W RALPH HALL PKWY @ STEGER TOWNE RD

TRAFFIC SIGNAL PLANS
CITY OF ROCKWALL, TEXAS

CIP-TR2016-001

CITY OF ROCKWALL

MAYOR:

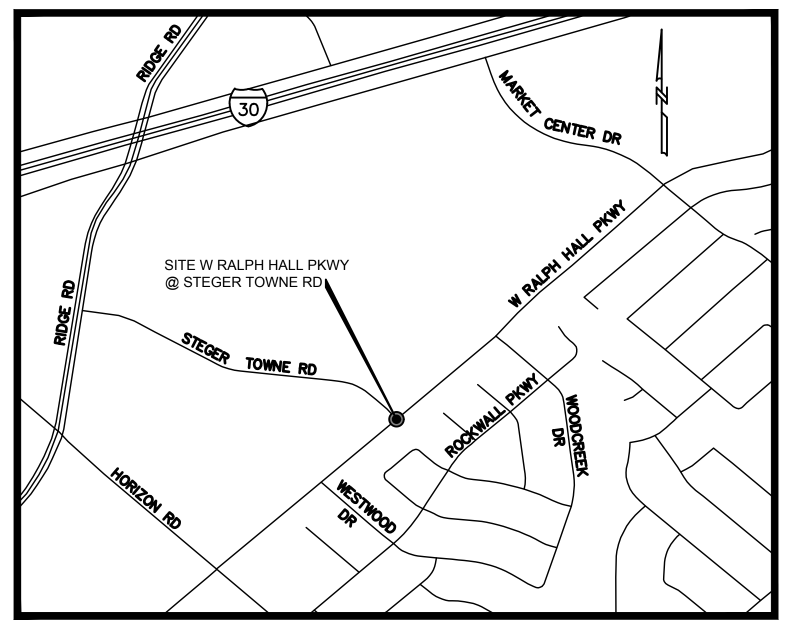
Jim Pruitt

CITY COUNCIL:

David White
John Hohenshelt
Kevin Fowler
Dennis Lewis
Scott Milder
Mike Townsend, Mayor Pro-Tem

CITY MANAGER:

Rick Crowley



LOCATION MAP

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CONTRACTOR

ROADWAY SOLUTIONS, INC.

"RECORD DRAWINGS"

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02/17/2017

STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED
PROFESSIONAL ENGINEER

CITY OF ROCKWALL
385 SOUTH GOLIAD STREET, ROCKWALL TEXAS 75087

FEBRUARY 2017

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\\pzdal\data\bbi\BBCPI\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\BB16266-COVER SHEET.dwg-1 COVER SHEET Plotted Oct 19, 2017 at 8:19am by cwilliams | Last Saved by: cwilliams

NOTES:

GENERAL:

1. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER/INSPECTOR AT LEAST ONE WEEK PRIOR TO THE STARTING OF THIS PROJECT.
2. THE CONTRACTOR WILL ONLY BE ALLOWED TO WORK ON THIS PROJECT DURING DAYLIGHT HOURS (8 A.M. – 5 P.M. MONDAY – FRIDAY)
3. THE CONTRACTOR SHALL CLEAN UP AND REMOVE FROM THE WORK AREA ALL LOOSE MATERIAL RESULTING FROM THE CONTRACT OPERATIONS EACH DAY BEFORE WORK IS SUSPENDED.
4. ANY OBSTRUCTIONS TO EXISTING DRAINAGE DUE TO THE CONTRACTOR'S OPERATIONS WILL BE REMOVED BY THE CONTRACTOR AS REQUIRED BY THE CITY AT THE CONTRACTOR'S ENTIRE EXPENSE.
5. THE CONTRACTOR SHALL ADJUST ALL UTILITIES (PROPOSED AND EXISTING) TO FINAL GRADE. (NO SEPARATE PAY)
6. THE CONTRACTOR SHALL BACKFILL BEHIND CURB, FIX RUTS, AND BLOCK SOD ALL DISTURBED AREAS.
7. THE CONTRACTOR SHALL REPAIR OR ADJUST ALL IRRIGATION THAT IS EFFECTED OR CONFLICTED. (NO SEPARATE PAY)

TEST PERIOD FOR SIGNALS:

1. ONCE THE PERMANENT SIGNALS HAVE BEEN INSTALLED AND PLACED IN OPERATION, THEY SHALL OPERATE CONTINUOUSLY FOR A MINIMUM OF 30 CALENDAR DAYS IN A SATISFACTORY MANNER. EQUIPMENT FAILURES DURING THIS 30 DAYS WILL CAUSE THE TEST PERIOD TO START OVER.

EXISTING UTILITIES:

1. THE EXACT LOCATION OF THE UNDERGROUND UTILITIES IS NOT CERTAIN. THE CONTRACTOR SHALL CONTACT THE CITY OF ROCKWALL AND UTILITY COMPANIES IN THE AREA FOR EXACT LOCATION PRIOR TO DRILLING FOR FOUNDATIONS AND ANY OTHER WORK THAT MIGHT INTERFERE WITH OR DAMAGE PRESENT UTILITIES. NO ADDITIONAL PAYMENT WILL BE MADE FOR THE RELOCATION OF ANY FOUNDATIONS DUE TO UTILITIES.
2. TEXAS STATE LAW, ARTICLE 1436C, MAKES UNLAWFUL THE OPERATION OF EQUIPMENT OR MACHINES WITHIN 10 FEET OF ANY OVERHEAD ELECTRICAL LINE UNLESS DANGER AGAINST CONTACT WITH HIGH VOLTAGE LINES HAD BEEN EFFECTIVELY GUARDED AGAINST PURSUANT TO THE PROVISION OF THE ARTICLE. WHEN CONSTRUCTION OPERATIONS REQUIRES WORKING NEAR AN OVERHEAD ELECTRICAL LINE, THE CONTRACTOR SHALL CONTACT THE OWNER/OPERATOR OF THE OVERHEAD ELECTRICAL LINE TO MAKE ADEQUATE ARRANGEMENTS AND TO TAKE NECESSARY SAFETY PRECAUTIONS TO ENSURE THAT ALL LAWS, ELECTRICAL LINE OWNER/OPERATOR REQUIREMENTS AND STANDARD INDUSTRY SAFETY PRACTICES ARE MET.

ITEM 416 – POLE FOUNDATIONS:

1. NO MAST ARM POLE SHALL BE PLACED ON THE FOUNDATIONS PRIOR TO SEVEN (7) DAYS FOLLOWING PLACEMENT OF CONCRETE.
2. STAKE FOUNDATIONS LOCATIONS AND HAVE THEM APPROVED BY THE INSPECTOR BEFORE INSTALLATION. THIS WILL ENSURE THAT ALL LUMINAIRES AND MAST ARMS ARE CLEAR OF ALL OVERHEAD LINES AND UNDERGROUND UTILITIES BEFORE DRILLING BEGINS. THE SIGNAL INSPECTOR TOGETHER WITH THE CONTRACTOR WILL CALCULATE THE VERTICAL SIGNAL HEAD CLEARANCE BEFORE PLACING ANY TRAFFIC SIGNAL POLE.
3. THE DIMENSIONS SHOWN ON THE PLANS FOR LOCATION OF SIGNAL FOUNDATIONS, CONDUIT, AND OTHER ITEMS MAY BE VARIED TO MEET LOCAL CONDITIONS, SUBJECT TO APPROVAL BY THE CITY.
4. THE CONTRACTOR SHALL NOTIFY THE CITY AT LEAST 48 HOURS BEFORE PLACING CONCRETE.
5. ALL EXPOSED SIGNAL POLE AND CONTROLLER FOUNDATIONS SHALL RECEIVE A CLASS C FINISH PER TXDOT ITEM 427.

ITEM 618 – CONDUIT:

1. UNDERGROUND CONDUIT FOR CABLE SHALL BE SCHEDULE 40 PVC. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATER PROOF.
2. DO NOT USE EXPANDABLE FOAM TO SEAL ENDS OF CONDUIT, WHETHER USED OR UNUSED. CAP AND PLUG METHOD SHALL BE USED.

ITEM 620 – ELECTRICAL CONDUCTORS:

1. ALL ELECTRICAL CONNECTORS FOR BREAKAWAY POLES SHALL BE BREAKAWAY IN ACCORDANCE WITH TXDOT RID(2). ALL ELECTRICAL CONNECTIONS FOR NEUTRALS SHALL BE BREAKAWAY, SHALL HAVE A WHITE COLOR IN MARKING AND SHALL HAVE PERMANENTLY INSTALLED SOLID NEUTRAL.

ITEM 628 – ELECTRICAL SERVICE:

1. CONTRACTOR SHALL COORDINATE WITH THE ELECTRIC SERVICE PROVIDER AT LEAST 30 DAYS IN ADVANCE OF THE NEED FOR A SERVICE CONNECTION. ONCOR CONTACT INFORMATION: PHILLIP DICKERSON, 972.551.6712.

ITEM 680 – TRAFFIC SIGNAL INSTALLATION:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL EQUIPMENT TO MAKE THE SIGNAL OPERATIONAL. THIS INCLUDES, BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CABINET, CONTROLLER, DIGITAL DETECTORS, AND CARD RACK ASSEMBLIES, AS REQUIRED. CARD RACK ASSEMBLIES SHALL BE FAIL–SAFE. ALL EQUIPMENT SHALL BE COMPATIBLE WITH EXISTING CITY SYSTEMS. ALL TRAFFIC SIGNAL EQUIPMENT SHALL BE APPROVED BY THE CITY PRIOR TO PURCHASE. UNLESS SPECIFICALLY CALLED OUT IN PLANS OR SPECIFICATIONS FURNISHING AND INSTALLATION OF THESE ITEMS SHALL BE SUBSIDIARY TO INSTALLATION OF HIGHWAY TRAFFIC SIGNAL BID ITEM. TRAFFIC SIGNAL EQUIPMENT SPECIFICS INCLUDE THE FOLLOWING:
   - A. THE TRAFFIC SIGNAL CONTROLLER SHALL BE AN ASC3–2100 ECONOLITE.
   - B. THE TRAFFIC SIGNAL CABINET SHALL BE A PTSI TRAFFIC SIGNAL CABINET, OR APPROVED EQUAL, MEETING THE FOLLOWING SPECIFICATIONS: NEMA TS/2, TYPE 1, SIZE 6, BASE MOUNT, WITH 16 POSITIONS.
   - C. THE BATTERY BACK–UP SHALL BE AN ALPHA BBU SYSTEM, OR APPROVED EQUAL, WHICH INCLUDES THE FOLLOWING: FXM2000, UNIVERSAL AUTOMATIC TRANSFER SWITCH, FOUR (4) ALPHAGEL BATTERIES, A BATTERY HARNESS, ALPHA GUARD, AND A S6 SIDE MOUNT CABINET.
   - D. OPTICOM DETECTORS, MOUNTING EQUIPMENT, AND PHASE SELECTION EQUIPMENT SHALL BE MANUFACTURED BY 3M OR AN APPROVED EQUAL. PROVIDE ALL EQUIPMENT NECESSARY TO MAKE OPERATIONAL, WHICH INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING.
     - –3M 380 CARD RACK.
     - –NARROW MMB MOUNTING EQUIPMENT
   - E. PROVIDE ONE (1) RACKVISION PRO 2 CARD AND THREE (3) AUTOSCOPE IMAGE SENSOR IV VIDEO DETECTION CAMERAS. THE CONTRACTOR SHALL INSTALL THE VIDEO DETECTION EQUIPMENT AND MAKE OPERATIONAL.
   - F. PROVIDE THREE (3) RED LIGHT CONFIRMATION SIGNALS AND WIRING AS IDENTIFIED IN THE PLANS.
2. FURNISH AND INSTALL MAST ARMS, SIGNAL POLES, LUMINAIRES, SIGNAL HEADS, ILLUMINATED STREET NAME SIGNS, AND SIGNAL CABLE.
3. FURNISH AND INSTALL CONDUIT AND GROUND BOXES.
4. FURNISH AND PLACE ALL CONCRETE AND REINFORCING STEEL FOR THE SIGNAL POLE FOUNDATIONS AND CONTROLLER FOUNDATIONS.
5. THE CONTRACTOR SHALL ALSO FURNISH AND INSTALL ALL OTHER ITEMS NOT LISTED ABOVE WHICH ARE NEEDED TO PROVIDE THE COMPLETE TRAFFIC SIGNAL INSTALLATION AS CALLED FOR IN THE PLANS AND SPECIFICATIONS.
6. UNLESS DIRECTED BY THE CITY, THE SIGNAL SHALL BE PLACED IN FULL OPERATION BETWEEN 9:00 AM – 12:00 P.M. (NOON) ON MONDAY, TUESDAY, OR WEDNESDAY ONLY.
7. CITY STAFF OR CITY REPRESENTATIVE SHALL BE PRESENT WHEN THE SIGNAL ARE PLACED IN OPERATION. THE CONTRACTOR SHALL NOTIFY THE CITY 48 HOURS IN ADVANCE OF THE TURN ON.
8. LIMINAIRE MAST ARMS, FIXTURES, AND LAMPS ARE CONSIDERED SUBSIDIARY TO ITEM 680. LUMINARE MAST ARMS SHALL BE POSITIONED DIRECTLY ABOVE AND IN LINE WITH THE ASSOCIATED MAST ARM.

ITEM 682 – SIGNAL HEADS:

1. UNLESS OTHERWISE SHOWN IN THE PLANS, ALL SIGNAL HEADS SHALL BE MOUNTED HORIZONTALLY.
2. ALL SIGNAL HEADS SHALL BE COVERED WITH BURLAP OR OTHER APPROVED MATERIAL FROM THE TIME OF INSTALLATION UNTIL THE SIGNAL IS PLACED IN OPERATION.
3. LED SIGNAL LAMPS SHALL BE USED FOR ALL SIGNAL INDICATIONS AND FURNISHED BY THE CONTRACTOR.
4. PROVIDE ALL SIGNAL HEADS FROM THE SAME MANUFACTURER.
5. ALL NEW VEHICLE AND COUNTDOWN PEDESTRIAN SIGNAL HEADS FOR THE PERMANENT SIGNAL SHALL BE ALUMINUM WITH ALUMINUM VENTED BACK PLATES. THESE ITEMS SHALL BE PRIMED PRIOR TO AND PAINTED WITH PERMANENT BLACK PAINT.

ITEM 684 – TRAFFIC SIGNAL CABLES

1. IDENTIFY EACH CABLE AS SHOWN ON THE PLANS (CABLE 1, ETC.) WITH PRE–NUMBERED IDENTIFICATION TAGS OF PLASTIC, TAPE OR MARKING LABELS AT EACH SIGNAL HEAD, GROUND BOX, TERMINAL BLOCK, POLE BASE AND CONTROLLER.
2. ALL CABLES SHALL BE CONTINUOUS WITHOUT SPLICES FROM TERMINAL POINT TO TERMINAL POINT OR AS DIRECTED OR APPROVED. ALL PROPOSED SIGNAL CABLE AND NUMBER OF CONDUCTORS REQUIRED SHALL BE AS SHOWN ON THE PLANS. TERMINATE ALL ELECTRICAL CONDUCTORS FROM THE CONTROLLER AT THE TERMINATION BLOCK IN THE SIGNAL POLE HAND HOLE WHETHER IN USE OR NOT. PROVIDE THE NUMBER OF CONDUCTORS AS SHOWN ON THE PLANS.

ITEM 686 – POLE ASSEMBLIES:

1. CRITICAL POLE ASSEMBLY FEATURES AND DIMENSIONS REQUIRED FOR THIS PROJECT ARE SHOWN ON THE PLAN DETAIL SHEETS. POLE SHAFT/MAST ARM IDENTIFICATION NUMBERS SHALL BE STENCILED ON POLE SHAFTS AND MAST ARMS BEFORE SHIPMENT TO ENSURE MATCHING OF POLES AN MAST ARMS DURING FIELD ASSEMBLY.
2. ALL SIGNAL POLES AND MAST ARMS SHALL BE GALVANIZED STEEL.
3. ALL SIGNAL POLES SHALL BE ROUND TYPE.
4. PROVIDE ALL SIGNAL POLES FROM THE SAME MANUFACTURER.

SIGNING AND PAVEMENT MARKINGS:

1. EXISTING STOP SIGNS SHALL REMAIN IN OPERATION UNTIL THE NEW SIGNAL OPERATION HAS BEEN TURNED ON.
2. CONTRACTOR IS TO PROVIDE ALL NEW TRAFFIC SIGNS.
3. EXISTING SIGNS WHICH ARE TO BE REMOVED ARE TO BE SALVAGE AND RETURNED TO THE CITY.
4. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC AND FURNISHED AND INSTALLED BY THE CONTRACTOR.

ILLUMINATED STREET NAME SIGNS:

1. CONTRACTOR SHALL FURNISH AND INSTALL ILLUMINATED STREET NAME SIGNS.
2. SIGNS ARE TO BE TEMPLE EDGE–LIT INTERNALLY ILLUMINATED LED SIGNS OR APPROVED EQUAL.
3. CONTRACTOR TO PROVIDE SHOP DRAWINGS OF PROPOSED SIGNS TO THE CITY FOR APPROVAL BEFORE ORDERING SIGNS.
4. ILLUMINATED STREET NAME SIGNS ARE TO BE MOUNTED TO THE SIGNAL MAST ARM BY AN APPROVED MOUNTING METHOD. THE SIGNS SHALL NOT BE FREE SWINGING BELOW THE MAST ARM OR ON A SEPARATE ARM DESIGNATED FOR THE ILLUMINATED STREET NAME SIGN.

