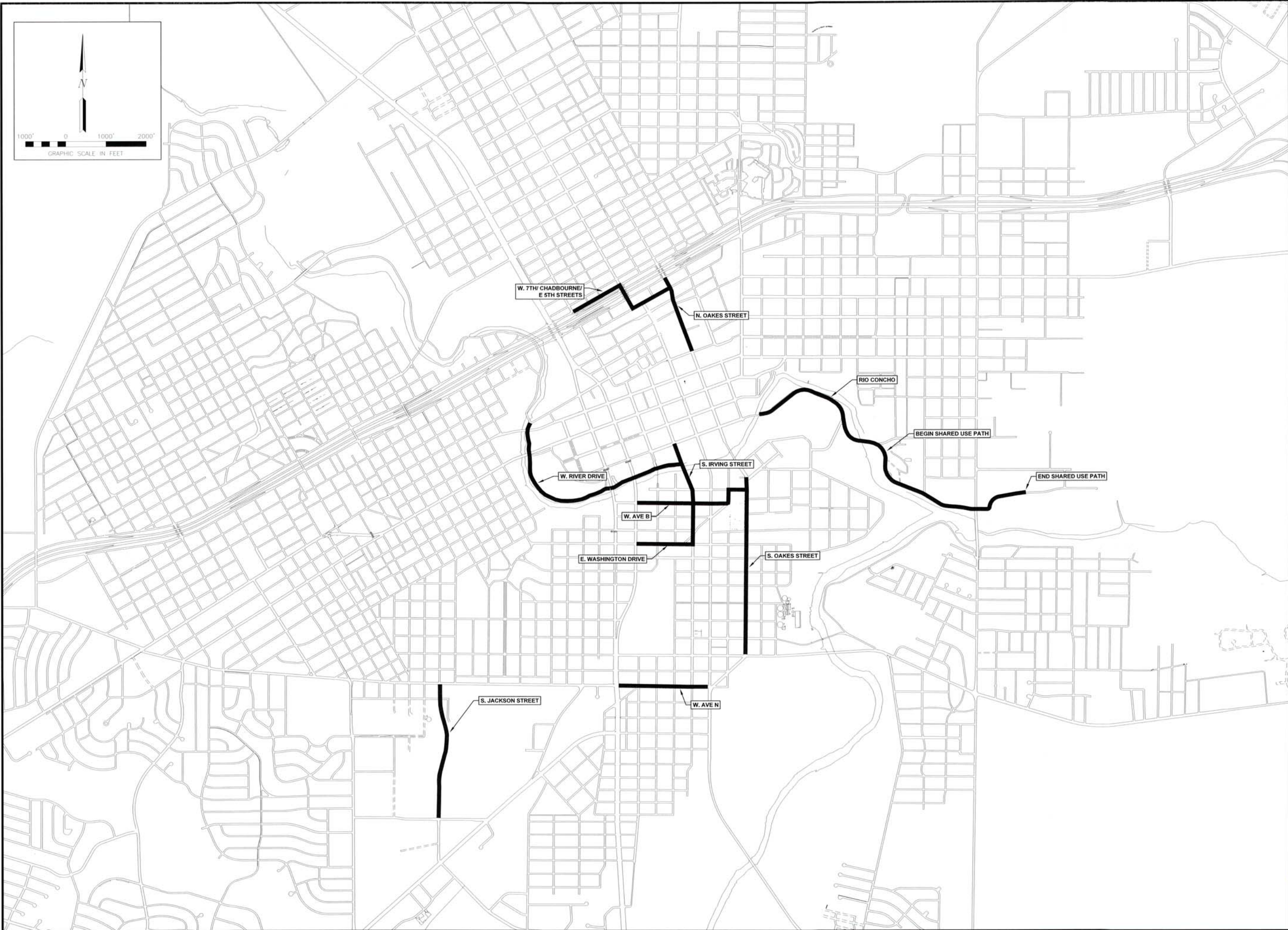
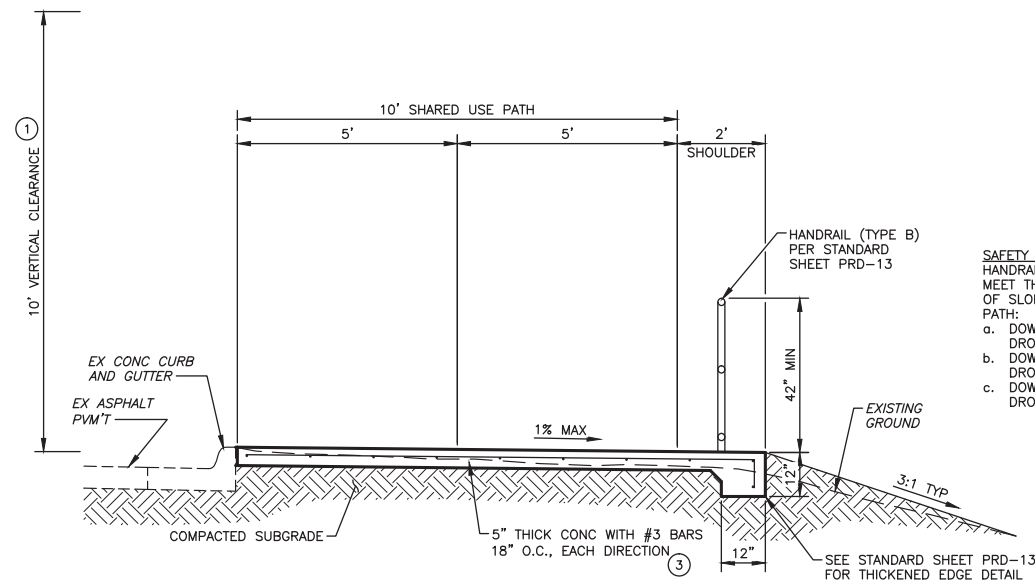




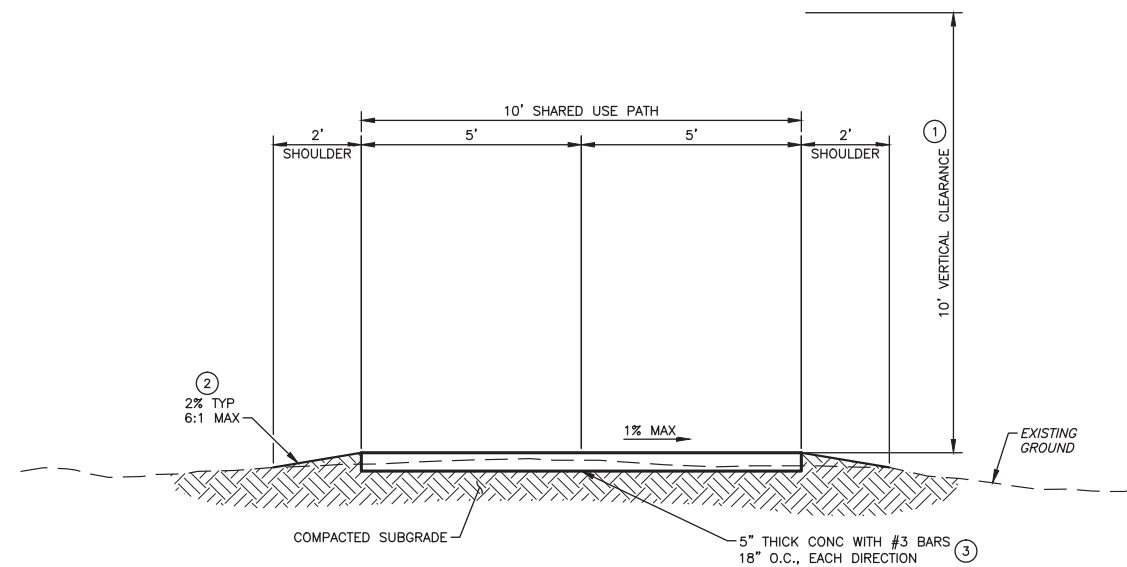
TEP GRANT
ADDITIONAL BICYCLE LANES

MARK	REVISION	DATE

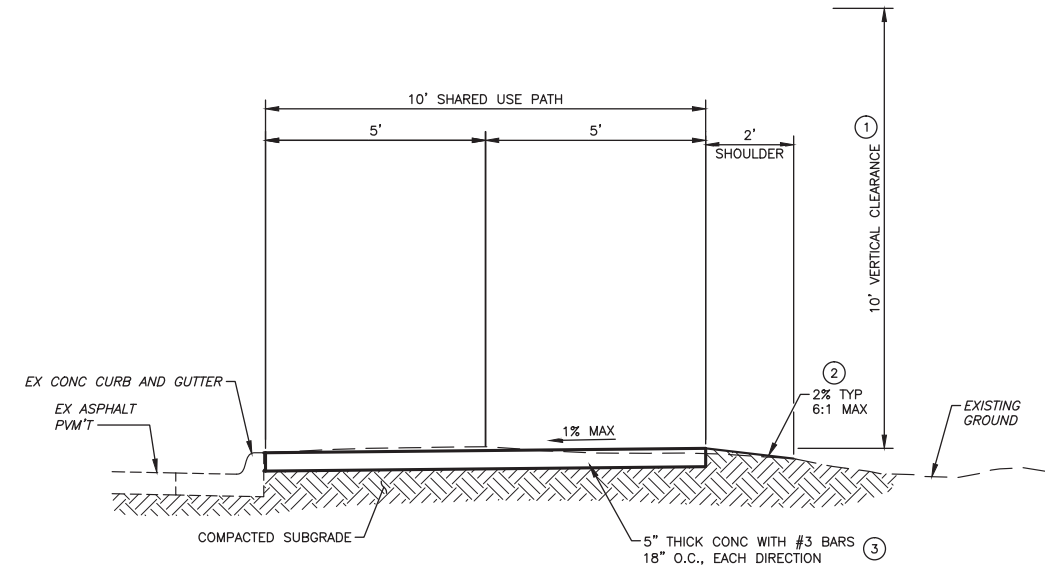


**TYPICAL SECTION
WITH HANDRAIL**

- ① THE SHARED USE PATH SHALL HAVE A CLEAR AREA UP TO 10 FEET ABOVE GRADE FOR THE FULL WIDTH OF THE PATH. ANY TREES OR LIMBS THAT ENCROACH INTO THIS AREA SHALL BE REMOVED OR TRIMMED OUTSIDE OF THESE PRESCRIBED LIMITS.
- ② SHOULDERS MAY BE CONSTRUCTED FROM IN-SITU MATERIAL.
- ③ CONCRETE FOR SHARED USE PATH SHALL BE CLASS A WITH GRADE 60 REINFORCEMENT.



TYPICAL SECTION



TYPICAL SECTION
ADJACENT TO STREET

MARK	REVISION	DATE

C:\PWORKING\CWILSON\DOA\811361\15004RD-RC-TYP
 SECT.DWG | LAYOUT1 | 7/13/2016 - 2:43 PM

DRAWING PATH NAME | LAYOUT | PLOT DATE - TIME

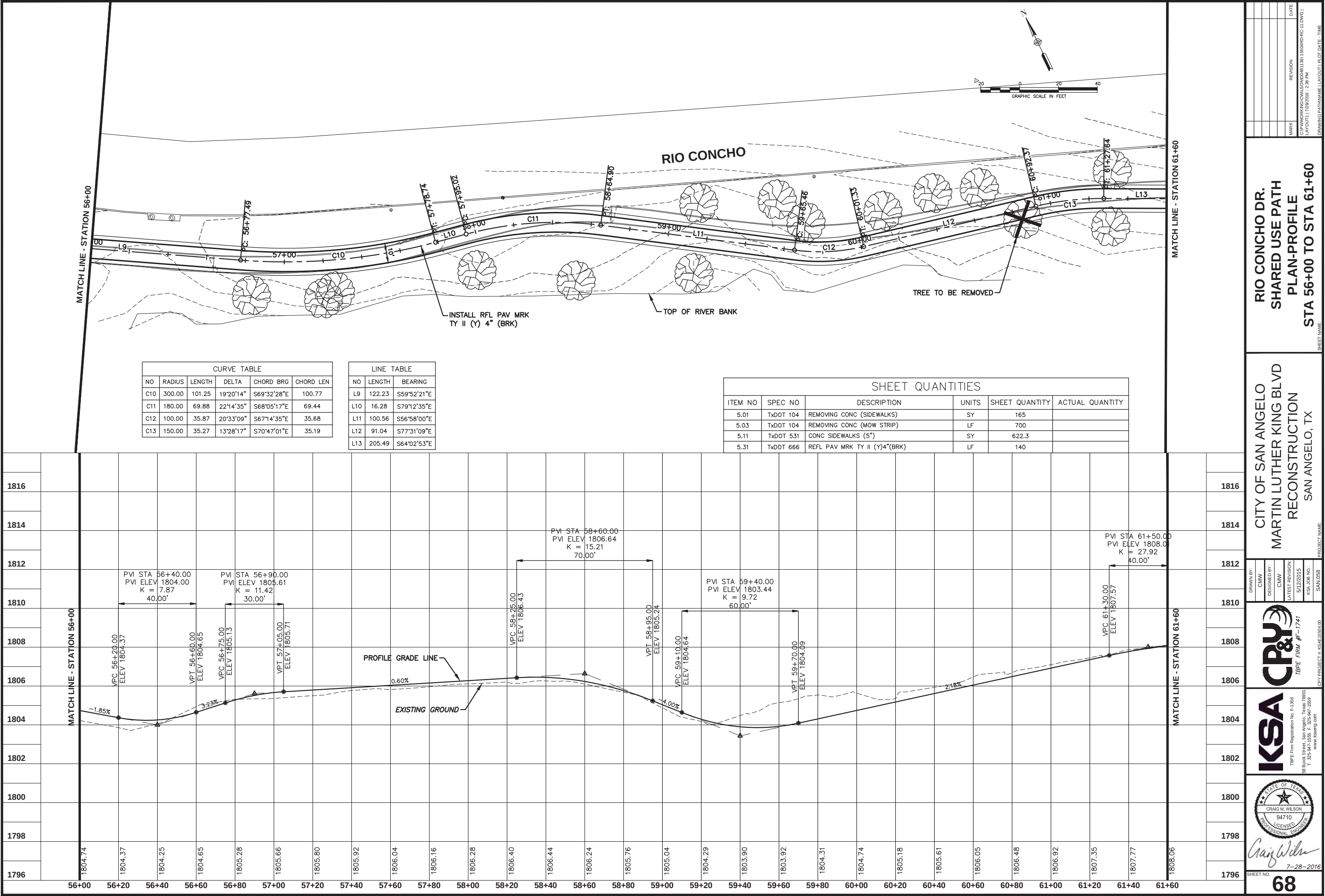
**RIO CONCHO DR.
SHARED USE PATH
TYPICAL SECTIONS**

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	
CMW	
DESIGNED BY:	
CMW	
ATEST REVISION:	
5/12/2015	
KSA JOB NO.:	
SAN.058	



7-12-2016



MARK

REVISION

DATE

C:\PWORKING\OWILSON\DWG\11361156ARD-RC-11.DWG
LAYOUT1 | 7/28/2016 - 2:38 PM

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME

RIO CONCHO DR.
SHARED USE PATH
PLAN-PROFILE
STA 56+00 TO STA 61+60

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CWM

DESIGNED BY:
CWM

LATEST REVISION
5/12/2015

KSA JOB NO.
SAN1058

KSA

CP&Y

TS&PE Firm Registration No. F-1386
88 Bullock Street, San Angelo, Texas 76901
T. 325-947-1555 F. 325-947-1559
www.ksaeng.com

STATE OF TEXAS

94710

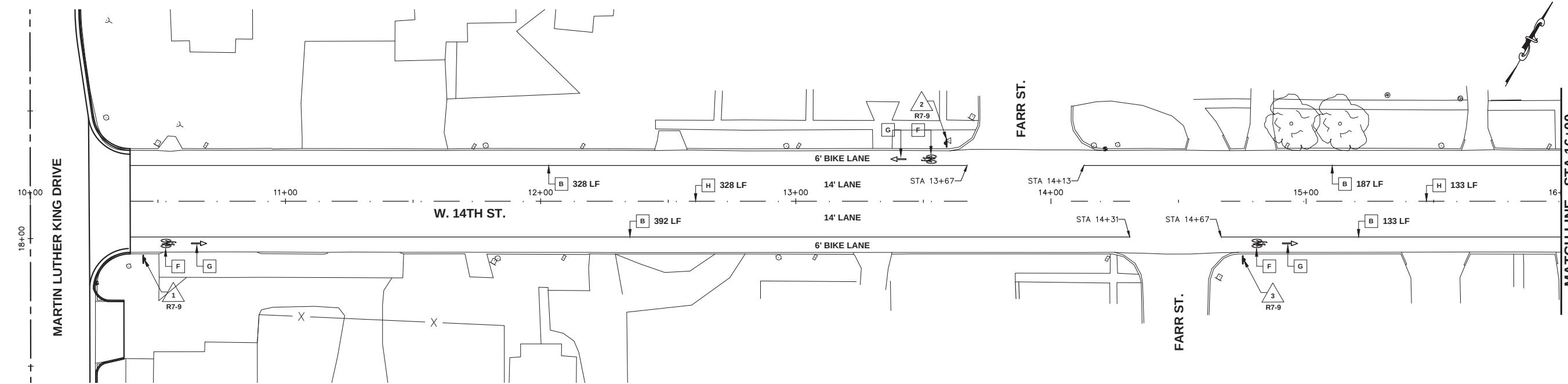
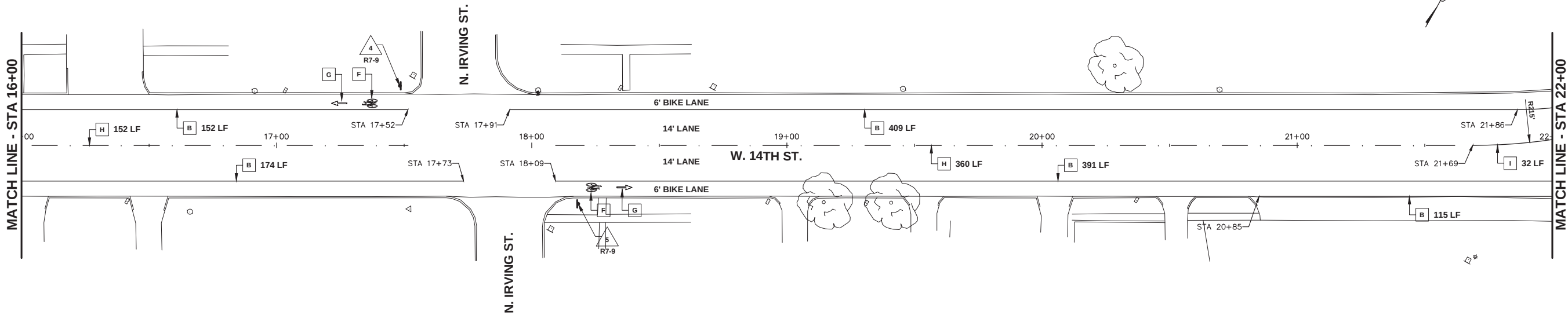
LICENSED PROFESSIONAL ENGINEER

Craig Wilson
7-28-2016

CP&Y PROJECT #: KSAE15564.00

SHEET NO.

68



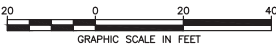
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ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	7.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	5	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	2129	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	5	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(BRK)(090MIL)	LF	244	
5.30	TxDOT 666	REFL PAV MRK TY I (Y)4"(SLD)(090MIL)	LF	64	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



7-12-2016
SHEET NO. 74

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

PEDESTRIAN FACILITIES
SIGNING AND STRIPING

W. 14TH ST. - MLK TO N. CHADBOURNE

SHEET NAME:

PROJECT NAME:

SAN1058

CPY PROJECT #: KSAE15564.00

DATE

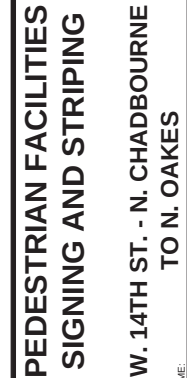
REVISION

MARK

C:\PWORKING\OWILSON\04811441\1504PM-14TH.DWG

14TH-1 1/13/2016 - 2:53 PM

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME



SHEET QUANTITIES					
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5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	6.0	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	4	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	2732	
5.24	TxDOT 666	REFL PAV MRK TY I (W)12"(SLD)(090MIL)	LF	69	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	7	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(BRK)(090MIL)	LF	196	
5.30	TxDOT 666	REFL PAV MRK TY I (Y)4"(SLD)(090MIL)	LF	456	

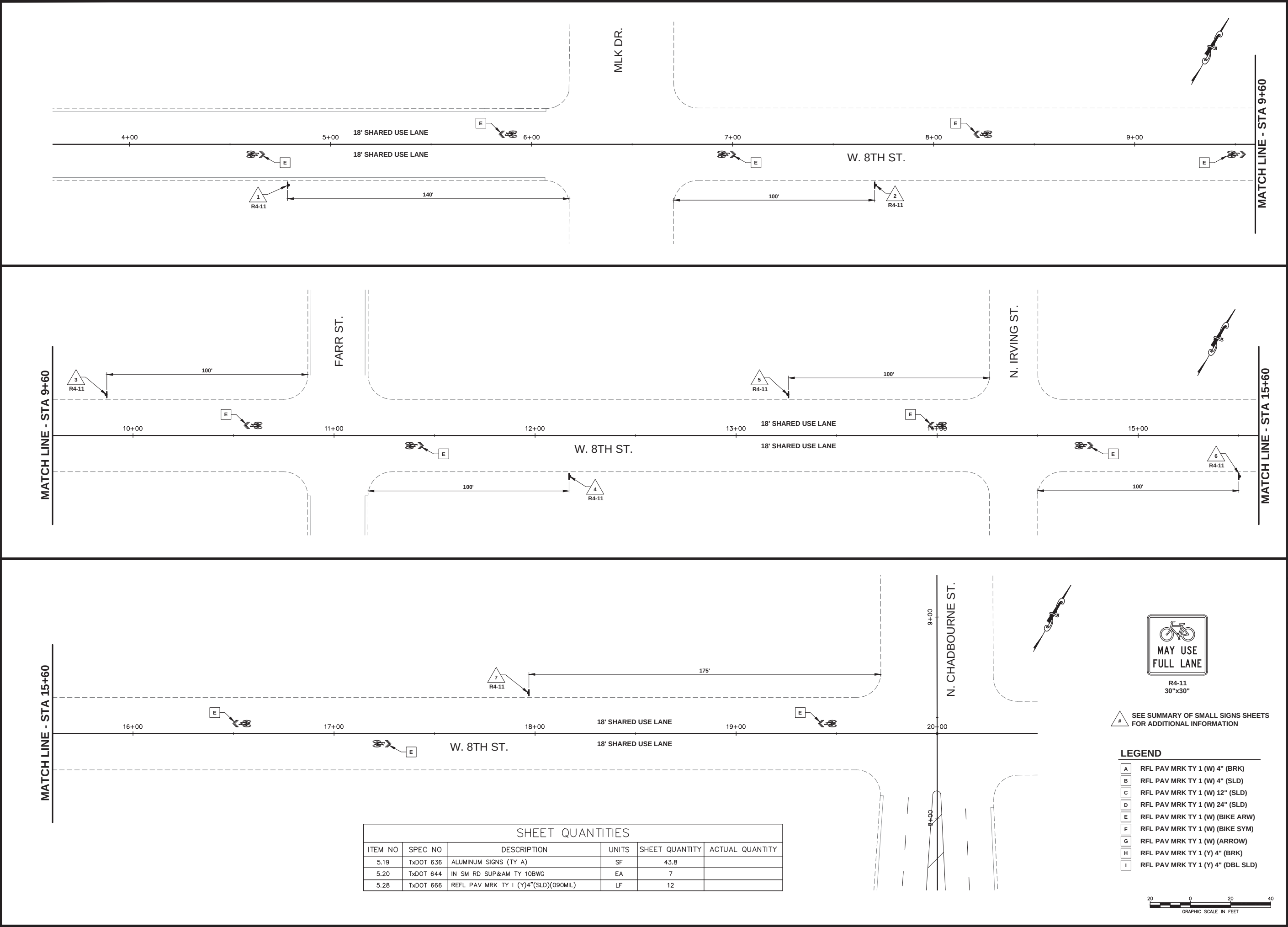


 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |





SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	43.8	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	7	
5.28	TxDOT 666	REFL PAV MRK TY 1 (Y)4"(SLD)(090MIL)	LF	12	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

MARK

REVISION

DATE

8TH-117132016 - 254 PM

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8TH-117132016 - 254 PM

PROJECT NAME

PROJECT NO.

PROJECT NAME

CP&Y

CP&Y PROJECT #: KSAE1504.00

CP&Y FIRM # - 1741

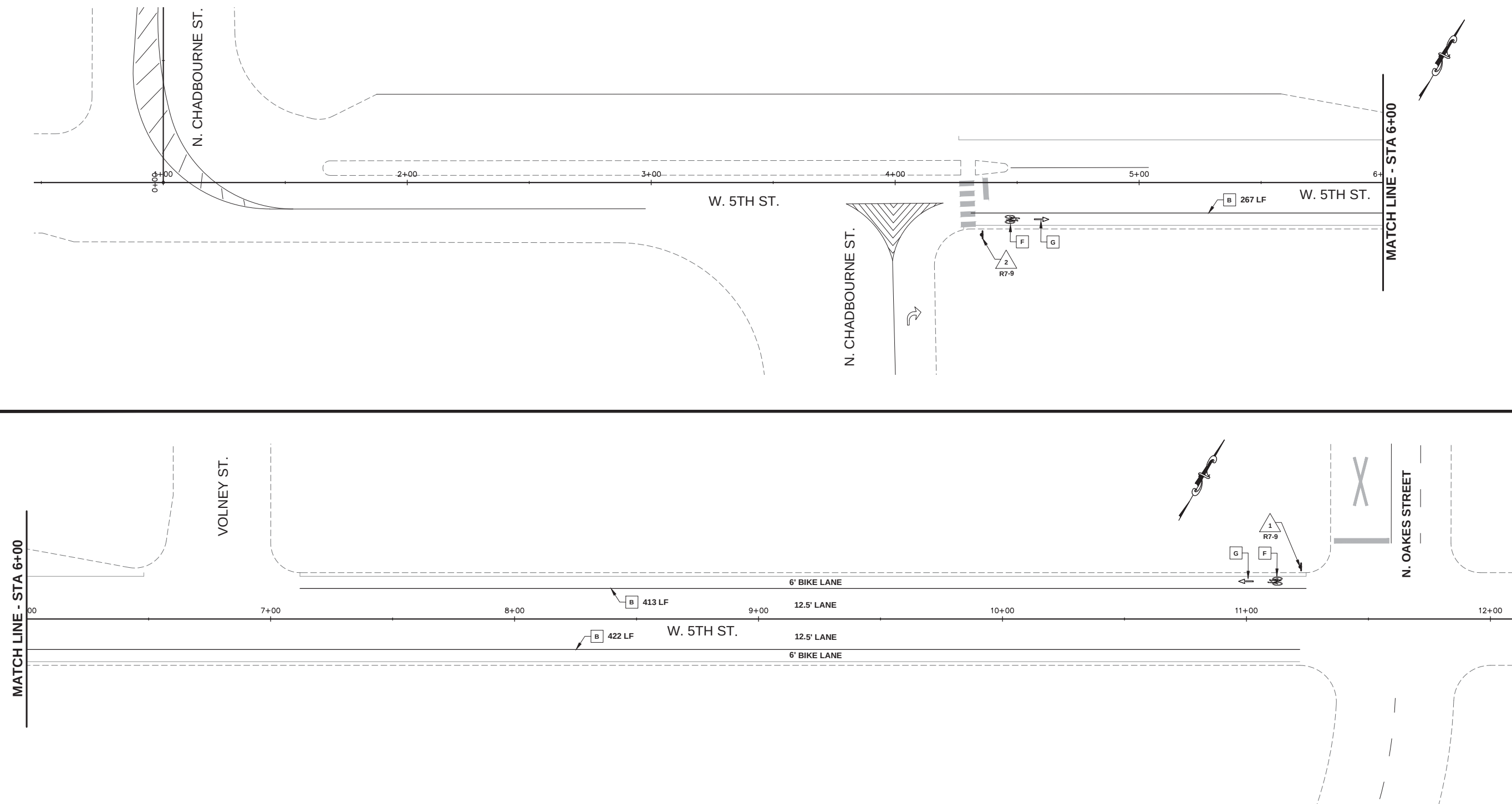
STATE OF TEXAS

94710

PROFESSIONAL ENGINEER

7-12-2016

76



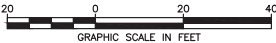
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5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	2	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4*(SLD)(090MIL)	LF	1102	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	2	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	2	



 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



DRAWN BY:	CMW
DESIGNED BY:	CMW
DATE TEST REVISION	5/12/2015
KSA JOB NO.:	SAN.058



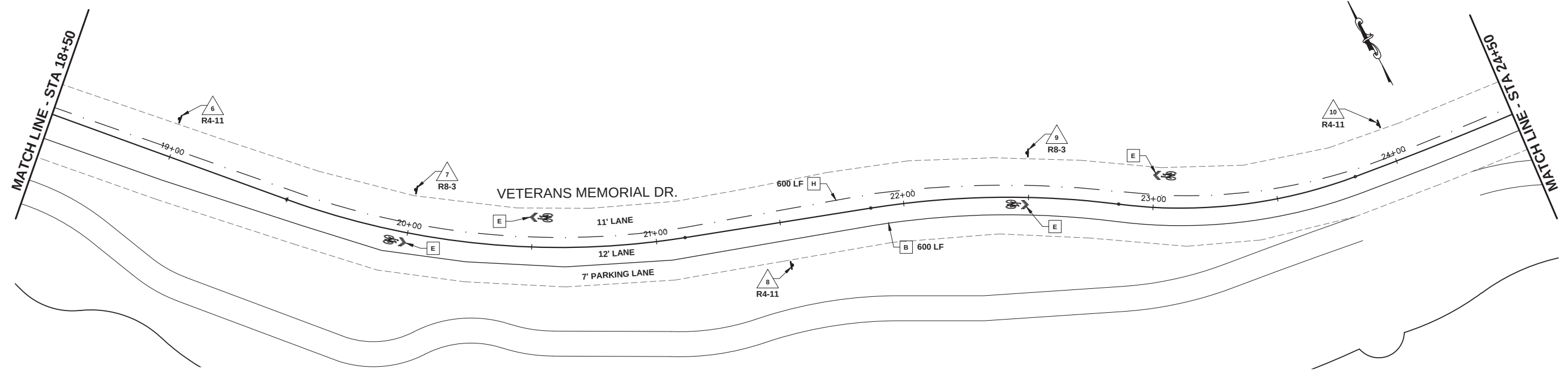
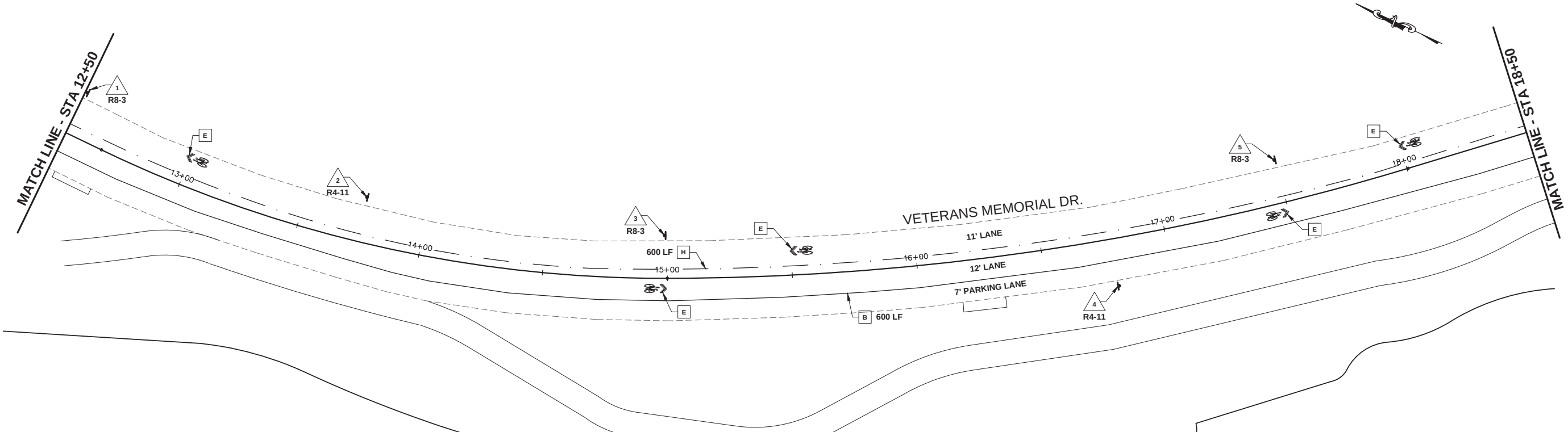
Craig Wilbur
7-12-2016
SHEET NO. **77**

PEDESTRIAN FACILITIES
SIGNING AND STRIPING
W. 5TH ST. - N. CHADBOURNE TO
N. OAKES
NAME:

DATE	REVISION	MARK

C:\PWORKING\OWILSON\04811441.15504PW-5TH.DWG |
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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME



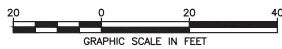
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5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	10	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1200	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	9	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(SLD)(090MIL)	LF	300	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

VETERANS MEMORIAL DR. -
STA 12+50 TO STA 24+50

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CIWM

DESIGNED BY:
CIWM

DATE TEST REVISION:
5/12/2015

KSA JOB NO.:
SAN1058

CP&Y

TBPE FIRM # - 1741

CPY PROJECT #: KSAE15564.00

KSA

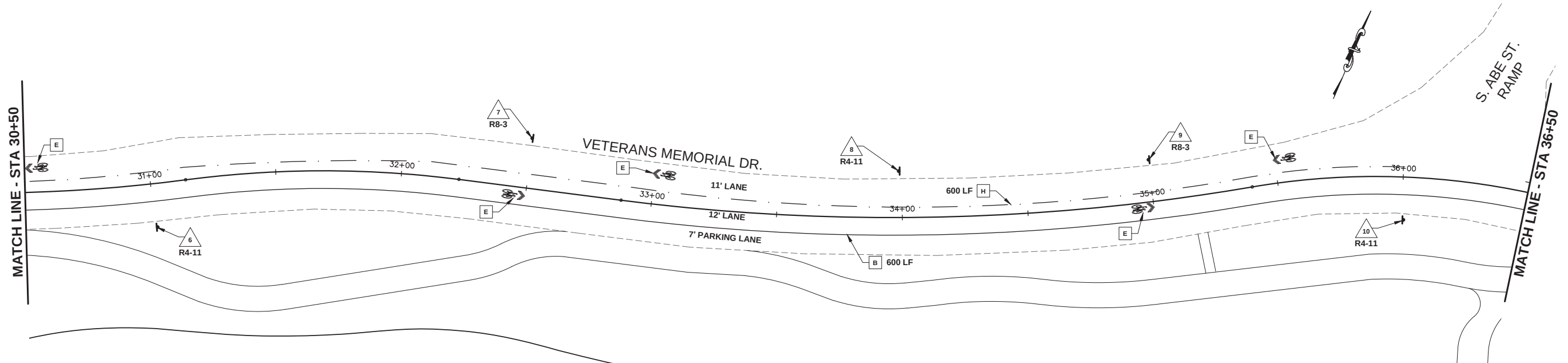
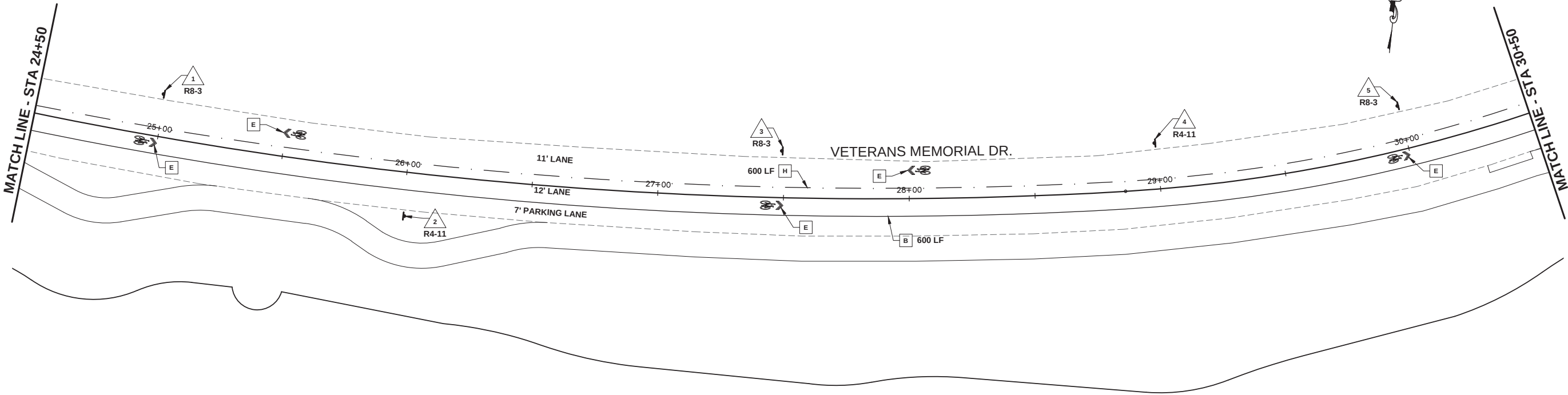
TBPE Firm Registration No. F-1386
88 Bullock Street, San Angelo, Texas 76901
T. 325-947-1555 F. 325-947-1559
www.kasang.com

STATE OF TEXAS
94710
LICENSED
PROFESSIONAL ENGINEER

Craig Wilson
7-12-2016

SHEET NO.
79

DATE
RIVER-2 1/13/2016 - 2:57 PM
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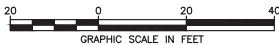
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5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	10	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1200	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	10	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(SLD)(090MIL)	LF	300	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

VETERANS MEMORIAL DR. -
STA 24+50 TO STA 36+50

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CIW

DESIGNED BY:
CIW

LATEST REVISION:
5/12/2015

KSA JOB NO.:
SAN 058

CP&Y

TBPE FIRM # - 1741

KSA

TBPE Firm Registration No. F-1386
88 Bullock Street, San Angelo, Texas 76901
T. 325-947-1555 F. 325-947-1559
www.kasang.com

STATE OF TEXAS
94710
LICENSED
PROFESSIONAL ENGINEER

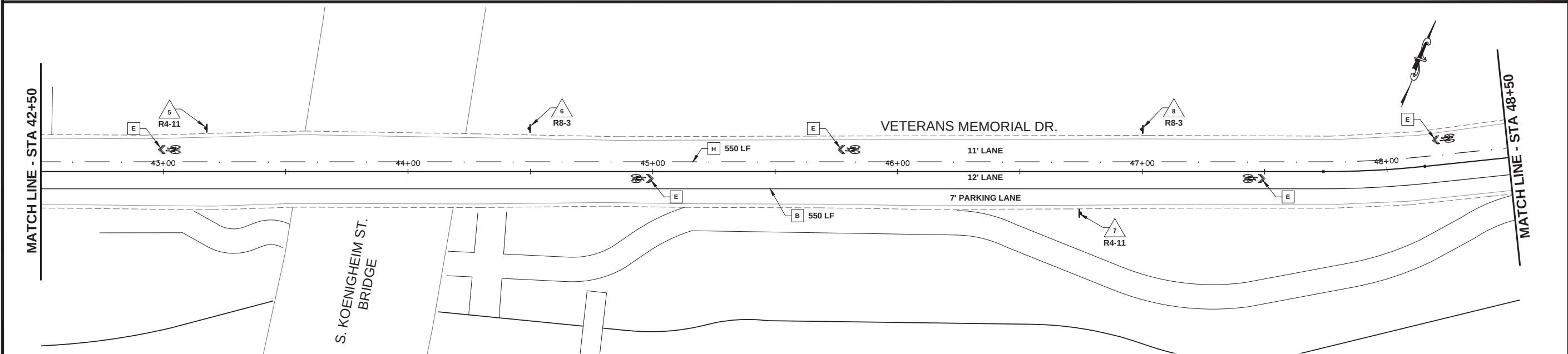
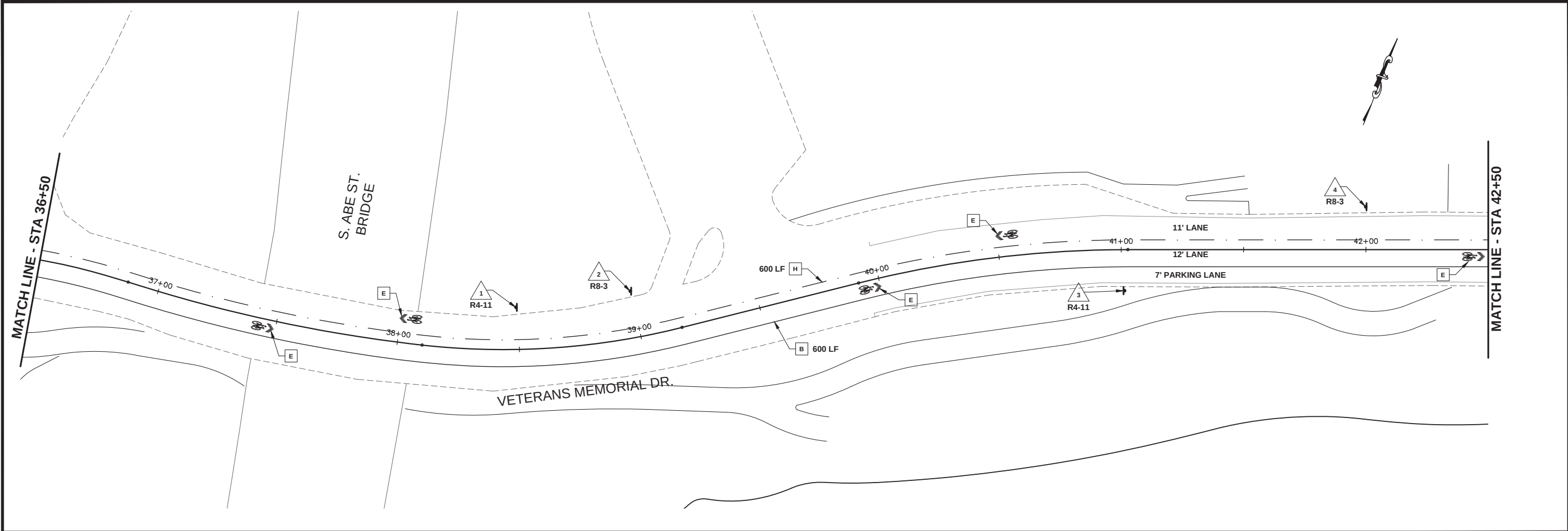
Craig Wilson
7-12-2016

REVISION
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DATE
RIVER-3 1/13/2016 - 2:58 PM

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME

SHEET NO.
80



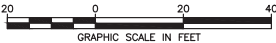
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5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	8	
5.23	TxDOT 666	REFL PAV MRK TY 1 (W)4"(SLD)(090MIL)	LF	1200	
5.28	TxDOT 666	REFL PAV MRK TY 1 (W)(BIKE ARW)(090MIL)	LF	10	
5.29	TxDOT 666	REFL PAV MRK TY 1 (Y)4"(SLD)(090MIL)	LF	300	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



REVISION	DATE
MARK	REVISION
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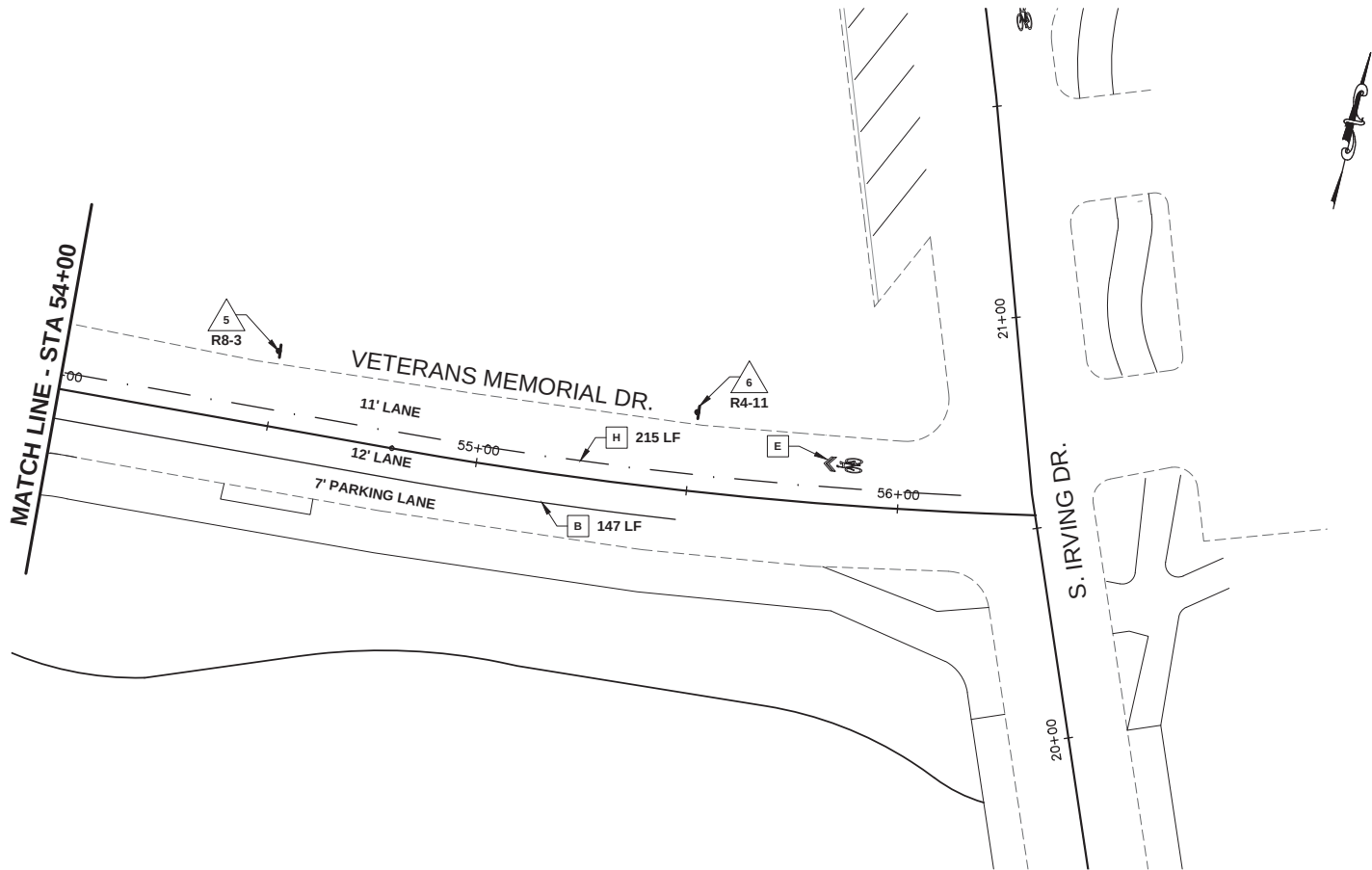
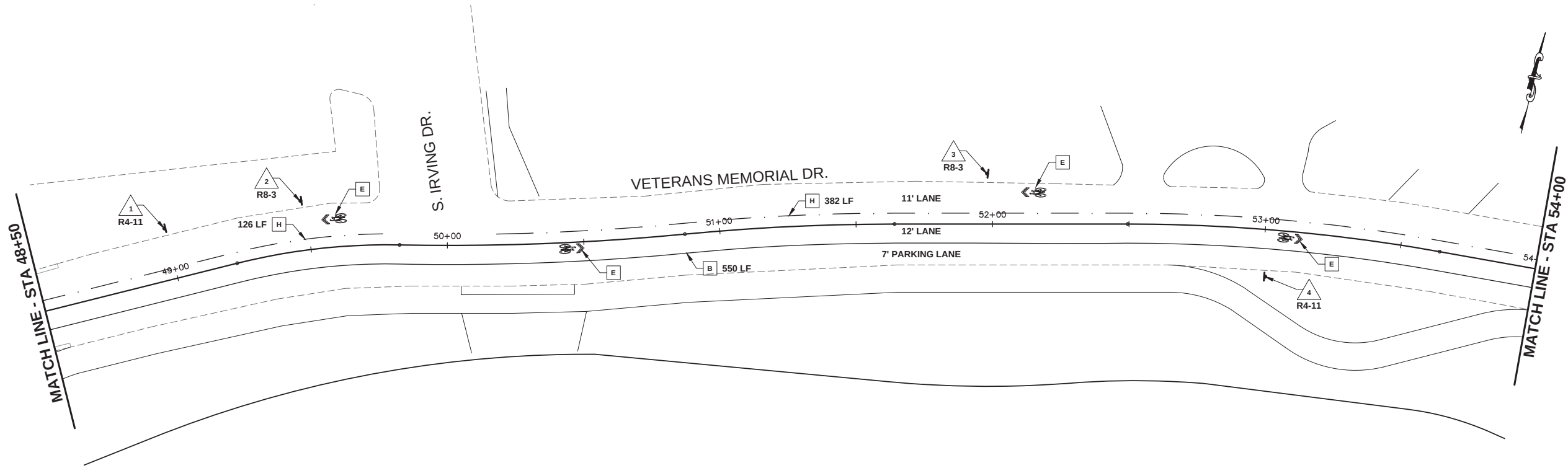
PEDESTRIAN FACILITIES
SIGNING AND STRIPING
VETERANS MEMORIAL DR. -
STA 36+50 TO STA 48+50

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	CWM
DESIGNED BY:	CWM
LATEST REVISION	5/12/2015
KSA JOB NO.	SAN1058



7-12-2016
SHEET NO. 81



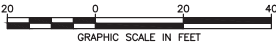
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	34.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	6	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	697	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	5	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(SLD)(090MIL)	LF	181	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



