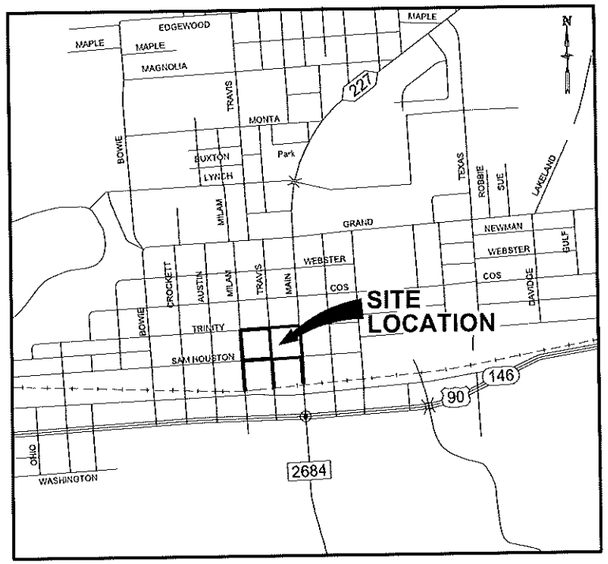
CONSTRUCTION PLANS FOR DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT LIBERTY, TEXAS



VICINITY MAP
SCALE: 1"=1,000'

CITY COUNCIL

MAYOR PROTEM:	DIANE DRIGGERS
COUNCIL MEMBER:	LIBBY SIMONSON
COUNCIL MEMBER:	DAVID ARNOLD, DDS
COUNCIL MEMBER:	DENNIS BEASLEY
COUNCIL MEMBER:	CHIPPER SMITH
COUNCIL MEMBER:	NEAL THORNTON

MAYOR
CARL PICKETT

DATE

CITY MANAGER
TOM WARNER, P.E.

DATE

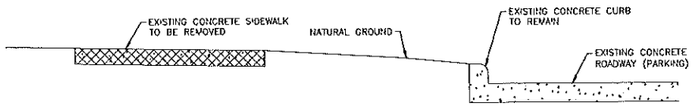
INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

JEFFERY D. LEAVINS, P.E.
P.E. #111537

DATE

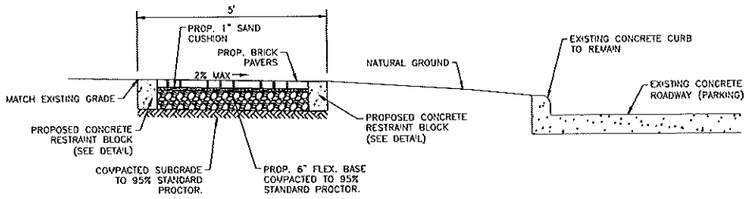
WHITELEY OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

APRIL 2021



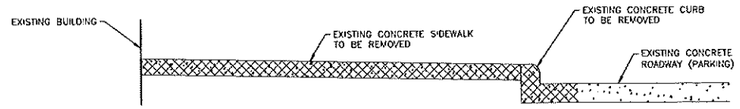
WEST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

EXISTING



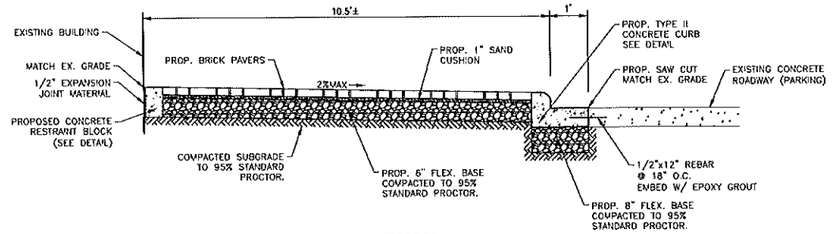
WEST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

PROPOSED



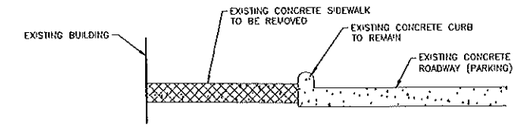
WEST SIDE
FROM STA. 1+51 TO STA. 2+60

EXISTING



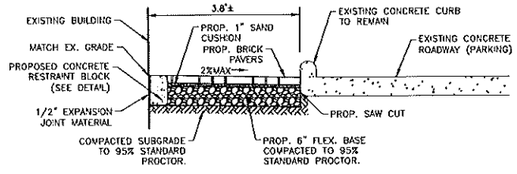
WEST SIDE
FROM STA. 1+51 TO STA. 2+60

PROPOSED



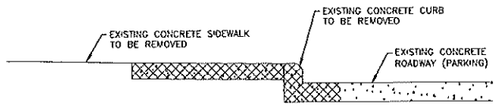
WEST SIDE
FROM STA. 2+96 TO STA. 3+64

EXISTING



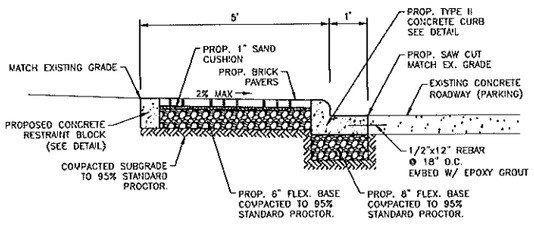
WEST SIDE
FROM STA. 2+96 TO STA. 3+64

PROPOSED



WEST SIDE
FROM STA. 0+52 TO STA. 1+39

EXISTING

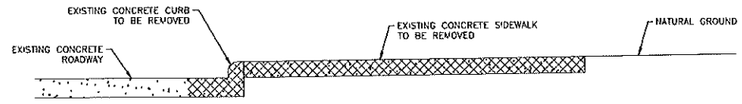


WEST SIDE
FROM STA. 0+52 TO STA. 1+39

PROPOSED

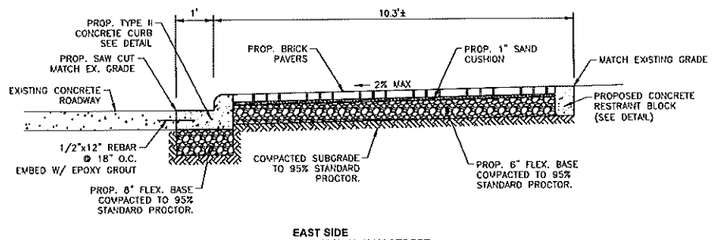
NOTE:

1. TYPICAL SECTIONS FOR SIDEWALK TO MEET ADA CROSS SLOPE OF 2% MAX.
2. SHOULD ONSITE CONDITIONS NOT WARRANT TYPICAL SECTIONS, THE ENGINEER WILL DETERMINE THE METHOD OF CONSTRUCTION TO MEET ALL AGENCY STANDARDS.
3. SEE SHEETS 48 & 49 FOR DETAILS NOT SHOWN HERE.



EAST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

EXISTING



EAST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

PROPOSED

INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

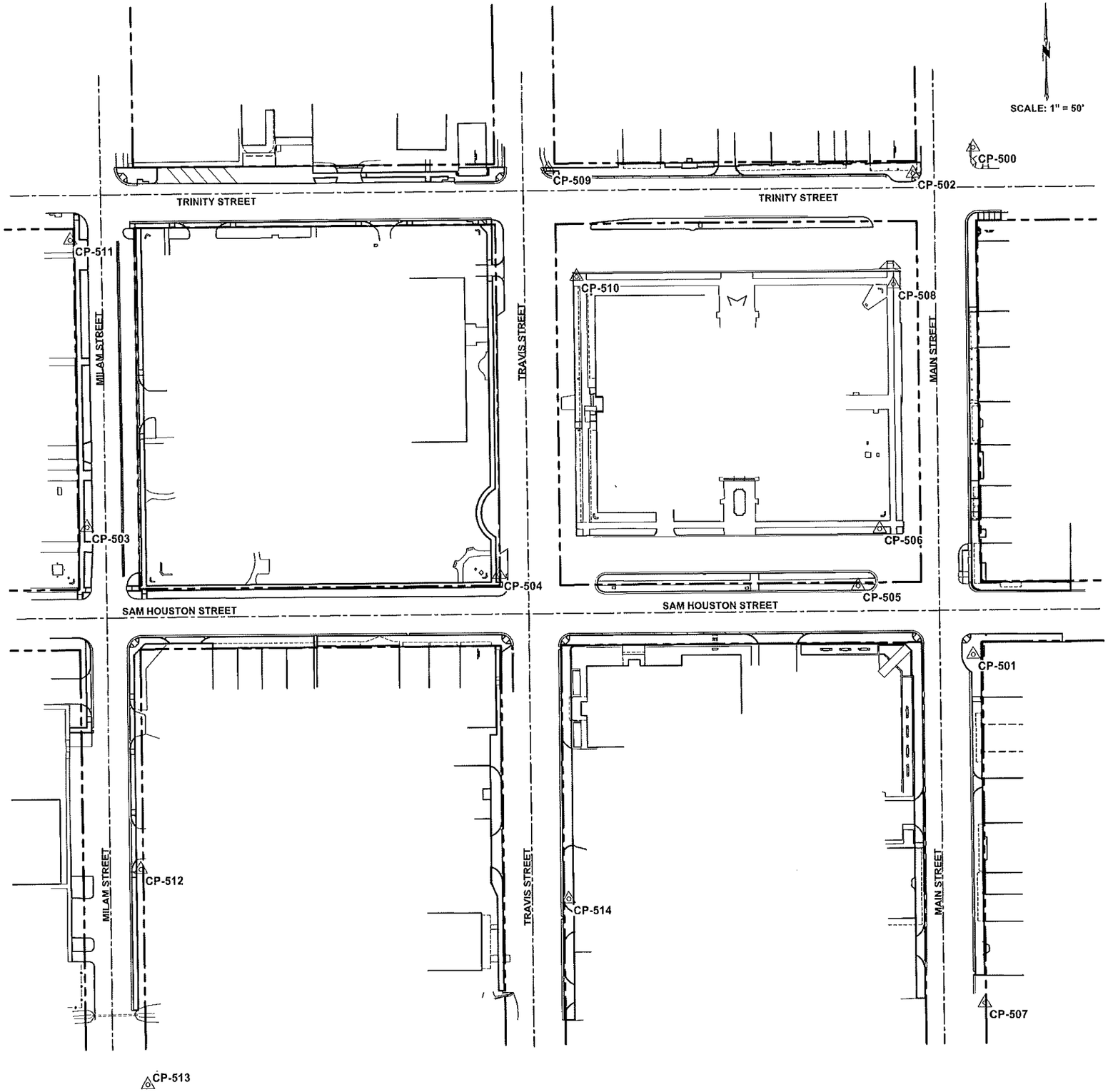
WHITELEY + OLIVER ENGINEERING, LLC

TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421|MWWASSOC.COM

CLIENT:
CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
TRAVIS STREET
TYPICAL SECTIONS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 4
DATE: APR 2021		
JOB NO. 20-1277	#/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0



GENERAL

(1)A FLAGGER SHALL BE STATIONED WHERE ANY EQUIPMENT IS IN OPERATION ON THE ROAD, WHERE ANY OTHER HAZARDS DUE TO CONSTRUCTION OPERATIONS EXIST AND/OR AS DIRECTED BY THE ENGINEER. THIS WORK IS SUBSIDIARY TO THE BID ITEMS.
(2) DO NOT STORE ANY CONSTRUCTION MATERIAL OR EQUIPMENT AT ANY LOCATION THAT WILL CONSTITUTE A HAZARD OR WILL ENDANGER TRAFFIC.
(3) THE CONTRACTOR MAY PROPOSE/RECOMMEND MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE ENGINEER. MAJOR MODIFICATIONS RECOMMENDED BY THE CONTRACTOR SHALL INCLUDE ALL CHANGES TO THE RESPECTIVE PAY ITEMS, IMPACT TO TRAFFIC, EFFECT OF OVERALL PROJECT IN TIME AND COST, ETC. DO NOT PROCEED WITH CONSTRUCTION OPERATIONS BASED ON A RECOMMENDED PHASE/SEQUENCE UNTIL WRITTEN APPROVAL IS OBTAINED FROM THE ENGINEER. IF AT ANY TIME DURING CONSTRUCTION THE CONTRACTORS PROPOSED PLAN OF OPERATION FOR HANDLING TRAFFIC DOES NOT PROVIDE FOR SAFE AND COMFORTABLE MOVEMENT, IMMEDIATELY ADJUST THE OPERATION TO CORRECT FOR THIS UNSATISFACTORY CONDITION.
(4) MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES THROUGHOUT ALL PHASES OF CONSTRUCTION. ADEQUACY OF ACCESS WILL BE AT THE DISCRETION OF THE ENGINEER. SAFE ENTRANCE AND EXIT TO ALL DRIVEWAYS SHALL BE PROVIDED WITH A MINIMUM OF INCONVENIENCE.
(5) BY THE END OF EACH WORK DAY, DURING ALL PHASES OF CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN ALL CHANNELIZING DEVICES AS SHOWN ON THE PLANS OR ACCORDING TO MUTCD.

SEQUENCE OF WORK

(1) INSTALL ADVANCED WARNING SIGNS AND BARRICADES IN ACCORDANCE WITH STANDARDS FOR THE LIMITS OF THE PROPOSED SIDEWALK CONSTRUCTION.
(2) SET UP TRAFFIC CONTROL IN ACCORDANCE WITH APPLICABLE TCP STANDARDS. CLOSE PARKING SPACES WITHIN THE LIMITS OF THE WORK AND ESTABLISH WORK ZONE ROAD CLOSURE TRAFFIC CONTROL FROM THE LIMITS OF THE PROPOSED SIDEWALK CONSTRUCTION. SEE APPLICABLE STANDARDS FOR SIGNS, BARRICADES AND ALL OTHER TRAFFIC CONTROL DEVICES.
(3) INSTALL SW3P MEASURES AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
(4) REMOVE EXISTING SIDEWALKS, CURB AND GUTTER AND STREET SIGNS. PROTECT EXISTING WATER METERS, WATER VALVES, FIRE HYDRANT AND ALL BUILDING FACES AND APPURTENANCES. CONTRACTOR TO MAINTAIN ACCESS TO BUILDING ENTRANCES ON A DAILY BASIS.
(5) ADJUST WATER METERS AND WATER VALVES AS APPROVED BY THE CITY OF LIBERTY.
(6) CONSTRUCT PROPOSED SIDEWALKS AND RELATED APPURTENANCES. CONTRACTOR TO MAINTAIN ACCESS TO THE BUILDING ENTRANCES ON A DAILY BASIS.
(7) CLEAN PROJECT TO OPEN TO TRAFFIC.
(8) CONTRACTOR TO PROVIDE THE CITY OF LIBERTY 48 HOURS NOTICE PRIOR TO COMMENCEMENT OF WORK ON NEW LOCATIONS.

SAFETY

(1) THE CONTRACTOR WILL PROVIDE, CONSTRUCT AND MAINTAIN BARRICADES AND SIGNS IN ACCORDANCE WITH STATE STANDARDS BC(1-12)-13. ANY SIGNS REQUIRED THAT ARE NOT DETAILED IN THE STANDARD SHEETS SHALL BE IN CONFORMANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS" AND THE "STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS".
(2) BARRICADES AND WARNING SIGNS SHALL BE PLACED AS INDICATED ON THE PLANS. THIS SHALL BE CONSIDERED THE MINIMUM REQUIRED TO PROVIDE FOR THE SAFETY OF TRAFFIC DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN OTHER SUCH BARRICADES AND SIGNS DEEMED NECESSARY BY THE ENGINEER OR AS DIRECTED BY FIELD CONDITIONS TO PROVIDE FOR THE PASSAGE OF TRAFFIC IN SAFETY AT ALL TIMES.
(3) THE CONTRACTOR SHALL PROVIDE AND MAINTAIN FLAGGERS AS DIRECTED/APPROVED BY THE ENGINEER, AT SUCH POINTS, AND FOR SUCH PERIODS OF TIME AS MAY BE REQUIRED, TO PROVIDE FOR THE SAFETY OF THE TRAVELING PUBLIC AND THE CONTRACTORS PERSONNEL.
(4) THE CONTRACTOR SHALL KEEP THE ROADWAY CLEAN AND FREE OF DIRT OR OTHER MATERIALS DURING CONSTRUCTION OPERATIONS. IF THE CONTRACTOR DOES NOT MAINTAIN A CLEAN ROADWAY, THEY SHALL CEASE ALL CONSTRUCTION OPERATIONS, WHEN DIRECTED BY THE ENGINEER TO CLEAN THE ROADWAY TO THE SATISFACTION OF THE ENGINEER.

HAULING EQUIPMENT

(1) THE USE OF RUBBER-TIRED EQUIPMENT WILL BE REQUIRED FOR MOVING DIRT OR OTHER MATERIALS ALONG OR ACROSS PAVED SURFACES. WHERE THE CONTRACTOR DESIRES TO MOVE ANY EQUIPMENT NOT LICENSED FOR OPERATION ON PUBLIC HIGHWAYS, ON OR ACROSS PAVEMENT, THEY SHALL PROTECT THE PAVEMENT FROM DAMAGE AS DIRECTED/APPROVED BY THE ENGINEER.

FINAL CLEAN UP

(1) UPON COMPLETION OF THE WORK AND BEFORE FINAL ACCEPTANCE AND FINAL PAYMENT IS MADE, THE CONTRACTOR SHALL CLEAR AND REMOVE FROM THE SITE ALL SURPLUS AND DISCARDED MATERIALS AND DEBRIS OF EVERY KIND AND LEAVE THE ENTIRE PROJECT IN A SMOOTH, NEAT AND SIGHTLY CONDITION.

CONTROL POINT COORDINATES

CONTROL POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP-500	5,369.18	5,361.85	100.00	SCRIBED "X" IN CONCRETE
CP-501	4,900.95	5,357.25	101.18	SCRIBED "X" IN CONCRETE
CP-502	5,345.51	5,305.99	100.60	"MAG" NAIL
CP-503	5,023.95	4,539.48	99.97	"MAG" NAIL
CP-504	4,977.47	4,919.89	99.84	"MAG" NAIL
CP-505	4,964.98	5,251.50	100.26	"MAG" NAIL
CP-506	5,017.50	5,271.90	100.65	"MAG" NAIL
CP-507	4,578.84	5,364.92	99.84	"MAG" NAIL
CP-508	5,243.43	5,286.81	100.47	"MAG" NAIL
CP-509	5,351.50	4,969.52	100.01	"MAG" NAIL
CP-510	5,252.01	4,994.43	100.23	"MAG" NAIL
CP-511	5,289.15	4,527.78	99.42	"MAG" NAIL
CP-512	4,707.79	4,585.64	100.25	"MAG" NAIL
CP-513	4,508.57	4,589.83	100.63	"MAG" NAIL
CP-514	4,677.58	4,981.25	100.03	"MAG" NAIL

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DATE: 4/8/2021

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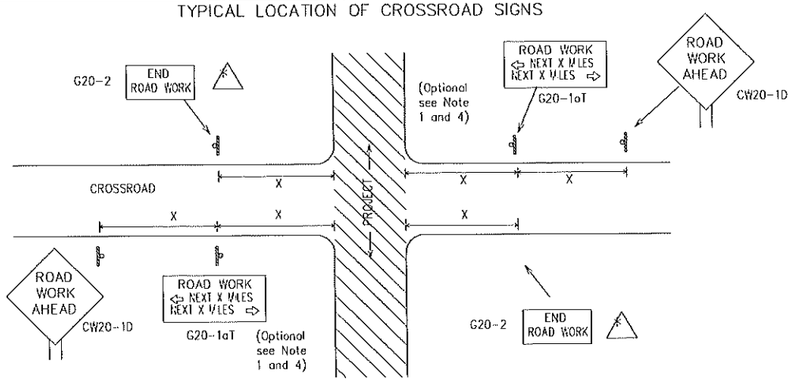
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT SEQUENCE OF WORK & SURVEY CONTROL LAYOUT

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: 1"=50'	SHEET NO: 9
DATE: APR 2021		
JOB NO. 20-1277	P:/2020/20-1277 Liberty Sidewalk/Construction Plans/20-1277 Construction Plan.dwg	REV. 0

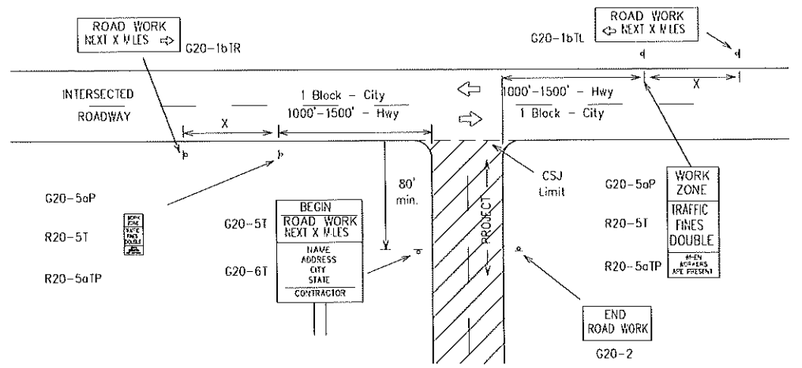
TYPICAL LOCATION OF CROSSROAD SIGNS



⚠* May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING [1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign Spacing "X" Δ
MPH	Feet (Approx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

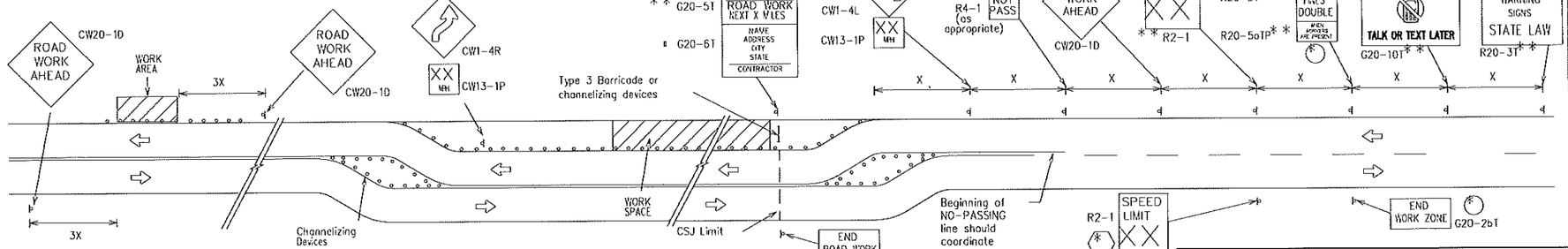
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

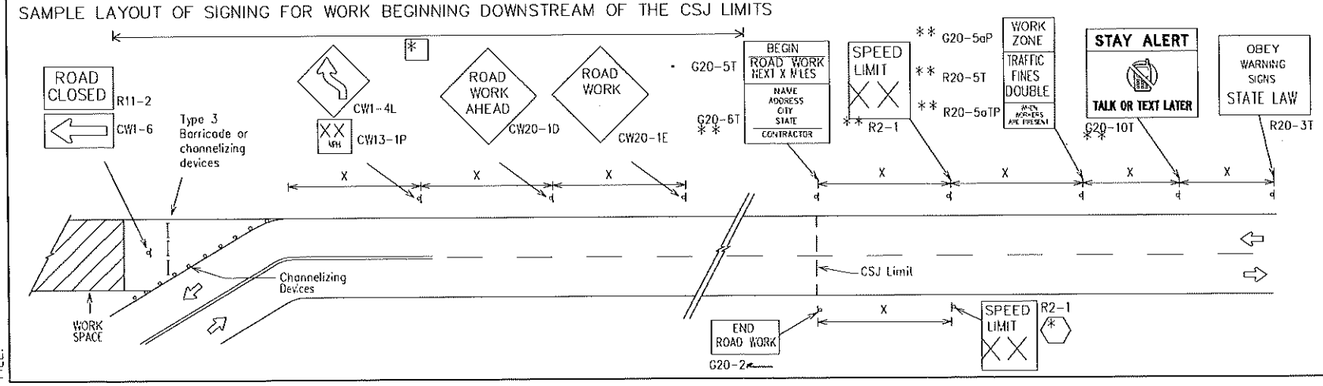
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

(*) The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

[*] Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

⬡* Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

⊢	Type 3 Barricade
○ ○ ○	Channelizing Devices
	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

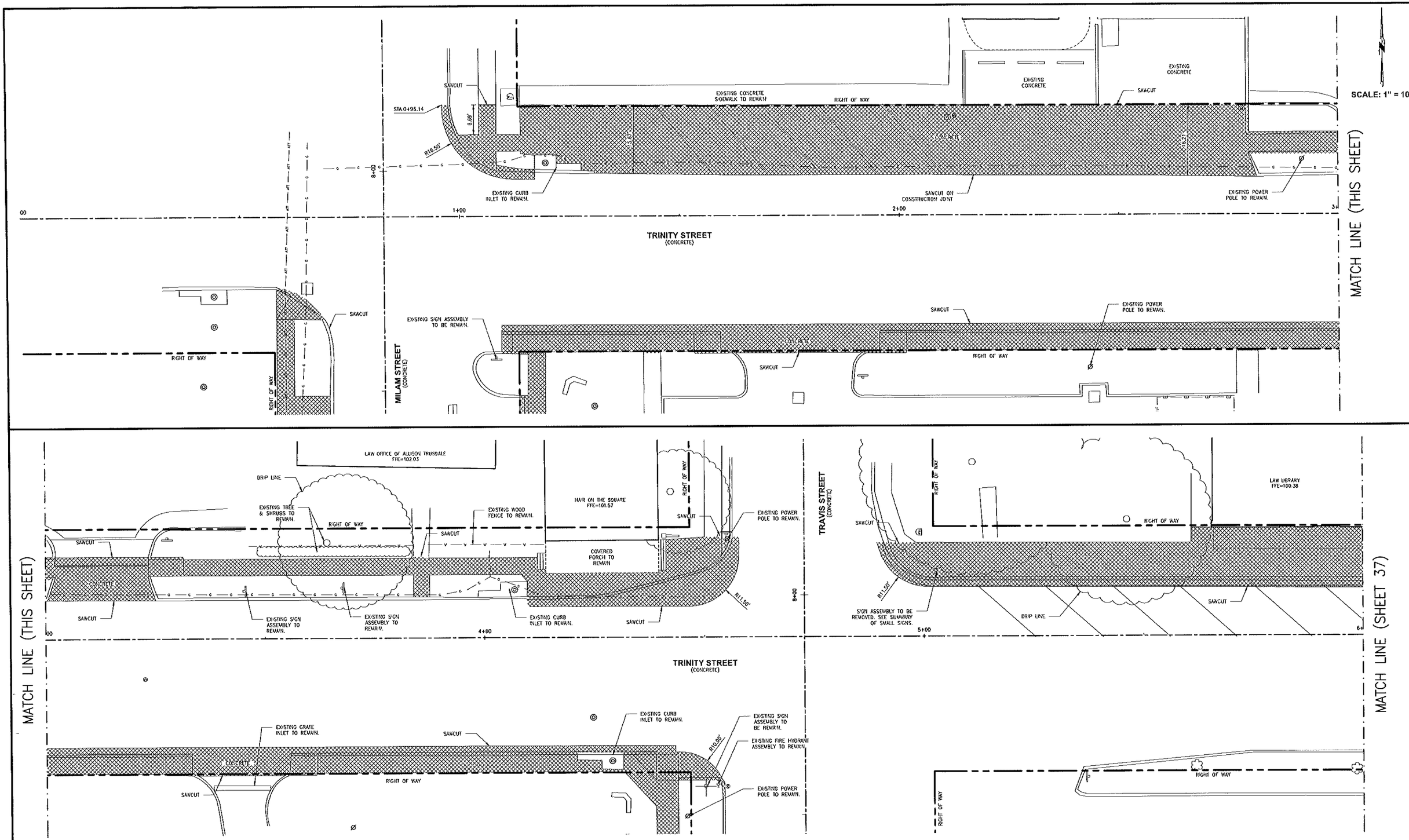
Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	H.CHAAY
REVISIONS					
9-07 8-14		DIST	COUNTY		SHEET NO.
7-13					11
96					

DATE:
FILE:



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- P-PEDUNE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- COVERED

NOTES:

1. UTILITY LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT EXACT. ADDITIONAL UTILITIES MAY BE PRESENT. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO BE RESPONSIBLE FOR DAMAGE CAUSED TO AREAS DESIGNATED TO REMAIN.

NO	REVISION	DRAWN	CHECK	APP'VD	DATE

INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

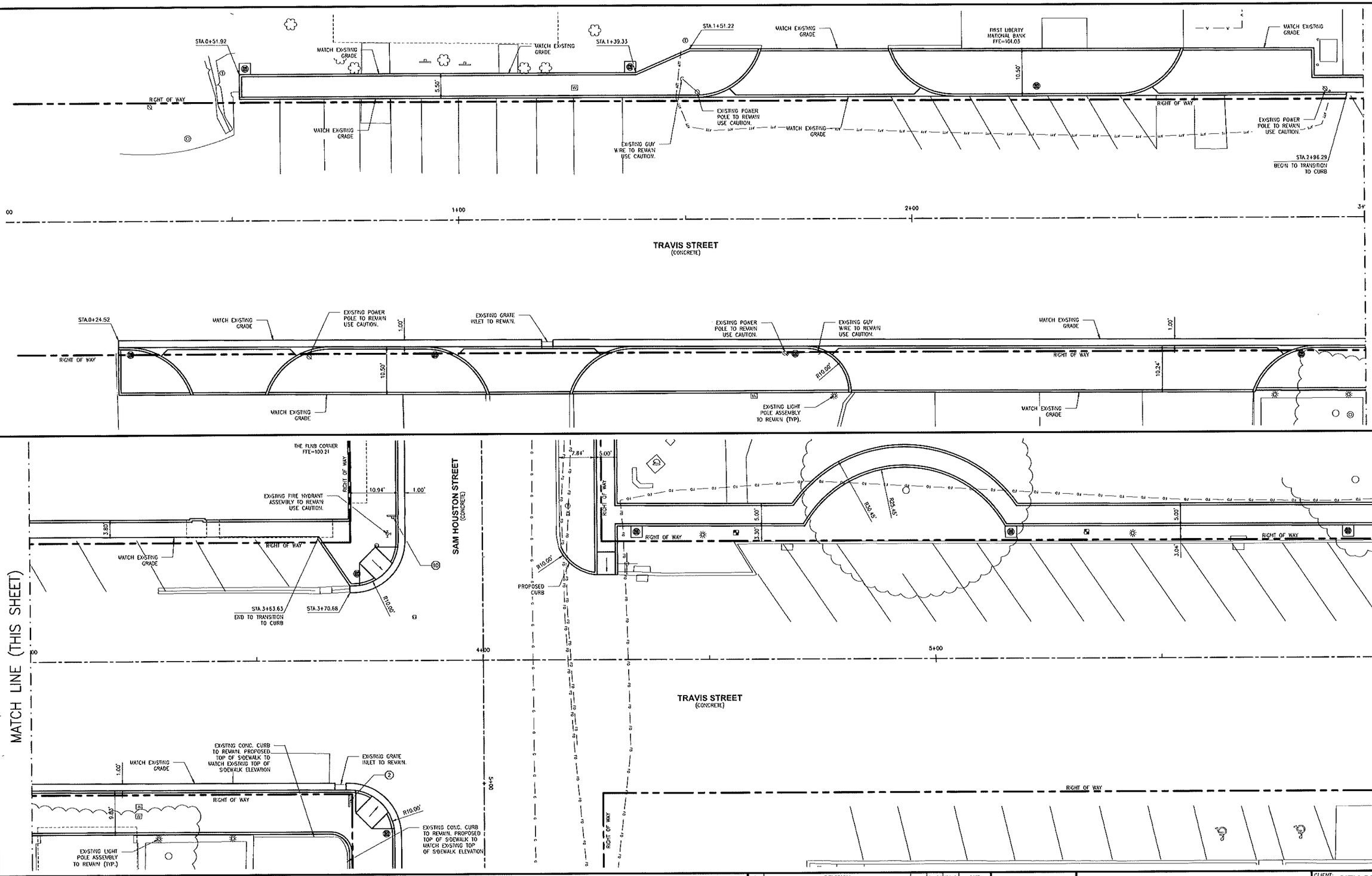
WHITELEY OLIVER ENGINEERING, LLC

TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | WWW.ASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
TRINITY STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	36



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
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- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- SIGN ASSEMBLY REFER TO SUMMARY OF SMALL SIGNS
- PROPOSED RAMP
- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON

NOTES:

1. UTILITY LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT EXACT. ADDITIONAL UTILITIES MAY BE PRESENT. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO BE RESPONSIBLE FOR DAMAGE CAUSED TO AREAS DESIGNATED TO REMAIN.
3. HATCH SHOWN FOR PICTORIAL PURPOSE ONLY. FINAL PATTERN MAY VARY REFER TO DETAILS.

NO	REVISION	DRAWN	CHECK	APPVD	DATE

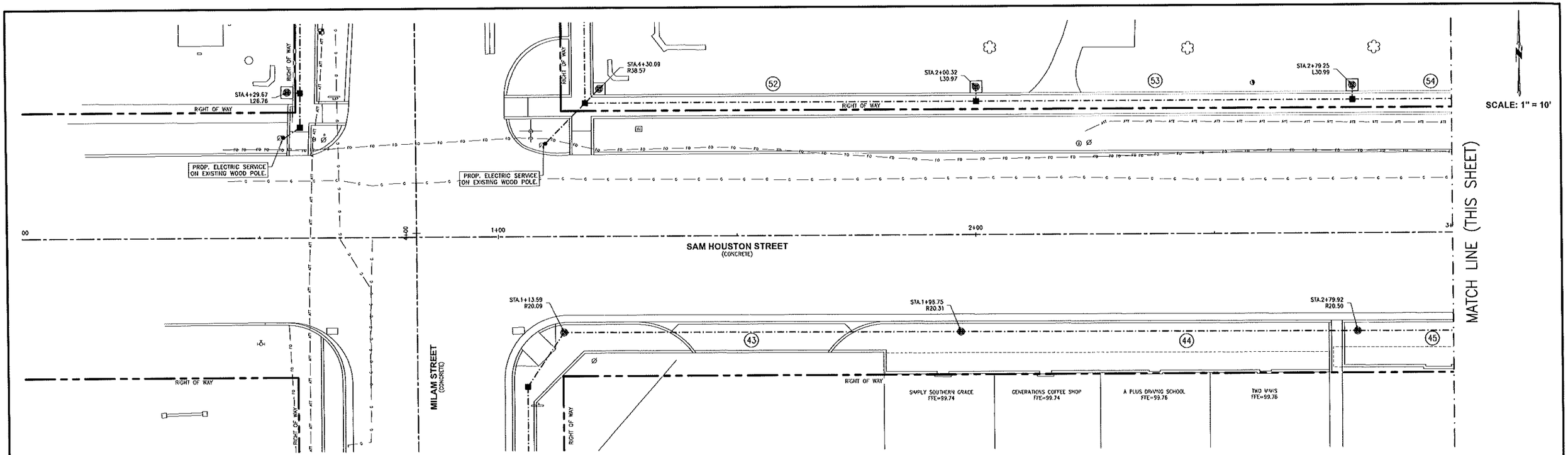
INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/6/2021

WHITELEY OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-8421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
TRAVIS STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	40



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- (X) – CONDUIT RUN NUMBER

NOTES:
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NO	REVISION	DRAWN	CHECK	APPVD	DATE

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DATE: 4/8/2021

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409-892-6421 | WWW.ASSOC.COM

CLIENT: CITY OF LIBERTY

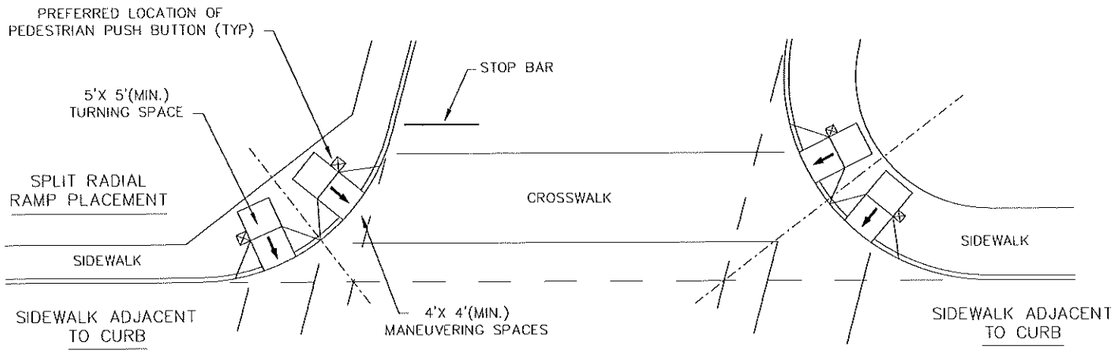
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
SAM HOUSTON STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	59

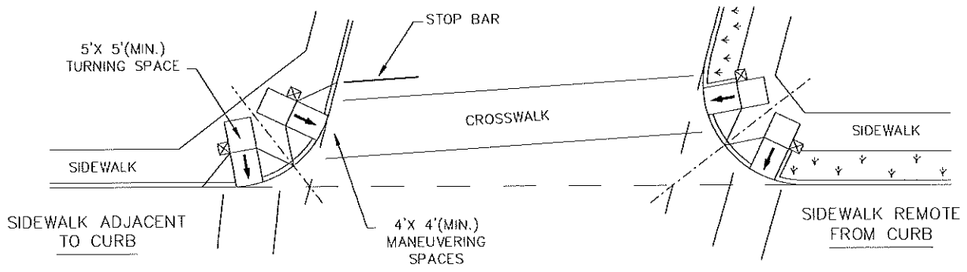
DATE:
FILE:

TYPICAL CROSSING LAYOUTS

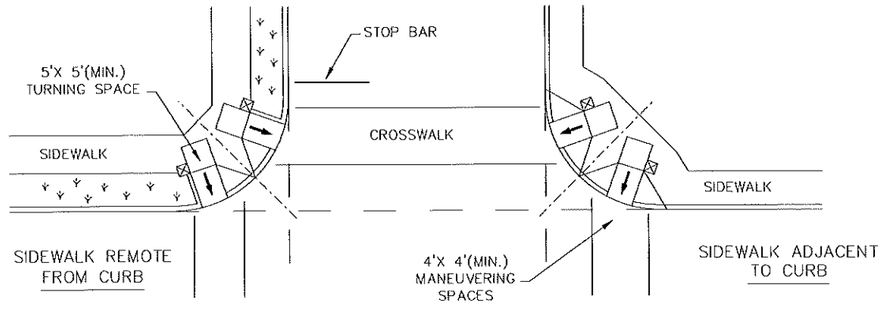
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



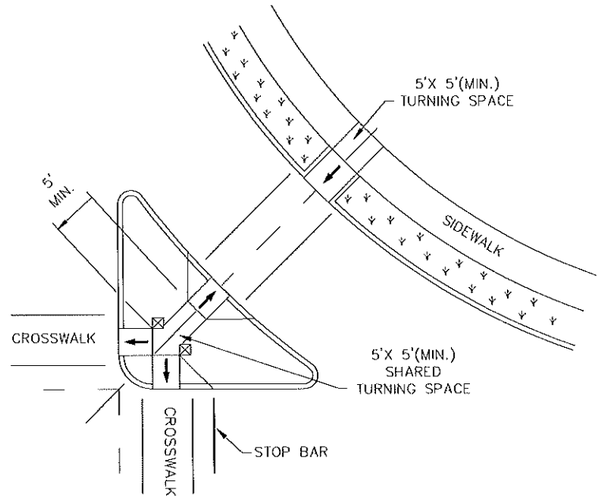
SKEWED INTERSECTION WITH "LARGE" RADIUS



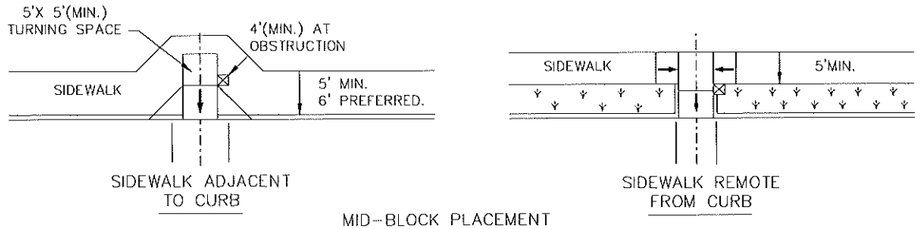
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

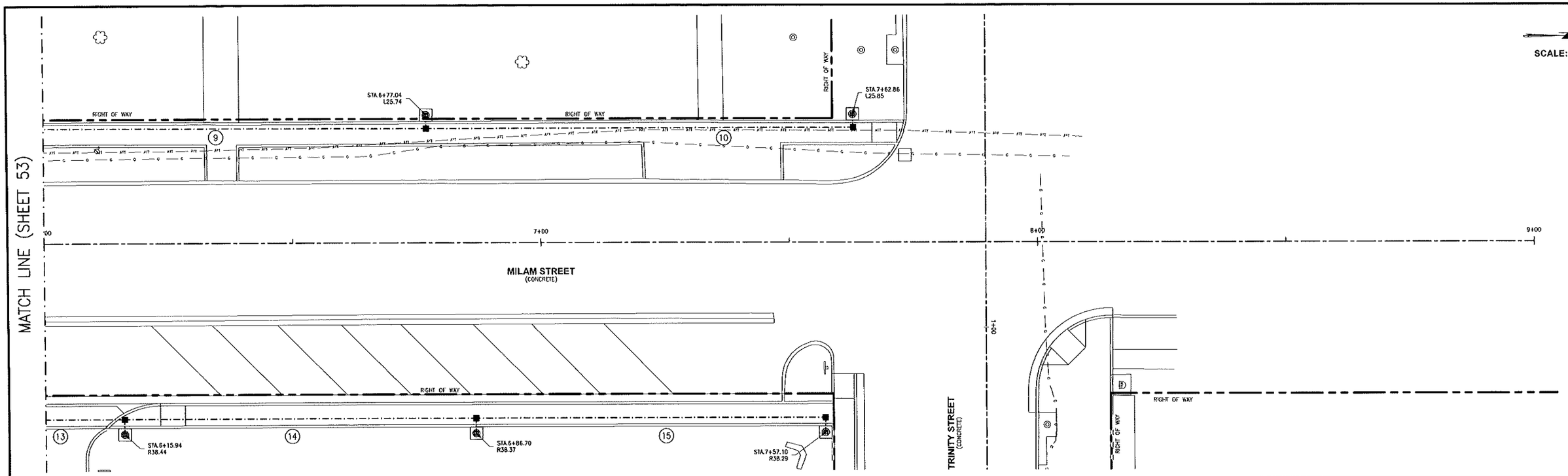
DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS REVISED 08,2005 REVISED 06,2012 REVISED 01,2018					
	DIST	COUNTY		SHEET NO.	
				27	



CONDUIT & CONDUCTOR RUNS MILAM STREET			
RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
1	180	90	90
2	180	90	90
3	160	80	80
4	170	85	85
5	30	15	15
6	20	10	10
7	160	80	80
8	180	90	90
9	180	90	90
10	180	90	90
11	30	15	15
12	200	100	100
13	200	100	100
14	150	75	75
15	160	80	80

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
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- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- (X) CONDUIT RUN NUMBER

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409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
MILAM STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	54

SCALE: 1" = 10'

STA.0+53.17
L33.58

STA.1+38.08
L33.63

FIRST LIBERTY
NATIONAL BANK
FFE=101.03

STA.2+27.74
L29.19

RIGHT OF WAY

PROP. ELECTRIC SERVICE
ON EXISTING WOOD POLE.

