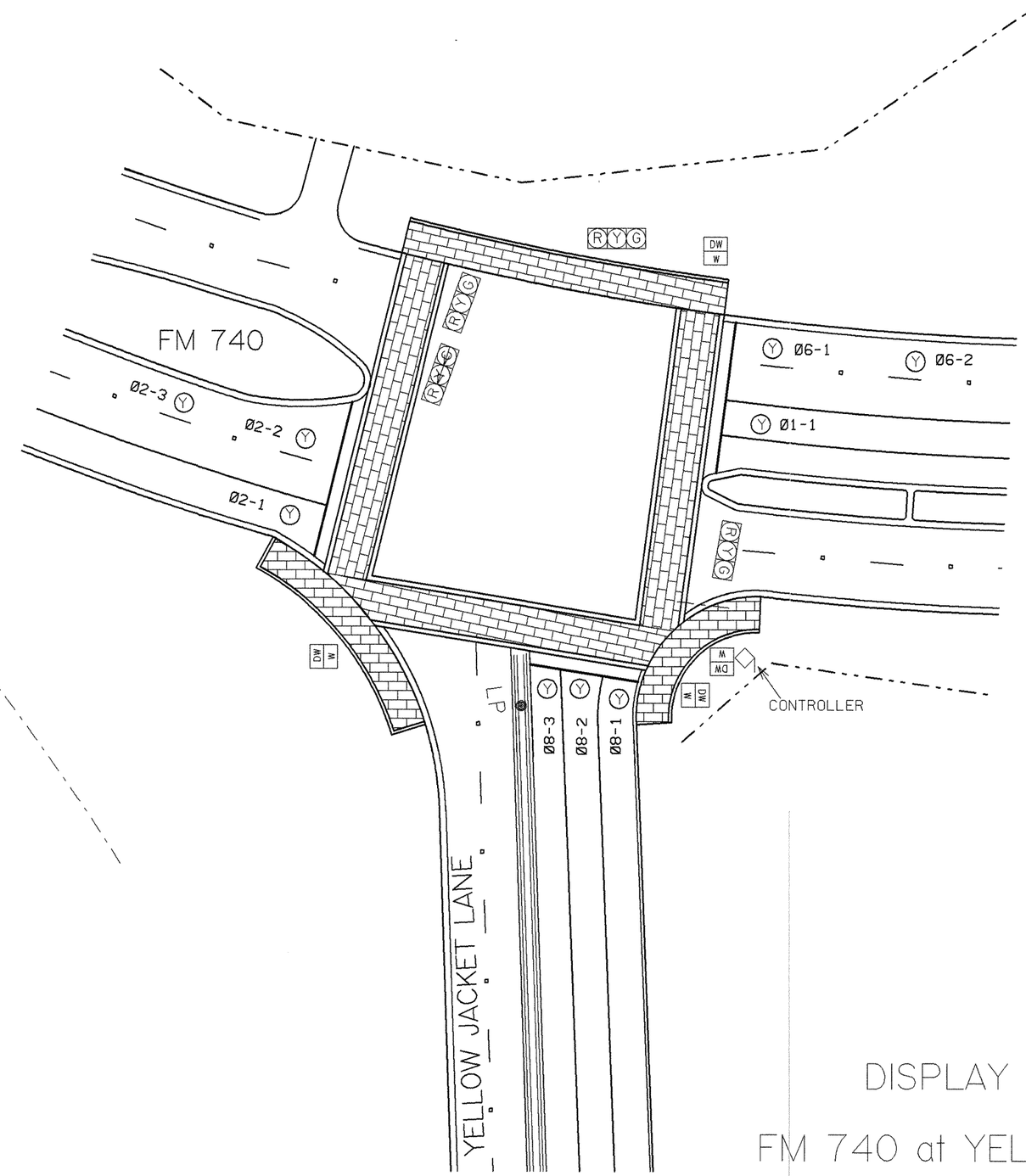
authorized by
Maher M. Ghanayem,
P.E. 63459, on
7/7, 1999
Maher M. Ghanayem

SIGNING DETAILS
FM 740 at YELLOW JACKET

Texas Department
of Transportation

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		139
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



LEVELS DISPLAYED
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17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FILE: .DGN

DISPLAY BOARD

FM 740 at YELLOW JACKET

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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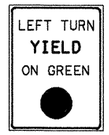
Maher M. Ghanayem

 Texas Department of Transportation

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		140
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

X4497



R10-12
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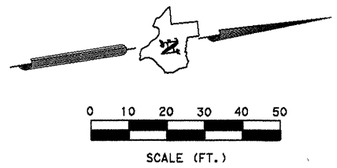

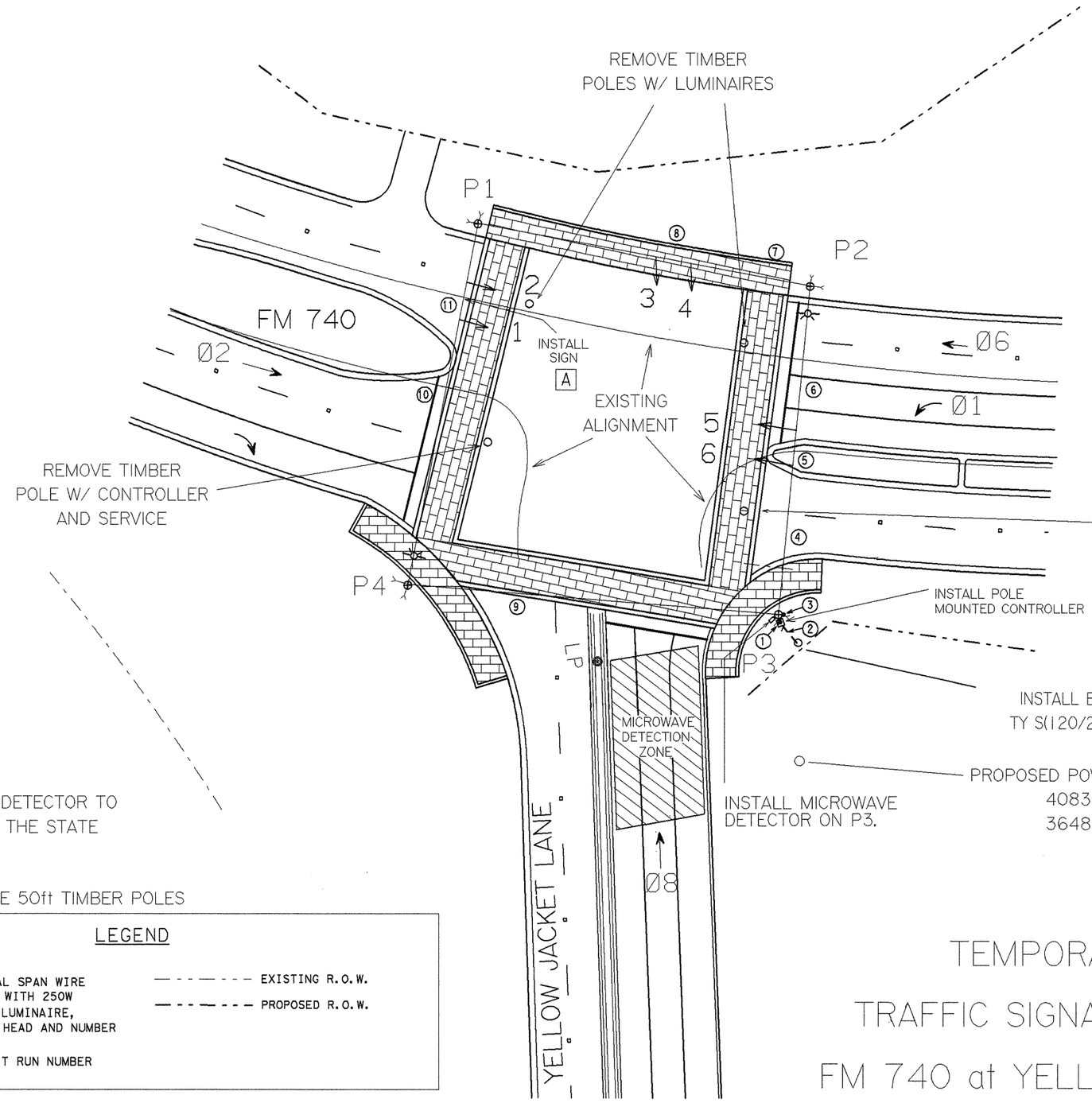

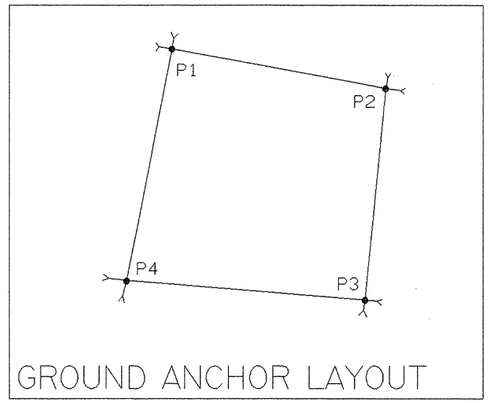

NOTE: MICROWAVE DETECTOR TO BE SUPPLIED BY THE STATE

NOTE: P1 & P2 ARE 50ft TIMBER POLES

LEGEND

TYPICAL SPAN WIRE
POLE WITH 250W
HPS LUMINAIRE,
SIGNAL HEAD AND NUMBER

EXISTING R.O.W.

PROPOSED R.O.W.

CONDUIT RUN NUMBER

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:
FILE: .DGN

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Maher M. Ghanayem

SHEET 1 OF 2

TEMPORARY
TRAFFIC SIGNAL LAYOUT
FM 740 at YELLOW JACKET

 Texas Department of Transportation

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		101
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

CABLE TERMINATION CHART

CNDR. COLOR	CABLE 1 FROM P1 TO CNTRL. 7 CNDR.	CABLE 2 FROM P2 TO CNTRL. 7 CNDR.	CABLE 3 FROM P3 TO CNTRL. 7 CNDR.
BLACK	SH 1 ~~Y~~	SPARE	SPARE
WHITE	SIGNAL COMMON	SIGNAL COMMON	SIGNAL COMMON
RED	SH 1,2 R	SH 3,4 R	SH 5,6 R
GREEN	SH 1,2 G	SH 3,4 G	SH 5,6 G
ORANGE	SH 1,2 Y	SH 3,4 Y	SH 5,6 Y
BLUE	SH 1 ~~G~~	SPARE	SPARE
WHITE/ BLACK	SPARE	SPARE	SPARE

SIGNAL HEAD

NO.	TYPE	BACK PLATE 3 SEC	BACK PLATE 5 SEC	12" VEH SECTION	PED SECTION
1	H5LT		1	5	
2	H3	1		3	
3	H3	1		3	
4	H3	1		3	
5	H3	1		3	
6	H3	1		3	
TOTAL (EA)		5	1	20	

CONDUIT RUNS (FEET)

RUN NO.	CONDUIT TYPE (ITEM 618) 2 in RM	2 in PVC	3 in RM	WIRE SIZE AND TYPE (EA.) CONDUCTORS (ITEM 620) NO.6 XHHW	NO.6 BARE	NO.8 XHHW	SIGNAL CABLE (ITEM 684) TY-A (12AWG) 7 CNDR CABLE	10 CNDR CABLE	15 CNDR CABLE	SIGNAL CABLE 6 PAIR*	TOTAL MAXIMUM LENGTH OF RUN
1			15		1		3			1	15
2	5	10		2	1						15
3	25	10			1	6					35
4		OVERHEAD			1	3	2				70
5		OVERHEAD			1	3	2				12
6		OVERHEAD			1	3	1				74
7		OVERHEAD					1				78
8		OVERHEAD					1				12
9		OVERHEAD			1	3	1			1	124
10		OVERHEAD					1				98
11		OVERHEAD					1				12
TOTAL	30	20	15	30	355	1050	599	0.0	0.0	150	

* TO BE SUPPLIED BY THE STATE

CNDR/CABLE SUMMARY

CONDUCTOR/ CABLE	TOTAL LENGTH (ft)
NO. 6 BARE	355
NO. 6 XHHW	30
NO. 8 XHHW	1050
NO. 12 XHHW	
5 CNDR CABLE (16 AWG)	
7 CNDR CABLE (16 AWG)	
7 CNDR CABLE (12 AWG)	599
10 CNDR CABLE (12 AWG)	
15 CNDR CABLE (12 AWG)	
6 PAIR WIRE*	150

* TO BE SUPPLIED BY THE STATE

CONDUIT SUMMARY

CONDUIT TYPE	TOTAL LENGTH (ft)
2in RM	30
2in PVC	20
3in RM	15
3in BORE	
4in PVC	
4in BORE	

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:
FILE: .DGN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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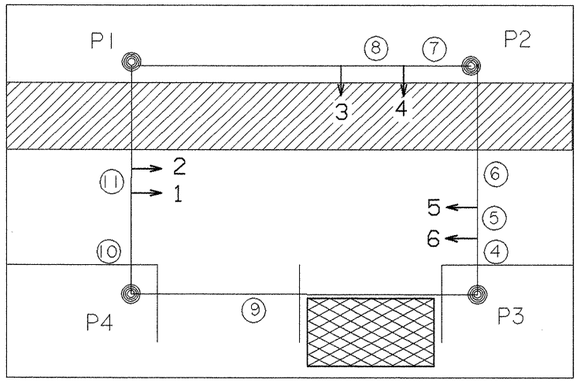
Maher M. Ghanayem

SHEET 2 OF 2

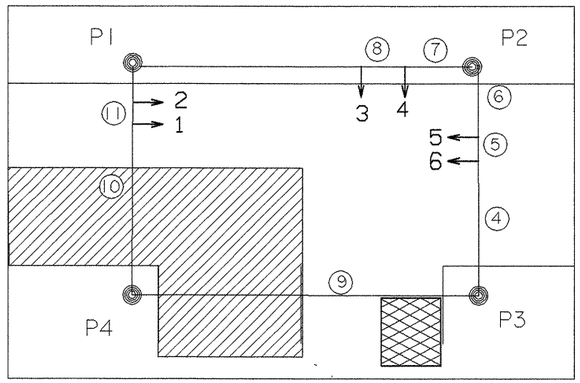
TEMPORARY
TRAFFIC SIGNAL LAYOUT
FM 740 AT YELLOW JACKET LANE

DESIGNED BY: GUYDOSH		REVIEWED BY: ALDERMAN	
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		142
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



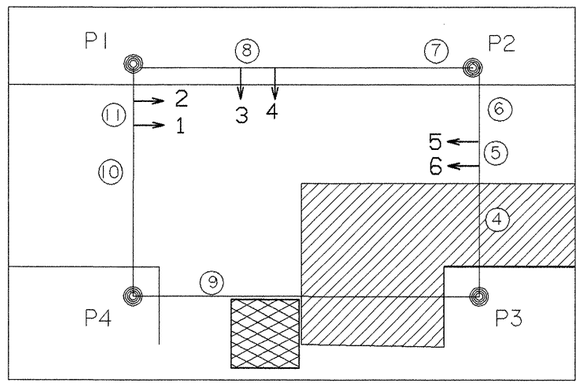
RUN	4	5	6	7	8	9	10	11
LEN.	60	12	37	41	12	124	80	12

PHASE I



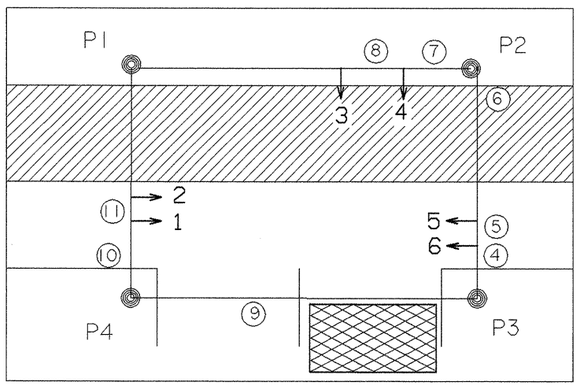
RUN	4	5	6	7	8	9	10	11
LEN.	70	12	27	41	12	124	84	12

PHASE IIA



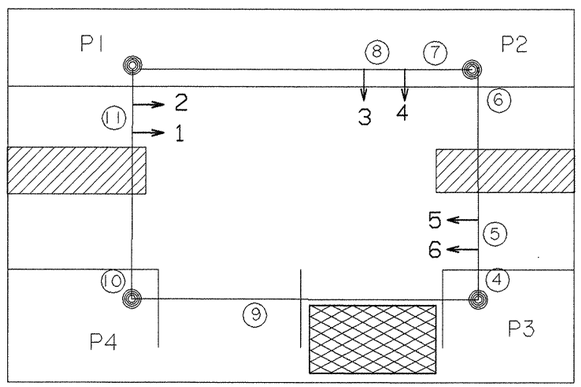
RUN	4	5	6	7	8	9	10	11
LEN.	70	12	27	78	12	124	84	12

PHASE IIB



RUN	4	5	6	7	8	9	10	11
LEN.	23	12	74	41	12	124	48	12

PHASE IIIA



RUN	4	5	6	7	8	9	10	11
LEN.	23	12	74	41	12	124	98	12

PHASE IIIB

FURTHEST SIGNAL HEAD PLACEMENT DURING CONSTRUCTION

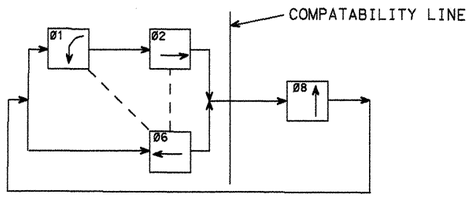
MAXIMUM DISTANCE (7 CONDR.)

FROM P3 TO	LF	FROM P3 TO	LF
HEAD 1	222	HEAD 4	187
HEAD 2	234	HEAD 5	82
HEAD 3	199	HEAD 6	70

NOTE: MICROWAVE DETECTOR TO BE INSTALLED ON POLE P3.
DURING PHASE IIB, DETECTOR SHALL MOVE TO POLE P4.

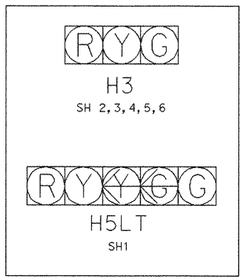
- MICROWAVE DETECTION ZONE

- CONSTUCTION ZONE



EIGHT PHASE NEMA CONTROLLER

Ø1 IS A PROTECTED/PERMITTED LEFT TURN PHASE



CONSTRUCTION PHASING
SIGNAL HEAD PLACEMENT
FM 740 AT YELLOW JACKET LANE

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by Maher M. Ghanayem, P.E. 63459, on 7/7, 1999

Maher M. Ghanayem

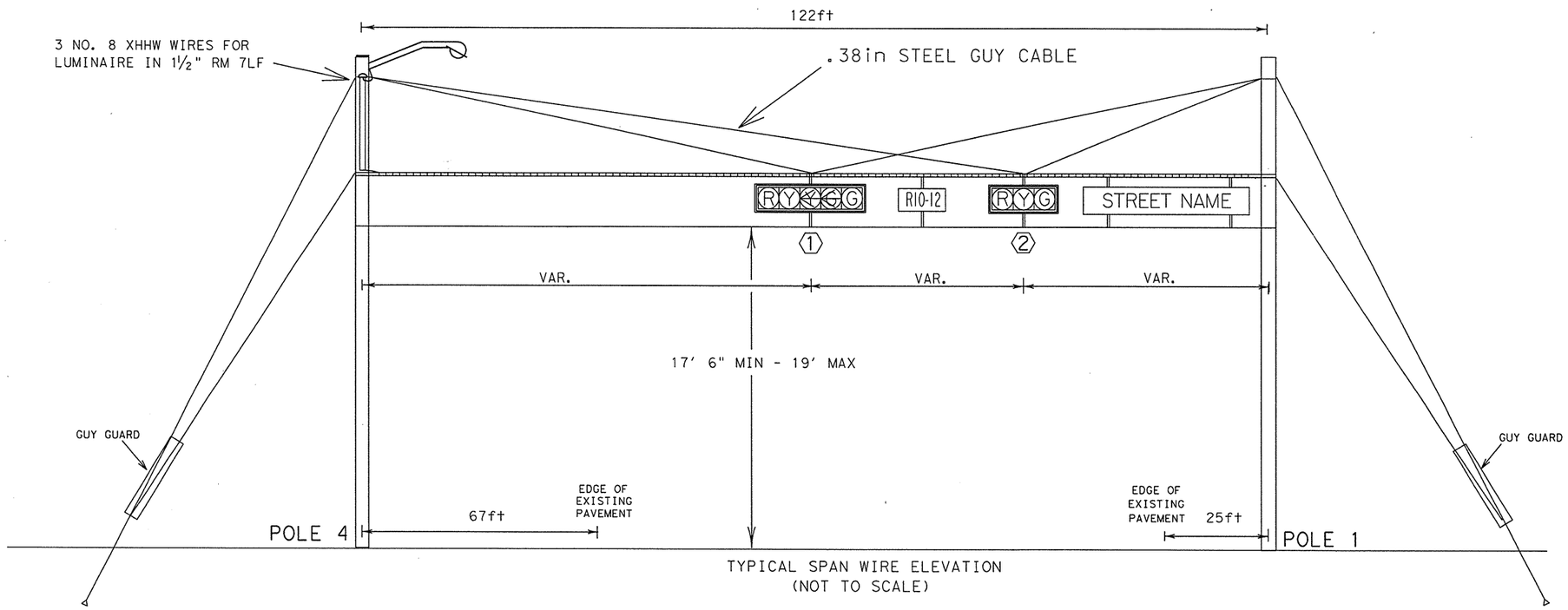
Texas Department of Transportation

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED.RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		143
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

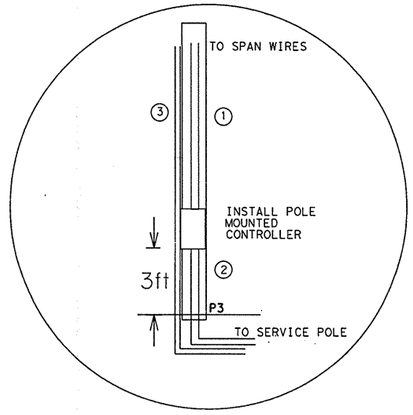
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 31 41 51 6
17 18 19 20 21 22 32 42 52 62 72 82 92 93 03 152
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

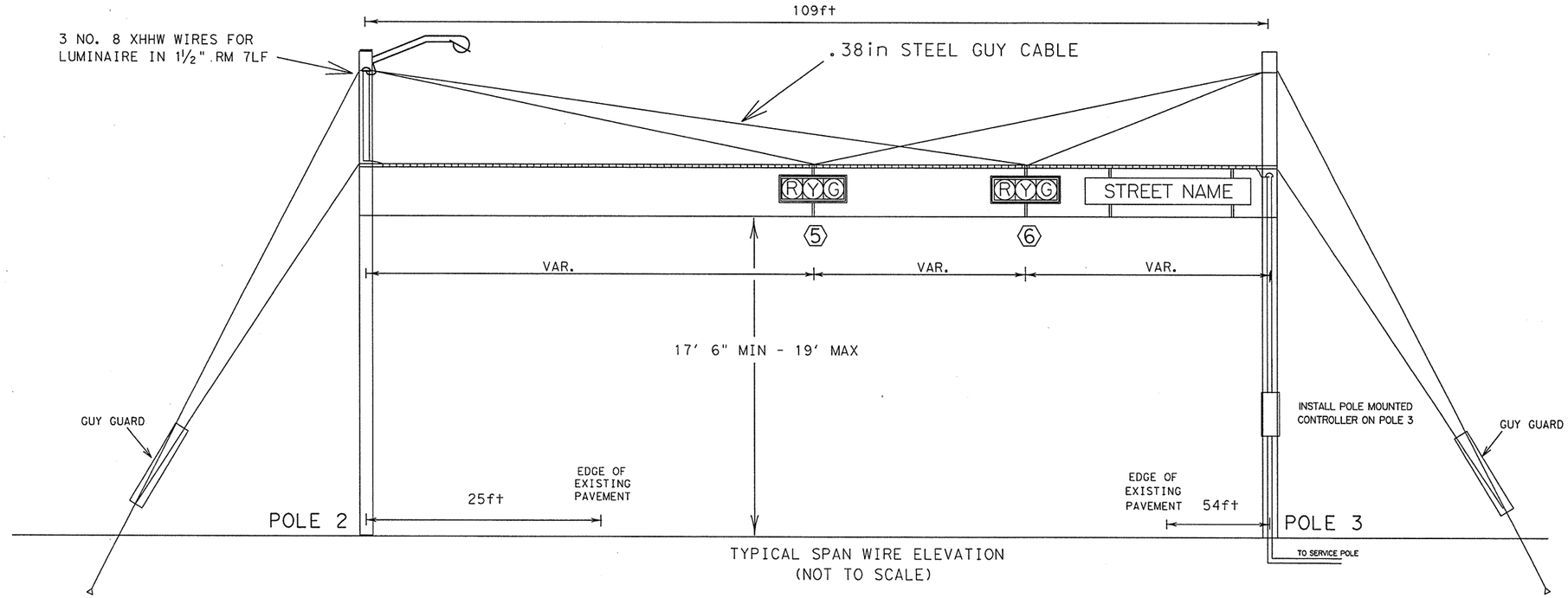
ACC:

FILE: .DGN



TYPICAL SPAN WIRE ELEVATION
(NOT TO SCALE)





TYPICAL SPAN WIRE ELEVATION
(NOT TO SCALE)

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
50 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FILE: .DGN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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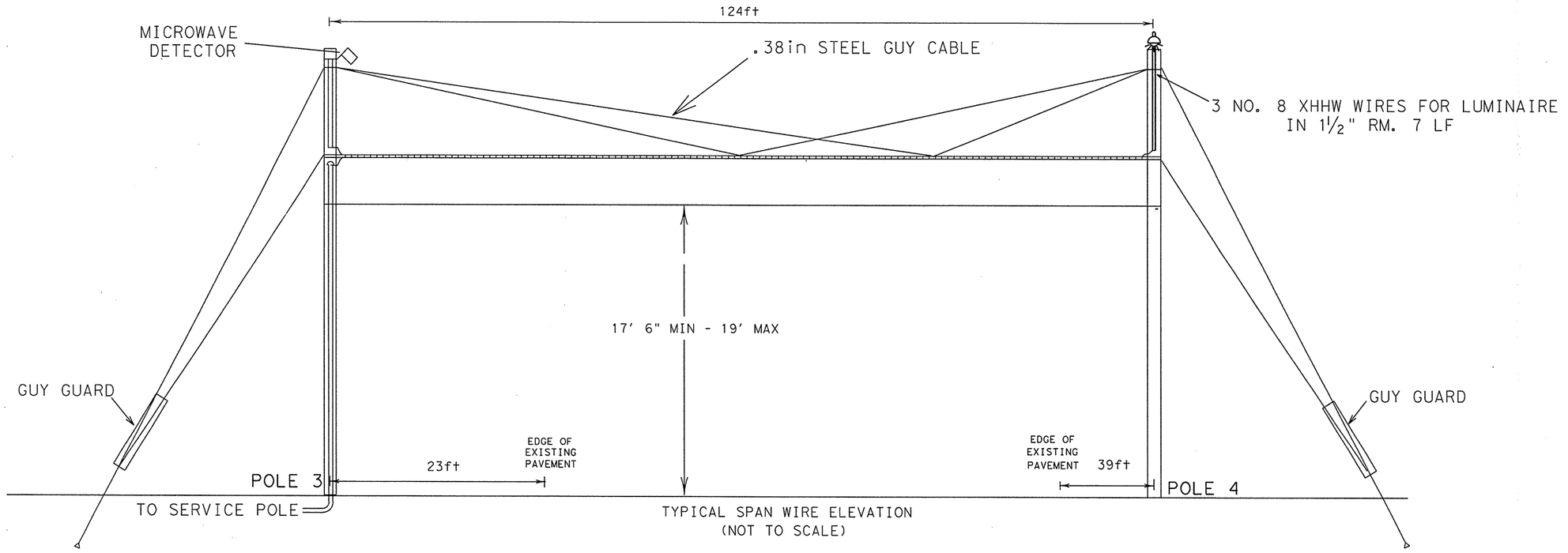
Maher M. Ghanayem

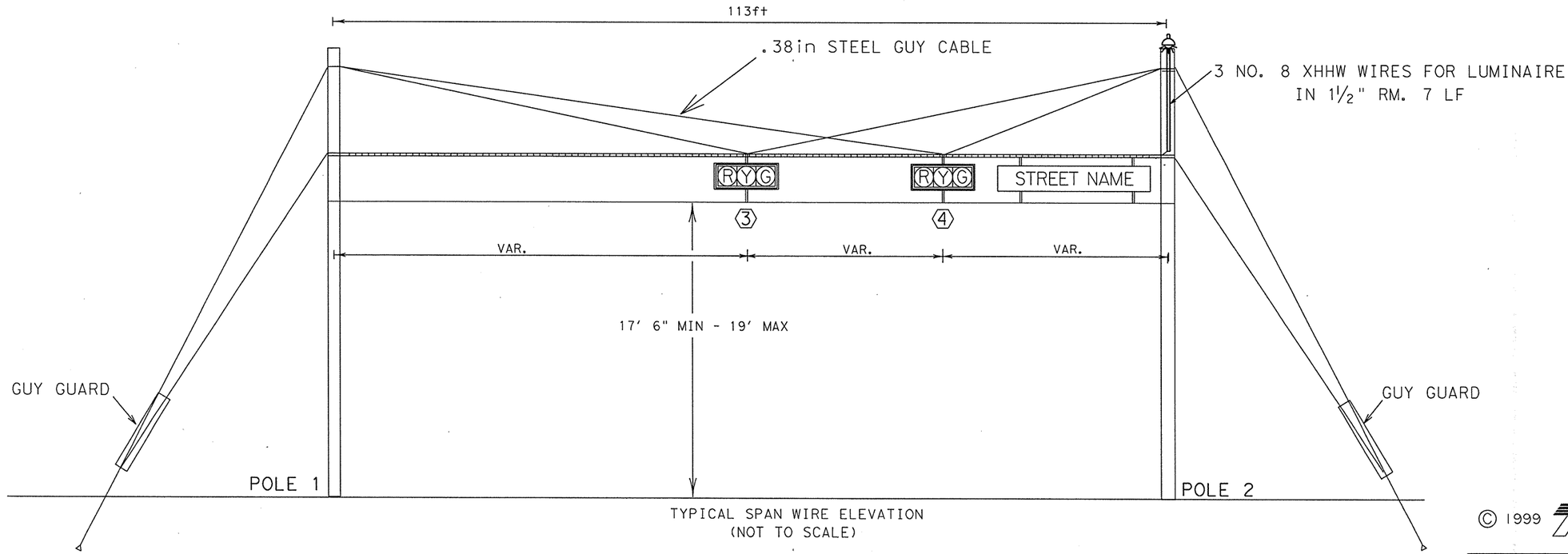
SHEET 1 OF 2

SPAN WIRE ELEVATIONS
FM 740 at YELLOW JACKET

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		144
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



TYPICAL SPAN WIRE ELEVATION
(NOT TO SCALE)



TYPICAL SPAN WIRE ELEVATION
(NOT TO SCALE)

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:
FILE: .DGN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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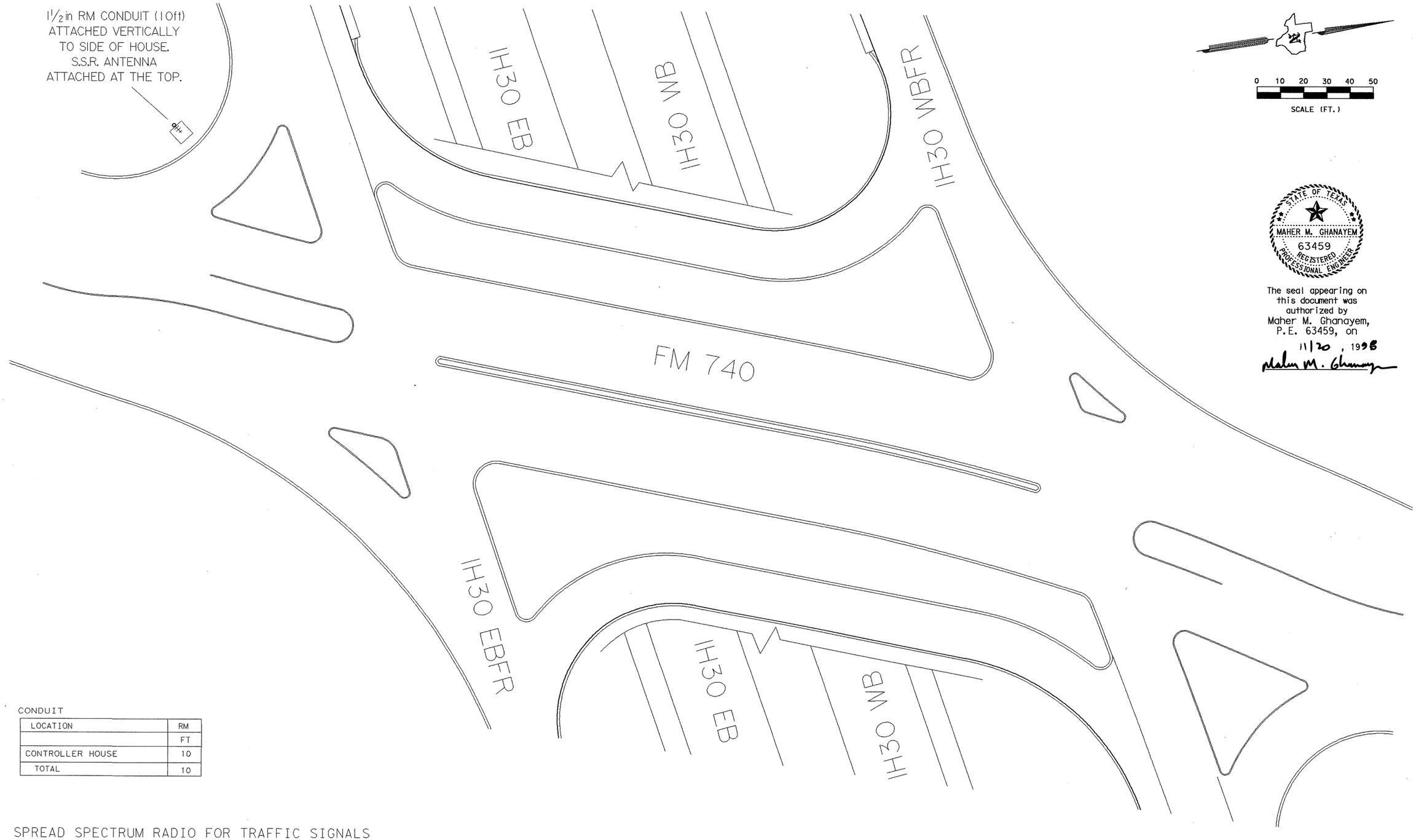
Maher M. Ghanayem

SHEET 2 OF 2

 Texas Department of Transportation

SPAN WIRE ELEVATIONS
FM 740 at YELLOW JACKET

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		145
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



0 10 20 30 40 50
SCALE (FT.)

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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Maher M. Ghanayem

CONDUIT

LOCATION	RM
	FT
CONTROLLER HOUSE	10
TOTAL	10

SPREAD SPECTRUM RADIO FOR TRAFFIC SIGNALS

LOCATION	ANTENNA (OMNI-DIRL)	ANTENNA (UNI-DIRL)	RADIO RECEIVER	RADIO MASTER	COAXIAL CABLE
	EA	EA	EA	EA	FT
FM 740 & IH30	1	0	0	1	20
TOTAL	1	0	0	1	20

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:
FILE: .DGN

 Texas Department of Transportation

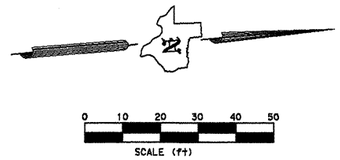
TRAFFIC SIGNAL LAYOUT
FM 740 at IH 30

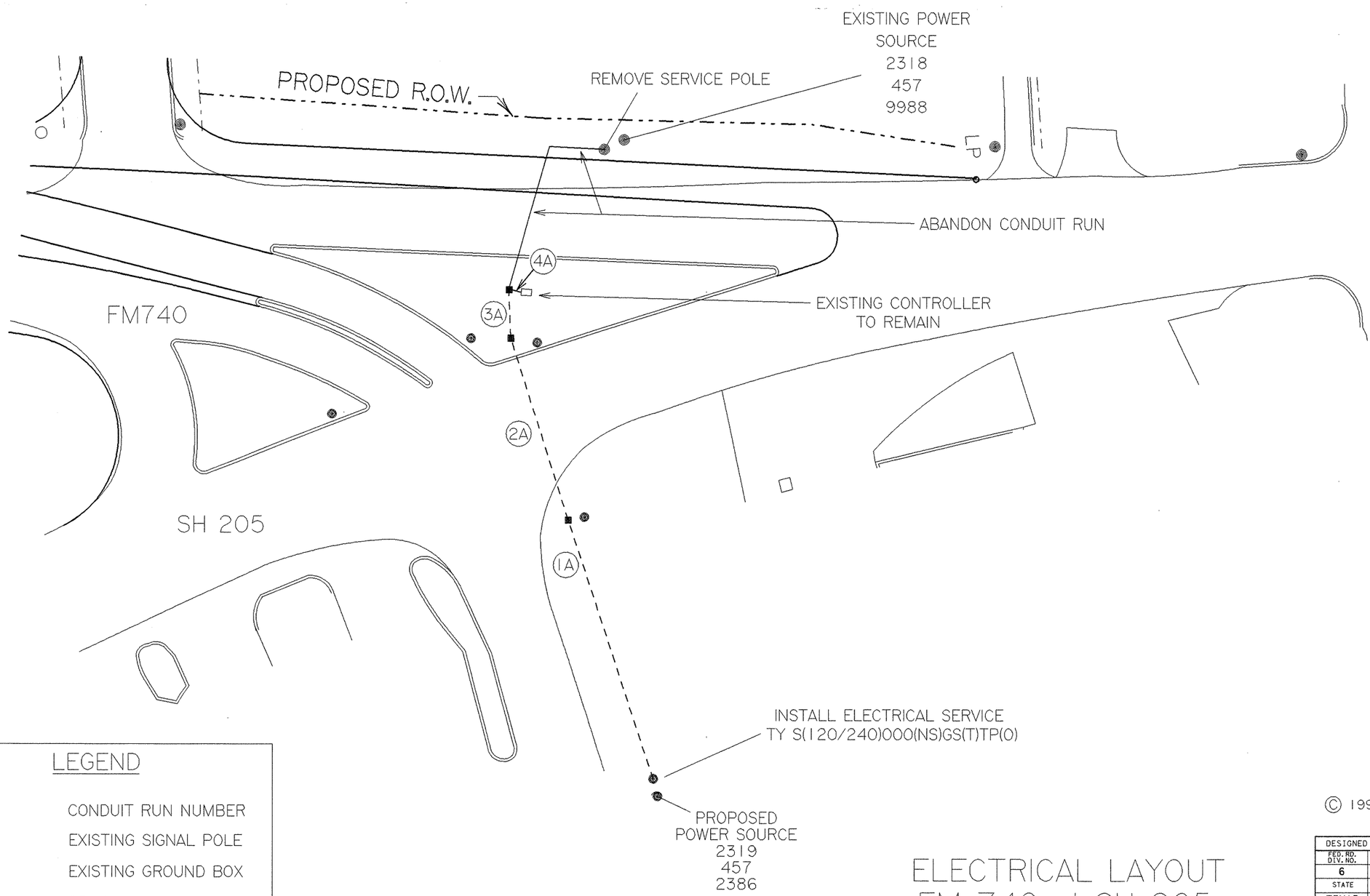
DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		146
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

X4497

CONDUIT RUNS (FEET)											
CONDUIT TYPE (ITEM 618)				WIRE SIZE AND TYPE (EA.)							TOTAL
				CONDUCTORS (ITEM 620)			SIGNAL CABLE (ITEM 684)				
							TY-A (12AWG)			TY-C	
RUN NO.	2 in PVC	3 in PVC	3 in BORE	NO. 6 XHHW	NO. 6 BARE	NO. 8 XHHW	7 CNDR CABLE	10 CNDR CABLE	15 CNDR CABLE	DET. CABLE	LENGTH OF RUN
1A	100			2	1	2					100
2A		22	48	2	1	2					70
3A	18			2	1	2					18
4A	8*			2	1						8*
TOTAL	118	22	48	392	196	376	0.0	0.0	0.0	0.0	

* USE EXISTING CONDUIT RUN





LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FILE: . DGN

LEGEND

- (2A) CONDUIT RUN NUMBER
- EXISTING SIGNAL POLE
- EXISTING GROUND BOX
- PROPOSED CONDUIT RUN

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

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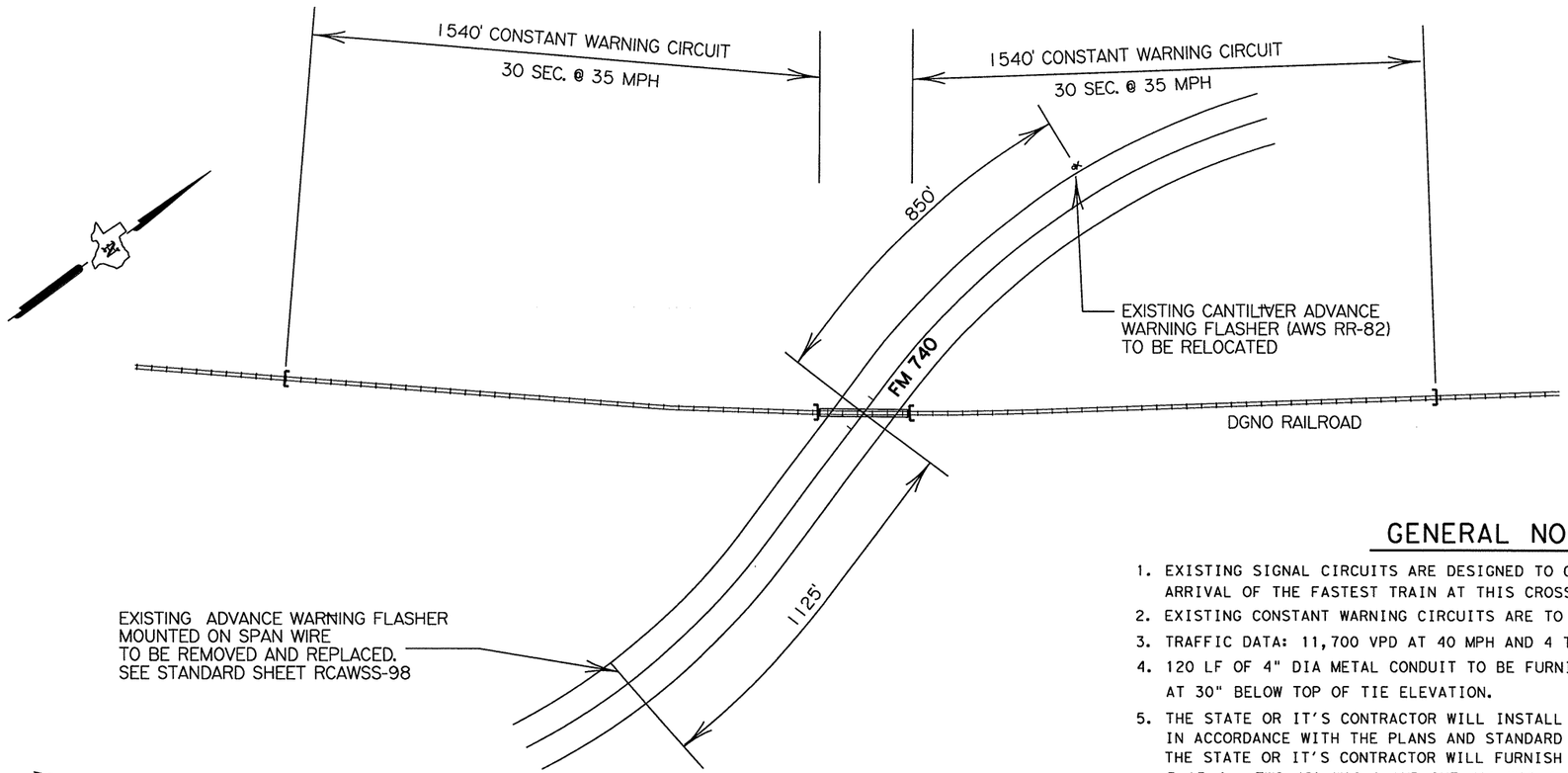
Maher M. Ghanayem

 Texas Department of Transportation

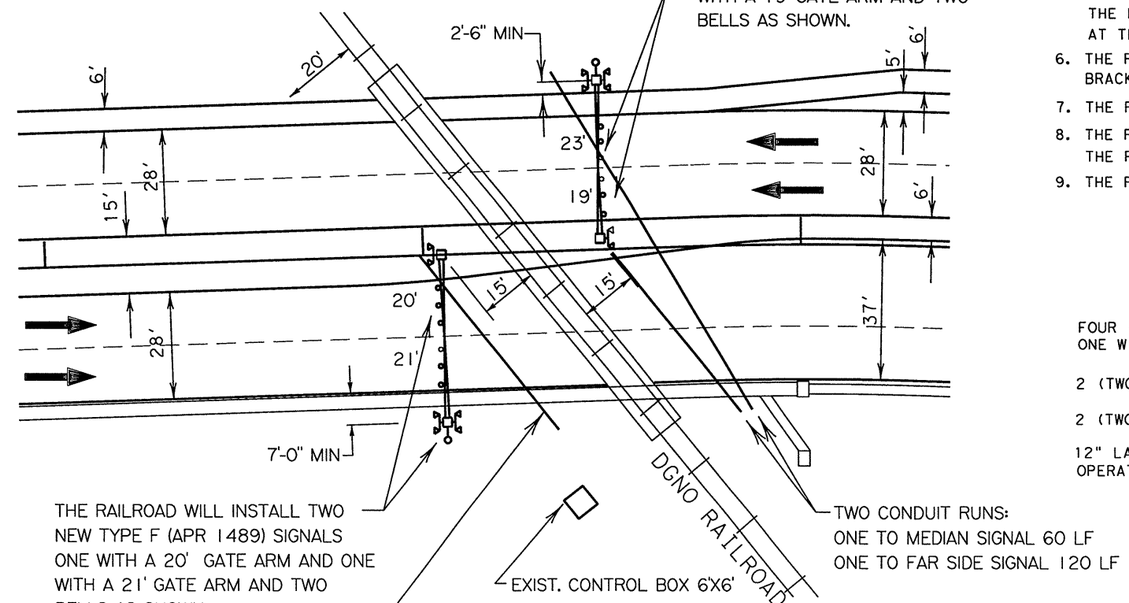
ELECTRICAL LAYOUT
FM 740 at SH 205

DESIGNED BY: GUYDOSH		REVIEWED BY: GHANAYEM	
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		147
STATE	DIST.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



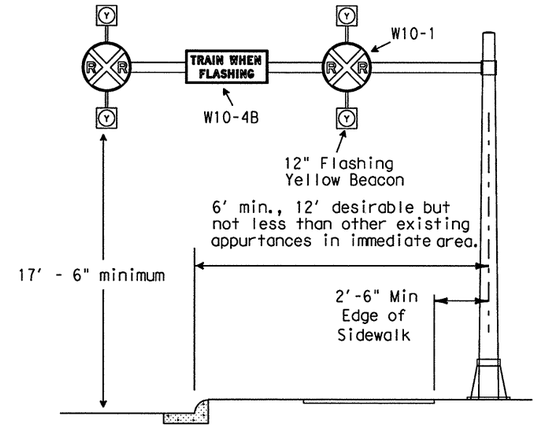
VICINITY LAYOUT

SCALE 1"=200'



PLAN VIEW

SCALE 1"=40'



Typical Multi-Lane Usage

(Non-curbed sections require approval of design)

GENERAL NOTES

1. EXISTING SIGNAL CIRCUITS ARE DESIGNED TO GIVE 25 SECONDS OPERATION PRIOR TO ARRIVAL OF THE FASTEST TRAIN AT THIS CROSSING PLUS 5 SECONDS ADDED FOR INSTRUMENT LAG.
2. EXISTING CONSTANT WARNING CIRCUITS ARE TO BE USED ON THIS PROJECT.
3. TRAFFIC DATA: 11,700 VPD AT 40 MPH AND 4 THROUGH TRAINS PER DAY AT 35 MPH.
4. 120 LF OF 4" DIA METAL CONDUIT TO BE FURNISHED AND PLACED BY THE RAILROAD COMPANY AT 30" BELOW TOP OF TIE ELEVATION.
5. THE STATE OR IT'S CONTRACTOR WILL INSTALL PAVEMENT MARKINGS PERTINENT TO THIS PROJECT, IN ACCORDANCE WITH THE PLANS AND STANDARD SHEET RCPM-96.
   THE STATE OR IT'S CONTRACTOR WILL FURNISH AND INSTALL THE FOLLOWING SIGNS: TWO(2) R-15-4, TWO (2) W10-1 AND ONE (1) W10-4. ALL PAVEMENT MARKINGS AND SIGNING WILL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE TEXAS MUTCD AND THE ATTACHED STANDARD SHEETS. THE STATE AGREES TO MAINTAIN PAVEMENT MARKINGS AND ADVANCE WARNING SIGNS PLACED ALONG THE ROADWAY(S) UNDER THEIR JURISDICTION IN ACCORDANCE WITH THE TEXAS MUTCD AND ATTACHED STANDARD SHEETS AFTER PROJECT COMPLETION.
   THE RAILROAD WILL FURNISH AND INSTALL SIGN MOUNTING BRACKETS FOR THE MALFUNCTION SIGN AT THE STATE'S EXPENSE.
6. THE RAILROAD COMPANY WILL FURNISH AND INSTALL SIGN MOUNTING BRACKETS FOR THE MALFUNCTION SIGNS AT THE STATE'S EXPENSE.
7. THE RAILROAD WILL REMOVE AND RELOCATE THE EXISTING SIGNALS AND GATES INCLUDING FOUNDATIONS.
8. THE RAILROAD COMPANY SHALL STENCIL THE DOT-AAR NUMBERS ON THE SIGNAL MAST FACING THE ROADWAY USING 2 INCH BLACK LETTERING.
9. THE RAILROAD WILL RELOCATE SIGNALS AS REQUIRED BY CONSTRUCTION PHASE WORK.

DESCRIPTION OF PROJECT

FOUR (4) FLASHING LIGHT SIGNALS, TYPE F (AAR 1489) ONE WITH A 23 FT GATE ARM, ONE WITH A 19 FT GATE ARM, ONE WITH A 20 FT GATE ARM AND ONE WITH A 21 FT. GATE ARM.

2 (TWO) BELLS AS SHOWN HEREON.

2 (TWO) ADVANCE WARNING SIGN & SIGNAL INSTALLATIONS (MULTI LANE USAGE)

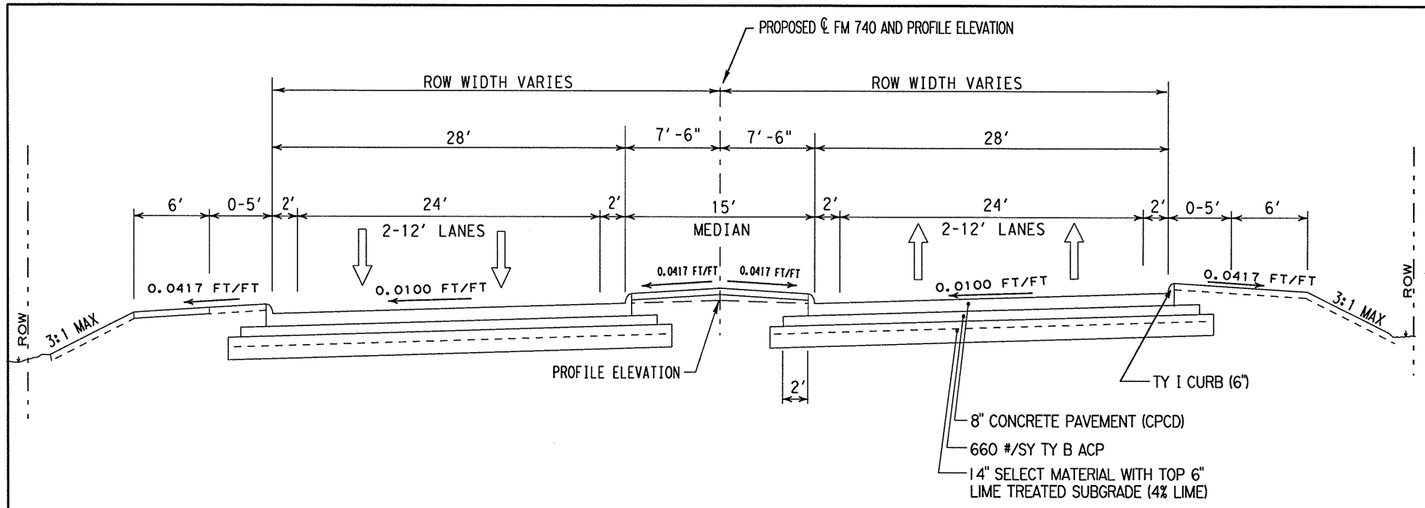
12" LAMP HOUSINGS SHALL BE USED AND SHALL BE EQUIPPED WITH 25 WATT LIGHT GLOBES, OPERATED AT NOT LESS THAN 8.5 VOLTS UNDER NORMAL OPERATING CONDITIONS.

STATE OF TEXAS
FERNANDO J. DE LA GARZA
71510
REGISTERED PROFESSIONAL ENGINEER

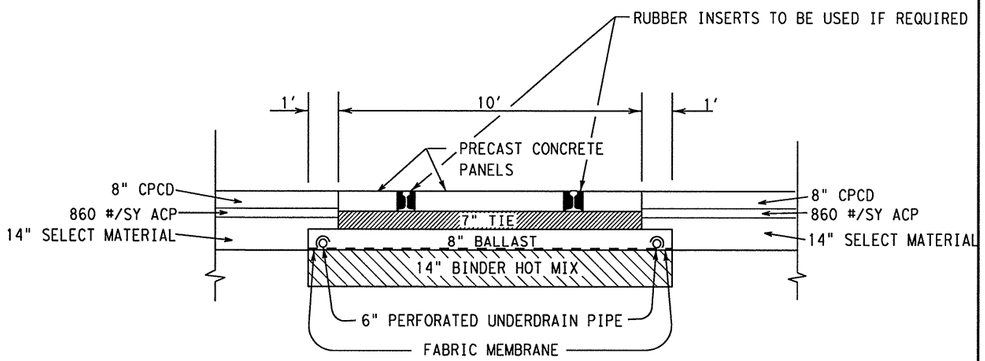
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY FERNANDO J. DE LA GARZA, P.E. 71510 ON NOVEMBER 13, 1998. ALTERATION OF A SEALED DOCUMENT WITHOUT NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

EXHIBIT "A"
DGNO RAILROAD
F.M. 740--ROCKWALL CO.
HWY. STA. 167+26.75 R.R. MP 740.00
DOT NO. 415-215X
SHEET 1 OF 5

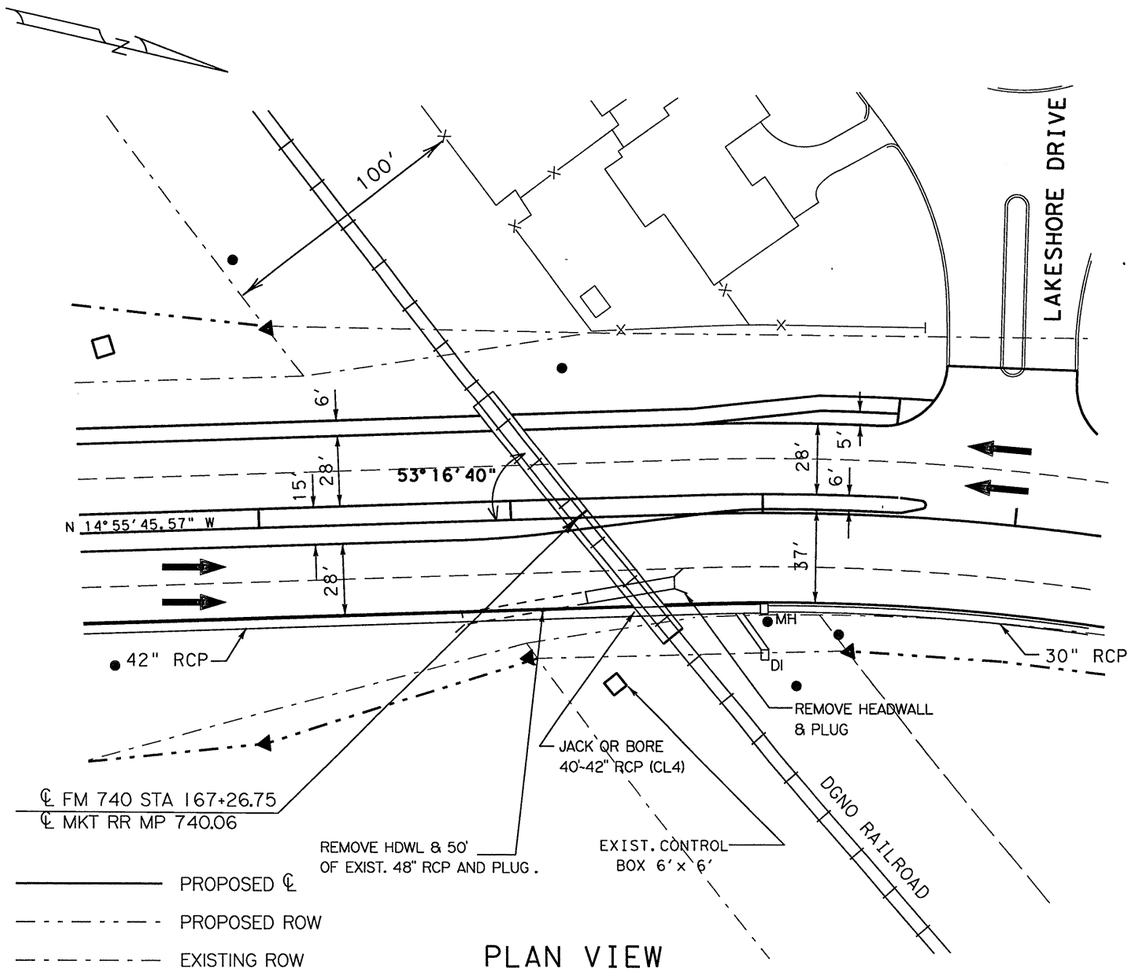
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		148
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



TYPICAL SECTION F.M. 740 IN THE VICINITY OF DGNO CROSSING



TYPICAL SECTION DGNO RAILROAD



PLAN VIEW
SCALE: 1"=60'

PROPOSED IMPROVEMENTS TO BE PERFORMED BY THE DGNO RAILROAD COMPANY AT THE EXPENSE OF TXDOT.

1. REMOVE EXISTING RUBBERIZED PLANKING CROSSING.
2. REMOVE EXISTING RAILS AND TIES THROUGH THE CROSSING FOR A LENGTH OF APPROX. 130 FT. TO ALLOW THE CONSTRUCTION OF THE SUPPPORT FOUNDATION BY THE STATE'S CONTRACTOR.
3. FURNISH AND INSTALL 190" X 134' OF FABRIC MEMBRANE AS SHOWN.
4. FURNISH AND INSTALL NEW CROSSTIES THROUGHOUT THE CROSSING.
5. FURNISH AND INSTALL PERFORATED CORRUGATED GALVANIZED METAL DRAIN PIPE, 6" DIA. X 260'.
6. FURNISH AND PLACE TRACK BALLAST.
7. FURNISH AND INSTALL 120 LF NEW FULL DEPTH CONCRETE CROSSING CENTERED ABOUT THE CENTERLINE OF FM 740.
8. PROVIDE CONTINUOUS WELDING OF RAILS THROUGHOUT THE CROSSING.

PROPOSED IMPROVEMENTS TO BE PERFORMED BY TXDOT CONTRACTOR.

1. FURNISH , INSTALL AND PROVIDE BARRICADES, WARNING SIGNS , FLAGGING AND TRAFFIC HANDLING DURING CONSTRUCTION.
2. EXCAVATE FOR SUPPORT FOUNDATION.
3. FURNISH AND INSTALL SUBGRADE OF BINDER HOT MIX (APPROX. 1.2 FT. X 12.0 FT. X 120 FT).
4. ADJUST HIGHWAY GRADE AS REQUIRED
5. REMOVE HEADWALL & 50' OF EXIST. 48" RCP AND PLUG.
6. INSTALL NEW DRAINAGE STRUCTURES AS SHOWN.
7. INSTALL THE ADVANCE WARNING SIGNALS AND ALL CONDUIT FROM THE RAILROAD CABIN TO THE SIGNAL LOCATIONS.

STATE OF TEXAS
FERNANDO J. DE LA GARZA
71510
REGISTERED PROFESSIONAL ENGINEER

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TRAFFIC DATA: 11,700 V.P.D. AT 40 MPH
4 TRAINS PER DAY AT 35 MPH

EXHIBIT "A"
DGNO RAILROAD
F.M. 740--ROCKWALL CO.
HWY. STA. 167+26.75 R.R. MP 740.00
DOT NO. 415-215X
SHEET 2 OF 5

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		149
STATE	STATE DIST.NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FERNANDO J. DE LA GARZA
71510

▨ TEMPORARY 6" ASPHALT DETOUR

▦ MEDIAN CONSTRUCTION

▧ CONCRETE PAVEMENT CONSTRUCTION

PHASE I CONSTRUCTION SEQUENCE
CONSTRUCT 6" ASPHALT DETOUR

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WORK TO BE DONE BY RAILROAD

1) ADJUST EXISTING GATE ARM TO 25'.
2) INSTALL ADVANCE WARNING SIGNALS

WORK TO BE DONE BY STATE CONTRACTOR

1) INSTALL LOW PROFILE CTB AT TEMPORARY FLASHING RR SIGNALS.

EXHIBIT "A"
DGNO RAILROAD
F.M. 740--ROCKWALL CO.
HWY. STA. 167+26.75 R.R. MP 740.00
DOT NO. 415-215X
SHEET 3 OF 5

TEXAS DEPARTMENT OF TRANSPORTATION

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		150
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

▩ TEMPORARY 6" ASPHALT DETOUR

▦ MEDIAN CONSTRUCTION

▨ CONCRETE PAVEMENT CONSTRUCTION

PHASE II CONSTRUCTION SEQUENCE
CONSTRUCT SOUTH BOUND LANES

WORK TO BE DONE BY RAILROAD

1) RELOCATE EXISTING SOUTH BOUND RR SIGNAL /W FLASHING LIGHTS TO DETOUR LOCATION.

FERNANDO J. DE LA GARZA
71510

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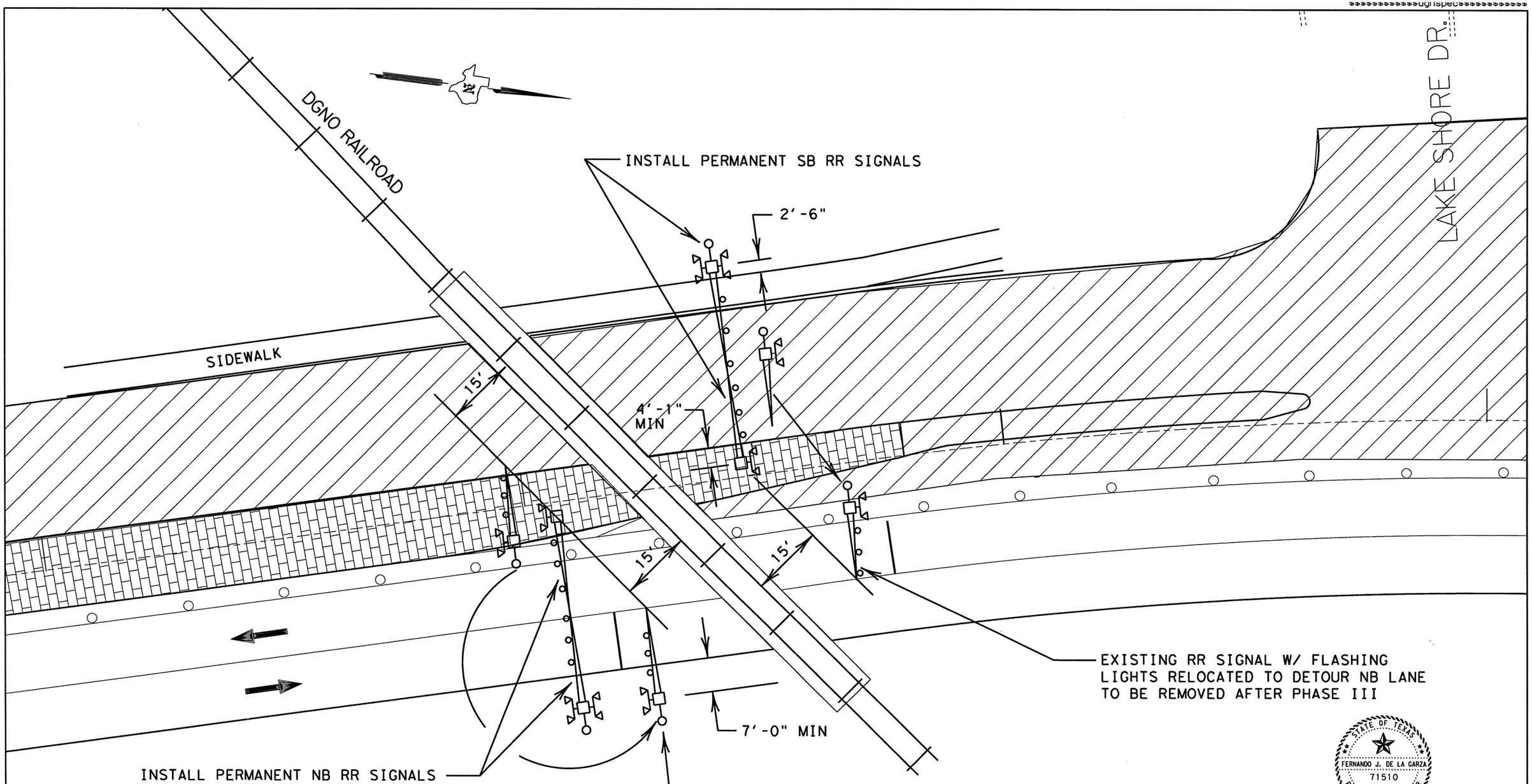
EXHIBIT "A"
DGNO RAILROAD
F.M. 740--ROCKWALL CO.
HWY. STA. 167+26.75 R.R. MP 740.00
DOT NO. 415-215X
SHEET 4 OF 5

TEXAS DEPARTMENT OF TRANSPORTATION

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		151
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



TEMPORARY 6" ASPHALT DETOUR

MEDIAN CONSTRUCTION

CONCRETE PAVEMENT CONSTRUCTION

PHASE III CONSTRUCTION SEQUENCE
CONSTRUCT NORTH BOUND LANES

WORK TO BE DONE BY RAILROAD

1) RELOCATE EXISTING SOUTH BOUND & NORTH BOUND RR SIGNALS /W FLASHING LIGHTS TO DETOUR LOCATIONS.
2) REMOVE EXISTING TEMPORARY SIGNALS
3) INSTALL PERMANENT SIGNALS AND GATES FOR NORTH BOUND AND SOUTH BOUND LANES.

STATE OF TEXAS
FERNANDO J. DE LA GARZA
71510
REGISTERED PROFESSIONAL ENGINEER

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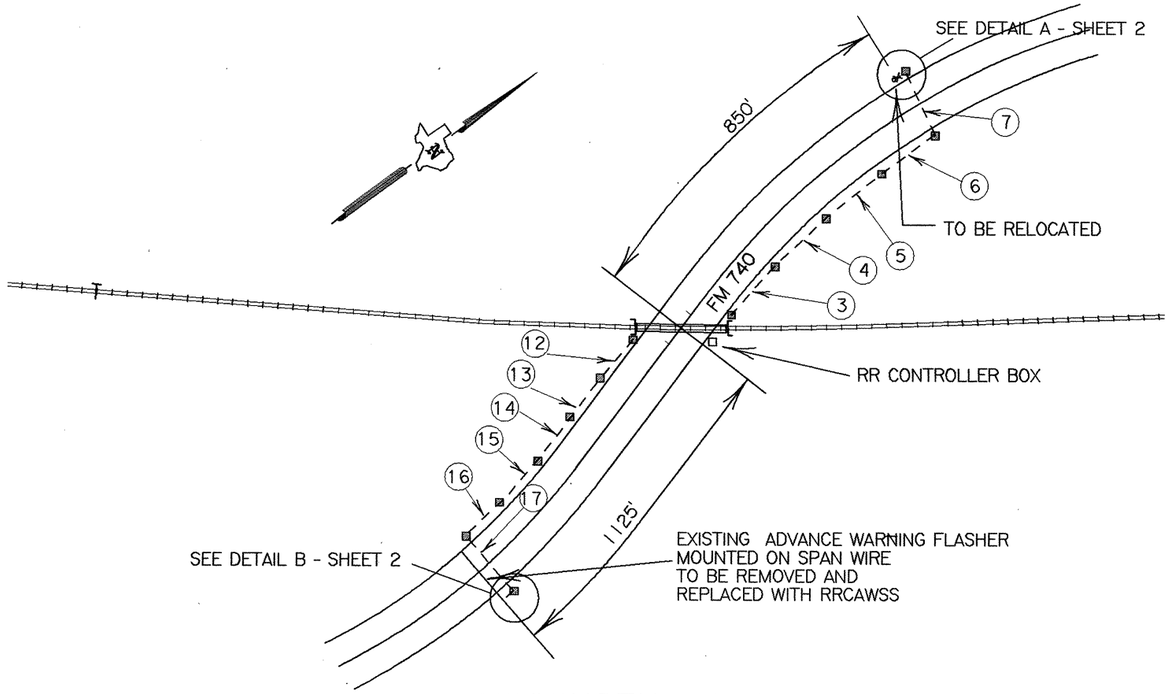
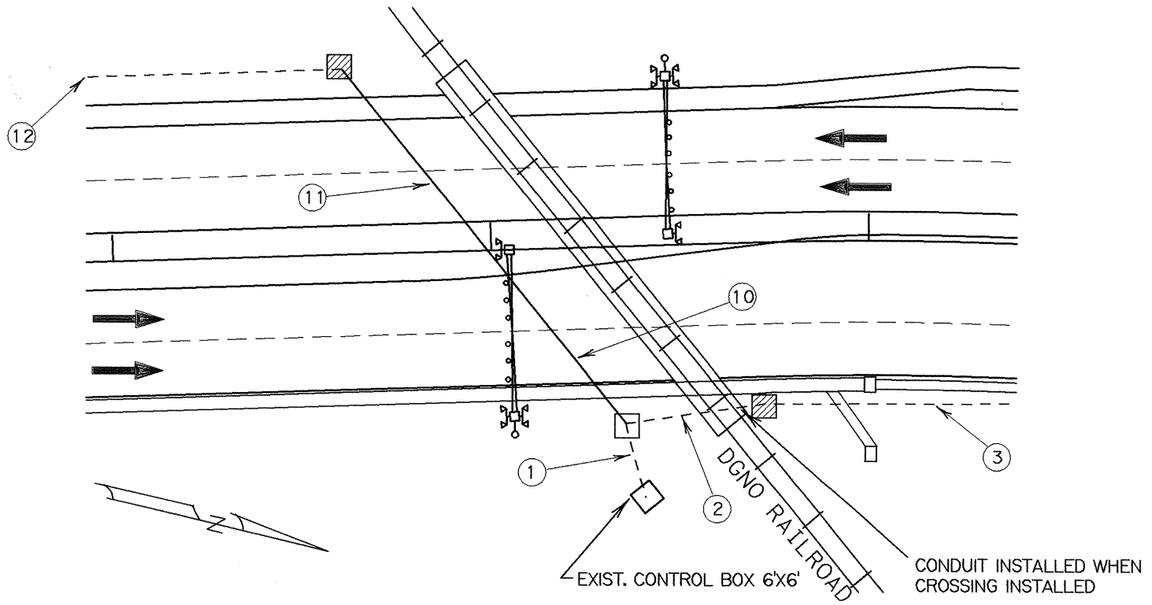
EXHIBIT "A"
DGNO RAILROAD
F.M. 740--ROCKWALL CO.
HWY. STA. 167+26.75 R.R. MP 740.00
DOT NO. 415-215X
SHEET 5 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		152
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740



VICINITY LAYOUT

NO SCALE



PLAN VIEW

NO SCALE

LEGEND

- INSTALL TYPE A GROUND BOX
- INSTALL TYPE C GROUND BOX
- PROPOSED CONDUIT RUN
- (3) CONDUIT RUN NUMBER

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

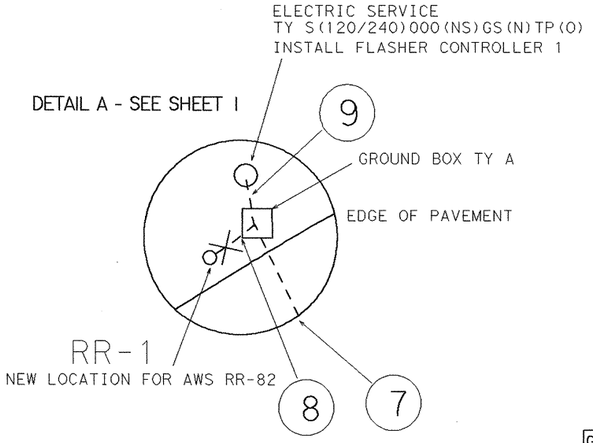
The seal appearing on this document was authorized by MAHER M. GHANAYEM P.E. 63459, on 10/7, 1999

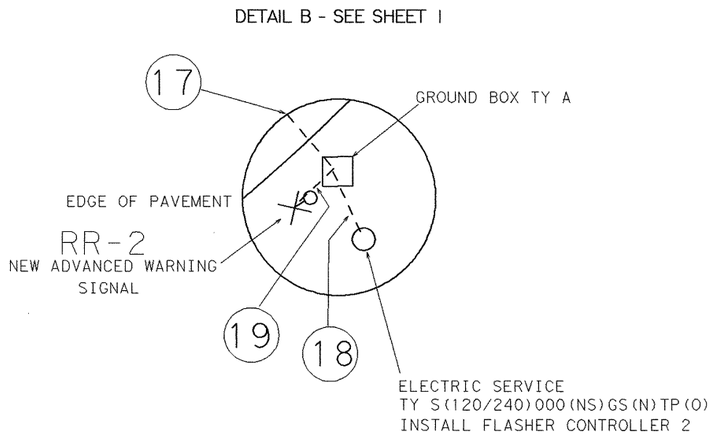
Maher M. Ghanayem

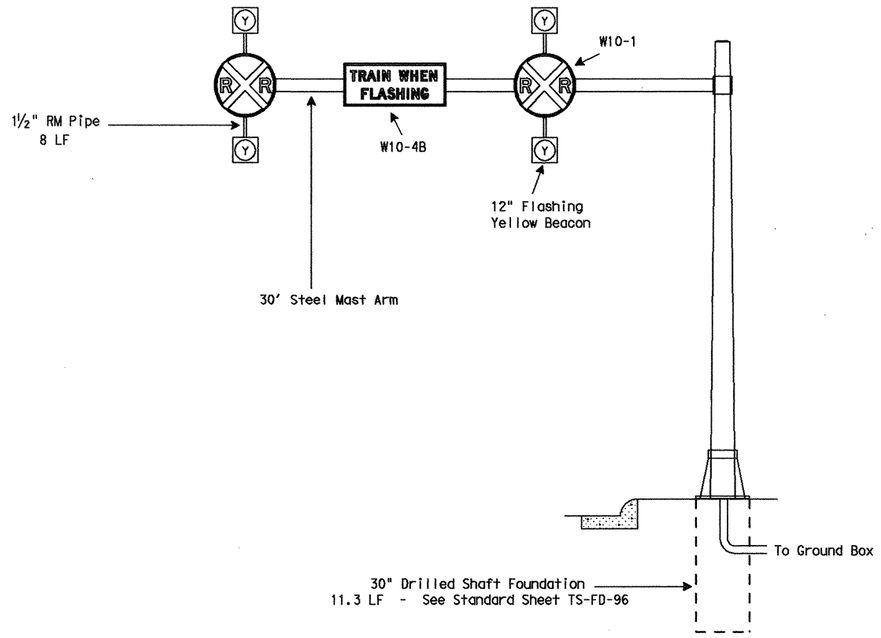
LAYOUT SHEET
SHEET 1 OF 2

RAILROAD ADVANCED WARNING SIGNAL

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		153
STATE	STATE DIST.NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740







Railroad Crossing Advanced Warning Sign and Signal

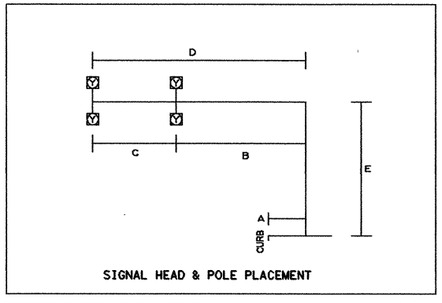
GROUND BOXES	EA
TY A W/APRON	13
TY C W/APRON	1

CONDUIT AND WIRE			3" PVC	TY A	NO 6	LENGTH
RUN	2" PVC	3" PVC	BORE	3 CDR	BARE	(FEET)
1	R-R INSTALLED			2	1	24
2		40		1	1	40
3	215			1	1	215
4	215			1	1	215
5	215			1	1	215
6	215			1	1	215
7			86	1	1	86
8	6			1	1	6
9	6			2	1	6
10	R-R INSTALLED			1	1	64
11	R-R INSTALLED			1	1	62
12	228			1	1	228
13	228			1	1	228
14	228			1	1	228
15	228			1	1	228
16	228			1	1	228
17			86	1	1	86
18	6			2	1	6
19	6			1	1	6
TOTAL	2024	40	172	2422	2386	

CABLE TERMINATION CHART

CNDR COLOR	CABLE 1 FROM RR TO CNTRL 1 3 CNDR	CABLE 2 FROM RR TO CNTRL 2 3 CNDR	CABLE 3 FROM CNTR 1 TO RR-1 3 CNDR	CABLE 4 FROM CNTR 2 TO RR-2 3 CNDR
BLACK	SPARE	SPARE	SPARE	SPARE
WHITE	RR SIGNAL	RR SIGNAL	FLASH	FLASH
RED	RR SIGNAL	RR SIGNAL	FLASH	FLASH

SIGNAL HEAD & POLE PLACEMENT (FEET)								WIRE INSIDE POLE (ITEM 684)
POLE NO	A	B	C	D	E	NO. OF HEADS	FND TYPE	SIG CABLE TY-A 5 CNDR
R-1	12.0	18.0	12.0	32.0	19.0	2	30-A	—
R-2	12.0	18.0	12.0	32.0	19.0	2	30-A	77.0
							TOTAL	77.0



SIGNAL HEAD & POLE PLACEMENT

RAILROAD CROSSING ADVANCED WARNING SIGN AND SIGNAL SUMMARY			
ITEM		UNIT	QUANTITY
0618-0504	1½" RM CONDUIT	LF	16
0618-0511	CONDUIT (PVC)(SCHD 40)(2")	LF	2024
0618-0513	CONDUIT (PVC)(SCHD 40)(3")	LF	40
0618-0534	CONDUIT (PVC)(SCHD 40)(3")(BORE)	LF	172
0620-0504	ELEC CONDUCTOR (NO.6)BARE	LF	2386
0624-0501	GROUND BOX TY A (122311) W/APRON	EA	13
0624-0503	GROUND BOX TY C (162911) W/APRON	EA	1
0628-0549	ELEC SERV TY S(120/240)000(NS)GS(N)TP(O)	EA	2
0644-0501	SIGN (TYA) W10-4 INTERSECTION	EA	1
0656-0521	FND FOR TRAF SIG (TY A)(30IN DR SH)	LF	22.6
0680-0501	FLASHER CABINET, CONTROLLER + ACS.	EA	2
	SIGN PANEL W10-4B "TRAIN WHEN FLASHING"	EA	2
	SIGN PANEL W10-1 RR SYMBOL	EA	4
	RELOCATE MAST ARM	EA	1
0682-0502	VEH SIG SEC (12") - YELLOW LAMP	EA	4
0684-0503	TRAF SIG CBL (TY A)(3 CONDR)(12 AWG)	LF	2422
0684-0553	TRAF SIG CBL (TY A)(5 CONDR)(16 AWG)	LF	77
0686-0569	TRAF SIG POLE ASM (STL)1 ARM (32 FT)	EA	1

LEGEND

- INSTALL TYPE A GROUND BOX
- INSTALL TYPE C GROUND BOX
- PROPOSED CONDUIT RUN
- (3) CONDUIT RUN NUMBER

GENERAL NOTES

1. THE RRCAWSS TO BE RELOCATED SHALL HAVE A NEW FOUNDATION.
2. THE FOUNDATION FOR THE EXISTING RRCAWSS SHALL BE REMOVED TO AT LEAST TWO FEET BELOW GRADE.
3. THE SIGN PANELS AND FLASHER CONTROLLER AND CABINET SHALL BE SUBSIDIARY TO ITEM 680.
4. FLASHER CONTROL CABINETS TO BE MOUNTED ON THE SERVICE POLES, BELOW OR ON THE OPPOSITE SIDE OF THE METER.

STATE OF TEXAS
MAHER M. GHANAYEM
63459
REGISTERED PROFESSIONAL ENGINEER

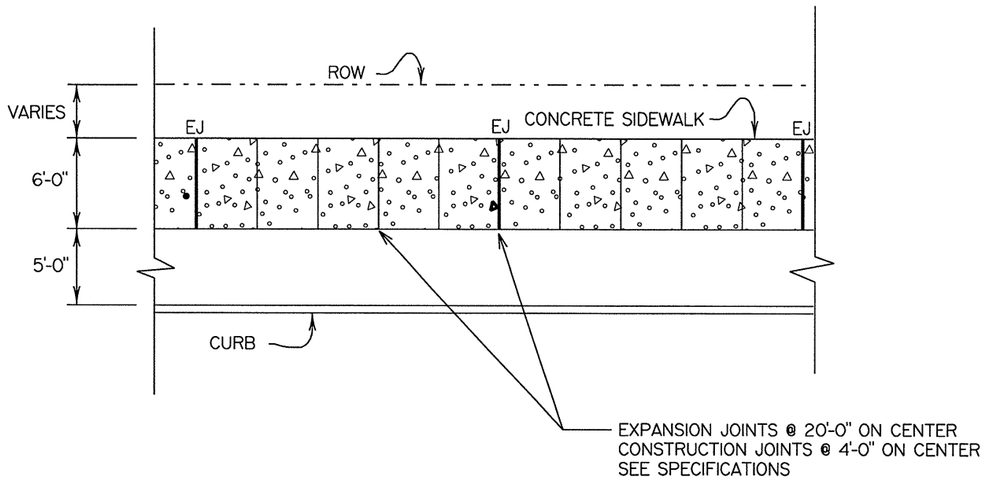
The seal appearing on this document was authorized by MAHER M. GHANAYEM P.E. 63459, on 10/7, 1999

Maher Ghanayem

LAYOUT SHEET
SHEET 2 OF 2

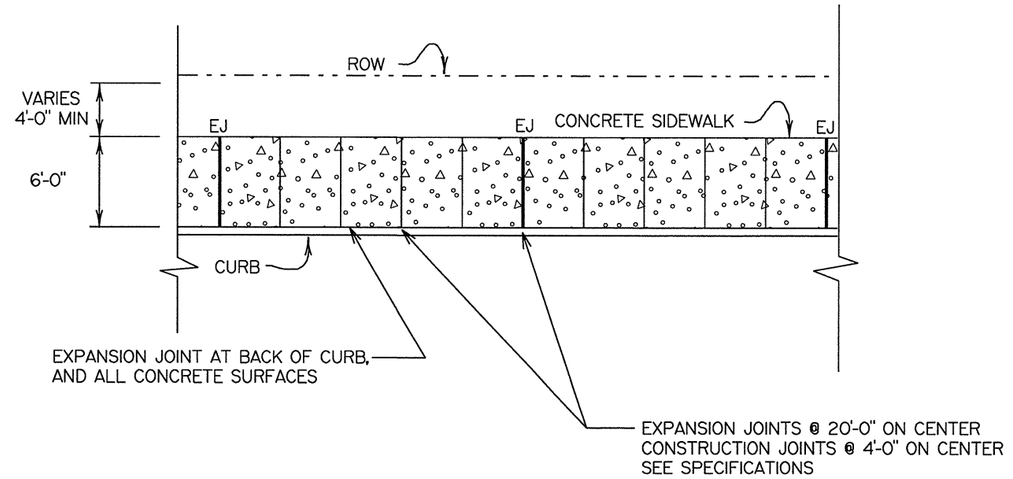
RAILROAD ADVANCED WARNING SIGNAL

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		153A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



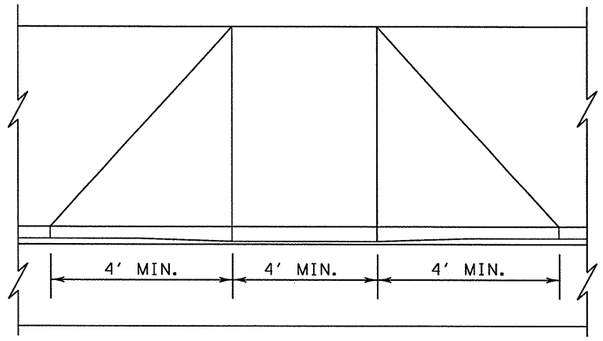
① SIDEWALK DETAILS, STRAIGHT

N.T.S.

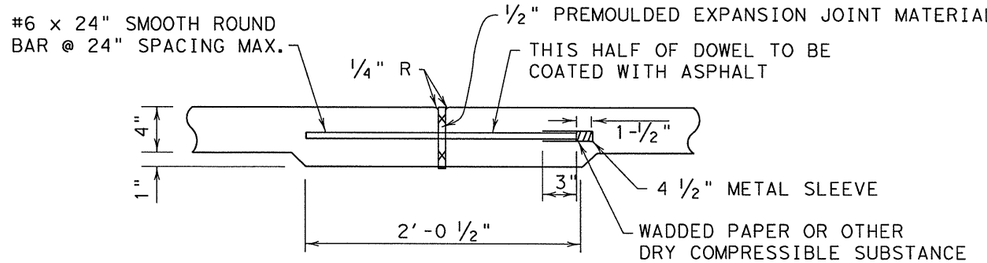


② SIDEWALK DETAILS, AT CURB

N.T.S.



WHEELCHAIR AND BICYCLE RAMP DETAIL



SIDEWALK EXPANSION JOINT DETAIL

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

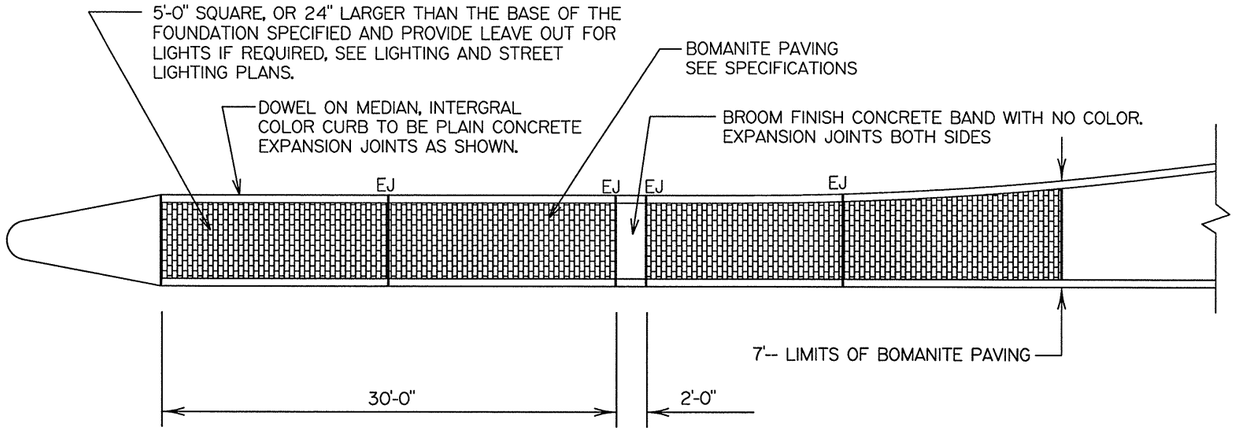
8/16/, 1999

David Lott, P.E.

MISCELLANEOUS DETAILS CROSSWALK, RAMPS, & SIDEWALK DETAILS

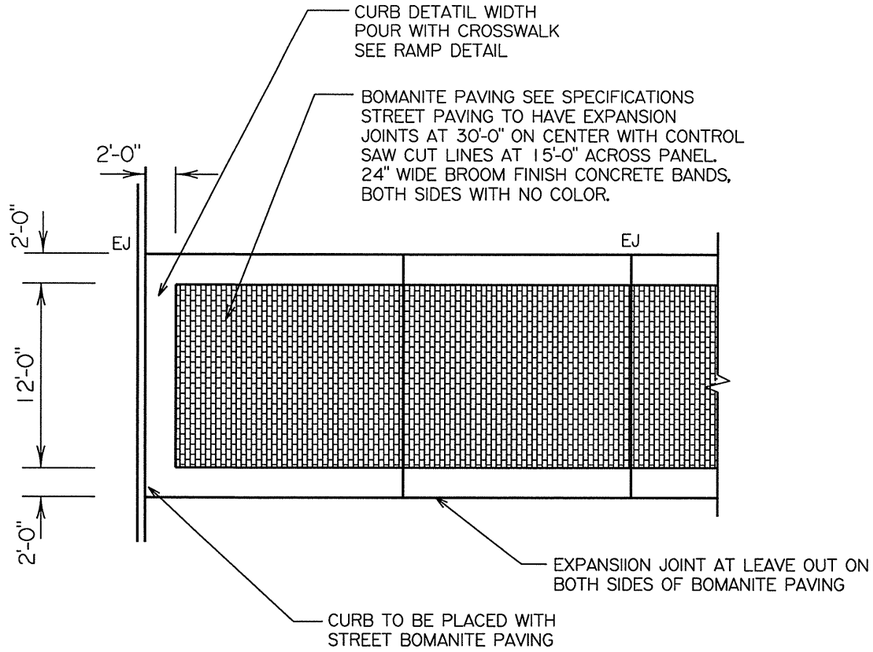
SHEET 1 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		154
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



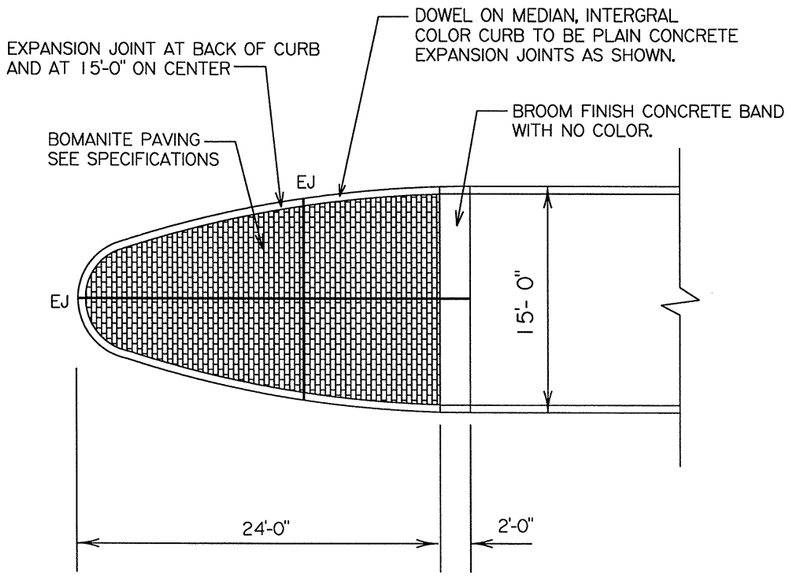
NOTE: SEE PLAN FOR LOCATION OF REQUIRED LEAVEOUTS.

MEDIAN PAVING AT NOSE, AND TURN LANE

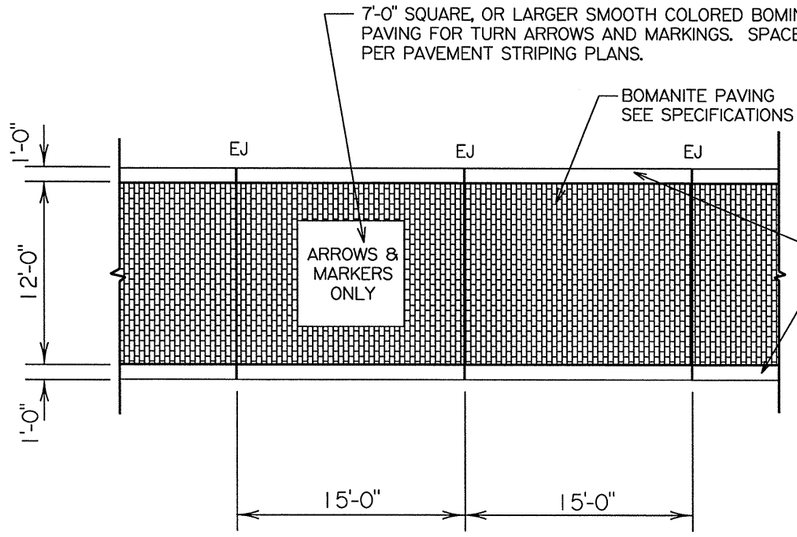


STREET CROSSWALK

NOTE: INCLUDE ADA HANDICAP SLOPED CURBS AT ALL CROSSWALKS PER STATE STANDARDS



MEDIAN PAVING AT NOSE, NO TURN LANE



STREET PAVING AT LEFT TURN LANE

NOTE: BRICKS TO RUN PERPENDICULAR TO TRAFFIC

STATE OF TEXAS
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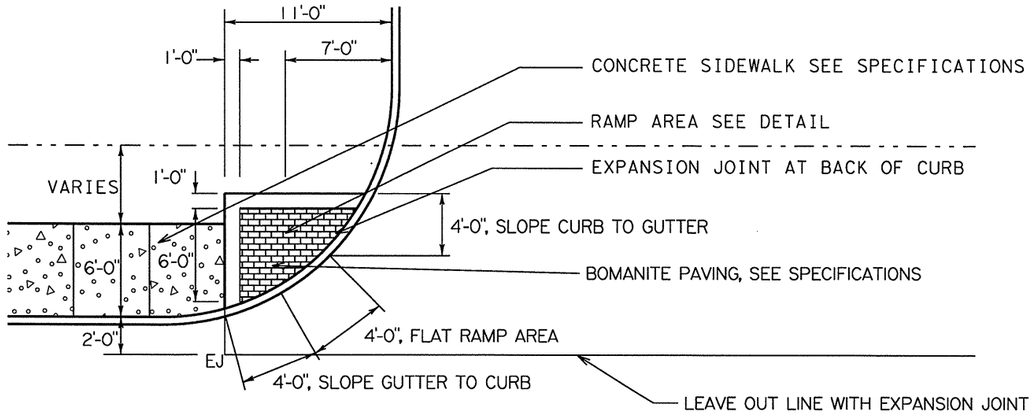
MISCELLANEOUS DETAILS CROSSWALK, RAMPS, & SIDEWALK DETAILS

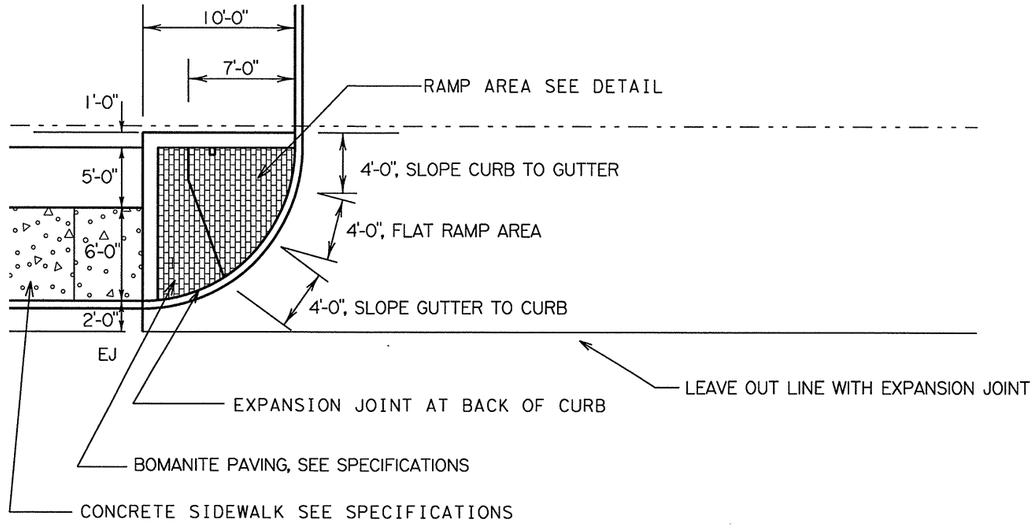
SHEET 2 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		155
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



① SIDEWALK DETAILS, DRIVE RAMP #1

N.T.S.



② SIDEWALK DETAILS, DRIVE RAMP #3

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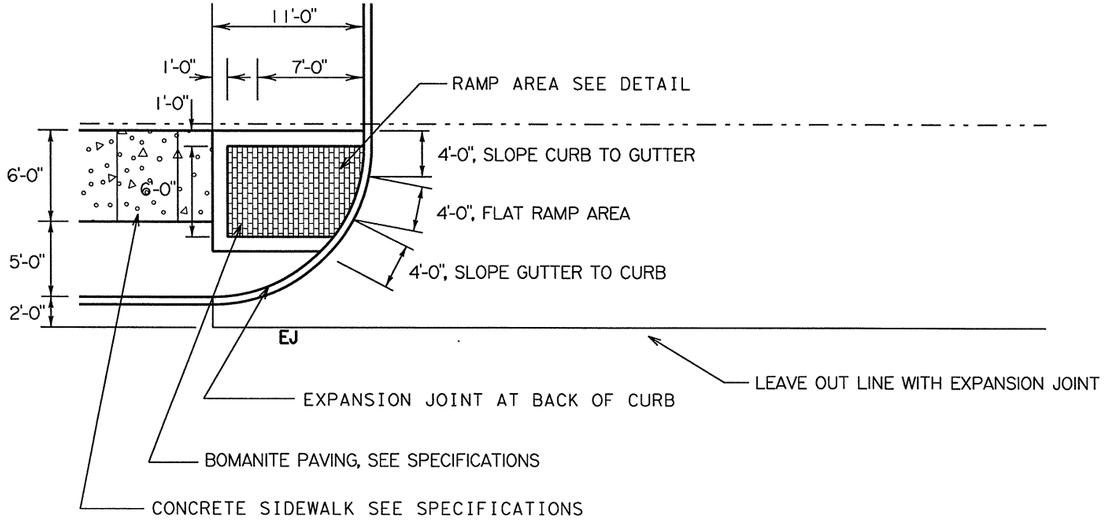

③ SIDEWALK DETAILS, DRIVE RAMP #2

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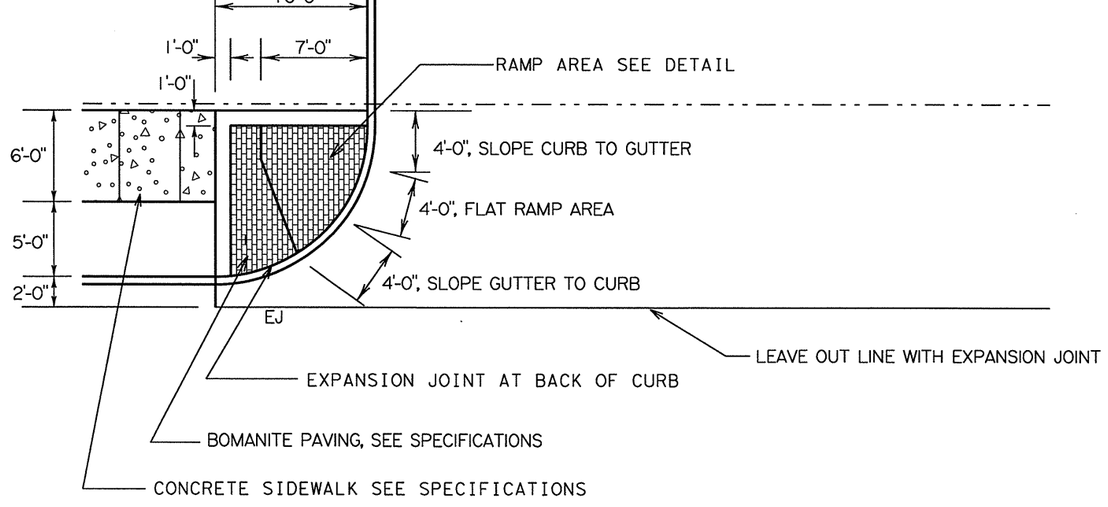


④ SIDEWALK DETAILS, DRIVE RAMP #1

N.T.S.

NOTE:
CONCRETE SIDEWALK, SEE SPECIFICATIONS
BOMANITE PAVING, SEE SPECIFICATIONS
RAMPS TO MEET ADA GUIDELINES.

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

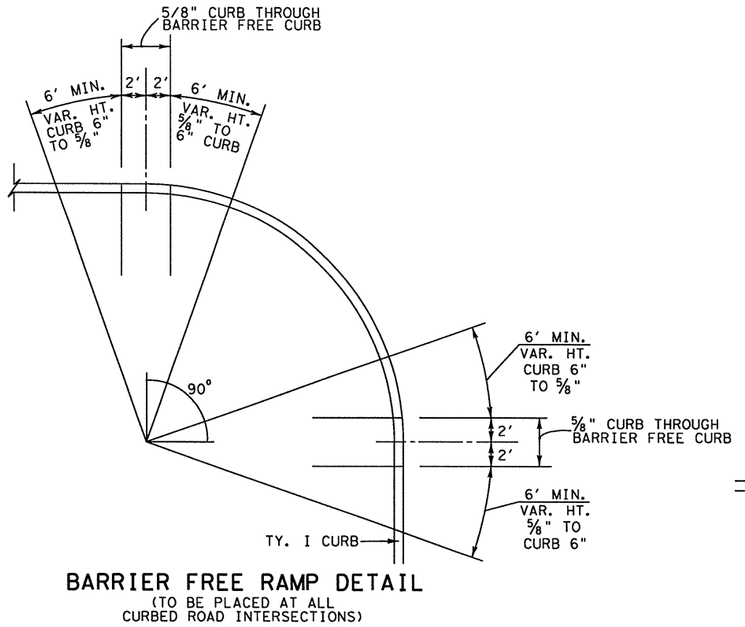
8/16/, 1999

David Lott, P.E.

MISCELLANEOUS DETAILS CROSSWALK, RAMPS, & SIDEWALK DETAILS

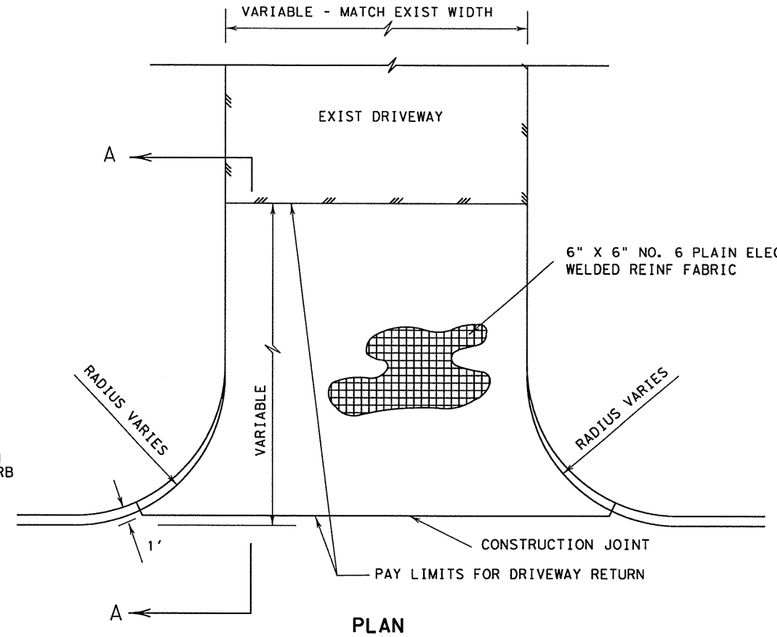
SHEET 3 OF 5

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		156
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

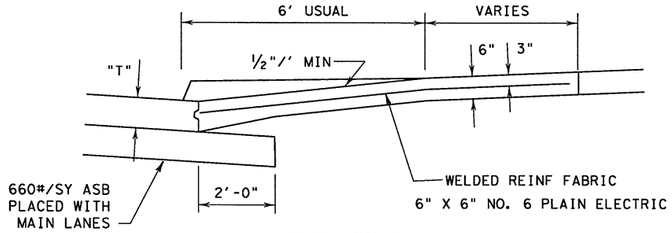


BARRIER FREE RAMP DETAIL

(TO BE PLACED AT ALL CURBED ROAD INTERSECTIONS)



PLAN

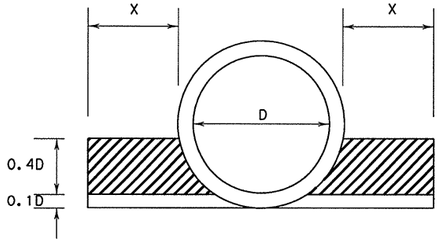


SECTION A-A

DRIVEWAY RETURNS

NOTES:

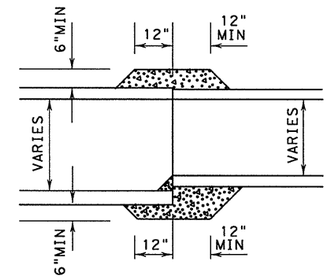
1. DRIVEWAY LOCATIONS MAY BE SHIFTED AT THE TIME OF CONSTRUCTION AS DIRECTED BY THE ENGINEER TO MATCH EXISTING CONDITIONS.
2. OMIT PAYMENT FOR CURB WITHIN LIMITS OF DRIVEWAY. CURBS ON DRIVEWAYS SHALL BE CONSIDERED SUBSIDIARY TO THE PRICE BID PER SQUARE YARD FOR DRIVEWAY AND WILL NOT BE PAID FOR DIRECTLY.



