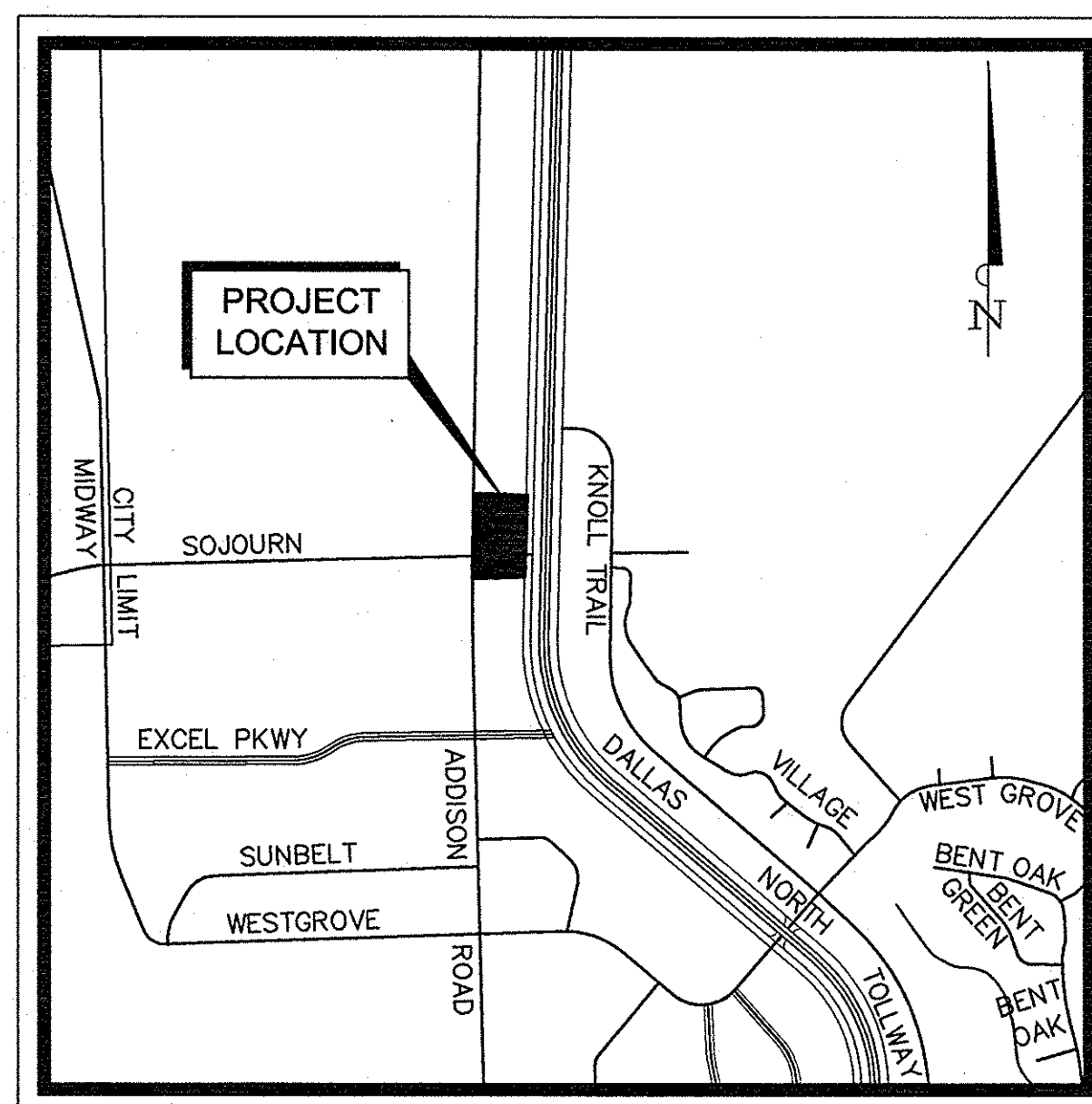


PAVING, GRADING, DRAINAGE AND UTILITY CONSTRUCTION PLANS FOR METHODIST PAVILION ONE

DALLAS NORTH TOLLWAY ADDISON, TEXAS

PW #2012 - 01



VICINITY MAP
N.T.S.

PLANS SUBMITTAL/REVIEW LOG

CIVIL DRAWINGS -FOR CONSTRUCTION	06/12/2012
REVISION 1 -DETENTION AND SITE CHANGES	06/29/2012
REVISION 2 -SOJOURN IMPROVEMENTS	07/16/2012
REVISION 2 -SOJOURN IMPROVEMENTS 2ND SUBMITTAL	08/23/2012
REVISION 2 -SOJOURN IMPROVEMENTS 3RD SUBMITTAL	09/14/2012
REVISION 3 -GENERATOR PAD REVISIONS	09/26/2012
REVISION 4 -PAVING, CROSSWALK, & GRADING REVISIONS	02/01/2013
RECORD SET	07/29/2013

INDEX OF SHEETS

SHEET NO.	DESCRIPTION	DATE	REVISION
C-01	COVER SHEET	02/01/2013	▲▲▲▲
1 OF 2	FINAL PLAT		
2 OF 2	FINAL PLAT		
C-02	GENERAL NOTES	06/12/2012	
C-03	DEMOLITION PLAN	09/14/2012	▲
C-04	DIMENSION CONTROL AND PAVING PLAN	02/01/2013	▲▲▲▲
C-05	GRADING PLAN	02/01/2013	▲▲▲▲
C-06A	DRAINAGE AREA MAP	06/12/2012	
C-06B	EXISTING DRAINAGE AREA MAP	06/12/2012	
C-07	STORM SEWER CALCULATIONS	06/12/2012	
C-08	DETENTION CALCULATIONS	06/12/2012	
C-09	STORM SEWER PLAN	06/23/2012	▲
C-10	UTILITY PLAN	09/14/2012	▲▲
C-11A	UTILITY PROFILES	09/14/2012	▲
C-11B	EROSION CONTROL PLAN	06/12/2012	
C-12	EROSION CONTROL DETAILS	06/12/2012	
C-13	CONSTRUCTION DETAILS I	06/12/2012	
C-14	CONSTRUCTION DETAILS II	06/12/2012	
C-15	CONSTRUCTION DETAILS III	06/12/2012	
C-16	TRAFFIC CONTROL PLAN	09/14/2012	▲
C-17	ADDISON ROAD ROADWAY IMPROVEMENTS	06/12/2012	
C-18	SOJOURN DRIVE ROADWAY IMPROVEMENTS	09/14/2012	▲
TCF (1-1, 1-4)-12	TRAFFIC CONTROL PLAN	02/11/2012	▲
BC (1, 12)-07	BARRICADE AND CONSTRUCTION	04/11/2012	
WZ (BTS) 2-03	TRAFFIC SIGNAL INSTALLATION	04/11/2012	
SIGNALS_1(DAL)	TRAFFIC SIGNAL HEAD IDENTIFICATION	01/11/2011	▲
SIGNALS_2(DAL)	TRAFFIC SIGNAL HEAD IDENTIFICATION	04/11/2012	
SMA-80(X)-12(DAL)	TRAFFIC SIGNAL CONTROLLER CABINET	01/11/2012	▲
TS-CF-04	TRAFFIC SIGNAL SUPPORT STRUCTURES	04/11/2012	
MA-C-12	STANDARD ASSEMBLY TRAFFIC SIGNAL SUPPORT STRUCTURES	04/11/2012	
MA-D-12(DAL)	TRAFFIC SIGNAL SUPPORT STRUCTURES MAST AND POLE	04/11/2012	
TS-FD-12	TRAFFIC SIGNAL POLE FOUNDATION	04/11/2012	
ED(1, 13)-03	ELECTRICAL DETAILS	04/11/2012	
PM(3)-12	PAVEMENT MARKINGS	02/12/2012	▲
EC(1)-09	EROSION CONTROL	04/11/2012	
TS-01	TRAFFIC SIGNAL LAYOUT	09/12/2012	▲
TS-02	TRAFFIC SIGNAL QUANTITIES	09/12/2012	▲
TS-03	TRAFFIC SIGNAL GENERAL NOTES	09/12/2012	▲


DEVELOPER

SRP MEDICAL
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ARCHITECT

BOKA POWELL, LLC
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ENGINEER

 **Kimley-Horn
and Associates, Inc.**
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FRISCO, TEXAS 75034
TEL. (972) 335-3580
FAX. 972-335-3779
CONTACT: DAVID KOCHALKA, P.E.
STATE OF TEXAS REGISTRATION NO. F-928

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company



David Kochalka
7/29/13
RECORD DRAWINGS

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

FEBRUARY 2013

GENERAL NOTES:

- 1. ALL CONSTRUCTION WITHIN THE ADDISON TOWN LIMITS SHALL BE IN ACCORDANCE WITH THESE PLANS AND THE TOWN OF ADDISON DEVELOPMENT SERVICES' STANDARD CONSTRUCTION DETAILS'...

STORM DRAINAGE (CONTINUED)

- 7. THE SITE UTILITY CONTRACTOR SHALL PROVIDE ALL MATERIALS AND APPURTENANCES NECESSARY FOR COMPLETE INSTALLATION OF THE STORM SEWER.

GRADING

- 1. ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THESE PLANS AND THE TOWN OF ADDISON DEVELOPMENT SERVICES' STANDARD CONSTRUCTION DETAILS' AND THE FINAL GEOTECHNICAL REPORT...

PAVING

- 1. ALL CONSTRUCTION WITHIN THE TOWN OF ADDISON LIMITS SHALL BE IN ACCORDANCE WITH THESE PLANS AND THE TOWN OF ADDISON DEVELOPMENT SERVICES' STANDARD CONSTRUCTION DETAILS'...

PAVING (CONTINUED)

- 8. TESTING OF MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE PAVING IMPROVEMENTS SHALL BE PERFORMED BY AN APPROVED AGENCY FOR TESTING MATERIALS.

WATER AND SANITARY

- 1. ALL MATERIALS AND WORKMANSHIP TO CONFORM TO THE REQUIREMENTS SET FORTH IN THE TOWN OF ADDISON 'WATER SYSTEM REQUIREMENTS' MANUAL FOR GENERAL PROCEDURES FOR THE DESIGN OF WATER LINES.

KHA GENERAL CONSTRUCTION NOTES

- 1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION FOR THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (LATEST EDITION)...

KHA GENERAL CONSTRUCTION NOTES (CONTINUED)

- 37. THESE PLANS, PREPARED BY KIMLEY-HORN AND ASSOCIATES, INC. DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES...

REFER TO TNRC/TCOEQ DESIGN GUIDELINES (CHAPTER 290) FOR ALL UTILITY CROSSINGS.

STOP! CALL BEFORE YOU DIG DIG TESS 1-800-DIG-TESS (at least 72 hours prior to digging)

WARNING: CONTRACTOR TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

GEOTECHNICAL REPORT REPORT NO. G110598 ALPHA TESTING DALLAS, TEXAS DATED: JULY 5, 2011

UTILITY CONTACTS

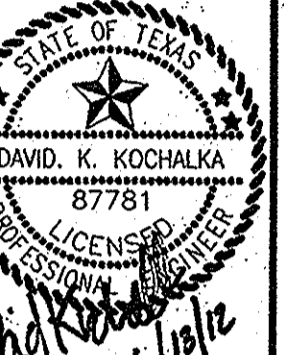
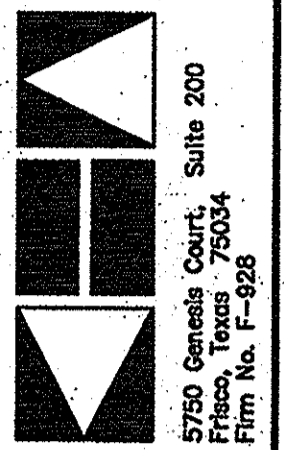
- ONCOR (ELECTRIC) CONTACT: KAREN EASTMAN 817-335-7050

RECORD DRAWINGS (July 2013)

INFORMATION PROVIDED BY: Rogers-O'Brien Construction Company

THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND SHALL NOTIFY THE CONSTRUCTION MANAGER AND ENGINEER OF ANY CONFLICTS DISCOVERED...

Kimley-Horn and Associates, Inc. Tel: No. (972) 335-3580 Fax: No. (972) 335-3779



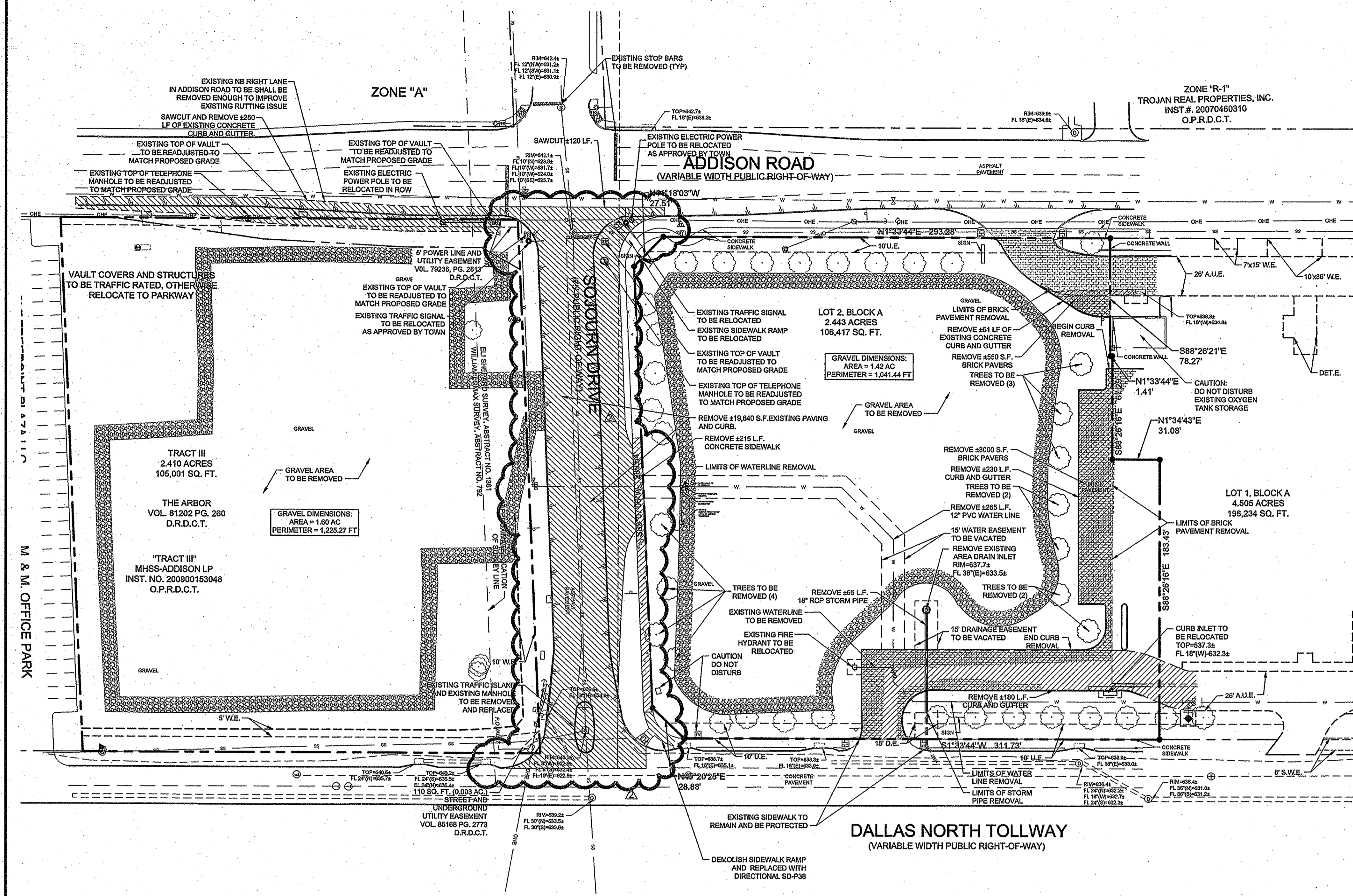
METHODIST PAVILION ONE

TOWN OF ADDISON, DALLAS COUNTY, TEXAS

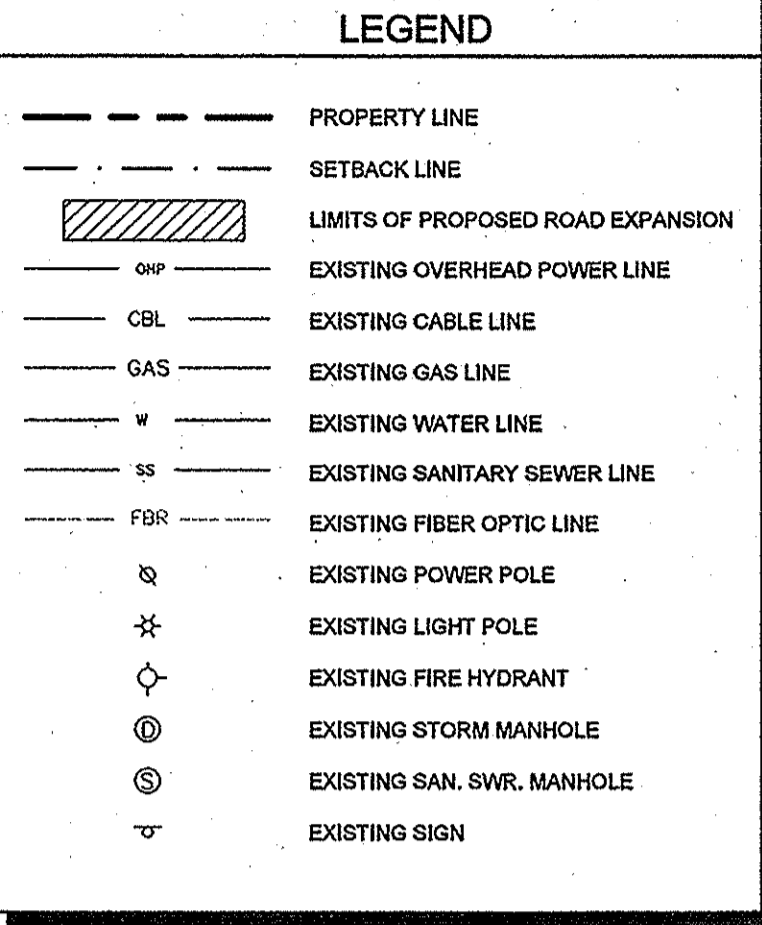
GENERAL NOTES

AS DESIGNED DESIGNED BY: DKK CHECKED BY: RK DATE: 06/20/12 PROJECT NO.: 0903260

SHEET C-02



- ### DEMOLITION NOTES
- THE CONTRACTOR SHALL FIELD VERIFY AND LOCATE ALL EXISTING UTILITIES ON SITE PRIOR TO DEMOLITION.
 - THE CONTRACTOR SHALL PERFORM DEMOLITION ACTIVITIES AS NOTED AND SHOWN ON THESE PLANS AND AS DIRECTED BY THE OWNER.
 - IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY PERMITS AND PAY ANY FEES REQUIRED FOR DEMOLITION AND HAUL-OFF FROM THE APPROPRIATE AUTHORITIES.
 - THE CONTRACTOR SHALL PREPARE ALL DOCUMENTS AND ACQUIRE APPROPRIATE PERMITS AS REQUIRED PRIOR TO THE COMMENCEMENT OF DEMOLITION.
 - THE DEMOLITION PLAN IS INTENDED TO DEPICT GENERAL DEMOLITION AND UTILITY WORK. IT IS NOT INTENDED TO IDENTIFY EACH ELEMENT OF DEMOLITION OR RELOCATION. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER AND APPROPRIATE UTILITY COMPANY PRIOR TO WORK.
 - CONTRACTOR TO COMPLETELY DEMOLISH AND DISPOSE OF OFFSITE IN A LAWFUL MANNER EXISTING BUILDINGS, INCLUDING FOUNDATIONS AND ALL APPURTENANCES LOCATED ON AND AROUND THE PROPERTY INCLUDING BUT NOT LIMITED TO BOLLARDS, GAS METERS, GAS CONDITIONING UNITS, SIGNS, CURBS, SIDEWALKS, ELECTRIC METERS, FENCING, ETC.
 - REMOVE AND DISPOSE OF ANY SIDEWALK, FENCES, STAIRS, WALLS, FOUNDATIONS, CONCRETE LIGHT POLE BASES, DEBRIS AND RUBBISH REQUIRING REMOVAL FROM THE WORK AREA IN AN APPROVED LANDFILL.
 - REMOVE AND/OR PLUG EXISTING UTILITIES SUCH AS SANITARY SEWER, WATER, GAS, ELECTRIC, AND TELEPHONE AS SHOWN OR AS NEEDED. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING EACH UTILITY COMPANY TO COORDINATE REMOVAL OF ALL UTILITIES AND FOR DETERMINING HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES PRIOR TO COMMENCING WORK.
 - THE CONTRACTOR SHALL CUT AND PLUG, OR ARRANGE FOR THE APPROPRIATE UTILITY COMPANY TO CUT AND PLUG ALL SERVICE PIPING AT THE STREET LINE OR MAIN, AS REQUIRED, OR AS OTHERWISE NOTED. ALL SERVICES MAY NOT BE SHOWN ON THIS PLAN. THE CONTRACTOR SHALL INVESTIGATE THE SITE PRIOR TO BIDDING TO DETERMINE THE EXTENT OF SERVICE PIPING TO BE REMOVED, CUT OR PLUGGED.
 - THE CONTRACTOR SHALL ARRANGE FOR THE RESETTING OF CURB BOXES, VALVE BOXES AND REMOVAL AND/OR RELOCATION OF OVERHEAD UTILITIES AND POLES WITH THE APPROPRIATE UTILITY COMPANY.
 - INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AND TREE PROTECTION PRIOR TO BEGINNING DEMOLITION WORK.
 - THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES TO REMAIN IN PLACE.
 - THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO AVOID UNNECESSARY DAMAGE TO EXISTING ROAD SURFACE.
 - FINISH SURFACE TO BE REMOVED OR DEMOLISHED SHALL BE CUT ALONG LINES OF JOINTS WHICH WILL PERMIT A NEAT SURFACE WHEN RESTORED.
 - ALL EXISTING ITEMS TO REMAIN WHICH ARE DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT THE SOLE EXPENSE OF THE CONTRACTOR.
 - DO NOT INTERRUPT EXISTING UTILITIES SERVICING FACILITIES OCCUPIED AND USED BY THE OWNER OR OTHERS DURING OCCUPIED HOURS EXCEPT WHEN SUCH INTERRUPTIONS HAVE BEEN AUTHORIZED IN WRITING BY THE OWNER AND THE LOCAL MUNICIPALITIES. INTERRUPTIONS SHALL ONLY OCCUR AFTER ACCEPTABLE TEMPORARY SERVICE HAS BEEN PROVIDED.
 - SHOULD ANY UNCHARTED OR INCORRECTLY CHARTED EXISTING PIPING OR OTHER UTILITY BE UNCOVERED DURING EXCAVATION, CONTACT THE ENGINEER IMMEDIATELY FOR DIRECTIONS BEFORE PROCEEDING FURTHER WITH WORK IN THE AREA.
 - ASBESTOS OR HAZARDOUS MATERIAL, IF FOUND ON SITE, SHALL BE REMOVED BY A LICENSED HAZARDOUS MATERIAL CONTRACTOR.
 - CONTRACTOR TO REMOVE EXISTING BRICK PAVERS AND TO RE-USE IF POSSIBLE.
 - CONTRACTOR SHALL ATTEMPT TO RELOCATE EXISTING TREES WHEN POSSIBLE.
 - ANY EXISTING SIGNAGE REMOVED DURING CONSTRUCTION SHALL BE REPLACED WITH TEMPORARY SIGNAGE AND THEN REPLACED WITH PERMANENT SIGNAGE AT THE END OF CONSTRUCTION.
 - GUY WIRES FOR RELOCATED POWER POLES ARE TO BE 24" CLEAR OF THE PROPOSED BOC.



- ### NOTES
- SEE MEP PLANS FOR ALL UTILITY CONNECTIONS INTO BUILDING.
 - WATER AND SEWER LINES SHALL STUB 5 FEET FROM BUILDING FOR SERVICE CONNECTIONS UNLESS OTHERWISE NOTED.
 - A FIVE FOOT CLEARANCE SHALL BE MAINTAINED AROUND ALL FIRE HYDRANTS.
 - REFER TO TOWN OF ADDISON DETAILS FOR WATER METER, METER BOX, FIRE HYDRANTS, VALVES, VALVE BOXES AND SERVICE INSTALLATION. VAULT COVERS AND STRUCTURES TO BE TRAFFIC RATED, OTHERWISE RELOCATE TO PARKWAY.
 - REFER TO DETAILS FOR SANITARY SEWER MANHOLE REQUIREMENTS.
 - REFER TO DETAILS FOR TRENCHING, BEDDING, BACKFILL, AND TRENCH COMPACTION REQUIREMENTS.
 - WATER AND SANITARY SEWER PIPE SHALL BE CONSTRUCTED OF SLIP-ON OR MECHANICAL JOINT CAST OR DUCTILE IRON PIPE, OR PVC PIPE.
 - REFER TO ARCHITECTURE PLANS FOR LOCATION AND SIZING OF PVC SLEEVES FOR FRANCHISE UTILITIES, IRRIGATION, ETC.
 - ALL PIPE DEFLECTIONS SHALL BE PER MANUFACTURER'S SPECIFICATIONS. ANY VARIATIONS SHALL BE APPROVED IN WRITING BY THE ENGINEER BEFORE INSTALLATION.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEFLECT ELECTRIC, GAS, CABLE, AND TELEPHONE CONDUIT AND PIPING AS REQUIRED TO AVOID UTILITY CONFLICTS.
 - IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY A TRAFFIC CONTROL PLAN TO THE TOWN FOR APPROVAL FOR ALL WORK WITHIN THE PUBLIC R.O.W.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE TOWN OF ADDISON FOR TRAFFIC SIGNALS.

NOTES

KIMLEY-HORN AND ASSOCIATES, INC. IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE CONTRACTOR TO IMPLEMENT THIS DEMOLITION PLAN. THIS DEMOLITION PLAN SIMPLY INDICATES THE KNOWN OBJECTS ON THE SUBJECT TRACTS THAT ARE TO BE DEMOLISHED AND REMOVED FROM THE SITE. KIMLEY-HORN AND ASSOCIATES, INC. DOES NOT WARRANT OR REPRESENT THAT THE PLAN, WHICH WAS PREPARED BASED ON SURVEY AND UTILITY INFORMATION PROVIDED BY OTHERS, SHOWS ALL IMPROVEMENTS AND UTILITIES, AND THAT THE IMPROVEMENTS AND UTILITIES ARE SHOWN ACCURATELY. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING HIS OWN SITE RECONNAISSANCE TO SCOPE HIS WORK AND TO CONFIRM WITH THE OWNERS OF EXISTING IMPROVEMENTS AND UTILITIES THE ABILITY AND PROCESS FOR THE REMOVAL OF PROPOSED DEMOLITION. THE GOAL OF THE DEMOLITION IS TO LEAVE THE SITE IN A STATE SUITABLE FOR THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS. REMOVAL, RELOCATION, OR PRESERVATION OF EXISTING IMPROVEMENTS, UTILITIES, ETC. TO ACCOMPLISH THIS GOAL ARE THE RESPONSIBILITY OF THE CONTRACTOR.

CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS REGARDING THE DEMOLITION OF OBJECTS ON THE SITE AND THE DISPOSAL OF THE DEMOLISHED MATERIALS OFF-SITE. IF IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO REVIEW THE SITE, DETERMINE THE APPLICABLE REGULATIONS, RECEIVE THE REQUIRED PERMITS AND AUTHORIZATIONS, AND COMPLY.

FRANCHISE UTILITY CONTACTS

ONCOR (ELECTRIC)	817-335-7050
CONTACT: KAREN EASTMAN	
ATMOS ENERGY (GAS)	972-881-4152
CONTACT: GEORGE LONG	
AT&T COMMUNICATION (PHONE)	972-234-7039
CONTACT: STEVEN J. ELLIOT	

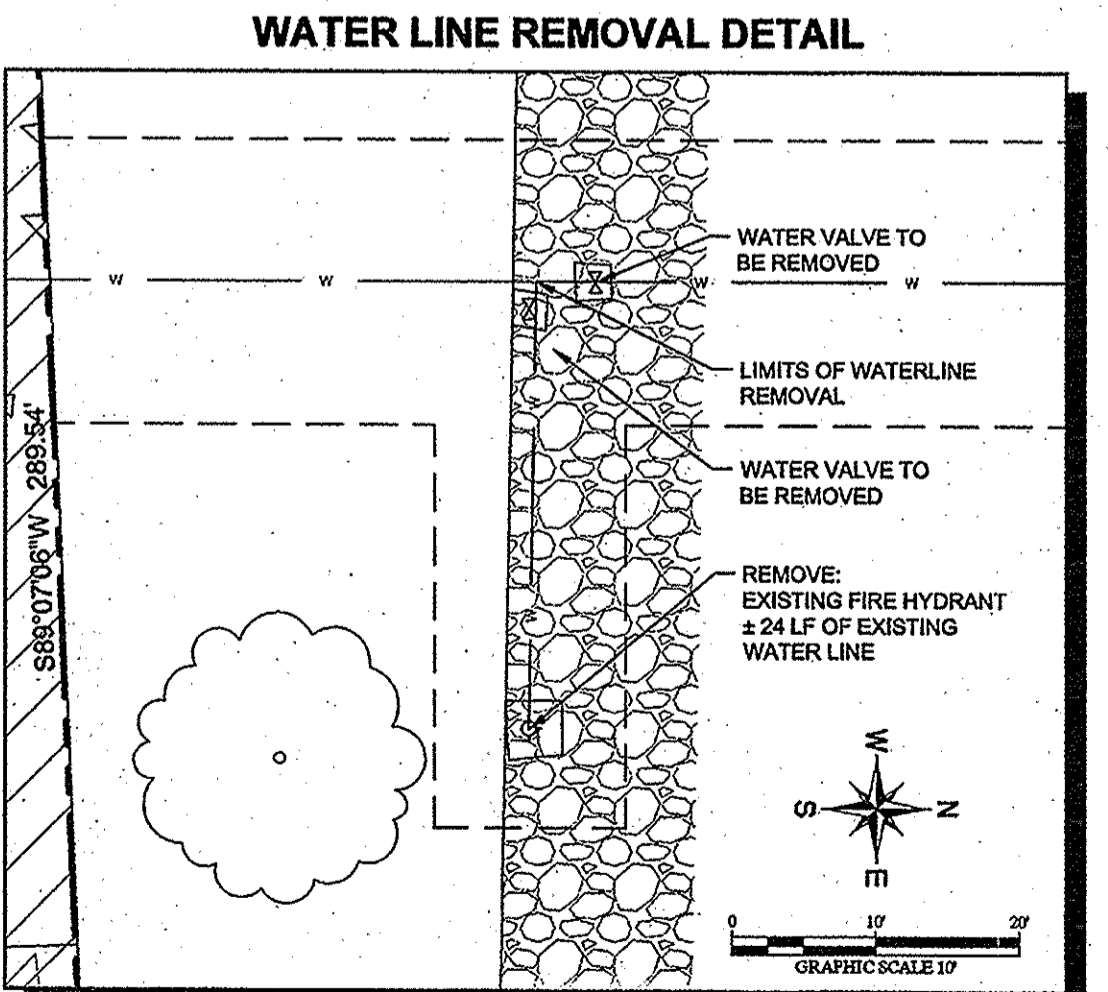
- ### BENCH MARK LIST
- BM #60 FOUND ON TOP OF THE CONCRETE BASE OF A LIGHT POLE IN THE CENTER MEDIAN OF EXCEL PARKWAY APPROXIMATELY 50 FEET WEST OF THE CENTERLINE OF ADDISON ROAD. (PER TOWN OF ADDISON PLAN # 96103, SHEET 2, DATED JANUARY 1998) ELEV=644.41
 - BM #61 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 826 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=632.78
 - BM #62 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 180 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=638.04

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Regers-O'Brien Construction Company

THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND SHALL NOTIFY THE CONSTRUCTION MANAGER AND ENGINEER OF ANY CONFLICTS DISCOVERED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES (SHOWN OR NOT SHOWN) WITHIN SCOPE OF CONSTRUCTION. IF ANY EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL REPLACE THEM AT HIS OWN EXPENSE. CALL 1-800-DIG-TESS AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION IN VICINITY.

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!
CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.



Scale: AS SHOWN
Designed by: JCM
Drawn by: JCM
Checked by: DDK
Date: 08/22/2012
Project No.: 69060200

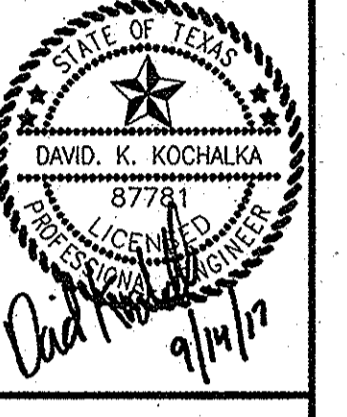
Revisions
No. Date

App. JCM

B/23/2012 SOJOURN DR REVISIONS

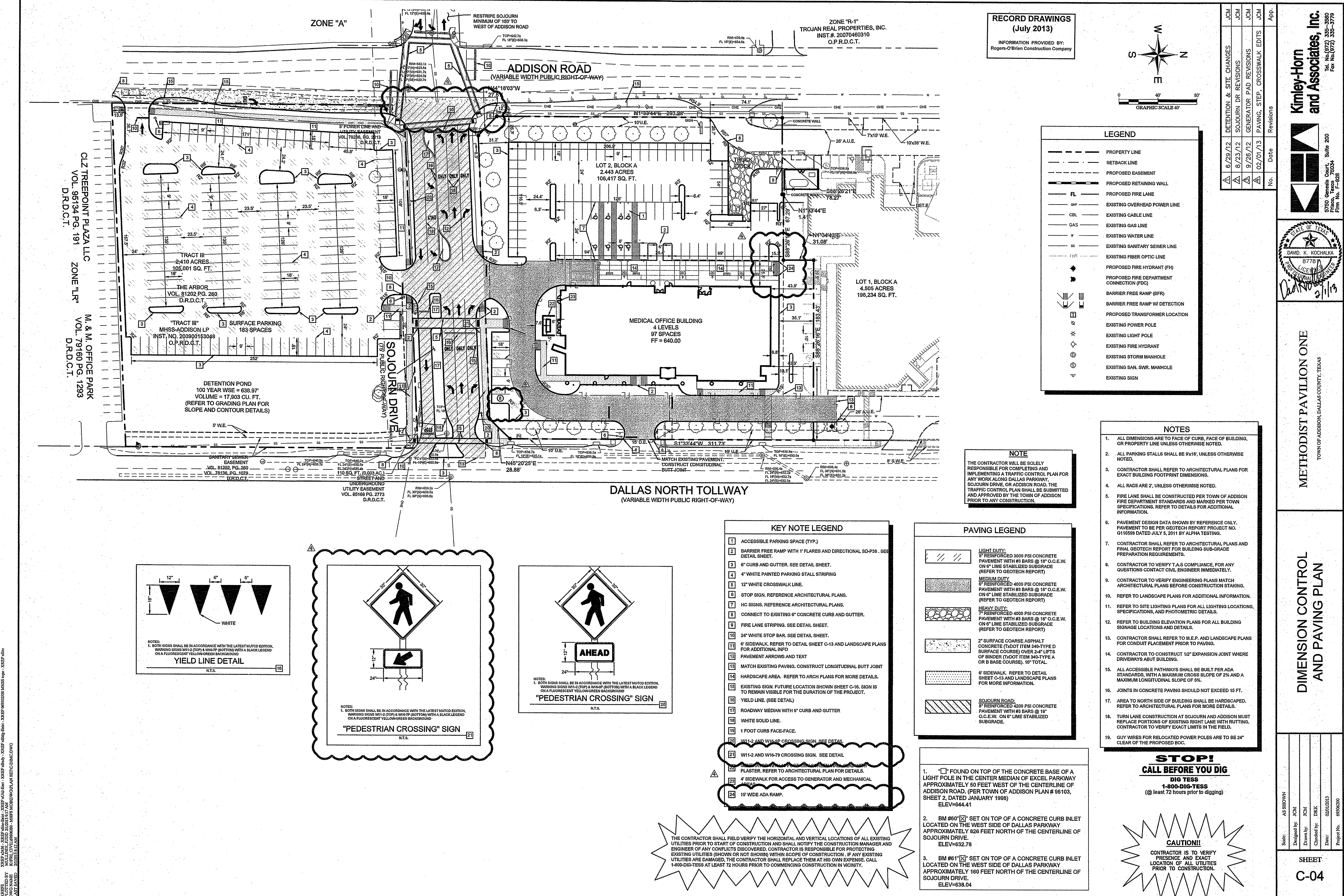
Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-3500
Fax No. (972) 335-3778

5750 Grande Court, Suite 200
Frisco, Texas 75034
Firm No. F-928



METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

DEMOLITION PLAN



Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-3550
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5750 Geneva Court,
Dallas, Texas 75244
Firm No. F-928

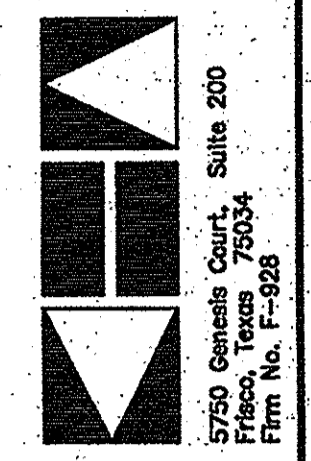
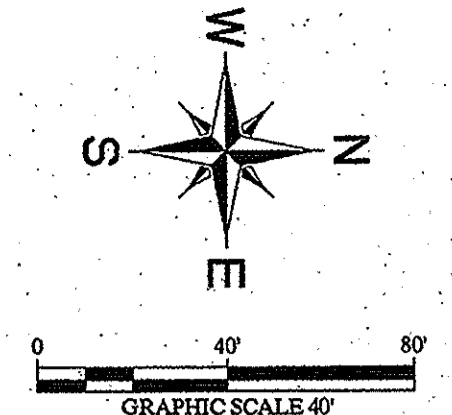
STATE OF TEXAS
DAVID K. KOCHALKA
8778
Professional Engineer
2/11/13

METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

DIMENSION CONTROL AND PAVING PLAN

Scale: AS SHOWN
Designed by: JCM
Drawn by: JCM
Checked by: DKC
Date: 02/01/13
Project No: 6930600

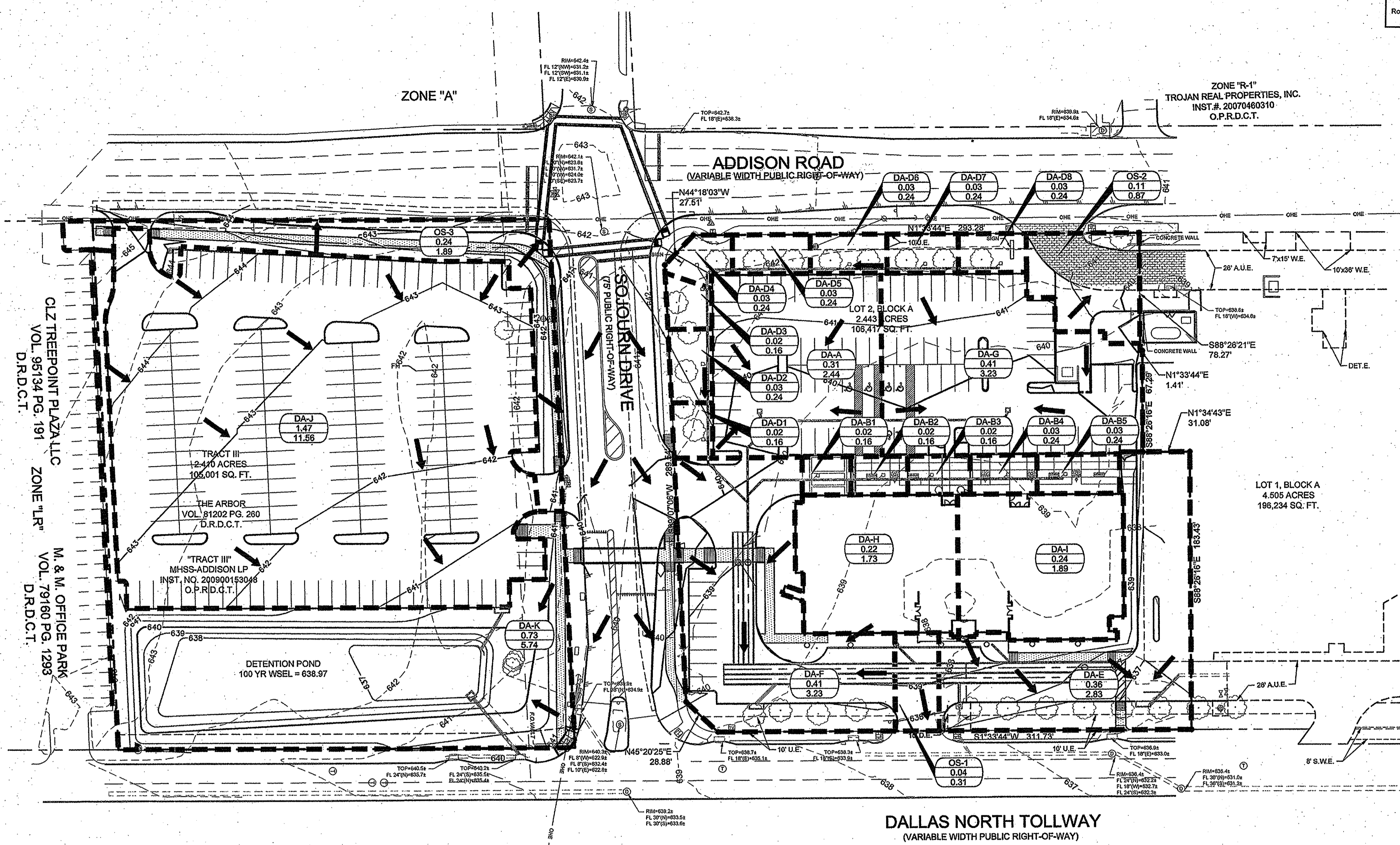
SHEET C-04



DAVID K. KOCHALKA
87781
PROFESSIONAL ENGINEER
STATE OF TEXAS
6/15/12

METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

DRAINAGE AREA MAP



LEGEND

- PROPERTY LINE
- - - - - EXISTING MAJOR CONTOUR
- - - - - EXISTING MINOR CONTOUR
- 455 --- PROPOSED MAJOR CONTOUR
- - - - - 453 --- PROPOSED MINOR CONTOUR
- - - - - DRAINAGE AREA BOUNDARY
- FLOW ARROW
- (DA-1) DRAINAGE AREA
- (0.54 AC, 4.2 CFS) 100-YEAR FLOW RATE

DRAINAGE AREA CALCULATIONS

DRAINAGE AREA CALCULATIONS NORTH LOT

DA	Area (Acres)	C	Tc (min)	I100 (in/hr)	Q100 (cfs)
DETAINED AREA					
DA-B1	0.02	0.90	10	8.74	0.16
DA-B2	0.02	0.90	10	8.74	0.16
DA-B3	0.02	0.90	10	8.74	0.16
DA-B4	0.03	0.90	10	8.74	0.24
DA-B5	0.03	0.90	10	8.74	0.24
DA-D1	0.02	0.90	10	8.74	0.16
DA-D2	0.03	0.90	10	8.74	0.24
DA-D3	0.02	0.90	10	8.74	0.16
DA-D4	0.03	0.90	10	8.74	0.24
DA-D5	0.03	0.90	10	8.74	0.24
DA-D6	0.03	0.90	10	8.74	0.24
DA-D7	0.03	0.90	10	8.74	0.24
DA-D8	0.03	0.90	10	8.74	0.24
DA-A	0.31	0.90	10	8.74	2.44
DA-F	0.41	0.90	10	8.74	3.23
DA-G	0.41	0.90	10	8.74	3.23
DA-H	0.22	0.90	10	8.74	1.73
DA-I	0.24	0.90	10	8.74	1.89
TOTAL	1.93				15.18
UNDETAINED AREA					
OS-1	0.04	0.90	10	8.74	0.31
ACCOUNTED FOR IN EXISTING HOSPITAL DETENTION					
OS-2	0.11	0.90	10	8.74	0.87
DA-E	0.36	0.90	10	8.74	2.83
TOTAL	0.47				3.70

DRAINAGE AREA CALCULATIONS

DRAINAGE AREA CALCULATIONS SOUTH LOT

DA	Area (Acres)	C	Tc (min)	I100 (in/hr)	Q100 (cfs)
DA-J	1.47	0.90	10	8.74	11.56
DA-K	0.73	0.90	10	8.74	5.74
OS-3	0.24	0.90	10	8.74	1.89
TOTAL	2.44				19.19

DRAINAGE AREA NOTE

THE TOTAL DRAINAGE AREA FOR THE "DETAINED AREA" AND "OS-1" ARE EQUAL TO THE 1.98 ACRE EXISTING DRAINAGE AREA SHOWN ON SHEET C-06B. DRAINAGE AREA "DA-E" IS REPRESENTATIVE OF THE EXISTING AREA "DA-2" ON SHEET C-06B. DRAINAGE AREA "OS-2" IS REPRESENTATIVE OF AREA "DA-3" ON SHEET C-06B. DRAINAGE AREAS "OS-2" AND "DA-E" OMIT THE PORTIONS NOT ON OUR PROPERTY AS THEY ARE TYING INTO THE EXISTING DETENTION SYSTEM FOR THE HOSPITAL PROJECT.

- BENCH MARK LIST**
1. FOUND ON TOP OF THE CONCRETE BASE OF A LIGHT POLE IN THE CENTER MEDIAN OF EXCEL PARKWAY APPROXIMATELY 50 FEET WEST OF THE CENTERLINE OF ADDISON ROAD. (PER TOWN OF ADDISON PLAN # 98103, SHEET 2, DATED JANUARY 1998) ELEV=644.41
 2. BM #60 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 826 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=632.78
 3. BM #61 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 160 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=638.04

STOP!
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(at least 72 hours prior to digging)

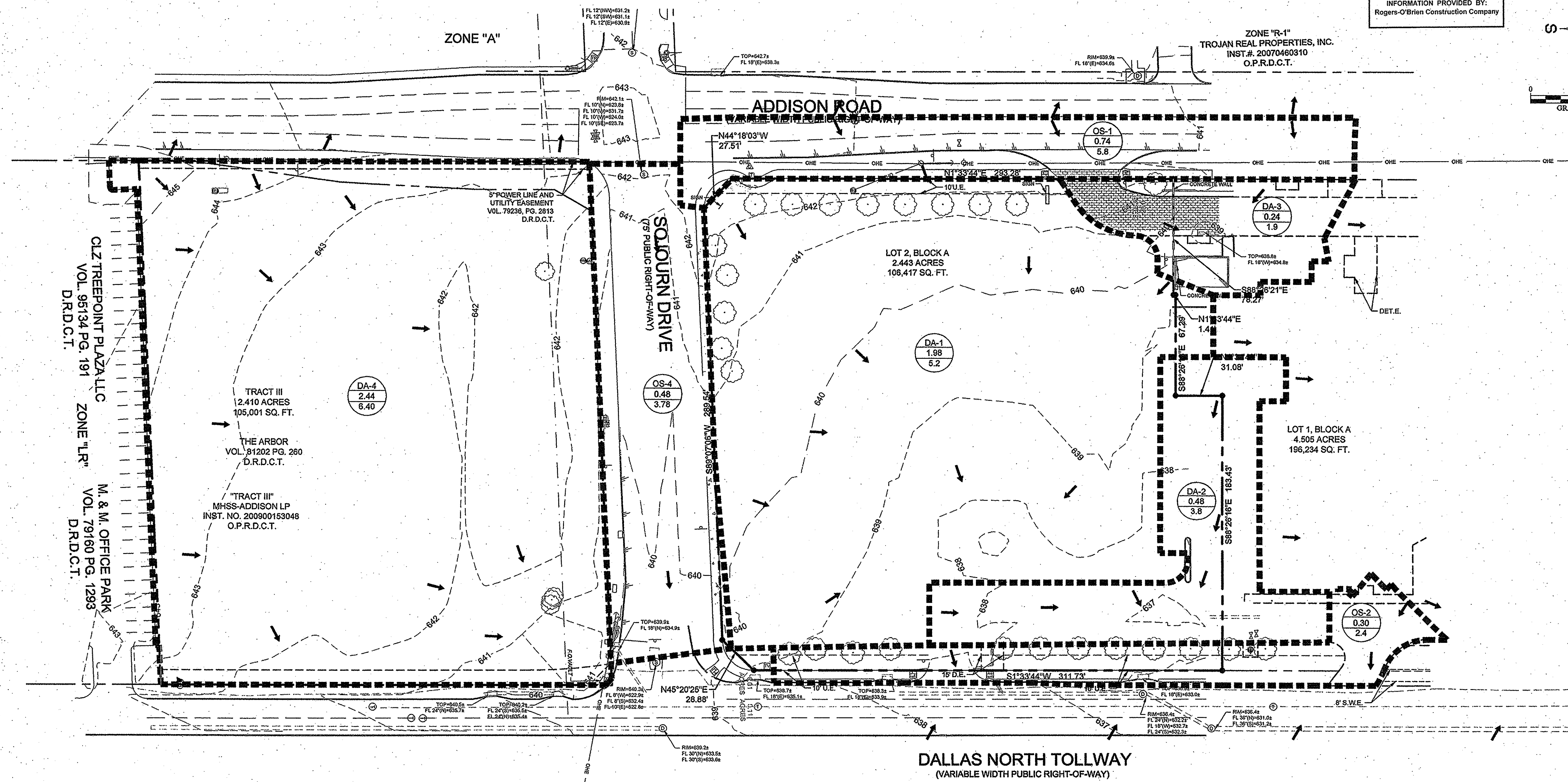
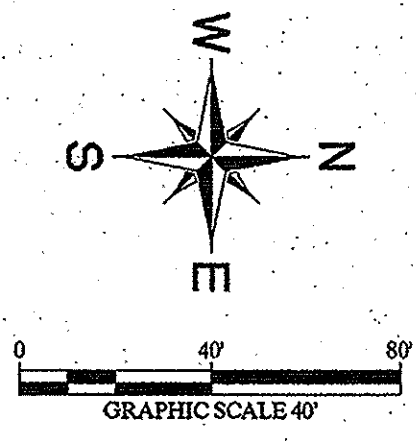
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DIMENSIONS: 1/8" = 1'-0" (VERTICAL) 1/8" = 1'-0" (HORIZONTAL) 1/8" = 1'-0" (HORIZONTAL) 1/8" = 1'-0" (HORIZONTAL) 1/8" = 1'-0" (HORIZONTAL)
 DATE: 6/15/12
 DRAWN BY: DSK
 CHECKED BY: DSK
 PROJECT NO.: 6906200

AS SHOWN
Designed by: DSK
Drawn by: B.K.
Checked by: DSK
Date: 6/15/2012
Project No.: 6906200



DRAINAGE AREA CALCULATIONS

EXISTING DRAINAGE AREA CALCULATIONS

DA	Area (Acres)	C	Tc (min)	I100 (in/hr)	Q100 (cfs)
DA-1	1.98	0.30	10	8.74	5.19
DA-2	0.48	0.90	10	8.74	3.78
DA-3	0.24	0.90	10	8.74	1.91
DA-4	2.44	0.30	10	8.74	6.40
OS-1	0.74	0.90	10	8.74	5.82
OS-2	0.30	0.90	10	8.74	2.36
OS-3	0.48	0.90	10	8.74	3.78

LEGEND

---	PROPERTY LINE
-455-	EXISTING MAJOR CONTOUR
-453-	EXISTING MINOR CONTOUR
- - -	DRAINAGE AREA BOUNDARY
→	FLOW ARROW
(DA-1) X.XX X.XX	DRAINAGE AREA AREA 100-YEAR FLOW RATE

BENCH MARK LIST

- FOUND ON TOP OF THE CONCRETE BASE OF A LIGHT POLE IN THE CENTER MEDIAN OF EXCEL PARKWAY APPROXIMATELY 50 FEET WEST OF THE CENTERLINE OF ADDISON ROAD. (PER TOWN OF ADDISON PLAN # 96103, SHEET 2, DATED JANUARY 1998)
ELEV=644.41
- BM #60 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 826 FEET NORTH OF THE CENTERLINE OF SQJOURN DRIVE.
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- BM #61 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 160 FEET NORTH OF THE CENTERLINE OF SQJOURN DRIVE.
ELEV=638.04

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DIG TESS
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(@ least 72 hours prior to digging)

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PLANS FOR THIS PROJECT WERE PREPARED BY R.O.B. ENGINEERING, INC. UNDER THE CLOSE PERSONAL SUPERVISION AND DIRECT CONTROL OF THE PROFESSIONAL ENGINEER, DALLAS, TEXAS, REGISTERED PROFESSIONAL ENGINEER NO. 60900. THESE PLANS WERE PREPARED AND CHECKED BY THE ENGINEER ON THE DATE INDICATED AND THE ENGINEER ACCEPTS FULL RESPONSIBILITY FOR THE DESIGN AND CONSTRUCTION OF THE PROJECT.

Modified Rational Method for Stormwater Detention Pond (Underground)

Methodist Hospital for Surgery Expansion, Town of Addison

Design Frequency: 100 - year storm

Purpose: Use the Modified Rational Method to determine the volume of stormwater storage needed to compensate for increased runoff due to development

Method: Use the Rational Method to determine maximum rate of runoff

$Q = C * I * A$ Where: C = Runoff Coefficient
 I = Rainfall Intensity (in/hr)
 A = Drainage Area (acres)

Assumptions: Rainfall intensity determined using the IDF curve provided by the Town of Addison

For Existing Conditions: C = 0.30, $T_c = 10$ min, $i = 8.74$ in

For Proposed Conditions: C = 0.90, $T_c = 10$ min, $i = 8.74$ in/hr

I. Determination of Allowable Release Rate - Existing Site

Total site area	1.98 acres
Time of concentration	10 minutes
Rainfall intensity	8.74 in/hr
Existing runoff coefficient	0.30
Existing site runoff	5.19 cfs

Area of site draining through detention pond	1.93 acres
Area of site draining undetained	0.04 acres
Undetained time of concentration	10 minutes
Rainfall intensity for one-hundred year storm	8.74 in/hr
Proposed runoff coefficient	0.90
Runoff from undetained area	0.31 cfs

Allowable release rate from detention pond = **4.88 cfs**

Allowable release rate = Existing site runoff - Runoff from undetained area

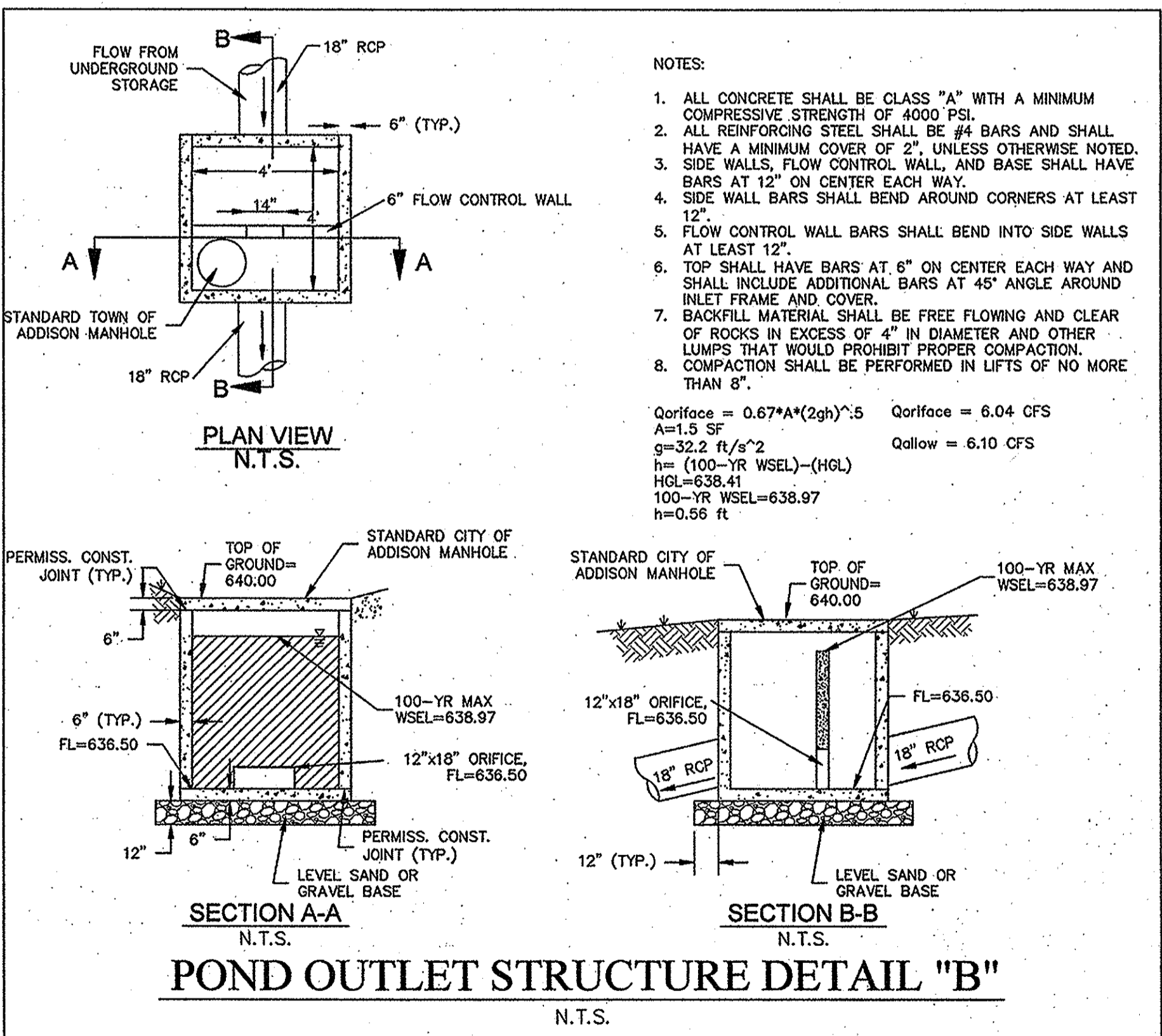
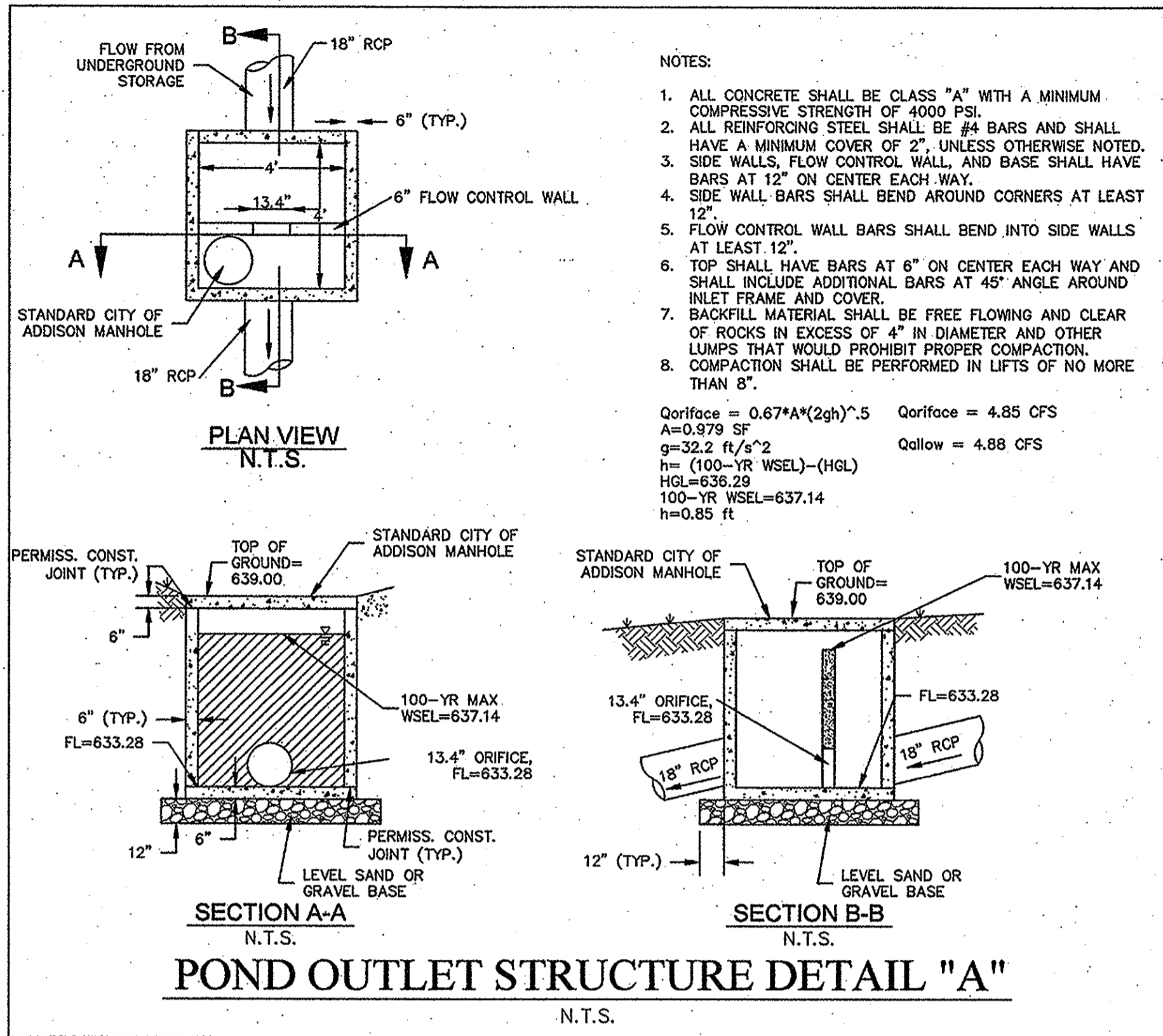
II. Required Storage Calculations

Duration (min)	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Inflow Volume (cf)	Outflow Rate (cfs)	Outflow Volume (cf)	Inflow-Outflow Volume (cf)
10	8.74	15.2	9,109	4.88	2,926	6,183
15	7.52	13.1	11,756	4.88	3,658	8,098
20	6.80	11.8	14,174	4.88	4,389	9,785
30	5.75	10.0	17,978	4.88	5,852	12,126
40	5.00	8.7	20,844	4.88	7,315	13,529
50	4.45	7.7	23,189	4.88	8,778	14,410
60	3.91	6.8	24,450	4.88	10,242	14,208
70	3.63	6.3	26,482	4.88	11,705	14,778
80	3.33	5.8	27,764	4.88	13,168	14,597
90	3.08	5.3	28,890	4.88	14,631	14,259
100	2.87	5.0	29,911	4.88	16,094	13,817
110	2.68	4.7	30,724	4.88	17,557	13,167
120	2.52	4.4	31,516	4.88	19,020	12,496

Underground Detention Stage-Storage Table

Elevation (ft)	Sectional Volume (cf)						Storage (cf)
633.35	0.00	0.00	0.00	0.00	0.00	0.00	0
633.50	33.69	33.69	34.00	34.00	0.00	0.00	135
634.00	459.58	459.58	336.03	336.03	152.25	141.75	1,885
634.50	923.80	923.80	644.31	644.31	414.75	404.25	3,955
635.00	1388.02	1388.02	952.59	952.59	677.25	666.75	6,025
635.50	1852.24	1852.24	1260.87	1260.87	939.75	929.25	8,095
636.00	2316.46	2316.46	1569.15	1569.15	1202.25	1191.75	10,165
636.50	2780.68	2780.68	1877.43	1877.43	1464.75	1454.25	12,235
637.00	3244.90	3244.90	2185.71	2185.71	1727.25	1716.75	14,305
637.14	3350.48	3350.48	2245.16	2245.16	1800.75	1790.25	14,782

Required Storage 100-Year WSEL = **14,778 cfs**
 637.14



DETENTION SYSTEM CALCULATIONS (ABOVE GROUND)

MODIFIED RATIONAL METHOD

DESIGN FREQUENCY = 100 YEAR STORM

ALLOWABLE RELEASE RATE (EXISTING CONDITIONS):

DRAINAGE AREA (A)	2.44 AC	ANTEC. PREC. COEFF. (K)	1.00
TIME OF CONC. (T _c)	10 MIN	Q = K * C * I * A	
RAINFALL INTENSITY (I)	8.74 IN/HR		
RUNOFF COEFFICIENT (C)	0.30		
ALLOW. SITE DISCHARGE	6.4 CFS		

PROPOSED CONDITIONS:

ON-SITE DETAINED RUNOFF:		OFF-SITE PASS THROUGH FLOW:	
DRAINAGE AREA (A)	2.20 AC	DRAINAGE AREA (A)	0.04 AC
TIME OF CONC. (T _c)	10 MIN	TIME OF CONC. (T _c)	10 MIN
RAINFALL INTENSITY (I)	8.74 IN/HR	RAINFALL INTENSITY (I)	8.74 IN/HR
RUNOFF COEFFICIENT (C)	0.90	RUNOFF COEFFICIENT (C)	0.90
DETAINED RUNOFF	17.3 CFS	OFF-SITE PASS THROUGH FLOW:	0.3 CFS

ON-SITE UNDETAINED RUNOFF:		ALLOWABLE POND DISCHARGE:	6.1 CFS
DRAINAGE AREA (A)	0.24 AC		
TIME OF CONC. (T _c)	10 MIN		
RAINFALL INTENSITY (I)	8.74 IN/HR		
RUNOFF COEFFICIENT (C)	0.90		
UNDETAINED RUNOFF	0.6 CFS		

STORAGE CALCULATIONS:

DURATION (MIN)	RAINFALL INTENSITY (IN/HR)	INFLOW RATE (CFS)	INFLOW VOLUME (CF)	OUTFLOW RATE (CFS)	OUTFLOW VOLUME (CF)	REQUIRED STORAGE (INFLOW - OUTFLOW) (CF)	(AC-FT)
10	0.17	9.20	18.5	11.23	6.1	3,650	7,473 0.17
15	0.25	7.86	16.8	14,254	6.1	4,562	9,692 0.22
20	0.33	6.90	13.9	16,694	6.1	5,476	11,220 0.26
30	0.50	5.62	11.3	20,379	6.1	7,300	13,079 0.30
40	0.67	4.78	9.6	23,134	6.1	9,125	14,010 0.32
50	0.83	4.19	8.4	25,343	6.1	10,949	14,393 0.33
60	1.00	3.75	7.6	27,192	6.1	12,774	14,418 0.33
70	1.17	3.40	6.9	28,788	6.1	14,599	14,189 0.33
80	1.33	3.12	6.3	30,196	6.1	16,424	13,771 0.32
90	1.50	2.89	5.8	31,457	6.1	18,249	13,208 0.30
100	1.67	2.70	5.4	32,603	6.1	20,074	12,529 0.29
110	1.83	2.53	5.1	33,655	6.1	21,899	11,756 0.27
120	2.00	2.39	4.8	34,627	6.1	23,724	10,903 0.25
130	2.17	2.26	4.6	35,533	6.1	25,549	9,984 0.23
140	2.33	2.15	4.3	36,382	6.1	27,374	9,008 0.21
150	2.50	2.05	4.1	37,181	6.1	29,199	7,983 0.18
160	2.67	1.96	4.0	37,937	6.1	31,024	6,914 0.16
170	2.83	1.88	3.8	38,655	6.1	32,848	5,806 0.13
180	3.00	1.81	3.6	39,338	6.1	34,673	4,665 0.11
190	3.17	1.74	3.5	39,991	6.1	36,498	3,492 0.08
200	3.33	1.68	3.4	40,616	6.1	38,323	2,292 0.05
210	3.50	1.62	3.3	41,216	6.1	40,148	1,088 0.02
220	3.67	1.57	3.2	41,793	6.1	41,973	-180 0.00
230	3.83	1.52	3.1	42,349	6.1	43,798	-1,449 -0.03
240	4.00	1.48	3.0	42,885	6.1	45,623	-2,737 -0.06
MAXIMUM REQUIRED STORAGE =						14,418	0.33

Pond Volume Calculations

Method: Use the average-end area method to determine volume of storage of the pond and determine the 100-year storm high water level

Where: $Volume = (1/2) * (\text{Area of top contour} + \text{Area of bottom contour}) * \text{depth increment}$

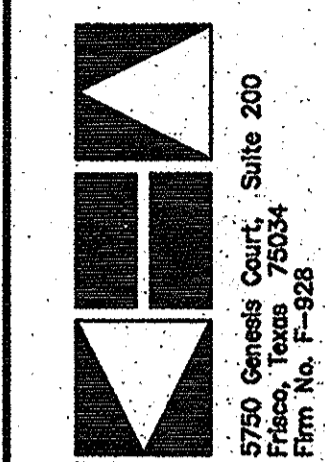
High Water Elevation	639.00 feet
High Water Elevation + 1' freeboard	640.00 feet
Invert elevation of outlet structure	636.50 feet

Goal: Calculated 100-yr storage = 14,418 cubic feet

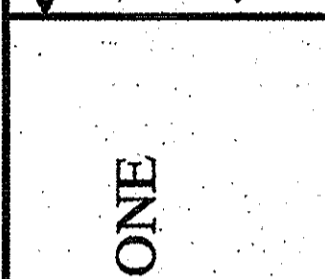
Elevation (feet)	Incremental Volume (cubic ft.)		Total Volume (cubic ft.)	
	(sq. ft.)	(ac. ft.)	(ac. ft.)	(cubic ft.)
636.50	0.0			
637.00	2,804.6	701.2	0.016	701
638.00	9,794.4	6,299.5	0.145	7,001
639.00	12,687.7	11,241.1	0.258	18,242
640.00	12,250.6	12,469.1	0.286	30,711

RECORD DRAWINGS (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

Kimley-Horn and Associates, Inc.
 Tel. No. (972) 335-3589
 Fax. No. (972) 335-0779



1970 Geneva Circle, Suite 200
 Frisco, TX 75034
 Firm No. K-523

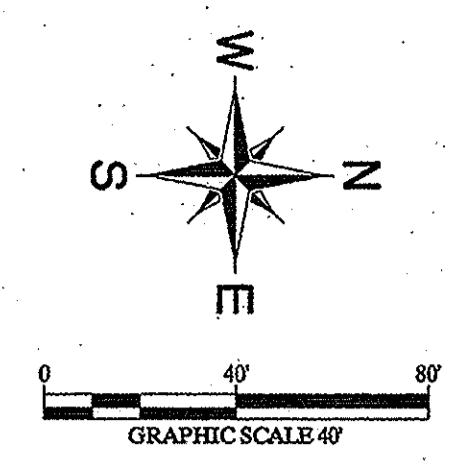
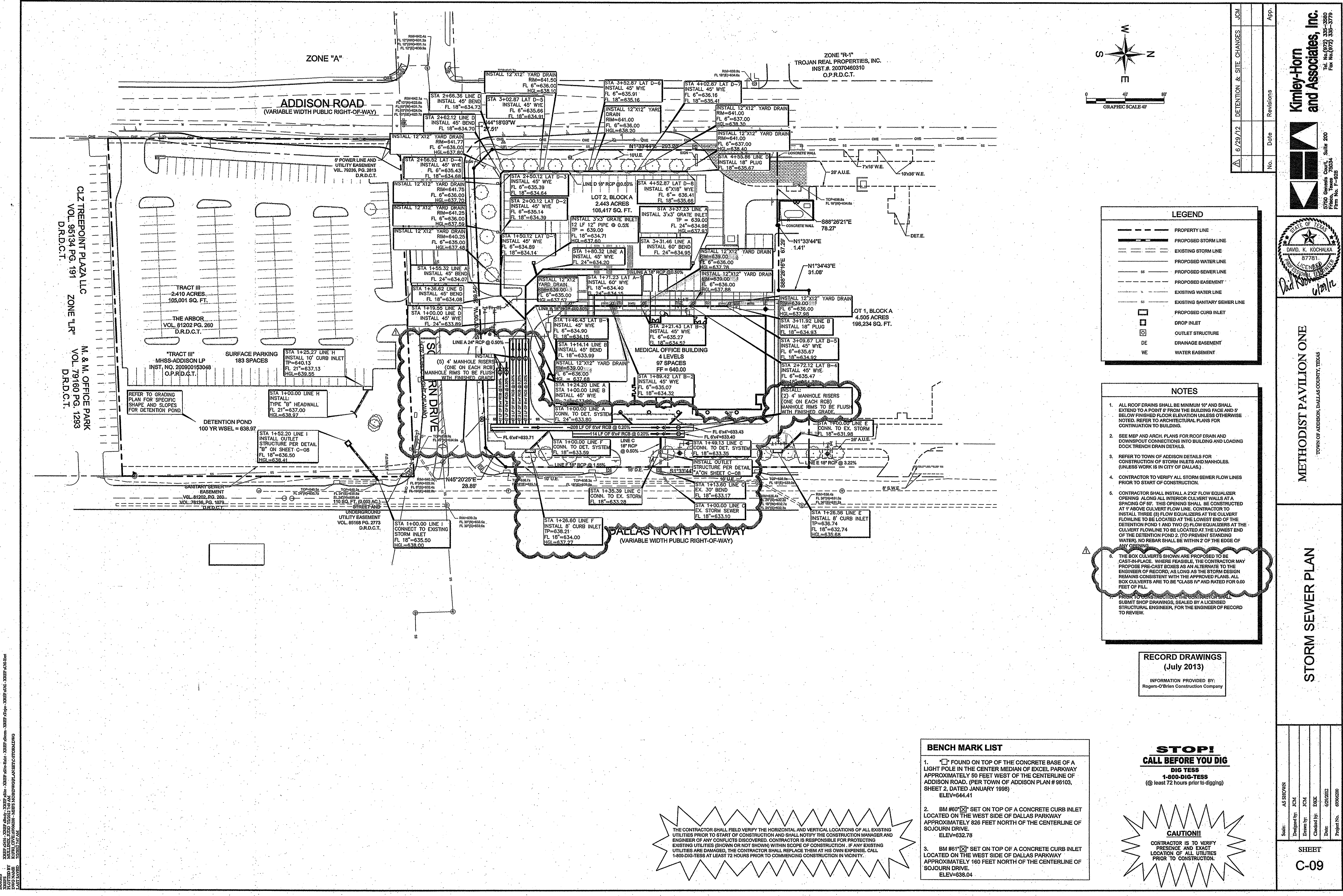


METHODIST PAVILION ONE
 TOWN OF ADDISON, DALLAS COUNTY, TEXAS

DETENTION CALCULATIONS

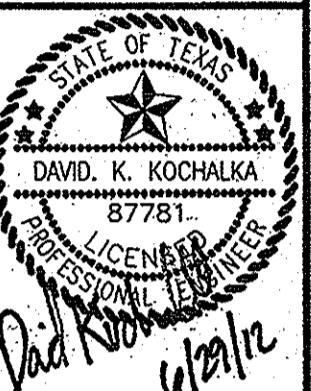
Scale: AS SHOWN
 Designed By: DRK
 Drawn By: RJK
 Checked By: DRK
 Date: 06/27/2012
 Project No.: 6930200

SHEET C-08



No.	Date	Revisions	App.
1	6/29/12	DETECTION & SITE CHANGES	JCM

Kimley-Horn and Associates, Inc.
 Tel. No. (972) 335-3580
 Fax No. (972) 335-3779
 5750 Genesis Court, Suite 200
 Frisco, Texas 75034
 Firm No. F-928



METHODIST PAVILION ONE
 TOWN OF ADDISON, DALLAS COUNTY, TEXAS

STORM SEWER PLAN

LEGEND

	PROPERTY LINE	
	PROPOSED STORM LINE	
	EXISTING STORM LINE	
	PROPOSED WATER LINE	
	PROPOSED SEWER LINE	
	PROPOSED EASEMENT	
	EXISTING WATER LINE	
	EXISTING SANITARY SEWER LINE	
	PROPOSED CURB INLET	
	DROP INLET	
	OUTLET STRUCTURE	
	DRAINAGE EASEMENT	
	WE	WATER EASEMENT

- NOTES**
1. ALL ROOF DRAINS SHALL BE MINIMUM 18" AND SHALL EXTEND TO A POINT 6' FROM THE BUILDING FACE AND 5' BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED. REFER TO ARCHITECTURAL PLANS FOR CONTINUATION TO BUILDING.
 2. SEE MEP AND ARCH. PLANS FOR ROOF DRAIN AND DOWNSPOUT CONNECTIONS INTO BUILDING AND LOADING DOCK TRENCH DRAIN DETAILS.
 3. REFER TO TOWN OF ADDISON DETAILS FOR CONSTRUCTION OF STORM INLETS AND MANHOLES (UNLESS WORK IS IN CITY OF DALLAS).
 4. CONTRACTOR TO VERIFY ALL STORM SEWER FLOW LINES PRIOR TO START OF CONSTRUCTION.
 5. CONTRACTOR SHALL INSTALL A 2X2' FLOW EQUALIZER OPENING ALONG ALL INTERIOR CULVERT WALLS AT A SPACING OF 50'. THIS OPENING SHALL BE CONSTRUCTED AT 1' ABOVE CULVERT FLOW LINE. CONTRACTOR TO INSTALL THREE (3) FLOW EQUALIZERS AT THE CULVERT FLOWLINE TO BE LOCATED AT THE LOWEST END OF THE DETENTION POND 1 AND TWO (2) FLOW EQUALIZERS AT THE CULVERT FLOWLINE TO BE LOCATED AT THE LOWEST END OF THE DETENTION POND 2. (TO PREVENT STANDING WATER), NO REBAR SHALL BE WITHIN 2' OF THE EDGE OF ANY OPENING.
 6. THE BOX CULVERTS SHOWN ARE PROPOSED TO BE CAST-IN-PLACE. WHERE FEASIBLE, THE CONTRACTOR MAY PROPOSE PRE-CAST BOXES AS AN ALTERNATE TO THE ENGINEER OF RECORD, AS LONG AS THE STORM DESIGN REMAINS CONSISTENT WITH THE APPROVED PLANS. ALL BOX CULVERTS ARE TO BE "CLASS IV" AND RATED FOR 0.00 FEET OF FILL.

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

BENCH MARK LIST

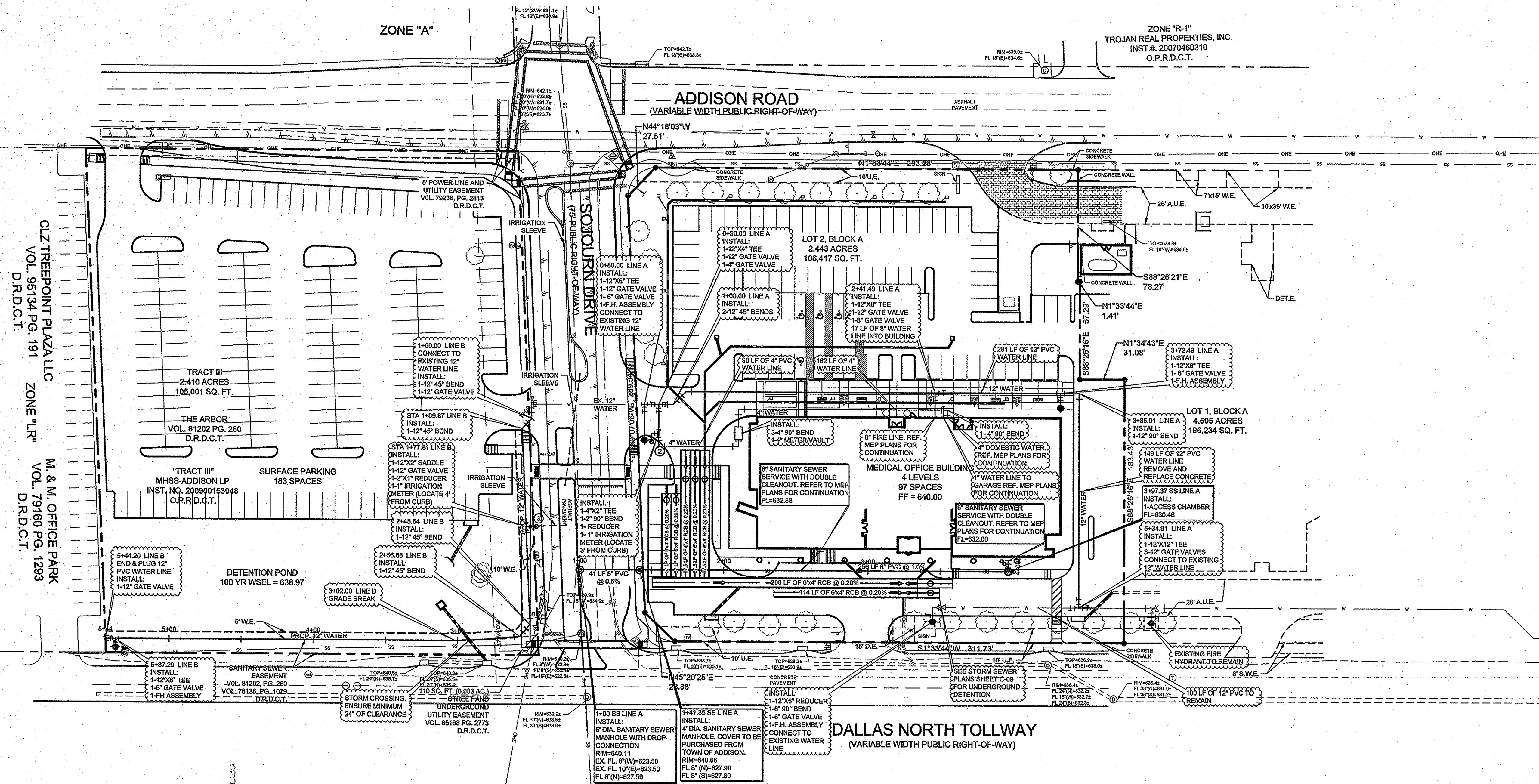
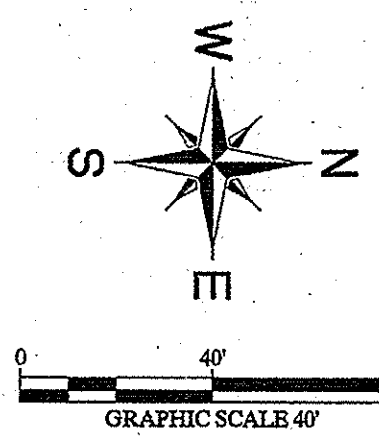
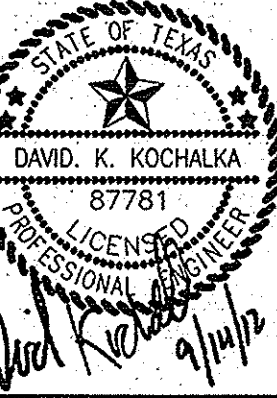
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DATE: 07/20/13
 DRAWN BY: JCM
 CHECKED BY: JCM
 DESIGNED BY: JCM
 PROJECT NO.: 0906200
 SHEET NO.: C-09



LEGEND

- PROPERTY LINE
- SETBACK LINE
- PROPOSED EASEMENT
- PROPOSED RETAINING WALL
- PROPOSED SANITARY SEWER LINE
- PROPOSED WATER LINE
- EXISTING OVERHEAD POWER LINE
- EXISTING CABLE LINE
- GAS
- EXISTING GAS LINE
- EXISTING WATER LINE
- EXISTING SANITARY SEWER LINE
- EXISTING FIBER OPTIC LINE
- PROPOSED FIRE HYDRANT (FH)
- PROPOSED FIRE DEPARTMENT CONNECTION (FDC)
- BARRIER FREE RAMP (BFR)
- PROPOSED TRANSFORMER LOCATION
- NUMBER OF PARKING SPACES PER ROW
- EXISTING POWER POLE
- EXISTING LIGHT POLE
- EXISTING FIRE HYDRANT
- EXISTING STORM MANHOLE
- EXISTING SAN. SWR. MANHOLE
- EXISTING SIGN

- NOTES**
- SEE MEP PLANS FOR ALL UTILITY CONNECTIONS INTO BUILDING.
 - WATER AND SEWER LINES SHALL STUB 5 FEET FROM BUILDING FOR SERVICE CONNECTIONS UNLESS OTHERWISE NOTED.
 - A FIVE FOOT CLEARANCE SHALL BE MAINTAINED AROUND ALL FIRE HYDRANTS.
 - REFER TO TOWN OF ADDISON DETAILS FOR WATER METER, METER BOX, FIRE HYDRANTS, VALVES, VALVE BOXES AND SERVICE INSTALLATION.
 - REFER TO DETAILS FOR SANITARY SEWER MANHOLE REQUIREMENTS.
 - REFER TO DETAILS FOR TRENCHING, BEDDING, BACKFILL, AND TRENCH COMPACTION REQUIREMENTS.
 - WATER AND SANITARY SEWER PIPE SHALL BE CONSTRUCTED OF SLIP-ON OR MECHANICAL JOINT CAST OR DUCTILE IRON PIPE, OR PVC PIPE.
 - REFER TO ARCHITECTURE PLANS FOR LOCATION AND SIZING OF PVC SLEEVES FOR FRANCHISE UTILITIES, IRRIGATION, ETC.
 - ALL PIPE DEFLECTIONS SHALL BE PER MANUFACTURER'S SPECIFICATIONS. ANY VARIATIONS SHALL BE APPROVED IN WRITING BY THE ENGINEER BEFORE INSTALLATION.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEFLECT ELECTRIC, GAS, CABLE, AND TELEPHONE CONDUIT AND PIPING AS REQUIRED TO AVOID UTILITY CONFLICTS.
 - IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY A TRAFFIC CONTROL PLAN TO THE TOWN FOR APPROVAL FOR UTILITY WORK WITHIN THE PUBLIC R.O.W.
 - REFER TO LANDSCAPE PLANS FOR MORE INFORMATION REGARDING THE IRRIGATION SLEEVES SHOWN IN SOJOURN.

WATER METER SCHEDULE

I.D.	TYPE	SIZE	NO.	SAN. SEW.
①	DOMESTIC	4"	1	2-6"
②	IRRIGATION	1"	1	N/A
③	IRRIGATION	1"	1	N/A

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 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

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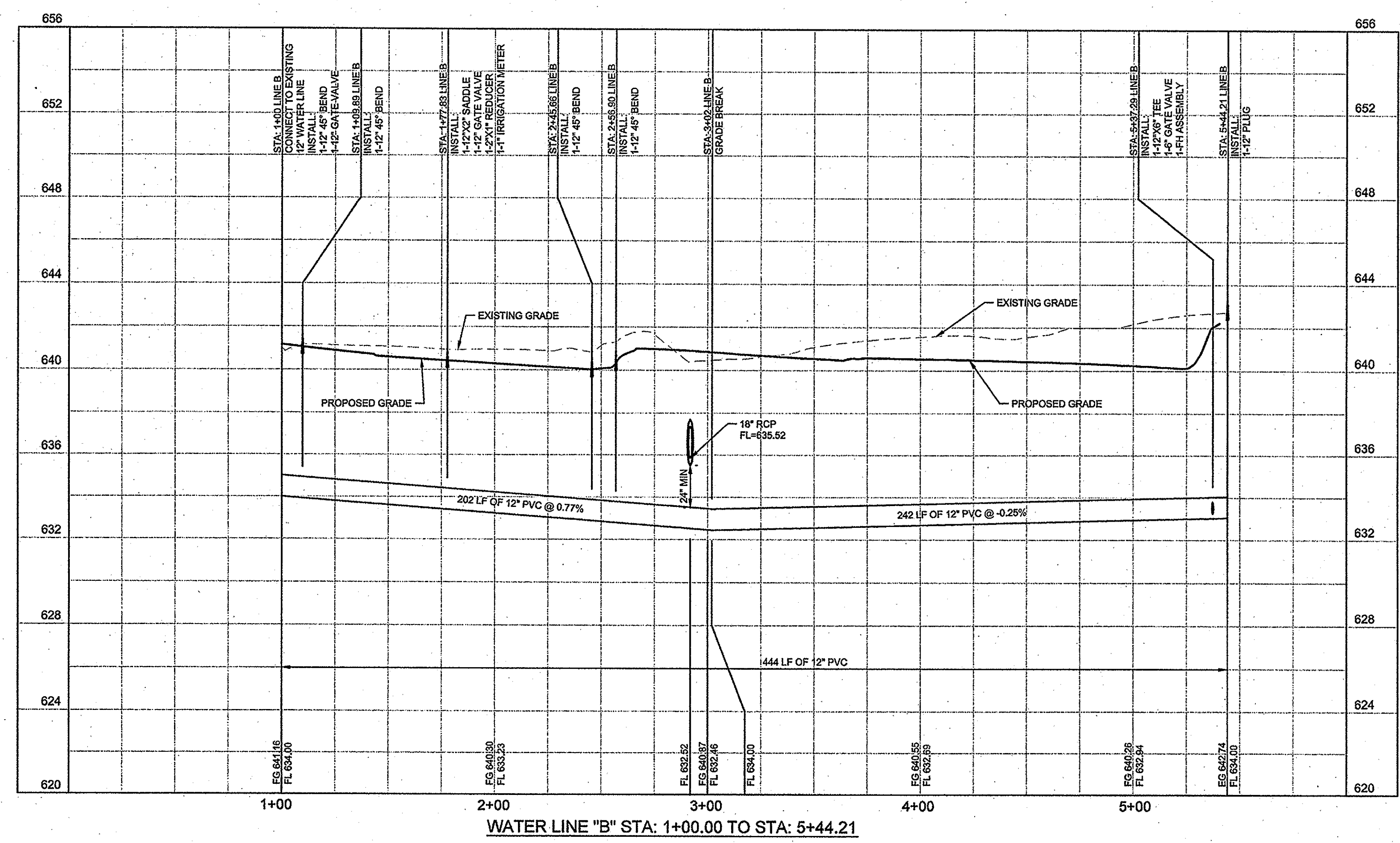
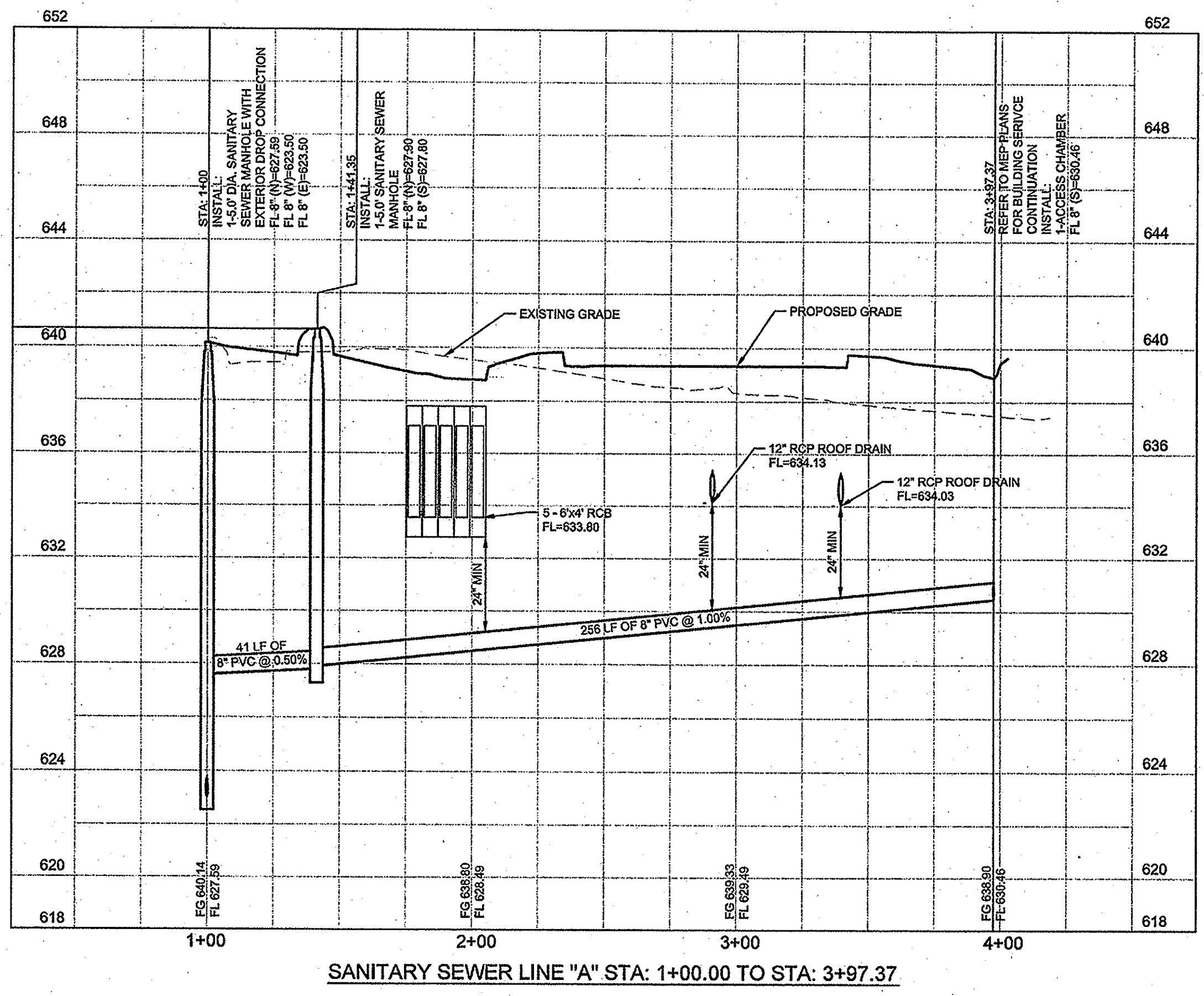
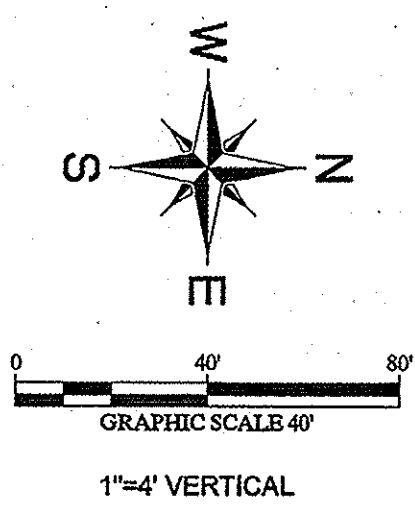
CIZ TREPOINT PLAZA LLC
 VOL. 95134 PG. 191
 D.R.D.C.T.

M & M OFFICE PARK
 VOL. 79160 PG. 1293
 D.R.D.C.T.