RIGHT OF WAY

16 17 18 19

00 1+00 2+00 3+

MATCH LINE (THIS SHEET)

TRAVIS STREET
(CONCRETE)

STA.0+27.17
R29.43

PROP. ELECTRIC SERVICE
ON EXISTING WOOD POLE.

STA.0+94.43
R29.73

STA.1+73.99
R29.76

STA.2+85.76
R30.27

RIGHT OF WAY

RIGHT OF WAY

24 25 26 27 28

THE FLNB CORNER
FFE=100.21

RIGHT OF WAY

SAM HOUSTON STREET
(CONCRETE)

RIGHT OF WAY

RIGHT OF WAY

RIGHT OF WAY

RIGHT OF WAY

STA.4+34.11
L28.21

STA.5+16.81
L27.93

STA.5+91.32
L27.87

19 20 21 22

STA.3+72.27
L19.22

00 4+00 5+00 6+

MATCH LINE (SHEET 56)

TRAVIS STREET
(CONCRETE)

RIGHT OF WAY

RIGHT OF WAY

RIGHT OF WAY

STA.3+78.37
R38.19

28

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
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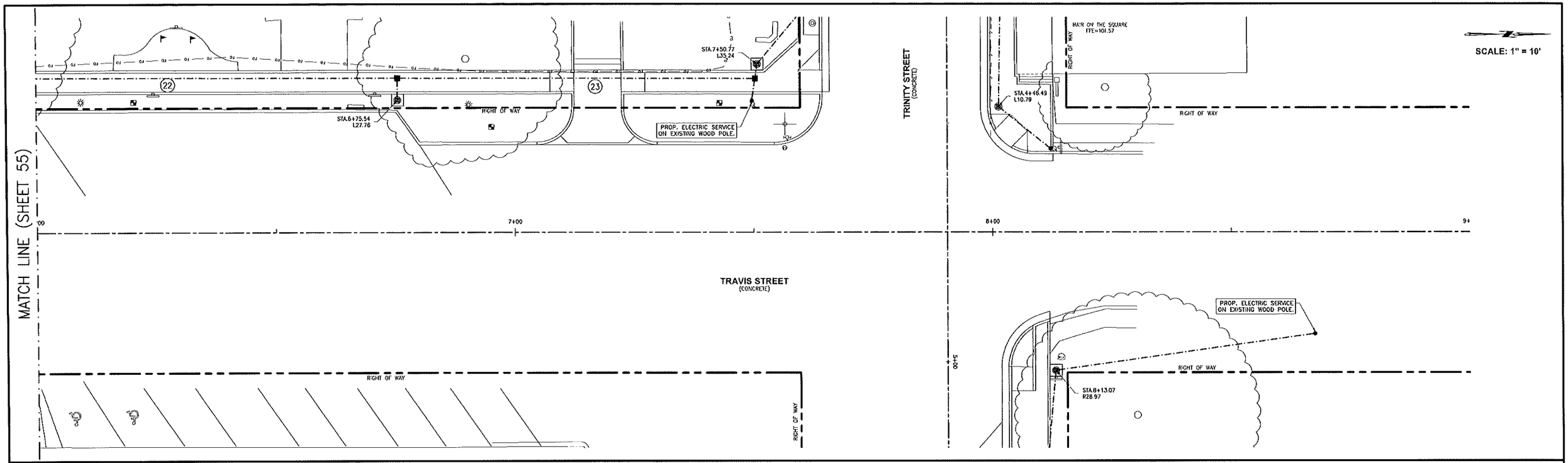
409-832-0421 | WWW.ASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
TRAVIS STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	55



CONDUIT & CONDUCTOR RUNS
TRAVIS STREET

RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
16	180	90	90
17	40	20	20
18	150	75	75
19	300	150	150
20	180	90	90
21	160	80	80
22	180	90	90
23	160	80	80
24	80	40	40
25	60	30	30
26	160	80	80
27	230	115	115
28	190	95	95

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
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409-892-6421 | WWW.ASSOC.COM

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DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
TRAVIS STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	56

INDEX OF SHEETS

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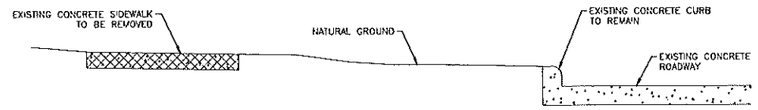
409-892-0421|MWWASSOC.COM

CLIENT:
CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT

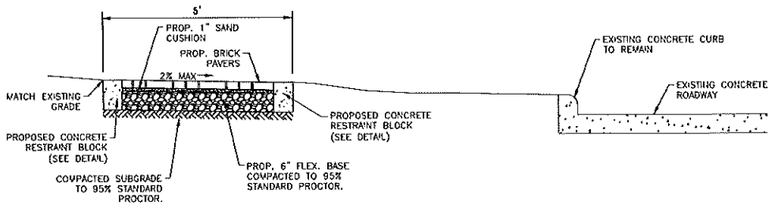
INDEX OF SHEETS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 2
DATE: APR. 2021		
JOB NO. 20–1277	#/2020/20-1277 Liberty Sidewalk/Construction Plans/20-1277 Construction Plans.dwg	REV. 0



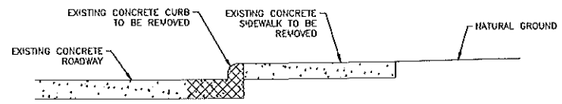
WEST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

EXISTING



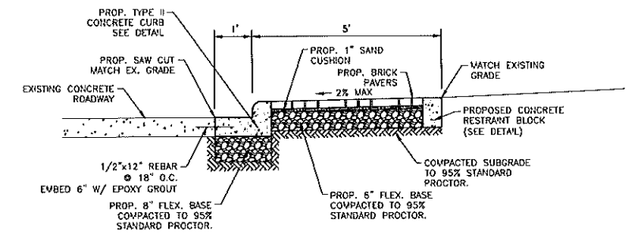
WEST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

PROPOSED



EAST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

EXISTING

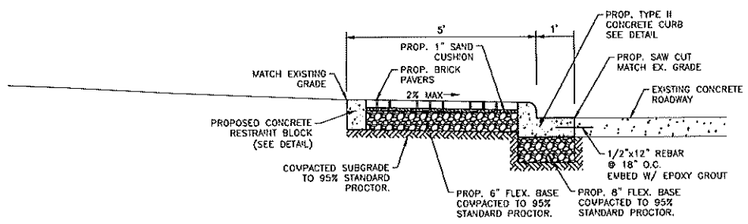


EAST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

PROPOSED

WEST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

EXISTING



WEST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

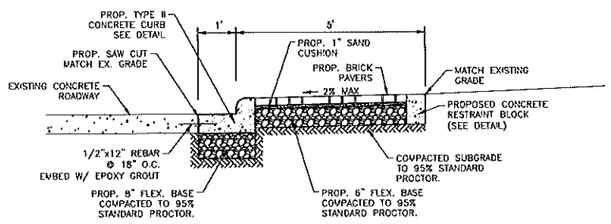
PROPOSED

NOTE:

1. TYPICAL SECTIONS FOR SIDEWALK TO MEET ADA CROSS SLOPE OF 2% MAX.
2. SHOULD ONSITE CONDITIONS NOT WARRANT TYPICAL SECTIONS, THE ENGINEER WILL DETERMINE THE METHOD OF CONSTRUCTION TO MEET ALL AGENCY STANDARDS.
3. SEE SHEETS 48 & 49 FOR DETAILS NOT SHOWN HERE.

EAST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

EXISTING



EAST SIDE
FROM U.P.R.R. TO SAM HOUSTON STREET

PROPOSED

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CLIENT:
CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
MILAM STREET
TYPICAL SECTIONS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 3
DATE: APR. 2021		
JOB NO. 20-1277	K:/2020/20-1277 Liberty Sidewalk/Construction Plan/20-1277 Construction Plan.dwg	REV: 0

DATE:
FILE:

BATTERY BOX GROUND BOXES NOTES

A. MATERIALS

1. Provide polymer concrete or fiberglass reinforced plastic (FRP) battery box ground box and cover in accordance with Departmental Material Specification (DMS) 11071 "Battery Box Ground Boxes." Battery box will accommodate up to 4 batteries, each measuring 8 in. x 13.5 in. x 10 in. (W x L x D). Label battery box ground box cover in accordance with DMS 11071.

2. Supply a marine grade batteries with covers. Secure the marine grade batteries with covers to the stainless steel rack in the bottom of the ground box with tie down straps.

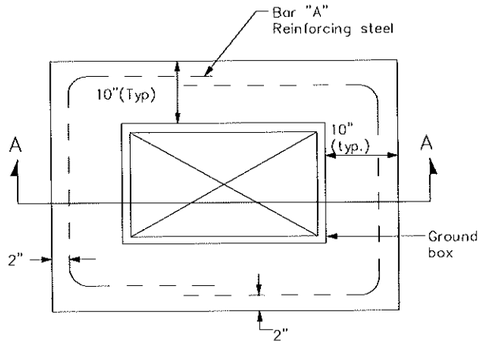
B. CONSTRUCTION METHODS

1. Ensure conduit entry will not interfere with placement of the batteries in the battery box ground box.

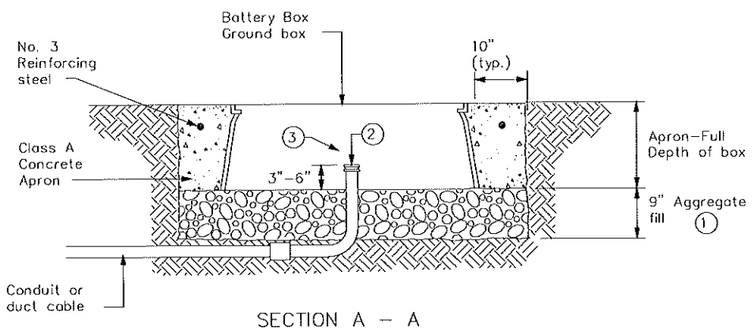
2. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting battery box ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure the aggregate bed is in place and is a minimum of 9 in. deep prior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

3. Cast battery 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. Battery box ground box aprons, including concrete and reinforcing steel, are subsidiary to battery box ground boxes when called for by descriptive code.

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



PLAN VIEW



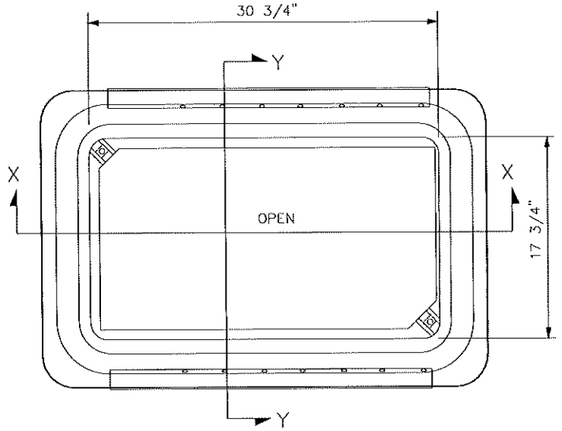
SECTION A – A

APRON FOR BATTERY BOX GROUND BOXES

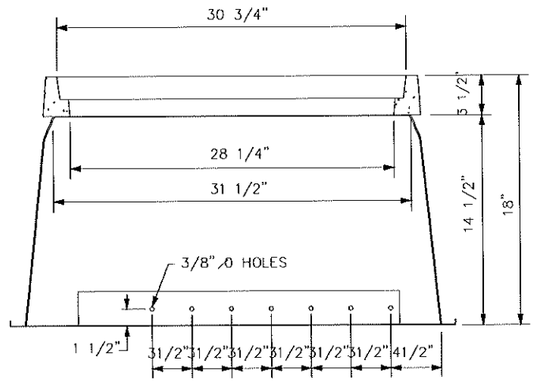
(1) Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.

(2) Install bushing or bell end fitting on the upper end of all ells.

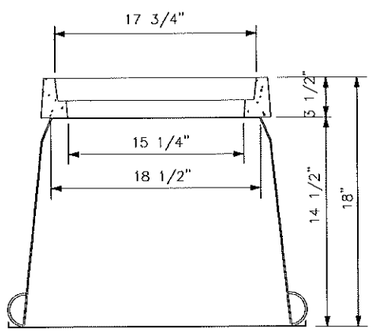
(3) Install all conduits in a neat and workmanlike manner.



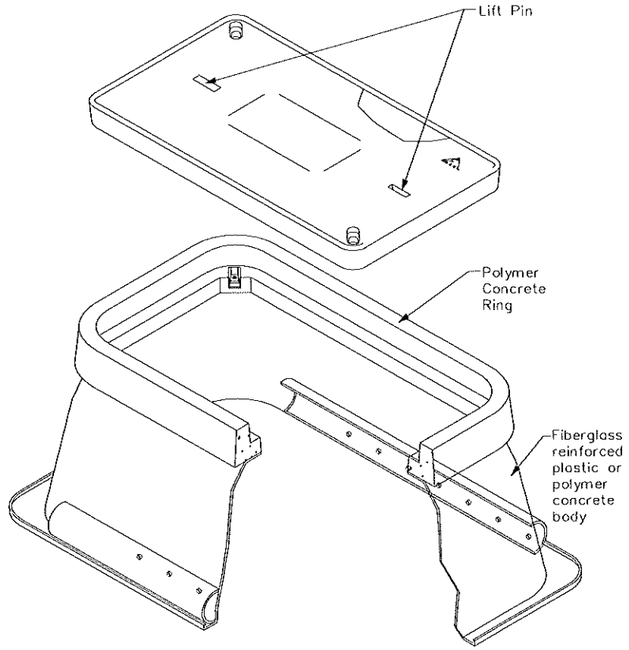
BATTERY BOX TOP VIEW



SECTION X–X



SECTION Y–Y



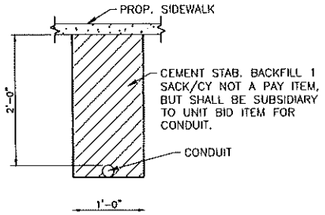
Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS
BATTERY BOX
GROUND BOXES

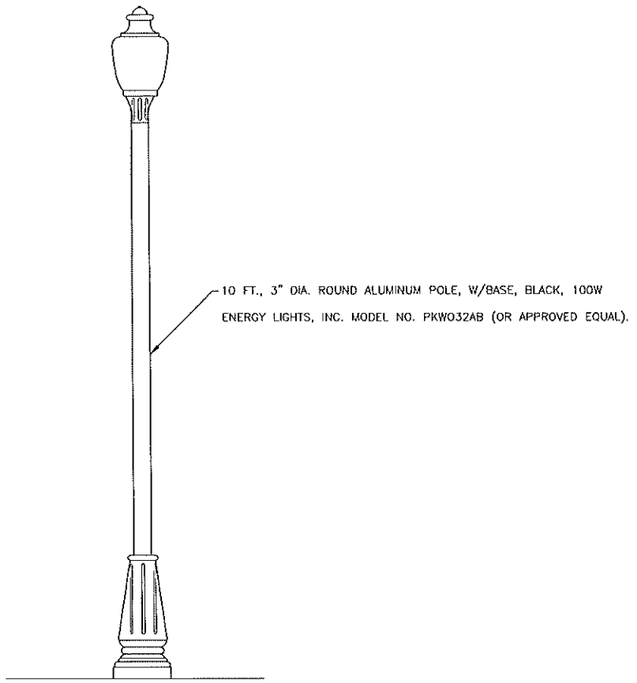
ED(12)–14

FILE: ed12-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT			
©TxDOT October 2014	CONT	SECT	JOB		HIGHWAY		
REVISIONS							
	DIST	COUNTY			SHEET NO.		
					71		

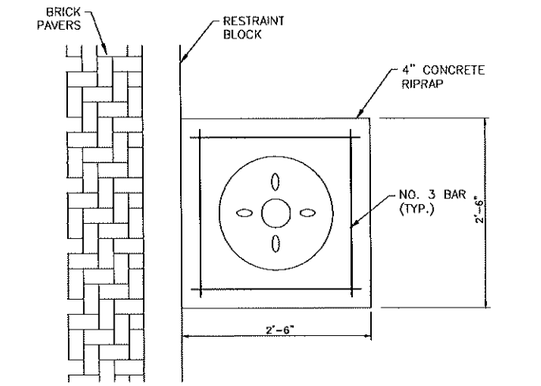
71M

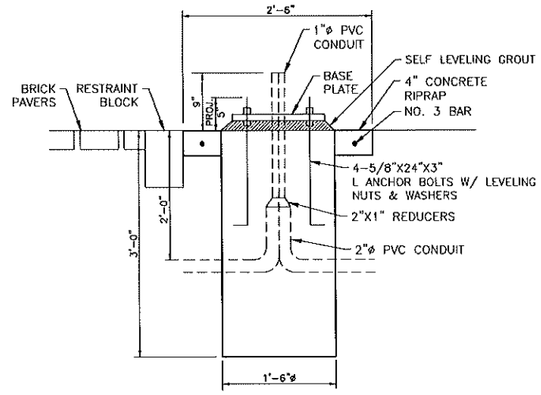


EXCAV. & BACKFILL FOR ELECTRICAL CONDUIT SECTION

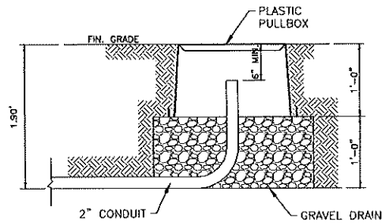


POST LIGHT

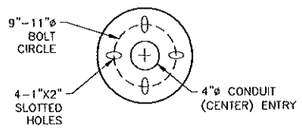




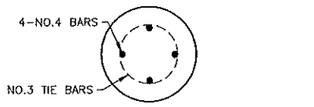
ILLUMINATION FOUNDATION W/CONCRETE APRON

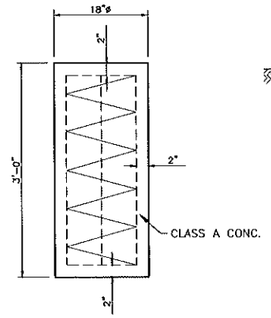


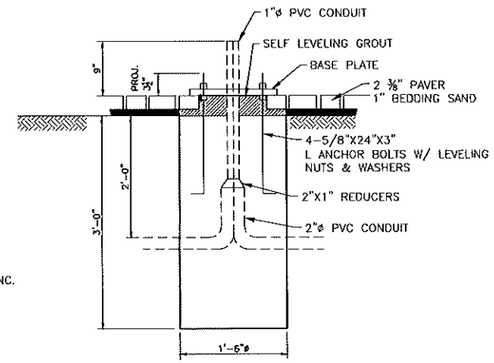
PULLBOX DETAIL



BASE PLATE DETAIL







ILLUMINATION FOUNDATION
ALL CONDUIT FITTINGS ARE SUBSIDIARY TO CONDUIT ITEM

NOTES:

1. CONFIRM ALL DIMENSIONS & REINF. AND ANCHORAGE DETAIL REQUIREMENTS WITH POLE MANUFACTURER.
2. COORDINATE WITH ELECTRICAL UTILITY PROVIDER ALL REQUIREMENTS RELATED TO ELECTRICAL SERVICE & PAY ALL UTILITY COMPANY FEES/CHARGES. COORDINATE THE PART OF THE SERVICE INSTALLATION, CONSTRUCTION INCLUDING METERING PROVISIONS. (WIRE TO BE SIZED BY ELECTRICAL UTILITY PROVIDER)
3. ALL ELECTRICAL INSTALLATIONS MUST COMPLY WITH THE MOST RECENT VERSIONS OF ALL APPLICABLE LAWS, RULES, REGULATIONS, & ORDINANCES OF ALL GOVERNING CODES & AUTHORITIES.

INTERIM SUBMITTAL
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ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

WHITELEY & OLIVER ENGINEERING, LLC

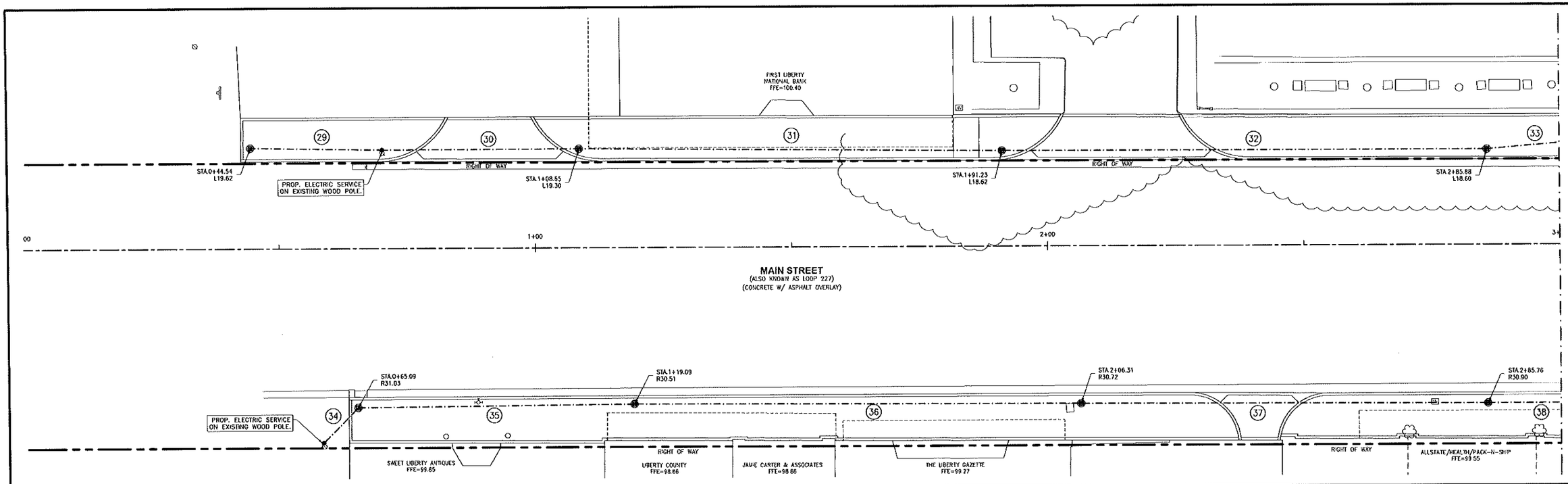
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWASSOC.COM

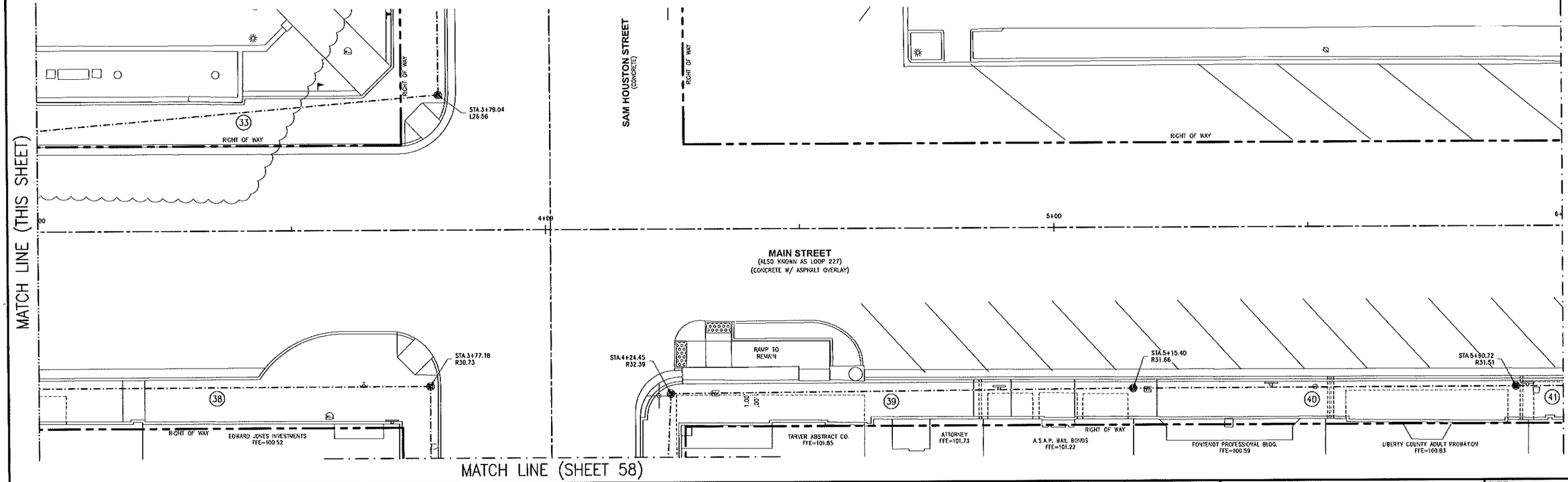
CLIENT: **CITY OF LIBERTY**

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT MISCELLANEOUS ILLUMINATION DETAILS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 63
DATE: APR. 2021		
JOB NO. 20-1277	W:/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0

SCALE: 1" = 10'





LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- (X) CONDUIT RUN NUMBER

NOTES:

1. UTILITY LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT EXACT. ADDITIONAL UTILITIES MAY BE PRESENT. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO BE RESPONSIBLE FOR DAMAGE CAUSED TO AREAS DESIGNATED TO REMAIN.
3. CONDUIT LOCATIONS SHOWN ARE APPROXIMATE. ADJUSTMENTS MAY BE NECESSARY DEPENDING ON FIELD CONDITIONS AS APPROVED BY THE ENGINEER.
4. HATCH SHOWN FOR PICTORIAL PURPOSE ONLY. FINAL PATTERN MAY VARY REFER TO DETAILS.

NO	REVISION	DRAWN	CHECK	APPVD	DATE

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P.E. NO. 111537
DATE: 4/8/2021

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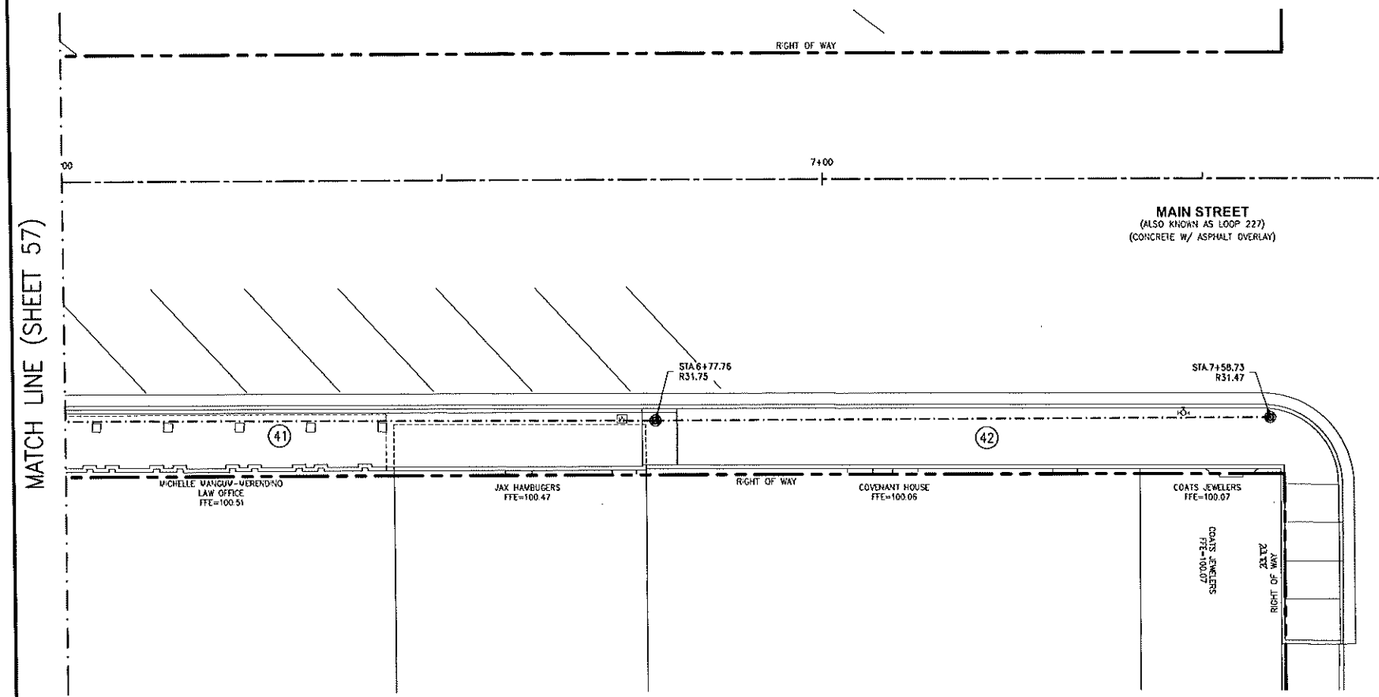
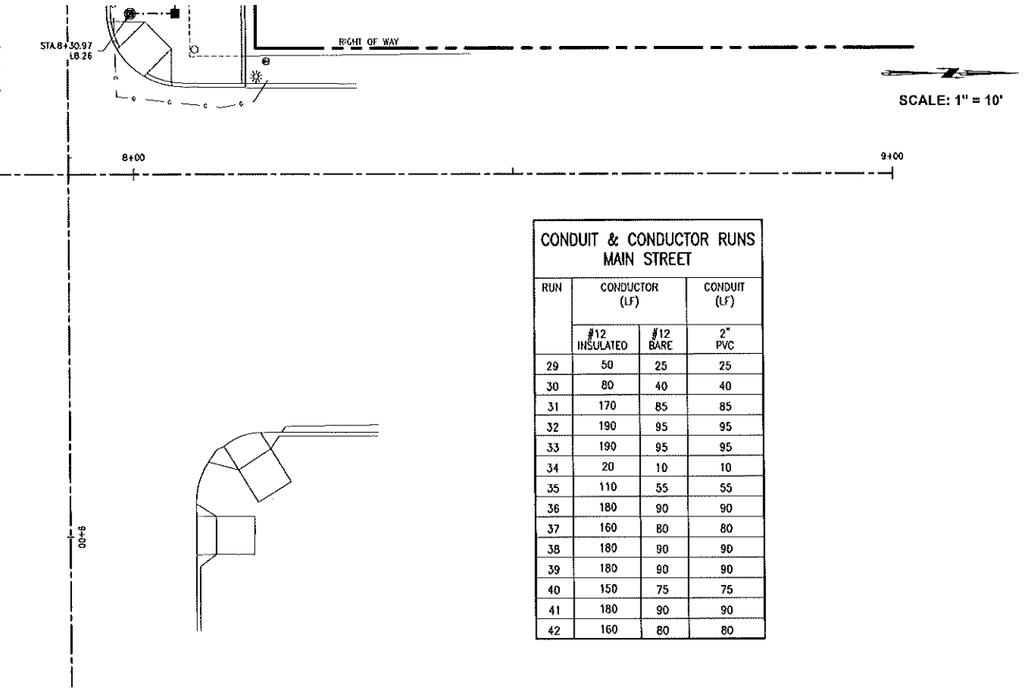
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | WWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
MAIN STREET
STA. 0+00 - 6+00

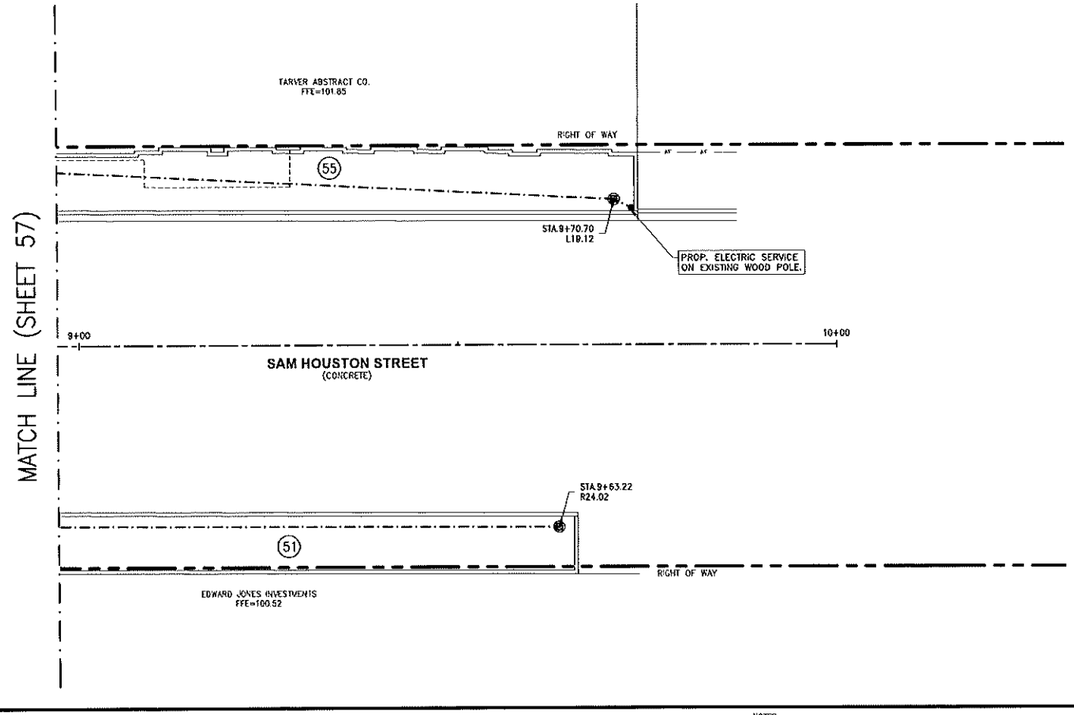
VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	57





SCALE: 1" = 10'

CONDUIT & CONDUCTOR RUNS MAIN STREET			
RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
29	50	25	25
30	80	40	40
31	170	85	85
32	190	95	95
33	190	95	95
34	20	10	10
35	110	55	55
36	180	90	90
37	160	80	80
38	180	90	90
39	180	90	90
40	150	75	75
41	180	90	90
42	160	80	80



CONDUIT & CONDUCTOR RUNS SAM HOUSTON STREET			
RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
51	180	90	90
55	180	90	90

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- CONDUIT RUN NUMBER

NOTES:

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DATE: 4/8/2021

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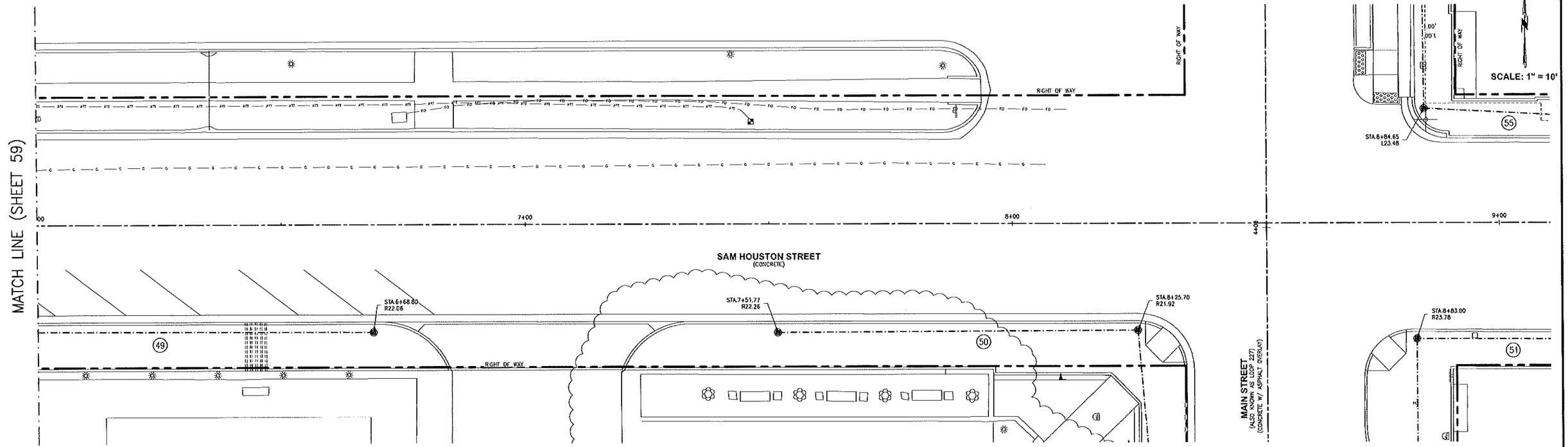
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | WWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
MAIN STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	58



CONDUIT & CONDUCTOR RUNS SAM HOUSTON STREET			
RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
43	170	85	85
44	170	85	85
45	180	90	90
46	160	80	80
47	20	10	10
48	150	75	75
49	170	85	85
50	150	75	75
51	180	90	90
52	170	85	85
53	160	80	80
54	160	80	80
55	180	90	90