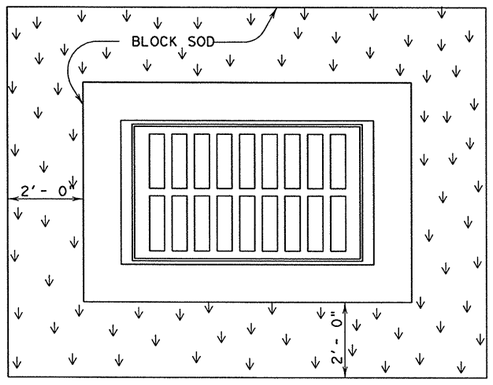
X = 1'-0" FOR PIPES 42" OR LESS
AND
X = 2'-0" FOR PIPES OVER 42"

CEMENT STABILIZED BACKFILL

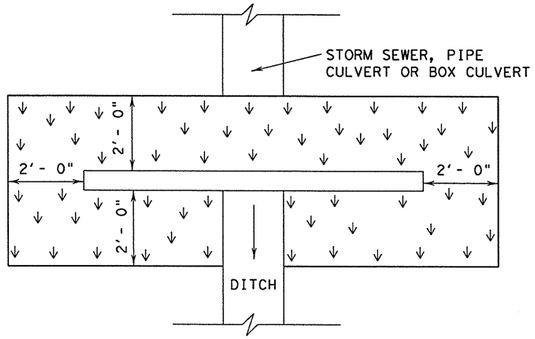
FOR STORM SEWERS ON SLOPES GREATER THAN 10%



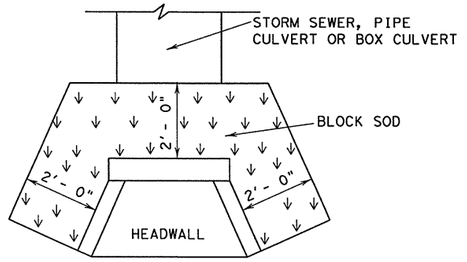
CONCRETE COLLAR FOR PIPE CONNECTION



BLOCK SOD AT INLETS



BLOCK SOD AT HEADWALL



BLOCK SOD AT HEADWALL

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED
PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

MISCELLANEOUS DETAIL

SHEET 4 OF 5

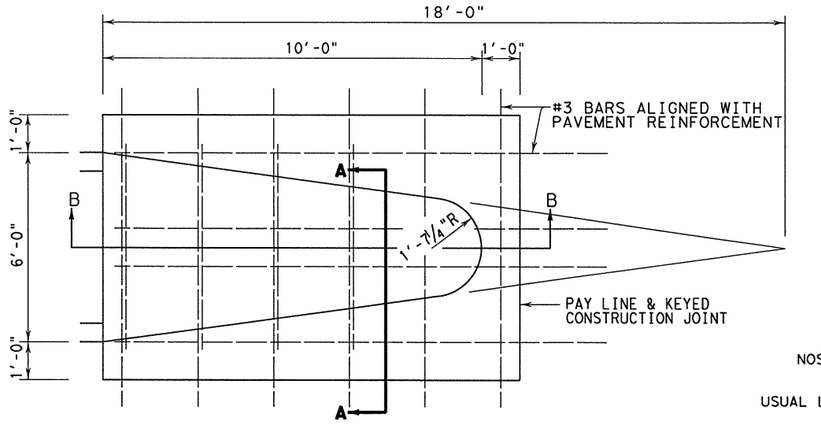
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		157
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

740misc.dgn(2)

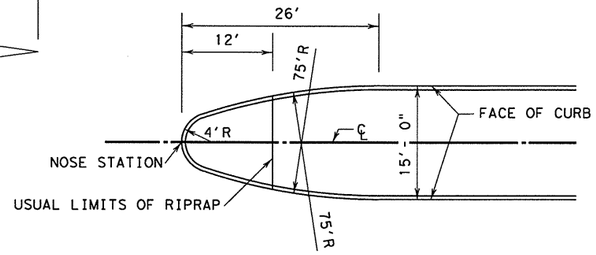
LEVELS
DRAINAGE
HORIZONTAL & VERTICAL ALIGNMENT
REMOVALS

REFERENCE FILES
FV \DGN
FV \OPO.DGN
911DON.DGN
DESIGN FILES
FM740MISC.DGN
1

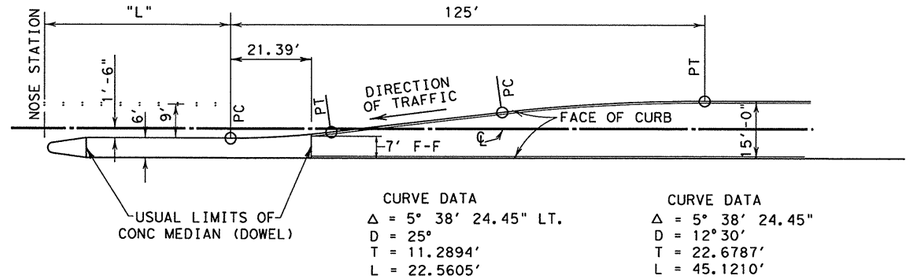
$$$$date$$$$



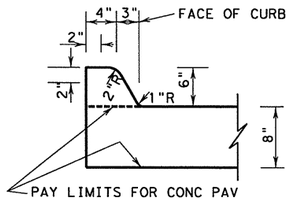
MONOLITHIC MEDIAN NOSE



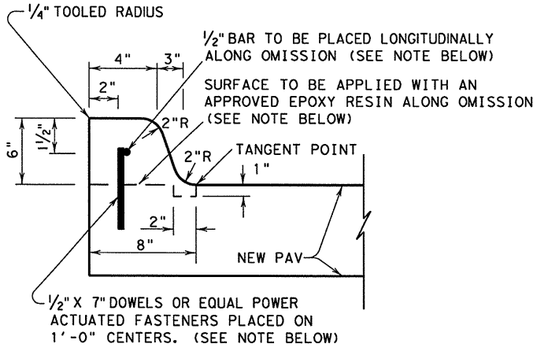
TYPICAL BULLET NOSE



TYPICAL LEFT TURN LANE DETAIL

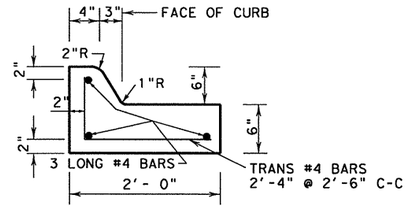


TYPE I CURB

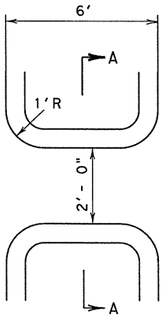


NOTE:
IF CONTINUOUS MONOLITHIC CURB HAS TO BE OMITTED FOR ANY REASON, THE CURB SHALL BE DOWELED AS SHOWN ABOVE.

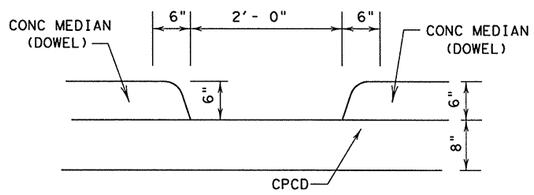
TYPE I DOWEL CURB
(FOR NEW PAVEMENT)



CONCRETE
CURB & GUTTER
TYPE I

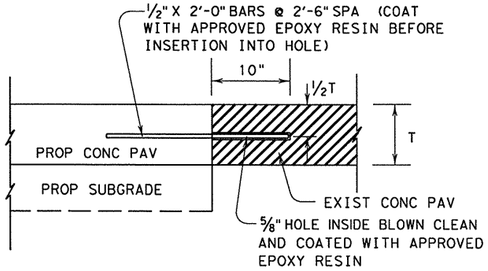


PLAN



SECTION A-A

DETAILS FOR MEDIAN DRAIN



ANCHOR JOINT DETAIL

TO BE USED WHERE PROPOSED CONCRETE PAVEMENT MEETS EXISTING CONCRETE PAVEMENT

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

MISCELLANEOUS DETAIL

SHEET 5 OF 5

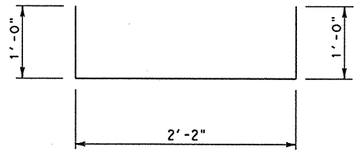
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		159
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

740misc.dgn(1)

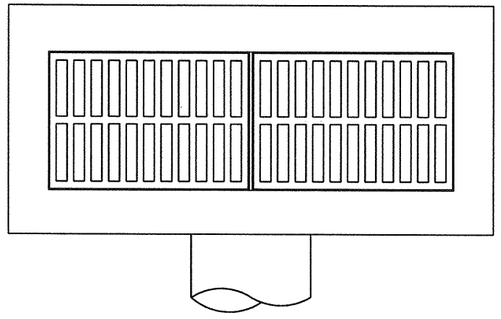
REFERENCE FILES	HORIZONTAL & VERTICAL ALIGNMENT	DRAINAGE
FM7^^_.DGN		
FV_ JPO.DGN		
91l_ _.DGN		
DESIGN FILES		
FM740MISC.DGN		1

REMOVALS

$$$date$$$$

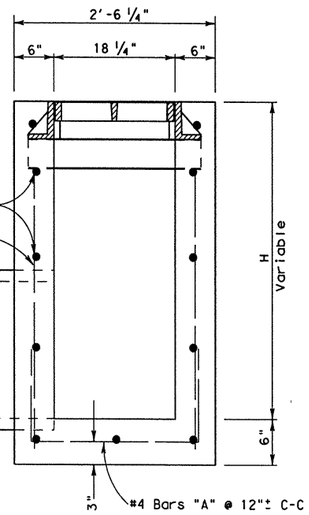


BARS A



PLAN

ELEVATION



SECTION C-C

ESTIMATED QUANTITIES

1 GRATE

Ht.	Reinforcing Steel																Totals	
	Bars "A"				Bars "B"				Bars "C"				Bars "D"				Reinf Steel	Conc C.Y.
	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.		
3'-0"	4	#4	4'-0"	11	11	#4	3'-2"	23	10	#4	2'-10"	19	8	#4	2'-2"	12	65	0.73
3'-6"	4	#4	4'-0"	11	11	#4	3'-2"	23	10	#4	3'-4"	22	8	#4	2'-2"	12	68	0.82
4'-0"	4	#4	4'-0"	11	13	#4	3'-2"	27	10	#4	3'-10"	26	10	#4	2'-2"	14	78	0.91
4'-6"	4	#4	4'-0"	11	13	#4	3'-2"	27	10	#4	4'-4"	29	10	#4	2'-2"	14	81	1.00

2 GRATE

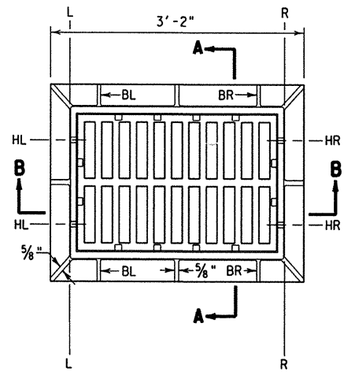
Ht.	Reinforcing Steel																Totals	
	Bars "A"				Bars "B"				Bars "C"				Bars "D"				Reinf Steel	Conc C.Y.
	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.		
3'-0"	7	#4	4'-0"	19	11	#4	5'-10"	43	16	#4	2'-10"	30	8	#4	2'-2"	12	104	1.14
3'-6"	7	#4	4'-0"	19	11	#4	5'-10"	43	16	#4	3'-4"	36	8	#4	2'-2"	12	110	1.28
4'-0"	7	#4	4'-0"	19	13	#4	5'-10"	51	16	#4	3'-10"	41	10	#4	2'-2"	14	125	1.42
4'-6"	7	#4	4'-0"	19	13	#4	5'-10"	51	16	#4	4'-4"	47	10	#4	2'-2"	14	131	1.56

3 GRATE

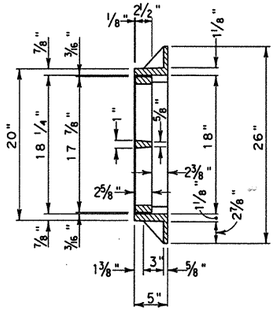
Ht.	Reinforcing Steel																Totals	
	Bars "A"				Bars "B"				Bars "C"				Bars "D"				Reinf Steel	Conc C.Y.
	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.	No.	Size	Lgth	Wt.		
3'-0"	10	#4	4'-0"	27	11	#4	8'-6"	62	22	#4	2'-10"	42	8	#4	2'-2"	12	143	1.56
3'-6"	10	#4	4'-0"	27	11	#4	8'-6"	62	22	#4	3'-4"	49	8	#4	2'-2"	12	150	1.75
4'-0"	10	#4	4'-0"	27	13	#4	8'-6"	74	22	#4	3'-10"	56	10	#4	2'-2"	14	171	1.94
4'-6"	10	#4	4'-0"	27	13	#4	8'-6"	74	22	#4	4'-4"	64	10	#4	2'-2"	14	179	2.13

Conc. To Be Deducted For Pipes

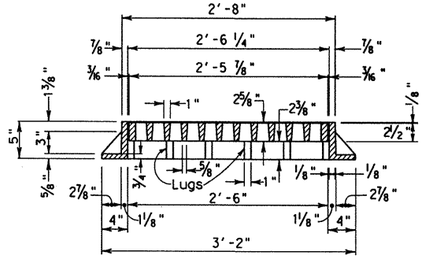
Pipe Size	Conc. C.Y.
15"	0.04
18"	0.05
21"	0.07
24"	0.09



PLAN



SECTION A-A



SECTION B-B

FRAME & GRATE TY A

For Standard Single Grate Inlets-Frame as shown omitting bolt holes and brackets BR & BL

For Standard Double Grate Inlets-Right frame as shown omitting flange on Line L-L, put on bracket "BL" and core holes "HL". Left frame as shown omitting flange on line R-R, put on bracket "BR" and core holes "HR".

For Standard Triple Grate Inlets-Make one Right frame and one Left frame and one frame omitting both end flanges. Put on brackets 'BR & BL' and core holes "HR & HL".

GENERAL NOTES:

All Concrete shall be Class "A"

All dimensions to reinforcing steel are to the centers of the bars.

Grates and Forms shall be of Gray Cast Iron conforming to ASTM Specification A-48 for Class No. 30 Cast Iron.

After the Inlet has been constructed and the inside forms removed, additional Class "A" concrete shall be placed in the bottom of the inlet as indicated. The circular surface shall recieve a smooth steel trowel finish.

Quantities are for informational purposes only.

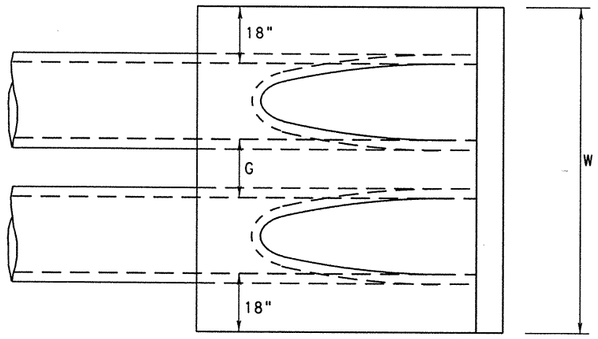
Lateral pipe may enter inlet at any location.

Install steps same as for Manhole in all Inlets when height of Inlet is more than 4 feet.

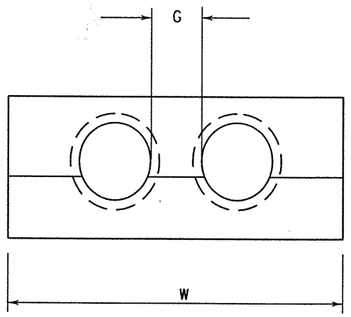
DROP INLET TYPE D DETAILS

DISTRICT 18 STANDARD

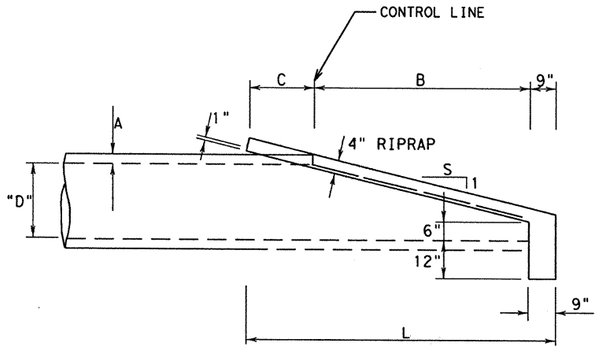
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		154
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740



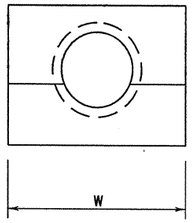
TOP VIEW
MULTIPLE PIPES



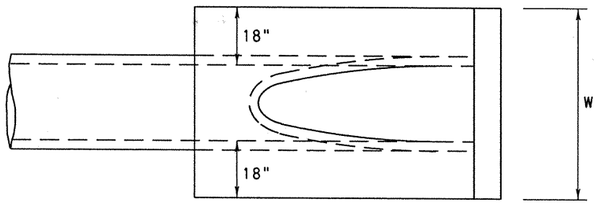
END VIEW
MULTIPLE PIPES



SIDE VIEW
SINGLE OR MULTIPLE PIPES



END VIEW
SINGLE PIPE



TOP VIEW
SINGLE PIPE

NO PIPES	NPS SIZE (IN)	NPS SIZE (MM)	OUTSIDE DIA (MM)	SLOPE	DIMENSIONS (IN)						RIPRAP CY
					A	B	C	L	G	W	
1	18	450	565	1:3	2 1/4"	36"	24"	69"	---	54"	0.44
2	"	"	"	"	"	"	"	"	14"	86"	0.72
3	"	"	"	"	"	"	"	"	14"	118"	1.01
1	"	"	"	1:4	"	48"	33"	90"	---	54"	0.52
2	"	"	"	"	"	"	"	"	14"	86"	0.87
3	"	"	"	"	"	"	"	"	14"	118"	1.21
1	"	"	"	1:5	"	60"	39"	108"	---	54"	0.60
2	"	"	"	"	"	"	"	"	14"	86"	0.99
3	"	"	"	"	"	"	"	"	14"	118"	1.39
1	"	"	"	1:6	"	72"	48"	129"	---	54"	0.68
2	"	"	"	"	"	"	"	"	14"	86"	1.13
3	"	"	"	"	"	"	"	"	14"	118"	1.59
1	21	525	650	1:3	2 1/2"	45"	24"	78"	---	57"	0.49
2	"	"	"	"	"	"	"	"	15"	93"	0.84
3	"	"	"	"	"	"	"	"	15"	129"	1.18
1	"	"	"	1:4	"	60"	33"	102"	---	57"	0.59
2	"	"	"	"	"	"	"	"	15"	93"	1.01
3	"	"	"	"	"	"	"	"	15"	129"	1.44
1	"	"	"	1:5	"	75"	39"	123"	---	57"	0.67
2	"	"	"	"	"	"	"	"	15"	93"	1.16
3	"	"	"	"	"	"	"	"	15"	129"	1.65
1	"	"	"	1:6	"	90"	48"	147"	---	57"	0.77
2	"	"	"	"	"	"	"	"	15"	93"	1.34
3	"	"	"	"	"	"	"	"	15"	129"	1.90
1	24	600	750	1:3	3"	54"	24"	87"	---	60"	0.54
2	"	"	"	"	"	"	"	"	17"	101"	0.97
3	"	"	"	"	"	"	"	"	17"	142"	1.40
1	"	"	"	1:4	"	72"	33"	114"	---	60"	0.65
2	"	"	"	"	"	"	"	"	17"	101"	1.18
3	"	"	"	"	"	"	"	"	17"	142"	1.71
1	"	"	"	1:5	"	90"	39"	138"	---	60"	0.75
2	"	"	"	"	"	"	"	"	17"	101"	1.36
3	"	"	"	"	"	"	"	"	17"	142"	1.98
1	"	"	"	1:6	"	108"	48"	165"	---	60"	0.86
2	"	"	"	"	"	"	"	"	17"	101"	1.57
3	"	"	"	"	"	"	"	"	17"	142"	2.28
1	27	675	840	1:3	3 1/4"	63"	24"	96"	---	63"	0.59
2	"	"	"	"	"	"	"	"	18 1/2"	108.5"	1.10
3	"	"	"	"	"	"	"	"	18 1/2"	154"	1.61
1	"	"	"	1:4	"	84"	33"	126"	---	63"	0.72
2	"	"	"	"	"	"	"	"	18 1/2"	108.5"	1.35
3	"	"	"	"	"	"	"	"	18 1/2"	154"	1.98
1	"	"	"	1:5	"	105"	39"	153"	---	63"	0.83
2	"	"	"	"	"	"	"	"	18 1/2"	108.5"	1.57
3	"	"	"	"	"	"	"	"	18 1/2"	154"	2.31
1	"	"	"	1:6	"	126"	48"	183"	---	63"	0.96
2	"	"	"	"	"	"	"	"	18 1/2"	108.5"	1.81
3	"	"	"	"	"	"	"	"	18 1/2"	154"	2.67
1	30	750	925	1:3	3 1/2"	72"	24"	105"	---	66"	0.65
2	"	"	"	"	"	"	"	"	20"	116"	1.25
3	"	"	"	"	"	"	"	"	20"	166"	1.85
1	"	"	"	1:4	"	96"	33"	138"	---	66"	0.79
2	"	"	"	"	"	"	"	"	20"	116"	1.53
3	"	"	"	"	"	"	"	"	20"	166"	2.28
1	"	"	"	1:5	"	120"	39"	168"	---	66"	0.91
2	"	"	"	"	"	"	"	"	20"	116"	1.79
3	"	"	"	"	"	"	"	"	20"	166"	2.66
1	"	"	"	1:6	"	144"	48"	201"	---	66"	1.05
2	"	"	"	"	"	"	"	"	20"	116"	2.07
3	"	"	"	"	"	"	"	"	20"	166"	3.09
1	33	825	1015	1:3	3 3/4"	81"	24"	114"	---	69"	0.70
* 2	"	"	"	"	"	"	"	"	21 1/2"	123.5"	1.40
* 3	"	"	"	"	"	"	"	"	21 1/2"	178"	2.09
1	"	"	"	1:4	"	108"	33"	150"	---	69"	0.86
* 2	"	"	"	"	"	"	"	"	21 1/2"	123.5"	1.73
* 3	"	"	"	"	"	"	"	"	21 1/2"	178"	2.59
1	"	"	"	1:5	"	135"	39"	183"	---	69"	1.00
* 2	"	"	"	"	"	"	"	"	21 1/2"	123.5"	2.02
* 3	"	"	"	"	"	"	"	"	21 1/2"	178"	3.05
1	"	"	"	1:6	"	162"	48"	219"	---	69"	1.15
* 2	"	"	"	"	"	"	"	"	21 1/2"	123.5"	2.35
* 3	"	"	"	"	"	"	"	"	21 1/2"	178"	3.54

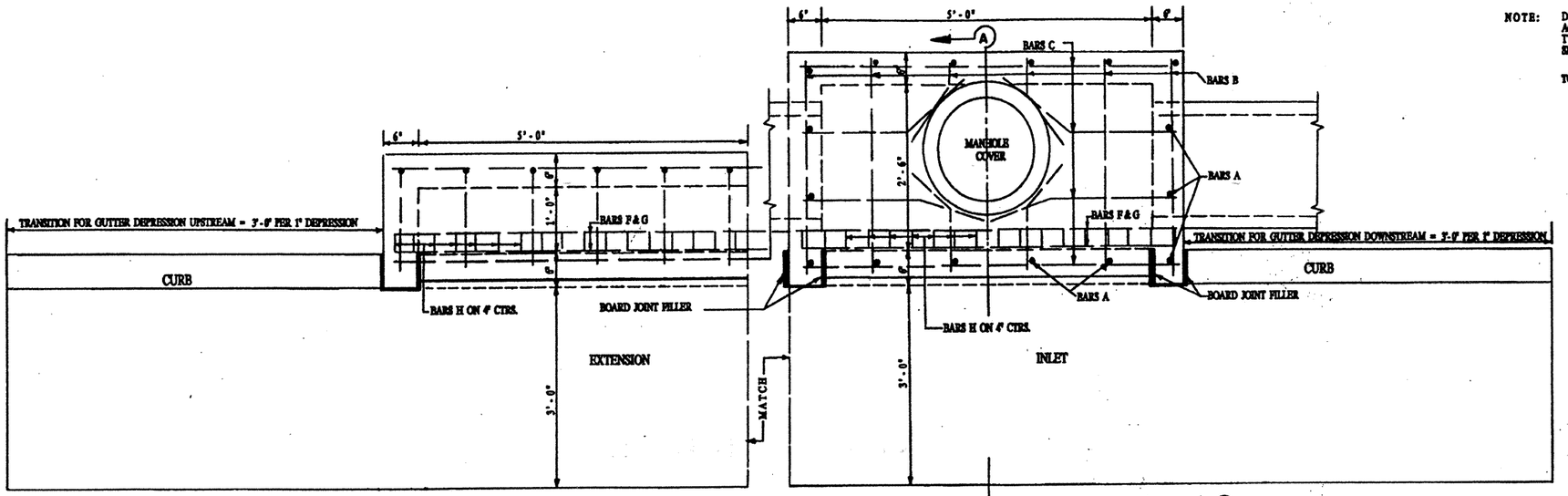
REFER TO CD-SPR FOR DETAILS NOT SHOWN
*MULTIPLE PIPES GREATER THAN 30" DIAMETER REQUIRE SAFETY PIPE RUNNERS

SAFETY END TREATMENT

TxDOT
DALLAS DISTRICT STANDARD 2/92

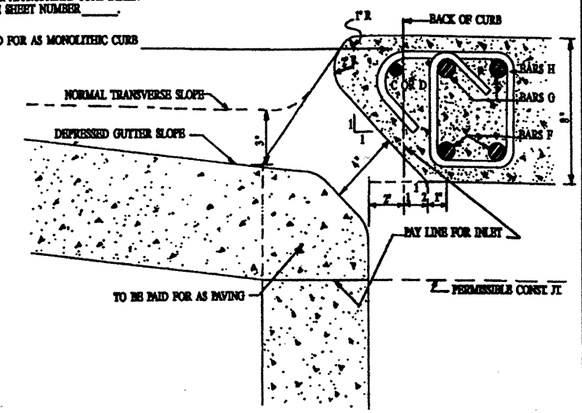
FED.RD. DIST.NO.	STATE	FEDERAL AID PROJECT NO.			HIGHWAY NO.
6	TEXAS	STP 99(413)MM			FM740
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	SHEET NO.
18	ROCKWALL	1014	03	033	160

CITYID34.CIT

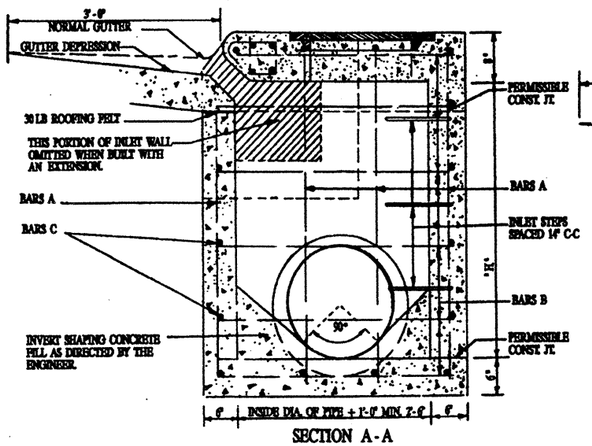


PLAN
SCALE 1"- 1'

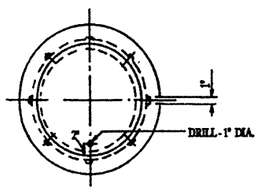
NOTE: DIMENSIONS FOR CURB SECTIONS VARY ACCORDING TO LIMITS OF PROPOSED CURB TYPES. FOR APPROPRIATE CURB DIMENSIONS, SEE SHEET NUMBER _____.



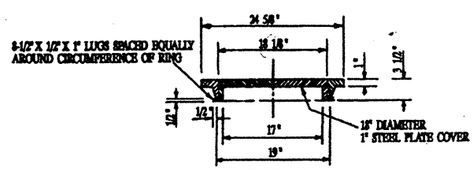
THROAT DETAIL
SCALE: 3" = 1'



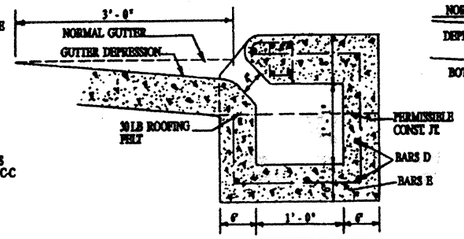
SECTION A-A
SCALE 1" = 1'



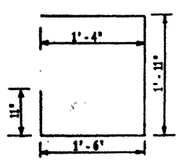
PLAN



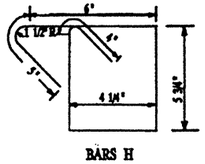
SECTION
18" C.I. MANHOLE RING & STEEL PLATE COVER
TY A



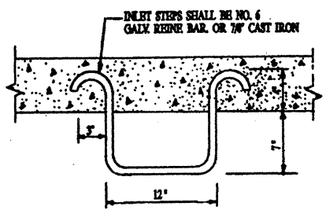
SECTION B-B
SCALE 1" = 1'



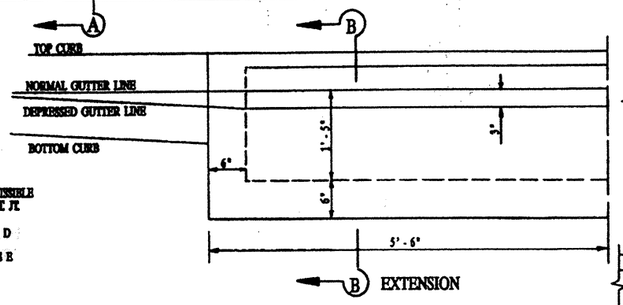
BARS E

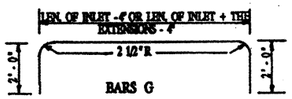


BARS H

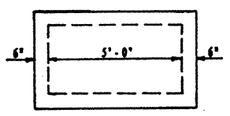


DETAIL
OF INLET STEPS

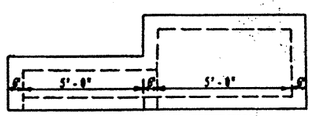




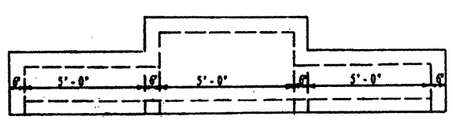
BARS G



REGULAR INLET

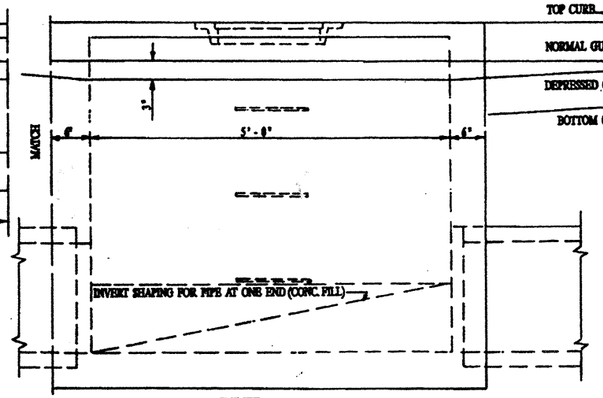


INLET WITH ONE EXTENSION



INLET WITH TWO EXTENSIONS

PLAN OF INLET AND EXTENSIONS



INLET

ELEVATION
SCALE : 1" = 1'

GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS A. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
2. CAST IRON STEPS, SPACED 14" AND LOCATED AS DIRECTED BY THE ENGINEER, SHALL BE PROVIDED AND INSTALLED IN ALL INLETS WHERE THE DEPTH EXCEEDS 4'- 0".
3. PAYMENT OF CURB INLETS AND EXTENSIONS THERETO AS SHOWN ON THE PLANS WILL BE MADE AT THE UNIT PRICE BID FOR "INLET (COMPLETE) (TYPE I)", "INLET EXTENSION"
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. SEE SHEET NO. _____ FOR INLET SUMMARY OF CONCRETE AND REINFORCING STEEL.

DALLAS DISTRICT STANDARD

TxDOT

CURB INLET TYPE I DETAILS

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		101
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DAL	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

SHEET 1 OF 2 2/92

CONCRETE TO BE DEDUCTED FOR PIPES

Pipe Size	Conc. C.Y.
18"	0.04
18"	0.05
21"	0.07
24"	0.09
27"	0.11
30"	0.14
33"	0.17
36"	0.19
42"	0.26
48"	0.34
54"	0.43

REINFORCING STEEL AND CONCRETE IN TYPE I - 5FT. INLETS

INLET SIZE		STEEL																								TOTALS	
		BARS A				BARS A'				BARS B				BARS C				BARS F				BARS G				BARS H				Reinf. Steel Lbs.	Conc. Cl. A C.Y.*
H	W	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	Length	Weight		
3.0	2.5	12	4	3'-10"	31	4	4	2'-6"	7	18	4	3'-2"	38	13	4	5'-8"	49	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	194	1.64
3.5	2.5	12	4	4'-4"	35	4	4	3'-0"	8	18	4	3'-2"	38	13	4	5'-8"	49	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	199	1.80
4.0	2.5	12	4	4'-10"	39	4	4	3'-6"	9	20	4	3'-2"	42	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	216	1.96
4.5	2.5	12	4	5'-4"	43	4	4	4'-0"	11	20	4	3'-2"	42	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	222	2.11
5.0	2.5	12	4	5'-10"	47	4	4	4'-6"	12	22	4	3'-2"	47	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	239	2.27
5.5	2.5	12	4	6'-4"	51	4	4	5'-0"	13	22	4	3'-2"	47	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	244	2.42
6.0	2.5	12	4	6'-10"	55	4	4	5'-6"	15	24	4	3'-2"	51	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	262	2.59
6.5	2.5	12	4	7'-4"	59	4	4	6'-0"	16	24	4	3'-2"	51	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	267	2.74
8.0	2.5	12	4	8'-10"	71	4	4	7'-6"	20	28	4	3'-2"	59	23	4	5'-8"	87	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	306	3.22
8.5	2.5	12	4	9'-4"	75	4	4	8'-0"	21	28	4	3'-2"	59	23	4	5'-8"	87	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	311	3.37
10.0	2.5	12	4	10'-10"	87	4	4	9'-6"	25	32	4	3'-2"	68	27	4	5'-8"	102	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	351	3.84
10.5	2.5	12	4	11'-4"	91	4	4	10'-0"	27	32	4	3'-2"	68	27	4	5'-8"	102	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	357	4.00
4.0	3.0	12	4	4'-10"	39	4	4	3'-6"	9	20	4	3'-8"	49	15	4	5'-8"	57	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	223	2.16
4.5	3.5	14	4	5'-4"	50	4	4	4'-0"	11	20	4	4'-2"	56	17	4	5'-8"	64	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	250	2.54
5.5	3.5	14	4	6'-4"	59	4	4	5'-0"	13	22	4	4'-2"	61	19	4	5'-8"	72	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	274	2.89
7.5	4.0	16	4	8'-4"	89	4	4	7'-0"	19	26	4	4'-8"	81	25	4	5'-8"	95	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	353	3.87
10.0	5.0	18	4	10'-10"	130	4	4	9'-6"	25	32	4	5'-8"	121	35	4	5'-8"	125	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	470	5.42
7.5	5.0	18	4	8'-4"	100	4	4	7'-0"	19	26	4	5'-8"	98	29	4	5'-8"	110	2	7	5'-8"	23	2	6	9'-8"	29	18	3	2'-7"	17	406	4.09

NOTE : On inlets with extensions, Bars F & G shall run continuous thru inlet and extensions.
Where two or more extensions are together, Bars D shall run continuous thru the extensions.
** Does not include quantity for invert shaping.*

REINFORCING STEEL AND CONCRETE IN EXTENSIONS

5'-0" EXTN. No.	STEEL																TOTALS	
	BARS D				BARS E				BARS F				BARS G				BARS H				REINF STEEL LBS.	CL. A CONC. C.Y.
	No.	Size	Length	Weight	No.	Size	Length	Weight	No.	Size	*Length	Weight	No.	Size	*Length	Weight	No.	Size	Length	Weight		
1	8	4	5'-8"	30	6	4	5'-4"	21	2	7	5'-6"	23	2	6	5'-6"	17	16	3	2'-7"	6	107	0.53
2	8	4	11'-2"	60	12	4	5'-4"	43	2	7	11'-0"	45	2	6	11'-0"	33	33	3	2'-7"	32	213	1.06
3	Reinf. Steel is as shown for 1 Extension and as shown for 2 Extensions																				320	1.59

** Length to be added to the length as shown in the above table for Ty. I - 5'-0" inlets.*

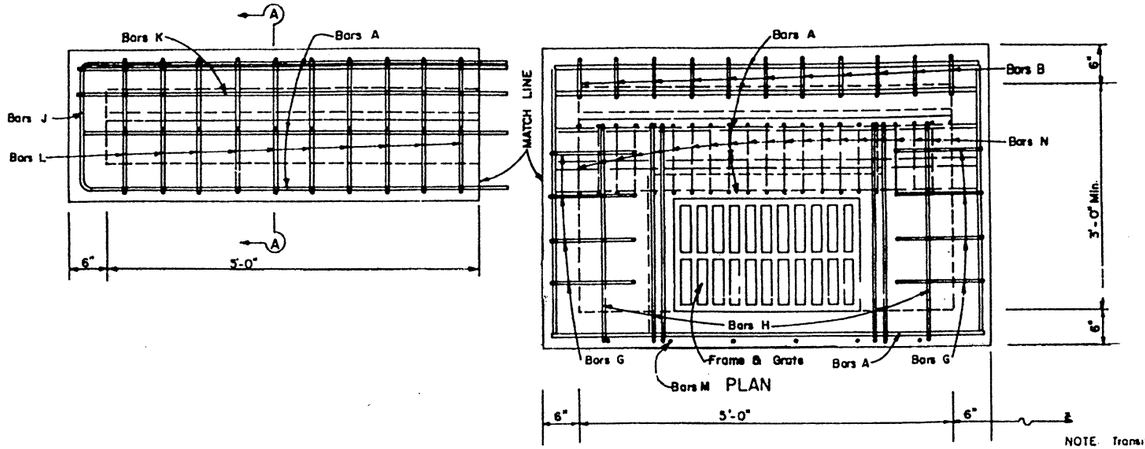
GENERAL NOTES:

Reinforcing Steel and Concrete tables shown above are for information only. These tables are to be used with Inlet Type I, with 3" & 5" normal curb height and 8" concrete pavement.

CONC. AND REINF. STEEL TABLES FOR INLET TYPE I

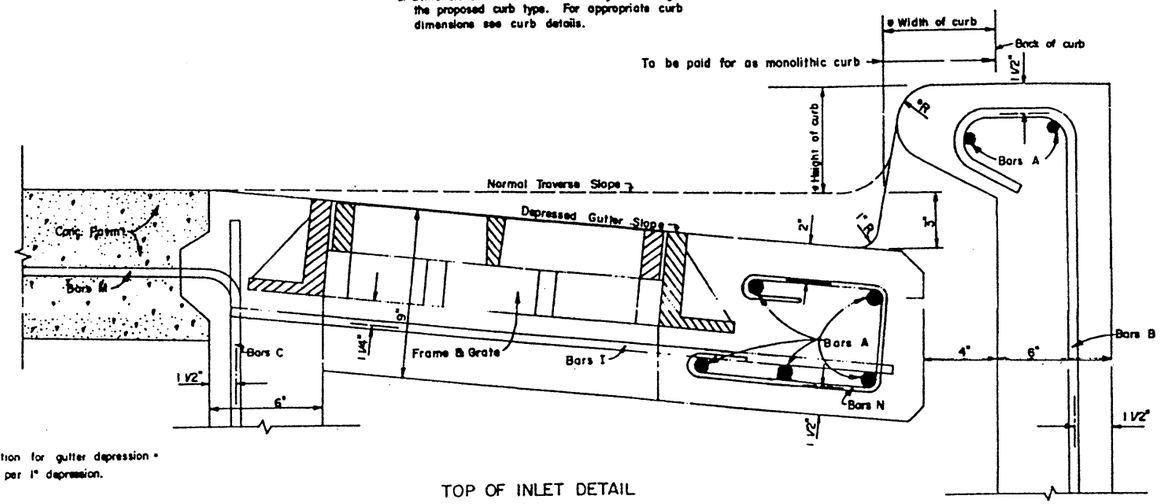
DISTRICT 18 STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		162
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

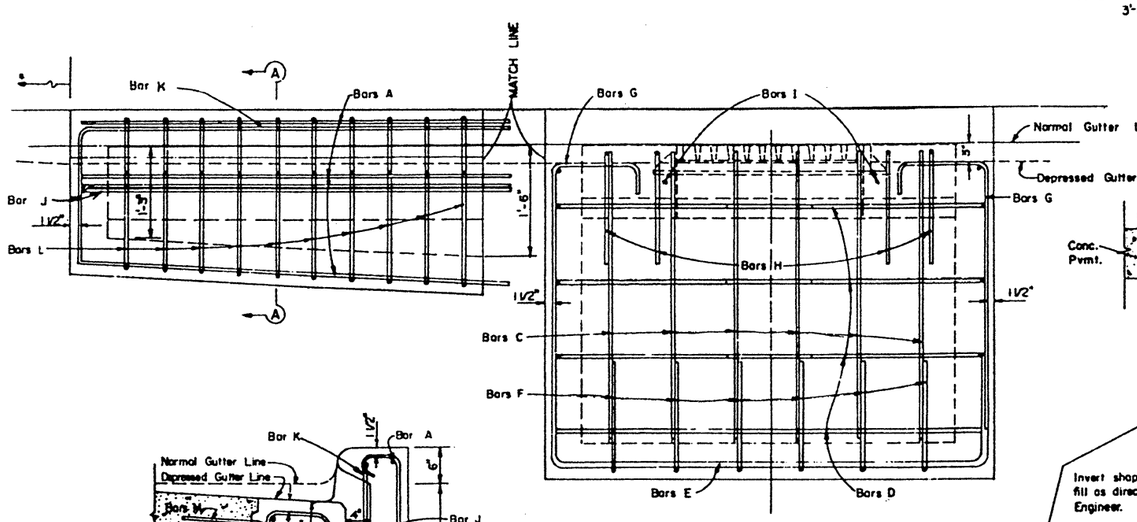


NOTE. Transition for gutter depression = 3'-0" per 1" depression.

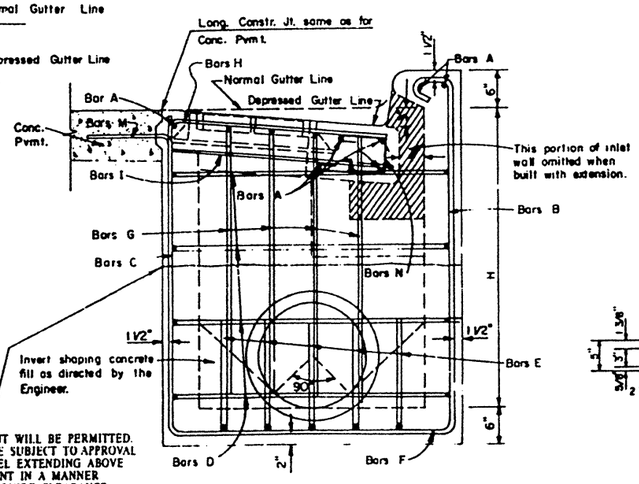
* Dimensions for curb sections vary according to the proposed curb type. For appropriate curb dimensions see curb details.



TOP OF INLET DETAIL
Scale: 3" = 1'-0"



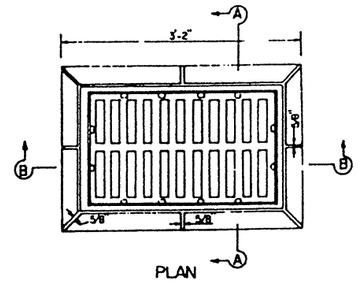
ELEVATION



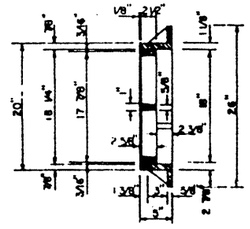
Invert shaping concrete fill as directed by the Engineer.

ONE HORIZONTAL CONSTRUCTION JOINT WILL BE PERMITTED. THE LOCATION OF THIS JOINT WILL BE SUBJECT TO APPROVAL BY THE ENGINEER. REINFORCING STEEL EXTENDING ABOVE THE CONSTRUCTION JOINT MAY BE BENT IN A MANNER ACCEPTABLE TO THE ENGINEER TO PROVIDE CLEARANCE FOR PAVING OPERATIONS. IN LIEU OF BENDING THE STEEL, THE CONTRACTOR MAY PROVIDE A MINIMUM 1'-0" LAP SPLICE TO THE LOWER STEEL.

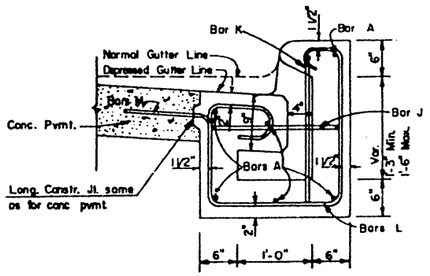
SIDE VIEW



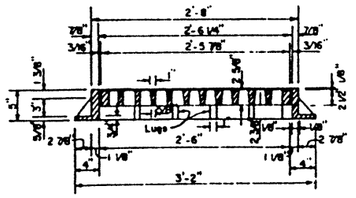
PLAN



SECTION A-A



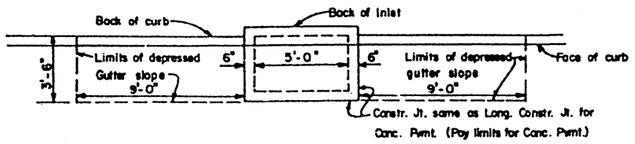
SECTION A-A



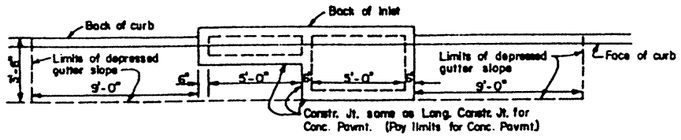
SECTION B-B

NOTE:
Frame and grate to be of gray cast iron conforming to A.S.T.M. Spec. A-48 for Class No. 30 Cast Iron.

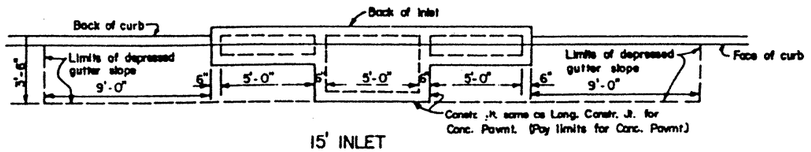
FRAME & GRATE TYPE A



5' INLET



10' INLET



15' INLET

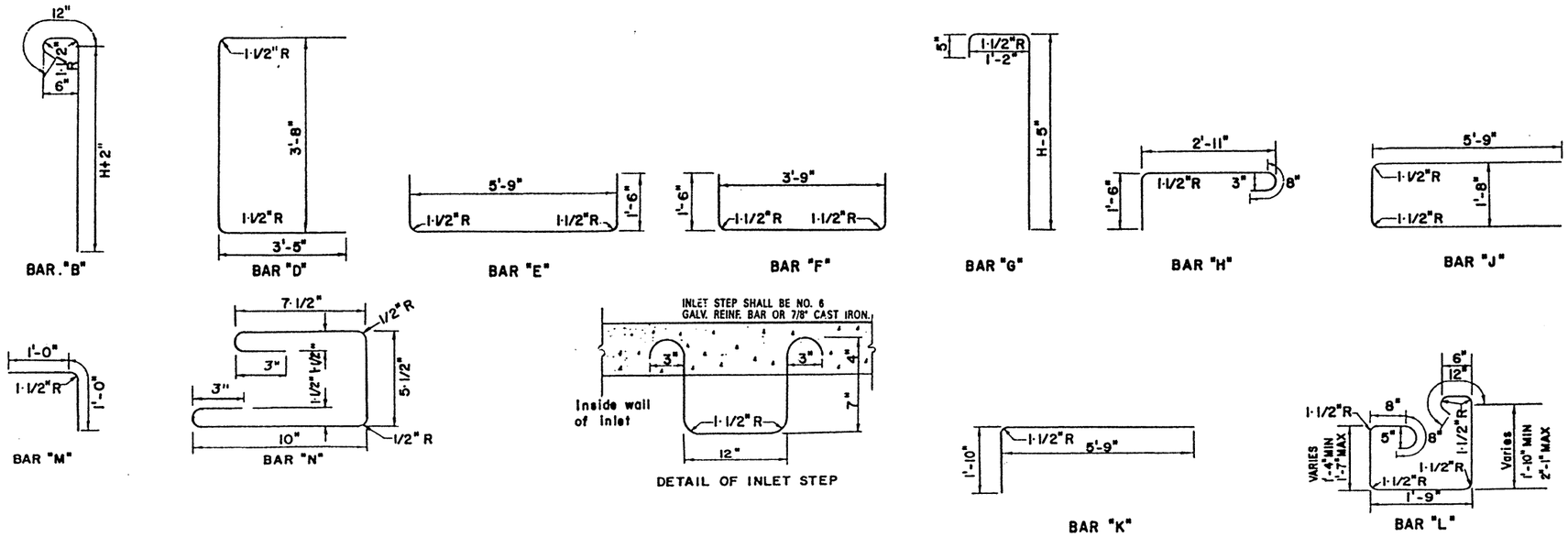
PLAN OF INLET AND EXTENSIONS

TxDOT
DALLAS DISTRICT STANDARD

CURB & GRATE INLET TYPE IV DETAILS

SHEET 1 OF 2
5/93

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(913)MM		162A
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM740



REINFORCING STEEL AND CONCRETE FOR 5' INLET

INLET SIZE		STEEL																																		TOTALS	
Height Ft.	Width Ft.	BAR "A"						BAR "B"						BAR "C"				BAR "D"				BAR "E"				BAR "F"				BAR "G"				BAR "H"				BAR "I"				BAR "M"				BAR "N"				Steel Lbs.	Conc. C.Y.
		No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.	No.	Size	Ty.	Spacing	Length	Wt.		
2.5	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	3'-8"	27	6	4	St.	10"c.c.	2'-4"	9	4	4	Bt.	12"c.c.	10'-6"	28	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	3'-8"	20	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	271	1.63
3.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	4'-2"	31	6	4	St.	10"c.c.	2'-10"	11	6	4	Bt.	12"c.c.	10'-6"	42	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	4'-2"	22	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	298	1.80
3.5	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	4'-8"	34	6	4	St.	10"c.c.	3'-4"	13	6	4	Bt.	12"c.c.	10'-6"	42	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	4'-8"	25	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	301	1.96
4.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	5'-2"	38	6	4	St.	10"c.c.	3'-10"	15	8	4	Bt.	12"c.c.	10'-6"	56	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	5'-2"	28	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	324	2.13
4.5	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	5'-8"	42	6	4	St.	10"c.c.	4'-4"	17	8	4	Bt.	12"c.c.	10'-6"	56	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	5'-8"	30	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	332	2.50
5.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	6'-2"	45	6	4	St.	10"c.c.	4'-10"	19	10	4	Bt.	12"c.c.	10'-6"	70	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	6'-2"	33	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	354	2.47
5.5	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	6'-8"	49	6	4	St.	10"c.c.	5'-4"	21	10	4	Bt.	12"c.c.	10'-6"	70	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	6'-8"	36	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	363	2.63
6.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	7'-2"	53	6	4	St.	10"c.c.	5'-10"	23	12	4	Bt.	12"c.c.	10'-6"	84	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	7'-2"	38	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	385	2.80
7.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	8'-2"	60	6	4	St.	10"c.c.	6'-10"	27	14	4	Bt.	12"c.c.	10'-6"	98	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	8'-2"	44	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	416	3.13
8.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	9'-2"	67	6	4	St.	10"c.c.	7'-10"	31	16	4	Bt.	12"c.c.	10'-6"	112	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	9'-2"	49	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	446	3.47
9.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	10'-2"	75	6	4	St.	10"c.c.	8'-10"	35	18	4	Bt.	12"c.c.	10'-6"	126	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.c.	10'-2"	54	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	477	3.80
10.0	3.0	8	6	St.	As Shown	5'-9"	69	11	4	Bt.	6"c.c.	11'-2"	82	6	4	St.	10"c.c.	9'-10"	39	20	4	Bt.	12"c.c.	10'-6"	140	5	4	Bt.	7"c.c.	8'-9"	29	6	4	Bt.	10"c.c.	6'-9"	27	8	4	Bt.	7"c.e.	11'-2"	60	4	4	Bt.	As Shown	5'-0"	13	2	4	St.	As Shown	2'-11"	4	7	4	Bt.	24"c.c.	2'-0"	9	21	4	Bt.	3"c.c.	2'-7"	36	508	4.14

REINFORCING STEEL AND CONCRETE FOR ONE 5' EXT.

Bar	No.	Size	Ty.	Spacing	Length	Weight
A	6	6	St.	As Shown	5'-9"	23
J	1	4	Bt.	As Shown	13'-2"	9
K	1	4	Bt.	As Shown	7'-7"	5
L	10	4	Bt.	6"c.c.	7'-3" to 7'-9"	50
M	4	4	Bt.	24"c.c.	2'-0"	5
Total Reinforcing Steel (Lbs)						92
Total Concrete (C.Y.)						0.62

CONCRETE TO BE DEDUCTED FOR PIPES (ONE PIPE)

Pipe ϕ "	Conc. C.Y.
15"	0.04
18"	0.05
21"	0.07
24"	0.09
27"	0.11
30"	0.14
36"	0.20

GENERAL NOTES:

1. All concrete shall be Class "A".
2. All exposed corners shall be chamfered ¾".
3. Inlet steps spaced 14" c.c. and located as directed by the Engineer, Shall be provided and installed in all inlets where the depth exceeds 5'-0".
4. Dimensions relating to reinforcing steel are to the center of the bars.
5. Total quantities shown for concrete and reinforcing steel are approximate and are placed heron for informational purposes only.
6. Bar details shall be adjusted as necessary to accomodate a horizontal construction joint if used. Reinforcing steel quantities shown do not include lap steel required for construction joints.
7. Payment of Curb & Grate Inlets and Extensions thereto as shown on the plans will be made at the unit price bid for "Inlet (Complete) (TypeIV)", Inlet Extension (Type IV)".

CURB & GRATE INLET TYPE IV DETAILS

TxDOT
DALLAS DISTRICT STANDARD

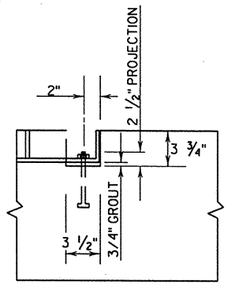
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6	STP99(413)MM 1621B	
STATE	STATE DIST. NO.	COUNT.
TEXAS	18	ROCKWALL
CONT.	SECT.	JOB / HIGHWAY NO.
1014	03	033 / FM740

Sheet 2 of 2

2/92

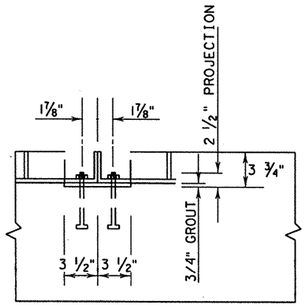
6185

TYCINL34.DGN

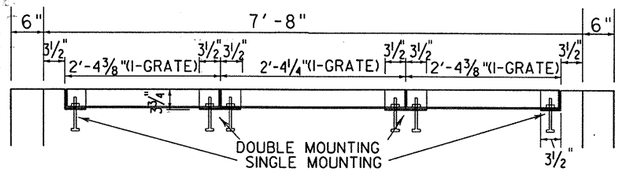


SINGLE MOUNTING

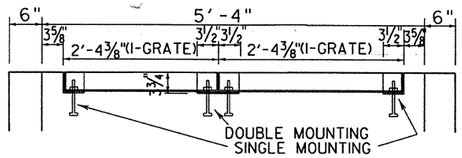
INTERIOR ANGLES W/4 - ½" DIAMETER X 6" BOLTS, HEX NUTS AND WASHERS



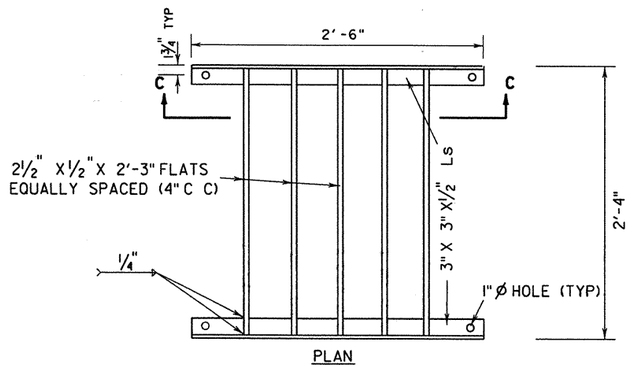
DOUBLE MOUNTING



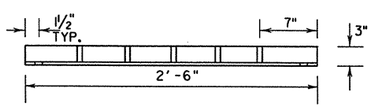
THREE GRATES



TWO GRATES

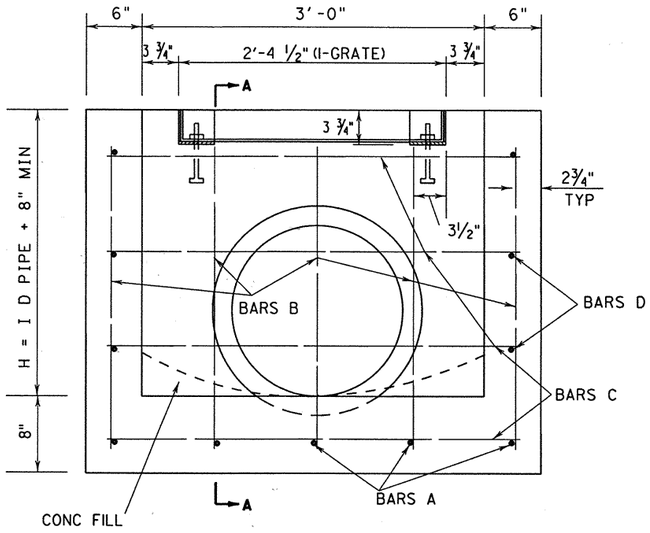


PLAN

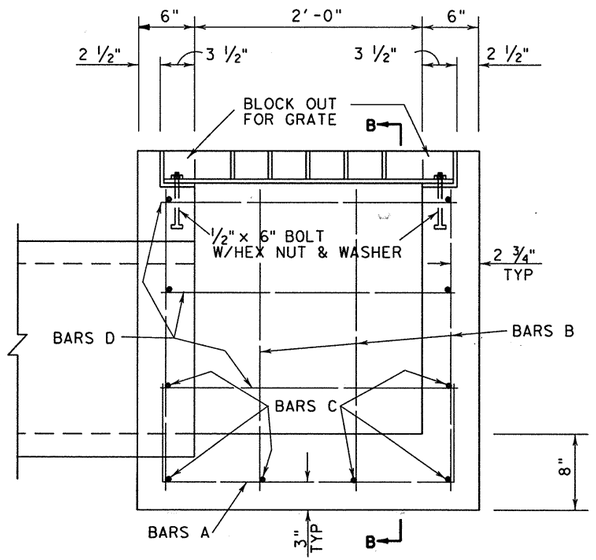


GRATE DETAILS TYPE "C"

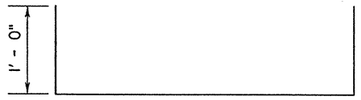
SECTION C-C

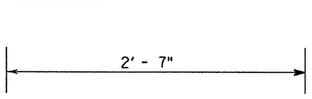


SECTION B-B



SECTION A-A





BAR A

GENERAL NOTES

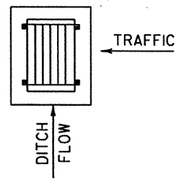
EXPOSED EDGES SHALL BE CHAMFERED ¾".

ALL CONCRETE SHALL BE CLASS "A".

ALL DIMENSIONS TO REINFORCING STEEL ARE TO CENTERS OF BARS.

IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, BLOCKOUTS, PIPES ANCHOR BOLTS OR OTHER REINFORCING STEEL, THE REINFORCEMENT SHALL BE BENT OR ADJUSTED TO CLEAR AS DIRECTED BY THE ENGINEER.

IF POSSIBLE HORIZONTAL GRATE INLET SHOULD BE ORIENTED SUCH THAT BOTH TRAFFIC AND DITCH WATER APPROACH THE INLET IN THE MANNER SHOWN AT RIGHT. IF THIS IS NOT POSSIBLE, ORIENTATION SHOULD FAVOR TRAFFIC FLOW WHERE PIPE SIZES PERMIT.



STRUCTURAL STEEL FOR GRATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION A-36 OR AISI DESIGNATION M 1010 - M 1020. PAYMENT FOR GRATES SHALL BE MADE UNDER THE BID ITEM "GRATE (TY C)".

QUANTITIES FOR CONCRETE AND STEEL ARE FOR CONTRACTOR'S INFORMATION ONLY.

PAYMENT FOR INLETS SHALL BE MADE UNDER TTHE BID ITEM "INLETS (COMP) (TY C 1 GRATE), (TY C 2 GRATE) OR (TY C 3 GRATE)".

CONCRETE TO BE DEDUCTED FOR PIPES

PIPE SIZE	CONC. C.Y.
15"	0.04
18"	0.05
21"	0.07
24"	0.09
27"	0.11
30"	0.14
33"	0.17
36"	0.20
39"	0.23
42"	0.26
48"	0.34

BILL OF REINFORCING STEEL FOR TYPE "C" INLETS

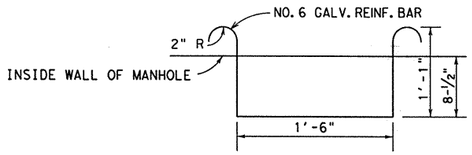
	"H"	BARS A 12" C.C.				BARS B 12" C.C.				BARS C 12" C.C.				BARS D 12" C.C.				REINF. STEEL	CL. "A" CONC.*	GRATE
		NO.	LENGTH	SIZE	WT.	NO.	LENGTH	SIZE	WT.	NO.	LENGTH	SIZE	WT.	NO.	LENGTH	SIZE	WT.	LB.	C.Y.	
1-GRATE	2'- 2"	5	4'- 7"	4	15	14	2'- 4"	4	22	8	3'- 8"	4	20	4	2'- 8"	4	7	64	0.78	
	2'- 6"	5	4'- 7"	4	15	14	2'- 8"	4	25	10	3'- 8"	4	24	6	2'- 8"	4	11	75	0.85	
	3'- 0"	5	4'- 7"	4	15	14	3'- 2"	4	30	10	3'- 8"	4	24	6	2'- 8"	4	11	80	0.96	95#
	3'- 6"	5	4'- 7"	4	15	14	3'- 8"	4	34	12	3'- 8"	4	29	8	2'- 8"	4	14	92	1.07	
	4'- 0"	5	4'- 7"	4	15	14	4'- 2"	4	39	12	3'- 8"	4	29	8	2'- 8"	4	14	97	1.18	
	4'- 6"	5	4'- 7"	4	15	14	4'- 8"	4	44	14	3'- 8"	4	34	10	2'- 8"	4	18	111	1.29	
	6'- 6"	5	4'- 7"	4	15	14	6'- 8"	4	62	18	3'- 8"	4	44	14	2'- 8"	4	25	146	1.73	
2-GRATE	5'- 0"	5	4'- 7"	4	15	14	5'- 2"	4	48	14	3'- 8"	4	34	10	2'- 8"	4	18	115	1.40	
	3'- 0"	7	4'- 7"	4	21	18	3'- 2"	4	38	10	6'- 0"	4	40	6	2'- 8"	4	11	110	1.38	
	3'- 6"	7	4'- 7"	4	21	18	3'- 8"	4	44	12	6'- 0"	4	48	8	2'- 8"	4	14	127	1.53	
	4'- 0"	7	4'- 7"	4	21	18	4'- 2"	4	50	12	6'- 0"	4	48	8	2'- 8"	4	14	133	1.68	190#
	4'- 6"	7	4'- 7"	4	21	18	4'- 8"	4	56	14	6'- 0"	4	56	10	2'- 8"	4	18	151	1.83	
	5'- 0"	7	4'- 7"	4	21	18	5'- 2"	4	62	14	6'- 0"	4	56	10	2'- 8"	4	18	157	1.98	
	5'- 6"	7	4'- 7"	4	21	18	4'- 2"	4	68	16	6'- 0"	4	64	12	2'- 8"	4	21	174	2.13	
3-GRATE	3'- 6"	10	4'- 7"	4	31	24	3'- 8"	4	59	12	8'- 4"	4	67	8	2'- 8"	4	14	171	1.23	
	4'- 0"	10	4'- 7"	4	31	24	5'- 8"	4	67	12	8'- 4"	4	67	8	2'- 8"	4	14	179	2.22	
	4'- 6"	10	4'- 7"	4	31	24	4'- 8"	4	75	14	8'- 4"	4	78	10	2'- 8"	4	18	202	2.41	
	5'- 0"	10	4'- 7"	4	31	24	5'- 2"	4	83	14	8'- 4"	4	78	10	2'- 8"	4	18	210	2.60	
	5'- 6"	10	4'- 7"	4	31	24	5'- 8"	4	91	16	8'- 4"	4	89	12	2'- 8"	4	21	232	2.79	285#
	6'- 0"	10	4'- 7"	4	31	24	6'- 2"	4	99	16	8'- 4"	4	89	12	2'- 8"	4	21	240	2.98	
	6'- 6"	10	4'- 7"	4	31	24	6'- 8"	4	107	18	8'- 4"	4	100	14	2'- 8"	4	25	263	3.17	
4-GRATE	4'- 4"	12	4'- 7"	4	37	28	4'- 6"	4	84	14	12'- 8"	4	119	10	2'- 8"	4	18	258	2.89	
	4'- 6"	12	4'- 7"	4	37	28	4'- 8"	4	87	14	12'- 8"	4	119	10	2'- 8"	4	18	261	2.47	380#
5-GRATE	3.20'	14	4'- 7"	4	43	32	3.37'	4	72	10	13'- 0"	4	87	6	2'- 8"	4	11	213	2.79	
	4'- 6"	14	4'- 7"	4	43	32	4'- 8"	4	100	14	13'- 0"	4	122	10	2'- 8"	4	18	283	3.53	475#
6-GRATE	5'- 0"	17	4'- 7"	4	52	38	5'- 2"	4	131	14	15'- 5"	4	144	10	2'- 8"	4	18	345	6.36	
																				570#

* DOES NOT INCLUDE QUANTITY FOR SHAPING OR DEDUCTION FOR PIPES.

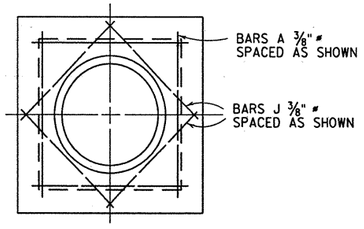
INLET DETAILS TYPE "C"

DISTRICT 18 STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99(413)MM		163
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

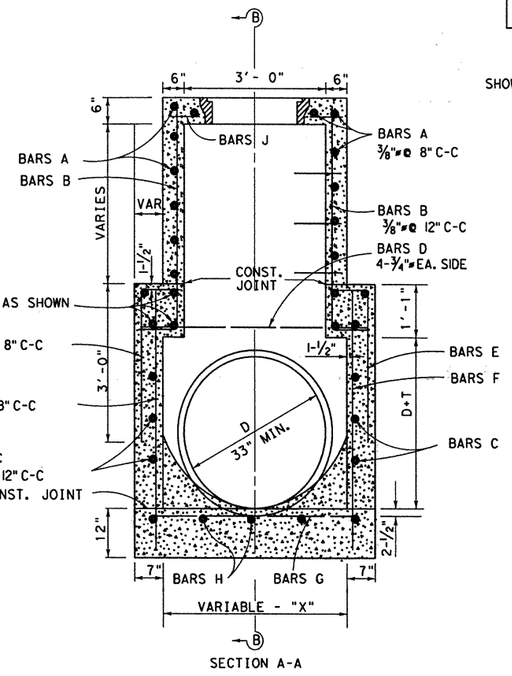


DETAIL OF MANHOLE STEP

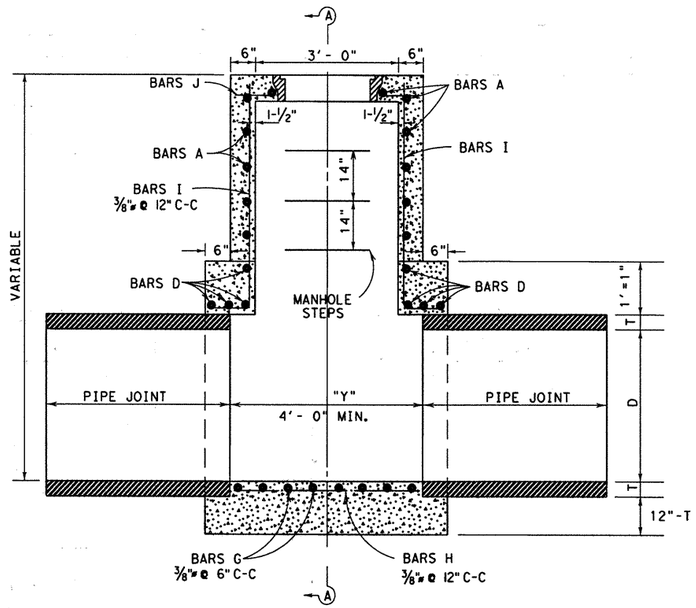


PLAN *
SHOWING REINFORCING STEEL IN MANHOLE TOP

TYPE I & II MANHOLES:
PROVIDE ¼" PREMOLDED EXPANSION JOINT, SEALED WITH RUBBER COMPOUND AROUND MANHOLE TOP WHEN IN PAVEMENT.

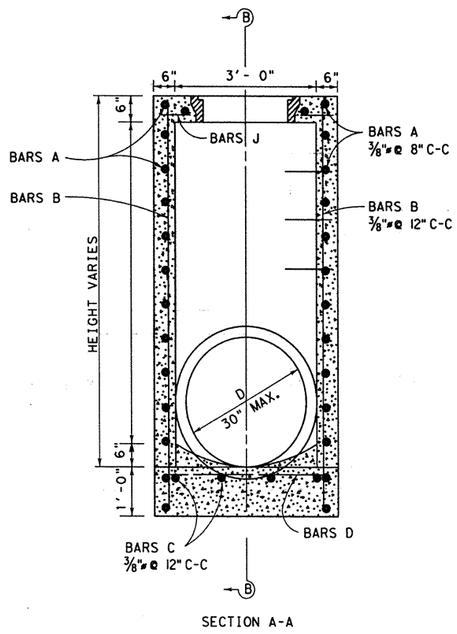


SECTION A-A

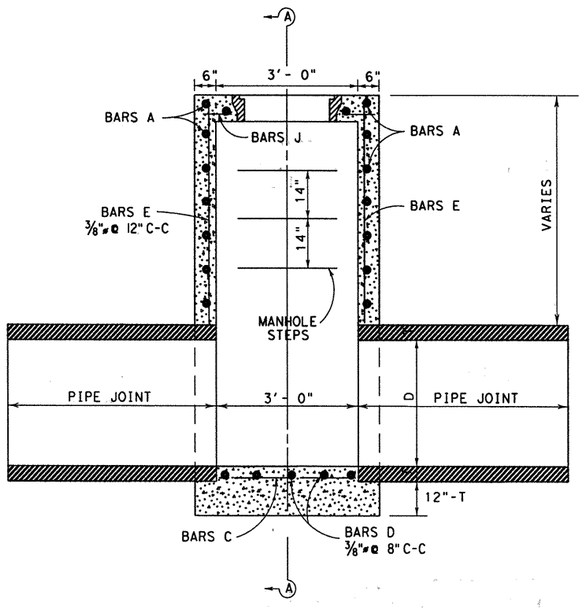


SECTION B-B

TYPE I MANHOLE



SECTION A-A

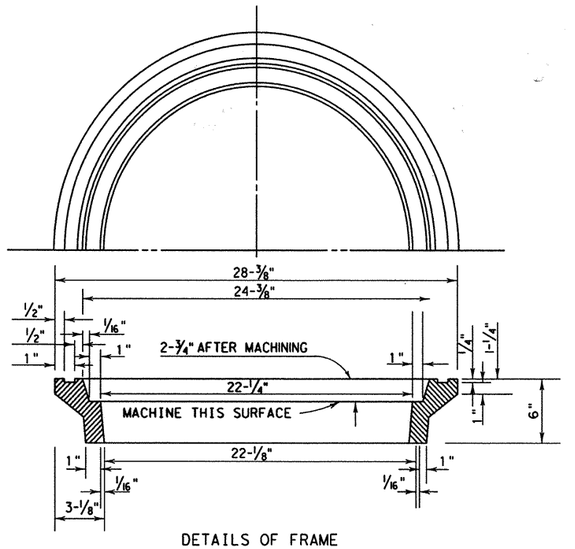


SECTION B-B

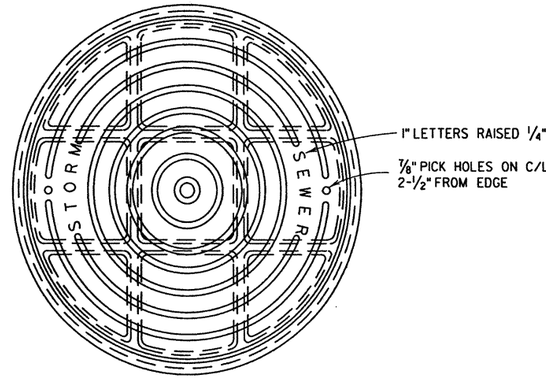
*TYPE II MANHOLE TOP SAME AS PLAN FOR TYPE I MANHOLE TOP

TYPE II MANHOLE

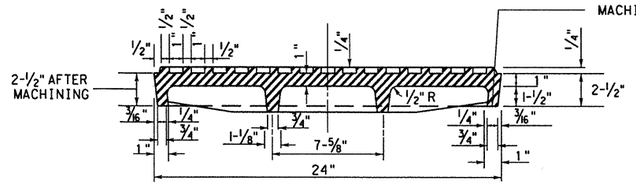
NOTE: FRAME AND COVER TO BE OF GRAY CAST IRON CONFORMING TO A.S.T.M. SPEC. A-48 FOR CLASS 30 CAST IRON.



DETAILS OF FRAME



TOP PLAN OF COVER



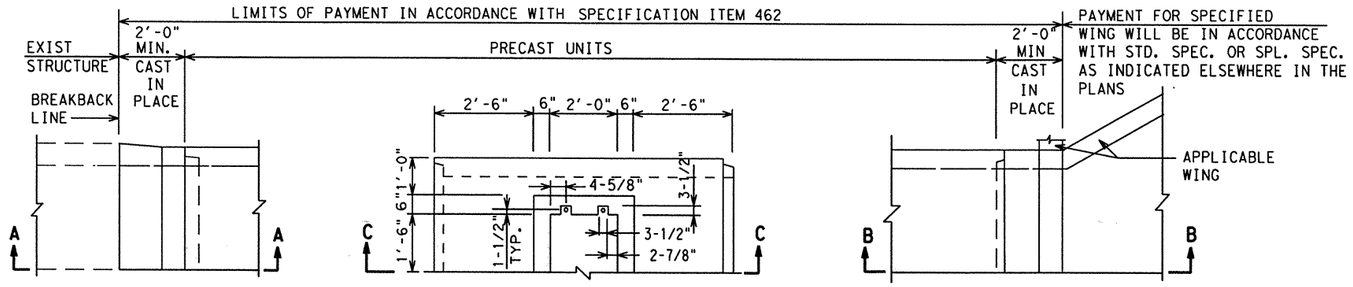
SECTION OF COVER

TYPE I & II
MANHOLE DETAILS
MANHOLE FRAME & COVER TY A

TxDOT
DALLAS DISTRICT STANDARD

2/92

FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
6	TEXAS	STP 99(413)MM				164
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.		SHEET NO.
DAL	ROCKWALL	1014	03	033		740



DROP INLET DETAIL

NORMAL

PLAN VIEW

GENERAL NOTES:

REINFORCING STEEL AND STRUCTURE DIMENSIONS FOR CAST IN PLACE SECTIONS SHALL CONFORM TO THE SINGLE BOX CULVERT STANDARD SPECIFIED ON THE CULVERT CROSS SECTION SHEET.

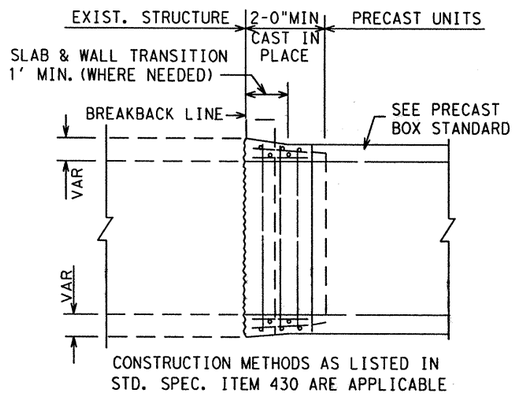
DETAILS OF CAST IN PLACE SECTIONS INDICATED HEREON MAY BE ALTERED AT THE REQUEST OF THE CONTRACTOR WITH THE WRITTEN APPROVAL OF THE ENGINEER.

MINOR ALIGNMENT TRANSITIONS WILL NOT REQUIRE SPECIAL TREATMENT AS DETAILED HEREON. SITUATIONS WHERE THESE EXCLUSIONS ARE APPLICABLE ARE NOTED ON THE CULVERT SECTION SHEET OR SHEETS.

ALL CONCRETE SHALL BE CLASS A EXCEPT CLASS S SHALL BE USED WHERE A DIRECT CULVERT IS SPECIFIED.

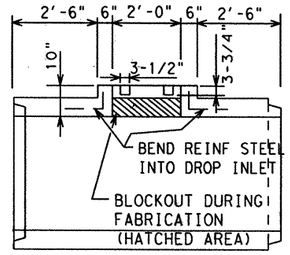
CHAMFER ALL EXPOSED CORNERS 3/4"

PAYMENT FOR GRATES SHALL BE MADE UNDER THE BID ITEM "GRATE (TY C)". REFER TO INLET DETAILS TYPE C AND G FOR GRATE DETAIL.



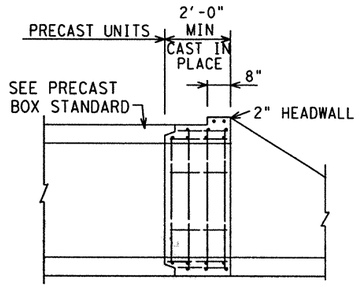
CONNECTION TO EXISTING BOX

SECTION A-A



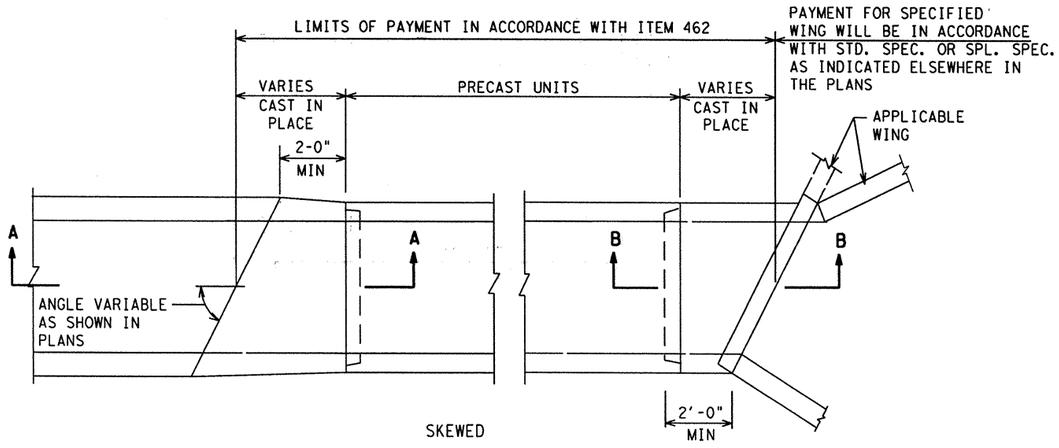
DROP INLET CONNECTION

SECTION C-C



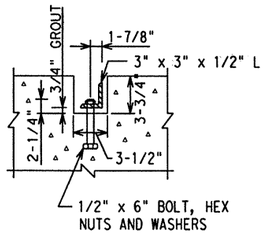
CONNECTION OF WINGS

SECTION B-B



SKEWED

PLAN VIEW



GRATE MOUNTING DETAIL

TxDOT
DISTRICT 18 STANDARD

SPECIAL DETAILS
PRECAST CONCRETE BOX SEWER

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP99(413)MM		165
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM740

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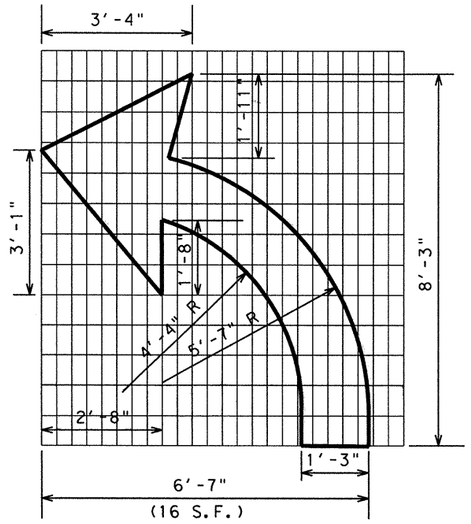
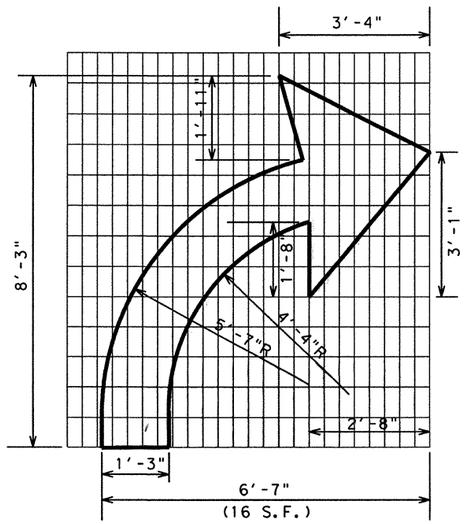
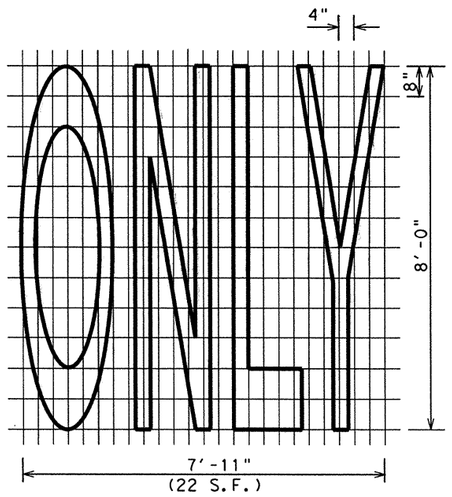
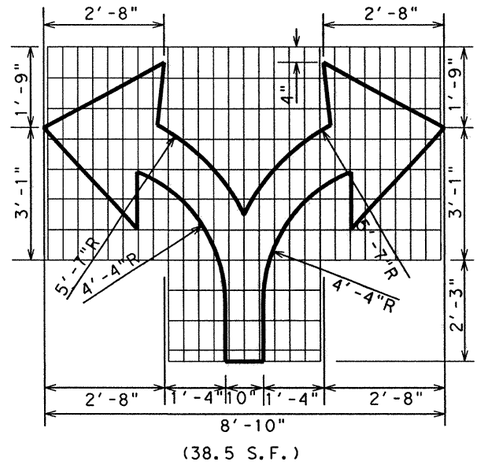






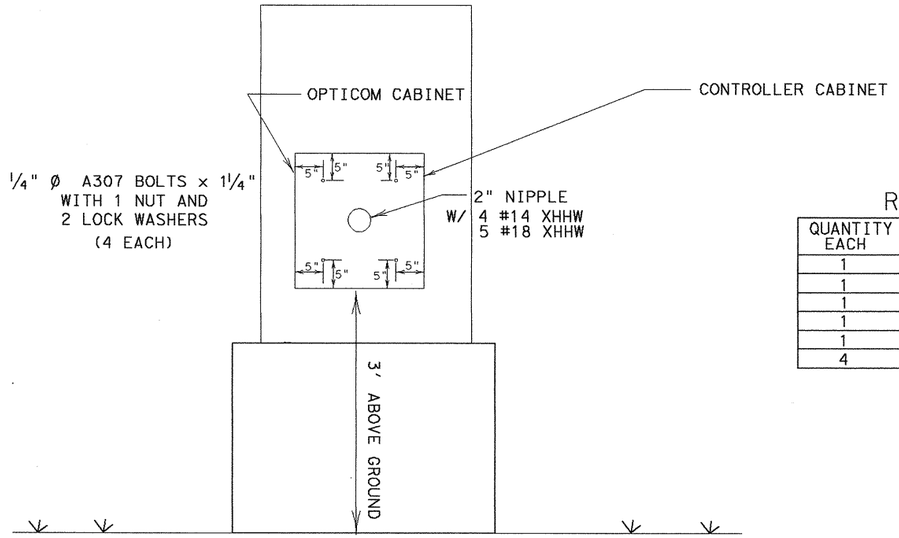


NOTES: PAVEMENT MARKINGS SHALL BE FORMED BY USING MATERIALS SPECIFIED ELSEWHERE IN PLANS AND ARE TO BE USED AT LOCATIONS SHOWN ON THE PLAN SHEETS AND/OR AS DIRECTED BY THE ENGINEER. "WORD" AND "ARROW" COMBINATIONS ARE TO BE AS SHOWN ON PAV. MARKING SHEETS AND SHALL BE CENTERED IN TRAFFIC LANES.

PAVEMENT MARKINGS
(WORDS AND ARROWS)
DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99 (413) MM		166
STATE	STATE DISTRICT	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONTROL	SECTION	JOB	HIGHWAY NO.
1014	03	033	FM 740

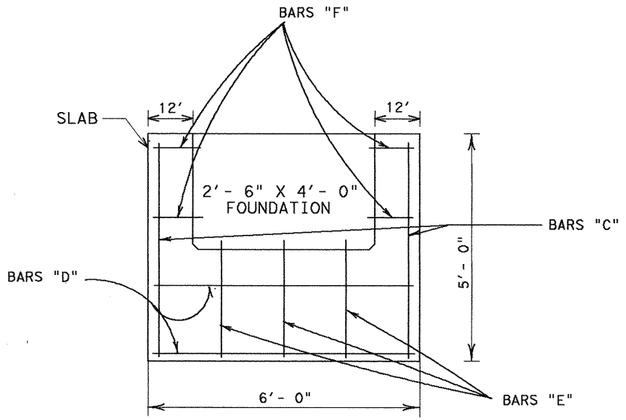
:$$$date$$$$



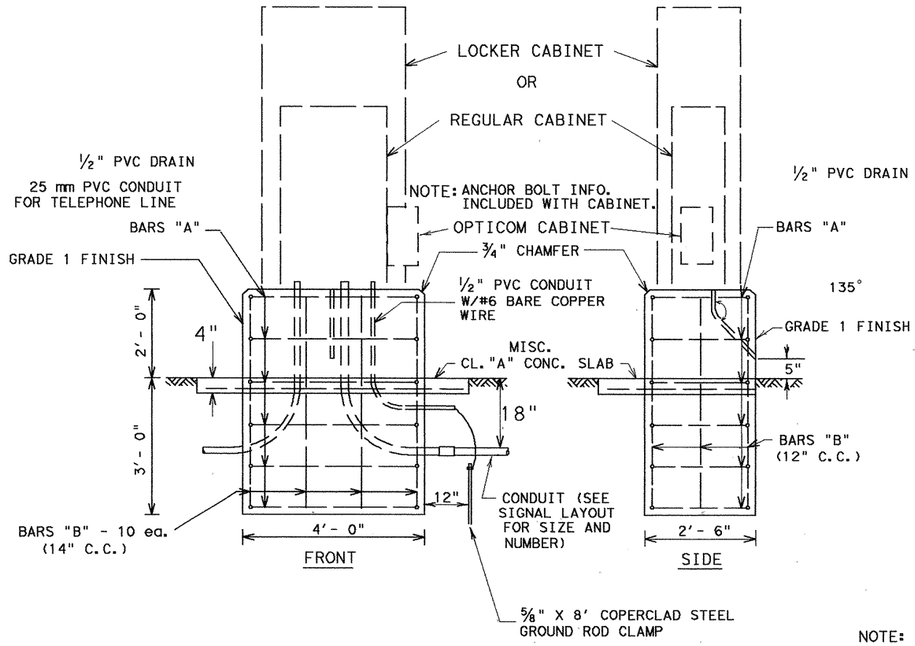
FRONT VIEW OF OPTICOM CABINET

REQUIRED WIRE FOR OPTICOM

QUANTITY EACH	WIRE TYPE	COLOR	DESCRIPTION
1	#14	BLACK	120 VAC FOR OPTICOM
1	#14	BLACK	120 VAC FOR FAN & CABINET LIGHT
1	#14	WHITE	AC NEUTRAL
1	#14	GREEN	CHASSIS GROUND
1	#18	GRAY	LOGIC GROUND
4	#18	BLUE	PREEMPT COMMANDS



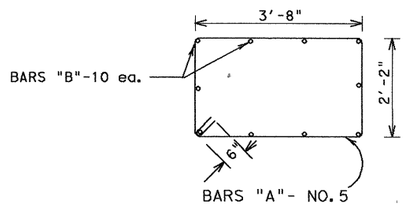
TOP



NOTE: DRAIN SHALL BE FLUSH WITH CONCRETE FOUNDATION

BAR	NO. BARS	SIZE	LENGTH	SPACING
A	6	5	12'-8"	11" C.C.
B	10	5	4'-8"	VAR.
C	2	3	4'-8"	16.5" C.C.
D	2	3	5'-8"	18" C.C.
E	3	3	2'-8"	16.5" C.C.
F	4	3	1'-2"	18" C.C.

PROVIDE 2" MIN. COVER FOR TOP AND SIDES



NOTES:

1. DRAIN SHALL BE FLUSH WITH CONCRETE FOUNDATION
2. CONDUIT FOR TELEPHONE LINE SHALL BE STUBBED OUT 18" BELOW GROUND AND 12" FROM THE FOUNDATION. THE FOUNDATION SHALL BE STAMPED ON THE LEFT SIDE WITH "TEL" TO INDICATE THE LOCATION OF THE CONDUIT.

CONTROLLER FOUNDATION DETAIL

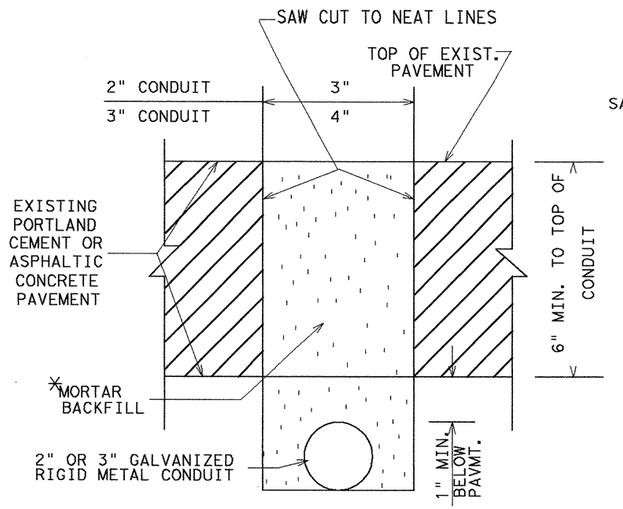
CONTROLLER FOUNDATION DETAILS

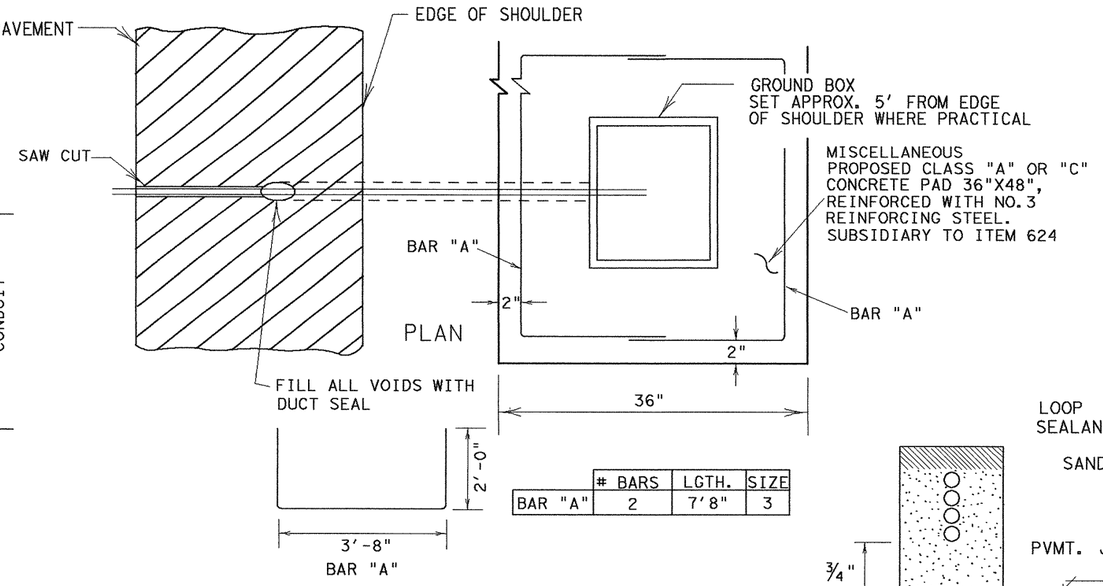
DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 49(413)MM 167			
STATE	STATE DIST.	COUNTY		
TEXAS	DALLAS	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

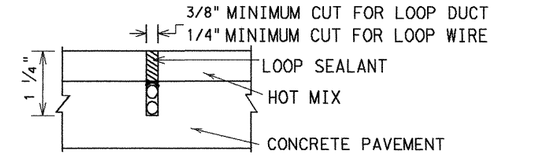
STATE ETC.

238





	# BARS	LGTH.	SIZE
BAR "A"	2	7'8"	3



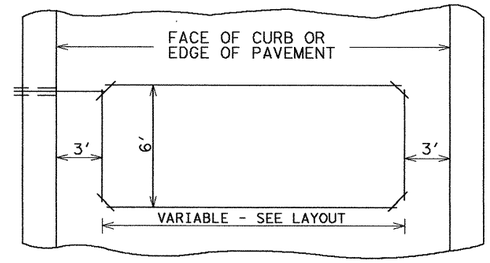
SAW CUT INSTALLATION

NOTES

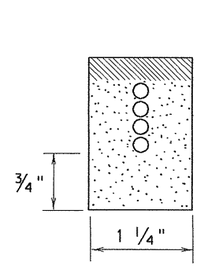
1. SAW CUT WILL INCREASE BY 1/4" PER CABLE IN PLACE TO A MAXIMUM DEPTH (4 CABLES) OF 1¾". LIMIT SAW CUT DEPTH TO 1" MAXIMUM ON BRIDGE DECKS.
2. LOOSE MATERIAL SHALL BE REMOVED AND THE CUT DRIED PRIOR TO PLACEMENT OF SEALING COMPOUND.
3. DETECTORS WILL BE INSTALLED DURING OFF PEAK HOURS.
4. WHERE CONDITIONS WARRANT, SUCH AS PAVEMENT CONSISTING OF FLEXIBLE BASE WITH SEAL COAT OR HOT MIX, THE MINIMUM SAW CUT SHALL BE 3". AS DIRECTED BY THE ENGINEER.
5. WHEN USING LOOP DUCT, THE SAW CUT FROM THE LOOP LOOP TO THE GROUND BOX SHALL BE WIDE ENOUGH TO ALLOW FOR TWISTING THE LOOP A MINIMUM OF 2 TIMES PER FOOT.
6. WHEN USING LOOP WIRE, THE SAW CUT FROM THE LOOP LOOP TO THE GROUND BOX SHALL BE WIDE ENOUGH TO ALLOW FOR TWISTING THE LOOP A MINIMUM OF 5 TIMES PER FOOT.

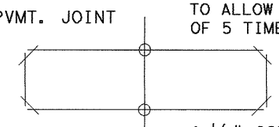
*MORTAR BACKFILL SHALL CONSIST OF 1 PART TYPE III PORTLAND CEMENT, 2 PARTS FINELY GRADED SAND (CLEAN, DURABLE, HARD GRAINS) AND WATER (MINIMUM AMOUNT TO MAKE MIX PLASTIC), OR COMPACTED ACP APPROVED BY THE ENGINEER.

SAW CUT TRENCH DETAILS FOR CONDUIT INSTALLATION

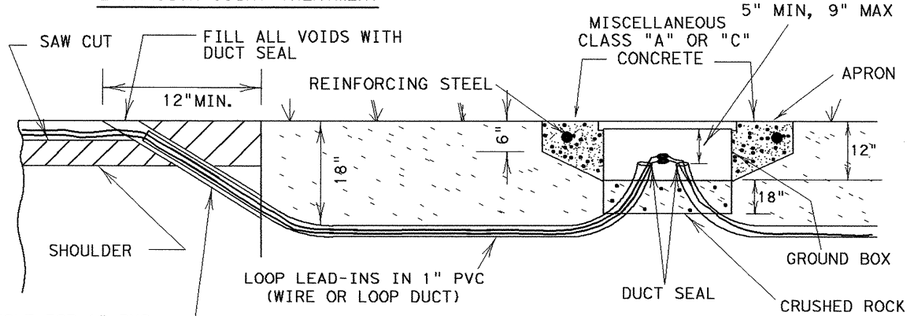


TRANSVERSE LOOP DETECTOR INSTALLATION DETAIL



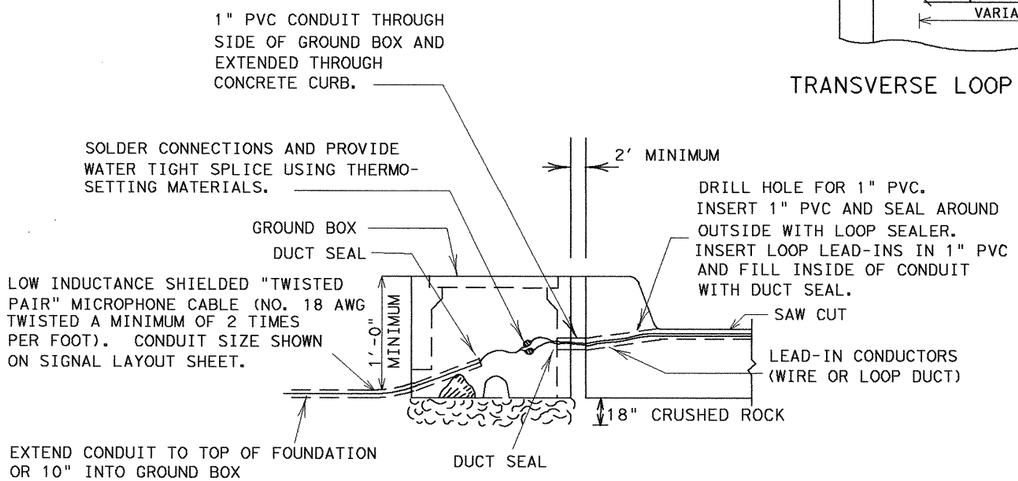


EXPANSION JOINT TREATMENT

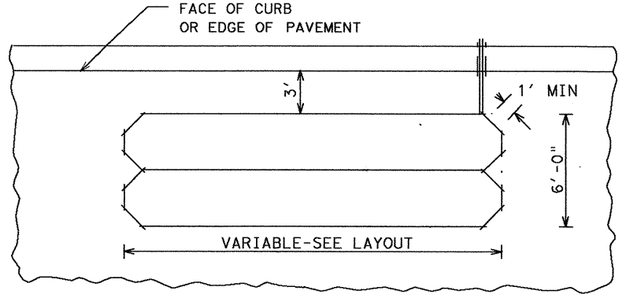


ELEVATION

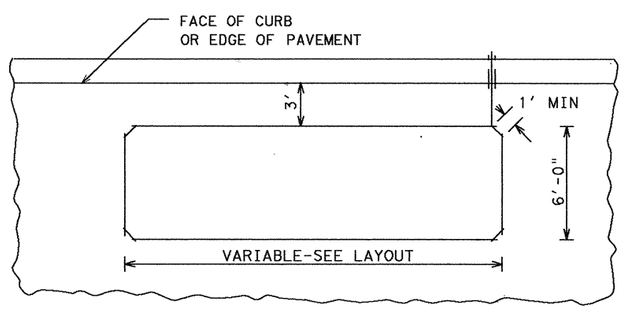
LOOP DETECTOR
PULL BOX INSTALLATION DETAIL FOR NON-CURBED SECTIONS



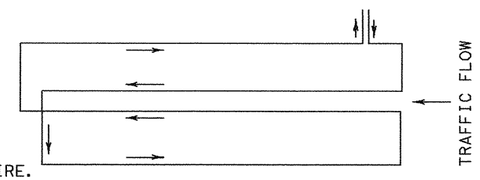
LOOP DETECTOR
PULL BOX INSTALLATION DETAIL FOR CURBED SECTIONS



QUADRAPOLE LOOP DETECTOR INSTALLATION DETAIL



LONGITUDINAL LOOP DETECTOR INSTALLATION DETAIL

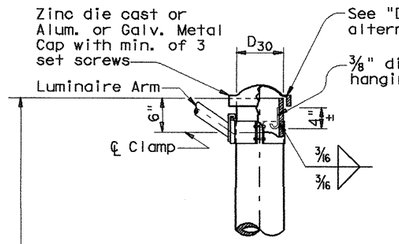


QUADRAPOLE LOOPS 6' X 20' & SMALLER SHALL HAVE 2 TURNS (2-4-2) OF LOOP DUCT OR WIRE. QUADRAPOLE LOOPS WITH NOMINAL LENGTHS OVER 20' WILL HAVE 1TURN (1-2-1) OF LOOP DUCT OR WIRE.

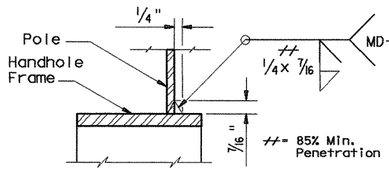
LOOP DETECTOR INSTALLATION DETAILS

DALLAS DISTRICT STANDARD

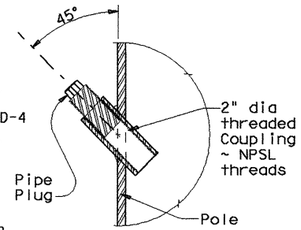
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		168
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



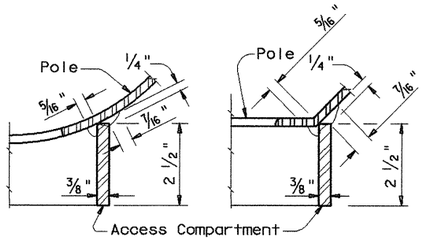
DETAIL A
(for pole with luminaire)



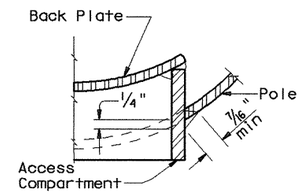
DETAIL E



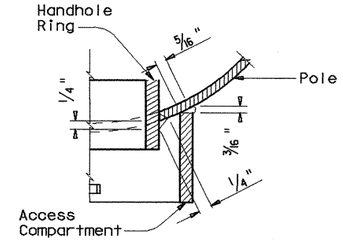
COUPLING DETAIL



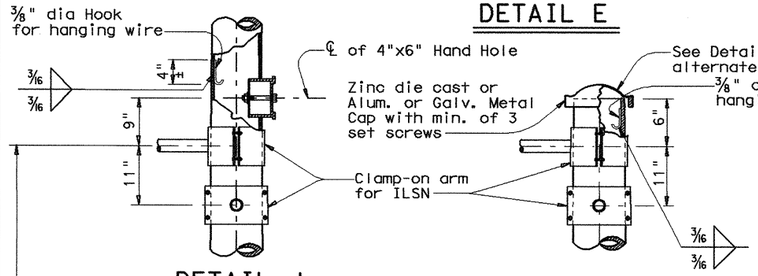
DETAIL H



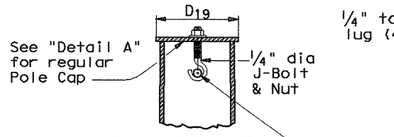
DETAIL G



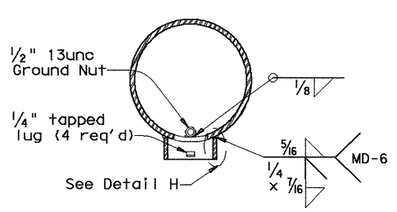
DETAIL F



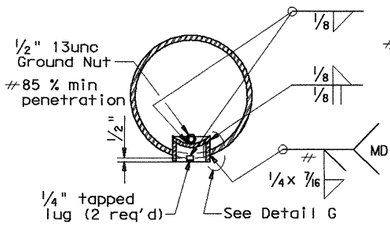
DETAIL J
(If ILSN applied)



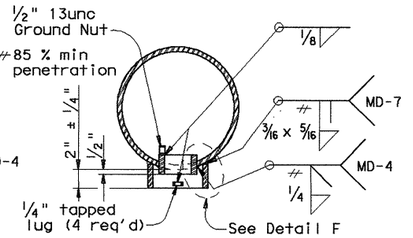
SECTION E-E



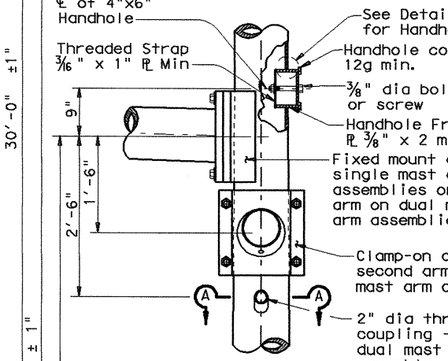
SECTION D-D



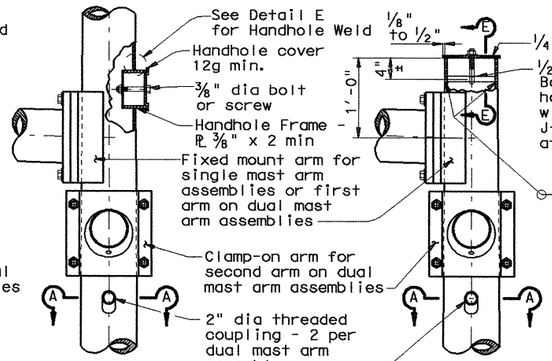
SECTION C-C



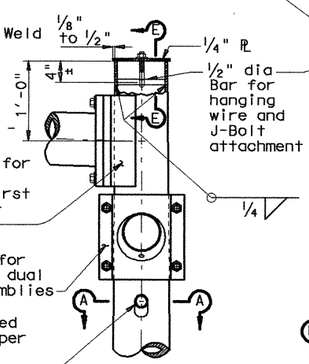
SECTION B-B



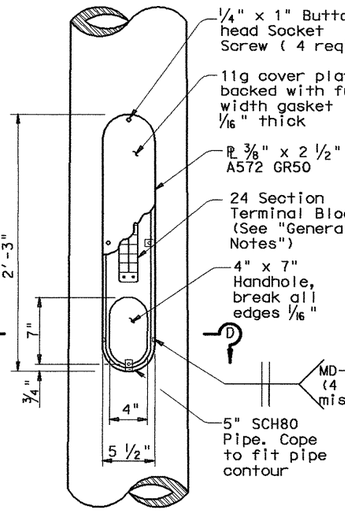
DETAIL B
(for pole with luminaire and ILSN sign)



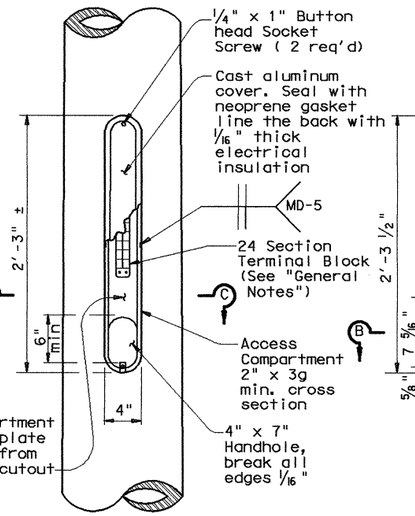
DETAIL K
(for pole with ILSN sign and no luminaire)



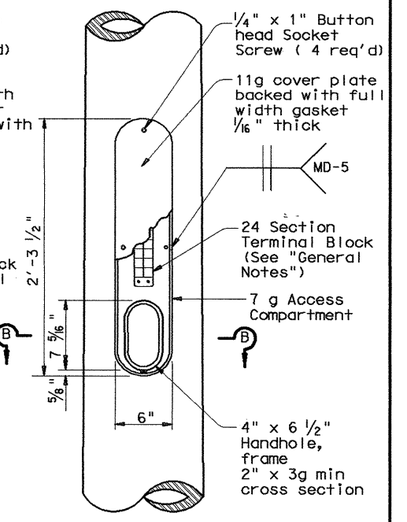
DETAIL C
(for pole with no ILSN sign and no luminaire)



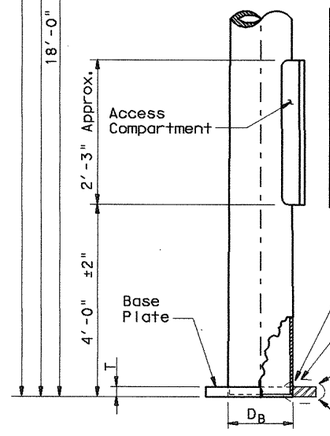
ACCESS COMPARTMENT DETAIL 1



ACCESS COMPARTMENT DETAIL 2



ACCESS COMPARTMENT DETAIL 3

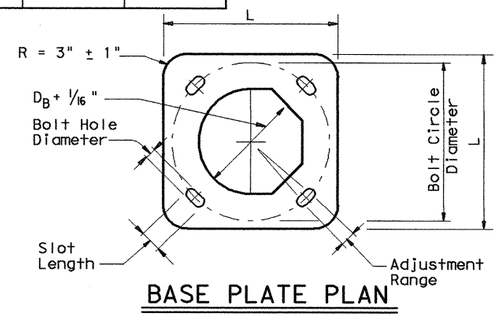


POLE ELEVATION

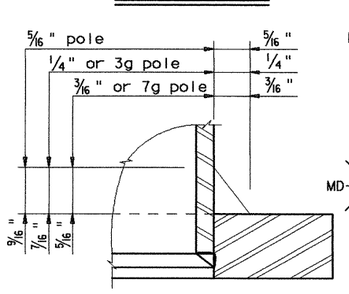
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°

GENERAL NOTES:

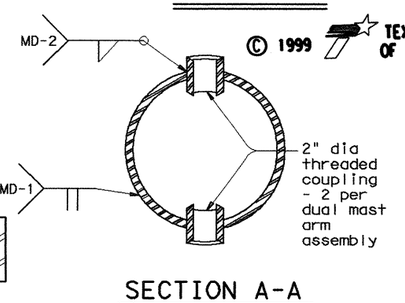
The Fabricator shall furnish each pole with a twelve position, double posted, molded phenolic Terminal Block with insulating strip as necessary. The Terminal Block shall be provided with size 8-32 nickel plated screws and shall be T.R.W. Cinch No. 12-142 or equal.