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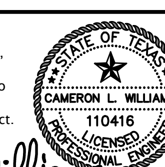

NO.	REVISIONS	DATE
X	—	—/—/—

GENERAL NOTES
W RALPH HALL PKWY
@ STEGER TOWNE RD
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DRAWN BY:	DATE:	SCALE:	JOB NUMBER:	SHEET:
BBI	FEBRUARY 2017	NA	BB16266	2

\\pzdc\data\bbi\BBOPI\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\BB16266-TS QUANTITIES, SOSS, DETAILS.dwg-2 GENERAL NOTES Plotted Oct 19, 2017 at 8:20am by cwilliams | Last Saved by: cwilliams

SUMMARY OF QUANTITIES (1 OF 2)

ITEM	TXDOT ITEM	DESCRIPTION	UNIT	W. RALPH HALL PKWY AT STEGER TOWNE DR
1	104	REMOVING CONCRETE (SIDEWALKS)	SY	80
2	416	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	18
3	416	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	24
4	416	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	14
5	500	MOBILIZATION (MAX 5% OF CONTRACT AMOUNT)	LS	1
6	502	BARRICADES, SIGNS, AND TRAFFIC HANDLING	LS	1
7	529	CONCRETE CURB AND GUTTER	LF	110
8	531	CONCRETE SIDEWALKS	SY	110
9	618	CONDUIT (PVC) (SCHD 40) (2")	LF	285
10	618	CONDUIT (PVC) (SCHD 40) (2") (BORED)	LF	75
11	618	CONDUIT (PVC) (SCHD 40) (4")	LF	115
12	618	CONDUIT (PVC) (SCHD 40) (4") (BORED)	LF	255
13	620	ELEC CONDR (NO.12) INSULATED - ILSN	LF	180
14	620	ELEC CONDR (NO. 8) INSULATED - ILSN	LF	845
15	620	ELEC CONDR (NO. 6) INSULATED	LF	550
16	620	ELEC CONDR (NO. 6) GROUND	LF	825
17	621	TRAY CABLE (3 CONDR) (14 AWG) - LUM - RLCS	LF	635
18	624	GROUND BOX (TYPE D)	EA	4
19	628	ELECTRICAL METER PEDESTAL	EA	1
20	636*	ALUMINUM SIGNS	EA	3
21	656*	TRAFFIC SIGNAL CONTROLLER CABINET FOUNDATION	EA	1
22	666	REFLECTIVE PAVEMENT MARKING TYPE I (W) 4" (SLD) (100 MIL)	LF	200
23	666	REFLECTIVE PAVEMENT MARKING TYPE I (W) 8" (SLD) (100 MIL)	LF	200
24	666	REFLECTIVE PAVEMENT MARKING TYPE I (W) 24" (SLD) (100 MIL)	LF	215
25	666	REFLECTIVE PAVEMENT MARKING TYPE I (W) (ARROW) (100 MIL)	EA	3
26	666	REFLECTIVE PAVEMENT MARKING TYPE I (W) (WORD) (100 MIL)	EA	3
27	666	REFLECTIVE PAVEMENT MARKING TYPE I (Y) 4" (SLD) (100 MIL)	LF	200
28	666	PAVEMENT SEALER 4"	LF	400
29	666	PAVEMENT SEALER 8"	LF	200
30	666	PAVEMENT SEALER 24"	LF	215
31	666	PAVEMENT SEALER (ARROW)	EA	3
32	666	PAVEMENT SEALER (WORD)	EA	3
33	678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (4")	LF	400
34	678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (8")	LF	200
35	678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (24")	LF	215
36	678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (ARROW)	EA	3
37	678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (WORD)	EA	3
38	680	INSTALLATION OF HIGHWAY TRAFFIC SIGNALS	EA	1
39	682	BACKPLATE (12 IN) (3 SEC)	EA	7
40	682	BACKPLATE (12 IN) (4 SEC)	EA	1
41	682	VEHICLE SIGNAL SECTION (12 IN) LED (RED ARROW)	EA	1
42	682	VEHICLE SIGNAL SECTION (12 IN) LED (RED)	EA	7
43	682	VEHICLE SIGNAL SECTION (12 IN) LED (GREEN ARROW)	EA	1
44	682	VEHICLE SIGNAL SECTION (12 IN) LED (GREEN)	EA	7
45	682	VEHICLE SIGNAL SECTION (12 IN) LED (YELLOW ARROW)	EA	2
46	682	VEHICLE SIGNAL SECTION (12 IN) LED (YELLOW)	EA	7
47	682	PEDESTRIAN SIGNAL SECTION LED (COUNTDOWN)	EA	4

* ITEMS SUBSIDIARY TO ITEM 680 - INSTALLATION OF HIGHWAY TRAFFIC SIGNALS

SUMMARY OF QUANTITIES (2 OF 2)

48	684	TRAFFIC SIGNAL CABLE (TY A) (14 AWG) (5 CONDR)	LF	268
49	684	TRAFFIC SIGNAL CABLE (TY A) (14 AWG) (7 CONDR)	LF	539
50	684	TRAFFIC SIGNAL CABLE (TY A) (14 AWG) (16 CONDR)	LF	290
51	686	PEDESTRIAN POLE ASSEMBLY	EA	3
52	686	INSTALL TRAFFIC SIGNAL POLE ASSEMBLY (S) 1 ARM (24') ILSN	EA	1
53	686	INSTALL TRAFFIC SIGNAL POLE ASSEMBLY (S) 1 ARM (28') LUM & ILSN	EA	1
54	686	INSTALL TRAFFIC SIGNAL POLE ASSEMBLY (S) 1 ARM (40') LUM & ILSN	EA	1
55	688	PEDESTRIAN PUSHBUTTONS	EA	4
56	752	TREE REMOVAL	EA	2
57	*	CONTROLLER AND CABINET	EA	1
58	*	BATTERY BACKUP SYSTEM	EA	1
59	-	VIDEO DETECTOR SYSTEM (MULTI-CHANNEL SYSTEM)	EA	1
60	-	VIDEO DETECTOR SYSTEM (CAMERA)	EA	3
61	-	VIDEO (POWER)	LF	426
62	-	VIDEO (COAXIAL)	LF	396
63	-	EMERGENCY PRE-EMPTION - 1 CHANNEL DETECTOR UNIT (OPTICOM DETECTOR 3M-721)	EA	3
64	-	EMERGENCY PRE-EMPTION - 4 CHANNEL DESCRIMINATOR UNIT (3M-764)	EA	1
65	-	3M 138 OPTICOM CABLE	LF	426
66	-	INSTALL ILLUMINATED STREET NAME SIGN(S) (ILSN)	EA	3
67	-	DETECTABLE WARNING (2' X 5') TRUNCATED DOMES)	EA	5
68	*	3M - 380 CARD RACK	EA	1
69	*	NARROW MOUNTING HUB FOR OPTICOM DETECTOR TO SIGNAL ARM	EA	3

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STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED PROFESSIONAL ENGINEER

NO.	REVISIONS	DATE
x	--	--/--/--

QUANTITY SUMMARY
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

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BBI	FEBRUARY 2017	NA	BB16266	3

\\pzdal\data\bbi\BBCPI\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\BB16266-TS QUANTITIES, SOSS, DETAILS.dwg-3 QUANTITY SUMMARY Plotted Oct 19, 2017 at 8:20am by cwilliams | Last Saved by: cwilliams

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DATE:
FILE:

SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN TEXT	DIMENSIONS	ALUMINUM TYPE A	ALUMINUM TYPE G	Post Type: FRP = Fiberglass, TWT = Thin-Wall, 10BWG = 10 BWG, S80 = Sch 80	Posts (1 or 2)	Anchor Type: UA=Univer-Conc, UB=Univer-Bolt, SA=Slip-Conc, SB=Slip-Bolt, WS=Wedge Steel, WP=Wedge Plastic	Mounting Designation: P = Prefab. "Plain", T = Prefab. "T", U = Prefab. "U"; 1EXT or 2EXT = # of Ext., BM = Extruded Wind Beam, WC = 1.12 #/ft Wing Chan., EXAL= Extruded Aluminum
5	S1	ILSN	500 W. Ralph Hall PKWY 600	TBD	✓					MOUNT ON MAST ARM ON POLE T100.
5	S2	R3-8LR	ONLY ONLY	36" x 30"	✓					MOUNT ON MAST ARM ON POLE T100.
5	S3	ILSN	Steger Towne DR 900	TBD	✓					MOUNT ON MAST ARM ON POLE T200.
5	S4	ILSN	900 Steger Towne DR	TBD	✓					MOUNT ON MAST ARM ON POLE T400.
5	S5	R10-17T	LEFT TURN YIELD ON FLASHING YELLOW ARROW	30" x 30"	✓					MOUNT ON MAST ARM ON POLE T400.
7	S6	R3-8LR	ONLY ONLY	36" x 30"	✓		10BWG	1	SA	MOUNT ON SIGN POST.

NOTE:

1. SEE SHEET 21 FOR CITY'S OVERHEAD SIGN SPECIFICATION.
2. THE CONTRACTOR SHALL VERIFY THE FINAL SIGN SIZE AND LAYOUT WITH CITY AND SUBMIT ILSN PROOFS TO CITY AND ENGINEER FOR FINAL APPROVAL.

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ALUMINUM SIGN BLANKS (TYPE A)

Square Ft.	Min. Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

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02/17/17

Cameron L. Williams

STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED PROFESSIONAL ENGINEER

SUMMARY OF SMALL SIGNS

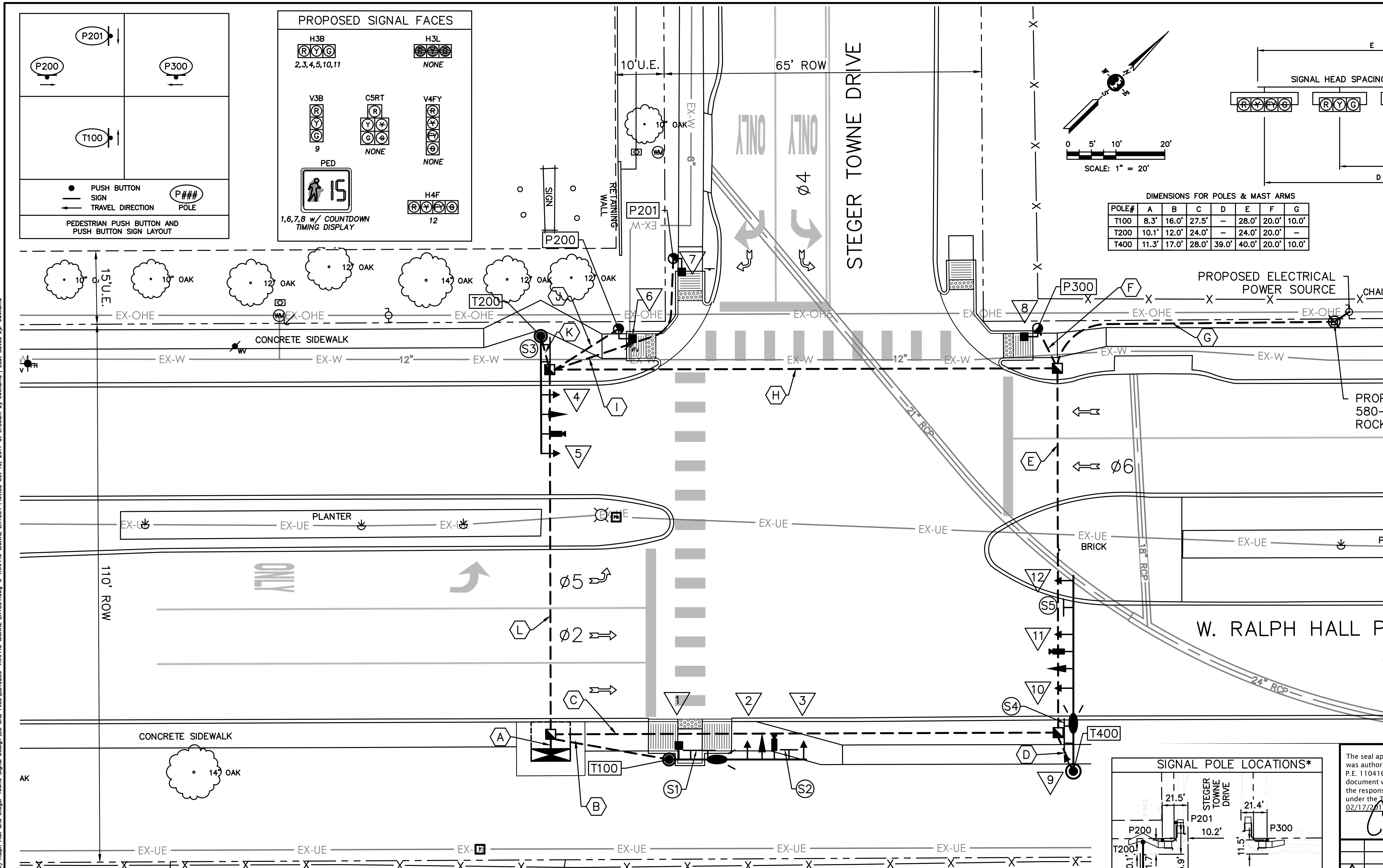
SOSS

©TxDOT May 1987	REVISIONS		
DN: TxDOT	11-93	7-02	
CK: TxDOT	8-95	2-07	
DW: TxDOT	1-02	9-08	
CK: TxDOT			

DIST	COUNTY	CONT	SECT	JOB	HIGHWAY
	ROCKWALL COUNTY			88162&6	

SHEET NO. 4

18



DIMENSIONS FOR POLES & MAST ARMS

POLE#	A	B	C	D	E	F	G
T100	8.3'	16.0'	27.5'	–	28.0'	20.0'	10.0'
T200	10.1'	12.0'	24.0'	–	24.0'	20.0'	–
T400	11.3'	17.0'	28.0'	39.0'	40.0'	20.0'	10.0'

"RECORD DRAWINGS"

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CAUTION EXISTING UTILITIES !!!

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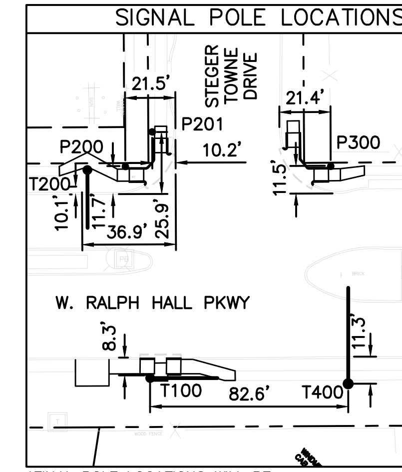
LEGEND

TRAFFIC SIGNAL POLE w/ PED PB & PED PB SIGN	METER PEDESTAL	POST MOUNTED SIGN
PEDESTRIAN SIGNAL INDICATION	PAD MOUNTED CONTROLLER AND CABINET	MAST ARM SIGN/WIND DAMPER
TRAFFIC SIGNAL WITH BACK PLATE	STREET LIGHT LUMINAIRE (LED)	STREET NAME SIGN (ILLUMINATED)
PED PB POLE w/ PED PB & PED PB SIGN	SIGNAL HEAD NUMBER	VIVDS
GROUND BOX (TYPE D)	ø2 APPROACH PHASE	OPTICOM DETECTOR
GROUND BOX (TYPE A)	T300 POLE NUMBER	S1 SIGN NUMBER
CONDUIT	A CONDUIT RUN NUMBER	TRAFFIC FLOW ARROWS

SIGNAL POLE LOCATIONS*



*FINAL POLE LOCATIONS WILL BE DETERMINED IN THE FIELD BY THE CITY.

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STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED PROFESSIONAL ENGINEER

NO.	REVISIONS	DATE
x	—	—/—/—

TRAFFIC SIGNAL LAYOUT
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

Binkley &Barfield, Inc.
consulting engineers
Texas Registration Number F-257
1801 Gateway Blvd. Suite 101 Richardson, Texas 75080 Phone (972) 644-2800
www.binkleybarfield.com

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BBI	FEBRUARY 2017	1" = 20'	BB16266	5

\\pzdal\data\bbi\BBCPI\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\BB16266-TS QUANTITIES, SOSS, DETAILS.dwg-6 TRAFFIC SIGNAL DETAILS Plotted Oct 19, 2017 at 8:21am by cwilliams | Last Saved by: cwilliams

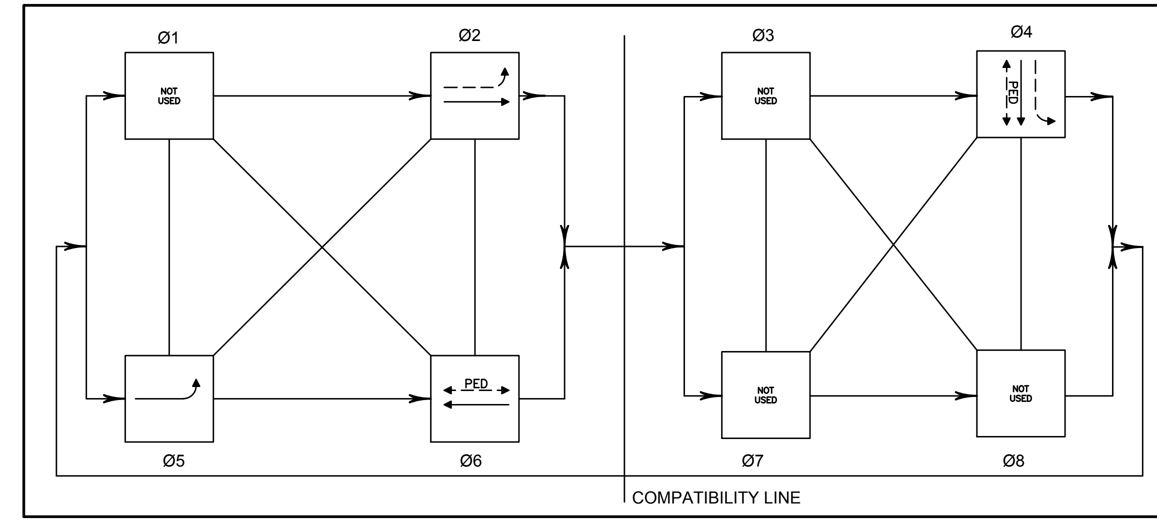
CABLE TERMINATION CHART

CABLE CONDUCTOR		T100 16 CONDUCTOR	T200 16 CONDUCTOR	P200 7 CONDUCTOR	P201 7 CONDUCTOR	P300 7 CONDUCTOR	T400 16 CONDUCTOR
1	Black	SPARE	SPARE	PB COMMON	PB COMMON	PB COMMON	SPARE
2	White	SIG. COMMON	SIG. COMMON	SIG. COMMON	SIG. COMMON	SIG. COMMON	SIG. COMMON
3	Red	SH 2,3 R Φ4	SH 4,5 R Φ6	Φ6 DW (SH 6)	Φ4 DW (SH 7)	Φ6 DW (SH 8)	SH 9,10,11 R Φ2
4	Orange	SH 2,3 Y Φ4	SH 4,5 Y Φ6	Φ6 W (SH 6)	Φ4 W (SH 7)	Φ6 W (SH 8)	SH 9,10,11 Y Φ2
5	Green	SH 2,3 G Φ4	SH 4,5 G Φ6	SPARE	SPARE	SPARE	SH 9,10,11 G Φ2
6	Blue	SPARE	SPARE	PB Φ6	PB Φ4	PB Φ6	SPARE
7	Red/Black	SPARE	SPARE	SPARE	SPARE	SPARE	SH 12 RA Φ5
8	White/Black	SPARE	SPARE	-	-	-	SH 12 YA Φ5
9	Orange/Black	SPARE	SPARE	-	-	-	SH 12 FYA Φ5
10	Green/Black	PB COMMON	SPARE	-	-	-	SH 12 GA Φ5
11	Blue/Black	Φ4 DW (SH 1)	SPARE	-	-	-	SPARE
12	Black/White	Φ4 W (SH 1)	SPARE	-	-	-	SPARE
13	Red/White	SPARE	SPARE	-	-	-	SH 9 R Φ4
14	Green/White	SPARE	SPARE	-	-	-	SH 9 Y Φ4
15	Blue/White	PB Φ4	SPARE	-	-	-	SH 9 G Φ4
16	Black/Red	SPARE	SPARE	-	-	-	SPARE

