

PLOT DRIVER: RD*11x17*PDF.PIT
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FINAL PLANS

NAME OF CONTRACTOR: _____
DATE OF LETTING: _____
DATE WORK BEGAN: _____
DATE WORK COMPLETED: _____
DATE WORK ACCEPTED: _____
SUMMARY OF CHANGE ORDERS:

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT
STP 2018(889)
CSJ: 1015-01-023

FM 3549

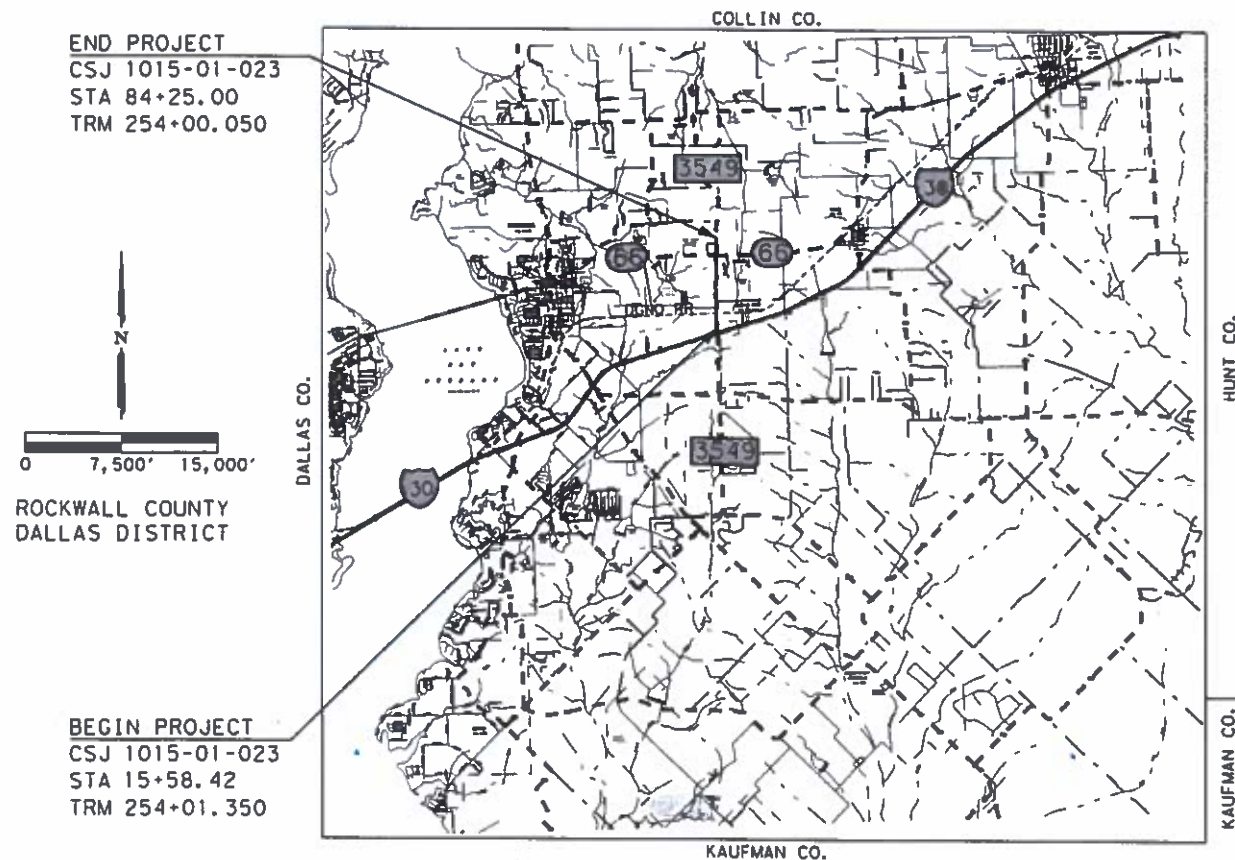
ROCKWALL COUNTY

LIMITS: FROM IH-30 TO NORTH OF SH 66

TOTAL LENGTH OF PROJECT - ROADWAY = 6866.58 FT. = 1.300 MI.
BRIDGE = 000.00 FT. = 0.000 MI.
TOTAL = 6866.58 FT. = 1.300 MI.

TYPE OF WORK: FOR THE CONSTRUCTION OF WIDEN FROM
2 LANE RURAL TO 4 LANE URBAN DIVIDED

CONSISTING OF: GRADING, BASE, DRAINAGE, CONCRETE PAVING,
SIGNING, PAVEMENT MARKINGS, AND TRAFFIC SIGNALS



EQUATIONS: NONE
EXCEPTIONS: NONE
RAILROAD CROSSINGS: DALLAS GARLAND NORTHEASTERN (DGNO) STA. 28+60.89

WORK WAS COMPLETED ACCORDING
TO THE PLANS AND CONTRACT.

_____, P.E.
Signature of Registrant & Date

| | | | | |
|-------------|-------------------|-------------------------|----------|-------------|
| DESIGN TM | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| GRAPHICS TM | 6 | STP 2018(889) | | FM 3549 |
| CHECK WL | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JR | TEXAS | DALLAS | ROCKWALL | 1 |
| | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

| | |
|--------------|--------------|
| ROADWAY | DESIGN SPEED |
| FM 3549 | 45 MPH |
| SH 66 | 40 MPH |
| CROSS STREET | 30 MPH |

EXISTING ADT (2016) = 8,800
PROJECTED ADT (2036) = 13,200

FUNCTIONAL CLASSIFICATION:
URBAN MAJOR COLLECTOR

DESIGN VEHICLE = WB-40

NOTE:

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012)

Registered Accessibility Specialist (RAS) inspection required. TDLR No. EABPRJ:

ATKINS TBPE REG. #F-474
SUBMITTED FOR LETTING 2/15/2018
Tara McDonald, P.E.
CONSULTANT DESIGN ENGINEER OR PROJECT MANAGER
17304 Preston Road, Suite 1300
Dallas, Texas 75252
(972) 818-7275

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING 20

_____, P.E.
DIRECTOR OF TRANSPORTATION
PLANNING & DEVELOPMENT

APPROVED FOR LETTING: 20

_____, P.E.
DISTRICT ENGINEER

RECOMMENDED FOR LETTING 2/23 2018
Jeff A. Bush, P.E.
AREA ENGINEER

INDEX OF SHEETS

DATE: 2/28/2018 TIME: 2:24:28 PM

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| | |
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THE STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Tara McDonald, P.E. 2/28/2018
 Signature of Registrant & Date



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

Jenn-Hwan Ma, P.E. 2/28/2018
 Signature of Registrant & Date



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

Naser Abusaad, P.E. 2/28/2018
 Signature of Registrant & Date

| | | |
|------------------------------|----------------------|--|
| CIVIL ASSOCIATES, INC. | C A I | 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981 |
|------------------------------|----------------------|--|



TBPE REG. # F-474



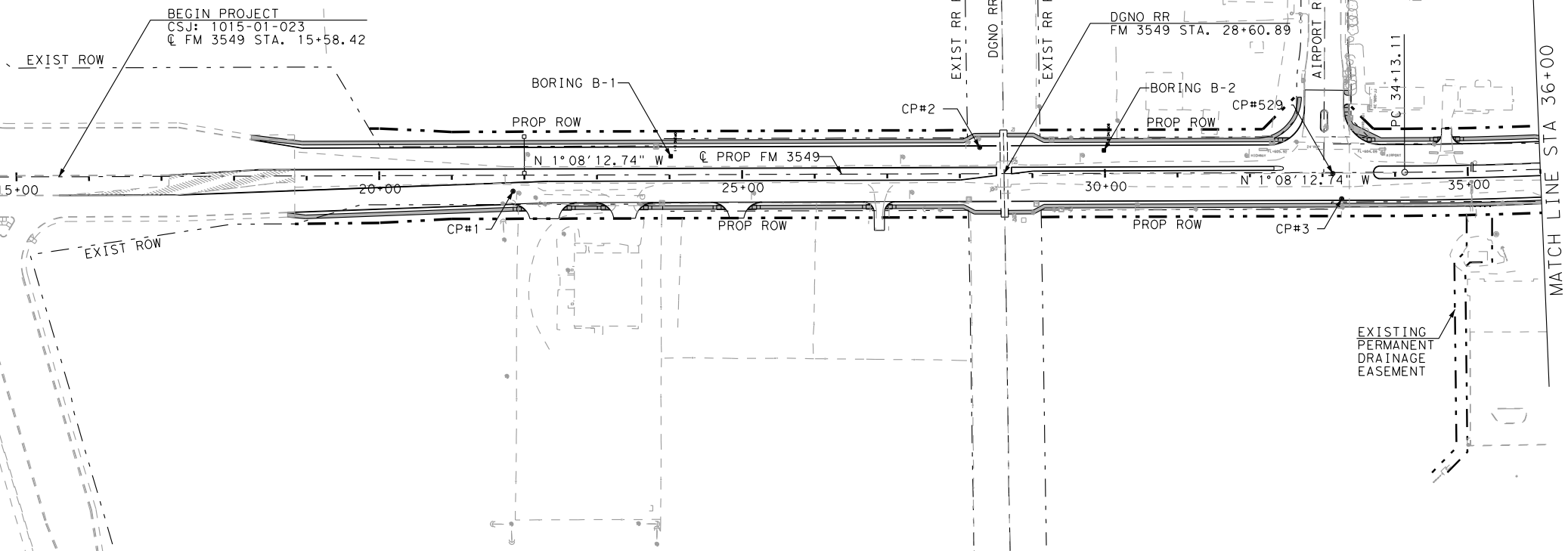
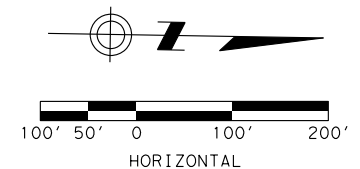
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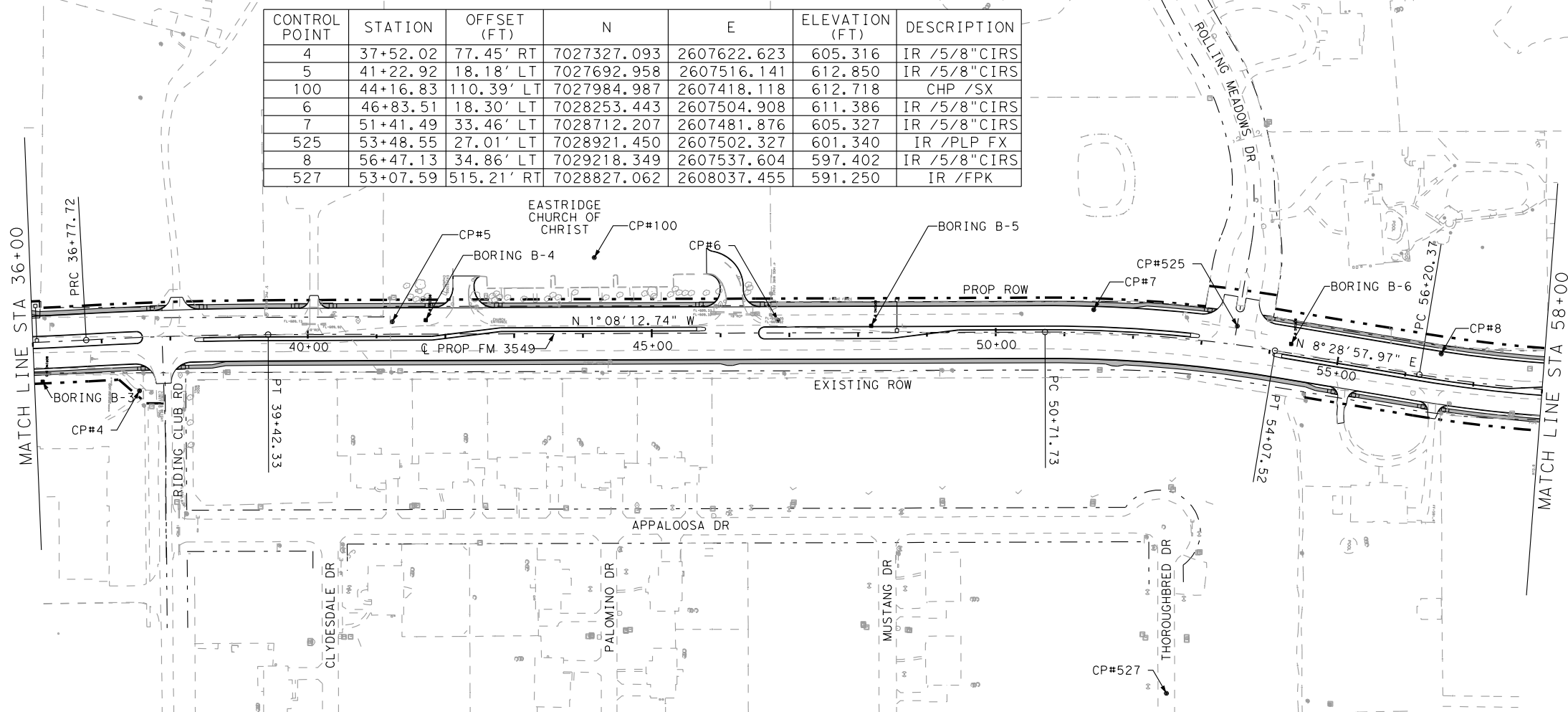
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 2 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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| CONTROL POINT | STATION | OFFSET (FT) | N | E | ELEVATION (FT) | DESCRIPTION |
|---------------|----------|-------------|-------------|-------------|----------------|--------------|
| 1 | 21+84.25 | 22.06' RT | 7025756.000 | 2607608.839 | 604.099 | IR /5/8"CIRS |
| 2 | 28+27.54 | 36.27' LT | 7026398.005 | 2607537.752 | 609.186 | IR /5/8"CIRS |
| 529 | 33+14.08 | 1.42' RT | 7026885.200 | 2607565.780 | 610.030 | IR /MAG NAIL |
| 3 | 33+26.18 | 36.34' RT | 7026897.991 | 2607600.459 | 605.764 | IR /5/8"CIRS |



| CONTROL POINT | STATION | OFFSET (FT) | N | E | ELEVATION (FT) | DESCRIPTION |
|---------------|----------|-------------|-------------|-------------|----------------|--------------|
| 4 | 37+52.02 | 77.45' RT | 7027327.093 | 2607622.623 | 605.316 | IR /5/8"CIRS |
| 5 | 41+22.92 | 18.18' LT | 7027692.958 | 2607516.141 | 612.850 | IR /5/8"CIRS |
| 100 | 44+16.83 | 110.39' LT | 7027984.987 | 2607418.118 | 612.718 | CHP /SX |
| 6 | 46+83.51 | 18.30' LT | 7028253.443 | 2607504.908 | 611.386 | IR /5/8"CIRS |
| 7 | 51+41.49 | 33.46' LT | 7028712.207 | 2607481.876 | 605.327 | IR /5/8"CIRS |
| 525 | 53+48.55 | 27.01' LT | 7028921.450 | 2607502.327 | 601.340 | IR /PLP FX |
| 8 | 56+47.13 | 34.86' LT | 7029218.349 | 2607537.604 | 597.402 | IR /5/8"CIRS |
| 527 | 53+07.59 | 515.21' RT | 7028827.062 | 2608037.455 | 591.250 | IR /FPK |



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 TBPE REG. # F-474

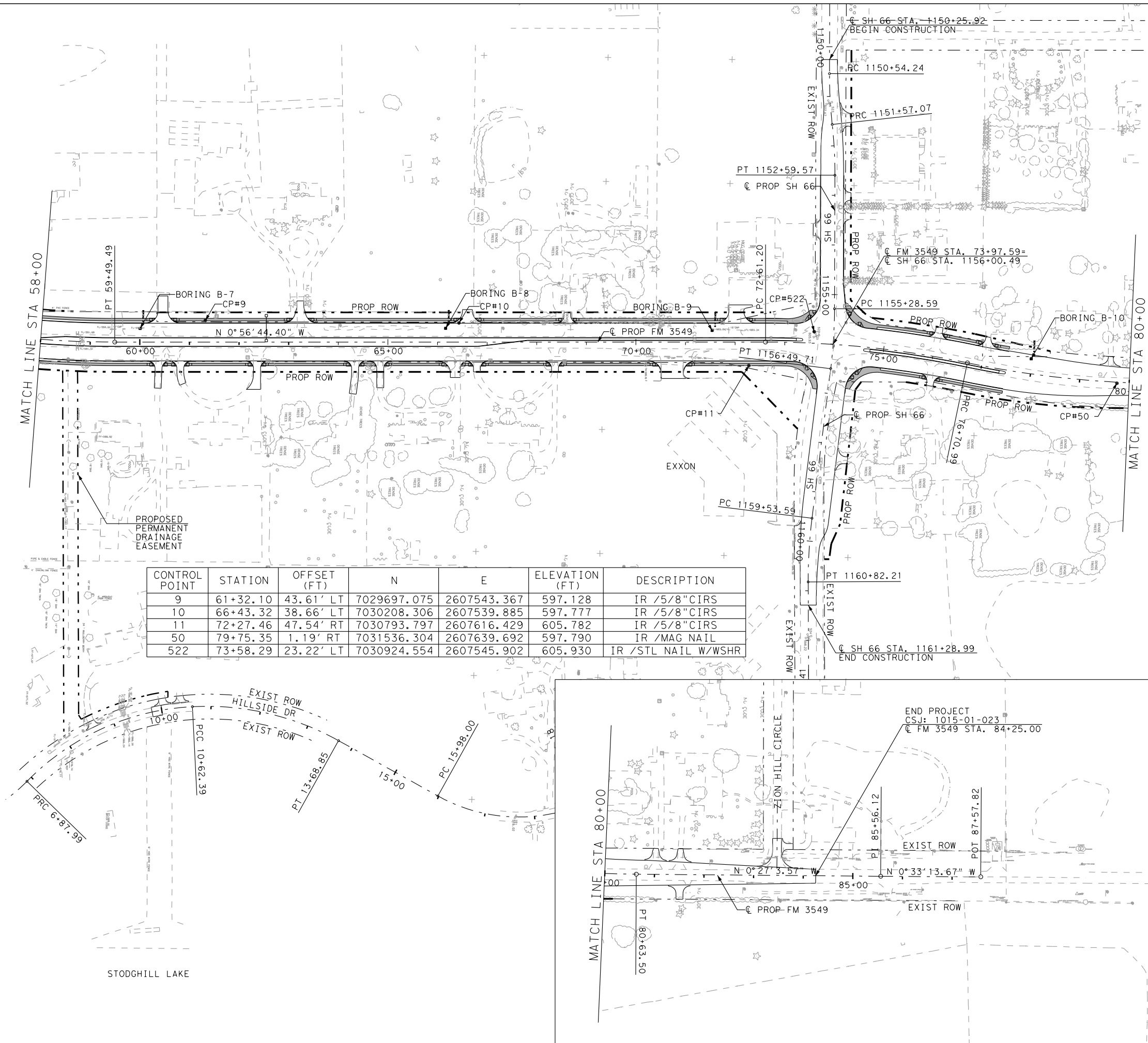


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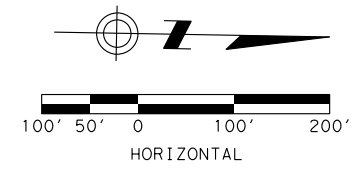
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SHEET 1 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 3 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



| CONTROL POINT | STATION | OFFSET (FT) | N | E | ELEVATION (FT) | DESCRIPTION |
|---------------|----------|-------------|-------------|-------------|----------------|---------------------|
| 9 | 61+32.10 | 43.61' LT | 7029697.075 | 2607543.367 | 597.128 | IR /5/8" CIRS |
| 10 | 66+43.32 | 38.66' LT | 7030208.306 | 2607539.885 | 597.777 | IR /5/8" CIRS |
| 11 | 72+27.46 | 47.54' RT | 7030793.797 | 2607616.429 | 605.782 | IR /5/8" CIRS |
| 50 | 79+75.35 | 1.19' RT | 7031536.304 | 2607639.692 | 597.790 | IR /MAG NAIL |
| 522 | 73+58.29 | 23.22' LT | 7030924.554 | 2607545.902 | 605.930 | IR /STL NAIL W/WSHR |



Tara McDonald

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PROJECT LAYOUT

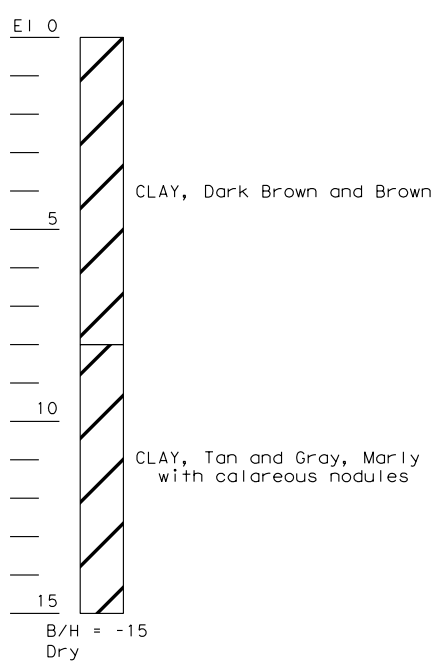
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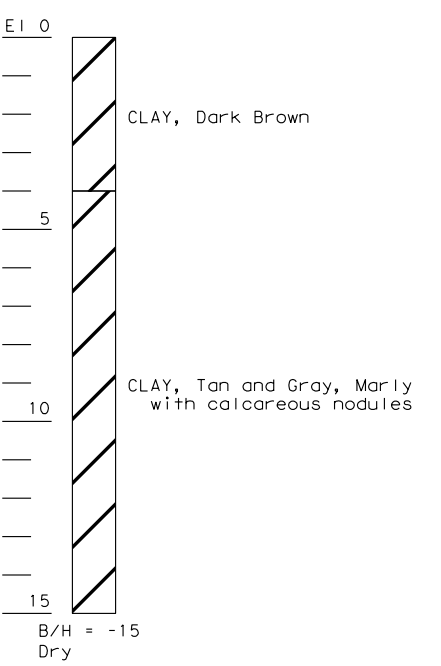
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 4 |
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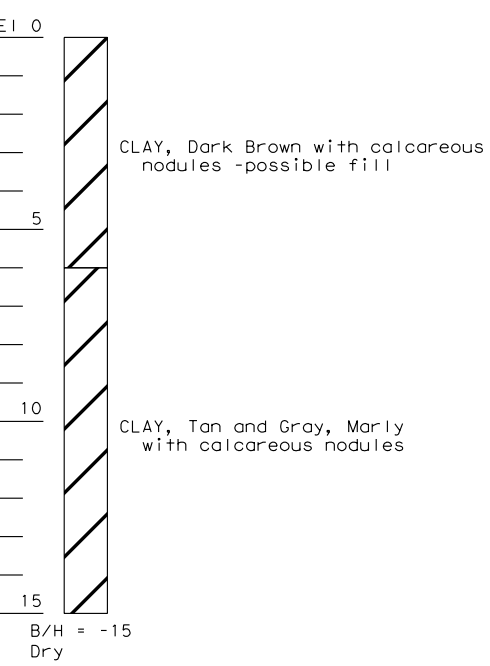
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Sta. 24+01.89, 25.50' Lt.



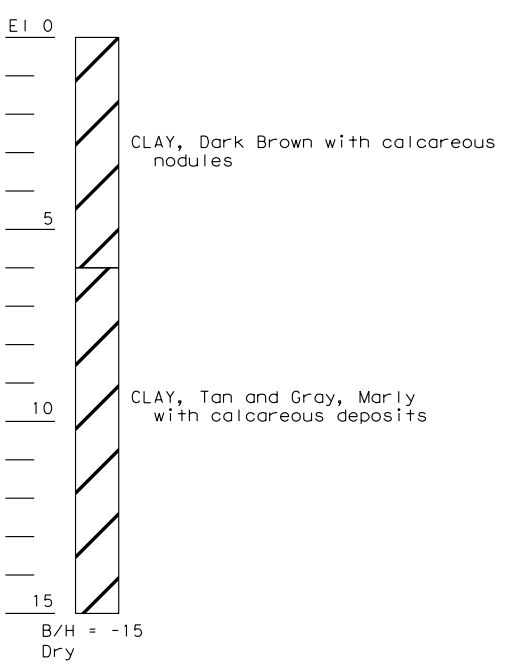
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Sta. 29+98.75, 31.56' Lt.



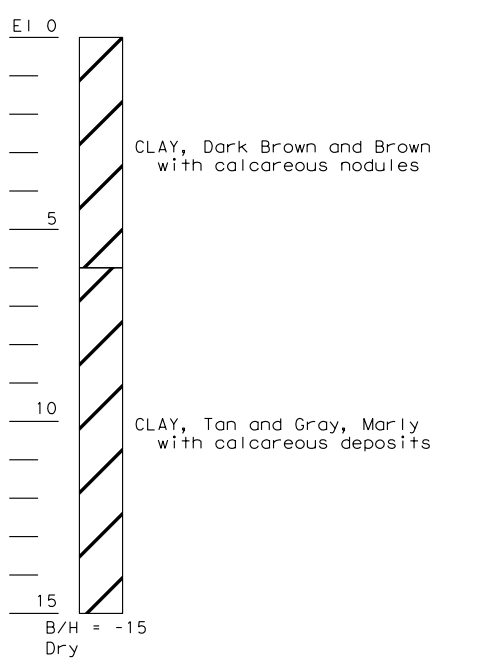
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Sta. 36+11.85, 57.38' Rt.



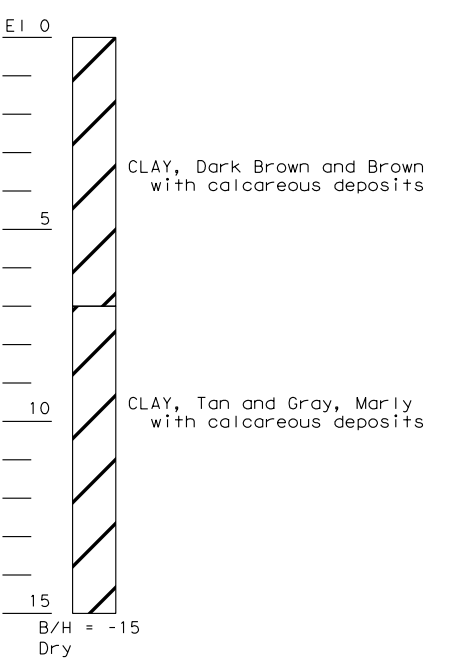
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Sta. 41+71.51, 20.33' Lt.



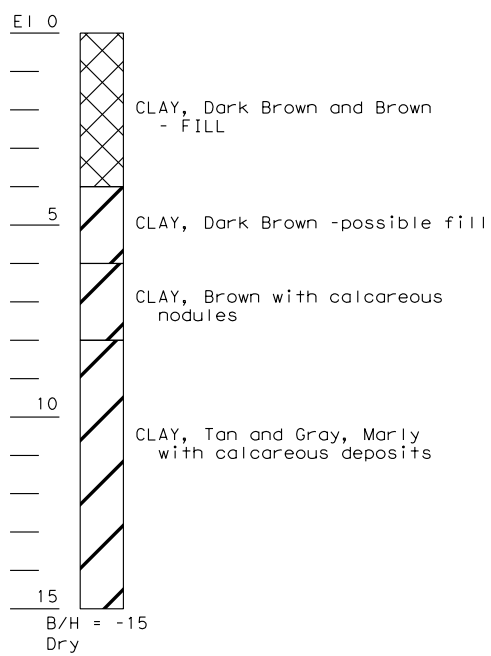
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Sta. 48+18.96, 9.84' Lt.



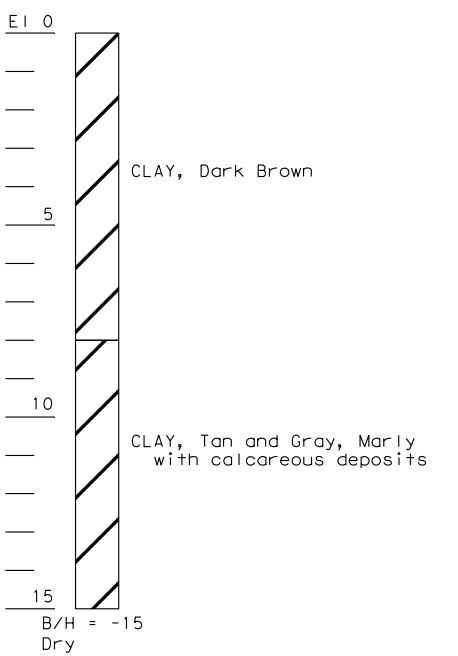
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Sta. 54+29.21, 13.39' Lt.



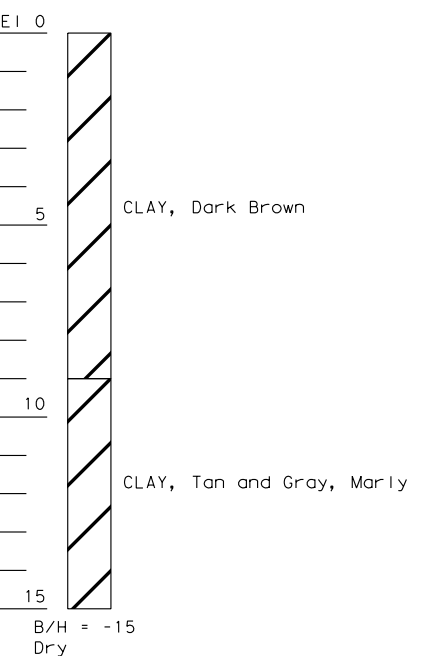
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Sta. 60+00.60, 27.49' Lt.



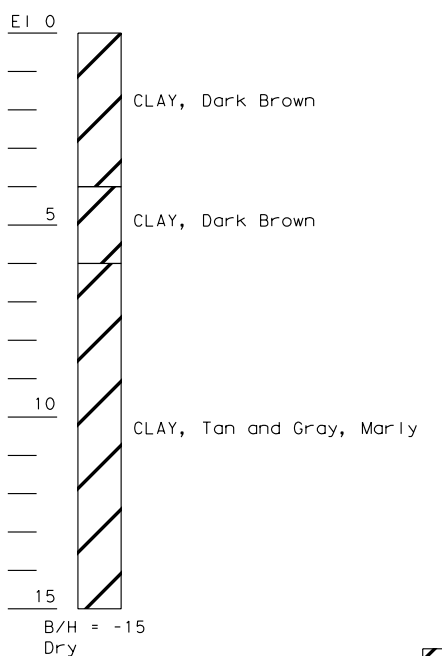
BORING B-8
Sta. 66+16.42, 27.62' Lt.



BORING B-9
Sta. 71+53.58, 23.37' Lt.



BORING B-10
Sta. 77+97.17, 30.62' Lt.



LEGEND

- (CH), HIGH PLASTICITY CLAY
- FILL



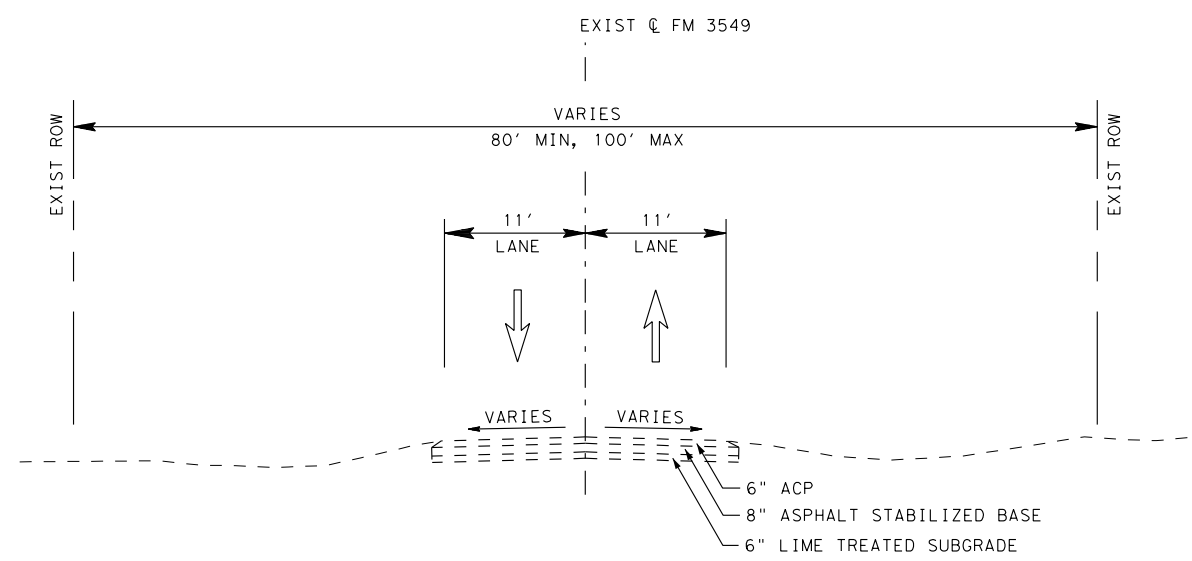
Tara McDonald

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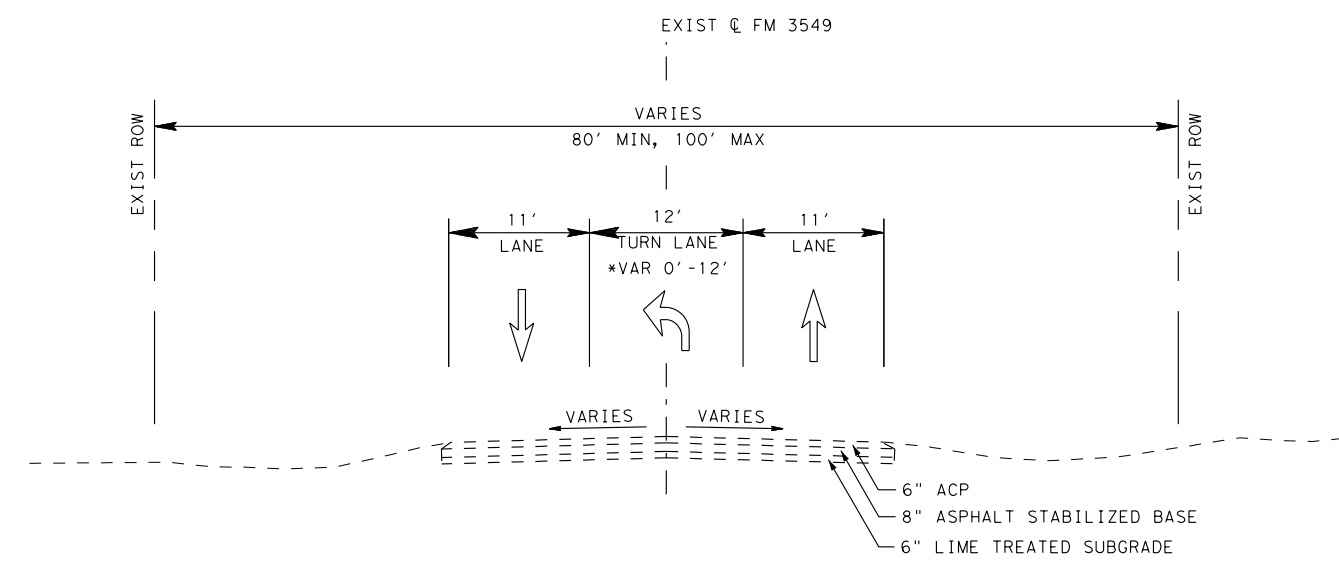
SOIL BORE LOGS

| | | | |
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| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY |
| CHECK WL | TEXAS | DALLAS | ROCKWALL |
| CHECK WL | CONTROL | SECTION | JOB |
| | 1015 | 01 | 023 |
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FM 3549 EXISTING TYPICAL SECTION

STA. 18+83.42 TO STA. 29+09.55
 STA. 34+96.85 TO STA. 39+89.22
 STA. 48+57.68 TO STA. 84+25.00



FM 3549 EXISTING TYPICAL SECTION

*STA. 29+09.55 TO STA. 30+47.05
 STA. 30+47.05 TO STA. 33+78.93
 *STA. 33+78.93 TO STA. 34+96.85
 *STA. 39+89.22 TO STA. 41+73.22
 STA. 41+73.22 TO STA. 46+71.92
 *STA. 46+71.92 TO STA. 48+57.68



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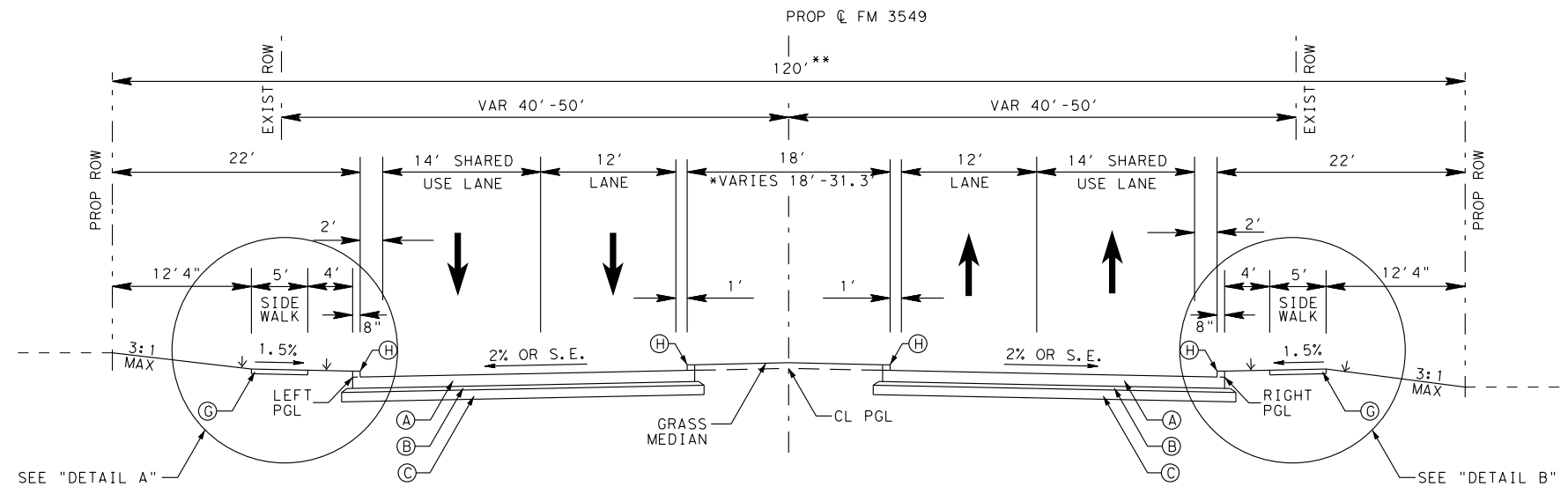


TYPICAL SECTIONS
 FM 3549

SCALE: 1"=15'H SHEET 1 OF 8

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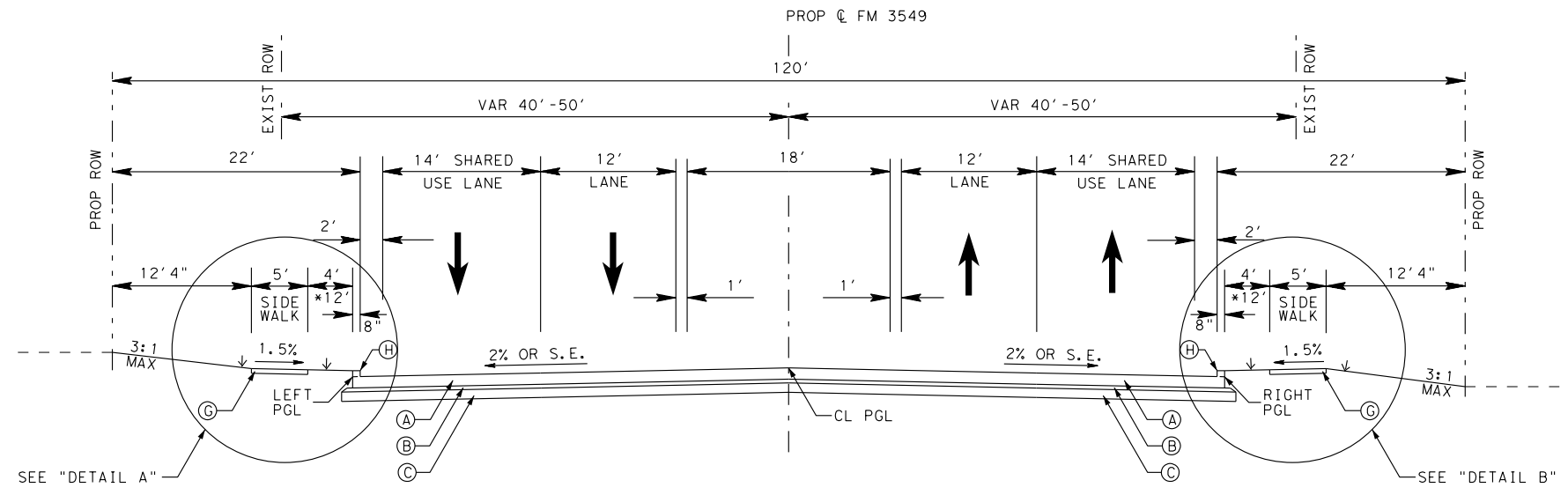
FM 3549 PROPOSED TYPICAL SECTION

*STA. 18+83.42 TO STA. 22+32.93
 STA. 22+32.93 TO STA. 28+00.93
 STA. 33+78.89 TO STA. 37+50.93
 STA. 46+64.12 TO STA. 48+46.08
 STA. 58+50.45 TO STA. 66+81.31

** 120' TO 130' ROW FROM STA 18+83.42 TO STA 20+00.00
 110' ROW FROM STA 36+13.01 TO STA 38+20.84
 100' 5" TO 132' 2" ROW FROM 38+20.84 TO 54+60.52

DETAIL A
 STA. 36+10.98 TO STA. 51+97.83

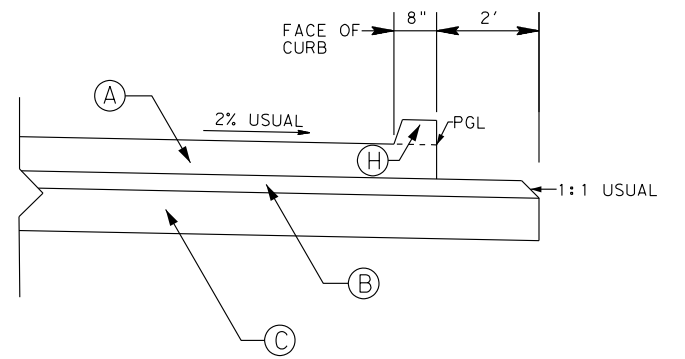
DETAIL B
 STA. 38+80.04 TO STA. 54+59.78



FM 3549 PROPOSED TYPICAL SECTION

*STA. 28+50.89 TO STA. 28+70.89
 STA. 32+45.93 TO STA. 33+78.89
 STA. 37+50.93 TO STA. 38+35.34
 STA. 45+78.32 TO STA. 46+64.12
 STA. 52+96.08 TO STA. 54+05.45

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



CRCP STRUCTURE



Tara McDonald

2/26/2018

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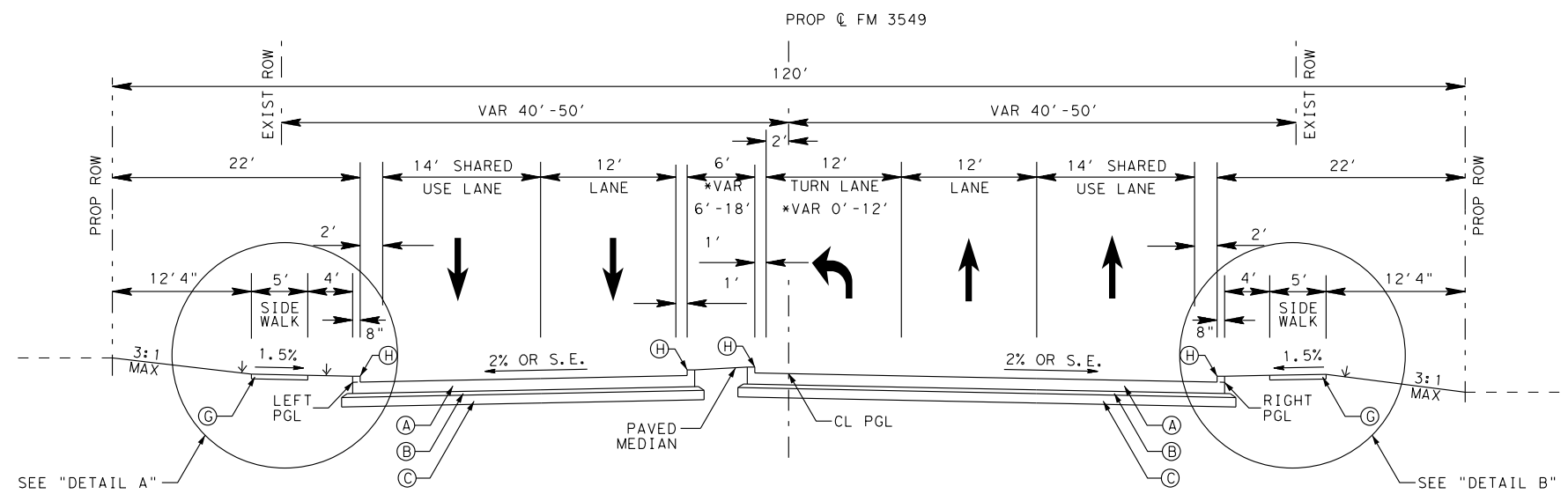


TYPICAL SECTIONS
FM 3549

SCALE: 1"=15'H SHEET 2 OF 8

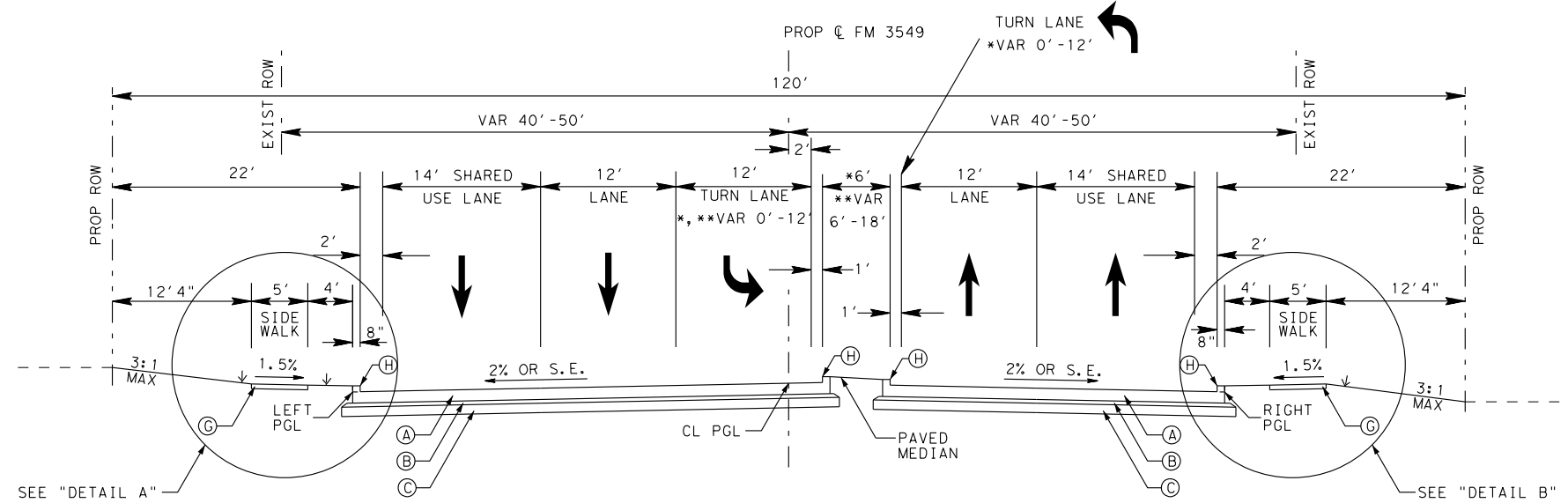
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|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 7 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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FM 3549 PROPOSED TYPICAL SECTION

- *STA. 28+00.93 TO STA. 28+50.89
- *STA. 28+70.89 TO STA. 29+00.93
- STA. 29+00.93 TO STA. 32+45.93
- STA. 42+80.34 TO STA. 45+78.32
- *STA 48+46.08 TO STA. 49+46.08
- STA. 49+46.08 TO STA. 52+96.08
- *STA. 66+81.31 TO STA. 67+81.31
- STA. 67+81.31 TO STA. 73+04.62

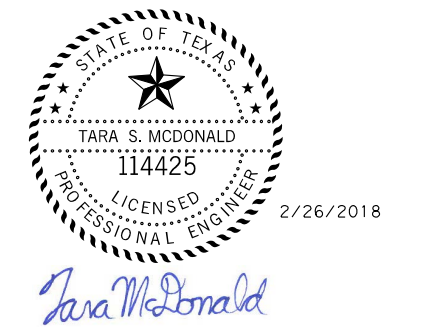


FM 3549 PROPOSED TYPICAL SECTION

- STA. 38+35.34 TO STA. 41+80.34
- *STA. 41+80.34 TO STA. 42+80.34
- STA. 54+05.45 TO STA. 57+50.45
- **STA. 57+50.45 TO STA. 58+50.45

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE

NOTE:
 1. SEE DETAIL A AND B SHOWN ON SHEET 2 OF 6.



| NO. | DATE | REVISION | BY |
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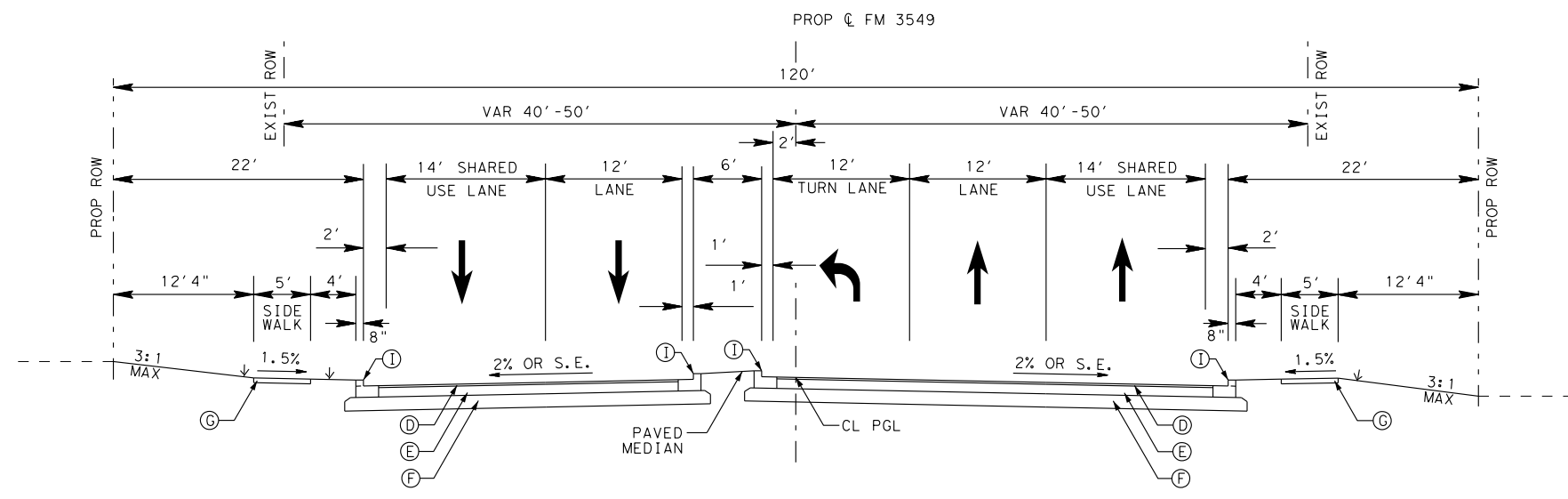


TYPICAL SECTIONS
 FM 3549

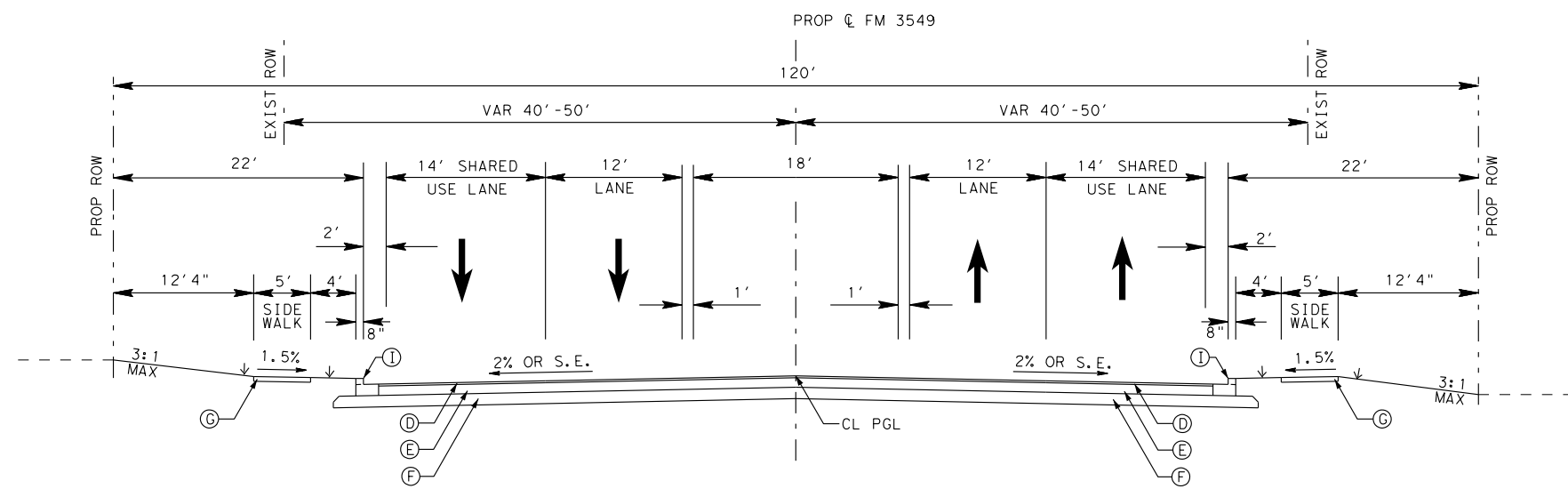
SCALE: 1"=15'H SHEET 3 OF 8

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK | TEXAS | DALLAS | ROCKWALL | 8 |
| WL | CONTROL | SECTION | JOB | |
| CHECK | 1015 | 01 | 023 | |

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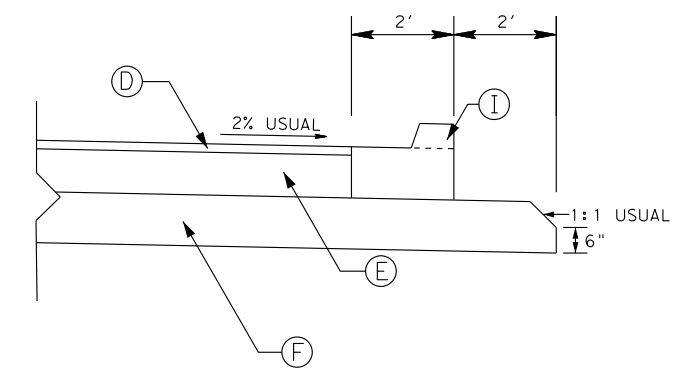


FM 3549 PROPOSED TYPICAL SECTION
 STA. 73+04.35 TO STA. 73+36.09

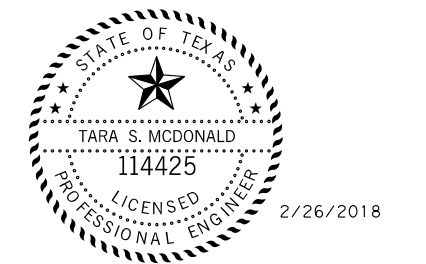


FM 3549 PROPOSED TYPICAL SECTION
 STA. 73+36.09 TO STA. 74+59.65

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



HMAC STRUCTURE



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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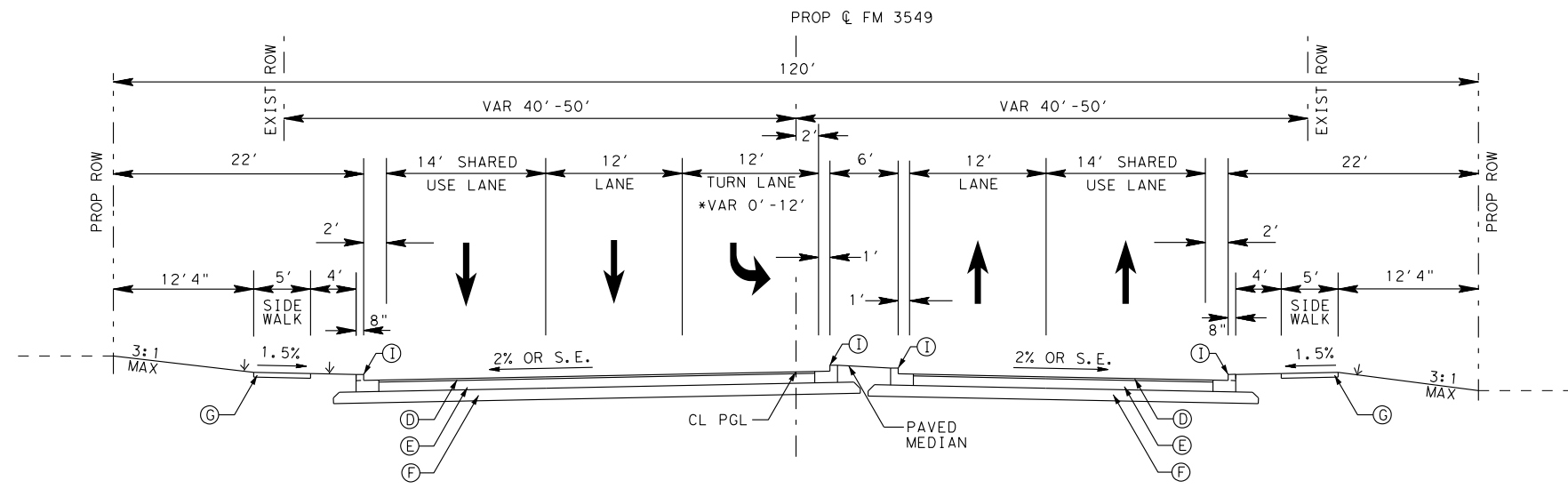


TYPICAL SECTIONS
 FM 3549

SCALE: 1"=15'H SHEET 4 OF 8

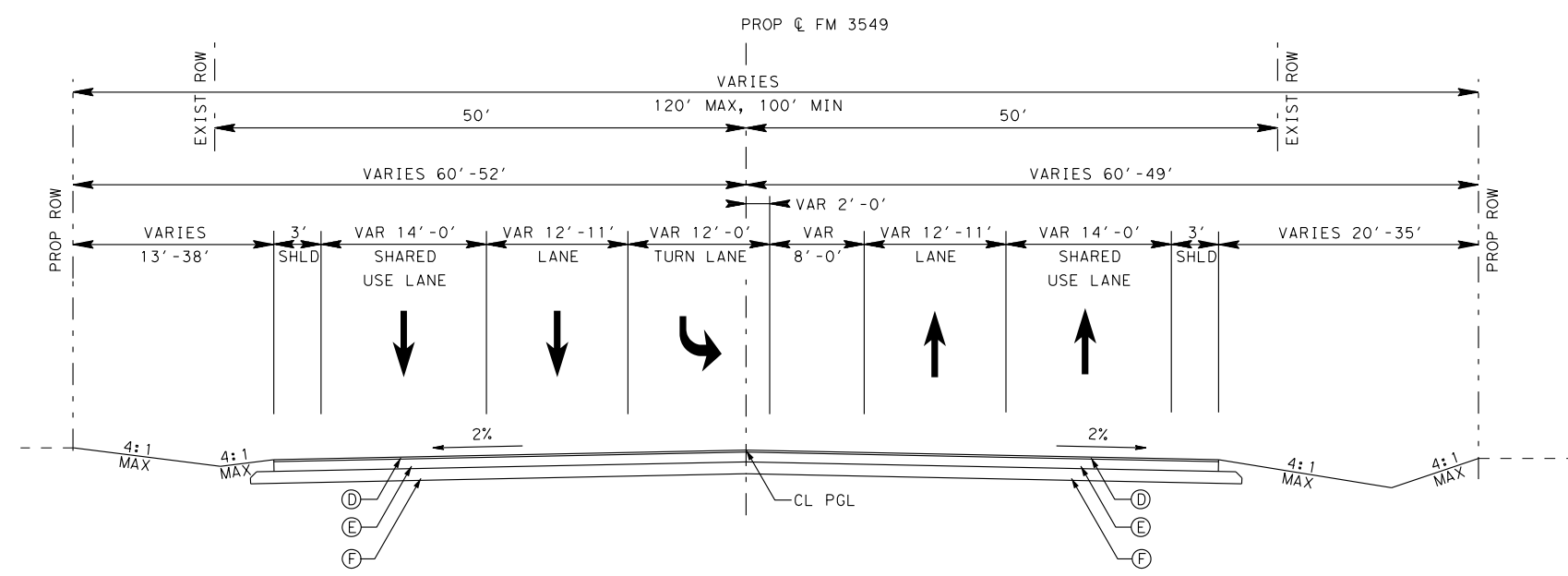
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 9 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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FM 3549 PROPOSED TYPICAL SECTION
 STA. 74+59.65 TO STA. 77+50.00

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



FM 3549 PROPOSED TYPICAL SECTION
 STA. 77+50.00 TO STA. 84+25.00



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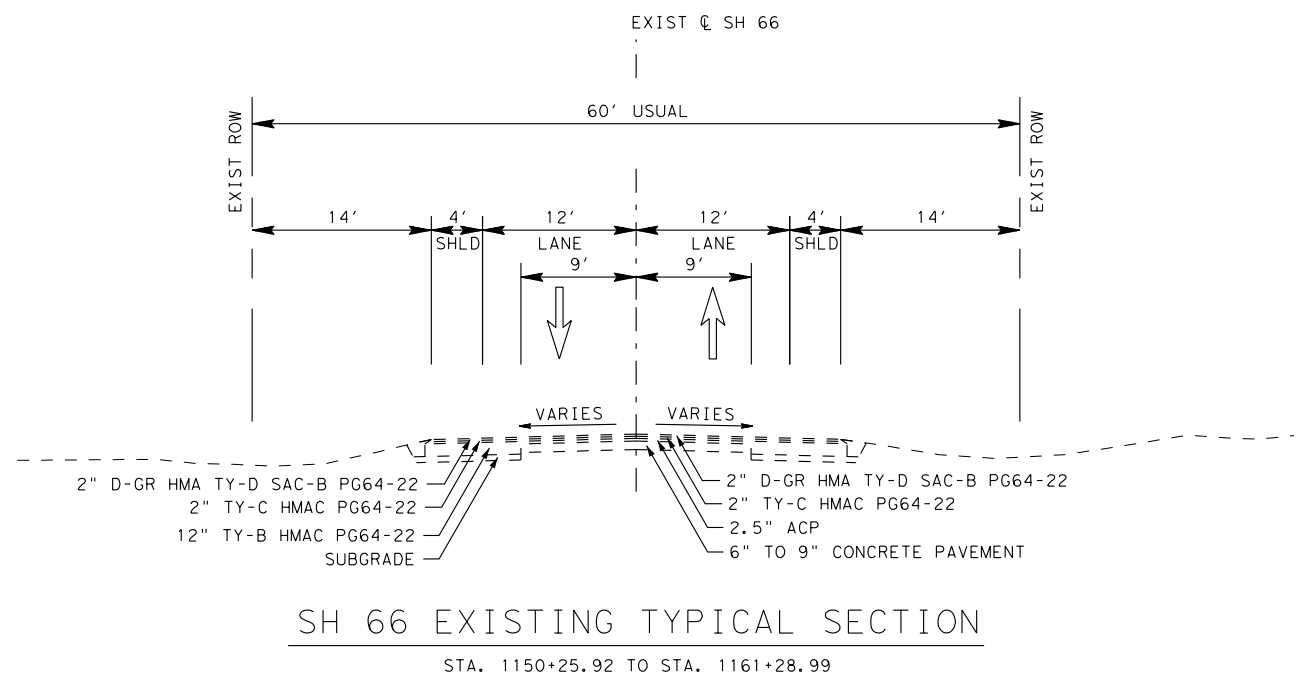


TYPICAL SECTIONS
 FM 3549

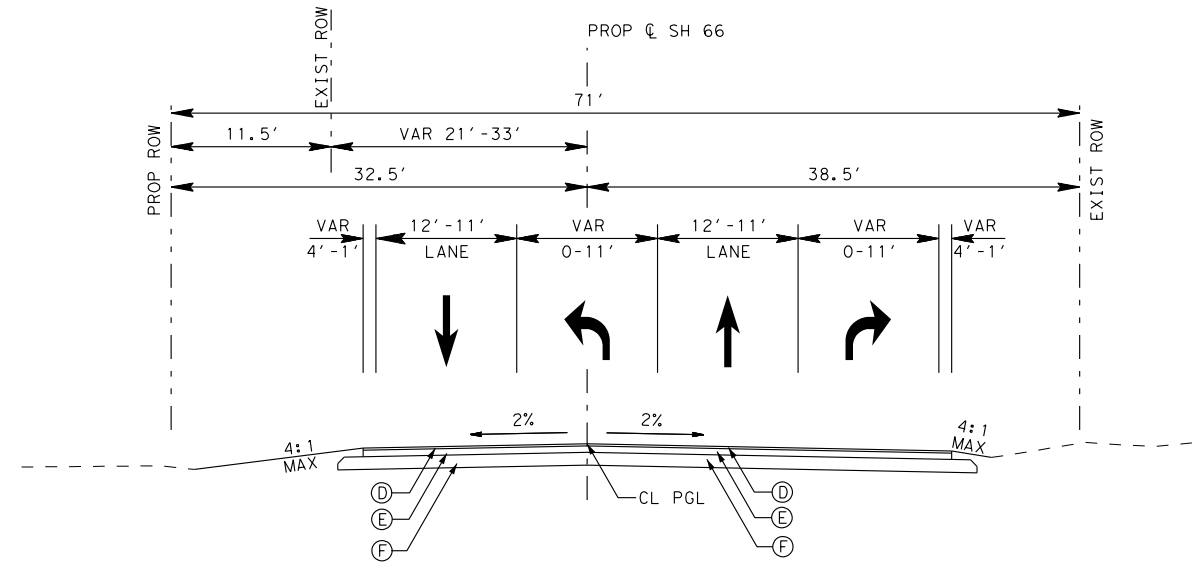
SCALE: 1"=15'H SHEET 5 OF 8

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
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| TM | TEXAS | DALLAS | ROCKWALL | 10 |
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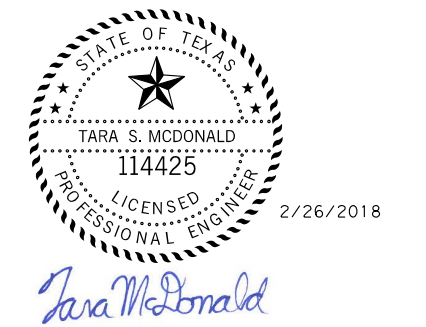


SH 66 EXISTING TYPICAL SECTION
 STA. 1150+25.92 TO STA. 1161+28.99



SH 66 PROPOSED TYPICAL SECTION
 STA. 1150+25.92 TO STA. 1152+59.57

- LEGEND
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



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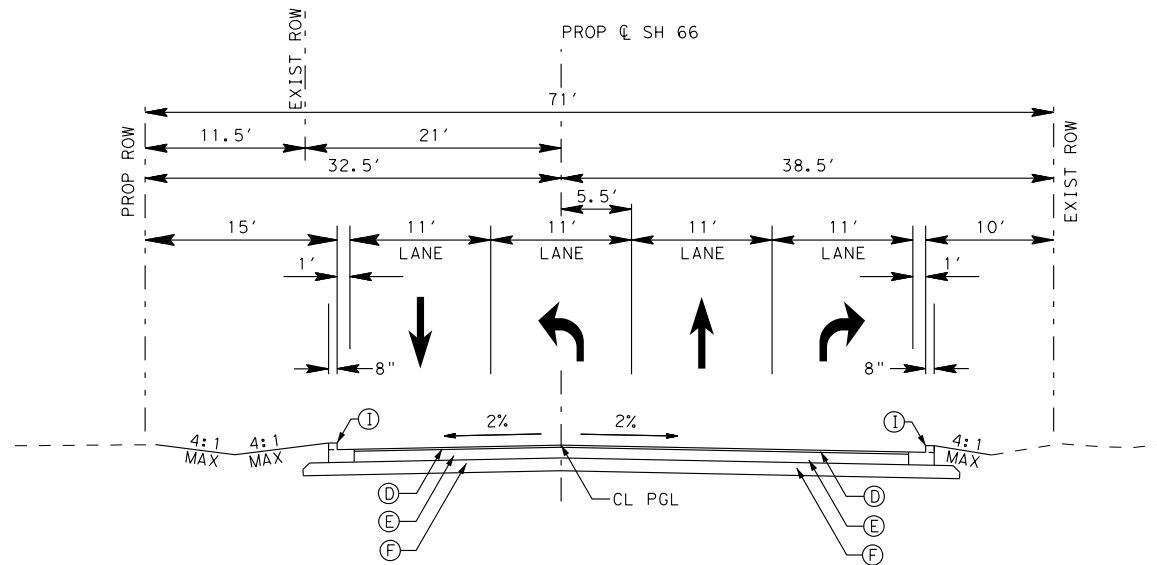


TYPICAL SECTIONS
 SH 66

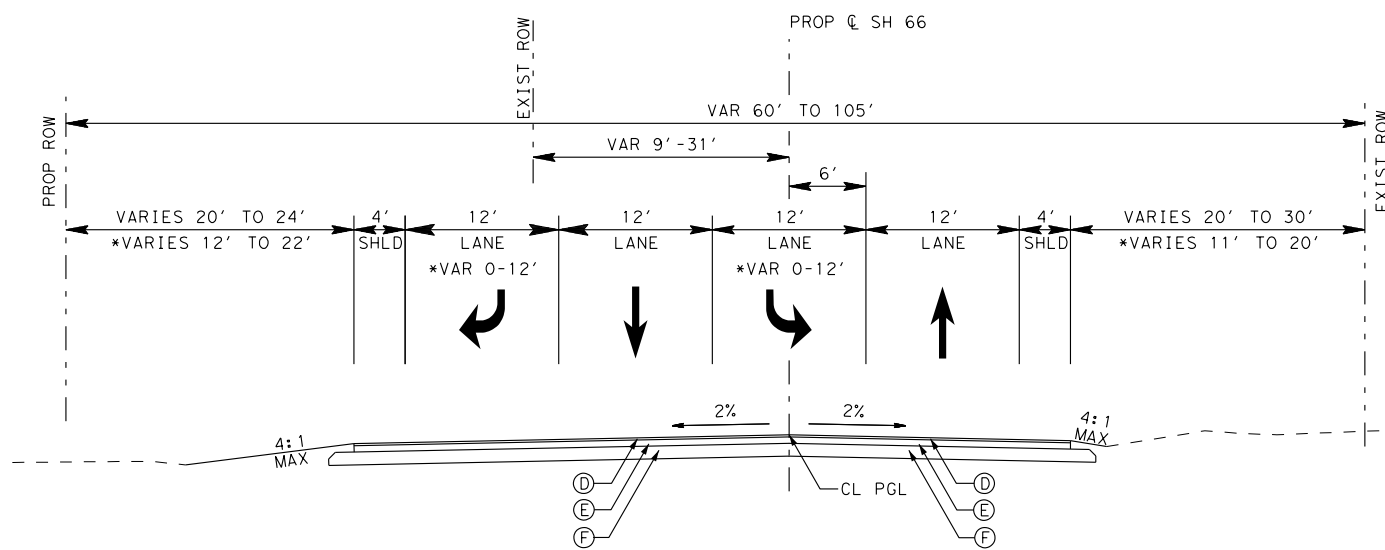
SCALE: 1"=15'H SHEET 6 OF 8

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 11 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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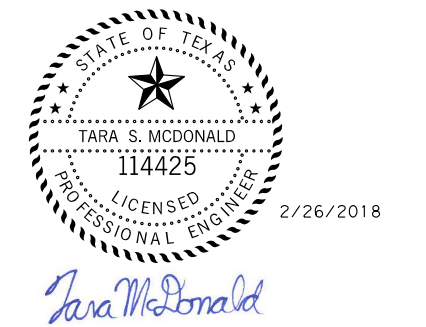


SH 66 PROPOSED TYPICAL SECTION
 STA. 1152+59.57 TO STA. 1155+08.90



SH 66 PROPOSED TYPICAL SECTION
 STA. 1156+94.13 TO STA. 1159+07.97
 *STA. 1159+07.97 TO STA. 1161+28.99

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



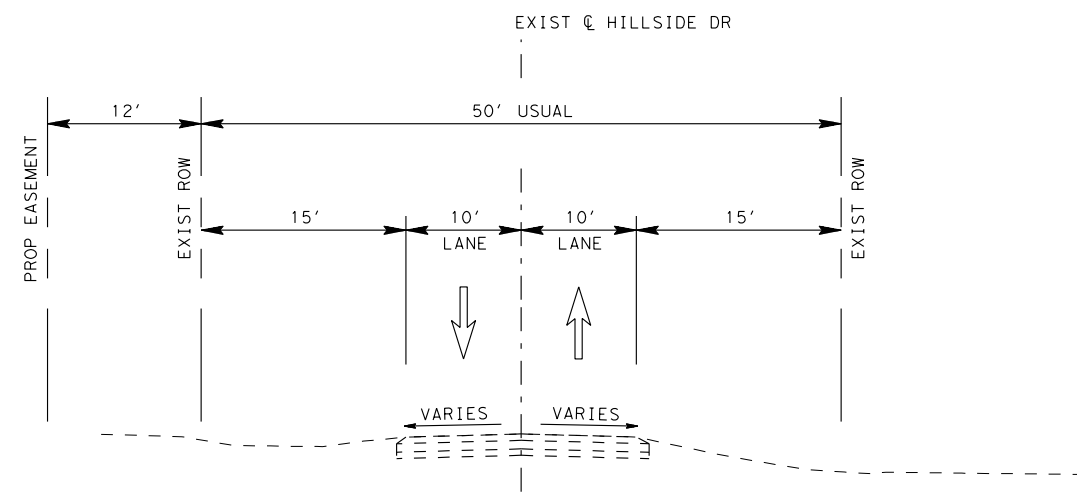
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TYPICAL SECTIONS
 SH 66

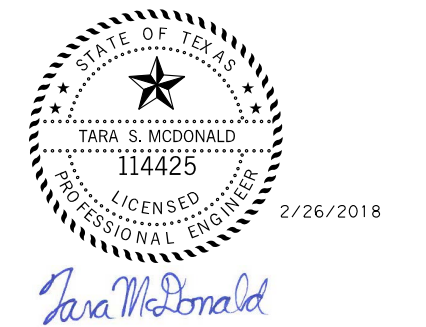
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 12 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



HILLSIDE DR EXISTING TYPICAL SECTION
 STA. 9+80.35 TO STA. 10+00.35

- LEGEND**
- (A) CONC PAV (CONT REIN - CRCP) (8")
 - (B) SUPERPAVE MIXTURES SP-B PG64-22 (4")
 - (C) LIME TRT (10") (8% LIME)
 - (D) SUPERPAVE MIXTURES SP-D PG64-22 (2")
 - (E) SUPERPAVE MIXTURES SP-B PG64-22 (10")
 - (F) FLEX BASE TY D GR1-2 (12")
 - (G) CONC SIDEWALK (4")
 - (H) CURB (MONO) (TY II)
 - (I) 2' CONC CURB AND GUTTER (12" THICK)
 - PGL PROFILE GRADE LINE



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TYPICAL SECTIONS
 HILLSIDE DR

SHEET 8 OF 8

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 13 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

SPECIFICATION DATA

| Table 1: Soil Constants Requirements | | | | |
|--------------------------------------|--------------------------|------------------|-----|------|
| Item | Description | Plasticity Index | | Note |
| | | Max | Min | |
| 132 | Embk(Dens Cont)(Type C1) | 40 | 8 | 1 |

Note 1: Material excavated from the project must meet the PI requirements when used in the top 10 feet of embankment that supports the pavement structure or other locations shown in the plans. Do not use shale and obtain approval to incorporate shaley clay produced by the construction project.

| Table 2: Basis of Estimate for Permanent Construction | | | | | |
|---|-----------------------------------|-----------|------|-----------|----------|
| Item | Description | Thickness | Rate | | Quantity |
| 162 | Block Sod | 4" | | | 27,489 |
| 166 * | Fertilizer (12-6-6) | N/A | 500 | Lb/Ac | 1.41 |
| 168 | Vegetative Watering** | N/A | 7 | MG/Ac/Day | 1,015.2 |
| 260 | LIME (HYD, COM, OR QK(SLURRY)) | | | 8% by wt | 1,387 |
| 344 | Superpave Mixtures SP-B, PG 64-22 | | 110 | Lbs/SY/ln | 17,269 |
| | Superpave Mixtures SP-D, PG 64-22 | | 110 | Lbs/SY/ln | 1,418 |
| * For contractor's information only | | | | | |
| **Adjust for actual field conditions/temperatures as necessary. See Vegetation Establishment Plan Sheet for estimated daily rates. | | | | | |
| Note: (1) Base material weight based on 1.50 Ton/CY (dry- compacted) (2) Asphalt weight based on 110 Lbs/SY/ln (3) Subgrade weight based on 1.35 Ton/CY (dry-compacted) | | | | | |

| Table 3: Basis of Estimate for Temporary Erosion Control Items | | | | |
|--|-------------------------------------|--------------------|-----------|----------|
| Item | Description | Rate | | Quantity |
| 164 | Drill Seeding (Temp) (Warm or Cool) | See Specifications | | 17,838 |
| 166* | Fertilizer (12-6-6) | 500 | Lb/Ac | 3.6 |
| 168 | Vegetative Watering** | 7 | MG/Ac/Day | 2,658 |
| *For Contractor's Information Only. **Adjust for Actual Field Conditions/Temperatures as Necessary. See Vegetation Establishment Sheet for estimated daily rates. | | | | |

GENERAL

The construction, operation and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

The disturbed area for this project, as shown on the plans is 22.52 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

This project required permits with environmental resources agencies. There is a high probability that an environmentally sensitive area could be encountered on the contractor designated Project-Specific Locations (PSL) for this project (haul roads, equipment staging areas, borrow pits, disposal sites, field offices, storage areas, parking areas, etc.). Item 7.6 "Project-Specific Locations", provides a listing of regulatory agencies that may need to be contacted regarding this project.

Leave all right of way areas undisturbed until actual construction is to be performed in said areas.

Item 2:

Submit pre-letting questions, by email only, to the attention of Area Engineer or Assistant Area Engineer.

Area Engineer's Email: Jeffrey.Bush@txdot.gov

Assistant Area Engineer's Email: Brenda.Callaway@txdot.gov

Answers will be provided by email.

In addition, an electronic file containing pre-letting questions, answers and cross section files in only .pdf format will be uploaded to the following site that can be downloaded by using the Login Name and Password as follows:

FTP Website Address: <ftp://ftp.dot.state.tx.us>

Login Name: Kaufman-ao-ro

Password: L26B29

Paper copies of cross-sections may be produced by using the provided .pdf file located on the above FTP Website at the bidders' expense. This data is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with appropriate plans, specifications and estimate for the project.

Item 5:

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (214-320-6682) for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (214-320-6636) for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

For the project to be deemed complete, permanently stabilize all unpaved disturbed areas of the project with a vegetative cover at a minimum of 70% density for the control of erosion.

Item 7:

Repair or replace any structures and utilities that might have been damaged by negligence or a failure to have utility locates performed.

Perform all electrical work in accordance with the National Electrical Code and Texas Department of Transportation Specifications.

Consult with appropriate electric company representatives according to their respective area to coordinate electrical services installations.

No significant traffic generator events identified in this project.

Item 8:

This Project will be a Five-Day Workweek in accordance with Article 8.3.1.1. The Contractor has option of working on Saturday. The Saturday workday will be counted as official working day.

Meet weekly with the engineer to notify him or her of planned work for the upcoming week.

Provide the engineer with a daily work schedule of planned work.

Critical Path Method (CPM) schedule in P6 format will be required for this project. Submit baseline schedule and obtain approval prior to beginning construction. The baseline schedule working days will be the same as the number of working days established by the Contract. The Estimate will be held if monthly update is not submitted.

Item 100:

Remove the existing roadway small signs, delineators and object markers as shown on the plans, or as directed, during construction within the right of way. Small sign, delineator and object marker removals are subsidiary to this Item.

The limits of preparing right of way will be measured from Sta. 15+58.42 to Sta. 84+25.00 along the centerline of FM 3549 construction and from Sta. 8+35.00 to 10+00.00 along the centerline of Hillside Dr.

Item 104:

In those areas where the pavement is not to be overlaid, provide a smooth surface after the curb removal. Planing or grinding is considered an acceptable method at these locations. Measurement and payment is in accordance with this item.

Sawing of concrete is not paid for directly, but is considered subsidiary to this item.

Item 105:

Take possession of recycled asphalt pavement from the project and recycle the material.

Properly dispose of unsalvageable material at your own expense.

Saw existing asphalt along neat lines where portions are to be left in place temporarily or permanently. Sawing is not paid for directly, but is subsidiary to this item.

Item 110:

Excavated shale is not an acceptable material for embankment.

Items 110 and 132:

Scarify and loosen the excavated areas, unpaved surface areas, except rock, to a depth of at least 8 inches and compact in accordance with the specifications.

Excavation and embankment for driveways, sleeper slabs, alleys and intersections will not be paid for directly, but will be considered subsidiary to these items.

Item 132:

Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no

expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

Earth embankment Type C1, is mainly composed of material other than shale. Furnish material that is free from vegetation or other objectionable material and that conforms to the requirements of Table 1 (Sheet A). If necessary, treat material with lime slurry in accordance with Item 260, "Lime Treatment (Road-Mixed)" in order to meet these requirements. Use Tex-121-E, figure 1, page 4 to calculate the amount of lime required. When lime treated subgrade is specified, 3000 PPM is the maximum allowed sulfate content in the top 3 feet when material comes from borrow source. Follow recommendations of 260.4.4 for mixing and mellowing. The engineer will test material placed or excavated to a depth of one foot below and laterally to one foot outside the proposed treatment limit. Lime treatment of this material will not be paid for directly, but will be considered subsidiary to this item.

Do not use shaley clays in embankment unless approved in writing.

Item 160:

Sequence construction operations to salvage topsoil from one location and spread on areas ready to receive topsoil. Keep stockpiling of topsoil to a minimum.

Use fertile clay or loam from the project site not more than two feet below natural grade as topsoil.

Item 247:

Construct uniform layer thickness of 12 inches, or less with the required density and moisture content. Minimum PI is equal to three (3) for all grades.

Item 260:

Furnish and distribute MS-2 smoothly and evenly at the rate of 0.20 gallons per square yard to cure lime, as directed.

Provide Quicklime Slurry and apply lime by slurry placement method.

Item 301:

Provide liquid antistripping agents unless otherwise directed. Add the minimum dosage determined by the manufacturer or higher dosage determined by design requirement and try subsequent trials at 0.25% increments.

Item 320:

Use a self-propelled wheel mounted MTV capable of receiving mix from the haul trucks, separate from the paver. It shall have a minimum storage capacity of approximately 25 tons. It shall be equipped with a pivoting discharge conveyor and shall completely and thoroughly remix the material prior to placement. The effectiveness of the MTV's remixing ability is subject to the approval of the Engineer. In addition, the paver shall have a surge storage insert with a minimum capacity of 20 tons.

The use of windrow pick-up equipment is allowed except on the first course of roadway material placed over the subgrade.

Item 344:

Tack Coat is required.

Use aggregate that meets the Surface Aggregate Classification (SAC) requirement of Class B.

Superpave Mixtures used as concrete pavement underlayment is deemed as "Exempt Production".

Provide the engineer the opportunity to witness all mixture design tests. The engineer may require a retest if not given the opportunity to witness.

Dilution of tack is not allowed.

Provide PG binder 64-22 in Type SP-B mixture.

Provide PG binder 64-22 in Type SP-C mixture.

Item 360:

Use of multiple piece tiebars will be required. Provide chairs for multiple piece tiebars, threaded connectors or other adequate devices, used in concrete paving, or tie them to the pavement reinforcing steel. If approved by the engineer for specific areas, in lieu of multiple piece tiebars, drill holes into the pavement and grout straight tiebars in place with epoxy. Use a non-impact, rotary core drill to prevent damage to the pavement unless otherwise directed. Clean the drill holes and then completely fill with epoxy before inserting the tiebar. Do not bend the tiebars or insert them into plastic concrete without the approval of the engineer.

Provide curbs monolithically constructed with the concrete pavement. If continuous monolithic curb has to be temporarily omitted for any reason, provide dowelled curbs in the proposed areas, as detailed in the plans, and apply an approved epoxy resin to the pavement to receive the curb as directed. This work and materials will not be paid for directly, but is considered subsidiary to this item.

If asphalt curing is used, cure the concrete pavement with MS-2.

Stockpile the concrete aggregates at the plant site.

Provide pavement widening joints, as detailed in the plans, at all locations where concrete pavement is placed adjacent to existing concrete pavement. Installation of these joints is not paid for directly, but is considered subsidiary to this item.

Provide a curing machine equipped with rubber tires, or other acceptable arrangement, so that the machine will span the pavement and monolithic curb.

The installation of curb openings is not paid for directly, but is considered subsidiary to this item.

Place construction, sawed and contraction joints in accordance with the pavement detail sheet and as directed. Joint locations, other than as shown on the plans, are subject to approval. Pavement leaveouts are required on this project as necessary to provide for traffic at driveways and side streets as shown in the plans or as directed. The cost of providing these leaveouts,

including the construction of a suitable crossover connection at each site, is not paid for directly but is considered subsidiary to this item.

If a traveling form paver is used, provide one equipped with an electronically operated horizontal control device.

Use "mechanical steel placing equipment" at the discretion of the engineer.

Provide Class HES concrete at the locations shown on the plans. Design Class HES to meet the requirements of Class P and a minimum average flexural strength of 450 psi or minimum average compressive strength of 3200 psi in 24 hr.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

If more than 30% of an area in any 1000-Ft section of roadway requires grinding, action will be taken by the Contractor to make that 1000-Ft full width section uniform without changing ride quality, compromising quality of pavement and decreasing skid resistance. Approved blasting method or other method approved by the Engineer will be performed at the Contractor's expense.

Item 400:

Structural Excavation is not paid for directly but is considered subsidiary to pertinent Items.

When placing concrete storm drain pipe on slopes of greater than 10 percent, provide cement stabilized backfill to a depth shown on the plans.

Item 416:

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

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

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

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

Item 420:

Apply an ordinary surface finish to all concrete surfaces within 30 days after form removal.

Item 421:

Furnish mix designs to the Engineer in a format compatible to the latest version of the Department's Construction Management System (Site Manager). Mix Design templates will be provided by the Engineer.

Provide a digital hydraulic compression testing Machine and accessories. The machine shall have a minimum testing range of 2500 pounds force to 250,000 pounds force with a hydraulic switching valve to allow for rapid advancing, hold, controlled advancing and rapid retracting. The machine shall have a load cell to measure compressive forces within the testing range and shall be calibrated and verified in accordance with ASTM latest version. The Machine can meet or exceed the following when approved by the Engineer:

ELE International ACCU-TEK250 Digital Compression Tester including accessories or Forney F-250EX Standard Compression Machine including accessories or TxDOT approved equal.

Supply the Engineer with a list of certified personnel and copies of their current ACI certificates before beginning production and when personnel changes are made. Supply hard copies of calibration reports for testing equipment when required by the Engineer.

Provide sulfate resistant concrete for all drilled shafts.

Item 440:

Fiber Reinforced Concrete (FRC) can be used as a substitute for Non-Structural Class Reinforced Concrete in Mow-Strip and Rip Rap Items as approved. FRC may also be used for other Non-Structural Class Reinforced Concrete Items as approved.

Item 449:

Use Crouse Hinds TL-2, OZ/Gedney Stl, Thomas & Betts Kopr-Shield or other approved electrically conducting lubricant compound.

Item 464:

The concrete collars and the connections of pipes to existing or proposed concrete boxes or pipe will not be paid for directly but will be considered subsidiary to the various bid items.

At locations where storm drains dead-end, plug with a concrete plug of a thickness equal to 1 ½ inches per foot of diameter of pipe with a minimum thickness of 3 inches. The cost of the plugs shall be included in the unit price bid per foot of the various storm drain pipes.

Item 465:

All manholes, junction boxes and inlets will require inverts unless otherwise directed.

Item 471:

Tackweld all inlet grates and manhole covers to the frame with two 1-inch welds. Supply unpainted cast iron inlet grate and frame and/or cast iron manhole frame and cover.

Item 496:

Concrete pavement removed as a result of removing the inlets will not be paid for directly but will be considered as subsidiary to Item 496.

Inlet grates and manhole covers become the property of the contractor for disposal.

Item 500:

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

Item 502:

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide written proposed lane closure information by 1:00 pm on the business day prior to the proposed closures. Do not close lanes when this requirement is not met.

When excavation is required next to a pavement lane carrying traffic and the widening is not completed by the end of the work day, backfill against the edge of the pavement with at least a 3:1 slope using an acceptable material to support vehicular traffic. Carefully remove and dispose of this material when work resumes. Backfilling pavement edges, and the materials required for the work will be subsidiary to this item.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Do not operate or park any equipment/machinery closer than 30 feet from the traveled roadway after sunset unless authorized by the engineer.

When moving unlicensed equipment on or across any pavement or public highways, protect the pavement from all damage using an acceptable method.

Traffic Control Plans with Lane Closures causing backups of 20 minutes or greater in duration will be modified by the Engineer.

Limit lane closures along FM 3549 and SH 66 to the hours between 9:00 am and 3:30 pm. Work in other areas of the project is not restricted to this time frame.

Item 504:

Furnish one Field Office and Laboratory (Type B) for this project.

Provide one local phone line to the field office. Supply one phone jack and one telephone per each room in the field office. The cost of the phone installation and various monthly phone service charges will be the contractor's responsibility.

Chain link fencing, area dimensioned as directed by the Engineer, will be provided around TxDOT field office/laboratory and parking areas separate from contractor areas. Keep Contractor and TxDOT parking separate. No Contractor vehicles, equipment, dumpsters, storage, etc. is allowed in TxDOT parking area.

Provide an all in one printer/scanner/fax/copier with software that is compatible with TxDOT equipment, cost not in excess of \$300. This is subsidiary to the various bid items.

Item 506:

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

Provide SW3P Signs. Obtain from the Engineer a copy of the project's completed TPDES Storm Water Program Construction Site Notice and Contractor Site Notice. Laminate the sheets and bond with adhesive to 36" X 36" plywood sign blanks. Ensure the sheets remain dry. Apply Type C Blue reflective sheeting as the background and add the text "SW3P" in 5" white lettering, centered at the top. Attach the signs to approved temporary mounts and locate at each of the project limits just inside the right of way line at a readable height or as directed by the Engineer. If the sign cannot be placed outside the clear zone, it must adhere to the TMUTCD. SW3P signs, maintenance, and reposting (for replacement or as needed to ensure readability) will be subsidiary to Item 502.

Concrete Washouts are required per the CGP. The Concrete Washout Area(s) structural controls must consist of temporary berms, temporary shallow pits, and/or temporary storage tanks to prevent contaminated runoff and must be lined as to prevent contamination of underlying soil. Ensure pits properly maintained including removal of concrete as not to allow over flow. The location(s) of washout area will be approved by the Engineer. When washout pits are no longer needed, they will be removed and area will be restored to original condition. This work, materials and labor will not be measured or paid for directly but will be subsidiary to Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls."