DESIGNED BY: JCM
 DRAWN BY: JCM
 CHECKED BY: DKC
 DATE: 08/20/12
 PROJECT NO: 6906000

**Kimley-Horn
and Associates, Inc.**
Tel. No. (972) 335-3890
Fax No. (972) 335-5778

5750 Genesis Court, Suite 200
Frisco, Texas 75034
Firm No. F-928



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METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

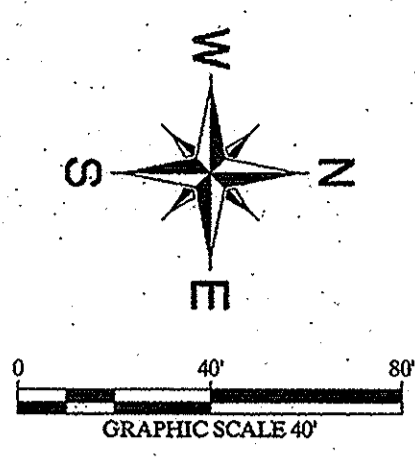
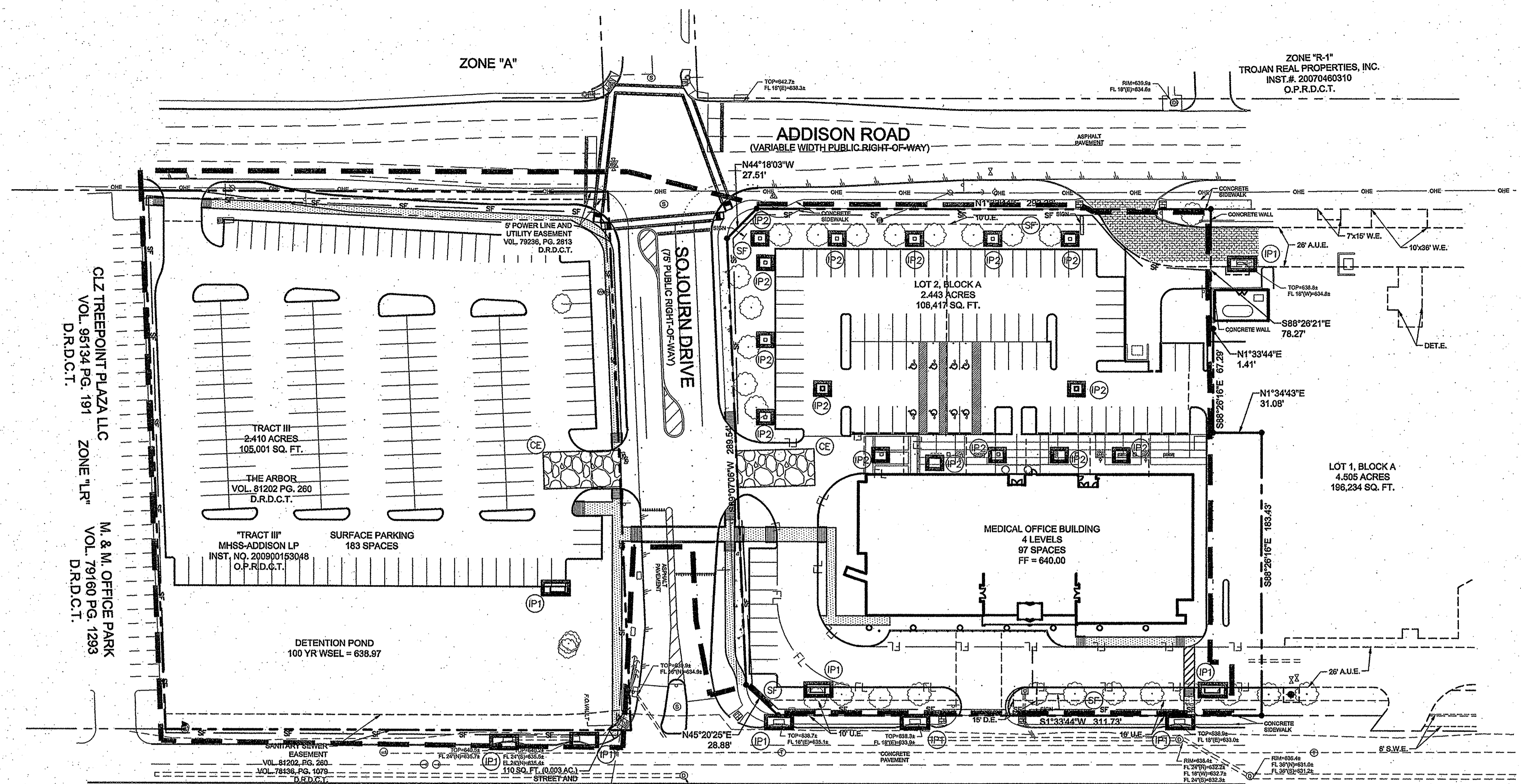
UTILITY PROFILES

Scale:	AS SHOWN
Designed by:	JCM
Drawn by:	JCM
Checked by:	DCK
Date:	08/23/2012
Project No.:	698600

RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

SHEET
C-11A



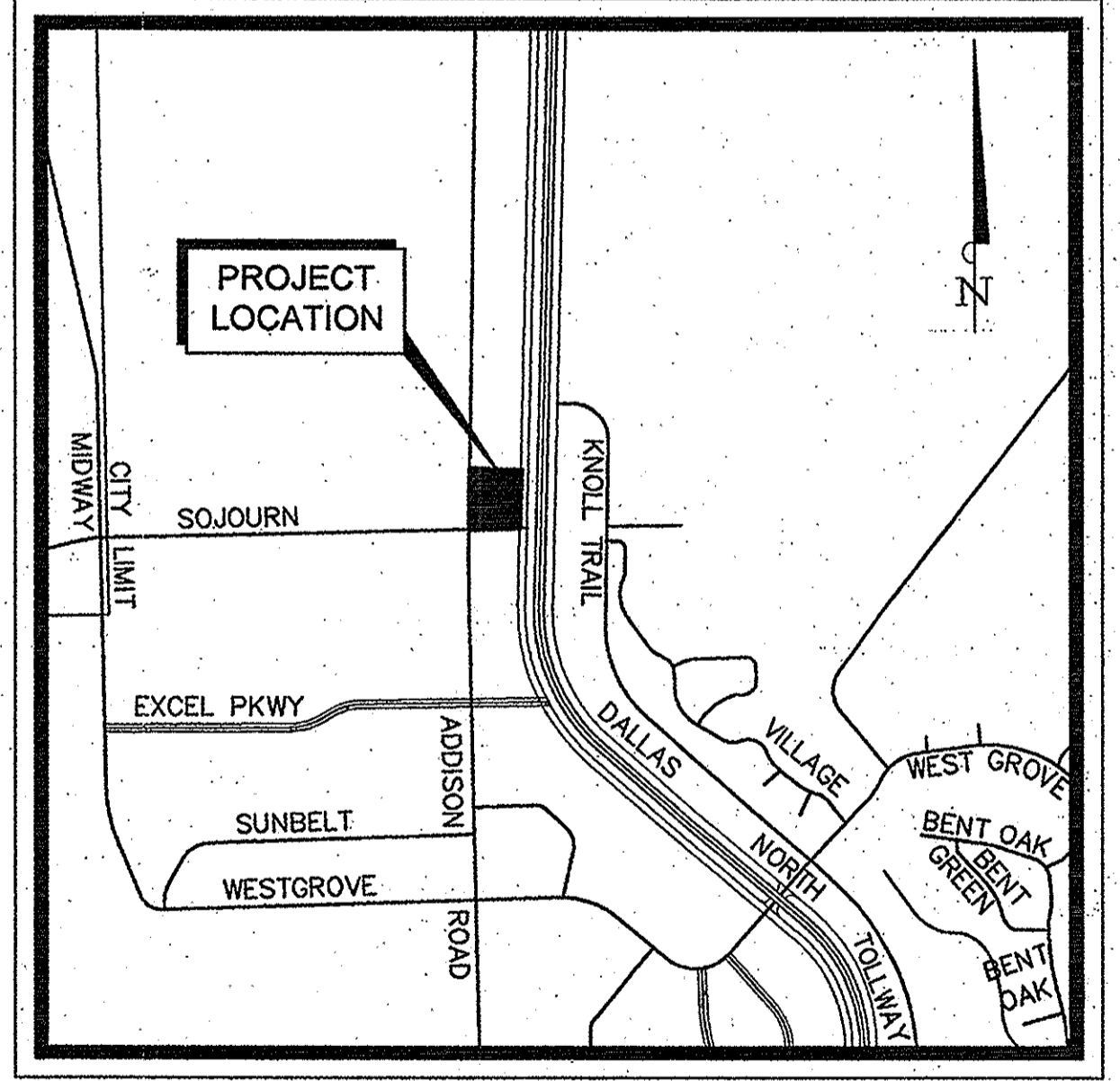
LEGEND

---	PROPERTY LINE
---	EXISTING MAJOR CONTOUR
---	EXISTING MINOR CONTOUR
---	PROPOSED MAJOR CONTOUR
---	PROPOSED MINOR CONTOUR
---	LIMITS OF DISTURBANCE
SF	SILT FENCE
IP1	INLET PROTECTION
IP2	INLET PROTECTION
CE	CONSTRUCTION ENTRANCE
→	FLOW DIRECTION

SITE DATA

TOTAL SITE AREA	2.44 AC.
TOTAL SITE AREA DISTURBED	2.29 AC.
TOTAL OFF-SITE AREA DISTURBED	0.68 AC.
TOTAL AREA DISTURBED *	2.97 AC.
NEW PAVED AREA	0.72 AC.
NEW ROOFED AREA	1.31 AC.
NEW SEEDED/GROUND COVER AREA	0.41 AC.
PRE-DEVELOPMENT RUNOFF COEFFICIENT	0.30
POST-DEVELOPMENT RUNOFF COEFFICIENT	0.50

* DOES NOT INCLUDE ANY OFF-SITE DISPOSAL OR BORROW AREAS - CONTRACTOR TO UPDATE AS NECESSARY DURING CONSTRUCTION.



RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

VEGETATIVE STABILIZATION REQUIREMENTS

TEMPORARY SEEDING

ALL DISTURBED AREAS WHICH WILL BE LEFT DORMANT FOR GREATER THAN 14 DAYS SHALL BE SEEDED WITH FAST-GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING OPERATIONS. SELECTION OF THE SEED WILL DEPEND ON THE TIME OF YEAR IT IS APPLIED (SEE DESCRIPTIONS IN TABLE 2). REFERENCE LANDSCAPE PLAN FOR PERMANENT STABILIZATION REQUIREMENTS. ALL TEMPORARY SEEDING MATERIALS SHALL BE APPROVED BY THE OWNERS REPRESENTATIVE PRIOR TO APPLICATION.

TABLE 2
VEGETATION TABLE*

TEMPORARY SEEDING SPECIES	PLANTING RATE	PLANTING DATES
CRIMSON CLOVER	7#/ACRE	8/15 - 11/30
MILLET, FOXTAIL	30#/ACRE	8/1 - 8/31
RYEGRASS, ANNUAL	30#/ACRE	8/15 - 8/30
SPRANGLETOP, GREEN	2.5#/ACRE	2/1 - 5/1
TALL FESCUE	7#/100/1000 SF	9/1 - 10/15

*USE ONLY USDA CERTIFIED SEED.

SURFACE PREPARATION FOR TEMPORARY SEEDING

- INSTALL EROSION STRUCTURES SUCH AS DIKES, DIVERSIONS, ETC. PRIOR TO SEEDING.
- FURROW SLOPES STEEPER THAN 3:1 ON THE CONTOUR LINE BEFORE SEEDING.
- ENSURE SEED BED IS FULVERIZED, LOOSE, AND UNIFORM.

APPLICATION

- WHEN HYDROMULCHING IS USED, DO NOT MIX SEED AND FERTILIZER MORE THAN 30 MINUTES PRIOR TO APPLICATION.
- APPLY SEED EVENLY USING PROPER EQUIPMENT AND WATER TO AID VEGETATION GROWTH.
- EROSION CONTROL NETTING SHALL BE INSTALLED OVER FILL SLOPES WHICH HAVE BEEN BROUGHT TO FINAL GRADE AND HAVE BEEN SEEDED TO PROTECT AGAINST EROSION. MULCH (STRAW OR FIBER) SHALL BE USED ON RELATIVELY FLAT SLOPES.

- SITE MAP-GENERAL NOTES**
- CONTRACTOR IS SOLELY RESPONSIBLE FOR SELECTION, IMPLEMENTATION, MAINTENANCE, AND EFFECTIVENESS OF ALL SWPPP CONTROLS - CONTROLS SHOWN ON THIS SITE MAP ARE SUGGESTED CONTROLS ONLY.
 - CONTRACTOR SHALL RECORD INSTALLATION, MAINTENANCE OR MODIFICATION, AND REMOVAL DATES FOR EACH BMP EMPLOYED (WHETHER CALLED OUT ON ORIGINAL SWPPP OR NOT DIRECTLY ON THE SITE MAP).
 - DRAINAGE PATTERNS ARE SHOWN ON THIS PLAN BY PROPOSED AND EXISTING CONTOURS, FLOW ARROWS, AND SLOPES.
 - TEMPORARY AND PERMANENT STABILIZATION PRACTICES AND BMP'S SHALL BE INSTALLED AT THE EARLIEST POSSIBLE TIME DURING THE CONSTRUCTION SEQUENCE. AS AN EXAMPLE, PERIMETER SILT FENCE SHALL BE INSTALLED BEFORE COMMENCEMENT OF ANY GRADING ACTIVITIES. OTHER BMP'S SHALL BE INSTALLED AS SOON AS PRACTICABLE AND SHALL BE MAINTAINED UNTIL FINAL SITE STABILIZATION IS ATTAINED. CONTRACTOR SHALL ALSO REFERENCE CIVIL AND LANDSCAPE PLANS SINCE PERMANENT STABILIZATION IS PROVIDED BY LANDSCAPING, THE BUILDING(S), AND SITE PAVING.
 - BMP'S HAVE BEEN LOCATED AS INDICATED ON THIS PLAN IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRACTICES IN ORDER TO MINIMIZE SEDIMENT TRANSFER. FOR EXAMPLE: SILT FENCES LOCATED AT TOE OF SLOPE AND INLET PROTECTION FOR INLETS RECEIVING SEDIMENT FROM SITE RUN-OFF.
 - SANITARY SEWER EFFLUENT IS DISPOSED OF VIA AN ONSITE SEWER SYSTEM CONNECTED TO A MUNICIPAL SEWER SYSTEM.
 - NO STEEL POSTS IN TOWN R.O.W.

- EROSION CONTROL SCHEDULE AND PHASING**
- THE PROJECT SHALL GENERALLY CONFORM TO THE FOLLOWING:
- PHASE 1 - GRADING
- CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE, SILT FENCE AND INLET PROTECTION ACCORDING TO THE APPROXIMATE LOCATION SHOWN ON THE GRADING AND EROSION CONTROL PLAN NOTES AND DETAIL SHEET.
 - BEGIN CLEARING AND GRADING OF SITE.
 - SEED AND REVEGETATE SLOPES WHERE NECESSARY.
- PHASE 2 - UTILITIES
- KEEP ALL STORM WATER POLLUTION PREVENTION MEASURES IN PLACE.
 - INSTALL STORM DRAINS AND INLET PROTECTION AS SPECIFIED ON PLAN SHEETS.
- PHASE 3 - PAVING
- KEEP ALL STORM WATER POLLUTION PREVENTION MEASURES IN PLACE. REMOVE AS NEEDED TO PAVE.
 - STABILIZE SUBGRADE.
 - PAVE PARKING LOT AND SIDEWALKS AS SPECIFIED ON PLAN SHEETS.
- PHASE 4 - LANDSCAPING AND DEVELOPMENT
- REVEGETATE LOT AND PARKWAYS.
 - LANDSCAPE CONTRACTOR SHALL REVEGETATE ALL AREAS RESERVED FOR LANDSCAPE VEGETATIVE COVERS.
 - REMOVE EROSION CONTROL DEVICES WHEN GROUND COVER ESTABLISHED.

- STANDARD EROSION CONTROL GENERAL NOTES**
- EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.
 - ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY THE DESIGN ENGINEER AND THE TOWN OF ADDISON ENGINEERING DEPARTMENT.
 - IF THE EROSION CONTROL PLAN AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE.
 - IF OFF-SITE BORROW OR SPOILS SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN. OFF-SITE BORROW AND SPOILS AREAS ARE CONSIDERED PART OF THE PROJECT SITE AND THEREFORE SHALL COMPLY WITH THE TOWN OF ADDISON EROSION CONTROL REQUIREMENTS. THESE AREAS SHALL BE STABILIZED WITH GROUND COVER PRIOR TO FINAL APPROVAL OF THE PROJECT.

THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND SHALL NOTIFY THE CONSTRUCTION MANAGER AND ENGINEER OF ANY CONFLICTS DISCOVERED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES (SHOWN OR NOT SHOWN) WITHIN SCOPE OF CONSTRUCTION. IF ANY EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL REPLACE THEM AT HIS OWN EXPENSE. CALL 1-800-DIG-TESS AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION IN VICINITY.

- BENCH MARK LIST**
- BM #60 SET ON TOP OF THE CONCRETE BASE OF A LIGHT POLE IN THE CENTER MEDIAN OF EXCEL PARKWAY APPROXIMATELY 50 FEET WEST OF THE CENTERLINE OF ADDISON ROAD. (PER TOWN OF ADDISON PLAN # 98103, SHEET 2, DATED JANUARY 1998)
ELEV=644.41
 - BM #60 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 828 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE.
ELEV=632.78
 - BM #61 SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 160 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE.
ELEV=638.04

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-3590
Fax No. (972) 335-3778

METHODIST PAVILION ONE
TOWN OF ADDISON DALLAS COUNTY, TEXAS

EROSION CONTROL PLAN

AS SHOWN
Designed by: DEX
Drawn by: REX
Checked by: DEX
Date: 08/27/2013
Project No.: 6900020

SHEET
C-11B

DAVID K. KOCHALKA
77781
LICENSED PROFESSIONAL ENGINEER
State of Texas
06/14/12

CONSTRUCTION SPECIFICATIONS FOR SILT BARRIER FENCE MATERIALS:

1. SYNTHETIC FILTER FABRIC SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER OR ETHYLENE YARN AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE FOLLOWING REQUIREMENTS (PER ASTM METHODS):

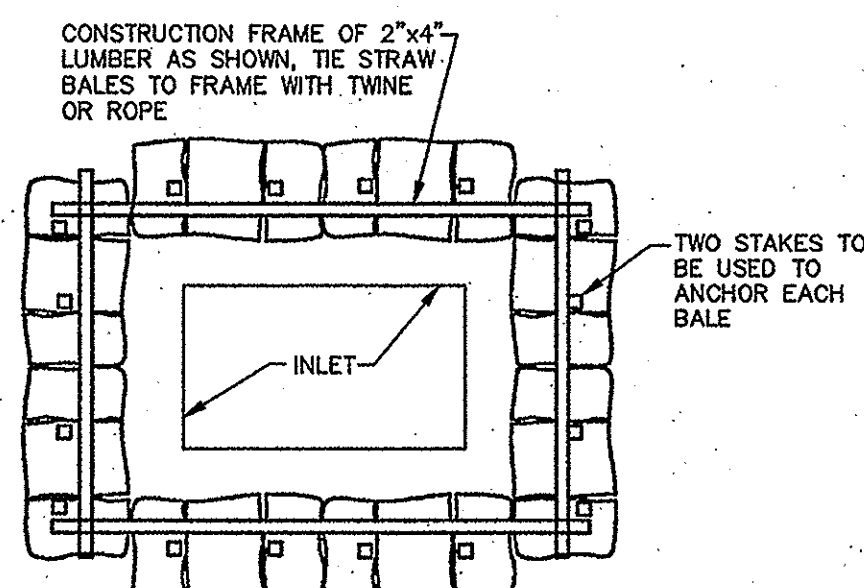
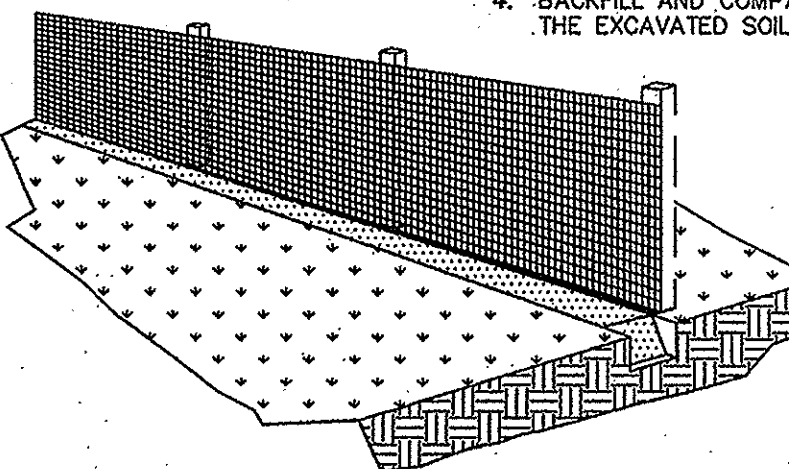
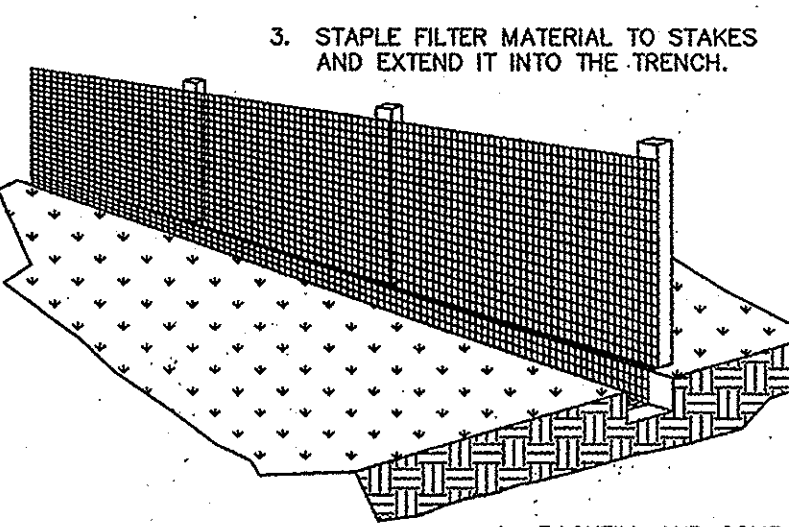
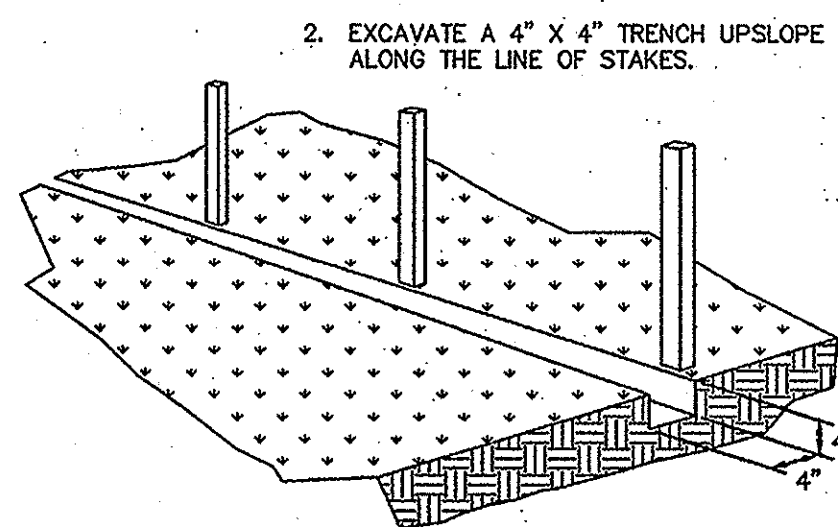
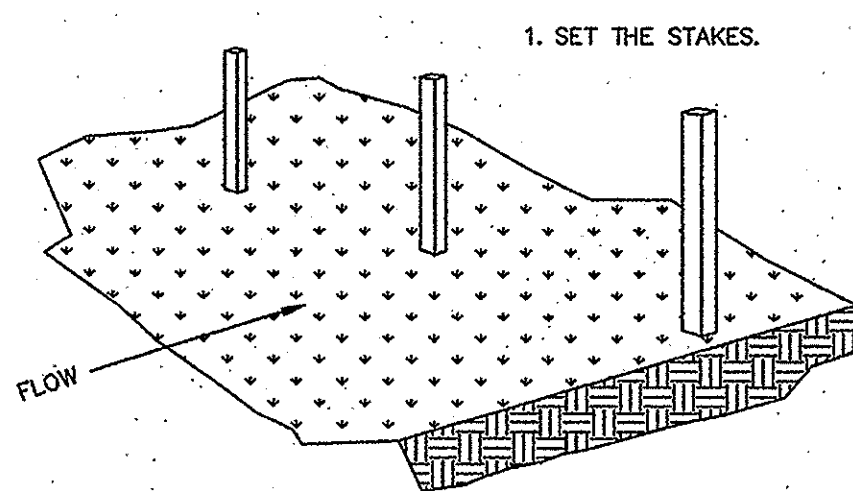
PHYSICAL PROPERTY	REQUIREMENTS
FILTERING EFFICIENCY	75% (MIN.)
TENSILE STRENGTH AT 20% EXT. STRENGTH = 50 LBS./LIN. IN. (MIN.)	
MAXIMUM ELONGATION STD. STRENGTH = 30 LBS./LIN. IN. (MIN.)	
FLOW RATE 30 GAL./SQ. FT./MINUTE (MIN.)	
2. SYNTHETIC FILTER FABRIC SHALL CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS TO PROVIDE A MINIMUM OF 6 MONTHS OF EXPECTED USABLE CONSTRUCTION LIFE AT A TEMPERATURE RANGE OF 0° TO 120°.

INSTALLATION:

1. THE HEIGHT OF THE SILT FENCE SHALL BE A MINIMUM OF 15" AND A MAXIMUM OF 18" ABOVE FINAL GRADE.
2. STANDARD STRENGTH SYNTHETIC FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS, (AND THUS IMPROVE THE BARRIER'S STRENGTH AND EFFICIENCY).
3. STAKES FOR THE SILT FENCE SHALL BE 2" x 2" WOOD WITH A MINIMUM LENGTH OF 3 FEET.
4. THE STAKES SHALL BE SPACED A MAXIMUM OF 5 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (18" MIN.).
5. A TRENCH SHALL BE EXCAVATED APPROX. 6" WIDE AND 6" DEEP ALONG THE LINE OF STAKES AND UPSLOPE FROM THE BARRIER.
6. THE SILT FENCE SHALL BE STAPLED TO THE STAKES WITH 8" (MIN.) OF FABRIC EXTENDED INTO THE TRENCH. HEAVY DUTY WIRE STAPLES (1/2" LONG MIN.) SHALL BE USED. THE FENCE SHALL NOT BE STAPLED TO EXISTING TREES.
7. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FENCE MATERIAL.
8. IF A SILT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, THE BARRIER SHALL BE OF SUFFICIENT LENGTH TO ELIMINATE END FLOW. THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE WITH THE ENDS ORIENTED UPSLOPE.
9. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.

MAINTENANCE:

6. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
7. SHOULD THE FABRIC ON A SILT FENCE DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE SILT FENCE IS STILL NECESSARY, IT SHALL BE REPLACED IMMEDIATELY.
8. SEDIMENT DEPOSITS SHALL BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY 1/3 THE HEIGHT OF THE FENCE.
9. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM WITH THE EXISTING GRADE, PREPARED AND SEEDED.
10. THERE SHOULD BE NO GAPS OR SAGS IN THE SILT FENCE.

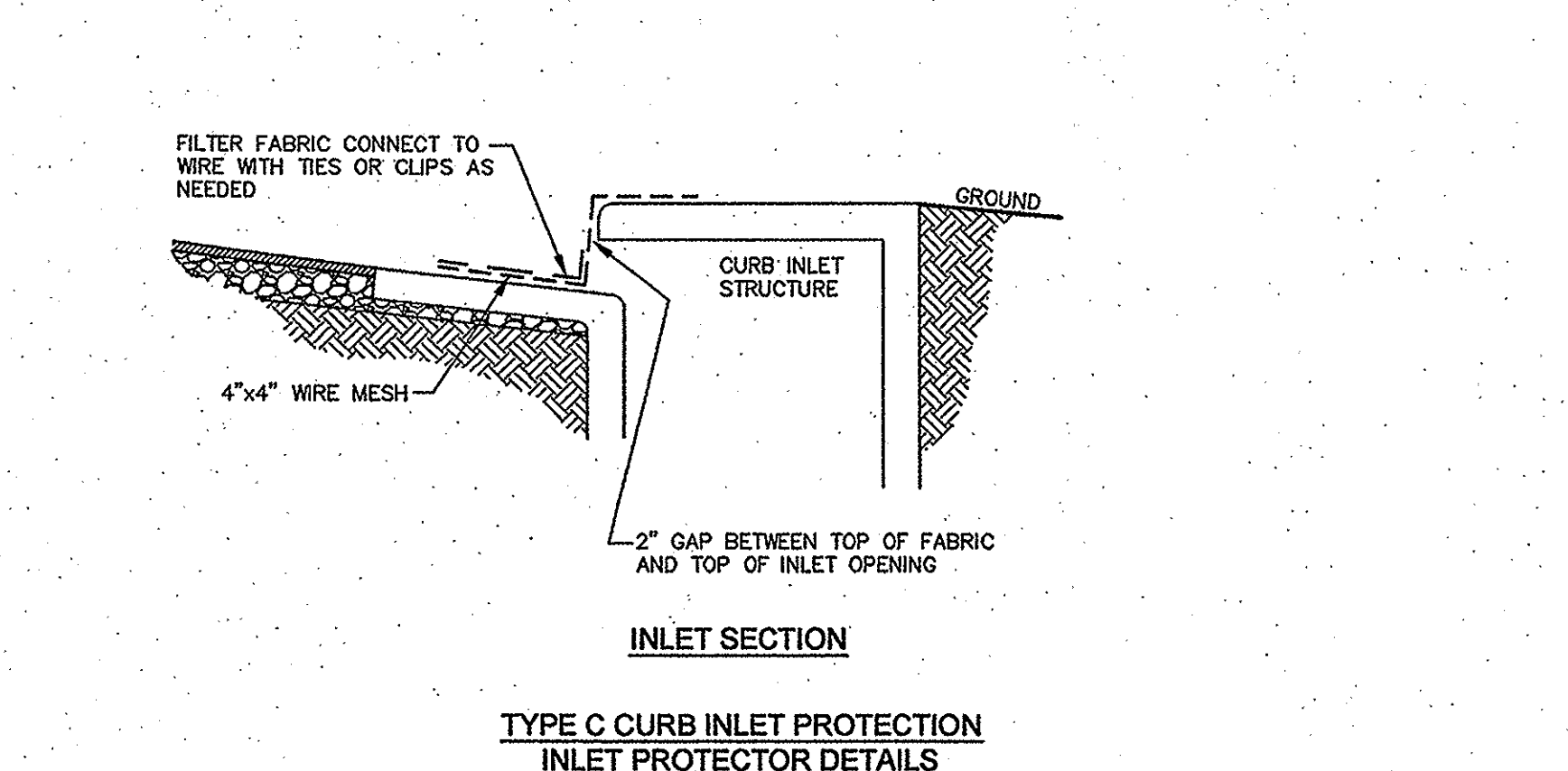
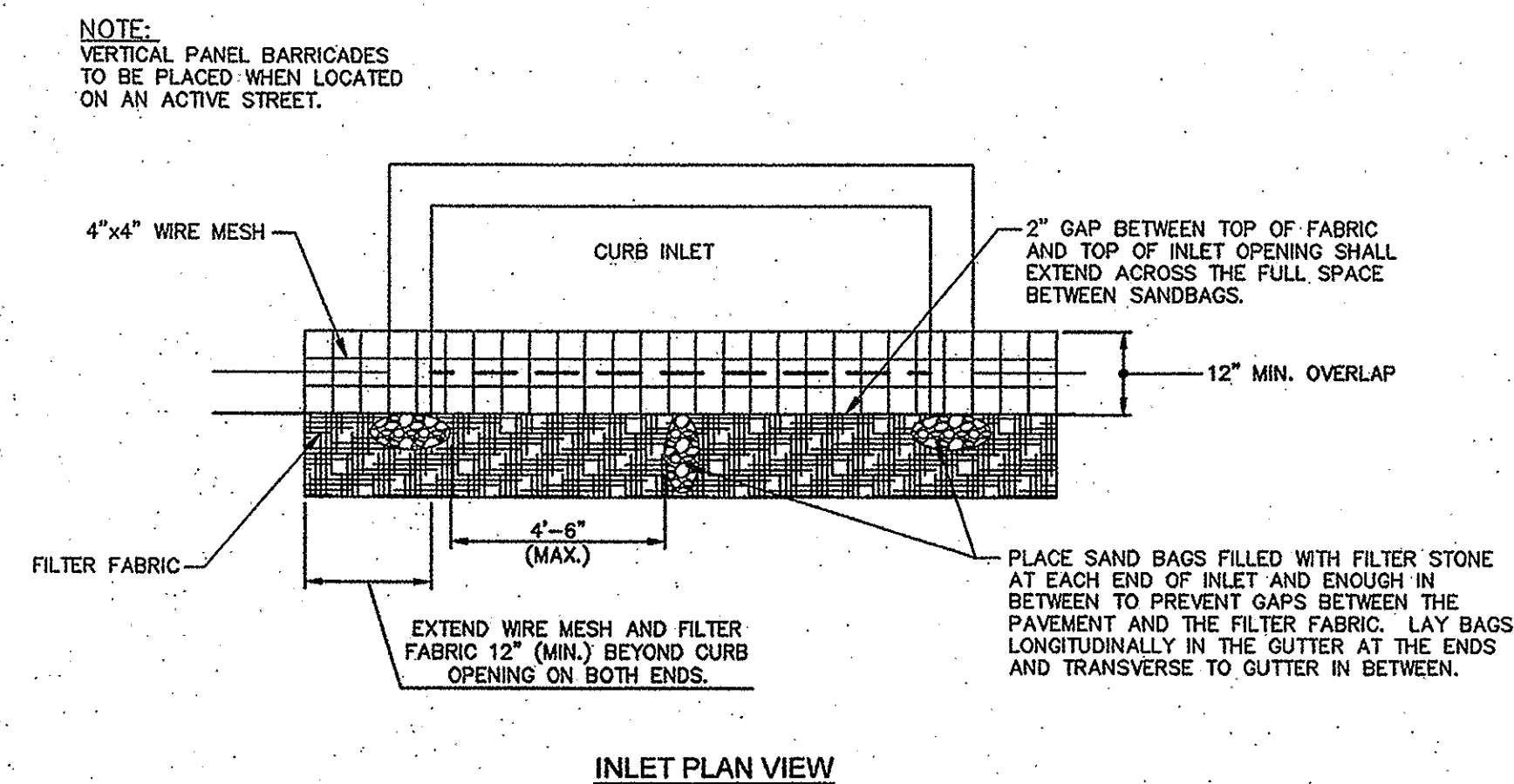
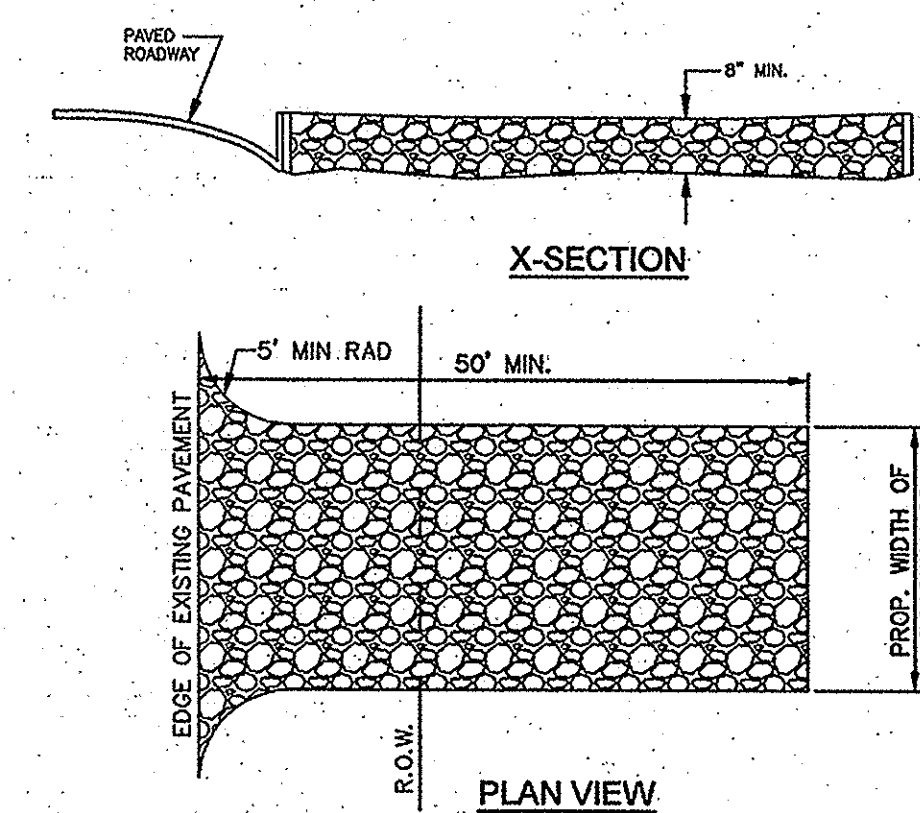


NOTE: STRAW BALE SEDIMENT BARRIER TO BE USED AROUND INLETS AND OTHER OPENINGS INTO DRAINAGE SYSTEMS THROUGHOUT CONSTRUCTION

CONSTRUCTION OF A FILTER BARRIER
N.T.S.

TYPE \"/>

(SF)



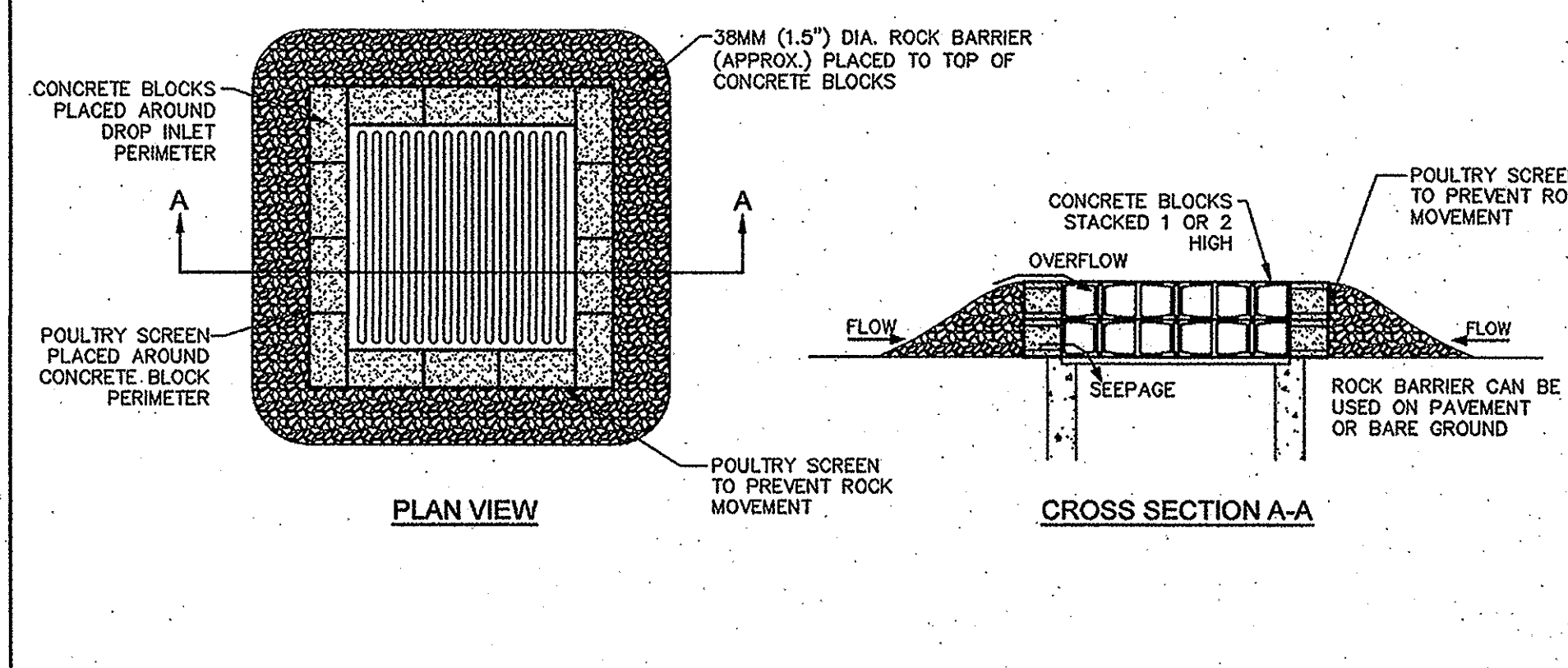
- NOTES:**
1. Stone size - 3 to 5 inches crushed rock.
 2. Length - as effective, but not less than 50 feet.
 3. Thickness - not less than 8 inches.
 4. Width - not less than full width of all points of ingress or egress.
 5. Washing - when necessary, wheels shall be cleaned to remove sediment prior to entrance onto public roadway. When washing is required, it shall be done on an area stabilized with crushed stone which drains into an approved trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch or watercourse using approved methods.
 6. Maintenance - the entrance shall be maintained in condition which will prevent tracking or flowing of sediment onto public roadways. This may require periodic top dressing with additional stone as conditions demand, and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public roadway, must be removed immediately.
 7. Drainage - entrance must be properly graded or incorporate a drainage swale to prevent runoff from leaving the construction site.
 8. Contractor to coordinate exact location of this detail.

CONSTRUCTION ENTRANCE
N.T.S.

TYPE C CURB INLET PROTECTION
N.T.S.

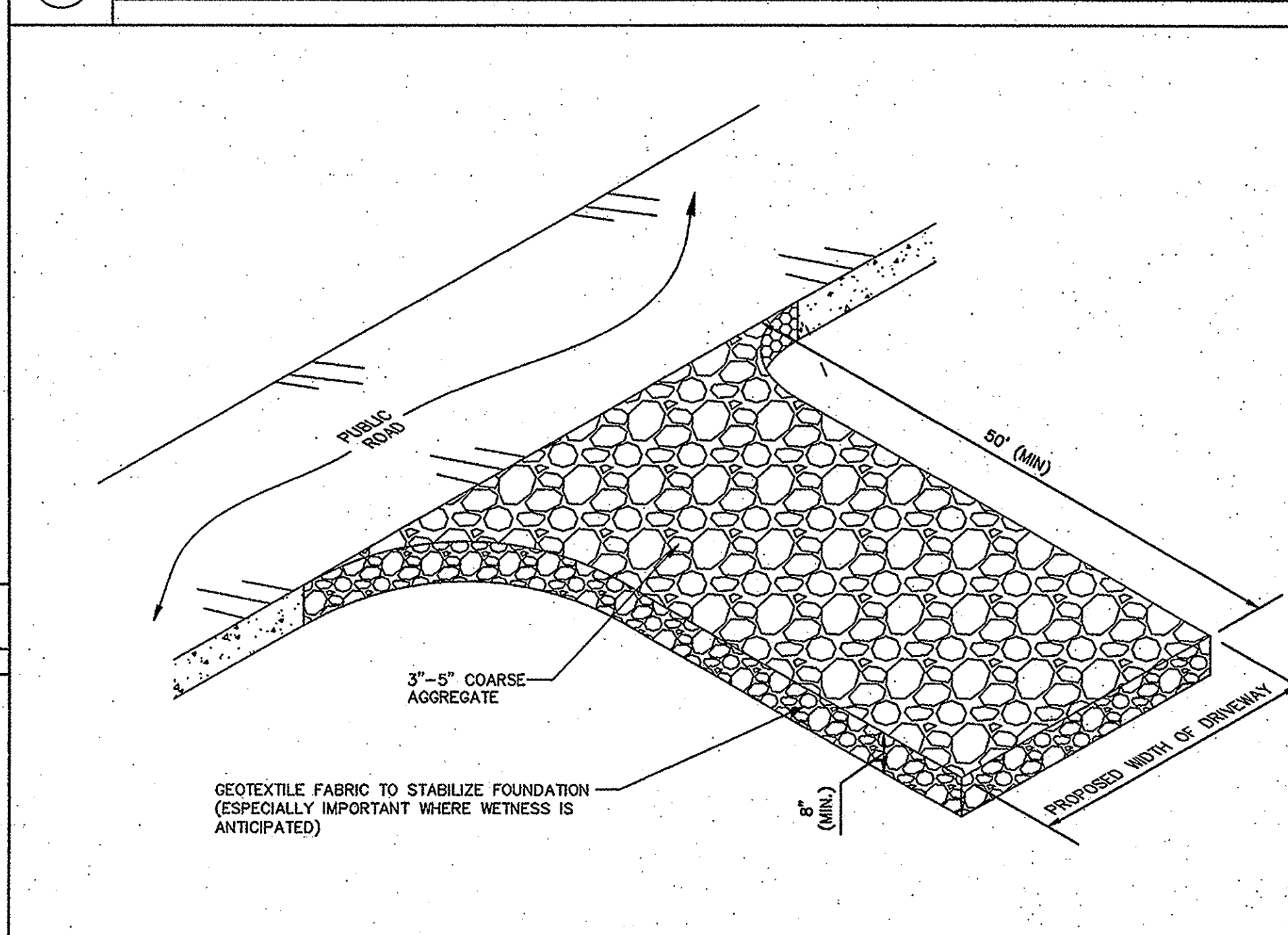
(CE)

(IP1)



GRATE INLET PROTECTION DETAIL
N.T.S.

(IP2)



CONSTRUCTION ENTRANCE
N.T.S.

(CE)

GENERAL NOTES

1. ALL EROSION CONTROL DEVICES SHALL BE INSTALLED PRIOR TO SITE DISTURBANCE AND SHALL REMAIN IN PLACE UNTIL FINAL GRADING AND PAVING IS COMPLETE AND A STAND OF GRASS IS ESTABLISHED WITH 70% COVERAGE ACHIEVED.
2. CONSTRUCTION OPERATIONS SHALL BE MANAGED SO THAT AS MUCH OF THE SITE AS POSSIBLE IS LEFT COVERED WITH TOPSOIL AND VEGETATION.
3. ALL AREAS DISTURBED BY CONSTRUCTION OPERATIONS MUST BE SEEDED AND IRRIGATED UNTIL A PERMANENT STAND OF GRASS IS ACHIEVED WITH A MINIMUM OF 70% COVERAGE.
4. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL EROSION, CONSERVATION, AND SILTATION ORDINANCES. THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF PERMANENT DRAINAGE AND THE ESTABLISHMENT OF A STAND OF GRASS SUFFICIENT TO PREVENT EROSION.
5. THE CONTRACTOR MUST USE SEDIMENT FILTERS OR OTHER MEASURES APPROVED BY THE ENGINEER AND CONSTRUCTION MANAGER TO PREVENT SILT AND CONSTRUCTION DEBRIS FROM CLOGGING STORM SEWER PIPES OR PROPOSED OR EXISTING INLETS, OR FROM BEING TRANSPORTED TO ADJACENT PROPERTIES.
6. CONSTRUCTION ENTRANCE
 - MINIMUM SIZE STONE: 3\"/>
 - THICKNESS: NOT LESS THAN 8\"/>
 - LENGTH: NOT LESS THAN 100\"/>
 - WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS AND EGRESS. MAINTENANCE REQUIREMENTS: AS NECESSARY TO PREVENT TRACKING OR FLOWING MUD INTO PUBLIC RIGHT-OF-WAY OR PARKING AREAS.
7. PLACE INLET PROTECTION AROUND ALL PROPOSED INLETS DURING CONSTRUCTION.
8. SITE ENTRY AND EXIT LOCATIONS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAYS. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON A PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY. WHEN WASHING IS REQUIRED TO REMOVE SEDIMENT PRIOR TO ENTRANCE TO A PUBLIC ROADWAY, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN. ALL FINES IMPOSED FOR TRACKING ONTO PUBLIC ROADS SHALL BE PAID BY THE CONTRACTOR.
9. MAINTENANCE: EROSION CONTROLS SHALL BE REPAIRED OR REPLACED AS INSPECTION DEEMS NECESSARY, OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE. ACCUMULATED SILT IN ANY EROSION CONTROL DEVICE SHALL BE REMOVED AND SHALL BE DISTRIBUTED ON SITE IN A MANNER NOT CONTRIBUTING TO ADDITIONAL SILTATION.
10. EROSION CONTROL MEASURES MAY ONLY BE PLACED IN FRONT OF INLETS, OR IN CHANNELS, DRAINAGE WAYS OR BORROW DITCHES AT RISK OF CONTRACTOR. CONTRACTOR SHALL REMAIN LIABLE FOR ANY DAMAGE CAUSED BY THE MEASURES, INCLUDING FLOODING DAMAGE WHICH MAY OCCUR DUE TO BLOCKED DRAINAGE. AT THE CONCLUSION OF ANY PROJECT, ALL CHANNELS, DRAINAGE WAYS AND BORROW DITCHES IN THE WORK ZONE SHALL BE DREDGED OF ANY SEDIMENT GENERATED BY THE PROJECT OR DEPOSITED AS A RESULT OF EROSION CONTROL MEASURES.
11. THE CONTRACTOR IS RESPONSIBLE FOR REESTABLISHING ANY EROSION CONTROL DEVICE WHICH THEY DISTURB. EACH CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY DEFICIENCIES IN THE ESTABLISHED EROSION CONTROL MEASURES WHICH MAY LEAD TO UNAUTHORIZED DISCHARGE OR STORM WATER POLLUTION, SEDIMENTATION OR OTHER POLLUTANTS. UNAUTHORIZED POLLUTANTS INCLUDE, BUT ARE NOT LIMITED TO, EXCESS CONCRETE DUMPING OR CONCRETE RESIDUE, PAINTS, SOLVENTS, GREASES, FUEL AND LUBE OIL, PESTICIDES, AND SOLID WASTE MATERIALS.
12. THE CONTRACTOR SHALL MAINTAIN ADEQUATE SITE DRAINAGE DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL USE FILTER BARRIER (OR OTHER METHOD APPROVED BY THE ENGINEER AND TOWN OF ADDISON) AS REQUIRED TO PREVENT SILT AND CONSTRUCTION DEBRIS FROM FLOWING ONTO ADJACENT PROPERTIES. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL EROSION, CONSERVATION, AND SILTATION ORDINANCES. CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF PERMANENT DRAINAGE FACILITIES AND THE ESTABLISHMENT OF A STAND OF GRASS OR OTHER GROWTH TO PREVENT EROSION.
13. THE CONTRACTOR SHALL CONSTRUCT FILTER BARRIER, STRAW BALES OR OTHER APPROVED DEVICES PRIOR TO CONSTRUCTION TO PREVENT ADVERSE OFF SITE IMPACT OR STORM WATER QUALITY AND AS REQUIRED BY THE TOWN OF ADDISON. CONTRACTOR IS RESPONSIBLE FOR PROPER MAINTENANCE OF THE REQUIRED EROSION CONTROL DEVICES THROUGHOUT THE ENTIRE CONSTRUCTION PROCESS.
14. CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL SILT AND DEBRIS OFF SITE FROM THE EXISTING ROADWAYS AND PROJECT SITE THAT ARE A RESULT OF THE PROPOSED CONSTRUCTION AS REQUESTED BY THE TOWN OF ADDISON.
15. CONTRACTOR SHALL CONSTRUCT A STABILIZED CONSTRUCTION ENTRANCE AT ALL PRIMARY POINTS OF ACCESS. CONTRACTOR IS RESPONSIBLE FOR INSURING THAT ALL CONSTRUCTION TRAFFIC UTILIZES THE STABILIZED ENTRANCE AT ALL TIMES FOR INGRESS/EGRESS TO THE SITE.
16. THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST. CONTRACTOR SHALL CONTROL DUST BY SPRINKLING WATER, OR BY OTHER MEANS APPROVED BY THE CITY AND ENGINEER, AT NO ADDITIONAL COST TO THE OWNER.
17. BEFORE ANY EARTHWORK IS DONE, THE CONTRACTOR SHALL STAKE OUT AND MARK THE LIMITS OF CONSTRUCTION AND OTHER ITEMS ESTABLISHED BY THE PLANS. THE CONTRACTOR SHALL PROTECT AND PRESERVE CONTROL POINTS AT ALL TIMES DURING THE COURSE OF THE PROJECT. THE GRADING CONTRACTOR SHALL PROVIDE ALL NECESSARY ENGINEERING AND SURVEYING FOR LINE AND GRADE CONTROL POINTS RELATED TO EARTHWORK.
18. THE CONTRACTOR SHALL SALVAGE AND PROTECT ALL EXISTING POWER POLES, SIGNS, MANHOLES, TELEPHONE RISERS, WATER VALVES, ETC. DURING ALL CONSTRUCTION PHASES UNLESS NOTED OTHERWISE.
19. CONTRACTOR STAGING AREA TO BE AGREED UPON BY OWNER PRIOR TO CONSTRUCTION.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

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 Suite 200
 5700 General Court
 Dallas, TX 75241
 Firm No. K-H-228

STATE OF TEXAS
 LICENSED PROFESSIONAL ENGINEER
 DAVID K. KOCHALKA
 87781
 6/19/12

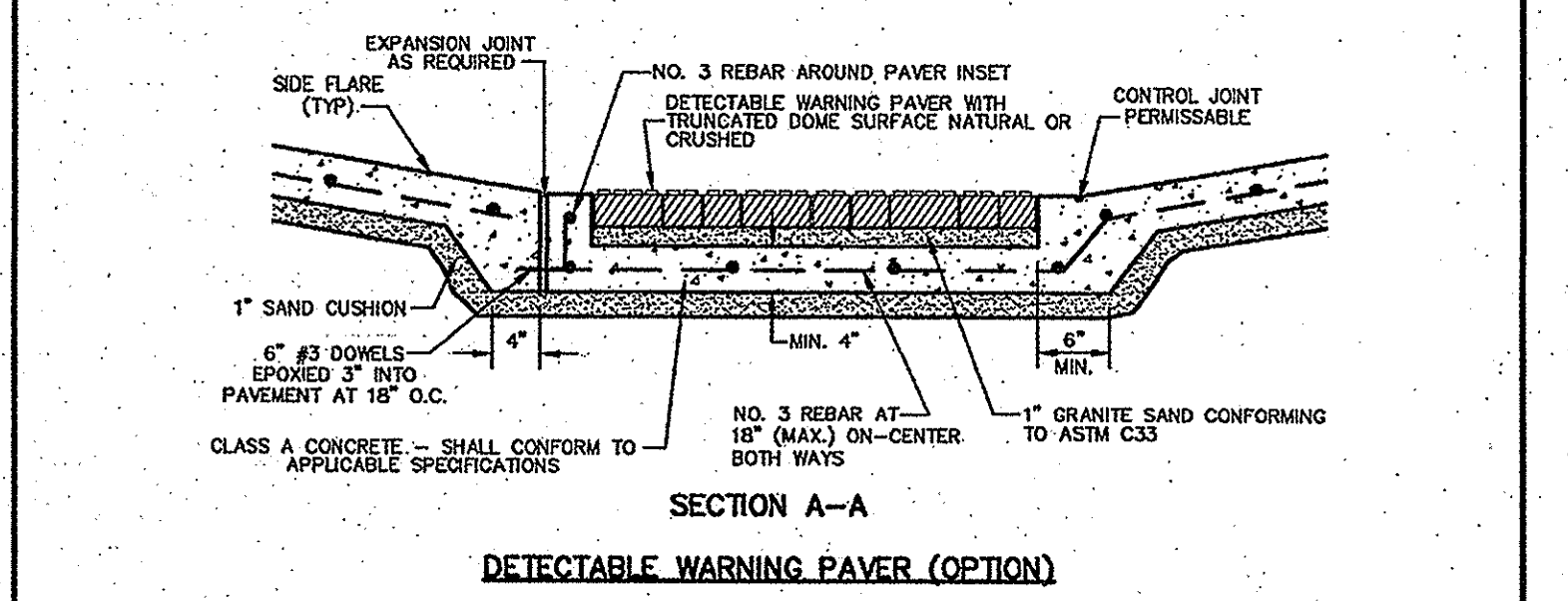
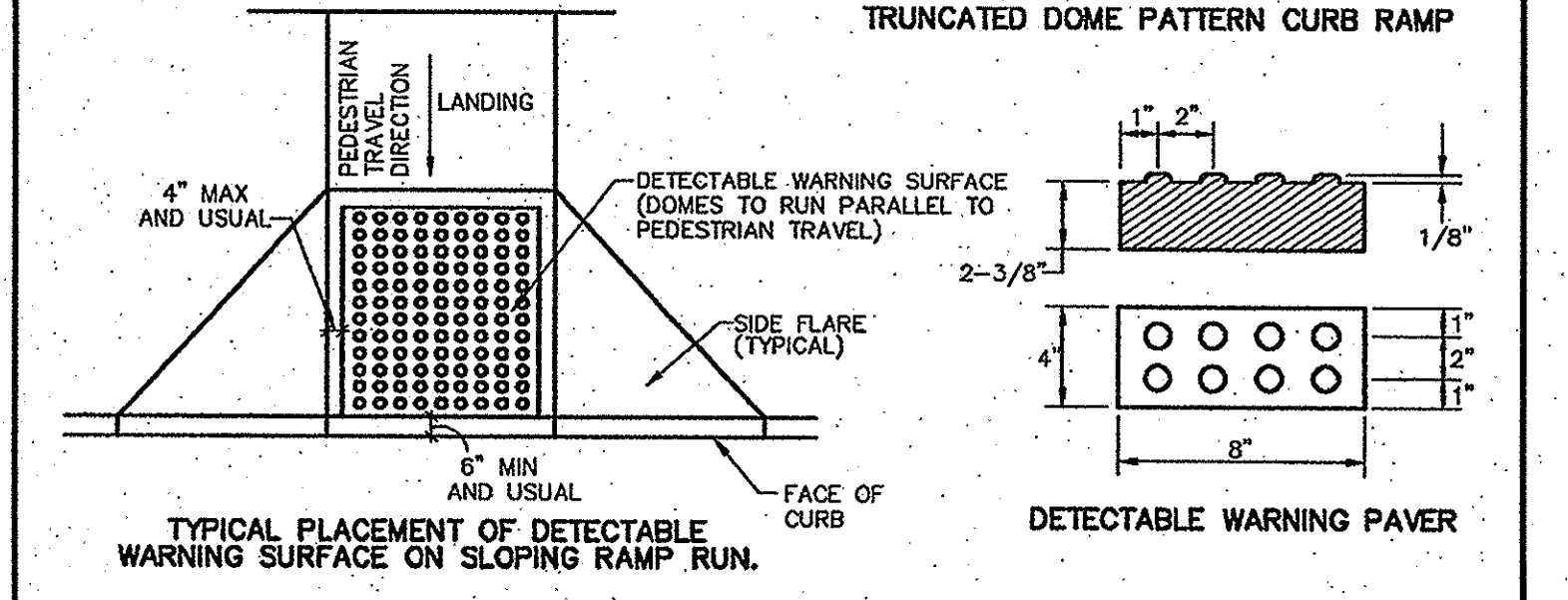
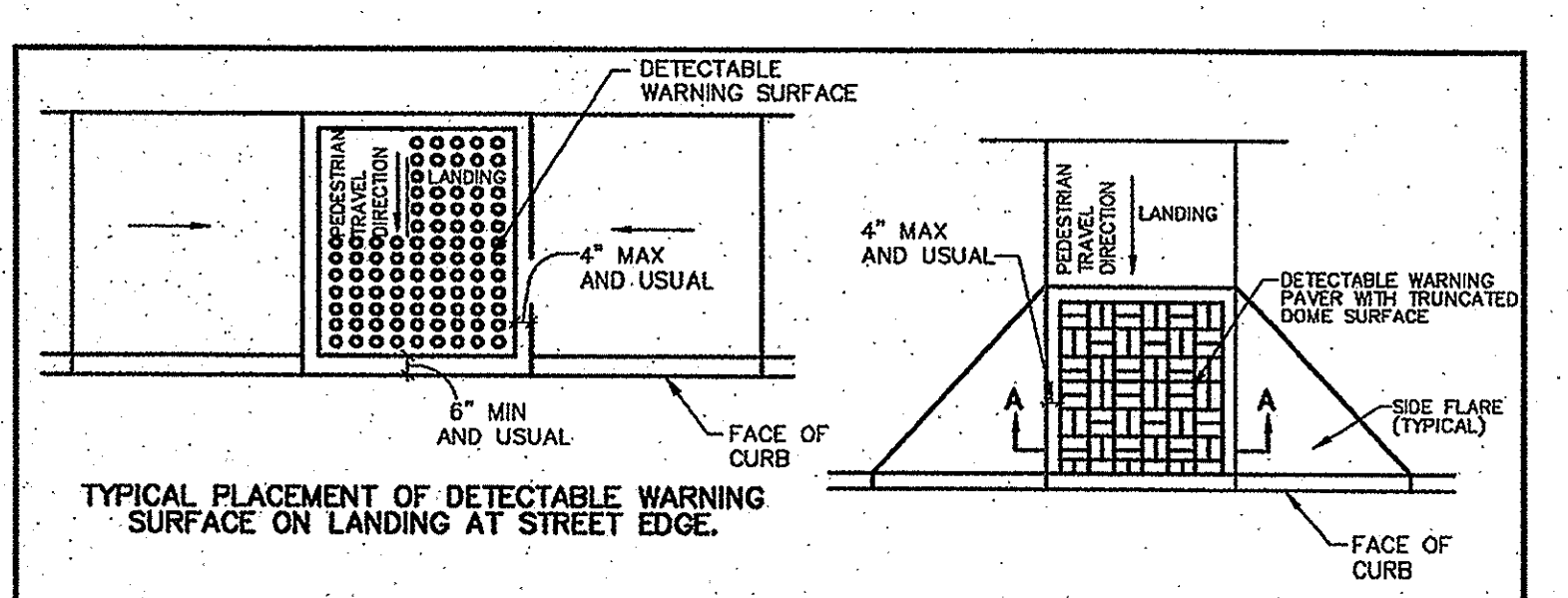
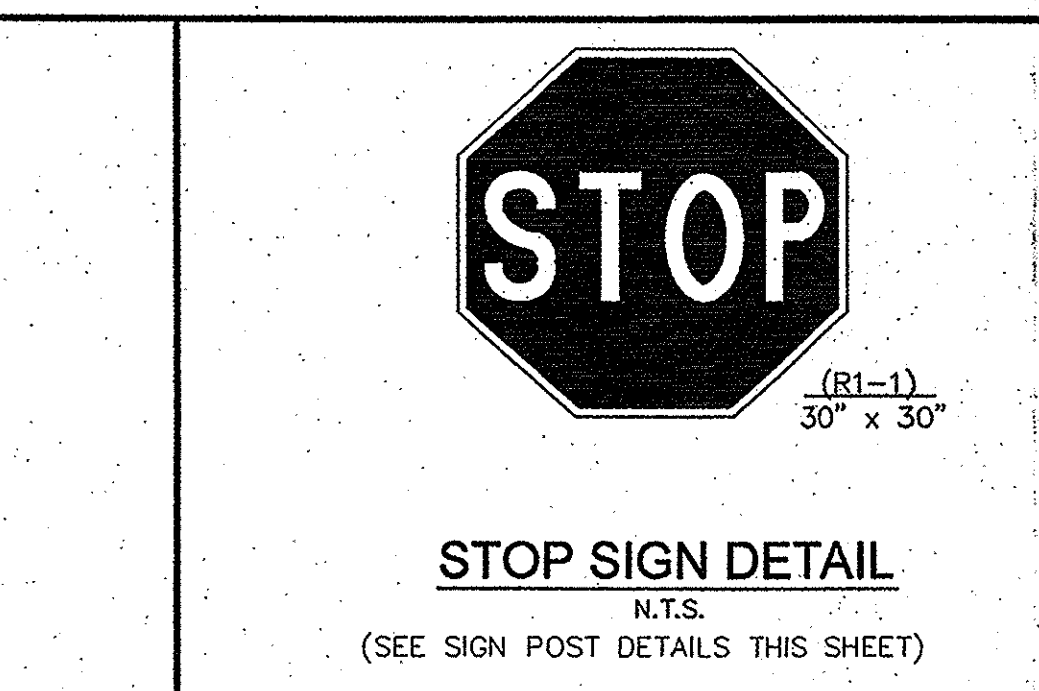
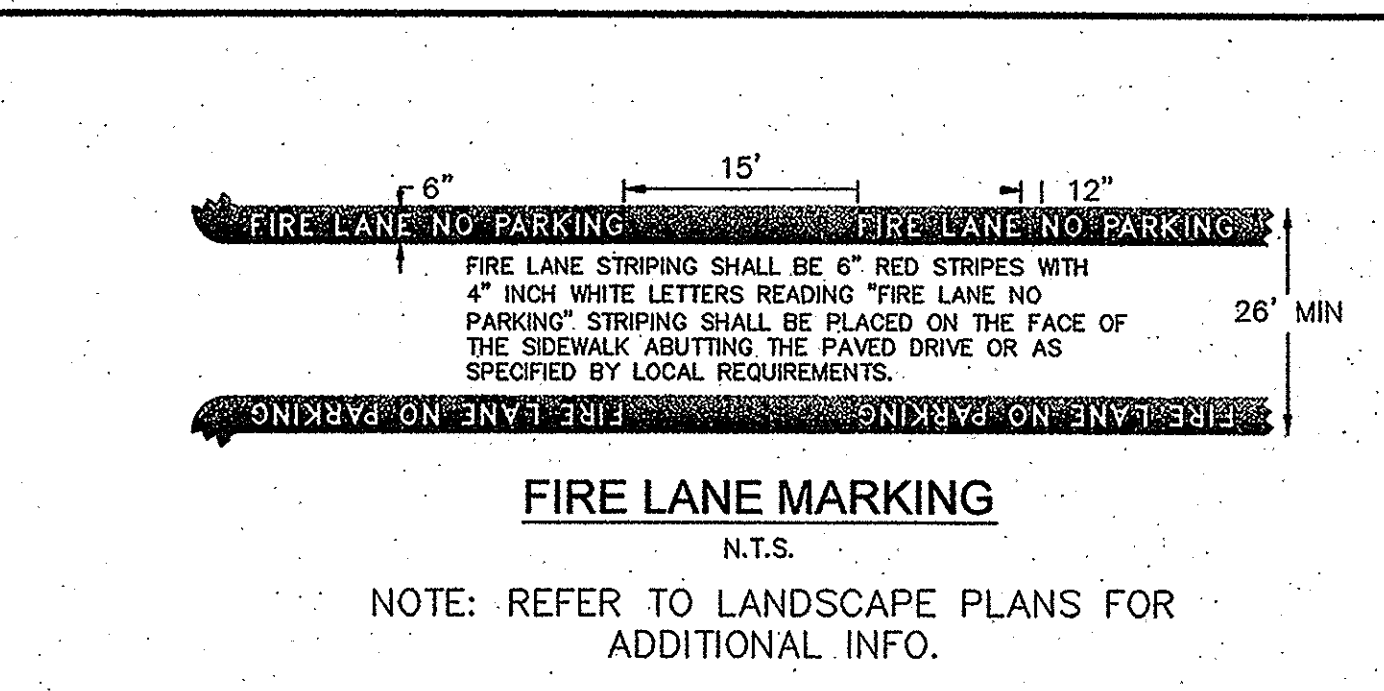
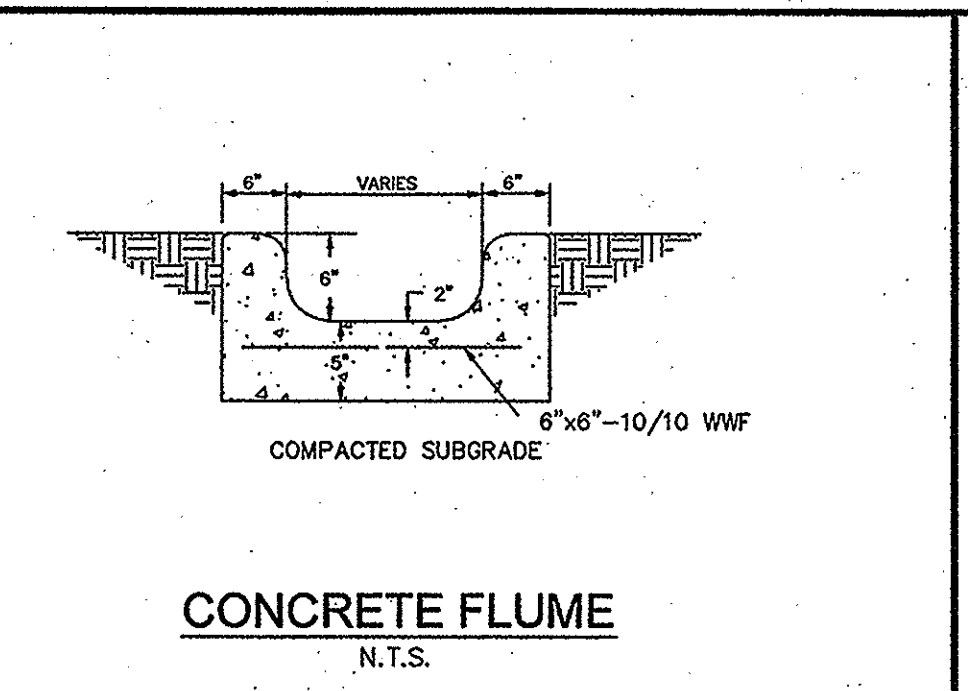
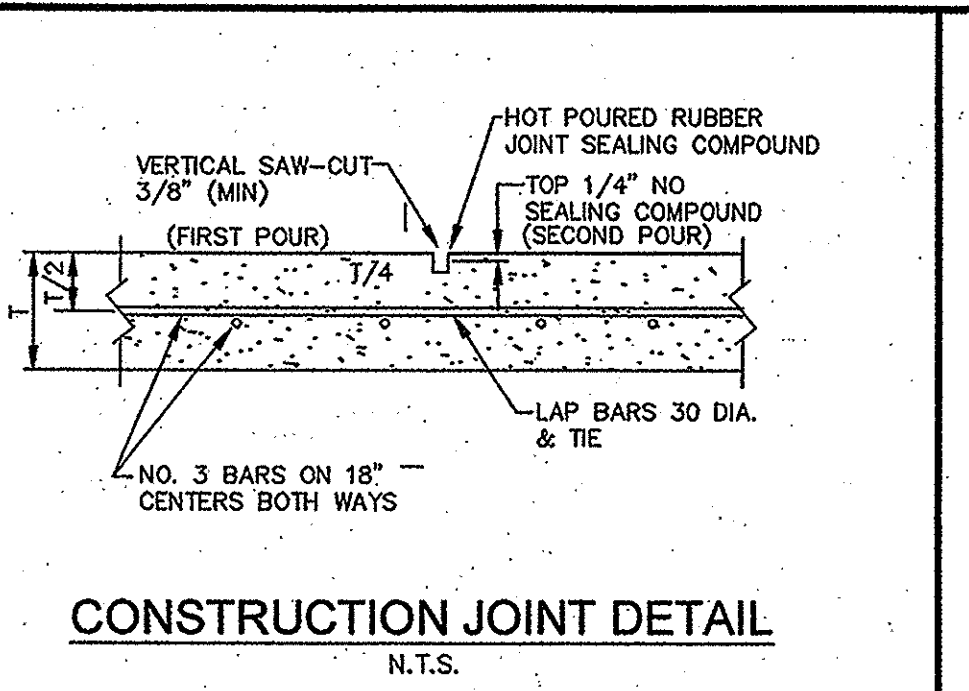
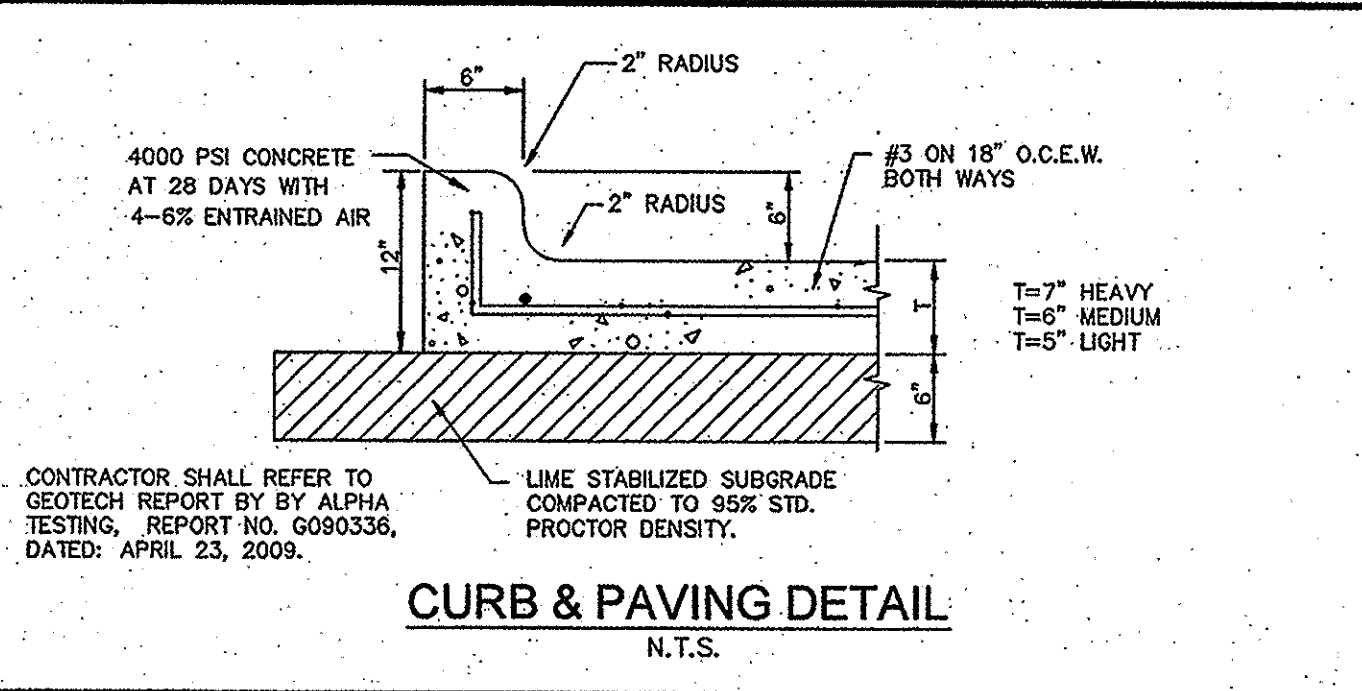
METHODIST PAVILION ONE
 TOWN OF ADDISON, DALLAS COUNTY, TEXAS

EROSION CONTROL DETAILS

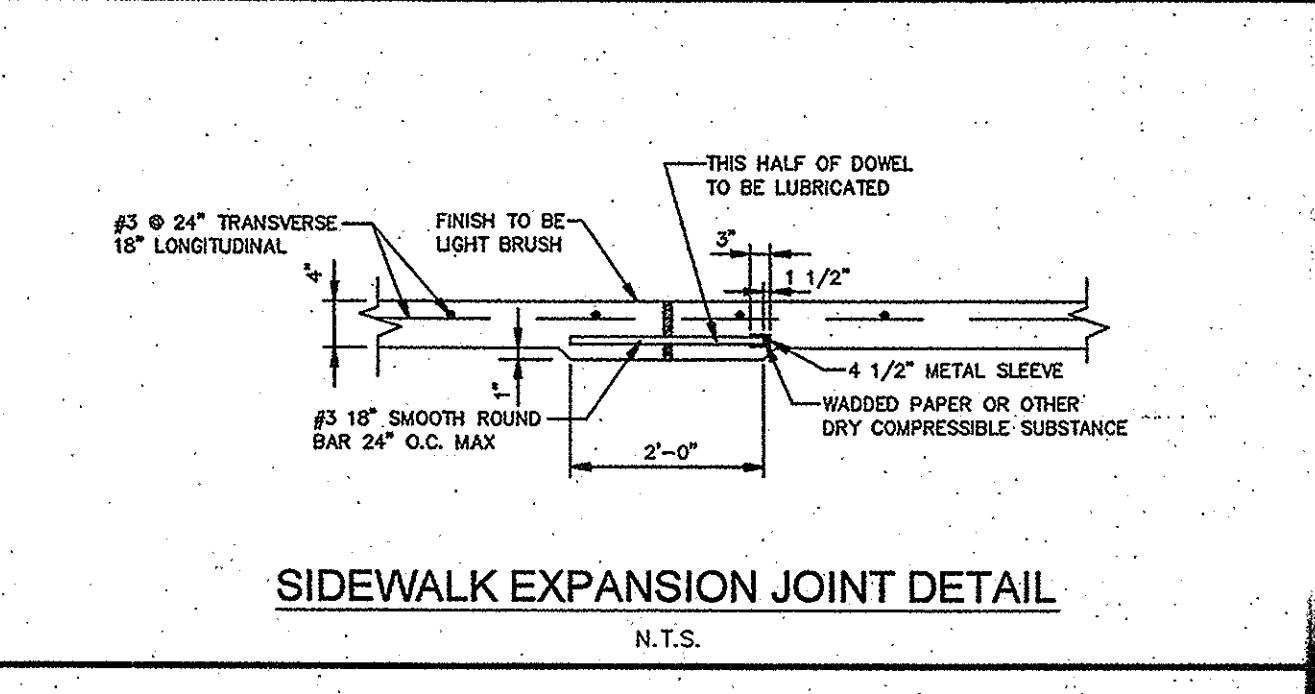
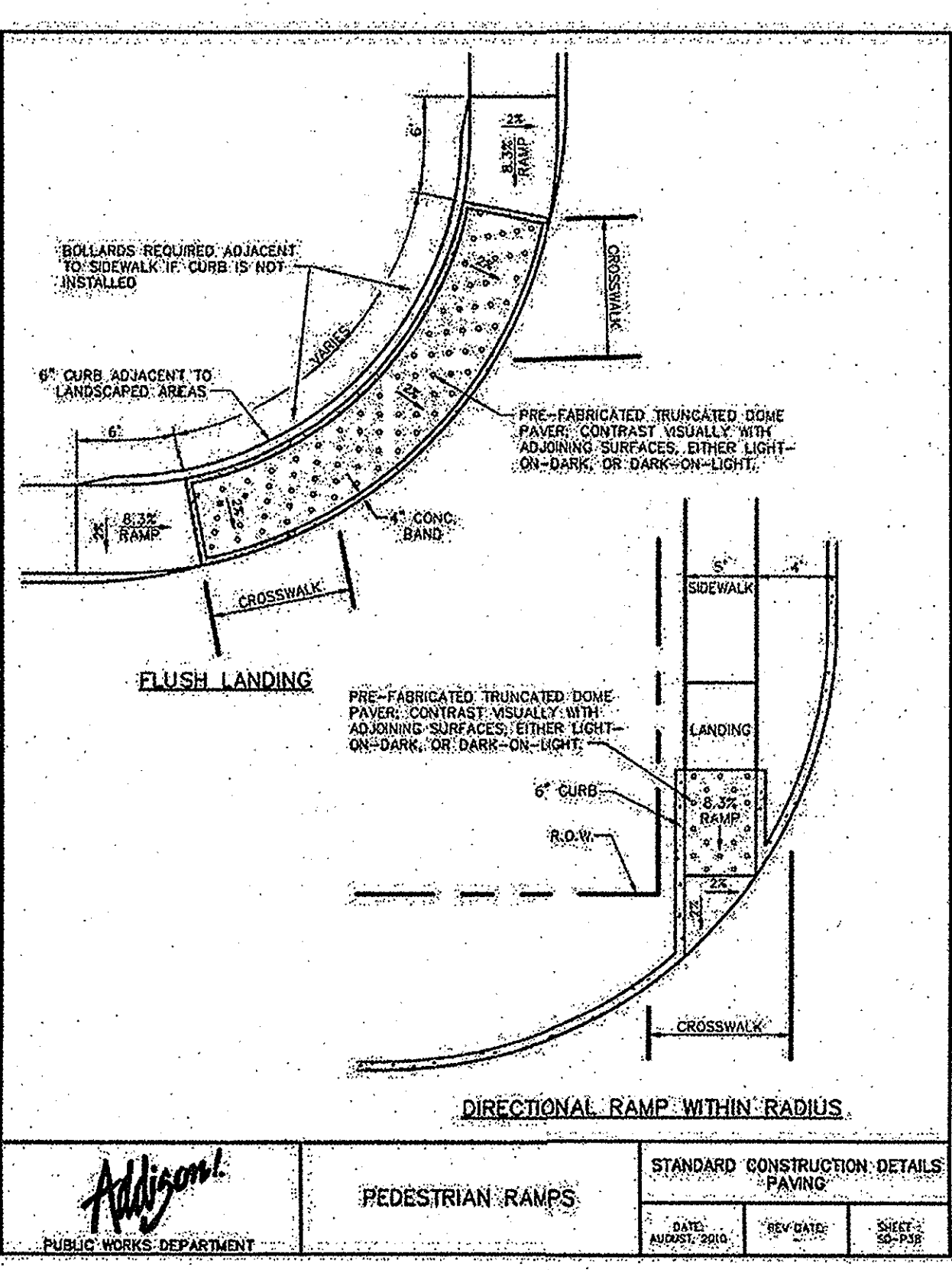
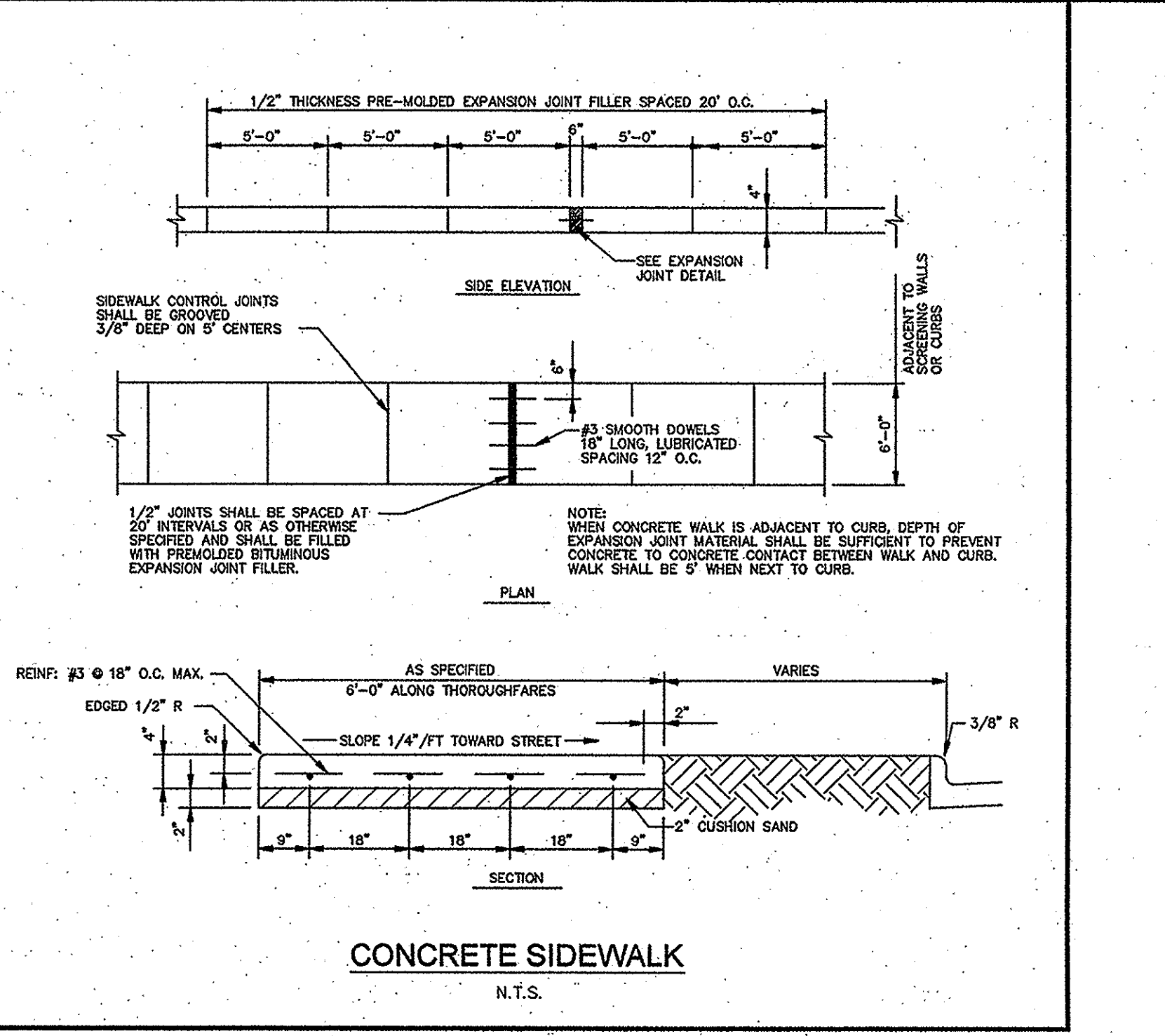
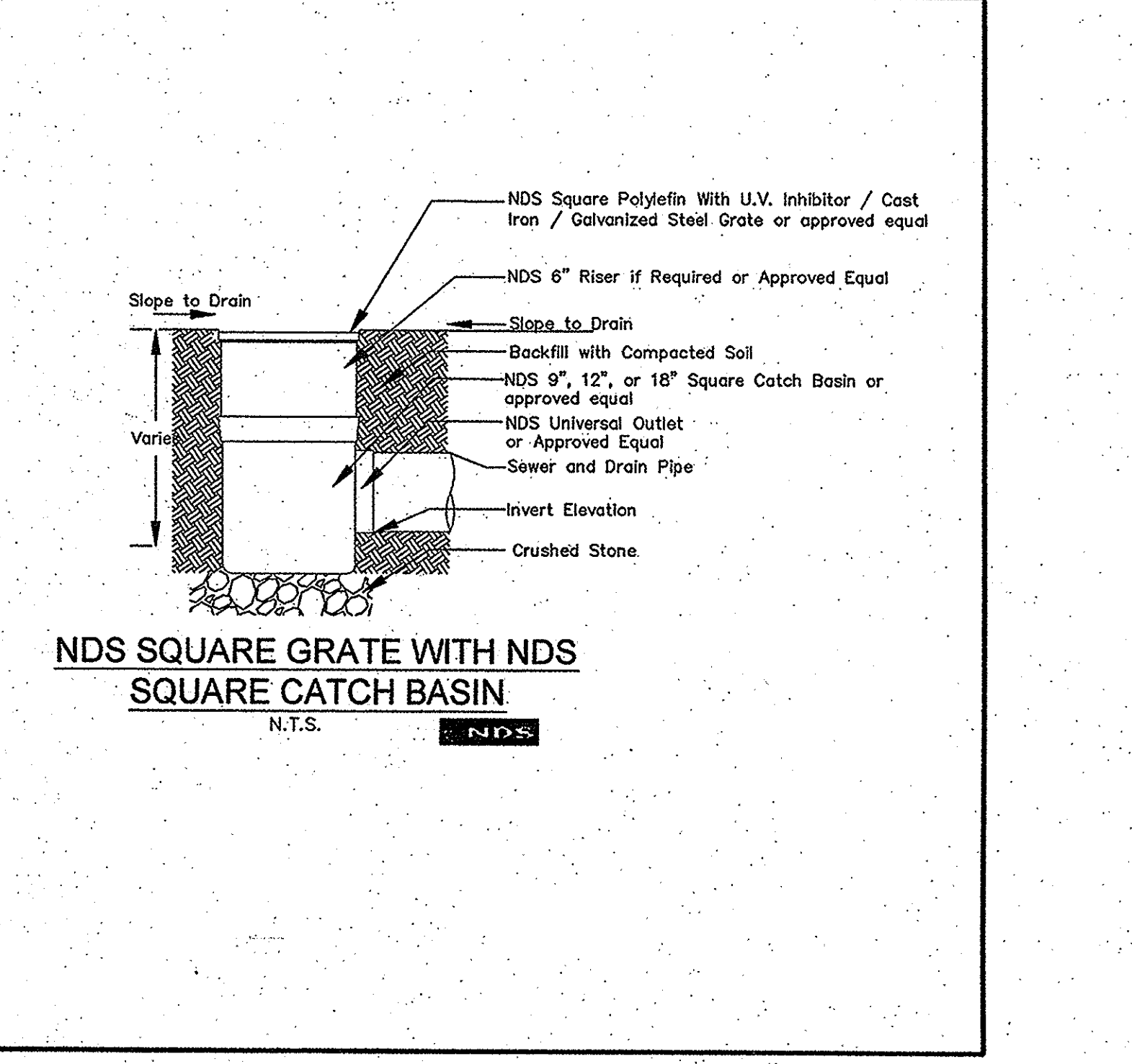
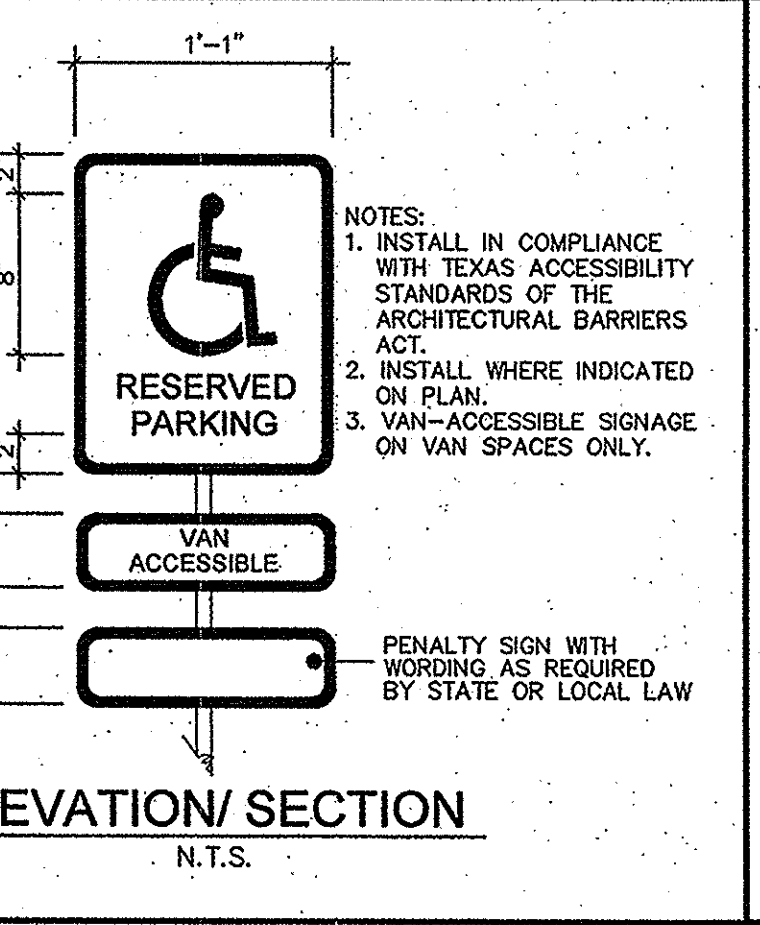
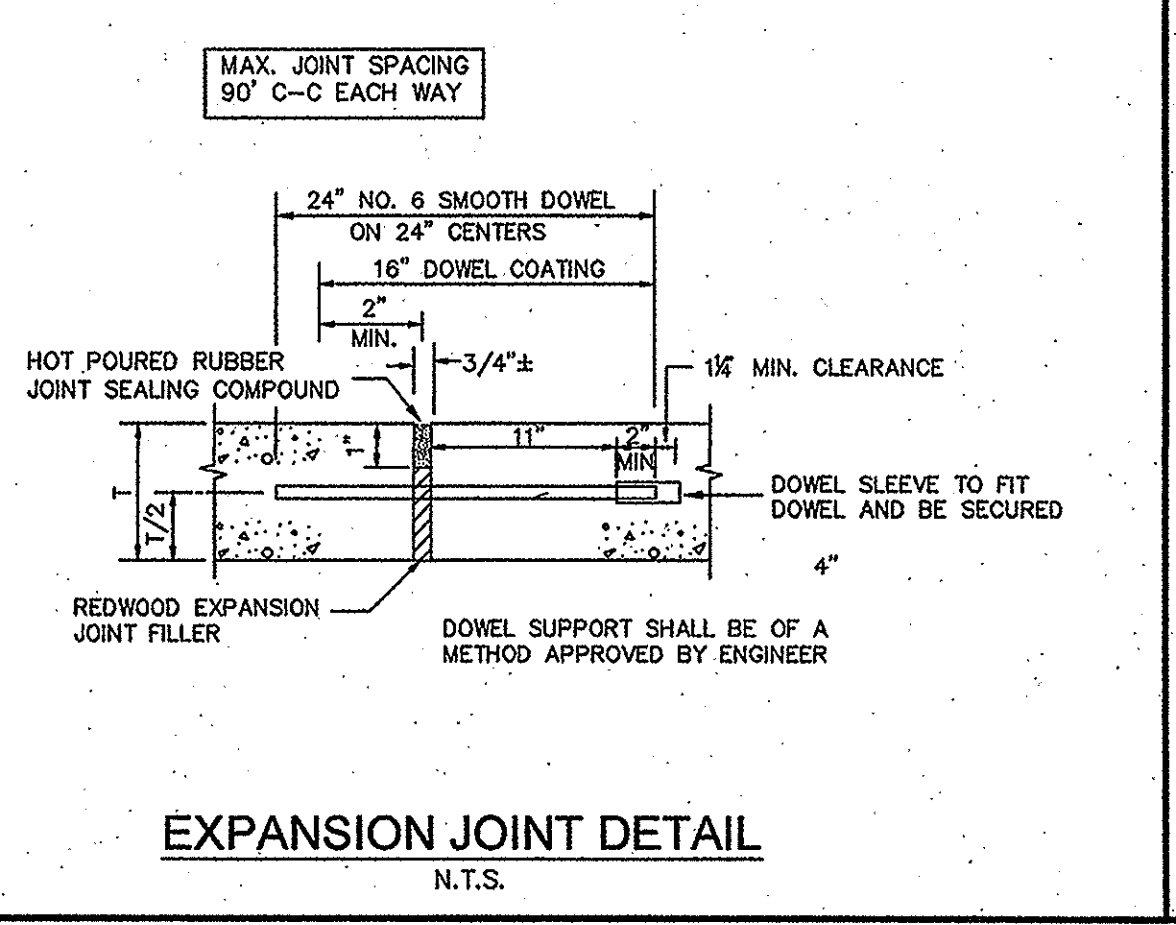
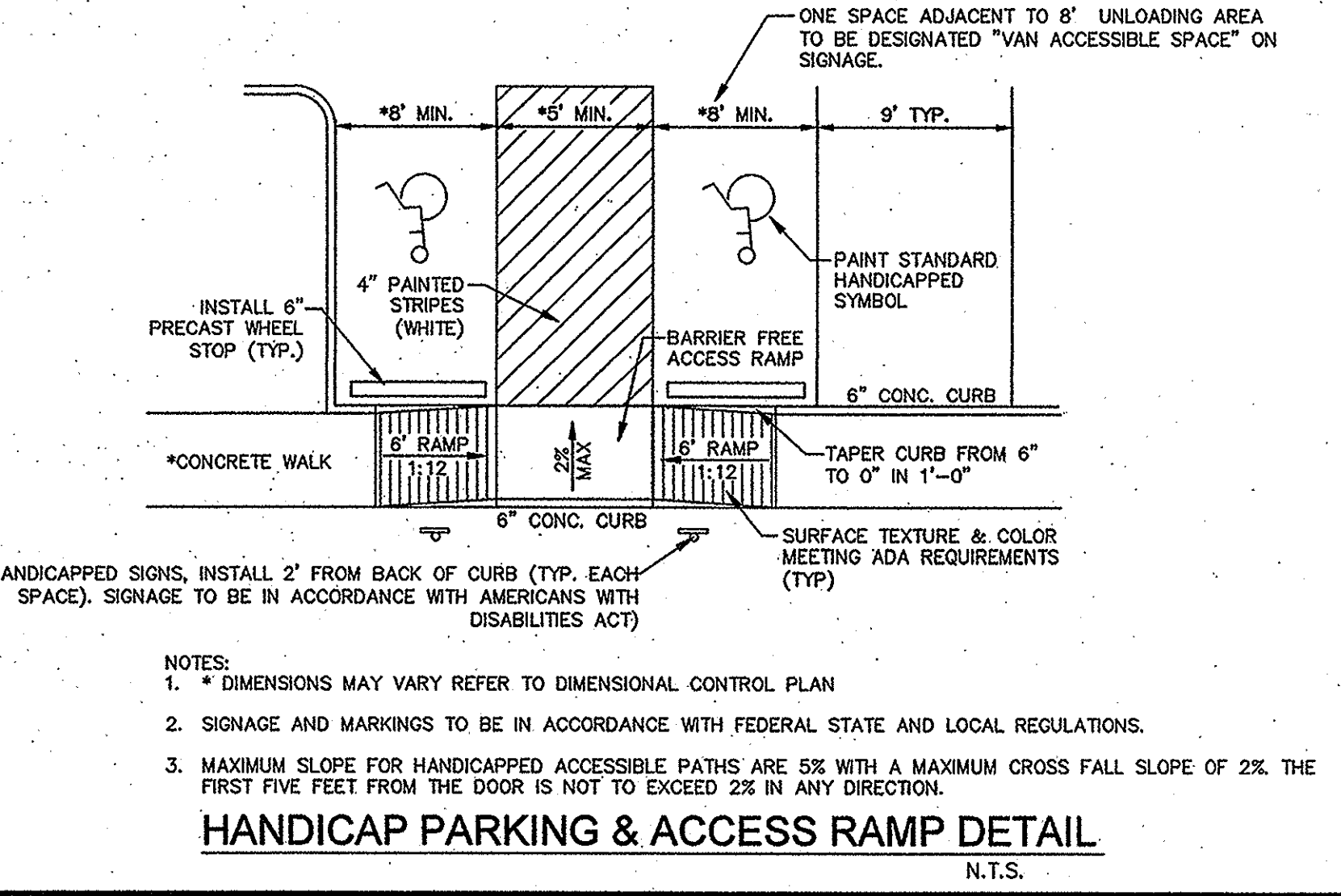
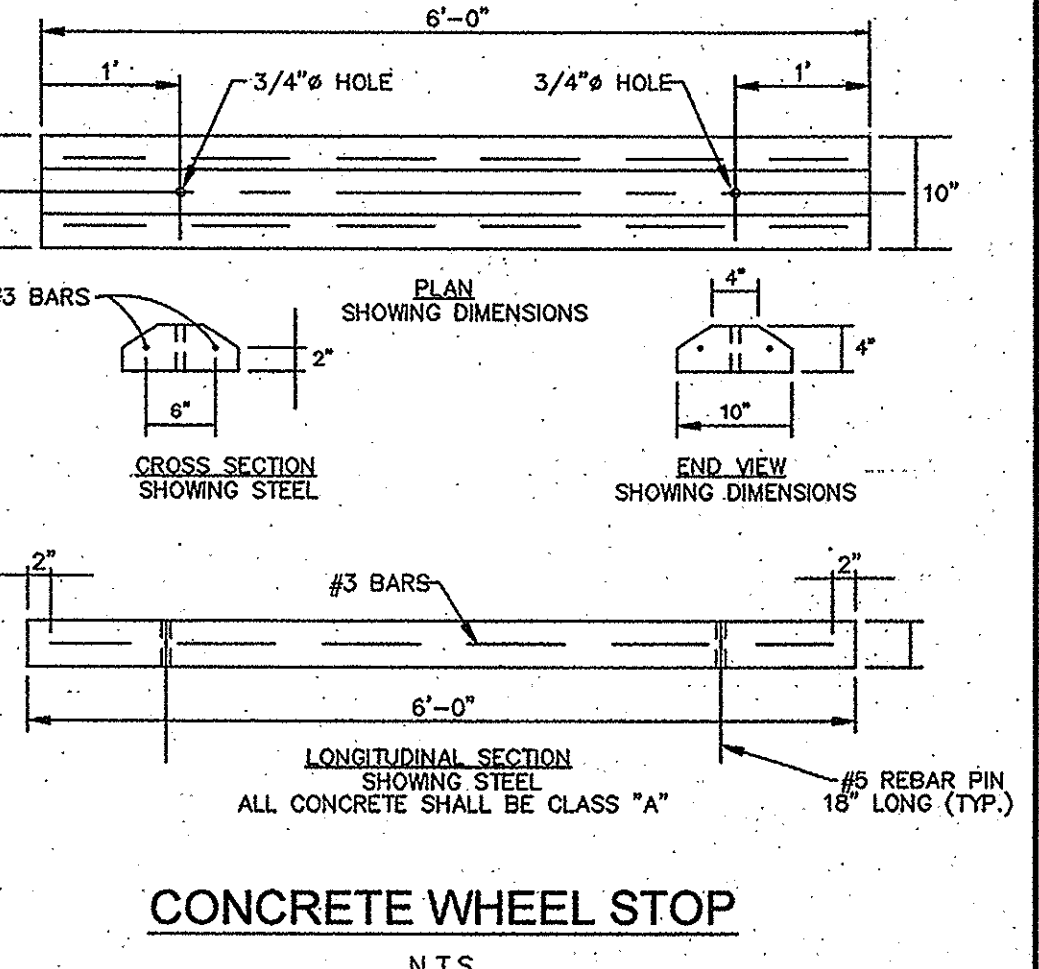
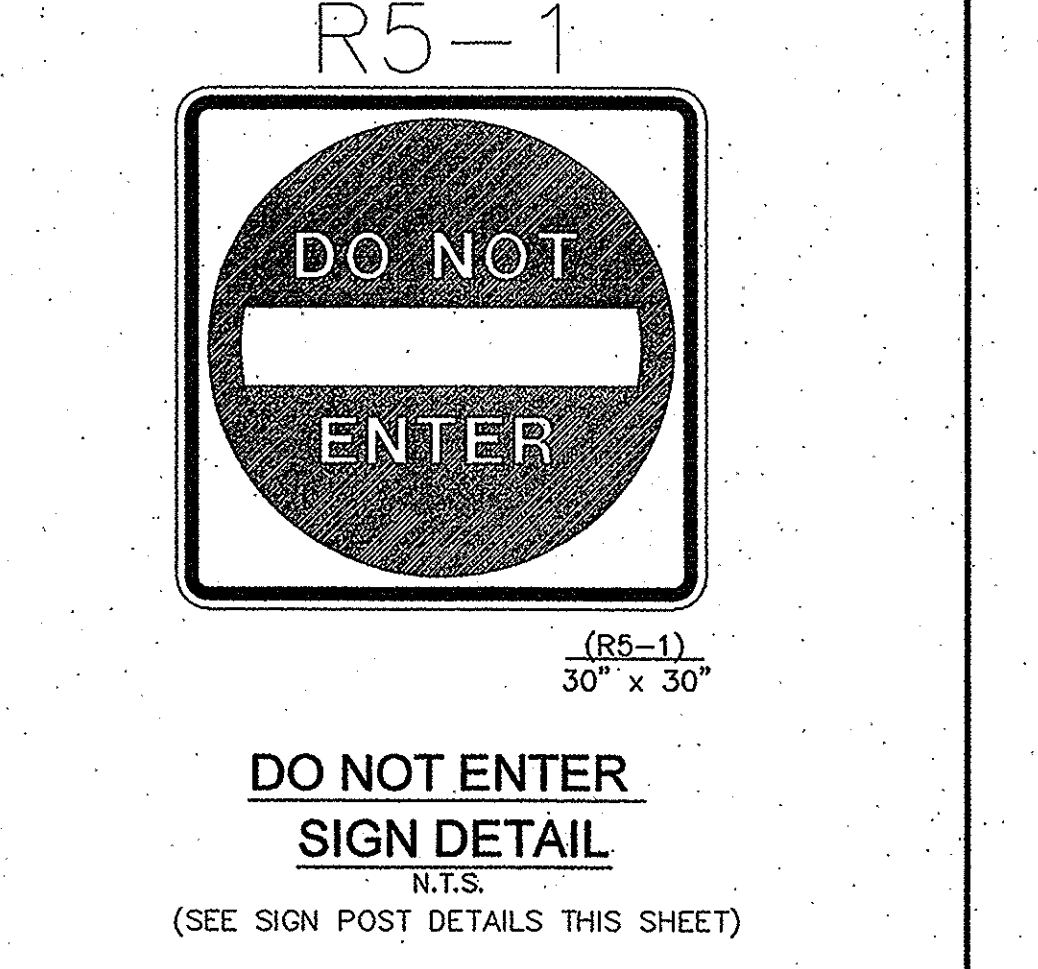
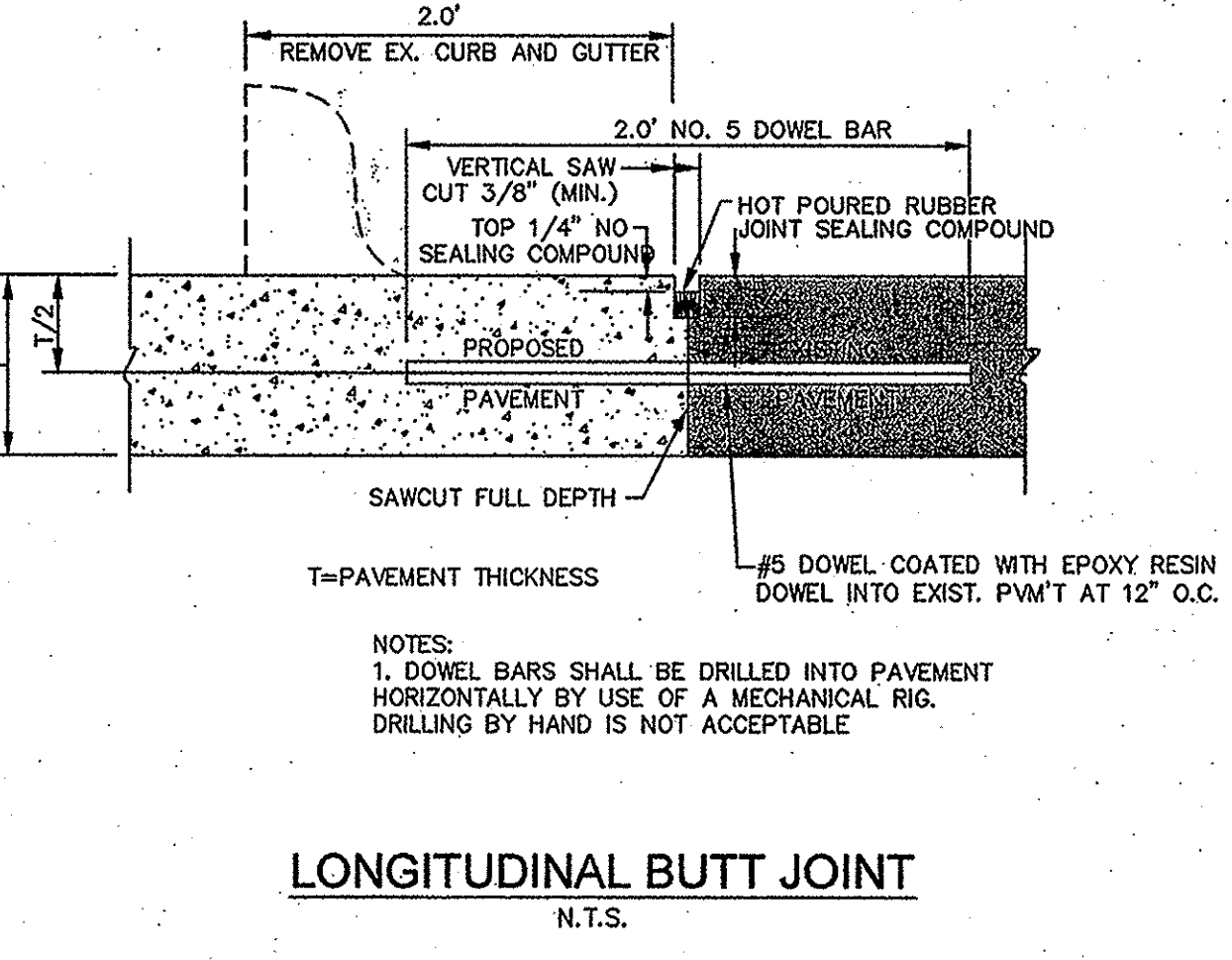
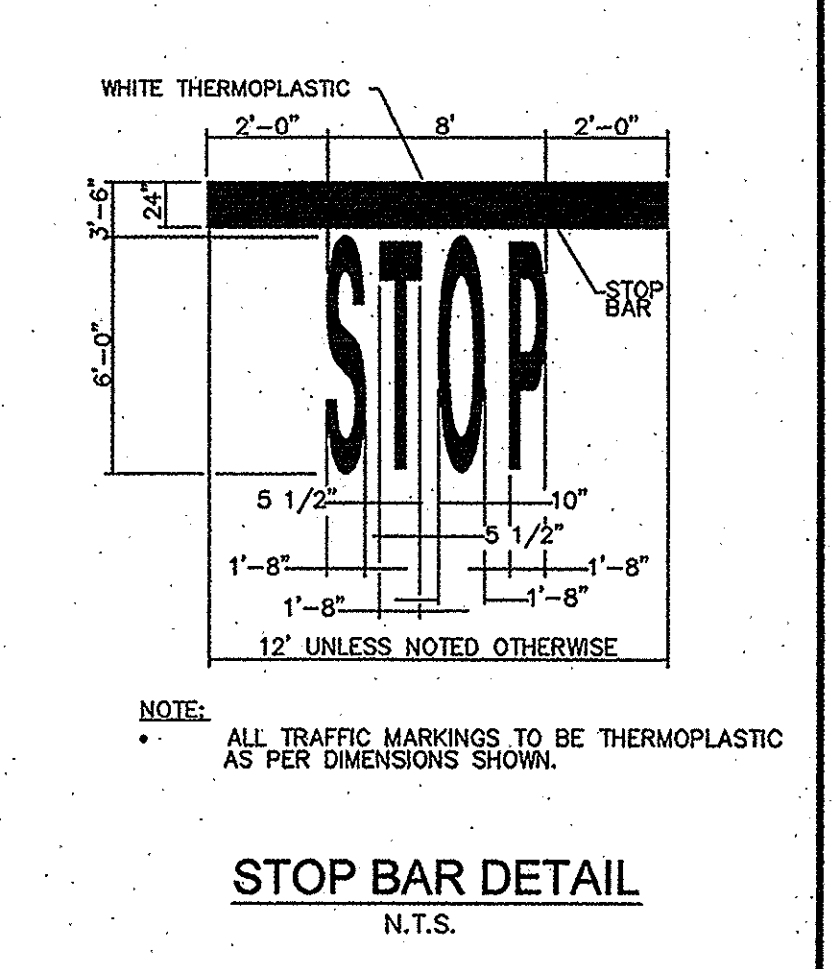
Scale:	AS SHOWN
Designed by:	DRK
Drawn by:	FRK
Checked by:	DRK
Date:	06/12/2013
Project No.:	69506200

SHEET
C-12

DRAWINGS: XREF: 6/12/2013 5:58 PM
 PLOTTED BY: JAMES
 DATE PLOTTED: 6/12/2013 5:58 PM
 PLOTTER: HP PLOTTER
 FILE: C:\WORK\2013\06\12\2013\06122013\METHODIST PAVILION ONE\EROSION CONTROL DETAILS.DWG



DATE:	REV. DATE:	SHEET:
AUGUST, 2010		30-P41



RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

THESE DETAILS APPLY ONLY TO IMPROVEMENTS WITHIN THE TOWN OF ADDISON LIMITS.

Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-3579
Fax No. (972) 335-3778

9750 Glenns Court, Suite 200
Frisco, Texas 75034
Firm No. F-928

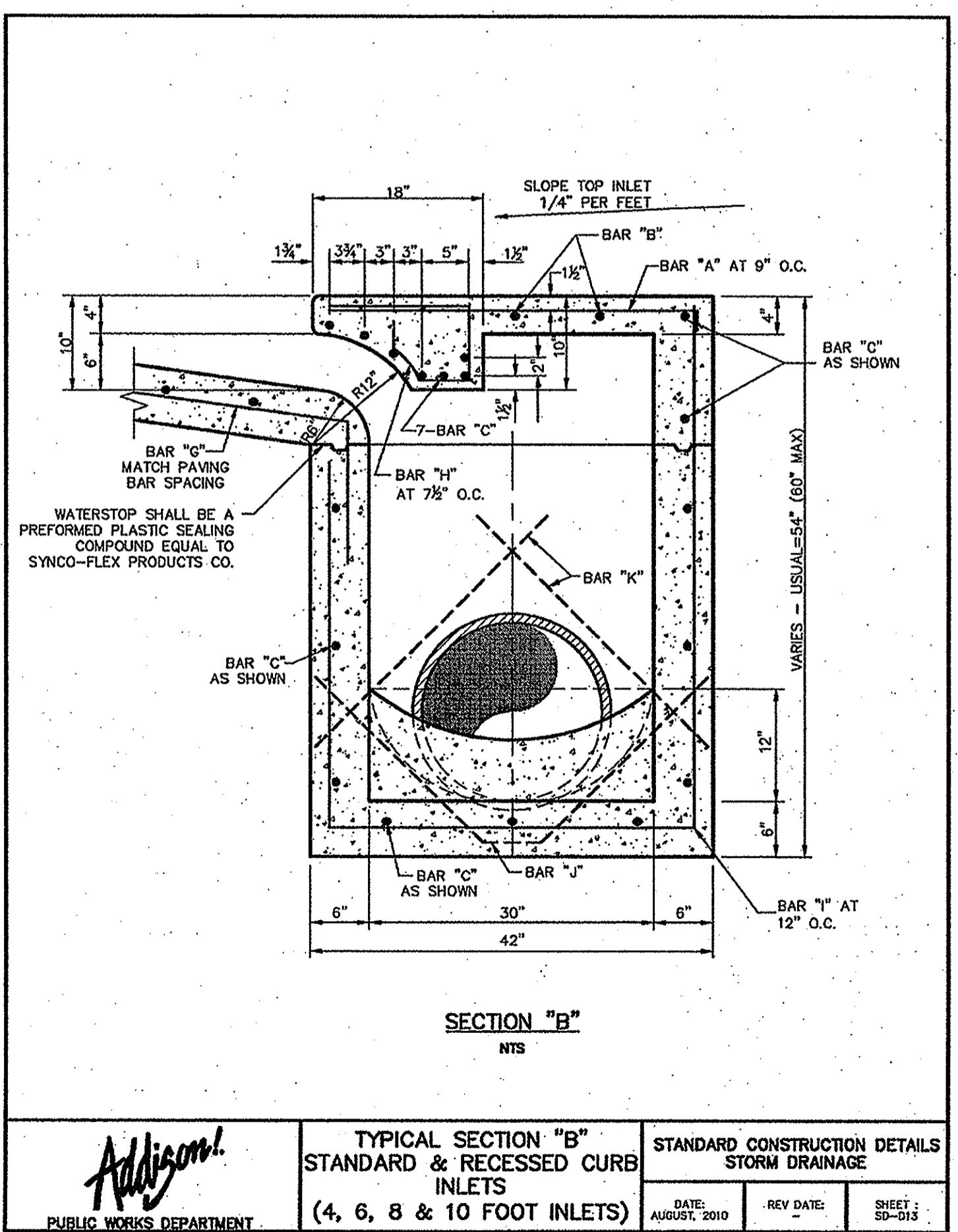
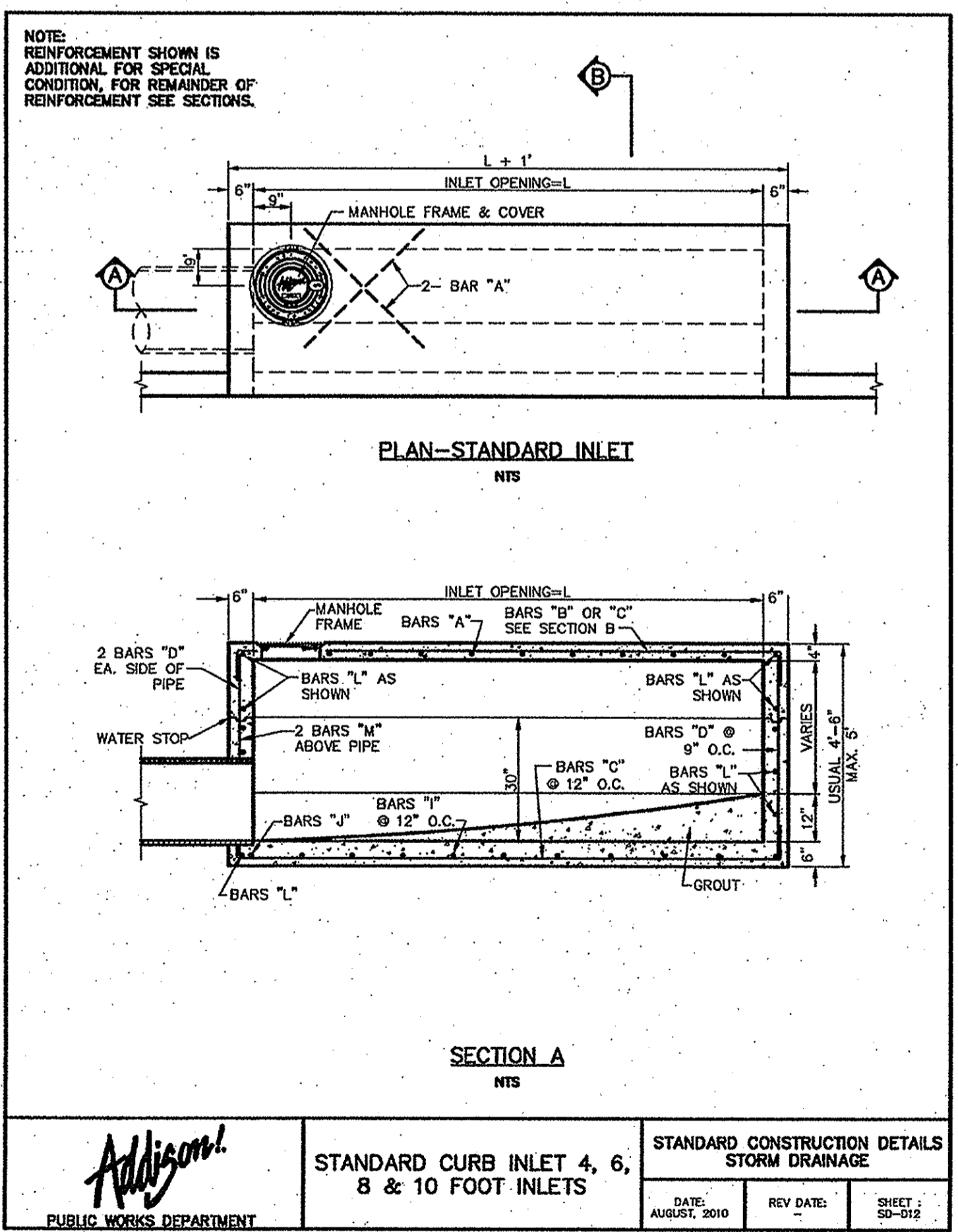
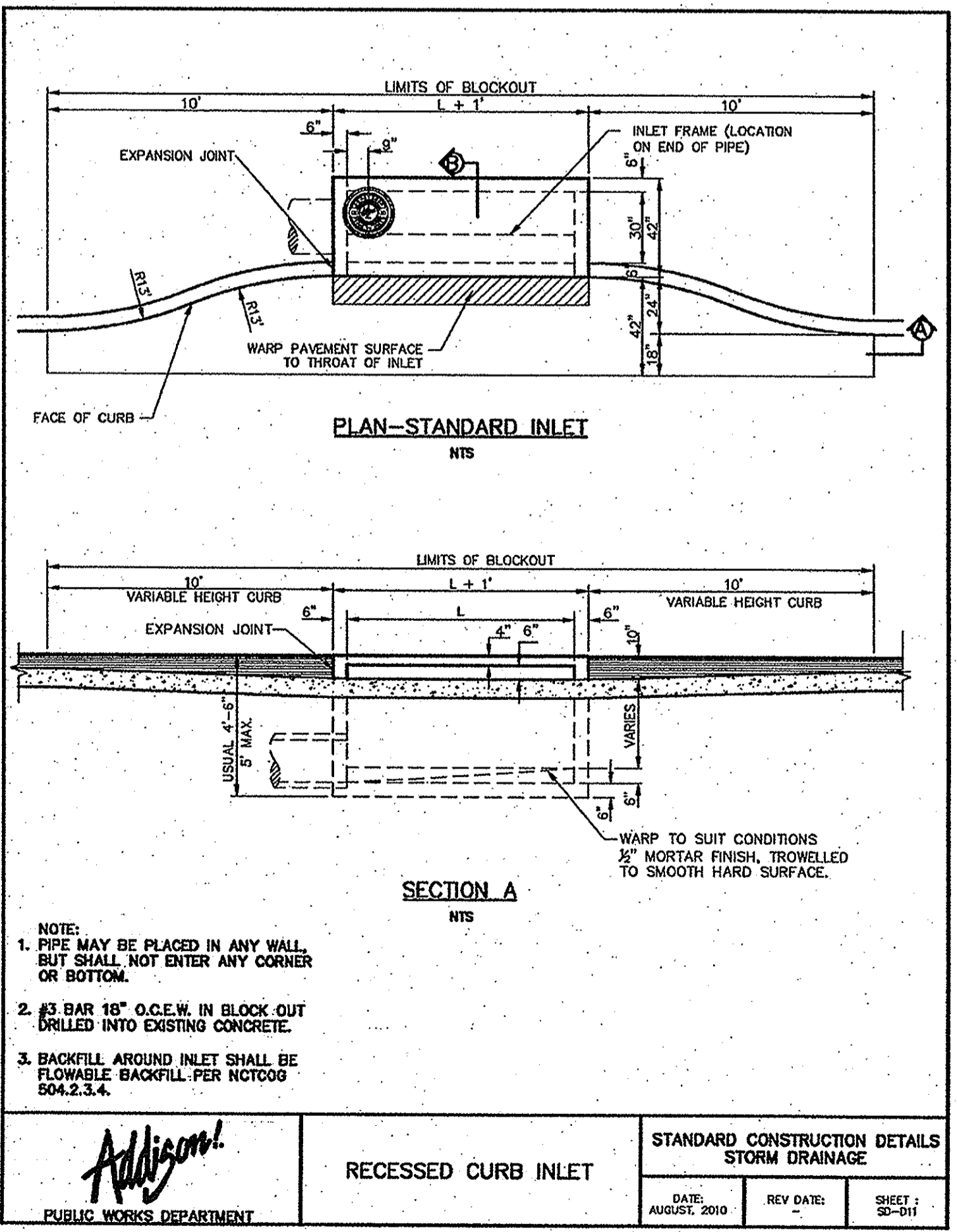
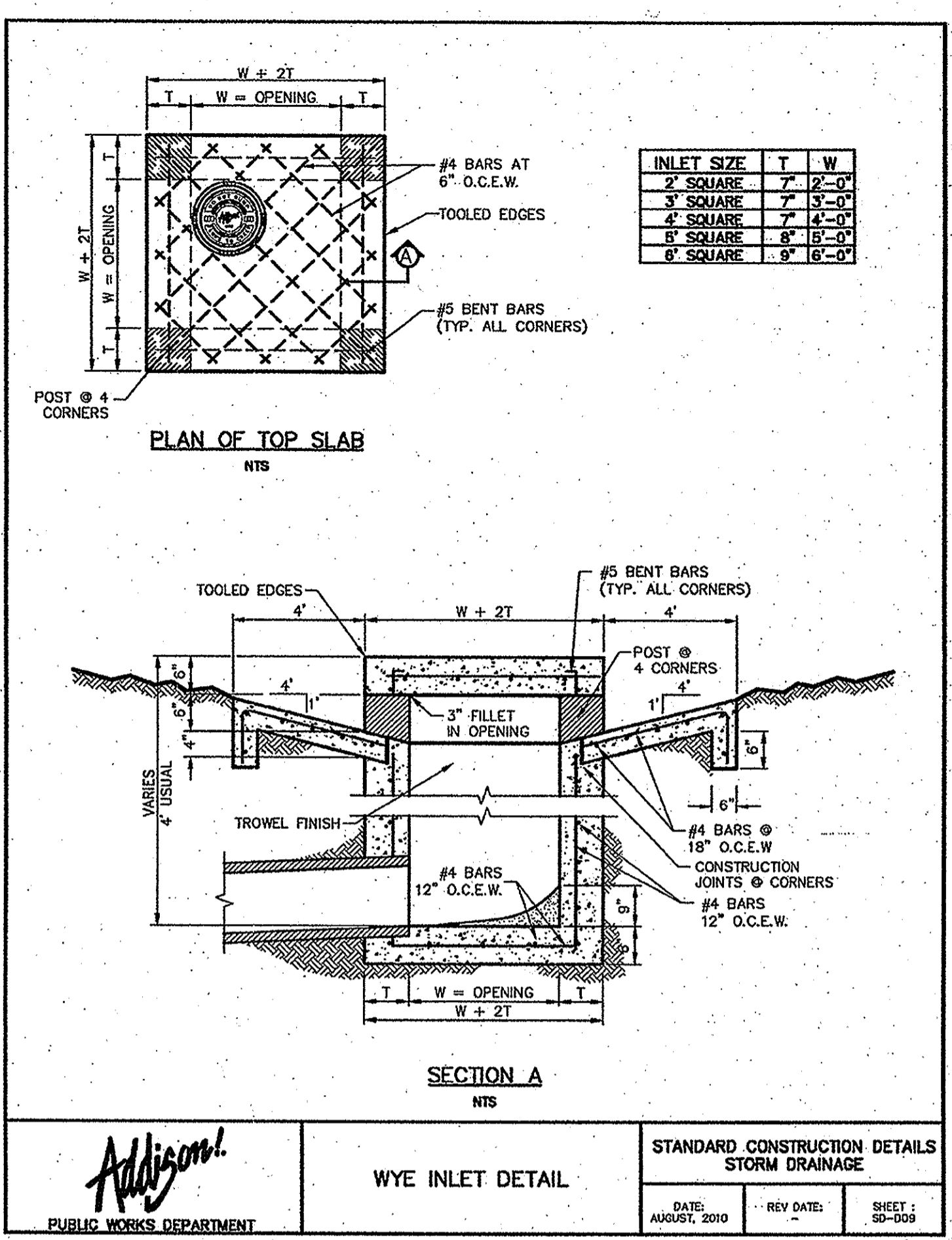
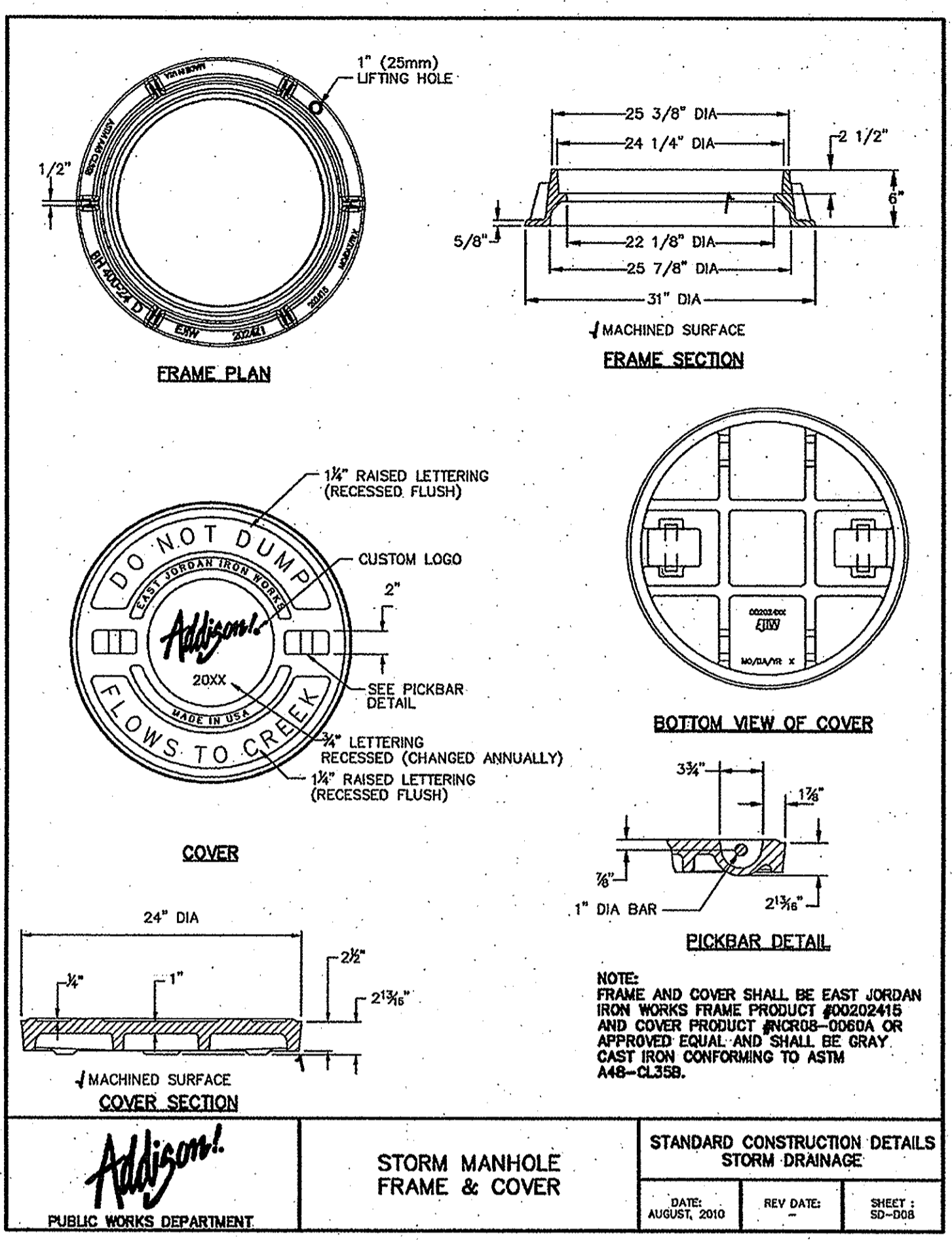
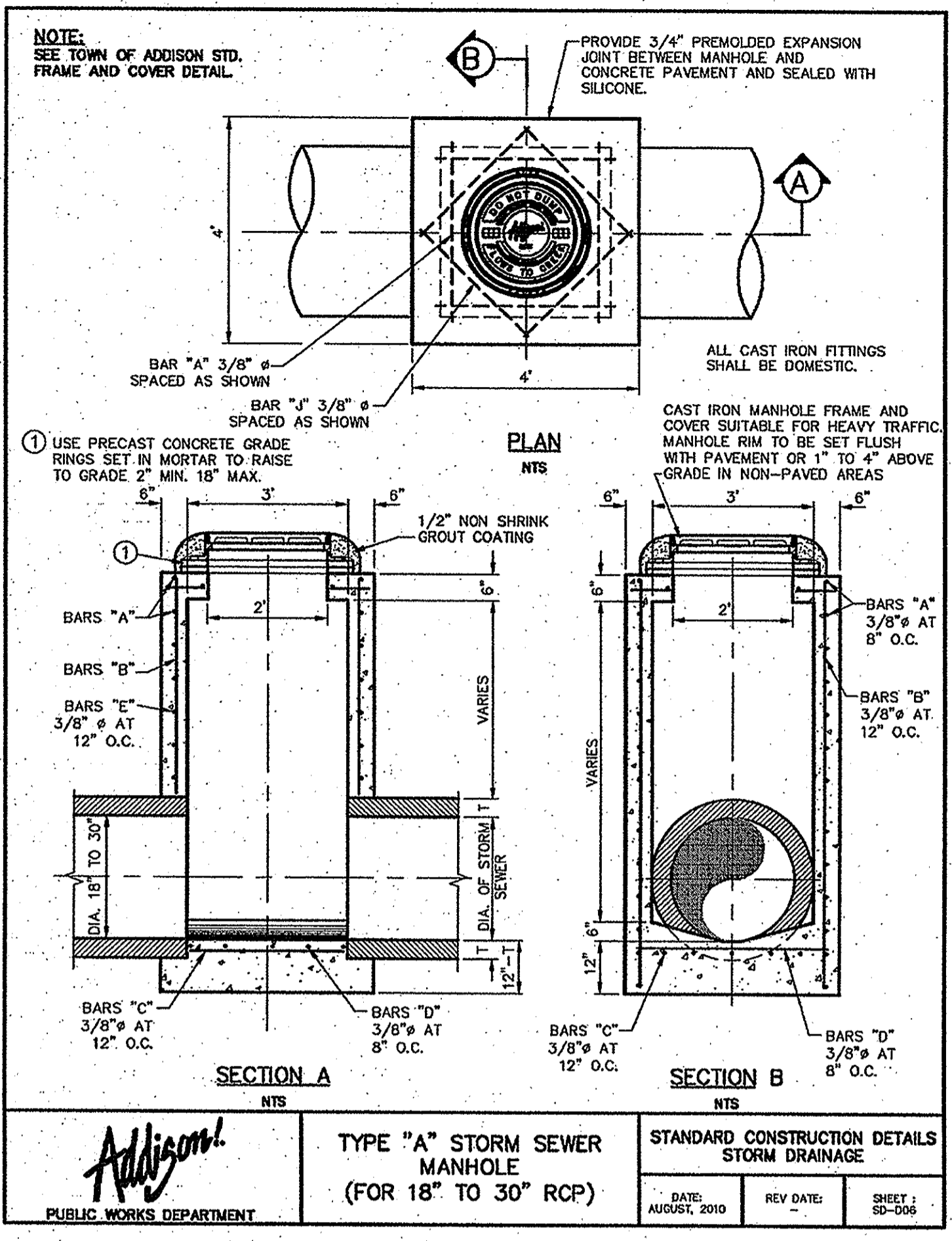
STATE OF TEXAS
DAVID K. KOCHALKA
7/7/11
LICENSED PROFESSIONAL ENGINEER
No. 13712

METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

CONSTRUCTION DETAILS

Scale:	AS SHOWN
Designed by:	DKK
Drawn by:	DKK
Checked by:	DKK
Date:	06/22/2012
Project No.:	6950290

SHEET
C-13



REINFORCING STEEL SCHEDULE DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLET

INLET LENGTH	BAR TYPE	BAR DIA. (1/8")	NO. REIN.	BAR DIMENSIONS		
				A	B	C
4'	A	3	8	3'-2"	0'-3"	-
4'	B	3	2	2'-10"	-	-
4'	C	4	18	4'-8"	0'-8"	-
4'	D	4	9	4'-8"	-	-
4'	G	3	4	2'-0"	1'-3"	-
4'	H	4	7	4'-8"	-	-
4'	J	5	1	-	-	-
4'	K	5	2	3'-2"	0'-5"	-
4'	L	4	11	3'-2"	0'-5"	-
4'	M	4	2	3'-0"	-	-
4'	O	3	6	2'-0"	1'-3"	-
4'	H	3	11	-	-	-
4'	I	4	5	3'-2"	3'-2"	4'-8"
4'	J	5	1	-	-	-
4'	K	5	2	3'-2"	0'-5"	-
4'	L	4	11	3'-2"	0'-5"	-
4'	M	4	2	3'-0"	-	-
4'	A	3	12	3'-2"	0'-3"	-
4'	C	4	3	6'-10"	-	-
4'	D	4	9	4'-8"	-	-
4'	G	3	7	2'-0"	1'-3"	-
4'	H	3	14	-	-	-
4'	I	4	7	3'-2"	3'-2"	4'-8"
4'	J	5	1	-	-	-
4'	K	5	2	3'-2"	0'-5"	-
4'	L	4	11	3'-2"	0'-5"	-
4'	M	4	2	3'-0"	-	-
4'	A	3	18	3'-2"	0'-3"	-
4'	C	4	9	4'-8"	-	-
4'	D	4	9	4'-8"	-	-
4'	G	3	9	2'-0"	1'-3"	-
4'	H	3	17	-	-	-
4'	I	4	9	3'-2"	3'-2"	4'-8"
4'	J	5	1	-	-	-
4'	K	5	2	3'-2"	0'-5"	-
4'	L	4	11	3'-2"	0'-5"	-
4'	M	4	2	3'-0"	-	-

* SEE DIAGRAM FOR DIMENSIONS
** FIELD CUT AS REQUIRED TO ACCOMMODATE DRAIN PIPE

REINFORCING STEEL SCHEDULE 4, 6, 8 & 10 FOOT INLETS

STANDARD CONSTRUCTION DETAILS STORM DRAINAGE

DATE: AUGUST, 2010 REV. DATE: SHEET: SD-014

RECORD DRAWINGS (July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

NOTE:
FOR WORK WITHIN THE CITY OF DALLAS REFER TO THE CITY OF DALLAS CONSTRUCTION STANDARDS AS SPECIFIED IN THE FILE 2510-1.

Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-9550
Fax No. (972) 335-3779

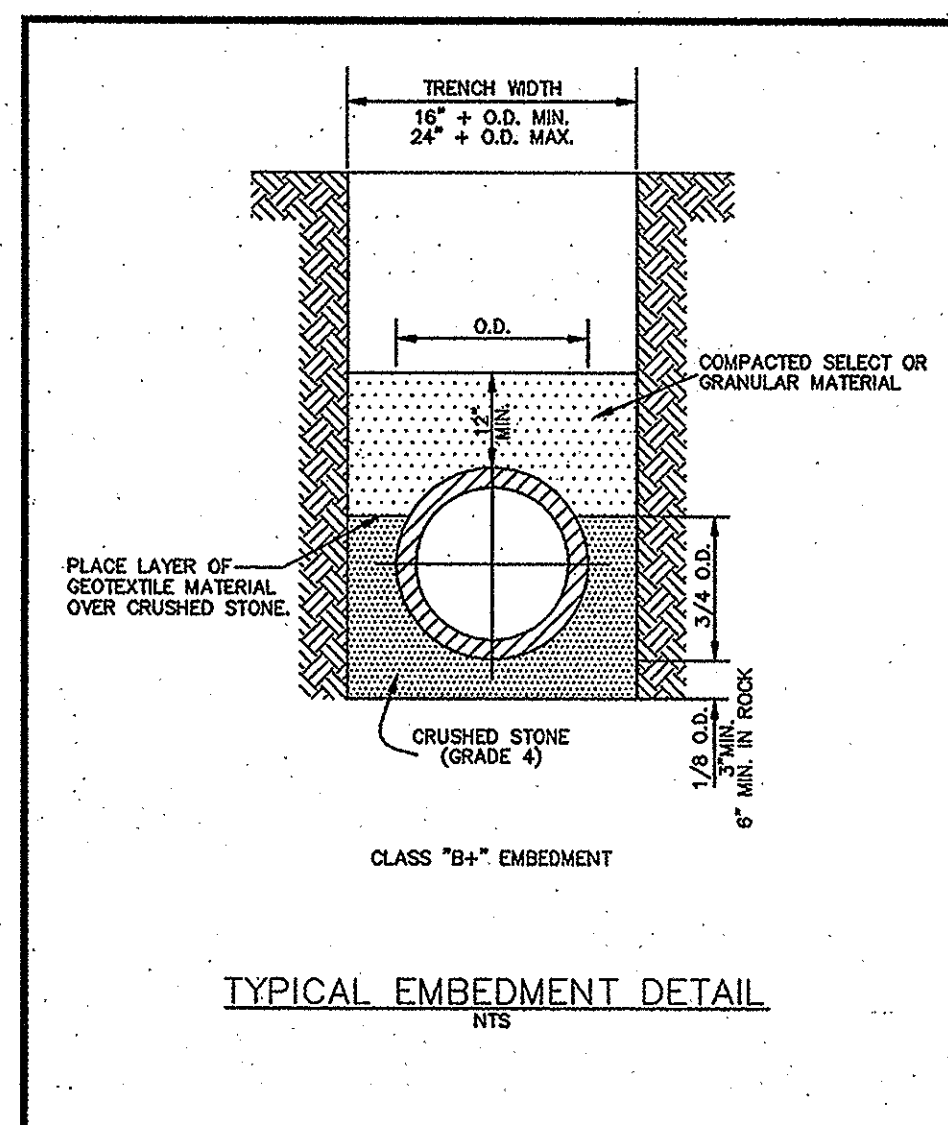
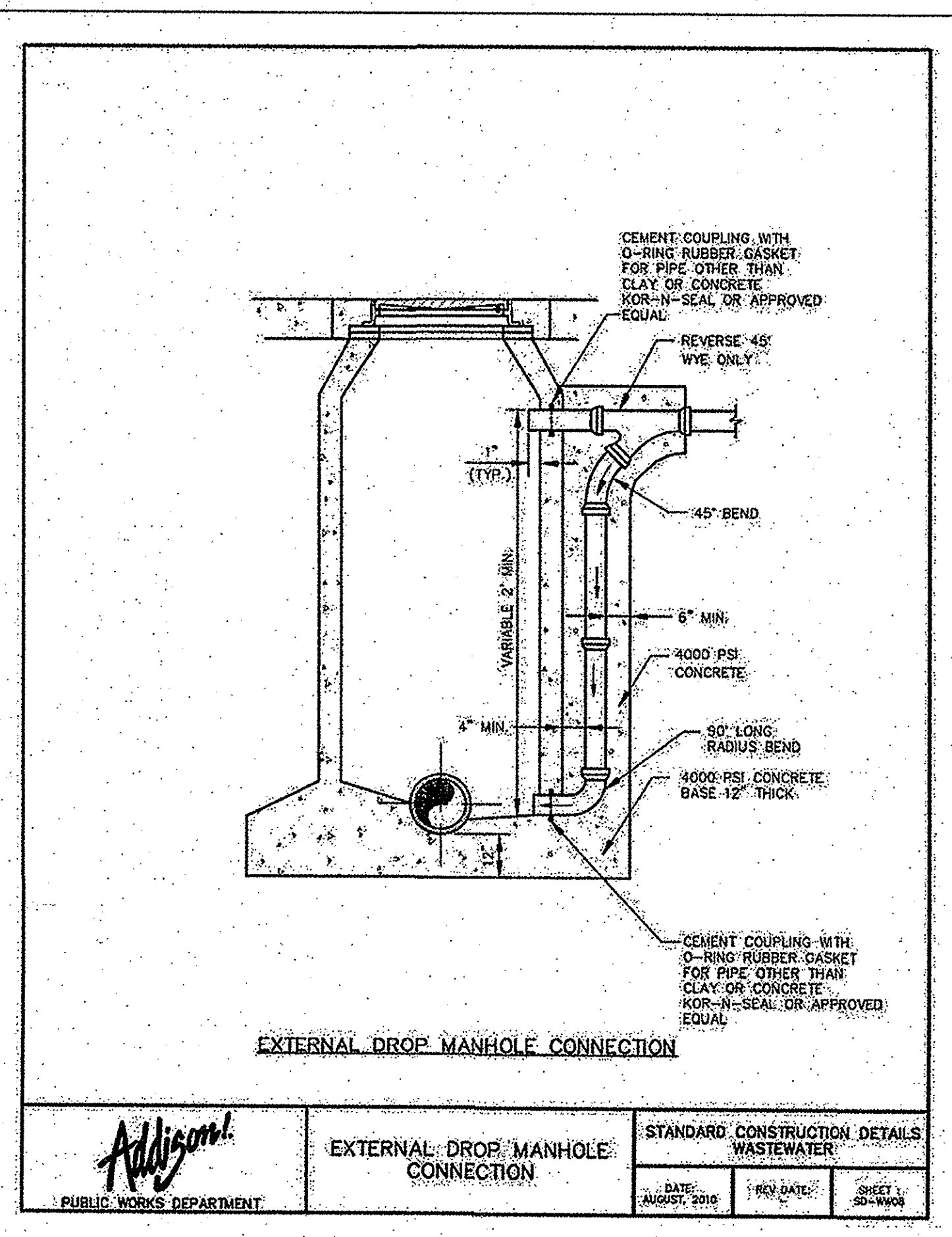
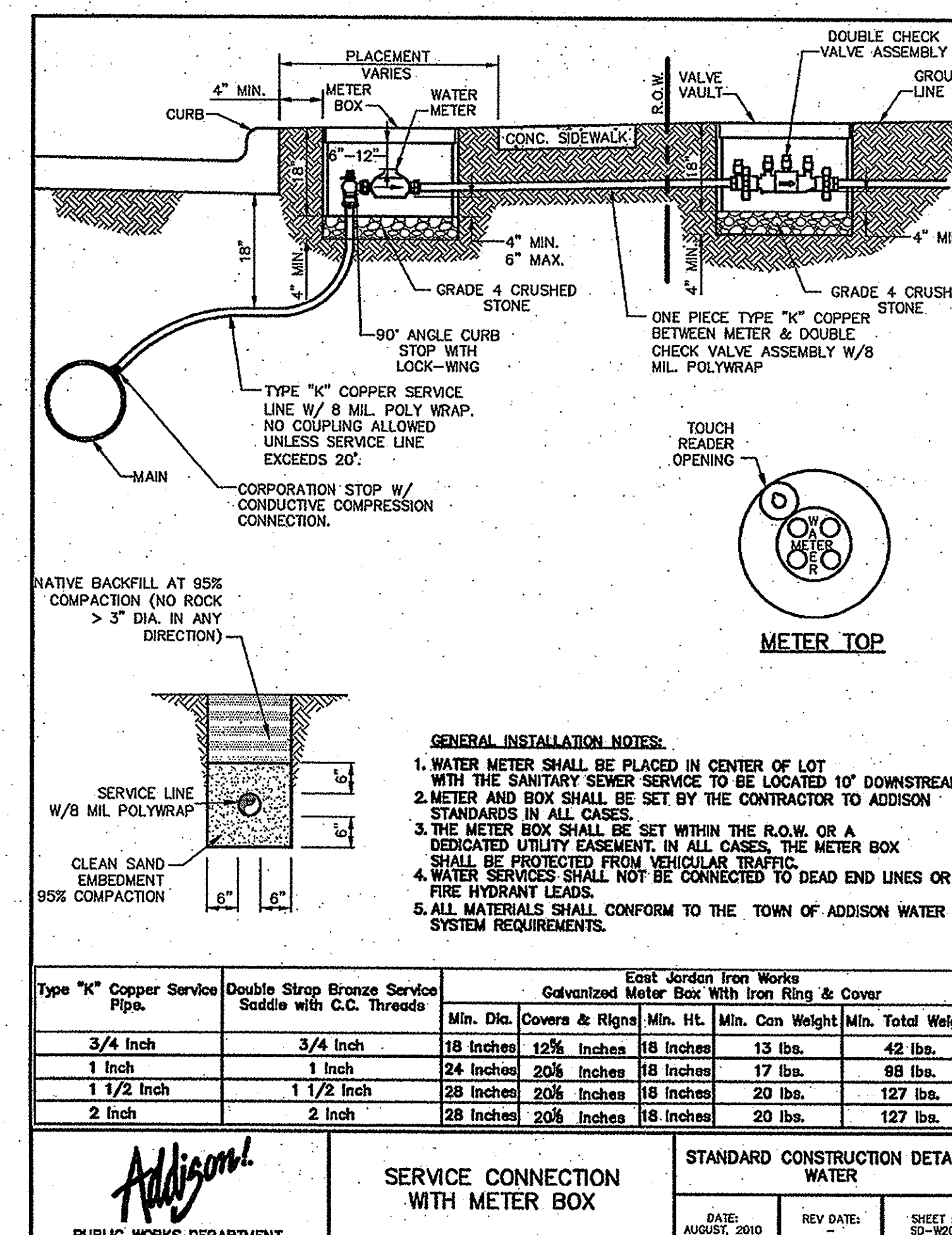
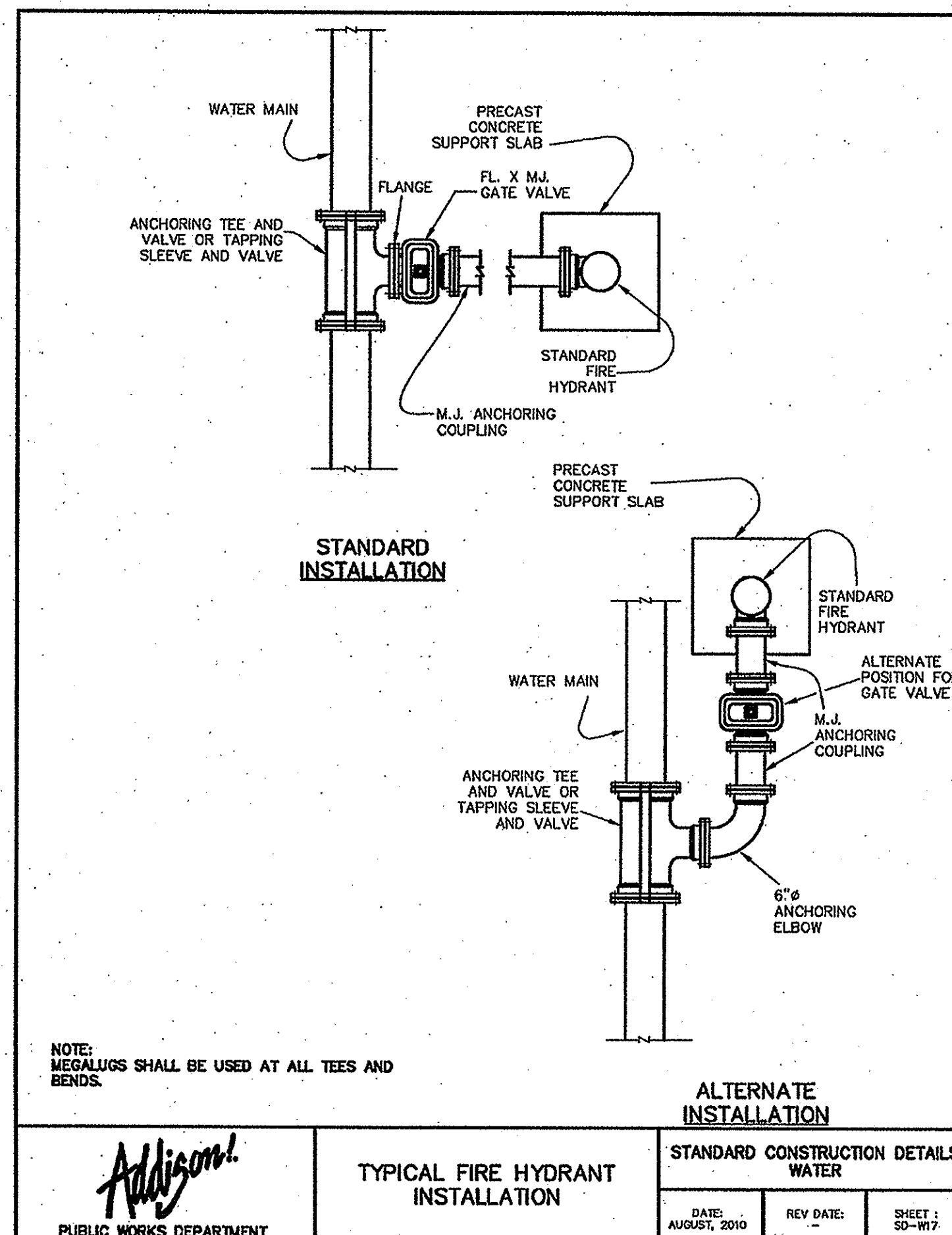
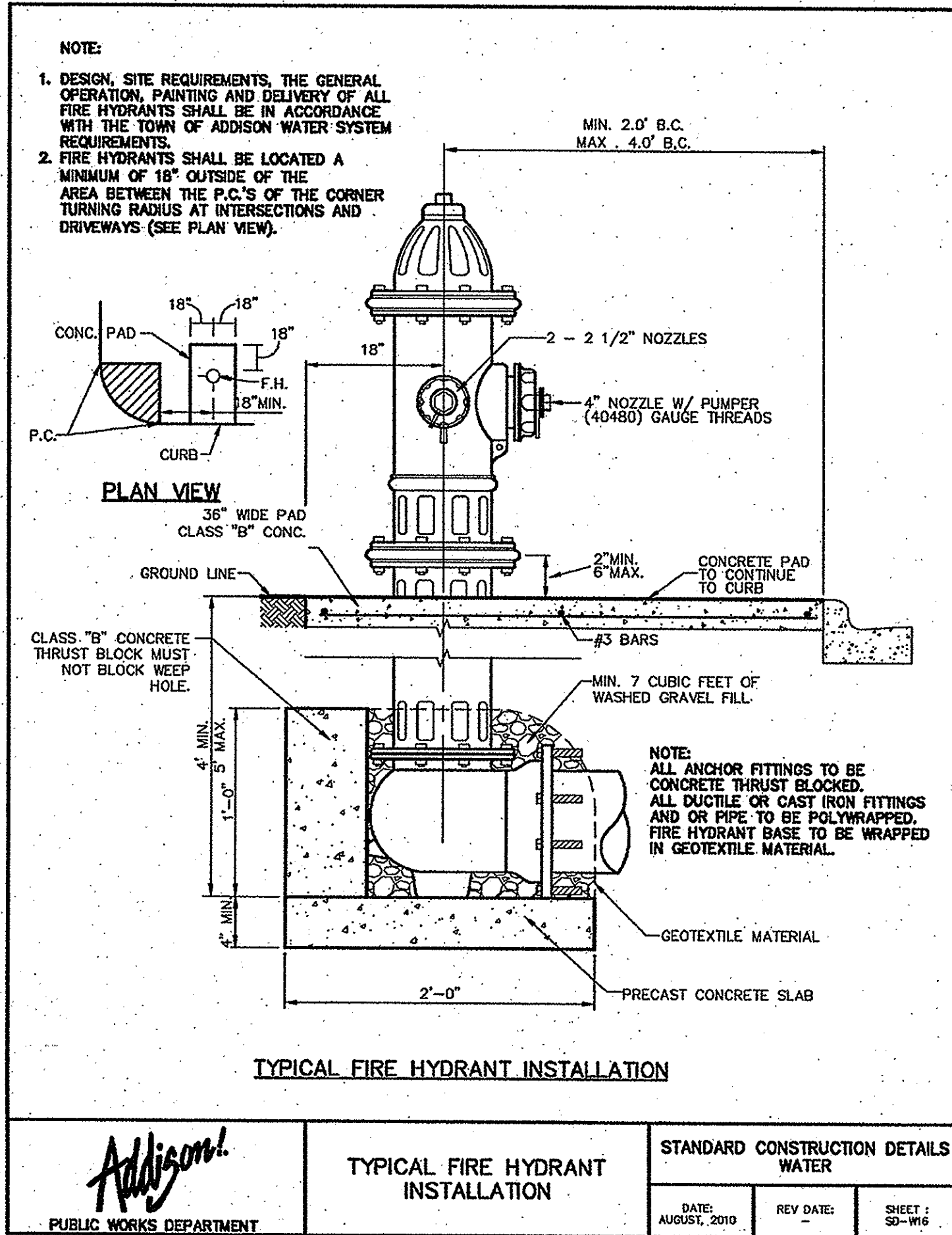
5750 Glenview Court, Suite 200
Frisco, TX 75034
Plm. No. K-028

METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

CONSTRUCTION DETAILS

Scale: AS SHOWN
Designed by: DSK
Drawn by: BK
Checked by: DSK
Date: 06/10/2012
Project No.: 0906030

SHEET
C-14



ADDISON PUBLIC WORKS DEPARTMENT

STANDARD CONSTRUCTION DETAILS WASTEWATER

DATE: AUGUST, 2010 REV DATE: SHEET: SD-W19

Kimley-Horn and Associates, Inc.
Tel. No. (972) 335-3580 Fax No. (972) 335-9779

5730 Geneva Court, Suite 200
Frisco, TX 75034
P.E. No. 10127

STATE OF TEXAS
DAVID K. KOCHALKA
87781
LICENSED PROFESSIONAL ENGINEER

METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

CONSTRUCTION DETAILS

Scale: AS SHOWN
Designed by: DRK
Drawn by: RKC
Checked by: DRK
Date: 06/27/2012
Project No.: 6930030

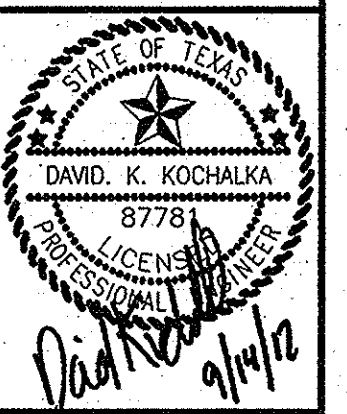
RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

SHEET C-15

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PLOTTER: HP DesignJet 2450
PLOT DATE: 08/20/10 09:00 AM
PLOT TIME: 08/20/10 09:00 AM

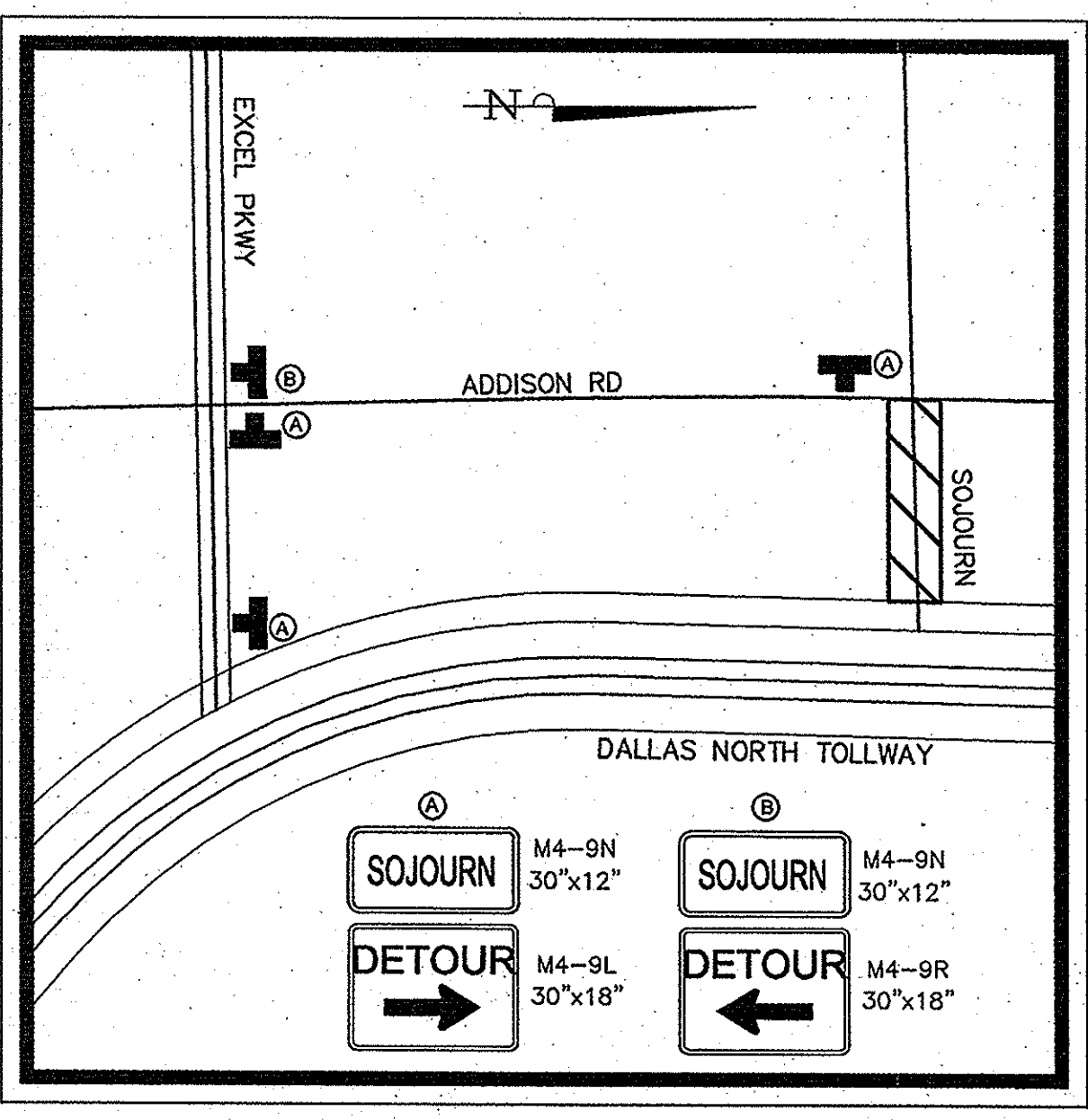
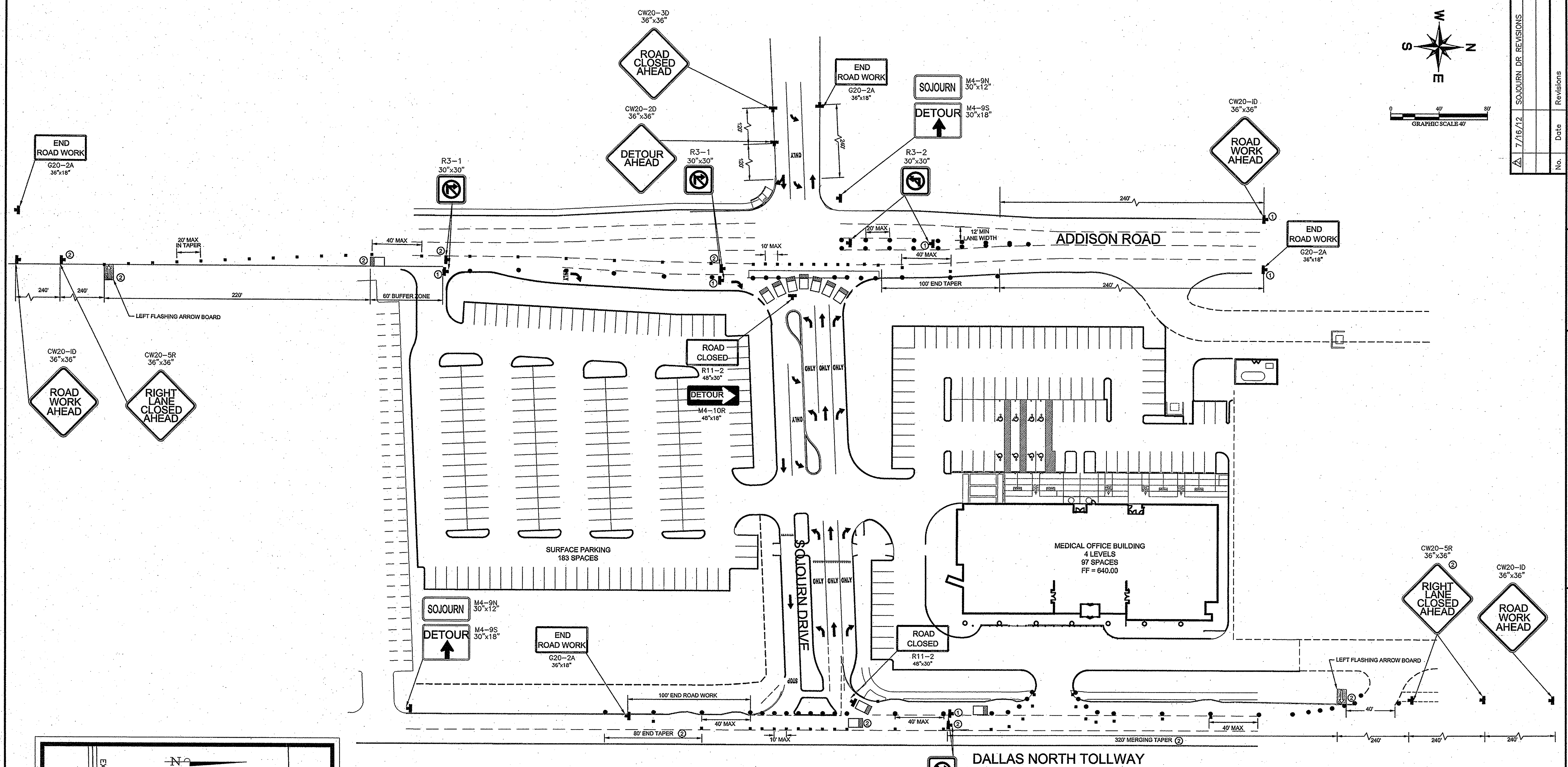
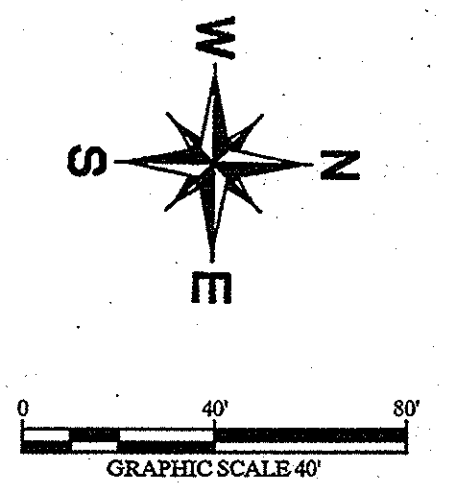
KLW			
7/16/12	SOJOURN DR REVISIONS		
No.	Date	Revisions	App.

Kimley-Horn and Associates, Inc.
 1750 Geneva County, Suite 200
 Dallas, TX 75243
 Tel. No. (972) 335-3990
 Fax No. (972) 335-3778



METHODIST PAVILION ONE
 TOWN OF ADDISON, DALLAS COUNTY, TEXAS

TRAFFIC CONTROL PLAN



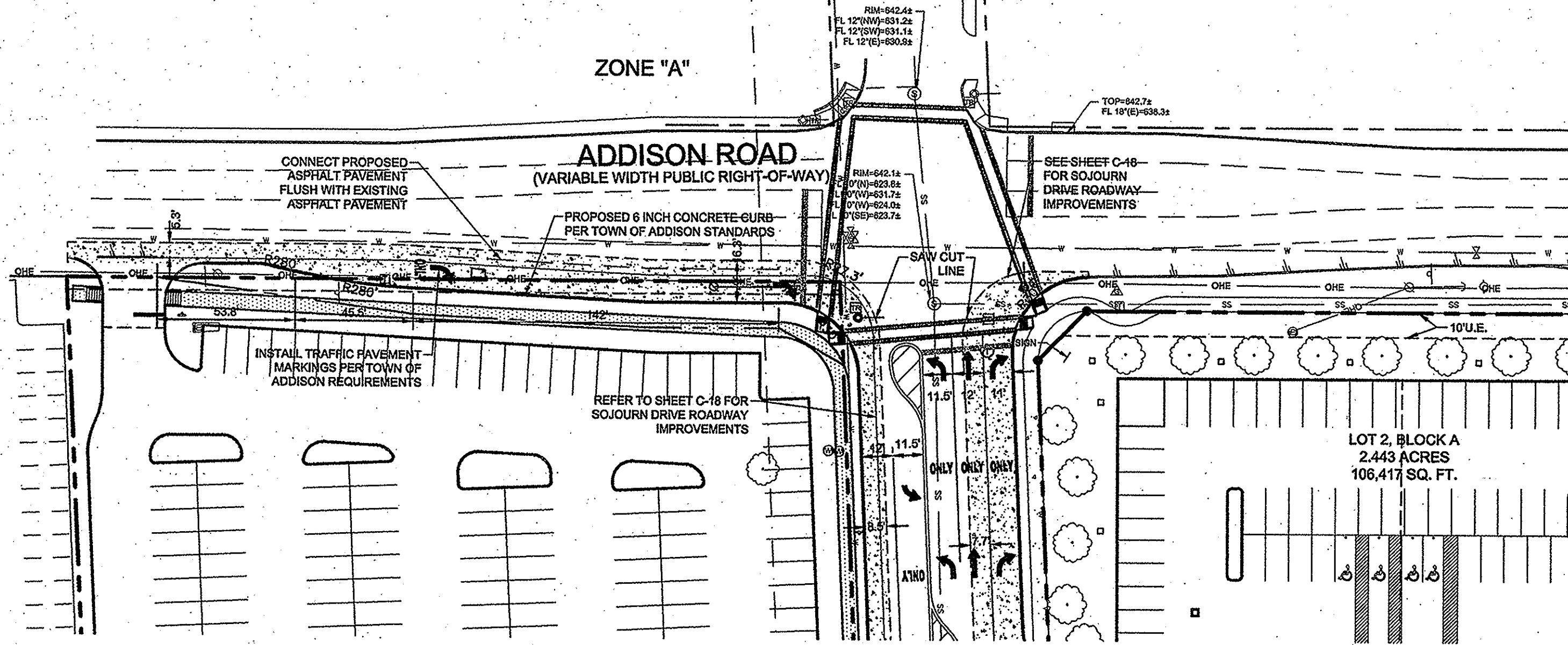
RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

LEGEND

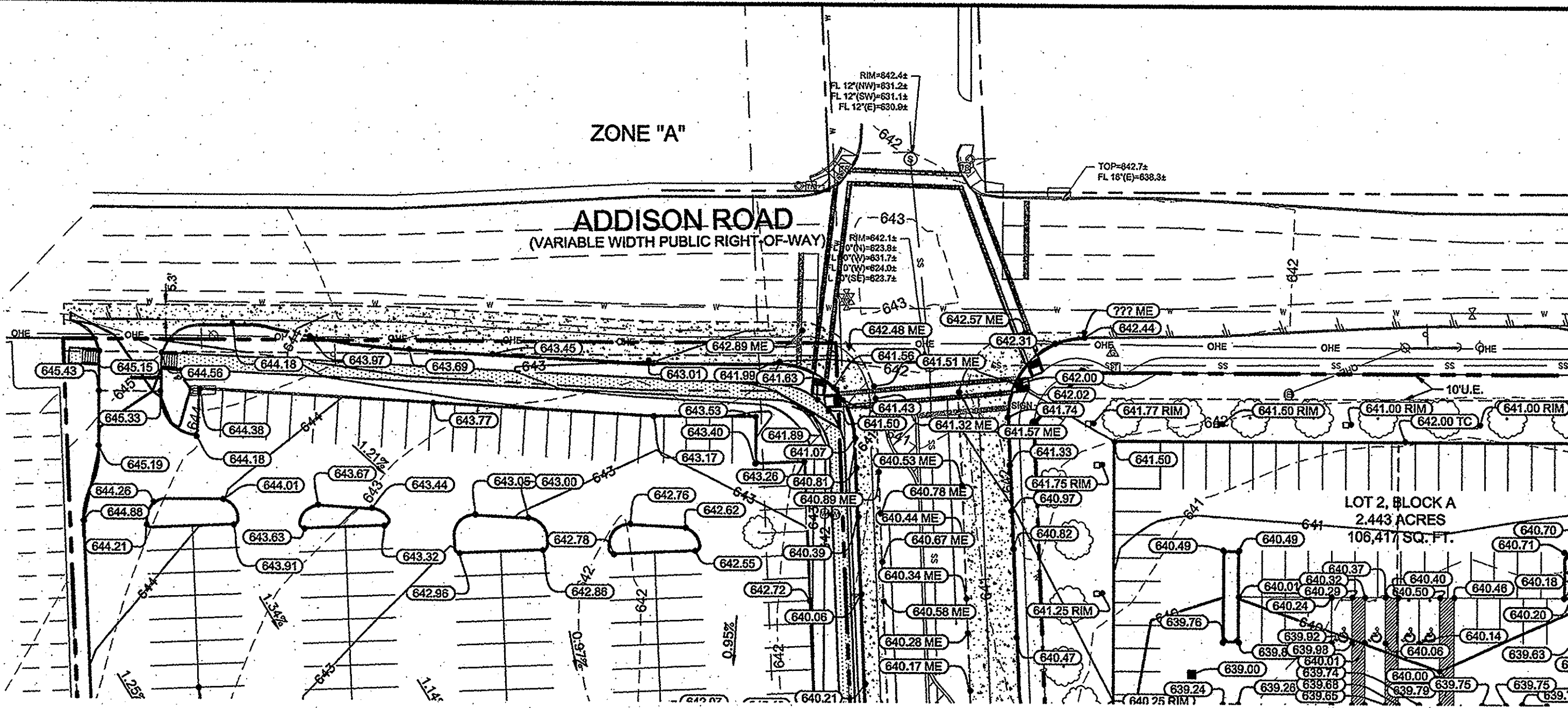
	TYPE 3 BARRICADE
	PHASE 1: CHANNELIZATION VERTICAL DRUM
	PHASE 2: CHANNELIZATION VERTICAL DRUM
	TRAFFIC CONTROL SIGN AND POST
	LEFT FLASHING ARROW BOARD
	WORK AREA DURING CONSTRUCTION
	PHASE 1: DEVICES IN PLACE FOR SOJOURN ROAD CLOSURE ONLY
	PHASE 2: DEVICES IN PLACE FOR SOJOURN ROAD CLOSURE AND LANE CLOSURES

- NOTES**
- ALL TRAFFIC CONTROL SHALL CONFORM TO THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), PART VI. FIELD MODIFICATIONS MAY BE MADE TO ADDRESS LOCAL CONDITIONS WITH THE APPROVAL OF THE ENGINEER.
 - DESIGN SPEED IS 40 MPH ON ADDISON ROAD AND SB DALLAS PARKWAY, AND 30 MPH ON SOJOURN ROAD. MINIMUM SIGN SPACING IS 240' ON ADDISON ROAD AND SB DALLAS PARKWAY, AND 120' ON SOJOURN ROAD.
 - CONTRACTOR IS RESPONSIBLE FOR INSTALLATION, MAINTENANCE, AND REMOVAL OF TRAFFIC CONTROL DEVICES. TRAFFIC CONTROL DEVICES SHOULD BE INSPECTED DAILY AND REPAIRED OR REPLACED AS NECESSARY. AFTER REMOVAL, CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF MODIFICATIONS TO ROADWAY AND SIDEWALK SURFACES, ROADWAY MARKINGS, AND SIGNAGE DUE TO TRAFFIC CONTROL DEVICES OR CONSTRUCTION ACTIVITY.
 - DURING THE HOURS OF DARKNESS, ALL CHANNELIZATION SHALL HAVE A TYPE "C" STEADY BURN WARNING LIGHT OR EQUIVALENT REFLECTOR, AND ALL WARNING SIGNS SHALL HAVE A TYPE "A" LOW INTENSITY FLASHING WARNING LIGHT.
 - THE NORTHBOUND ADDISON ROAD LANE CLOSURE SHALL BE REMOVED EACH WEEKDAY BETWEEN THE HOURS OF 4PM AND 7PM, AND THE EXISTING TWO NORTHBOUND TRAVEL LANES RESTORED. THE SOUTHBOUND DALLAS PARKWAY LANE CLOSURE SHALL BE REMOVED EACH WEEKDAY BETWEEN THE HOURS OF 6AM AND 9AM, AND THE EXISTING TWO SOUTHBOUND TRAVEL LANES RESTORED. CHANNELIZATION DEVICES SHALL BE MOVED TO THE EDGE OF THE TRAVEL LANES AND THE SIGNAGE SHALL BE MODIFIED AS NOTED. IF THERE IS A DROP-OFF OUTSIDE THE EXISTING NORTHBOUND TRAVEL LANES, POST THE W8-9A "SHOULDER DROP OFF" SIGN AT THE SOUTH EDGE OF THE WORKWAY.
 - DEVICES NOT MARKED WITH A PHASE (SOJOURN CLOSURE ONLY OR SOJOURN CLOSURE AND LANE CLOSURE PHASE) SHALL BE IN PLACE AT ALL TIMES.

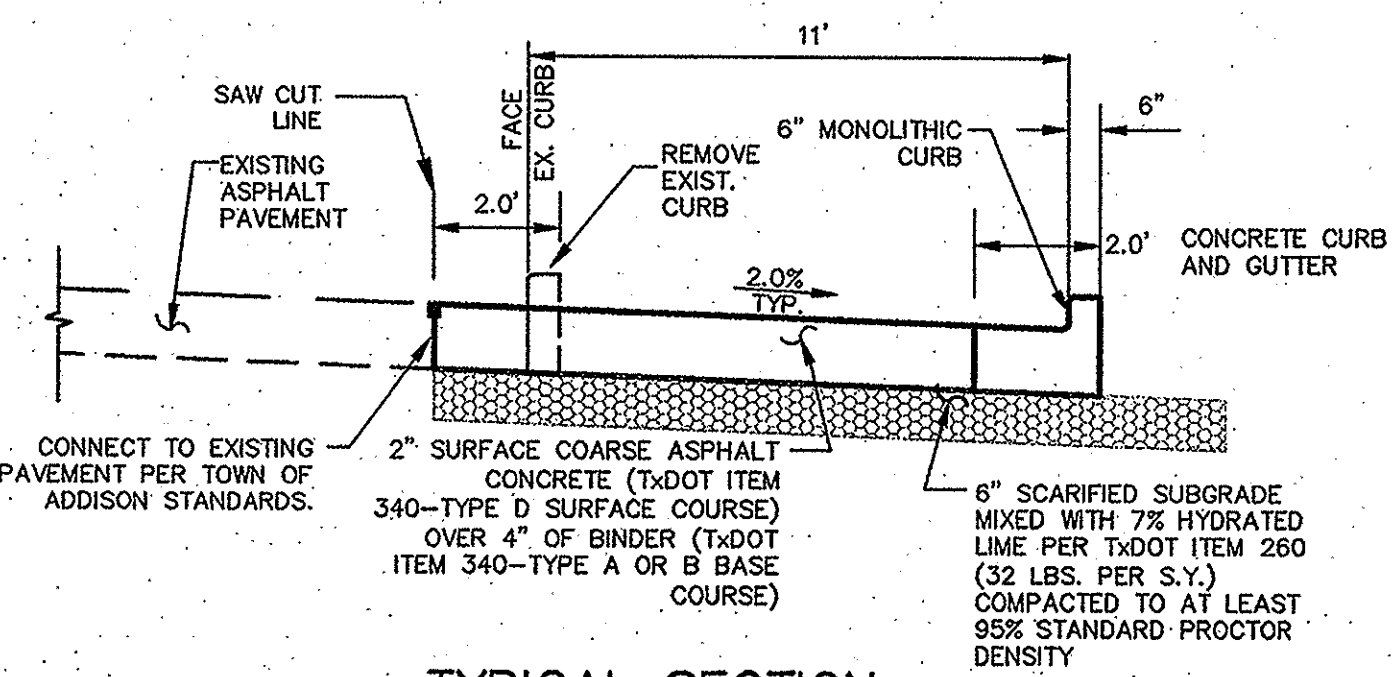
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ADDISON ROAD-DIMENSIONS

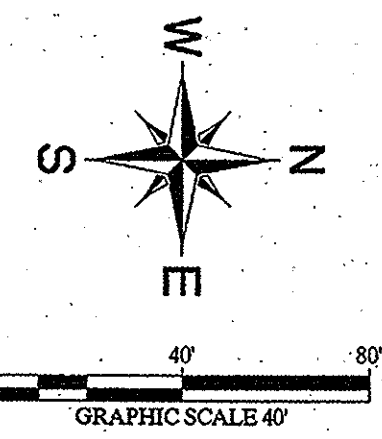


ADDISON ROAD-GRADING



THE CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND SHALL NOTIFY THE CONSTRUCTION MANAGER AND ENGINEER OF ANY CONFLICTS DISCOVERED. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING UTILITIES (SHOWN OR NOT SHOWN) WITHIN SCOPE OF CONSTRUCTION. IF ANY EXISTING UTILITIES ARE DAMAGED, THE CONTRACTOR SHALL REPLACE THEM AT HIS OWN EXPENSE. CALL 1-800-DIG-TESS AT LEAST 72 HOURS PRIOR TO COMMENCING CONSTRUCTION IN VICINITY.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company



LEGEND

---	PROPERTY LINE
---	SETBACK LINE
- - - -	PROPOSED EASEMENT
OP	EXISTING OVERHEAD POWER LINE
CBL	EXISTING CABLE LINE
GAS	EXISTING GAS LINE
W	EXISTING WATER LINE
SS	EXISTING SANITARY SEWER LINE
455	EXISTING MAJOR CONTOUR
453	EXISTING MINOR CONTOUR
455	PROPOSED MAJOR CONTOUR
453	PROPOSED MINOR CONTOUR
- - - -	PROPOSED RETAINING WALL
FL	PROPOSED FIRE LANE
FBR	EXISTING FIBER OPTIC LINE
BFR	BARRIER FREE RAMP (BFR)
SP	EXISTING POWER POLE
★	EXISTING LIGHT POLE
⊙	EXISTING FIRE HYDRANT
⊙	EXISTING STORM MANHOLE
⊙	EXISTING SAN. SWR. MANHOLE
↓	EXISTING SIGN
• (640.25)	PROPOSED TOP OF PAVEMENT ELEVATION
• (640.25 ME)	MATCH EXISTING PAVEMENT ELEVATION
→	FLOW ARROW
⬇	PROPOSED FIRE HYDRANT (FH)
⬇	PROPOSED FIRE DEPARTMENT CONNECTION (FDC)
⊠	PROPOSED TRANSFORMER LOCATION

PAVING LEGEND

▨	2" SURFACE COARSE ASPHALT CONCRETE (TXDOT ITEM 340-TYPE D SURFACE COURSE) OVER 2" LIFTS OF BINDER (TXDOT ITEM 340-TYPE A OR B BASE COURSE), 10" TOTAL
---	---

- NOTES
- ALL DIMENSIONS ARE TO FACE OF CURB, FACE OF BUILDING, OR PROPERTY LINE UNLESS OTHERWISE NOTED.
 - ALL PARKING STALLS SHALL BE 9'x16', UNLESS OTHERWISE NOTED.
 - CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING FOOTPRINT DIMENSIONS.
 - ALL RADII ARE 2', UNLESS OTHERWISE NOTED.
 - FIRE LANE SHALL BE CONSTRUCTED PER TOWN OF ADDISON FIRE DEPARTMENT STANDARDS AND MARKED PER TOWN SPECIFICATIONS. REFER TO DETAILS FOR ADDITIONAL INFORMATION.
 - PAVEMENT DESIGN DATA SHOWN BY REFERENCE ONLY. PAVEMENT TO BE PER GEOTECH REPORT PROJECT NO. 0980536 DATED APRIL 23, 2009 BY ALPHA TESTING.
 - CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND FINAL GEOTECH REPORT FOR BUILDING SUB-GRADE PREPARATION REQUIREMENTS.
 - CONTRACTOR TO VERIFY T.A.S. COMPLIANCE. FOR ANY QUESTIONS CONTACT CIVIL ENGINEER IMMEDIATELY.
 - CONTRACTOR TO VERIFY ENGINEERING PLANS MATCH ARCHITECTURAL PLANS BEFORE CONSTRUCTION STAKING.
 - REFER TO LANDSCAPE PLANS FOR ADDITIONAL INFORMATION.
 - REFER TO SITE LIGHTING PLANS FOR ALL LIGHTING LOCATIONS, SPECIFICATIONS, AND PHOTOMETRIC DETAILS.
 - REFER TO BUILDING ELEVATION PLANS FOR ALL BUILDING SIGNAGE LOCATIONS AND DETAILS.
 - CONTRACTOR SHALL REFER TO M.E.P. AND LANDSCAPE PLANS FOR CONDUIT PLACEMENT PRIOR TO PAVING.
 - CONTRACTOR TO CONSTRUCT 1/2" EXPANSION JOINT WHERE DRIVEWAYS ABUT BUILDING.
 - ALL ACCESSIBLE PATHWAYS SHALL BE BUILT PER ADA STANDARDS, WITH A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM LONGITUDINAL SLOPE OF 5%.
 - JOINTS IN CONCRETE PAVING SHOULD NOT EXCEED 15 FT.

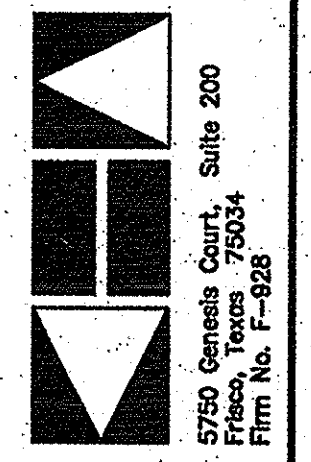
- NOTES
- ALL SPOT ELEVATIONS ARE TOP OF PAVEMENT ELEVATIONS, UNLESS OTHERWISE NOTED (ADD 0.50' FOR ELEVATION AT TOP OF CURB)
 - CONTRACTOR TO REFER TO STRUCTURAL PLANS FOR SUBGRADE PREPARATION SPECIFICATIONS FOR ALL PROPOSED BUILDING
 - ALL FILL MATERIAL SHALL BE COMPACTED TO A MINIMUM 85% STANDARD PROCTOR DENSITY. REFER TO PAVING SECTION DETAILS FOR SUBGRADE PREPARATION REQUIREMENTS UNDER ALL PAVED AREAS. (REFER TO GEOTECH REPORT)
 - ALL SIDEWALKS SHALL HAVE A MAXIMUM LONGITUDINAL SLOPE OF 5% AND A MAXIMUM CROSS SLOPE OF 2% IF THE CONTRACTOR IDENTIFIES SLOPES GREATER, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO CONSTRUCTION.
 - CONTRACTOR SHALL VERIFY COMPLIANCE WITH TEXAS ACCESSIBILITY STANDARDS (TAS) AND SHALL NOTIFY CIVIL ENGINEER IMMEDIATELY OF ANY CONFLICTS.
 - CONTRACTOR SHALL COORDINATE GRADING AT FACE OF BUILDING WITH PLANS BY ARCHITECT AND SHALL NOTIFY CIVIL ENGINEER IMMEDIATELY OF ANY CONFLICTS.
 - MAXIMUM SLOPES FOR CUT AND FILL ARE BOTH 4:1.
 - ALL VAULTS, METERS, MANHOLE RIMS, CLEANOUTS, FIRE HYDRANTS SLABS, ETC. SHALL BE LAID FLUSH WITH PROPOSED FLATWORK GRADING.
 - FOR INFORMATION REGARDING REMOVAL AND RELOCATION OF UTILITIES REFER TO DEMOLITION PLAN, SHEET C-03. CONTRACTOR TO COORDINATE RELOCATION WITH TOWN OF ADDISON.

- BENCH MARK LIST
- FOUND ON TOP OF THE CONCRETE BASE OF A LIGHT POLE IN THE CENTER MEDIAN OF EXCEL PARKWAY APPROXIMATELY 50 FEET WEST OF THE CENTERLINE OF ADDISON ROAD. (PER TOWN OF ADDISON PLAN # 95103, SHEET 2, DATED JANUARY 1998) ELEV=844.41
 - BM #60' [X] SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 828 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=832.78
 - BM #61' [X] SET ON TOP OF A CONCRETE CURB INLET LOCATED ON THE WEST SIDE OF DALLAS PARKWAY APPROXIMATELY 160 FEET NORTH OF THE CENTERLINE OF SOJOURN DRIVE. ELEV=838.04

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!
CONTRACTOR IS TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

Kimley-Horn
and Associates, Inc.
Tel. No. (972) 335-3580
Fax. No. (972) 335-3770



STATE OF TEXAS
DAVID K. KOCHALKA
87781
LICENSED PROFESSIONAL ENGINEER
Dedicated to Excellence

METHODIST PAVILION ONE
TOWN OF ADDISON DALLAS COUNTY, TEXAS

ADDISON ROAD
ROADWAY
IMPROVEMENTS

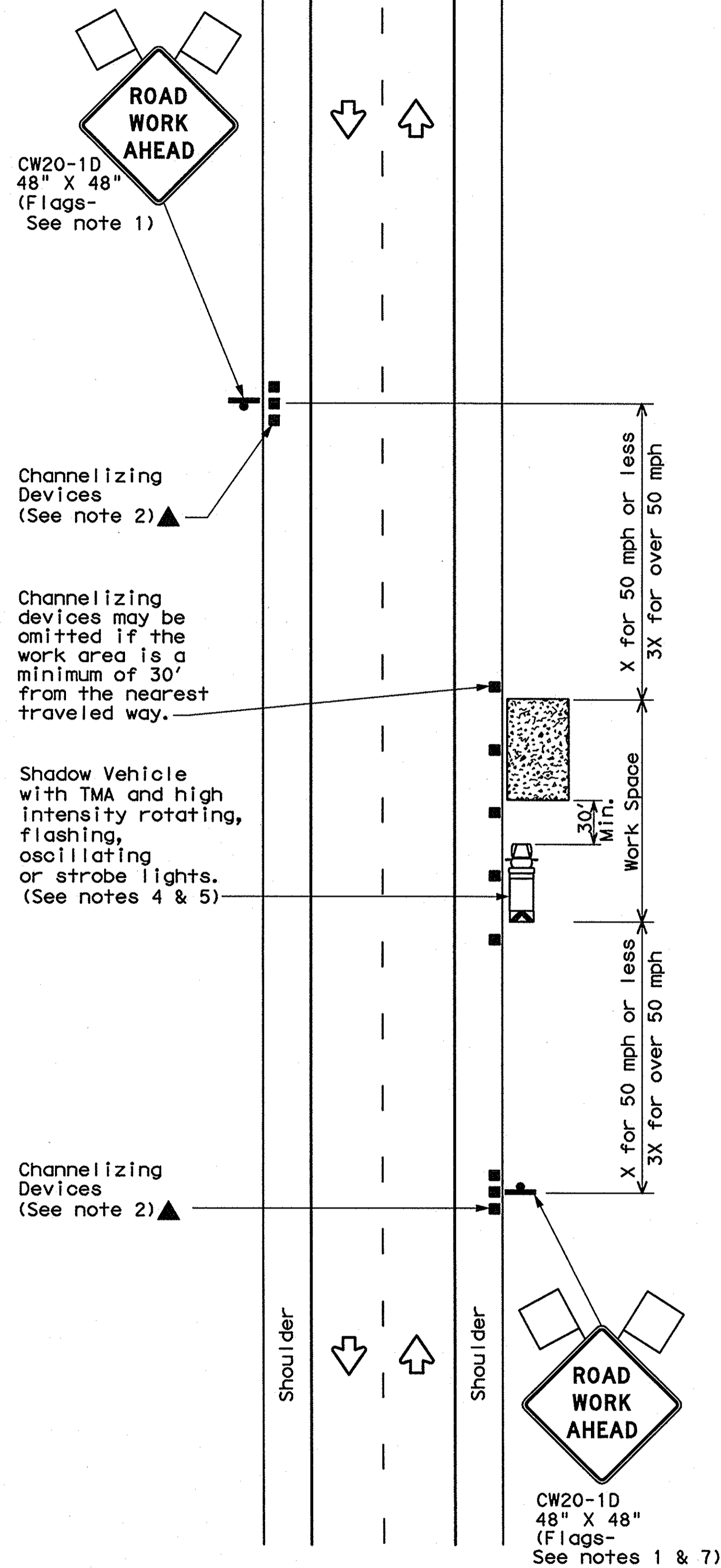
Scale:	AS SHOWN
Designed by:	DJK
Drawn by:	RJK
Checked by:	DJK
Date:	06/27/2012
Project No.:	6990200

SHEET
C-17

14 SHEETS
 CHECKED BY: XREP/ASH
 DESIGNED BY: XREP/ASH
 DATE: 07/20/12
 PROJECT: 6990200
 SHEET: C-17

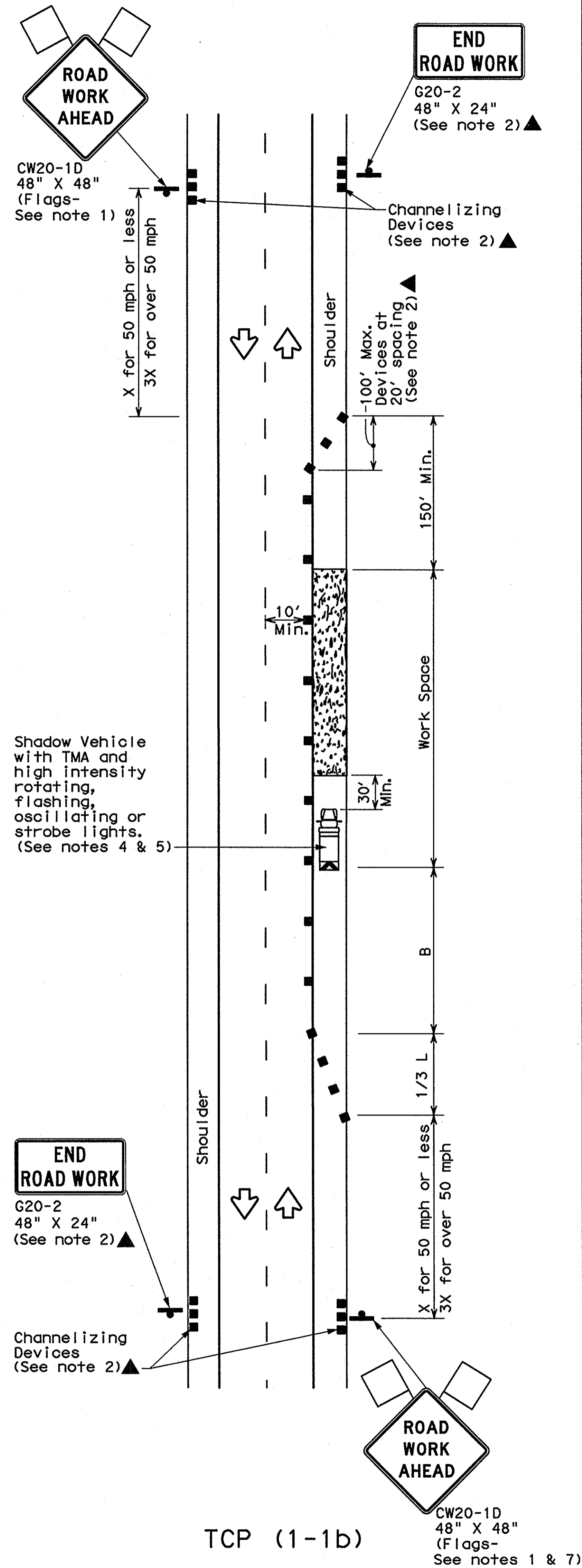
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DATE: FILE:



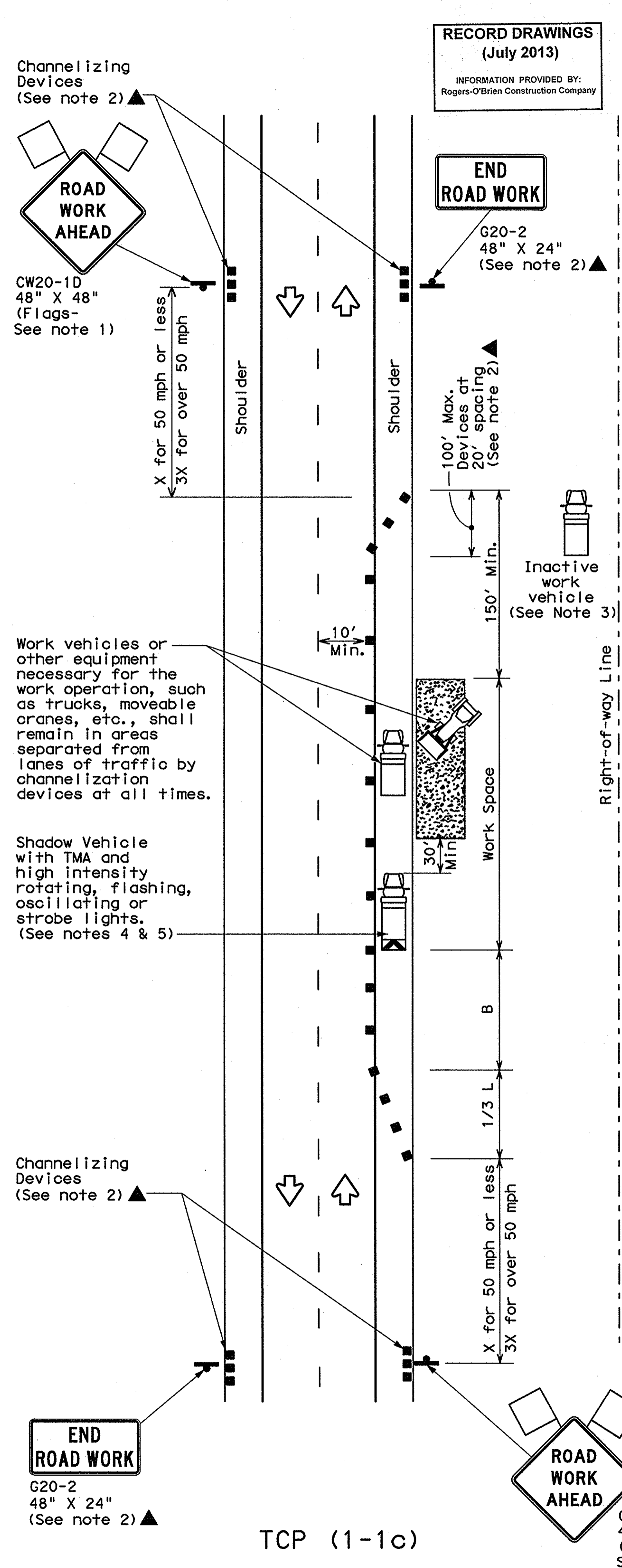
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70	700'	770'	840'	70'	140'	800'	475'	
75	750'	825'	900'	75'	150'	900'	540'	

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
 - See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
 - CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

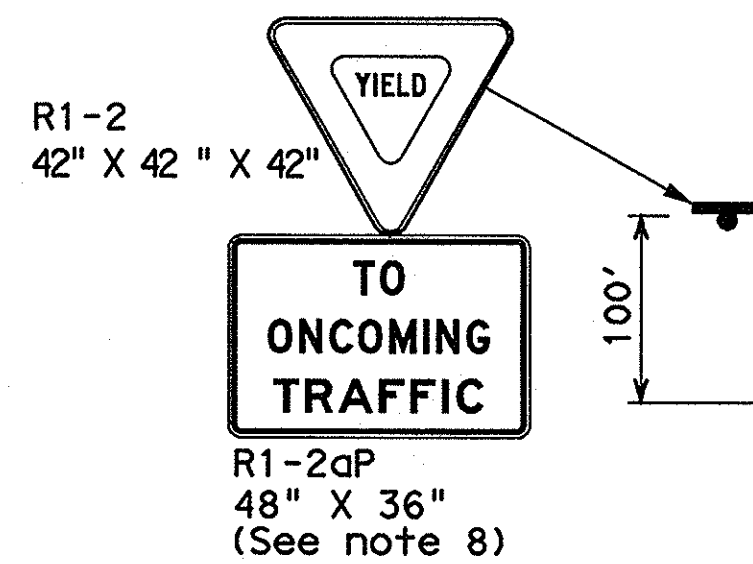
TCP(1-1)-12

© TxDOT December 1985		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94	2-12				
8-95					
1-97					
4-98					
		DIST	COUNTY		SHEET NO.