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- CONDUIT RUN NUMBER

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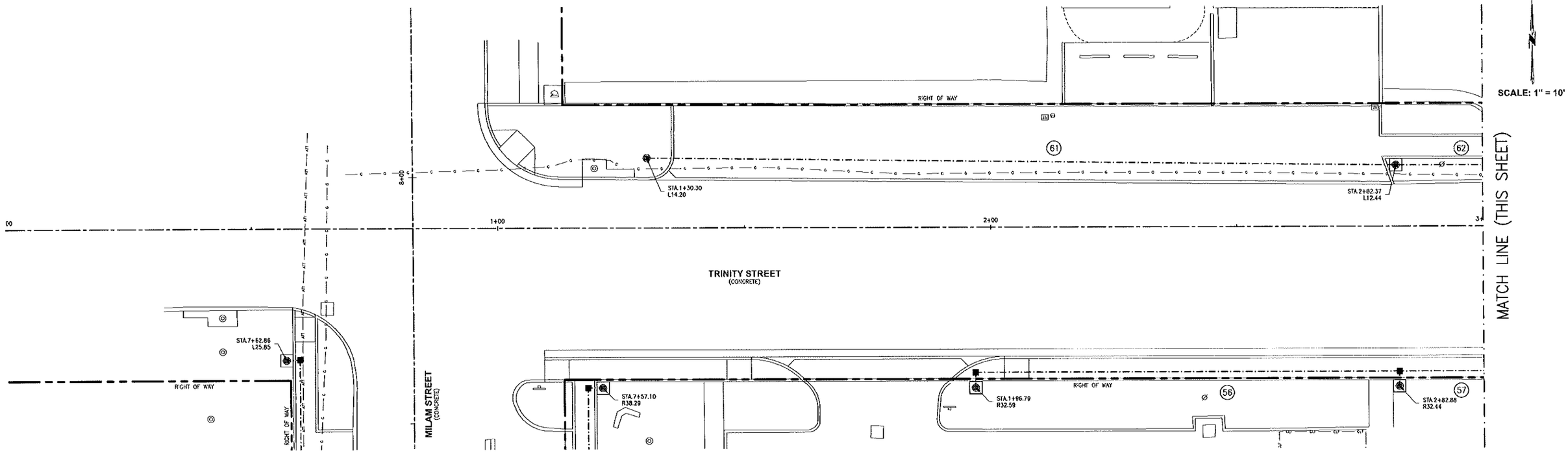
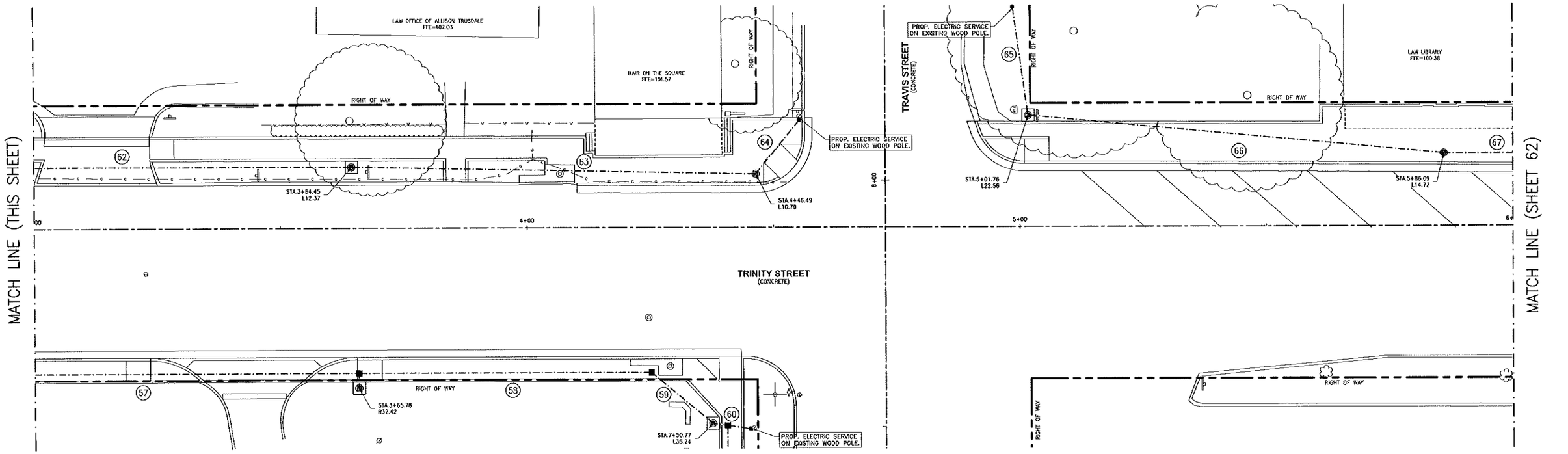
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT ILLUMINATION PLAN SAM HOUSTON STREET STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	60





LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
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- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- CONDUIT RUN NUMBER

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DATE: 4/8/2021

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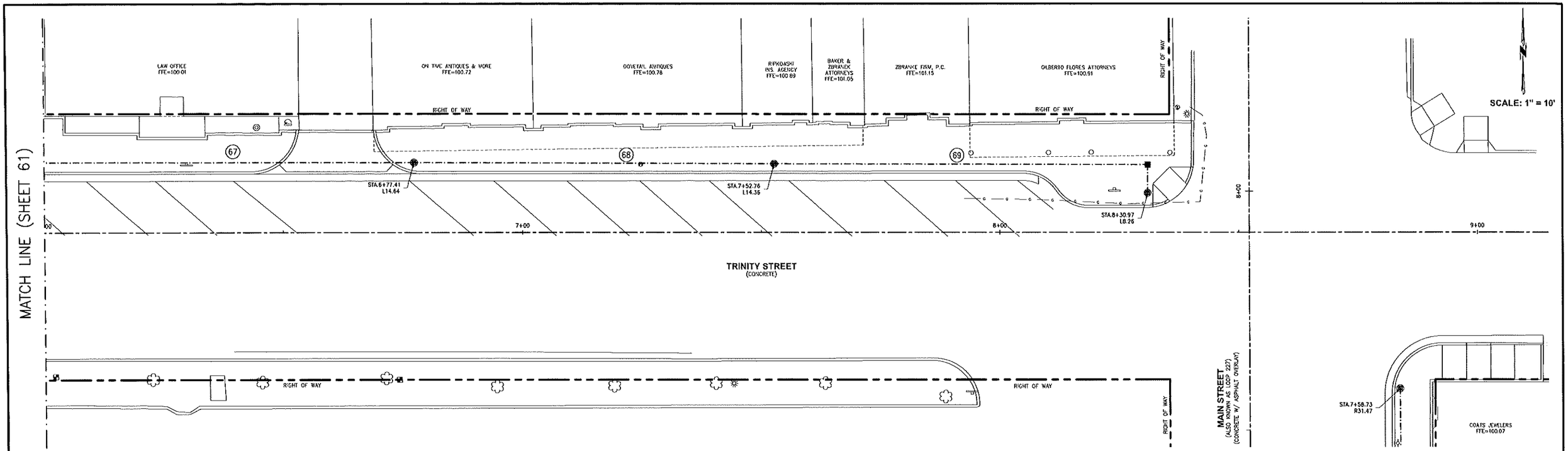
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
TRINITY STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	61



CONDUIT & CONDUCTOR RUNS TRINITY STREET			
RUN	CONDUCTOR (LF)		CONDUIT (LF)
	#12 INSULATED	#12 BARE	2" PVC
56	180	90	90
57	170	85	85
58	130	65	65
59	40	20	20
60	10	5	5
61	300	150	150
62	160	80	80
63	160	80	80
64	30	15	15
65	130	115	115
66	270	135	135
67	180	90	90
68	150	75	75
69	170	85	85

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
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- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- CONDUIT RUN NUMBER

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409-892-8421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
TRINITY STREET
STA. 6+00 - 9+00

VER.	JOB NO.	SHEET NO.
ACAD 2019	20-1277	62

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 1/2 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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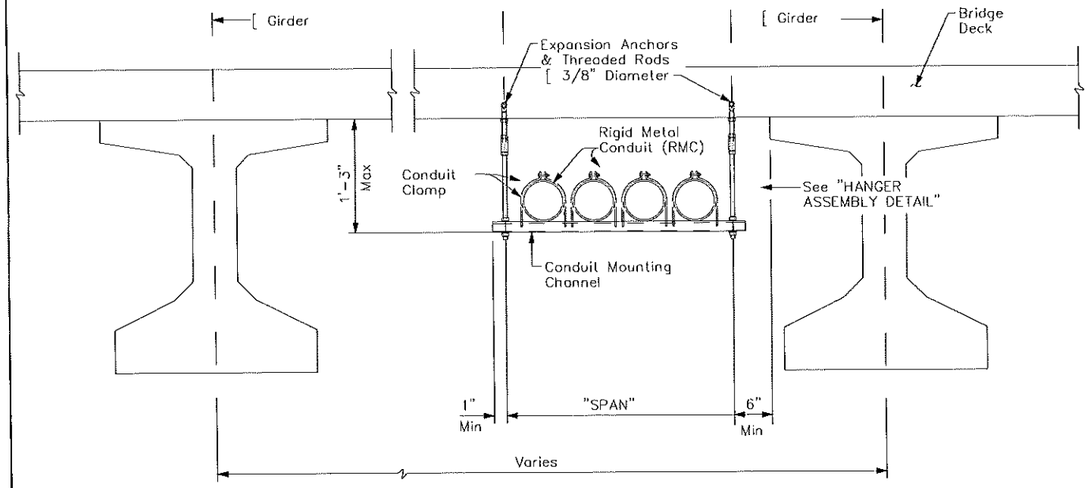
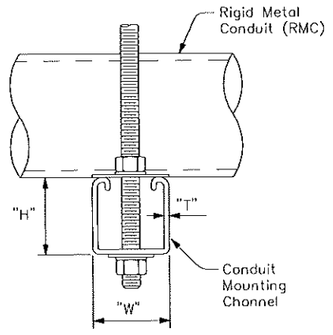
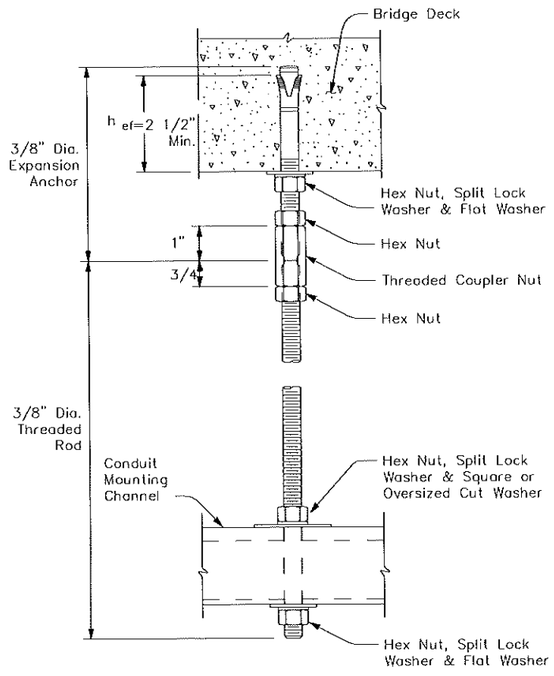


CONDUIT HANGING DETAIL

CONDUIT MOUNTING CHANNEL		
"SPAN"	"W" x "H"	"T"
less thon 2'	1 5/8" x 1 3/8"	12 Ga.
2'-0" to 2'-6"	1 5/8" x 1 5/8"	12 Ga.
>2'-6" to 3'-0"	1 5/8" x 2 7/16"	12 Ga.

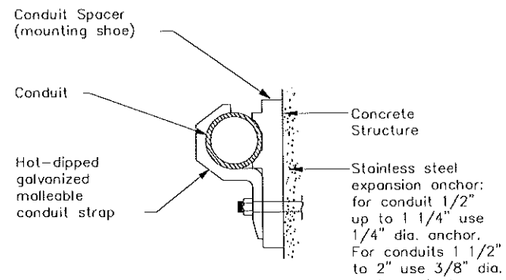
Channels with round or short slotted hole patterns are allowed, if the load carrying capacity is not reduced by more than 15%.

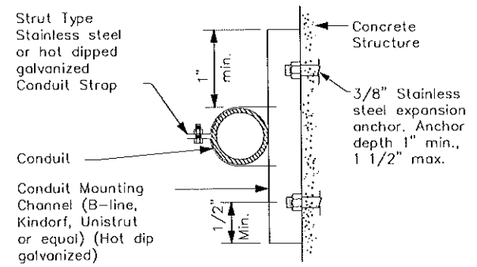




HANGER ASSEMBLY DETAIL

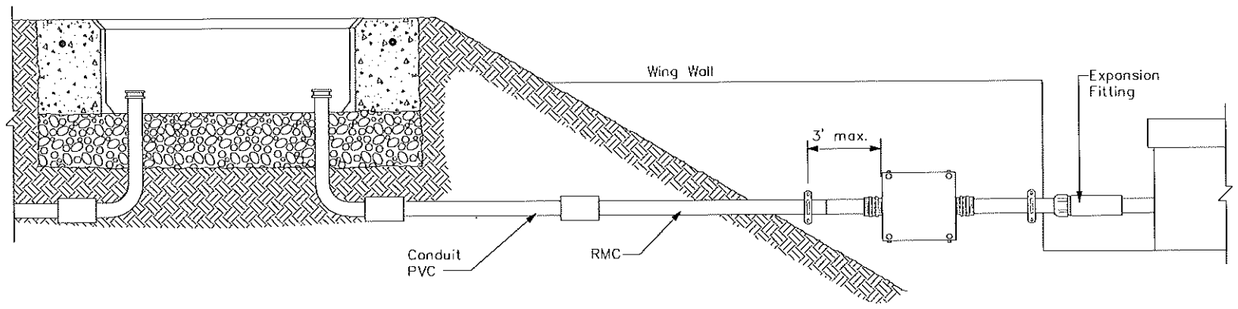
ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT





CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(1)8.2



TYPICAL CONDUIT ENTRY TO BRIDGE STRUCTURE DETAIL

EXPANSION ANCHOR NOTES FOR BRIDGE DECK ATTACHMENT

1. Use torque controlled mechanical expansion anchors that are approved for use in cracked concrete by the International Code Council, Evaluation Service (ICC-ES). The chosen anchor product shall have a designated ICC-ES Evaluation Report number, and its approval status shall be maintained on the ICC-ES website under Division 031600 for Concrete Anchors.

2. Unless otherwise approved by the Engineer: do not use adhesive anchors; do not use expansion anchors that are not included in the ICC-ES approval list; and do not use expansion anchors that are only approved for use in uncracked concrete.

3. Use anchors manufactured with stainless steel expansion wedges. Anchors manufactured with carbon steel expansion wedges are not allowed. Anchor bodies can be either zinc-plated carbon steel or stainless steel. For application in marine environment, both the anchor body and expansion wedge shall be stainless steel.

4. Install anchors as shown on the plans and in accordance with the anchor manufacturer's published installation instructions. Arrange a field demonstration test to evaluate the procedures and tools. The test shall be witnessed and approved by the Engineer prior to furnishing anchors on the structure.

5. Prior to hole drilling, use rebar locator to ensure clearing of existing deck strands or reinforcement. Install anchors to ensure a minimum effective embedment depth, (ef), as shown. Increase (ef)as needed to ensure sufficient thread length for proper torqueing and tightening of anchors.

6. Use anchors of minimum 1600 Lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strengths as determined by ACI 318 Appendix D) at the required minimum embedment depth (ef). Nb lateral loads shall be introduced after conduit installation.

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ELECTRICAL DETAILS
CONDUIT SUPPORTS

ED(2)-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.

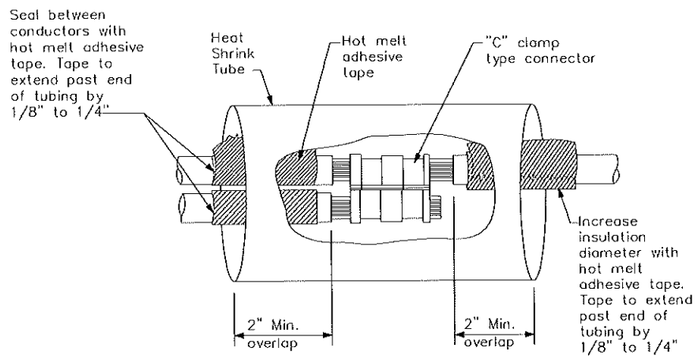
3. Install ground rods so the imprinted part number is at the upper end of the rod.

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

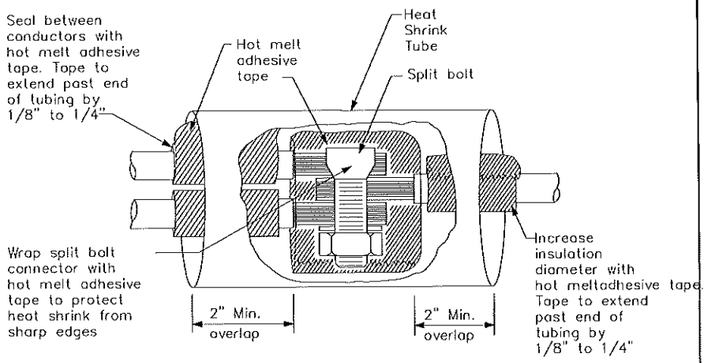
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

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.

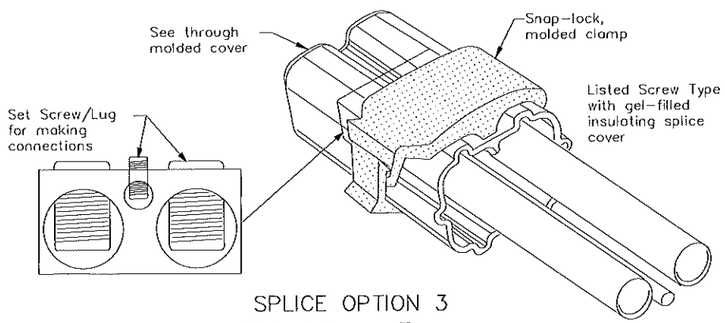
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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ELECTRICAL DETAILS
CONDUCTORS

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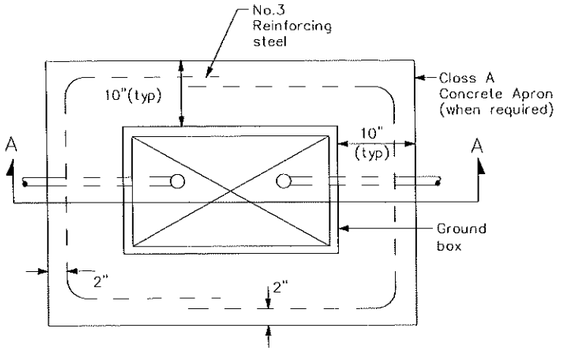
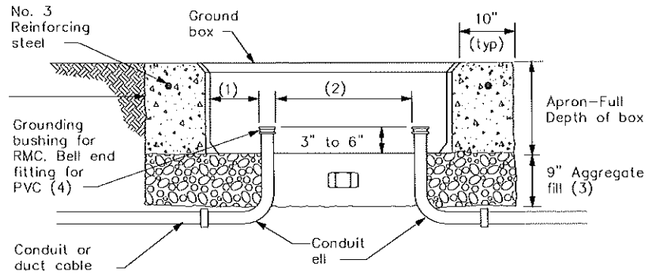


PLAN VIEW



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.

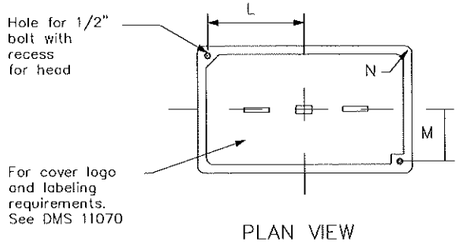
(2) Maintain sufficient space between conduits to allow for proper installation of bushing.

(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



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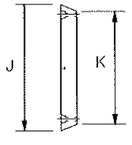

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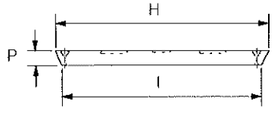

SIDE

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 1/2 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 1/2 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 1/2 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 1/4"	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 1/4"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

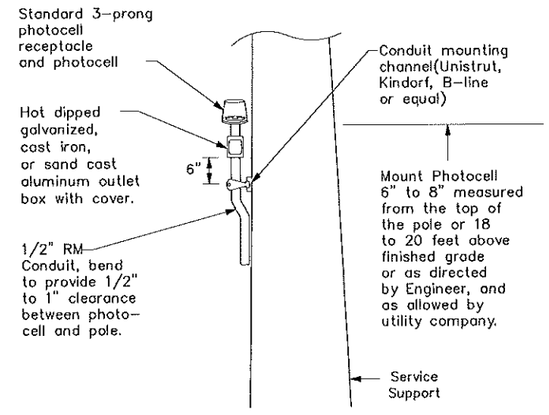
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** 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

ED(5)–14

FILE:	ed5–14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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71E

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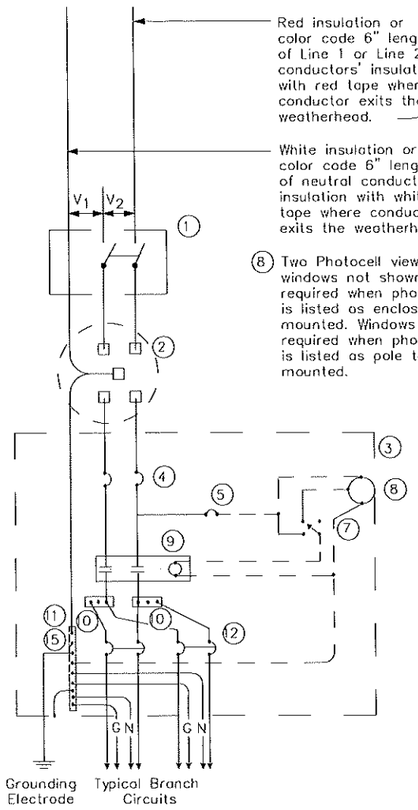
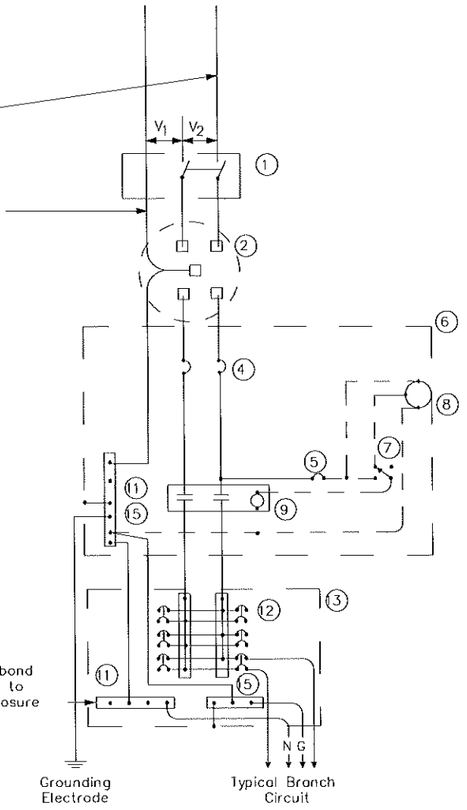
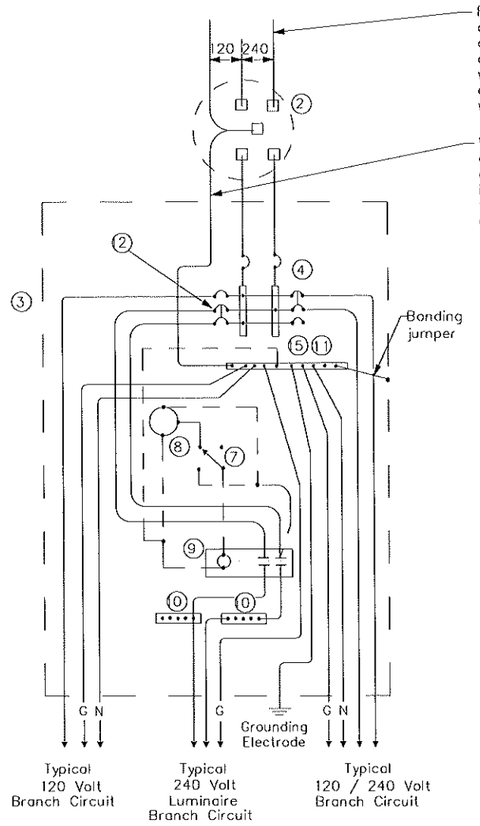


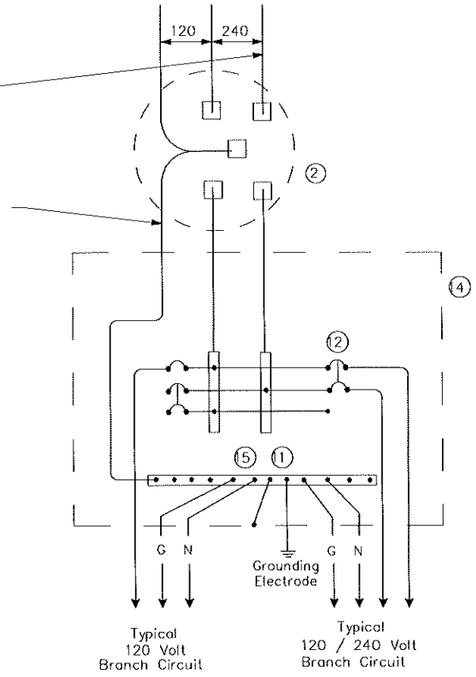
SCHEMATIC TYPE A
THREE WIRE



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

FILE: ed6-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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TIMBER POLE(TP)SERVICE SUPPORT NOTES

1. Ensure electrical service support is a class 5 treated timber pole as per Item 627 "Treated Timber Poles." Embed timber pole to depth required in Item 627.
2. Conduit and electrical conductors attached to the electrical service pole and underground within 12 in. of service pole are not paid for directly but are subsidiary to the electrical service.
3. Install pole-top mounted photocell (T) on north side of pole, or in service enclosure (E) as required. See Electrical Service Data chart in plan set.
4. Gain pole as required to provide flat surface for each channel. Gain timber pole to 5/8 in. max. depth and 1 7/8 in. max. height. Gain pole in a neat and workmanlike manner.
5. Mount meter and service equipment on stainless steel or galvanized channel (Unistrut, Kindorf, or equal). Provide channel sized 1 in. to 3 3/4 in. maximum depth, and 11/2 in. to 15/8 in. maximum width. File smooth the cut ends of galvanized channel and paint with zinc rich paint before installing on pole. Secure each channel section to timber pole with two galvanized or SS lag bolts, 1/4 in. minimum diameter by 11/2 in. minimum length. Use a galvanized or SS flat washer on each lag bolt. Do not stock channel.
6. When excess length must be trimmed from poles, trim from the top end only.

(1) Class 5 pole, height as required

(2) Service drop from utility company (attached below weatherhead)

(3) Service conduit (RMC)and service entrance conductors – One Red, One Black, One White (See Electrical Service Data)

(4) Safety switch (when required)

(5) Meter (when required)

(6) Service enclosure

(7) 6 AWG bare grounding electrode conductor in 1/2 in. PVC to ground rod – extend 1/2 in. PVC 6 in. underground.

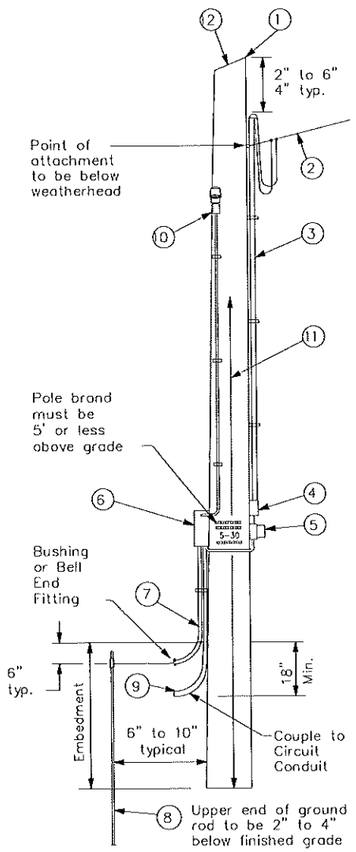
(8) 5/8 in. x 8 ft. Copper clad ground rod – drive ground rod to a depth of 2 in. to 4 in. below grade.

(9) RMC same size as branch circuit conduit.

(10) See pole-top mounted photocell detail on ED(5).

(11) When required by the serving utility provide bare 6 AWG copper conductor. Run wire from pole top to butt wrap or copper butt plate. Protect conductor with non-conductive material to a height of 8 ft. above finished grade.

(12) When required by utility, cut top of pole at an angle to enhance rain run off.

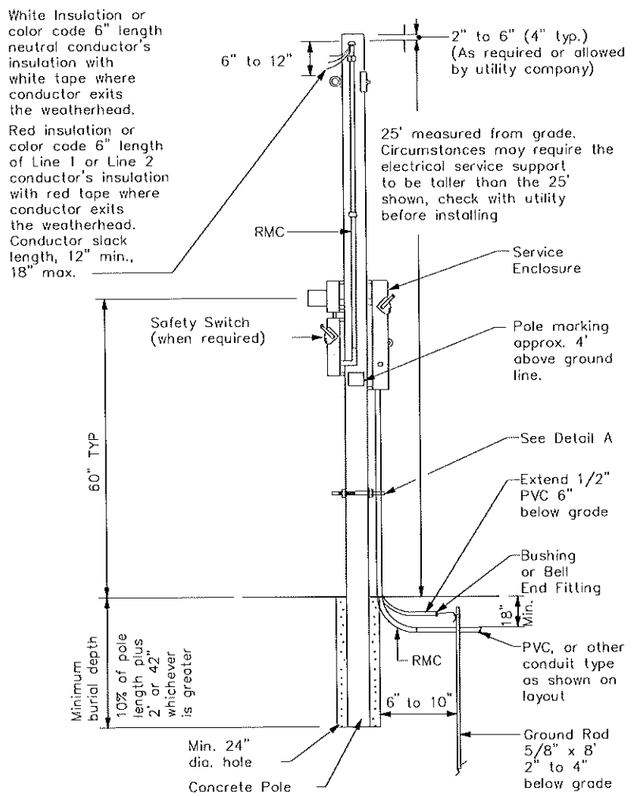


SERVICE SUPPORT TYPE TP (O)

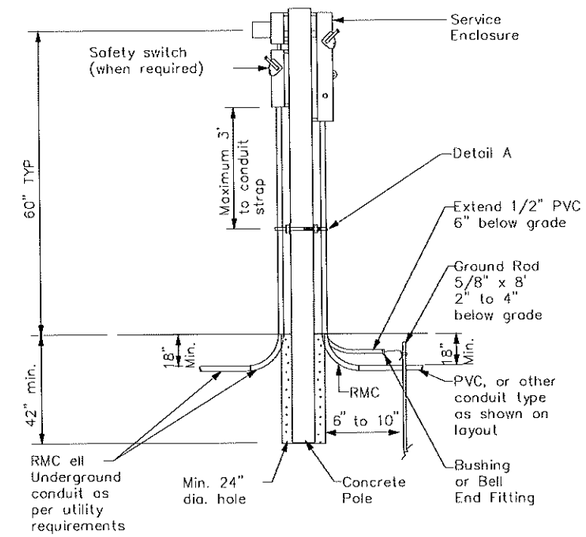
GRANITE CONCRETE(GC)& OTHER CONCRETE(OC)NOTES

Ensure electrical service support structures bid as type Gronite Concrete (GC) or Other Concrete (OC) meet the following requirements.

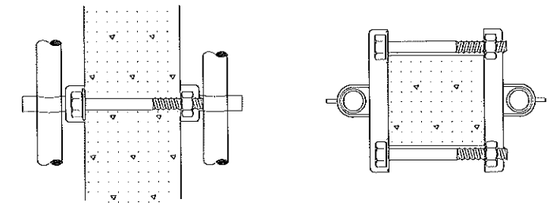
1. Provide GC and OC poles that meet the requirements of DMS 11080 "Electrical Services."
2. Provide prestressed concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 11080. Location of marking should be approximately 4' above final grade. Use the two-point pickup locations when handling pole in horizontal position, and one-point pickup location for use in raising the pole to a vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 10% of the length plus 2 ft., whichever is greater.
5. Ensure all installation details of services are in accordance with utility company specifications.
6. Install a one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the electric utility.
7. Furnish and install galvanized or stainless steel channel strut 1 1/2 in. or 1 5/8 in. wide by 1 in. up to 3 3/4 in. deep (Unistrut, Kindorf, B-line or equal). Attach channel strut with stainless steel concrete anchors (max. 1" depth), square U-bolts or back to back channel strut with long bolts, or other secure mounting as approved by the Engineer. Ensure bolts are galvanized in accordance with ASTM A153. Do not stock channel struts.
8. Backfill the holes thoroughly by tamping in 6 in. lifts. After tamping to grade, place additional backfill material in a 6 inch high cone around the pole to allow for settling. Use material equal in composition and density to the surrounding area. Backfilling will not be paid for directly but is subsidiary to various bid items.



CONCRETE SERVICE SUPPORT
Overhead(O)



CONCRETE SERVICE SUPPORT
Underground(U)



DETAIL A

See Note 7. Before installing channel that has been cut, file sharp edges and paint with zinc-rich paint. Ensure there is no paint splatter on the pole.

Texas Department of Transportation | Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP

ED(10)-14

FILE: ed10-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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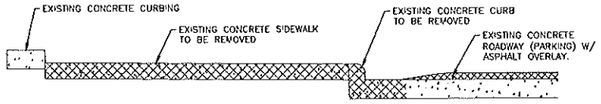

WEST SIDE
FROM STA. 1+87 TO SAM HOUSTON STREET

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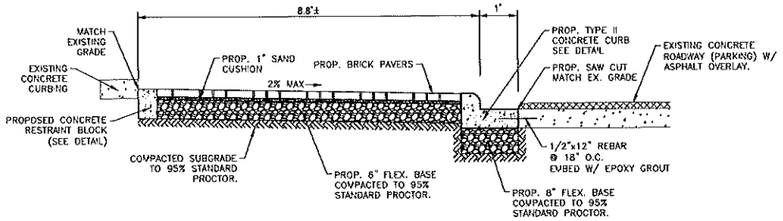

WEST SIDE
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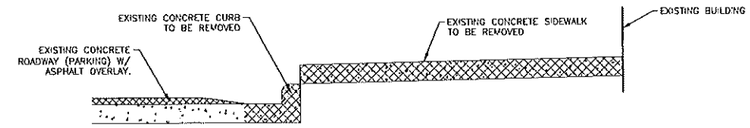
PROPOSED



EAST SIDE
FROM SAM HOUSTON STREET TO TRINITY STREET

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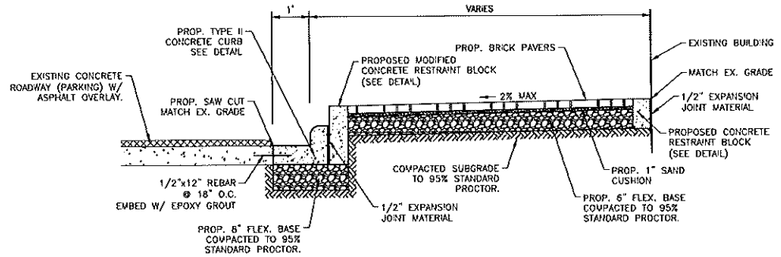

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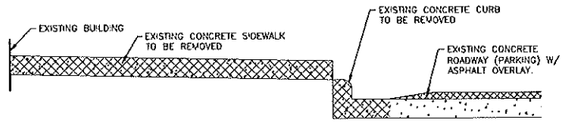

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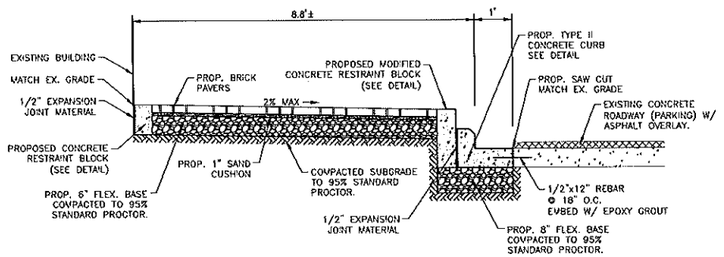

WEST SIDE
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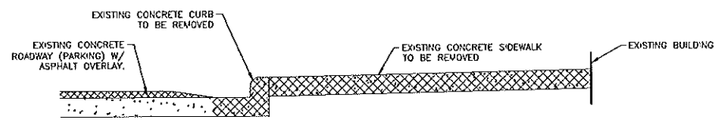

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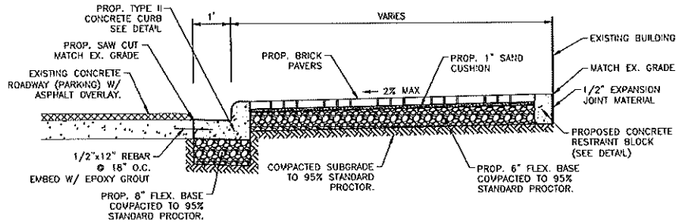

EAST SIDE
FROM STA. 3+21 TO SAM HOUSTON STREET

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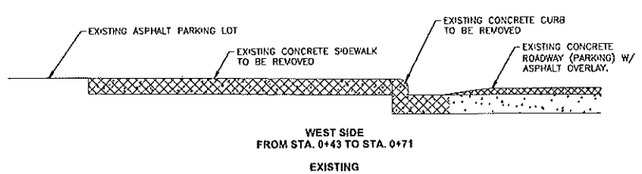

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FROM STA. 0+43 TO STA. 0+71

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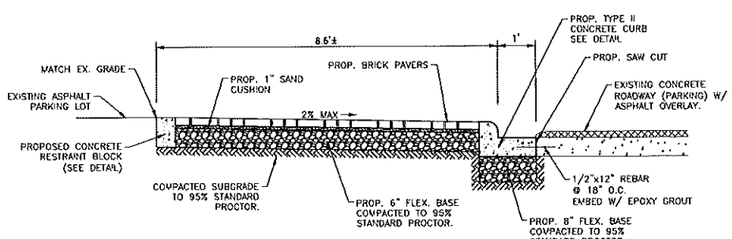

WEST SIDE
FROM STA. 0+43 TO STA. 0+71

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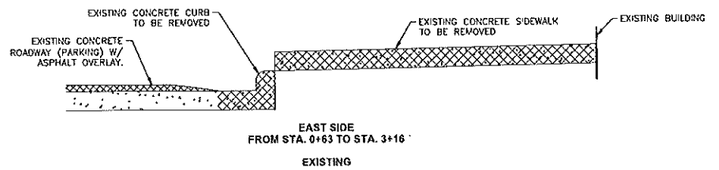

EAST SIDE
FROM STA. 0+63 TO STA. 3+16

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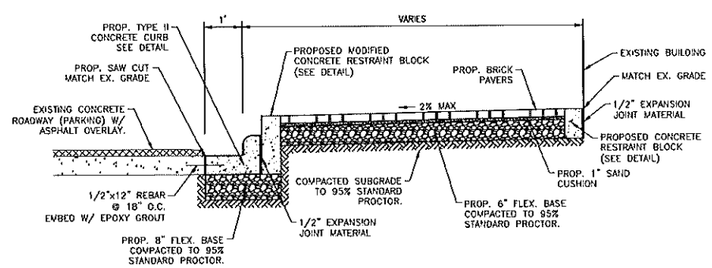


EAST SIDE
FROM STA. 0+63 TO STA. 3+16

PROPOSED

NOTE:

1. TYPICAL SECTIONS FOR SIDEWALK TO MEET ADA CROSS SLOPE OF 2% MAX.
2. SHOULD ONSITE CONDITIONS NOT WARRANT TYPICAL SECTIONS, THE ENGINEER WILL DETERMINE THE METHOD OF CONSTRUCTION TO MEET ALL AGENCY STANDARDS.
3. SEE SHEETS 48 & 49 FOR DETAILS NOT SHOWN HERE.

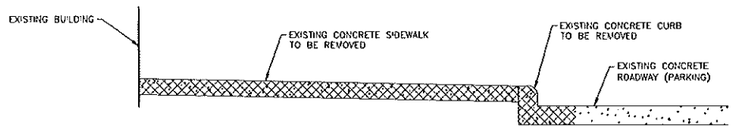
INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

WHITELEY + OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
MAIN STREET
TYPICAL SECTIONS

DR BY: THC	CK BY: SAW	APP BY: JDL	
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 5	
DATE: APR. 2021			
JOB NO. 20-1277	#/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0	



NORTH SIDE
FROM MAIN STREET TO STA. 9+74

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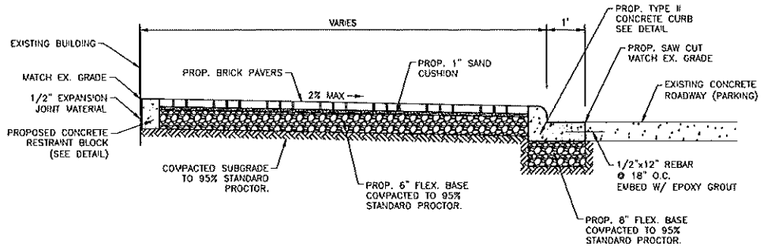
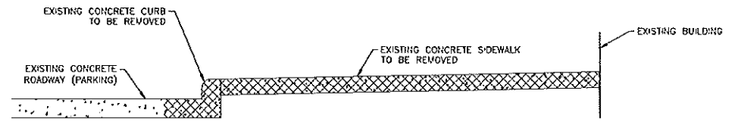


NORTH SIDE
FROM MAIN STREET TO STA. 9+74

PROPOSED



SOUTH SIDE
FROM MAIN STREET TO STA. 9+66

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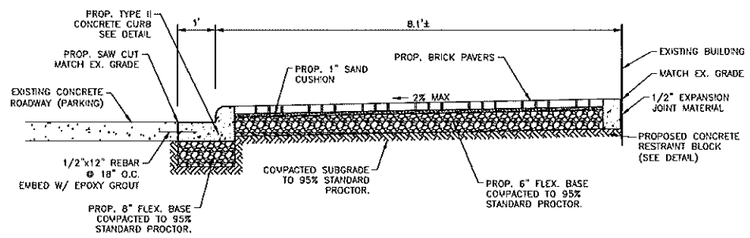
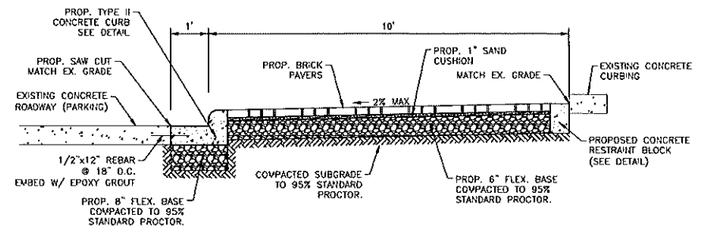


SOUTH SIDE
FROM MAIN STREET TO STA. 9+66

PROPOSED

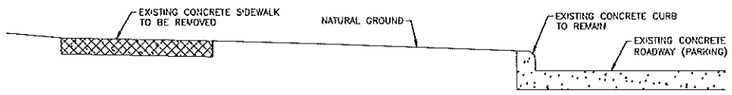
SOUTH SIDE
FROM TRAVIS STREET TO MAIN STREET

EXISTING



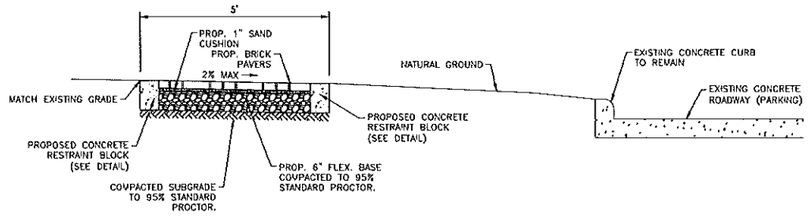
SOUTH SIDE
FROM TRAVIS STREET TO MAIN STREET

PROPOSED



NORTH SIDE
FROM MILAM STREET TO TRAVIS STREET

EXISTING

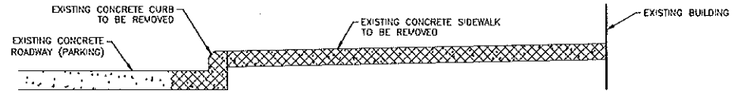


NORTH SIDE
FROM MILAM STREET TO TRAVIS STREET

PROPOSED

NOTE:

1. TYPICAL SECTIONS FOR SIDEWALK TO MEET ADA CROSS SLOPE OF 2% MAX.
2. SHOULD ONSITE CONDITIONS NOT WARRANT TYPICAL SECTIONS, THE ENGINEER WILL DETERMINE THE METHOD OF CONSTRUCTION TO MEET ALL AGENCY STANDARDS.
3. SEE SHEETS 48 & 49 FOR DETAILS NOT SHOWN HERE.