Item 508:

Testing of materials used in the construction of a temporary detour may be waived when approved by the Engineer.

Item 529:

Provide grooved joints at 10-foot intervals and ¾ inch expansion joint material for doweled curb at the same locations as on the existing pavement.

Curb transitions will be paid for by the foot at the unit price for the corresponding curb section.

Saw joints at the same location as on the existing pavement.

Item 536:

Use Class "B" concrete for concrete medians and directional islands.

Item 585:

Use Surface Test Type A on all intersections and driveways.

Use Surface Test Type B pay adjustment schedule 2 on the travel lanes.

Item 618:

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

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

Furnish and install a non-metallic pull rope in conduit runs in excess of 50 feet. Also furnish and install non-metallic mule tape in conduit installed for future use and cap using standard weather-tight conduit caps, as approved. Furnish Garvin # PT-1250-3K, ComStar PUL 1250P3K, Ideal Part No. 31-315 or equal as approved by the Engineer. This work will not be paid for directly, but is subsidiary to this Item.

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

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

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

Communications cable shall be installed in a separate conduit and bored separately.

2" Schedule 80 PVC conduit will be used at the power pole, unless otherwise requested by the utility company, to supply electricity to underground services.

Item 620:

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

Item 624:

Slack conductors required by Standard Sheet ED(3)-14 will be subsidiary to Item 624.

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

Item 627:

Use the timber pole heights, as shown on the plans and in the material summary, for bidding purposes only. Coordinate pole locations and make field measurements before construction to ensure a vertical clearance of 17 to 19 feet from the highest point on the roadway surface to the span. Except for supplemental nearside signal heads, all signal heads must be installed at least 40' from the stop line. If field adjustments result in the nearest signal head being more than 180' from the stop line, install a supplemental nearside signal head as directed by the engineer. Determine the field measurements and elevations from the actual field location of the poles, considering all above and below ground utilities and existing roadway elevations.

Item 628:

Contact the appropriate utility company during the first three weeks of the project lead-time period to allow adequate time for any necessary utility adjustments, transformer installation, etc.

The Meter Base or Transocket shall be mounted facing the roadway and the service enclosure shall be mounted on the opposite side of the pole from the Meter Base or Transocket on all types of poles, Granite Concrete, Timber Pole or Steel Pole.

The Contractor shall obtain the street address of the new electrical service directly from the applicable City.

Label the service enclosures indicating service address as well as all required information as shown on the Electrical Detail (ED) standard sheets. Labeling shall be silk screening or other acceptable method. This work will not be paid for directly, but is subsidiary to this Item.

A Licensed Master Electrician shall be required to install all electrical services.

Bill the electrical service power usage to the Texas Department of Transportation.

Item 636:

Affix a sign identification decal to the back of all signs and mark out the installation date in accordance with Item 643.

Provide two (2) sets of shop drawings for signs. The shop drawings shall conform to the details shown on the plans. The shop drawings shall show the details of the panels, wind beams, stiffeners, joint backing plates, splices, fasteners, brackets, and sign support connections. The shop drawings shall show letter types and sizes, interline spacing and message arrangements.

Items 644:

Prior to taking elevations to determine lengths for fabrication of sign posts and/or sign support towers, obtain verification of all proposed locations.

All sign mounts shall have a clamp base system for all small roadside sign assemblies.

Item 656:

Ensure the anchor bolt spacing will match the anchor bolts and cabinet before placing the concrete for the controller foundation.

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

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

Item 662 and 672:

Black adhesive will be used on asphalt pavements and white adhesive will be used on concrete pavements.

Item 677:

A water blasting method approved by the Engineer will be the only method allowed for the removal of permanent and temporary pavement markings except on a sealcoat surface. A 2 foot wide sealcoat will be required on sealcoat surfaces to eliminate permanent and temporary pavement markings.

Item 680:

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

1. Notify the District Signal Maintenance Office at (214)320-6682 and Construction Office at (214)320-6694 one week before beginning any work involving traffic signals.
2. Provide submittal literature for all traffic signal equipment before installation.
3. Furnish and install a new controller (eight phase NEMA TS 2 Type 1) and cabinet (NEMA TS 2 Size 6, 16 position load bay), meeting the requirements of Departmental Materials Specifications DMS-11170. Provide detector panel toggle switches that additionally permit the user to disconnect the detector.
4. Deliver the cabinet, controller, and accessories (with all cabinet components completely connected and securely strapped down) to the District Signal Shop, 4777 E Hwy 80, Mesquite, for testing. Notify the District Signal Shop two working days before delivery at (214)320-6682.
5. Install the controller cabinet in an orientation as directed.
6. Connect all field wiring to the controller assembly, including SSR coaxial cable termination into the polyphaser. The District will assist in determining how the detection cables are to be connected, and will also program the controller for operation, hook up the malfunction management unit (MMU) or conflict monitor, detector units, and other equipment, and turn on the controller. Pick up the signal cabinet from the District Signal Shop. Have a qualified technician and a representative from the controller supplier on the project site to place the traffic signals in operation.
7. Furnish and install all sign panels for mounting on signal poles, mast arms, and span wires. Fabricate the sign panels in accordance with Item 636, and mount with Astro-Sign Brac, Sign fix aluminum channel, or equal as approved by the Engineer. Submit five (5) sets of shop drawings for street name signs.

8. Install the sign panels supplied for mounting on signal poles, mast arms, and span wires. Furnish and install all other signs in accordance to Item 636. Furnish all mounting hardware for all signs. Mount signs with Astro-Sign Brac, Signfix aluminum channel, or equal as approved by the Engineer.
9. Provide 250W HPS Equivalent LED Fixtures with 240 volt electronic LED drivers as shown on the Material Producers List.
10. Install the emergency vehicle preemption equipment supplied by the City of Rockwall and City of Fate.
11. Have a qualified technician on the project site to place the traffic signal in operation.
12. Use qualified personnel to respond to and diagnose all trouble calls during the thirty-day test period. Repair any malfunction to Contractor-supplied signal equipment. Provide to the Engineer a local telephone number, not subject to frequent changes and available on a 24-hour basis, for reporting trouble calls. Response time to reported calls must be less than 2 hours. Make appropriate repairs within 24 hours. Place a logbook in the controller cabinet and keep a record of each trouble call reported. Notify the Engineer of each trouble call. Do not clear the error log in the conflict monitor or MMU during the thirty-day test period without approval.
13. Prevent any damage to property owner's poles, fences, shrubs, mailboxes, etc. Protect all underground and overhead utilities and repair any damage. Provide access to all driveways during construction.
14. The concrete foundation for the controller as shown on the TS-CF-04 is diagrammatic and the dimensions will be adjusted in the field to fit existing conditions.
15. Salvage the existing traffic signals at FM 3549 & SH 66, etc. as shown on the plans. Salvage luminaire poles, controller cabinet, radar units, BBU, VIVIDS cameras, and any other equipment as directed. This equipment remains the property of the Texas Department of Transportation. The material listed above is to be stockpiled at the TxDOT Cedar Hill Maintenance yard, 1424 High Meadows Way, Cedar Hill, Tx 75104, or as directed. Contact the District Signal Shop at 214-320-6682 48 hours in advance of delivery. All other material removed in this project will become the property of the Contractor. Dispose of material off the right of way in accordance with federal, state, and local regulations. Maintain the operation of the existing traffic signal until directed to remove it.
16. Completely remove timber poles not set in concrete without cutting off the pole. Timber poles set in concrete are considered unsalvageable.
17. Integrate the proposed traffic signal(s) into the existing closed loop system as shown on the plans. Aries closed loop software, which utilizes Econolite controllers, is currently in use in the Dallas District. Provide controllers on this project that fully communicate with the existing closed loop system.

Item 681:

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

1. Re-guy signal heads and re-strap the cable after making adjustments to head locations. Accomplish relocation of signal heads for a phase change during the same day.
2. Bottom tether cable for signal heads and signs will be required.
3. Provide submittal literature for all traffic signal equipment before installation.
4. Furnish and install a controller (eight phase NEMA TS 2 Type 1) and cabinet (NEMA TS 2 Size 6, 16 position load bay), meeting the requirements of Departmental Materials Specifications DMS-11170. Provide detector panel toggle switches that additionally permit the user to disconnect the detector. Provide a pole-mounted cabinet that has three brackets for pole mounting and install a 5' x 5' x 4" Class A concrete pad under the cabinet in accordance to Items 420 and 421.
5. Operate and maintain the temporary signal. Provide a telephone number to the District for trouble calls. Check the signal equipment at least monthly, and within 24 hours in response to complaints, and immediately repair or replace any malfunctioning Contractor-supplied equipment. Notify the Department immediately upon finding malfunctioning Department-supplied equipment or a problem with the signal timing. If the controller is supplied by the Contractor, provide a reliable technical support person and phone number for the manufacturer of the controller. If the vehicle detection is Department-supplied, notify the TxDOT Dallas District Signal Shop one week prior to traffic switches to reprogram and reaim the detectors.
6. Relocate existing emergency vehicle preemption equipment to temporary signals.
7. Install pole-mounted BBU on the opposite side of the pole from the controller cabinet.

Item 682:

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

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

Provide aluminum pedestrian and vehicle signal heads in the following color: Federal Yellow #13538 of Federal Standard 595. Provide non-painted aluminum tubing. Provide back plates, louvers, and the inside of visors with a flat black finish. Provide aluminum vented back plates for all traffic signal heads.

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

Mount signal heads level and plumb and aim as directed.

Item 684:

Provide stranded 14 AWG Type A signal cables for LED signal heads and stranded 12 AWG Type C cables for APS units.

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

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

Item 686:

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

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

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

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

Provide vertical clearance of 17 to 19 feet from the roadway to the lowest point of the signal head or mast arm. Except for supplemental nearside signal heads, all signal heads must be installed at least 40' from the stop line. If field adjustments result in the nearest signal head being more than 180' from the stop line, install a supplemental nearside signal head as directed by the engineer. Determine the field measurements and elevations from the actual field location of the poles, considering all above and below ground utilities and existing roadway elevations.

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

For mast arm poles designated with an ILSN bid code, the ILSN arm, clamps, bolts, and washers will be considered part of the complete pole assembly. The ILSN signs and mounting hardware will be furnished by the applicable City.

Item 687:

Provide 12 circuit Buchanan Type 112SN, Kulka Type 985-GP-10 CU, or equal terminal strip in the pedestal pole access compartment. The conductors for the line and load side of the terminal strip shall be identified with a plastic label with two straps per tag. The load side shall have each signal head and ped head identified on the tag.

Item 688:

Verify the location of the APS units and the direction of the arrows on the signs prior to installation.

Item 730:

At the discretion of the Engineer, mow non-paved areas within the project prior to placement of permanent vegetation. Mow up to three (3) cycles per growing season.

Item 6002:

Provide a Video Processor System (VPS) that can provide up to twenty-four (24) detector outputs to the controller from up to eight (8) camera/video processor units (C/VPU). Route the detector outputs through the detector panel and the detector test switches. For each C/VPU, provide a field of view with a minimum of twenty-four (24) virtual detection zones for vehicle detection. (Note: Use one processor system per intersection)

If not terminated through the backplane of the card rack, wire the outputs as follows:

| Output | Detector | Output | Detector |
|--------|----------|--------|----------|
| 1 | 1-1 | 13 | Spare |
| 2 | 6-1 | 14 | Spare |
| 3 | 6-2 | 15 | Spare |
| 4 | 5-1 | 16 | Spare |
| 5 | 2-1 | 17 | Spare |
| 6 | 2-2 | 18 | Spare |
| 7 | 3-1 | 19 | Spare |
| 8 | 8-1 | 20 | Spare |
| 9 | 8-2 | 21 | Spare |
| 10 | 7-1 | 22 | Spare |
| 11 | 4-1 | 23 | Spare |
| 12 | 4-2 | 24 | Spare |

Provide (5) cameras for this project, including one (1) spare camera. Central control will not be required on this project.

Provide a set-up system. Load required set-up software onto all of the District Signal Shop's notebook computers and provide all necessary licensing. The Contractor does not provide computers as part of the set-up system.

Supply an interface software package that will operate with Windows 98, 2000, 7, NT and Vista.

Ensure the C/VPU operational software is stored internally in flash memory and capable of being updated without the removal and replacement of memory devices.

Install the VIVDS detection zones as directed. Have qualified personnel on site at the time of the signal turn-on to assist with the installation of detection zones.

If the camera locations shown in the plans do not allow for proper sight of the proposed detection zones, relocate the cameras as needed and as directed. This labor and material cost will not be paid separately, but is subsidiary to this item.

Provide Field Communications Link required by the manufacturer of the video detection system. These cables will be paid for as the type shown in the plans regardless of actual type of cable.

Items 6025 & 6155:

If the radar mounting locations shown on the plans do not allow for proper detection of the proposed zones, relocate the radar units as needed and directed. The labor cost to adjust the units will not be paid for separately, but will be considered subsidiary to these items.

Item 6054

Supply one spare omni-directional and one spare uni-directional antenna, and one spare spread spectrum radio. Deliver to the District Signal Shop at 4777 E. Hwy 80, Mesquite.

Install the coaxial cable so that it is not exposed to the outdoor environment.

Ensure yagi antenna installation allows for vertical and horizontal adjustment of the antenna. Provide a PCTEL MYK10 antenna bracket or approved equal for yagi antenna installation.

Provide the latest version of the applicable SSR diagnostic software to the District on CD-ROMs, and ensure that it will operate under Windows 98, 2000, 7, Vista and XP operating systems.

Provide new Intuicom spread spectrum radios that are compatible with the existing radios in the closed loop system. The master radio is located at Springer Ln water tower.

Item 6058:

The BBU will be installed with the controller on the concrete pad paid for under Item 680. If a larger pad is needed to accommodate the BBU, the additional labor and material will be subsidiary to this item.

Item 6185:

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below. See Traffic Control Summary for additional information.

| TCP Standard(s) | Scenario | Required TMA | Pay by |
|------------------|----------|--------------|--------|
| (2-1) Thru (2-5) | All | 6 | EA |
| (3-3) | B | 2 | HR |

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the each and must be available for use at any time as determined by the Engineer.

Mobile operations will be paid for by the hour, per specifications. For mobile operations, payment will be made only while the TMA is in use.

Therefore, 8 total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project.

The list of material below is for the Contractor's information only.
 It is the responsibility of the Contractor to verify
 all items and quantities listed below.

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 680

| DESCRIPTION | UNIT | QUANTITY |
|--|------|----------|
| 8 PHASE NEMA CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES | EA | 1 |
| TRAFFIC SIGNAL CONTROLLER BASE | EA | 1 |
| CONCRETE FOUNDATION (8'X9'X6", CLASS B) | EA | 1 |
| 250W EQ LED LUMINAIRE | EA | 2 |
| RELOCATE OPTICOM EQUIPMENT | EA | 4 |
| RELOCATE ADVANCE RADAR UNITS | EA | 4 |
| R10-17T SIGN | EA | 4 |
| R10-3eR SIGN | EA | 4 |
| R10-3eL SIGN | EA | 4 |
| ILSN STREET SIGN – PAID BY CITY OF FATE | EA | 2 |
| ILSN STREET SIGN – PAID BY CITY OF ROCKWALL | EA | 2 |

The list of material below is for the Contractor's information only.
 It is the responsibility of the Contractor to verify
 all items and quantities listed below.

LIST OF MATERIAL/LABOR
SUBSIDIARY TO ITEM 681

| DESCRIPTION | UNIT | QUANTITY |
|--|------|----------|
| 50 FT TIMBER POLE (CLASS 2) | EA | 4 |
| 8 FT LUMINAIRE MAST ARM FOR WOOD POLE MOUNTING W/ 250W HPS LUMINAIRE | EA | 2 |
| CABLE STRAPS | EA | 485 |
| 3/8 INCH ZINC-COATED STRANDED STEEL CABLE | LF | 2192 |
| 1/4 INCH ZINC-COATED STRANDED STEEL CABLE | LF | 528 |
| GROUND ANCHORS | EA | 8 |
| YELLOW PLASTIC GUY GUARD | EA | 16 |
| DOUBLE EYE ANCHOR ROD | EA | 8 |
| 5/8" X 8' COPPERCLAD GROUND ROD W/CLAMP | EA | 4 |
| 2 INCH WEATHERHEAD | EA | 2 |
| 4 INCH WEATHERHEAD | EA | 1 |
| 250W EQ LED LUMINAIRE | EA | 2 |
| 8 PHASE NEMA CONTROLLER COMPLETE W/ CABINET AND ACCESSORIES | EA | 1 |
| BBU | EA | 1 |
| INSTALL OPTICOM EQUIPMENT (INTERSECTION) | LS | 1 |
| SINGLE STREET NAME SIGN PANEL | EA | 4 |
| CONCRETE FOUNDATION (5' X 5' X 4", CLASS A) ****for pole mounted cabinets**** | SF | 25 |
| TYPE C GROUND BOX W/APRON | EA | 1 |
| CONDT (RM) (2") | LF | 39 |
| CONDT (PVC) (SCH 80) (2")(TRENCH) | LF | 80 |
| CONDT (RM)(4") | LF | 12 |
| NO. 6 XHHW WIRE | LF | 60 |
| NO. 6 BARE WIRE | LF | 84 |
| NO. 8 XHHW WIRE | LF | 736 |

| DESCRIPTION | UNIT | QUANTITY |
|---|------|----------|
| 9 CNDR 14 AWG | LF | 756 |
| VIVDS PRESENCE COAXIAL CABLE | LF | 577 |
| VIVDS PRESENCE CAMERAS | EA | 4 |
| ADVANCE RADAR INSTALLATION (INTERSECTION) | LS | 1 |
| RELOCATE EXISTING SIGNS | EA | 4 |
| H3 SIGNAL HEAD BACK PLATE | EA | 4 |
| H5LT SIGNAL HEAD BACK PLATE | EA | 4 |
| 12" LED BALL RED | EA | 8 |
| 12" LED BALL YELLOW | EA | 8 |
| 12" LED BALL GREEN | EA | 8 |
| 12" LED ARROW YELLOW | EA | 4 |
| 12" LED ARROW GREEN | EA | 4 |

LIST OF MATERIAL
 FURNISHED BY THE CITY OF ROCKWALL

| DESCRIPTION | UNIT | QUANTITY |
|---|------|----------|
| OPTICOM CABLE | LF | 642 |
| OPTICOM DETECTOR W/MOUNTING BRACKET | EA | 4 |
| OPTICOM MODULES (2-CHANNEL) | EA | 1 |
| OPTICOM CARD RACK AND HARNESS | EA | 1 |
| OPTICOM CONTROLLER ASSEMBLY COMPLETE WITH CABINET AND ACCESSORIES | EA | 1 |
| ILSN STREET SIGNS | EA | 2 |

LIST OF MATERIAL
 FURNISHED BY THE CITY OF FATE

| DESCRIPTION | UNIT | QUANTITY |
|-------------------|------|----------|
| ILSN STREET SIGNS | EA | 2 |

City of Rockwall contact information:
 Jeremy M. White, P.E., CFM
 Bus: (972) 771-7746
 E-mail: jwhite@rockwall.com
 Civil Engineer
 Address: 385 S. Goliad
 Rockwall, TX 75087

City of Fate contact information:
 Scott Monaghan
 Bus: (972) 771-4601 Ext 114
 E-mail: smonaghan@cityoffate.com
 Director of Public Works
 Address: 1900 CD Boren Parkway
 Fate, TX 75087

LIST OF MATERIAL
 FURNISHED BY THE DALLAS DISTRICT

| DESCRIPTION | UNIT | QUANTITY |
|---------------------------|------|----------|
| RADAR COMMUNICATION CABLE | LF | 642 |
| ADVANCE RADAR DETECTORS | EA | 4 |

Estimate Sheet

| ESTIMATE SUMMARY | | | | | | | | | | | | | | | |
|------------------|-------|-----|-------|-----|-------|---|-------|-------------|--------------|--------------|----------|---|------|-----------|-------|
| | | | | | | CONTROL 1015-01-023 FM 3549 STP 2018(889) | | A L T | ITEM CODE | | | DESCRIPTION | UNIT | TOTAL | |
| EST | FINAL | EST | FINAL | EST | FINAL | EST | FINAL | | ITEM CODE | DESC CODE | SP NO | | | EST | FINAL |
| | | | | | | 70.320 | | | 100 | 6002 | | PREPARING ROW | STA | 70.320 | |
| | | | | | | 3034.000 | | | 104 | 6001 | | REMOVING CONC (PAV) | SY | 3034.000 | |
| | | | | | | 77.000 | | | 104 | 6009 | | REMOVING CONC (RIPRAP) | SY | 77.000 | |
| | | | | | | 47.000 | | | 104 | 6015 | | REMOVING CONC (SIDEWALKS) | SY | 47.000 | |
| | | | | | | 2314.000 | | | 104 | 6017 | | REMOVING CONC (DRIVEWAYS) | SY | 2314.000 | |
| | | | | | | 70.000 | | | 104 | 6021 | | REMOVING CONC (CURB) | LF | 70.000 | |
| | | | | | | 2220.000 | | | 105 | 6008 | | REMOVING STAB BASE AND ASPH PAV (6") | SY | 2220.000 | |
| | | | | | | 1864.000 | | | 105 | 6016 | | REMOVING STAB BASE & ASPH PAV(16") | SY | 1864.000 | |
| | | | | | | 20216.000 | | | 105 | 6019 | | REMOVING STAB BASE & ASPH PAV(14") | SY | 20216.000 | |
| | | | | | | 2205.000 | | | 105 | 6042 | | REMOVE STAB BASE & ASPH PAV (6.5") | SY | 2205.000 | |
| | | | | | | 31097.000 | | | 110 | 6001 | | EXCAVATION (ROADWAY) | CY | 31097.000 | |
| | | | | | | 5949.000 | | | 132 | 6025 | | EMBANKMENT (FINAL) (DENS CONT) (TY C1) | CY | 5949.000 | |
| | | | | | | 27489.000 | | | 160 | 6003 | | FURNISHING AND PLACING TOPSOIL (4") | SY | 27489.000 | |
| | | | | | | 27489.000 | | | 162 | 6002 | | BLOCK SODDING | SY | 27489.000 | |
| | | | | | | 17838.000 | | | 164 | 6051 | | DRILL SEED (TEMP)(WARM OR COOL) | SY | 17838.000 | |
| | | | | | | 3673.200 | | | 168 | 6001 | | VEGETATIVE WATERING | MG | 3673.200 | |
| | | | | | | 4787.000 | | | 247 | 6113 | | FL BS (RDWY DEL) (TY D GR 1-2) (IN VEH) | CY | 4787.000 | |
| | | | | | | 46264.000 | | | 260 | 6009 | | LIME TRT (EXST MATL)(10") | SY | 46264.000 | |
| | | | | | | 1387.000 | | | 260 | 6016 | | LIME (HYD, COM, OR QK(SLURRY)) | TON | 1387.000 | |
| | | | | | | 17269.000 | | | 344 | 6011 | | SUPERPAVE MIXTURES SP-B PG64-22 | TON | 17269.000 | |
| | | | | | | 1418.000 | | | 344 | 6106 | | SUPERPAVE MIXTURES SP-D PG64-22 | TON | 1418.000 | |
| | | | | | | 41373.000 | | | 360 | 6002 | | CONC PVMT (CONT REINF - CRCP) (8") | SY | 41373.000 | |
| | | | | | | 2.400 | | | 400 | 6005 | | CEM STABIL BKFL | CY | 2.400 | |
| | | | | | | 45.000 | | | 400 | 6008 | | CUT & RESTORE ASPH PAVING | SY | 45.000 | |
| | | | | | | 14.000 | | | 401 | 6001 | | FLOWABLE BACKFILL | CY | 14.000 | |
| | | | | | | 7330.000 | | | 402 | 6001 | | TRENCH EXCAVATION PROTECTION | LF | 7330.000 | |
| | | | | | | 2212.000 | | | 403 | 6001 | | TEMPORARY SPL SHORING | SF | 2212.000 | |
| | | | | | | 26.000 | | | 416 | 6032 | | DRILL SHAFT (TRF SIG POLE) (36 IN) | LF | 26.000 | |
| | | | | | | 44.000 | | | 416 | 6034 | | DRILL SHAFT (TRF SIG POLE) (48 IN) | LF | 44.000 | |
| | | | | | | 9.000 | | | 432 | 6002 | | RIPRAP (CONC)(5 IN) | CY | 9.000 | |
| | | | | | | 39.000 | | | 450 | 6042 | | RAIL (TY PR1) | LF | 39.000 | |
| | | | | | | 173.000 | | | 459 | 6007 | | GABION MATTRESSES (GALV)(12 IN) | SY | 173.000 | |
| | | | | | | 901.000 | | | 462 | 6004 | | CONC BOX CULV (4 FT X 3 FT) | LF | 901.000 | |
| | | | | | | 403.000 | | | 462 | 6007 | | CONC BOX CULV (5 FT X 3 FT) | LF | 403.000 | |
| | | | | | | 35.000 | | | 462 | 6045 | | CONC BOX CULV (3 FT X 2 FT)(EXTEND) | LF | 35.000 | |
| | | | | | | 30.000 | | | 462 | 6048 | | CONC BOX CULV (4 FT X 3 FT)(EXTEND) | LF | 30.000 | |
| | | | | | | 5329.000 | | | 464 | 6003 | | RC PIPE (CL III)(18 IN) | LF | 5329.000 | |
| | | | | | | 4083.000 | | | 464 | 6005 | | RC PIPE (CL III)(24 IN) | LF | 4083.000 | |
| | | | | | | 1322.000 | | | 464 | 6007 | | RC PIPE (CL III)(30 IN) | LF | 1322.000 | |
| | | | | | | 11.000 | | | 465 | 6002 | | MANH (COMPL)(PRM)(48IN) | EA | 11.000 | |
| | | | | | | 1.000 | | | 465 | 6003 | | MANH (COMPL)(PRM)(60IN) | EA | 1.000 | |
| | | | | | | 4.000 | | | 465 | 6013 | | INLET (COMPL)(PCO)(3FT)(NONE) | EA | 4.000 | |
| | | | | | | 14.000 | | | 465 | 6014 | | INLET (COMPL)(PCO)(3FT)(LEFT) | EA | 14.000 | |
| | | | | | | 8.000 | | | 465 | 6015 | | INLET (COMPL)(PCO)(3FT)(RIGHT) | EA | 8.000 | |
| | | | | | | 7.000 | | | 465 | 6016 | | INLET (COMPL)(PCO)(3FT)(BOTH) | EA | 7.000 | |
| | | | | | | 3.000 | | | 465 | 6029 | | INLET (COMPL)(PCU)(3FT)(NONE) | EA | 3.000 | |
| | | | | | | 7.000 | | | 465 | 6031 | | INLET (COMPL)(PCU)(3FT)(RIGHT) | EA | 7.000 | |
| | | | | | | 3.000 | | | 465 | 6032 | | INLET (COMPL)(PCU)(3FT)(BOTH) | EA | 3.000 | |
| | | | | | | 2.000 | | | 465 | 6033 | | INLET (COMPL)(PCU)(4FT)(NONE) | EA | 2.000 | |
| | | | | | | 3.000 | | | 465 | 6036 | | INLET (COMPL)(PCU)(4FT)(BOTH) | EA | 3.000 | |

Estimate Sheet

| ESTIMATE SUMMARY | | | | | | | | | | | | | | | |
|------------------|-------|-----|-------|-----|-------|---|-------|-------------|--------------|--------------|----------|---|------|-----------|-------|
| | | | | | | CONTROL 1015-01-023 FM 3549 STP 2018(889) | | A L T | ITEM CODE | | | DESCRIPTION | UNIT | TOTAL | |
| EST | FINAL | EST | FINAL | EST | FINAL | EST | FINAL | | ITEM CODE | DESC CODE | SP NO | | | EST | FINAL |
| | | | | | | 1.000 | | | 465 | 6049 | | INLET (COMPL)(POD)(FG)(4FTX4FT) | EA | 1.000 | |
| | | | | | | 1.000 | | | 465 | 6050 | | INLET (COMPL)(POD)(FG)(3FTX5FT) | EA | 1.000 | |
| | | | | | | 1.000 | | | 465 | 6075 | | INLET (COMPL)(PSL)(RC)(5FTX6FT) | EA | 1.000 | |
| | | | | | | 2.000 | | | 465 | 6076 | | INLET (COMPL)(PSL)(RC)(6FTX6FT) | EA | 2.000 | |
| | | | | | | 1.000 | | | 465 | 6100 | | INLET (COMPL)(PSL)(SH)(6FTX6FT-3FTX3FT) | EA | 1.000 | |
| | | | | | | 2.000 | | | 465 | 6104 | | INLET (COMPL)(PSL)(SH)(8FTX8FT-4FTX4FT) | EA | 2.000 | |
| | | | | | | 6.000 | | | 465 | 6126 | | INLET (COMPL)(PSL)(FG)(3FTX3FT-3FTX3FT) | EA | 6.000 | |
| | | | | | | 1.000 | | | 465 | 6128 | | INLET (COMPL)(PSL)(FG)(4FTX4FT-4FTX4FT) | EA | 1.000 | |
| | | | | | | 5.000 | | | 465 | 6158 | | INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX3FT) | EA | 5.000 | |
| | | | | | | 5.000 | | | 465 | 6160 | | INLET(COMPL)(PAZD)(FG)(4FTX4FT-4FTX4FT) | EA | 5.000 | |
| | | | | | | 3.000 | | | 465 | 6217 | | INLET (COMPL)(CURB)(5 FT)(SPECIAL) | EA | 3.000 | |
| | | | | | | 1.000 | | | 466 | 6151 | | WINGWALL (FW - 0) (HW=4 FT) | EA | 1.000 | |
| | | | | | | 1.000 | | | 466 | 6180 | | WINGWALL (PW - 1) (HW=5 FT) | EA | 1.000 | |
| | | | | | | 2.000 | | | 467 | 6106 | | SET (TY I)(S=3 FT)(HW=3FT)(4:1)(C) | EA | 2.000 | |
| | | | | | | 2.000 | | | 467 | 6144 | | SET (TY I)(S= 4 FT)(HW= 4 FT)(4:1) (C) | EA | 2.000 | |
| | | | | | | 1.000 | | | 467 | 6357 | | SET (TY II) (18 IN) (RCP) (3: 1) (P) | EA | 1.000 | |
| | | | | | | 6.000 | | | 467 | 6359 | | SET (TY II) (18 IN) (RCP) (4: 1) (P) | EA | 6.000 | |
| | | | | | | 1.000 | | | 467 | 6395 | | SET (TY II) (24 IN) (RCP) (6: 1) (P) | EA | 1.000 | |
| | | | | | | 175.000 | | | 481 | 6024 | | PIPE (PVC) (SCH 80) (8 IN) | LF | 175.000 | |
| | | | | | | 1.000 | | | 496 | 6002 | | REMOV STR (INLET) | EA | 1.000 | |
| | | | | | | 24.000 | | | 496 | 6004 | | REMOV STR (SET) | EA | 24.000 | |
| | | | | | | 4.000 | | | 496 | 6005 | | REMOV STR (WINGWALL) | EA | 4.000 | |
| | | | | | | 1536.000 | | | 496 | 6007 | | REMOV STR (PIPE) | LF | 1536.000 | |
| | | | | | | 120.000 | | | 496 | 6008 | | REMOV STR (BOX CULVERT) | LF | 120.000 | |
| | | | | | | 1.000 | | | 500 | 6001 | | MOBILIZATION | LS | 1.000 | |
| | | | | | | 21.000 | | | 502 | 6001 | | BARRICADES, SIGNS AND TRAFFIC HANDLING | MO | 21.000 | |
| | | | | | | 191.000 | | | 506 | 6002 | 003 | ROCK FILTER DAMS (INSTALL) (TY 2) | LF | 191.000 | |
| | | | | | | 191.000 | | | 506 | 6011 | 003 | ROCK FILTER DAMS (REMOVE) | LF | 191.000 | |
| | | | | | | 624.000 | | | 506 | 6020 | 003 | CONSTRUCTION EXITS (INSTALL) (TY 1) | SY | 624.000 | |
| | | | | | | 624.000 | | | 506 | 6024 | 003 | CONSTRUCTION EXITS (REMOVE) | SY | 624.000 | |
| | | | | | | 7954.000 | | | 506 | 6038 | 003 | TEMP SEDMT CONT FENCE (INSTALL) | LF | 7954.000 | |
| | | | | | | 7954.000 | | | 506 | 6039 | 003 | TEMP SEDMT CONT FENCE (REMOVE) | LF | 7954.000 | |
| | | | | | | 2141.000 | | | 506 | 6041 | 003 | BIODEG EROSN CONT LOGS (INSTL) (12") | LF | 2141.000 | |
| | | | | | | 2141.000 | | | 506 | 6043 | 003 | BIODEG EROSN CONT LOGS (REMOVE) | LF | 2141.000 | |
| | | | | | | 10009.000 | | | 508 | 6001 | | CONSTRUCTING DETOURS | SY | 10009.000 | |
| | | | | | | 820.000 | | | 512 | 6009 | | PORT CTB (FUR & INST)(LOW PROF)(TY 1) | LF | 820.000 | |
| | | | | | | 120.000 | | | 512 | 6010 | | PORT CTB (FUR & INST)(LOW PROF)(TY 2) | LF | 120.000 | |
| | | | | | | 1460.000 | | | 512 | 6033 | | PORT CTB (MOVE)(LOW PROF)(TY 1) | LF | 1460.000 | |
| | | | | | | 240.000 | | | 512 | 6034 | | PORT CTB (MOVE)(LOW PROF)(TY 2) | LF | 240.000 | |
| | | | | | | 820.000 | | | 512 | 6057 | | PORT CTB (REMOVE)(LOW PROF)(TY 1) | LF | 820.000 | |
| | | | | | | 120.000 | | | 512 | 6058 | | PORT CTB (REMOVE)(LOW PROF)(TY 2) | LF | 120.000 | |
| | | | | | | 1349.000 | | | 528 | 6002 | | COLORED TEXTURED CONC (6") | SY | 1349.000 | |
| | | | | | | 19801.000 | | | 529 | 6005 | | CONC CURB (MONO) (TY II) | LF | 19801.000 | |
| | | | | | | 1628.000 | | | 529 | 6008 | | CONC CURB & GUTTER (TY II) | LF | 1628.000 | |
| | | | | | | 569.000 | | | 529 | 6022 | | CONC CURB (DOWEL) (TY II) | LF | 569.000 | |
| | | | | | | 3494.000 | | | 530 | 6004 | | DRIVEWAYS (CONC) | SY | 3494.000 | |
| | | | | | | 5995.000 | | | 531 | 6001 | | CONC SIDEWALKS (4") | SY | 5995.000 | |
| | | | | | | 9.000 | | | 531 | 6004 | | CURB RAMPS (TY 1) | EA | 9.000 | |
| | | | | | | 53.000 | | | 531 | 6010 | | CURB RAMPS (TY 7) | EA | 53.000 | |
| | | | | | | 10.000 | | | 531 | 6013 | | CURB RAMPS (TY 10) | EA | 10.000 | |

ESTIMATE & QUANTITY SHEET

| | | | |
|------|----------|-------------|-------|
| DIST | COUNTY | CCSJ | SHEET |
| 18 | ROCKWALL | 1015-01-023 | 15A |

Estimate Sheet

| ESTIMATE SUMMARY | | | | | | | | | | | | | | | |
|------------------|-------|-----|-------|-----|-------|---|-------|-------------|--------------|--------------|----------|---|------|-----------|-------|
| | | | | | | CONTROL 1015-01-023 FM 3549 STP 2018(889) | | A L T | ITEM CODE | | | DESCRIPTION | UNIT | TOTAL | |
| EST | FINAL | EST | FINAL | EST | FINAL | EST | FINAL | | ITEM CODE | DESC CODE | SP NO | | | EST | FINAL |
| | | | | | | 99.000 | | | 536 | 6006 | | CONC MEDIAN(MONO NOSE) | SY | 99.000 | |
| | | | | | | 16.000 | | | 560 | 6001 | | MAILBOX INSTALL-S (TWG-POST) TY 1 | EA | 16.000 | |
| | | | | | | 281.000 | | | 618 | 6029 | | CONDT (PVC) (SCH 40) (3") | LF | 281.000 | |
| | | | | | | 474.000 | | | 618 | 6033 | | CONDT (PVC) (SCH 40) (4") | LF | 474.000 | |
| | | | | | | 160.000 | | | 620 | 6004 | | ELEC CONDR (NO.12) INSULATED | LF | 160.000 | |
| | | | | | | 800.000 | | | 620 | 6008 | | ELEC CONDR (NO.8) INSULATED | LF | 800.000 | |
| | | | | | | 735.000 | | | 620 | 6009 | | ELEC CONDR (NO.6) BARE | LF | 735.000 | |
| | | | | | | 64.000 | | | 620 | 6010 | | ELEC CONDR (NO.6) INSULATED | LF | 64.000 | |
| | | | | | | 915.000 | | | 621 | 6002 | | TRAY CABLE (3 CONDR) (12 AWG) | LF | 915.000 | |
| | | | | | | 1.000 | | | 624 | 6002 | | GROUND BOX TY A (122311)W/APRON | EA | 1.000 | |
| | | | | | | 12.000 | | | 624 | 6008 | | GROUND BOX TY C (162911)W/APRON | EA | 12.000 | |
| | | | | | | 1.000 | | | 628 | 6187 | | ELC SRV TY D 120/240 070(NS)SS(E)PS(U) | EA | 1.000 | |
| | | | | | | 8.000 | | | 636 | 6001 | 001 | ALUMINUM SIGNS (TY A) | SF | 8.000 | |
| | | | | | | 23.000 | | | 644 | 6001 | | IN SM RD SN SUP&AM TY10BWG(1)SA(P) | EA | 23.000 | |
| | | | | | | 1.000 | | | 644 | 6002 | | IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM) | EA | 1.000 | |
| | | | | | | 5.000 | | | 644 | 6004 | | IN SM RD SN SUP&AM TY10BWG(1)SA(T) | EA | 5.000 | |
| | | | | | | 2.000 | | | 644 | 6028 | | IN SM RD SN SUP&AM TYS80(1)SA(P-BM) | EA | 2.000 | |
| | | | | | | 2.000 | | | 644 | 6030 | | IN SM RD SN SUP&AM TYS80(1)SA(T) | EA | 2.000 | |
| | | | | | | 3.000 | | | 644 | 6033 | | IN SM RD SN SUP&AM TYS80(1)SA(U) | EA | 3.000 | |
| | | | | | | 1.000 | | | 644 | 6068 | | RELOCATE SM RD SN SUP&AM TY 10BWG | EA | 1.000 | |
| | | | | | | 4380.000 | | | 662 | 6004 | | WK ZN PAV MRK NON-REMOV (W)4"(SLD) | LF | 4380.000 | |
| | | | | | | 11.000 | | | 662 | 6016 | | WK ZN PAV MRK NON-REMOV (W)24"(SLD) | LF | 11.000 | |
| | | | | | | 4075.000 | | | 662 | 6034 | | WK ZN PAV MRK NON-REMOV (Y)4"(SLD) | LF | 4075.000 | |
| | | | | | | 582.000 | | | 662 | 6050 | | WK ZN PAV MRK REMOV (REFL) TY II-A-A | EA | 582.000 | |
| | | | | | | 23130.000 | | | 662 | 6063 | | WK ZN PAV MRK REMOV (W)4"(SLD) | LF | 23130.000 | |
| | | | | | | 161.000 | | | 662 | 6075 | | WK ZN PAV MRK REMOV (W)24"(SLD) | LF | 161.000 | |
| | | | | | | 498.000 | | | 662 | 6093 | | WK ZN PAV MRK REMOV (Y)4"(BRK) | LF | 498.000 | |
| | | | | | | 43345.000 | | | 662 | 6095 | | WK ZN PAV MRK REMOV (Y)4"(SLD) | LF | 43345.000 | |
| | | | | | | 4881.000 | | | 666 | 6036 | 007 | REFL PAV MRK TY I (W)8"(SLD)(100MIL) | LF | 4881.000 | |
| | | | | | | 1288.000 | | | 666 | 6042 | 007 | REFL PAV MRK TY I (W)12"(SLD)(100MIL) | LF | 1288.000 | |
| | | | | | | 911.000 | | | 666 | 6048 | 007 | REFL PAV MRK TY I (W)24"(SLD)(100MIL) | LF | 911.000 | |
| | | | | | | 30.000 | | | 666 | 6054 | 007 | REFL PAV MRK TY I (W)(ARROW)(100MIL) | EA | 30.000 | |
| | | | | | | 30.000 | | | 666 | 6078 | 007 | REFL PAV MRK TY I (W)(WORD)(100MIL) | EA | 30.000 | |
| | | | | | | 4.000 | | | 666 | 6093 | 007 | REFL PAV MRK TY I (W)(RR XING)(100MIL) | EA | 4.000 | |
| | | | | | | 29074.000 | | | 666 | 6224 | 007 | PAVEMENT SEALER 4" | LF | 29074.000 | |
| | | | | | | 3925.000 | | | 666 | 6226 | 007 | PAVEMENT SEALER 8" | LF | 3925.000 | |
| | | | | | | 1288.000 | | | 666 | 6228 | 007 | PAVEMENT SEALER 12" | LF | 1288.000 | |
| | | | | | | 911.000 | | | 666 | 6230 | 007 | PAVEMENT SEALER 24" | LF | 911.000 | |
| | | | | | | 30.000 | | | 666 | 6231 | 007 | PAVEMENT SEALER (ARROW) | EA | 30.000 | |
| | | | | | | 30.000 | | | 666 | 6232 | 007 | PAVEMENT SEALER (WORD) | EA | 30.000 | |
| | | | | | | 4.000 | | | 666 | 6242 | 007 | PAVEMENT SEALER (RR XING) | EA | 4.000 | |
| | | | | | | 2900.000 | | | 666 | 6300 | 007 | RE PM W/RET REQ TY I (W)4"(BRK)(100MIL) | LF | 2900.000 | |
| | | | | | | 14448.000 | | | 666 | 6303 | 007 | RE PM W/RET REQ TY I (W)4"(SLD)(100MIL) | LF | 14448.000 | |
| | | | | | | 15762.000 | | | 666 | 6315 | 007 | RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL) | LF | 15762.000 | |
| | | | | | | 137.000 | | | 672 | 6007 | | REFL PAV MRKR TY I-C | EA | 137.000 | |
| | | | | | | 40.000 | | | 672 | 6009 | | REFL PAV MRKR TY II-A-A | EA | 40.000 | |
| | | | | | | 144.000 | | | 672 | 6010 | | REFL PAV MRKR TY II-C-R | EA | 144.000 | |
| | | | | | | 18805.000 | | | 677 | 6001 | | ELIM EXT PAV MRK & MRKS (4") | LF | 18805.000 | |
| | | | | | | 29074.000 | | | 678 | 6001 | | PAV SURF PREP FOR MRK (4") | LF | 29074.000 | |
| | | | | | | 3925.000 | | | 678 | 6004 | | PAV SURF PREP FOR MRK (8") | LF | 3925.000 | |

Estimate Sheet

| ESTIMATE SUMMARY | | | | | | | | | | | | | | | |
|------------------|-------|-----|-------|-----|-------|---|-------|-------------|--------------|--------------|----------|--|------|----------|-------|
| | | | | | | CONTROL 1015-01-023 FM 3549 STP 2018(889) | | A L T | ITEM CODE | | | DESCRIPTION | UNIT | TOTAL | |
| EST | FINAL | EST | FINAL | EST | FINAL | EST | FINAL | | ITEM CODE | DESC CODE | SP NO | | | EST | FINAL |
| | | | | | | 1288.000 | | | 678 | 6006 | | PAV SURF PREP FOR MRK (12") | LF | 1288.000 | |
| | | | | | | 911.000 | | | 678 | 6008 | | PAV SURF PREP FOR MRK (24") | LF | 911.000 | |
| | | | | | | 30.000 | | | 678 | 6009 | | PAV SURF PREP FOR MRK (ARROW) | EA | 30.000 | |
| | | | | | | 30.000 | | | 678 | 6016 | | PAV SURF PREP FOR MRK (WORD) | EA | 30.000 | |
| | | | | | | 4.000 | | | 678 | 6020 | | PAV SURF PREP FOR MRK (RR XING) | EA | 4.000 | |
| | | | | | | 1.000 | | | 680 | 6002 | | INSTALL HWY TRF SIG (ISOLATED) | EA | 1.000 | |
| | | | | | | 1.000 | | | 680 | 6004 | | REMOVING TRAFFIC SIGNALS | EA | 1.000 | |
| | | | | | | 1.000 | | | 681 | 6001 | | TEMP TRAF SIGNALS | EA | 1.000 | |
| | | | | | | 8.000 | | | 682 | 6001 | | VEH SIG SEC (12")LED(GRN) | EA | 8.000 | |
| | | | | | | 4.000 | | | 682 | 6002 | | VEH SIG SEC (12")LED(GRN ARW) | EA | 4.000 | |
| | | | | | | 8.000 | | | 682 | 6003 | | VEH SIG SEC (12")LED(YEL) | EA | 8.000 | |
| | | | | | | 8.000 | | | 682 | 6004 | | VEH SIG SEC (12")LED(YEL ARW) | EA | 8.000 | |
| | | | | | | 8.000 | | | 682 | 6005 | | VEH SIG SEC (12")LED(RED) | EA | 8.000 | |
| | | | | | | 8.000 | | | 682 | 6006 | | VEH SIG SEC (12")LED(RED ARW) | EA | 8.000 | |
| | | | | | | 8.000 | | | 682 | 6018 | | PED SIG SEC (LED)(COUNTDOWN) | EA | 8.000 | |
| | | | | | | 8.000 | | | 682 | 6035 | | BACK PLATE (12")(3 SEC)(VENTED)ALUM | EA | 8.000 | |
| | | | | | | 4.000 | | | 682 | 6037 | | BACK PLATE (12")(5 SEC)(VENTED)ALUM | EA | 4.000 | |
| | | | | | | 356.000 | | | 684 | 6031 | | TRF SIG CBL (TY A)(14 AWG)(5 CONDR) | LF | 356.000 | |
| | | | | | | 1015.000 | | | 684 | 6033 | | TRF SIG CBL (TY A)(14 AWG)(7 CONDR) | LF | 1015.000 | |
| | | | | | | 763.000 | | | 684 | 6046 | | TRF SIG CBL (TY A)(14 AWG)(20 CONDR) | LF | 763.000 | |
| | | | | | | 1547.000 | | | 684 | 6079 | | TRF SIG CBL (TY C)(12 AWG)(2 CONDR) | LF | 1547.000 | |
| | | | | | | 1.000 | | | 686 | 6040 | | INS TRF SIG PL AM(S)1 ARM(36')LUM&ILSN | EA | 1.000 | |
| | | | | | | 1.000 | | | 686 | 6052 | | INS TRF SIG PL AM(S)1 ARM(48')LUM&ILSN | EA | 1.000 | |
| | | | | | | 2.000 | | | 686 | 6062 | | INS TRF SIG PL AM(S)1 ARM(60')ILSN | EA | 2.000 | |
| | | | | | | 4.000 | | | 687 | 6001 | | PED POLE ASSEMBLY | EA | 4.000 | |
| | | | | | | 8.000 | | | 688 | 6001 | | PED DETECT PUSH BUTTON (APS) | EA | 8.000 | |
| | | | | | | 1.000 | | | 688 | 6003 | | PED DETECTOR CONTROLLER UNIT | EA | 1.000 | |
| | | | | | | 10.000 | | | 730 | 6001 | | STRIP MOWING | AC | 10.000 | |
| | | | | | | 3.000 | | | 734 | 6002 | | LITTER REMOVAL | CYC | 3.000 | |
| | | | | | | 4.000 | | | 6025 | 6001 | | RADAR PRESENCE DETECTOR | EA | 4.000 | |
| | | | | | | 843.000 | | | 6025 | 6002 | | RADAR PRESENCE DETECTOR COMM CABLE | LF | 843.000 | |
| | | | | | | 1.000 | | | 6054 | 6001 | | SPREAD SPECTRUM RADIO | EA | 1.000 | |
| | | | | | | 87.000 | | | 6054 | 6002 | | COAXIAL CABLE | LF | 87.000 | |
| | | | | | | 1.000 | | | 6054 | 6005 | | ANTENNA (UNI-DIRECTIONAL) | EA | 1.000 | |
| | | | | | | 1.000 | | | 6058 | 6001 | | BBU SYSTEM (EXTERNAL BATT CABINET) | EA | 1.000 | |
| | | | | | | 4.000 | | | 6155 | 6001 | | RADAR DETECTOR | EA | 4.000 | |
| | | | | | | 1006.000 | | | 6155 | 6002 | | RADAR COMMUNICATION CABLE | LF | 1006.000 | |
| | | | | | | 6.000 | | | 6185 | 6001 | | TMA (STATIONARY) | EA | 6.000 | |
| | | | | | | 128.000 | | | 6185 | 6003 | | TMA (MOBILE OPERATION) | HR | 128.000 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | CONTRACTOR FORCE ACCOUNT WORK | | | |
| | | | | | | | | | | | | EROSION CONTROL_MAINTENANCE | LS | 1.000 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | CONTRACTOR FORCE ACCOUNT WORK | | | |
| | | | | | | | | | | | | SAFETY CONTINGENCY | LS | 1.000 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | MATERIAL FURNISHED BY THE STATE (PART) | | | |
| | | | | | | | | | | | | TRAFFIC SIGNALS | LS | 1.000 | |

Estimate Sheet

| ESTIMATE SUMMARY | | | | | | | | | | | | | | | |
|------------------|-------|-----|-------|-----|-------|---|-------|-------------|--------------|--------------|----------|-------------------------------|------|-------|-------|
| | | | | | | CONTROL 1015-01-023 FM 3549 STP 2018(889) | | A L T | ITEM CODE | | | DESCRIPTION | UNIT | TOTAL | |
| EST | FINAL | EST | FINAL | EST | FINAL | EST | FINAL | | ITEM CODE | DESC CODE | SP NO | | | EST | FINAL |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | CONTRACTOR FORCE ACCOUNT WORK | | | |
| | | | | | | | | | | | | RAILROAD CROSSING | LS | 1.000 | |
| | | | | | | | | | | | | | | | |
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ESTIMATE & QUANTITY SHEET

| | | | |
|------|----------|-------------|-------|
| DIST | COUNTY | CCSJ | SHEET |
| 18 | ROCKWALL | 1015-01-023 | 15D |

TRAFFIC CONTROL SUMMARY

TIME: 3:10:18 PM

DATE: 2/23/2018

PLOT DRIVER: RD*11x17*PDF.plt
PEN TABLE: plotordr.tbl
FILE: pw:\\CP-PWS-1501.pbs.j.com:ATKATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\GEN\FM3549*SUMMARY*TCP.dgn

| ITEM NO. | DESC. | CODE | *344 | *344 | 403 6001 | 508 6001 | 662 6004 | 662 6016 | 662 6034 | 662 6050 | 662 6063 | 662 6075 | 662 6093 | 662 6095 | 677 6001 |
|--------------------------------------|-------------------|----------------|---------------------------------|---------------------------------|-----------------------|------------------------|--------------------------------------|---------------------------------------|--------------------------------------|--------------------------------------|----------------------------------|-----------------------------------|----------------------------------|----------------------------------|------------------------------|
| SHEET NO. | BEGINNING STATION | ENDING STATION | SUPERPAVE MIXTURES SP-B PG64-22 | SUPERPAVE MIXTURES SP-C PG64-22 | TEMPORARY SPL SHORING | CONSTRUCT- ING DETOURS | WK ZN PAV MRK NON-REMOV (W) 4" (SLD) | WK ZN PAV MRK NON-REMOV (W) 24" (SLD) | WK ZN PAV MRK NON-REMOV (Y) 4" (SLD) | WK ZN PAV MRK REMOV (REFL) TY II-A-A | WK ZN PAV MRK REMOV (W) 4" (SLD) | WK ZN PAV MRK REMOV (W) 24" (SLD) | WK ZN PAV MRK REMOV (Y) 4" (BRK) | WK ZN PAV MRK REMOV (Y) 4" (SLD) | ELIM EXT PAV MRK & MRKS (4") |
| | | | TON | TON | SF | SY | LF | LF | LF | EA | LF | LF | LF | LF | LF |
| PHASE 1 - STEP 1 | | | | | | | | | | | | | | | |
| 1 OF 3 | 15+58.42 | 36+00.00 | 147 | 37 | | 333 | | | | 6 | 233 | | | 697 | 929 |
| 2 OF 3 | 36+00.00 | 58+00.00 | 881 | 221 | | 2002 | | | | 65 | 1450 | 28 | | 2608 | 4058 |
| 3 OF 3 | 58+00.00 | 69+00.00 | 266 | 67 | | 604 | | | | 22 | 432 | | | 864 | 1296 |
| PHASE 1 - STEP 2 | | | | | | | | | | | | | | | |
| 1 OF 3 | 15+58.42 | 36+00.00 | 245 | 62 | 246 | 556 | | | | 10 | 649 | | | 591 | 399 |
| 2 OF 3 | 36+00.00 | 58+00.00 | 325 | 82 | | 737 | | | | 3 | 2639 | 10 | 498 | 6048 | 3033 |
| 3 OF 3 | 58+00.00 | 69+00.00 | 222 | 56 | 663 | 503 | | | | 22 | 774 | | | 864 | 342 |
| PHASE 1 - STEP 3 | | | | | | | | | | | | | | | |
| 1 OF 6 | 15+58.42 | 36+00.00 | | | 225 | | | | | 8 | 780 | | | 844 | 243 |
| 2 OF 6 | 36+00.00 | 58+00.00 | | | | | | | | 14 | 1229 | | | 2151 | |
| 3 OF 6 | 58+00.00 | 80+00.00 | 316 | 79 | 316 | 718 | | | | 36 | 1083 | | | 1432 | 1048 |
| 4 OF 6 | 80+00.00 | 84+25.00 | 497 | 125 | | 1129 | | | | 18 | 369 | | | 739 | 1108 |
| 5 OF 6 | 1150+25.92 | 1161+28.99 | 250 | 63 | | 568 | | | | | | | | | |
| 6 OF 6 | HILLSIDE DR | | | | 306 | | | | | | | | | | |
| PHASE 2 | | | | | | | | | | | | | | | |
| 1 OF 5 | 15+58.42 | 36+00.00 | 78 | 20 | | 176 | 779 | | 1008 | 2 | | | | | |
| 2 OF 5 | 36+00.00 | 58+00.00 | 117 | 30 | | 264 | 2868 | | 2334 | 58 | | | | | |
| 3 OF 5 | 58+00.00 | 80+00.00 | 392 | 98 | | 889 | 733 | 11 | 733 | 44 | 912 | | | 1013 | 628 |
| 4 OF 5 | 80+00.00 | 84+25.00 | 39 | 10 | | 88 | | | | 34 | 1357 | | | 1357 | |
| 5 OF 5 | 1150+25.92 | 1161+28.99 | 413 | 104 | | 937 | | | | 59 | 2367 | | | 2367 | 4734 |
| PHASE 2 - AIRPORT RD DETAILS | | | | | | | | | | | | | | | |
| 1 OF 1 | | | 125 | 32 | | 283 | | | | 43 | 1063 | 36 | | 1738 | |
| PHASE 2 - RIDING CLUB RD DETAILS | | | | | | | | | | | | | | | |
| 1 OF 2 | | | 24 | 6 | | 53 | | | | 21 | 461 | 10 | | 847 | |
| 2 OF 2 | | | 13 | 4 | | 29 | | | | | | 10 | | | |
| PHASE 2 - ROLLING MEADOWS DR DETAILS | | | | | | | | | | | | | | | |
| 1 OF 1 | | | 48 | 12 | | 109 | | | | 18 | 353 | 20 | | 706 | |
| PHASE 3 - STEP 1 | | | | | | | | | | | | | | | |
| 1 OF 3 | 58+00.00 | 80+00.00 | 14 | 4 | 456 | 31 | | | | | | | | | |
| 2 OF 3 | 80+00.00 | 84+25.00 | | | | | | | | | | | | | |
| 3 OF 3 | 1150+25.92 | 1161+28.99 | | | | | | | | | | | | | |
| PHASE 3 - STEP 2 | | | | | | | | | | | | | | | |
| 1 OF 3 | 58+00.00 | 80+00.00 | | | | | | | | 13 | 1023 | | | 1612 | |
| 2 OF 3 | 80+00.00 | 84+25.00 | | | | | | | | | 904 | 35 | | 1357 | |
| 3 OF 3 | 1150+25.92 | 1161+28.99 | | | | | | | | 61 | 2456 | | | 2456 | |
| PHASE 4 - STEP 1 | | | | | | | | | | | | | | | |
| 1 OF 5 | 15+58.42 | 36+00.00 | | | | | | | | | 489 | | | 3931 | 987 |
| 2 OF 5 | 36+00.00 | 58+00.00 | | | | | | | | | | | | 4400 | |
| 3 OF 5 | 58+00.00 | 80+00.00 | | | | | | | | | | 12 | | 3141 | |
| 4 OF 5 | 80+00.00 | 84+25.00 | | | | | | | | | | | | | |
| 5 OF 5 | 1150+25.92 | 1161+28.99 | | | | | | | | | | | | | |
| PHASE 4 - STEP 2 | | | | | | | | | | | | | | | |
| 1 OF 2 | 69+00.00 | 84+25.00 | | | | | | | | 6 | 1222 | | | 834 | |
| 2 OF 2 | 1150+25.92 | 1161+28.99 | | | | | | | | 19 | 885 | | | 748 | |
| TOTAL | | | 4412 | 1112 | 2212 | 10009 | 4380 | 11 | 4075 | 582 | 23130 | 161 | 498 | 43345 | 18805 |

* FOR CONTRACTOR'S INFORMATION ONLY. THIS ITEM IS SUBSIDIARY TO ITEM 508 6001.

| ITEM NO. | DESC. | CODE | 462 6045 | 462 6048 | 467 6106 | 467 6144 | 512 6009 | 512 6010 | 512 6033 | 512 6034 | 512 6057 | 512 6058 | 6185 6001 | 6185 6003 |
|---------------------------------|------------------------------------|------------------------------------|---------------------------------------|---------------------------------------|---|---|-----------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|------------------|------------------------|-----------|
| PHASE | CONC BOX CULV (3FT X 2FT) (EXTEND) | CONC BOX CULV (4FT X 3FT) (EXTEND) | SET (TY 1) (S=3FT) (HW=3FT) (4:1) (C) | SET (TY 1) (S=4FT) (HW=4FT) (4:1) (C) | PORT CTB (FUR & INST) (LOW PROF) (TY 2) | PORT CTB (FUR & INST) (LOW PROF) (TY 2) | PORT CTB (MOVE) (LOW PROF) (TY 1) | PORT CTB (MOVE) (LOW PROF) (TY 2) | PORT CTB (MOVE) (LOW PROF) (TY 1) | PORT CTB (REMOVE) (LOW PROF) (TY 1) | PORT CTB (REMOVE) (LOW PROF) (TY 2) | TMA (STATIONARY) | TMA (MOBILE OPERATION) | |
| | LF | LF | EA | EA | LF | LF | LF | LF | LF | LF | LF | EA | HR | |
| PHASE 1 - STEP 1 | | | | | | | | | | | | | | |
| PHASE 1 - STEP 1 | 15 | 15 | 1 | 1 | | | | | | | | 3* | 8 | |
| PHASE 1 - STEP 2 | | | | | | | | | | | | | | |
| PHASE 1 - STEP 2 | 20 | 15 | 1 | 1 | 640 | 120 | | | | | | 4* | 16 | |
| PHASE 1 - STEP 3 | | | | | | | | | | | | | | |
| PHASE 1 - STEP 3 | | | | | | | 560 | 120 | 80 | 200 | 40 | 6* | 16 | |
| PHASE 2 | | | | | | | | | | | | | | |
| PHASE 2 - STEP 1 (SIDE STREETS) | | | | | | | 360 | 80 | | | | 2* | 8 | |
| PHASE 2 - STEP 2 (SIDE STREETS) | | | | | | | | | | | | 3* | 8 | |
| PHASE 2 - STEP 3 (SIDE STREETS) | | | | | | | | | | | | 1* | 8 | |
| PHASE 3 - STEP 1 | | | | | | | | | | | | | | |
| PHASE 3 - STEP 1 | | | | | 180 | | | | | | | | 8 | |
| PHASE 3 - STEP 2 | | | | | | | | | | | | | | |
| PHASE 3 - STEP 2 | | | | | | | 540 | 40 | | | | | 8 | |
| PHASE 4 - STEP 1 | | | | | | | | | | | | | | |
| PHASE 4 - STEP 1 | | | | | | | | | 540 | 40 | | 5* | 16 | |
| PHASE 4 - STEP 2 | | | | | | | | | | | | | | |
| PHASE 4 - STEP 2 | | | | | | | | | | | | 3* | 8 | |
| TOTAL | | | 35 | 30 | 2 | 2 | 820 | 120 | 1460 | 240 | 820 | 120 | 6 | 128 |

* FOR CONTRACTOR'S INFORMATION ONLY.

NOTES:

- FOR ITEM 508 6001, 44 SY PER DRIVEWAY WAS ADDED TO EACH SHEET IN PHASE 2 IN ORDER TO ACCOUNT FOR THE WEDGES OF TEMPORARY PAVEMENT NEEDED TO PROVIDE ACCESS FROM EXISTING PAVEMENT TO NEWLY CONSTRUCTED DRIVEWAYS.

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
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ATKINS

TBPE REG. # F-474



TRAFFIC CONTROL SUMMARY

SHEET 1 OF 1

| | | | | |
|-------------|-------------------|-------------------------|----------|-------------|
| DESIGN TM | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| GRAPHICS TM | 6 | SEE TITLE SHEET | | FM 3549 |
| CHECK WL | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 16 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

REMOVAL SUMMARY

| SHEET NO. | ITEM NO. | DESC. | CODE | 104 6001 | 104 6009 | 104 6015 | 104 6017 | 104 6021 | 105 6008 | 105 6019 | 105 6016 | 105 6042 | 496 6002 | 496 6004 | 496 6005 | 496 6007 | 496 6008 |
|-------------|-------------------|----------------|------|---------------------|------------------------|---------------------------|---------------------------|----------------------|--------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|-------------------|-----------------|----------------------|------------------|-------------------------|
| | | | | REMOVING CONC (PAV) | REMOVING CONC (RIPRAP) | REMOVING CONC (SIDEWALKS) | REMOVING CONC (DRIVEWAYS) | REMOVING CONC (CURB) | REMOVING STAB BASE AND ASPH PAV (6") | REMOVING STAB BASE & ASPH PAV (14") | REMOVING STAB BASE & ASPH PAV (16") | REMOVE STAB BASE & ASPH PAV (6.5") | REMOV STR (INLET) | REMOV STR (SET) | REMOV STR (WINGWALL) | REMOV STR (PIPE) | REMOV STR (BOX CULVERT) |
| | BEGINNING STATION | ENDING STATION | | SY | SY | SY | SY | LF | SY | SY | SY | SY | EA | EA | EA | LF | LF |
| FM 3549 | | | | | | | | | | | | | | | | | |
| 1 OF 5 | 15+58.42 | 36+00.00 | | 404 | 77 | 47 | | 70 | 678 | 6271 | | | | 4 | 2 | 382 | 62 |
| 2 OF 5 | 36+00.00 | 58+00.00 | | 425 | | | 892 | | 91 | 6804 | | | | 6 | | 286 | |
| 3 OF 5 | 58+00.00 | 80+00.00 | | 397 | | | 877 | | 1181 | 5853 | 458 | 397 | | 2 | 2 | 519 | 58 |
| 4 OF 5 | 80+00.00 | 84+25.00 | | | | | 156 | | 37 | 1288 | | | | 2 | | 73 | |
| SH 66 | | | | | | | | | | | | | | | | | |
| 4 OF 5 | 1150+25.92 | 1155+00.00 | | 947 | | | 293 | | | | 736 | 947 | | 6 | | 90 | |
| 4 OF 5 | 1157+00.00 | 1161+28.99 | | 861 | | | 96 | | 167 | | 670 | 861 | | 2 | | 27 | |
| HILLSIDE DR | | | | | | | | | | | | | | | | | |
| 5 OF 5 | | | | | | | | | 66 | | | | 1 | 2 | | 159 | |
| | TOTAL | | | 3034 | 77 | 47 | 2314 | 70 | 2220 | 20216 | 1864 | 2205 | 1 | 24 | 4 | 1536 | 120 |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\\CP-PWS-1501.pbs.j.com:ATKNATX01\Documents\Roads and Bridges\Projects\100012351 FM 3549\CADD\GEN\FM3549*SUMMARY*REMOVAL.dgn DATE: 2/23/2018 TIME: 3:10:33 PM

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
| | | | |
| | | | |
| | | | |



Texas Department of Transportation
 © 2018

REMOVAL SUMMARY

SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 17 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

ROADWAY SUMMARY

| ITEM NO. DESC. CODE | | | 100 6002 | 160 6003 | 162 6002 | *166 6002 | 168 6001 | 247 6113 | 260 6009 | 260 6016 | 344 6011 | 344 6106 | 360 6002 | 450 6042 | 481 6024 |
|-----------------------|-------------------|----------------|---------------|-------------------------------------|---------------|------------|---------------------|---|----------------------------|---------------------------------|---------------------------------|---------------------------------|------------------------------------|---------------|----------------------------|
| SHEET NO. | BEGINNING STATION | ENDING STATION | PREPARING ROW | FURNISHING AND PLACING TOPSOIL (4") | BLOCK SODDING | FERTILIZER | VEGETATIVE WATERING | FL BS (RDWY DEL) (TY D GR 1-2) (IN VEH) | LIME TRT (EXST MATL) (10") | LIME (HYD, COM, OR QK (SLURRY)) | SUPERPAVE MIXTURES SP-B PG64-22 | SUPERPAVE MIXTURES SP-D PG64-22 | CONC PVMT (CONT REINF - CRCP) (8") | RAIL (TY PR1) | PIPE (PVC) (SCH 80) (8 IN) |
| | | | STA | SY | SY | TON | MG | CY | SY | TON | TON | TON | SY | LF | LF |
| ROADWAY P&P SHEETS | | | | | | | | | | | | | | | |
| 1 OF 8 | 15+58.42 | 25+00.00 | 9.42 | 2011 | 2011 | 0.10 | 72.0 | | 4706 | 141 | 1035 | | 4158 | | 45 |
| 2 OF 8 | 25+00.00 | 36+00.00 | 11.00 | 3838 | 3838 | 0.20 | 144.0 | | 9647 | 289 | 2122 | | 8660 | 39 | |
| 3 OF 8 | 36+00.00 | 47+00.00 | 11.00 | 2169 | 2169 | 0.11 | 79.2 | | 9783 | 293 | 2152 | | 8799 | | 45 |
| 4 OF 8 | 47+00.00 | 58+00.00 | 11.00 | 2642 | 2642 | 0.14 | 100.8 | | 9835 | 295 | 2164 | | 8837 | | 40 |
| 5 OF 8 | 58+00.00 | 69+00.00 | 11.00 | 3500 | 3500 | 0.18 | 129.6 | | 8638 | 259 | 1900 | | 7654 | | 45 |
| 6 OF 8 | 69+00.00 | 80+00.00 | 11.00 | 4072 | 4072 | 0.21 | 151.2 | 2343 | 3654 | 110 | 4259 | 691 | 3265 | | |
| 7 OF 8 | 80+00.00 | 84+25.00 | 4.25 | 2606 | 2606 | 0.13 | 93.6 | 783 | | | 1177 | 235 | | | |
| 8 OF 8 | 1150+25.92 | 1155+00.00 | | 3546 | 3546 | 0.18 | 129.6 | 1661 | | | 2460 | 492 | | | |
| | 1157+00.00 | 1161+28.99 | | | | | | | | | | | | | |
| HILLSIDE DR | | | 1.65 | 425 | 425 | 0.02 | 14.4 | | | | | | | | |
| DITCH OVER CULVERT B3 | | | | 2680 | 2680 | 0.14 | 100.8 | | | | | | | | |
| TOTAL | | | 70.32 | 27489 | 27489 | 1.41 | 1015.2 | 4787 | 46264 | 1387 | 17269 | 1418 | 41373 | 39 | 175 |

* FOR CONTRACTOR'S INFORMATION ONLY

| ITEM NO. DESC. CODE | | | 500 6001 | 502 6001 | 528 6002 | 529 6005 | 529 6008 | 529 6022 | 531 6001 | 536 6006 | 624 6008 |
|---------------------|-------------------|----------------|--------------|--|----------------------------|--------------------------|----------------------------|---------------------------|---------------------|-------------------------|---------------------------------|
| SHEET NO. | BEGINNING STATION | ENDING STATION | MOBILIZATION | BARRICADES, SIGNS AND TRAFFIC HANDLING | COLORED TEXTURED CONC (6") | CONC CURB (MONO) (TY II) | CONC CURB & GUTTER (TY II) | CONC CURB (DOWEL) (TY II) | CONC SIDEWALKS (4") | CONC MEDIAN (MONO NOSE) | GROUND BOX TY C (162911)W/APRON |
| | | | LS | MO | SY | LF | LF | LF | SY | SY | EA |
| ROADWAY P&P SHEETS | | | | | | | | | | | |
| 1 OF 8 | 15+58.42 | 25+00.00 | | | | 2319 | | 569 | 618 | | 2 |
| 2 OF 8 | 25+00.00 | 36+00.00 | | | 183 | 3995 | | | 1160 | 12 | |
| 3 OF 8 | 36+00.00 | 47+00.00 | | | 372 | 3886 | | | 1153 | 25 | 2 |
| 4 OF 8 | 47+00.00 | 58+00.00 | | | 366 | 4005 | | | 1271 | 25 | 2 |
| 5 OF 8 | 58+00.00 | 69+00.00 | | | 72 | 4039 | | | 880 | | 2 |
| 6 OF 8 | 69+00.00 | 80+00.00 | | | 356 | 1557 | 1242 | | 913 | 37 | |
| 7 OF 8 | 80+00.00 | 84+25.00 | | | | | | | | | |
| 8 OF 8 | 1150+25.92 | 1155+00.00 | | | | | 386 | | | | |
| | 1157+00.00 | 1161+28.99 | | | | | | | | | |
| TOTAL | | | 1 | 21 | 1349 | 19801 | 1628 | 569 | 5995 | 99 | 8 |

NOTES:

- VEGETATIVE WATERING (ITEM 168) WAS CALCULATED ASSUMING SUMMER MONTHS (12,000 GALLONS/ACRE PER WORKING DAY) WITH 60 CONSECUTIVE WORKING DAYS OF WATERING.
- LIME QUANTITY (ITEM 260) WAS CALCULATED USING A RATE OF 60 LBS/SY FOR 10 IN LIME.
- FERTILIZER QUANTITY (ITEM 166) WAS CALCULATED USING A RATE OF 500 LB PER AC.

| ITEM NO. DESC. CODE | | | 400 6008 | 401 6001 | 530 6004 | 531 6004 | 531 6010 | 531 6013 | 560 6001 |
|---------------------------|--------------------|----------------|---------------------------|-------------------|------------------|-------------------|-------------------|--------------------|-----------------------------------|
| SHEET NO. | BEGINNING STATION | ENDING STATION | CUT & RESTORE ASPH PAVING | FLOWABLE BACKFILL | DRIVEWAYS (CONC) | CURB RAMPS (TY 1) | CURB RAMPS (TY 7) | CURB RAMPS (TY 10) | MAILBOX INSTALL-S (TWG-POST) TY 1 |
| | | | SY | CY | SY | EA | EA | EA | EA |
| SIDE STREET P&P SHEETS | | | | | | | | | |
| 1 OF 5 | AIRPORT RD | | | | | 1 | 1 | 1 | |
| 2 OF 5 | RIDING CLUB RD | | | | | | 2 | | |
| 3 OF 5 | ROLLING MEADOWS DR | | | | | | 2 | | |
| 4 OF 5 | ZION HILL CIRCLE | | | | | | | | |
| 5 OF 5 | HILLSIDE DR | | 45 | 14 | | | | | |
| INTERSECTION DETAIL SHEET | | | | | | | | | |
| 1 OF 1 | SH 66 | | | | | 8 | | | |
| DRIVEWAY P&P SHEETS | | | | | | | | | |
| 1 OF 22 | | | | | 228 | | 4 | | 1 |
| 2 OF 22 | | | | | 117 | | 4 | | |
| 3 OF 22 | | | | | 101 | | | 4 | 1 |
| 4 OF 22 | | | | | 546 | | | 4 | |
| 5 OF 22 | | | | | 121 | | 4 | | 1 |
| 6 OF 22 | | | | | 248 | | 4 | | 1 |
| 7 OF 22 | | | | | 199 | | 4 | | 1 |
| 8 OF 22 | | | | | 231 | | 4 | | 2 |
| 9 OF 22 | | | | | 190 | | 4 | | 1 |
| 10 OF 22 | | | | | 136 | | 4 | | |
| 11 OF 22 | | | | | 90 | | 4 | | 1 |
| 12 OF 22 | | | | | 370 | | 4 | | |
| 13 OF 22 | | | | | 90 | | 4 | | 1 |
| 14 OF 22 | | | | | 94 | | | | 2 |
| 15 OF 22 | | | | | 119 | | | | |
| 16 OF 22 | | | | | 113 | | | | 1 |
| 17 OF 22 | | | | | 82 | | | | 1 |
| 18 OF 22 | | | | | 152 | | | | |
| 19 OF 22 | | | | | 92 | | 2 | 1 | |
| 20 OF 22 | | | | | 59 | | | | 1 |
| 21 OF 22 | | | | | 71 | | | | |
| 22 OF 22 | | | | | 45 | | 2 | | 1 |
| TOTAL | | | 45 | 14 | 3494 | 9 | 53 | 10 | 16 |

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
| | | | |
| | | | |
| | | | |

ATKINS

TBPE REG. # F-474



ROADWAY SUMMARY

SHEET 1 OF 1

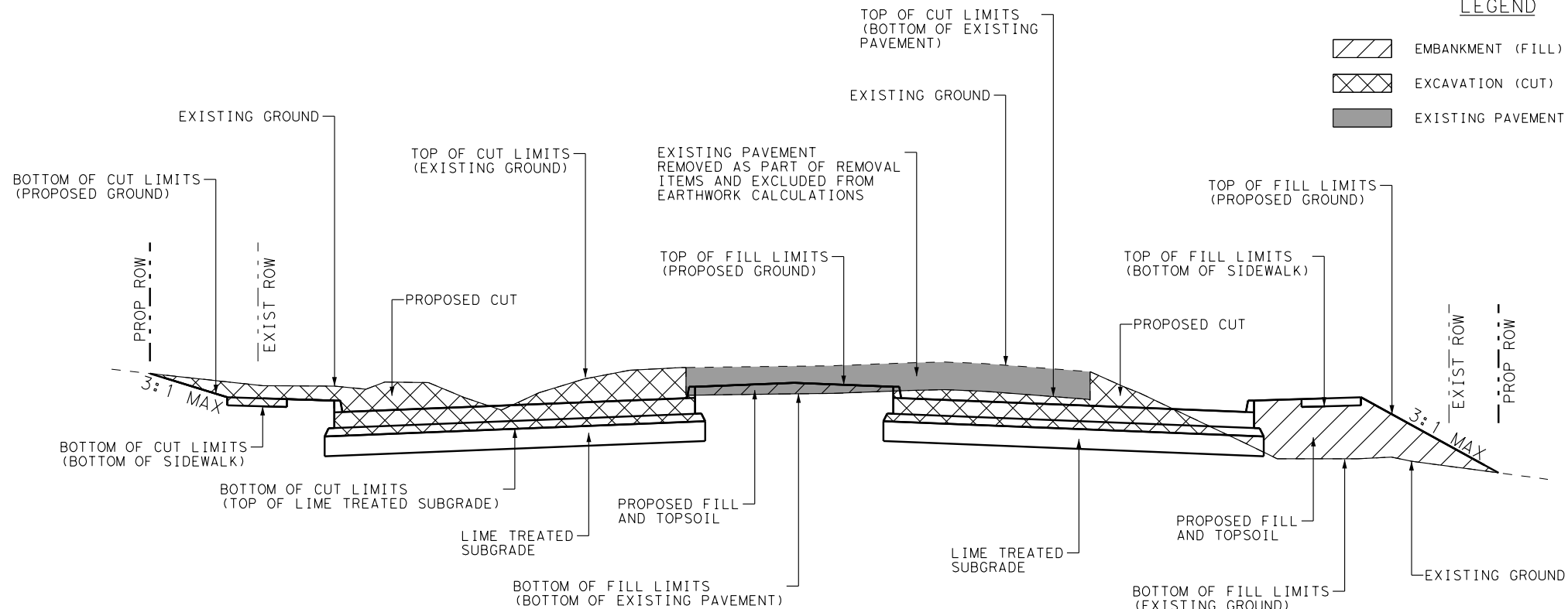
| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 18 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotdrv.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Projects\100012351 FM 3549\CADD\GEN\FM3549\SUMMARY*ROADWAY.dgn DATE: 2/27/2018 TIME: 2:50:52 PM

EARTHWORK SUMMARY

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\GEN\FM3549*SUMMARY*EARTHWORK.dgn DATE: 2/23/2018 TIME: 3:11:17 PM

| ITEM NO. | DESC. CODE | 110 6001 | 132 6025 |
|----------|------------|----------------------------|--|
| | | EXCAVATION (ROADWAY) CY | EMBANKMENT (FINAL) (DENS CONT) (TY C1) CY |
| FM 3549 | 19+00.00 | 48 | 167 |
| FM 3549 | 20+00.00 | 62 | 387 |
| FM 3549 | 21+00.00 | 39 | 379 |
| FM 3549 | 22+00.00 | 69 | 257 |
| FM 3549 | 23+00.00 | 130 | 168 |
| FM 3549 | 24+00.00 | 176 | 108 |
| FM 3549 | 25+00.00 | 172 | 93 |
| FM 3549 | 26+00.00 | 155 | 109 |
| FM 3549 | 27+00.00 | 215 | 95 |
| FM 3549 | 28+00.00 | 278 | 88 |
| FM 3549 | 29+00.00 | 311 | 79 |
| FM 3549 | 30+00.00 | 484 | 33 |
| FM 3549 | 31+00.00 | 563 | 0 |
| FM 3549 | 32+00.00 | 450 | 67 |
| FM 3549 | 33+00.00 | 644 | 88 |
| FM 3549 | 34+00.00 | 645 | 80 |
| FM 3549 | 35+00.00 | 362 | 73 |
| FM 3549 | 36+00.00 | 342 | 37 |
| FM 3549 | 37+00.00 | 331 | 101 |
| FM 3549 | 38+00.00 | 306 | 78 |
| FM 3549 | 39+00.00 | 249 | 39 |
| FM 3549 | 40+00.00 | 290 | 52 |
| FM 3549 | 41+00.00 | 426 | 23 |
| FM 3549 | 42+00.00 | 488 | 40 |
| FM 3549 | 43+00.00 | 387 | 82 |
| FM 3549 | 44+00.00 | 235 | 119 |
| FM 3549 | 45+00.00 | 222 | 139 |
| FM 3549 | 46+00.00 | 316 | 128 |
| FM 3549 | 47+00.00 | 383 | 113 |
| FM 3549 | 48+00.00 | 364 | 92 |
| FM 3549 | 49+00.00 | 419 | 44 |
| FM 3549 | 50+00.00 | 533 | 10 |
| FM 3549 | 51+00.00 | 579 | 8 |
| FM 3549 | 52+00.00 | 553 | 15 |
| FM 3549 | 53+00.00 | 445 | 32 |
| FM 3549 | 54+00.00 | 293 | 62 |
| FM 3549 | 55+00.00 | 309 | 70 |
| FM 3549 | 56+00.00 | 477 | 56 |
| FM 3549 | 57+00.00 | 703 | 29 |
| FM 3549 | 58+00.00 | 801 | 15 |
| FM 3549 | 59+00.00 | 614 | 81 |
| FM 3549 | 60+00.00 | 561 | 91 |
| FM 3549 | 61+00.00 | 623 | 38 |
| FM 3549 | 62+00.00 | 536 | 48 |
| FM 3549 | 63+00.00 | 428 | 86 |
| FM 3549 | 64+00.00 | 294 | 149 |
| FM 3549 | 65+00.00 | 173 | 199 |
| FM 3549 | 66+00.00 | 128 | 202 |
| FM 3549 | 67+00.00 | 138 | 168 |
| FM 3549 | 68+00.00 | 193 | 120 |
| FM 3549 | 69+00.00 | 298 | 59 |
| FM 3549 | 70+00.00 | 469 | 10 |
| FM 3549 | 71+00.00 | 746 | 0 |
| FM 3549 | 72+00.00 | 1064 | 0 |
| FM 3549 | 73+00.00 | 1086 | 0 |
| FM 3549 | 74+00.00 | 1796 | 0 |
| FM 3549 | 75+00.00 | 1731 | 19 |
| FM 3549 | 76+00.00 | 763 | 31 |
| FM 3549 | 77+00.00 | 511 | 74 |
| FM 3549 | 78+00.00 | 270 | 92 |
| FM 3549 | 79+00.00 | 184 | 80 |
| FM 3549 | 80+00.00 | 135 | 104 |
| FM 3549 | 81+00.00 | 100 | 99 |
| FM 3549 | 82+00.00 | 66 | 105 |
| FM 3549 | 83+00.00 | 38 | 119 |
| FM 3549 | 84+00.00 | 32 | 101 |
| FM 3549 | 85+00.00 | 17 | 42 |
| TOTAL | | 27248 | 5772 |



LEGEND

| | |
|--|-------------------|
| | EMBANKMENT (FILL) |
| | EXCAVATION (CUT) |
| | EXISTING PAVEMENT |

| ITEM NO. | DESC. CODE | 110 6001 | 132 6025 |
|-----------------------|------------|----------------------------|--|
| | | EXCAVATION (ROADWAY) CY | EMBANKMENT (FINAL) (DENS CONT) (TY C1) CY |
| SH 66 | 1151+00.00 | 104 | 17 |
| SH 66 | 1152+00.00 | 220 | 22 |
| SH 66 | 1153+00.00 | 256 | 9 |
| SH 66 | 1154+00.00 | 339 | 10 |
| SH 66 | 1155+00.00 | 468 | 7 |
| SH 66 | 1158+00.00 | 1004 | 0 |
| SH 66 | 1159+00.00 | 642 | 7 |
| SH 66 | 1160+00.00 | 287 | 14 |
| SH 66 | 1161+00.00 | 98 | 40 |
| SH 66 | 1162+00.00 | 33 | 33 |
| DITCH OVER CULVERT B3 | | 393 | 14 |
| HILLSIDE DR | | 5 | 4 |
| TOTAL | | 3849 | 177 |
| GRAND TOTAL | | 31097 | 5949 |

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
| | | | |
| | | | |
| | | | |

ATKINS
 TBPE REG. # F-474

Texas Department of Transportation
 © 2018

EARTHWORK SUMMARY

SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 19 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\GEN\FM3549*SUMMARY*DRAINAGE DATE: 2/28/2018 TIME: 10:05:53 AM

| CSJ 1015-01-023 SUMMARY OF DRAINAGE ITEMS | | | | | | | | | | | | | | | | |
|---|--------------------|------------------------------------|----------------------------|---|---------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|---|---|--|---|---|
| LOCATION | 400 6005 | 402 6001 | 432 6002 | 459 6007 | 462 6004 | 462 6007 | 464 6003 | 464 6005 | 464 6007 | 465 6002 | 465 6003 | 465 6013 | 465 6014 | 465 6015 | 465 6016 | 465 6029 |
| | CEM STABIL BKFL | TRENCH EXCAVATION PROTECTION | RIPRAP (CONC) (5 IN) | GABION MATTRESSES (GALV) (12 IN) | CONC BOX CULV (4 FTX3 FT) | CONC BOX CULV (5 FTX3 FT) | RC PIPE (CL III) (18 IN) | RC PIPE (CL III) (24 IN) | RC PIPE (CL III) (30 IN) | MANH (COMPL) (PRM) (48IN) | MANH (COMPL) (PR M) (60IN) | INLET (COMPL) (PCO) (3FT) (NONE) | INLET (COMPL) (PCO) (3FT) (LEFT) | INLET (COMPL) (PCO) (3FT) (RIGHT) | INLET (COMPL) (PCO) (3FT) (BOTH) | INLET (COMPL) (PCU) (3FT) (NONE) |
| DRAINAGE PLAN & PROFILE SHEET | CY | LF | CY | SY | LF | LF | LF | LF | LF | EA | EA | EA | EA | EA | EA | EA |
| SHEET 1 OF 9 | | 300 | | | | | 1,329 | | | 2 | | | 1 | | 3 | |
| SHEET 2 OF 9 | | 1,688 | | 109 | 94 | | 1,581 | 464 | | 4 | | 3 | 4 | 5 | 1 | 2 |
| SHEET 3 OF 9 | 1.0 | 1,037 | 4.5 | | | | 412 | 729 | 189 | | | | 2 | 1 | | 1 |
| SHEET 4 OF 9 | | 1,325 | | | | | 973 | 91 | 1,066 | 4 | | | 1 | | 2 | |
| SHEET 5 OF 9 | | 930 | | | | | 183 | 1,913 | 67 | 1 | | | 3 | | 1 | |
| SHEET 6 OF 9 | | 530 | 1.4 | | | | 804 | 329 | | | 1 | 1 | 3 | 2 | | |
| SHEET 7 OF 9 | | 220 | | | | | 21 | 531 | | | | | | | | |
| SHEET 8 OF 9 | | 850 | | | 807 | | | | | | | | | | | |
| SHEET 9 OF 9 | 1.4 | 450 | 2.7 | 64 | | 403 | 26 | 26 | | | | | | | | |
| CSJ 1015-01-023 TOTAL | 2.4 | 7,330 | 9 | 173 | 901 | 403 | 5,329* | 4,083* | 1,322 | 11 | 1 | 4 | 14 | 8 | 7 | 3 |

| CSJ 1015-01-023 SUMMARY OF DRAINAGE ITEMS (CONT'D) | | | | | | | | | | | |
|--|--|---|---|---|---|---|---|---|--|--|---|
| LOCATION | 465 6031 | 465 6032 | 465 6033 | 465 6036 | 465 6049 | 465 6050 | 465 6075 | 465 6076 | 465 6100 | 465 6104 | 465 6126 |
| | INLET (COMPL) (PCU) (3FT) (RIGHT) | INLET (COMPL) (PCU) (3FT) (BOTH) | INLET (COMPL) (PCU) (4FT) (NONE) | INLET (COMPL) (PCU) (4FT) (BOTH) | INLET (COMPL) (POD) (FG) (4FTX4FT) | INLET (COMPL) (POD) (FG) (3FTX5FT) | INLET (COMPL) (PSL) (RC) (5FTX6FT) | INLET (COMPL) (PSL) (RC) (6FTX6FT) | INLET (COMPL) (PSL) (SH) (6FTX6FT -3FTX3FT) | INLET (COMPL) (PSL) (SH) (8FTX8FT -4FTX4FT) | INLET (COMPL) (PSL) (FG) (3FTX3FT- 3FTX3FT) |
| DRAINAGE PLAN & PROFILE SHEET | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | EA |
| SHEET 1 OF 9 | | | | | | | | | | | 3 |
| SHEET 2 OF 9 | | | | | | | 1 | | | | 3 |
| SHEET 3 OF 9 | 3 | 2 | | | | | | | | | |
| SHEET 4 OF 9 | | | 1 | 3 | | | | | | | |
| SHEET 5 OF 9 | 4 | 1 | 1 | | | | | | | | |
| SHEET 6 OF 9 | | | | | | | 1 | | | | |
| SHEET 7 OF 9 | | | | | | | | | | | |
| SHEET 8 OF 9 | | | | | 1 | | | 1 | | 1 | |
| SHEET 9 OF 9 | | | | | | 1 | | | | 1 | |
| CSJ 1015-01-023 TOTAL | 7 | 3 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 2 | 6 |

* QUANTITY INCLUDES LATERALS.

| CSJ 1015-01-023 SUMMARY OF DRAINAGE ITEMS (CONT'D) | | | | | | | | | |
|--|---|--|--|---|-----------------------------------|-----------------------------------|---|---|---|
| LOCATION | 465 6128 | 465 6158 | 465 6160 | 465 6217 | 466 6151 | 466 6180 | 467 6357 | 467 6359 | 467 6395 |
| | INLET (COMPL) (PSL) (FG) (4FTX4FT- 4FTX4FT) | INLET (COMPL) (PAZD) (FG) (3FTX3FT- 3FTX3FT) | INLET (COMPL) (PAZD) (FG) (4FTX4FT- 4FTX4FT) | INLET (COMPL) (CURB) (5 FT) (SPECIAL) | WINGWALL (FW - 0) (HW=4 FT) | WINGWALL (PW - 1) (HW=5 FT) | SET (TY II) (18 IN) (RCP) (3: 1) (P) | SET (TY II) (18 IN) (RCP) (4: 1) (P) | SET (TY II) (24 IN) (RCP) (6: 1) (P) |
| DRAINAGE PLAN & PROFILE SHEET | EA | EA | EA | EA | EA | EA | EA | EA | EA |
| SHEET 1 OF 9 | | | 3 | | | | | | |
| SHEET 2 OF 9 | | | | | | 1 | | | |
| SHEET 3 OF 9 | | | | 3 | | | | | |
| SHEET 4 OF 9 | | | | | | | | | |
| SHEET 5 OF 9 | | | | | | | | | |
| SHEET 6 OF 9 | | 1 | | | | | | 4 | |
| SHEET 7 OF 9 | | 3 | | | | | | 2 | 1 |
| SHEET 8 OF 9 | | 1 | 1 | | | | | | |
| SHEET 9 OF 9 | 1 | | 1 | | 1 | | 1 | | |
| CSJ 1015-01-023 TOTAL | 1 | 5 | 5 | 3 | 1 | 1 | 1 | 6 | 1 |

CIVIL ASSOCIATES, INC.