REVISION	DATE
MARK	DATE
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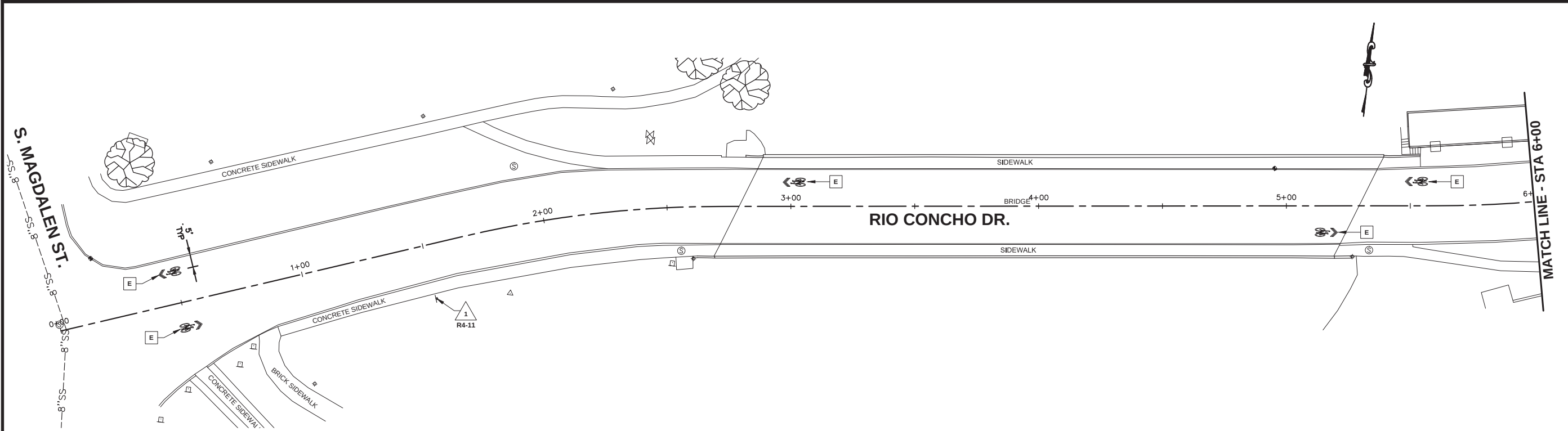
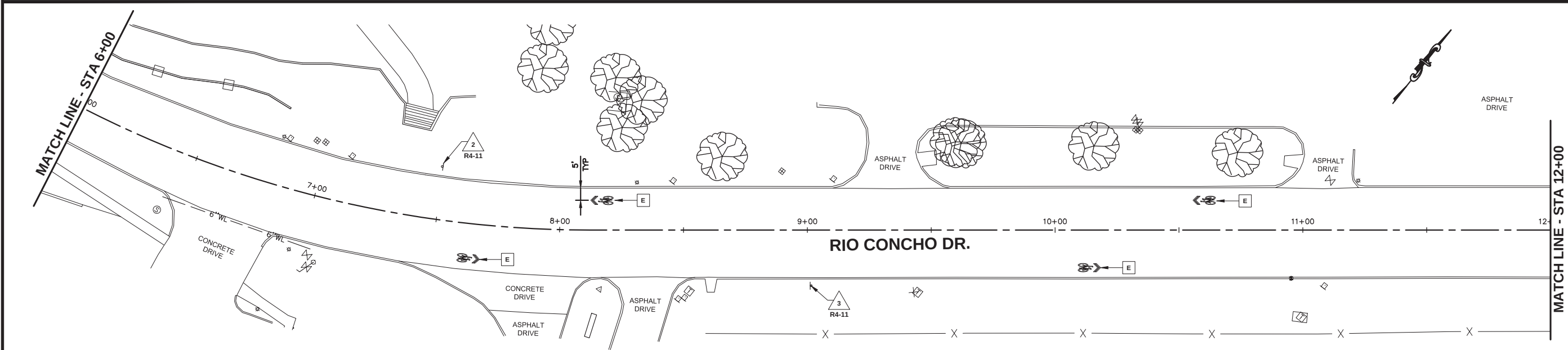
PEDESTRIAN FACILITIES
SIGNING AND STRIPING
VETERANS MEMORIAL DR. -
STA 48+50 TO N. IRVING

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	CIW
DESIGNED BY:	CIW
LATEST REVISION:	5/12/2015
KSA JOB NO.	SAN 058



7-12-2016
SHEET NO. 82



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	19.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	3	
5.28	TxDOT 666	REFL PAV MRK TY 1 (W)(BIKE ARW)(090MIL)	LF	9	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



7-12-2016
SHEET NO. 83

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

PEDESTRIAN FACILITIES
SIGNING AND STRIPING

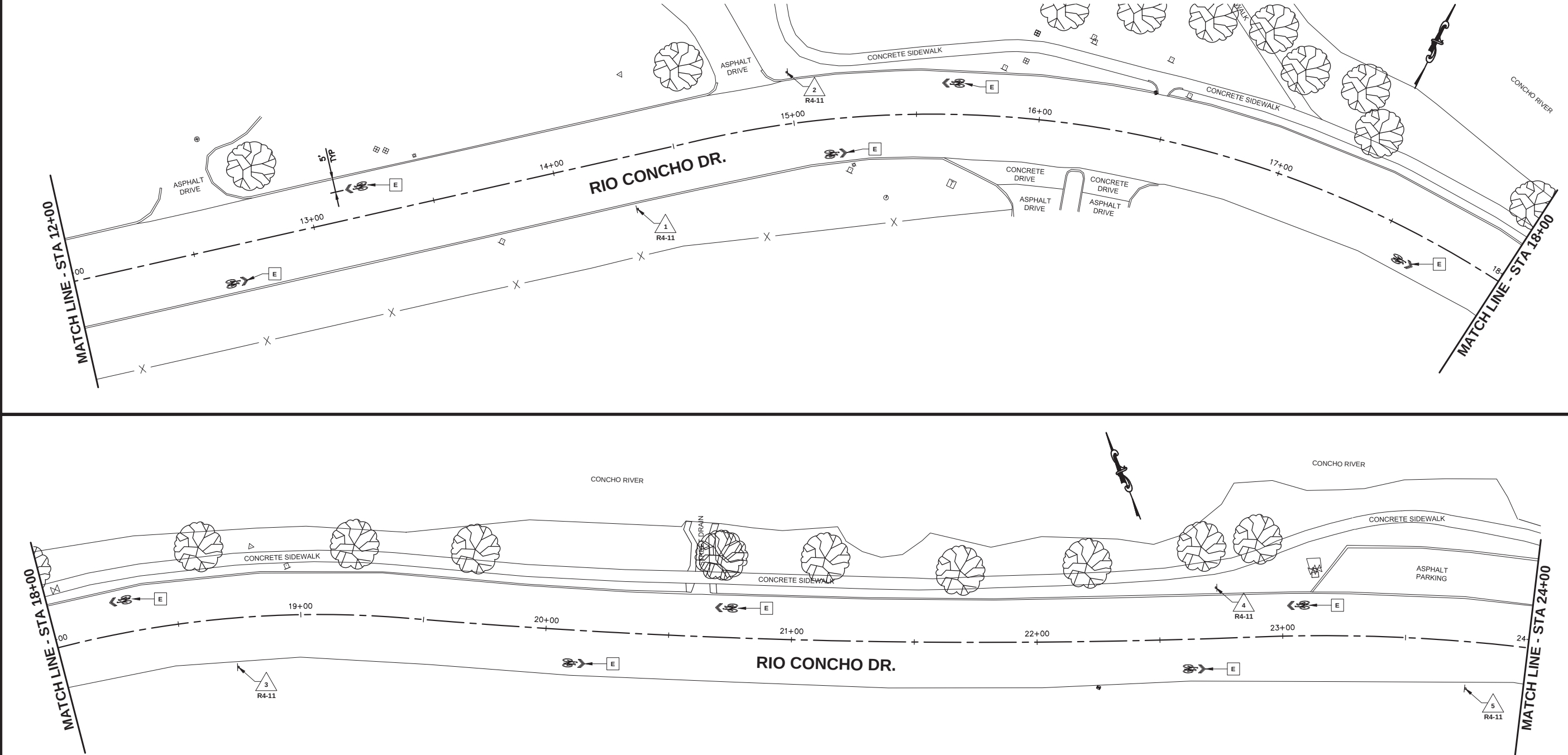
RIO CONCHO DR. - BEGIN TO STA 12+00

MARK REVISION DATE

C:\PWORKING\WILSON\04811441\1504PM-RC.DWG

LAYOUT 17/13/2016 - 3:00 PM

DRAWING PATH NAME LAYOUT1 PLOT DATE TIME



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	32.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	5	
5.28	TxDOT 666	REFL PAV MRK TY 1 (W)(BIKE ARW)(090MIL)	LF	10	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

- LEGEND**
- A RFL PAV MRK TY 1 (W) 4" (BRK)
 - B RFL PAV MRK TY 1 (W) 4" (SLD)
 - C RFL PAV MRK TY 1 (W) 12" (SLD)
 - D RFL PAV MRK TY 1 (W) 24" (SLD)
 - E RFL PAV MRK TY 1 (W) (BIKE ARW)
 - F RFL PAV MRK TY 1 (W) (BIKE SYM)
 - G RFL PAV MRK TY 1 (W) (ARROW)
 - H RFL PAV MRK TY 1 (Y) 4" (BRK)
 - I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



REVISION

DATE

MARK

C:\PWORK\KING\WILSON\04811441\1504PM-RC.DWG

LAYOUT 2 17/13/2016 - 3:00 PM

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME

PEDESTRIAN FACILITIES

SIGNING AND STRIPING

RIO CONCHO DR. - STA 12+00 TO STA 24+00

SHEET NAME:

CITY OF SAN ANGELO

MARTIN LUTHER KING BLVD

RECONSTRUCTION

SAN ANGELO, TX

PROJECT NAME:

DRAWN BY:

CIW

DESIGNED BY:

CIW

LATEST REVISION:

5/12/2015

KSA JOB NO.:

SAN1088

CP&Y

TBPE FIRM # - 1741

CPY PROJECT #: KSAE15564.00

KSA

TBPE Firm Registration No. F-1386

88 Bullock Street, San Angelo, Texas 76901

T. 325-947-1555 F. 325-947-1559

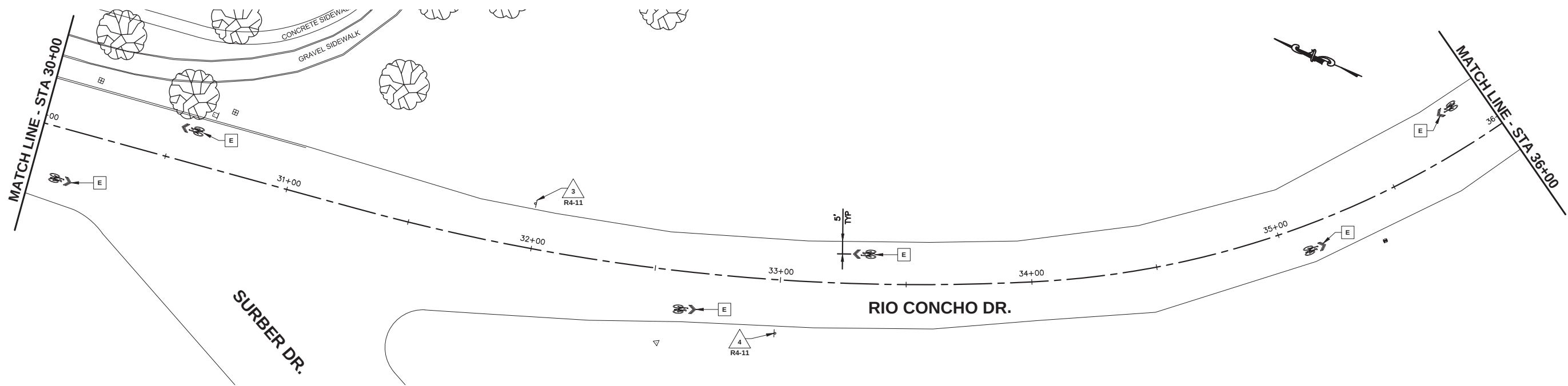
www.kasang.com

Craig Wilson

7-12-2016

SHEET NO.

84



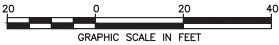
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	26.0	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	4	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	10	

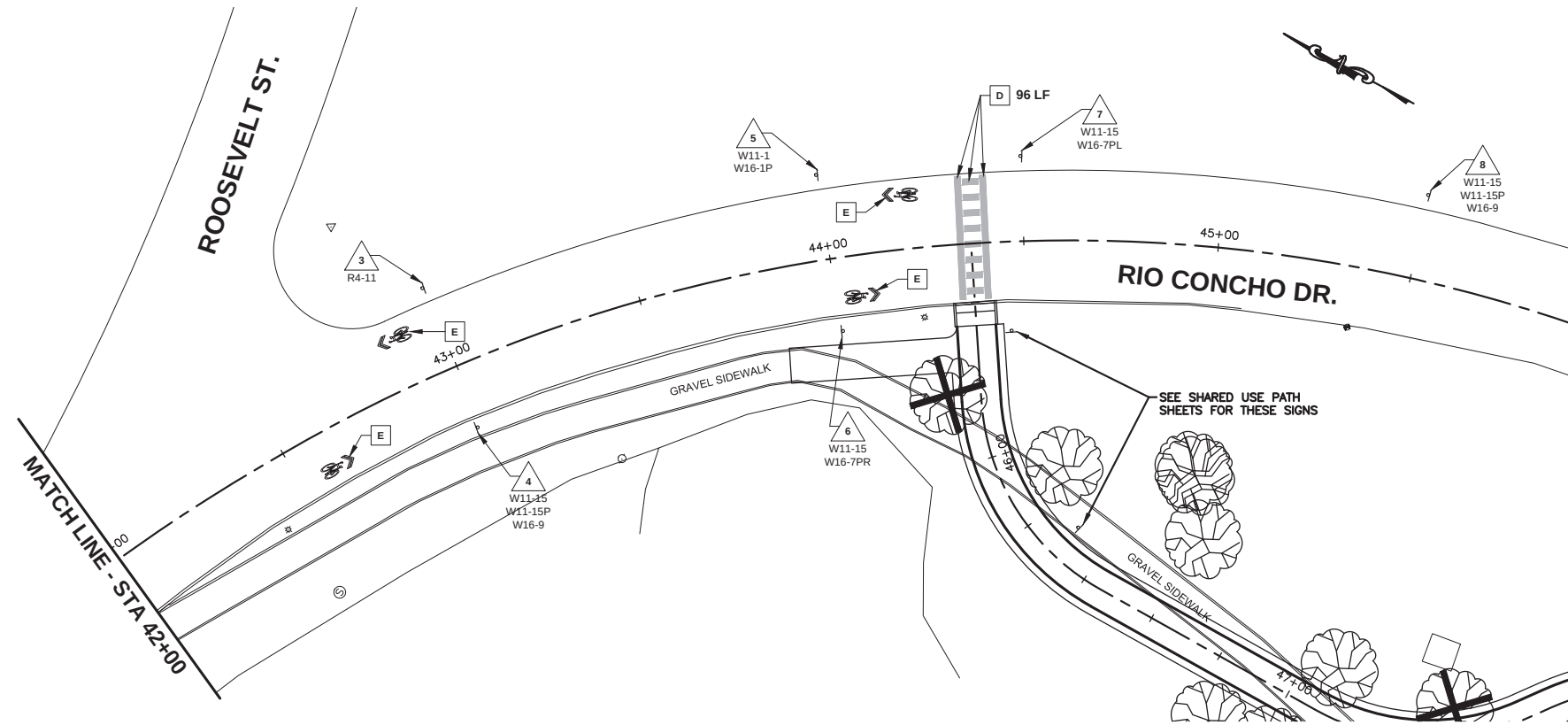
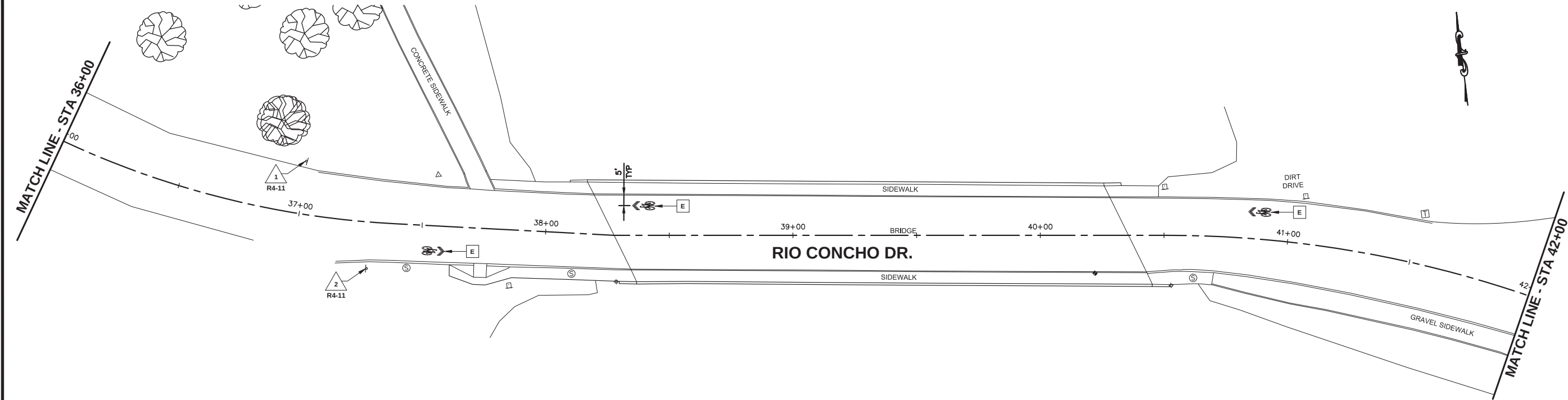


SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |





SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	56.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	8	
5.25	TxDOT 666	REFL PAV MRK TY 1 (W)24"(SLD)(090MIL)	LF	96	
5.28	TxDOT 666	REFL PAV MRK TY 1 (W)(BIKE ARW)(090MIL)	LF	7	

R4-11 - 30"x30"

W11-1 - 24"x24"
W16-1P - 18"x24"

W11-15 - 24"x24"
W11-15P - 24"x18"
W16-9 - 24"x12"

W11-15 - 24"x24"
W16-7PL - 24"x12"
W11-15P - 24"x18"
W16-9 - 24"x12"

SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND	
A	RFL PAV MRK TY 1 (W) 4" (BRK)
B	RFL PAV MRK TY 1 (W) 4" (SLD)
C	RFL PAV MRK TY 1 (W) 12" (SLD)
D	RFL PAV MRK TY 1 (W) 24" (SLD)
E	RFL PAV MRK TY 1 (W) (BIKE ARW)
F	RFL PAV MRK TY 1 (W) (BIKE SYM)
G	RFL PAV MRK TY 1 (W) (ARROW)
H	RFL PAV MRK TY 1 (Y) 4" (BRK)
I	RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

RIO CONCHO DR - STA 36+00 TO END

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CWM

DESIGNED BY:
CWM

LATEST REVISION:
5/12/2015

KSA JOB NO.
SAN1088

CP&Y
TBPET FIRM # - 1741

KSA
TBPET FIRM Registration No. F-1386
88 Bullock Street, San Antonio, Texas 78201
T. 282-947-1555 F. 282-947-1559
www.kasang.com

7-12-2016

REVISION
C:\PWORKING\OWILSON\0811441\1504PM-RC.DWG
LAYOUT 17/13/2015 - 3:01 PM

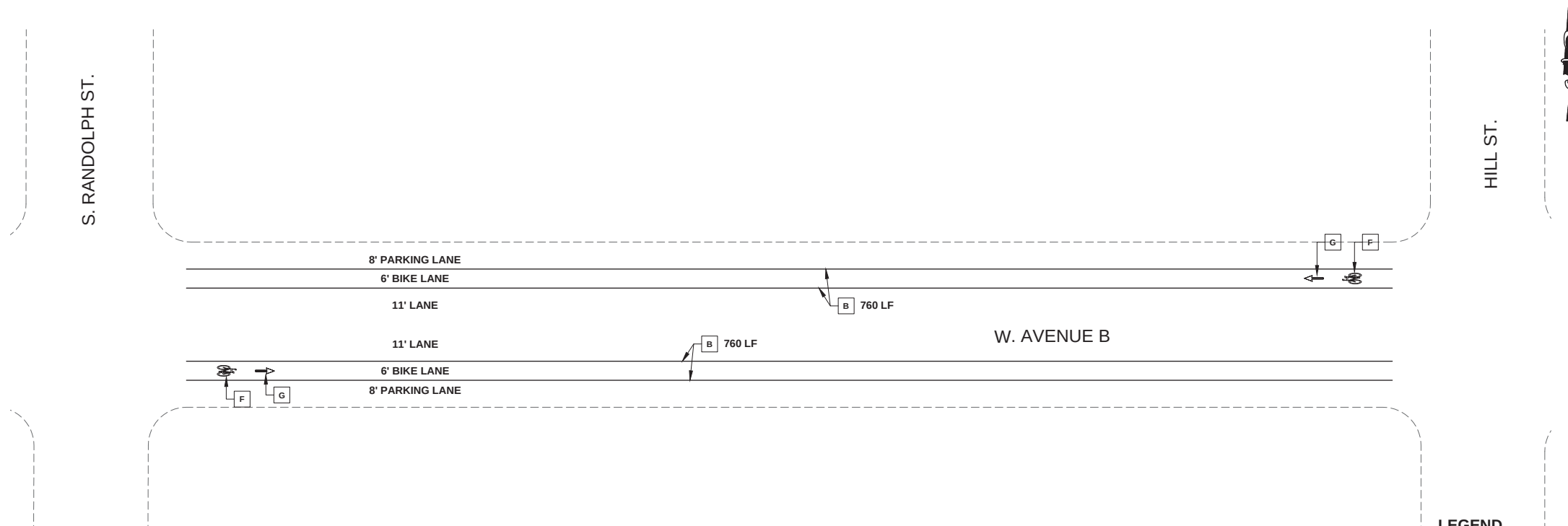
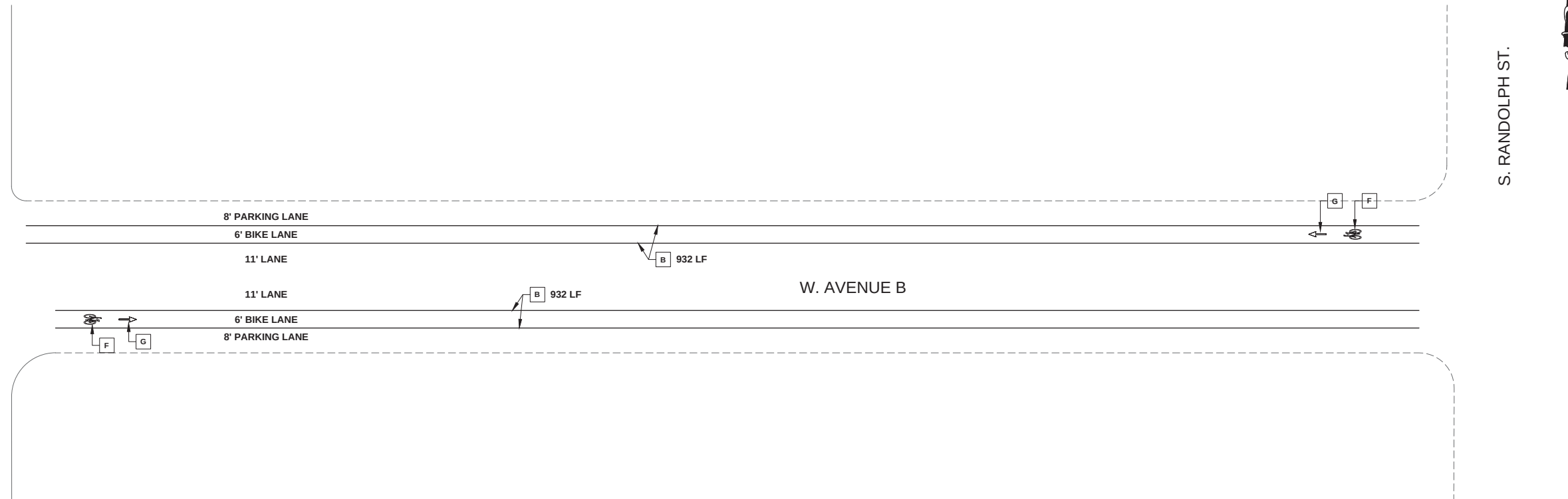
MARK

DATE

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME

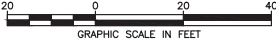
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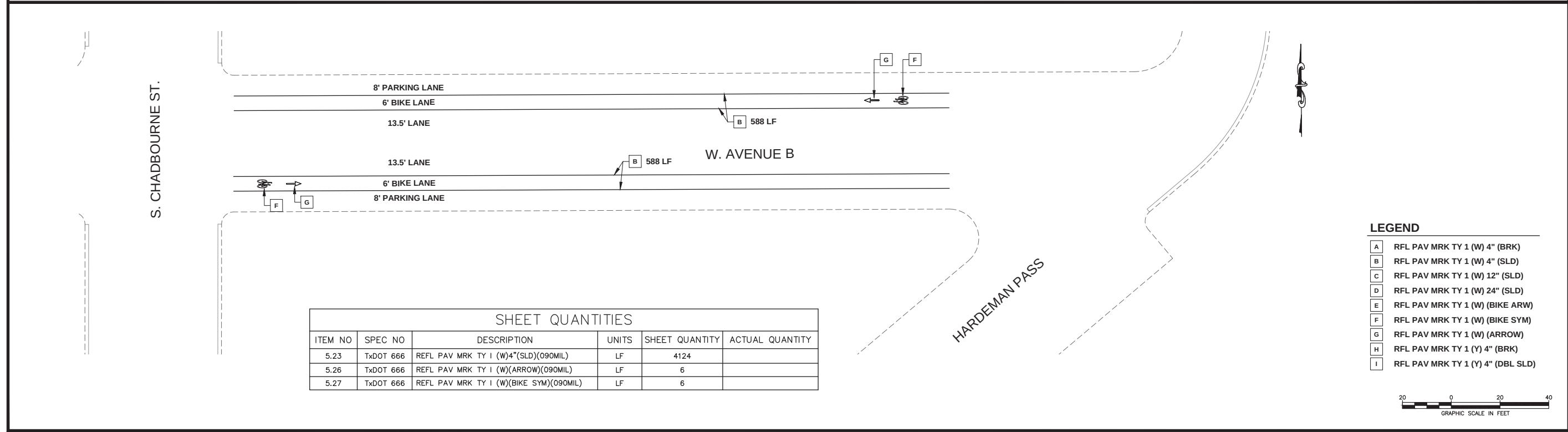
SHEET NO.
86



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	3384	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	4	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	4	

- | LEGEND | |
|--------|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |

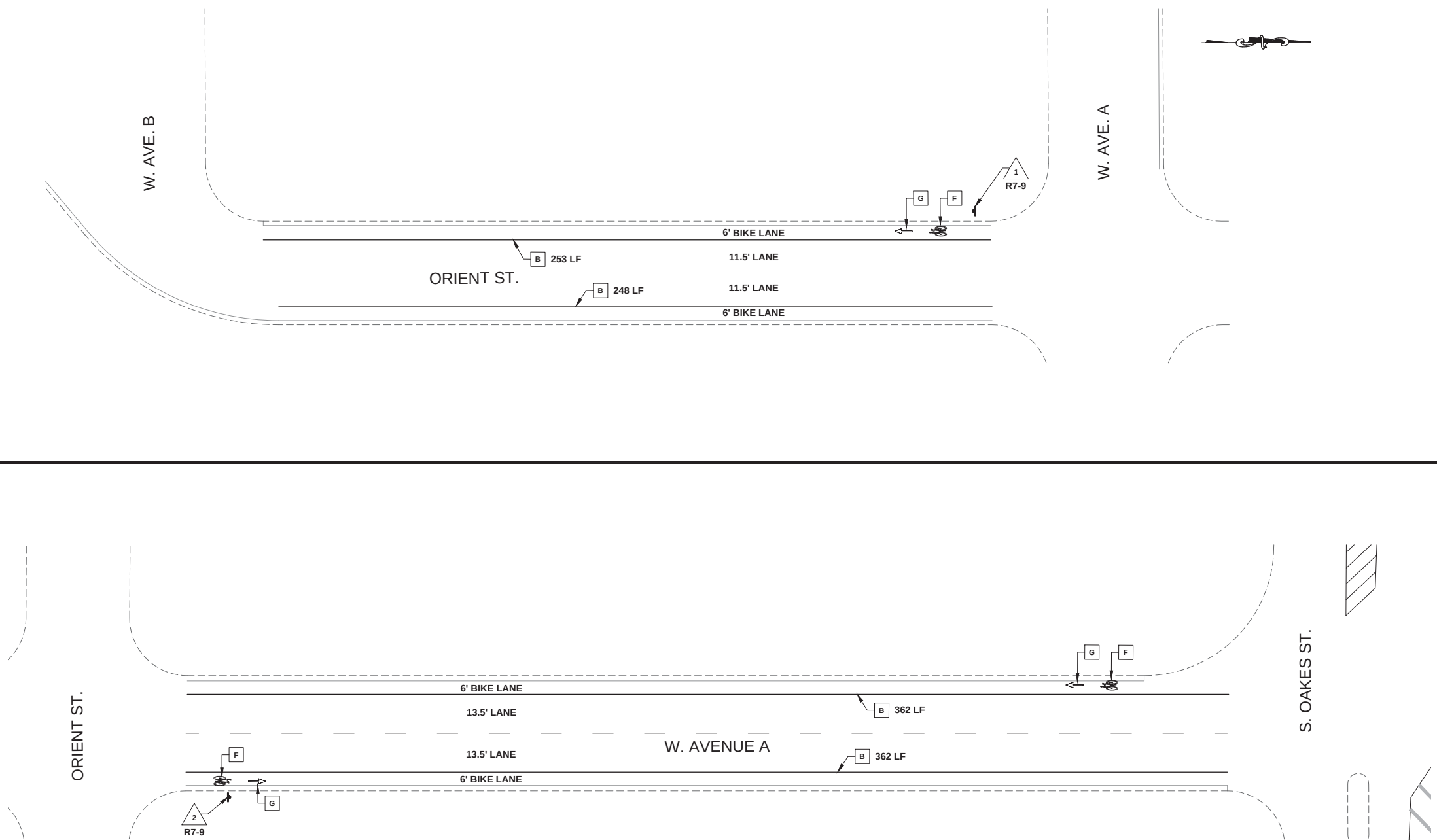




SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	4124	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	6	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	6	

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |





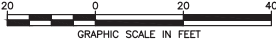
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	3.0	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	2	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1225	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	3	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	3	



 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



PEDESTRIAN FACILITIES SIGNING AND STRIPING

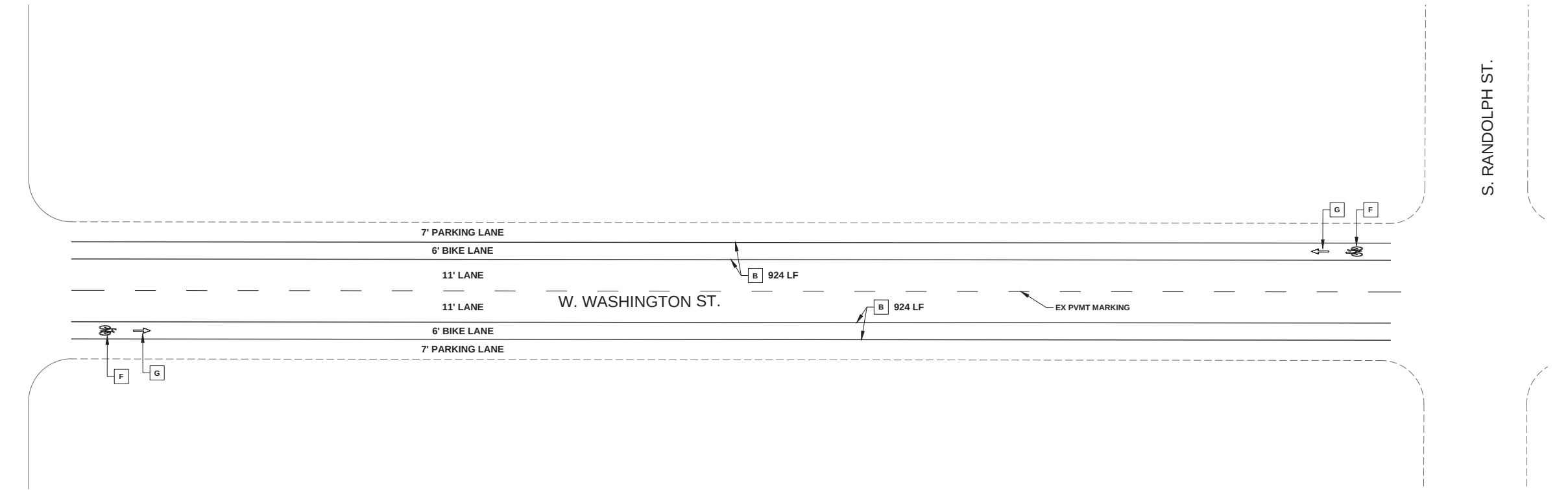
ORIENT ST. - W. AVE. A TO W. AVE B
W. AVE. A-ORIENT ST. TO S. OAKES ST.

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	CMW
DESIGNED BY:	CMW
LATEST REVISION	5/12/2015
KSA JOB NO.:	SAN.058

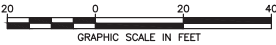


Craig Wilbur
7-12-2016
SHEET NO. **89**



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	3440	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	4	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	4	

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

PEDESTRIAN FACILITIES
SIGNING AND STRIPING

W. WASHINGTON ST. - S. KOENIGSHEIM
TO S. HILL

SHEET NAME:

DRAWN BY:	CMW
DESIGNED BY:	CMW
LATEST REVISION	5/12/2015
KSA JOB NO.:	SAN.058

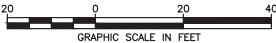


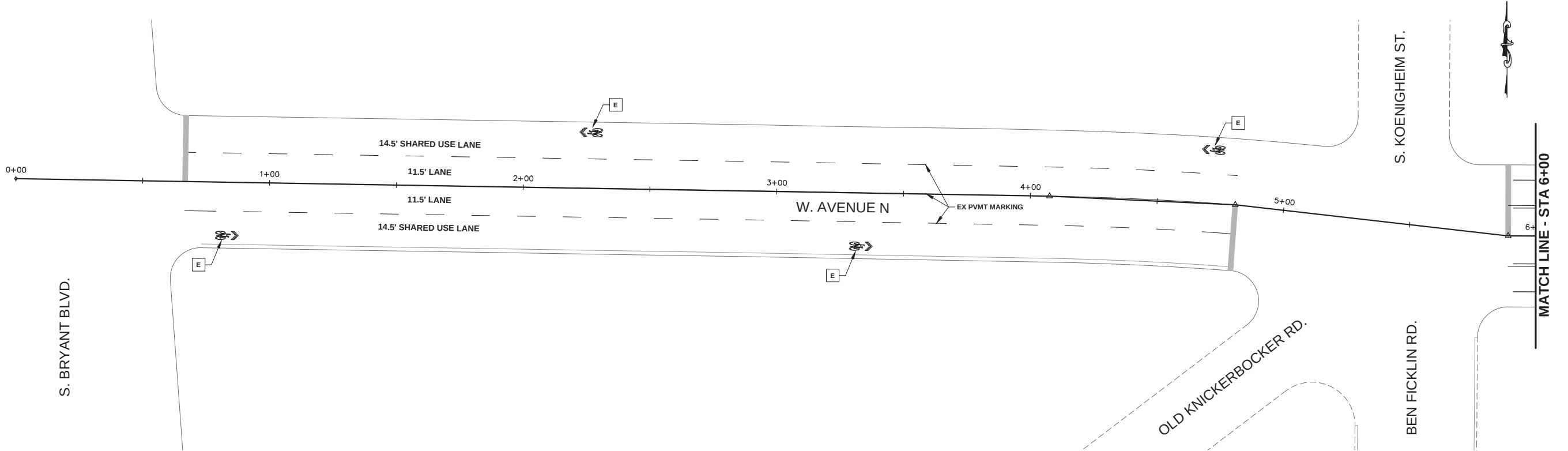
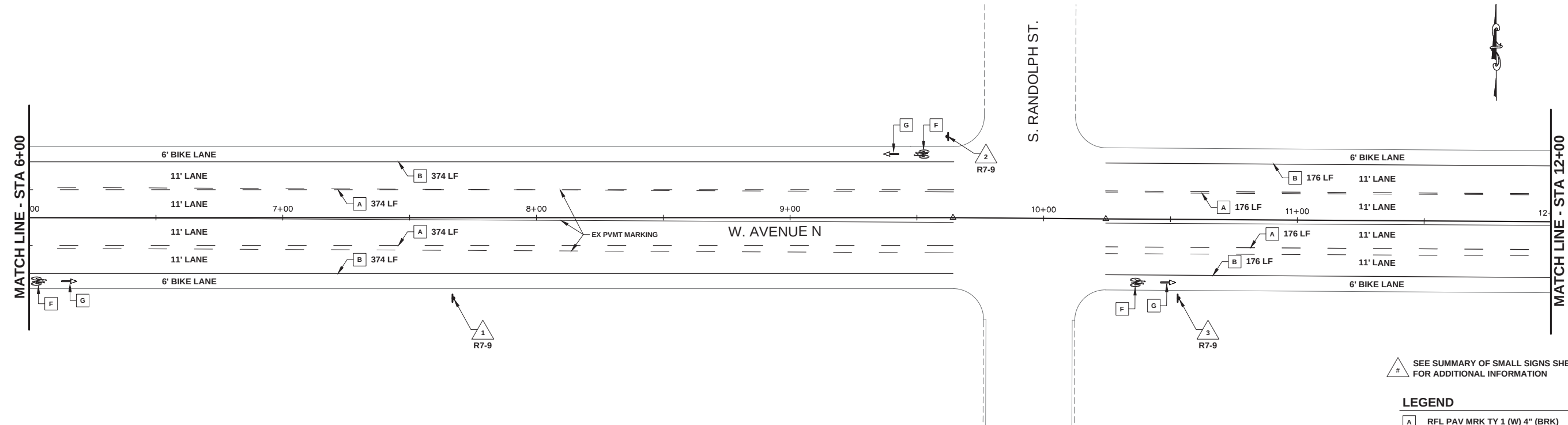
Graig Wilson
7-12-2016
SHEET NO. **90**

[illegible]



LEGEND	
A	RFL PAV MRK TY 1 (W) 4" (BRK)
B	RFL PAV MRK TY 1 (W) 4" (SLD)
C	RFL PAV MRK TY 1 (W) 12" (SLD)
D	RFL PAV MRK TY 1 (W) 24" (SLD)
E	RFL PAV MRK TY 1 (W) (BIKE ARW)
F	RFL PAV MRK TY 1 (W) (BIKE SYM)
G	RFL PAV MRK TY 1 (W) (ARROW)
H	RFL PAV MRK TY 1 (Y) 4" (BRK)
I	RFL PAV MRK TY 1 (Y) 4" (DBL SLD)





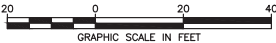
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ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
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5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	3	
5.22	TxDOT 666	REFL PAV MRK TY I (W)4"(BRK)(090MIL)	LF	275	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1100	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	3	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	3	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	4	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



CP&Y

TBPE FIRM # - 1741

KSA

TBPE Firm Registration No. F-1326
88 Bullock Street, San Angelo, Texas 76901
T. 325-947-1555 F. 325-947-1559
www.ksaeng.com

STATE OF TEXAS

94710

LICENSED PROFESSIONAL ENGINEER

Craig Wilson

7-12-2016

PROJECT NAME:

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

PROJECT NAME:

W. AVE. N - S. BRYANT BLVD.
TO STA 18+00

DESIGNED BY:

CP&Y

DRAWN BY:

CP&Y

DATE

5/12/2015

REVISION

5/12/2015

MARK

CP&Y WORKING DOWNS 08/11/41 1:50 PM AVE N-1 171302016 - 3:04 PM

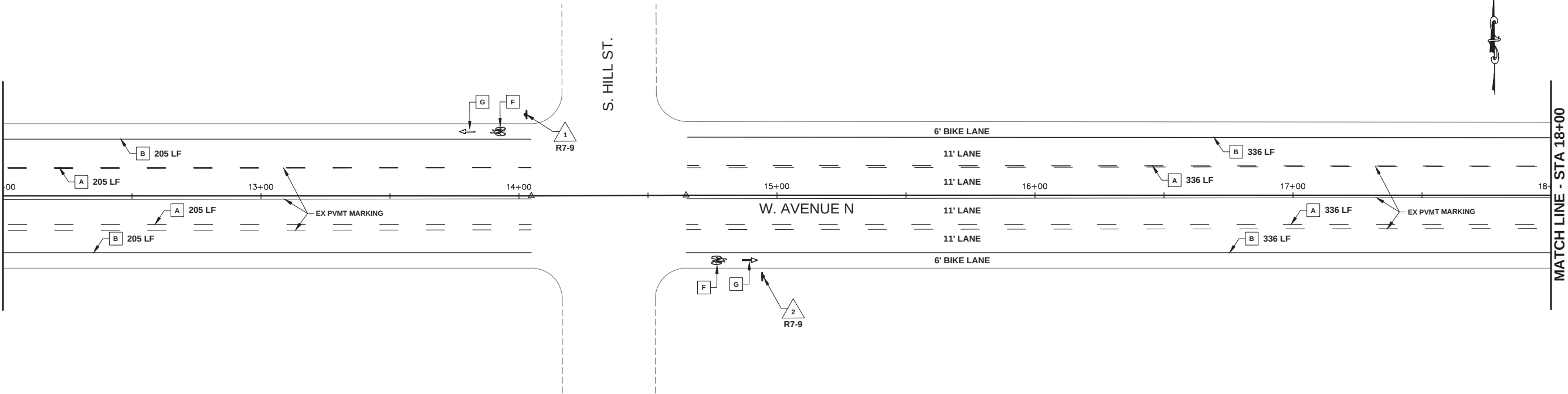
SHEET NAME:

PEDESTRIAN FACILITIES
SIGNING AND STRIPING

SHEET NO.

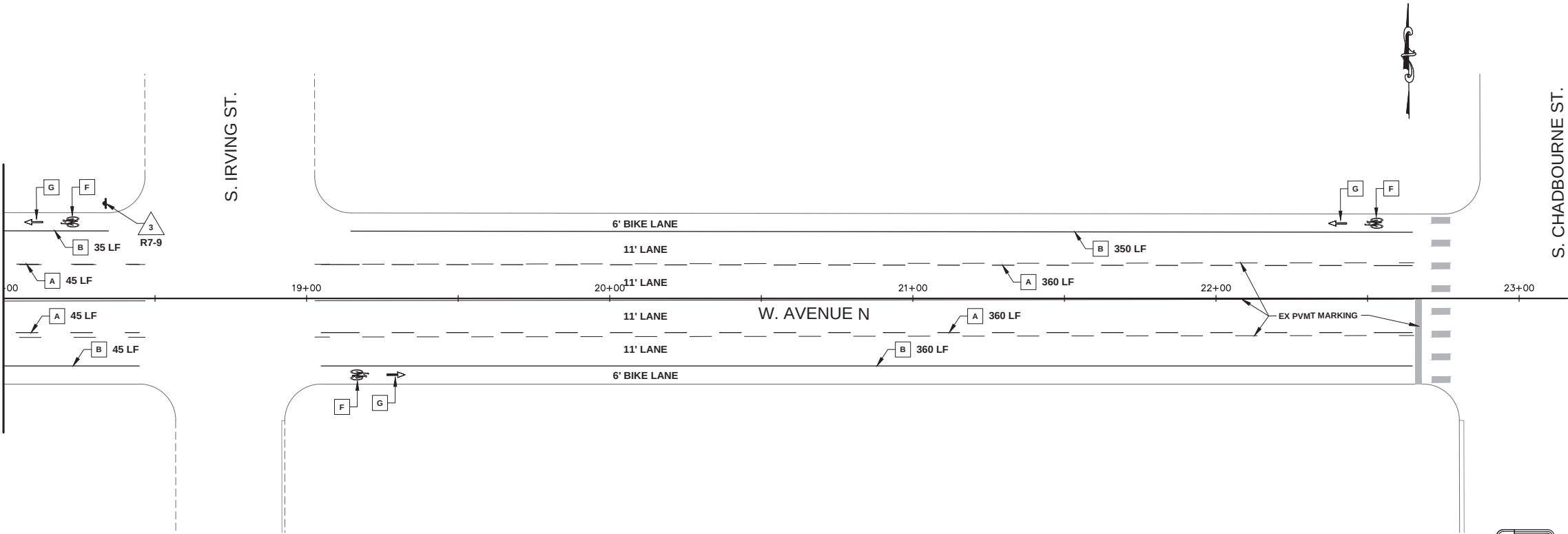
92

MATCH LINE - STA 12+00



MATCH LINE - STA 18+00

MATCH LINE - STA 18+00



S. CHADBOURNE ST.

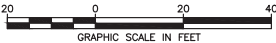
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	4.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	3	
5.22	TxDOT 666	REFL PAV MRK TY I (W)4"(BRK)(090MIL)	LF	473	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1872	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	5	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

W. AVE. N - STA 18+00 TO S.
CHADBOURNE

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CW/M

DESIGNED BY:
CW/M

LATEST REVISION:
5/12/2015

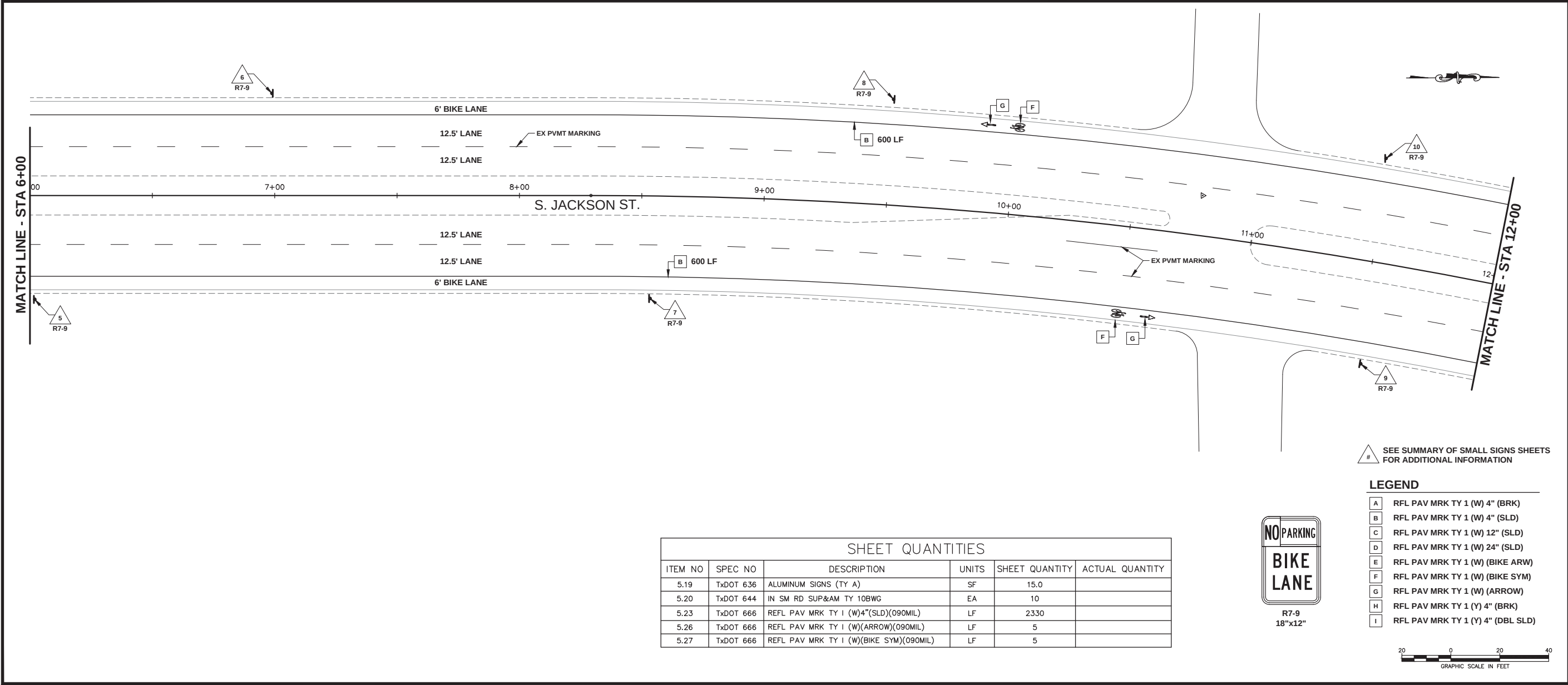
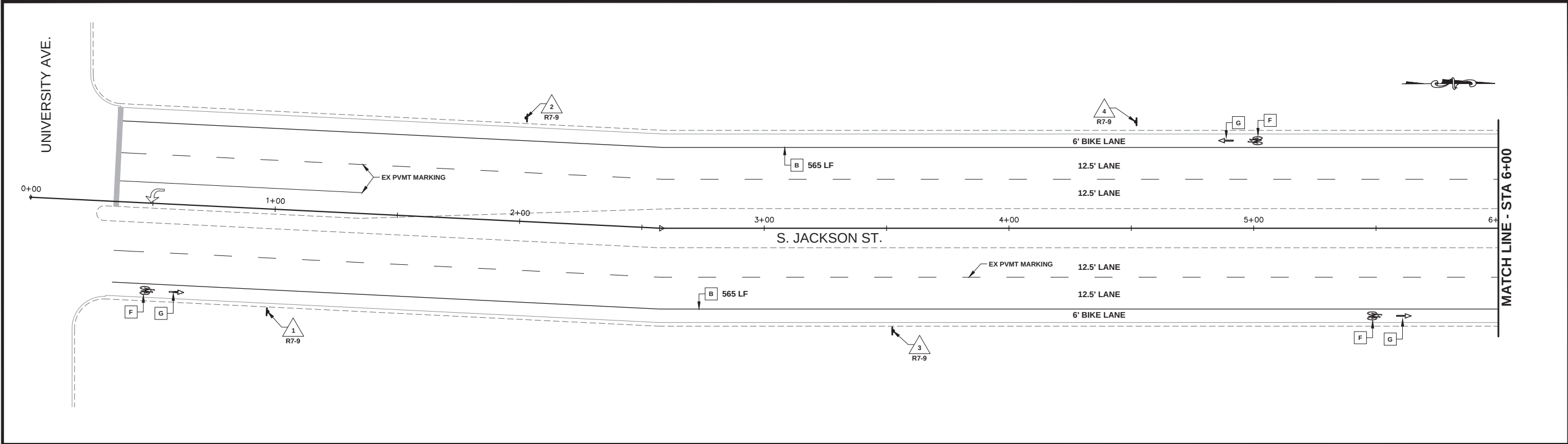
KSA JOB NO.
SAN1088