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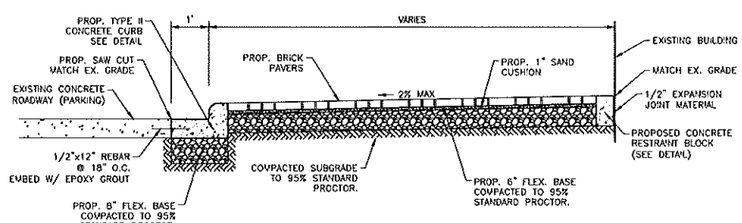


SOUTH SIDE
FROM MILAM STREET TO TRAVIS STREET

PROPOSED

INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

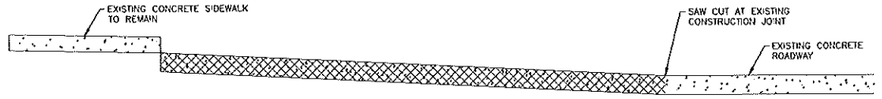
WHITELEY + OLIVER ENGINEERING, LLC

TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421|MWWASSOC.COM

CLIENT: **CITY OF LIBERTY**

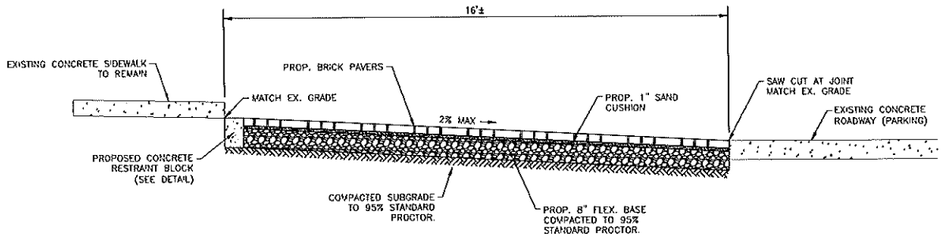
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT SAM HOUSTON STREET TYPICAL SECTIONS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 6
DATE: APR. 2021		
JOB NO. 20-1277	K:/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0



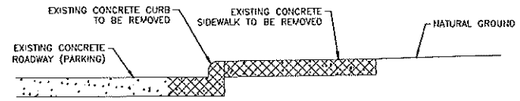
NORTH SIDE
FROM MILAM STREET TO STA. 2+80

EXISTING



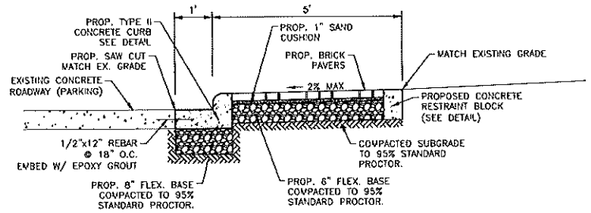
NORTH SIDE
FROM MILAM STREET TO STA. 2+80

PROPOSED



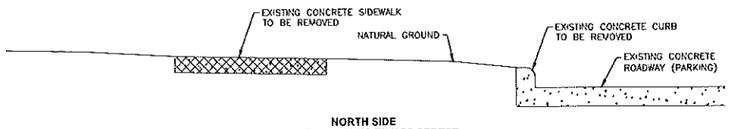
SOUTH SIDE
FROM MILAM STREET TO TRAVIS STREET

EXISTING



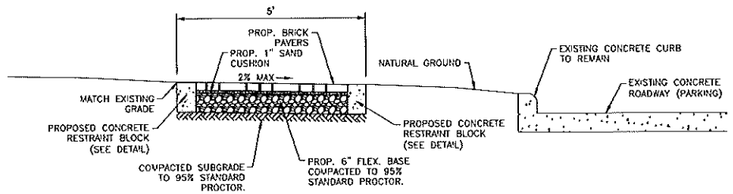
SOUTH SIDE
FROM MILAM STREET TO TRAVIS STREET

PROPOSED



NORTH SIDE
FROM STA. 2+80 TO TRAVIS STREET

EXISTING



NORTH SIDE
FROM STA. 2+80 TO TRAVIS STREET

PROPOSED

NOTE:

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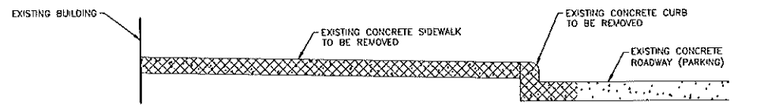
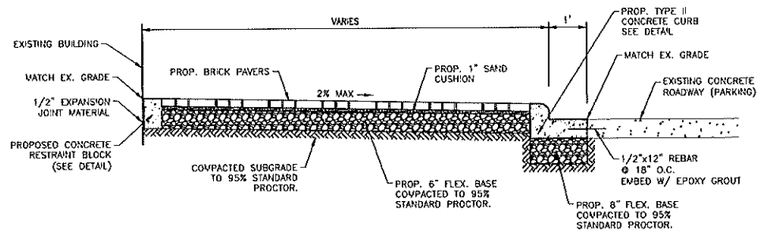
3. SEE SHEETS 48 & 49 FOR DETAILS NOT SHOWN HERE.



NORTH SIDE
FROM TRAVIS STREET TO MAIN STREET

EXISTING



NORTH SIDE
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PROPOSED

INTERIM SUBMITTAL
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TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT:
CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
TRINITY STREET
TYPICAL SECTIONS

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 7
DATE: APR 2021		
JOB NO. 20-1277	W:/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0

GENERAL NOTES:

1. ALLOW STATE, CITY, OR COUNTY FORCES TO ENTER THIS PROJECT TO ACCOMPLISH SUCH WORK AS SHOWN IN THE PLANS (BY OTHERS) AND AS MAY BE DEEMED NECESSARY BY THE ENGINEER.
2. CONTRACTOR SHALL PROVIDE ALL ONSITE GENERAL CONSTRUCTION SURVEYING, LAYOUT, AND ANY OTHER SURVEYING REQUIREMENTS NECESSARY FOR THE CONSTRUCTION OF THE PROJECT.
3. EXISTING MONUMENTS OR PROPERTY CORNERS SHALL NOT BE DISTURBED. THE CONTRACTOR WILL REPLACE AND ACCURATELY RELOCATE ALL REFERENCE POINTS AND CONSTRUCTION STAKES LOST, DESTROYED, OR MOVED SOLELY AT HIS EXPENSE.
4. CONTRACTOR SHALL ASSUME OWNERSHIP FOR ALL DESIGNATED WASTE MATERIAL AND DISPOSE OF IT AT A PLACE OFF OF THE RIGHT OF WAY, UNLESS OTHERWISE APPROVED BY THE ENGINEER. ALL HAULING OF MATERIALS (INCLUDING AUTHORIZED WASTE) WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT.
5. CONTRACTOR SHALL PROCURE ALL THE NECESSARY CITY AND/OR COUNTY PERMITS AND LICENSES. ANY PERMITS OR FEES REQUIRED BY THE CITY OR ANY OTHER ENTITY SHALL BE PAID FOR BY THE CONTRACTOR.
6. CONTRACTOR SHALL MAINTAIN ANY SUCH METHOD OR DEVICE, APPROVED BY THE ENGINEER, NECESSARY TO ENSURE CONTROL AND SAFETY OF THE SITE AT ALL TIMES. USE OF THE CONSTRUCTION SITE BY ANYONE OTHER THAN THE CITY, ENGINEER, CONTRACTOR OR IT'S SUBS AND UTILITY COMPANIES SHALL NOT BE PERMITTED, UNLESS SPECIFIED BY THE CITY OR ENGINEER.
7. REFERENCES TO MANUFACTURER'S TRADE NAME OR CATALOG NUMBERS ARE FOR THE PURPOSE OF IDENTIFICATION ONLY. SIMILAR MATERIALS FROM OTHER MANUFACTURERS ARE PERMITTED IF THEY ARE OF EQUAL QUALITY, COMPLY WITH THE SPECIFICATIONS FOR THIS PROJECT, AND ARE APPROVED.
8. A MINIMUM OF 48-HOUR NOTIFICATION TO THE OWNER AND ENGINEER IS NECESSARY PRIOR TO THE COMMENCEMENT OF WORK.
9. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO CITY AND STATE STANDARDS, EXCEPT AS NOTED HEREIN AND APPROVED BY THE ENGINEER.
10. INGRESS AND EGRESS ADJACENT TO THE PROJECT SHALL BE MAINTAINED BY THE CONTRACTOR AT ALL TIMES. THE CONTRACTOR WILL BE RESPONSIBLE FOR KEEPING MUD AND DEBRIS OFF EXISTING PUBLIC STREETS ADJACENT TO THE SITE.
11. CONTRACTOR SHALL KEEP ONE COMPLETE SET OF PLANS AND SPECIFICATIONS IN GOOD CONDITION ON THE JOB SITE AT ALL TIMES.
12. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITY SHALL BE RESTORED TO AN EQUAL OR BETTER CONDITION AT THE EXPENSE OF THE CONTRACTOR.
13. ALL CULVERTS SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION OPERATIONS. CULVERTS DAMAGED AS A RESULT OF CONTRACTOR'S NEGLIGENCE SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.
14. CONTRACTOR SHALL FURNISH, ERECT, AND MAINTAIN ALL BARRICADES, WARNING SIGNS, AND MARKINGS FOR HAZARDS NECESSARY TO PROTECT THE PUBLIC AND THE WORK SITE. WHEN USED DURING PERIODS OF DARKNESS, SUCH BARRICADES, WARNING SIGNS AND HAZARD MARKINGS SHALL BE SUITABLY ILLUMINATED. ALL TRAFFIC CONTROL DEVICES AND THEIR PLACEMENT SHALL BE IN ACCORDANCE WITH THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
15. CONTRACTOR SHALL PAY FOR ALL REQUIRED TESTING, INCLUDING BUT NOT LIMITED TO REQUIRED DENSITIES FOR SUBGRADE, BASE AND ASSOCIATED MOISTURE-DENSITY RELATIONSHIPS. THE CONTRACTOR WILL SAMPLE ALL CONCRETE AND MAKE AND TEST ALL BEAMS AND CYLINDERS IN ACCORDANCE WITH THE TEST METHODS PROVIDED FOR UNDER THE APPROPRIATE STANDARD SPECIFICATIONS FOR THE VARIOUS ITEMS.
16. CITY FORCES WILL MAINTAIN THE EXISTING SECTION OF STREETS AND ITS APPURTENANCES NOT A PART OF THIS PROJECT EXCEPT THAT THOSE SECTIONS DAMAGED BY THE CONTRACTOR'S FORCES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS ENTIRE EXPENSE.
17. THE CONTRACTOR SHALL MAINTAIN ADEQUATE DRAINAGE THROUGHOUT THE LIMITS OF THE PROJECT DURING ALL CONSTRUCTION PHASES.
18. ALL DRAINAGE STRUCTURES WITHIN THE PROJECT LIMITS SHALL BE CLEANED AND UNOBSTRUCTED AT THE TIME OF ACCEPTANCE BY THE CITY.
19. ALL MATERIALS, LABOR AND INCIDENTALS REQUIRED FOR THE CONTRACTOR TO PROVIDE FOR TRAFFIC ACROSS THE STREETS AND FOR TEMPORARY INGRESS AND EGRESS TO PRIVATE PROPERTY SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY AND SHALL BE CONSIDERED AS INCIDENTAL TO THE VARIOUS BID ITEMS IN THIS PROJECT.
20. ANY STORM WATER PERMIT AND ASSOCIATED FEES REQUIRED FOR CONSTRUCTION OF THIS PROJECT SHALL BE AT THE CONTRACTOR'S EXPENSE. ALSO, ANY TEMPORARY EROSION, SEDIMENT AND WATER CONTROL MEASURES REQUIRED SHALL BE IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS AND ALL WORK AND MATERIALS REQUIRED SHALL BE PAID FOR UNDER THE ITEM "TEMPORARY EROSION, SEDIMENTATION & ENVIRONMENTAL CONTROLS.
21. ALL JOINTS, INCLUDING EXPANSION JOINTS WITH REMOVABLE TACK STRIPS, SHALL BE SEALED WITH SELF-LEVELING JOINT SEALANT.
22. UNLESS OTHERWISE SHOWN ON THE PLANS OR OTHERWISE DIRECTED, COMMENCE WORK AFTER SUNRISE AND ENSURE CONSTRUCTION EQUIPMENT IS OFF THE ROAD BY SUNSET.
23. CONTRACTOR SHALL SCHEDULE WORK IN A MANNER THAT WILL CAUSE MINIMUM INTERFERENCE WITH TRAFFIC AND TO THE GENERAL PUBLIC.
24. WHERE POSSIBLE, PROTECT AND PRESERVE PERMANENT SIGNS, MARKERS, AND DESIGNATIONS OF UNDERGROUND FACILITIES.
25. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE EXISTING BUILDINGS OR EXISTING NATURAL GROUND TOWARDS THE ROADWAY CURB AND GUTTER WITH NO PONDING IN PAVED AREAS AND SHALL NOTIFY THE ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES OR SLOPES.
26. CONTRACTOR SHALL MAINTAIN ADEQUATE ACCESS TO PROPERTY AND BUSINESSES THROUGHOUT THE PROJECT. IT IS UPON THE CONTRACTOR TO NOTIFY AND COORDINATE WITH THE PROPERTY OWNERS. THIS WORK WILL NOT BE PAID SEPARATELY AND SHALL BE CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.
27. CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING THE EXISTING STORM DRAIN PIPE LOCATED UNDER THE SIDEWALK AND WITHIN THE CURB. DAMAGE OR REPLACEMENT AS NECESSARY WILL BE AT THE CONTRACTORS EXPENSIVE. THIS WORK AND MATERIALS FURNISHED, ALONG WITH EXCAVATION AND EMBANKMENT WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS ITEMS.
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPORT AND PROTECTION OF THE EXISTING COLUMNS IN THE SIDEWALK WHILE SAW-CUTTING AROUND THEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROCEDURE IN PERFORMING THE WORK AROUND THE COLUMNS. THIS WORK SHALL NOT BE PAID FOR DIRECTLY AND SHALL BE CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.
29. THE CONTRACTOR SHALL TAKE CARE TO PREVENT TRACKING OF SEDIMENT ONTO ADJACENT PROPERTY, AND SHALL SWEEP AS NECESSARY TO REMOVE ANY TRACKED MATERIAL.
30. IT IS NOT ANTICIPATED THAT ANY EROSION, SEDIMENTATION, OR ENVIRONMENTAL CONTROL DEVICES WILL BE NEEDED ON THIS PROJECT. IN THE EVENT THAT SUCH CONTROLS ARE NECESSARY, THE SW3P FOR THIS PROJECT WILL CONSIST OF THE USE OF ANY TEMPORARY EROSION CONTROL MEASURES DEEMED NECESSARY BY THE ENGINEER AND AS APPROVED UNDER THIS ITEM. PAYMENT FOR THIS WORK WILL BE DETERMINED AS PROVIDED IN THE CONTRACT DOCUMENTS FOR CHANGE ORDERS.

UTILITY NOTES:

1. UTILITY LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT EXACT. THE ENGINEER AND THE OWNER ASSUME NO RESPONSIBILITY FOR VARIATION IN LOCATION AND GRADES. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING FACILITY PRIOR TO CONSTRUCTION OF PROPOSED FACILITIES. DISCREPANCIES BETWEEN THE TWO SHALL BE IMMEDIATELY REPORTED TO THE OWNER OR ENGINEER.
2. THERE ARE EXISTING WATER VALVES, WATER METERS, POWER POLES, GUY ANCHORS AND OTHER UTILITIES WITHIN THE PROJECT LIMITS. CONTRACTOR TO USE CAUSE NOT TO CAUSE DAMAGE.
3. CONTRACTOR WILL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES WITH EXISTING FACILITIES IN THE AREAS OF CONSTRUCTION 48 HOURS PRIOR TO CONSTRUCTION IN AREAS OF POSSIBLE UNDERGROUND UTILITIES WHICH MAY OR NOT BE SHOWN ON DRAWING. CONTRACTOR IS RESPONSIBLE FOR MAKING THE TEXAS ONE CALL AND FOLLOWING ALL REQUIREMENTS SET FORTH THROUGH THAT AGENCY. TEXAS ONE CALL, TOLL-FREE 1-800-245-4545. THIS ACTION DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITIES UNDER THE TERMS OF THE CONTRACT OR THE PLANS AND SPECIFICATIONS. DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AND RESTORED TO SERVICE IN A TIMELY MANNER AT NO EXPENSE TO THE CITY.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITY LINES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES AND SHALL PROMPTLY REPAIR SAME OR MAKE ARRANGEMENTS FOR SUCH REPAIR WITH THE OWNER OF THE UTILITY INVOLVED.
5. IN ALL CASES THE CONTRACTOR SHALL INFORM AND COORDINATE WORK WITH THE OWNERS OF THE VARIOUS UTILITIES SUFFICIENTLY IN ADVANCE OF THE CONTRACTOR'S OPERATION TO ENABLE SUCH UTILITY OWNERS, IN ADVANCE OF ANY WORK WHICH MIGHT DAMAGE, INTERFERE WITH OR REQUIRE ADJUSTMENTS TO UTILITIES ALONG OR ADJACENT TO THE WORK, TO REROUTE, PROVIDE TEMPORARY DETOURS, OR TO MAKE OTHER ADJUSTMENTS TO UTILITIES IN ORDER THAT THE CONTRACTOR MAY PROCEED WITH HIS WORK WITH A MINIMUM AMOUNT OF DELAY AND EXPENSE.
6. THE CONTRACTOR SHALL COOPERATE WITH ALL UTILITY OWNERS CONCERNED IN EFFECTING ANY UTILITY ADJUSTMENTS NECESSARY AND SHALL NOT HOLD THE OWNER OR ENGINEER LIABLE FOR ANY EXPENSES DUE TO DELAY OR ADDITIONAL WORK BECAUSE OF CONFLICTS. THE CONTRACTOR SHALL ALLOW UTILITY AND/OR PIPELINE COMPANIES TO ENTER THIS PROJECT TO ACCOMPLISH SUCH WORK AS REQUIRED FOR PLACEMENT OR PROTECTION OF THEIR SERVICES AND AS MAY BE DEEMED NECESSARY BY THE ENGINEER.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING THE EXACT LOCATION OF UTILITY LINES AND OF ANY OTHERS WHICH MAY EXIST. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE UTILITY INVOLVED IN CASE OF CONFLICT OR DAMAGE AND THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE THAT OCCURS. WHERE THE CONTRACTOR ENCOUNTERS ABANDONED LINES THAT INTERFERE WITH THE CONSTRUCTION OF THIS PROJECT, SUCH LINES SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK AND IT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS IN THE CONTRACT.
8. IF OVERHEAD OR UNDERGROUND POWER LINES NEED TO BE DE-ENERGIZED, CONTACT THE ELECTRICAL SERVICE PROVIDER TO PERFORM THIS WORK. COSTS ASSOCIATED WITH DE-ENERGIZING THE POWER LINES OR OTHER PROTECTIVE MEASURES REQUIRED ARE AT NO EXPENSE TO THE CITY.
9. IF WORKING NEAR POWER LINES, COMPLY WITH THE APPROPRIATE SECTIONS OF TEXAS STATE LAW AND FEDERAL REGULATIONS RELATING TO THE TYPE OF WORK INVOLVED.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL PUBLIC UTILITIES IN THE CONSTRUCTION OF THIS PROJECT. ALL MANHOLES, CLEAN-OUTS, WATER VALVES, WATER METERS, BOXES, FIRE HYDRANTS, ETC. MUST BE ADJUSTED TO PROPER LINE AND GRADE BY THE CONTRACTOR PRIOR TO AND AFTER THE PLACING OF PERMANENT PAVING. UTILITIES MUST BE MAINTAINED TO PROPER LINE AND GRADE DURING CONSTRUCTION OF THE PAVING FOR THIS DEVELOPMENT.
11. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL UTILITY COORDINATION AND THERE WILL BE NO COST TO THE OWNER (CITY OF LIBERTY) FOR DELAYS RELATED TO ANY UTILITY ADJUSTMENTS.

ITEM 5 CONTROL OF THE WORK

1. ANY EARTHWORK CROSS-SECTIONS, COMPUTER PRINTOUTS, DATA FILES AND ANY OTHER INFORMATION PROVIDED IS FOR NON-CONSTRUCTION PURPOSES ONLY AND IT IS THE RESPONSIBILITY OF THE PROSPECTIVE BIDDER TO VALIDATE THE DATA WITH THE APPROPRIATE PLANS, SPECIFICATIONS AND ESTIMATES FOR THE PROJECTS. CONTACT THE AREA OFFICE FOR INFORMATION ON AVAILABILITY.
2. VERIFY ALL HORIZONTAL AND VERTICAL CONTROL PRIOR TO BEGINNING WORK. NOTIFY THE ENGINEER IMMEDIATELY IF DISCREPANCIES ARE DISCOVERED IN THE HORIZONTAL CONTROL OR THE BENCHMARK DATA.

ITEM 7 LEGAL RELATIONS AND RESPONSIBILITIES

1. FURNISH ALL MATERIALS, LABOR AND INCIDENTALS REQUIRED TO PROVIDE FOR TRAFFIC ACROSS THE HIGHWAY AND FOR TEMPORARY INGRESS AND EGRESS TO PRIVATE PROPERTY IN ACCORDANCE WITH ARTICLE 7.7 OF THE STANDARD SPECIFICATIONS AT NO ADDITIONAL COST TO THE STATE. MAINTAIN INGRESS AND EGRESS TO THE ADJACENT PROPERTY AT ALL TIMES. CONSIDER THIS WORK TO BE SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT.
2. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR THE IMMEDIATE REMOVAL OF ANY MATERIAL THAT GETS UPON ANY VEHICLE AS A RESULT OF THEIR OPERATION.
3. PERSONAL VEHICLES OF THE CONTRACTOR'S EMPLOYEES SHALL NOT BE PARKED WITHIN THE RIGHT-OF-WAY AT ANY TIME INCLUDING ANY SECTION CLOSED TO PUBLIC TRAFFIC, UNLESS THE VEHICLE IS BEING UTILIZED FOR CONSTRUCTION PROCEDURES. HOWEVER, THE CONTRACTOR'S EMPLOYEES MAY PARK ON THE RIGHT-OF-WAY AT SITES NEARBY WHERE PUBLIC PARKING IS ALLOWED.
4. MAINTAIN INGRESS AND EGRESS TO THE ADJACENT PROPERTY AT ALL TIMES. CONSIDER THIS WORK TO BE SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT.

ITEM 8 PROSECUTION AND PROGRESS

1. WORK MAY BE PERFORMED ON SATURDAY WHEN APPROVED BY THE ENGINEER.
2. THE CONTRACTOR WILL BE EXPECTED TO SCHEDULE THIS WORK SO THAT THE BASE PLACEMENT OPERATIONS WILL FOLLOW THE SUBGRADE WORK AS CLOSELY AS PRACTICAL IN ORDER TO REDUCE THE HAZARD TO THE TRAVELING PUBLIC AND PREVENT UNDUE DELAY FROM WET WEATHER.
3. THE CONSTRUCTION SEQUENCE MAY BE MODIFIED AS DIRECTED AND APPROVED BY THE ENGINEER.

ITEM 104 REMOVING CONCRETE

1. PROVIDE FULL-DEPTH SAW CUTTING FOR REMOVAL OF EXISTING CONCRETE SIDEWALKS AND CURBS AT LIMITS SHOWN ON THE PLANS. CONSIDER THIS WORK TO BE SUBSIDIARY TO THE VARIOUS BID ITEMS OF THE CONTRACT.
2. REMOVE THE EXISTING CONCRETE CURB AND REBAR FLUSH WITH THE CONCRETE PAVEMENT.
3. ALL REMOVED CONCRETE SHALL BE DESIGNATED AS WASTE MATERIAL AND SHALL BECOME PROPERTY OF THE CONTRACTOR.

ITEM 110 EXCAVATION

1. DO NOT WINDROW OR STOCKPILE MATERIAL NEXT TO OR ALONG THE ROADWAY. MOVE EXCESS MATERIAL FROM THE PROJECT DAILY.

ITEM 247 FLEXIBLE BASE

1. USE TYPE A, GRADE 1-2 FLEXIBLE BASE AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT CERTAIN EXISTING AND/OR PROPOSED STRUCTURES MAY BE WITHIN THE LIMITS OF THE FLEXIBLE BASE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PERFORM CONSTRUCTION OPERATIONS WITHOUT DAMAGE TO THESE STRUCTURES.
3. CONSTRUCT FLEXIBLE BASE AT A MAXIMUM OF 8 INCH LIFTS.
4. COMPACTION METHOD SPECIFIED AS ORDINARY COMPACTION.
5. COMPACT THE FLEX BASE TO AT LEAST 95% OF THE MAXIMUM DENSITY.
6. ANY MATERIAL NEEDED FOR FILL AFTER REMOVAL OF EXISTING SIDEWALK, ETC. TO INSTALL THE FLEXIBLE BASE TO THE PROPOSED GRADE SHALL BE CONSIDERED SUBSIDIARY TO THIS BID ITEM. THE MATERIAL SHALL BE AN APPROVED (60/40) SELECT FILL.

ITEM 360 CONCRETE PAVEMENT

1. CONCRETE PLACEMENT WILL NOT BE PERMITTED WHEN IMPENDING WEATHER CONDITIONS, IN THE OPINION OF THE ENGINEER, MAY RESULT IN RAINFALL OR LOW TEMPERATURES WHICH WILL IMPAIR THE QUALITY OF THE FINISHED WORK.
2. USE CLASS A CONCRETE.

ITEM 420 CONCRETE STRUCTURES

1. USE CLASS A CONCRETE FOR ALL PROPOSED STRUCTURES UNDER THIS CONTRACT.
2. WATERPROOFING SHALL BE PERFORMED NEXT TO THE EXISTING BUILDINGS. THE MATERIAL SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO CONCRETE STRUCTURES – RESTRAINT BLOCK, AND WILL NOT BE PAID SEPARATELY.
3. THE CONCRETE STRUCTURE – RESTRAINT BLOCK, SHALL BE REINFORCED AS SHOWN IN THE DETAIL.
4. ANY MATERIAL NEEDED FOR FILL AFTER REMOVAL OF EXISTING CURB, SIDEWALK, ETC. TO INSTALL THE CONCRETE STRUCTURES SHALL BE CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS. THE MATERIAL SHALL BE AN APPROVED (60/40) SELECT FILL.

ITEM 427 SURFACE FINISHES FOR CONCRETE

1. ALL EXPOSED CONCRETE SURFACES SHALL HAVE A BROOM/BRUSH FINISH.

ITEM 496 REMOVING STRUCTURES

1. ALL PIPES, SIGNS AND MATERIAL REMOVED FROM THE PROJECT, UNLESS OTHERWISE SHOWN ON THE PLANS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED OF OFF THE RIGHT OF WAY UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING

1. PROVIDE ADDITIONAL CONTROL FEATURES AS REQUIRED AT ALL ACCESS POINTS OF LOCAL BUSINESSES WITHIN THE WORK SPACE TO PROTECT PEDESTRIAN TRAFFIC. THIS WORK WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.
2. ENSURE THE CONTRACTOR'S RESPONSIBLE PERSON (CRP) FOR BARRICADES, SIGNS AND TRAFFIC HANDLING IS AVAILABLE AT ALL TIMES AND ABLE TO RECEIVE INSTRUCTIONS FROM THE ENGINEER OR AUTHORIZED DEPARTMENT REPRESENTATIVE. THE CRP SHALL BE A PERSON THAT IS USUALLY AT THE PROJECT SITE DURING NORMAL WORKING HOURS.
3. THE CONTRACTOR RESPONSIBLE PERSON (CRP) FOR WORK ZONE TRAFFIC CONTROLS SHALL INSPECT AND INSURE ANY DEFICIENCIES ARE CORRECTED EACH AND EVERY DAY THROUGHOUT THE DURATION OF THIS CONTRACT. CAREFULLY MONITOR THE WORK SITE TO ENSURE THAT ALL DELINEATION DEVICES, SIGNS, AND PAVEMENT MARKINGS ARE CLEAN, UPRIGHT, IN GOOD REPAIR, PROPERLY LOCATED, OPERATING EFFECTIVELY, AND IN AN OVERALL HIGHLY VISIBLE CONDITION. PROBLEMS BROUGHT TO THE CONTRACTOR'S ATTENTION SHALL BE CORRECTED AS SOON AS POSSIBLE AND BY NO LATER THAN THE NEXT DAY. THIS SHALL INCLUDE CORRECTIONS NECESSARY DUE TO ACTS OF VANDALISM OR ACCIDENTS.
4. SIGNS AND BARRICADES SHOWN TO BE PLACED IN THE TRAFFIC CONTROL PLAN SHEETS ARE TO REMAIN IN PLACE AND MAINTAINED FOR AS LONG AS THE RELEVANT CONDITION EXISTS.
5. CONSTRUCT ALL WORK ZONE SIGNS, SIGN SUPPORTS, AND BARRICADES FROM MATERIAL OTHER THAN WOOD UNLESS APPROVED OTHERWISE BY THE ENGINEER. METAL POSTS, IF USED, ARE TO BE GALVANIZED. ALUMINUM SIGNS, IF USED, SHALL MEET THE FOLLOWING MINIMUM THICKNESS REQUIREMENTS:

SQUARE FEET	MINIMUM THICKNESS
LESS THAN 7.5	0.080 INCHES
7.5 TO 15	0.100 INCHES
GREATER THAN 15	0.125 INCHES

6. CAREFULLY MONITOR THE WORK SITE TO ENSURE THAT ALL DELINEATION DEVICES, SIGNS, AND PAVEMENT MARKINGS ARE CLEAN, UPRIGHT, IN GOOD REPAIR, PROPERLY LOCATED, OPERATING EFFECTIVELY, AND IN AN OVERALL HIGHLY VISIBLE CONDITION. PROBLEMS BROUGHT TO THE CONTRACTOR'S ATTENTION SHALL BE CORRECTED AS SOON AS POSSIBLE AND BY NO LATER THAN THE NEXT DAY. THIS SHALL INCLUDE CORRECTIONS NECESSARY DUE TO ACTS OF VANDALISM OR ACCIDENTS.

ITEM 528 COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS

1. REMOVE EXISTING BRICK, CONCRETE, AND ANY UNDERLAYING STRUCTURES THAT WILL BE IN CONFLICT WITH THE CONSTRUCTION OF THE BRICK PAVER SIDEWALK'S CONSTRUCTION LIMITS, INCLUDING THE RESTRAINT BLOCK. REMOVAL OF THIS MATERIAL WILL NOT BE PAID FOR SEPARATELY AND SHALL BE CONSIDERED SUBSIDIARY TO THIS BID ITEM.
2. THE BRICK PAVER COLORS SHALL CONSIST OF SMOKE GRAY BORDER AND CRIMSON RED INLAY AS SHOWN ON THE DETAILS IN THE PLANS. THE COLORS SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER.
3. CONTRACTOR TO PROVIDE 1" SAND CUSHION AS SHOWN IN THE PLANS AS A LEVELING COURSE. THIS MATERIAL WILL NOT BE PAID FOR SEPARATELY AND SHALL BE CONSIDERED SUBSIDIARY TO THIS BID ITEM.
4. WATER METER BOXES SHALL BE REPLACED WITH NO. 37 METER BOX AND SHALL BE SET FLUSH WITH THE BRICK PAVERS. WATER VALVES SHALL BE ADJUSTED AS NEEDED TO MATCH BRICK PAVERS. WHERE NECESSARY, ADJUSTABLE VALVE BOXES SHALL BE INSTALLED. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK AND IT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS IN THE CONTRACT.
5. THERE WILL BE NO DIRECT PAYMENT FOR PROPOSED RAMPS SHOWN IN THE PLANS. RAMPS WILL NOT BE PAID FOR SEPARATELY AND SHALL BE CONSIDERED SUBSIDIARY TO THIS BID ITEM.

ITEM 610 ROADWAY ILLUMINATION ASSEMBLIES

1. PROVIDE ROADWAY ILLUMINATION ASSEMBLIES IN ACCORDANCE WITH DETAILS SHOWN IN PLANS.
2. THE WORK PERFORMED AND MATERIAL FURNISHED IN ACCORDANCE WITH THIS ITEM WILL BE PAID FOR AT THE UNIT PRICE BID FOR EACH ASSEMBLY. THIS PRICE IS FULL COMPENSATION FOR INSTALLING CONCRETE FOUNDATIONS, CONDUIT AND CONDUCTORS INTERNAL TO THE FOUNDATION AND ASSEMBLY AS WELL AS FOR FURNISHING, INSTALLING AND TESTING ANCHOR BOLT ASSEMBLIES, TEMPLATES, BRACKETS, BASES, POLES, LUMINAIRES; CONDUCTING SYSTEM PERFORMANCE TESTING; AND MATERIALS, LABOR, TOOLS AND INCIDENTALS.

ITEM 618 CONDUIT

1. CAP, NOT GLUE, OPEN ENDS OF CONDUIT.
2. IF CASING IS REQUIRED TO PLACE BORED CONDUIT, CONSIDER THE CASING INCIDENTAL AND SUBSIDIARY TO THE CONDUIT.
3. ENSURE OPEN TRENCHES AND EXCAVATIONS ARE FILLED AT THE END OF EACH WORK DAY.
4. WHEN BACKFILLING BORE PITS, ENSURE THAT THE CONDUIT DOES NOT BECOME DAMAGED DURING INSTALLATION OR DUE TO ANY SETTLING OF THE BACKFILL MATERIAL. COMPACT SELECT BACKFILL (USE TYPE SM OR SC) IN THREE EQUAL LIFTS TO THE BOTTOM OF THE CONDUIT; OR IF SAND IS USED, IT MUST BE PLACED TO A POINT 2 INCHES ABOVE THE CONDUIT. BACKFILL DENSITY SHALL BE EQUAL TO THE EXISTING SOIL. EXERCISE DUE CARE TO PREVENT ANY MATERIAL FROM ENTERING THE CONDUIT.
5. PITS FOR BORING SHALL NOT BE CLOSER THAN 3 FEET FROM EDGE OF PAVEMENT UNLESS OTHERWISE APPROVED. WATER JETTING WILL NOT BE PERMITTED. AT THE CLOSE OF WORK EACH DAY, COVER ALL OPEN PITS AND BARRICADE FOR SAFETY.
6. WHEN CONDUIT IS LAID IN A TRENCH OR BORED, MINIMUM DEPTH TO THE TOP OF THE CONDUIT SHALL BE 2 FEET WHERE OBSTRUCTIONS PREVENT LAYING CONDUIT AT THIS DEPTH, PLACE CONDUIT AT THE MAXIMUM DEPTH POSSIBLE.
7. CEMENT STABILIZED SAND BACKFILL SHALL BE CONSIDERED SUBSIDIARY TO THIS ITEM.

ITEM 620 ELECTRICAL CONDUCTORS

1. ALL CONDUCTORS ARE TO BE CONTINUOUS WITHOUT SPLICE FROM TERMINAL POINT TO TERMINAL POINT OR AS OTHERWISE DIRECTED BY THE ENGINEER. NO ALUMINUM CONDUCTORS WILL BE ALLOWED ON THIS PROJECT.
2. ALL ELECTRICAL INSTALLATIONS MUST COMPLY WITH THE MOST RECENT VERSION OF ALL APPLICABLE LAWS, RULES, REGULATIONS, & ORDINANCES OF ALL GOVERNING CODES & AUTHORITIES.

ITEM 624 GROUND BOXES

1. LOCATION AND ESTIMATED NUMBER OF GROUND BOXES ARE DIAGRAMMATIC ONLY AND MAY VARY TO ACCOMMODATE FIELD CONDITIONS AS DIRECTED.
2. THE CONCRETE APRON SHALL NOT BE PAID FOR SEPARATELY AND SHALL BE CONSIDERED SUBSIDIARY TO THIS BID ITEM.

ITEM 628 ELECTRICAL SERVICES

1. CONSTRUCT ELECTRICAL SERVICES AS SHOWN ON THE ED SHEETS. MAKE ALL ARRANGEMENTS FOR ELECTRICAL SERVICES AND COMPLY WITH LOCAL STANDARDS FOR PROPER INSTALLATION.
2. PROVIDE LOCKABLE SERVICE ENCLOSURE EQUIPPED WITH MASTER #2195 PADLOCK WITH TWO KEYS.

ITEM 644 SMALL ROADSIDE SIGN SUPPORTS AND ASSEMBLIES

1. ERECT ALL SIGNS ACCORDING TO THE LOCATIONS SHOWN ON THE PLANS.
2. CONSTRUCT SIGN FOUNDATION TO BE BELOW BRICK PAVERS. CONSTRUCT BRICK PAVERS UP TO SIGN POST.
3. EXISTING SUPPORTS AND POLES SHALL NOT BE REUSED, AND SHALL BECOME THE PROPERTY OF THE CONTRACTOR.
4. ALL PROPOSED SIGNS SHALL INCLUDE NEW FOUNDATIONS, SUPPORTS AND POLES.