TBPE REG. # F-474



9330 LBJ Frwy, Ste. 1150
Dallas, Texas 75243
TBPE Firm Registration No. 6981

DRAINAGE SUMMARY

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 20 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |

SHEET 1 OF 1

| CSJ 1015-01-023 SUMMARY OF SIGNAL ITEMS | | | | |
|---|--|------|---------------------------|---------------------------|
| BID ITEM | DESCRIPTION | UNIT | TEMPORARY SIGNAL QUANTITY | PERMANENT SIGNAL QUANTITY |
| 0416 6032 | DRILL SHAFT (TRF SIG POLE) (36 IN) | LF | | 26 |
| 0416 6034 | DRILL SHAFT (TRF SIG POLE) (48 IN) | LF | | 44 |
| 0618-6029 | CONDT (PVC) (SCH 40) (3") | LF | | 281 |
| 0618 6033 | CONDT (PVC) (SCH 40) (4") | LF | | 474 |
| 0618 6034 | CONDT (PVC) (SCH 40) (4") (BORE) | LF | | 0 |
| 0620 6004 | ELEC CONDR (NO.12) INSULATED | LF | | 160 |
| 0620 6008 | ELEC CONDR (NO.8) INSULATED | LF | | 800 |
| 0620 6009 | ELEC CONDR (NO.6) BARE | LF | | 735 |
| 0620 6010 | ELEC CONDR (NO.6) INSULATED | LF | | 64 |
| 0621 6002 | TRAY CABLE (3 CONDR) (12 AWG) | LF | | 915 |
| 0624 6002 | GROUND BOX TY A (122311)W/APRON | EA | | 1 |
| 0624 6008 | GROUND BOX TY C (162911)W/APRON | EA | | 4 |
| 0628 6187 | ELC SRV TY D 120/240 070(NS)SS(E)PS(U) | EA | | 1 |
| 0680 6002 | INSTALL HWY TRF SIG (ISOLATED) | EA | | 1 |
| 0680 6004 | REMOVING TRAFFIC SIGNALS | EA | 1 | |
| 0681 6001 | TEMP TRAF SIGNALS | EA | 1 | |
| 0682 6001 | VEH SIG SEC (12")LED(GRN) | EA | | 8 |
| 0682 6002 | VEH SIG SEC (12")LED(GRN ARW) | EA | | 4 |
| 0682 6003 | VEH SIG SEC (12")LED(YEL) | EA | | 8 |
| 0682 6004 | VEH SIG SEC (12")LED(YEL ARW) | EA | | 8 |
| 0682 6005 | VEH SIG SEC (12")LED(RED) | EA | | 8 |
| 0682 6006 | VEH SIG SEC (12")LED(RED ARW) | EA | | 8 |
| 0682 6018 | PED SIG SEC (LED)(COUNTDOWN) | EA | | 8 |
| 0682 6035 | BACK PLATE (12") (3 SEC)(VENTED)ALUM | EA | | 8 |
| 0682 6037 | BACK PLATE (12") (5 SEC)(VENTED)ALUM | EA | | 4 |
| 0684 6031 | TRF SIG CBL (TY A) (14 AWG) (5 CONDR) | LF | | 356 |
| 0684 6033 | TRF SIG CBL (TY A) (14 AWG) (7 CONDR) | LF | | 1015 |
| 0684 6046 | TRF SIG CBL (TY A) (14 AWG) (20 CONDR) | LF | | 763 |
| 0684 6079 | TRF SIG CBL (TY C) (12 AWG) (2 CONDR) | LF | | 1547 |
| 0686 6040 | INS TRF SIG PL AM(S)1 ARM(36')LUM&ILSN | EA | | 1 |
| 0686 6052 | INS TRF SIG PL AM(S)1 ARM(48')LUM&ILSN | EA | | 1 |
| 0686 6062 | INS TRF SIG PL AM(S)1 ARM(60')ILSN | EA | | 2 |
| 0687 6001 | PED POLE ASSEMBLY | EA | | 4 |
| 0688 6001 | PED DETECT PUSH BUTTON (APS) | EA | | 8 |
| 0688 6003 | PED DETECTOR CONTROLLER UNIT | EA | | 1 |
| 6025 6001 | RADAR PRESENCE DETECTOR | EA | | 4 |
| 6025 6002 | RADAR PRESENCE DETECTOR COMM CABLE | LF | | 843 |
| 6054 6001 | SPREAD SPECTRUM RADIO | EA | | 1 |
| 6054 6002 | COAXIAL CABLE | LF | | 87 |
| 6054 6005 | ANTENNA (UNI-DIRECTIONAL) | EA | | 1 |
| 6058 6001 | BBU SYSTEM (EXTERNAL BATT CABINET) | EA | | 1 |
| 6155 6001 | RADAR ADVANCED DETECTION DEVICE | EA | | 4 |
| 6155 6002 | RADAR COMMUNICATION CABLE | LF | | 1006 |

| | | | | |
|--|---------------------|--|----------|---------------------|
| CIVIL ASSOCIATES, INC. | |  9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981 | | |
| ATKINS TBPE REG. # F-474 | | | | |
|  Texas Department of Transportation © 2018 | | | | |
| SIGNAL SUMMARY | | | | |
| SHEET 1 OF 1 | | | | |
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS | ROCKWALL | 21 |
| CHECK NA | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |




CSJ 1015-01-023 SUMMARY OF SIGN AND PAVEMENT MARKINGS ITEMS

| LOCATION | 636 6001 | 644 6001 | 644 6002 | 644 6004 | 644 6028 | 644 6030 | 644 6033 | 644 6068 | 666 6036 | 666 6042 | 666 6048 | 666 6054 | 666 6078 | 666 6093 | 666 6224 | 666 6226 | 666 6228 |
|---------------------------------------|-----------------------------|--|---|--|---|--|--|--|--|---|---|---|--|---|-----------------------|-----------------------|------------------------|
| | ALUMINUM SIGNS (TY A) | IN SM RD SN SUP&AM TY10BWG (1) SA (P) | IN SM RD SN SUP&AM TY10BWG (1) SA (P-BM) | IN SM RD SN SUP&AM TY10BWG (1) SA (T) | IN SM RD SN SUP&AM TYS80 (1) SA (P-BM) | IN SM RD SN SUP&AM TYS80 (1) SA (T) | IN SM RD SN SUP&AM TYS80 (1) SA (U) | RELOCATE SM RD SN SUP&AM TY 10BWG | REFL PAV MRK TY I (W) 8" (SLD) (100MIL) | REFL PAV MRK TY I (W) 12" (SLD) (100MIL) | REFL PAV MRK TY I (W) 24" (SLD) (100MIL) | REFL PAV MRK TY I (W) (ARROW) (100MIL) | REFL PAV MRK TY I (W) (WORD) (100MIL) | REFL PAV MRK TY I (W) (RR XING) (100MIL) | PAVEMENT SEALER 4" | PAVEMENT SEALER 8" | PAVEMENT SEALER 12" |
| SIGNING & PAVEMENT MARKING PLAN SHEET | SF | EA | EA | EA | EA | EA | EA | EA | LF | LF | LF | EA | EA | EA | LF | LF | LF |
| SHEET 1 OF 4 | 8 | 11 | 1 | 2 | | 1 | | | 1,477 | 447 | 260 | 8 | 8 | 4 | 9,292 | 1,477 | 447 |
| SHEET 2 OF 4 | | 2 | | | 2 | | | | 1,304 | 213 | 35 | 8 | 8 | | 9,584 | 1,304 | 213 |
| SHEET 3 OF 4 | | 6 | | 1 | | 1 | 3 | 1 | 1,144 | 628 | 616 | 6 | 6 | | 10,198 | 1,144 | 628 |
| SHEET 4 OF 4 | | 4 | | 2 | | | | | 956 | | | 8 | 8 | | | | |
| CSJ 1015-01-023 TOTAL | 8 | 23 | 1 | 5 | 2 | 2 | 3 | 1 | 4,881 | 1,288 | 911 | 30 | 30 | 4 | 29,074 | 3,925 | 1,288 |

CSJ 1015-01-023 SUMMARY OF SIGN AND PAVEMENT MARKINGS ITEMS (CONT'D)



| LOCATION | 666 6230 | 666 6231 | 666 6232 | 666 6242 | 666 6300 | 666 6303 | 666 6315 | 672 6007 | 672 6009 | 672 6010 | 678 6001 | 678 6004 | 678 6006 | 678 6008 | 678 6009 | 678 6016 | 678 6020 |
|---------------------------------------|------------------------|-------------------------------|------------------------------|---------------------------------|--|--|--|----------------------------|-------------------------------|-------------------------------|----------------------------------|----------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|------------------------------------|--|
| | PAVEMENT SEALER 24" | PAVEMENT SEALER (ARROW) | PAVEMENT SEALER (WORD) | PAVEMENT SEALER (RR XING) | RE PM W/RET REQ TY I (W) 4" (BRK) (100MIL) | RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL) | RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL) | REFL PAV MRKR TY I-C | REFL PAV MRKR TY II-A-A | REFL PAV MRKR TY II-C-R | PAV SURF PREP FOR MRK (4") | PAV SURF PREP FOR MRK (8") | PAV SURF PREP FOR MRK (12") | PAV SURF PREP FOR MRK (24") | PAV SURF PREP FOR MRK (ARROW) | PAV SURF PREP FOR MRK (WORD) | PAV SURF PREP FOR MRK (RR XING) |
| SIGNING & PAVEMENT MARKING PLAN SHEET | LF | EA | EA | EA | LF | LF | LF | EA | EA | EA | LF | LF | LF | LF | EA | EA | EA |
| SHEET 1 OF 4 | 260 | 8 | 8 | 4 | 940 | 4,314 | 4,038 | 28 | | 46 | 9,292 | 1,477 | 447 | 260 | 8 | 8 | 4 |
| SHEET 2 OF 4 | 35 | 8 | 8 | | 1,120 | 4,400 | 4,064 | 64 | | 56 | 9,584 | 1,304 | 213 | 35 | 8 | 8 | |
| SHEET 3 OF 4 | 616 | 6 | 6 | | 840 | 4,734 | 4,624 | 45 | | 42 | 10,198 | 1,144 | 628 | 616 | 6 | 6 | |
| SHEET 4 OF 4 | | 8 | 8 | | | 1,000 | 3,036 | | 40 | | 0 | 0 | | | 8 | 8 | |
| CSJ 1015-01-023 TOTAL | 911 | 30 | 30 | 4 | 2,900 | 14,448 | 15,762 | 137 | 40 | 144 | 29,074 | 3,925 | 1,288 | 911 | 30 | 30 | 4 |

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 DATE: 2/26/2018
 TIME: 1:32:47 PM

| | | | |
|---|---|--|---------------------------|
| CIVIL ASSOCIATES, INC. |  | 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981 | |
|  | | | |
|  | | | |
| SIGNING AND PAVEMENT MARKINGS SUMMARY | | | |
| SHEET 1 OF 1 | | | |
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY |
| CHECK JM | TEXAS | DALLAS | ROCKWALL |
| CHECK JM | CONTROL | SECTION | JOB |
| | 1015 | 01 | 023 |
| | | | 22 |

| CSJ 1015-01-023 SUMMARY OF SW3P ITEMS | | | | | | | | | | | |
|---------------------------------------|---|--------------|------------------------|--|---------------------------------|--|-----------------------------------|---------------------------------------|--------------------------------------|--|--|
| LOCATION | 164 6051 | 166 6001 | 168 6001 | 506 6002 | 506 6011 | 506 6020 | 506 6024 | 506 6038 | 506 6039 | 506 6041 | 506 6043 |
| | DRILL SEED (TEMP) (WARM OR COOL) | FERTILIZER | VEGETATIVE WATERING | ROCK FILTER DAMS (INSTALL) (TY 2) | ROCK FILTER DAMS (REMOVE) | CONSTRUCTION EXITS (INSTALL) (TY 1) | CONSTRUCTION EXITS (REMOVE) | TEMP SEDMT CONT FENCE (INSTALL) | TEMP SEDMT CONT FENCE (REMOVE) | BIODEG EROSN CONT LOGS (INSTL) (12") | BIODEG EROSN CONT LOGS (REMOVE) |
| SW3P SITE PLAN SHEET | SY | AC | MG | LF | LF | SY | SY | LF | LF | LF | LF |
| PHASE 1 SHEET 1 OF 5 | | | | 54 | 54 | | | 243 | 243 | 29 | 29 |
| PHASE 1 SHEET 2 OF 5 | | | | 28 | 28 | | | 590 | 590 | 40 | 40 |
| PHASE 1 SHEET 3 OF 5 | 526 | 0.1 | 79 | 28 | 28 | | | 410 | 410 | 28 | 28 |
| PHASE 1 SHEET 4 OF 5 | 2,126 | 0.4 | 317 | 81 | 81 | | | 310 | 310 | 172 | 172 |
| PHASE 1 SHEET 5 OF 5 | | | | | | | | | | 56 | 56 |
| PHASE 2 SHEET 1 OF 5 | 3,024 | 0.6 | 450 | | | | | 1,910 | 1,910 | 422 | 422 |
| PHASE 2 SHEET 2 OF 5 | 2,630 | 0.5 | 392 | | | | | 2,202 | 2,202 | 266 | 266 |
| PHASE 2 SHEET 3 OF 5 | 3,516 | 0.7 | 523 | | | | | 1,781 | 1,781 | 224 | 224 |
| PHASE 2 SHEET 4 OF 5 | | | | | | | | | | 84 | 84 |
| PHASE 2 SHEET 5 OF 5 | | | | | | | | 412 | 412 | 50 | 50 |
| PHASE 4 SHEET 1 OF 5 | | | | | | | | | | 305 | 305 |
| PHASE 4 SHEET 2 OF 5 | | | | | | | | | | 220 | 220 |
| PHASE 4 SHEET 3 OF 5 | 790 | 0.2 | 118 | | | | | | | 199 | 199 |
| PHASE 4 SHEET 4 OF 5 | 1,728 | 0.4 | 258 | | | | | | | | |
| PHASE 4 SHEET 5 OF 5 | 3,498 | 0.7 | 521 | | | | | 96 | 96 | 46 | 46 |
| CSJ 1015-01-023 TOTAL | 17,838 | 3.6 * | 2,658 | 191 | 191 | 624 | 624 | 7,954 | 7,954 | 2,141 | 2,141 |

* FOR CONTRACTOR'S INFORMATION ONLY

| | | | |
|--|---------------------------|--|------------------------|
| CIVIL ASSOCIATES, INC. | |  9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981 | |
| ATKINS TBPE REG. # F-474 | | | |
|  Texas Department of Transportation © 2018 | | | |
| SW3P SUMMARY | | | |
| SHEET 1 OF 1 | | | |
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | |
| GRAPHICS TC | STATE | DISTRICT | HIGHWAY NO. FM 3549 |
| CHECK JM | TEXAS | DALLAS | COUNTY ROCKWALL |
| CHECK JM | CONTROL | SECTION | JOB 023 |
| | 1015 | 01 | 23 |

PLOT DRIVER: RD*11x17*PDF.plt
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TRAFFIC CONTROL PLAN GENERAL NOTES

1. MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL MEASURES IMPLEMENTED DURING CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND THE LATEST TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) BC, WZ, AND TCP STANDARD DRAWINGS OF THE TRAFFIC ENGINEERING STANDARD SHEETS.
2. MAINTENANCE AND PROTECTION OF TRAFFIC SHALL BE PROVIDED IN ACCORDANCE WITH ITEM 502 OF THE TXDOT STANDARD SPECIFICATION, THE TMUTCD, AND ANY PROVISIONS CONTAINED IN THESE PLANS AND CONTRACT DOCUMENTS.
3. THE CONTRACTOR SHALL ENSURE THAT ALL IMPLEMENTED TRAFFIC CONTROL MEASURES ARE MAINTAINED IN A CLEAN AND FUNCTIONAL CONDITION AT ALL TIMES, INCLUDING MAINTENANCE DUE TO ACTS OF VANDALISM OR ACCIDENT. THE CONTRACTOR SHALL HAVE ADEQUATE REPLACEMENT TRAFFIC CONTROL DEVICES AVAILABLE AT ALL TIMES IN ORDER TO REPLACE THOSE DAMAGED WITHIN 24 HOURS OF NOTIFICATION.
4. ADVANCE WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT THE DURATION OF THE PROJECT. THE CONTRACTOR SHALL ADJUST LOCATION OF SIGNS IN ACCORDANCE WITH APPLICABLE BC STANDARDS AND THE LATEST TMUTCD OR AS DIRECTED BY THE ENGINEER.
5. THE CONTRACTOR IS TO PROVIDE ANY ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTIBILITY & VISIBILITY. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
6. THE CONTRACTOR SHALL COVER OR OTHERWISE REMOVE FROM VIEW OF THE TRAVELING PUBLIC EXISTING TRAFFIC SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL SIGNS OR THE INTENT OF THE TRAFFIC CONTROL PLANS. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO ITEM 502.
7. ANY PORTIONS OF THIS PROJECT THAT COINCIDE WITH EXISTING PUBLIC ROADS AND/OR PRIVATE DRIVES SHALL BE KEPT OPEN TO TRAFFIC AT ALL TIMES UNLESS OTHERWISE PROVIDED FOR OR APPROVED BY THE ENGINEER. PRIVATE DRIVES SHALL BE CONSTRUCTED DURING THE SAME CONSTRUCTION PHASE OR OPERATION AS ADJACENT PAVEMENT. ANY ADDITIONAL TRAFFIC CONTROL MEASURES REQUIRED TO MEET THESE PROVISIONS SHALL BE SUBSIDIARY TO ITEM 502.
8. ACCESS TO BUSINESSES AND RESIDENCES SHALL BE MAINTAINED AT ALL TIMES. ACCESS FOR EMERGENCY VEHICLES, SCHOOL BUSES, AND UNITED STATES POSTAL DELIVERY SHALL BE MAINTAINED AT ALL TIMES.
9. CONTRACTOR SHALL REFER TO WORKSHEET FOR EDGE CONDITION TREATMENT TYPES AND FOLLOW THE APPROPRIATE TREATMENT TYPE GUIDELINES FOR EDGE CONDITIONS.
10. THE CONTRACTOR SHALL PLACE A 3:1 SLOPE BETWEEN THE CONSTRUCTION ZONE AND TRAVELED PAVEMENT AT THE END OF EACH DAY IF DROP-OFF EXCEEDS 2 INCHES.
11. CONTRACTOR SHALL CONSTRUCT A 10' LONG TEMPORARY VERTICAL TRANSITION FROM SUITABLE MATERIAL ACROSS THE EDGE OF THE ACTIVE ROADWAY WORK SECTION ALLOW TRAFFIC TO SAFELY TRANSITION BETWEEN EXISTING AND PROPOSED ROADWAY SURFACE ELEVATIONS AND PREVENT TRANSVERSE DROP-OFFS. TEMPORARY VERTICAL TRANSITIONS SHALL BE SUBSIDIARY TO ITEM 502. "BUMP" SIGNS WITH 30 MPH ADVISORY SPEED PLAQUES SHALL BE PLACED IN ADVANCE OF VERTICAL TRANSITIONS. "PAVEMENT ENDS," "NO CENTER STRIPE," AND "ROUGH ROAD" (WITH 30 MPH ADVISORY SPEED PLAQUES) SHALL BE IN PLACE WHERE TRAFFIC IS ALLOWED TO TRAVEL ON THE UNSURFACED PAVEMENT.
12. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAINTAINING POSITIVE TEMPORARY DRAINAGE THROUGHOUT THE PROJECT LIMITS, DURING ALL PHASES OF CONSTRUCTION, IN ORDER TO AVOID CREATING HAZARDOUS ROAD CONDITIONS AND FLOODING OF PROPERTIES ADJACENT TO THE PROJECT AREA.
13. ALL LEADING EDGES OF CONCRETE BARRIER SHALL BE PROTECTED WHILE IN THE CLEAR ZONE. WHEN CONNECTING BARRIERS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A UNIFORM FACE AND ENSURING THAT NO EDGES PROTRUDE INTO ONCOMING TRAFFIC.
14. THE CONTRACTOR IS TO ENSURE THAT ALL EXISTING UTILITIES ARE PROPERLY LOCATED PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.
15. THE TRAFFIC CONTROL NARRATIVE AND TRAFFIC CONTROL LAYOUTS SERVE AS A GUIDE FOR SEQUENCING CONSTRUCTION AND THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION OF THE PROPOSED IMPROVEMENTS AND DO NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED OR COULD BE ENCOUNTERED DURING EACH PHASE OF CONSTRUCTION. THE CONTRACTOR HAS SOLE RESPONSIBILITY OF CONSTRUCTING THE PROPOSED IMPROVEMENTS AND PROVIDING FOR THE SAFE HANDLING OF TRAFFIC DURING CONSTRUCTION.

16. THE CONTRACTOR HAS THE OPTION TO PREPARE AND SUBMIT AN ALTERNATIVE NARRATIVE AND TRAFFIC CONTROL PLAN TO THE ENGINEER FOR REVIEW. THE CONTRACTOR SHALL NOT IMPLEMENT ANY SUCH ALTERNATIVE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER. THE ALTERNATIVE NARRATIVE AND TRAFFIC CONTROL PLAN SHALL BE DESIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS. THE CONTRACTOR WILL NOT BE COMPENSATED FOR THE DESIGN WHETHER ACCEPTED OR REJECTED BY TXDOT AND ANY SUCH EFFORT SHALL BE SUBSIDIARY TO ITEM 502.
17. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL ONLY BE PLACED IN AREAS WHERE SOIL DISTURBANCE IS EXPECTED TO OCCUR WITHIN TWO WEEKS.
18. TEMPORARY SW3P EROSION CONTROL MEASURES SHALL BE REMOVED IN EACH AREA WITHIN TWO WEEKS OF VEGETATION ESTABLISHMENT OR AS APPROVED BY THE ENGINEER.



Tara McDonald

2/26/2018

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ATKINS

TBPE REG. # F-474



TRAFFIC CONTROL PLAN GENERAL NOTES

SHEET 1 OF 1

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 24 |
| CHECK WL | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 DATE: 2/23/2018
 TIME: 1:44:11 PM

TRAFFIC CONTROL PLAN NARRATIVE

PHASE 1 - STEP 1

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC ON FM 3549 TO THE EAST AS SHOWN.
- EXTEND EXISTING 3'X2' CULVERT AT STA. 35+05.92 AND 4'X3' CULVERT AT STA. 58+74.18 WEST 15 FT.
- CONSTRUCT TEMPORARY PAVEMENT ON WEST SIDE OF FM 3549 AS SHOWN. ON HILLSIDE DR, CONSTRUCT TEMPORARY PAVEMENT TO EAST AS SHOWN. UTILIZE TXDOT STANDARD TCP(2-2)-12 TO DIRECT TRAFFIC ON HILLSIDE DR AS NECESSARY.

PHASE 1 - STEP 2

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC TO TEMPORARY PAVEMENT CONSTRUCTED IN PREVIOUS PHASE WHERE SHOWN.
- EXTEND EXISTING 3'X2' CULVERT 20' AT STA. 35+05.92 AND 4'X3' CULVERT 15' AT STA. 58+74.18 EAST.
- CONSTRUCT EASTERN PORTION OF NEW CULVERT AT STA. 35+15.00. CONSTRUCT NEW CULVERT AT STA. 58+66.28 FROM LOCATION SHOWN ON FM 3549 TO LOCATION SHOWN ON HILLSIDE DR. UTILIZE TXDOT STANDARD TCP(2-2)-12 TO DIRECT TRAFFIC ON HILLSIDE DR AS NECESSARY.
- CONSTRUCT TEMPORARY PAVEMENT ON EAST SIDE OF FM 3549 AND NORTH SIDE OF RIDING CLUB RD AS SHOWN. UTILIZE STANDARD TCP(2-2)-12 TO DIRECT TRAFFIC ON RIDING CLUB RD AS NECESSARY.

PHASE 1 - STEP 3

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC TO TEMPORARY PAVEMENT CONSTRUCTED IN PREVIOUS PHASE WHERE SHOWN.
- CONSTRUCT THE REMAINING PORTIONS OF THE CULVERTS AT STA. 35+15.00 AND STA. 58+66.28. CONSTRUCT THE REMAINING PORTION OF THE CULVERT EAST OF HILLSIDE DR. UTILIZE TXDOT STANDARD TCP(2-2)-12 TO DIRECT TRAFFIC ON HILLSIDE DR AS NECESSARY.
- CONSTRUCT TEMPORARY PAVEMENT ON EAST SIDE OF FM 3549 AND SOUTH SIDE OF SH 66 AS SHOWN.

PHASE 2

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC ON FM 3549 AND SH 66 TO TEMPORARY PAVEMENT AS SHOWN.
- MODIFY AND/OR INSTALL TEMPORARY TRAFFIC SIGNAL AT FM 3549/SH 66 INTERSECTION TO ACCOMMODATE TRAFFIC SHIFT.
- CONSTRUCT THE OUTSIDE LANES ON BOTH SIDES OF FM 3549 FROM THE BEGINNING OF THE PROJECT TO STA. 77+50.00 ON THE EAST SIDE AND STA. 84+25.00 ON THE WEST SIDE AS SHOWN. CONSTRUCT THE NORTHERN SIDE OF SH 66 AS SHOWN. CONSTRUCT FULL DEPTH PAVEMENT, CURB AND GUTTER, DRAINAGE STRUCTURES, SIDEWALKS, AND DRIVEWAYS AS SHOWN. DO NOT BUILD CURB AND GUTTER ON THE NORTH SIDE OF SH 66 AS THIS WILL BE BUILT IN A LATER PHASE. REMOVE ALL EXISTING PAVEMENT ON SH 66 INCLUDING 6"-9" CONCRETE PAVEMENT. CONSTRUCT FULL DEPTH PAVEMENT ON ZION HILL IN HALVES TO MAINTAIN ACCESS AT ALL TIMES. CONSTRUCT TEMPORARY PAVEMENT WEDGES AS NECESSARY TO PROVIDE ACCESS FROM EXISTING PAVEMENT TO NEWLY CONSTRUCTED DRIVEWAYS (NOT SHOWN ON TCP LAYOUTS).
- CONSTRUCT FULL DEPTH PAVEMENT FOR AIRPORT RD, RIDING CLUB RD, AND ROLLING MEADOWS DR ACCORDING TO PHASE 2 DETAIL SHEETS. MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

PHASE 3 - STEP 1

- SUBMIT A DETAILED CONSTRUCTION SCHEDULE OF PHASE 3 STEPS 1 AND 2 TO THE ENGINEER FOR APPROVAL PRIOR TO THE BEGINNING OF CONSTRUCTION. PHASE 3 WORK WILL START AT 7:00 PM ON A FRIDAY AND WILL END BY 5:00 AM ON THE FOLLOWING THURSDAY. THE THROUGH TRAFFIC ON NB ANS SB FM 3549 WILL BE CLOSED DURING THIS PAHSE.
- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- IMPLEMENT THE FM 3549 PHASE 3 - STEP 1 DETOUR PLAN FROM FRIDAY 7:00 PM TO MONDAY 6:00 AM AS NECESSARY TO COMPLETE CONSTRUCTION OF THIS PHASE.
- MODIFY AND/OR INSTALL TEMPORARY TRAFFIC SIGNAL AT FM 3549/SH 66 INTERSECTION TO ACCOMMODATE TRAFFIC SHIFT.
- CONSTRUCT NORTHERN HALF OF FM 3549/SH 66 INTERSECTION. CONSTRUCT FULL DEPTH PAVEMENT AND CURB AND GUTTER AS SHOWN. CONSTRUCT TEMPORARY PAVEMENT ON THE NORTHWEST SIDE OF THE INTERSECTION AS SHOWN.

PHASE 3 - STEP 2

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC ON FM 3549 AND SH 66 TO COMPLETED AND TEMPORARY PAVEMENT AS SHOWN.
- IMPLEMENT THE FM 3549 PHASE 3 - STEP 2 DETOUR PLAN FROM MONDAY 6:00 AM TO THURSDAY 5:00 AM AS NECESSARY TO COMPLETE CONSTRUCTION OF THIS PHASE.
- MODIFY AND/OR INSTALL TEMPORARY TRAFFIC SIGNAL AT FM 3549/SH 66 INTERSECTION TO ACCOMMODATE TRAFFIC SHIFT.
- CONSTRUCT SOUTHERN HALF OF FM 3549/SH 66 INTERSECTION. CONSTRUCT FULL DEPTH PAVEMENT AND CURB AND GUTTER AS SHOWN.

PHASE 4 - STEP 1

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT TRAFFIC TO COMPLETED OUTSIDE LANES ALONG FM 3549.
- MODIFY AND/OR INSTALL TEMPORARY OR PERMANENT TRAFFIC SIGNAL AT FM3549/SH66 INTERSECTION AS NEEDED TO ACCOMMODATE TRAFFIC SHIFT.
- CONSTRUCT INSIDE PORTION OF FM 3549 AND THE SOUTHERN HALF OF SH 66 AS SHOWN. CONSTRUCT FULL DEPTH PAVEMENT, CURB AND GUTTER, DRAINAGE STRUCTURES, SIDEWALKS, AND DRIVEWAYS AS SHOWN. REMOVE ALL EXISTING PAVEMENT ON SH 66 INCLUDING 6"-9" CONCRETE PAVEMENT. CONSTRUCT SIDEWALK AND CURB RAMPS AT THREE OUT OF FOUR CORNERS OF THE FM3549/SH66 INTERSECTION AS SHOWN.
- CONSTRUCT INTERSECTIONS AT AIRPORT RD, RIDING CLUB RD, ROLLING MEADOWS DR, AND EASTRIDGE CHURCH IN PHASES TO MAINTAIN ACCESS TO AND FROM ROADS THROUGHOUT CONSTRUCTION. DIRECT TRAFFIC TO THE NORTH AND SOUTH SIDES OF ROADS AS NECESSARY UTILIZING STANDARDS TCP(2-2)-12, TCP(2-3)-12, TCP(2-4)-12, AND TCP(2-5)-12.

PHASE 4 - STEP 2

- PLACE ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, PAVEMENT MARKINGS, AND BARRICADES AS SHOWN IN TCP PLAN, AS REQUIRED BY TCP AND BC STANDARDS, AND/OR AS DIRECTED BY THE ENGINEER. ELIMINATE EXISTING STRIPING AS NECESSARY. PLACE AND MAINTAIN SW3P DEVICES AS SHOWN IN THE PLANS AND AS DIRECTED BY THE ENGINEER.
- SHIFT NORTHBOUND FM 3549 TRAFFIC TO THE WEST NORTH OF THE SH 66 INTERSECTION. SHIFT SH 66 TRAFFIC TO THE SOUTH.
- MODIFY AND/OR INSTALL TEMPORARY OR PERMANENT TRAFFIC SIGNAL AT FM 3549/SH 66 INTERSECTION TO ACCOMMODATE TRAFFIC SHIFT.
- CONSTRUCT REMAINING EASTERN PORTION OF FM 3549 NORTH OF SH 66 INCLUDING DRIVEWAY. CONSTRUCT SIDEWALK AND CURB RAMPS AT NORTHWEST CORNER OF FM3549/SH66 INTERSECTION.
- CONSTRUCT REMAINING DRIVEWAYS AND 2' CURB AND GUTTER ON NORTH SIDE OF SH 66.

PROJECT CLOSEOUT

- PERFORM FINAL SITE CLEAN-UP AS DIRECTED BY THE ENGINEER.
- REMOVE SW3P DEVICES UPON FINAL ESTABLISHMENT OF VEGETATIVE COVER.
- REMOVE PROJECT LIMIT/ADVANCE WARNING SIGNS.



Tara McDonald

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TBPE REG. # F-474

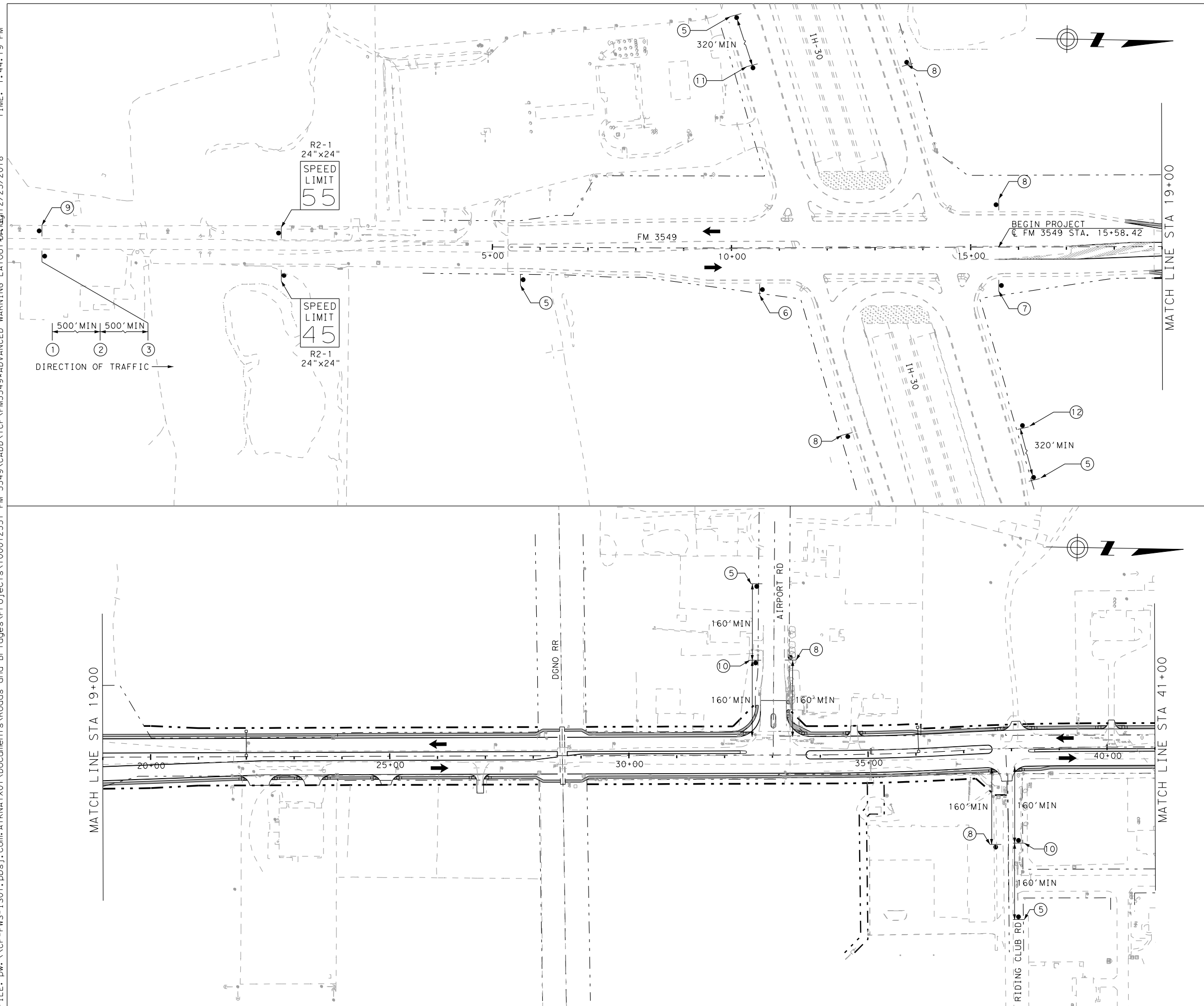


TRAFFIC CONTROL PLAN NARRATIVE

SHEET 1 OF 1

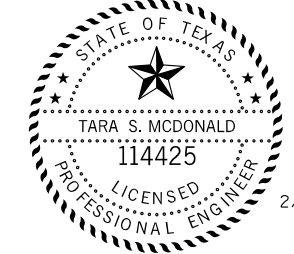
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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 25 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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LEGEND

- ① OBEY WARNING SIGNS STATE LAW
R20-3T
48"x42"
- ② STAY ALERT TALK OR TEXT LATER
G20-10T
60"x48"
- ③ BEGIN WORK ZONE TRAFFIC FINES DOUBLE WHEN WORKERS ARE PRESENT
G20-9TP 24"x24"
R20-5T 24"x30"
R20-5aTP 24"x12"
- ④ SPEED LIMIT
R2-1
24"x24"
- ⑤ ROAD WORK AHEAD
CW20-1D
48"x48"
- ⑥ DO NOT PASS
R4-1
24"x24"
- ⑦ BEGIN ROAD WORK NEXT X MILES
NAME ADDRESS CITY STATE CONTRACTOR
G20-5T 48"x24"
G20-6T 48"x30"
- ⑧ END ROAD WORK
G20-2
48"x24"
- ⑨ END WORK ZONE
G20-2bT 48"x24"
- ⑩ ROAD WORK NEXT X MILES
G20-1aT 72"x36"
- ⑪ ROAD WORK NEXT X MILES
G20-1bTL 72"x24"
- ⑫ ROAD WORK NEXT X MILES
G20-1bTR 72"x24"



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

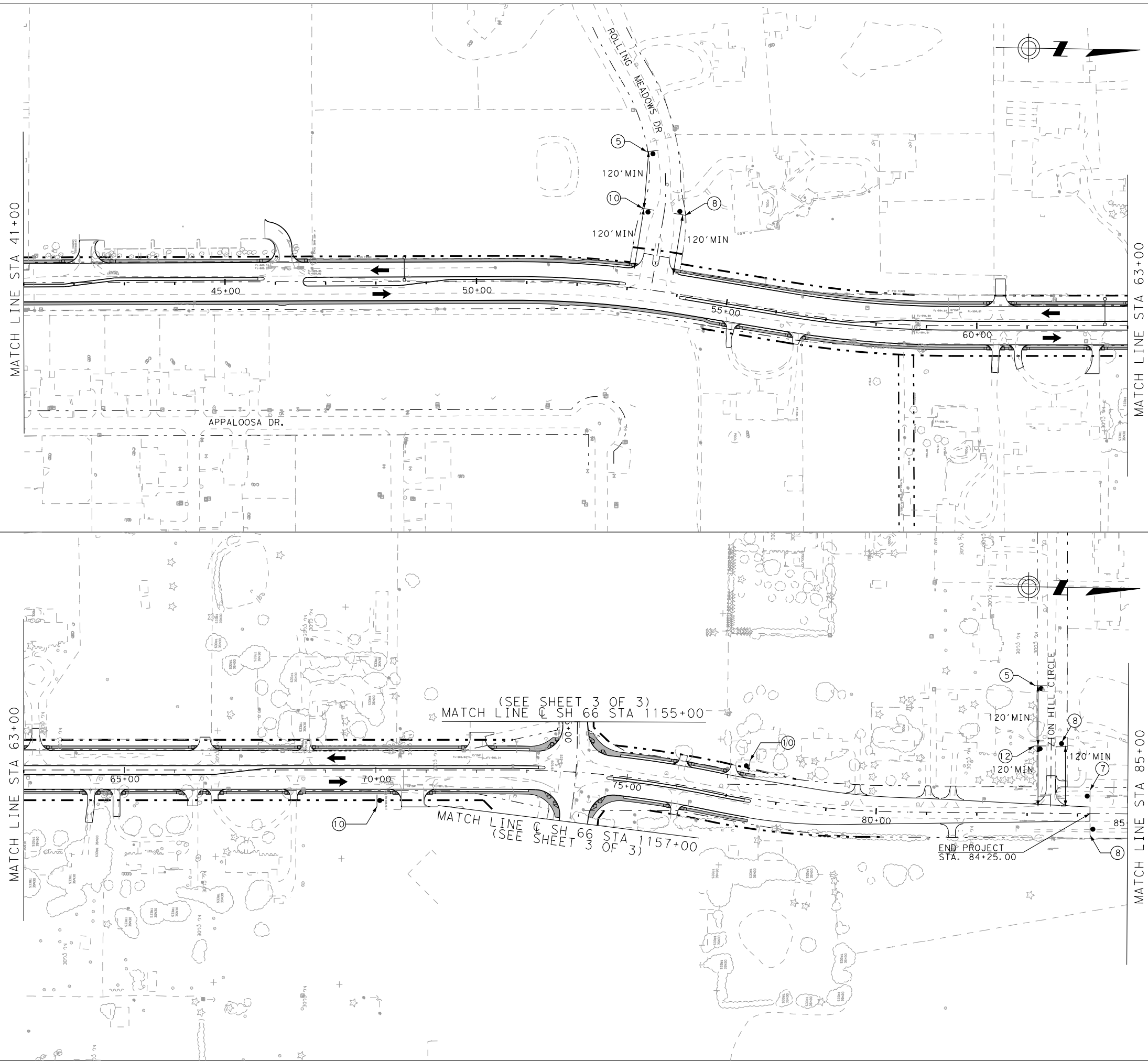


ADVANCED WARNING SIGN LAYOUT
 BEGIN PROJECT TO STA. 41+00

SHEET 1 OF 3

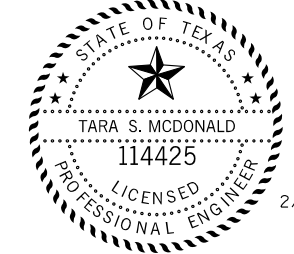
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 26 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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LEGEND

- ① OBEY WARNING SIGNS STATE LAW
R20-3T
48"x42"
- ② STAY ALERT TALK OR TEXT LATER
G20-10T
60"x48"
- ③ BEGIN WORK ZONE TRAFFIC FINES DOUBLE WHEN WORKERS ARE PRESENT
G20-9TP 24"x24"
R20-5T 24"x30"
R20-5aTP 24"x12"
- ④ SPEED LIMIT
R2-1
24"x24"
- ⑤ ROAD WORK AHEAD
CW20-1D
48"x48"
- ⑥ DO NOT PASS
R4-1
24"x24"
- ⑦ BEGIN ROAD WORK NEXT X MILES
NAME ADDRESS CITY STATE CONTRACTOR
G20-5T 48"x24"
G20-6T 48"x30"
- ⑧ END ROAD WORK
G20-2
48"x24"
- ⑨ END WORK ZONE
G20-2bT 48"x24"
- ⑩ ROAD WORK NEXT X MILES
G20-1aT 72"x36"
- ⑪ ROAD WORK NEXT X MILES
G20-1bTL 72"x24"
- ⑫ ROAD WORK NEXT X MILES
G20-1bTR 72"x24"



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
TBPE REG. # F-474

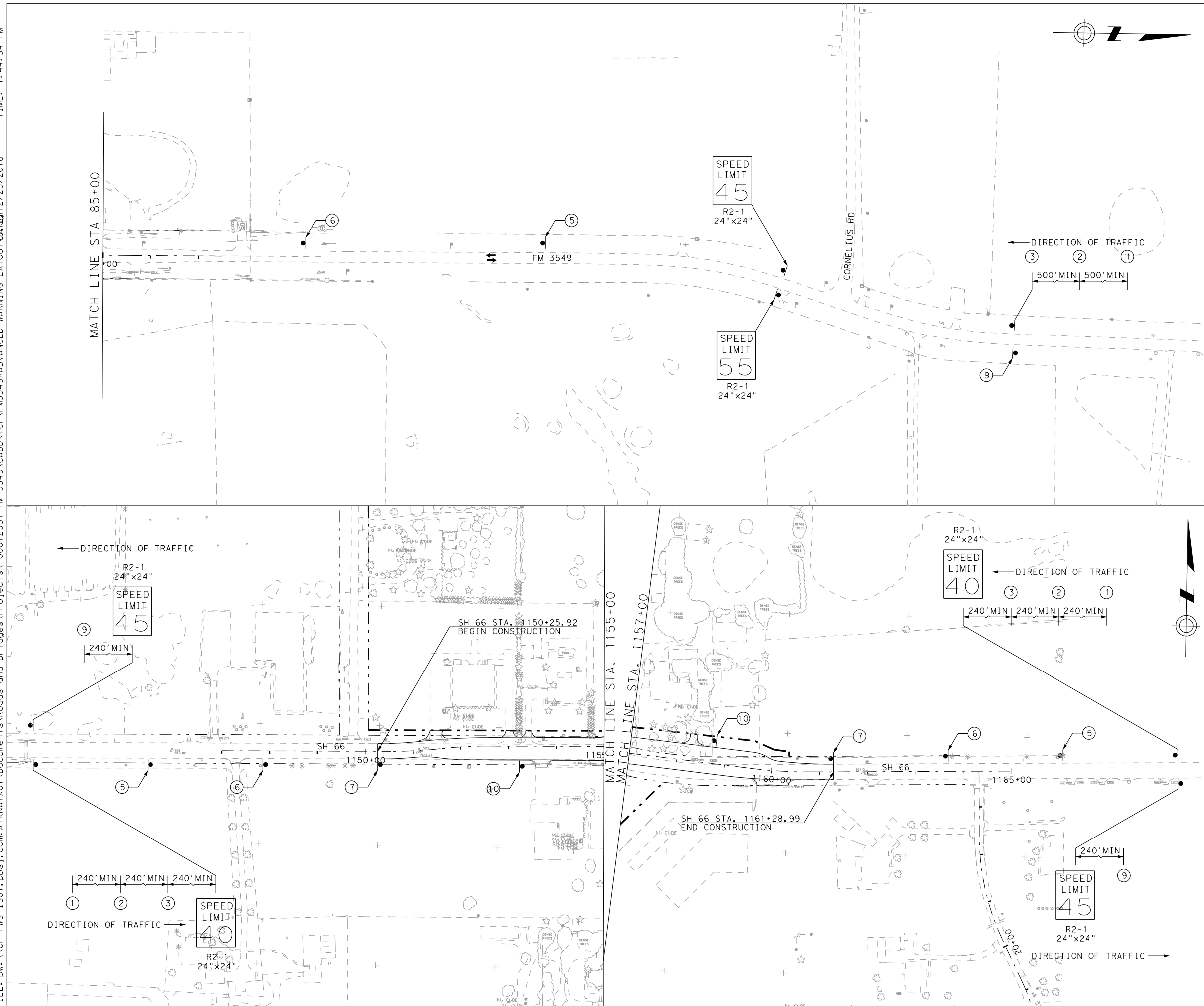


ADVANCED WARNING SIGN LAYOUT
STA. 41+00 TO STA. 85+00

SHEET 2 OF 3

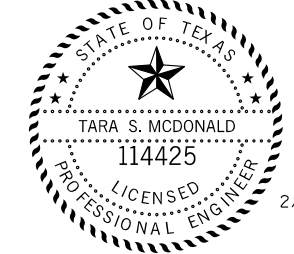
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 27 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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 TIME: 1:44:34 PM



LEGEND

- ① OBEY WARNING SIGNS STATE LAW
R20-3T 48"x42"
- ② STAY ALERT TALK OR TEXT LATER
G20-10T 60"x48"
- ③ BEGIN WORK ZONE TRAFFIC FINES DOUBLE WHEN WORKERS ARE PRESENT
G20-9TP 24"x24"
R20-5T 24"x30"
R20-5aTP 24"x12"
- ④ SPEED LIMIT XX
R2-1 24"x24"
- ⑤ ROAD WORK AHEAD
CW20-1D 48"x48"
- ⑥ DO NOT PASS
R4-1 24"x24"
- ⑦ BEGIN ROAD WORK NEXT X MILES
NAME ADDRESS CITY STATE CONTRACTOR
G20-5T 48"x24"
G20-6T 48"x30"
- ⑧ END ROAD WORK
G20-2 48"x24"
- ⑨ END WORK ZONE
G20-2bT 48"x24"
- ⑩ ROAD WORK NEXT X MILES
G20-1aT 72"x36"
- ⑪ ROAD WORK NEXT X MILES
G20-1bTL 72"x24"
- ⑫ ROAD WORK NEXT X MILES
G20-1bTR 72"x24"



Tara McDonald

2/26/2018

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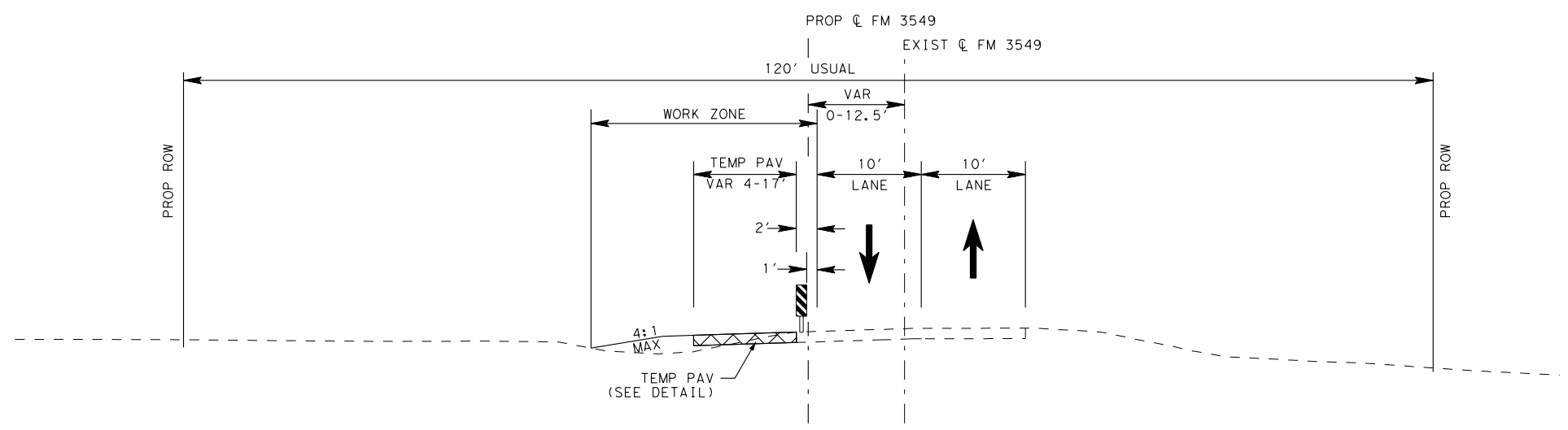
ADVANCED WARNING SIGN LAYOUT

FM 3549 STA. 85+00 TO END PROJECT & SH 66

SHEET 3 OF 3

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 28 |
| CHECK WL | CONTROL 1015 | SECTION 01 | JOB 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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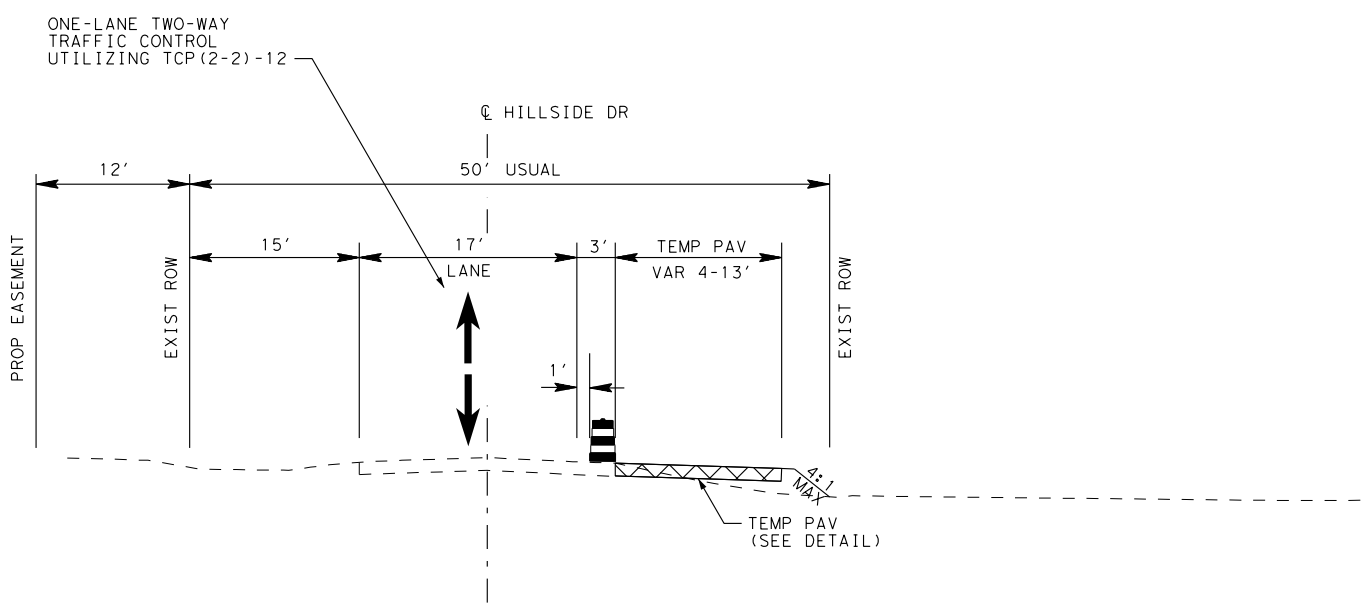
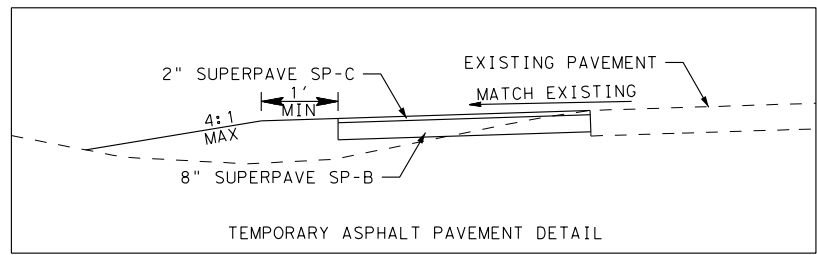


LEGEND

| | |
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| | CONSTRUCTION THIS PHASE |
| | CONSTRUCTION PREVIOUS PHASE |
| | TEMPORARY PAVEMENT THIS PHASE |
| | TEMPORARY PAVEMENT PREVIOUS PHASE |
| | LOW PROFILE CONCRETE TRAFFIC BARRIER |
| | PLASTIC DRUM |
| | VERTICAL PANEL |

PHASE 1 - STEP 1 (FM 3549)

STA. 33+61.53 TO STA. 41+34.10
 STA. 46+76.46 TO STA. 53+18.92
 STA. 53+78.05 TO STA. 61+42.07



PHASE 1 - STEP 1 (HILLSIDE DR)

STA. 8+87.16 TO STA. 10+93.81



Tara McDonald

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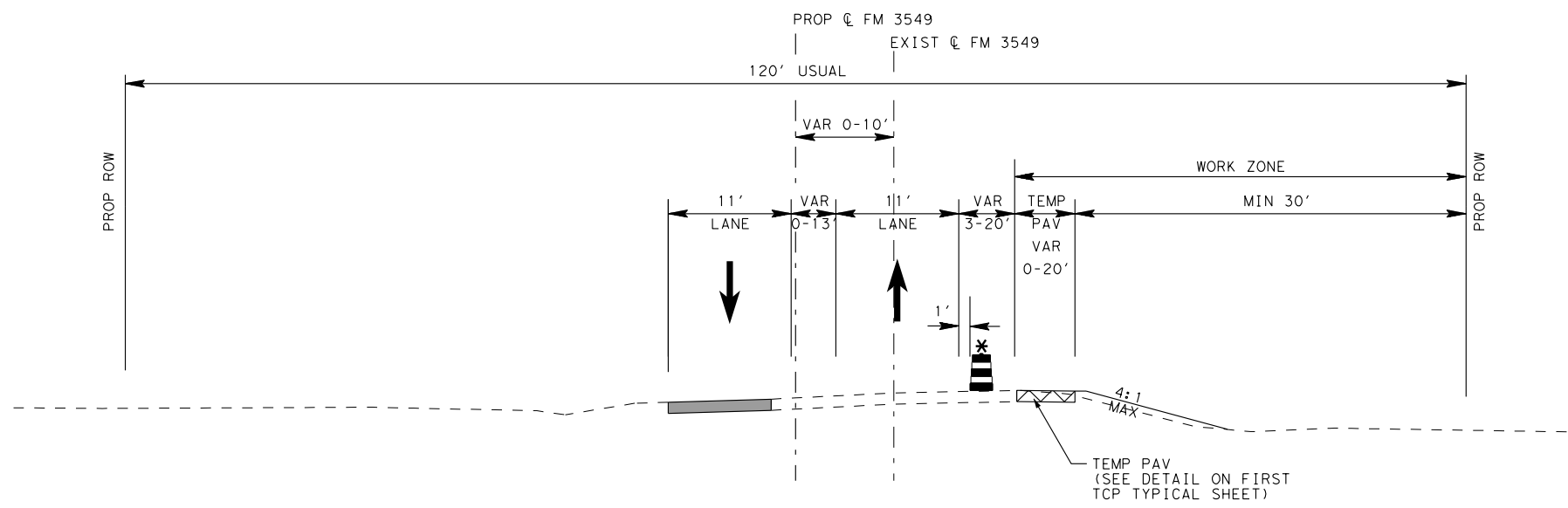


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 1 STEP 1

SCALE: 1"=15'H SHEET 1 OF 1

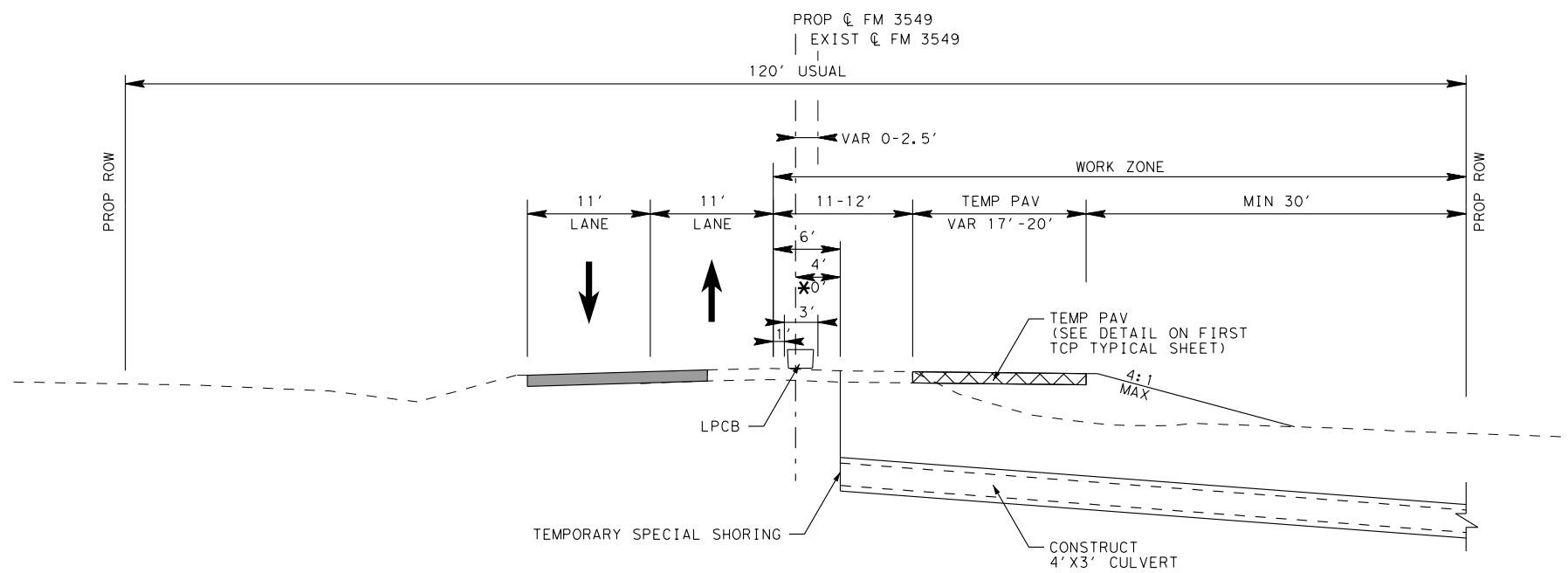
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 29 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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PHASE 1 - STEP 2 (FM 3549)

- * STA. 32+30.12 TO STA. 35+55.00 (LPCB)
- STA. 35+55.00 TO STA. 37+46.56
- STA. 52+94.57 TO STA. 56+60.00
- * STA. 56+60.00 TO STA. 59+00.00 (LPCB)
- STA. 59+00.00 TO STA. 61+12.02

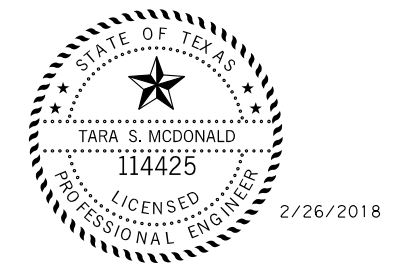


PHASE 1 - STEP 2 (FM 3549)

- STA. 35+15.00
- * STA. 58+66.28

LEGEND

- CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- PLASTIC DRUM
- VERTICAL PANEL



Tara McDonald

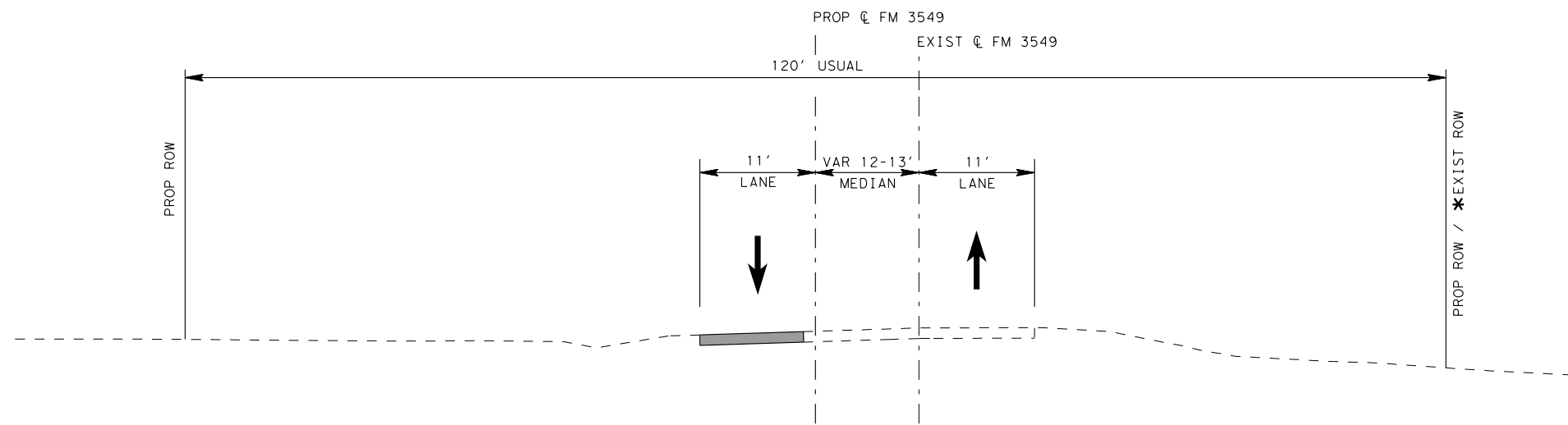
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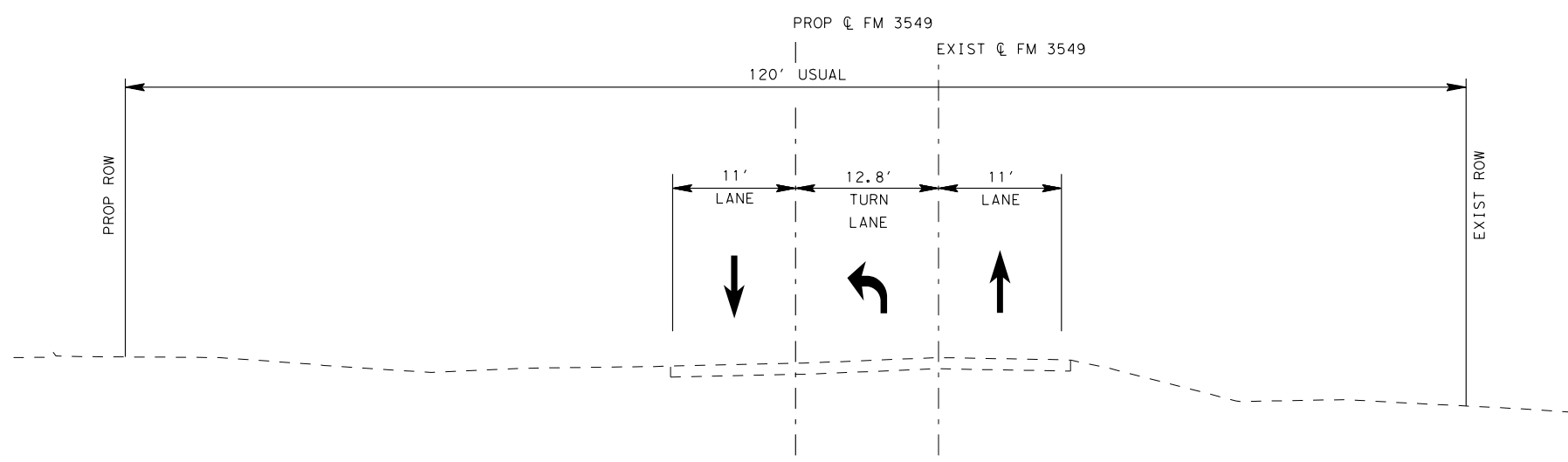
TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 1 STEP 2

SCALE: 1"=15'H SHEET 1 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 30 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



PHASE 1 - STEP 2 (FM 3549)
 STA. 38+32.73 TO STA. 41+72.67
 *STA. 46+71.12 TO STA. 52+94.57



PHASE 1 - STEP 2 (FM 3549)
 STA. 41+72.67 TO STA. 46+71.12

- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



| NO. | DATE | REVISION | BY |
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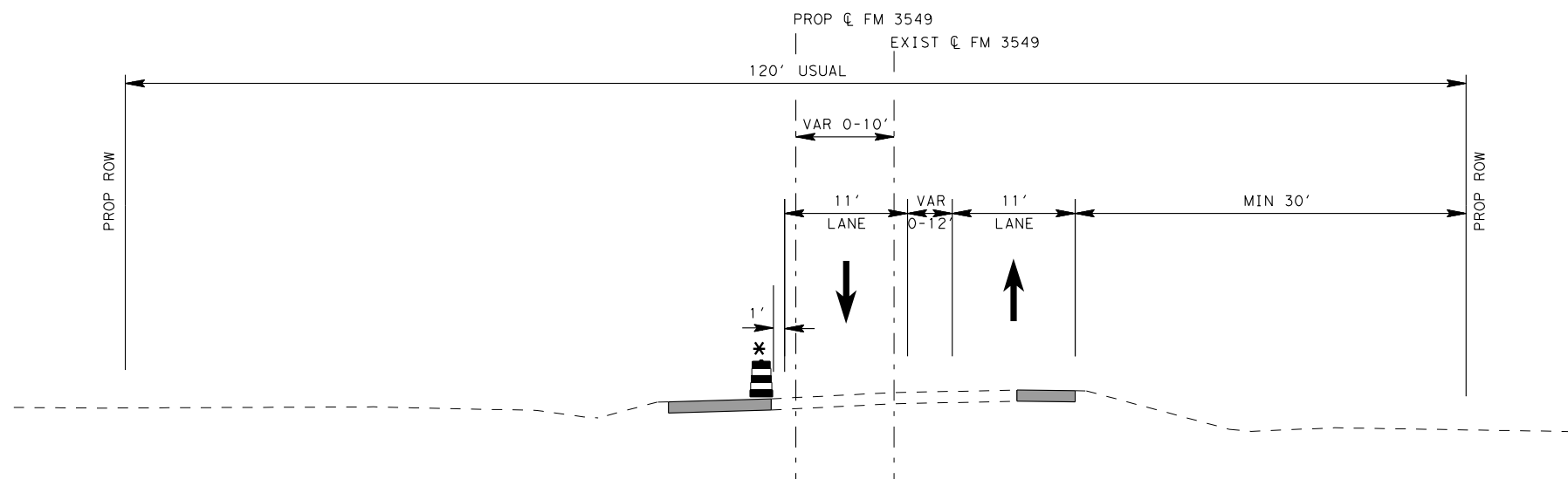


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 1 STEP 2

SCALE: 1"=15'H SHEET 2 OF 2

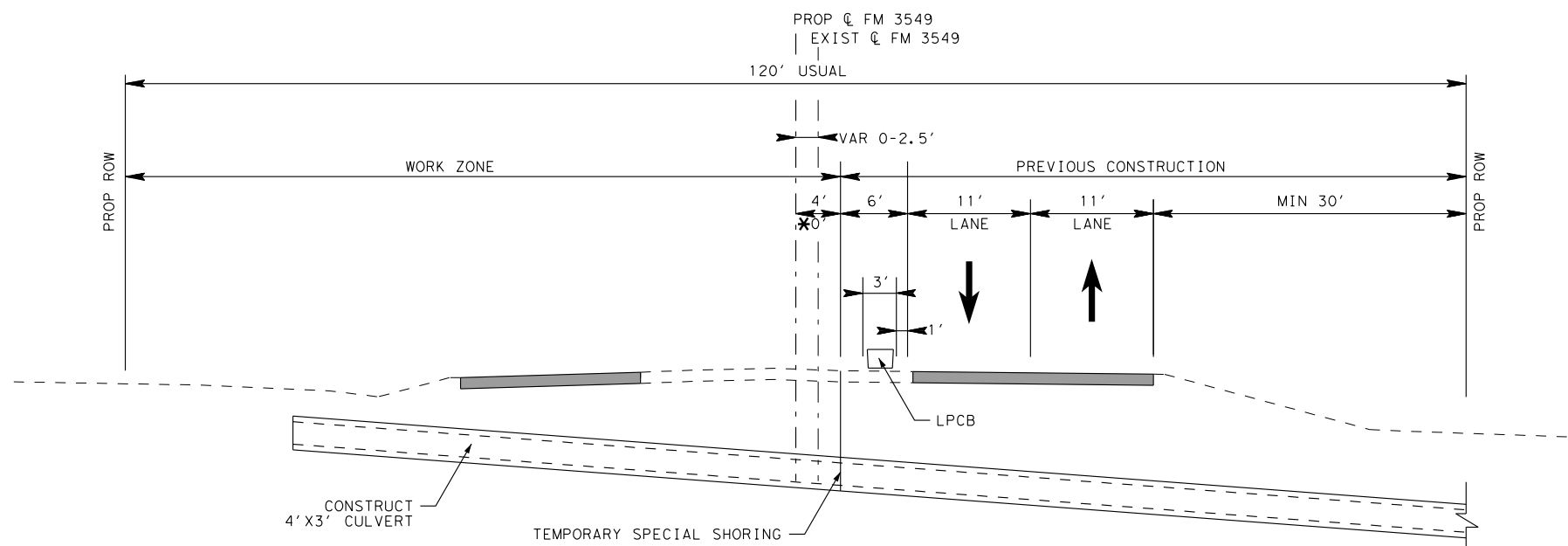
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 31 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 1 - STEP 3 (FM 3549)

- STA. 33+66.94 TO STA. 34+80.00
- * STA. 34+80.00 TO STA. 37+20.00 (LPCB)
- STA. 37+20.00 TO STA. 39+03.30
- STA. 54+06.31 TO STA. 57+85.00
- * STA. 57+85.00 TO STA. 60+25.00 (LPCB)
- STA. 60+25.00 TO STA. 61+66.74



PHASE 1 - STEP 3 (FM 3549)

- STA. 35+15.00
- * STA. 58+66.28

LEGEND

- CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- PLASTIC DRUM
- VERTICAL PANEL



Tara McDonald

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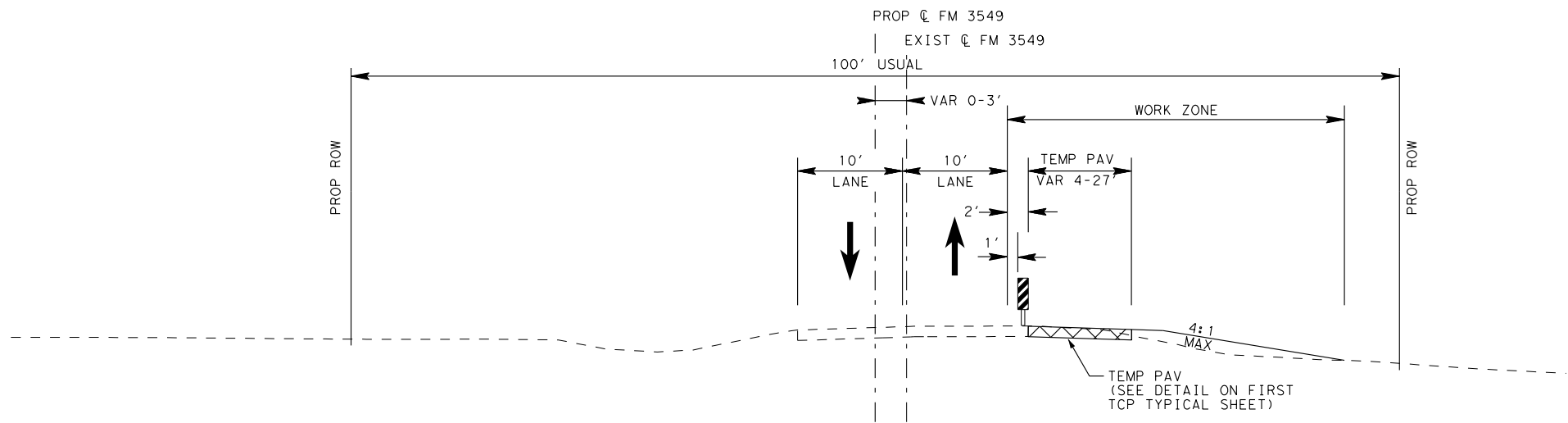
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TBPE REG. # F-474



TRAFFIC CONTROL PLAN
TYPICAL SECTIONS - PHASE 1 STEP 3

SCALE: 1"=15'H SHEET 1 OF 2

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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| CHECK WL | 1015 | 01 | 023 | |

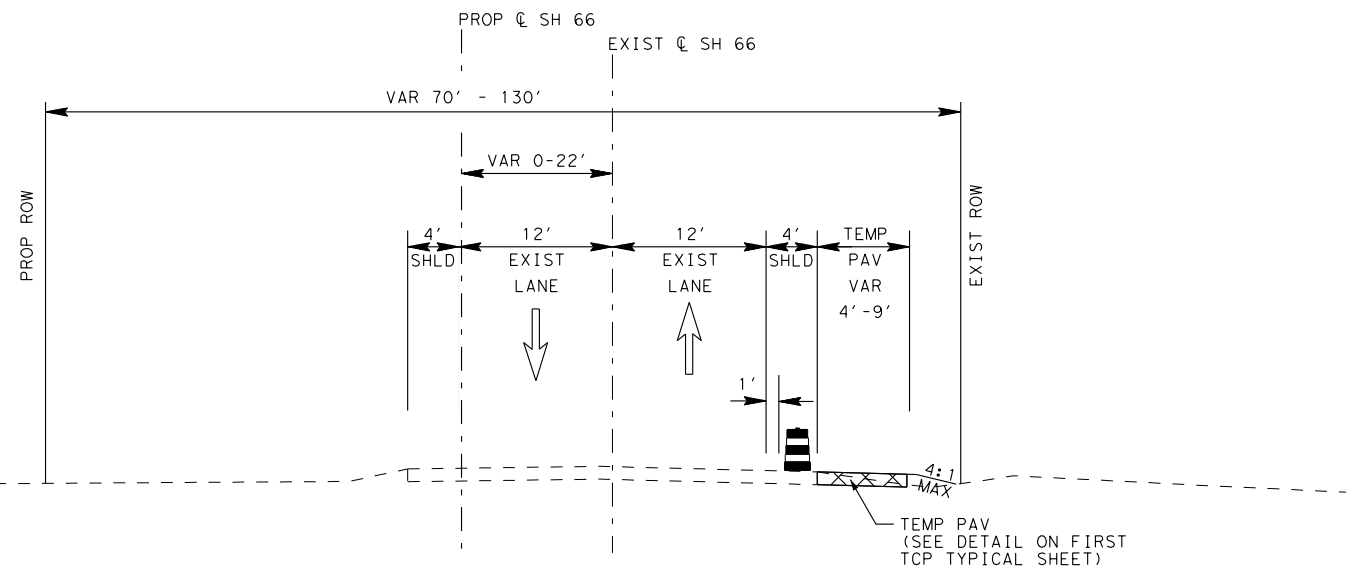


PHASE 1 - STEP 3 (FM 3549)

STA. 77+50.00 TO STA. 85+57.44

LEGEND

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| | CONSTRUCTION THIS PHASE |
| | CONSTRUCTION PREVIOUS PHASE |
| | TEMPORARY PAVEMENT THIS PHASE |
| | TEMPORARY PAVEMENT PREVIOUS PHASE |
| | LOW PROFILE CONCRETE TRAFFIC BARRIER |
| | PLASTIC DRUM |
| | VERTICAL PANEL |



PHASE 1 - STEP 3 (SH 66)

STA. 1148+83.29 TO STA. 1152+29.03
 STA. 1159+49.90 TO STA. 1162+91.37



| NO. | DATE | REVISION | BY |
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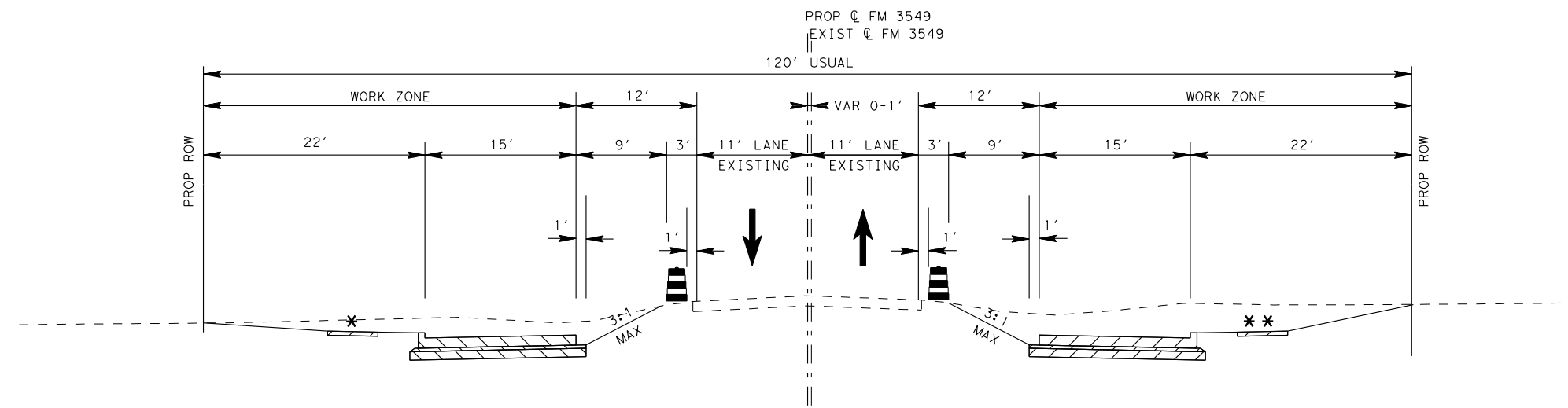


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 1 STEP 3

SCALE: 1"=15'H SHEET 2 OF 2

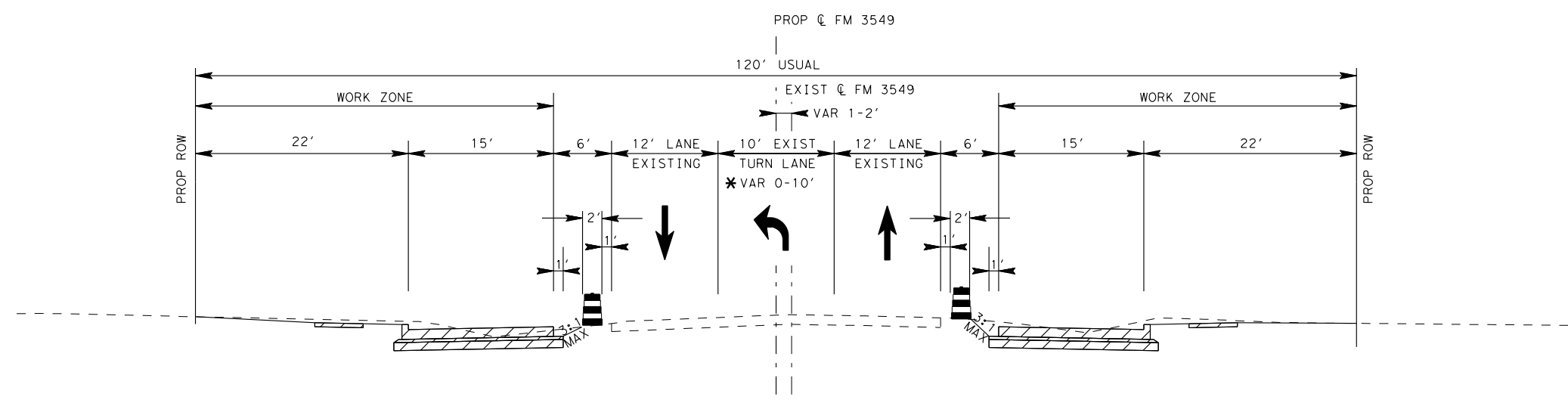
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 33 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 2 (FM 3549)

- * STA 18+22.81 TO STA. 18+73.42 (SB SIDEWALK ONLY)
- ** STA. 18+73.42 TO STA. 18+83.42 (SB AND NB SIDEWALK ONLY)
- STA. 18+83.42 TO STA. 29+08.88
- STA. 61+42.07 TO STA. 73+04.35
- STA. 74+81.62 TO STA. 77+50.00



PHASE 2 (FM 3549)

- * STA. 29+08.88 TO STA. 31+21.55
- STA. 31+21.55 TO STA. 33+69.63
- * STA. 33+69.63 TO STA. 35+81.86

LEGEND

- CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- PLASTIC DRUM
- VERTICAL PANEL

Tara McDonald

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ATKINS
 TBPE REG. # F-474

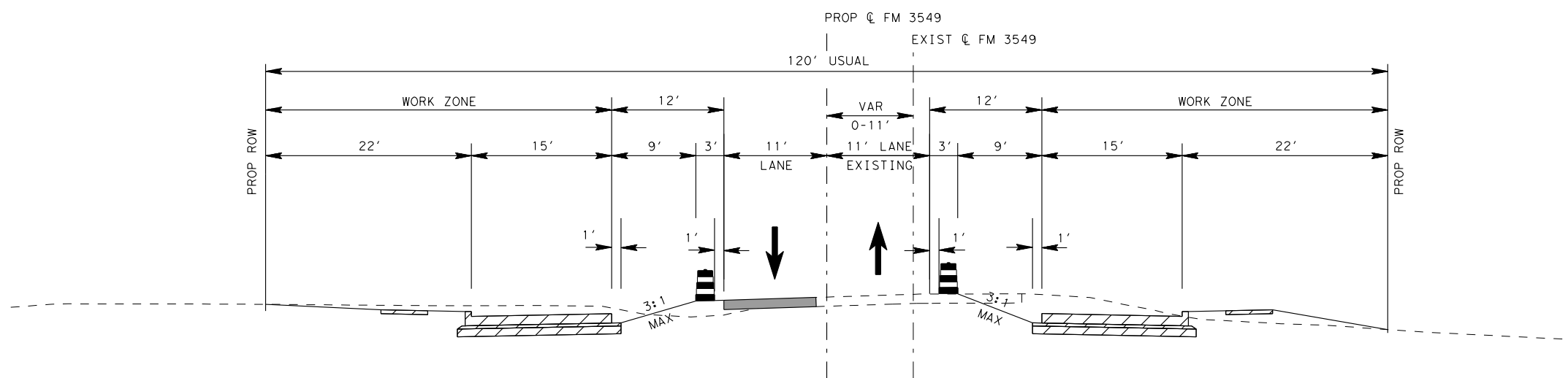
Texas Department of Transportation
 © 2018

TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 2

SCALE: 1"=15'H SHEET 1 OF 4

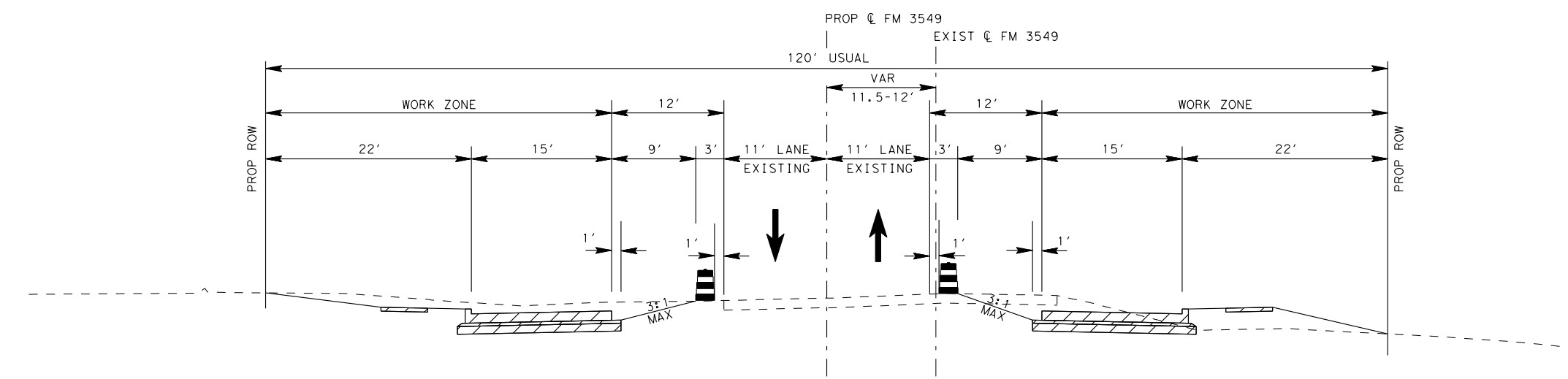
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 34 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 2 (FM 3549)

STA. 33+69.63 TO STA. 41+34.39
 STA. 46+76.14 TO STA. 61+42.07



PHASE 2 (FM 3549)

STA. 41+34.39 TO STA. 46+76.14

LEGEND

- CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- PLASTIC DRUM
- VERTICAL PANEL



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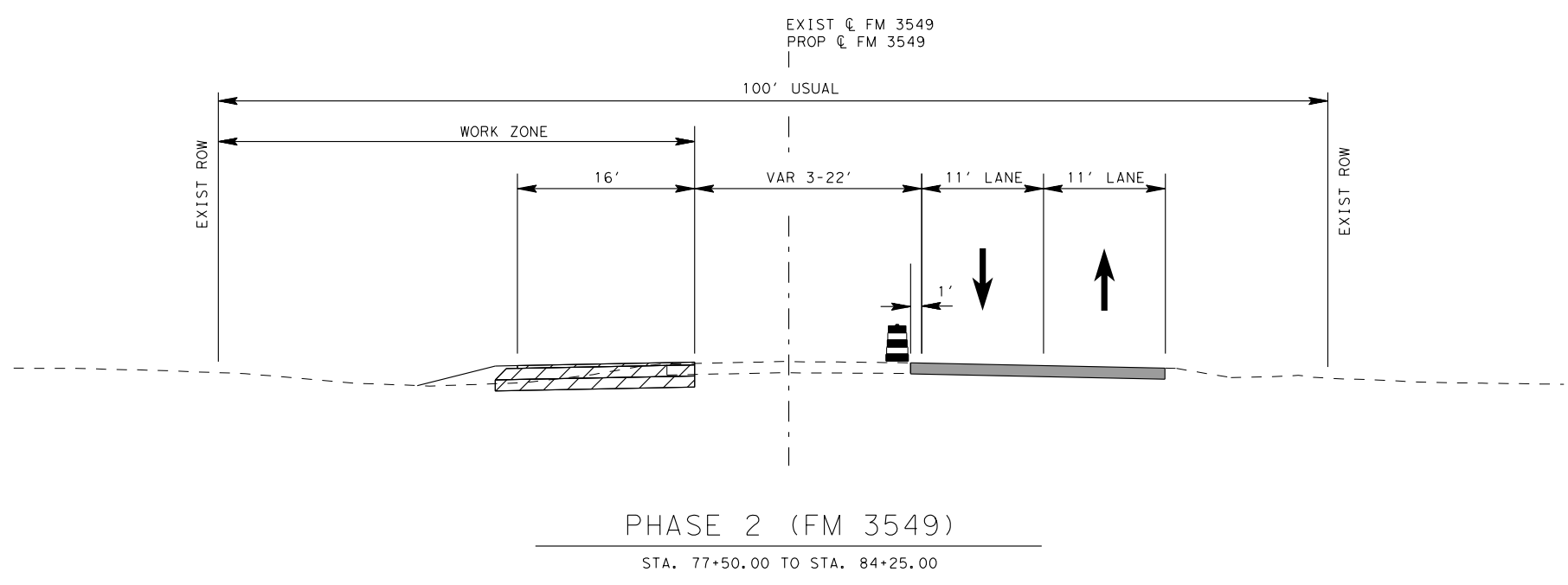


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 2

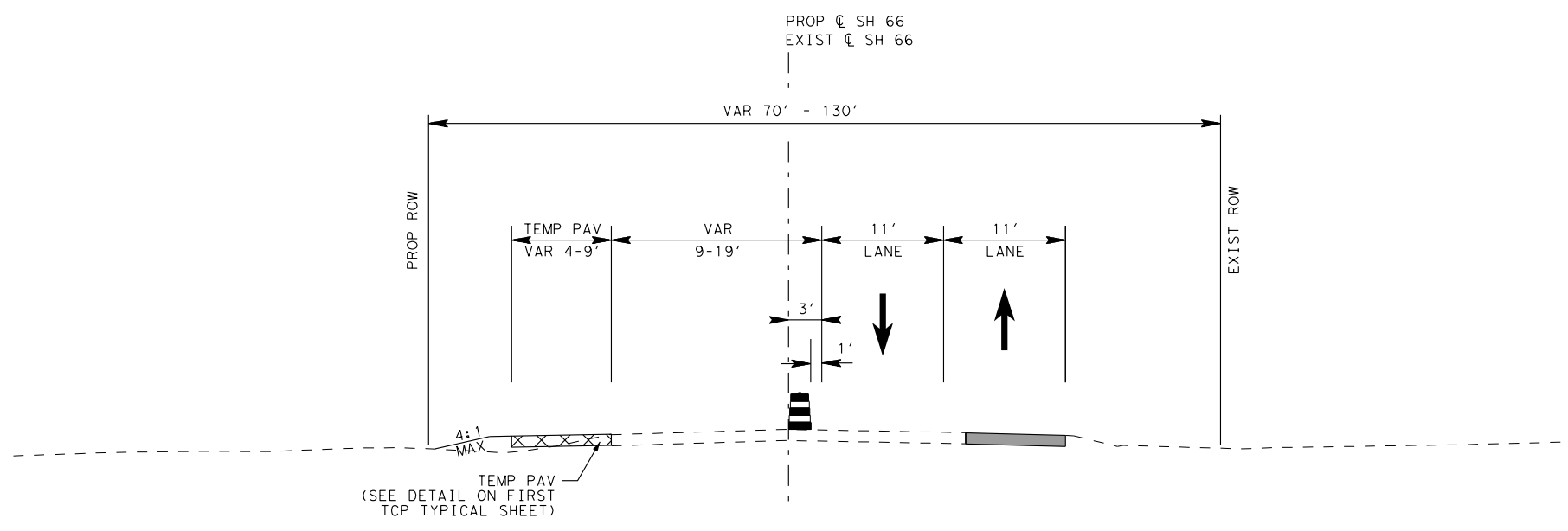
SCALE: 1"=15'H SHEET 2 OF 4

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 35 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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PHASE 2 (FM 3549)
 STA. 77+50.00 TO STA. 84+25.00



PHASE 2 (SH 66)
 STA. 1148+80.51 TO STA. 1150+25.92
 STA. 1161+28.99 TO STA. 1163+08.13

- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



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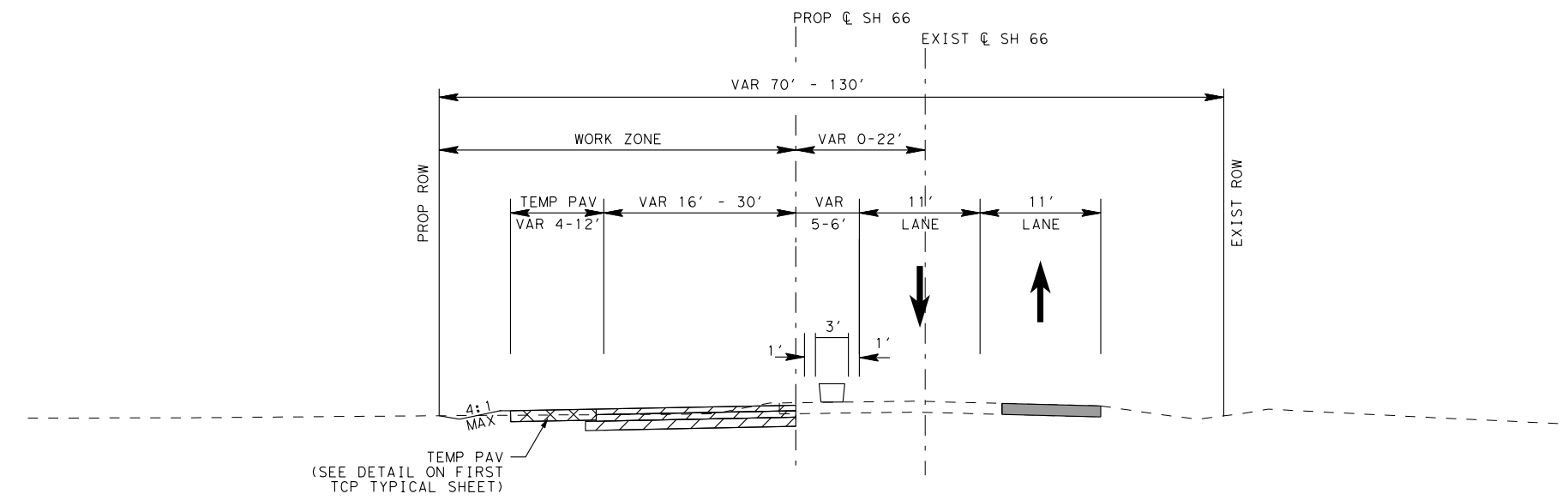