Craig Wilson
7-12-2016

SHEET NO.
93

MARK: REVISION: DATE: C:\PWORKING\WILSON\DWG\4811441\1504PM-AVE N.DWG I AVE N-2171302016 - 3:05 PM DRAWING PATH\NAME LAYOUT\1 PLOT DATE - TIME

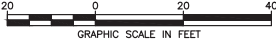


SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	15.0	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	10	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	2330	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	5	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	



SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

- LEGEND**
- A RFL PAV MRK TY 1 (W) 4" (BRK)
 - B RFL PAV MRK TY 1 (W) 4" (SLD)
 - C RFL PAV MRK TY 1 (W) 12" (SLD)
 - D RFL PAV MRK TY 1 (W) 24" (SLD)
 - E RFL PAV MRK TY 1 (W) (BIKE ARW)
 - F RFL PAV MRK TY 1 (W) (BIKE SYM)
 - G RFL PAV MRK TY 1 (W) (ARROW)
 - H RFL PAV MRK TY 1 (Y) 4" (BRK)
 - I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



REVISION

DATE

MARK

C:\PWORK\KINGWILSON\0481344_15504PM-JACKSON.DWG

JACKSON-1

7/13/2016 - 3:05 PM

DRAWING PATH\NAME LAYOUT\ PLOT DATE - TIME

PEDESTRIAN FACILITIES
SIGNING AND STRIPING

S. JACKSON ST. - UNIVERSITY AVE.
TO STA 12+00

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CWM

DESIGNED BY:
CWM

LATEST REVISION:
5/12/2015

KSA JOB NO.:
SAN1058

CP&Y

CP&Y FIRM # - 1741

CP&Y PROJECT #: KSAE15504.00

KSA

CP&Y FIRM Registration No. F-1386
88 Bullock Street, San Antonio, Texas 78201
T. 325-947-1555 F. 325-947-1559
www.ksaeng.com

STATE OF TEXAS

94710

LICENSED PROFESSIONAL ENGINEER

Craig Wilson

7-12-2016

SHEET NO. 94



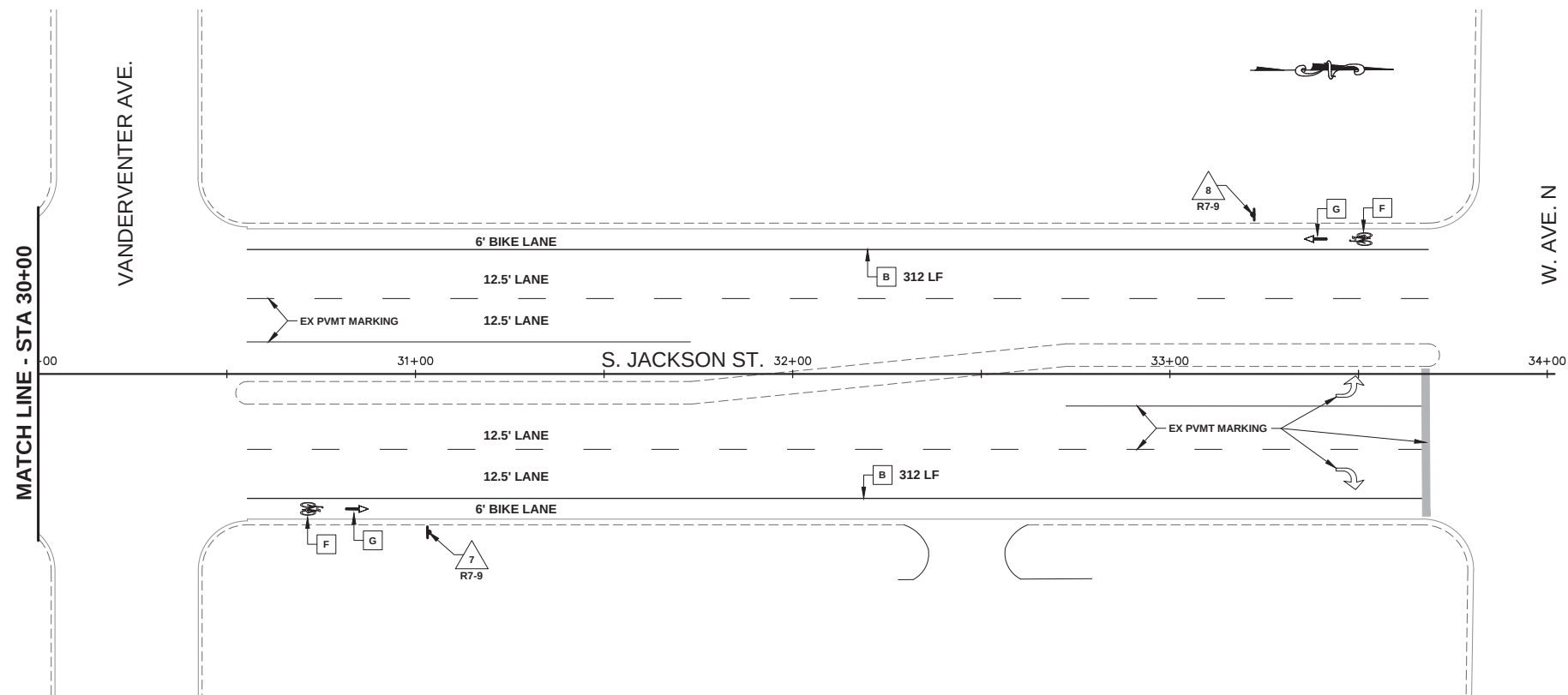
**SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION**

LEGEND

A	RFL PAV MRK TY 1 (W) 4" (BRK)
B	RFL PAV MRK TY 1 (W) 4" (SLD)
C	RFL PAV MRK TY 1 (W) 12" (SLD)
D	RFL PAV MRK TY 1 (W) 24" (SLD)
E	RFL PAV MRK TY 1 (W) (BIKE ARW)
F	RFL PAV MRK TY 1 (W) (BIKE SYM)
G	RFL PAV MRK TY 1 (W) (ARROW)
H	RFL PAV MRK TY 1 (Y) 4" (BRK)
I	RFL PAV MRK TY 1 (Y) 4" (DBL SLD)

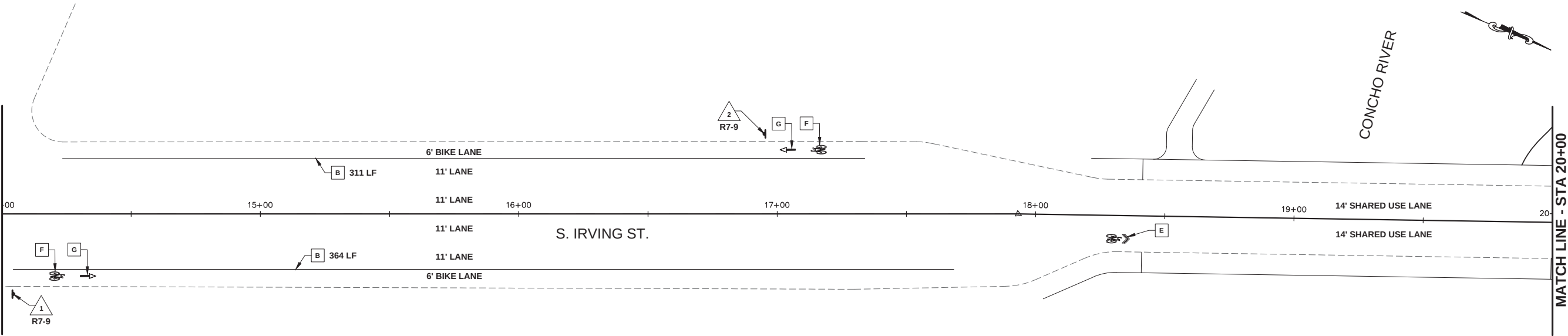


GRAPHIC SCALE IN FEET

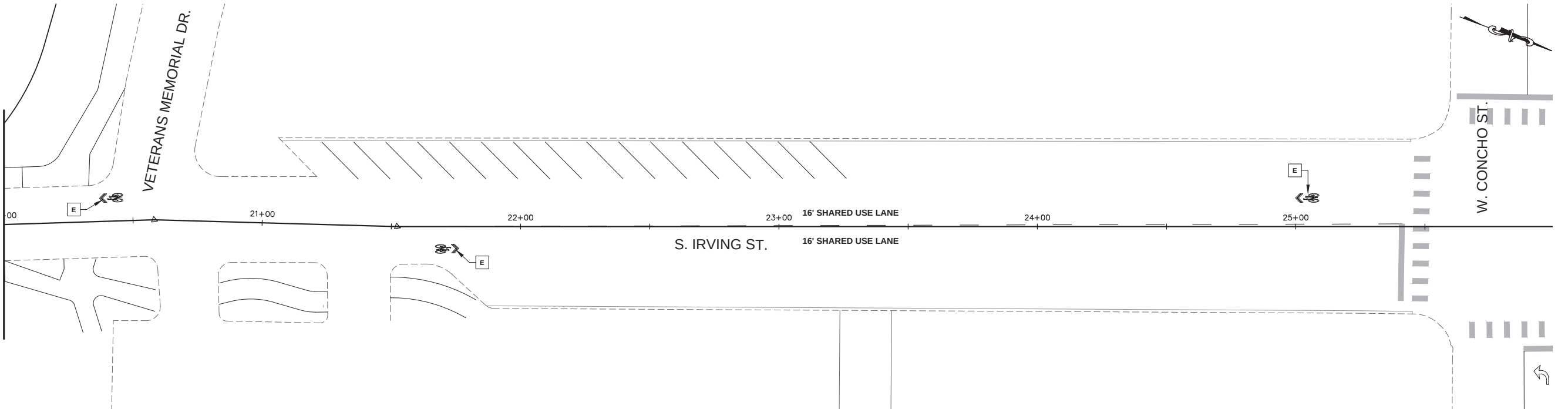


GRAPHIC SCALE IN FEET

MATCH LINE - STA 14+00



MATCH LINE - STA 20+00



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	3.0	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	2	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	675	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	1	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	1	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	4	

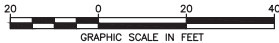


R7-9
18"x12"

SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

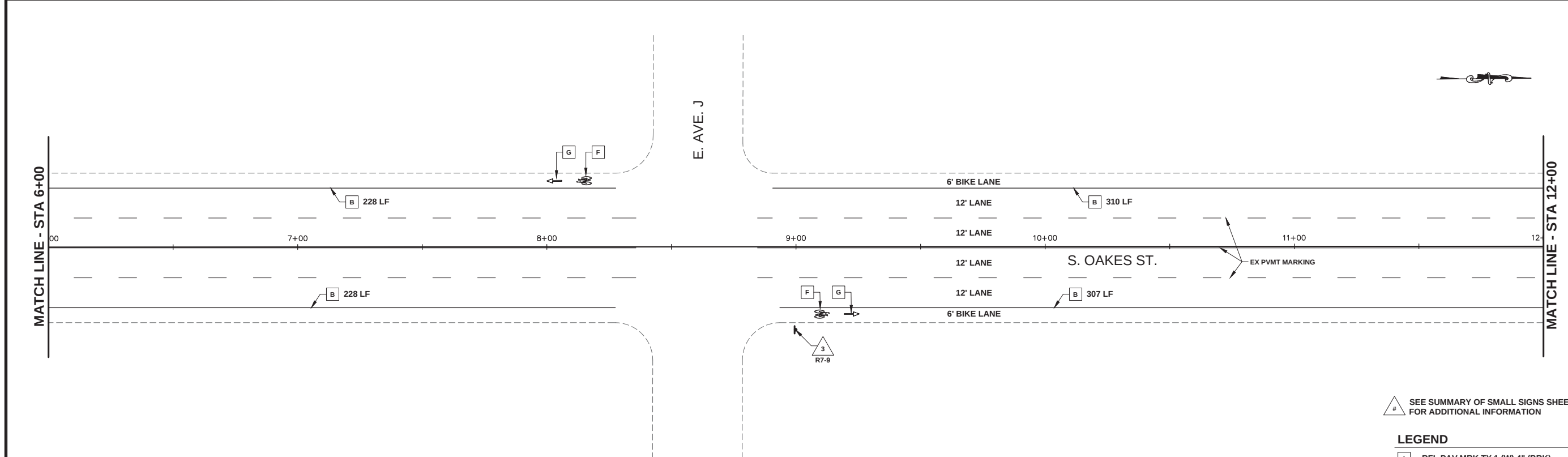
S. IRVING ST. - W. AVE. A TO
W. CONCHO

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CWM
DESIGNED BY:
CWM
LATEST REVISION:
5/12/2015
KSA JOB NO.:
SAN1058



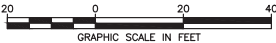
7-12-2016
SHEET NO.
99

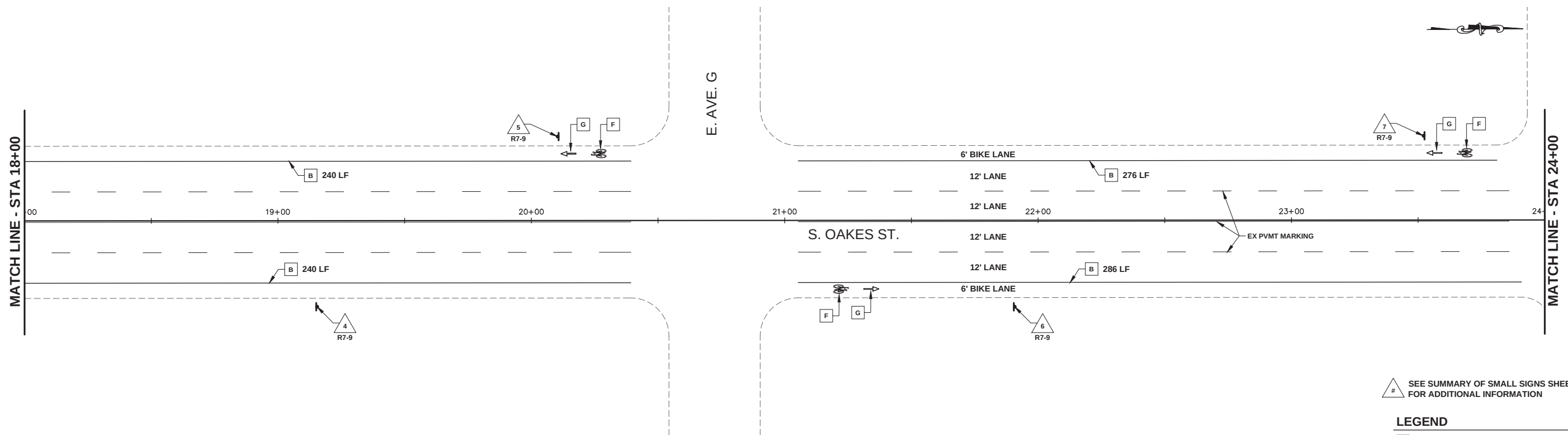


NO PARKING
BIKE
LANE

R7-9
18"x12"

A	RFL PAV MRK TY 1 (W) 4" (BRK)
B	RFL PAV MRK TY 1 (W) 4" (SLD)
C	RFL PAV MRK TY 1 (W) 12" (SLD)
D	RFL PAV MRK TY 1 (W) 24" (SLD)
E	RFL PAV MRK TY 1 (W) (BIKE ARW)
F	RFL PAV MRK TY 1 (W) (BIKE SYM)
G	RFL PAV MRK TY 1 (W) (ARROW)
H	RFL PAV MRK TY 1 (Y) 4" (BRK)
I	RFL PAV MRK TY 1 (Y) 4" (DBL SLD)





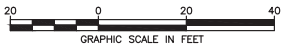
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	10.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	7	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1980	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	7	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	7	

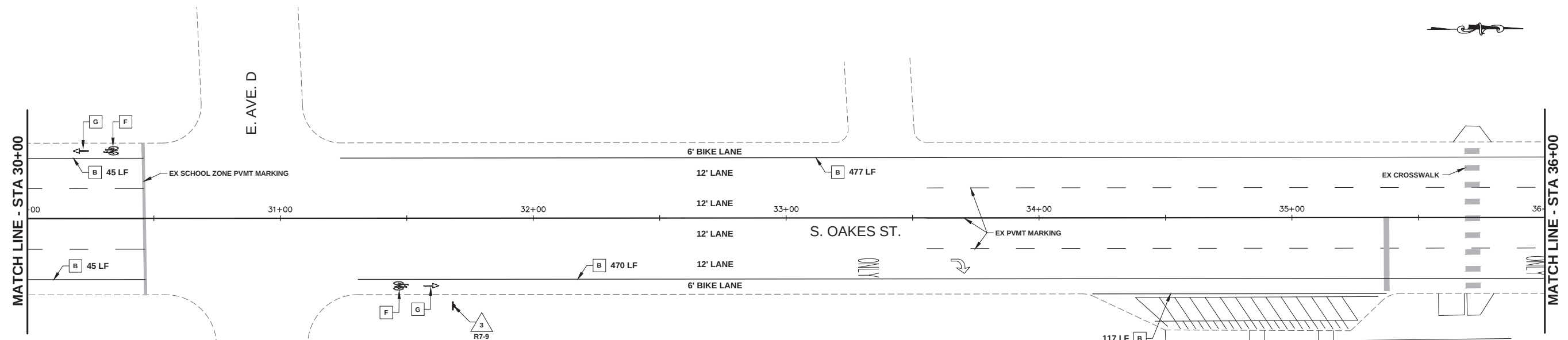


 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |





SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	4.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	3	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	2090	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	5	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	

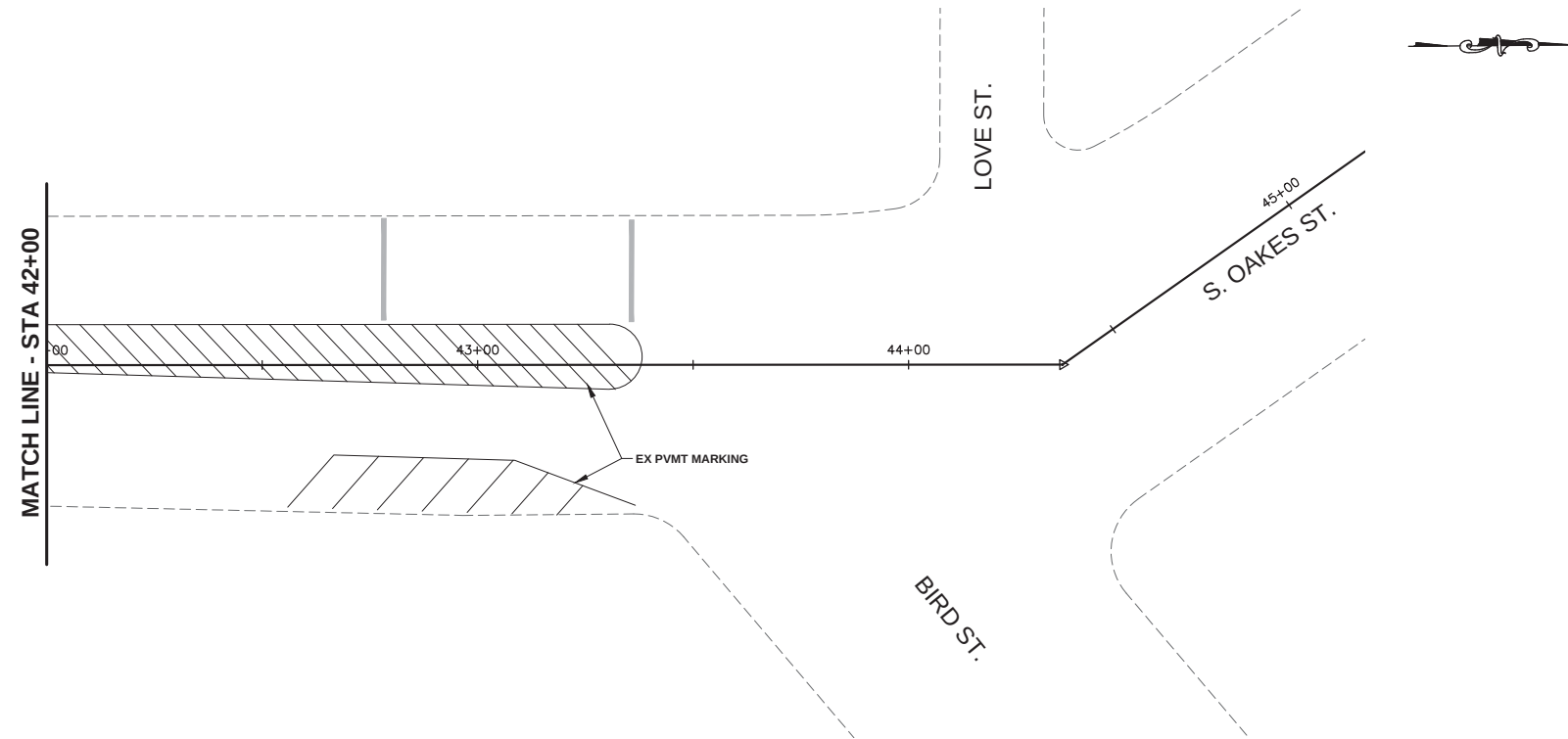


 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



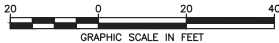


SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.22	TxDOT 666	REFL PAV MRK TY I (W)4"(BRK)(090MIL)	LF	12	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	454	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	1	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	1	

 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



DRAWN BY:	CMW
DESIGNED BY:	CMW
TEST REVISION:	5/12/2015
KSA JOB NO.:	SAN.058



Craig Wilbur
7-12-2016
SHEET NO. **103**

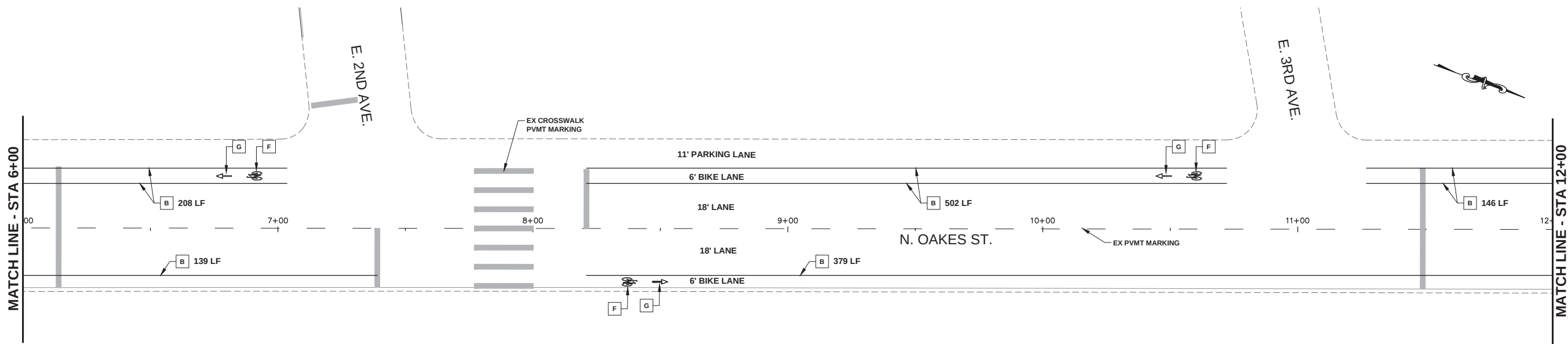
PEDESTRIAN FACILITIES SIGNING AND STRIPING

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

S. OAKES ST. - STA 36+00 TO BIRD ST.

MARK	REVISION	DATE

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME
 C:\P\WORKING\G1\WILLSOND\46111441.15504PM - S OAKES.DWG
 S OAKES-s | 7/13/2016 - 3:09 PM

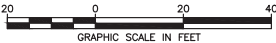


SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.23	TxDOT 666	REFL PAV MRK TY I (W)4*(SLD)(090MIL)	LF	2609	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	5	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	5	

 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE ARW) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |



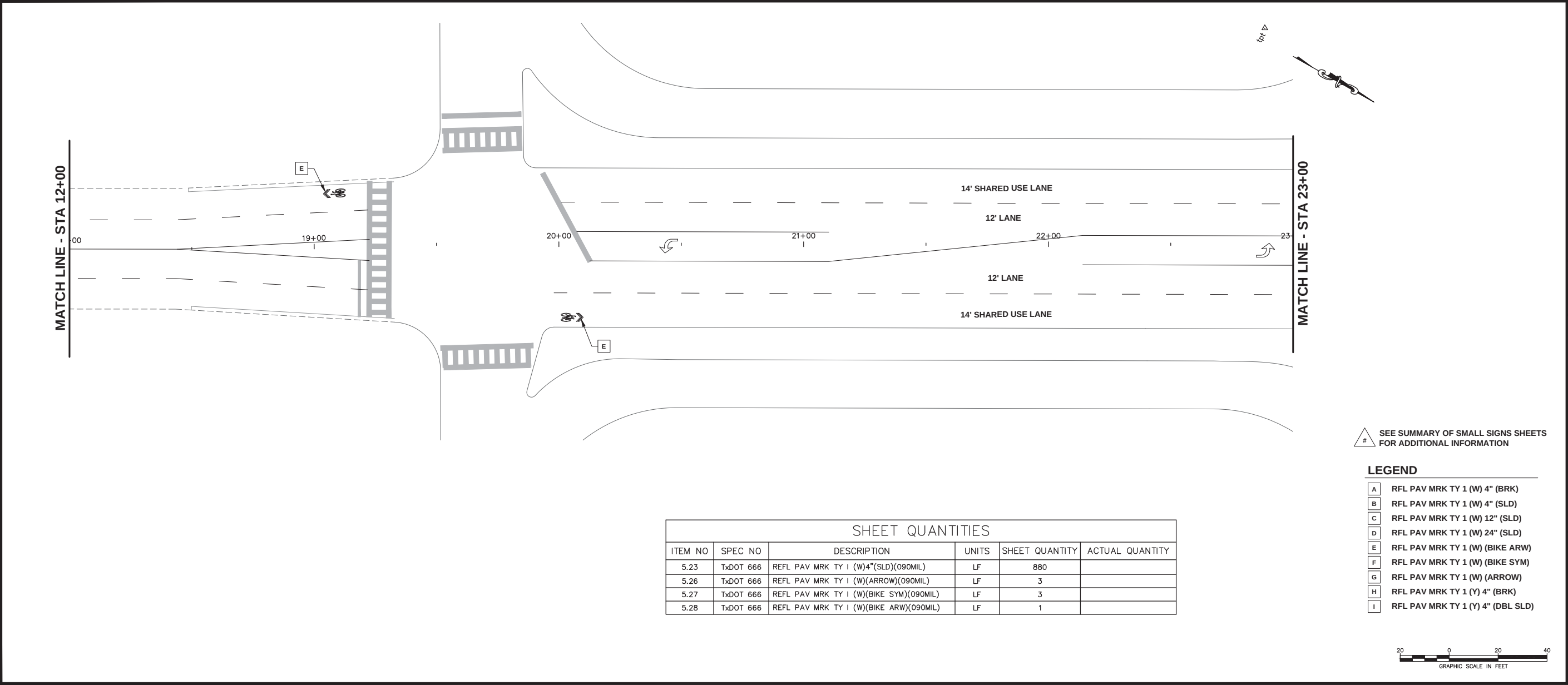
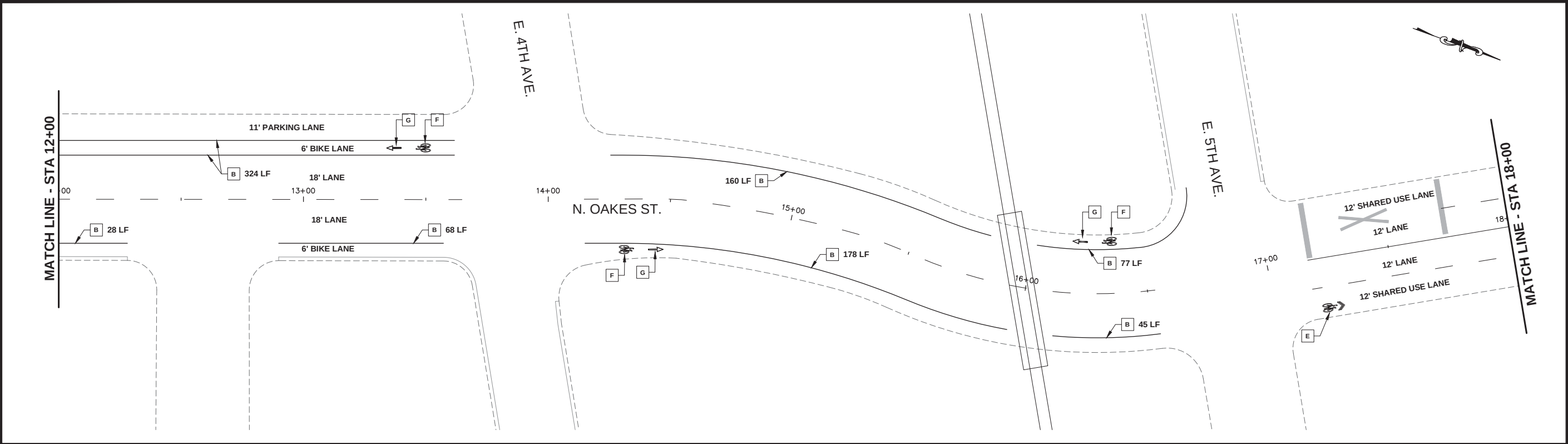
PEDESTRIAN FACILITIES
SIGNING AND STRIPING
N. OAKES ST. - E. COLLEGE AVE
TO STA 12+00
(NAME: _____)

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	CMW
DESIGNED BY:	CMW
TEST REVISION	5/12/2015
KSA JOB NO.:	SAN.058



Craig Wilbur
7-12-2016
SHEET NO. **104**



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	880	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	3	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	3	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	1	

SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



PEDESTRIAN FACILITIES
SIGNING AND STRIPING

N. OAKES ST. - STA 12+00 TO
STA 23+00

CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CWM

DESIGNED BY:
CWM

LATEST REVISION:
5/12/2015

KSA JOB NO.:
SAN 058

CP&Y

CP&Y PROJECT #: KSAE15564.00

7BPE FIRM # - 1741

CP&Y PROJECT #: KSAE15564.00

KSA

CP&Y

CP&Y PROJECT #: KSAE15564.00

CP&Y PROJECT #: KSAE15564.00

STATE OF TEXAS

94710

PROFESSIONAL ENGINEER

Craig Wilson

7-12-2016

SHEET NO.

105

MARK

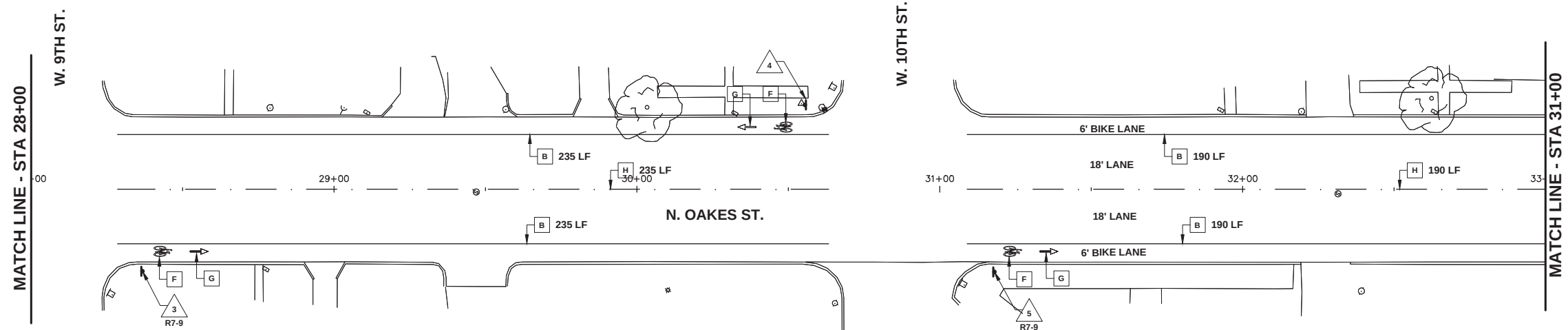
REVISION

DATE

C:\PWORKING\WILSON\04811441\1504PM-N OAKES.DWG

OAKES-18 7/13/2016 - 3:11 PM

DRAWING PATH\NAME LAYOUT1 PLOT DATE - TIME



SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	10.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	7	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1514	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	7	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	7	
5.28	TxDOT 666	REFL PAV MRK TY I (W)(BIKE ARW)(090MIL)	LF	1	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(BRK)(090MIL)	LF	163	

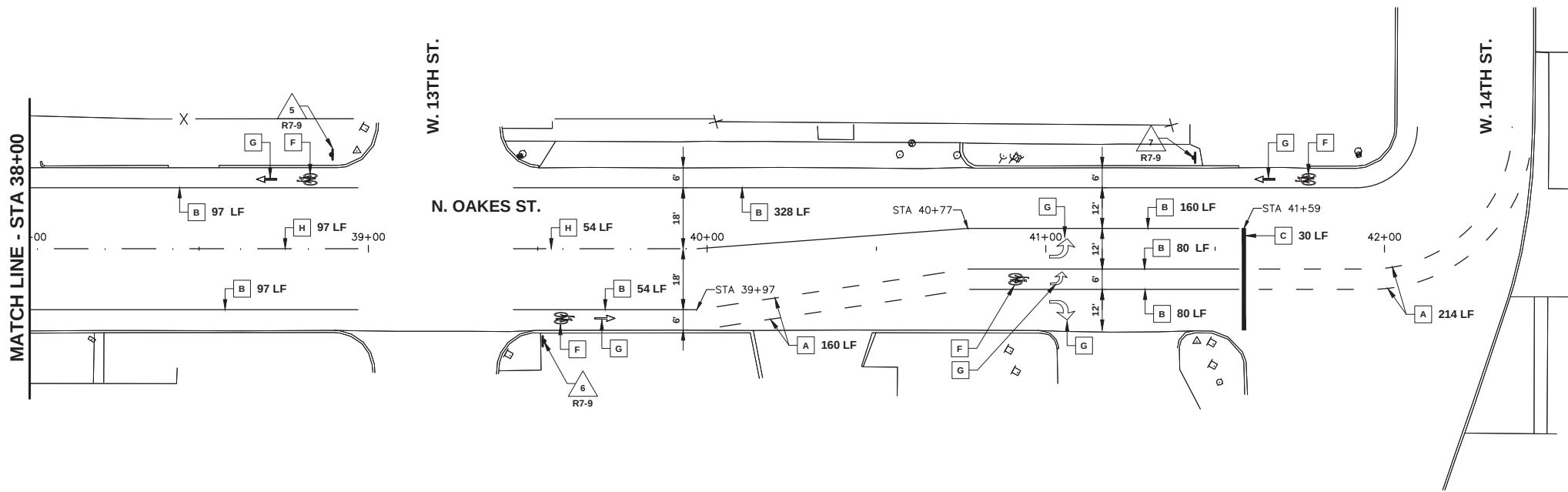
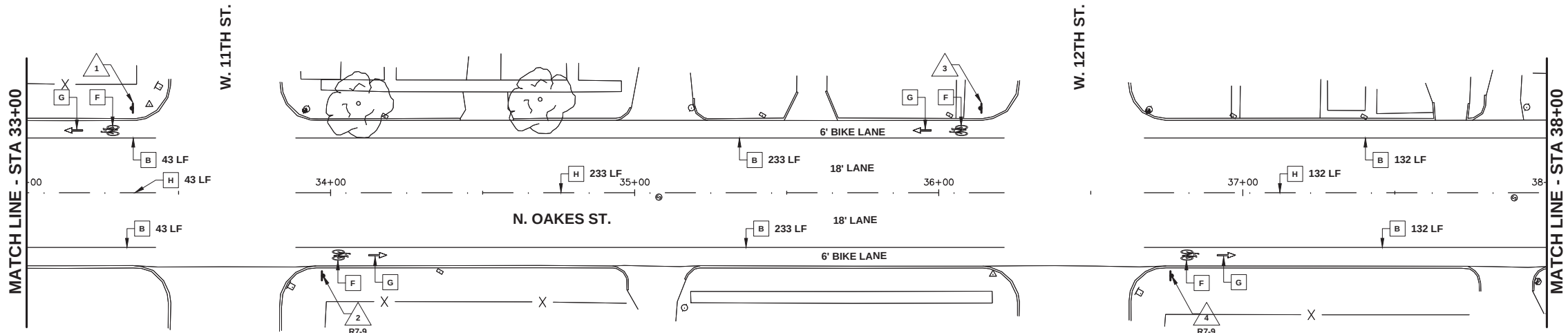


 SEE SUMMARY OF SMALL SIGNS SHEETS
FOR ADDITIONAL INFORMATION

LEGEND

- | | |
|---|-----------------------------------|
| A | RFL PAV MRK TY 1 (W) 4" (BRK) |
| B | RFL PAV MRK TY 1 (W) 4" (SLD) |
| C | RFL PAV MRK TY 1 (W) 12" (SLD) |
| D | RFL PAV MRK TY 1 (W) 24" (SLD) |
| E | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| F | RFL PAV MRK TY 1 (W) (BIKE SYM) |
| G | RFL PAV MRK TY 1 (W) (ARROW) |
| H | RFL PAV MRK TY 1 (Y) 4" (BRK) |
| I | RFL PAV MRK TY 1 (Y) 4" (DBL SLD) |





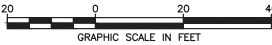
SHEET QUANTITIES					
ITEM NO	SPEC NO	DESCRIPTION	UNITS	SHEET QUANTITY	ACTUAL QUANTITY
5.19	TxDOT 636	ALUMINUM SIGNS (TY A)	SF	10.5	
5.20	TxDOT 644	IN SM RD SUP&AM TY 10BWG	EA	7	
5.22	TxDOT 666	REFL PAV MRK TY I (W)4"(BRK)(090MIL)	LF	94	
5.23	TxDOT 666	REFL PAV MRK TY I (W)4"(SLD)(090MIL)	LF	1712	
5.24	TxDOT 666	REFL PAV MRK TY I (W)12"(SLD)(090MIL)	LF	30	
5.26	TxDOT 666	REFL PAV MRK TY I (W)(ARROW)(090MIL)	LF	10	
5.27	TxDOT 666	REFL PAV MRK TY I (W)(BIKE SYM)(090MIL)	LF	8	
5.29	TxDOT 666	REFL PAV MRK TY I (Y)4"(BRK)(090MIL)	LF	140	



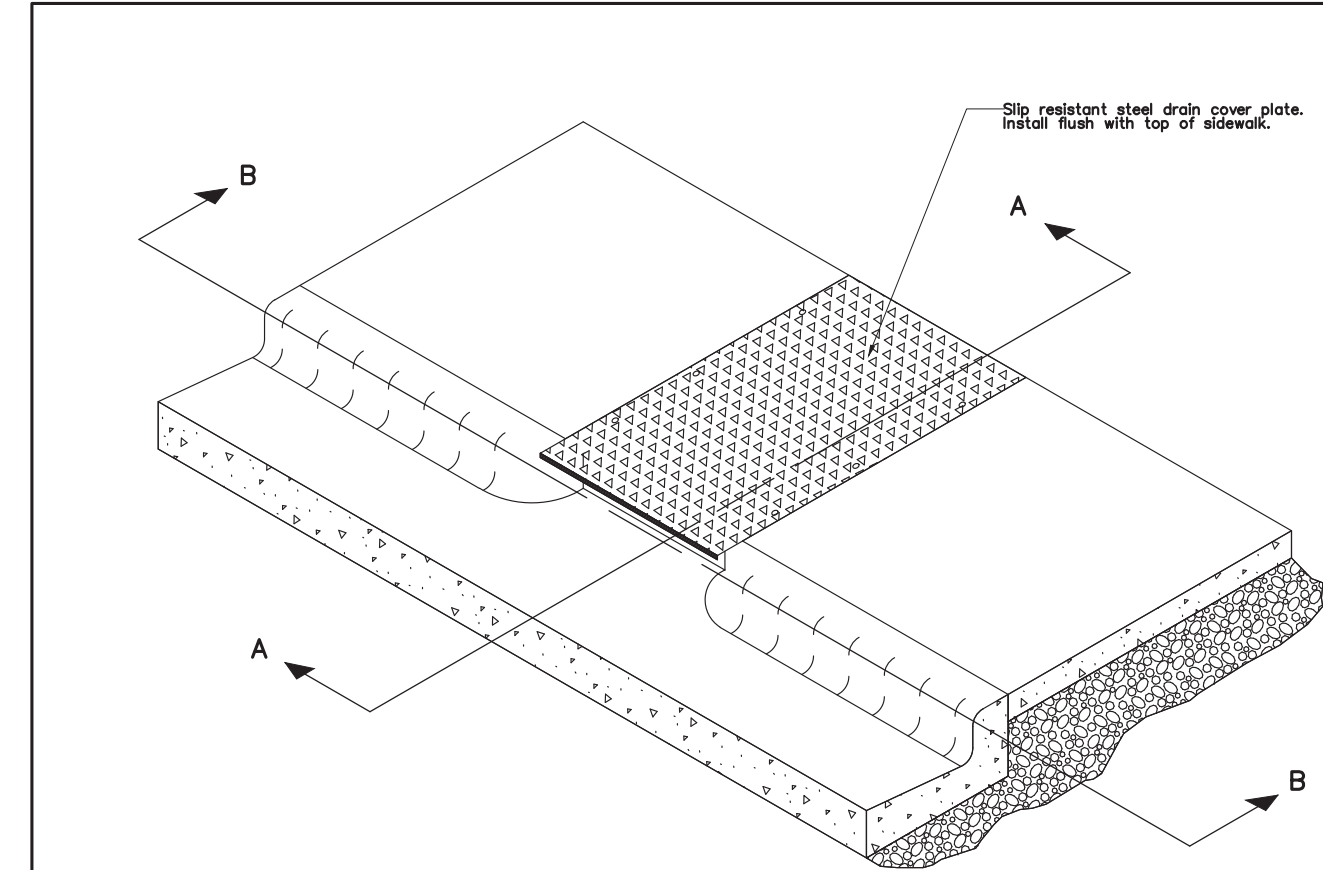
SEE SUMMARY OF SMALL SIGNS SHEETS FOR ADDITIONAL INFORMATION

LEGEND

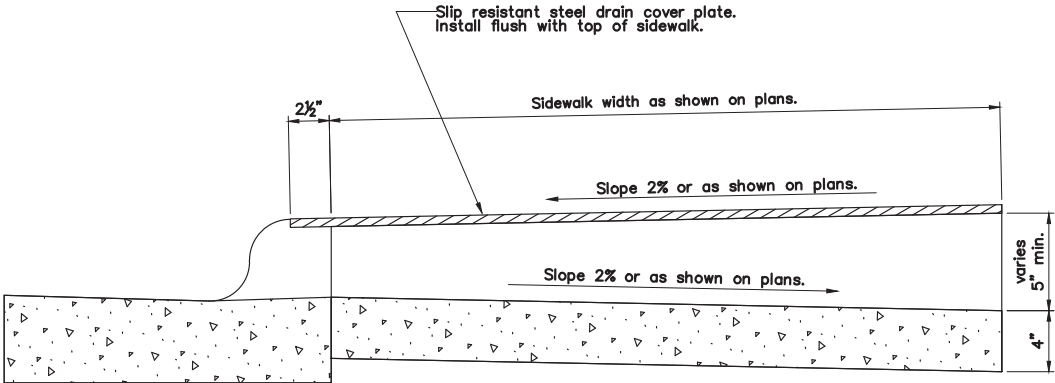
- A RFL PAV MRK TY 1 (W) 4" (BRK)
- B RFL PAV MRK TY 1 (W) 4" (SLD)
- C RFL PAV MRK TY 1 (W) 12" (SLD)
- D RFL PAV MRK TY 1 (W) 24" (SLD)
- E RFL PAV MRK TY 1 (W) (BIKE ARW)
- F RFL PAV MRK TY 1 (W) (BIKE SYM)
- G RFL PAV MRK TY 1 (W) (ARROW)
- H RFL PAV MRK TY 1 (Y) 4" (BRK)
- I RFL PAV MRK TY 1 (Y) 4" (DBL SLD)



DATE: 08/15/2016
TIME: 3:12 PM
FILE: 0420 6002 CL A CONC (MISC)



ISOMETRIC VIEW
SHOWING SINGLE DRAIN OPENING



SECTION A-A

GENERAL NOTES

- Existing conditions may vary from dimensions shown. Field verify all dimensions, and adjust dimensions of proposed work as directed.
- Align steel plate with existing sidewalk grades.
- Steel drain cover plates will be measured and paid for as Item 442. Fasteners, hardware, and reinforcing steel will not be measured or paid for separately, but will be considered as included in payment for the various bid items.
- Reinforcing steel shall conform to the requirements of Item 440, "Reinforcement for Concrete."
- The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber is listed on the Department's "Fibers for Class A and Class B Concrete Applications" Material/Producer List.
- If used, steel reinforcing in sidewalk drain shall be No. 3 uncoated deformed bars on 9 in. centers each way, placed at the vertical mid-point of the sidewalk drain thickness. Securely tie steel reinforcing where bars lap, intersect, or cross.
- The sidewalk width and number of drain slots will be shown on the plans for each location.
- Remove existing curb to match curb opening, if curb is present. This work will be considered as included in payment for the various bid items.
- Hot-dip galvanize slip resistant steel plate after fabrication in accordance with Item 445, "Galvanizing". Chamfer or round edges approximately 1/16 in. prior to galvanizing.

APPROVED SLIP RESISTANT PLATE	
Product	Manufacturer Website
Mebac® #3, Steel	www.harscoikg.com
Algrip™, Steel	www.algrip.com
SlipNOT® Grade 2, Steel	www.slipnot.com

Drain cover plates must be fabricated with a product from this list. No exceptions are permitted.

CLASS A CONCRETE QUANTITIES (CY)

sidewalk width	number of drain openings				
	one	two	three	four	five
4 ft.	0.4	0.5	0.6	0.7	0.8
5 ft.	0.5	0.6	0.8	0.9	1.0
6 ft.	0.6	0.8	0.9	1.0	1.2
7 ft.	0.7	0.9	1.1	1.2	1.4
8 ft.	0.9	1.0	1.2	1.4	1.6
9 ft.	1.0	1.2	1.4	1.5	1.7
10 ft.	1.1	1.3	1.5	1.7	1.9

STRUCTURAL STEEL QUANTITIES (LB)

sidewalk width	number of drain openings				
	one	two	three	four	five
4 ft.	199	371	542	714	886
5 ft.	246	459	671	884	1,097
6 ft.	293	547	800	1,054	1,307
7 ft.	340	635	929	1,223	1,518
8 ft.	388	723	1,058	1,393	1,728
9 ft.	435	811	1,187	1,563	1,939
10 ft.	482	899	1,316	1,732	2,149

PAY ITEMS

0420 6002 CL A CONC (MISC) CY
0442 6007 STR STEEL (MISC NON - BRIDGE) LB

		San Angelo District	
SIDEWALK DRAIN DETAILS			
SHEET 1 OF 2		NOT TO SCALE	
©TXDOT	REVISIONS	CONT	SECT
	08-15		
		DIST	COUNTY
			SHEET NO.