POLE FOUNDATION SUMMARY

POLE NO.	TYPE 24-A	30-A	36-A
T100	-	12	-
T200	-	12	-
P200	6	-	-
P201	6	-	-
P300	6	-	-
T400	-	-	14
TOTALS	18	24	14

PHASING DIAGRAM



CONDUIT AND WIRING TABLE

CONDUIT RUN	CONDUIT: 2" PVC TRENCHED	2" PVC BORED	4" PVC TRENCHED	4" PVC BORED	WIRE AND CABLE: 1C #6 AWG (POWER)	1C #6 AWG (BARE)	#8 AWG XHHW (ILSN)	3C #14 AWG (LUM)	3M 128 OPTICOM CABLE	VIDEO (POWER)	VIDEO (COAXIAL)	7C#14 AWG (SIGNAL)	16C #14 AWG (SIGNALS)	LENGTH OF CONDUIT RUN C-C	CONDUIT RUN
A			1			1			1	1	1	2	2	14 5	A
			1			1			2	2	2	1	1	14 5	
	1				2	1								14 5	
B	1					1	2	1	1	1	1		1	43 25	B
C			1			1	2	1	1	1	1	1	1	106 105	C
	1				2	1								106 105	
D	1					1	2	1	1	1	1		1	24 10	D
E				1		1	2	2				1		87 75	E
		1			2	1								87 75	
F	1					1						1		17 10	F
G	1				2	1	2	2						82 65	G
H				1		1	2							107 105	H
I	1					1						1		45 40	I
J	1					1						1		30 20	J
K	1					1	2	1	1	1	1		1	20 5	K
L				1		1			1	1	1	2	1	86 75	L
SLACK					10	19	13	9	11	11	11	13	11	5	SLACK
TOTALS	285	75	115	255	550	825	845	470	290	290	290	480	290	-	TOTALS

SIGNAL HEAD SUMMARY

NO.	TYPE	EXISTING/ PROPOSED	BACKPLATE 3 SECT.	BACKPLATE 4 SECT.	12" VEH SEC	16"X18" COUNTDOWN PED
1	PED	P			0	1
2	H3	P	1		3	
3	H3	P	1		3	
4	H3	P	1		3	
5	H3	P	1		3	
6	PED	P			0	1
7	PED	P			0	1
8	PED	P			0	1
9	V3	P	1		3	
10	H3	P	1		3	
11	H3	P	1		3	
12	H4FY	P		1	4	
TOTALS		-	7	1	25	4

MAST ARM SIGNAL HEAD AND POLE SUMMARY

POLE NUMBER	T100			T200		P200	P201	P300	T400			
EXSITNIG/PROPSOED	PROPOSED			PROPOSED		PROPOSED	PROPOSED	PROPOSED	PROPOSED			
MAST ARM LENGTH	28'			24'		N/A	N/A	N/A	40'			
FOUNDATION TYPE	30-A			30-A		24-A	24-A	24-A	36-A			
WITH LUMINAIRES	YES			NO		NO	NO	NO	YES			
WITH ILSN	YES			YES		NO	NO	NO	YES			
SIZE OF LENS	12"			12"		12"	12"	12"	12"			
SIGNAL TYPE	PED	H3	H3	H3	H3	PED	PED	PED	V3	H3	H3	H4FY
SIGNAL FACE NO.	1	2	3	4	5	6	7	8	9	10	11	12
SIGNAL INDICATIONS	DW	R	R	R	R	DW	DW	DW	R	R	R	RA
	W	Y	Y	Y	Y	W	W	W	Y	Y	Y	YA
	-	G	G	G	G	-	-	-	G	G	G	FYA
	-	-	-	-	-	-	-	-	-	-	-	GA
	-	-	-	-	-	-	-	-	-	-	-	-

POLE WIRING TABLE AND SUMMARY

POLE NO.	#12 AWG XHHW (ILSN)	3C #14 AWG (LUM)	3C #14 AWG (RLCS)	3M 128 OPTICOM CABLE	VIDEO (POWER)	VIDEO (COAXIAL)	5C#14 (SIGNAL)	7C#14 (SIGNAL)
T100	60	30	25	48	48	48	84	-
T200	60	30	25	40	40	10	69	-
P200	-	-	-	-	-	-	10	-
P201	-	-	-	-	-	-	10	-
P300	-	-	-	-	-	-	10	-
T400	60	30	25	48	48	48	85	59
TOTALS	180	90	75	136	136	106	268	59

NOTE: RLCS - RED LIGHT CONFIRMATION SIGNAL

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LED TRAFFIC SIGNAL LAMPS

LED TRAFFIC SIGNAL LAMP 12 INCH (EA)						PED SIGNAL LAMP
RED	GREEN	YELLOW	RED ARROW	YELLOW ARROW	GREEN ARROW	COUNTDOWN
7	7	7	1	2	1	4

5C/7C TERMINATION CHART

CABLE CONDUCTOR		T100 S.H. NO. 1	T100 S.H. NO. 2	T100 S.H. NO. 3	T200 S.H. NO. 4	T200 S.H. NO. 5	P200 S.H. NO. 6	P201 S.H. NO. 7	P300 S.H. NO. 8	T400 S.H. NO. 9	T400 S.H. NO. 10	T400 S.H. NO. 11	T400 S.H. NO. 12
1	WHITE	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON
2	RED	DW	R	R	R	R	DW	DW	DW	R	R	R	RA
3	ORANGE	SPARE	Y	Y	Y	Y	SPARE	SPARE	SPARE	Y	Y	Y	YA
4	GREEN	W	G	G	G	G	W	W	W	G	G	G	GA
5	BLACK	PB	SPARE	SPARE	SPARE	SPARE	PB	PB	PB	SPARE	SPARE	SPARE	SPARE
6	BLUE	-	-	-	-	-	-	-	-	-	-	-	SPARE
7	WHITE/BLACK	-	-	-	-	-	-	-	-	-	-	-	FYA

GROUND BOX SUMMARY

GROUND BOX TYPE	TOTAL (EA.)
TYPE C	-
TYPE D	4
TYPE E	-

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STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED
PROFESSIONAL ENGINEER

NO.	REVISIONS	DATE
△	—	—/—/—

TRAFFIC SIGNAL DETAILS
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

Binkley & Barfield, Inc.
consulting engineers
Texas Registration Number F-257
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www.binkleybarfield.com

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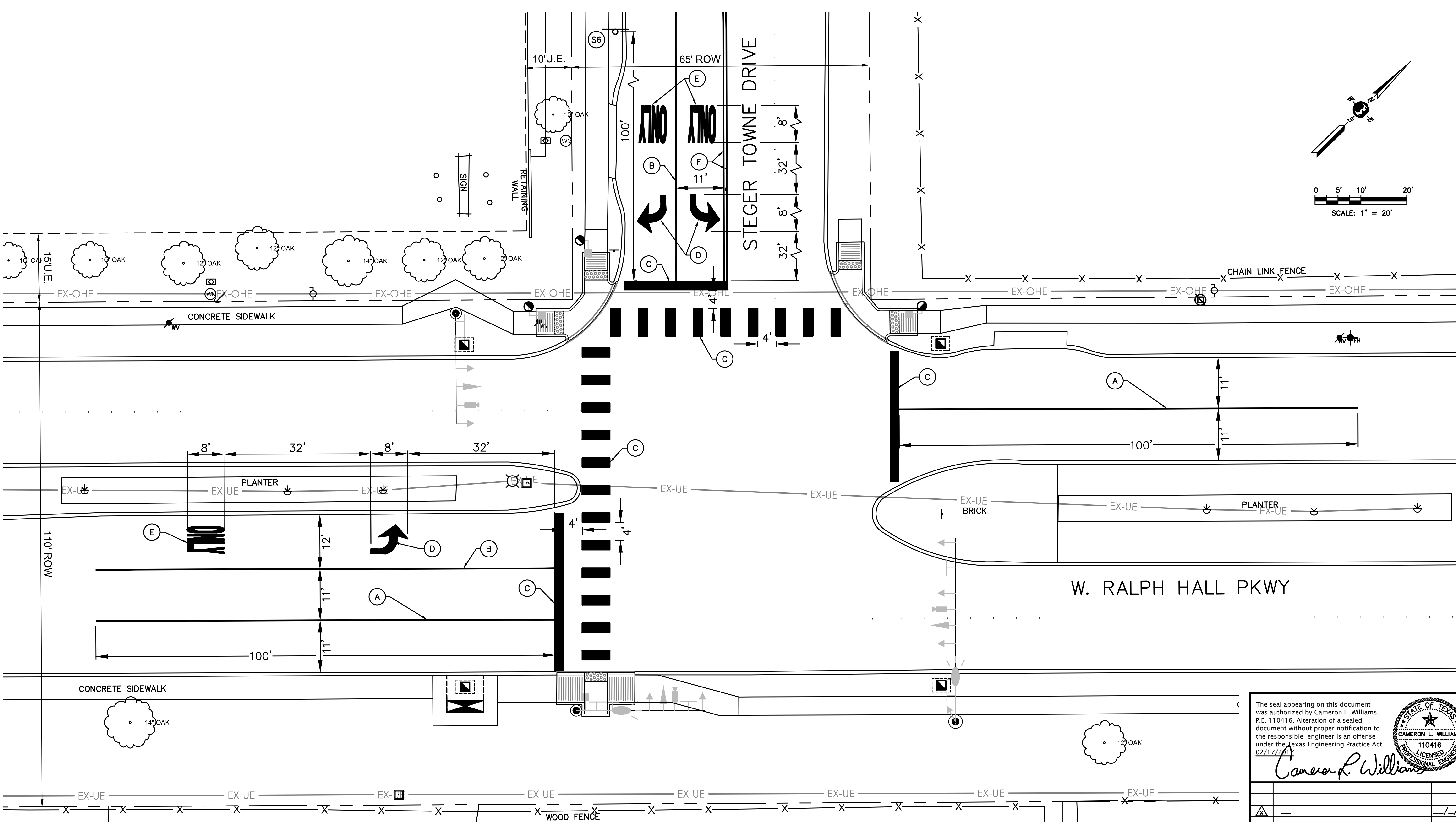
BBI	FEBRUARY 2017	NA	BB16266	6



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NO.	REVISIONS	DATE
	—	—/—/—

LEGEND

(thin line)	EXISTING MARKINGS
(thick line)	PROPOSED MARKINGS
A	REFL PAV MRK TY I (W) 4" (SLD)
B	REFL PAV MRK TY I (W) 8" (SLD)
C	REFL PAV MRK TY I (W) 24" (SLD)
D	REFL PAV MRK TY I (W) (ARROW)
E	REFL PAV MRK TY I (W) (WORD)
F	REFL PAV MRK TY I (Y) 4" (SLD)
S6	SIGN NUMBER

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SIGNS AND PAVEMENT MARKINGS LAYOUT
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

Binkley & Barfield, Inc.
consulting engineers
Texas Registration Number F-257
1801 Gateway Blvd. Suite 101 Richardson, Texas 75080 Phone (972) 644-2800
www.binkleybarfield.com

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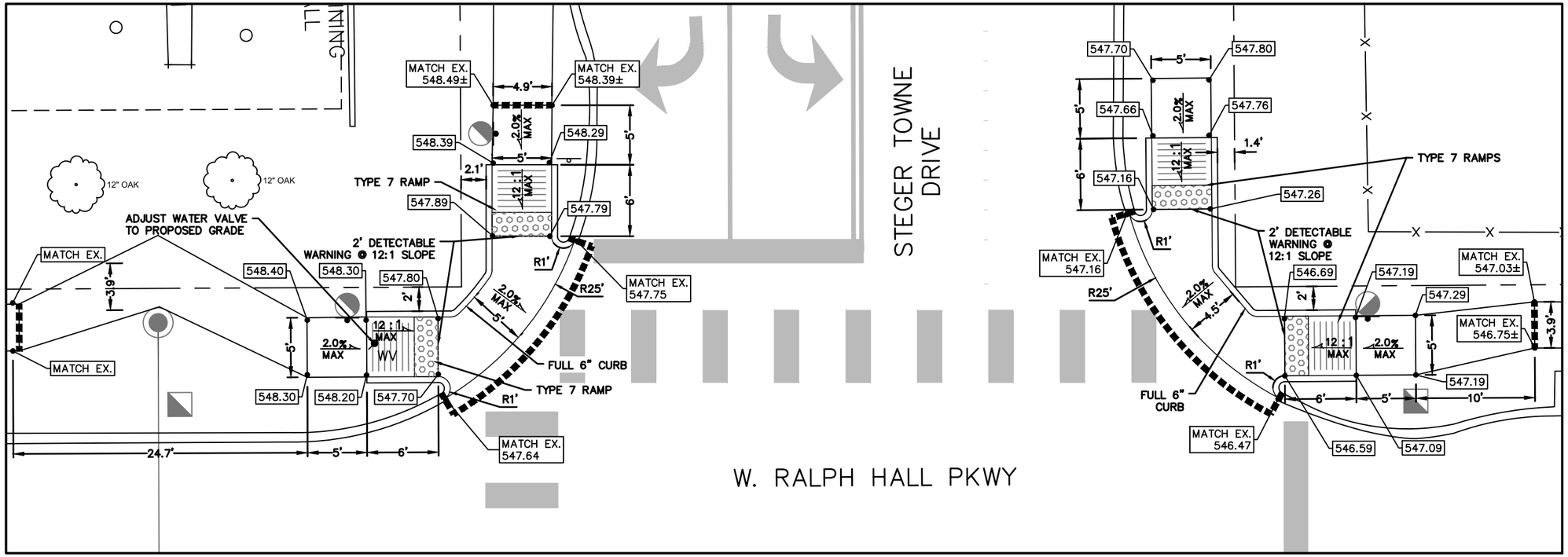
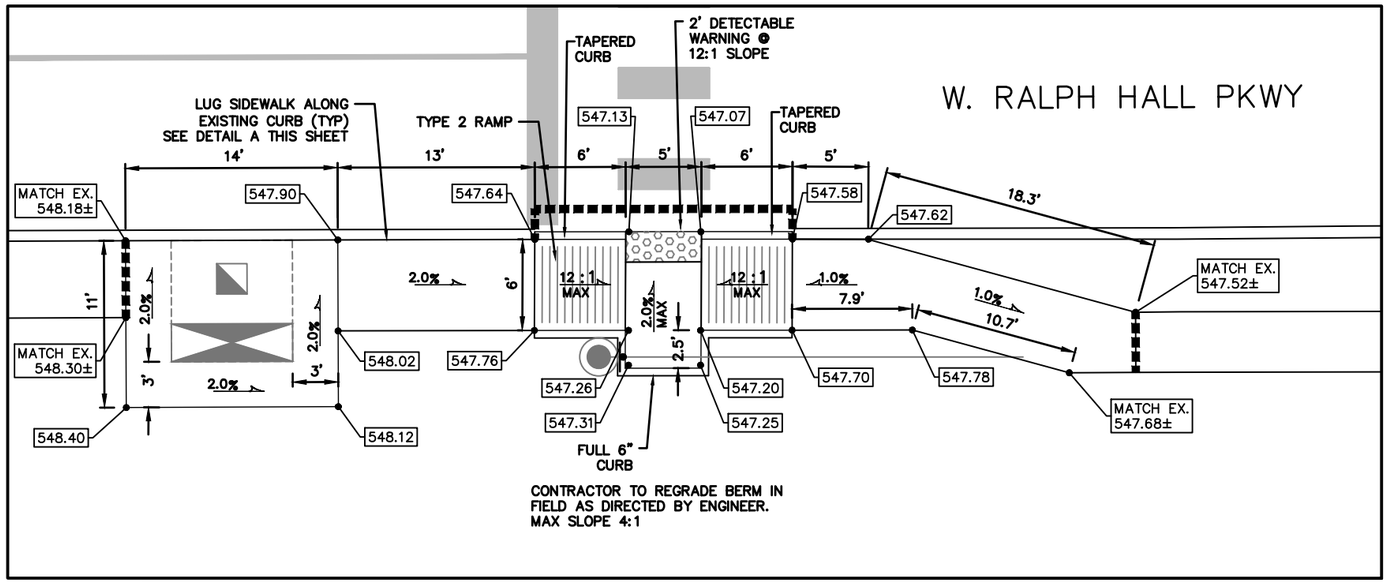
BBI	FEBRUARY 2017	1" = 20'	BB16266	7

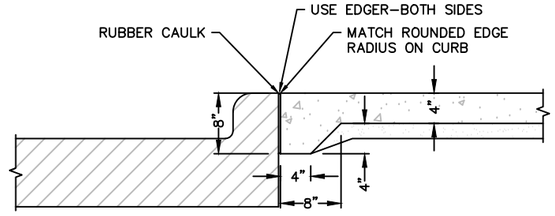
\\pzdal\data\bbi\BBCPI\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\x-BB16266-11x17-BDR.dwg-Model Plotted Mar 30, 2017 at 2:17pm by jmaxwell | Last Saved by: cwilliams



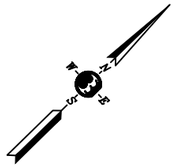
WEST & NORTH CURB RAMP DETAILS
SCALE: 1" = 10'



SOUTH CURB RAMP DETAIL
SCALE: 1" = 10"



JOINT LUG DETAIL FOR SIDEWALK ADJACENT TO CURB
N.T.S.