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 2

SCALE: 1"=15'H SHEET 3 OF 4

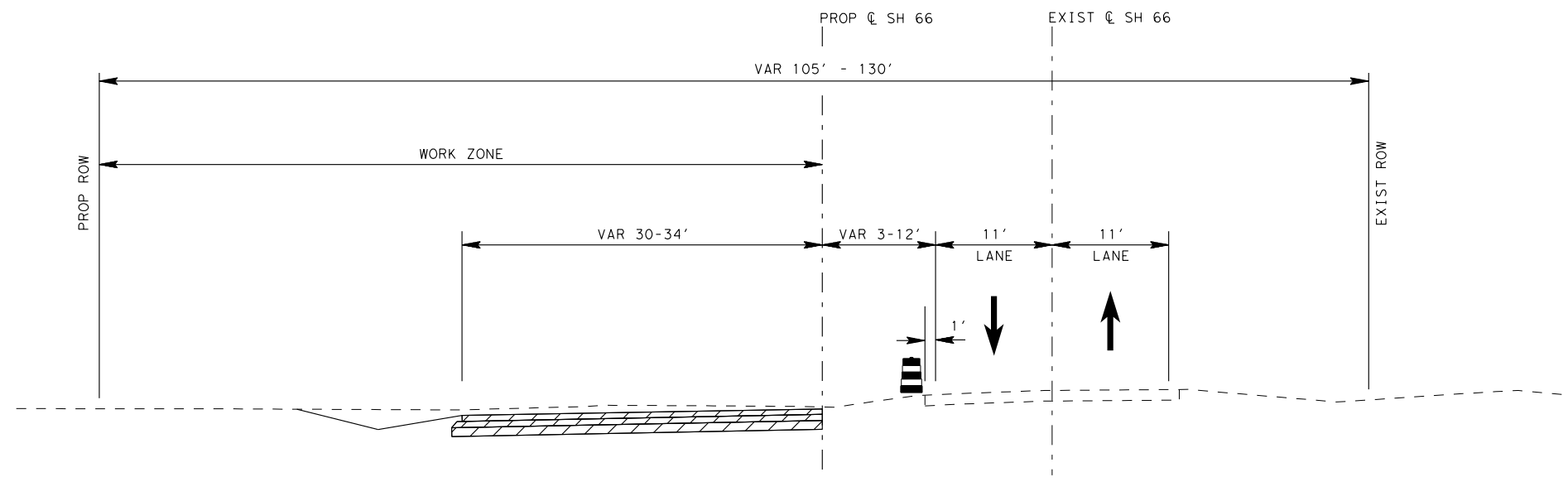
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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 36 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 2 (SH 66)

STA. 1150+25.92 TO STA. 1155+08.90
 STA. 1159+84.25 TO STA. 1161+28.99



PHASE 2 (SH 66)

STA. 1156+94.13 TO STA. 1159+84.25

- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



Tara McDonald

| NO. | DATE | REVISION | BY |
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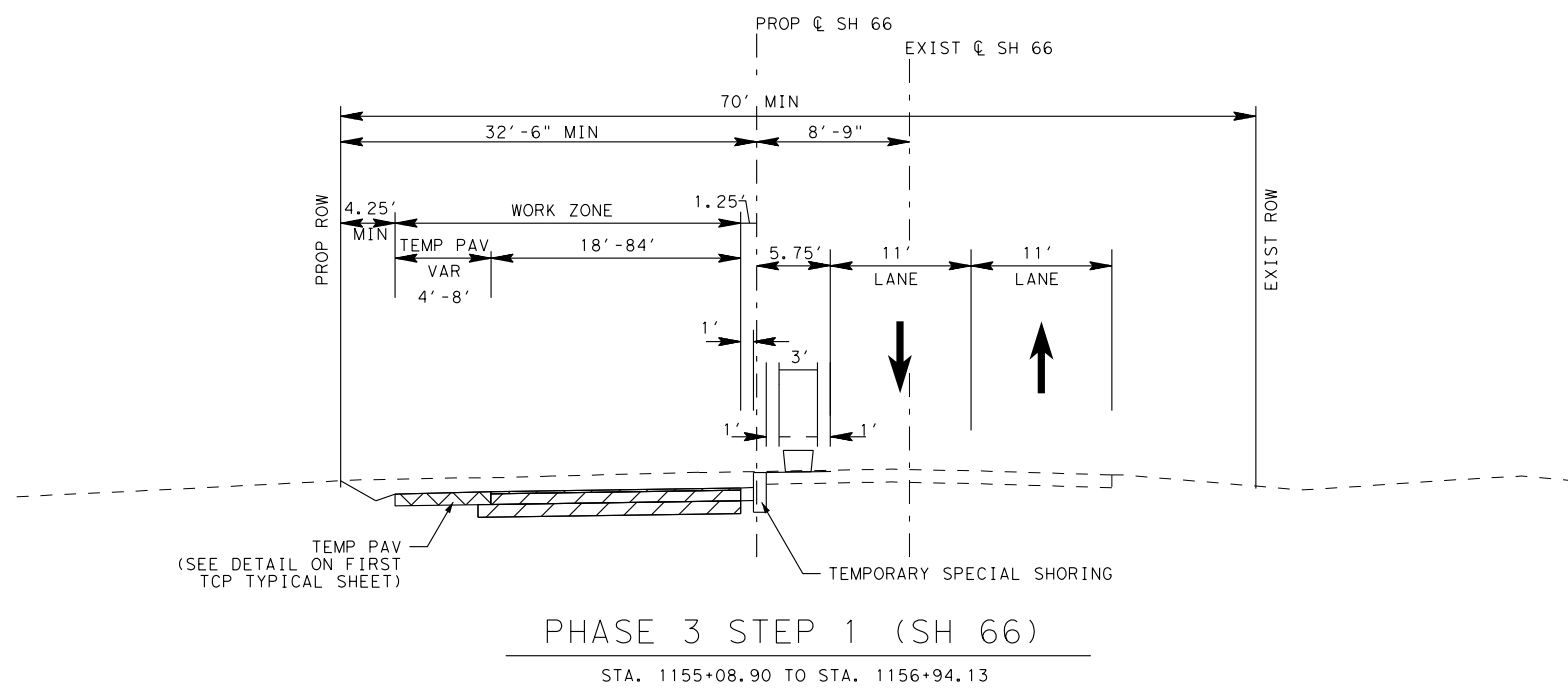


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 2

SCALE: 1"=15'H SHEET 4 OF 4

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 37 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



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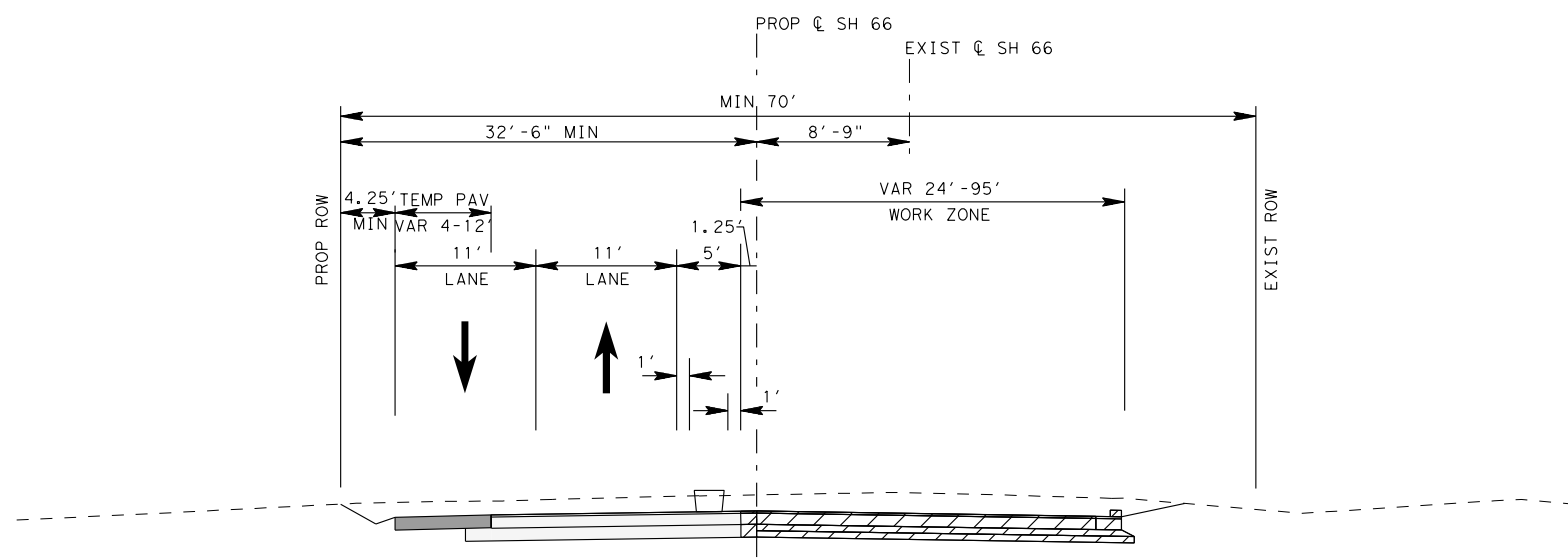


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 3 STEP 1

SCALE: 1"=15'H SHEET 1 OF 1

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 38 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 3 STEP 2 (SH 66)
 STA. 1155+08.90 TO STA. 1156+94.13

- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



| NO. | DATE | REVISION | BY |
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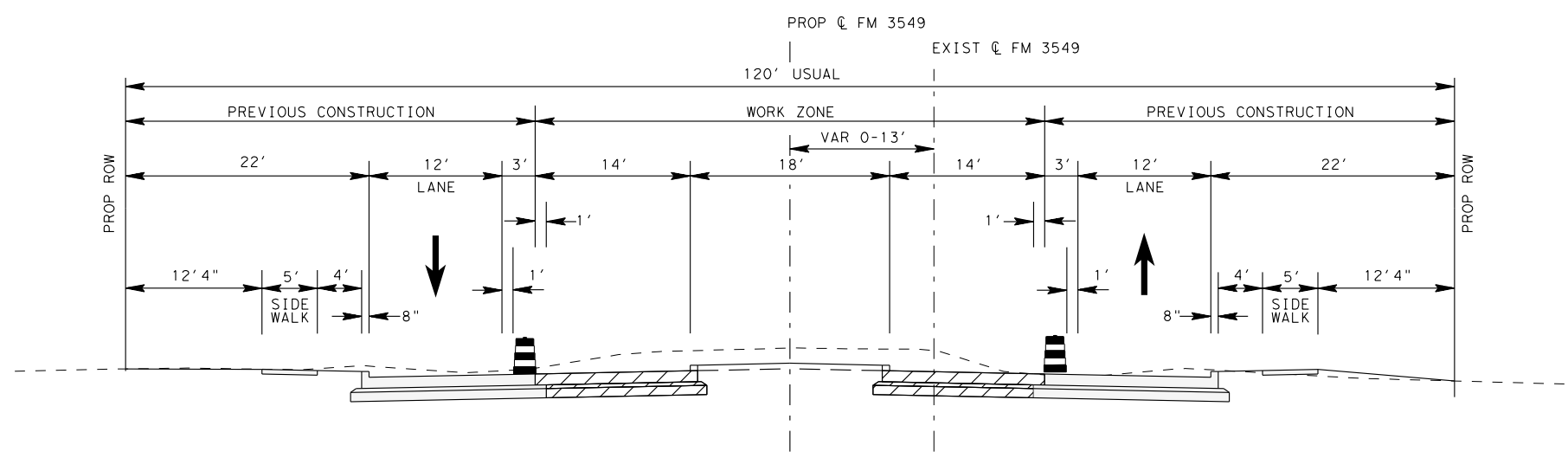


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 3 STEP 2

SCALE: 1"=15'H SHEET 1 OF 1

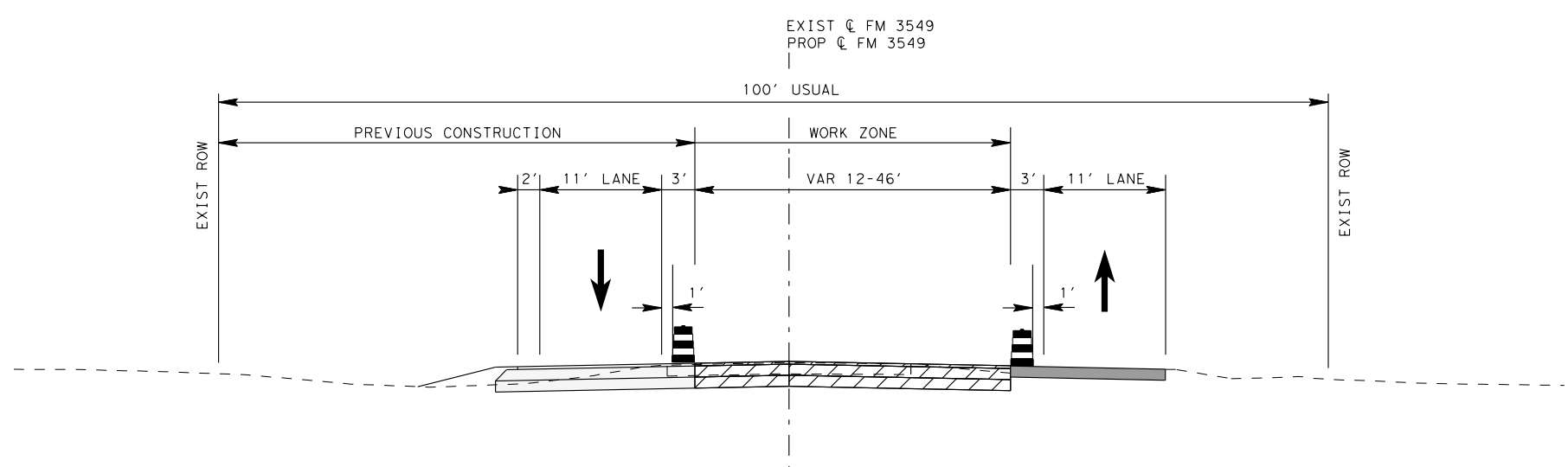
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 39 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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PHASE 4 - STEP 1 (FM 3549)

STA. 18+83.42 TO STA. 73+04.35
 STA. 74+81.62 TO STA. 77+50.00



PHASE 4 - STEP 1 (FM 3549)

STA. 77+50.00 TO STA. 84+25.00

LEGEND

- CONSTRUCTION THIS PHASE
- CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- PLASTIC DRUM
- VERTICAL PANEL



2/26/2018

Tara McDonald

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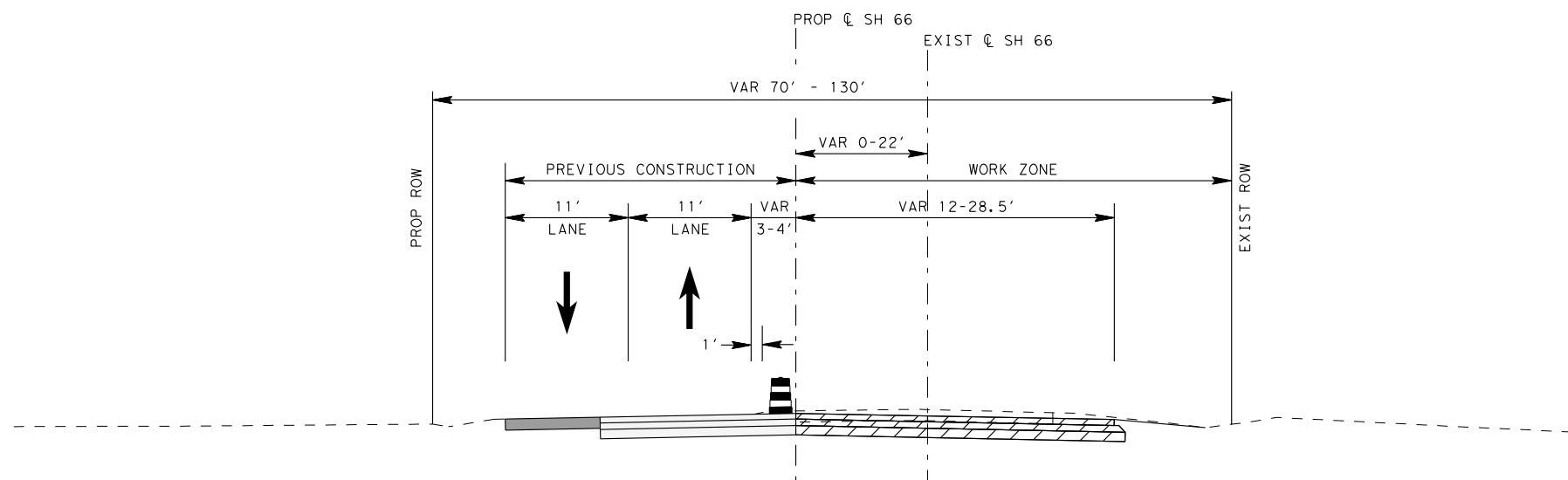


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 4 STEP 1

SCALE: 1"=15'H SHEET 1 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

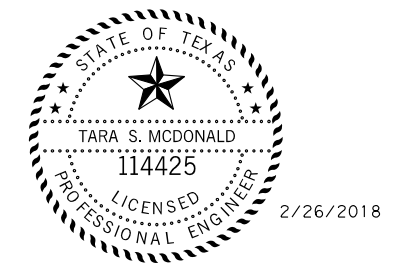
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PHASE 4 - STEP 1 (SH 66)

STA. 1150+25.93 TO STA. 1155+08.90
 STA. 1156+94.13 TO STA. 1161+28.99

- LEGEND**
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



Tara McDonald

| NO. | DATE | REVISION | BY |
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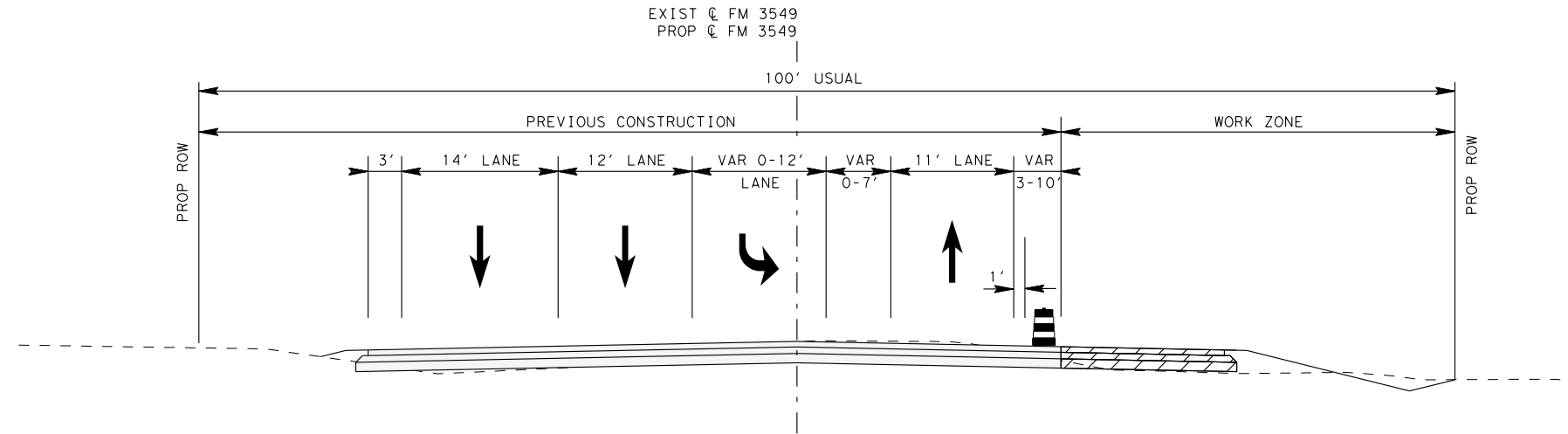


TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 4 STEP 1

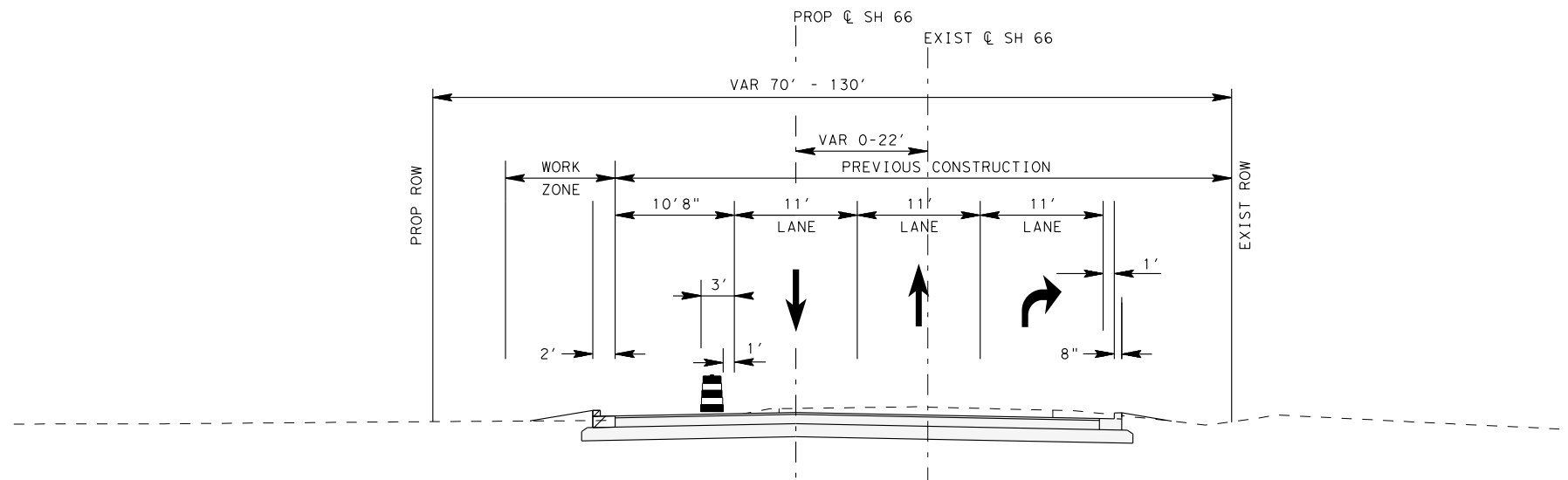
SCALE: 1"=15'H SHEET 2 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 41 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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PHASE 4 - STEP 2 (FM 3549)
 STA. 77+50.00 TO STA. 80+18.86



PHASE 4 - STEP 2 (SH 66)
 STA. 1152+59.57 TO STA. 1155+39.18

- LEGEND
- CONSTRUCTION THIS PHASE
 - CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - PLASTIC DRUM
 - VERTICAL PANEL



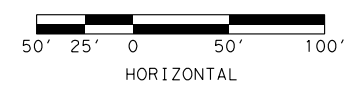
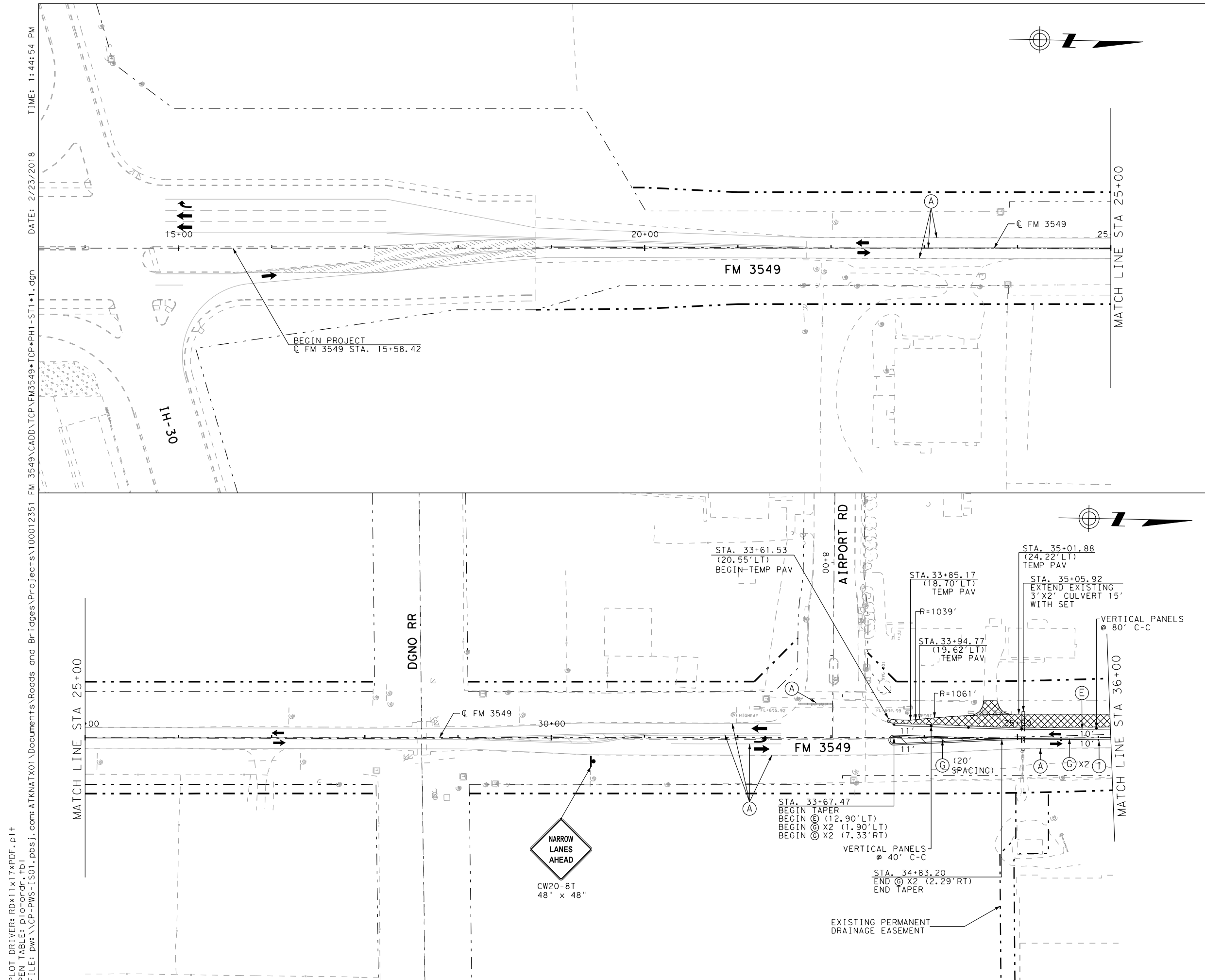
| NO. | DATE | REVISION | BY |
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TRAFFIC CONTROL PLAN
 TYPICAL SECTIONS - PHASE 4 STEP 2

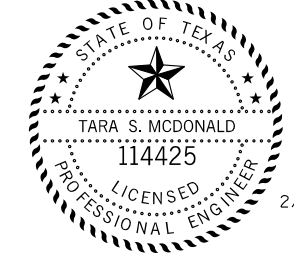
SHEET 1 OF 1

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 42 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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 TBPE REG. # F-474

Texas Department of Transportation
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TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 1
 BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 3

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 43 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 TIME: 1:44:54 PM

TIME: 1:45:01 PM

DATE: 2/23/2018

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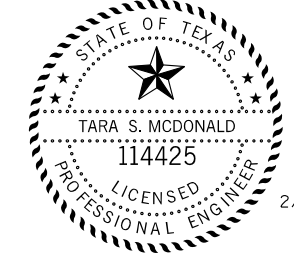
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LEGEND

- EXISTING ROW
- - - PROPOSED ROW
- CHANNELIZING DEVICES
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- I TY III BARRICADE
- ▲ TRUCK MOUNTED ATTENUATOR
- SIGN POST
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
- ▧ TEMPORARY PAVEMENT THIS STEP
- ▦ TEMPORARY PAVEMENT PREVIOUS STEPS
- (A) EXISTING STRIPING / STRIPING PREV STEP
- (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
- (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
- (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
- (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
- (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
- (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
- (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
- (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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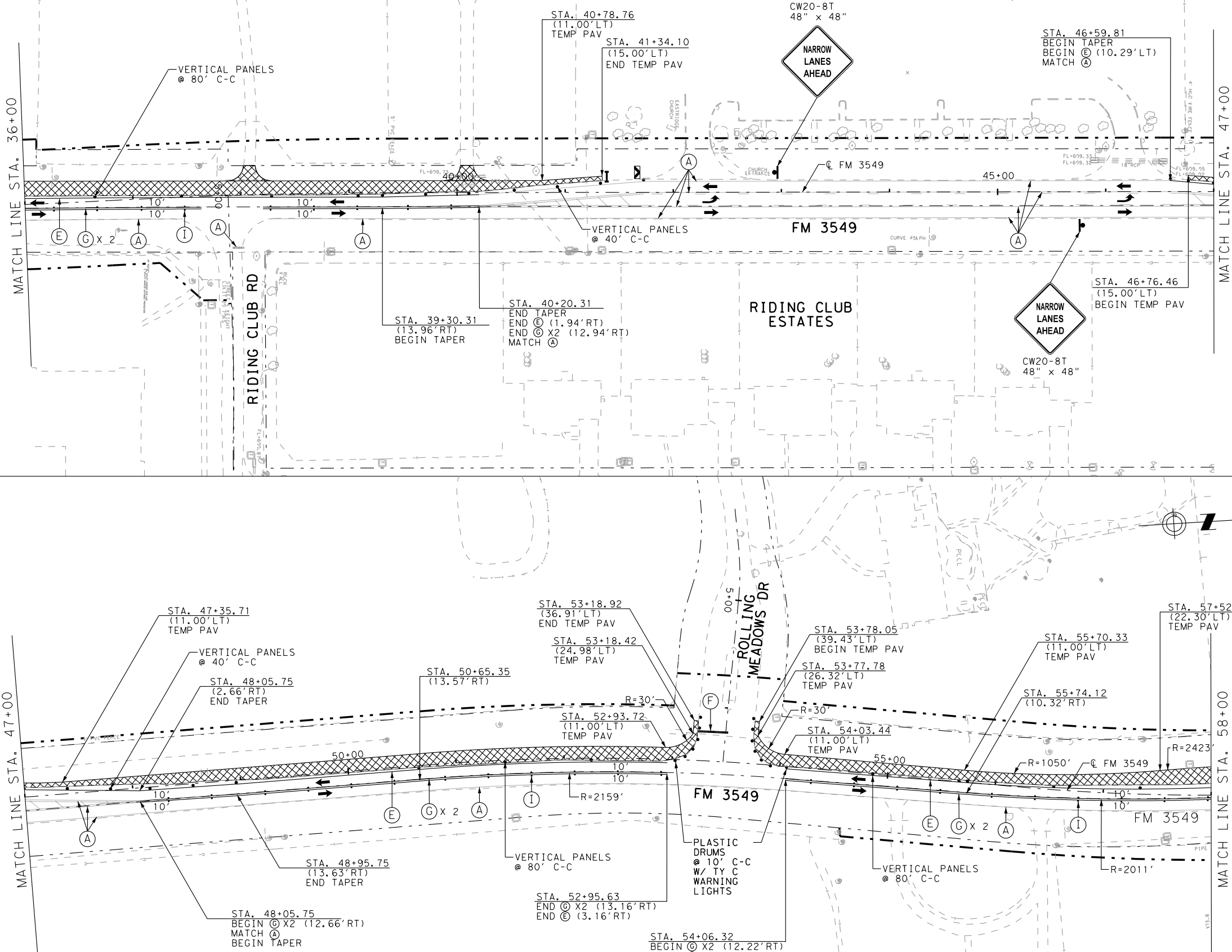


TRAFFIC CONTROL PLAN

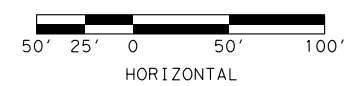
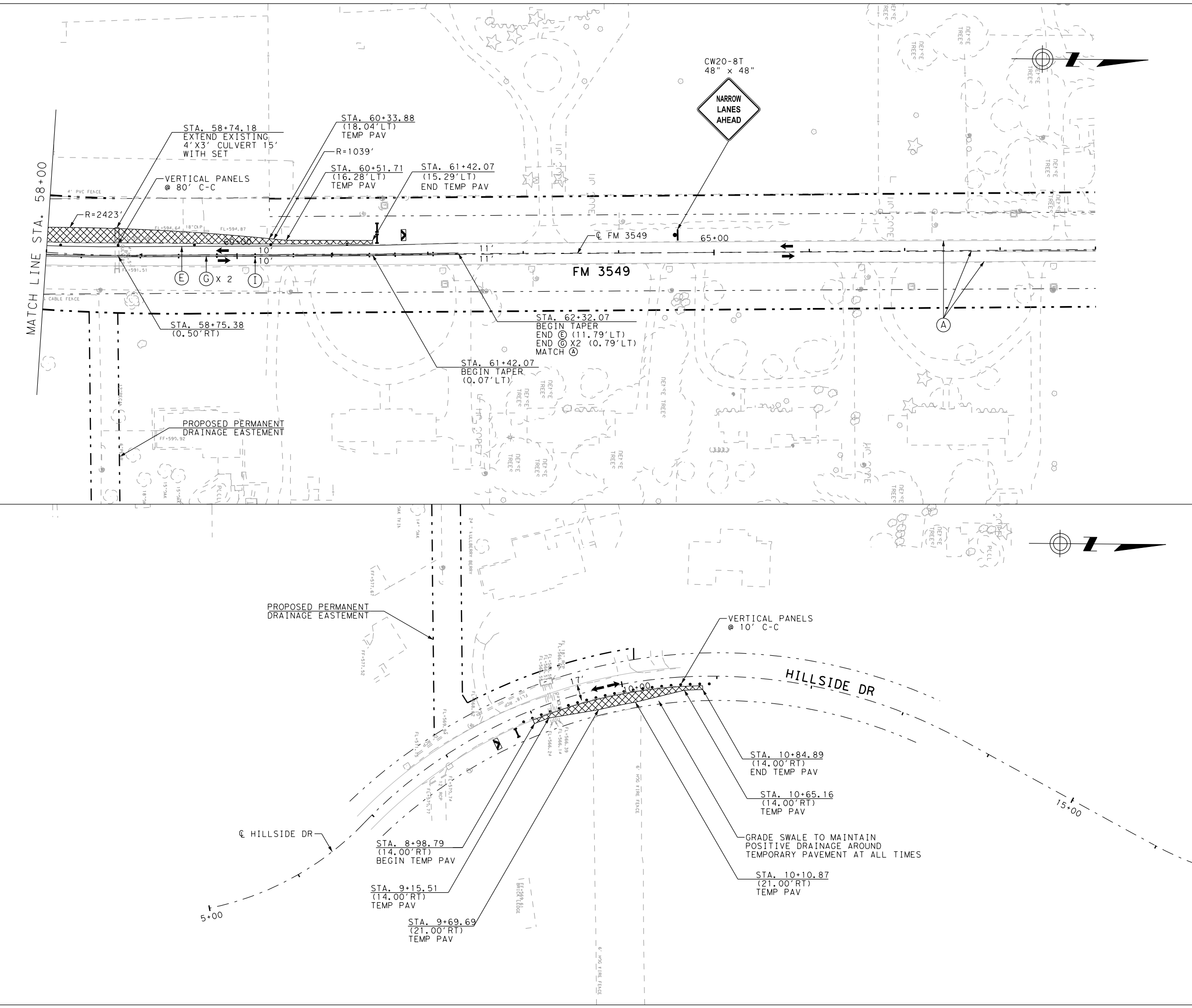
PHASE 1 - STEP 1
STA. 36+00 TO STA. 58+00

SHEET 2 OF 3

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 44 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

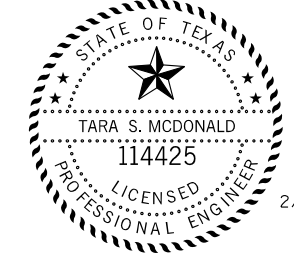


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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +—+—+— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - +—+—+— TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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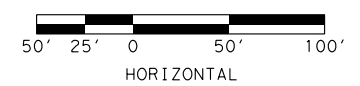
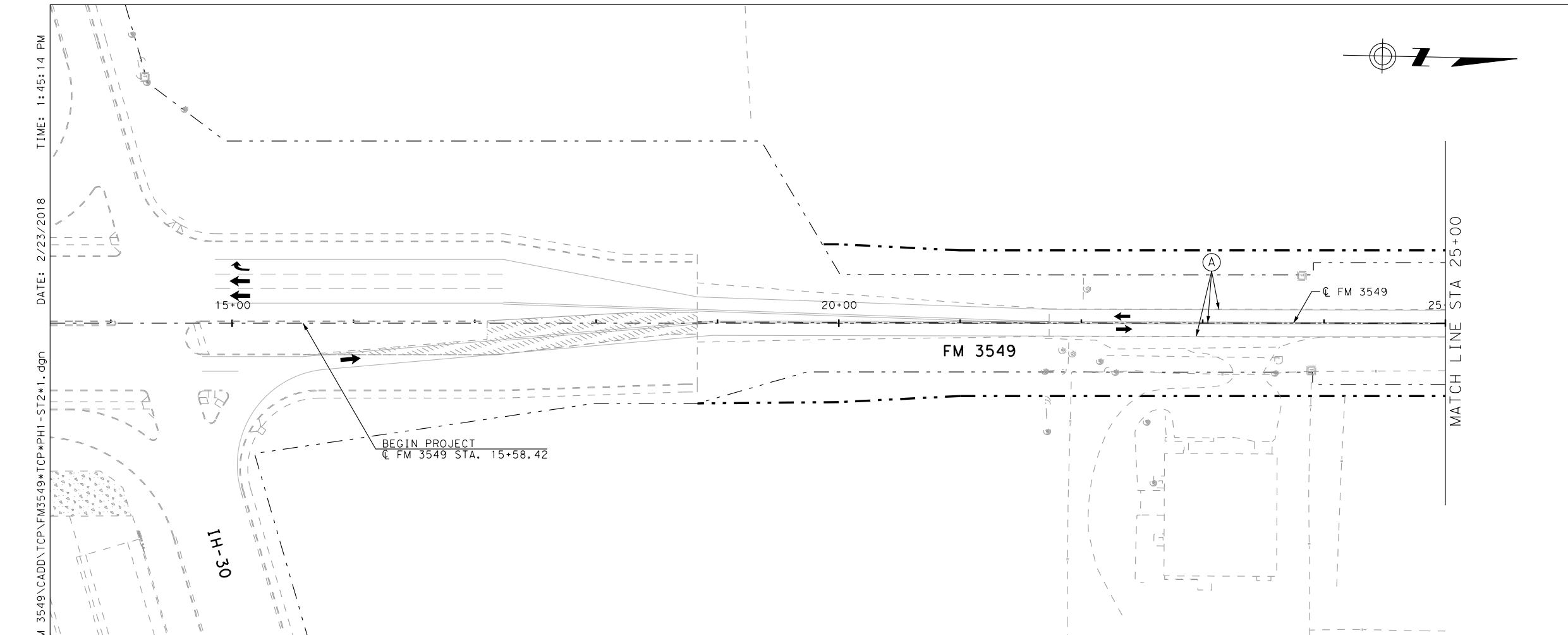
ATKINS
 TBPE REG. # F-474



TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 1
 STA. 58+00 TO STA. 69+00, HILLSIDE DR

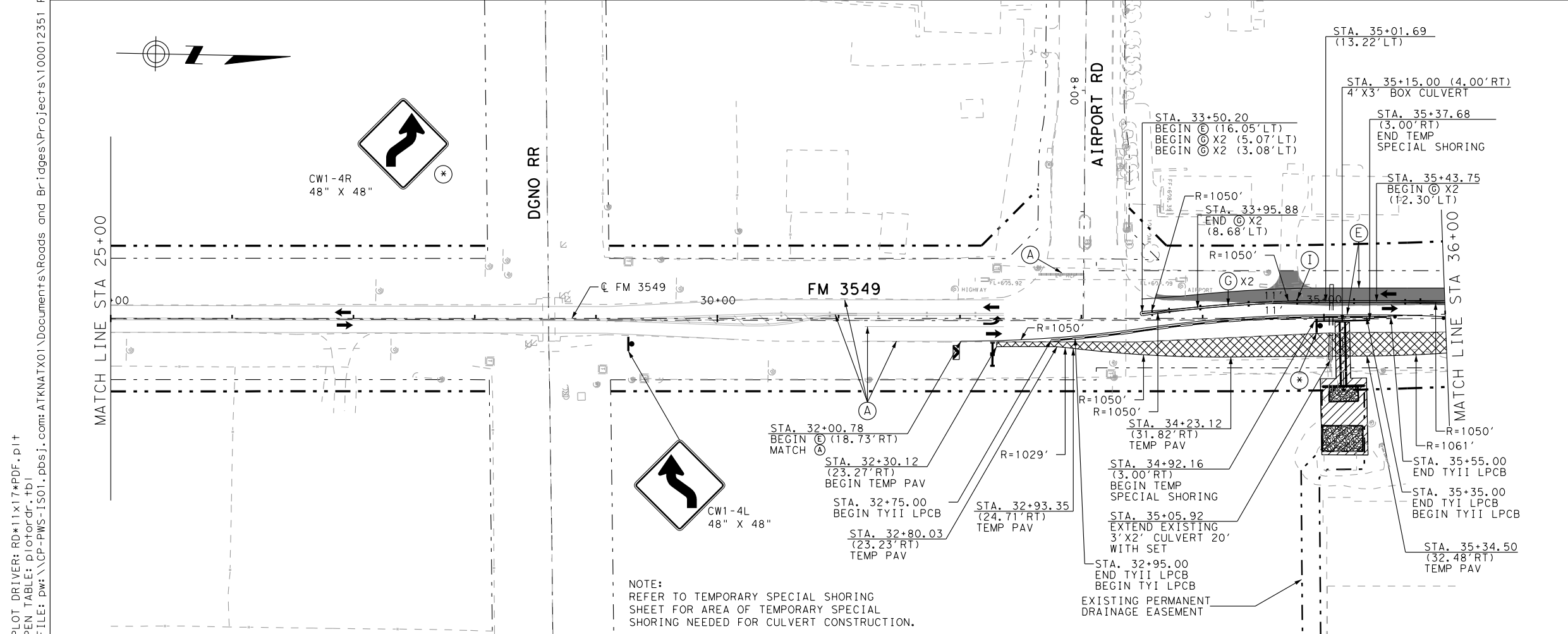
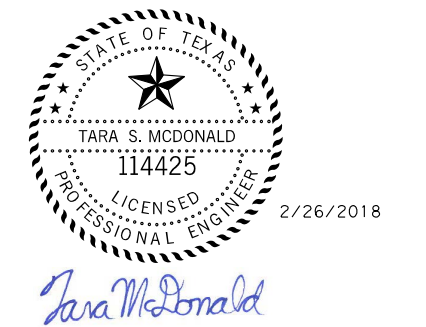
SHEET 3 OF 3

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 45 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



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TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 2
 BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 3

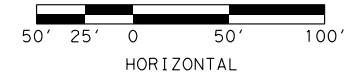
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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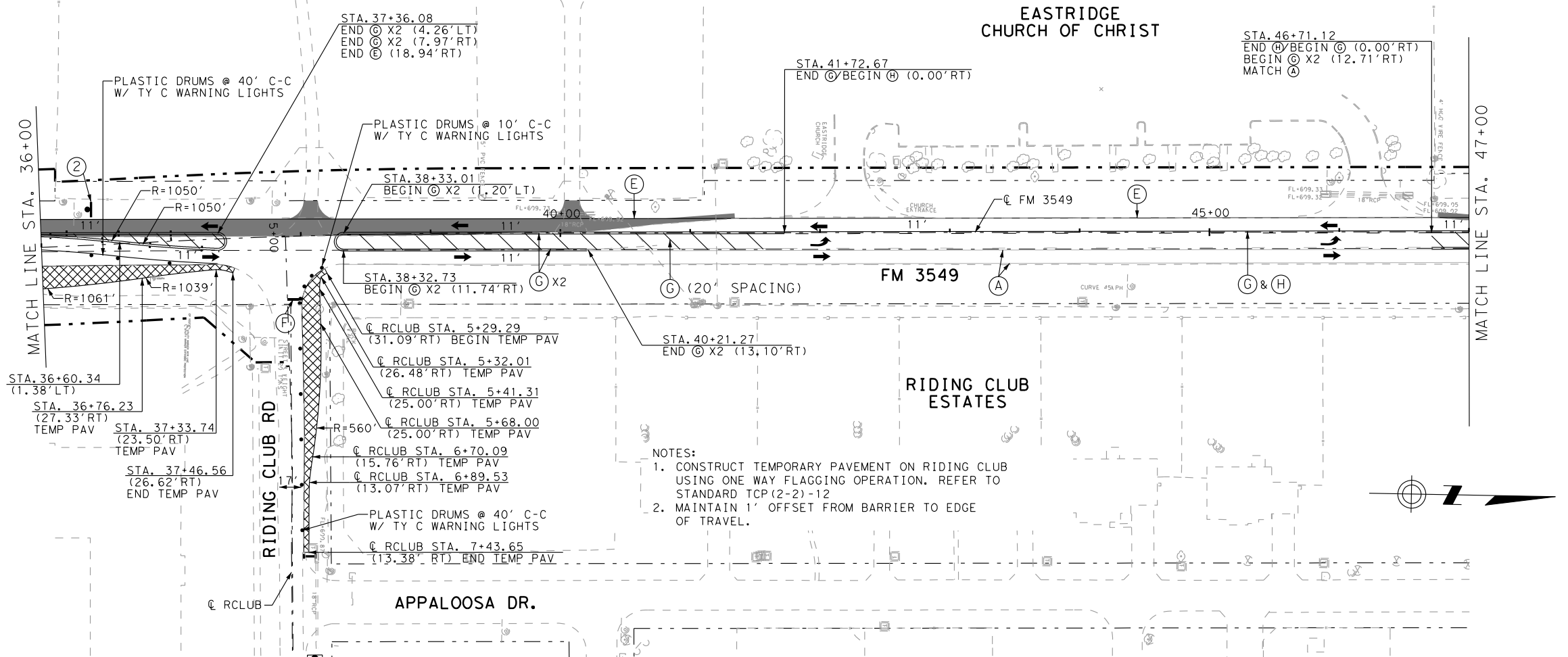
NOTE:
 REFER TO TEMPORARY SPECIAL SHORING SHEET FOR AREA OF TEMPORARY SPECIAL SHORING NEEDED FOR CULVERT CONSTRUCTION.

PLOT DRIVER: RD*11x17*PDF.plt
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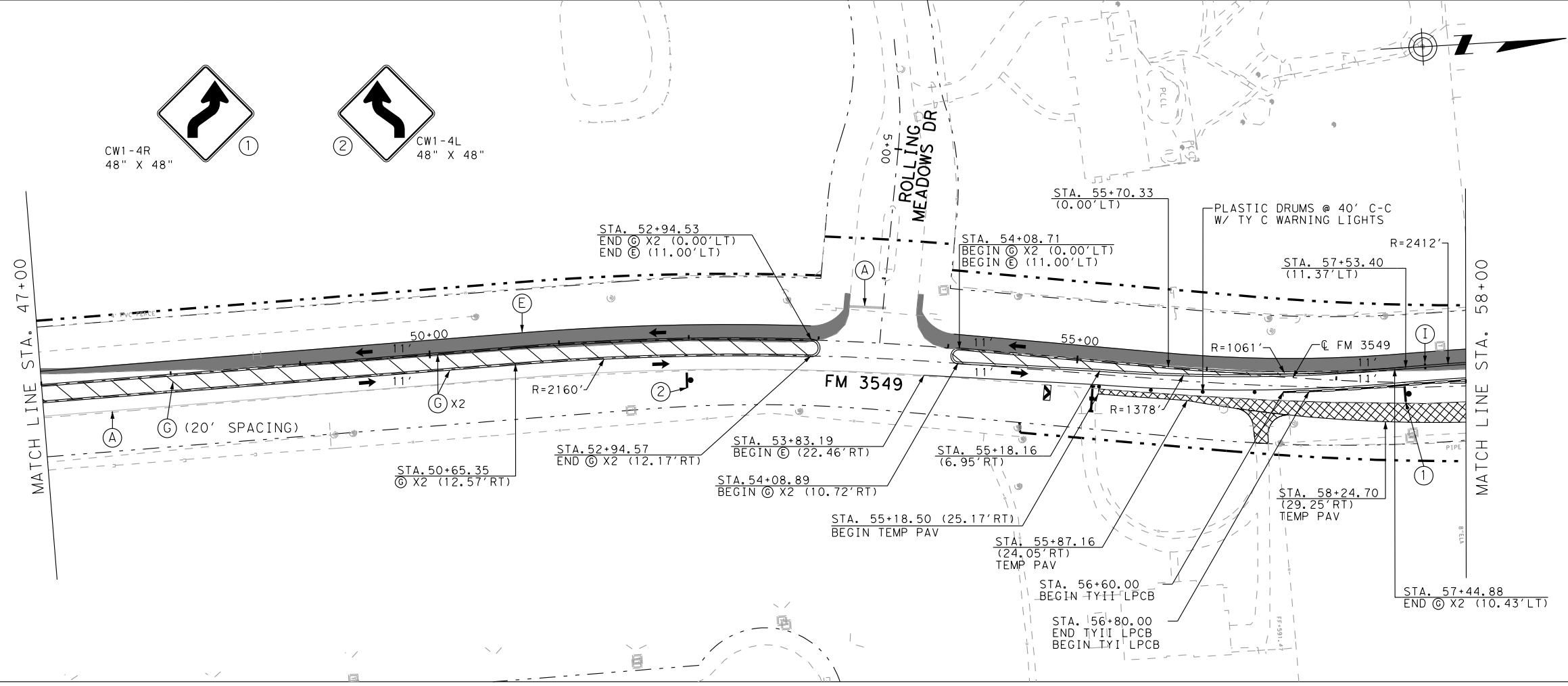
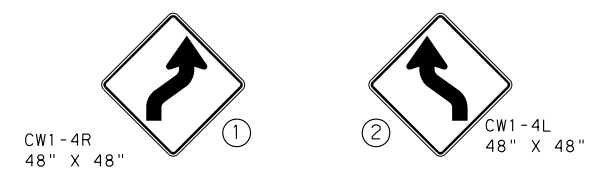
EASTRIDGE
 CHURCH OF CHRIST



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - ... CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)



NOTES:
 1. CONSTRUCT TEMPORARY PAVEMENT ON RIDING CLUB USING ONE WAY FLAGGING OPERATION. REFER TO STANDARD TCP(2-2)-12
 2. MAINTAIN 1' OFFSET FROM BARRIER TO EDGE OF TRAVEL.



GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



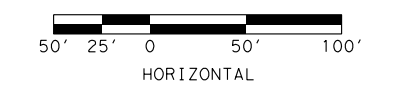
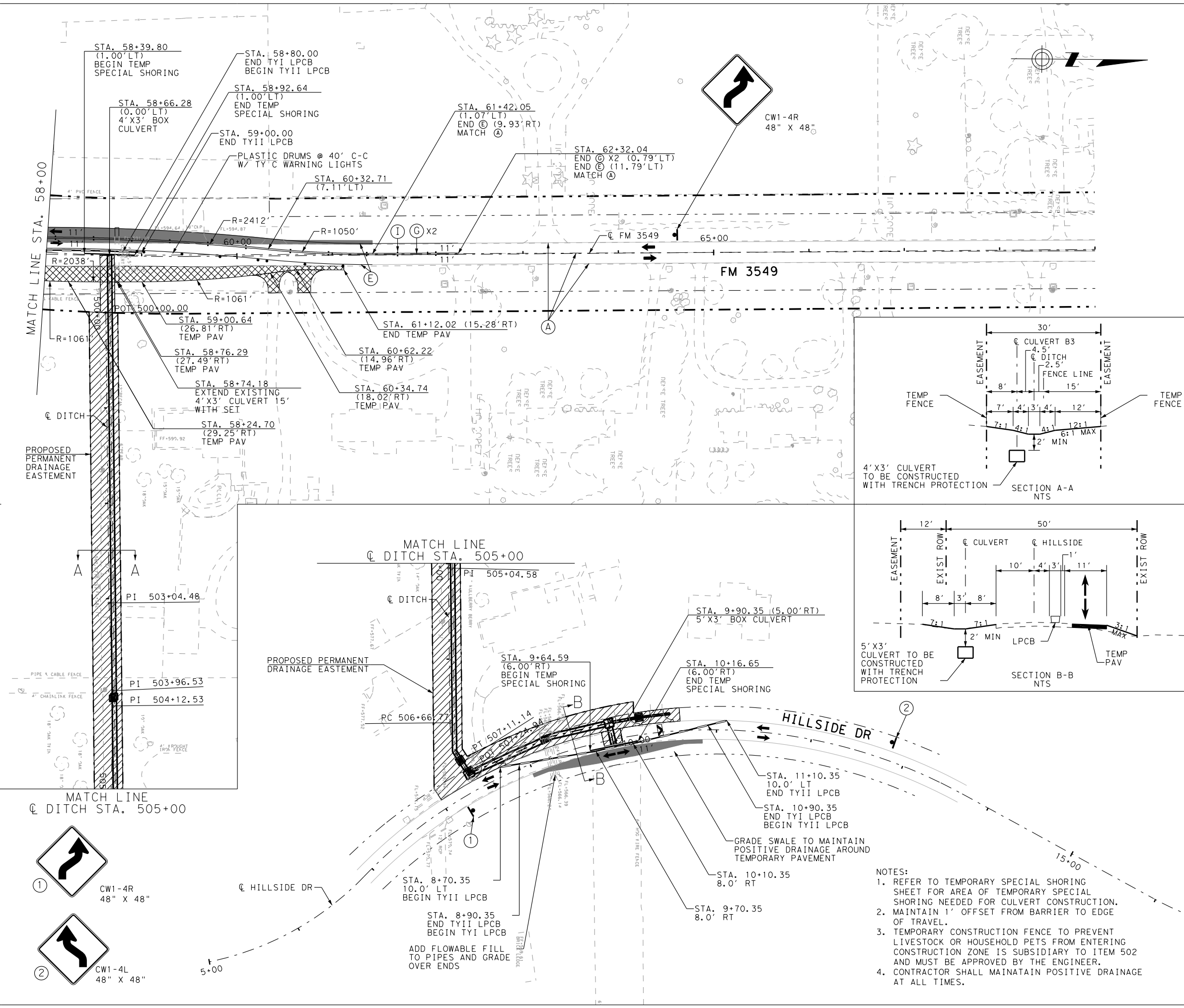
| NO. | DATE | REVISION | BY |
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TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 2
 STA. 36+00 TO STA. 58+00
 SHEET 2 OF 3

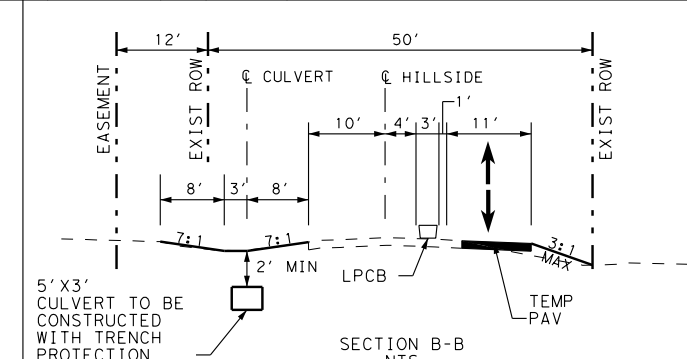
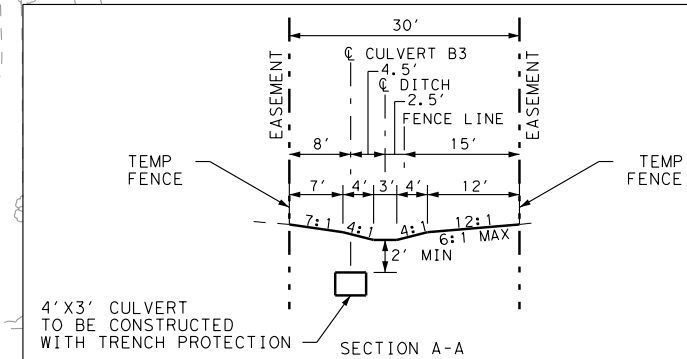
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| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 47 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓙ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



| NO. | DATE | REVISION | BY |
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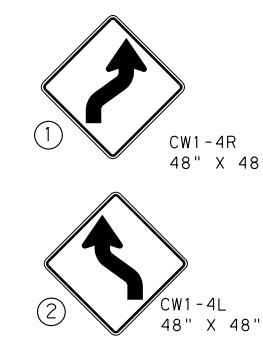
ATKINS
 TBPE REG. # F-474



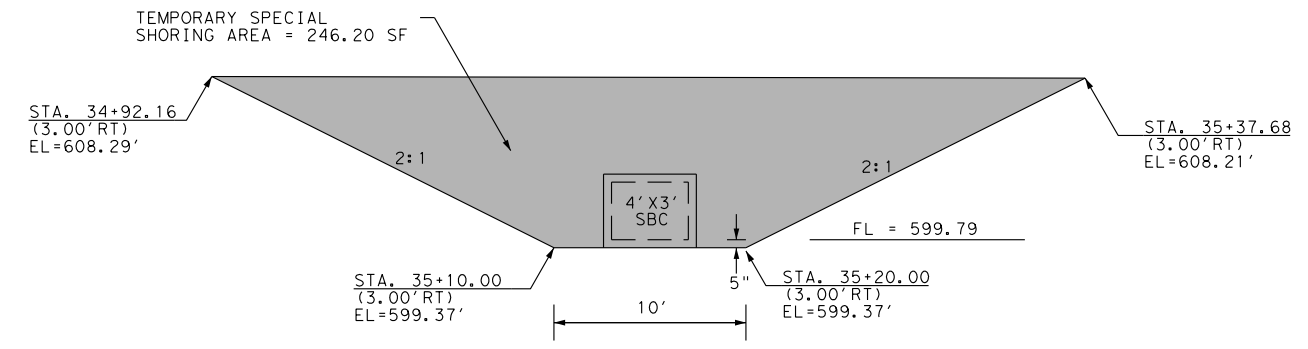
TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 2
 STA. 58+00 TO STA. 69+00, HILLSIDE DR

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 48 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

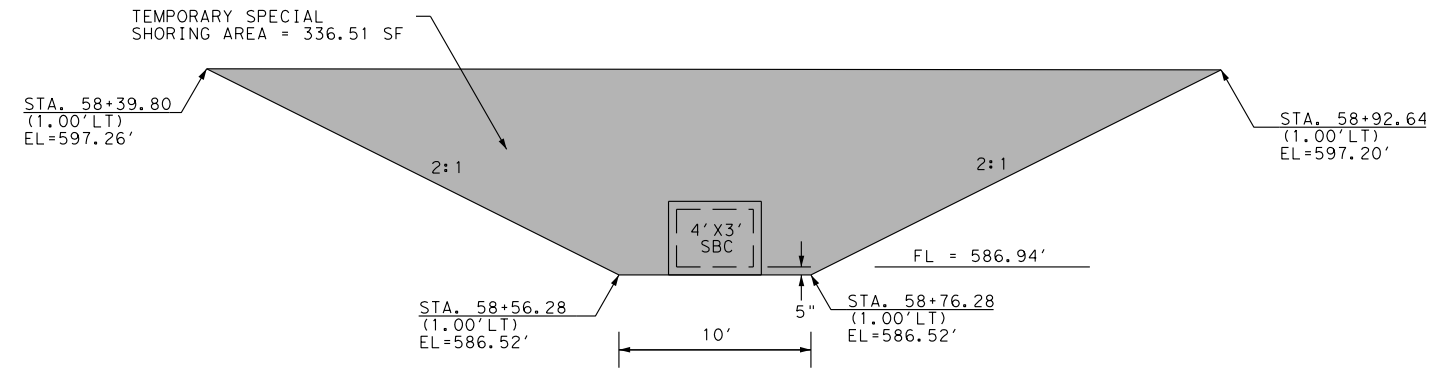
- NOTES:**
- REFER TO TEMPORARY SPECIAL SHORING SHEET FOR AREA OF TEMPORARY SPECIAL SHORING NEEDED FOR CULVERT CONSTRUCTION.
 - MAINTAIN 1' OFFSET FROM BARRIER TO EDGE OF TRAVEL.
 - TEMPORARY CONSTRUCTION FENCE TO PREVENT LIVESTOCK OR HOUSEHOLD PETS FROM ENTERING CONSTRUCTION ZONE IS SUBSIDIARY TO ITEM 502 AND MUST BE APPROVED BY THE ENGINEER.
 - CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AT ALL TIMES.



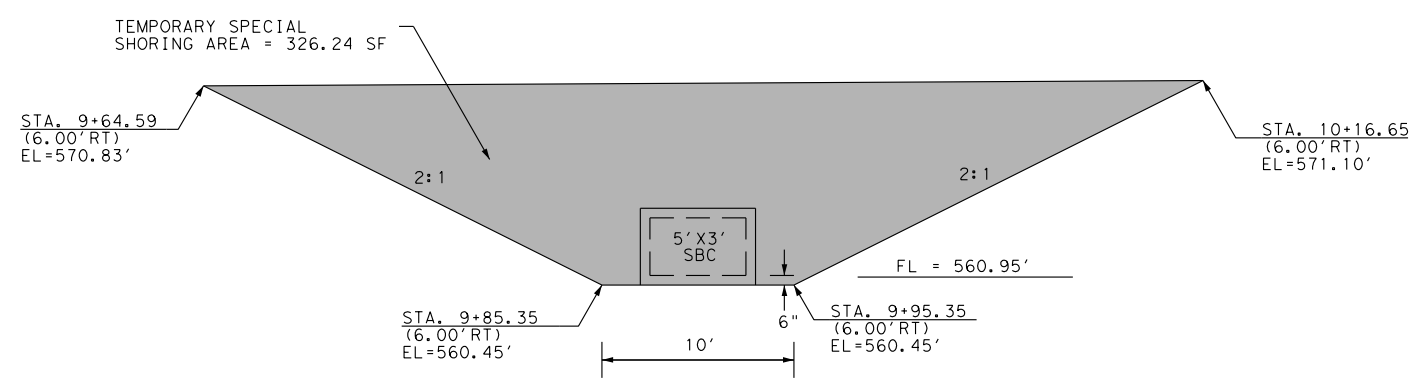
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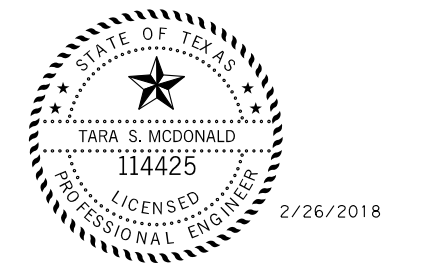
PHASE 1 - STEP 2 (FM 3549 STA. 35+15.00)



PHASE 1 - STEP 2 (FM 3549 STA. 58+66.29)



PHASE 1 - STEP 2 (HILLSIDE DR STA. 9+90.35)



Tara McDonald

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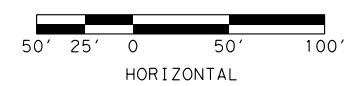
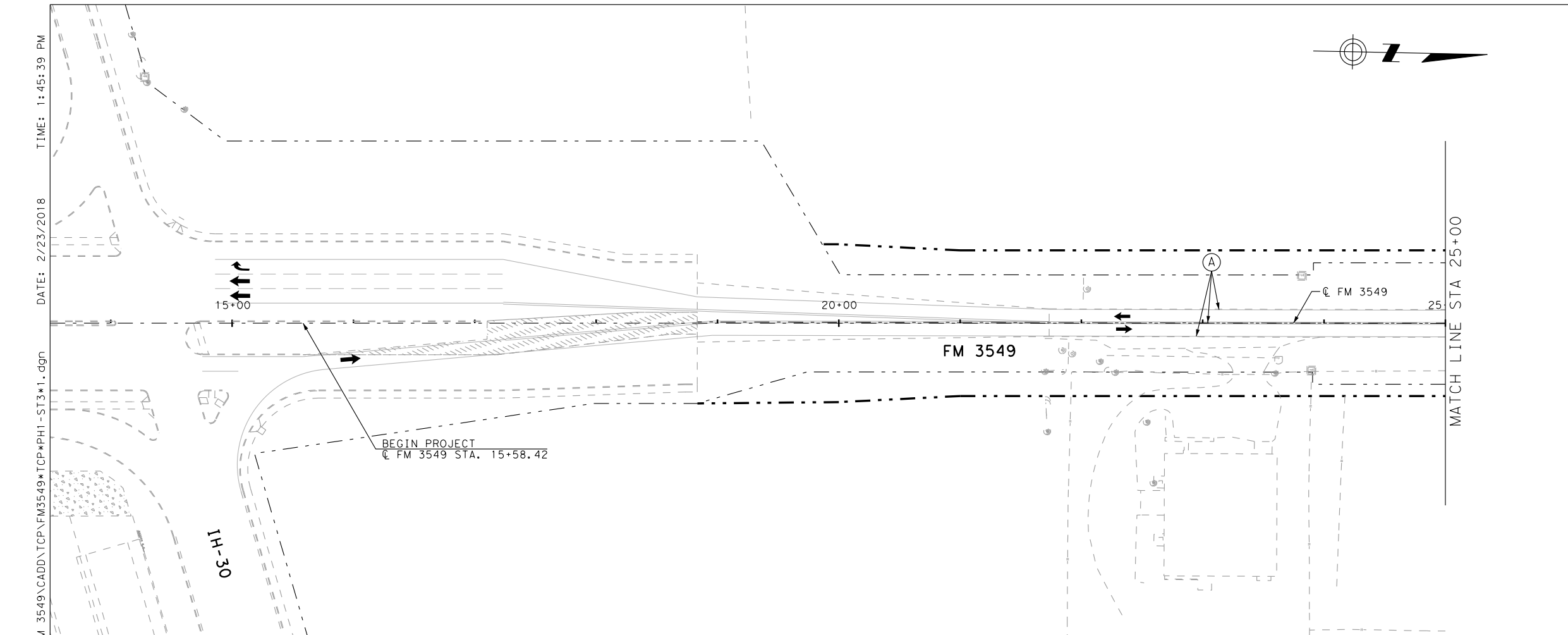
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TBPE REG. # F-474



TRAFFIC CONTROL PLAN
PHASE 1 - STEP 2
TEMPORARY SPECIAL SHORING DETAILS

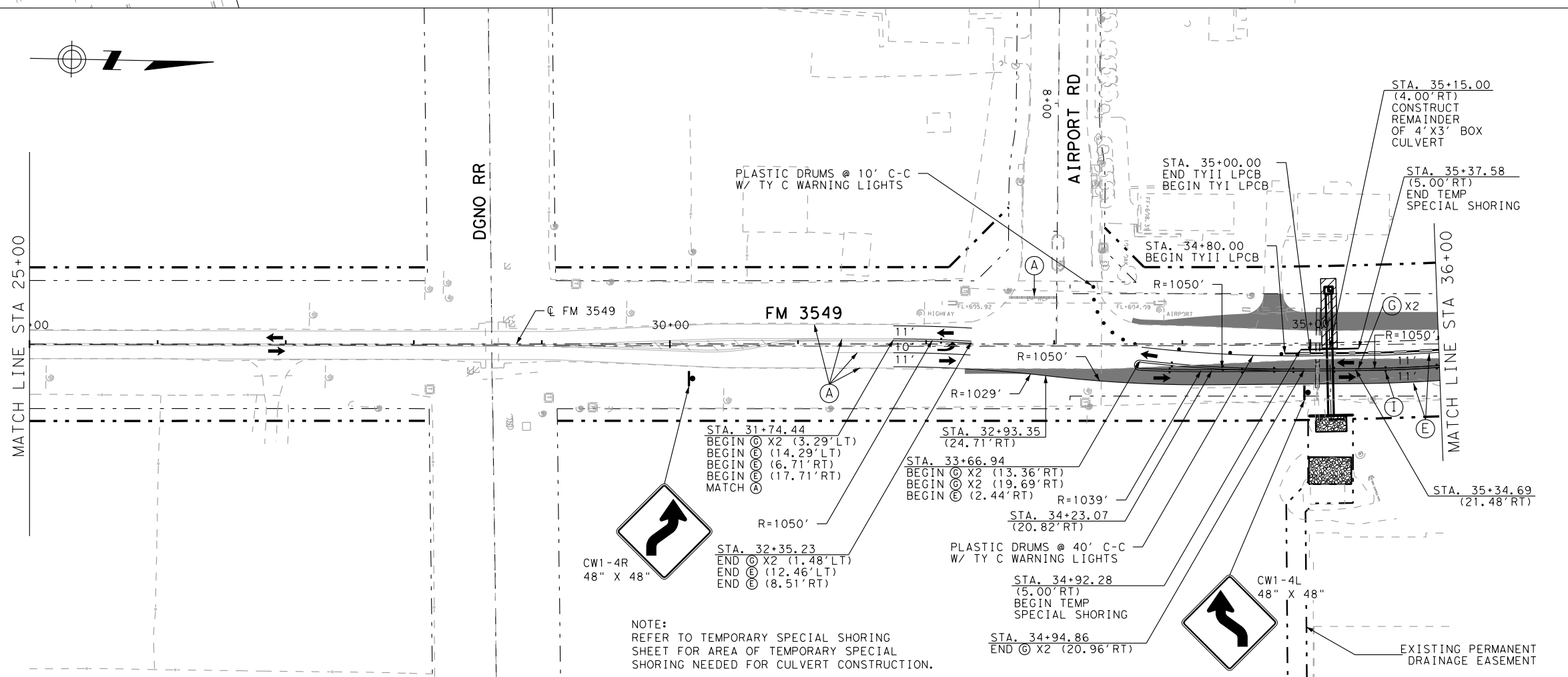
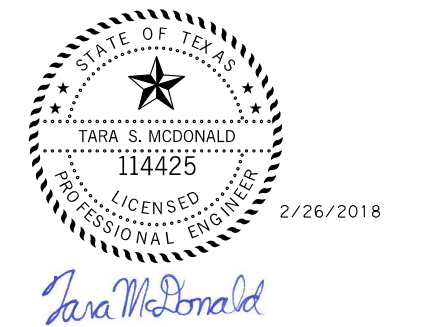
SHEET 1 OF 1

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 49 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



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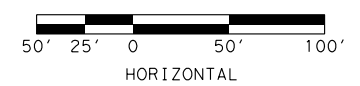
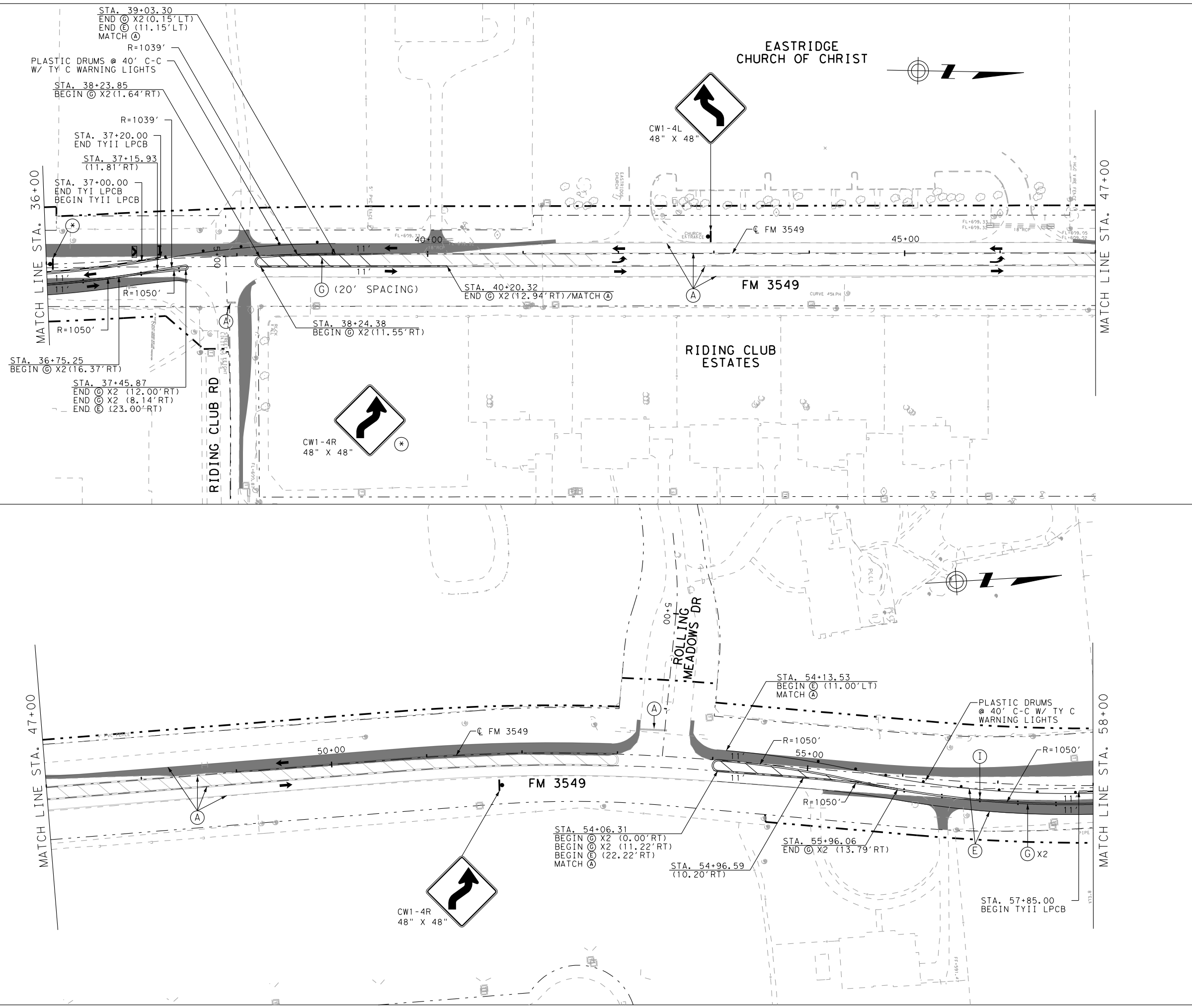
TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 6

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 50 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

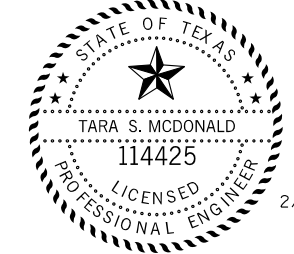
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 DATE: 2/23/2018
 TIME: 1:45:45 PM



- LEGEND**
- EXISTING ROW
 - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▩ TEMPORARY PAVEMENT THIS STEP
 - TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4'') (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24'') (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4'') (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4'') (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24'') (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4'') (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4'') (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓙ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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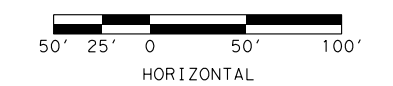
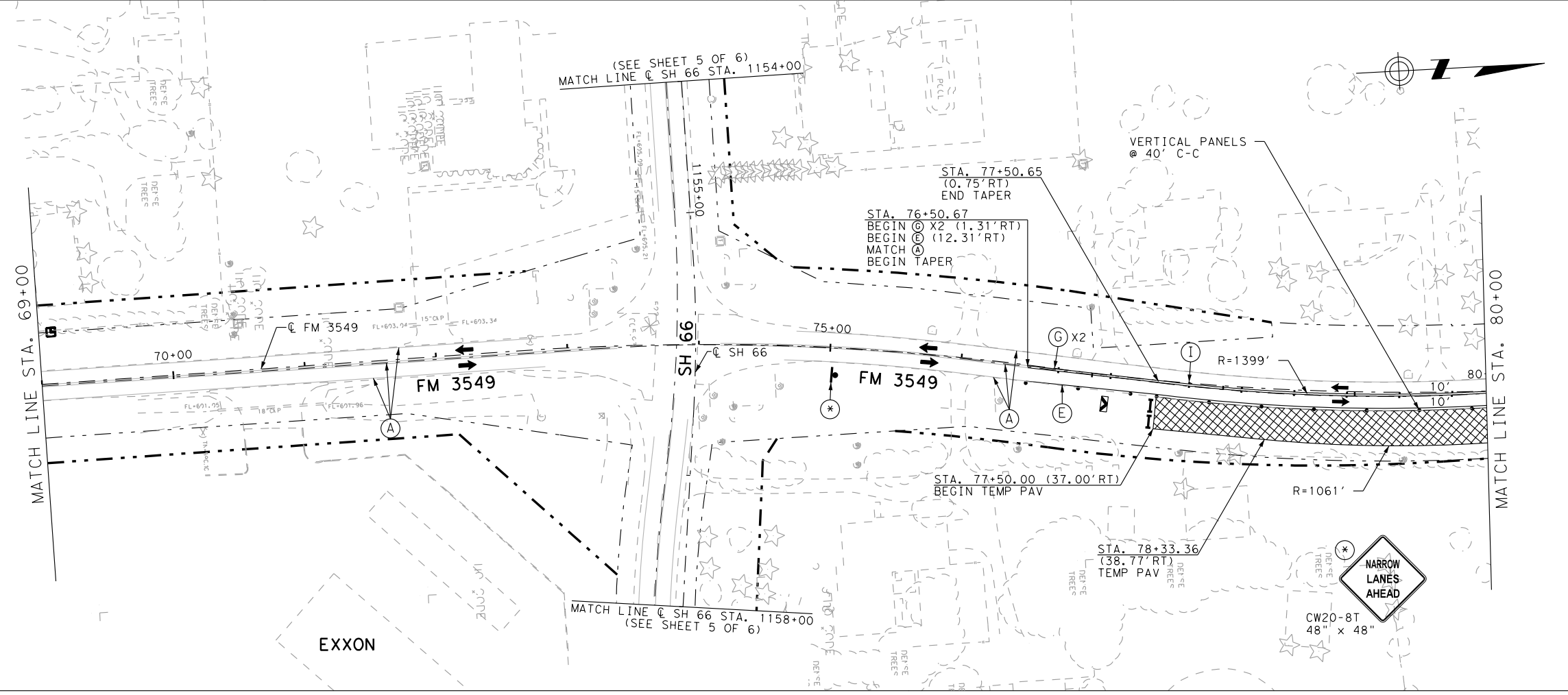
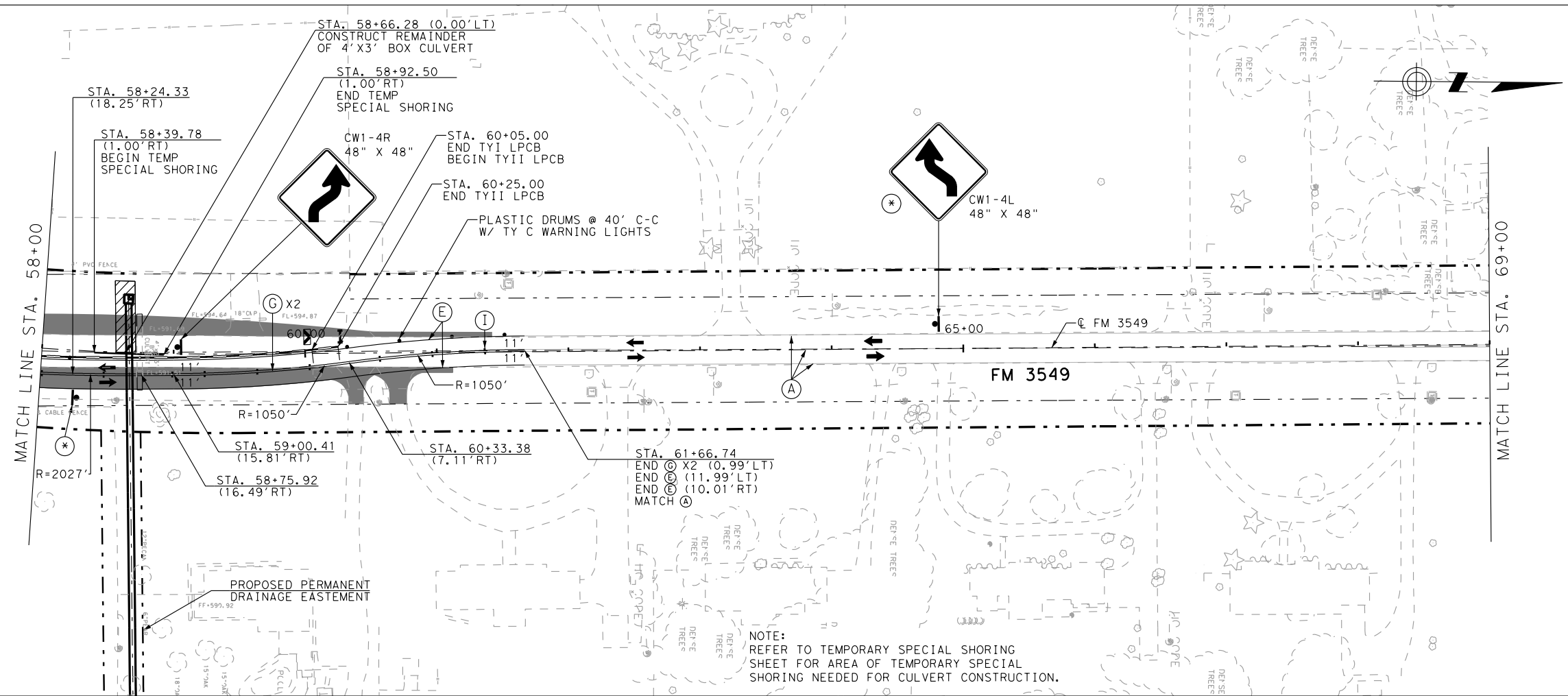
ATKINS
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TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 STA. 36+00 TO STA. 58+00
 SHEET 2 OF 6

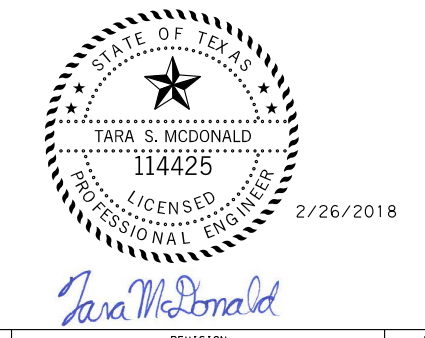
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|-------------|-------------------|-------------------------|----------|-------------|
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| CHECK WL | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 51 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



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ATKINS
 TBPE REG. # F-474

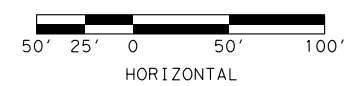
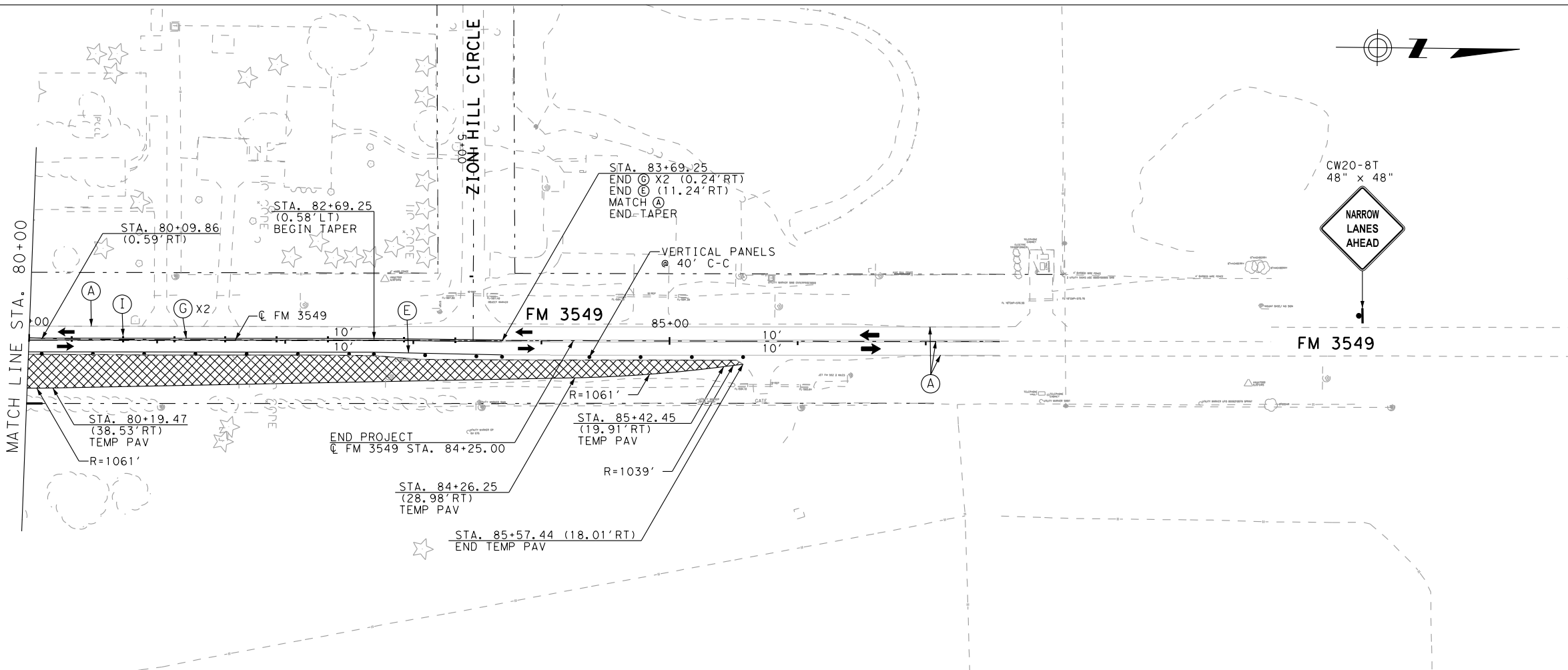


TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 STA. 58+00 TO STA. 80+00

SHEET 3 OF 6

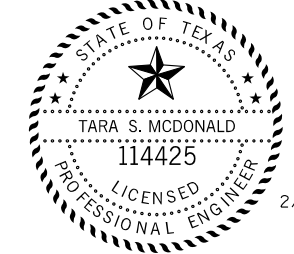
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|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 52 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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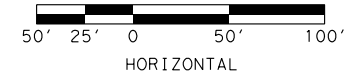
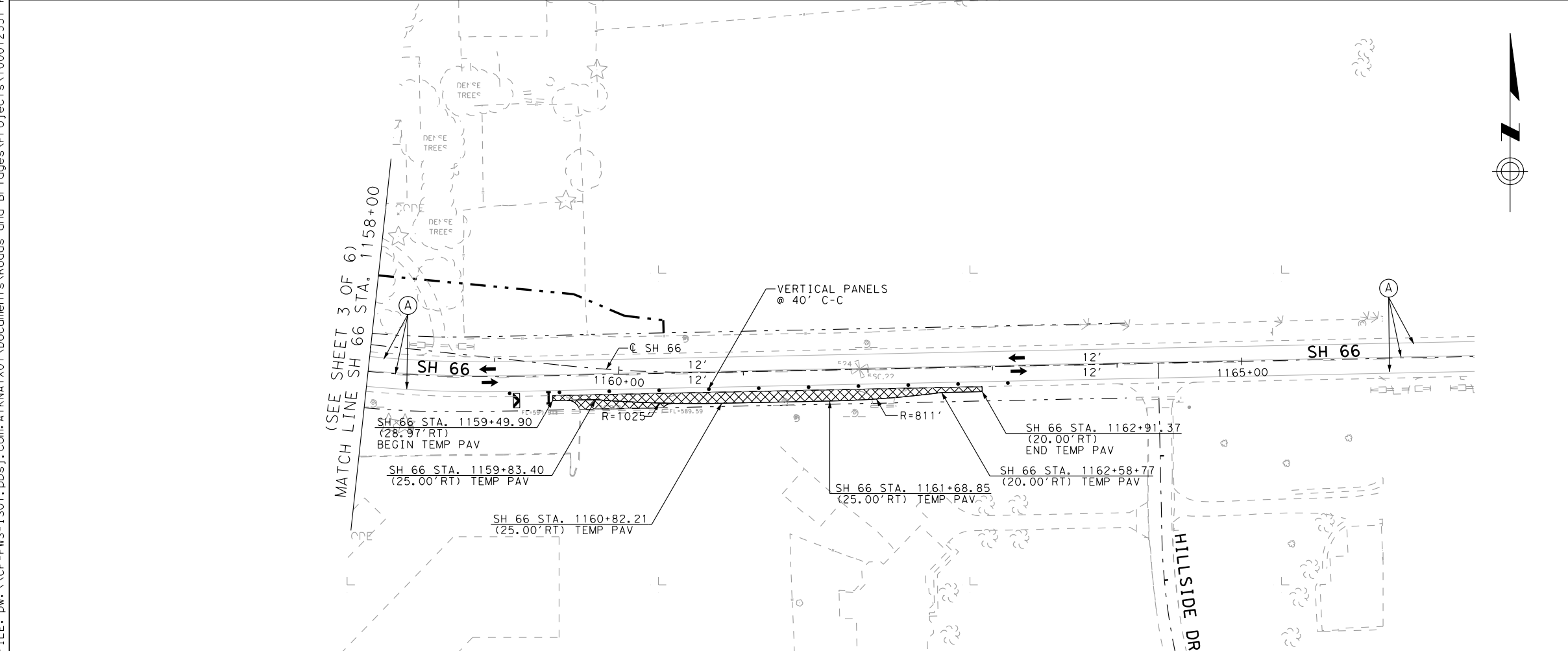
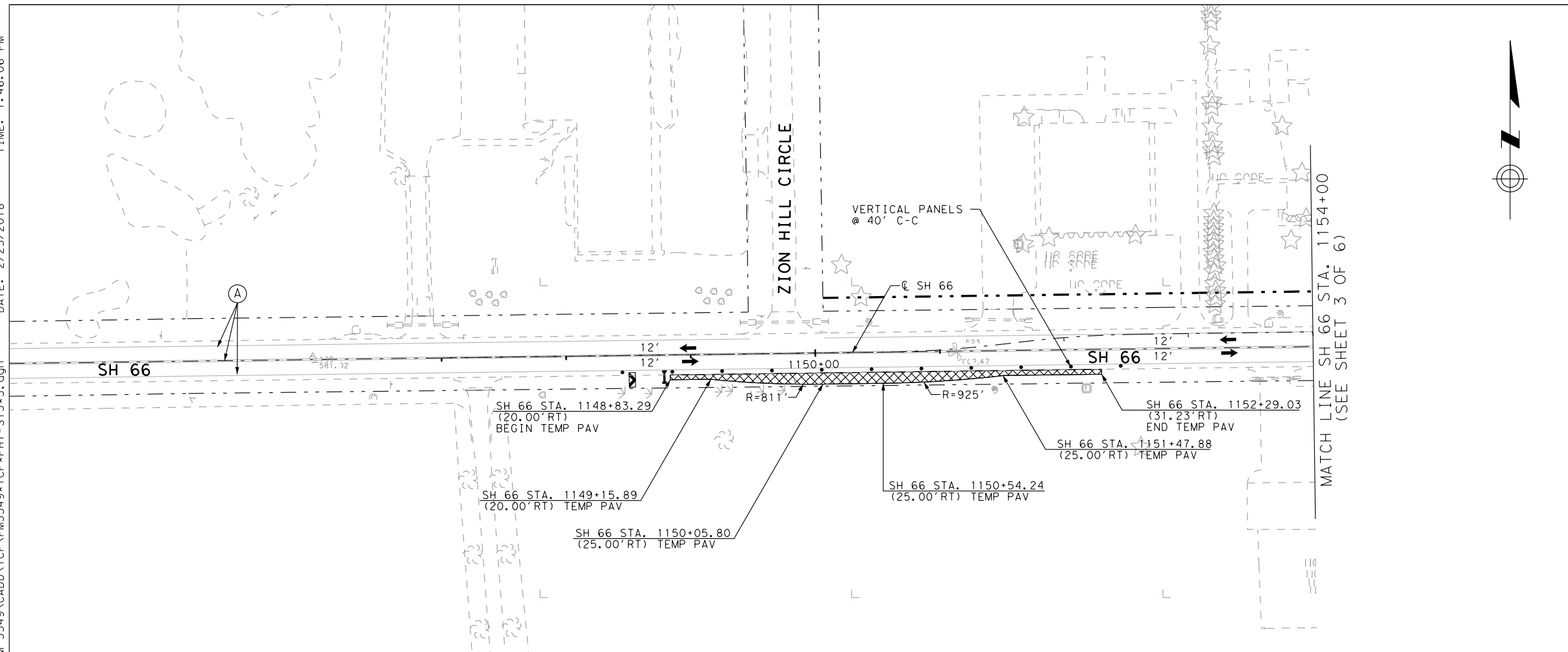


TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 FM 3549 STA. 80+00 TO END PROJECT

SHEET 4 OF 6

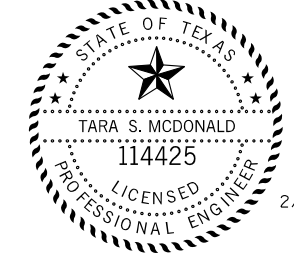
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK | TEXAS | DALLAS | ROCKWALL | 53 |
| WL | CONTROL | SECTION | JOB | |
| CHECK | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▴ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

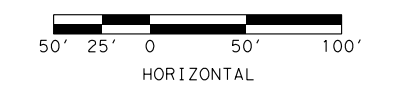
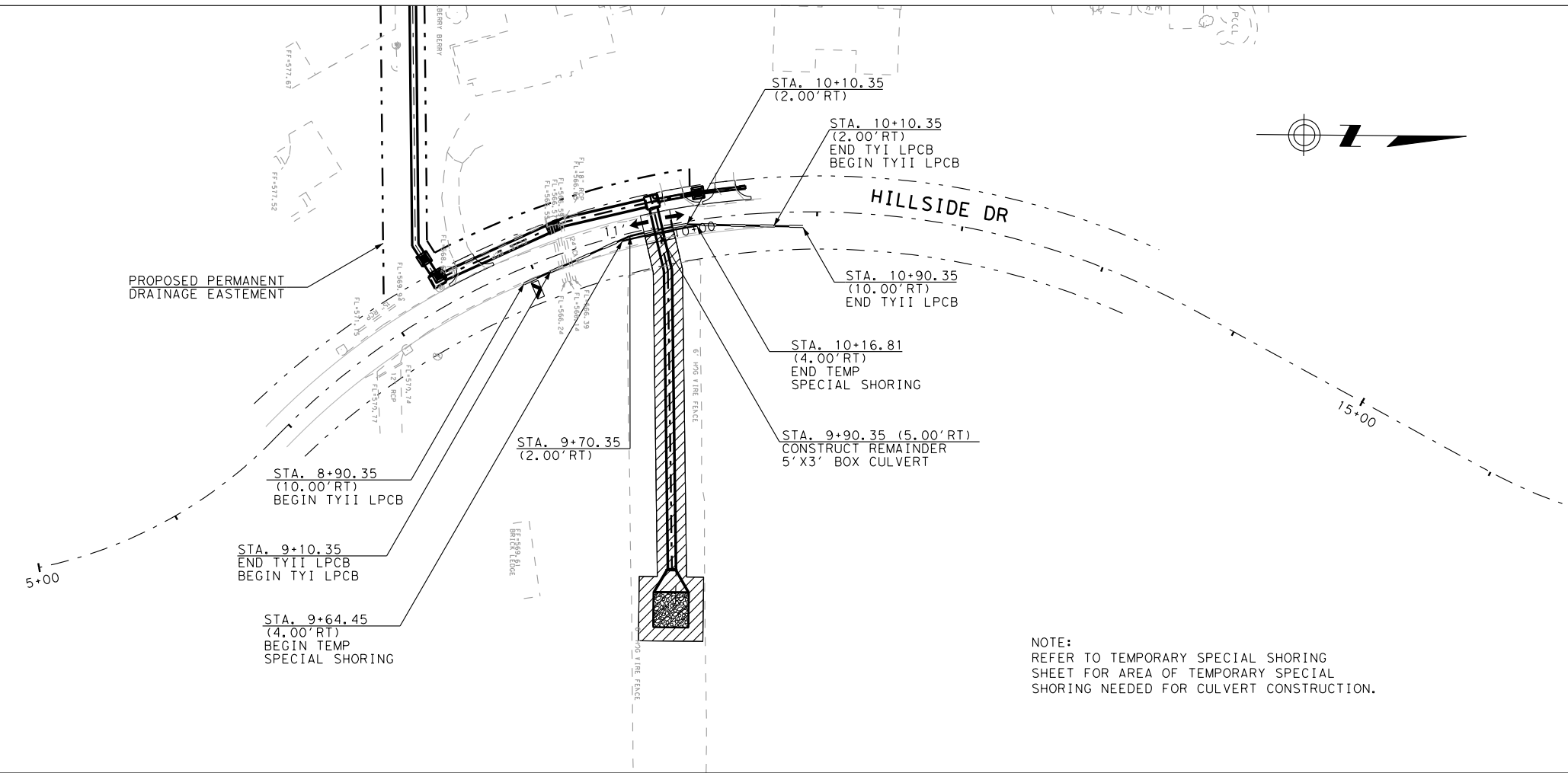


TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 ☉ SH 66 STA. 1147+00 TO STA. 1154+00
 ☉ SH 66 STA. 1158+00 TO STA. 1165+00

SHEET 5 OF 6

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 54 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



| NO. | DATE | REVISION | BY |
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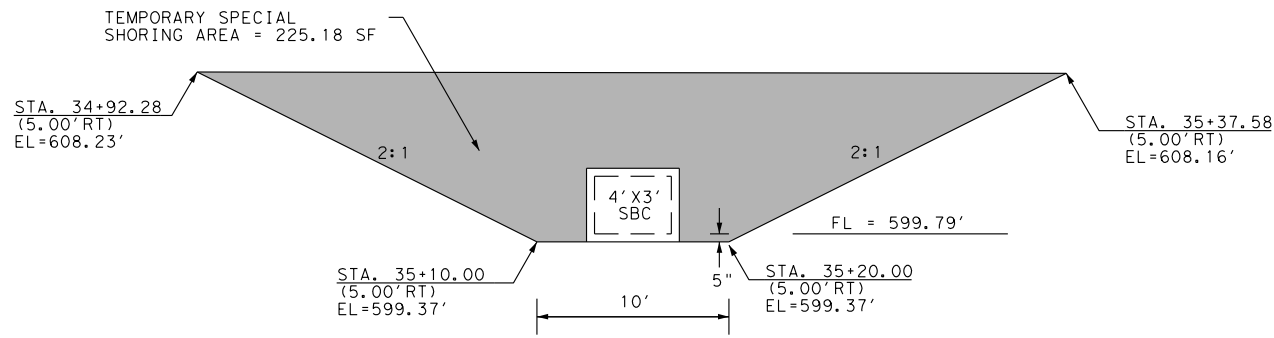


TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 HILLSIDE DR

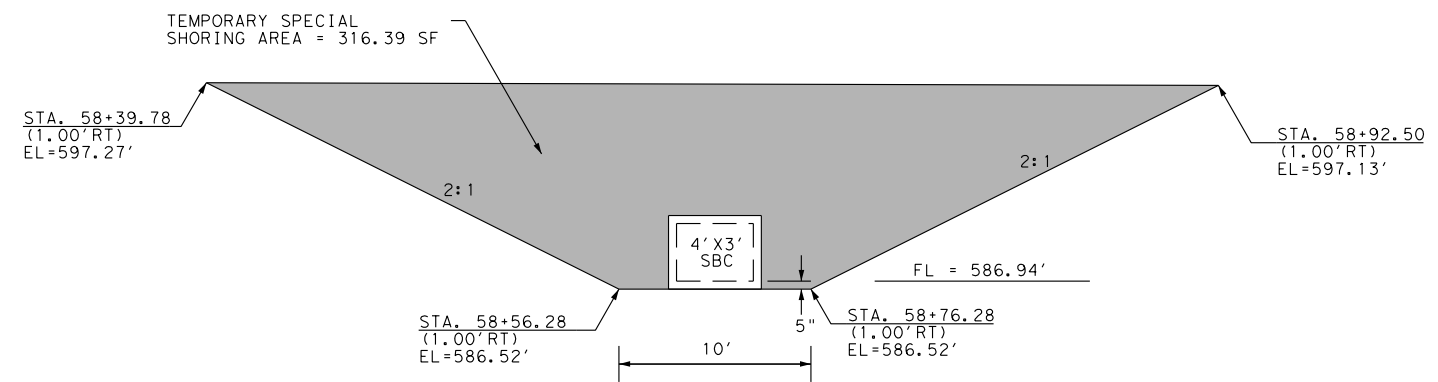
SHEET 6 OF 6

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 55 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

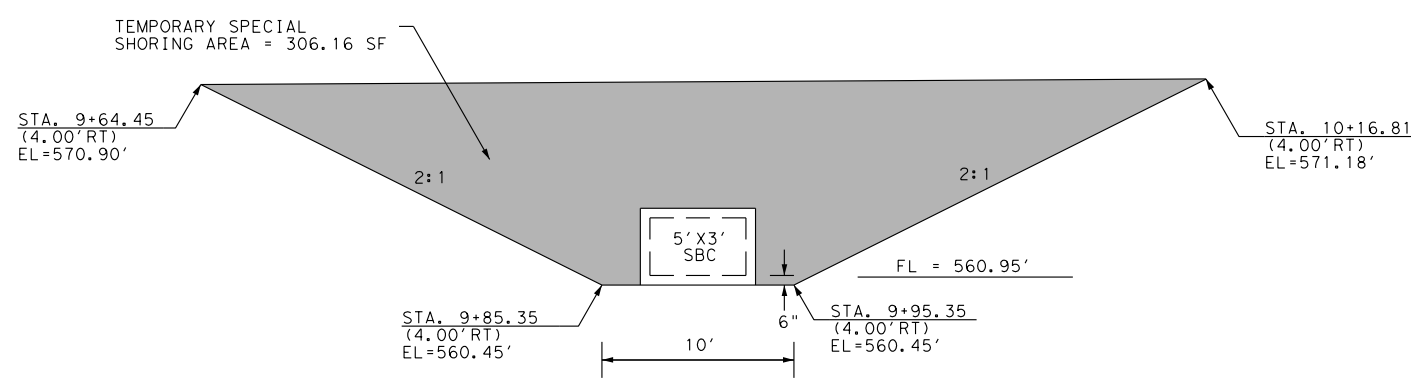
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PHASE 1 - STEP 3 (FM 3549 STA. 35+15.00)



PHASE 1 - STEP 3 (FM 3549 STA. 58+66.29)



PHASE 1 - STEP 3 (HILLSIDE DR STA. 9+90.35)



Tara McDonald

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TRAFFIC CONTROL PLAN
 PHASE 1 - STEP 3
 TEMPORARY SPECIAL SHORING DETAILS

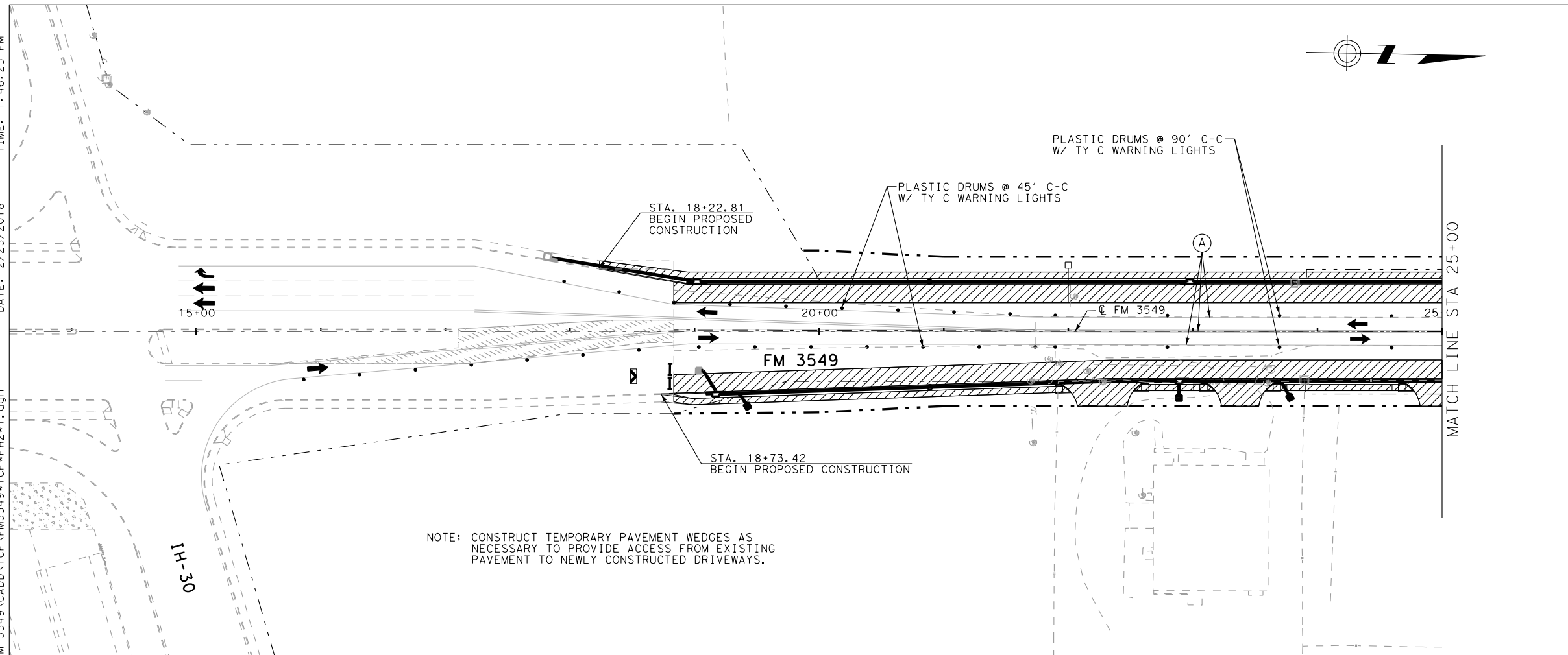
SHEET 1 OF 1

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 56 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

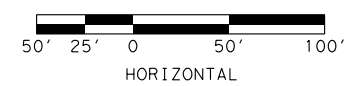
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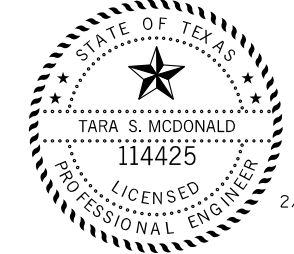


NOTE: CONSTRUCT TEMPORARY PAVEMENT WEDGES AS NECESSARY TO PROVIDE ACCESS FROM EXISTING PAVEMENT TO NEWLY CONSTRUCTED DRIVEWAYS.



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▴ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
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 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
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Tara McDonald

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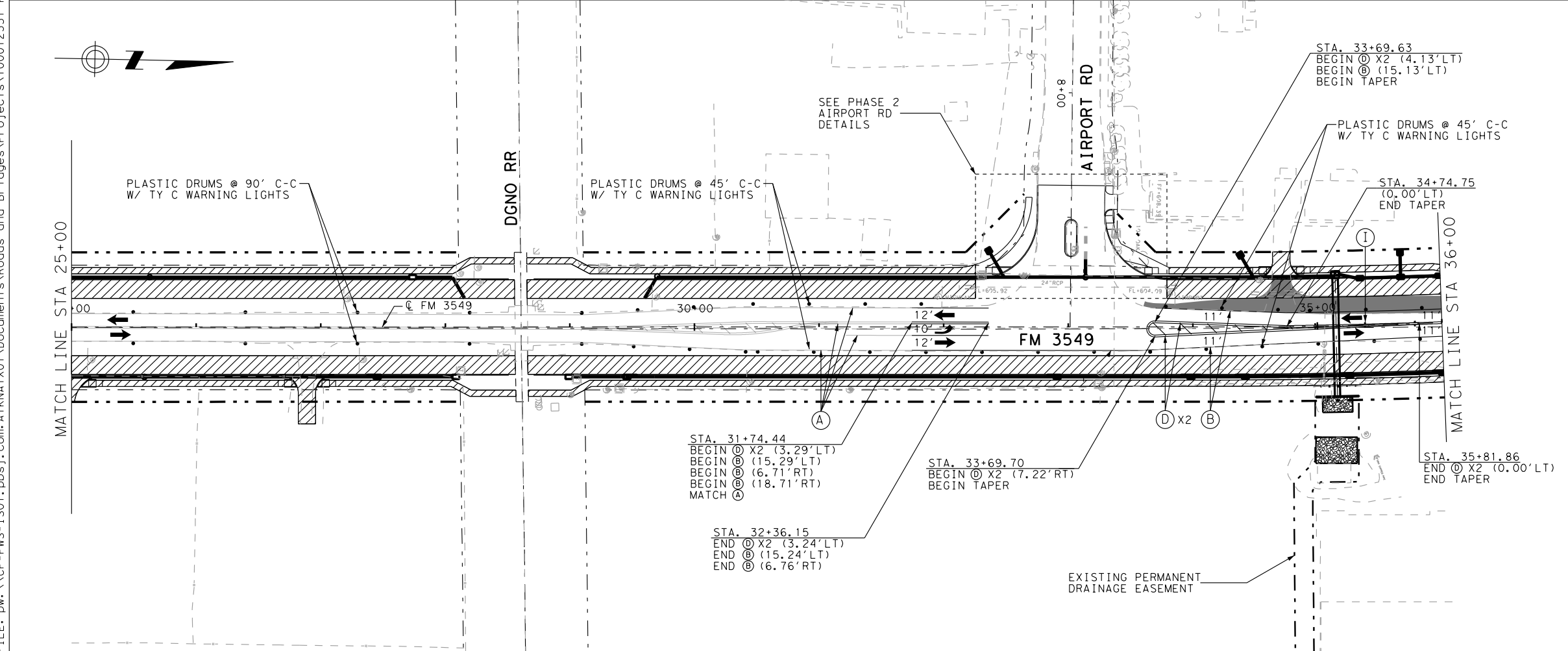
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TBPE REG. # F-474



TRAFFIC CONTROL PLAN
PHASE 2
BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 5

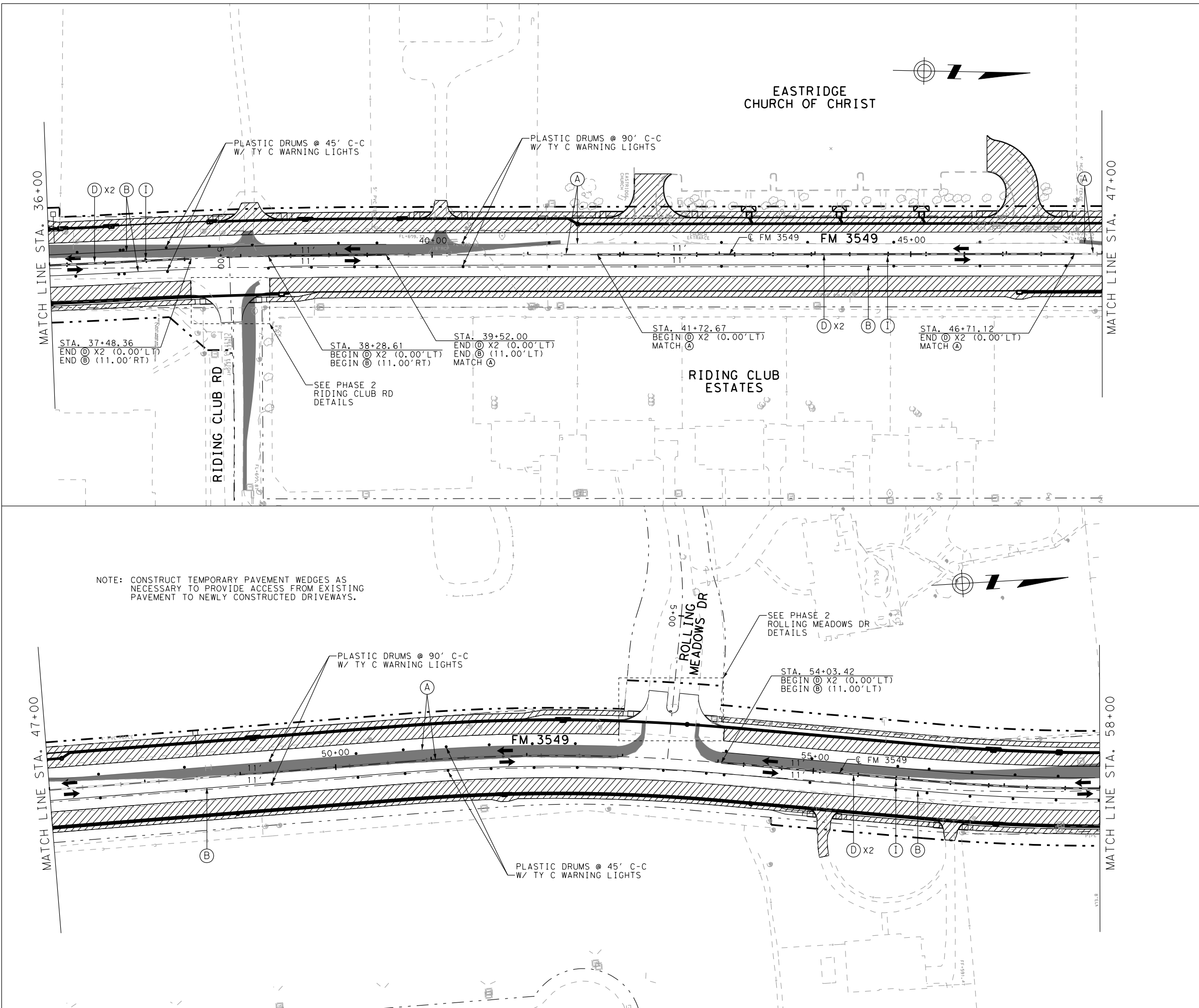
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 57 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



EXISTING PERMANENT DRAINAGE EASEMENT

DATE: 2/23/2018 TIME: 1:46:31 PM

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LEGEND

- EXISTING ROW
- - - PROPOSED ROW
- CHANNELIZING DEVICES
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- I TY III BARRICADE
- ▲ TRUCK MOUNTED ATTENUATOR
- SIGN POST
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
- (A) EXISTING STRIPING / STRIPING PREV STEP
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- (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
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- (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
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Tara McDonald

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 TBPE REG. # F-474



TRAFFIC CONTROL PLAN
 PHASE 2
 STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 58 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

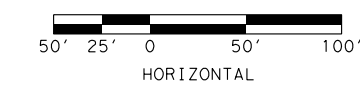
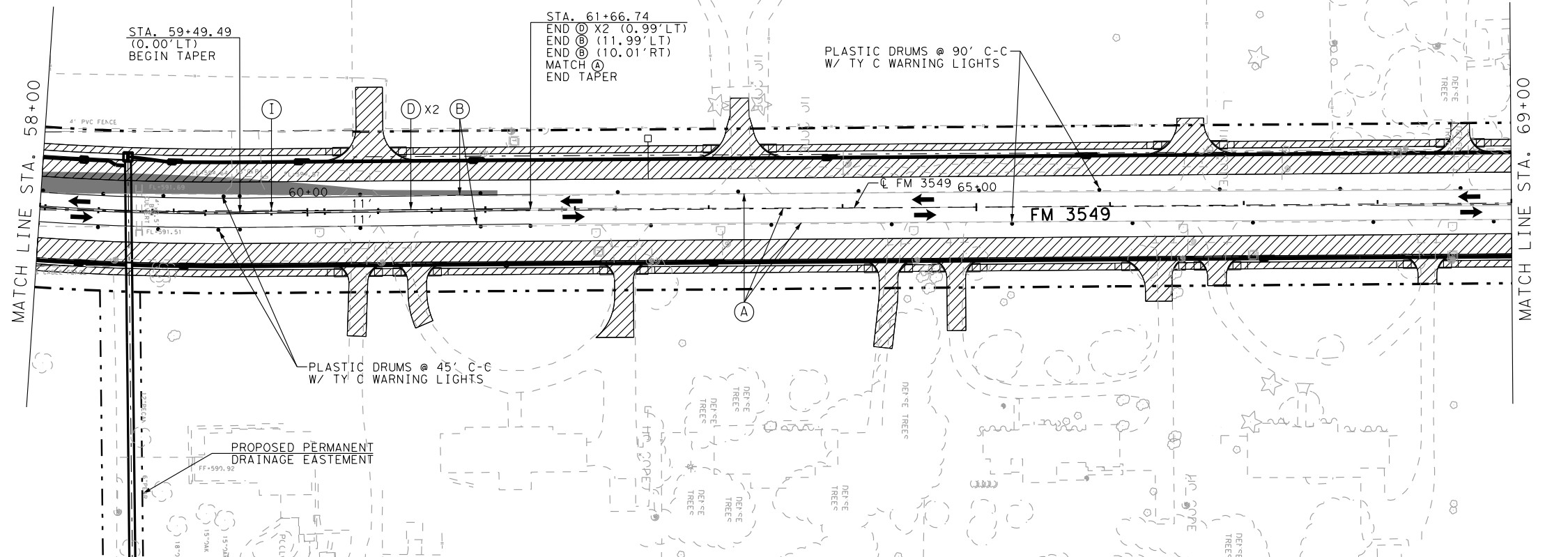
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DATE: 2/23/2018

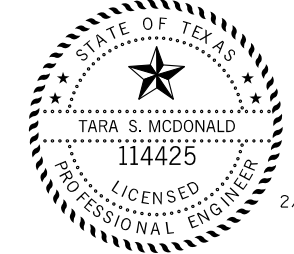
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NOTE: CONSTRUCT TEMPORARY PAVEMENT WEDGES AS NECESSARY TO PROVIDE ACCESS FROM EXISTING PAVEMENT TO NEWLY CONSTRUCTED DRIVEWAYS.

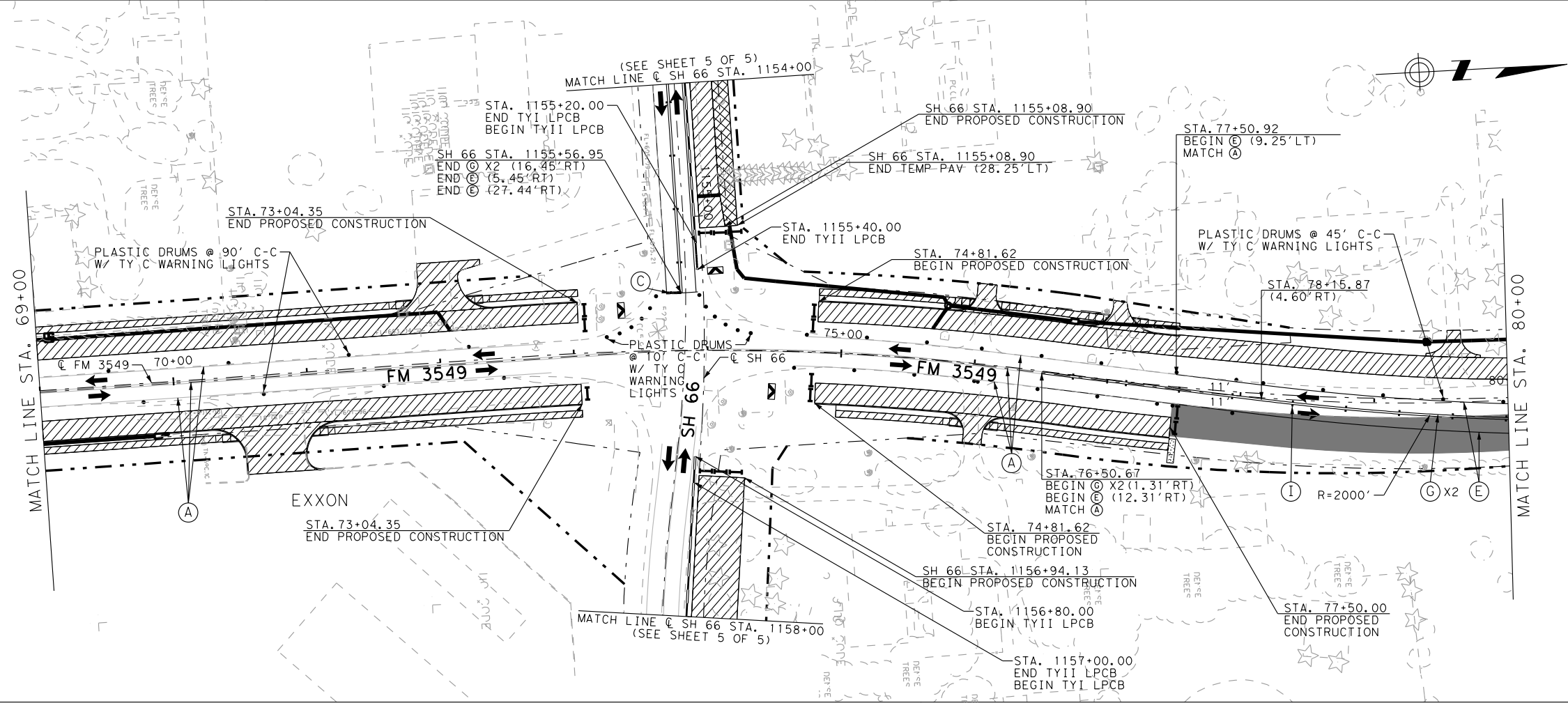


- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
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 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
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 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
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Tara McDonald



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ATKINS
TBPE REG. # F-474

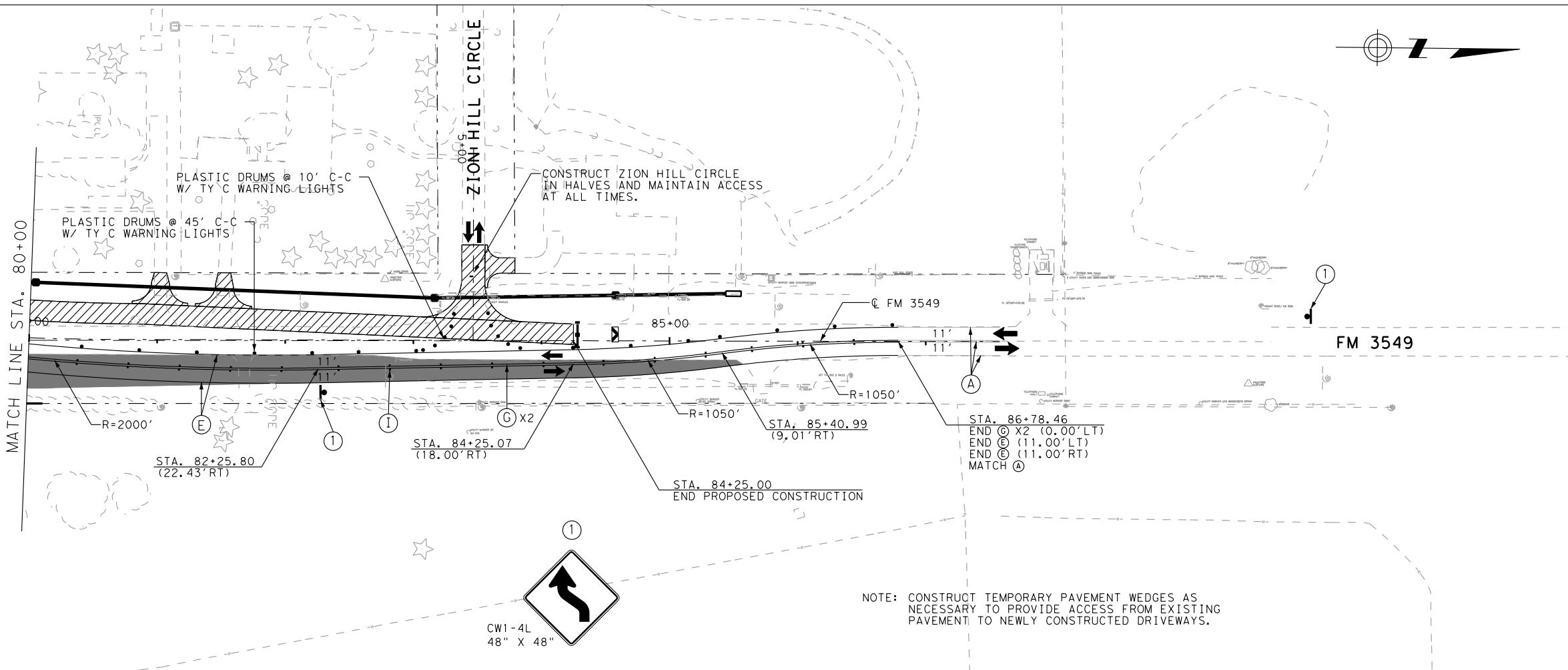


TRAFFIC CONTROL PLAN
PHASE 2
STA. 58+00 TO STA. 80+00

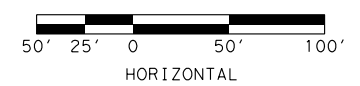
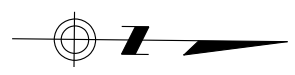
SHEET 3 OF 5

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 59 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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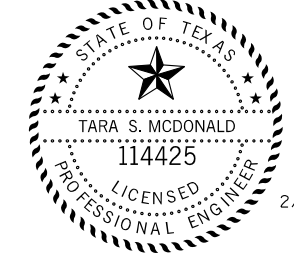


NOTE: CONSTRUCT TEMPORARY PAVEMENT WEDGES AS NECESSARY TO PROVIDE ACCESS FROM EXISTING PAVEMENT TO NEWLY CONSTRUCTED DRIVEWAYS.



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
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 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
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 - Ⓙ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

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Tara McDonald

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ATKINS
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TRAFFIC CONTROL PLAN
 PHASE 2
 FM 3549 STA. 80+00 TO END PROJECT

SHEET 4 OF 5

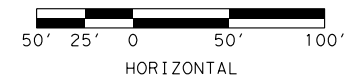
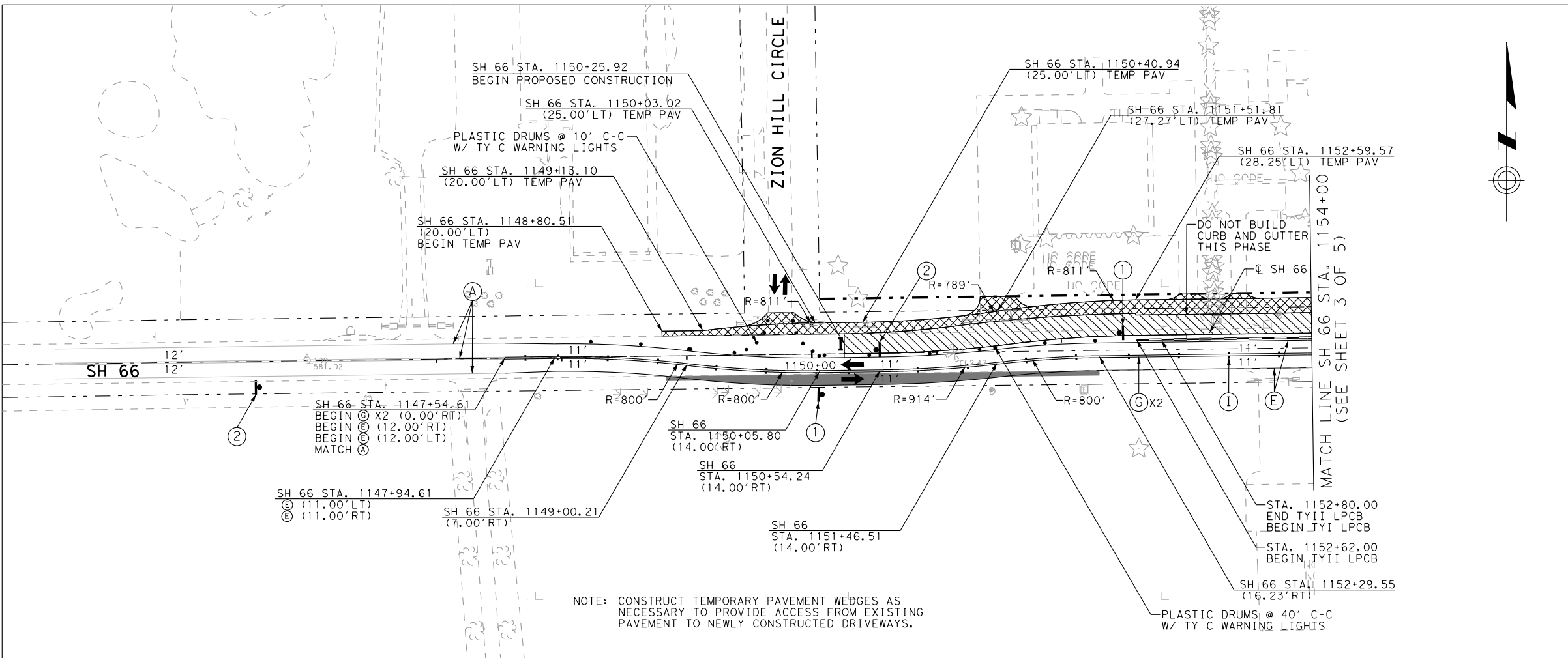
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 60 |
| CHECK | CONTROL | SECTION | JOB | |
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DATE: 2/23/2018

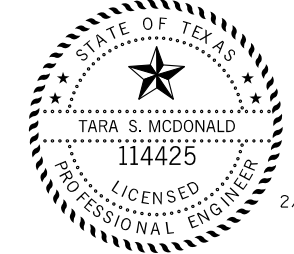
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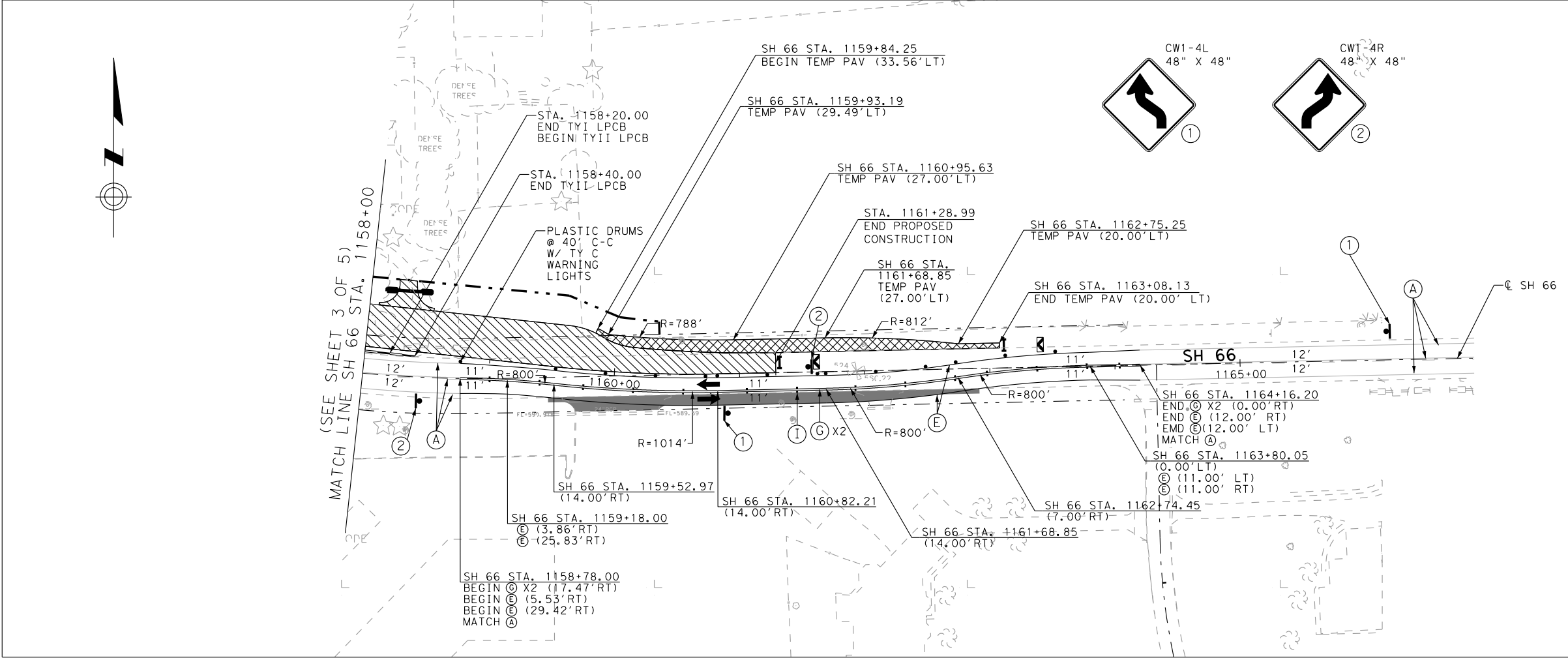


- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - TRUCK MOUNTED ATTENUATOR
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GENERAL NOTES:
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Tara McDonald



| NO. | DATE | REVISION | BY |
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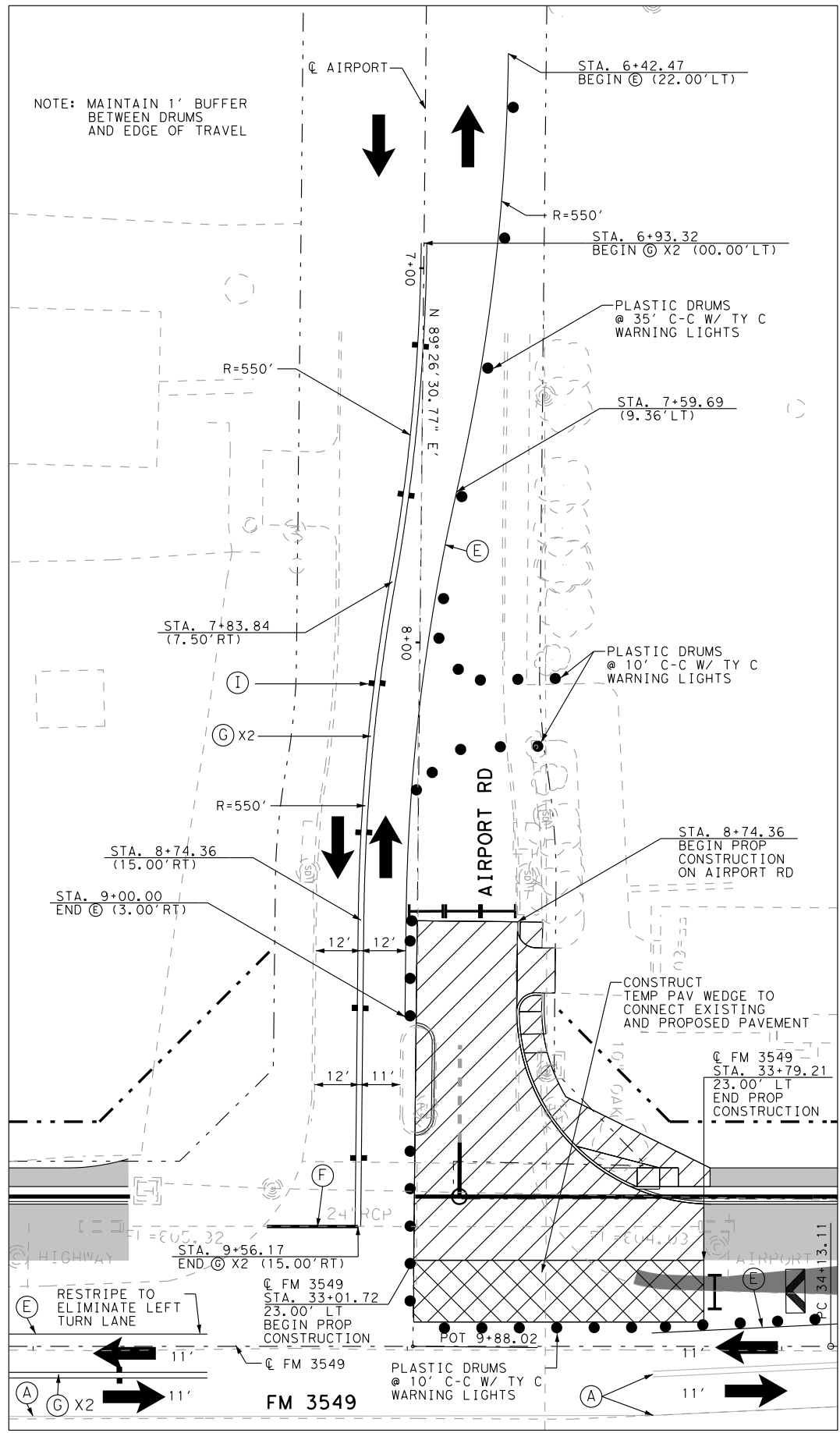
ATKINS
TBPE REG. # F-474

Texas Department of Transportation
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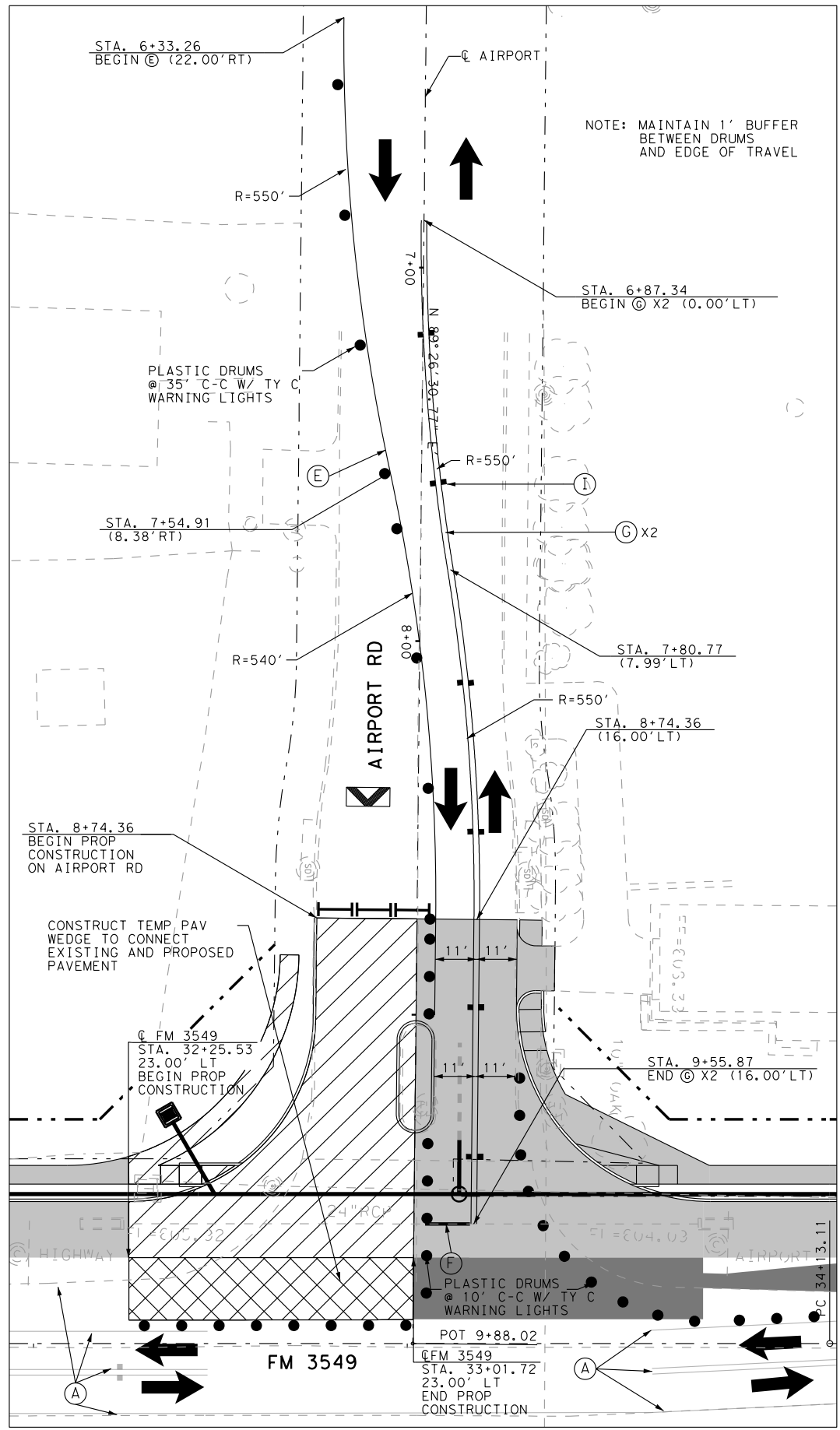
TRAFFIC CONTROL PLAN
PHASE 2
SH 66 STA. 1147+00 TO STA. 1154+00
SH 66 STA. 1158+00 TO STA. 1165+00
SHEET 5 OF 5

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 61 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

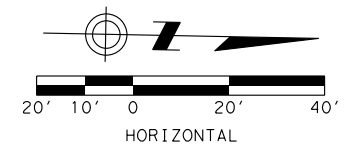
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STEP 1



STEP 2



- EXISTING ROW
- - - PROPOSED ROW
- CHANNELIZING DEVICES
- +— LOW PROFILE CONCRETE TRAFFIC BARRIER
- +— TY III BARRICADE
- ▲ TRUCK MOUNTED ATTENUATOR
- SIGN POST
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
- Ⓐ EXISTING STRIPING / STRIPING PREV STEP
- Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
- Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
- Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
- Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
- Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
- Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
- Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
- Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

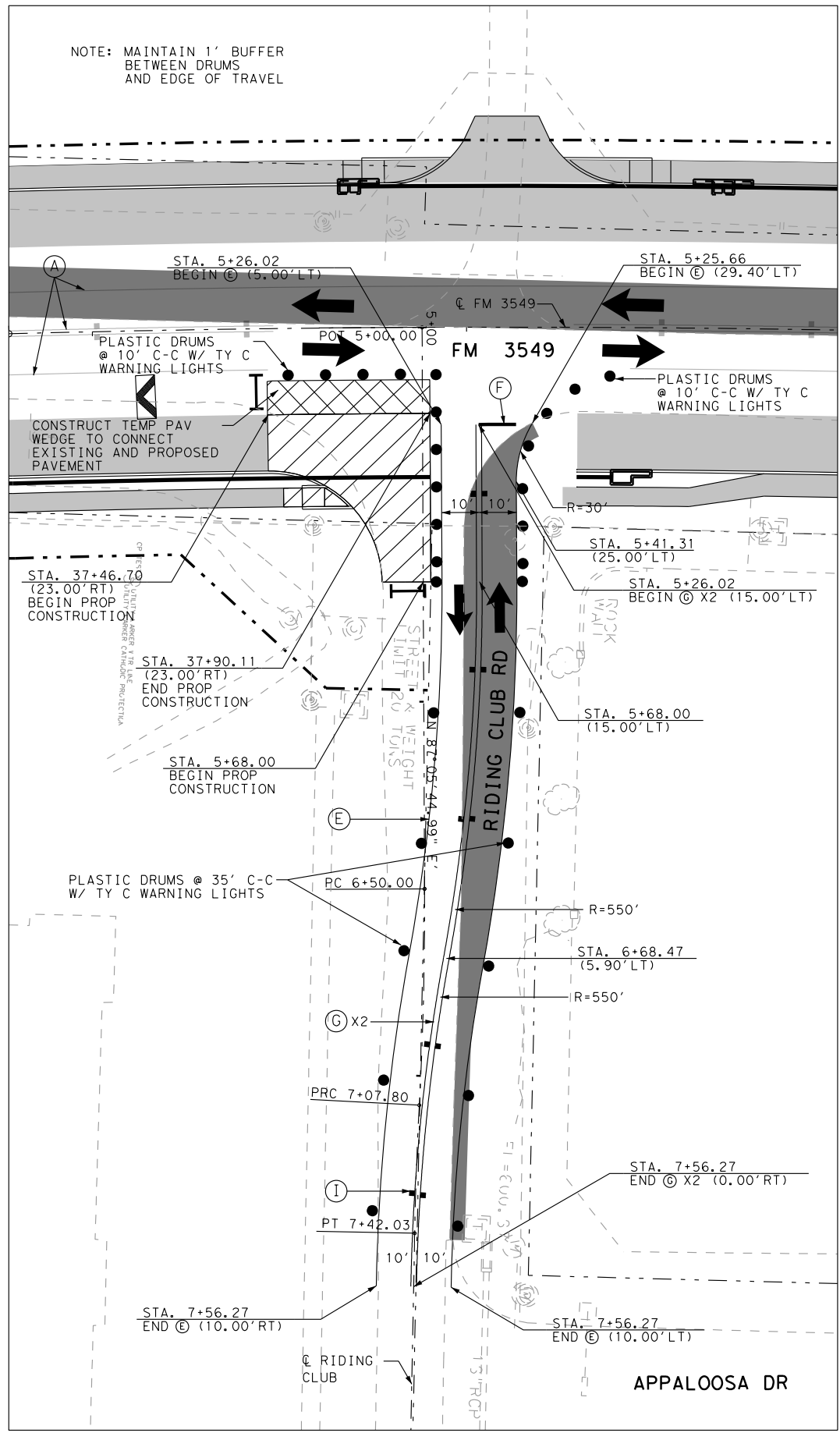


TRAFFIC CONTROL PLAN
 PHASE 2
 AIRPORT RD DETAILS

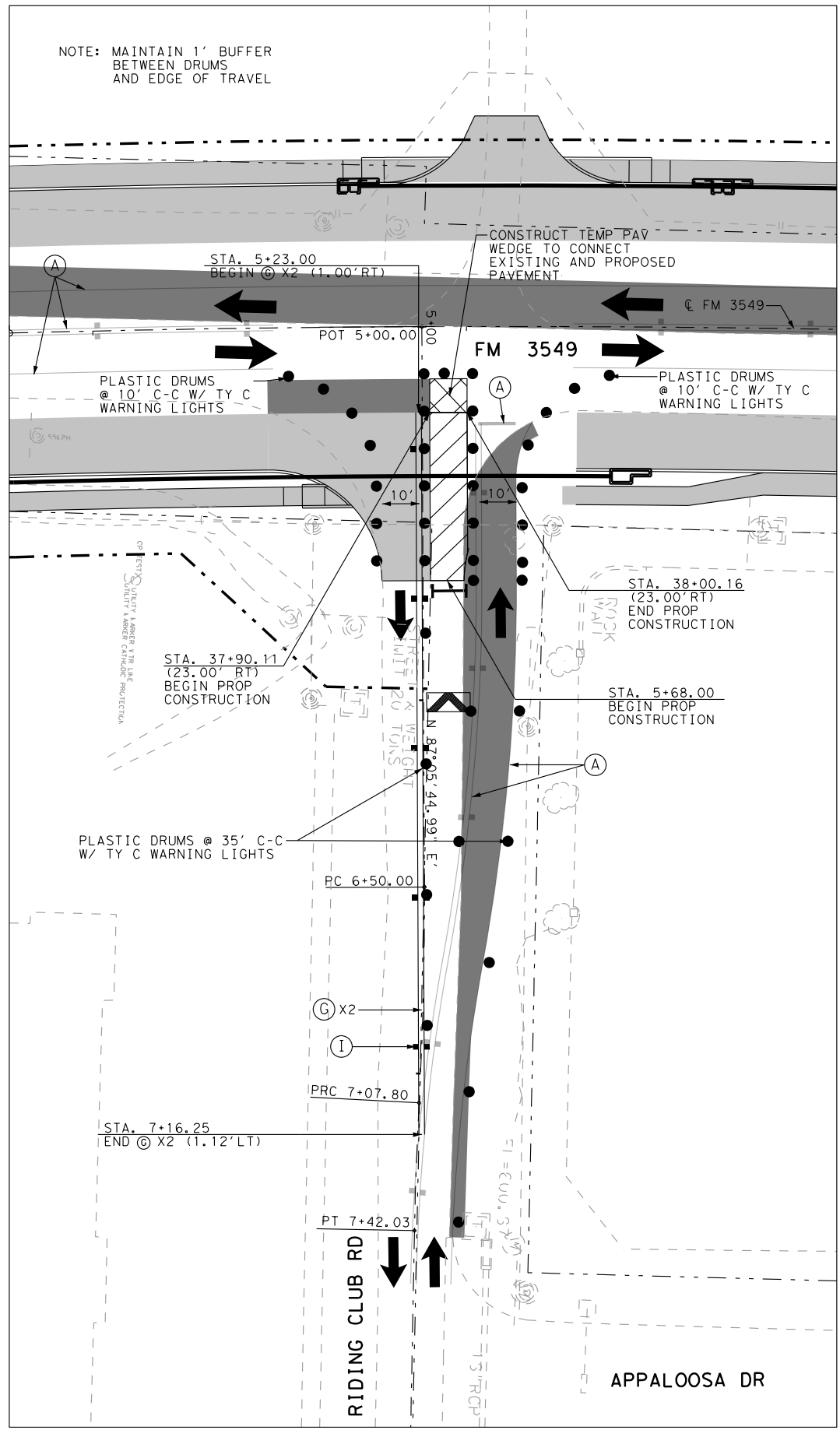
SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 62 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

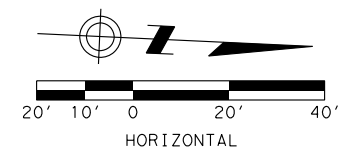
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 TIME: 1:47:05 PM



STEP 1



STEP 2



- EXISTING ROW
- PROPOSED ROW
- CHANNELIZING DEVICES
- LOW PROFILE CONCRETE TRAFFIC BARRIER
- TY III BARRICADE
- TRUCK MOUNTED ATTENUATOR
- SIGN POST
- [Hatched Box] PROPOSED CONSTRUCTION THIS STEP
- [Solid Grey Box] PROPOSED CONSTRUCTION PREVIOUS STEPS
- [Cross-hatched Box] TEMPORARY PAVEMENT THIS STEP
- [Dark Grey Box] TEMPORARY PAVEMENT PREVIOUS STEPS
- (A) EXISTING STRIPING / STRIPING PREV STEP
- (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
- (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
- (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
- (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
- (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
- (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
- (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
- (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald
 2/26/2018

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ATKINS
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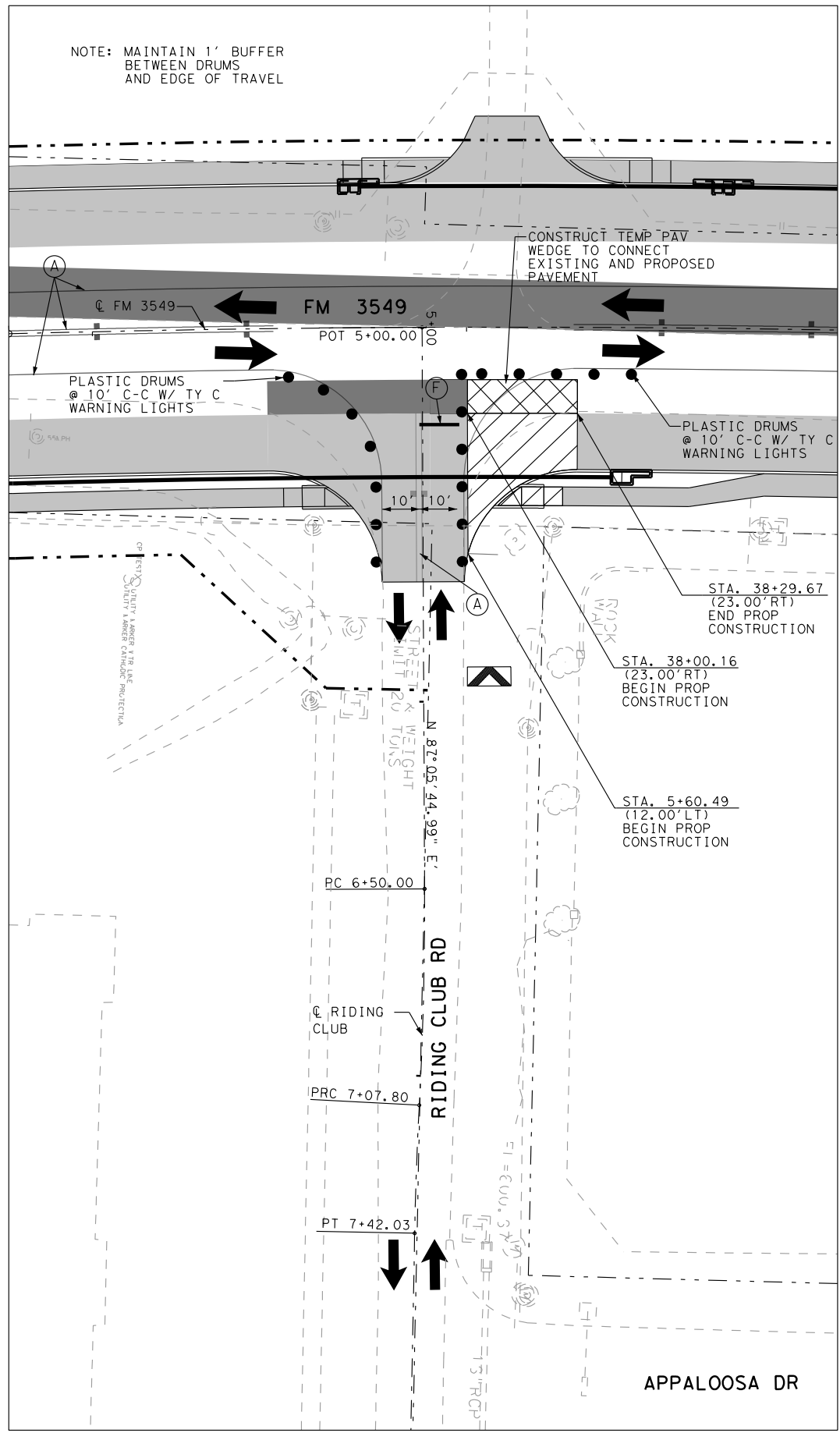


TRAFFIC CONTROL PLAN
 PHASE 2
 RIDING CLUB RD DETAILS

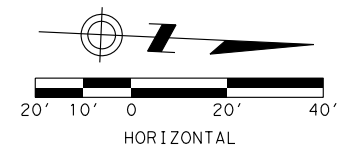
SHEET 1 OF 2

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 63 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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STEP 3



- EXISTING ROW
- - - PROPOSED ROW
- CHANNELIZING DEVICES
- +— LOW PROFILE CONCRETE TRAFFIC BARRIER
- ⊥ TY III BARRICADE
- ▲ TRUCK MOUNTED ATTENUATOR
- SIGN POST
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
- Ⓐ EXISTING STRIPING / STRIPING PREV STEP
- Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
- Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
- Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
- Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
- Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
- Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
- Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
- ⓵ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



| NO. | DATE | REVISION | BY |
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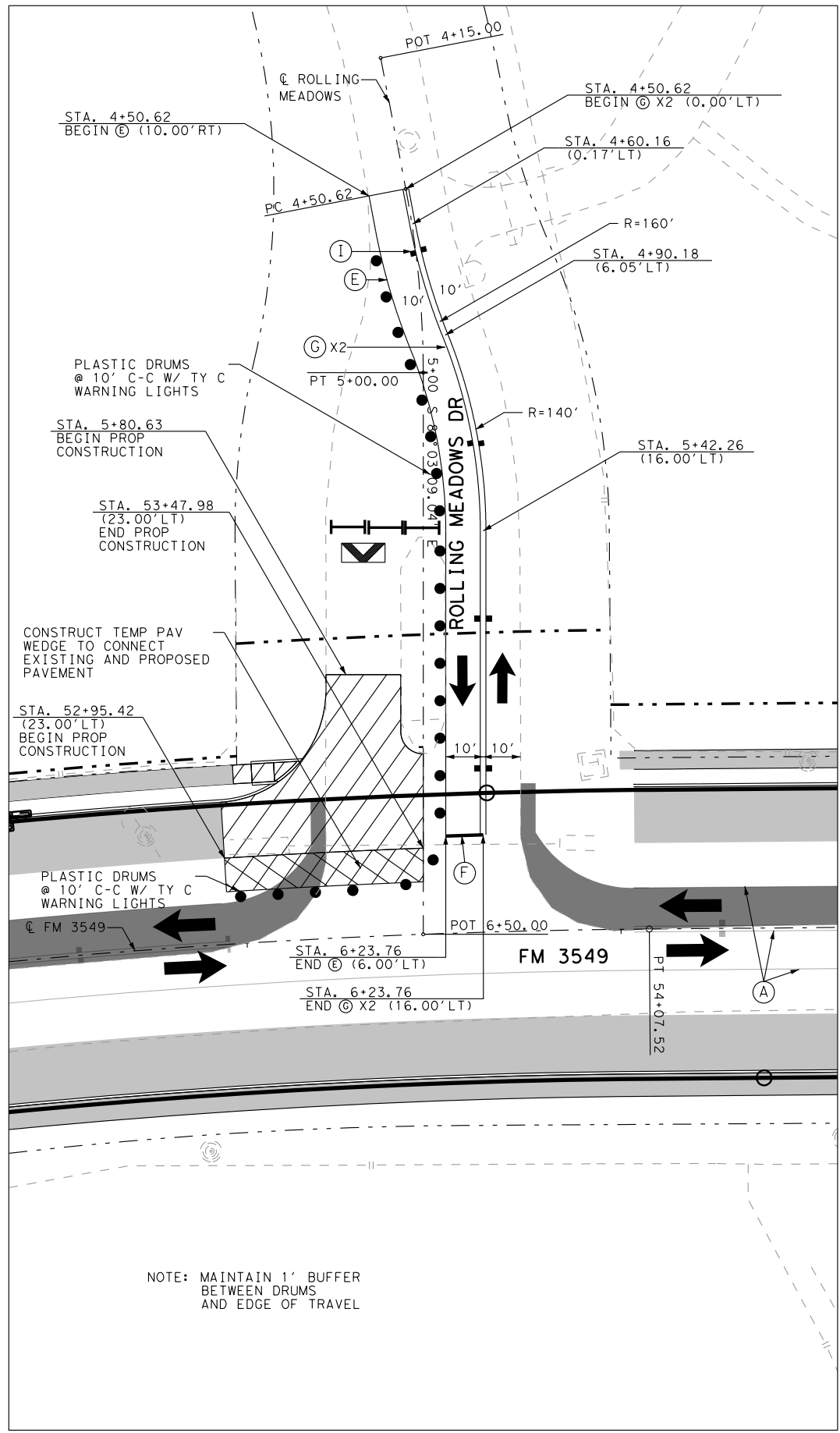


TRAFFIC CONTROL PLAN
 PHASE 2
 RIDING CLUB RD DETAILS

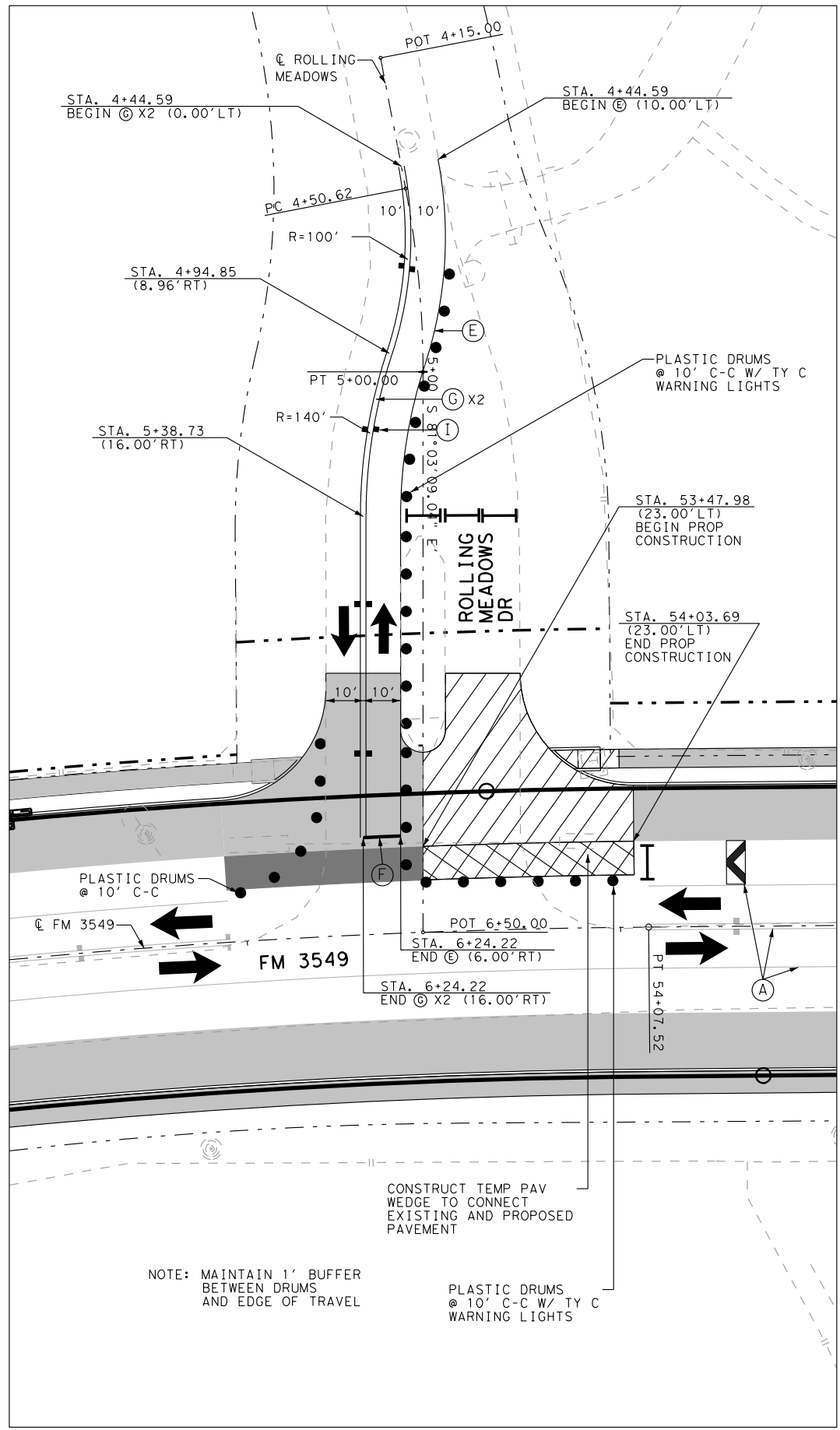
SHEET 2 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 64 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

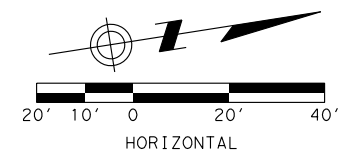
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 TIME: 1:47:17 PM



STEP 1



STEP 2



- EXISTING ROW
- - - PROPOSED ROW
- CHANNELIZING DEVICES
- ▬ LOW PROFILE CONCRETE TRAFFIC BARRIER
- ▬ TY III BARRICADE
- ▬ TRUCK MOUNTED ATTENUATOR
- ▬ SIGN POST
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
- ▧ TEMPORARY PAVEMENT THIS STEP
- ▦ TEMPORARY PAVEMENT PREVIOUS STEPS
- (A) EXISTING STRIPING / STRIPING PREV STEP
- (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
- (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
- (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
- (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
- (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
- (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
- (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
- (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
- (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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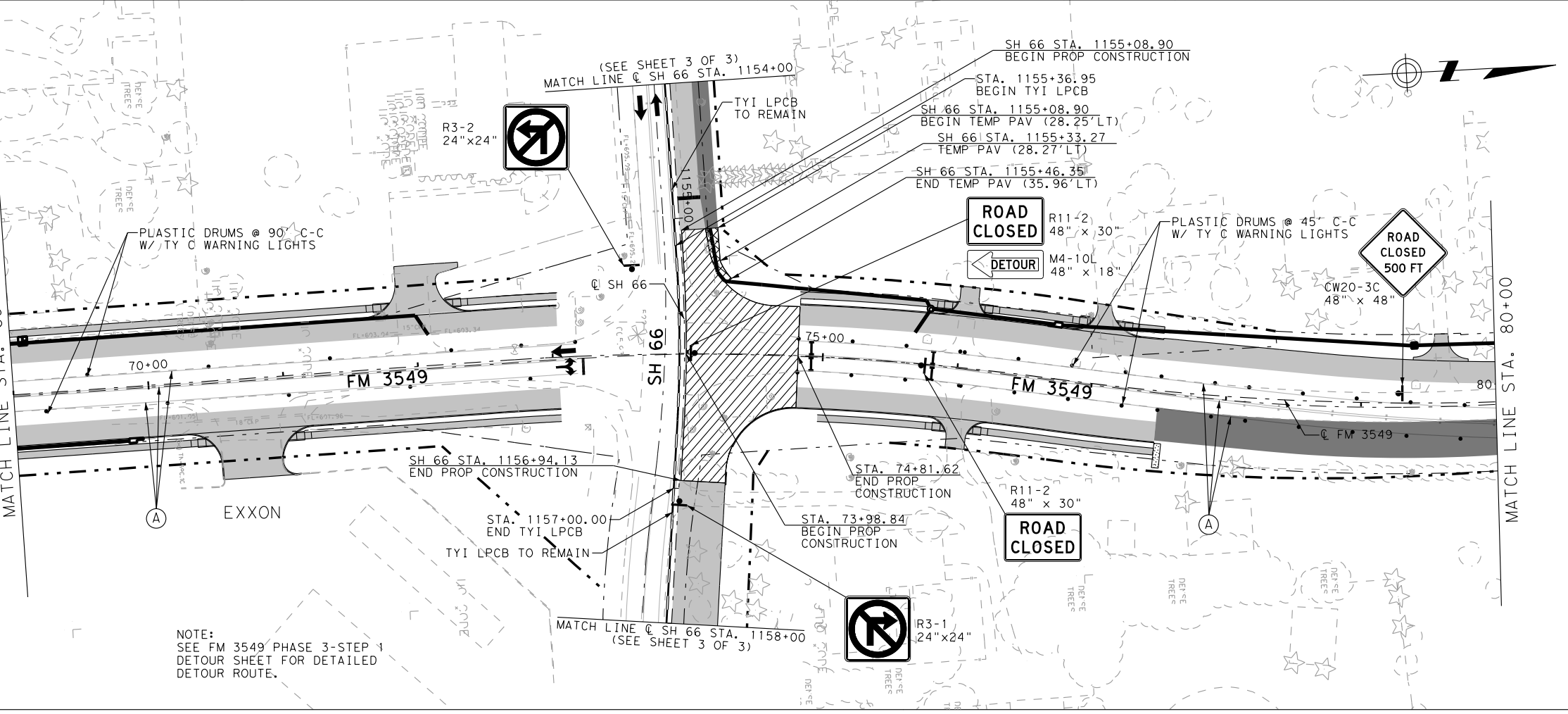
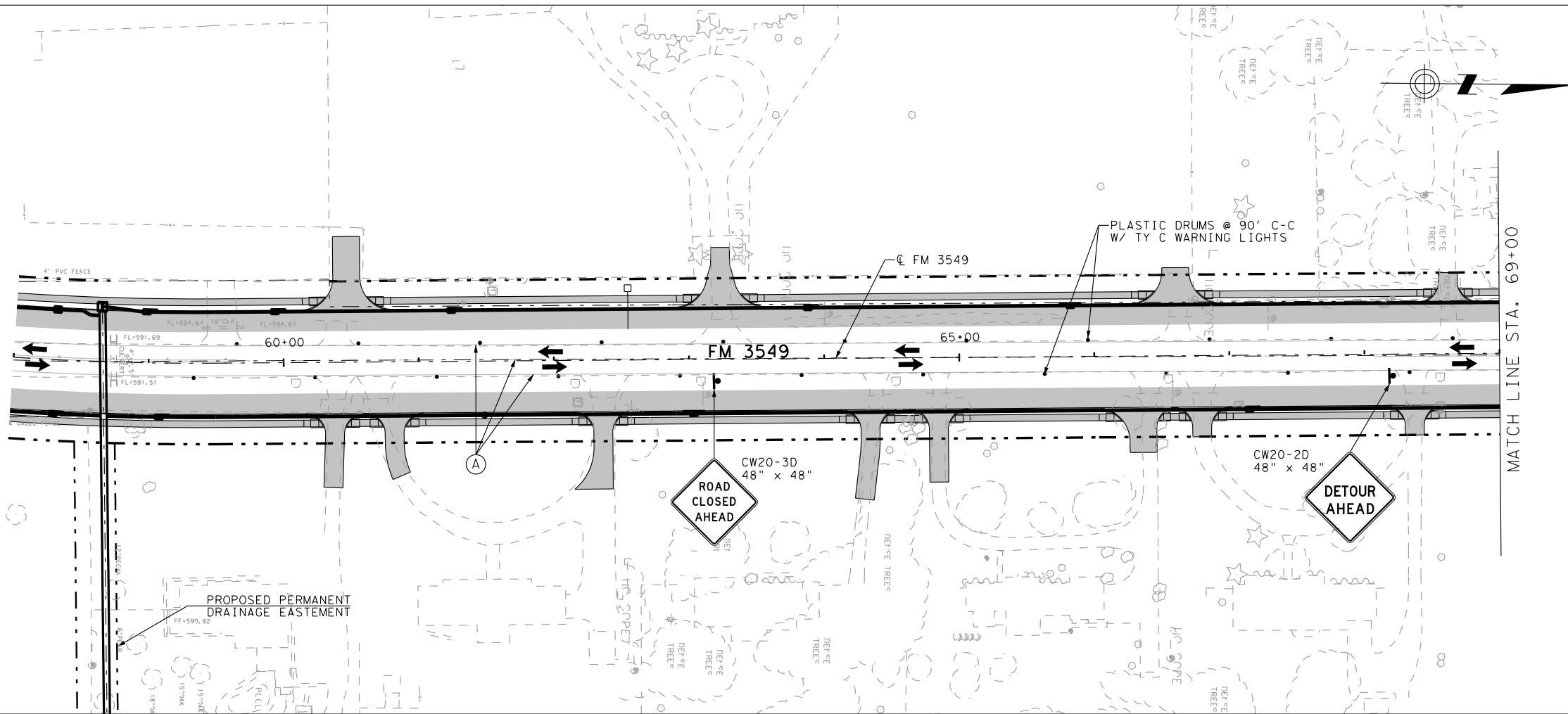


TRAFFIC CONTROL PLAN
 PHASE 2
 ROLLING MEADOWS DR DETAILS

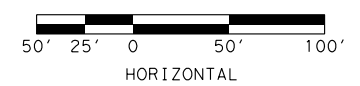
SHEET 1 OF 1

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 65 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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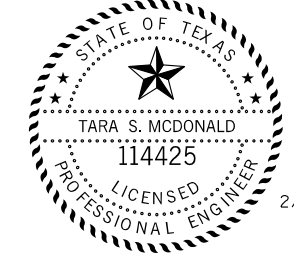


NOTE:
 SEE FM 3549 PHASE 3-STEP 1
 DETOUR SHEET FOR DETAILED
 DETOUR ROUTE.



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
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| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

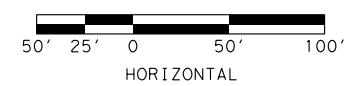
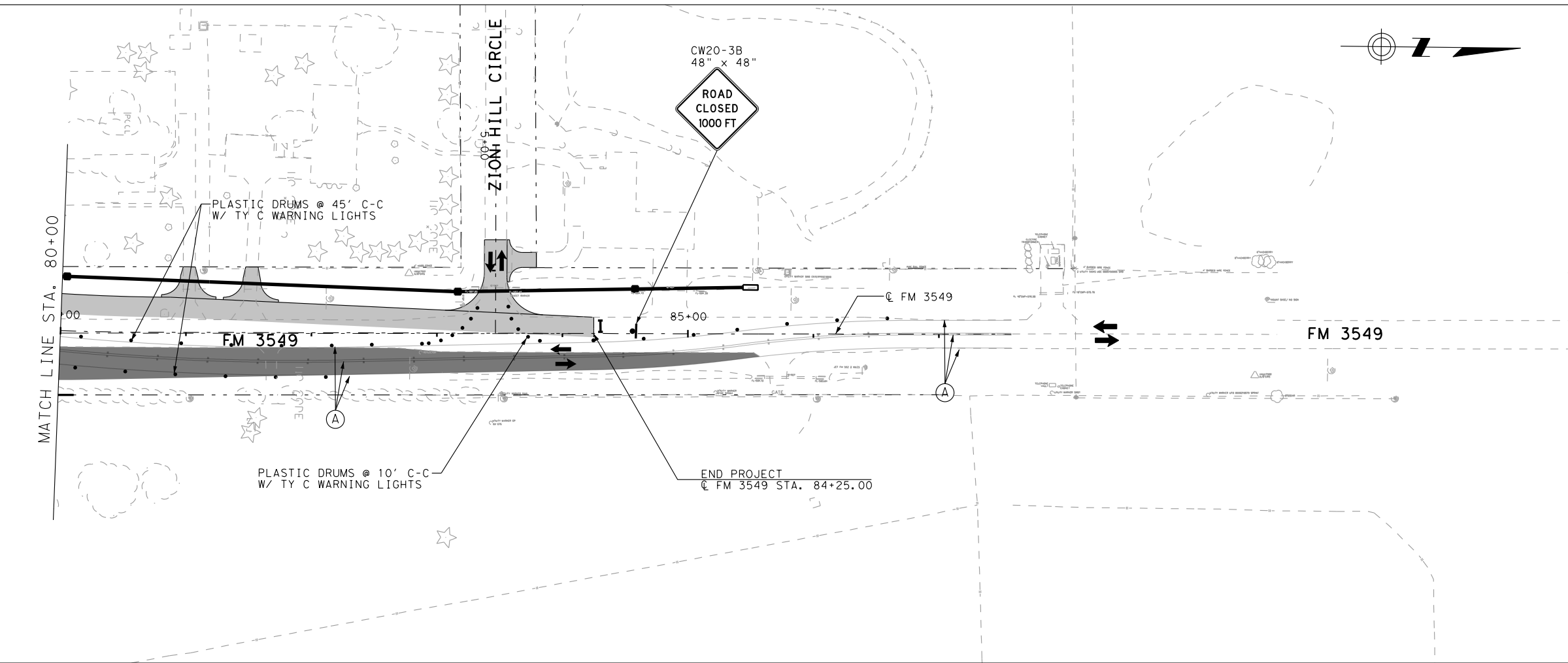


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 1
 STA. 58+00 TO STA. 80+00

SHEET 1 OF 3

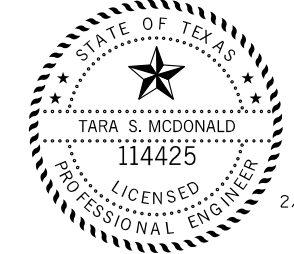
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 66 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 DATE: 2/23/2018 TIME: 1:47:31 PM



- LEGEND**
- EXISTING ROW
 - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

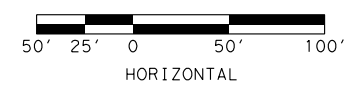
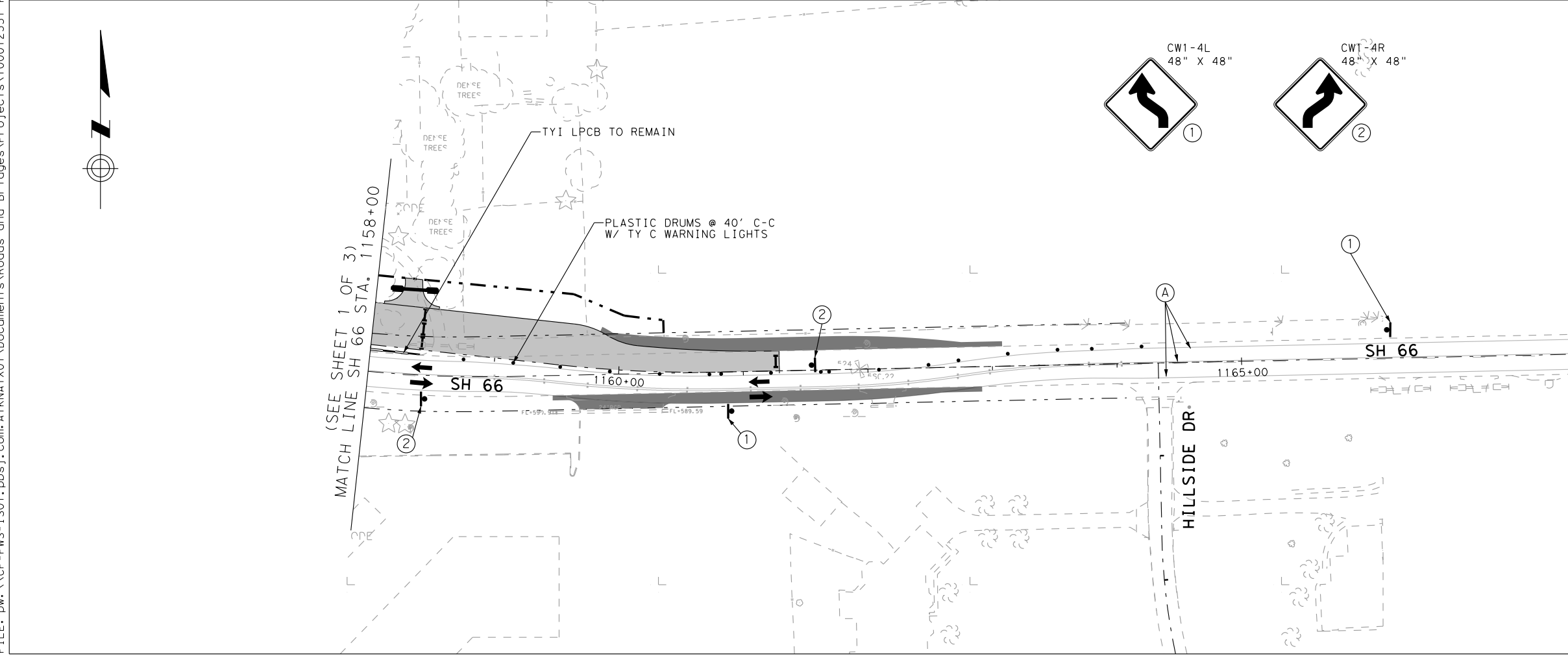
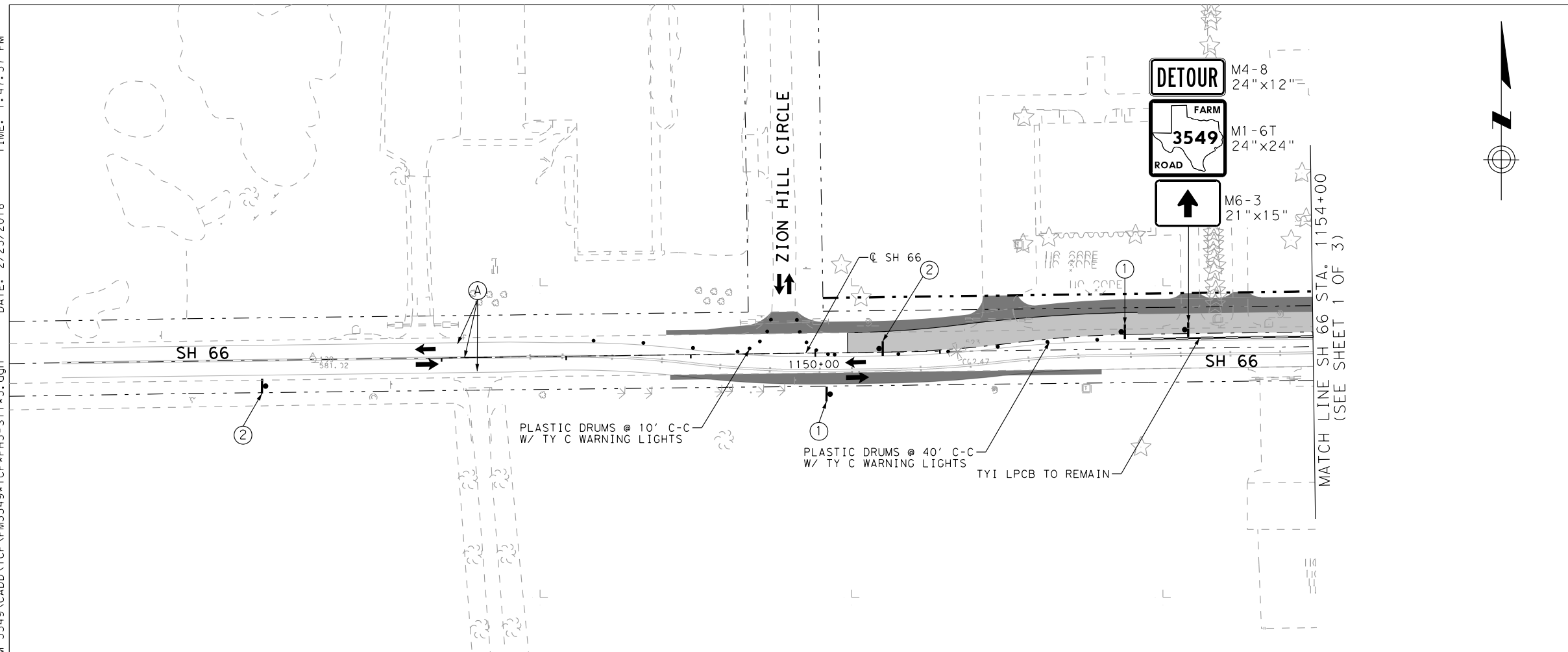


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 1
 @ FM 3549 STA. 80+00 TO END PROJECT

SHEET 2 OF 3

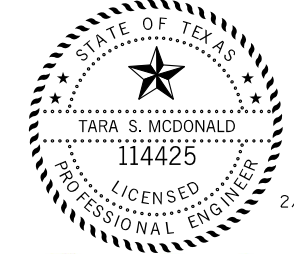
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 67 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
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Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

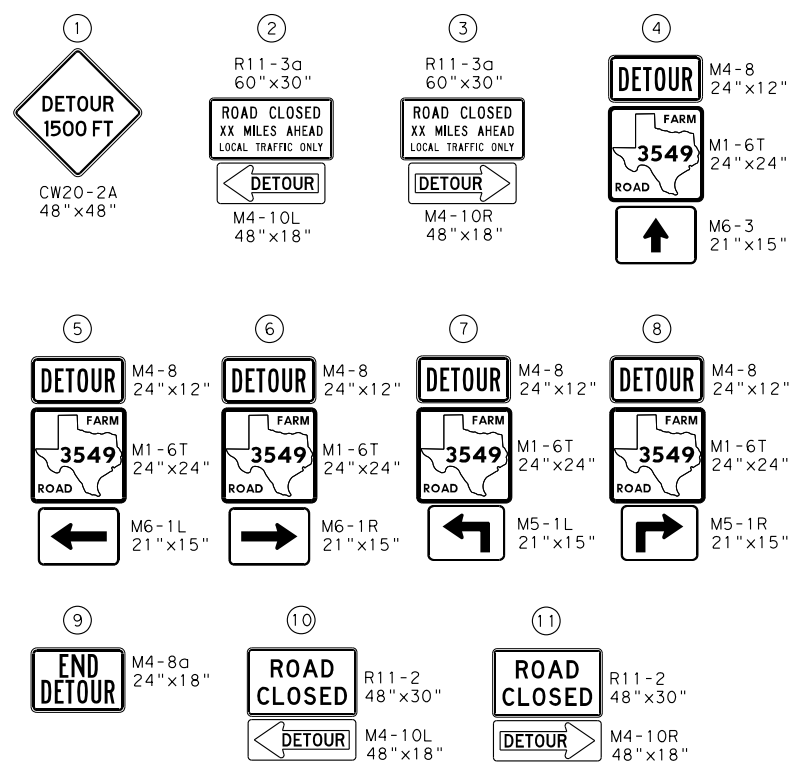
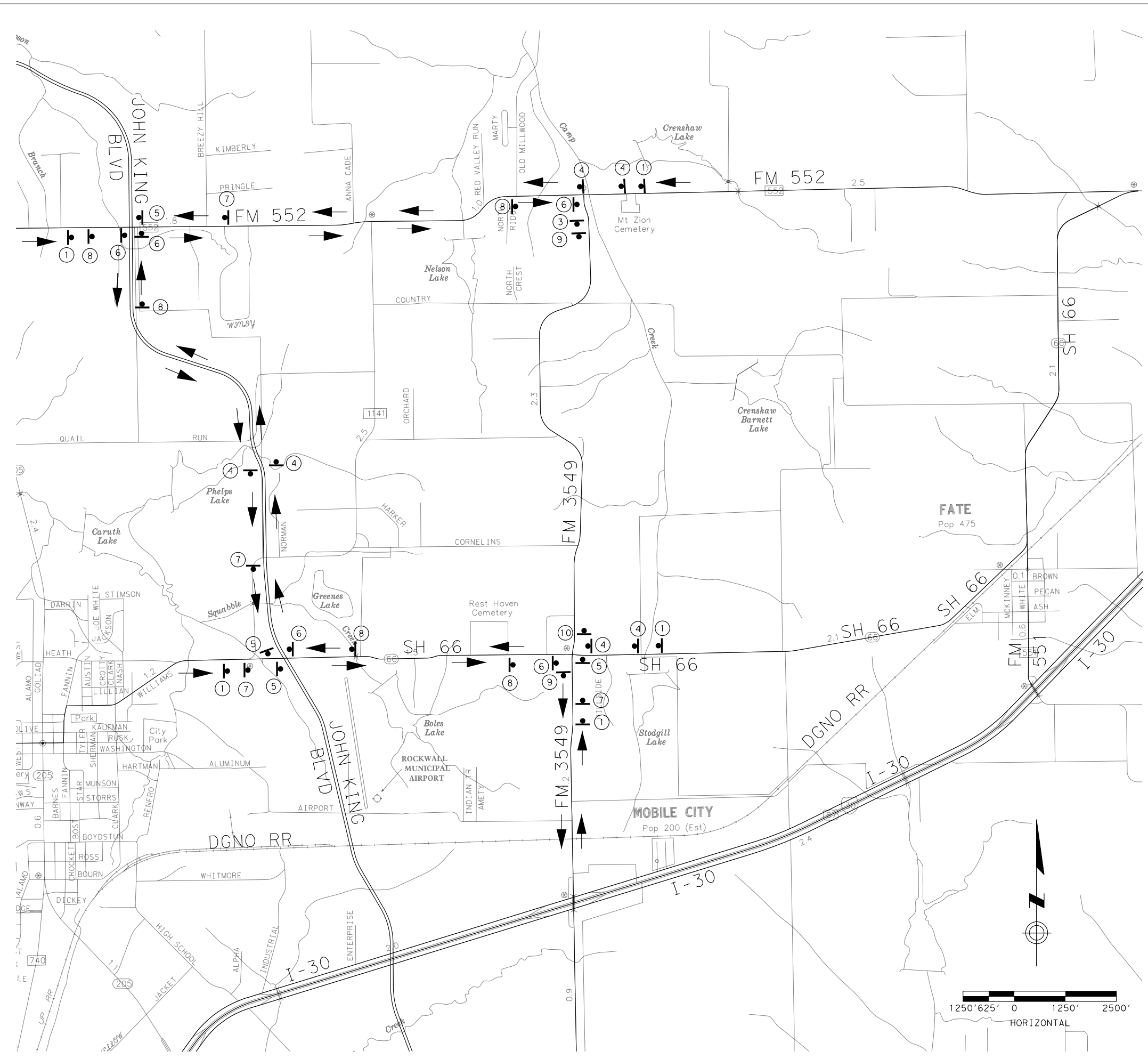


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 1
 ☐ SH 66 STA. 1147+00 TO STA. 1154+00
 ☐ SH 66 STA. 1158+00 TO STA. 1156+00

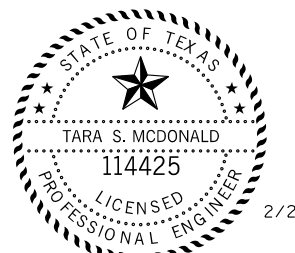
SHEET 3 OF 3

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 68 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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GENERAL NOTES:
 1. SIGNS ARE SHOWN AT APPROXIMATE LOCATIONS AND MAY NEED FIELD ADJUSTMENT TO MATCH FIELD CONDITIONS. REFER TO TXDOT BC AND WZ STANDARDS FOR SIGN PLACEMENT REQUIREMENTS.