MARK

REVISION

DATE

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DRAIN DETAILS DWG

SD-1

17122016

3.12 PM

DRAWING PATH\NAME

LAYOUT

PLOT DATE

TIME

SIDEWALK DRAIN DETAILS

SHEET 1 OF 2

CITY OF SAN ANGELO

MARTIN LUTHER KING BLVD

RECONSTRUCTION

SAN ANGELO, TX

DRAWN BY:

CIMW

DESIGNED BY:

CIMW

LATEST REVISION:

5/12/2015

KSA JOB NO.:

SAN1058



CP&Y

CP&Y PROJECT #: KSAE15564.00



KSA

TXBPE Firm Registration No. F-1386

88 Bullock Street, San Antonio, Texas 78201

T. 202-947-1555 F. 202-947-1559

www.ksaeng.com



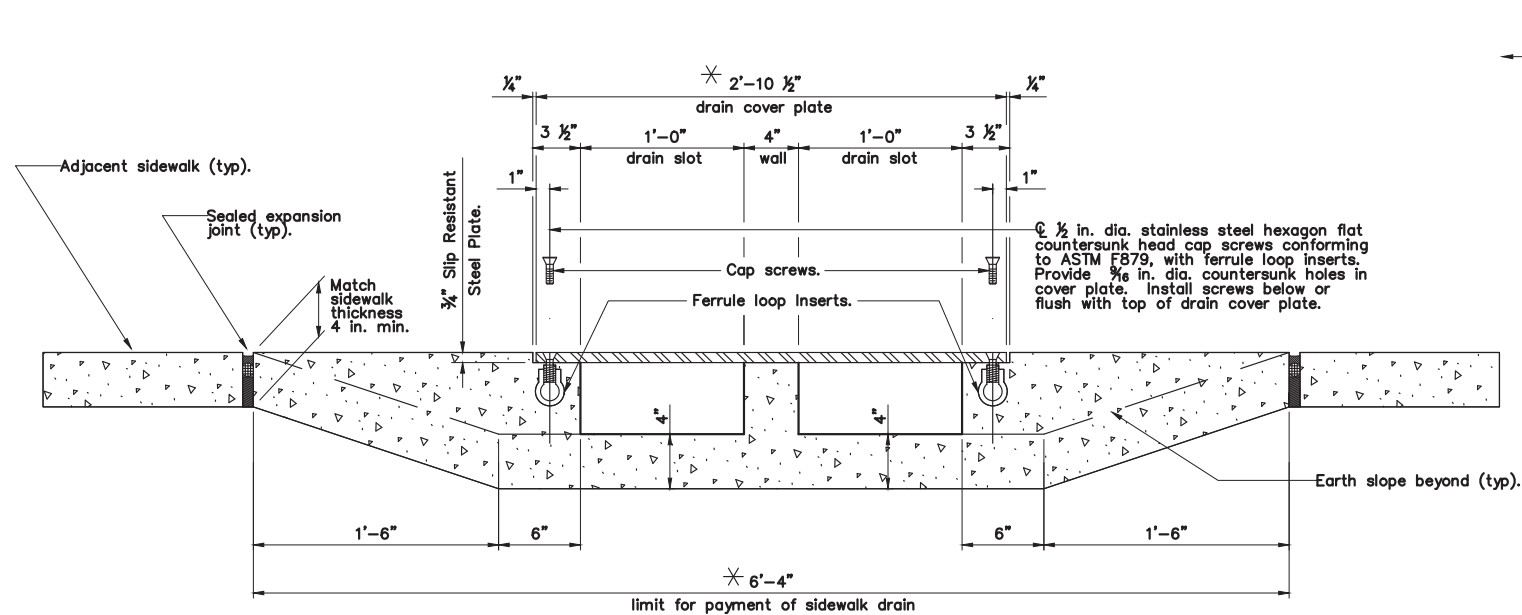
Craig Wilson

7-12-2016

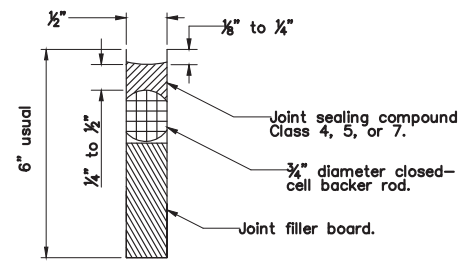
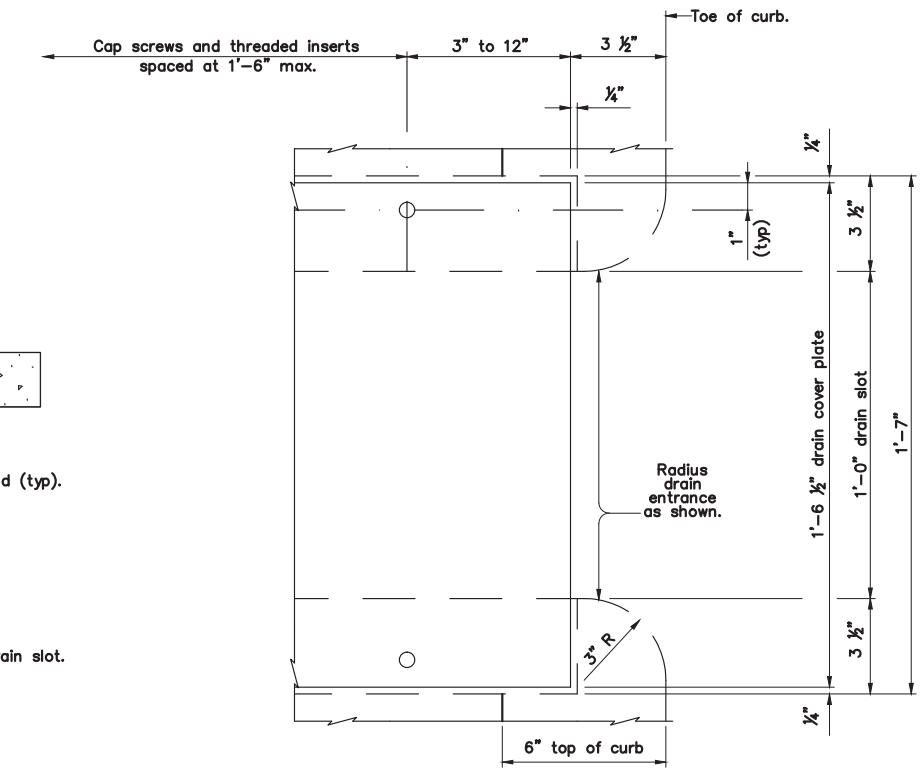
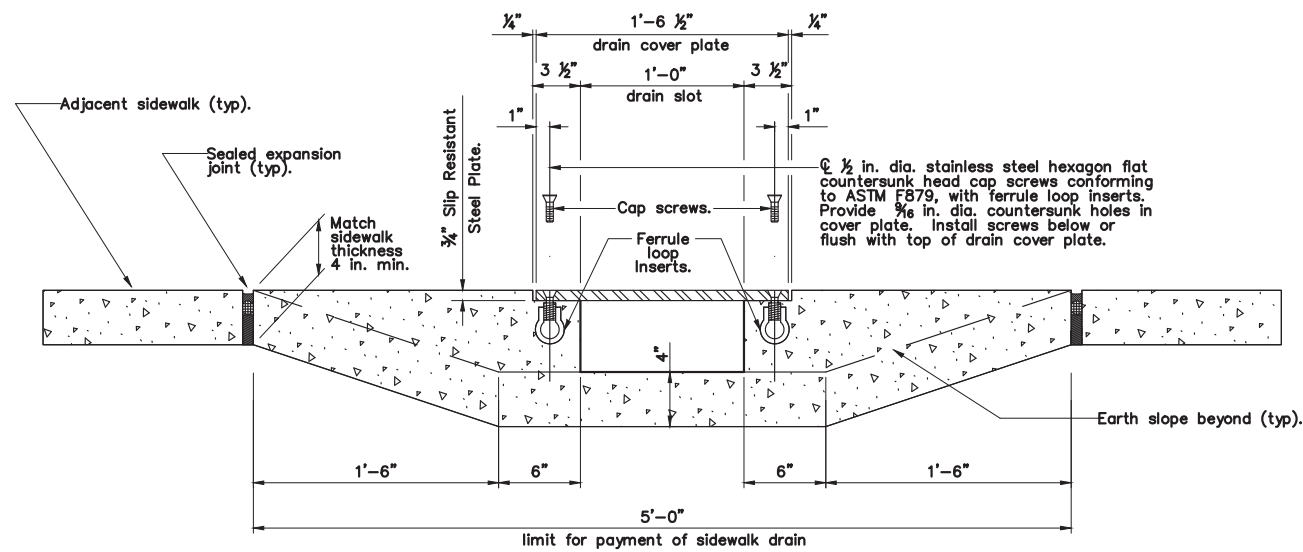
SHEET NO.

108

DATE: 08/15/2015
FILE: 08/15/2015



SECTION B-B
SHOWING ONE DRAIN SLOT OPENING

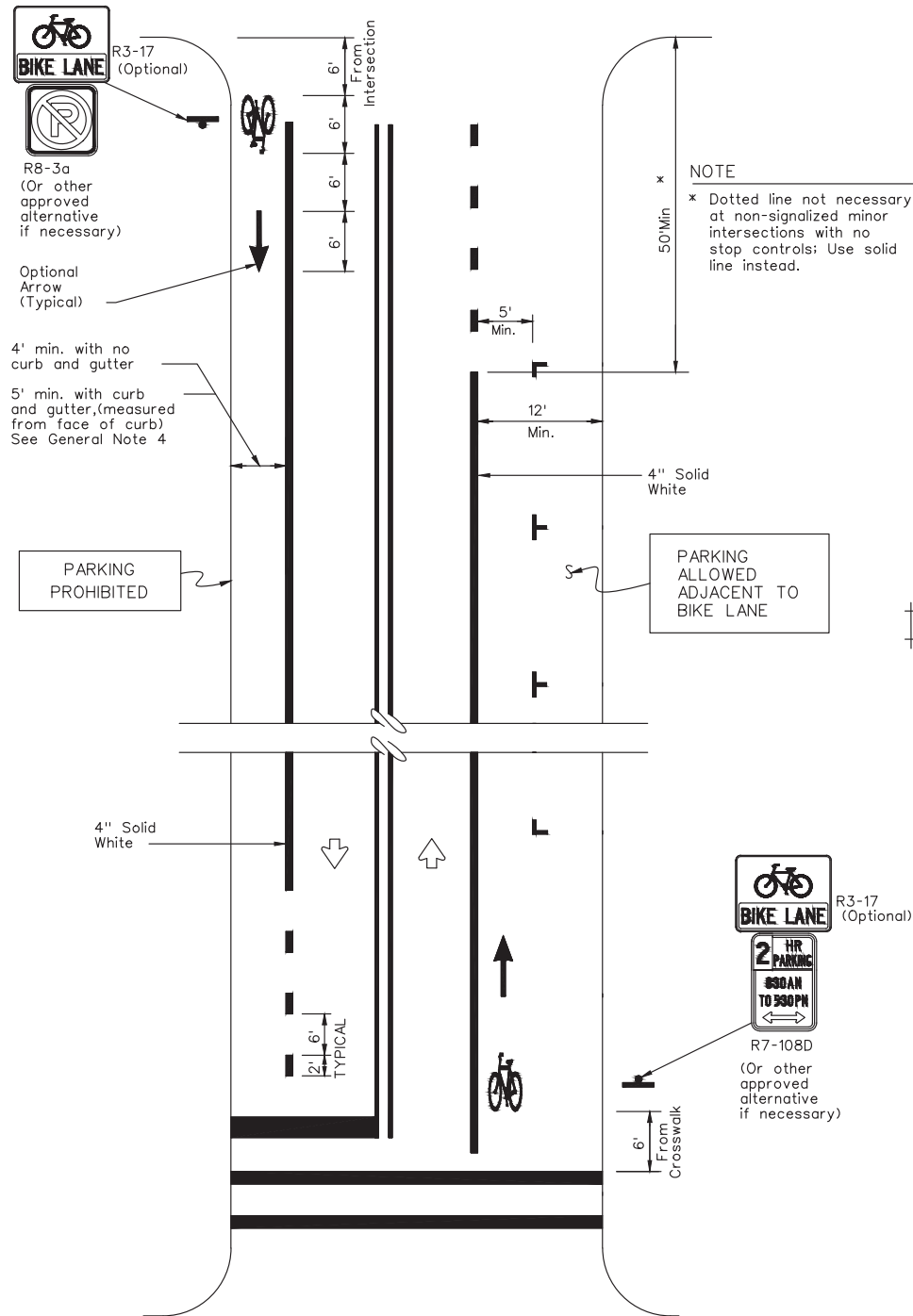


		San Angelo District	
SIDEWALK DRAIN DETAILS			
SHEET 2 OF 2		NOT TO SCALE	
©TXDOT	REVISIONS	CONT	SECT
	08-15		
		DIST	COUNTY
			SHEET NO.

CITY OF SAN ANGELO MARTIN LUTHER KING BLVD RECONSTRUCTION SAN ANGELO, TX		SIDEWALK DRAIN DETAILS SHEET 2 OF 2	
DRAWN BY: CWM		REVISION	
DESIGNED BY: CWM		DATE	
LATEST REVISION: 5/12/2015		C:\PWORKING\WILSON\081140\150452 SIDEWALK DRAIN DETAILS.DWG (SD-2) 7/12/2016 - 3:12 PM	
KSA JOB NO. SAN 088		DRAWING PATH NAME LAYOUT1 PLOT DATE TIME	
CPY PROJECT #: KSAE1504.00		SHEET NAME:	
		CP&Y FIRM # - 1741	
		KSA FIRM REGISTRATION NO. F-1386 88 Bullock Street, San Angelo, Texas 76901 T. 325-947-1555 F. 325-947-1559 www.kasang.com	
		7-12-2016	
SHEET NO.		109	

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DATE:
FILE:



NOTES

- Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
- On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

-1200' for 45 MPH or less roads
-2500' for 50 MPH and greater roads.

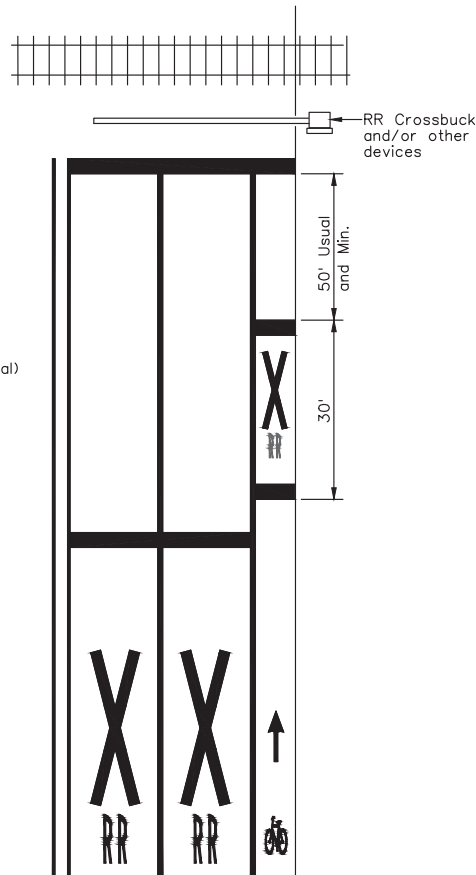
TWO-WAY STREET

NOTE

- * Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

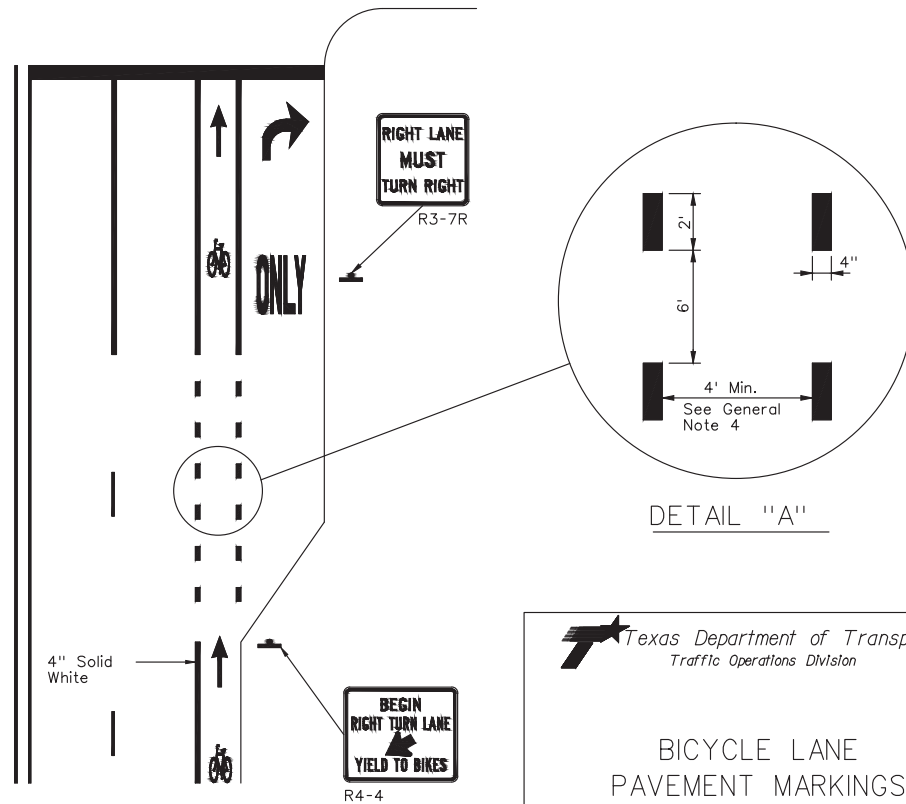
GENERAL NOTES

- All bicycle lane pavement markings shall be white unless otherwise noted.
- All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
- Exact sign placement and details are shown elsewhere in the plans.
- The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
- Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
- The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
- The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.



(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



DETAIL "A"

Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

BLPM-10

© TxDOT	May 2010	CONT	SECT	JOB	HIGHWAY	DIST	COUNTY	SHEET NO.

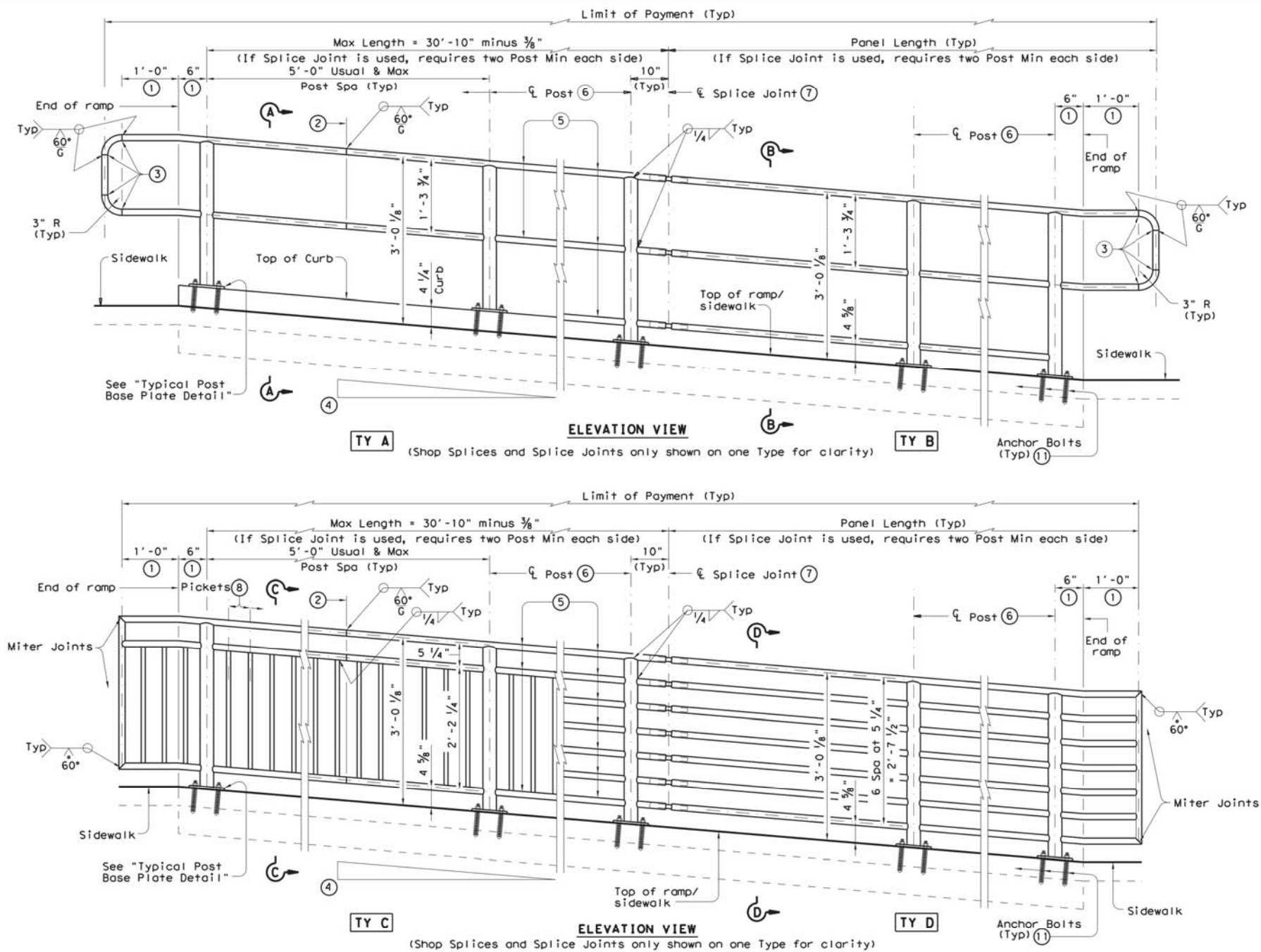
16

LEGEND	
Sign	
Traffic Flow	

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

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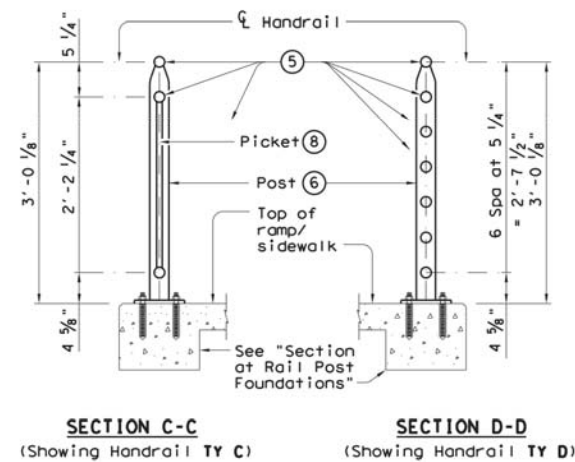
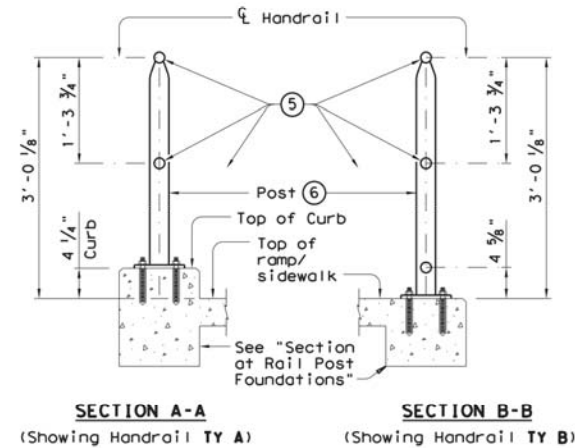
DATE:
FILE:



- 1 Parallel to ground.
- 2 One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- 3 Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
- 4 See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
- 5 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.

- 6 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
- 7 See "Handrail Fabrication Details" for Splice Joints.
- 8 1/2" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
- 9 When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.
- 10 Not to be used on bridges.
- 11 See "General Notes" for anchor bolt information.

RECOMMENDED USAGE 9 10	
Dropoff Height/Condition	Recommended Rail Options
<30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F



SHEET 1 OF 3

Texas Department of Transportation		Design Division Standard	
PEDESTRIAN HANDRAIL DETAILS			
PRD-13			
FILE: prd13.dgn	DW: TxDOT	CHK: AM	DW: JTR
© TxDOT December 2006	CONT	SECT	JOB
REVISIONS			HIGHWAY
REVISED MAY, 2013 (VP)	DIST	COUNTY	SHEET NO.

PEDESTRIAN HANDRAIL
DETAILS - SHEET 1 OF 3

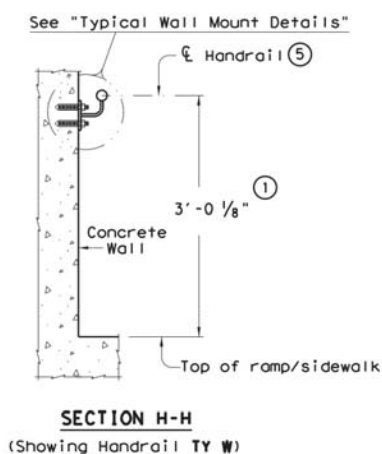
CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX

CP&Y
KSA
TBP# PRM # - 1741
TBP# PRM # - 1741
TBP# PRM # - 1741

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DATE: _____
FILE: _____

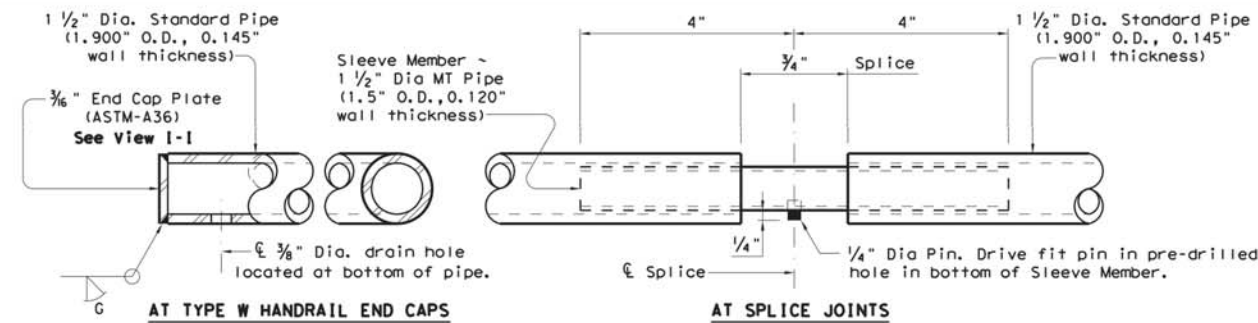
- ① Parallel to ground.
 - ② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
 - ③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.
 - ④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.
 - ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
 - ⑥ 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.
 - ⑦ See "Handrail Fabrication Details" for Splice Joints.
 - ⑧ 5/8" Dia. Round Bar equal spacing at 4 1/2" Max. Plumb all pickets.
 - ⑪ See "General Notes" for anchor bolt information.



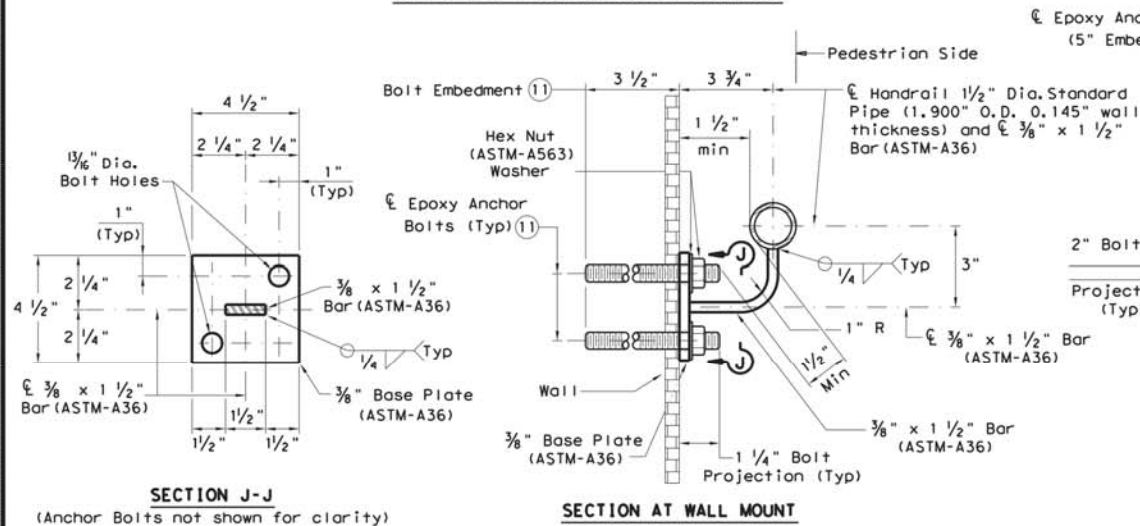
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© TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED MAY, 2013 (VP)	DIST	COUNTY		SHEET

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DATE: FILE:

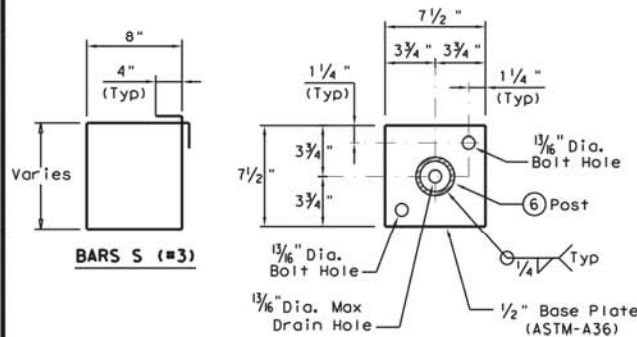


HANDRAIL FABRICATION DETAILS

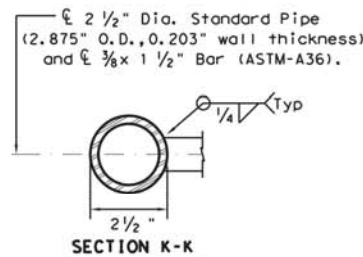


TYPICAL WALL MOUNT DETAILS

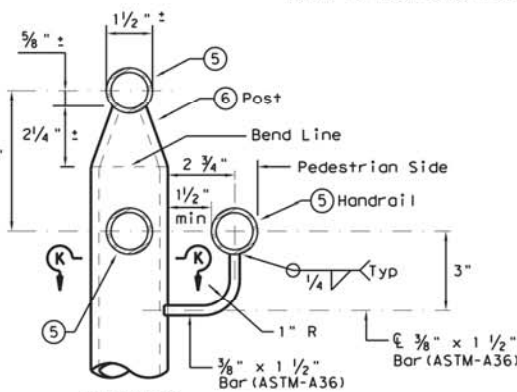
- ⑤ 1 1/2" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 1/2" Dia. pipe for galvanizing drainage and venting.
- ⑥ 2 1/2" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diameter of top rail. Provide holes as needed in post for galvanizing drainage and venting.
- ⑪ See "General Notes" for anchor bolt information.
- ⑫ Bars S (#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).
- ⑬ Provide 1 1/2" end cover to Bars D (#4) from outside edge of overall length of Ramp/Sidewalk.



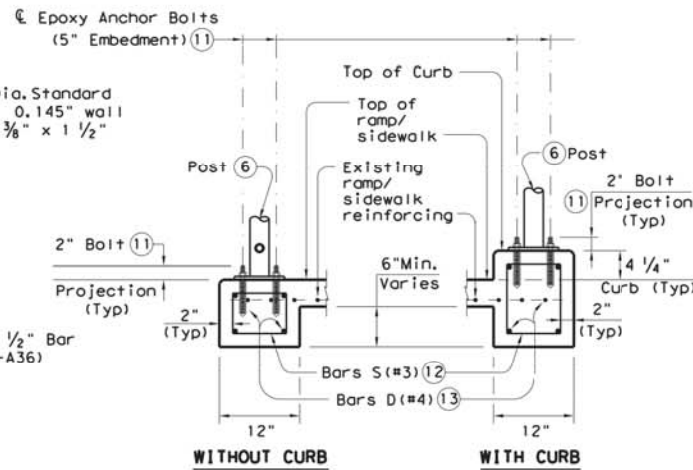
TYPICAL POST BASE PLATE DETAIL



POST MOUNT DETAILS

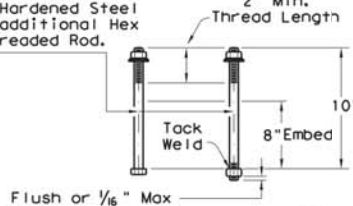


ELEVATION

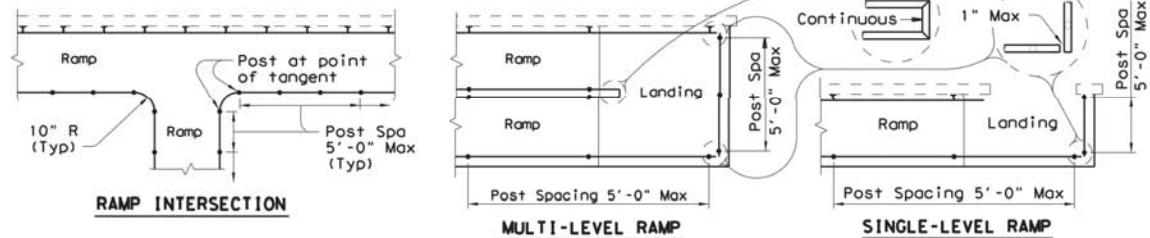


SECTION AT RAIL POST FOUNDATIONS

3/8" Dia. Hex Head Anchor Bolt (ASTM-A307) or Threaded Rod (ASTM-A36) with one Hardened Steel Washer placed under Hex Nut. One additional Hex Nut will be furnished for each Threaded Rod.



CAST-IN-PLACE ANCHOR BOLT OPTIONS
(Used for Post Base Plate only)



PLAN SHOWING RAIL AT RAMP CONDITIONS

GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bars will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM A513 Grade 1015 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated ~ #4 = 1'-5" Epoxy coated ~ #4 = 2'-1"

When the plans require pointed steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be 3/8" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. 3/8" Dia. threaded rod embedment depth for wall mounts is 3 1/2" and embedment depth for post base plate is 5".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be 3/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted. For curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately 1/8" by grinding.

SHEET 3 OF 3



PEDESTRIAN HANDRAIL
DETAILS
PRD-13

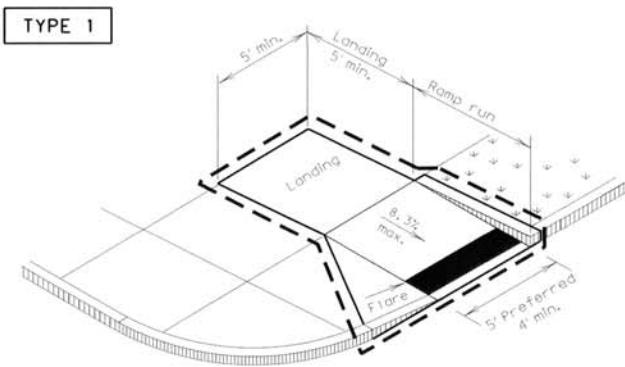
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© TxDOT December 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	
REVISED MAY, 2013 (VP)				

PEDESTRIAN HANDRAIL
DETAILS- SHEET 3 OF 3

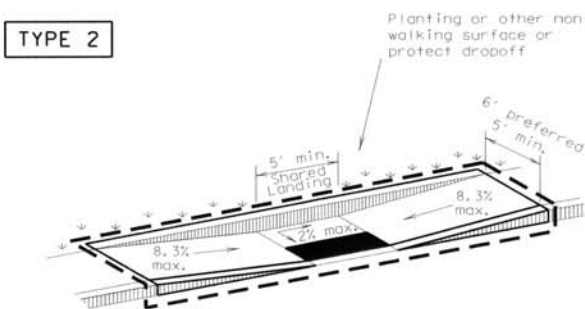
CITY OF SAN ANGELO
MARTIN LUTHER KING BLVD
RECONSTRUCTION
SAN ANGELO, TX



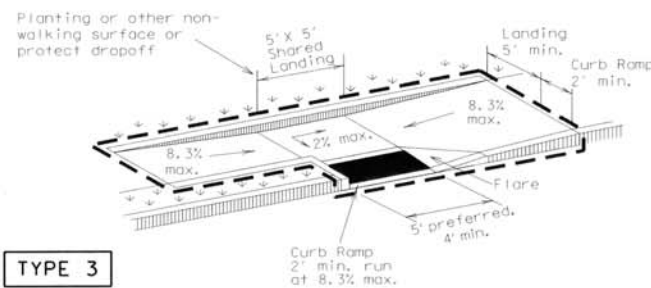
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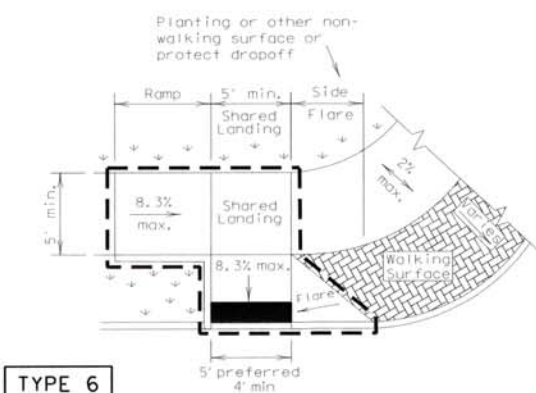
PERPENDICULAR CURB RAMP



PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

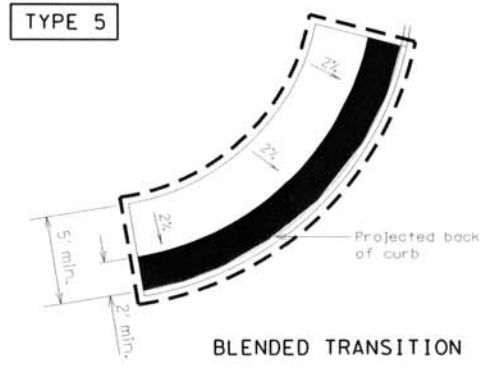


TYPE 3

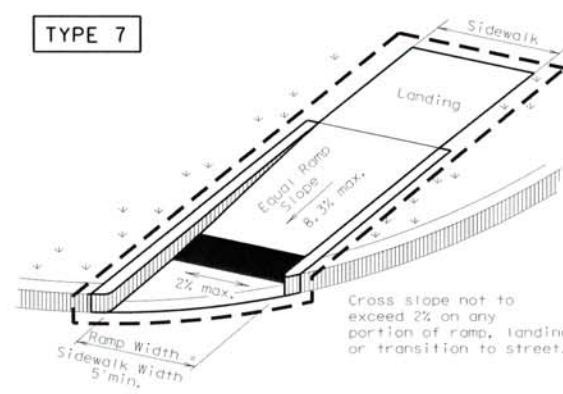


TYPE 6

COMBINATION CURB RAMPS

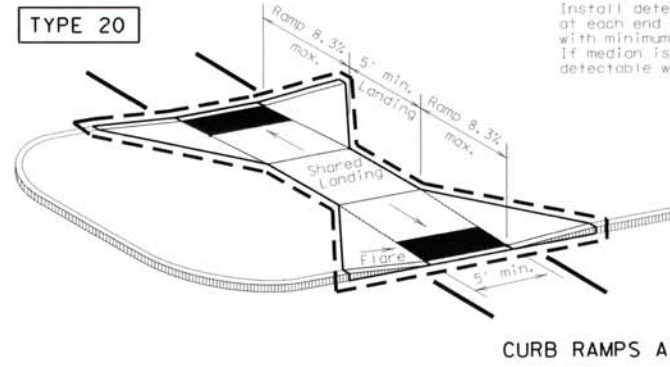


BLENDED TRANSITION

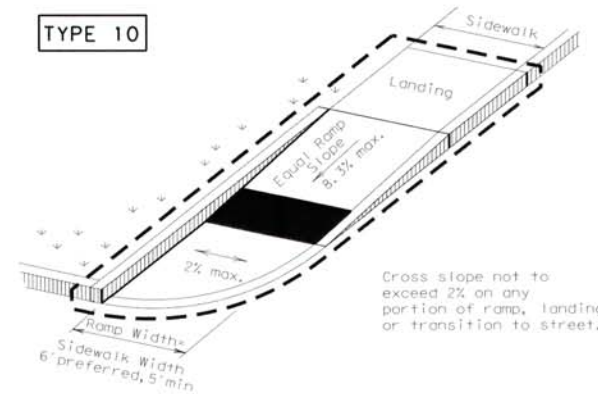


(Sidewalk set back from curb)

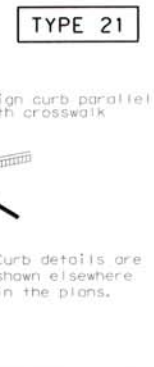
DIRECTIONAL RAMPS WITHIN RADIUS



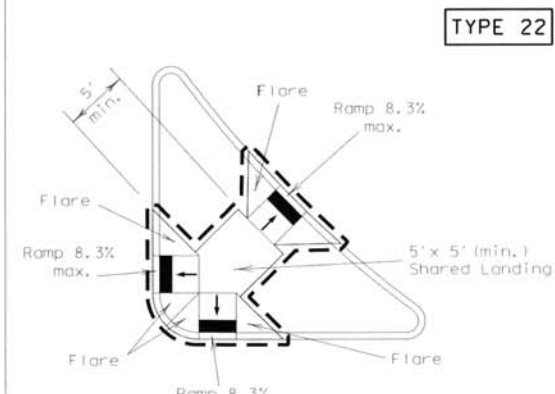
CURB RAMPS AT MEDIAN ISLANDS



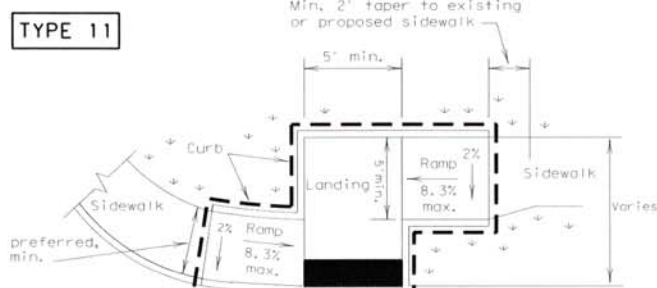
(Sidewalk adjacent to curb)



Curb details are shown elsewhere in the plans.



COMBINATION ISLAND RAMPS



OFFSET PARALLEL CURB RAMP

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.

--- Ramp Limits of Payment

■ Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation
Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

FILE: ped12a.dgn	DW: TxDOT	CK: RM	DW: TxDOT	CK: VP
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REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.

PEDESTRIAN FACILITIES CURB
RAMPS TxDOT-1

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO.:
SAN 058

CP&Y
TBE FIRM #1741

KSA
TBE Firm Registration No. F-1356
5800 South Loop West, Suite 2000, Houston, Texas 77051
713.254.1555 F. 713.254.1557
www.ksaeng.com

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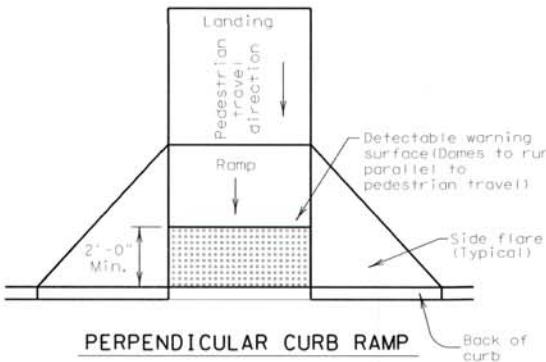
General Notes

Curb Ramps

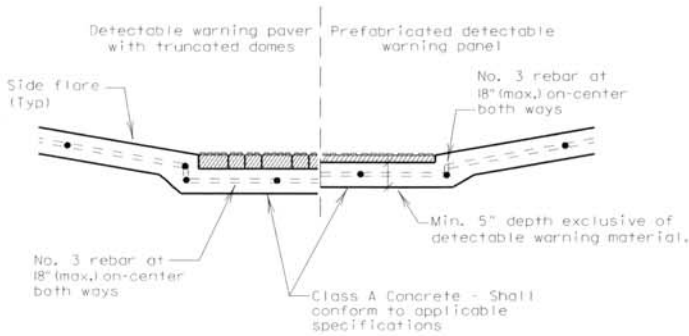
1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk 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.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering 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.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
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 current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
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. Handrails are not required on curb ramps. Provide curb ramps wherever on accessible route crosses (penetrates) a curb.
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. Provide a smooth transition where the curb ramps connect to the street.
16. 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.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

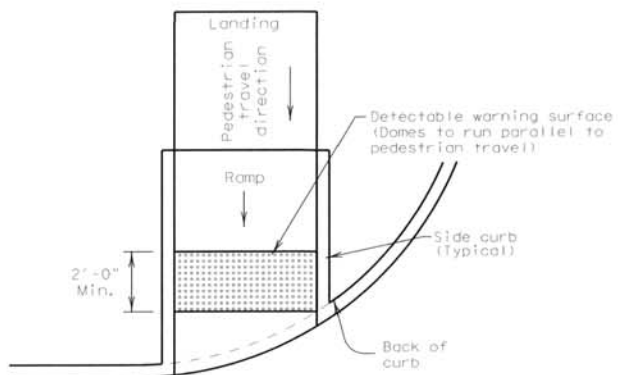
18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. 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.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" 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.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



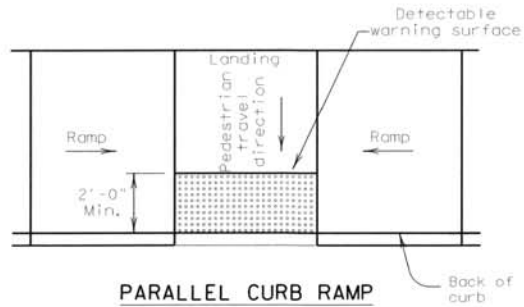
PERPENDICULAR CURB RAMP
Typical placement of detectable warning surface on sloping ramp run.



SECTION: CURB RAMP AT DETECTABLE WARNING



DIRECTIONAL CURB RAMP
Typical placement of detectable warning surface on sloping ramp run.



PARALLEL CURB RAMP
Typical placement of detectable warning surface on landing at street edge.

DETECTABLE WARNINGS

Detectable Warning Pavers

24. 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.
25. Lay full-size units first followed by closure units consisting of at least 25 percent of a full unit. Cut detectable warning paver units using a power saw.

Sidewalks

26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. 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.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. 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 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 TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. 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".
33. Sidewalk details are shown elsewhere in the plans.

SHEET 2 OF 4



PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	ENR TxDOT	CHK RM	ENR TxDOT	CHK VP
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

PEDESTRIAN FACILITIES CURB
RAMPS TXDOT-2

DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO: SAN 058

KSA CP&Y
TYPE FIRM #1-1741

KSA
TYPE Firm Registration No. F-1306
58 Buick Street, San Angelo, Texas 76901
T. 325-847-1555 F. 325-847-1559
www.ksaeng.com

SHEET NO.
115

Concrete Driveway Payment

Driveway Apron

5' Min

4' Usual

2%

Planting or other non-walking surface

Setback sidewalk

Concrete Driveway Payment

Driveway Apron

5' Minimum

4' Usual

2%

10%

Apron offset sidewalk

Concrete Driveway Payment

Driveway Apron

5' Min

4' Usual

2%

10%

Wide sidewalk

Concrete Driveway Payment

Driveway Apron

5' Min

4' Usual

2%

10%

Ramp sidewalk

5' Min

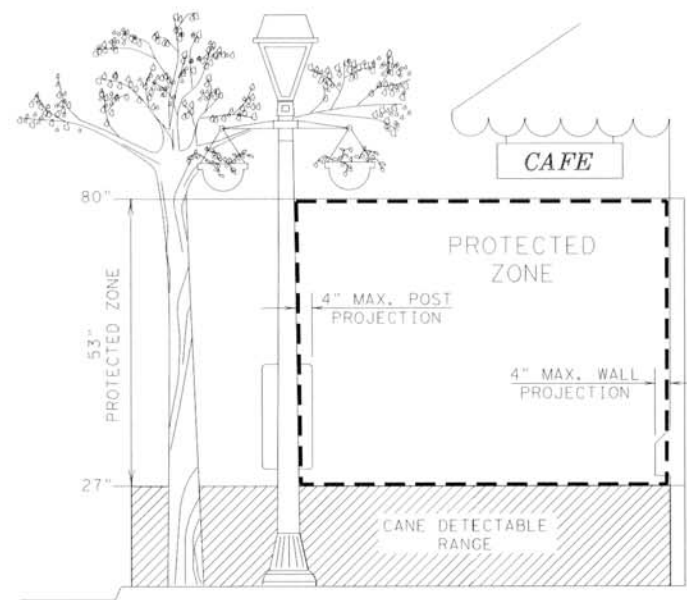
4' Usual

2%

8.5%

* If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

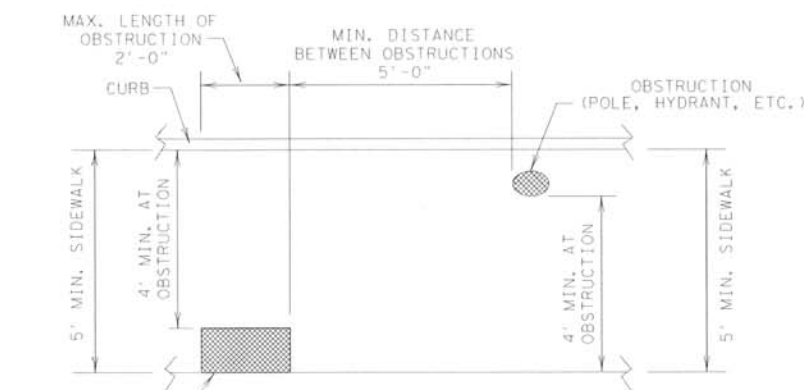
SIDEWALK TREATMENT AT DRIVEWAYS



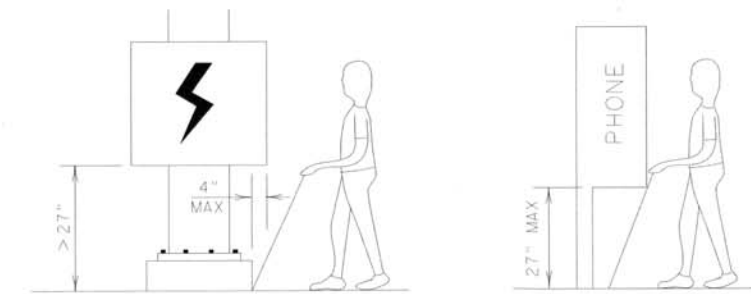
In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27" and 80" above the surface.



CLEAR GROUND SPACE ADJACENT
TO PEDESTRIAN PUSH BUTTON



(ITEMS NOT INTENDED FOR PUBLIC USE.
MINIMUM 4' x 4' CLEAR GROUND SPACE
REQUIRED AT PUBLIC USE FIXTURES.)



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 $\leq 27"$ are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR
VERTICAL CLEARANCE < 80"

SHEET 3 OF 4



**Design
Division
Standard**

PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

FILE: ped12a.dgn	DW TxDOT	CK RM	DW TxDOT	CK VP
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	BLST		COUNTY	SHEET NO.