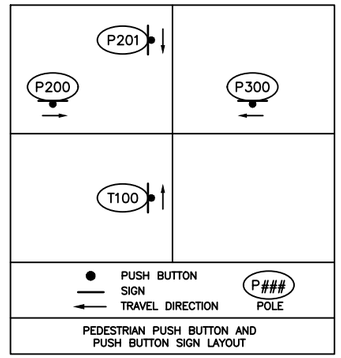
SCALE: 1" = 10'

NOTES:

1. SAWCUT, REMOVE & DISPOSE EXISTING CONCRETE PVMT., CURB & GUTTER & BARRIER FREE RAMP AS SHOWN. SAWCUT SHALL BE FULL DEPTH.
2. CONCRETE STREET PAVING & BARRIER FREE RAMPS SHALL BE 3,600 PSI (6.5 SACKS/CY) WITH NO. 4 BARS SPACED @ 18 INCHES ON CENTER EACH WAY. CONCRETE SIDEWALK PAVING SHALL BE 3,000 PSI (5.5 SACKS/CY) WITH NO. 3 BARS SPACED AT 24 INCHES ON CENTER EACH WAY.
3. CONTRACTOR TO INSTALL 6" CURB AS NECESSARY AT SIDEWALK LANDING AREAS AND SLOPE GROUND 2:1 BEHIND 6" CURB.
4. DETECTABLE WARNING SHALL BE TRUNCATED DOMES PLATES AND COLONIAL RED IN COLOR.

ADA NOTE:

1. ADA RAMP LOCATIONS SHALL BE IN ACCORDANCE WITH CITY STANDARDS AND SHALL BE PRE–MARKED AND APPROVED BY THE CITY PRIOR TO THEIR CONSTRUCTION.



PEDESTRIAN PUSH BUTTON AND PUSH BUTTON SIGN LAYOUT

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NO.	REVISIONS	DATE
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SIDEWALK RAMP DETAILS
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

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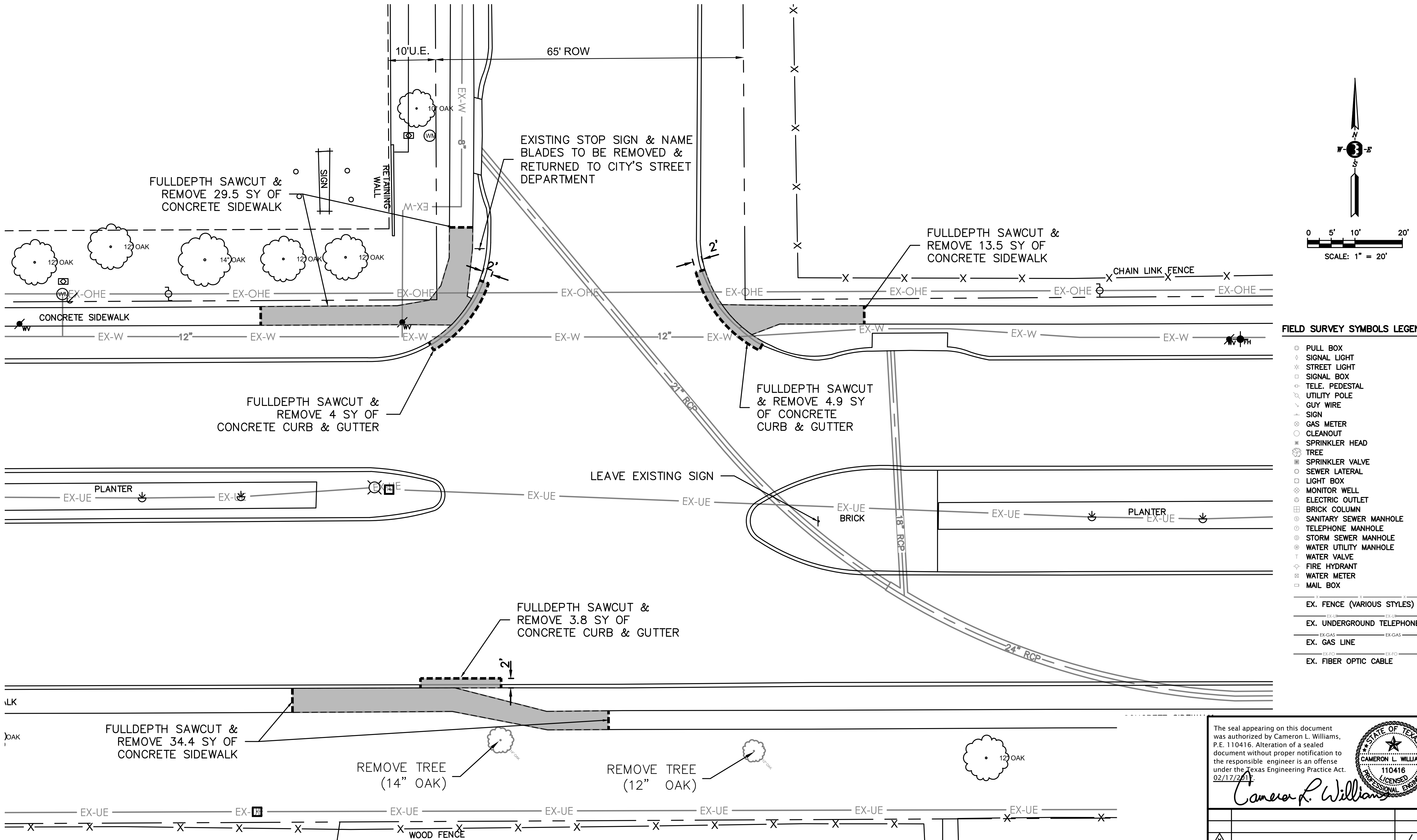
BBI	FEBRUARY 2017	1" = 10'	BB16266	8

\\grads\data\bbi\BBCPW\JOBS\BB16266 (City of Rockwall) Ralph Hall and Steger Towne Signal Design\05 CAD Files\BB16266–SIDEWALK, RAMP AND PAVING LAYOUT.dwg–8 SIDEWALK RAMP DETAILS Plotted Oct 19, 2017 at 9:56am by cwilliams | Last Saved by: cwilliams



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CAMERON L. WILLIAMS
110416
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NO.	REVISIONS	DATE
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REMOVAL PLAN
W RALPH HALL PKWY
@ STEGER TOWNE RD
CITY OF ROCKWALL, TEXAS

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BBI	FEBRUARY 2017	1" = 20'	BB16266	9

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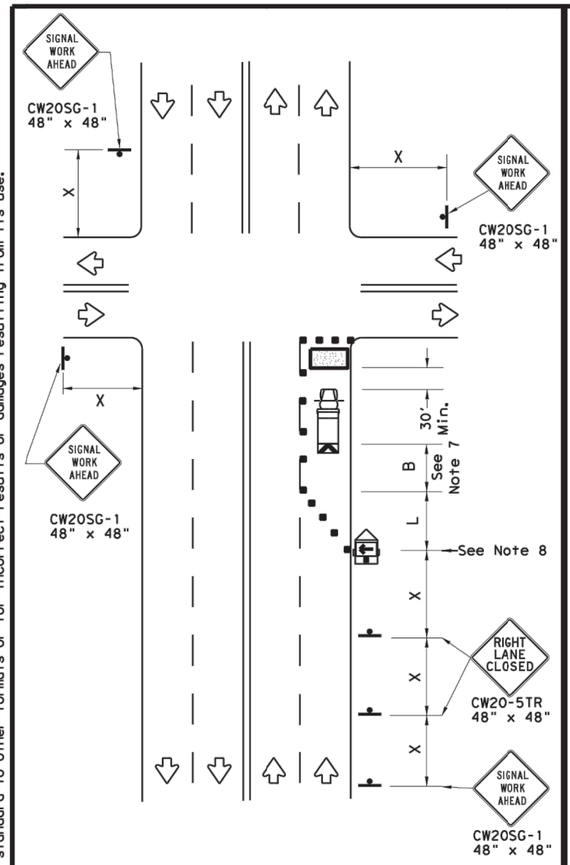
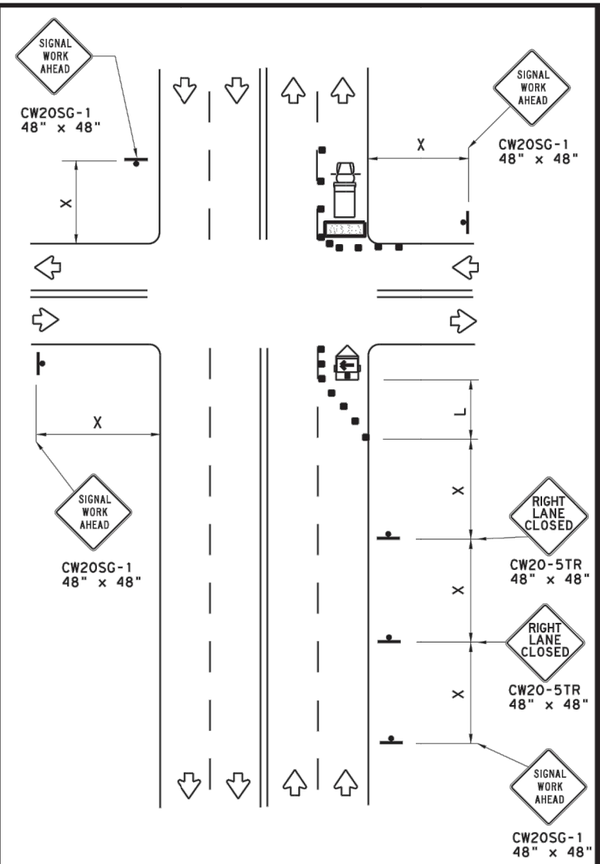


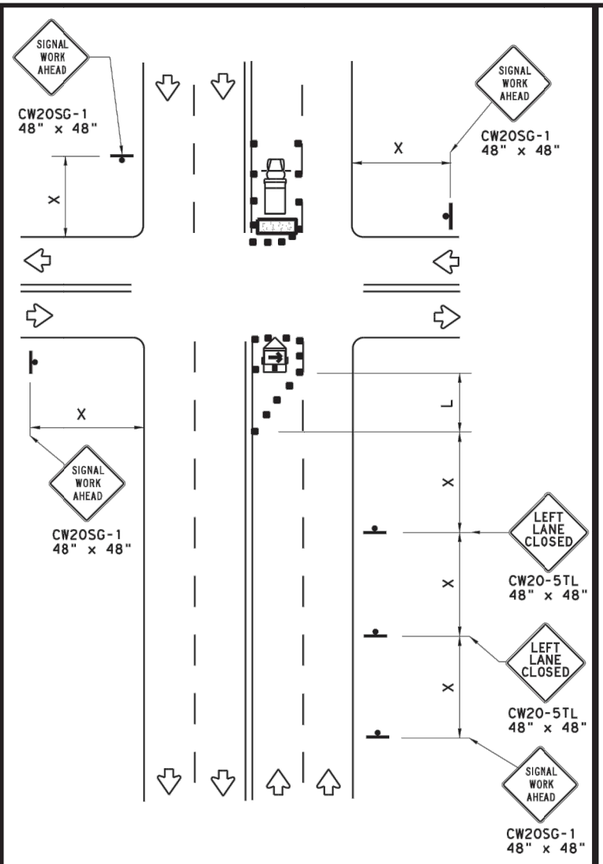
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY

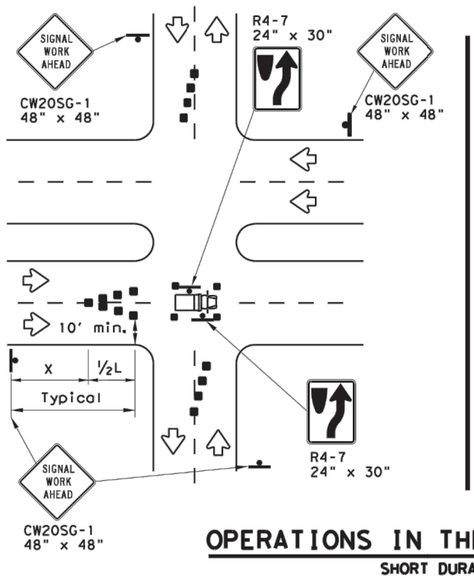
LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

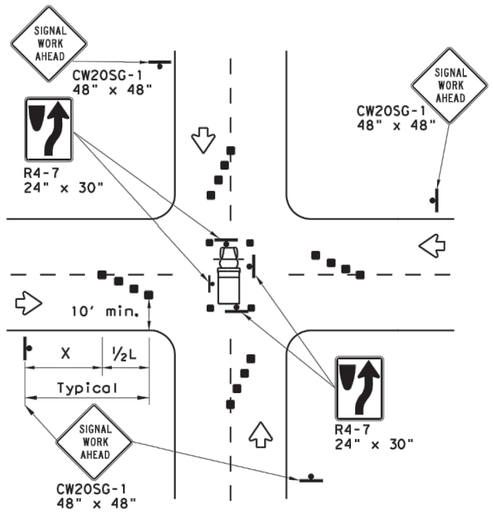
Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	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)

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.





OPERATIONS IN THE INTERSECTION

SHORT DURATION

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

SHEET 1 OF 2

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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4-98 3-03				10

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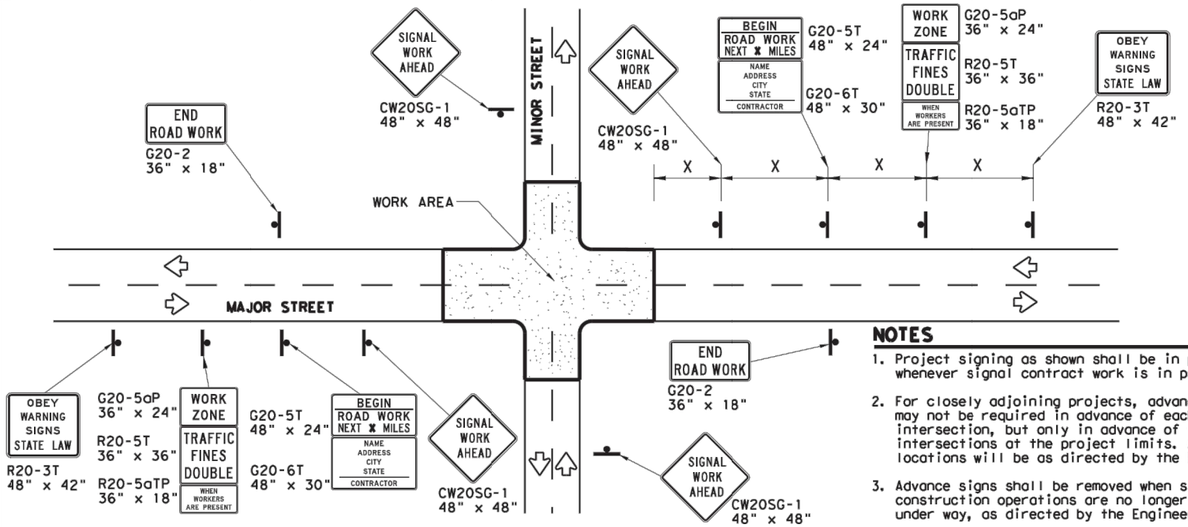


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For 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. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. 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".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. 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

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. 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, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

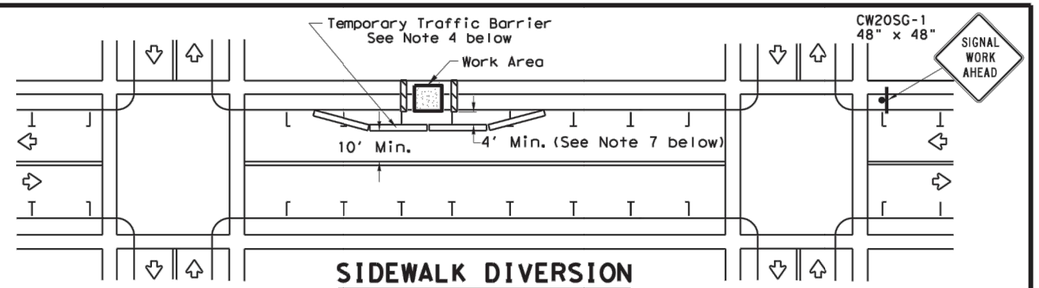
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber, such as tire inner tubes, shall not be used.
6. Rubber ballasts 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.
7. 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 fastners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

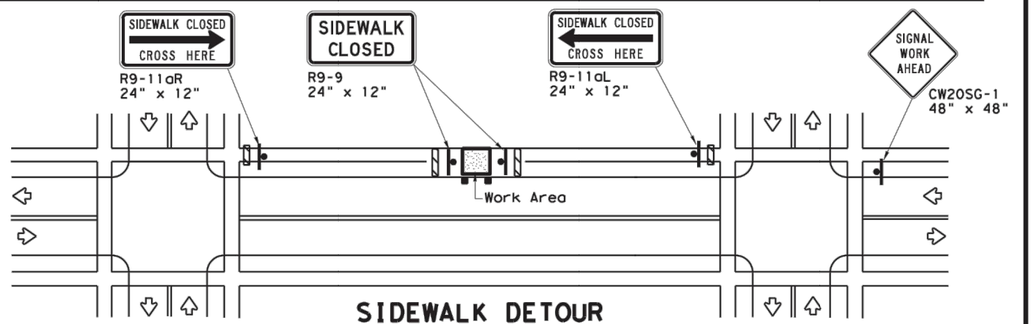
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

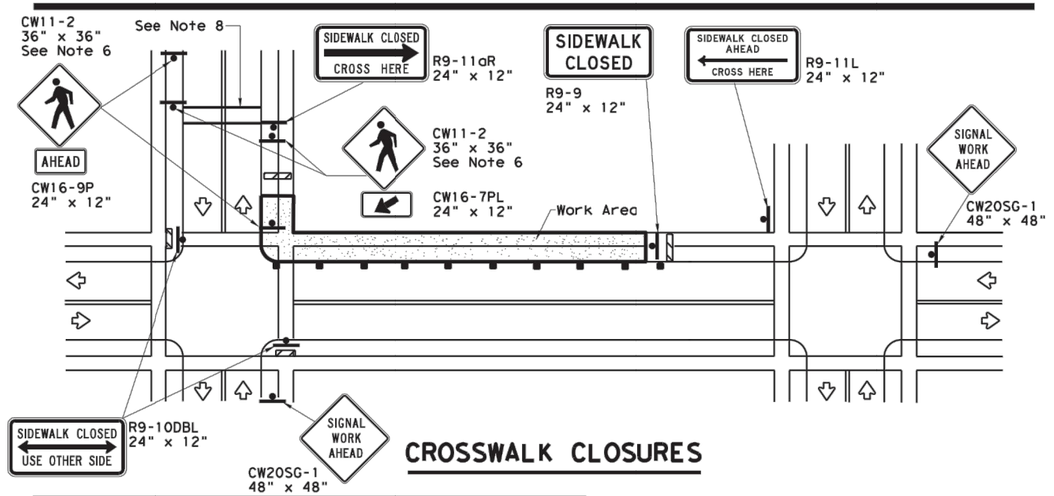
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation | Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

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"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

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ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past 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, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