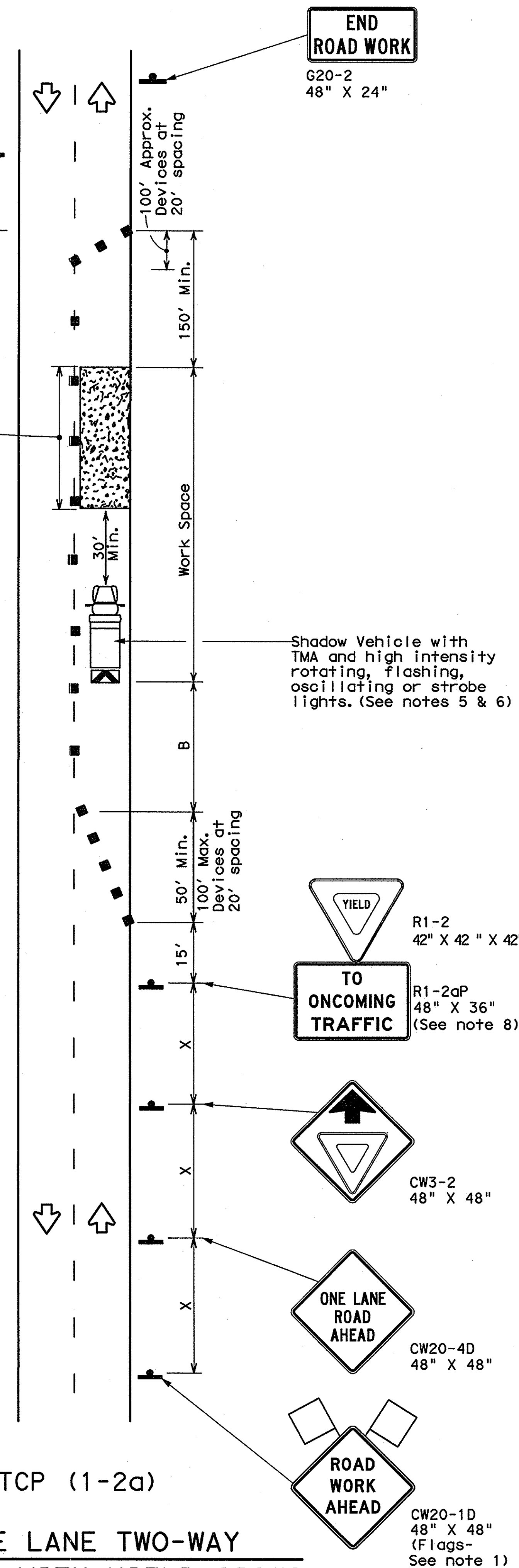
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DATE: FILE:

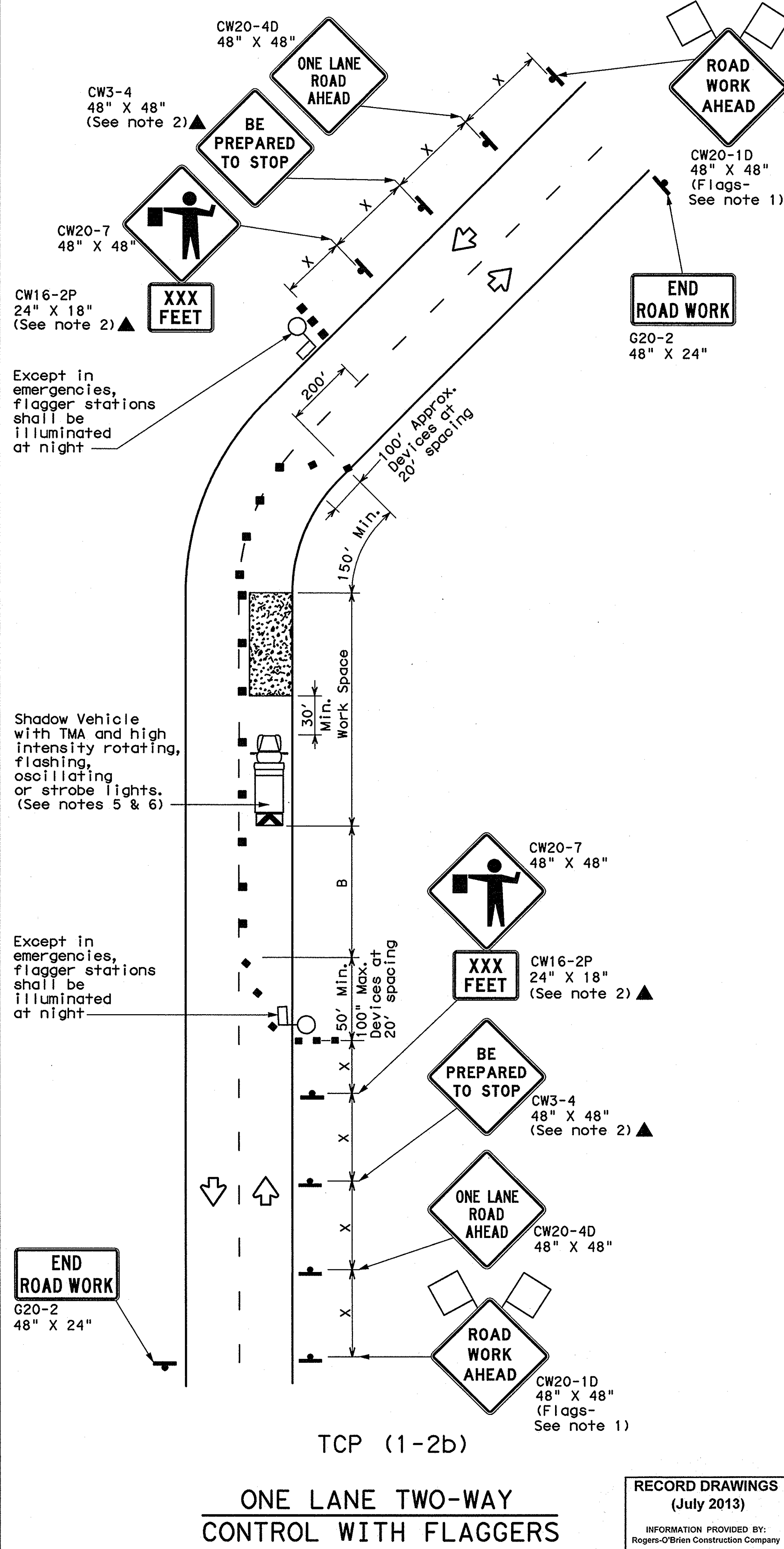
Warning Sign Sequence in Opposite Direction Same as Below



Channelizing devices separate work space from traveled way



TCP (1-2a)
ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)
ONE LANE TWO-WAY CONTROL WITH FLAGGERS

RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	35'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
 - Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- TCP (1-2a)**
- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
 - R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.
- TCP (1-2b)**
- Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
 - Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

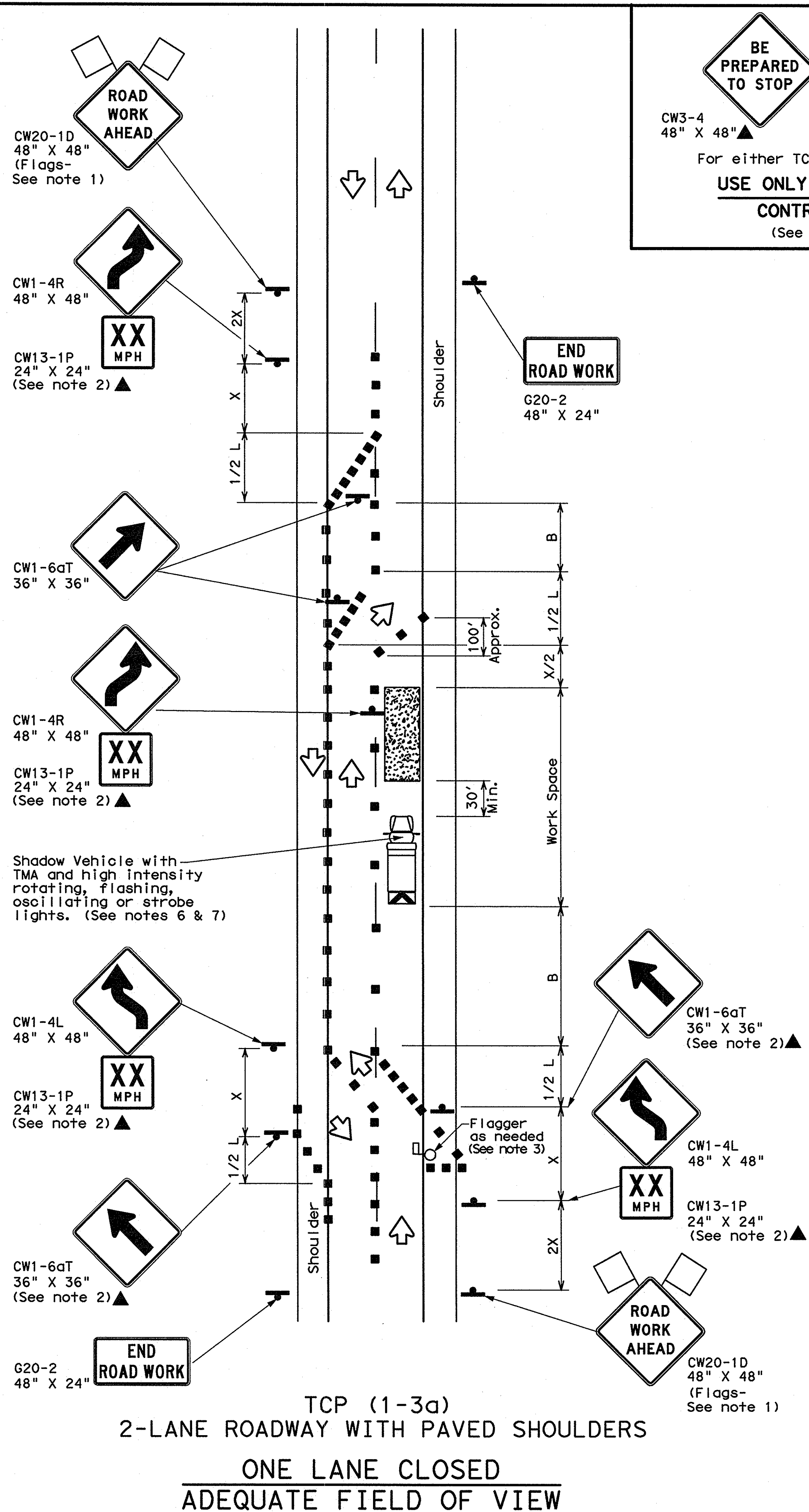
**TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL**

TCP (1-2) - 12

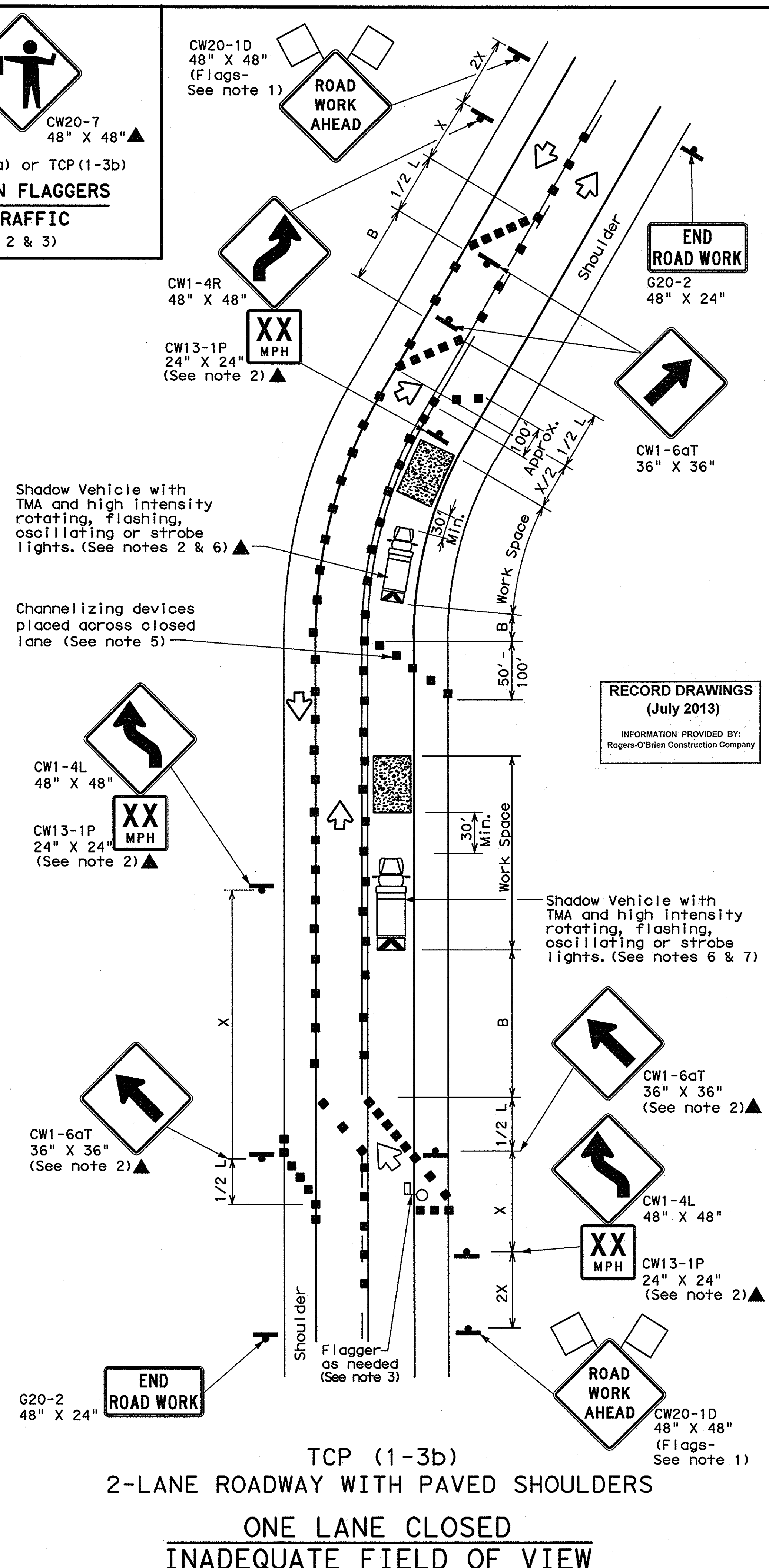
© TxDOT December 1985		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS					
4-90	2-12	CONT	SECT	JOB	HIGHWAY
2-94					
1-97					
4-98					
		DIST	COUNTY	SHEET NO.	

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DATE: FILE:



BE PREPARED TO STOP
USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)



LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
 - DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
 - When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
 - Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO LANE ROADS

TCP (1-3) - 12

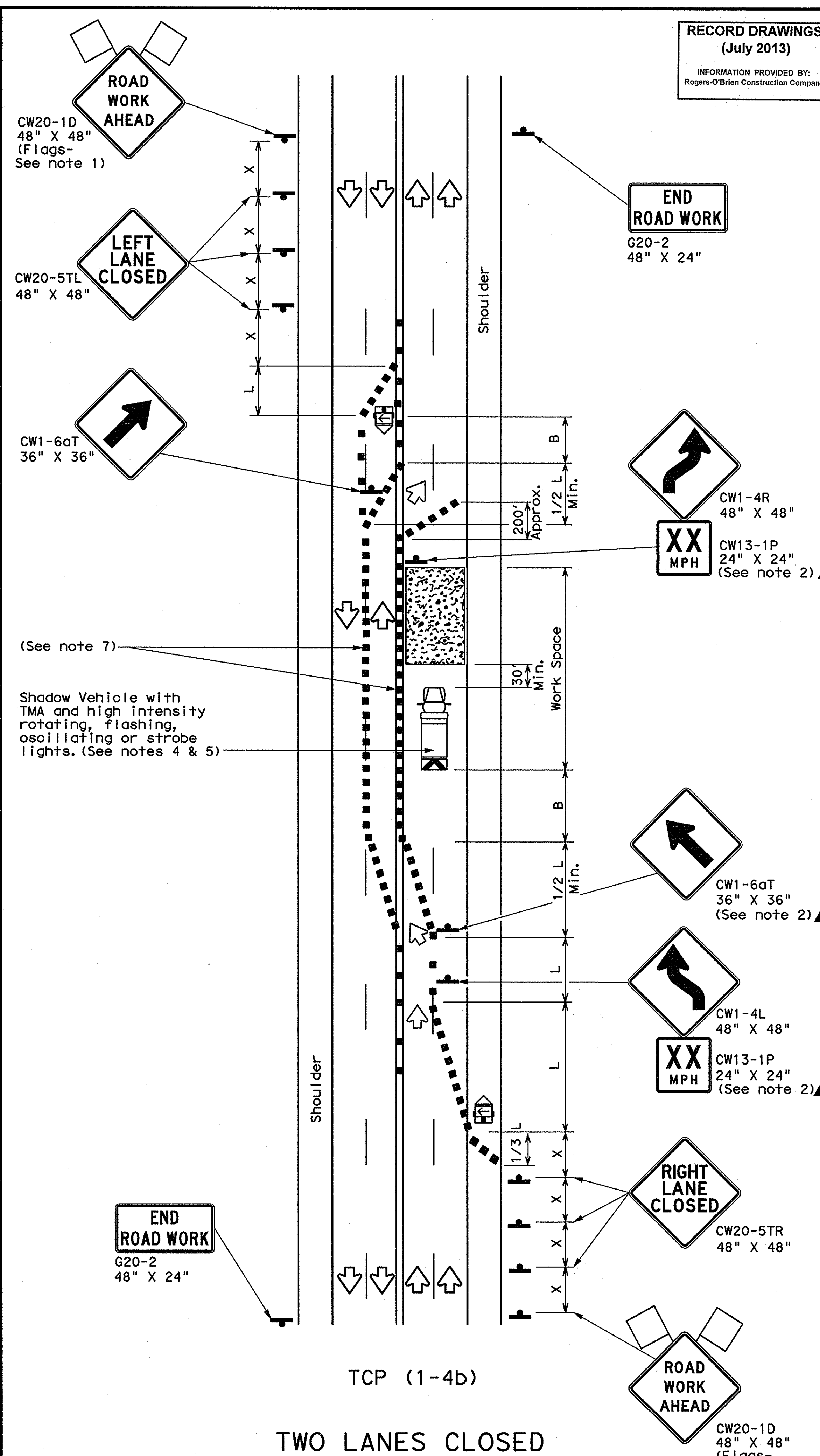
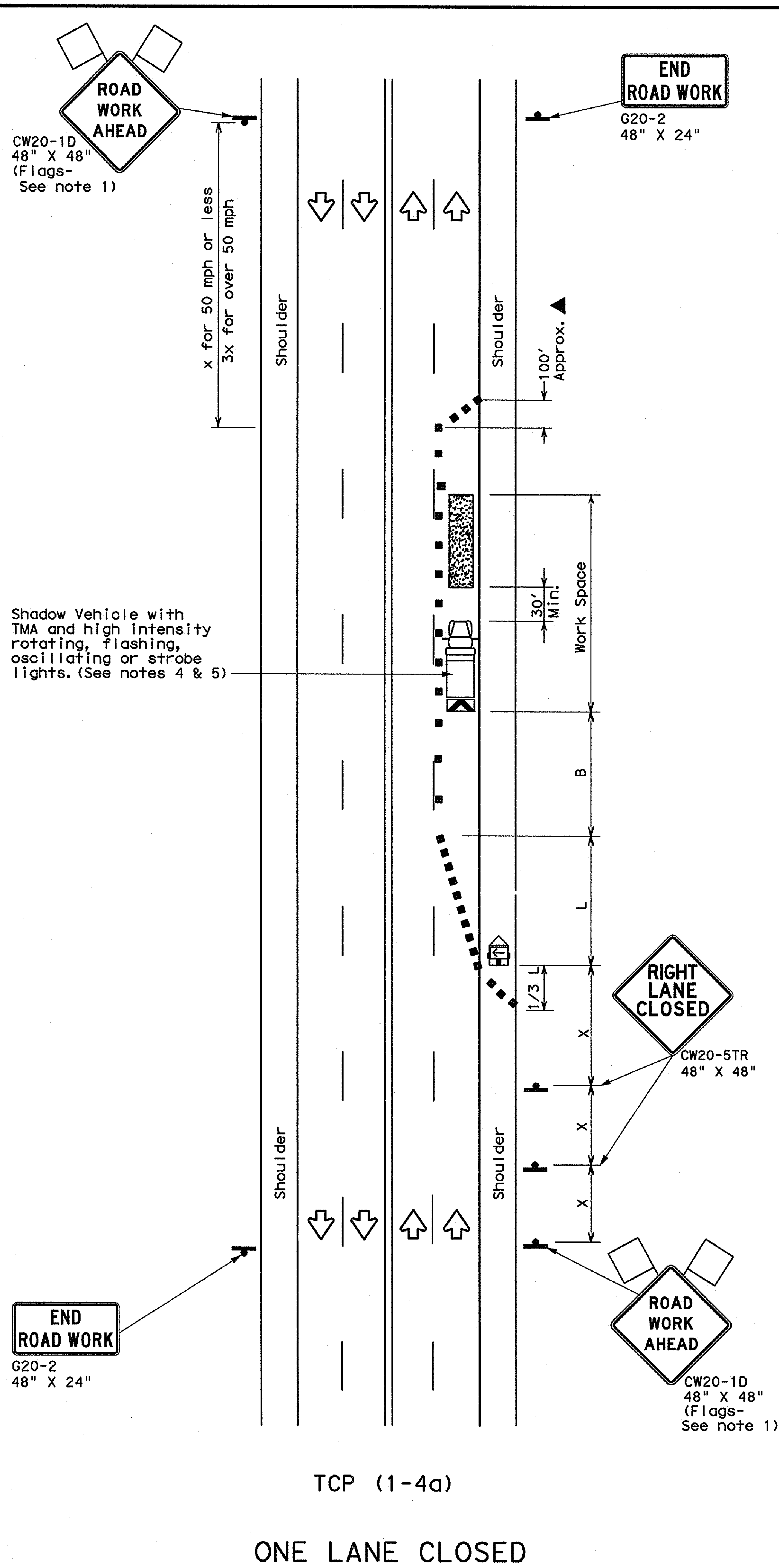
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2-94	2-12	CONTRACT	SECTION	JOB	HIGHWAY
8-95		DISTRICT	COUNTY		SHEET NO.
1-97					
4-98					

153

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RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths X X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS ² / 60	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
* Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
LANE CLOSURES ON MULTILANE
CONVENTIONAL ROADS

TCP (1-4) - 12

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REVISIONS		CONT	SECT	JOB	HIGHWAY
2-94	2-12				
8-95					
1-97					
4-98					
DIST		COUNTY		SHEET NO.	
154					

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FILE:

Barricade and Construction (BC) Standard Sheets General Notes:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets", the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the 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 shall 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.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

Worker Safety Apparel Notes:


1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes prequalified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
 Traffic Operations Division - TE
 Phone (512) 416-3134

- WEB ADDRESSES FOR REFERENCED DOCUMENTS**
- Compliant Work Zone Traffic Control Devices List (CWZTCD)
<http://www.txdot.gov/publications/traffic.htm>
 - Texas Manual on Uniform Traffic Control Devices (TMUTCD)
<http://www.txdot.gov/publications/traffic.htm>
 - Standard Highway Sign Designs for Texas (SHSD)
<http://www.txdot.gov/publications/traffic.htm>
 - Traffic Engineering Standard Sheets
<http://www.txdot.gov/business/disclaim.htm>
 - Material Producer List
<http://www.txdot.gov/business/producer#list.htm>
 - Departmental Material Specifications (DMS)
<http://www.txdot.gov/services/construction/material#specifications/>
 - Roadway Design Manual
<http://www.txdot.gov/services/general#services/manuals.htm>

RECORD DRAWINGS
 (July 2013)
INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company



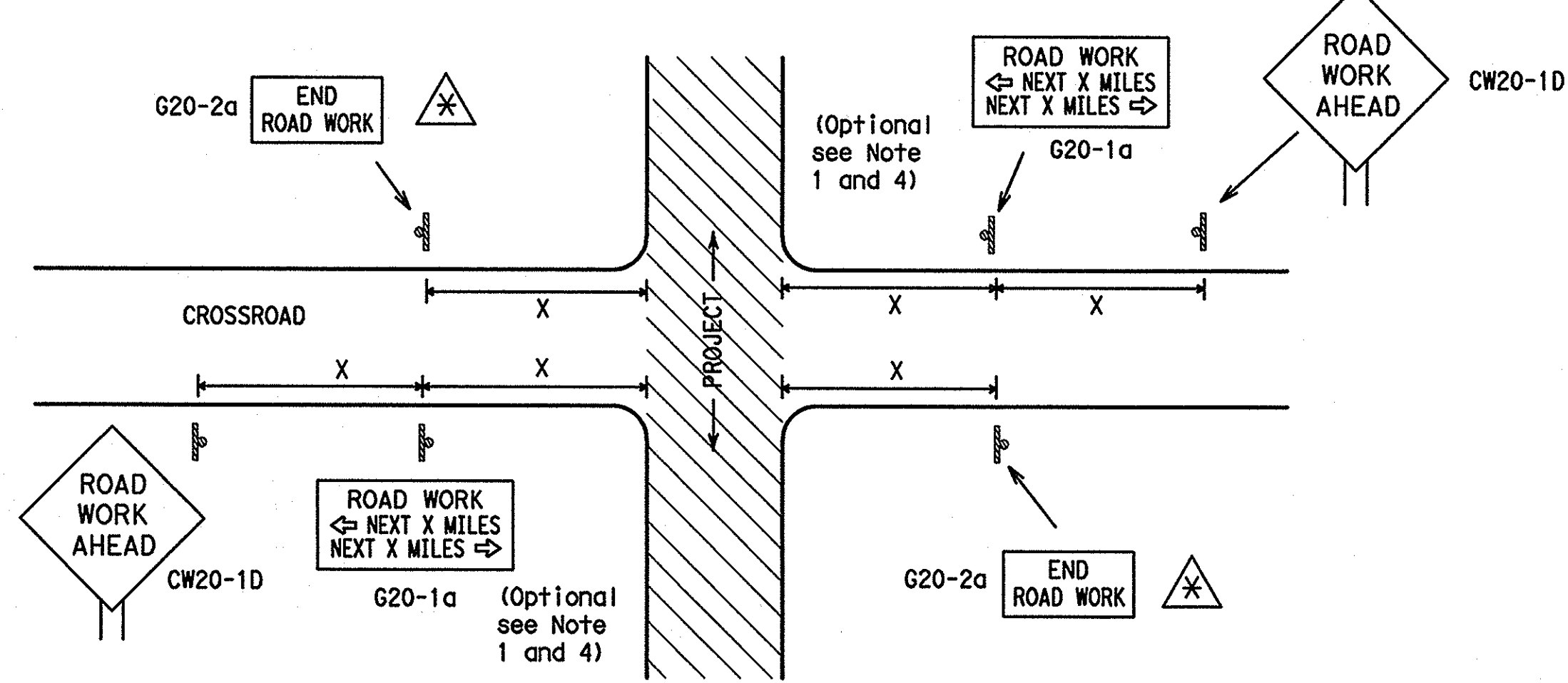
**BARRICADE AND CONSTRUCTION
 GENERAL NOTES
 AND REQUIREMENTS**

1 of 12 BC(1)-07

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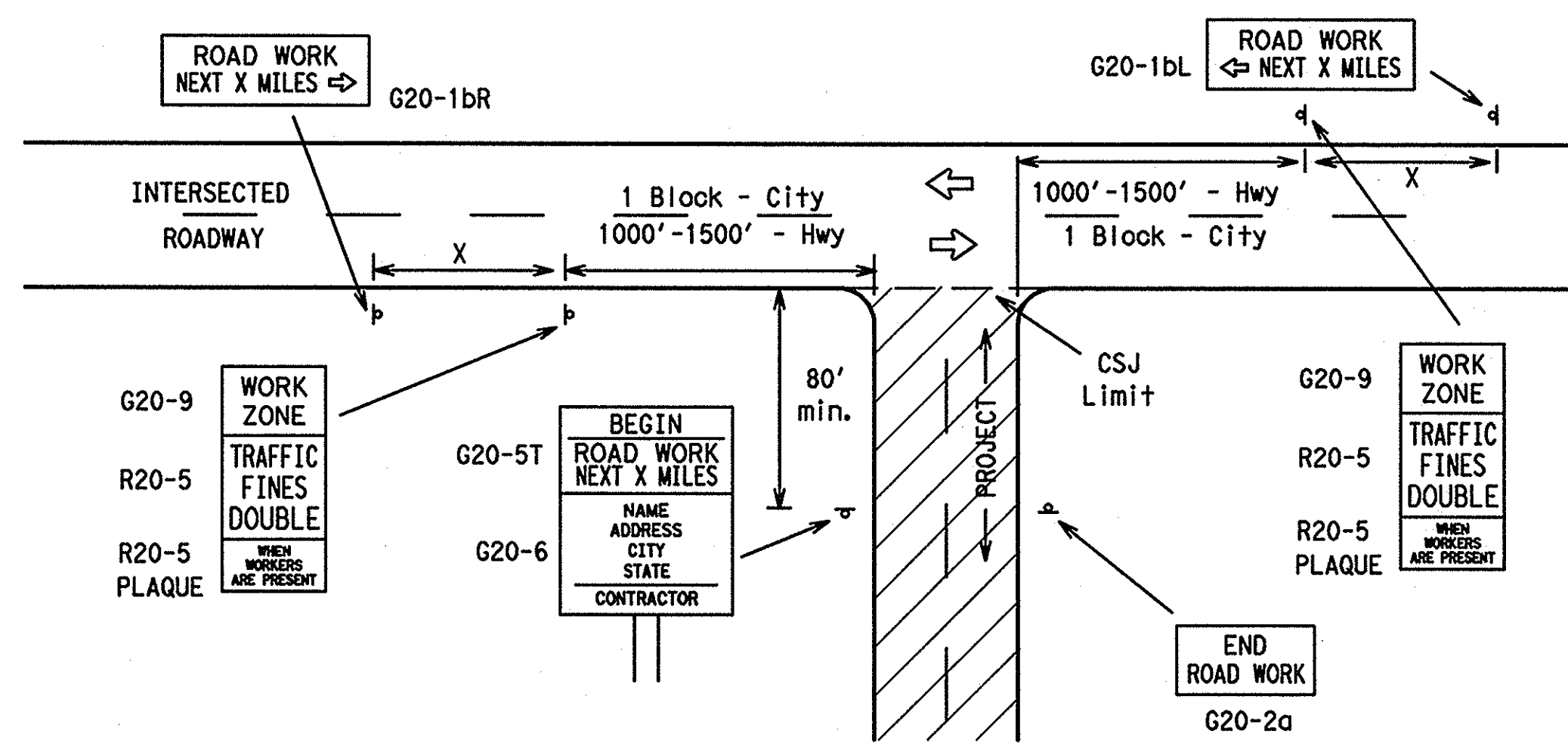
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TYPICAL LOCATION OF CROSSROAD SIGNS



- △ May be mounted on back of CW20-1D sign with approval of engineer. (See note 2 below)
- The typical minimum signing on a crossroad approach should be a CW20-1D ROAD WORK AHEAD sign and a G20-2a END ROAD WORK sign, unless noted otherwise in plans.
 - The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" END ROAD WORK (G20-2a) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
 - Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
 - The G20-1a sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
 - Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
 - When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

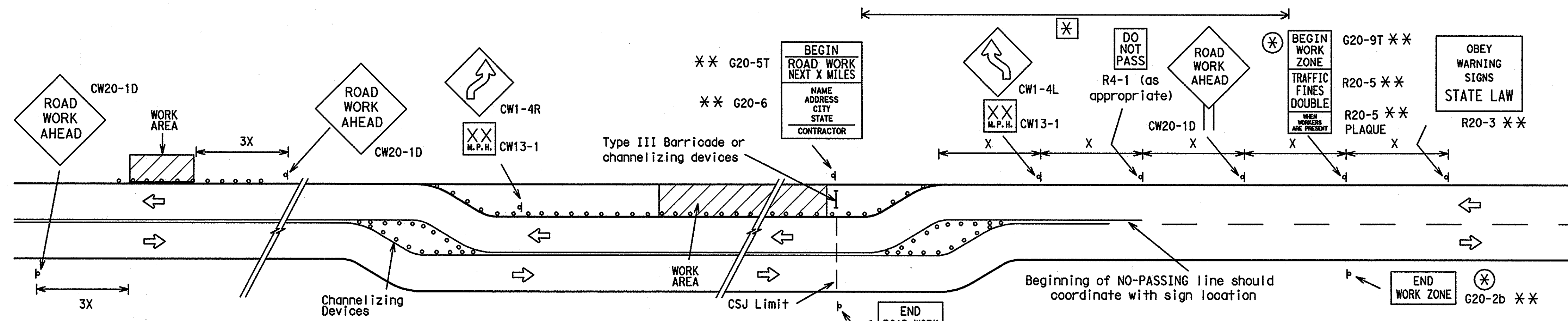
- The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
- If construction closes the road at a T-intersection the Contractor shall place the G20-6 "Contractor Name" sign behind the Type III Barricades for the road closure (see BC(10) also). The G20-1bL and G20-1bR signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "X" (Feet (Apprx.))
CW20 CW21 CW22 CW23 CW25	48" x 48"	48" x 48"	30 35 40 45	120 160 240 320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50 55 60 65	400 500 ² 600 ² 700 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	70 75 80	800 ² 900 ² 1000 ²
			*	* ³

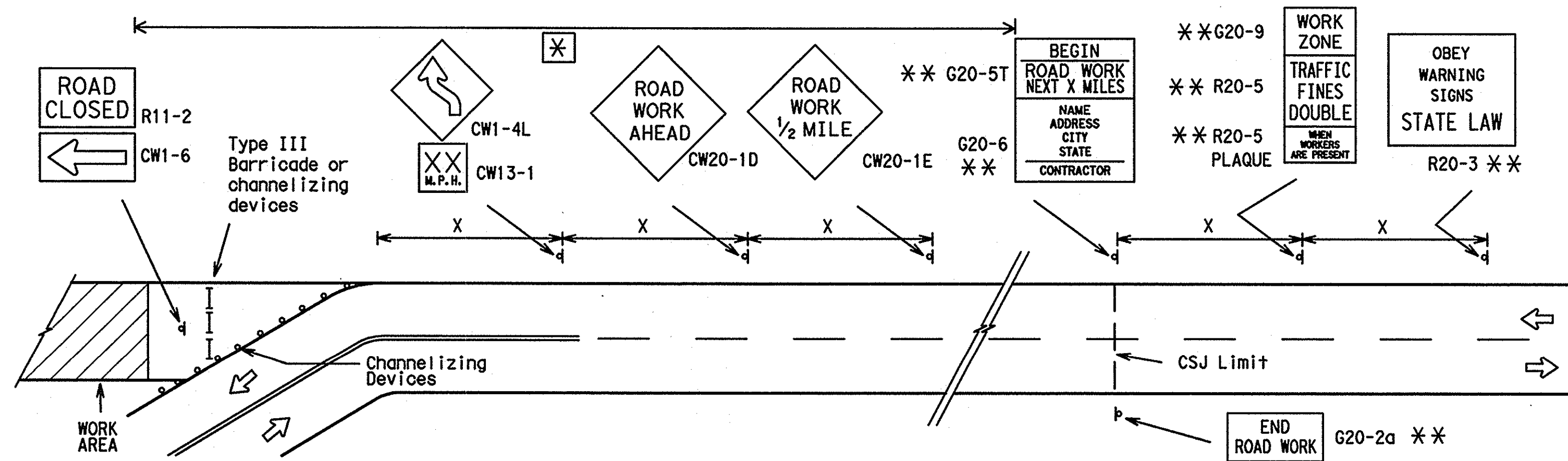
- * For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.
- Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.
- General Notes:
- Special or larger size signs may be used as necessary.
 - Distance between signs should be increased as required to have 1500 feet advance warning.
 - Distance between signs should be increased as required to have 1/2 mile or more advance warning.
 - 36" x 36" ROAD WORK AHEAD (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
 - Only diamond shaped warning sign sizes are indicated.
 - See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

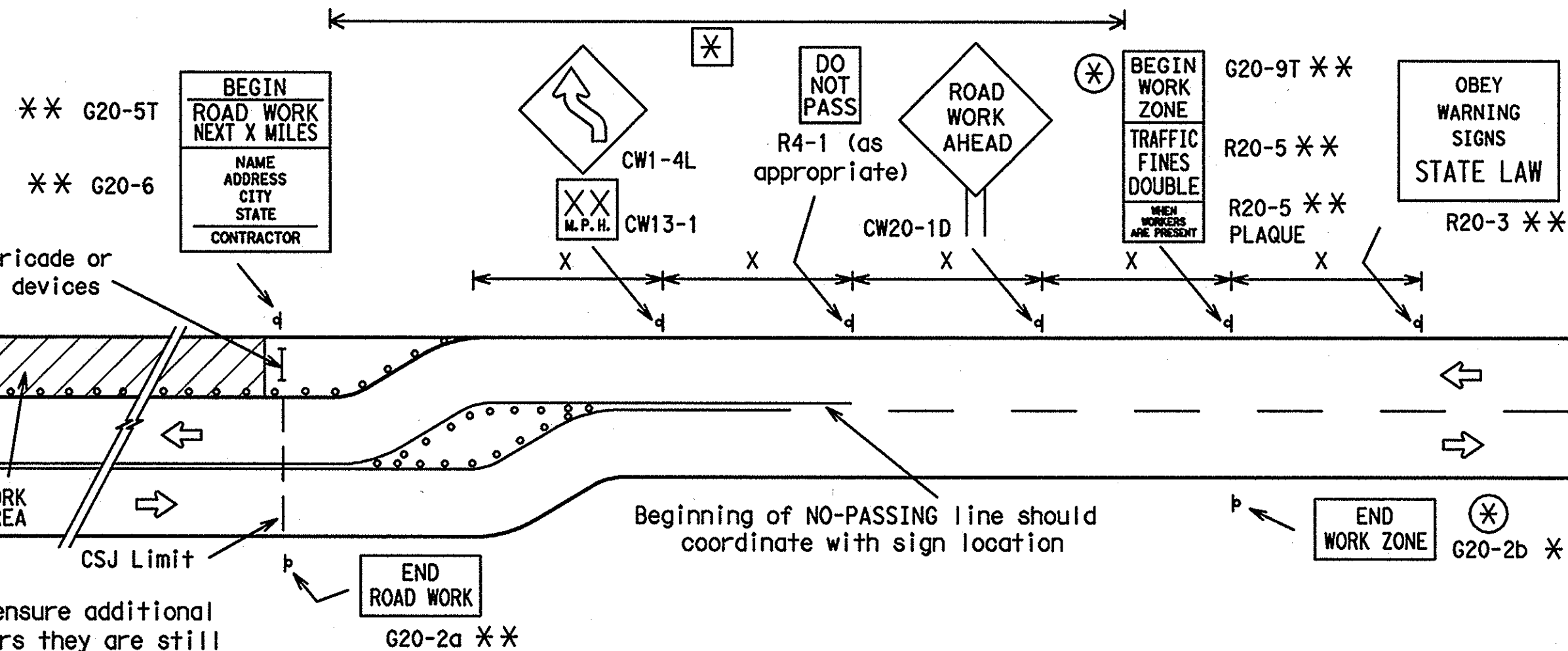


When extended distances occur between minimal work areas, the Engineer/Inspector should ensure additional Road Work Ahead (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and G20-5T sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- ⊗ The G20-9T and G20-2b shall be used when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a work zone where traffic fines may double if workers are present.
- ** Required CSJ Limit signing. See Note 10 on BC(1).
- ⊗ Area for placement of "ROAD WORK AHEAD" sign and other signs or devices as called for on the Traffic Control Plan.

LEGEND

- ⊙ Sign
- Channelizing Devices
- I Type III Barricade
- X See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.



RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
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R20-3
Legend/Border - Black
Background - White

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Traffic Operations Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT STANDARD

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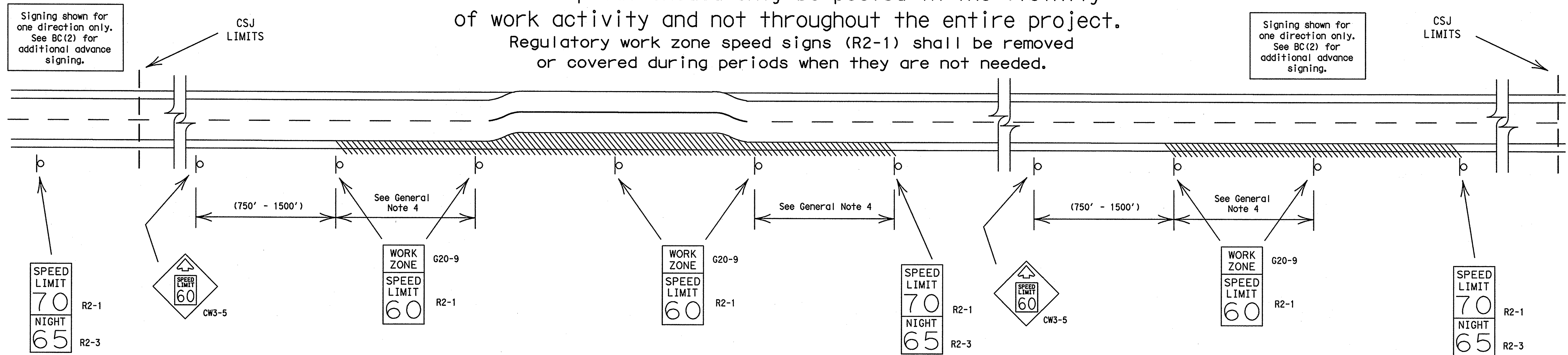
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 15 feet of pavement edge or actually on the pavement.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES:

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:
 - 40 mph and greater 0.2 to 2 miles
 - 35 mph and less 0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the CW3-5 sign, G20-9 plaque and the R2-1 and R2-3 signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless otherwise noted.
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.

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Traffic Operations Division

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT STANDARD

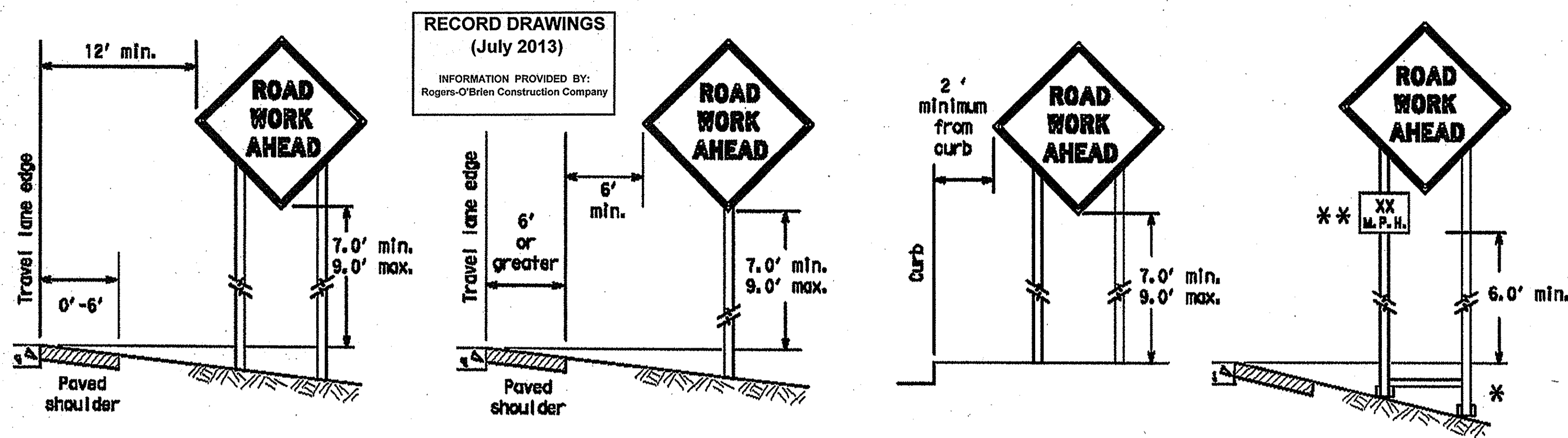
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TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

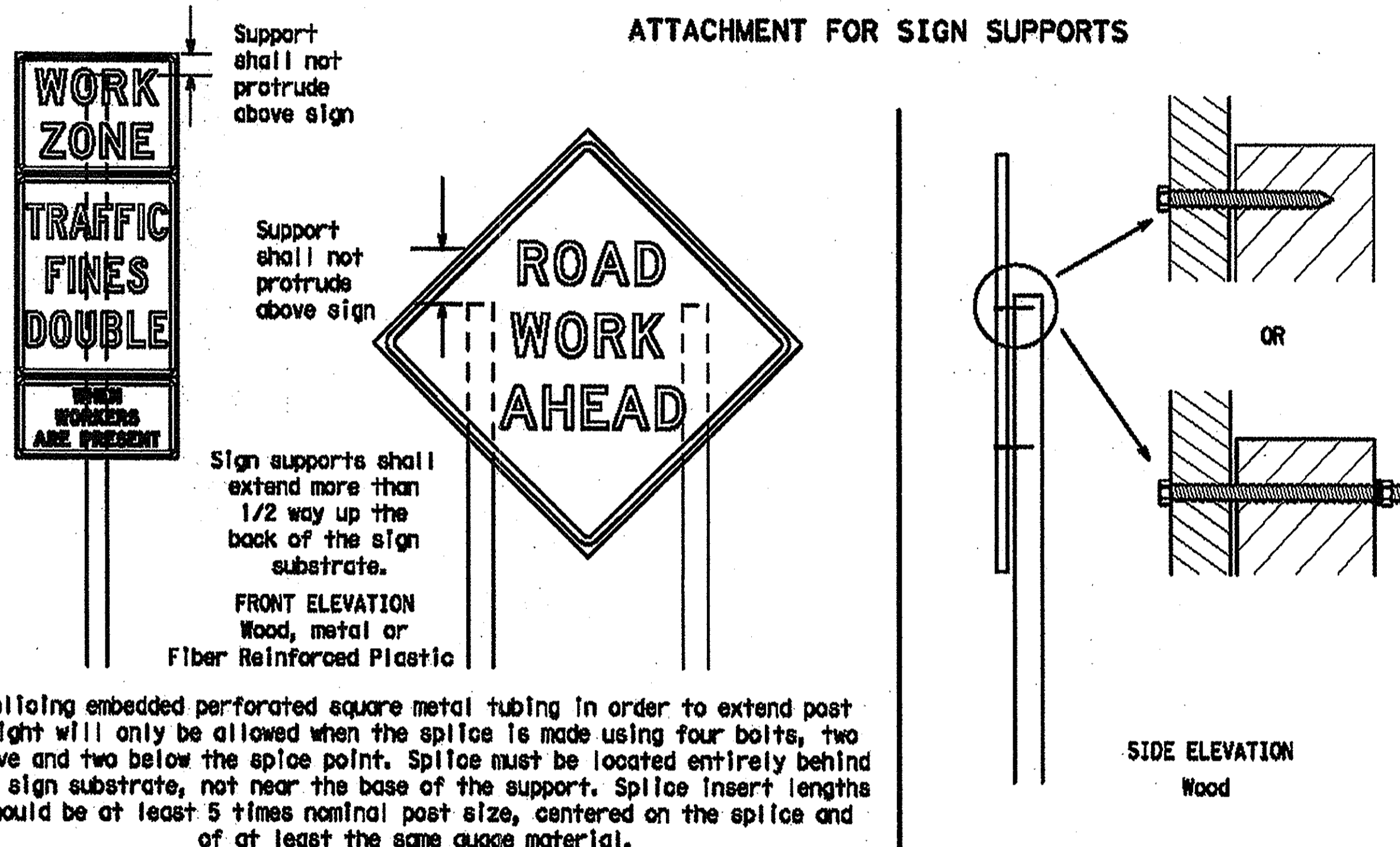


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

RECORD DRAWINGS (July 2013)
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ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
 - Wooden sign posts shall be painted white.
 - Barricades shall NOT be used as sign supports.
 - Nails shall NOT be used to attach signs to any support.
 - All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
 - The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor Initial and date the agreed upon changes.
 - The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
 - The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
 - Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
 - The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.
- DURATION OF WORK** (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6):
- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- 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 shall be removed at the end of the workday, or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Engineer may allow the use of smaller size construction warning signs on secondary roads or city streets where speeds are low if the sign size is listed as an option on the "Typical Construction Warning Sign Size and Spacing" chart shown on BC(2).
- The Contractor shall furnish the sign sizes shown in plans, the BC Sheets, the TCP sheets or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type C (High Specific Intensity), shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type E (Fluorescent Prismatic), shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

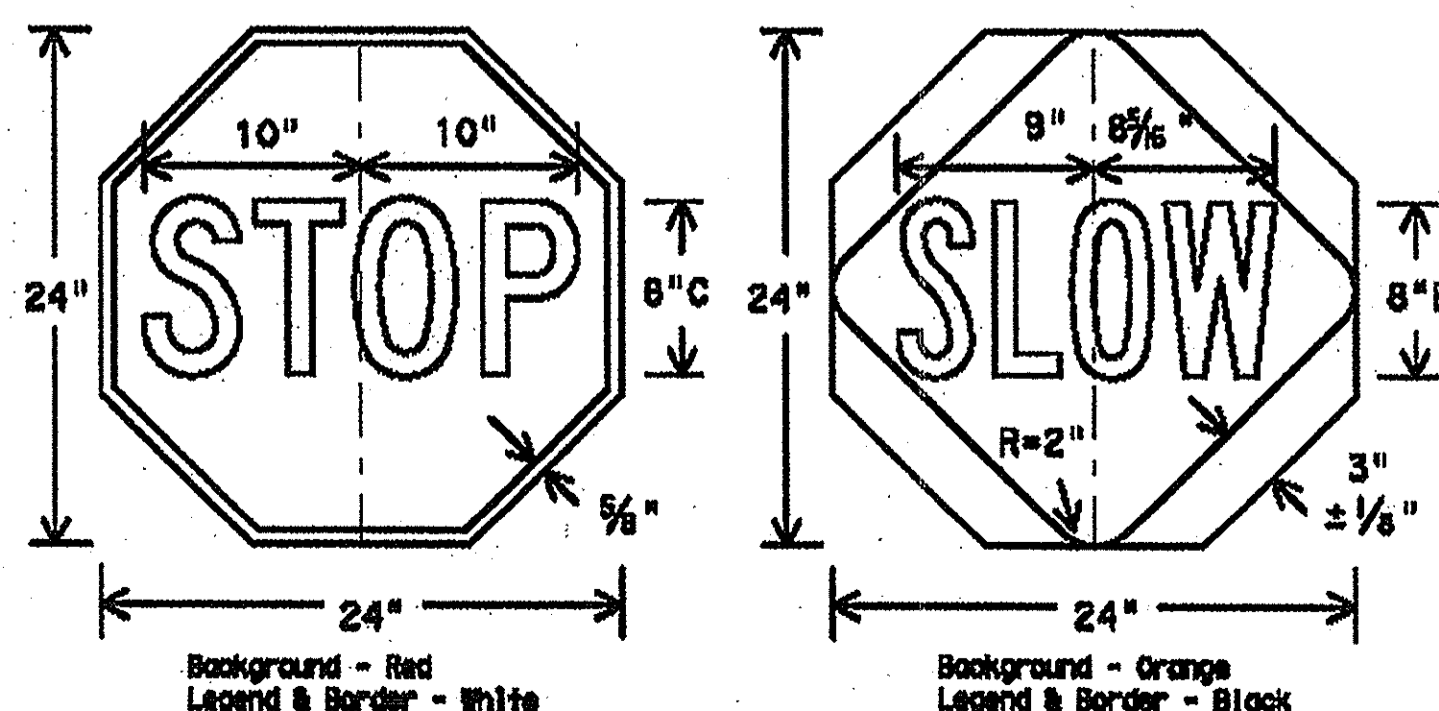
- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This type of sign support meets the crashworthiness standards regardless of the direction of impact. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face. These materials can damage the retroreflectivity of sheeting.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact.
- Rubber (such as tire inner tubes) shall NOT be used for sandbags.
- Rubber ballcoats designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
- When used at night, the STOP/SLOW paddle shall be retroreflectORIZED.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES STANDARD

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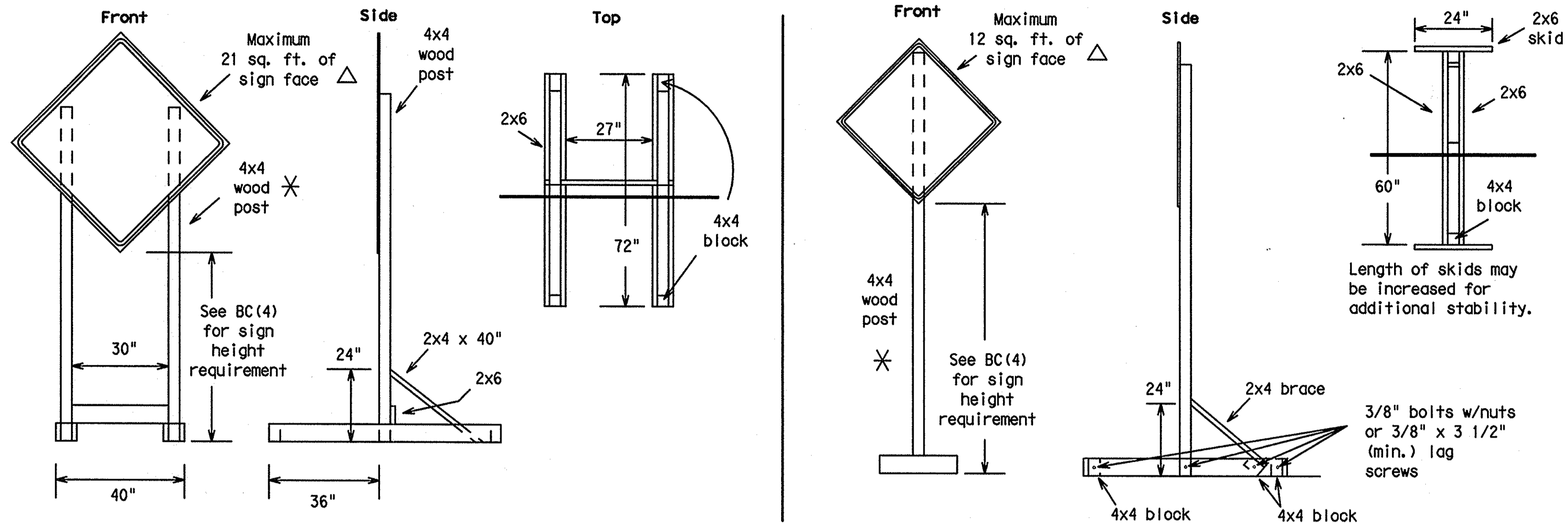
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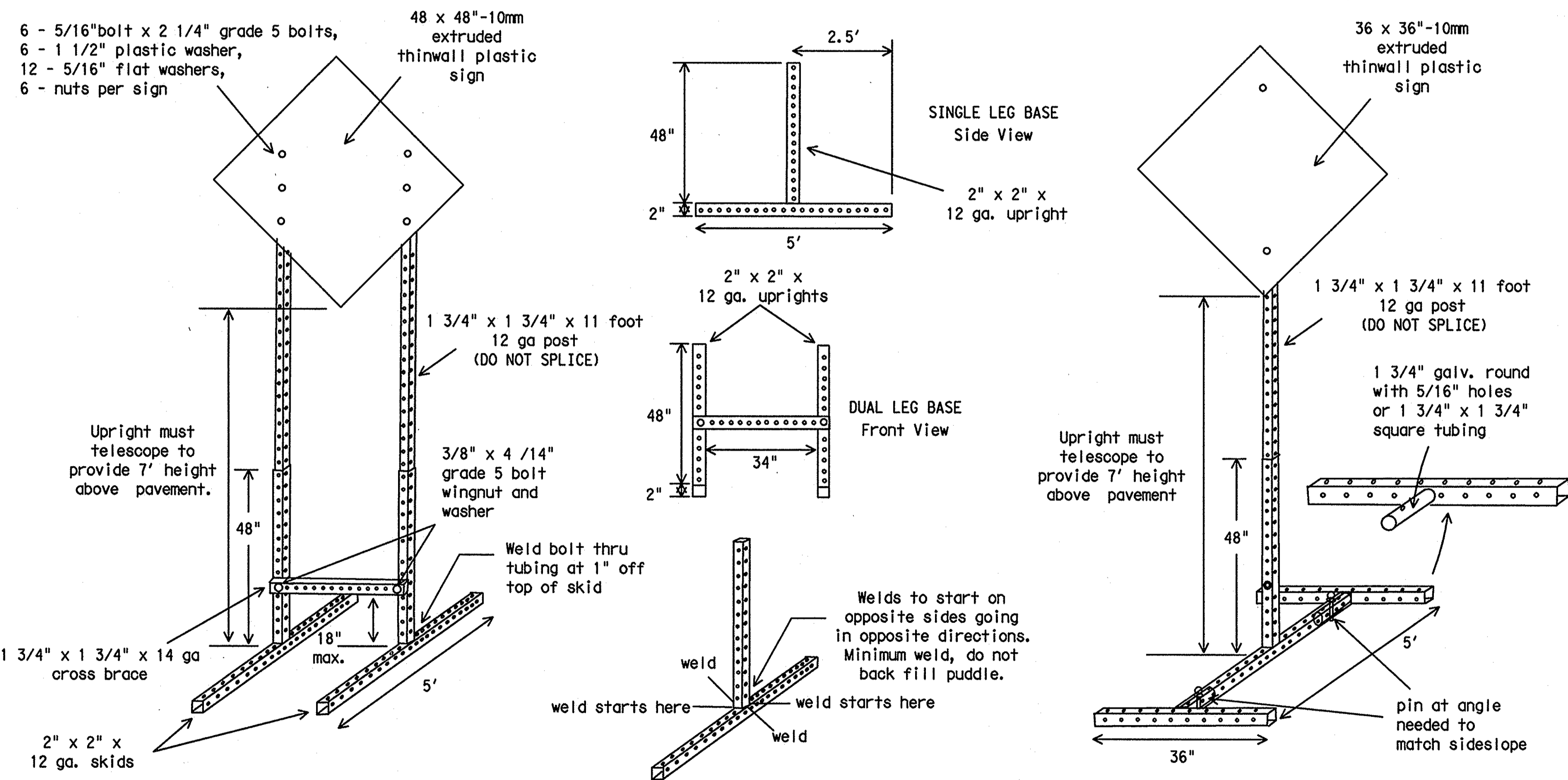
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SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

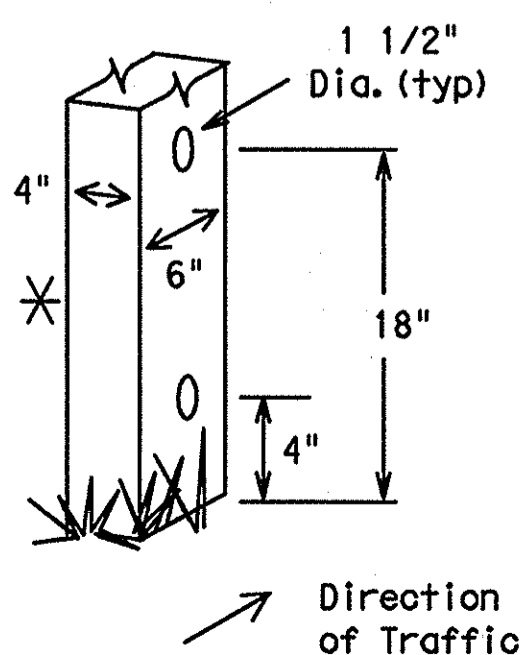


SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).



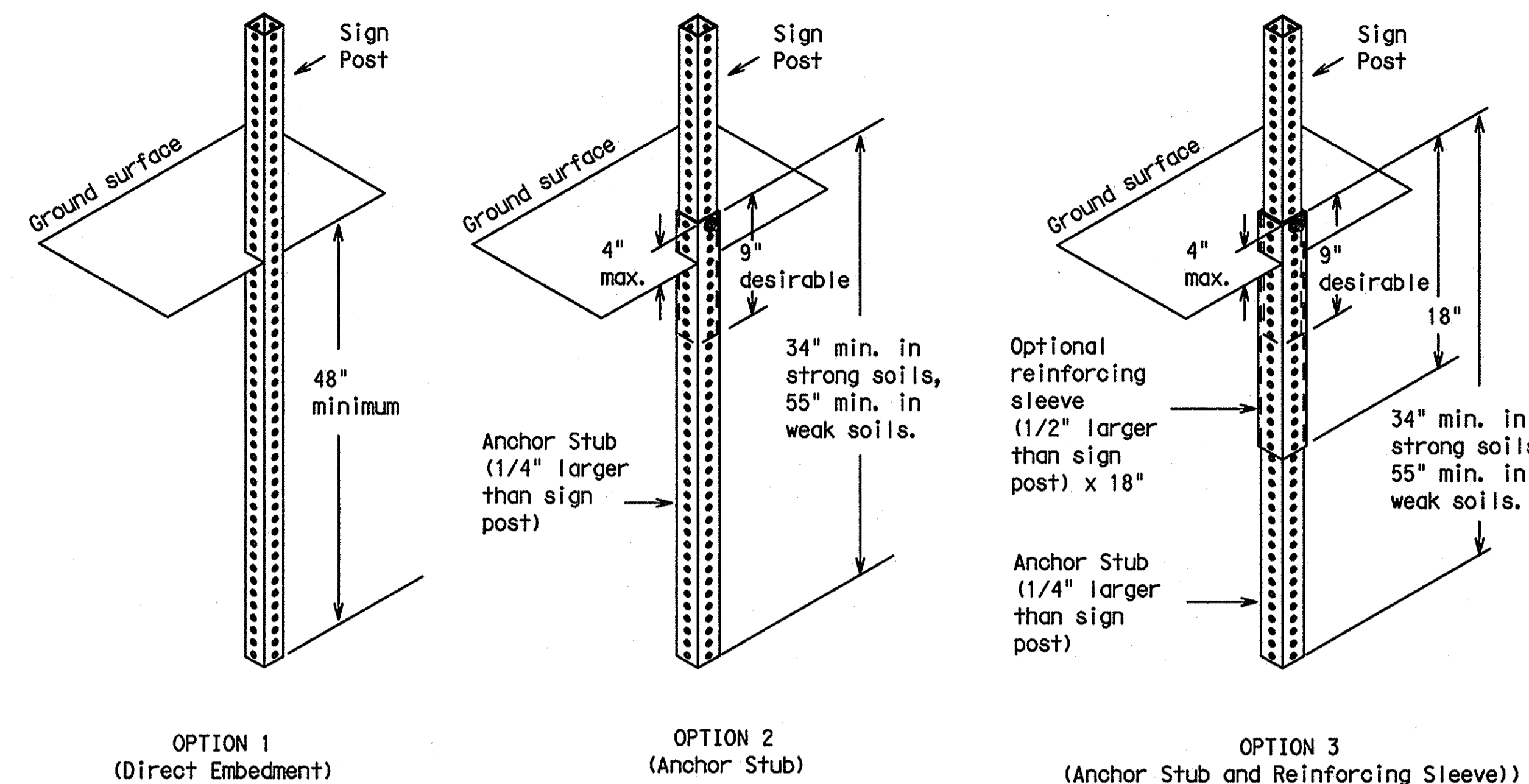
WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

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

GROUND MOUNTED SIGN SUPPORTS

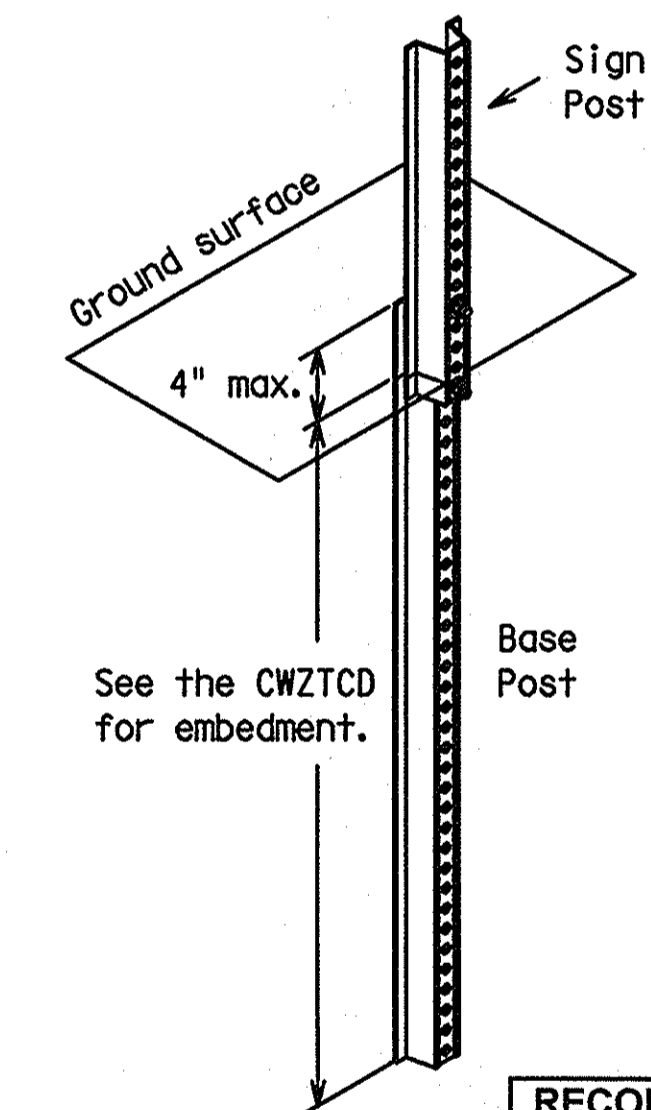
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.

PERFORATED SQUARE METAL TUBING



WING CHANNEL

Lap-splice/base bolted anchor



GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
- More details of approved Long/Intermediate and Short Term supports can be found on the CWZTCD list. See BC(1) for website location.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

* Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

△ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

RECORD DRAWINGS
(July 2013)

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT STANDARD

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PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 720 feet. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

Word or Phrase	Abb.	Word or Phrase	Abb.
Access Road	ACCS RD	Major	MAJ
Air Quality	AIR QLTY	Miles	MI
Alternate	ALT	Miles Per Hour	MPH
Avenue	AVE	Minor	MNR
Best Route	BEST RTE	Monday	MON
Boulevard	BLVD	Normal	NORM
Bridge	BRDG	North	N
Cannot	CANT	Northbound	(route) N
Center	CNTR	Parking	PKING
Construction Ahead	CONST AHEAD	Parking Lot	PRK LOT
Detour Route	DETOUR RTE	Road	RD
Do Not	DONT	Right Lane	RGT LN
East	E	Saturday	SAT
Eastbound	(route) E	Service Road	SERV RD
Emergency	EMER	Shoulder	SHLDR
Emergency Vehicle	EMER VEH	Slippery	SLIP
Entrance, Enter	ENT	South	S
Express Lanes	EXP LANE	Southbound	(route) S
Expressway	EXPWY	Speed	SPD
XXXX Feet	XXXX FT	Street	ST
Fog Ahead	FOG AHD	Sunday	SUN
Freeway	FRWY, FWY	Telephone	PHONE
Freeway Blocked	FWY BLKD	Temporary	TEMP
Friday	FRI	Thursday	THURS
Hazardous Driving	HAZ DRIVING	To Downtown	TO DWNTN
Hazardous Material	HAZMAT	Traffic	TRAF
High-Occupancy Vehicle	HOV	Travelers	TRVLRS
Highway	HWY	Tuesday	TUES
Hours	HR	Time Minutes	TIME MIN
Information	INFO	Upper Level	UPPR LVL
It Is	ITS	Vehicle	VEH
Junction	JCT	Warning	WARN
Left	LFT	Wednesday	WED
Left Lane	LFT LN	Weight Limit	WT LIMIT
Lane Closed	LN CLSD	West	W
Lower Level	LOWR LVL	Westbound	(route) W
Maintenance	MAINT	Wet Pavement	WET PVMT
		Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number
 WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Application Guidelines

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX	BEFORE RAILROAD CROSSING	NEXT X MILES	PAST US XXX EXIT	XXXXXXXXX TO XXXXXXXX	US XXX TO FM XXXX
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Warning List

SPEED LIMIT XX MPH	MAXIMUM SPEED XX MPH	MINIMUM SPEED XX MPH	ADVISORY SPEED XX MPH	RIGHT LANE EXIT	USE CAUTION	DRIVE SAFELY	DRIVE WITH CARE
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** Advance Notice List

TUE-FRI XX AM- X PM	APR XX-XX X PM-X AM	BEGINS MONDAY	BEGINS MAY XX	MAY X-X XX PM - XX AM	NEXT FRI-SUN	XX AM TO XX PM	NEXT TUE AUG XX	TONIGHT XX PM- XX AM
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** See Application Guidelines Note 6.

Wording Alternatives

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the CW20-7a Flagger Symbol, are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow panel provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

RECORD DRAWINGS (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

Texas Department of Transportation
 Traffic Operations Division

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARD

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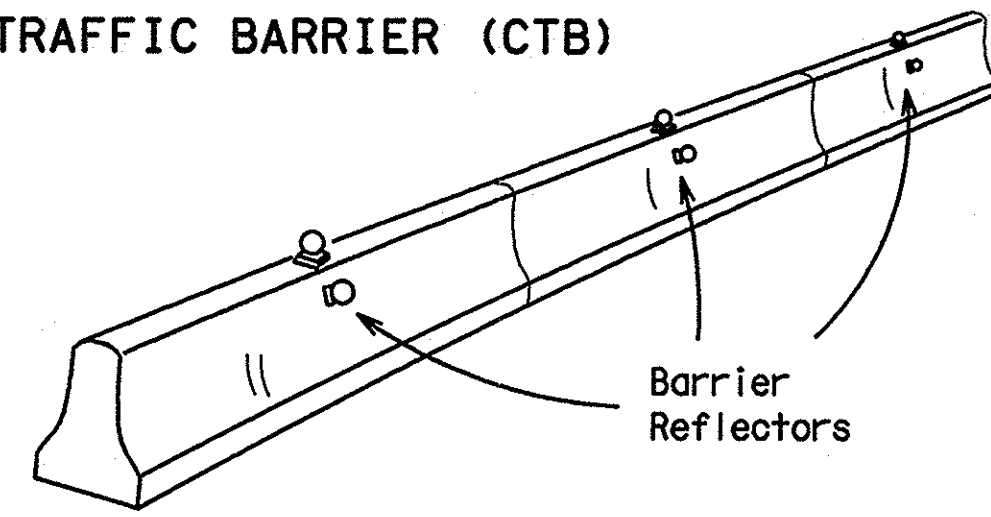
© TxDOT 11-4-02	DATE	REV	BY	CHKD	DATE
9-07	REVISIONS				
	COUNT	SECT	JOB		HIGHWAY
	POST		COUNTY		SHEET NO.

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BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

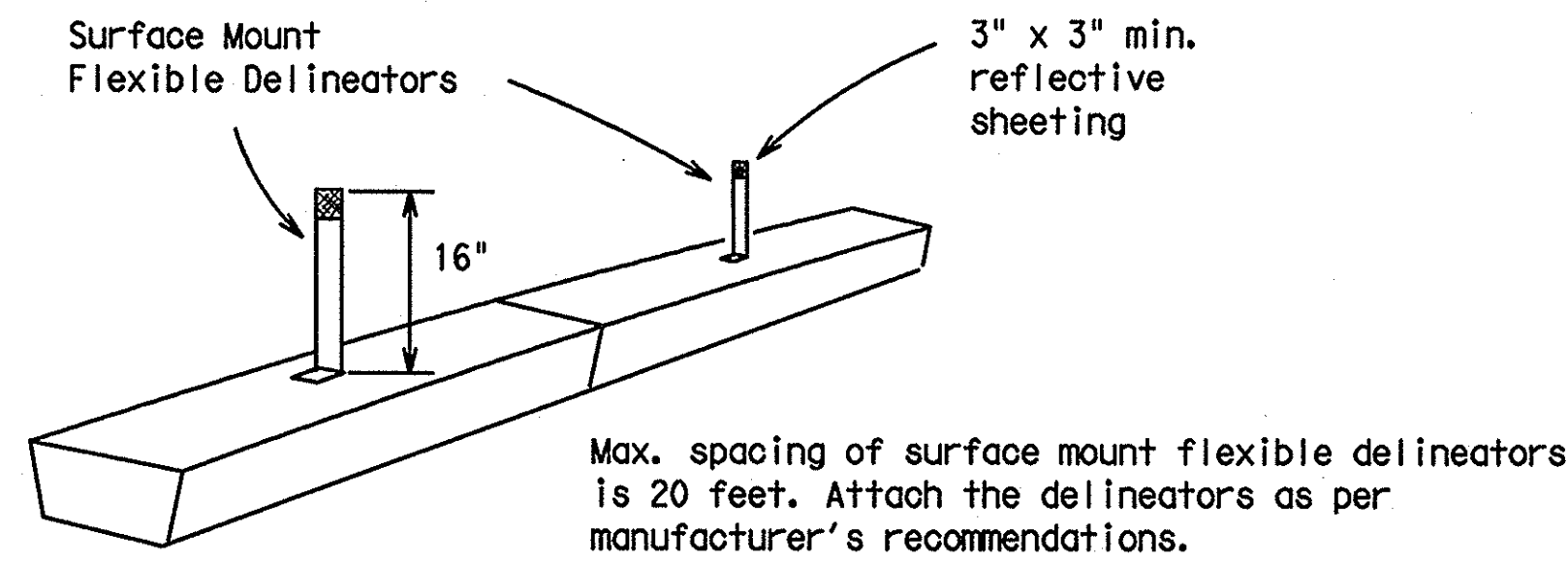
- Barrier Reflectors shall be prequalified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors (Type C Delineators) can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 502.

CONCRETE TRAFFIC BARRIER (CTB)

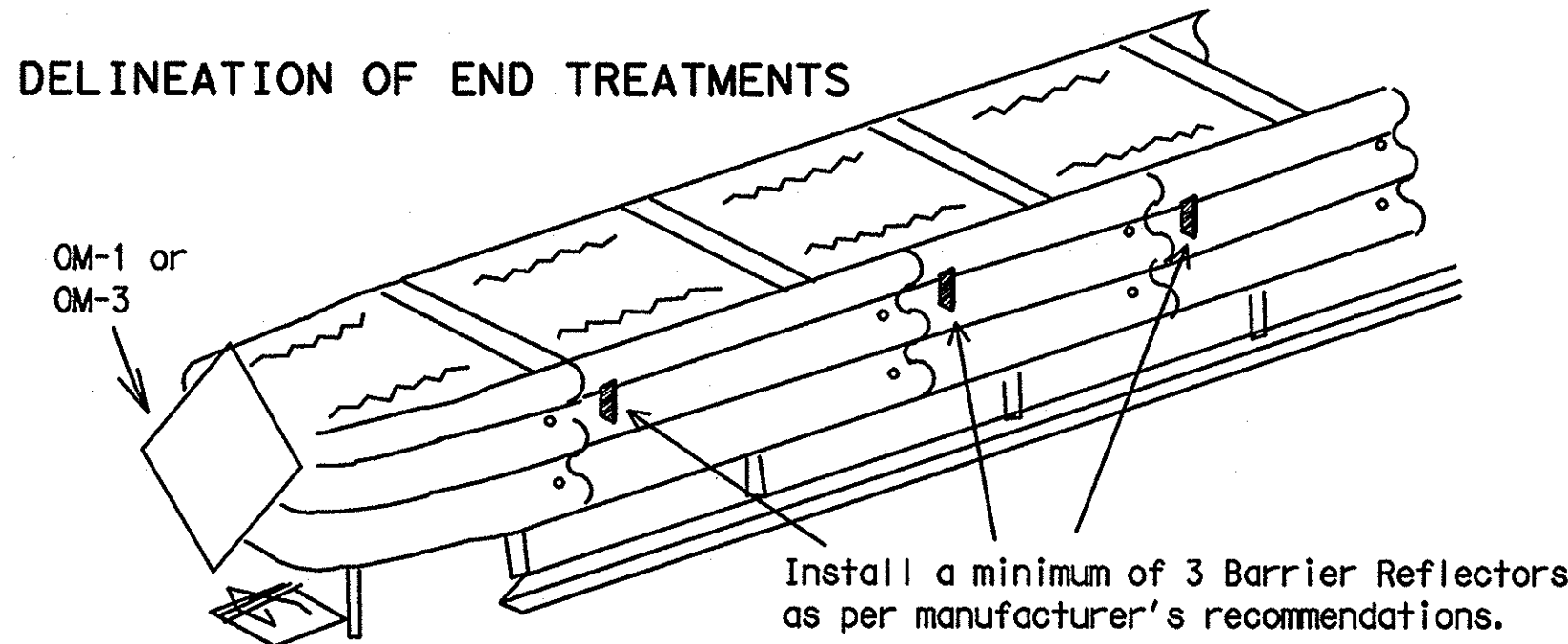


- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented. Yellow Barrier Reflectors shall be made with Type E Fluorescent Prismatic Yellow Retroreflective Sheeting. White reflectors shall be made with Type D White Prismatic sheeting.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

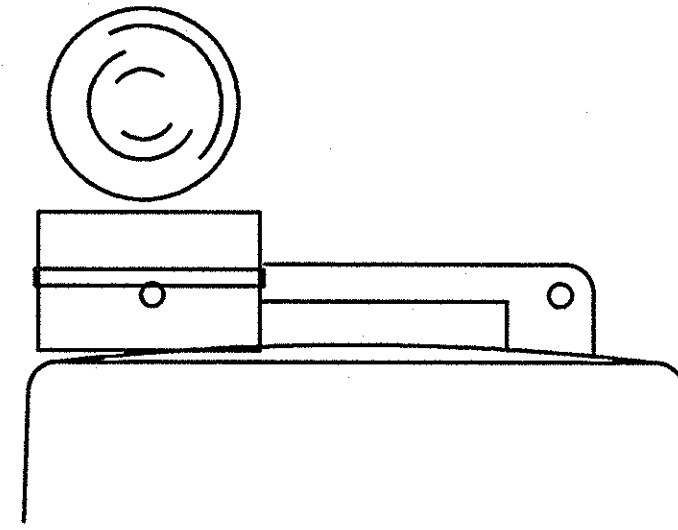


DELINEATION	APPROACHING TRAFFIC	
	BOTH SIDES	ONE SIDE
OM-1		OM-3 or Vertical Panel

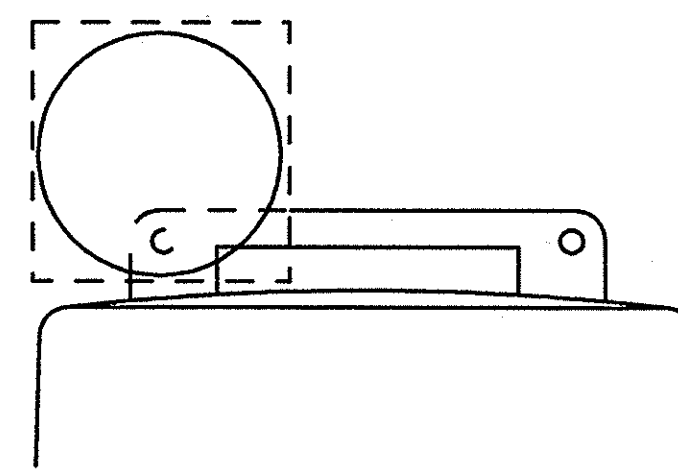
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

WARNING LIGHTS



Type C Warning Light or approved substitute mounted adjacent to the travel way.



Warning reflector may be round or square. Must have a reflective surface area of at least 30 square inches

- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type E Sheeting (Fluorescent Prismatic) meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

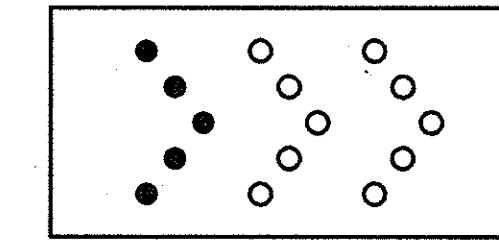
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

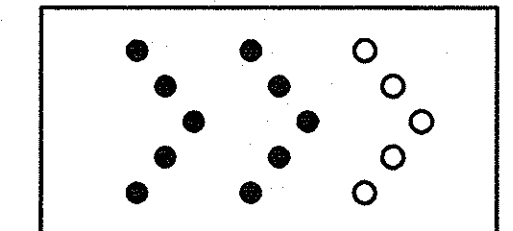
- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type D (Non-fluorescent Prismatic).
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

TYPICAL FLASHING ARROW PANEL

Arrow Panels may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

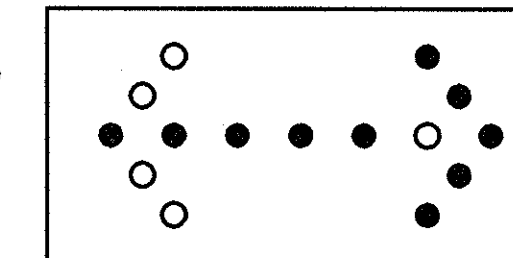


Sequential Chevron

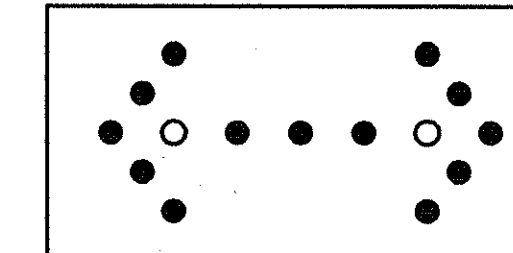


- The Flashing Arrow Panel should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Panels should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Panel.
- The Flashing Arrow Panel should be able to display the following symbols:

Flashing RIGHT (LEFT) ARROW



Flashing DOUBLE ARROW



Flashing CAUTION

- The "CAUTION" display consists of four corner lamps flashing simultaneously.
- The straight line caution display is NOT ALLOWED.
- The Flashing 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 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.

TYPE	REQUIREMENTS		
	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION: Flashing Arrow Panels shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW PANEL FROM THE RIGHT-OF-WAY OR PLACE THE ARROW PANEL BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

- The Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Panel SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Panel provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted arrow panels should be 7 feet from roadway to bottom of panel.

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the dates shown in the CWZTCD to ensure that the TMA meets the age requirements and the crashworthiness criteria established by the Federal Highway Administration (FHWA) for TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned approximately 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

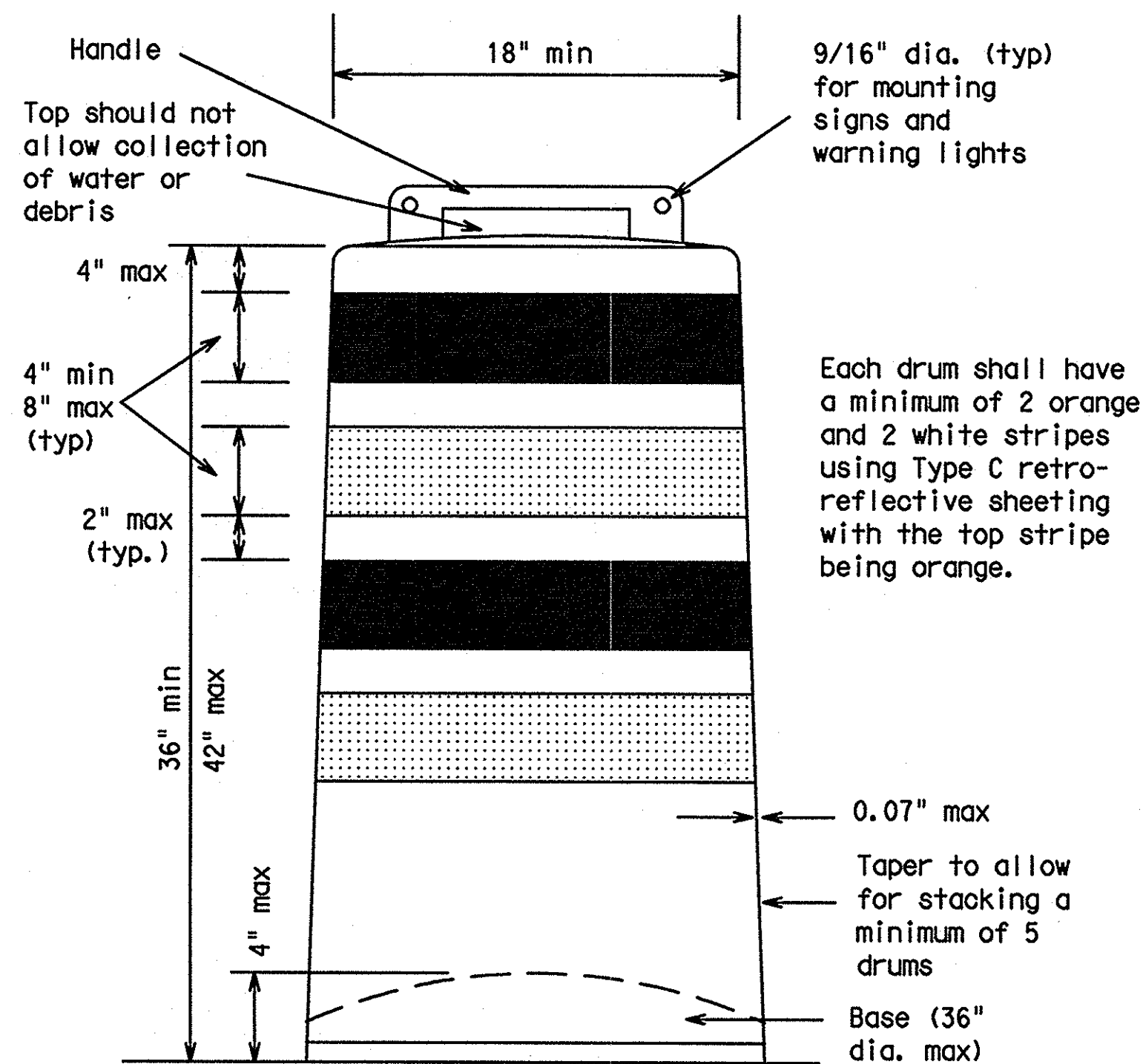
Texas Department of Transportation
 Traffic Operations Division

**BARRICADE AND CONSTRUCTION
 ARROW PANEL, REFLECTORS,
 WARNING LIGHTS & ATTENUATOR
 STANDARD**

7 of 12 BC (7) -07

© TxDOT 11-4-02	DATE	BY	CHKD	DATE	CHKD	DATE	CHKD
9-07	REVISIONS	CUNY	SECT	JUN		HIGHWAY	
		LIST		COUNTY		SHEET NO.	

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Prequalified plastic drums shall meet the following requirements:

- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- 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 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch 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.
- The top of the 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 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant 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 nor greater than 8 inches in width. 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.

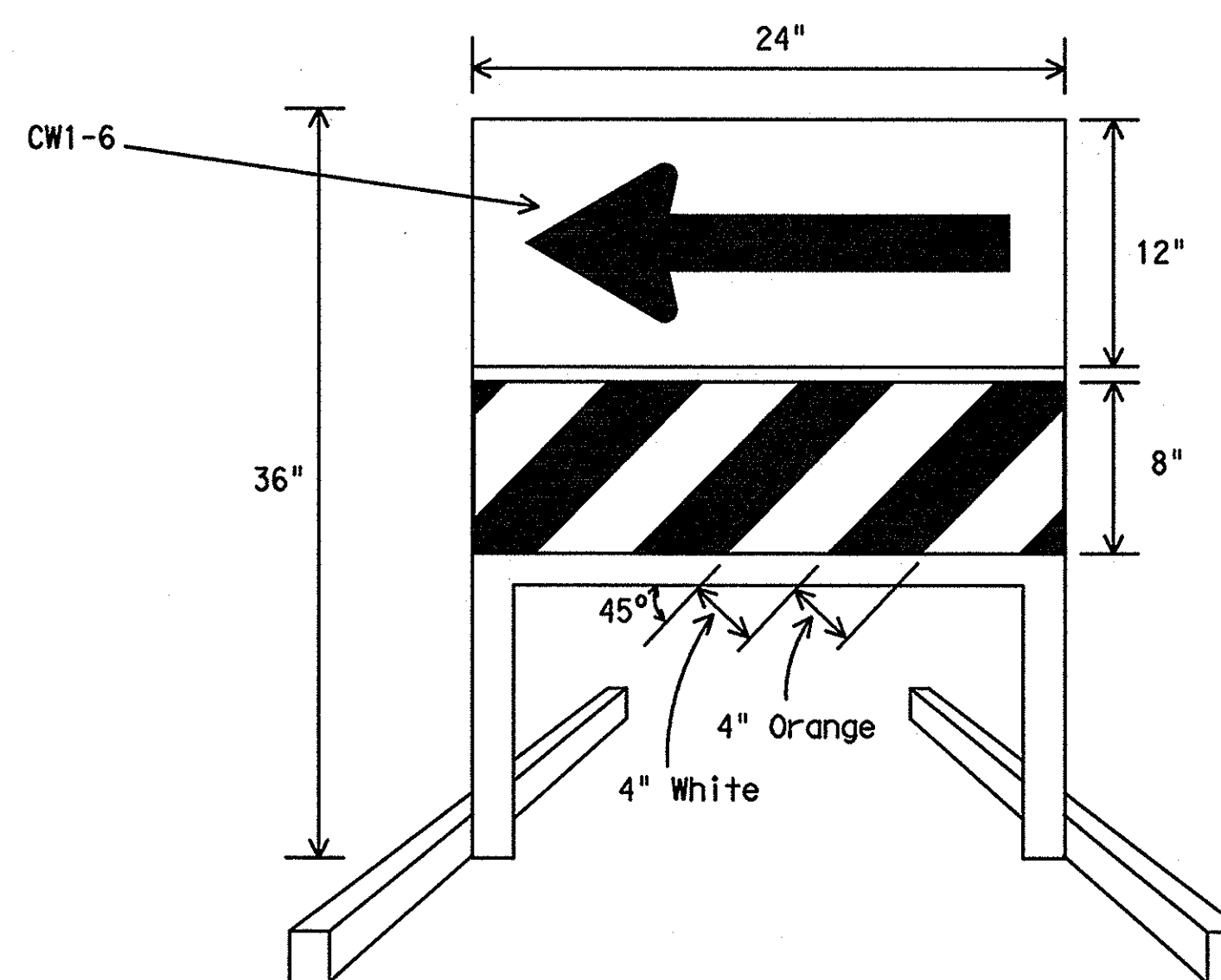
- Drum body shall have a minimum unballasted weight of 7.7 lbs. and maximum unballasted weight of 11 lbs. The wall of the drum body shall be a minimum of 0.07 inch in thickness. Weight of any drum supplied shall not vary more than 0.5 lb. from that of the prequalified sample.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Flat Surface Reflective Sheeting." High Specific Intensity (Type C) retroreflective sheeting shall be supplied unless otherwise specified in the plans.
- 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, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

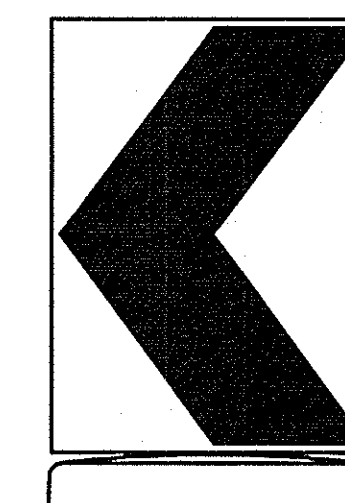
BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- The ballast 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.

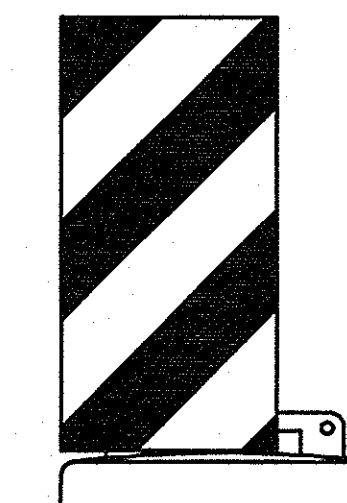


DIRECTION INDICATOR BARRICADE

- The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
- If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
- The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type E Fluorescent Prismatic Orange above a rail with Type C High Specific Intensity retroreflective sheeting in alternation 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass.
- Double arrows on the Direction Indicator Barricade will not be allowed.
- Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24" Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type E (Fluorescent Prismatic) sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type C (High Specific Intensity). Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- 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.
- Signs shall be installed using a 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 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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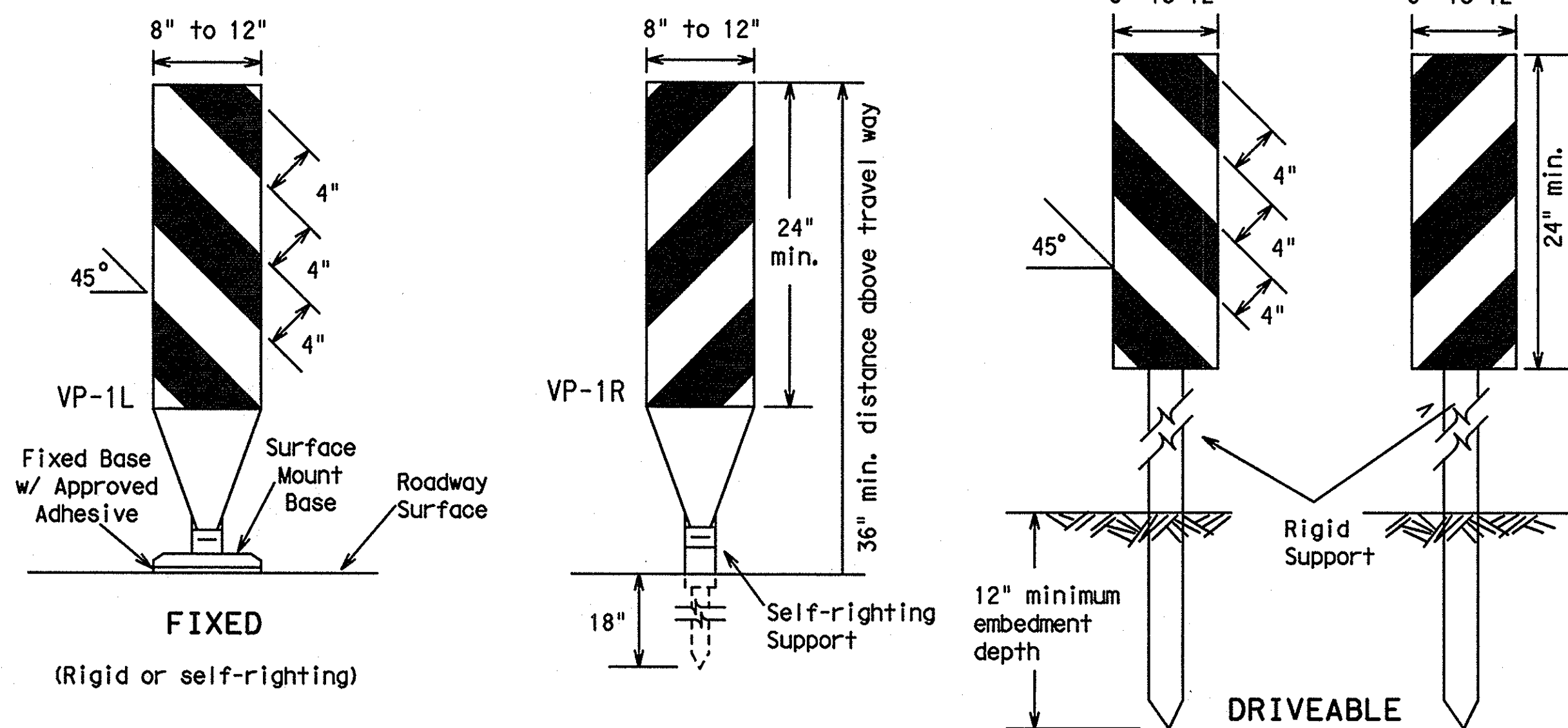
BC (8) -07

© TxDOT 11-4-02		DATE	BY	CHKD	APPD
4-03	REVISIONS	DATE	BY	CHKD	APPD
9-07					

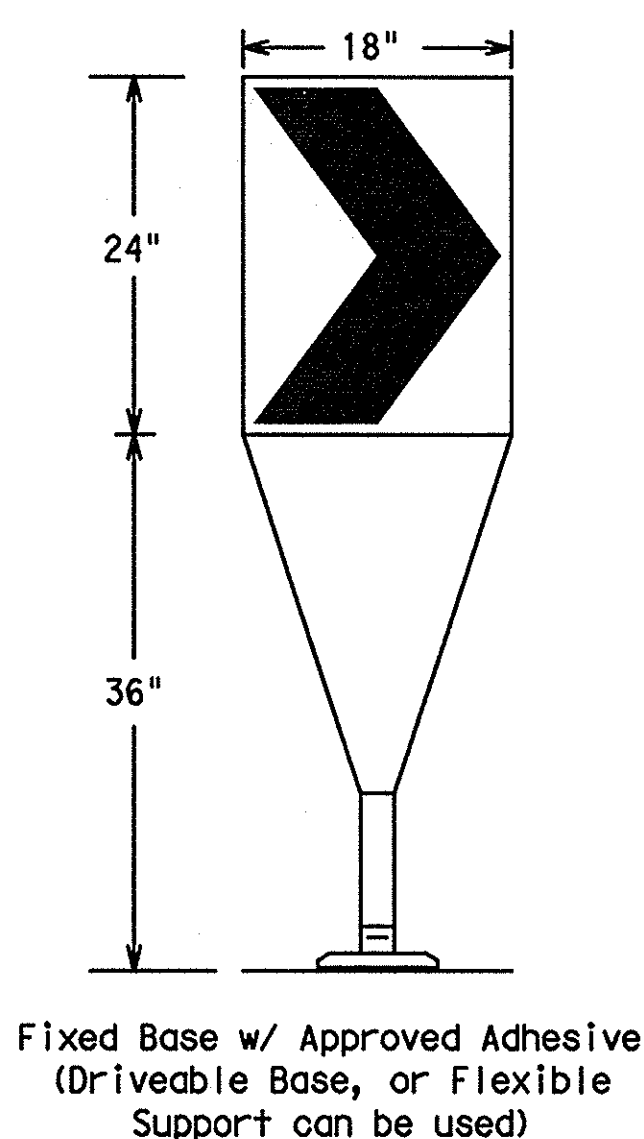
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CHANNELIZING DEVICES

VERTICAL PANELS (VPs)



CHEVRONS



1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type E (Fluorescent Prismatic) conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall be black vinyl non-reflective decal sheeting meeting the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

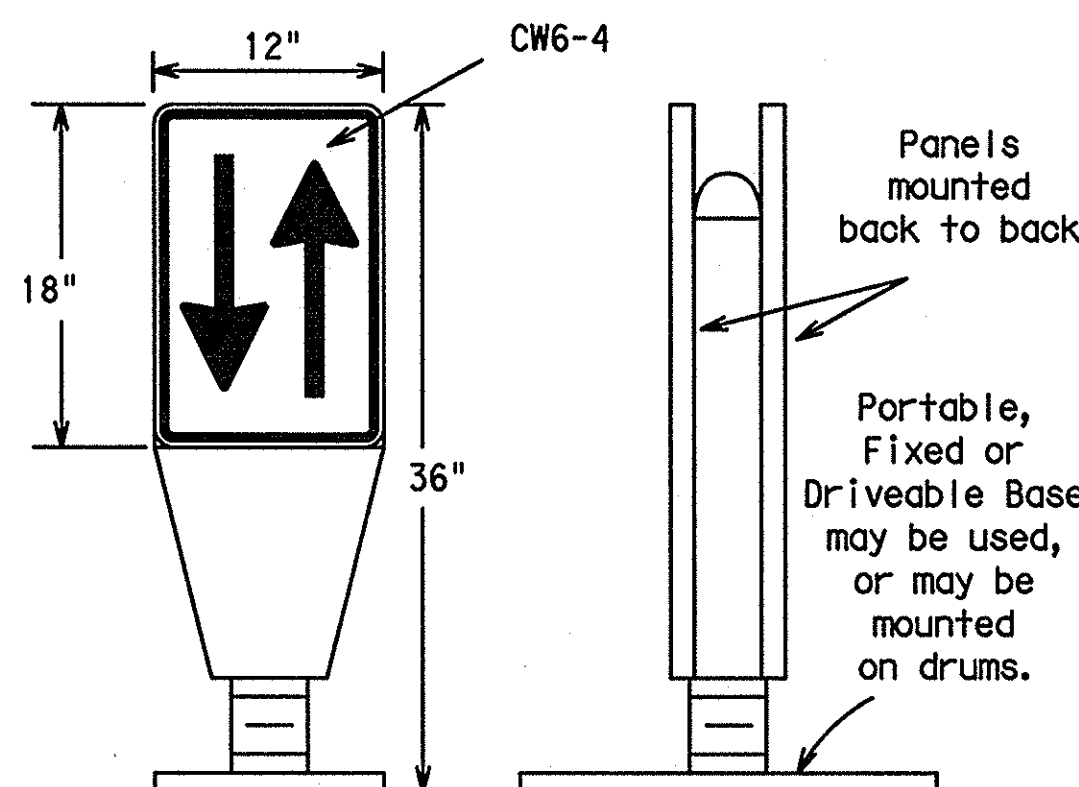
GENERAL NOTES:

1. 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. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh approximately 35 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.
8. Examples on this sheet are commonly used channelizing devices in work zones. For other devices, refer to the CWZTCD.