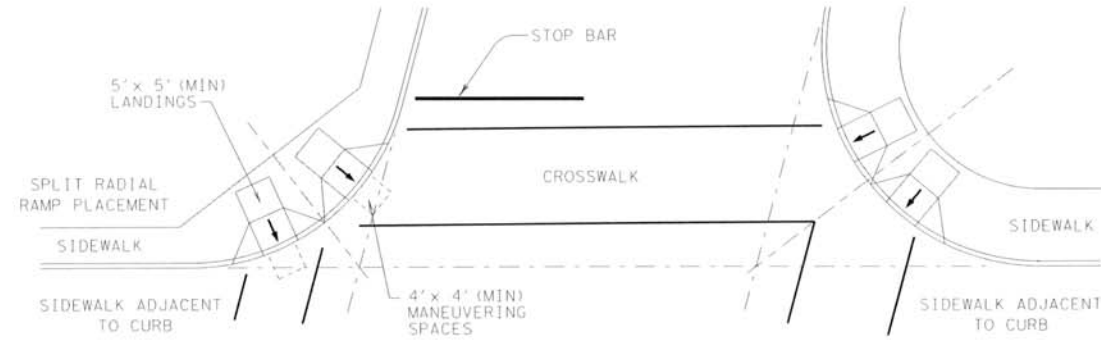
PEDESTRIAN FACILITIES CURB RAMPS TXDOT-3

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

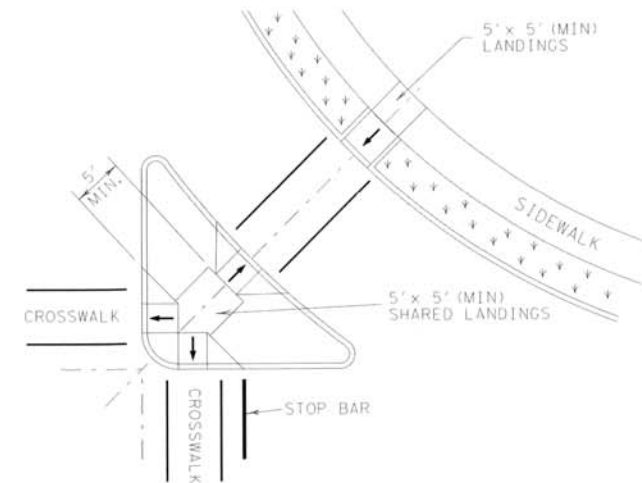
KSA
 CPY &
 TBPE FIRM #F-1741

116

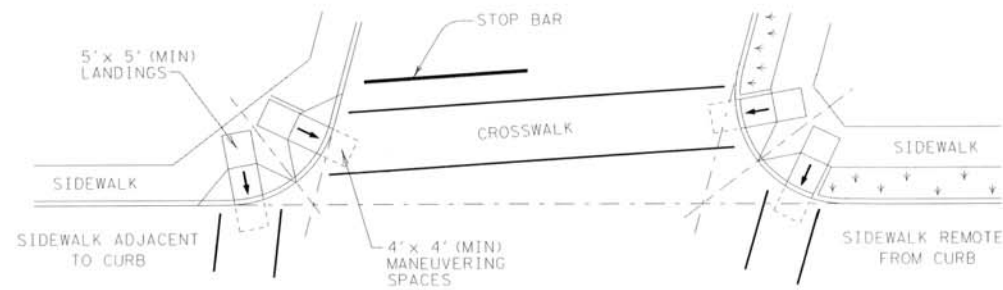
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation or its agents for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



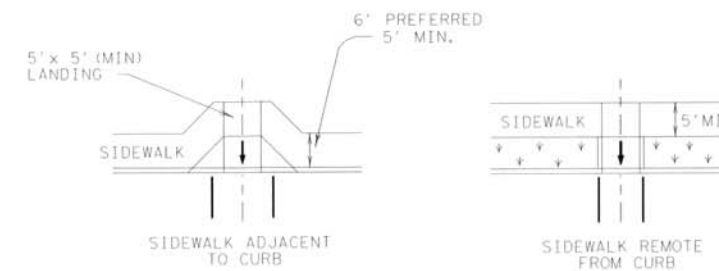
SKewed INTERSECTION WITH "LARGE" RADIUS



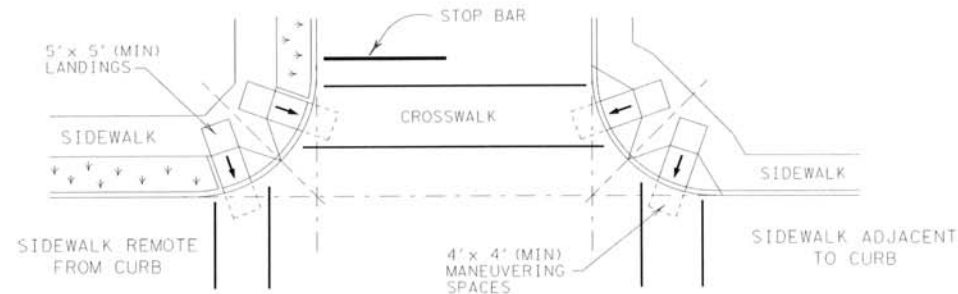
AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

TYPICAL CROSSING LAYOUTS

SHEET 4 OF 4



PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DN: TxDOT	CK: VP
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
VP: June 13, 2012	DIST	COUNTY	SHEET NO.	

PEDESTRIAN FACILITIES CURB
RAMPS TXDOT-4

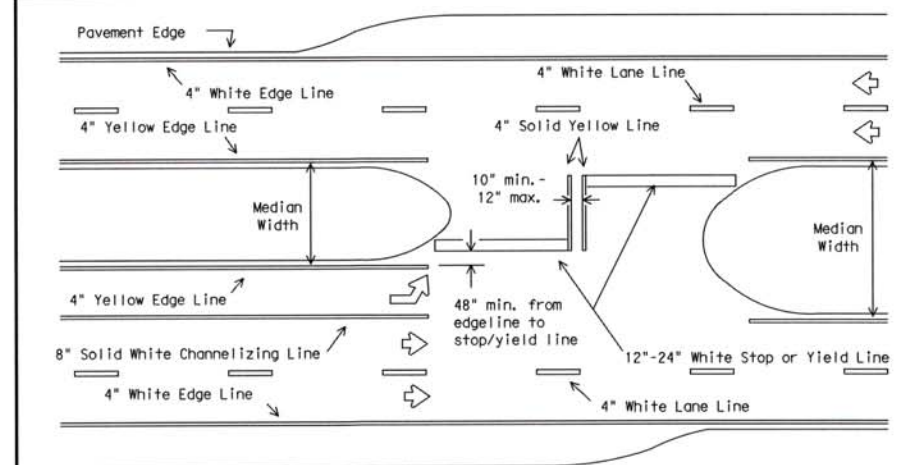
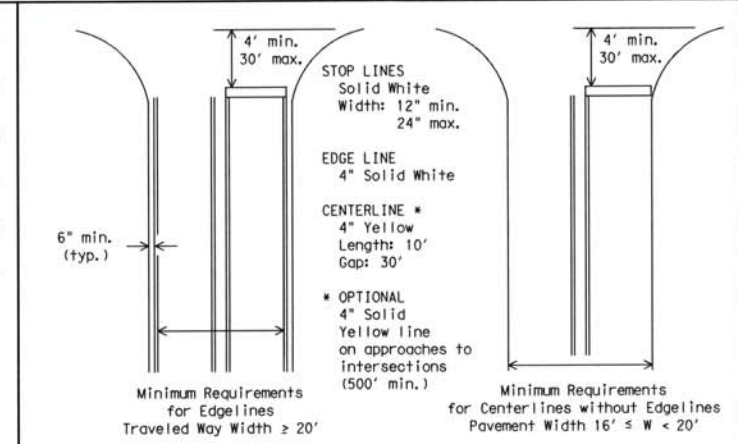
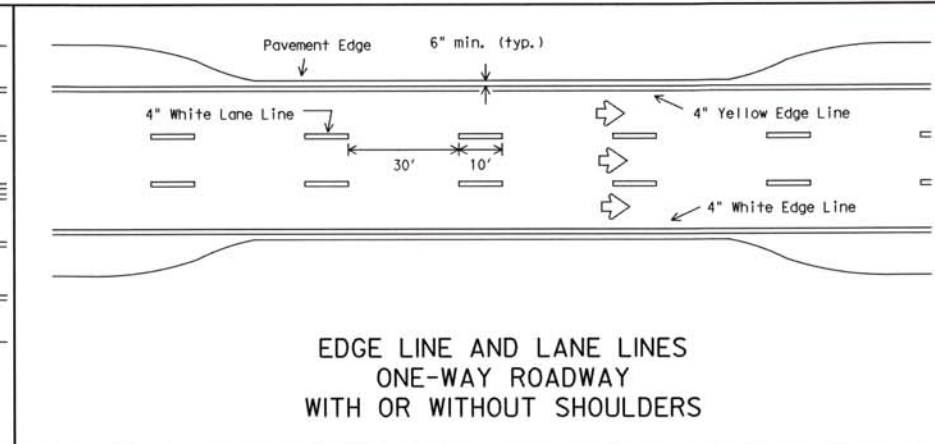
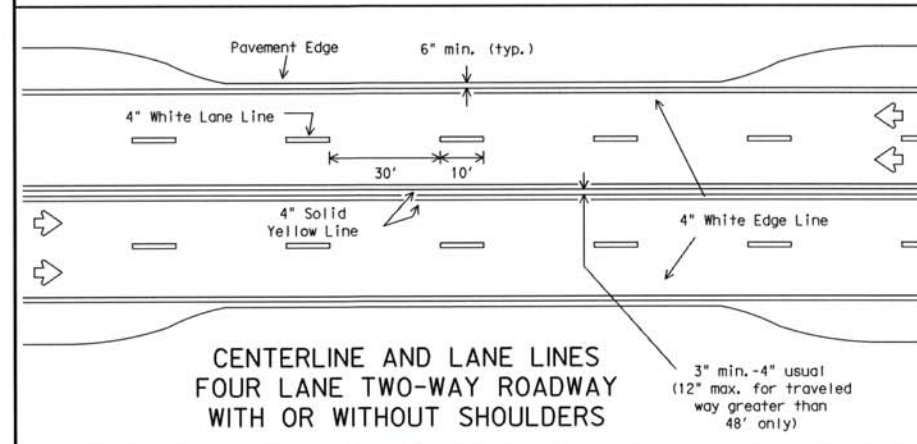
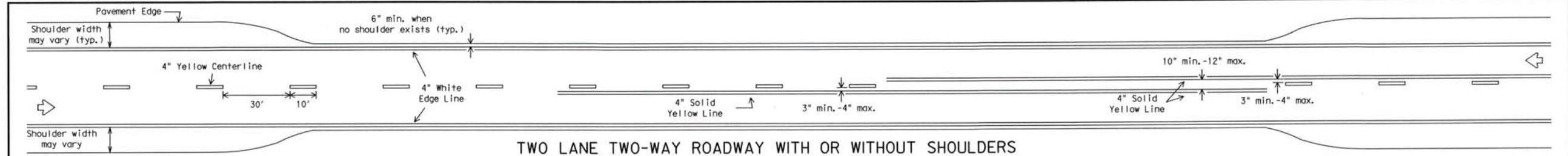
CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY	CBS
DESIGNED BY	JWD
LATEST REVISION	7/14/2016
KSA JOB NO.	
SAN CBS	



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DATE: FILE:



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and of opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

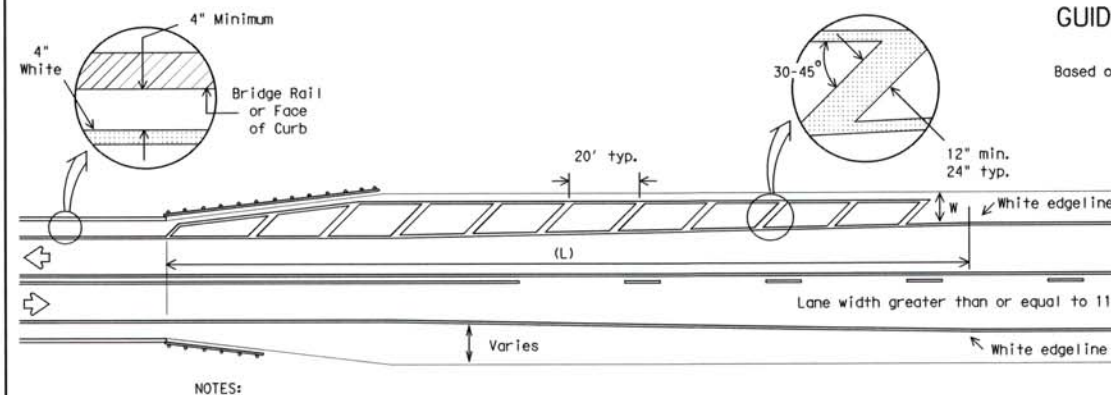
FOUR LANE DIVIDED ROADWAY INTERSECTIONS

GENERAL NOTES

- Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
- The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

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

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



NOTES:

- No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
- For crosshatching length (L) see Table 1.
- The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
- The crosshatching is not required if delineators or barrier reflectors are used along the structure.
- For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

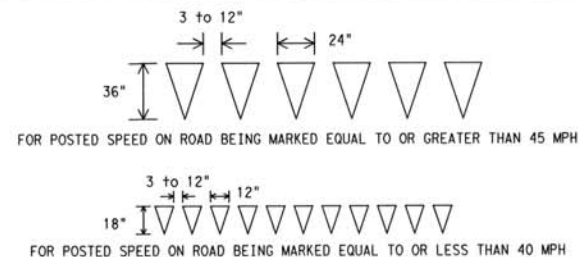


TABLE 1 - TYPICAL LENGTH (L)

Posted Speed	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	$L = WS$

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the crosshatching should be:
 $L = 8 \times 70 = 560$ ft.
A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the crosshatching should be:
 $L = 4(40)^2 / 60 = 106.67$ ft. rounded to 110 ft.

Texas Department of Transportation
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-12

REVISIONS	DATE	BY	CHKD	APPD
8-95 2-12				
5-00				
8-00				
3-03				

22A

MARKING DETAILS SHEET 1

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

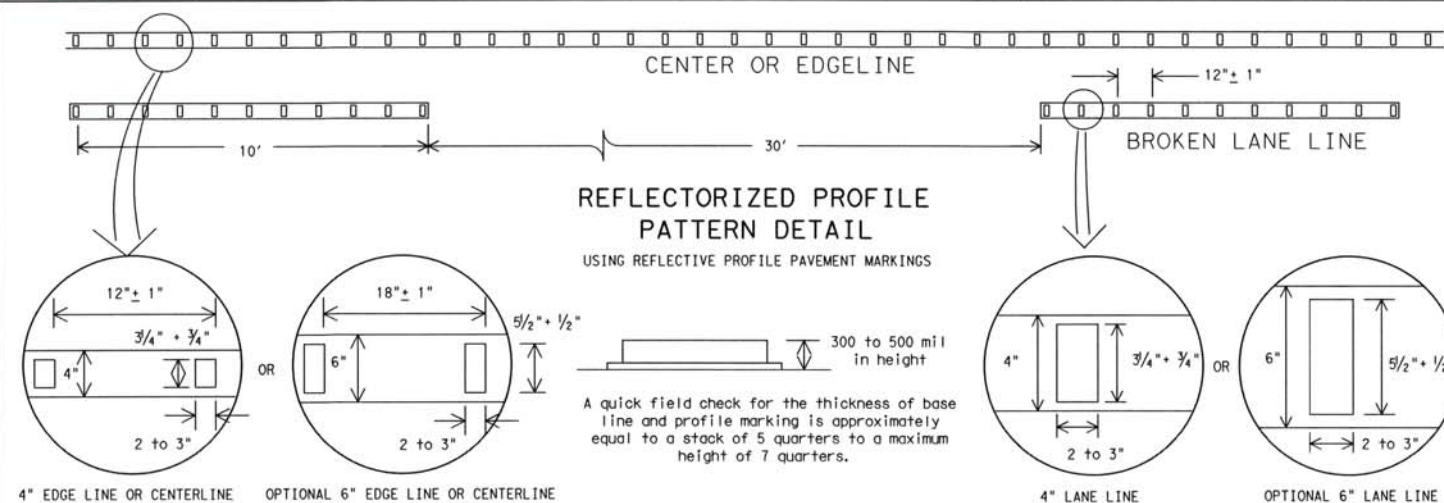
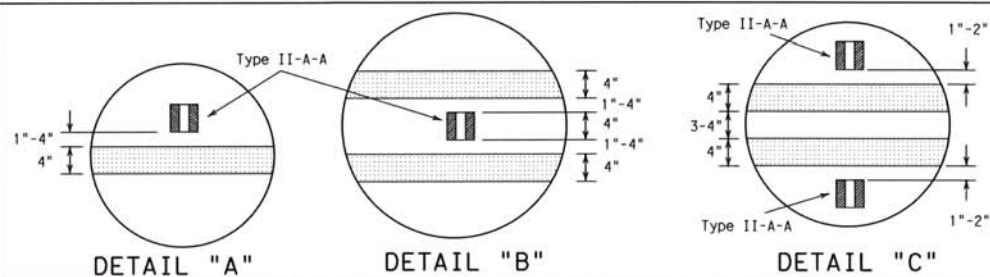
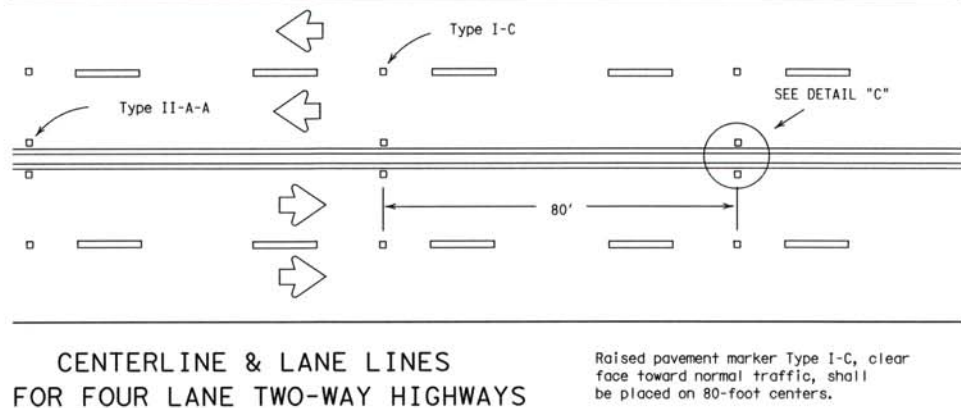
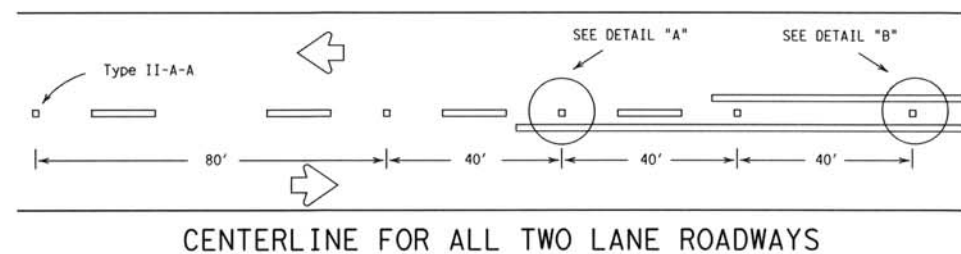
CP&Y
TYPE FIRM #1741

KSA
TYPE FIRM Registration No. F-1398
5800 Black Street, San Antonio, Texas 78201
T. 325-947-1555 F. 325-947-1559
www.ksaeng.com

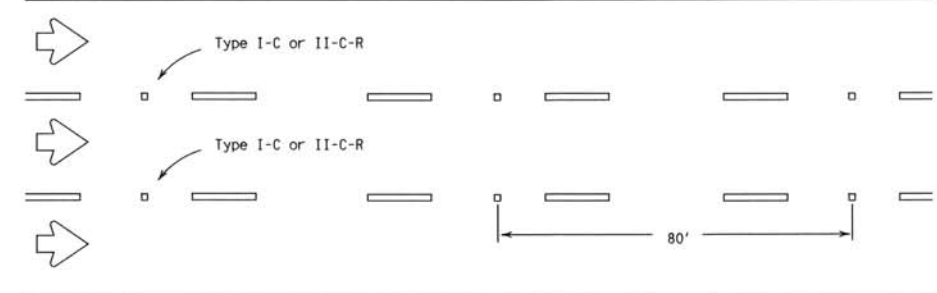
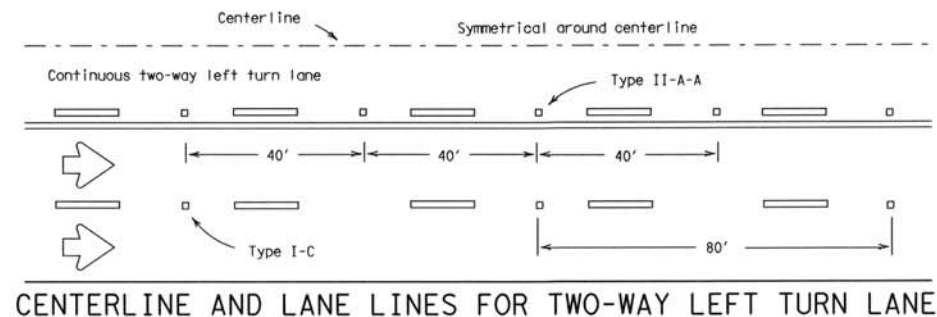
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DATE: FILE:

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



NOTE:
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

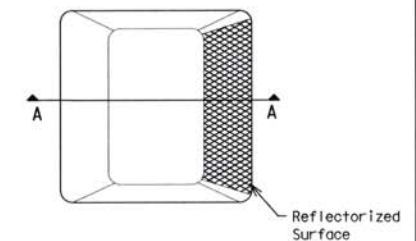
GENERAL NOTES

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

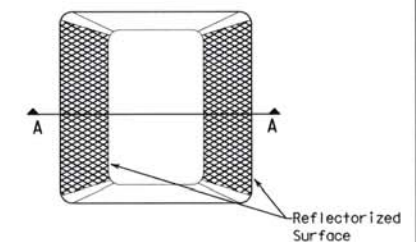
MATERIAL SPECIFICATIONS

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

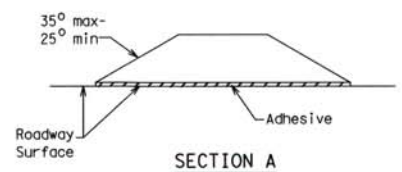
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



RAISED PAVEMENT MARKERS

Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

PM(2)-12

© TxDOT April 1977	DIST	COUNTY	SHEET NO.
REVISIONS:	CONT	SECT	JOB
4-92 2-10			
5-00 2-12			
8-00			
2-08			

22B

MARKING DETAILS SHEET 2

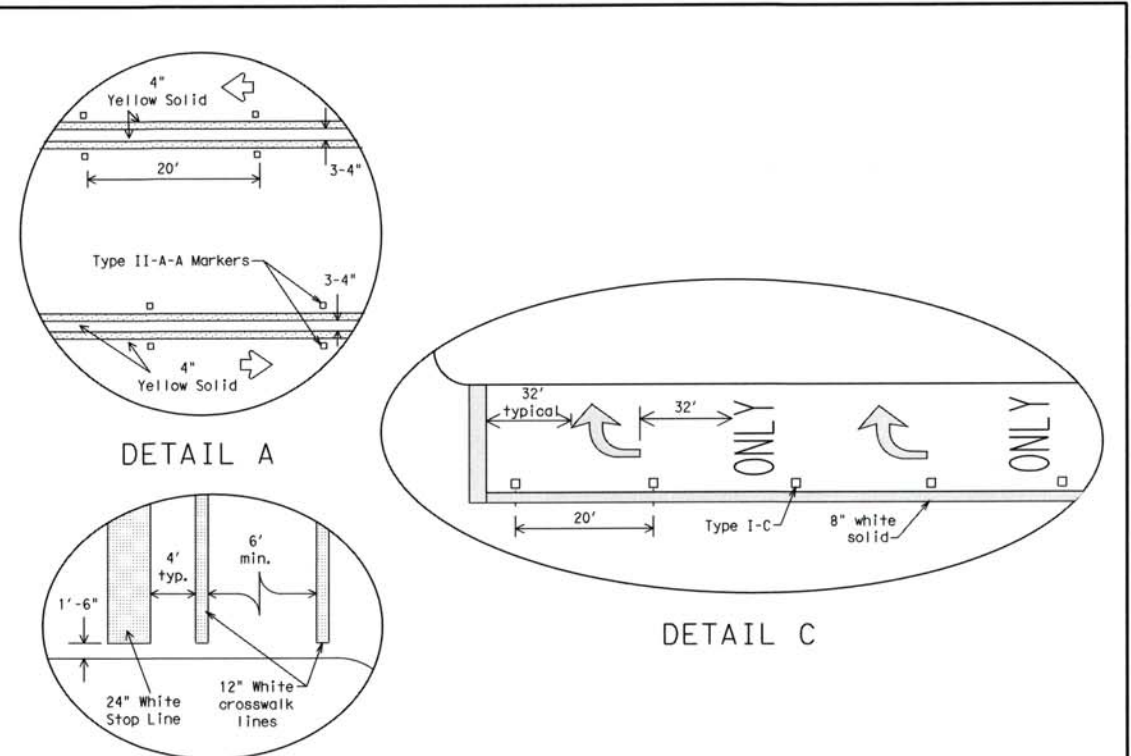
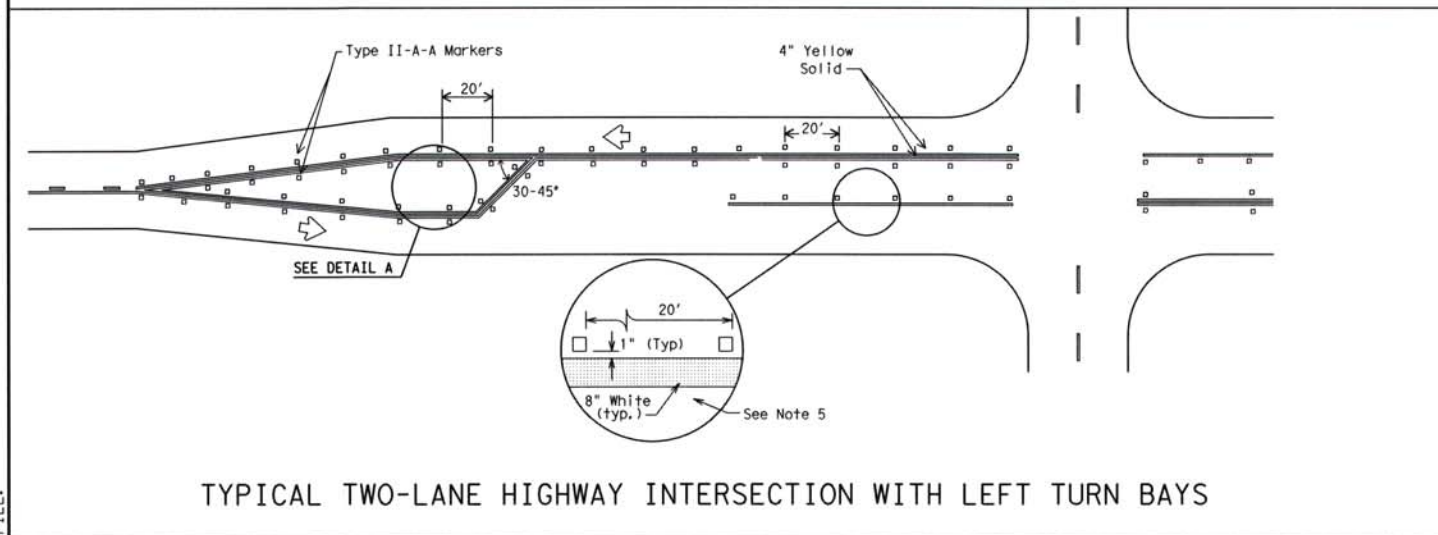
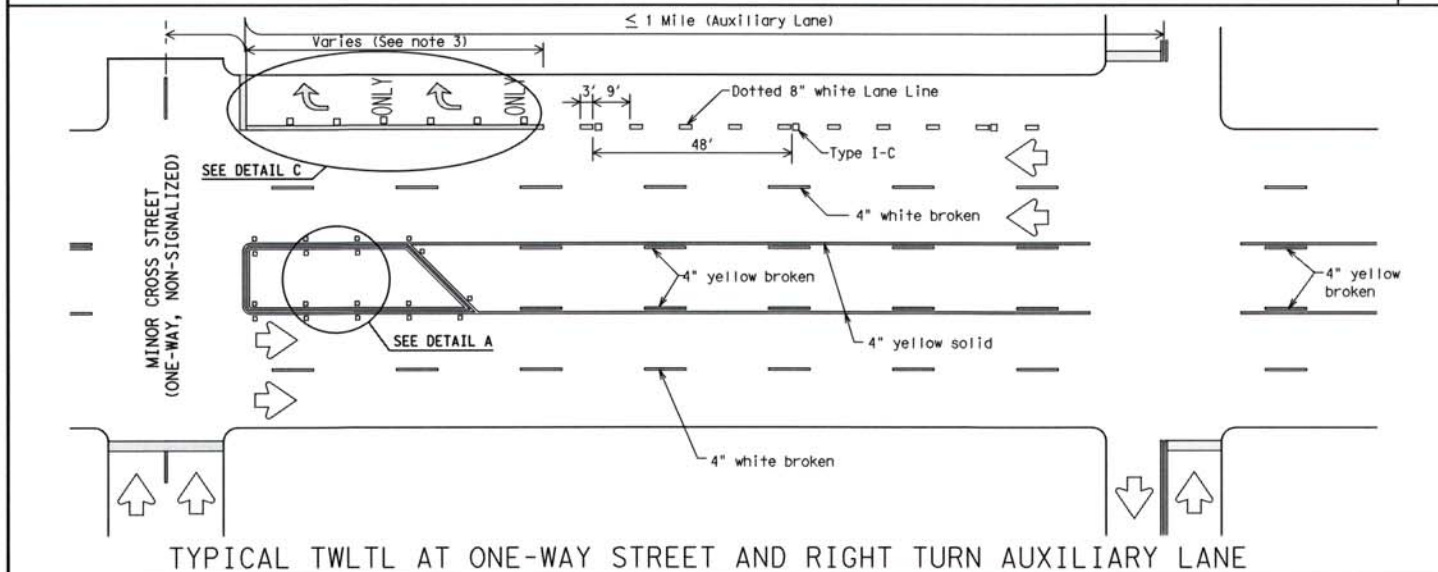
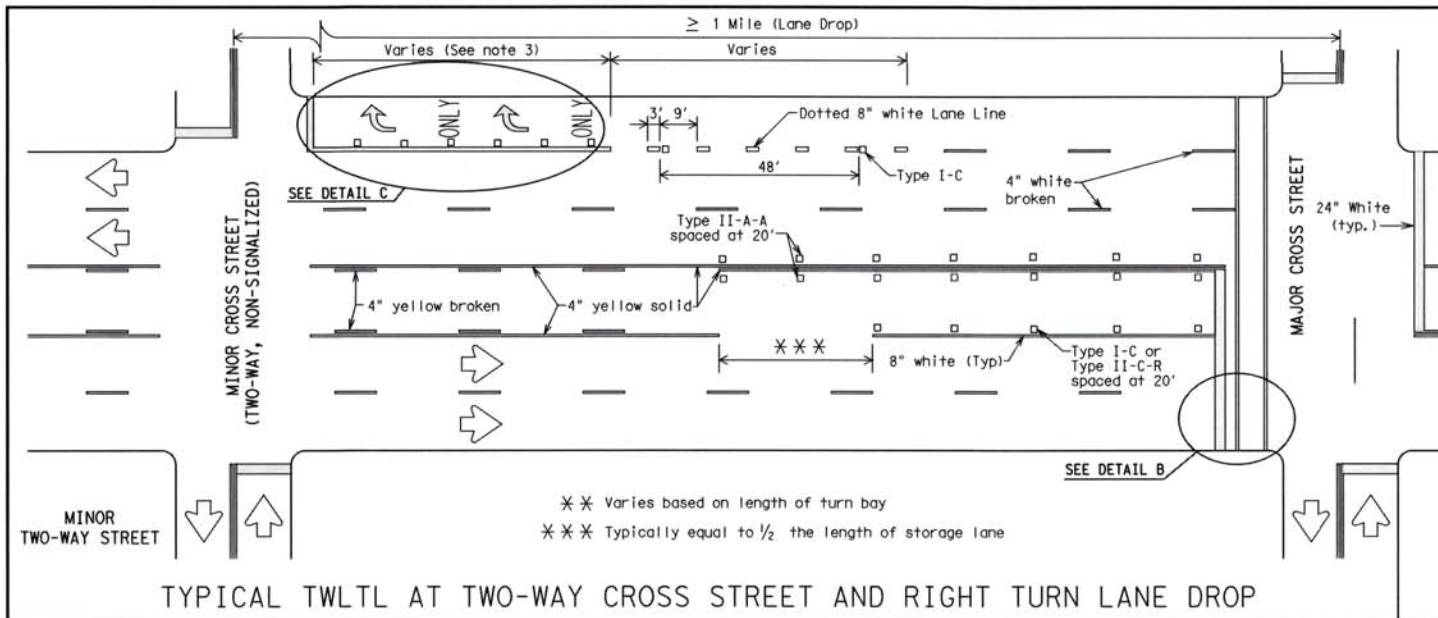
CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

CP&Y
TBE FIRM #1741

KSA
TBE Firm Registration No. F-1356
5810 Bullock Street, San Antonio, Texas 78201
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DATE:
FILE:

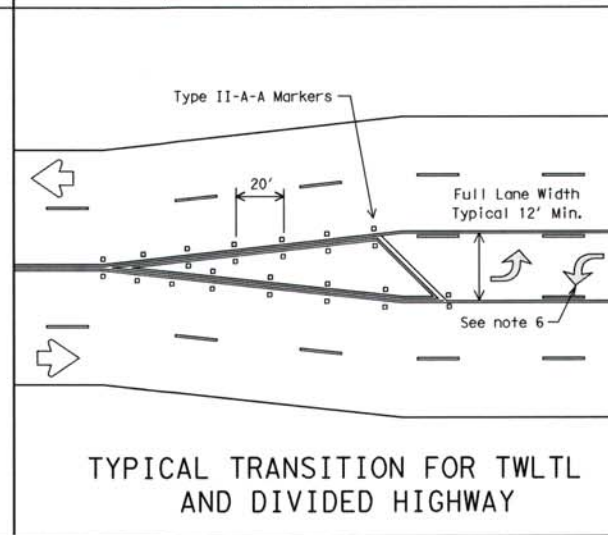


Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

DETAIL B

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

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



GENERAL NOTES

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

Texas Department of Transportation
Traffic Operations Division

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

PM(3)-12

© TxDOT April 1998		CONTRACT	SECTION	JOB	HIGHWAY
5-00	2-12				
8-00					
3-03					
2-10					

22C

MARKING DETAILS SHEET 3

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

CP&Y
TBPE FIRM #1741

KSA
TBPE Firm Registration No. F-1306
58 Bullock Street, San Angelo, Texas 76901
T. 325-947-1555 F. 325-947-1559
www.ksaeng.com

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DATE: FILE:

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)

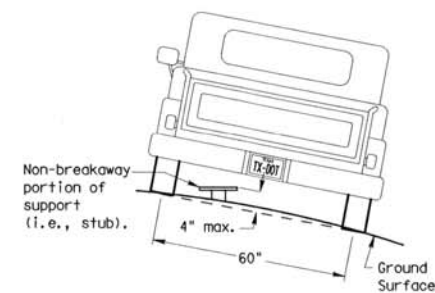
Anchor Type

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
TEXT 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))

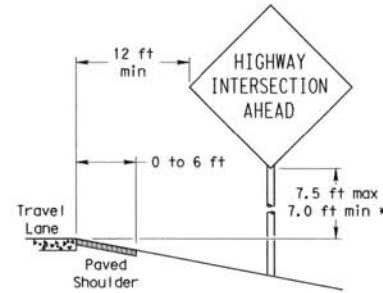
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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).

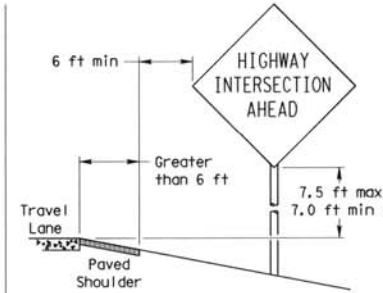
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

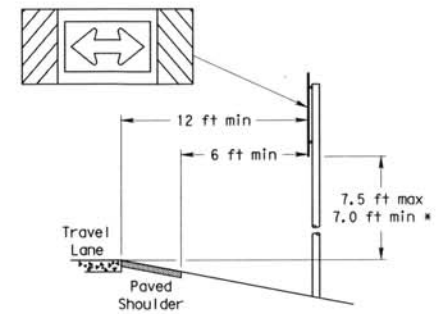
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

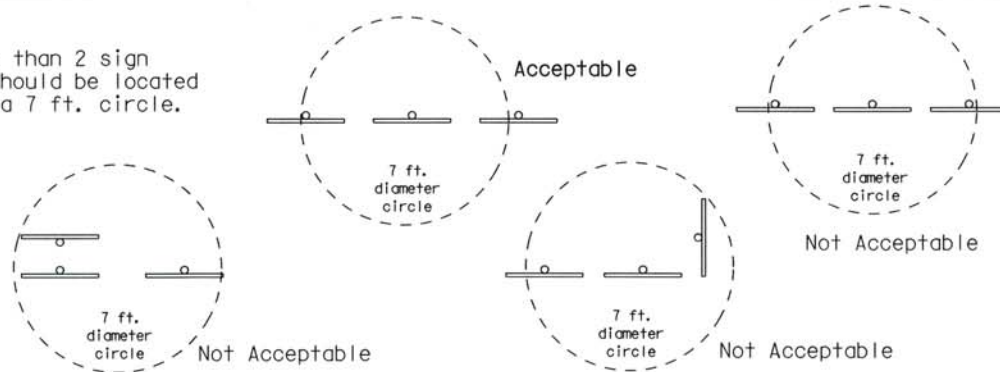
When the shoulder is greater than 6 ft. in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

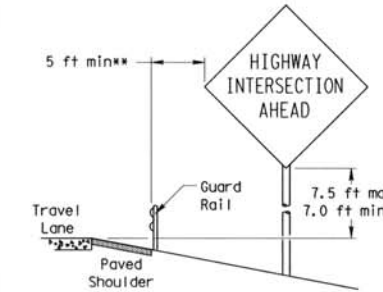


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

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

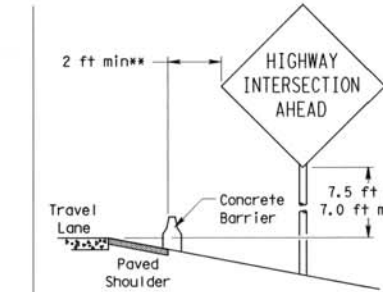


BEHIND BARRIER



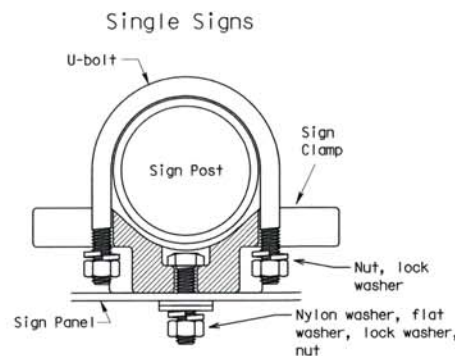
BEHIND GUARDRAIL

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



BEHIND CONCRETE BARRIER

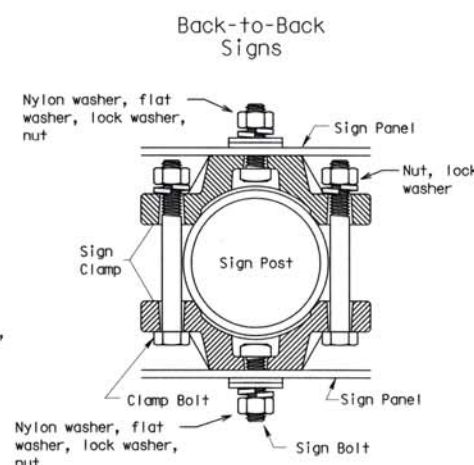
TYPICAL SIGN ATTACHMENT DETAIL



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.

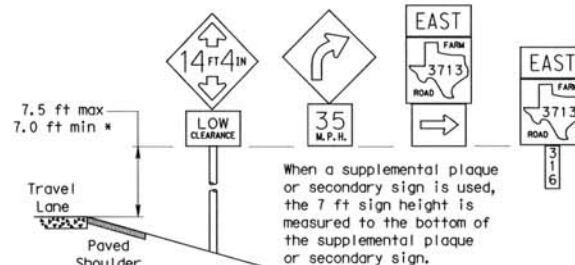
When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending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

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

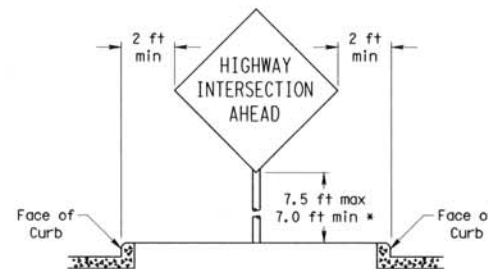


Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

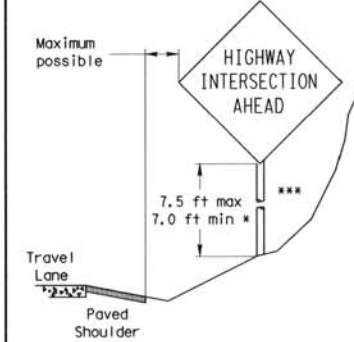
SIGNS WITH PLAQUES



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.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD (GEN) -08

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9-08	REVISED	CULT	SECT	WIDEN
		11ST	CULTY	SHEET

MARKING DETAILS SIGN MOUNTING DETAILS SHEET 5

CITY OF SAN ANGELO MARTIN LUTHER KING DRIVE RECONSTRUCTION SAN ANGELO, TX

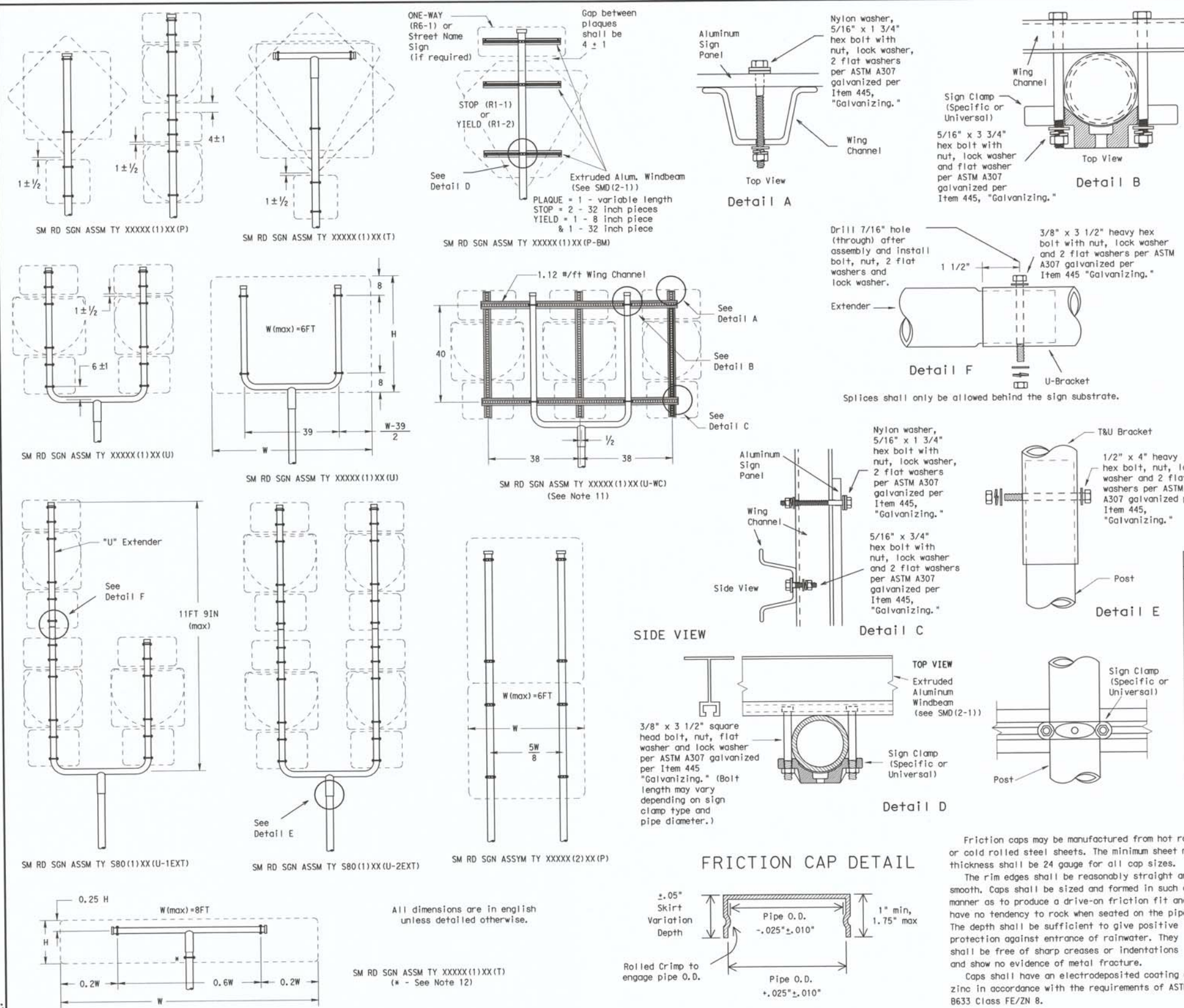
DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO.:
SAN CBS

CP&Y
TBPE FIRM #1741

KSA
TBPE Firm Registration No. F-1356
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DATE: FILE:



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 Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

SIGN DESCRIPTION	SUPPORT
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)
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)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM SMD(SLIP-2) -08

© TxDOT July 2002	Rev	By	App	Rev	By	App
9-08	1	SEC	JWB	1	HIGHWAY	
		REV				

26C

MARKING DETAILS SIGN MOUNTING DETAILS SHEET 7

CITY OF SAN ANGELO MARTIN LUTHER KING DRIVE RECONSTRUCTION SAN ANGELO, TX

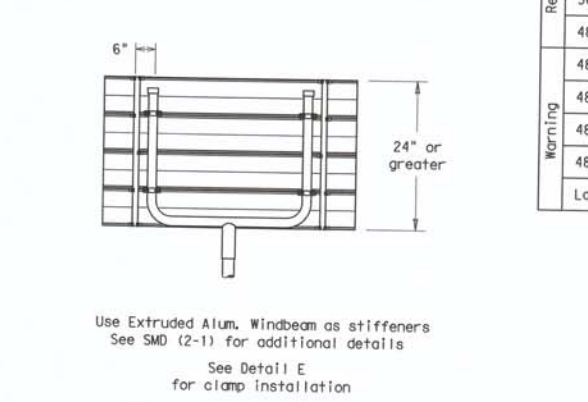
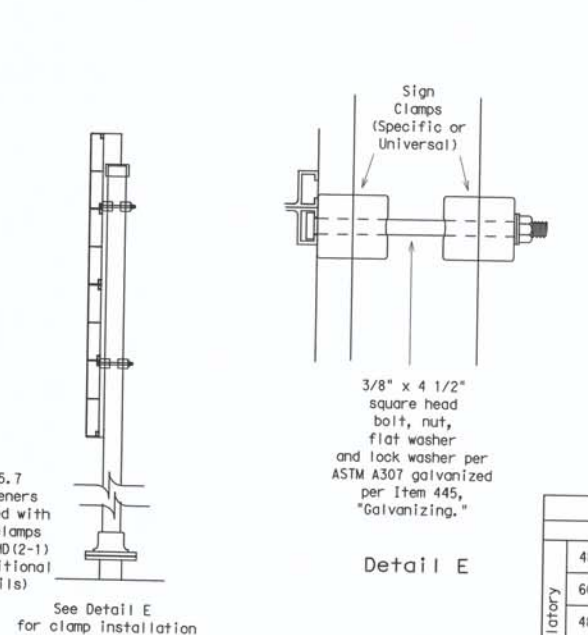
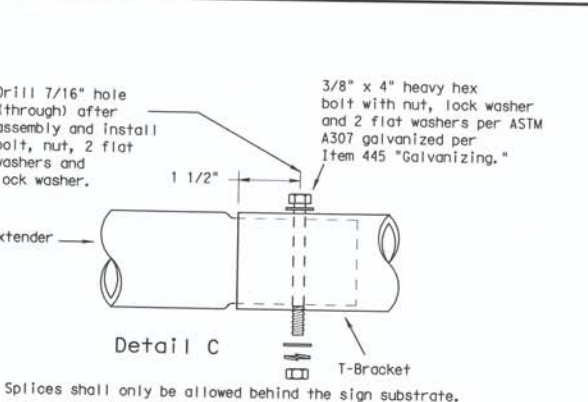
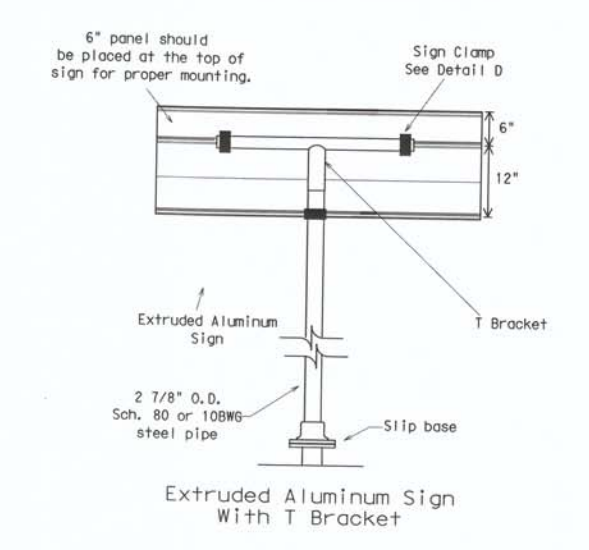
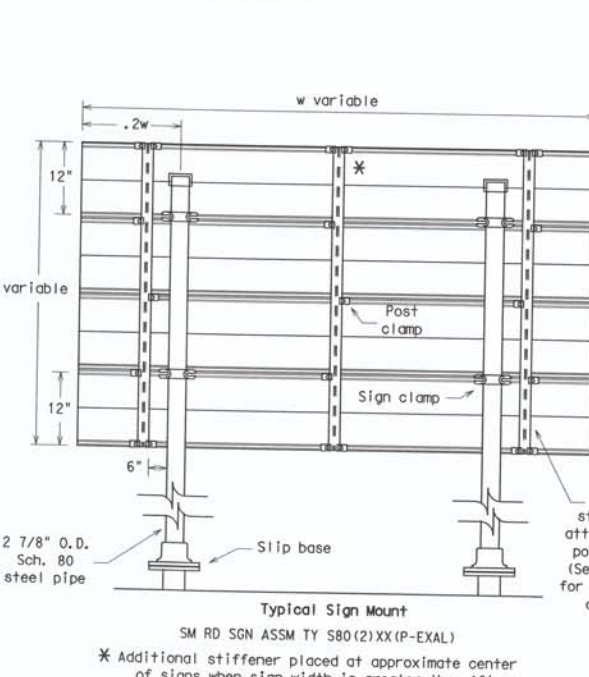
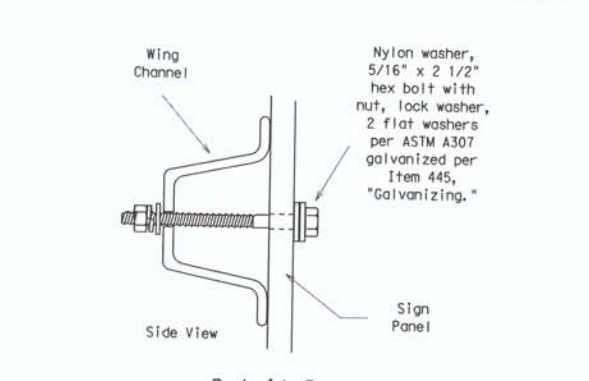
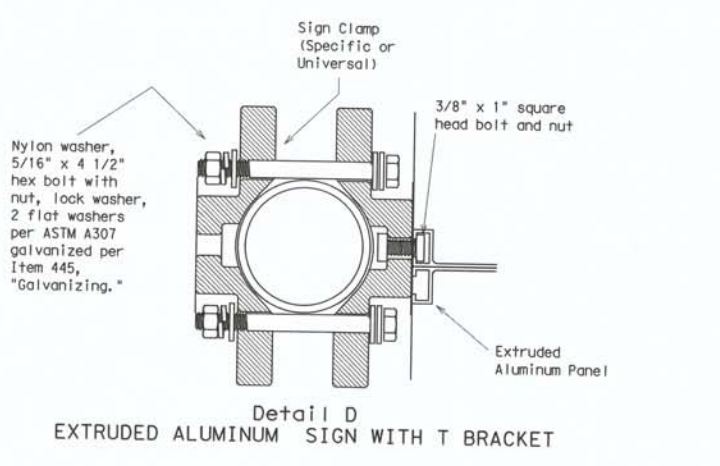
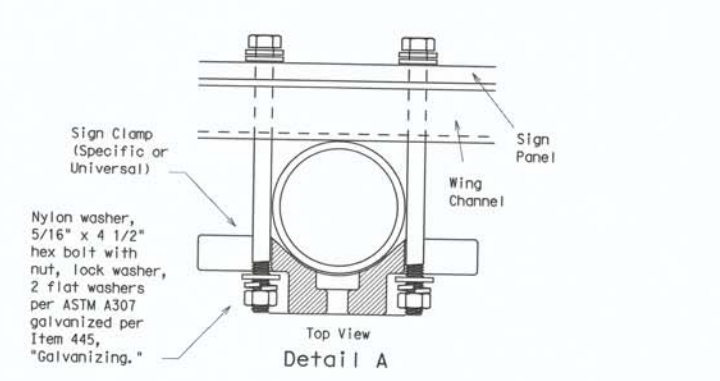
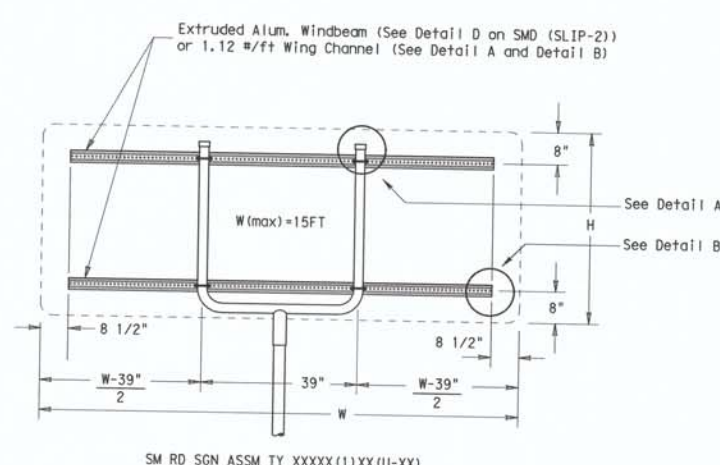
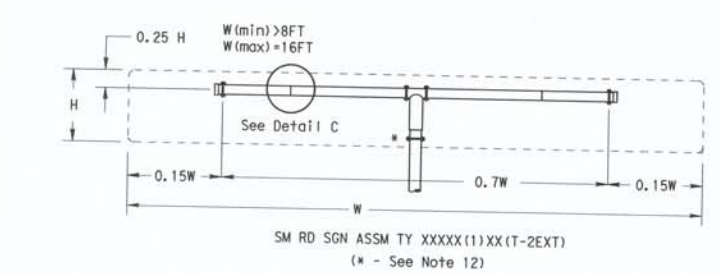
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DESIGNED BY: JWB
LATEST REVISION: 7/14/2016
KSA JOB NO.:
SAN 058

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DATE: FILE:



- GENERAL NOTES:
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10 BWG 1 16 SF
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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. Sign blanks shall be the sizes and shapes shown on the plans.
 11. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
 12. Post open ends shall be fitted with Friction Caps.