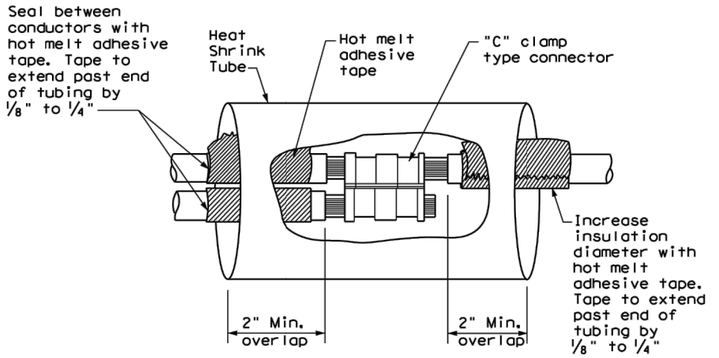
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

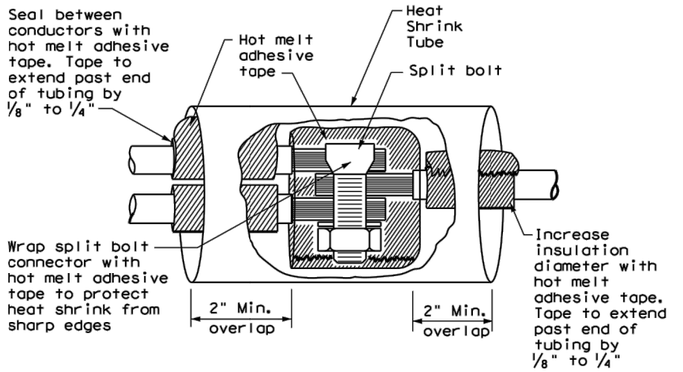
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

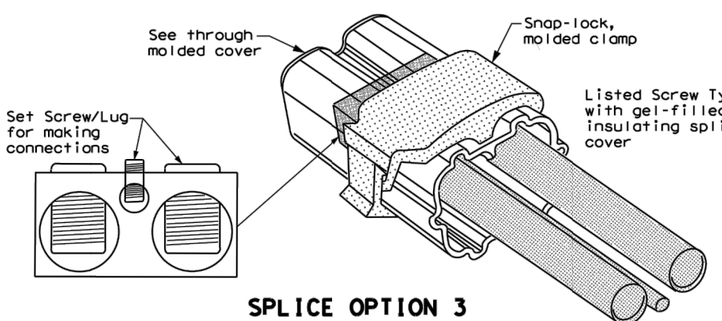
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUCTORS

ED(3)-14

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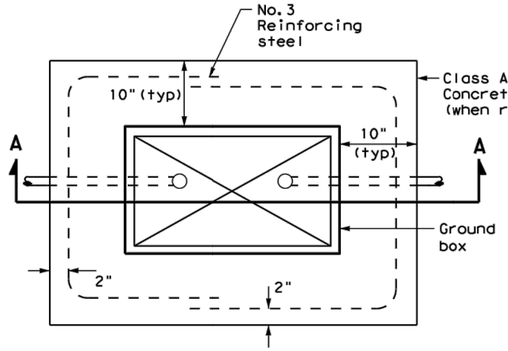
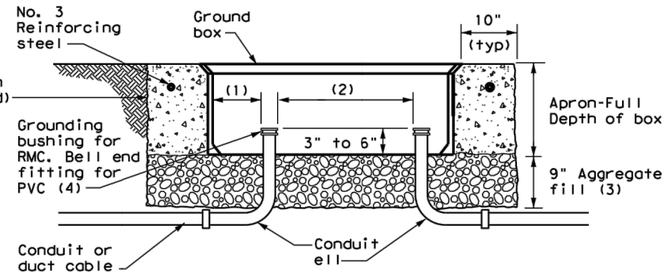


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

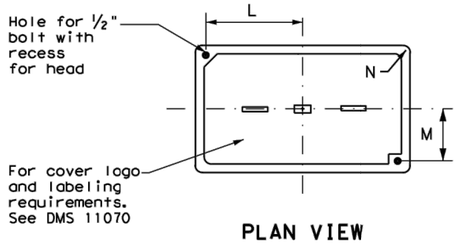
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

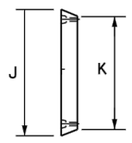
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	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



PLAN VIEW



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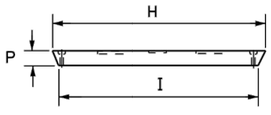

SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

Schematic Type

Service Voltage V / V

Disconnect Amp Rating
000 indicates main lug only/
Typically Type T

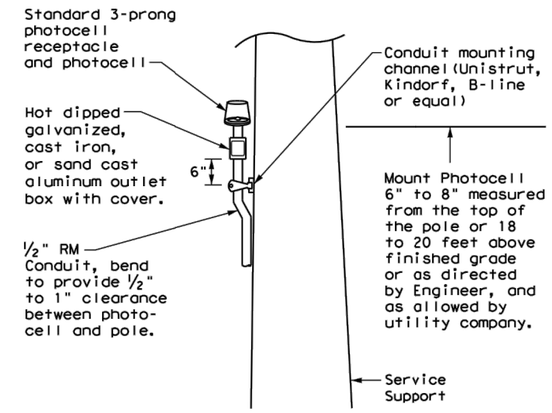
(SS)= Safety Switch Ahead of Meter-Check With Utility
(NS)= No safety Switch Ahead of Meter-Check with Utility

Enclosure Type
GS= Galvanized steel("off the shelf")
SS= Stainless steel(Custom Enclosure)See MPL
AL= Aluminum (Custom Enclosure)See MPL

Photocell Mounting Location
(E)= Inside Service/Enclosure Mounted
(T)= Top of pole
(L)= Luminaire mounted
(N)= None/No Photocell or Lighting Contactor Required

Service Support Type
GC= Granite concrete
OC= Other concrete
TP= Timber pole
SP= Steel pole
SF= Steel frame
OT= Pole by others or paid for separately
EX= Existing pole
TS= Service on traffic signal pole
PS= Pedestal Service

O= Overhead Service Feed from Utility
U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

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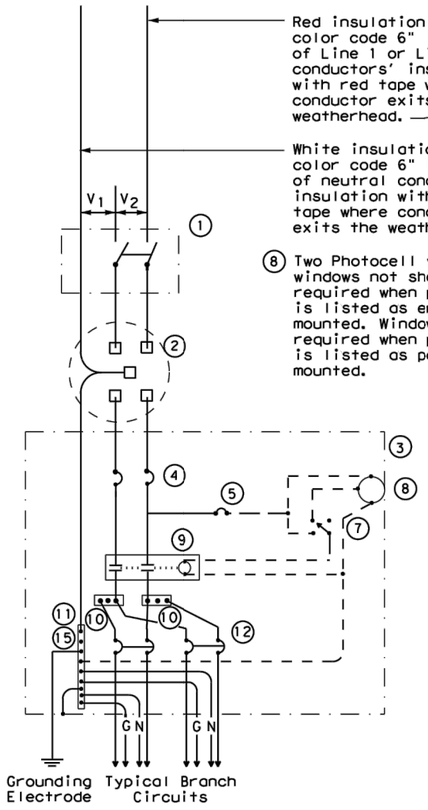
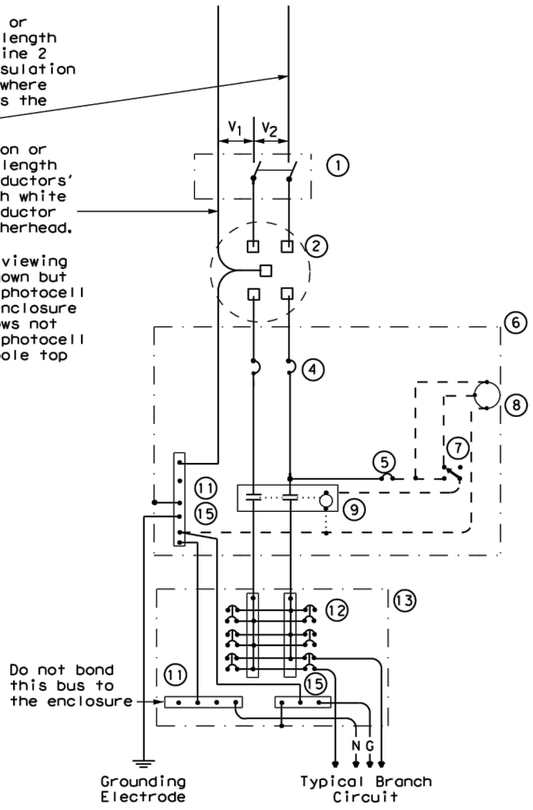
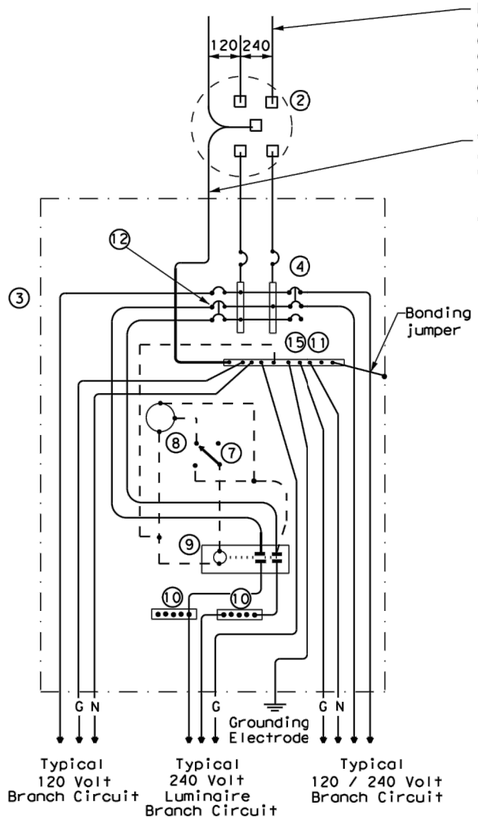


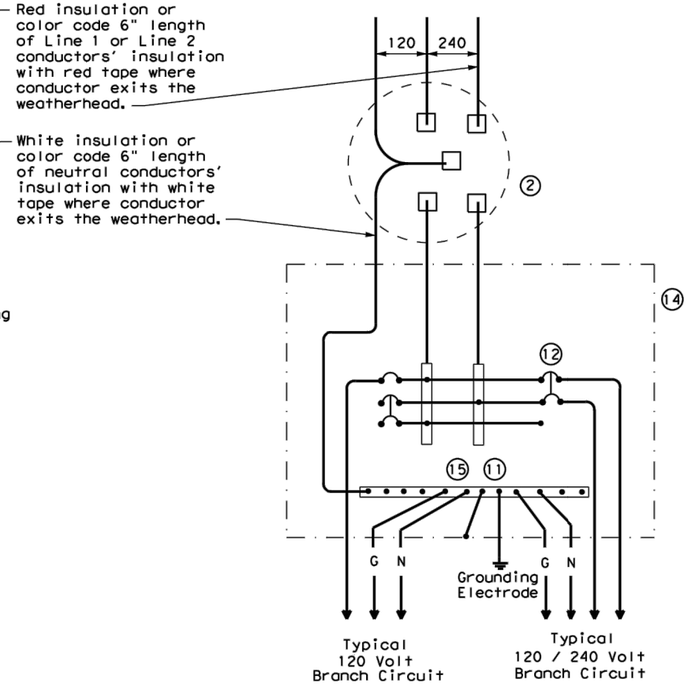
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
- - - -	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

ED(6)-14

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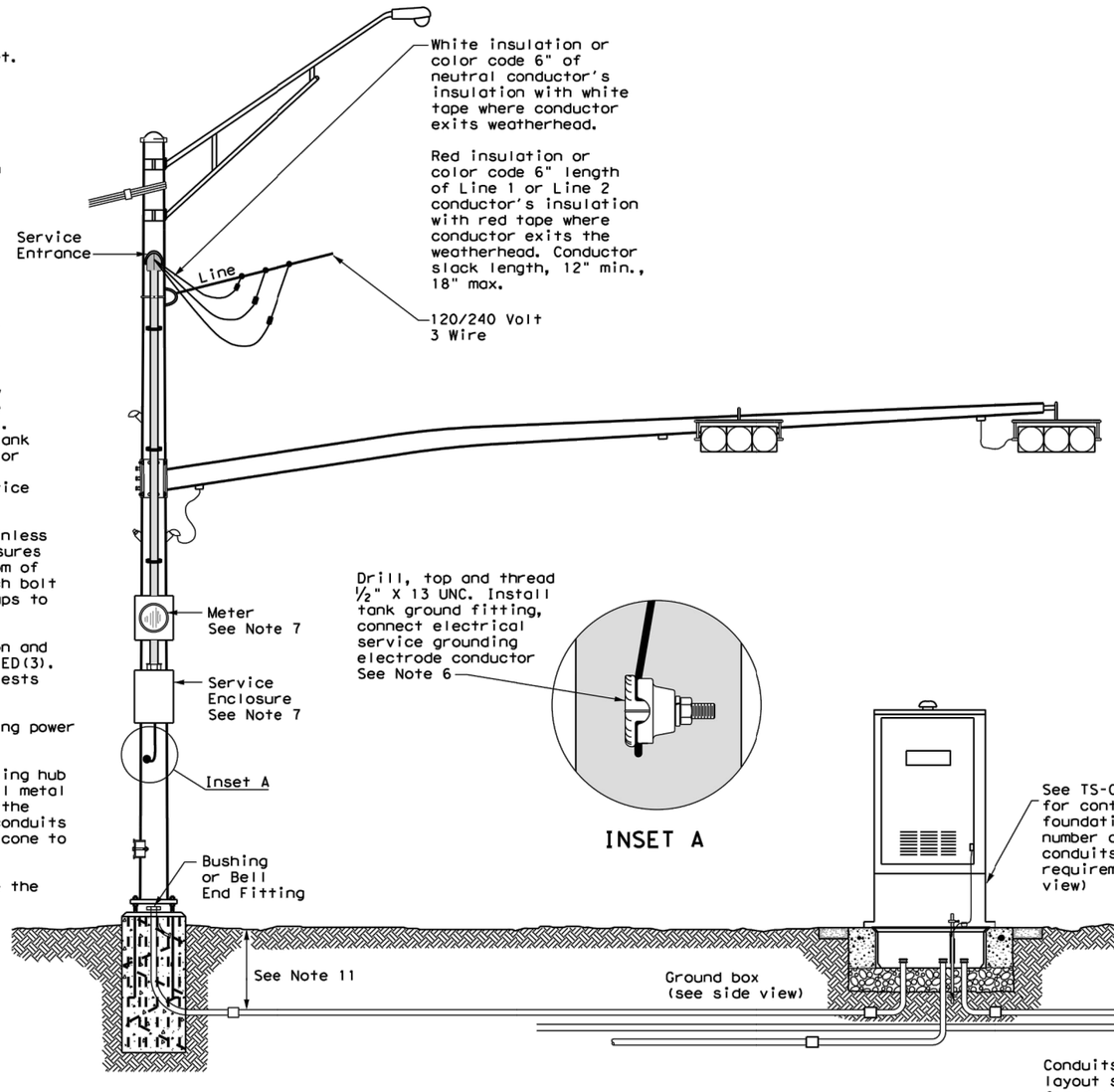
TRAFFIC SIGNAL NOTES

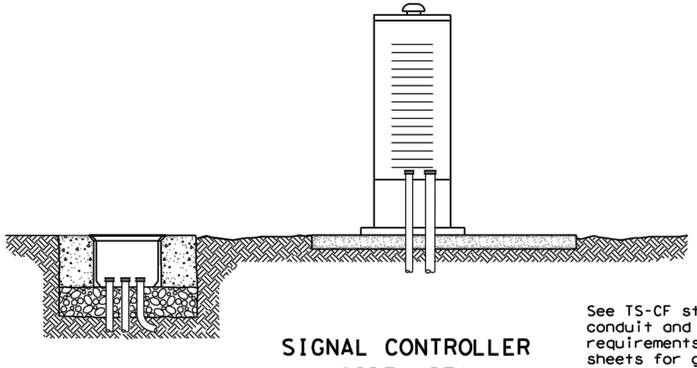
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

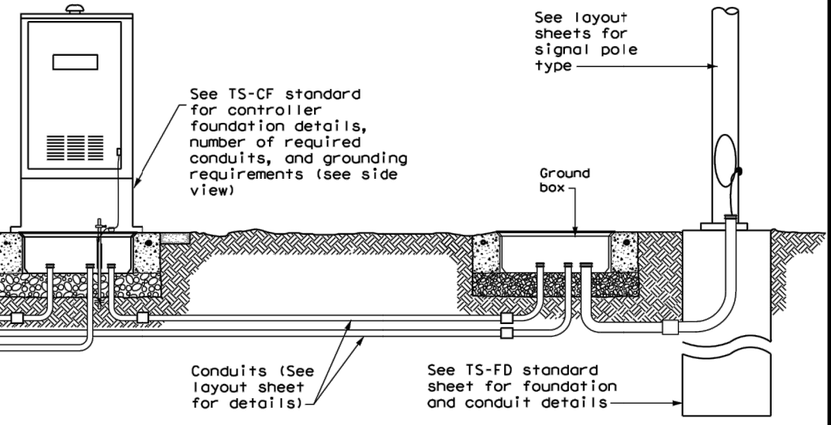
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS

ED(8)-14

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

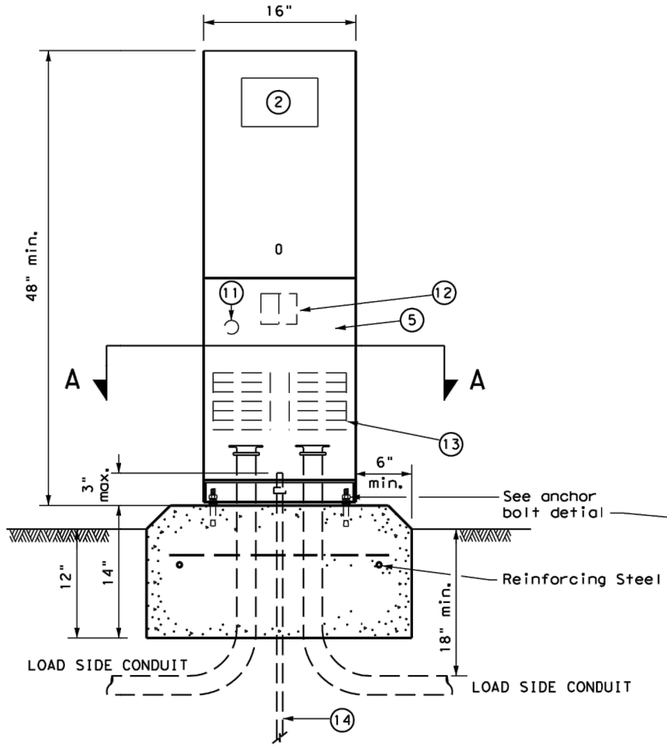
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install ½ in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a ½ in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

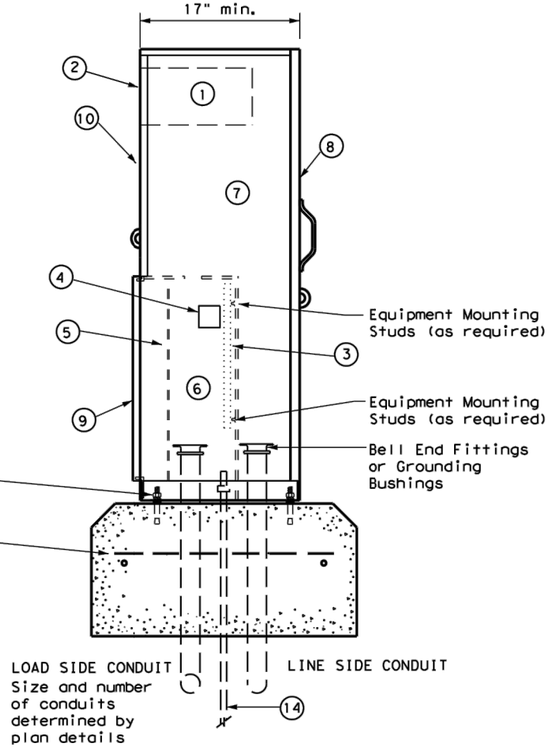
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than ⅛ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of ⅛ in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within ¼ in. Repair rocking or movement of the service enclosure at no additional cost to the department.