Tara McDonald

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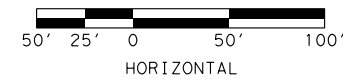
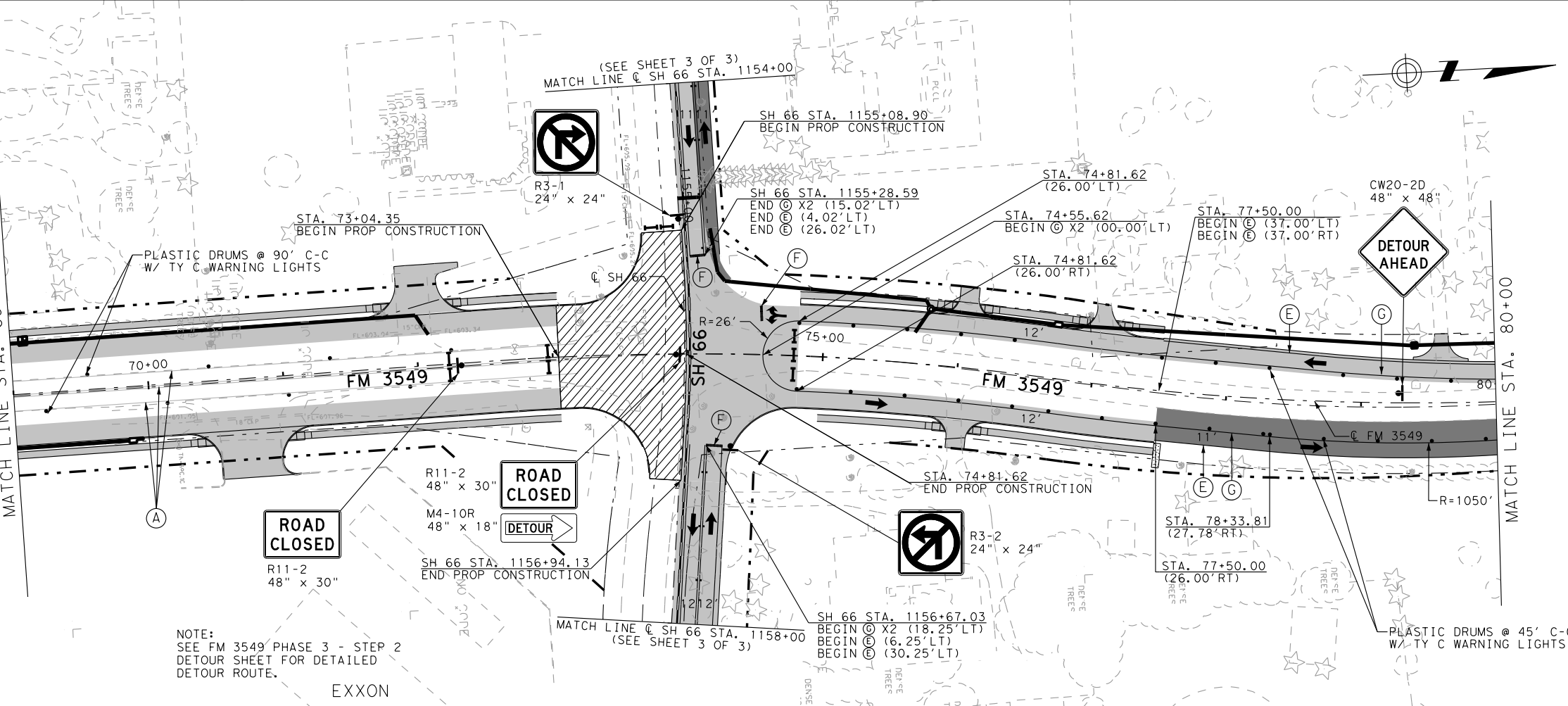
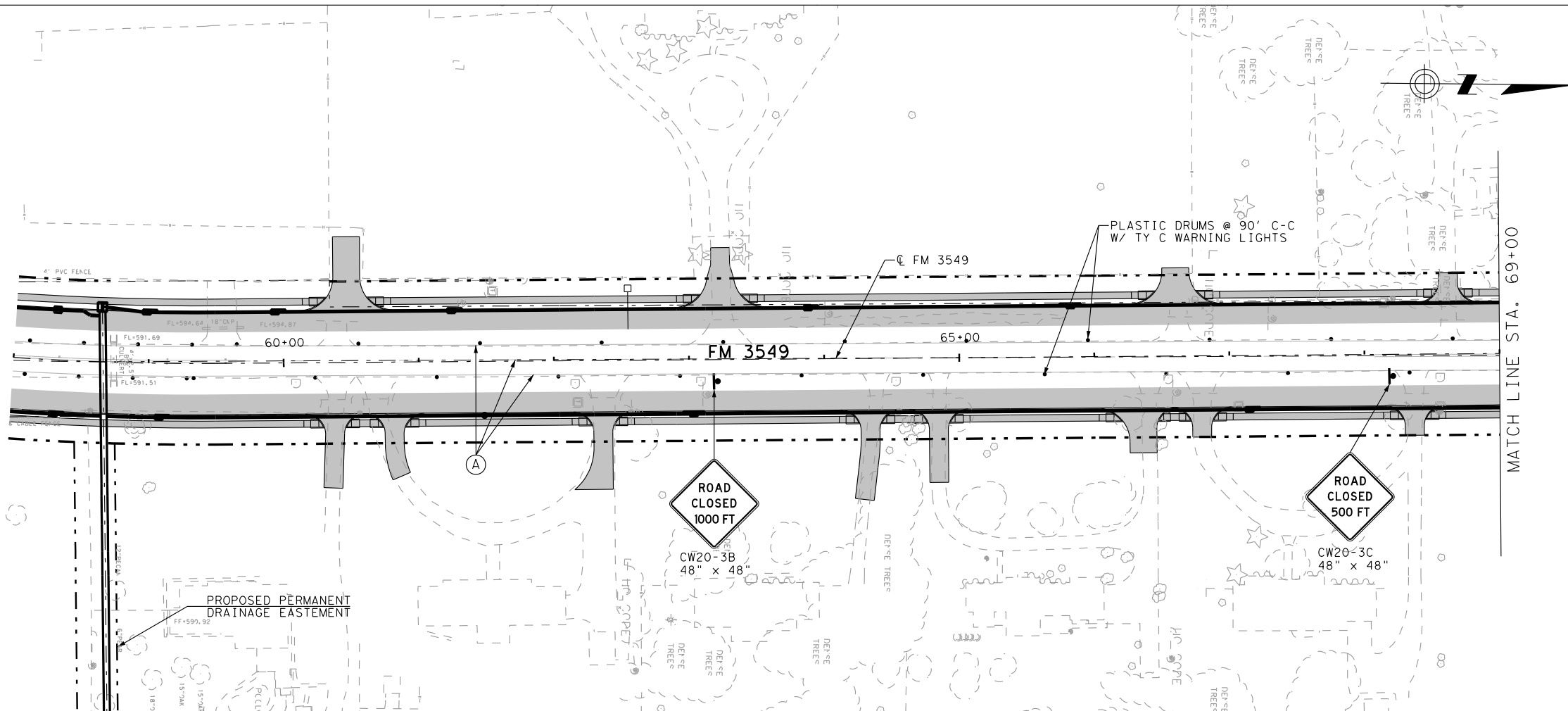
ATKINS
 TBPE REG. # F-474



FM 3549 DETOUR
 PHASE 3 - STEP 1

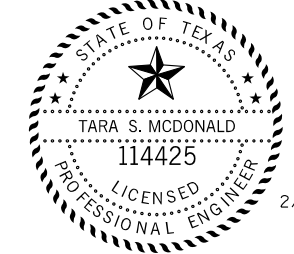
SHEET 1 OF 1

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|----------------|---------------------------|--|----------|---------------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 69 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



- LEGEND**
- EXISTING ROW
 - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

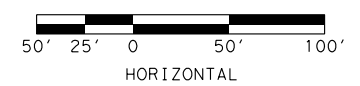
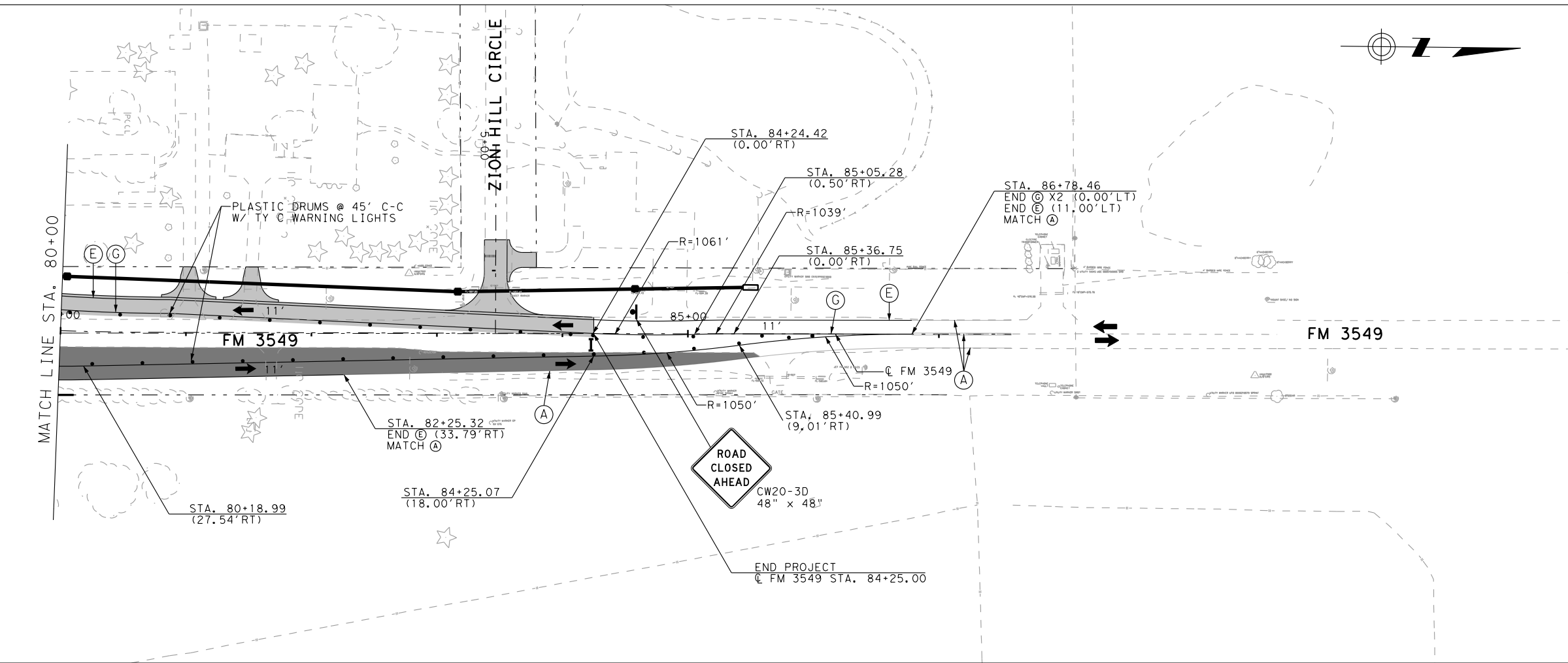


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 2
 STA. 58+00 TO STA. 80+00

SHEET 1 OF 3

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 70 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓙ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

2/26/2018

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ATKINS
 TBPE REG. # F-474

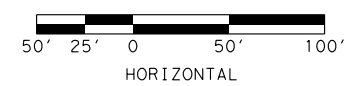
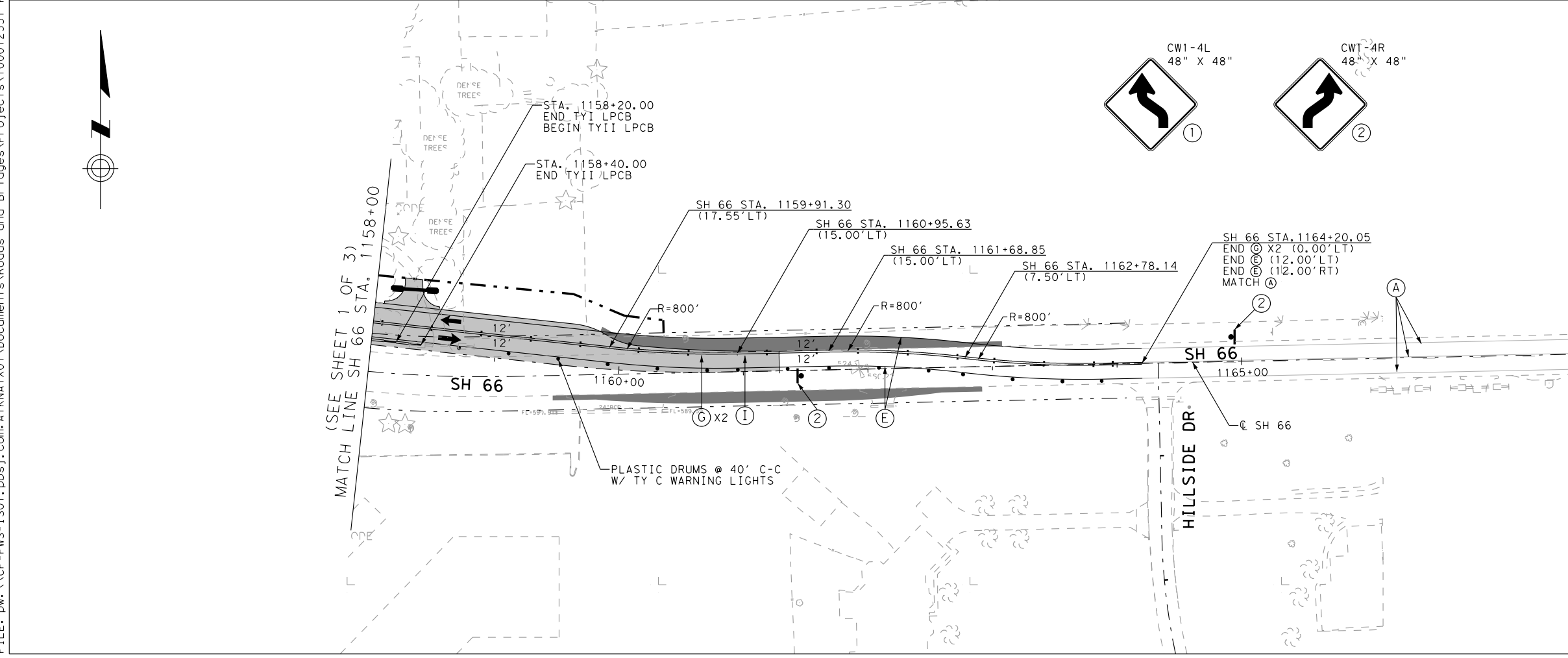
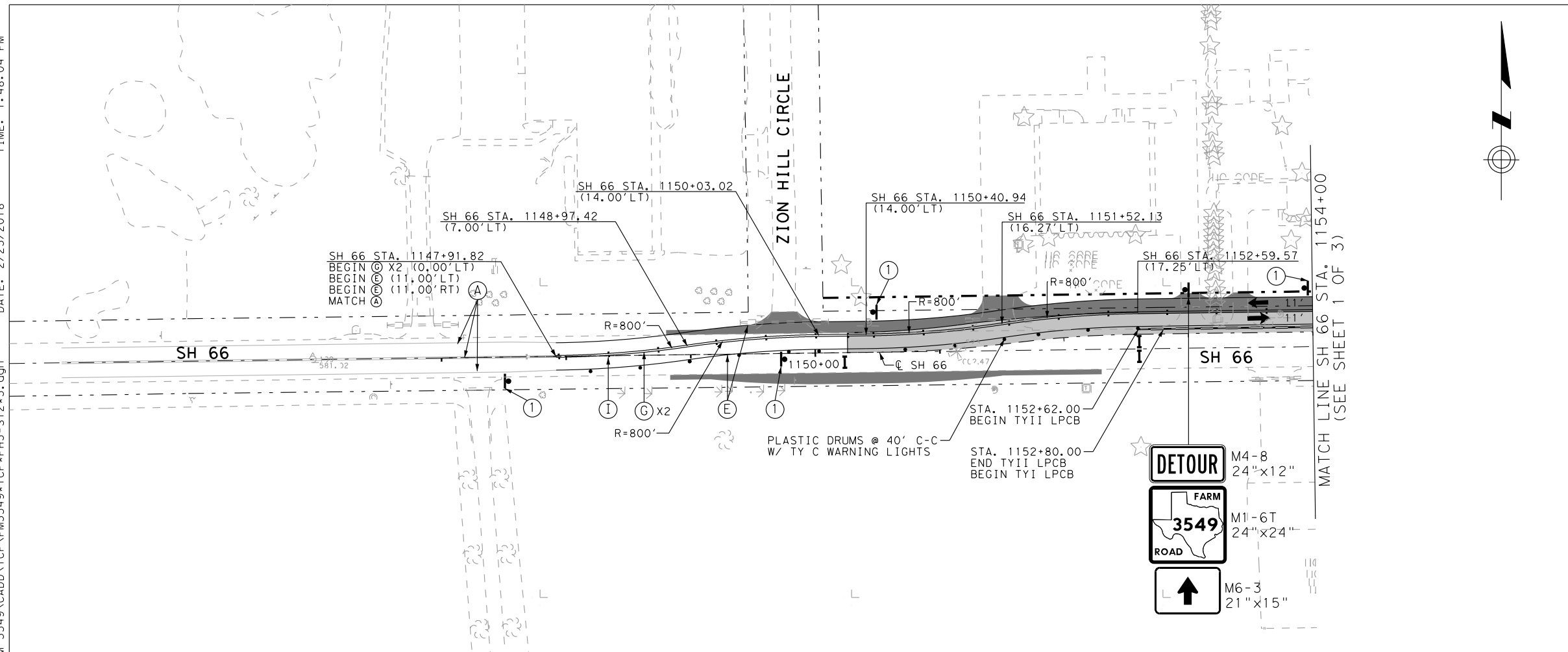


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 2
 FM 3549 STA. 80+00 TO END PROJECT

SHEET 2 OF 3

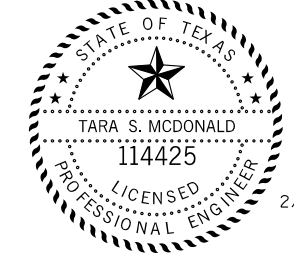
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 71 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotdrv.tbl
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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - ⊥ TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

2/26/2018

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ATKINS
 TBPE REG. # F-474

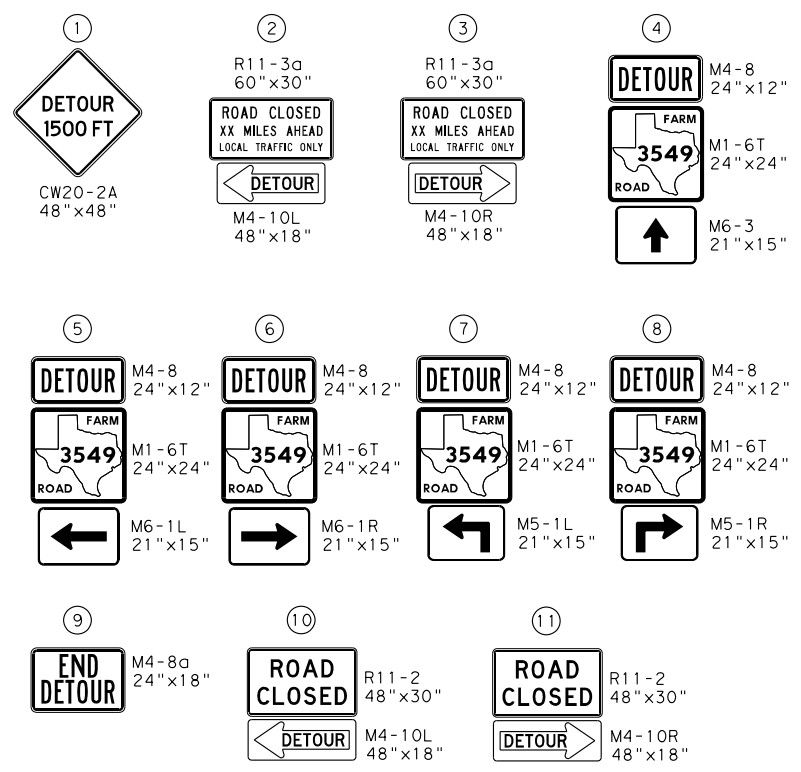
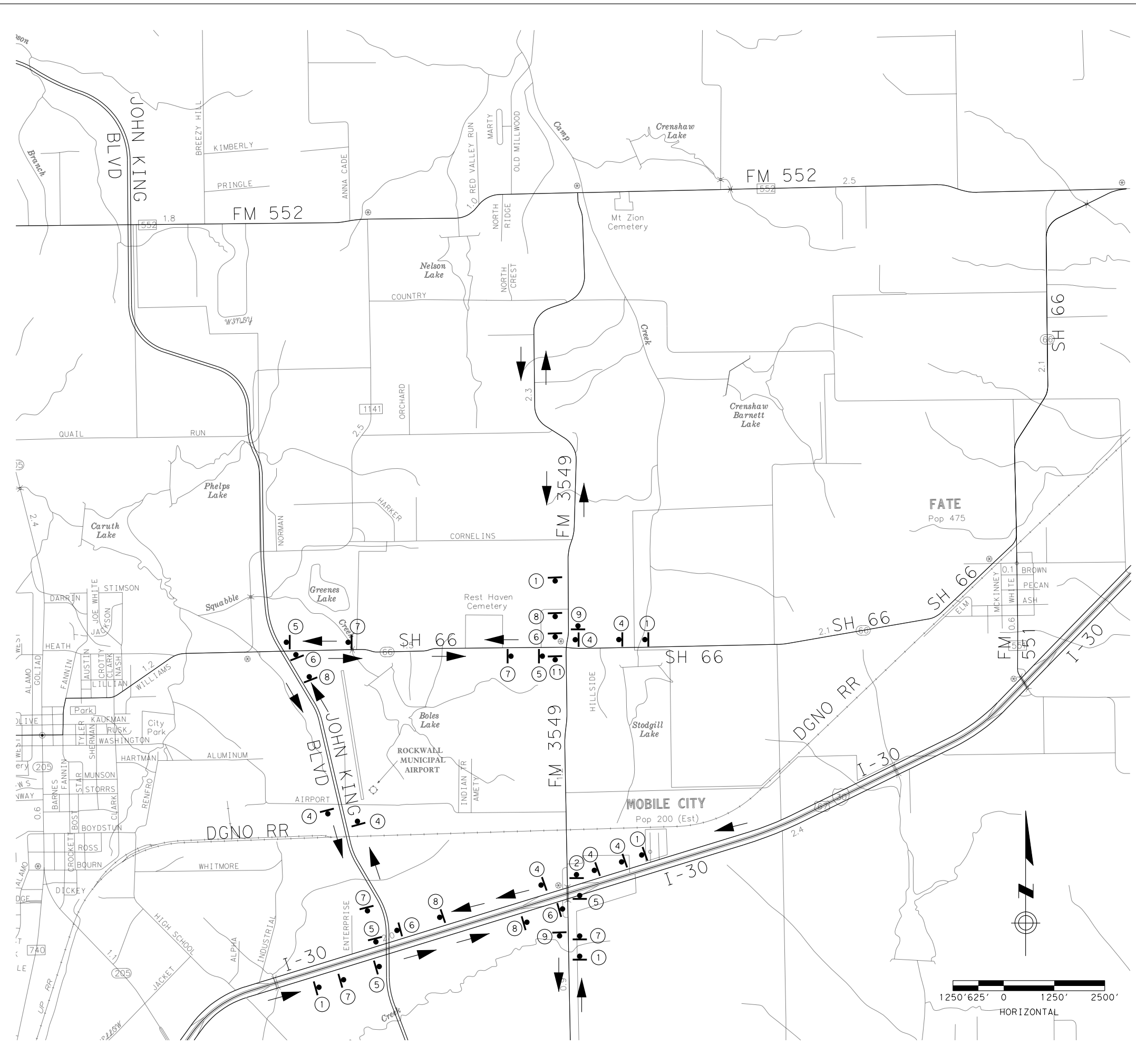


TRAFFIC CONTROL PLAN
 PHASE 3 - STEP 2
 SH 66 STA. 1147+00 TO STA. 1154+00
 SH 66 STA. 1158+00 TO STA. 1156+00

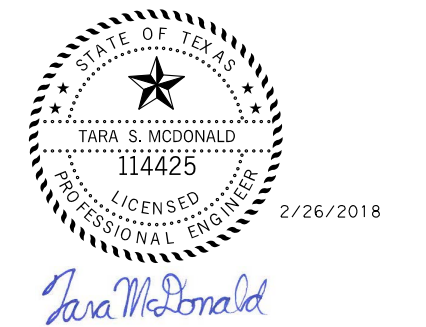
SHEET 3 OF 3

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 72 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
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GENERAL NOTES:
 1. SIGNS ARE SHOWN AT APPROXIMATE LOCATIONS AND MAY NEED FIELD ADJUSTMENT TO MATCH FIELD CONDITIONS. REFER TO TXDOT BC AND WZ STANDARDS FOR SIGN PLACEMENT REQUIREMENTS.



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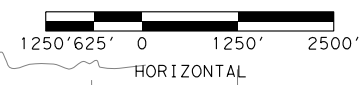
ATKINS
 TBPE REG. # F-474

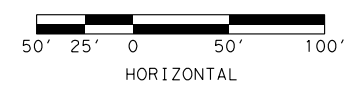
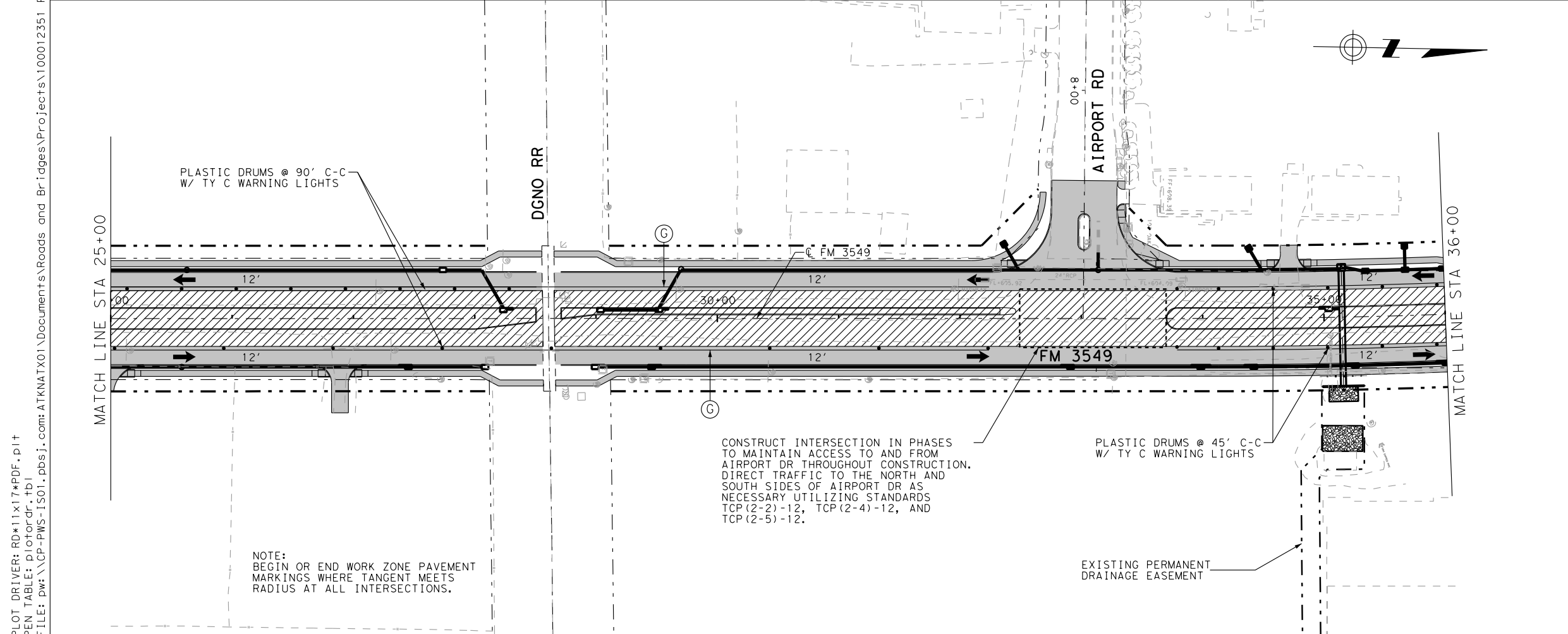
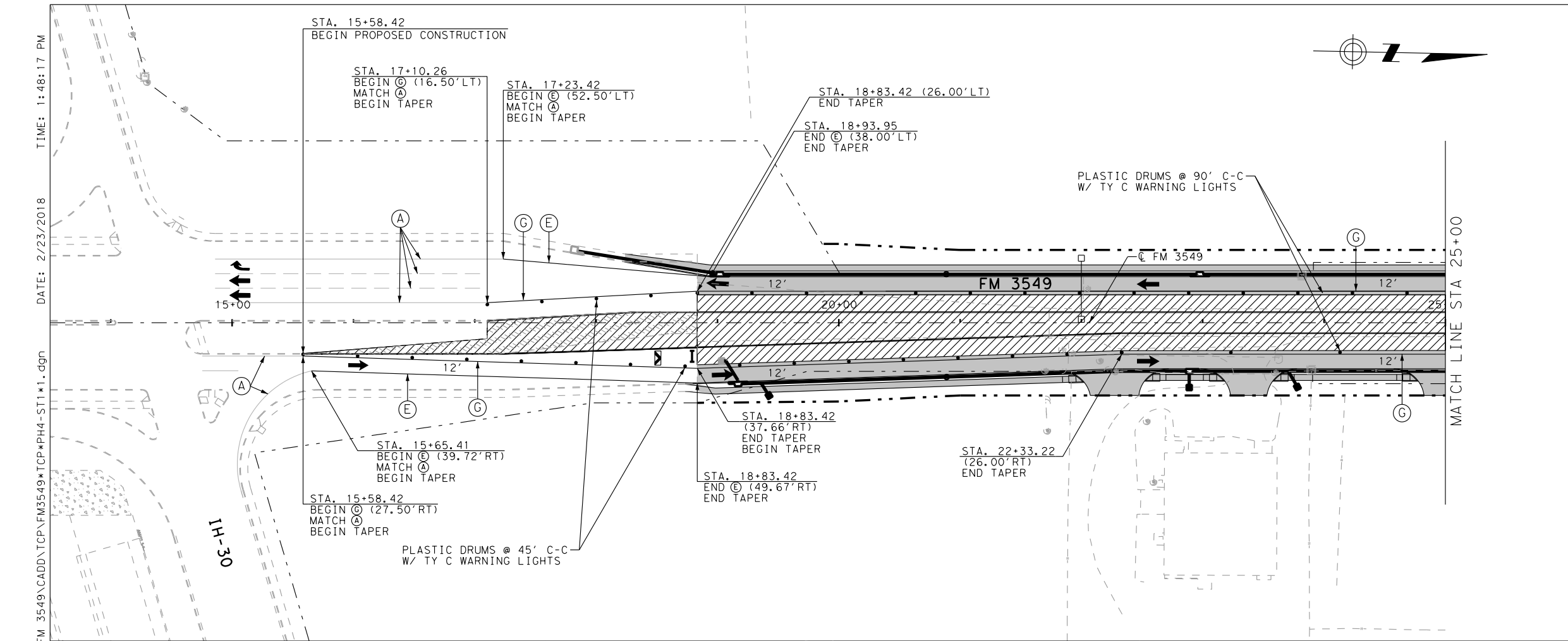


FM 3549 DETOUR
 PHASE 3 - STEP 2

SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | |
| CHECK | CONTROL | SECTION | JOB | 73 |
| WL | 1015 | 01 | 023 | |





- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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ATKINS
 TBPE REG. # F-474



TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 1
 BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 74 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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DATE: 2/23/2018
 TIME: 1:48:17 PM

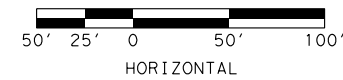
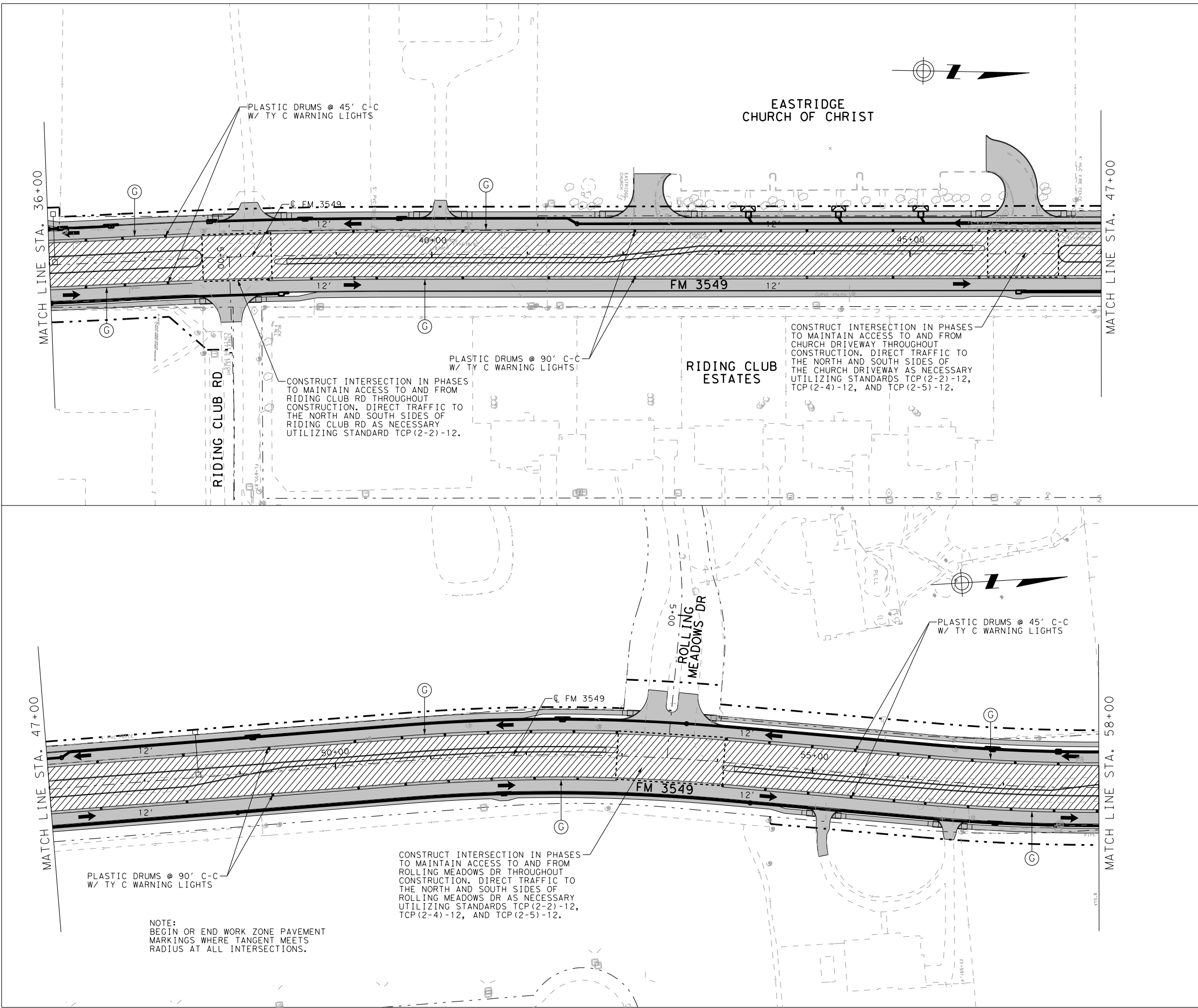
NOTE:
 BEGIN OR END WORK ZONE PAVEMENT MARKINGS WHERE TANGENT MEETS RADIUS AT ALL INTERSECTIONS.

TIME: 1:48:24 PM

DATE: 2/23/2018

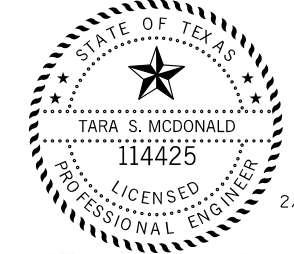
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PEN TABLE: plotordr.tbl
FILE: \\CP-PWS-1501.pbsj.com:ATKATX01\Projects\100012351 FM 3549\CADD\TCP\FM3549*TCP*PH4-ST1*2.dgn



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

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ATKINS
 TBPE REG. # F-474

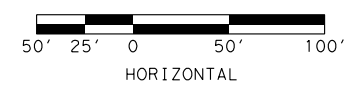
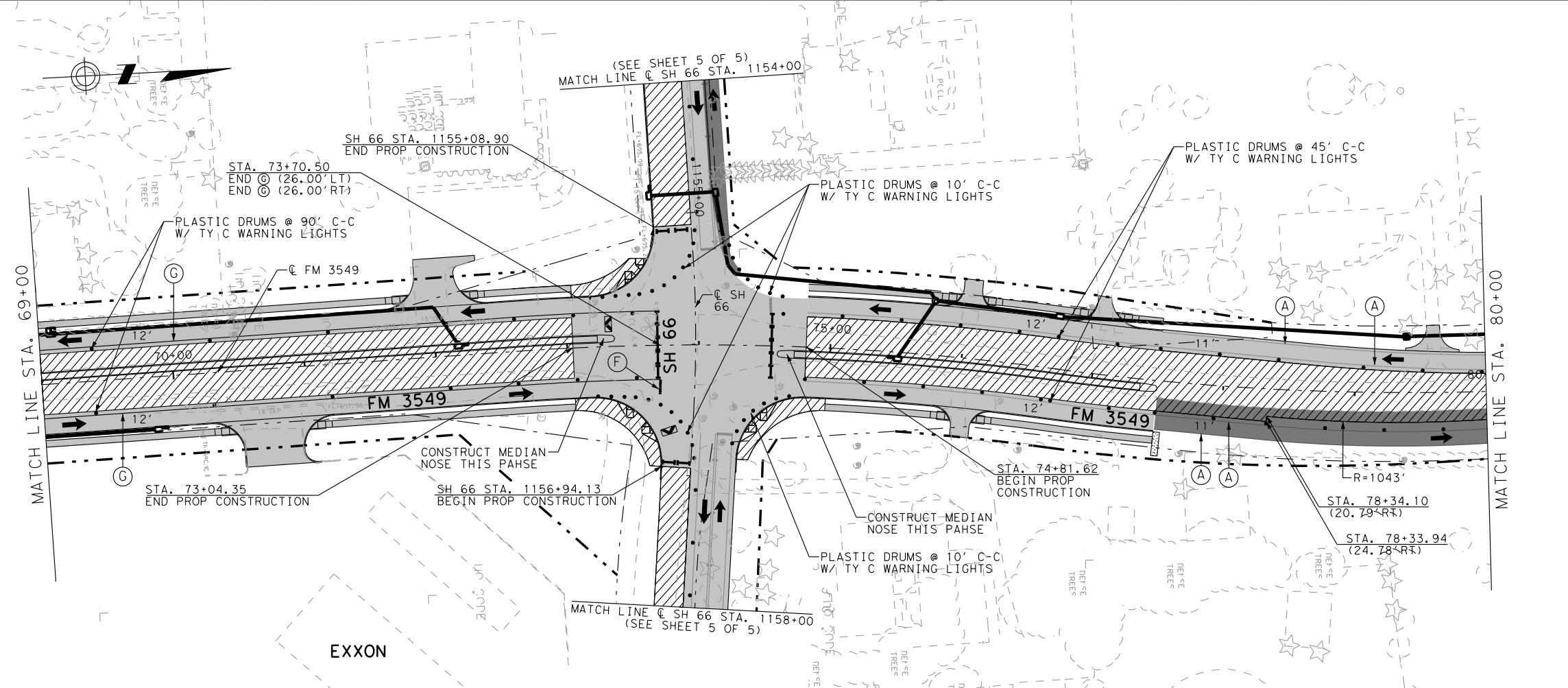
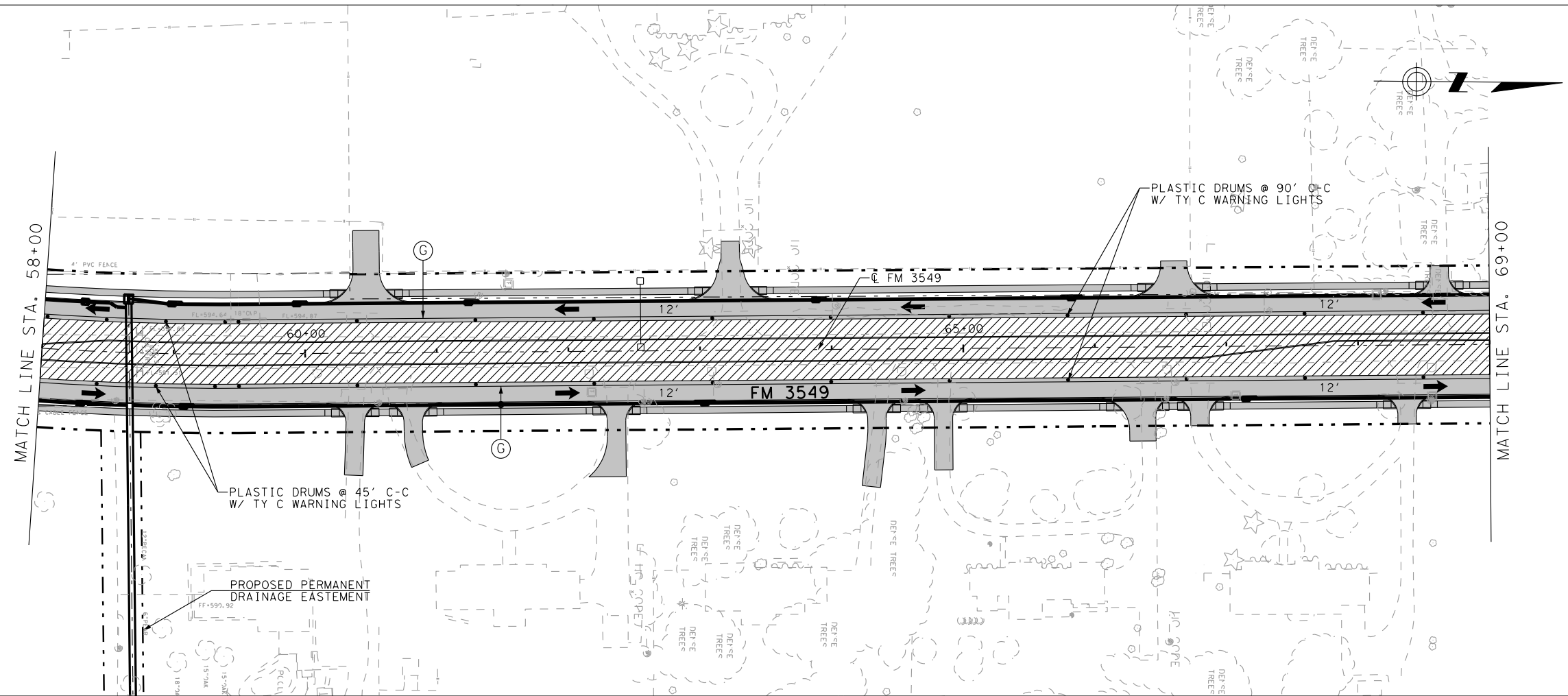


TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 1
 STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

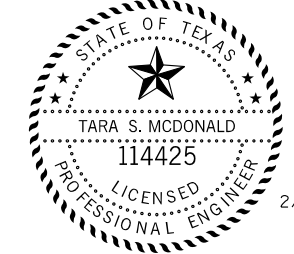
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 75 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

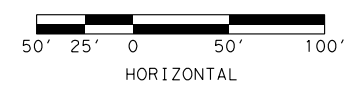
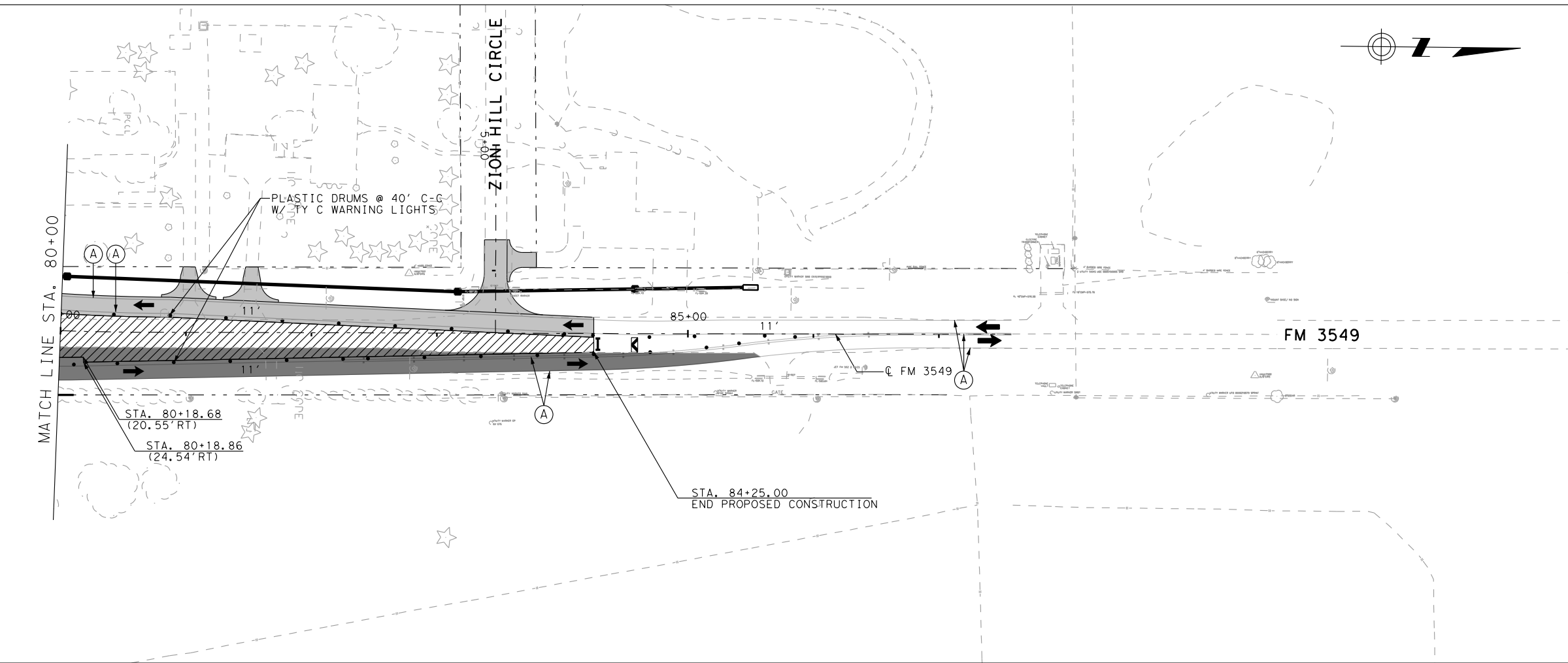


TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 1
 STA. 58+00 TO STA. 80+00

SHEET 3 OF 5

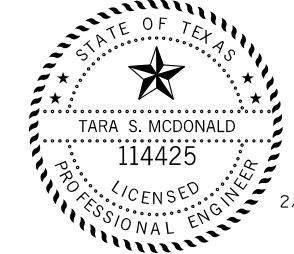
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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 76 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 DATE: 2/23/2018
 TIME: 1:48:37 PM



- LEGEND**
- EXISTING ROW
 - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - Ⓐ EXISTING STRIPING / STRIPING PREV STEP
 - Ⓑ WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - Ⓒ WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - Ⓓ WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - Ⓔ WK ZN PAV MARK (REM) (W) (4") (SLD)
 - Ⓕ WK ZN PAV MARK (REM) (W) (24") (SLD)
 - Ⓖ WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - Ⓗ WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - Ⓘ WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - Ⓝ PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

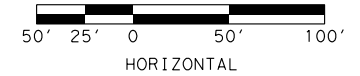
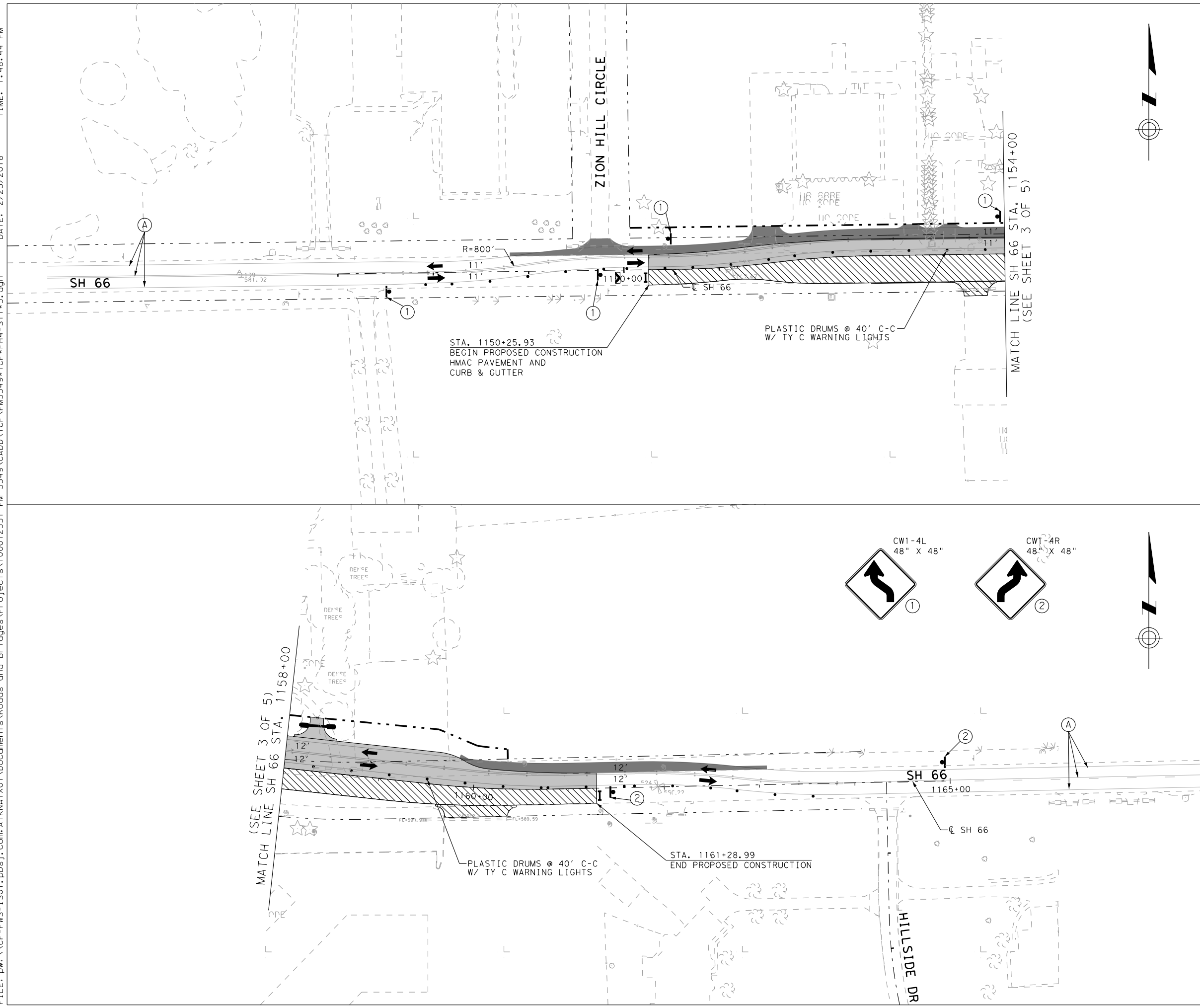


TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 1
 FM 3549 STA. 80+00 TO END PROJECT

SHEET 4 OF 5

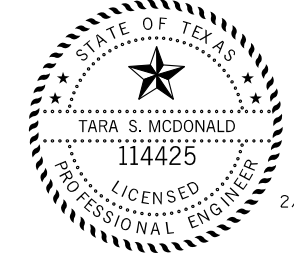
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 77 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 1
 SH 66 STA. 1147+00 TO STA. 1154+00
 SH 66 STA. 1158+00 TO STA. 1165+00

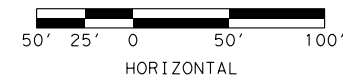
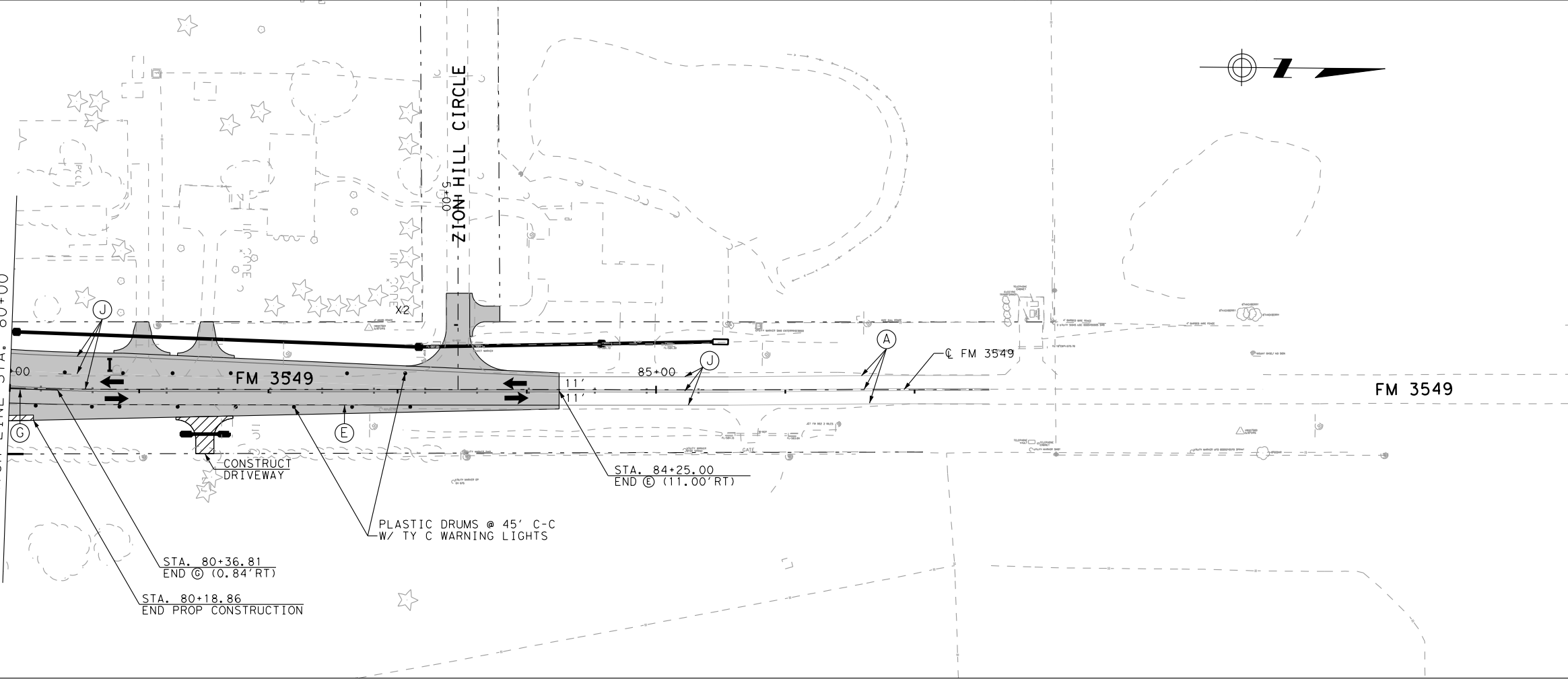
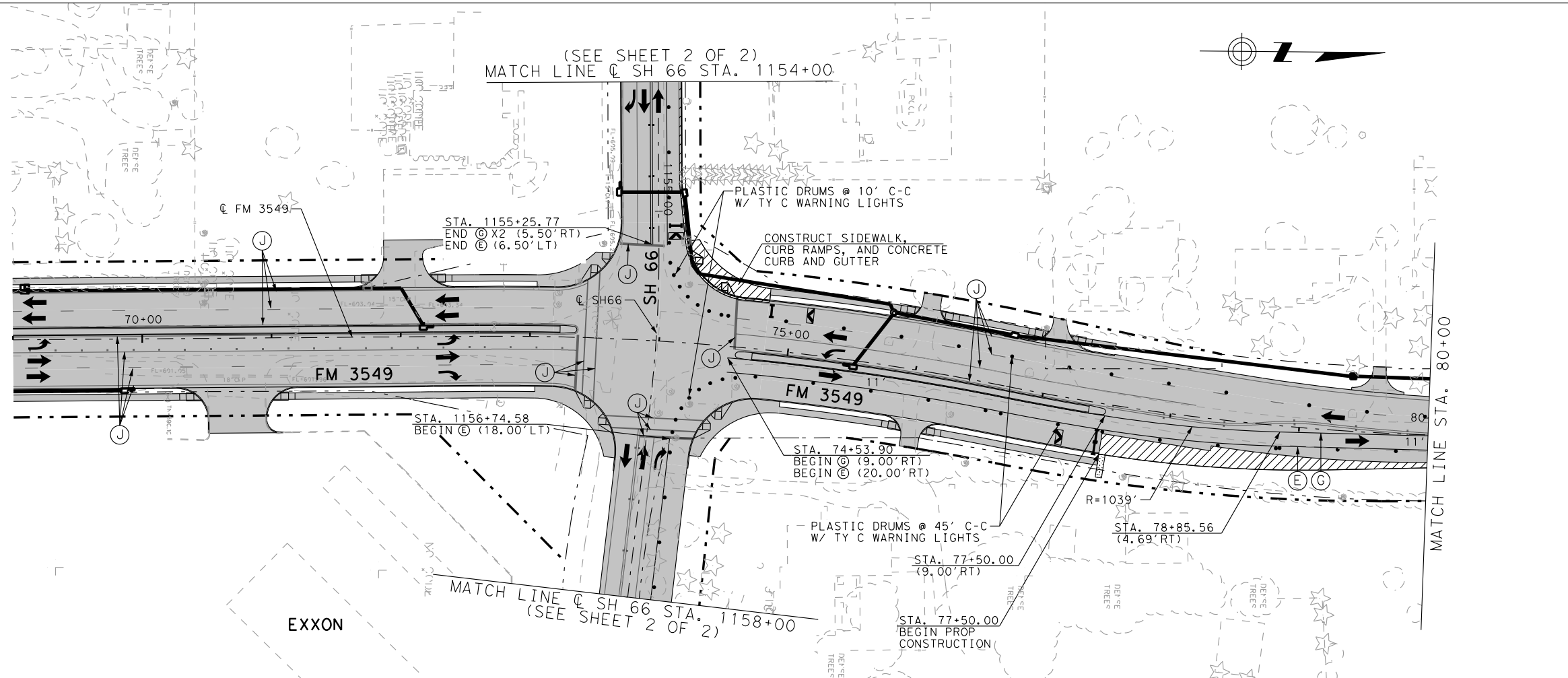
SHEET 5 OF 5

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 78 |
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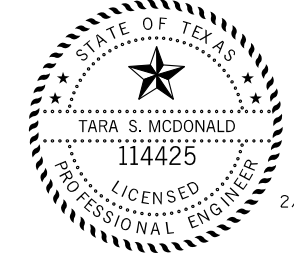
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- LEGEND**
- EXISTING ROW
 - PROPOSED ROW
 - ... CHANNELIZING DEVICES
 - LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

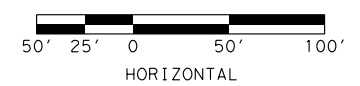
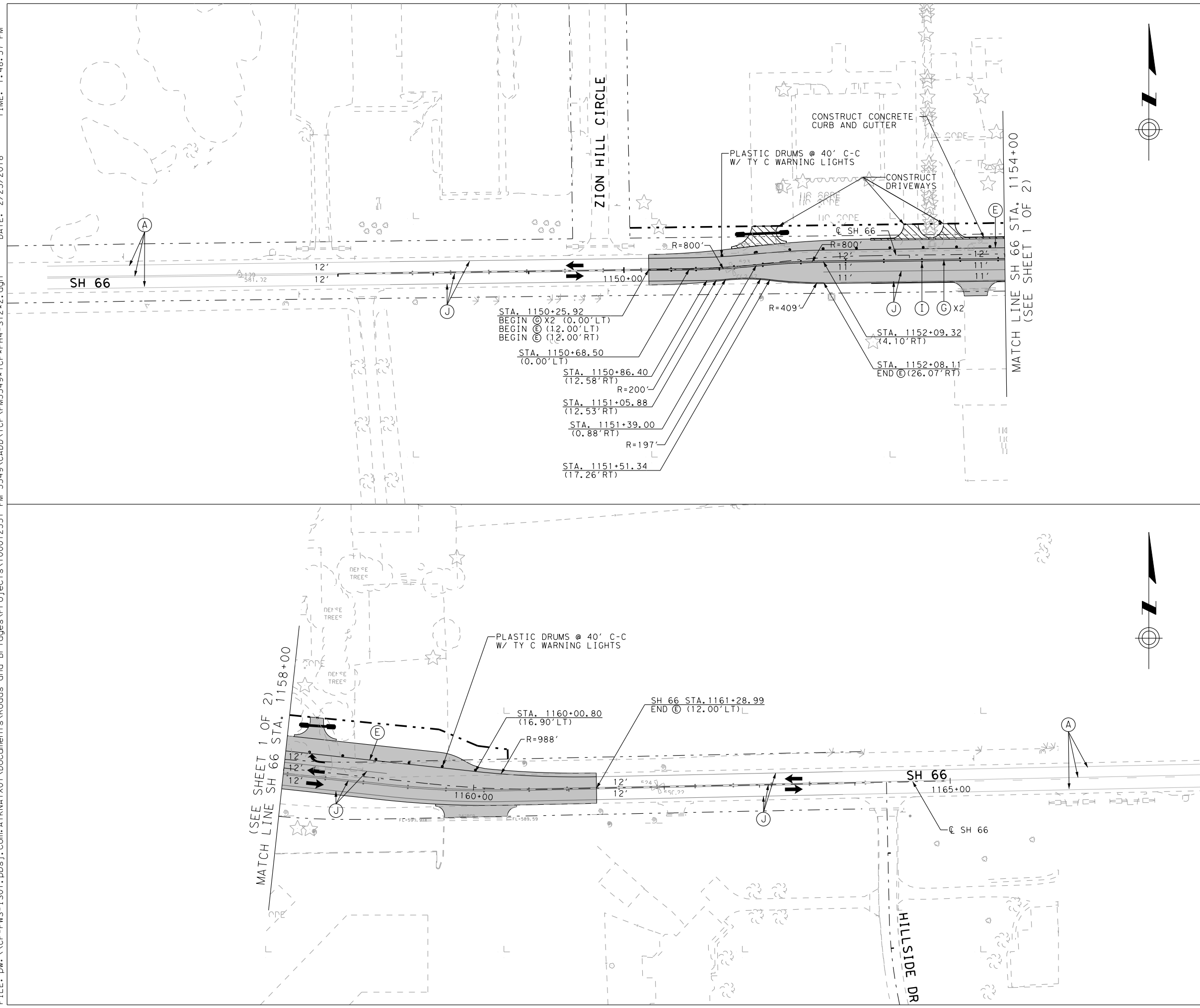


TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 2
 STA. 69+00 TO END PROJECT

SHEET 1 OF 2

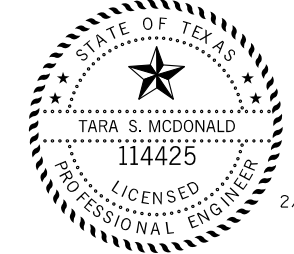
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|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 79 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - CHANNELIZING DEVICES
 - +— LOW PROFILE CONCRETE TRAFFIC BARRIER
 - I TY III BARRICADE
 - ▲ TRUCK MOUNTED ATTENUATOR
 - SIGN POST
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEPS
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEPS
 - (A) EXISTING STRIPING / STRIPING PREV STEP
 - (B) WK ZN PAV MARK (NON-REM) (W) (4") (SLD)
 - (C) WK ZN PAV MARK (NON-REM) (W) (24") (SLD)
 - (D) WK ZN PAV MARK (NON-REM) (Y) (4") (SLD)
 - (E) WK ZN PAV MARK (REM) (W) (4") (SLD)
 - (F) WK ZN PAV MARK (REM) (W) (24") (SLD)
 - (G) WK ZN PAV MARK (REM) (Y) (4") (SLD)
 - (H) WK ZN PAV MARK (REM) (Y) (4") (BRK)
 - (I) WK ZN PAV MARK (REM) (REFL) TY II-A-A
 - (J) PERMANENT STRIPING (SEE SIGNING AND STRIPING PLANS)

GENERAL NOTES:
 1. ANY RELOCATION OF DRIVEWAY OR SIDE STREET CULVERTS ASSOCIATED WITH THE CONSTRUCTION OF TEMPORARY PAVEMENT SHALL BE SUBSIDIARY TO ITEM 508.



Tara McDonald

| NO. | DATE | REVISION | BY |
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 TBPE REG. # F-474

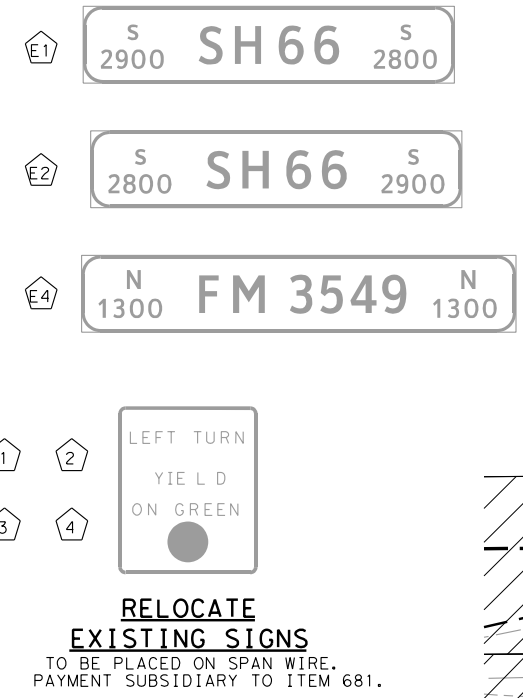


TRAFFIC CONTROL PLAN
 PHASE 4 - STEP 2
 SH 66 STA. 1147+00 TO STA. 1154+00
 SH 66 STA. 1158+00 TO STA. 1165+00

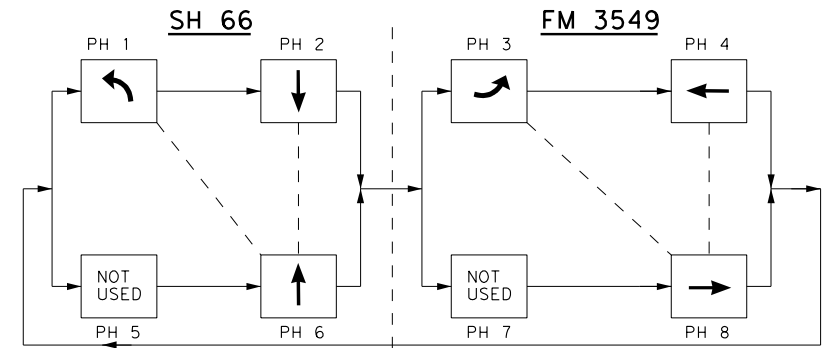
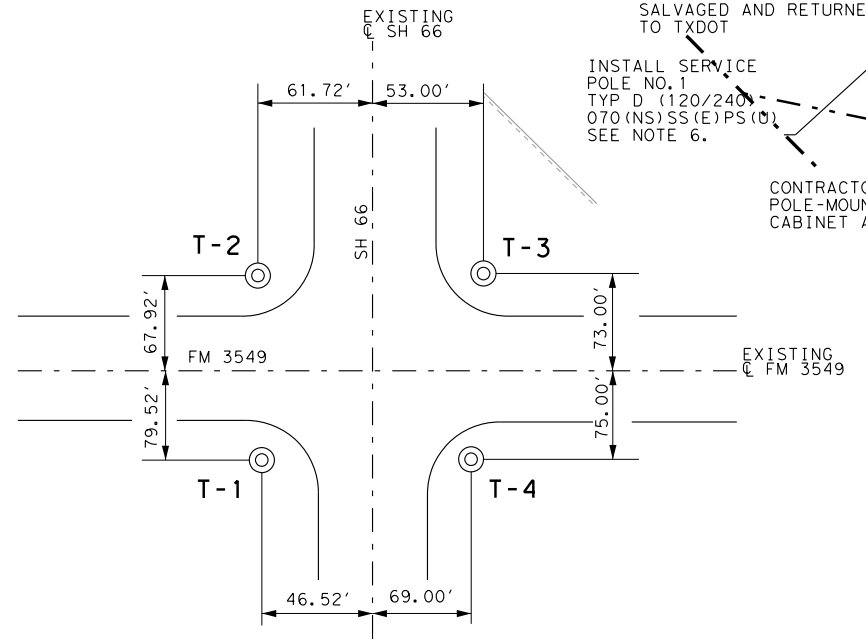
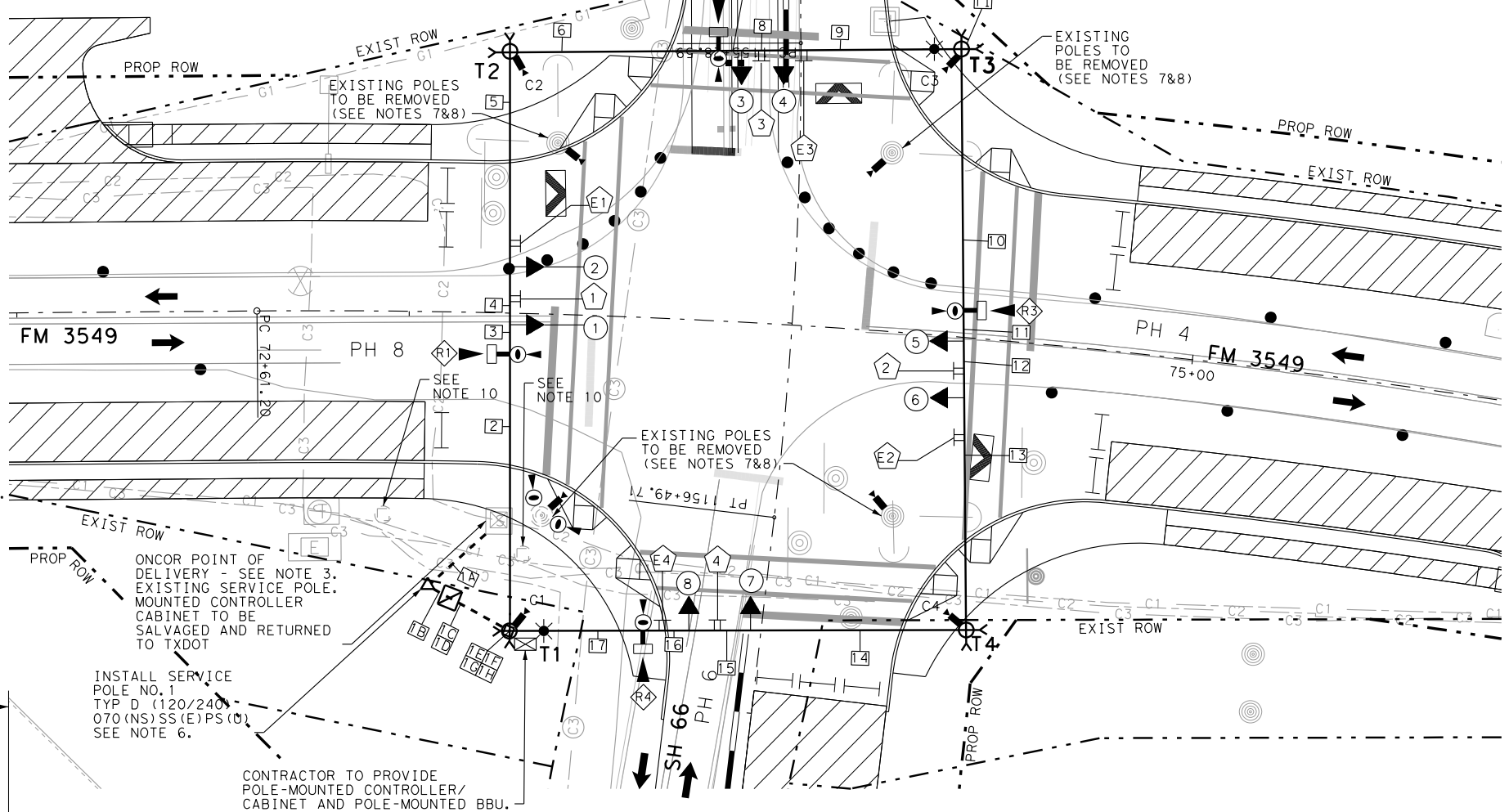
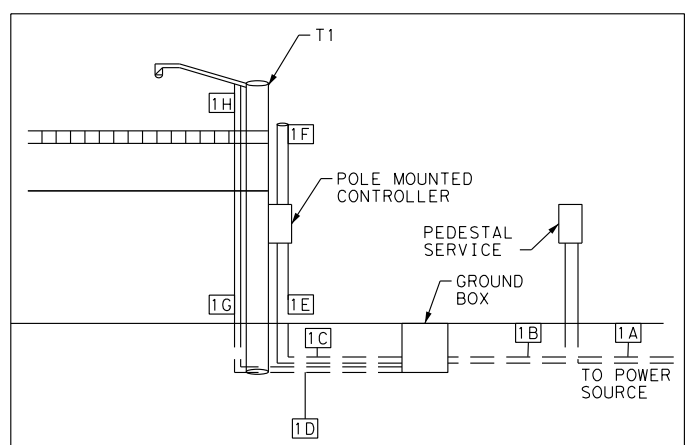
SHEET 2 OF 2

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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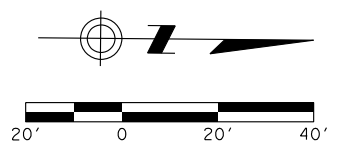
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- NOTES CONTINUED**
- SALVAGE SIGNAL HEADS, RADAR, VIVIDS BBU, RADAR, LUMINAIRE, AND OTHER EQUIPMENT AS DIRECTED AND RETURN TO TXDOT SIGNAL SHOP.
 - RELOCATE EXISTING OPTICOM EQUIPMENT TO SPAN WIRE AND CABINET AND OBTAIN CABLE AND ADDITIONAL EQUIPMENT FROM THE CITY OF ROCKWALL AND CITY OF FATE.
 - ADVANCE RADAR DETECTION DEVICES TO BE SUPPLIED BY TXDOT SIGNAL SHOP.
 - EXISTING STEEL POLES AND RADARS TO BE REMOVED AND RETURNED TO TXDOT SIGNAL SHOP.



- NOTES**
- CONTRACTOR SHALL VERIFY UTILITY LOCATIONS.
 - EXISTING TRAFFIC SIGNAL SHALL REMAIN IN PLACE UNTIL TEMPORARY TRAFFIC SIGNAL IS PLACED INTO FULL OPERATION.
 - CONTRACTOR IS TO COORDINATE ELECTRICAL SERVICE WITH ONCOR (HERMAN STORK - 214-486-3555) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO PEDESTAL SERVICE.
 - CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC SIGNAL IN ACCORDANCE WITH THE GUIDELINES SET FORTH IN THE 2011 TMUTCD. CONTRACTOR SHALL ADJUST ALL SIGNAL HEADS EACH PHASE/STEP TO BE IN LINE WITH THE THRU LANES AND ADJUST/AIM RADAR AND VIVDS DETECTION AND OPTICOM FOR EACH CONSTRUCTION PHASE.
 - CONTRACTOR SHALL RELOCATE THE EXISTING STREET NAME SIGNS TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM.
 - PERMANENT ELECTRICAL SERVICE WILL BE INSTALLED DURING THE TEMPORARY TRAFFIC SIGNAL INSTALLATION. TO REFER TO THE ELECTRICAL SERVICE DATA CHART LOCATED ON SHEET 2 OF 2 OF PERMANENT TRAFFIC SIGNAL QUANTITIES FOR DETAILS.



- LEGEND**
- T1 TEMPORARY TIMBER POLE NUMBER
 - GROUND BOX TY C
 - POLE MOUNTED CONTROLLER CABINET BY CONTRACTOR
 - ▶ EXISTING VIDEO DETECTOR CAMERA
 - EXISTING OPTICOM DETECTOR
 - 2 CONDUIT RUN NUMBER
 - WOOD POLE AND SPAN WIRE *TEMPORARY*
 - ① SIGNAL AND SIGNAL HEAD NUMBER
 - ① SIGN NUMBER
 - ▶ C1 PROP PRESENCE VIVDS DETECTOR BY CONTRACTOR
 - ▶ R1 PROP ADVANCE RADAR DETECTOR
 - △ SERVICE POLE
 - ★ LUMINAIRE (250W EQ LED)
 - TT GUY WIRE MOUNTED SIGN
 - TYPE III BARRICADE
 - ← CONSTRUCTION TRAFFIC FLOW
 - ▨ PROPOSED CONSTRUCTION THIS STEP
 - ▩ PROPOSED CONSTRUCTION PREVIOUS STEP
 - ▤ TEMPORARY PAVEMENT THIS STEP
 - ▥ TEMPORARY PAVEMENT PREVIOUS STEP
 - CURRENT PHASE BARRIER & DRUMS
 - G1 --- ATMOS GAS
 - C1 --- AT&T FIBER/DUCT
 - C2 --- SPRINT FIBER/DUCT
 - C3 --- AT&T CABLE
 - ⊙ C3 --- AT&T CABLE
 - ⊙ W1 --- WATER

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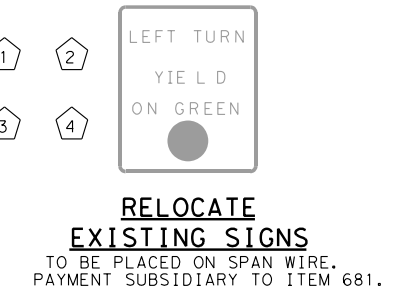
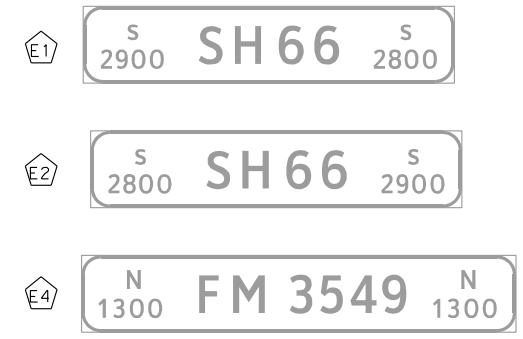
TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 2

SCALE: 1"=40 SHEET 1 OF 1

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| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
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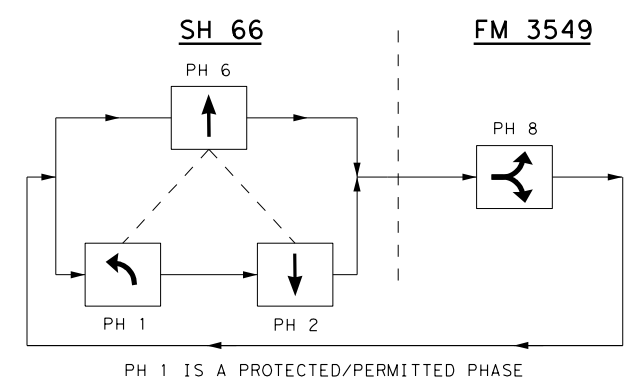
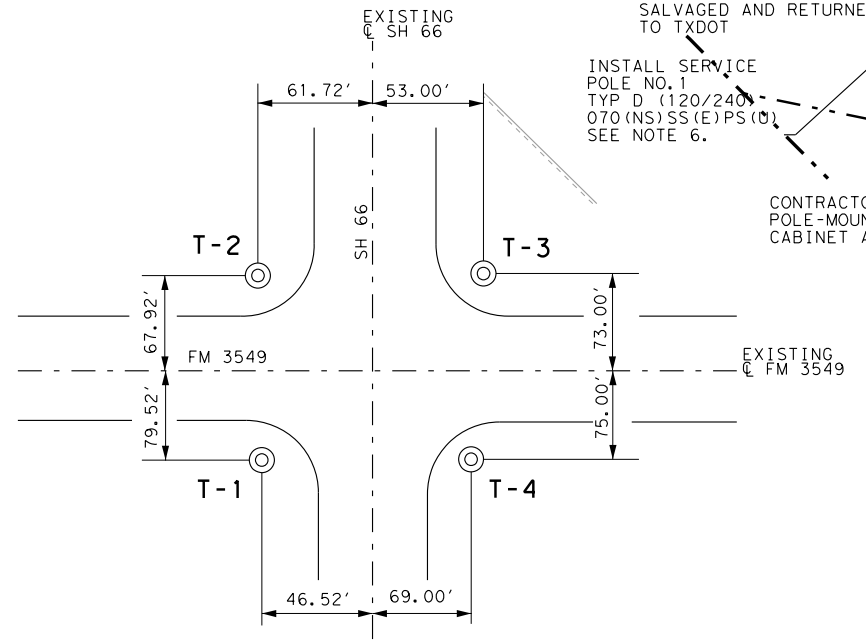
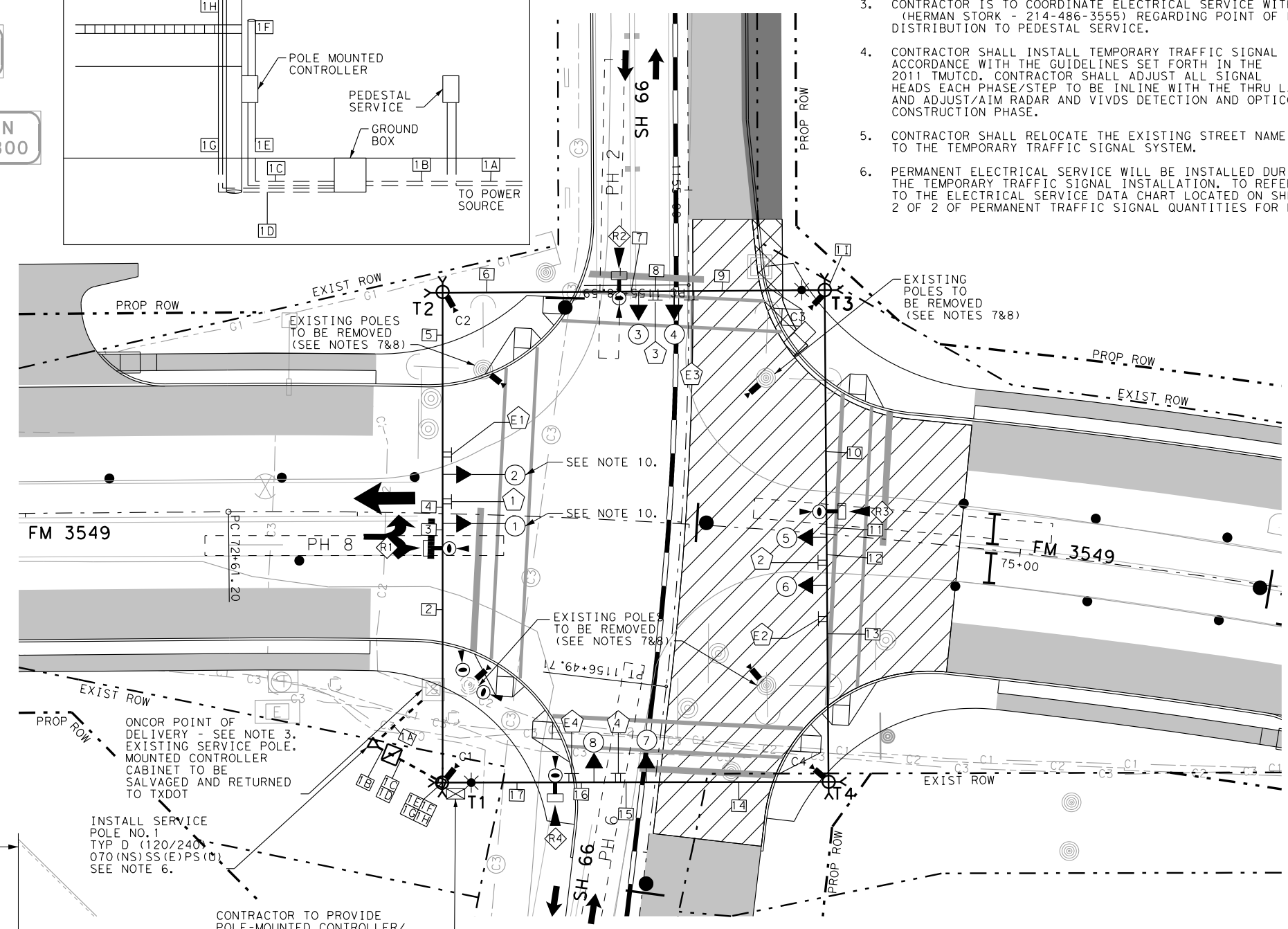
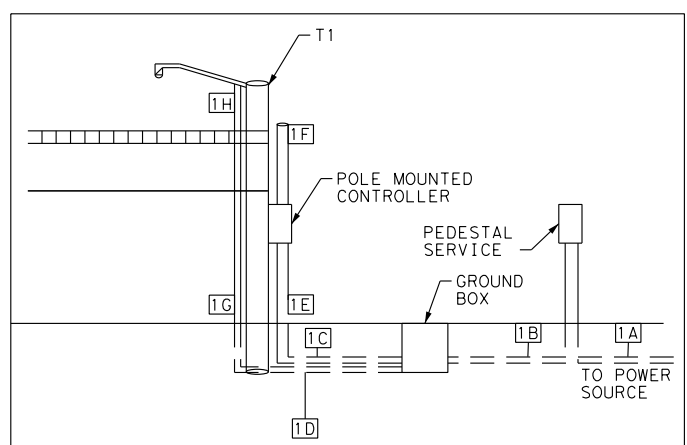
STATE OF TEXAS
 NASER ABUSAAD
 83200
 LICENSED PROFESSIONAL ENGINEER
 2/26/2018

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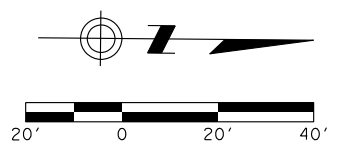
NOTES CONTINUED

7. SALVAGE SIGNAL HEADS, RADAR, VIVIDS BBU, RADAR, LUMINAIRE, AND OTHER EQUIPMENT AS DIRECTED AND RETURN TO TXDOT SIGNAL SHOP.
8. RELOCATE EXISTING OPTICOM EQUIPMENT TO SPAN WIRE AND CABINET AND OBTAIN CABLE AND ADDITIONAL EQUIPMENT FROM THE CITY OF ROCKWALL AND CITY OF FATE.
9. ADVANCE RADAR DETECTION DEVICES TO BE SUPPLIED BY TXDOT SIGNAL SHOP.
10. COVER SIGNAL HEADS 1 AND 2 THIS PHASE 3 STEP 1 ONLY.



NOTES

1. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS.
2. EXISTING TRAFFIC SIGNAL SHALL REMAIN IN PLACE UNTIL TEMPORARY TRAFFIC SIGNAL IS PLACED INTO FULL OPERATION.
3. CONTRACTOR IS TO COORDINATE ELECTRICAL SERVICE WITH ONCOR (HERMAN STORK - 214-486-3555) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO PEDESTAL SERVICE.
4. CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC SIGNAL IN ACCORDANCE WITH THE GUIDELINES SET FORTH IN THE 2011 TMUTCD. CONTRACTOR SHALL ADJUST ALL SIGNAL HEADS EACH PHASE/STEP TO BE IN LINE WITH THE THRU LANES AND ADJUST/AIM RADAR AND VIVDS DETECTION AND OPTICOM FOR EACH CONSTRUCTION PHASE.
5. CONTRACTOR SHALL RELOCATE THE EXISTING STREET NAME SIGNS TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM.
6. PERMANENT ELECTRICAL SERVICE WILL BE INSTALLED DURING THE TEMPORARY TRAFFIC SIGNAL INSTALLATION. TO REFER TO THE ELECTRICAL SERVICE DATA CHART LOCATED ON SHEET 2 OF 2 OF PERMANENT TRAFFIC SIGNAL QUANTITIES FOR DETAILS.