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)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD (SLIP-3) -08

© TxDOT July 2002

9-08	REVISIONS	DATE	SHEET	NO.



Diagram illustrating a manhole configuration where multiple pipes enter and exit. The central chamber is labeled 'MANHOLE'. The diagram shows four pipes: one entering from the top, one exiting to the right, and two others (one horizontal, one diagonal) entering from the left. The flow path is indicated by arrows, showing water entering from the top, flowing down, and then exiting through the right pipe. The text 'ALL PIPES ENTERING MAINTAIN A EACH INVERT. NG AND LEAVING CENTER OF' is partially visible. The text 'HOLE INVERTS PIPE ANHOLES.' is also present. The text 'E AS LARGE AS POSSIBLE IN LOW CHANNEL' is at the bottom. The diagram shows the importance of maintaining a large flow channel for the exiting pipe.

Figure 1 consists of two cross-sectional diagrams of test specimens, labeled (a) and (b). Both diagrams show a circular specimen with a diameter of 6 inches and a height of 4 inches. The specimen is surrounded by a bedding material layer that is 2 inches thick. In diagram (a), the specimen is labeled 'BEDDING MATERIAL'. In diagram (b), the specimen is labeled '2,000 P.S.I. CONCRETE' and 'OD/2'. The diagrams also show a 'W' label at the bottom, indicating the width of the specimen.

CONCRETE CAP



CONCRETE ENCASEMENT

STANDARD TRENCH WIDTH	
PIPE SIZE	W
16" OR LESS	6"
GREATER THAN 16"	AS SPECIFIED BY PIPE MFG. & APPROVED BY CITY OF SAN ANGELO

NOTES:

1. BEDDING MATERIAL FOR AND INSTALLATION OF WATER AND SEWER MAINS SHALL BE CRUSHED STONE OR PEA GRAVEL THAT WILL REMAIN FIRM AND NOT BE DISPLACED BY THE PIPE EITHER DURING PIPE LAYING OR BACKFILLING OR FOLLOWING THE COMPLETION OF CONSTRUCTION.
2. BEDDING MATERIAL SHALL BE FROM AN APPROVED BEDDING MATERIAL SOURCE PER THE LIST OF APPROVED BEDDING SUPPLIERS OR BE APPROVED BY THE CITY ENGINEER.
3. TRENCH SPILLS ARE NOT ACCEPTABLE FOR "EMBEDMENT ZONE MATERIAL"

CITY OF SAN ANGELO	
EMBEDMENT ZONE WATER AND SEWER MAIN	
APRIL 2016	WCBT

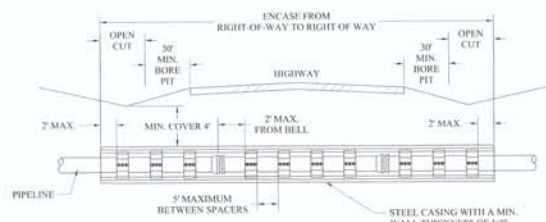
[illegible]

NOTE:

1. IN ALL CROSSING SITUATIONS WHERE A NEW MAIN WILL CROSS WITHIN 2" VERTICALLY OF AN EXISTING MAIN, THE NEW MAIN SHALL BE ENCASED.
2. CROSSINGS NOT COVERED BY THIS DETAIL, SHALL BE ACCOMPLISHED IN ACCORDANCE WITH TCEC CHAPTERS 217 AND 220.

CITY OF SAN ANGELO	
UTILITY CROSSING DETAIL	
WATER AND SEWER MAINS	
APRIL 2016	W-1/TH-XIN

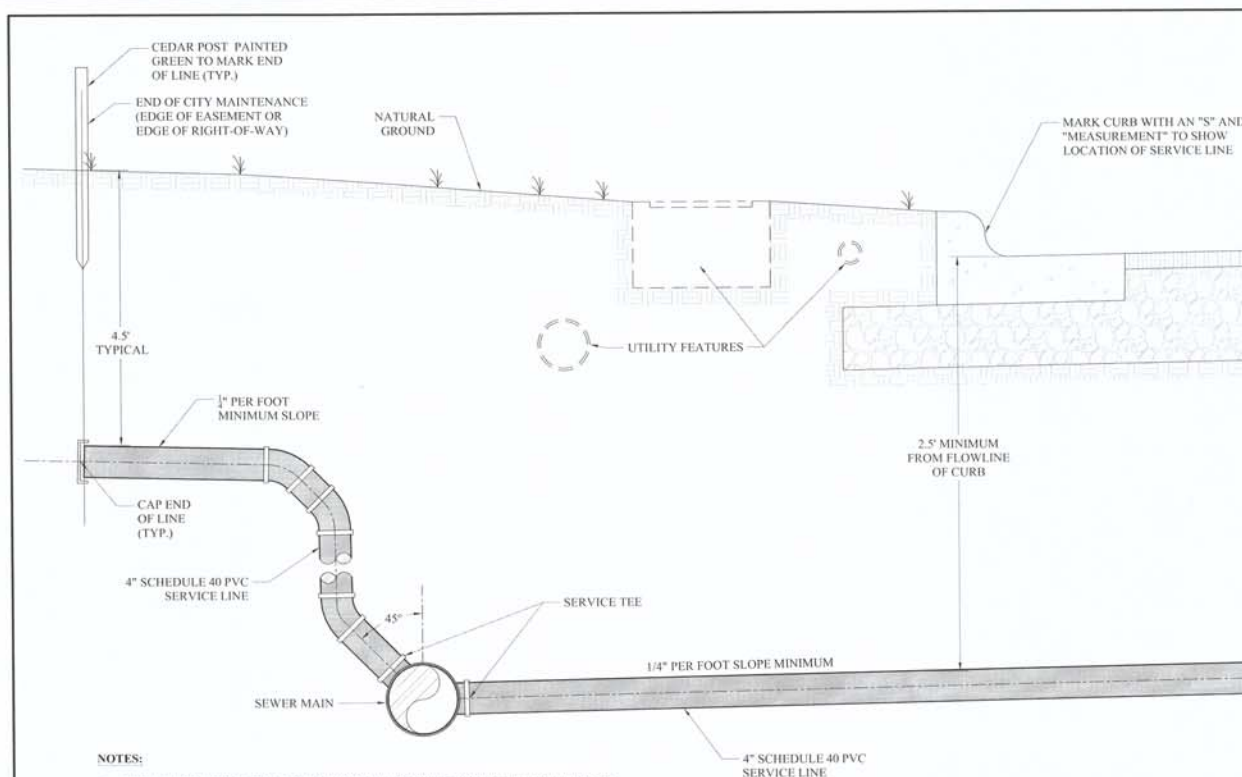
HIGHWAY CROSSING



NOTES

1. ALL HIGHWAY CROSSINGS SHALL BE MADE BY BORING OR TUNNELING. ENCASEMENT PIPE SHALL EXTEND FROM ROW TO ROW. BORE PITS SHALL BE A MINIMUM OF 30' FROM THE EDGE OF PAVEMENT.
2. GROUT AROUND CASING ALL OVER CUTTING IN EXCESS OF 1".
3. GROUT EACH END OF ENCASEMENT A MINIMUM OF 2'.
4. GROUT SHALL HAVE A MINIMUM STRENGTH OF 1,300 P.S.I. IN 28 DAYS WITH A SLUMP OF 10" OR GREATER.
5. CASING SPACERS SHALL BE SPACED A MAXIMUM OF 2' FROM EACH END OF JOINT AND NOT MORE THAN 5' BETWEEN SPACERS. CASING SPACERS SHALL BE HDPE.
6. BORE PITS SHALL BE CONTINUED TO THE WORK FACEMENT.
7. BORE PITS SHALL BE LOCATED AT THE SPECIFIED END OF ENCASEMENT PIPE AND SHALL BE CONSTRUCTED IN SUCH A MANNER AS TO NOT INTERFERE WITH HIGHWAY STRUCTURAL INTEGRITY OR SAFE TRAFFIC OPERATIONS, IF NECESSARY. SHORING SHALL BE USED.
8. LINES AND GRADES ARE CRITICAL AND SHALL BE MAINTAINED.
9. RESTORE HIGHWAY RIGHT-OF-WAY TO ORIGINAL OR BETTER CONDITION IN ACCORDANCE WITH TxDOT PERMIT REQUIREMENTS.

CITY OF SAN ANGELO	
HIGHWAY CROSSING	
APRIL 2016	W HWY XING



NOTES:

1. SEWER SERVICE LINE SHALL BE MINIMUM 4" SCHEDULE 40 PVC WITH GLUED JOINTS.
2. SERVICE LINE PIPE TO BE STANDARD 20' JOINTS, UNLESS TOTAL LENGTH OF SERVICE LINE IS LESS THAN 10', OR UNLESS APPROVED OTHERWISE BY THE CITY OF SAN ANGELO.
3. WHERE BENDS ARE NEEDED, MAXIMUM DEGREE ALLOWABLE SHALL BE 45°.
4. SEWER SERVICES WITH LESS THAN 2.5' OF COVER FROM THE FLOWLINE OF CURB ON THE SHALLOWER SIDE OF THE STREET REQUIRE A CONCRETE CAP.
5. SEWER SERVICE WITH LESS THAN 2.0' OF COVER FROM THE FLOWLINE OF CURB REQUIRE CITY OF SAN ANGELO APPROVAL.

CITY OF SAN ANGELO	
SEWER SERVICE LINE	
APRIL, 2016	W-SA-SL-1

[illegible]

CONSTRUCTION DETAILS
SHEET #2

**CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX**

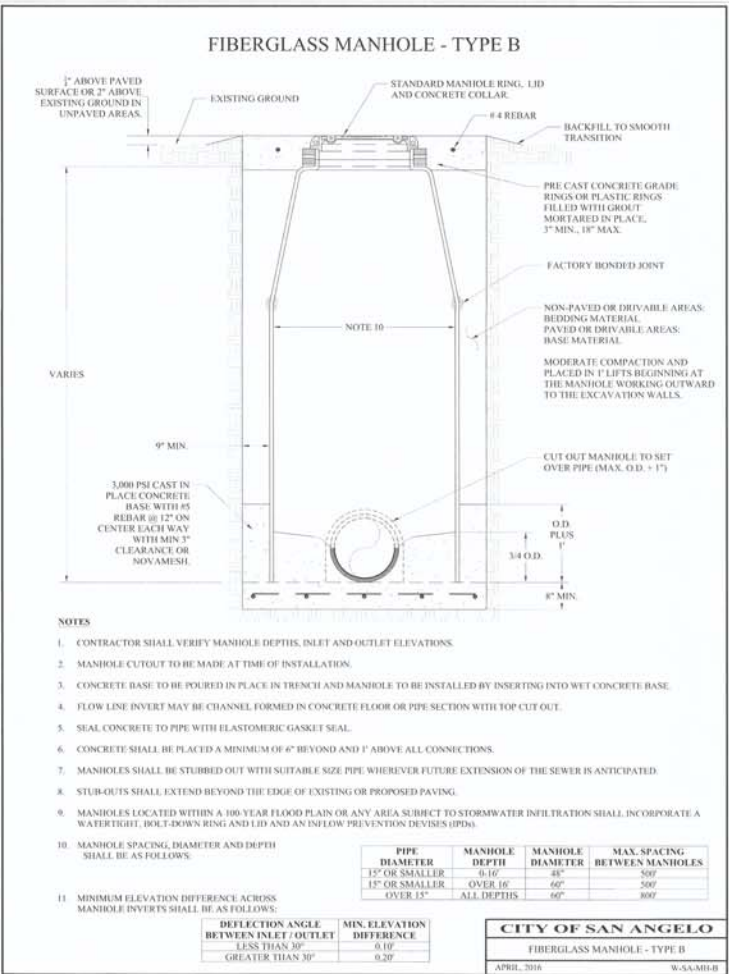
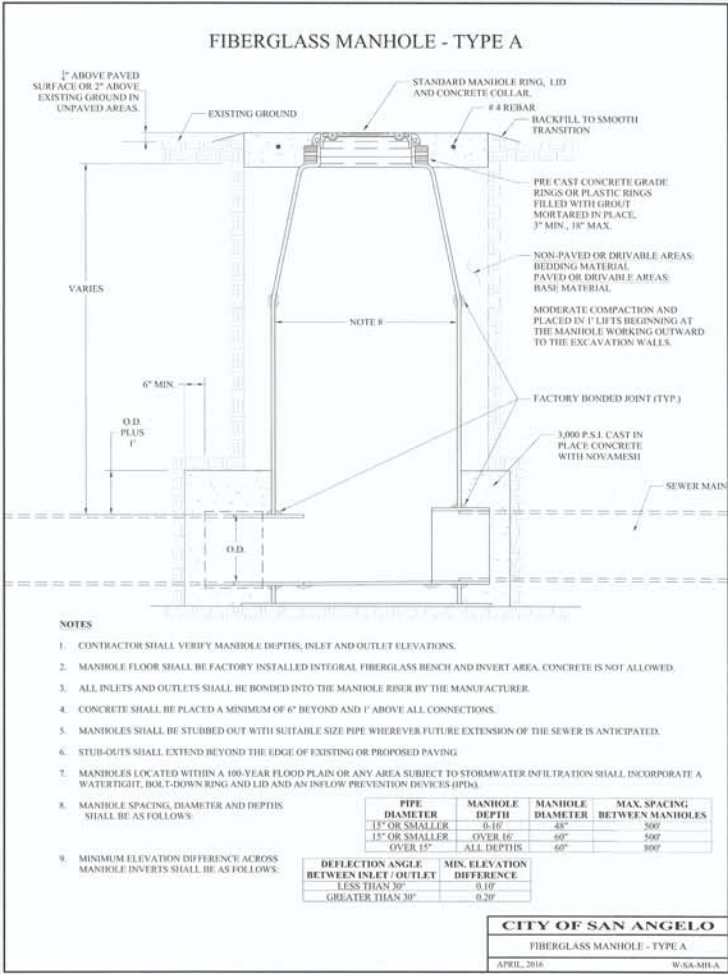
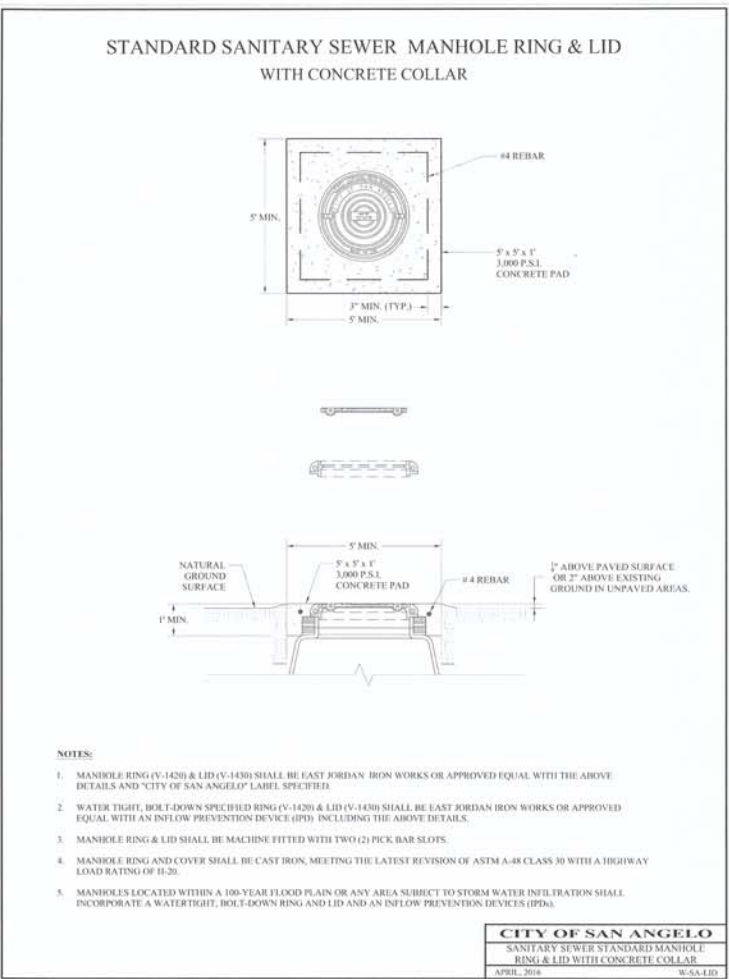
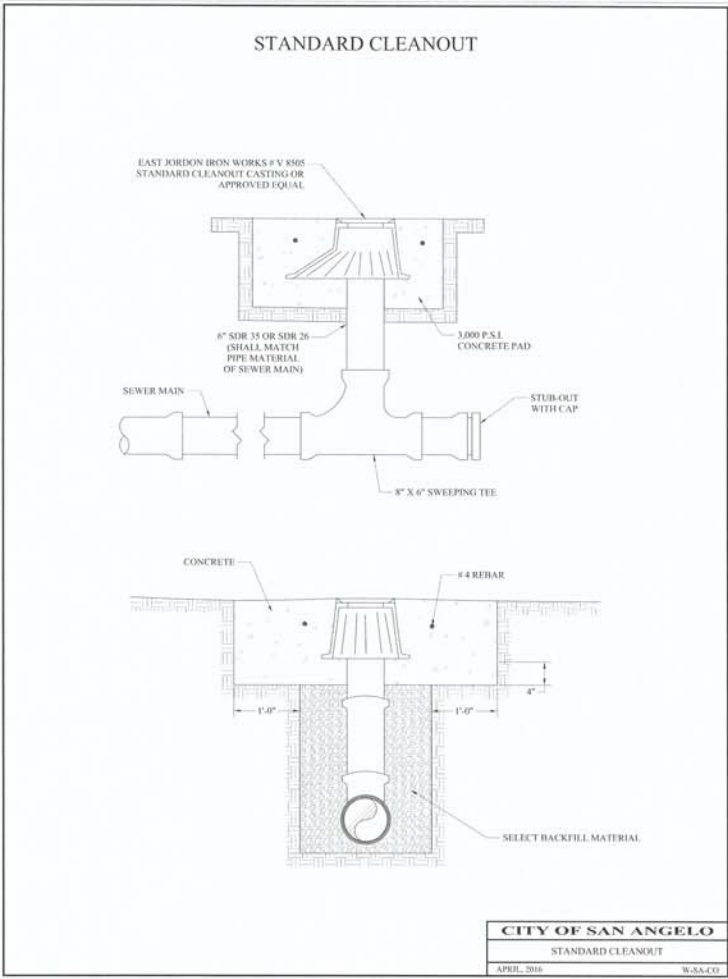
DRAWN BY:	
CBS	
DESIGNED BY:	
JWD	
TEST REVISION:	
7/14/2016	
KSA JOB NO.:	
CAN. JOB NO.:	



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SHEET NO. **127**



CONSTRUCTION DETAILS
SHEET #3

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO.: SAN 058

CP&Y
TBPE FIRM #1741

KSA
TYPE Firm Registration No. F-1366
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www.ksaeng.com

STATE OF TEXAS
DAVID A. ALEXANDER
96658
LICENSED PROFESSIONAL ENGINEER

SHEET NO.
128

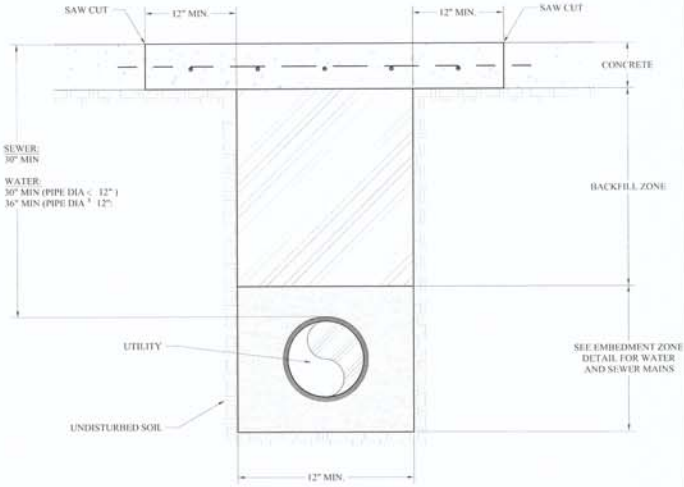
SEWER PIPE SLOPES

SIZE OF PIPE (INCHES)	MINIMUM SLOPE (%)	MAXIMUM SLOPE (%)
6	0.50	12.35
8	0.33	8.40
10	0.25	6.23
12	0.20	4.88
15	0.15	3.62
18	0.11	2.83
21	0.09	2.30
24	0.08	1.93
27	0.06	1.65
30	0.055	1.43
33	0.05	1.26
36	0.045	1.12
39	0.04	1.01
>39	*	*

* FOR PIPES LARGER THAN 39 INCHES IN DIAMETER, THE SLOPE IS DETERMINED BY MANNING'S FORMULA TO MAINTAIN A VELOCITY GREATER THAN 2.0 FEET PER SECOND AND LESS THAN 10.0 FEET PER SECOND WHEN FLOWING FULL.

CITY OF SAN ANGELO
SEWER PIPE SLOPES
APRIL, 2016 W-SA-SLOPE

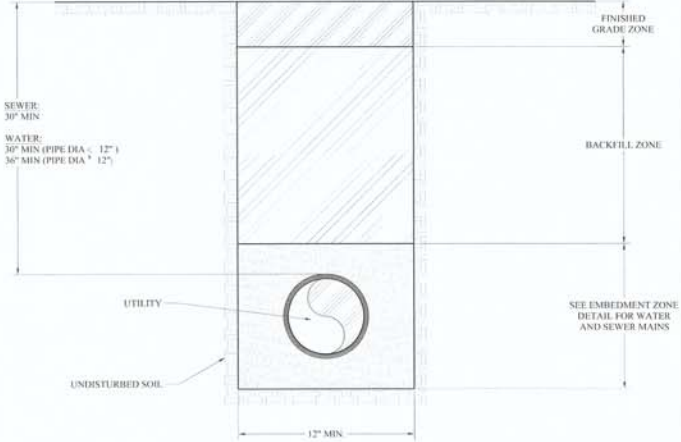
UTILITY TRENCH SECTION
RIGID PAVEMENT



- NOTES:
1. WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30\"/>
 2. CLASS P, 4,400 P.S.I. COMPRESSIVE, 600 P.S.I. FLEXURAL AT 28 DAY TEST. BEND EXISTING REBAR INTO CENTER OF NEW CONCRETE. REPLACE AS NECESSARY WITH #4 REBAR ON 12\"/>
 3. CLASS K, 4,400 P.S.I. COMPRESSIVE, 600 P.S.I. FLEXURAL AT 28 DAY TEST. BEND EXISTING REBAR INTO CENTER OF NEW CONCRETE. REPLACE AS NECESSARY WITH #4 REBAR ON 12\"/>
 4. FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6\"/>

CITY OF SAN ANGELO
UTILITY TRENCH SECTION
RIGID PAVEMENT
APRIL, 2016 W-UT-RIG

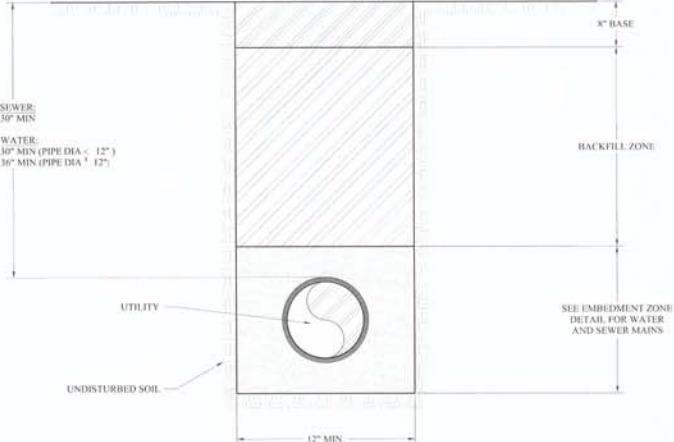
UTILITY TRENCH SECTION
OTHER UNPAVED AREAS



- NOTES:
- BACKFILL ZONE:
- OPTION #1: WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP-EDGED STONES, OR STONES LARGER THAN 3\"/>
- OPTION #2: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6\"/>
- FINISHED GRADE ZONE:
- BACKFILL SHALL MATCH EXISTING GROUND CONDITIONS (SEE OPTIONS BELOW) OR AS DIRECTED BY THE OWNER.
- OPTION A: UTILIZE BACKFILL ZONE MATERIAL FROM OPTION #1
- OPTION B: 6\"/>
- OPTION C: 8\"/>
- COVER:
- WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30\"/>

CITY OF SAN ANGELO
UTILITY TRENCH SECTION
OTHER UNPAVED AREAS
APRIL, 2016 W-UT-UNA

UTILITY TRENCH SECTION
UNPAVED STREETS, ALLEYS & DRIVEWAYS



- NOTES:
- BASE:
- FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS. COMPACTED IN 6\"/>
- BACKFILL ZONE:
- WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP-EDGED STONES, OR STONES LARGER THAN 3\"/>
- COVER:
- WATER OR SEWER MAINS AND SERVICES WITH LESS THAN 30\"/>

CITY OF SAN ANGELO
UTILITY TRENCH SECTION
UNPAVED STREETS, ALLEYS AND DRIVEWAYS
APRIL, 2016 W-UT-USA

CONSTRUCTION DETAILS
SHEET #4

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:
CBS

DESIGNED BY:
JWD

LATEST REVISION:
7/14/2016

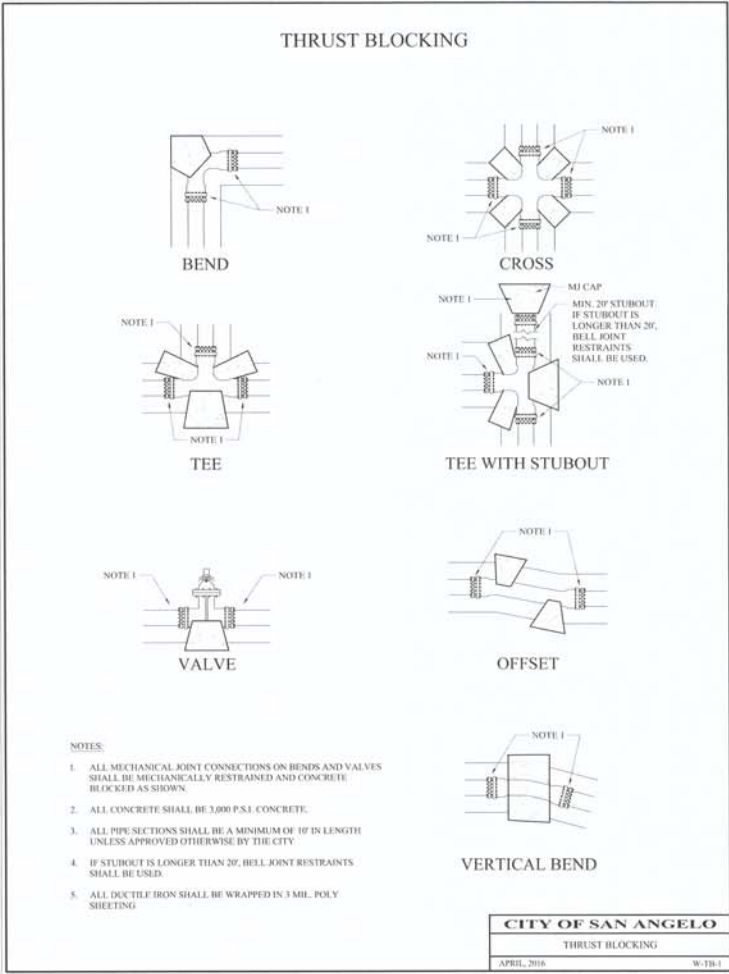
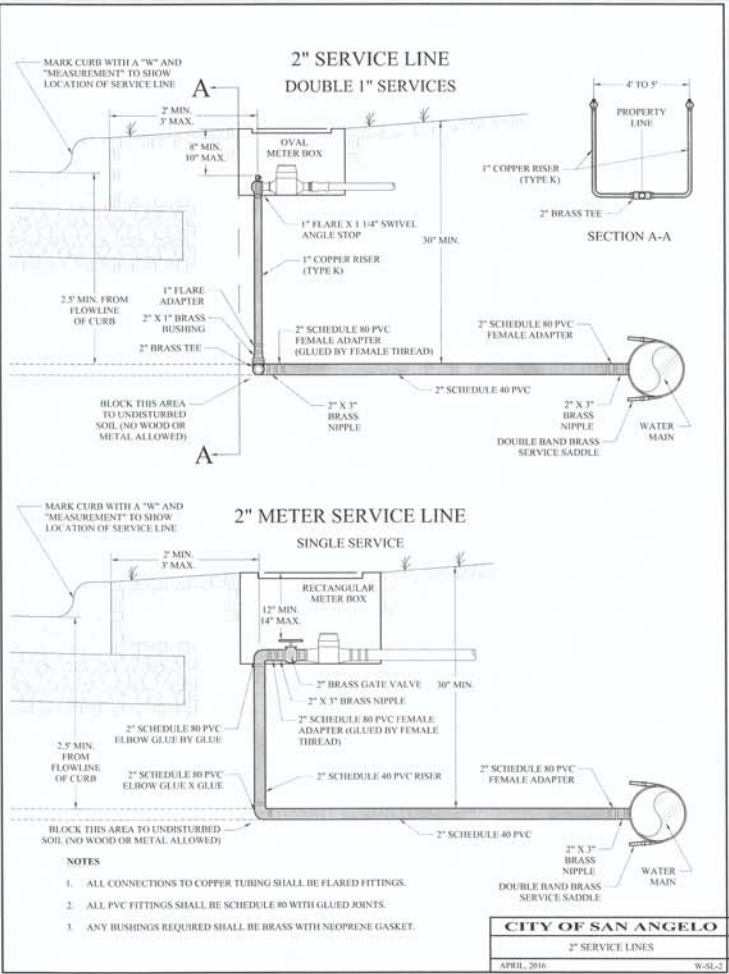
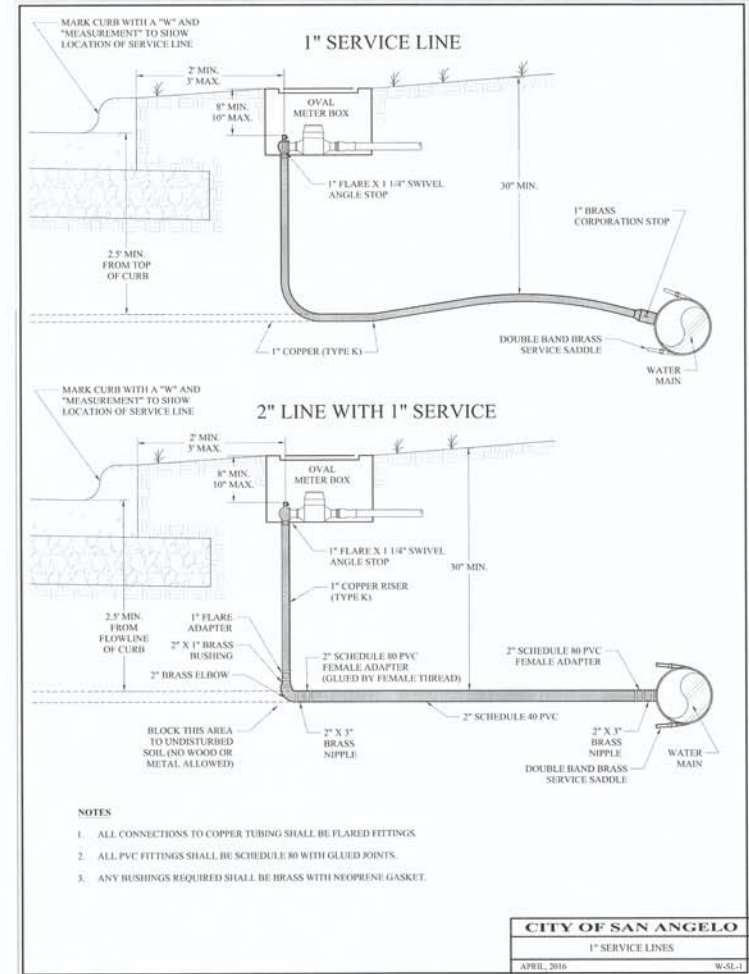
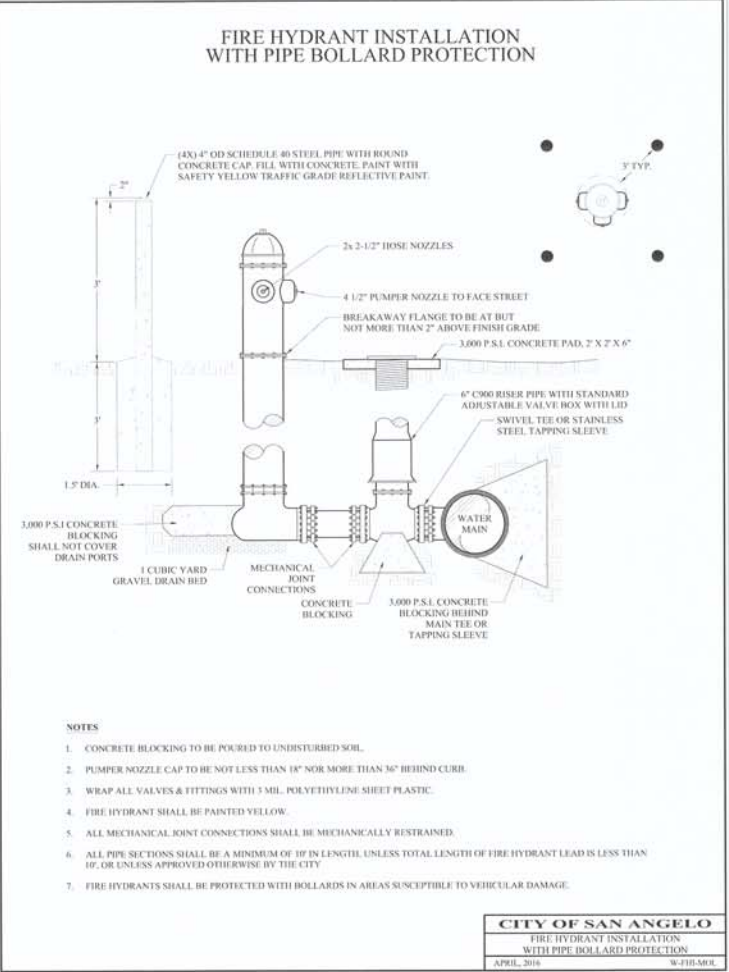
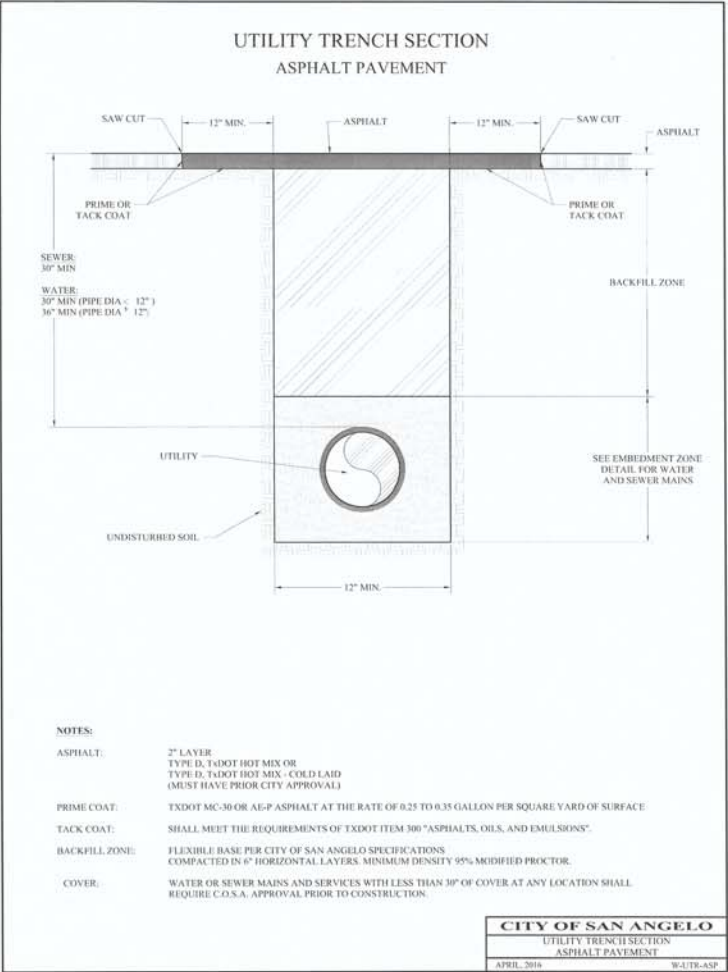
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STATE OF TEXAS
DAVID A. ALEXANDER
96658
PROFESSIONAL ENGINEER

SHEET NO.
129



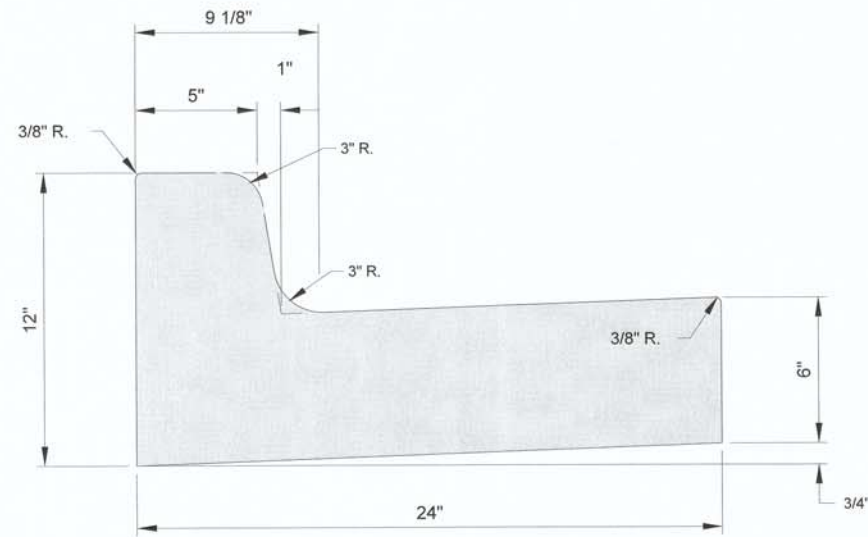
CONSTRUCTION DETAILS
SHEET #5

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

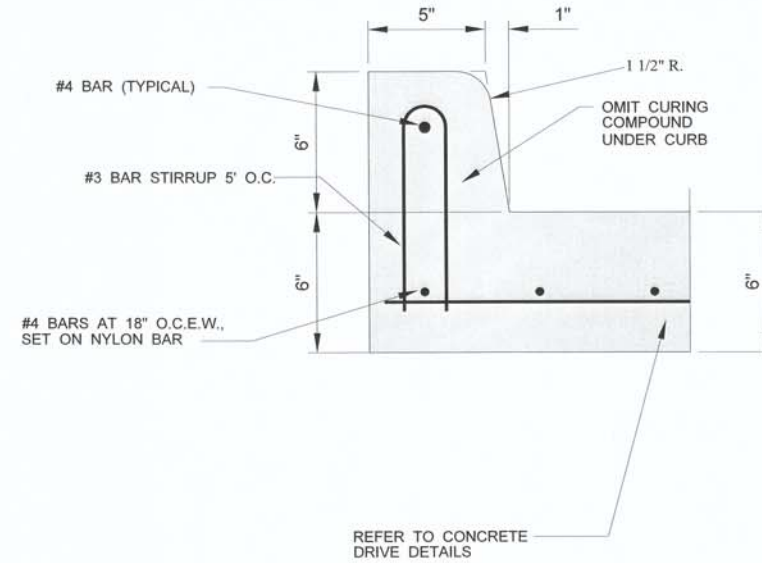
DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO.: SAN 058
PROJECT NAME: TBPE FIRM #1741

KSA CP&Y
STATE OF TEXAS
DAVID A. ALEXANDER
96658
LICENSED PROFESSIONAL ENGINEER

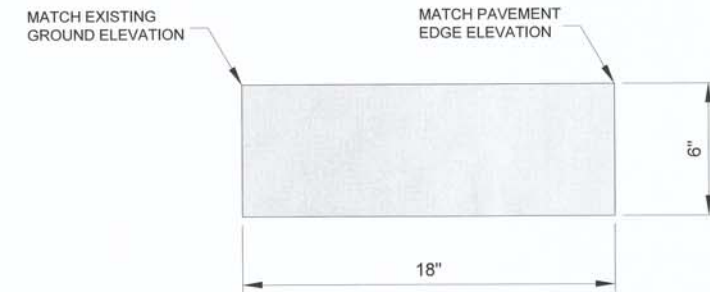
SHEET NO. 130



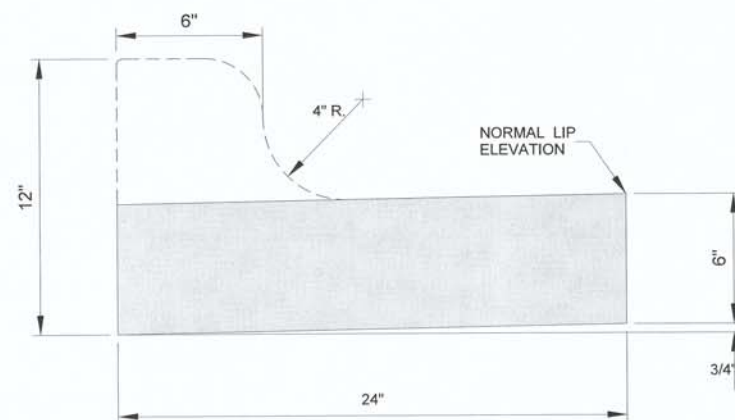
STANDARD CURB & GUTTER
NTS



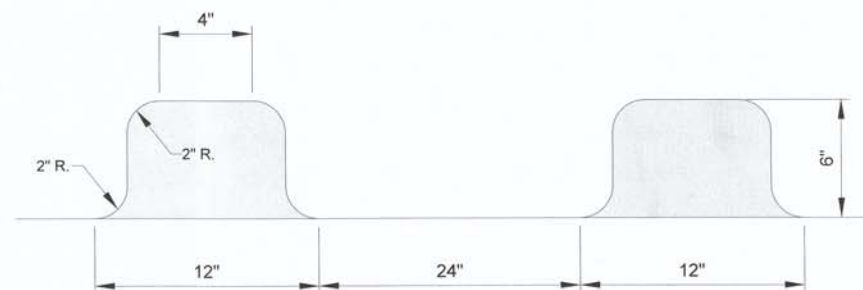
STANDARD MONOLITHIC CURB
ON CONCRETE DRIVEWAY
NTS



HEADER CURB
NTS



SIDE VIEW
SAWTOOTH CURB
NTS



FRONT VIEW
SAWTOOTH CURB
NTS

NOTES:

- DIMENSIONS HEREIN SHOWN ARE MINIMUM REQUIRED. THE DESIGNER MAY ADJUST WITH ACCORDING TO THE NEED. CONCRETE FOR CURB AND GUTTER SHALL BE CLASS "A" CONCRETE EXCEPT FOR STANDARD MONOLITHIC CURB WHICH IS CLASS "P". THE USE OF MORTAR TOPPING IS OPTIONAL. IF NOT MACHINE LAID, A "MULE" FINISHING TOOL SHALL BE USED.
- ALL TOOLED CONTRACTION JOINTS WILL BE ON 10' SPACING AT 1-1/2" MINIMUM DEPTHS. ALL EXPANSION JOINTS WILL BE ON 50' SPACING, AT THE BEGINNING OF RADII, OR AT INTERSECTIONS AT 1/2" DEPTHS.
- EXTRUDED CONCRETE MAY USE A MODIFIED GRADATION FOR MACHINE LAID CURB AND GUTTER AS APPROVED BY THE CITY ENGINEER.
- IF MACHINE LAID, A MAXIMUM 1" FLARE AT THE BOTTOM IS PERMITTED.