7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

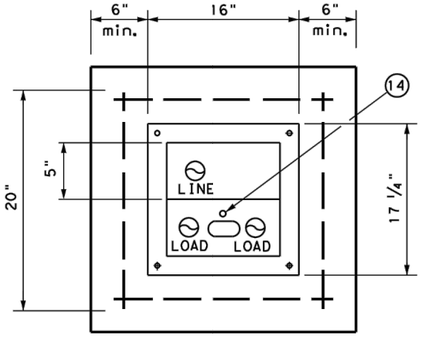


FRONT VIEW

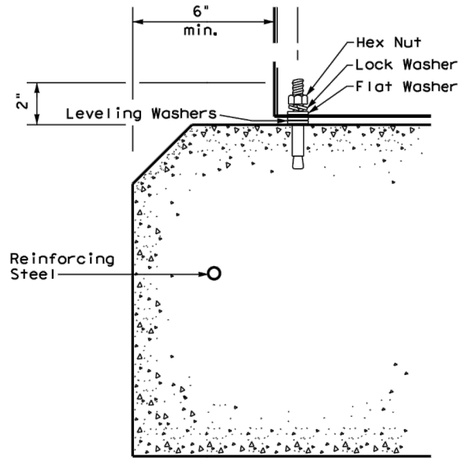


SIDE VIEW

TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

FILE: ed9-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
	DIST	COUNTY		SHEET NO.
				18

71J

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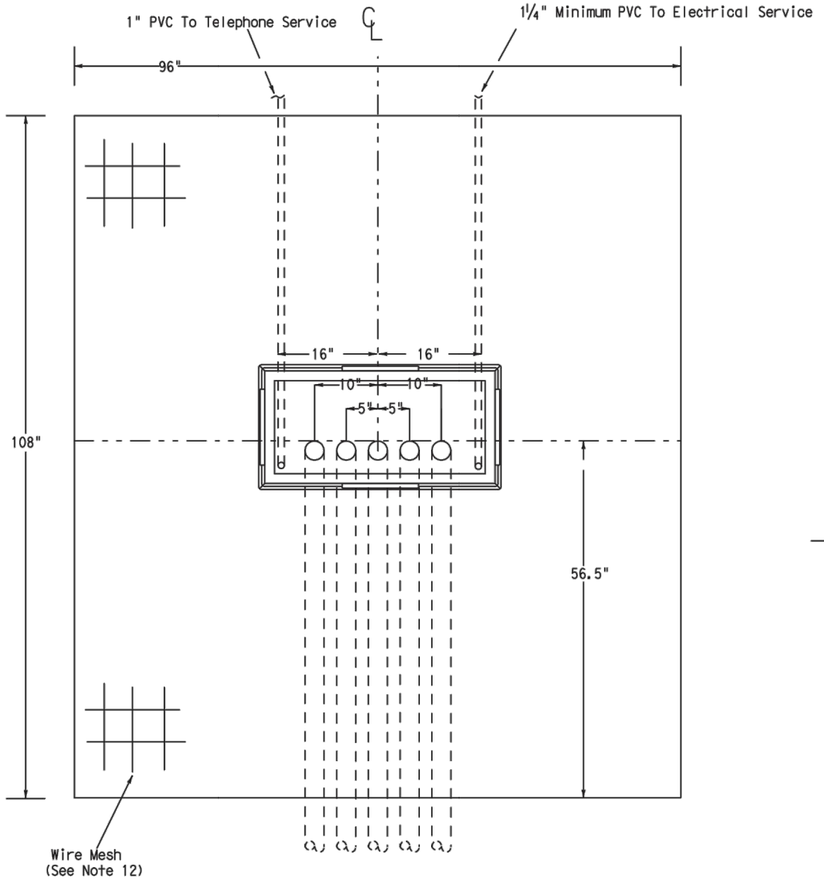
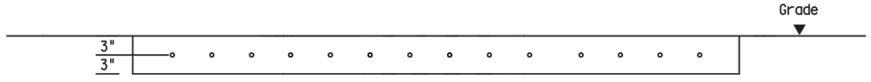
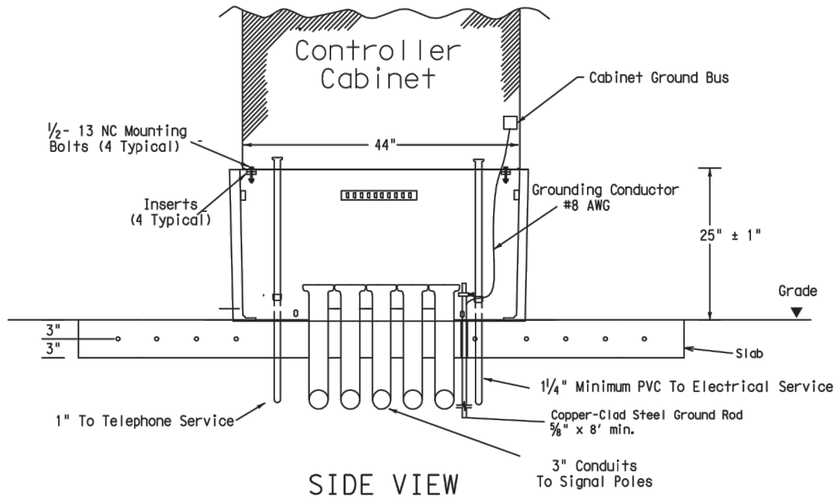
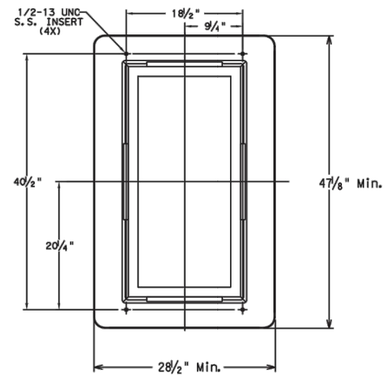
TOP VIEW
(Slab & Base)







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: Armorcast 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 ½"-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 ⅝ x ⅜ 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 ½"-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.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

TS-CF-04

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			19

12-04 REVISIONS

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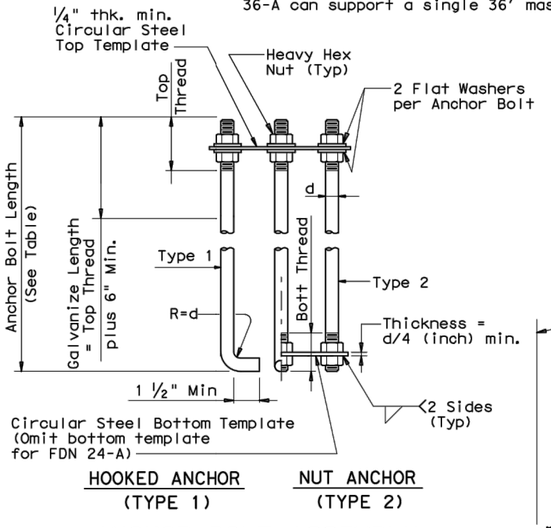
FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft ④, ⑤, ⑥			ANCHOR BOLT DESIGN ①				FOUNDATION DESIGN LOAD ②		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft 10	15	40	ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

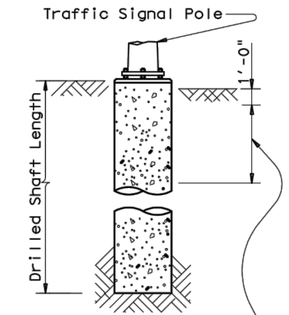
FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

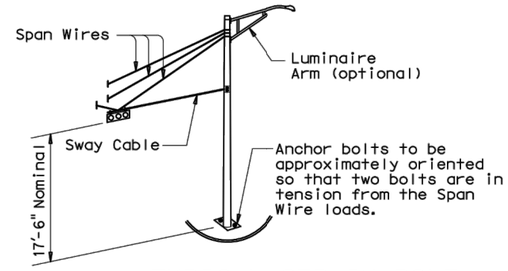
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

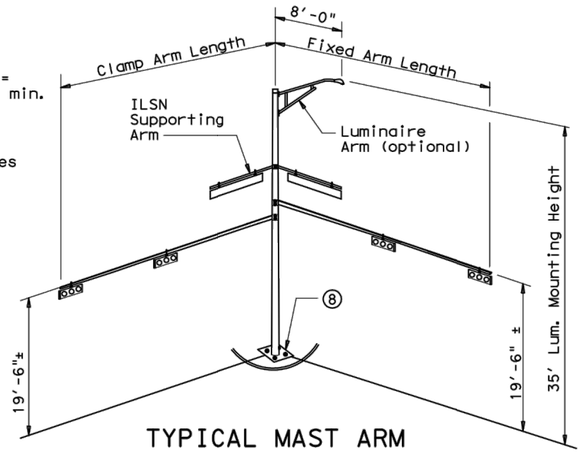


ANCHOR BOLT ASSEMBLY





TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

⑧Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

NOTES:

① Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

② Foundation Design Loads are the allowable moments and shears at the base of the structure.

③ Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

④ Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

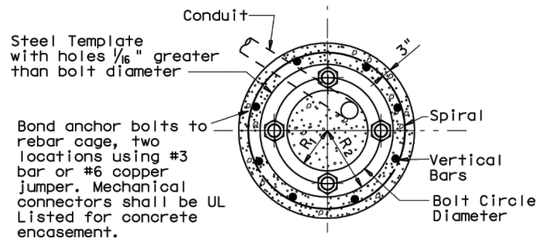
⑤ If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

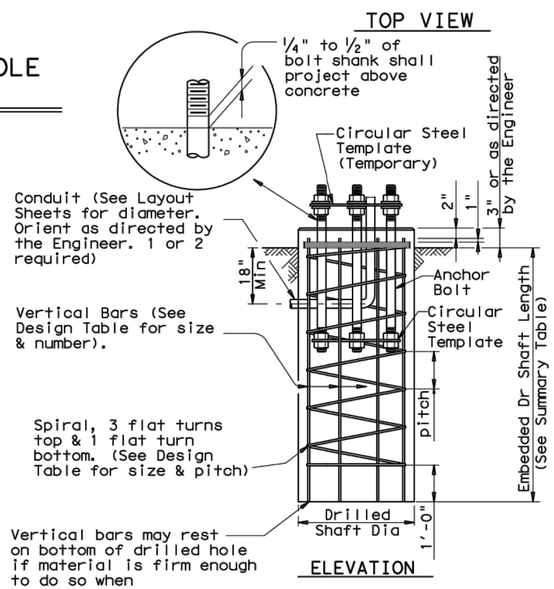
⑥ Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	⑦ BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

⑦ Min dimensions given, longer bolts are acceptable.





FOUNDATION DETAILS

FOUNDATION SUMMARY TABLE ③

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH ⑥ (FEET) 24-A	30-A	36-A	36-B	42-A
T100, T200	10	30-A	2		12			
P200, P201, P300	10	24-A	3	6				
T400	10	36-A	1			14		
TOTAL DRILLED SHAFT LENGTHS				18	24	14		

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02/17/2017

STATE OF TEXAS · CAMERON L. WILLIAMS · 110416 · LICENSED PROFESSIONAL ENGINEER

Cameron L. Williams

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

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REVISIONS	DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB
5-95 11-98 1-12	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO. 20

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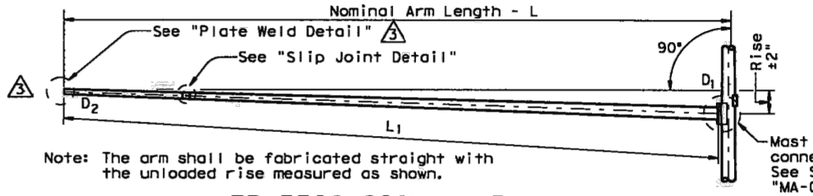
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	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	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"
48	47.0	10.5	4.1	.239	3'-4"	47.0	11.0	3.5	.239	2'-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

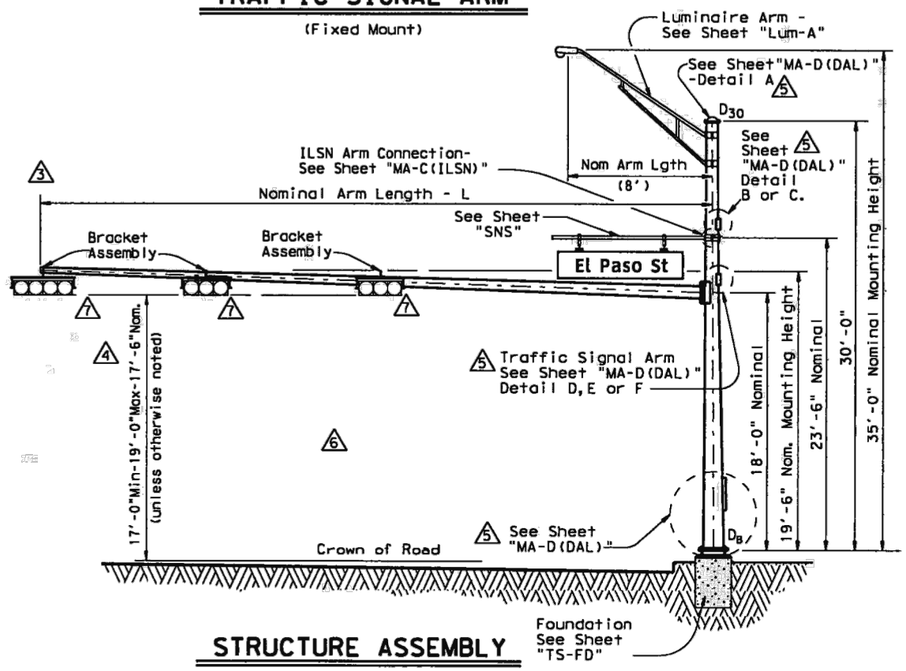
② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

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	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	1
28	28L-80	1	28S-80		28-80	
32	32L-80		32S-80		32-80	
36	36L-80		36S-80		36-80	
40	40L-80	1	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)	
	⚠1 1 Bracket Assembly		2 Bracket Assemblies		3 Bracket Assemblies	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80	1		
28	28I-80		28II-80	1		
32			32II-80		32III-80	
36			36II-80		36III-80	
40			⚠2 40II-80		40III-80	1
44			44II-80		44III-80	
48					48III-80	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	2

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
1 ½"	3'-4"	2
1 ¾"	3'-10"	1

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

Templates may be removed for shipment.

"RECORD DRAWINGS"

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02/17/2011

STATE OF TEXAS
CAMERON L. WILLIAMS
110416
LICENSED PROFESSIONAL ENGINEER

Cameron L. Williams

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)

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12(DAL)

© TxDOT August 1995

DN: MS	CK: JSY	DW: MWF	CK: JSY

REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96				
11-99				
1-12				

DIST	COUNTY	SHEET NO.
18		21

122A1

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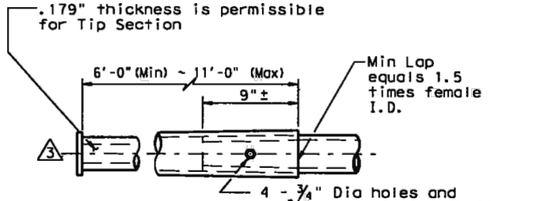


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL

NOTE:
Pole manufacturer shall drill ½" hole in bottom of mast arm at end plate. (for hot-dip galvanizing)

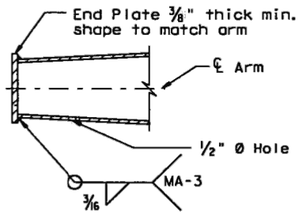
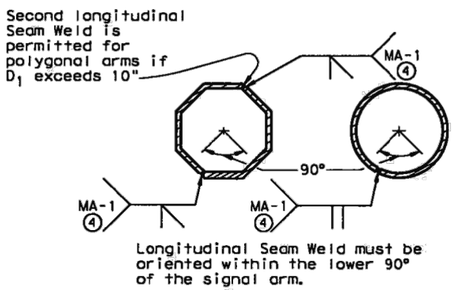


PLATE WELD DETAIL
3

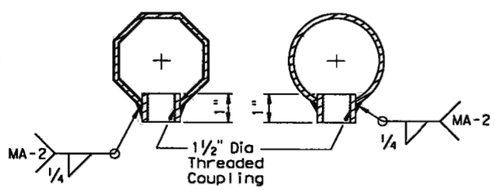
Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

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



ARM COUPLING DETAILS

VIBRATION WARNING

Mast 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 backpates. 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).

5 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.