SUMMARY OF SMALL SIGNS

LOCATION (STREET)	SIGN NUMBER	SIGN TYPE	ACTION	EXISTING STA.	EXISTING OFFSET	PROPOSED STA.	PROPOSED OFFSET
MILAM	1	STOP	REPLACE	3+67.07	23.20'RT	3+63.91	25.00'RT
TRAVIS		POLE	REMOVE	1+95.10	37.45'LT		
	2	STOP	REPLACE	3+70.33	30.98'RT	3+70.33	30.98'RT
	3	PARKING	REINSTALL	6+24.41	28.89'LT	6+24.41	28.89'LT
	4	PARKING	REINSTALL	6+70.79	28.81'LT	6+70.79	28.81'LT
MAIN		POLE	REMOVE	0+70.90	18.63'LT		
		ADVERTISING	REMOVE	2+71.91	30.41'RT		
		ADVERTISING	REMOVE	2+93.93	30.29'RT		
	5	HISTORICAL	REINSTALL	3+69.50	37.51'RT	3+69.50	37.51'RT
	6	STREET	REINSTALL	4+22.09	32.79'RT	4+22.09	32.79'RT
		POLE	REMOVE	4+60.80	30.92'RT		
	7	PARKING	REPLACE	4+89.04	31.30'RT	4+89.04	31.30'RT
	8	PARKING	REPLACE	5+42.55	30.86'RT	5+42.55	30.86'RT
	9	PARKING	REPLACE	5+92.96	31.04'RT	5+92.96	31.04'RT
		POLE	REMOVE	7+32.82	30.94'RT		
SAM HOUSTON		TRESPASSING	REMOVE	1+23.52	23.22'RT		
	10	STOP	REPLACE	4+40.95	19.79'RT	4+40.95	19.79'RT
TRINITY	11	STOP	REPLACE	5+02.83	14.55'LT	5+03.50	22.51'LT
	12	PARKING	REPLACE	6+29.80	14.28'LT	6+29.80	14.28'LT
	13	ONE WAY	REPLACE	8+23.97	8.86'LT	8+23.97	8.86'LT

NOTE: SIGN FACES MARKED AS REINSTALL MAY BE REUSED

QUANTITY SUMMARY

ITEM CODE	DESC CODE	DESCRIPTION	UNIT	TOTAL
104	6015	REMOVING CONCRETE/ASPHALT (SIDEWALKS)	SY	4,977
104	6029	REMOVING CONCRETE (CURB AND GUTTER)	LF	3,540
110	6001	EXCAVATION	CY	1,331
247	6041	FL BS (CMP IN PLACE)(TY A GR 1-2)(FINAL POS)	CY	869
420	6003	CONCRETE STRUCTURES (RESTRAINT BLOCK)	SY	375
500	6001	MOBILIZATION	LS	1
502	6001	BARRICADES, SIGNS, AND TRAFFIC HANDLING	MO	12
528	6004	LANDSCAPE PAVERS	SY	4,424
529	6004	CONC CURB & GUTTER (TY II)	LF	3,540
610	6001	ILLUMINATION ASSEMBLY AND FOUNDATION	EA	37
610	6002	ILLUMINATION ASSEMBLY AND FOUNDATION W/CONCRETE APRON	EA	30
618	6023	CONDT (PVC) (SCHD 40)(2")	LF	5,225
620	6003	ELEC CONDT (NO. 12) BARE	LF	5,225
620	6004	ELEC CONDT (NO. 12) INSULATED	LF	10,450
624	6001	GROUND BOX (TYPE A)	EA	31
628	6001	ELC SRV TY A 120/240	EA	10
644	6001	REPLACE SIGN	EA	9
644	6075	RE-INSTALL SIGN WITH NEW SUPPORT	EA	4
644	6076	REMOVE SIGN	EA	7

INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

WHITELEY OLIVER ENGINEERING, LLC

TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: **CITY OF LIBERTY**

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT GENERAL NOTES & ESTIMATED QUANTITIES

DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 8
DATE: APR 2021		
JOB NO. 20-1277	#/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg	REV. 0

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

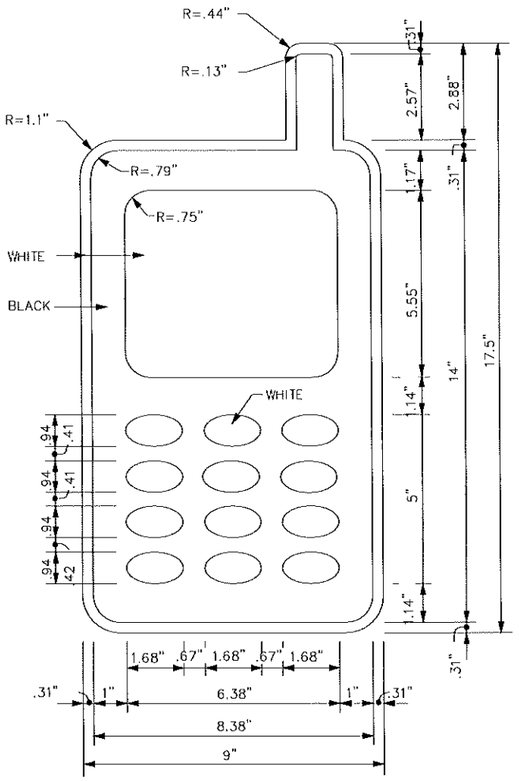
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

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



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

SIGN DETAIL (G20-10T)

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

Texas Department of Transportation
Traffic Operations Division – TE
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL – SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 4-03 5-10 8-14 9-07 7-13	DIST	COUNTY		SHEET NO. 10

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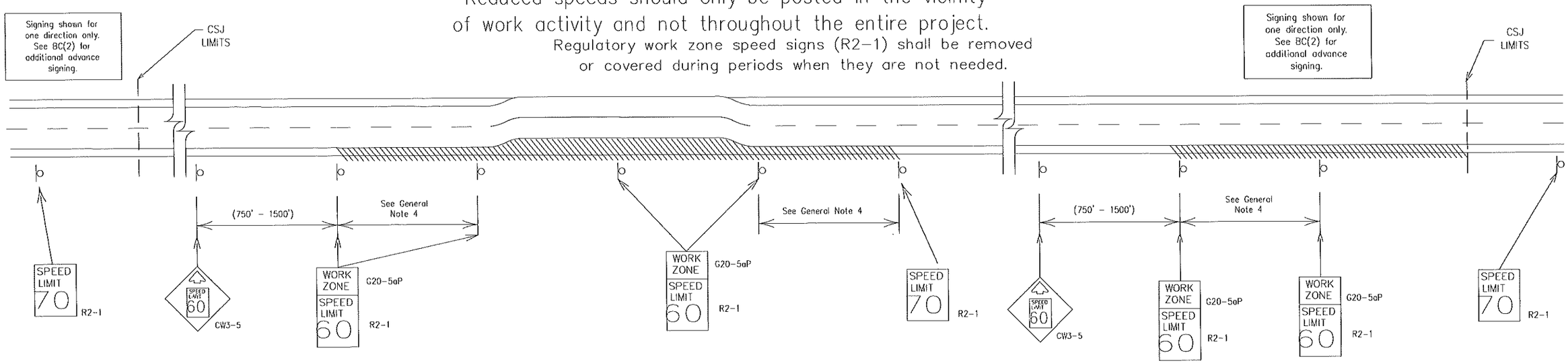
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

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

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the travelled way.

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

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	DIST	COUNTY		SHEET NO. 12

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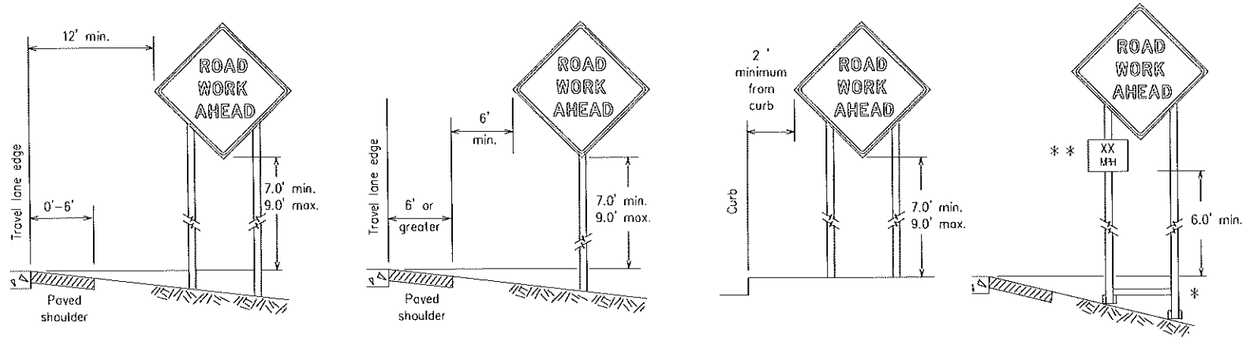
DATE:
FILE:

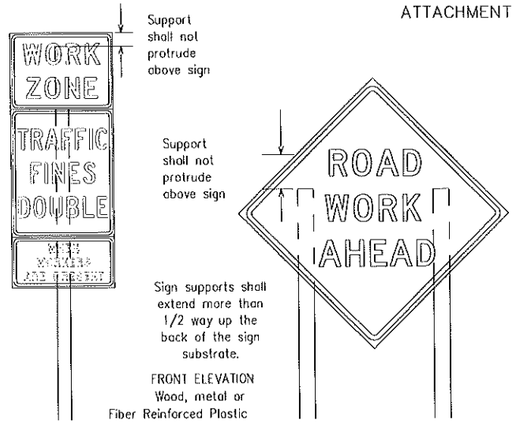
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

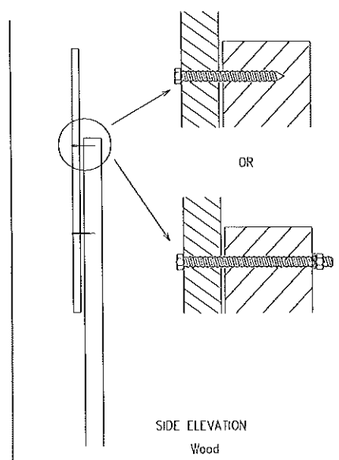


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

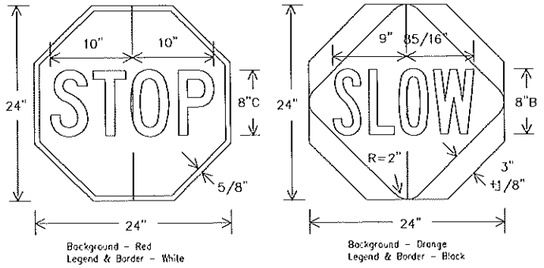
Nails shall NOT be allowed.

Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height,the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary – work that occupies a location more than 3 days.
   b. Intermediate-term stationary – work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary – daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration – work that occupies a location up to 1 hour.
   e. Mobile – work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. 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.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
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 shall 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 fasteners. 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.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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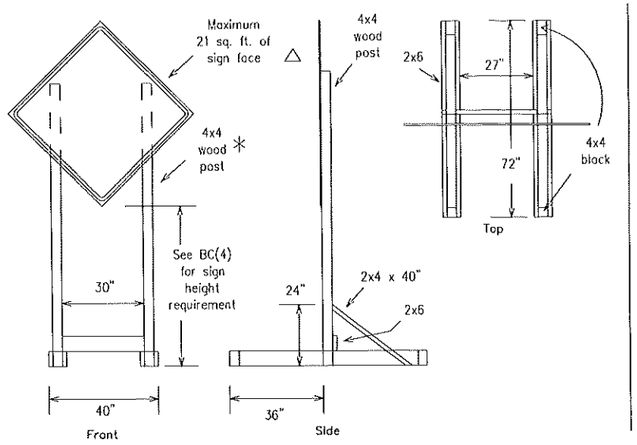
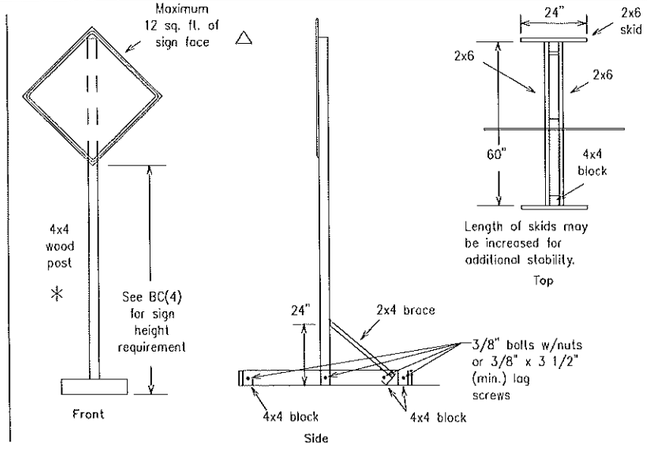
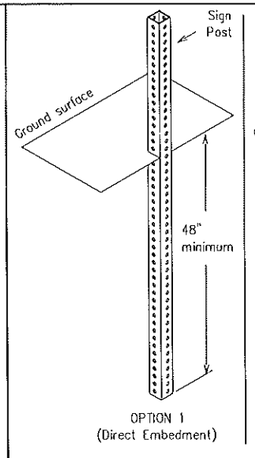
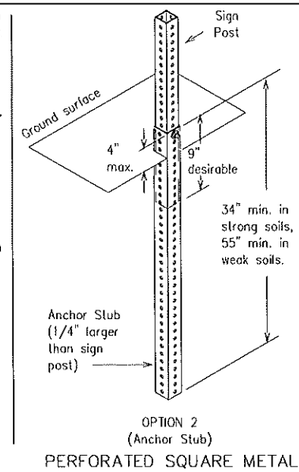


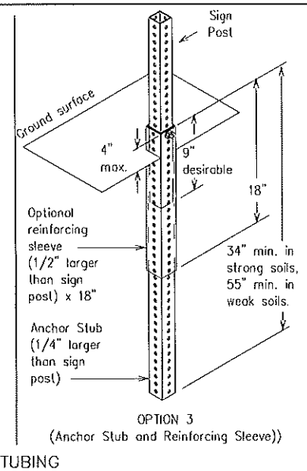


SKID MOUNTED WOOD SIGN SUPPORTS

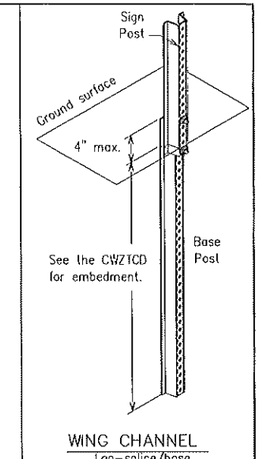
LONG/INTERMEDIATE TERM STATIONARY – PORTABLE SKID MOUNTED SIGN SUPPORTS □





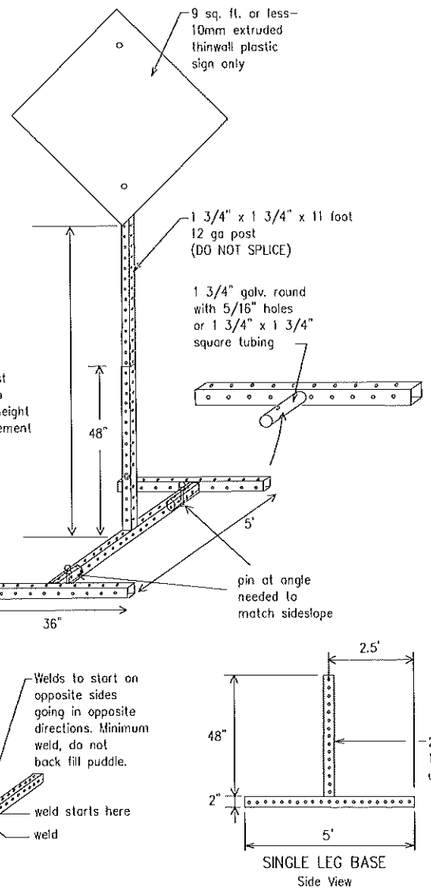


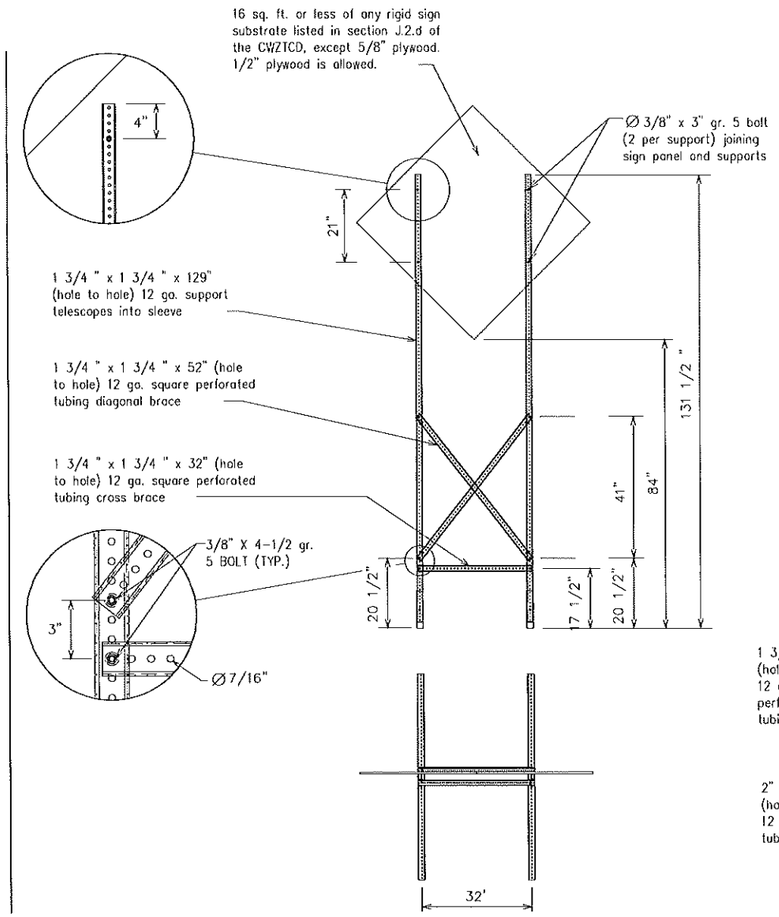
PERFORATED SQUARE METAL TUBING

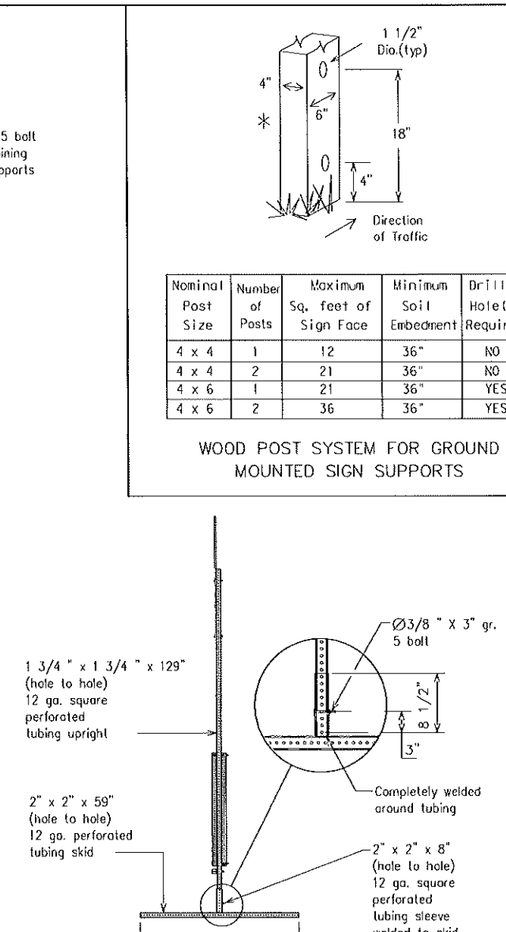


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

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

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

✳ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be pointed white.

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

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)–14

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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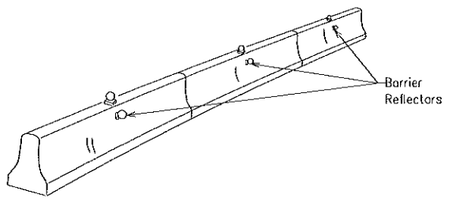
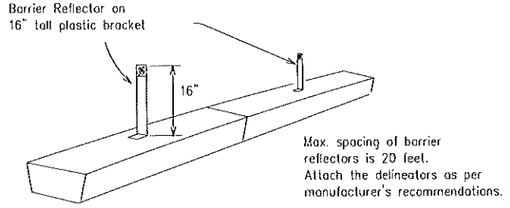
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

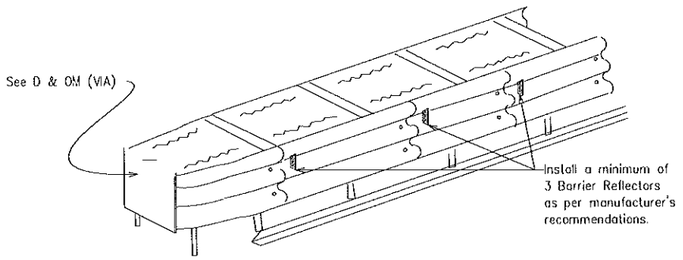


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

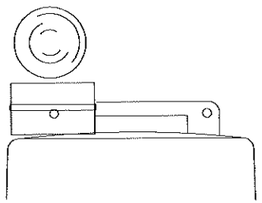


DELINEATION OF END TREATMENTS

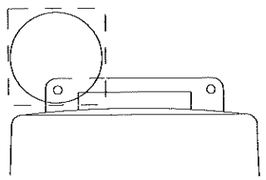
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

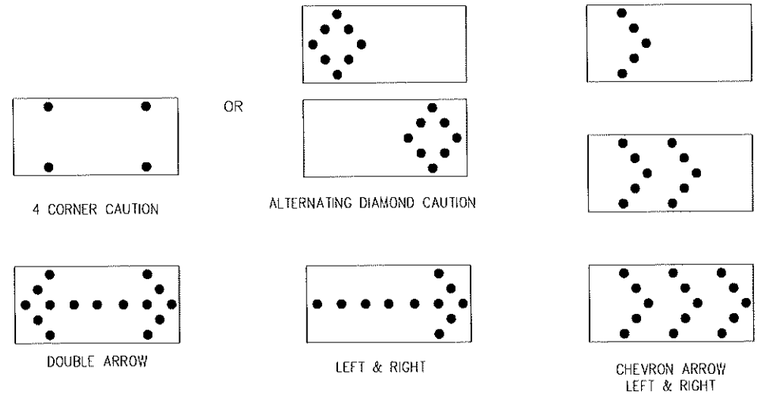
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage.
   The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
L	⌐	⌐	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

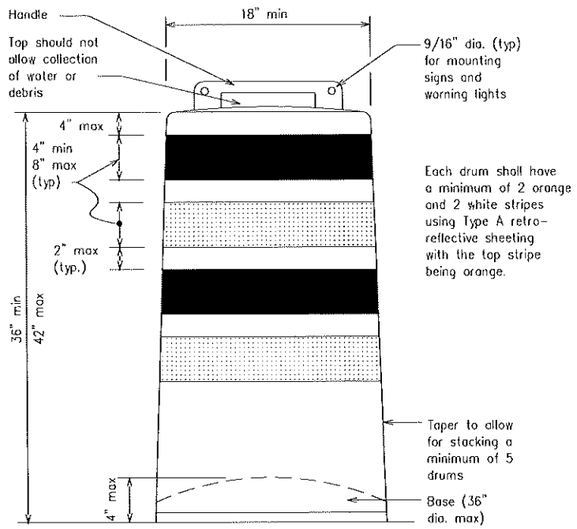
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

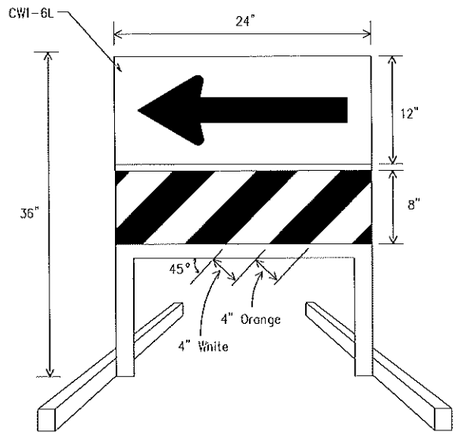
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

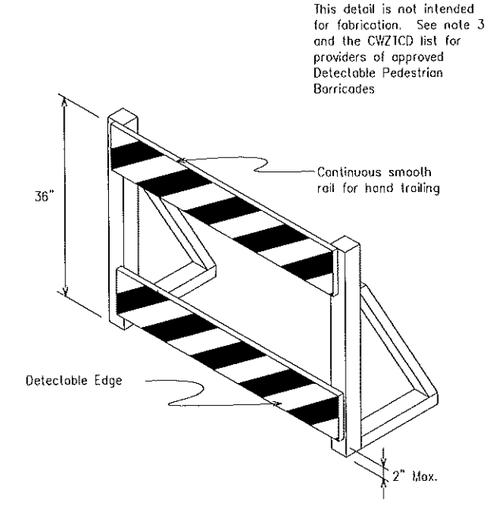
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.





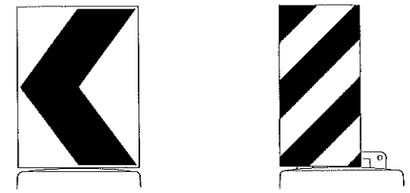
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B or Type C Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B or Type C Orange$_{FL}$ sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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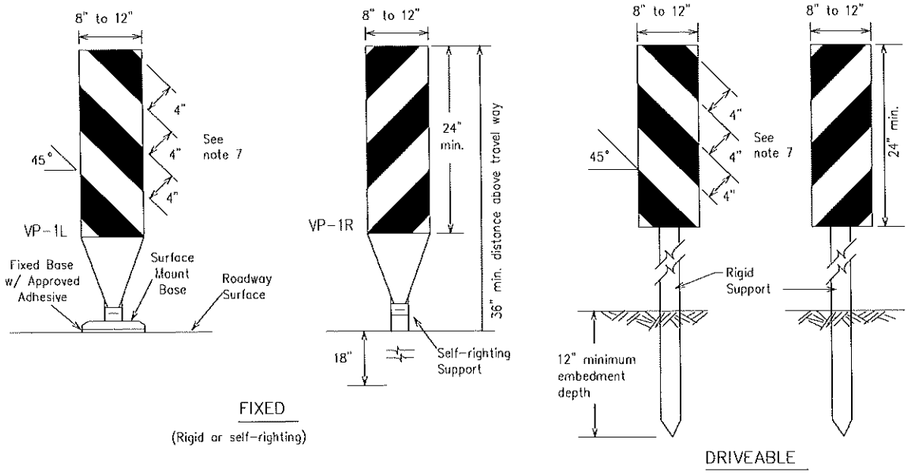
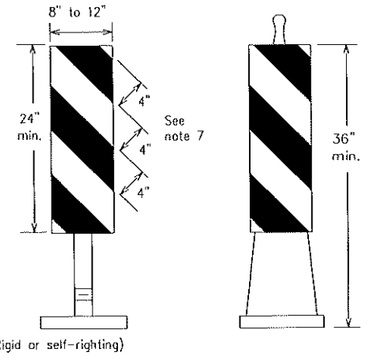


FIXED

(Rigid or self-righting)

DRIVEABLE

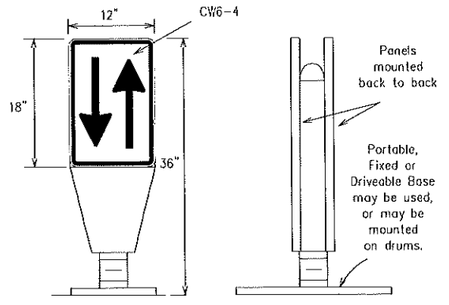


(Rigid or self-righting)

PORTABLE

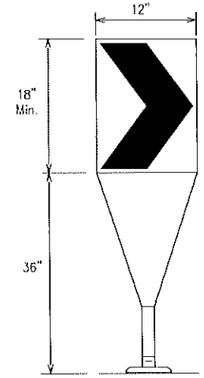
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B or Type C conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



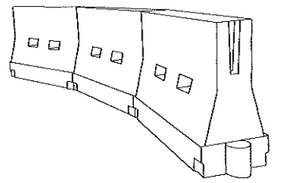
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L=WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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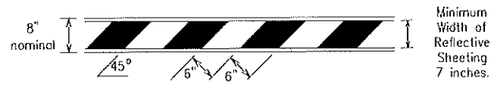
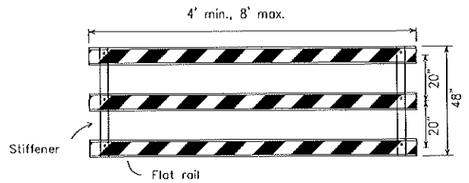
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



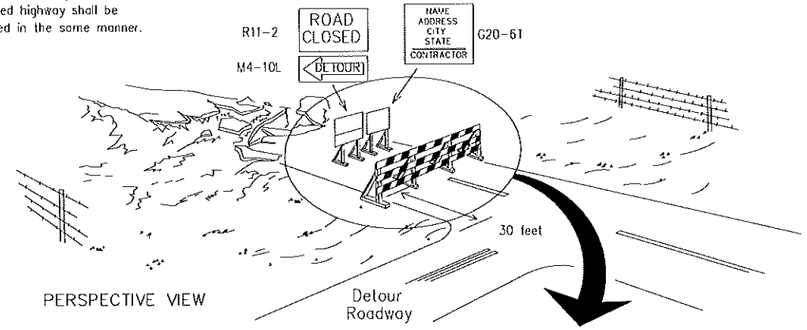
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

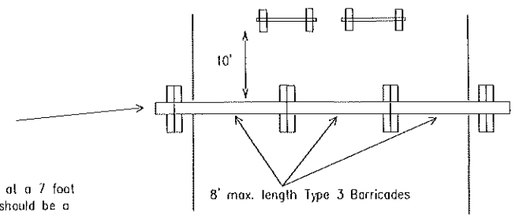
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

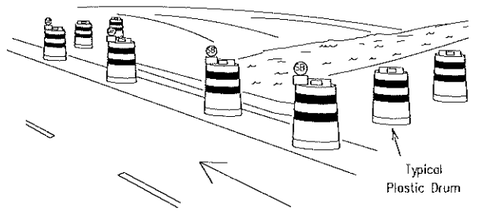
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

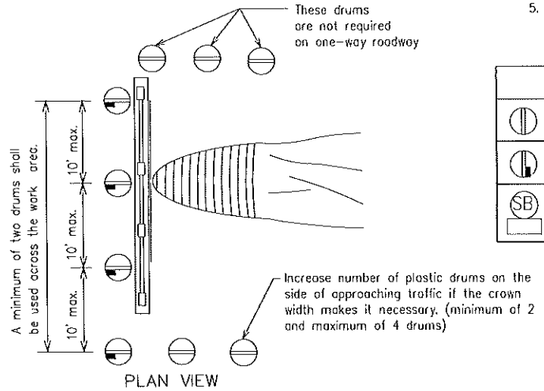
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

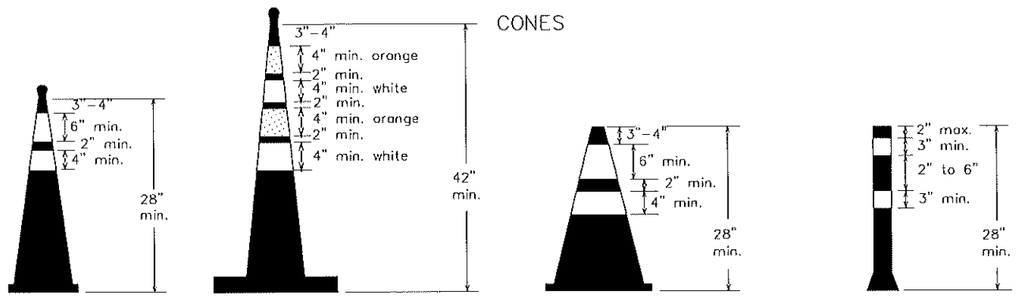
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



PLAN VIEW

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

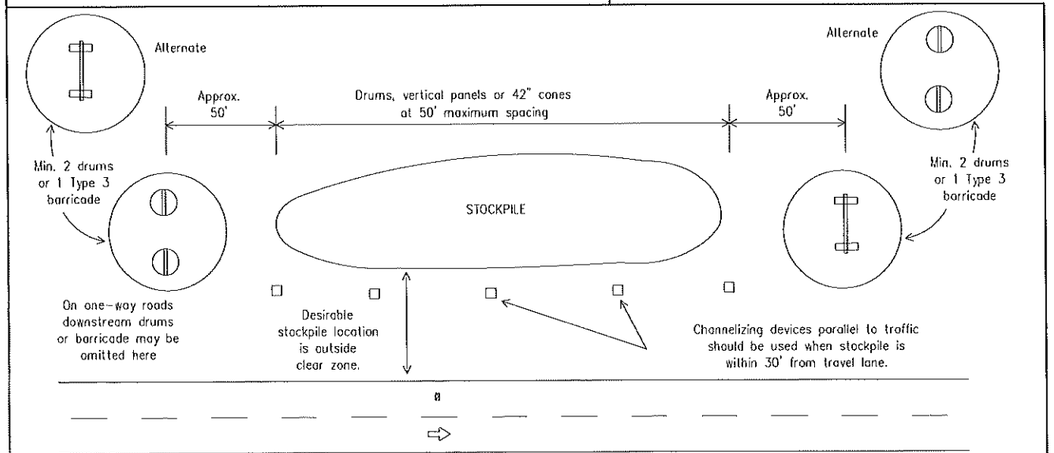
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

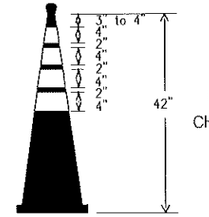
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS 9-07 8-14 7-13	DIST	COUNTY		SHEET NO. 19

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

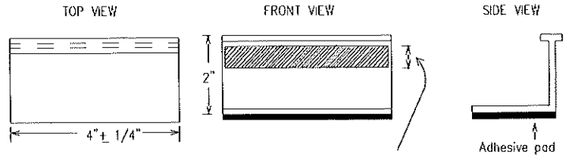
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where floggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



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

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

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

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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11-02 8-14				

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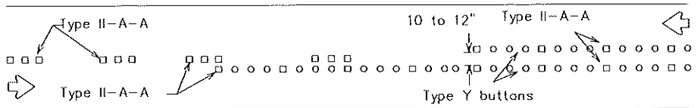
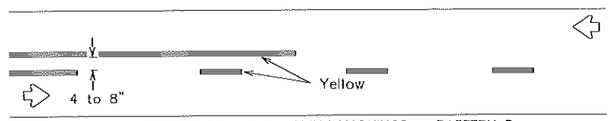
FILE:

PAVEMENT MARKING PATTERNS

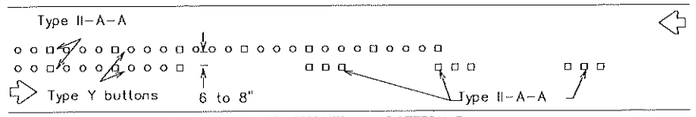
REFLECTORIZED PAVEMENT MARKINGS – PATTERN A



RAISED PAVEMENT MARKERS – PATTERN A



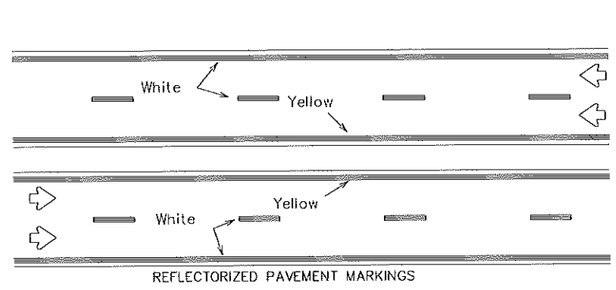
REFLECTORIZED PAVEMENT MARKINGS – PATTERN B



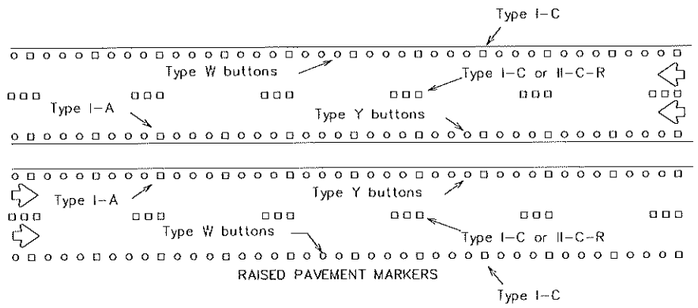
RAISED PAVEMENT MARKERS – PATTERN B

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

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



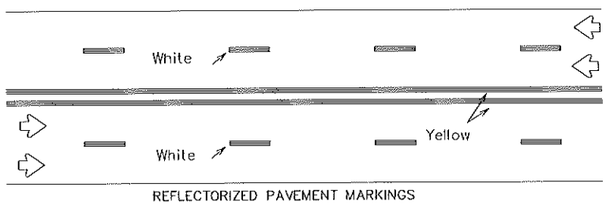
REFLECTORIZED PAVEMENT MARKINGS



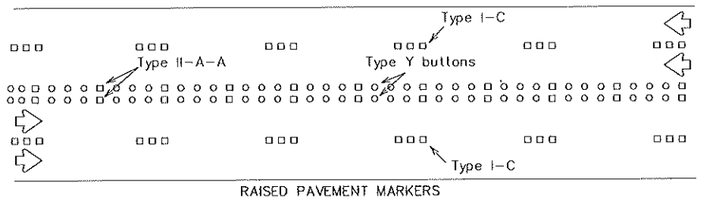
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



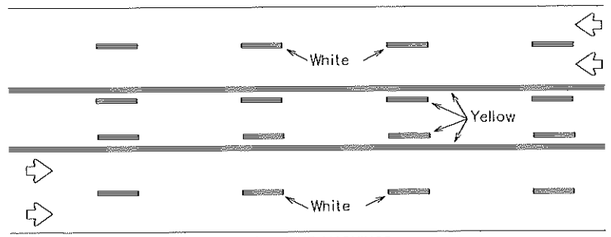
REFLECTORIZED PAVEMENT MARKINGS



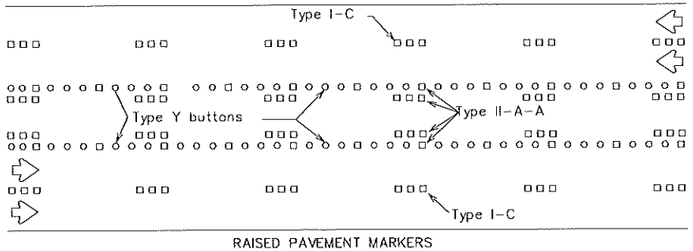
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

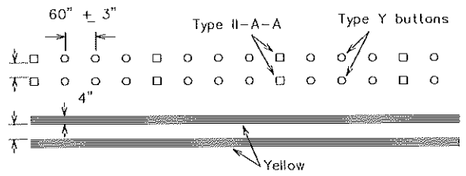
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

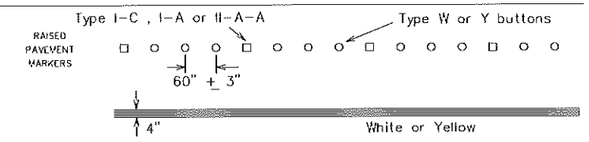
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

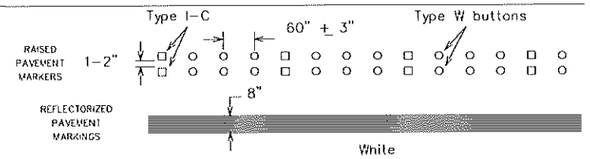


EDGE LINE OR SINGLE NO-PASSING LINE



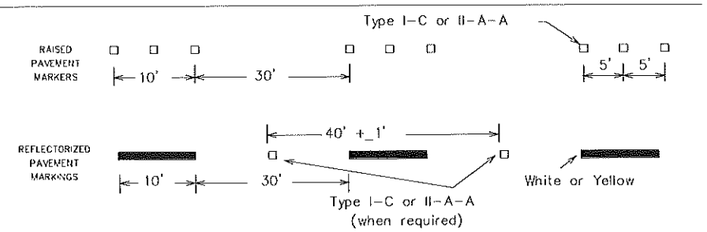
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)