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1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of outs adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, shall have a minimum of 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is greater than 36 inches, a panel stripe of 6 inches shall be used.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

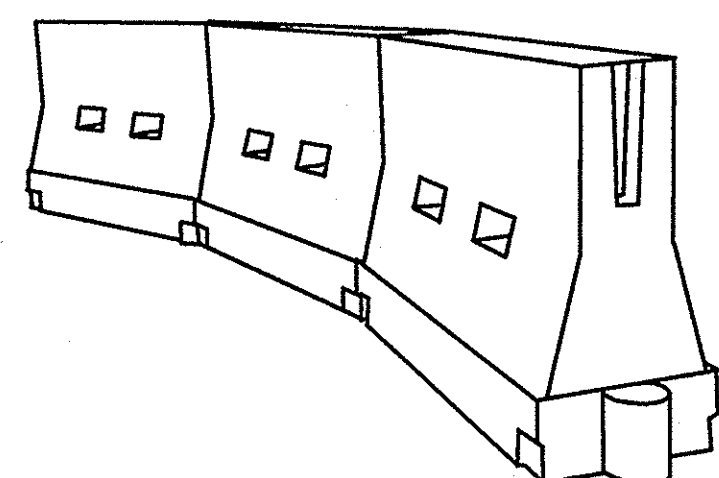


1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with simple tubular markers or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. Tubular markers or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type E (Fluorescent Prismatic) conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall be black vinyl non-reflective decal sheeting meeting the requirements of DMS-8300.

Posted Speed	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60' - 75'
35		205'	225'	245'	35'	70' - 90'
40	L = WS	265'	295'	320'	40'	80' - 100'
45		450'	495'	540'	45'	90' - 110'
50	L = WS	500'	550'	600'	50'	100' - 125'
55		550'	605'	660'	55'	110' - 140'
60	L = WS	600'	660'	720'	60'	120' - 150'
65		650'	715'	780'	65'	130' - 165'
70	L = WS	700'	770'	840'	70'	140' - 175'
75		750'	825'	900'	75'	150' - 185'
80	L = WS	800'	880'	960'	80'	160' - 195'
80		800'	880'	960'	80'	160' - 195'

**Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS



LONGITUDINAL CHANNELIZING DEVICES

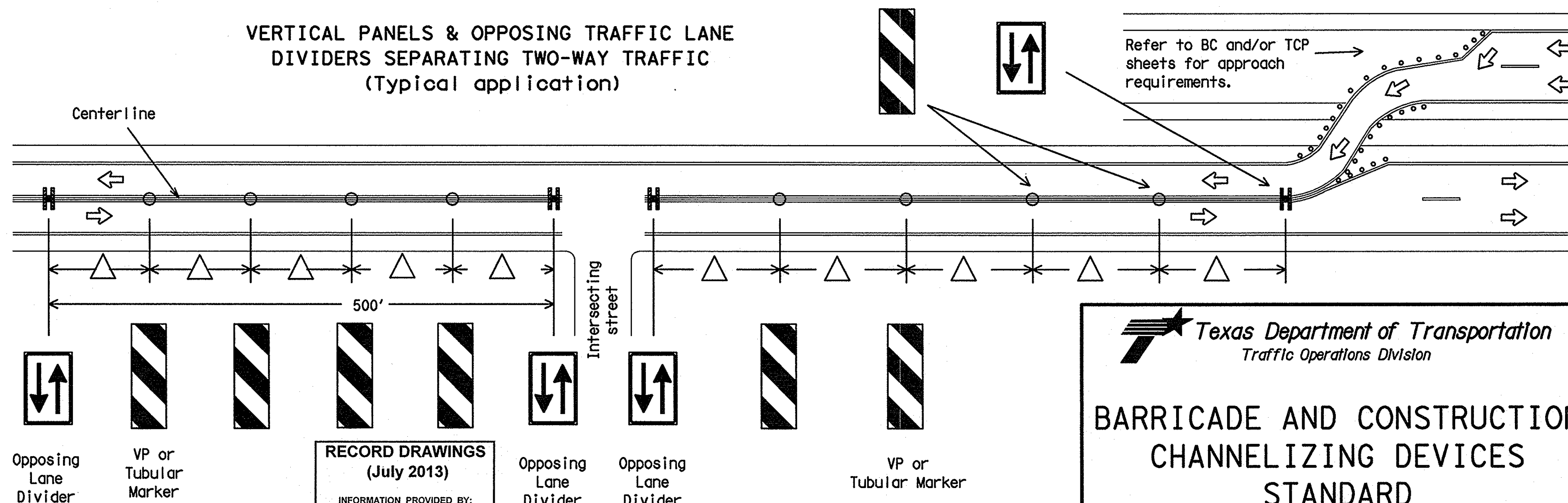
1. Longitudinal channelizing devices are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. Longitudinal channelizing devices may be used instead of a line of cones or drums.
3. Longitudinal channelizing devices shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Longitudinal channelizing devices should not be used to provide positive protection for obstacles, pedestrians or workers.
5. Longitudinal channelizing devices shall be retroreflective, or supplemented with retroreflective delineation as required for temporary barriers on BC(7)-07.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall be not less than 32 inches in height.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS SEPARATING TWO-WAY TRAFFIC (Typical application)



△ Spacing between the VP's or tubular markers shall not exceed 100 feet. On roadways with speeds less than 45 MPH, spacing between the tubular markers or VP's shall be as shown on the channelizing spacing table shown on this page. If the table shows spacing greater than 100 feet based on the roadway speed, then use a maximum of 100 feet spacing between the tubular markers or VP's. Every fifth channelizing device shall be an OTLD, except when the OTLD must be spaced closer to accommodate an intersection. Spacing between the OTLD shall not exceed 500 feet.

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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	POST	COUNTY		SHEET NO.	

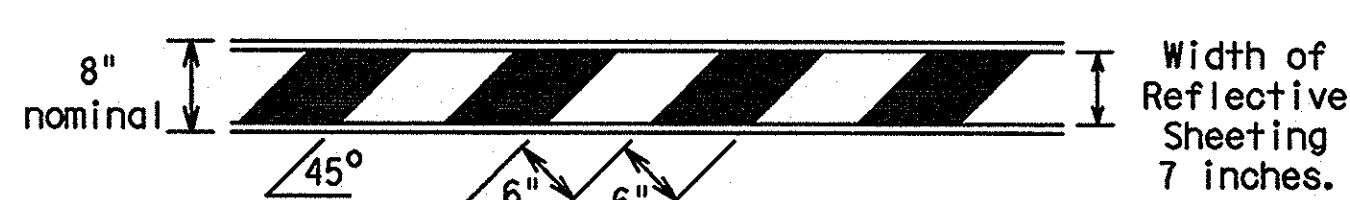
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TYPE III BARRICADES

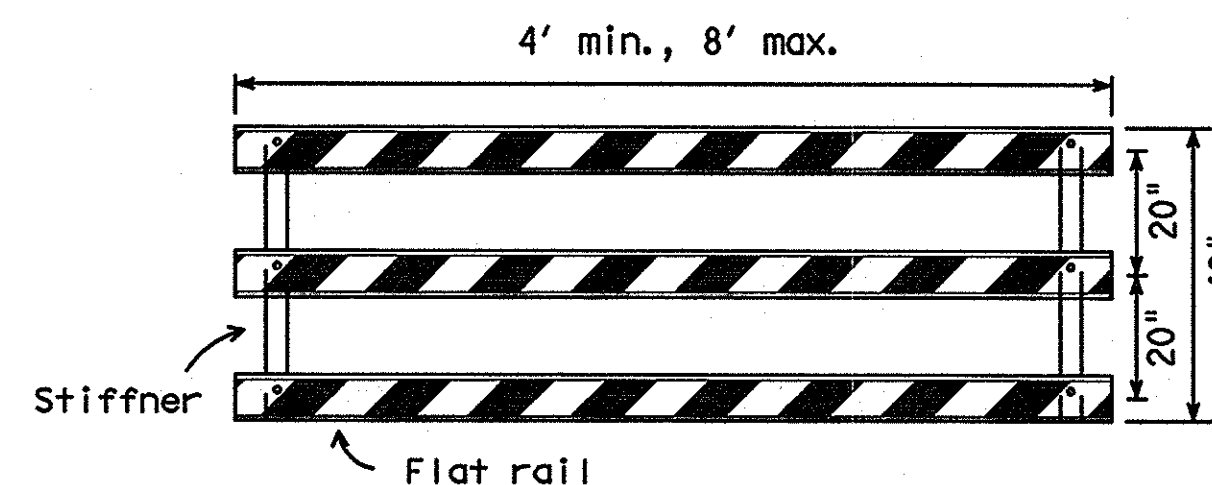
1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type III Barricades and a list of all materials used in the construction of Type III Barricades.
2. Type III Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades 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, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. 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 downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. 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.
9. Sheeting for barricades shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

TYPICAL STRIPING DETAIL FOR BARRICADE RAIL

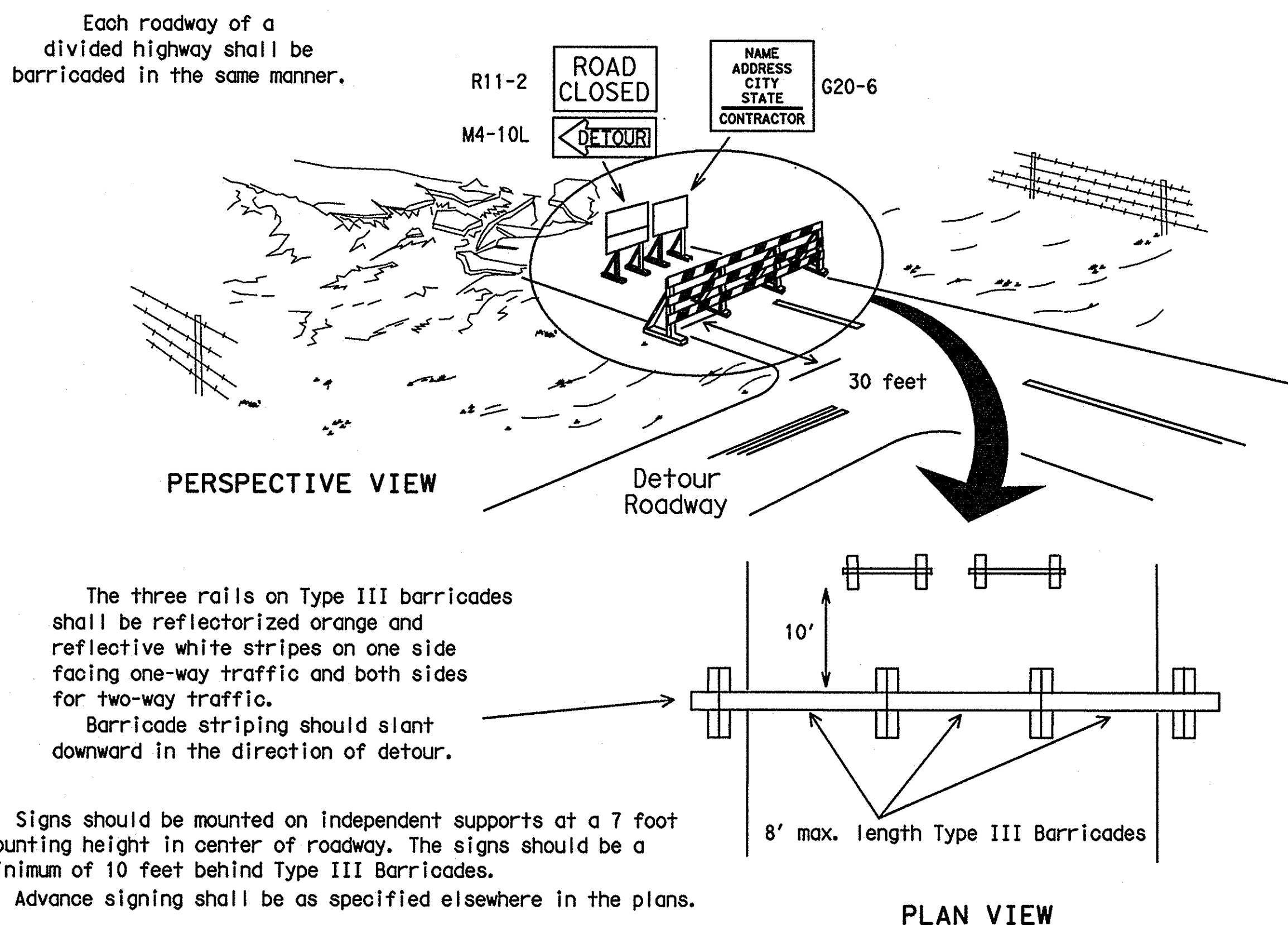


TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



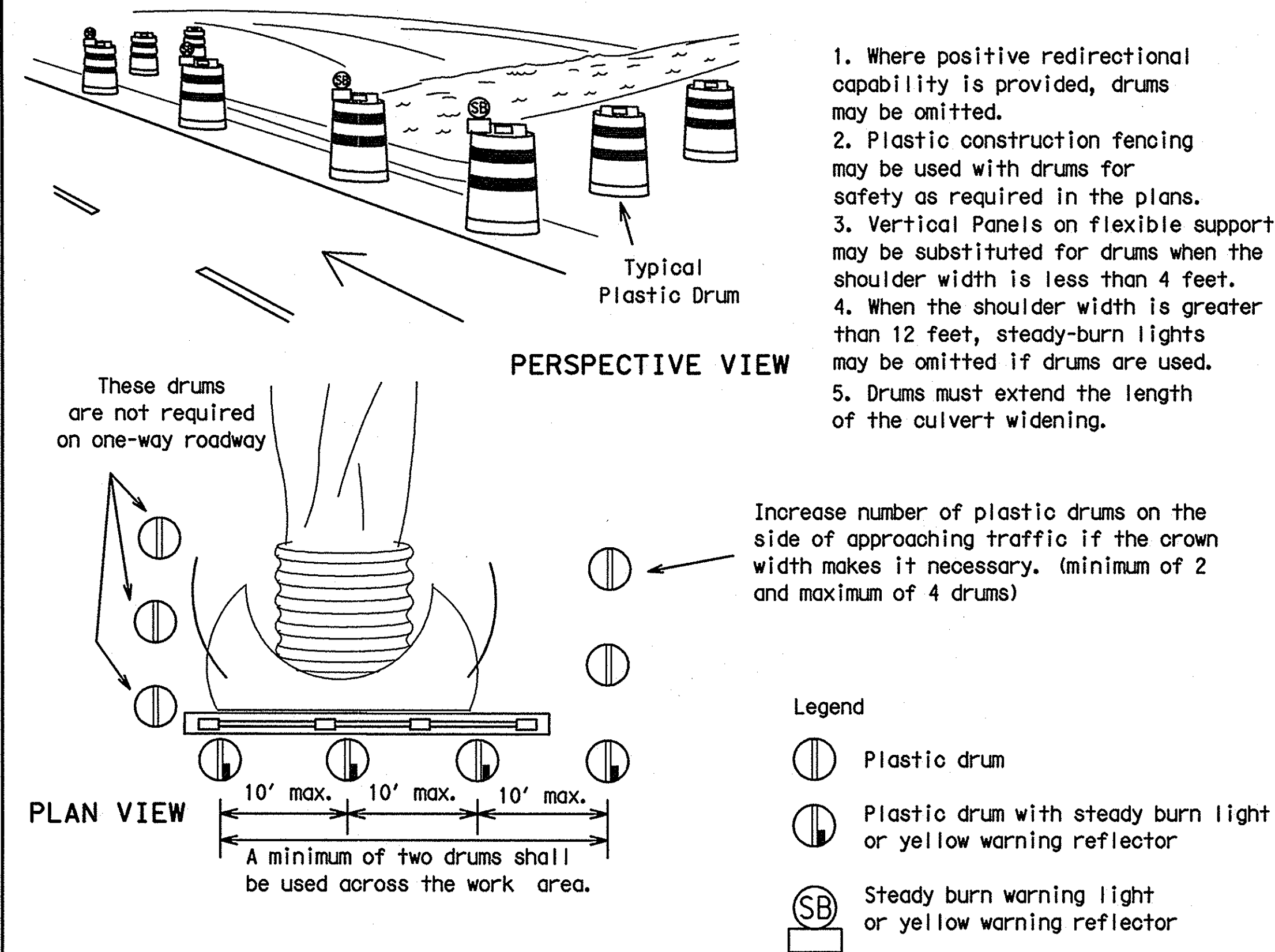
Stiffner may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPE III BARRICADE (POST AND SKID) TYPICAL APPLICATION



1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type III Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

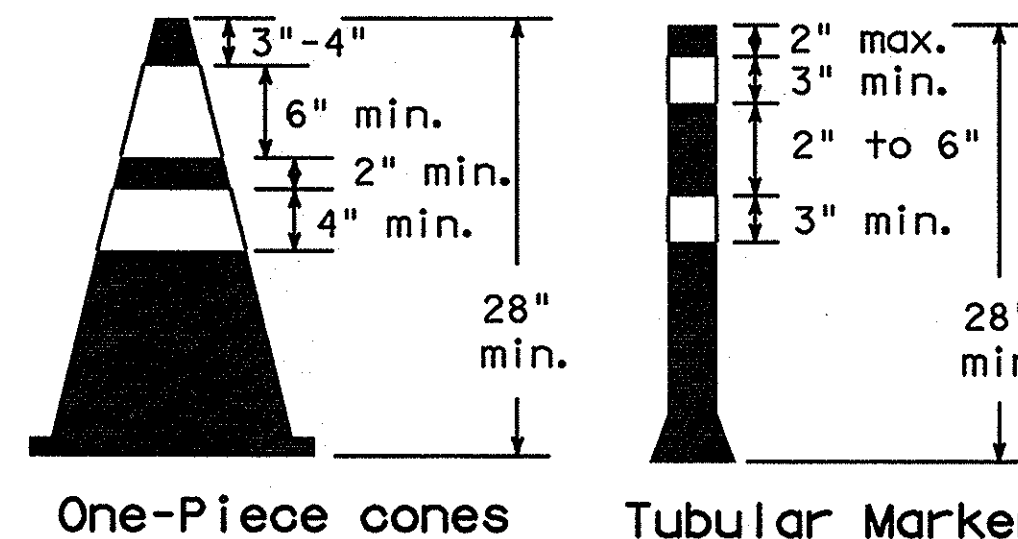
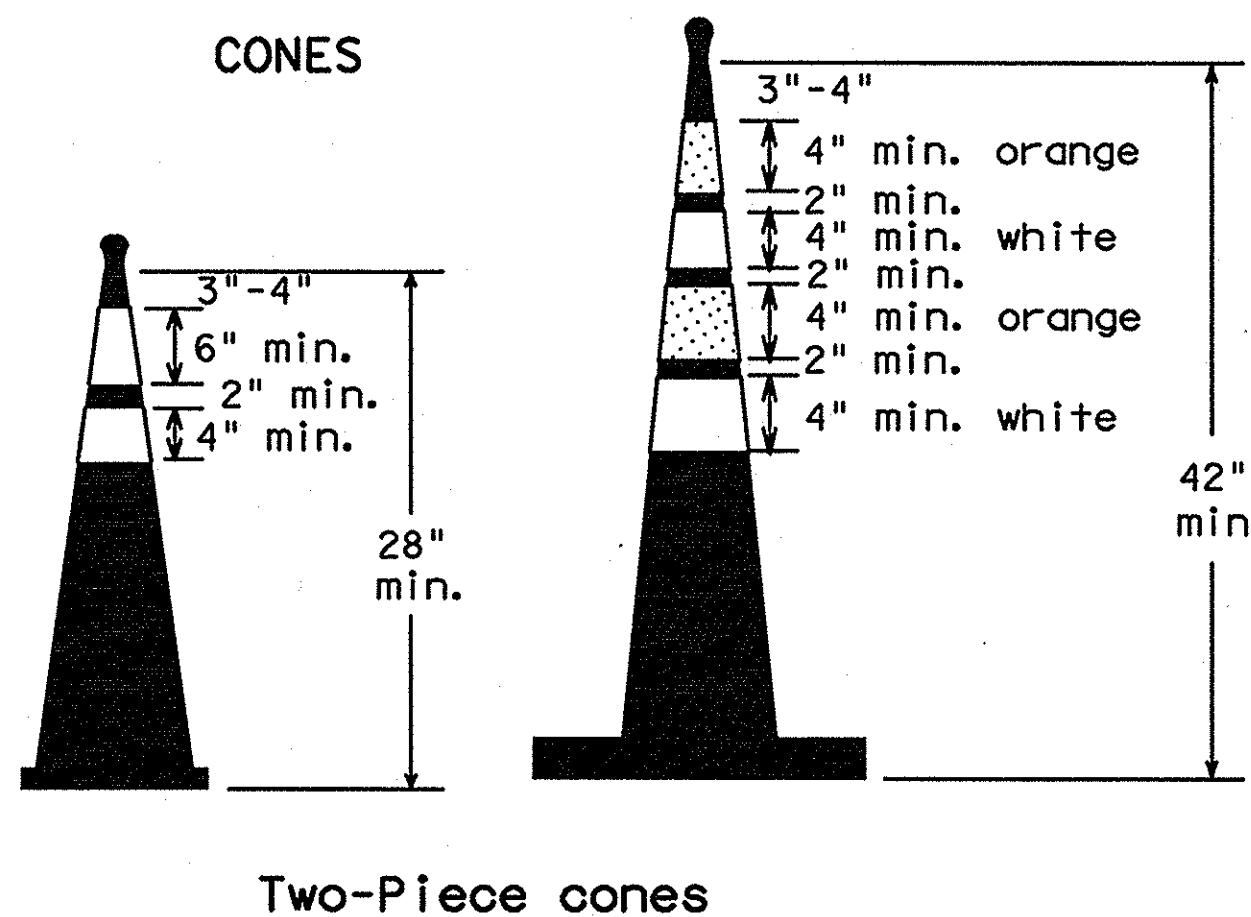


1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

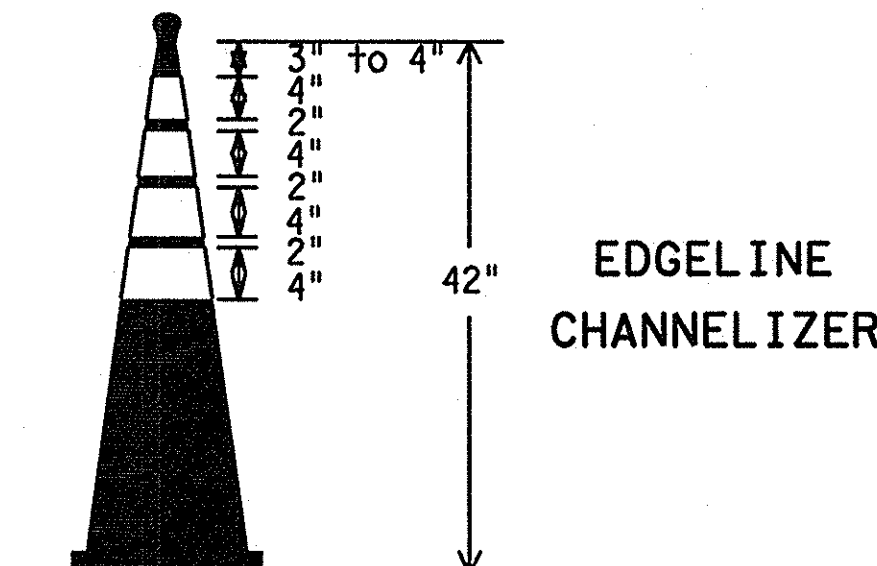
Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

- Legend
- Plastic drum
 - Plastic drum with steady burn light or yellow warning reflector
 - Steady burn warning light or yellow warning reflector

CONES

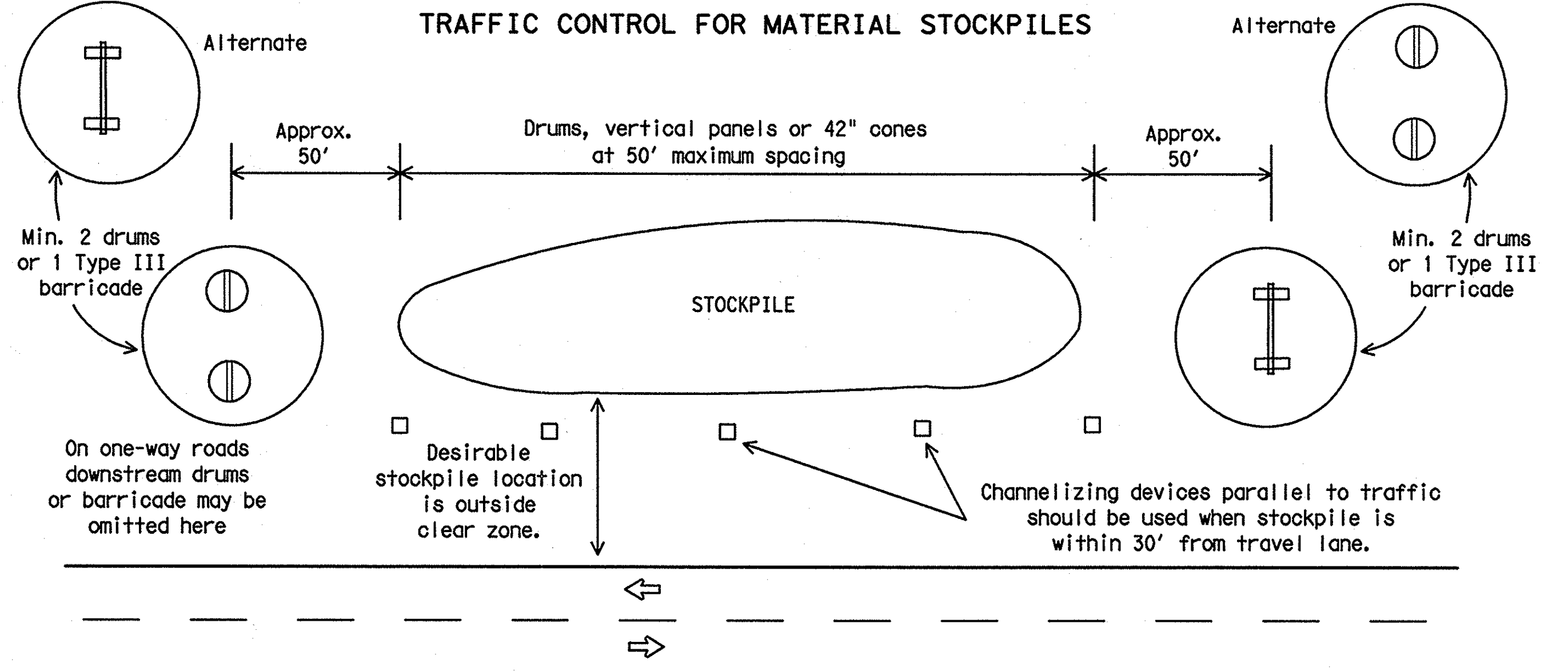


28" Cones shall have a minimum weight of 9 1/2 lbs.
 42" 2-piece cones shall have a minimum weight of 30 lbs. including base.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type C encapsulated bead (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

TRAFFIC CONTROL FOR MATERIAL STOCKPILES



1. Traffic cones and tubular markers shall be a minimum of 28 inches in height when used either on freeways or at nighttime.
2. Cones or tubular markers shall be predominantly orange, fluorescent red-orange, or fluorescent yellow-orange. They should be kept clean and bright for maximum visibility.
3. Cones used only for daytime operations do not require the reflectorized bands.
4. Cones and tubular markers used for nighttime operations shall be reflectorized. Reflectorized material shall have a smooth, sealed outer surface that displays the same approximate color during the day and night. The reflectorized bands shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
5. When used at night, appropriate personnel shall ensure that cones and tubular markers remain in their proper location and in an upright position.
6. ReflectORIZATION of 28" cones shall consist of 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.
7. ReflectORIZATION of 42" cones shall be provided by alternating 4 to 6" orange and white stripes with orange on top.
8. 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.
9. 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 they remain in their proper location and in an upright position.
10. Cones or tubular markers used on each project shall be of the same size and shape.
11. The handle may be designed as a 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. Length of the handle shall not be considered with regard to the overall height of the cone.

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 (July 2013)
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Texas Department of Transportation
 Traffic Operations Division

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ 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.
- Pavement markings shall be installed in accordance with the 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 Plan Sheet WZ (STPM).
- 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 at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

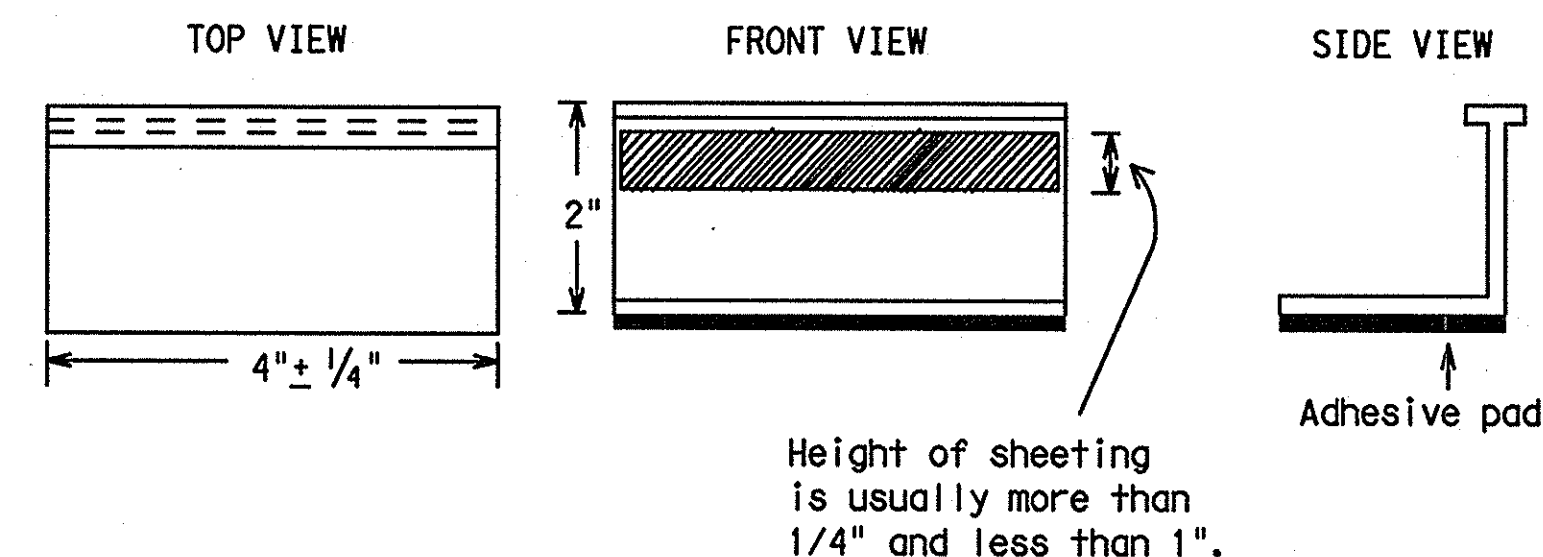
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway, shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than two weeks, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway.
- 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 Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-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.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform 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 the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ (STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

Raised Pavement Markers used as Guidemarks

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- 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.

Guidemarks shall be designated as:

- YELLOW - (two amber reflective surfaces with yellow body).
- WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS

PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PREFABRICATED PAVEMENT MARKINGS-PERMANENT	DMS-8240
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	DMS-8241
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS STANDARD

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			DISTRICT	COUNTY	SHEET NO.	

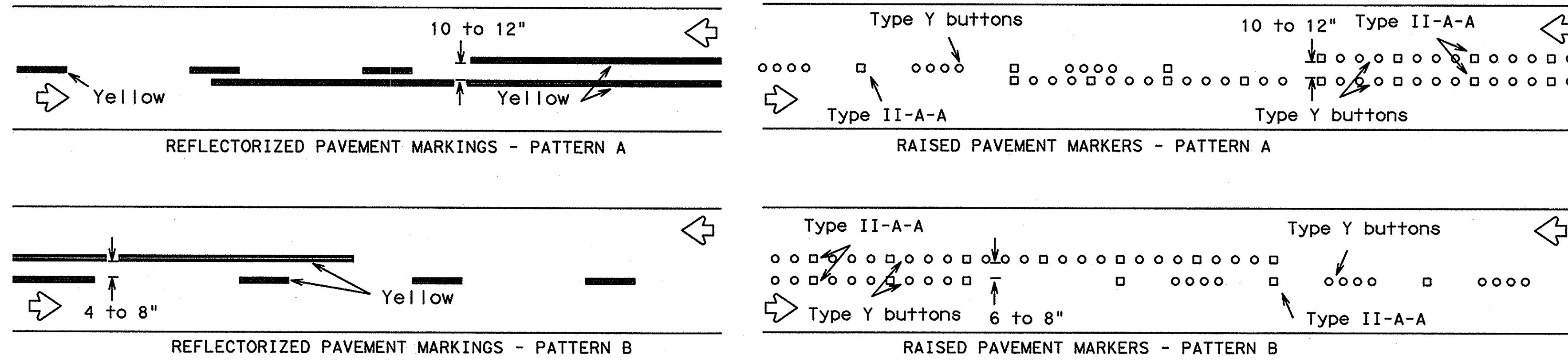
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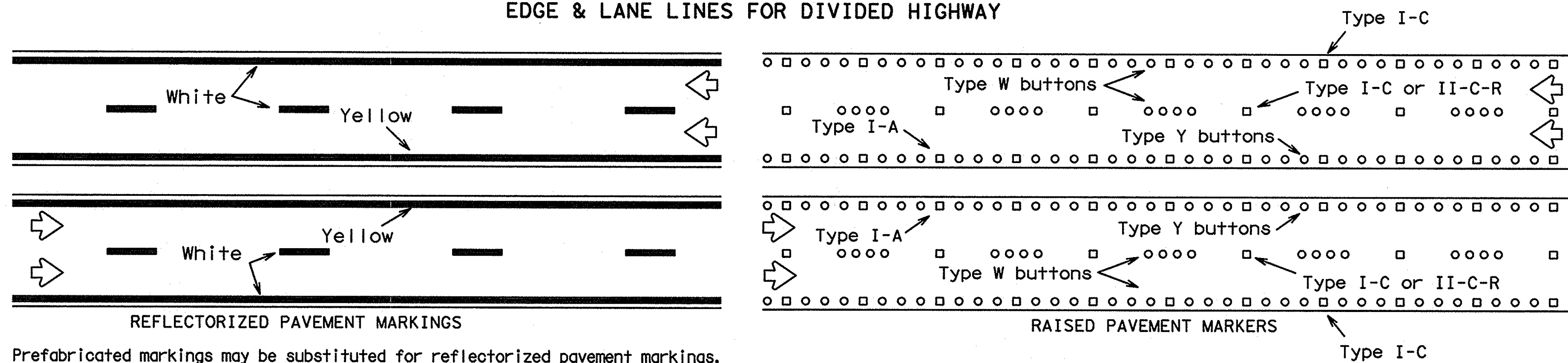
PAVEMENT MARKING PATTERNS

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



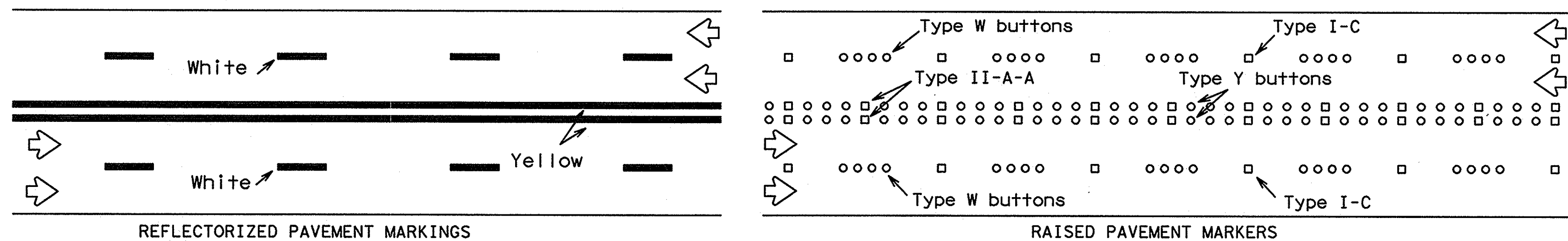
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



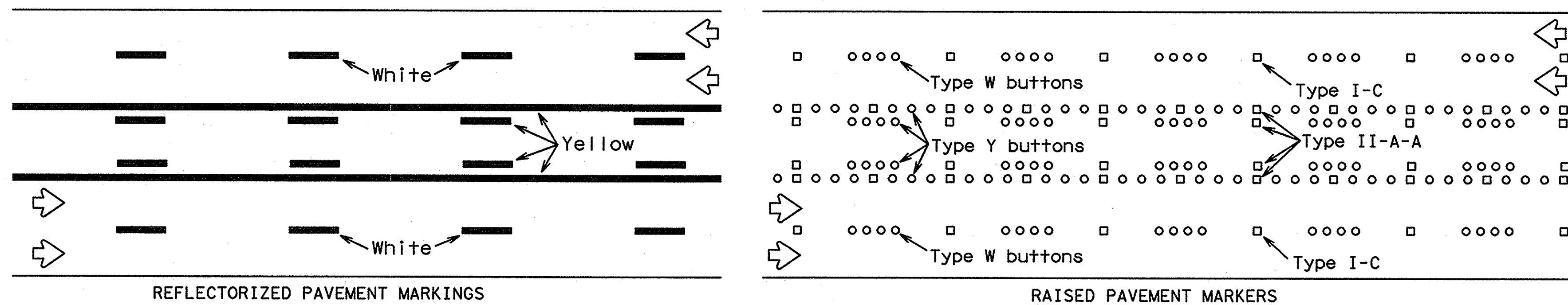
Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



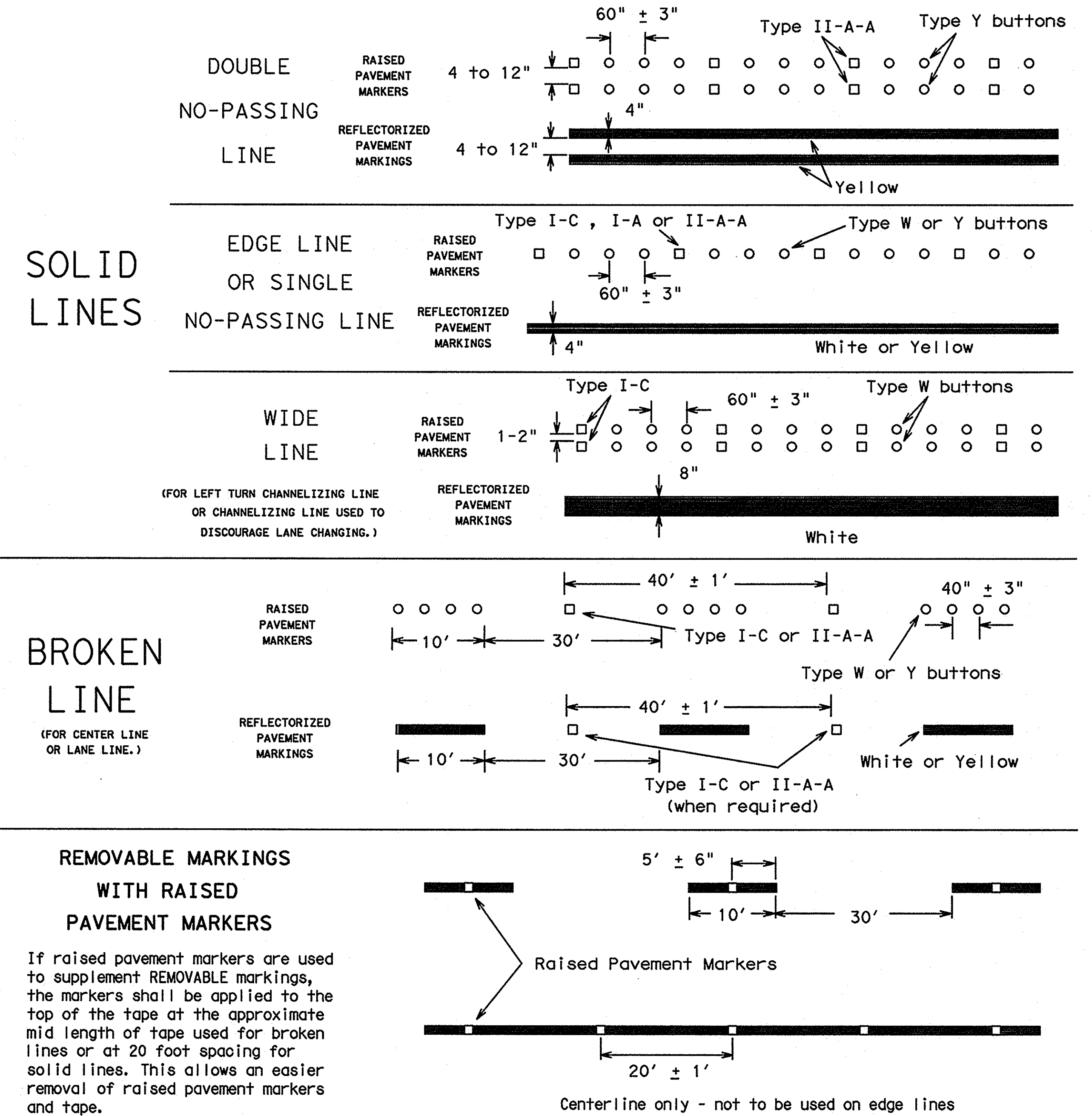
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE



Prefabricated markings may be substituted for reflectorized pavement markings.

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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 or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

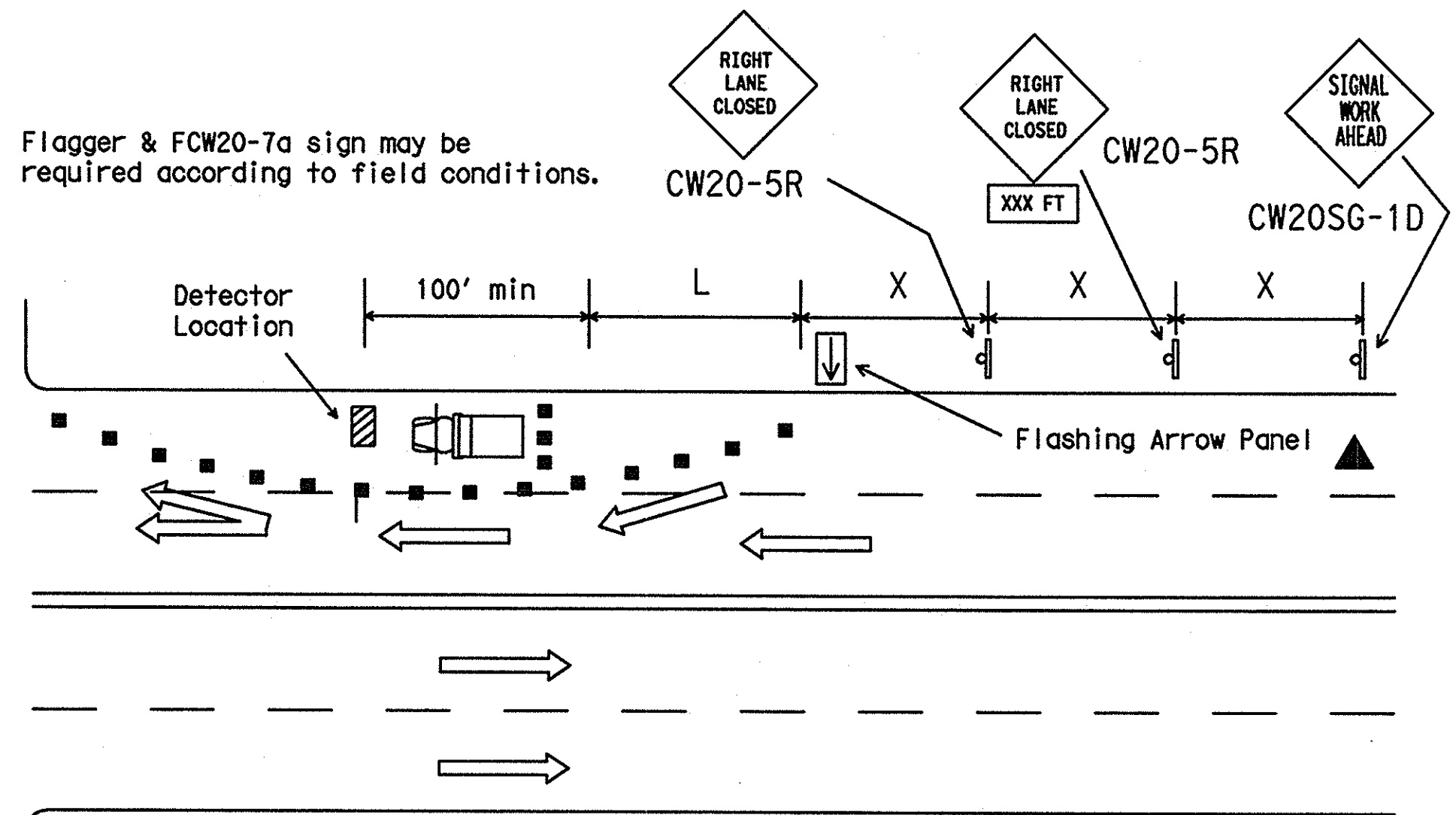
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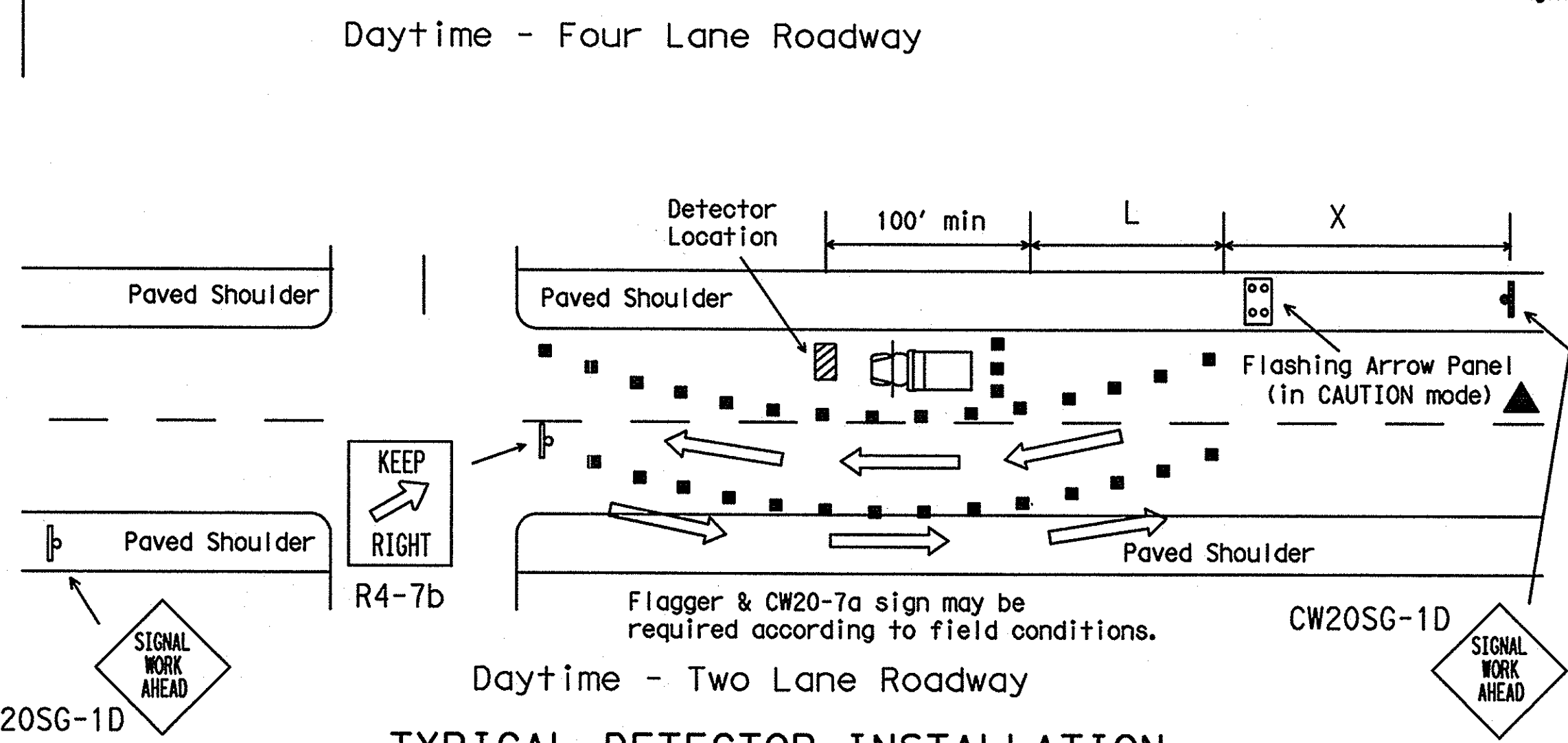
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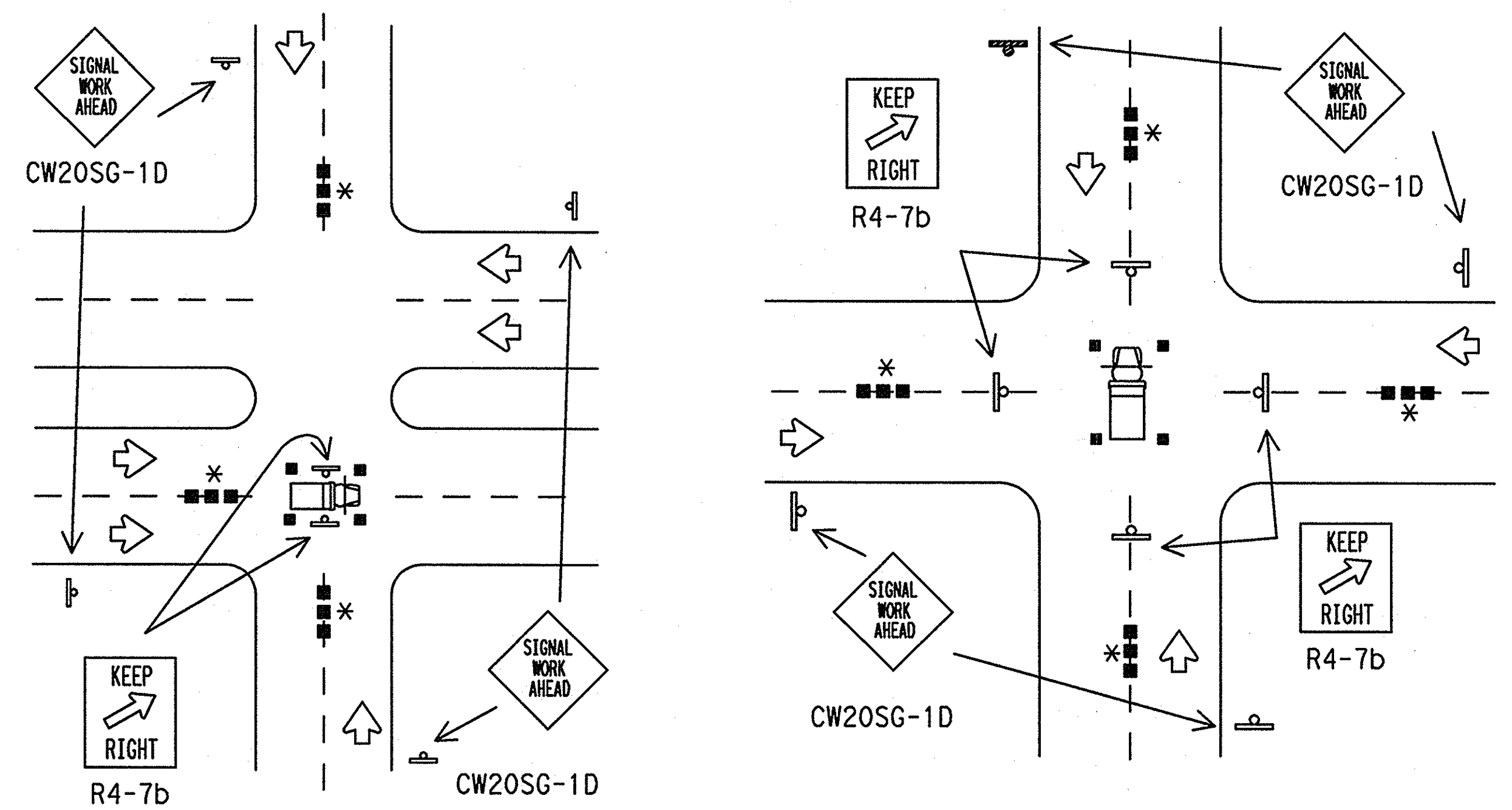


Posted Speed	Formula	Minimum Desirable Taper Lengths X*			Suggested Maximum Spacing of Device		Minimum Sign Spacing X Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'
35		205'	225'	245'	35'	70' - 90'	160'
40		265'	295'	320'	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'	
75	750'	825'	900'	75'	150' - 185'	900'	

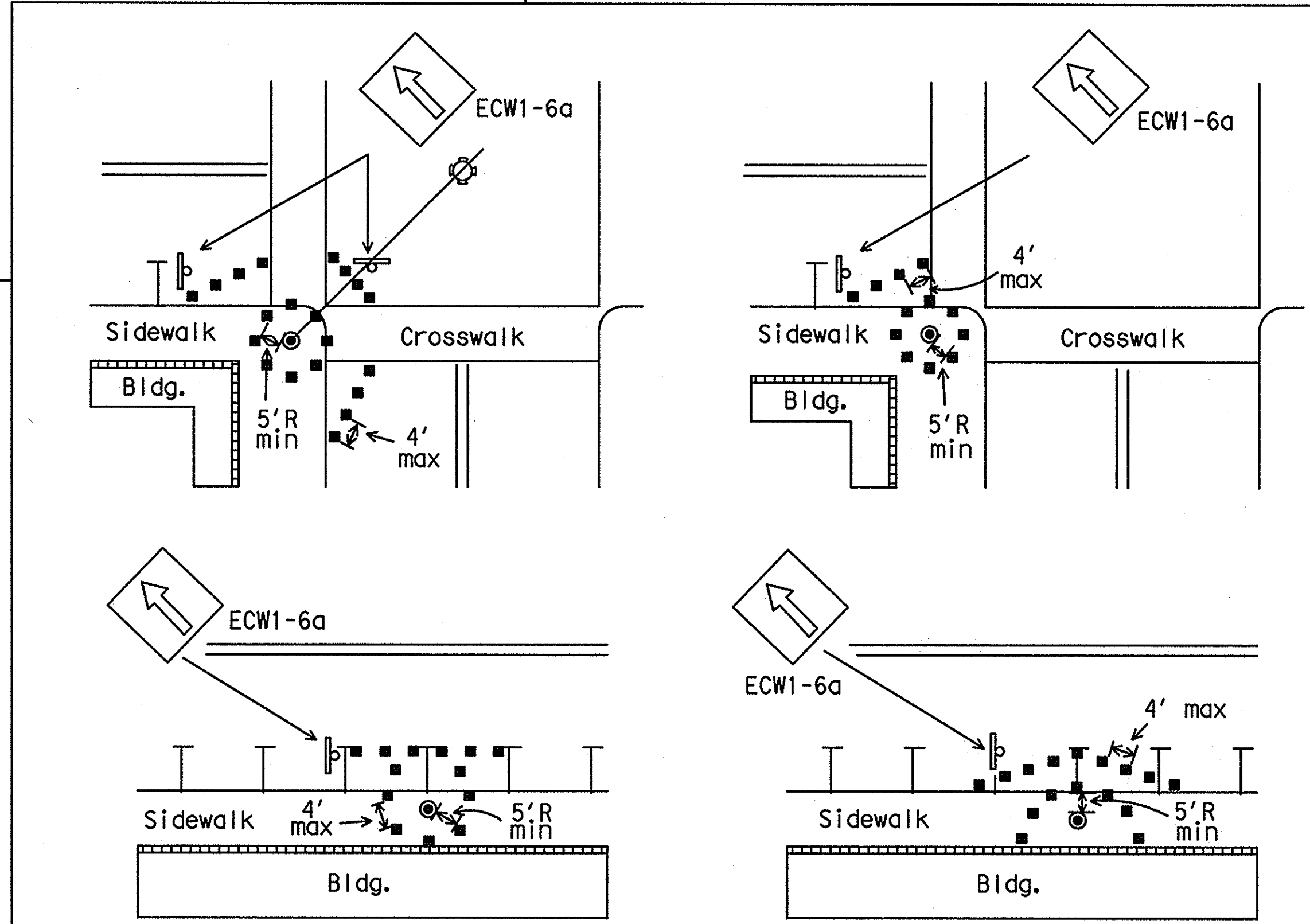
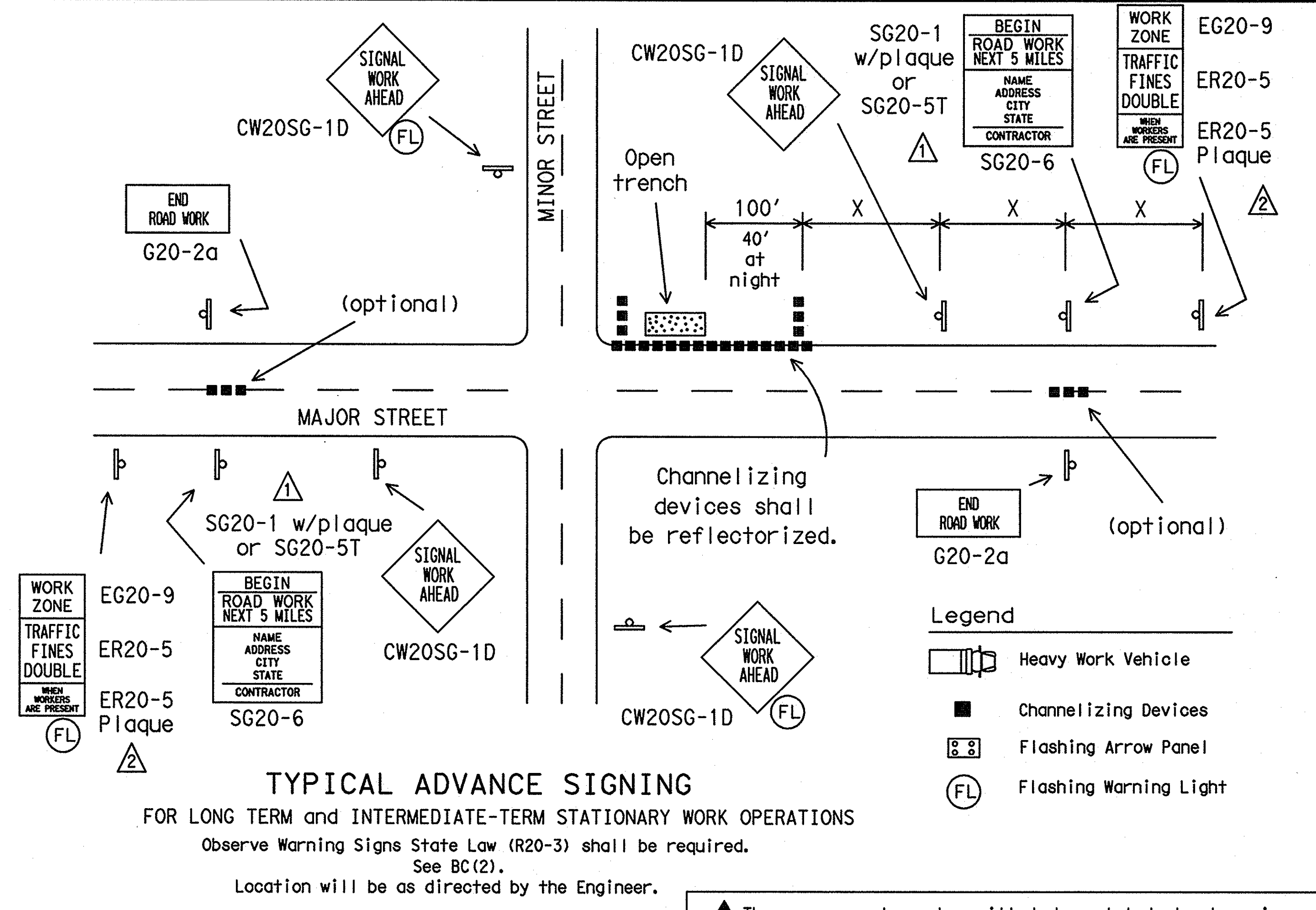
*Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)



TYPICAL DETECTOR INSTALLATION
OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION
Nighttime Channelizing Devices shall be reflectorized.



TYPICAL HANGING SIGNAL INSTALLATIONS
OR OTHER WORK OPERATIONS THAT ARE SHORT TERM OR SHORT DURATION
* Advance warning channelizing devices are optional.



Channelizing devices should not be placed closer than 5 foot radius (minimum) to signal poles.
Parking may be eliminated by placing channelizing devices in spaces.
If pedestrian walkways are blocked, refer to the Texas Manual on Uniform Traffic Control Devices (TMUTCD) Part 6.

TYPICAL RESTRICTED PEDESTRIAN MOVEMENTS
FOR ALL WORK OPERATIONS REGARDLESS OF WORK DURATION

- ▲ The arrow panel may be omitted when stated elsewhere in the plans.
- 1. Typical channelizing device is the 28" cone.
- 2. Plastic drums or vertical panels may be used if approved by the Engineer.
- 3. For several closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits.
- 4. See details elsewhere in the plans for advance signing requirements.
- 5. Advance signs shall be in place when signal construction operations are in progress.
- 6. The contractor shall remove advance signs when no construction operations are underway.
- 7. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
- 8. All holes, trenches or other hazardous areas shall be adequately protected by lights or other protective devices.
- 9. Trenches shall be covered or surrounded with orange plastic construction fence as directed by the Engineer.
- 10. Flagger and FCW20-7a sign may be required according to field conditions.
- 11. Vehicles parked in roadway shall be equipped with two strobes.
- 12. High level flags at corners of vehicle may also be used.
- 13. Work operations that require work vehicle in traveled way 20 minutes or less may use cones, high level flags and strobes as advance warning devices.
- 14. Cones should only be placed around vehicle.
- 15. Flaggers may be used on high speed rural intersections.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION
TYPICAL DETAILS

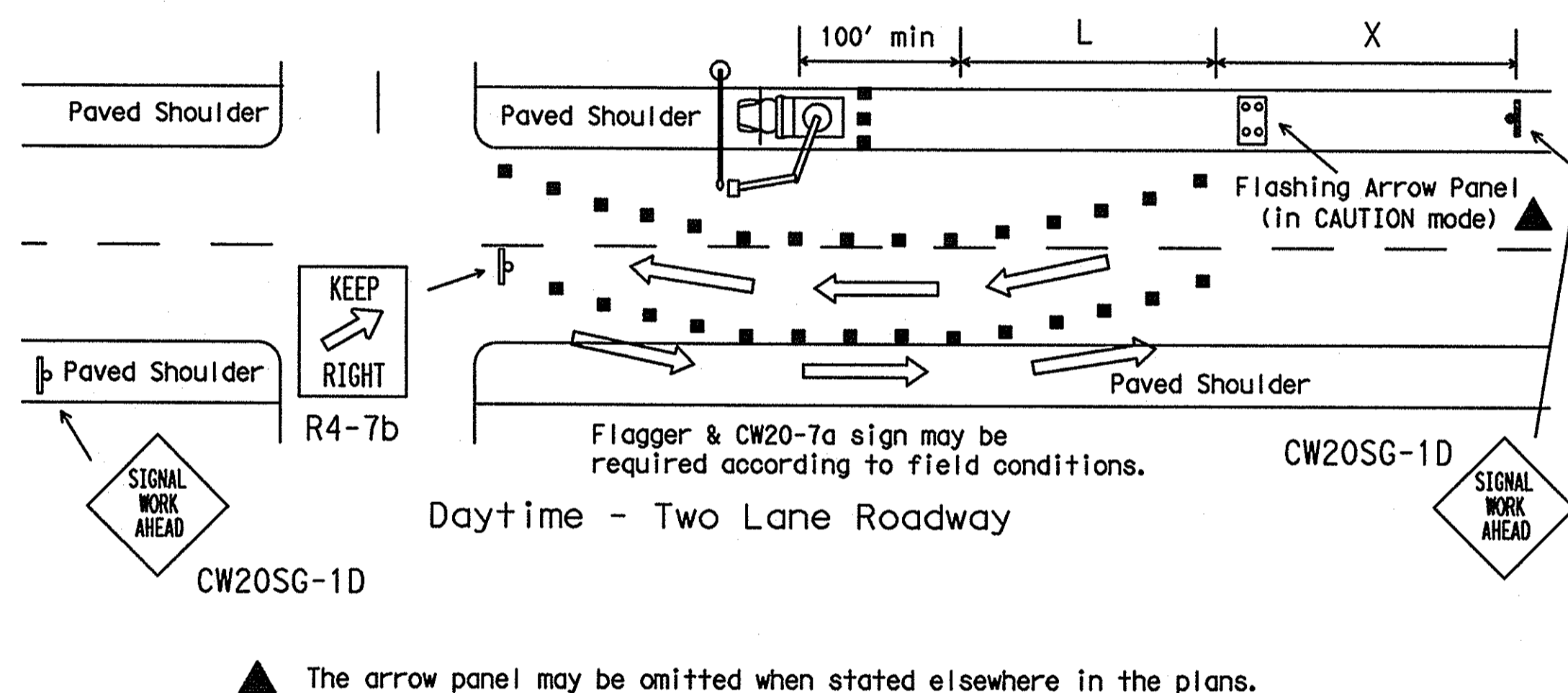
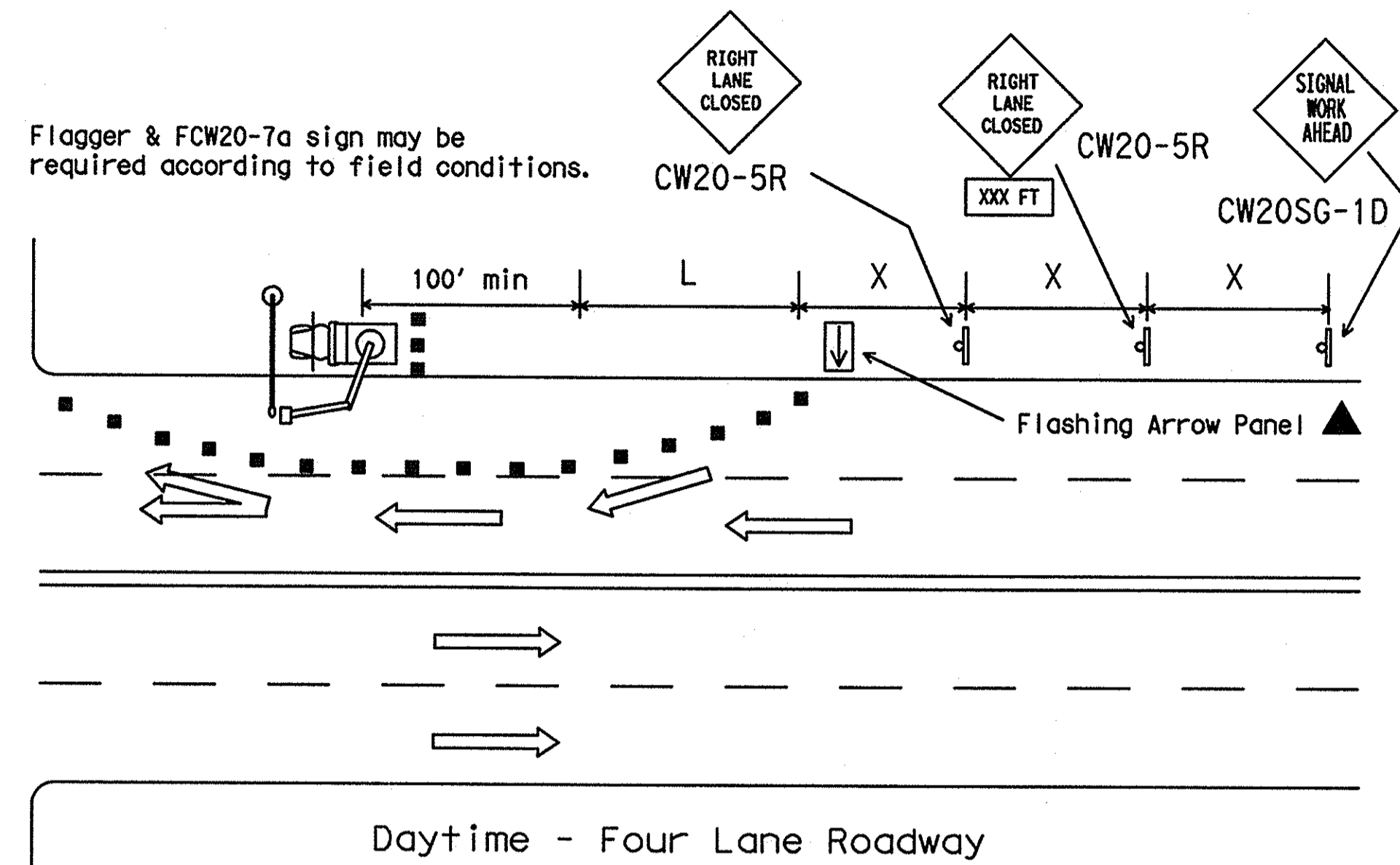
SHEET 1 OF 2 WZ (BTS-1) -03

© TxDOT April 1992		DATE	BY	CHKD	DATE	CHKD
REVISIONS		CULT	SECT	JU9		HIGHWAY
2-98						
4-98						
10-99						
3-03						
		DIST	COUNTY			SHEET NO.

DATE: FILE:

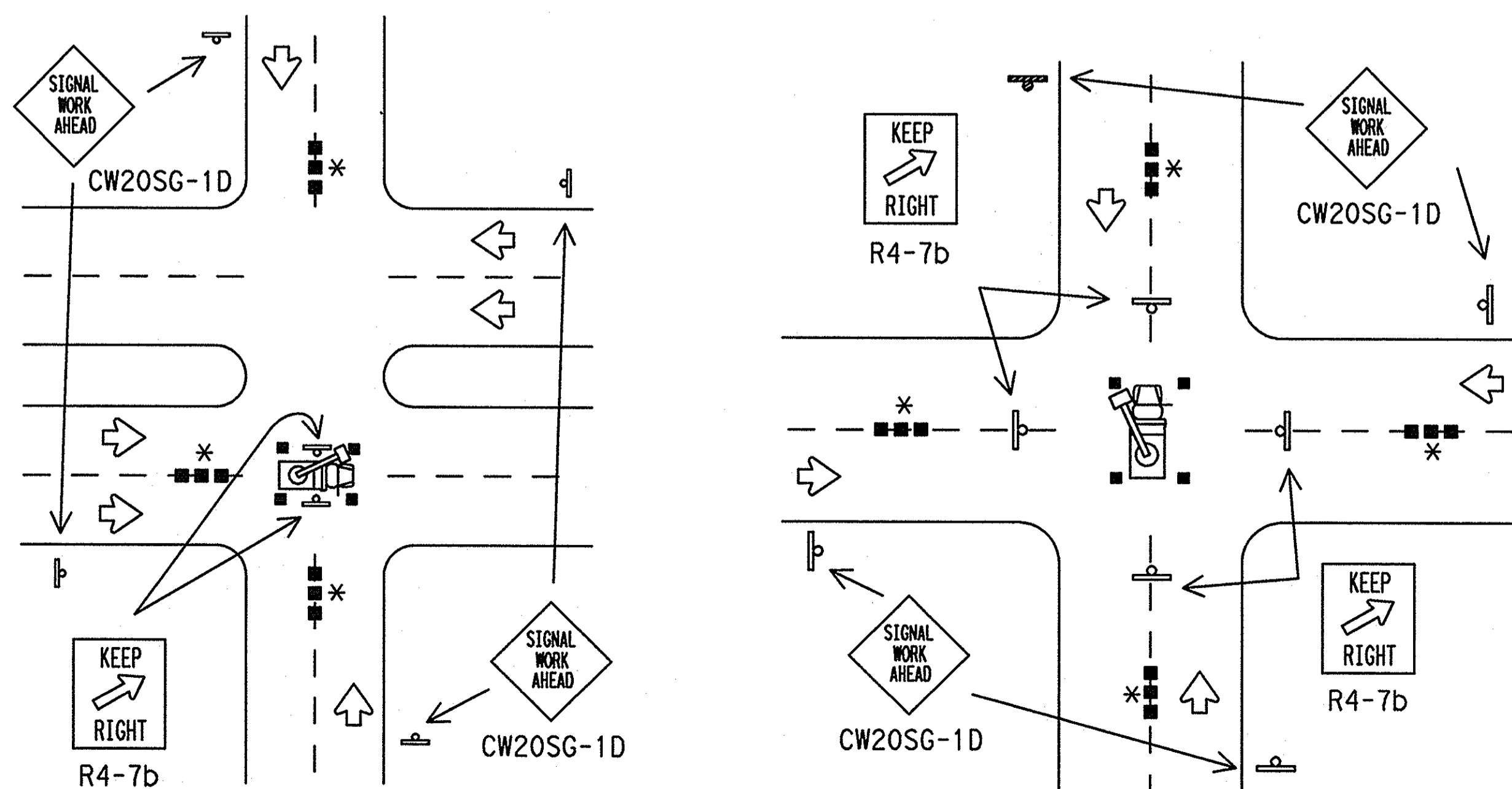
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"ABOVE LANE" WORK PERFORMED BY BUCKET TRUCK



▲ The arrow panel may be omitted when stated elsewhere in the plans.

"ABOVE TRUCK" WORK PERFORMED BY BUCKET TRUCK



GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- Nails shall NOT be used to attach signs to any support.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes. The additional signs requested by the Engineer/Inspector shall not be subsidiary.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so that the Engineer can verify the correct procedures are being followed.
- The contractor is responsible for sign installations and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

Duration of Work (as defined by the TMUTCD Part 6)

- The types of sign supports, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring that the sign support and substrate meets crashworthiness and length of work requirements.
- Long-term stationary is work that occupies a location more than 3 days.
 - Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
 - Short-term stationary is daytime work that occupies a location for more than 1 hour, but less than 12 hours.
 - Short duration is work that occupies a location up to 1 hour.
 - Mobile is work that moves intermittently or continuously.

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 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 shall be removed at the end of the workday.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This type of sign support meets the crashworthiness standards regardless of the direction of impact. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face. These materials can damage the retroreflectivity of sign sheeting.
- Signs shall be removed upon completion of the work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact.
- Rubber (such as tire inner tubes) shall NOT be used for sandbags.
- Rubber ballasts (such as those used with cones or edgeline channelizers) shall NOT be used as sign support weights.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

DEPARTMENTAL MATERIAL SPECIFICATIONS

PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
FLAT SURFACE REFLECTIVE SHEETING	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310
VINYL NON-REFLECTIVE SHEETING	DMS-8320

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE E (FLUORESCENT PRISMATIC)
WHITE	BACKGROUND	TYPE C (HIGH SPECIFIC INTENSITY)
WHITE	LEGEND & BORDERS	TYPE C (HIGH SPECIFIC INTENSITY)
BLACK	LEGEND & BORDERS	VINYL NON-REFLECTIVE SHEETING

RECORD DRAWINGS (July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL INSTALLATION BARRICADES AND SIGNS

SHEET 2 OF 2 WZ (BTS-2) -03

DATE	REVISIONS	BY: TxDOT	CHK: TxDOT	DATE: TxDOT	CHK: TxDOT
2-98					
4-98					
10-99					
3-03					

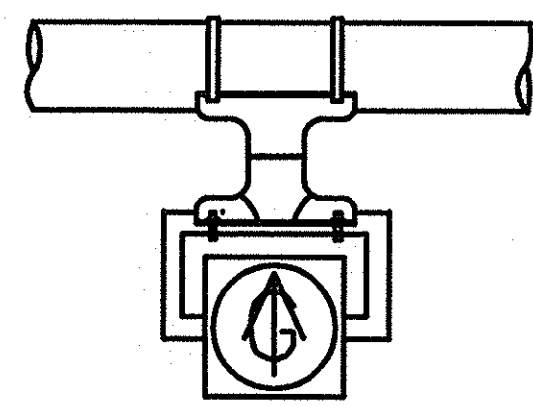
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be obtained by contacting:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3120
Fax (512) 416-3299

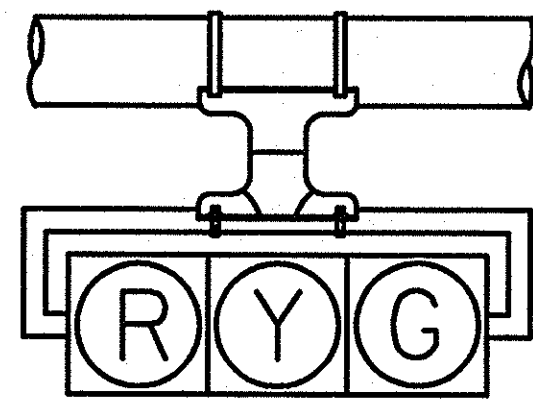
Instructions to locate the "CWZTCD" on TxDOT website are:

Start at website - www.dot.state.tx.us
Click on "About TxDOT",
Click on "Organizational Chart",
Click on Traffic Operations Box,
Click on "Compliant Work Zone Traffic Control Devices",
Click on "View PDF".
This site is printable.

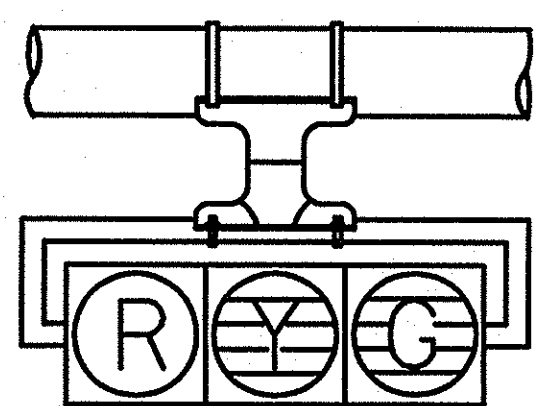
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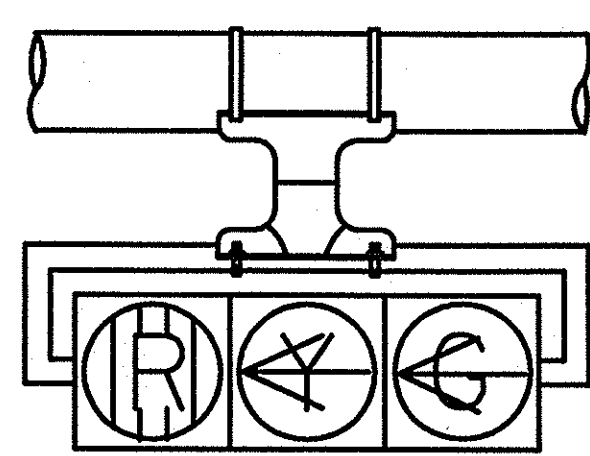
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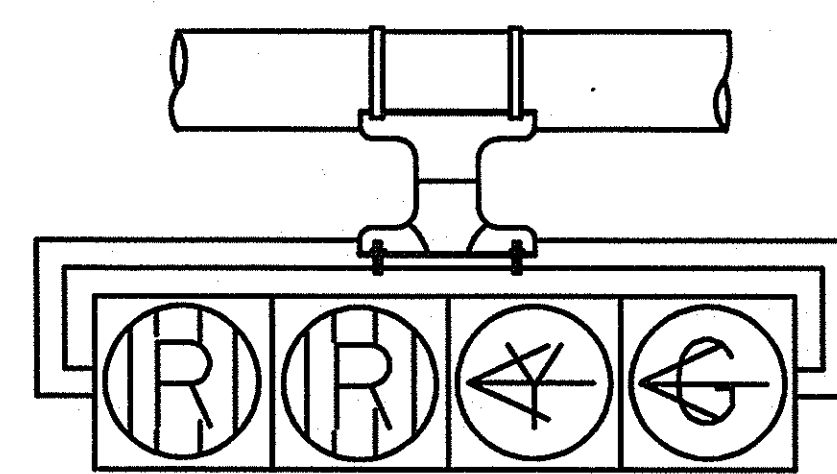
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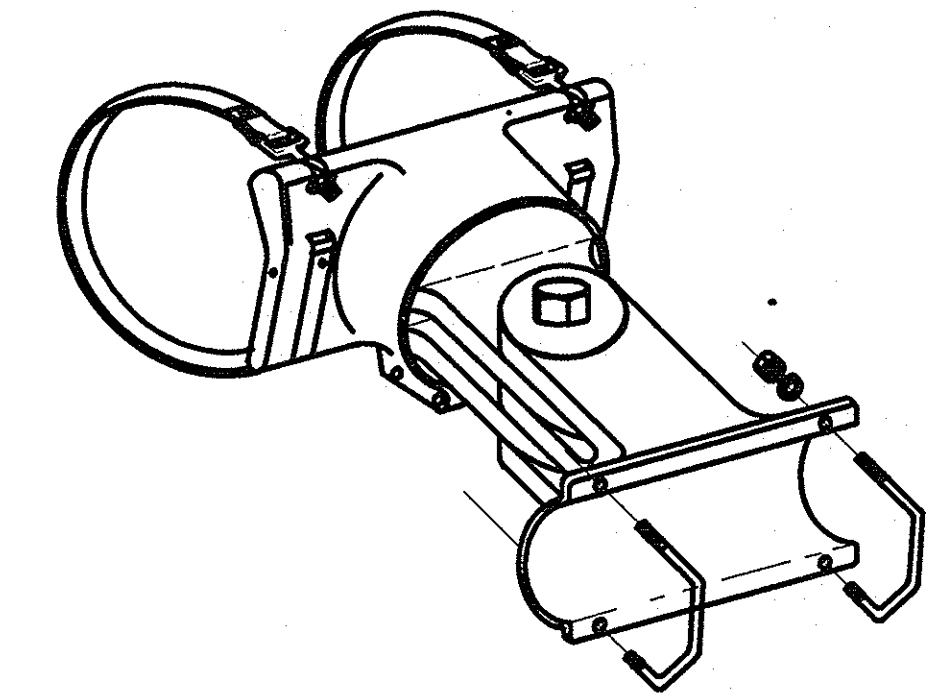
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H3LLT

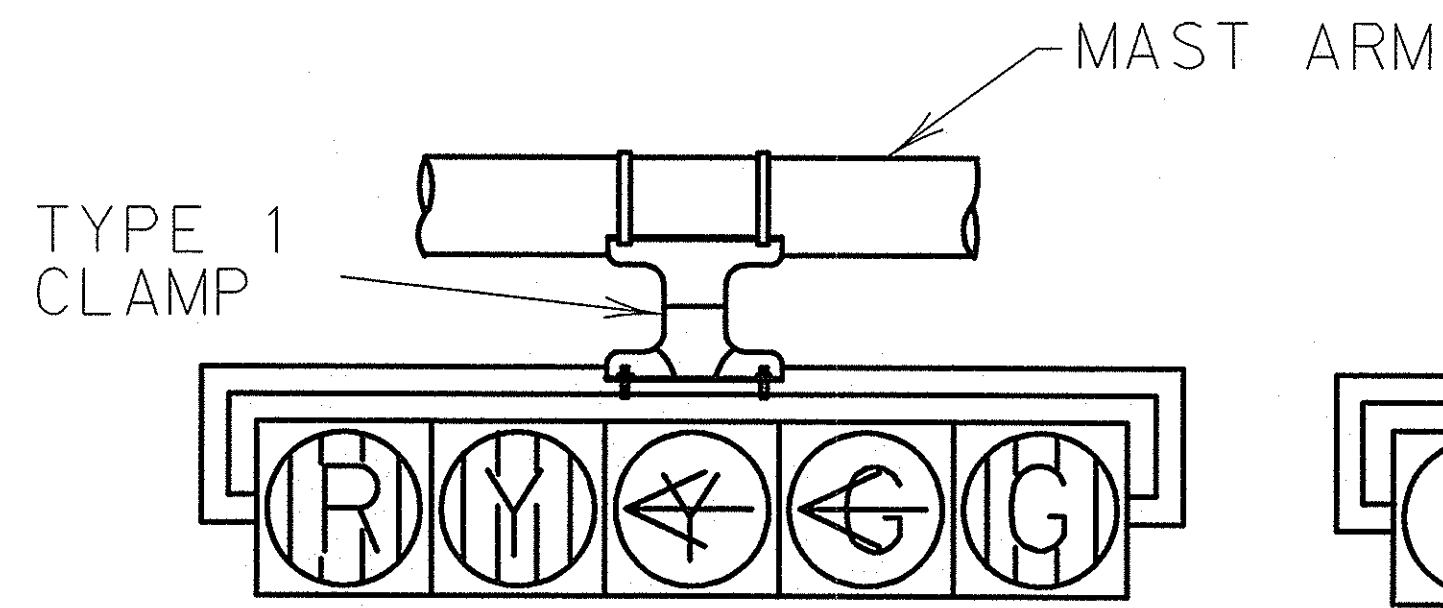


H4LLT

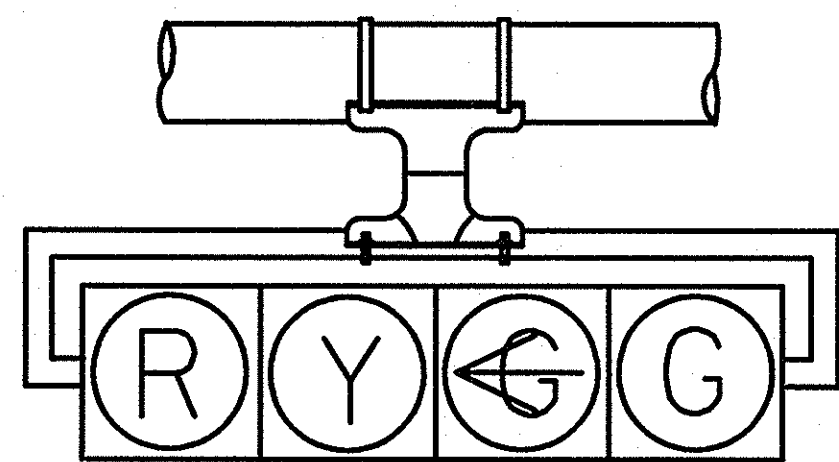


TYPE 2 CLAMP KIT

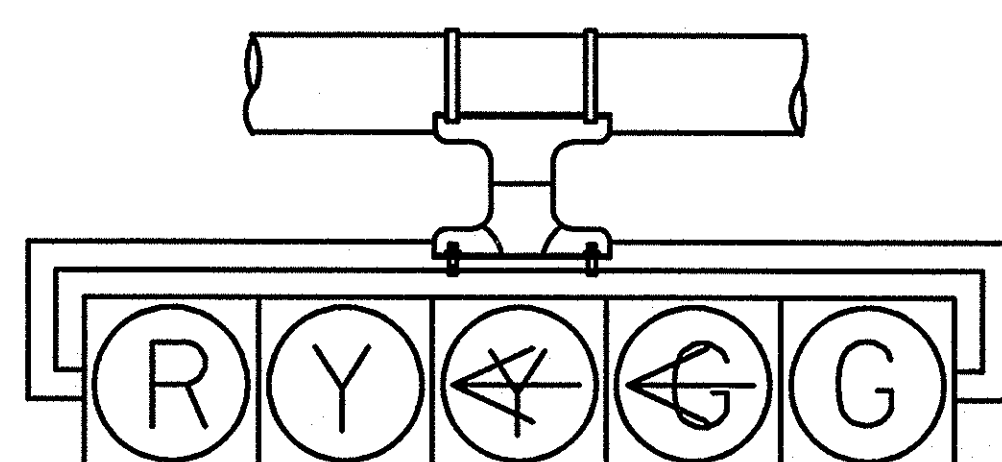
SHALL BE INSTALLED WHEN ROTATION ABOUT THE HORIZONTAL AND VERTICAL AXES ARE NEEDED.



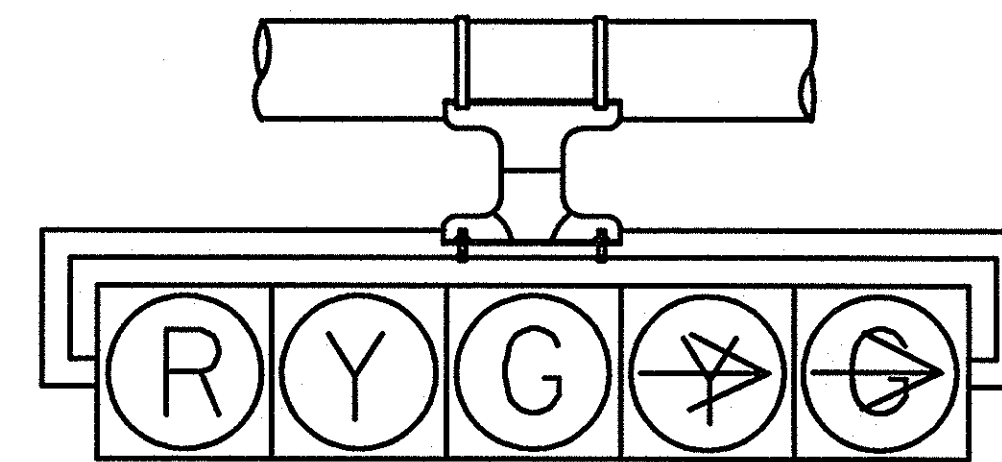
H5LLT



H4LT

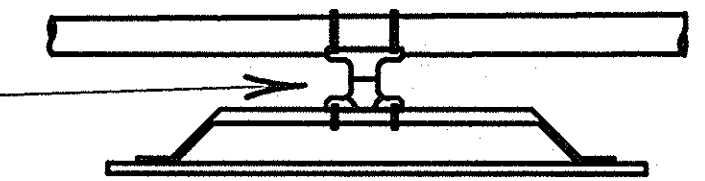


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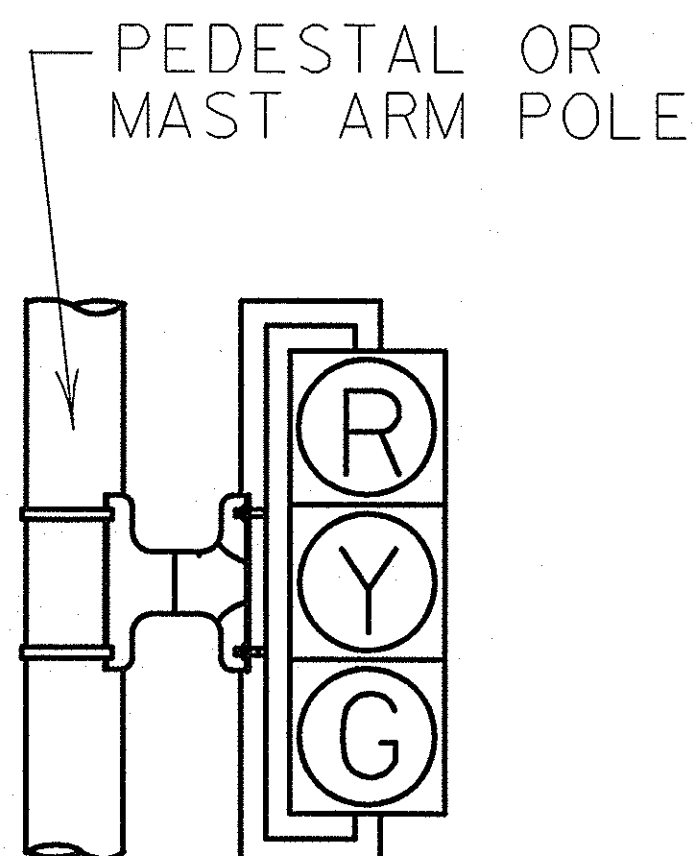
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TYPE 1 CLAMP

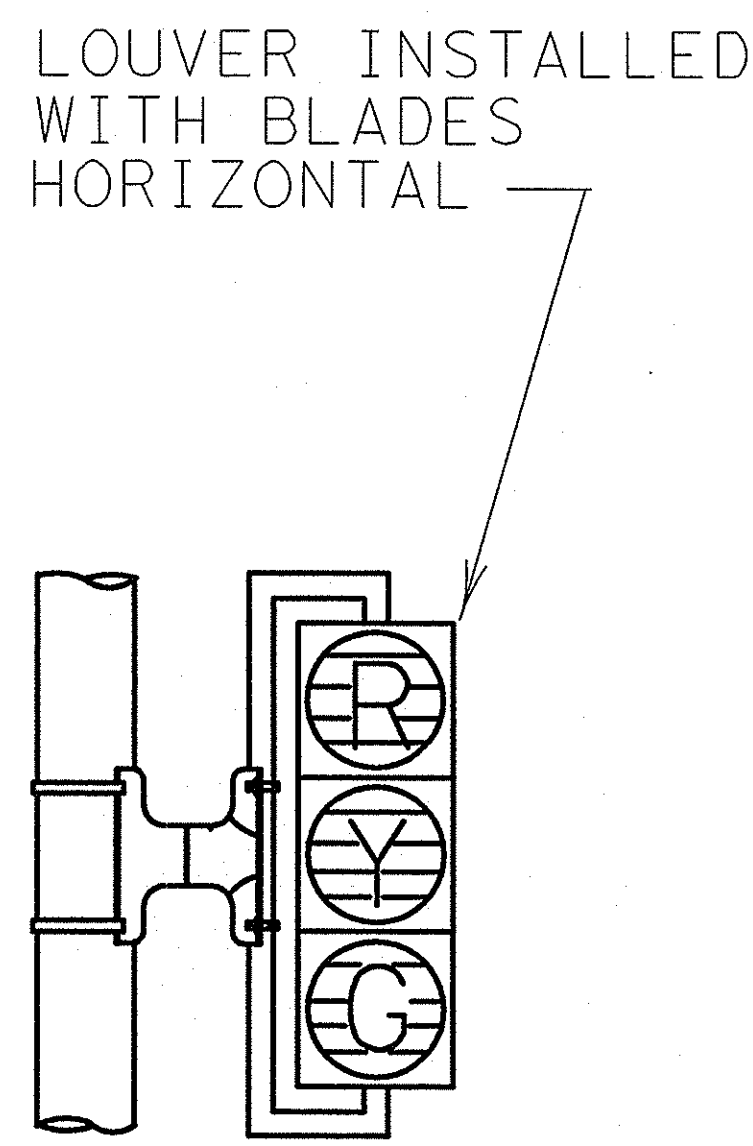


ONE (1) CLAMP SHALL BE USED ON SIGNS LESS THAN OR EQUAL TO 10'-0" IN LENGTH.