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

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

Texas Department of Transportation

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

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DN: MS	CK: JSY	DW: MMF	CK: JSY

REVISIONS
5-96
1-12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
18		22

122BT

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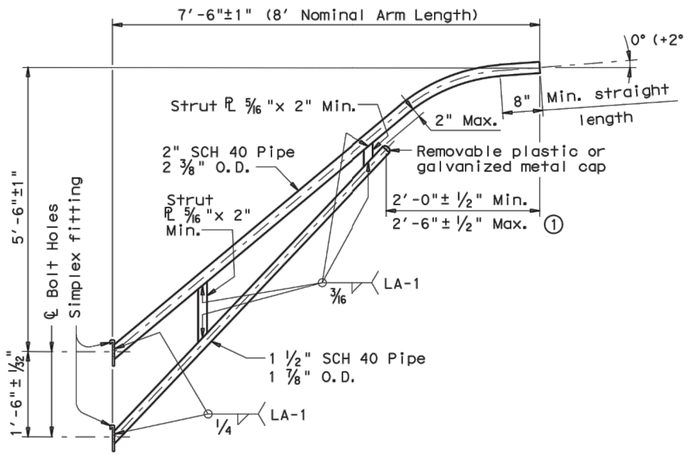
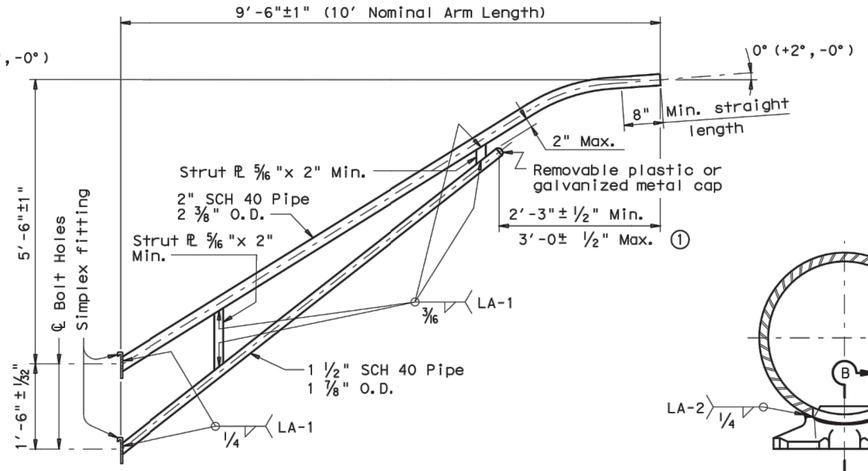
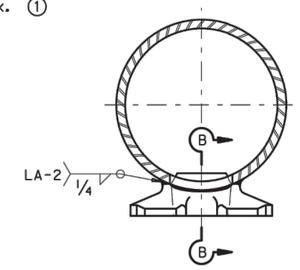


8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 ③, or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 ④, or A1011 HSLAS-F Gr.50 ④
Arm Strut Plates ②	ASTM A36, A572 Gr.50 ④, or A588
Misc.	ASTM designations as noted

① Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

② Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

③ A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

④ ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

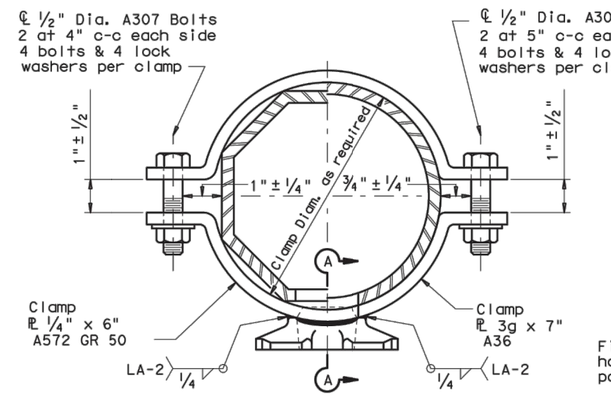
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabriciation. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

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

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.

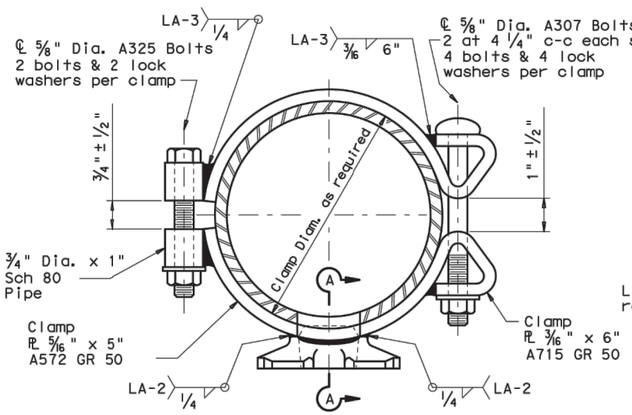
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



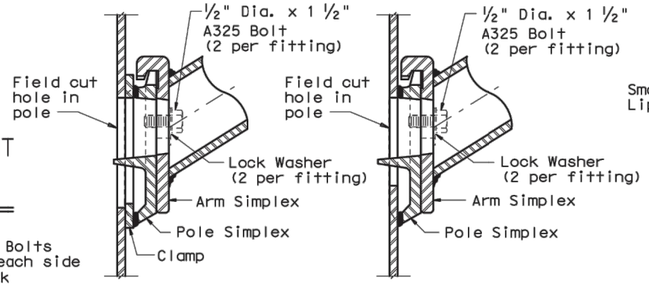
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



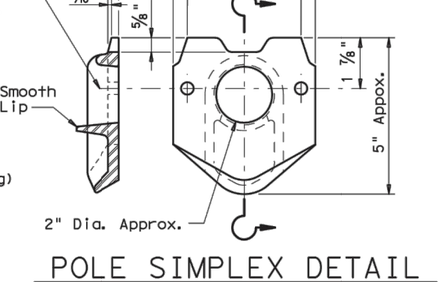
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

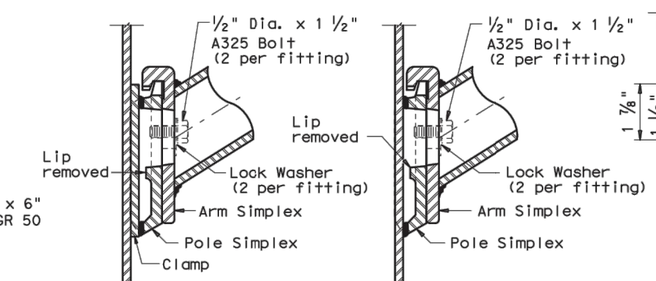


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

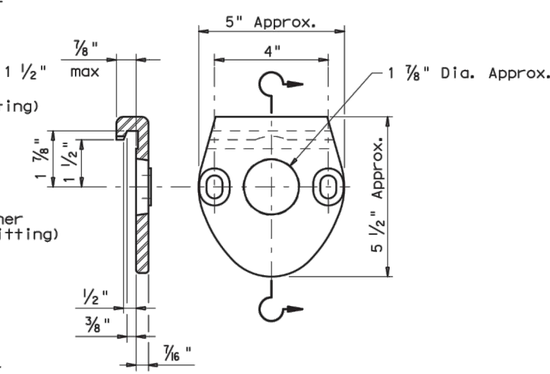


LOWER SIMPLEX FITTING

LOWER SIMPLEX FITTING

SECTON A-A

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

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DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96				
1-99				
1-12				
	DIST	COUNTY		SHEET NO.
				23

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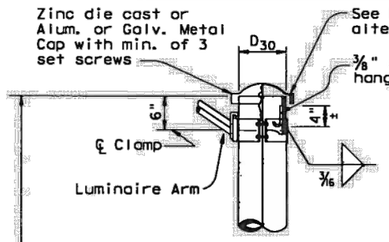
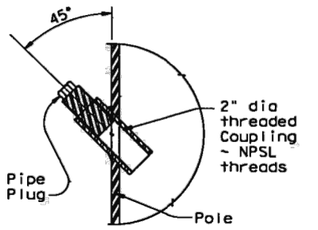
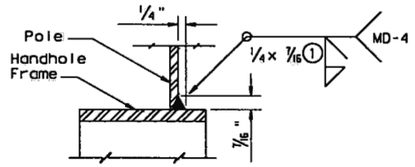


DETAIL A

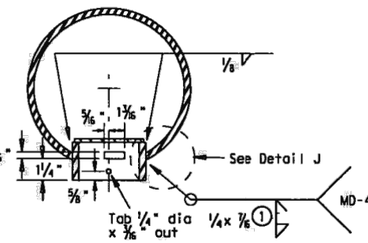
(for pole with luminaire)



POLE COUPLING DETAIL

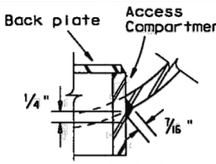


DETAIL G

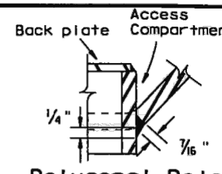


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

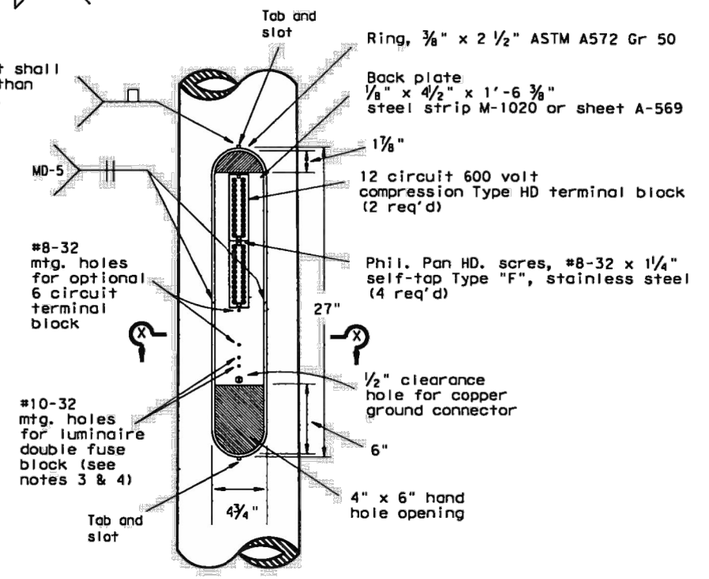


Round Pole

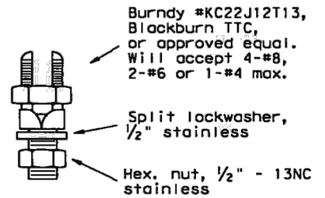


Polygonal Pole

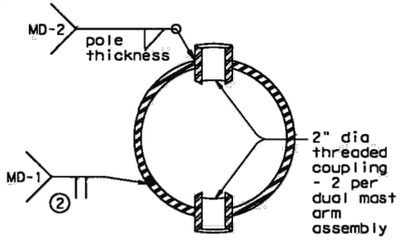
DETAIL J



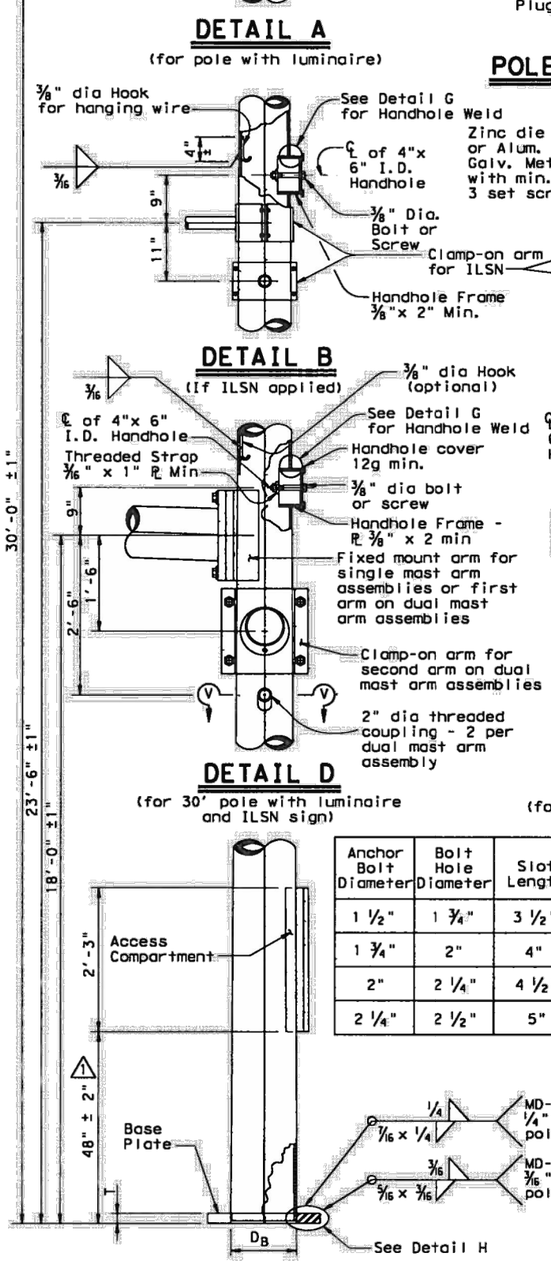
ACCESS COMPARTMENT



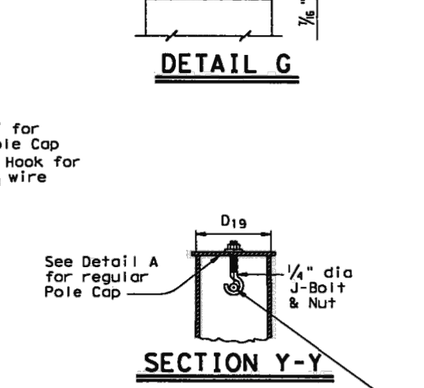
COPPER GROUND CONNECTOR



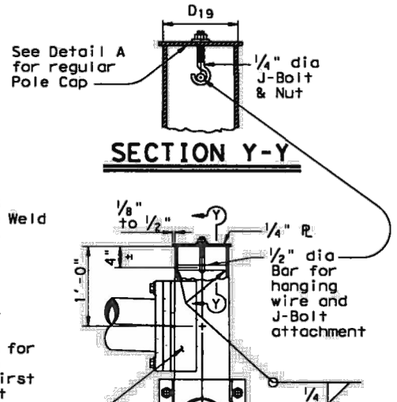
SECTION V-V



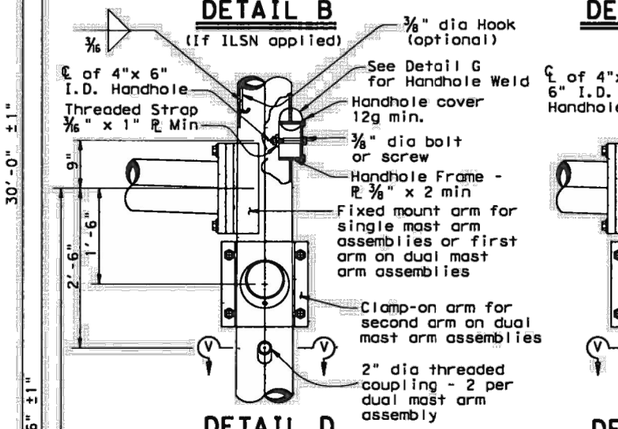
DETAIL B



DETAIL C

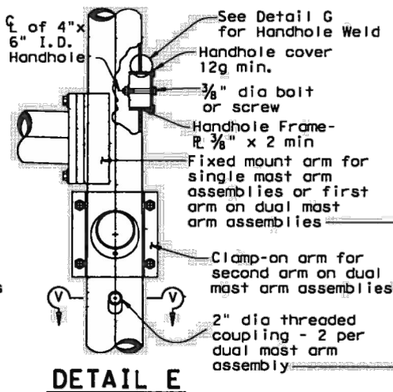


SECTION Y-Y



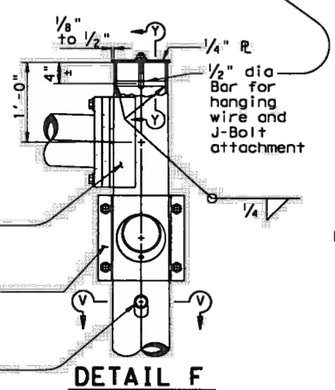
DETAIL D

(for 30' pole with luminaire and ILSN sign)



DETAIL E

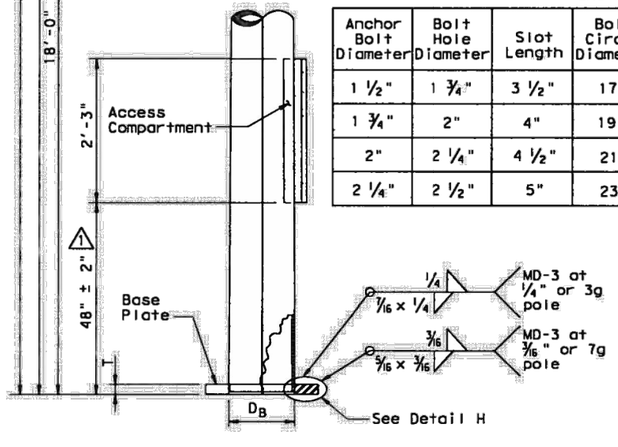
(for 24' pole with ILSN sign and no luminaire)



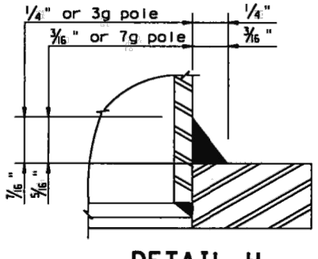
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

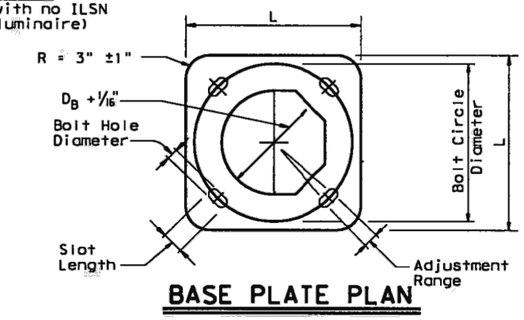
Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℄ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

① 85% Min. penetration

② 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

⚠1 REVISED THE ELEVATION OF ACCESS COMPARTMENT (2/12).