BASE PLATE PLAN



DETAIL D



SECTION A-A

MOD. ACCESS COMPARTMENT MT. HEIGHT

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS
MA-D-96 (DAL)

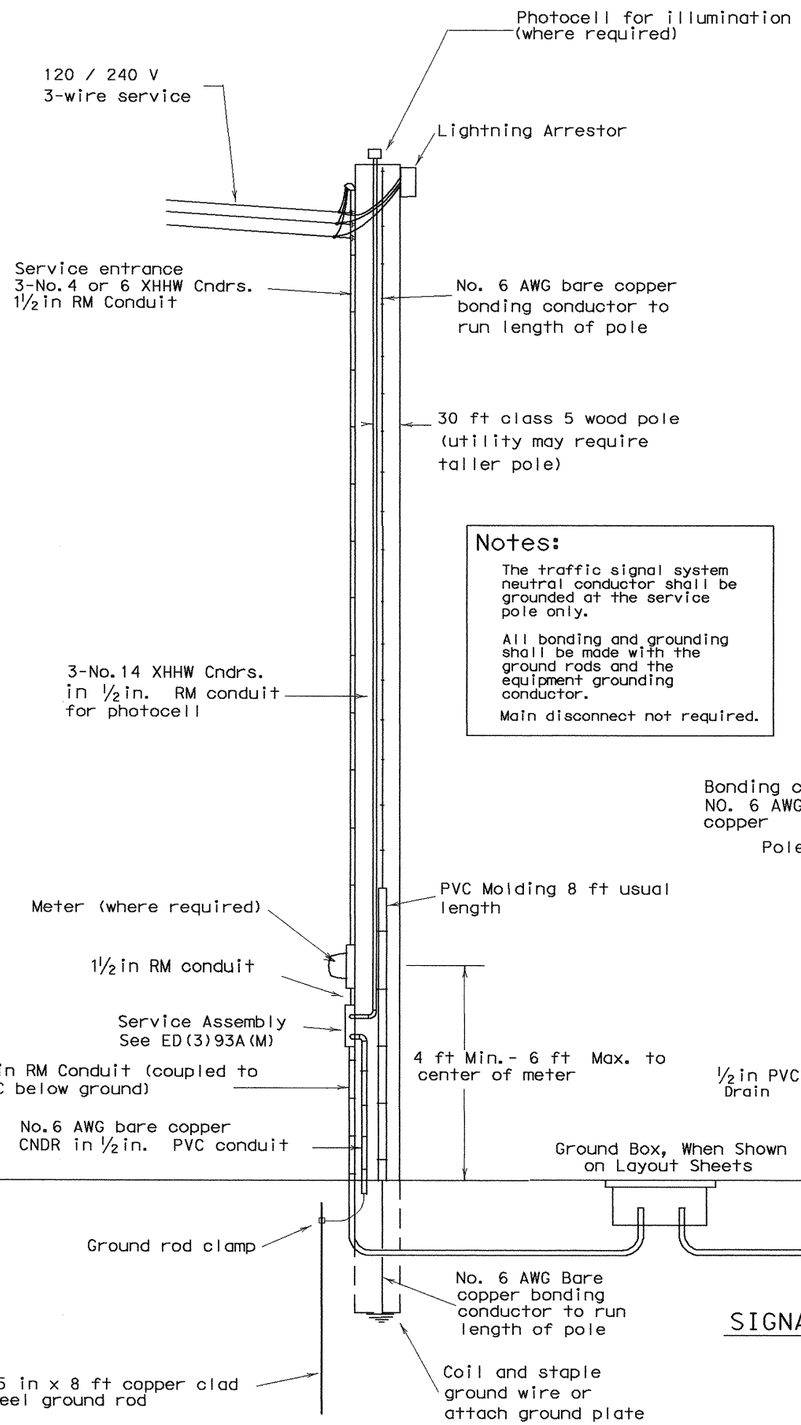
ORIG. DRAWN DATE: August 1995	DW: MS	CK: JSY	DW: MMF	CK: JSY	MSG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT NO.		SHEET
	DALLAS	6	STP 99(413)MM		169
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM 740

DALLAS DISTRICT STANDARD

127

ACC: d48hplqt/usr/d482517
LAYERS: 1,2 for English 1,3 for Metric

x4497



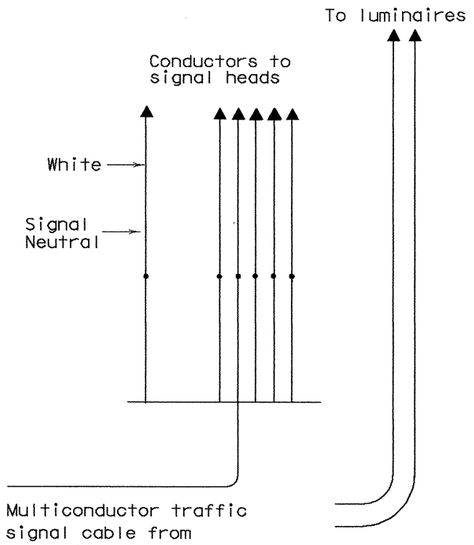
SERVICE POLE

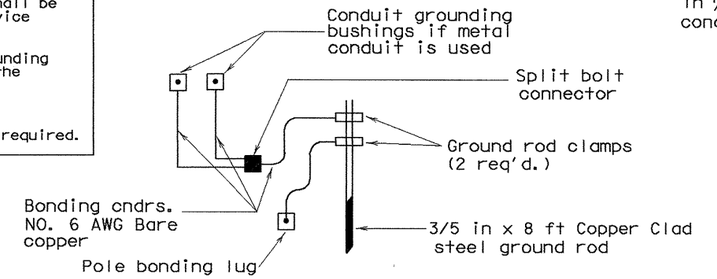
Notes:

The traffic signal system neutral conductor shall be grounded at the service pole only.

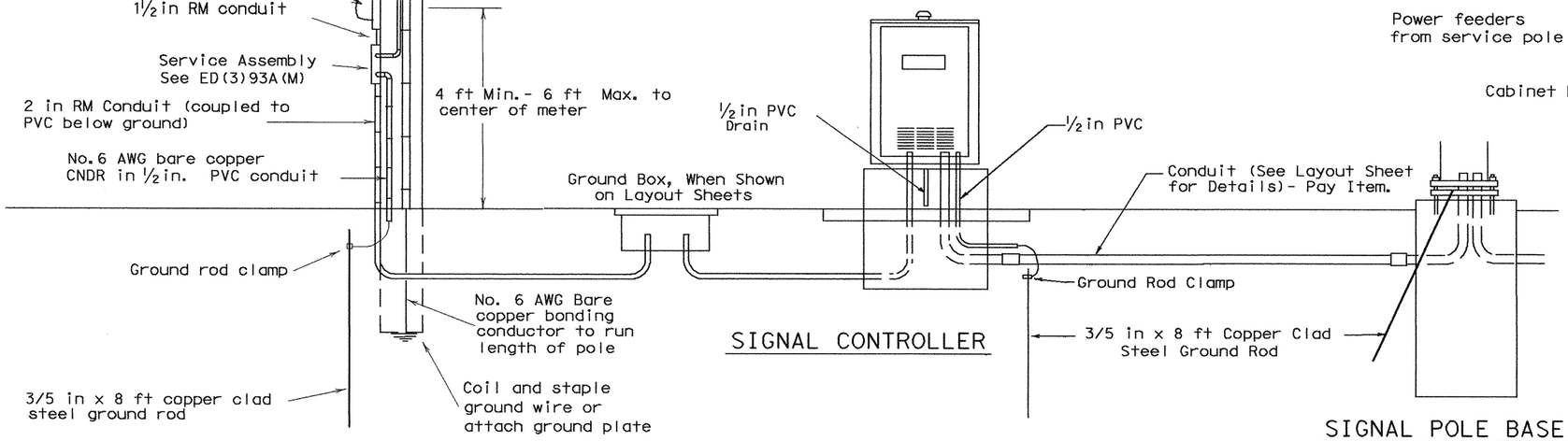
All bonding and grounding shall be made with the ground rods and the equipment grounding conductor.

Main disconnect not required.



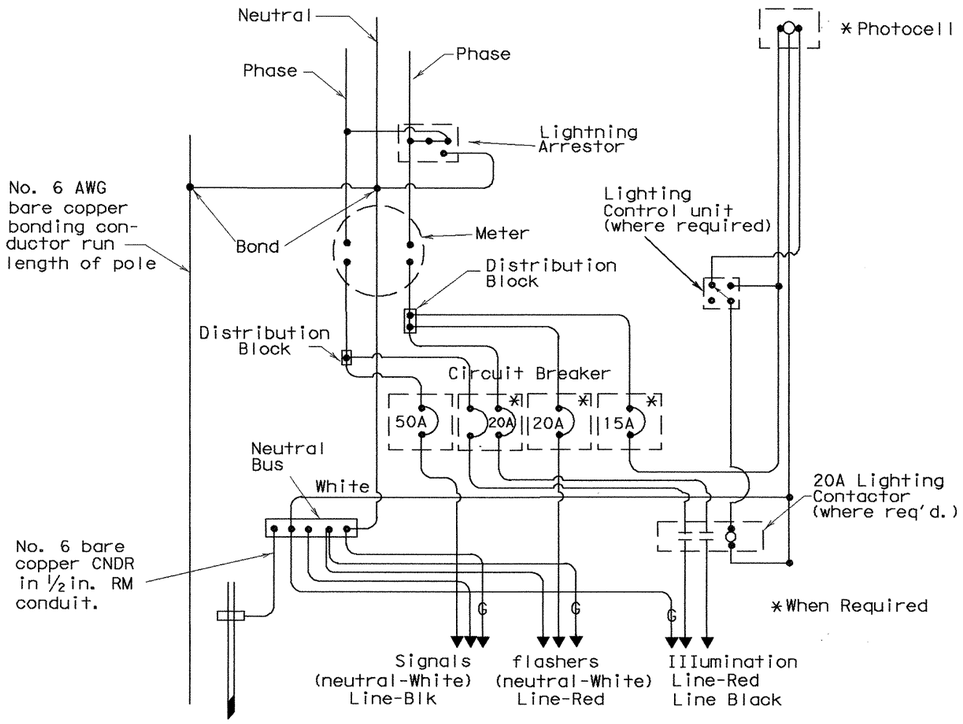


CONNECTION AT STEEL POLE BASE



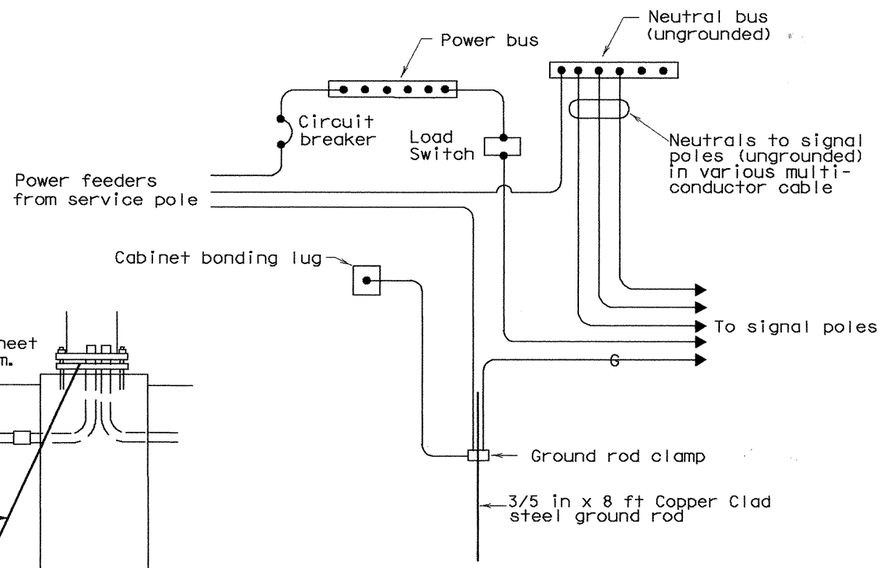
SIGNAL CONTROLLER

SIGNAL POLE BASE



CONNECTIONS AT SERVICE SCHEMATIC TY S

120/240 VOLT - THREE WIRE



CONNECTIONS AT SIGNAL CONTROLLERS

Elec. Serv. Ty. S(120/240)000(NS)GS(T)TP(0)

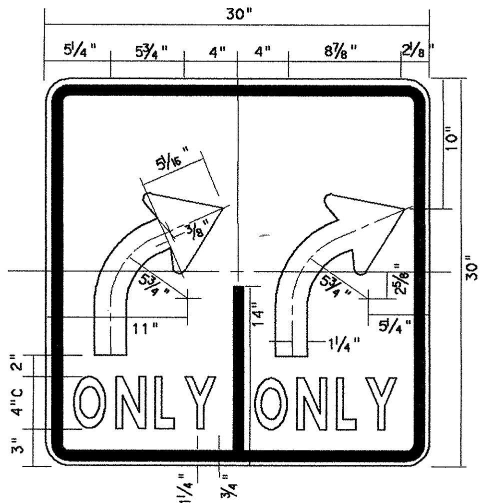
SERVICE POLE DETAILS

DALLAS DISTRICT STANDARD

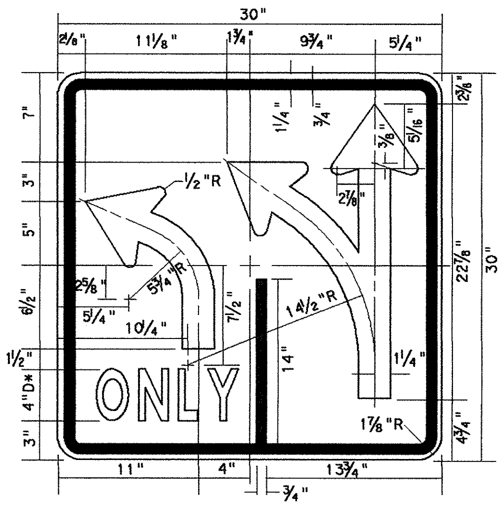
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		170
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

238D

1993 Specifications

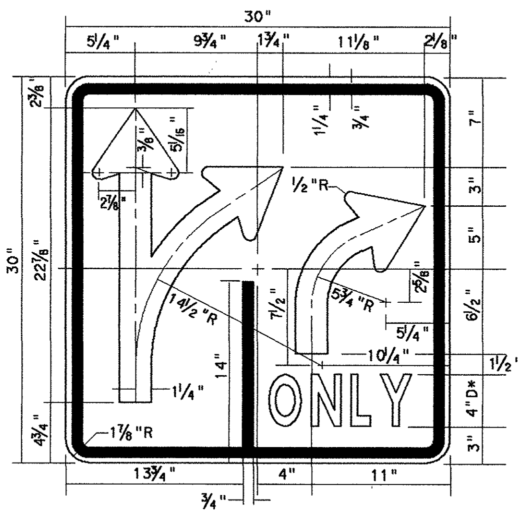


R3-8RR
30"x 30"

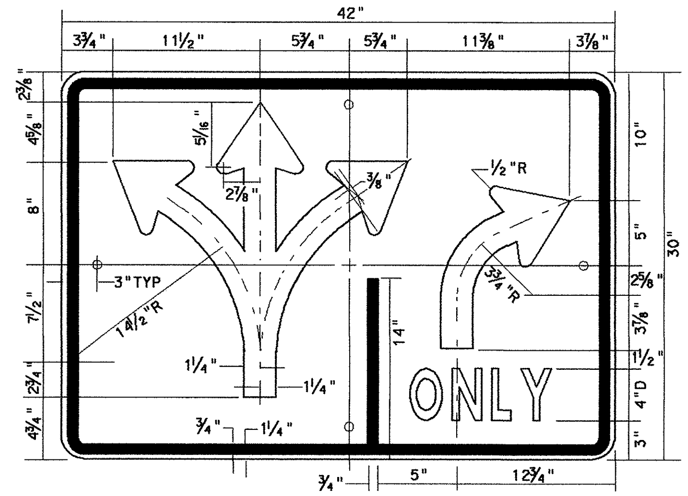


* SPACING REDUCED 50%

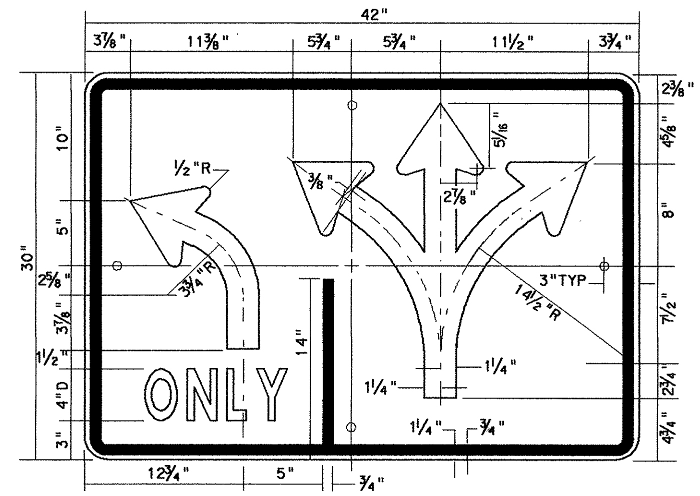
R3-8L
30"x 30"



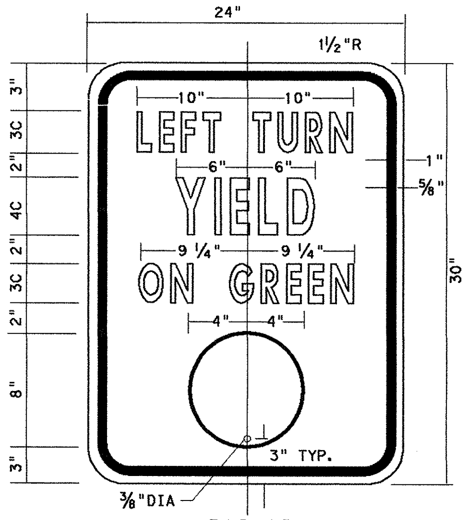
R3-8R
30"x 30"



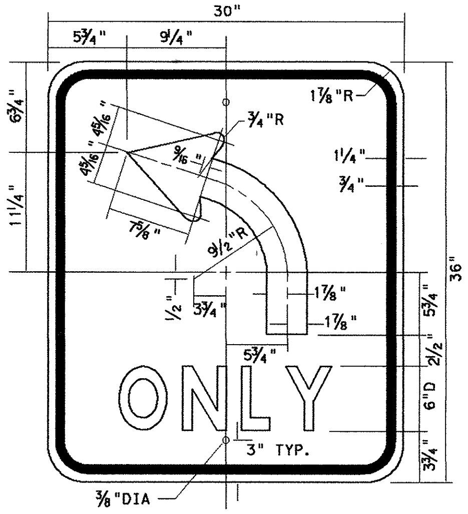
R3-8R(SPL)
42"x 30"



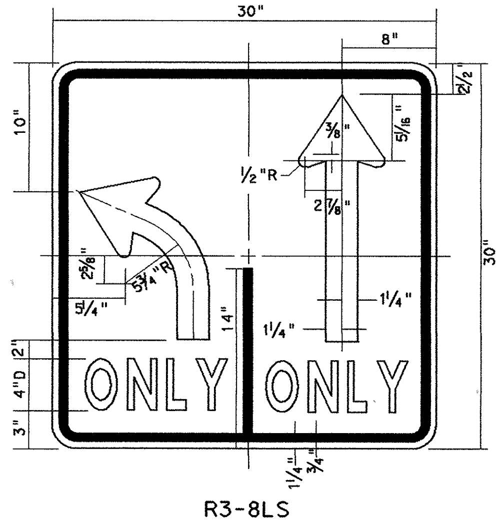
R3-8L(SPL)
42"x 30"



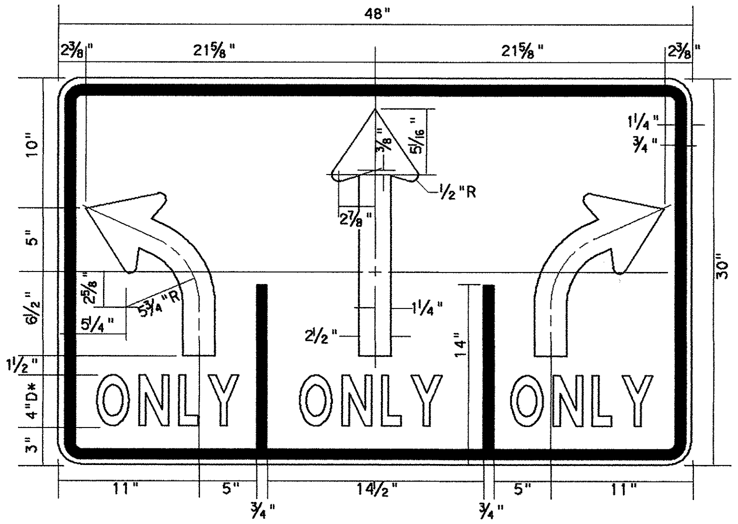
R10-12
24"x 30"
LEGEND BLACK(NON-REFLECTIVE)
BACKGROUND WHITE(REFLECTIVE)
CIRCULAR GREEN(REFLECTIVE)



R3-5L
R3-5R(RT. ARROW)
30"x 36"

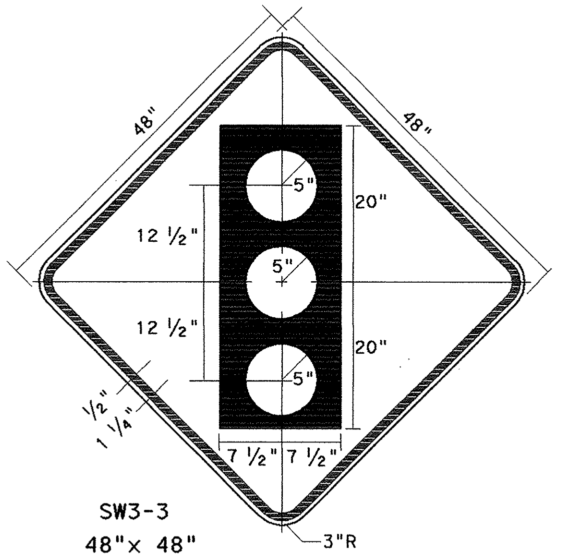


R3-8LS
30"x 30"



R3-8RSL
48"x 30"

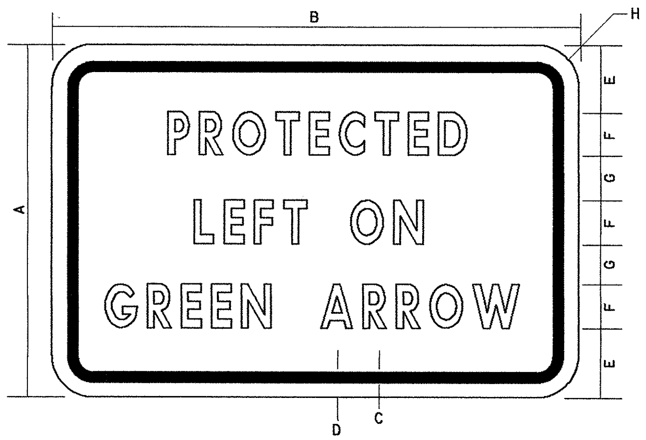
*SPACING REDUCED 50%



SW3-3
48"x 48"

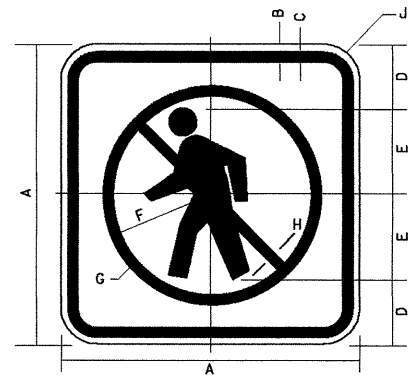
COLORS

SYMBOL & LEGEND- BLACK (NON-REFL.)
TOP CIRCLE - RED (REFL.)
BOTTOM CIRCLE - GREEN (REFL.)
BACKGROUND - YELLOW (REFL.)
TYPE C REFLECTIVE SHEETING



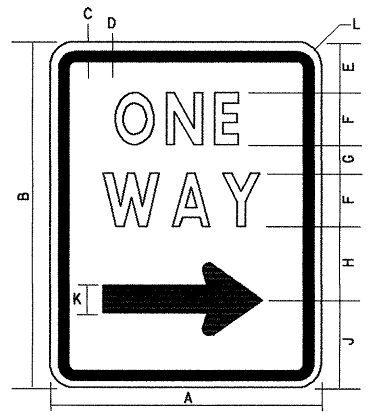
SIGN NO.	SIGN	DIMENSIONS (INCHES)							
		A	B	C	D	E	F	G	H
R10-9	STD.	12	18	3/8	3/4	2	2 C	1	1 1/2
SR10-9S	EXPWY.	18	30	3/8	3/4	3	3 C	1 1/2	1 1/2
SR10-9	FRWY.	24	36	5/8	1	4	4C*	2	1 1/2

* - REDUCE SPACING 40%

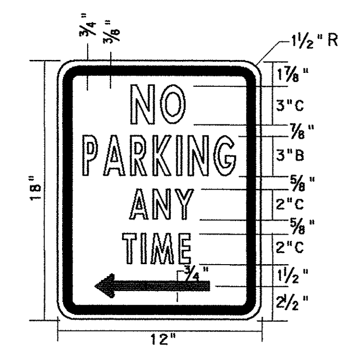


CIRCLE AND DIAGONAL - RED
SYMBOL & BORDER - BLACK
BACKGROUND - WHITE

SIGN NO.	SIGN	DIMENSIONS (INCHES)								
		A	B	C	D	E	F	G	H	J
R9-3a	STD.	18	1	5/8	3 1/2	5 1/2	6 3/8	7 7/8	1 1/2	1 1/2
ER9-3a	EXPWY.	24	1	5/8	4 1/2	7 1/2	8 1/2	10 1/2	2	1 1/2
FR9-3a	FRWY.	30	1 1/4	3/4	5 3/4	9 1/4	10 5/8	13 1/8	2 1/2	1 7/8



SIGN NO.	SIGN	DIMENSIONS (INCHES)										
		A	B	C	D	E	F	G	H	J	K	L
R6-2	STD.	18	24	1	5/8	2 1/2	5D	1 1/2	4 1/2	5 1/2	2 1/4	1 1/2
SR6-2	SPEC.	24	30	1	5/8	3	6D	1 7/8	6 1/16	7 1/16	3	1 1/2



R7-1L
R7-1R(RT ARROW)
R7-1LR(DBL ARROW)
12"x 18"

GENERAL NOTES:

ALPHABETS AND LATERAL SPACING BETWEEN LETTERS AND NUMERALS SHALL CONFORM WITH THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS", LATEST EDITION AND ANY APPROVED CHANGES THERETO. LATERAL SPACING OF TEXT SHALL BE SUCH AS TO PROVIDE A BALANCED APPEARANCE.

SIGN BACKGROUNDS SHALL BE OF FLAT SURFACE REFLECTIVE SHEETING CONFORMING WITH THE SPECIFICATIONS (TYPE A) UNLESS OTHERWISE SPECIFIED IN THE PLANS.

SIGN LEGENDS SHALL BE APPLIED BY THE SCREENING PROCESS.

THE SIGN BLANKS SHALL BE ONE PIECE 5/8 INCH THICK PLYWOOD (TYPE A) CONFORMING TO THE SPECIFICATIONS UNLESS ATTACHED TO SIGNAL POLES.

THE SIGN BLANKS SHALL BE ONE PIECE SHEET ALUMINUM ALLOY 0.080 INCH THICK CONFORMING TO THE ITEM "ALUMINUM SIGNS (TYPE A)" WHEN ATTACHED TO SIGNAL POLES.

SIGNS

DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.			SHEET NO.
6	STP 99(413)MM			171
STATE	STATE DIST. NO.	COUNTY		
TEXAS	DALLAS	ROCKWALL		
CONT.	SECT.	JOB	HIGHWAY NO.	
1014	03	033	FM 740	

621D

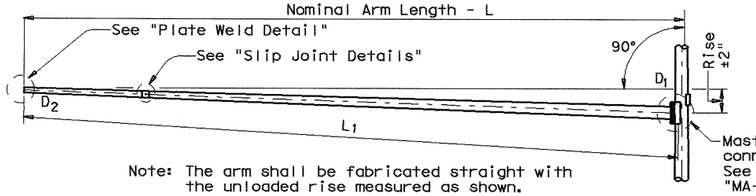
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	11.5	8.8	8.1	7.3	.239	12.5	9.5	8.7	7.8	.239	30-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

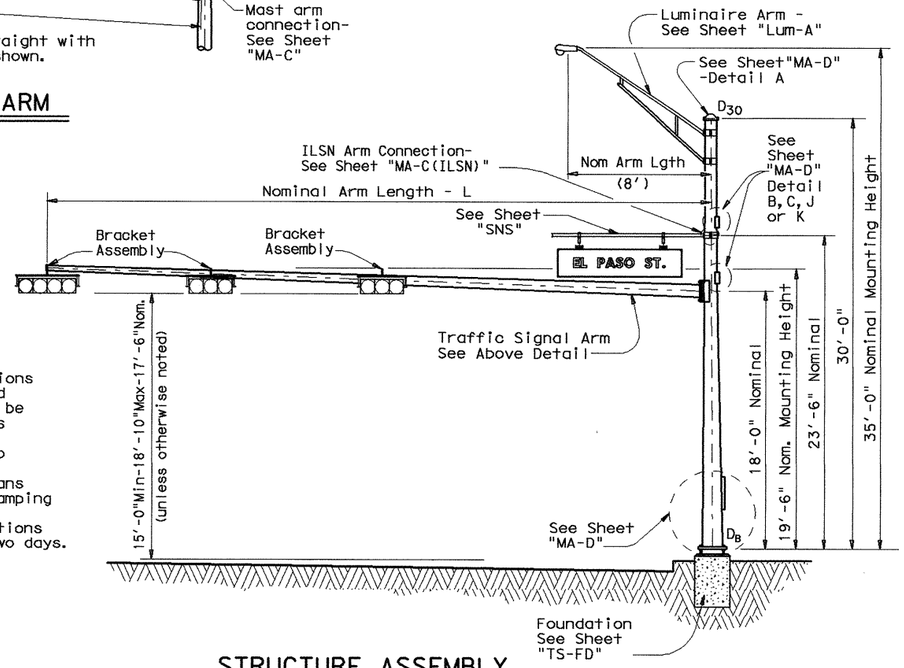
② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

VIBRATION WARNING

Mast Arms of approximately 40' or longer are subject to possible harmonic vertical vibrations in light wind conditions due to unusual combinations of signal numbers, weights or positions, arm-wind orientation, and arm-pole stiffness. Arms shall be visually inspected in 5 to 20 mph wind conditions after signal head installation and, if vertical movements with a total excursion (max positive to max negative) of more than approximately 8" are observed at arm tip, damping devices or other means shall be fitted to the arm(s). The necessary damping device(s) or other remedial measures shall be as recommended by the fabricator. Excessive vibrations shall not be allowed to continue for more than two days.

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30' Poles With Luminaire: Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		24' Poles With ILSN: Above hardware plus one small hand hole		19' Poles With No Luminaire and No ILSN: See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	1
32	32L-80		32S-80		32-80	
36	36L-80	1	36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80	1	44S-80		44-80	
48	48L-80		48S-80		48-80	

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal): 1 Bracket Assembly		Type II Arm (2 Signals): 2 Bracket Assemblies		Type III Arm (3 Signals): 3 Bracket Assemblies	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80		32III-80	
36			36II-80	1	36III-80	
40					40III-80	
44					44III-80	1
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1'-6"	1
1 ½"	3'-4"	2
1 ¾"	3'-10"	1

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, 4 lock washers and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

MODIFICATIONS

Ⓐ REMOVED BRACKET ASSEMBLY OPTIONS A AND B

Ⓑ REMOVED CGB CONNECTORS

Ⓒ REMOVED TENON DETAIL

Ⓓ REQUIRE MEASUREMENT OF POLE HEIGHT

Ⓔ MIN. AND MAX. SIGNAL HEAD HEIGHT DISTANCE

DALLAS DISTRICT STANDARD

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

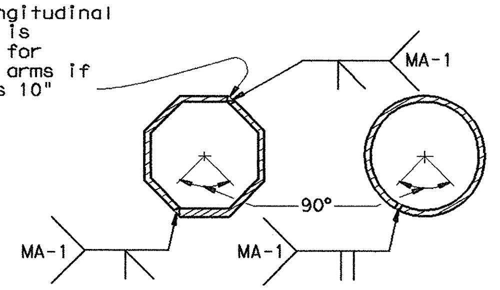
SMA-80(1)-96 (DAL)

FILE: SMA-80.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
ORIG DATE: AUGUST, 1995	DIST	FED REG	FEDERAL AID PROJECT •	SHEET
REVISIONS 6-96	18	6	STP 99(413)MM	172
	COUNTY		CONTROL SECT JOB	HIGHWAY
	ROCKWALL		1014 03 033	FM 740

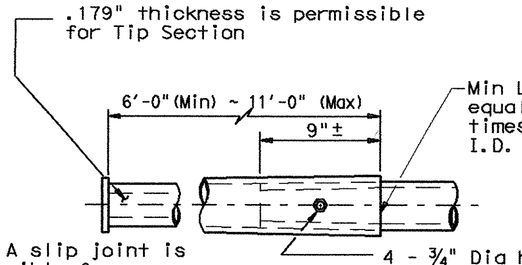
122A

Stainless steel bands and cast bracket as in "Astro-Brac" with 1½" Dia Threaded Coupling.

BRACKET ASSEMBLY OPTION C

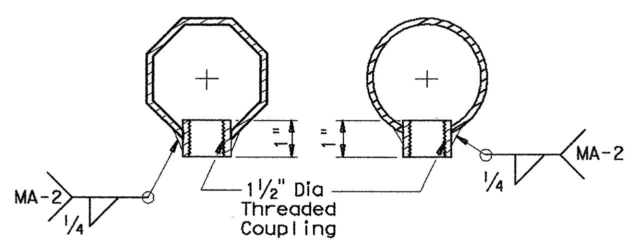


ARM WELD DETAIL



Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL



COUPLING DETAILS

NOTE:

Pole manufacturer shall drill ½" hole in bottom of mast arm at end plate. (for hot-dip galvanizing)

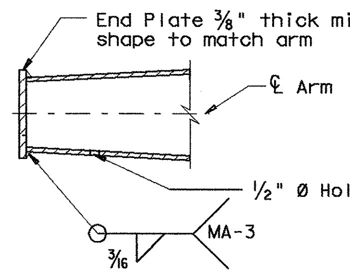


PLATE WELD DETAIL

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 75 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.5 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with the Specifications and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Miscellaneous welds which do not call for preapproved weld procedures are nevertheless subject to rejection for poor workmanship. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and the Specifications.

Unless otherwise noted, all parts shall be galvanized in accordance with the Specifications.

Special design require submission of shop drawings in accordance with the item "Steel Structures".

△ The pole heights are for bidding purposes only. Prior to fabrication, the Contractor in cooperation with the Engineer shall make field measurements to determine the actual pole height necessary to ensure a verticle clearance of 17'-6" min., 19' max.

DALLAS DISTRICT STANDARD

SHEET 2 OF 2

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL SUPPORT STRUCTURES

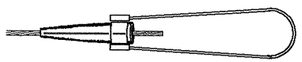
SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)

SMA-80(2)-96 (DAL)

FILE: SMA-80.DGN	DN: MS	CK: JSY	DW: MMF		CK: JSY	
ORIG DATE: AUGUST, 1995	DIST	FED REG	FEDERAL AID PROJECT ♦			SHEET
REVISIONS 6-96	18	6	STP 99(413)MM			173
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM 740

122B

FILENAME: [3221531SPANDET.DGN



COMPRESSION FITTING

SOURCES:
RELIABLE ELECTRIC NO. 5264
FARGO NO. OR EQUAL

LUMINAIRE ARM

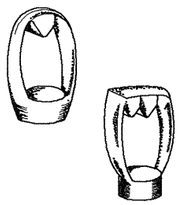
SOURCES:
CROUSE HINDS NO. 106-R82
JOSLYN NO. J75100B OR EQUAL

THIMBLEYE BOLT (Angle Type)

SOURCES:
JOSLYN NO. J80 SERIES
McGRAW EDISON DG4F OR EQUAL

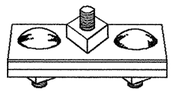
LIFT PLATE

SOURCES:
JOSLYN J7886
McGRAW EDISON DG4M-2 OR EQUAL



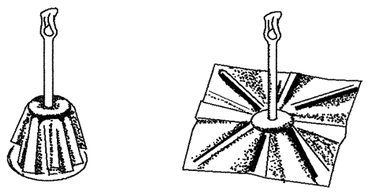
EYE NUTS (Twineye & tripleye)

SOURCES:
JOSLYN NO. J12593
McGRAW EDISON DGISE OR EQUAL



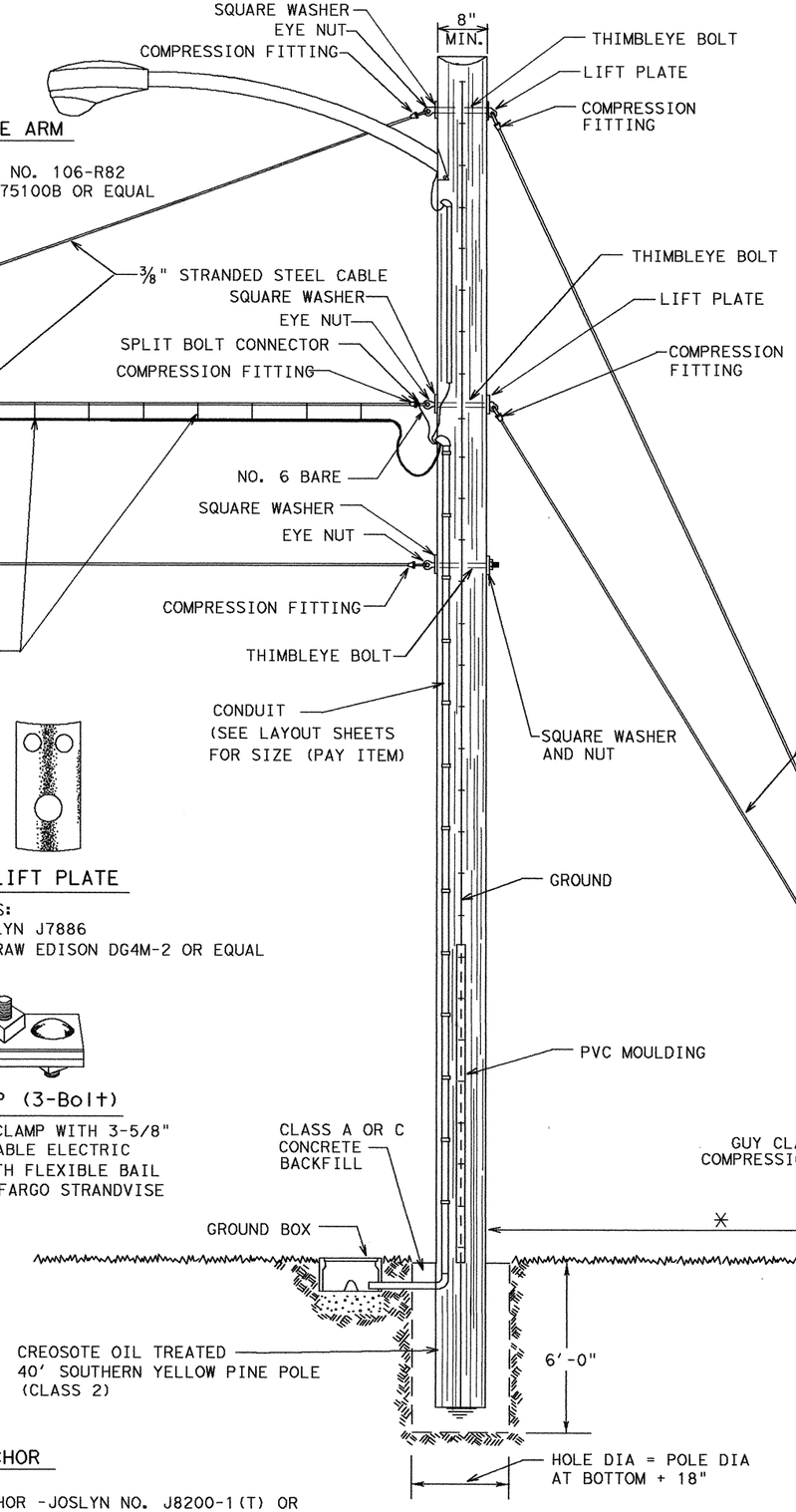
GUY CLAMP (3-Bolt)

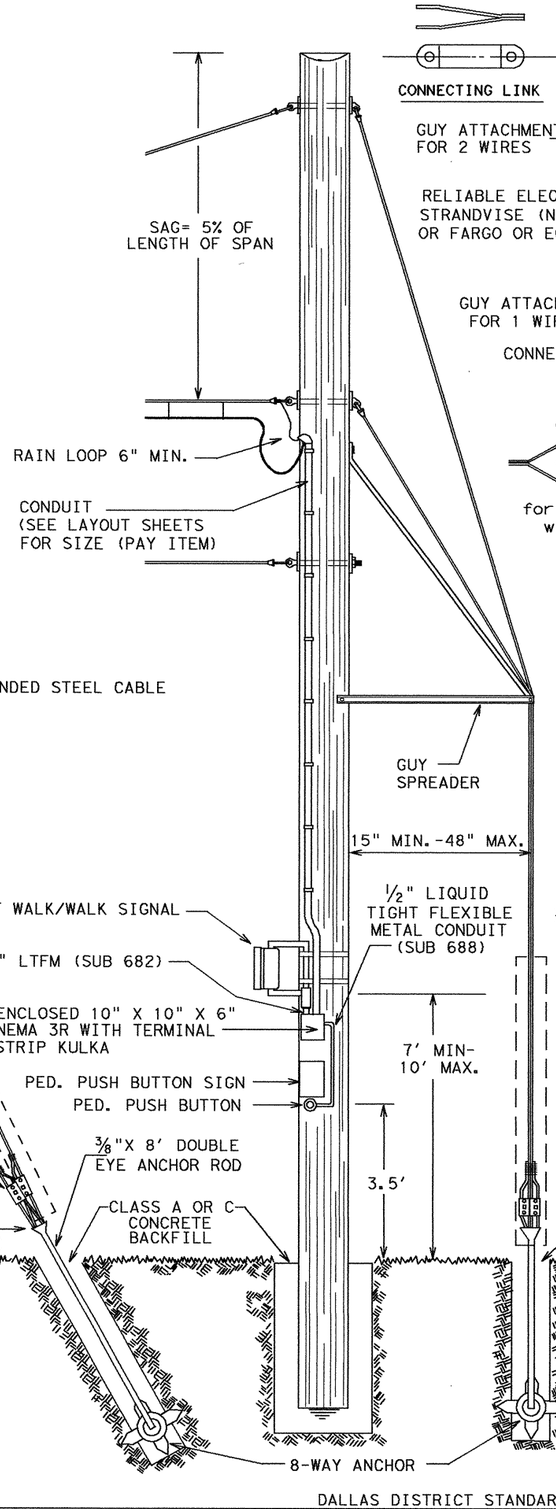
6" HEAVY GUY CLAMP WITH 3-5/8" BOLTS OR RELIABLE ELECTRIC STRANDVISE WITH FLEXIBLE BAIL (NO. 5264) OR FARGO STRANDVISE OR EQUAL

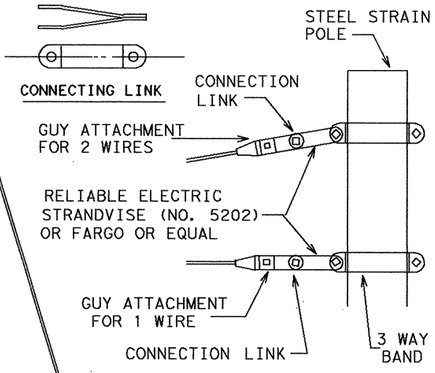


8-WAY ANCHOR

SOURCES:
8-WAY ANCHOR -JOSLYN NO. J8200-1(T) OR
6-WAY ANCHOR-McGRAW EDISON DA6E1 OR EQUAL







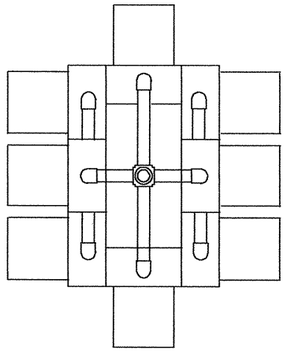
SPAN CABLE ATTACHMENT DETAILS FOR STEEL STRAIN POLES

* ANCHORS SHOULD BE LOCATED SO THAT THE DISTANCE BETWEEN THE ANCHOR AND THE POLE BUTT IS EQUAL TO THE DISTANCE FROM THE GROUND TO THE POINT OF GUY ATTACHMENT. IN NO CASE SHOULD THE DISTANCE FROM THE ANCHOR TO THE POLE BUTT BE LESS THAN 1/3 OF THE DISTANCE FROM THE GROUND TO THE POINT OF GUY ATTACHMENT.

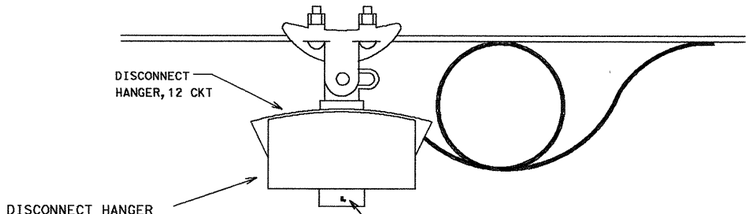
DALLAS DISTRICT STANDARD

CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED SIGNALS

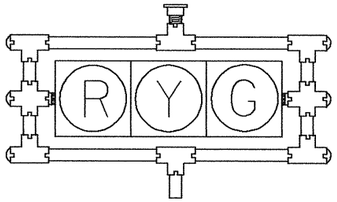
FED. RD. DIV. NO.	FEDERAL PROJECT NO.		SHEET NO.
6	STP 99 (13) MM		174
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



TOP

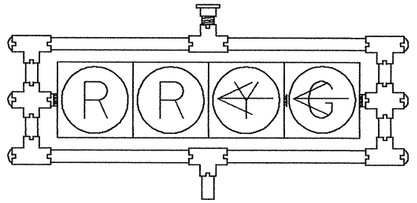


DISCONNECT HANGER MODIFICATION



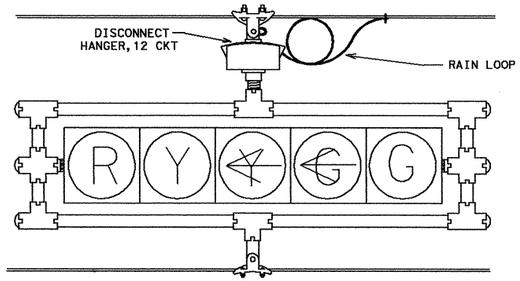
SH 3H

TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION



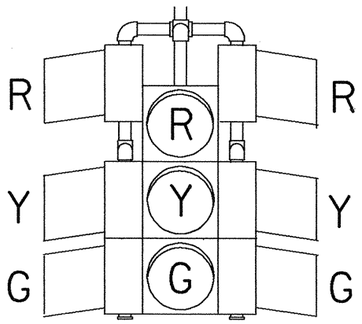
SH 4H

TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION

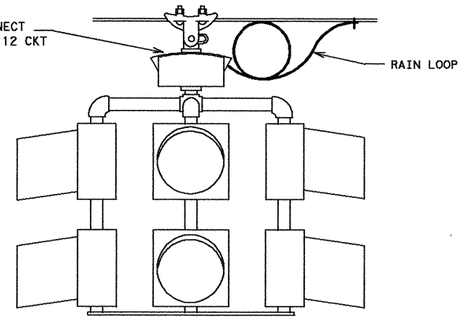


SH 5H

TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION

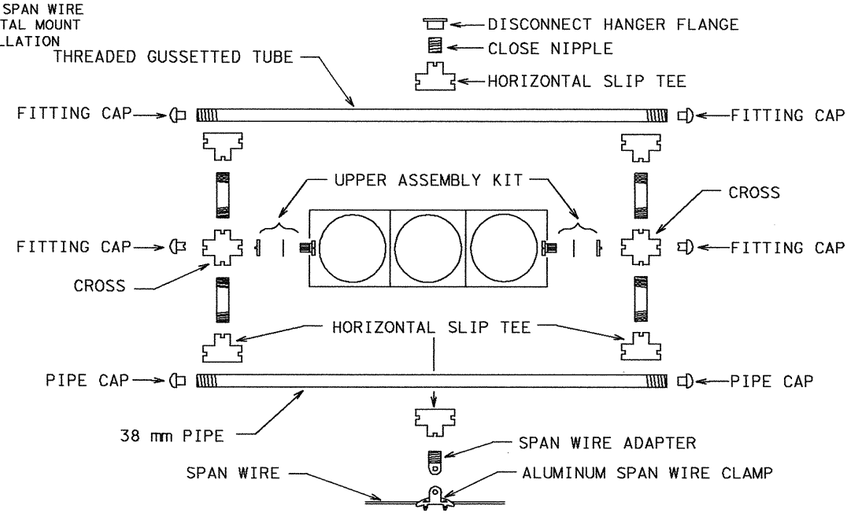


SIDES

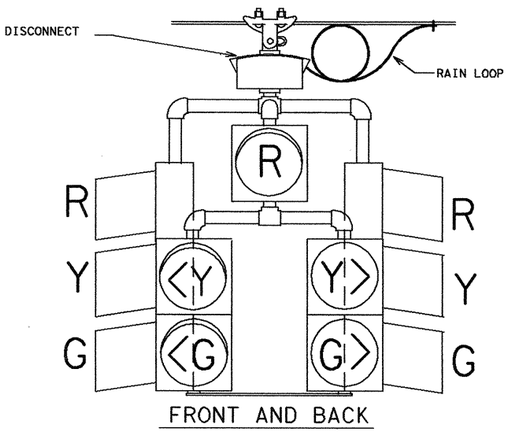


TYPICAL
FLASHING BEACON
INSTALLATION

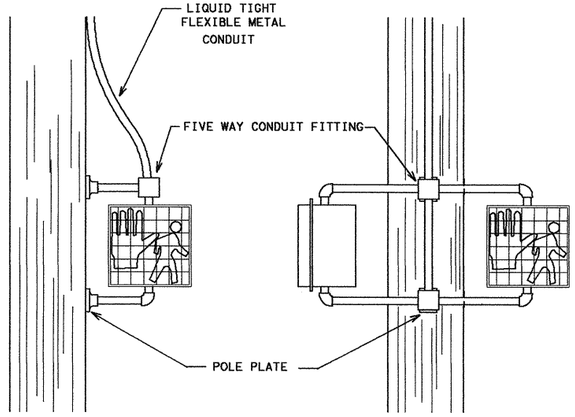
PEDESTRIAN PUSHBUTTON
SIGN DETAILS



BOTTOM TETHERED, SPAN WIRE SIGNAL HARDWARE ASSEMBLY
(BACK PANEL NOT SHOWN)

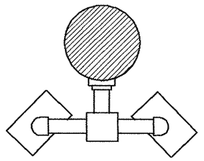


FRONT AND BACK

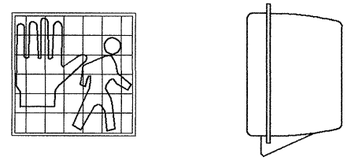


SH 152A
ONE-WAY
ADJUSTABLE FACE SIGNAL FOR
WOOD POLE MOUNTING

SH 143C
TWO-WAY
ADJUSTABLE FACE SIGNAL FOR
WOOD POLE MOUNTING



SH 143C
PLAN VIEW

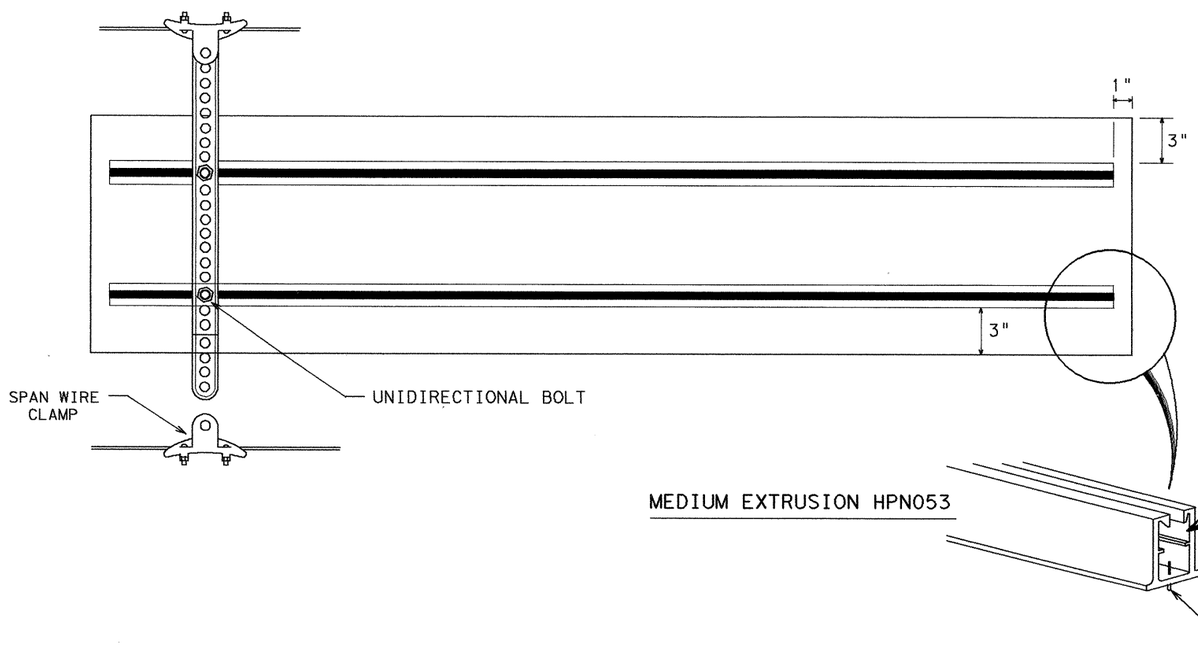


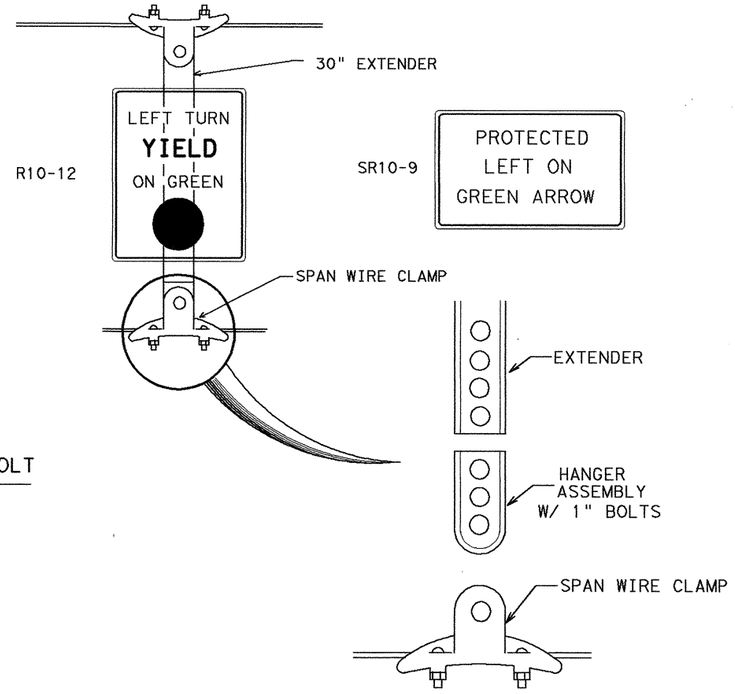
"EGGCRATE" VISOR PEDESTRIAN SIGNAL
WITH ONE-PIECE REFLECTOR

SIGNAL HEADS FOR SPAN WIRE INSTALLATION

DALLAS DISTRICT STANDARD

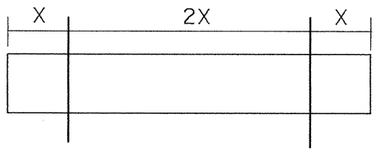
FED. RD. DIV. NO.	FEDERAL PROJECT NO.		SHEET NO.
6	STP C.99(413)MM		175
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



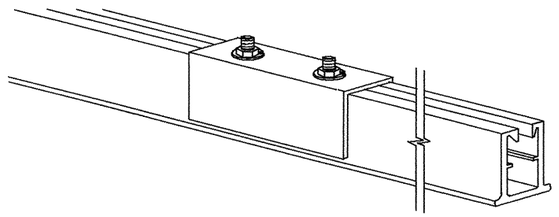


HANGER ASSEMBLY DETAILS

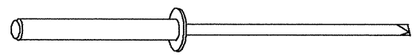
NOTES:
1. FOR SIGNS LESS THAN 5'-0" ONE VERTICAL SUPPORT IS REQUIRED PER SIGN. TWO VERTICAL SUPPORTS SHALL BE USED FOR SIGNS LONGER THAN 5'-0"
2. FOR STREET NAME SIGNS, EXTRUDED ALUMINUM SHALL BE MOUNTED FOR HORIZONTAL SUPPORT AS SHOWN.



SIGN LENGTH	X
5'-6"-6'-0"	1'-6"
6'-6"-7'-0"	1'-9"
7'-6"-8'-0"	2'-0"
8'-6"-9'-0"	2'-3"
9'-6"-10'-0"	2'-6"
10'-6"-11'-0"	2'-9"
11'-6"-12'-0"	3'-0"
12'-6"-13'-0"	3'-3"



5" ALUMINUM COUPLING
6061-T6



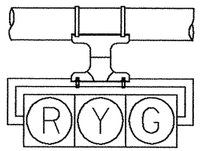
ALUMINUM RIVET

NOTE: ALUMINUM RIVETS SHALL BE USED TO ATTACH THE SIGN TO THE EXTRUDED ALUMINUM. SPACINGS OF RIVETS SHALL BE 6" O.C.

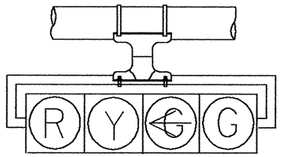
DALLAS DISTRICT STANDARD

SIGNS FOR SPAN WIRE INSTALLATION

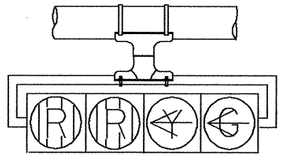
FED. RD. DIV. NO.	FEDERAL PROJECT NO.		SHEET NO.
6	STP 99(413)MM		176
STATE	STATE DIST. NO.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740



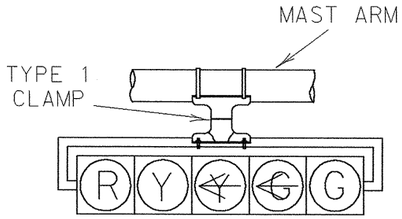
H3



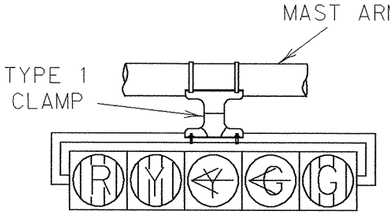
H4LT



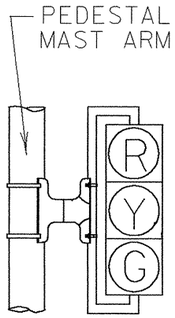
H4LLT



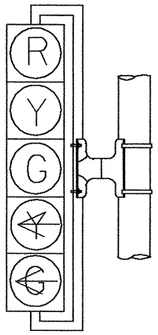
H5LT



H5LLT

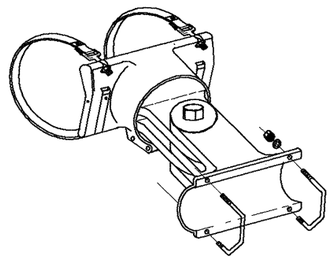


V3



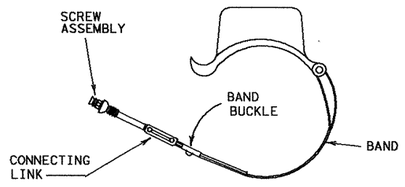
V5LT

NOTE:
VERTICAL LOUVERS SHALL BE INSTALLED ON HORIZONTAL MOUNTED SIGNALS, HORIZONTAL LOUVERS SHALL BE INSTALLED ON VERTICAL MOUNTED SIGNAL WHEN NEEDED.



TYPE 2 CLAMP KIT

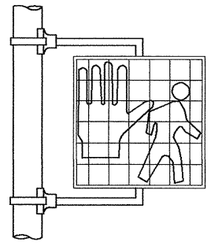
SHALL BE INSTALLED WHEN ROTATION ABOUT THE HORIZONTAL AND VERTICAL AXES ARE NEEDED.



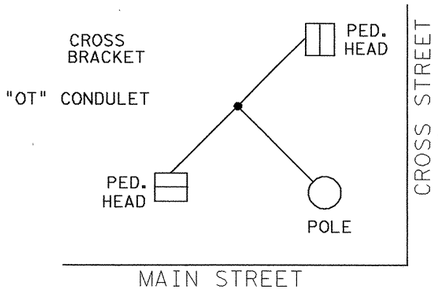
TYPE 1 CLAMP

1 NOTE:
CLAM SHELL MOUNTING HARDWARE MAY BE USED INSTEAD OF MOUNTING HARDWARE SHOWN ABOVE, AS APPROVED BY THE ENGINEER. ICC P/N 4805 OR OR McCAIN QUICKMOUNT OR APPROVED EQUAL.

TYPE 1 CLAMP

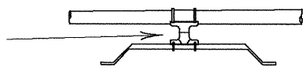


PEDESTRIAN SIGNAL HEAD MOUNTING FOR ONE PEDESTRIAN SIGNAL HEAD
152A

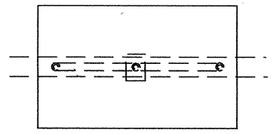


PEDESTRIAN SIGNAL HEAD MOUNTING FOR TWO PEDESTRIAN SIGNAL HEADS
143C

TYPE 1
1 CLAMP

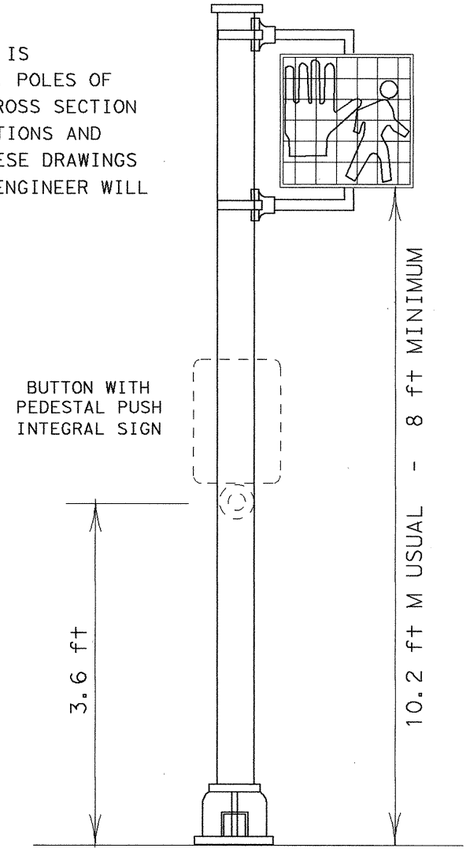


* ONE (1) CLAMP SHALL BE USED ON SIGNS LESS THAN OR EQUAL TO 10 ft IN LENGTH.
* TWO (2) CLAMPS SHALL BE USED ON SIGNS GREATER THAN 10 ft IN LENGTH.



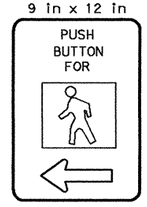
SIGN OR DAMPENING DEVICE ATTACHMENT FOR MAST ARMS

NOTE:
THE POLE ON THIS DRAWING IS SHOWN AS AN EXAMPLE ONLY. POLES OF SIMILAR DESIGN FOR ANY CROSS SECTION WHICH MEET THE SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND ARE APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.



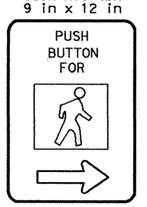
PEDESTAL POLE

SIGN R10-4bL
9 in x 12 in



PEDESTRIAN PUSHBUTTON SIGN DETAILS

SIGN R10-4bR
9 in x 12 in



PEDESTRIAN PUSHBUTTON SIGN DETAILS

1 ALTERNATIVE MOUNTING METHOD revised 12-92

* REVISED 3-7-97

NOTES:

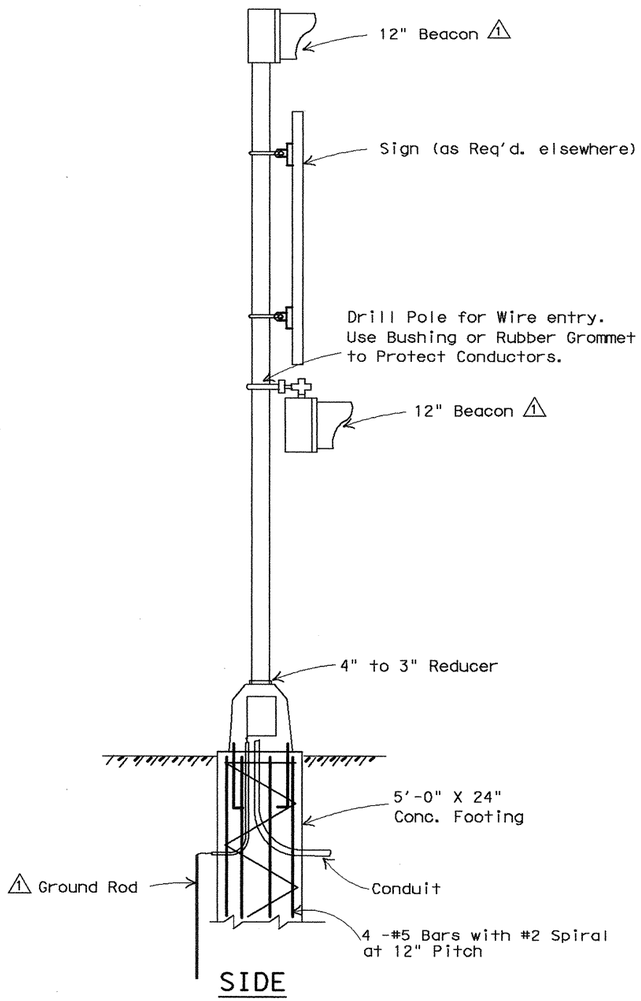
1. VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMP AND APPROPRIATE TUBING.
2. ALL POLE MOUNTED VEHICLE AND PEDESTRIAN HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. ALL DAMPING DEVICES SHALL BE 450 mm TO 610 mm WIDE BY 1.2 M IN LENGTH.
4. ALL WIRING FOR PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
5. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ABOVE.

TRAFFIC SIGNAL AND PEDESTRIAN HEAD IDENTIFICATION

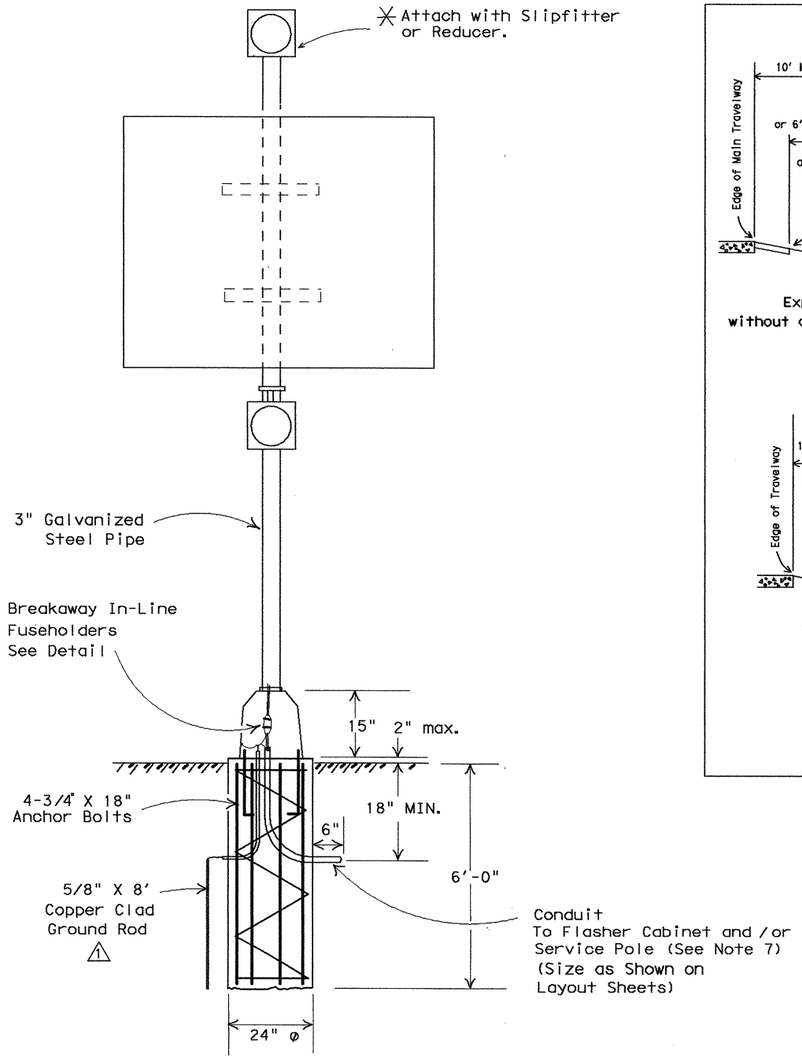
DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 9414(3)MM		177
STATE	STATE DIST.	COUNTY	
TEXAS	DALLAS	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

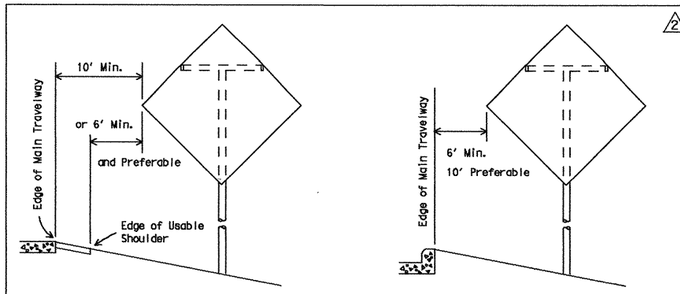
621



SIDE

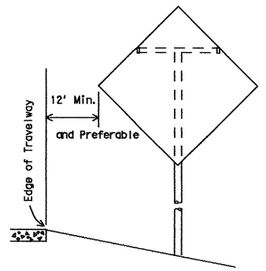


FRONT

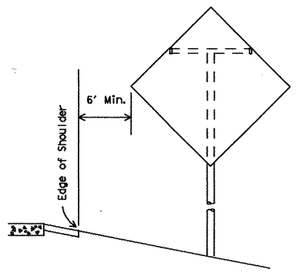


Expressways or Freeways
without curb or with mountable curb.

Expressways or Freeways
with unmountable curb.

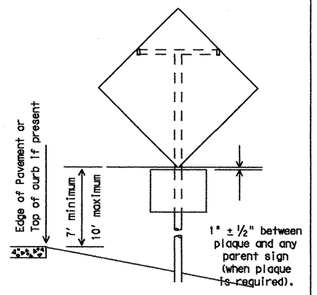


Rural Conventional Highway
without shoulder.

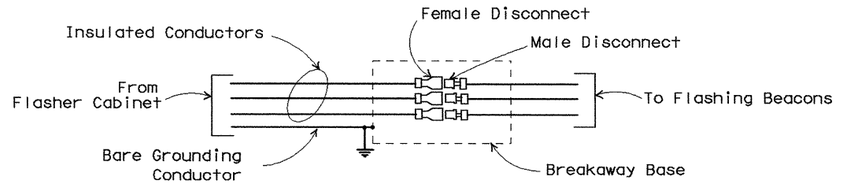


Rural Conventional Highway
with shoulder.

LATERAL CLEARANCE TO THE
RIGHT OF LEFT SIDE OF ROADWAY



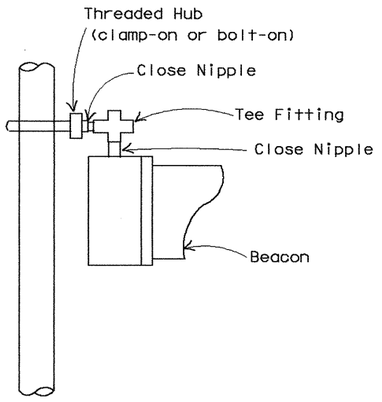
VERTICAL CLEARANCE
ALL TYPES OF ROADWAYS



BREAKAWAY IN-LINE FUSEHOLDERS

NOTES:

1. The Roadside Flashing Beacon Assembly is designed for small signs where electrical power is needed with a breakaway sign pole. (e.g. Warning signs or school zone signs). See signing layouts for actual sign to be installed.
2. Details depicted herein show a typical warning sign with two flashing beacon heads.
3. See SMD Standard sheets for sign mounting details.
4. See Special Specification, "Roadside Flashing Beacon Assembly" for further requirements.
5. Breakaway electrical quick-disconnects shall be watertight Bussmann HEB series ; Homac Floodseal series; Gould GEB series or equal.
6. ✳ Or other mounting shown elsewhere in the plans or as approved by the Engineer.
7. Conduit in foundation and within six (6) inches of foundation is subsidiary to the Item, "Roadside Flashing Beacon Assembly."



✳ LOWER BEACON MOUNTING DETAIL

1 12-91 MOD. BEACON SIZE, GROUND ROD PLACEMENT
2 10-98 ADD LATERAL, VERTICAL CLEARANCE

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION

ROADSIDE FLASHING BEACON ASSEMBLY (DAL)

DISTRICT 18 STANDARD

ORIGINAL DRAWING DATE: 11-91	STATE DISTRICT	FEDERAL REGION	FEDERAL PROJECT NUMBER			SHEET
DN.: K. A. B. REVISIONS	DALLAS	6	STP 99(413)MM			178
CK.: T. B.	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
DN.: R. E. S.	ROCKWALL		1014	03	033	FM 740
CK.: T. B.						

Maintenance and Operations Division (D-18) ZFA3: [122,106] RFBA.DGN

I. GENERAL REQUIREMENTS FOR ALL ELECTRICAL WORK

The location of all conductors, conduits, junction boxes, ground boxes, electrical services and transformer stations is diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

Materials shall be new and unused, and materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards and be Underwriters Laboratories (UL) Listed. Faulty fabrication or poor workmanship in any material, equipment or installation shall be justification for rejection.

SUBMITTALS:

The contractor shall submit for approval no less than five (5) copies of catalog cut sheets on electrical services, ground boxes, including loading capicity certification, breakaway disconnects, heat shrink tubing and heat shrink filler tape, photocells, and, when required, verification of available fault current. Submittals shall be legible and shall be marked to indicate which product on a cut-sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

Grounding shall be as shown on the plans and in accordance with the NEC. Metallic conduit, lighting poles and luminaires on bridge structures shall be bonded to the system grounding conductor and to a ground rod in each ground box or junction box at the bridge ends, and in each ground box installed for underpass lighting. The grounding conductor shall be bare or, if insulated, shall be green. Ground rods, connectors, and bonding jumpers will not be paid for separately, but will be subsidiary to the various bid items.

II. CONDUIT

A. MATERIALS

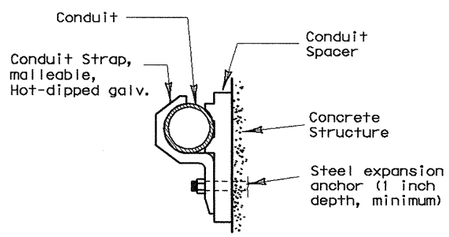
1. Conduit and fittings shall be UL Listed for the intended use shown on plan sheets.
2. Neither aluminum conduit, electrical metallic tubing (EMT), nor intermediate metal conduit (IMC) shall be permitted as a substitute for rigid metal conduit (RMC).
3. All exposed conduits shall be (RMC), unless otherwise specifically shown on the plans.
4. Fittings for RMC shall be steel or malleable iron, threaded, or threadless compression type, rain-tight, and shall be UL Listed for the intended use.
5. Expansion joints for metallic conduit shall be Appleton UNYL 50 Series, OZ/Gedney AX Series, or equal.
6. Junction box minimum sizes shall be in accordance with the following table which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, the conductors shall be counted as if all are of the larger size. Situations not applicable to the table shall be sized in accordance with NEC 370-28.

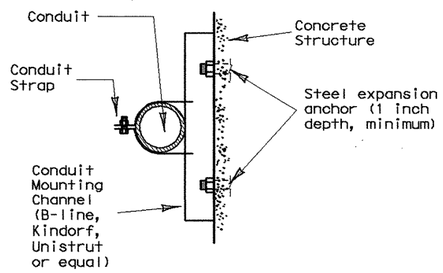
AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

7. RMC system junction boxes surface mounted and containing conductors #8 or larger, shall be hot dipped galvanized cast iron, or aluminum, minimum wall thickness shall be 3/16 inch, and shall have mounting lugs, (Crouse Type WAB, OZ/Gedney Type YS, Adalet Type 3R, or approved equal).
8. Junction boxes containing only #10 and #12 AWG conductors shall be Crouse Hinds Type GRFX, Appleton Type JBOX, two-gang FD, or similar approved cast iron. Boxes shall be sized according to NEC Table 370-16(a).
9. Junction boxes in EMT conduit systems shall be made from galvanized sheeting and shall be UL Listed as approved for outdoor use, unless otherwise noted on the plans. Sheet metal junction boxes shall be sized in accordance with the NEC.
10. Junction boxes in PVC conduit systems shall be PVC, UL Listed for outdoor use, unless otherwise noted on the plans.
11. Elbows in PVC conduit systems one inch and larger shall be rigid metal. Rigid metal elbows buried less than 18 inches underground shall be grounded. Elbows installed at ground boxes and foundations shall be extended with rigid metal conduit to the inside of the ground box or the top of the foundation. At that point a grounding bushing shall be installed.

B. CONSTRUCTION METHODS

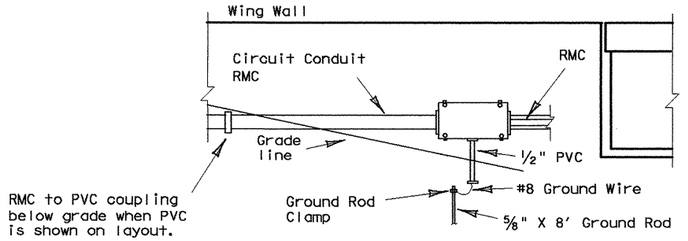
1. Conduit in structures shall have expansion fittings at structure expansion joints.
2. Conduit supports shall be spaced at maximum intervals of 5 feet. Conduit spacers shall be used with metal conduit placed on surfaces of concrete structures (See conduit mounting options).
3. Conduit supports shall not be attached directly to prestressed concrete beams except as shown specifically in the plans and approved by the Engineer.
4. Unless otherwise shown on the plans, conduit placed beneath existing roadways, driveways, or sidewalks, or after the base or surfacing operation has begun, shall be accomplished by jacking or boring. The Contractor shall back fill and compact the bore pits to the bottom of the conduit prior to installing connecting conduit or duct cable to prevent bending of the connection.
5. Conduit trenched in the subgrade of new roadways shall be back filled with excavated material, unless otherwise noted on the plans. Conduit trenched in the sub-base of new roadways shall be back filled with cement-stabilized base.
6. Open ends of all conduit and raceways shall be fitted with temporary caps or plugs to prevent entry of dirt, debris and rodents during construction. The temporary cap may be constructed of duct tape, but in all cases shall be tightly fixed to the conduit and shall be durable. The contractor shall clean out the conduit and prove it clear in accordance with Standard Specifications Item 618.3 prior to installing any conductors.
7. Conduit entry into the top of junction boxes and enclosures shall be made weathertight using threaded hubs.
8. A bonding jumper shall be installed from each grounding bushing to the nearest grounding rod, grounding lug, and/or system grounding conductor. At electrical services, grounding electrode conductor shall be #6 AWG. All other jumpers shall be the same size as supply conductors. Conduit used as casing under roadways for duct cable need not be grounded if duct extends full length through the casing.
9. Metal junction boxes shall be bonded to the grounding conductor in accordance with the NEC.
10. Conduits entering ground boxes shall be placed so that the conduit ends shall be not less that 5 inches nor more than 9 inches from the box cover (See ground box detail on sheet ED(2)).
11. Conduit ends shall be sealed with heat shrink boots with sealant, silicone caulking, urethane foam, or by other methods approved by the Engineer. Sealing shall be done after completion of any required pull tests. Duct tape shall not be used as a permanent conduit sealant.





CONDUIT MOUNTING OPTIONS

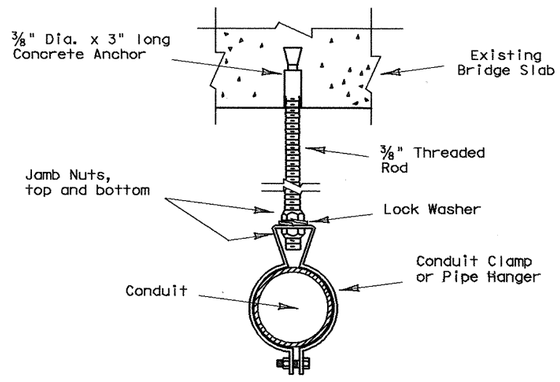
(Attachment to concrete surfaces)
(See para. II.B.2)



NOTES

1. Conduit shall be 2" RMC for duct cable entry to junction box.
2. Ground rod clamp to be Blackburn GG 5/8H, Weaver W5/8 or equal.
3. Surface mounting shown, for conduit to be placed in structure use flush-mounted box.
4. Bond junction box to grounding conductor.

TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL



CONDUIT HANGER DETAIL

(Attachment to horizontal surfaces)
(See para. II.B.2)

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS- CONDUIT

ED(1)-98

© TxDOT January 1992	DN: KB	CK: JM	DW: DN	CK: KB	MSG NO.:
REVISIONS 5-93, 10-93, 4-98	STATE DISTRICT: 6	FEDERAL REGION	FEDERAL AID PROJECT: STP 99(413)MM		SHEET: 179
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM 740

71A

LEVEL 1 2 3 4 5 6 7
LAYED 1 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
DATE:
ACC:
FILE:
DN:
CK:
DW:
CK:

I. ELECTRICAL CONDUCTORS

A. MATERIALS

1. Insulated conductors shall be NEC Type XHHW. Conductors shall be color coded in accordance with the NEC, articles 200, 250, and 310; i.e. Grounded conductors (neutrals) shall be white, Grounding conductors (ground wires) shall be bare or green, Ungrounded conductors (hots) shall be any color except green, white, or grey. Identification of conductors #10 AWG and smaller shall be by continuous jacket color. Color coding of electrical conductors #8 AWG and larger shall be either by continuous color jacket or by colored tape. Colored tape marker shall consist of a half-lap of tape covering a 6 inch length of conductor.

2. Where two or more circuits are present in one conduit or enclosure, the conductors of each circuit shall be identified by a permanent non-metallic tag at each accessible location. The tag shall be fastened to the conductors by plastic straps.

3. Grounding electrode conductors #6 AWG or smaller, for bonding to ground rods at electrical services, shall be solid. Connection of conductors to ground rods shall be made using UL Listed connectors designed for such purposes.

4. Heat Shrink Tape filler shall be used to seal the ends of heat shrink tubing around two or more conductors that are insulated with heat shrink tubing. Tape material shall have a minimum dielectric strength of 225 volts per mil and may be either cross-linked butyl rubber or silicone gel strip. Tape shall be supplied in rolls and shall have a backing (release paper) to prevent the tape from sticking to itself.

B. CONSTRUCTION METHODS

1. After conductors have been installed in conduit, a pull test will be made on conductors. When any length of conductor cannot be freely pulled, the Contractor shall make any needed alterations or repairs at no expense to the State.

2. Conductors in illumination poles shall be supported by a J-hook in the top of the pole.

3. A sufficient length of conductor for making up connections shall be left in ground boxes (2 feet minimum to point of splice, 3 feet minimum when conductor is pulled through with no splice), enclosures, and pole bases (1 foot minimum and typical).

4. Splices shall be made only in junction boxes, ground boxes, pole bases, or electrical enclosures and shall be made with approved compression sleeves or split bolt connectors. Splices shall be insulated with heavy wall heat shrink tubing containing factory applied sealant and shall be watertight. Heat shrink sleeve shall overlap conductor insulation a minimum of 2 inches on both sides of the splice. Heat shrink tape filler is required where two or more conductors enter one heat shrink tube to ensure watertight splice. Heat shrink tape shall be either butyl rubber or silicone gel strip.

5. Wire nuts may be used for #8 AWG and smaller conductors in above-ground junction boxes, but not in pole bases or ground boxes. Wire nuts shall be positioned upright to prevent the accumulation of water.

II. GROUND BOX

A. MATERIALS

1. Ground boxes shall be concrete or polymer concrete, as required by the descriptive code shown elsewhere.

2. All precast ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number, name or logo.

3. Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.

4. Ground box Types A, B, C, D & E shall be Polymer Concrete and shall meet the following requirements:

   a. Boxes shall be manufactured from Reinforced Polymer Concrete (RPM) composed of borosilicate glass fiber, a catalyzed polyester resin and an aggregate. Side walls may be fiber reinforced polymer.

   b. Minimum inside dimensions shall be as follows (width x length x depth):

      Type A shall be 11.5 inches x 21 inches x 10 inches , (122311)
      Type B shall be 11.5 inches x 21 inches x 20 inches , (122322)
      Type C shall be 15.25 inches x 28.25 inches x 10 inches , (162911)
      Type D shall be 15.25 inches x 28.25 inches x 20 inches , (162922)
      Type E shall be 11.5 inches x 21 inches x 16 inches , (122317)

   c. Bottom edge of box or extension shall be footed with a minimum 1 1/4 inch flange.

   d. Ground boxes shall withstand a test loading of 20,000 lbs. over a 10 in. by 10 in. area centered on the lid and 600 lbs. per sq. ft. applied over the entire side wall. The model of ground box proposed shall have been tested by a laboratory independent of the manufacturer to meet loading requirements. Certification of such tests shall be submitted to the Engineer for approval.

   e. Covers shall be 2 inch (nominal) thick polymer concrete. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be captive and shall withstand a minimum of 70 ft-lbs torque and shall have a minimum 750 lbs straight pull out strength. Nuts shall be floating. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown below. Cover shall be legibly imprinted with the words "Danger High Voltage" in minimum 1 inch letters. When required, other cover lettering shall be as shown elsewhere on the plans.

5. Cast in place and precast concrete boxes shall be as shown elsewhere in the plans.

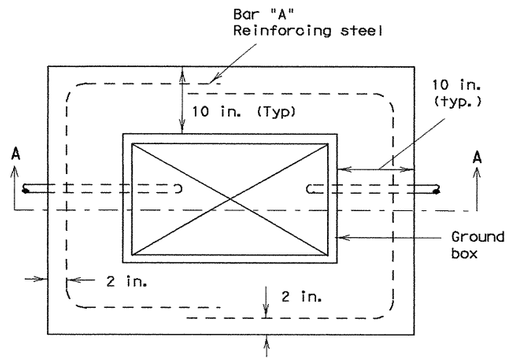
B. CONSTRUCTION METHODS

1. Ground boxes shall be set on a 9 inch (minimum) bed of course No. 1 aggregate as defined by item 421. Gravel shall be in place prior to setting box and conduits shall be capped. Any gravel or dirt in conduit shall be removed.

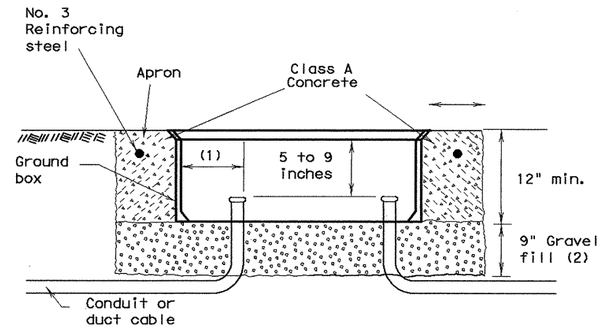
2. When required by Item descriptive code, construction of an apron encasing a ground box including concrete and reinforcing steel shall not be paid for directly but shall be subsidiary to the ground box. Reinforcing steel may be field bent. Concrete for aprons shall be considered miscellaneous concrete for testing purposes.

3. Conduit holes may be cut into the walls of deep boxes at least 18 inches beneath the cover.

4. Steel covers shall be bonded to grounding conductor with a 3 feet long flexible jumper.



PLAN VIEW



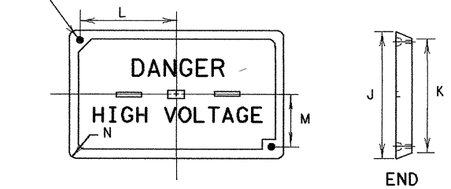
SECTION A - A

(1) Final position of end of conduit shall not exceed one-half of the distance to the side of the box opposite of the conduit entry.

(2) Place gravel "under" the box, not "in" the box. Gravel should not encroach on the interior volume of the box.

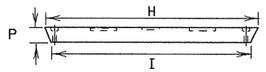
APRON FOR GROUND BOXES

(Where required)



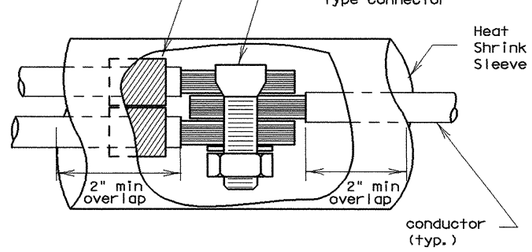
PLAN VIEW

END



SIDE

GROUND BOX COVER



SPLICE DETAIL

GROUND BOX COVER DIMENSIONS								
BOX	DIMENSIONS (INCHES)							
SIZE (WXL)	H	I	J	K	L	M	N	P
12 x 23	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
16 x 29	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

LEVEL LAYED
1 2 3 4 5 6 7
1 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DN: CK: DW: CK:
DATE: ACC: FILE:

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS-CONDUCTORS, GROUND BOXES

ED(2)-98

DN: JM	CK: KB	DW: DN	CK: JM	REC NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
5-93		6	STP 99 (413) 99	180
10-93	COUNTY		CONTROL SECTION JOB	HIGHWAY
4-98	ROCKWALL		1614 03 633	FM740

ELECTRICAL SERVICES NOTES

All work, materials, services, and incidentals, whether or not specifically shown on the plans, which may be necessary for a complete and proper electrical service installation as specified in the plans to obtain electrical power (except extending primary lines to electrical service) shall be paid for, performed, furnished and installed by the Contractor. The Contractor shall contact the Utility for metering and shall comply with all Utility requirements.

Primary line extensions, when required, shall be paid for under Force Account work. The Contractor shall consult with the appropriate Utility to determine costs and requirements, and shall coordinate the Utility's work as approved by the Engineer. The contractor shall be reimbursed only the amount billed by the Utility. No additional amount for supervision of the Utility's work will be paid.

Materials shall be new and unused, and materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards and shall be Underwriters Laboratories (UL) Listed. Electrical Service conduits, conductors, disconnects, contactors, circuit breaker panel sizes, and branch circuit breakers, shall be as shown in the Electrical Service Data elsewhere in the plans. Faulty fabrication or poor workmanship in any material, equipment, or installation shall be justification for rejection.

The Contractor shall submit for approval no less than five (5) copies of catalog cut sheets on electrical service materials. Submittals shall be legible and shall be marked to incicate which product on a cut-sheet is to be supplied. Where manufacturers provide warranties and guarantees as a customary trade practice, Contractor shall furnish to the State such warranties or guarantees.

I. Safety Switch. A safety switch, placed ahead of the meter, shall only be used when specified by the Utility and is shown on the Electrical Service Data. The switch shall be UL Listed, heavy duty type, 600 volt, unfused, with a UL type 3R enclosure and equipped with a solid neutral (s/n) assembly. The switch shall be padlockable in the "on" position.

II. Service Type. Electrical service types A, C, D, and T shall be as schematically detailed on ED(4). Other service types shall be as detailed elsewhere on the plans.

III. Branch Circuit Breakers. Circuit breakers shall be thermal magnetic and have a minimum interrupting capacity of 10,000 amps and a voltage rating compatible with their use. Circuit breakers shall be sized as shown on electrical service data table. Circuit breakers in panelboards and load centers shall be full size and designed exclusively for the panelboard or load center in use. Tandem and half-width breakers shall not be used. All circuit breakers shall be permanently and clearly marked identifying the circuit or device attached. Circuit breakers shall be UL Listed to UL489. Circuit breakers shall beswitch duty.

IV. Circuit Breaker Panelboard. Panelboards shall be UL Listed and shall meet Federal Specification W-P-115b, Type 1, Class 1 requirements. Panelboards shall have copper busses, a minimum of 12 one-pole spaces, and shall be rated for service equipment. Enclosure shall meet UL type 3R classification. Panelboards shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be bolt-in type only.

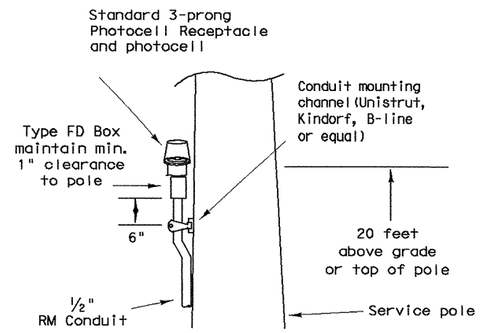
V. Circuit Breaker Load Center. Load centers shall be UL Listed, and shall meet Federal Specification W-P-115c, Type 1, Class 2 requirements. Load centers shall have copper busses, a minimum of 4 one-pole spaces, and shall be rated for service equipment. Enclosure shall meet UL type 3R classification. Load centers shall have a threaded hub conduit entry for conduit entering the top of the enclosure. Circuit breakers shall be plug-in type only. Load centers for type T services shall accomodate a maximum of 6 one-pole breakers.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

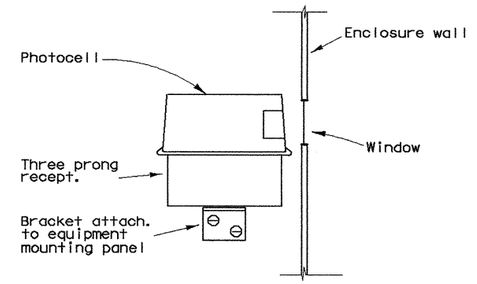
ELEC SERV TY X (XXX/XXX) XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage (V / V)
- Main Disconnect Amp Rating (000 indicates none)
  - SS= Safety switch ahead of meter
  - NS= No switch ahead of meter and/or no meter required
- Enclosure Type
  - GS= Galvanized steel
  - SS= Stainless steel
- Photocell Location
  - T= Top of pole
  - E= Enclosure mounted
  - L= Luminaire mounted
  - N= None
- Service Support Type
  - GC= Granite concrete
  - OC= Other concrete
  - TP= Timber pole
  - SP= Steel pole
  - SF= Steel frame
  - OT= Pole by others or paid for separately
  - EX= Existing pole
  - TS= Switch gear to be placed on traffic signal pole
  - RT= Rectangular structural tubing
  - PS= Pedestal Service
- O= Overhead service
- U= Underground service

Example: ELEC SERV TY D(120/240)070(NS)GS(T)TP(O)

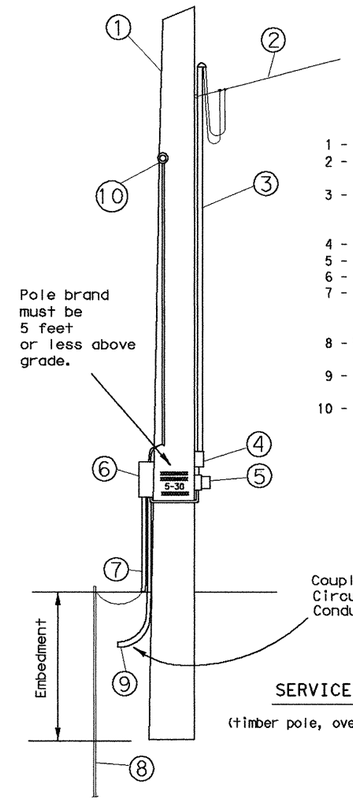


TOP MOUNTED PHOTOCELL



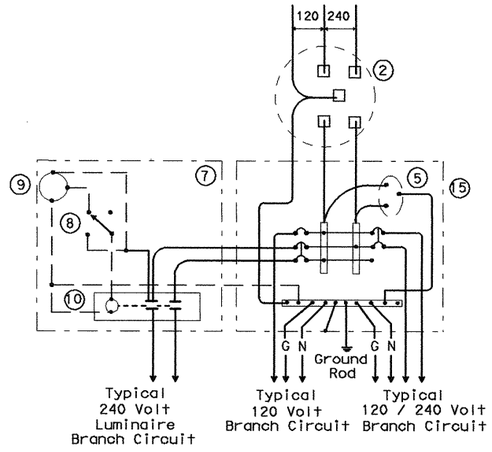
ENCLOSURE MOUNTED PHOTOCELL

For photocell specifications see ED(4),XII.



SERVICE SUPPORT TYPE TP (O)

(timber pole, overhead service, typical arrangement)



SCHEMATIC TYPE T

120/240 VOLTS - THREE WIRE

[Install photocell and lighting contactor when shown on Electrical Service Data.]

SCHEMATIC LEGEND

1 - Safety Switch (when required)
2 - Meter (when required)
3 - Service Assembly Enclosure
4 - Main Disconnect (Switch or Breaker, See Electrical Service Data)
5 - Lightning Arrestor
6 - Circuit Breaker, 15A
7 - Auxiliary Enclosure
8 - Control Station ("H-O-A" Switch)
9 - Photo Electric Control (enclosure-mounted shown)
10 - Lighting Contactor
11 - Power Distribution Terminal Blocks
12 - Neutral/Ground Bus
13 - Branch Circuit Breaker (See Electrical Service Data)
14 - Circuit Breaker Panelboard (See Electrical Service Data)
15 - Load Center (See Electrical Service Data)

——— Power Wiring
– – – – Control Wiring
——N—— Neutral Conductor (when required)
——G—— Grounding Conductor

TIMBER POLE NOTES

1. Conduit and conductors attached to service pole and underground within 12 inches of service pole shall not be paid for directly but shall be subsidiary to the service pole.
2. Install photo electric control on north side of pole or in service enclosure as required. See Electrical Service Data.
3. Attach service enclosure with galvanized channel (Unistrut, Kindorf, or equal). Gain pole two places to provide flat surfaces. Paint ends of channel with zinc rich paint.
4. Embedment depth shall be as required in Item 627 Treated Timber Poles.
5. Poles trimmed for excess length shall be trimmed from the top end only.

DN: CK: DW: CK:

DATE: FILE:

LEVEL: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

LAYER: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ELECTRICAL DETAILS- SERVICE SCHEMATICS AND SUPPORT-TYPE TP (OVERHEAD)

ED(3)-98

DN: KB	CK: TB	DW: DN	CK: JM	MEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
		6	STP 99(413)MM	181

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
DALLAS	1014	03	033	FM 740

71C

x4497

SERVICE ENCLOSURE NOTES

VI. Service Assembly Enclosures. All service assemblies and enclosures shall be UL Listed for the intended purpose.

A. Shop built or shop assembled service assemblies (all types except Type T and Type D without lighting contactor) shall be built or assembled by a UL Listed Industrial Control Panel shop and shall have a unique serial numbered UL Label with the words "LISTED ENCLOSED INDUSTRIAL CONTROL PANEL". The same or an additional label shall have the name, location, and phone number of the shop, the UL file number of the shop, the shop order or drawing number, date of manufacture or assembly, and the line voltage. The enclosure shall also be labeled "SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT".

B. Conduit entries into the top of all enclosures shall have threaded hubs.

C. All enclosures shall be permanently labeled on the front door "DANGER HIGH VOLTAGE" and the equipment supplied (i.e. LIGHTING, LANDSCAPING, SIGNALS, TRAFFIC MANAGEMENT). Unless otherwise approved by the Engineer, the labeling shall be minimum 1 inch letters and shall be applied by stenciled paint or stick-on decal.

D. Type GS enclosures for service types D, T, and the circuit breaker panelboard of service type C shall be made from pre-galvanized steel sheeting, hot dipped galvanized steel, or powder coat painted steel. Painted enclosures shall be painted inside and outside; galvanized enclosures may be painted. Unless otherwise approved by the engineer, painted enclosures shall be gray, beige, or white. Panelboard/loadcenter enclosures shall be UL type 3R, shall have a dead front trim, and shall have a door with provisions for padlocking. Auxiliary enclosures, when required for illumination or other control equipment, shall be UL type 12 as described in III.E. below for service types A and C.

E. Type GS enclosures for service types A and C shall meet the requirements of type GS in III.D. above for service types D and T except that the enclosure shall be a UL type 12 enclosure conforming to UL 50 and shall meet additional requirements of this paragraph. The enclosure door shall have a rolled lip around all sides of the enclosure opening, a continuous hinge, and a padlock handle. The door shall have a mechanically attached data pocket constructed of either thermoplastic or metal and measuring at least 12 inches by 12 inches. The main disconnect operator shall be flange-mounted, shall interlock the door when in the "on" position, and shall be pad lockable in both the "on" or the "off" positions. Enclosure shall include an equipment mounting panel installed inside the enclosure on collar studs or tapped bosses, and constructed of either 12-gauge steel or 0.10 inch thick aluminum. Enclosure shall be either hot dip galvanized, pre-galvanized sheeting or prime and painted. Paint shall be powder coat paint as show below. Color shall be white or gray. Condensation drainage shall be provided through 0.25 inch drain holes drilled in the bottom of the enclosure at two diagonal opposing corners. The contractor shall place in the service enclosure a laminated copy of the "as built" electrical plans showing the equipment supplied by that electrical service and all applicable wiring diagrams, layouts, and ED and RID standard sheets.

F. Type SS Stainless steel enclosure shall be meet all the requirements above for the respective type GS except that the enclosure shall be UL type 4X conforming to UL 50. Type GS circuit breaker panel housed in a stainless steel UL type 4X enclosure conforming to UL 50 shall be considered complying with the Type SS requirements for Service types D & T.

G. Type PS enclosure shall be as detailed and specified on ED(8).

VII. Powder Coat Paint. Powder coating shall be either a polyester thermosetting resin, a zinc rich primer with a TGIC (triglycidyl isocyanurate) powder overcoating, or a zinc-rich epoxy powder, applied by either electrostatic spray or fluidized bed immersion, high temperature oven cured, high density, low gloss, 4 mil thick (minimum), coating. Adhesion shall meet the 5A or 5B classifications of ASTM D3359. Finish shall be uniform in appearance and free of scratches.

VIII. Main Disconnect. Main disconnect device shall be either a fusible switch or a circuit breaker, as specified in the Electrical Service Data, shall be two pole, and rated for the voltage and amperage specified.

A. Switch shall be UL and NEMA Type HD (heavy duty) flange-mounted in the service assembly enclosure. Switch shall have clips for Class R fuses.

B. Circuit breaker shall be a UL Listed thermal-magnetic circuit breaker flange-mounted in the service assembly enclosure. Circuit breakers shall have a minimum interrupting rating of 14,000 Amps. Contractor shall verify that the available fault current is less than the circuit breaker amps interrupting capacity (AIC) rating and shall provide documentation from the Utility to the Engineer. Documentation shall be submitted at the same time as other electrical submittals. Circuit breaker shall be UL Listed to UL489.

IX. Lightning Arrester. Arresters shall be MOV-type secondary surge arresters rated 650 volts for 240/480 volt services or 175 volts for 120/240 volt services and shall meet ANSI, IEEE, UL, and NEMA standards. Mounting brackets shall be provided for mounting the arresters inside the service assembly enclosures, unless otherwise specified by the Engineer. Lightning arrester leads shall be run as straight and short as practical.

X. Control Circuit. Control circuit protection shall be either a 10 or 15 amp circuit breaker.

XI. Control Station ("H-O-A" Switch). Control station shall be a maintained-contact, three position selector switch in a UL type enclosure. Switch shall be rated 600 volts and shall be fitted with "Hand-Off-Auto" legend.

XII. Photo Electric Control. Photo electric control shall consist of a photocell, internal lightning arrester, and relay or bimetallic switch mounted inside a weatherproof enclosure with standard 3-prong twist lock photocell plug and receptacle. The enclosure shall be made of poly-acrylic with clear acrylic window. Enclosure chassis shall be molded phenolic plastic. The photocell shall have a polyethylene gasket, and shall have a hermetically sealed cadmium sulfide cell. The arrester shall have an enclosed type expulsion arrester rated 2.0 kV sparkover with 10,000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photo electric control shall be rated 1800 VA, 105-285 volts.

Enclosure mounted photocells shall be the same as above except that the photocell shall be mounted inside the enclosure. The enclosure shall have two acrylic paned windows, or other material approved by the Engineer, one on each side of the enclosure. Each window shall be rectangular approximately 1 inch by 2 inch, round 2 inch diameter, or as otherwise approved by the Engineer. The photocell shall be mounted in a position to receive light from one window. Top of pole mounted photocells shall be mounted as shown on ED(4).

The Contractor shall be responsible for proper operation of the photo-electric control. The Contractor shall move and/or adjust or shield the photocell from stray or ambient nighttime light or shall make any other adjustments required for proper operation. The photocell shall face North when practicable. Unless otherwise shown on the plans, the photocell shall turn on the illumination system at 1.0 +(-) 0.5 footcandle and turn off the illumination system at 2 footcandles higher than turn on.

XIII. Lighting Contactor. Lighting contactor shall be a UL Listed lighting contactor, two-pole or multipole as required, electrically held type designed to control high pressure sodium lighting loads, with silver alloy double break contacts rated at 480 volts or 600 volts.

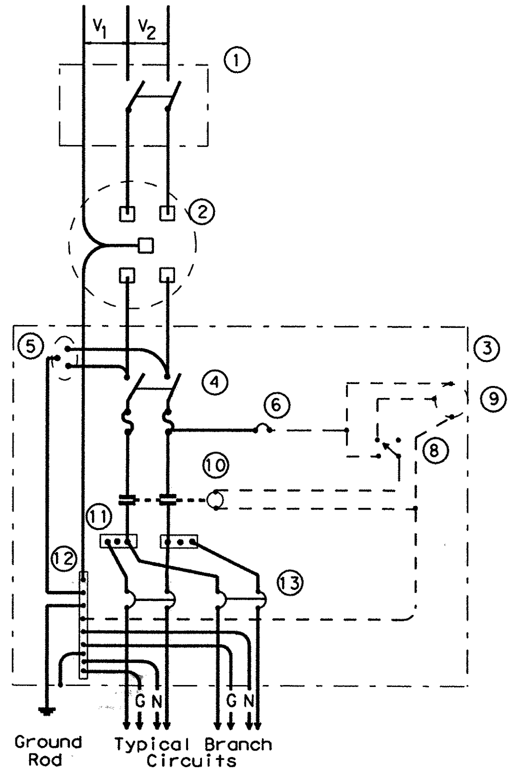
XIV. Power Distribution Terminal Blocks. Power distribution terminal blocks shall be rated for 600 volts and shall be used for line side connections to branch circuit breakers where more than one circuit breaker is required. Lugs on blocks shall be properly sized for conductors being used. Only one conductor shall be placed under each lug.

XV. Neutral/Ground Bus. Neutral/ground bus shall be a factory made bus permanently bonded to the enclosure with properly sized lugs for grounding and neutral conductors.