BROKEN LINES

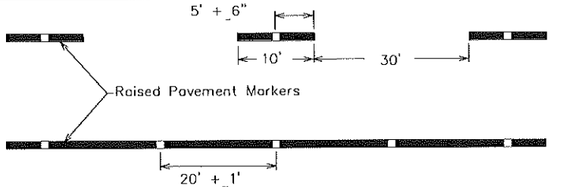
CENTER LINE OR LANE LINE



AUXILIARY OR LANEDROP LINE

REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only – not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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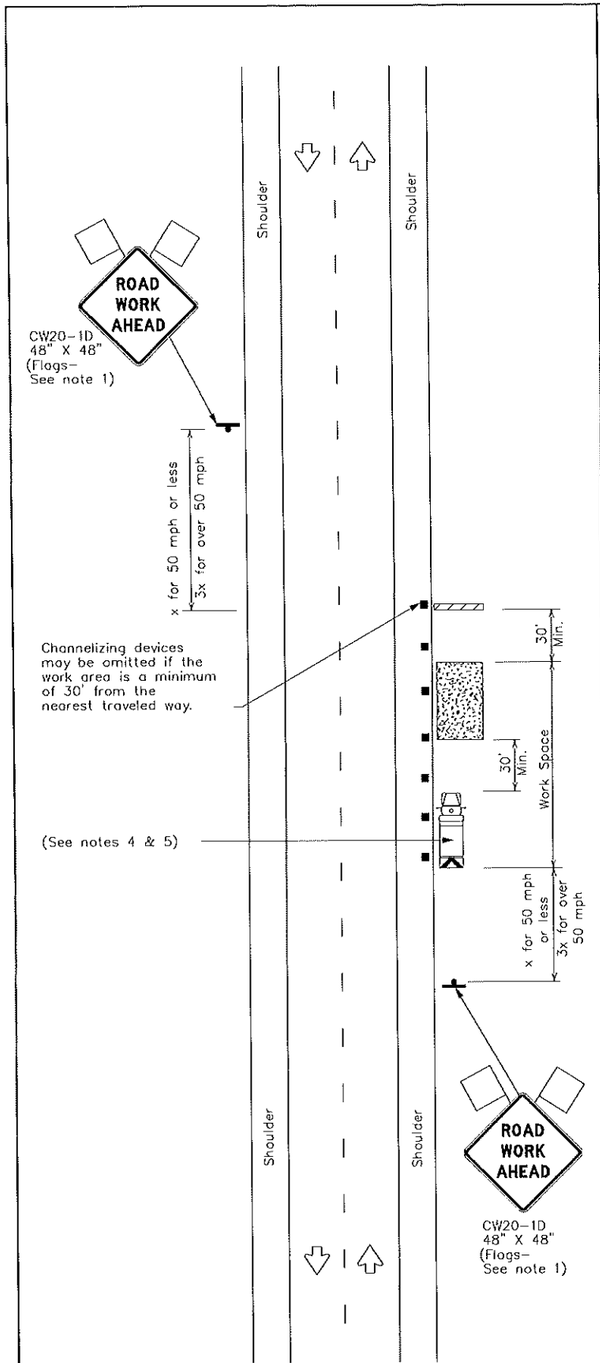
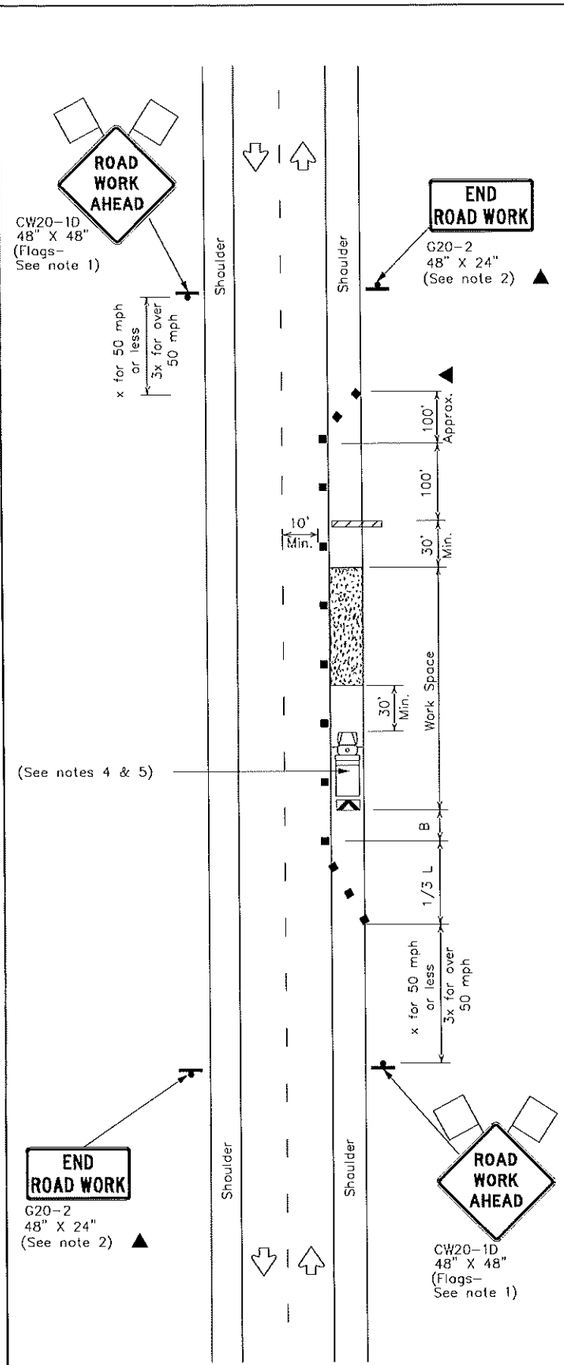


TCP (2-1a)

WORK SPACE NEAR SHOULDER

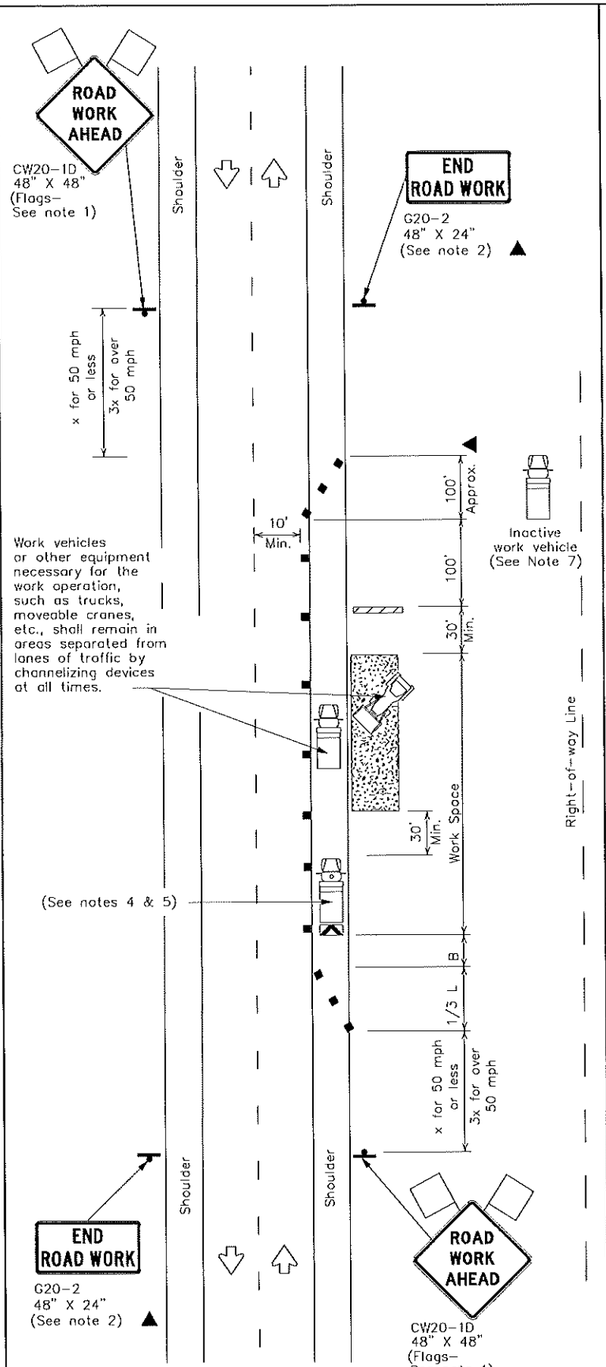
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

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)

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

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REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO. 22

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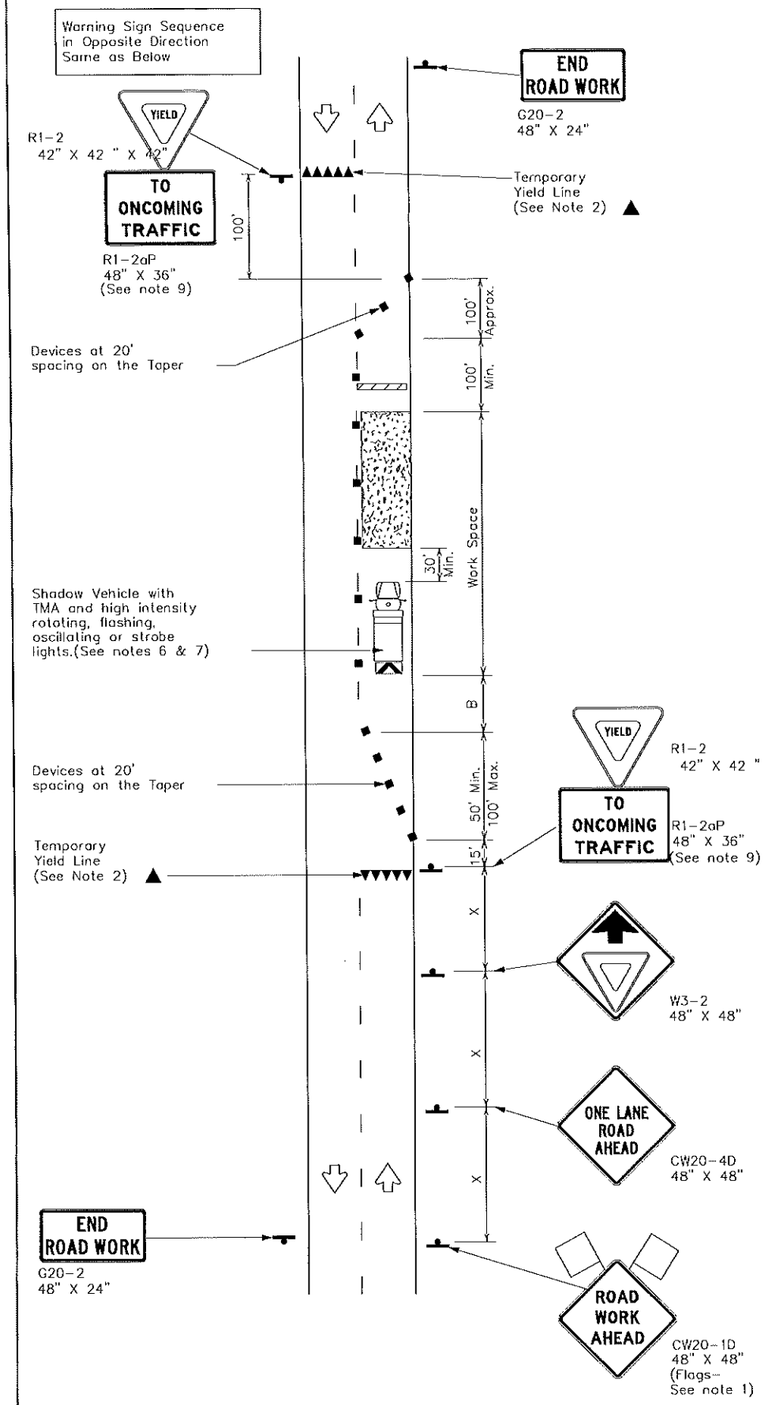


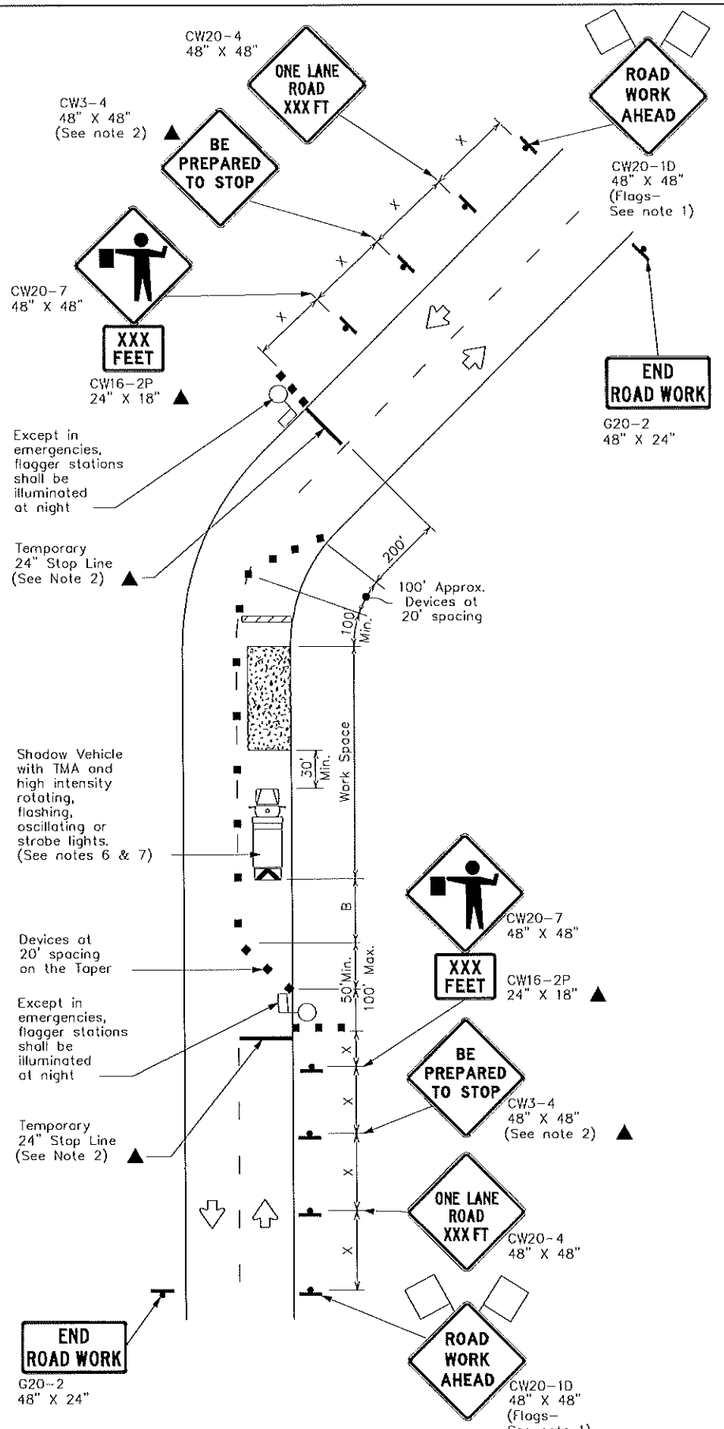
TCP (2-2a)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See Note 9)



TCP (2-2b)

2-LANE ROADWAY WITHOUT PAVED SHOULDERS

ONE LANE TWO-WAY

CONTROL WITH FLAGGERS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

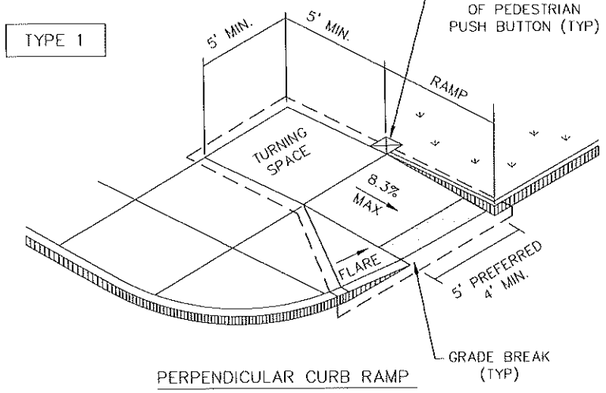
TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	DIST	COUNTY		SHEET NO. 23

162

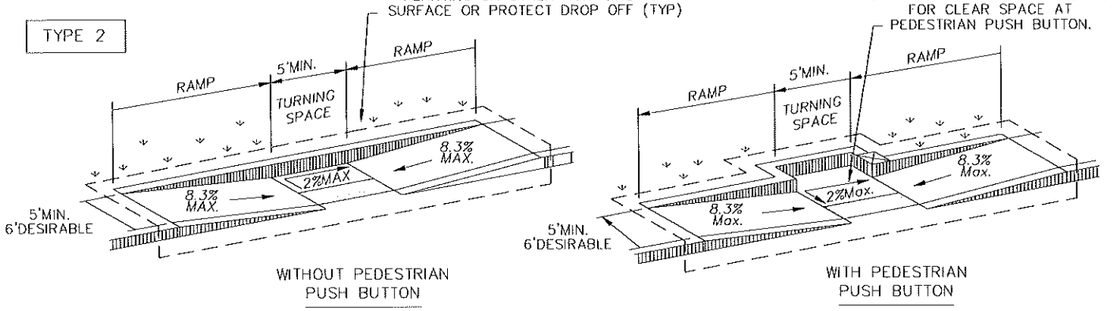
DATE:
FILE:

TYPE 1



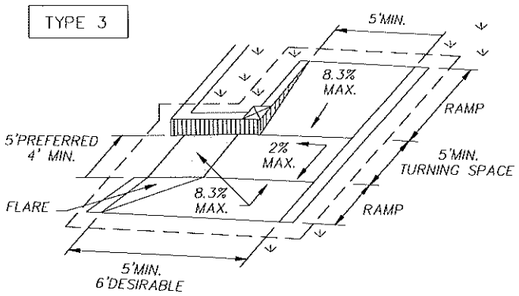
PERPENDICULAR CURB RAMP

TYPE 2

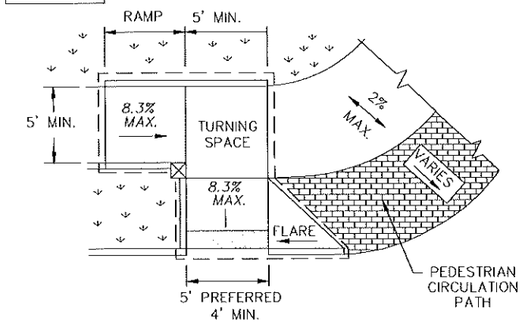


PARALLEL CURB RAMP

TYPE 3

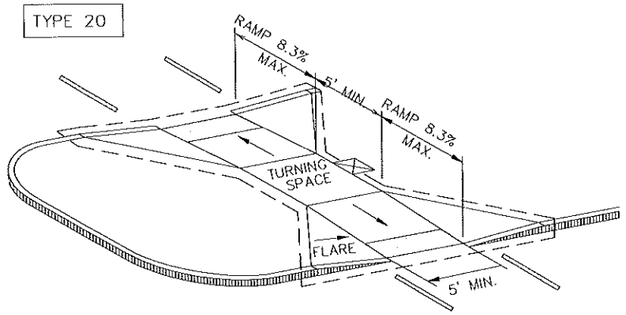


TYPE 6



COMBINATION CURB RAMPS

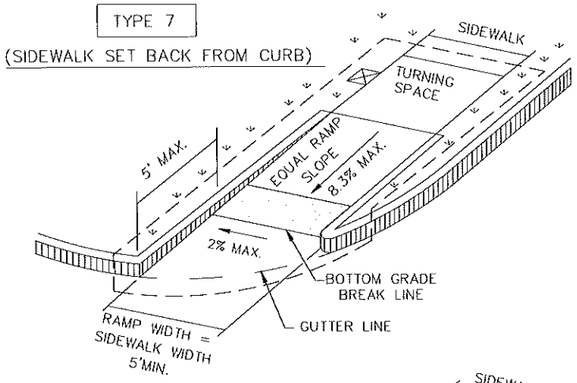
TYPE 20



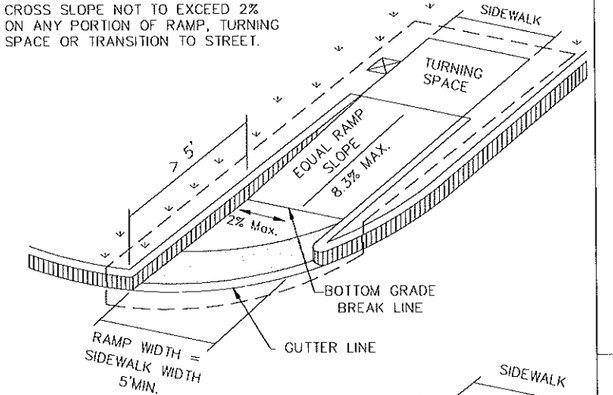
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

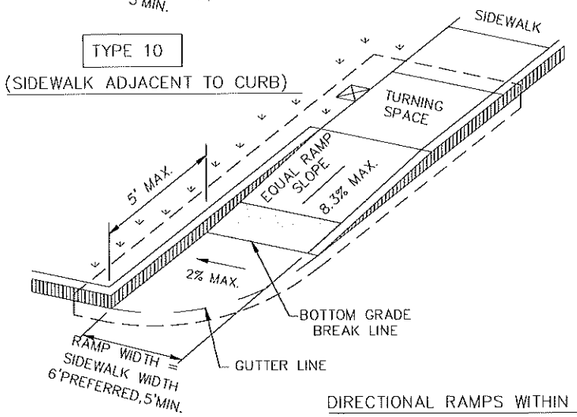


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

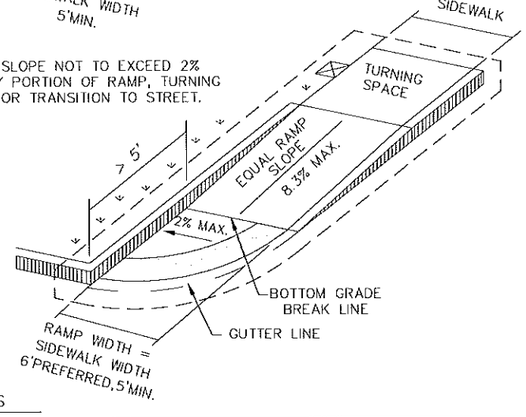


TYPE 10

(SIDEWALK ADJACENT TO CURB)

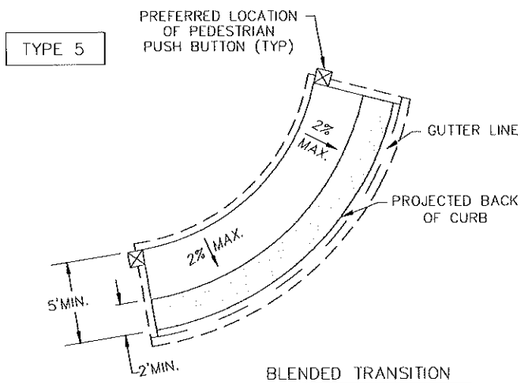


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

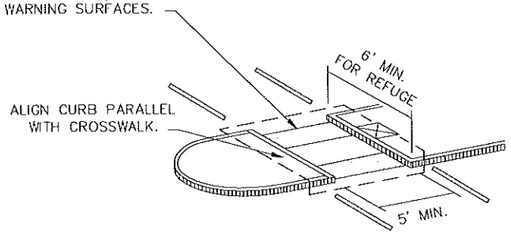
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

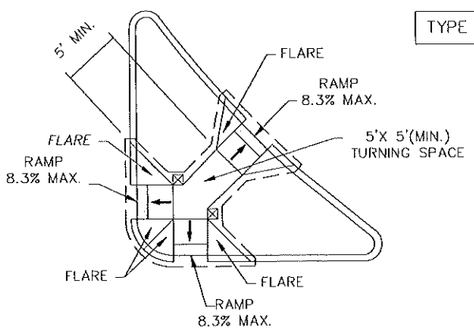
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21

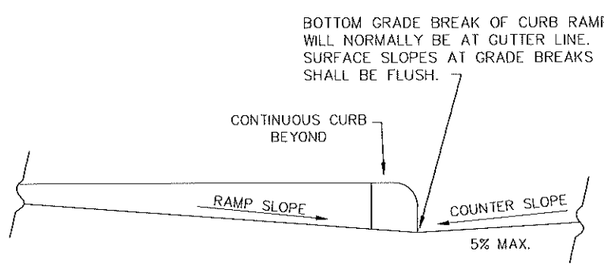


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
				24	

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

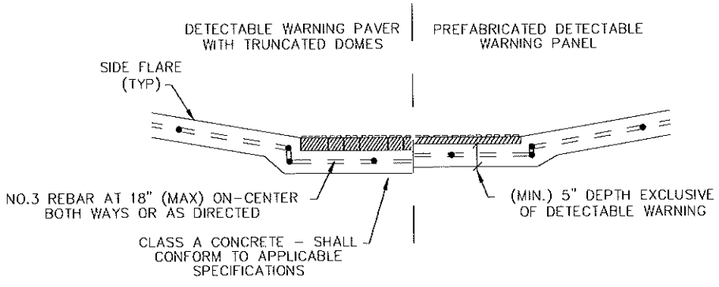
19. Curb ramps must contain a detectable warning surface that consists of roised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

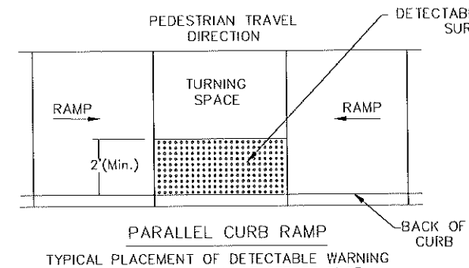
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

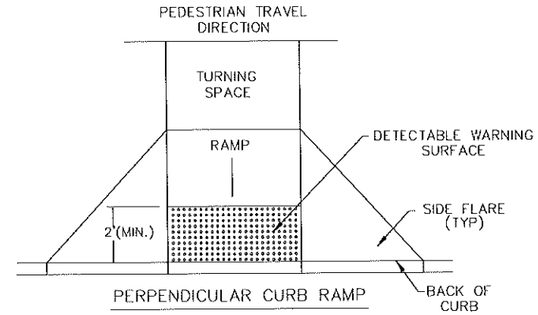


SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

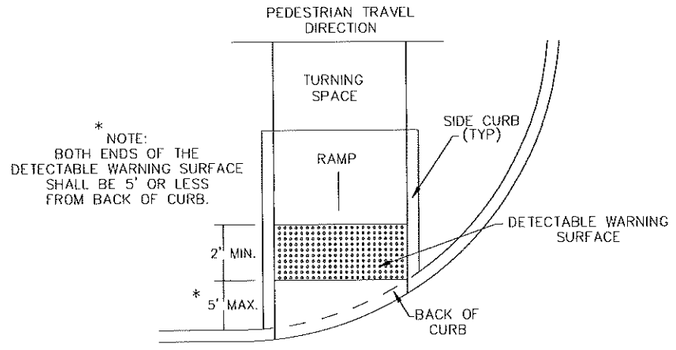
DETECTABLE WARNING SURFACE DETAILS



PARALLEL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

DATE:
FILE:

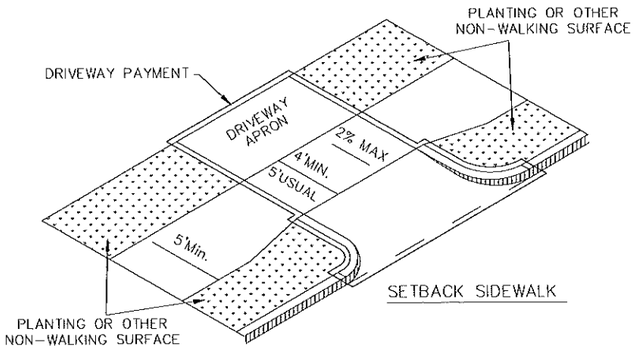
Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS
PED-18

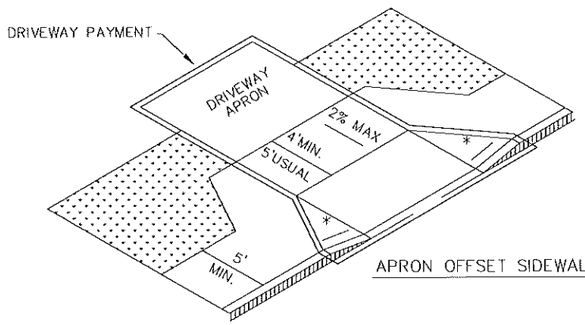
FILE: ped18	DN: TxDOT	CK: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS: REVISED 08,2005; REVISED 06,2012; REVISED 01,2018	DIST	COUNTY		SHEET NO. 25

DATE:
FILE:

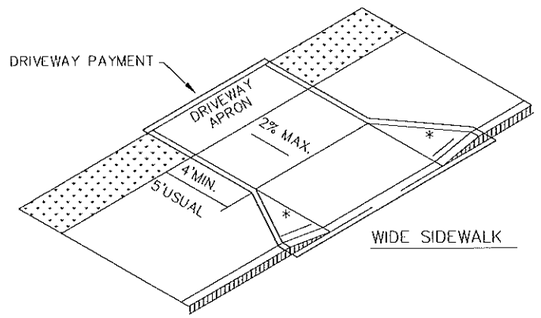
SIDEWALK TREATMENT AT DRIVEWAYS



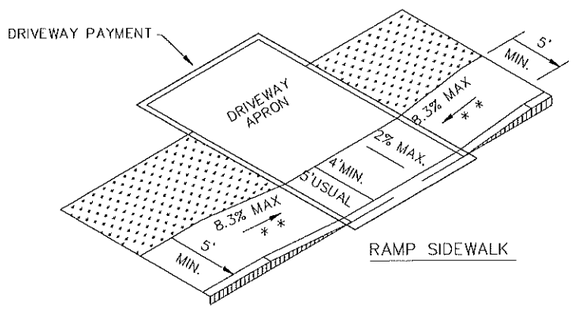
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

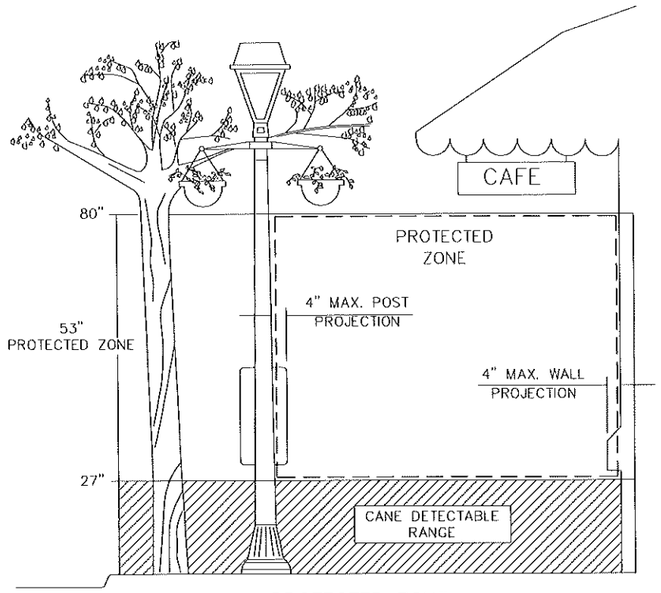


RAMP SIDEWALK

NOTES:

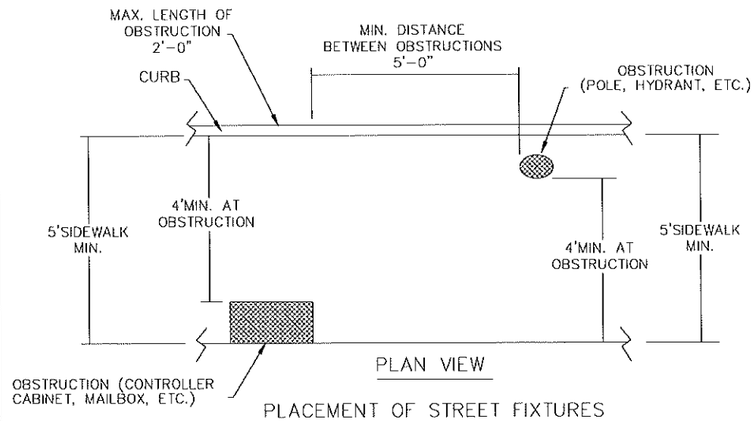
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5% HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.



PROTECTED ZONE

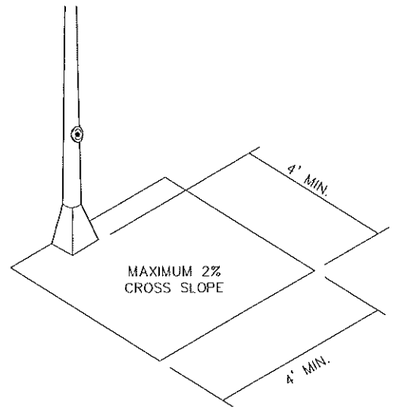
NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



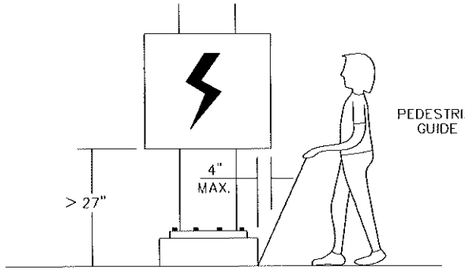
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.

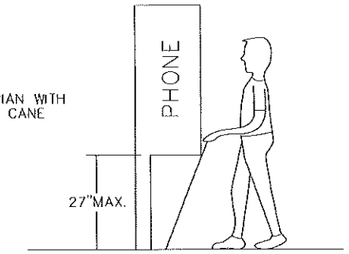


CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



PEDESTRIAN WITH GUIDE CANE

WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT 2¾" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE <80"

Texas Department of Transportation | *Design Division Standard*

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS					
REVISED 08.2005 REVISED 06.2012 REVISED 01.2018	DIST	COUNTY		SHEET NO.	
				26	

SCALE: 1" = 10'

RIGHT OF WAY

EXISTING SIGN ASSEMBLY TO BE REMAIN.

EXISTING POWER POLE TO REMAIN.

EXISTING SIGN ASSEMBLY TO BE REMAIN.

EXISTING TELEPHONE PEDESTAL TO REMAIN.

EXISTING POWER POLE TO REMAIN.

DRIP LINE

RIGHT OF WAY

EXISTING POWER POLE TO REMAIN.

EXISTING SIGN ASSEMBLY TO BE REMAIN.

EXISTING GRATE INLET TO REMAIN.

00 1+00 2+00 3+

MILAM STREET
(CONCRETE)

MATCH LINE (THIS SHEET)

DRIP LINE

STA.0+36.37

DRIP LINE

SAWCUT

EXISTING GRATE INLET TO REMAIN.

4.50'

CONCRETE

4.40'

SAWCUT

4.39'

CONCRETE

SAWCUT

RIGHT OF WAY

RIGHT OF WAY

EXISTING TREE TO BE REMOVED.

EXISTING TREE TO BE REMOVED.

MATCH LINE (THIS SHEET)

RIGHT OF WAY

RIGHT OF WAY

SAWCUT

SAWCUT

SAWCUT

EXISTING ELECTRIC PEDESTAL TO REMAIN.

4.52'

CONCRETE

4.53'

CONCRETE

R1.00'

SAWCUT

RIGHT OF WAY

EXISTING TELEPHONE PEDESTAL TO REMAIN.

EXISTING POWER POLE TO REMAIN.

EXISTING SIGN ASSEMBLY TO BE REMAIN.

EXISTING ELECTRIC PEDESTAL TO REMAIN.

EXISTING CURB TO REMAIN.

EXISTING ELECTRIC PEDESTAL TO REMAIN.

EXISTING CURB TO REMAIN.

SAWCUT

CONCRETE

'00 4+00 5+00 6+

MILAM STREET
(CONCRETE)

SAWCUT

SIGN ASSEMBLY TO BE REMOVED. SEE SUMMARY OF SMALL SIGNS.

R1.50'

4.43'

CONCRETE

SAWCUT

EXISTING POWER POLE TO REMAIN.

RIGHT OF WAY

EXISTING SIGN ASSEMBLY TO BE REMOVED.

RIGHT OF WAY

EXISTING SIGN ASSEMBLY TO BE REMAIN.

EXISTING POWER POLE TO REMAIN.

SAM HOUSTON STREET
(CONCRETE)

RIGHT OF WAY

RIGHT OF WAY

SAWCUT

SAWCUT

SAWCUT

4.51'

CONCRETE

SAWCUT

MATCH LINE (SHEET 29)

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- COVERED

NOTES:

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2. CONTRACTOR TO BE RESPONSIBLE FOR DAMAGE CAUSED TO AREAS DESIGNATED TO REMAIN.

NO	REVISION	DRAWN	CHECK	APPVD	DATE

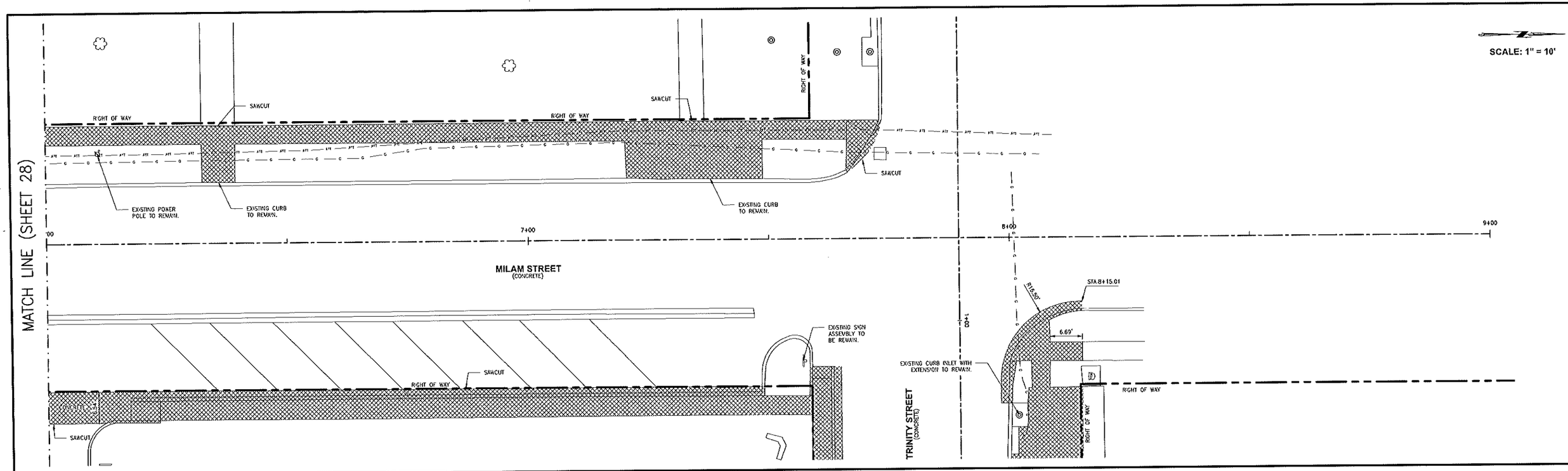
INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE 4/8/2021

WHITELEY OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421|WWW.ASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
MILAM STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	28



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- COVERED

NOTES:

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CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
MILAM STREET
STA. 6+00 - 9+00

VER: ACAD 2019 | JOB NO. 20-1277 | SHEET NO. 29

SCALE: 1" = 10'

RIGHT OF WAY
SAWCUT
EXISTING POWER POLE TO REMAIN.
EXISTING GUY WIRE TO REMAIN.
REMOVE EXISTING SIGN POLE.
FIRST LIBERTY NATIONAL BANK FFE=101.03
CONCRETE
EXISTING POWER POLE TO REMAIN.
0+00
1+00
2+00
3+
MATCH LINE (THIS SHEET)

TRAVIS STREET
(CONCRETE)

EXISTING POWER POLE TO REMAIN.
EXISTING GRATE INLET TO REMAIN.
SAWCUT
EXISTING POWER POLE TO REMAIN.
EXISTING GUY WIRE TO REMAIN.
DRIP LINE
RIGHT OF WAY
CONCRETE
EXISTING LIGHT POLE ASSEMBLY TO REMAIN (TYP).

MATCH LINE (THIS SHEET)

THE FLNB CORNER FFE=100.21
RIGHT OF WAY
EXISTING FIRE HYDRANT ASSEMBLY TO REMAIN.
SIGN ASSEMBLY TO BE REMOVED. SEE SUMMARY OF SMALL SIGNS.
R11.50'

SAM HOUSTON STREET
(CONCRETE)

EXISTING TELEPHONE PEDESTAL TO REMAIN.
EXISTING CABLE PEDESTAL TO REMAIN.
EXISTING SIGN ASSEMBLY TO BE REMAIN.
EXISTING CURB INLET TO REMAIN.
EXISTING GRATE INLET TO REMAIN.
EXISTING ELECTRIC PEDESTAL TO REMAIN.
EXISTING TREE TO REMAIN.
EXISTING ELECTRIC PEDESTAL TO REMAIN.
EXISTING LIGHT POLE ASSEMBLY TO REMAIN (TYP.)
EXISTING CURB INLET TO REMAIN.
DRIP LINE
4+00
5+00
6+
MATCH LINE (SHEET 31)

TRAVIS STREET
(CONCRETE)

SAWCUT
DRIP LINE
EXISTING GRATE INLET TO REMAIN.
SIGN ASSEMBLY TO BE REMOVED. SEE SUMMARY OF SMALL SIGNS.
R11.50'
EXISTING LIGHT POLE ASSEMBLY TO REMAIN (TYP.)
EXISTING TREE TO REMAIN.