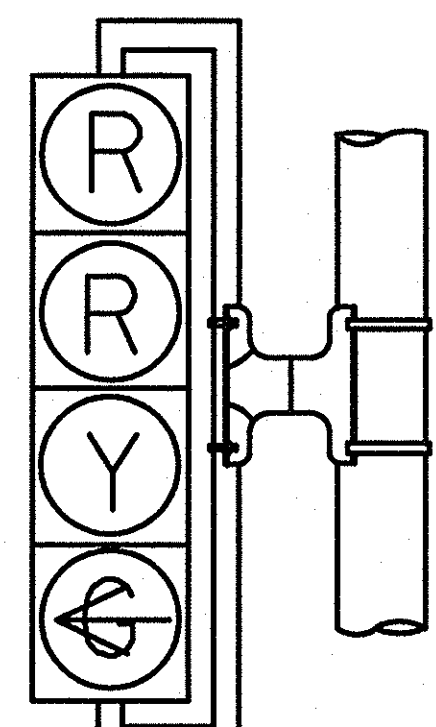
TWO (2) CLAMPS SHALL BE USED ON SIGNS GREATER THAN 10'-0" IN LENGTH.



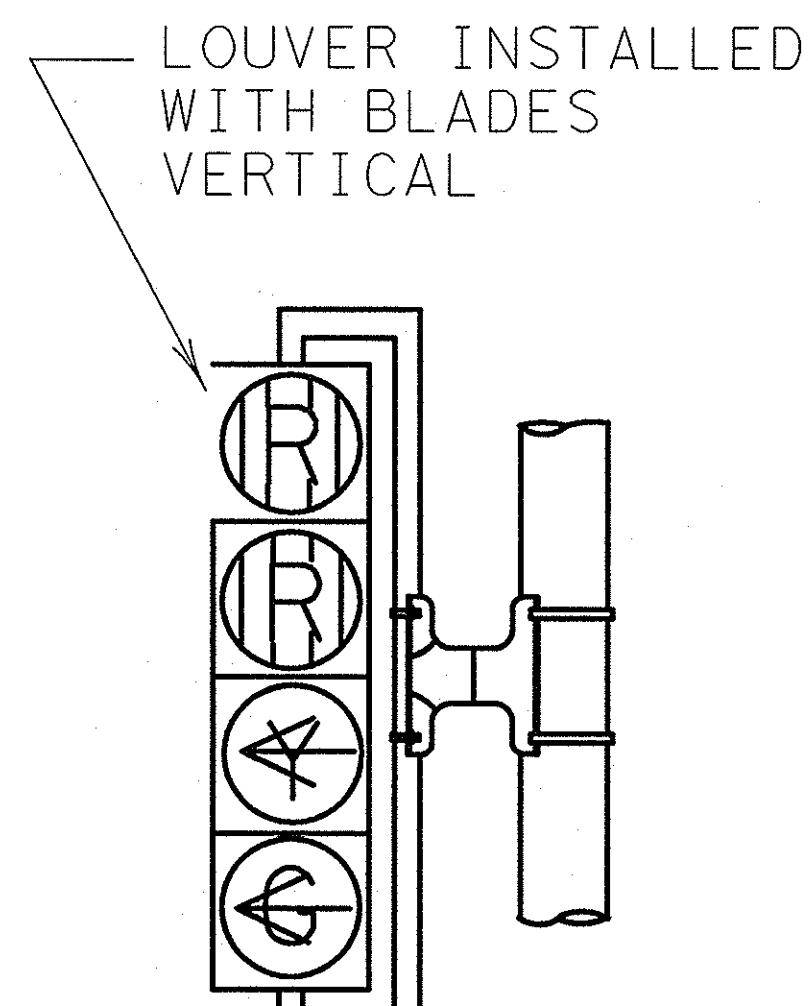
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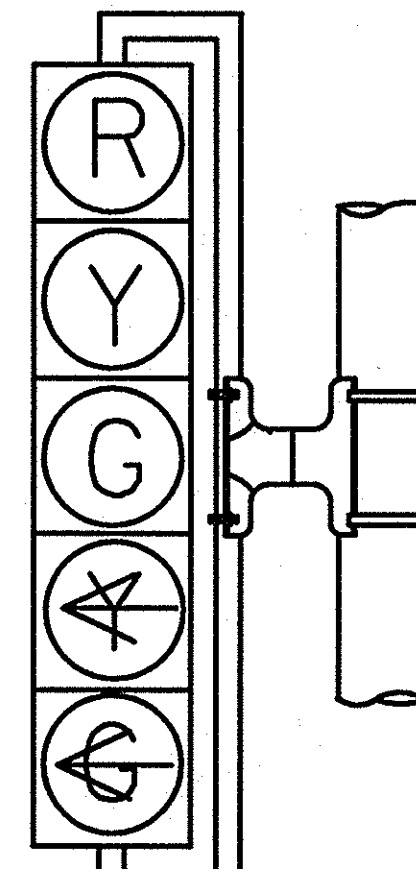
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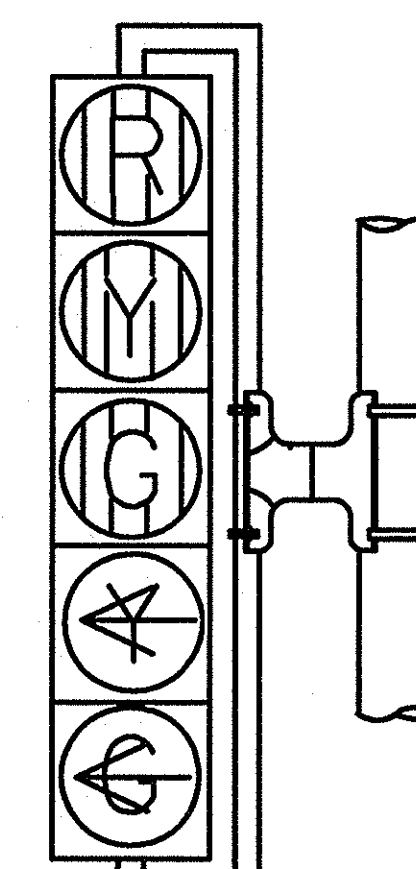
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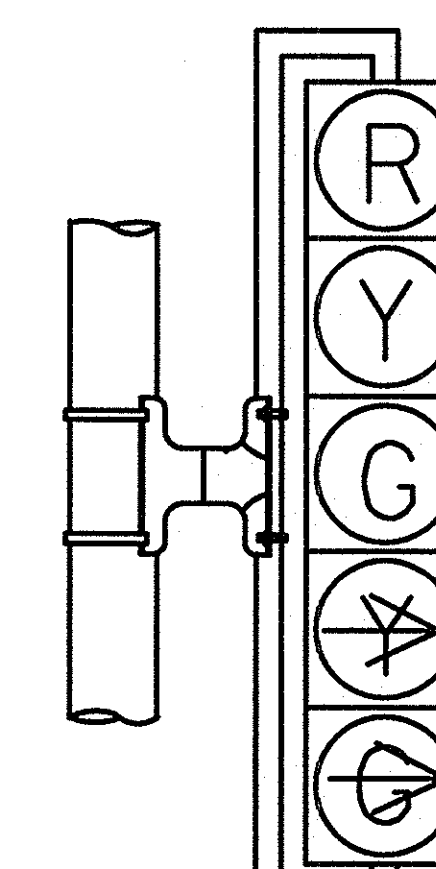
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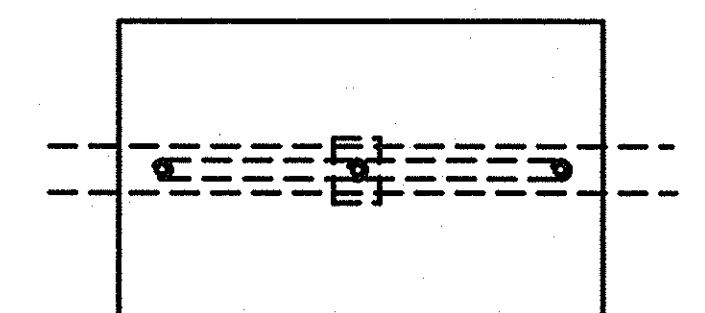
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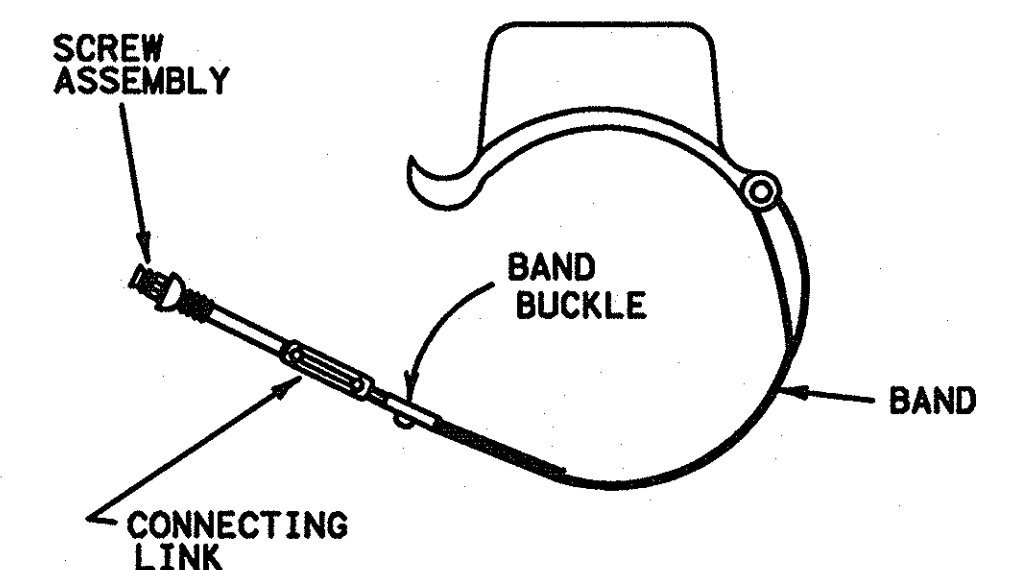
V5LLT



V5RT



SIGN OR DAMPENING DEVICE ATTACHMENT FOR MAST ARMS



TYPE 1 AND 2 CLAMPS

NOTES:

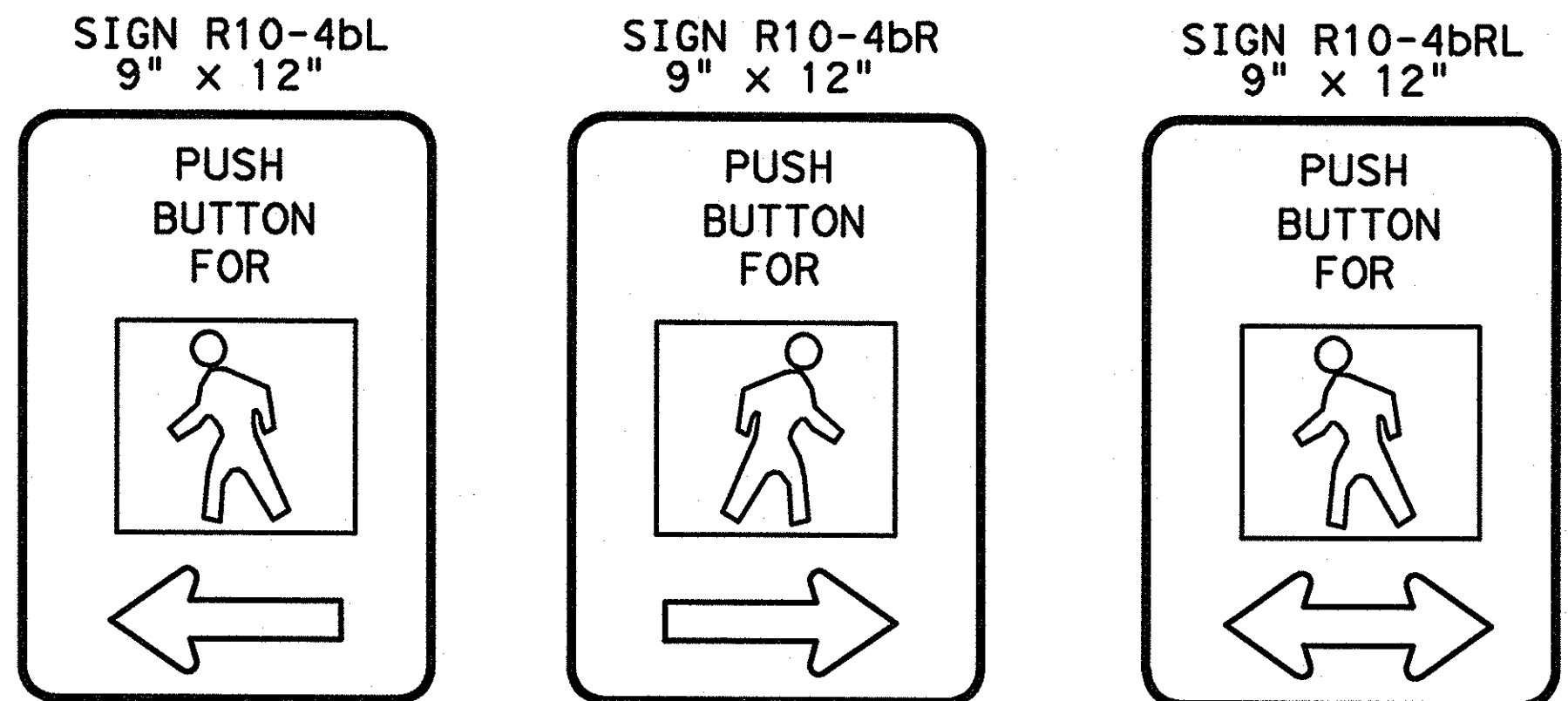
1. VEHICLE SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMP AND APPROPRIATE TUBING.
2. ALL POLE MOUNTED VEHICLE HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. ALL DAMPING DEVICES SHALL BE 18" TO 2' WIDE BY 4' IN LENGTH.

RECORD DRAWINGS (July 2013) INFORMATION PROVIDED BY: Rogers-O'Brien Construction Company

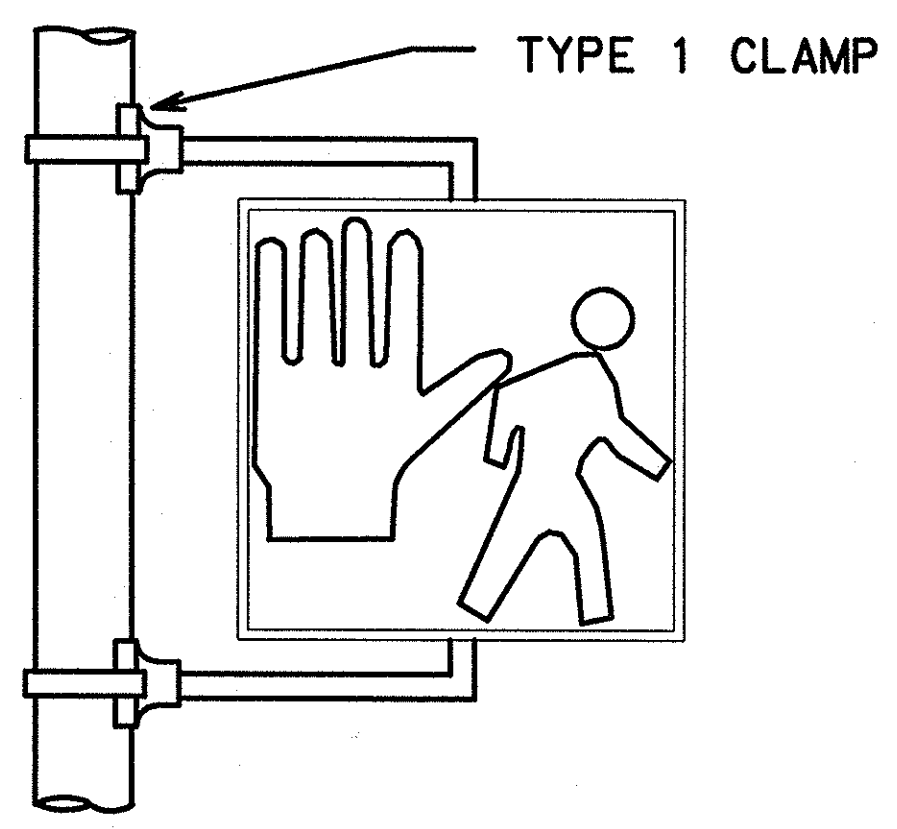
TRAFFIC SIGNAL HEAD IDENTIFICATION

TXDOT 2005 DALLAS DISTRICT STANDARD

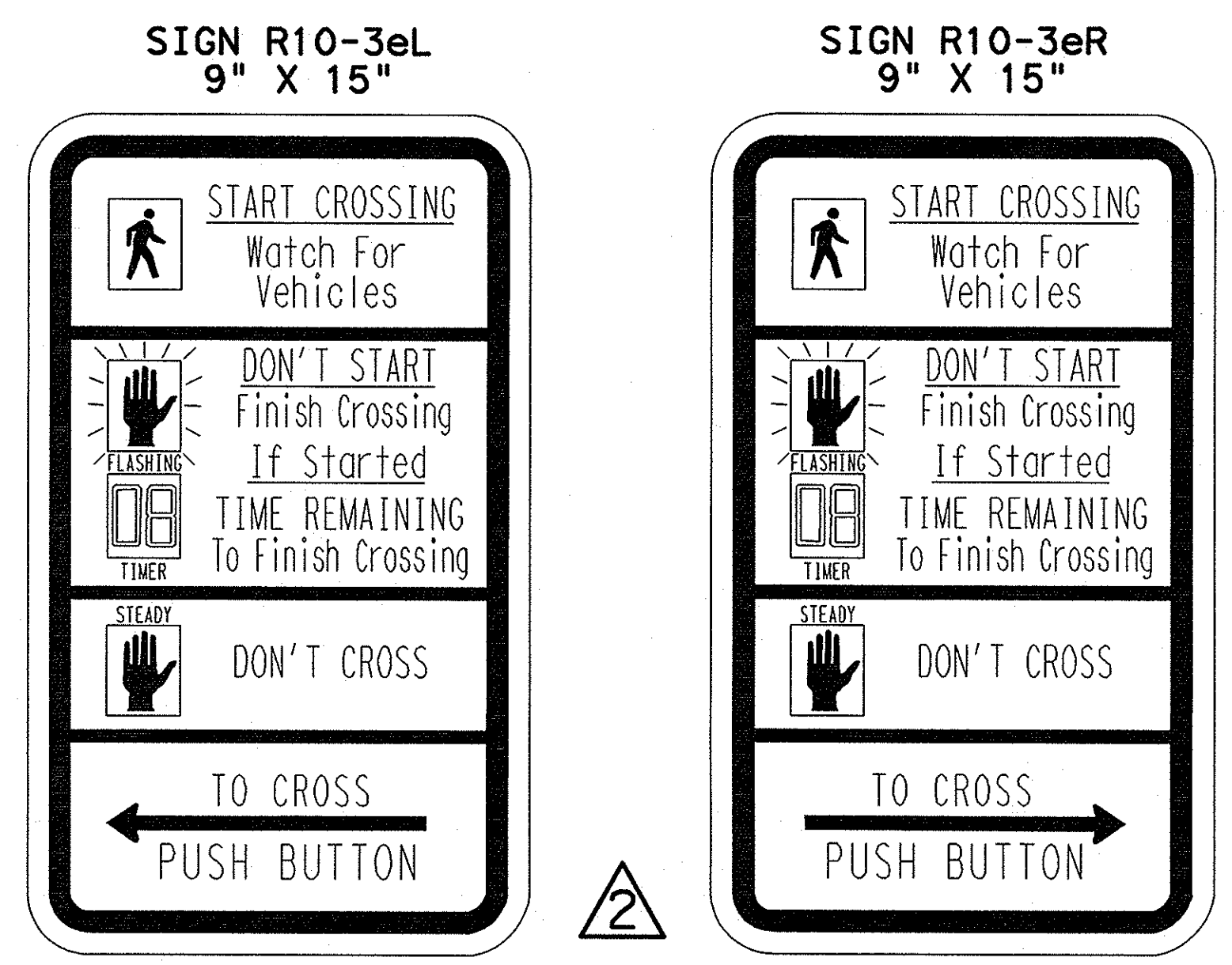
FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.	SHEET NO.
6		
STATE	STATE DIST.	COUNTY
TEXAS		
CONT.	SECT.	JOB HIGHWAY NO.



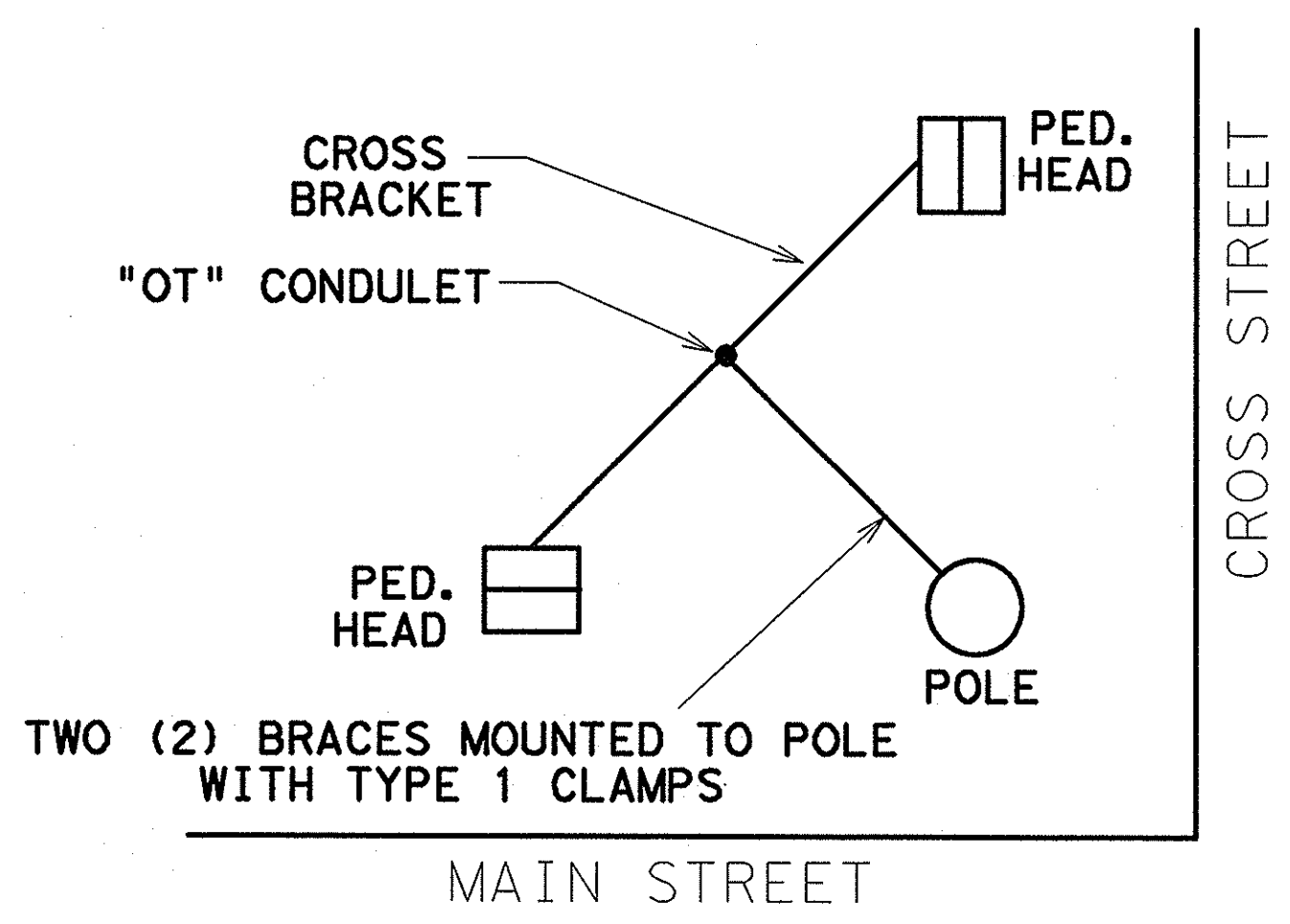
PEDESTRIAN PUSHBUTTON SIGN DETAILS



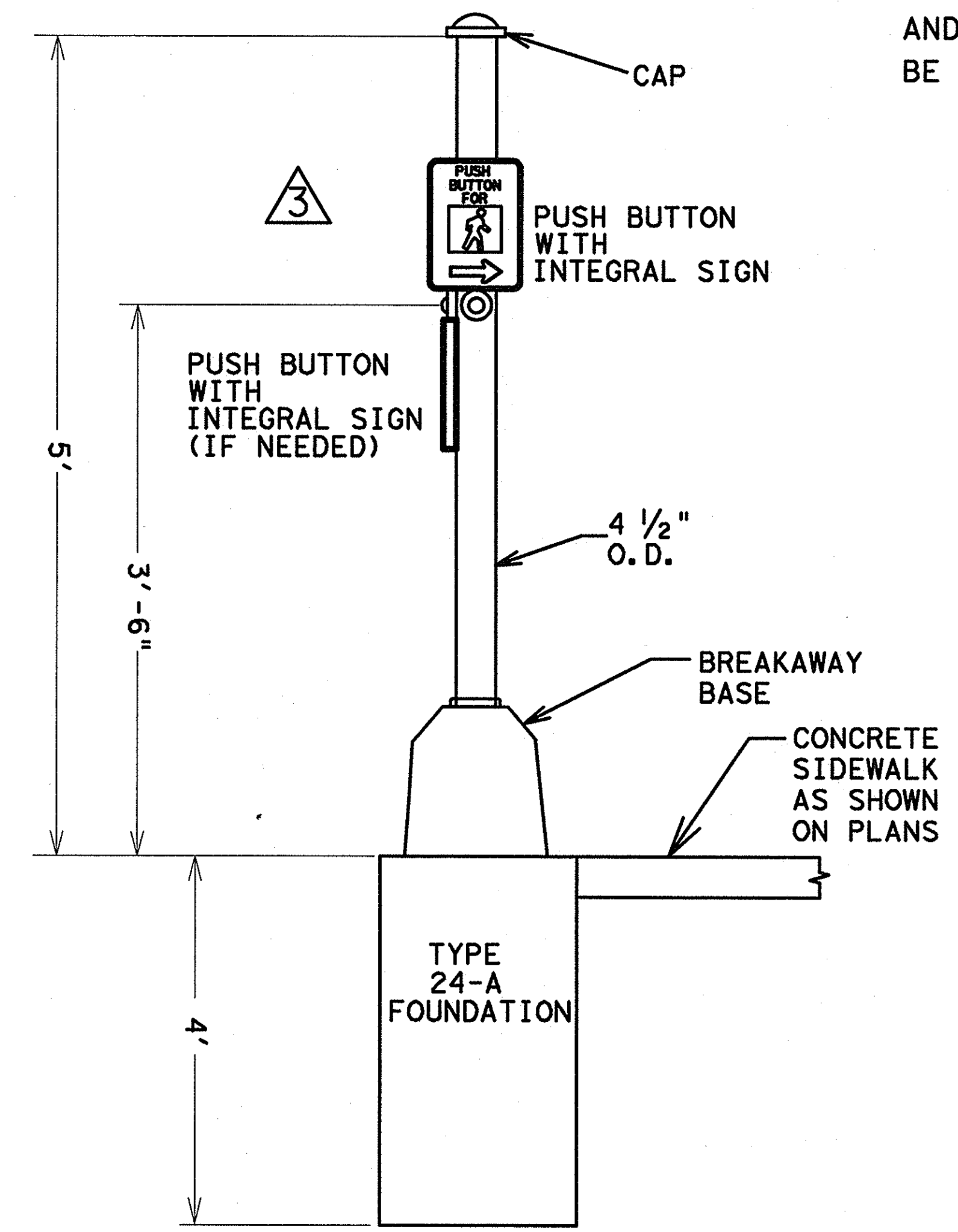
PEDESTRIAN SIGNAL HEAD MOUNTING FOR ONE PEDESTRIAN SIGNAL HEAD 152A



COUNTDOWN PEDESTRIAN PUSHBUTTON SIGN DETAILS



PEDESTRIAN SIGNAL HEAD MOUNTING FOR TWO PEDESTRIAN SIGNAL HEADS 143C

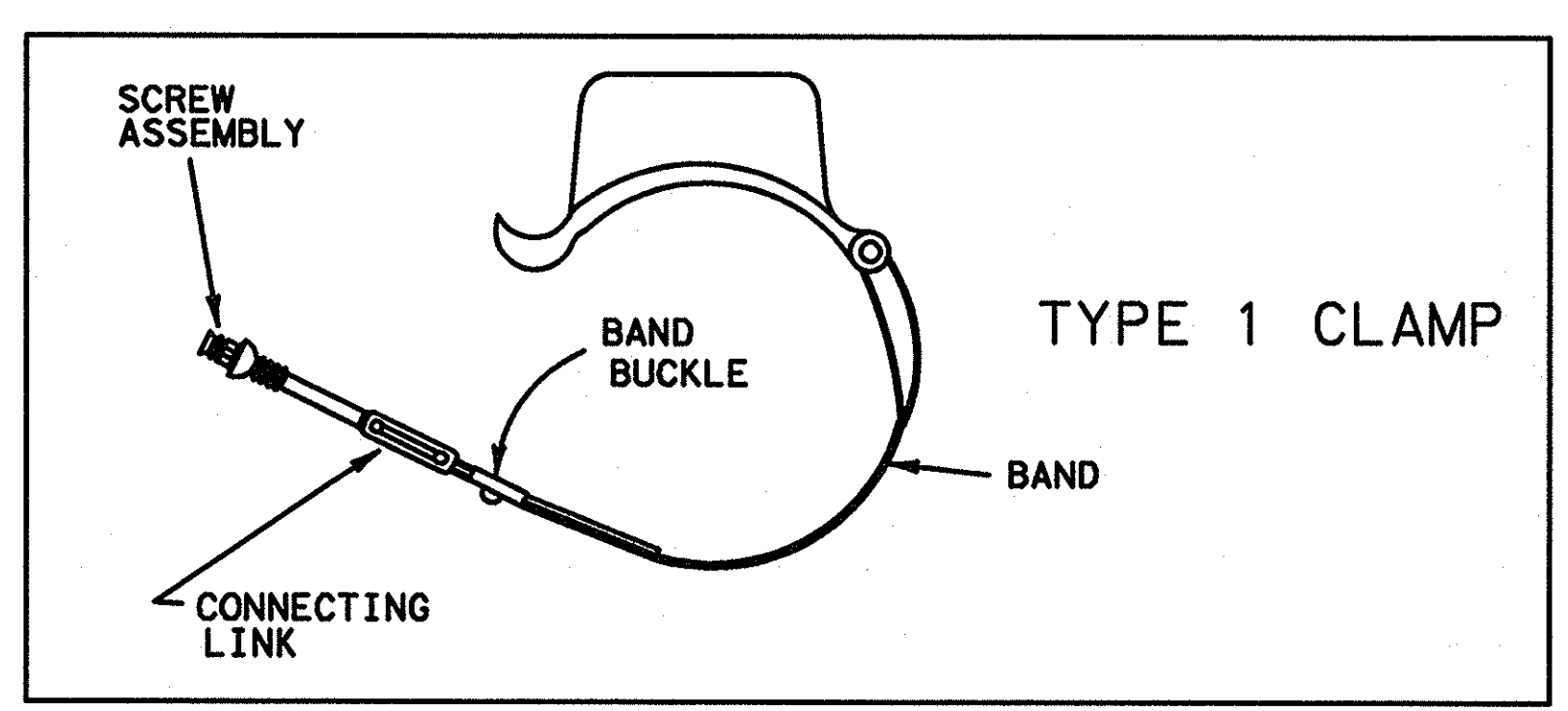


PEDESTRIAN PUSH BUTTON POLE

NOTE:
 THE POLES ON THIS DRAWING ARE 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.

NOTE: CLAM SHELL MOUNTING HARDWARE MAY BE USED INSTEAD OF MOUNTING HARDWARE SHOWN ABOVE, AS APPROVED BY THE ENGINEER. ICC P/N 4805 OR McCAIN QUICKMOUNT OR APPROVED EQUAL.

- NOTES:
1. PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMPS AND APPROPRIATE TUBING.
 2. ALL PEDESTRIAN SIGNAL HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
 3. ALL WIRING FOR PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
 4. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ABOVE.



- 1 ALTERNATIVE MOUNTING METHOD revised 12-92
- 2 ALTERNATIVE PEDESTRIAN SIGNAL HEAD AND SIGNING revised 10-08
- 3 PEDESTRIAN PUSH BUTTON POLE revised 01-11

RECORD DRAWINGS (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

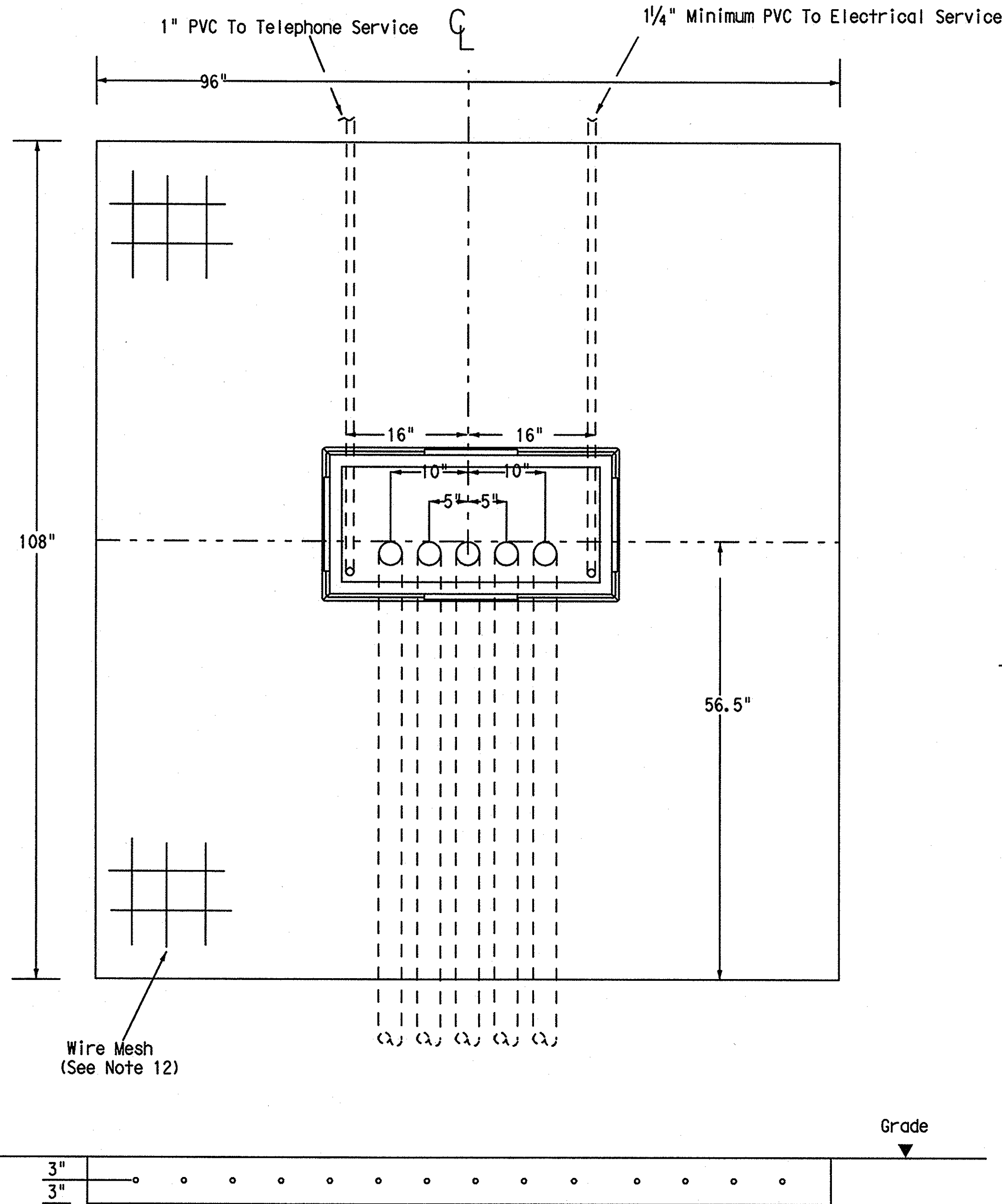
PEDESTRIAN SIGNAL HEAD IDENTIFICATION

DALLAS DISTRICT STANDARD

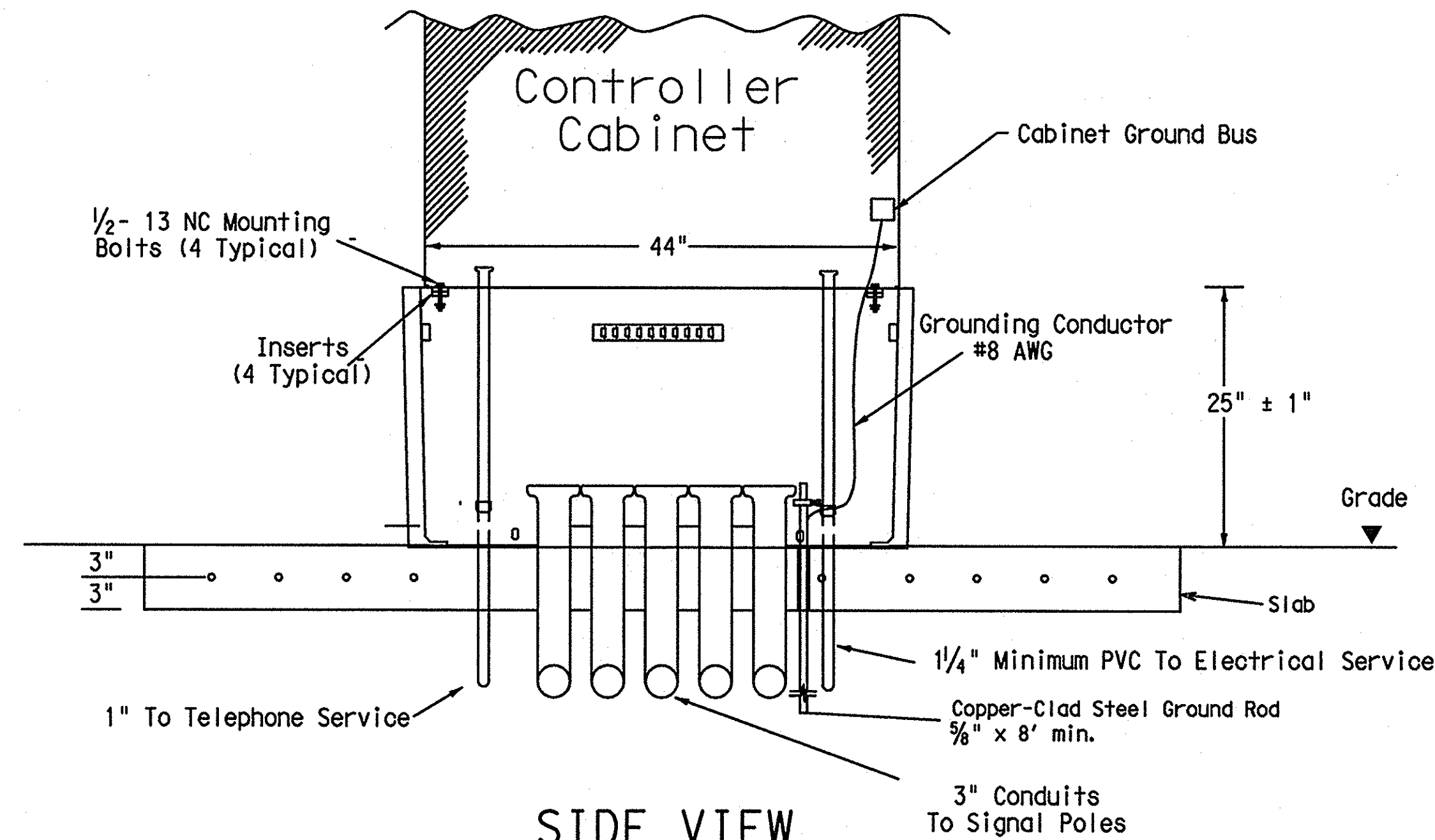
FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6	(SEE TITLE SHEET)	
STATE	STATE DIST.	COUNTY
TEXAS	18	
CONT.	SECT.	JOB HIGHWAY NO.

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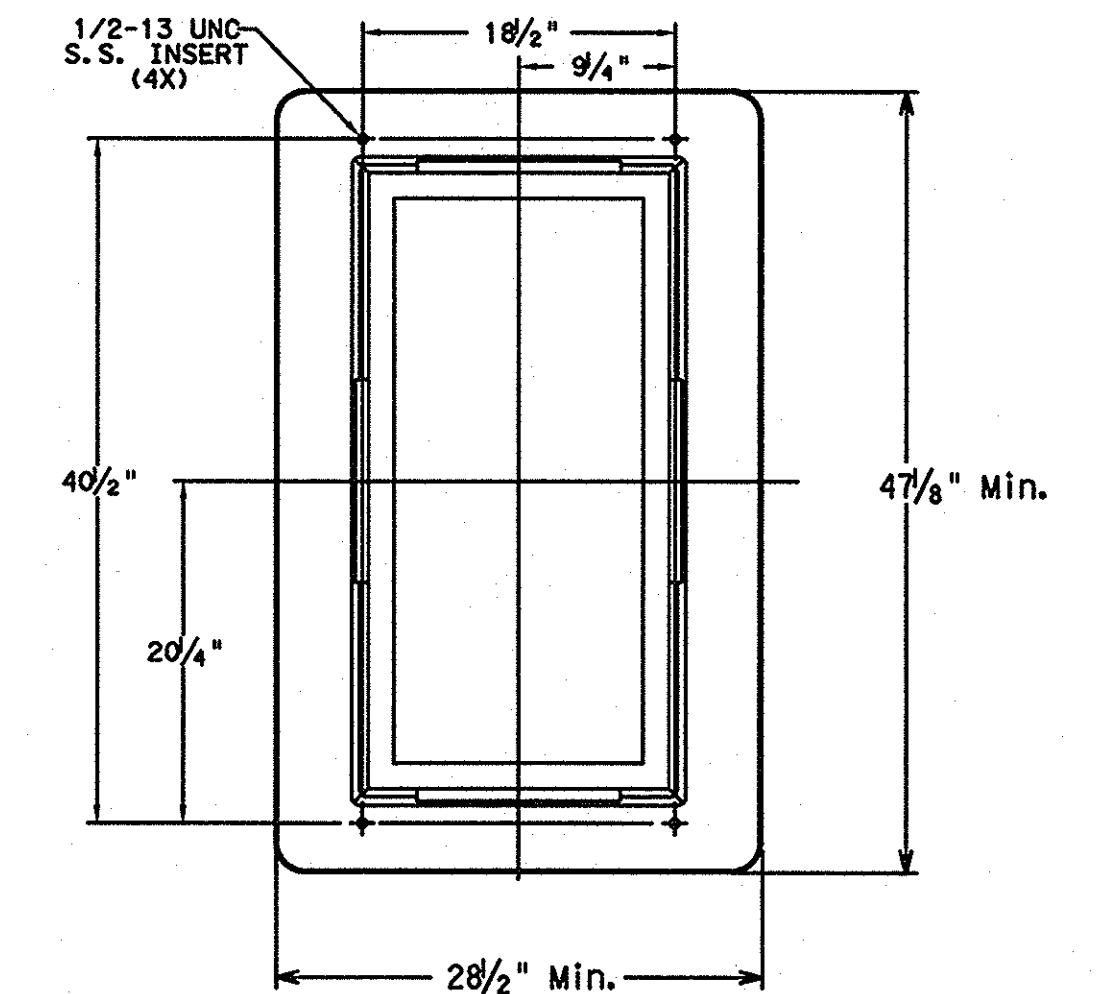
TOP VIEW
(Slab & Base)



SIDE VIEW
(Slab & Base)



CABINET BASE



TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armocast Part # A6001848X24, Quazite Model # PG3048Z709, or other as approved by TxDOT Traffic Operation Division.
 2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
 3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
 4. Supply the cabinet base with four 1/2"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
 5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7" from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 3/8 x 3/8 inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using 1/2"-13 UNC stainless steel screws and inserts.
 6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
 7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
 8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.
- CONCRETE SLAB:
9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.

10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:
20. Bid TS-CF as subsidiary to Item 680.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL
CONTROLLER CABINET
BASE AND PAD

TS-CF-04

© TxDOT October 2000	DATE TxDOT	CK: TxDOT	DATE TxDOT	CK: TxDOT
12-04	REVISIONS	CURT SECT	JUB	HIGHWAY
		DIST	COUNTY	SHEET NO.

DATE:
FILE:

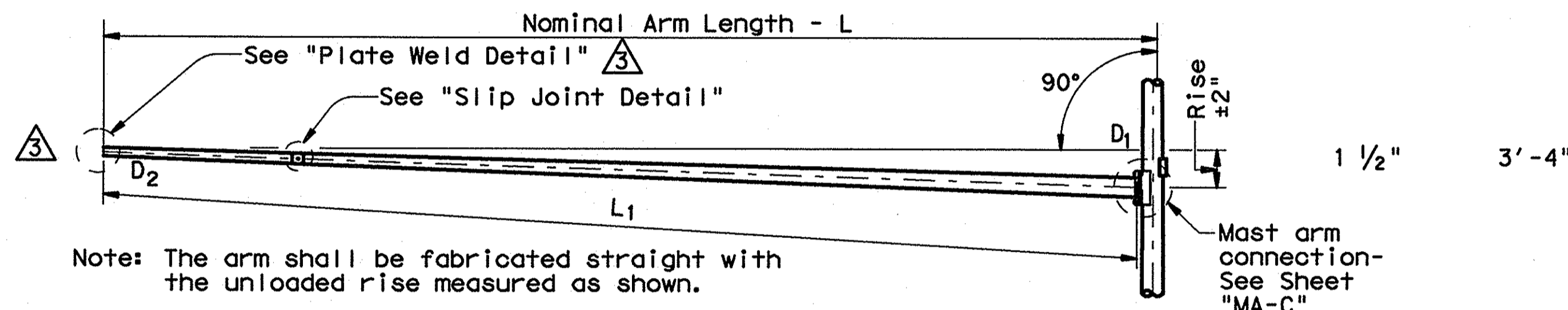
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

Arm Length ft.	ROUND POLES					POLYGONAL POLES					Foundation Type
	D _B in.	D ₁₉ in.	D ₂₄ in.	D ₃₀ in.	① thk in.	D _B in.	D ₁₉ in.	D ₂₄ in.	D ₃₀ in.	① thk 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	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-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

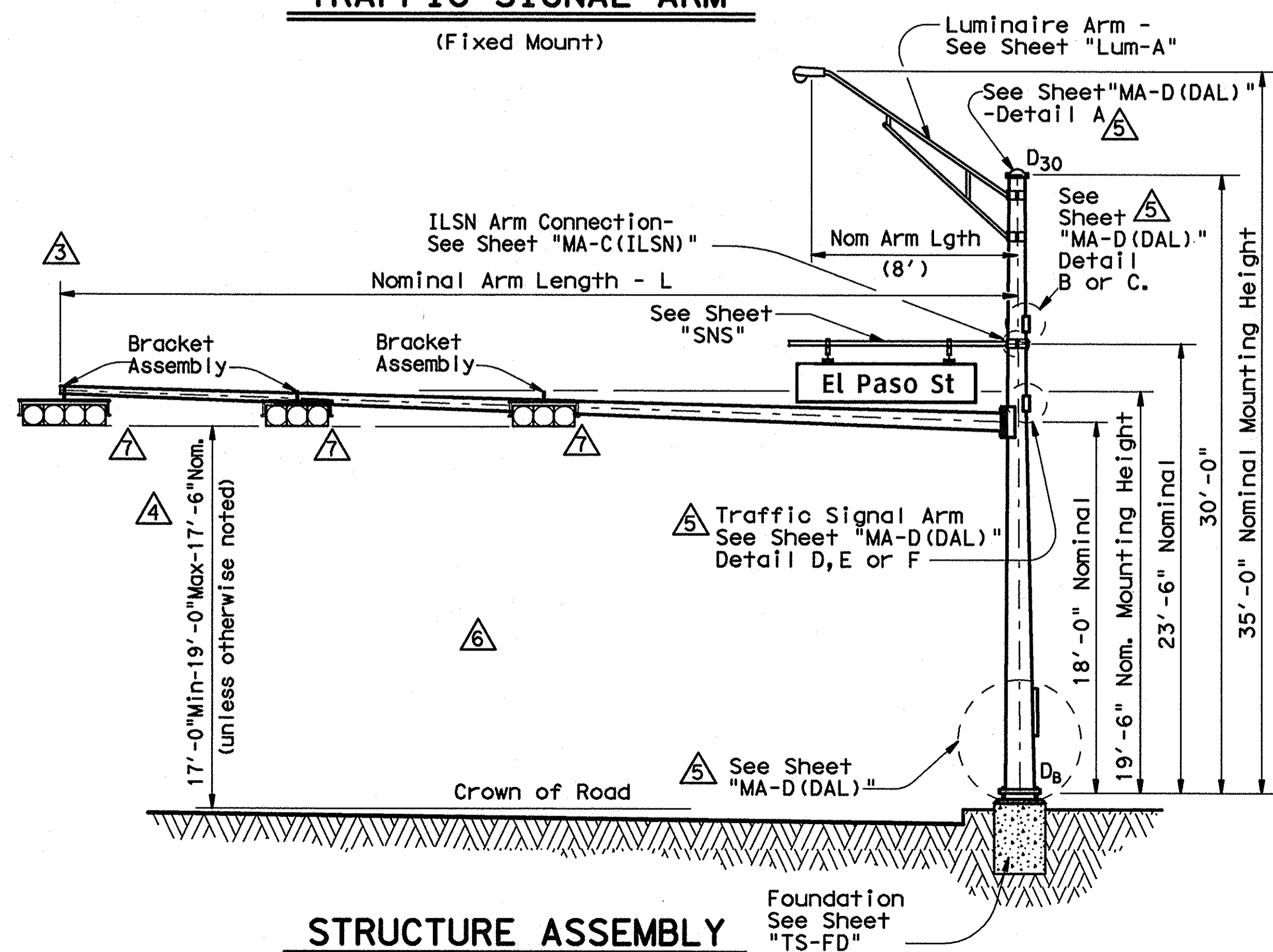
Arm Length ft.	ROUND ARMS					POLYGONAL ARMS				
	L ₁ ft.	D ₁ in.	D ₂ in.	① thk in.	Rise	L ₁ ft.	D ₁ in.	② D ₂ in.	① thk in.	Rise
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.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.
 D₁₉ = Pole Top O.D. with no Luminaire and no ILSN
 D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
 D₃₀ = Pole Top O.D. with Luminaire
 D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 L = Nominal Arm Length

- ① Thickness shown are minimums, thicker materials may be used.
- ② D₂ may be increased by up to 1" for polygonal arms.



TRAFFIC SIGNAL ARM
(Fixed Mount)



STRUCTURE ASSEMBLY

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		24' Poles With ILSN		19' Poles With No Luminaire and No ILSN	
	Designation	Quantity	Designation	Quantity	Designation	Quantity
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	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		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)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	Designation	Quantity	Designation	Quantity	Designation	Quantity
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40			40II-80		40III-80	
44			44II-80		44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

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
3/4"	1'-6"	
1 1/2"	3'-4"	
1 3/4"	3'-10"	

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

MODIFICATIONS:

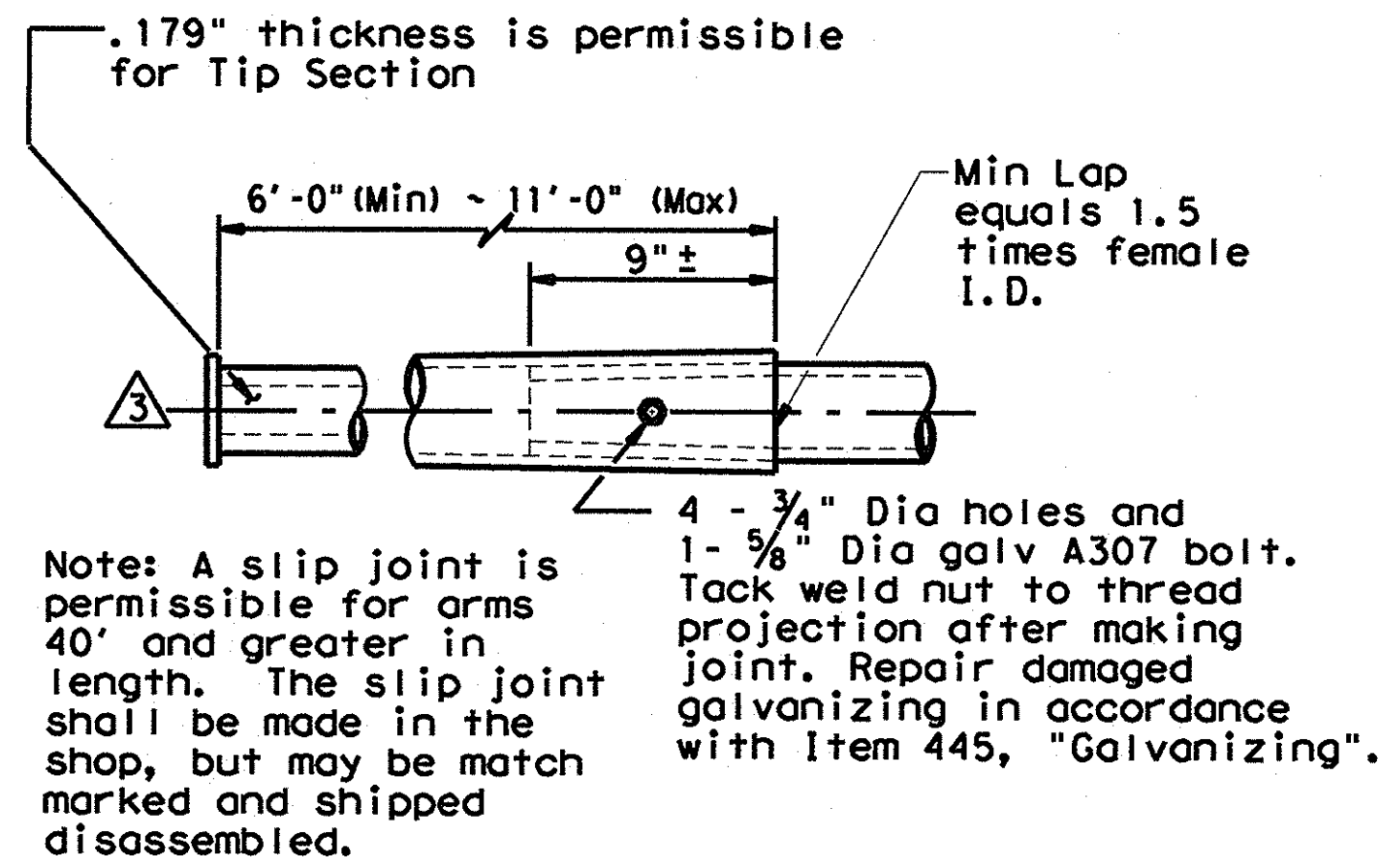
- ① REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY. (2/12)
- ② ADDITIONAL OPTION. (3/12)
- ③ REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)
- ④ REVISED MINIMUM SIGNAL HEIGHT. (3/12)
- ⑤ REPLACED "MA-D" WITH "MA-D(DAL)". (2/12)
- ⑥ REMOVED TABLE OF DIMENSIONS "A". (2/12)
- ⑦ REMOVED CGB CONNECTORS. (2/12)

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-D'Brien Construction Company

Texas Department of Transportation
TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY
(80 MPH WIND ZONE)
SMA-80(1)-12(DAL)

REVISIONS		DATE	BY	CHKD	APP'D	DESCRIPTION
5-96	11-99	1-12				
18						

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SLIP JOINT DETAIL

NOTE:
 Pole manufacturer shall drill 1/2" hole in bottom of mast arm at end plate.
 (for hot-dip galvanizing)

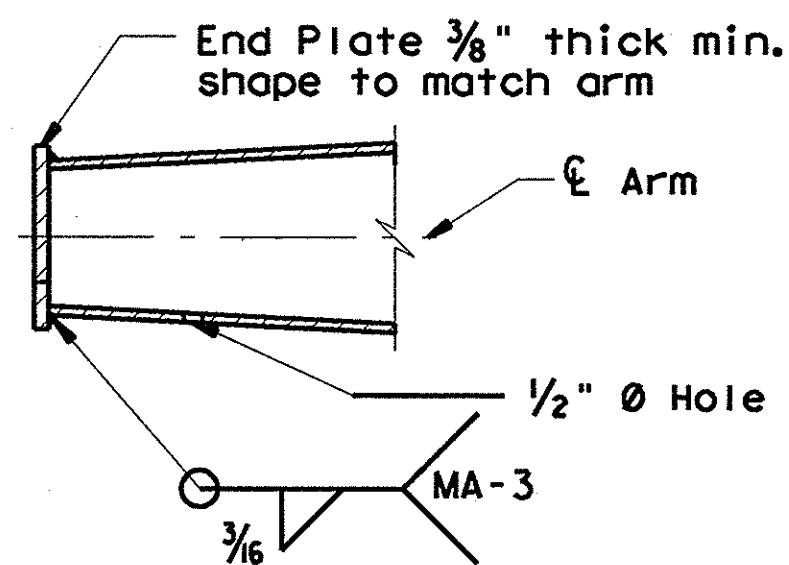


PLATE WELD DETAIL

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1/2" Dia Threaded Coupling.

BRACKET ASSEMBLY

VIBRATION WARNING

Most Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backplates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

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.

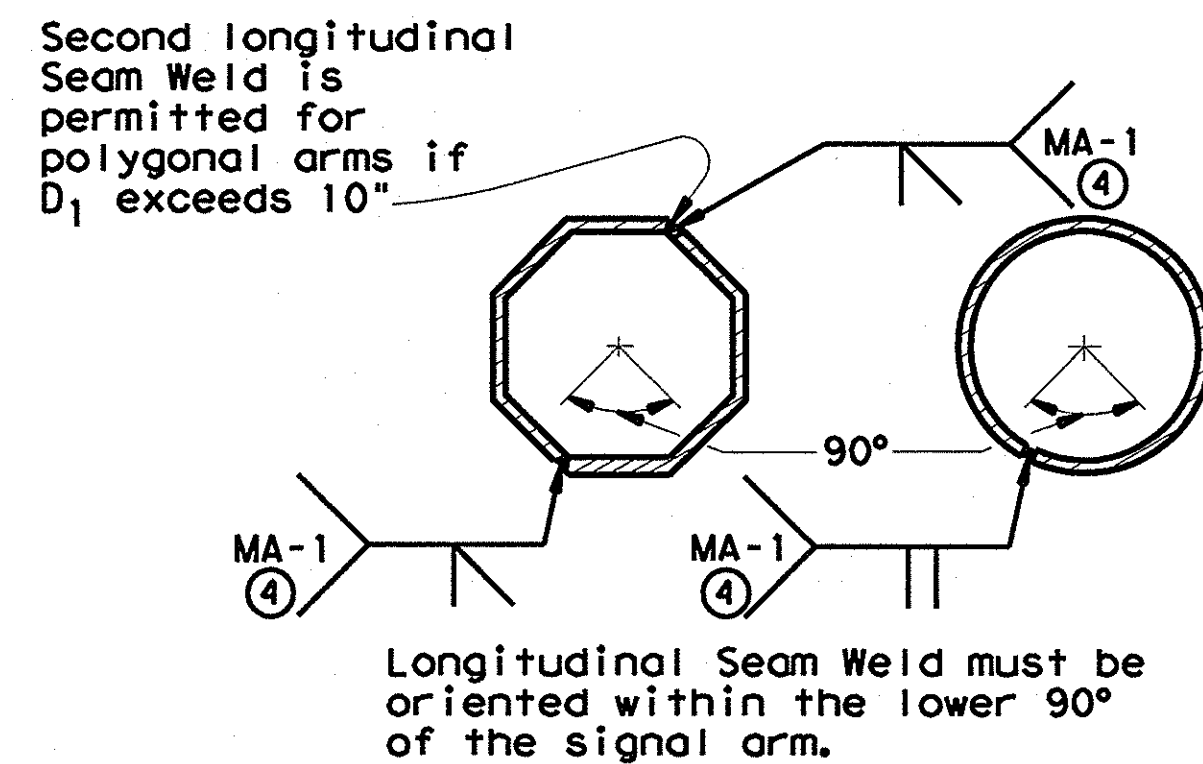
Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 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(DAL)" 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 Item 686, "Traffic Signal Pole Assemblies (Steel)" 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. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

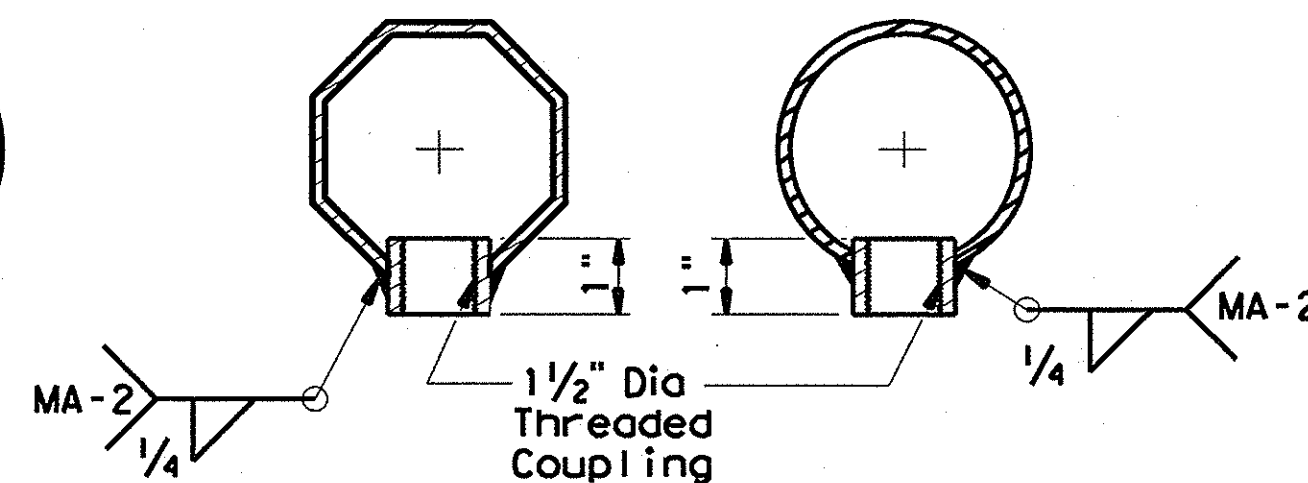
Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.



ARM WELD DETAIL

④ 60% Min. penetration
 100% penetration within
 6" of circumferential
 base welds.



ARM COUPLING DETAILS

③ REPLACED TENON DETAIL WITH PLATE WELD DETAIL (2/12).

⑤ REPLACED "MA-D" WITH "MA-D(DAL)" (2/12).

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

Texas Department of Transportation

**TRAFFIC SIGNAL
 SUPPORT STRUCTURES
 SINGLE MAST ARM ASSEMBLY
 (80 MPH WIND ZONE)
 SMA-80(2)-12(DAL)**

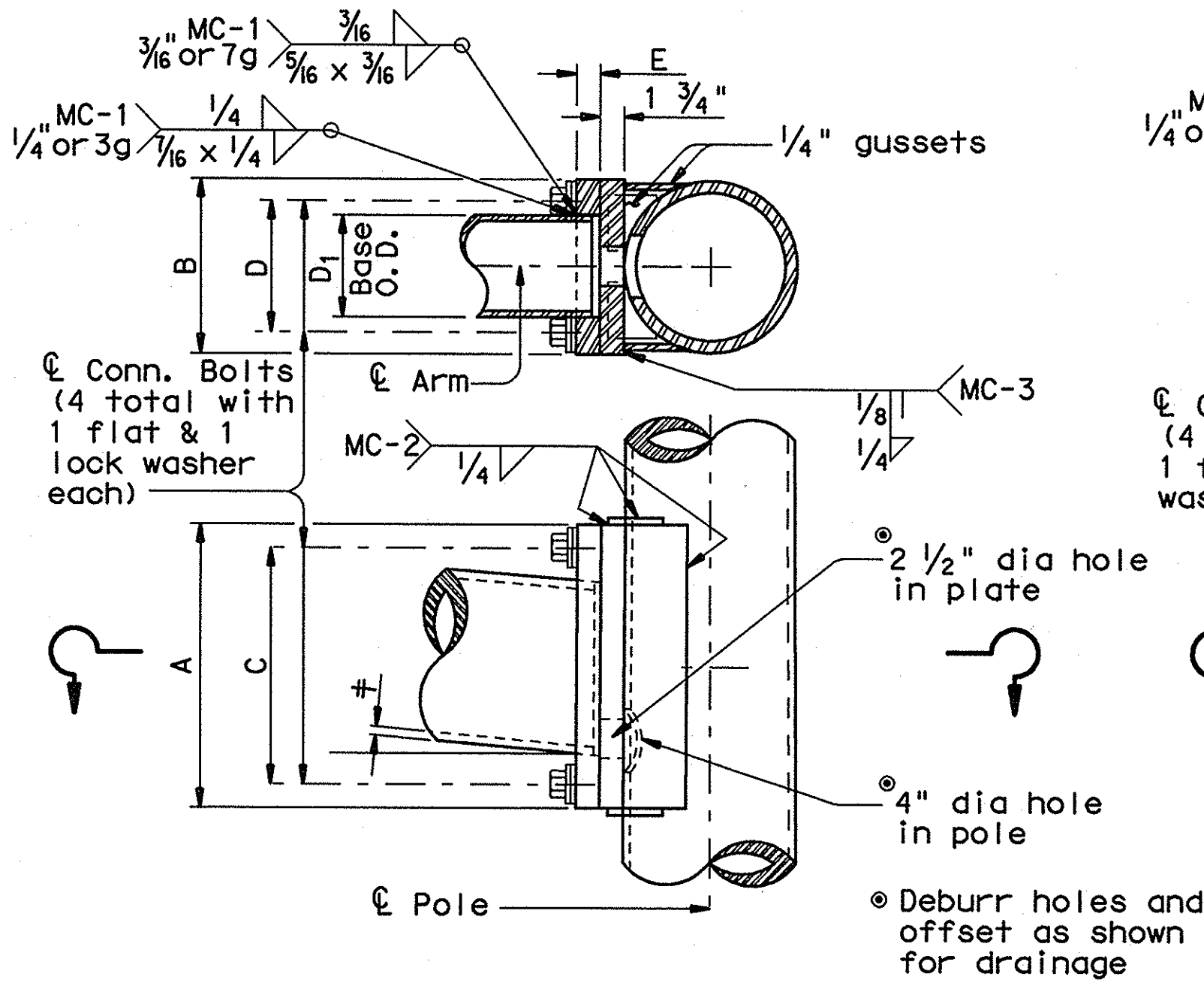
© TxDOT August 1995		DW: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS		CONT	SECT	JOB	HIGHWAY
5-96					
1-12					
		DIST	COUNTY		SHEET NO.
		18			

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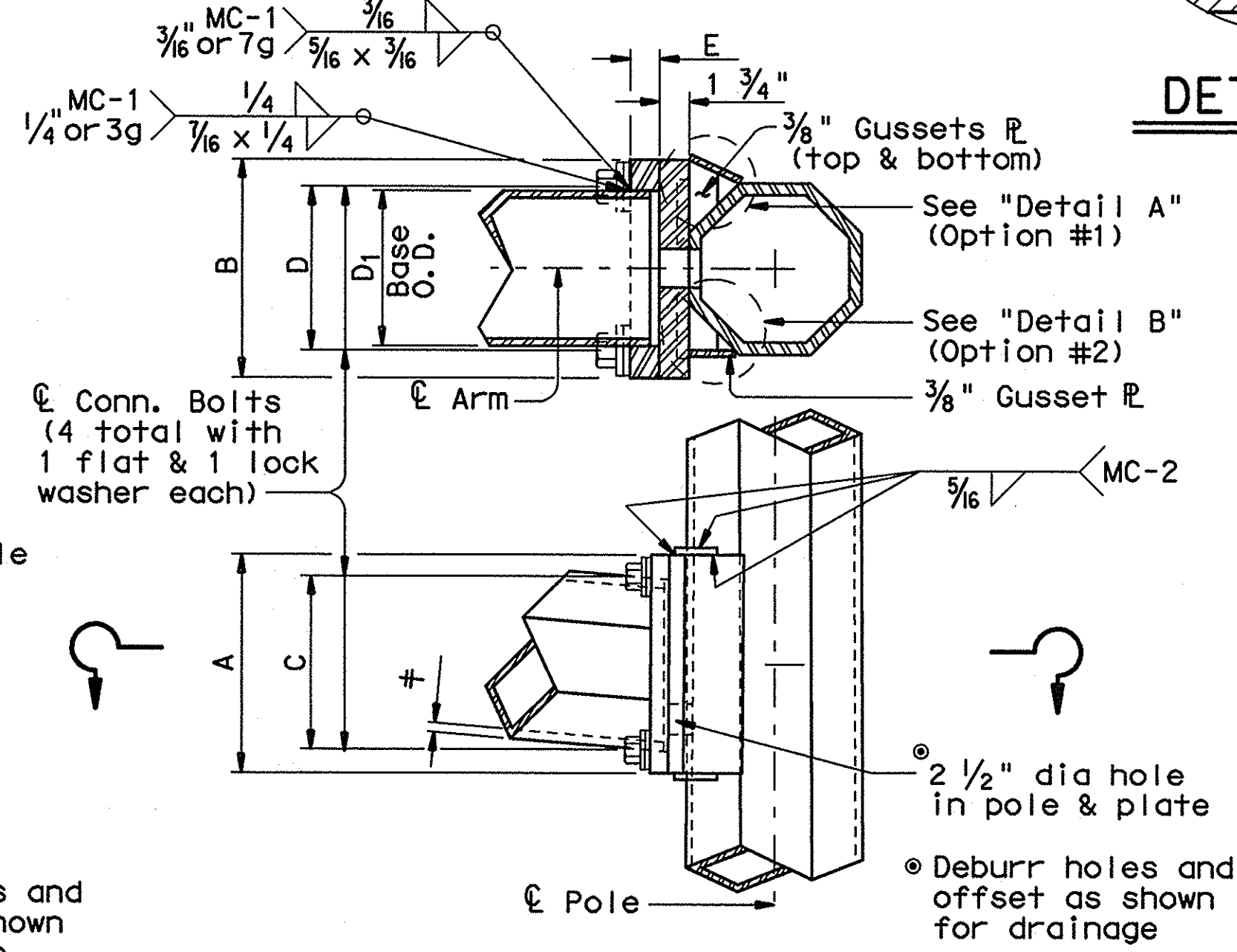
DATE: FILE:

ARM SIZE		A	B	C	D	E	CONN BOLT DIA
D ₁	±	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 3/4	1
7.5	.179	13	9	10	6	1 3/4	1
8.0	.179	14	10	11	7	2	1 1/4
9.0	.179	16	11	13	8	2	1 1/4
9.5	.179	17	12	14	9	2	1 1/4
9.5	.239	18	12	15	9	2	1 1/4
10.0	.239	18	12	15	9	2	1 1/4
10.5	.239	18	13	15	10	3	1 1/2
11.0	.239	18	13	15	10	3	1 1/2

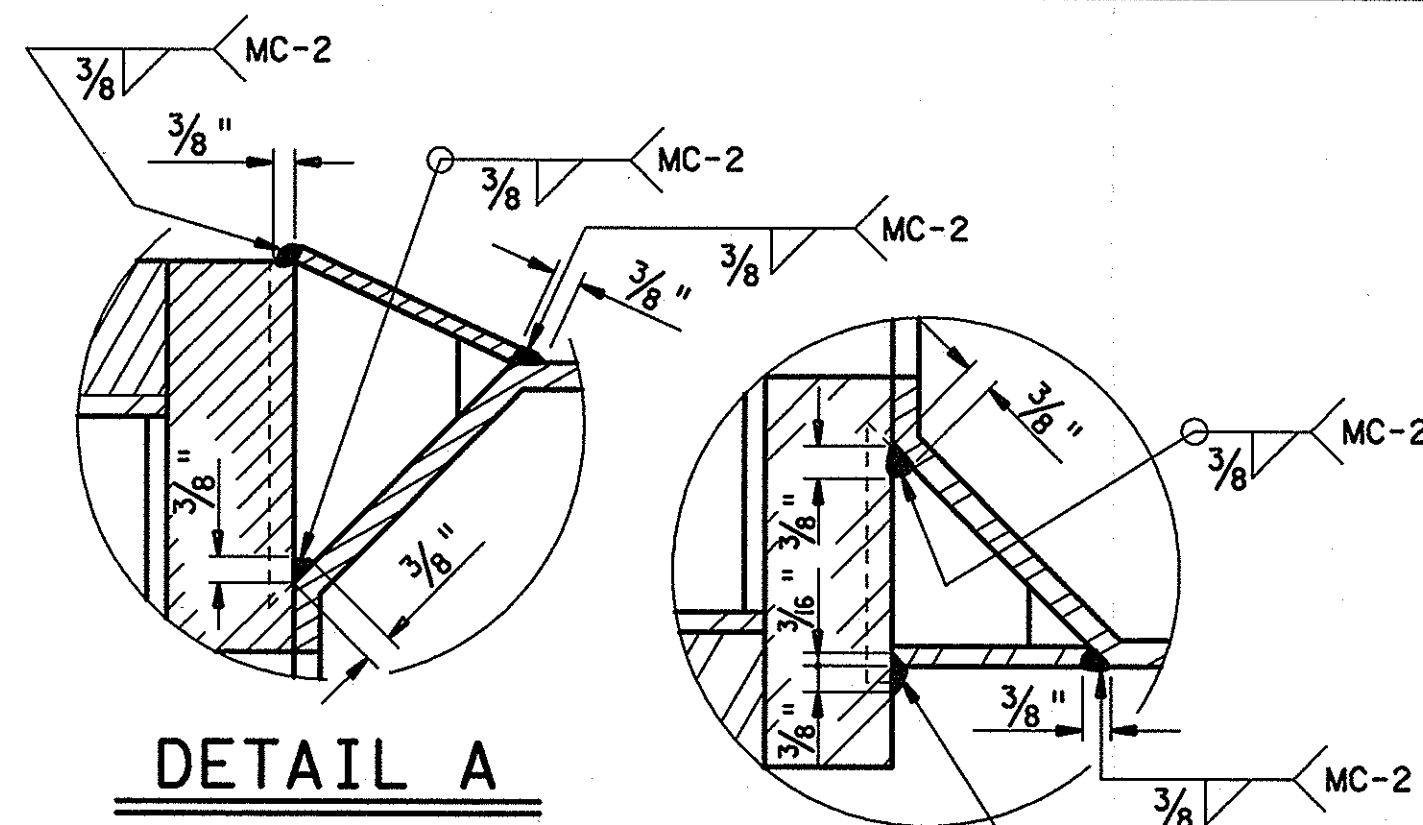
ARM SIZE		A	B	C	D	E	CONN BOLT DIA
D ₁	±	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 3/4	1 1/4
7.5	.179	11	11	8	8	1 3/4	1 1/4
8.0	.179	11	11	8	8	2	1 1/4
9.0	.179	13	13	10	10	2	1 1/4
10.0	.179	13	13	10	10	2	1 1/4
9.5	.239	13	13	10	10	2	1 1/4
10.0	.239	14	14	11	11	2	1 1/2
11.0	.239	14	14	11	11	3	1 1/2
11.5	.239	14	14	11	11	3	1 1/2



FIXED MOUNT DETAIL 1

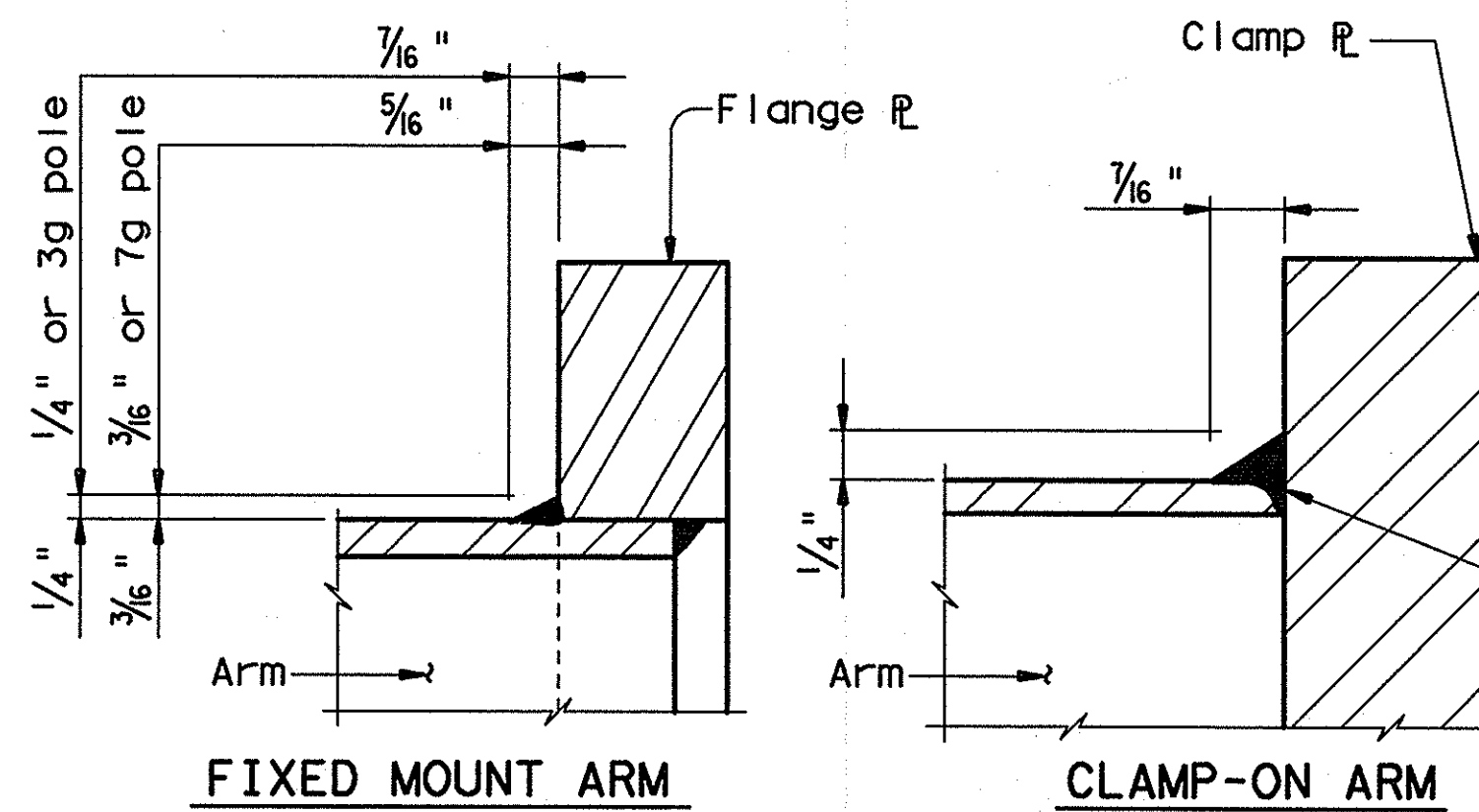


FIXED MOUNT DETAIL 2



DETAIL A

DETAIL B



FIXED MOUNT ARM

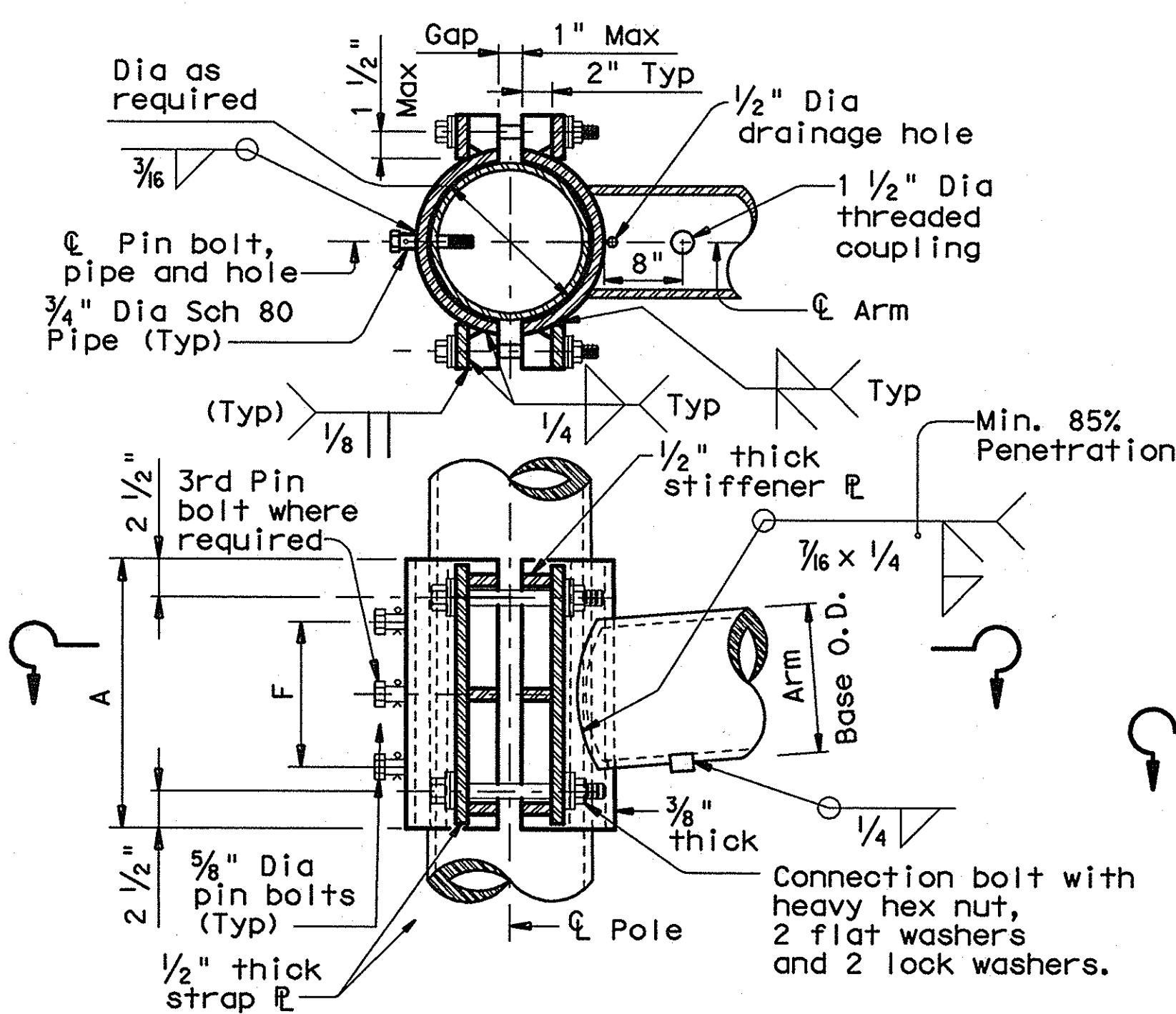
CLAMP-ON ARM

ARM BASE WELD DETAILS

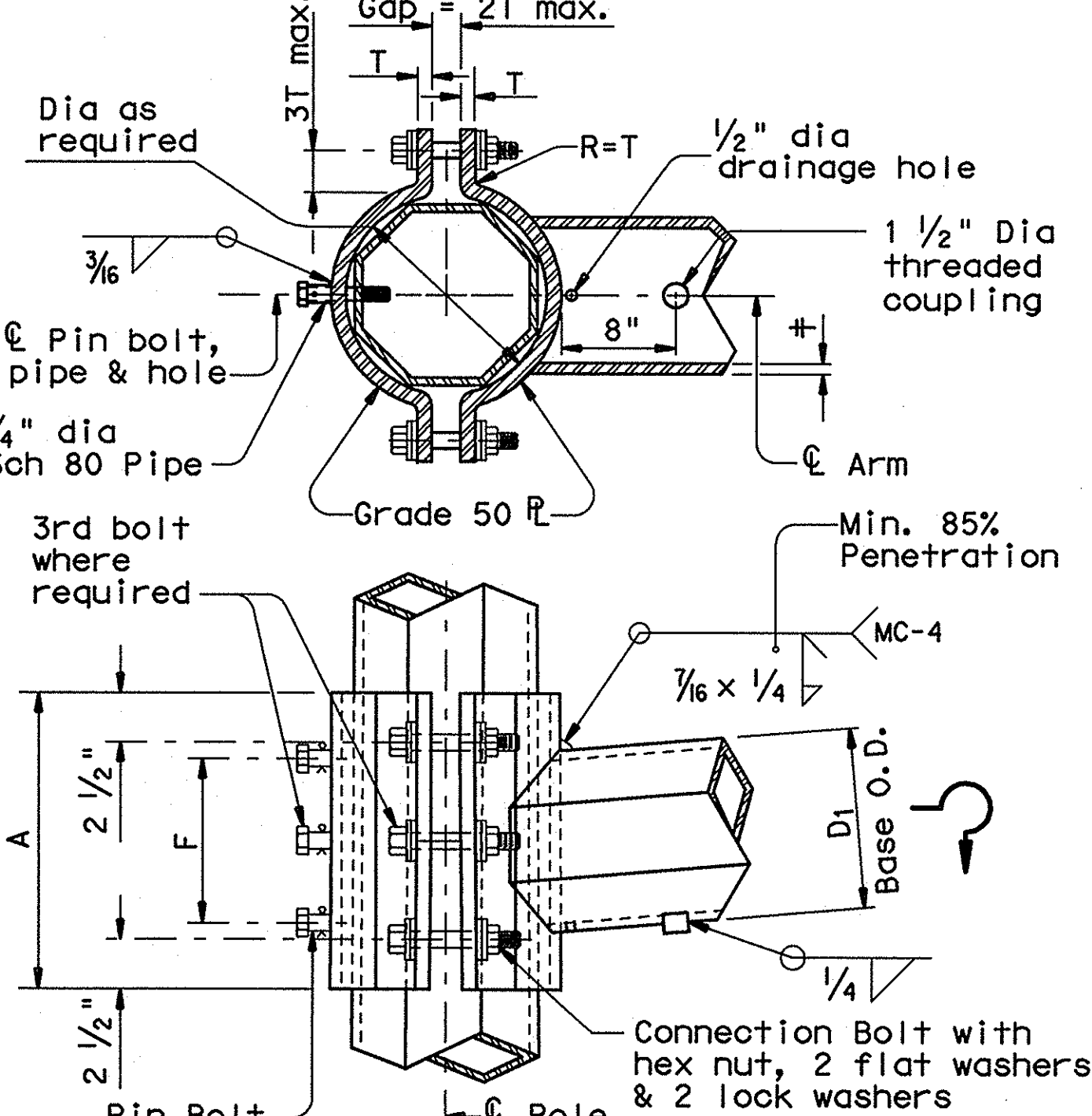
ARM SIZE		A	F	CONN. BOLTS		PIN BOLTS	
D ₁	±	in.	in.	No.	Dia	No.	Dia
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8

ARM SIZE		A	F	T	CONN. BOLTS		PIN BOLTS	
D ₁	±	in.	in.	in.	No.	Dia	No.	Dia
7.0	.179	12	6	3/4	4	3/4	2	5/8
7.5	.179	14	8	3/4	4	3/4	2	5/8
8.0	.179	14	8	3/4	4	3/4	2	5/8
9.0	.179	16	10	7/8	4	1	2	5/8
10.0	.179	18	10	7/8	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8

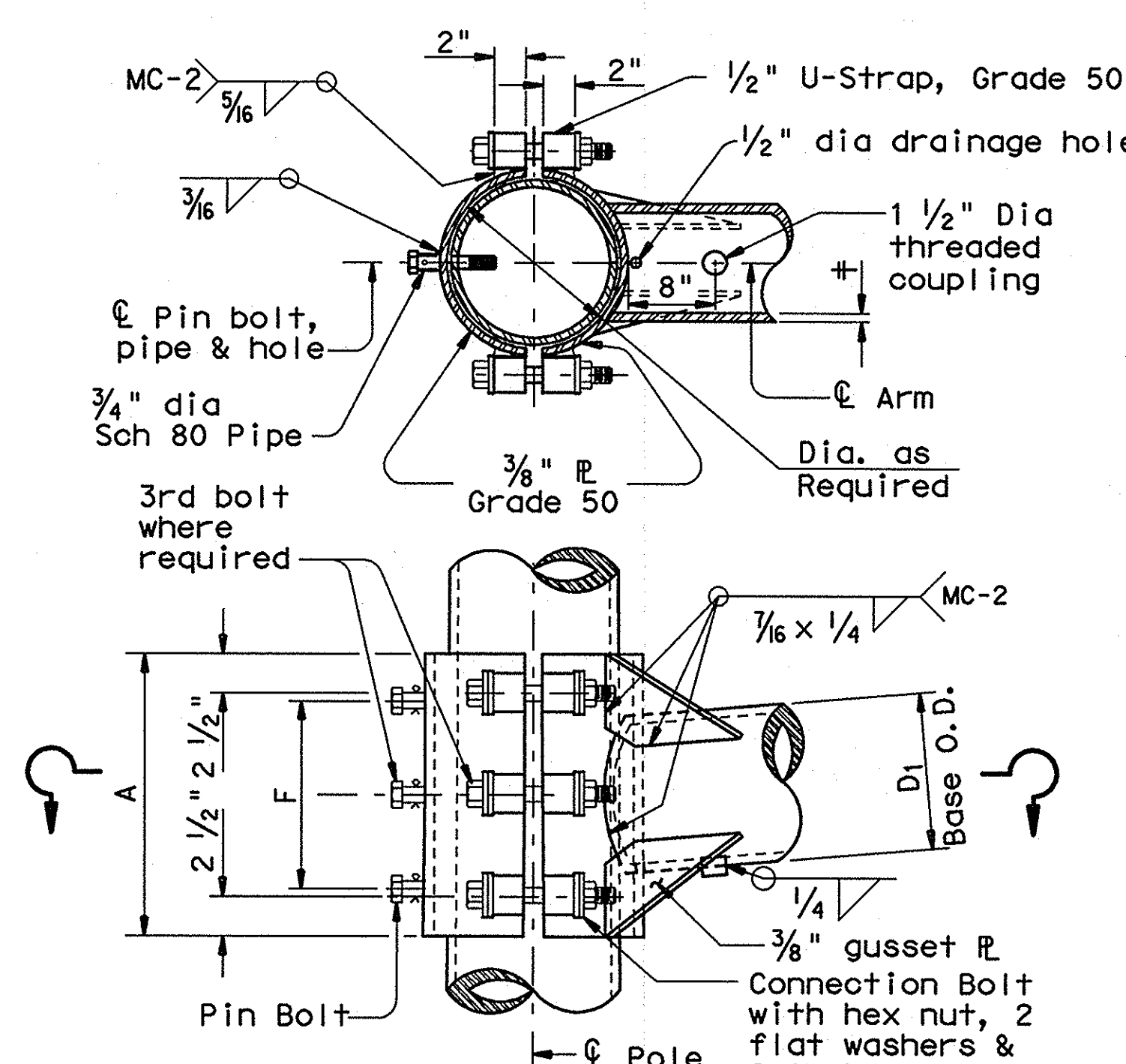
ARM SIZE		A	F	CONN. BOLTS		PIN BOLTS	
D ₁	±	in.	in.	No.	Dia	No.	Dia
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8



CLAMP-ON DETAIL 1



CLAMP-ON DETAIL 2



CLAMP-ON DETAIL 3

MATERIALS	
Round Shafts or Polygonal Shafts ^①	ASTM A595 Gr. A, A588, A1008 HSLAS Gr. 50 Class 2, A1011 HSLAS Gr. 50 Class 2, A572 Gr. 50 or A1011 SS Gr. 50 ^②
Plates ^①	ASTM A36, A588, or A572 Gr. 50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ^①	ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr. 50, A1011 HSLAS-F Gr. 50
Misc. Hardware	Galvanized steel or stainless steel or as noted

- ① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.
- ② ASTM A1011 SS Gr. 50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2 inch wide vertical slotted hole shall 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 inch.

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:

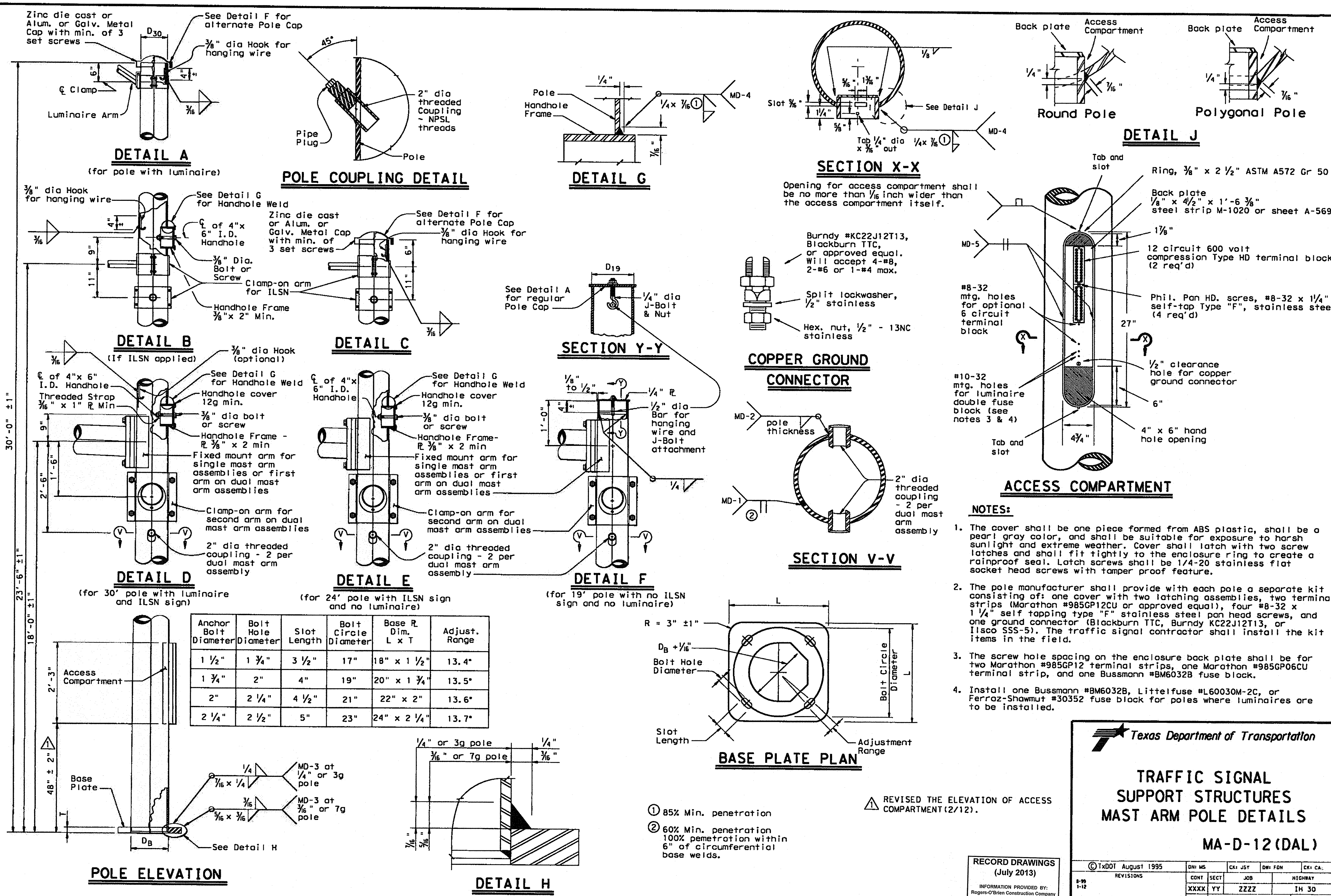
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and 3/4 inch dia pipe shall have 3/16 inch dia holes for a 1/8 inch dia galvanized cotter pin. Back clamp plate shall be furnished with a 3/4 inch dia hole for each pin bolt. An 1/16 inch dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

Texas Department of Transportation
Traffic Operations Division
**STANDARD ASSEMBLY
FOR TRAFFIC SIGNAL
SUPPORT STRUCTURES
MAST ARM CONNECTIONS**
MA-C-12

© TxDOT August 1995		DNH: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS		CONT	SECT	JOB	HIGHWAY
5-96					
5-09					
1-12					
DIST		COUNTY		SHEET NO.	

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Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base R 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"

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS
MA-D-12 (DAL)

© TxDOT August 1995		DN: MS	CK: JSY	DN: FDN	CK: CA.
REVISONS		CONT	SECT	JOB	HIGHWAY
1-12		XXXX	YY	ZZZZ	IH 30
		DIST	COUNTY	SHEET NO.	
		18	DALLAS		

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DISCLAIMER:

DATE: FILE:

I. GENERAL REQUIREMENTS FOR ALL ELECTRICAL WORK

The location of all conductors, conduits, junction boxes, ground boxes, and electrical services is diagrammatic only and may be shifted by the Engineer to accommodate local conditions.

Materials shall be new and unused. Materials and installation shall comply with the applicable provisions of the National Electrical Code (NEC), National Electrical Manufacturers Association (NEMA) standards, and shall be Underwriters Laboratories (UL) Listed unless otherwise shown on the plans or specifications or approved by the Engineer in writing. Faulty fabrication or poor workmanship in any material, equipment, or installation shall be justification for rejection. When reference is made to UL, it can be considered to mean a Nationally Recognized Independent Testing Lab (NRTL). Comparable standards of Canadian Standard Association, Electrical Testing Laboratories or Factory Mutual can be equal to the referenced UL standard. Where reference is made to NEMA listed devices, IEC listed devices shall not be considered to be an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing.