SCHEMATIC LEGEND

1 - Safety Switch (when required)
2 - Meter (when required)
3 - Service Assembly Enclosure
4 - Main Disconnect (Switch or Breaker, (See Electrical Service Data)
5 - Lightning Arrestor
6 - Circuit Breaker, 15A
7 - Auxiliary Enclosure
8 - Control Station ("H-O-A" Switch)
9 - Photo Electric Control (enclosure-mounted shown)
10 - Lighting Contactor
11 - Power Distribution Terminal Blocks
12 - Neutral/Ground Bus
13 - Branch Circuit Breaker (See Electrical Service Data)
14 - Circuit Breaker Panelboard (See Electrical Service Data)
15 - Load Center

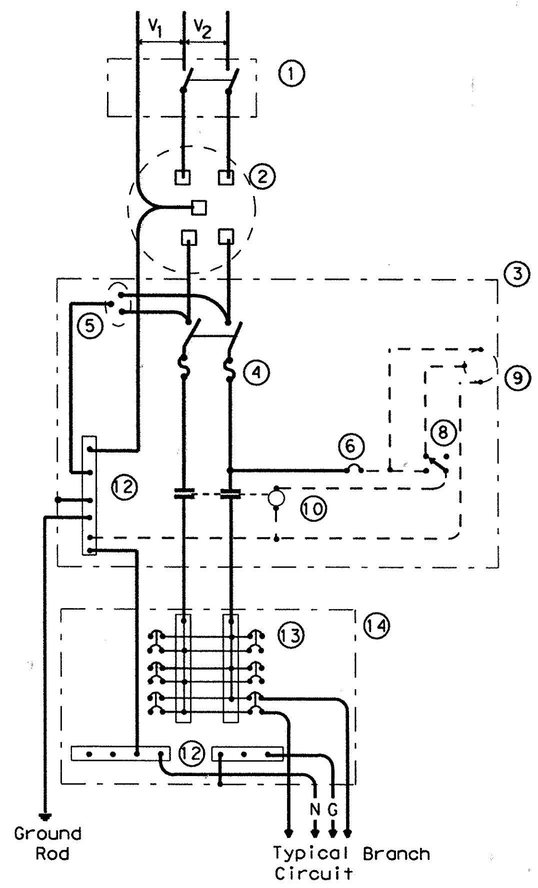
———— Power Wiring
– – – – Control Wiring
—N— Neutral Conductor (when required)
—G— Grounding Conductor



SCHEMATIC TYPE A

THREE WIRE

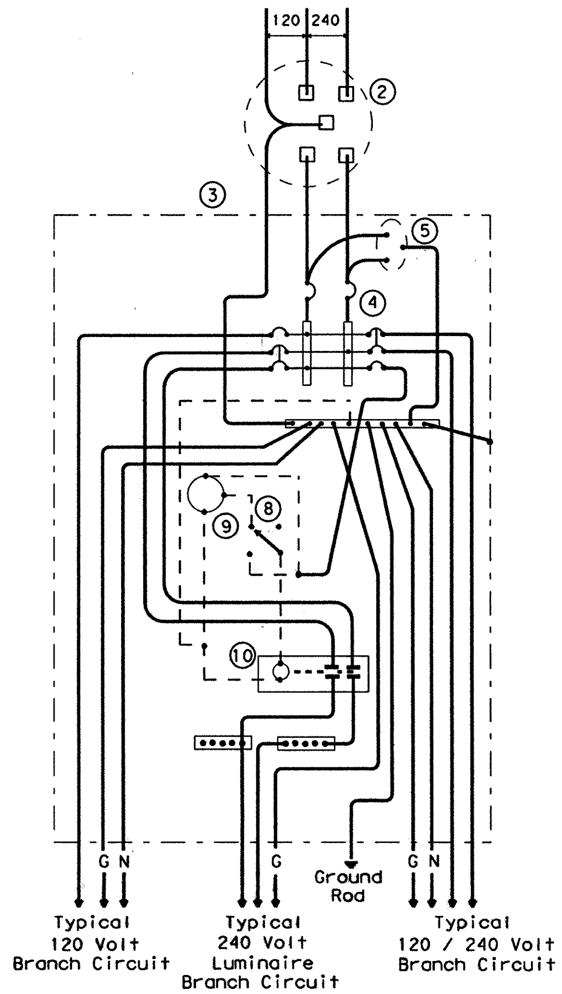
Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.



SCHEMATIC TYPE C

THREE WIRE

Maximum feeder circuit size (High Mast Poles): 100 amps for two pole 480V, 125 amps for one or two pole 120V or 240V. Maximum branch circuit size: 50 amps.



SCHEMATIC TYPE D

120/240 VOLTS - THREE WIRE

Install photocell and lighting contactor when shown on Electrical Service Data. See Type D service notes.

TYPE D SERVICE NOTE

Photocell and lighting contactor shall be located in the same UL type 3R enclosure. Photocells shall have a window on each side of enclosure to allow operation. Photocell/contactor and breaker area shall have separate dead front trim. Enclosure, except for RT and PS supports, shall not exceed 36 inches in height or 15 inches in width unless approved by the engineer.

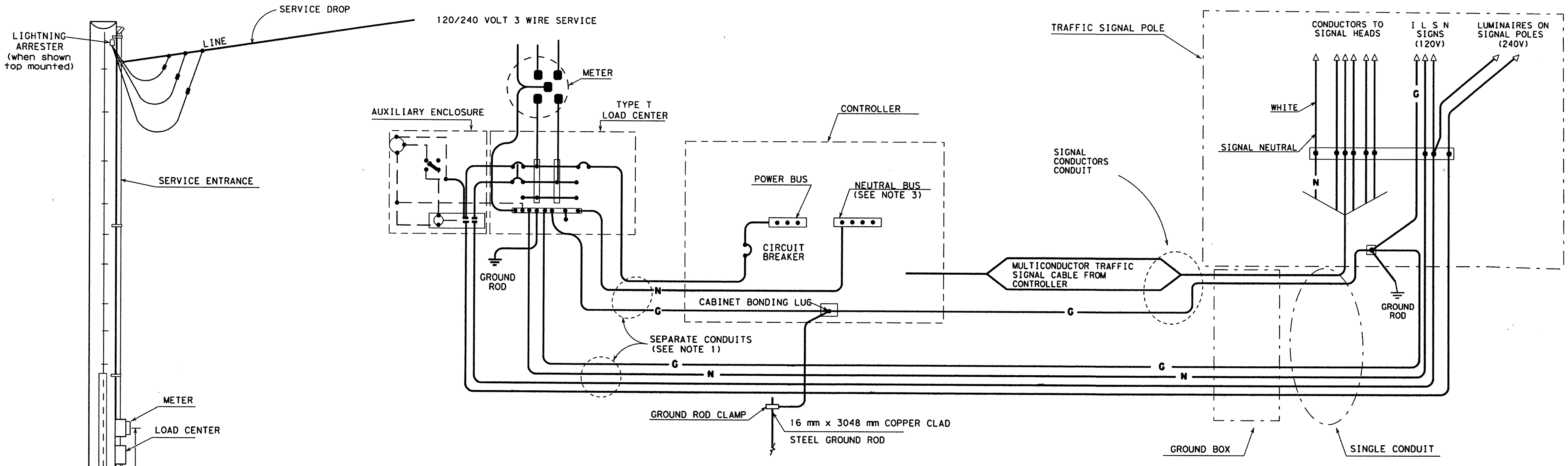
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

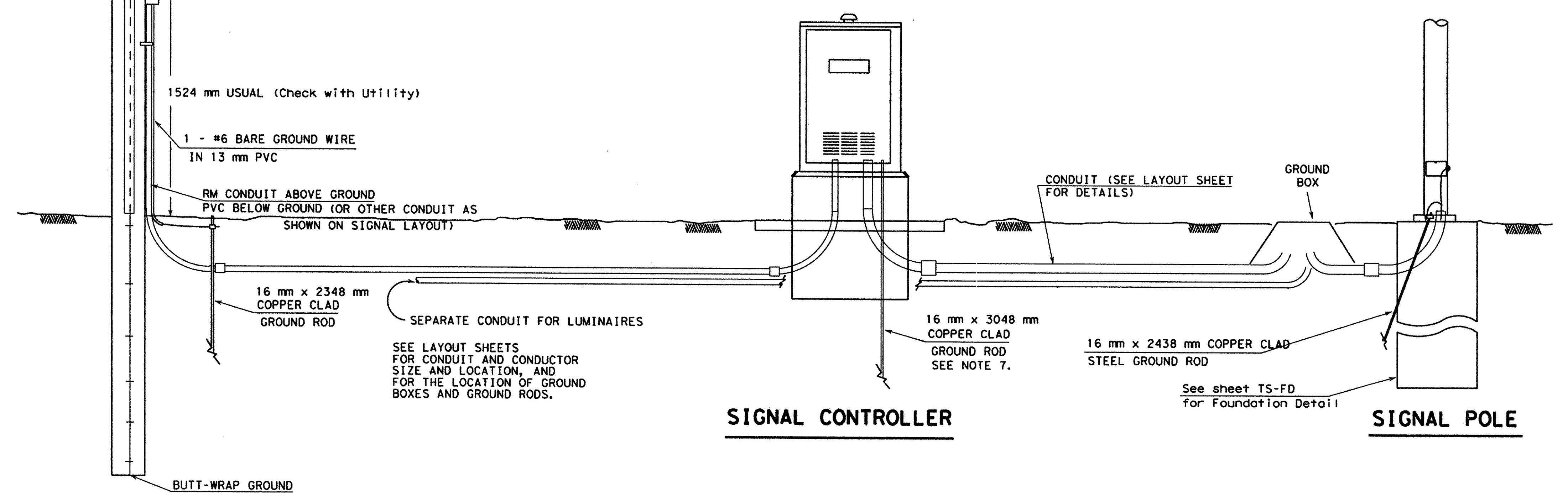
ELECTRICAL DETAILS-
SERVICE ENCLOSURE
& NOTES

ED(4)-98

©TxDOT April 1998	DN: KB	CK: TB	DW: DN	CK: JM
REVISIONS: STATE DISTRICT 18	FEDERAL REGION 6	FEDERAL AID PROJECT STP 99(413)MM		SHEET 182
COUNTY DALLAS	CONTROL 1014	SECTION 03	JOB 033	HIGHWAY FM 740

71D





ELECTRICAL SERVICE

(TYPE T TIMBER POLE SHOWN AS EXAMPLE, SEE ELECTRICAL DETAILS, LAYOUT SHEETS, AND ELECTRICAL SERVICE DATA SHEET FOR SERVICE REQUIRED AND FOR DETAILS.)

NOTES:

1. Luminaire conductors shall not be looped through controller cabinet.
2. Electrical system to include an equipment grounding conductor noted here as "G". All exposed metal parts, lightning arrestors and surge protectors are to be bonded to grounding conductor.
3. Bond neutral bus to cabinet bonding lug when required elsewhere on the plans or when required by the Engineer.
4. Photocell, when required, shall be mounted at top of pole or in enclosure as shown on ED(3) and ED(4) and as required by descriptive code.
5. Roadway lighting fixtures, when required, shall be in accordance with the material and construction methods of the Item, "Roadway Illumination Assemblies" except for the test period for proper operation of the luminaires. Installed roadway lighting luminaires and internally lighted street name signs shall be tested for proper operation as a part of the associated traffic signal system.
6. Internally lighted street name signs (ILSN), when required, shall be in accordance with the Item "Internally Lighted Street Name Signs". Because of the electrical isolation of ILSN hinges, a #12 green grounding conductor shall be run to the ILSN fixture.
7. Install ground rod at alternate location when directed by the Engineer. Maintain a minimum of 2400 mm in contact with the earth.

All dimensions are in millimeters unless otherwise noted.

Unless shown elsewhere in the plans, electrical service data for Types D and T shall be as follows.

ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION (SEE ED(3))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT SWITCH AMP/FUSES	MAIN DISCONNECT CKT. BRK. POLE/AMP	TWO-POLE CONTACTOR AMPS	PANELBD./LOADCENTER AMP RATING (MIN)	CIRCUIT NO.	BRANCH CKT. BRK. POLE/AMPS	KVA LOAD
TY D (120/240)070(NS)GS(E)**(*)	38 mm	3/#4	N/A	N/A	2P/70	20	70	T.S. Lighting	1P/50 2P/20	<7.1
TY T (120/240)000(NS)GS(E)**(*)	38 mm	3/#4	N/A	None	None	20	70	T.S. Lighting	1P/50 2P/20	<7.1

** See descriptive code in estimate for service support type.
* See descriptive code in estimate for overhead or underground service.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

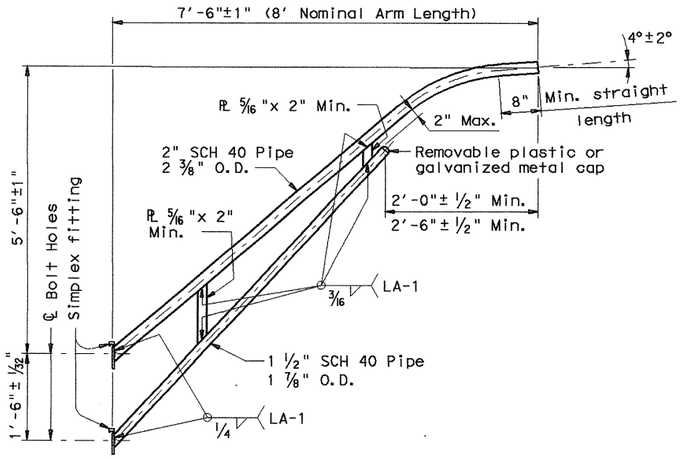
ELECTRICAL DETAILS- TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(7)-98(M)

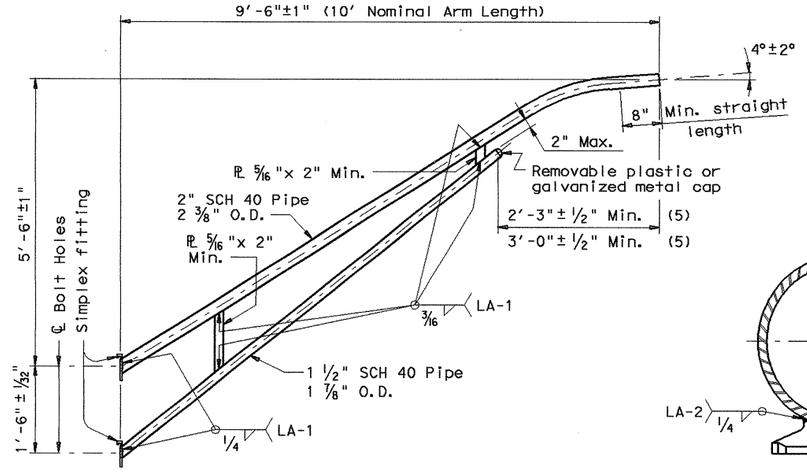
©TxDOT January 1992 | DN: KB | CK: TB | DW: RS | CK: TB
REVISIONS: 5-93, 10-93, 1-96, 4-98
STATE DISTRICT: 18 | FEDERAL REGION: 6 | FEDERAL AID PROJECT: STP 99(413)MM | SHEET: 183
COUNTY: DALLAS | CONTROL: 1014 | SECTION: 03 | JOB: 033 | HIGHWAY: FM 740
Metric 71G

DATE:
ACC: d58hplc/usr/d580504
FILE:
DN: CK: DW: CK: MT

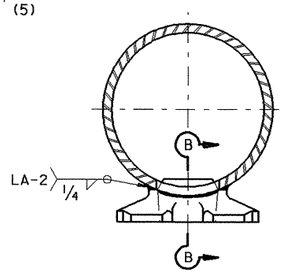
LEVELS DISPLAYED | ACC: | (LV=1,2 for English; 1,3 for Metric)



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 GR 65-35 or A148 GR 80-50 or A576 GR 1021 (4) or A36 (Arm only)
Arm Pipes	ASTM A53 GR A or B or A500 GR B or A501 or A595 (2) or A715 GR 50
Arm Plates (3)	ASTM A36 or A572 GR50 (1) or A595 GR A or A588
Misc.	ASTM designations as noted

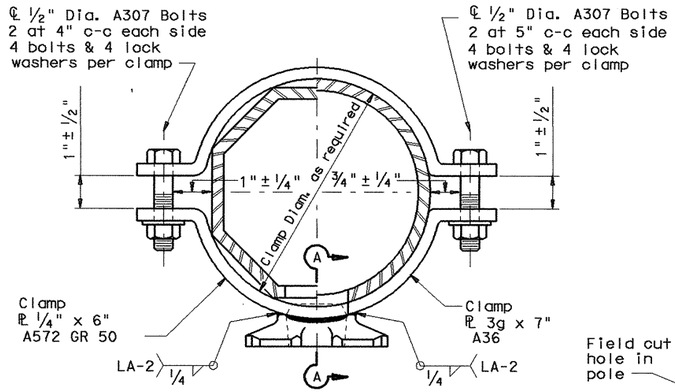
(1) ASTM A36M50 steel as described in Item 442 "Metal for Structures" may be used in lieu of A 572 GR 50.

(2) If A595 GR A material is used, arm need not be cold worked to A595 requiremants, but material must have 40 ksi minimum yield prior to fabrication.

(3) Either of the materials listed for pates may be used where the drawings do not specify a particular ASTM designation.

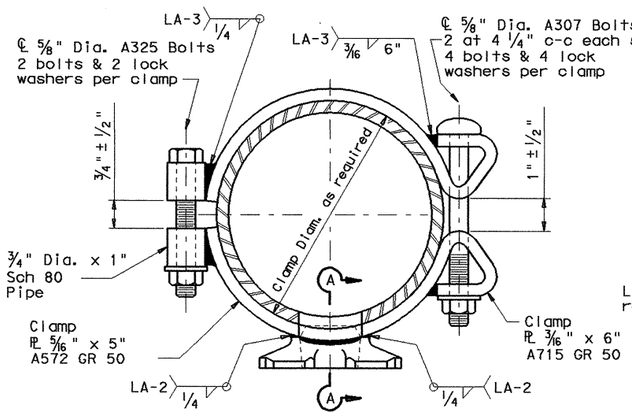
(4) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(5) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.



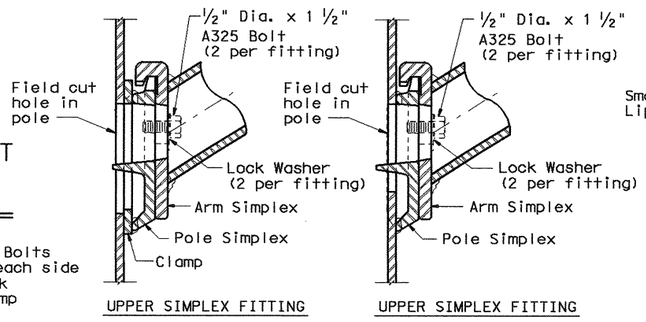
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

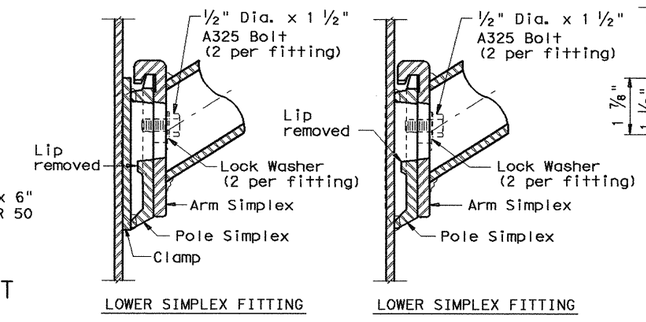
CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

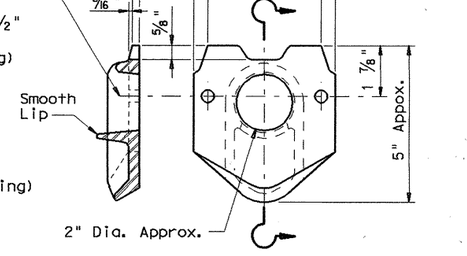
CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



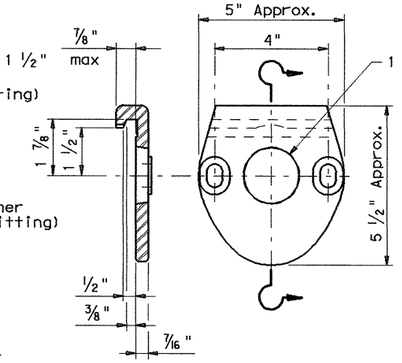


SECTON A-A

SECTON B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 75 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.5 sq. ft.

Materials and fabrication shall be in accordance with the Specificatons and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with the Specifications.

Special designs require submission of shop drawings in accordance with the item "Steel Structures".

Each pole simplex fitting shall be supplied with 2 A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

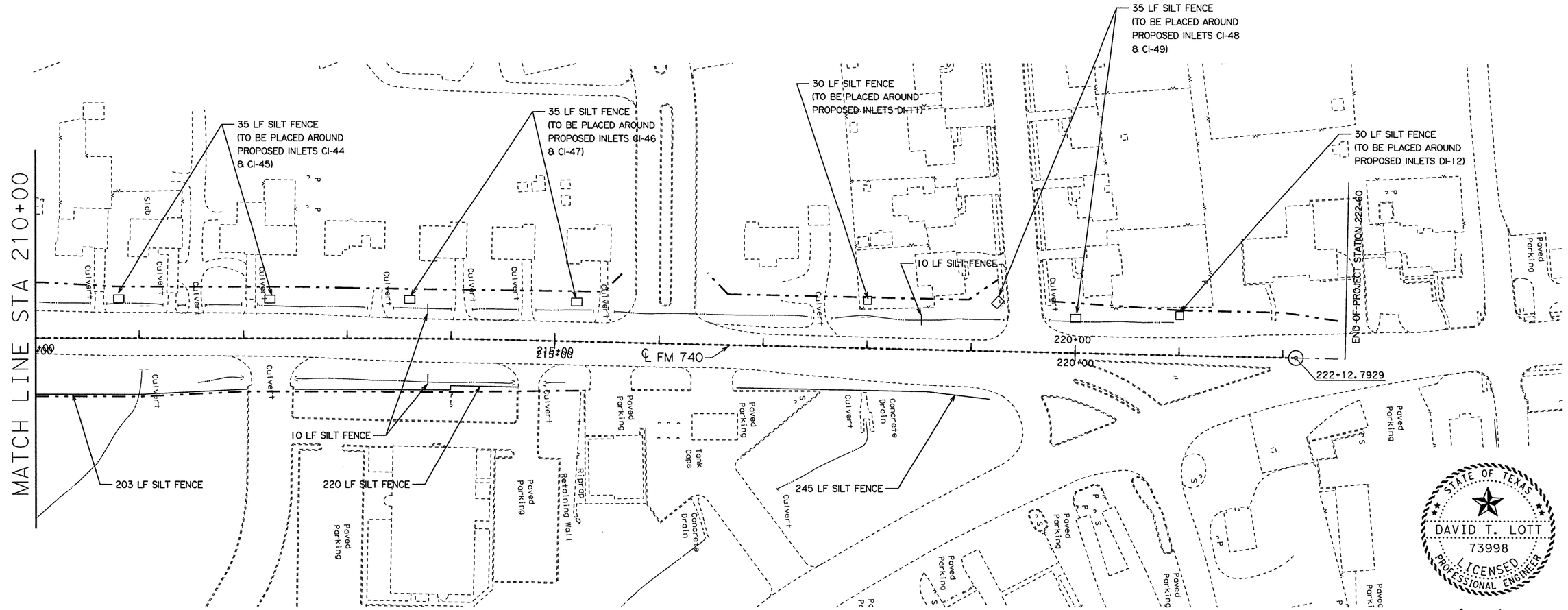
LUM-A-96

FILE: lum-a.dgn	DN: LEH	CK: JSY	DW: LTT	CK: TEB	STD:	
ORIG DATE: August 1995	DIST	FED REG	FEDERAL AID PROJECT #			SHEET
REVISIONS	DALLAS	6	STP 99(413)		MM	184
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM 740

129

×4497

D:\FM740\ECP9.DGN



PLAN SCALE 1" = 100'

STATE OF TEXAS
DAVID T. LOTT
73998
LICENSED PROFESSIONAL ENGINEER

8/16/, 1999

David Lott, P.E.

STORM WATER POLLUTION PREVENTION PLAN

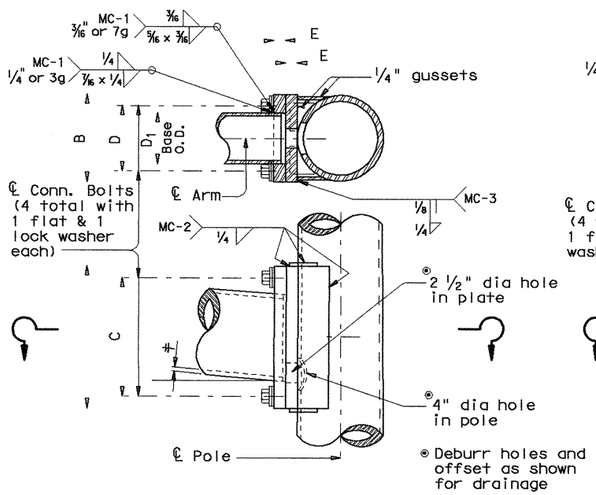
SHEET 9 OF 9

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6	STP 99(413)MM		1844
STATE	STATE DIST. NO.	COUNTY	
TEXAS	18	ROCKWALL	
CONT.	SECT.	JOB	HIGHWAY NO.
1014	03	033	FM 740

FEBRUARY 10, 1998

199A

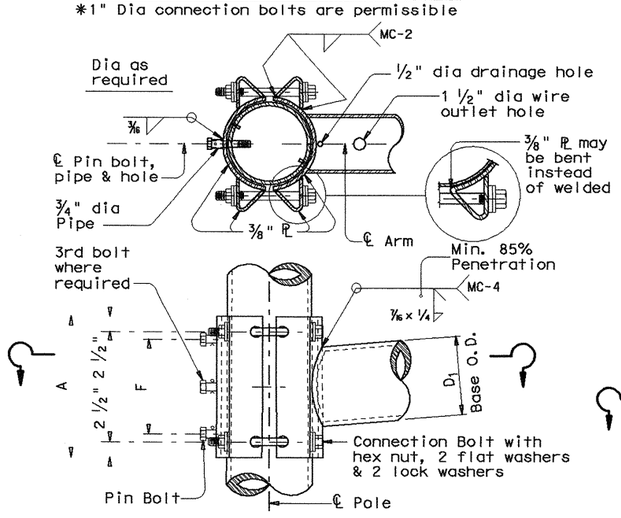
ARM SIZE D_1	ARM SIZE ∓	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1	1
7.5	.179	13	9	10	6	1	1
8.0	.179	14	10	11	7	1 ¼	1 ¼
9.0	.179	16	11	13	8	1 ¼	1 ¼
9.5	.179	17	12	14	9	1 ¼	1 ¼
9.5	.239	18	12	15	9	1 ¼	1 ¼
10.0	.239	18	12	15	9	1 ¼	1 ¼
10.5	.239	18	13	15	10	1 ½	1 ½
11.0	.239	18	13	15	10	1 ½	1 ½



FIXED MOUNT DETAIL 1

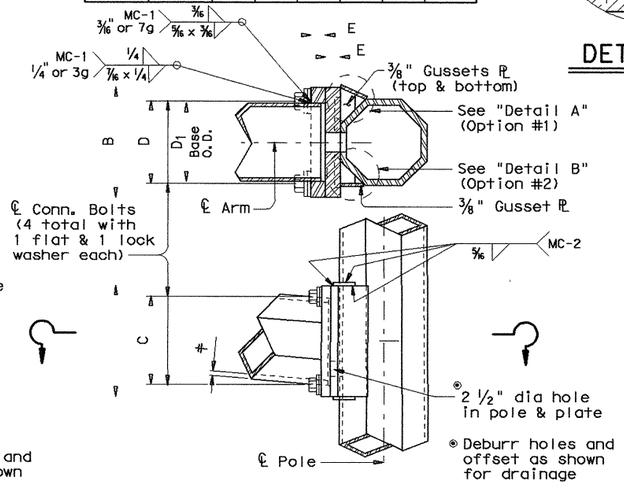
ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	8	4	* ⅞	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	4	1 ¼	3	⅝
9.5	.239	18	12	4	1 ¼	3	⅝
10.0	.239	18	12	4	1 ¼	3	⅝

*1" Dia connection bolts are permissible



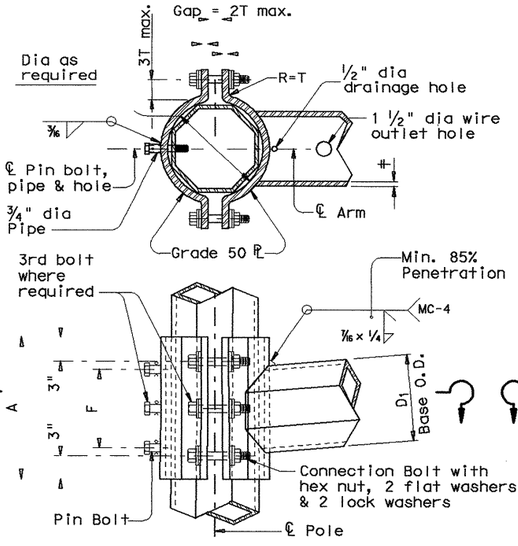
CLAMP-ON DETAIL 1

ARM SIZE D_1	ARM SIZE ∓	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 ¼	1 ¼
7.5	.179	11	11	8	8	1 ¼	1 ¼
8.0	.179	11	11	8	8	1 ¼	1 ¼
9.0	.179	13	13	10	10	1 ¼	1 ¼
10.0	.179	13	13	10	10	1 ¼	1 ¼
9.5	.239	13	13	10	10	1 ¼	1 ¼
10.0	.239	14	14	11	11	1 ½	1 ½
11.0	.239	14	14	11	11	1 ½	1 ½
11.5	.239	14	14	11	11	1 ½	1 ½



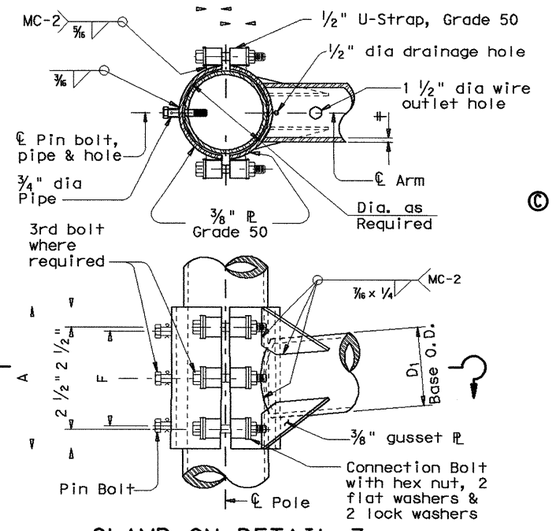
FIXED MOUNT DETAIL 2

ARM SIZE D_1	ARM SIZE ∓	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	8	¾	4	¾	2	⅝
7.5	.179	14	8	¾	4	¾	2	⅝
8.0	.179	14	8	¾	4	¾	2	⅝
9.0	.179	16	10	⅞	4	1	2	⅝
10.0	.179	18	10	⅞	4	1	2	⅝
9.5	.239	18	10	1	6	1	3	⅝
10.0	.239	18	10	1	6	1	3	⅝

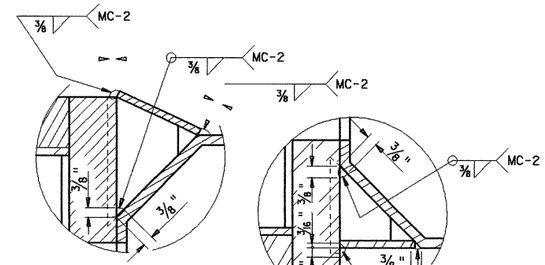


CLAMP-ON DETAIL 2

ARM SIZE D_1	ARM SIZE ∓	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	8	4	1	2	⅝
7.5	.179	14	8	4	1	2	⅝
8.0	.179	14	8	4	1	2	⅝
9.0	.179	16	10	4	1	2	⅝
9.5	.179	18	12	6	1	3	⅝
9.5	.239	18	12	6	1	3	⅝
10.0	.239	18	12	6	1	3	⅝



CLAMP-ON DETAIL 3



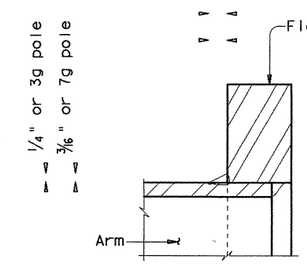
DETAIL A

DETAIL B

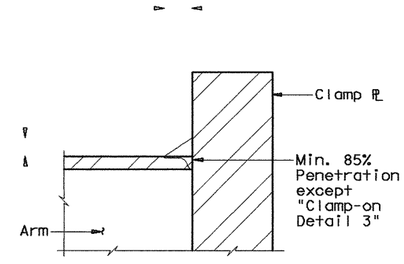
MATERIALS	
Round Shafts or Polygonal Shafts	ASTM A595 GR A, ASTM A570 GR 50, ASTM A607 GR 50, ASTM A572 GR 50 or A36M50
Plates (1)	ASTM A36 OR A572 GR 50 or A595(2) or A36M50
Connection Bolts	ASTM A325 except where noted
Pin Bolts	ASTM A325
Pipe	ASTM A53 GR A or B, or A501
Misc. Hardware	Galvanized steel or stainless steel or as noted

(1) Any of the materials listed for plates may be used where the drawings do not specify a particular Grade designation.

(2) If A595 material is used, it need not be cold worked to A595 requirments, but material must have 40 ksi minimum yield prior to fabrication.



FIXED MOUNT ARM



CLAMP-ON ARM

ARM BASE WELD DETAILS

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" dia holes for a ⅛" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-96

FILE: MA-C.DGN	DN: MS	CK: JSY	DW: MMF	CK: JSY
ORIG DATE: AUGUST, 1995	DIST	FED REG	FEDERAL AID PROJECT NO.	SHEET
REVISIONS	DALLAS	6	STP 99(215)MM	185
	COUNTY		CONTROL SECT JOB	HIGHWAY
	ROCKWALL		1014 03 033	FM 740

126A

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC: d48npiq:/usr/d482517

LV=1,2 for English 1,3 for Metric

x4497

II. ROADWAY ILLUMINATION ASSEMBLIES (cont.)

B. Transformer Base

1. Transformer base shall be cast from aluminum, ASTM B-108 or B-26 Alloy 356.0-T6, or other material approved by the Engineer, and shall be furnished with eight 1/2 inch flat washers as recommended by the manufacturer. Transformer base bolt circles (Top and Bottom) shall match bolt circles for poles and foundations shown on RID (3).

2. Transformer base shall be approximately 15-20 inches high and shall have a door approximately 13 inches x 8 inches x 9 1/4 inches or as otherwise approved by the Engineer. Screw or bolts for attachment of door to base shall be stainless steel. Four machine bolts with four nuts, eight 1/2 inch flat washers and four lock washer, galvanized ASTM A-153 Class C or D, or B-695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A-563 grade DH galvanized. A 1/2-13 NC female threaded grounding lug shall be provided inside the transformer base near the bottom.

3. The X-base shall be made from extruded aluminum channel and aluminum plate. The base breakaway features shall rely on bolt shear and not on bolt torque. Bolt shall have torque controlled break-off hex-head. Bolt shall be Aluminum Association type 2024-T4 aluminum. X-base channel shall be connected with aluminum bolts. Bolt shall be left hand thread and shall not be interchangeable with any other bolt not designed specifically for use with the X-base.

4. All breakaway bases shall meet the breakaway requirements of the AASTHO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," latest edition, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to meet or exceed the full designed plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with shop drawings. Shop drawings shall show breakaway base model number and manufacturer's name or logo.

5. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.

6. Doors for transformer bases shall be made of plastic, fiberglass or other non-aluminum material approved by the Engineer. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

C. All Luminaires.

1. The luminaire housing shall be cast or drawn from a non-ferrous alloy and shall be free of cracks and excessive porosity. All nuts, screws, clips, washers and attaching hardware shall be made of stainless steel; steel electro-zinc-plated, minimum thickness 0.0002 inches with olive green drab or yellow chromate conversion coating; steel coated with an acidic chromate-phosphate-binder system primer, top coated with a polytetrafluoroethylene modified silicon primer, bright metallic in color, meeting the requirements of General Motors automotive specification GM 164M; or other approved conversion coatings except that brackets may be made from pre-galvanized steel. All threaded surfaces used in the housing shall be lubricated with a silicone grease.

2. The slipfitter shall securely clamp the luminaire to the mast arm. A positive means of vertical adjustments shall be provided. The refractor or lens shall be clear glass. The optic assembly shall be provided with resilient gaskets and so constructed that a positive seal against weather and other contaminants will be maintained. The latch shall provide a positive means of maintaining closure of the luminaire. The socket shell shall be nickel plated and shall be rigidly attached to a high grade porcelain mogul base which shall extend and enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. Reflectors shall be polished aluminum with Alzak or equal coating and shall not be painted.

3. Mast-arm mounted luminaires shall be provided with a leveling indicator which is clearly visible from the ground. Leveling indicator shall be sensitive to one (1) degree (maximum) changes in position at any point within five (5) degrees (minimum) level position. Unless otherwise directed by the Engineer, mast-arm mounted luminaires will be installed in the level position.

4. Underpass luminaires shall be fused internally. Fuses shall be 10 amp time-delay type.

△1 5. The Contractor may be responsible for fixture testing costs. See Materials and Tests Section test method TEX-1110-T.

6. The Contractor shall furnish six (6) sets of submittals of the luminaire fixture to the Engineer at the project address. These submittals shall be approved by the Engineer before the Contractor begins work.

△1 D. High Pressure Sodium Vapor Luminaires

1. Photometrics

a. The U/P (SPL-CO) (.15KW)S (TY 1) and (TY 2) underpass luminaires shall be 150 watt high pressure sodium, IES TYPE M-C with flat tempered glass lens. The fixtures shall provide a minimum measured intensity of 0.2 footcandle in a rectangular area measuring 120 feet x 30 feet, when mounted 20 feet above the midpoint of either long side of the surface area.

The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 25:1 within the above mentioned rectangular area.

b. The 250-watt mast arm mounted luminaire shall be IES Type full cutoff and, when mounted 40 feet above the midpoint of either long side of a rectangular area 190 feet by 45 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 20 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.5 footcandle in any 10 foot interval along the aforementioned line from 10 to 90 feet on both sides of the luminaire and shall not be less than 0.3 footcandle at any point along such line.

The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 15:1 within the above mentioned rectangular area.

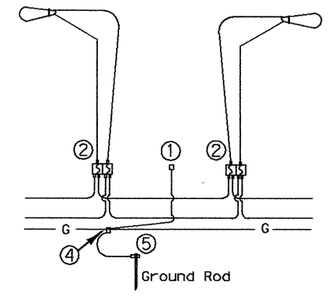
c. The 400-watt mast arm mounted luminaire shall be IES Type full cutoff and, when mounted 50 foot above the midpoint of either long side of a rectangular area 220 feet by 60 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 30 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.5 footcandle in any 10 foot interval along the aforementioned line from 10 to 90 feet on both sides of the luminaire and shall not be less than 0.3 footcandle at any point along such line.

The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 15:1 within the above mentioned rectangular area.

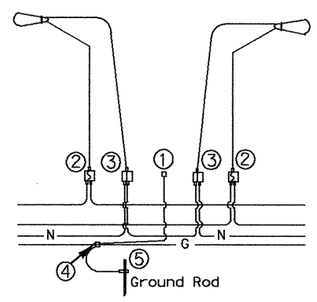
d. The luminaires shall meet the photometric requirements shown above, when energized at 100 percent of rated line voltage. Test will be run with the fixture in the level position as indicated on leveling indicator.

Fabrication Tolerances Table		
Part	Dimension	Tolerance
Pole Asssembly	Shaft length	± 1"
	I.D. of outside piece of slip fitting pieces	+ 1/8 " - 1/16 "
	O.D. of inside piece of slip fitting pieces	+ 1/32 " - 1/8 "
	Shaft diameter: other	+ 3/16 "
	Out of "round"	1/4 "
	Straightness of shaft	± 1/4 " in 10 ft
	Twist in shaft	4° in 50 ft
	Perpendicular to baseplate	1/8 " in 24"
	Pole centered on baseplate	± 1/4 "
	Location of Attachments	± 1/4 "
Arm Assembly	Arm Length	± 3"
	Arm Rise	± 1 3/4 " in 10 ft
	Arm Diameter	± 3/16 "
	Overall length or width	± 1/4 "
	Thickness	+ 1/4 " - 1/16 "
	Deviation from flat	1/8 " in 12"
	Spacing between holes	± 3/32 "
	Anchor bolt hole size	± 1/16 "
Anchor Bolt	Length	+ 1" - 1/4 "
	Threaded length	+ 1 1/2 " - 1/8 "
	Galvanized length (if required)	+ 8" - 1/4 "
Miscellaneous	Bolt hole spacing	± 1/16 "
	Strut location in truss arms	± 1 1/2 "

△1



FOR THREE-WIRE CIRCUIT-CENTER GROUNDED
LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR FOR 120/240 VOLT SERVICE.



FOUR-WIRE CIRCUIT-CENTER GROUNDED
LUMINAIRES SERVED AT 240V (240/480 VOLT SERVICE)

NOTES:

(1) Pole Bonding Connector Blackburn TTC3 or Weaver TGC3 or equal.
(2) Fused Connector-All electrical connectors for breakaway poles shall be watertight and shall be designed as break-away (Buchannan 65U, Bussmann HEBW, Littelfuse LEB or equal). All fuses shall be time-delay types. 10 Amp (Littelfuse FLQ, Bussman FNQ or equal).
* (3) Un-fused Connector-All electrical connections for neutrals shall be watertight. For breakaway poles, connections shall be designed as breakaway, shall have a white color marking, and shall have a permanently installed solid neutral (Buchannan 20U, Bussmann HET, Littelfuse LET or equal). Dummy/Neutral fuse shall be Bussman NTS-R-3 or equal.
(4) Split Bolt or other connector.
(5) Ground Rod Clamp - Blackburn GG58H, Burndy GKP635, or equal.

*For Transformer Base Poles. On Shoe Base Poles omit un-fused connector for neutral conductor.

△1 10-98: clarified T-base washers; mod. fixture requirements; removed two wire diagram; revised breakaway connectors requirements

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS

RID(2)-98

© TxDOT January 1992	DN: RS	CK: KB	DW: FDN	CK: RS	REF NO.:	
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
5-93	18	6	STP 99(413)MM			186
10-93	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
10-98	ROCKWALL		1014	03	033	FM 740
						72B

LEVEL LAYED

	1	2	3	4	5	6	7
1	1	2	3	4	5	6	7
2	8	9	10	11	12	13	14
3	15	16	17	18	19	20	21
4	22	23	24	25	26	27	28
5	29	30	31	32	33	34	35
6	36	37	38	39	40	41	42
7	43	44	45	46	47	48	49
8	50	51	52	53	54	55	56
9	57	58	59	60	61	62	63

DATE:
ACC: d58hplc/usr/d580504
FILE:
DN:
CK:
DW: DN
CK: MT

II. ROADWAY ILLUMINATION ASSEMBLIES (cont.)

D. High pressure Sodium Vapor Luminaires (cont.)

2. Ballasts

a. All ballasts shall be isolated-winding lag-type magnetic regulators designed to operate high pressure sodium lamps unless otherwise shown on the plans.

b. When the circuit voltage indicated on the plans is applied, the ballast input wattage during fluctuations of the test voltage of +10 and -10 percent shall not exceed the following;

Nominal Lamp Rating, Watts	Maximum Wattage Input
150	220
250	440
400	552

c. During fluctuation of the test voltage of +10 and -10 percent, the lamp wattage fluctuation shall no exceed a total of 20 percent and ballast shall maintain lamp wattage within the following limits:

Nominal Lamp Watts	Minimum Lamp Watts	Maximum Lamp Watts
150	110	180
250	175	370
400	280	475

d. The power factor of any ballast when tested at the circuit voltage indicated in the plans shall be not less than 90 percent.

e. The electronic starting aid shall provide a starting pulse with an amplitude of 2500 volts minimum, 4000 volts maximum. The pulse width shall be a minimum of 0.8 microseconds at 2250 volts. The pulse shall occur when the open-circuit voltage is equal to or greater than 90 percent of peak open-circuit voltage. Pulse repetition rate shall be a minimum of one per cycle and pulse current shall be a minimum of 0.18 amperes. Electronic staring aids for mast-arm mounted poles shall be replaceable without the use of tools. The starting aid shall discontinue to pulse when the lamp starts.

f. Luminaires will be tested for satisfactory operation of the starter board under open-circuit (lamp-out) condition for a minimum of 72 hours. Any failures of starter boards will be considered grounds for rejection of the model starter board being supplied.

g. Ballasts shall permanently and clearly indicate the following: lamp type, catalog number, voltage rating, connection diagram, and manufacturer. Capacitors in all luminaires shall be non-PCB type.

3. Lamps

a. All lamps shall be new and shall be of recent manufacture.

b. 150 watt lamps shall be rated for 55 volts.

c. High pressure sodium lamps shall meet ANSI C78 requirements and shall be the type that extinguishes at the end of usable lamp life and remains extinguished without cycling. 400 watt lamps shall contain less than 4.0 mg of mercury, 250 watt lamps shall contain less than 3.0 mg of mercury. Lamps shall be lead free and shall pass the Federal Toxic Characteristic Leachate Procedure (TCLP).

4. Testing

a. Ballasts and luminaires will be tested using a lamp furnished for the same project.

b. Luminaires, ballasts, and lamps will be sampled and tested in accordance with the TXDOT Materials and Test Section's Manual of Testing Procedures.

III. ROADWAY ILLUMINATION ASSEMBLY FOUNDATIONS

A. Foundations will be paid for under the Item "Foundations for Signs, Traffic Signals and Roadway Illumination Assemblies", unless otherwise shown on the plans. Top 6 inches of foundation shall be formed and struck level.

B. Anchor bolts for all poles, except CTB-mounted poles, shall be A-36M55 Anchor Bolts. Anchor bolts for CTB mounted poles shall be steel, ASTM A-325 or A-321 threaded rod. Nuts for CTB anchor bolts shall be ASTM A-563 Grade D heavy hex, galvanized. The top 8 inches of all anchor bolts shall be galvanized per ASTM A-153. Anchor bolts in foundations shall be 1 1/4 inches x 30 inches for mounting heights 40 feet and greater, 1 inch x 30 inches for mounting heights less than 40 feet.* Anchor bolts shall have top end threaded not less than 5 inches and furnished with galvanized hex nuts, 1/2 inch flat washers (T-base), lock washers (shoe base) and template. The lower end of the bolt shall be threaded and furnished with nut and template. When bolts with rolled threads are furnished, bolt body need not be full size. See CTB and SSCB details for anchor bolts in concrete traffic barriers. Anchor bolts and nuts shall have Class 2A and 2B fit. Nuts shall be tapped and chased after galvanizing.

C. Concrete shall be Class A or C.

D. A minimum of two conduits shall be installed in each foundation. See lighting layout sheets for locations of foundations with more than two conduits. Any unused conduits in foundations shall be capped on both ends.

E. Unless otherwise dimensioned on the plans, breakaway roadway illumination assemblies should be located as shown in the placement table. Non-breakaway illumination assemblies should be protected from vehicular impact (i.e. 2 feet behind guard rail or mounted atop traffic barrier) or located outside the clear zone, except that 2.5 feet from curb face is minimum desired for light poles on city streets, 45 mph or less, see design guidelines for further information.

F. Anchor bolt template shall not be supplied with flat washers. Transformer base shall be held with 1/2 inch thick washers and nuts supplied with base. No washers or shims shall be used under transformer base.

G. Riprap shall be placed around the foundtion when called for elsewhere in the plans.

H. Conduit location in foundation is critical for new style breakaway devices. Conduits shall be placed 2 inches apart on centerline as shown in foundation details.

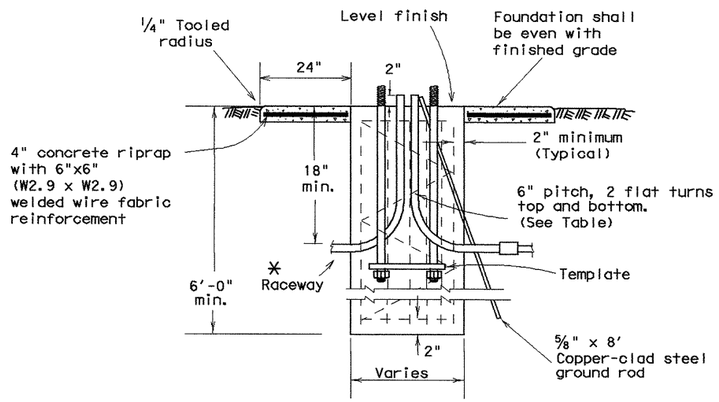
* Except that anchor bolts shall be 1 inch x 30 inches for all X-base poles.

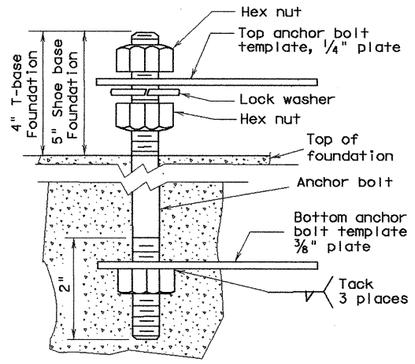
Breakaway Pole Placement, see Para. III. E.	
Roadway Functional Classification	** Pole Offset (distance to transformer base, tolerance + 6in.-0in.)
Freeway mainlanes (roadways with full control of access)	15 ft (minimum and typical) from lane edge
All curbed, 45 mph or less design speed	2.5 ft minimum (15 ft desirable) from curb face
All others	10 ft minimum* (15 ft desirable) from lane edge

*or as close to ROW line as is practicable

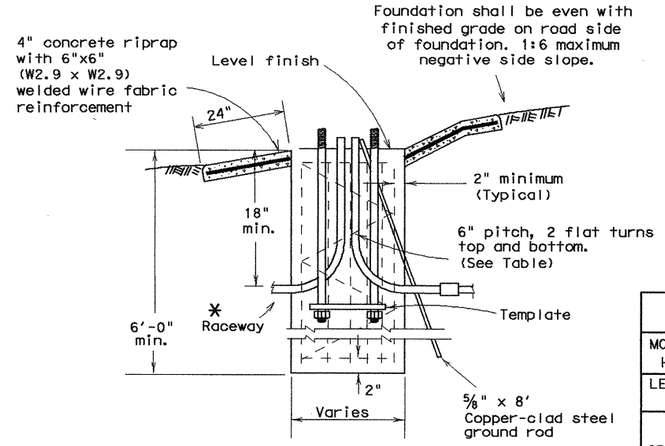
**all breakaway poles should have 2/5 of the luminaire mounting height behind the pole for "falling area" to prevent encroachment on other travel lanes. See design guidelines.

PAY QUANTITY OF RIPRAP PER FOUNDATION		
FOUNDATION DIAMETER	RIPRAP DIAMETER	RIPRAP (CONC) (CL A)
30 in.	78 in.	0.35 CY





ANCHOR BOLT DETAIL

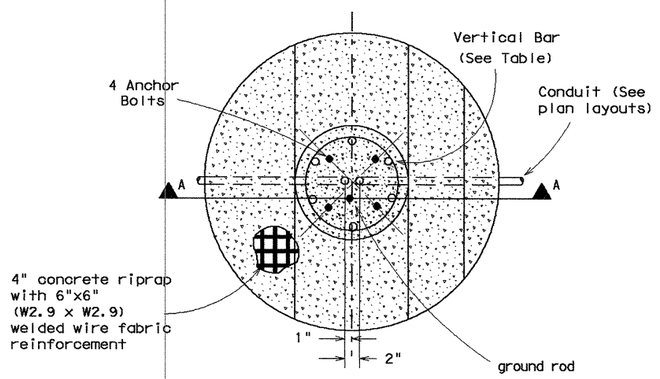


SECTION A-A

FOUNDATIONS				
FND. TYPE	DRILL SHAFT DIA.	DRILL SHAFT LENGTH	REINFORCING BAR	REINFORCING SPIRAL
A	30 in	6 ft	6-#4	#2
B	30 in	8 ft	6-#5	#2
C	30 in	10 ft	6-#6	#3

BOLT CIRCLES AND ANCHOR BOLTS				
MOUNTING HEIGHT	POLE BASE PLATE	BOLT CIRCLE SHOE BASE	BOLT CIRCLE *T-BASE	BOLT SIZE
LESS THAN 40 ft	13 in	13 in	14 in	1 in. X 30 in.
40 ft OR GREATER	15 in	15 in	17 1/4 in	** 1 1/4 in. X 30 in.

* AND X-BASE
** 1" FOR X-BASE



FOUNDATION DETAIL

* For duct cable, match duct size, see ED(10). For conductor in conduit system, same size as system conduit with standard radius bends.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS

RID(3)-98

©TxDOT January 1992	DN: RS	CK: KB	DW: FDN	CK: RS	REQ NO.:
REVISIONS 5-93 10-93 2-94 10-98	STATE DISTRICT 18	FEDERAL REGION 6	FEDERAL AID PROJECT STP 99(413)MM		SHEET 187
	COUNTY ROCKWALL		CONTROL 1014	SECTION 03	JOB 033
					HIGHWAY FM 740

72C

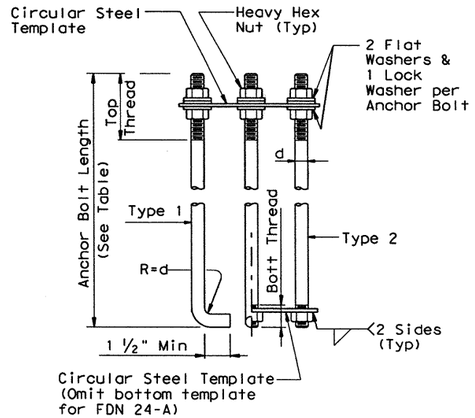
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)				FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	36'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	24'	36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

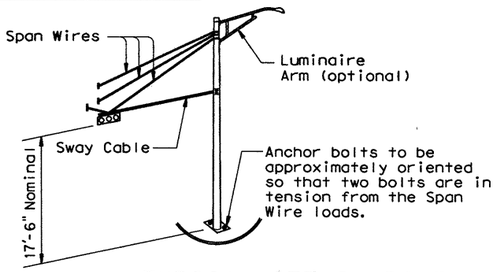
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



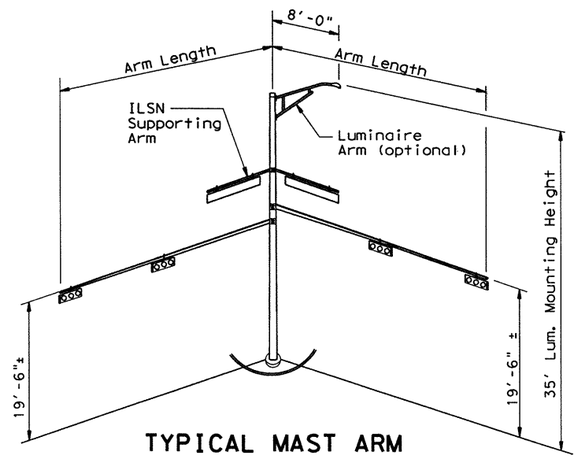
HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

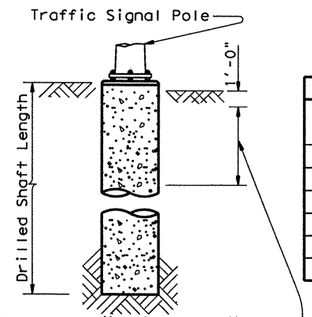
INSTALLATION PROCEDURE:
Threads of anchor bolts shall be coated with pipe joint compound prior to installation of upper nuts when erecting pole. After pole is plumbed and in permanent alignment, the exposed threads of painted bolts shall be cleaned and an additional coating of zinc-rich paint applied to seal the bolt thread-nut joint.



TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY



Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

NOTES:

(1) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(2) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(3) Foundations may be listed seperately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

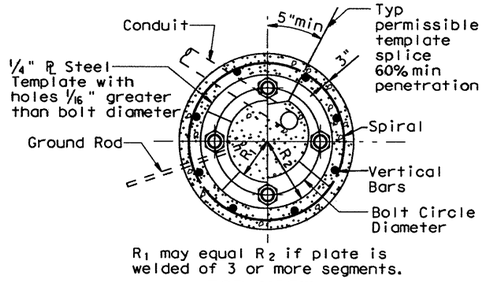
(4) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(5) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

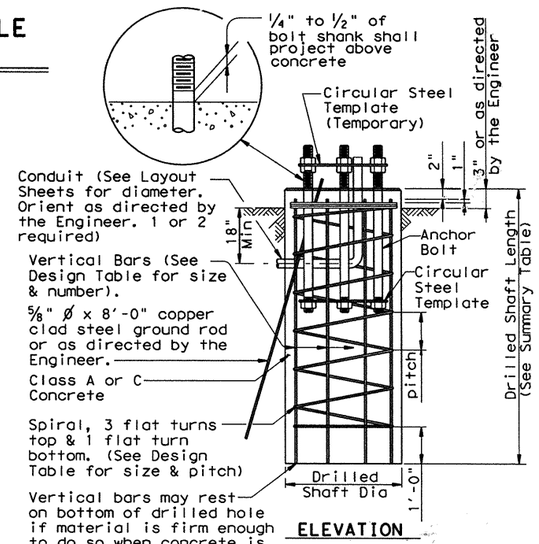
ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTT THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	2"	17"	10"	7"
1 ¾"	3'-10"	7"	2 ¼"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	2 ½"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	3"	23"	13 ¾"	9 ¼"

(7) Min dimensions given, longer bolts are acceptable.



R_1 may equal R_2 if plate is welded of 3 or more segments.

TOP VIEW



ELEVATION

FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION		AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
					24-A	30-A	36-A	36-B	42-A
R-1		10	30-A	1		11.3			
R-2		10	30-A	1		11.3			
P-1		10	36-A	1			13.2		
P-2		10	30-A	1		11.3			
P-3		10	30-A	1		11.3			
P-4		10	24-A	1	5.7				
P-5		10	24-A	1	5.7				
P-4		10	24-A	1	5.7				
TOTAL DRILLED SHAFT LENGTHS						69.7			

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440. Concrete shall be Class A or C.

Threads for anchor bolts and nuts shall be rolled or cut threads of unified national coarse thread series except for A193B7 bolts which shall have 8 pitch thread series. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Anchor bolts larger than 1" in diameter shall conform to A36M55 in accordance with the Item, "Anchor Bolts" or ASTM A193B7 or A687. Galvanize or coat with zinc-rich paint a minimum of the upper 14 inches of all anchor bolts unless otherwise noted. Exposed nuts shall be galvanized or coated with zinc-rich paint. Washers shall be galvanized. Templates and embeded nuts need not be galvanized.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-96

FILE: TS-FD.DGN	DN: MS	CK: JSY	DW: MAO/MWF	CK: JSY/TEB
ORIG DATE: AUGUST, 1995	DIST	FED REG	FEDERAL AID PROJECT •	SHEET
REVISIONS	DALLAS	6	STP 99(413)MM	88
	COUNTY		CONTROL SECT JOB	HIGHWAY
	DALLAS		1014 03 033	FM 740

LEVEL: 1 2 3 4 5 6 7 | PLAYED (a, y) 1 0 1 1 1 2 1 3 1 4 1 5 1 6 | ACC: d48hplq:/usr/d482517
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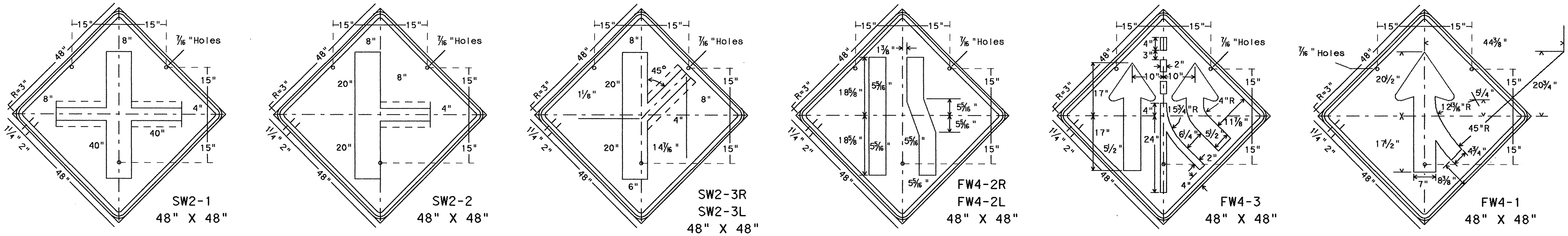
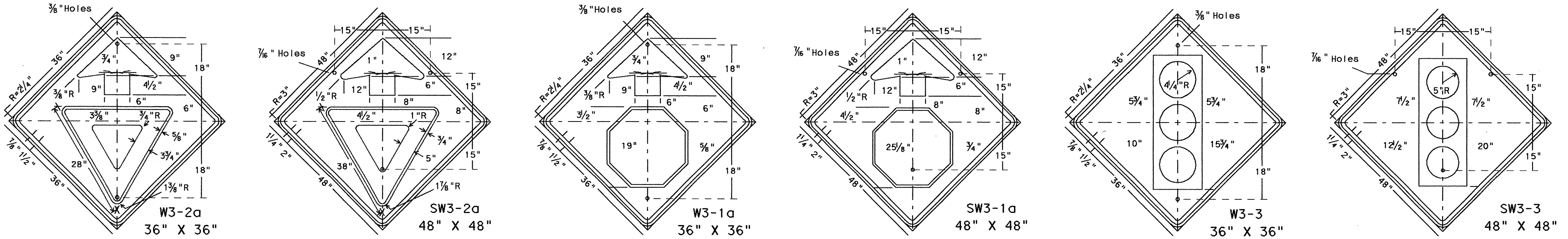
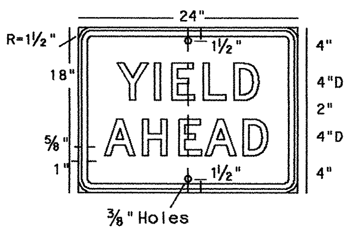
4 9 5 0 5 1 5 2 5 3 5 4 5 5 5 6 5 7 5 8 5 9 6 0 6 1 6 2 6 3 | LV=1,2 for English 1,3 for Metric



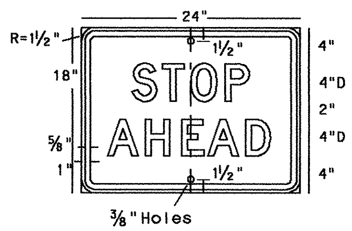


Border and Arrow - Black
Symbol - Red Border Band on White Background (Refl)
Background - Yellow Reflective



Border and Arrow - Black
Symbol - Red Border Band on White Background (Refl)
Background - Yellow Reflective

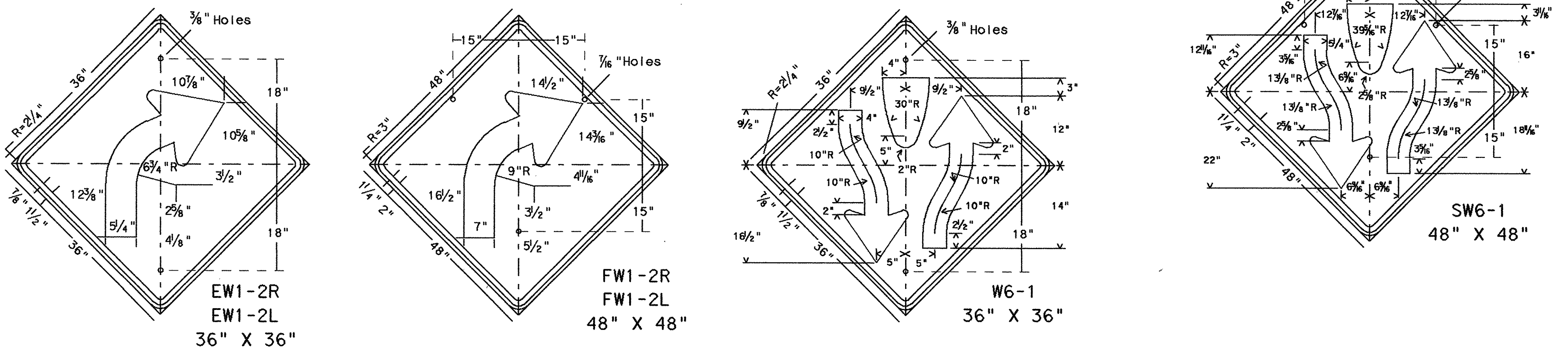
Border and Arrow - Black
Symbol - White Border on Red Background (Refl)
Background - Yellow Reflective



Border and Arrow - Black
Symbol - White Border on Red Background (Refl)
Background - Yellow Reflective

Symbol and Border - Black
Top Circle - Red Reflective
Bottom Circle - Green Reflective
Background - Yellow Reflective

Symbol and Border - Black
Top Circle - Red Reflective
Bottom Circle - Green Reflective
Background - Yellow Reflective



SPECIFICATION REFERENCE TABLE	
MATERIALS AND TESTS DIVISION SPECIFICATIONS	
PLYWOOD SIGN BLANKS	D-9-7100
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

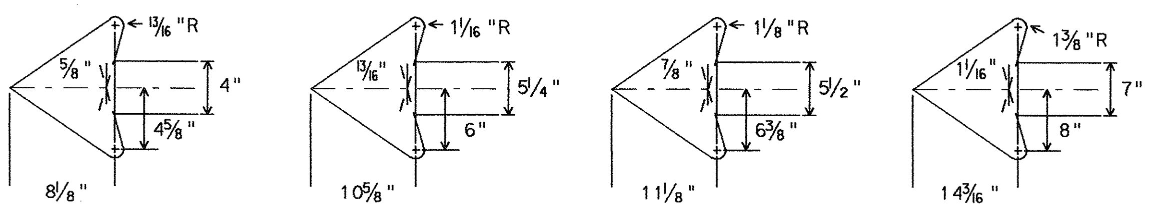
GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be applied by screening process of black and/or transparent colored ink, cut-out black vinyl non-reflective decal sheeting and/or reflective sheeting or combination thereof. Background shall be yellow reflective sheeting (Type C).

Sign blanks shall be one piece 5/8 inch thick plywood (Type A), unless otherwise noted elsewhere in the plans.

ARROWHEAD DETAILS



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WARNING SIGNS

W(1)-95

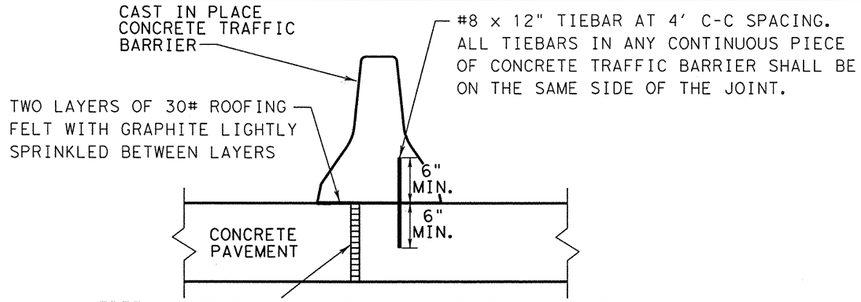
ORIG DRAW DATE: JAN. 1981 DN: LR CK: DW: DN CK: NEG NO.:

REVISIONS: 1-85, 7-90, 8-95

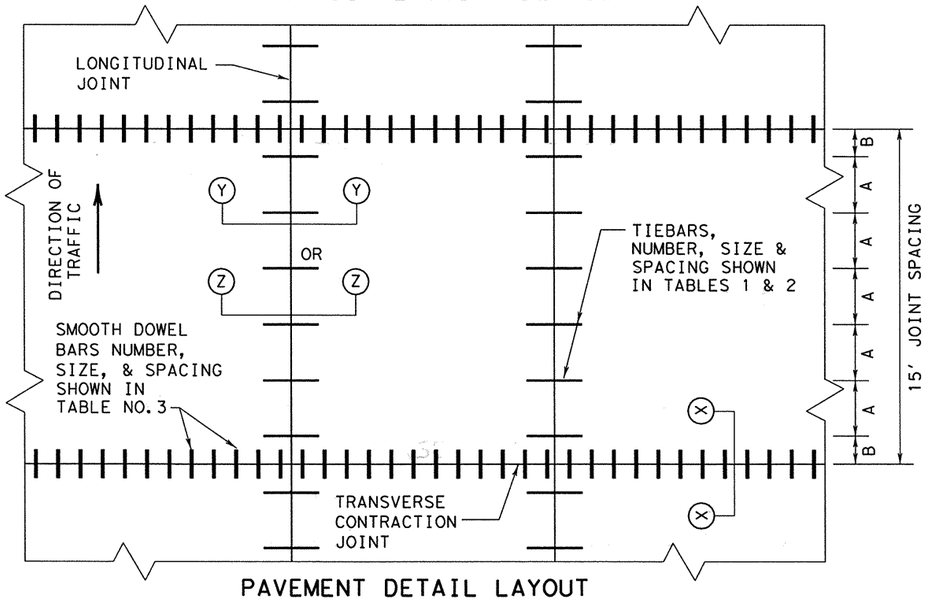
STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DALLAS	6	STP 99(415)MM	189

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM 740

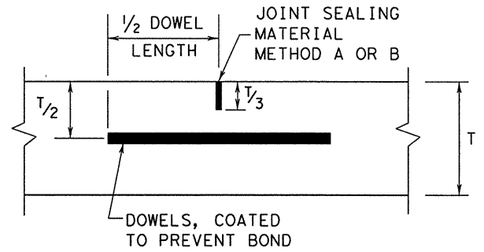
9A



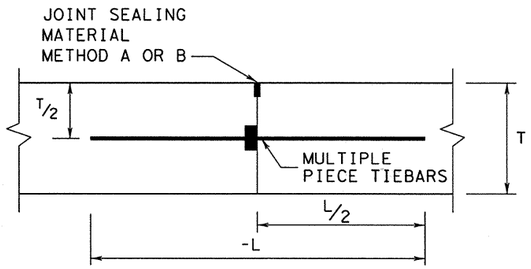
FREE LONGITUDINAL JOINT DETAIL



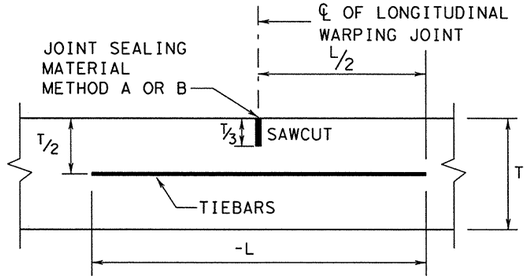
PAVEMENT DETAIL LAYOUT



TRANSVERSE CONTRACTION JOINT SECTION X-X



LONGITUDINAL CONSTRUCTION JOINT SECTION Y-Y



LONGITUDINAL WARPING JOINT SECTION Z-Z

GENERAL NOTES

1. CONCRETE SLABS WIDER THAN 100' WITHOUT A FREE JOINT, ARE NOT COVERED BY THIS STANDARD.
2. FOR FURTHER INFORMATION REGARDING THE PLACEMENT OF CONCRETE AND LOAD TRANSFER DEVICES REFER TO THE GOVERNING SPECIFICATIONS FOR "CONCRETE PAVEMENT" AND "REINFORCING STEEL."
3. DETAILS FOR PAVEMENT WIDTH, PAVEMENT THICKNESS, AND CROWN CROSS SLOPE SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
4. THE DETAIL FOR THE JOINT SEALANT AND RESERVOIR WILL BE SHOWN IN CONCRETE PAVEMENT DETAIL, JOINT SEALANT STANDARD (JS-94).
5. PAVEMENT WIDTHS IN EXCESS OF 16' SHALL BE PROVIDED WITH A LONGITUDINAL JOINT (SECTION Z-Z OR Y-Y). THESE JOINTS SHALL BE LOCATED WITHIN 6" OF THE LANE LINES UNLESS SHOWN ELSEWHERE ON THE PLANS.
6. THE JOINT BETWEEN OUTSIDE LANE AND SHOULDER SHALL BE A LONGITUDINAL WARPING JOINT (SECTION Z-Z) UNLESS OTHERWISE SHOWN IN THE PLANS.
7. THE SPACING BETWEEN TRANSVERSE JOINTS SHALL BE 15 FEET UNLESS OTHERWISE SHOWN IN THE PLANS.
8. WHERE A MONOLITHIC CURB IS SPECIFIED, THE JOINT IN THE CURB SHALL COINCIDE WITH PAVEMENT JOINTS AND MAY BE FORMED BY ANY MEANS APPROVED BY THE ENGINEER.
9. TRANSVERSE CONSTRUCTION JOINTS MAY BE FORMED BY USE OF METAL OR WOOD FORMS EQUAL IN DEPTH TO THE NOMINAL DEPTH OF THE PAVEMENT, OR BY METHODS APPROVED BY THE ENGINEER.
10. THE ENGINEER WILL ADJUST THE REQUIRED NUMBER OF TIEBARS FOR SLABS SHORTER OR LONGER THAN 15'. SPACING "B" WILL BE ADJUSTED TO MAINTAIN A MINIMUM CLEARANCE OF 2" BETWEEN THE TIEBAR AND THE DOWEL BARS AT THE TRANSVERSE JOINT AND THE "A" SPACING WILL REMAIN AS REQUIRED FOR THE PAVEMENT SLAB WIDTH.
11. MULTIPLE PIECE TIEBARS SHALL BE USED AT LONGITUDINAL CONSTRUCTION JOINTS UNLESS OTHERWISE SPECIFIED IN THE PLANS.
12. THE SAW CUT FOR LONGITUDINAL WARPING AND THE TRANSVERSE CONSTRUCTION JOINTS MAY BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.

TABLE NO. 1 TIEBARS REQUIRED FOR LONGITUDINAL JOINT JOINTS FOR EACH 15' SLAB

ASTM A-616 OR A-615 (GRADE 60) STRAIGHT OR MULIPLE PIECE REINFORCING TIEBARS		CONCRETE SLAB THICKNESS	DISTANCE FROM THE LONGITUDINAL JOINT TO THE NEAREST LONGITUDINAL FREE EDGE			
			< OR =16'	< OR =24'	< OR =34'	< OR =50'
BAR LENGTH, "L" INCHES	BAR SIZE	"T" INCHES	REQUIRED NO. OF BARS	REQUIRED NO. OF BARS	REQUIRED NO. OF BARS	REQUIRED NO. OF BARS
42	#5 (5/8")	8	5	5	6	9
		9	5	5	7	10
		10	5	5	7	11
		11	5	6	8	12
		12	5	6	9	13
		13	5	7	9	13
		14	6	7	10	NA
		15	6	8	11	NA
50	#6 (3/4")	8	5	5	5	6
		9	5	5	5	7
		10	5	5	5	8
		11	5	5	6	8
		12	5	5	6	9
		13	5	5	7	10
		14	5	5	7	10
		15	5	6	8	11

THE DISTANCE TO THE FREE EDGE WILL BE DETERMINED BY THE ENGINEER AND THE DISTANCE WILL BE BASED ON THE NOMINAL WIDTHS OF THE LANES AND SHOULDERS PLUS ANY TIED RAMPS OR CONNECTING ROADWAYS.

TABLE NO. 2 TIEBAR SPACINGS

SPACING REQUIREMENT FOR 15' SLAB FOR REQUIRED NUMBER OF BARS		
REQUIRED NO. OF BARS	REGUALR SPACING "A" INCHES	FIRST AT JOINT "B" INCHES
5	36	18
6	30	15
7	25	15
8	21	16.5
9	18	18
10	16	18
11	15	15
12	13	18.5
13	12	18

TABLE NO. 3 DOWELS REQUIEMENTS

T, IN.	DOWELS (SMOOTH BARS)	
	SIZE AND LENGTH	AVERAGE SPACING (INCHES)
8	1" X 18"	12
9	1 1/8" X 18"	12
10	1 1/4" X 18"	12
11	1 3/8" X 18"	12
12	1 1/2" X 18"	12
13	1 5/8" X 18"	12
14	1 3/4" X 18"	12
15	1 7/8" X 18"	12

ACC: /usc/0481303
FILE: CPCD94.DGN
LEVELS DISPLAYED

Texas Department of Transportation
Design Division (Pavement)

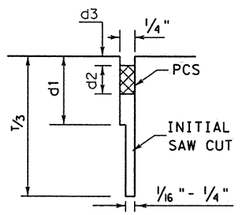
CONCRETE PAVEMENT DETAILS
CONTRACTION DESIGN
T-8 THROUGH 15 INCHES
CPCD-94

MODIFICATIONS

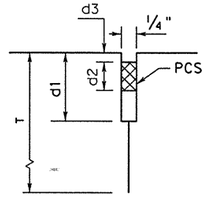
DN: LJB	CK: LJB	DW: BGD	CK: GLG	HEG NO.: R0000

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	190

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

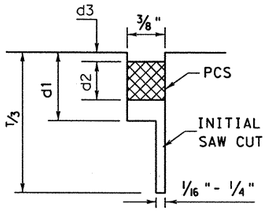


SAWED
LONGITUDINAL JOINT

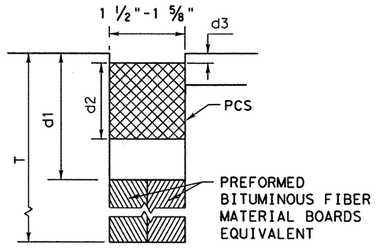


LONGITUDINAL
CONSTRUCTION JOINT

LONGITUDINAL JOINT SEALS



SAWED
CONTRACTION JOINT



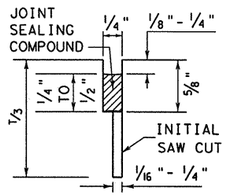
FORMED
FORMED EXPANSION JOINT

TRANSVERSE JOINT SEALS

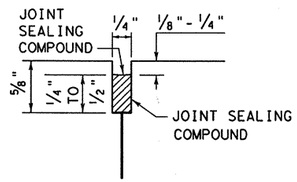
METHOD A: PREFORMED COMPRESSION SEALS (PCS)
(CLASS 6 PREFORMED JOINT SEALANT)

GENERAL NOTES FOR METHOD "A"

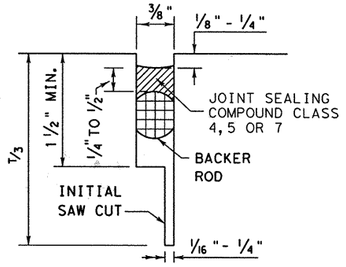
1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. DIMENSIONS d1, d2, AND d3 SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURES RECOMMENDATION.
4. THE JOINT RESERVOIR FOR SEALANT SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION AND THE TWO SAWED JOINTS.
5. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 AND PRIOR TO BEGINNING OPERATIONS, THE CONTRACTOR SHALL SUBMIT A STATEMENT FROM THE SEALANT MANUFACTURER SHOWING THE RECOMMENDED EQUIPMENT AND INSTALLATION PROCEDURES TO BE USED.
6. THE SAW CUT FOR THE LONGITUDINAL JOINT SHALL BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.



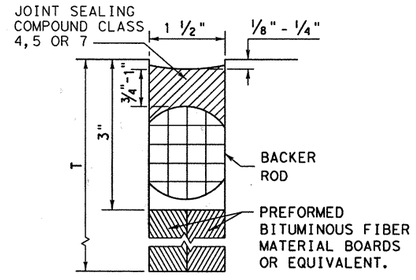
SAWED
LONGITUDINAL JOINT



LONGITUDINAL OR TRANSVERSE
CONSTRUCTION JOINT



TRANSVERSE SAWED
CONTRACTION JOINT



TRANSVERSE FORMED
EXPANSION JOINT

METHOD B: JOINT SEALING COMPOUND

GENERAL NOTES FOR METHOD "B"

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE ENGINEER SHALL SELECT A TARGET PLACEMENT THICKNESS FOR THE SEALANT DETAILS WHICH SHOW RANGES IN THICKNESS. THE TARGET THICKNESS WILL NORMALLY BE THE MIDPOINT OF THE RANGE.
4. THE JOINT RESERVOIR FOR SEALANT SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION AND THE TWO SAWED JOINTS.
5. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 AND PRIOR TO BEGINNING OPERATIONS, THE CONTRACTOR SHALL SUBMIT A STATEMENT FROM THE SEALANT MANUFACTURER SHOWING THE RECOMMENDED EQUIPMENT AND INSTALLATION PROCEDURES TO BE USED.
6. THE SAW CUT FOR THE LONGITUDINAL JOINT SHALL BE ONE FOURTH THE SLAB THICKNESS WHEN CRUSHED LIMESTONE IS USED AS THE COARSE AGGREGATE.

Texas Department of Transportation
Design Division (Pavement)

CONCRETE PAVING DETAILS
JOINT SEALS

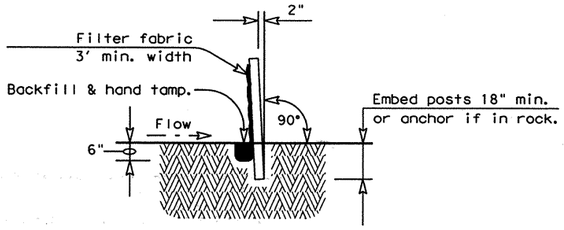
JS-94

DW: LJB	CK: LJB	DW: BGD	CK: GLG	MSG NO.: R0000
MODIFICATIONS				

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	191

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

ACC: /usc/d481303
FILE: JS94.DGN
PLAYED
LEVEL
1



SECTION A-A

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

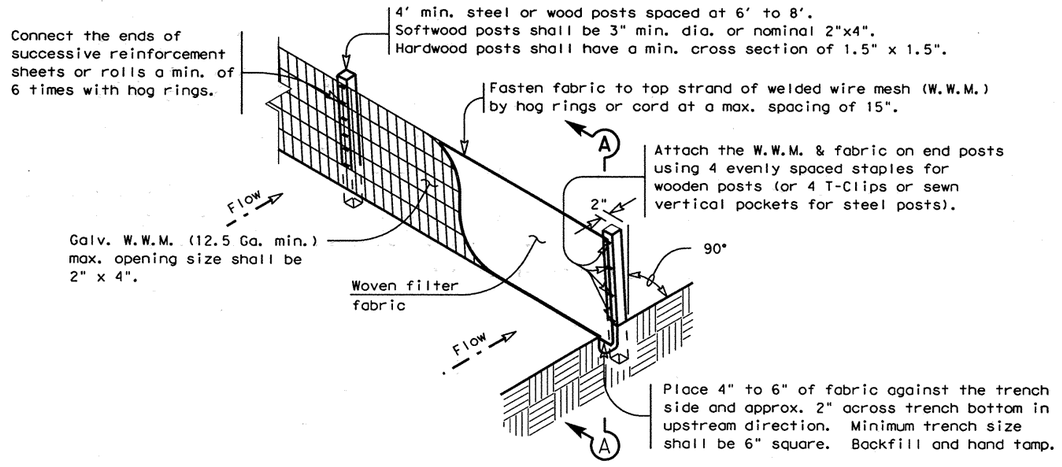
Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

PLAN SHEET LEGEND

Sediment Control Fence —— SCF ——

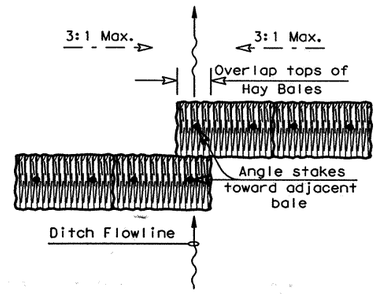
GENERAL NOTES

1. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

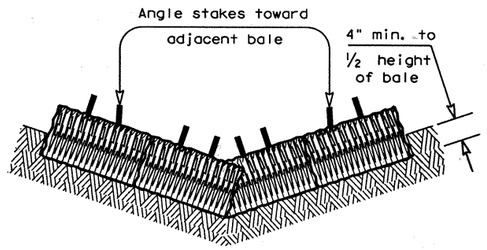


TEMPORARY SEDIMENT CONTROL FENCE

SCF



PLAN VIEW



PROFILE VIEW

PLANS SHEET LEGEND

Baled Hay —— BH ——

BALED HAY USAGE GUIDELINES

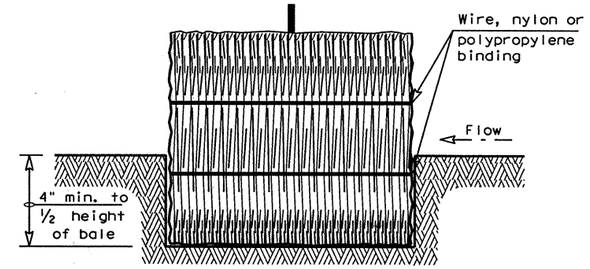
A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT^2 of cross sectional area. Baled hay may be used at the following locations:

1. Where the runoff approaching the baled hay flows over disturbed soil for less than 100'. If the slope of the disturbed soil exceeds 10%, the length of slope upstream the baled hay should be less than 50'.
2. Where the installation will be required for less than 3 months.
3. Where the contributing drainage area is less than ½ acre.

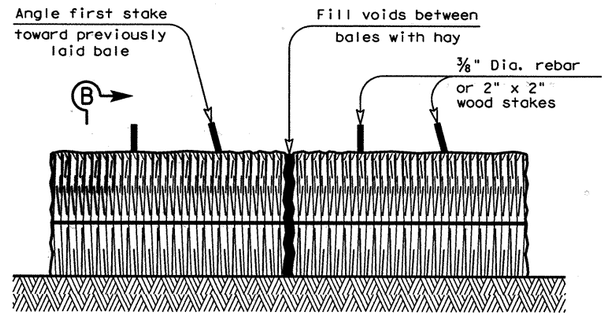
For Baled Hay installations in small ditches, the additional following considerations apply:

1. The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
2. The ditch should be graded large enough to contain the overtopping drainage when sediment has filled to the top of the baled hay.

Bales should be replaced usually every 2 months or more often during wet weather when loss of structural integrity is accelerated.



SECTION B-B



BALED HAY FOR EROSION CONTROL

BH

GENERAL NOTES

1. Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
2. Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetable matter.
3. Hay bales shall be embedded in the soil a minimum of 4" and where possible ½ the height of the bale.
4. Hay bales shall be placed in a row with ends tightly abutting the adjacent bales. The bales shall be placed with bindings parallel to the ground.
5. Hay bales shall be securely anchored in place with ⅜" Dia. rebar or 2" x 2" wood stakes, driven through the bales. The first stake shall be angled towards the previously laid bale to force the bales together.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

TEXAS DEPARTMENT OF TRANSPORTATION

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

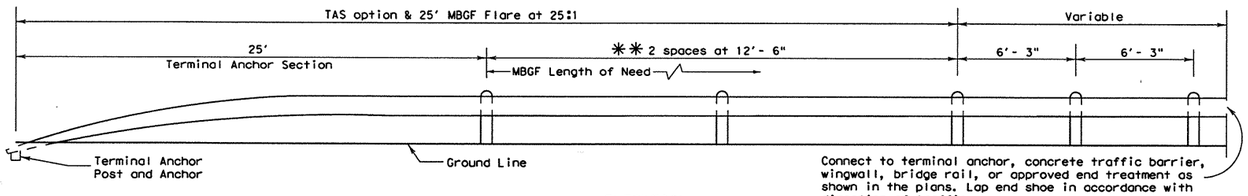
FENCE & BALED HAY

EC(1)-93

MODIFICATIONS

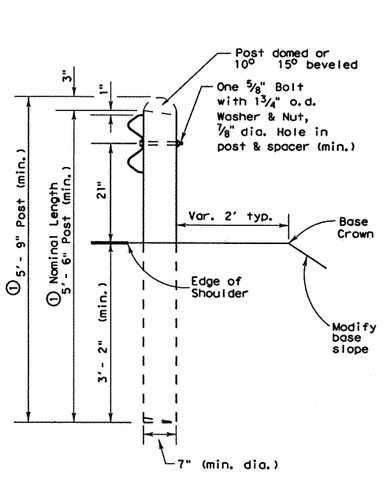
FED.RD. DIV.NO.	STATE	FEDERAL AID PROJECT NO.				SHEET NO.
6	TEXAS	STP99(413)MM				192
STATE DIST. NO.	COUNTY		CONT.	SECT.	JOB	HIGHWAY NO.
DAL	ROCKWALL		1014	03	033	FM740

** Post spacing of 6'- 3" may be used on the downstream (from a traffic flow standpoint) end of MBGF placed on roadways with one-way traffic operations.

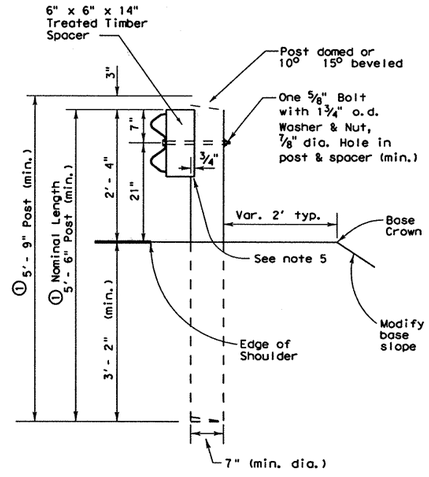


ELEVATION

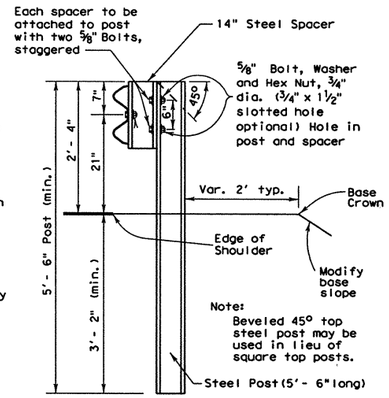
Note (1): Where a nominal length of 6'- 0" is specified as acceptable elsewhere in the plans, these dimensions shall be increased by 0'- 6". The additional length should be specified only on roadways where future ACP overlays and adjustments of the rail height on the same posts are likely.



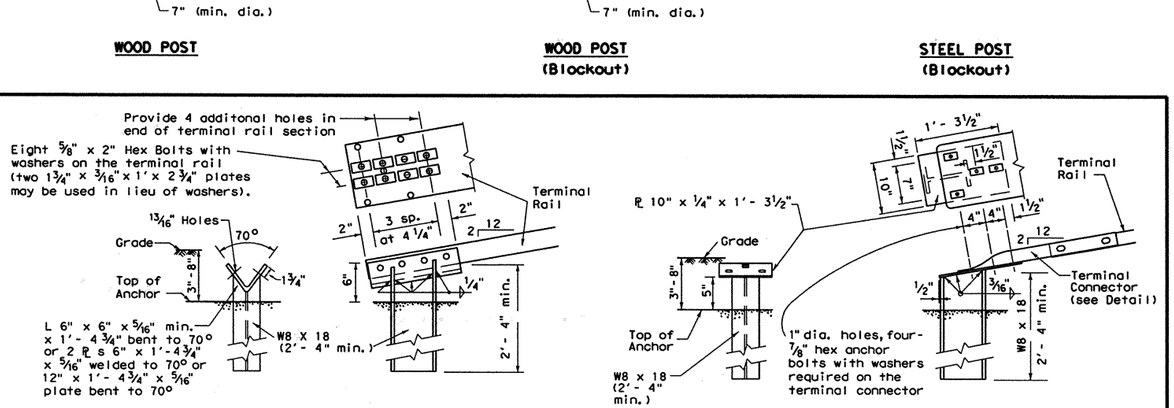
WOOD POST



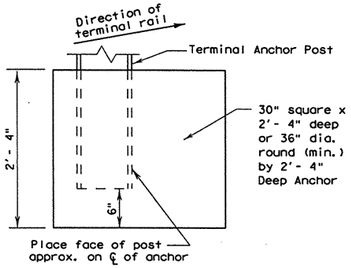
WOOD POST (Blockout)



STEEL POST (Blockout)



TERMINAL ANCHOR POST OPTIONS

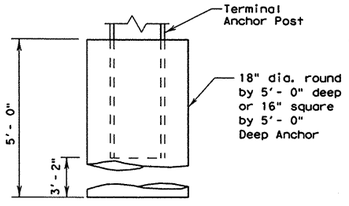


Notes: Either post may be used with either anchor.

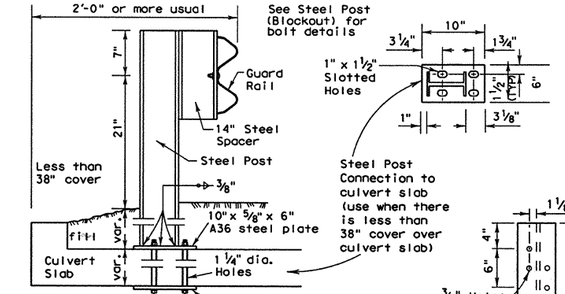
No construction joint is allowed in the concrete anchor.

Terminal rail may be bolted to post and in twist position prior to placing concrete anchor.

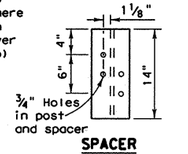
If concrete anchor is precast, the area should be compacted as directed by the Engineer, when placed in the field.



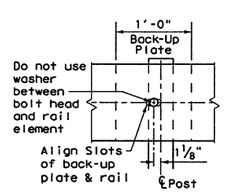
TERMINAL CONCRETE ANCHOR OPTIONS



LOW FILL CULVERT POST MOUNTING OPTION

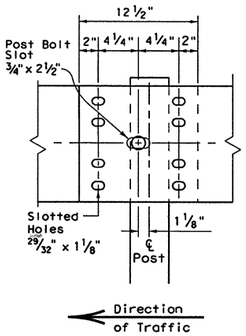


SPACER

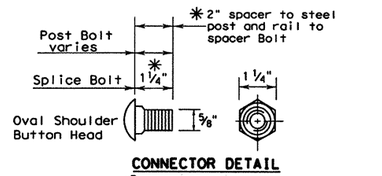


POST CONNECTION STEEL POST

Non-Splice Steel Post Only



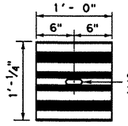
RAIL SPLICE



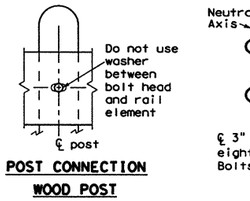
CONNECTOR DETAIL

(7/8" Hex Bolts required for terminal connector)

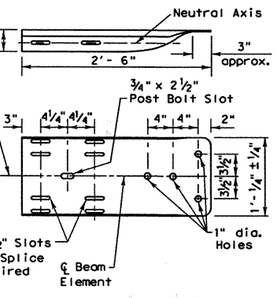
* Or as approved by the Engineer



BACK-UP PLATE

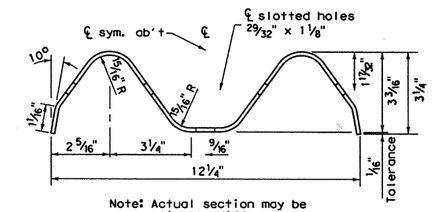


POST CONNECTION WOOD POST



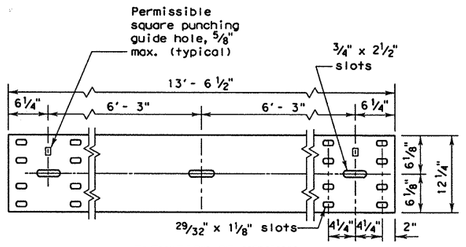
TERMINAL CONNECTOR

(10 Gauge Minimum)



Note: Actual section may be slightly different depending upon the manufacturer.

SECTION THRU GUARD RAIL



ELEVATION OF NOMINAL 12 1/2 FOOT GUARD RAIL

(25 foot sections may also be supplied)

GENERAL NOTES

1. The exact position of guard fence shall be as shown elsewhere on the plans or as directed by the Engineer. Guard fence shall be transitioned to a smooth connection with other guard fence or structure railing as shown elsewhere on plans.
2. Unless otherwise shown in the plans, guard fence placed in the vicinity of curbs shall be blocked out so that the face of curb is located directly below or behind the face of rail. Rail placed over curbs shall be installed so that the post bolt is located approximately 21-inches above the gutter pan or roadway surface.
3. Unless otherwise shown in the plans, MBGF shall be placed with the face of rail directly above the shoulder edge (or curbface) except the 25' Terminal Anchor Section and adjacent 25' or MBGF shall be flared at 25:1 (longitudinal:lateral) to provide a 2' offset between buried anchor and shoulder edge (or curbface). Flaring the 25' Terminal Anchor and adjacent 25' MBGF is optional for one-way traffic conditions on the downstream end of guard fence.
4. At the option of the Contractor, the rail elements for the guard fence may be be furnished in either 12 1/2 or 25 foot nominal lengths with post bolt slots for connection to posts.
5. Timber posts may be beveled from 10 to 15 degrees on the top of both ends with high side of top of post placed toward the roadway or they may be domed. When blockout guard fence is specified elsewhere in the plans, a 6" x 6" x 14" treated timber spacer of yellow pine shall be used with wood posts. When "blocked out", the upper portion of the post shall be notched 3/4" to provide flat surface for timber spacer. A tolerance of ±1/8" will be permitted on the notched portion of the post. Routing the timber spacer may be used in lieu of notching the post. The depth of routing shall be 3/4" at the center of radius ±1/8".
6. Steel posts shall be blocked out. Steel posts and spacers shall meet the requirements of ASTM A-36 (W6 x 9.0 or W6 x 8.5). Bolt holes shall be approximately centered between web and edge of flange of spacers and posts.
7. Post spacing will be 6'-3" except that the first post will be 25' from the terminal anchor post and the next two posts spaced at 12'-6" with a minimum of 8 posts adjacent to structures spaced at 3'-1 1/2" and posts adjacent to Type T6 bridge rail are spaced at 6'- 3". Post spacing adjacent to structures may vary as shown on bridge rail details or as directed by the Engineer.
8. The upper 10" (minimum) of the terminal anchor post and all steel fittings thereon shall be galvanized.
9. The terminal anchor post shall be set in Class "A" concrete in (unless otherwise shown on plans) in accordance with Item, "Portland Cement Concrete". Concrete shall be subsidiary to the bid item requiring construction of the terminal rail section and anchorage system.
10. An anchor other than to a terminal anchor post shall consist of a connection similar to the rail splice or similar to the terminal connector.
11. Back-up plates shall be provided at intermediate (non-splice) steel posts. Back-up plates shall conform to the materials and galvanizing requirements specified for the rail element, and shall be of the same nominal thickness as the rail element used.
12. Washers used with the eight 5/8" splice bolts and nuts that are provided for terminal connectors and/or terminal anchor posts shall be 1 3/4" x 3" x 3/16", or 1" i.d. and 2" o.d. x 0.134" (ANSI B27.2) narrow Type A plain washers.
13. The 10 gauge terminal connectors must be used with the optional terminal anchor post. Either anchor post may be used with either concrete anchor.
14. Welded steel posts and spacers shall meet the requirements of ASTM A-36. The flange width and thickness, web thickness, and depth of welded posts and spacers shall equal or exceed the dimensions of a standard rolled W6 x 8.5 or W6 x 9.0.
15. Special fabrication will be required at installations having a curvature of less than 150' radius.
16. Bolts shall be of sufficient length to extend through the full thickness of the nut and no more than 3/4" beyond it. (Button head bolts may be used instead of hex bolts when specified by the Engineer.) Fittings (bolts, nuts, and washers) shall be in accodance with Item, "Metal For Structures". Fittings shall be subsidiary to the bid item requiring construction of MBGF or Terminal Anchor Section.
17. Crown will be widened to accommodate guard fence.
18. Where solid rock is encountered or where shown on the plans, the diameter of the holes shall be approximately 12 inches, the backfilling shall be with a cohesionless material, and embedment depth shall be 1'-6" or more as directed by the Engineer. Timber posts shall not be set in concrete.

ACC: /usc/d481303
FILE: MBGF94.DGN
PLOTTED LEVEL 1

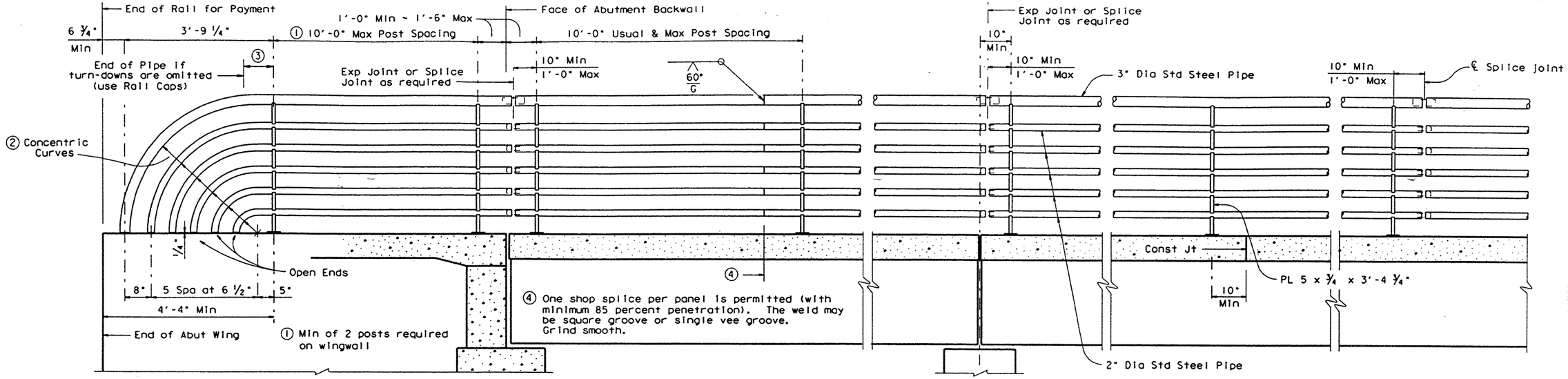
Texas Department of Transportation
Design Division (Roadway)

METAL BEAM GUARD FENCE

MBGF-94

©TxDOT JULY 1994	DN: TGM	CK: TGM	DW: BGD	CK:	REG NO.: A6
MODIFICATIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	STP 99(413)MM		193
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

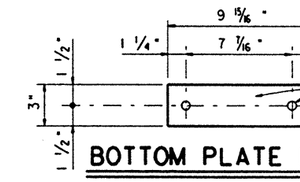
ACC:
(LV=1.2 for English, 1.3 for Metric)
AYED
CEVE
1:2



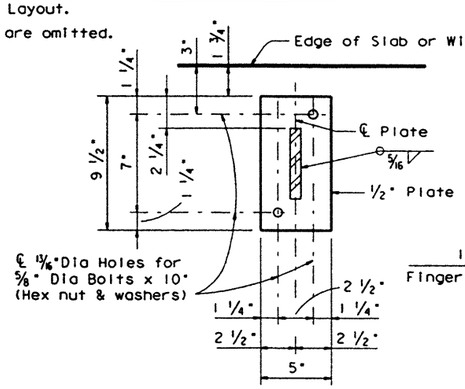
② Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.

③ 10" Min ~ 1'-6" Max if turn-downs are omitted.

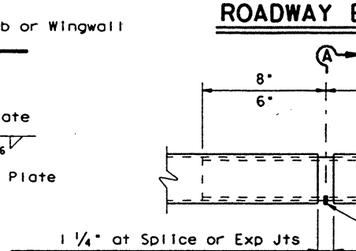
ROADWAY ELEVATION OF RAIL

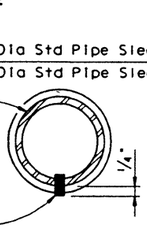


BOTTOM PLATE DETAIL



BASE PLATE DETAIL



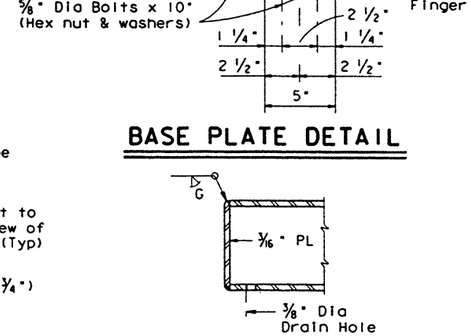


SECTION A-A

AT SPLICE OR EXP JTS

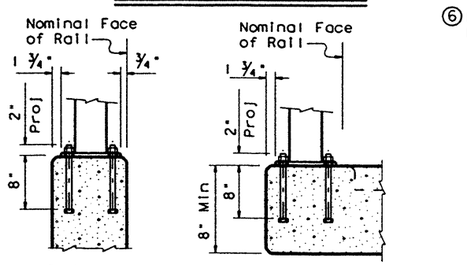
HANDRAIL SPLICE DETAIL

CG (PAN FORM)



BASIC CONDITION

RAIL CAP DETAIL

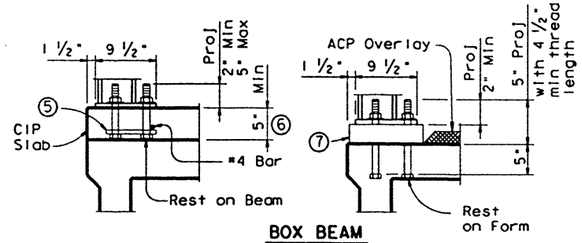


ON ABUT WING OR CIP RETAINING WALL

ON CULVERTS OR SLABS OVER 8" THICK

POST MOUNTING DETAILS

⑥ For CIP slabs under 6" add PL ⑤ (tack weld to bolt heads) and an additional longitudinal #4 bar as shown (included as part of rail for payment).



BOX BEAM

⑦ A 6" x 9 1/2" min x 3" max thickness grout pad may be used under the rail post base plate to adjust the rail for vertical grade and box beam camber.

GENERAL NOTES:

Designed according to current AASHTO Standard Specifications for Highway Bridges.

Pipe for railing shall be Std Pipe (ASTM A-53) (E or S Grade A or B).

All anchor bolts, nuts, washers and bottom plates to be included in unit price bid for railing.

Panel lengths of railing shall be attached to a minimum of three posts except at abutment wingwalls.

All steel components to be galvanized unless otherwise shown in plans.

Anchor bolts shall be 5/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded nex nut each) with one hex nut and one 1 3/4" O.D. hardened steel washer at each bolt. Threaded rods may be 0.557" minimum diameter with rolled threads. Nuts shall conform to to A563 requirements. The untapped blanks shall be galvanized prior to cutting the threads. Threads for bolts and nuts shall have Class 2A and 2B fit tolerances in accordance with ANSI B1.1.

Face of rail and posts shall be vertical transversely unless otherwise approved by the Engineer. Posts shall be perpendicular to adjacent roadway grade. Grout may be used under base plates if necessary.

Shop drawings to be submitted to the Bridge Engineer for approval will be required only for rails on horizontal curves in which case the rail members shall be fabricated to the required radius for radii of 600' or less. For rails not requiring shop drawings, erection drawings showing panel lengths, splice locations, rail post spacing and anchor bolt setting shall be submitted to the Area Engineer for approval.

Shop drawings may be submitted as 11" x 17" prints provided they are clearly legible.

Exposed edges of handrail and handrail posts shall be rounded or chamfered to approximately 1/16" by grinding.

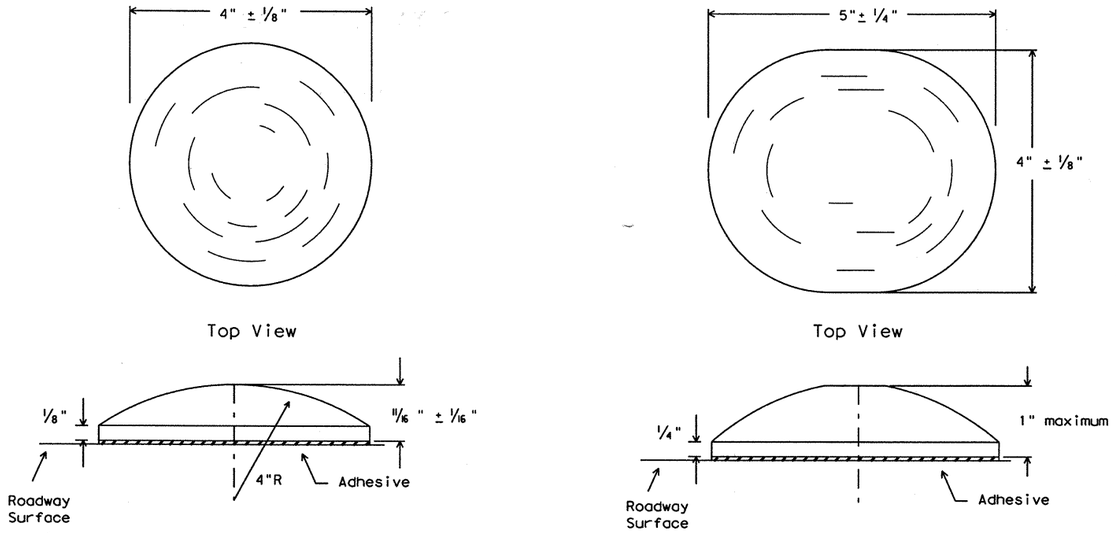
Average weight of railing is 30 plf.