LEGEND

- T1 TEMPORARY TIMBER POLE NUMBER
- ☐ GROUND BOX TY C
- ☒ POLE MOUNTED CONTROLLER CABINET BY CONTRACTOR
- ▶ EXISTING VIDEO DETECTOR CAMERA
- ⊙ EXISTING OPTICOM DETECTOR
- 2 CONDUIT RUN NUMBER
- WOOD POLE AND SPAN WIRE *TEMPORARY*
- ① SIGNAL AND SIGNAL HEAD NUMBER
- ① SIGN NUMBER
- ▶ C1 PROP PRESENCE VIVDS DETECTOR BY CONTRACTOR
- ▶ R1 PROP ADVANCE RADAR DETECTOR
- △ SERVICE POLE
- ★ LUMINAIRE (250W EQ LED)
- TT GUY WIRE MOUNTED SIGN
- TYPE III BARRICADE
- ➔ CONSTRUCTION TRAFFIC FLOW
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEP
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEP
- CURRENT PHASE BARRIER & DRUMS
- G1 --- ATMOS GAS
- C1 --- AT&T FIBER/DUCT
- C2 --- SPRINT FIBER/DUCT
- C3 --- AT&T CABLE
- ⊙ C3 --- AT&T CABLE
- ⊙ W1 --- WATER

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TBPE REG. # F-474



TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 3 STEP 1

SCALE: 1"=40 SHEET 1 OF 1

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|-------------|---------------------|---|----------|---------------------|
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS | ROCKWALL | 82 |
| CHECK NA | CONTROL | SECTION | JOB | |
| NA | 1015 | 01 | 023 | |

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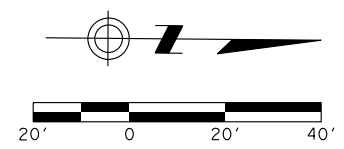
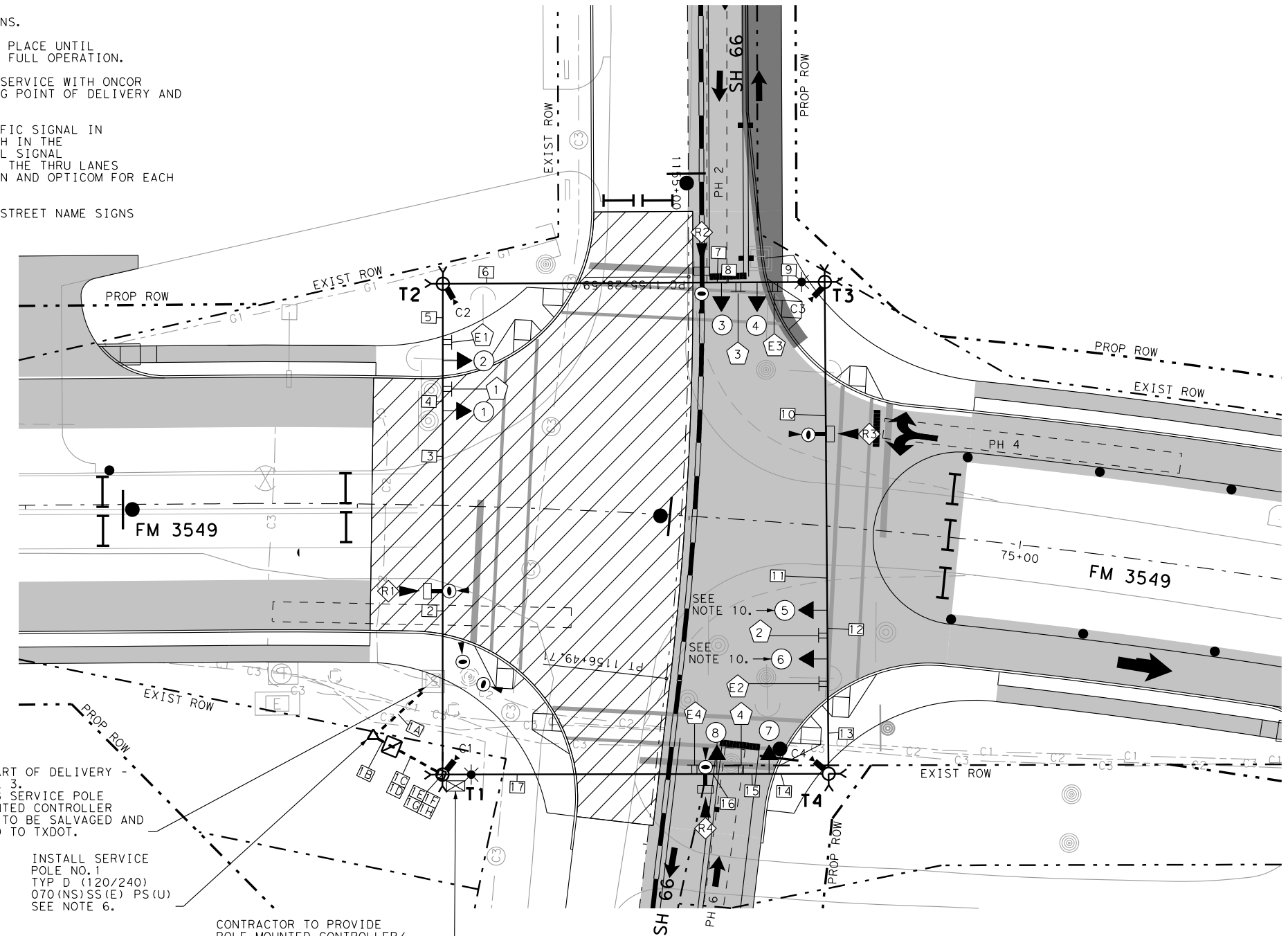
NOTES

1. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS.
2. EXISTING TRAFFIC SIGNAL SHALL REMAIN IN PLACE UNTIL TEMPORARY TRAFFIC SIGNAL IS PLACED INTO FULL OPERATION.
3. CONTRACTOR IS TO COORDINATE ELECTRICAL SERVICE WITH ONCOR (HERMAN STORK - 214-486-3555) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO PEDESTAL SERVICE.
4. CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC SIGNAL IN ACCORDANCE WITH THE GUIDELINES SET FORTH IN THE 2011 TMTCD. CONTRACTOR SHALL ADJUST ALL SIGNAL HEADS EACH PHASE/STEP TO BE IN LINE WITH THE THRU LANES AND ADJUST/AIM RADAR AND VIVDS DETECTION AND OPTICOM FOR EACH CONSTRUCTION PHASE.
5. CONTRACTOR SHALL RELOCATE THE EXISTING STREET NAME SIGNS TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM.
6. PERMANENT ELECTRICAL SERVICE WILL BE INSTALLED DURING THE TEMPORARY TRAFFIC SIGNAL INSTALLATION. TO REFER TO THE ELECTRICAL SERVICE DATA CHART LOCATED ON SHEET 2 OF 2 OF PERMANENT TRAFFIC SIGNAL QUANTITIES FOR DETAILS.
7. SALVAGE SIGNAL HEADS, RADAR, VIVIDS BBU, RADAR, LUMINAIRE, AND OTHER EQUIPMENT AS DIRECTED AND RETURN TO TXDOT SIGNAL SHOP.
8. RELOCATE EXISTING OPTICOM EQUIPMENT TO SPAN WIRE AND CABINET AND OBTAIN CABLE AND ADDITIONAL EQUIPMENT FROM THE CITY OF ROCKWALL AND CITY OF FATE.
9. ADVANCE RADAR DETECTION DEVICES TO BE SUPPLIED BY TXDOT SIGNAL SHOP.
10. COVER SIGNAL HEADS 5 AND 6 THIS PHASE 3 STEP 2 ONLY.

ONCOR PART OF DELIVERY - SEE NOTE 3. EXISTING SERVICE POLE AND MOUNTED CONTROLLER CABINET TO BE SALVAGED AND RETURNED TO TXDOT.

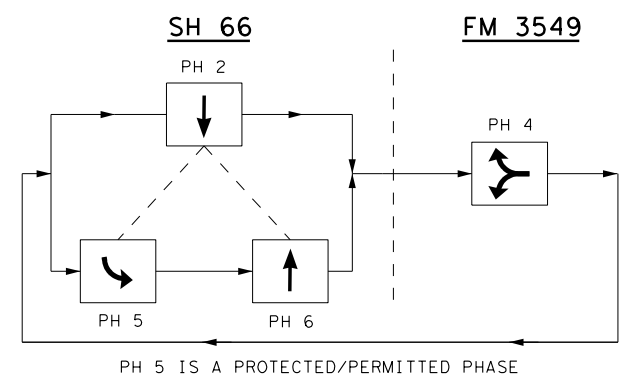
INSTALL SERVICE POLE NO. 1
 TYP D (120/240)
 070 (NS) SS (E) PS (U)
 SEE NOTE 6.

CONTRACTOR TO PROVIDE POLE-MOUNTED CONTROLLER/CABINET AND POLE-MOUNTED BBU.



LEGEND

- T1 TEMPORARY TIMBER POLE NUMBER
- ☒ GROUND BOX TY C
- ☒ POLE MOUNTED CONTROLLER CABINET BY CONTRACTOR
- ▶ EXISTING VIDEO DETECTOR CAMERA
- ⊙ EXISTING OPTICOM DETECTOR
- 2 CONDUIT RUN NUMBER
- ⊙ WOOD POLE AND SPAN WIRE *TEMPORARY*
- ① SIGNAL AND SIGNAL HEAD NUMBER
- ① SIGN NUMBER
- ▶ C1 PROP PRESENCE VIVDS DETECTOR BY CONTRACTOR
- ▶ ◊ PROP ADVANCE RADAR DETECTOR
- △ SERVICE POLE
- ★ LUMINAIRE (250W EQ LED)
- TT GUY WIRE MOUNTED SIGN
- TYPE III BARRICADE
- ➔ CONSTRUCTION TRAFFIC FLOW
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEP
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEP
- ● CURRENT PHASE BARRIER & DRUMS
- G1 --- ATMOS GAS
- C1 --- AT&T FIBER/DUCT
- C2 --- SPRINT FIBER/DUCT
- C3 --- AT&T CABLE
- ⊙ C3 --- AT&T CABLE
- ⊙ W1 --- WATER



PHASE DIAGRAM



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474



TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 3 STEP 2

SCALE: 1"=40 SHEET 1 OF 1

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS | ROCKWALL | 83 |
| CHECK NA | CONTROL | SECTION | JOB | |
| NA | 1015 | 01 | 023 | |

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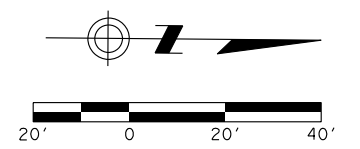
NOTES

- CONTRACTOR SHALL VERIFY UTILITY LOCATIONS.
- EXISTING TRAFFIC SIGNAL SHALL REMAIN IN PLACE UNTIL TEMPORARY TRAFFIC SIGNAL IS PLACED INTO FULL OPERATION.
- CONTRACTOR IS TO COORDINATE ELECTRICAL SERVICE WITH ONCOR (HERMAN STORK - 214-486-3555) REGARDING POINT OF DELIVERY AND DISTRIBUTION TO PEDESTAL SERVICE.
- CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC SIGNAL IN ACCORDANCE WITH THE GUIDELINES SET FORTH IN THE 2011 TMUTCD. CONTRACTOR SHALL ADJUST ALL SIGNAL HEADS EACH PHASE/STEP TO BE IN LINE WITH THE THRU LANES AND ADJUST/AIM RADAR AND VIVDS DETECTION AND OPTICOM FOR EACH CONSTRUCTION PHASE.
- CONTRACTOR SHALL RELOCATE THE EXISTING STREET NAME SIGNS TO THE TEMPORARY TRAFFIC SIGNAL SYSTEM.
- PERMANENT ELECTRICAL SERVICE WILL BE INSTALLED DURING THE TEMPORARY TRAFFIC SIGNAL INSTALLATION. TO REFER TO THE ELECTRICAL SERVICE DATA CHART LOCATED ON SHEET 2 OF 2 OF PERMANENT TRAFFIC SIGNAL QUANTITIES FOR DETAILS.
- SALVAGE SIGNAL HEADS, RADAR, VIVIDS BBU, RADAR, LUMINAIRE AND OTHER EQUIPMENT AS DIRECTED AND RETURN TO TXDOT SIGNAL SHOP.
- RELOCATE EXISTING OPTICOM EQUIPMENT TO SPAN WIRE AND CABINET AND OBTAIN CABLE AND ADDITIONAL EQUIPMENT FROM THE CITY OF ROCKWALL AND CITY OF FATE.
- ADVANCE RADAR DETECTION DEVICES TO BE SUPPLIED BY TXDOT SIGNAL SHOP.

ONCOR PART OF DELIVERY - SEE NOTE 3. EXISTING SERVICE POLE AND MOUNTED CONTROLLER CABINET TO BE SALVAGED AND RETURNED TO TXDOT.

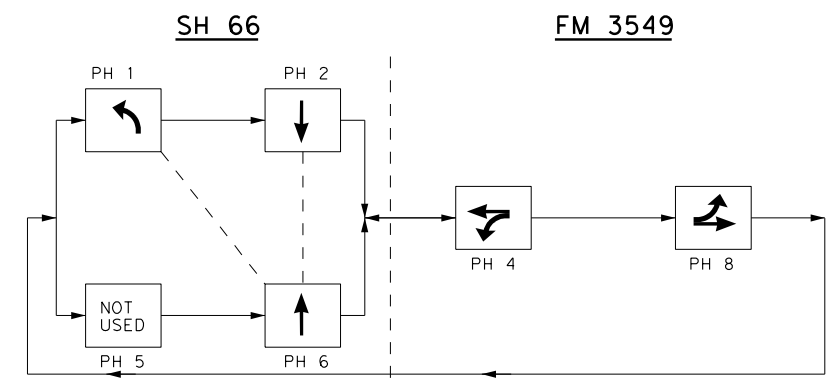
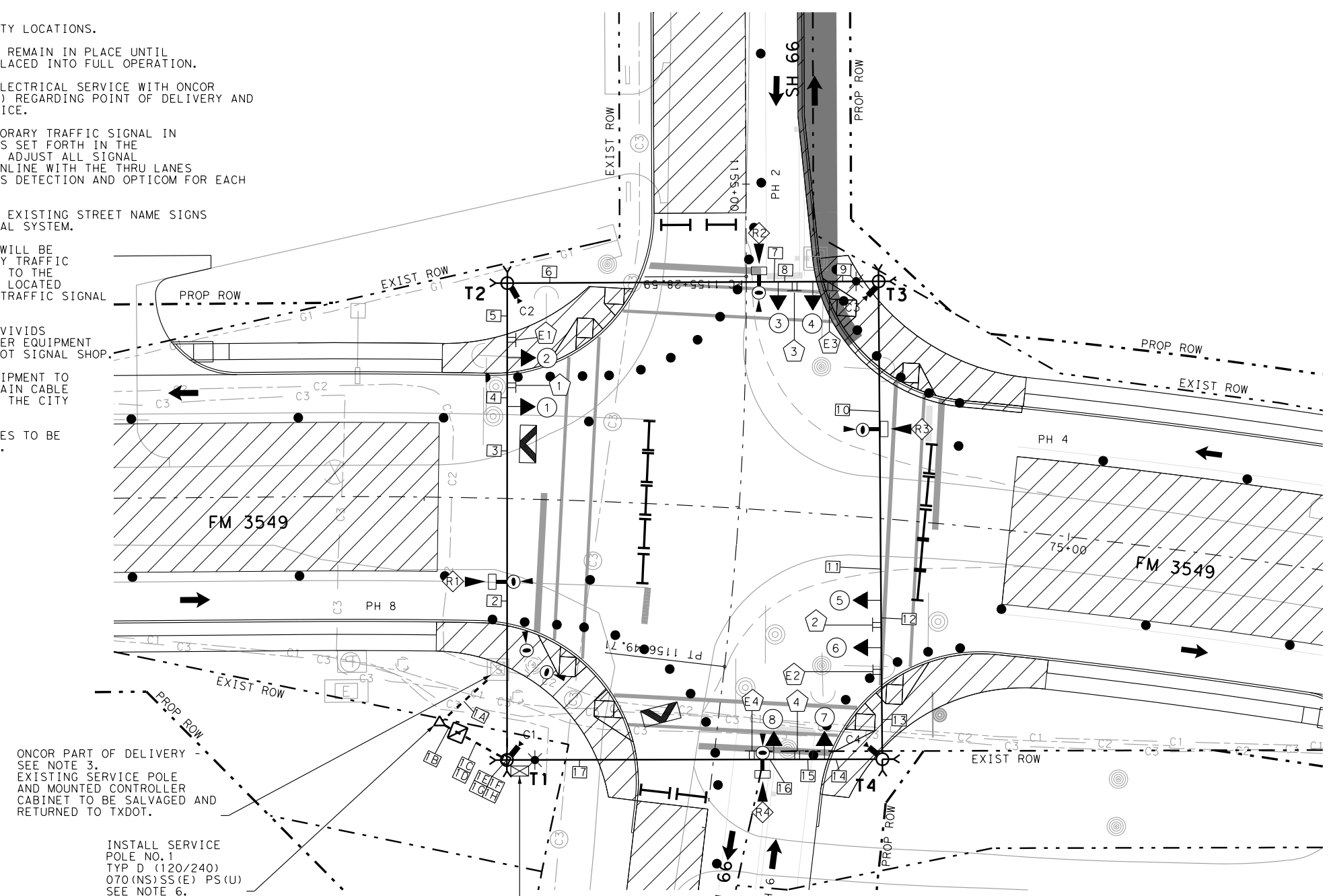
INSTALL SERVICE POLE NO. 1
 TYP D (120/240)
 070 (NS)SS(E) PS(U)
 SEE NOTE 6.

CONTRACTOR TO PROVIDE POLE-MOUNTED CONTROLLER/CABINET AND POLE-MOUNTED BBU.



LEGEND

- T1 TEMPORARY TIMBER POLE NUMBER
- ☒ GROUND BOX TY C
- ☒ POLE MOUNTED CONTROLLER CABINET BY CONTRACTOR
- ▶ EXISTING VIDEO DETECTOR CAMERA
- ⊙ EXISTING OPTICOM DETECTOR
- ② CONDUIT RUN NUMBER
- WOOD POLE AND SPAN WIRE *TEMPORARY*
- ① ◀ SIGNAL AND SIGNAL HEAD NUMBER
- ① ◀ SIGN NUMBER
- ▶ C1 PROP PRESENCE VIVDS DETECTOR BY CONTRACTOR
- ▶ ◀ R1 PROP ADVANCE RADAR DETECTOR
- △ SERVICE POLE
- ★ LUMINAIRE (250W EQ LED)
- TT GUY WIRE MOUNTED SIGN
- TYPE III BARRICADE
- CONSTRUCTION TRAFFIC FLOW
- ▨ PROPOSED CONSTRUCTION THIS STEP
- ▩ PROPOSED CONSTRUCTION PREVIOUS STEP
- ▤ TEMPORARY PAVEMENT THIS STEP
- ▥ TEMPORARY PAVEMENT PREVIOUS STEP
- ● ● CURRENT PHASE BARRIER & DRUMS
- G1 --- ATMOS GAS
- C1 --- AT&T FIBER/DUCT
- C2 --- SPRINT FIBER/DUCT
- C3 --- AT&T CABLE
- ⊙ C3 --- AT&T CABLE
- ⊙ W1 --- WATER



PH 1 IS A PROTECTED/PERMITTED LEFT TURN PHASE.

PHASE DIAGRAM



2/26/2018

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474



TEMPORARY TRAFFIC SIGNAL LAYOUT PHASE 4

SCALE: 1"=40 SHEET 1 OF 1

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS | ROCKWALL | 84 |
| CHECK NA | CONTROL | SECTION | JOB | |
| CHECK NA | 1015 | 01 | 023 | |

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 DATE: 2/27/2018 TIME: 11:28:14 AM

| RUN NO. | OVERHEAD SPAN (FT) | CONDUIT RUNS | | | | | | | | | |
|------------|--------------------|-------------------------|--------------------|------------|--------------------------------------|--------------------|--------------------|-------------------------|---|------------------------------------|---------------------------|
| | | ITEM 618 - CONDUIT TYPE | | | ITEM 620 - ELECTRICAL CNDR (WIRE) | | | ITEM 684 - TYPE A | ITEM 6002 | ITEM 6155 | * * |
| | | 2" RM (LF) | 2" PVC TRENCH (LF) | 4" RM (LF) | NO. 6 XHHW QTY/RUN | NO. 6 BARE QTY/RUN | NO. 8 XHHW QTY/RUN | * 9 CNDR 14 AWG QTY/RUN | VIVDS PRESENCE COMM CABLE COAXIAL QTY/RUN | * RADAR ADVANCE COMM CABLE QTY/RUN | * * OPTICOM CABLE QTY/RUN |
| 1A | | | 35 | | CONDUCTORS TO BE INSTALLED BY ONCOR. | | | | | | |
| 1B | | | 5 | | 2 | 1 | 4 | | | | |
| 1C | | | 20 | | 2 | 1 | | | | | |
| 1D | | | 20 | | | 1 | 4 | | | | |
| 1E | | 5 | | | 2 | 1 | | | | | |
| 1F | | | | 12 | | 1 | | 4 | 4 | 4 | |
| 1G | | 20 | | | | 1 | 4 | | | | |
| 1H | | 7 | | | | 1 | 2 | | | | |
| 1I | | 7 | | | | 1 | 2 | | | | |
| 2 | 72 | | | | | | 2 | 2 | 2 | 2 | |
| 3 | 8 | | | | | | 2 | 2 | 1 | 1 | |
| 4 | 14 | | | | | | 2 | 2 | 1 | 1 | |
| 5 | 55 | | | | | | 2 | 1 | 2 | 1 | |
| 6 | 54 | | | | | | 2 | 1 | 1 | 1 | |
| 7 | 5 | | | | | | 2 | 1 | 1 | | |
| 8 | 11 | | | | | | 2 | 1 | 1 | | |
| 9 | 45 | | | | | | 2 | | 1 | | |
| 10 | 67 | | | | | | | | | | |
| 11 | 8 | | | | | | | | 1 | 1 | |
| 12 | 14 | | | | | | 1 | | 1 | 1 | |
| 13 | 59 | | | | | | 1 | | 1 | 1 | |
| 14 | 55 | | | | | | 1 | 1 | 1 | 1 | |
| 15 | 15 | | | | | | 1 | 1 | 1 | 1 | |
| 16 | 12 | | | | | | 2 | 1 | 1 | 1 | |
| 17 | 34 | | | | | | 2 | 1 | 2 | 2 | |
| TOTAL (LF) | | 39 | 80 | 12 | 60 | 84 | 736 | 756 | 577 | 642 | |

| POLE DATA | |
|--------------------|--------------------|
| TIMBER POLE NUMBER | TIMBER POLE HEIGHT |
| T1 | 50' |
| T2 | 50' |
| T3 | 50' |
| T4 | 50' |

| GROUND BOX SUMMARY (ITEM 624 6008) | | | |
|------------------------------------|--------------------|------|-----|
| TYPE | DESCRIPTION | UNIT | QTY |
| C | NO 162911 W/ APRON | EA | 1 |

NOTES:

- ALL ITEMS LISTED ON THIS SHEET ARE FOR CONTRACTOR'S INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO ITEM 681 6001 TEMP TRAF SIGNALS.
- REFER TO PERMANENT TRAFFIC SIGNAL FOR ELECTRICAL SERVICE CENTER.

* TOTAL INCLUDES: 42 FEET FOR SIGNAL HEAD AND ADVANCE RADAR RELOCATIONS BETWEEN PHASES AND RAIN LOOPS ON SPAN T1-T2, COIL EXCESS ON POLE T1; 36 FEET FOR SIGNAL HEAD AND ADVANCE RADAR RELOCATIONS BETWEEN PHASES AND RAIN LOOPS ON SPAN T2-T3, COIL EXCESS ON POLE T2; 48 FEET FOR SIGNAL HEAD AND ADVANCE RADAR RELOCATIONS BETWEEN PHASES AND RAIN LOOPS ON SPAN T1-T4, COIL EXCESS ON POLE T1; 34 FEET FOR SIGNAL HEAD AND ADVANCE RADAR RELOCATIONS BETWEEN PHASES AND RAIN LOOPS ON SPAN T4-T3, COIL EXCESS ON POLE T4; ADVANCE RADAR CABLE SUPPLIED BY TXDOT AND INSTALLED BY CONTRACTOR.

* * : SUPPLIED BY CITIES OF ROCKWALL AND FATE; TOTAL INCLUDES EXCESS LENGTH FOR RELOCATIONS BETWEEN PHASES; COIL EXCESS ON POLES. FOR CONTRACTOR INFORMATION ONLY.

* * * : VIVDS PRESENCE DETECTION CAMERAS AND CABLE SUPPLIED AND INSTALLED BY CONTRACTOR.



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243
 TA I TBPE Firm Registration No. 6981

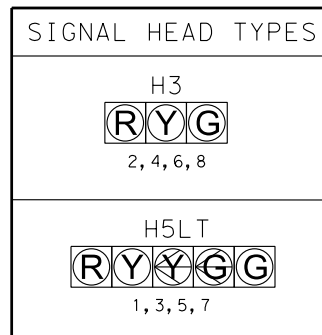


TEMPORARY TRAFFIC SIGNAL QUANTITIES

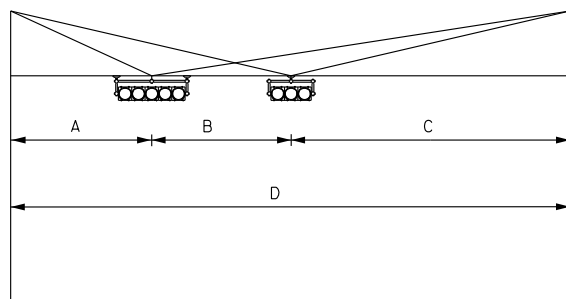
SHEET 1 OF 2

| | | | | |
|-------------|---------------------|---|----------|---------------------|
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| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
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| | 1015 | 01 | 023 | |

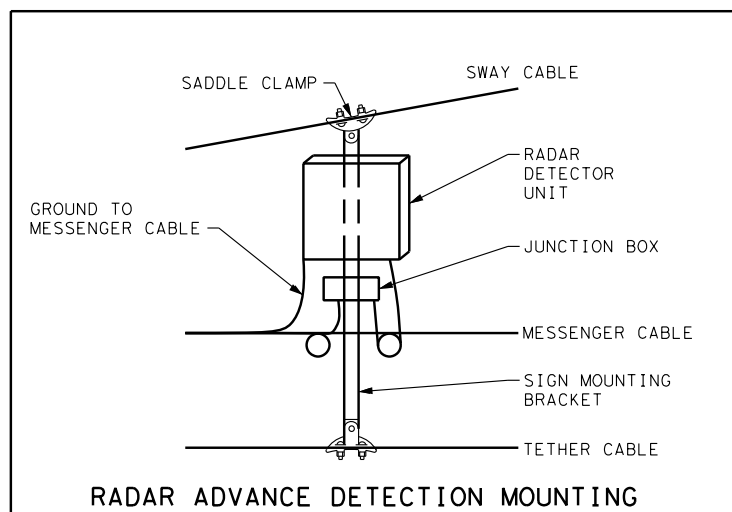
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| SIGNAL HEAD SUMMARY | | | | | | | | | | |
|---------------------|------------------|-----------------------|-------|----------|---------------------------------|----------|----------|---------------|----------|----------|
| SIGNAL HEAD NO. | SIGNAL HEAD TYPE | ITEM 682 - BACK PLATE | | | ITEM 682 - TRAFFIC SIGNAL LAMPS | | | | | |
| | | 6023 | 6024 | 6025 | 6005 | 6003 | 6001 | 6006 | 6004 | 6002 |
| | | 12" SIGNAL INDICATION | | | 12" LED BALL | | | 12" LED ARROW | | |
| | | 3 SEC | 4 SEC | 5 SEC | RED | YELLOW | GREEN | RED | YELLOW | GREEN |
| EA | EA | EA | EA | EA | EA | EA | EA | EA | EA | |
| 2, 4, 6, 8 | H3 | 4 | | | 4 | 4 | 4 | | | |
| 1, 3, 5, 7 | H5LT | | | 4 | 4 | 4 | | | 4 | 4 |
| TOTAL | | 4 | | 4 | 8 | 8 | 8 | | 4 | 4 |



| SIGNAL HEAD PLACEMENT (FT) | | | | | | | | | | | | | | | | |
|----------------------------|---------|----|----|-----|-----------------|----|----|-----|-----------------|----|----|-----|---------|----|----|-----|
| SPAN | PHASE 2 | | | | PHASE 3, STEP 1 | | | | PHASE 3, STEP 2 | | | | PHASE 4 | | | |
| | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| T1-T2 | 80 | 14 | 55 | 149 | 80 | 14 | 55 | 149 | 110 | 15 | 24 | 149 | 110 | 15 | 24 | 149 |
| T2-T3 | 59 | 11 | 45 | 115 | 59 | 11 | 45 | 115 | 84 | 11 | 20 | 115 | 84 | 11 | 20 | 115 |
| T3-T4 | 75 | 14 | 59 | 148 | 75 | 14 | 59 | 148 | 99 | 14 | 35 | 148 | 99 | 14 | 35 | 148 |
| T4-T1 | 55 | 15 | 46 | 116 | 55 | 15 | 46 | 116 | 20 | 14 | 82 | 116 | 20 | 14 | 82 | 116 |



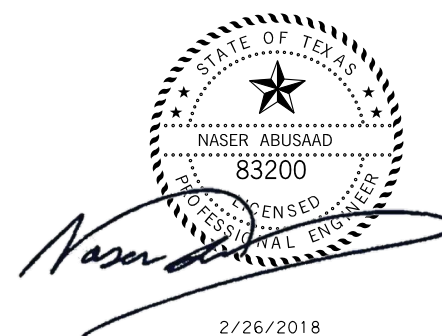
| CABLE TERMINATION CHART | | | | | |
|-------------------------|-----------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| CNDR NO. | CONDUCTOR COLOR | CABLE 1 FROM T1-T2 TO CNTRL 9-CNDR. | CABLE 2 FROM T2-T3 TO CNTRL 9-CNDR. | CABLE 3 FROM T3-T4 TO CNTRL 9-CNDR. | CABLE 4 FROM T4-T1 TO CNTRL 9-CNDR. |
| 1 | BLACK | SPARE | SPARE | SPARE | SPARE |
| 2 | WHITE | SIG COMM | SIG COMM | SIG COMM | SIG COMM |
| 3 | RED | SH 1, 2: R | SH 3, 4: R | SH 5, 6: R | SH 7, 8: R |
| 4 | GREEN | SH 1, 2: G | SH 3, 4: G | SH 5, 6: G | SH 7, 8: G |
| 5 | ORANGE | SH 1, 2: Y | SH 3, 4: Y | SH 5, 6: Y | SH 7, 8: Y |
| 6 | BLUE | SH 1: G LT ARW | SH 3: G LT ARW | SH 5: G LT ARW | SH 7: G LT ARW |
| 7 | WHITE/BLACK | SH 1: Y LT ARW | SH 3: Y LT ARW | SH 5: Y LT ARW | SH 7: Y LT ARW |
| 8 | RED/BLACK | SPARE | SPARE | SPARE | SPARE |
| 9 | GREEN/BLACK | SPARE | SPARE | SPARE | SPARE |

| DETECTION ZONE DETAILS | | | | | | |
|------------------------|-------------------|-----------------|---------------|-----------|---------------------------|---------------------|
| VIVDS /RADAR | MOUNTING LOCATION | MOUNTING HEIGHT | ZONE LOCATION | ZONE | SETBACK DISTANCE | DETECTION DIMENSION |
| C1 | POLE T1 | 28' | STOPBAR | PH 2 (EB) | N/A | 6' X 90' |
| C2 | POLE T2 | 28' | STOPBAR | PH 4 (SB) | N/A | 6' X 90' |
| C3 | POLE T3 | 28' | STOPBAR | PH 6 (WB) | N/A | 6' X 90' |
| C4 | POLE T4 | 28' | STOPBAR | PH 8 (NB) | N/A | 6' X 90' |
| R5 | SPAN T1-T2 | 20' | SETBACK | PH 8 (NB) | 100' TO 500' FROM STOPBAR | N/A |
| R6 | SPAN T2-T3 | 20' | SETBACK | PH 2 (EB) | 100' TO 500' FROM STOPBAR | N/A |
| R7 | SPAN T3-T4 | 20' | SETBACK | PH 4 (SB) | 100' TO 500' FROM STOPBAR | N/A |
| R8 | SPAN T4-T1 | 20' | SETBACK | PH 6 (WB) | 100' TO 500' FROM STOPBAR | N/A |

NOTE: CONTRACTOR IS RESPONSIBLE FOR REALIGNING DETECTION ZONES FOR EACH CONSTRUCTION PHASE.

NOTES:

- ALL ITEMS LISTED ON THIS SHEET ARE FOR CONTRACTOR'S INFORMATION ONLY. THESE ITEMS ARE SUBSIDIARY TO ITEM 681 6001 TEMP TRAF SIGNALS.
- REFER TO PERMANENT TRAFFIC SIGNAL FOR ELECTRICAL SERVICE CENTER.



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ATKINS TBPE REG. # F-474

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TEMPORARY TRAFFIC SIGNAL QUANTITIES

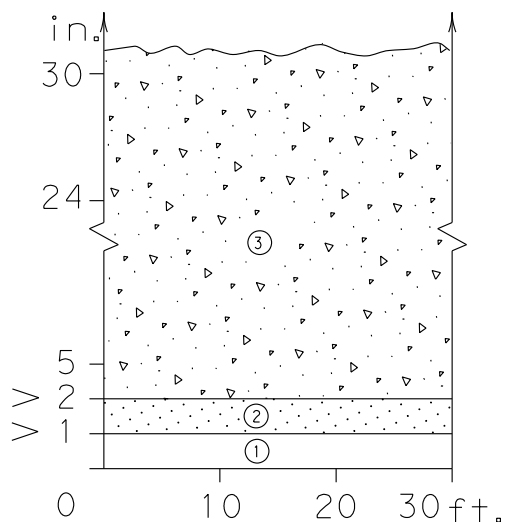
SHEET 2 OF 2

| | | | | |
|-------------|---------------------|---|----------|---------------------|
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| GRAPHICS BS | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS | ROCKWALL | 86 |
| CHECK NA | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

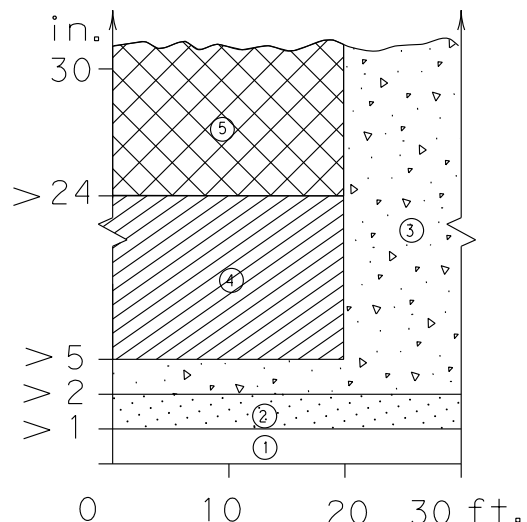
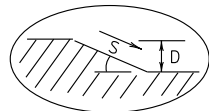
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DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

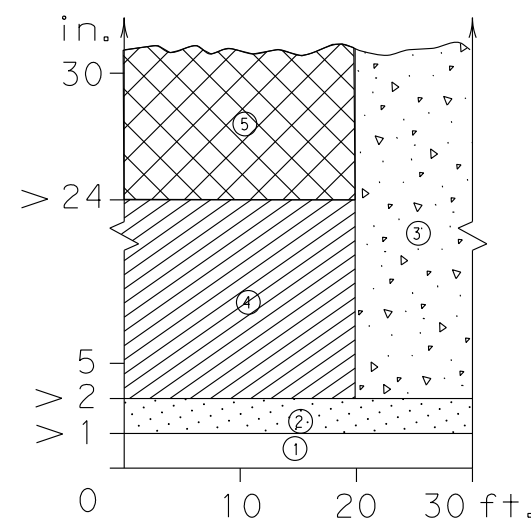
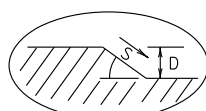
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



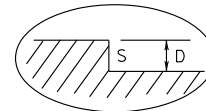
Edge Condition I
S = (3:1) (or flatter)



Edge Condition II
S = ((2.99):1) to (1:1)

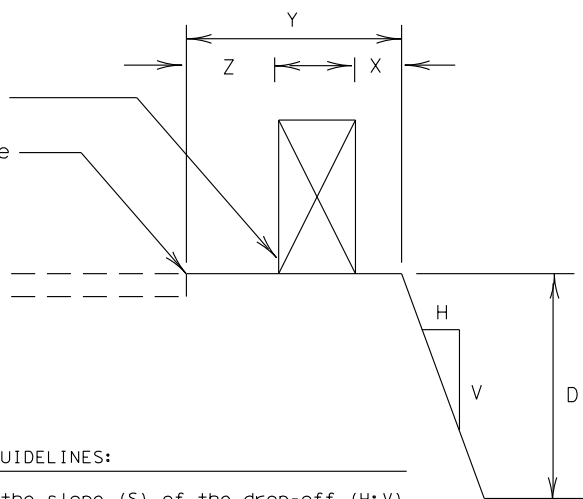


Edge Condition III
S is steeper than (1:1)



Warning Device or Traffic Barrier

4" White Edge Line or Edge of Lanes being used for maintenance of traffic.



FACTORS CONSIDERED IN THE GUIDELINES:

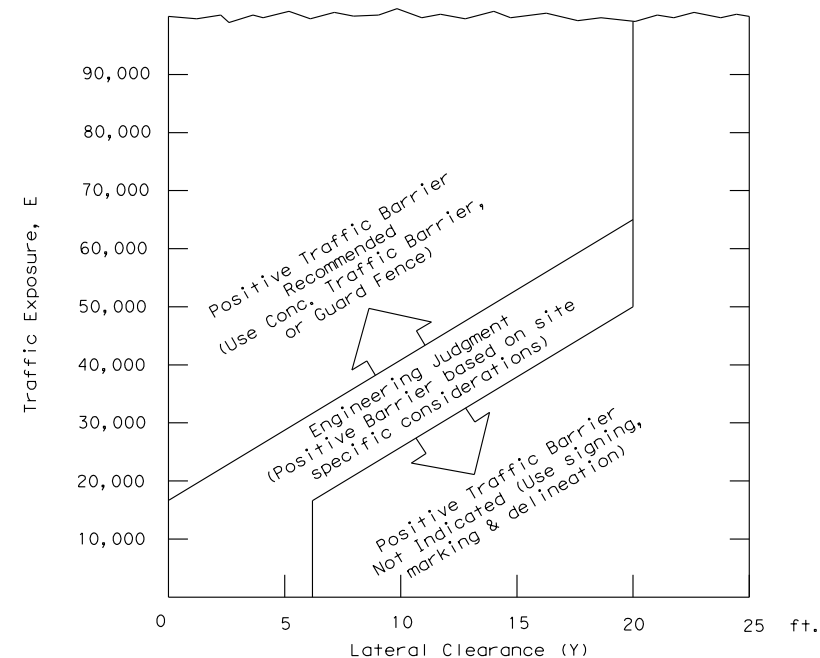
- The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".
- Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
- In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
- The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
- If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

| Zone | Treatment Types Guidelines: |
|------|---|
| ① | No treatment. |
| ② | CW 8-11 "Uneven Lanes" signs. |
| ③ | CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels. |
| ④ | CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I. |
| ⑤ | Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors. |

Edge Condition Notes:

- Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
- Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exceeds 24 inches, the possibility for rollover is greater in most vehicles.
- Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
- Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ([Cross-hatched symbol])



- $E = ADT \times T$
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

DATE: FILE:

Engineer's Seal

Date 2/26/2018

Tara McDonald

Texas Department of Transportation
Traffic Operations Division

TREATMENT FOR VARIOUS EDGE CONDITIONS

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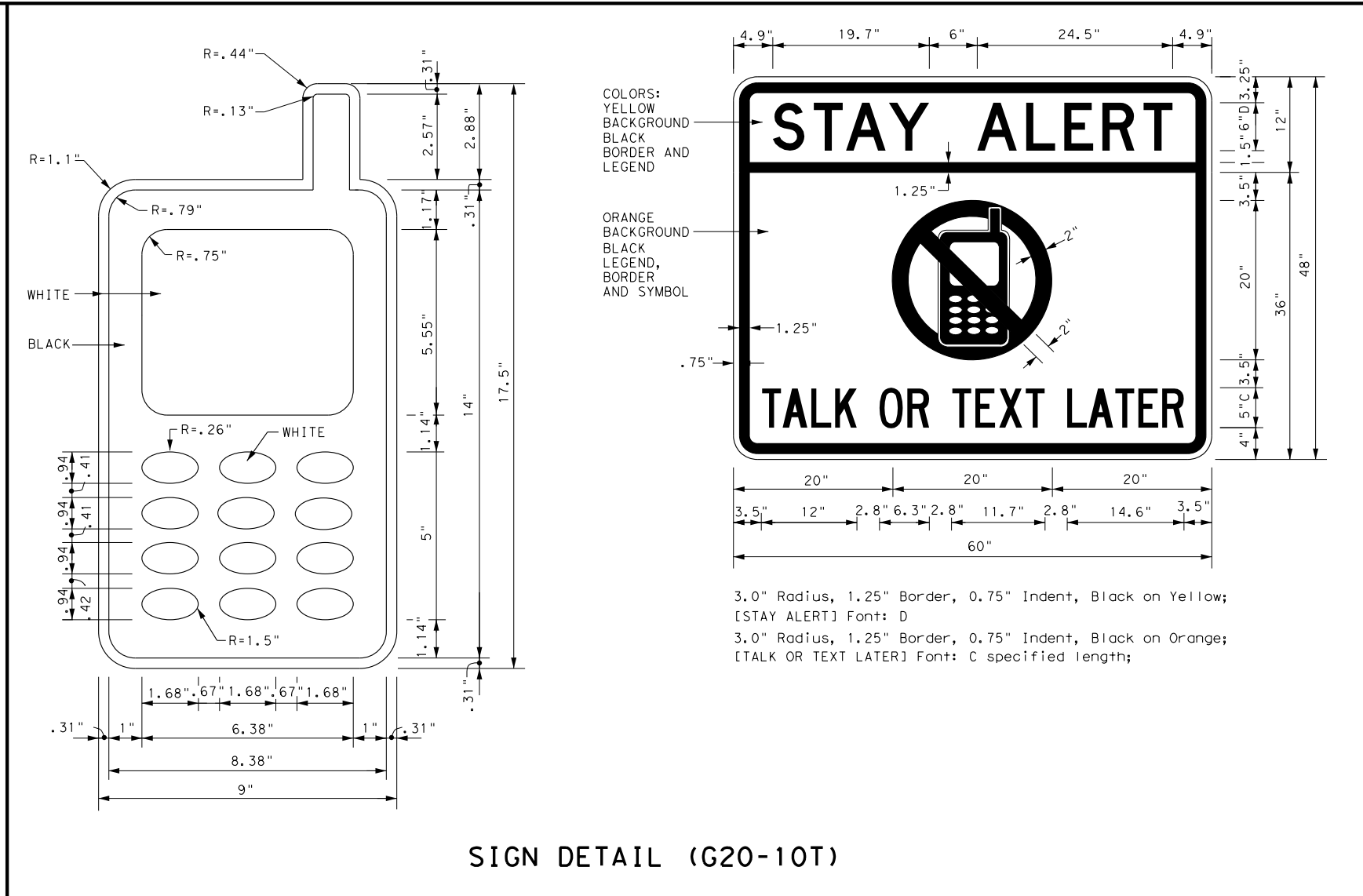
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
- The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
- Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
- When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
- The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
- All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
- The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
- As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
- Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

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

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

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

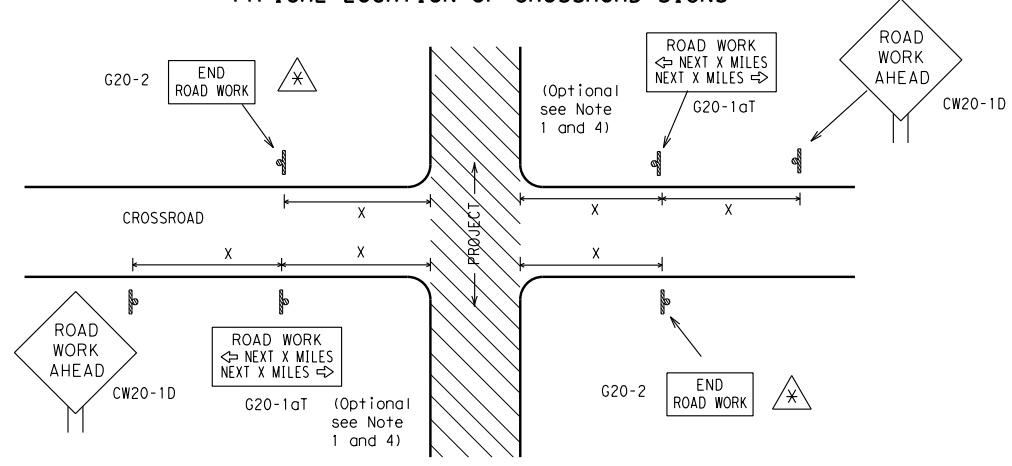
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| THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov | |
| COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD) | |
| DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) | |
| MATERIAL PRODUCER LIST (MPL) | |
| ROADWAY DESIGN MANUAL - SEE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

SHEET 1 OF 12

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| | | <i>Traffic Operations Division Standard</i> |
| BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS | | |
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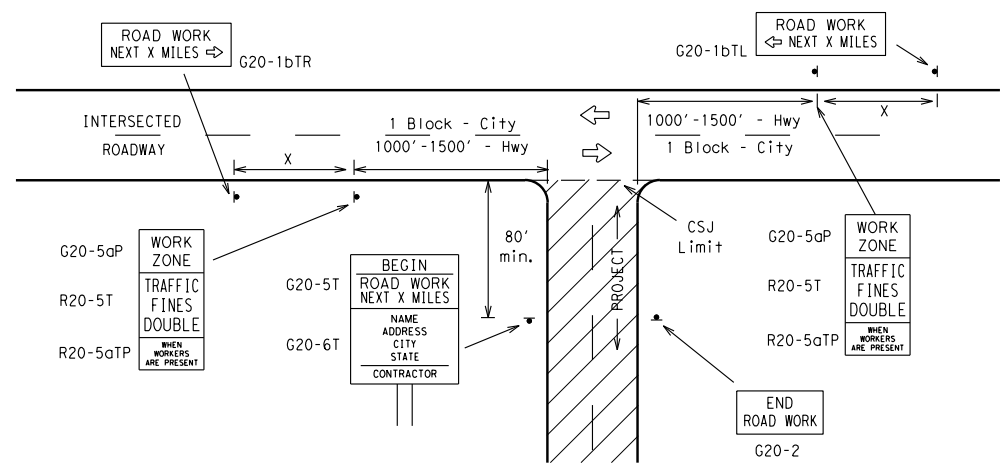
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TYPICAL LOCATION OF CROSSROAD SIGNS



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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING 15.6

| Sign Number or Series | SIZE | | SPACING | |
|---------------------------------------|-------------------|--------------------|--------------|--------------------|
| | Conventional Road | Expressway/Freeway | Posted Speed | Sign Δ Spacing "X" |
| CW20 ⁴ | 48" x 48" | 48" x 48" | MPH | Feet (Apprx.) |
| CW21 | | | 30 | 120 |
| CW22 | | | 35 | 160 |
| CW23 | | | 40 | 240 |
| CW25 | | | 45 | 320 |
| CW1, CW2, CW7, CW8, CW9, CW11, CW14 | 36" x 36" | 48" x 48" | 50 | 400 |
| CW3, CW4, CW5, CW6, CW8-3, CW10, CW12 | 48" x 48" | 48" x 48" | 60 | 600 ² |
| | | | 65 | 700 ² |
| | | | 70 | 800 ² |
| | | | 75 | 900 ² |
| | | | 80 | 1000 ² |
| | | | * | * ³ |

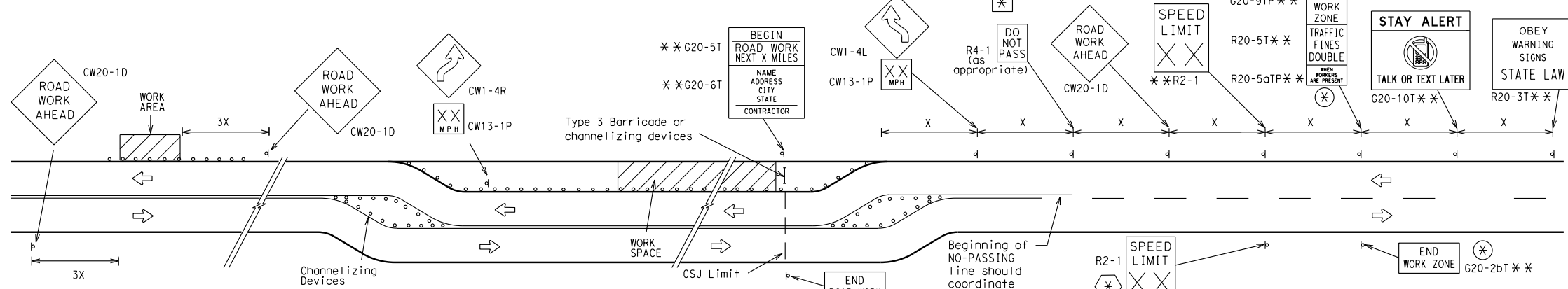
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

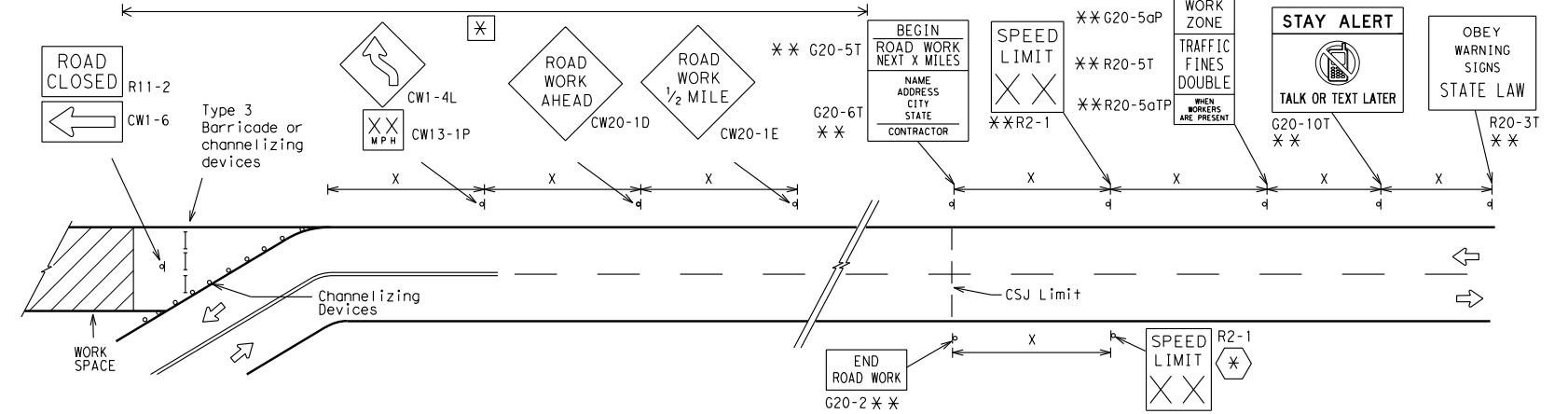
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be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

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

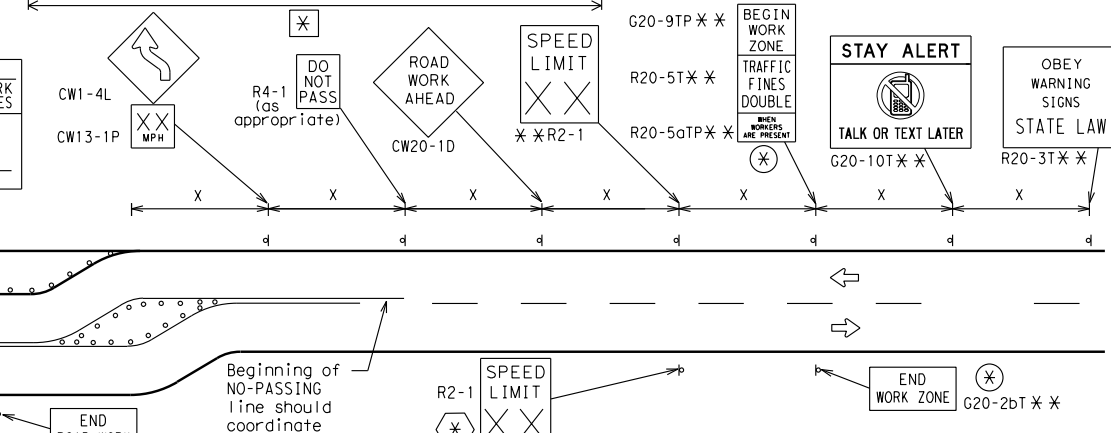


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

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



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- ⊛ The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
- ** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.
- ⊛ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
- ⊛ Contractor will install a regulatory speed limit sign at the end of the work zone.

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

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BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

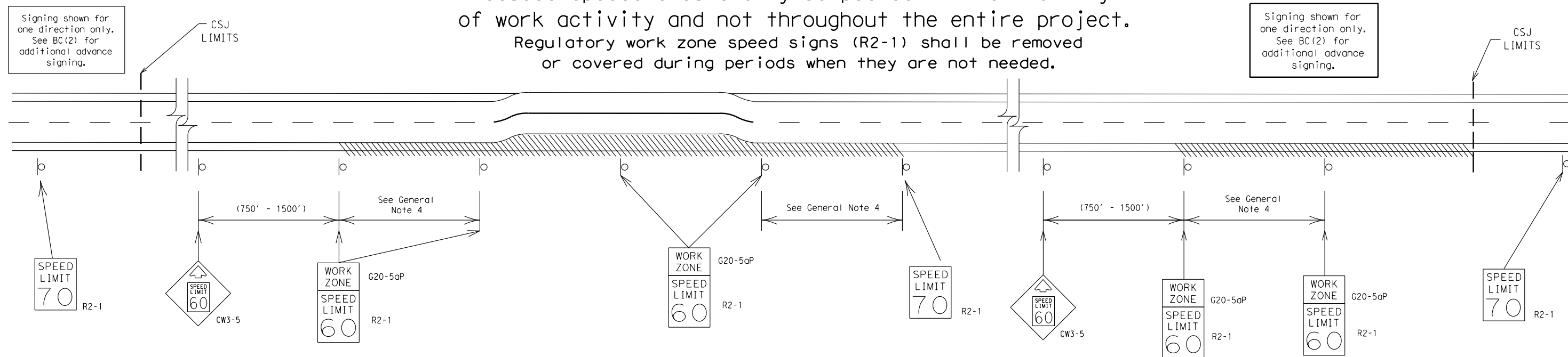
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

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

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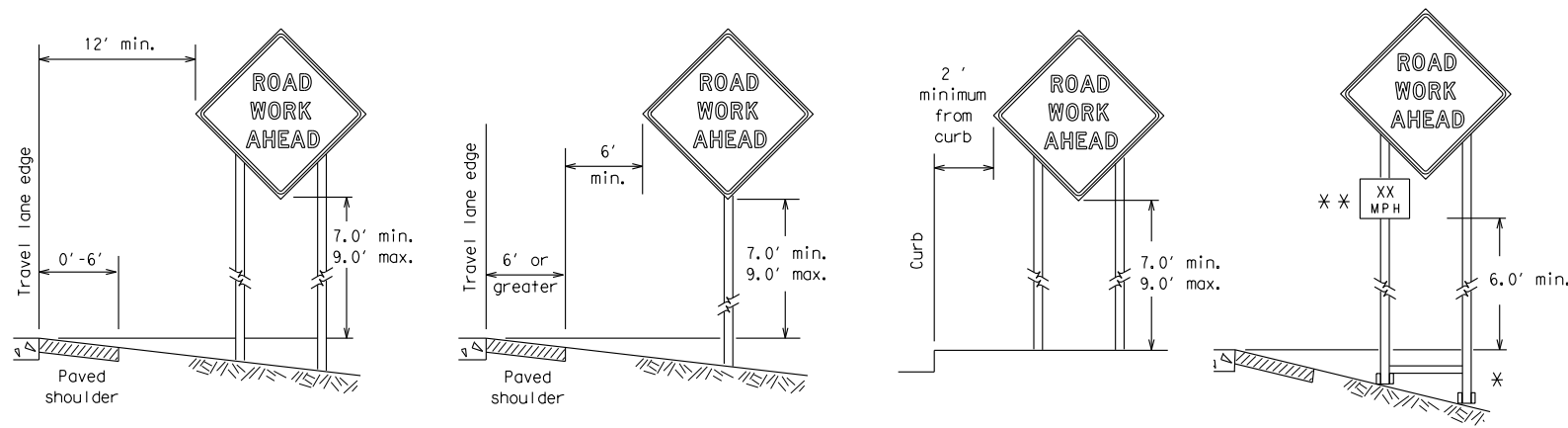


BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 14

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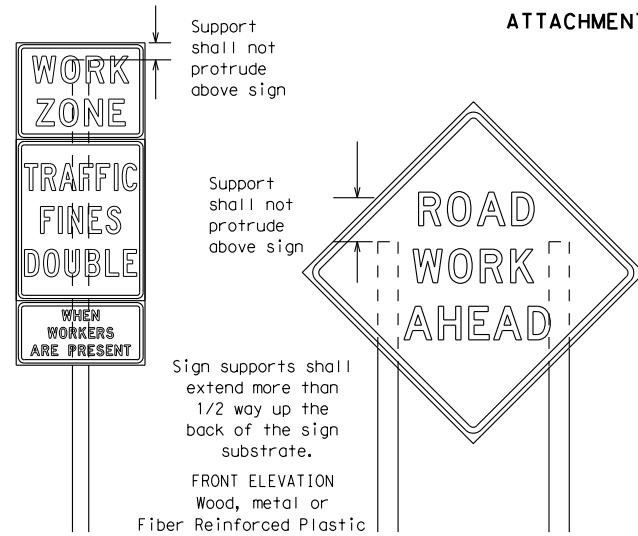
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



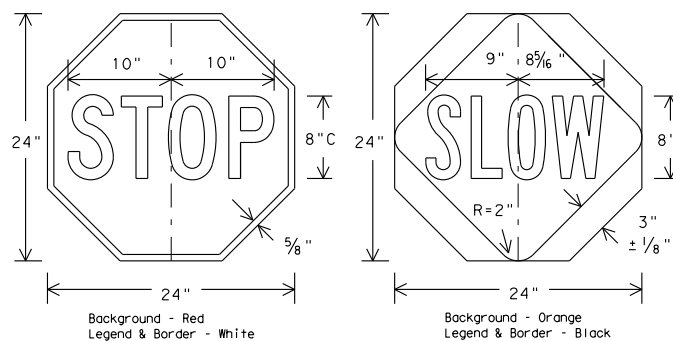
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

SHEET 4 OF 12



BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

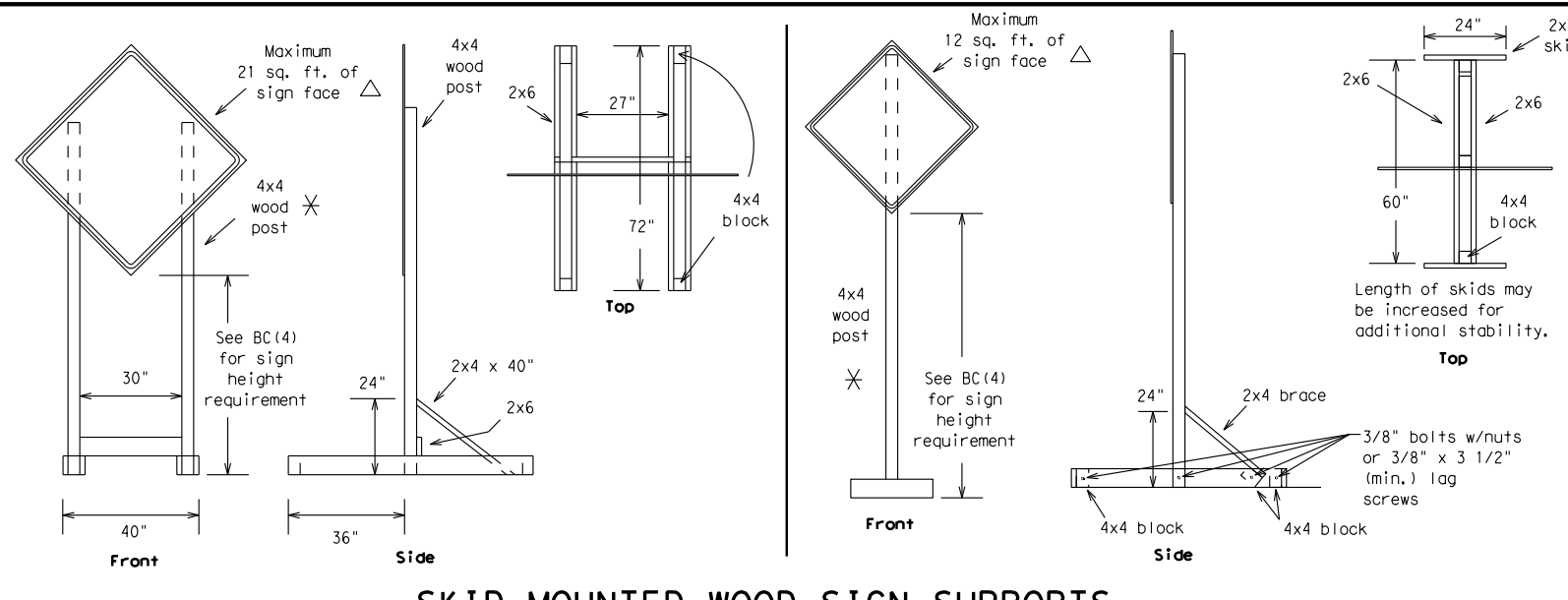
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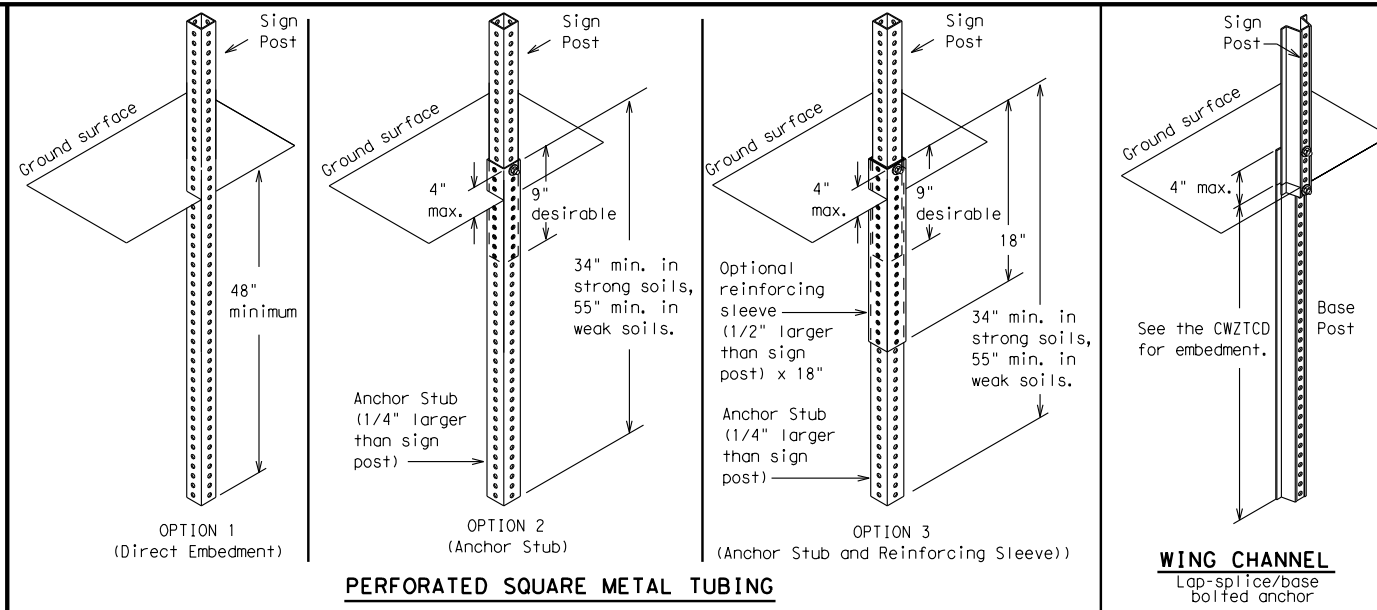
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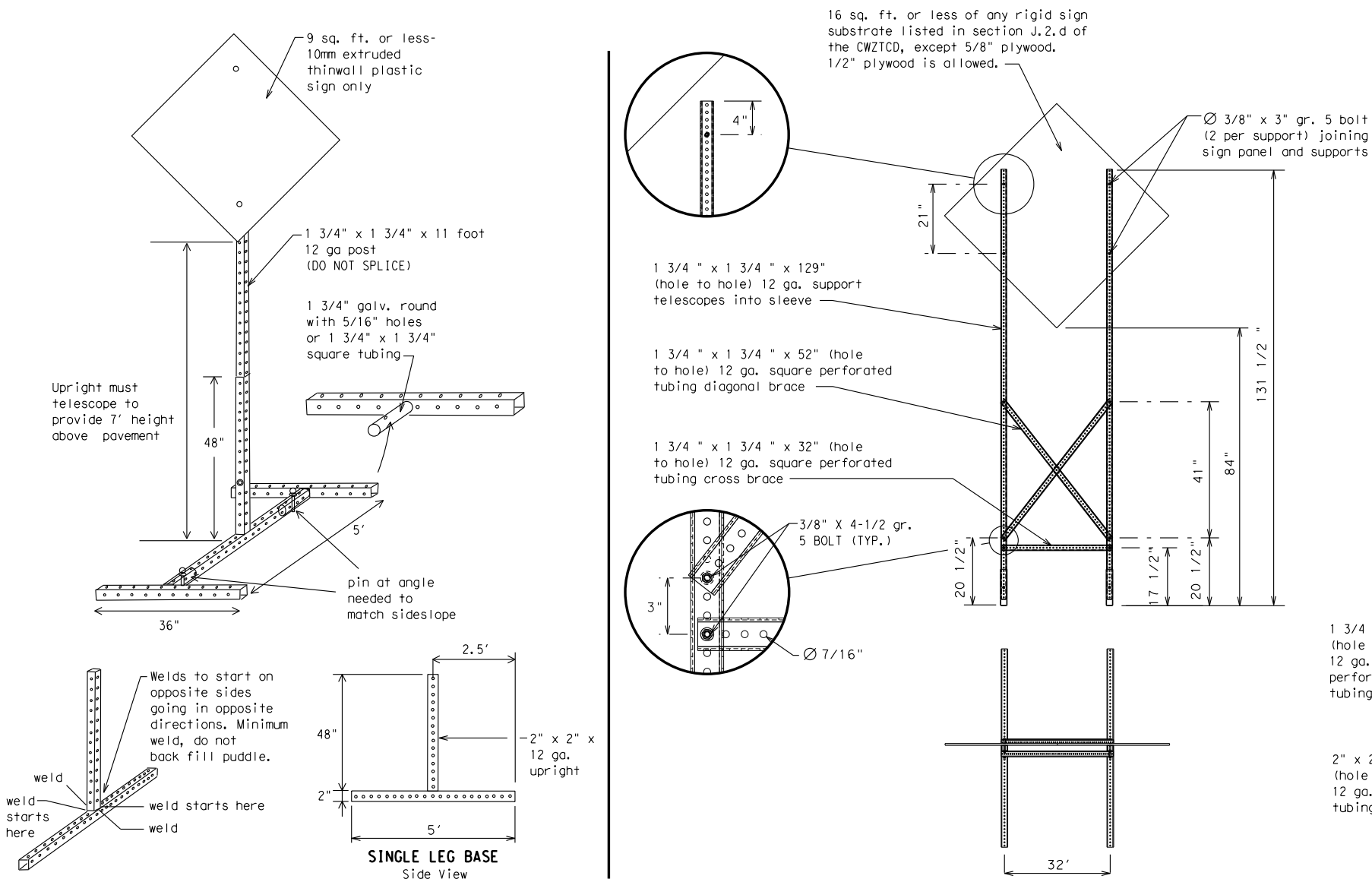
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS \square

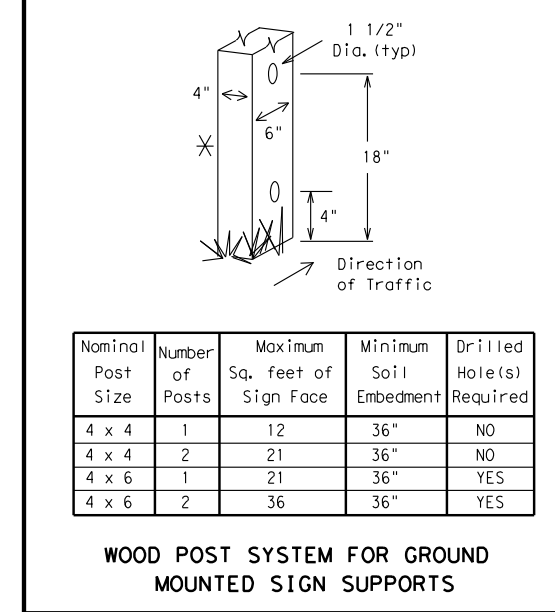


GROUND MOUNTED SIGN SUPPORTS

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



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 14

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

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| WORD OR PHRASE | ABBREVIATION | WORD OR PHRASE | ABBREVIATION |
|------------------------|--------------|----------------|--------------|
| Access Road | ACCS RD | Major | MAJ |
| Alternate | ALT | Miles | MI |
| Avenue | AVE | Miles Per Hour | MPH |
| Best Route | BEST RTE | Minor | MNR |
| Boulevard | BLVD | Monday | MON |
| Bridge | BRDG | Normal | NORM |
| Canal | CANT | North | N |
| Center | CTR | Northbound | (route) N |
| Construction Ahead | CONST AHD | Parking | PKING |
| CROSSING | XING | Road | RD |
| Detour Route | DETOUR RTE | Right Lane | RT LN |
| Do Not | DONT | Saturday | SAT |
| East | E | Service Road | SERV RD |
| Eastbound | (route) E | Shoulder | SHLDR |
| Emergency | EMER | Slippery | SLIP |
| Emergency Vehicle | EMER VEH | South | S |
| Entrance, Enter | ENT | Southbound | (route) S |
| Express Lane | EXP LN | Speed | SPD |
| Expressway | EXPWY | Street | ST |
| XXXX Feet | XXXX FT | Sunday | SUN |
| Fog Ahead | FOG AHD | Telephone | PHONE |
| Freeway | FRWY, FWY | Temporary | TEMP |
| Freeway Blocked | FWY BLKD | Thursday | THURS |
| Friday | FRI | To Downtown | TO DWNTN |
| Hazardous Driving | HAZ DRIVING | Traffic | TRAF |
| Hazardous Material | HAZMAT | Travelers | TRVLR |
| High-Occupancy Vehicle | HOV | Tuesday | TUES |
| Highway | HWY | Time Minutes | TIME MIN |
| Hour(s) | HR, HRS | Upper Level | UPR LEVEL |
| Information | INFO | Vehicles (s) | VEH, VEHS |
| It Is | ITS | Warning | WARN |
| Junction | JCT | Wednesday | WED |
| Left | LFT | Weight Limit | WT LIMIT |
| Left Lane | LFT LN | West | W |
| Lane Closed | LN CLOSED | Westbound | (route) W |
| Lower Level | LWR LEVEL | Wet Pavement | WET PVMT |
| Maintenance | MAINT | Will Not | WONT |

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

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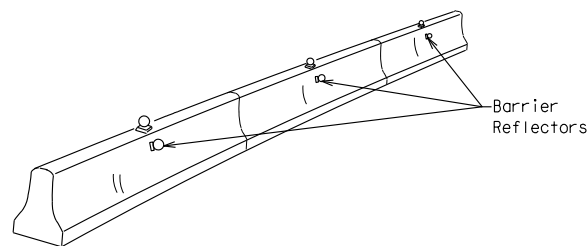
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC (6) - 14

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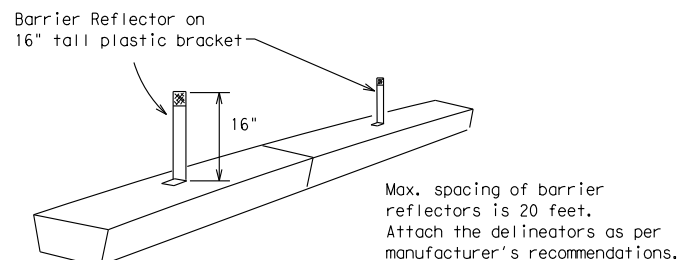
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors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

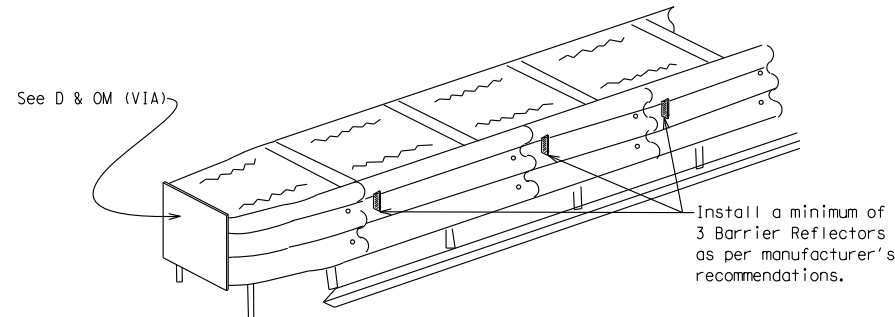


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

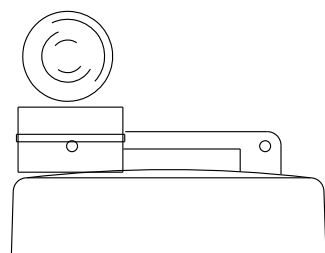
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

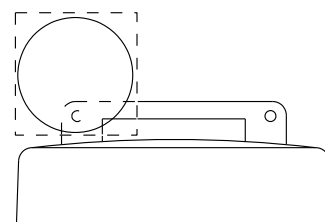
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing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

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

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



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

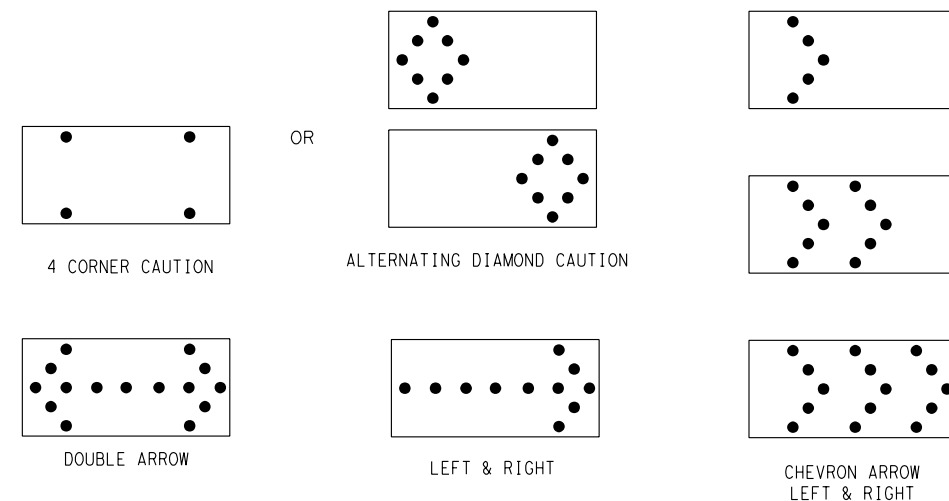


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

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



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

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

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

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

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

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



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

BC (7) - 14

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

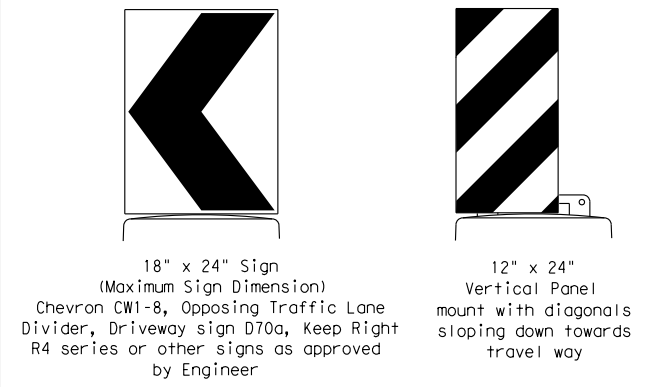
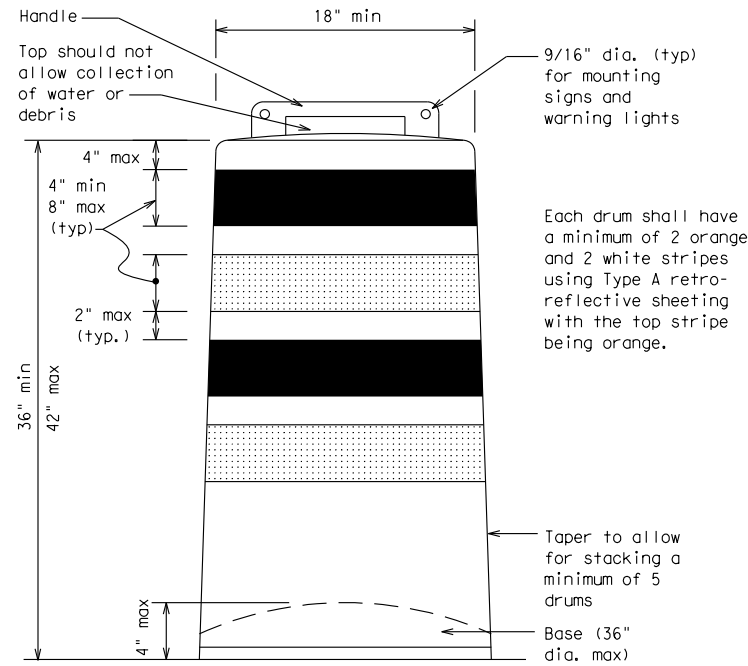
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

RETROREFLECTIVE SHEETING

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

BALLAST

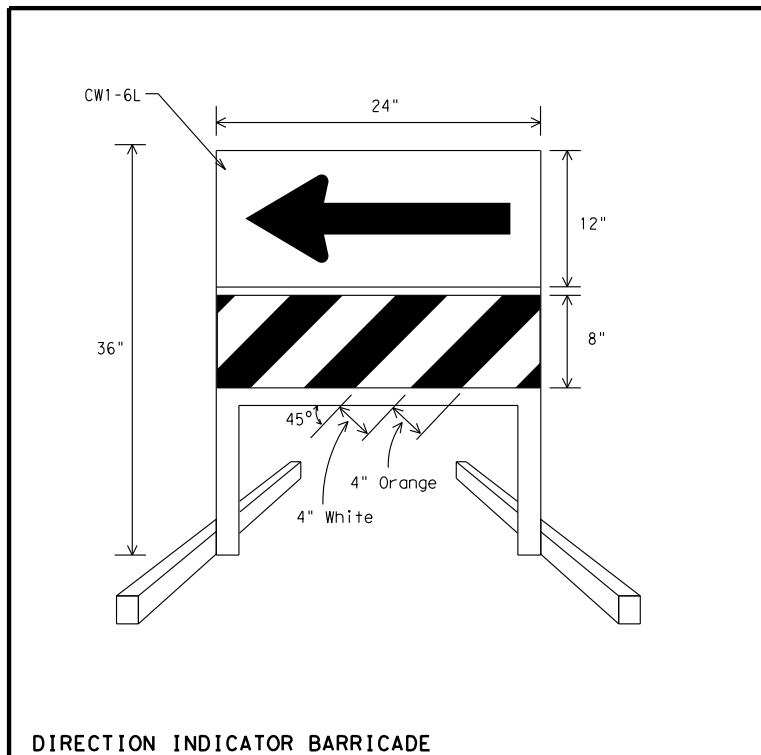
- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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



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

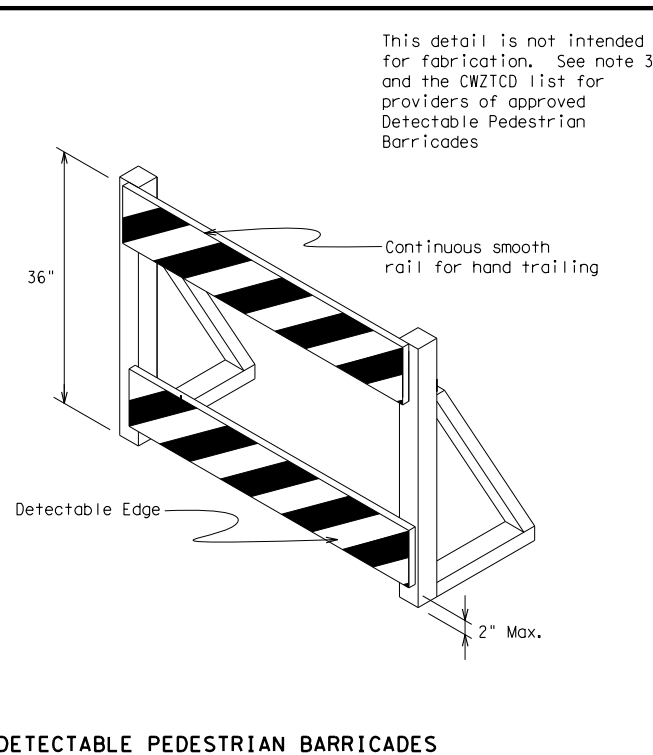
SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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



DIRECTION INDICATOR BARRICADE

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



DETECTABLE PEDESTRIAN BARRICADES

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

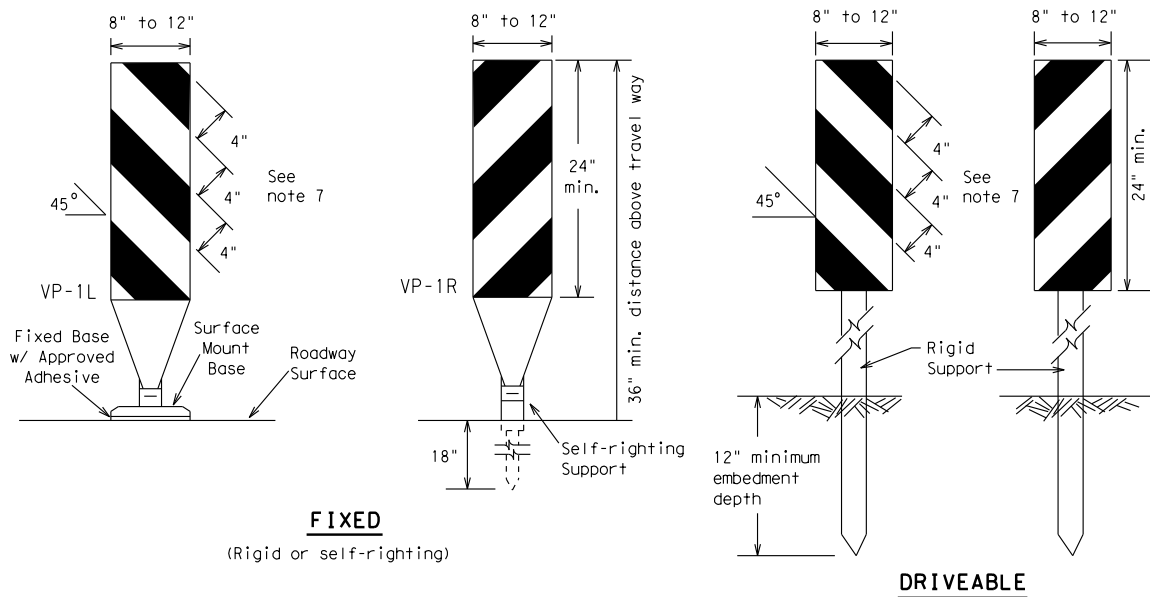


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 14

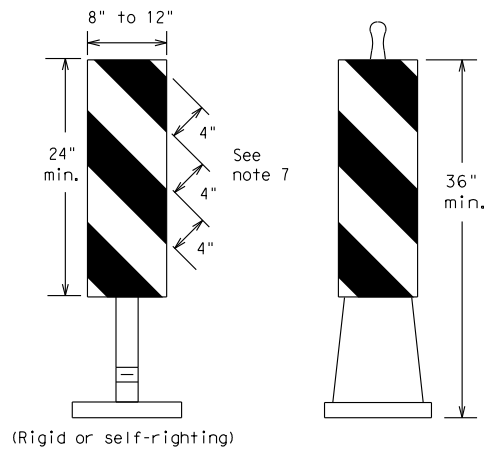
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FIXED
(Rigid or self-righting)

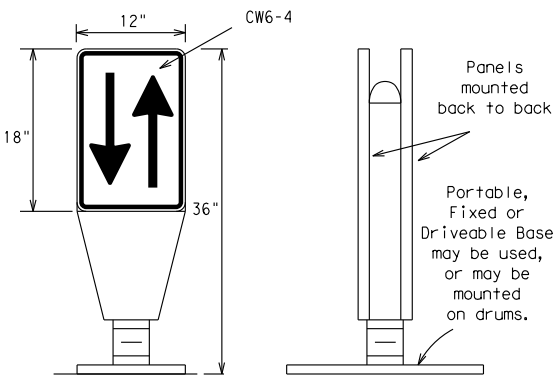
DRIVEABLE



PORTABLE

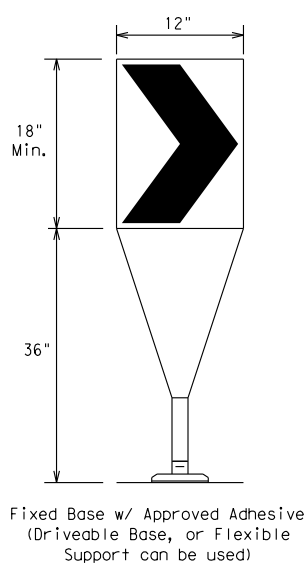
VERTICAL PANELS (VPs)

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



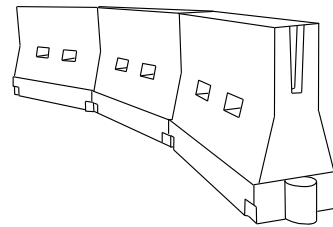
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

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



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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 14

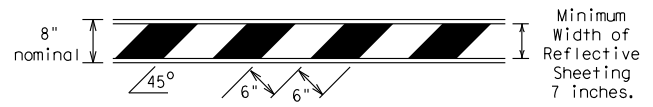
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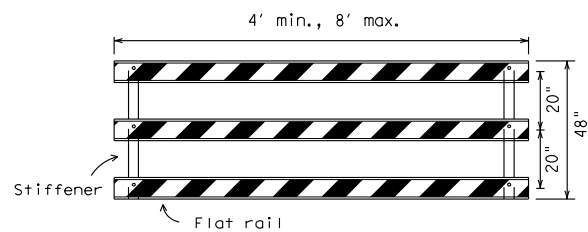
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

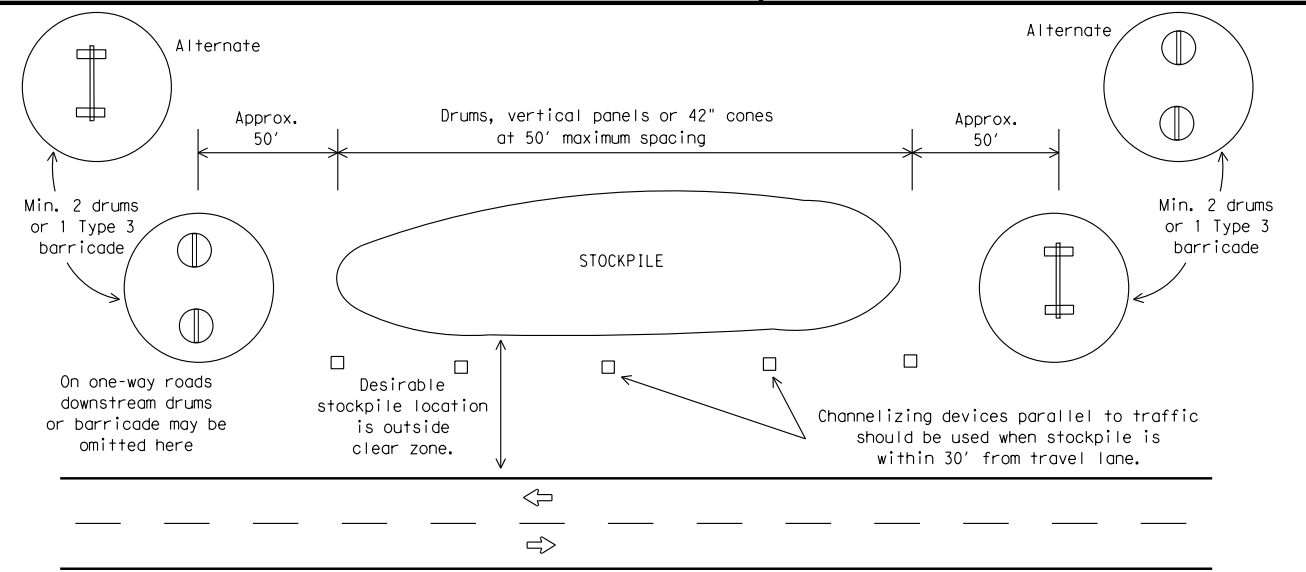


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



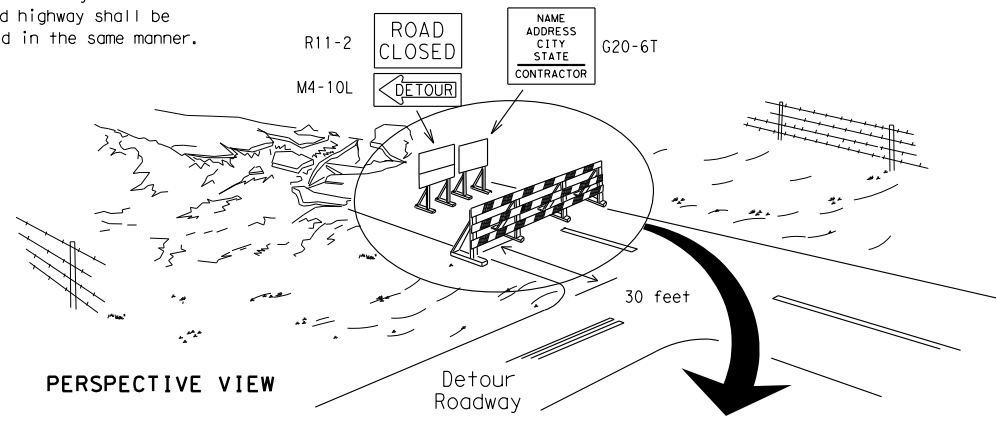
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



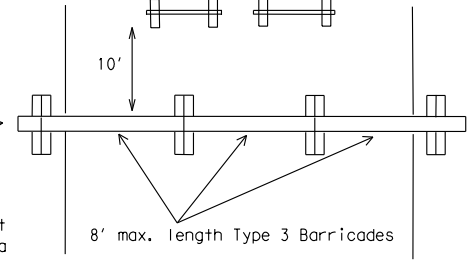
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

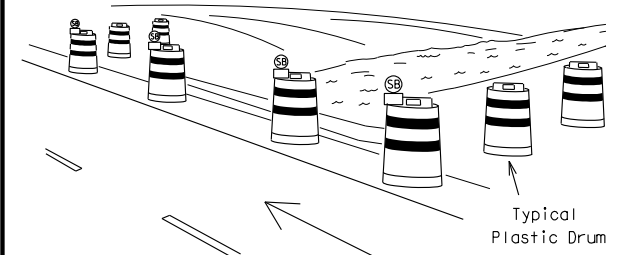
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



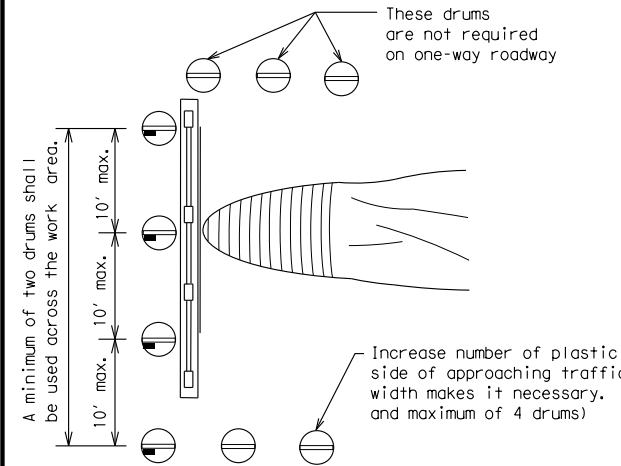
PLAN VIEW

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

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

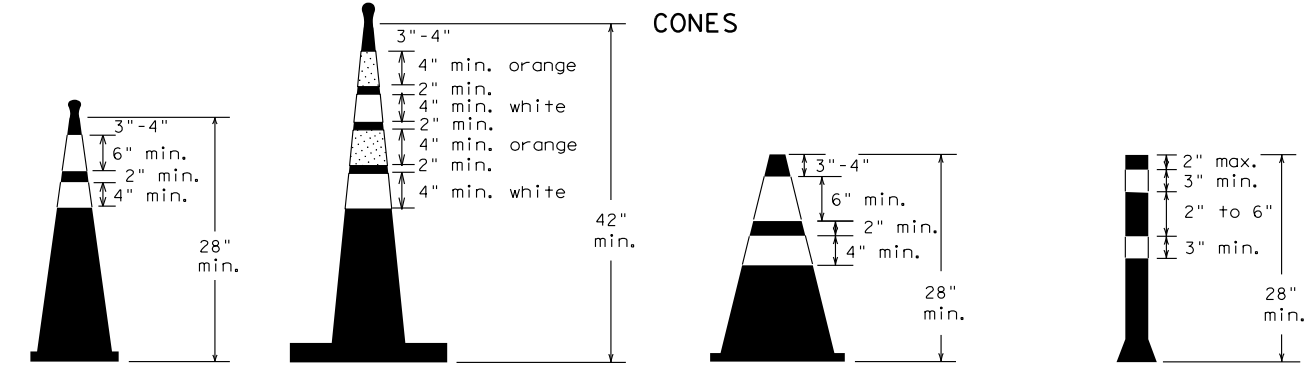


PLAN VIEW

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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



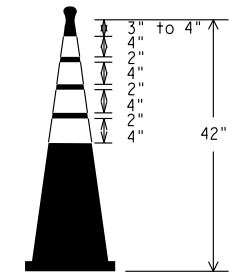
Two-Piece cones

One-Piece cones

Tubular Marker

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

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



EDGE LINE CHANNELIZER

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



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 14

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

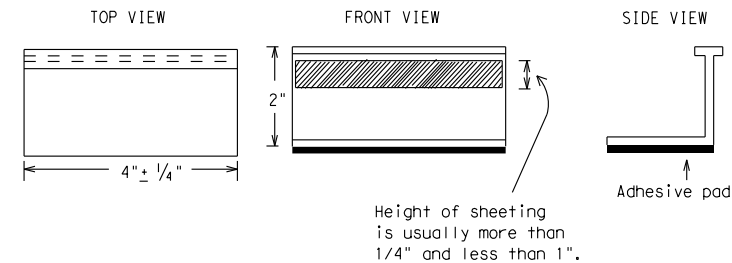
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

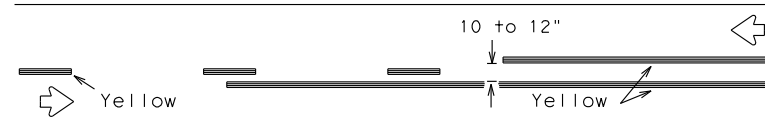
BC(11) - 14

| | | | | |
|-----------------------|-----------|-----------|-----------|-----------|
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| © TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | | | | |
| 2-98 9-07 | 1015 | 01 | 023 | FM 3549 |
| 1-02 7-13 | DIST | COUNTY | | SHEET NO. |
| 11-02 8-14 | DAL | ROCKWALL | | 98 |

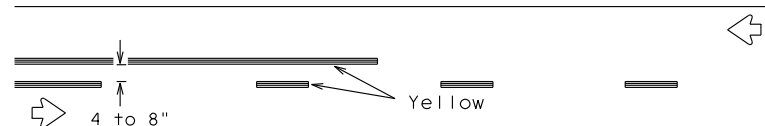
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PAVEMENT MARKING PATTERNS

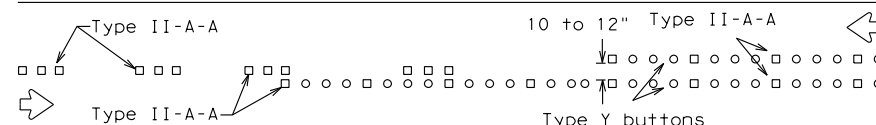


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

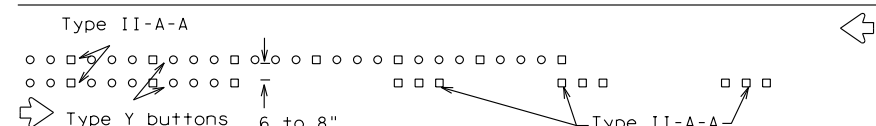


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

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

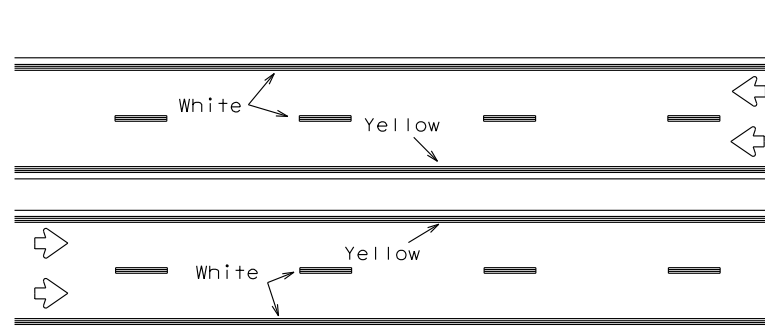


RAISED PAVEMENT MARKERS - PATTERN A



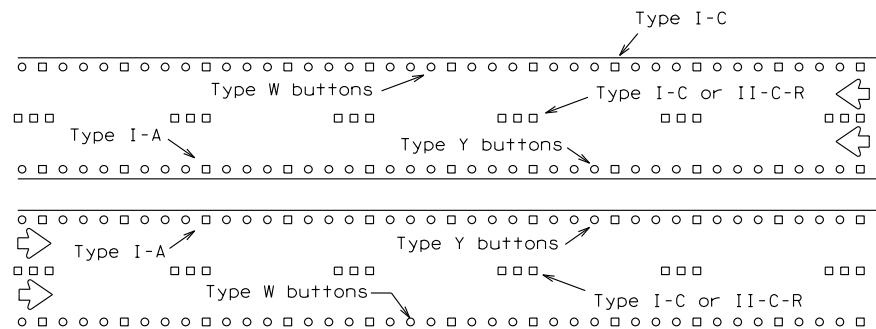
RAISED PAVEMENT MARKERS - PATTERN B

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



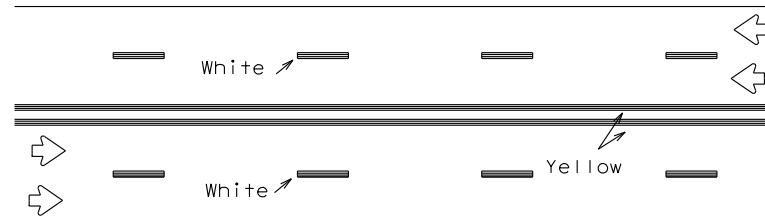
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



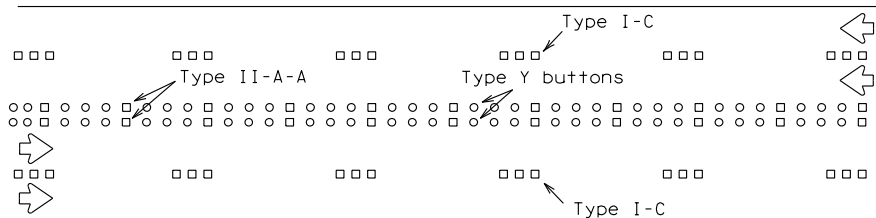
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



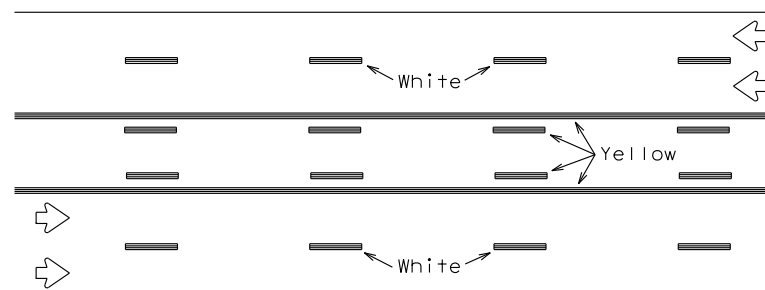
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



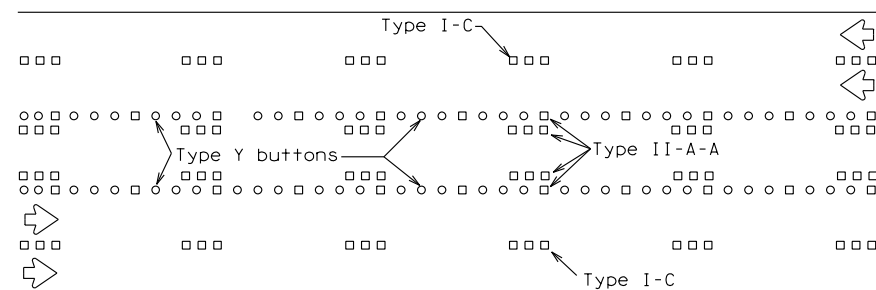
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

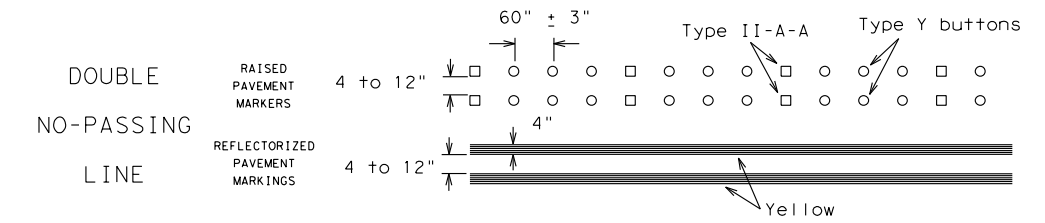
Prefabricated markings may be substituted for reflectORIZED pavement markings.