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- P-PELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- COVERED

NOTES:
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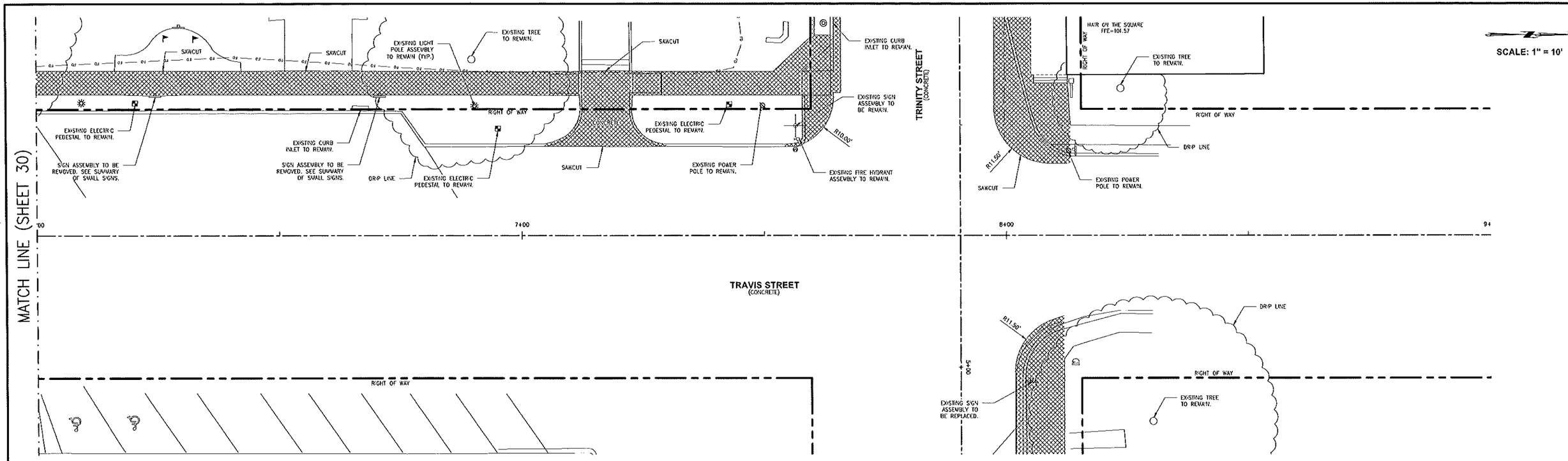
CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
TRAVIS STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	30



LEGEND

POWER POLE	STOP/STREET SIGN	CLF	CHAIN LINK FENCE
TELEPHONE PEDESTAL	PIPELINE MARKER	P	PIPE RAIL FENCE
ELECTRIC BOX	MANHOLE	G	GAS LINE
WATER VALVE	CLEAN OUT	ATT	ATT FIBER OPTIC LINE
WATER METER	FLAG POLE	FO	FIBER OPTIC CABLE
LIGHT POLE	GUY ANCHOR		DITCH TOP
FIRE HYDRANT	WOOD FENCE		DITCH CENTERLINE
SIGN	DEMO		COVERED

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DATE: 4/8/2021

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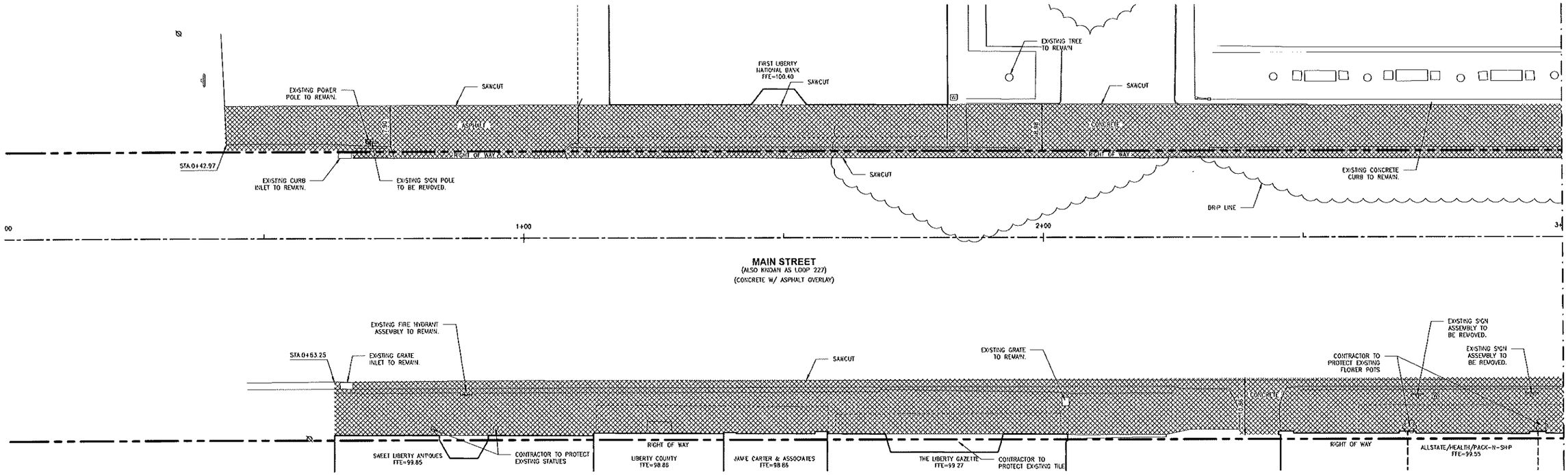
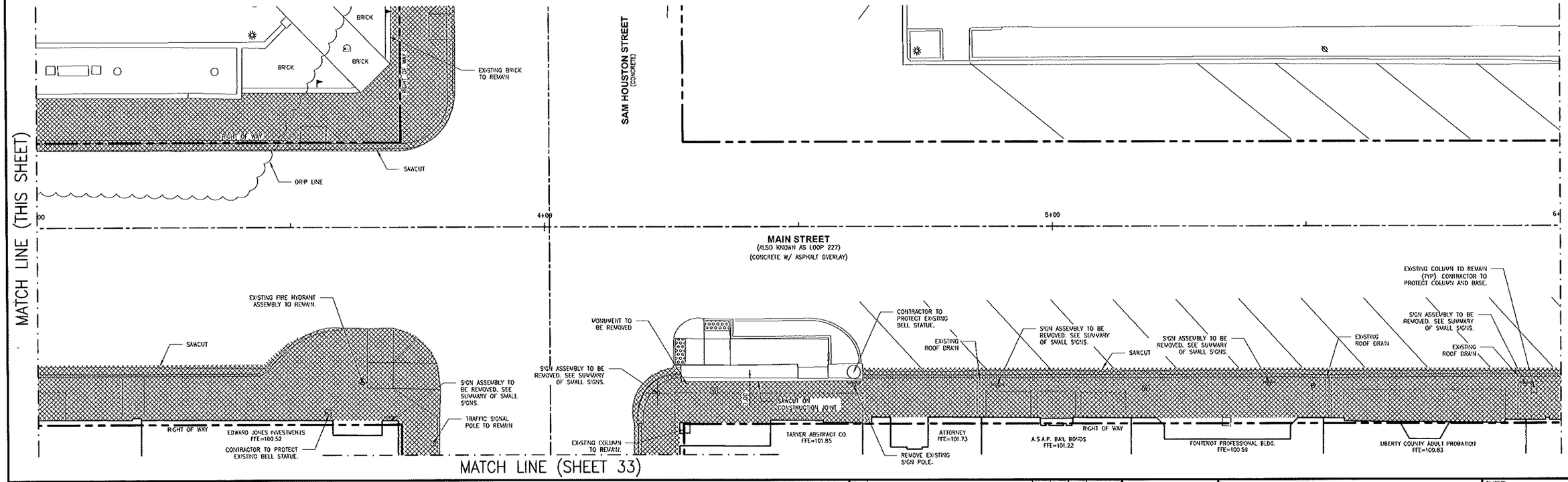
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
TRAVIS STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	31

SCALE: 1" = 10'





LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- P/PELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
- PIPE RAIL FENCE
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- FIBER OPTIC CABLE
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DATE: 4/8/2021

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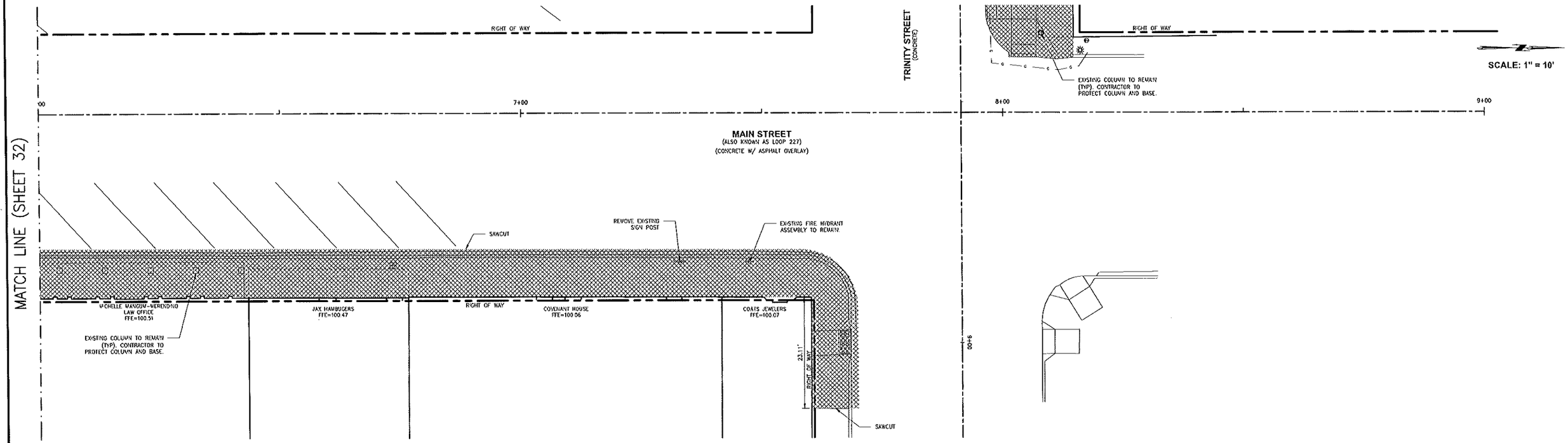
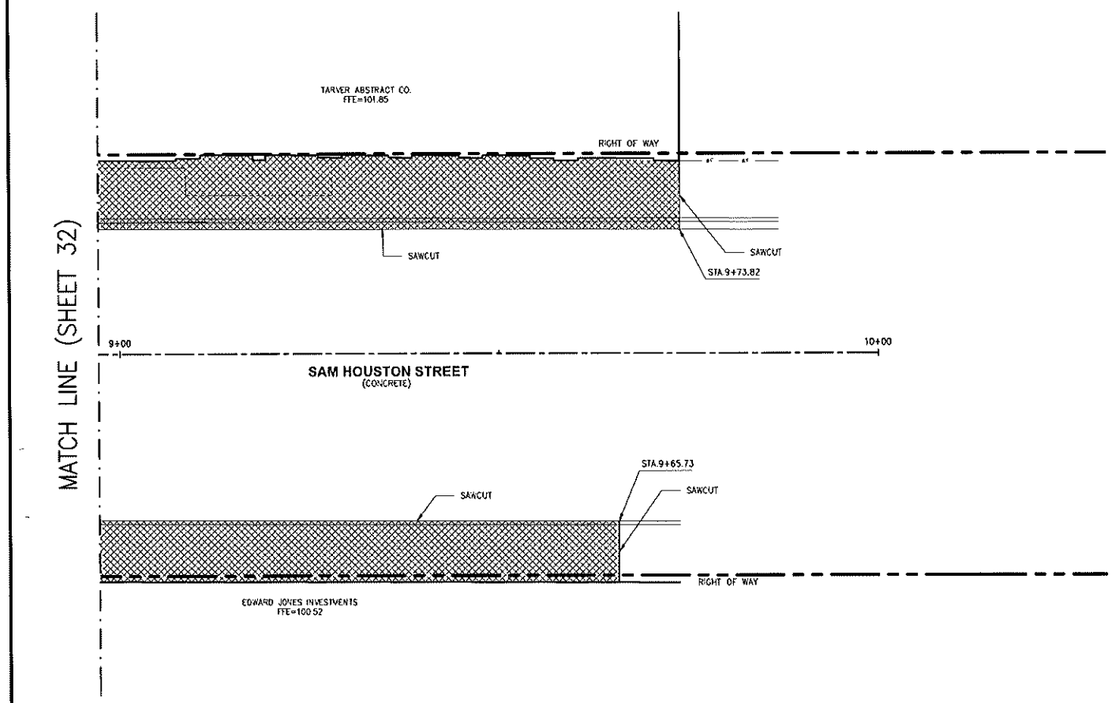
409-892-6421 | WWW.ASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
MAIN STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	32





LEGEND

POWER POLE	STOP/STREET SIGN	CLF	CHAIN LINK FENCE
TELEPHONE PEDESTAL	PIPELINE MARKER	P	PIPE RAIL FENCE
ELECTRIC BOX	MANHOLE	G	GAS LINE
WATER VALVE	CLEAN OUT	ATT	ATT FIBER OPTIC LINE
WATER METER	FLAG POLE	FO	FIBER OPTIC CABLE
LIGHT POLE	GUY ANCHOR		DITCH TOP
FIRE HYDRANT	WOOD FENCE		DITCH CENTERLINE
SIGN	DEVO		COVERED

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DATE: 4/8/2021

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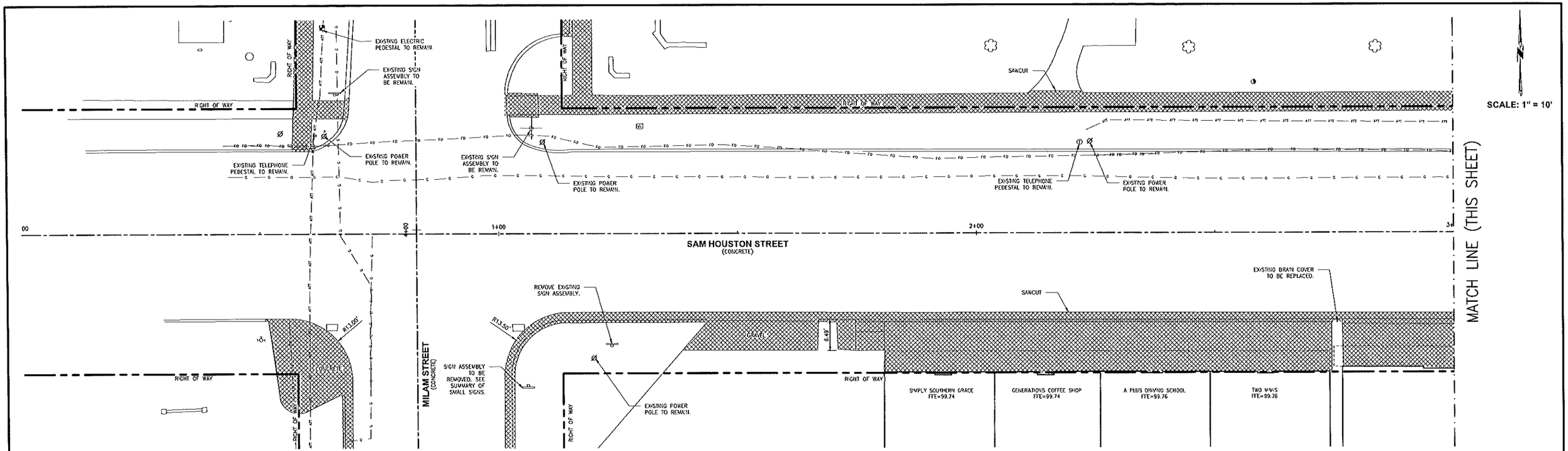
409-892-0421|MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
MAIN STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	33



LEGEND

POWER POLE	STOP/STREET SIGN	CHAIN LINK FENCE
TELEPHONE PEDESTAL	PIPELINE MARKER	PIPE RAIL FENCE
ELECTRIC BOX	MANHOLE	GAS LINE
WATER VALVE	CLEAN OUT	ATT FIBER OPTIC LINE
WATER METER	FLAG POLE	FIBER OPTIC CABLE
LIGHT POLE	GUY ANCHOR	DITCH TOP
FIRE HYDRANT	WOOD FENCE	DITCH CENTERLINE
SIGN	DEMO	COVERED

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DATE: 4/6/2021

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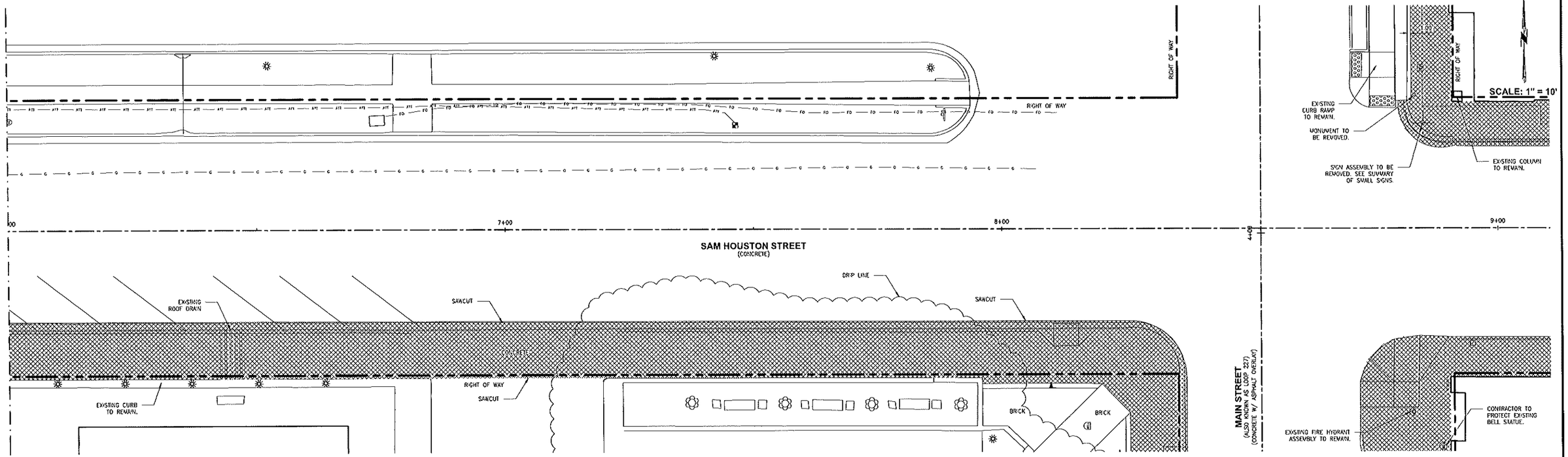
409-892-0421|MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
SAM HOUSTON STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	34



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- GUY ANCHOR
- WOOD FENCE
- DEMO
- CHAIN LINK FENCE
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- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
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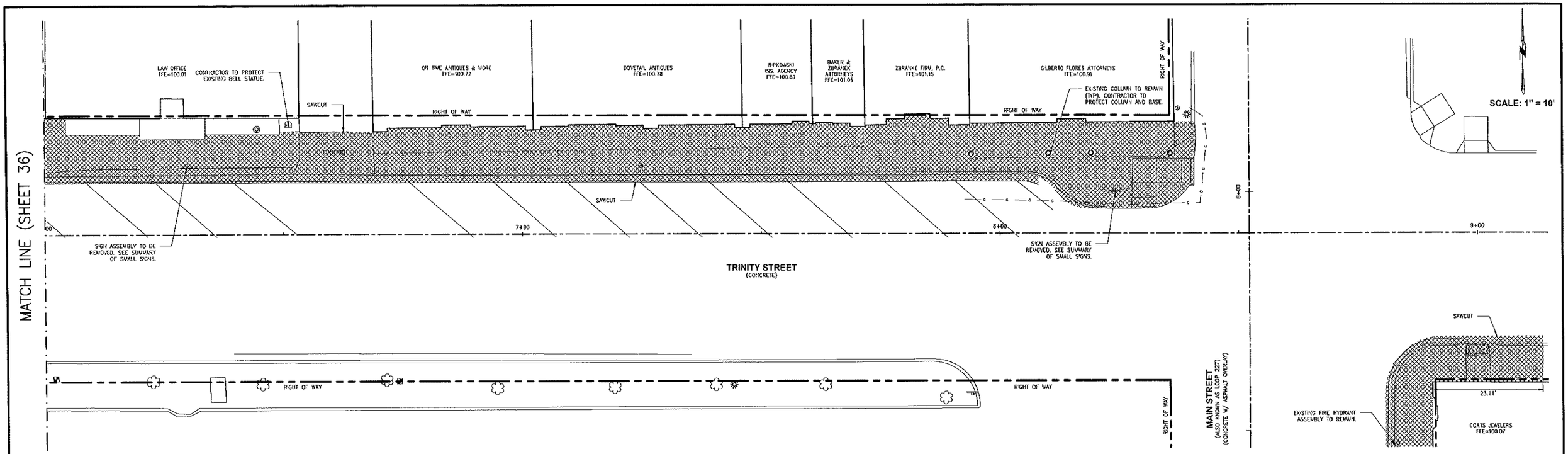
CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
SAM HOUSTON STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	35



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
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CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
DEMOLITION PLAN
TRINITY STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	37

SCALE: 1" = 10'

MATCH LINE (THIS SHEET)

MATCH LINE (SHEET 39)

MILAM STREET
(CONCRETE)

SAM HOUSTON STREET
(CONCRETE)

STA.0+36.37

STA.2+93.38

MATCH EXISTING GRADE

RIGHT OF WAY

DRIP LINE

5.00'

1.00'

EXISTING GRATE INLET TO REMAIN.

EXISTING TELEPHONE PEDESTAL TO REMAIN USE CAUTION.

EXISTING SIGN ASSEMBLY TO REMAIN USE CAUTION.

EXISTING ELECTRIC PEDESTAL TO REMAIN USE CAUTION.

EXISTING ELECTRIC PEDESTAL TO REMAIN

MATCH EXISTING TOP OF CURB

RESTRAINT BLOCK

EXISTING POWER POLE TO REMAIN.

R12.00'

R13.00'

R11.50'

11.04'

5.01'

6.51'

10.06'

9.89'

6.91'

5.83'

6.96'

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- ① – SIGN ASSEMBLY REFER TO SUMMARY OF SMALL SIGNS
- PROPOSED RAMP
- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON

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3. HATCH SHOWN FOR PICTORIAL PURPOSE ONLY. FINAL PATTERN MAY VARY REFER TO DETAILS.

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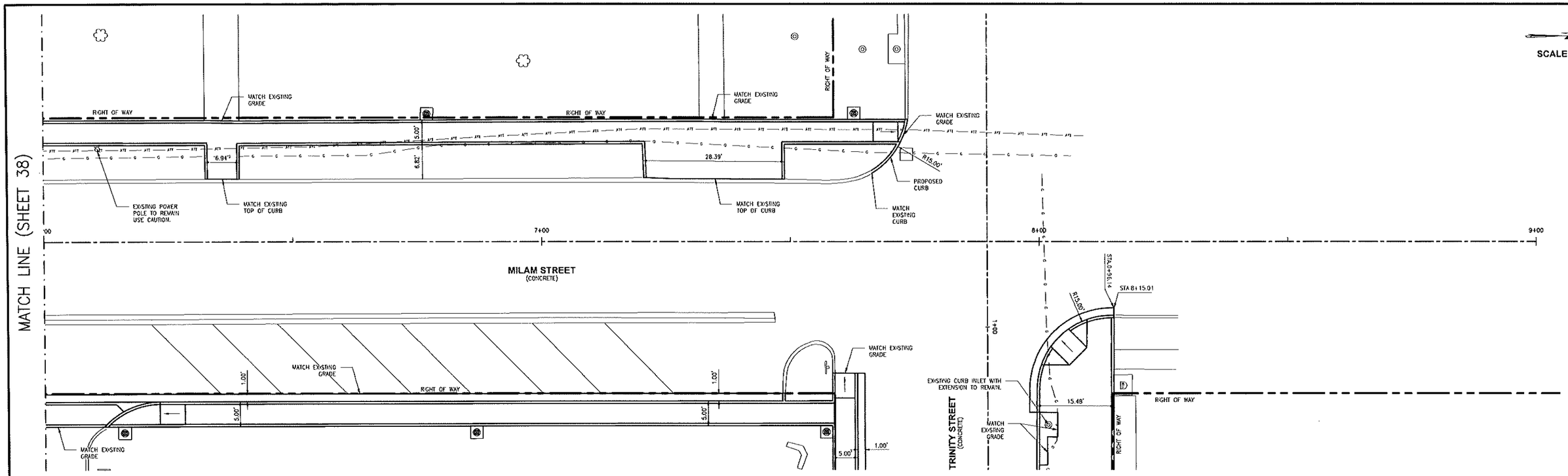
CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
MILAM STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	38



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- SIGN ASSEMBLY REFER TO SUMMARY OF SMALL SIGNS
- PROPOSED RAMP
- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON

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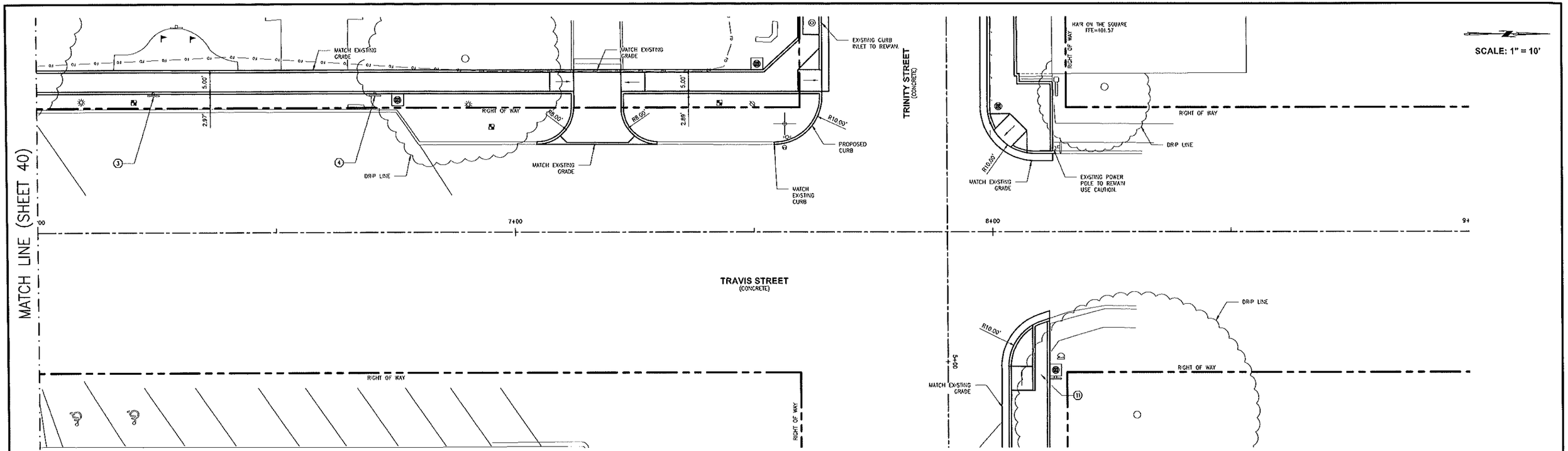
SITE PLAN
MILAM STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	39



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- P.R.F. — P.R.F. — PIPE RAIL FENCE
- G — GAS LINE
- AFO — AFO FIBER OPTIC LINE
- FO — FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- (1) – SIGN ASSEMBLY REFER TO SUMMARY OF SMALL SIGNS
- PROPOSED RAMP
- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON

NOTES:

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3. HATCH SHOWN FOR PICTORIAL PURPOSE ONLY. FINAL PATTERN MAY VARY REFER TO DETAILS.

NO	REVISION	DRAWN	CHECK	APP'VD	DATE

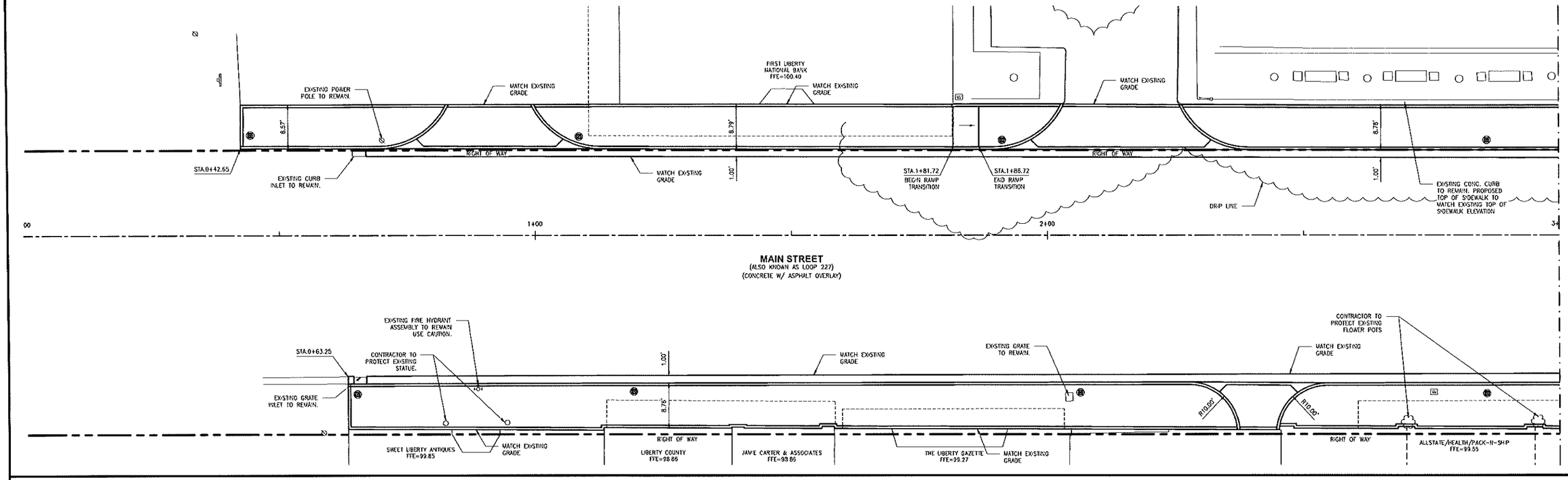
INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF D. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

WHITELEY OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421|MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
TRAVIS STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	41



LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- PIPE RAIL FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- SIGN ASSEMBLY REFER TO SUMMARY OF SMALL SIGNS
- PROPOSED RAMP
- PROPOSED LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON

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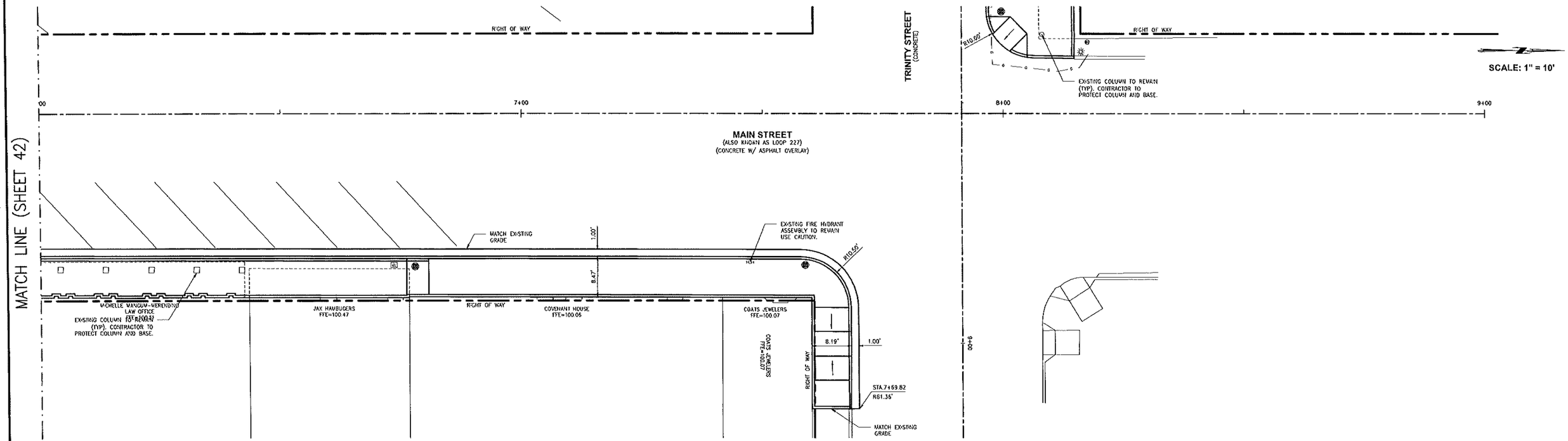
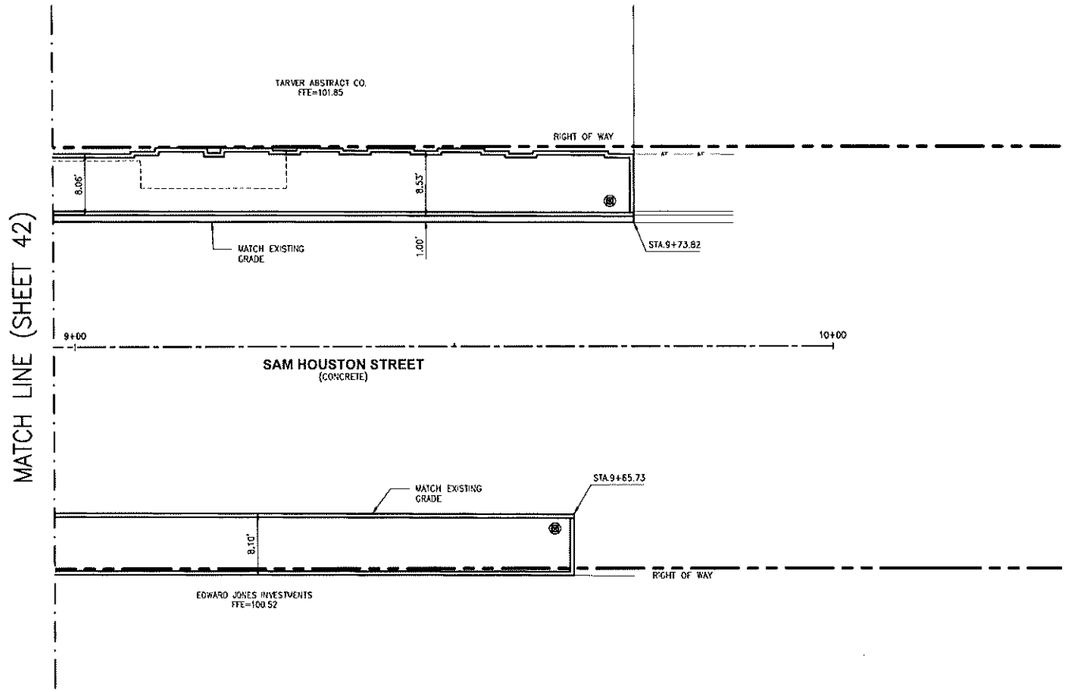
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
MAIN STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	42





LEGEND

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- LIGHT POLE
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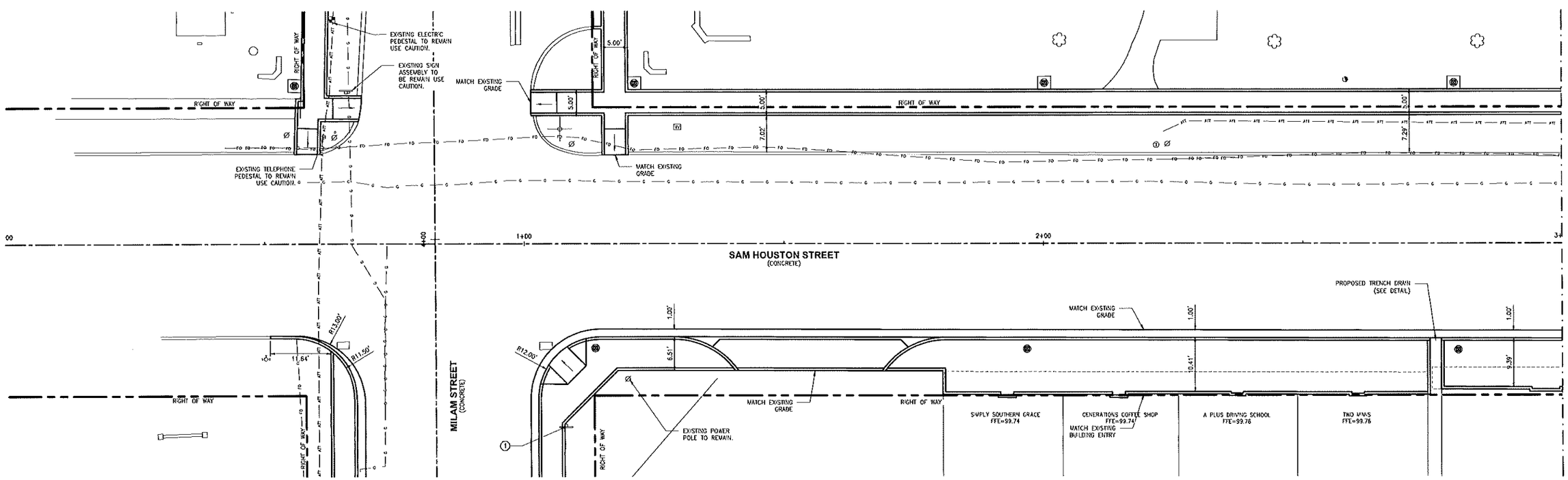
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
MAIN STREET
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	43



LEGEND

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- WATER METER
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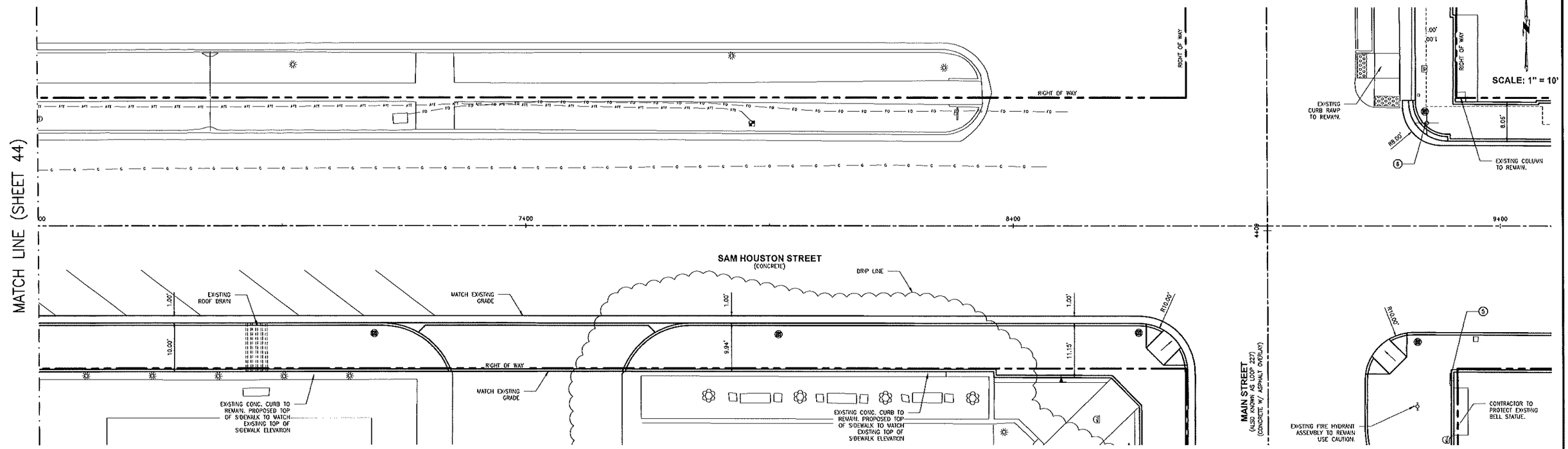
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
SITE PLAN
SAM HOUSTON STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	44