With the exception of high strength bolts, miscellaneous nuts, bolts and hardware may be stainless steel when plans specify galvanized, provided that bolts are 1/2 inch or less in diameter. The Contractor shall provide the following electrical test instruments as required by the Engineer to confirm compliance with the contract and the NEC. Those test instruments are voltmeter, amp probe, megger (1000 volt DC) and torque wrenches. All meters shall have been properly calibrated within one year. Calibration certification shall be provided to the Engineer upon request. Calibration certification tag shall also be applied to the meter. The Contractor shall operate meters during inspection as requested by the Engineer. Grounding shall be as shown on the plans and in accordance with the NEC. Metallic conduit, light poles, luminaires on bridge structures, and all metal enclosures shall be bonded to the system-grounding conductor. The ground rod in each ground box or junction box at the bridge ends, and in each ground box installed for underpass lighting will also be bonded to the system grounding conductor. 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.

SUBMITTALS:

The contractor shall submit for approval six (6) copies of catalog out sheets for each of the following three (3) categories.

Category 1. Electrical services including photocell.

Category 2. Breakaway disconnects, heat shrink tubing, heat shrink filler tape, GelCaps and ground boxes which will include loading capacity certification.

Category 3. Highmast assembly kits, when applicable. See Item 614 "Highmast Illumination Assemblies". 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, the Contractor shall furnish to the State such warranties and guarantees. Any deviation from plans or specifications, including deviations due to plan error should be prominently displayed on the submittal. Any changes not prominently noted in submittal and incorporated into the work without proper authorization will constitute grounds for rejection of that portion of the work.

II. CONDUIT

A. MATERIALS

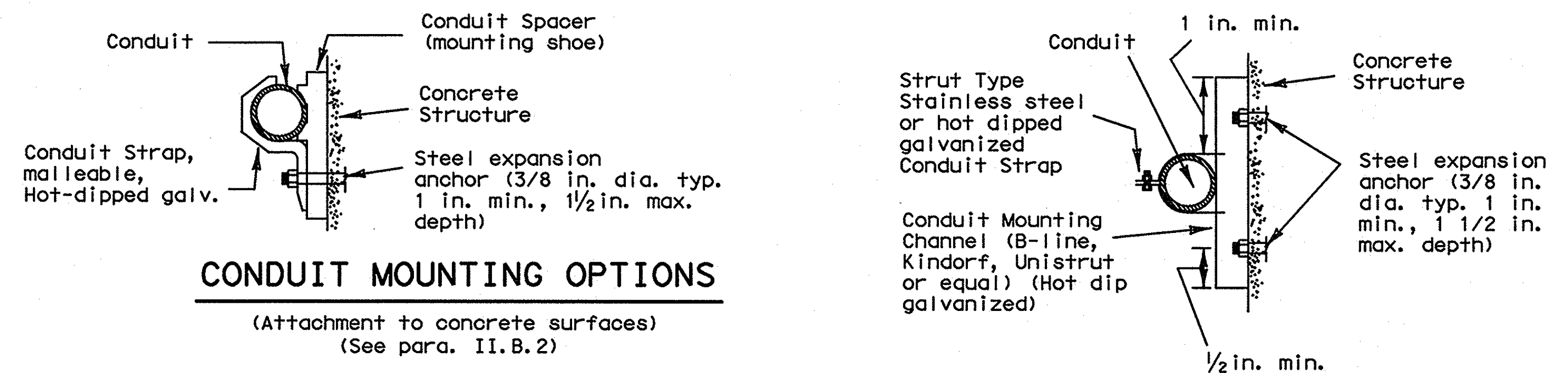
- Conduit and fittings shall be UL Listed for the intended use shown on plan sheets.
- Conduit shall be the type shown by descriptive code or shown elsewhere on the plans. Substitution of the various types of conduits will not be permitted. All flexible conduit in rigid metallic conduit (RMC) systems shall be Liquidtight Flexible Metal (LFMC) conduit. All flexible conduit in PVC systems shall be Liquidtight Flexible Non-metallic conduit (LFNC).
- All exposed conduits shall be RMC, unless otherwise specifically shown on the plans. All metal conduit shall be properly grounded.
- Couplings, connectors, conduit bodies, grounding bushings, and offset nipples for RMC shall be electro-zinc plated steel or hot dipped galvanized malleable iron, threaded or threadless compression type, rain-tight and shall be UL listed for the intended use.
- Expansion joints for metal conduit shall be provided with an internal or external bonding jumper and shall be UL listed.
- Unless otherwise shown on the plans, 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 are 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"

- RMC system junction boxes equal to or smaller, in any dimension, than 12 x 12 x 6 (HxWxD), surface mounted and containing conductors #8 or larger, shall be hot dipped galvanized cast iron with minimum wall thickness of 3/16 inch, shall have external mounting lugs, and shall be UL listed Crouse-Hinds Type WAB, OZ/Gedney Type YS or approved equal. Unless otherwise shown elsewhere on the plans, RMC system junction boxes larger than the aforementioned boxes but equal to or smaller, in any dimension, than 18 x 18 x 6 (HxWxD) shall be 14-ga. stainless steel; RMC system junction boxes larger than 18 x 18 x 6 (HxWxD) shall be 12-ga. stainless steel. All metal junction boxes shall be equipped with a threaded hole or lug for grounding. Stainless steel boxes 12 x 12 x 6 and larger need not be UL Listed but shall meet the other requirements of the NEC and shall have ribs, stiffeners, or thicker metal and shall have external mounting feet. Junction boxes with an internal volume of more than 100 cu. in. may be supported by connection of two or more rigid metal conduits, where specifically shown on the plans or where approved by the Engineer.
- Junction boxes containing only #10 or #12 AWG conductors shall be Crouse Hinds Type GRFX, Appleton Type JBOX, two-gang FD, or similar approved cast iron box. Boxes shall be sized according to NEC Table 370-16(a).
- IMC and EMT conduit shall not be used unless specifically required by the plan layout sheets. Junction boxes in EMT conduit systems shall be made from galvanized sheeting and shall be UL listed and approved for outdoor use, unless otherwise noted on the plans. Sheet metal junction boxes shall be sized in accordance with the NEC. Junction boxes for IMC conduit systems shall meet the requirements of boxes used with RMC systems.
- Junction boxes in PVC conduit systems shall be PVC, intended for outdoor use, unless otherwise noted on the plans.
- Elbows in PVC conduit systems one inch and larger shall be rigid metal, with the exception of traffic signal systems which may have PVC elbows instead of rigid. If any part of the rigid metal elbow is buried less than 18 inches underground the elbow and rigid metal extension shall be grounded. Grounding shall be accomplished by means of a grounding bushing installed on the extension. Unless specifically shown on the plans, rigid metal elbows containing, or entering ground boxes containing only communications conductors, loop detectors, or other low voltage power limited circuits need not be grounded unless a ground wire is present in the conduit or ground box. The rigid metal elbows located in concrete foundations may be extended with PVC conduit and need not be grounded provided that the end of the elbow nearest the end of the conduit run exiting the foundation is at least 2 inches below the concrete. RMC elbows will not be eliminated. RMC elbows will not be paid for directly, but will be subsidiary to various bid items.
- High-Density Polyethylene (HDPE) conduit shall meet the requirements of Item 622, Duct Cable, except that the HDPE conduit, when bid under Item 618, Conduit, shall not contain factory installed conductors. Fittings for HDPE conduit shall be UL listed as an electrical conduit connector or shall be thermally fused using an electrically heated wound wire resistance welding method. HDPE conduit may be substituted for bored schedule 40 or schedule 80 PVC conduit. When such substitution is made, bored HDPE shall be schedule 40 of the size PVC being replaced. The HDPE conduit shall transition to PVC (or RMC elbow when required) at the bore pit. Size and schedule shall be as shown on the plans. Substituted conduit may not be extended to ground boxes or foundations; RMC elbows shall be installed at ground boxes and foundations. RMC elbows will not be eliminated.
- All conduit support hardware including straps, nuts, bolts, screws, retaining anchors and washers shall be hot dipped galvanized or stainless steel. Strut type conduit straps shall be stainless steel or hot dipped galvanized. Strut type straps need not be made of malleable type material. Stamped-cadmium plated straps will not be allowed. Straps having only one mounting hole shall not be allowed for use on conduits 2 inches and larger with the exception of electrical service poles where stainless steel standoff straps will be allowed. Two piece conduit straps designed to be used with a mounting shoe shall be installed only with the correctly sized shoe.

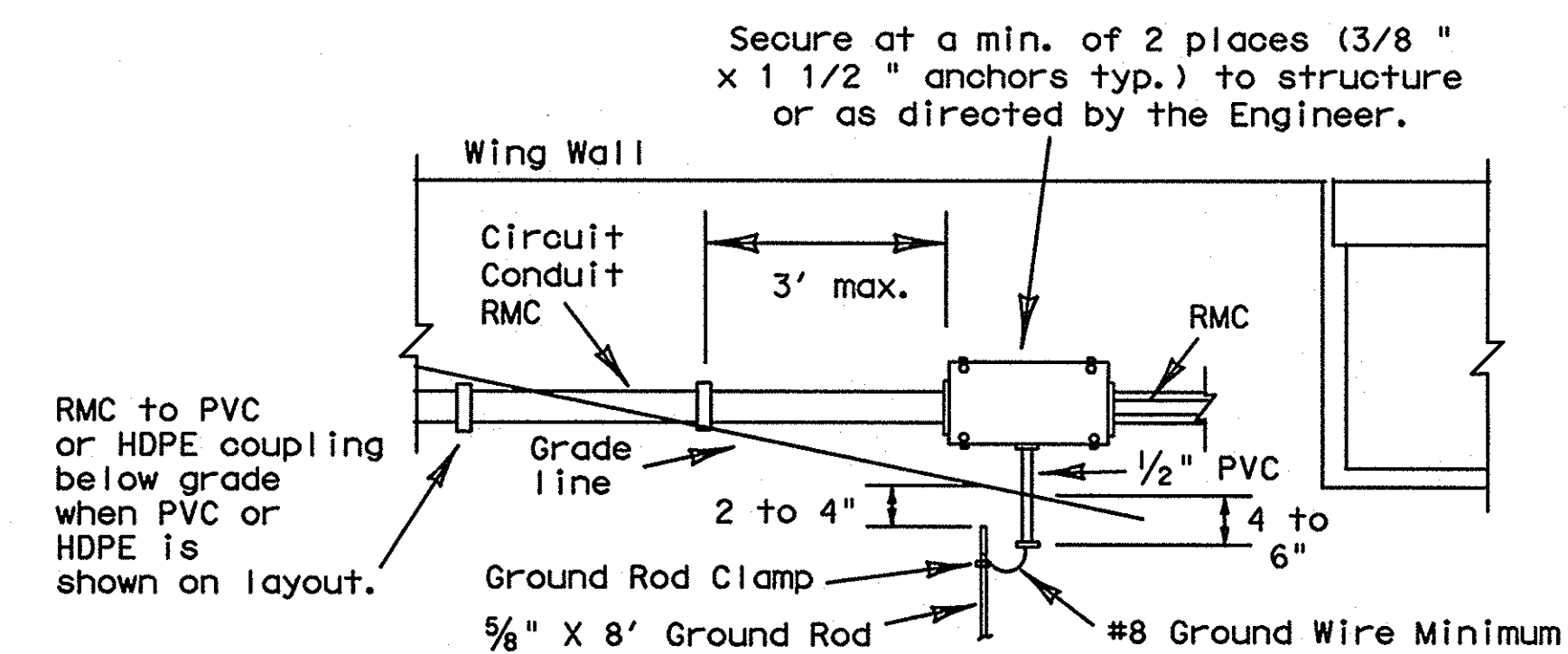
B. CONSTRUCTION METHODS

- Conduit in structures shall have expansion fittings at structure expansion joints. All straight runs of RMC conduit exposed on structures such as bridges shall have expansion joints installed at maximum intervals of 150 feet. Expansion joints shall be installed so they allow for movement of the conduit. Installation of the joint in such a manner that will not allow for movement shall be repaired at no expense to the state. The method of determining the final setting length of the expansion joint shall be provided to the Engineer upon request.
- 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).
- Conduit supports shall not be attached directly to prestressed concrete beams except as shown specifically in the plans and approved by the Engineer.
- 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.
- Conduit trenched in the subgrade of new roadways shall be backfilled with excavated material, unless otherwise noted on the plans. Conduit trenched in the sub-base of new roadways shall be backfilled with cement-stabilized base.
- 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.
- Conduit entry into the top of enclosures such as safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes shall be made weatherproof using conduit sealing hubs, or threaded bosses.
- A bonding jumper shall be installed from each grounding bushing to the nearest grounding rod, grounding lug, and/or equipment grounding conductor. All jumpers shall be the same size as equipment grounding conductor. Conduit used as casing under roadways for duct cable need not be grounded if duct extends full length through the casing. At electrical services, grounding electrode conductor shall be a solid Copper #6 AWG.
- Metal junction boxes shall be bonded to the grounding conductor in accordance with the NEC.
- Conduits entering ground boxes shall be placed so that the conduit ends shall be not less than 3 inches nor more than 6 inches from bottom of box (See ground box detail on sheet ED(3)).
- Conduit ends shall be sealed with heat shrink boots with waterproof sealant, 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. Silicone caulking shall not be used as a sealant.
- All strut mounting material and hardware shall be hot-dip galvanized or shall be stainless steel. The cut ends of strut and non-galvanized rigid metal conduit threads shall be coated with a zinc rich paint (90% or more zinc content). Zinc rich paint may only be used to touch up galvanized material as allowed under item 445.6 galvanizing. The painting of non-galvanized material with a zinc rich paint shall not be considered as an approved alternative for galvanized materials.
- All PVC conduit terminations shall be fitted with bushings or bell ends. All metal conduit terminations shall be fitted with a grounding type bushing.

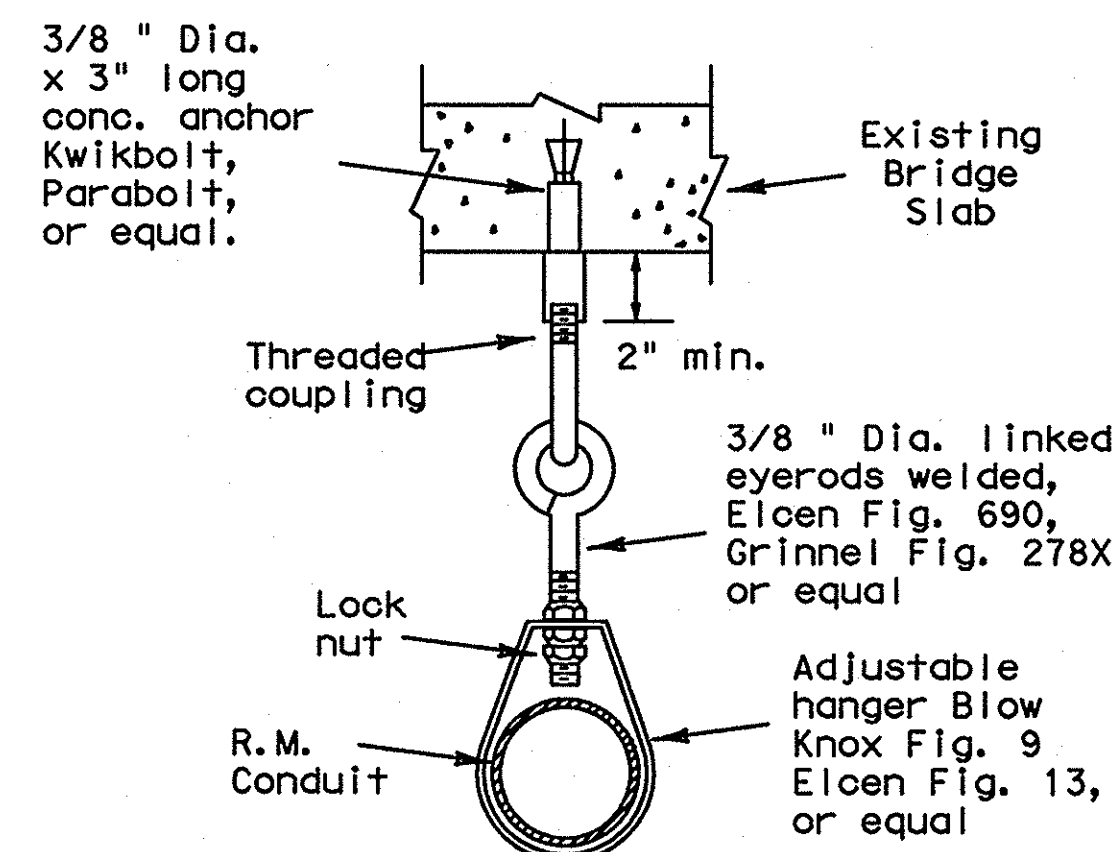


CONDUIT MOUNTING OPTIONS

(Attachment to concrete surfaces)
(See para. II.B.2)



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL



CONDUIT HANGER DETAIL

(Attachment to horizontal surfaces)
Hangers need not be UL listed for electrical use
i.e: plumber pipe hangers are acceptable

RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

5/03 Revision

Revised notes.

Texas Department of Transportation
Traffic Operations Division

**ELECTRICAL DETAILS-
CONDUIT**

ED(1)-03

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12-00					
3-03					
5-03					
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DISCLAIMER:

I. ELECTRICAL CONDUCTORS

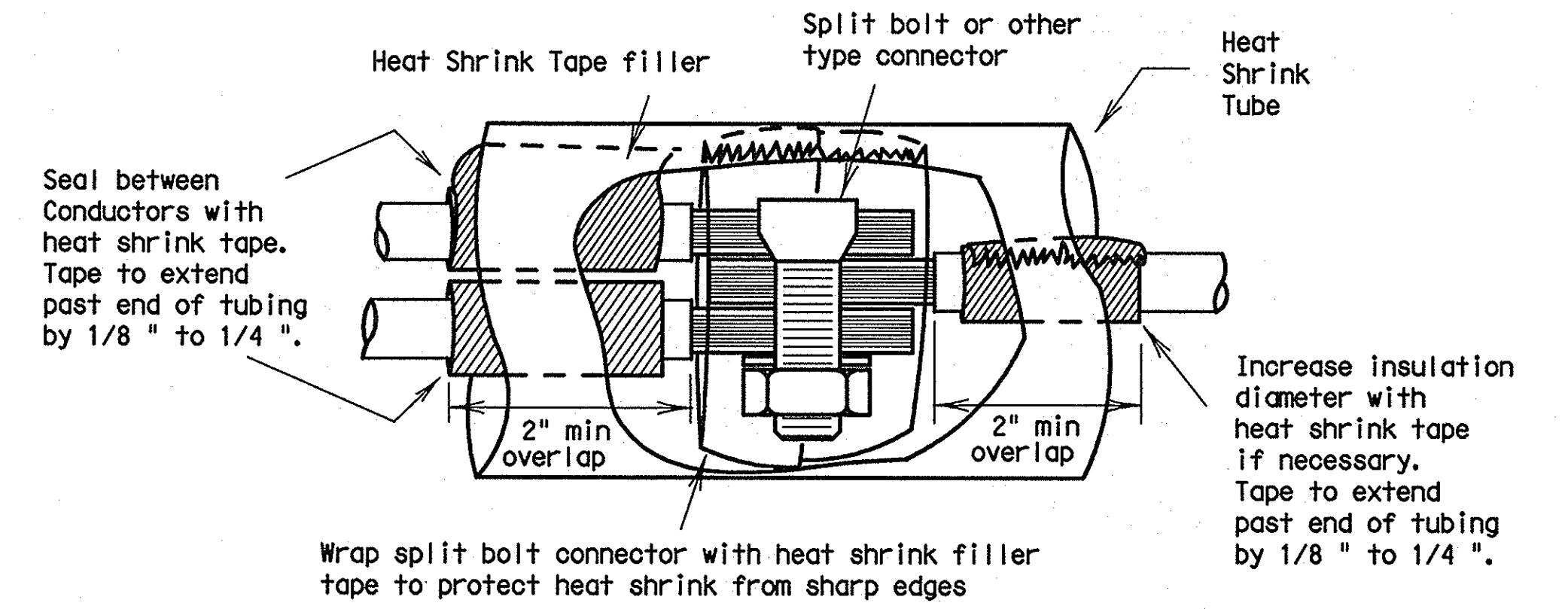
A. MATERIALS

- Insulated conductors shall be NEC Type XHHW. Insulated conductors shall be color coded in accordance with the NEC, articles 200, 250, and 310; i.e. Insulation of grounded conductors (neutrals) shall be white. Grounding conductors (ground wires) shall be bare or insulation shall be green. Insulation of ungrounded conductors (hots) shall be any color except green, white, or gray. Identification of conductors #6 American Wire Gauge (AWG) and smaller shall be by continuous jacket color. Color coding of electrical conductors #4 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.
- 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 two plastic straps. Each tag shall indicate circuit number, letter, or other identification shown in the plans.
- Grounding electrode conductor #6 AWG for bonding to ground rod at electrical service, shall be solid. Connection of conductor to ground rod shall be made using UL Listed connectors designed for such purposes.
- 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 shall be cross-linked butyl rubber. Tape shall be supplied in rolls and shall have a backing (release paper) to prevent the tape from sticking to itself.
- Heat shrink tubing shall be heavy wall, UL listed for 600 volts or greater and shall have factory applied internal sealant.
- GelCaps shall be UL listed for 600-volt applications. GelCap shall have see-through elastomer molded cover. Cover shall be filled with high dielectric insulating gel silicone sealant to provide waterseal. Cover shall be held in place by snap-lock, molded clamp made of UV stable polypropylene.
- Splicing materials, insulating materials, breakaway disconnects, GelCaps and fuse holders will not be paid for directly but shall be subsidiary to various bid items.

B. CONSTRUCTION METHODS

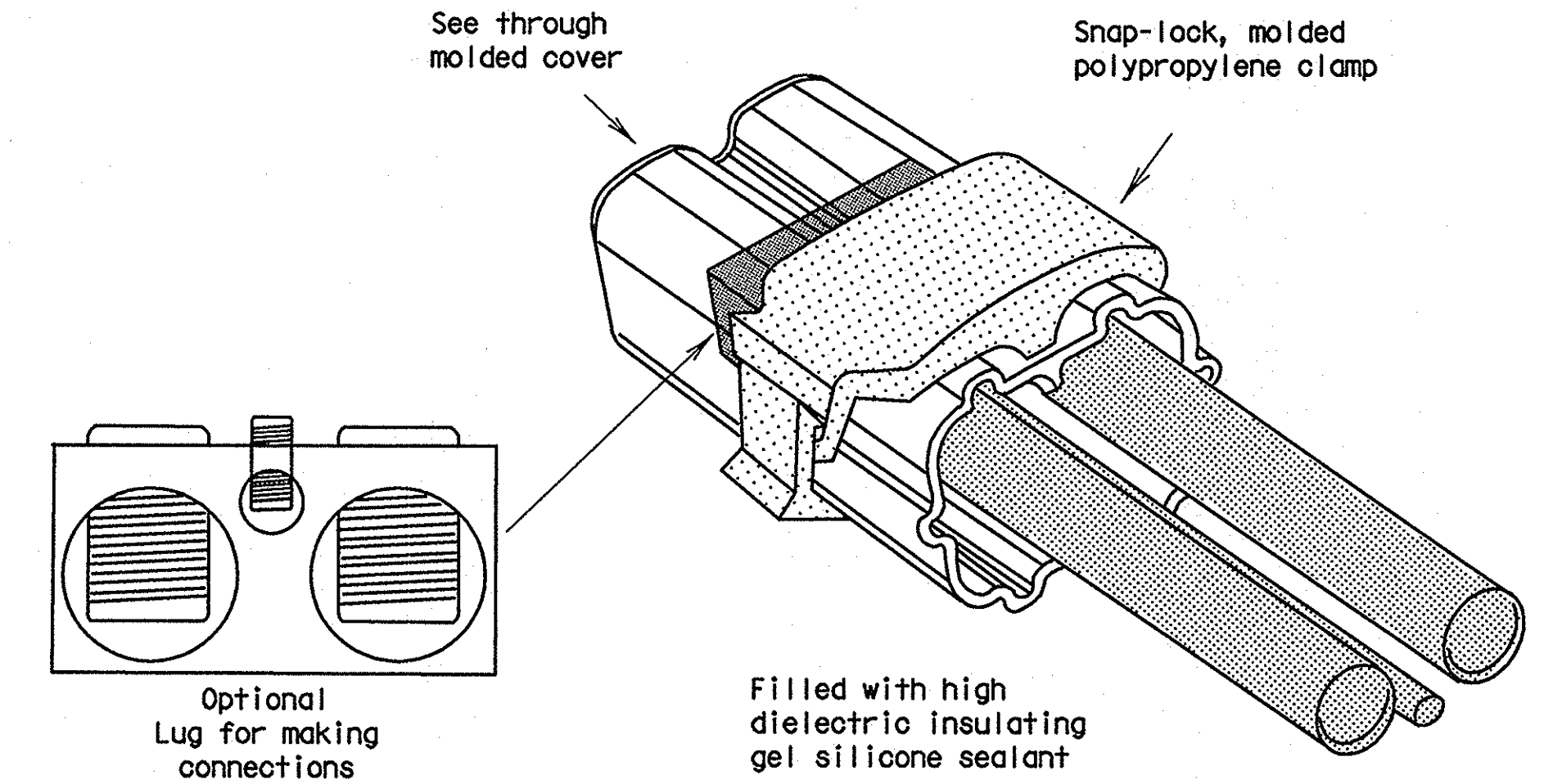
- After conductors have been installed in conduit, a pull test shall be made on conductors. When any length of conductor cannot be freely pulled, the Contractor shall make any needed alterations or repairs at no expense to the State.
- The Contractor shall perform insulation resistance tests in accordance with Item 620, "Electrical Conductors." The Contractor shall coordinate with the Engineer to witness the tests.
- A sufficient length of conductor for making up connections shall be left in ground boxes (2 feet minimum, 3 feet maximum, to point of splice, 3 feet minimum, 4 feet maximum, when conductor is pulled through with no splice), enclosures, weatherheads and pole bases (1 foot minimum, 1.5 feet maximum).
- Splices shall be made only in junction boxes, ground boxes, pole bases, or electrical enclosures and shall be made with listed compression or screw type pressure connectors, terminal blocks, bolted lugs, or split bolt connectors. Splices shall be insulated with heavy wall heat shrink tubing or GelCaps and shall be made so as to provide a watertight splice. Heat shrink sleeve shall overlap conductor insulation a minimum of 2 inches on both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, the Contractor shall increase the diameter of the conductors insulation using heat shrink filler tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Tape shall be visible after completion of all splices. Where filler tape is used but not visible, the Engineer shall approve each individual splice by conducting a physical inspection of each splice. When it appears the tubing has been burned, or overheated the tubing shall be considered to be defective and shall be replaced.
- GelCaps when used in place of heat shrink method of splicing, shall be sized and installed according to manufacturer's specifications. (Raychem GelCap and GelCap SL or equal.)
- Wire nuts may be used for #8 AWG or 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. Wire nuts used at these locations shall have factory applied waterproof sealant.
- Conductors in illumination poles shall be supported by a J-hook in the top of the pole.
- All conductors bid under Item 620 "Electrical Conductors" shall have breakaway electrical disconnects installed anytime conductors pass through a break-away support device.
- For terminating the conductors, insulation-jacketing material shall be removed in such a manner as to not nick any of the individual strands of the conductor. When individual conductor strands are removed, the conductor shall be considered to be damaged.
- When a conductor or cable has been damaged, or fails to pass an insulation resistance test, the conductor shall be replaced.
- Duct tape, black electrical tape, or wire nuts shall not be used in the repair of a damaged conductor.
- For terminations, no more than one wire may be installed under a single pressure connector, unless the device is listed for more than one wire.
- Conductors connected to break-away in line fuse holders must be installed in accordance with the specific manufacturer's installation instructions. Where threaded connections are made, they shall be properly torqued. Where crimp type connections are made, crimps shall be made using properly sized crimping pliers. Proper conductor terminations are critical to the safe operation of break-away devices.
- Waterproofing boots shall be properly trimmed to fit snugly around the conductor so as to provide a water proof connection. No more than one wire may enter a single opening in any one boot. Water proofing boots must provide the correct number of openings. Where only one wire is to be connected to a boot, the boot may not be a two wire type.

**SPLICE OPTION 3
SPLIT BOLT**



**SPLICE OPTION 4
GELCAP**

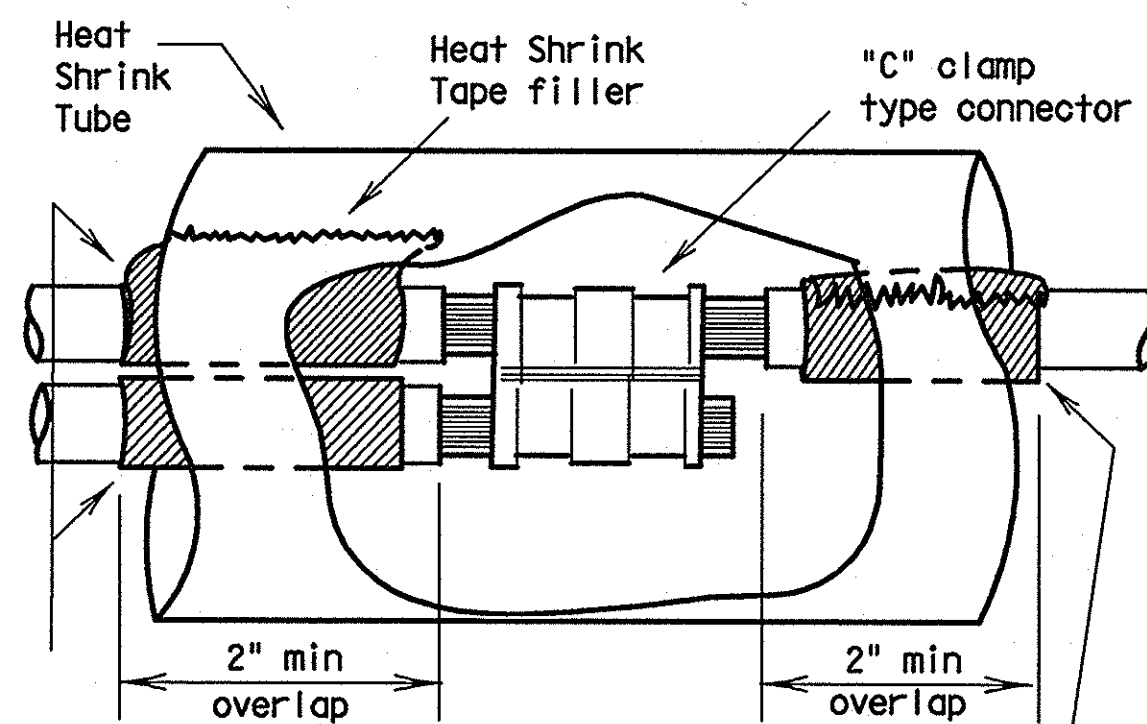
GelCap shall be sized and installed according to manufacturers specifications



- All conduits that contain circuit wiring of 50 volts or more shall contain an equipment grounding conductor (EGC). Conduit for traffic signals shall have an EGC, with a minimum size of #8 AWG stranded. Unless otherwise shown on the plans, the EGC for all other conduits shall be the same AWG size as the largest current carrying conductor contained in that conduit. The EGC shall be paid for item 620-Electrical Conductors.

C. TEMPORARY WIRING

- Temporary conductors and electrical equipment to provide power for utilization equipment, shall be installed in accordance with the NEC article 305. All temporary wiring materials and methods shall comply with the standard sheets. All power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade, supplied from a utility power source, shall be provided with a ground fault circuit interrupter.
- Residual current protective devices (GFCI) may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
- Where wire nuts are approved for temporary wiring, they shall be of the self-sealing type.
- All conductor splices must be contained within a listed enclosure, ground box or the splices will be more than ten feet above grade vertically and more than five feet horizontally from any metal structure. Where temporary conductors are installed in any area that is likely to be subjected to vehicle traffic, or mobile construction equipment, the vertical clearance to ground shall be at least 18 feet when measured at the lowest point. Where power conductors are to be supported by a span wire, the span wire shall be properly grounded.
- Existing conduit containing service conductors uncovered during the construction process shall be repaired in a timely manner in accordance with the NEC. Existing non-metallic conduit exposed during construction shall not be left exposed above grade, or with less than eighteen inches of cover, without protective methods approved by the Engineer.

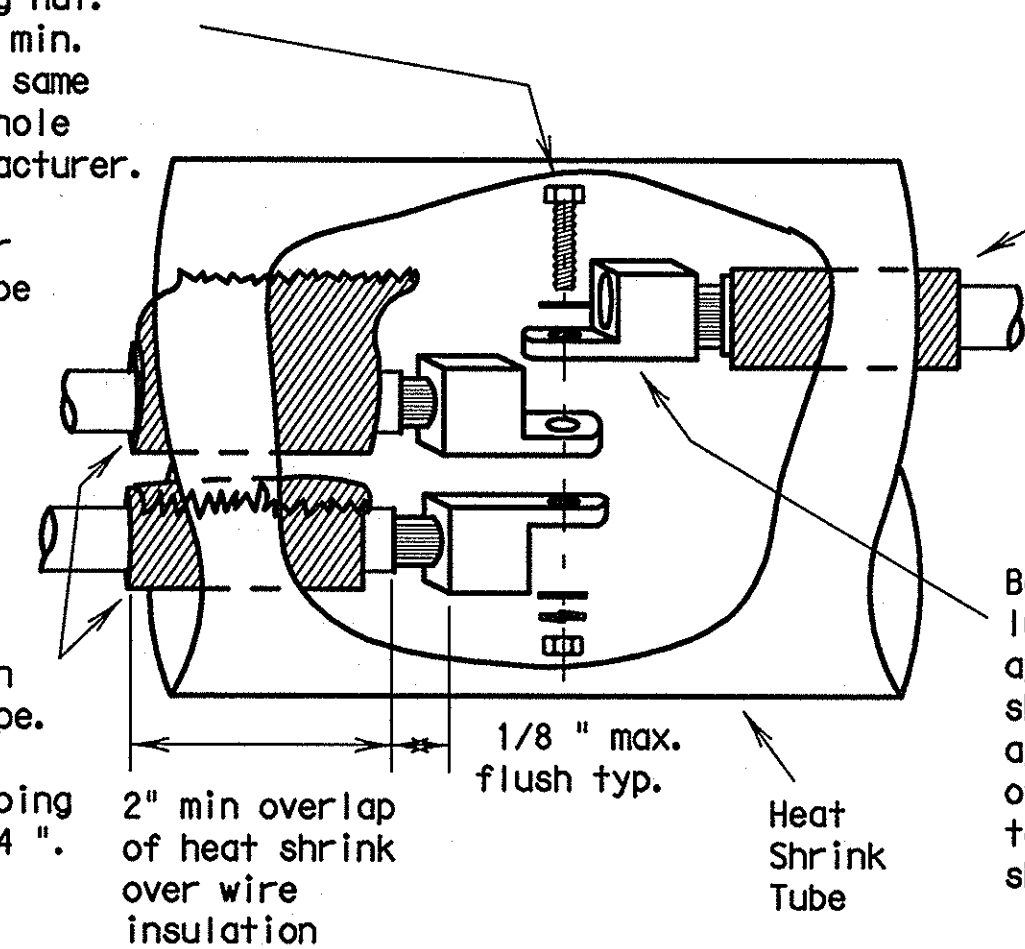


Seal between Conductors with heat shrink tape. Tape to extend past end of tubing by 1/8" to 1/4".

Increase insulation diameter with heat shrink tape if necessary. Tape to extend past end of tubing by 1/8" to 1/4".

**SPLICE OPTION 1
C-CLAMP**

Stainless steel or brass machine screw, nut, 2 flat washers, lock washer or self locking nut. Machine screw to be a min. of 10-24, 3/16 or the same size as the mounting hole provided by the manufacturer. Secure wrench tight. Movement of lugs after final assembly shall be considered to be a defective connection.



**SPLICE OPTION 2
BOLTED WIRE LUGS**

Increase insulation diameter with heat shrink tape if necessary. Tape to extend past end of tubing by 1/8" to 1/4".

Bolt together lugs and prior to applying heat shrink tubing, apply two layers of heat shrink tape to cover sharp edges.

**RECORD DRAWINGS
(July 2013)**
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

**Texas Department of Transportation
Traffic Operations Division**

**ELECTRICAL DETAILS-
CONDUCTORS**

ED (2) -03

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II. GROUND RODS

A. MATERIALS

- All ground rods installed at electrical services, including supplemental lightning protection ground rods specified by the plans in other locations such as pole bases, shall be copper clad and UL listed. Rods shall be a minimum diameter of 5/8 inch. The length shall be a minimum of 8 feet. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets.
- Ground rod clamps shall be listed to be in direct contact with the soil. Where concrete encasement is required, the clamp shall be listed for concrete encasement.

B. CONSTRUCTION METHODS

- Ground rods installed in locations such as pole bases, to provide supplemental lightning protection need not be totally in contact with the soil. Where called for in the plans, rods may be encased in soil or concrete or any combination of soil and concrete. When concrete encased, the connection of the conductor to the rod shall be readily accessible for inspection or repairs. When driven into the soil the upper end shall be between 2 to 4 inches below finished grade. Ground rods shall not be placed in the same drilled hole as a timber pole.
- Ground rods shall be installed such that the end imprinted with the rod's part number is installed as being the upper end.
- Non-conductive coatings such as concrete splatter shall be removed from the rod at the clamp location.
- Routing of lightning protection ground rod wires shall be run as short and straight as possible. Where bends are required they shall have a minimum radius of four inches.
- Unless specifically called for by the plans, conduits used for ground rod wires shall be non-metallic. Where metal conduits are specified, a grounding bushing and properly sized bonding jumper shall be provided and properly installed on each end.
- Where rocky soil or a solid rock bottom is encountered when driving a ground rod and the horizontal trench placement method is the only viable solution, written authorization from the Engineer must be obtained.

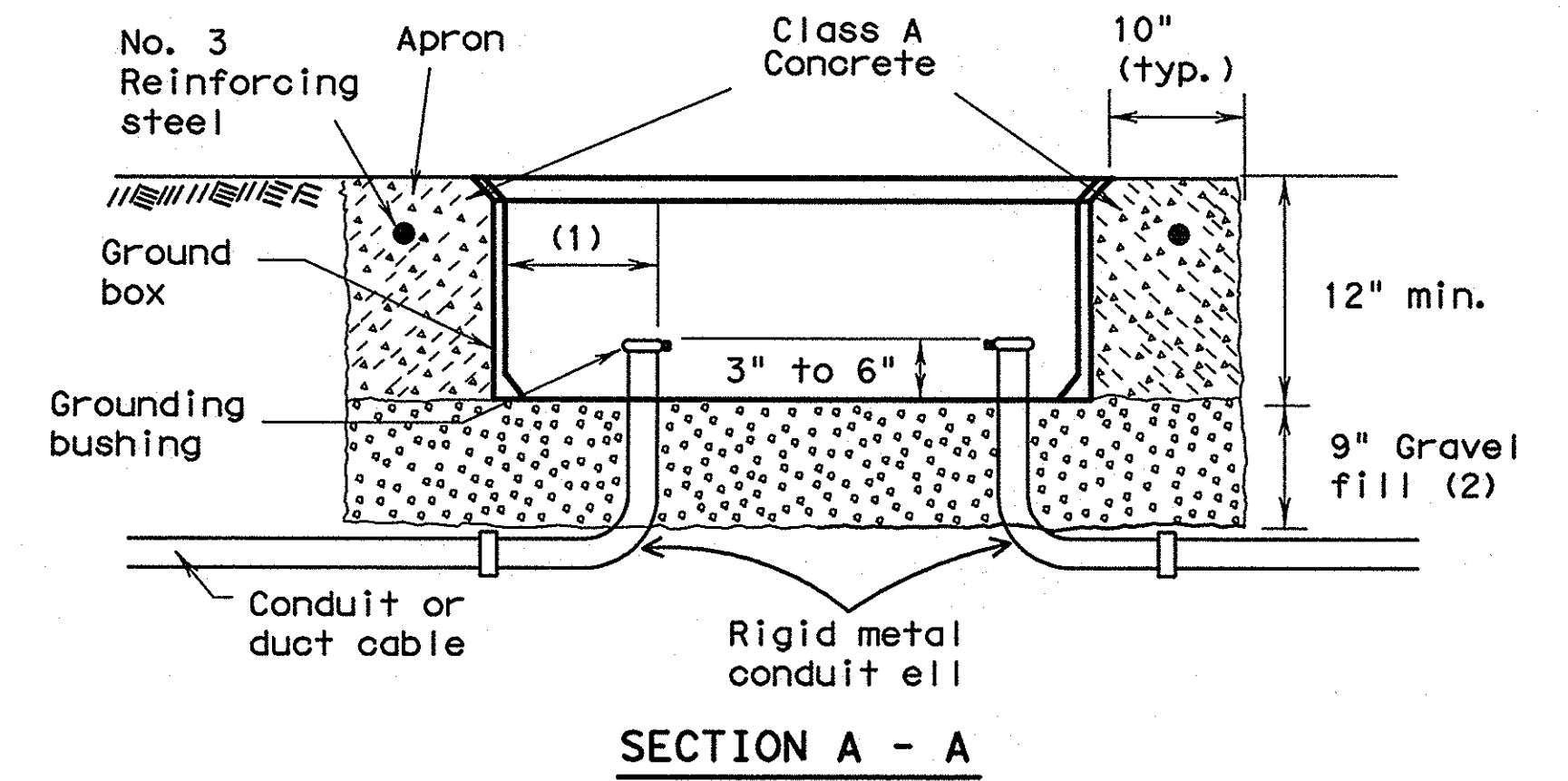
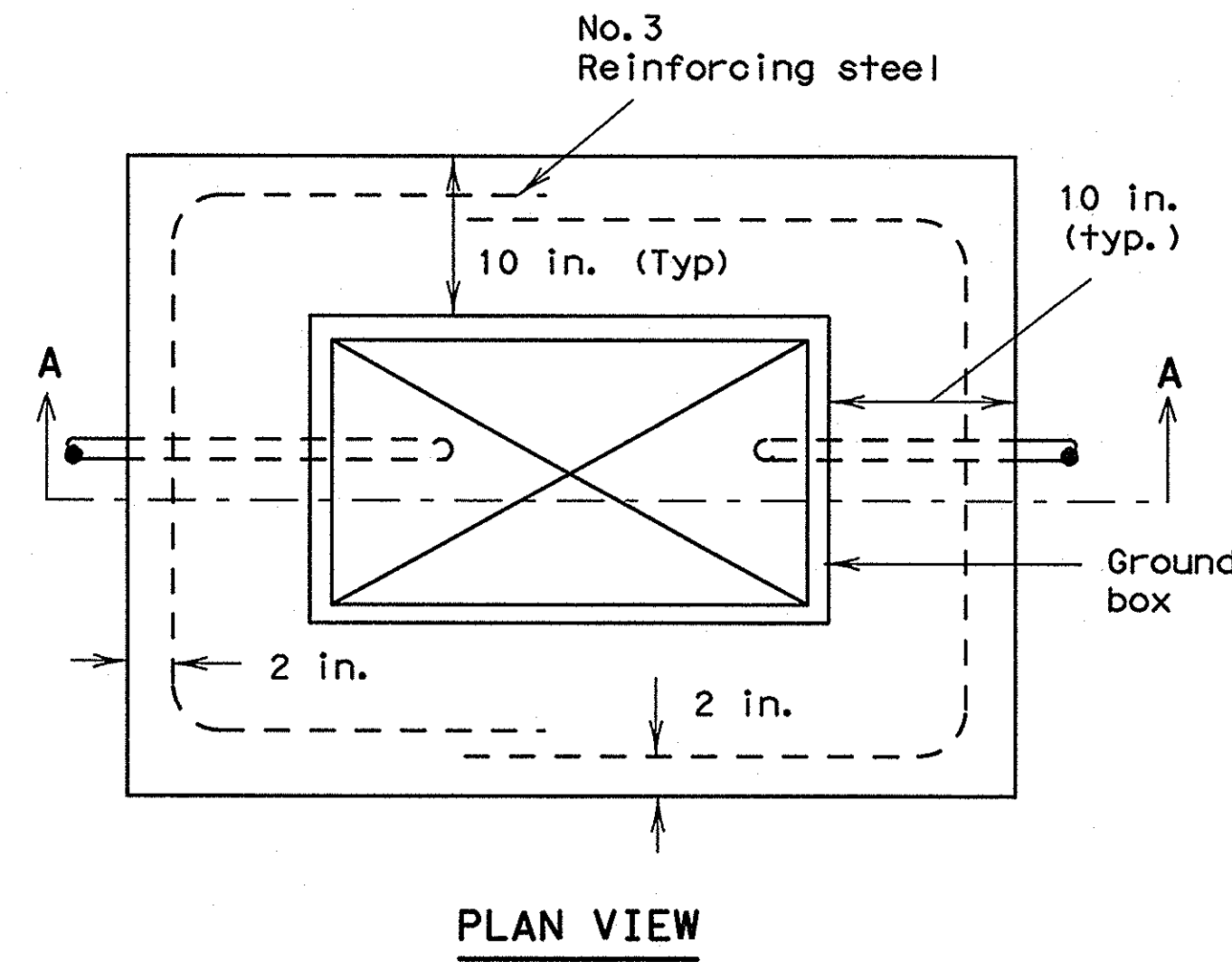
III. GROUND BOX

A. MATERIALS

- Ground boxes 16x30x24 inches (WxLxD) or smaller shall be polymer concrete of the type required by the descriptive code shown elsewhere. Larger ground boxes shall be as shown elsewhere in the plans.
- All ground boxes and covers shall be permanently marked either by impress or by permanent ink, with manufacturer's model number and manufacturer's name or logo.
- Covers shall be bolted down, and bolt holes in the box shall be arranged to drain dirt.
- Ground box Types A, B, C, D & E shall meet the following requirements:
 - Ground boxes and covers be manufactured from polymer concrete reinforced with continuous strands of woven or stitched borosilicate fiberglass cloth. The polymer concrete shall be made from catalyzed polyester resin, sand and aggregate, and shall have a minimum compressive strength of 11,000 psi. Polymer concrete containing chopped fiberglass or fiberglass reinforced plastic is not acceptable.
 - 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)
 - Bottom edge of box or extension shall be footed with a minimum 1 1/4 inch flange.
 - Ground boxes shall withstand 600 lbs. per sq. ft. applied over the entire sidewall with less than 1/4 inch deflection per foot length of box. Ground boxes and covers shall withstand a test loading of 20,000 lbs. over a 10 inch by 10 inch area centered on the cover with less than 1/2 inch deflection. Ground boxes and covers shall meet Western Underground Standards 3.6. Manufacturer shall supply certification by an independent laboratory or sealed by a Texas-Licensed Professional Engineer.
 - Covers shall be 2 inch (nominal) thick polymer concrete. All hardware shall be stainless steel. Cover shall be secured with two 1/2 inch stainless steel bolts. Bolts shall be self-retaining 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 and shall provide a minimum of 1/2 inch movement from the center of the nut. Covers shall be skid resistant, minimum 0.5 coefficient of friction. Covers shall be interchangeable between manufacturers and shall conform to the dimensions shown herein. Unless otherwise approved by the Engineer, cover shall be legibly imprinted with the following words in minimum 1 inch letters:
 - Ground Boxes containing wiring for traffic signals shall be labeled, Danger High Voltage Traffic Signal.
 - Ground boxes containing wiring for illumination systems shall be labeled, Danger High Voltage Illumination.
 - Ground boxes containing wiring for traffic management systems shall be labeled, Danger High Voltage Traffic Management.
 - Ground boxes containing wiring for sign illumination systems shall be labeled, Danger High Voltage Sign Illumination.
 - Ground boxes containing wiring for traffic signals that also contain illumination, powered by the signal electrical service, shall be labeled, Danger High Voltage Traffic Signal.

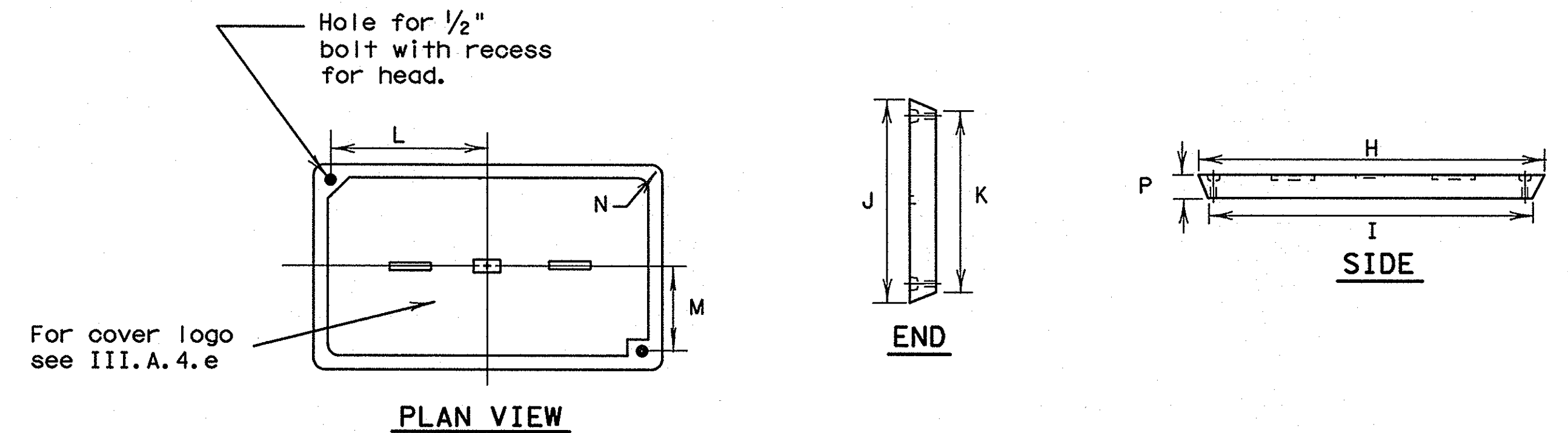
B. CONSTRUCTION METHODS

- Ground boxes shall be set on a 9 inch (minimum) bed of aggregate from 3/4 " up to 2" in size. Aggregate shall be in place prior to setting box and conduits shall be capped. Any gravel or dirt in conduit shall be removed.
- 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. Aprons shall be cast in place.
- Conduit holes may be cut in the walls of type B & D boxes at least 18 inches beneath the cover.
- If, within the limits of this project, the Contractor must utilize an existing ground box equipped with a metal cover, the Contractor shall bond the cover to the grounding conductor with a 3 foot long flexible stranded jumper the same size as the grounding conductor. Connection of bonding jumper to metal ground cover shall not be paid for directly but shall be subsidiary to various bid items. The box(es) must be clearly shown on the plans with plan notes fully describing the work required.
- If there are other ground boxes with metal covers within the project limits but not involved in the contract, the Engineer may direct the Contractor to ground the covers, designating and identifying the specific boxes in writing. This work will be paid for separately.
- Termination to metal ground box covers shall be made using a tank ground type lug.



APRON FOR GROUND BOXES
(Where required)

- Final position of end of conduit shall not exceed one-half the distance to the side of box opposite the conduit entry.
- Place gravel "under" the box, not "in" the box. Gravel should not encroach on the interior volume of the box.
- Install bushing on the upper end of all ells.
- Where a ground rod is present in the ground box, connect it to any and all equipment grounding conductors using a listed connector.
- Maintain sufficient space between all conduits so as to allow for proper installation of bushings.
- All conduits shall be installed in a neat and workmanlike manner.
- All conduits installed in the ground box shall be sealed after completion of conductor installation and any required pull tests. Silicone shall not be used as sealant.



GROUND BOX COVER DIMENSIONS								
BOX	DIMENSIONS (INCHES)							
SIZE	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

5/03 Revision
 Revised notes.

Texas Department of Transportation
 Traffic Operations Division

**ELECTRICAL DETAILS-
GROUND BOXES**

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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 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, connection charges, meter charges, and other charges by the Utility company to provide power to the location shown, when required, shall be paid for under force account work. The costs associated with these charges shall be approved by the Engineer prior to engaging the Utility company to do the 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, 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 six (6) copies of catalog cut sheets on electrical service materials. 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.

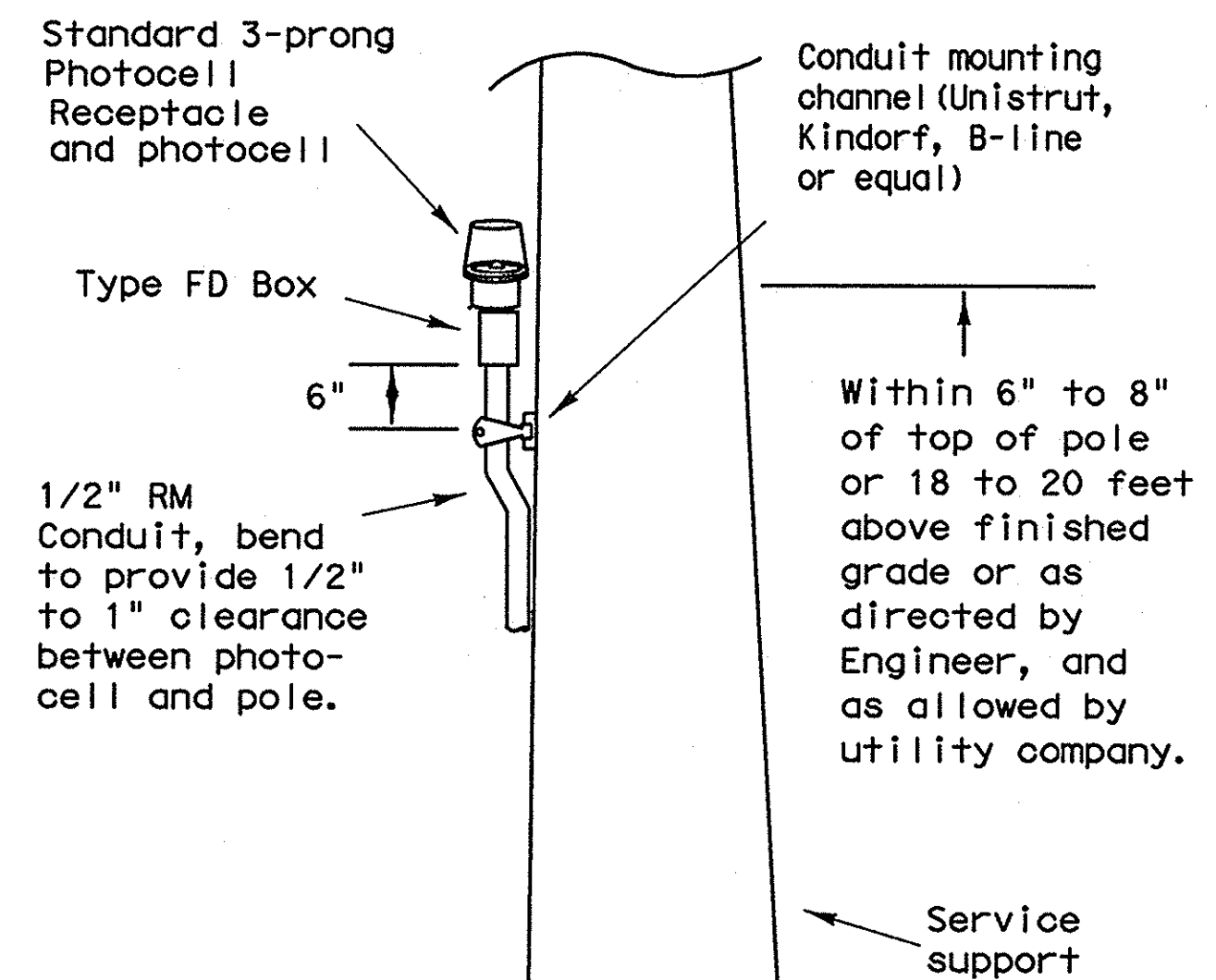
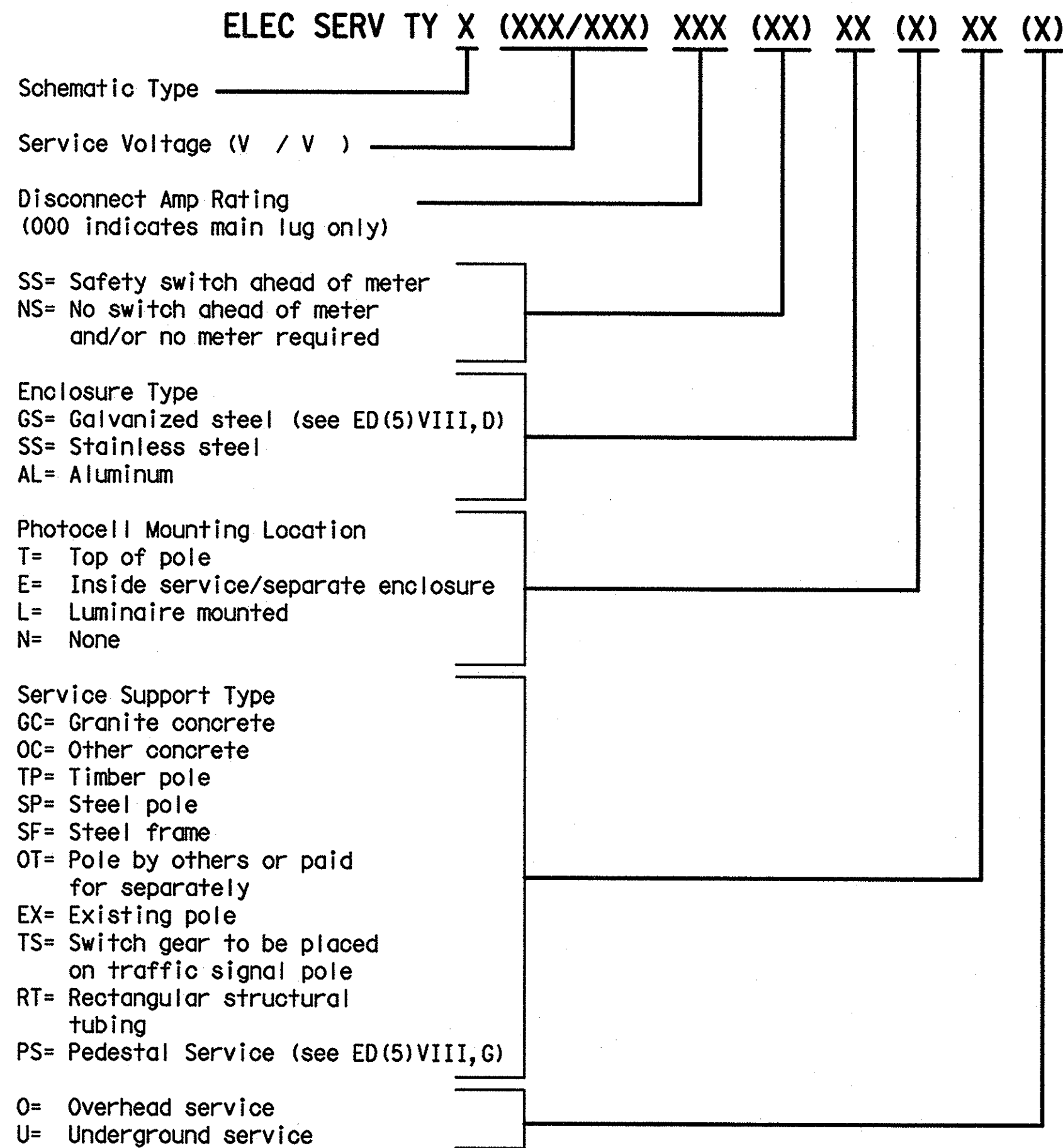
The Contractor shall provide locks keyed with Master #2195 for all lockable electrical enclosures. Keys and locks become property of the State. Unless otherwise approved by the Engineer, enclosures shall not be energized until locks are provided and all bolts are installed. Circuit directories, where provided, shall be filled out. All breakers and components in shop built panels and enclosures shall be labeled with duo-colored plastic labels. Letters shall be a minimum 3/8" in height.

Enclosures with external disconnects that de-energize all equipment inside the enclosure, need not have dead front trim, except that incoming line terminations shall be protected from incidental contact.

When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used. All wiring and components shall be rated for 75 degrees C. Minimum size for service entrance conductors shall be #6 XHHW.

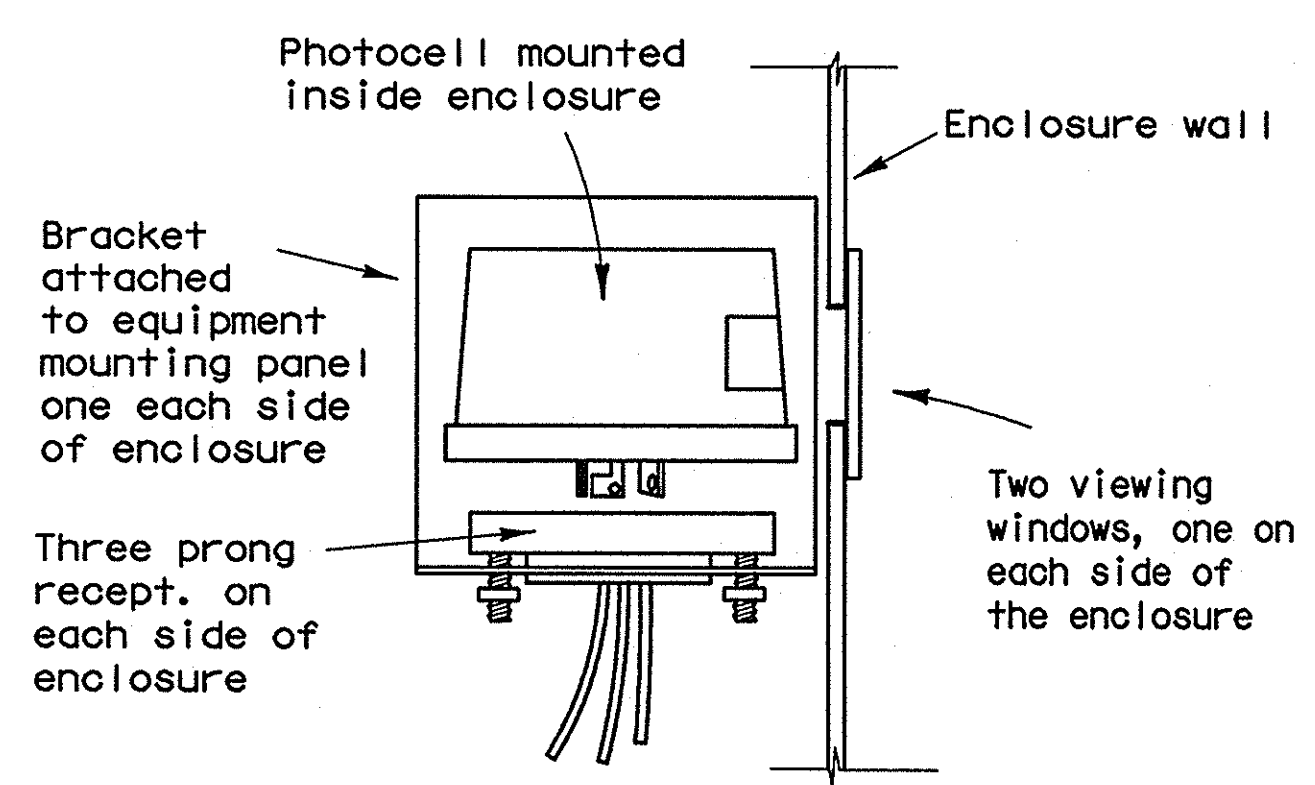
- I. Safety Switch. A safety switch, placed ahead of the meter, shall only be used when specified by the Utility and when shown on the Electrical Service Data. The switch shall be UL Listed, heavy duty type, 600 volt, unfused, with a UL type 3R enclosure and equipped with a solid neutral (s/n) assembly. 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) or ED(5). 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 in the electrical service data. 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 supplied. Circuit breakers shall be UL Listed to UL489.
- IV. Circuit Breaker Panelboard. Panelboards shall be UL Listed. Panelboards shall have copper busses, a minimum of 6 one-pole spaces or as required in the electrical service data, and when required will be rated for service equipment. Enclosure shall meet or exceed 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. Load centers for type T services may have copper or aluminum busses, all other load centers will be copper bus only. Load center will have 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 accommodate a maximum of 6 one-pole breakers.
- VI. Separate or Auxiliary Enclosure. Separate enclosures for HOA, photocell and lighting contactors for types D & T Services shall be a UL Listed assembly with outer door. Interior shall have dead front trim. HOA switch operator shall extend through the dead front trim. Photocell shall be mounted inside the enclosure as described in paragraph XIII when required by descriptive code. Separate enclosures shall meet the construction requirements of paragraph VIII. E, except that separate enclosure shall not have external operating handle, need not have a data pocket and door may latch at only one point. All equipment may be located in one enclosure instead of two, when approved by the Engineer.
- VII. Where a Type D or T service is provided, laminated "as built" drawings are required as shown on ED(5) VIII E; shall be delivered before completion of the work, to the Engineer in lieu of placement within these smaller enclosures. Conduit may not enter the back wall of a service enclosure penetrating the equipment mounting panel. Provide grounding bushings on all metal conduits, terminate bonding jumper to grounding bus. Grounding bushing is not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss such as a meter base.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



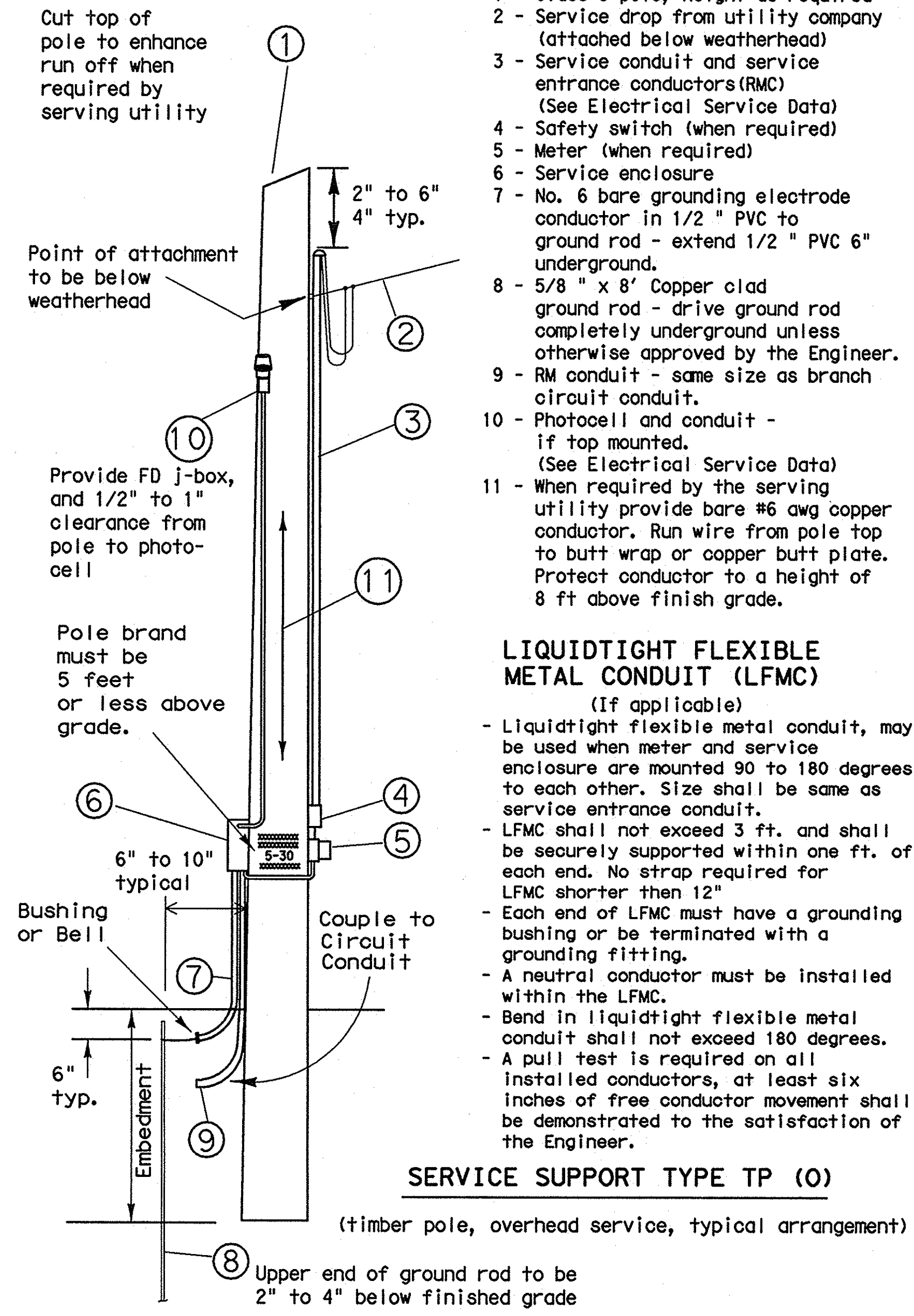
TOP MOUNTED PHOTOCELL

Conduit support spacing 3 feet from enclosure; 5 feet max.



ENCLOSURE MOUNTED PHOTOCELL

For photocell specifications see ED(5),XIII.



LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

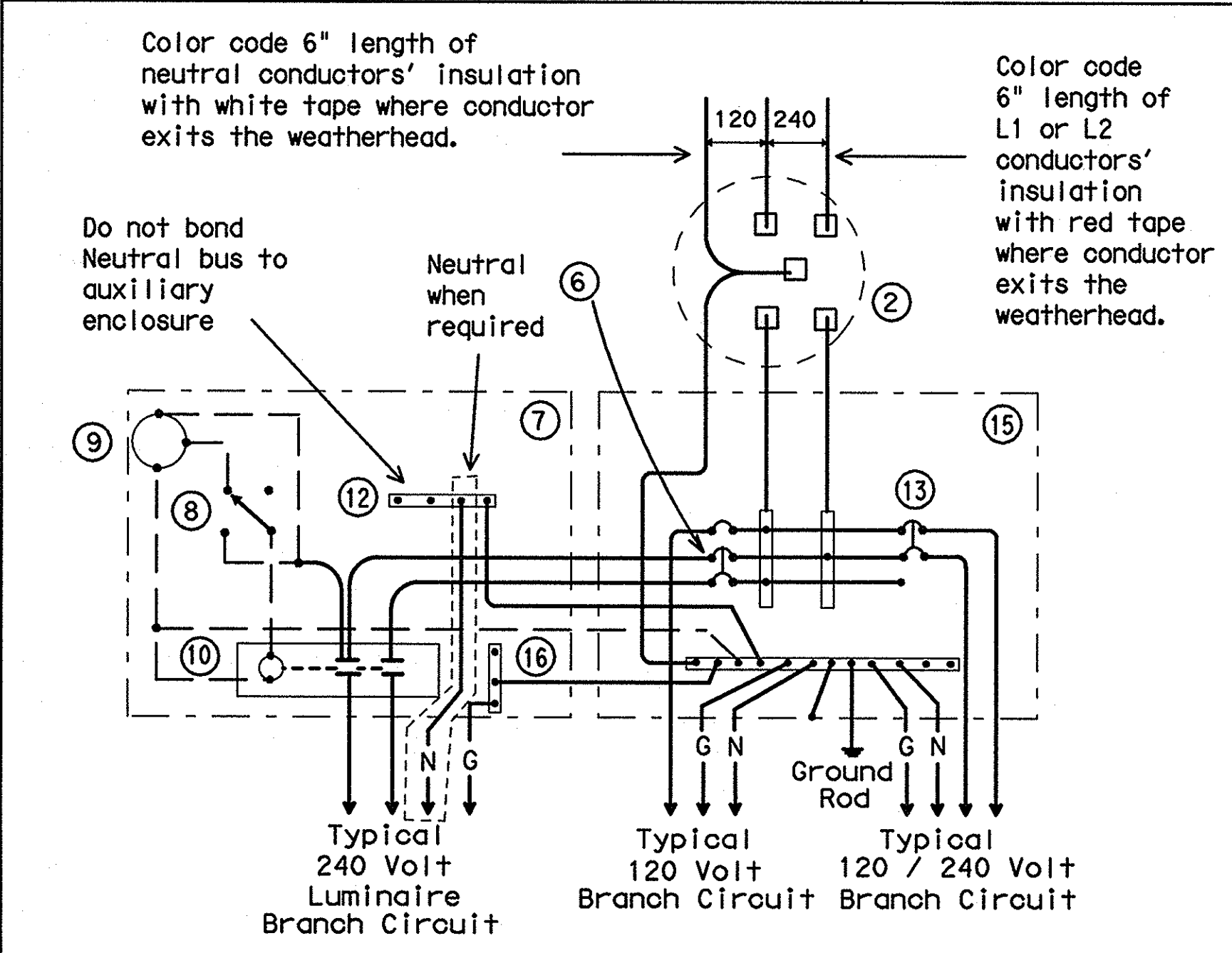
- (If applicable)
- Liquidtight flexible metal conduit, may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. Size shall be same as service entrance conduit.
 - LFMC shall not exceed 3 ft. and shall be securely supported within one ft. of each end. No strap required for LFMC shorter than 12"
 - Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting.
 - A neutral conductor must be installed within the LFMC.
 - Bend in liquidtight flexible metal conduit shall not exceed 180 degrees.
 - A pull test is required on all installed conductors, at least six inches of free conductor movement shall be demonstrated to the satisfaction of the Engineer.

SERVICE SUPPORT TYPE TP (O)

(timber pole, overhead service, typical arrangement)

TIMBER POLE NOTES

1. Conduit and electrical conductors attached to the electrical 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. Pole top mounted photocell, install on north side of pole or in service enclosure as required. See Electrical Service Data.
3. Attach meter and service equipment with stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Gain pole as required to provide flat surfaces for each strut. Paint ends of galvanized channel with zinc rich paint. Gain depth 5/8" max. Gain height 1 7/8" max. Strut to be 1" max. deep, and 1 5/8" wide max. Secure each strut section to timber pole with two galvanized or SS lag bolts, 1/4" diameter min. by 1 1/2" length min. Place flat out galvanized or SS washer on each lag bolt. Gain pole in a neat and workmanlike manner.
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.



SCHEMATIC LEGEND

- 1 - omitted
 - 2 - Meter (when required)
 - 3 - Service Assembly Enclosure
 - 4 - Main Disconnect Breaker (Not Used)
 - 5 - Omit
 - 6 - Circuit Breaker, 15 Amp typical for control circuit wiring
 - 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 (Not Used)
 - 12 - Neutral Bus required when 120 v. lights are controlled by lighting contactor
 - 13 - Branch Circuit Breaker (See Electrical Service Data)
 - 14 - Circuit Breaker Panelboard (Not Used)
 - 15 - Load Center
 - 16 - Ground Bus
- Power Wiring
--- Control Wiring
--- N --- Neutral Conductor (when required-to serve 120 v. loads only)
--- G --- Equipment grounding conductor-always required

SCHEMATIC TYPE I
120/240 VOLTS - THREE WIRE

Install photocell and lighting contactor when shown on Electrical Service Data.

RECORD DRAWINGS
(July 2013)
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

ELECTRICAL DETAILS-
SERVICE SCHEMATICS AND
SUPPORT-TYPE TP (OVERHEAD)
ED(4)-03

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3-03					
		DIST	COUNTY	SHEET NO.	

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DISCLAIMER:

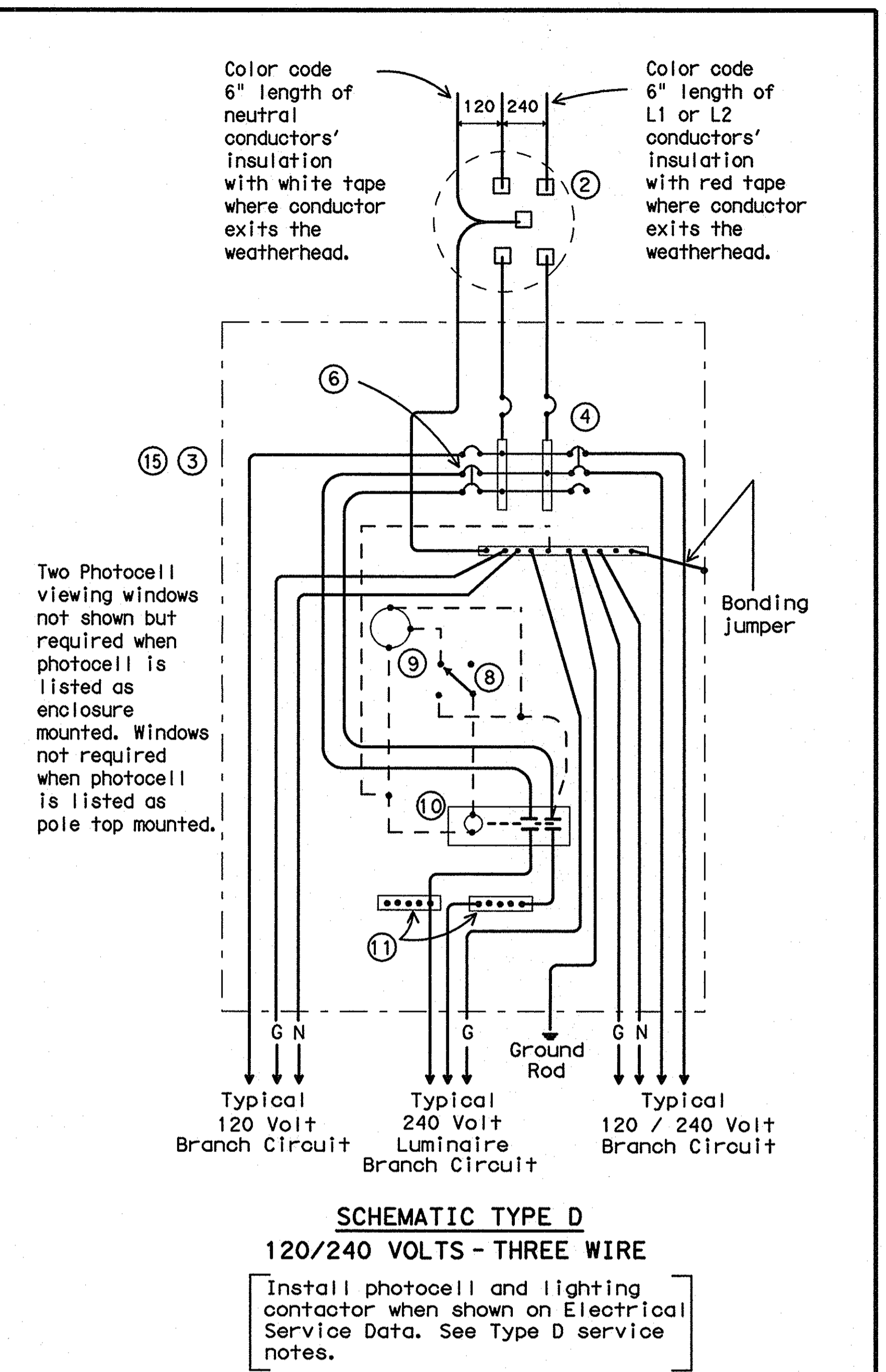
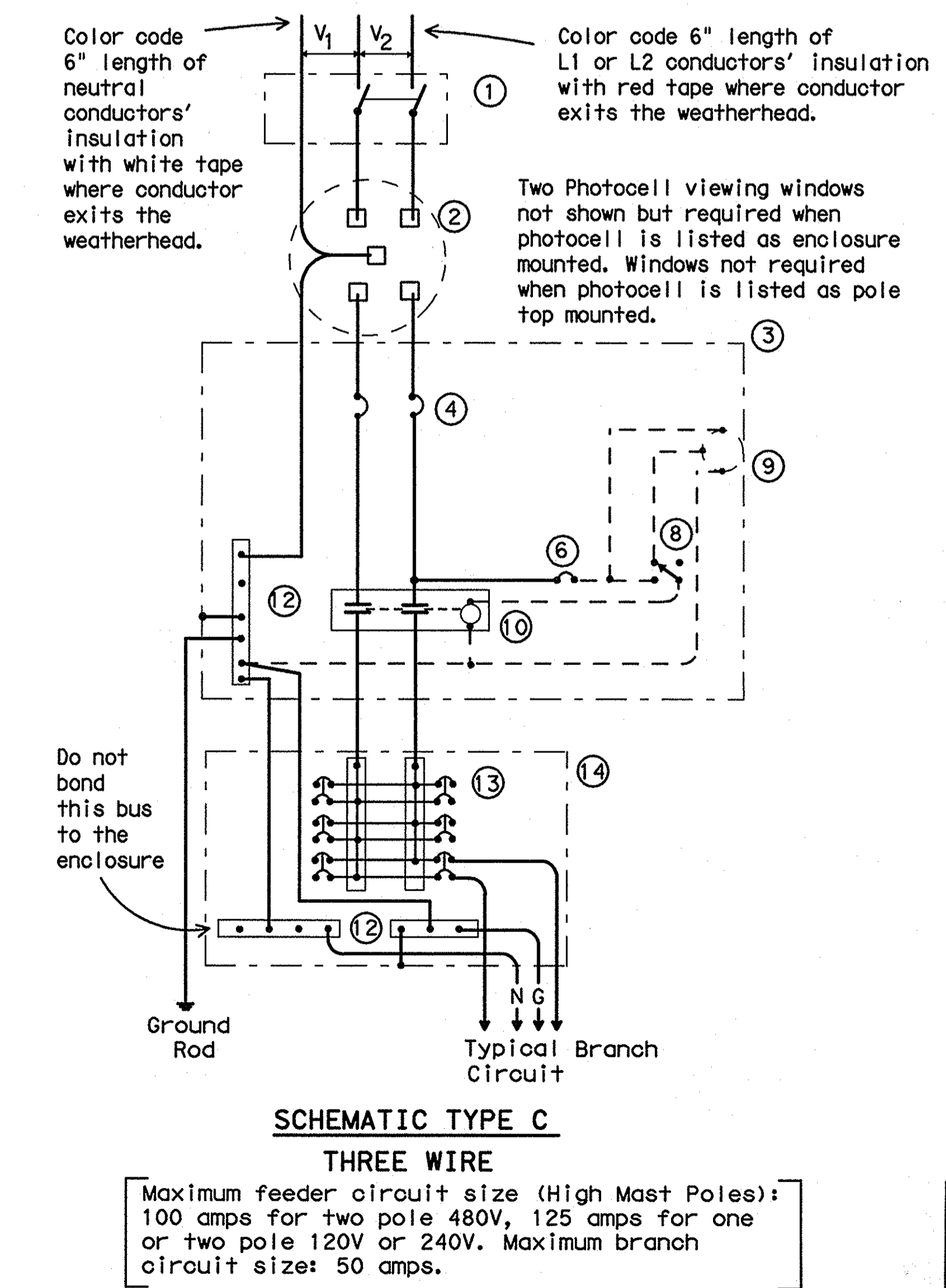
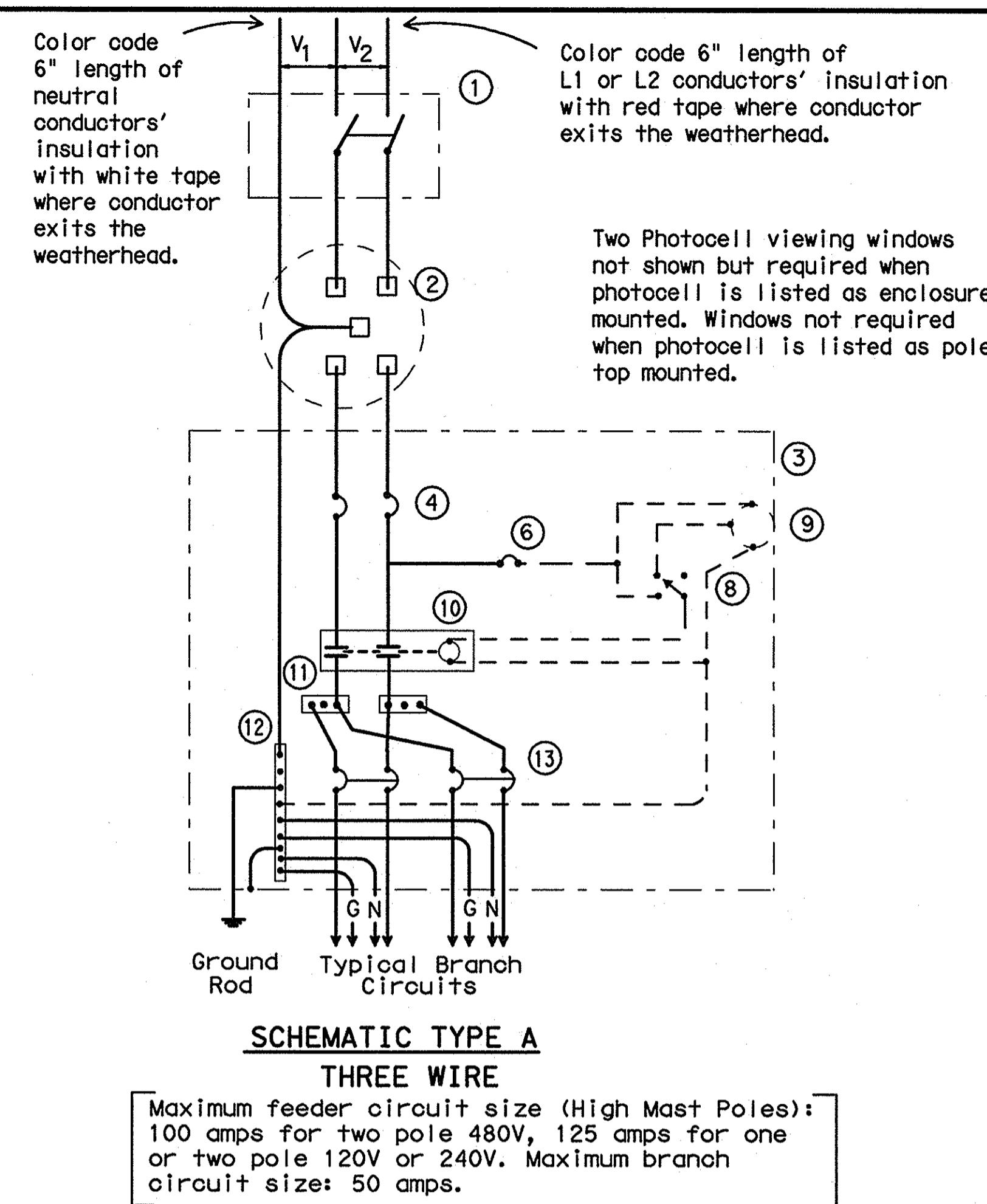
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SERVICE ENCLOSURE NOTES

- VIII. 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 or enclosure mounted photocell) and all auxiliary equipment enclosures mounted with service equipment and paid for as part of Item 628, "Electrical Services", 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 service assembly enclosure shall also be labeled "SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT".
 - B. Conduit entries into the top of enclosures shall have threaded hubs. Conduit entries through the equipment mounting back plate will not be allowed.
 - C. All service enclosure front doors shall be permanently labeled "DANGER HIGH VOLTAGE". Label shall be a self sticking type, intended for outdoor installation. Lettering style, layout and colors of red, black and white shall be as required by OSHA. Label letters shall be 1 to 1 1/2 inches high or as high as the enclosure door width will permit for smaller services. Separate or auxiliary lighting enclosures need not be OSHA labeled when mounted in the same viewing plane as the service enclosure front door. Where only one type of load is served by the service, the service door shall be marked using duo-colored plastic labels or self adhesive vinyl weather resistant labels, minimum of 1 inch high; applied in a neat and workmanlike manner. On the label will be the service number shown on the plans as well as identifying the load served specifically (i.e. lighting, landscaping, signals, traffic management or other wording as directed by the Engineer). Safety switches need not be OSHA labeled unless specifically required by the serving utility.
 - D. Type GS enclosures will only be allowed for service Types D and T without an enclosure mounted photocell and/or lighting contactor and the Type C panelboard. This spec will allow an "off the shelf" product meeting these specifications to be used. Type GS enclosures shall be made from pre-galvanized steel sheeting, hot dipped galvanized steel, or powder coat painted steel unless shown differently on the plans. Steel enclosures shall be painted inside and outside; galvanized enclosures may be painted. Unless otherwise approved by the Engineer, painted enclosures shall be gray, beige, white or light green. Panelboard/loadcenter enclosures shall meet UL type 3R requirements, shall have a dead front trim, and an outer padlockable door preventing unauthorized persons from operating contained equipment. Galvanized steel is no longer allowed for Types A, C, or custom-built D or T enclosures. If GS is shown in the descriptive code for any of these, an AL shall be provided.
 - E. Type AL enclosures for service Types A and C shall meet UL type 3R requirements and shall also meet additional requirements of this paragraph. The enclosure shall have both a main disconnect remote operator handle and a door latch handle. Die-cast handles are not acceptable. The main disconnect remote operator shall be flange-mounted, shall interlock the door when in the "on" position, and shall be padlockable in both the "on" or "off" positions. Door latch shall latch at two or more points, operate by a handle separate from disconnect switch and be capable of being locked. Door closure clamps will not be allowed. Lock must be keyed to Master #2195. All the enclosures shall have either a continuous stainless steel piano hinge with stainless steel pin or enclosures less than 30 inches may have two heavy duty hinges, those over 30 inches must have three. Heavy duty two and three point hinges shall have a 0.185 inch minimum diameter electro-zinc plated steel pin or a stainless steel pin. Two point hinged doors shall be rated for 56 lbs of loading. Three point hinged doors shall be rated for 70 lbs of loading. The door shall have an attached data pocket constructed of either thermoplastic or metal. Pocket shall be 12" x 12", unless that size will not fit in enclosure. The pocket shall then be as large as possible, as approved by the Engineer, and mechanically attached with stainless steel nuts and bolts, or stainless steel or aluminum rivets. Enclosure shall include an equipment mounting panel installed inside the enclosure on collar studs or tapped bosses, and constructed of a minimum 12 gauge galvanized steel. Equipment mounting panels shall not be painted. Enclosure shall have factory installed external mounting feet. Enclosure door shall be capable of opening at least 130 degrees, with arm or other approved means to hold the door open. Only the enclosure exterior will be primed and painted. Paint color shall be beige or gray and shall be powder coat paint as shown below. Condensation drainage shall be provided in the bottom of the enclosure before leaving the factory. The Contractor shall prepare and submit a schematic drawing unique to an individual service. The approved drawing shall be laminated and placed in the document pocket of the service at the time of shipment to the job site. All applicable wiring diagrams and plan sheet layouts for all equipment and branch breaker circuits supplied by that service shall also be laminated and placed in the document pocket prior to shipping. Type AL enclosures for Type D and T services with enclosure mounted photocell and/or lighting contactor shall have the loadcenter interior mounted in an enclosure with properly adapted dead front trim. Types D and T shall not have a loadcenter exterior "can" mounted inside another enclosure meeting these specifications. (Do not put one enclosure inside another enclosure). Types D and T with enclosure mounted photocell and/or lighting contactor shall meet the additional requirements of this paragraph except that remote-operating handle will not be provided.
 - F. Type SS enclosures for Type A and C shall meet all the requirements above for their respective type AL. Type SS enclosures for D and T shall meet all the requirements above for their respective type AL. Stainless Steel shall not be painted.
 - G. PS enclosure shall be as detailed and specified on ED(8). Galvanized steel will not be allowed for any pedestal service. If GS is shown in the descriptive code an AL will be provided.
 - IX. 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 SA or SB classifications of ASTM D3359. Finish shall be uniform in appearance and free of scratches.
 - X. Main Disconnect. Main disconnect device shall be a circuit breaker, as specified in the Electrical Service Data, shall be two or three pole, and rated for the voltage and amperage specified. Circuit breaker shall be an UL Listed thermal-magnetic circuit breaker controlled by flange-mounted remote operator in the service assembly enclosure when required. Circuit breakers shall have a minimum interrupting rating of 10,000 Amps. When the utility company provides a transformer larger than 50 KVA, 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. No backed breakers will be allowed for use as a main disconnect.
 - XI. Control Circuit. Control circuit protection shall be 15 amp circuit breaker.
 - XII. Control Station ("H-O-A" Switch). Control station shall be a maintained-contact, three position selector switch in an UL type enclosure. Switch shall be rated 600 volts and shall be fitted with "Hand-Off-Auto" legend.
 - XIII. 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 thermosetting 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 5,000 amps follow-through. Relay or switch shall be time delay type with normally closed contacts. Photo electric control shall be rated a minimum of 1800 VA, voltage as required. 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 one inch by two inches, round 2 inch diameter, or as otherwise approved by the Engineer. Bracket and photocell's receptacle will be mounted inside enclosure next to each window. Except for window side, 2" of clearance is required on all sides of photocell for ease of replacement. The photocell's receptacle is held in place by two mounting screws on bracket and located next to each window of the enclosure. The 3-prong twist lock photocell shall be mounted in a position to receive light from the window closest to the photocell. 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 two footcandles higher than turn on.
 - XIV. Lighting Contactor. Lighting contactor shall be a UL Listed NEMA rated 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 240 volts, 480 volts or 600 volts as required. Lighting contactor shall not be the DIN rail mounted type.
 - XV. 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.
 - XVI. 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.

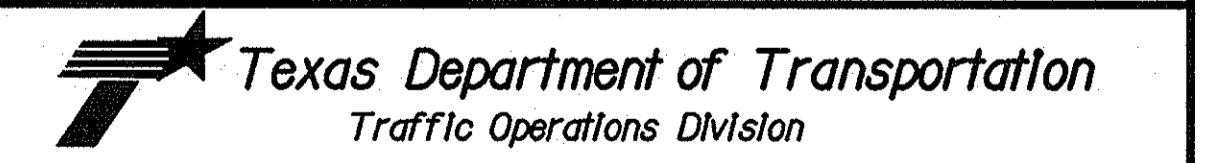
SCHEMATIC LEGEND

- | | |
|---|---|
| 1 - Safety Switch (when required) | 12 - Neutral/Ground Bus |
| 2 - Meter (when required) | 13 - Branch Circuit Breaker (See Electrical Service Data) |
| 3 - Service Assembly Enclosure | 14 - Circuit Breaker Panelboard (See Electrical Service Data) |
| 4 - Main Disconnect Breaker (See Electrical Service Data) | (If Type C is shown as AL or SS on descriptive code, this is the service assembly enclosure only. Panelboard enclosure is GS unless otherwise noted.) |
| 5 - Omit | 15 - Load Center |
| 6 - Circuit Breaker, 15Amp | |
| 7 - Auxiliary Enclosure | |
| 8 - Control Station ("H-O-A" Switch) | — — — — — Power Wiring |
| 9 - Photo Electric Control (enclosure-mounted shown) | — — — — — Control Wiring |
| 10 - Lighting Contactor | — N — — — Neutral Conductor (when required) serve 120 v. loads only |
| 11 - Power Distribution Terminal Blocks | — G — — — Equipment grounding conductor-always required |



TYPE D SERVICE NOTES

Photocell and lighting contactor shall be located either in the same UL type 3R enclosure with load center or, if approved by Engineer, in separate enclosure. There shall be a window on each side of enclosure to allow operation of photocell. Both photocell contactor and breaker area shall have dead front trim. Enclosure, except for RT and PS supports, shall not exceed 36 inches in height or 16 inches in width unless approved by the Engineer. Ty D load center with lighting controls or Ty D separate lighting control enclosure shall have power distribution blocks for a minimum of 4, #8 conductors per phase.