Texas Department of Transportation
Design Division (Bridge)

PEDESTRIAN RAIL

TYPE PR1

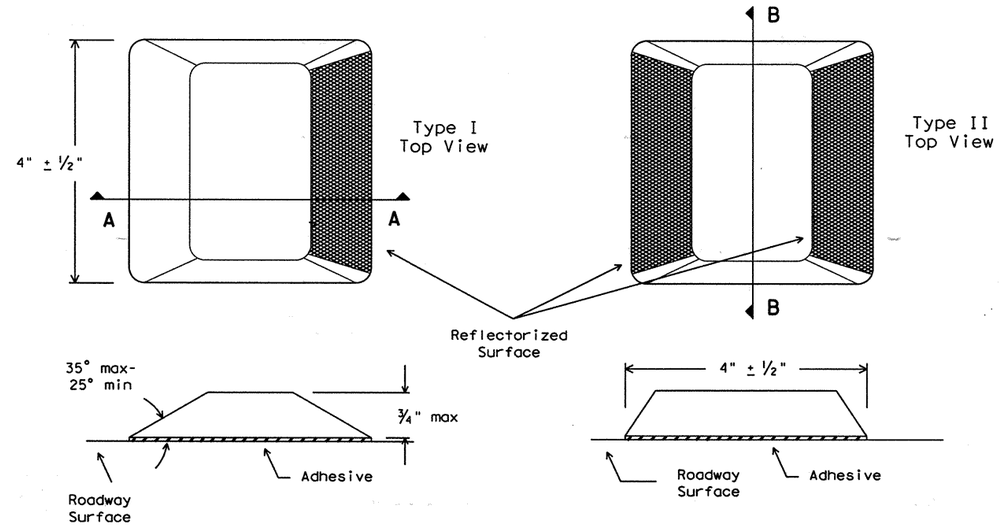
FILE:	rlstd034.dgn	DN: THD	CK: THD	DW: DRC	CK: LDS	NEG:	BSB3
ORIG DATE:	JANUARY 1996	DIST	FED REG	FEDERAL AID PROJECT			SHEET
REVISIONS		6	STP 99 (413) MM				192
		COUNTY		CONTROL	SECT	JOB	HIGHWAY
		ROCKWALL		1014	03	082	710



TRAFFIC BUTTONS

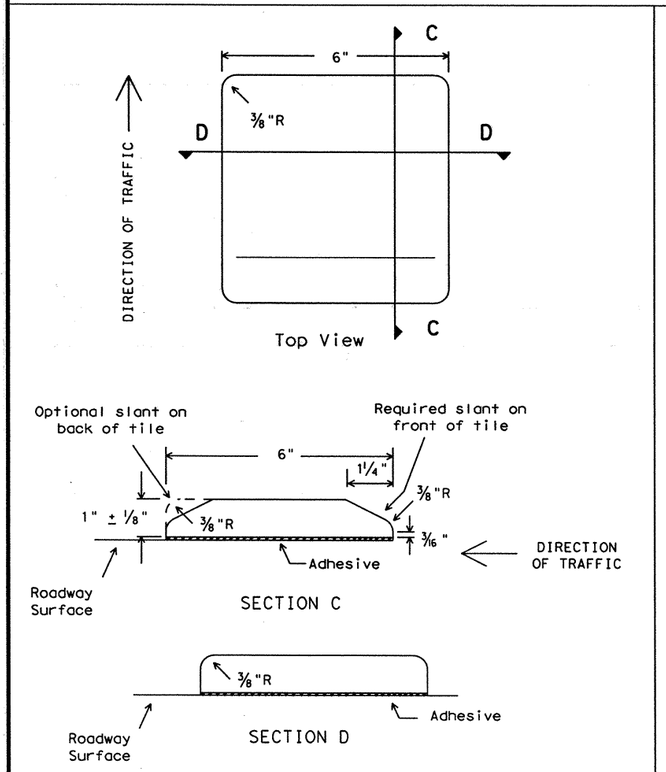
(NON-REFLECTORIZED)

NOTE: Minimum area of markers shall be not less than 12.5 square inches.
Either shape may be used but the same shape shall be used through out the project.



RAISED PAVEMENT MARKERS

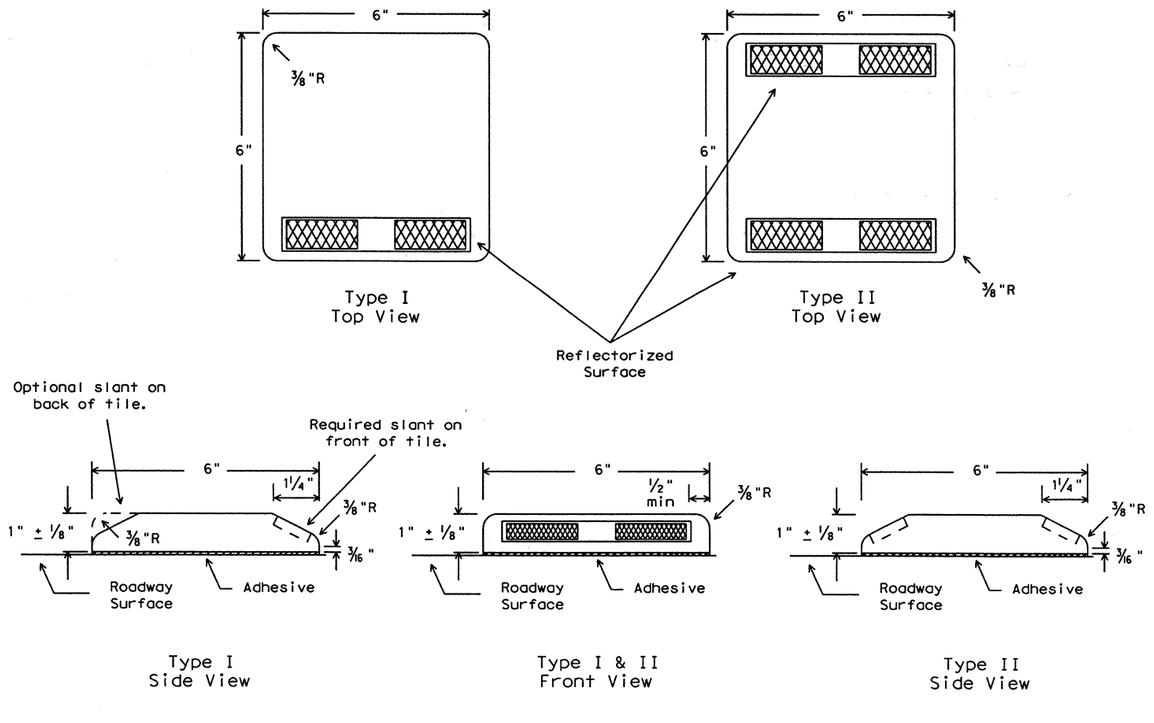
(REFLECTORIZED)



JIGGLE BAR TILES

(NON-REFLECTORIZED)

"Jiggle Bars" consist of a number of Jiggle Bar Tiles placed in a linear configuration.



JIGGLE BAR TILES

(REFLECTORIZED)

SPECIFICATION REFERENCE TABLE	
MATERIALS AND TEST SPECIFICATIONS (D-9)	
JIGGLE BAR TILE	D-9-4100
PAVEMENT MARKERS (REFLECTORIZED)	D-9-4200
TRAFFIC BUTTONS	D-9-4300
BITUMINOUS ADHESIVE	D-9-6130

GENERAL NOTES:

RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.

JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE ENGINEER.

MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.

ALL DIMENSIONS ARE ± 1/8 " UNLESS OTHERWISE NOTED.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

RAISED PAVEMENT MARKERS REFLECTIVE PAVEMENT MARKERS, TRAFFIC BUTTONS & JIGGLE BAR TILE

RPM(1)-92

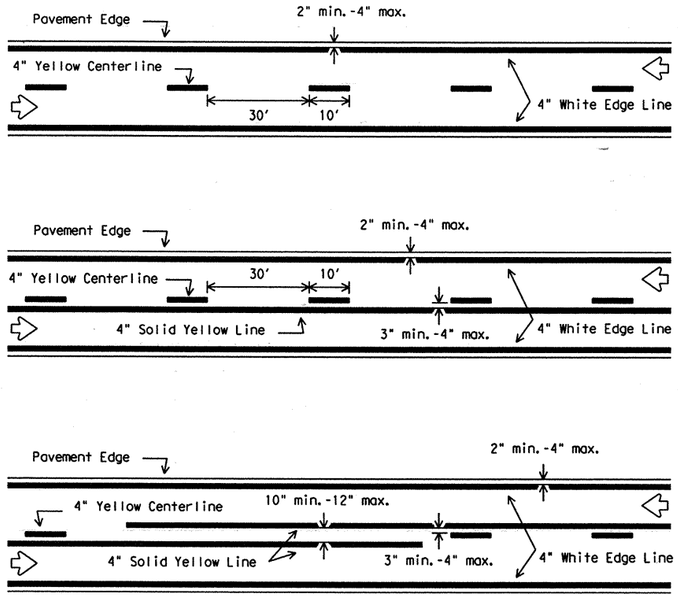
DN: LR	CK: -	DW: DN	CK: -	MEG NO.:

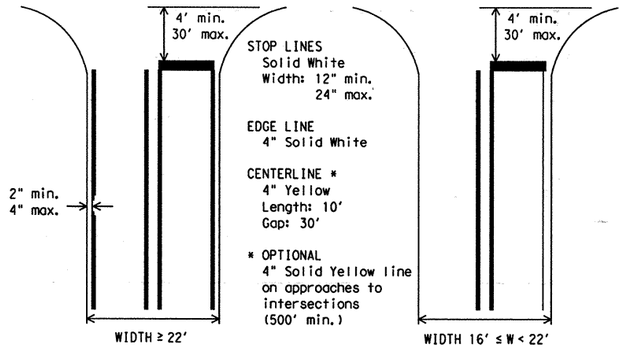
REVISIONS		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
2-82	10-86	DAL	6	STP 99(413)MM	195
7-85	12-90				
11-85	4-92	COUNTY		CONTROL SECTION JOB	HIGHWAY
7-86		ROCKWALL		1014 03 033	FM740

21A

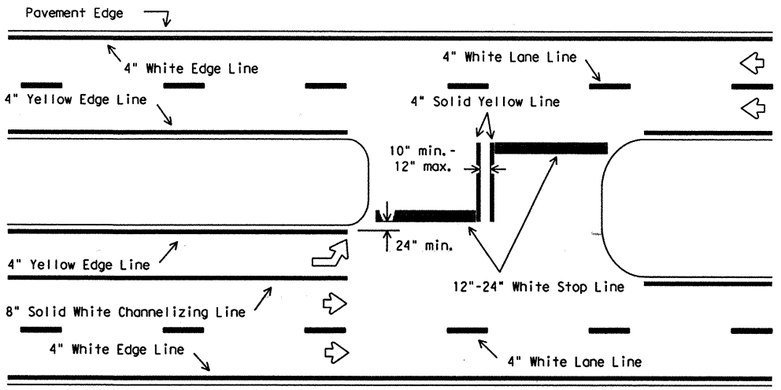
CK: CW
DW: DN
CK: MT
ACC: d58npic/usr/d580504
FILE:

TWO LANE TWO-WAY ROADWAY

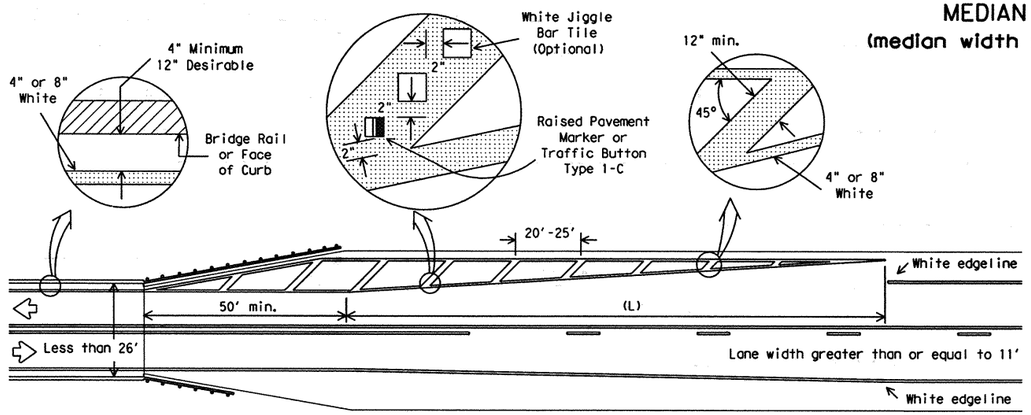




GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



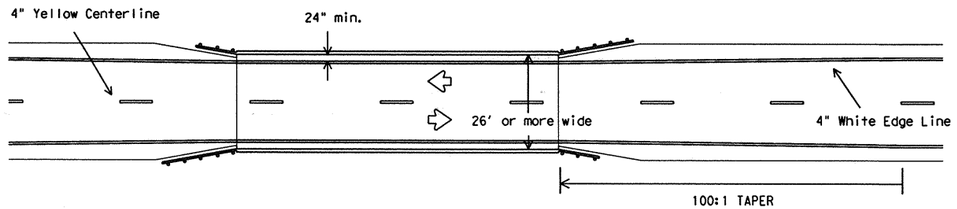
FOUR LANE DIVIDED ROADWAY INTERSECTIONS
MEDIAN WIDTH GREATER THAN 30 FEET
(median width measured between crossover stop lines)



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. 12 inch crosshatching is optional. See plan quantities.
3. For taper length (L) see Table 1.

NARROW BRIDGES (less than 26')
TWO LANE TWO-WAY ROADWAY



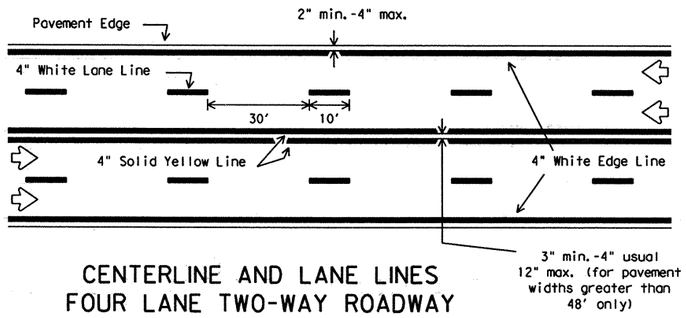
BRIDGES (26' or greater in width)
TWO LANE TWO-WAY ROADWAY

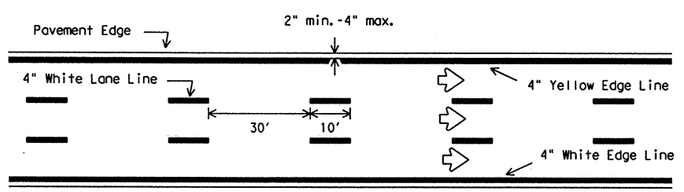
TABLE 1
TYPICAL TAPER LENGTH (L)

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset
30	$L = \frac{WS^2}{60}$	150'	165'	180'
35		205'	225'	245'
40		265'	295'	320'
45	L=WS	450'	495'	540'
50		500'	550'	600'
55		550'	605'	660'
60		600'	660'	720'
65		650'	715'	780'

✳ 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit.
✳✳ Taper lenghts have been rounded.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY





EDGE LINE AND LANE LINES
ONE-WAY ROADWAY

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-95

©TxDOT November 1978	DW:-LR	CK:-	DW:-DN	CK:-	MSG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
2-82 7-92	DAL	6	STP 99(413)MM	196
11-85 8-95	COUNTY		CONTROL SECTION JOB	HIGHWAY
7-86 4-92	ROCKWALL		1014 03 033	FM740

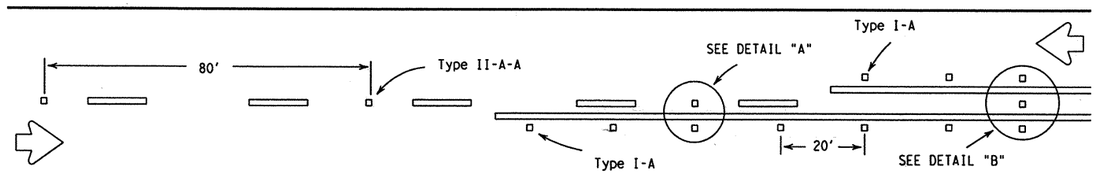
22A

ACC: d58hplc/usr/d580504 CK:CW DW:DN CK:MT FILE:

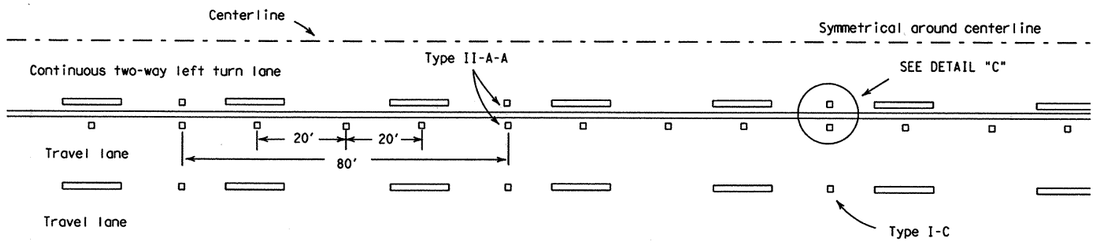
Raised pavement markers supplement painted lines

CENTERLINE & NO-PASSING LINES FOR TWO LANE TWO-WAY HIGHWAYS

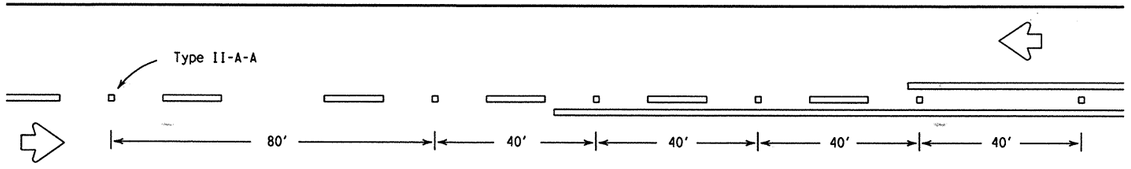
Raised pavement markers as vehicle positioning guides



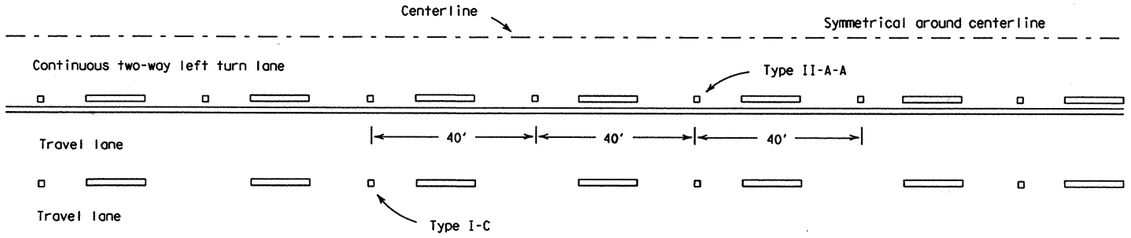
(FOR ROADWAYS 24 FEET OR WIDER)



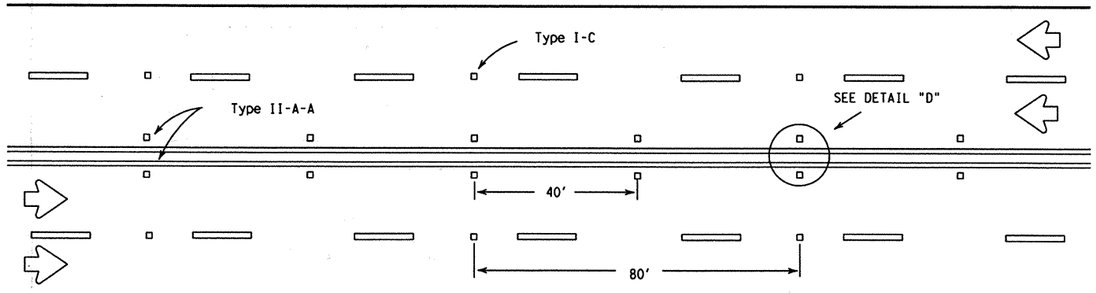
TWO-WAY LEFT TURN LANE



(FOR ALL ROADWAYS)

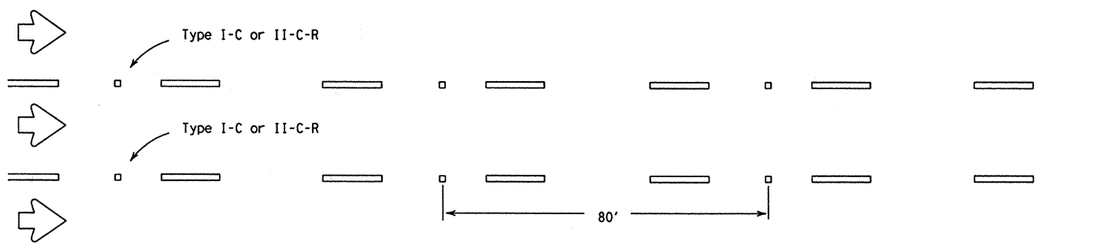


TWO-WAY LEFT TURN LANE



CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY HIGHWAYS

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

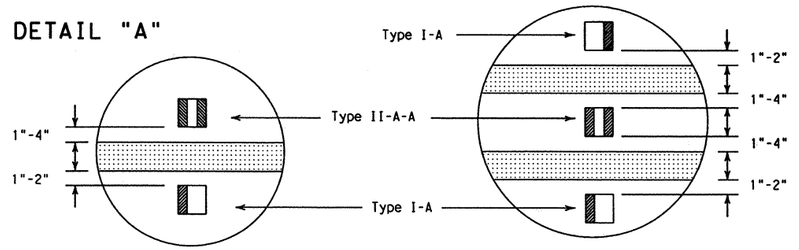


LANE LINES FOR ONE-WAY ROADWAY

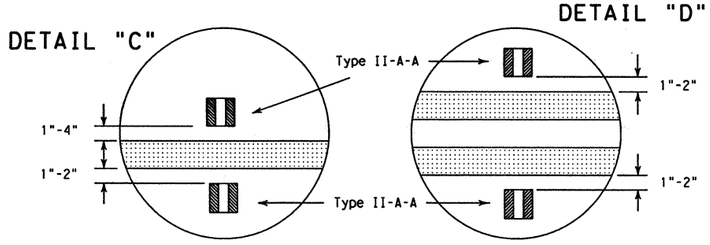
Raised pavement markers Type II-C-R, clear face toward normal traffic and red face toward wrong-way traffic, shall be spaced on 80-foot centers.

As required by the Engineer or shown elsewhere in the plans, Type II-C-R markers shall be placed on 40-foot centers for the below listed conditions:

1. Vertical curves with grades over 2 percent and less than 1000 feet long,
2. horizontal curves,
3. or continously illuminated sections.



DETAIL "B"



GENERAL NOTES:

All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.

First and last raised pavement markers in a no-passing line are to be located adjacent to either the midpoint of the gap of the centerline marking or the midpoint of the broken line of the centerline marking.

On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS WITH RAISED PAVEMENT MARKERS

PM(2)-92

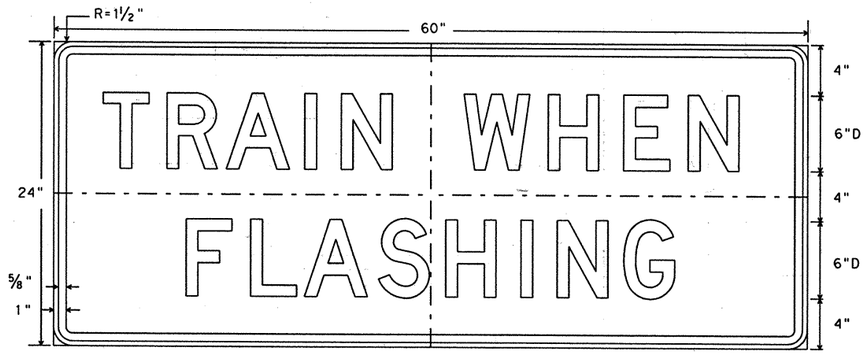
DN: LR	CK: -	DW: DN	CK: -	MEG NO.:

REVISIONS: 2-82 4-92; 11-85; 7-86; 10-86

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	197

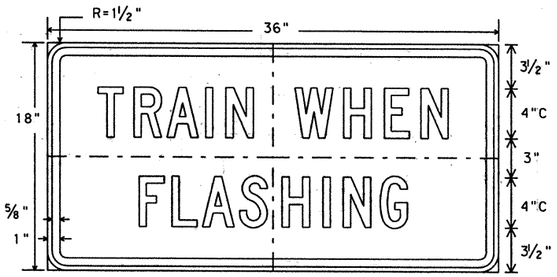
COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

22B



W10-4B
60" x 24"

Legend - Black
Background - Yellow Refl.



W10-4A
36" x 18"

Legend - Black
Background - Yellow Refl.

SPECIFICATION REFERENCE TABLE	
MATERIALS AND TESTS DIVISION SPECIFICATIONS	
Plywood Sign Blanks	D-9-7100
Aluminum Sign Blanks	D-9-7110

Square Ft.	Min. Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

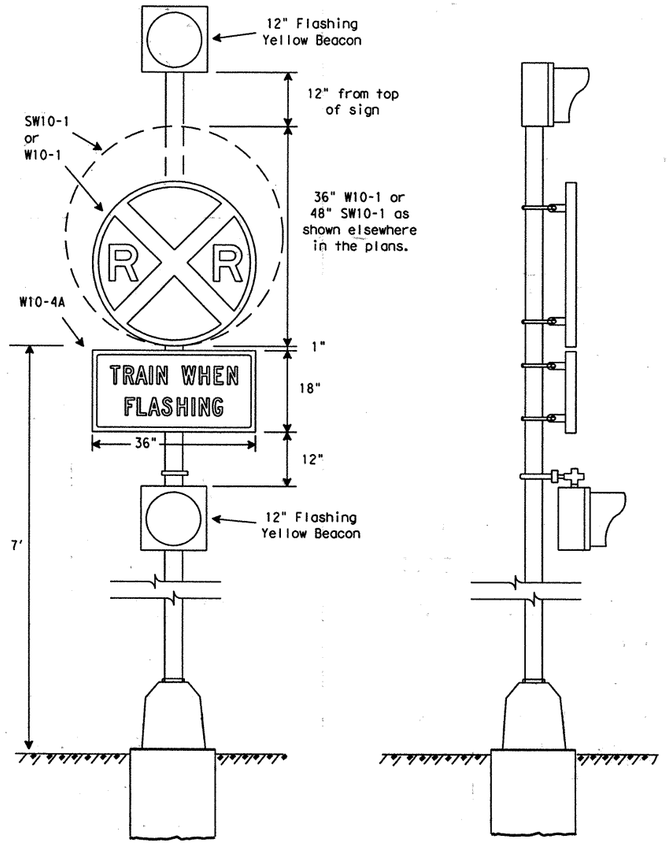
Reflective Sheeting, Type C (High Specific Intensity)	D-9-8300
Vinyl Non-Reflective Decal Sheeting	D-9-8320

GENERAL SIGN NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

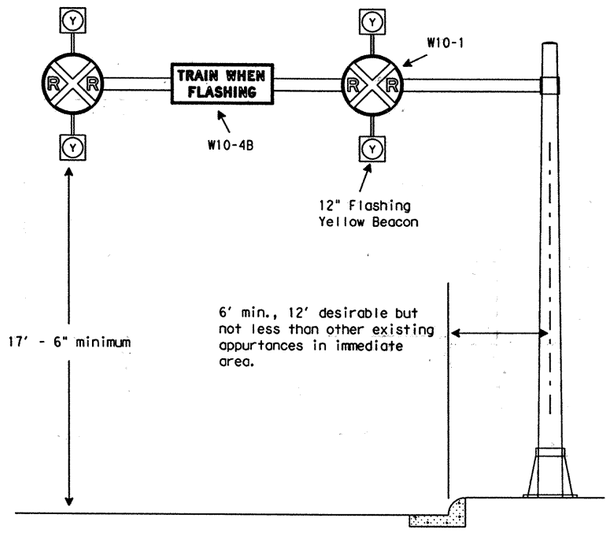
Legend for W10-4A and W10-4B shall be black and applied by screening process, cut-out vinyl non-reflective decal sheeting or combination thereof. Background shall be yellow reflective sheeting (Type C).

Sign blanks shall be fabricated as specified in the plans from one piece 5/8 inch thick plywood (Type A), or one piece sheet aluminum alloy (Type A) of the approved thickness.



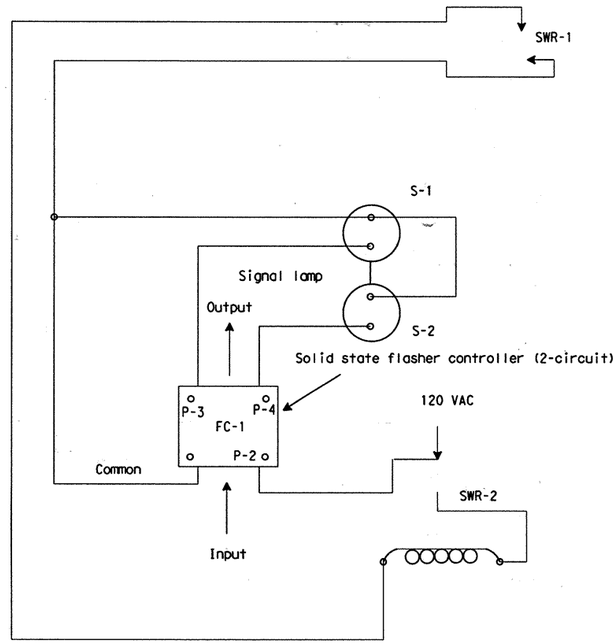
Pedestal Pole Assembly

(See Standard RFBA)



Typical Multi-Lane Usage -

(Non-curbed sections require approval of design)



Interconnection Schematic

SW R-1	switching relay in the railroad control box
SW R-2	relay in the flasher controller cabinet
FC-1	flasher controller
S-1 & S-2	signal lamps on the advance warning sign

For the above schematic, SW R-1 is shown open (i.e. train is present)

(a) common connection is broken on one side of the relay coil of SW R-2

(b) SW R-2 is de-energized, connecting 120 VAC on the moveable contact to P-2

(c) FC-1 becomes activated and sends 120 VAC pulse outputs to P-3 and P-4

(d) Outputs are one-half second alternating pulses to S-1 and S-2

When train is not present

(a) SW R-1 is closed, completing the common connection to the relay coil of SW R-2

(b) SW R-2 is energized, breaking the 120 VAC moveable contact from P-2

(c) 120 VAC to P-2 is lost, stopping power pulses to P-3 and P-4

(d) S-1 and S-2 are turned off

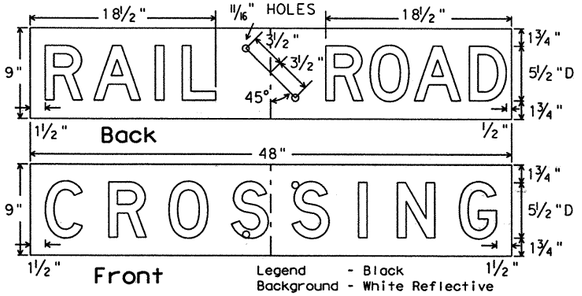
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

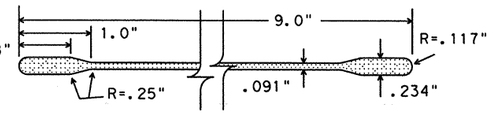
RAILROAD CROSSING ADVANCE WARNING SIGN & SIGNAL

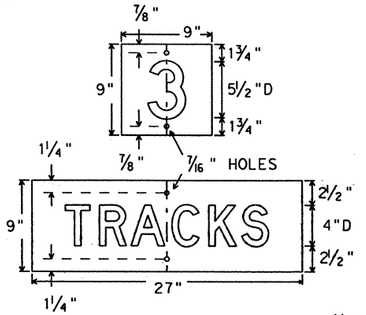
RCAWSS-98

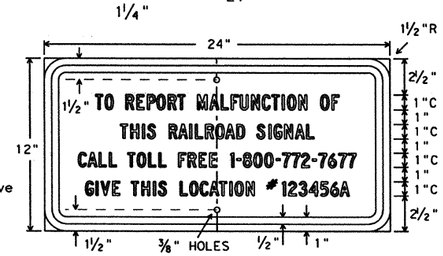
©TxDOT August 1995	DN: - MT	CK: -	DW: - DN	CK: -	NEG NO.:

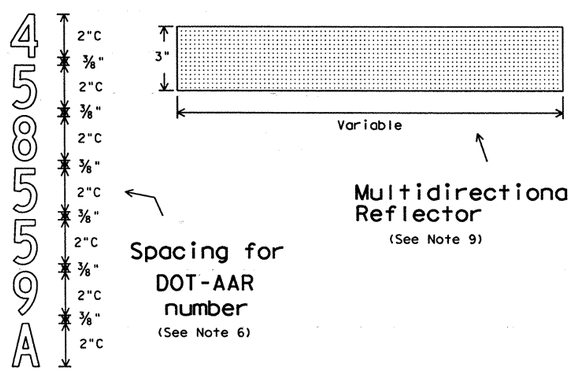
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
2-96 4-98	DAL	6	STP99(413)MM			198
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

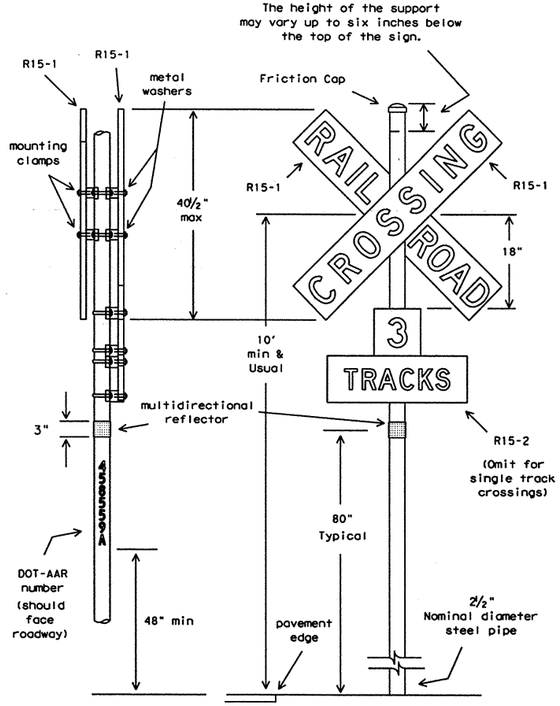


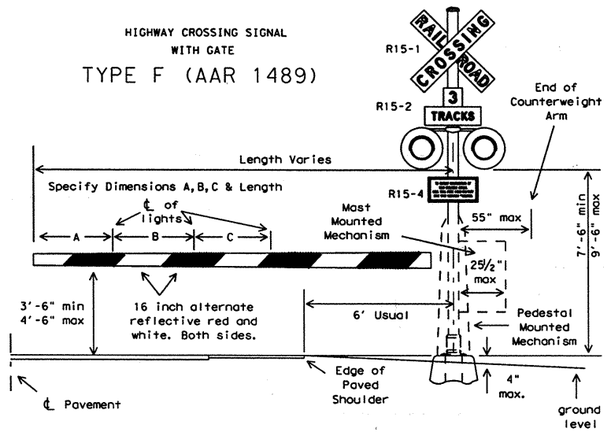


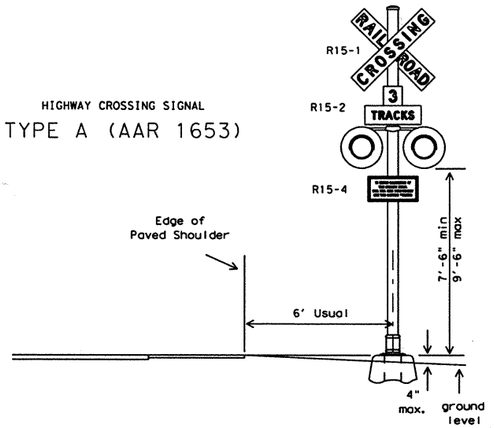


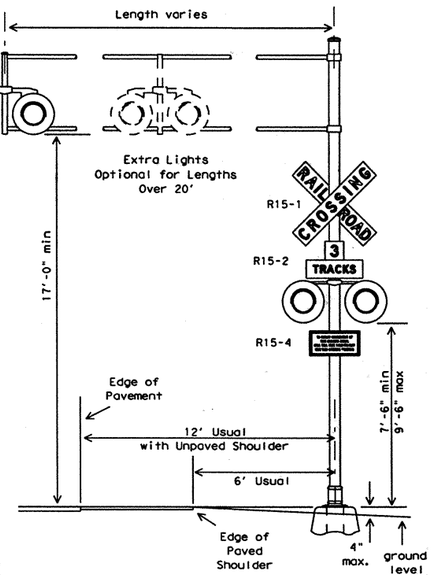


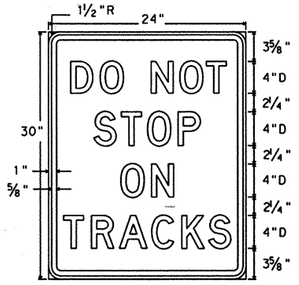












R15-1 Blade Detail

Two double faced blades are required for each sign.

Blade cross section

ASTM B221 aluminum alloy
6061-T6 or 6063-T6

R15-2 Multiple Track Sign Detail

Legend - Black
Background - White Reflective

R15-4 Malfunction Sign

Legend - Black
Background - White Reflective

Spacing for DOT-AAR number
(See Note 6)

Multidirectional Reflector
(See Note 9)

Assembled Elevations

RAILROAD CROSSBUCK SIGN INSTALLATION (NEW POLE AND FOUNDATION) (R15-1)

LATERAL CLEARANCES FOR SIGNS

R15-2

SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

ALUMINUM SIGN BLANKS	D-9-7110
FLAT SURFACE REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300

GENERAL NOTES

1. All signals and installations shall conform to the Association of American Railroads Signal Section Specifications.
2. Unfinished metal parts shall receive a prime coat of paint and a finish coat of aluminum paint. Finished aluminum parts will not require painting.
3. Railroad Company standard type signal foundations may be used. Concrete foundation surfaces exposed to view shall be finished by rubbing with a carborundum stone or equal abrasive until a smooth uniform appearance results.
4. Top of foundation to be at the same elevation as the traveled way and no more than 4 inches above the surface of the ground.
5. Any existing crossbuck sign which is in poor condition, does not conform to the Texas "Manual on Uniform Traffic Control Devices", or is not located in accordance with the plans shall be replaced and/or relocated.
6. The designated DOT-AAR number shall be placed on all crossbuck sign supports at each crossing as shown on the adjacent sketch, "DOT-AAR NUMBER". The contractor shall use black lettering on a white conformable sheeting reflectorized background or stencil the number on the post with paint. If the paint option is used, the paint shall be black. The method chosen for numbering shall be consistent throughout the project.
7. A crossbuck sign should be erected for each roadway approach and should normally be located on the right-hand side. See Standard Sheet RCPM for details. Minimum lateral clearances should be maintained between the railroad and highway, but exact locations shall be as directed by the Engineer.
   A crossbuck and R15-2 sign, indicating the number of tracks, should be installed at multi-track crossings (adjacent tracks separated by less than 100 feet).
8. Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy conforming with Item "Aluminum Signs (Type A)".
9. Multidirectional reflectors shall be white reflective sheeting with pressure sensitive adhesive conforming with Department Specification D-9-8300. Support cirumference may vary, therefore the excess should be trimmed to avoid overlap.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

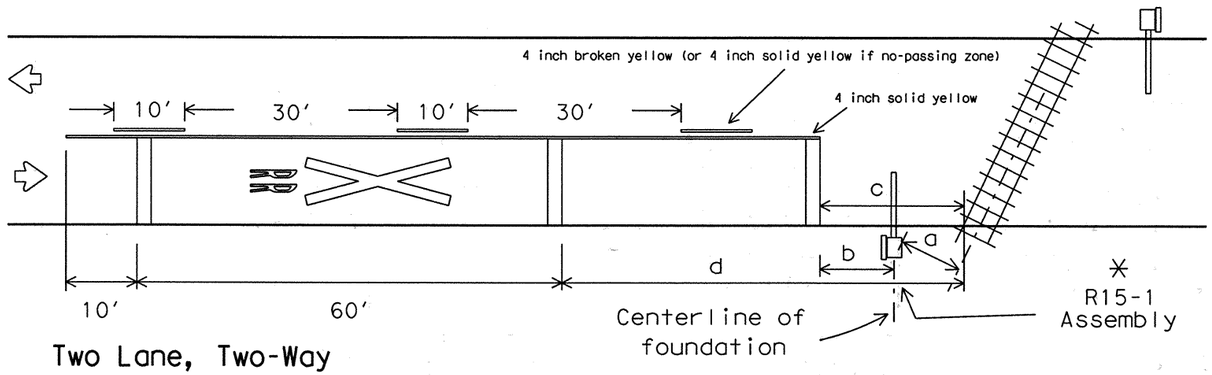
RAILROAD CROSSING SIGNS and SIGNALS

RCSS-98

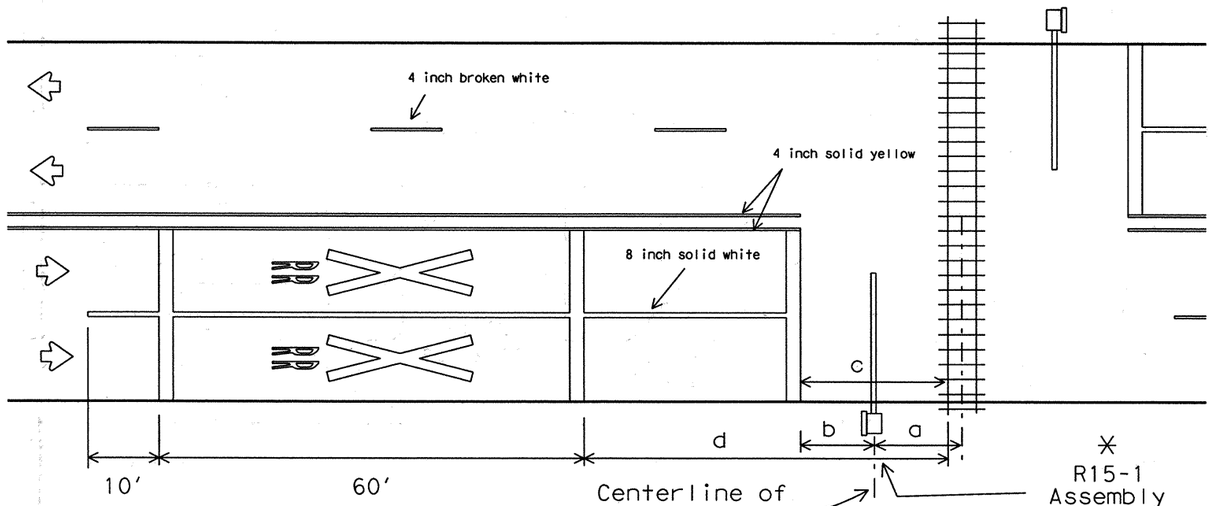
© TxDOT August 1990	DN: -LR	CK: -	DW: - DN	CK: -	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
11-90 4-98 5-91 4-92 8-95	DAL	6	STP99(413)MM			199
	COUNTY			CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL			1014	03	033	FM740

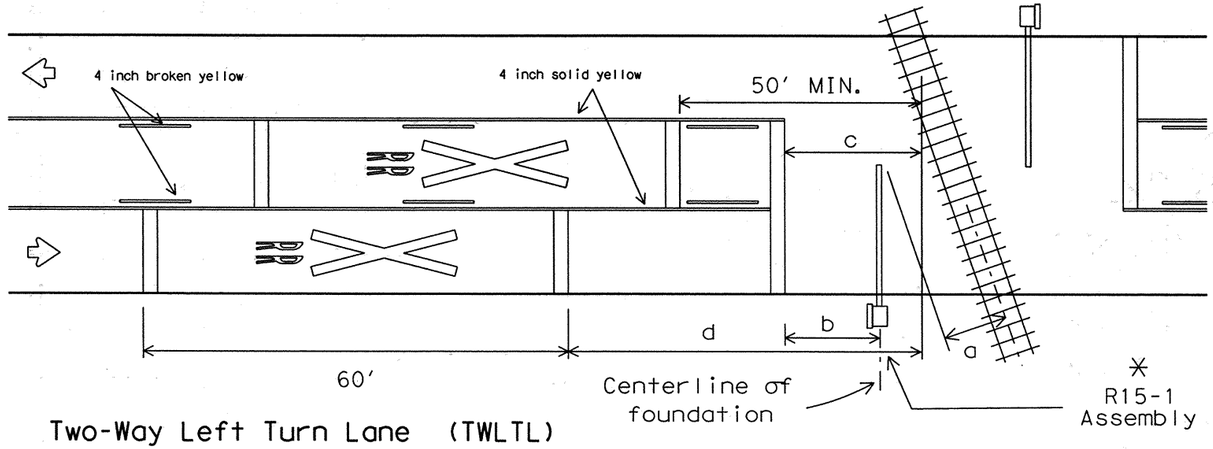
8A



Two Lane, Two-Way



Undivided Multilane Roadway



Two-Way Left Turn Lane (TWLTL)

a =

12 feet minimum, 15 feet usual, if active warning devices are present. Distance "a" should be measured from the centerline of * R15-1 assembly to the centerline of nearest track.

b =

Stop lines should be approximately 8 feet in advance of active warning devices (Type A, E or F). Stop line should be approximately 15 feet from near rail if only passive devices (R15-1, plus R15-2 when applicable) are present.

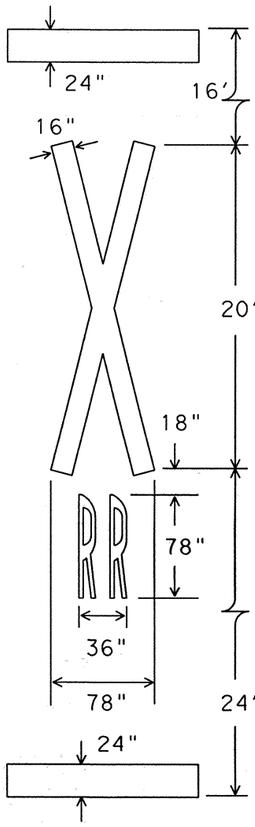
c =

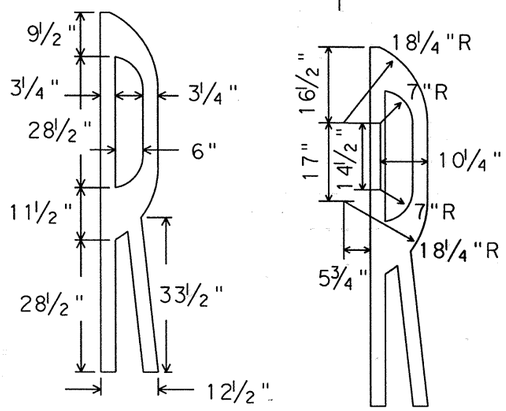
15 feet desirable minimum. R15-1 should be placed between stop line and rails with adequate distance provided for "a".

* d =

Approach Speed (mph)	Desirable Placement (feet)
20	145
25	220
30	295
35	370
40	445
45	520
50	595
55	670
60	745
65	820
70	900

* Local conditions may require alternate placement locations.





ESTIMATED QUANTITIES

(for Contractor Information ONLY)

24 INCH WHITE TRANSVERSE MARKINGS AND STOP LINES

No. of Approach Lanes (Include TWLTL)	LANE WIDTH (FT) 11	12	13	14
1	33	36	39	42
2	66	72	78	84
3	99	108	117	126
4	132	144	156	168

4 INCH SOLID YELLOW NO PASSING LINE = "d" - "c" + 70

For: Two Lane, Two-Way, Single Lane Approach per Direction

8 INCH SOLID WHITE LANE LINE = "d" - "a" + 70

For: Two-Way or One-Way Traffic, 2 or More Approach Lanes in Same Direction (Do NOT Include TWLTL)

GENERAL NOTES

1. The pavement markings on an approach to a railroad grade crossing shall consist of:
   a. The RR Xing symbol,
   b. Three transverse 24" lines, and
   c. Lane lines: a solid no passing line for two-way traffic approaches, or solid lane lines for multilane approaches.
2. For bidding purposes, the RR Xing symbol will be measured and paid for as for each lane in place. The transverse markings and lane lines will be measured and paid for by the lineal foot.
3. Centerlines shall be yellow, other markings shall be white.
4. Approach lanes less than 8 foot width shall NOT have markings.
5. Markings should NOT be placed where less than 110 feet of approach roadway is available for placement.
6. RR Xing symbols should be placed approximately in the center of the approach lane.
7. All transverse markings, including stop lines, shall be placed at right angles to the centerline and across all approach lanes.
8. Existing non-standard markings shall be removed to the fullest extent possible so as not to leave a discernable marking, by any method approved by the engineer. OVERPAINTING WILL NOT BE ALLOWED.
9. Additional markings and placement details may be found in the TMUTCD, Appendix H.
10. The Engineer may require additional longitudinal markings if the distance between the stop lines is greater than 80 feet. Markings are not required across or between the rails unless specified elsewhere in the plans.

* R15-1 Assembly

May consist of one or more of the following:

R15-1	Crossbuck Sign
R15-2	Multiple Track Sign
Type A	Mast Flashers
Type E	Cantilevers
Type F	Gates

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

RAILROAD CROSSING PAVEMENT MARKING TYPICAL DETAILS

RCPM-96

DN: LR/MT	CK: -	DW: DN	CK: -	MEG NO.:

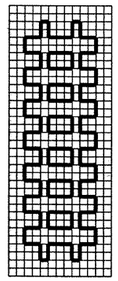
REVISIONS: 12-90 2-96; 5-91; 4-92; 8-95

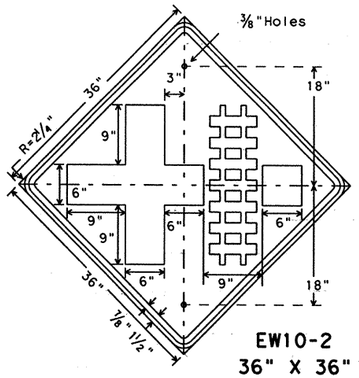
STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	200

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

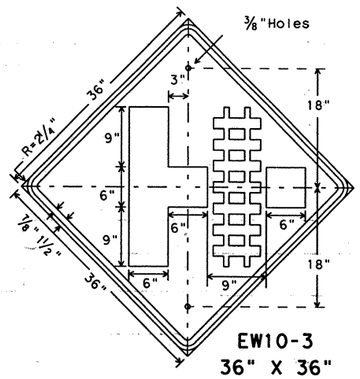
24

CK: CW DW: DN CK: MT
FILE: d58hp1c/usr/d580504 ACC:

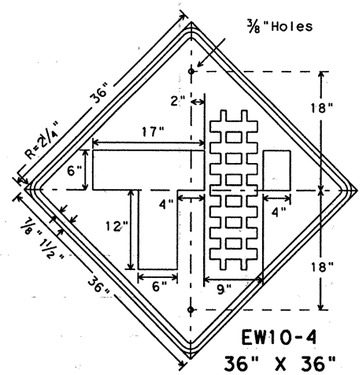




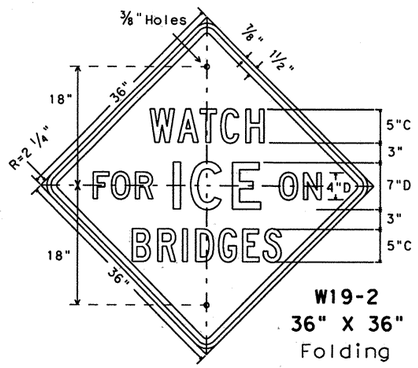
EW10-2
36" X 36"



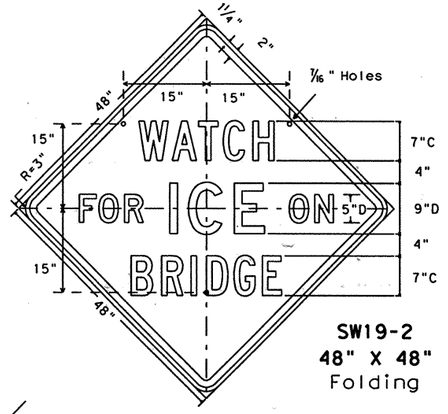
EW10-3
36" X 36"



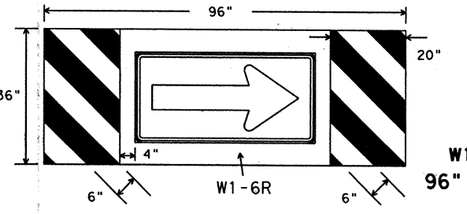
EW10-4
36" X 36"



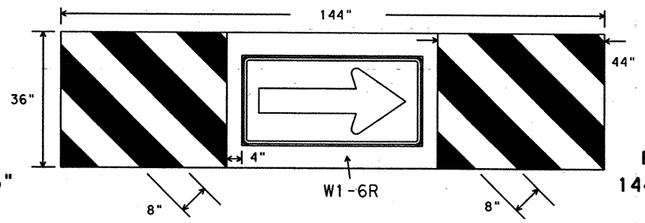
W19-2
36" X 36"
Folding



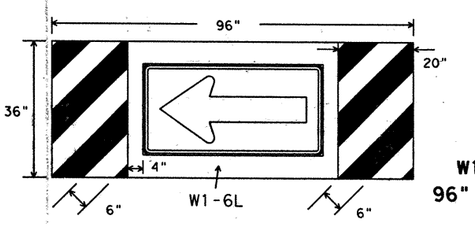
SW19-2
48" X 48"
Folding



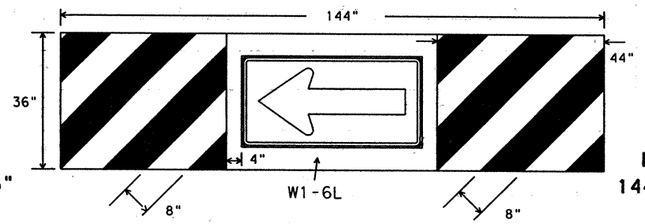
W1-9R
96" x 36"



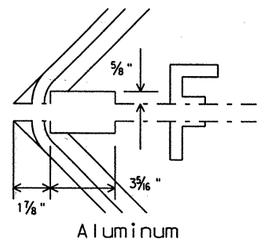
FW1-9R
144" x 36"



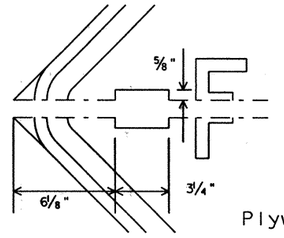
W1-9L
96" x 36"



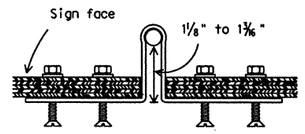
FW1-9L
144" x 36"



Aluminum



Plywood



Folding Sign Hinge Details

Aluminum folding signs shall use 3" flat hinges, three per sign. The hinge slot on each half of sign is 5/8" deep by 3 5/16" wide. The sign halves are seperated by 3/32" when hinges are installed to the back of the sign with four 3/16" pop rivets. Location of hinges on the sign are as shown on above detail.

Plywood folding signs shall use 6" strap hinges, three per sign. The hinge slot on each half of sign is 5/8" deep by 3 1/4" wide. The hinges are bent with tapered side of holes on the external side, and attached to the back of sign with pivot extending through to front of sign. Attachment of each hinge will be with four each of 10x24x1" flat head screws with a tapered head shank, 5/16"x 3/16" flat washers and 3/16" bolt x 7/16" wrench hex nuts. Hinge bending and location on sign are as shown on above details.

SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATIONS	
PLYWOOD SIGN BLANKS	D-9-7100
ALUMINUM SIGN BLANKS	D-9-7110

Square Ft.	Min. Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

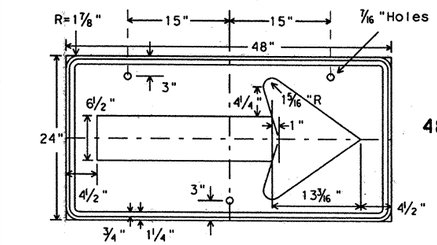
GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

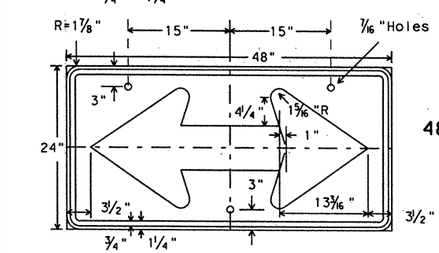
Legend (except where noted), shall be black and applied by screening process, cut-out vinyl non-reflective decal sheeting or combination thereof. Background shall be yellow reflective sheeting (Type C).

Sign blanks shall be fabricated as specified in the plans of one piece 5/8 inch thick plywood (Type A) or one piece aluminum alloy (Type A) of the approved thickness.

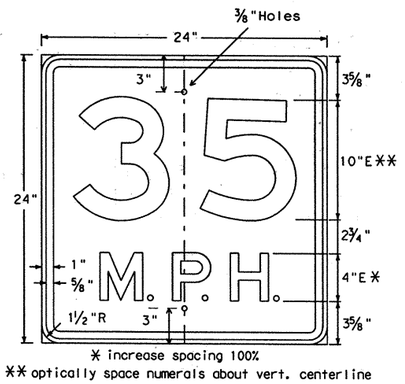
Large arrow signs W1-9, W1-10, FW1-9 and FW1-10 shall be composed of a standard W1-6 or W1-7 sign attached directly to the background material.



W1-6
48" X 24"

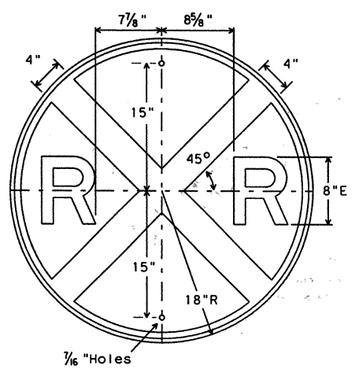


W1-7
48" X 24"



SW13-1
24" X 24"

Speed value to be determined at the site by the Engineer.



W10-1
36" Diameter

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WARNING SIGNS

W(3)-95

DN: LR	CK: -	DW: DN	CK: -	MEG NO.:

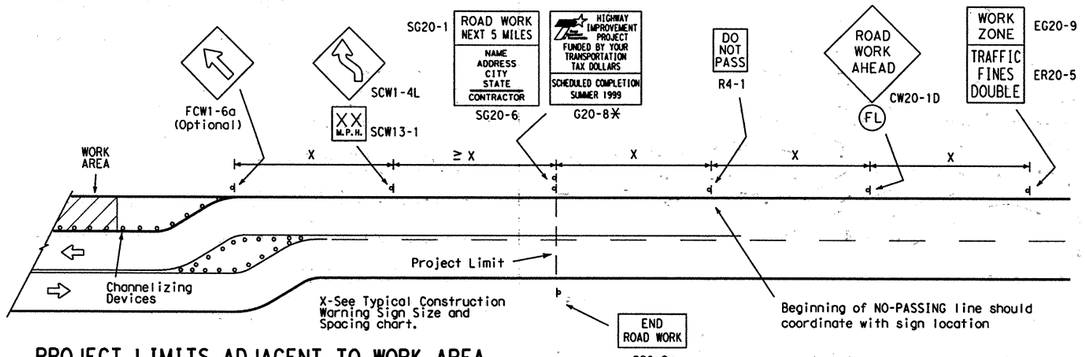
REVISIONS
8-90
8-95

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP99(413)MM	201

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

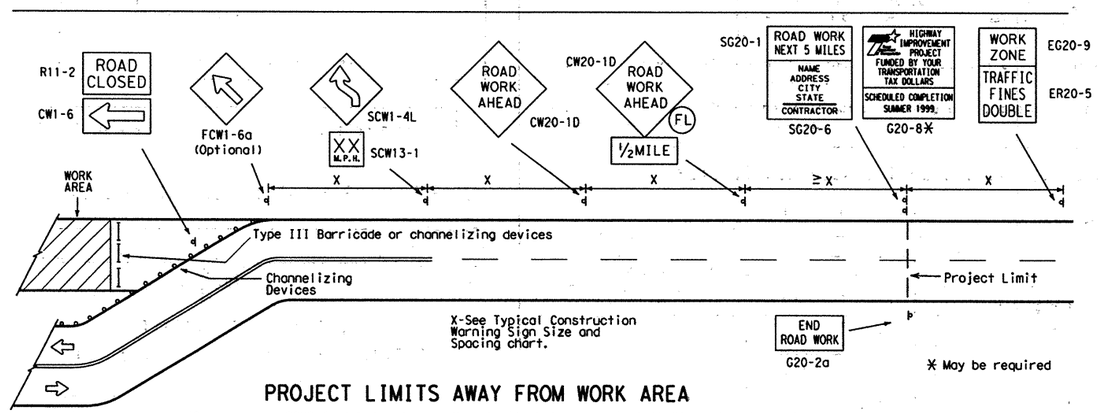
9C

PROJECT LIMIT TRAFFIC CONTROL DEVICES



PROJECT LIMITS ADJACENT TO WORK AREA

(Less than 2000 feet between project limits and work area)



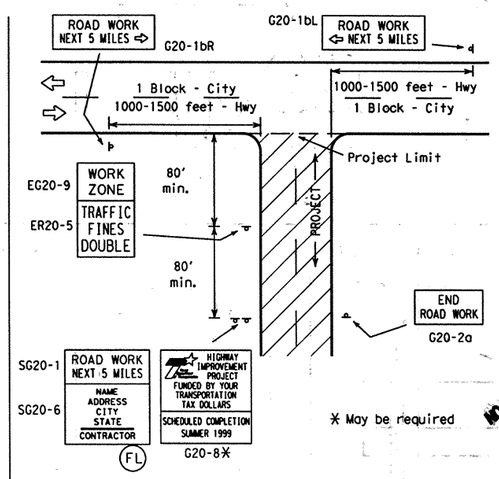
PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 2000 feet but not more than 1 mile between project limits and work area)

PROJECT LIMIT GENERAL NOTES

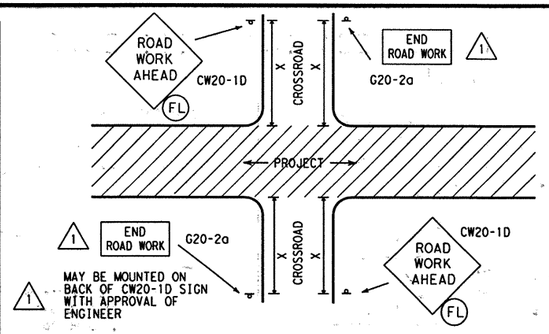
SIGNS AND WARNING LIGHTS

1. When specified on this sheet or other sheets in the plans, warning lights for a sign shall be installed and maintained by the contractor. Warning lights shall be attached to the sign support using a 1/2" bolt (minimum) of sufficient length for three washers, lock washer and a nut.
2. Warning lights shall be maintained as directed by the Engineer.
3. Appropriate standard traffic control devices shall be used as required by the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the contractor's responsible person.
4. As a general rule, additional traffic control devices in advance of the project limits should only be used in those cases where a work area, a detour, or a potentially hazardous location is less than 2000 feet inside the project limits.
5. The traffic control devices used in the above illustrations are examples only. Field conditions and engineering judgement should dictate the most appropriate traffic control devices to be used. Any variation in the plans shall be documented by written agreement between the Engineer and the contractor's responsible person.
6. As detailed above, the ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the project limits and the WORK ZONE TRAFFIC FINES DOUBLE sign shall be erected in advance of the project limits. These signs should be adjusted to provide adequate spacing to other signs. The OBSERVE WARNING SIGNS STATE LAW sign shall be installed when required elsewhere in the plans.
7. With the agreement of an adjacent project Engineer, the Engineer(s) may allow the omission of END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the contractor will erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
8. Duplicate construction warning signs should be erected on the median side of divided highways where median width will permit and traffic volumes justifies the signing.
9. Except for devices required by Note 6, traffic control devices should be in place only while work is actually in progress or a definite need exists.
10. Sign size should be based on the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD).
11. The Special Public Information sign (G20-8 shall be installed at the project limits when required elsewhere in the plans. Refer to SMD Standards for approved mounting details.

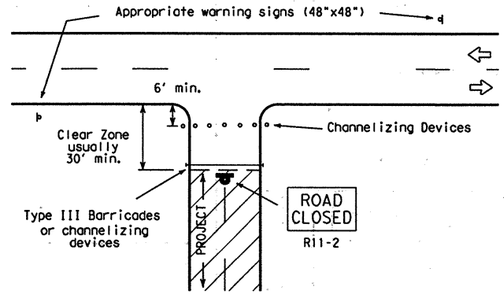


PROJECT LIMITS AT T-INTERSECTION

1. The ROAD WORK NEXT X MILES sign should be erected on the intersected highway as detailed above.
2. On the intersected roadway, additional traffic control devices, such as a flagger and accompanying signs or other signs, should be used when work is being performed at or near the intersection.

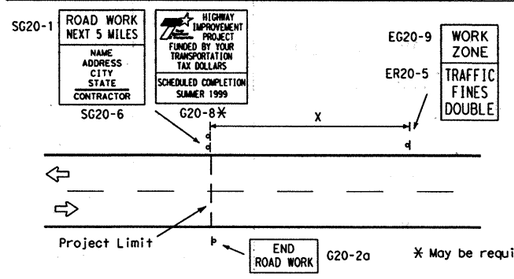


CROSSROAD SIGNING AND BARRICADING



PROJECT LIMITS FOR CLOSED ROADWAY

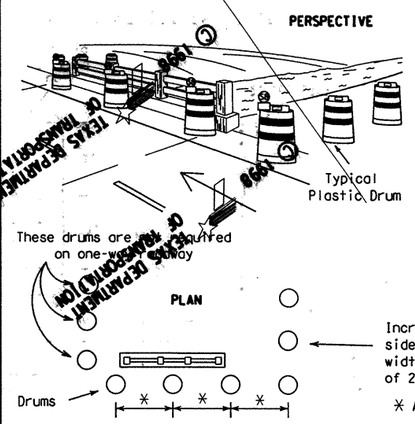
Barricades shall be erected completely across roadway. Channelizing Devices may be drums, vertical panels or cones as specified in the plans.



PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 1 mile between project limits and work area)

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



1). Where positive redirectional capability is provided, drums may be omitted.

2). Plastic construction fencing may be used with drums for safety as required in the plans.

3). Vertical Panel on flexible support may be substituted for drums when shoulder width is less than 4'.

4). When shoulder width is greater than 12', steady-burn lights may be omitted, if drums are used.

CROSSROAD SIGNING AND BARRICADING

1. Except as noted elsewhere in plans, the usual minimum signing on a cross-road approach should be one CW20-1D ROAD WORK AHEAD sign and G20-2a END ROAD WORK sign. Where speeds and volumes are relatively low, a smaller ROAD WORK AHEAD sign may be used.

   When approved by the Engineer, on low volume crossroads, advance warning signs may be the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 24" x 18" END ROAD WORK (SG20-2a) sign. See the "STANDARD HIGHWAY SIGN DESIGNS for TEXAS" manual and BC(9) thru BC(9C) for sign design details. On low volume crossroads, advance signing may be omitted if approved by the Engineer.

   Additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs may be required. When additional signs are required, such signs will be considered part of the minimum requirements.
2. The G20-1a sign shall be required on major crossroads to advise motorists of the length of construction in either direction from the intersection.
3. On higher volume crossroads additional traffic control devices may be noted elsewhere in the plans.
4. When work occurs in the intersection area, appropriate traffic control devices shall be in place.

WARNING LIGHTS

Warning lights shall meet the requirements of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

Flashing and Steady-Burn Warning Lights shall NOT be installed on barricades.

Type A-Low Intensity Flashing Warning Lights are commonly used with signs. They are intended to warn of an approaching potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "(FL)".

Type-C Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "(SB)".

TYPICAL CONSTRUCTION WARNING SIGN SIZE [4,5,6] AND SPACING

Roadway Classification	Posted Speed	Sign Spacing "X" Δ	Long-term Or Intermediate-term Stationary Approach Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW21 Series		Other Warning Signs
	MPH	Feet (Apprx.)	Standard inches	Minimum[4] inches	Standard inches [7]	Minimum[4] inches [7]	Standard mm [7]
Conven.	30	120	48 x 48	36 x 36	30 x 30 or 36 x 36	24 x 24 or 30 x 30	30 x 30 or 26 x 36
	35	160 [8]					
	40	240					
	45	320					
	50	400					
	55	500[2]		Use Standard Size		Use Standard Size	
	60	600[2]			48 x 48		48 x 48
	65	700[2]					
	70	800[2]					
Exp or Frwy	*	* [3]			**	**	**

* For typical sign spacings on expressways and freeways, see TMUTCD typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to 1st Advance Warning sign and/or distance between each additional sign.

** Smaller sign sizes may be used where sign designs have not been included in the "Standard Highway Sign Designs for Texas" manual.

General Notes:
1. Special or larger size signs may be used as may be necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have ½ mile or more advance warning.
4. For use only on secondary roads or city streets where speeds are low.
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
7. Where two sizes are listed, see sign size listing in TMUTCD, Appendix A for proper size.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing
Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

ADVANCE SIGNING
CROSSROAD SIGNING
WARNING LIGHTS

BC(1)-98

DN: LR	CK: DTN	DW: DN	CK: GB	REQ NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	DAL	6	STP 99(413)MM	202

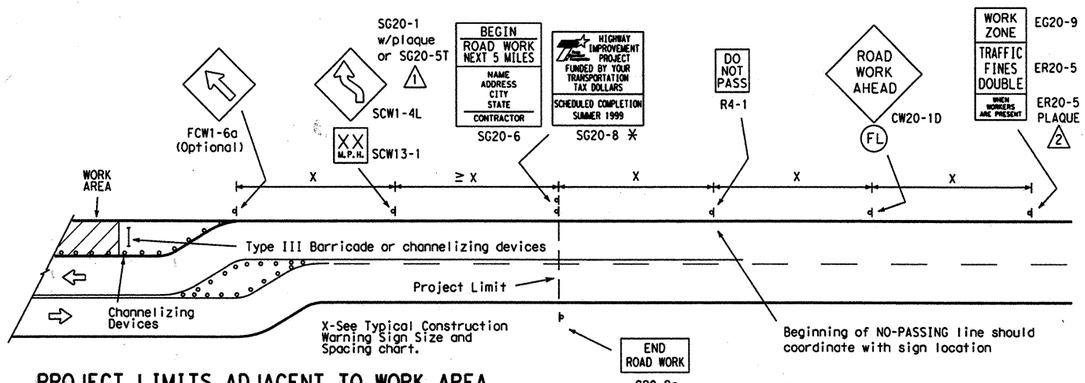
COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

DN:
CK:
DW:
CK:

DATE:
ACC:
FILE:

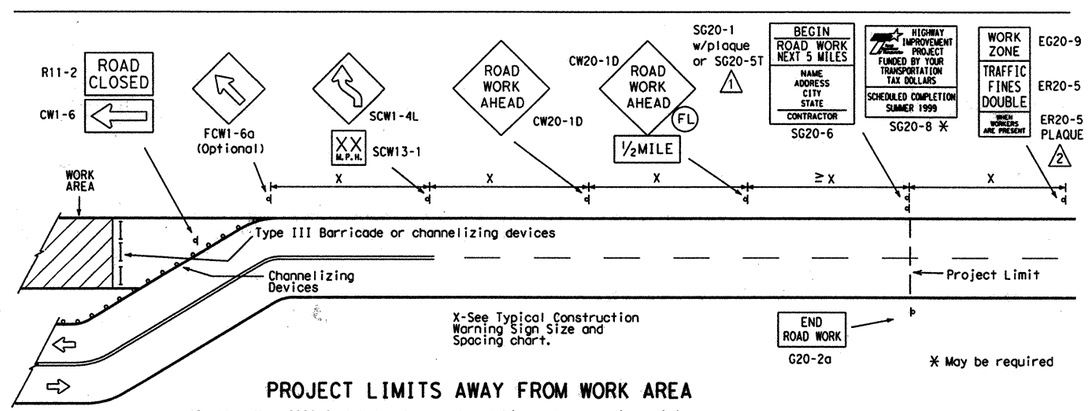
PLAYED
LEVEL

PROJECT LIMIT TRAFFIC CONTROL DEVICES



PROJECT LIMITS ADJACENT TO WORK AREA

(Less than 2000 feet between project limits and work area)



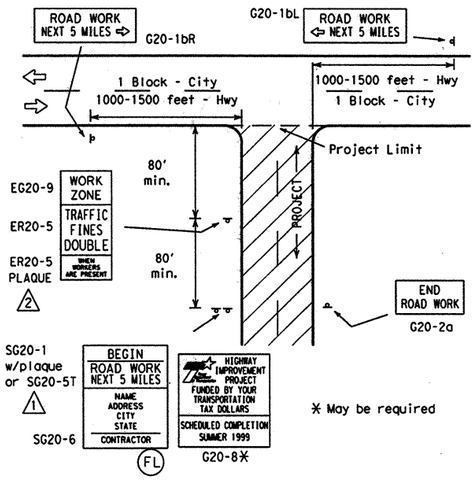
PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 2000 feet but not more than 1 mile between project limits and work area)

PROJECT LIMIT GENERAL NOTES

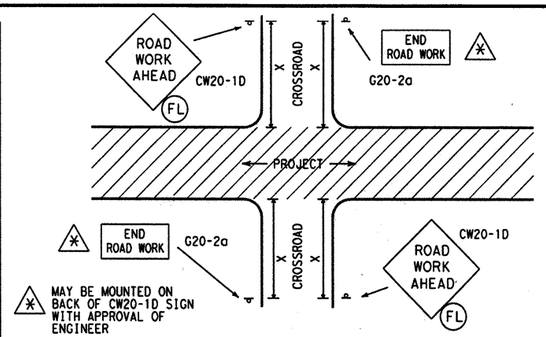
SIGNS AND WARNING LIGHTS

1. When specified on this sheet or other sheets in the plans, warning lights for a sign shall be installed and maintained by the contractor. Warning lights shall be attached to the sign support using a 1/2" bolt (minimum) of sufficient length for three washers, lock washer and a nut.
2. Warning lights shall be maintained as directed by the Engineer.
3. Appropriate standard traffic control devices shall be used as required by the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the contractor's responsible person.
4. As a general rule, additional traffic control devices in advance of the project limits should only be used in those cases where a work area, a detour, or a potentially hazardous location is less than 2000 feet inside the project limits.
5. The traffic control devices used in the above illustrations are examples only. Field conditions and engineering judgement should dictate the most appropriate traffic control devices to be used. Any variation in the plans shall be documented by written agreement between the Engineer and the contractor's responsible person.
6. As detailed above, the BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the project limits and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the project limits. These signs should be adjusted to provide adequate spacing to other signs. The OBSERVE WARNING SIGNS STATE LAW sign shall be installed when required elsewhere in the plans.
7. With the agreement of an adjacent project Engineer, the Engineer(s) may allow the omission of END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the contractor will erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
8. Duplicate construction warning signs should be erected on the median side of divided highways where median width will permit and traffic volumes justifies the signing.
9. Except for devices required by Note 6, traffic control devices should be in place only while work is actually in progress or a definite need exists.
10. Sign size should be based on the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD).
11. The Special Public Information sign (SG20-8) shall be installed at the project limits when required elsewhere in the plans. Refer to SMD Standards for approved mounting details.

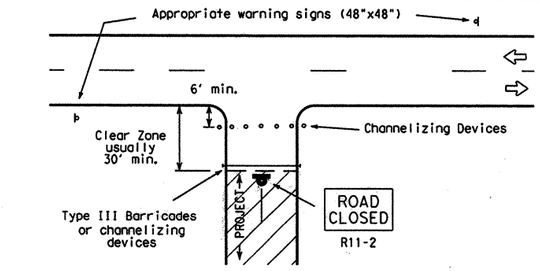


PROJECT LIMITS AT T-INTERSECTION

1. The ROAD WORK NEXT X MILES sign should be erected on the intersected highway as detailed above.
2. On the intersected roadway, additional traffic control devices, such as a flagger and accompanying signs or other signs, should be used when work is being performed at or near the intersection.

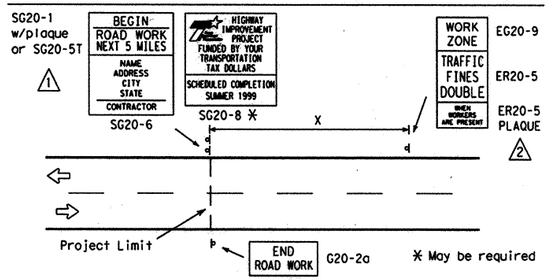


CROSSROAD SIGNING AND BARRICADING



PROJECT LIMITS FOR CLOSED ROADWAY

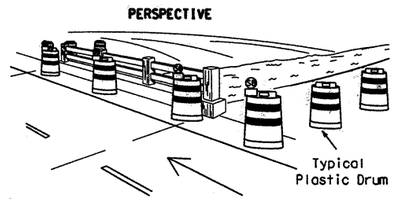
Barricades or channelizing devices shall be erected completely across roadway. Channelizing Devices may be drums, vertical panels or cones as specified in the plans.



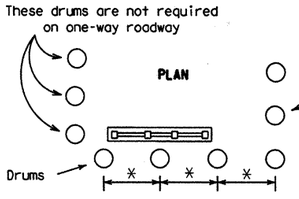
PROJECT LIMITS AWAY FROM WORK AREA

(Greater than 1 mile between project limits and work area)

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



1). Where positive redirectional capability is provided, drums may be omitted.
2). Plastic construction fencing may be used with drums for safety as required in the plans.
3). Vertical Panel on flexible support may be substituted for drums when shoulder width is less than 4'.
4). When shoulder width is greater than 12', steady-burn lights may be omitted, if drums are used.



Increase number of plastic drums on side of approaching traffic if crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

CROSSROAD SIGNING AND BARRICADING

1. Except as noted elsewhere in plans, the usual minimum signing on a cross-road approach should be one CW20-1D ROAD WORK AHEAD sign and G20-2a END ROAD WORK sign. Where speeds and volumes are relatively low, a smaller ROAD WORK AHEAD sign may be used.

When approved by the Engineer, on low volume crossroads, advance warning signs may be the reduced size 36" x 36" ROAD WORK AHEAD (MCW20-1D) sign mounted back to back with the reduced size 36" x 18" END ROAD WORK (SG20-2a) sign. See the "STANDARD HIGHWAY SIGN DESIGNS for TEXAS" manual and BC(9) thru BC(9C) for sign design details. On low volume crossroads, advance signing may be omitted if approved by the Engineer.

Additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs may be required. When additional signs are required, such signs will be considered part of the minimum requirements.

2. The G20-1a sign shall be required on major crossroads to advise motorists of the length of construction in either direction from the intersection.
3. On higher volume crossroads additional traffic control devices may be noted elsewhere in the plans.
4. When work occurs in the intersection area, appropriate traffic control devices shall be in place.

WARNING LIGHTS

Warning lights shall meet the requirements of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

Warning lights shall NOT be installed on barricades.

Type A-Low Intensity Flashing Warning Lights are commonly used with signs. They are intended to warn of an approaching potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "(FL)".

Type-C Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "(SB)".

TYPICAL CONSTRUCTION WARNING SIGN SIZE [4,5,6] AND SPACING

Roadway Classification	Posted Speed	Sign Spacing "X" Δ	Long-term Or Intermediate-term Stationary Approach Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW21 Series		Other Warning Signs
	MPH	Feet (Apprx.)	Standard inches	Minimum[4] inches	Standard inches[7]	Minimum[4] inches[7]	Standard inches[7]
Conven.	30	120	48 x 48	36 x 36	30 x 30 or 36 x 36	24 x 24 or 30 x 30	30 x 30 or 36 x 36
	35	160					
	40	240					
	45	320		Use Standard Size		Use Standard Size	
	50	400					
	55	500[2]			48 x 48		48 x 48
	60	600[2]					
	65	700[2]					
	70	800[2]					
Exp or Frwy	*	* [3]			**	**	**

* For typical sign spacings on expressways and freeways, see TMUTCD typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to 1st Advance Warning sign and/or distance between each additional sign.

** Smaller sign sizes may be used where sign designs have been included in the "Standard Highway Sign Designs for Texas" manual.

General Notes:
1. Special or larger size signs may be used as may be necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have ½ mile or more advance warning.
4. For use only on secondary roads or city streets where speeds are low.
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
7. Where two sizes are listed, see sign size listing in TMUTCD, Appendix A for proper size.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:
Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3120
Fax (512) 416-3161
E-mail TRF-STANDARDS@mailgw.dot.state.tx.us

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

ADVANCE SIGNING
CROSSROAD SIGNING
WARNING LIGHTS

BC(1)-99

10/99 Revision

1 Added "BEGIN" to "ROADWORK NEXT XX MILES" sign

2 Added "WHEN WORKERS ARE PRESENT" plaque

DN: LR	CK: DTN	DW: DN	CK: GB	MEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
10-99	DALLAS	6	STP 99(413) MM	202A

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM 740

217A

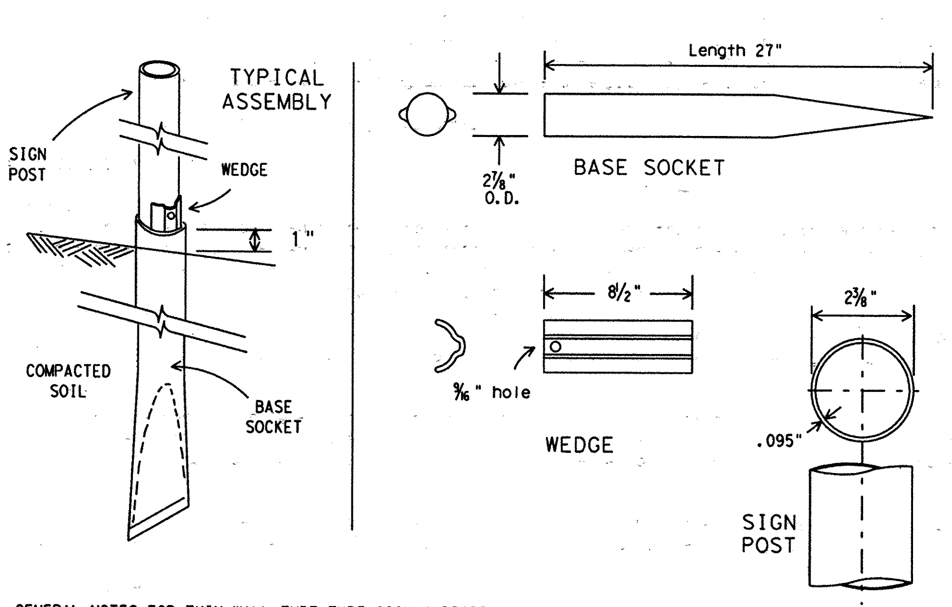
LEVELS DISP: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC:
FILE:

DN:
CK:
DW:
CK:

TYPE III BARRICADE (POST TYPE)

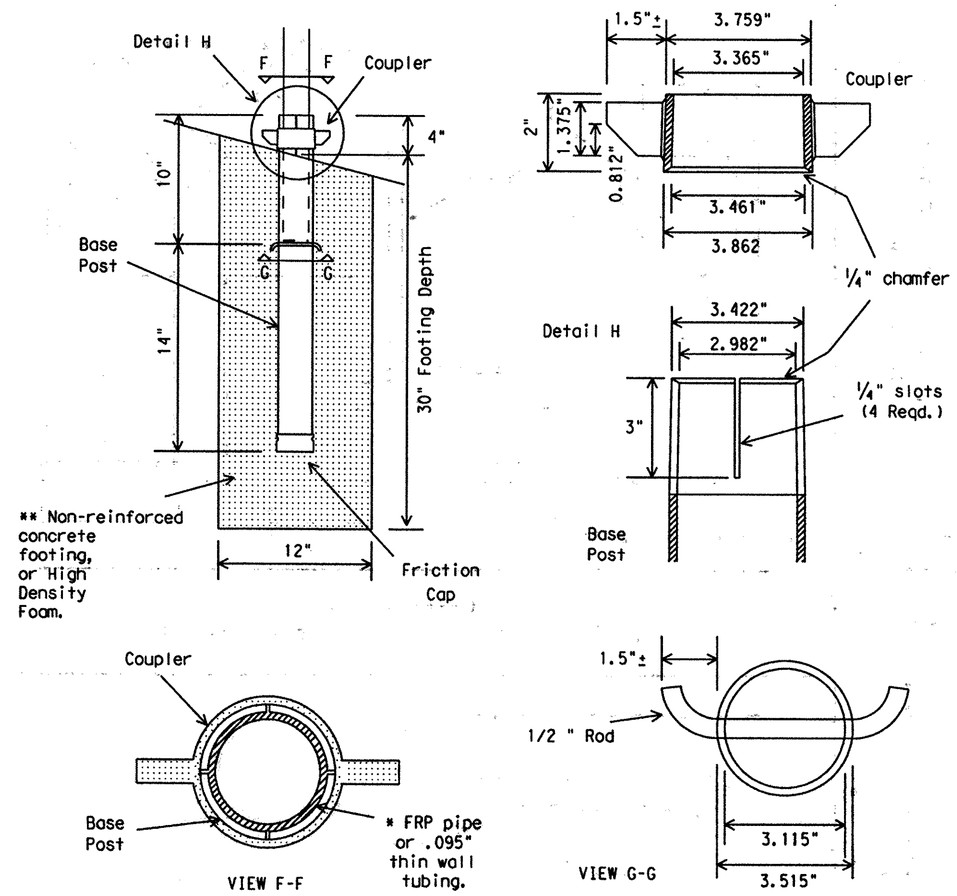
POZ-LOC
(Driveable)



GENERAL NOTES FOR THIN WALL TUBE TYPE SIGN SUPPORT:

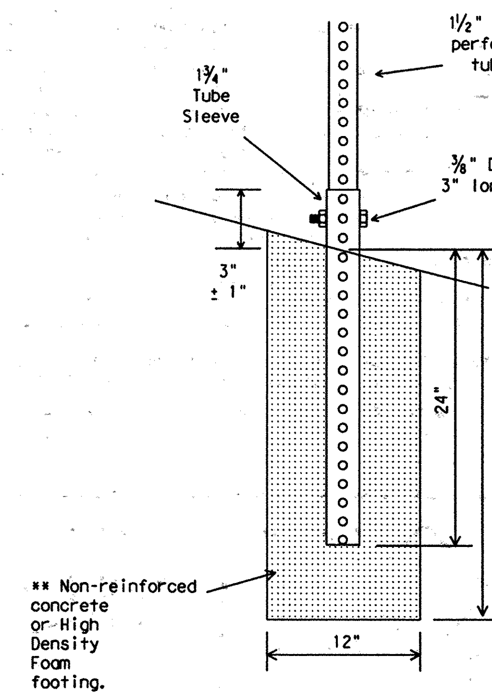
1. The BASE SOCKET is formed from 2⅞" O.D. x 12 gauge galvanized pipe.
2. The WEDGE is formed from 11 gauge steel galvanized per ASTM A525.
3. The SIGN POST is 2.375" O.D. x 0.095" thin wall steel tubing.
4. Steel Supports shall be made from new material and shall be corrosion resistant. Steel supports shall be galvanized in accordance with ASTM Designations A123 or A525 (G-90 or better).
5. Supports shall be straight within ¼" per 5 feet of length and shall have a smooth, uniform finish free from defects affecting strength or appearance. Any bolt holes and sheared ends shall be free from burrs. Bases of multisection supports shall not extend more than 5 inches above ground when installed.
6. Bolts, nuts, screws, washers and other miscellaneous hardware shall be galvanized in accordance to ASTM Designation: A153 Class C or D, or B695 Class 50.
7. Barricade supports systems used on this sheet may be suitable for only certain soil types. The contractor is responsible for selecting the appropriate support system for soil conditions on each project.

UNIVERSAL ANCHOR SYSTEM



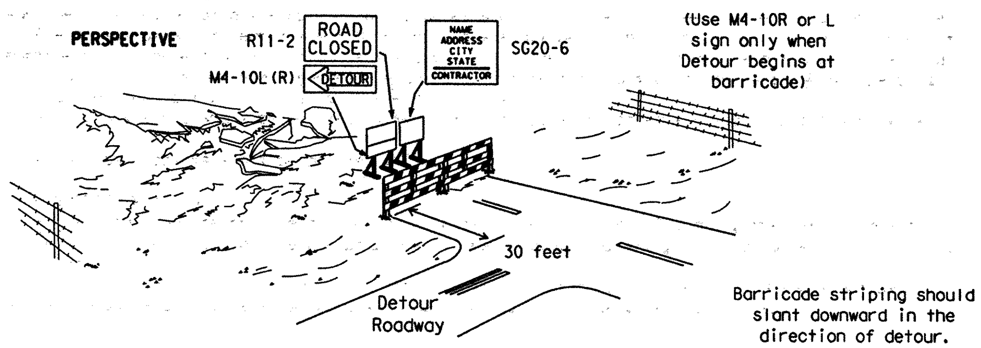
* Plastic insert must be used with 1/16" thin wall tubing.
** Footing shall be removed and backfilled when barricade is removed.

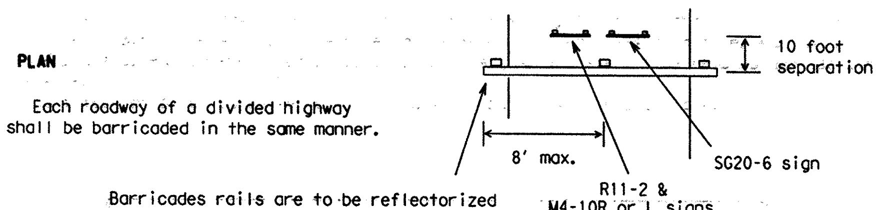
SQUARE TUBING



Barricades shall NOT be used as a sign support.

TYPE III BARRICADE (POST TYPE) TYPICAL APPLICATION





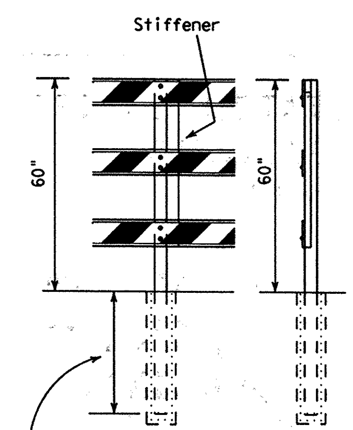
Each roadway of a divided highway shall be barricaded in the same manner.

Barricades rails are to be reflectorized on all sides that face traffic.

1). R11-2 and M4-10 signs should be mounted on independent supports at 7 foot mounting height in center of roadway.

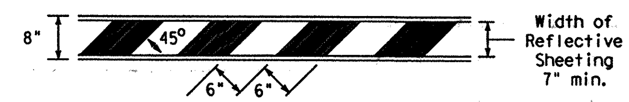
2). Advance signing, including construction warning signs, and detour signing shall be as specified elsewhere in the plans.

TYPE III BARRICADE (POST)

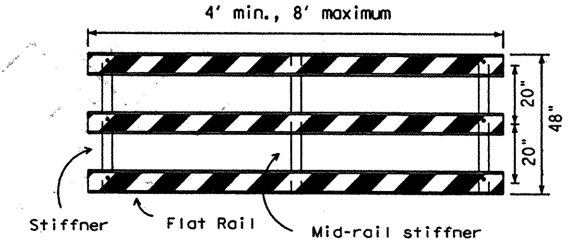


See foundation details above

TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



Stiffner may be inside or outside of support.

* For dimensions of components refer to TxDOT approved products list.

Barricades shall be made using pre-qualified materials. A list of compliant products and their sources may be obtained by writing or faxing:

**Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us**

**STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION**
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

BARRICADES (POST TYPE)

BC(3)-98

©TxDOT February 1998	DN: LR	CK: DTN	DW: DN	CK: GB	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	STP 99(413)MM		204
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

DISCLAIMER
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

GENERAL NOTES:

1. Sign Supports detailed on this sheet have been crash tested and are approved breakaway systems. TxDOT acceptance of these breakaway systems does not cover the structural features of the sign support systems.
2. Sign support systems approved by FHWA may be used as approved fixed sign supports. The contractor shall provide documentation from FHWA approving sign support systems not shown on this sheet.
3. Sign support systems listed on this sheet may be suitable for only certain soil types. The contractor is responsible for selecting appropriate sign support systems for soil conditions on each project.
4. Barricades shall NOT be used as sign supports.

WORK ZONE SIGNS

GENERAL

Standard signs shall be used as required by the BC Standard sheets, the plans, or as directed by the Engineer to regulate, warn, and guide traffic. All sign usage and erection shall be in strict accordance with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD). The Contractor shall maintain each sign as directed by the Engineer.

The Contractor may use either the sign designs shown on the BC Standard Sheets, or those sign designs shown in the "Standard Highway Sign Designs for Texas" (SHSD). All work zone signs provided for in the TMUTCD but not detailed in the plans may be used when directed by the Engineer.

SIZE OF SIGNS

On secondary roads or city streets where speeds are low, smaller size construction warning signs may be used with the written approval of the Engineer and if the sign size is in accordance with the "Typical Construction Warning Sign Size and Spacing Chart" shown on page 6C-11 of the TMUTCD, Part VI.

SPLICES

All wooden sign panels fabricated from 2 or more pieces shall have one or more plywood cleats, 1/2 inch thick by 6 inches wide, fastened to the back of the sign and extending fully across the sign.

Wood Sign posts shall not be spliced.

REFLECTIVE SHEETING

Reflectorized signs shall be constructed of retroreflective sheeting meeting the color and reflectivity requirements of Material Specification D-9-8300 or D-9-8310. Day only is defined as a device that is used only during daylight hours.

Type A, B or C sheeting may be used for all day only applications. Type A sheeting should be used for all white background regulatory signs. Type C sheeting shall be used for all other applications.

The above applications of sheeting grades to different type signs will apply unless otherwise specified in the plans.

TYPE A = Engineer Grade, TYPE B = Super Engineer Grade, TYPE C = High Specific Intensity

SIGN LETTERS

All sign lettering shall be clear, open rounded type capital letters as approved by and as published by the Federal Highway Administration (FHWA). Signs and lettering shall be of first class workmanship equivalent to that of the Department standard signs.

WORK DURATION TERMINOLOGY-(as defined by the "Texas Manual on Uniform Traffic Control Devices")

Long-term Stationary = occupies a location 3 or more days;
Intermediate-term Stationary = occupies a location from overnight to 3 days;
Short-term Stationary = daylight work that occupies a location from 1 to 12 hours;
Short Duration = occupies a location up to 1 hour.

SUPPORTS AND MOUNTING HEIGHT

The bottom of Long-term / Intermediate-term signs shall be at least 7 feet above the paved surface. The bottom of any supplementary plaques shall be at least 6 feet above the paved surface.

The bottom of Short-term / Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground. Long-term / Intermediate-term Signs may be used in lieu of Short-term / Short Duration signing. Short-term / Short Duration signs shall be used only during daylight and removed at the end of the workday.

Regulatory signs shall be mounted at least 7 feet above the paved surface regardless of work duration.

Wood sign supports shall be painted white.

SIGN SUPPORT WEIGHTS

Where sign supports require the use of weights to keep from turning over, the use of some type of sandbag is recommended. The use of pieces of rock, concrete, iron, steel or other solid objects will not be permitted.

Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.

REMOVING OR COVERING

When sign messages may be confusing or no longer apply, the signs shall be removed or completely covered. When signs are covered the material used shall be opaque, such as heavy mil black plastic. Burlap shall not be used to cover signs. Signs shall be removed upon completion of the work.

Duct tape or other adhesive material shall not be affixed to sign face.

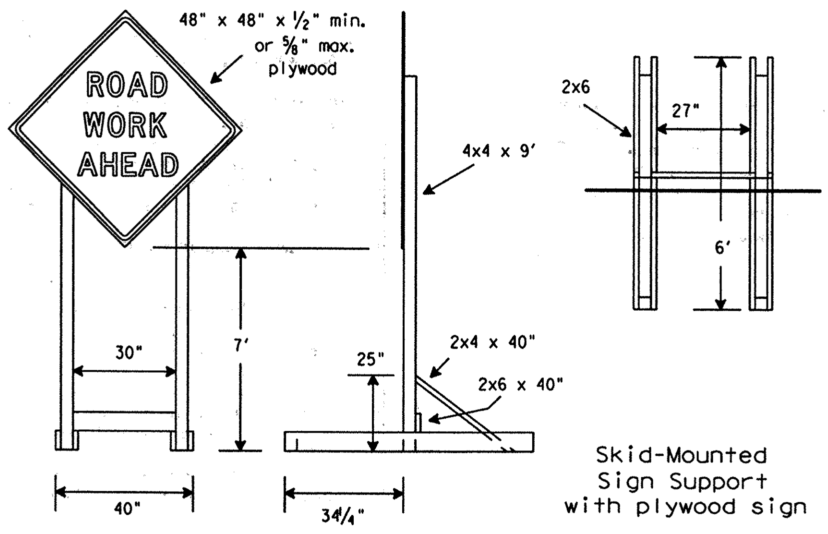
Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

LONG/INTERMEDIATE TERM STATIONARY PORTABLE SIGN SUPPORTS

7 Foot Mounting Height

(SKID MOUNTED)



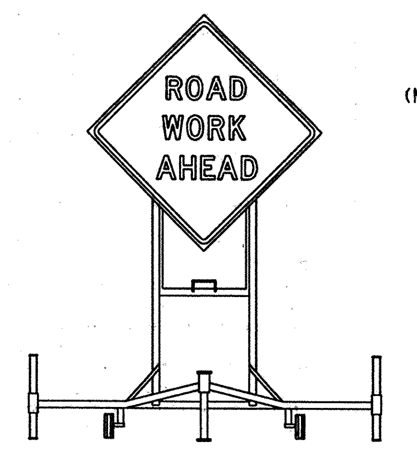
Skid-Mounted Sign Support with plywood sign

(POST TYPE)

Refer to acceptable products list.

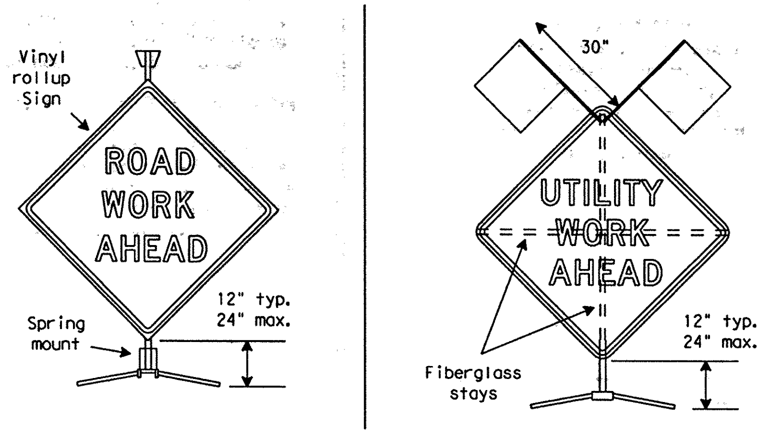
WHEELED PORTABLE SIGN SUPPORT

with plywood sign (Minimum thickness 1/2 inch) TxDOT Design

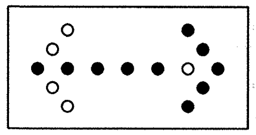


SHORT TERM STATIONARY/SHORT DURATION PORTABLE SIGN SUPPORTS

1 Foot Mounting Height



TYPICAL FLASHING ARROW PANEL



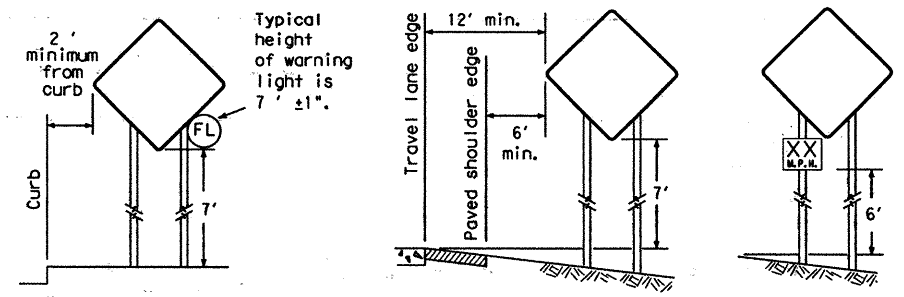
For traffic to move right.

ATTENTION: Arrow panels shall be equipped with automatic dimming devices.

1. The Advance Warning Flashing Arrow Panel should be used for all lane closures (multilane roadway), or slow moving maintenance or construction activities on the traveled way. Arrow panels should not be used on two-lane roadways, detours, diversions or work on shoulders unless the CAUTION mode is used.
2. Necessary signs, barricades or other traffic control devices should be used in conjunction with the Advance Warning Arrow Panel.
3. The Arrow panel should have the capability of the following display selections: LEFT ARROW, RIGHT ARROW, LEFT and RIGHT ARROW and CAUTION. The CAUTION mode consists of four corner lamps flashing simultaneously.
4. The Arrow panel shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 times per minute nor more than 40 flashes per minute. The Advance Warning Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
5. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and 25 percent for the sequential chevron.
6. The TxDOT standard is the flashing arrow, however, the sequential chevron may be used during daylight operations. The sequential arrow should NOT be used.

REQUIREMENTS TYPE	MINIMUM SIZE	MIN. NUMBER OF PANEL LAMPS	MIN. VISIBILITY DISTANCE
B	30" x 60"	13	3/4 mile
C	48" x 96"	15	1 mile

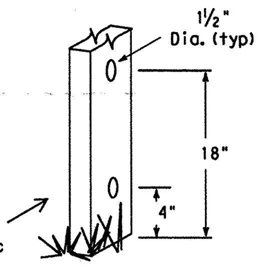
TYPICAL MINIMUM CLEARANCES FOR LONG/INTERMEDIATE TERM SIGNS



It is the intent of these plans to provide positive guidance to motorists throughout the project limits by the use of signs, pavement markings, delineation devices and/or channelizing devices. All traffic control devices shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

WOOD POST SYSTEM FOR FIXED SIGN SUPPORTS

Nominal Post Size	No. of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	no
4 x 4	2	21	36"	no
4 x 6	1	21	36	YES



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

SIGN SUPPORTS

BC(4)-98

© TxDOT February 1998	DN: - LR	CK: - DTN	DW: - DN	CK: - GB	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
	DAL	6	STP 99(413)MM			205
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

GENERAL NOTES:

1. Sign Supports detailed on this sheet have been crash tested and are approved breakaway systems. TxDOT acceptance of these breakaway systems does not cover the structural features of the sign support systems.
2. Sign support systems approved by FHWA may be used as approved fixed sign supports, as long as they meet TxDOT minimum sign height requirements. The contractor shall provide documentation from FHWA approving sign support systems not shown on this sheet.
3. Sign support systems listed on this sheet may be suitable for only certain soil types. The contractor is responsible for selecting appropriate sign support systems for soil conditions on each project.
4. Barricades shall NOT be used as sign supports.

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SPLICES

All wooden sign panels fabricated from 2 or more pieces shall have one or more plywood cleats, 1/2 inch thick by 6 inches wide, fastened to the back of the sign and extending fully across the sign.

Wood Sign posts shall not be spliced.

REFLECTIVE SHEETING

Reflectorized signs shall be constructed of retroreflective sheeting meeting the color and reflectivity requirements of TxDOT Material Specification DMS 8300 or DMS 8310. Day only is defined as a device that is used only during daylight hours.

Type A, B or C sheeting may be used for all day only applications. Type A sheeting should be used for all white background regulatory signs. Type C sheeting shall be used for all other applications.

The above applications of sheeting grades to different type signs will apply unless otherwise specified in the plans.

TYPE A = Engineer Grade, TYPE B = Super Engineer Grade, TYPE C = High Specific Intensity

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Wood sign supports shall be painted white.

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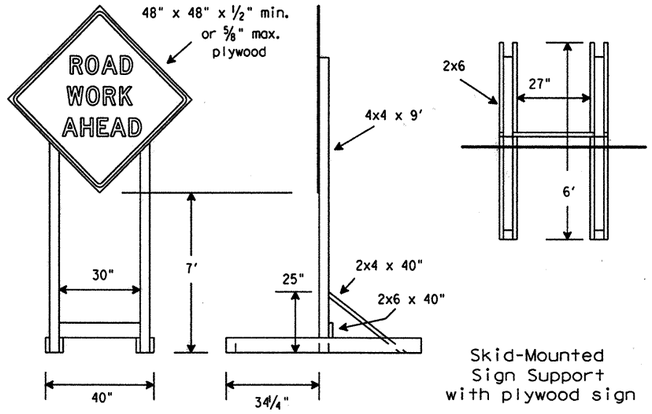
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3120
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

LONG/INTERMEDIATE TERM STATIONARY PORTABLE SIGN SUPPORTS

7 Foot Mounting Height

(SKID MOUNTED)



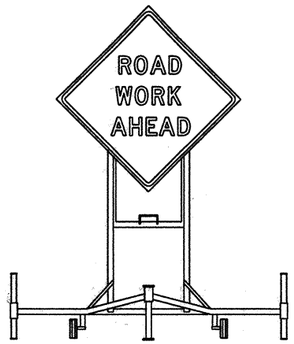
Skid-Mounted Sign Support with plywood sign

(POST TYPE)

Refer to acceptable products list.

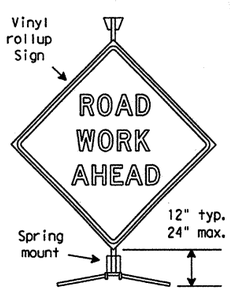
WHEELED PORTABLE SIGN SUPPORT

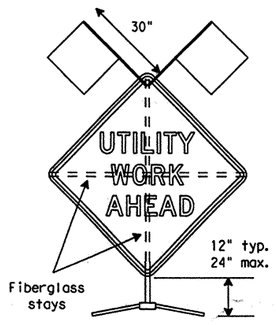
with plywood sign
(Minimum thickness 1/2 inch)
TxDOT Design



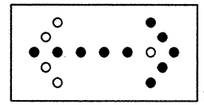
SHORT TERM STATIONARY/SHORT DURATION PORTABLE SIGN SUPPORTS

1 Foot Mounting Height





TYPICAL FLASHING ARROW PANEL



For traffic to move right.

ATTENTION: Arrow panels shall be equipped with automatic dimming devices.

1. The Advance Warning Flashing Arrow Panel should be used for all lane closures (multilane roadway), or slow moving maintenance or construction activities on the traveled way. Arrow panels should not be used on two-lane roadways, detours, diversions or work on shoulders unless the CAUTION mode is used.
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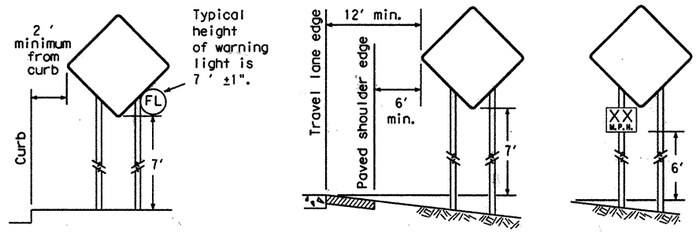
3. The Arrow panel should have the capability of the following display selections: LEFT ARROW, RIGHT ARROW, LEFT and RIGHT ARROW and CAUTION. The CAUTION mode consists of four corner lamps flashing simultaneously.
4. The Arrow panel shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 times per minute nor more than 40 flashes per minute. The Advance Warning Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
5. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and 25 percent for the sequential chevron.
6. The TxDOT standard is the flashing arrow, however, the sequential chevron may be used during daylight operations. The sequential arrow should NOT be used.

REQUIREMENTS TYPE	MINIMUM SIZE	MIN. NUMBER OF PANEL LAMPS	MIN. VISIBILITY DISTANCE
B	30" x 60"	13	3/4 mile
C	48" x 96"	15	1 mile

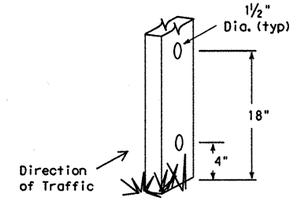
TYPICAL MINIMUM CLEARANCES FOR LONG/INTERMEDIATE TERM SIGNS



It is the intent of these plans to provide positive guidance to motorists throughout the project limits by the use of signs, pavement markings, delineation devices and/or channelizing devices. All traffic control devices shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

WOOD POST SYSTEM FOR FIXED SIGN SUPPORTS

Nominal Post Size	No. of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	no
4 x 4	2	21	36"	no
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES



10/99 Revision

1 Added 2 post - 4 x 6 sign support

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

SIGN SUPPORTS

BC(4)-99

©TxDOT February 1998	DN-LR	CK-DTN	DW-DN	CK-GB	MEG NO.:
REVISIONS 10-99	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DALLAS	6	STP 99(413) MM		205A
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM 740

104

220A

LEVELS DIS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE: ACC: FILE:

DW: CK: DW: CK:

GENERAL NOTES

Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects which would adversely affect their appearance or serviceability.

After drums and other traffic control devices are placed, the work zone should be driven through both during the day and after dark to be certain that these devices are functioning as intended.

PLASTIC DRUM - Prequalified plastic drums shall meet the following requirements.

GENERAL DESIGN REQUIREMENTS

Plastic drums shall be of a two-piece design; the "body" of the drum shall be the top portion of the drum and the "base" shall be the bottom of the drum.

The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 35 km/h or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles. Plastic drums that have been in use for more than two years generally do not have enough locking strength to prevent accidental separation. Plastic drums identified for replacement by the project engineer, inspector or their designee shall be replaced within 24 hours with an approved device.