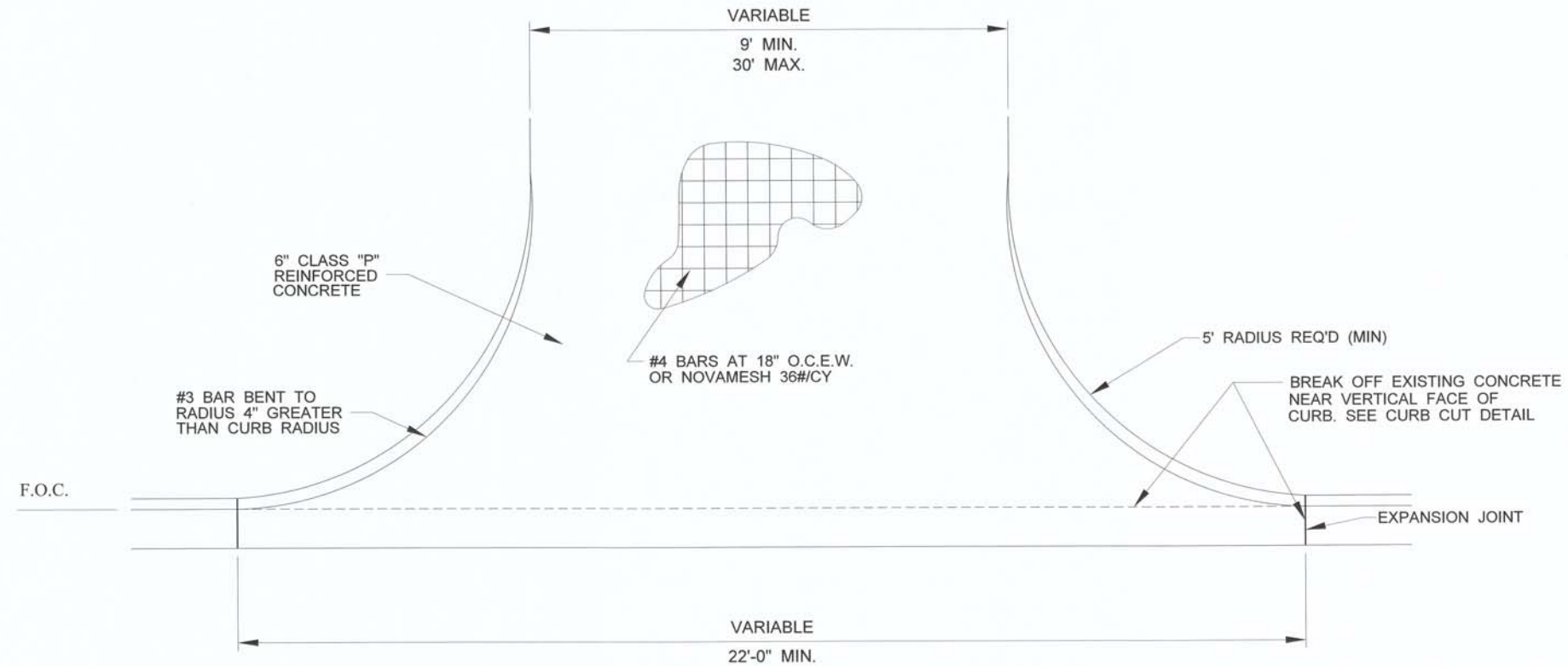
MARK	REVISION	DATE
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3	FOR CONSTRUCTION	7/15/2016
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5	FOR CONSTRUCTION	7/15/2016
6	FOR CONSTRUCTION	7/15/2016
7	FOR CONSTRUCTION	7/15/2016
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CONSTRUCTION DETAILS
SHEET #7

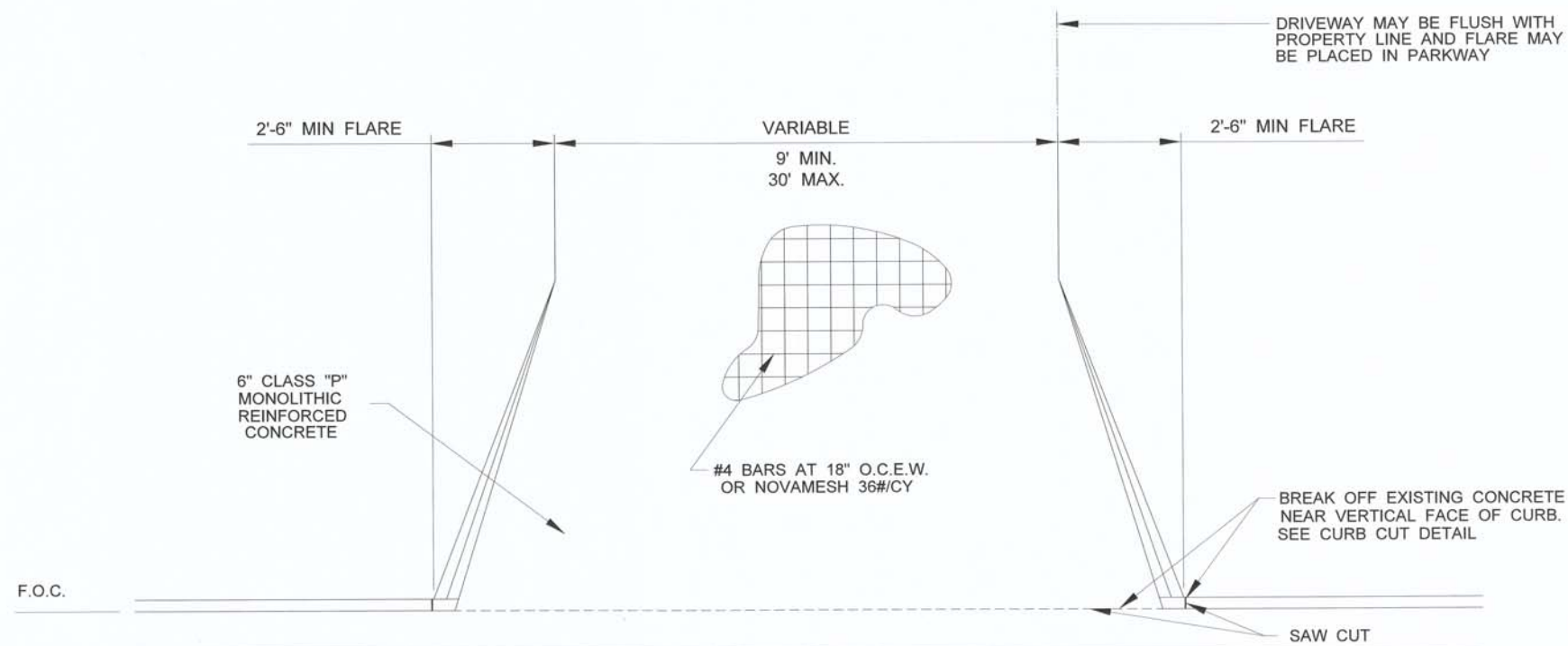
CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY	CBS
DESIGNED BY	JWD
LATEST REVISION	7/14/2016
KSA JOB NO.	SAN 058





CONCRETE DRIVEWAY APRON
NTS



CONCRETE DRIVEWAY APPROACH
(ALTERNATE)
NTS

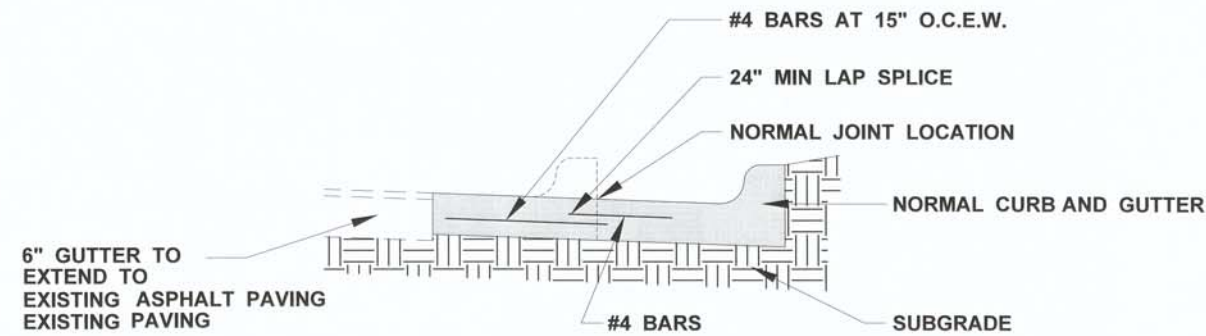
MARK	REVISION	DATE

CONSTRUCTION DETAILS
SHEET #8

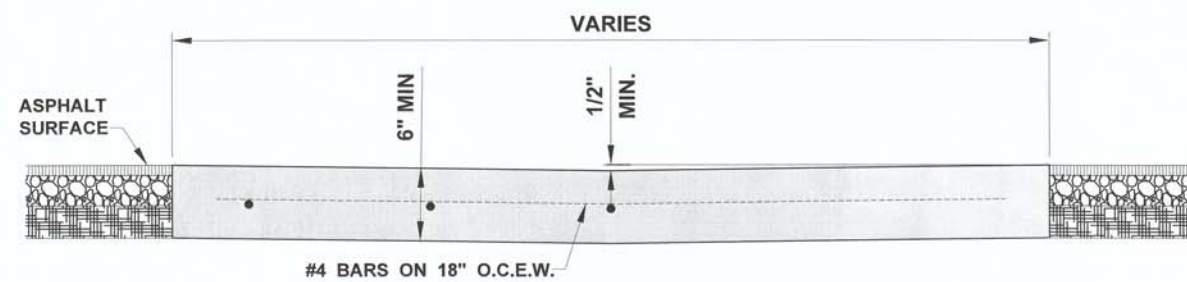
CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY:	CBS
DESIGNED BY:	JWD
LATEST REVISION:	7/14/2016
KSA JOB NO.:	SAN 058

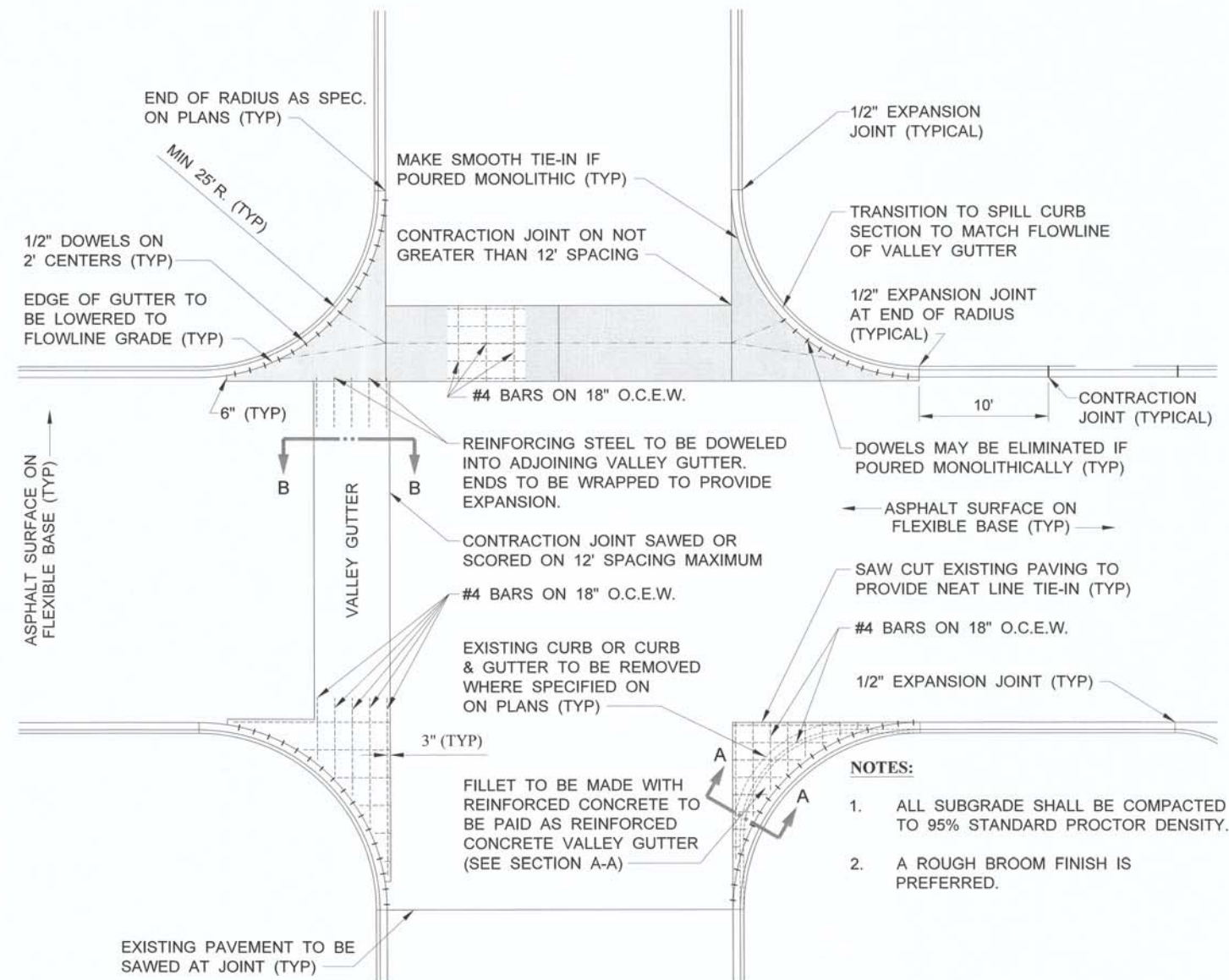




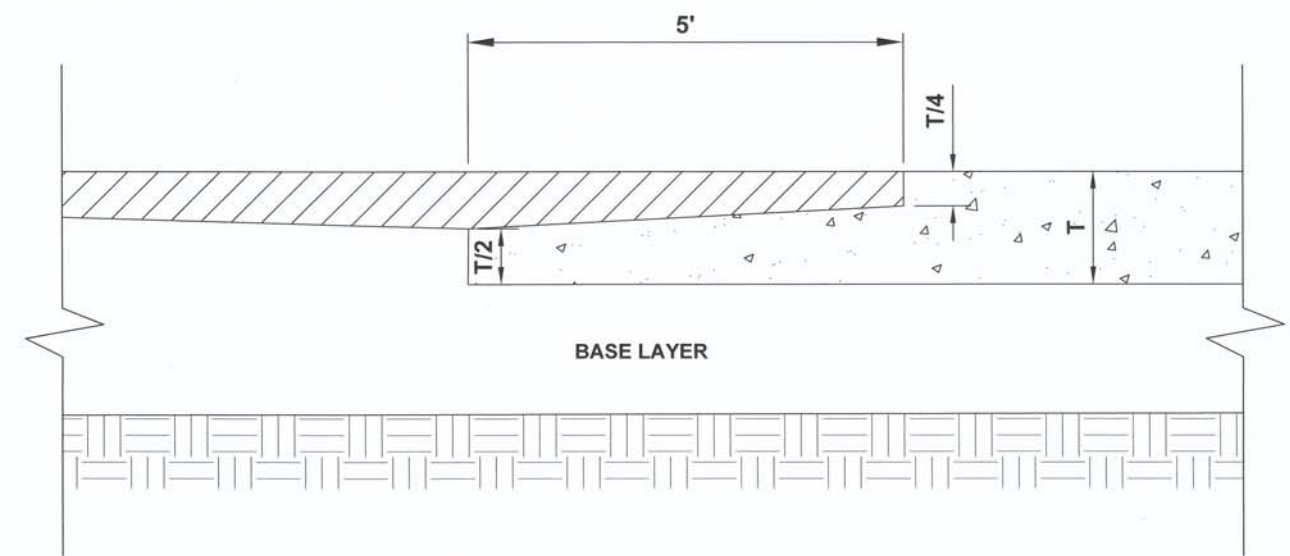
VALLEY GUTTER FILLET
NTS



VALLEY GUTTER DETAIL
NTS



TYPICAL SECTION
NTS



TRANSITION BETWEEN HMA
AND CONCRETE PAVEMENT
NTS

CONSTRUCTION DETAILS
SHEET #9

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: CBS
DESIGNED BY: JWD
LATEST REVISION: 7/14/2016
KSA JOB NO.:
SAN JOB:

CP&Y
TBPE FIRM #F-1741

KSA
TBPE Firm Registration No. F-1356
58 Buck Street, San Angelo, Texas 76901
P.O. Box 1237, San Angelo, Texas 76901
www.ksaeng.com

STATE OF TEXAS
DAVID A. ALEXANDER
96658
LICENSED PROFESSIONAL ENGINEER

SHEET NO.
134

DATE
REVISION
MARK
PROJECT NO. 20-CONSTRUCTION DETAILS SHEET
5 LONG (SHEET 9) 1/15/2016 - 2:51 PM
DRAWING PATHNAME: LAYOUT 1 PLOT DATE - TIME

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DATE: FILE:

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1. CITY OF SAN ANGELO

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000.
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

- ☒ No Permit Required
- ☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- ☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- ☐ Individual 404 Permit Required
- ☐ Other Nationwide Permit Required: NWP# _____

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1.

2.

3.

4.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion

- ☐ Temporary Vegetation
- ☐ Blankets/Matting
- ☐ Mulch
- ☐ Sodding
- ☐ Interceptor Swale
- ☐ Diversion Dike
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks

Sedimentation

- ☐ Silt Fence
- ☐ Rock Berm
- ☐ Triangular Filter Dike
- ☐ Sand Bag Berm
- ☐ Straw Bale Dike
- ☐ Brush Berms
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks
- ☐ Stone Outlet Sediment Traps
- ☐ Sediment Basins

Post-Construction TSS

- ☐ Vegetative Filter Strips
- ☐ Retention/Irrigation Systems
- ☐ Extended Detention Basin
- ☐ Constructed Wetlands
- ☐ Wet Basin
- ☐ Erosion Control Compost
- ☐ Mulch Filter Berm and Socks
- ☐ Compost Filter Berm and Socks
- ☐ Vegetation Lined Ditches
- ☐ Sand Filter Systems
- ☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

4.

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

☐ No Action Required ☐ Required Action

Action No.

1. Migratory Bird Treaty Act (MBTA) The Migratory Bird Treaty Act (MBTA) states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulation. A site survey identified active nests within the project action area. The City of San Angelo will take all appropriate actions to prevent the take of migratory birds, their active nests, eggs, or young by the use of proper phasing of the project or other appropriate actions.
2. Contractors will be advised of potential occurrence of Spot-tailed Earless Lizards and Texas Horned Lizards in the project area, and to avoid harming the species if encountered. This should include avoiding harvester ant mounds in the selection of Project Specific Locations (PSLs) where feasible.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

BMP:	Best Management Practice	SPCC:	Spill Prevention Control and Countermeasure
CCP:	Construction General Permit	SW3P:	Storm Water Pollution Prevention Plan
DSHS:	Texas Department of State Health Services	PCN:	Pre-Construction Notification
FHWA:	Federal Highway Administration	PSL:	Project Specific Location
MOA:	Memorandum of Agreement	TCEQ:	Texas Commission on Environmental Quality
MOU:	Memorandum of Understanding	TPDES:	Texas Pollutant Discharge Elimination System
MS4:	Municipal Separate Stormwater Sewer System	TPWD:	Texas Parks and Wildlife Department
MBTA:	Migratory Bird Treaty Act	TxDOT:	Texas Department of Transportation
NOT:	Notice of Termination	T&E:	Threatened and Endangered Species
NWP:	Nationwide Permit	USACE:	U.S. Army Corps of Engineers
NOI:	Notice of Intent	USFWS:	U.S. Fish and Wildlife Service

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (not identified as normal)
- Trash piles, drums, canister, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of substances

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

☐ Yes ☐ No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

☐ Yes ☐ No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☐ No Action Required ☐ Required Action

Action No.

1.

2.

3.

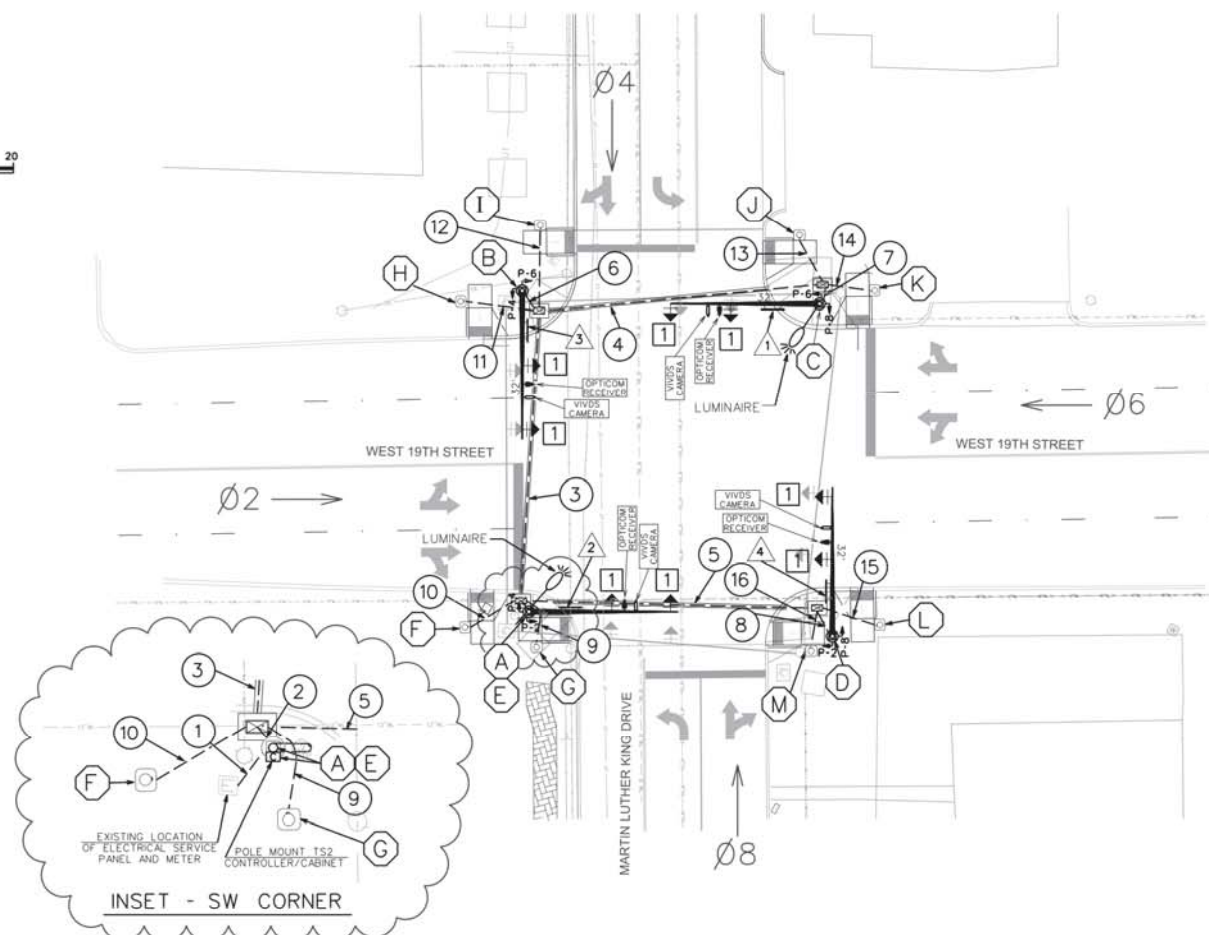
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ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS			
EPIC			
FILE: epic.dgn	DIST	COUNTY	SHEET NO.
©TxDOT: February 2015	CONT	SECT	HIGHWAY
REVISIONS			
12-12-2011: (DS)			
06-07-14: ADDED NOTE SECTION 14.			
01-23-2015: SECTION 1: CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.			

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

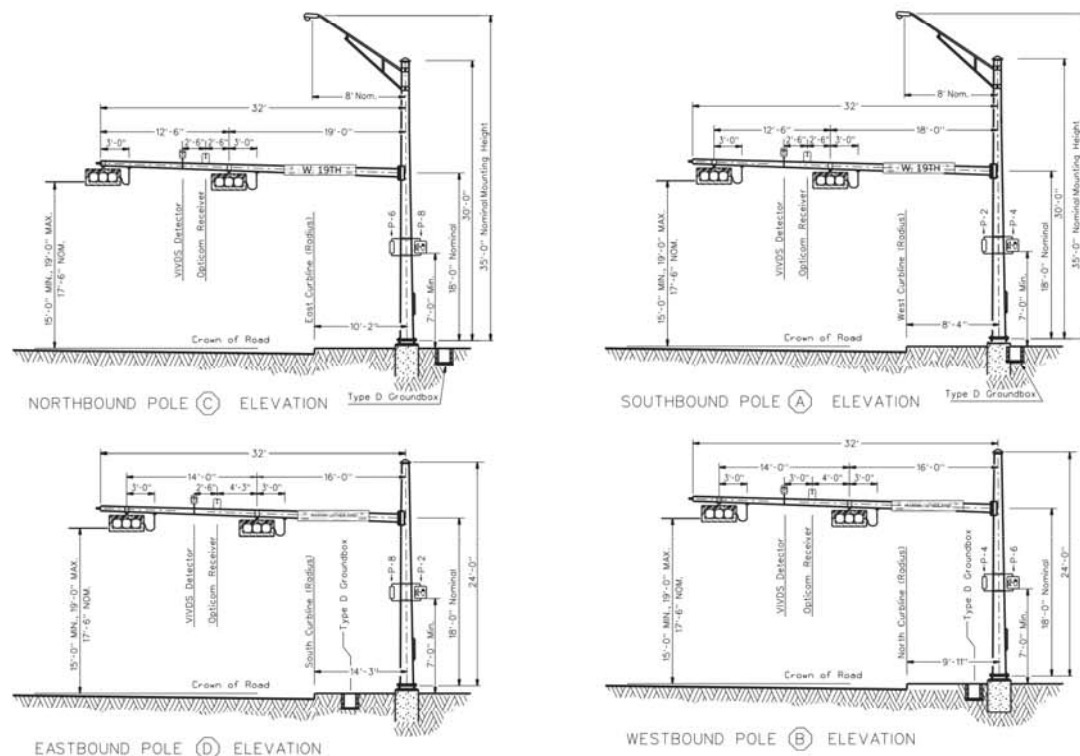

KSA
CP&Y
TBPE FIRM # - 1741
TBPE Firm Registration No. F-1356
58 Bullock Street, San Angelo, Texas 76901
T. 325-947-1553 F. 325-947-1559
www.ksaeng.com



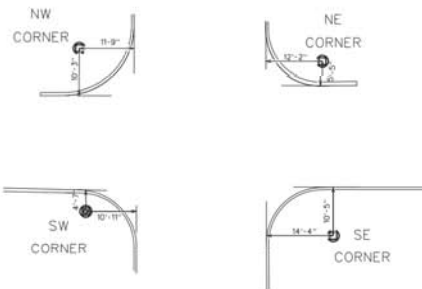
TRAFFIC SIGNAL LAYOUT



TRAFFIC SIGNAL ELEVATIONS



SIGNAL FOUNDATION LOCATIONS



LEGEND

	SERVICE PEDESTAL		TIMBER POLE (EXISTING)
	PULLBOX (EXISTING)		SIGNAL FOUNDATION/POLE
	PULLBOX (PROPOSED)		OVERHEAD ELECTRIC
	EX. CENTERLINE		WATER LINE
	PROP. CENTERLINE		SANITARY SEWER
	EX. CONDUIT RUN		UG TELE/FIBER
	CONDUIT RUN (TRENCH)		ROW LINE
	CONDUIT RUN (BORE)		CENTER LINE
	CONDUIT RUN NUMBER		VIVOS DETECTOR
	TRAFFIC SIGNAL HEAD W/ BACKPLATE		OPTICOM RECEIVER
	TRAFFIC SIGNAL HEAD IDENTIFIER		LUMINAIRE & ARM
	SIGN (OVERHEAD)		
	SIGN IDENTIFIER		
	POLE IDENTIFIER		

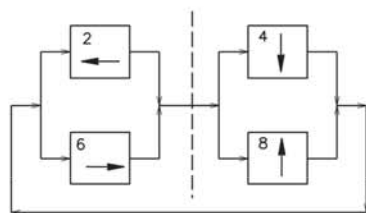
SIGNING

1	St 300	W. 19TH	St 200
2	St 200	W. 19TH	St 300
3	St 1800	MARTIN LUTHER KING	St 1900
4	St 1900	MARTIN LUTHER KING	St 1800

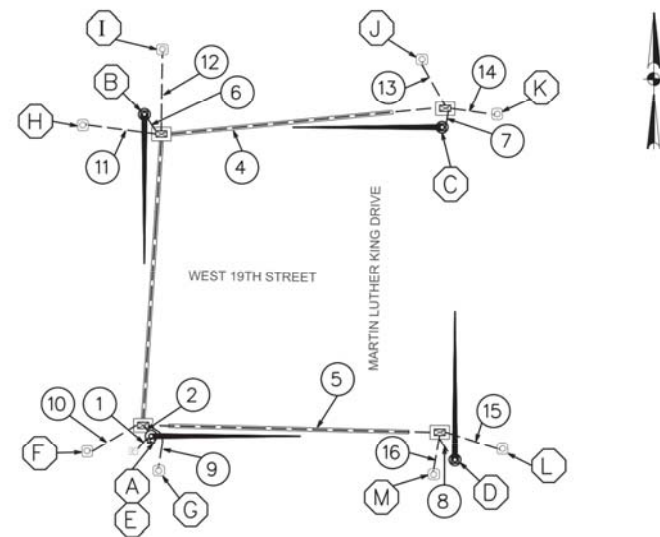
CONDUIT AND CONDUCTOR SCHEDULE

CONDUIT/SPAN RUN NUMBER		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CONDUIT SIZE IN INCHES		2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2
NUMBER OF CONDUITS		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TYPE (RIGID-RM, PVC-P)		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
LENGTH OF RUN (FT)		6	5	65	65	65	6	6	8	14	14	17	18	12	11	14	10
TRENCH (T) / BORE (B) / SPAN (S) / EXIST (Ex)		T	T	T	T/B	T/B	T	T	T	T	T	T	T	T	T	T	T
CIRCUIT		NUMBER OF CABLES															
#6 XHH-W 120 POWER HOT		1															
#6 BARE 120 POWER COMMON		1															
#6 BARE BARE BOND GROUND		1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1
16 COND #14 AWG VEHICLE SIGNALS																	
POLE 'A' (Ø4)																	
POLE 'B' (Ø6)			1	1			1										
POLE 'C' (Ø8)			1	1	1			1									
POLE 'D' (Ø2)			1				1										
2/C #14 SOLID TYPE A PEDESTRIAN PUSHBUTTON																	
PUSHBUTTON 'F'																	
PUSHBUTTON 'G'																	
PUSHBUTTON 'H'																	
PUSHBUTTON 'I'																	
PUSHBUTTON 'J'																	
PUSHBUTTON 'K'																	
PUSHBUTTON 'L'																	
PUSHBUTTON 'M'																	
VIVOS DETECTORS TWO-IN-ONE COAXIAL CABLE & 3/C #18 POWER CABLES																	
POLE 'A' (Ø4)																	
POLE 'B' (Ø6)			1	1			1										
POLE 'C' (Ø8)			1	1	1			1									
POLE 'D' (Ø2)			1				1										
OPTICOM DETECTORS OPTICOM MODEL 138 DETECTOR CABLE																	
POLE 'A' (Ø4)																	
POLE 'B' (Ø6)			1	1			1										
POLE 'C' (Ø8)			1	1	1			1									
POLE 'D' (Ø2)			1				1										
#8 XHH-W LUMINAIRE																	
POLE 'A'		3															
POLE 'C'		3	3	3	3			3									

PHASE SEQUENCE



POLE I.D.	POLE & EQUIPMENT DESCRIPTION AND ATTACHMENTS
A	CONSTRUCT 30'-A FOUNDATION WITH 30' POLE AND 32' MAST ARM, VIVOS DETECTOR, OPTICOM RECEIVER, WITH TWO 3-SECTION SIGNAL HEADS WITH BACKPLATES, TWO PEDESTRIAN SIGNALS AND ONE 8' LUMINAIRE ARM W/ LUMINAIRE AND POLE-MOUNTED CONTROLLER/CABINET
B	CONSTRUCT 30'-A FOUNDATION WITH 24' POLE AND 32' MAST ARM, VIVOS DETECTOR, ONE OPTICOM RECEIVER, TWO 3-SECTION SIGNAL HEADS WITH BACKPLATES AND TWO PEDESTRIAN SIGNALS
C	CONSTRUCT 30'-A FOUNDATION WITH 30' POLE AND 32' MAST ARM, VIVOS DETECTOR, OPTICOM RECEIVER, TWO 3-SECTION SIGNALS WITH BACKPLATES, TWO PEDESTRIAN SIGNALS AND ONE 8' LUMINAIRE ARM W/ LUMINAIRE
D	CONSTRUCT 30'-A FOUNDATION WITH 24' POLE AND 32' MAST ARM, VIVOS DETECTOR, ONE OPTICOM RECEIVER, TWO 3-SECTION SIGNALS WITH BACKPLATES AND TWO PEDESTRIAN SIGNALS
E	PROVIDE POLE-MOUNTED CABINET WITH SEIMANS (EAGLE EPAC) NEMA M62 CONTROLLER
F, G, H, I, J, K, L, & M	CONSTRUCT PEDESTRIAN DETECTOR WITH 4 1/2" POST, STD. BASE AND PUSHBUTTON/SIGNAL ASSEMBLY PER DETAIL



ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION (SEE ED(4)-03)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO. & SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBO/ LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
ELC SRV TY D 120/240 100 (INSJAL/EIPS/U)	1-1/4"	3 - #4	N/A	2P / 100	30	100	T.S. ILLUM.	1P/50 2P/30	<7.1

NOTE: EXISTING SERVICE ENCLOSURE AND METER MOUNTED ON DERRICK-TYPE POLE TO REMAIN

TRAFFIC SIGNAL PLAN

CITY OF SAN ANGELO MARTIN LUTHER KING DRIVE RECONSTRUCTION SAN ANGELO, TX

DRAWN BY: JDF/AM
DESIGNED BY: JDF
LATEST REVISION: 7/19/2016
KSA JOB NO: 46394
SAN 056

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STATE OF TEXAS
JOHN D. FRIEDLE
REGISTERED PROFESSIONAL ENGINEER
46394
7.19.2016

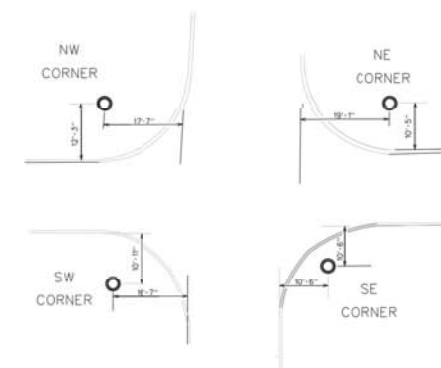
SHEET NO
136

TRAFFIC SIGNAL LAYOUT

SIGNING

SIGNAL FOUNDATION LOCATIONS

LEGEND

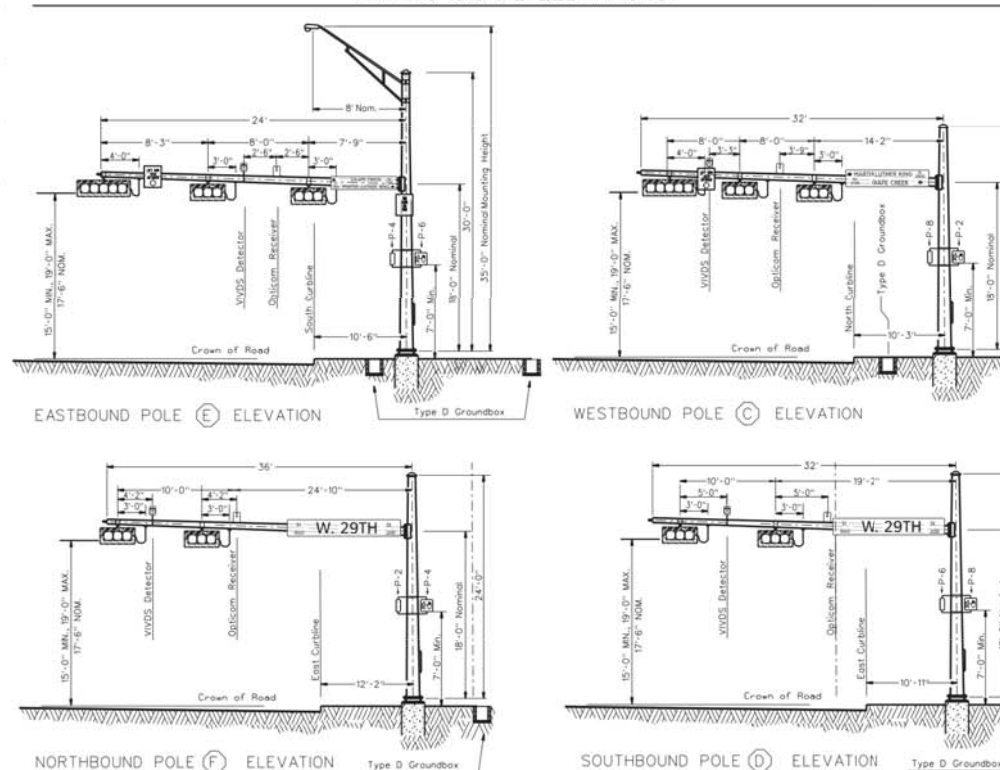


CONDUIT AND CONDUCTOR SCHEDULE

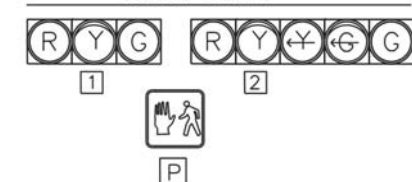
7/18/2016	CONDUIT/SPAN RUN NUMBER		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
	CONDUIT SIZE IN INCHES		3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	NUMBER OF CONDUITS		1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	TYPE (RIGID-RM, PVC-P)		P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
	LENGTH OF RUN (FT.)		16	5	5	23	23	58	58	24	24	73	66	66	66	15	47	9	19	12	11	11	5	9	20	12	8				
	TRENCH (T) / BORE (B) / SPAN (S) / EXIST (Ex)		S	T	T	T	B	B	T	T	T	B	B	T	B	T	B	T	T	T	T	T	T	T	T	T	T	T	T	T	
	CIRCUIT																														
		NUMBER OF CABLES																													
#6 XHHW	120 POWER HOT		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	120 POWER COMMON		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
# 6 BARE	BARE BOND GROUND		1	4	1	2	2	2	2				1	2	1	1	1		2	1	2	1	1	3	1	1	1	1	1	1	
16 COND #14 AWG	VEHICLE SIGNALS & PEDESTRIAN SIGNALS	POLE "C" (Ø2/Ø5) POLE "D" (Ø6LB) POLE "E" (Ø1-Ø6) POLE "F" (Ø4) PUSHBUTTON "G" PUSHBUTTON "H" PUSHBUTTON "I" PUSHBUTTON "J" PUSHBUTTON "K" PUSHBUTTON "L" PUSHBUTTON "M"		1	1	1	1	1										1													
2/C #14 SOLID TYPE A	PEDESTRIAN PUSHBUTTON		1																												

POLE I.D.	POLE & EQUIPMENT DESCRIPTION AND ATTACHMENTS
A	CONSTRUCT 11' ELECTRICAL SERVICE.
B	CONSTRUCT CONCRETE CONTROLLER FOUNDATION FOR CABINET AND SEMANS (EAGLE, EPAC) NEMA M62 CONTROLLER
C	32' SMA/24' POLE ON 30-A FOUNDATION, TWO PEDESTRIAN SIGNALS, ONE PED PUSHBUTTON ASSY, THREE VEHICLE SIGNAL HEADS, VVDS DETECTOR, OPTICOM RECEIVER AND SIGNS.
D	32' SMA/24' POLE ON 30-A FOUNDATION, TWO PEDESTRIAN SIGNALS, ONE PED PUSHBUTTON ASSY, TWO VEHICLE SIGNAL HEADS, VVDS DETECTOR, OPTICOM RECEIVER AND SIGNS.
E	24' SMA/30' POLE ON 30-A FOUNDATION, TWO PEDESTRIAN SIGNALS, THREE VEHICLE SIGNAL HEADS, LUMINAIRE, VVDS DETECTOR, OPTICOM RECEIVER AND SIGNS.
F	36' SMA/24' POLE ON 36-A FOUNDATION, TWO PEDESTRIAN SIGNALS, TWO VEHICLE SIGNAL HEADS, VVDS DETECTOR, OPTICOM RECEIVER AND SIGNS.
G, H, I, J, K, L & M	CONSTRUCT PEDESTRIAN DETECTOR STATION WITH 1/2" POST, STANDARD BASE AND PUSHBUTTON / SIGN ASSEMBLY PER DETAIL

TRAFFIC SIGNAL ELEVATIONS



SIGNAL HEADS



ELECTRICAL SERVICE DATA

ELECTRICAL SERVICE DESCRIPTION (SEE ED(4)-03)	SERVICE CONDUIT SIZE	SERVICE CONDUCTORS NO. - SIZE	SAFETY SWITCH AMPS	MAIN DISCONNECT CKT. BKR. POLE / AMP	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING	CIRCUIT NO.	BRANCH CKT. BRK. POLE / AMPS	KVA LOAD
ELC SRV TY T 120/240 000 (N5IGSLTIS10)	1-1/4"	3 - #4	N/A	2P / 100	30	100	T.S.	1P/50	<7.1
							ILLUM.	2P/30	

TRAFFIC SIGNAL PLAN
W. 29TH ST. & MARTIN LUTHER KING DR./
GRAPE CREEK RD./LAKE DR.

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: JDF/JAM
DESIGNED BY: JDF
LATEST REVISION: 7/19/2016
KSA JOB NO. SAN 058

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STATE OF TEXAS
REGISTERED PROFESSIONAL ENGINEER
46394
7/19/2016

SHEET NO. 137

PLAN NOTES

GENERAL NOTES

THE CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY ALL GOVERNING AUTHORITIES HAVING JURISDICTION OVER THIS PROJECT PRIOR TO STARTING CONSTRUCTION.

NO CONSTRUCTION OR FABRICATION SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED AND THOROUGHLY REVIEWED ALL PLANS AND OTHER DOCUMENTS APPROVED BY THE PERMITTING AUTHORITIES.

THE CONTRACTOR SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING OVERHEAD UTILITIES, GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.

THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES IMMEDIATELY ADJACENT TO THE CONSTRUCTION OF CONCRETE FOUNDATIONS AND TIMBER POLES.

THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES DURING THE CONSTRUCTION OF THIS PROJECT.

AT LEAST 48 HOURS PRIOR TO EXCAVATING, AND/OR DRILLING PUBLIC RIGHT-OF-WAY OR EASEMENTS, CONTRACTOR SHALL NOTIFY "TEXAS ONE-CALL SYSTEM" AT 1-800-245-4545 TO VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITY LINES.

ELECTRIC SERVICE IS CURRENTLY PROVIDED TO THE INTERSECTIONS.

SCOPE OF PROPOSED WORK

TWO INTERSECTIONS WILL BE SUBJECT OF RECONSTRUCTION ACTIVITIES: W. 19TH ST. & MARTIN LUTHER KING DR. AND W. 29TH ST. & MARTIN LUTHER KING DR.

W. 19TH & MARTIN LUTHER KING DR.

THE EXISTING SPAN WIRE SIGNAL IS TO BE REMOVED AND REPLACED TO INCLUDE THE FOLLOWING PRINCIPAL ITEMS:

1. FURNISHING AND INSTALLING TRAFFIC SIGNAL POLE ASSEMBLIES, CONCRETE FOUNDATIONS, TRAFFIC AND PEDESTRIAN SIGNAL HEADS, PEDESTRIAN PUSH-BUTTON STATIONS AND SIGNAL CABLE.
2. FURNISHING AND INSTALLING CONDUIT, CABLES AND GROUND BOXES.
3. FURNISHING AND INSTALLING OPTICOM DETECTORS, VIVDS DETECTORS AND METRO STREET NAME SIGNS.
4. FURNISHING AND INSTALLING ALL OTHER ITEMS NOT SPECIFICALLY REFERENCED ABOVE TO PROVIDE THE COMPLETE TRAFFIC SIGNAL INSTALLATION AS CALLED FOR IN THE PLANS AND SPECIFICATIONS.

AS THE EXISTING SIGNAL MUST FUNCTION NORMALLY DURING CONSTRUCTION OF THE PERMANENT SIGNAL, THE REMOVAL OR RELOCATION OF EXISTING EQUIPMENT MUST BE COORDINATED TO ENSURE NO LOSS OF FUNCTION DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE OFF-DUTY, UNIFORMED POLICE OFFICER(S) AS NECESSARY WHEN EXISTING SIGNALS ARE TURNED OFF OR PLACED IN FLASHING OPERATION.

W. 29TH & MARTIN LUTHER KING DR.

THE EXISTING POLE/MAST ARM SIGNAL IS TO BE REMOVED AND REPLACED TO INCLUDE THE FOLLOWING PRINCIPAL ITEMS:

1. FURNISHING AND INSTALLING TRAFFIC SIGNAL POLE ASSEMBLIES, CONCRETE FOUNDATIONS, TRAFFIC AND PEDESTRIAN SIGNAL HEADS, PEDESTRIAN PUSH-BUTTON STATIONS AND SIGNAL CABLE.
2. FURNISHING AND INSTALLING CONDUIT, CABLES AND GROUND BOXES.
3. FURNISHING AND INSTALLING OPTICOM DETECTORS, VIVDS DETECTORS AND METRO STREET NAME SIGNS.
4. FURNISHING AND INSTALLING ALL OTHER ITEMS NOT SPECIFICALLY REFERENCED ABOVE TO PROVIDE THE COMPLETE TRAFFIC SIGNAL INSTALLATION AS CALLED FOR IN THE PLANS AND SPECIFICATIONS.

IT IS ANTICIPATED THAT THE NEW SIGNAL APPURTENANCES CAN BE CONSTRUCTED WHILE THE EXISTING SIGNAL REMAINS IN OPERATION.

TRAFFIC SIGNAL NOTES

EXISTING UTILITIES

THE LOCATION OF EXISTING UTILITIES HAVE BEEN SHOWN ON THE PLANS BASED ON NON-INVASIVE SURVEY AND UTILITY LOCATES BY THE RESPECTIVE UTILITIES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS WITH THE OWNERS OF THE RESPECTIVE UTILITIES TO DETERMINE THEIR EXACT LOCATION AND DETERMINE IF ANY ADDITIONAL UTILITIES NOT SHOWN ON THE PLANS ARE PRESENT.

ELECTRICAL CONDUCTORS

ALL ELECTRICAL CONNECTORS FOR BREAKAWAY POLES SHALL BE BREAKAWAY (BUSSMAN HEBW, LITTLEFUSE LEB OR EQUAL) IN ACCORDANCE WITH TXDOT STANDARD SHEET RID (LUM)-07

GROUNDING CONDUCTORS THAT SHARE THE SAME CONDUIT, GROUND BOX, OR STRUCTURE SHALL BE BONDED TOGETHER AT EVERY ACCESSIBLE POINT IN ACCORDANCE WITH THE NEC

CONDUIT

ALL CONDUIT FOR CABLE SHALL BE SCHEDULE 80 PVC UNLESS OTHERWISE NOTED. ALL COUPLINGS AND CONNECTIONS SHALL BE TIGHT AND WATERPROOF. URETHANE FOAM SHALL BE USED TO ENCLOSE THE ENDS OF EACH CONDUIT CONTAINING CABLING IN THE CABINET AND GROUND BOXES.

A CONTINUOUS BARE COPPER WIRE, NO. 6 OR LARGER, SHALL BE INSTALLED IN EVERY PVC CONDUIT THROUGHOUT THE SYSTEM IN ACCORDANCE WITH THE ELECTRICAL DETAIL SHEETS AND THE LATEST EDITION OF THE NEC

CONDUIT CONNECTORS, ELBOWS, FLARED ENDS, CONNECTORS, EXTENSIONS, ETC. REQUIRED FOR CONDUIT INSTALLATION IS CONSIDERED SUBSIDIARY TO THE PAY ITEM FOR CONDUIT.

POLE FOUNDATIONS

NO MAST ARM POLES OR PEDESTAL POLES SHALL BE PLACED ON NEW FOUNDATIONS PRIOR TO SEVEN (7) FOLLOWING PLACEMENT OF CONCRETE.

THE DIMENSIONS SHOWN ON THE PLANS FOR LOCATON OF NEW SIGNAL FOUNDATIONS MAY BE VARIED TO MEET LOCAL CONDITIONS, SUBJECT TO APPROVAL OF THE ENGINEER.

CONCRETE TEST CYLINDERS WILL BE TESTED AT THE CONTRACTOR'S EXPENSE. TEST RESULTS SHALL BE FORWARDED TO THE ENGINEER WITHIN SEVEN (7) DAYS OF TEST COMPLETION.

TRAFFIC AND PEDESTRIAN SIGNAL HEADS

UNLESS OTHERWISE SHOWN IN THE PLANS, ALL TRAFFIC SIGNAL HEADS SHALL BE MOUNTED HORIZONTALLY.

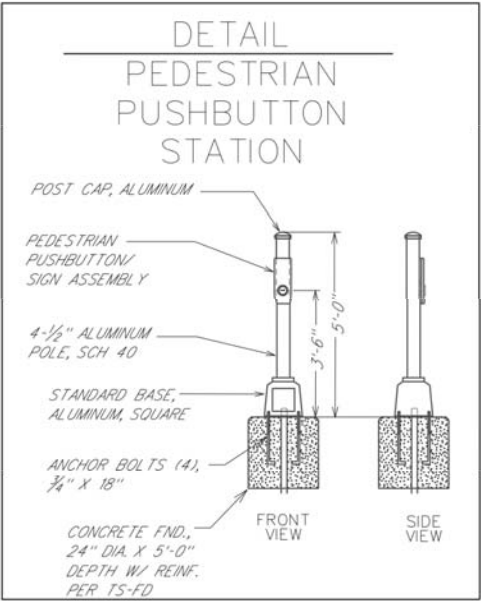
ALL NEW TRAFFIC SIGNAL HEADS SHALL BE POLYCARBONATE WITH VISORS AND BACKPLATES WITH LED INDICATIONS

SIGNAL HEADS PLACED OVER THE ROADWAY SHALL BE SECURELY BAGGED WITH DARK PLASTIC OR BURLAP MATERIAL UNTIL PLACED IN OPERATION.

ALL NEW PEDESTRIAN SIGNAL HEADS SHALL BE COUNTDOWN TYPE.