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SITE PLAN
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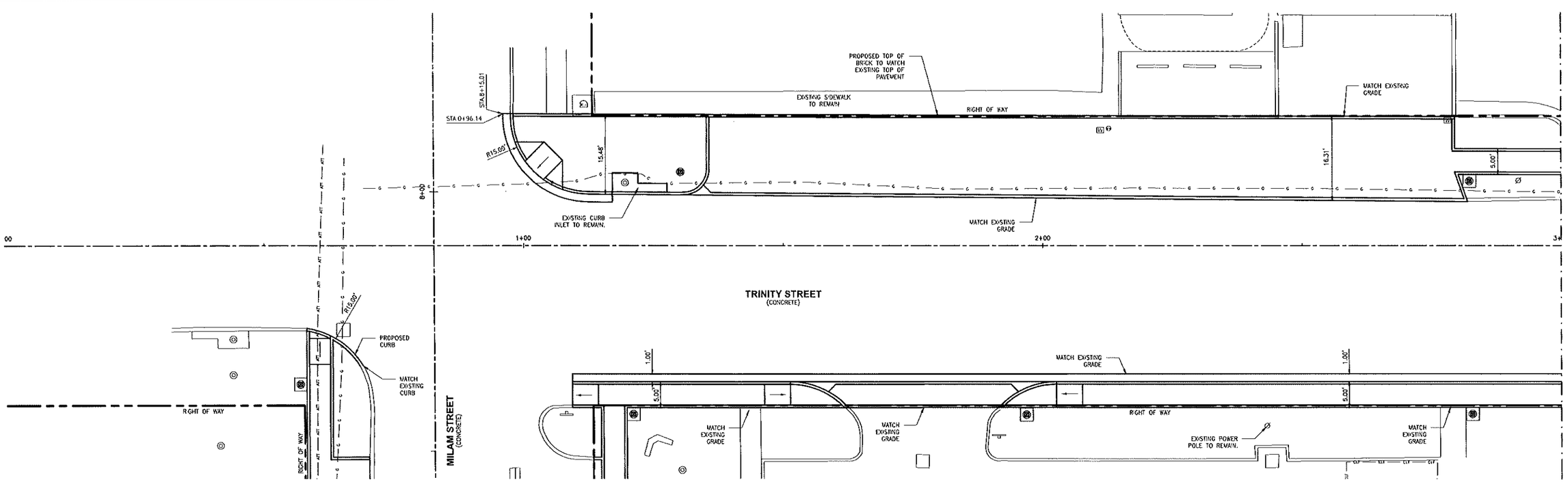
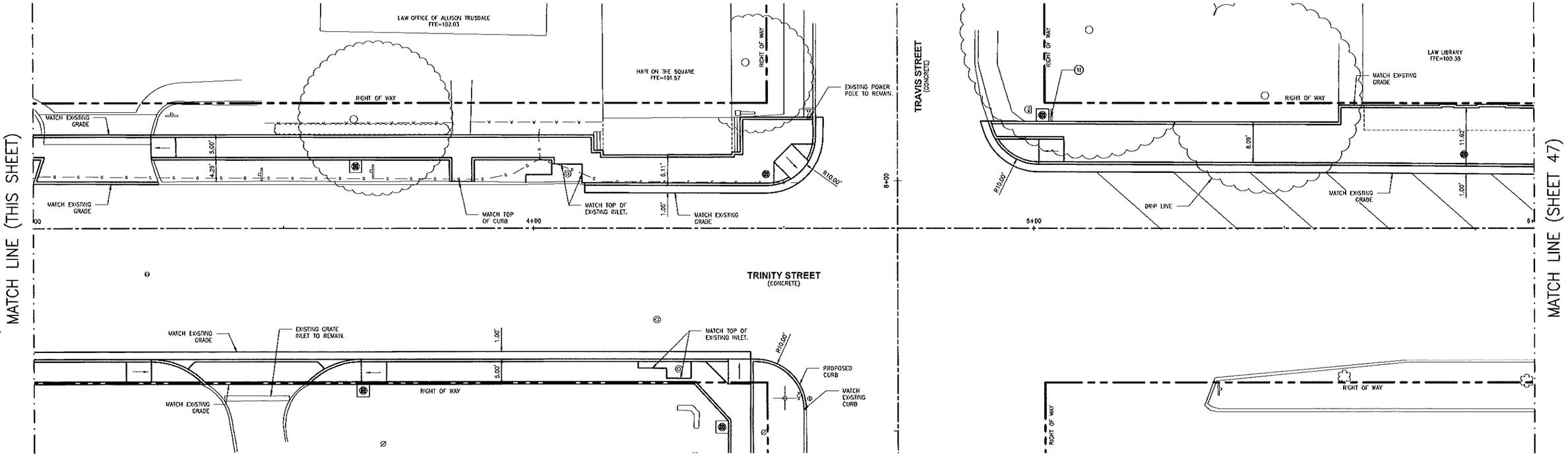
STA. 6+00 - 9+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	45





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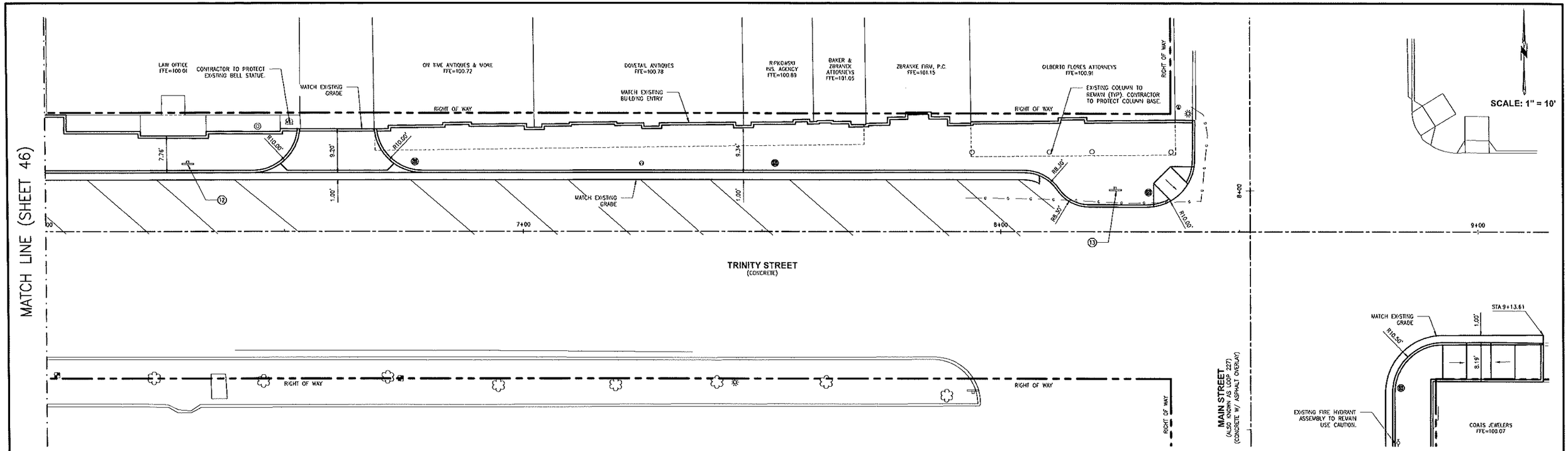
TRINITY STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	46



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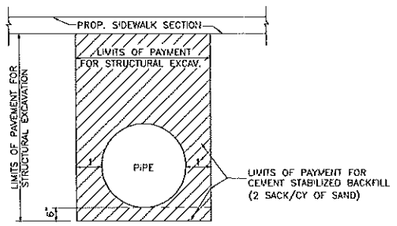
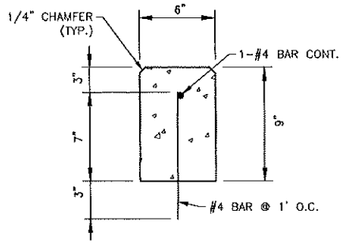
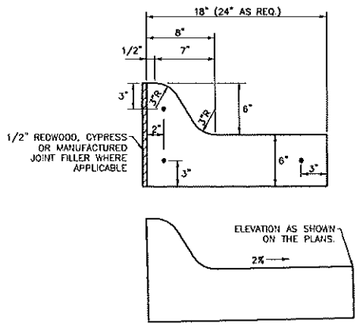


STRUCTURAL EXCAVATION & BACKFILL UNDER PAVEMENT



RESTRAINT BLOCK

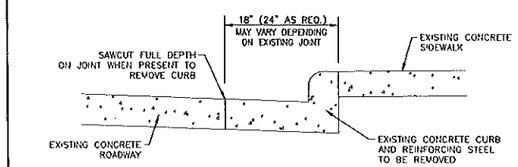
NOTES:
1. OMIT CHAMFER ALONG BUILDING LINE.
2. PROVIDE ½" RADIUS GROOVE JOINT @ 6' MAX. SPACING.
3. CONCRETE SHALL BE CLASS A.

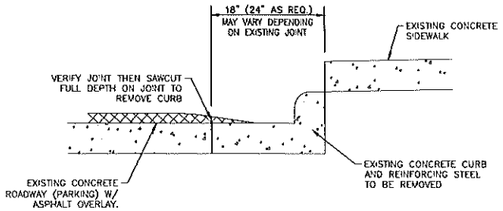


TYPE II CURB AND GUTTER 6" HEIGHT

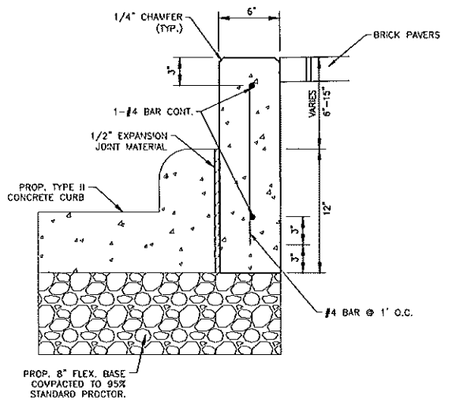
CURB AND GUTTER GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ITEM 529, "CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER."
2. CONCRETE SHALL BE CLASS A.
3. REINFORCING BARS SHALL BE NO.4.
4. ROUND EXPOSED SHARP EDGES WITH A ROUNDING TOOL, TO A MINIMUM RADIUS OF 1/4INCH.
5. ALL EXISTING CURBS AND DRIVEWAYS TO BE REMOVED SHALL BE SAWED OR REMOVED AT EXISTING JOINTS.
6. EXPANSION AND CONTRACTION JOINTS SHALL BE CONSTRUCTED TO MATCH PAVEMENT JOINTS IN ALL CURBS AND GUTTERS ADJACENT TO JOINTED CONCRETE PAVEMENT.





SAWCUT DETAILS



MODIFIED RESTRAINT BLOCK ADJACENT TO CURB

NOTES:
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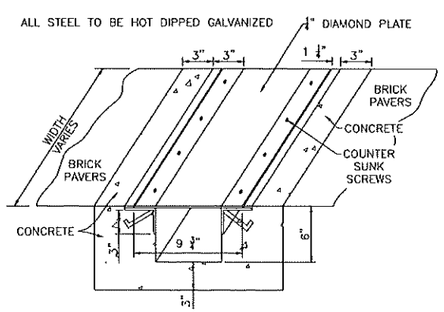
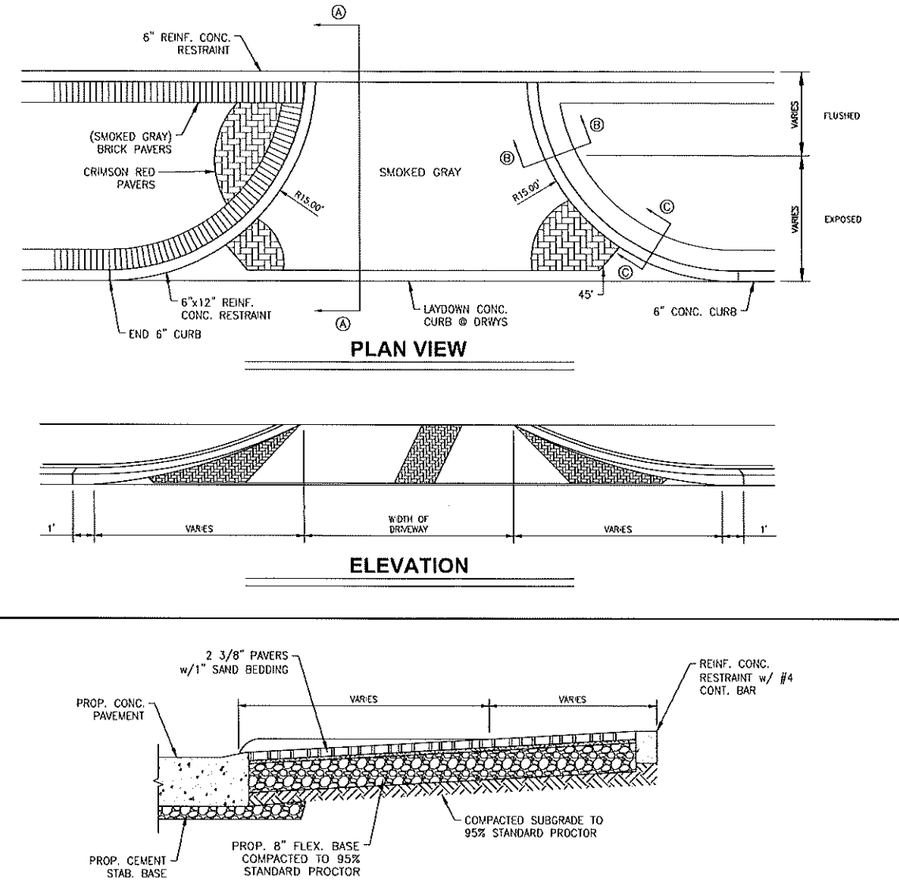


TRENCH DRAIN DETAIL

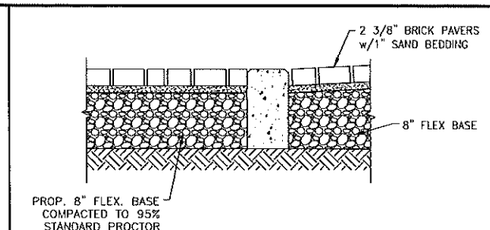


PLAN VIEW

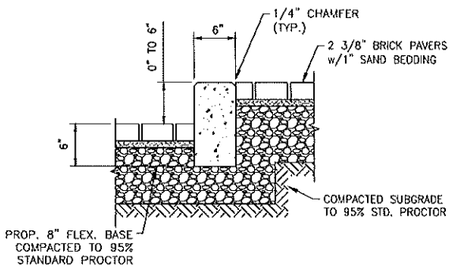
ELEVATION

PROP. SECTION A - A

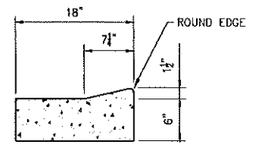
PROPOSED BRICK PAVER PATTERN



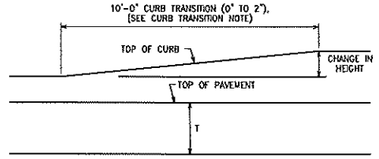
PROP. SECTION B - B



PROP. SECTION CC



TYP. DETAIL OF LAYDOWN CURB



CURB TRANSITION

CURB TRANSITION NOTE:

FIELD CONDITIONS MAY REQUIRE A LONGER OR SHORTER TRANSITION, AND SHALL BE SHOWN ELSEWHERE IN THE PLANS,OR AS DIRECTED BY THE ENGINEER.

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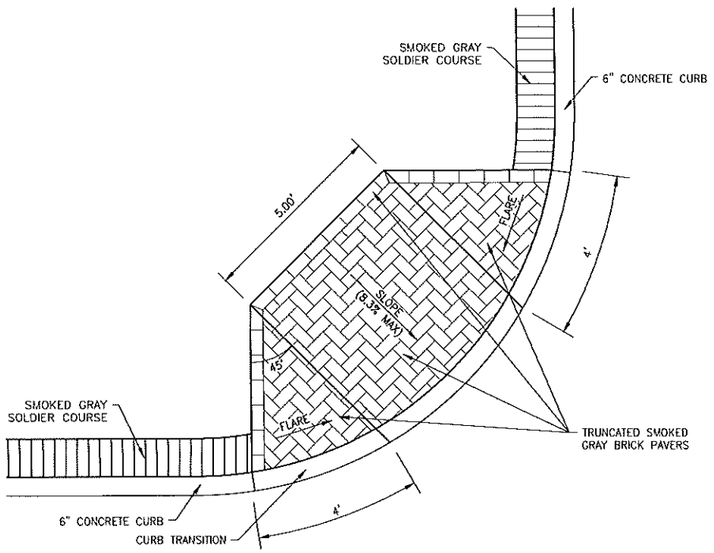
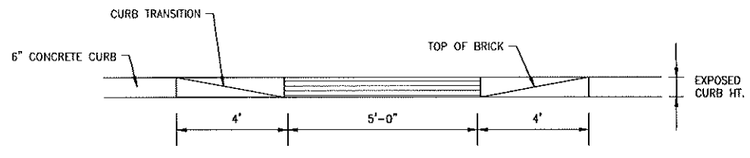
DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT

MISCELLANEOUS DETAILS

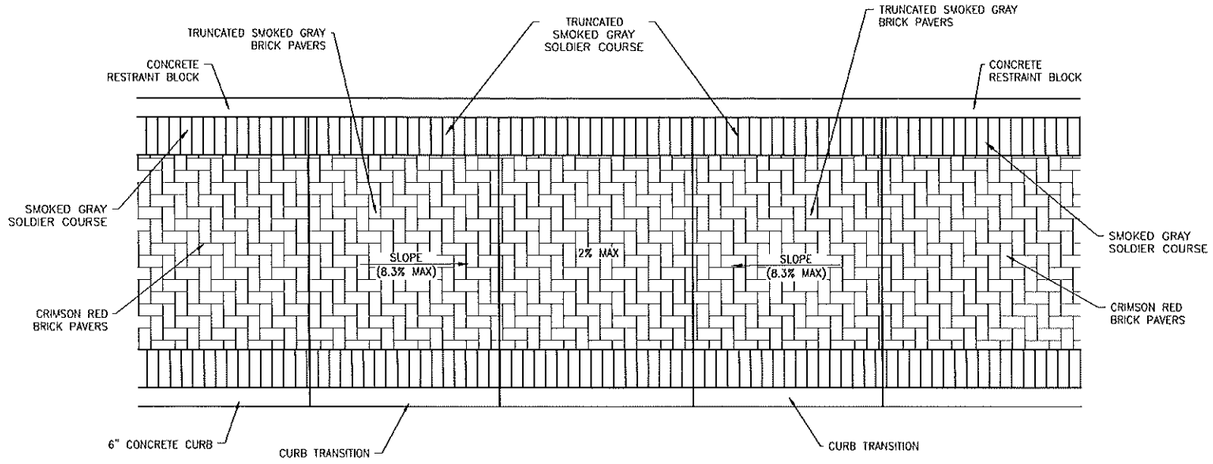
DR BY: THC	CK BY: SAW	APP BY: JDL
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 48
DATE: APR. 2021		
JOB NO. 20-1277	W:\2020\20-1277 Liberty Sidewalks\Construction Plans\20-1277 Construction Plans.dwg	REV. 0



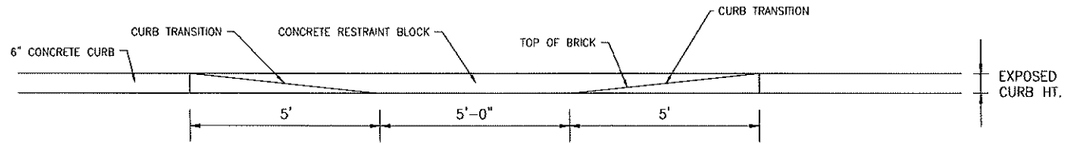
BRICK PAVER CURB RAMP W/ IN RADIUS PLAN



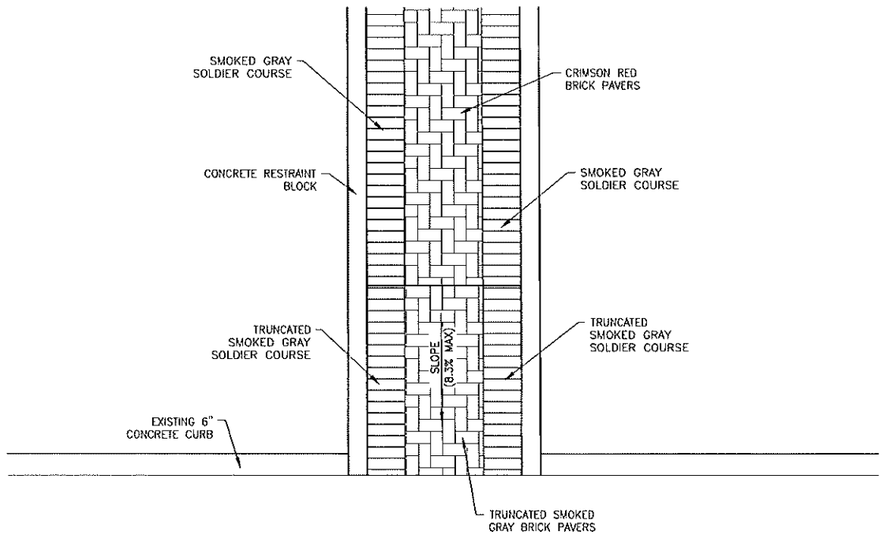
BRICK PAVER CURB RAMP W/ IN RADIUS ELEVATION



BRICK PAVER PARALLEL CURB RAMP PLAN



BRICK PAVER CURB RAMP ELEVATION



BRICK PAVER PERPENDICULAR CURB RAMP PLAN

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CLIENT:
CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT

MISCELLANEOUS DETAILS

DR BY: THC	CK BY: SAW	APP BY: JDL	
VER: ACAD 2019	SCALE: N.T.S.	SHEET NO: 49	
DATE: APR 2021			
JOB NO. 20-1277	R:/2020/20-1277 Liberty Sidewalks/Construction Plans/20-1277 Construction Plans.dwg		REV. 0

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

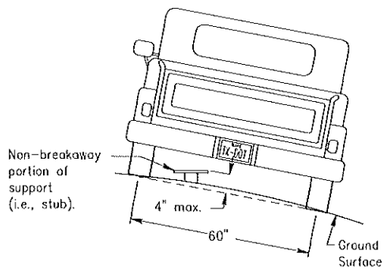
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
- WS = Wedge Anchor Steel - (see SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

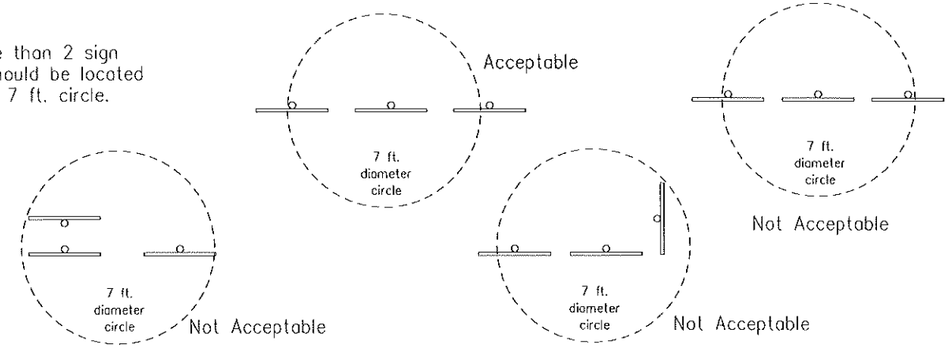
Sign Mounting Designation
- P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
- IF REQUIRED
- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



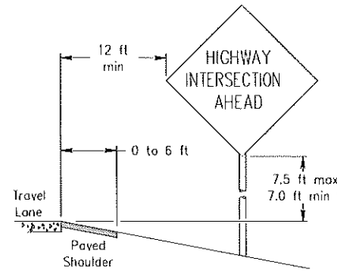
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

No more than 2 sign posts should be located within a 7 ft. circle.



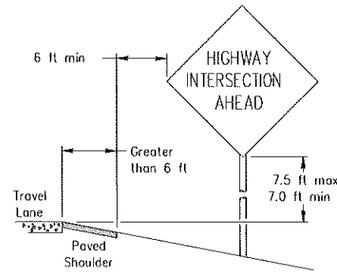
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

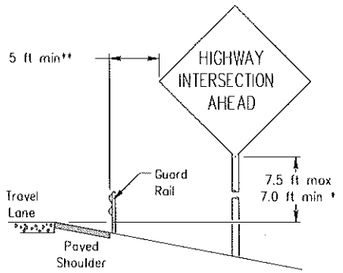
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



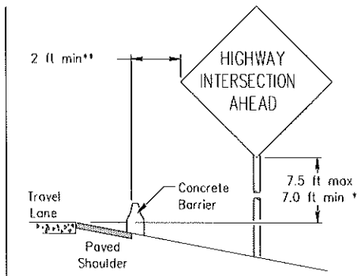
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

BEHIND BARRIER



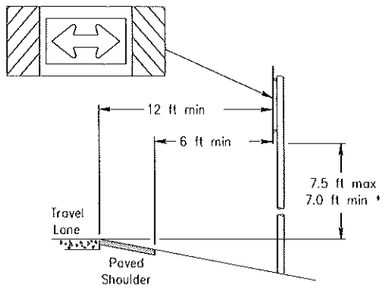
BEHIND GUARDRAIL



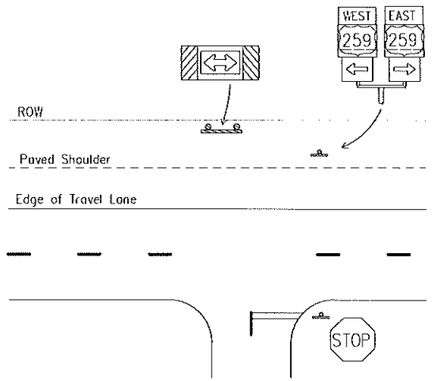
BEHIND CONCRETE BARRIER

**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

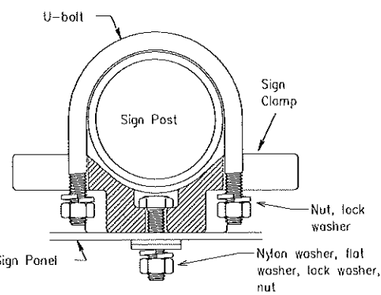
The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

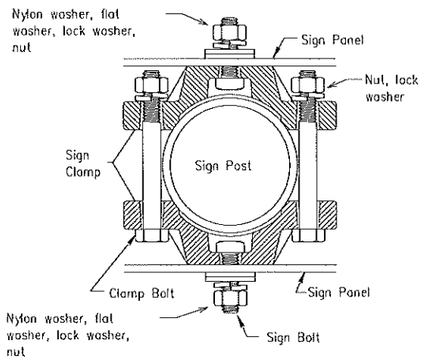
The website address is:
http://www.txdot.gov/publications/traffic.htm

TYPICAL SIGN ATTACHMENT DETAIL

Single Signs



Back-to-Back Signs



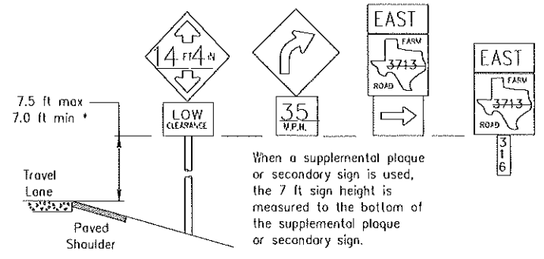
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

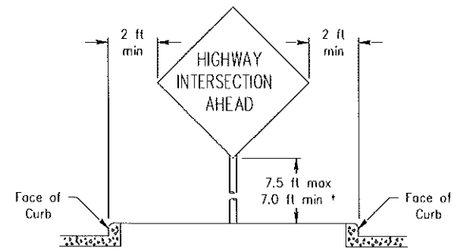
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



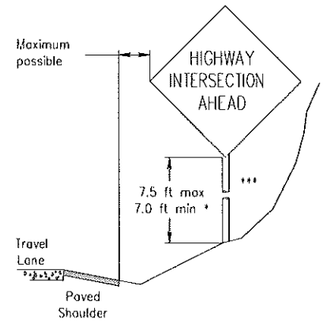
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

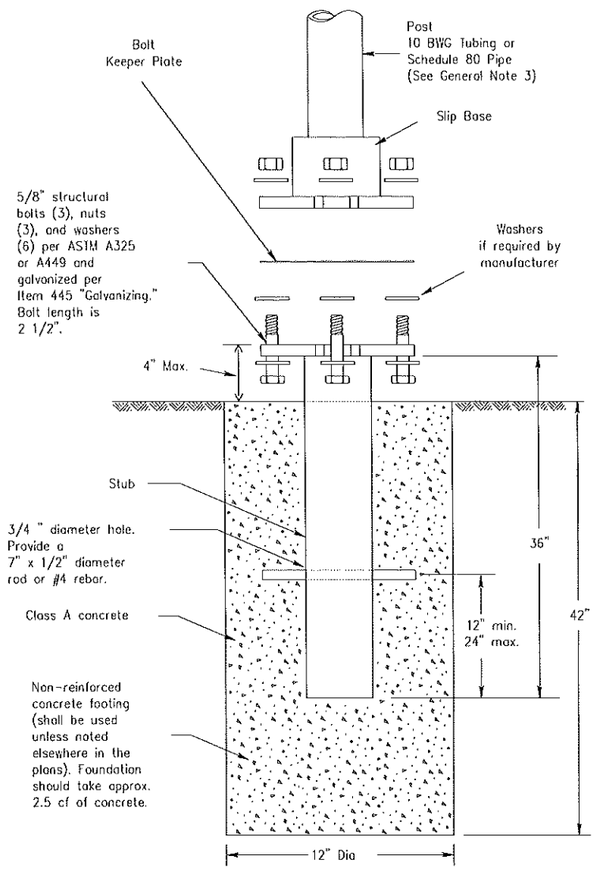
SMD(GEN)-08

©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				50

DATE:
FILE:

26A

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



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

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Moterial Producer List for approved slip base systems. http://www.txdot.gov/business/producer list.htm_ The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   - 10 BWG Tubing (2.875" outside diameter)
     - 0.134" nominal wall thickness
     - Seamless or electric-resistance welded steel tubing or pipe
     - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
     - Other steels may be used if they meet the following:
       - 55,000 PSI minimum yield strength
       - 70,000 PSI minimum tensile strength
       - 20% minimum elongation in 2"
     - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
     - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
     - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
   - Schedule 80 Pipe (2.875" outside diameter)
     - 0.276" nominal wall thickness
     - Steel tubing per ASTM A500 Gr C
     - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
       - 46,000 PSI minimum yield strength
       - 62,000 PSI minimum tensile strength
       - 21% minimum elongation in 2"
     - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
     - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
     - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced excepl where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

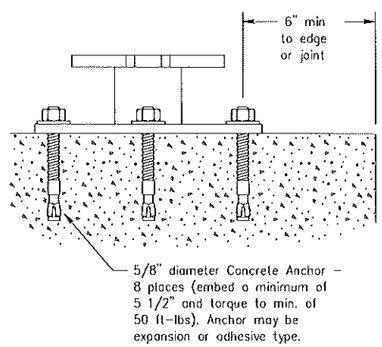
Foundation

1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



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

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT

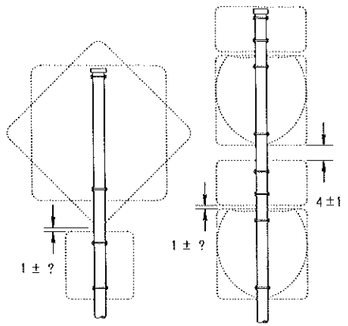
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
		51

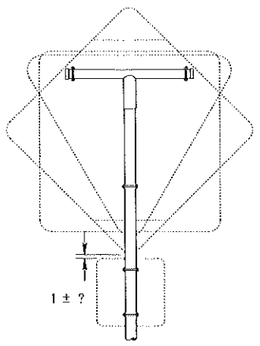
9-08 REVISIONS

DATE:
FILE:

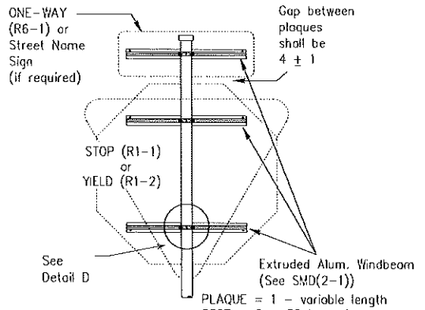
268



SM RD SGN ASSM TY XXXXX(1)XX(P)

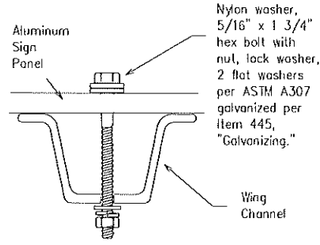


SM RD SGN ASSM TY XXXXX(1)XX(T)



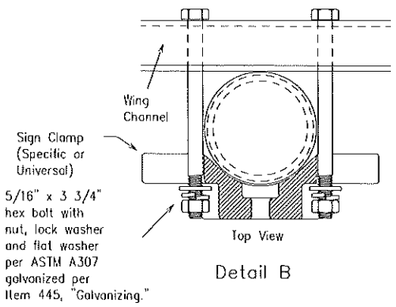
PLAQUE = 1 - variable length
STOP = 2 - 32 inch pieces
YIELD = 1 - 8 inch piece & 1 - 32 inch piece

SM RD SGN ASSM TY XXXXX(1)XX(P-BM)



Top View

Detail A



Top View

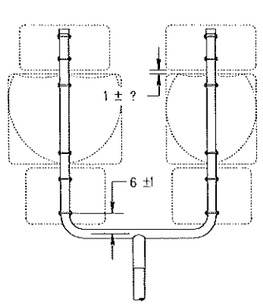
Detail B

GENERAL NOTES:

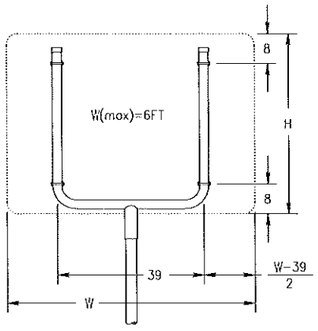
1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

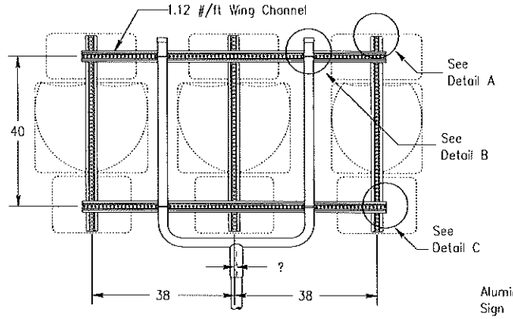
2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Cops.
13. Sign blanks shall be the sizes and shapes shown on the plans.



SM RD SGN ASSM TY XXXXX(1)XX(U)

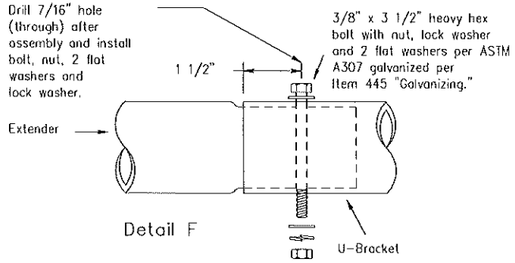


SM RD SGN ASSM TY XXXXX(1)XX(U)



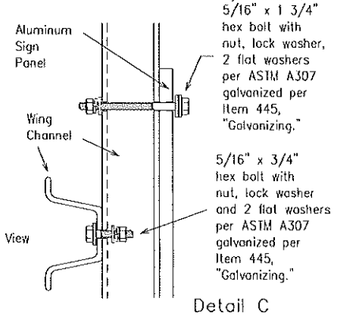
SM RD SGN ASSM TY XXXXX(1)XX(U-WC)
(See Note 11)

Drill 7/16" hole (through) after assembly and install bolt, nut, 2 flat washers and lock washer.

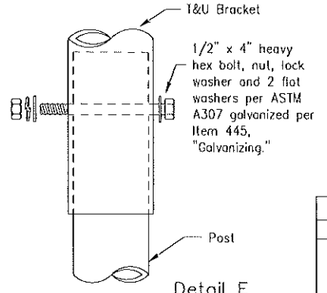


Detail F

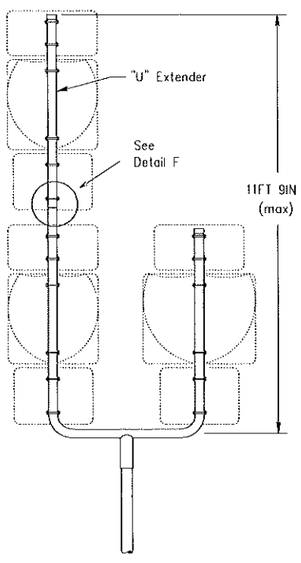
Splices shall only be allowed behind the sign substrate.



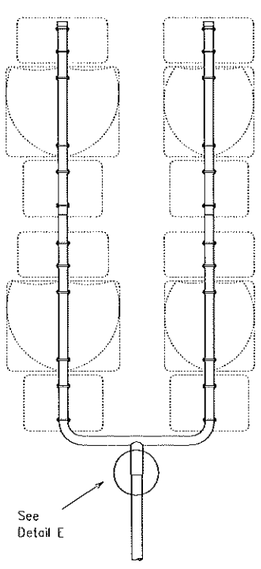
Detail C



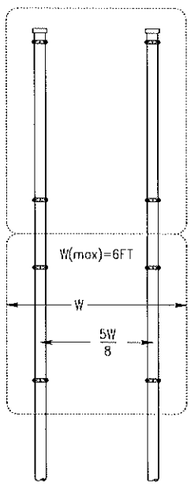
Detail E



SM RD SGN ASSM TY S80(1)XX(U-1EXT)

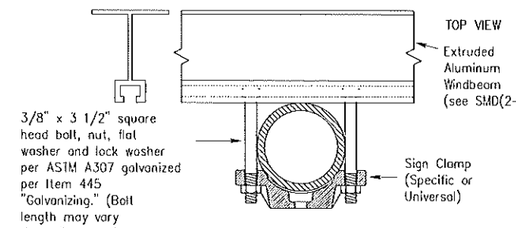


SM RD SGN ASSM TY S80(1)XX(U-2EXT)

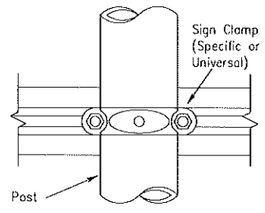


SM RD SGN ASSYM TY XXXXX(2)XX(P)

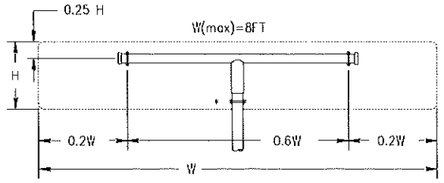
SIDE VIEW



Detail D



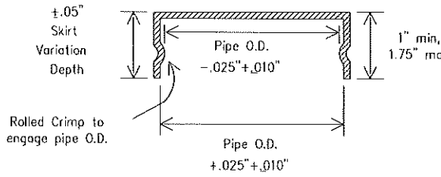
REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
CONT	SECT	JOB	HIGHWAY
			CS
DIST	COUNTY		SHEET NO.
			52

REVISIONS
9-08

DATE:
FILE:

SCALE: 1" = 10'

RIGHT OF WAY

RIGHT OF WAY

0+00

1+00

2+00

3+

MILAM STREET
(CONCRETE)

MATCH LINE (THIS SHEET)

STA.0+42.60
R25.51

STA.1+26.73
R25.64

STA.2+10.86
R25.77

STA.2+85.55
R25.89

RIGHT OF WAY

RIGHT OF WAY

RIGHT OF WAY

MATCH LINE (THIS SHEET)

RIGHT OF WAY

PROP. ELECTRIC SERVICE ON EXISTING WOOD POLE.

STA.4+29.67
L26.76

STA.5+05.79
L25.64

RIGHT OF WAY

STA.5+91.27
L25.73

0+00

4+00

5+00

6+

MILAM STREET
(CONCRETE)

PROP. ELECTRIC SERVICE ON EXISTING WOOD POLE.

SAM HOUSTON STREET
(CONCRETE)

RIGHT OF WAY

STA.1+13.59
R20.09

RIGHT OF WAY

RIGHT OF WAY

RIGHT OF WAY

STA.4+30.09
R38.57

STA.5+19.66
R38.49

MATCH LINE (SHEET 54)

LEGEND

- POWER POLE
- TELEPHONE PEDESTAL
- ELECTRIC BOX
- WATER VALVE
- WATER METER
- LIGHT POLE
- FIRE HYDRANT
- SIGN
- STOP/STREET SIGN
- PIPELINE MARKER
- MANHOLE
- CLEAN OUT
- FLAG POLE
- COVERED
- GUY ANCHOR
- WOOD FENCE
- CHAIN LINK FENCE
- P.R.R. FENCE
- GAS LINE
- ATT FIBER OPTIC LINE
- FIBER OPTIC CABLE
- DITCH TOP
- DITCH CENTERLINE
- DITCH TOE
- PROP. CONDUIT
- PROP. LIGHT POLE
- PROPOSED LIGHT POLE W/ CONCRETE APRON
- GROUND BOX
- (X) CONDUIT RUN NUMBER

NOTES:

1. UTILITY LOCATIONS SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT EXACT. ADDITIONAL UTILITIES MAY BE PRESENT. CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
2. CONTRACTOR TO BE RESPONSIBLE FOR DAMAGE CAUSED TO AREAS DESIGNATED TO REMAIN.
3. CONDUIT LOCATIONS SHOWN ARE APPROXIMATE. ADJUSTMENTS MAY BE NECESSARY DEPENDING ON FIELD CONDITIONS AS APPROVED BY THE ENGINEER.
4. HATCH SHOWN FOR PICTORIAL PURPOSE ONLY. FINAL PATTERN MAY VARY REFER TO DETAILS.

NO	REVISION	DRAWN	CHECK	APP'VD	DATE

INTERIM SUBMITTAL
DOCUMENT SUBMITTED FOR REVIEW ONLY. NOT FOR BIDDING, OR CONSTRUCTION.
ENGINEER:
JEFF O. LEAVINS
P.E. NO. 111537
DATE: 4/8/2021

WHITELEY OLIVER ENGINEERING, LLC
TEXAS ENGINEERING FIRM NO. F-22257
3250 EASTEX FWY, BEAUMONT, TEXAS 77703
409-892-0421 | MWWASSOC.COM

CLIENT: CITY OF LIBERTY

DOWNTOWN SIDEWALK IMPROVEMENTS PROJECT
ILLUMINATION PLAN
MILAM STREET
STA. 0+00 - 6+00

VER:	JOB NO.	SHEET NO.
ACAD 2019	20-1277	53