Plastic drums shall be constructed of lightweight flexible, and deformable materials. Use of metal drums or single piece plastic drums as channelization devices or sign supports shall not be allowed.

Drums shall present a profile that is a minimum of 18 inches in width at the 36 inches height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.

Drums shall be tapered to allow nesting of a minimum of 5 drum bodies for ease in transport.

The top of drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 14mm diameter holes to allow attachment of a warning light, delineator reflector unit or sign.

The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches in width nor greater than 8 inches. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.

Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.

Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.

Drum body shall have a minimum unballasted weight of 7.7 lbs. and maximum unballasted weight of 11 lbs. The wall of the drum body shall be a minimum of 0.07 inch in thickness. Weight of any drum supplied shall not vary more than 0.5 lb. from that of the prequalified sample.

Drum and base shall be marked with manufacture's name, model number, and year and month of construction.

RETROREFLECTIVE SHEETING

The retroreflective stripes used on drums shall be constructed of retroreflective sheeting meeting the color and reflectivity requirements of Departmental Materials Specification D-9-8300: Flat Surface Reflective Sheeting, Type C unless otherwise specified in the plans.

Drums used only during daylight hours may use any type of sheeting meeting the color and retroreflective color requirements of Departmental Materials Specification D-9-8300.

The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, checking, cracking, or loss of reflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

Unballasted bases shall be large enough to hold up to 50 lbs. of sand. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs.

The ballasted base should weigh between 35 (minimum) and 75 lbs. (maximum). The ballast may be sand in one to three sand bags separate from the base, sand in a sand-filled plastic base, a integral crumb rubber base and ballast or other ballasting devices as approved by the Engineer. Stacking of sand bags will be allowed, however height of sand bags above pavement surface may not exceed 12 inches.

The ballasts shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle. Ballast shall not be placed on top of drums

Adhesives may be used to secure base of drums to pavement.

SIGNS, CHEVRONS, AND VERTICAL PANELS

Signs used on plastic drums shall be manufactured using substrates listed on the Compliant Products List.

Chevrons and other work zone signs with an orange background shall be manufactured with Type C (high intensity grade) retroreflective sheeting meeting the color and reflectivity requirements of "Departmental Materials Specification D-9-8300: Flat Surface Reflective Sheeting, Type C" unless otherwise specified in the plans.

Signs with white backgrounds, such as the KEEP RIGHT sign (R4-8 series), shall be manufactured with Type A (engineer grade) sheeting.

Approved sign messages for signs mounted on plastic drums are the Chevron (CW1-8), the KEEP RIGHT/LEFT sign (R4-7 or R4-8 series), the Vertical Panel, and the Opposing Lane Divider. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height. Refer to acceptable materials list for approved substrate materials. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled way.

Signs shall be installed using one 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than ½" beyond nuts. The hardware used for the mounting of signs onto plastic drums shall be of adequate quality for this use.

WARNING LIGHTS, WARNING REFLECTORS, AND DELINEATORS

Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area. Type A flashing warning lights are not intended for delineation and shall not be used in a series.

Type B warning lights shall not be attached to a drum.

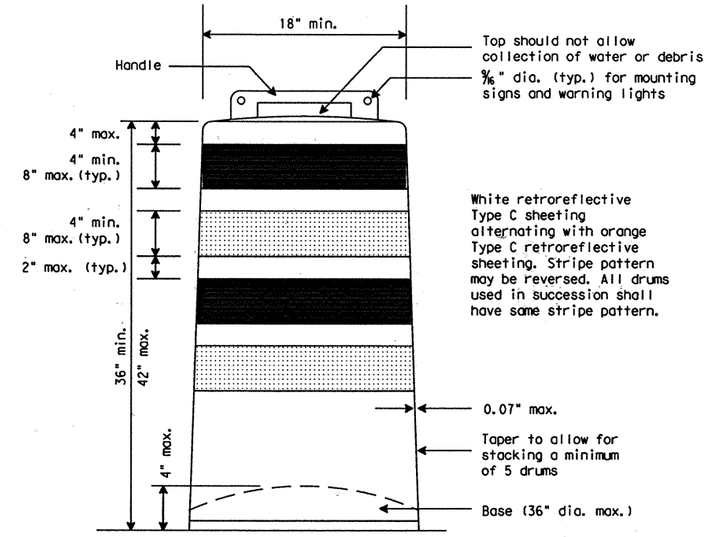
Type C steady-burn warning lights are intended to be used in a series to delineate the edge of the traveled way on detours, on lane changes, on lane closures, and on other similar conditions. Type A and Type C warning lights shall be installed at locations as detailed on other sheets in the plans.

A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, Steady Burn Warning Light at the discretion of the contractor unless otherwise noted in the plans. The warning reflector shall be manufactured from a sign substrate from the approved list for use on plastic drums. The warning reflector shall have a retroreflective surface area (one-side) no less than 30 square inches.

The side of the warning reflector facing approaching traffic shall be fully reflectorized using retroreflective sheeting meeting the color and reflectivity requirements for ASTM Type 4 retroreflective sheeting as described in ASTM Design Standard 4956-93B. When used near two-way traffic, both sides of the warning reflector shall be fully reflectorized. The warning reflector should be mounted on the side of the handle that faces approaching traffic so that the maximum amount of reflective sheeting is visible to traffic approaching in the adjacent lane. Delineators may be used as directed by the Engineer. Delineators may not be used to substitute for warning lights. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.

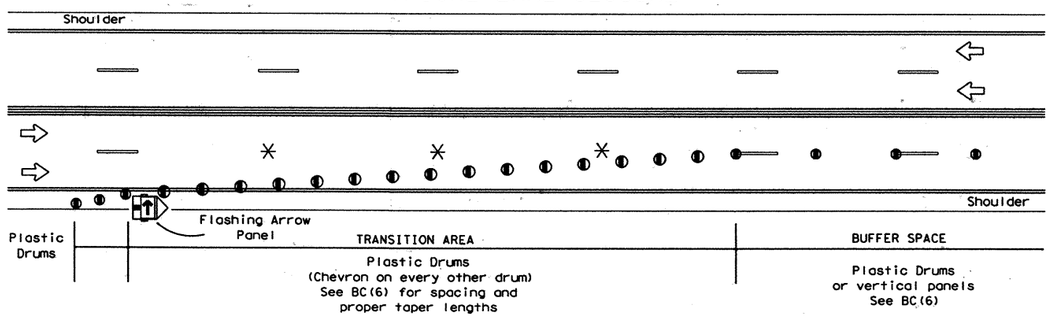
Type(A) Class(1), Type(A) Class(2), or Type(B) Reflector Units (D & OM Standard) may be attached to drums to delineate the intended vehicular path. The color of the reflector unit shall correspond to the marking it is supplementing or for which it is substituting. The reflective unit shall be attached to the handle of the drum using the mounting hole nearest the traveled way and shall be aligned perpendicular to approaching traffic.

Contractor shall provide, on request from project engineer, a letter from the drum manfacturer certifing the plastic drum model number, the year and month of construction and that it meets the specifications on this standard sheet.

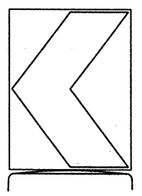


Color sequence of reflective sheeting may be reversed.

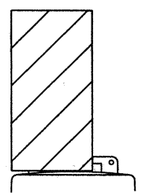
TYPICAL LANE CLOSURE



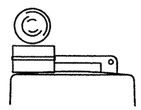
✳ NOTE: For Long Term Stationary Duration - Lane lines shall be removed.



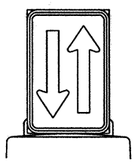
18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8,
Driveway sign D70a,
Keep Right R4 series
or other sign as approved by Engineer



12" x 24" Vertical Panel
mount with diagonals
sloping down towards
travel way



Warning Light or approved substitute
mount towards travel way



12" x 18" Sign
Opposing Lane Divider

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

PLASTIC DRUMS **BC(5)-98**

© TxDOT February 1998	DN: LR	CK: DTN	DW: DN	CK: DW	MSG NO.:
REVISIONS 4-98	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 99(413)MM		SHEET: 206
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM740

LEVEL SPLAYED DATE: FILE: DN: CK: DW: CK:

GENERAL NOTES:

SELF-RIGHTING SUPPORTS

1. Channelizing devices on self-righting supports may be a vertical panel, opposing lane divider or chevron.
2. Channelizing devices on self-righting supports shall be used at locations detailed elsewhere in the plans. These devices shall conform to the "Texas Manual on Uniform Traffic Control Devices". Type of base will be as directed by the Engineer.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. Devices should not be placed within 12 inches of the traveled way. Spacing and placement shall be uniform and in accordance with the "Texas MUTCD".
4. The contractor shall maintain devices in a clean condition and replace damaged, non-reflective, faded, or broken devices and bases as necessary.
5. Devices shall be erected by method shown on this sheet and as approved by the Engineer.
6. Portable bases shall be fabricated from virgin and/or recycled rubber. Approximate weight of portable bases shall be 35 lbs.
7. Pavement surfaces shall be prepared in a manner that will ensure proper bonding of adhesives and fixed mount bases to the pavement surfaces when required. Adhesives shall be prepared and applied as per manufacturers recommendations.
8. Application and removal of devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface intregity. Driveable bases shall not be permitted on final pavement surfaces. All application and removal procedures of fixed bases shall be approved by the Engineer.
9. These devices shall not be paid for directly but shall be considered subsidiary to the Item "Barricades, Signs, and Traffic Handling."

CONES

1. Traffic cones and tubular markers shall be a minimum of 28 inches in height when used on freeways or used at nighttime. Orange shall be the predominant color of cones and tubular markers. They should be kept clean and bright for maximum visibility. Cones shall have a minimum weight of 9½ lbs.
2. For nighttime use, cones shall be reflectorized. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night. When used at night, appropriate personnel shall be present at all times to ensure cones and tubular markers remain in their proper location and in an upright position.
3. Reflectorization of cones shall be a minimum 6 inch band placed at least 3 inches but not more than 4 inches from the top, supplemented by a minimum 4 inch band spaced a minimum of 2 inches below the 6 inch band. Reflectorization of tubular markers shall be a minimum of two 3 inch bands placed a maximum of 2 inches from the top with a maximum of 6 inches between bands.
4. One-piece cones or tubular markers are generally suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels, drums or two-piece cones for long term usage. Care should be taken to ensure that they remain in their proper location and in an upright position.
5. *-SPRAF (stacking/placement/removal assistance feature) may be designed as a handle, hook or other shape, fabricated from non-rigid materials similar to the cone material, and may extend up to a maximum of 8 inches above the top of cone. The length of the SPRAF shall not be considered with regard to the 28 inch minimum height.

DRUMS

Refer to BC(5).

SPECIFICATION REFERENCE TABLE
MATERIALS AND TEST SPECIFICATIONS (D-9)

FLAT SURFACE REFLECTIVE SHEETING, TYPE C
(HIGH SPECIFIC INTENSITY) D-9-8300

Only pre-qualified products shall be used. A List of compliant products and their sources may be obtained by writing, calling or faxing:

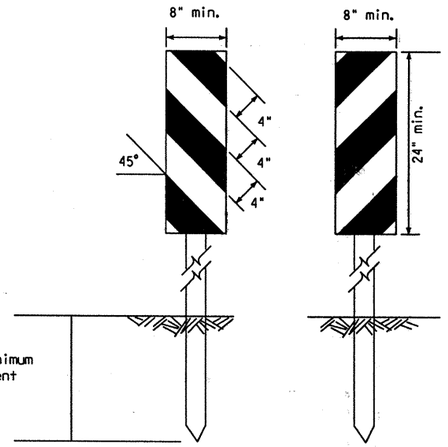
Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation (TxDOT)
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD @ mailgw.dot.state.tx.us

Posted Speed*	Formula	Minimum Desirable Taper Lengths** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing X Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	*600'
65		650'	715'	780'	65'	130'-165'	*700'
70		700'	770'	840'	70'	140'-175'	*800'

* Conventional Roads Only

**Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

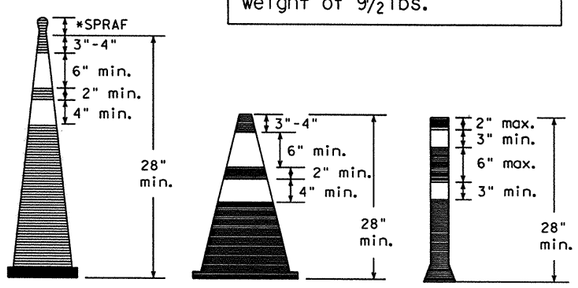
DRIVEABLE RIGID VERTICAL PANEL



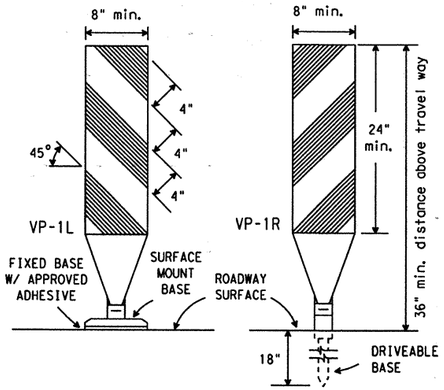
See Compliant Products List for supports and panel substrates

CONES

Cones shall have a minimum weight of 9½ lbs.



SELF-RIGHTING SUPPORTS



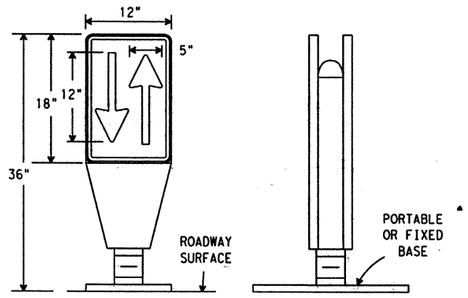
VERTICAL PANELS

Vertical Panels are normally used as channelizing devices to indicate tangent or nearly tangent roadway alignment where good target value of a device is needed in daytime as well as nighttime. In addition, vertical panels should be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation may be required. Vertical panels should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the traveled way. Vertical Panels used on expressways, freeways, and other high speed roadways shall have a minimum of 2 square feet of retroreflective area facing traffic.

Self-righting supports are available with portable base. See Compliant Products List.

OPPOSING LANE DIVIDER

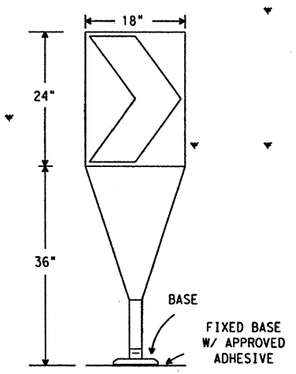
with Portable or Fixed Base Support



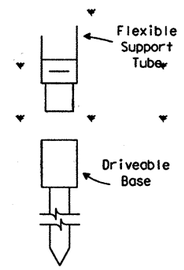
REFLECTIVE ORANGE BACKGROUND WITH BLACK ARROWS AND BORDER.

CHEVRON

with Flexible Support

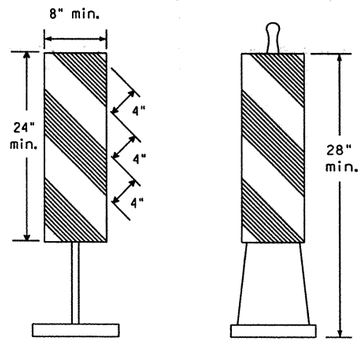


DRIVEABLE BASE



Driveable Support for Vertical Panel VP(F)-1 or Chevron CW1-8(F).

PORTABLE RIGID VERTICAL PANEL



See Compliant Products List for alternate designs.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

CHANNELIZING DEVICES
CONES

BC(6)-98

DN: LR	CK: DTN	DW: DN	CK: GB	MSG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	DAL	6	STP 99(413)MM	207

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

LEVEL	PLAYED	DATE:	DN:
1 2 3 4 5 6	1 0 1 1 2 1 3 1 4 1 5 1 6		
1 7 1 8 1 9 2 0 2 1 2 2	5 2 8 2 7 2 8 2 9 3 0 3 1 3 2	ACC:	CK:
3 3 4 3 5 3 6 3 7 3 8 3 9 4 0 4 1 4 2 4 3 4 4 4 5 4 6 4 7 4 8		FILE:	DW:
4 9 5 0 5 1 5 2 5 3 5 4 5 5 5 6 5 7 5 8 5 9 6 0 6 1 6 2 6 3			CK:

WORK ZONE PAVEMENT MARKINGS

GENERAL

The Contractor shall be responsible for maintaining work zone and existing pavement markings on all roadways open to traffic within the projects limits unless otherwise stated in the plans. Color, patterns, and dimensions shall be in conformance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Additional supplemental pavement marking details may be found in the plans or specifications.

Work zone pavement markings shall consist of guidemarks, short term markings and/or standard pavement markings. Unless otherwise shown in the plans, materials used for work zone pavement markings shall be thermoplastic, raised pavement markers, prefabricated pavement marking material, temporary flexible-reflective roadway marker tabs or other materials approved by the Engineer. Thermoplastic shall not be used for removable markings.

All roadways to be opened to traffic shall be marked with short term markings or standard markings as shown in the plans, at the end of each day's operation. Unless otherwise shown in the plans or approved in writing by the Engineer, all concrete surfaces shall have standard markings in place prior to opening to traffic.

Standard pavement markings shall be installed in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and as shown on the plans. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard WZ(STPM).

All asphaltic surfaces which are to be opened to traffic shall be marked with guidemarks immediately following placement and final rolling of any course. Guidemarks shall consist of a single temporary flexible-reflective roadway marker tab or a single temporary construction raised pavement marker at 40 foot spacing.

Guidemarks shall be placed in proper alignment with the final location of future pavement markings. Any guidemarks not in alignment with pavement markings shall be removed by the Contractor at the Contractor's expense. Guidemarks shall not be used to simulate edgelines.

When inclement weather prohibits the application of short term markings or standard pavement markings as called for on the plans, upon approval of the Engineer, guidemarks may be considered as temporary short term markings for asphaltic surfaces. The placement of pavement markings as shown on the plans may be delayed until such time that weather permits application of pavement markings.

When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of the sections where passing is permitted.

RAISED PAVEMENT MARKERS

Raised pavement markers are to be placed according to the patterns on BC(8). Raised pavement markers used as standard pavement markings or to supplement removable markings shall meet the requirements of Item "RAISED PAVEMENT MARKERS".

Unless otherwise shown on the plans, raised pavement markers will not be allowed for words, symbols, and shapes, diagonal or transverse lines.

PREFABRICATED PAVEMENT MARKINGS

Removable prefabricated pavement markings shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Department Materials Specification D-9-8241.

Non-removable prefabricated pavement markings (foil back) shall be a material of manufacture and product code or designation shown on the list of approved materials covered by the Specification TxDOT 550-74-01.

The lists of approved prefabricated work zone pavement marking materials may be obtained from TxDOT General Services Division.

MAINTENANCE

The Contractor will be responsible for maintaining work zone pavement markings within the project limits. Work Zone Pavement Markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 165 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics. Markings failing to meet this criteria shall be replaced as required by the Engineer.

REMOVAL OF PAVEMENT MARKINGS

Removal of pavement markings includes centerline, channelizing lines, lane lines, edge lines, words, arrows, symbols and raised pavement markers.

Pavement markings that are no longer applicable and which may create confusion or direct a motorist toward or into the closed portion of the roadway, shall be removed or obliterated before the roadway is open to traffic. The above shall not apply to detours of a short duration of a few hours, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route and the detour is not to be maintained during nighttime.

Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernible marking, by any method that does not materially damage the surface or texture of the pavement. The removal of pavement markings may require resurfacing or seal coating portions of the roadway, normally full lane widths. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used. Blast cleaning may be used but will not be required unless specifically shown in the plans. Over-painting of the markings SHALL NOT BE permitted. Removal of raised pavement markers shall be as directed by the Engineer.

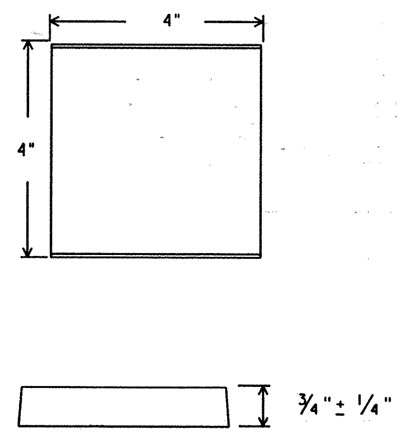
Removal of existing pavement markings and markers will be paid for directly in accordance with the Item "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS" unless otherwise stated elsewhere in the plans.

SPECIFICATION REFERENCE TABLE	
MATERIALS AND TESTS DIVISION SPECIFICATIONS	
JIGGLE BAR TILE	D-9-4100
PAVEMENT MARKERS (REFLECTORIZED)	D-9-4200
TRAFFIC BUTTONS	D-9-4300
EPOXY	D-9-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	D-9-6130
PREFABRICATED PAVEMENT MARKINGS - REMOVABLE	D-9-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	D-9-8242

PREQUALIFICATION PROCEDURES MAY BE OBTAINED BY WRITING:

GENERAL SERVICES DIVISION
TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)
125 EAST 11th STREET
AUSTIN, TX 78701-2483

Temporary Construction Raised Pavement Markers used as Guidemarks:



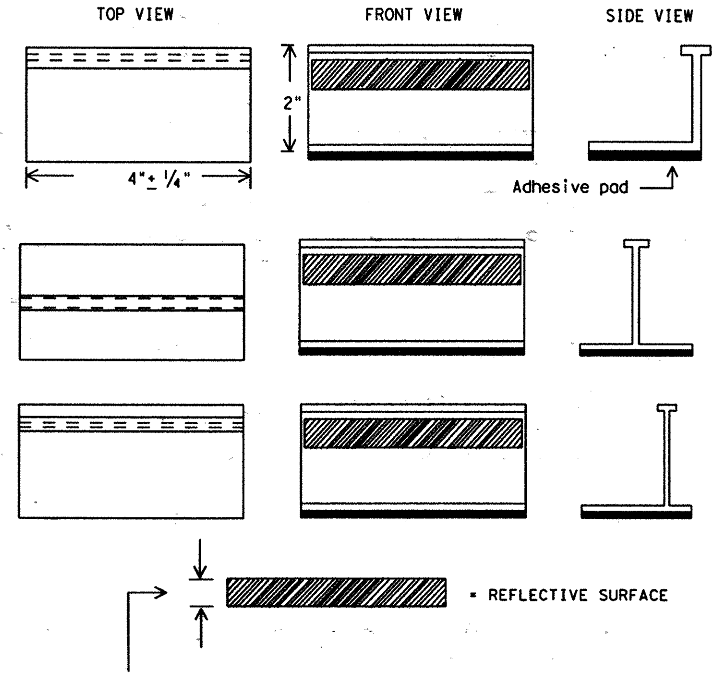
The above temporary construction raised pavement marker is shown for illustration purposes only and not intended to specify any particular product.

Temporary construction raised pavement markers used as guidemarks shall be of design and manufacture approved by the Engineer.

All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.

Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Temporary Flexible-Reflective Roadway Marker Tabs



Height of sheeting will be determined by notes under MAINTENANCE.
(Usually more than 1/4 inch and less than 1 inch.)

STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKERS TABS TO THE PAVEMENT SURFACE

Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of Departmental Material Specification D-9-8242.

Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.

A) Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Tests section to determine specification compliance.
B) Select five (5) tabs and submit to the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.

Guidemarks shall be designated as:

YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

PAVEMENT MARKINGS

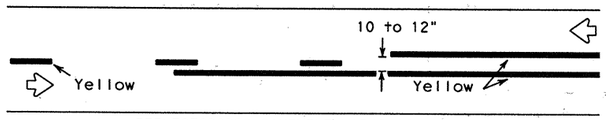
BC(7)-98

©TxDOT April 1992	DN: LR	CK: DTN	DW: DN	CK: GB	MEC NO.:
REVISIONS 2-94 1-97 2-98	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 99(413)MM		SHEET: 208
	COUNTY: ROCKWALL		CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM740

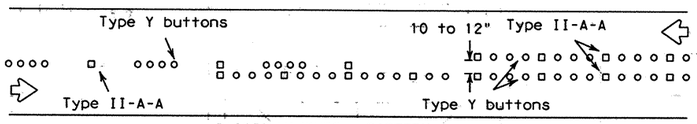
DN: CK: DW: CK:
DATE: ACC: FILE:

PAVEMENT MARKING PATTERNS

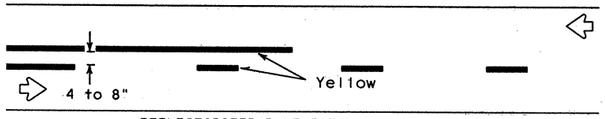
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



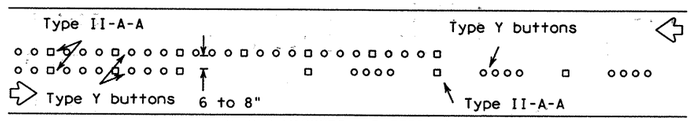
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED MARKERS - PATTERN A

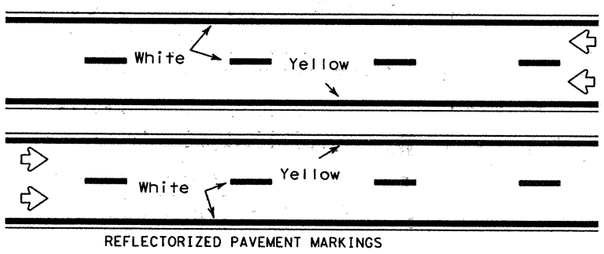


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

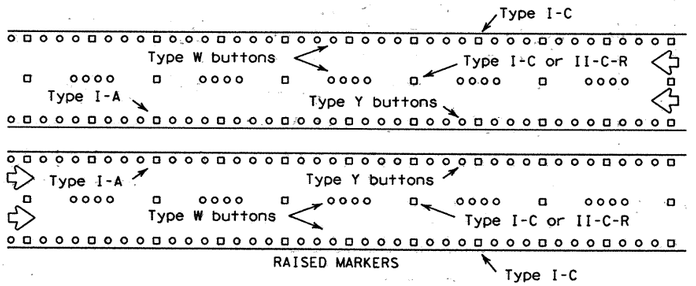


RAISED MARKERS - PATTERN B

EDGE & LANE LINES FOR DIVIDED HIGHWAY



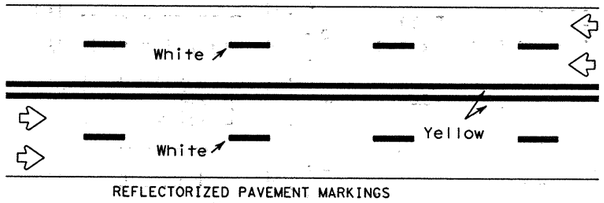
REFLECTORIZED PAVEMENT MARKINGS



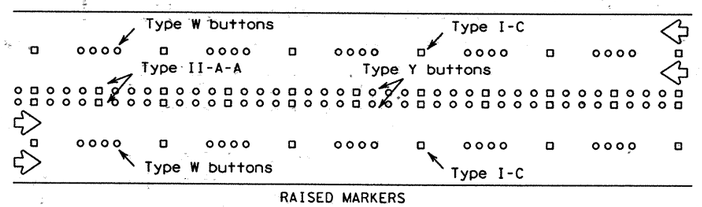
RAISED MARKERS

Type I-C

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS

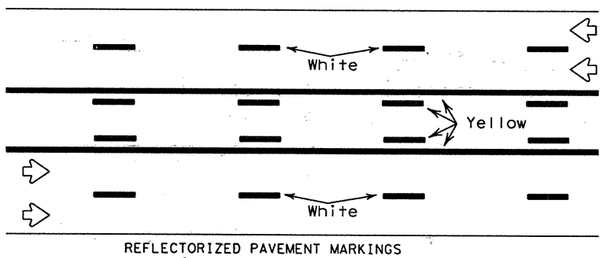


REFLECTORIZED PAVEMENT MARKINGS

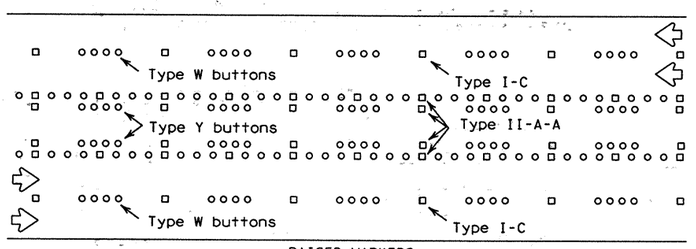


RAISED MARKERS

TWO-WAY LEFT TURN LANE



REFLECTORIZED PAVEMENT MARKINGS

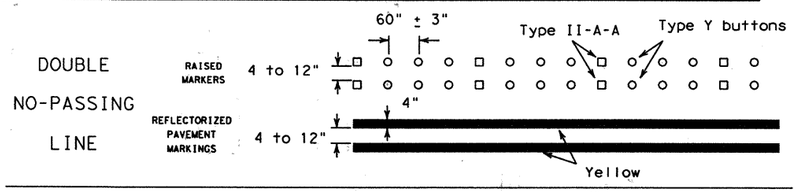


RAISED MARKERS

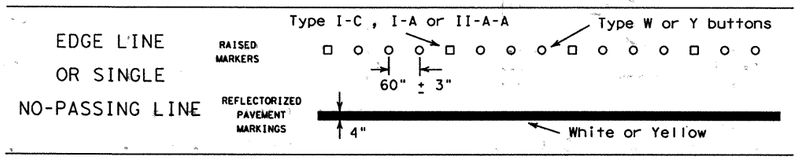
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

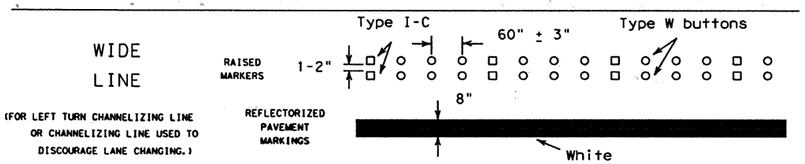


EDGE LINE OR SINGLE NO-PASSING LINE



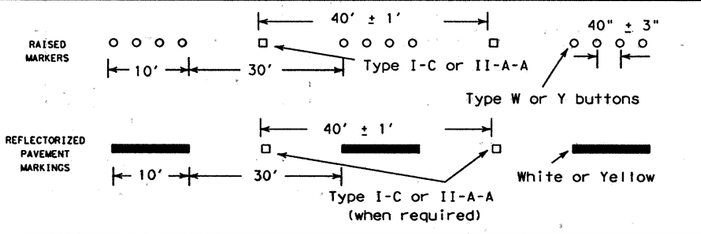
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)



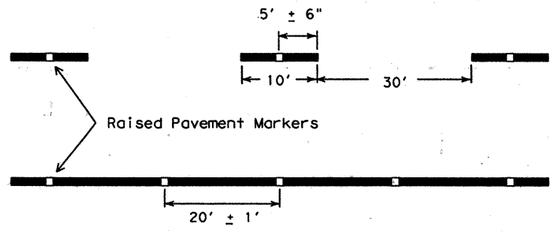
BROKEN LINE

(FOR CENTER LINE OR LANE LINE.)



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines and at approximately 20 foot spacing for solid lines. This allows an easier removal of raised markers and tape.



NOTES:
Pattern A is the Department Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be subsitituted for reflectorized pavement markings.

Raised pavement markers used as standard pavement markings shall meet the requirements of items "RAISED PAVEMENT MARKERS" and "EPOXY AND ADHESIVES."

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

PAVEMENT MARKINGS **BC(8)-98**

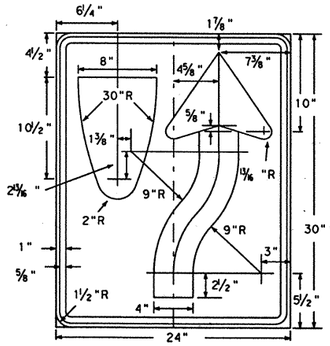
©TxDOT April 1992	DN: LR	CK: DTN	DW: DN	CK: GB	MSG NO.:
REVISIONS 2-94 1-97 2-98	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 99(413)MM		SHEET: 209
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM740

108

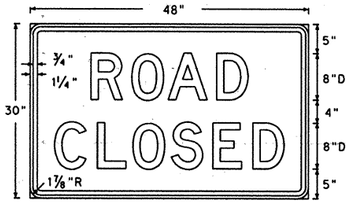
DN:
CK:
DW:
CK:

DATE:
ACC:
FILE:

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



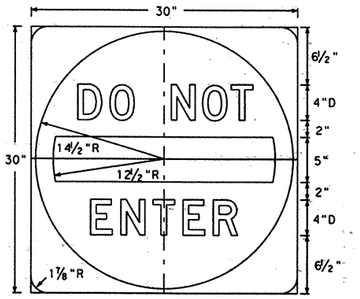
R4-7 (R4-8) 24" X 30"
Symbol - Black
Border - Black
Background - White Refl.



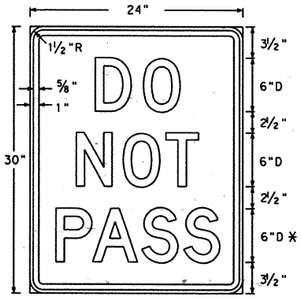
R11-2 48" X 30"
Letters - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

STREET I 8"D R11-2S
RAMP I 8"D R11-2R
BRIDGE I 8"D R11-2B

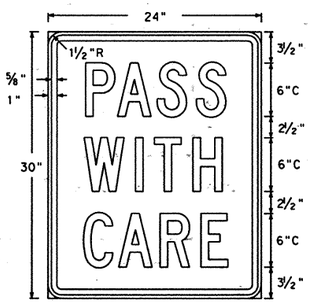


R5-1 30" X 30"
Letters - White Refl.
Bar - White Refl.
Border - White Refl.
Background - Red Refl.

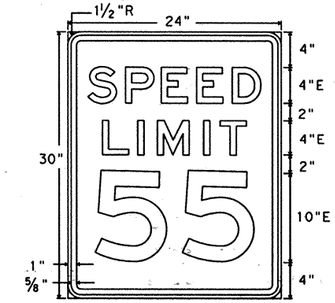


* reduce spacing 40%

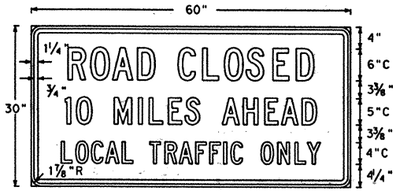
R4-1 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



R4-2 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



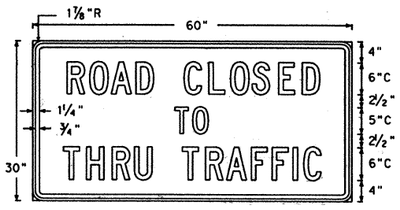
R2-1 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



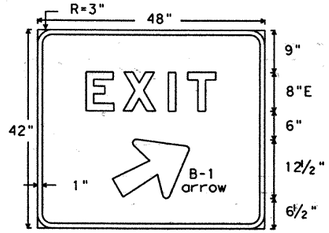
R11-3a 60" X 30"
Letters - Black
Numerals - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

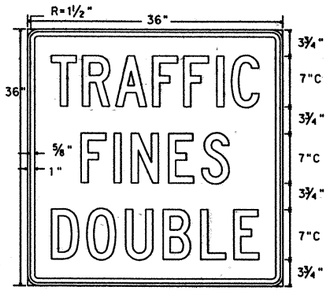
BRIDGE OUT I 6"C R11-3b



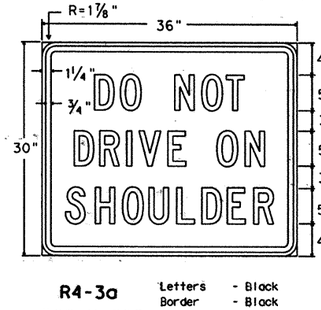
R11-4 60" X 30"
Letters - Black
Border - Black
Background - White Refl.



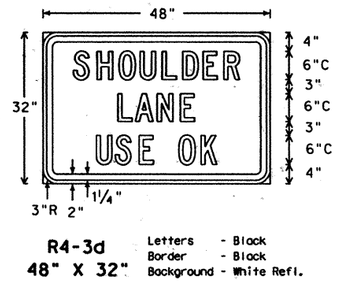
E5-1a 48" X 42"
Letters - White Refl.
Numerals - White Refl.
Symbol - White Refl.
Background - Green Refl.



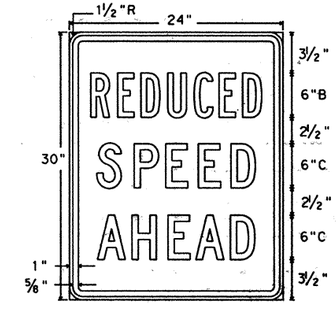
ER20-5 36" X 36"
Letters - Black
Border - Black
Background - White Refl.



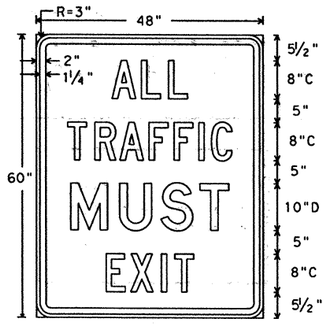
R4-3a 36" X 30"
Letters - Black
Border - Black
Background - White Refl.



R4-3d 48" X 32"
Letters - Black
Border - Black
Background - White Refl.

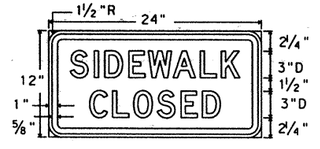


R2-5a 24" X 30"
Letters - Black
Border - Black
Background - White Refl.

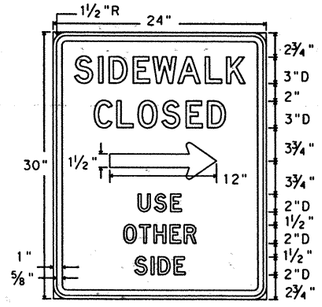


R3-22 48" X 60"
Letters - Black
Border - Black
Background - White Refl.

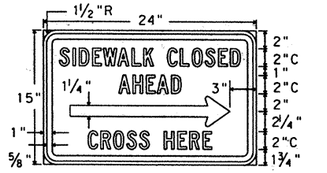
R5-7 24" X 12"
Letters - Black
Border - Black
Background - White Refl.



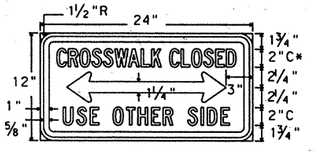
R5-8 24" X 12"
Letters - Black
Border - Black
Background - White Refl.



R5-8T 24" X 30"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

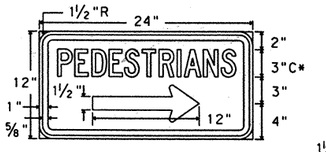


R5-9a 24" X 15"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.



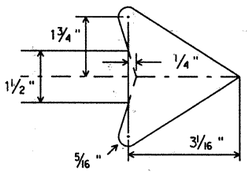
* reduce spacing 40%

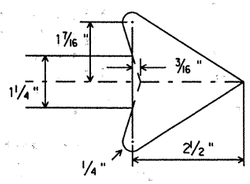
R5-9 24" X 12"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

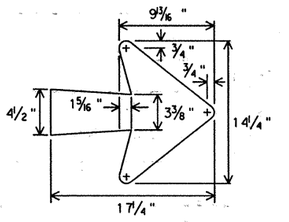


* reduce spacing 40%

R5-7T 24" X 12"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

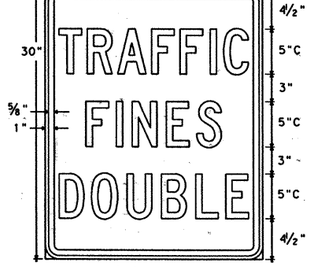




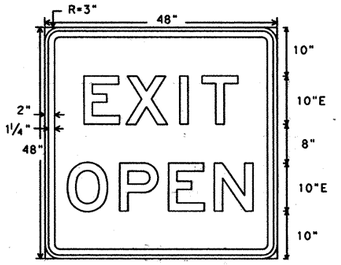


B-1 Arrow Detail

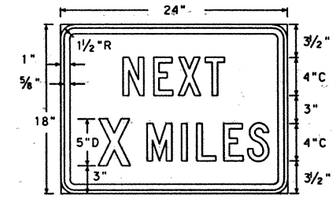
Signs E5-1a, E5-2 and R5-1 - letters, border and symbol may be fabricated from FLAT REFLECTIVE SHEETING, TYPE C.



R20-5 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



E5-2 48" X 48"
Letters - Black
Border - Black
Background - Orange Refl.



R20-1 24" X 18"
Letters - Black
Border - Black
Background - White Refl.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

REGULATORY AND GUIDE SIGNS

BC(9)-98

©TxDOT February 1998	DN: GB	CK: DTN	DW: DN	CK: GB	MEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	STP 99(413)MM		210
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

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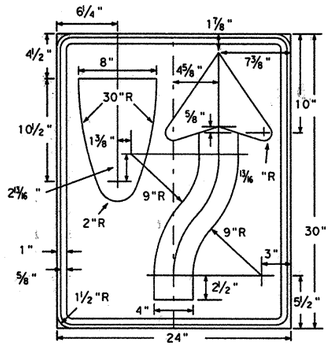
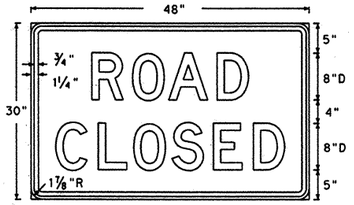
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC:
FILE:
DN:
C
D
CK:



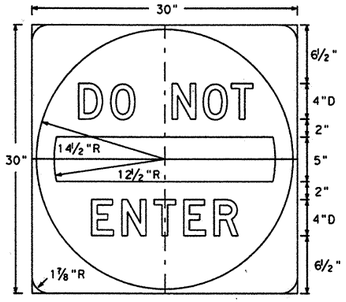
R4-7 (R4-8) 24" X 30"
Symbol - Black
Border - Black
Background - White Refl.



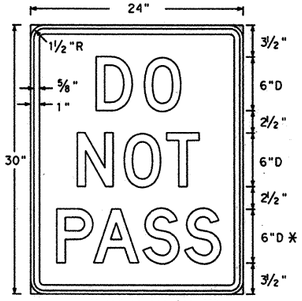
R11-2 48" X 30"
Letters - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

STREET I 8"D **R11-2S**
RAMP I 8"D **R11-2R**
BRIDGE I 8"D **R11-2B**

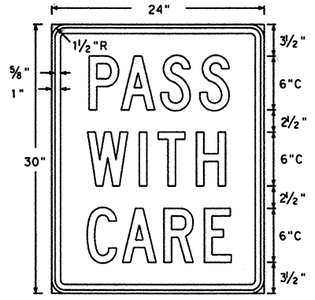


R5-1 30" X 30"
Letters - White Refl.
Bar - White Refl.
Border - White Refl.
Background - Red Refl.

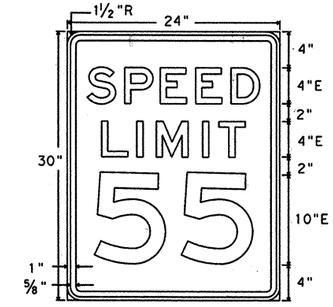


* reduce spacing 40%

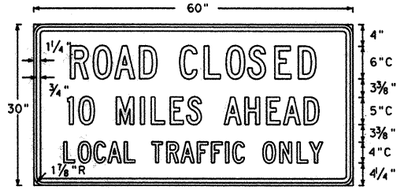
R4-1 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



R4-2 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



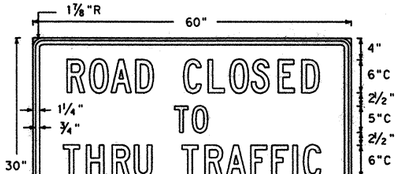
R2-1 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



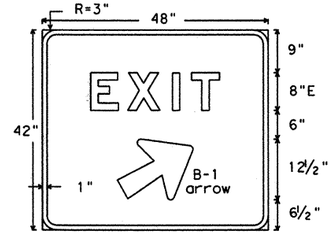
R11-3a 60" X 30"
Letters - Black
Numerals - Black
Border - Black
Background - White Refl.

Alternate 1st line legend

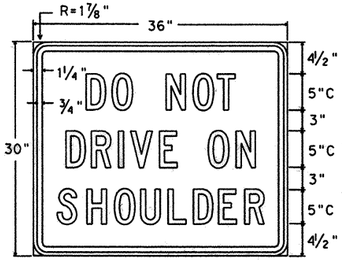
BRIDGE OUT I 6"C **R11-3b**



R11-4 60" X 30"
Letters - Black
Border - Black
Background - White Refl.

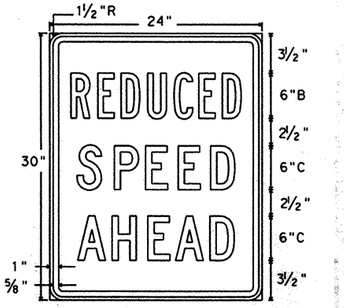


E5-1a 48" X 42"
Letters - White Refl.
Numerals - White Refl.
Symbol - White Refl.
Background - Green Refl.

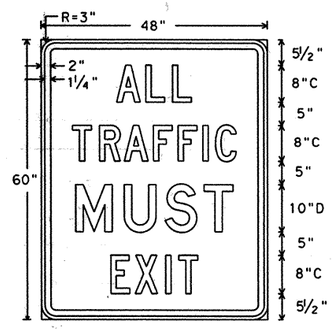


R4-3a 36" X 30"
Letters - Black
Border - Black
Background - White Refl.

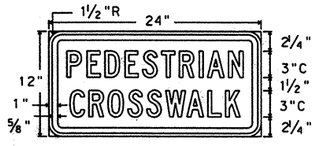
R4-3d 48" X 32"
Letters - Black
Border - Black
Background - White Refl.



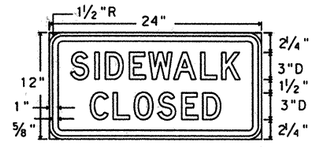
R2-5a 24" X 30"
Letters - Black
Border - Black
Background - White Refl.



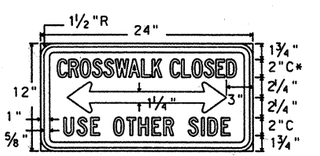
R3-22 48" X 60"
Letters - Black
Border - Black
Background - White Refl.



R5-7 24" X 12"
Letters - Black
Border - Black
Background - White Refl.



R5-8 24" X 12"
Letters - Black
Border - Black
Background - White Refl.

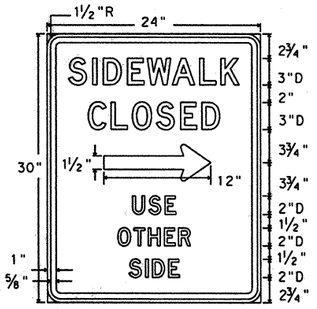


R5-9a 24" X 15"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

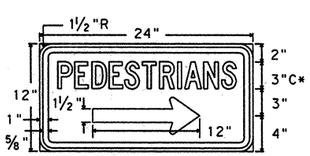
* reduce spacing 40%

R5-9 24" X 12"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

ER20-5 36" X 36"
Letters - Black
Border - Black
Background - White Refl.



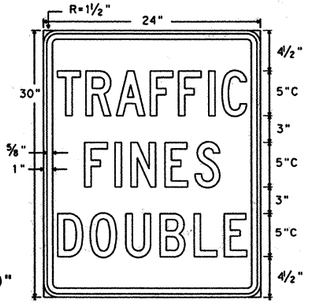
R5-8T 24" X 30"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

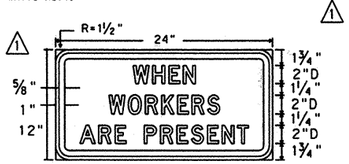


* reduce spacing 40%

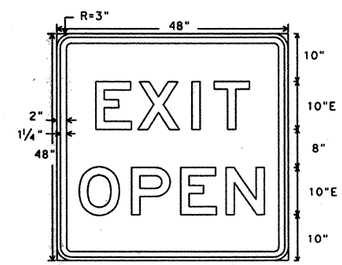
R5-7T 24" X 12"
Letters - Black
Symbol - Black
Border - Black
Background - White Refl.

R20-5 24" X 30"
Letters - Black
Border - Black
Background - White Refl.

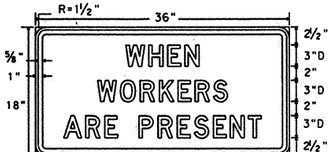




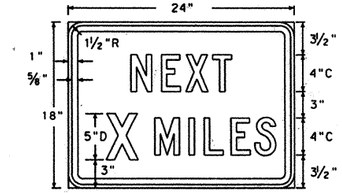
R20-5 Plaque 24" X 12"
Letters - Black
Border - Black
Background - White Refl.



E5-2 48" X 48"
Letters - Black
Border - Black
Background - Orange Refl.

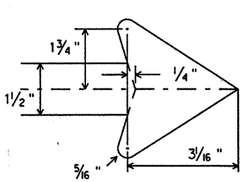


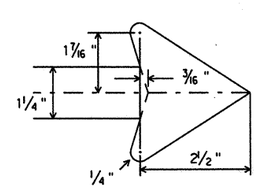
ER20-5 Plaque 36" X 18"
Letters - Black
Border - Black
Background - White Refl.

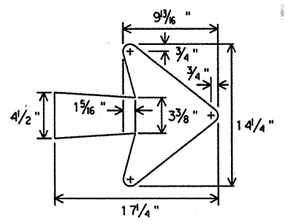


R20-1 24" X 18"
Letters - Black
Border - Black
Background - White Refl.

10/99 Revision
⚠ Added new sign







B-1 Arrow Detail

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

REGULATORY AND GUIDE SIGNS

BC(9)-99

DN: GB	CK: DTN	DW: DN	CK: GB	MEG NO.:

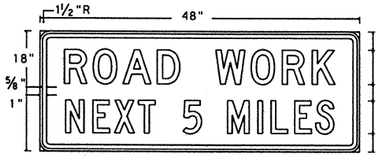
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
10-99	DALLAS	6	STP 99(413) MM	210A

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM 740

109

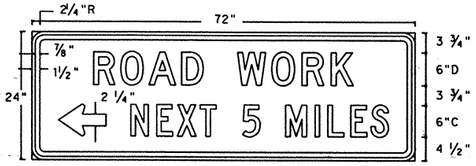
225A

LEVELS DI: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
DATE:
ACC:
FILE:
DGN:
CK:
DW:
CK:



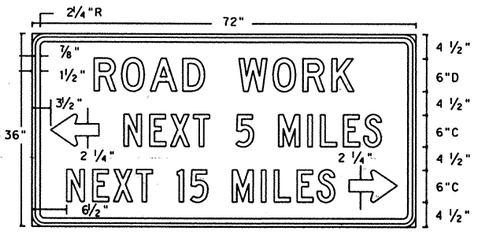
SG20-1
48" X 18"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



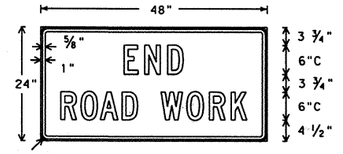
G20-1bL (R)
72" X 24"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



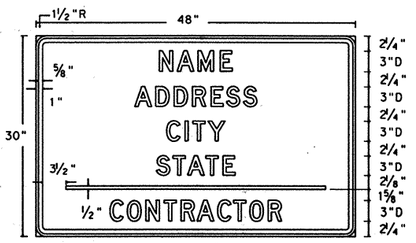
G20-1a
72" X 36"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



G20-2a
48" X 24"

Letters - Black
Border - Black
Background - Orange Refl.



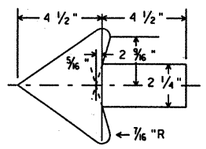
SG20-6
48" X 30"

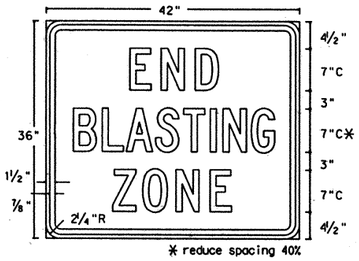
Letters - Black
Border - Black
Background - Orange Refl. or White Refl. (optional)

CW22-2a
60" X 36"

Letters - Black
Number - Black
Border - Black
Background - Orange Refl.

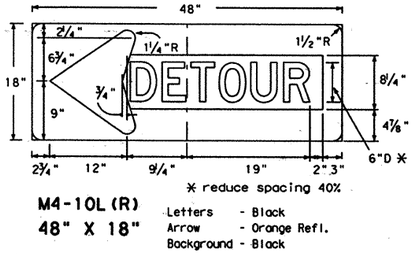
NOTE:
G20-1 Series signs shall show distances rounded to nearest whole mile. Fractions and decimal miles will not be used.





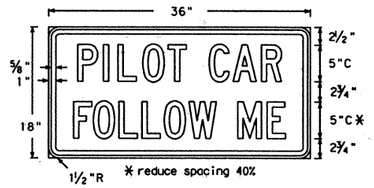
CW22-3
42" X 36"

Letters - Black
Border - Black
Background - Orange Refl.



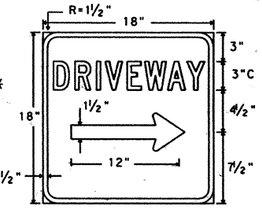
M4-10L (R)
48" X 18"

Letters - Black
Arrow - Orange Refl.
Background - Black



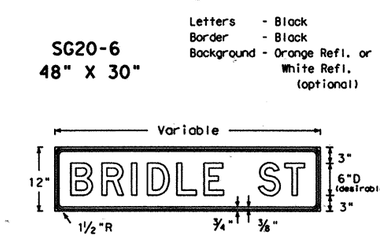
G20-4
36" X 18"

Letters - Black
Border - Black
Background - Orange (Refl. Optional)



D-70a
18" X 18"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

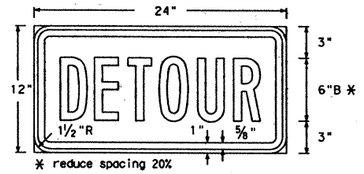


M4-9N
Variable X 12"

Letters - Black
Border - Black
Background - Orange Refl.

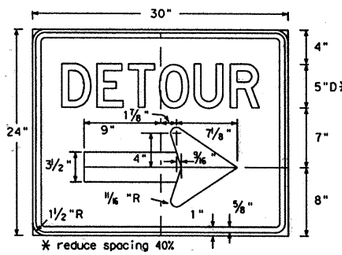
The M4-9R,L or S sign is to be used to detour local streets or roads that are not a State or Federal numbered highway; however, it should not be used in lieu of the M4-10 sign at the beginning of the detour or to detour State or Federal numbered routes.

Also, when the M4-9R,L or S sign is used, a sign (M4-9N) with the name of the street being detoured may be mounted above it.



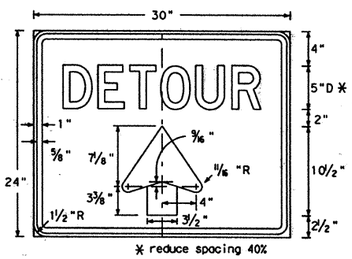
M4-8
24" X 12"

Letters - Black
Border - Black
Background - Orange Refl.



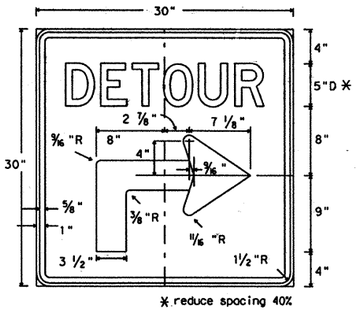
M4-9R(L)
30" X 24"

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.



M4-9S
30" X 24"

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

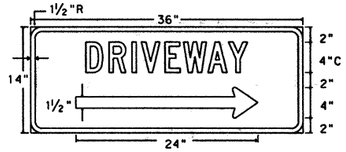


M4-9AR(L)
30" X 30"

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

D-70S
42" X 14"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.



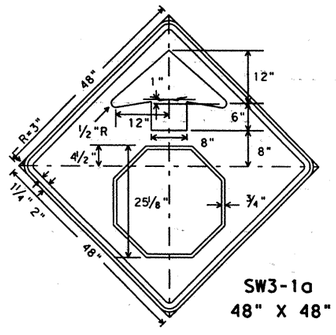
D-70
36" X 14"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

* Alternate first line legend for D-70S

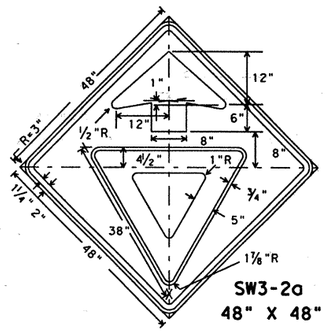
RESTAURANT I D70R 4"C
BUSINESS I D70B 4"C
MOTEL I D70M 4"C
GAS I D70G 4"C

NOTE:
STOP, YIELD, and SIGNAL AHEAD symbol signs should be yellow background.



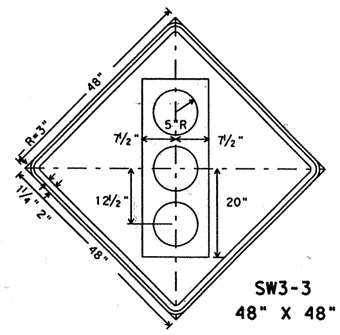
SW3-1a
48" X 48"

Border and Arrow - Black
Symbol - White Border on Red Background (Refl)
Background - Yellow Reflective



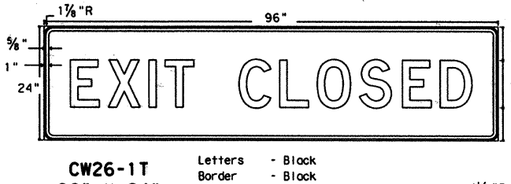
SW3-2a
48" X 48"

Border and Arrow - Black
Symbol - Red Border Band on White Background (Refl)
Background - Yellow Reflective



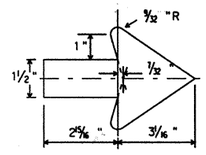
SW3-3
48" X 48"

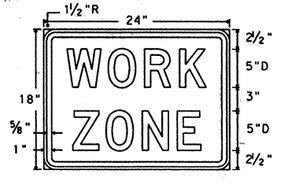
Symbol and Border - Black
Top Circle - Red Reflective
Bottom Circle - Green Reflective
Background - Yellow Reflective



CW26-1T
96" X 24"

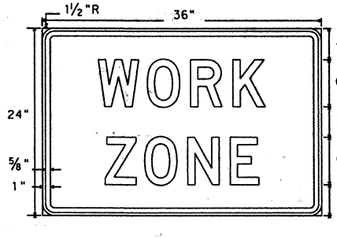
Letters - Black
Border - Black
Background - Orange Refl.





G20-9
24" X 18"

Letters - Black
Border - Black
Background - Orange Refl.



EG20-9
36" X 24"

Letters - Black
Border - Black
Background - Orange Refl.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

CONTRACTOR INFORMATION, DETOURS & WARNING SIGNS

BC(9A)-98

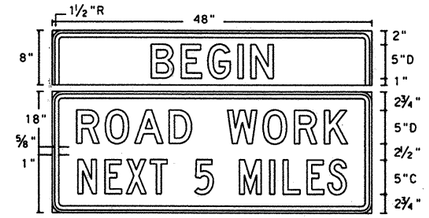
©TxDOT February 1998	DN: GB	CK: DTN	DW: DN	CK: GB	MEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
	DAL	6	STP 99(413)MM		21
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

109A

DN:
C
Dh.
CK:

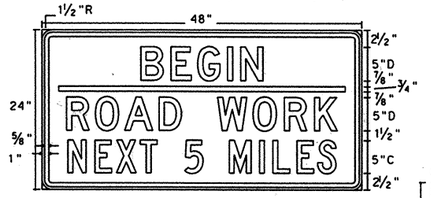
DATE:
ACC:
FILE:

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



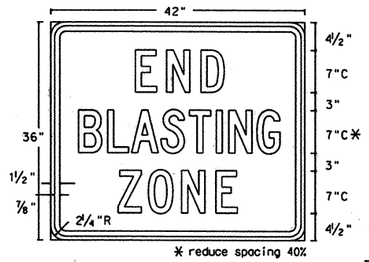
SG20-1 w/plaque
48" X 26"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



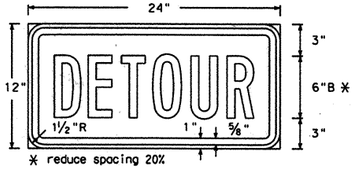
SG20-5T
48" X 24"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



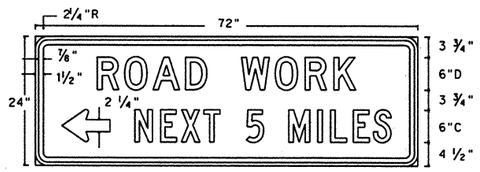
CW22-3
42" X 36"

Letters - Black
Border - Black
Background - Orange Refl.



M4-8
24" X 12"

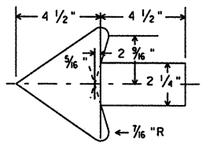
Letters - Black
Border - Black
Background - Orange Refl.

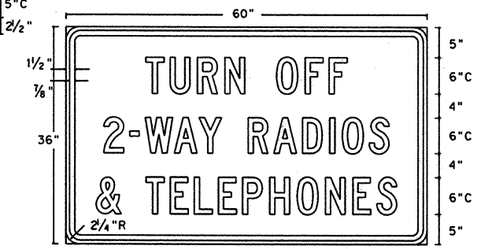


G20-1bL (R)
72" X 24"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.

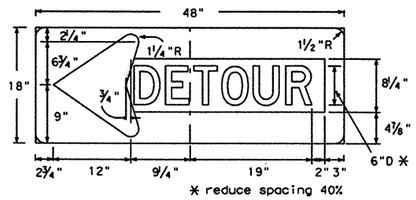
NOTE:
G20-1 Series signs shall show distances rounded to nearest whole mile. Fractions and decimal miles will not be used.





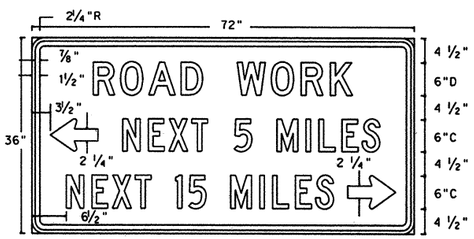
CW22-2a
60" X 36"

Letters - Black
Number - Black
Border - Black
Background - Orange Refl.



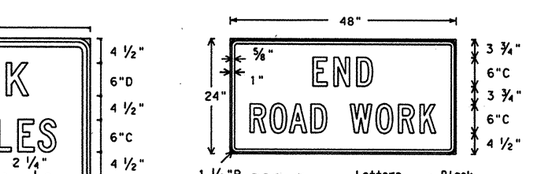
M4-10L (R)
48" X 18"

Letters - Black
Arrow - Orange Refl.
Background - Black



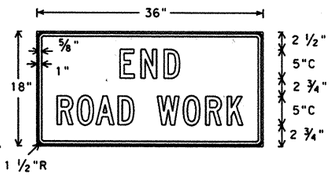
G20-1a
72" X 36"

Letters - Black
Numbers - Black
Border - Black
Background - Orange Refl.



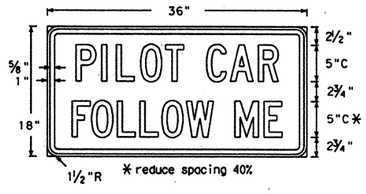
G20-2a
48" X 24"

Letters - Black
Border - Black
Background - Orange Refl.



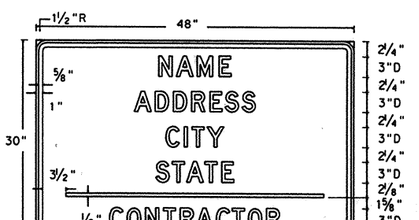
SG20-2a
36" X 18"

Letters - Black
Border - Black
Background - Orange Refl.



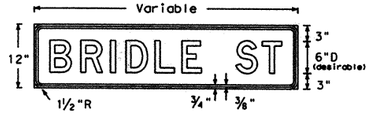
G20-4
36" X 18"

Letters - Black
Border - Black
Background - Orange
(Refl. Optional)



SG20-6
48" X 30"

Letters - Black
Border - Black
Background - Orange Refl. or White Refl. (optional)

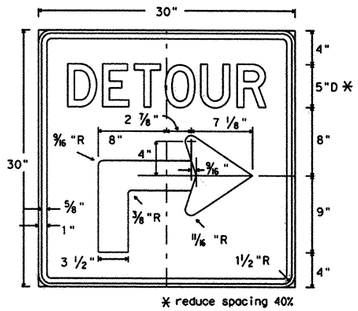


M4-9N
Variable X 12"

Letters - Black
Border - Black
Background - Orange Refl.

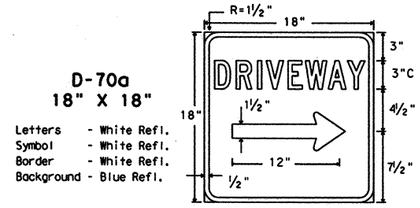
The M4-9R,L or S sign is to be used to detour local streets or roads that are not a State or Federal numbered highway; however, it should not be used in lieu of the M4-10 sign at the beginning of the detour or to detour State or Federal numbered routes.

Also, when the M4-9R,L or S sign is used, a sign (M4-9N) with the name of the street being detoured may be mounted above it.



M4-9AR(L)
30" X 30"

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

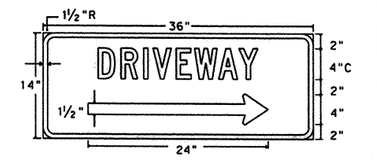


D-70a
18" X 18"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

D-70S
42" X 14"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

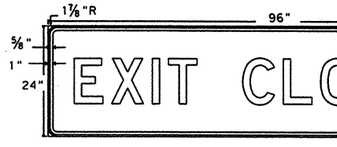


D-70
36" X 14"

Letters - White Refl.
Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

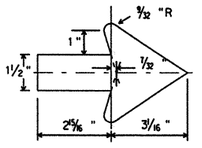
* Alternate first line legend for D-70S

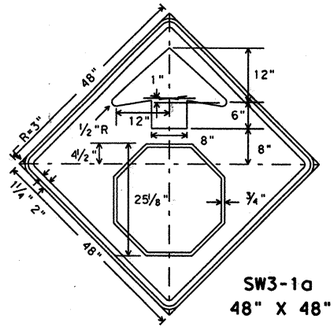
RESTAURANT I D70R 4"C
BUSINESS I D70B 4"C
MOTEL I D70M 4"C
GAS I D70G 4"C



CW26-1T
96" X 24"

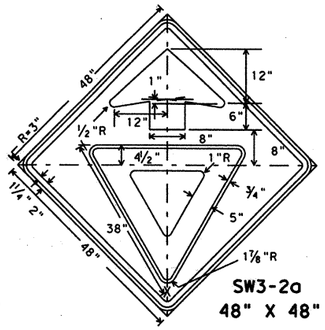
Letters - Black
Border - Black
Background - Orange Refl.





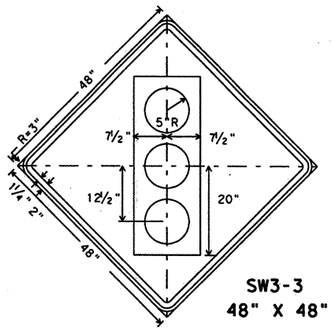
SW3-1a
48" X 48"

Border and Arrow - Black
Symbol - White Border on Red Background (Refl)
Background - Yellow Reflective



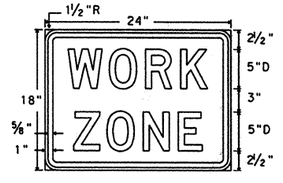
SW3-2a
48" X 48"

Border and Arrow - Black
Symbol - Red Border Band on White Background (Refl)
Background - Yellow Reflective



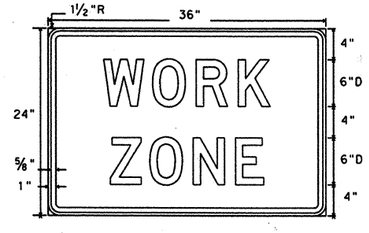
SW3-3
48" X 48"

Symbol and Border - Black
Top Circle - Red Reflective
Bottom Circle - Green Reflective
Background - Yellow Reflective



G20-9
24" X 18"

Letters - Black
Border - Black
Background - Orange Refl.



EG20-9
36" X 24"

Letters - Black
Border - Black
Background - Orange Refl.

10/99 Revision
⚠ Added new sign

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

CONTRACTOR INFORMATION, DETOURS & WARNING SIGNS

BC(9A)-99

DN: GB	CK: DTN	DW: DN	CK: GB	REQ NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
10-99	DALLAS	6	STP 99(413) MM	211A

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM 740

109A

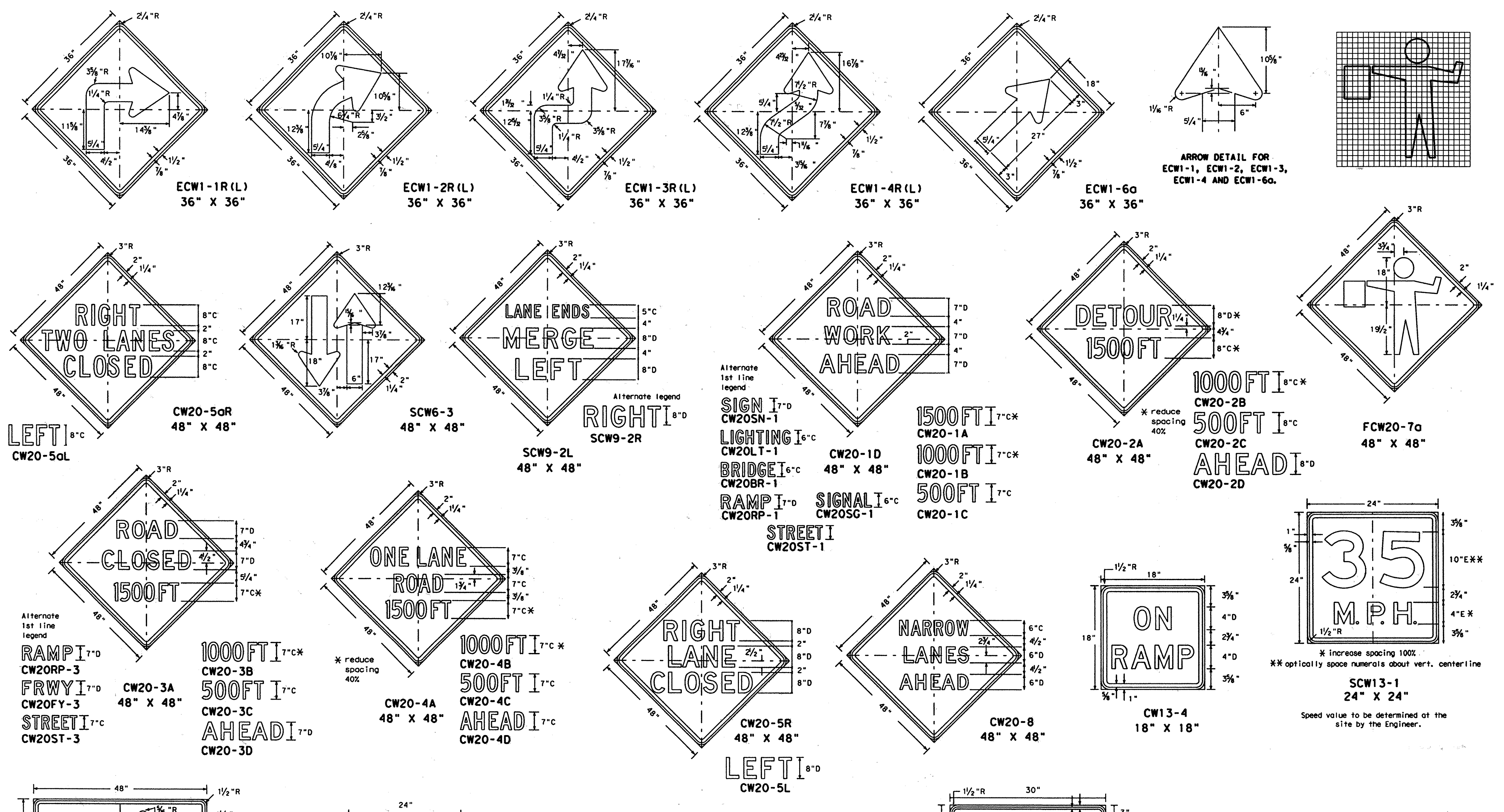
226A

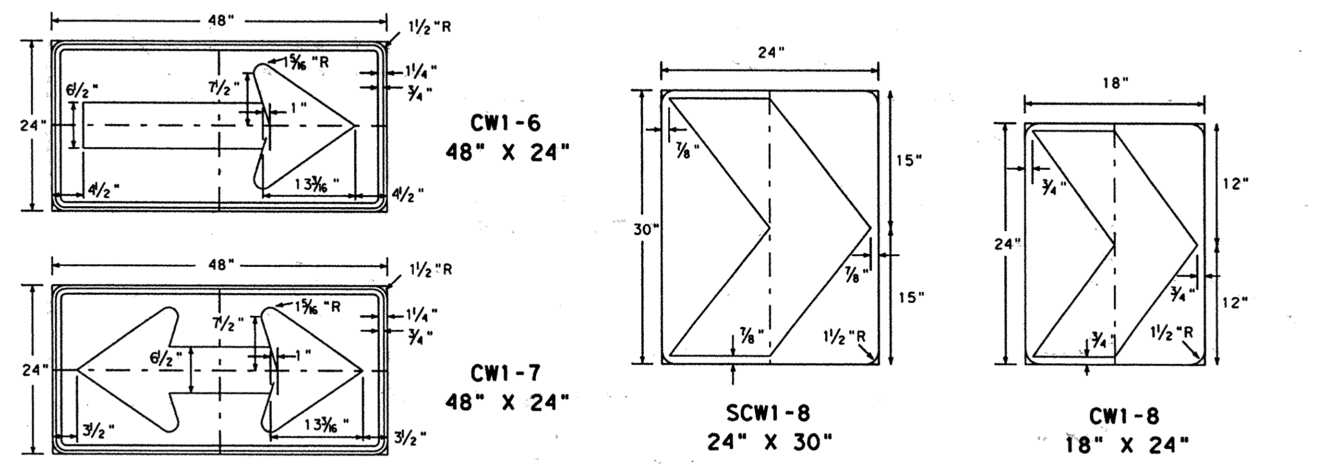
LEVELS DIS

	4	5	6	7	8	9	10	11	12	13	14	15	16
1													
17	18	19	20	21	22	23	24	25	26	27	28	29	30
33	34	35	36	37	38	39	40	41	42	43	44	45	46
49	50	51	52	53	54	55	56	57	58	59	60	61	62

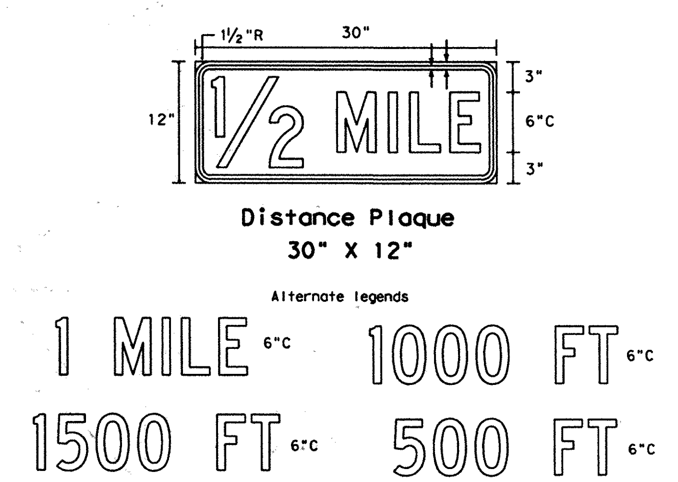
DATE:
ACC:
FILE:

DW:
CK:


ECW1-1R(L)
36" X 36"
ECW1-2R(L)
36" X 36"
ECW1-3R(L)
36" X 36"
ECW1-4R(L)
36" X 36"
ECW1-6a
36" X 36"
ARROW DETAIL FOR ECW1-1, ECW1-2, ECW1-3, ECW1-4 AND ECW1-6a.
RIGHT TWO LANES CLOSED
CW20-5aR
48" X 48"
LEFT
CW20-5aL
SCW6-3
48" X 48"
LANE ENDS MERGE LEFT
Alternate legend
RIGHT
SCW9-2R
SCW9-2L
48" X 48"
ROAD WORK AHEAD
Alternate 1st line legend
SIGN
CW20SN-1
LIGHTING
CW20LT-1
BRIDGE
CW20BR-1
RAMP
CW20RP-1
SIGNAL
CW20SG-1
STREET
CW20ST-1
CW20-1D
48" X 48"
1500 FT
CW20-1A
1000 FT
CW20-1B
500 FT
CW20-1C
DETOUR 1500 FT
* reduce spacing 40%
CW20-2A
48" X 48"
1000 FT
CW20-2B
500 FT
CW20-2C
AHEAD
CW20-2D
FCW20-7a
48" X 48"
ROAD CLOSED 1500 FT
Alternate 1st line legend
RAMP
CW20RP-3
FRWY
CW20FY-3
STREET
CW20ST-3
CW20-3A
48" X 48"
1000 FT
CW20-3B
500 FT
CW20-3C
AHEAD
CW20-3D
ONE LANE ROAD 1500 FT
* reduce spacing 40%
CW20-4A
48" X 48"
1000 FT
CW20-4B
500 FT
CW20-4C
AHEAD
CW20-4D
RIGHT LANE CLOSED
CW20-5R
48" X 48"
LEFT
CW20-5L
NARROW LANES AHEAD
CW20-8
48" X 48"
ON RAMP
CW13-4
18" X 18"
35 M.P.H.
* increase spacing 100%
** optically space numerals about vert. centerline
SCW13-1
24" X 24"
Speed value to be determined at the site by the Engineer.



GENERAL NOTES:
All signs detailed on this sheet shall have Black border, legend and/or symbol on an orange Type C reflective background.



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

CONSTRUCTION WARNING SIGNS

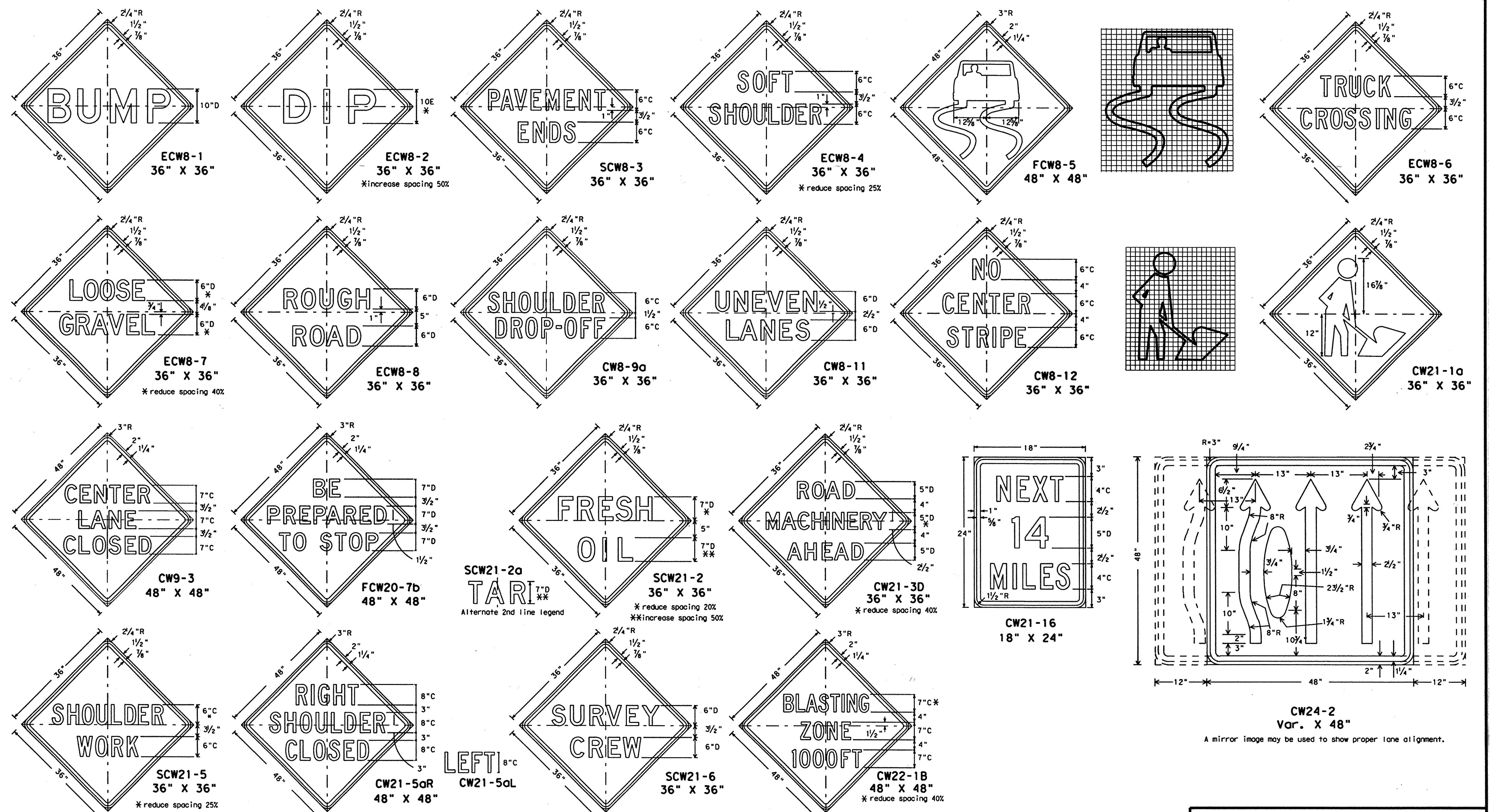
BC(9B)-98

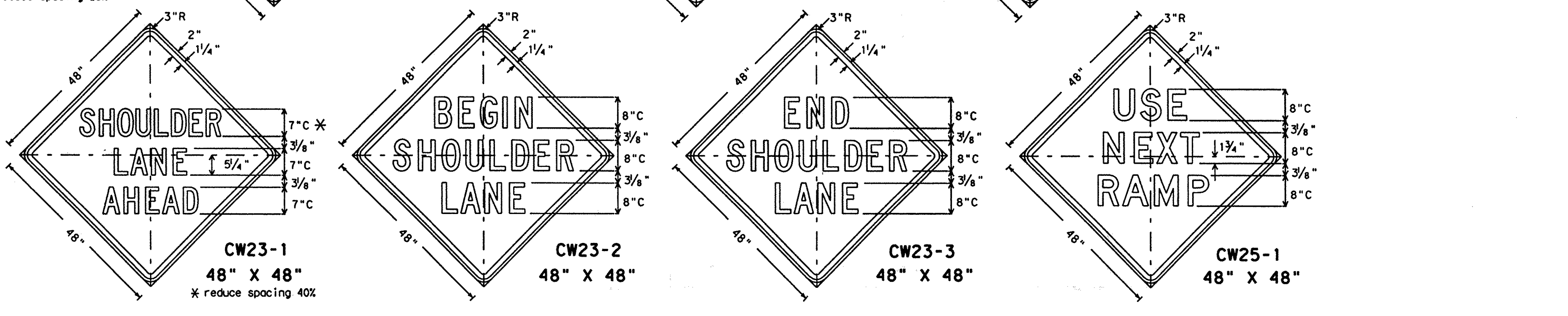
DN: GB	CK: DTN	DW: DN	CK: GB

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	2/2

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

DISCLAIMER
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.





GENERAL NOTES:
All signs detailed on this sheet shall have Black border, legend and/or symbol on an orange Type C reflective background.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

BARRICADE AND CONSTRUCTION STANDARDS

CONSTRUCTION WARNING SIGNS **BC (9C) -98**

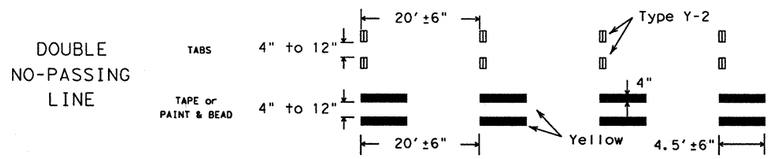
©TxDOT February 1998	DN: GB	CK: DTN	DW: DN	CK: GB
STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 99(413)MM		SHEET: 2/3
COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM740

109C

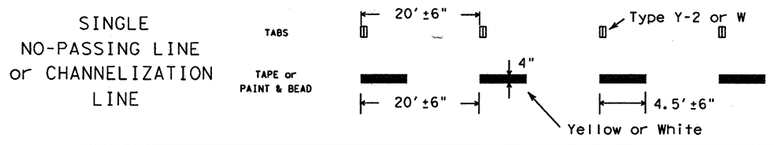
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

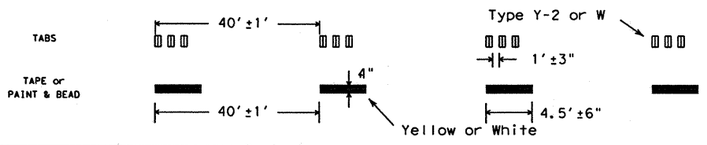


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



BROKEN LINE

(FOR CENTER LINE OR LANE LINE.)



NOTES:

1. Short term pavement markings may be paint and beads, prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans. Paint and beads shall not be used as removable short term pavement markings.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without standard pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until standard pavement markings are in place. When the Contractor is responsible for placement of standard pavement markings, no segment of roadway shall remain without standard pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Standard pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the TMUTCD and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Standard pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one silver reflective surface with white body). Additional details may be found on BC(8).
2. Tabs shall meet requirements of Department Material Specification D-9-8242.
3. The body of Tabs shall consist of a base and vertical wall made of polyurethane, polyester elastomer or other material approved by the Materials and Tests Division.
4. The reflective material shall be protected with an easily removable heat resistant transparent cover capable of withstanding and protecting reflective material from application of 400 degree F asphalt. Stapling or clipping devices used to retain the protective cover shall not protrude through reflective material.
5. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A) Select five (5) or more tabs at random from each lot or shipment and submit to the Materials and Tests Division to determine specification compliance.
   B) Select five (5) tabs and submit to the following test. Affix five (5) tabs at two (2) foot intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with front and rear wheels at a speed of 35 to 40 miles per hour, four times in each direction. No more than one (1) out of five reflective surfaces shall be lost or displaced as a result of this test.
6. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam headlight at night, unless sight distance is restricted by roadway geometrics.
7. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of note 6.

REMOVABLE - PREFABRICATED PAVEMENT MARKINGS

1. Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on list of approved materials covered by Materials and Tests Divisions Specification: D-9-8241.

NON REMOVABLE - PREFABRICATED PAVEMENT MARKINGS (FOIL BACK)

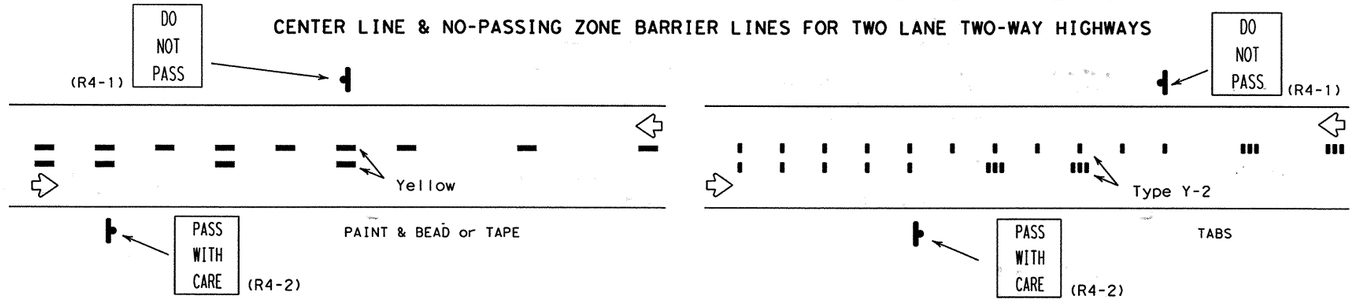
1. Prefabricated Pavement Markings shall be a material of manufacture and product code or designation shown on list of approved material covered by Specification TxDOT- 550-74-01.

RAISED PAVEMENT MARKERS

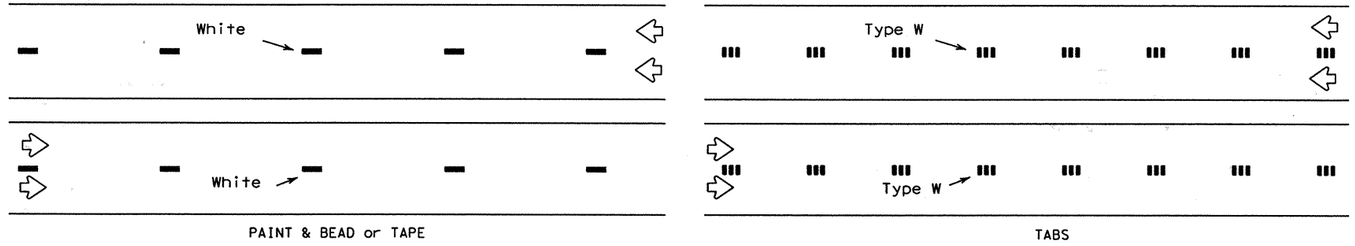
1. Raised pavement markers used to supplement short term removable pavement markings shall meet the requirements of Item "RAISED PAVEMENT MARKERS".

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS

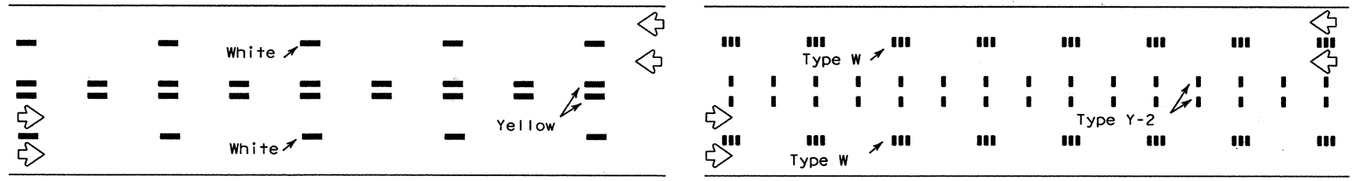
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



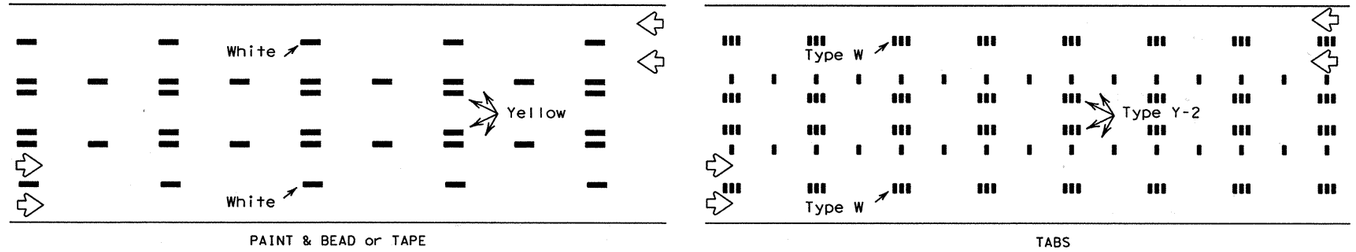
LANE LINES FOR DIVIDED HIGHWAY

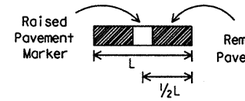


LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE





If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATIONS	
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	D-9-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	D-9-8242
PAVEMENT MARKERS (REFLECTORIZED)	D-9-4200

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-97

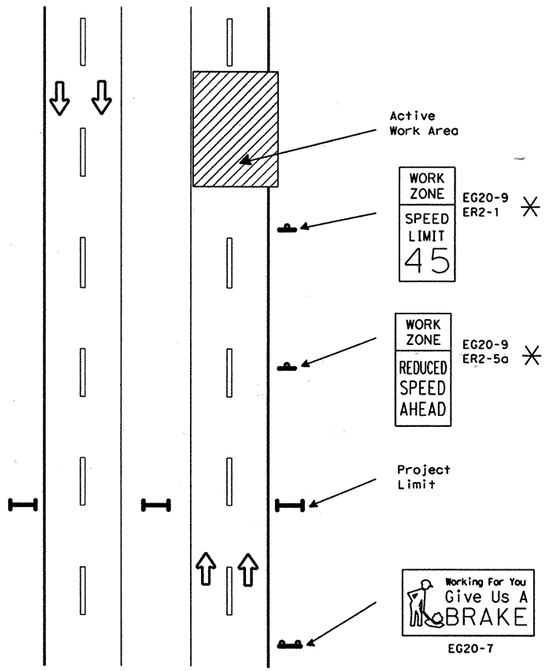
LEVEL	SPLAYED	DATE:
1 2 3 4 5 6 7	1 0 1 1 2 1 3 1 4 1 5 1 6	DN:
1 7 1 8 1 9 2 0 2 1 2 2 L	2 6 2 7 2 8 2 9 3 0 3 1 3 2	CK:
3 3 3 4 3 5 3 6 3 7 3 8 3 9	4 0 4 1 4 2 4 3 4 4 4 5 4 6 4 7 4 8	ACC:
4 9 5 0 5 1 5 2 5 3 5 4 5 5	5 6 5 7 5 8 5 9 6 0 6 1 6 2 6 3	FILE:

DN-LR	CK:-	DW-DN	CK:-MT	MEG NO.:

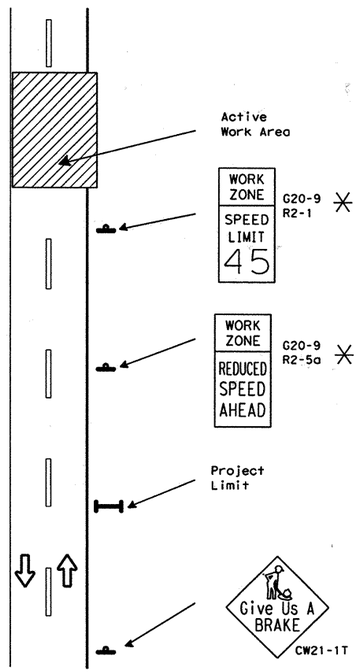
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
1-97	DAL	6	STP 99(413)MM	214

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

Divided Highway



Undivided Highway



✳ Posted only when reduced speed is directed by the Engineer

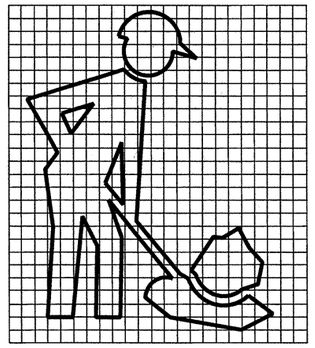
SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLY TY A (SQ FT)	GALVANIZED STRUCT STEEL Size	GALVANIZED STRUCT STEEL (LF) ①	GALVANIZED STRUCT STEEL (LF) ②	DRILLED SHAFT 24" DIA. (LF)
Orange	EG20-7	Give Us A BRAKE	16' x 8'	Type C	128	W8x18	16	17	12
Orange	G20-7	Give Us A BRAKE	8' x 4'	Type C	32	S4x7.7	12	13	7✳

✳ 12" Non-reinforced Concrete Footing (LF)

SUMMARY OF SMALL SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLY TY A (SQ FT)
Orange	EG20-9	WORK ZONE	36" x 24"	Type C	6
Orange	G20-9	WORK ZONE	24" x 18"	Type C	3
White	ER2-1	SPEED LIMIT	36" x 48"	Type A	12
White	ER2-5a	REDUCED SPEED AHEAD	36" x 48"	Type A	12
Orange	CW21-1T	GIVE US A BRAKE	48" x 48"	Type C	16



SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

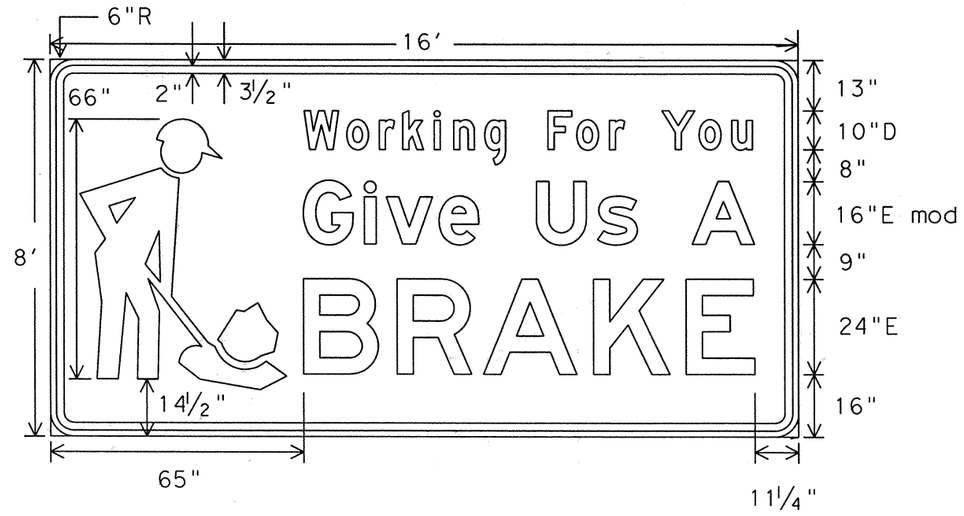
PLYWOOD SIGN BLANKS	D-9-7100
ALUMINUM SIGN BLANKS	D-9-7110
FLAT SURFACE REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE)	D-9-8300
FLAT SURFACE REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

1. See BC sheets, SMD(2-1), (2-2) and (2-3) for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us A BRAKE and WORK ZONE SPEED LIMIT signs should be repeated halfway through the project. Projects less than two miles generally do not require repeated Give Us A BRAKE signs.
4. Signs are illustrated for one direction of travel.
5. G20-7 and EG20-7 signs detailed on this sheet shall be paid for under the following bid items:

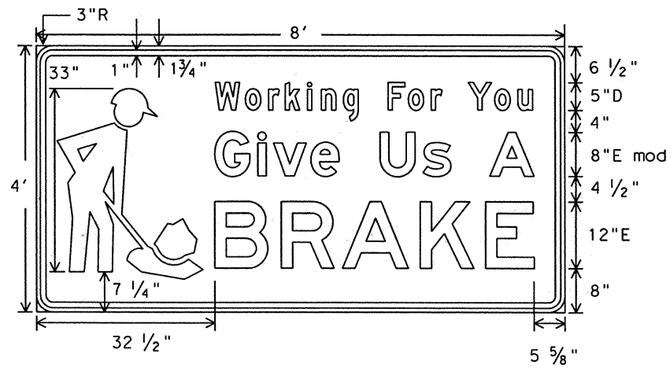
   Item 634 Plywood Signs Type A
   Item 647 Large Roadside Sign Supports
   Item 656 Foundations for Signs, Traffic Signals and Roadway Illumination Assemblies

6. EG20-9, G20-9, ER2-1, R2-1, ER2-5a, R2-5a and CW21-1T signs and sign supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."



Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

EG20-7



Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

G20-7

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WORK ZONE "GIVE US A BRAKE" SIGNS

SHEET 1 OF 2 WZ(BRK-1)-98

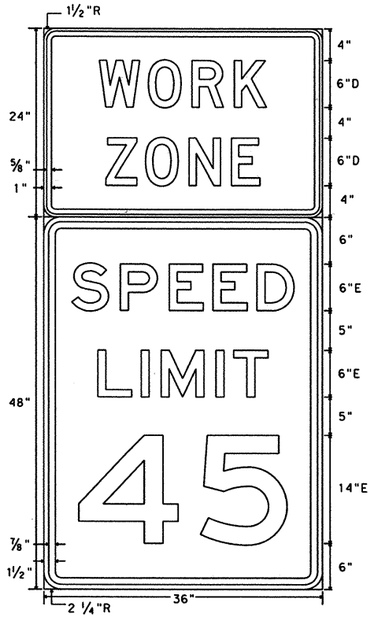
DN: LR	CK: -	DW: DN	CK: -	MSG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
12-95	DAL	6	STP 99(413)MM	2/5
6-96				
8-96	COUNTY		CONTROL SECTION JOB	HIGHWAY
5-98	ROCKWALL		1014 03 033	FM740

119A

LEVEL DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58hp1c/usr/d580504
FILE:
DN:
CI
DW: w4
CK: MT

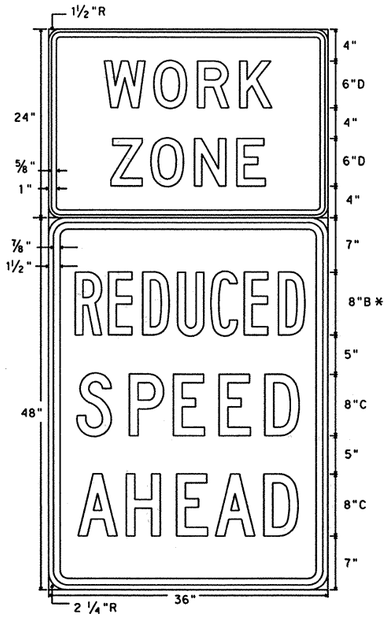


Letters - Black
Background - Orange Refl.

EG20-9

Letters - Black
Background - White Refl.

ER2-1



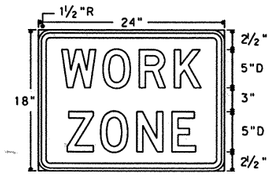
Letters - Black
Background - Orange Refl.

EG20-9

Letters - Black
Background - White Refl.

ER2-5a

*spacing reduced 40%



Letters - Black
Background - Orange Refl.

G20-9

SUMMARY OF SMALL SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLY TY A (SQ FT)
Orange	EG20-9	WORK ZONE	36" x 24"	Type C	6
Orange	G20-9	WORK ZONE	24" x 18"	Type C	3
White	ER2-1	SPEED LIMIT	36" x 48"	Type A	12
White	ER2-5a	REDUCED SPEED AHEAD	36" x 48"	Type A	12
Orange	CW21-1T	GIVE US A BRAKE	48" x 48"	Type C	16

SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

PLYWOOD SIGN BLANKS	D-9-7100
FLAT SURFACE REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE)	D-9-8300
FLAT SURFACE REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

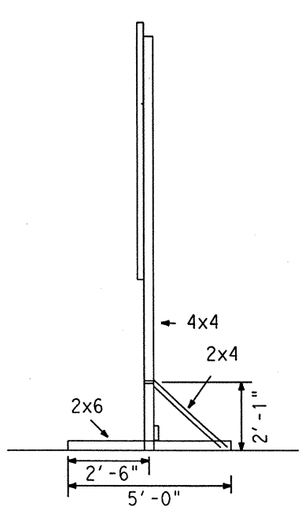
1. See BC sheets for additional sign support details.
2. The WORK ZONE (EG20-9) sign is to be installed in combination with a SPEED LIMIT (ER2-1) sign or REDUCED SPEED AHEAD (ER2-5a) sign.
3. Signs shall be placed at the minimum advance distances listed below:

MINIMUM ADVANCE DISTANCE

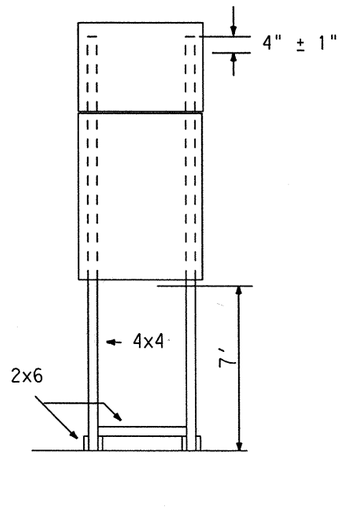
SIGNS	DIVIDED HIGHWAY	UNDIVIDED HIGHWAY	FROM
WORK ZONE SPEED LIMIT	1100'	800'	active work area
WORK ZONE REDUCED SPEED AHEAD	1600'	1000'	WORK ZONE SPEED LIMIT sign(s)

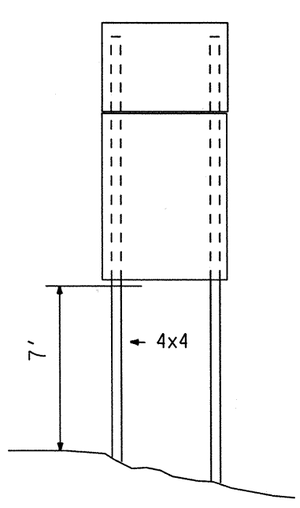
4. The WORK ZONE REDUCED SPEED AHEAD and WORK ZONE SPEED LIMIT signs should only be visible to motorists when workers are actually present in the work area.
5. Speed limits shall be regulatory and approved by the Texas Transportation Commission.
6. EG20-9, G20-9, ER2-1, R2-1, ER2-5a, R2-5a and CW21-1T signs and sign supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."

FIXED SUPPORTS REQUIRED FOR ER2-1 AND ER2-5a

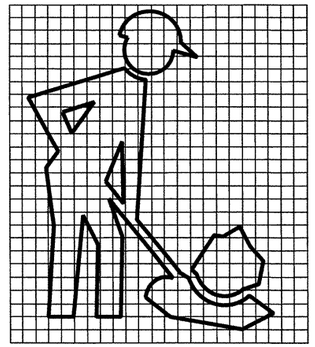


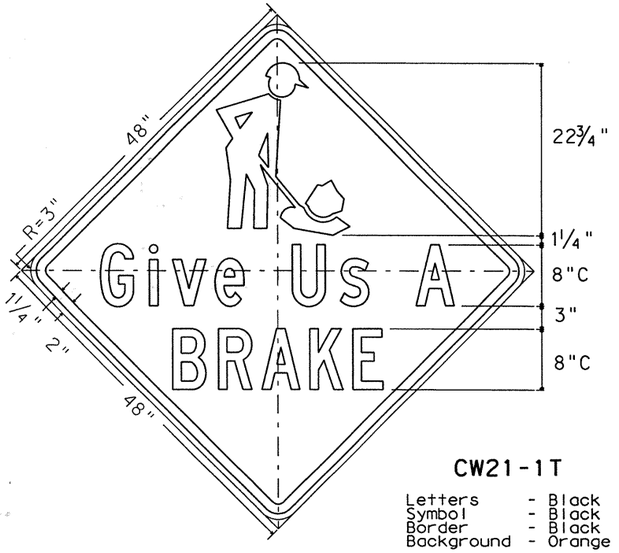
SKID MOUNT





GROUND MOUNT





CW21-1T

Letters - Black
Symbol - Black
Border - Black
Background - Orange Refl.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

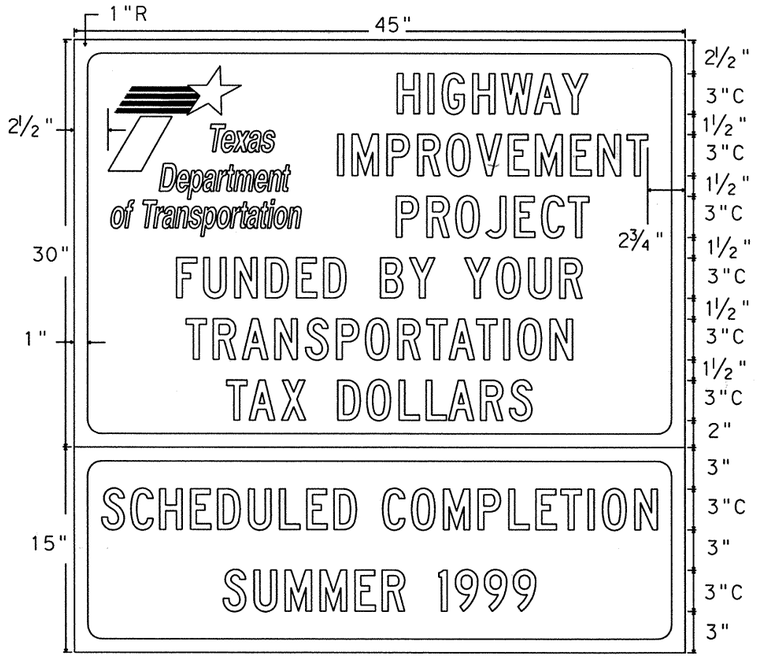
WORK ZONE "GIVE US A BRAKE" SIGNS

SHEET 2 OF 2 WZ(BRK-2)-98

DN: LR	CK:	DW: DN	CK:	MCG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
12-95	DAL	6	STP 99(413)MM	216
6-96	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
8-96	ROCKWALL		1014	03	033	FM740
5-98						

119B



SG20-8

45" x 30" sign
TxDOT logo - standard red & blue (auto decal)
Background - white
Legend & border - blue

45" x 15" plaque
Background - blue
Legend & border - white

The TxDOT logo is a registered trademark of the Texas Department of Transportation.

SIGN AND SUPPORTS SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS AND TRAFFIC HANDLING."

SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

PLYWOOD SIGN BLANKS	D-9-7100
ALUMINUM SIGN BLANKS	D-9-7110
REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE)	D-9-8300
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
SIGN HARDWARE	D-9-7120

COLOR	USAGE	REFLECTIVE SHEETING OR OTHER MATERIAL
BLUE	BACKGROUND	TYPE C (HIGH SPECIFIC INTENSITY)
WHITE	BACKGROUND	TYPE A (ENGINEER GRADE)
BLUE	LEGEND & BORDER	TYPE C (HIGH SPECIFIC INTENSITY)
WHITE	LEGEND & BORDER	TYPE A (ENGINEER GRADE)

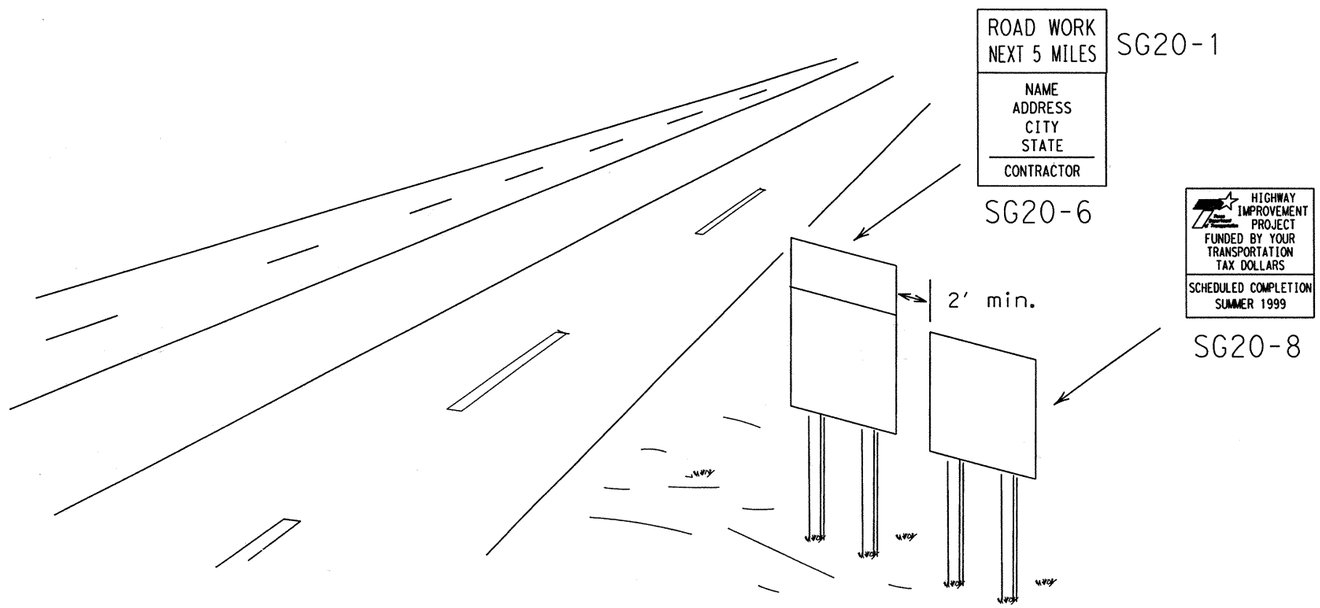
GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend and border may be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting (Type A).

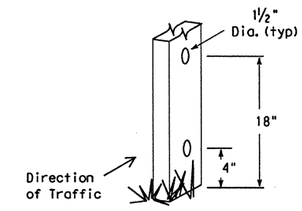
Sign blanks for roadside mounted guide signs shall be 5/8 inch thick plywood (Type A) or extruded aluminum, unless otherwise noted elsewhere in the plans. Dimensions shown for borders and corner radii are nominal. Borders may vary in width as much as 1/2 inch. Borders and corner radii must be of matching widths. The sign area outside the corner radius need not be trimmed or rounded. Panels attached below the parent sign shall be made of the same material as the parent sign, or as specified on the sign tabulation sheet.

Mounting details are shown on Standard Plan Sheets SMD series.



WOOD POST SYSTEM FOR FIXED SIGN SUPPORTS

Nominal Post Size	No. of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	no
4 x 4	2	21	36"	no
4 x 6	1	21	36	YES



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SPECIAL PUBLIC INFORMATION SIGN

WZ(SPIS)-98A

DN: MT	CK: DTN	DW: DN	CK: DM	MSG NO.:

REVISIONS
4-98
5-98

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DAL	6	STP 99(413)MM	217

COUNTY	CONTROL	SECTION	JOB	HIGHWAY
ROCKWALL	1014	03	033	FM740

119C

GENERAL NOTES

1. Additional details may be provided in the plans concerning sign size, type of channelization devices, sequence of work details, and required measures needed to control traffic during changes in the sequence of work.
2. All traffic control devices shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways" (TMUTCD), and shall be maintained as directed by the Engineer. Additional guidelines for traffic control devices may be found in the TMUTCD.
3. All distance and spacing shown on the TCP Standards are approximate.
4. All traffic control devices used during nighttime shall be reflectorized, illuminated from within or externally illuminated.
5. Additional information for fabrication, erection and usage of the following traffic control devices is found in the (TMUTCD) and Barricade and Construction (BC) Standards:

BARRICADES	BC(2) and BC(3)
CONES	BC(6)
BARRIER DELINEATION	WZ(BD)
DRUMS	BC(5)
PAVEMENT MARKINGS	BC(5), BC(7) and BC(8) WZ(STPM) or TCP(7-1) if applicable
SIGNS	BC(1), BC(2), BC(3), BC(4), BC(9), BC(9A), BC(9B) and BC(9C)

6. Work area operations are defined as follows:
Long-term stationary - Work that occupies a location more than 3 days.
Intermediate-term stationary - Work that occupies a location overnight to 3 days.
Short-term stationary - Daytime work that occupies a location from 1 to 12 hours.
Short Duration - Work that occupies a location up to 1 hour.
Mobile - Work that moves intermittently or continuously.

SIGNS

1. Selection of sign size should be based on Table 1.
2. Flashing warning lights, channelizing devices and/or flags may be required to call attention to the advance warning signs.
3. The words UTILITY, SIGNAL, BRIDGE, LIGHTING, SIGN, STREET or RAMP may be substituted for ROAD in all signs where applicable.
4. Advisory speed plaques, if used in conjunction with warning signs, speeds shall be determined in the field by the Engineer.
5. Regulatory signs shall be mounted at 7 foot minimum mounting height.
6. Warning signs may be mounted on the approved types of supports at the minimum mounting heights as stated on BC(4):

CHANNELIZING DEVICES

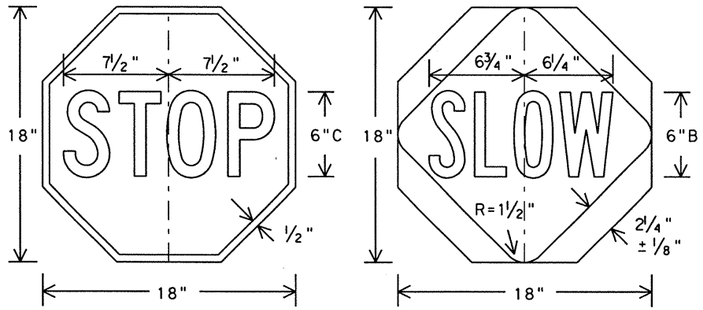
1. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit (S).
2. For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 10 feet is recommended. The 10 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
3. Channelizing device spacing should be reduced when placed on curves, hills or next to potential hazards. At least three channelizing devices should be in view at all times.
4. MERGING taper (lane closure with merging traffic) =L
SHIFTING taper (traffic diverted to adjacent lane) =1/2 L
SHOULDER taper (shoulder closed to traffic) =1/3 L
5. DOWNSTREAM taper usage is optional. When used it should be 100 foot minimum length per lane. Devices should be spaced at approximately 20 foot intervals.
6. ONE LANE, TWO-WAY taper is intended for a portion of the road controlled by STOP, YIELD traffic signals or flagger and used alternately by traffic in each direction. It should be 50-100 foot length with devices spaced at approximately 20 foot intervals.
7. Arrow panels used on two-way, two-lane roadways should flash in the four corner CAUTION display.

WORKER SAFETY

1. Workers exposed to traffic should wear orange safety vests.
2. Work vehicles within 30 feet of the traveled way should have strobe lights or rotating beacons in use.
3. When work vehicles are used to shadow the work area, the vehicle should be parked 30 feet or more from the work area, transmission in gear (or set in PARK), emergency brake set on, and front wheels turned away from work area. Shadow vehicles shall be equipped with truck mounted atteauators.
4. Inactive work vehicles, including workers' private vehicles, should be parked away from the work area and as close to the right-of-way line as possible.

FLAGGER CONTROL

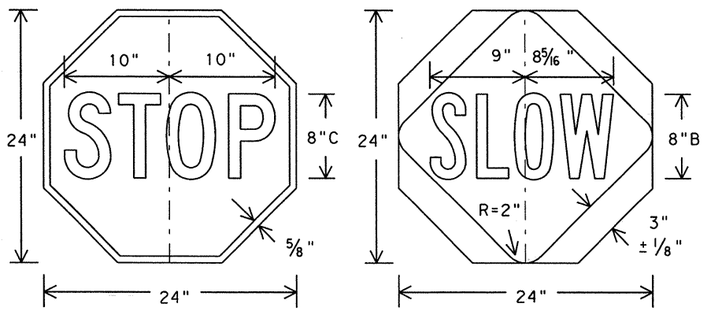
1. Flagger shall wear orange safety vests. Flaggers should wear saftey hats to provide a professional image to the motorist and to protect the head from flying objects.
2. STOP/SLOW paddles shall be used as the primary method to control traffic by flaggers. The STOP/SLOW paddle minimum size is 18" x 18". Paddles may be attached to a 60 inch staff for easier handling. The larger size (24" x 24") should be attached to a 60 inch staff.
3. The 24" paddle should be used when the posted speed is 45 MPH or greater.
4. Flags are only used to control traffic for emergency situations and the STOP/SLOW paddles are not available. Flags shall be 24" square and securely fastened to a staff approximately 3 feet long.
5. Flaggers may carry hand held air horns to alert workers of an emergency condition.
6. For one lane two-way traffic control, one or more flaggers should be used where traffic density, road conditions or motorists' sight distance justify their use. If flaggers are used, the taper should be reduced to 50-100 feet. When flaggers are used to control traffic, the FLAGGER symbol sign (FCW20-7a) shall be used. When flaggers are used, the BE PREPARED TO STOP sign (CW20-7b) should be used. Proper spacing between signs should be maintained.
7. When flaggers are used to draw attention to traffic control devices, the FLAGGER symbol sign should be used. Proper spacing should be maintained.
8. When more than one flagger is used, a chief flagger should be assigned the responsibility of making decisions concerning traffic control.
9. The contractor has the option to use a flashing Stop/Slow Paddle conforming to Departmental Materials Specification D-9-8620.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

18" STOP-SLOW PADDLE



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

24" STOP-SLOW PADDLE

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Table I

TYPICAL CONSTRUCTION WARNING SIGN SIZE ^{1,5,6} AND SPACING

Roadway Classi-fication	Posted Speed	Sign ▲ Spacing "X"	Long-term Stationary Or Intermediate-term Stationary Approach Warning Signs CW20 Series And CW22-1 Sign		Short-term Stationary Or Short Duration Approach Warning Signs CW21 Series		Other Warning Signs
	MPH	Ft. (Apprx.)	Standard Inches	Minimum^{4} Inches	Standard Inches^{7}	Minimum^{4} Inches^{7}	Standard Inches^{7}
Conven.	30	120	48X48	36X36	30X30 or 36x36	24X24 or 30x30	30X30 or 36x36
	35	160					
	40	240		↓		↓	
	45	320		Use Standard Size		Use Standard Size	
	50	400					
	55	500^{2}			↓		↓
	60	600^{2}			48x48		48x48
	65	700^{2}					
↓	70	800^{2}			↓		↓
Exp or Frwy	*	* ^{3}	↓		**	**	**

* For typical sign spacings on expressways and freeways, see TMUTCD typical appilcation diagrams or TCP Standard Sheets.

▲ Minimum distance from work area to 1st Advance Warning sign and/or distance between each additional sign.

** Smaller sign sizes may be used where sign designs have not been included in the "Standard Highway Sign Design for Texas" manual.

General Notes:

1. Special or larger size signs may be used as may be necessary.
2. Distance between signs should be increased as required to have 1500' advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. For use only on secondary roads or city streets where speeds are low.
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
7. Where two sizes are listed, see sign size listing in TMUTCD, Appendix A for proper size.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

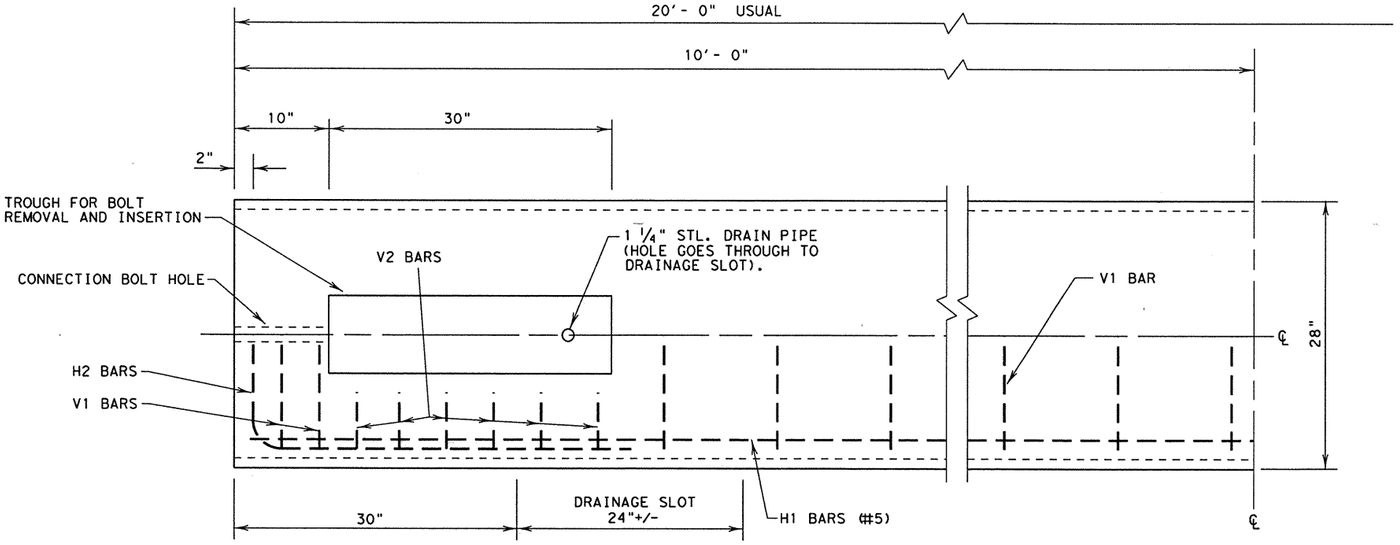
TRAFFIC CONTROL PLAN

TCP NOTES-98

© TxDOT Feburary 1994	DN: - MT	CK: -	DW: - DN	CK: - DM	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
8-95 1-97 4-98	DAL	6	STP 99(413)MM			2/9
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

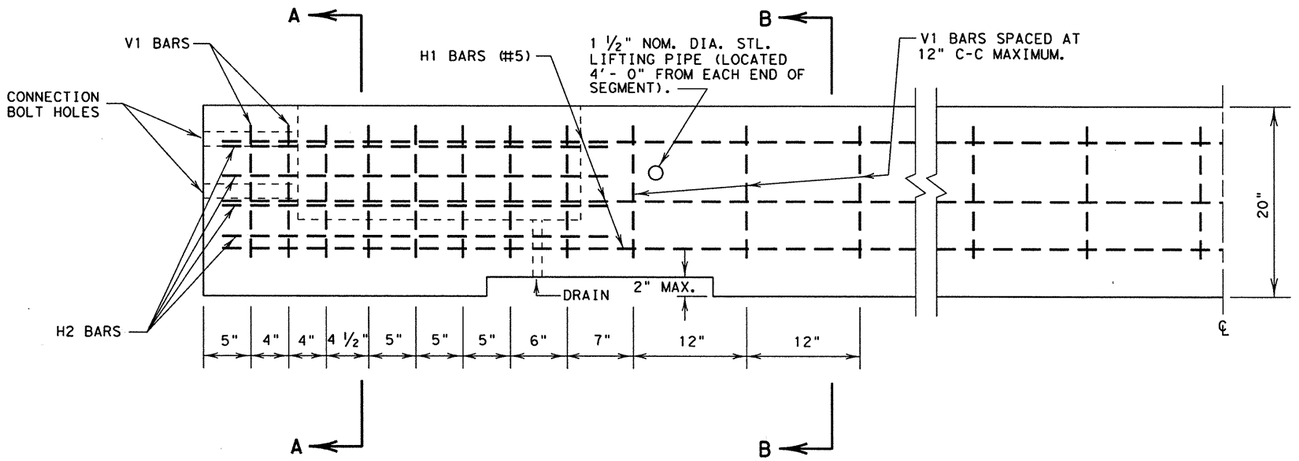
DATE:
ACC:
FILE:
DN:
CK:
DW:
CK:



NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

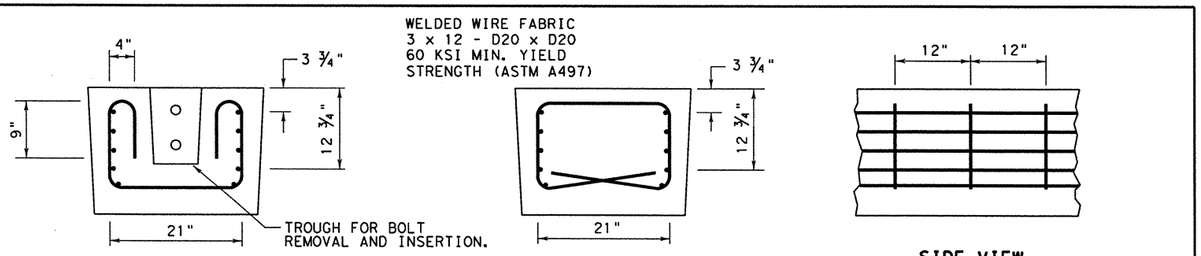
PLAN VIEW - TYPE 1

(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION - TYPE 1

(SYMMETRICAL ABOUT CENTER LINES)



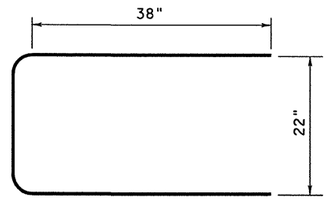
SECTION A-A

SECTION B-B

SIDE VIEW

NOTE: THIS FABRIC OPTION CAN BE USED IN PLACE OF V1, V2 AND H1 BARS. THE H2 BARS SPECIFIED ARE STILL REQUIRED.

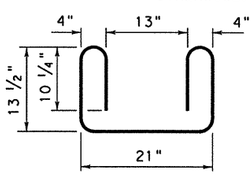
WELDED WIRE FABRIC OPTIONAL REINFORCING



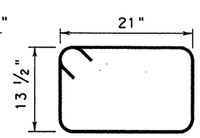
H2 BAR (#5)

(GRADE 60 MIN.)

NOTE: H2 REBAR IS TO BE BENT AT A 3" RADIUS.



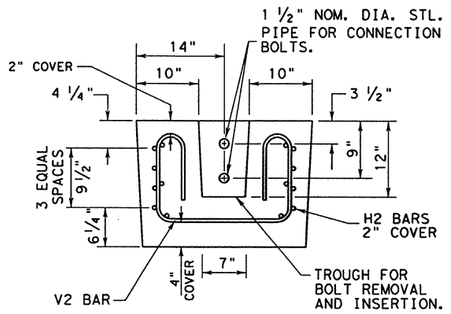
V2 BAR (#4)



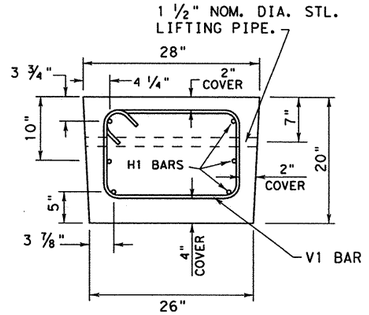
V1 BAR (#4)

NOTE: ALL BENDING OF SHEAR REBAR IS AT A 2" RADIUS, UNLESS SPECIFIED OTHERWISE.

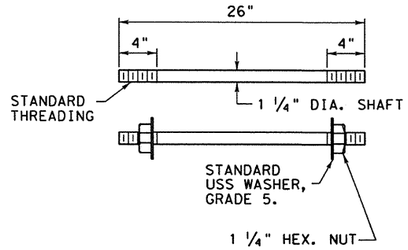
REINFORCING STEEL DETAILS



SECTION A-A



SECTION B-B



CONNECTION BOLT

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES	20 FT. SECTION	
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000

GENERAL NOTES

1. BARRIER LENGTH SHALL BE 20 FEET (+/- 1 INCH) UNLESS OTHERWISE SPECIFIED IN THE PLANS.
2. ALL CONCRETE, REINFORCEMENT, ANCHOR BOLTS, BLOCKING, ETC., AS SHOWN ARE CONSIDERED AS PART OF THE BARRIER FOR PAYMENT.
3. ALL CONCRETE SHALL BE CLASS A, C, OR H, UNLESS OTHERWISE SPECIFIED.
4. ALL REINFORCING STEEL SHALL BE GRADE 40, UNLESS OTHERWISE SPECIFIED.
5. CHAMFER ALL EDGES 3/4 INCH, AS DIRECTED BY THE ENGINEER.
6. STEEL PIPE SHALL BE HOT DIP GALVANIZED IN CONFORMANCE TO ASTM DESIGNATION A123. BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED TO ASTM DESIGNATION A153.
7. BOLTS SHALL CONFORM TO ASTM A36. NUTS SHALL CONFORM TO A307 REQUIREMENTS AND SHALL BE TAPPED OR CHASED AFTER GALVANIZING. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES.
8. THE BARRIER SHOULD BE LIGHT IN COLOR AND SHOULD BE SUPPLEMENTED BY DELINEATION AS DETAILED ELSEWHERE IN THE PLANS.

TEXAS DEPARTMENT OF TRANSPORTATION

LOW PROFILE CONCRETE BARRIER

(PORTABLE AND PRECAST)

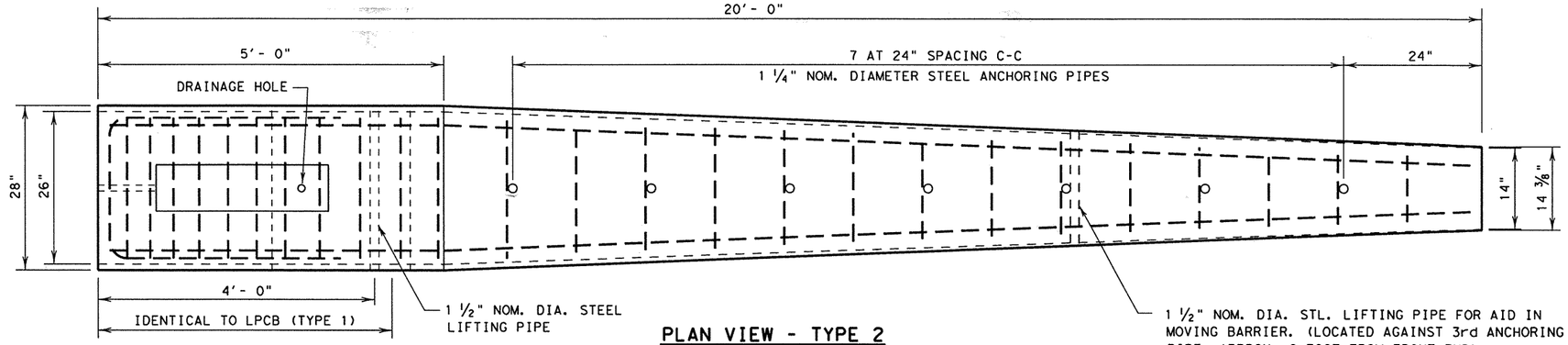
LPCB(1)-92

SHEET 1 OF 2

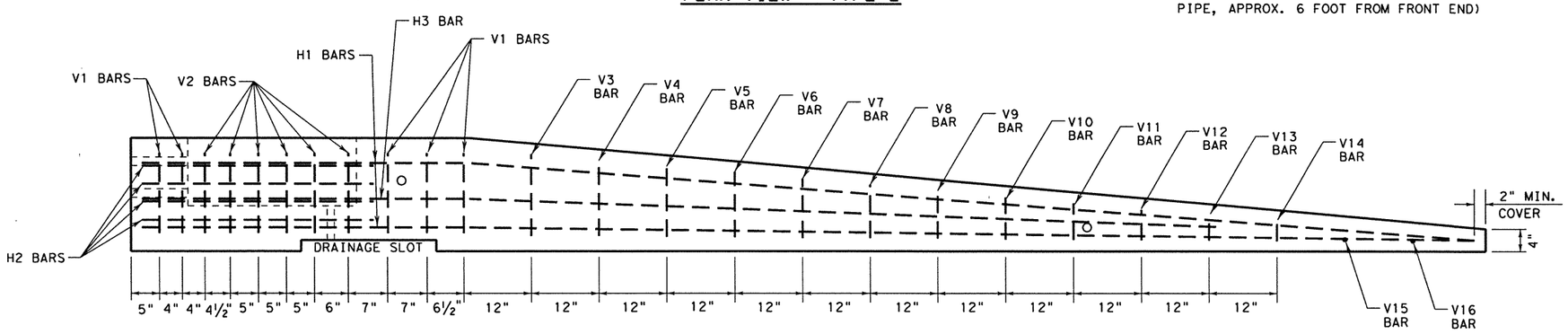
MODIFICATIONS

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
6	TEXAS	STP 99(413)MM			220
STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
DAL	ROCKWALL	1014	03	033	FM740

HIGHWAY DESIGN DIVISION (D-8)



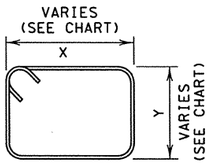
PLAN VIEW - TYPE 2



NOTE: ANCHORING PIPES NOT SHOWN

ELEVATION - TYPE 2

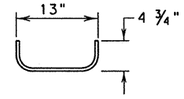
NOTE: ANCHORING PIPES NOT SHOWN IN ELEVATION.



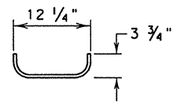
V 3-11 BARS (#4)

BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 1/4	14 1/2
V4 BAR	19 1/2	13 1/2
V5 BAR	18 1/2	12 1/4
V6 BAR	17 1/2	11 1/4
V7 BAR	17	10 1/4
V8 BAR	16 1/4	9
V9 BAR	15 1/2	8
V10 BAR	14 1/2	7
V11 BAR	13 3/4	6

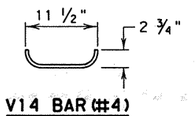
NOTE: ALL BENDING OF SHEAR REBAR IS AT A 2" RADIUS, UNLESS SPECIFIED OTHERWISE.



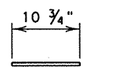
V12 BAR (#4)



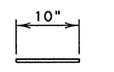
V13 BAR (#4)



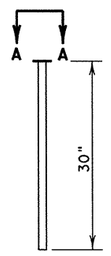
V14 BAR (#4)



V15 BAR (#4)

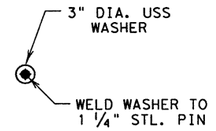


V16 BAR (#4)



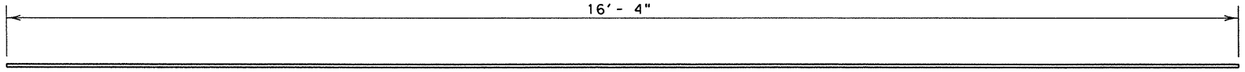
ANCHORING PIN

(1 1/4"DIA., A36 STL.)



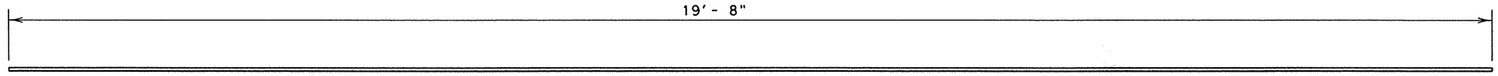
A-A

(HEAD OF ANCHORING PIN)



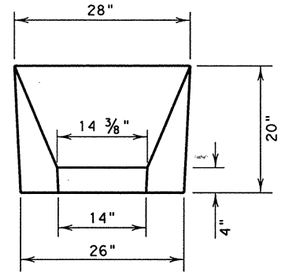
H3 BARS (#5)

(GRADE 60)



H1 BARS (#5)

(GRADE 60)



APPROACH VIEW

GENERAL NOTES

1. TYPE 2 BARRIER SHALL BE USED AS AN END TREATMENT FOR TYPE 1 BARRIER WHEN APPROPRIATE.
2. THE ANCHORAGE PINS ARE ALL THE SAME LENGTH AND ARE INTENDED TO BE DRIVEN FLUSH WITH THE TOP OF THE BARRIER SURFACE.
3. THE BENDS IN THE H3 AND H1 BARS ARE SLIGHT, NO FORMAL BEND IS NECESSARY.
4. TYPE 2 BARRIER MUST BE LIFTED FROM REAR FIRST TO PREVENT CRACKING OF SLOPED SECTION.
5. SEE SHEET 1 OF 2 FOR ADDITIONAL INFORMATION.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES		20 FT. SECTION
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

TEXAS DEPARTMENT OF TRANSPORTATION

LOW PROFILE CONCRETE BARRIER

(PORTABLE AND PRECAST)

LPCB(2)-92

SHEET 2 OF 2

MODIFICATIONS

FED. RD. DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
6	TEXAS	STP 99(413)MM	221

STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
DAL	ROCKWALL	1014	03	033	240

HIGHWAY DESIGN DIVISION (D-8)

BILLS OF REINFORCING STEEL FOR 44'-0" CLEAR WIDTH

	CULVERT SIZE		TYPE SECTION	DIMENSIONS		MAX. FILL	TOTAL QUANTITIES 44' CLEAR WIDTH		QUANTITIES P.L.F. OF BARREL		BARS A IN TOP SLAB					BARS B IN BOTTOM SLAB					BARS C WALLS AND TOP CORNER						BARS D IN BOTTOM CORNERS						62-#4 BARS E @ 18" C. to C.		#4 BARS F Length = 45'-1"								BARS H 4-#4		#4 BARS K @12"± 3'-11" Lg.		#4 BARS M IN TOP SLAB						#4 BARS N IN BOTTOM SLAB				
	S	H		T	U		Conc.	Reinf.	Conc.	Reinf.	No.	Size	Spac.	Length	Weight	No.	Size	Spac.	Length	Weight	No.	Size	Spac.	Length	Weight	Dim. "X"	No.	Size	Spac.	Length	Weight	Dim. "X"	Length	Weight	F1	Spac.	F2	Spac.	F3	Spac.	Total	Weight	Length	Weight	No.	Weight	No.	Spac.	Length	Weight	"X"	"Y"	No.	Spac.	Length	Weight	"X"
SC-NA	3 ×	2	1	6"	6"	14'	10.27	1,259	0.222	26.92	78	#4	7"	3'-8"	191																				7	12"±	3	20½"	4	10"	14	421	3'-9"	10	10	26	61	9"	8'-4"	339	3'-8"	2'-4"	61	9"	6'-8"	272	3'-8"
		3	1	6"	6"	14'	11.95	1,341	0.259	28.70	78	#4	7"	3'-8"	191																				7	12"±	3	20½"	4	14"	14	421	3'-9"	10	10	26	61	9"	10'-4"	421	3'-8"	3'-4"	61	9"	6'-8"	272	3'-8"
	4 ×	2	1	6"	6"	12'	12.00	1,726	0.259	37.06	91	#4	6"	4'-8"	284																				9	12"±	4	18"±	4	10"	17	512	4'-9"	13	12	31	78	7"	9'-4"	486	4'-8"	2'-4"	78	7"	7'-8"	400	4'-8"
		3	1	6"	6"	12'	13.68	1,830	0.296	39.35	91	#4	6"	4'-8"	284																				9	12"±	4	18"±	4	14"	17	512	4'-9"	13	12	31	78	7"	11'-4"	590	4'-8"	3'-4"	78	7"	7'-8"	400	4'-8"
		4	1	6"	6"	12'	15.36	1,995	0.333	42.98	91	#4	6"	4'-8"	284																				9	12"±	4	18"±	6	15"	19	572	4'-9"	13	12	31	78	7"	13'-4"	695	4'-8"	4'-4"	78	7"	7'-8"	400	4'-8"
	5 ×	2	2	6"	6"	8'	13.73	2,086	0.296	44.87	68	#5	8"	5'-8"	402	58	#4	9½"	5'-8"	220	136	#4	8"	4'-10"	439	2'-4"	136	#4	8"	4'-1"	371	1'-7"			9	12"±	7	18"±	4	10"	20	602	5'-9"	15	14	37											
		3	2	6"	6"	8'	15.41	2,177	0.333	46.87	68	#5	8"	5'-8"	402	58	#4	9½"	5'-8"	220	136	#4	8"	5'-10"	530	3'-4"	136	#4	8"	4'-1"	371	1'-7"			9	12"±	7	18"±	4	14"	20	602	5'-9"	15	14	37											
		4	2	6"	6"	8'	17.09	2,328	0.370	50.21	68	#5	8"	5'-8"	402	58	#4	9½"	5'-8"	220	136	#4	8"	6'-10"	620	4'-4"	136	#4	8"	4'-1"	371	1'-7"			9	12"±	7	18"±	6	15"	22	663	5'-9"	15	14	37											
		5	3	6"	7"	8'	20.45	2,942	0.444	63.66	68	#5	8"	5'-10"	413	58	#4	9½"	5'-10"	226	136	#4	8"	7'-10"	711	5'-4"	136	#4	8"	4'-1"	371	1'-7"	4'-11"	204	9	12"±	7	18"±	16	13"	32	964	5'-11"	16	14	37											
	6 ×	3	2	6"	6"	8'	17.14	2,726	0.370	58.70	78	#5	7"	6'-8"	543	78	#4	7"	6'-8"	347	168	#4	6½"	5'-10"	655	3'-4"	168	#4	6½"	4'-1"	458	1'-7"			10	12"±	8	18"±	4	14"	22	663	6'-9"	18	16	42											
		4	2	6"	6"	8'	18.81	2,898	0.407	62.50	78	#5	7"	6'-8"	543	78	#4	7"	6'-8"	347	168	#4	6½"	6'-10"	767	4'-4"	168	#4	6½"	4'-1"	458	1'-7"			10	12"±	8	18"±	6	15"	24	723	6'-9"	18	16	42											
		5	3	6"	7"	8'	22.13	3,538	0.481	76.53	78	#5	7"	6'-10"	556	78	#4	7"	6'-10"	356	168	#4	6½"	7'-10"	880	5'-4"	168	#4	6½"	4'-1"	458	1'-7"	4'-11"	204	10	12"±	8	18"±	16	13"	34	1,024	6'-11"	18	16	42											
		6	3	6"	7"	8'	24.14	3,691	0.525	79.88	78	#5	7"	6'-10"	556	78	#4	7"	6'-10"	356	168	#4	6½"	8'-10"	992	6'-4"	168	#4	6½"	4'-1"	458	1'-7"	5'-11"	245	10	12"±	8	18"±	16	16"	34	1,024	6'-11"	18	16	42											
	7 ×	3	2	6½"	6"	6'	19.98	2,914	0.432	62.69	78	#5	7"	7'-8"	624	91	#4	6"	7'-8"	466	156	#4	7"	5'-10"	608	3'-4"	156	#4	7"	4'-1"	425	1'-7"			11	12"±	9	18"±	4	14"	24	723	7'-9"	21	18	47											
		4	2	6½"	6"	6'	21.66	3,078	0.469	66.32	78	#5	7"	7'-8"	624	91	#4	6"	7'-8"	466	156	#4	7"	6'-10"	712	4'-4"	156	#4	7"	4'-1"	425	1'-7"			11	12"±	9	18"±	6	15"	26	783	7'-9"	21	18	47											
		5	3	6½"	7"	6'	25.05	3,551	0.544	76.76	78	#5	7"	7'-10"	637	91	#4	6"	7'-10"	476	136	#4	8"	7'-10"	711	5'-4"	136	#4	8"	4'-1"	371	1'-7"	4'-11"	204	11	12"±	9	18"±	16	14"	36	1,084	7'-11"	21	18	47											
		6	3	6½"	7"	6'	27.01	3,683	0.587	79.65	78	#5	7"	7'-10"	637	91	#4	6"	7'-10"	476	136	#4	8"	8'-10"	802	6'-4"	136	#4	8"	4'-1"	371	1'-7"	5'-11"	245	11	12"±	9	18"±	16	16"	36	1,084	7'-11"	21	18	47											
		7	3	6½"	7"	6'	28.97	3,936	0.630	85.22	78	#5	7"	7'-10"	637	91	#4	6"	7'-10"	476	136	#4	8"	9'-10"	893	7'-4"	136	#4	8"	4'-1"	371	1'-7"	6'-11"	287	11	12"±	9	18"±	20	15"	40	1,204	7'-11"	21	18	47											
	8 ×	4	2	6½"	6"	6'	23.53	3,564	0.509	76.92	78	#5	7"	8'-8"	705	68	#5	8"	8'-8"	615	182	#4	6"	6'-10"	830	4'-4"	182	#4	6"	4'-1"	496	1'-7"			12	12"±	10	18"±	6	14"	28	843	8'-9"	23	20	52											
		5	3	6½"	7"	6'	26.92	4,216	0.584	91.22	78	#5	7"	8'-10"	718	68	#5	8"	8'-10"	626	182	#4	6"	7'-10"	952	5'-4"	182	#4	6"	4'-1"	496	1'-7"	4'-11"	204	12	12"±	10	18"±	16	14"	38	1144	8'-11"	24	20	52											
		6	3	6½"	7"	6'	28.88	4,379	0.627	94.78	78	#5	7"	8'-10"	718	68	#5	8"	8'-10"	626	182	#4	6"	8'-10"	1,074	6'-4"	182	#4	6"	4'-1"	496	1'-7"	5'-11"	245	12	12"±	10	18"±	16	16"	38	1144	8'-11"	24	20	52											
		7	3	6½"	7"	6'	30.84	4,663	0.670	101.02	78	#5	7"	8'-10"	718	68	#5	8"	8'-10"	626	182	#4	6"	9'-10"	1,195	7'-4"	182	#4	6"	4'-1"	496	1'-7"	6'-11"	287	12	12"±	10	18"±	20	15"	42	1265	8'-11"	24	20	52											
		8	3	6½"	8"	6'	35.35	5,011	0.770	108.74	78	#5	7"	9'-0"	732	68	#5	8"	9'-0"	638	198	#4	5½"	10'-10"	1,432	8'-4"	198	#4	5½"	4'-1"	540	1'-7"	7'-11"	328	12	12"±	10	18"±	20	17"	42	1265	9'-1"	24	20	52											
	9 ×	5	3	7"	7"	6'	30.21	5,028	0.655	108.99	64	#6	8½"	9'-10"	945	84	#5	6½"	9'-10"	861	128	#5	8½"	8'-3"	1,101	5'-5"	128	#5	8½"	4'-11"	657	2'-1"	4'-11"	204	13	12"±	10	18"±	16	14"	39	1175	9'-11"	27	22	58											
		6	3	7"	7"	6'	32.17	5,203	0.699	112.83	64	#6	8½"	9'-10"	945	84	#5	6½"	9'-10"	861	128	#5	8½"	9'-3"	1,235	6'-5"	128	#5	8½"	4'-11"	657	2'-1"	5'-11"	245	13	12"±	10	18"±	16	16"	39	1175	9'-11"	27	22	58											
		7	3	7"	7"	6'	34.13	5,498	0.742	119.33	64	#6	8½"	9'-10"	945	84	#5	6½"	9'-10"	861	128	#5	8½"	10'-3"	1,368	7'-5"	128	#5	8½"	4'-11"	657	2'-1"	6'-11"	287	13	12"±	10	18"±	20	15"	43	1295	9'-11"	27	22	58											
		8	3	7"	8"	6'	38.66	5,949	0.842	128.47	61	#6	9"	10'-0"	916	61	#6	9"	10'-0"	916	122	#5	9"	11'-3"	1,432	8'-5"	122	#6	9"	5'-4"	977	2'-4"	7'-11"	328	13	12"±	10	18"±	20	17"	43	1295	10'-1"	27	22	58											
		9	3	7"	8"	6'	40.90	6,237	0.891	134.81	61	#6	9"	10'-0"	916	61	#6	9"	10'-0"	916	122	#5	9"	12'-3"	1,559	9'-5"	122	#6	9"	5'-4"	977	2'-4"	8'-11"	369	13	12"±	10	18"±	24	16½"	47	1415	10'-1"	27	22	58											
	10 ×	5	3	7"	7"	6'	32.22	5,886	0.699	127.67	68	#6	8"	10'-10"	1,106	68	#6	8"	10'-10"	1,106	156	#5	7"	8'-3"	1,342	5'-5"	156	#5	7"	4'-11"	801	2'-1"	4'-11"	204	14	12"±	11	18"±	16	14"	41	1235	10'-11"	29	24	63											
		6	3	7"	7"	6'	34.18	6,090	0.742	132.13	68	#6	8"	10'-10"	1,106	68	#6	8"	10'-10"	1,106	156	#5	7"	9'-3"	1,505	6'-5"	156	#5	7"	4'-11"	801	2'-1"	5'-11"	245	14	12"±	11	18"±	16	16"	41	1235	10'-11"	29	24	63											
		7	3	7"	7"	6'	36.14	6,415	0.785	139.27	68	#6	8"	10'-10"	1,106	68	#6	8"	10'-10"	1,106	156	#5	7"	10'-3"	1,668	7'-5"	156	#5	7"	4'-11"	801	2'-1"	6'-11"	287	14	12"±	11	18"±	20	15"	45	1355	10'-11"	29	24	63											
		8	3	7"	8"	6'	40.67	7,070	0.885	153.15	73	#6	7½"	11'-0"	1,206	73	#6	7½"	11'-0"	1,206	146	#5	7½"	11'-3"	1,713	8'-5"	146	#6	7½"	5'-4"	1,169	2'-4"	7'-11"	328	14	12"±	11	18"±	20	17"	45	1355	11'-1"	30	24	63											
		9	3	7"	8"	6'	42.91	7,384	0.934	160.05	73	#6	7½"	11'-0"	1,206	73	#6	7½"	11'-0"	1,206	146	#5	7½"	12'-3"	1,865	9'-5"	146	#6	7½"	5'-4"	1,169	2'-4"	8'-11"	369	14	12"±	11	18"±	24	16½"	49	1476	11'-1"	30	24	63											
		10	3	7"	8"	6'	45.15	7,699	0.984	166.95	73	#6	7½"	11'-0"	1,206	73	#6	7½"	11'-0"	1,206	146	#5	7½"	13'-3"	2,018	10'-5"	146	#6	7½"	5'-4"	1,169	2'-4"	9'-11"	411	14	12"±	11	18"±	28	16	53	1596	11'-1"	30	24	63											
SC-NB	6 ×	3	2	6"	6"	10'	17.14	2,813	0.370	60.70	68	#5	8"	6'-8"	473	68	#5	8"	6'-8"	473	182	#4	6"	5'-10"	709	3'-4"	182	#4	6"	4'-1"	496	1'-7"			8	18"±	8	18"±	4	14"	20	602	6'-9"	18	16	42											
		4	2	6"	6"	10'	18.81	2,995	0.407	64.72	68	#5	8"	6'-8"	473	68	#5	8"	6'-8"	473	182	#4	6"	6'-10"	830	4'-4"	182	#4	6"	4'-1"	496	1'-7"			8	18"±	8	18"±	6	15"	22	663	6'-9"	18	16	42											
		5	3	6"	7"	10'	22.13	3,644	0.481	78.95	68	#5	8"	6'-10"	484	68	#5	8"	6'-10"	484	182	#4	6"	7'-10"	952	5'-4"	182	#4	6"	4'-1"	496	1'-7"	4'-11"	204	8	18"±	8	18"±	16	14"	32	964	6'-11"	18	16	42											
		6	3	6"	7"	10'	24.14	3,945	0.525	85.65	68	#5	8"	6'-10"	484	68	#5	8"	6'-10"	484	198	#4	5½"	8'-10"	1,168	6'-4"	198	#4	5½"	4'-1"	540	1'-7"	5'-11"	245	8	18"±	8	18"±	16	16"	32	964	6'-11"	18	16	42											
	7 ×	3	2	6½"	6"	8'	19.98	3,130	0.432	67.58	68	#5	8"	7'-8"	544	68	#5	8"	7'-8"	544	198	#4	5½"	5'-10"	771	3'-4"	198	#4	5½"	4'-1"	540	1'-7"			9	18"±	9	18"±	4	14"	22	663	7'-9"	21	18	47											
		4	2	6½"	6"	8'	21.66	3,103	0.469	66.94	68	#5	8"	7'-8"	544	68	#5	8"	7'-8"	544	168	#4	6½"	6'-10"	766	4'-4"	168	#4	6½"	4'-1"	458	1'-7"			9	18"±	9	18"±	6	14"	24	723	7'-9"	21	18	47											
		5	3	6½"	7"	8'	25.05	3,743	0.544	80.97	68	#5	8"	7'-10"	555	68	#5	8"	7'-10"	555	168	#4	6½"	7'-10"	879	5'-4"	168	#4	6½"	4'-1"	458	1'-7"	4'-11"	204	9	18"±	9	18"±	16	14"	34	1024	7'-11"	21	18	47											
		6	3	6½"	7"	8'	27.01	4,099	0.587	88.61	73	#5	7½"	7'-10"	596	73	#5	7½"	7'-10"	596	182	#4	6"	8'-10"	1,074	6'-4"	182	#4	6"	4'-1"	496	1'-7"	5'-11"	245	9	18"±	9	18"±	16	16"	34	1024	7'-11"	21	18	47											
		7	3	6½"	7"	8'	28.97	4,531	0.630	98.23	73	#5	7½"	7'-10"	596	73	#5	7½"	7'-10"	596	198	#4	5½"	9'-10"	1,300	7'-4"	198	#4	5½"	4'-1"	540	1'-7"	6'-11"	282	9	18"±	9	18"±	20	15"	38	1144	7'-11"	21	18	47											
	8 ×	4	2	7"	6"	8'	24.79	3,845	0.537	83.08	84	#5	6½"	8'-8"	760	84	#5	6½"	8'-8"	760	198	#4	5½"	6'-11"	915	4'-5"	198	#4	5½"	4'-2"	552	1'-8"			10	18"±	10	18"±	6	14½"	26	783	8'-9"	23	20	52											
		5	3	7"	7"	8'	28.20	4,382	0.612	94.74	84	#5	6½"	8'-10"	774	84	#5	6½"	8'-10"	774	182	#4	6"	7'-11"	963	5'-5"	182	#4	6"	4'-2"	507	1'-8"	4'-11"	204	10	18"±	10	18"±	16	14"	36	1,084	8'-11"	24	20	52											
		6	3	7"	7"	8'	30.16	4,544	0.655	98.30	84	#5	6½"	8'-10"	774	84	#5	6½"	8'-10"	774	182	#4	6"	8'-11"	1,084	6'-5"	182	#4	6"	4'-2"	507	1'-8"	5'-11"	245	10	18"±	10	18"±	16	16½"	36	1084	8'-11"	24	20	52											
		7	3	7"	7"	8'	32.12	4,980	0.699	107.96	84	#5	6½"	8'-10"	774	84	#5	6½"	8'-10"	774	198	#4	5½"	9'-11"	1,312	7'-5"	198	#4	5½"	4'-2"	552	1'-8"	6'-11"	287	10	18"±	10	18"±	20	16"	40	1205	8'-11"	24	20	52											
		8	3	7"	8"	8'	36.65	5,384	0.798	116.82	84	#5	6½"	9'-0"	789	84	#5	6½"	9'-0"	789	218	#4	5"	10'-11"	1,590	8'-5"	218	#4	5"	4'-2"	607	1'-8"	7'-11"	328	10	18"±	10	18"±	20	18"	40	1205	9'-1"	24	20	52											
	9 ×	5	3	7"	7"	8'	30.21	5,524	0.655	119.82	68	#6	8"	9'-10"	1,004	68	#6	8"	9'-10"	1,004	156	#5	7"	8'-3"	1,342	5'-5"	156	#5	7"	4'-11"	801	2'-1"	4'-11"	204	10	18"±	10	18"±	16	14"	36	1084	9'-11"	27	22	58											
		6	3	7"	7"	8'	32.17	5,728	0.699	124.29	68	#6	8"	9'-10"	1,004	68	#6	8"	9'-10"	1,004	156	#5	7"	9'-3"	1,505	6'-5"	156	#5	7"	4'-11"	801	2'-1"	5'-11"	245	10	18"±	10	18"±	16	16½"	36	1084	9'-11"	27	22	58											
		7	3	7"	7"	8'	34.13	6,054	0.742	131.42	68	#6	8"	9'-10"	1,004	68	#6	8"	9'-10"	1,004	156	#5	7"	10'-3"	1,668	7'-5"	156	#5	7"	4'-11"	801	2'-1"	6'-11"	287	10	18"±	10	18"±	20	16"	40	1205	9'-11"	27	22	58											
		8	3	7"	8"	8'	38.66	6,493	0.842	141.10	68	#6	8"	10'-0"	1,021	68	#6	8"	10'-0"	1,021	168	#5	6½"	11'-3"	1,971	8'-5"	168	#5	6½"	4'-11"	862	2'-1"	7'-11"	328	10	18"±	10	18"±	20	18"	40	1205	10'-1"	27	22	58											
		9	3	7"	8"	8'	40.90	6,829	0.891	148.52	68	#6	8"	10'-0"	1,021	68	#6	8"	10'-0"	1,021	168	#5	6½"	12'-3"	2,146	9'-5"	168	#5	6½"	4'-11"	862	2'-1"	8'-11"	369	10	18"±	10	18"±	24	17"	44	1325	10'-1"	27	22	58											
	10 ×	5	3	8"	7"	8'	35.35	6,150	0.768	133.15	73	#6	7½"	10'-10"	1,187	73	#6	7½"	10'-10"	1,187	168	#5	6½"	8'-4"	1,460	5'-6"	168	#5	6½"	5'-0"	876	2'-2"	4'-11"	204	11	18"±	11	18"±	16	14"	38	1144	10'-11"	29	24	63											
		6	3	8"	7"	8'	37.30	6,530	0.811	141.61	78	#6	7"	10'-10"	1,269	78	#6	7"	10'-10"	1,269	168	#5	6½"	9'-4"	1,635	6'-6"	168	#5	6½"	5'-0"	876	2'-2"	5'-11"	245	11	18"±	11	18"±	16	16½"	38	1144	10'-11"	29	24	63											
		7	3	8"	7"	8'	39.26	6,868	0.854	149.03	78	#6	7"	10'-10"	1,269	78	#6	7"	10'-10"	1,269	168	#5	6½"	10'-4"	1,810	7'-6"	168	#5	6½"	5'-0"	876	2'-2"	6'-11"	287	11	18"±	11	18"±	20	16"	42	1265	10'-11"	29	24	63											
		8	3	8"	8"	8'	43.84	7,364	0.955	159.89	78	#6	7"	11'-0"	1,289	78	#6	7"	11'-0"	1,289	182	#5	6"	11'-4"	2,151	8'-6"	182	#5	6"	5'-0"	949	2'-2"	7'-11"	328	11	18"±	11	18"±	20	18"	42	1265	11'-1"	30	24	63											
		9	3	8"	8"	8'	46.08	7,715	1.004	167.62	78	#6	7"	11'-0"	1,289	78	#6	7"	11'-0"	1,289	182	#5	6"	12'-4"	2,341	9'-6"	182	#5	6"	5'-0"	949	2'-2"	8'-11"	369	11	18"±	11	18"±	24	17"	46	1385	11'-1"	30	24	63											
		10	3	8"	8"	8'	48.32	8,572	1.054	186.66	84	#6	6½"	11'-0"	1,388	84	#6	6½"	11'-0"	1,388	198	#5	5½"	13'-4"	2,753	10'-6"	198	#5	5½"	5'-0"	1,033	2'-2"	9'-11"	411	11	18"±	11	18"±	28	16"	50	1506	11'-1"	30	24	63											
SC-NC	7 ×	3	2	6½"	6"	10'	19.98	3,655	0.432	78.84	78	#5	7"	7'-8"	624	78	#5	7"	7'-8"	624	146	#5	7½"	6'-2"	940	3'-4"	146	#5	7½"	4'-10"	736	2'-0"			9	18"±	9	18"±	4	14"	22	663	7'-9"	21	18	47											
		4	2	6½"	6"	10'	21.66	3,837	0.469	83.12	84	#5	6½"	7'-8"	672	84	#5	6½"	7'-8"	672	136	#5	8"	7'-2"	1,017	4'-4"	136	#5	8"	4'-10"	685	2'-0"			9	18"±	9	18"±	6	14"	24	723	7'-9"	21	18	47											
		5	3	6½"	7"	10'	25.05	4,512	0.544	97.92	84	#5	6½"	7'-10"	686	84	#5	6½"	7'-10"	686	136	#5	8"	8'-2"	1,159	5'-4"	136	#5	8"	4'-10"	685	2'-0"	4'-11"	204	9	18"±	9	18"±	16	14"	34	1024	7'-11"	21	18	47											
		6	3	6½"	7"	10'	27.01	4,695	0.587	101.94	84	#5	6½"	7'-10"	686	84	#5	6½"	7'-10"	686	136	#5	8"	9'-2"	1,301	6'-4"	136	#5	8"	4'-10"	685	2'-0"	5'-11"	245	9	18"±	9	18"±	16	16"	34	1024	7'-11"	21	18	47											
		7	3	6½"	7"	10'	28.97	5,156	0.630	111.76	84	#5	6½"	7'-10"	686	84	#5	6½"	7'-10"	686	146	#5	7½"	10'-2"	1,549	7'-4"	146	#5	7½"	4'-10"	736	2'-0"	6'-11"	287	9	18"±	9	18"±	20	15"	38	1144	7'-11"	21	18	47											
	8 ×	4	2	7½"	6"	10'	26.05	4,483	0.565	97.05	68	#6	8"	8'-8"	886	68	#6	8"	8'-8"	886	146	#5	7½"	7'-3"	1,104	4'-5"	146	#5	7½"	4'-11"	749	2'-1"			10	18"±	10	18"±	6	14½"	26	783	8'-9"	23	20	52											
		5	3	7½"	7"	10'	29.49	5,036	0.640	109.43	68	#6	8"	8'-10"	902	68	#6	8"	8'-10"	902	136	#5	8"	8'-3"	1,170	5'-5"	136	#5	8"	4'-11"	698	2'-1"	4'-11"	204	10	18"±	10	18"±	16	14"	36	1084	8'-11"	24	20	52											
		6	3	7½"	7"	10'	31.44	5,219	0.684	113.45	68	#6	8"	8'-10"	902	68	#6	8"	8'-10"	902	136	#5	8"	9'-3"	1,312	6'-5"	136	#5	8"	4'-11"	698	2'-1"	5'-11"	245	10	18"±	10	18"±	16	16½"	36	1084	8'-11"	24	20	52											
		7	3	7½"	7"	10'	33.40	5,682	0.727	123.30	68	#6	8"	8'-10"	902	68	#6	8"	8'-10"	902	146	#5	7½"	10'-3"	1,561	7'-5"	146	#5	7½"	4'-11"	749	2'-1"	6'-11"	287	10	18"±	10	18"±	20	16"	40	1205	8'-11"	24	20	52											
		8	3	7½"	8"	10'	37.96	6,078	0.827	132.15	68	#6	8"	9'-0"	919	68	#6	8"	9'-0"	919	156	#5	7"	11'-3"	1,830	8'-5"	156	#5	7"	4'-11"	801	2'-1"	7'-11"	328	10	18"±	10	18"±	20	18"	40	1205	9'-1"	24	20	52											
	9 ×	5	3	8"	7"	10'	33.06	6,013	0.718	130.39	78	#6	7"	9'-10"	1,152	78	#6	7"	9'-10"	1,152	168	#5	6½"	8'-4"	1,460	5'-6"	168	#5	6½"	5'-0"	876	2'-2"	4'-11"	204	10	18"±	10	18"±	16	14"	36	1084	9'-11"	27	22	58											
		6	3	8"	7"	10'	35.02	6,229	0.761	135.13	78	#6	7"	9'-10"	1,152	78	#6	7"	9'-10"	1,152	168	#5	6½"	9'-4"	1,635	6'-6"	168	#5	6½"	5'-0"	876	2'-2"	5'-11"	245	10	18"±	10	18"±	16	16½"	36	1084	9'-11"	27	22	58											
		7	3	8"	7"	10'	36.97	6,743	0.805	146.43	84	#6	6½"	9'-10"	1,240	84	#6	6½"	9'-10"	1,240	168	#5	6½"	10'-4"	1,810	7'-6"	168	#5	6½"	5'-0"	876	2'-2"	6'-11"	287	10	18"±	10	18"±	20	16"	40	1205	9'-11"	27	22	58											
		8	3	8"	8"	10'	41.55	7,003	0.905	152.12	84	#6	6½"	10'-0"	1,262	84	#6	6½"	10'-0"	1,262	168	#5	6½"	11'-4"	1,985	8'-6"	168	#5	6½"	5'-0"	876	2'-2"	7'-11"	328	10	18"±	10	18"±	20	18"	40	1205	10'-1"	27	22	58											
		9	3	8"	8"	10'	43.79	7,593	0.955	165.09	84	#6	6½"	10'-0"	1,262	84	#6	6½"	10'-0"	1,262	182	#5	6"	12'-4"	2,341	9'-6"	182	#5	6"	5'-0"	949	2'-2"	8'-11"	369	10	18"±	10	18"±	24	17"	44	1325	10'-1"	27	22	58											
	10 ×	5	3	8½"	7"	10'	36.90	7,117	0.802	154.99	64	#7	8½"	10'-10"	1,417	64	#7	8½"	10'-10"	1,417	136	#6	8"	8'-6"	1,736	5'-6"	136	#6	8"	5'-5"	1,107	2'-5"	4'-11"	204	11	18"±	11	18"±	16	14"	38	1144	10'-11"	29	24	63											
		6	3	8½"	7"	10'	38.86	7,539	0.845	164.30	68	#7	8"	10'-10"	1,505	68	#7	8"	10'-10"	1,505	136	#6	8"	9'-6"	1,941	6'-6"	136	#6	8"	5'-5"	1,107	2'-5"	5'-11"	245	11	18"±	11	18"±	16	16½"	38	1144	10'-11"	29	24	63											
		7	3	8½"	7"	10'	40.82	7,906	0.888	172.36	68	#7	8"	10'-10"	1,505	68	#7	8"	10'-10"	1,505	136	#6	8"	10'-6"	2,145	7'-6"	136	#6	8"	5'-5"	1,107	2'-5"	6'-11"	287	11	18"±	11	18"±	20	16"	42	1265	10'-11"	29	24	63											
		8	3	8½"	8"	10'	45.43	8,200	0.990	178.80	68	#7	8"	11'-0"	1,529	68	#7	8"	11'-0"	1,529	136	#6	8"	11'-6"	2,349	8'-6"	136	#6	8"	5'-5"	1,107	2'-5"	7'-11"	328	11	18"±	11	18"±	20	18"	42	1265	11'-1"	30	24	63											
		9	3	8½"	8"	10'	47.67	8,835	1.039	192.24	68	#7	8"	11'-0"	1,529	68	#7	8"	11'-0"	1,529	146	#6	7½"	12'-6"	2,741	9'-6"	146	#6	7½"	5'-5"	1,189	2'-5"	8'-11"	369	11	18"±	11	18"±	24	17"	46	1385	11'-1"	30	24	63											
		10	3	8½"	8"	10'	49.90	9,725	1.088	211.62	73	#7	7½"	11'-0"	1,641	73	#7	7½"	11'-0"	1,641	156	#6	7"	13'-6"	3,163	10'-6"	156	#6	7"	5'-5"	1,269	2'-5"	9'-11"	411	11	18"±	11	18"±	28	16"	50	1506	11'-1"	30	24	63											

SECTION THRU CURB

① Width must be increased by 4" for use with T6 Rail. (See T6-CM Rail Standard)

For Direct Traffic construct slab to conform to crown of roadway, maintaining constant thickness of slab.

HALF SEC. TYPE 1

HALF SEC.-TYPE 2

HALF SEC. TYPE 3

PART PLAN OF REINF. STEEL
3X2 TO 4X4

PART PLAN OF REINF. STEEL
5X2 TO 10X10

GENERAL NOTES:

Designed for HS20 Loading and maximum fill heights shown.

The bottom edge of the top slab shall be chamfered 3 inches at the entrance. Reinforcing bars shall be adjusted to provide a minimum of 1¼ inches clear cover. Headwall heights will be reduced, if necessary, to provide a maximum of 3 inches projection above the roadway slope. No increase or decrease will be made in plan quantities of concrete or reinforcing steel for this work.

Construction joints shown at the flow line may be raised a maximum of 6 inches at the Contractor's option. Bars E may be cut off or raised. Bars M and N may be reversed and bars C and D may be reversed except where bar size is different, in which case bars C may be cut off and bars D extended to provide 30 diameter lap with bar C.

All reinforcing steel shall be Grade 60.

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION

SINGLE CULVERTS-NORMAL

SC-NA SC-NB SC-NC

DN. W.H.
CK. DN. R.M.M.
DW. L.B.A.
CK. DW. W.H.
TR. O.C.K.
CK. TR. R.M.M.

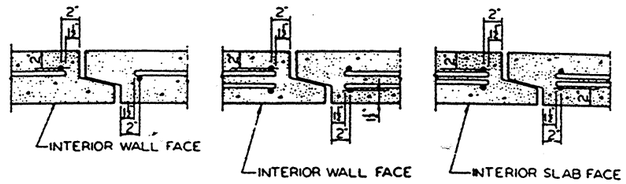
DRAWING	DATE
ORIGINAL	JAN. 1958
Rev. 8-87 (Grade 60)	
Rev. 7-95 (note ①)	

FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
6	TEXAS	STP 99(413)MM			222
STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
DAL	ROCKWALL	1014	03	033	740

BILL OF REINFORCING STEEL FOR L=8'

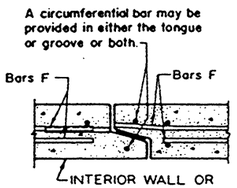
CULV. SIZE S	CULV. SIZE H	TYPE SECT.	DIMENSIONS F	DIMENSIONS U	MAX. FILL	TOTAL QUANTITIES FOR L=8' CONC. C.Y.	TOTAL QUANTITIES FOR L=8' REINF. LBS.	QUANTITIES P.L.F. OF BARREL CONC. C.Y.	QUANTITIES P.L.F. OF BARREL REINF. LBS.
3'	2'	1	4"	4"	26'	1.185	272	.1481	34.00
	3'	1	4"	4"	26'	1.383	339	.1728	42.38
4'	2'	1	5"	5"	24'	1.790	393	.2238	49.13
	3'	1	5"	5"	24'	2.037	474	.2546	59.25
	4'	1	5"	5"	24'	2.284	522	.2855	65.25
5'	2'	2	6"	6"	22'	2.518	615	.3148	76.88
	3'	2	6"	6"	22'	2.815	652	.3519	81.50
	4'	2	6"	6"	22'	3.111	650	.3889	81.25
	5'	3	6"	6"	22'	3.407	760	.4259	95.00
6'	3'	2	7"	7"	22'	3.714	893	.4643	111.63
	4'	2	7"	7"	22'	4.060	909	.5075	113.63
	5'	3	7"	7"	22'	4.405	988	.5506	123.50
	6'	3	7"	7"	22'	4.751	1049	.5939	131.13
7'	3'	2	8"	8"	23'	4.742	1127	.5928	140.88
	4'	2	8"	8"	23'	5.138	1159	.6423	144.88
	5'	3	8"	8"	23'	5.533	1262	.6916	157.75
	6'	3	8"	8"	23'	5.928	1283	.7410	160.38
	7'	3	8"	8"	23'	6.323	1347	.7904	168.38
8'	4'	2	8"	8"	20'	5.533	1415	.6916	176.88
	5'	3	8"	8"	20'	5.928	1489	.7410	186.13
	6'	3	8"	8"	20'	6.323	1581	.7904	197.63
	7'	3	8"	8"	20'	6.719	1673	.8399	209.13
	8'	3	8"	8"	20'	7.114	1670	.8893	208.75
9'	5'	3	9"	9"	20'	7.222	1936	.9208	242.00
	6'	3	9"	9"	20'	7.665	2003	.9581	250.38
	7'	3	9"	9"	20'	8.111	2007	1.014	250.88
	8'	3	9"	9"	20'	8.555	2064	1.069	258.00
	9'	3	9"	9"	20'	8.999	2141	1.125	267.63
10'	5'	3	10"	10"	21'	8.640	2300	1.080	287.50
	6'	3	10"	10"	21'	9.133	2369	1.142	296.13
	7'	3	10"	10"	21'	9.627	2376	1.203	297.00
	8'	3	10"	10"	21'	10.120	2460	1.265	307.50
	9'	3	10"	10"	21'	10.614	2526	1.327	315.75
	10'	3	10"	10"	21'	11.108	2611	1.389	326.38

BARS A TOP SLAB NO.	SIZE	SPA.	LG.	WT.	BARS B BOTTOM SLAB NO.	SIZE	SPA.	LG.	WT.	BARS C NO.	SIZE	SPA.	LG.	WT.	#4 BARS D @18"± C. TO C. NO.	LG.	WT.	#4 BARS F @ 18" MAX. LENGTH L-7" F1	SPA.	F2	SPA.	F3	SPA.	TOTAL	WT.	LIFT. WEIGHT L=8' LBS.
										12	#6	8"	12'-4"	222						8	14"	2	15"	10	50	5,000
										13	#6	7½"	14'-4"	280						8	14"	4	14"	12	59	5,850
										15	#6	6½"	14'-10"	334						10	14"	2	15"	12	59	7,530
										16	#6	6"	16'-10"	405						10	14"	4	14"	14	69	8,590
										16	#6	6"	18'-10"	453						10	14"	4	18"	14	69	9,620
10	#7	10½"	5'-6"	112	10	#7	10"	5'-6"	112	11	#6	9"	17'-8"	292				8	17"	10	17"	2	15"	20	99	10,620
11	#7	9½"	5'-6"	124	11	#7	9½"	5'-6"	124	10	#6	10"	19'-8"	295				8	17"	10	17"	4	14"	22	109	11,850
11	#7	9½"	5'-6"	124	11	#7	9"	5'-6"	124	9	#6	11"	21'-8"	293				8	17"	10	17"	4	18"	22	109	13,050
11	#7	9½"	5'-6"	124	11	#7	9"	5'-6"	124	9	#6	11"	23'-8"	320	12	5'-6"	44	8	17"	10	17"	12	17"	30	148	14,320
12	#7	8½"	6'-8"	164	12	#7	8"	6'-8"	164	13	#6	7½"	22'-4"	436				10	16"	12	16"	4	15"	26	129	15,660
12	#7	8"	6'-8"	164	13	#7	7½"	6'-8"	177	12	#6	8½"	24'-4"	439				10	16"	12	16"	4	18"	26	129	17,070
12	#7	8"	6'-8"	164	13	#7	7½"	6'-8"	177	11	#6	9"	26'-4"	435	12	5'-6"	44	10	16"	12	16"	12	17"	34	168	18,520
12	#7	8"	6'-8"	164	13	#7	7½"	6'-8"	177	11	#6	9"	28'-4"	468	12	6'-6"	52	10	16"	12	16"	16	16"	38	188	19,970
13	#7	7½"	7'-10"	208	13	#7	7½"	7'-10"	208	15	#6	6½"	25'-0"	563				12	16"	14	16"	4	15"	30	148	19,980
13	#7	7½"	7'-10"	208	14	#7	7"	7'-10"	224	14	#6	7"	27'-0"	568				12	16"	14	16"	6	15"	32	159	21,610
14	#7	7"	7'-10"	224	15	#7	6½"	7'-10"	240	13	#6	7½"	29'-0"	566	12	5'-6"	44	12	16"	14	16"	12	18"	38	188	23,280
14	#7	7"	7'-10"	224	15	#7	6½"	7'-10"	240	12	#6	8"	31'-0"	559	12	6'-6"	52	12	16"	14	16"	16	17"	42	208	24,890
14	#7	7"	7'-10"	224	15	#7	6½"	7'-10"	240	12	#6	8"	33'-0"	595	12	7'-6"	60	12	16"	14	16"	20	16"	46	228	26,540
15	#7	6½"	8'-10"	270	16	#7	6"	8'-10"	289	16	#6	6"	29'-0"	697				12	18"	14	18"	6	15"	32	159	23,390
15	#7	6½"	8'-10"	270	16	#7	6"	8'-10"	289	15	#6	6½"	31'-0"	698	12	5'-6"	44	12	18"	14	18"	12	18"	38	188	25,040
16	#7	6"	8'-10"	289	16	#7	6"	8'-10"	289	15	#6	6½"	33'-0"	743	12	6'-6"	52	12	18"	14	18"	16	17"	42	208	26,700
16	#7	6"	8'-10"	289	17	#7	5½"	8'-10"	307	15	#6	6½"	35'-0"	789	12	7'-6"	60	12	18"	14	18"	20	16"	46	228	28,370
16	#7	6"	8'-10"	289	17	#7	5½"	8'-10"	307	14	#6	7"	37'-0"	778	12	8'-6"	68	12	18"	14	18"	20	18"	46	228	29,960
13	#8	7½"	10'-0"	347	14	#8	7"	10'-0"	374	13	#7	7½"	35'-8"	948	12	6'-6"	52	14	18"	16	18"	16	17"	46	228	32,430
14	#8	7"	10'-0"	374	15	#8	6½"	10'-0"	401	12	#7	8"	37'-8"	924	12	7'-6"	60	14	18"	16	18"	20	16"	50	248	34,230
14	#8	7"	10'-0"	374	15	#8	6½"	10'-0"	401	12	#7	8"	39'-8"	973	12	8'-6"	68	14	18"	16	18"	20	18"	50	248	36,070
14	#8	7"	10'-0"	374	15	#8	6½"	10'-0"	401	12	#7	8"	41'-8"	1022	12	9'-6"	76	14	18"	16	18"	24	17"	54	268	37,920
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	15	#7	6½"	36'-4"	1114	12	5'-6"	44	16	17"	18	17"	16	15"	50	248	36,580
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	15	#7	6½"	38'-4"	1175	12	6'-6"	52	16	17"	18	17"	16	18"	50	248	38,620
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	14	#7	7"	40'-4"	1154	12	7'-6"	60	16	17"	18	17"	20	17"	54	268	40,630
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	14	#7	7"	42'-4"	1211	12	8'-6"	68	16	17"	18	17"	24	16"	58	287	42,680
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	14	#7	7"	44'-4"	1269	12	9'-6"	76	16	17"	18	17"	24	18"	58	287	44,730
15	#8	6½"	11'-2"	447	15	#8	6½"	11'-2"	447	14	#7	7"	46'-4"	1326	12	10'-6"	84	16	17"	18	17"	28	17"	62	307	46,790



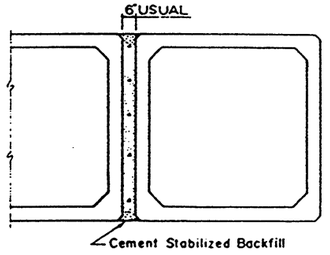
SINGLE MAT PLACEMENT

DOUBLE MAT PLACEMENT

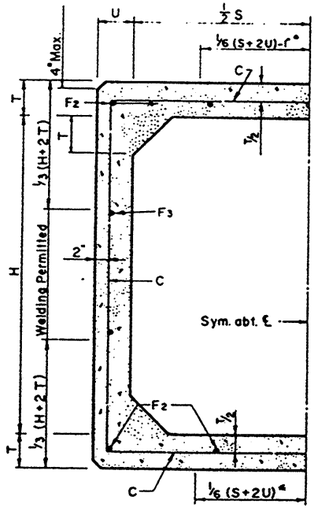


STEEL SUPPORT DETAIL

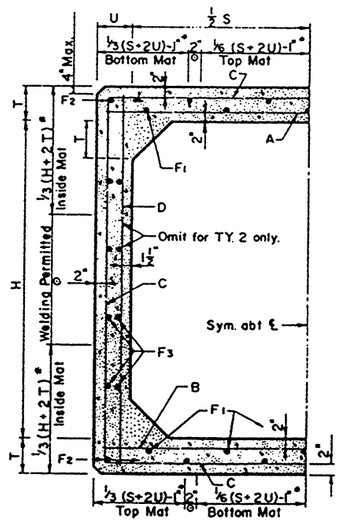
NOTE: As many Bars F as necessary may be extended to end of box to support steel during manufacture. Bars may be slightly bent to clear slope on groove lip as shown in detail. Alternatively the steel may be supported by bar extensions welded to Bars F.



MULTIPLE UNIT PLACEMENT



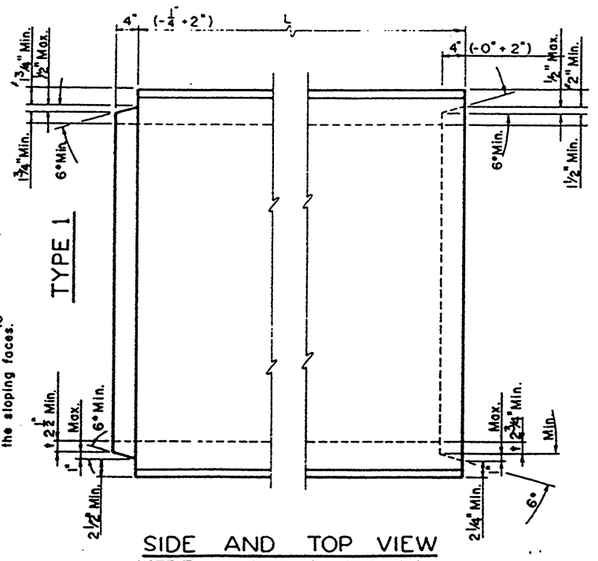
HALF SECTION TYPE 1



HALF SECTION TYPES 2 & 3

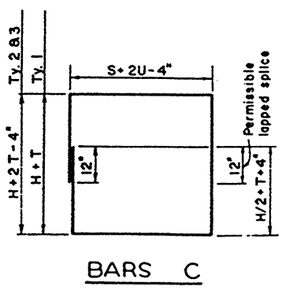
* These dimensions shall be sufficiently different to allow a ¼" (± 1/16") nominal space between the sloping faces.

* Permissible tack welding on mats shown.
* Permissible tack welding both mats.



SIDE AND TOP VIEW

NOTE: Tongue and groove dimensional controls shown are intended to allow either a 4" long 1" slope joint, a 6" long 6" slope joint or any joint configuration within these limits. Dimensions shown as minimums shall be maintained around the perimeter of the box.



BARS C

GENERAL NOTES:

All welding to be done by qualified welder.

Additional splices in reinforcing steel not shown hereon, must be submitted to the Bridge Division for approval prior to fabrication.

Grade 60 Bars or Wire Fabric may be used in place of Grade 40 Steel by supplying 82 % of the area of steel per linear foot shown in the Tables for Bars A.

Longitudinal steel shall have at least as much area as Bars F and shall be spaced at 18" c.c. maximum.

These designs are adequate for HS 20 live loading and any fill from 2'-0" to the maximum shown in the tables.

In lieu of furnishing the designs shown on this detail the contractor may use designs from ASTM C-789, Table I. In either case, the substituted design must equal or exceed the maximum fill height for the same sized box in the table on this detail. For boxes reinforced with wire fabric the minimum cover shall be three times the wire diameter but not less than one inch. Placing of reinforcment shall otherwise conform to specification "Reinforcing Steel".

TEXAS HIGHWAY DEPARTMENT

PRECAST CONCRETE BOX CULVERTS

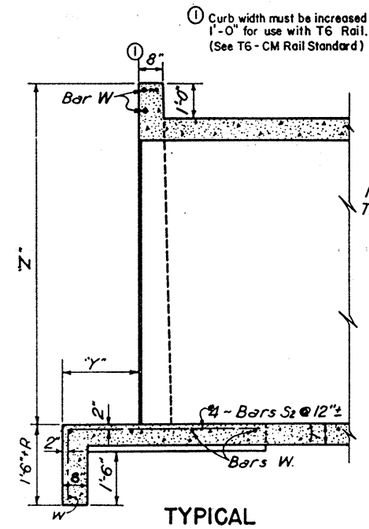
PC-5

ORIGINAL DRAWING DATE: MARCH 1983	REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
DR.:-ADC	Rev. 9-96 (Gen. Notes)	DAL	6	STP99(413)MM	223
CH.:-CCT	Rev. 7-98 (Gen. Notes)	COUNTY			
DW.:-EDS		ROCKWALL	1014	03 033	740
CK.:-CCT					

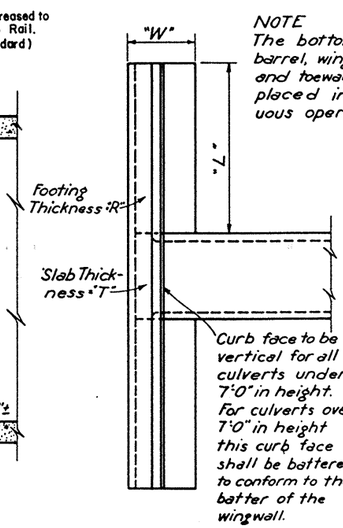
# CULVERT SIZE	SLAB DEPTH	MAX FILL	WING HEIGHT	WING LENGTH	TOTAL QUANT. 4 WINGWALLS CONC.	TOTAL QUANT. 4 WINGWALLS REINF.	TABLE OF DIMENSIONS R	W	V	D	Y
S	H	T"	FT	Z"	L"	C.Y.	LB.					
3 x 2	6"	14'	3'-6"	5'-3"	4.10	558	6½"	2'-6"	8"	10"	1'-0"
3 x 3	6"	14'	4'-6"	6'-9"	6.11	818	7"	2'-10"	8"	1'-2"	1'-0"
4 x 2	6"	12'	3'-6"	5'-3"	4.21	564	6½"	2'-6"	8"	10"	1'-0"
4 x 3	6"	12'	4'-6"	6'-9"	6.23	824	7"	2'-10"	8"	1'-2"	1'-0"
4 x 4	6"	12'	5'-6"	8'-3"	8.75	1322	7"	3'-5"	8"	1'-7"	1'-2"
5 x 2	6"	8'	3'-6"	5'-3"	4.33	569	7"	2'-6"	8"	10"	1'-0"
5 x 3	6"	8'	4'-6"	6'-9"	6.34	829	7"	2'-10"	8"	1'-2"	1'-0"
5 x 4	6"	8'	5'-6"	8'-3"	8.87	1328	7"	3'-5"	8"	1'-7"	1'-2"
5 x 5	6"	8'	6'-6"	9'-9"	11.86	1876	7"	4'-0"	8"	2'-0"	1'-4"
6 x 3	6"	8'	4'-6"	6'-9"	6.46	835	7"	2'-10"	8"	1'-2"	1'-0"
6 x 4	6"	8'	5'-6"	8'-3"	8.90	1334	7"	3'-5"	8"	1'-7"	1'-2"
6 x 5	6"	8'	6'-6"	9'-9"	11.99	1883	7"	4'-0"	8"	2'-0"	1'-4"
6 x 6	6"	8'	7'-6"	11'-3"	15.56	2616	7"	4'-8"	8"	2'-3"	1'-9"
7 x 3	6½"	8'	4'-6½"	6'-10"	6.68	841	7"	2'-10"	8"	1'-2"	1'-0"
7 x 4	6½"	8'	5'-6½"	8'-4"	9.24	1341	7"	3'-5"	8"	1'-7"	1'-2"
7 x 5	6½"	8'	6'-6½"	9'-10"	12.27	1890	7"	4'-0"	8"	2'-0"	1'-4"
7 x 6	6½"	8'	7'-6½"	11'-4"	15.89	2624	7"	4'-8"	8"	2'-3"	1'-9"
7 x 7	6½"	8'	8'-6½"	12'-10"	21.55	3650	8"	5'-2"	9½"	2'-6½"	1'-10"
8 x 4	6½"	4'	5'-6½"	8'-4"	9.36	1347	7"	3'-5"	8"	1'-7"	1'-2"
8 x 5	6½"	4'	6'-6½"	9'-10"	12.40	1897	7"	4'-0"	8"	2'-0"	1'-4"
8 x 6	6½"	4'	7'-6½"	11'-4"	16.03	2632	7"	4'-8"	8"	2'-3"	1'-9"
8 x 7	6½"	4'	8'-6½"	12'-10"	21.70	3659	8"	5'-2"	9½"	2'-6½"	1'-10"
8 x 8	6½"	4'	9'-6½"	14'-4"	28.49	5222	9"	5'-9"	10½"	2'-8½"	2'-2"
8 x 4	7"	6'	5'-7"	8'-4"	9.41	1347	7"	3'-5"	8"	1'-7"	1'-2"
8 x 5	7"	6'	6'-7"	9'-10"	12.46	1897	7"	4'-0"	8"	2'-0"	1'-4"
8 x 6	7"	6'	7'-7"	11'-4"	16.11	2632	7"	4'-8"	8"	2'-3"	1'-9"
8 x 7	7"	6'	8'-7"	12'-10"	21.79	3659	8"	5'-2"	9½"	2'-6½"	1'-10"
8 x 8	7"	6'	9'-7"	14'-4"	28.60	5222	9"	5'-9"	10½"	2'-8½"	2'-2"
8 x 4	7½"	8'	5'-7½"	8'-5"	9.54	1347	7"	3'-5"	8"	1'-7"	1'-2"
8 x 5	7½"	8'	6'-7½"	9'-11"	12.61	1897	7"	4'-0"	8"	2'-0"	1'-4"
8 x 6	7½"	8'	7'-7½"	11'-5"	16.30	2632	7"	4'-8"	8"	2'-3"	1'-9"
8 x 7	7½"	8'	8'-7½"	12'-11"	22.02	3659	8"	5'-2"	9½"	2'-6½"	1'-10"
8 x 8	7½"	8'	9'-7½"	14'-5"	28.88	5222	9"	5'-9"	10½"	2'-8½"	2'-2"
9 x 5	7"	6'	6'-7"	9'-10"	12.59	1904	7"	4'-0"	8"	2'-0"	1'-4"
9 x 6	7"	6'	7'-7"	11'-4"	16.26	2640	7"	4'-8"	8"	2'-3"	1'-9"
9 x 7	7"	6'	8'-7"	12'-10"	21.95	3668	8"	5'-2"	9½"	2'-6½"	1'-10"
9 x 8	7"	6'	9'-7"	14'-4"	28.78	5232	9"	5'-9"	10½"	2'-8½"	2'-2"
9 x 9	7"	6'	10'-7"	15'-10"	37.26	6874	9½"	6'-4"	12½"	2'-10½"	2'-5"
9 x 5	8"	8'	6'-8"	10'-0"	12.90	1904	7"	4'-0"	8"	2'-0"	1'-4"
9 x 6	8"	8'	7'-8"	11'-6"	17.35	2640	7½"	4'-9"	8½"	2'-3½"	1'-9"
9 x 7	8"	8'	8'-8"	13'-0"	23.11	3668	8½"	5'-4"	9½"	2'-7½"	1'-11"
9 x 8	8"	8'	9'-8"	14'-6"	30.73	5232	9½"	6'-0"	11"	2'-11"	2'-2"
9 x 9	8"	8'	10'-8"	16'-0"	38.93	6874	10"	6'-6"	12½"	2'-11½"	2'-6"
10 x 5	7"	4'	6'-7"	9'-10"	12.72	1911	7"	4'-0"	8"	2'-0"	1'-4"
10 x 6	7"	4'	7'-7"	11'-4"	16.41	2648	7"	4'-8"	8"	2'-3"	1'-9"
10 x 7	7"	4'	8'-7"	12'-10"	22.11	3677	8"	5'-2"	9½"	2'-6½"	1'-10"
10 x 8	7"	4'	9'-7"	14'-4"	28.96	5241	9"	5'-9"	10½"	2'-8½"	2'-2"
10 x 9	7"	4'	10'-7"	15'-10"	37.45	6885	9½"	6'-4"	12½"	2'-10½"	2'-5"
10 x 10	7"	4'	11'-7"	17'-4"	48.02	8740	11"	7'-0"	13½"	3'-2½"	2'-8"
10 x 5	8"	6'	6'-8"	10'-0"	13.04	1911	7"	4'-0"	8"	2'-0"	1'-4"
10 x 6	8"	6'	7'-8"	11'-6"	17.51	2648	7½"	4'-9"	8½"	2'-3½"	1'-9"
10 x 7	8"	6'	8'-8"	13'-0"	23.28	3677	8½"	5'-4"	9½"	2'-7½"	1'-11"
10 x 8	8"	6'	9'-8"	14'-6"	30.91	5241	9½"	6'-0"	11"	2'-11"	2'-2"
10 x 9	8"	6'	10'-8"	16'-0"	39.14	6885	10"	6'-6"	12½"	2'-11½"	2'-6"
10 x 10	8"	6'	11'-8"	17'-6"	48.80	8740	11"	7'-0"	13½"	3'-2½"	2'-8"
10 x 5	8½"	8'	6'-8½"	10'-1"	13.20	1911	7"	4'-0"	8"	2'-0"	1'-4"
10 x 6	8½"	8'	7'-8½"	11'-7"	17.71	2648	7½"	4'-9"	8½"	2'-3½"	1'-9"
10 x 7	8½"	8'	8'-8½"	13'-1"	23.52	3677	8½"	5'-4"	9½"	2'-7½"	1'-11"
10 x 8	8½"	8'	9'-8½"	14'-7"	31.20	5241	9½"	6'-0"	11"	2'-11"	2'-2"
10 x 9	8½"	8'	10'-8½"	16'-1"	39.50	6885	10"	6'-6"	12½"	2'-11½"	2'-6"
10 x 10	8½"	8'	11'-8½"	17'-7"	49.18	8740	11"	7'-0"	13½"	3'-2½"	2'-8"

TABLE OF REINFORCING STEEL FOR 4 WING WALLS

WING SIZE Z"	WING SIZE L"	BARS R NO	SIZE	SPAC	LENGTH	WEIGHT	BARS S1 NO	SIZE	SPAC	LENGTH	WEIGHT	#4 BARS T1 @18"± NO	LENGTH	WEIGHT	#4 BARS T2 @12"± NO	LENGTH	WEIGHT	BARS U NO	SIZE	SPAC	LENGTH	WEIGHT	#4 Bars P @18"c/c SPAC	LENGTH	WEIGHT	#4 BARS W @12"± NO	LENGTH	WEIGHT	TOTAL WEIGHT
3'-6"	5'-3"	24	#4	12"	5'-1"	81	24	#4	12"	3'-11"	63	16	5'-0"	53	8	5'-0"	27	16	#5	18"	6'-0"	100	20	3'-9"	50	28	8'-9"	164	538
4'-6"	6'-9"	32	#4	11"	6'-1"	130	32	#4	11"	4'-3"	91	24	6'-6"	104	8	6'-6"	35	24	#5	18"	6'-0"	150	24	4'-9"	76	28	11'-3"	210	796
5'-6"	8'-3"	60	#4	7"	7'-3"	291	60	#4	7"	4'-10"	194	32	8'-0"	171	8	8'-0	43	32	#5	18"	6'-0"	200	28	5'-9"	108	32	13'-3"	283	1290
6'-6"	9'-9"	56	#5	8½"	8'-5"	492	60	#5	8"	5'-5"	339	32	9'-6"	203	12	9'-6"	76	32	#5	18"	6'-0"	200	32	6'-9"	144	36	15'-9"	379	1833
7'-6"	11'-3"	80	#5	7"	9'-10"	820	80	#5	7"	6'-1"	507	40	11'-0"	294	12	11'-0"	88	40	#5	18"	6'-0"	250	36	7'-9"	186	36	17'-3"	415	2560
8'-6½"	12'-10"	112	#5	5½"	11'-4"	1,324	104	#5	6"	6'-7"	714	48	12'-7"	403	12	12'-7"	101	48	#5	18"	6'-0"	300	40"	8'-9"	234	40	18'-11"	505	3581
9'-6½"	14'-4"	108	#6	6½"	12'-9"	2,068	116	#6	6"	7'-4"	1277	48	14'-1"	452	16	14'-1"	150	48	#5	18"	6'-0"	300	44'	9'-9"	287	44	20'-6"	603	5137
10'-7"	15'-10"	140	#6	5½"	14'-4"	3,013	140	#6	5½"	7'-11"	1665	56	15'-7"	583	16	15'-7"	167	56	#5	18"	6'-0"	350	48	10'-10"	347	44	22'-0"	647	6772
11'-7"	17'-4"	168	#6	5"	15'-9"	3 974	168	#6	5"	8'-7"	2165	64	17'-1"	730	16	17'-1"	183	64	#5	18"	6'-0"	401	52	11'-10"	411	48	23'-6"	754	8618

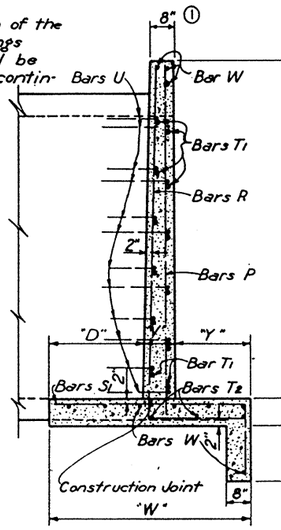


TYPICAL LONGITUDINAL SECTION THRU BOX SHOWING DETAIL OF APRON

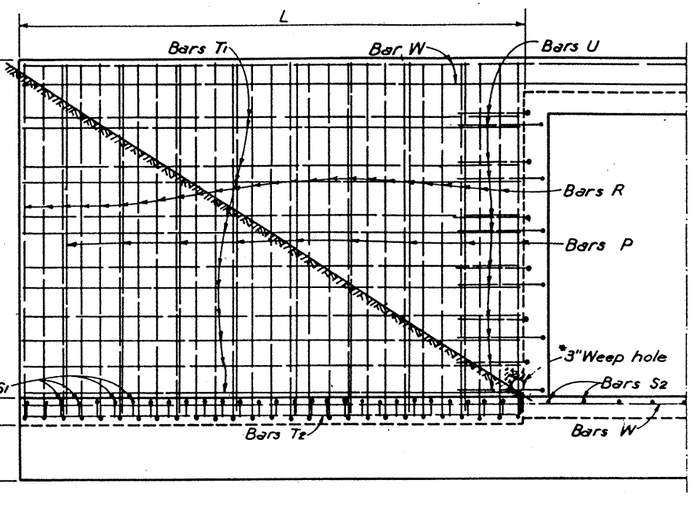


PLAN VIEW OF WING WALL

NOTE
The bottom slab of the barrel, wing footings and toewalls shall be placed in one continuous operation.



SECTION

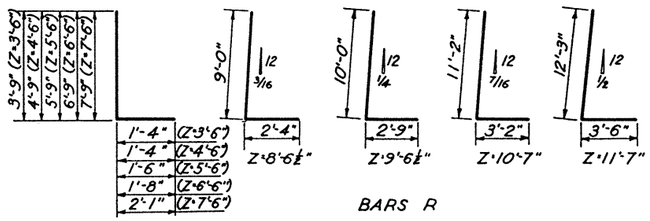


HALF ELEVATION

DETAIL OF WING WALL

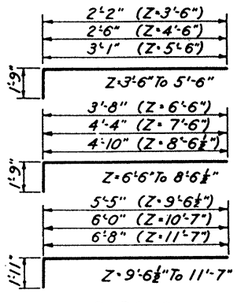
* Place one weep hole per wing at approximate earth line as shown. Fill around inlet of drains with broken stone or coarse gravel to permit free passage of water. Weep holes required for Z·6'-6" and greater.

GENERAL NOTES:
Chamfer all exposed corners ¾" unless specified otherwise.
All dimensions relating to reinforcing steel are to centers of bars.

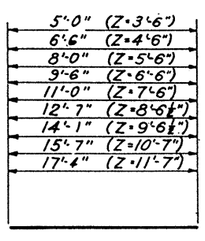


BARS R

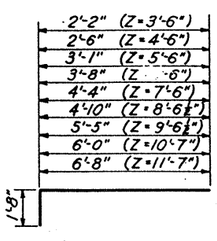
Z·3'-6" To 7'-6"



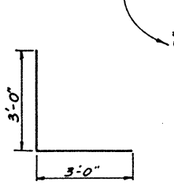
BARS S1



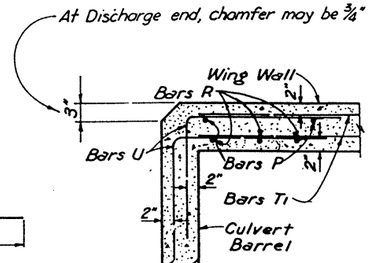
BARS T1



BARS S2 (Culvert Apron)



BARS U



ARRANGEMENT OF WING WALL REINF. AT CULVERT WALL

BILL OF #4 BARS S2 @ 12"± FOR 2 CULVERT APRONS									
Z"	SPAN	NO	LGTH	WEIGHT	Z"	SPAN	NO	LGTH	WEIGHT
3'-6"	3'-0"	8	3'-10"	20	6'-6"	9'-0"	20	5'-4"	71
	4'-0"	10	3'-10"	26		10'-0"	22	5'-4"	78
	5'-0"	12	3'-10"	31	7'-6"	6'-0"	14	6'-0"	56
4'-6"	3'-0"	8	4'-2"	22		7'-0"	16	6'-0"	64
	4'-0"	10	4'-2	28		8'-0"	18	6'-0"	72
	5'-0"	12	4'-2"	33		9'-0"	20	6'-0"	80
	6'-0"	14	4'-2"	39		10'-0"	22	6'-0"	88
	7'-0"	16	4'-2"	45	8'-6½"	7'-0"	16	6'-6"	69
5'-6"	4'-0"	10	4'-9"	32		8'-0"	18	6'-6"	78
	5'-0"	12	4'-9"	38		9'-0"	20	6'-6"	87
	6'-0"	14	4'-9"	44		10'-0"	22	6'-6"	96
	7'-0"	16	4'-9"	51	9'-6½"	8'-0"	18	7'-1"	85
	8'-0	18	4'-9"	57		9'-0"	20	7'-1"	95
6'-6"	5'-0"	12	5'-4"	43		10'-0"	22	7'-1"	104
	6'-0"	14	5'-4"	50	10'-7"	9'-0"	20	7'-8"	102
	7'-0"	16	5'-4"	57		10'-0"	22	7'-8"	113
	8'-0"	18	5'-4"	64	11'-7"	10'-0"	22	8'-4"	122

TEXAS HIGHWAY DEPARTMENT

PARALLEL WINGS-NORMAL

FOR SINGLE BOX CULVERTS
3 X 2 TO 10 X 10

PW-N

Dn. CFS/EWH	Drawing	Date	FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
Ck. Dn. WH	Original	June 1948				
Dr. ABL	Rev. 6-74		6	TEXAS	STP 99(413)MM	224
Ck. Dn. WH	Rev. 7-95 (note ①)					
Tr. AOB			STATE DIST. NO.	COUNTY	CONTROL NO. / SECTION NO. / JOB NO.	HIGHWAY NO.
Ck. Tr. WH			DAL	ROCKWALL	0014 03 033	740

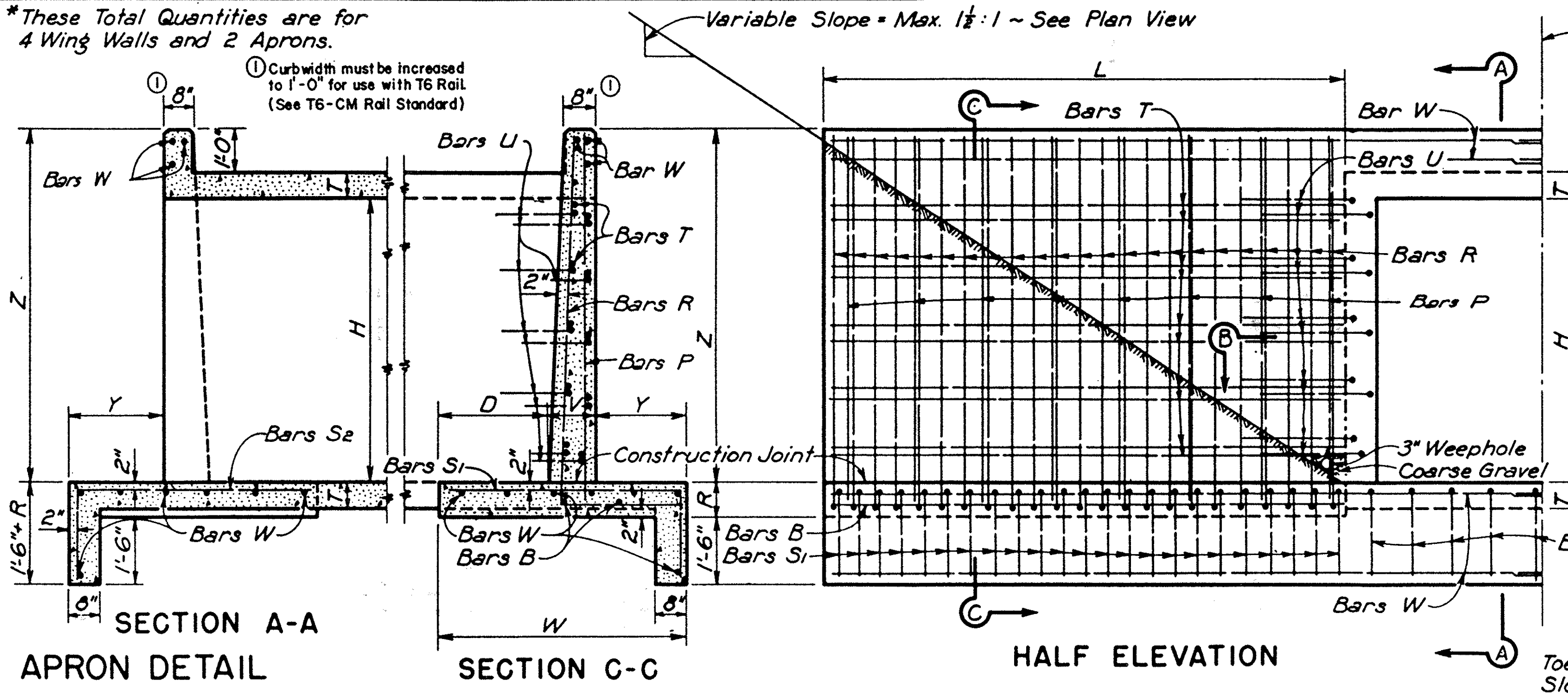
	CULVERT SIZE S x H	MAX FILL FT.	SLAB T	WING Z	WING L	WING R	WING W	WING V	WING D	WING Y	*TOTAL QUANT. CONC. C.Y.	*TOTAL QUANT. REINF. LB.
SC-45°A, SC-45°B & SC-45°C	3 x 2	14'	6"	3'-6"	7'-5"	6½"	2'-6"	8"	10"	1'-0"	5.79	718
	3 x 3	14'	6"	4'-6"	9'-7"	7"	2'-10"	8"	1'-2"	1'-0"	8.68	1069
	4 x 2	12'	6"	3'-6"	7'-5"	6½"	2'-6"	8"	10"	1'-0"	5.95	724
	4 x 3	12'	6"	4'-6"	9'-7"	7"	2'-10"	8"	1'-2"	1'-0"	8.84	1075
	4 x 4	12'	6"	5'-6"	11'-8"	7"	3'-5"	8"	1'-7"	1'-2"	12.37	1723
	5 x 2	8'	6"	3'-6"	7'-5"	7"	2'-6"	8"	10"	1'-0"	6.24	729
	5 x 3	8'	6"	4'-6"	9'-7"	7"	2'-10"	8"	1'-2"	1'-0"	9.00	1080
	5 x 4	8'	6"	5'-6"	11'-8"	7"	3'-5"	8"	1'-7"	1'-2"	12.54	1730
	5 x 5	8'	6"	6'-6"	13'-9"	7"	4'-0"	8"	2'-0"	1'-4"	16.73	2599
	6 x 3	8'	6"	4'-6"	9'-7"	7"	2'-10"	8"	1'-2"	1'-0"	9.17	1092
	6 x 4	8'	6"	5'-6"	11'-8"	7"	3'-5"	8"	1'-7"	1'-2"	12.71	1743
	6 x 5	8'	6"	6'-6"	13'-9"	7"	4'-0"	8"	2'-0"	1'-4"	16.91	2613
	6 x 6	8'	6"	7'-6"	15'-11"	7"	4'-8"	8"	2'-3"	1'-9"	22.02	3564
	7 x 3	8'	6½"	4'-6½"	9'-8"	7"	2'-10"	8"	1'-2"	1'-0"	9.45	1097
	7 x 4	8'	6½"	5'-6½"	11'-9"	7"	3'-5"	8"	1'-7"	1'-2"	13.03	1749
	7 x 5	8'	6½"	6'-6½"	13'-11"	7"	4'-0"	8"	2'-0"	1'-4"	17.36	2621
	7 x 6	8'	6½"	7'-6½"	16'-0"	7"	4'-8"	8"	2'-3"	1'-9"	22.43	3572
	7 x 7	8'	6½"	8'-6½"	18'-1"	8"	5'-2"	9½"	2'-6½"	1'-10"	30.37	5111
SC-45°A	8 x 4	4'	6½"	5'-6½"	11'-9"	7"	3'-5"	8"	1'-7"	1'-2"	13.21	1762
	8 x 5	4'	6½"	6'-6½"	13'-11"	7"	4'-0"	8"	2'-0"	1'-4"	17.55	2635
	8 x 6	4'	6½"	7'-6½"	16'-0"	7"	4'-8"	8"	2'-3"	1'-9"	22.64	3589
	8 x 7	4'	6½"	8'-6½"	18'-1"	8"	5'-2"	9½"	2'-6½"	1'-10"	30.59	5128
	8 x 8	4'	6½"	9'-6½"	20'-3"	9"	5'-9"	10½"	2'-8½"	2'-2"	40.26	7456
SC-45°B	8 x 4	6'	7"	5'-7"	11'-10"	7"	3'-5"	8"	1'-7"	1'-2"	13.36	1762
	8 x 5	6'	7"	6'-7"	14'-0"	7"	4'-0"	8"	2'-0"	1'-4"	17.72	2635
	8 x 6	6'	7"	7'-7"	16'-1"	7"	4'-8"	8"	2'-3"	1'-9"	22.86	3589
	8 x 7	6'	7"	8'-7"	18'-2"	8"	5'-2"	9½"	2'-6½"	1'-10"	30.85	5128
	8 x 8	6'	7"	9'-7"	20'-4"	9"	5'-9"	10½"	2'-8½"	2'-2"	40.58	7456
SC-45°C	8 x 4	8'	7½"	5'-7½"	11'-11"	7"	3'-5"	8"	1'-7"	1'-2"	13.51	1762
	8 x 5	8'	7½"	6'-7½"	14'-1"	7"	4'-0"	8"	2'-0"	1'-4"	17.90	2635
	8 x 6	8'	7½"	7'-7½"	16'-2"	7"	4'-8"	8"	2'-3"	1'-9"	23.07	3589
	8 x 7	8'	7½"	8'-7½"	18'-4"	8"	5'-2"	9½"	2'-6½"	1'-10"	31.24	5128
	8 x 8	8'	7½"	9'-7½"	20'-5"	9"	5'-9"	10½"	2'-8½"	2'-2"	40.89	7456
SC-45°A & SC-45°B	9 x 5	6'	7"	6'-7"	14'-0"	7"	4'-0"	8"	2'-0"	1'-4"	17.91	2642
	9 x 6	6'	7"	7'-7"	16'-1"	7"	4'-8"	8"	2'-3"	1'-9"	23.07	3597
	9 x 7	6'	7"	8'-7"	18'-2"	8"	5'-2"	9½"	2'-6½"	1'-10"	31.07	5137
	9 x 8	6'	7"	9'-7"	20'-4"	9"	5'-9"	10½"	2'-8½"	2'-2"	40.83	7465
	9 x 9	6'	7"	10'-7"	22'-5"	9½"	6'-4"	12½"	2'-10½"	2'-5"	52.76	9477
SC-45°C	9 x 5	8'	8"	6'-8"	14'-2"	7"	4'-0"	8"	2'-0"	1'-4"	18.22	2642
	9 x 6	8'	8"	7'-8"	16'-3"	7½"	4'-9"	8½"	2'-3½"	1'-9"	24.52	3597
	9 x 7	8'	8"	8'-8"	18'-3"	8½"	5'-4"	9½"	2'-7½"	1'-11"	32.46	5137
	9 x 8	8'	8"	9'-8"	20'-6"	9½"	6'-0"	11"	2'-11"	2'-2"	43.44	7465
	9 x 9	8'	8"	10'-8"	22'-8"	10"	6'-6"	12½"	2'-11½"	2'-6"	55.15	9477
SC-45°A	10 x 5	4'	7"	6'-7"	14'-0"	7"	4'-0"	8"	2'-0"	1'-4"	18.10	2657
	10 x 6	4'	7"	7'-7"	16'-1"	7"	4'-8"	8"	2'-3"	1'-9"	23.28	3613
	10 x 7	4'	7"	8'-7"	18'-2"	8"	5'-2"	9½"	2'-6½"	1'-10"	31.29	5155
	10 x 8	4'	7"	9'-7"	20'-4"	9"	5'-9"	10½"	2'-8½"	2'-2"	41.07	7484
	10 x 9	4'	7"	10'-7"	22'-5"	9½"	6'-4"	12½"	2'-10½"	2'-5"	53.02	9498
	10 x 10	4'	7"	11'-7"	24'-7"	11"	7'-0"	13½"	3'-2½"	2'-8"	68.10	12,122
SC-45°B	10 x 5	6'	8"	6'-8"	14'-2"	7"	4'-0"	8"	2'-0"	1'-4"	18.47	2657
	10 x 6	6'	8"	7'-8"	16'-3"	7½"	4'-9"	8½"	2'-3½"	1'-9"	24.74	3613
	10 x 7	6'	8"	8'-8"	18'-5"	8½"	5'-4"	9½"	2'-7½"	1'-11"	32.70	5155
	10 x 8	6'	8"	9'-8"	20'-6"	9½"	6'-0"	11"	2'-11"	2'-2"	43.71	7484
	10 x 9	6'	8"	10'-8"	22'-8"	10"	6'-6"	12½"	2'-11½"	2'-6"	55.44	9498
	10 x 10	6'	8"	11'-8"	24'-9"	11"	7'-0"	13½"	3'-2½"	2'-8"	69.01	12,122
SC-45°C	10 x 5	8'	8½"	6'-8½"	14'-3"	7"	4'-0"	8"	2'-0"	1'-4"	18.66	2657
	10 x 6	8'	8½"	7'-8½"	16'-4"	7½"	4'-9"	8½"	2'-3½"	1'-9"	24.98	3613
	10 x 7	8'	8½"	8'-8½"	18'-6"	8½"	5'-4"	9½"	2'-7½"	1'-11"	33.25	5155
	10 x 8	8'	8½"	9'-8½"	20'-7"	9½"	6'-0"	11"	2'-11"	2'-2"	44.05	7484
	10 x 9	8'	8½"	10'-8½"	22'-9"	10"	6'-6"	12½"	2'-11½"	2'-6"	55.84	9498
	10 x 10	8'	8½"	11'-8½"	24'-10"	11"	7'-0"	13½"	3'-2½"	2'-8"	69.47	12,122

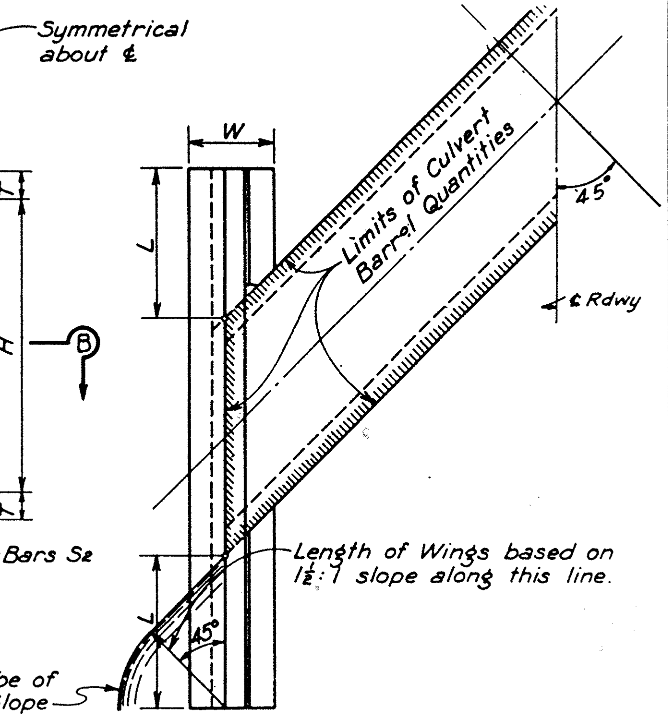
*These Total Quantities are for 4 Wing Walls and 2 Aprons.