ESTIMATED QUANTITIES

ITEM NO.	DESC	DESCRIPTION	UNIT	MLK & W.	MLK & W.	TOTAL
				19TH ST	29TH ST	
				QUANTITY	QUANTITY	QUANTITY
416	6030	DRILL SHAFT (TRF SIG POLE) (24 IN)	LF	40.0	30.0	70.0
416	6031	DRILL SHAFT (TRF SIG POLE) (30 IN)	LF	45.2	33.9	79.1
416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	-	13	13
618	6023	CONDT (PVC) (SCH 40) (2")	LF	140	270	410
618	6047	CONDT (PVC) (SCH 80) (2") (BORE)	LF	130	250	380
618	6029	CONDT (PVC) (SCH 40) (3")	LF	10	10	20
618	6054	CONDT (PVC) (SCH 80) (3") (BORE)	LF	70	-	70
620	6008	ELEC CONDR (NO.8) INSULATED	LF	460	250	710
620	6009	ELEC CONDR (NO.6) BARE	LF	350	600	950
620	6010	ELEC CONDR (NO.6) INSULATED	LF	130	230	360
624	6010	GROUND BOX TY D (162922)W/APRON	EA	4	7	11
628	6301	ELC SRV TY T 120/240 000(NS)GS(L)TS(O)	EA	-	1	1
628	X001	RELOC EX ELEC SERVICE	LS	1	-	1
636	6001	ALUMINUM SIGNS (TY A)	SF	64	105	169
666	6003	REFL PAV MRK TY I (W)4"(BRK)(100MIL)	LF	800	-	800
666	6012	REFL PAV MRK TY I (W)4"(SLD)(100MIL)	LF	400	200	600
666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	770	680	1,450
666	6126	REFL PAV MRK TY I (Y)4"(SLD)(100MIL)	LF	800	1,700	2,500
666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	4	4	8
680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1	1	2
680	6004	REMOVING TRAFFIC SIGNALS	EA	1	1	2
682	6001	VEH SIG SEC (12")LED(GRN)	EA	8	10	18
682	6003	VEH SIG SEC (12")LED(YEL)	EA	8	10	18
682	6005	VEH SIG SEC (12")LED(RED)	EA	8	10	18
682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	-	2	2
682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	-	2	2
682	6017	PED SIG SEC (LED)(2 INDICATIONS)	EA	8	8	16
682	6023	BACK PLATE (12")(3 SEC)	EA	8	8	16
682	6025	BACK PLATE (12")(5 SEC)	EA	-	2	2
684	6028	TRF SIG CBL (TY A)(14 AWG)(2 CONDR)	LF	110	180	290
684	6042	TRF SIG CBL (TY A)(14 AWG)(16 CONDR)	LF	300	380	680
686	6027	INS TRF SIG PL AM(S)1 ARM(24')LUM	EA		1	1
686	6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	2	2	4
686	6035	INS TRF SIG PL AM(S)1 ARM(32')LUM	EA	2	-	2
686	6037	INS TRF SIG PL AM(S)1 ARM(36')	EA		1	1
688	6001	PED DETECT PUSH BUTTON (APS)	EA	8	8	16
688	X001	PEDESTRIAN PUSH BUTTON STATION ASSEMBLY	EA	8	7	15
690	6036	INSTALL OF FND FOR GROUND MNT CABINETS	EA	-	1	1
690	X001	OPTICOM MODEL 722 DETECTOR	EA	4	4	8
690	X002	OPTICOM MODEL 138 DETECTOR CABLE	LF	300	380	680
690	X003	OPTICOM PHASE SELECTOR	EA	1	1	2
6002	6001	VIVDS PROCESSOR SYSTEM	EA	1	1	2
6002	6002	VIVDS CAMERA ASSEMBLY	EA	4	4	8
6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	300	380	680



REVISION	DATE
2.00 - PROJECTS, ACTIVITIES, ENGRS (141) SAN ANGELO 141.02 - TRAFFIC SIGNAL DESIGN (CAD) MLK SIGNAL BASE V1 (CON) MODEL 11/28/2016 11:28 AM	

TRAFFIC SIGNAL PLAN

NOTES, QUANTITIES AND DETAILS

CITY OF SAN ANGELO

MARTIN LUTHER KING DRIVE

RECONSTRUCTION

SAN ANGELO, TX

DRAWN BY:	JDF/MM
DESIGNED BY:	JDF
LATEST REVISION:	7/19/2016
REVISION NO.	RSB JDR NO.
SAN 058	

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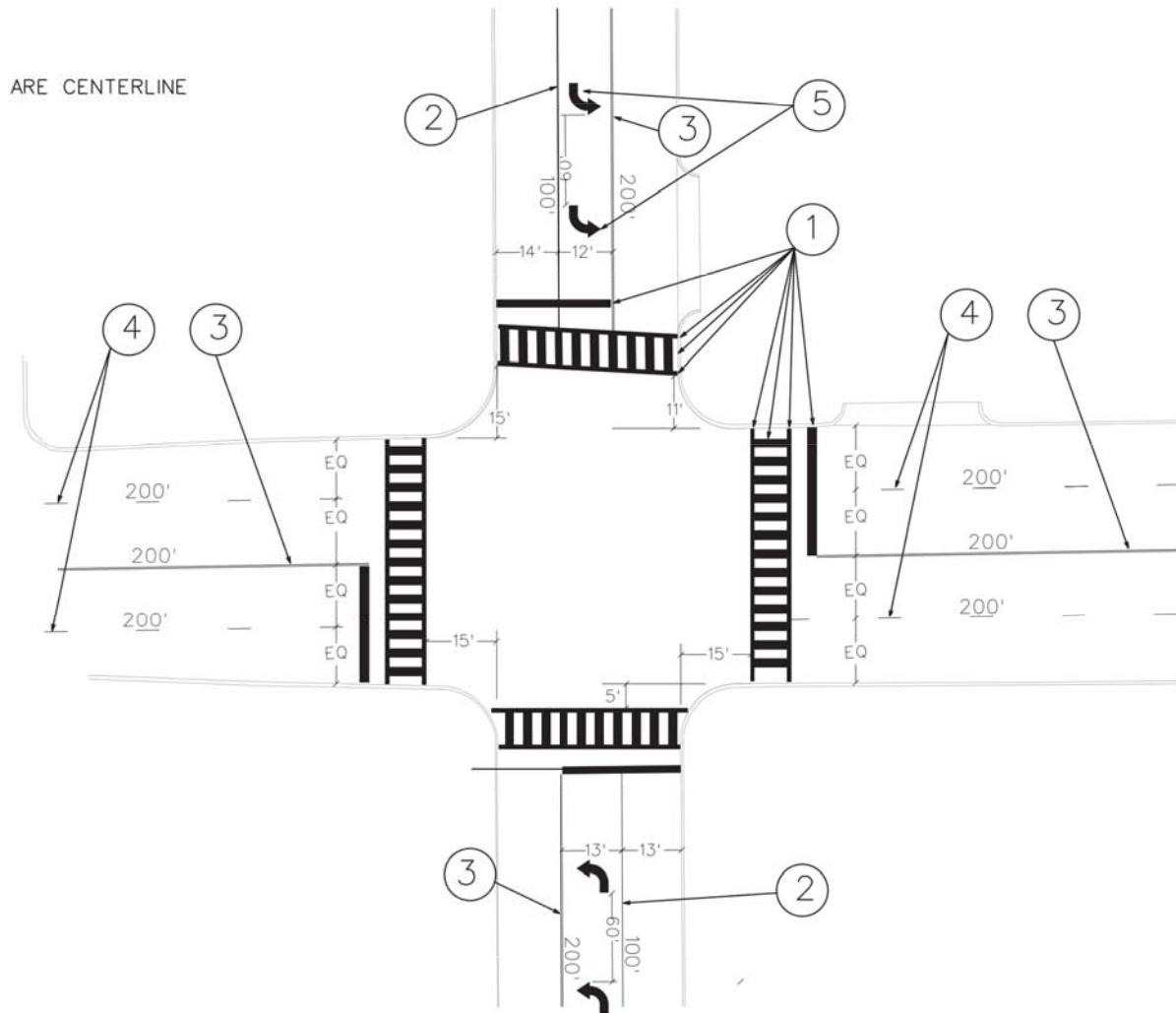
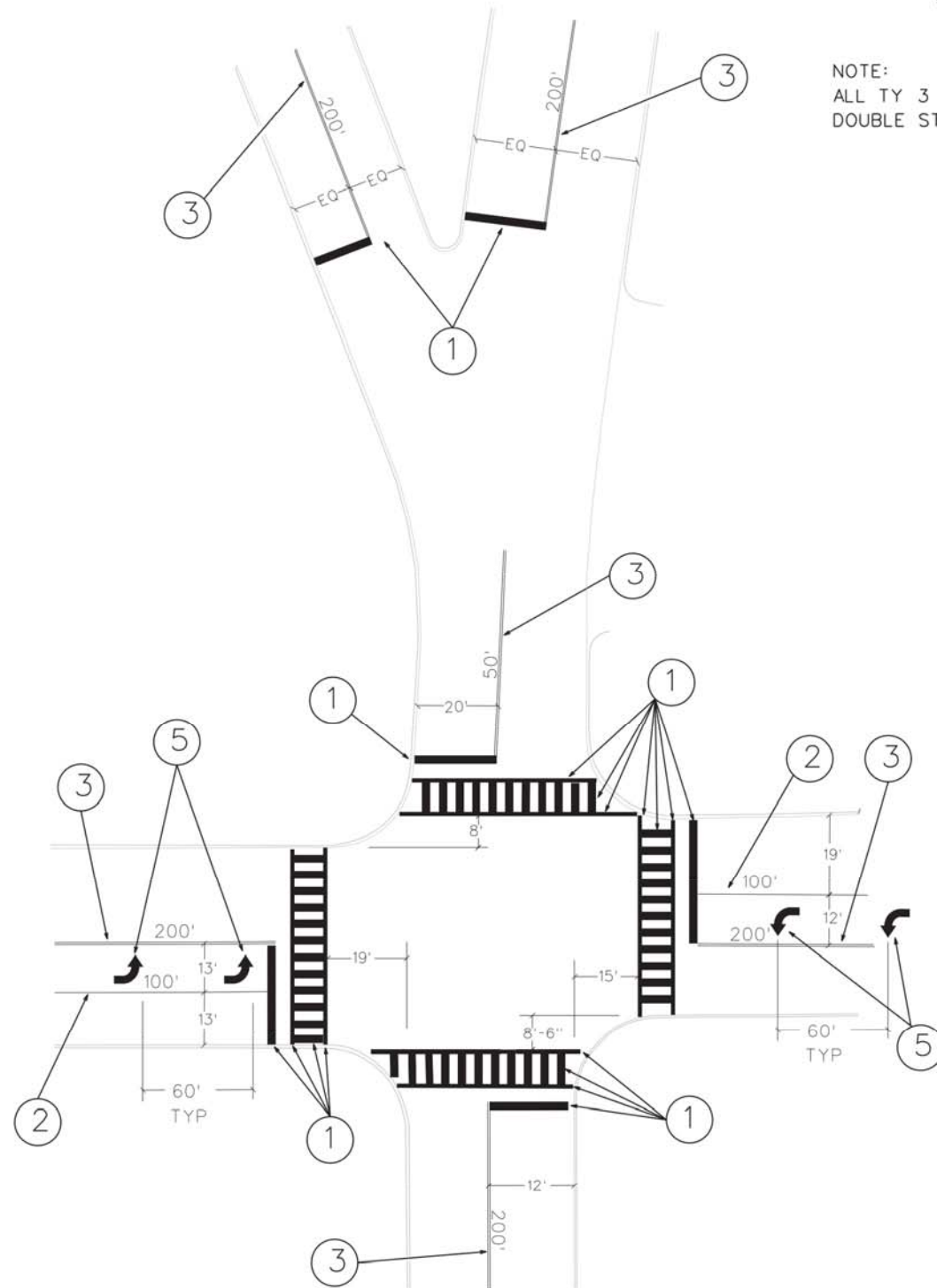
46394

7.19.2016

LEGEND

- ① REFL PAV MRK TY 1(W) 24"(SLD)(100MIL)
- ② REFL PAV MRK TY 1(W) 4" (SLD)(100MIL)
- ③ REFL PAV MRK TY 1(Y) 4"(SLD)(100MIL)
- ④ REFL PAV MRK TY 1(W) 4" (BRK)(100MIL)
- ⑤ REFL PAV MRK TY 1(W)(ARROW)(100MIL)

NOTE:
ALL TY 3 YELLOW MARKINGS ARE CENTERLINE
DOUBLE STRIPES



CROSSWALK DETAIL



TRAFFIC SIGNAL PLAN
INTERSECTION PAVEMENT MARKINGS

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: JDF
DESIGNED BY: JDF
LATEST REVISION: 7/19/2016
NSA JOB NO.: SAN 058

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JOHN D. FRIEBELE
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REGISTERED
PROFESSIONAL ENGINEER
7.19.2016

SHEET NO.
139

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 material. Ensure that all materials and installations comply with the applicable editions of the National Electrical Code (NEC), National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NEMA and UL listings can be considered equivalent to UL. Where there is a conflict between NEMA and UL listings, the UL listing shall prevail. For equipment, equipment shall be considered acceptable equivalent to NEMA listings if the equipment is listed by a Nationally Recognized Testing Lab (NRTL). For equipment, equipment shall be considered acceptable equivalent to UL listings if the equipment is listed by a Nationally Recognized Testing Lab (NRTL). For equipment, equipment shall be considered acceptable equivalent to UL listings if the equipment is listed by a Nationally Recognized Testing Lab (NRTL).
3. Macadamous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when parts specify galvanized, provided the bolt size is 1/2" 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, megohmmeter, megger, 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 electrical conductors, metal parts, enclosures and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or galvanized steel 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 MaterialProducers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on the Department'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) 1030 "Conduit" and Item 618 "Conduit" of the "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 equivalent flexible metal conduit (EMC) when flexible conduit is called for on approved drawings. Provide equivalent flexible metal conduit (EMC) when flexible conduit is called for on approved drawings. Provide equivalent flexible metal conduit (EMC) when flexible conduit is called for on approved drawings.
2. Provide galvanized steel RMC for all conduit systems, 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 any conduit with no more than four conductors per box. When the number of conductors is present, count the conductors as follows: 1. All conductors entering the box through any conduit with no more than four conductors per box. 2. All conductors entering the box through any conduit with no more than four conductors per box. 3. All conductors entering the box through any conduit with no more than four conductors per box.

ARC	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"	12" x 12" x 4"
6"	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
8"	8" x 8" x 4"	10" x 10" x 4"	12" x 12" 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 approved 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 junction boxes with an internal volume greater than 100 cu. in.
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 cast aluminum boxes. See 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 ground rods and conductors 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 hot, high tensile strength polyester fiber pultrusion for pulling conduits through the PVC conduit system. When galvanized steel 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 ground building 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 elbows are shown 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 listed under Item 618. Ensure bored HDPE 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 and 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 stand-off 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 all expansion points to allow for movement of the conduit in relation to the structure. Provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit internally exposed on structures such as bridges at maximum intervals of 100 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 of no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFM or LFM 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(1) for details. 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, jacks or bore conduit placed beneath existing roadways, streets, or other the base or surface operation or as required by the Engineer, compact the bore pits below the conduit per item 476 "Jacking, Boring, or Tunneling Pipe or Bore" prior to installing conduit or duct cable to the base of the concrete.
5. When placing conduit in the sub-grade of new roadways, backfill trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill trenches with compacted material. When placing conduit in the sub-base of existing roadways, backfill trenches with compacted material. When placing conduit in the sub-base of existing roadways, backfill trenches with compacted material. When placing conduit in the sub-base of existing roadways, backfill trenches with compacted material.
6. Provide and place warning tape approximately 10 ft. above all trenching call out 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. Tighten 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 hub or using boxes with threaded bases. This includes surface mounted safety enclosures, 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 bend end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
10. Install bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure bonding jumpers are the same size as the equipment grounding conductor. Bonding jumpers shall be installed in accordance with Item 618, when required, if the duct extends the full length through the casing.
11. At all electrical services, install 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 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 end of all mounting strut and RMC threaded or non-threaded with zinc rich paint 1047 or more as required to provide corrosion protection. Use zinc rich paint to touch up galvanized material as shown 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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PROJECT: 10000000000000000000	SHEET: 14	TOTAL SHEETS: 14	SCALE: N/A
DRAWN BY: JDF			

ELECTRICAL CONDUITS

A. MATERIAL INFORMATION

1. Provide Type 304 stainless steel conductors in accordance with Departmental Material Specification (DMS) 1030 "Conduit" and Item 618 "Conduit" of the "Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges," latest edition. Provide conductors as listed on the MaterialProducers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies." Item 620 "Color Code Insulated Conductors" in the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors with green insulation or bare conductors. Identify ungrounded conductors with any color insulation except green, white, or gray. Use color coding consistent with the wiring system. Identify 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 hot tape of the color.
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 1040. 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 strips, 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 1040. Use hot melt adhesive tape to fill the gap and seal the ends of hot 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.

5. Use only one hot, high tensile strength polyester fiber pultrusion 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.
6. 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 boxes.
7. Make splices only in junction boxes, ground boxes, pole boxes, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall hot shrink tubing. Gel-filled insulating splice covers with heavy wall hot shrink tubing may not be used. Overlap hot shrink tubing a minimum of 2 in. at each splice of the splice. Where hot shrink tubing may not shrink sufficiently to provide a airtight 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 airtight seal between the individual conductors and the hot shrink tubing. After the hot shrink tubing is applied, use hot shrink tubing to fill the gap and seal the ends of hot shrink tubing. Hot shrink tubing that appears to have been burned or over-heated, is considered defective and must be replaced.
8. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of hot shrink tubing.
9. Wire nuts with factory applied waterproof sealant may be used for 6 AWG or smaller conductors in above ground junction boxes, but not in pole boxes or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
10. Support conductors in luminaires with a J-hook at the top of the pole.
11. 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.
12. Replace conductors and cables that are damaged beyond repair or that fail on insulation resistance test at no additional cost to the department.
13. 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.
14. Install breakaway connectors on conductors but under item 620 whenever these conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly locate breakaway devices. Proper termination is critical to the safe operation of breakaway devices. Term waterproof 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 unsealed openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.



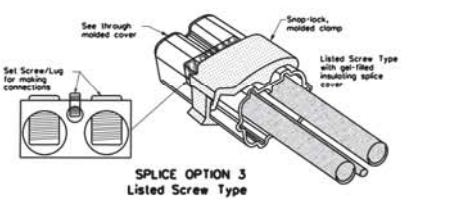
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

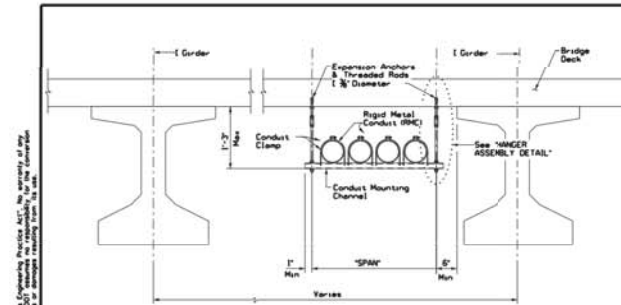
1. Provide and install a grounding electrode of electrical services. Provide ground rods according to DMS 1040 and the plans. Larger diameter rods are readily accessible for inspection or repair. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a similar 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 spall 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 non-metallic conduit, ensure the conduit is 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.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install 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 repair. 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 similar 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 spall 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 non-metallic conduit, ensure the conduit is 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.

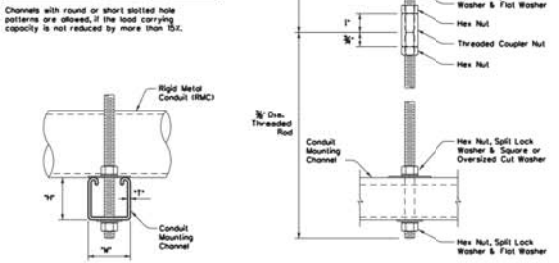


Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS CONDUITS			
ED(3)-14			
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PROJECT: 10000000000000000000	SHEET: 14	TOTAL SHEETS: 14	SCALE: N/A
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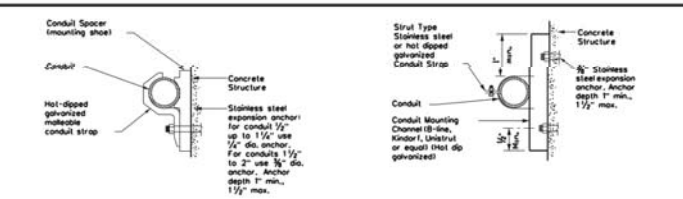
CONDUIT HANGING DETAIL

SPACER	1" x 1"	1"
less than 2"	1 1/2" x 1 1/2"	12 Ga.
2" to 2'-6"	1 1/2" x 1 1/2"	12 Ga.
2'-6" to 3'-6"	1 1/2" x 2 1/2"	12 Ga.



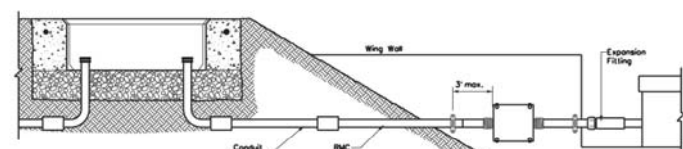
HANGER ASSEMBLY DETAIL

ELECTRIC CONDUIT TO BRIDGE DECK ATTACHMENT



CONDUIT MOUNTING OPTIONS

Attachment to concrete surfaces
See ED(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 Evaluator Report number, and its approval status shall be maintained on the ICC-ES website under Division 053000 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 or 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 limits. 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, 1 effort shall ensure needed to ensure sufficient thread length for proper torquing and tightening of anchors.
6. Use anchors of minimum 1000 lbs tensile capacity (minimum of steel, concrete breakout, and concrete pullout strength) as determined by AC308 Appendix D1 of the required minimum embedment depth. If all, all listed loads shall be introduced after conduit installation.

Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS CONDUIT SUPPLIES			
ED(2)-14			
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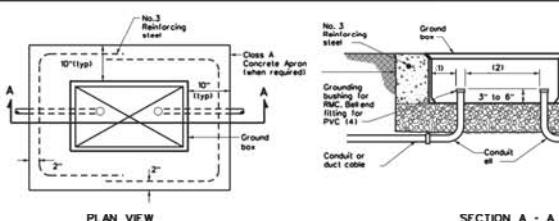
GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (16x30x24) or smaller in accordance with Departmental Material Specification (DMS) 1070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, and D ground boxes as shown in the plans, and as listed on the MaterialProducers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies." Item 624.
3. Ensure ground box cover is correctly located in accordance with DMS 1070.
4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all ground 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 "Aggregate for Surface Treatments." Ensure aggregate bed is in place and at least 6 inches deep, prior to setting one ground box. Measure 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 wires in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bend end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal all 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 in type B or D ground box is stocked to meet volume requirements, it is allowable to cut on 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 low ground type lug.

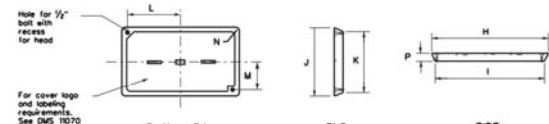


APRON FOR GROUND BOX

- (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 bend end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushings.
- (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 PVC bushing or bend end fitting on the upper end of all PVC conduits terminating in a ground box.

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

TYPE	DIMENSIONS (INCHES)									
	H	I	J	K	L	M	N	P		
A, B & C	23 1/4	23	13 3/4	13 3/4	9 3/4	5 1/4	1 3/4	2		
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/4	2		



GROUND BOX COVER

Texas Department of Transportation		Traffic Operations Division Standard	
ELECTRICAL DETAILS GROUND BOXES			
ED(4)-14			
DATE: 01/01/2016	DESIGNED BY: JDF	CHECKED BY: JDF	DATE: 01/01/2016
PROJECT: 10000000000000000000	SHEET: 14	TOTAL SHEETS: 14	SCALE: N/A
DRAWN BY: JDF			

DATE	REVISION	MARK
01/01/2016	1	

TRAFFIC SIGNAL DETAILS
(1 OF 9)

CITY OF SAN ANGELO
MARTIN LUTHER KING DRIVE
RECONSTRUCTION
SAN ANGELO, TX

DRAWN BY: JDF	DESIGNED BY: JDF	LATEST REVISION: 7/19/2016	KSA JOB NO: 10000000000000000000	SAN 058
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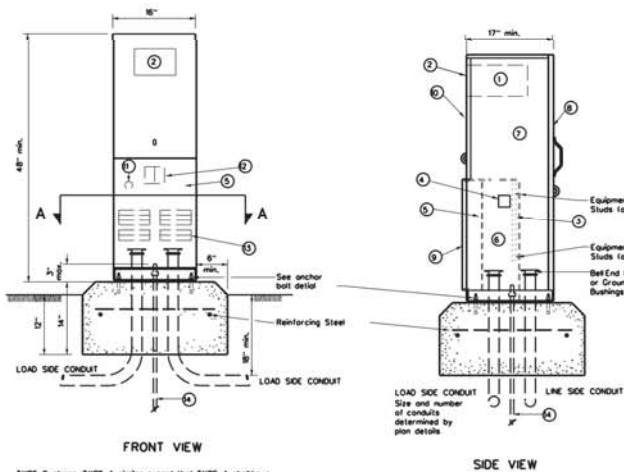
LEE ENGINEERING		TBE FIRM #1-550	
9901 IH 10 W, Suite 400		San Antonio, Texas 78201	
T: 210-561-5411		www.LeeEngineering.com	

KSA		TBE FIRM Registration No. F-1356	
58 Balsa Street, San Antonio, Texas 78201		T: 210-561-5411	
T: 210-561-5411		www.LeeEngineering.com	

ELECTRICAL SERVICES NOTES

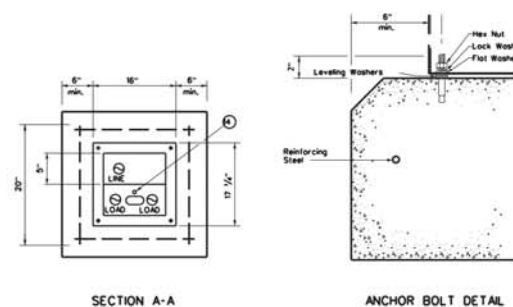
1. Provide new materials, ensure installation and materials comply with the applicable standards of the International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA) standards. Ensure materials are underwritten by Laboratories (UL) listed.
2. Type galvanized steel (GSS) enclosures may be used for Type C panelboards and Type D enclosures. Enclosures shall be installed in accordance with the applicable standards of the International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA) standards. Enclosures shall be installed in accordance with the applicable standards of the International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Association (NECA) standards.
3. Provide electrical services in accordance with Electrical Details Standard Sheets, Department of Transportation (DOT) 1000, Electrical Services, 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 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3. Manufacture electrical services in accordance with Department/Material Specifications (IM51080 "Electrical Services", 1005 "Electrical Services-Pedestal Poles" and Item 628 "Pedestal Poles"). The manufacturer of the pedestal shall be listed on the Material Producers List (MPL) on the Department's web site under "Equipment" Category. Installation shall be in accordance with the manufacturer's hardware and installation details of services meet utility company specifications. Contact the security company for details of the services to be installed. After installing the electrical/pedestal services, Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal/service foundations in accordance with Item 420, "Concrete Substructures," except that concrete shall be poured for directly but is not considered subsidiary to Item 828.
4. Provide #4 reinforcing steel foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install $\frac{1}{2}$ in. x 2 $\frac{1}{2}$ in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in the pedestal enclosure. The anchors shall be installed in the pedestal enclosure and the pedestal enclosure to the anchors in the foundation with a $\frac{1}{2}$ in. galvanized or stainless steel machine thread lock nut and lock washer. The anchors shall be installed in the pedestal enclosure.
6. Finish top of concrete foundation is a neat and workmanlike finish. If leveling anchors are used, ensure no more than $\frac{1}{8}$ in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of $\frac{1}{8}$ in. per foot. When properly installed, ensure the top of the pedestal enclosure is 1/2" above the top and side to side of the pedestal. Report rocking or movement of the service enclosure on an additional cost to the department.
7. Do not use lightweight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all fittings in the foundation are sized as per utility provider's conduit requirements. The size of the conduit shall be 1/2" larger than the size of the service. The rigid metal conduits are more than 2 in. below the top of the concrete foundation, where extension conduits are metal, grounding bushes must be installed with a bonding jumper to the conduit.

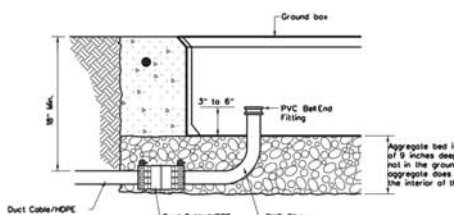


TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB handles shall protrude through hinged deadfront trim.

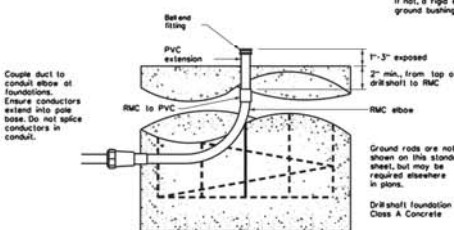
LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access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



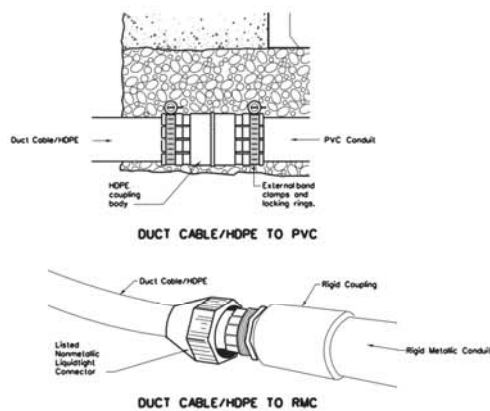
2. Provide duct cable in accordance with Departmental Material Specification (DMS) 1060 and provide "Duct Cable" and item 822 "Duct Cable." Provide duct cable as listed on the Material Price Schedule or on the Department web site under "Roadway Safety and Traffic Control Supplies." Item 822.
3. Provide High-Density Polyethylene (HDPE) conduit in accordance with DMS 1060 and provide "Duct Cable," "Duct Cable Conduit," and "Duct Cable Conduit Tee" on the Department web site at "Roadway Numeration and Traffic Supplies." Item 818.
4. Supply duct cable with a minimum 2 in. diameter, unless otherwise shown in the plans. Provide duct cable and HDPE conduit as shown by descriptive code or on the plans. Both duct cable and HDPE conduit are recommended by the manufacturer, with a minimum bending radius of 20 ft. In 2 in. duct, follow Manufacturer's recommendations when installing duct cable and HDPE conduit ends during installation of duct cable and HDPE conduit.
5. Do not splice conduits within duct cable or HDPE conduit. Couple duct cable and HDPE conduit end-to-end using approved couplings. Coupling sleeves must be installed in the field and all couplings are coded for fit in the plans and any portion of the RMC elbow is buried less than 18" below finished grade.
6. Furnish and install duct cable with factory installed conductors, sized as shown in the plans and as required by the National Electric Code (NEC). The NEC contains specific requirements for duct cable in Article, "Nomenclature - Underground Cables with Conductive Type MUCC."
7. When conduit casting is called for in the plans, extend duct cable or HDPE conduit through the conduit casting in one continuous length without connection to the casing.
7. Seal the ends of duct cable or HDPE conduit with duct seal, expandable foam, or other approved methods after installation.
8. Provide minimum cover of 24 in. under roadways, 18 in. at other locations, or as shown on the plans.
9. Furnish and install fittings to couple duct cable or HDPE conduit to other types of duct cable or duct cable and HDPE conduit. The fittings include split type PVC RMC threaded couplings connected with sealed lap-welded flanges connected using sealed couplings; split type PVC RMC threaded couplings connected with sealed lap-welded flanges and locking rings; split type PVC RMC threaded couplings connected with sealed lap-welded flanges and locking rings connected with approved metal couplings; and coupling devices using approved cast aluminum material made up on HDPE or aluminum specifically designed for HDPE. Couplings and connectors shall be used in accordance with the manufacturer's instructions. Do not use PVC glue on HDPE. Do not use water pipe fittings, or connect



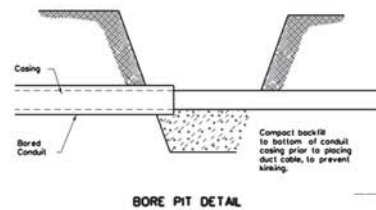
DUCT CABLE/HOPE AT GROUND BOX



DUCT CABLE / HDPE AT FOUNDATION

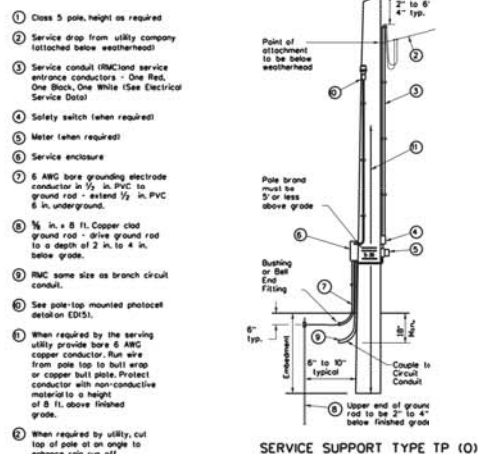


DUCT CABLE/HOPE TO RMC



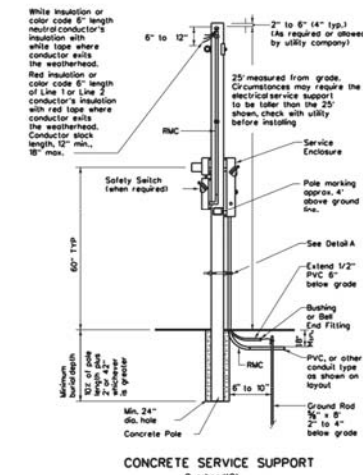
BORE PIT DETAIL

 Texas Department of Transportation		Traffic Operations Division Standard
ELECTRICAL DETAILS ELECTRICAL SERVICE SUPPORT PEDESTAL SERVICE TYPE PS ED(9)-14		
FILE: ed(9)-14.dwg C:\atc\ October 2014 44 sheets	DWG: 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 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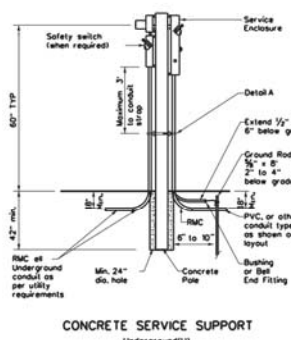
[illegible]

SERVICE SUPPORT TYPE TP (0)

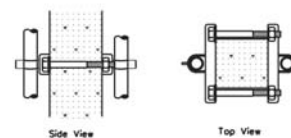
1. Provide GC and OC poles that meet the requirements of DMS 1000, "Electric Services."
2. Provide precast concrete poles suitable for direct embedment into the ground without special foundations.
3. Verify poles are marked as required on DMS 1000. Location of marks should be verified using a robotic total station. Use the two-pointed pole locations when handling pole in horizontal position, and one-pointed pole location when handling pole in vertical position. These marks are small but conspicuous.
4. Embed poles 42 in. or 102 of the same plant 2 ft, whichever is greater.
5. Ensure installation details of services are in accordance with utility standards.
6. Install one point rack or eye bolt bracket 6 inches to 12 inches below the weatherhead as an overhead service drop anchoring point for the service.
7. Furnish and install galvanized or aluminum steel conductor 19/ or 26/ or 1/4 inch, up to 1 in. up to 3 ft, in deep (minimum 4'x8'x8' or 8'x8'x8') trench, with 1/2 inch or larger steel plate (minimum 1/2 inch thick), secure U-bolts or back to back bolt construct with long bolts and nuts, and secure with 1/2 inch or larger steel plate (minimum 1/2 inch thick) galvanized in accordance with ASTM A575. Do not stack conductor in trench.
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. The cone should be 12 inches in diameter. The backfill should be to the surrounding grade. Backfilling will not be paid for directly but will be included in the overall cost of the project.



CONCRETE SERVICE SUPPORT

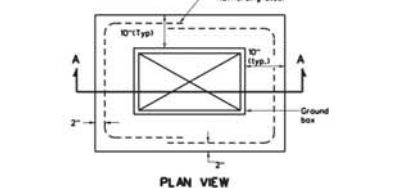


CONCRETE SERVICE SUPPORT

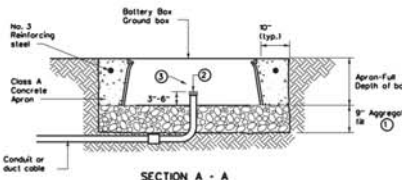


DETAIL A

	Texas Department of Transportation	Traffic Operations Division Standard
ELECTRICAL DETAILS SERVICE SUPPORT TYPES GC, OC, & TP		
ED(10)-14		
FILE NO.: EOTD 10-096	DWG NO.: TAD01	SHEET NO.: 1 OF 1
DATE: October 2004	CITY: SEITZ	STATE: MISSISSIPPI
PROJECT:	DRY CREEK	MILE OR LESS
	SEAN TOM GRANT	SHEET NO.

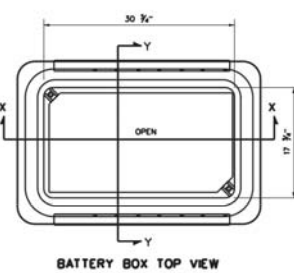
[illegible]

PLAN VIEW

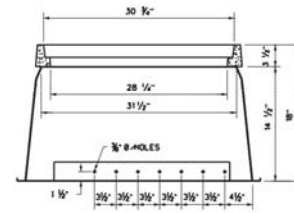


SECTION A - A

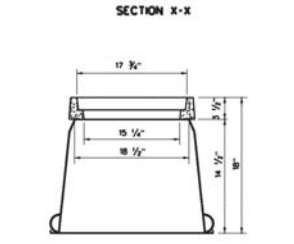
- ① Place aggregate under the box and not in the box. Aggregate should not encroach on the interior volume of the box.
- ② Install bushing or bellend fitting on the upper end of pipe.
- ③ Install all conduits in a neat and workmanlike manner.



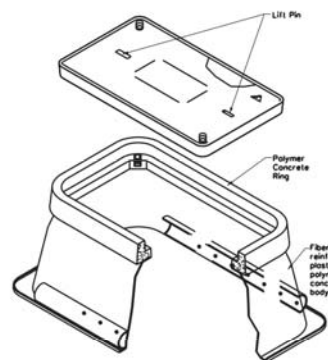
BATTERY BOX TOP VIEW



SECTION X-X



SECTION Y-Y



	Texas Department of Transportation	Traffic Operations Division Standard
ELECTRICAL DETAILS		
BATTERY BOX		
GROUND BOXES		
ED(12)-14		
File #	wtd-18-dgn.	
CNTDST	System 2009	Rev. 000000
DATE	08/17	JOB
DIST	0001	MILE
SAN	TOM GREEN	SHEET NO.

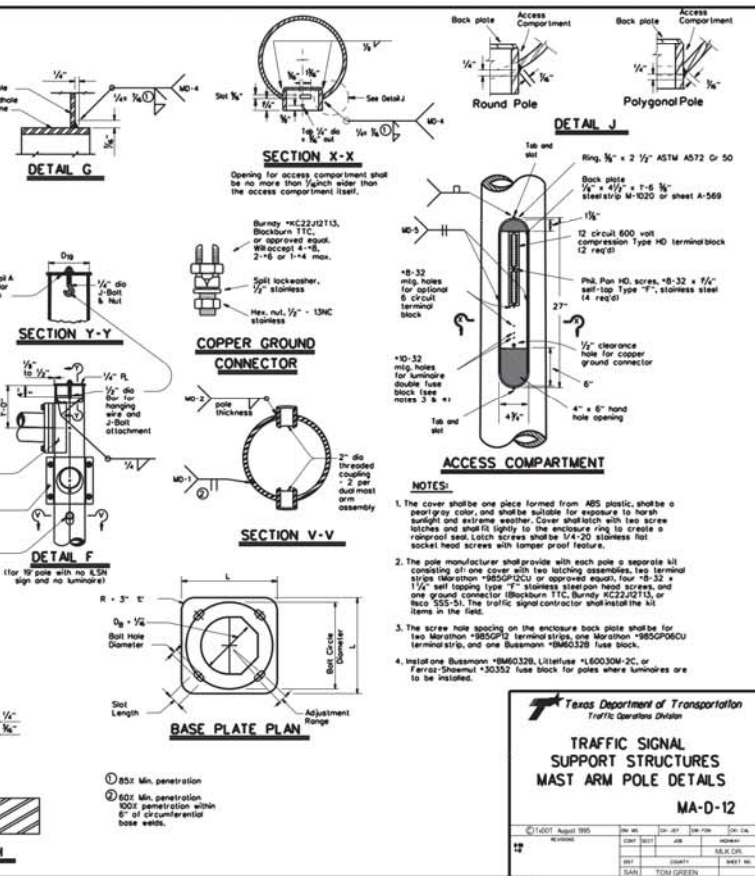
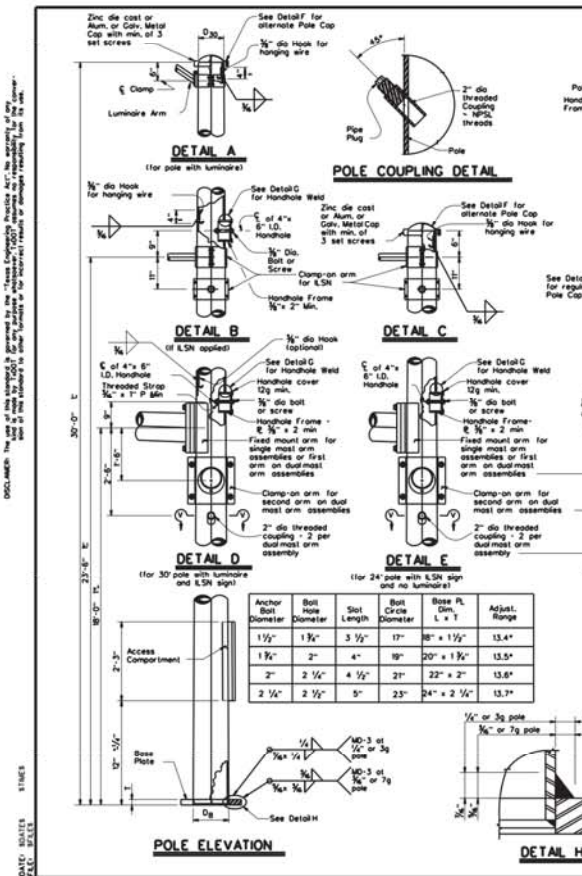
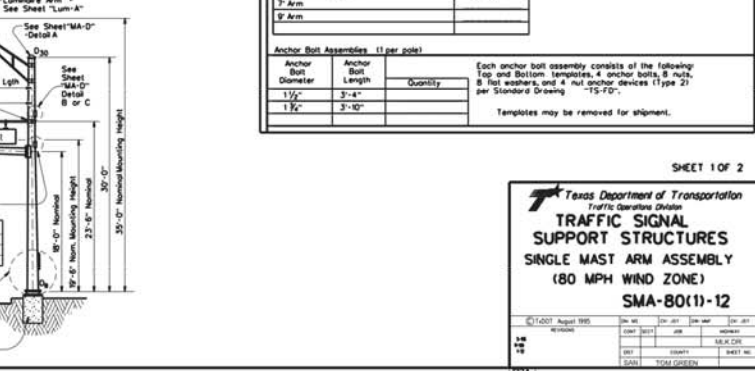
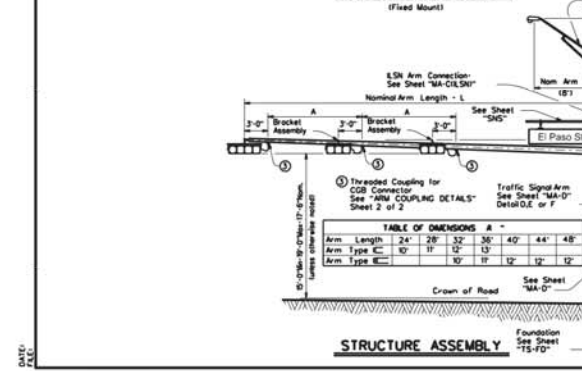
Arm Length	ROUND POLES				Rise	POLYGONAL POLES				Nominal Type	
	D ₁	D ₂	D ₃	D ₄		D ₁	D ₂	D ₃	D ₄		
11	11	11	11	11	11	11	11	11	11	30-A	
20	10.5	7.8	7.1	6.3	12.9	10.5	9.5	8.2	6.8	12.9	30-B
24	11.0	8.3	7.6	6.8	12.9	12.0	9.0	8.2	7.3	12.9	30-C
28	11.5	8.8	8.1	7.3	12.9	12.5	10.0	8.2	7.8	12.9	30-D
32	12.5	9.8	9.1	8.3	12.9	13.0	11.0	8.2	7.5	12.9	30-E
36	12.0	9.3	8.6	7.8	12.9	12.5	10.5	8.2	7.8	12.9	30-F
40	12.0	9.3	8.6	7.8	12.9	13.5	10.5	9.2	8.8	12.9	30-G
44	12.5	9.8	9.1	8.3	12.9	14.0	11.0	9.2	9.3	12.9	30-H
48	13.0	10.3	9.6	8.8	12.9	14.5	11.5	9.2	9.5	12.9	30-I

Arm Length	ROUND MIMS				Rise	POLYGONAL MIMS				Rise
	L ₁	D ₁	D ₂	D ₄		L ₁	D ₁	D ₂	D ₄	
20	19.1	6.5	5.8	5.8	17.9	17.9	7.0	5.5	17.9	17.9
24	23.3	7.5	6.8	6.8	17.9	23.3	7.5	6.8	17.9	17.9
28	27.1	8.0	7.2	7.2	17.9	27.1	8.0	7.2	17.9	17.9
32	31.0	9.0	8.7	7.2	17.9	31.0	9.0	8.5	17.9	20.0
36	35.0	9.5	8.6	7.2	17.9	35.0	10.0	9.0	17.9	20.0
40	39.0	9.5	8.1	7.2	17.9	39.0	9.5	8.5	17.9	20.0
44	43.0	10.0	8.1	7.2	17.9	43.0	10.0	9.0	17.9	20.0
48	47.0	10.5	8.1	7.2	17.9	47.0	11.0	9.5	17.9	20.0

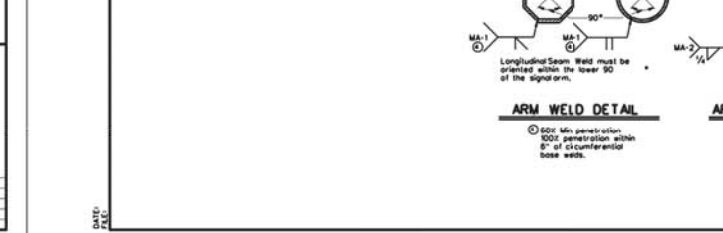
* These dimensions are based on the weight of the material used in the design. The weight of the material used in the design is 1.0 lb/ft. The weight of the material used in the design is 1.0 lb/ft. The weight of the material used in the design is 1.0 lb/ft.

Arm Length	ROUND ARMS				POLYGONAL ARMS				Nominal Type
	L ₁	L ₂	L ₃	L ₄	L ₁	L ₂	L ₃	L ₄	
11	11	11	11	11	11	11	11	11	7-B
20	10.5	7.8	7.1	6.3	12.9	10.5	9.5	8.2	7-B
24	11.0	8.3	7.6	6.8	12.9	12.0	10.0	8.2	7-B
28	11.5	8.8	8.1	7.3	12.9	12.5	10.5	8.2	7-B
32	12.5	9.8	9.1	8.3	12.9	13.0	11.0	8.2	7-B
36	12.0	9.3	8.6	7.8	12.9	12.5	10.5	8.2	7-B
40	12.0	9.3	8.6	7.8	12.9	13.5	11.5	9.2	7-B
44	12.5	9.8	9.1	8.3	12.9	14.0	12.0	9.2	7-B
48	13.0	10.3	9.6	8.8	12.9	14.5	12.5	9.2	7-B

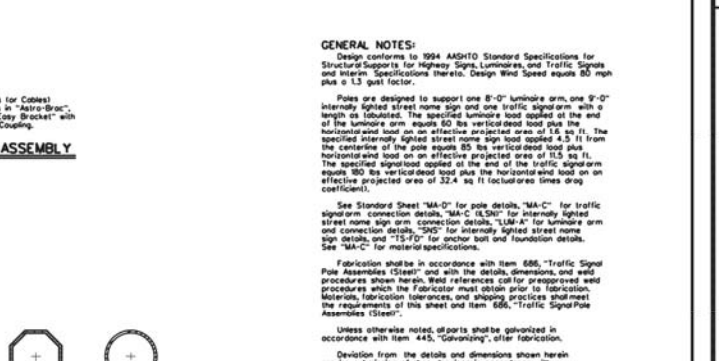
De = Pole Base O.D.
D₁ = Pole Top O.D. with no luminaire and no 6.5N
D₂ = Pole Top O.D. with 6.5N
D₃ = Pole Top O.D. with luminaire
D₄ = Arm Base O.D.
① Thickness shown are minimums, thicker materials may be used.
② D₂ may be increased by up to 1" for polygonal arms.



30' Poles With Luminaire			24' Poles With 6.5N			18' Poles With No Luminaire and No 6.5N		
Designation	Quantity	Designation	Quantity	Designation	Quantity	Designation	Quantity	Designation
20	20-80	205-80	20-80	20	20-80	205-80	20-80	20
24	24-80	245-80	24-80	24	24-80	245-80	24-80	24
28	28-80	285-80	28-80	28	28-80	285-80	28-80	28
32	32-80	325-80	32-80	32	32-80	325-80	32-80	32
36	36-80	365-80	36-80	36	36-80	365-80	36-80	36
40	40-80	405-80	40-80	40	40-80	405-80	40-80	40
44	44-80	445-80	44-80	44	44-80	445-80	44-80	44
48	48-80	485-80	48-80	48	48-80	485-80	48-80	48



1 Bracket Assembly and 2 CGB Connectors			2 Bracket Assemblies and 3 CGB Connectors		
Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20-80	205-80	20-80	20	20-80
24	24-80	245-80	24-80	24	24-80
28	28-80	285-80	28-80	28	28-80
32	32-80	325-80	32-80	32	32-80
36	36-80	365-80	36-80	36	36-80
40	40-80	405-80	40-80	40	40-80
44	44-80	445-80	44-80	44	44-80
48	48-80	485-80	48-80	48	48-80



1 Bracket Assembly and 2 CGB Connectors			2 Bracket Assemblies and 3 CGB Connectors		
Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20-80	205-80	20-80	20	20-80
24	24-80	245-80	24-80	24	24-80
28	28-80	285-80	28-80	28	28-80
32	32-80	325-80	32-80	32	32-80
36	36-80	365-80	36-80	36	36-80
40	40-80	405-80	40-80	40	40-80
44	44-80	445-80	44-80	44	44-80
48	48-80	485-80	48-80	48	48-80



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Comparable standards of Canadian Standard Association, Electrical Testing Laboratories or Factory Mutual can be equal to the referenced UL standard.