**ELECTRICAL DETAILS-
SERVICE ENCLOSURE
& NOTES**

ED (5) - 03

RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

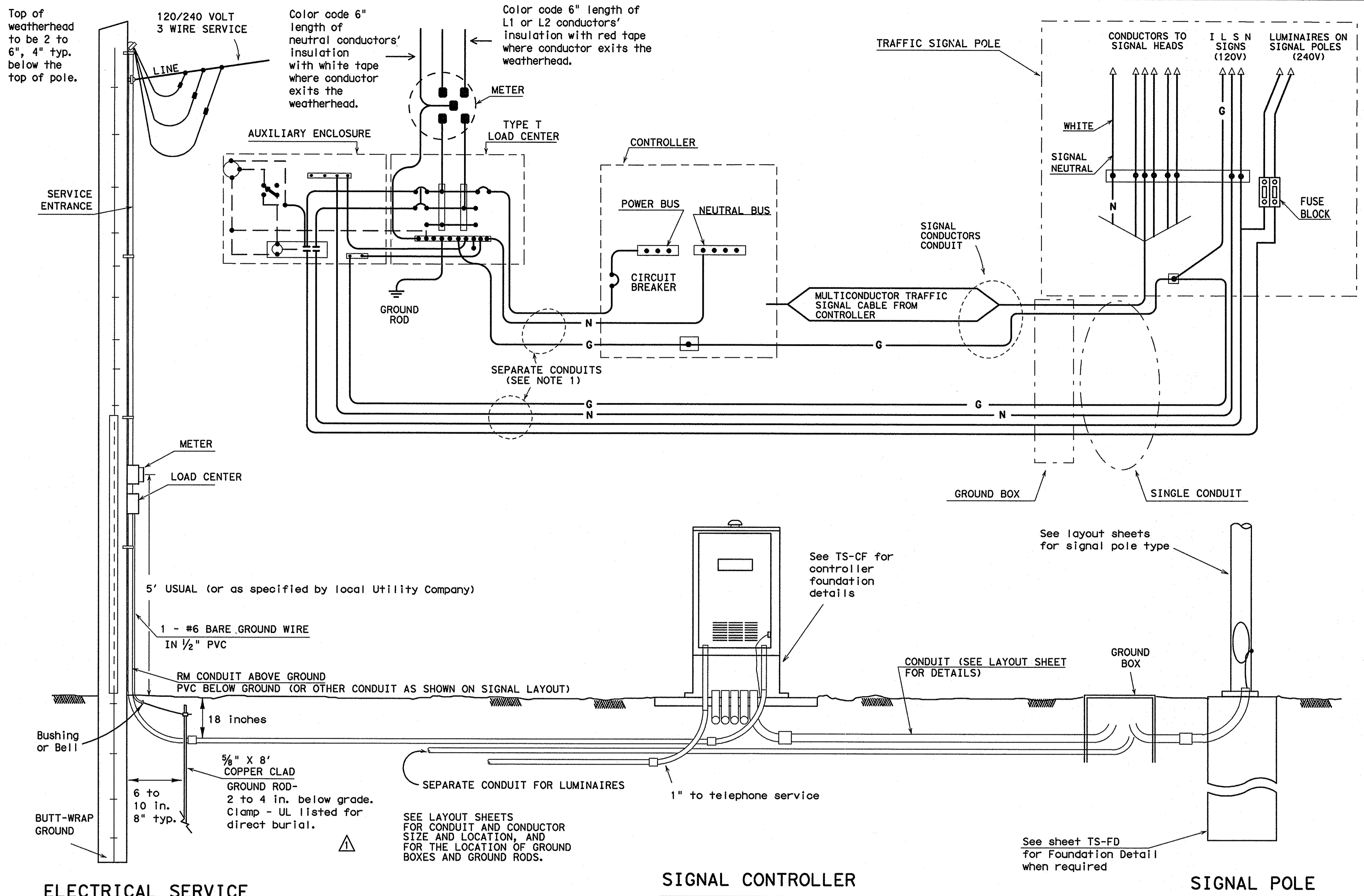
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DISCLAIMER:

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 are to be bonded to grounding conductor.
3. Photocell, when required, shall be mounted at top of pole or in enclosure as shown on ED(4) and ED(5) and as required by descriptive code.
4. 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.
5. 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.
6. Install ground rod at alternate location when directed by the Engineer. Maintain a minimum of 8 ft in contact with the earth.
7. Liquidtight flexible metal conduit (LFMC), may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. LFMC shall be same size as service entrance conduit. LFMC shall not exceed 3 ft. and shall be securely supported within one foot of each end. No strap required for a LFMC shorter than 12". Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. A neutral conductor must be installed within the LFMC. Bend in liquidtight flexible metal conduit shall not exceed 180 degrees.
8. Minimum embedment depth as per Item 627 Treated Timber Poles.
9. Pole to be set plumb.
10. Back fill thoroughly tamped in 6 in. lifts. Place 6 inches additional backfill above grade around pole base to allow for settling, as per Item 627.
11. Excess pole length shall be trimmed from the top at a slope to aid water run off.
12. Gain pole two places for each meter, service, separate or auxiliary enclosure. See ED(4) for details.
13. All illumination and power conductors to be pull tested and megged. Do not meg traffic signal cable.
14. Enclosures are to be locked, and ground box covers are to be bolted before power is applied to the circuit.
15. Conduits entering top of enclosures to be fitted with conduit sealing hub or threaded boss, such as meter hub. Off-set nipple, when required, shall not be zinc-die-pressure cast. All metal conduits not connected to conduit sealing hub, or threaded boss must have a grounding bushing. Terminate bonding jumper to ground bus. All conduits entering enclosures shall be sealed. Silicone shall not be allowed.



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.)

SIGNAL CONTROLLER

SIGNAL POLE

Unless shown elsewhere in the plans, electrical service data for Types D and T shall be as follows.

ELECTRICAL SERVICE DESCRIPTION (SEE ED(4))	SERVICE CONDUIT SIZE (RMC)	SERVICE CONDUCTORS NO./SIZE	SAFETY SWITCH AMPS	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)AL(E)**(*)	1/4	3/#4	N/A	2P/70	30	100	T.S. Lighting	1P/50 2P/15	<7.1
TY T (120/240)000(NS)GS(E)**(*)	1/4	3/#4	N/A	None	30	70	T.S. Lighting	1P/50 2P/15	<7.1

*** Eliminate photocell, contactor and separate enclosure if lighting, or internally lighted signs are not required by plans
 ** See descriptive code in estimate for service support type.
 * See descriptive code in estimate for overhead or underground service.

Texas Department of Transportation
 Traffic Operations Division

**ELECTRICAL DETAILS-
 TYPICAL TRAFFIC SIGNAL
 SYSTEM DETAILS**

ED(7)-03

**RECORD DRAWINGS
 (July 2013)**
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

5/03 Revision
 Revised notes.

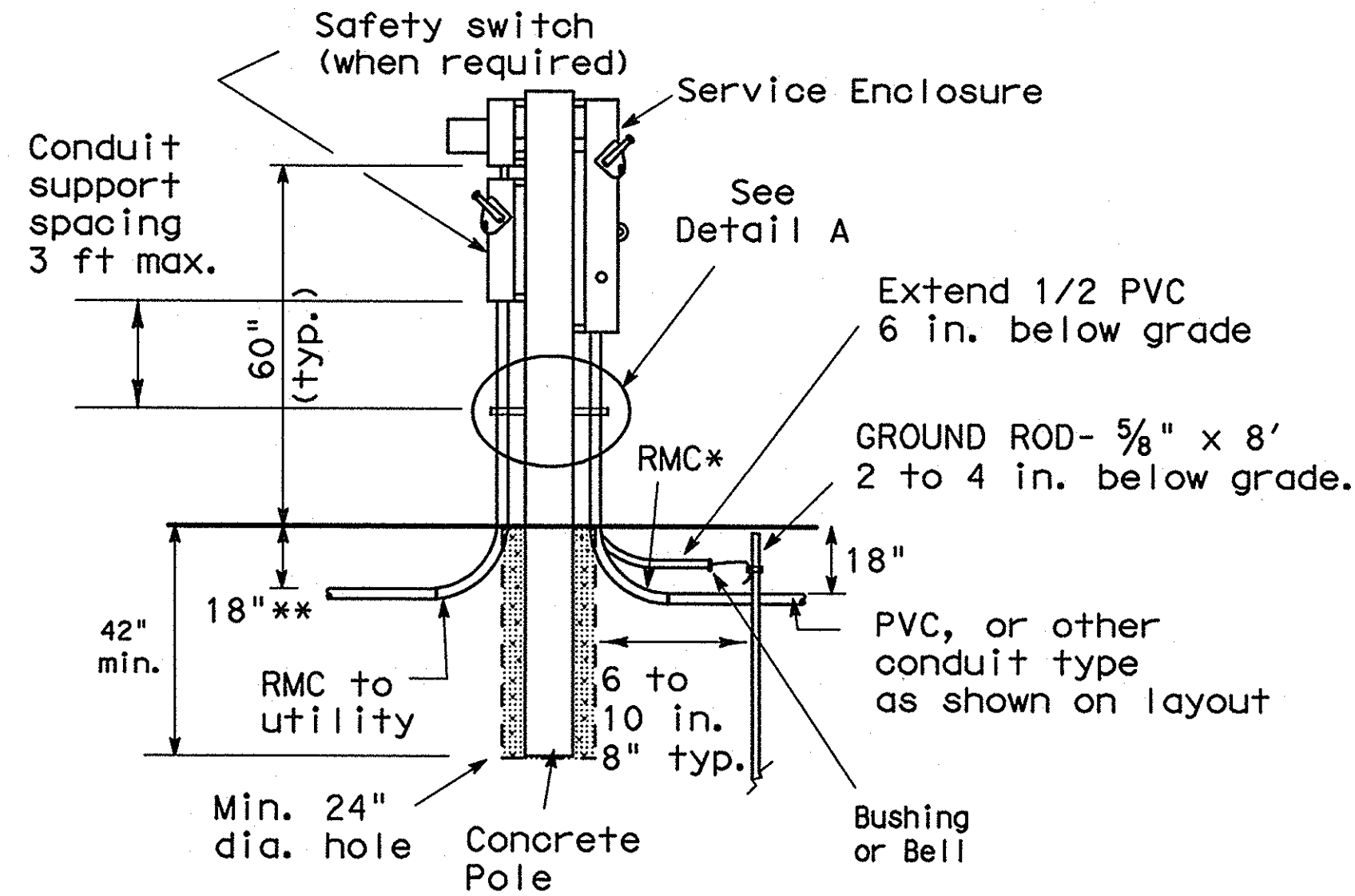
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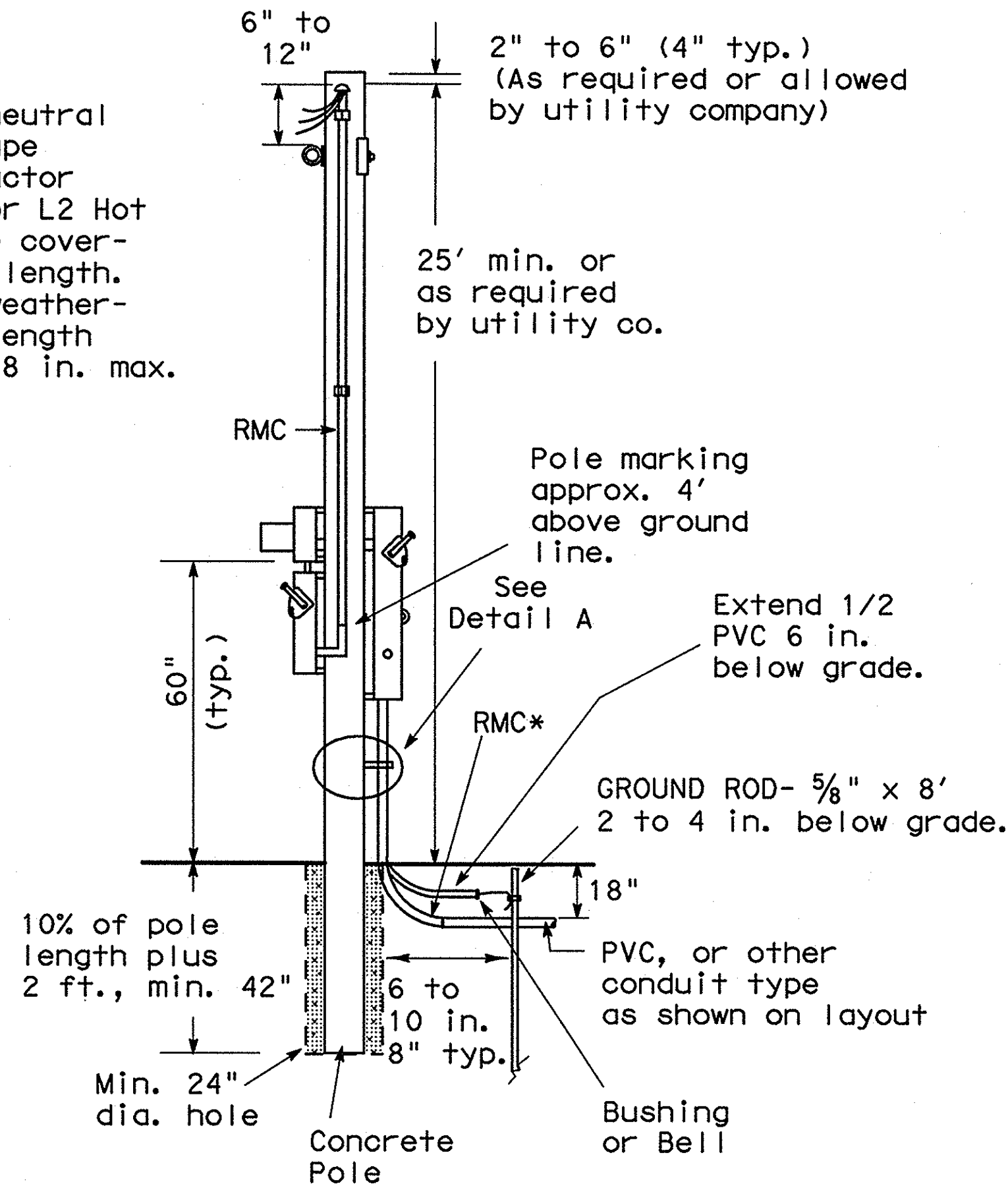
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DISCLAIMER:

Color code grounded - neutral conductor with white tape covering 6 in. of conductor length. Color code L1 or L2 Hot conductor with red tape covering 6 in. of conductor length. Where conductors exit weather-head, conductors free length shall be 12 in. min., 18 in. max.

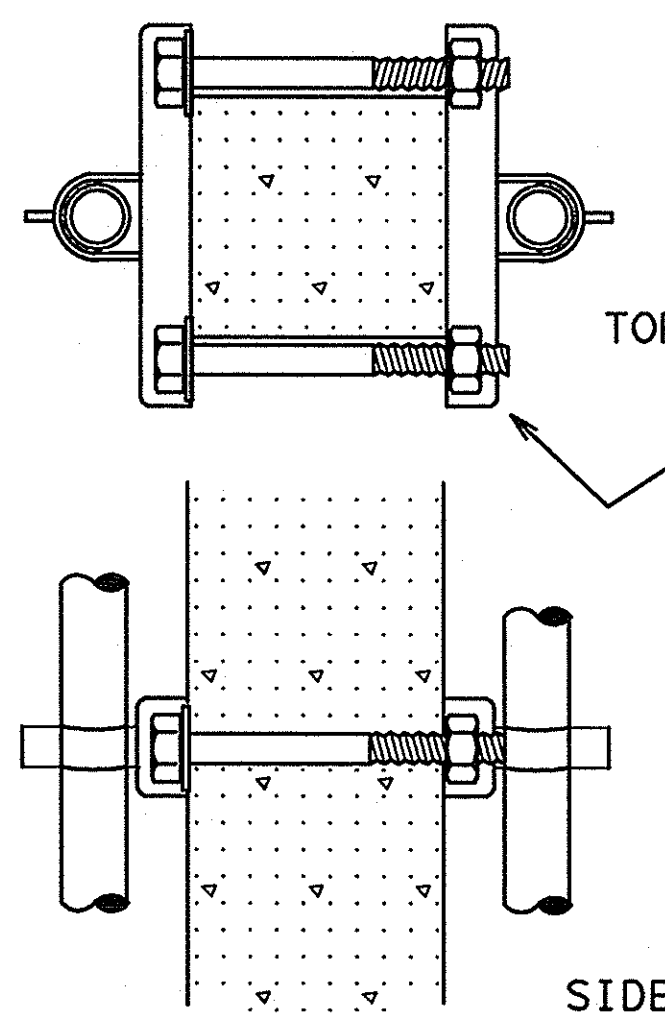


CONCRETE SERVICE SUPPORT
 (Underground)



CONCRETE SERVICE SUPPORT
 (Overhead)

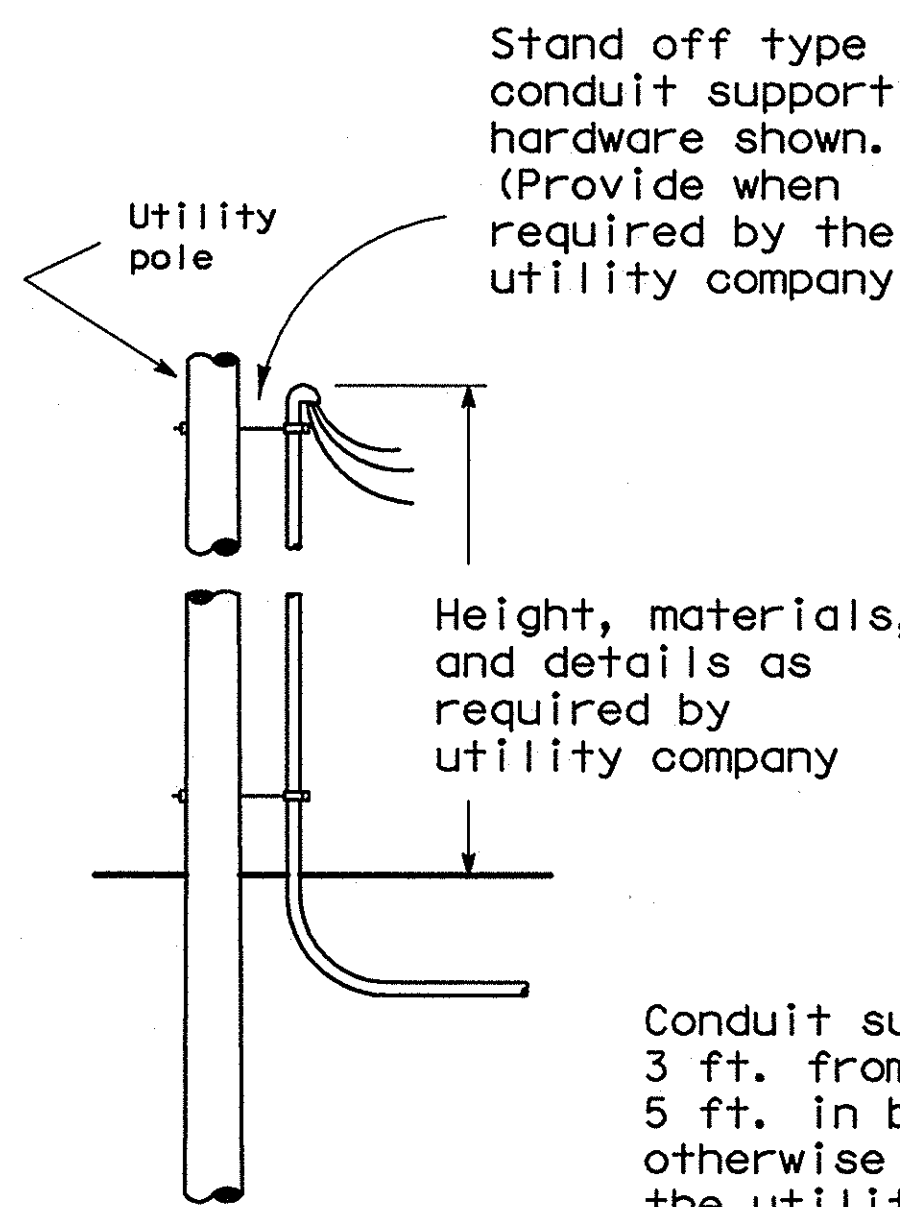
*same size as branch circuit conduit shown on layout sheets.
 ** or as required by utility company.



DETAIL A

Channel bracket or other arrangement approved by the Engineer. (Kindorf, Unistrut, B-line or equal)

Note: Attach channels with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel with long bolts, or other secure mounting as approved by the Engineer. Bolts galvanized in accordance with ASTM A153. Channel shall be galvanized.



UTILITY POLE CONNECTIONS

(When underground service is required by descriptive code and utility is overhead.)

NOTES:

- Electrical service support structures bid as type GC or OC shall be concrete poles and shall meet the following specifications.
- Poles shall be prestressed concrete and suitable for direct embedment into the ground without special foundations.
- Poles bid as type "GC" shall be a granite concrete mixture consisting of gray Portland cement with exposed pink granite aggregate. Poles bid as type "OC" shall be other concrete mixture as shown elsewhere on the plans or as directed by the Engineer.
- Poles greater than 10' shall be square in cross-section, with chamfered corners, and shall have a standard taper of 0.162 inch per foot. Cross sectional dimensions shall not deviate by more than 3/8 inch. Poles 10' or less may be tapered .162"/ft or may be non-tapered. The allowable tolerance shall be plus 3 inches and -2 inches in the overall length. The width of the bottom face of the pole as it is cast may be less than the top face. All small cavities shall be cleaned, saturated with water and then filled with mortar. A small cavity is defined as one larger than 1/4 inch but smaller than 3/4 inch in diameter, and less than 3/8 inch deep. Larger non-structural cavities and spalls shall be repaired by opening side of the damaged area on a 1 to 1 slope using a mechanical grinder, cleaning thoroughly and filling with a high-strength non-shrink concrete repair material. Poles with other defects may be repaired only upon authorization of and using the method prescribed by the Engineer.
- The end of each steel reinforcing strand in the tip and butt shall be burned back to a minimum depth of 1/2 inch. The holes left by the removal of the strand shall be thoroughly cleaned of any loose residue. The holes shall then be completely filled with non-shrink grout and smoothed evenly with tip or butt surface.
- Prestressing strands shall have a minimum concrete cover of 1 1/4 inch.
- A straight line joining the edge of the pole at the butt and the edge of the pole at the top shall not be distant from the surface of the pole at any point by more than 3/8 inch for each 10 feet of length.
- The chloride content of the concrete mix, including all ingredients shall be 0.4 pounds per cubic yard, or less.
- Concrete used in poles shall have a compressive strength at transfer of not less than 4,000 PSI, and a 28-day compressive strength of not less than 7,000 PSI.
- Materials shall comply with the latest version of the following standards:
 - Portland Cement - ASTM C105
 - Admixtures - ASTM C494
 - Aggregates - ASTM C33 or C330
 - Reinforcing Bars - ASTM A615
 - Cold-Drawn Spiral Wire - ASTM A82
 - Prestressing Strand, 270K - ASTM A416
- Poles greater than 10' shall have a 4 inch tip and 3/8 inch strands. Poles 10' or less shall have a 5 inch min. tip and 3/8 inch strands. Pole shall have a load capacity of greater than 1188 lbs. applied 2 ft. below tip.
- Poles shall be capable of withstanding single point pick up from the horizontal position when lifting from a point 30% of the overall length down from the tip.
- All poles shall be marked by imprinting on one face. Marking shall indicate manufacturer's name, year of manufacture, length and name or type of pole. Marking shall be located approximately 4 ft. above ground line.
- Dunnage points, two-point pickup locations for handling pole in horizontal position, and one-point pickup locations for use in raising the pole to a vertical position and handling in setting operation shall be marked on the pole with durable ink or paint or cast into the pole. These marks shall be small but conspicuous.
- Poles shall be embedded 42 inches or 10% of length plus 2 ft. into the ground whichever is greater.
- When required by utility company for overhead services, poles longer than 10 feet shall have a #6 solid ground wire running the entire length exiting within 6 inches from the top and bottom of the pole. The Contractor shall connect the bottom to a butt wrap or butt plate grounding device.
- All conduit and conductors attached to the service support and within 12 inches of the service support will not be paid for directly, but shall be subsidiary to the electrical service. All conduit and conductors from the utility company pole to a point 12 inches from the service support, including conduit and conductors required for the utility pole riser when furnished by the Contractor, will be paid for separately.
- All mounting hardware and installation details of services shall be in accordance with utility company specifications.
- All conduit on service supports shall be rigid metal conduit except the conduit for grounding electrode conductor (ground wire) shall be 1/2 inch PVC. Service entrance conduit size shall be as shown elsewhere. Conduit for branch circuit entry to enclosure shall be the same size as that shown on the layout sheets for branch circuit conduit. Rigid metal conduit shall extend a minimum of six inches underground and then coupled to the type conduit shown on the layout for that particular branch circuit. RMC shall have grounding bushings in enclosures.
- Backfill shall be in accordance with Item 400 except for measurement and payment. Backfilling will not be paid for directly but shall be subsidiary to the various bid items.
- Liquid tight flexible metal conduit (LFMC), may be used when meter and service enclosure are mounted 90 to 180 degrees to each other. LFMC shall not exceed 3 ft. and shall be securely supported within one ft. of each end. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. A neutral conductor must be installed within the LFMC. Bend in LFMC shall not exceed 180 degrees. LFMC may not be installed on utility company owned poles. A pull test is required on all installed conductors, at least six inches of free conductor movement shall be demonstrated to the satisfaction of the Engineer.
- Contractor may order concrete service support structures with 3/4" hole near top of pole for eye bolt type bracket. Eye bolt bracket may be installed as means of overhead service drop anchoring point by utility. Pole may also be center drilled in the field for installation of eye bolt bracket. When used, install bracket 6" to 12" below weatherhead.

**ELECTRICAL DETAILS-
 SERVICE SUPPORT
 TYPES GC AND OC**

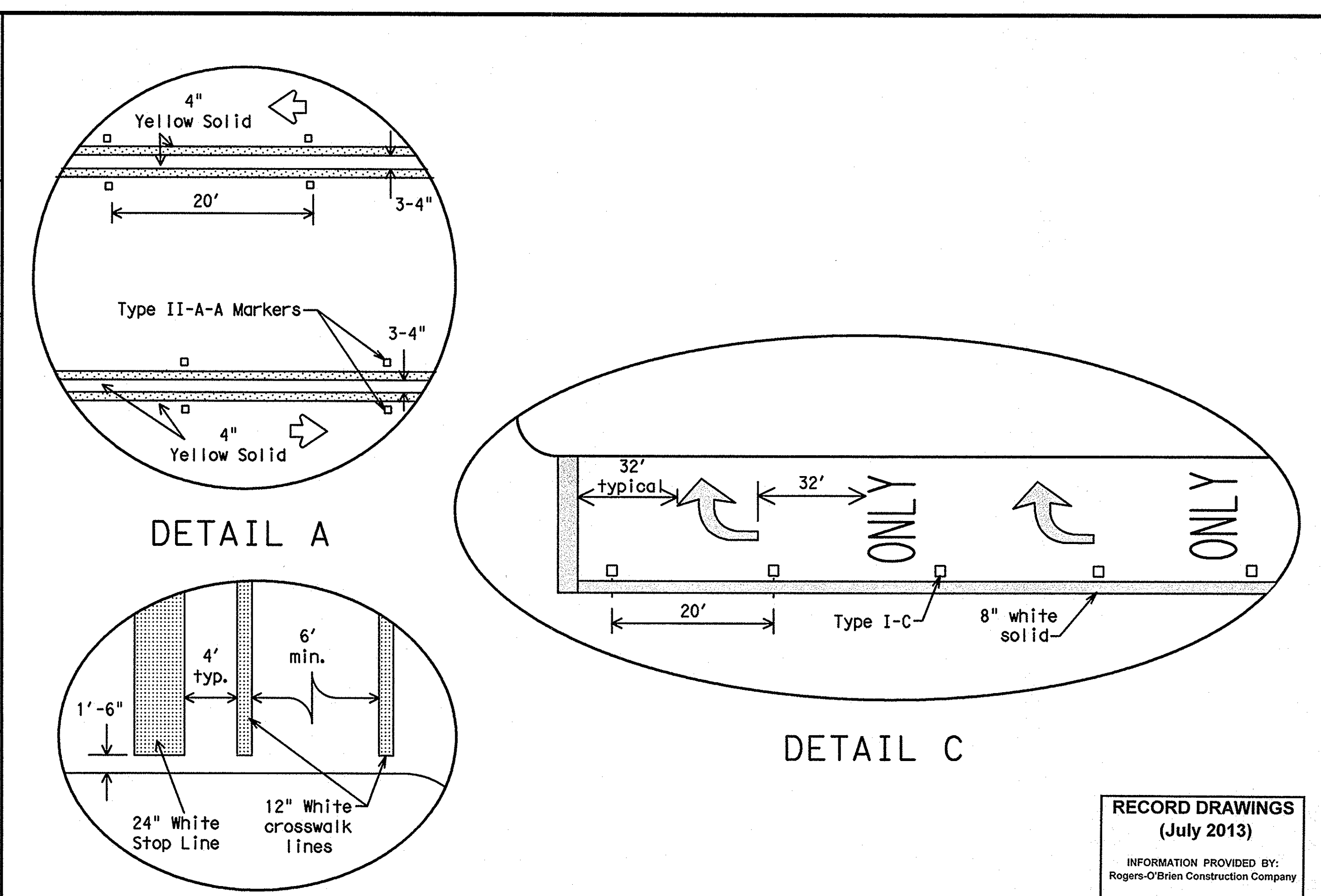
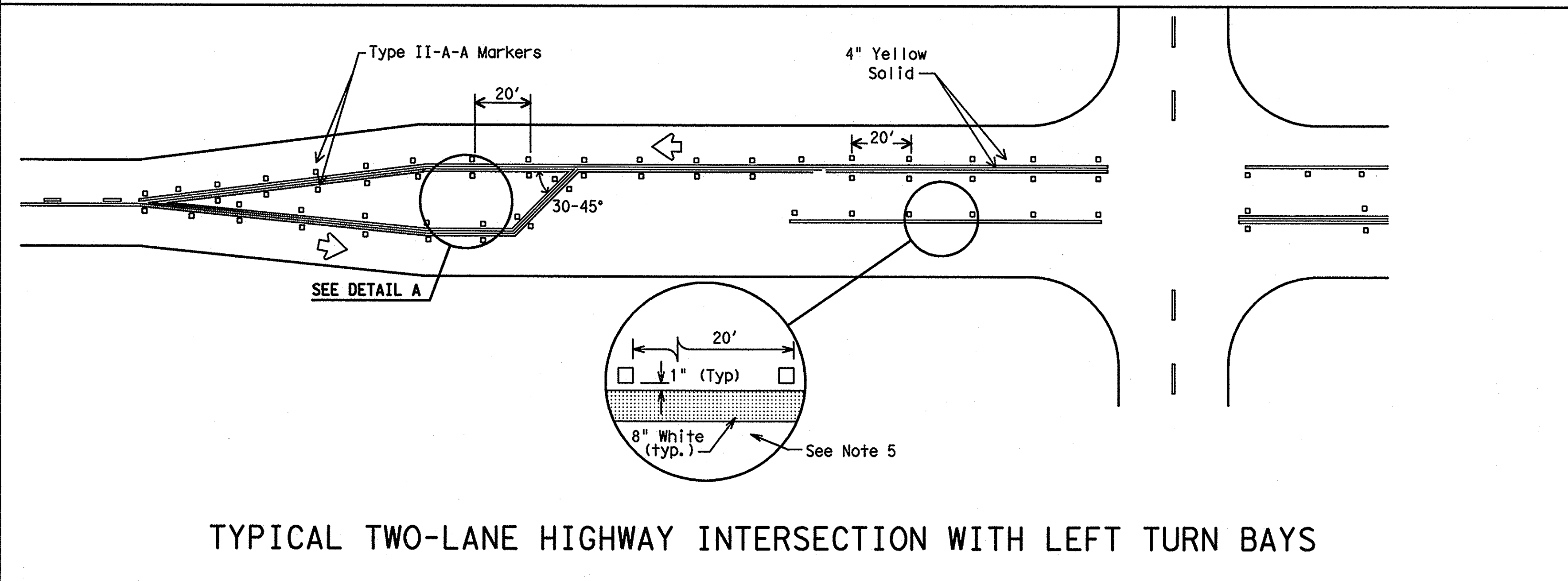
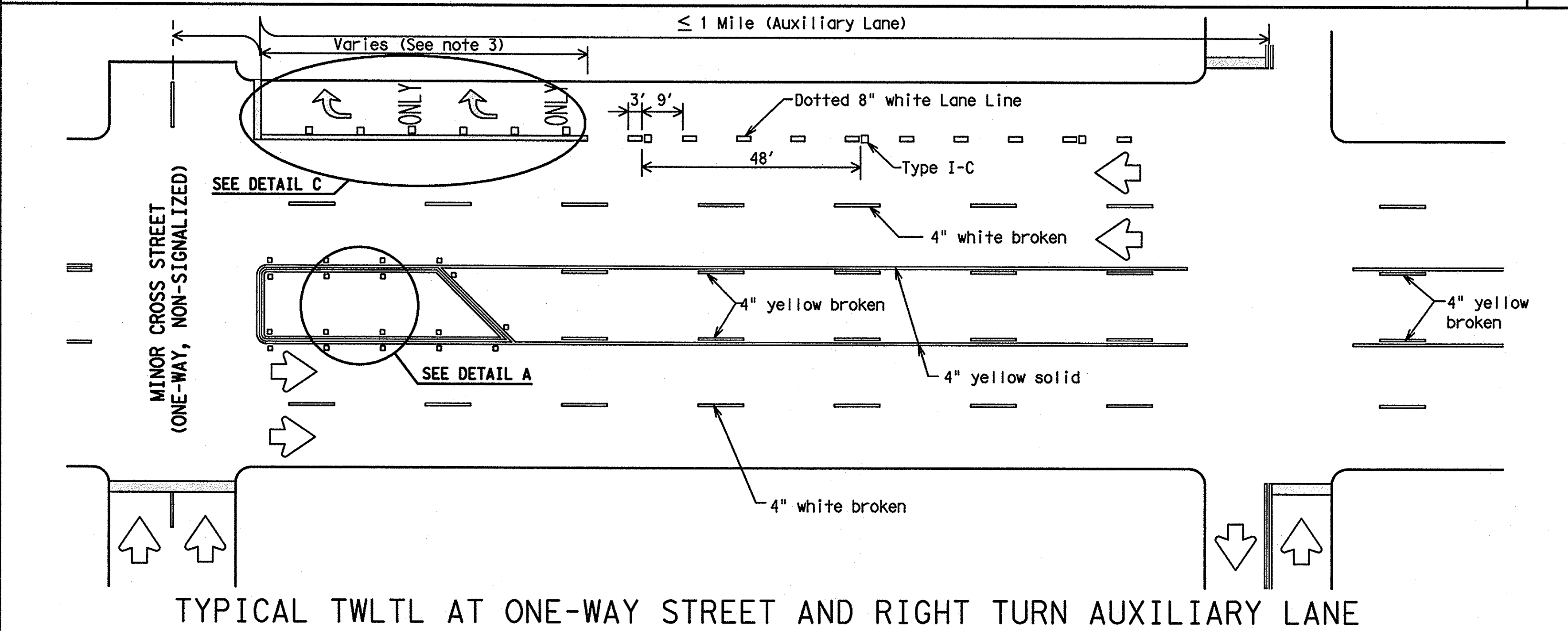
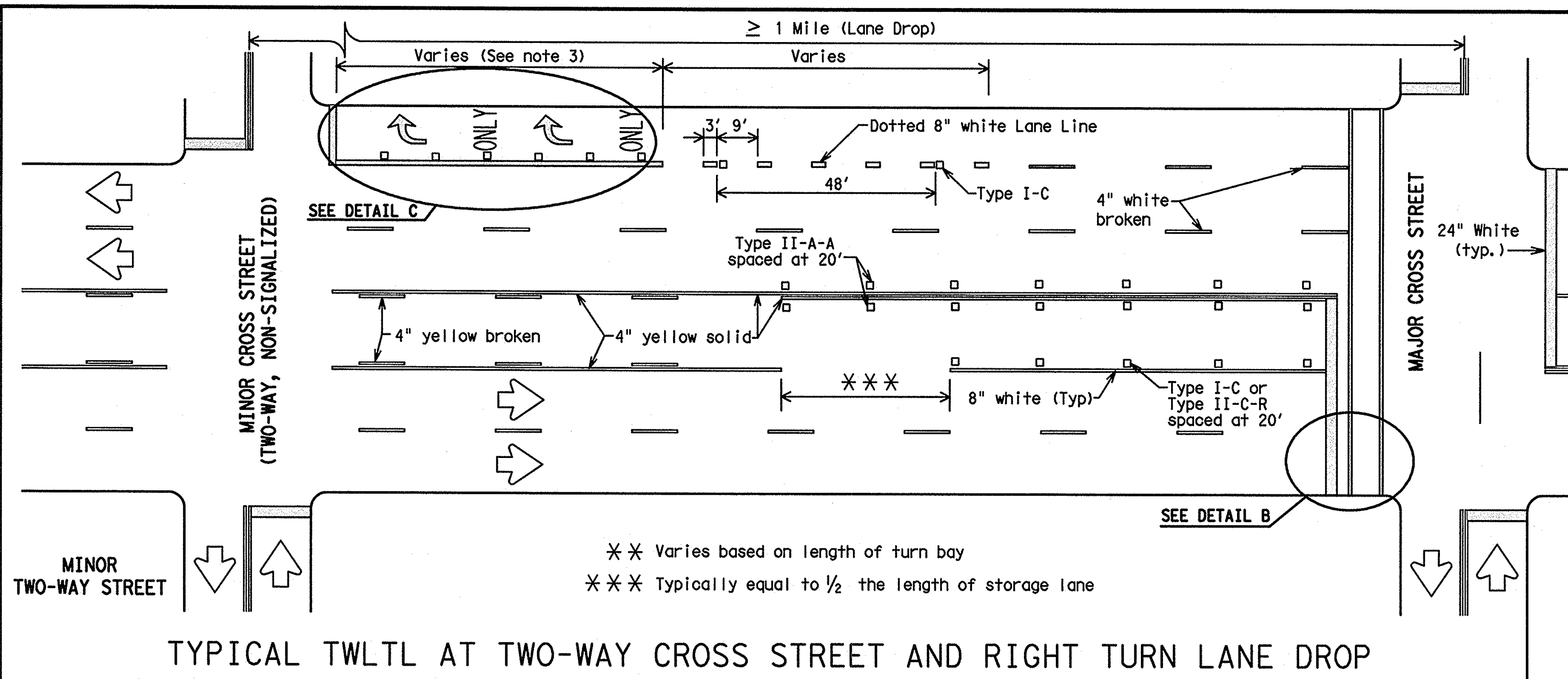
ED(9)-03

RECORD DRAWINGS
 (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

12-00		12-00		12-00		12-00	
3-03		3-03		3-03		3-03	
REV	DATE	BY	CHKD	DATE	BY	CHKD	DATE
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

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DATE: FILE:

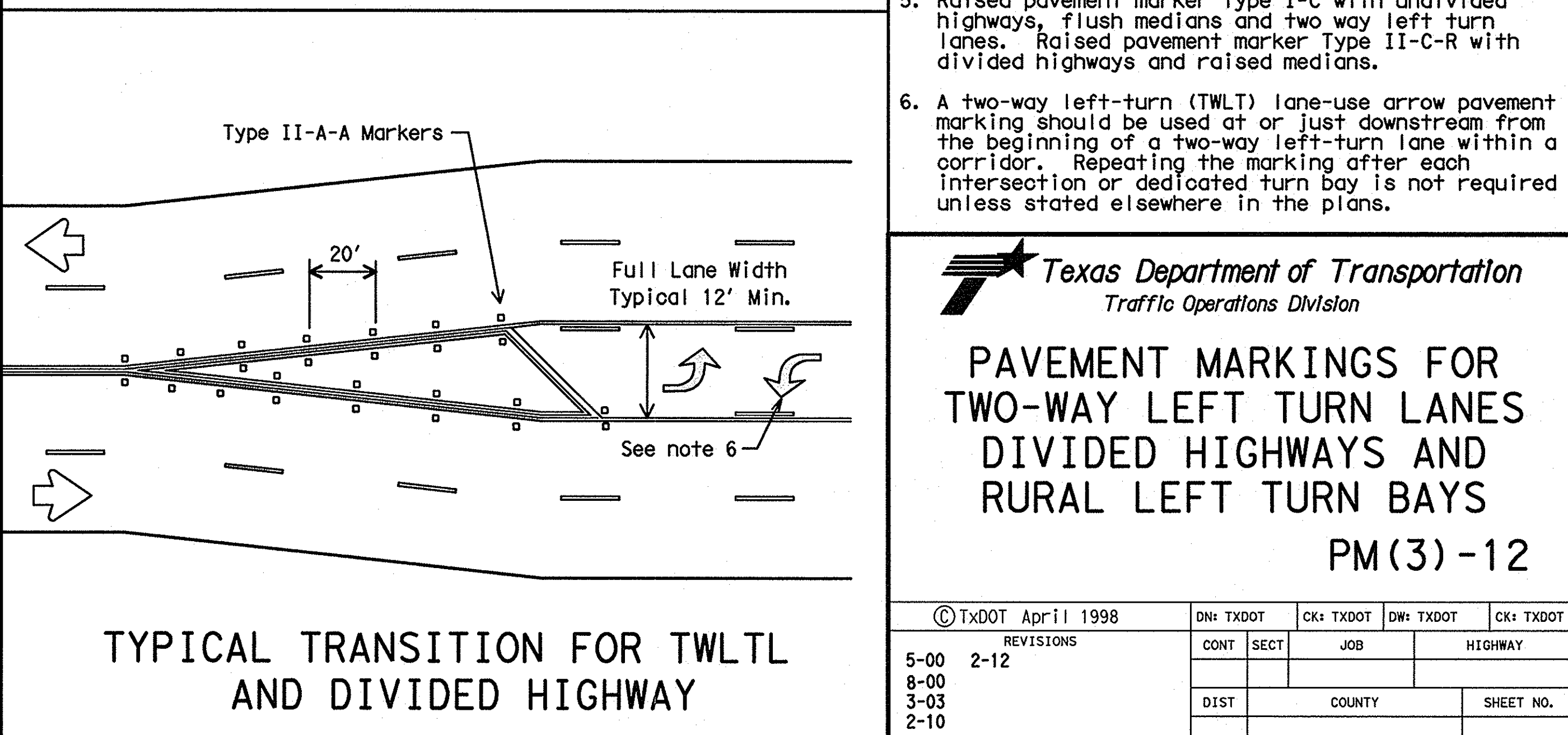


Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

DETAIL B

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



RECORD DRAWINGS (July 2013)
INFORMATION PROVIDED BY: Rogers-O'Brien Construction Company

- GENERAL NOTES**
- Refer elsewhere in plans for additional RPM placement and details.
 - Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows as shown in the Standard Highway Sign Designs for Texas.
 - When lane used word and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
 - Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
 - Raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.
 - A two-way left-turn (TWL) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

Texas Department of Transportation
Traffic Operations Division

PAVEMENT MARKINGS FOR TWO-WAY LEFT TURN LANES DIVIDED HIGHWAYS AND RURAL LEFT TURN BAYS

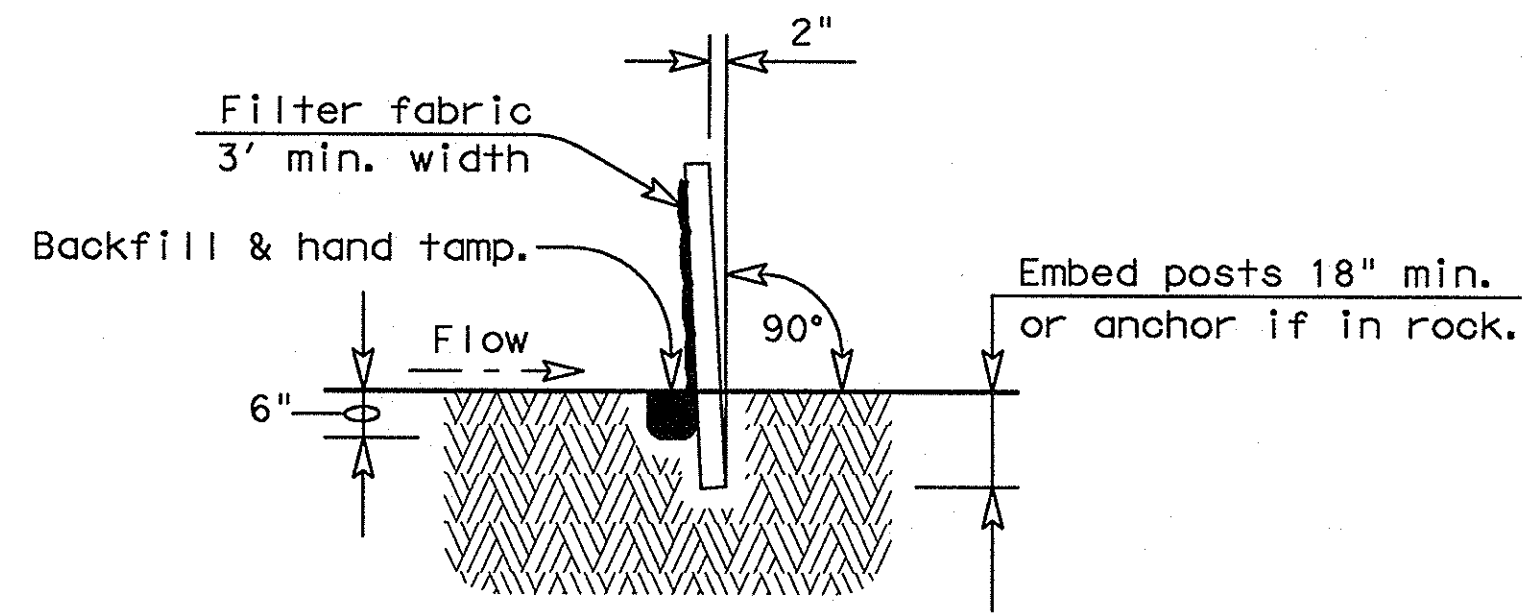
PM(3)-12

© TxDOT April 1998	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
5-00	2-12	CONT	SECT	JOB
8-00				HIGHWAY
3-03		DIST	COUNTY	SHEET NO.
2-10				

22C

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LEVELS DISPLAYED	
1	



SECTION A-A

GENERAL NOTES

- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

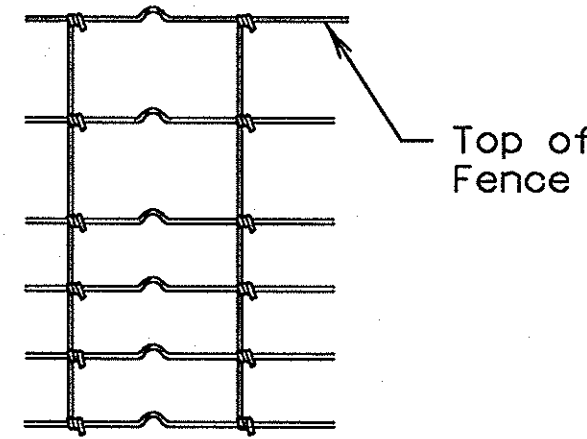
Sediment Control Fence — SCF —

SEDIMENT CONTROL FENCE USAGE GUIDELINES

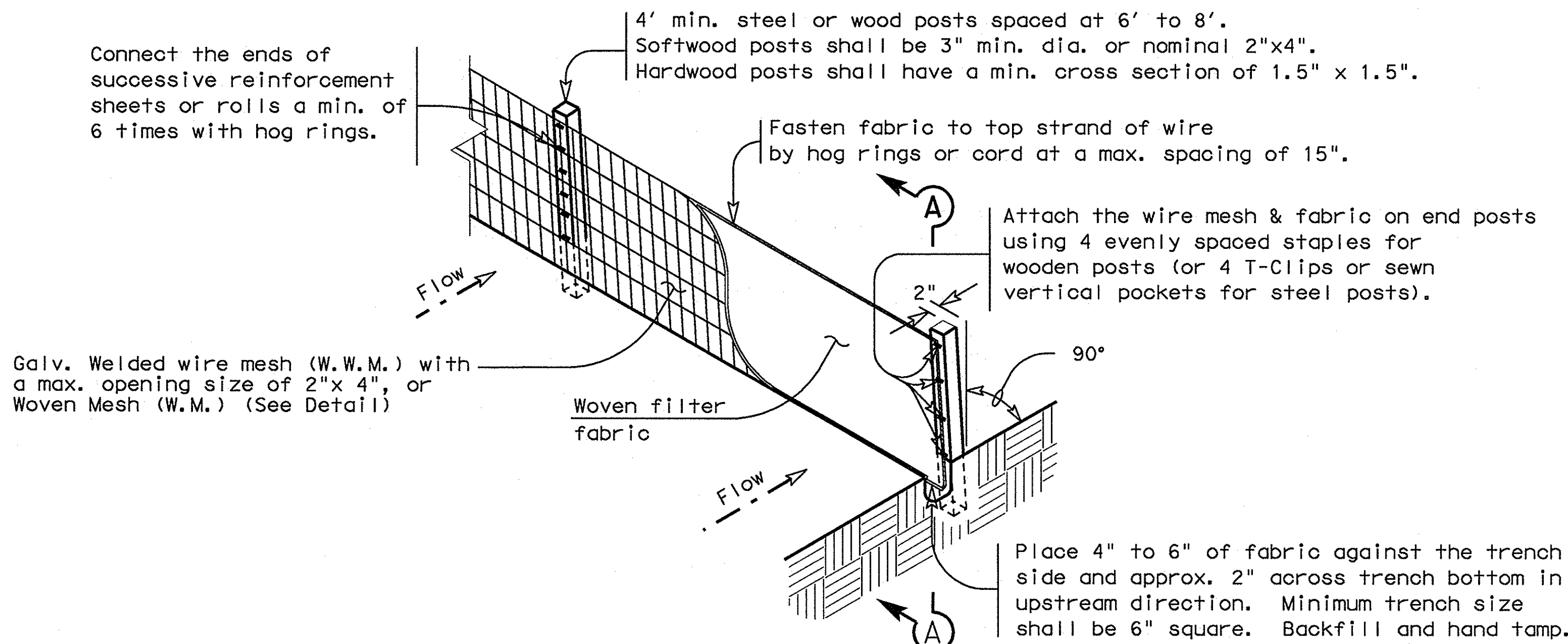
A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a max. flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

Galv. Hinge joint knot woven mesh (12.5 Ga. Min.) requires a minimum of five horizontal wires spaced at a max. 12 inches apart and all vertical wires spaced at a max. 12 inches apart.

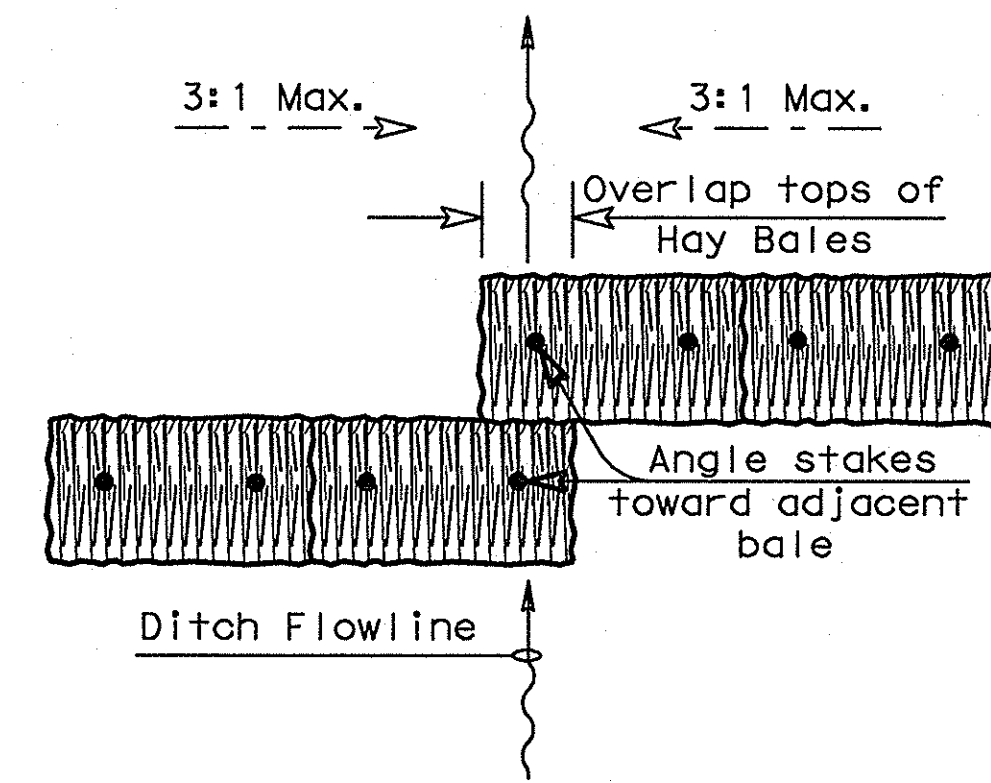


Hinge Joint Knot Woven Mesh (Option)

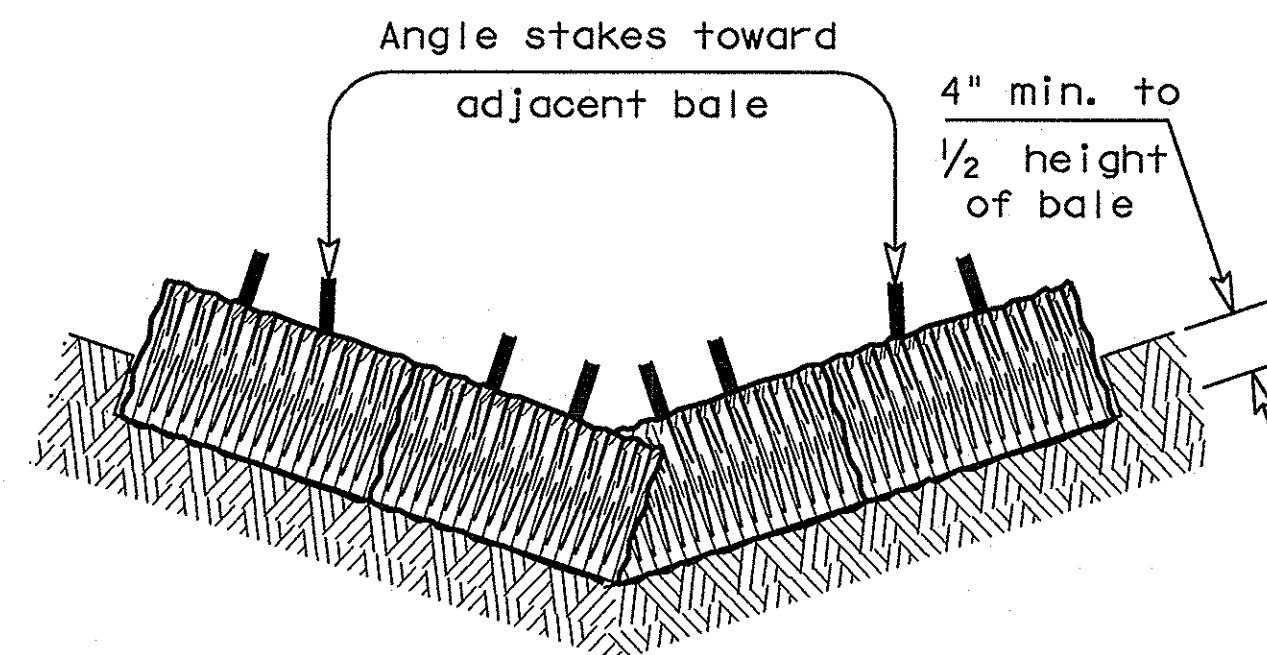


TEMPORARY SEDIMENT CONTROL FENCE

SCF



PLAN VIEW



PROFILE VIEW

PLANS SHEET LEGEND

Baled Hay — BH —

BALED HAY USAGE GUIDELINES

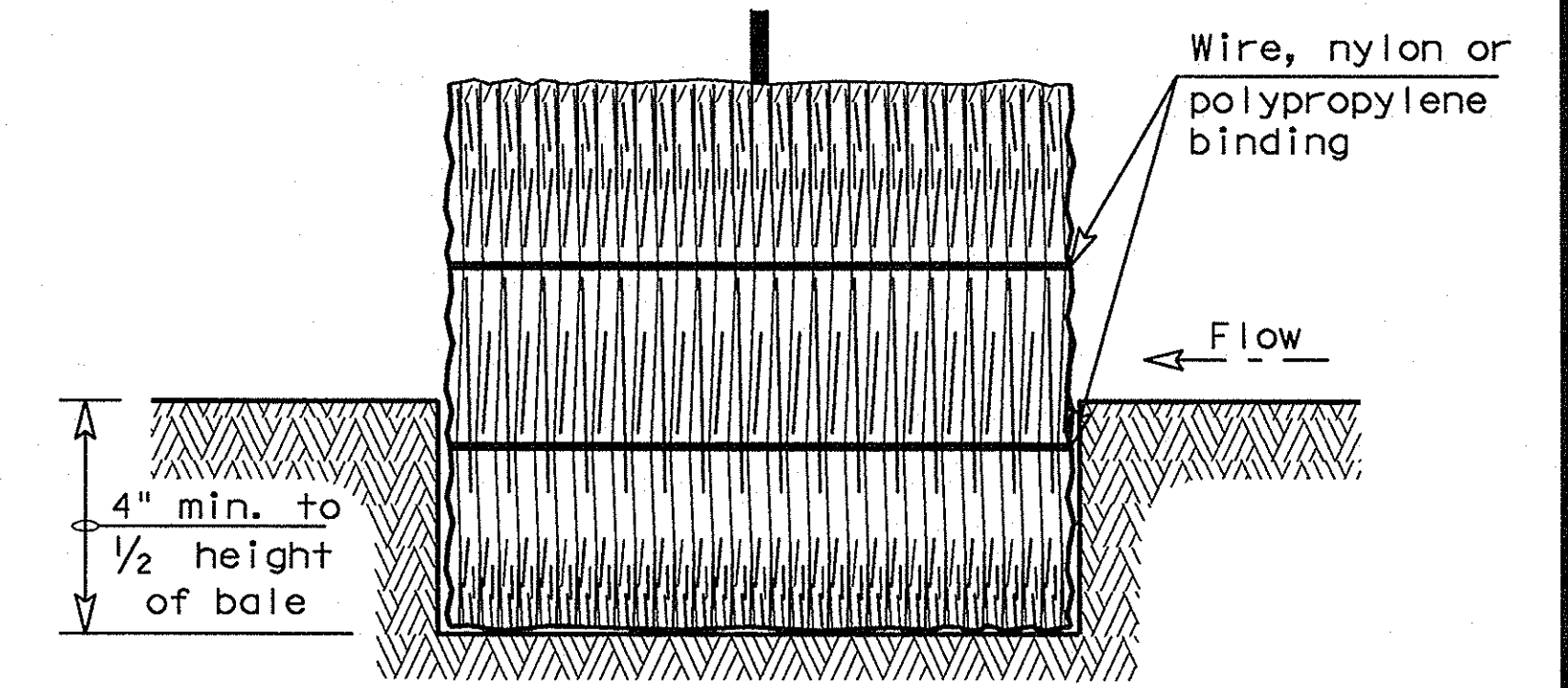
A Baled Hay installation may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A two year storm frequency may be used to calculate the flow rate to be filtered. The installation should be sized to filter a maximum flow thru rate of 5 GPM/FT² of cross sectional area. Baled hay may be used at the following locations:

- 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'.
- Where the installation will be required for less than 3 months.
- Where the contributing drainage area is less than 1/2 acre.

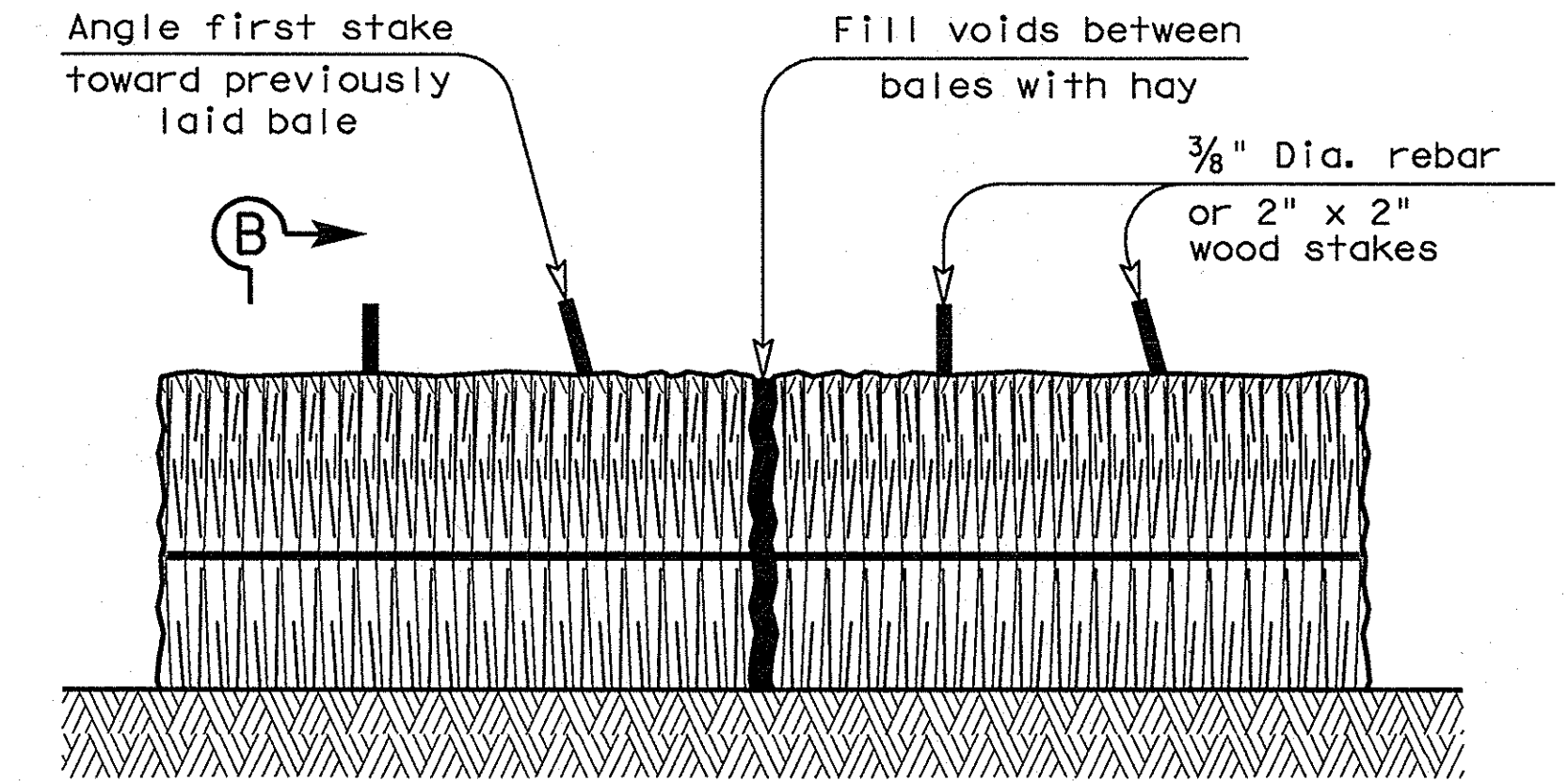
For Baled Hay installations in small ditches, the additional following considerations apply:

- The ditch sideslopes should be graded as flat as possible to maximize the drainage flowrate thru the hay.
- 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

- Hay bales shall be a minimum of 30" in length and weigh a minimum of 50 Lbs.
- Hay bales shall be bound by either wire or nylon or polypropylene string. The bales shall be composed entirely of vegetative matter.
- Hay bales shall be embedded in the soil a minimum of 4" and where possible 1/2 the height of the bale.
- 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.
- Hay bales shall be securely anchored in place with 3/8" Dia. rebar or 2" x 2" wood stakes. The first stake shall be angled towards the previously laid bale to force the bales together.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

RECORD DRAWINGS
(July 2013)

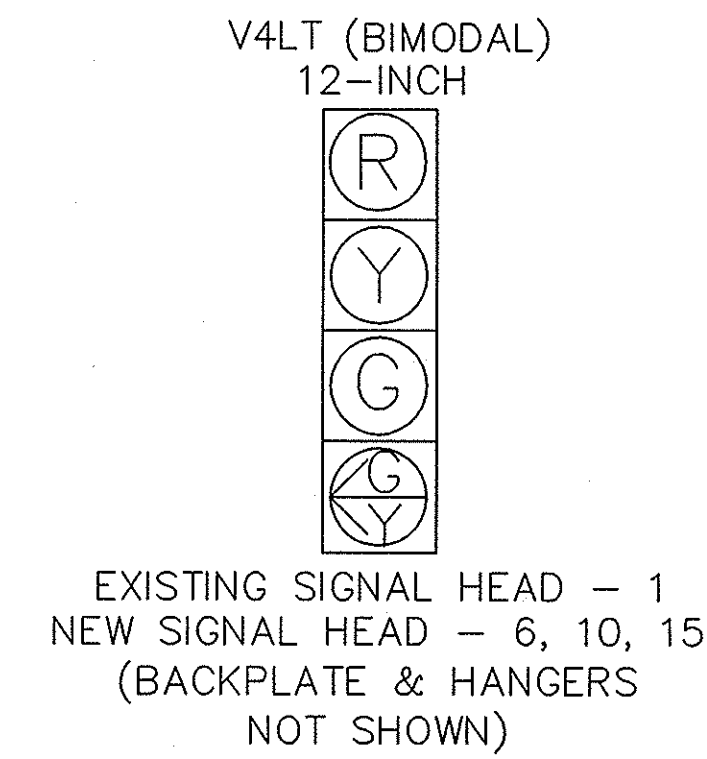
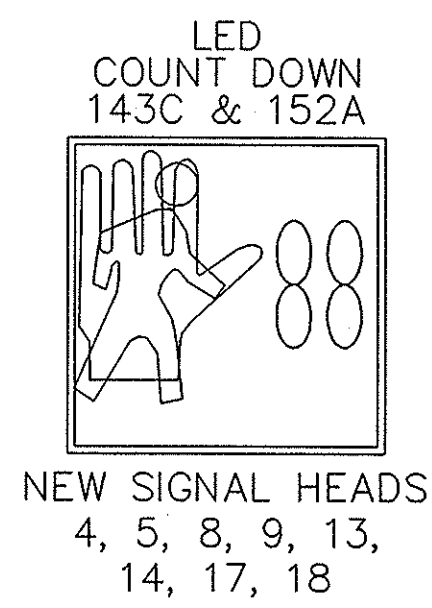
INFORMATION PROVIDED BY:
Rogers-O'Brien Construction Company

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
FENCE & BALED HAY
EC(1)-09

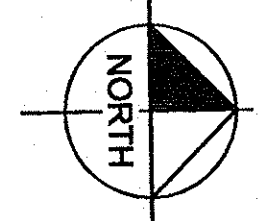
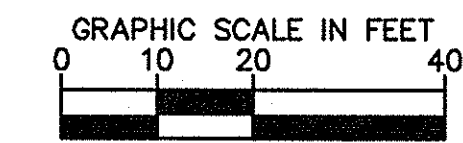
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© TxDOT JUNE 1993	DISTRICT	FEDERAL AID PROJECT	SHEET	
REVISIONS				
Language added to the end of the standard sheet note for site fence to allow for the use of the new backing.				
COUNTY	CONTROL	SECT	JOB	HIGHWAY

12-IN SIGNAL HEADS						
SIGNAL HEADS			BACKPLATES		VEHICLE SIGNAL SECTIONS	PED. SIGNAL SECTIONS
NUMBER	TYPE	STATUS	3 SECT.	4 SECT.		
2, 3, 7	V3	E				
11, 12, 16	V3	I	3		9	
* 1	V4LT (B)	E		3	12	
* 6, 10, 15	V4LT (B)	I				
4, 5, 8, 9	143C	I				4
13, 14, 17, 18	152A	I				4
TOTAL			3	3	21	8

(B)=Bi-Modal, * - THIS SIGNAL SECTION HAS A TOTAL OF 4-SECTIONS, AND THE GREEN/YELLOW ARROW ARE BI-MODAL, SHARING THE SAME BOTTOM SIGNAL SECTION.

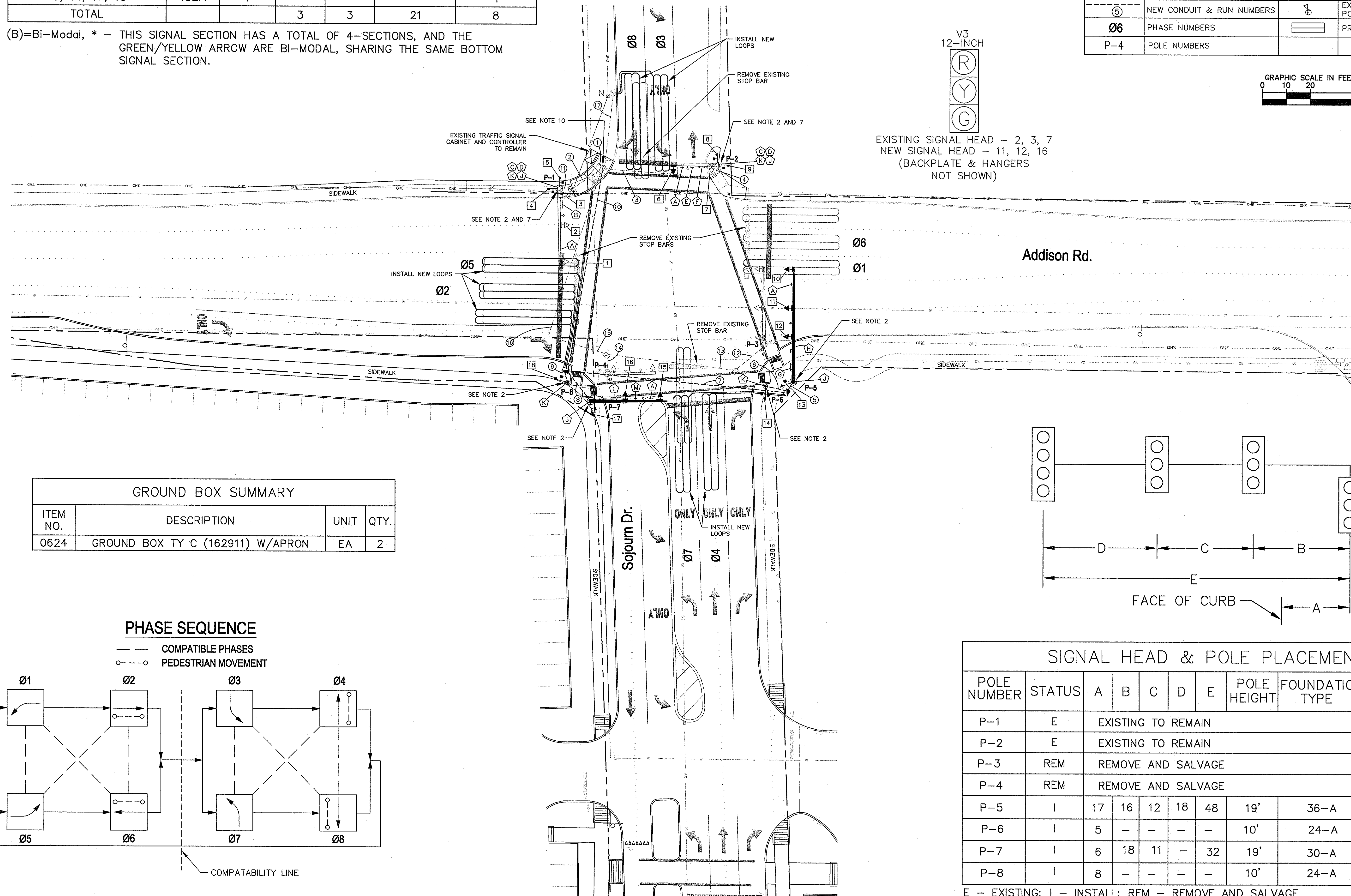


LEGEND OF SYMBOLS			
EXISTING		PROPOSED	
	EX. PEDESTAL POLE & HEAD		MAST ARM MOUNTED SIGN
	NEW PEDESTAL POLE & HEAD		EXISTING GROUND BOX
	EX. CONTROLLER CABINET		PROPOSED GROUND BOX
	EX. OPTICOM		SIGNAL HEAD NUMBERS
	PROPOSED OPTICOM		SIGN IDENTIFICATION
	EX. CONDUIT & RUN NUMBERS		EX. LOOP DETECTORS
	NEW CONDUIT & RUN NUMBERS		EX. ELECTRICAL SERVICE W/ POWER METER
	PHASE NUMBERS		PROPOSED LOOP DETECTORS
	POLE NUMBERS		

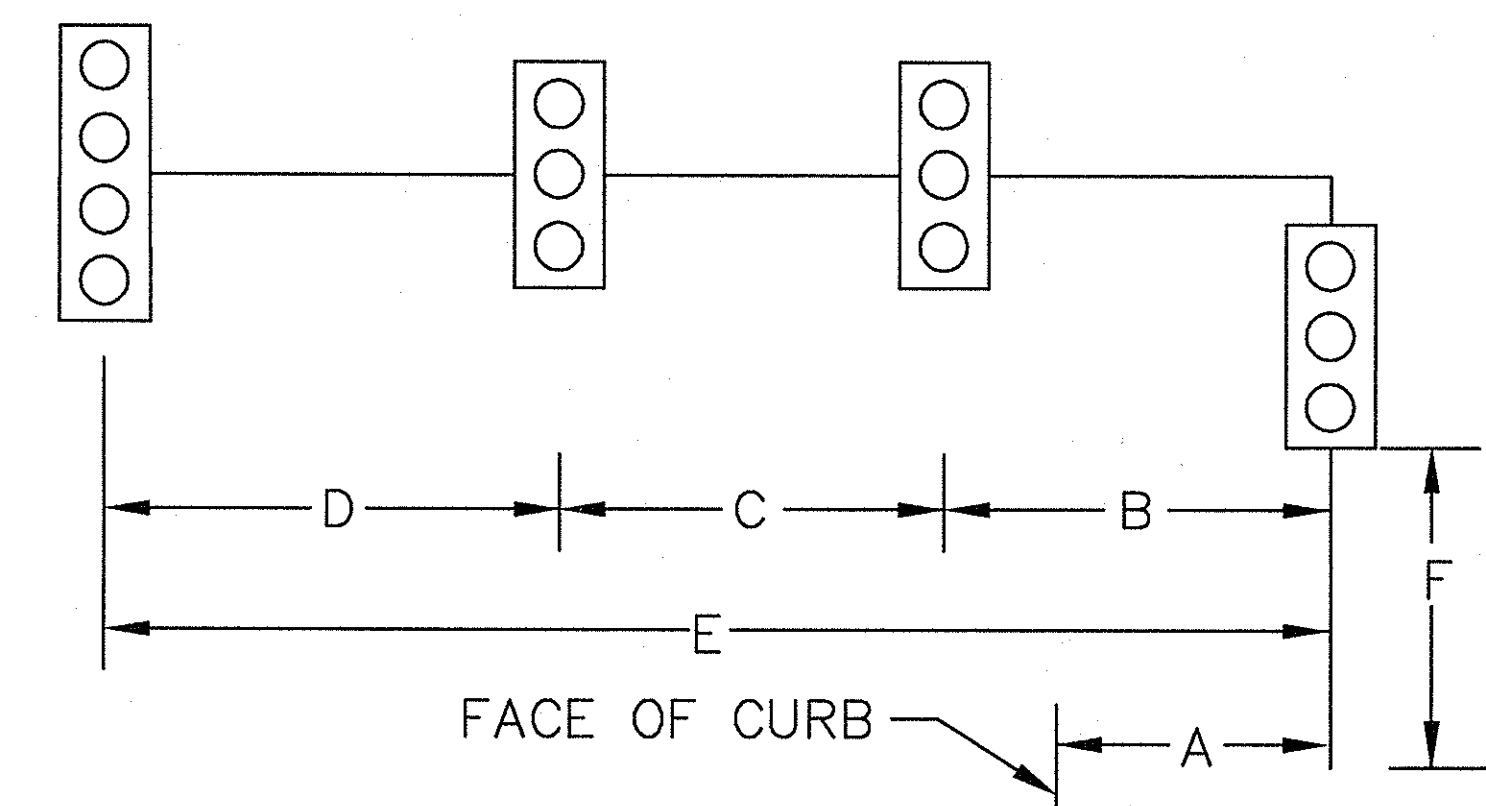


RECORD DRAWINGS
(July 2013)

INFORMATION PROVIDED BY:
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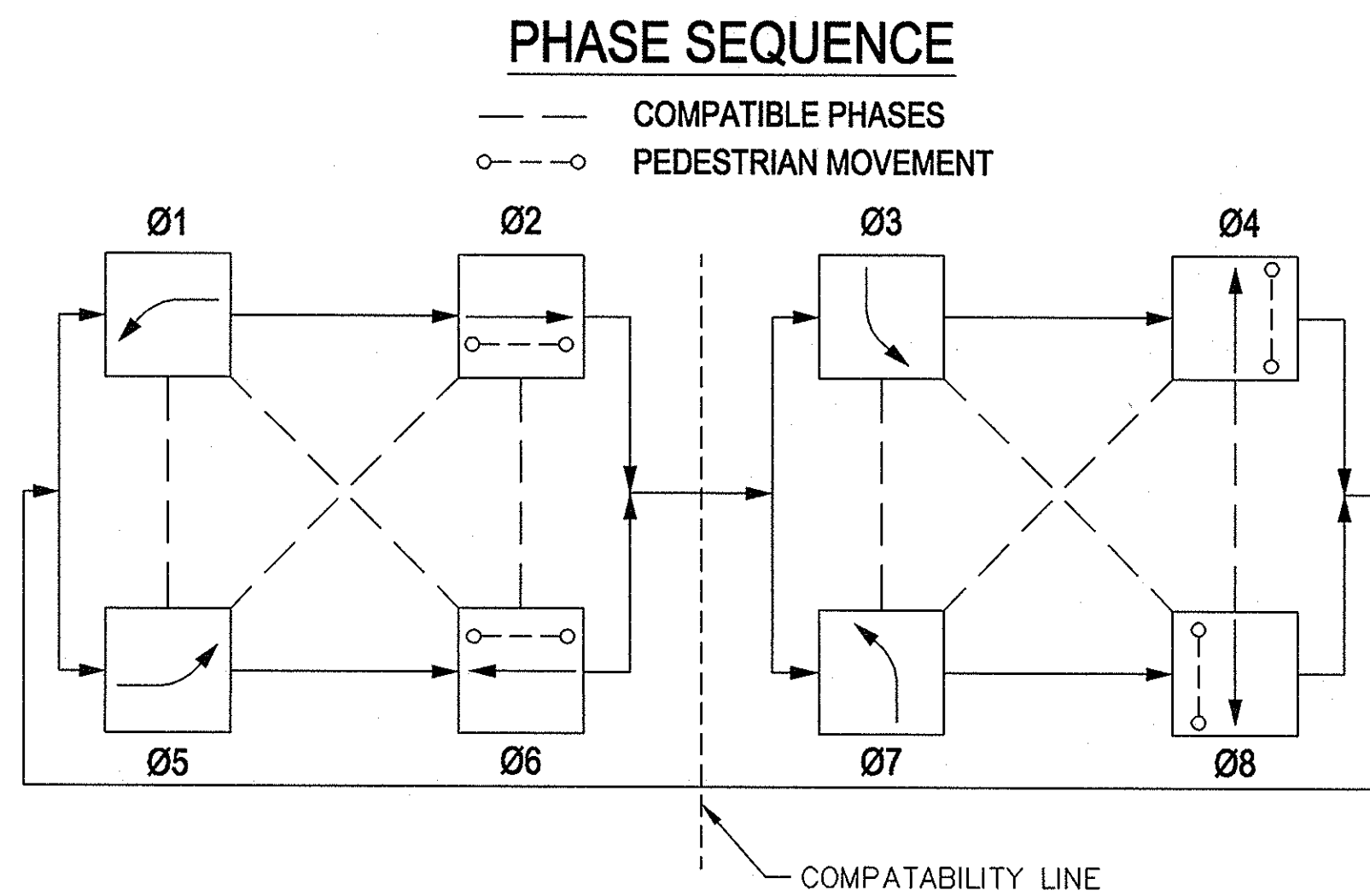


GROUND BOX SUMMARY			
ITEM NO.	DESCRIPTION	UNIT	QTY.
0624	GROUND BOX TY C (162911) W/APRON	EA	2



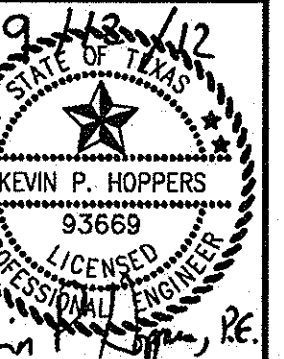
SIGNAL HEAD & POLE PLACEMENT										
POLE NUMBER	STATUS	A	B	C	D	E	POLE HEIGHT	FOUNDATION TYPE	LUMINAIRE	
P-1	E	EXISTING TO REMAIN								N
P-2	E	EXISTING TO REMAIN								N
P-3	REM	REMOVE AND SALVAGE								N
P-4	REM	REMOVE AND SALVAGE								N
P-5	I	17	16	12	18	48	19'	36-A	N	
P-6	I	5	-	-	-	-	10'	24-A	N	
P-7	I	6	18	11	-	32	19'	30-A	N	
P-8	I	8	-	-	-	-	10'	24-A	N	

E - EXISTING; I - INSTALL; REM - REMOVE AND SALVAGE



**Kimley-Horn
and Associates, Inc.**
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Fax No. (972) 335-3779

5700 General
Suite 200
Firm No. F-928



METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

**PROPOSED
TRAFFIC SIGNAL
LAYOUT**

Scale: AS SHOWN
Designed by: DMR
Drawn by: HFT
Checked by: KFH
Date: 09/12/2012
Project No.: 069506200

SHEET

TS-01

CONDUIT AND CABLE CHART

RUN NO	CONDUIT STATUS	CONDUITE SIZE AND TYPE		CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS			ITEM 684 SIG CAB TYPE A			3M OPTICOM CABLE	LENGTH OF RUN	RUN NO
		3" PVC	4" PVC (BORED)		NO. 6 BARE	NO. 14		NO. 14	NO. 14	NO. 14			
						10 CNDR	16 CNDR						
1	E			E & I							2	10	1
2	E			E								25	2
3	E			E & I								55	3
4	E			E & I								10	4
5	I	10		I	1				1			10	5
6	I	15		I	1				1			15	6
7	I		100	I	1				1			100	7
8	I	25		I	1				1			25	8
9	I	10		I	1				1			10	9
10	I		95	I	1				2			95	10
11	E			E								10	11
12	A			REM								20	12
13	A			REM								55	13
14	A			REM								10	14
15	A			REM								25	15
16	A			REM								80	16
17	E			I	1				2			30	17
TOTAL (LF)		60	195		285			335	420	805	345		

CONDUIT STATUS: E = EXISTING, I = INSTALLED, A = ABANDONED, REM = REMOVE

QUANTITIES IN TABLE ABOVE DOES NOT REFLECT THE CABLE INSIDE THE POLE (i.e. 5C#14 FOR 3-SECTION HEADS AND 7C#14 FOR 4-SECTION HEADS) OR SAWCUTS AND LOOPS.

NOTES

- CONTRACTOR TO REMOVE AND SALVAGE EXISTING POLE AND MAST ARM ASSEMBLIES P-3 AND P-4. CONTRACTOR WILL DELIVER SALVAGED EQUIPMENT TO THE TOWN OF ADDISON. CONTRACTOR TO COORDINATE WITH THE TOWN OF ADDISON AS TO TIME AND PLACE OF DELIVERY. CONTRACTOR TO INSTALL NEW POLE AND MAST ARM ASSEMBLY COMPLETE IN PLACE PRIOR TO REMOVAL OF EXISTING ASSEMBLY.
- CONTRACTOR TO PAINT EXISTING POLES P-1 & P-2 AND MAST ARMS BLACK TO MATCH NEW POWDER COATED POLES P-5, P-6, P-7, & P-8.
- CONTRACTOR RESPONSIBLE FOR LOCATING UTILITY LINES PRIOR TO INSTALLATION OF TRAFFIC SIGNAL EQUIPMENT.
- CONTRACTOR TO COORDINATE WITH THE TOWN OF ADDISON TO DETERMINE PROPER OFF PEAK TIME DURING WHICH SIGNAL WILL BE OUT OF OPERATION. PROPER TRAFFIC CONTROL SHOULD BE COORDINATED WITH THE TOWN OF ADDISON AND TOWN OF ADDISON POLICE.
- ALL NEW VEHICLE SIGNAL HEADS AND PEDESTRIAN SIGNAL HEADS SHALL MATCH EXISTING COLOR (BLACK).
- ALL NEW PEDESTRIAN SIGNAL HEADS SHALL BE LED COUNTDOWN.
- EXISTING PEDESTRIAN SIGNAL HEADS 4, 5, 8, AND 9 AND CORRESPONDING PUSH BUTTON ASSEMBLIES SHALL BE REMOVED AND REPLACED WITH NEW LED COUNTDOWN PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON ASSEMBLIES WITH SIGNS R10-3e(L or R).
- ILSN, SIGNS AND OPTICOM DETECTORS TO BE RELOCATED FROM EXISTING POLES TO PROPOSED POLES P-5 AND P-7.
- TOWN OF ADDISON TO PROVIDE CABLE TERMINATION CHART.
- CONTRACTOR TO LEVEL EXISTING GROUND BOX AND MAKE TOP OF GROUND BOX FLUSH WITH PROPOSED PEDESTRIAN RAMP. SEE ROADWAY PLANS FOR PEDESTRIAN RAMP DETAILS.
- EXISTING WI-FI ANTENNA ON POLE P-3 SHALL BE RETURNED TO THE TOWN OF ADDISON.

SIGN SUMMARY

SIGN	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	SIGN DIMENSION (in x in)	REFLECTIVE SHEETING
A	R10-12	LEFT TURN YIELD ON GREEN (BALL)	E	P-1	30" X 36"	C
			R	P-3		
			I	P-2, P-5, P-7		
B	ST. NAME	4800 SOJOURN DR 4700	E	P-1	ILSN	-
C	R10-4R	PUSH BUTTON FOR WALK SIGNAL (RIGHT ARROW)	REM	P-1, P-2	9" X 12"	C
D	R10-4L	PUSH BUTTON FOR WALK SIGNAL (LEFT ARROW)	REM	P-1, P-2	9" X 12"	C
E	R3-8b	LANE ASSIGNMENT	I	P-2	30" X 48"	C
F	ST. NAME	16900 ADDISON RD 17000	E	P-2	ILSN	-
G	ST. NAME	4700 SOJOURN DR 4800	R	P-3	ILSN	-
			I	P-5		
H	R3-5R	RIGHT TURN ONLY	I	P-5	30" X 36"	C
J	R10-3eL	PUSH BUTTON FOR (WALK SYMBOL) LEFT ARROW	I	P-1, P-2 P-5, P-7	9" X 15"	C
K	R10-3eR	PUSH BUTTON FOR (WALK SYMBOL) RIGHT ARROW	I	P-1, P-2 P-6, P-8	9" X 15"	C
L	ST. NAME	17000 ADDISON RD 16900	R	P-4	ILSN	-
			I	P-7		
M	R3-8LK	LANE ASSIGNMENT	I	P-7	30" X 36"	C

SIGN STATUS: E = EXISTING, I = INSTALLED, R = RELOCATE, REM = REMOVE, REP = REPLACED

Diagram A: LEFT TURN SIGNAL YIELD ON GREEN (30" X 36")

Diagram B: ST. NAME (4800 SOJOURN DR 4700)

Diagram C: PUSH BUTTON FOR WALK SIGNAL (RIGHT ARROW)

Diagram D: PUSH BUTTON FOR WALK SIGNAL (LEFT ARROW)

Diagram E: ONLY (30" X 36")

Diagram F: ST. NAME (16900 ADDISON RD 17000)

Diagram G: ST. NAME (4700 SOJOURN DR 4800)

Diagram H: ONLY (9" X 15")

Diagram I: ONLY (9" X 15")

Diagram J: START CROSSING (9" X 15")

Diagram K: START CROSSING (9" X 15")

Diagram L: ST. NAME (17000 ADDISON RD 16900)

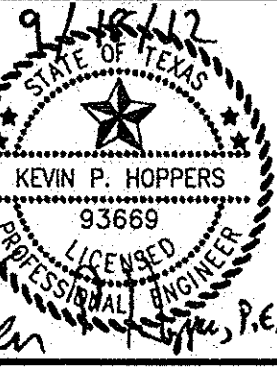
Diagram M: ONLY (30" X 36")

RECORD DRAWINGS (July 2013)
 INFORMATION PROVIDED BY:
 Rogers-O'Brien Construction Company

PLOTTED BY OSBORNE, ROBIN (DALLAS) 06/20/13 11:57 AM
 DWG NAME K:\DALLAS\PROJECTS\2013\06\20130620\METHODIST MOPCA\DD-C-SIGNAL.DWG
 SHEET 12 OF 12

Kimley-Horn and Associates, Inc.
 Tel. No. (972) 336-3500
 Fax No. (972) 336-3779

5160 Campbell Court, Suite 200
 Frisco, Texas 75034
 Firm No. F-928



METHODIST PAVILION ONE
 TOWN OF ADDISON, DALLAS COUNTY, TEXAS

PROPOSED TRAFFIC SIGNAL QUANTITIES

Scale: AS SHOWN
 Designed by: DKR
 Drawn by: RFT
 Checked by: KFH
 Date: 09/12/12
 Project No.: 06930600

SHEET
TS-02

GENERAL NOTES:

TRAFFIC SIGNAL INSTALLATION

All specifications and special provisions applicable to this project are identified as follows:

STANDARD SPECIFICATIONS: Adopted by the Texas Department of Transportation June 1, 2004. Standard specifications are incorporated into the contract by reference.

- Item 416 Drilled Shaft Foundations (421)(427)(440)(448)
Item 618 Conduit (400)(445)(476)(622)
Item 620 Electrical Conductors (610)(628)
Item 624 Ground Boxes (421) (440)
Item 636 Aluminum Signs
Item 680 Installation of Highway Traffic Signals (610)(625)(627)(634)(636)(656)
Item 682 Vehicle and Pedestrian Signal Heads
Item 684 Traffic Signal Cables
Item 686 Traffic Signal Pole Assemblies (Steel) (421)(441)(442)(445)(449)
Item 687 Pedestal Pole Assemblies (445)(449)(656)
Item 688 Pedestrian Detectors and Vehicle Loop Detectors (618)(624)(682)(684)

SPECIAL PROVISIONS: Special provisions will govern and take precedence over the specifications enumerated hereon wherever in conflict therewith.

- Special Provision to Item 400 (400-004)
Special Provision to Item 421 (421-035)
Special Provision to Item 440 (440-002)
Special Provision to Item 441 (441-002)
Special Provision to Item 442 (442-005)
Special Provision to Item 506 (506-010)
Special Provision to Item 620 (620-001)

Item 416:

Provide a formed smooth finish for all portions of drill shafts extending above proposed ground. Include cost for this work in the unit bid price for this item.

Traffic signal pole foundations will be paid for once regardless of extra work caused by obstructions.

Install a 5/8"x10' copper clad ground rod in each traffic signal pole foundation. The ground rod for each foundation will protrude above the finish grade of the foundation a minimum of 1" and a maximum of 2".

Concrete removal required for installation of drilled shafts will be subsidiary to Item 416.

General Notes Sheet A

Provide signal head attachments that allow for adjustment about the horizontal and vertical axis.

Turn down signal heads or cover with burlap or other material, as approved, until traffic signal is placed in operation.

Mount signal heads level and plumb and aimed as directed. Match existing signal head section color (black).

Item 684:

Provide stranded 14 AWG Type A signal cables.

Provide a separate multi-conductor signal cable (14 AWG) inside pedestal poles and signal poles from the terminal strip to each signal head as shown on the plans.

Identify each cable as shown on the plans (cable 1, etc.) with permanent marking labels (Panduit Type PLM standard single marker tie, Thomas&Betts Type 548M, or equal) at each ground box, pole base, and controller.

Item 686:

Provide 12 circuit Buchanan Type 112SN, Kulka Type 985-GP-12 CU, or equal terminal strips in the signal pole access compartment. Provide additional terminal strips of 8 circuits each when more than 12 circuits are required. The conductors for the Line and Load side of the terminal strip shall be identified with a plastic label with two straps per tag. The line side shall have each signal head, PED head, and push button identified on the tag.

Mark pole shafts and mast arms with the identification numbers from the plans to facilitate field-assembly. Identify pole shafts and mast arms by intersection for projects with multiple intersections.

Provide nuts on top and bottom (double nuts) of the base plate as shown on the plans.

Set anchor bolts for mast arm signal poles and strain poles so that two are in tension and two are in compression. Obtain approval of anchor bolt placement before placing concrete.

Use the traffic signal pole heights and mast arm lengths shown on the plans and in the material summary for bidding purposes only. Make field measurements to determine the actual pole height and mast arm length required. Provide vertical clearance of 17 to 19 feet from the roadway to the lowest point of the signal head or mast arm. Place signal heads 40 feet minimum and 180 feet maximum from the stop line. If the nearest signal is more than 180 feet from the stop line, place a supplemental near-side signal head. Determine the field measurements and elevations from the actual field location of the poles, considering all above and below ground utilities and existing roadway elevations.

Provide vibration dampers for mast arms 28 feet to 48 feet in length. Install as shown on MA-DPD-12.

For existing signal poles, replacement of existing conductors is not required inside the poles. Plug any unused openings in existing mast arms and poles with an approved material.

General Notes Sheet D

Item 618:

The location of conduits and ground boxes are diagrammatic only and may be shifted to accommodate field conditions as directed.

Secure permission and approval from the proper authority prior to cutting into or removing any sidewalks or curbs for installation of this Item.

When holes are drilled through concrete structures, use a coring device. Do not use masonry or concrete drills.

Place conduit under existing pavement by an approved boring method. Do not place boring pits closer than 2 feet from the edge of the pavement unless otherwise directed. Do not use water jetting. When conduits are bored, do not exceed 18 inches in the vertical and horizontal tolerances as measured from the intended target point.

Do not use a pneumatically driven device for punching holes beneath the pavement (commonly known as a "missile").

Furnish and install a non-metallic pull rope in conduit runs in excess of 50 feet.

Use a colored cleaner-primer on all PVC to PVC joints before application of PVC cement.

Seal all conduit ends with a permanently soft, non-toxic duct seal. Use a duct seal that does not adversely affect other plastic materials or corrode metals.

Furnish and install non-metallic pull ropes in conduit installed for future use and cap using standard weather-tight conduit caps, as approved. This work will not be paid for directly, but is subsidiary to this Item.

When using existing conduit, ensure that all conduits have bushings and are cleaned of mud and debris. Re-strap conduit that is being relocated to new timber poles as if it were a new installation. This work will not be paid for directly, but is subsidiary to this Item.

Item 620:

The equipment grounding conductor shall be identified by a continuous green colored jacket insulation or bare wire. Grounded conductors (Neutral) shall be identified by a continuous white colored jacket. Ungrounded conductors (Hot) in a 120/240v or 240/480v system shall be identified by each pole or leg. For 240-volt branch circuit fed from 120/240 source and 480-volt branch circuit fed from 240/480 source, ensure one leg is identified by a continuous black colored jacket and the other leg by a continuous red colored jacket.

For Ped poles (Item 687) within the project, provide single-pole breakaway disconnects. Use Bussman HEBW, Littlefuse LEB, Ferraz-Shawmut FEB, or equal on ungrounded conductors. For all grounded conductors use Bussman HET, Littlefuse LET, Ferraz-Shawmut FEBN, or equal. These breakaway connectors have a white colored marking and a permanently installed solid neutral.

Item 624:

Ground all junction boxes mounted on bridges and underpasses with a ground rod.

General Notes Sheet B

Provide 3 pipe plugs for wiring access on strain poles.

Provide a three piece bracket assembly on strain poles or drill the pole and use thimble eye bolts to attach the strain vise for the span wire.

Per Town of Addison, signal pole and mast arms to be powder coated black.

Item 688:

Maintain a minimum 12 inch separation between loop lead-in sawcuts and loop sawcuts, and a minimum 6 inch separation between loop lead-in sawcuts and other loop lead-in sawcuts.

Use loop wire for concrete pavement and loop duct for asphalt pavements.

Install loop detectors only during off-peak traffic periods.

Provide pedestrian push button assemblies that have permanent-type signs within the detector unit which indicates which crosswalk signal is actuated. Provide push buttons with a minimum 2 inch convex plunger. Provide a protective shroud encircling the plunger to deter vandalism that is cast as part of the housing cover. Use a plunger that protrudes beyond the shroud a distance adequate to accommodate the switch travel.

Verify the location of the push button assemblies and the direction of the arrows on the signs prior to installation.

Assist the Engineer in determining the loop inductance of each loop detector installation. In the presence of the engineer, conduct field testing to determine the total inductance of the loop detector and the percentage shift in loop inductance for various size vehicles.

All new pedestrian signal heads to be countdown.

General Notes Sheet E

Slack conductors required by Standard Sheet ED(2)-03 will be subsidiary to Item 624.

Concrete removal required for installation of ground boxes will be subsidiary to Item 624.

Item 656:

Form a 3/4-inch chamfer on the top edge of each signal pole foundation.

Probe for utilities and underground structures prior to drilling foundations. Foundations shall be paid for once regardless of extra work caused by obstructions.

Item 680:

Requirements for this Item include the following work, all of which are subsidiary to this Item:

- 1. Notify the Town of Addison one week before beginning any work involving traffic signals.
2. Provide submittal literature for all traffic signal equipment before installation.
3. Provide detector cards that have a Liquid Crystal Display (LCD) of all operational and diagnostic information. The LCD shall show all major parameters of the loop operation including loop frequency, loop inductance, inductance change, and loop faults. Loop faults include open circuit, short circuit, and inductance change. Provide a user's manual with full operating instructions and the contact name, address, and telephone number for the representative, manufacturer, or distributor for warranty repair.
4. Connect all field wiring to the controller assembly
5. Furnish and install all sign panels for mounting on signal poles and mast arms. Fabricate the sign panels in accordance with Item 636, and mount with Astro-Sign Brac, Signfix aluminum channel, or equal as approved by the Engineer.
6. Furnish and install all other signs in accordance to Item 636. Furnish all mounting hardware for all signs. Mount signs with Astro-Sign Brac, Signfix aluminum channel, or equal as approved by the Engineer.
7. Install the emergency vehicle preemption equipment.
8. Have a qualified technician on the project site to place the traffic signal in operation.
9. Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Engineer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. Do not clear the error log in the conflict monitor or MMU during the thirty-day test period without approval.
10. Prevent any damage to property owner's poles, fences, shrubs, etc. Protect all underground and overhead utilities and repair any damage. Provide access to all driveways during construction.

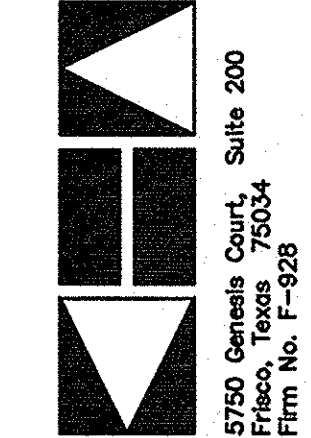
Item 682:

Install signal head attachments so that the wiring to each signal head passes from the mast arm through the attachment hardware to the signal head. Do not leave cable or wiring exposed.

General Notes Sheet C

PLOTTED BY REBEKKA DANIEL 8/12/2013 11:29 AM
DWG NAME: KEDAL_TT001R0101E01C70692625 - METHODIST MOP-CAD/C-SIGN-03.DWG
PLOT DATE: 8/12/2013

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METHODIST PAVILION ONE
TOWN OF ADDISON, DALLAS COUNTY, TEXAS

PROPOSED TRAFFIC SIGNAL GENERAL NOTES

Table with project details: Scale: AS SHOWN, Designed by: DMR, Drawn by: HT, Checked by: KPH, Date: 09/12/2012, Project No.: 069506200

RECORD DRAWINGS (July 2013)
INFORMATION PROVIDED BY: Rogers-O'Brien Construction Company

SHEET TS-03