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12(DAL)

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DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS
8-99
1-12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
18			24

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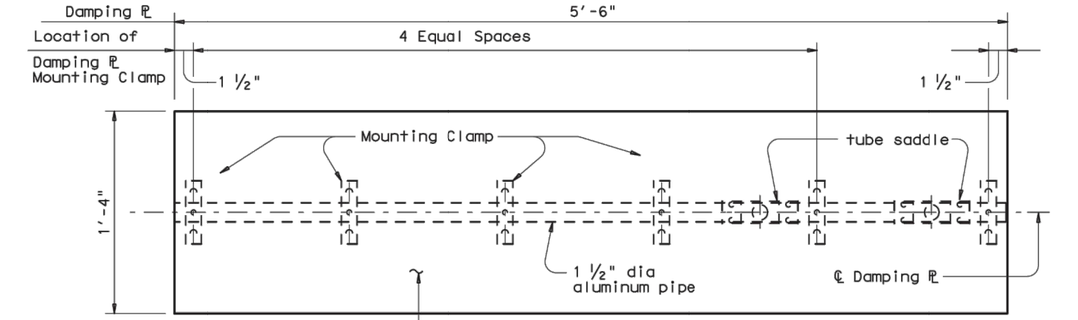
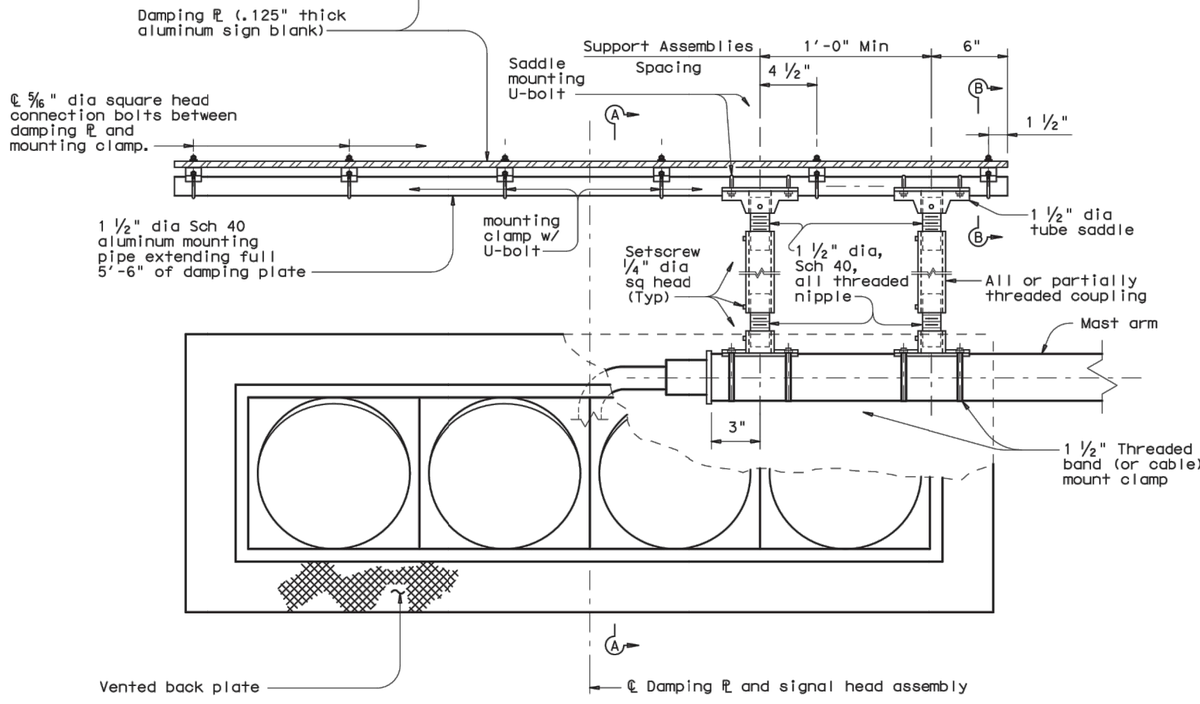


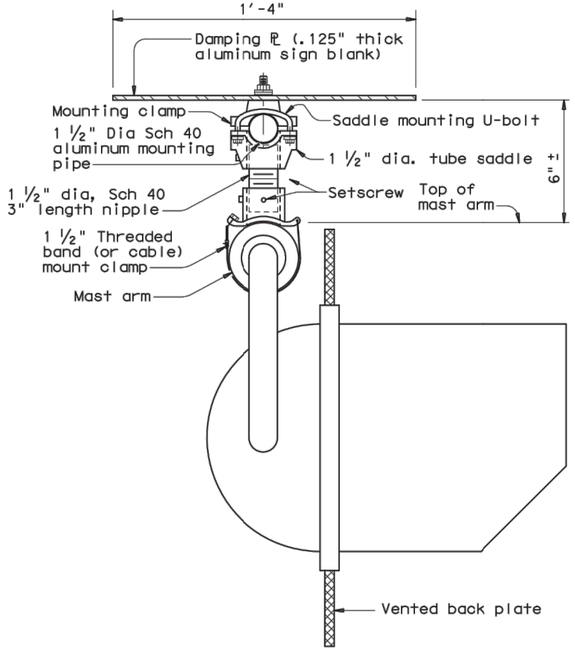
PLAN



ELEVATION

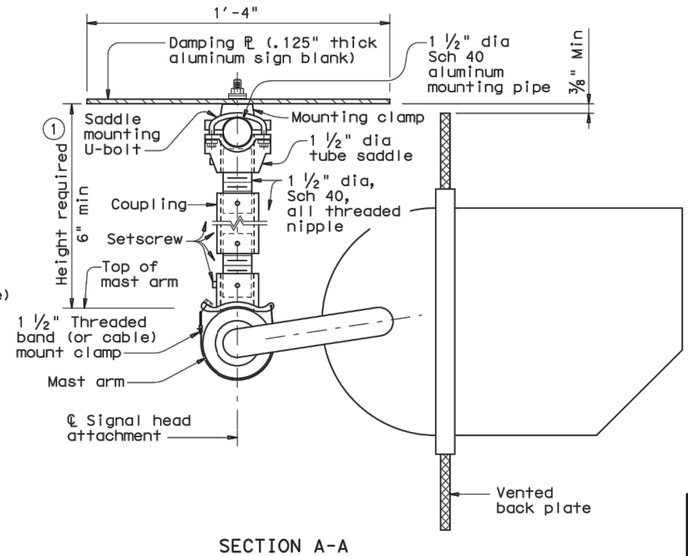
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

1 Recommended supporting assemblies to achieve required height			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

Aluminum sign blank for damping plate shall conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle shall be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling shall be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies shall conform to Standard sheet SMD(GEN)-08. U-bolts for saddle mounting shall have a minimum yield strength of 36 ksi.

Damping plate shall be mounted horizontally. Position centerline of damping plate to align with centerline of signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate shall be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

Unless stipulated by the manufacturers, all steel parts shall be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

Contractor shall verify applicable field dimensions before the installation.

SECTION B-B

(Showing damping plate attachment)

Texas Department of Transportation
Traffic Operations Division

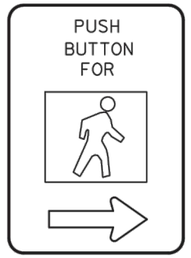
MAST ARM DAMPING PLATE DETAILS

MA-DPD-12

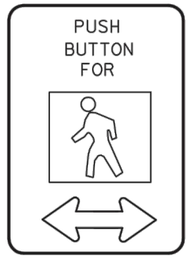
©TxDOT January 2012	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				25

SIGN R10-4bL
9" x 12"

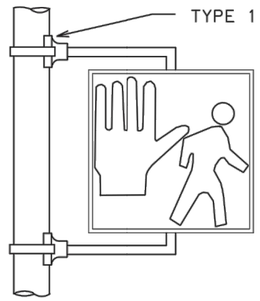
SIGN R10-4bR
9" x 12"



SIGN R10-4bRL
9" x 12"

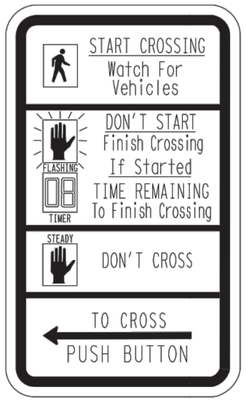


PEDESTRIAN PUSHBUTTON
SIGN DETAILS

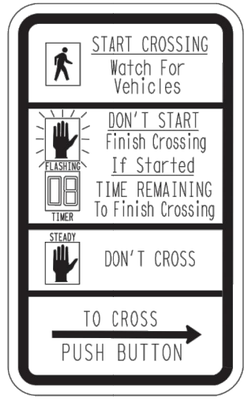


PEDESTRIAN SIGNAL HEAD MOUNTING
FOR ONE PEDESTRIAN SIGNAL HEAD
152A

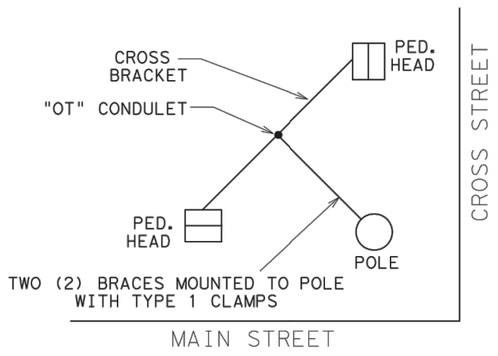
SIGN R10-3eL
9" X 15"



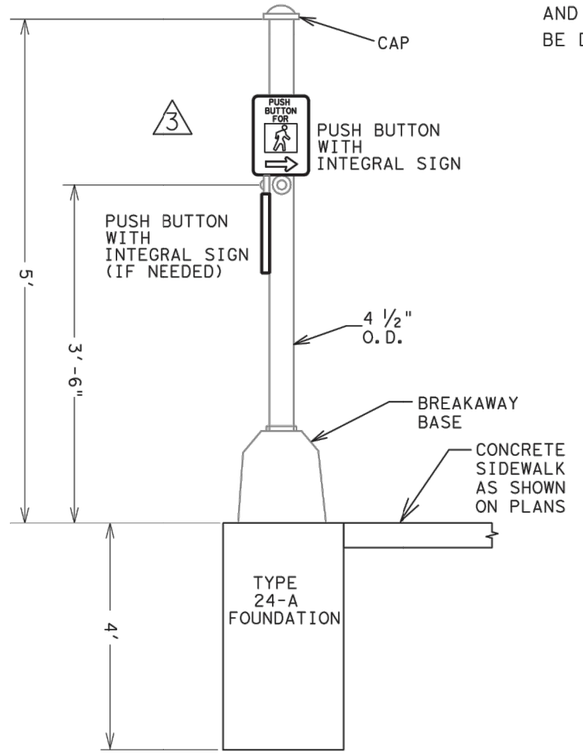
SIGN R10-3eR
9" X 15"



COUNTDOWN PEDESTRIAN PUSHBUTTON
SIGN DETAILS



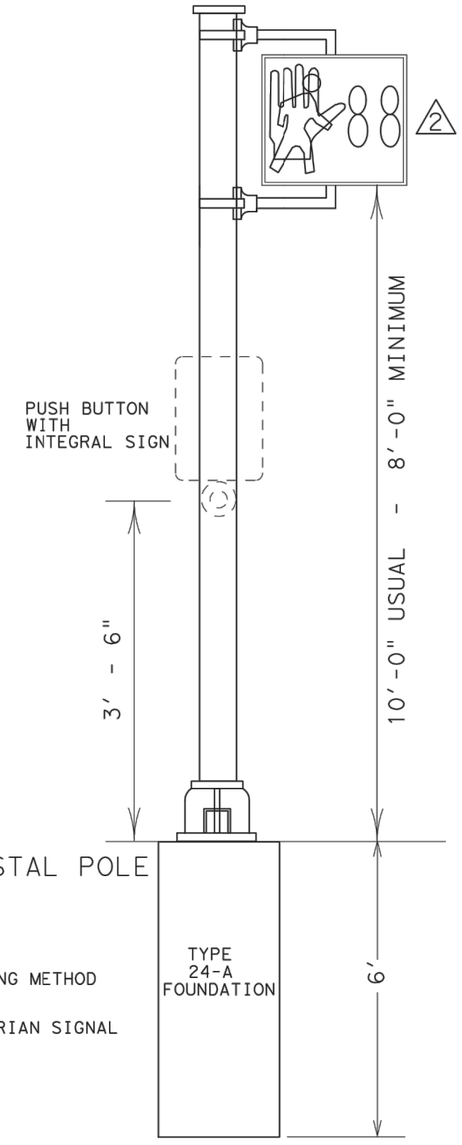
PEDESTRIAN SIGNAL HEAD MOUNTING
FOR TWO PEDESTRIAN SIGNAL HEADS
143C



PEDESTRIAN PUSH BUTTON POLE

NOTE: 3

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.

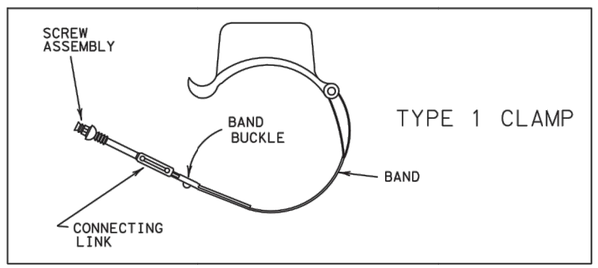


PEDESTAL POLE

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



TYPE 1 CLAMP

1 ALTERNATIVE MOUNTING METHOD
revised 12-92

2 ALTERNATIVE PEDESTRIAN SIGNAL HEAD AND SIGNING
revised 10-08

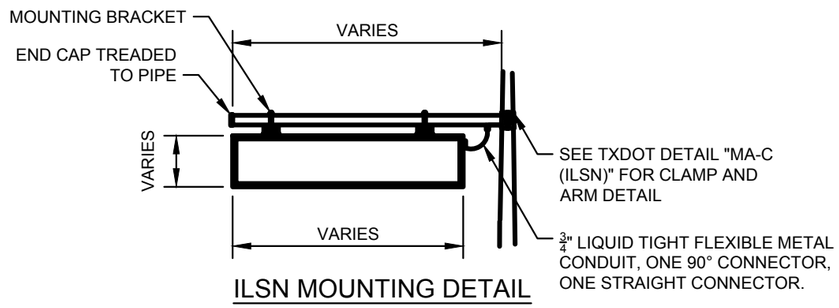
3 PEDESTRIAN PUSH BUTTON POLE
revised 01-11

DALLAS DISTRICT STANDARD

PEDESTRIAN SIGNAL HEAD IDENTIFICATION

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

EXAMPLE SINGLE STREET NAME DETAIL



ILSN MOUNTING DETAIL

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL LETTER SPACING AND WIDTH SHALL BE 100% OF THE US DOT MINIMUM RECOMMENDATION.
   A. LEGENDS REQUIRING LENGTHS GREATER THAN THE 96" WIDTH OF THE SIGN USING STANDARD SPACING, MAY BE ADJUSTED TO FIT.
2. ILSNS UP TO 6' IN LENGTH MAY BE PLACED ON A 7' ILSN CLAMP-ON ARM. ILSNS UP TO 8' IN LENGTH MAY BE PLACED ON A 9' ILSN CAMP-ON ARM.
3. LETTERING SIZE AND SPACING BETWEEN THE VARIOUS SIGN ELEMENTS SHALL FOLLOW THE CURRENT VERSION OF THE *STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS* MANUAL FOR D3-1.
   A. DESIRED LETTER HEIGHT FOR STREET NAME SIGNS SHALL BE 12" FOR UPPER CASE LETTERS. STREET NAME LETTER HEIGHT MAY BE REDUCED TO 10" TO REDUCE THE SIZE OF THE SIGN AS NEEDED.
4. THE CITY LOGO HEIGHT SHALL MATCH MAXIMUM TEXT SIZE HEIGHT ON SIGN LEGEND. THE LOGO SHALL BE PLACED ON THE LEFT SIDE OF EACH SIDE OF THE SIGN ON A WHITE BACKGROUND.
5. THE ILSN LEGEND MAY BE COMPOSED OF ONE LINE OR TWO LINES OF TEXT. CONTRACTOR TO VERIFY WITH CITY BEFORE SUBMITTING SHOP DRAWINGS FOR SIGNS WITH TWO LINES OF TEXT.
6. SIGNS SHALL BE EDGELIT LED ILLUMINATED
7. FACE COLOR/MATERIAL: GREEN EC FILM OVER HIGH-INTENSITY TRANSLUCENT REFLECTIVE WHITE SHEETING ON UV LEXAN.
8. FRAME WIDTH TO BE PROVIDED BY MANUFACTURER.
9. SIGN BODIES AND DOORS ARE TO BE POWDER COATED GLOSSY BLACK.
10. SIGNS SHALL BE SINGLE SIDED EXCEPT UNDER THE FOLLOWING CONDITION:
    SIGN SHALL BE DOUBLE SIDED IF BOTH APPROACHES FACING THE SIGN ARE UNDIVIDED(NO MEDIAN).
11. SIGNS SHALL BE TOP MOUNTED USING STANDARD TXDOT DETAILS.
12. ILSN SHALL BE MOUNTED ON A STANDARD TXDOT ILSN CLAMP-ON ARM UNLESS OTHERWISE DIRECTED IN THE PLANS
13. ILSN SHALL BE FULLY GASKETED AND WATERTIGHT.
14. TRAFFIC SIGNAL POLE SHALL BE AT LEAST 24' HEIGHT. (SEE TXDOT TRAFFIC SIGNAL POLE STANDARDS)
15. A SEPARATE PHOTOCELL FOR ILSN/120 VOLT CIRCUIT WILL BE REQUIRED.
16. TWO #8 XHHW CONDUCTORS SHALL BE INSTALLED FROM SERVICE TO TERMINAL BLOCK OF EACH POLE WITH ILSN UNLESS OTHERWISE SHOWN IN THE PLANS. (CONDUCTORS FROM SERVICE TO TERMINAL BLOCK OF EACH POLE SHALL BE PAID FOR SEPARATELY FROM THE ILSN PAY ITEM.)
    A. DAISY CHAIN ALL ILSNS UNLESS OTHERWISE DIRECTED IN THE PLANS.
17. TWO # 12 XHHW CONDUCTORS SHALL BE INSTALLED FROM TERMINAL BLOCK OF POLE TO ILSN UNLESS OTHERWISE SHOWN IN THE PLANS. (CONDUCTORS FROM THE TERMINAL BLOCK OF EACH POLE TO ILSN SHALL BE PAID FOR SEPARATELY FROM THE ILSN PAY ITEM.)
18. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF THE LED ILSNS TO CITY OF ROCKWALL FOR APPROVAL PRIOR TO FABRICATION.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EQUIPMENT NECESSARY TO INSTALL THE ILSN SIGN.
20. ALL ISLNS SHALL FOLLOW ALL RULES AND GUIDELINES AS SPECIFIED IN THE MOST RECENT EDITIONS OF THE *STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS* AND THE *TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.* SHOULD ANY CONFLICTS BETWEEN THE ABOVE NOTES AND THESE DOCUMENTS, THESE DOCUMENTS SHALL GOVERN.

ILLUMINATED STREET NAME SIGN	CITY OF ROCKWALL		
ILSN SIGN DETAIL		DATE DEC '16	DRAWING NO. 27