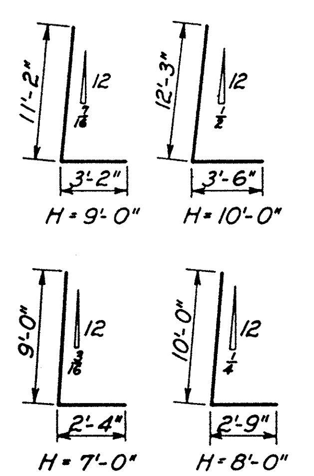
TABLE OF REINFORCING STEEL FOR 4 WINGWALLS

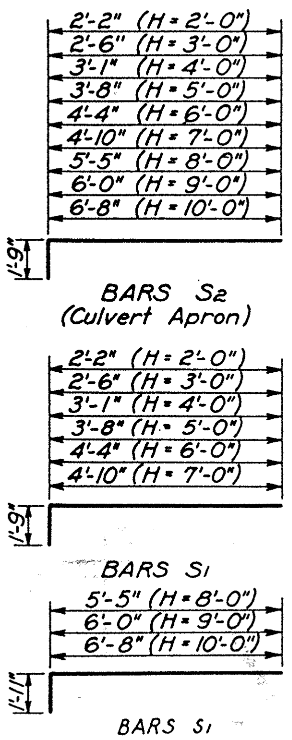
WING SIZE H	WING SIZE L	#4 BARS B @12"± NO.	LGTH.	WT.	BARS R NO.	SIZE	SPAC.	LGTH.	WT.	BARS S1 NO.	SIZE	SPAC.	LGTH.	WT.	#4 BARS T1 @18"± NO.	LGTH.	WT.
2'-0"	7'-5"	8	6'-7"	35	32	#4	12"	5'-1"	109	32	#4	12"	3'-11"	84	8	6'-7"	35
3'-0"	9'-7"	8	8'-9"	47	44	#4	11"	6'-1"	179	44	#4	11"	4'-3"	125	12	8'-9"	70
4'-0"	11'-8"	8	10'-10"	58	80	#4	7"	7'-3"	387	80	#4	7"	4'-10"	258	16	10'-10"	116
5'-0"	13'-9"	12	12'-11"	104	84	#5	8"	8'-5"	738	84	#5	8"	5'-5"	475	16	12'-11"	138
6'-0"	15'-11"	12	15'-1"	121	112	#5	7"	9'-10"	1148	112	#5	7"	6'-1"	710	20	15'-1"	202
7'-0"	18'-1"	12	17'-3"	138	160	#5	5½"	11'-4"	1891	160	#5	5½"	6'-7"	1098	24	17'-3"	277
8'-0"	20'-3"	16	19'-5"	208	164	#6	6"	12'-9"	3141	164	#6	6"	7'-4"	1806	24	19'-5"	311
9'-0"	22'-5"	16	21'-7"	231	196	#6	5½"	14'-4"	4219	196	#6	5½"	7'-11"	2332	28	21'-7"	404
10'-0"	24'-7"	16	23'-9"	254	236	#6	5"	15'-9"	5583	236	#6	5"	8'-7"	3041	32	23'-9"	508

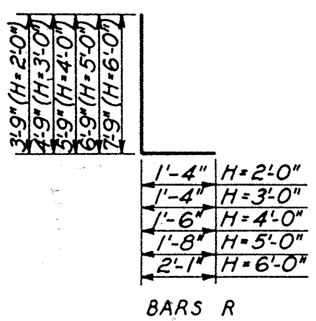
WING SIZE H	#4 BARS T2 @18"± NO.	LGTH.	WT.	BARS U1 @18"± NO.	SIZE	LGTH.	WT.	BARS U2 @18"± NO.	SIZE	LGTH.	WT.	#4 BARS W @12"± NO.	LGTH.	WT.	#4 Bars P @18" cc NO.	LGTH.	WT.	TOTAL WEIGHT
2'-0"	8	7'-7"	41	8	#5	6'-0"	50	8	#5	6'-0"	50	28	11'-11"	223	24	3'-9	60	687
3'-0"	12	9'-9"	78	12	#5	6'-0"	75	12	#5	6'-0"	75	28	15'-2"	284	32	4'-9	102	1,035
4'-0"	16	11'-10"	126	16	#5	6'-0"	100	16	#5	6'-0"	100	32	18'-6"	395	36	5'-9	138	1,678
5'-0"	16	13'-11"	149	16	#5	6'-0"	100	16	#5	6'-0"	100	36	22'-5"	539	44	6'-9	198	2,541
6'-0"	20	16'-1"	215	20	#5	6'-0"	125	20	#5	6'-0"	125	36	24'-6"	589	48	7'-9	248	3,483
7'-0"	24	18'-3"	293	24	#5	6'-0"	150	24	#5	6'-0"	150	40	26'-8"	713	52	8'-9	304	5,014
8'-0"	24	20'-5"	327	24	#5	6'-0"	150	24	#5	6'-0"	150	44	28'-10"	847	60	9'-9"	391	7,331
9'-0"	28	22'-7"	422	28	#5	6'-0"	175	28	#5	6'-0"	175	44	31'-0"	911	64	10'-10"	463	9,332
10'-0"	32	24'-9"	529	32	#5	6'-0"	200	32	#5	6'-0"	200	48	33'-0"	1058	72	11'-10"	569	11,942

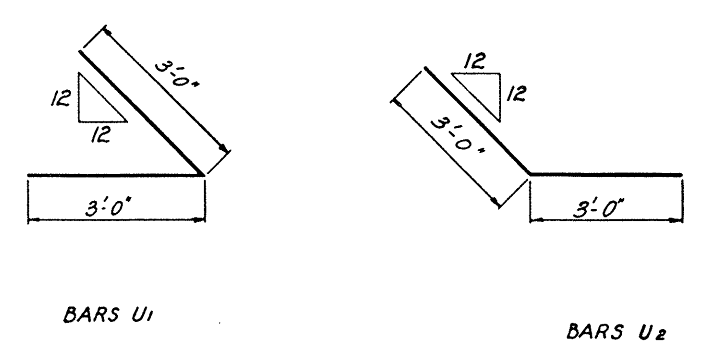


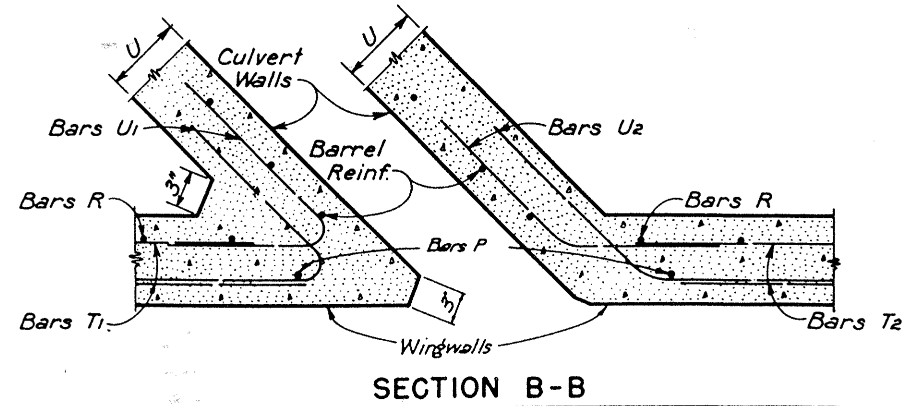












GENERAL NOTES:

Chamfer all exposed corners ¾".

All dimensions relating to reinforcing steel are to centers of bars.

Provide weepholes for H = 5'-0" and greater.

The bottom slab of the barrel, wing footings, and toe walls shall be placed in one continuous operation.

Wings shall be constructed monolithic with the barrel. If construction joints are used near the top of the barrel walls, these joints shall continue through the wings.

BILL OF #4 BARS S2 @ 12"± FOR 2 CULVERT APRONS									
H	SPAN	NO.	LGTH.	WT.	H	SPAN	NO.	LGTH.	WT.
2'-0"	3'-0"	12	3'-11"	31	5'-0"	9'-0"	28	5'-5"	101
	4'-0"	14	3'-11"	37		10'-0"	32	5'-5"	116
	5'-0"	16	3'-11"	42	6'-0"	6'-0"	20	6'-1"	81
3'-0"	3'-0"	12	4'-3"	34		7'-0"	22	6'-1"	89
	4'-0"	14	4'-3"	40		8'-0"	26	6'-1"	106
	5'-0"	16	4'-3"	45		9'-0"	28	6'-1"	114
	6'-0"	20	4'-3"	57		10'-0"	32	6'-1"	130
	7'-0"	22	4'-3"	62	7'-0"	7'-0"	22	6'-7"	97
4'-0"	4'-0"	14	4'-10"	45		8'-0"	26	6'-7"	114
	5'-0"	16	4'-10"	52		9'-0"	28	6'-7"	123
	6'-0"	20	4'-10"	65		10'-0"	32	6'-7"	141
	7'-0"	22	4'-10"	71	8'-0"	8'-0"	26	7'-2"	125
	8'-0"	26	4'-10"	84		9'-0"	28	7'-2"	134
5'-0"	5'-0"	16	5'-5"	58		10'-0"	32	7'-2"	153
	6'-0"	20	5'-5"	72	9'-0"	9'-0"	28	7'-9"	145
	7'-0"	22	5'-5"	80		10'-0"	32	7'-9"	166
	8'-0"	26	5'-5"	94	10'-0"	10'-0"	32	8'-5"	180

TEXAS HIGHWAY DEPARTMENT

PARALLEL WINGS - 45° SKEW
FOR SINGLE BOX CULVERTS
SIZES 3' x 2' TO 10' x 10'

 PW-45°

Dn.: C.F.S. & W.H.	DRAWING	DATE	FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.			SHEET NO.
Ck.Dn.: W.H.	Original	Jan., 1958	6	TEXAS	STP 99(413)MM			225
Dw.: M.D.A.	Rev. 11-67		STATE DIST. NO.	COUNTY	CONTROL NO.	SECTION NO.	JOB NO.	HIGHWAY NO.
Ck.Dw.: K.M.	Rev. 7-95 (note ①)		DAL	ROCKWALL	1014	03	033	740
Tr.: E.J.T.								
Ck.Tr.: M.D.A.								

PLAN — NOTE BOOK / NO. / SURVEYED / PLOTTED / ALIGN. CHECKED / RT. OF WAY CHECKED / BY / DATE

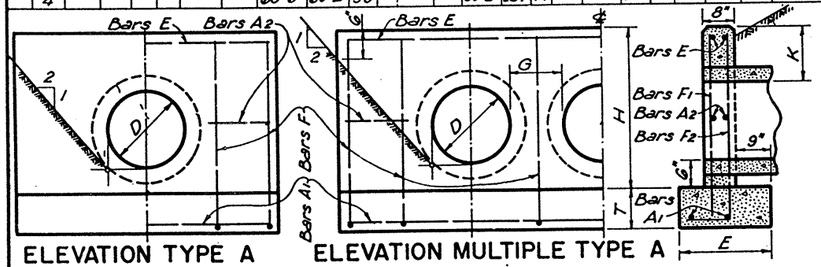
PROFILE — NOTE BOOK / NO. / SURVEYED / PLOTTED / GRADES CHECKED / B. M.'s NOTED / STRUCTURE NOTAT'NS CH'KD / BY / DATE

TABLE OF DIMENSIONS AND QUANTITIES FOR TWO TYPE A HEADWALLS

NO. OF PIPES	DIAM OF PIPES	TABLE OF DIMENSIONS G	K	T	E	H	W	REINF. STEEL FOR TWO HEADWALLS BARS A1 4~#3 Lgth.	Wt.	BARS A2 #3 @ 18"± No.	Lgth.	Wt.	BARS E 4~#5 Lgth.	Wt.	BARS F1 @ 12"± No.	Size	Lgth.	Wt.	BARS F2 @ 12"± No.	Size	Lgth.	Wt.	TOTAL QUANTITIES STEEL LBS.	CONC. C.Y.
1	12"	~	12"	9"	1'-9"	2'-6"	7'-0"	6'-8"	10	8	2'-6"	8	6'-8"	28	12	#4	2'-11"	23	12	#4	3'-8"	29	98	1.48
2	"	10"	"	"	"	"	8'-10"	8'-6"	13	"	"	"	8'-6"	35	14	"	"	27	14	"	"	34	117	1.81
3	"	"	"	"	"	"	10'-8"	10'-4"	16	"	"	"	10'-4"	43	16	"	"	31	16	"	"	39	137	2.15
4	"	"	"	"	"	"	12'-6"	12'-2"	18	"	"	"	12'-2"	51	18	"	"	35	18	"	"	44	156	2.48
1	15"	~	12"	9"	1'-9"	2'-9"	8'-3"	7'-11"	12	8	3'-0"	9	7'-11"	33	12	#4	3'-2"	25	12	#4	3'-11"	31	110	1.82
2	"	1'-0"	"	"	"	"	10'-6"	10'-2"	15	"	"	"	10'-2"	42	14	"	"	30	14	"	"	37	133	2.24
3	"	"	"	"	"	"	12'-9"	12'-5"	19	"	"	"	12'-5"	52	16	"	"	34	16	"	"	42	156	2.66
4	"	"	"	"	"	"	15'-0"	14'-8"	22	"	"	"	14'-8"	61	18	"	"	38	18	"	"	47	177	3.09
1	18"	~	12"	9"	1'-9"	3'-0"	9'-6"	9'-2"	14	8	3'-6"	11	9'-2"	38	20	#4	3'-5"	46	20	#4	4'-2"	56	165	2.19
2	"	1'-2"	"	"	"	"	12'-2"	11'-10"	18	"	"	"	11'-10"	49	22	"	"	50	22	"	"	61	189	2.70
3	"	"	"	"	"	"	14'-10"	14'-6"	22	"	"	"	14'-6"	60	24	"	"	55	24	"	"	67	215	3.21
4	"	"	"	"	"	"	17'-6"	17'-2"	26	"	"	"	17'-2"	72	26	"	"	59	26	"	"	72	240	3.73
1	24"	~	12"	9"	2'-0"	3'-6"	12'-0"	11'-8"	18	8	4'-6"	14	11'-8"	49	24	#4	3'-11"	63	24	#4	4'-11"	79	223	3.17
2	"	1'-5"	"	"	"	"	15'-5"	15'-1"	23	"	"	"	15'-1"	63	26	"	"	68	26	"	"	85	253	3.89
3	"	"	"	"	"	"	18'-10"	18'-6"	28	"	"	"	18'-6"	77	28	"	"	73	28	"	"	92	284	4.62
4	"	"	"	"	"	"	22'-3"	21'-11"	33	"	"	"	21'-11"	91	30	"	"	79	30	"	"	99	316	5.35
1	30"	~	12"	9"	2'-3"	4'-0"	14'-6"	14'-2"	21	16	5'-6"	33	14'-2"	59	28	#4	4'-5"	83	28	#4	5'-8"	106	302	4.31
2	"	1'-8"	"	"	"	"	18'-8"	18'-4"	28	"	"	"	18'-4"	76	32	"	"	94	32	"	"	121	352	5.28
3	"	"	"	"	"	"	22'-10"	22'-6"	34	"	"	"	22'-6"	94	36	"	"	106	36	"	"	136	403	6.26
4	"	"	"	"	"	"	27'-0"	26'-8"	40	"	"	"	26'-8"	111	40	"	"	118	40	"	"	152	454	7.24
1	36"	~	12"	12"	2'-6"	4'-6"	17'-0"	16'-8"	25	16	6'-6"	39	16'-8"	70	32	#4	5'-2"	111	32	#4	6'-8"	143	388	6.40
2	"	1'-11"	"	"	"	"	21'-11"	21'-7"	32	"	"	"	21'-7"	90	36	"	"	124	36	"	"	160	445	7.89
3	"	"	"	"	"	"	26'-10"	26'-6"	40	"	"	"	26'-6"	111	40	"	"	138	40	"	"	178	506	9.37
4	"	"	"	"	"	"	31'-9"	31'-5"	47	"	"	"	31'-5"	131	44	"	"	152	44	"	"	196	565	10.85
1	42"	~	12"	12"	2'-9"	5'-0"	19'-6"	19'-2"	29	16	7'-6"	45	19'-2"	80	36	#4	5'-8"	136	36	#4	7'-5"	178	468	8.10
2	"	2'-2"	"	"	"	"	25'-2"	24'-10"	37	"	"	"	24'-10"	104	40	"	"	152	40	"	"	198	536	9.96
3	"	"	"	"	"	"	30'-10"	30'-6"	46	"	"	"	30'-6"	127	44	"	"	167	44	"	"	218	603	11.80
4	"	"	"	"	"	"	36'-6"	36'-2"	54	"	"	"	36'-2"	151	48	"	"	182	48	"	"	238	670	13.68
1	48"	~	15"	12"	3'-0"	5'-9"	23'-0"	22'-8"	34	24	8'-9"	79	22'-8"	95	40	#5	6'-5"	268	40	#5	8'-5"	351	827	10.74
2	"	2'-5"	"	"	"	"	29'-5"	29'-1"	44	"	"	"	29'-1"	121	44	"	"	295	44	"	"	386	925	13.08
3	"	"	"	"	"	"	35'-10"	35'-6"	53	"	"	"	35'-6"	148	48	"	"	321	48	"	"	422	1023	15.43
4	"	"	"	"	"	"	42'-3"	41'-11"	63	"	"	"	41'-11"	175	52	"	"	348	52	"	"	457	1122	17.77
1	54"	~	15"	12"	3'-3"	6'-3"	25'-6"	25'-2"	38	24	9'-9"	88	25'-2"	105	44	#5	6'-11"	318	44	#5	9'-2"	421	970	12.87
2	"	3'-0"	"	"	"	"	32'-10"	32'-6"	49	"	"	"	32'-6"	136	50	"	"	361	50	"	"	478	1112	15.77
3	"	"	"	"	"	"	40'-2"	39'-10"	60	"	"	"	39'-10"	166	56	"	"	404	56	"	"	536	1254	18.66
4	"	"	"	"	"	"	47'-6"	47'-2"	71	"	"	"	47'-2"	197	62	"	"	447	62	"	"	593	1396	21.55
1	60"	~	15"	12"	3'-6"	6'-9"	28'-0"	27'-8"	42	24	10'-9"	97	27'-8"	115	48	#5	7'-5"	371	48	#5	9'-11"	497	1122	15.20
2	"	3'-0"	"	"	"	"	36'-0"	35'-8"	54	"	"	"	35'-8"	149	54	"	"	418	54	"	"	559	1277	18.55
3	"	"	"	"	"	"	44'-0"	43'-8"	66	"	"	"	43'-8"	182	60	"	"	464	60	"	"	621	1430	21.89
4	"	"	"	"	"	"	52'-0"	51'-8"	78	"	"	"	51'-8"	216	66	"	"	511	66	"	"	683	1585	25.24
1	66"	~	15"	12"	3'-9"	7'-3"	30'-6"	30'-2"	45	32	11'-9"	141	30'-2"	126	52	#5	7'-11"	430	52	#5	10'-8"	579	1321	17.72
2	"	3'-1"	"	"	"	"	39'-1"	38'-9"	58	"	"	"	38'-9"	162	58	"	"	479	58	"	"	645	1485	21.49
3	"	"	"	"	"	"	47'-8"	47'-4"	78	"	"	"	47'-4"	198	64	"	"	529	64	"	"	712	1651	25.27
4	"	"	"	"	"	"	56'-3"	55'-11"	84	"	"	"	55'-11"	233	70	"	"	578	70	"	"	779	1815	29.05
1	72"	~	15"	12"	4'-0"	7'-9"	33'-0"	32'-8"	49	32	12'-9"	153	32'-8"	136	56	#5	8'-5"	492	56	#5	11'-5"	667	1497	20.42
2	"	3'-2"	"	"	"	"	42'-2"	41'-10"	63	"	"	"	41'-10"	175	62	"	"	544	62	"	"	738	1673	24.66
3	"	"	"	"	"	"	51'-4"	51'-0"	77	"	"	"	51'-0"	213	68	"	"	597	68	"	"	810	1850	28.89
4	"	"	"	"	"	"	60'-6"	60'-2"	90	"	"	"	60'-2"	251	74	"	"	650	74	"	"	881	2025	33.12

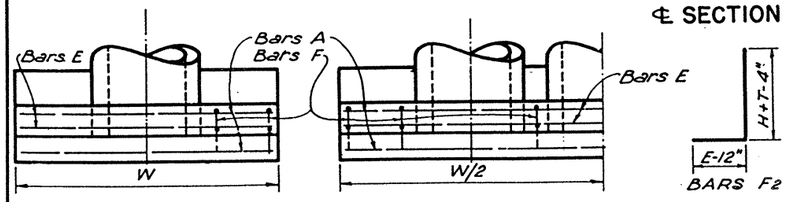
TABLE OF DIMENSIONS AND QUANTITIES FOR TWO TYPE B HEADWALLS

NO. OF PIPES	DIAM. OF PIPES	TABLE OF DIMENSIONS G	K	X	H	Y	W	REINFORCING STEEL AND QUANTITIES FOR TWO HEADWALLS BARS A1-Ax #4 @ 12"± No.	Av. Lgth.	Wt.	BARS B #3 @ 18"± No.	Lgth.	Wt.	BARS B1-Bx #3 @ 18"± No.	Av. Lgth.	Wt.	C=2'-0" #4 @12"± No.	Wt.	BARS D1-Dx #3 @ 12"± No.	Av. Lgth.	Wt.	BARS E 8~#5 Lgth.	Wt.	BARS F No.	Size	Lgth.	Wt.	BARS G 4~#3 Lgth.	Wt.	BARS S 12~#4 Lgth.	Wt.	BARS V1-Vx #4 @ 12"± No.	Av. Lgth.	Wt.	BARS W 4~#5 Lgth.	Wt.	*TOTAL QUANTITIES STEEL LBS.	CONC. C.Y.
1	12"	~	12"	2'-8"	2'-0"	1'-0"	2'-4"	2	2'-8"	4	6	2'-6"	6	~	~	~	4	5	~	~	~	2'-0"	17	8	#4	2'-2"	12	2'-8"	4	8"	5	4	2'-11"	8	1'-8"	7	68	.52
2	"	10"	"	4'-2"	"	"	4'-2"	"	4'-6"	6	8	"	8	~	~	~	"	"	~	~	~	3'-10"	32	12	"	"	17	4'-6"	7	"	"	"	"	"	"	"	"	95	.82
3	"	"	"	6'-0"	"	"	6'-0"	"	6'-4"	8	10	"	9	~	~	~	"	"	~	~	~	5'-8"	47	16	"	"	23	6'-4"	10	"	"	"	"	"	"	"	"	122	1.11
4	"	"	"	7'-10"	"	"	7'-10"	"	8'-2"	11	12	"	11	~	~	~	"	"	~	~	~	7'-6"	63	20	"	"	29	8'-2"	12	"	"	"	"	"	"	"	"	151	1.40
1	15"	~	12"	2'-7⅞"	2'-3"	1'-6"	3'-2⅝"	4	3'-0"	8	6	3'-0"	7	4	1'-10"	3	8	11	~	~	~	2'-3"	19	8	#4	2'-5"	13	3'-7"	5	1'-3"	10	8	3'-0"	16	2'-3"	9	101	.75
2	"	1'-0"	"	4'-10⅝"	"	"	5'-5⅞"	"	5'-3"	14	8	"	9	"	"	"	"	"	~	~	~	4'-6"	38	12	"	"	19	5'-10"	9	"	"	"	"	"	"	"	"	138	1.16
3	"	"	"	7'-1½"	"	"	7'-8½"	"	7'-6"	20	10	"	11	"	"	"	"	"	~	~	~	6'-9"	56	16	"	"	26	8'-1"	12	"	"	"	"	"	"	"	"	174	1.57
4	"	"	"	9'-4½"	"	"	9'-11½"	"	9'-9"	26	14	"	16	"	"	"	"	"	~	~	~	9'-0"	75	20	"	"	32	10'-4"	16	"	"	"	"	"	"	"	"	214	1.98
1	18"	~	12"	2'-11"	2'-6"	2'-0"	4'-0⅜"	4	3'-10"	10	6	3'-6"	8	4	1'-10"	3	8	11	4	1'-0"	2	2'-7"	22	8	#4	2'-8"	14	4'-5"	7	1'-10"	15	12	3'-2"	25	2'-11"	12	129	1.00
2	"	1'-2"	"	5'-7"	"	"	6'-8⅜"	"	6'-6"	17	8	"	11	"	"	"	"	"	"	"	"	5'-3"	44	12	"	"	21	7'-1"	11	"	"	"	"	"	"	"	"	172	1.55
3	"	"	"	8'-3"	"	"	9'-4⅞"	"	9'-2"	25	12	"	16	"	"	"	"	"	"	"	"	7'-11"	66	16	"	"	29	9'-9"	15	"	"	"	"	"	"	"	"	219	2.11
4	"	"	"	10'-11"	"	"	12'-0⅜"	"	11'-10"	32	16	"	21	"	"	"	"	"	"	"	"	10'-7"	88	20	"	"	36	12'-5"	19	"	"	"	"	"	"	"	"	264	2.65
1	24"	~	12"	3'-6"	3'-0"	3'-0"	5'-9⅜"	6	5'-0"	20	6	4'-6"	10	4	1'-10"	3	8	11	4	1'-0"	2	3'-2"	26	8	#4	3'-2"	17	6'-2"	9	3'-0"	24	16	3'-5"	37	4'-2"	17	176	1.62
2	"	1'-5"	"	6'-11"	"	"	9'-2⅝"	"	8'-5"	34	10	"	17	"	"	"	"	"	"	"	"	6'-7"	55	12	"	"	25	9'-7"	14	"	"	"	"	"	"	"	"	239	2.46
3	"	"	"	10'-4"	"	"	12'-7⅝"	"	11'-10"	47	16	"	27	"	"	"	"	"	"	"	"	9'-10"	82	16	"	"	34	13'-0"	20	"	"	"	"	"	"	"	"	304	3.32
4	"	"	"	13'-9"	"	"	16'-0⅝"	"	15'-3"	61	20	"	34	"	"	"	"	"	"	"	"	13'-5"	112	20	"	"	42	16'-5"	25	"	"	"	"	"	"	"	"	368	4.18
1	30"	~	12"	4'-1"	3'-6"	4'-0"	7'-6⅜"	8	6'-2"	33	6	5'-6"	12	8	3'-1"	9	12	16	8	2'-2"	7	3'-9"	31	8	#4	3'-8"	20	7'-11"	12	4'-2"	33	20	3'-8"	49	5'-5"	23	245	2.34
2	"	"	"	8'-3"	"	"	9'-11⅝"	"	10'-4"	55	12	"	25	"	"	"	"	"	"	"	"	7'-11"	56	16	"	"	39	12'-1"	18	"	"	"	"	"	"	"	"	340	3.58
3	"	"	"	12'-5"	"	"	13'-10⅝"	"	14'-6"	77	18	"	37	"	"	"	"	"	"	"	"	12'-1"	101	24	"	"	59	16'-3"	24	"	"	"	"	"	"	"	"	435	4.80
4	"	"	"	16'-7"	"	"	20'-0⅝"	"	18'-8"	100	24	"	50	"	"	"	"	"	"	"	"	16'-3"	136	32	"	"	78	20'-5"	31	"	"	"	"	"	"	"	"	532	6.04
1	36"	~	12"	4'-8"	4'-0"	5'-0"	9'-3⅛"	10	7'-4"	49	8	6'-6"	20	8	3'-1"	9	12	16	8	2'-2"	7	4'-4"	36	8	#4	4'-2"	22	9'-8"	15	5'-4"	43	24	3'-11"	63	6'-8"	28	308	3.23
2	"	1'-11"	"	9'-7"	"	"	14'-2⅜"	"	12'-3"	82	14	"	34	"	"	"	"	"	"	"	"	9'-3"	77	16	"	"	45	14'-7"	22	"	"	"	"	"	"	"	"	426	4.89
3	"	"	"	14'-6"	"	"	19'-1⅝"	"	17'-2"	115	20	"	49	"	"	"	"	"	"	"	"	14'-2"	118	24	"	"	67	19'-6"	29	"	"	"	"	"	"	"	"	544	6.55
4	"	"	"	19'-5"	"	"	24'-0⅝"	"	22'-1"	147	28	"	68	"	"	"	"	"	"	"	"	19'-1"	159	32	"	"	89	24'-5"	37	"	"	"	"	"	"	"	"	666	8.22
1	42"	~	12"	5'-3"	4'-6"	6'-0"	11'-0⅜"	12	8'-6"	68	8	7'-6"	23	12	4'-5"	20	16	21	12	3'-3"	15	4'-11"	41	8	#4	4'-8"	25	11'-5"	17	6'-5"	51	28	4'-2"	78	7'-11"	33	392	4.23
2	"	2'-2"	"	10'-11"	"	"	16'-8¼"	"	14'-2"	114	16	"	45	"	"	"	"	"	"	"	"	10'-7"	88	16	"	"	50	17'-1"	26	"	"	"	"	"	"	"	"	541	6.40
3	"	"	"	16'-7"	"	"	22'-4⅛"	"	19'-10"	159	24	"	68	"	"	"	"	"	"	"	"	16'-3"	136	24	"	"	75	22'-9"	34	"	"	"	"	"	"	"	"	690	8.56
4	"	"	"	22'-3"	"	"	28'-0⅛"	"	25'-6"	204	32	"	90	"	"	"	"	"	"	"	"	21'-11"	183	32	"	"	100	28'-5"	43	"	"	"	"	"	"	"	"	838	10.74
1	48"	~	15"	5'-10"	5'-3"	7'-0"	12'-9⅞"	14	9'-8"	90	10	8'-6"	32	12	4'-5"	20	16	21	12	3'-4"	15	5'-6"	46	8	#5	5'-5"	45	13'-2"	20	7'-7"	61	32	4'-5"	94	9'-3"	39	483	5.43
2	"	2'-5"	"	12'-3"	"	"	19'-2⅜"	"	16'-1"	150	18	"	58	"	"	"	"	"	"	"	"	11'-11"	99	16	"	"	90	19'-7"	29	"	"	"	"	"	"	"	"	676	8.25
3	"	"	"	18'-8"	"	"	25'-7⅞"	"	22'-6"	210	26	"	83	"	"	"	"	"	"	"	"	18'-4"	153	24	"	"	136	26'-0"	39	"	"	"	"	"	"	"	"	871	11.07
4	"	"	"	25'-1"	"	"	32'-0⅜"	"	28'-11"	270	36	"	115	"	"	"	"	"	"	"	"	24'-9"	207	32	"	"	181	32'-5"	49	"	"	"	"	"	"	"	"	1072	13.89
1	54"	~	15"	6'-5"	5'-9"	8'-0"	14'-6"	16	10'-10"	116	10	9'-6"	36	12	4'-5"	20	20	27	16	4'-5"	27	6'-1"	51	8	#5	5'-11"	49	14'-10"	22	8'-9"	70	40	4'-8"	125	10'-5"	43	586	6.71
2	"	3'-0"	"	7'-3"	"	"	18'-2"	"	16'-1"	194	20	"	71	"	"	"	"	"	"	"	"	13'-5"	112	20	"	"	123	22'-2"	33	"	"	"	"	"	"	"	"	845	10.28
3	"	"	"	21'-1"	"	"	29'-2"	"	25'-6"	273	30	"	107	"	"	"	"	"	"	"	"	20'-9"	173	32	"	"	198	29'-6"	44	"	"	"	"	"	"	"	"	1107	13.84
4	"	"	"	28'-5"	"	"	36'-6"	"	32'-10"	351	40	"	143	"	"	"	"	"	"	"	"	28'-1"	234	44	"	"	272	36'-10"	55	"	"	"	"	"	"	"	"	1367	17.42
1	60"	~	15"	7'-0"	6'-3"	9'-0"	16'-2⅞"	18	12'-0"	144	10	10'-6"	39	16	5'-9"	35	20	27	16	4'-5"	27	6'-8"	56	8	#5	6'-5"	54	16'-7"	25	9'-11"	80	44	4'-11"	145	11'-8"	49	681	8.11
2	"	3'-0"	"	15'-0"	"	"	20'-3⅜"	"	18'-2"	194	22	"	87	"	"	"	"	"	"	"	"	14'-8"	122	20	"	"	134	25'-7"	38	"	"	"	"	"	"	"	"	984	12.34
3	"	"	"	23'-0"	"	"	32'-3⅞"	"	28'-0"	337	32	"	126	"	"	"	"	"	"	"	"	22'-8"	189	32	"	"	214	32'-7"	49	"	"	"	"	"	"	"	"	1278	16.57
4	"	"	"	31'-0"	"	"	40'-4⅜"	"	36'-5"	438	44	"	174	"	"	"	"	"	"	"	"	30'-8"	256	44	"	"	295	40'-8"	61	"	"	"	"	"	"	"	"	1587	20.82
1	66"	~	15"	7'-7"	6'-9"	10'-0"	17'-11⅛"	20	13'-2"	176	12	11'-6"	52	16	5'-9"	35	24	32	20	5'-7"	42	7'-3"	60	8	#5	6'-11"	58	18'-4"	28	11'-1"	89	48	5'-2"	166	13'-0"	54	792	9.65
2	"	3'-1"	"	16'-2"	"	"	26'-6¼"	"	21'-9"	231	24	"	104	"	"	"	"	"	"	"	"	15'-10"	132	20	"	"	144	26'-11"	40	"	"	"	"	"	"	"	"	1129	14.54
3	"	"	"	24'-9"	"	"	35'-1⅜"	"	30'-4"	405	34	"	147	"	"	"	"	"	"	"	"	24'-5"	204	32	"	"	231	35'-6"	53	"	"	"	"	"	"	"	"	1458	19.42
4	"	"	"	33'-4"	"	"	43'-8¾"	"	39'-8"	530	46	"	199	"	"	"	"	"	"	"	"	33'-0"	275	44	"	"	318	44'-2"	67	"	"	"	"	"	"	"	"	1807	24.31
1	72"	~	15"	8'-2"	7'-3"	11'-0"	19'-8⅜"	22	14'-4"	211	12	12'-6"	56	16	5'-9"	35	24	32	20	5'-7"	42	7'-10"	65	8	#5	7'-5"	62	20'-1"	30	12'-3"	98	52	5'-5"	188	14'-3"	59	878	11.32
2	"	3'-2"	"	17'-4"	"	"	28'-10⅝"	"	23'-6"	345	24	"	113	"	"	"	"	"	"	"	"	17'-0"	142	20	"	"	155	29'-3"	44	"	"	"	"	"	"	"	"	1253	16.91
3	"	"	"	26'-6"	"	"	38'-0⅜"	"	32'-10"	482	38	"	179	"	"	"	"	"	"	"	"	26'-2"	218	32	"	"	248	38'-5"	58	"	"	"	"	"	"	"	"	1639	22.52
4	"	"	"	35'-8"	"	"	47'-2⅛"	"	41'-10"	615	50	"	235	"	"	"	"	"	"	"	"	35'-4"	295	44	"	"	341	47'-8"	72	"	"	"	"	"	"	"	"	2017	28.11



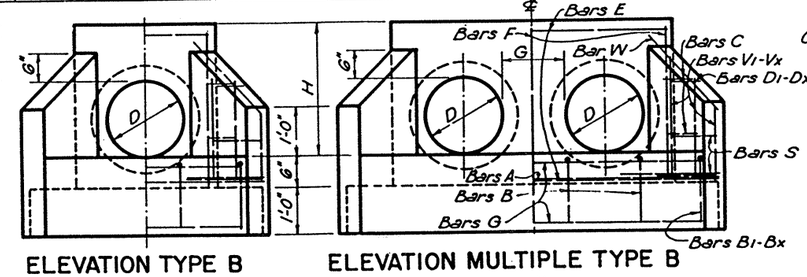
ELEVATION TYPE A — ELEVATION MULTIPLE TYPE A

℄ SECTION

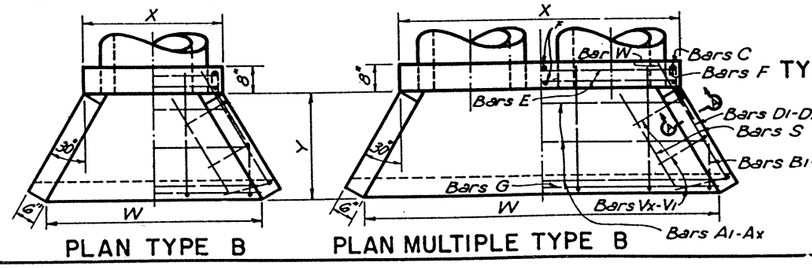


PLAN TYPE A — PLAN MULTIPLE TYPE A

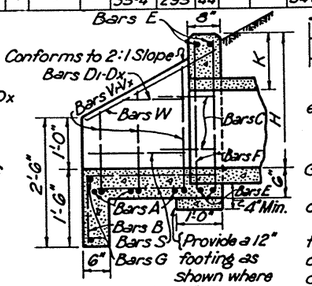
*Concrete Quantities increase slightly for metal pipe installations.



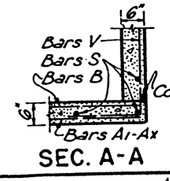
ELEVATION TYPE B — ELEVATION MULTIPLE TYPE B



PLAN TYPE B — PLAN MULTIPLE TYPE B



TYPICAL WING ELEVATION



SEC. A-A

$A_1 = W + 4\frac{1}{2}"$
$A_2 = W - 9\frac{1}{8}"$

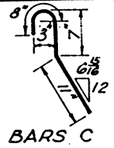
This dimension reduced 1'-1⅛" for each successive bar.

BARS A1-Ax

$B_1 = Y + 4"$
$B_1 = 8"$

This dimension increased 2'-7" for each successive bar.

BARS B & B1-Bx



BARS C

GENERAL NOTES :- All exposed corners shall be chamfered ¾". Reinforcing steel shall be placed with the center of the outside layer of bars 2" from the surface of the concrete. Total Quantities include one 20 diameter lap for all bars over 60'-0" in length.

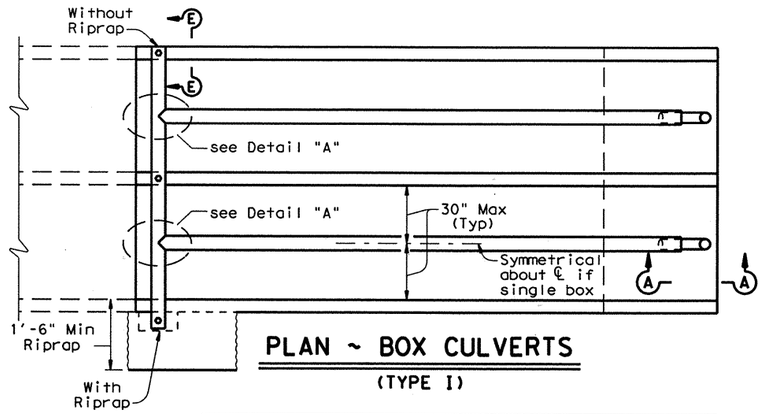
TEXAS HIGHWAY DEPARTMENT

CONCRETE HEADWALLS FOR PIPE CULVERTS

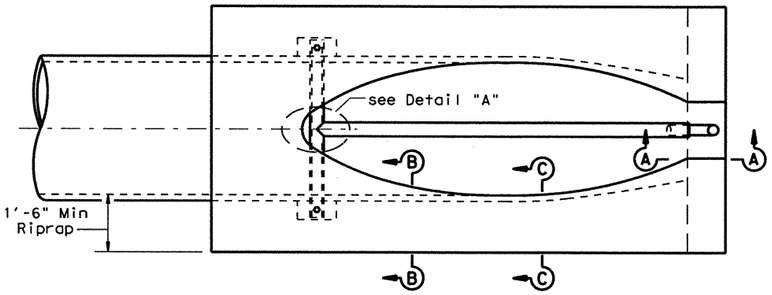
12 TO 72 INCHES IN DIAMETER

CH-11

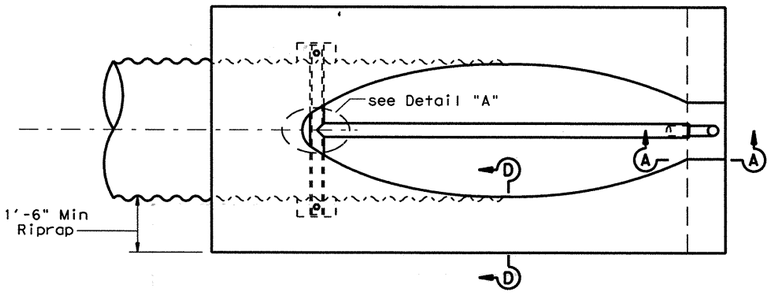
DN. T.H.D	DRAWING	DATE	FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.
CK. DN. T.H.D	Original	Feb. 1950	6	TEXAS	STP99(413)MM	226
DW. M.D.A	Rev. 11-67 Concrete		STATE DIST. NO.	COUNTY	CONTROL NO. SECTION NO. JOB NO.	H. SHEET NO.
CK. DW. K.M			DAL	ROCKWALL	1014 03 033	740
TR. O.C.K						
CK. TR. M.D.A						



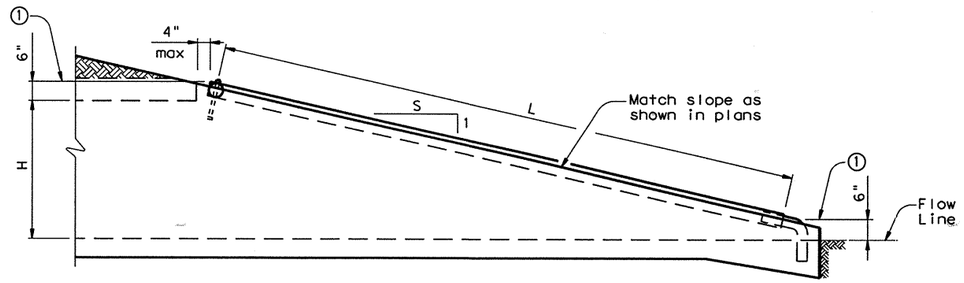
PLAN ~ BOX CULVERTS
(TYPE I)



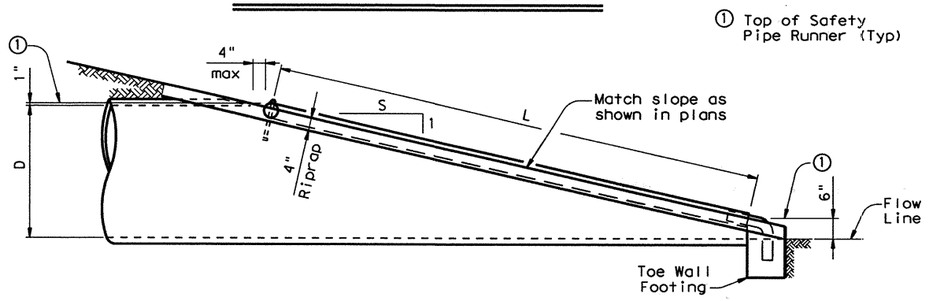
PLAN ~ CONCRETE PIPE
(TYPE II)



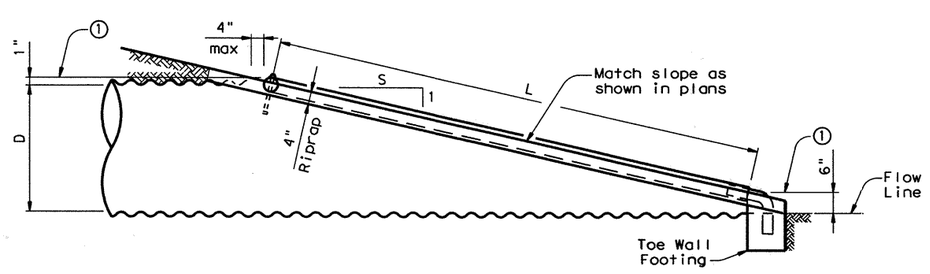
PLAN ~ CORRUGATED METAL PIPE
(TYPE II)



END TREATMENT ~ MULTIPLE OR SINGLE BOX CULVERTS

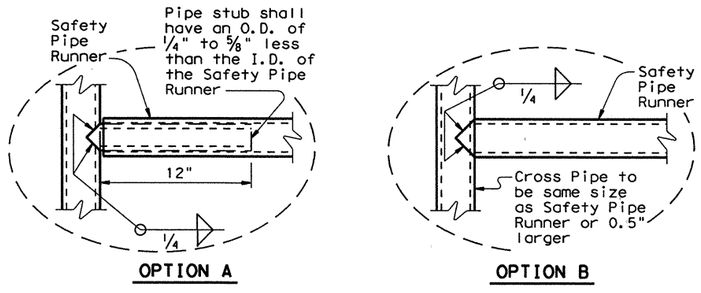


END TREATMENT ~ CONCRETE PIPE



END TREATMENT ~ CORRUGATED METAL PIPE

Note: See Sheet 2 of 2 for Sections A-A, B-B, C-C, D-D and E-E.



DETAIL A

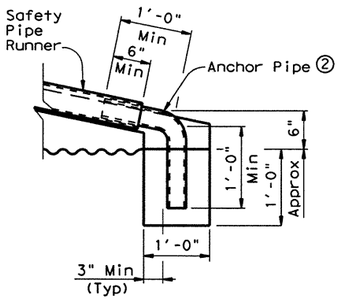
Texas Department of Transportation
Design Division (Bridge)

CROSS DRAINAGE SAFETY PIPE RUNNERS

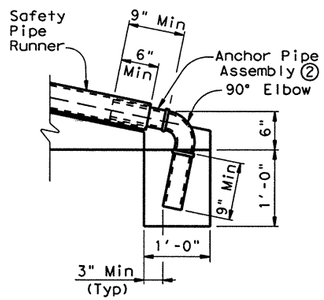
CD-SPR

FILE: csprestd.dgn	DN: MPM	CK: TER	DW: MCB	CK: TER	STD: B15
©TxDOT October 1996	DIST	FED REG	FEDERAL AID PROJECT •		SHEET
REVISIONS	DAL	6	STP99(413)MM		227
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

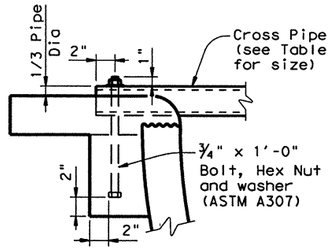
ACC: (LV=1,2 for English)
LAYED LEVEL 1 2



OPTION A

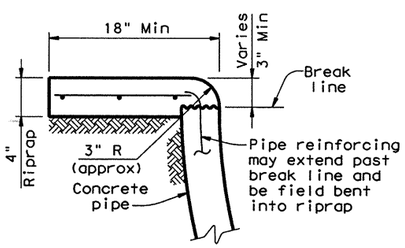


OPTION B

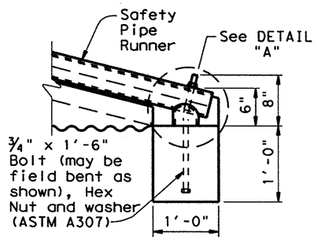


SECTION B-B

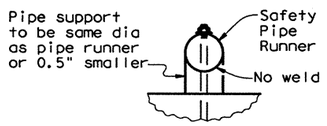
Deepen and widen Riprap around end of cross pipe and provide bolted connection to allow cleanout access



SECTION C-C



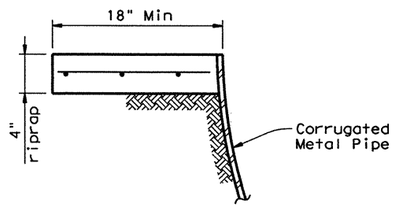
OPTION C



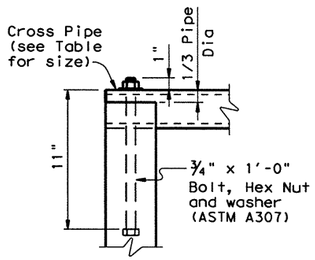
DETAIL "A"

Note:
Any of the above Safety Pipe Runner Lower Anchorage options may be used.

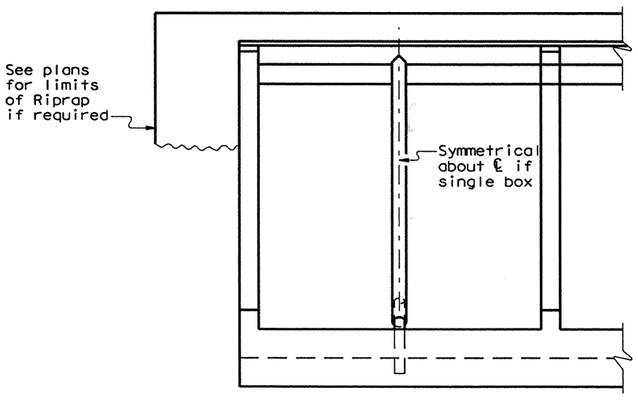
SECTION A-A



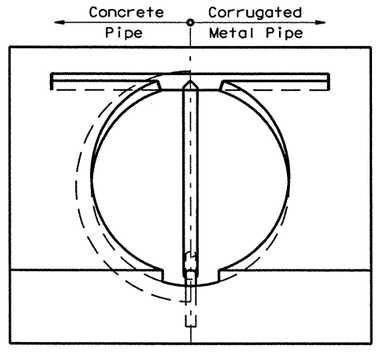
SECTION D-D



SECTION E-E



END VIEW ~ MULTIPLE OR SINGLE BOX CULVERTS



END VIEW ~ CONCRETE OR CORRUGATED METAL PIPE

"L" FOR VARIOUS CULVERT SIZES AND SIDE SLOPES ③				
Size	3:1 Slope	4:1 Slope	5:1 Slope	6:1 Slope
H = 24"	6'- 4"	8'- 3"	10'- 2"	12'- 2"
D = 36"	8'- 2"	10'- 8"	13'- 2"	15'- 9"
H = 36"	9'- 6"	12'- 4"	15'- 4"	18'- 3"
D = 42"	9'- 9"	12'- 9"	15'- 9"	18'- 9"
H = 42"	11'- 1"	14'- 5"	17'-10"	21'- 3"
D = 48"	11'- 4"	14'- 9"	18'- 3"	21'-10"
H = 48"	12'- 8"	16'- 6"	20'- 5"	24'- 4"
D = 54"	12'-11"	16'-10"	20'-10"	24'-10"
H = 54"	14'- 3"	18'- 7"	22'-11"	27'- 4"
D = 60"	14'- 6"	18'-11"	23'- 4"	27'-11"
H = 60"	15'-10"	20'- 7"	25'- 6"	30'- 5"

MAXIMUM PIPE "L" FOR A GIVEN PIPE SIZE AND YIELD			
Yield / Nom Dia	35 ksi ASTM A53 Ty E and S Gr B	42 ksi ASTM A500 Gr B	52 ksi API5LX52
3" (OD=3.500")	11'- 2"	13'- 4"	16'- 7"
3 ½" (OD=4.000")	15'- 6"	18'- 7"	23'- 0"
4" (OD=4.500")	20'-10"	25'- 0"	30'-11"
5" (OD=5.563")	35'- 4"	~	~

② Anchor Pipe may be any of the above materials and shall have an O.D. of ¼" to ⅝" less than the I.D. of the Safety Pipe Runners.
③ For anchor pipe using Option C for lower anchorage, add 1'-3" to the value for "L" in the above table.

DESIGN: Safety Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, Safety Treatment of Roadside Cross-Drainage Structures, Texas Transportation Institute, March 1981.

GENERAL NOTES:

These details are to be used as a guide for installation of safety pipe runners for cross-drainage structures where out of control vehicles may traverse the openings approximately perpendicular to the safety pipe runners. Some installations may require the preparation of special details. In general, safety pipe runners are installed on cross-drainage structures at maximum spacings of approximately 30 inches.

Installation of safety pipe runners for single or multiple culverts will be in accordance with the details shown if the use of safety pipe runners are specified elsewhere in the plans.

Payment for riprap (if required) and toe wall footing is included in the price bid for each Safety Pipe End Treatment.

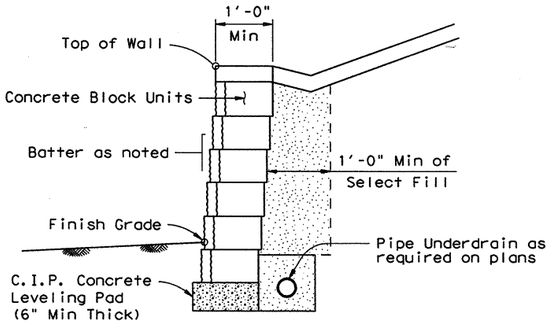
Texas Department of Transportation
Design Division (Bridge)

CROSS DRAINAGE SAFETY PIPE RUNNERS

CD-SPR

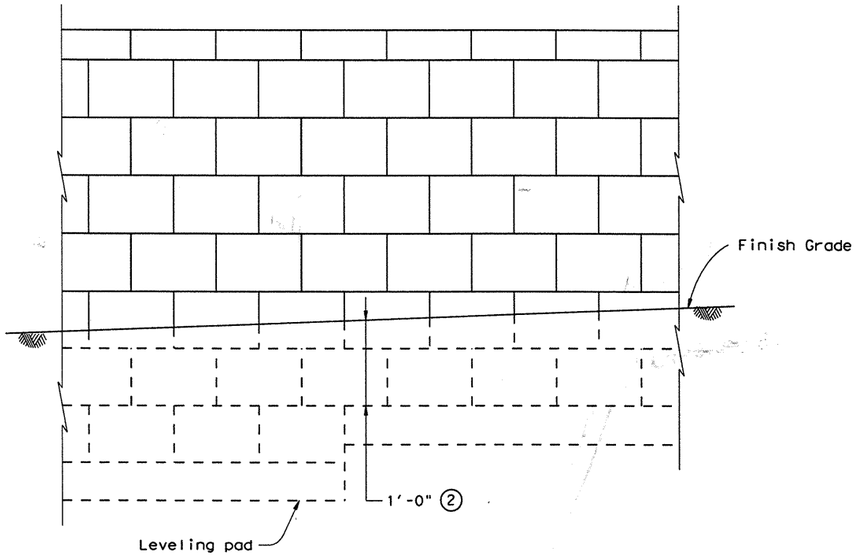
FILE: csprestd.dgn	DN: MPM	CK: TER	DW: MCB	CK: TER	STD: B15
©TxDOT October 1996	DIST	FED REG	FEDERAL AID PROJECT •		SHEET
REVISIONS	DAL	6	STP99(413)MM		223
	COUNTY		CONTROL	SECT	JOB HIGHWAY
	ROCKWALL		1014	03	033FM740

ACC: (LV=1,2 for English)
PLAYED
LEVEL 1 2

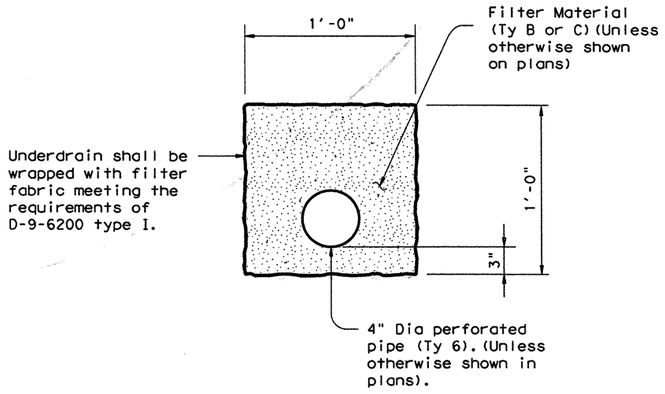


SECTION

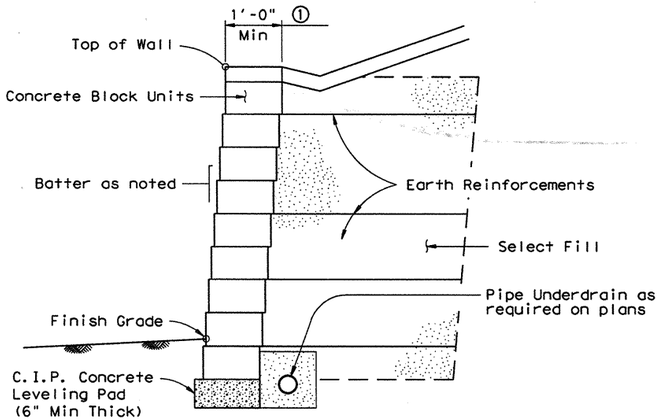
(No Earth Reinforcements)



TYPICAL ELEVATION



UNDERDRAIN DETAIL



SECTION

(With Earth Reinforcements)

① For systems utilizing continuous structural pins passing thru a minimum of 3 block layers, the minimum block depth shall be 8". The maximum vertical spacing of primary reinforcement on these systems shall be 24", and intermediate reinforcement will not be required.

② Unless noted elsewhere in the plans, 1'-0" minimum cover shall be provided from the top of leveling pad to finish grade.

③ For walls which are designated as landscape walls and are less than 6' tall, the following modifications to the design criteria will be allowed:

Factor of safety in sliding > 1.2.
Factor of safety in overturning > 1.5.
Connection strength factor of safety of 1.0 at 3/4" strain.
Minimum earth reinforcement length of 4'.

The above modified criteria does not apply to walls over 6' tall regardless of designation.

EARTH REINFORCEMENTS:

Walls may be constructed without earth reinforcements if all stability criteria are met with the blocks alone. If all stability criteria are not satisfied, earth reinforcements shall be provided.

The long term design strength (LTDS) of earth reinforcement shall be calculated in accordance with AASHTO 1992 Standard and current Interim Specifications.

Soil-geogrid pullout coefficient values shall be determined in accordance with Geosynthetics Research Institute (GRI) Method GG-5, "Guidelines for Evaluating Geogrid Pullout".

For the combination of concrete block and geogrid chosen, connection strength data shall be provided. The allowable connection load shall be limited to the connection strength developed at 3/4" displacement, divided by a 1.5 safety factor. ③

For internal stability calculations, the failure plane will be assumed to originate at the back of the concrete blocks.

The factor of safety against pullout of the earth reinforcements shall be determined from test data evaluated at 3/4" strain.

The maximum vertical spacing of primary earth reinforcement layers shall be 40 inches. ①
The minimum length of primary earth reinforcements shall be 8 feet, measured from the front of the blocks. ③

A layer of intermediate reinforcement shall be provided between primary reinforcements when the spacing between primary layers exceeds twice the horizontal depth of the concrete block unit. Intermediate reinforcement shall have a minimum length of 4 feet, and shall provide local stablity for the concrete block units. ①

STABILITY CRITERIA:

Factor of safety in sliding along the base of the structure shall be greater than or equal to 1.5. ③

Factor of safety in overturning shall be greater than or equal to 2.0. ③

The base pressure resultant shall fall within the middle third of the retaining wall.

DESIGN PARAMETERS:

Structure shall be based on the following design parameters:

Random Backfill: Unit weight = 120 pcf.
(Embankment or Existing Soils) ø = 30° c = 0 psf
Select Backfill: Unit weight = 120 pcf
ø = 34° c = 0 psf

GENERAL NOTES:

Sections and Typical Elevation shown are for informational purposes only. Specific geometry is to be determined based on wall layouts and other plan information.

Unless otherwise shown in the plans, wall batter shall be a maximum of 3" per foot. Blocks shall be placed horizontally, and a positive means of obtaining batter such as pins, keyways, or concrete lips shall be provided.

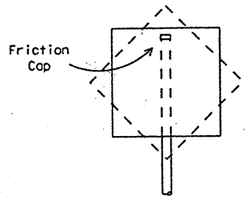
Texas Department of Transportation
Design Division (Bridge)

CONCRETE BLOCK RETAINING WALL

RW(CB)

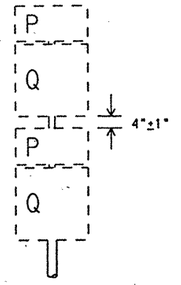
FILE: rwestd11.dgn	DN: MPM	CK: JCG	DW: KDK	CK: LDS	STD: B480
©TxDOT March 1996	DIST	FED REG	FEDERAL AID PROJECT #		SHEET
REVISIONS		6	STP 99(413)MM		229
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	ROCKWALL		1014	3	33	740

ACC: (LV=1,2 for English)
LEVELS
LAYED
1 2



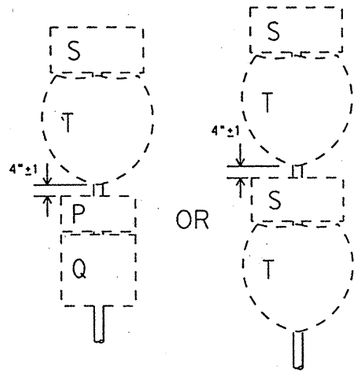
Type A

This type of mount which uses thin wall tubing or fiberglass reinforced plastic (FRP) pipe may be used to support any sign or combination of signs with a a total area less than the maximum areas given for that support on SMD(1-4) with the exception of the following signs: FR6-1, W1-6 and W1-7. These signs should be mounted on a Type D-1 support.



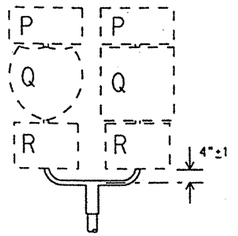
Type A-1

This type of mount may be used for up to two route markers (along with the appropriate cardinal direction markers). A 36" or 45" Interstate route marker may not be used on this support. May be used as a specified optional substriture for Type B. Post shall be 2½" Sch. 10.



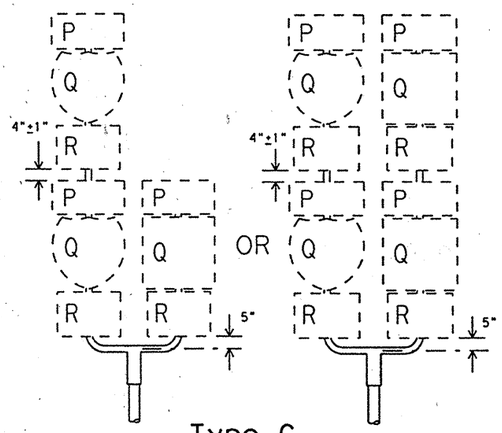
Type A-2

This type of mount may be used for up to two route markers (along with the appropriate cardinal direction markers). 36" or 45" Interstate route markers are allowable on this support. May be used as a specified optional substriture for Type B. Post shall be 2½" Sch. 80.



Type B

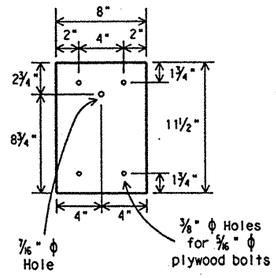
This type of mount may be used with two route markers (along with the appropriate cardinal direction markers). A 36" or 45" Interstate route marker may not be used on this support. Post shall be 2½" Sch. 10.



Type C

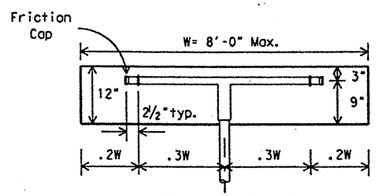
This type of mount is to be used when 3 or 4 route markers are required. If a 36" or 45" Interstate route marker is required, it shoud be mounted independently using a Type A mount or in conjunction with another 36" or 45" Interstate route marker using a Type A-2 mount. Post shall be 2½" Sch. 80.

P = 24"x12" Cardinal Direction Marker
Q_1 = 24"x24" Interstate, US or State Route Marker
Q_2 = 30"x24" Interstate or US Route Marker
R = 21"x15" Direction Arrow
S = 30"x15" Cardinal Direction Marker
T_1 = 36"x36" (2) digit Interstate Route Marker
T_2 = 45"x36" (3) digit Interstate Route Marker



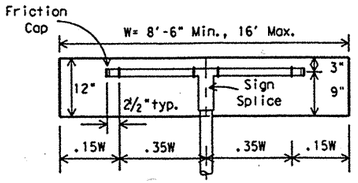
Splice Plate

Splice plates shall be 1/8 " steel plate (ASTM A36) or 1/8 " aluminum plate (ASTM B209 ALLOY 6061-T6 or 5052-H38). Steel shall be galvanized in accordance with ASTM A123.



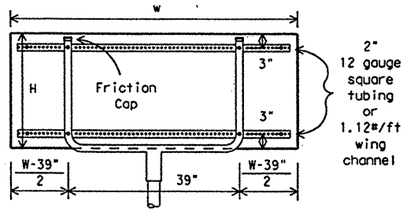
Type D-1

1. Mounting clamps are spaced 28" apart for "ONE WAY" signs (FR6-1, 48"x16"). Top of sign is 8" above centerline of "T" bar.
2. For "LARGE ARROW" signs (W1-6, 48"x24"), mounting clamps are spaced 30" apart.
3. Prefabricated 2" thin wall "T" mounted on a 2½" Sch. 10 post.



Type D-3

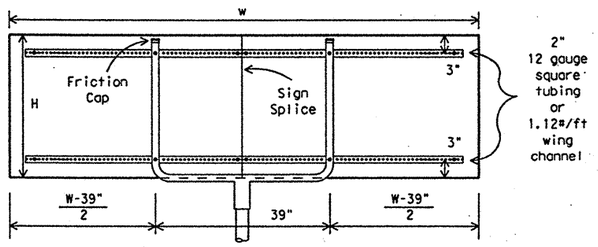
Prefabricated 2" thin wall "T" mounted on a 2½" Sch. 10 post.



Type D-2

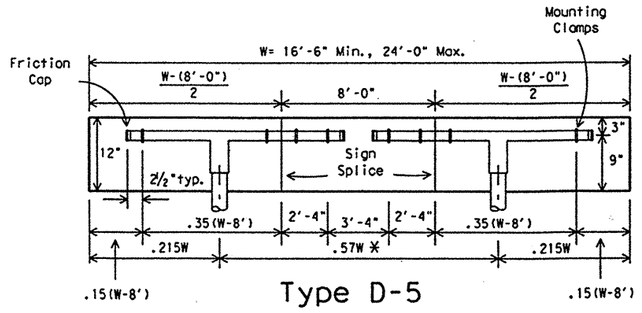
Prefabricated 2" thin wall "U" mounted on a 2½" Sch. 10 post.

MOUNT TYPE	H	W Min	W Max
D-2	24"	n/a	8'
	30"	n/a	6'6"
	36"	n/a	5'6"
D-4	24"	8'6"	13'6"
	30"	8'0"	11'0"
	36"	6'0"	9'0"



Type D-4

Prefabricated 2" thin wall "U" mounted on a 2½" Sch. 80 post.

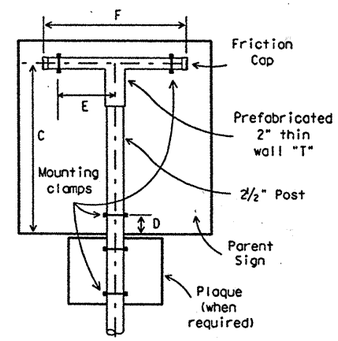


Type D-5

1. Post spacing may vary ± 5% of total sign width to fit field conditions.
2. Prefabricated 2" thin wall "T" mounted on a 2½" Sch 10 post.

NOTES: (FOR TYPES D-1 THROUGH D-5)

1. Splice plate required on D-3 and D-5 mounts.
2. Sign blanks shall be 5/8 " thick plywood conforming with Departmental Material Specification D-9-7100, unless otherwise noted elsewhere in the plans.



Type F

Type of Sign		2½" Post	C	D	E	F	
Regulatory Signs	SR1-1	SCH 10	39"	9"	15"	35"	
	FR1-2	SCH 10	43"	21"	11"	27"	
	36"X48"	SCH 10	42"	6"	9"	23"	
	48"X36"	SCH 10	30"	6"	15"	35"	
	48"X48"	SCH 10	42"	6"	15"	35"	1 2
	48"X60"	SCH 80	54"	6"	12"	29"	2
Warning Signs	48"X48"	SCH 10	49"	19"	15"	35"	1
	48"X60"	SCH 80	54"	6"	12"	29"	
School Signs	SS1-1	SCH 10	30"	6"	12"	29"	3
	SS2-1	SCH 10	30"	6"	12"	29"	3

1 Includes parent signs of this size which have supplementary plaque. Example: when "DO NOT ENTER" sign (SR5-1, 48" X 48") is mounted in combination with the "RAMP" plaque (R5-1T, 48" X 18"), the "DO NOT ENTER" sign is mounted as a 48" X 48" regulatory sign and the "RAMP" sign is mounted as a plaque.

2 "SPEED LIMIT" signs FR2-2, FR2-3 AND FR2-4 are mounted only in combination with "SPEED LIMIT" sign FR2-1 on Type G mount. "TRUCK SPEED LIMIT" sign (FR2-2A, 48" X 72") is to be mounted independently on Type G mount, see standard SMD (TY G) for details. When "WRONG WAY" sign (SR5-1A, 48" X 36") is mounted in combination with "DO NOT ENTER" sign (SR5-1, 48" X 48"), Type G mount is used.

3 "SCHOOL ADVANCE" (SS1-1, 48" X 48") and "SCHOOL CROSSING" (SS2-1, 48" X 48") symbol signs shall be mounted on a Type F mount.

SIGN SUPPORTS SHALL NOT BE SPLICED EXCEPT AS SHOWN ELSEWHERE ON SMD STANDARDS

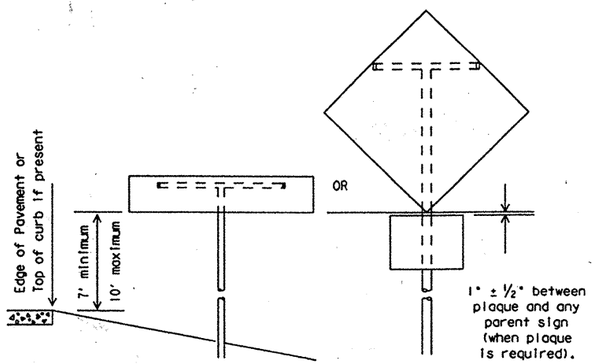
STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

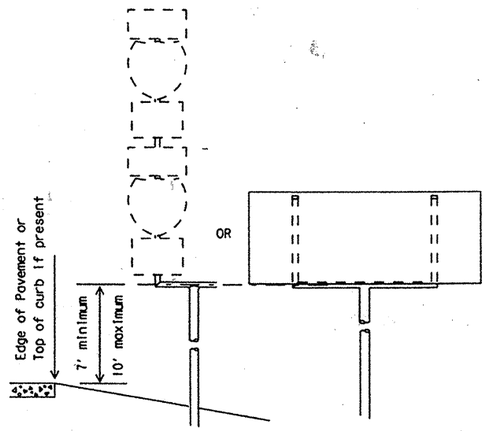
SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS

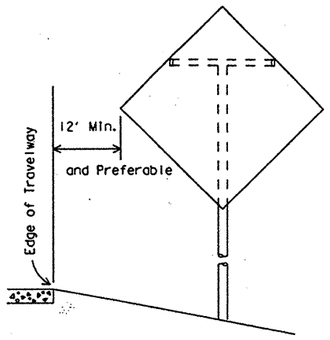
SMD(1-1)-98

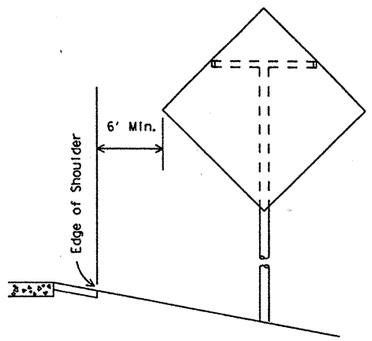
DN: GRB	CK: JDM	DW: FDN	CK: DTN

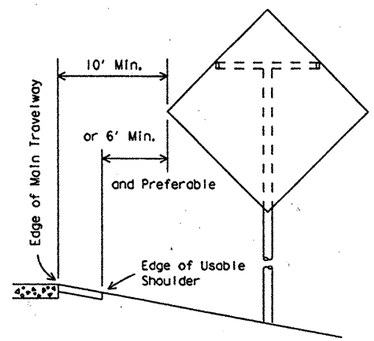
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
1-97 12-98 1-99	DAL	6	STP 99(413)MM	230
	COUNTY		CONTROL SECTION JOB	HIGHWAY
	ROCKWALL		1014 03 033	FM 740

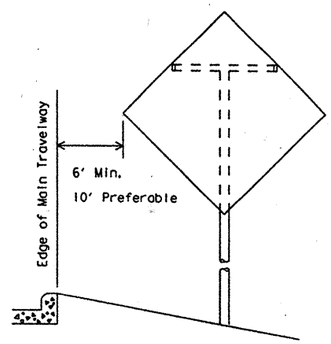


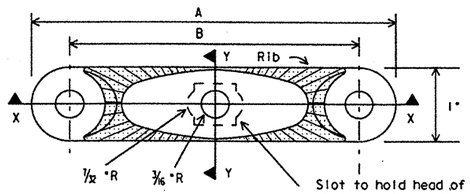


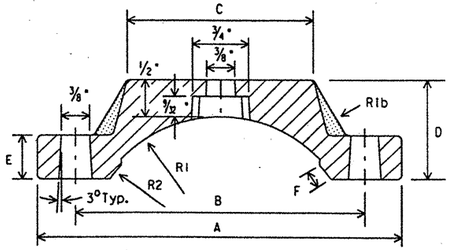


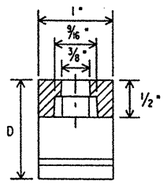


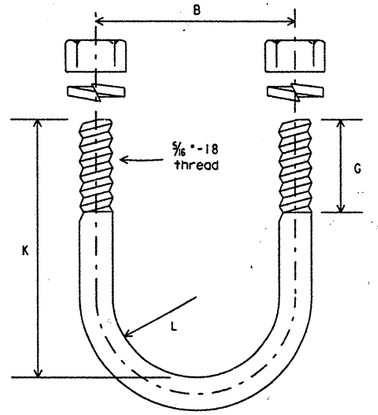


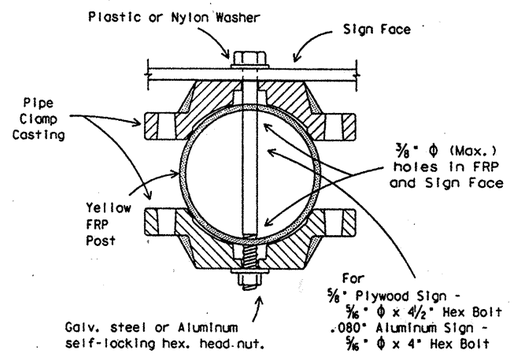


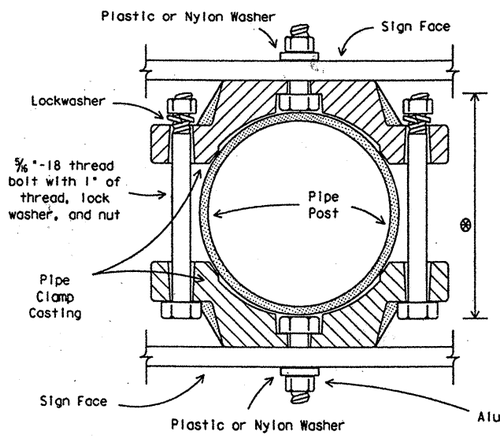












VERTICAL CLEARANCE OF SMALL SIGNS ALL TYPES OF ROADWAYS

Rural Conventional Highway
without shoulder.

Rural Conventional Highway
with shoulder.

Expressways or Freeways
without curb or with mountable curb.

Expressways or Freeways
with unmountable curb.

LATERAL CLEARANCE OF SMALL SIGNS TO THE RIGHT OR LEFT SIDE OF ROADWAY

Slot to hold head of 5/16" sq. head bolt. The bolt shall be 1" long for metal signs and 1 3/4" long for plywood signs, with full threads, a medium washer, and galv. steel or aluminum self-locking hex head nut. The bolt head must not turn in slot.

Section X-X

Section Y-Y

Pipe Clamp Casting

Pipe clamp casting shall be ASTM B26 or B108 aluminum alloy A444.0-T4 or 356.0-F.

All sign mounting clamp parts not made from aluminum shall be galvanized steel in conformance with ASTM A153 Class A or stainless steel.

U-Bolt

U-Bolt to be made in accordance with standard manufacturing procedure. 9/32" dia. stock is permissible. American standard regular semi-finished hex. nuts and spring lockwashers.

NOTE: Type A support shall be pipe or Yellow FRP. FRP mounts shall meet Departmental Material Specification D-9-4410.

Typical Detail Yellow Fiberglass Reinforced Plastic (FRP) Mounting

GENERAL NOTES:

1. All clearances apply to both rural and urban locations, except as noted.
2. Where physical features of the roadway will permit, maximum lateral clearances are desirable. For frontage roads, ramps and other connecting roadways, lesser clearances may be used, but generally no less than six feet is recommended between the edge of the travelway and the edge of the sign. At intersections, signs should be positioned in the optimum location for viewing by traffic.
3. Where necessary, the minimum allowable clearance of two feet may be used in urban locations on conventional highways.
4. Where a sign is to be located behind guardrail, the allowable minimum clearance may be used, measured from the face of the guardrail to the near edge of the sign.
5. Lateral clearances of signs mounted on left side of roadway are the same as shown above where space will permit.

⊗ Approx. Bolt Length ~ Pipe Size

2 1/8"	1 1/4"ϕ
2 5/16"	1 1/2"ϕ
2 5/8"	2"ϕ
2 7/8"	2 1/2"ϕ
3 1/8"	3"ϕ

Bolt Length to be adjusted to fit field conditions.

Typical Detail
Back to Back Mounting of Signs

Dimensions for Mounting Clamp

Standard Pipe Size	A	B	C	D	E	F	G	K	L	R1	R2
1 1/4	3 5/64	2 5/64	3/4	15/16	7/16	3/16	5/8	2 9/64	27/32	57/64	53/64
1 1/2	3 9/32	2 9/32	1	1 1/16	7/16	3/16	5/8	2 7/16	63/64	31/32	15/16
2	3 3/4	2 3/4	1 1/2	1 1/8	1/2	3/16	1	2 11/16	1 7/32	1 1/4	1 3/16
2 1/2	4 1/4	3 1/4	2	1 1/4	1/2	1/4	1	3 3/16	1 15/32	1 1/2	1 7/16
3	4 7/8	3 7/8	2 1/2	1 3/8	5/8	1/4	1	3 13/16	1 25/32	1 13/16	1 3/4

All dimensions shown are in inches.

MOUNTING CLAMP DETAILS

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS- SMALL ROADSIDE SIGNS

SMD(1-2)-98

	DN: LR	CK:	DW: DN	CK: MT	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
1-97 4-98	DAL	6	STP 99(413)MM		231
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL		1014	03	033	FM740

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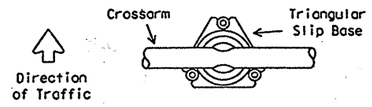
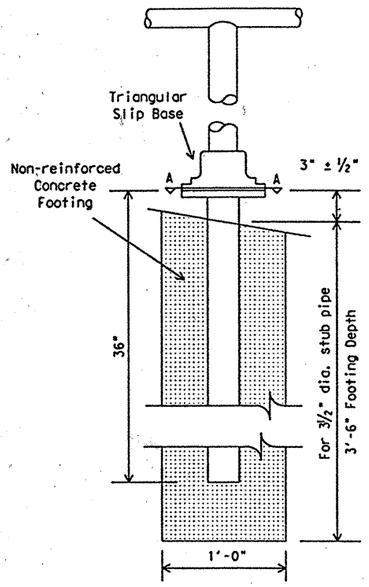
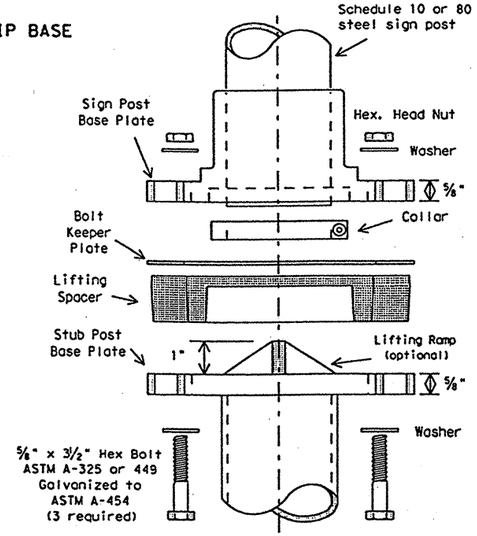
TEXAS UNIVERSAL TRIANGULAR SLIP BASE



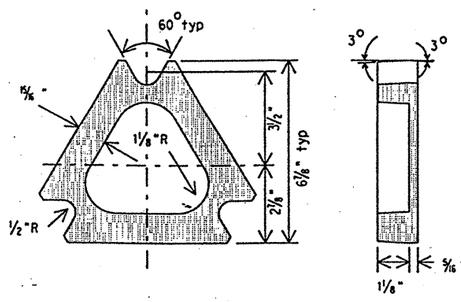
The crossarm should be parallel to one side of the triangular slip base.



Texas Universal Triangular Slip Base shall be used for signs supported on 2½" diameter pipe posts.

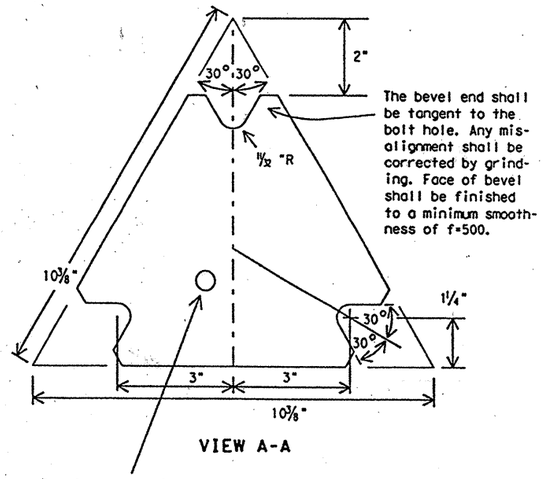


NOTE: If stub post base plate does not have lifting ramp, lifting spacer should be deleted from assembly, unless plumbing shims are required.



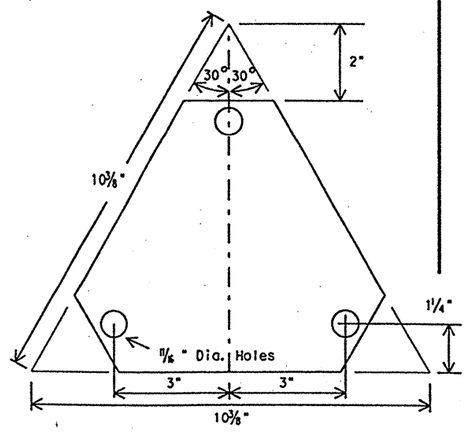
LIFTING SPACER

100% Recycled ABS or Polycarbonate



VIEW A-A

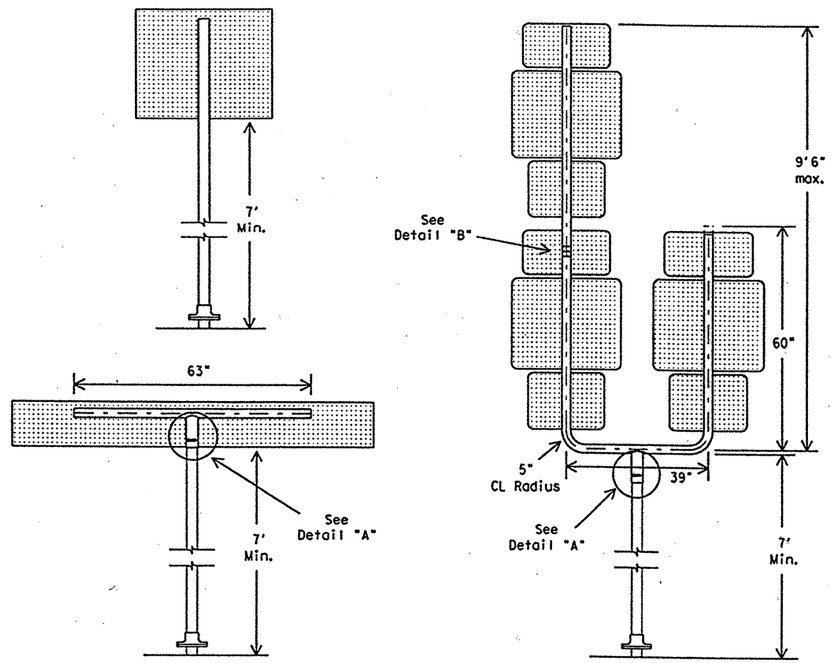
Provide 1/2 " dia. (max.) hole in the Stub Post Base Plate within the inside radius of the stub post for galvanized drainage.



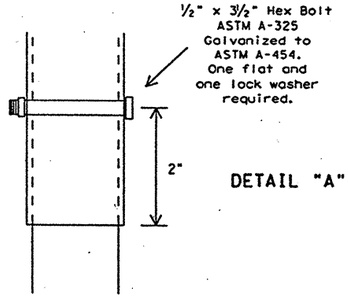
BOLT KEEPER PLATE

Bolt Keeper Plate shall be 30 gauge galvanized steel.

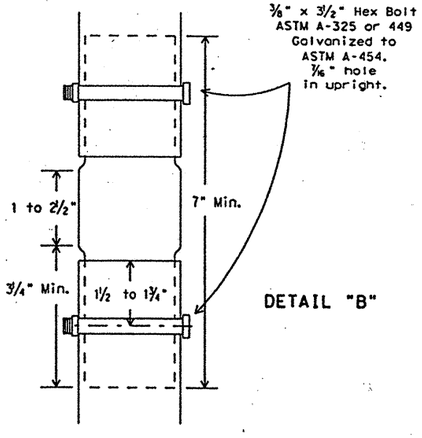
PREFABRICATED T'S AND U'S



Refer to SMD(1-1) for "T" and "U" pipe lengths and marker combinations.



DETAIL "A"



DETAIL "B"

NOTE:
1. 2⅜" OD x .095" wall tubing swaged to 2⅛" OD.
2. Splices will only be allowed behind the sign substrate.

GENERAL NOTES:

Support and design shall conform with AASHTO Standard Specifications for structural supports of Highway signs, luminaires and traffic signals with a design wind speed of 60 mph.

Steel pipe shall be galvanized in accordance to ASTM Designation A123.

Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18 inches. When solid rock is encountered below ground level, the foundation shall extend into the solid rock a minimum depth of 18 inches or provide a minimum foundation depth of 30 inches. Only concrete foundations shall be used in rock.

TRIANGULAR SLIP BASE NOTES:

1. The Sign Post Base Plate of the Triangular Slip Base shall have the same exterior dimensions as the bottom plate.

2. The Base Plates shall conform with the requirements of ASTM-A36, A441 or A572 Grade 50.

3. All structural steel shall be galvanized in accordance with ASTM A153. The entire support shall be galvanized from the top down to a minimum depth of 6 inches into the foundation. All nuts, bolts and washers shall be galvanized in accordance with the zinc specification of ASTM B454.

4. All high strength bolts shall conform to ASTM-A325 (ASTM A449 may be substituted for ASTM-A325 provided proper bolt head, nut and/or washer clearances are maintained). All high strength nuts shall be of such capacity as to develop the bolt strength.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1 Assemble Sign Post, Bolt Keeper Plate and Stub Post with bolts and flat washers as shown.

2 Shim as required to plumb post. If shims are needed lifting spacer must be used. Shims shall be placed between stub post base plate and lifting spacer.

3 Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.

4 Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque of 480 inch pounds or 40 foot pounds.
DO NOT OVERTIGHTEN.

5 To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS

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SMD(1-3)-98

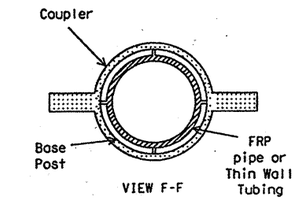
DSN: GRB	CK: JDM	DW: FDN	CK: DTN

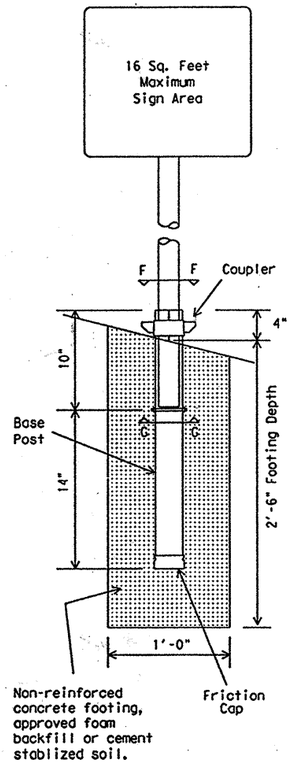
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
1-96	DAL	6	STP 99(413)MM	232
1-97	COUNTY		CONTROL / SECTION / JOB	HIGHWAY
12-98	ROCKWALL		1014 / 03 / 033	FM 740
1-99				

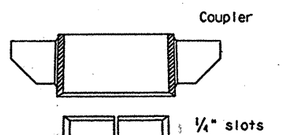
DATE:
FILE:
ACC:
DW:
CK:
UN:
CK:

UNIVERSAL ANCHOR SYSTEM TYPE A

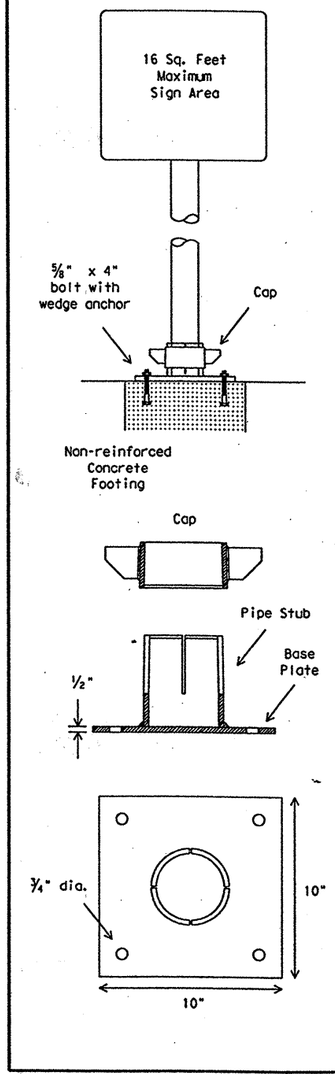
For FRP or Thin Wall Tubing



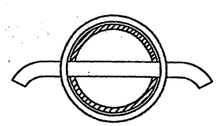




BOLT DOWN SIGN SUPPORT TYPE A

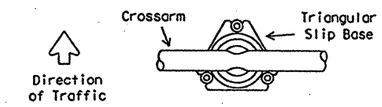


NOTE: When Thin Wall Tubing is used, rubber insert must be placed in base post.

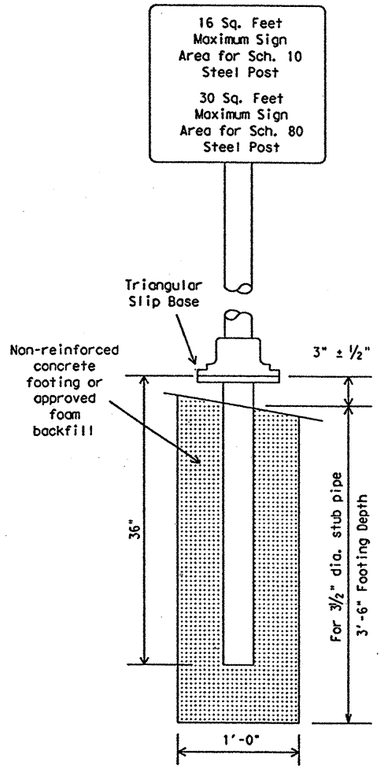


TEXAS UNIVERSAL TRIANGULAR SLIP BASE

Types A, A-1, A-2, B, C, D-1, D-2, D-3, D-4, D-5 and F. For additional information on types, refer to SMD(1-1).

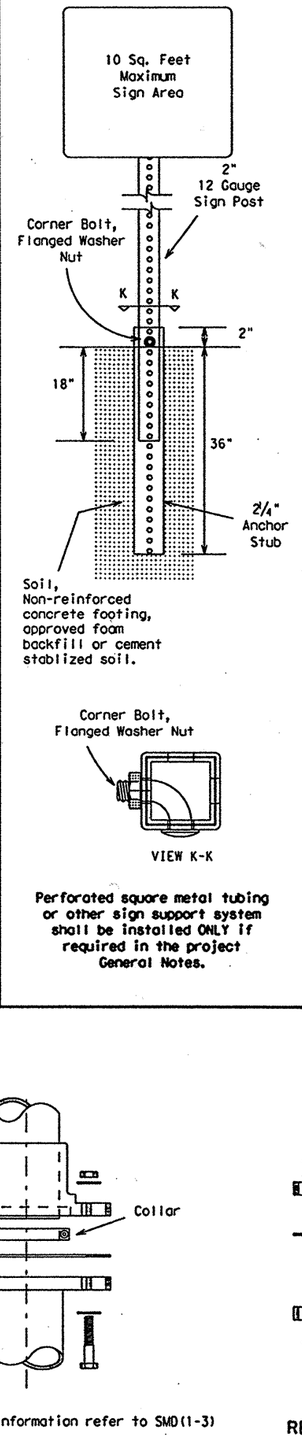


The crossarm should be parallel to one side of the triangular slip base.



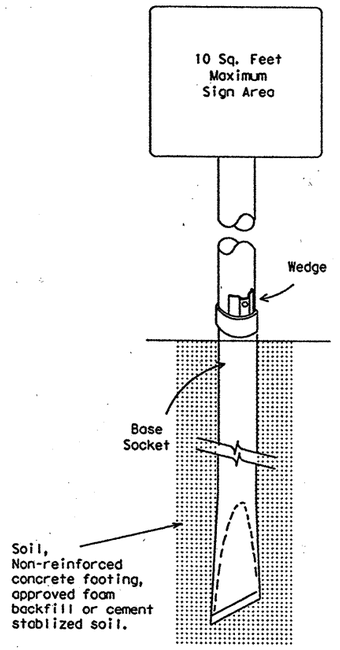
Triangular Slip Base shall be used for signs supported on 2½" diameter pipe posts.

PERFORATED SQUARE METAL TUBING (DRIVEABLE) TYPE U



Perforated square metal tubing or other sign support system shall be installed ONLY if required in the project General Notes.

WEDGE ANCHOR THIN WALL (DRIVEABLE) TYPE A



For additional information refer to SMD(1-5)

GENERAL NOTES:

The project General Notes may specify a particular sign support.

Support and design shall conform with AASHTO Standard Specifications for structural supports of Highway signs, luminaires and traffic signals with a design wind speed of 70 mph.

Steel pipe shall be galvanized in accordance to ASTM Designation A123.

Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18 inches. When solid rock is encountered below ground level, the foundation shall extend into the solid rock a minimum depth of 18 inches or provide a minimum foundation depth of 30 inches. Only concrete foundations shall be used in rock.

FRP SUPPORTS

Materials and fabrication shall conform to the requirements of Department Material Specification D-9-4410 and will be furnished in a yellow or gray color as specified elsewhere in the plans.

Thickness of FRP sign support is 0.125 inch + 0.031 inch, - 0.0 inch.

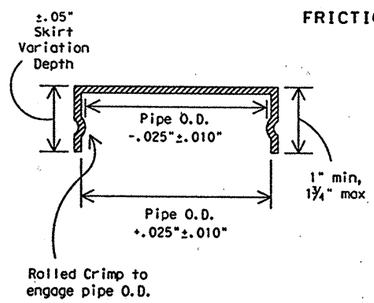
For FRP sign supports, all bolts, nuts, screws, washers and other miscellaneous hardware, shall be type 304 stainless steel or galvanized in accordance to ASTM Designation: A-153, Class C or D, B-695 Class 50 or B633 Class FE/ZN 8 unless otherwise specified.

FRP sign supports for a single type sign support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.

FRP sign supports are prequalified by the Traffic Operations Division. Prequalification procedures are obtained by writing:

TX DOT
Traffic Operations Division
125 E. 11th Street
Austin, Tx 78701-2483.

FRICTION CAP DETAIL

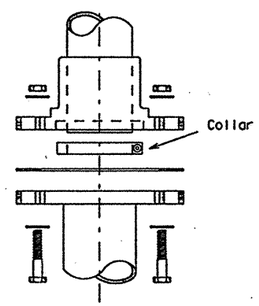


Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 guage for all cap sizes.

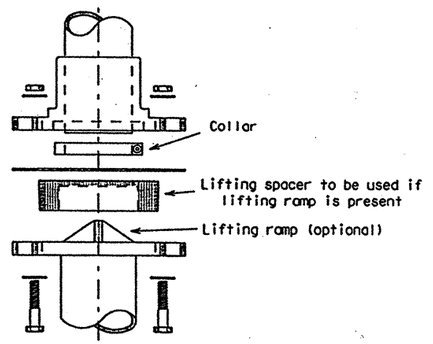
The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirement of ASTM B633 Class FE/ZN 8.

SIGN POST SELECTION	
MOUNT TYPE	2½" POST
A, A-1	Sch. 10
A-2	Sch. 80
B	Sch. 10
C	Sch. 80
D-1, D-2, D-3, D-5	Sch. 10
D-4	Sch. 80



For additional information refer to SMD(1-3)



RETROFIT FOR EXISTING STUB BASES

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS

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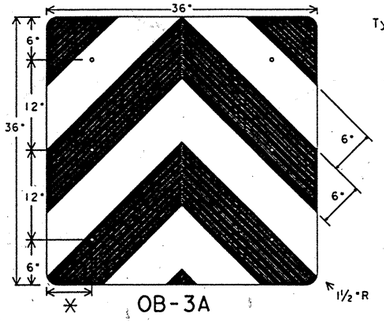
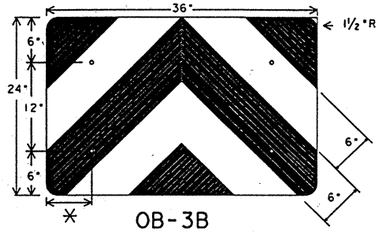
SMD(1-4)-98

©TxDOT August 1995	dn: GRB	ck: JDM	dw: FDN	ck: DTN
REVISIONS 1-97 12-98 1-99	STATE DISTRICT: DAL	FEDERAL REGION: 6	FEDERAL AID PROJECT: STP 99(413)MM	SHEET: 233
	COUNTY: ROCKWALL	CONTROL: 1014	SECTION: 03	JOB: 033	HIGHWAY: FM740

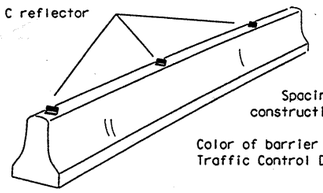


OB-3A



OB-3B

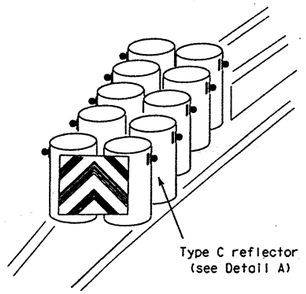
* adjust to fit attenuator per manufacturer's recommendation, or as directed by the Engineer.



Barrier Reflectors will be installed only on barriers designated for reflectorization as required elsewhere in the plans.

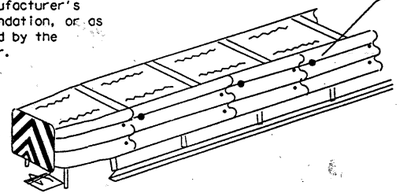
Spacing of reflectors is 40 feet. Mount reflectors to barrier by construction adhesive or butyl rubber adhesive.

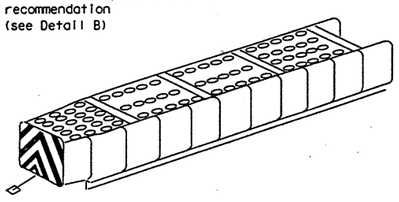
Color of barrier reflectors will conform to the Texas "Manual on Uniform Traffic Control Devices", (TMUTCD).

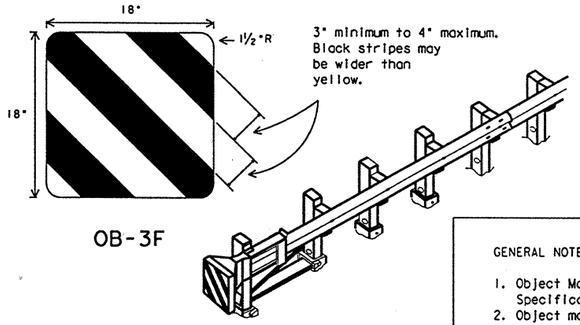


Object Marker blank to be 5/8" Plywood (Type A) in accordance with item "PLYWOOD SIGNS (TYPE A)" or 0.08" Aluminum as per Specification D-9-7110.

Mounting should be flush with top of VIA.
Minimum size 36" x 24".

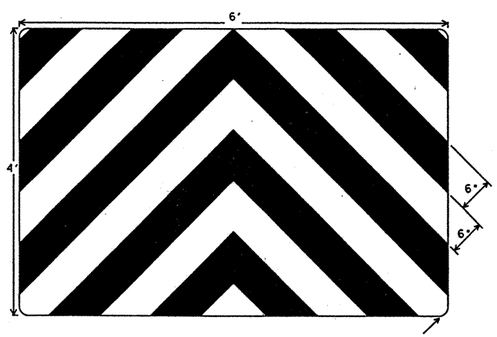




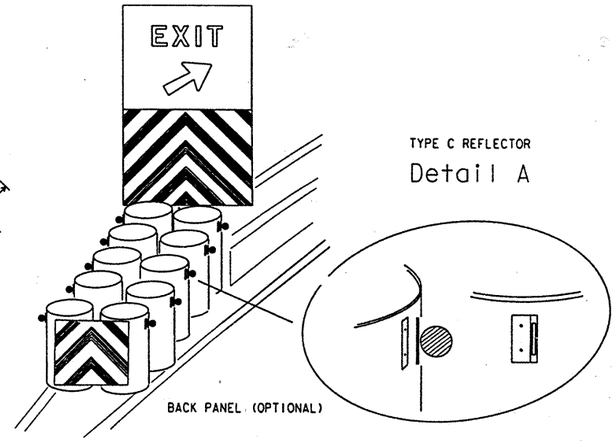


OB-3F

TYPICAL GUARDRAIL END TREATMENT



OB-3E



TYPE C REFLECTOR
Detail A

GENERAL NOTES:

1. Back Panel (OB-3E) shall be made of 5/8" plywood (Type A) panels unless otherwise noted in the plans.
2. Back panel will be mounted independent of the attenuator. The minimum mounting height is flush with the top of the attenuator.
3. Alternating flashing yellow lights may be added. Lights should be mounted minimum 72" above pavement.
4. Attenuator may have additional yellow reflective and black striping, and/or reflectors placed on sides. CHEVRONS (WI-8) may be erected to delineate roadway curvature beyond the attenuator. These additional devices will be installed if required elsewhere in the plans.
5. Mount Back Panel per details on SMD Standards, or as detailed elsewhere in the plans.

GENERAL NOTES: OBJECT MARKERS

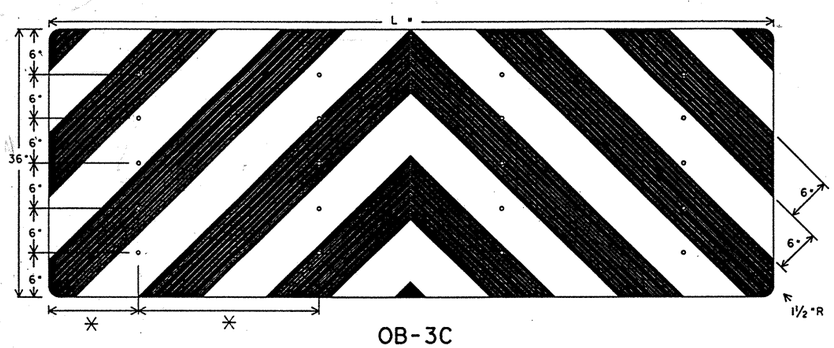
1. Object Markers shall conform to the Texas MUTCD and meet the color and reflectivity requirement of Department Material Specification D-9-8300, Type C. Background shall be yellow reflective and Chevron shall be black.
2. Object markers OB-3C, OB-3D and OB-3F may be fabricated from reflective sheeting applied to:
   (a) galvanized sheet metal gauge 24 to 28 per ASTM A366.025 nominal, aluminum sheet of 6061-T6 or 5052-H38 alloy approximately .065 inch thickness,
   (b) low or medium density polyetheylene approximately 0.08 inch thickness, or
   (c) other material as specified in the plans or approved by the Engineer.
3. OB-3F is intended for use only with guardrail end treatments (i.e. GET, CAT, BEST, BRAKEMASTER, SENTRE, etc.). OM-BF may be fabricated from adhesive backed reflective sheeting applied directly to guardrail end treatment, or applied directly to an "end cap" as per the manufacturer's recommendation. Direct applied sheeting shall provide a smooth surface and have no wrinkles, air bubbles, cuts or tears.
4. Size may be reduced to fit smaller devices, however, the minimum size shall be:
   (a) 24 x 24 inches for attenuators, and
   (b) 18 x 18 inches for guardrail end treatments.
5. Pop rivets, screws, or nuts and bolts may be used to attach object markers and reflectors. Holes, slots or other openings may be cut or drilled through object markers to allow cable or other attachments.
6. When traffic passes only on one side of attenuator, only the OM-3 marker should be installed. OM-3 should be installed per the requirements of D & OM Standards with a minimum mounting height of 18 inches.

TYPE C REFLECTORS

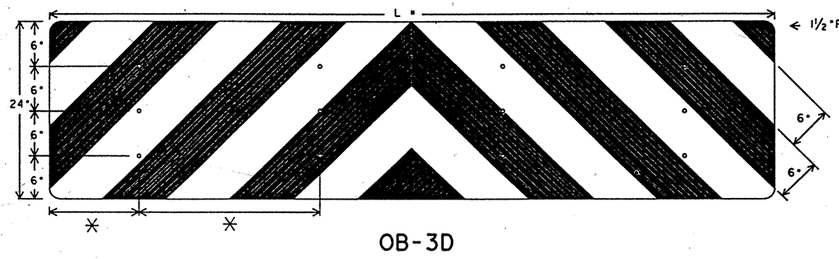
1. Type C reflectors shall consist of a reflector unit attached to a bracket to facilitate delineator mounting on attenuators, guardrails and concrete traffic barriers.
2. Type C reflectors may also be used to delineate side of attenuator, guardrail and concrete traffic barrier.
3. Type C reflectors shall meet the requirements of D-9-8600.

TRAFFIC FLOW	BOTH SIDES						ONE SIDE
ATTENUATOR TYPE	OB-3A	OB-3B	OB-3C	OB-3D	L	OM-1	
GREAT	NR	✓	NR	✓	96"	✓	
Steel Drum	✓	✓	✓	✓	114"	✓	
Hydraulic	✓	✓	NR	NR	NR	✓	
Hex Foam	✓	✓	NR	NR	NR	✓	OM-3
Low Maintenance	NR	✓	NR	✓	96"	✓	
Sand Filled Plastic Modules	NR	NR	NR	NR	NR	✓	
Sand Tire	NR	NR	NR	NR	NR	✓	

NR - Not Recommended



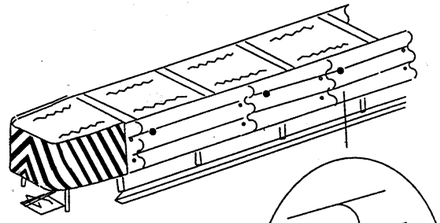
OB-3C

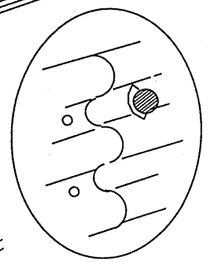


OB-3D

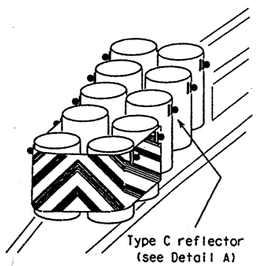
* spacing adjusted to attach through centerline of drum, per attenuator manufacturers recommendation, or as directed by the Engineer.

Mounting should be flush with top of attenuator.
Minimum size 96" x 24".





TYPE C REFLECTOR
Detail B



STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

DELINEATORS & OBJECT MARKERS FOR VEHICLE IMPACT ATTENUATORS

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D & OM(VIA)-98

© TxDOT December 1989	DW: LR	CK:	DW: DN	CK:	HCG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
4-90	DAL	6	STP 99(413)MM		234
4-92	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
8-95	ROCKWALL		1014	03	033	FM740
4-98						

20C

CK: CW
DW: DN
CK: MT

FILE: d58hpic/usr/d580504

ACC: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48