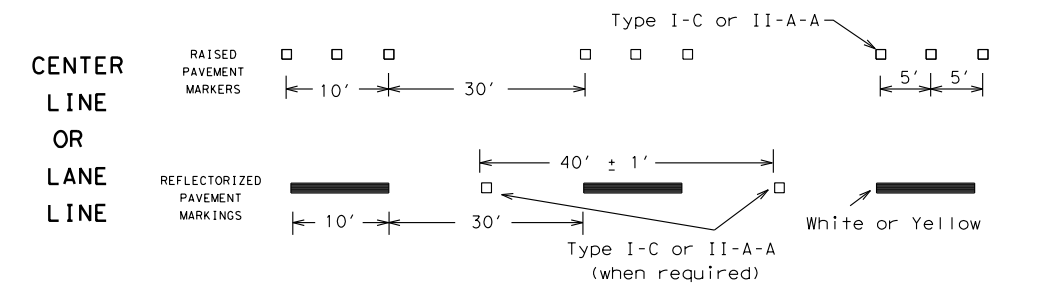
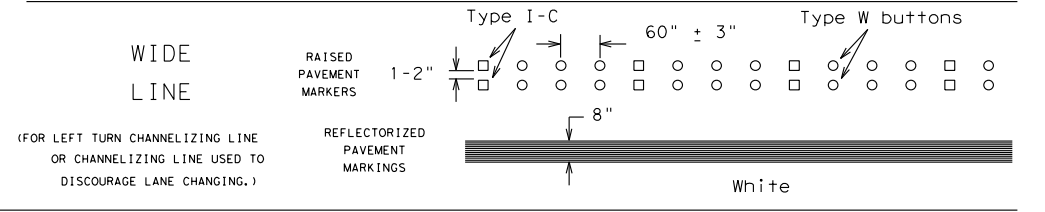
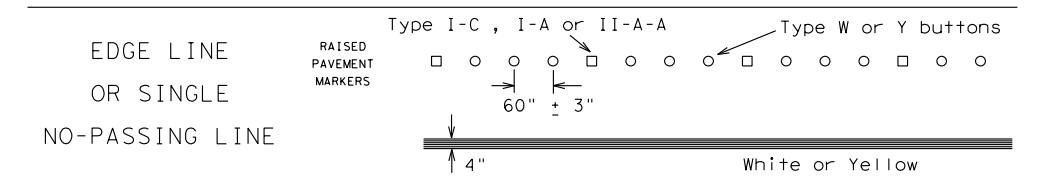
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

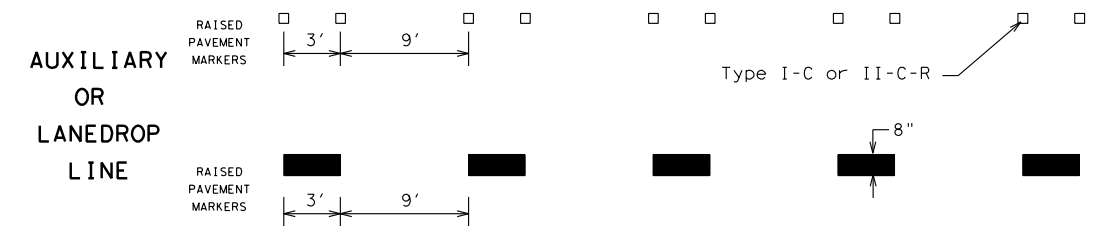
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

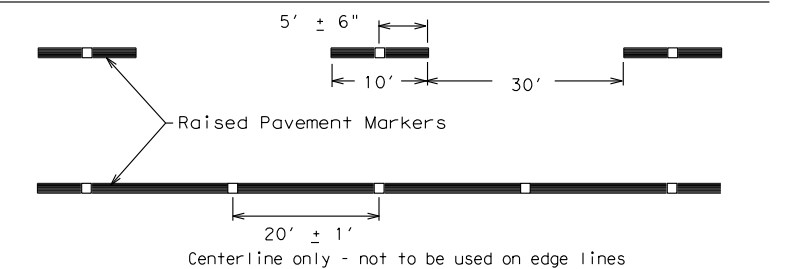


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC (12) - 14

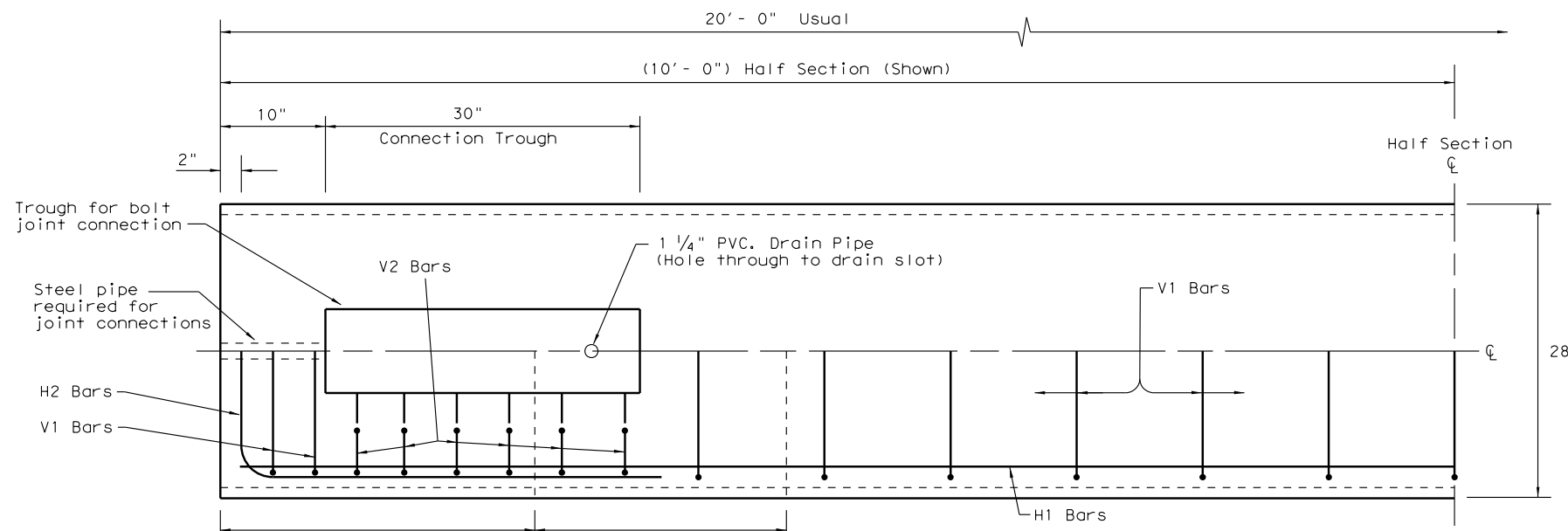
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| ©TxDOT February 1998 | CONT | SECT | JOB | HIGHWAY |
| 1-97 9-07 | 1015 | 01 | 023 | FM 3549 |
| 2-98 7-13 | DIST | COUNTY | SHEET NO. | |
| 11-02 8-14 | DAL | ROCKWALL | 99 | |

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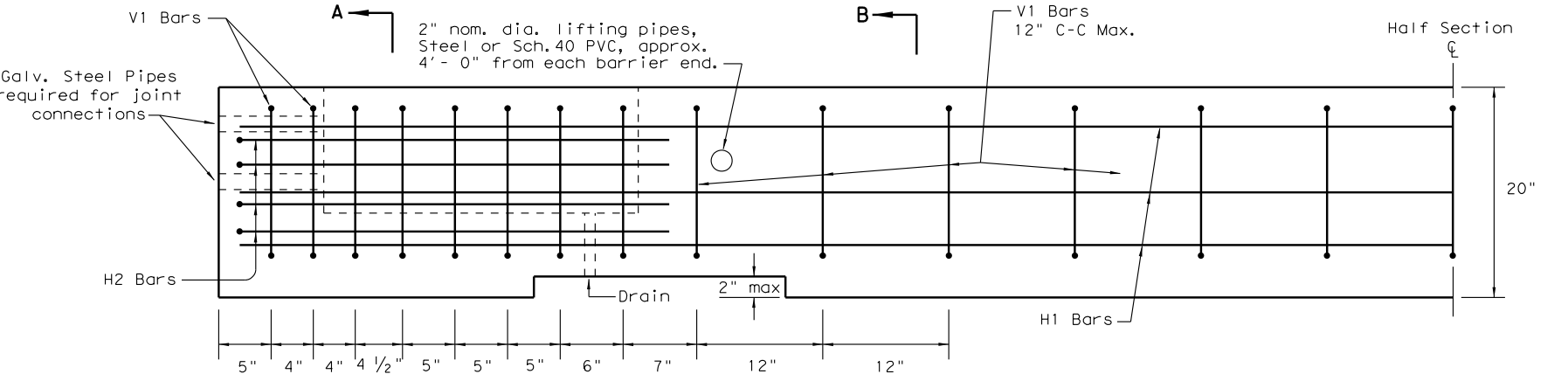
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Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

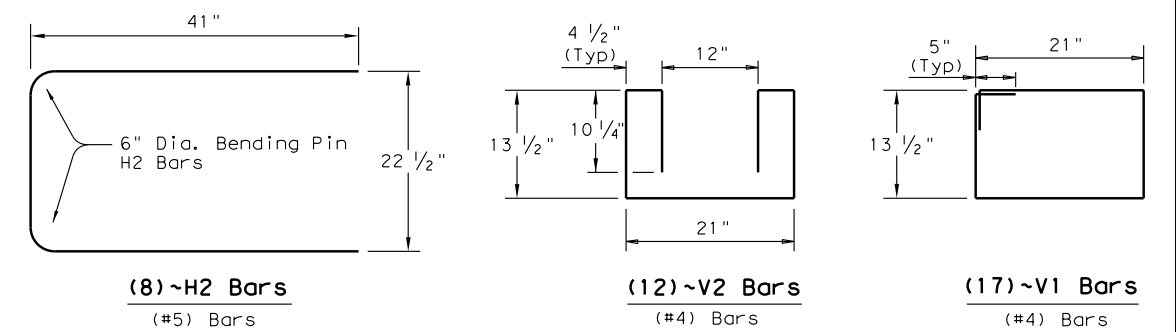
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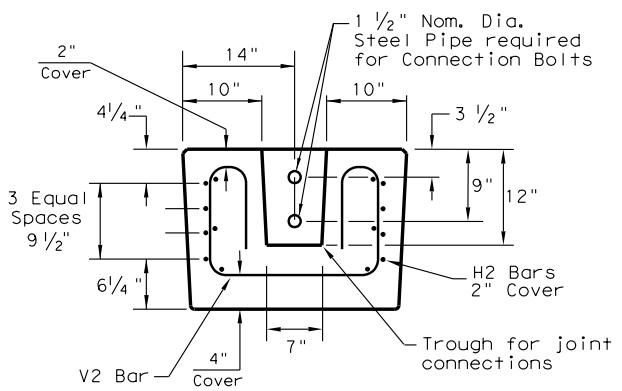
PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



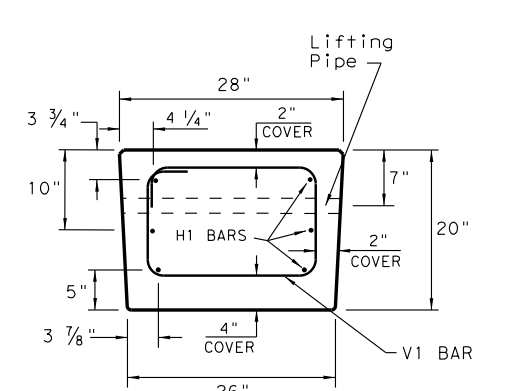
ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT
Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



SECTION B-B

- GENERAL NOTES**
1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
 2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
 3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
 4. Precast LPCB barrier length shall be 20 ft.
 5. All barrier edges shall have 3/4" chamfer or a tooled radius.
 6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
 7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
 8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

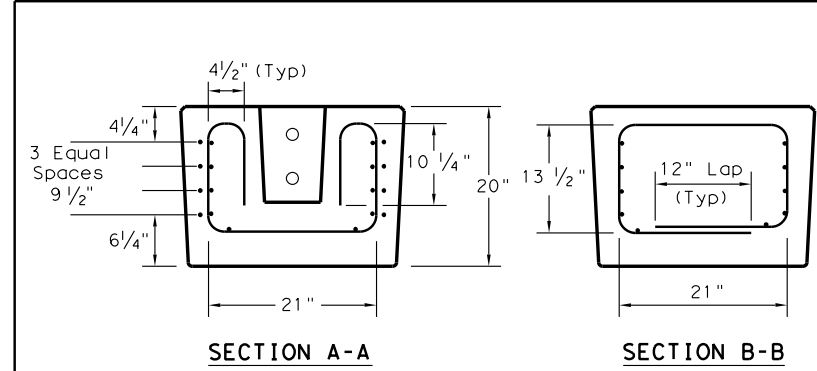
| (TYPE 1) APPROX. QUANTITIES 20 FT. SECTION | | |
|---|-----|-------|
| CONCRETE | CY | 2.6 |
| REINFORCING STEEL | LBS | 330 |
| TOTAL BARRIER WT. | LBS | 11000 |

(WWR) GENERAL NOTES

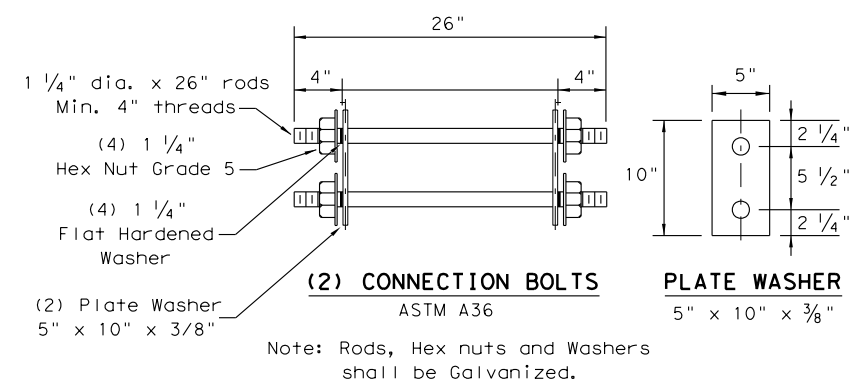
1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

- 8 ~ (D31) Horizontal Wires (Equally spaced)
- 10 ~ (D20) Horizontal Wires (Equally spaced)
- 29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)



WELDED WIRE REINFORCEMENT (WWR) - OPTIONAL REINFORCING



Note: Rods, Hex nuts and Washers shall be Galvanized.

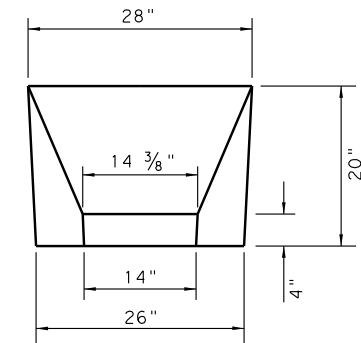
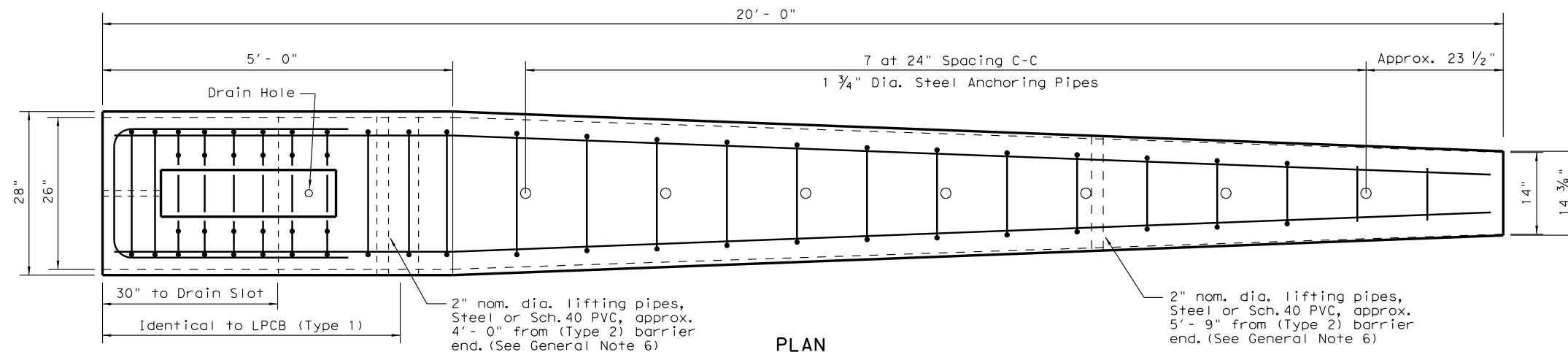
Texas Department of Transportation Design Division Standard

LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 1) LPCB-13

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|----------------------|-----------|----------|-----------|-----|
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| ©TxDOT December 2010 | CONT SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 01 | 023 | FM 3549 | |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 100 | |

DATE:
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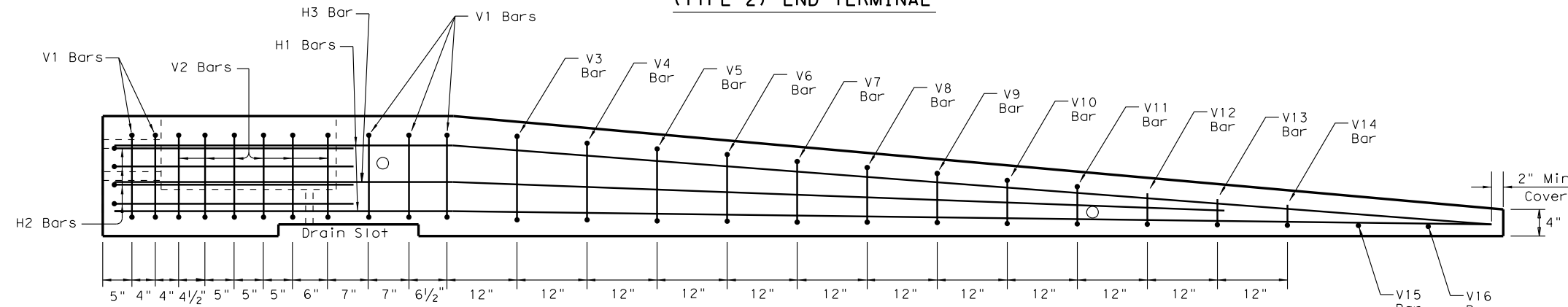
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APPROACH VIEW

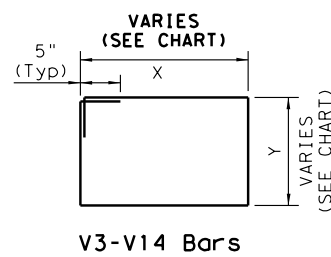
TYPE 2 - NOTES

1. Welded wire reinforcement (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.

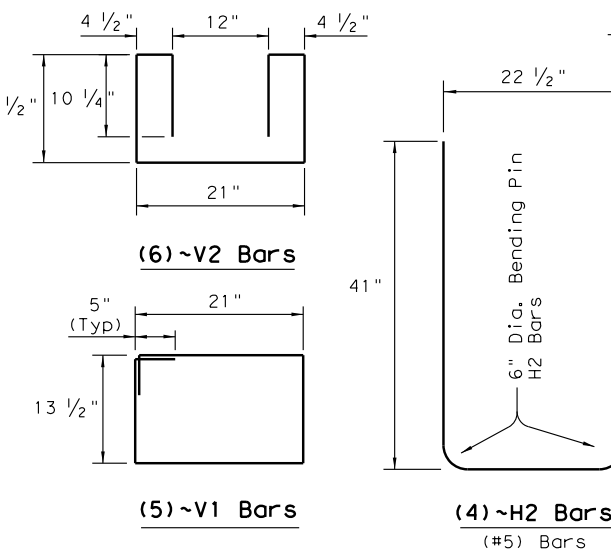


ELEVATION (TYPE 2) END TERMINAL

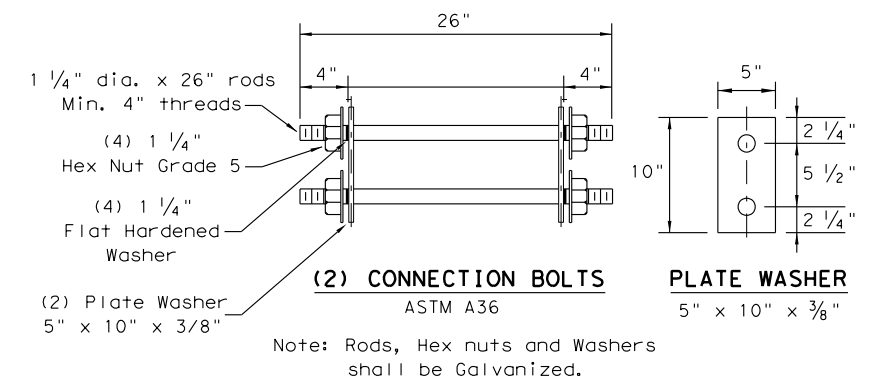
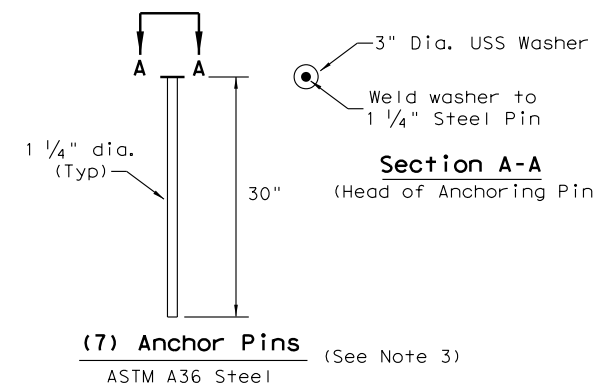
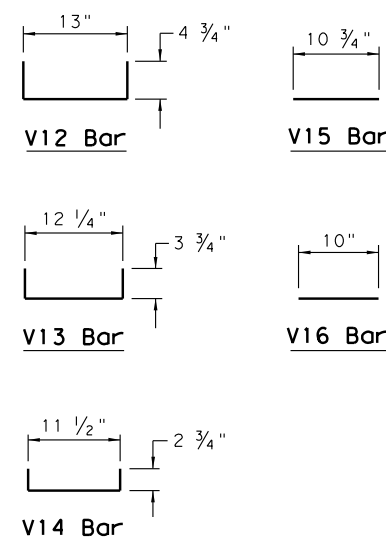
Note: Anchoring pipes not shown in Elevation View



| BAR (#4) | X (IN.) | Y (IN.) |
|----------|---------|---------|
| V3 BAR | 20 1/4 | 14 1/2 |
| V4 BAR | 19 1/2 | 13 1/2 |
| V5 BAR | 18 1/2 | 12 1/4 |
| V6 BAR | 17 1/2 | 11 1/4 |
| V7 BAR | 17 | 10 1/4 |
| V8 BAR | 16 1/4 | 9 |
| V9 BAR | 15 1/2 | 8 |
| V10 BAR | 14 1/2 | 7 |
| V11 BAR | 13 3/4 | 6 |

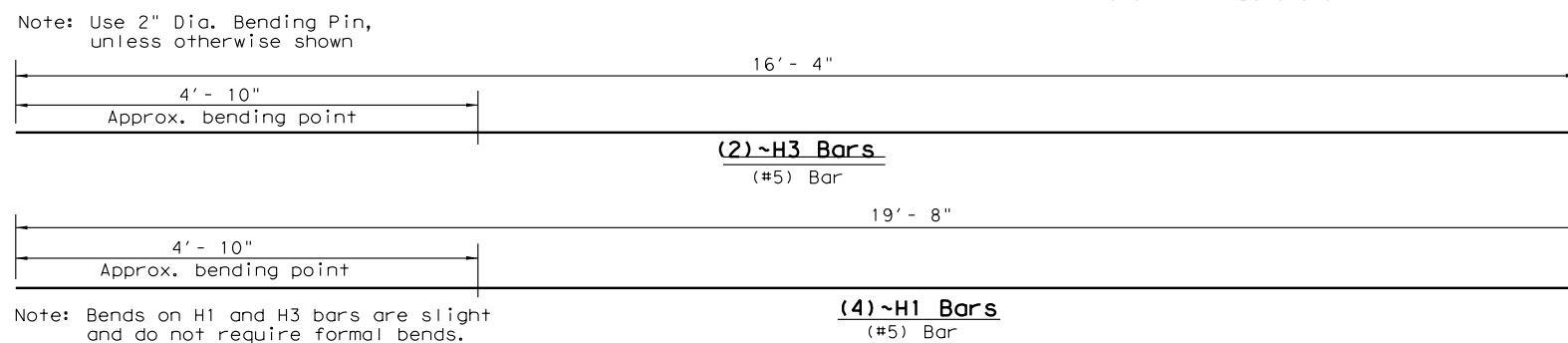


REINFORCING STEEL DETAILS TYPE 2 - END TERMINAL



FOR CONTRACTORS INFORMATION ONLY

| (TYPE 2) | | APPROX. QUANTITIES 20 FT. SECTION | |
|-------------------|-----|-----------------------------------|--|
| CONCRETE | CY | 1.65 | |
| REINFORCING STEEL | LBS | 240 | |
| TOTAL BARRIER WT. | LBS | 7000 | |



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

Note: All V Bars are (#4)

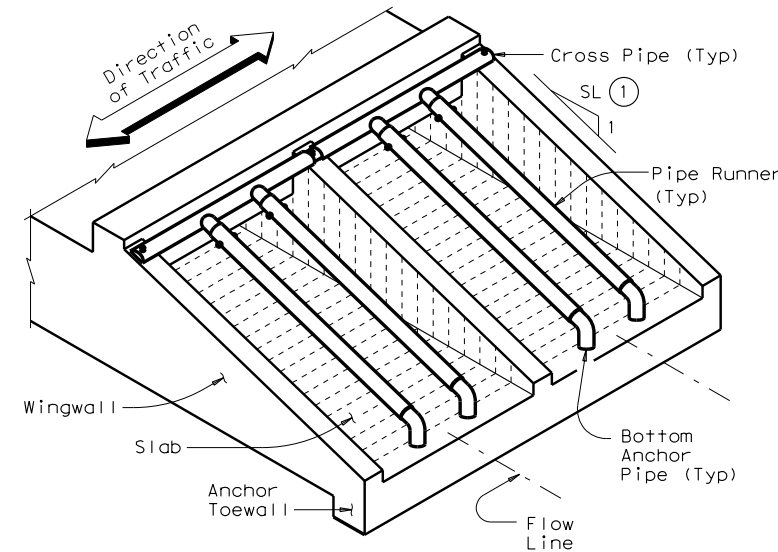
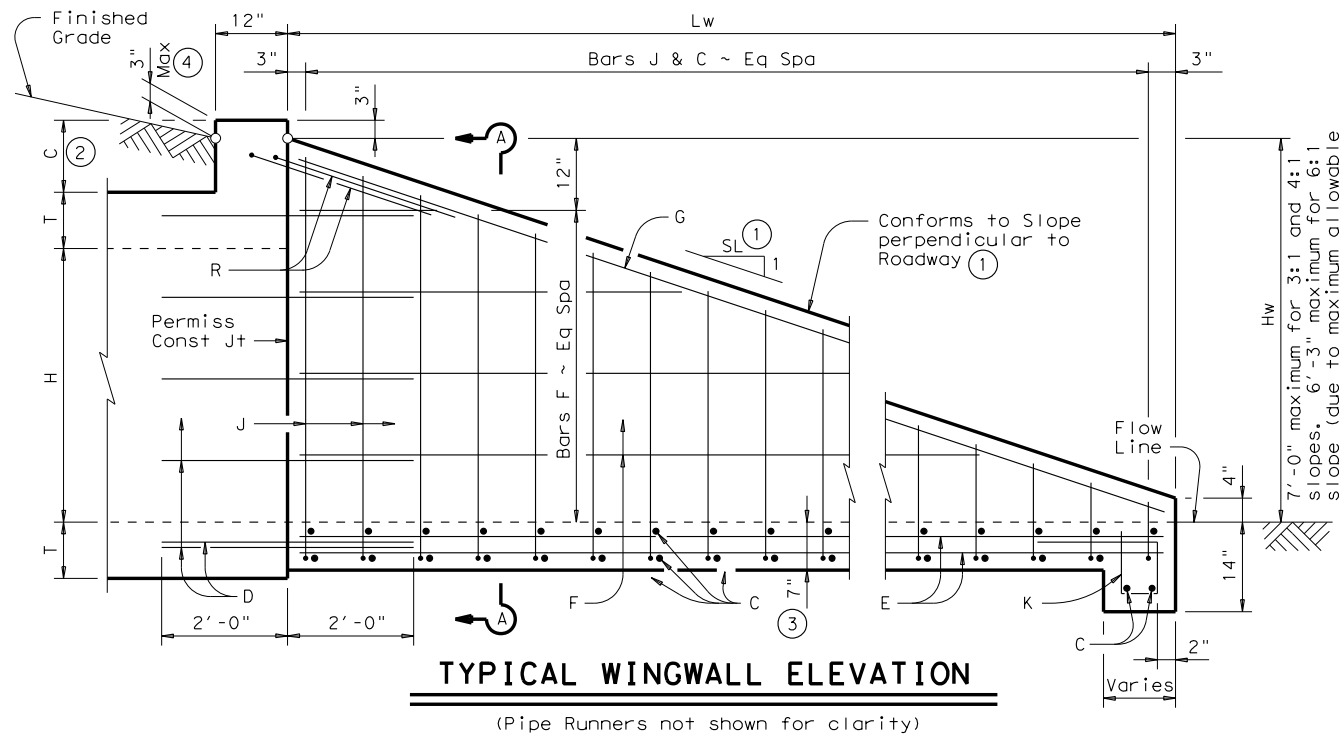
Texas Department of Transportation
LOW PROFILE CONCRETE BARRIER PRECAST BARRIER (TYPE 2) LPCB-13
 Design Division Standard

| | | | | |
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| © TxDOT December 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 101 | |

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ISOMETRIC VIEW OF TYPICAL INSTALLATION

Formulas: (All values are in Feet)
 $H_w = H + T + C - 0.250'$
 $L_w = (H_w - 0.333') (SL)$

For Cast-in-place culverts:
 $Atw = (N) (S) + (N+1) (U)$

For Precast culverts:
 $Atw = (N) (2U+S) + (N-1) (0.500')$

Total Wingwall Area (S.F.)
 $= (0.5) (H_w + 0.333') (L_w) (N+1)$

Total Concrete Volume (C.Y.)
 $= [(Wingwall Area) (0.583') + (L_w) (Atw) (0.583') + (Atw) (1.167') (1.167' - 0.583')] \div (27)$

Pipe Runner Length
 $= (L_w) (K1) - (1.917')$

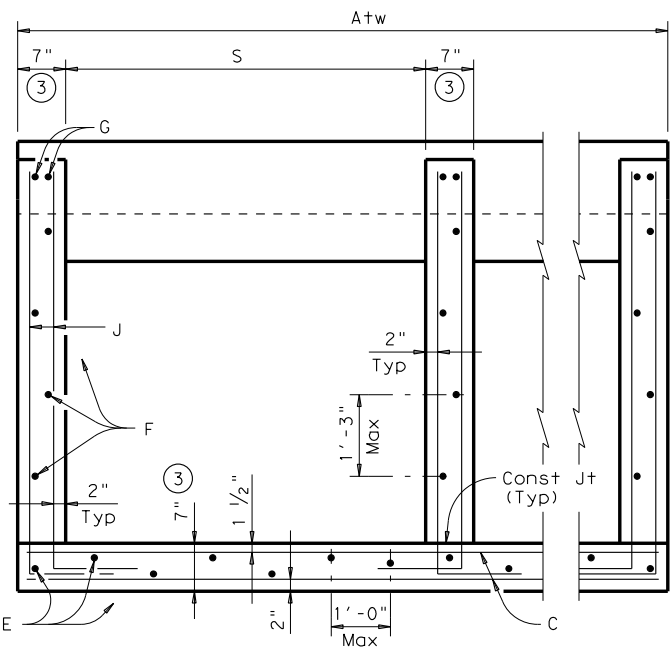
Total Reinforcing (Lbs)
 $= (1.55) (L_w) (Atw) + (4.43) (Atw) + (K2) (H_w) (N+1) (\sqrt{L_w})$

C = Height of Curb above top of Top Slab
H_w = Height of Wingwall
K = Constant Value for use in formulas
Slope SL:1 K1 K2
3:1 ~ 1.054 ~ 7.45
4:1 ~ 1.031 ~ 8.49
6:1 ~ 1.014 ~ 10.30

Atw = Anchor Toewall Length
L_w = Length of Wingwall
N = Number of Culvert Barrels
SL:1 = Side Slope Ratio (Horizontal : 1 Vertical)

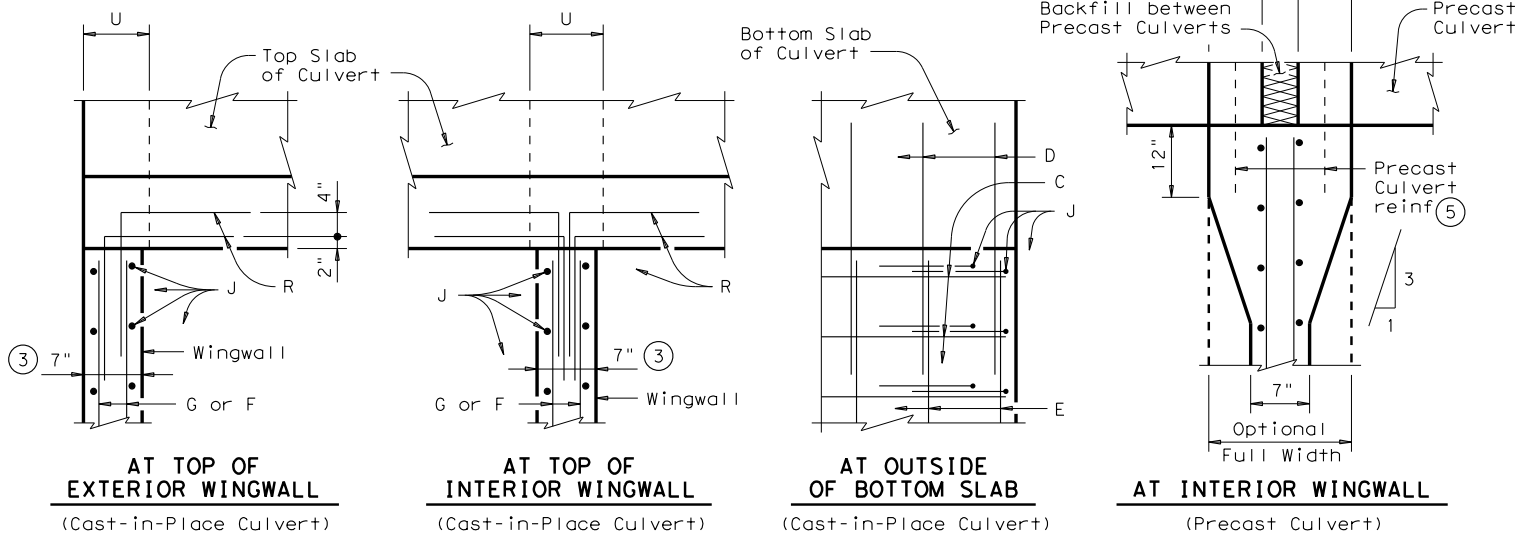
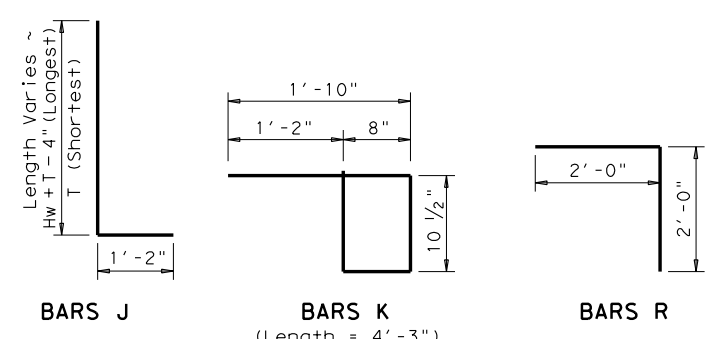
See applicable box culvert standard for H, S, T, and U values.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
The Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Pipe Runners.
Pipe Runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
All reinforcing steel shall be Grade 60. All reinforcing shall be adjusted as necessary to provide a minimum clear cover of 1 1/4".
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.
The quantities for Pipe Runners, reinforcing steel, and concrete, resulting from the formulas given herein are for Contractor's information only.
Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.
Bolts and nuts shall conform to ASTM A307.
All steel components, except the concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.
See BCS standard sheet for additional dimensions and information.
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the Safety End Treatments.



SECTION A-A

(Showing typical Wingwall and Wing Slab reinforcing)
(Pipe Runners not shown for clarity)



PLAN VIEWS OF CORNER DETAILS

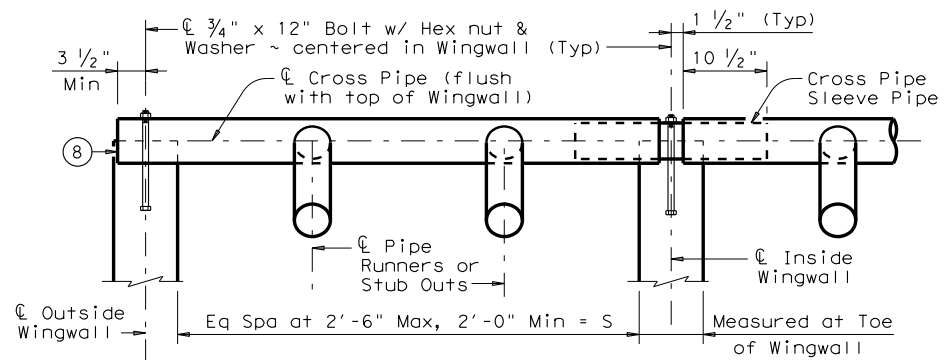
| TABLE OF REINFORCING BAR SIZES & SPACING | | |
|--|------|-------------|
| Bar | Size | Spacing |
| C | #4 | 10" Max |
| D | #4 | match F & E |
| E | #4 | 1'-0" Max |
| F | #4 | 1'-3" Max |
| G | #6 | Shown |
| J | #4 | 10" Max |
| K | #4 | 1'-0" Max |
| R | #4 | Shown |

- Recommended values of slope are: 3:1, 4:1, & 6:1. Slope shall be 3:1 or flatter.
- 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to ECD standard.
- Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- For vehicle safety, curbs shall project no more than 3" above finished grade. Curb heights shall be reduced, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For Culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into Wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the "Wingwall Connection Detail" on the SCP-MD standard.

| | | | |
|--|---------|---------------------------------|-----------|
| | | Bridge Division Standard | |
| SAFETY END TREATMENT FOR 0° SKEW BOX CULVERTS (MAXIMUM H_w = 7'-0") TYPE I ~ CROSS DRAINAGE | | | |
| SETB-CD | | | |
| FILE: setbc0se.dgn | DN: GAF | CK: CAT | DW: JRP |
| ©TxDOT February 2010 | CONT | SECT | JOB |
| REVISIONS | 1015 | 01 | 023 |
| | DIST | COUNTY | SHEET NO. |
| | DAL | ROCKWALL | 102 |

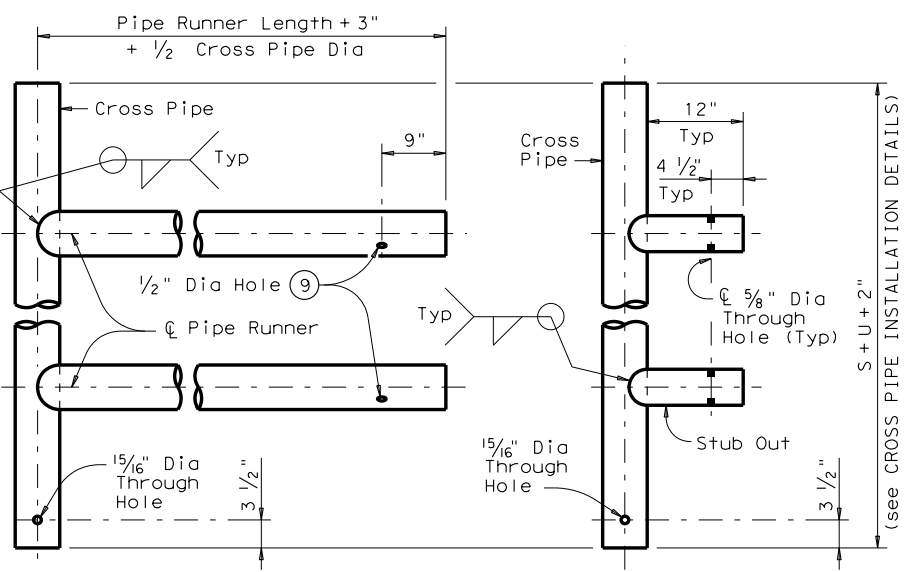
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DATE: FILE:

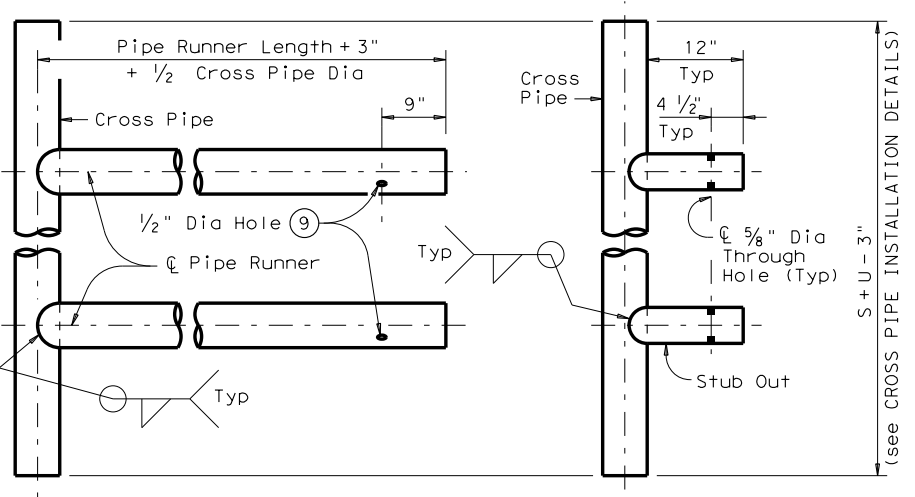


NOTE: At Contractor's option, the Cross Pipe may be made continuous across the Inside Wingwalls. If such option is selected, the Sleeve Pipe shall be omitted and a 1 5/16 inch diameter through hole be made in the Cross Pipe to accept the anchor bolt at the centerline of each Inside Wingwall.

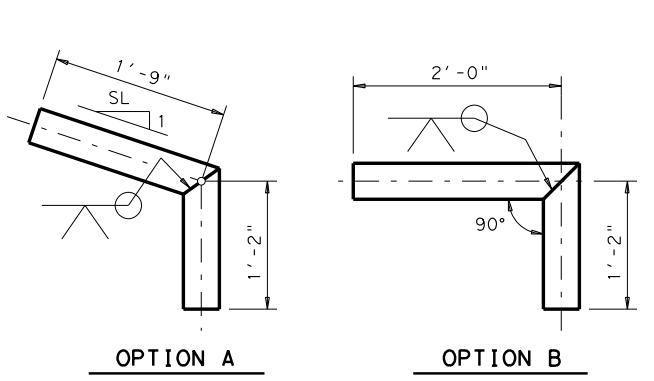
CROSS PIPE INSTALLATION DETAILS



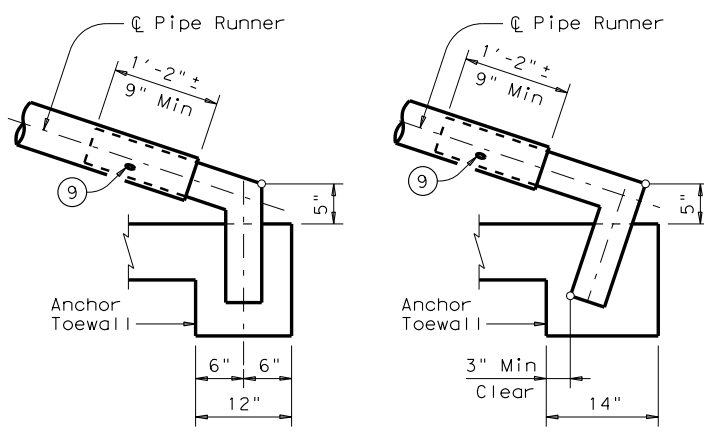
OPTION A2 OPTION A1
FOR USE IN OUTSIDE CULVERT BAY



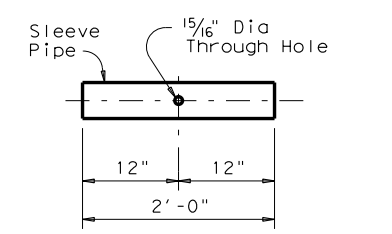
OPTION A2 OPTION A1
FOR USE IN INSIDE CULVERT BAY
CROSS PIPE AND CONNECTIONS DETAILS



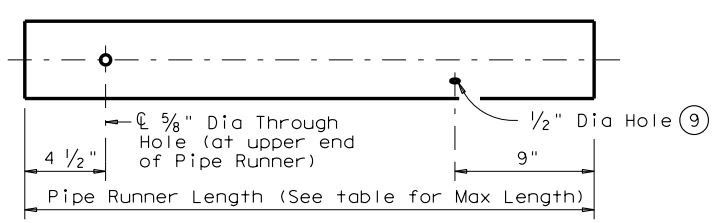
**OPTION A OPTION B
BOTTOM ANCHOR PIPE DETAILS**



OPTION B1 OPTION B2
BOTTOM ANCHOR TOEWALL DETAILS
(Wingwall not shown for clarity)



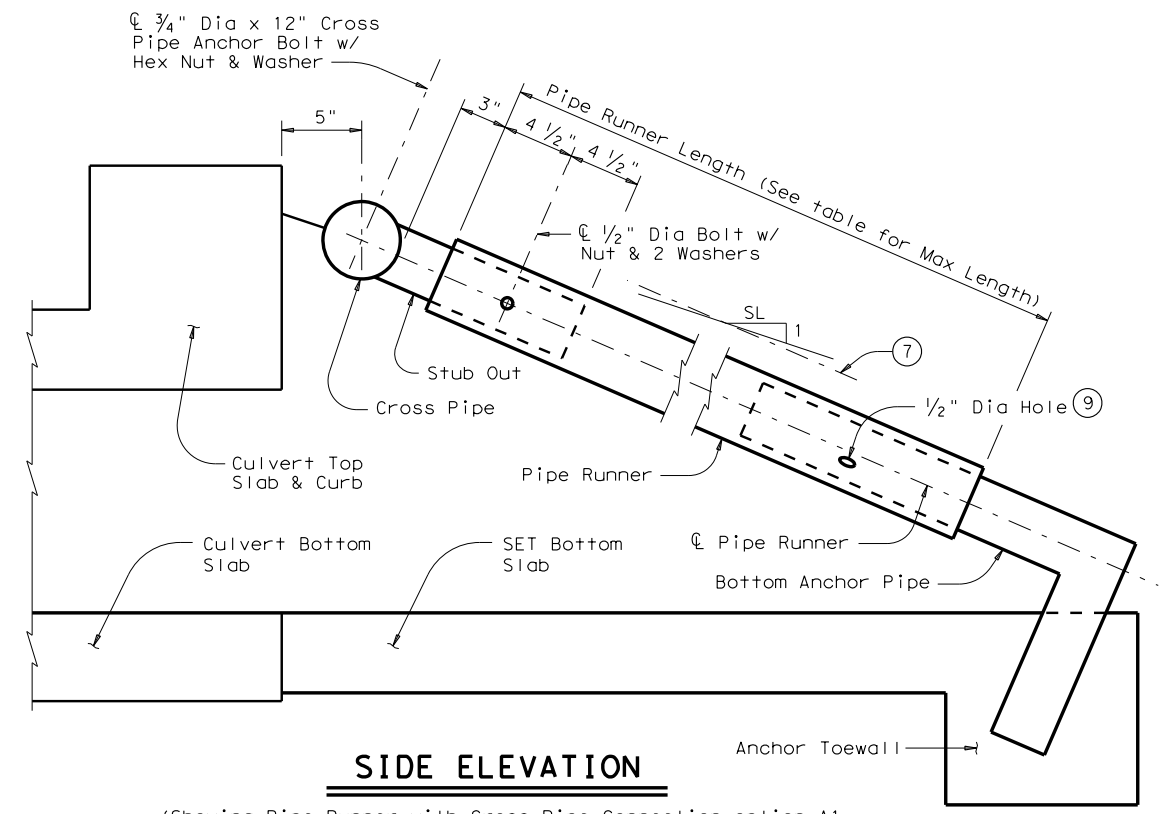
CROSS PIPE SLEEVE PIPE DETAILS



NOTE: The separate Pipe Runner shown is required when Cross Pipe Connection Option A1 is used.
PIPE RUNNER DETAILS

- ⑥ Cross Pipe shall be the same size as the Pipe Runner. Cross Pipe Stub Out shall be the same size as the Anchor Pipe.
- ⑦ Note that actual slope of Safety Pipe Runner may vary slightly from Side Slope.
- ⑧ Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access.
- ⑨ After installation, the 1/2 inch hole shall be inspected to ensure that the lap of the Safety Pipe Runner with the Bottom Anchor Pipe is adequate.
- ⑩ At fabricator's option, a heat bend to a smooth 5 inch radius or a manufactured elbow (of the same material as the Runner) may be substituted for the mitered and welded joint in the Bottom Anchor Pipe.

| Maximum Pipe Runner Length | Required Pipe Runner Size | | | Required Anchor Pipe Size | | |
|----------------------------|---------------------------|-----------|-----------|---------------------------|-----------|-----------|
| | Pipe Size | Pipe O.D. | Pipe I.D. | Pipe Size | Pipe O.D. | Pipe I.D. |
| 10' - 0" | 3" STD | 3.500" | 3.068" | 2" STD | 2.375" | 2.067" |
| 19' - 8" | 4" STD | 4.500" | 4.026" | 3" STD | 3.500" | 3.068" |
| 34' - 2" | 5" STD | 5.563" | 5.047" | 4" STD | 4.500" | 4.026" |



SIDE ELEVATION
(Showing Pipe Runner with Cross Pipe Connection option A1 and anchor Pipe option B2. Wingwall not shown for clarity)

SHEET 2 OF 2

Texas Department of Transportation
 Bridge Division Standard

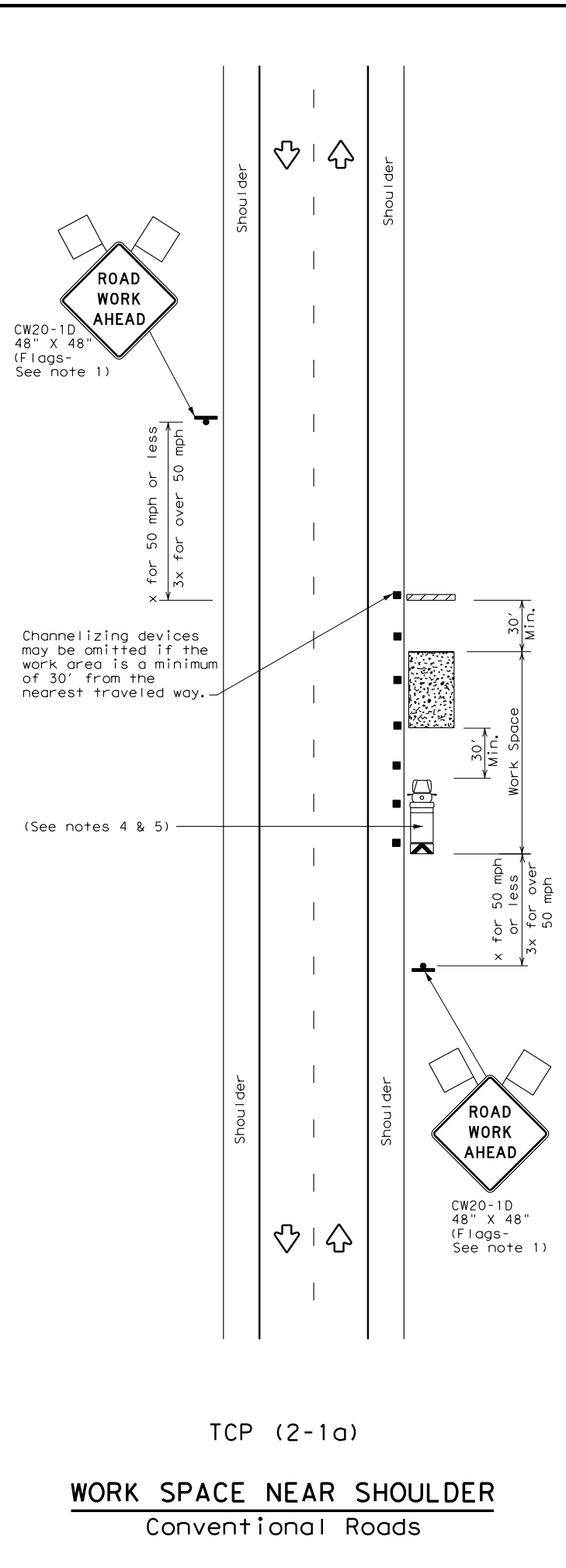
SAFETY END TREATMENT
 FOR 0° SKEW BOX CULVERTS
 (MAXIMUM Hw = 7'-0")
 TYPE I ~ CROSS DRAINAGE

SETB-CD

| | | | | |
|----------------------|---------|----------|-----------|---------|
| FILE: setbc0se.dgn | DN: GAF | CK: CAT | DW: JRP | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 103 | |

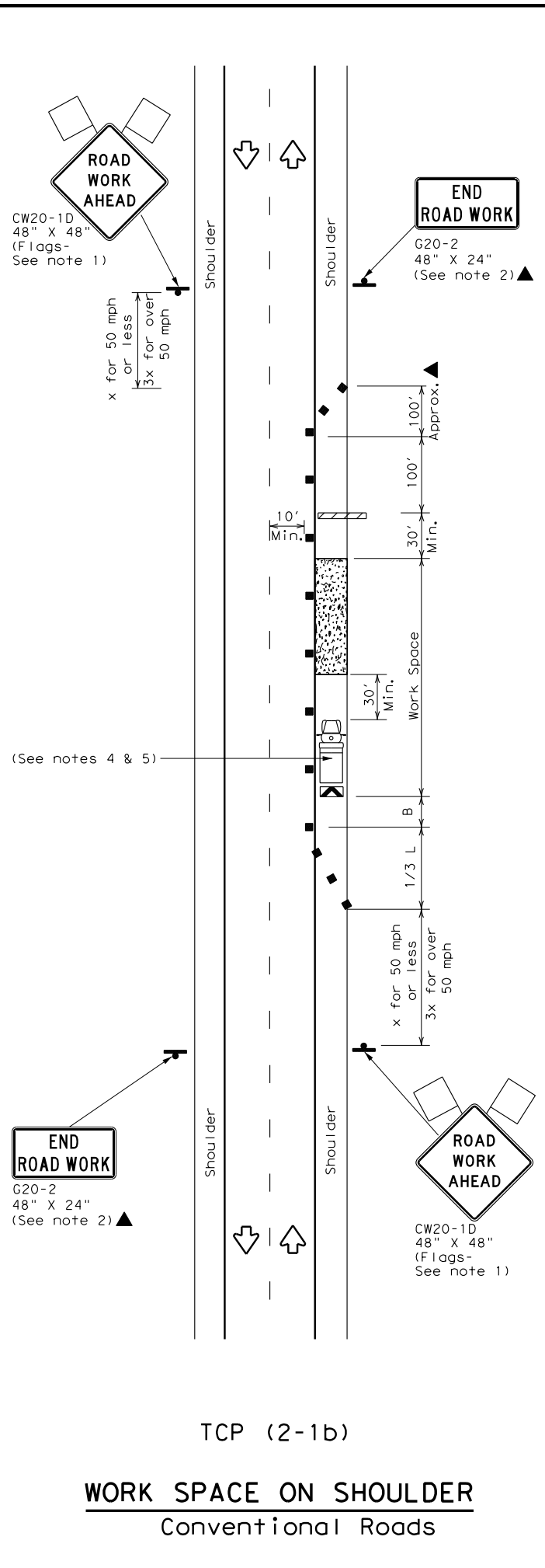
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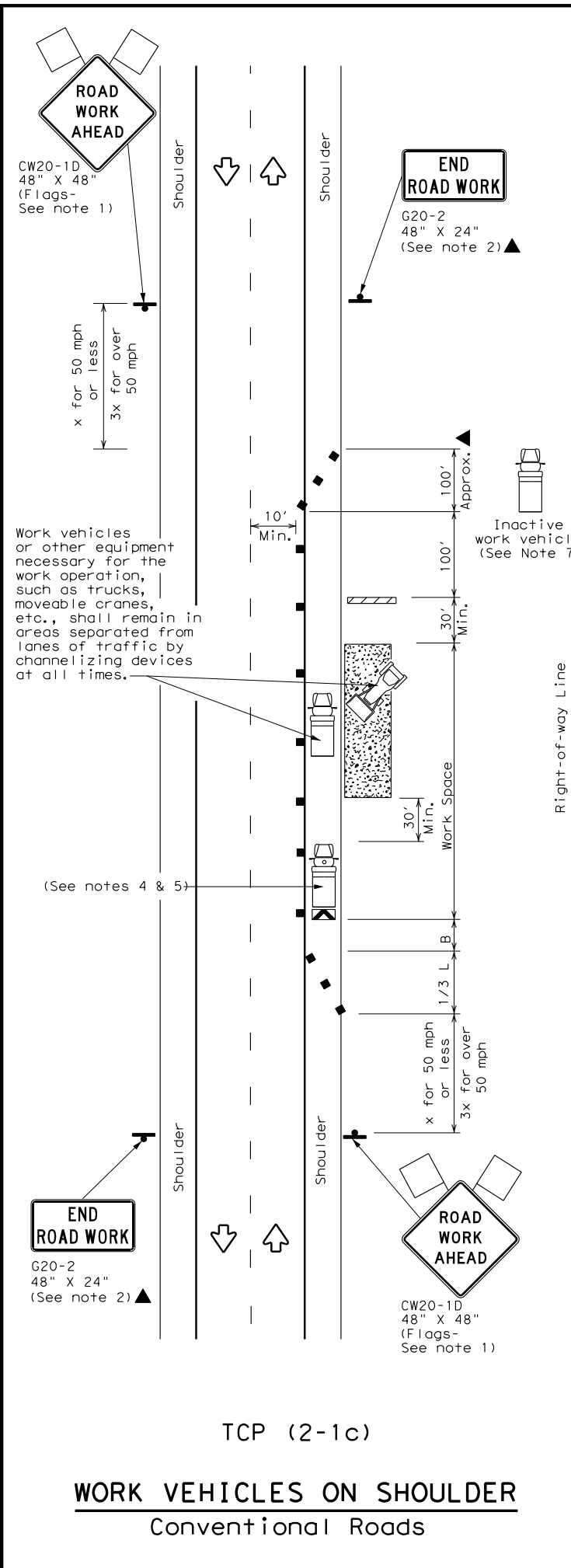
TCP (2-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

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

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

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

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

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

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



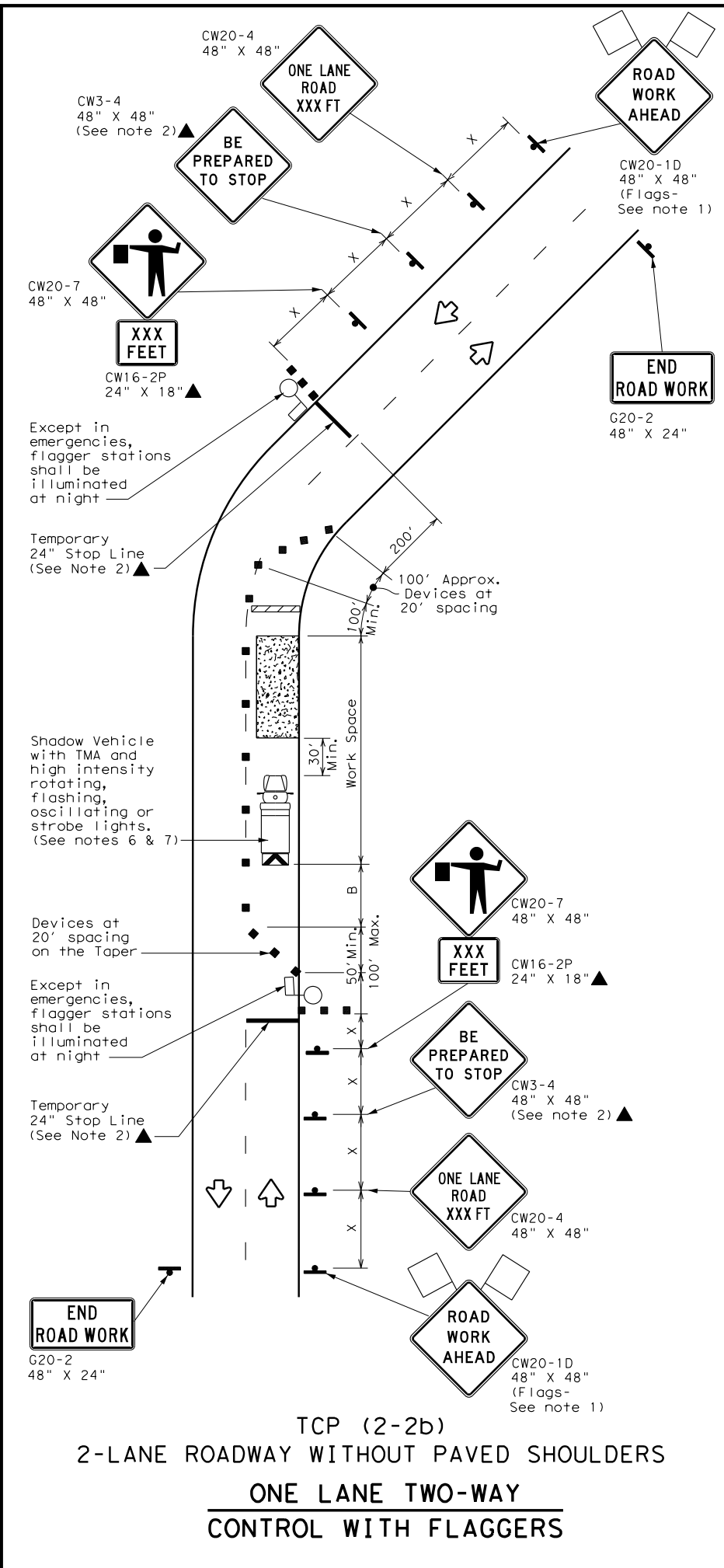
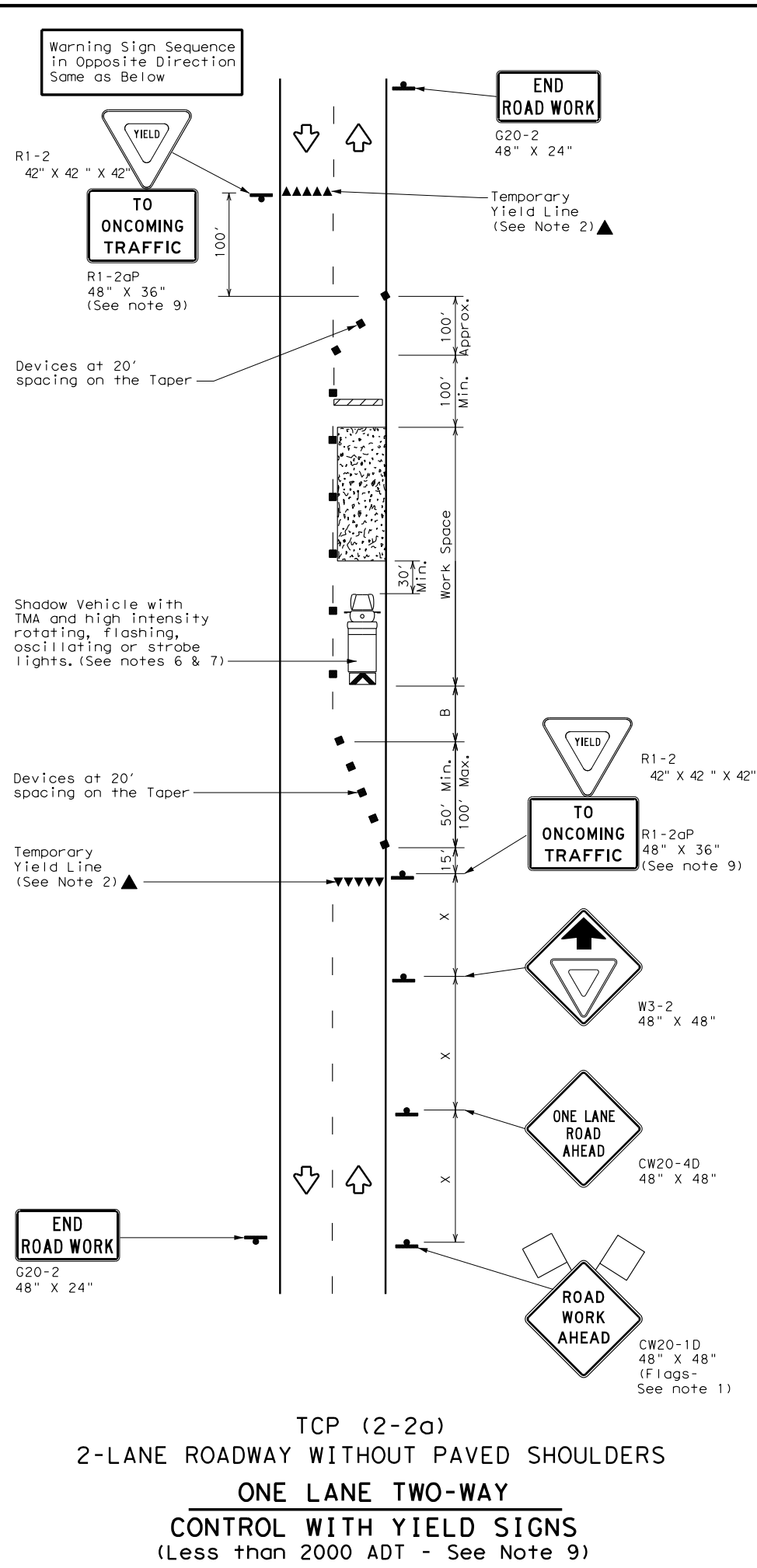
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 12

| | | | | | |
|-----------------------|------|-----------|-----------|-----------|-----------|
| © TxDOT December 1985 | | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| REVISONS | | | | | |
| 2-94 | 2-12 | CONT | SECT | JOB | HIGHWAY |
| 8-95 | | 1015 | 01 | 023 | FM 3549 |
| 1-97 | | DIST | COUNTY | | SHEET NO. |
| 4-98 | | DAL | ROCKWALL | | 104 |

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LEGEND

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

| Posted Speed * | Formula | Minimum Desirable Taper Lengths ** | | | Suggested Maximum Spacing of Channelizing Devices | | Minimum Sign Spacing "x" Distance | Suggested Longitudinal Buffer Space "B" | Stopping Sight Distance |
|----------------|--------------------------|------------------------------------|------------|------------|---|--------------|-----------------------------------|---|-------------------------|
| | | 10' Offset | 11' Offset | 12' Offset | On a Taper | On a Tangent | | | |
| 30 | L = WS ² / 60 | 150' | 165' | 180' | 30' | 60' | 120' | 90' | 200' |
| 35 | | 205' | 225' | 245' | 35' | 70' | 160' | 120' | 250' |
| 40 | | 265' | 295' | 320' | 40' | 80' | 240' | 155' | 305' |
| 45 | L = WS | 450' | 495' | 540' | 45' | 90' | 320' | 195' | 360' |
| 50 | | 500' | 550' | 600' | 50' | 100' | 400' | 240' | 425' |
| 55 | | 550' | 605' | 660' | 55' | 110' | 500' | 295' | 495' |
| 60 | | 600' | 660' | 720' | 60' | 120' | 600' | 350' | 575' |
| 65 | | 650' | 715' | 780' | 65' | 130' | 700' | 410' | 645' |
| 70 | | 700' | 770' | 840' | 70' | 140' | 800' | 475' | 730' |
| 75 | | 750' | 825' | 900' | 75' | 150' | 900' | 540' | 820' |

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

TYPICAL USAGE

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

GENERAL NOTES

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

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

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

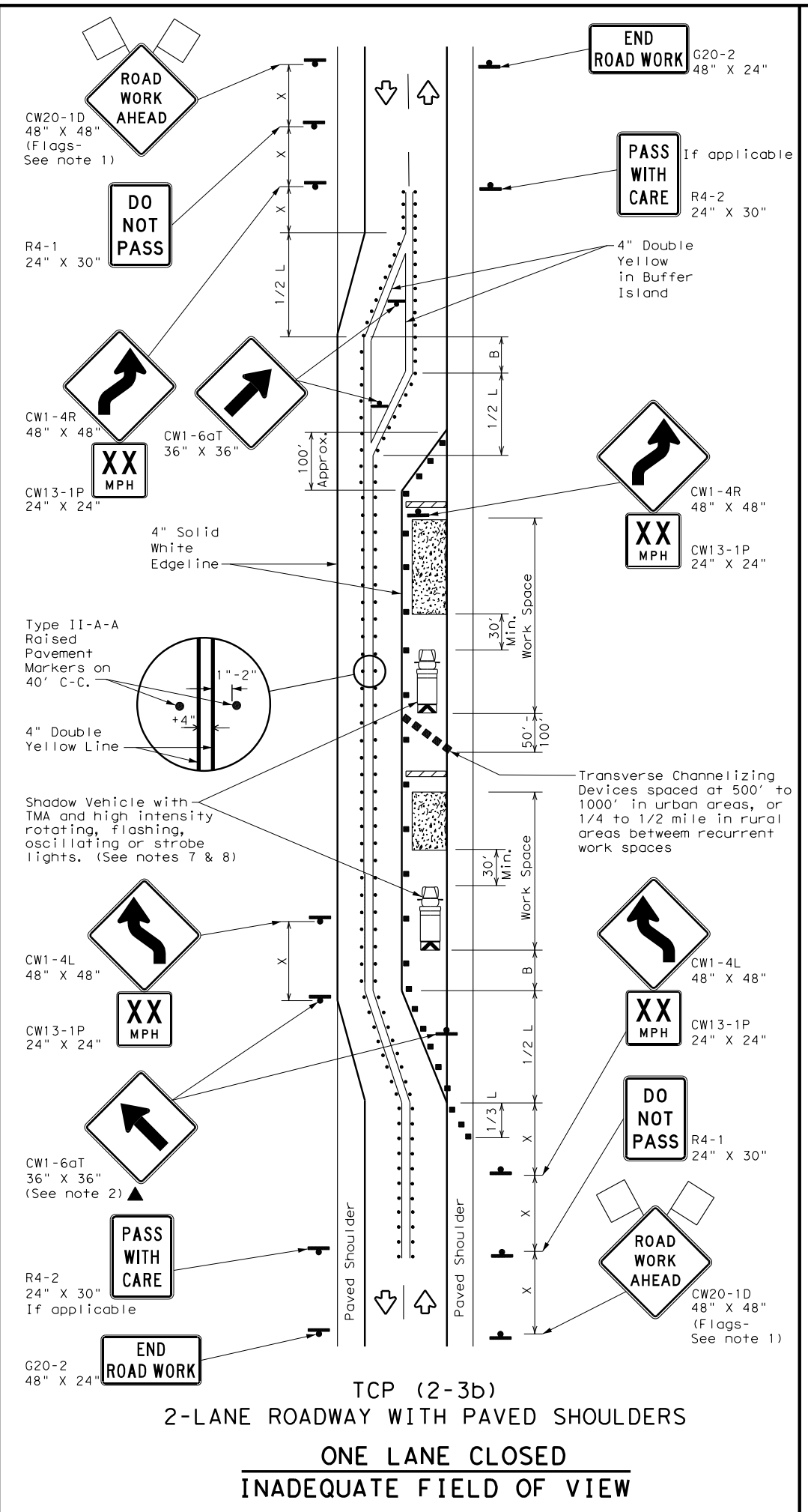
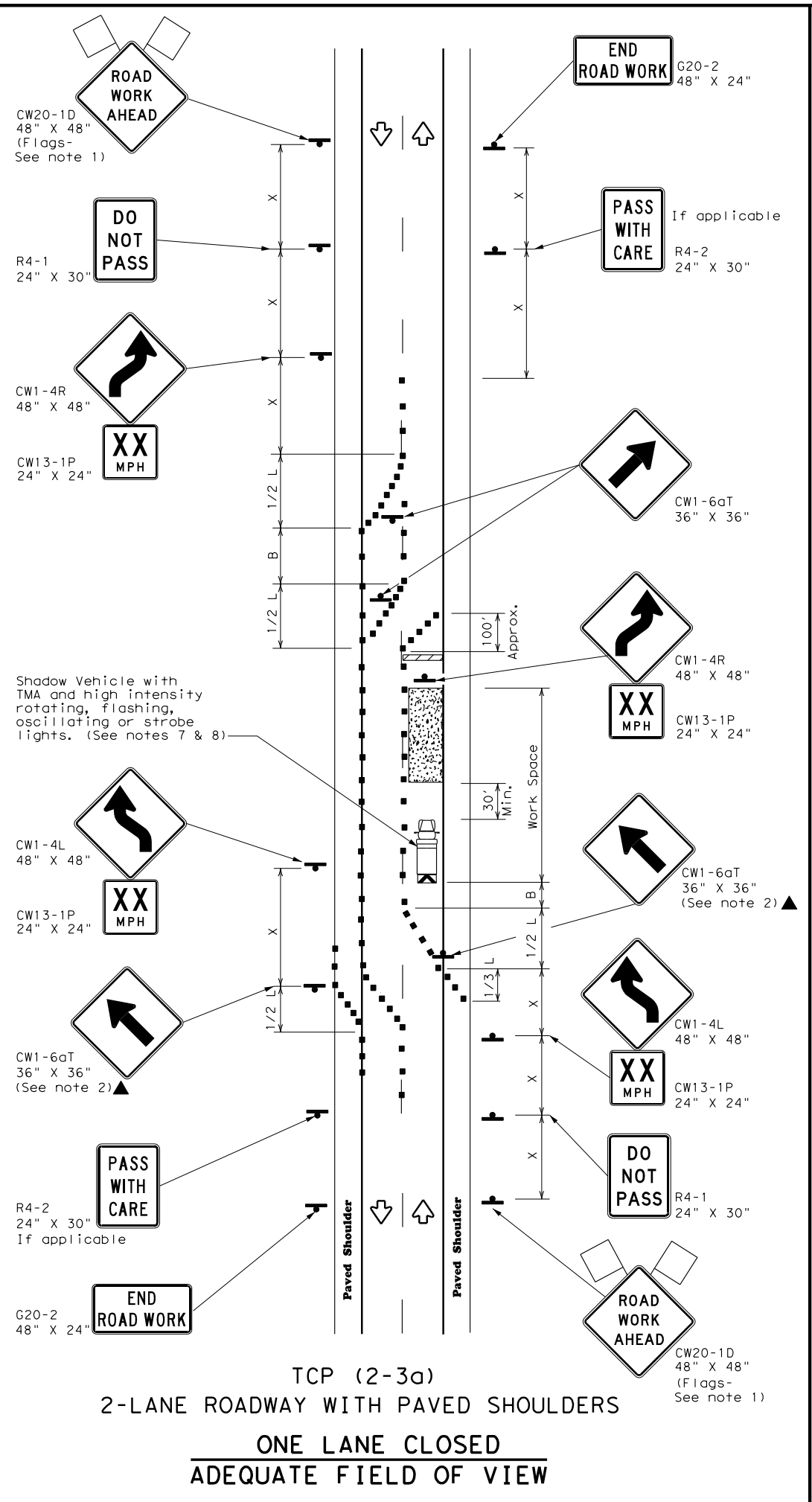
TCP (2-2) -12

| | | | | | |
|-----------------------|------|-----------|-----------|-----------|-----------|
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| REVISONS | | | | | |
| 8-95 | 2-12 | CONT | SECT | JOB | HIGHWAY |
| 1-97 | | 1015 | 01 | 023 | FM 3549 |
| 4-98 | | DIST | COUNTY | | SHEET NO. |
| 3-03 | | DAL | ROCKWALL | | 105 |

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| LEGEND | | | |
|--------|--------------------------------------|--|----------------------------------|
| | Type 3 Barricade | | Channelizing Devices |
| | Heavy Work Vehicle | | Truck Mounted Attenuator (TMA) |
| | Trailer Mounted Flashing Arrow Board | | Raised Pavement Markers Ty II-AA |
| | Sign | | Traffic Flow |
| | Flag | | Flagger |

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

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

| TYPICAL USAGE | | | | |
|---------------|----------------|-----------------------|------------------------------|----------------------|
| MOBILE | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
| | | | ✓ | ✓ |
| | | | | TCP (2-3b) ONLY |

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
 - Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
 - The R4-1 "DO NOT PASS," R4-2 "PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
 - Conflicting pavement marking shall be removed for long term projects.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
 - Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- TCP (2-3a)**
- Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

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

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON
TWO-LANE ROADS

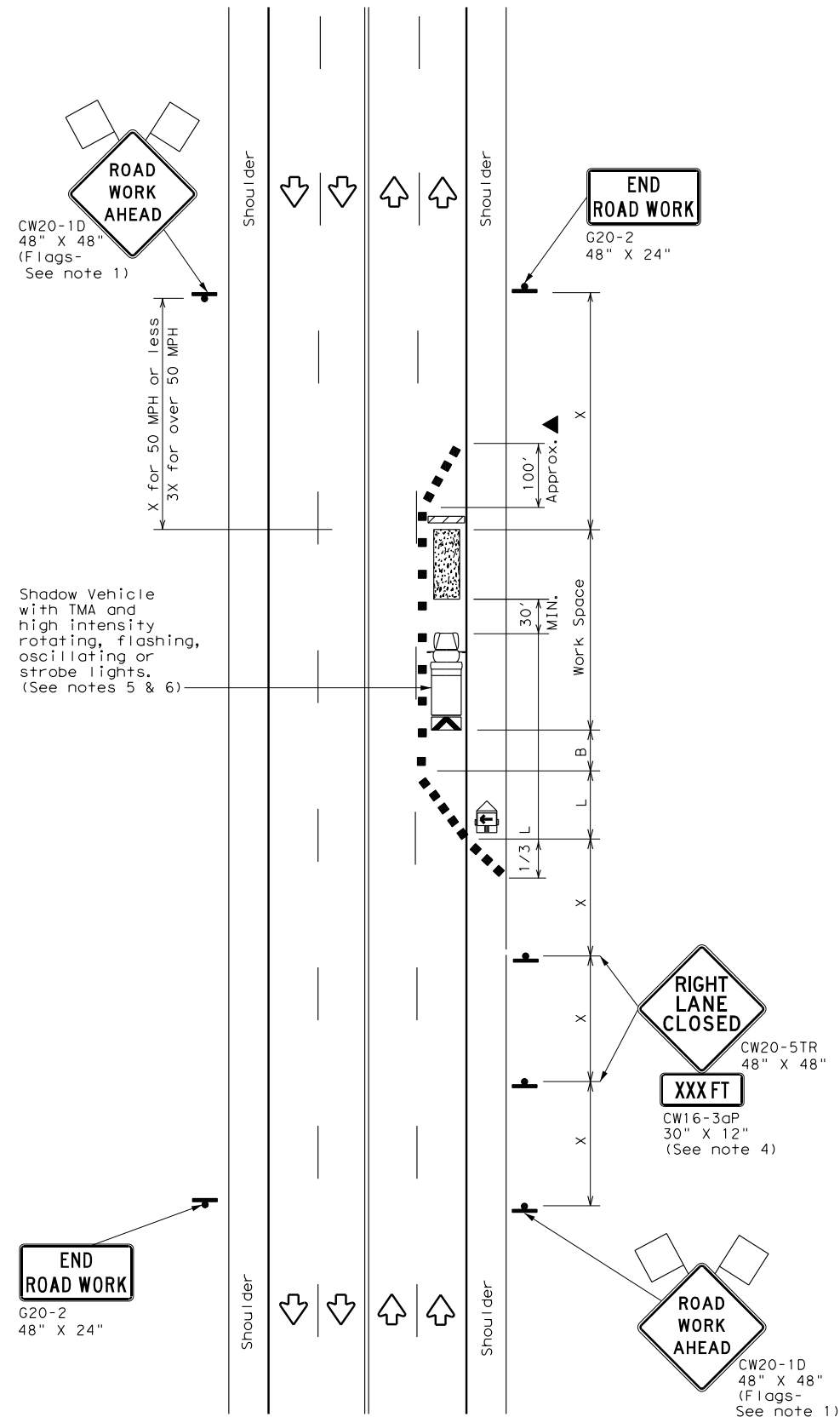
TCP (2-3) - 12

| | | | | | |
|-----------------------|------|-----------|-----------|-----------|-----------|
| © TxDOT December 1985 | | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| REVISONS | | | | | |
| 8-95 | 2-12 | CONT | SECT | JOB | HIGHWAY |
| 1-97 | | 1015 | 01 | 023 | FM 3549 |
| 4-98 | | DIST | COUNTY | | SHEET NO. |
| 3-03 | | DAL | ROCKWALL | | 106 |

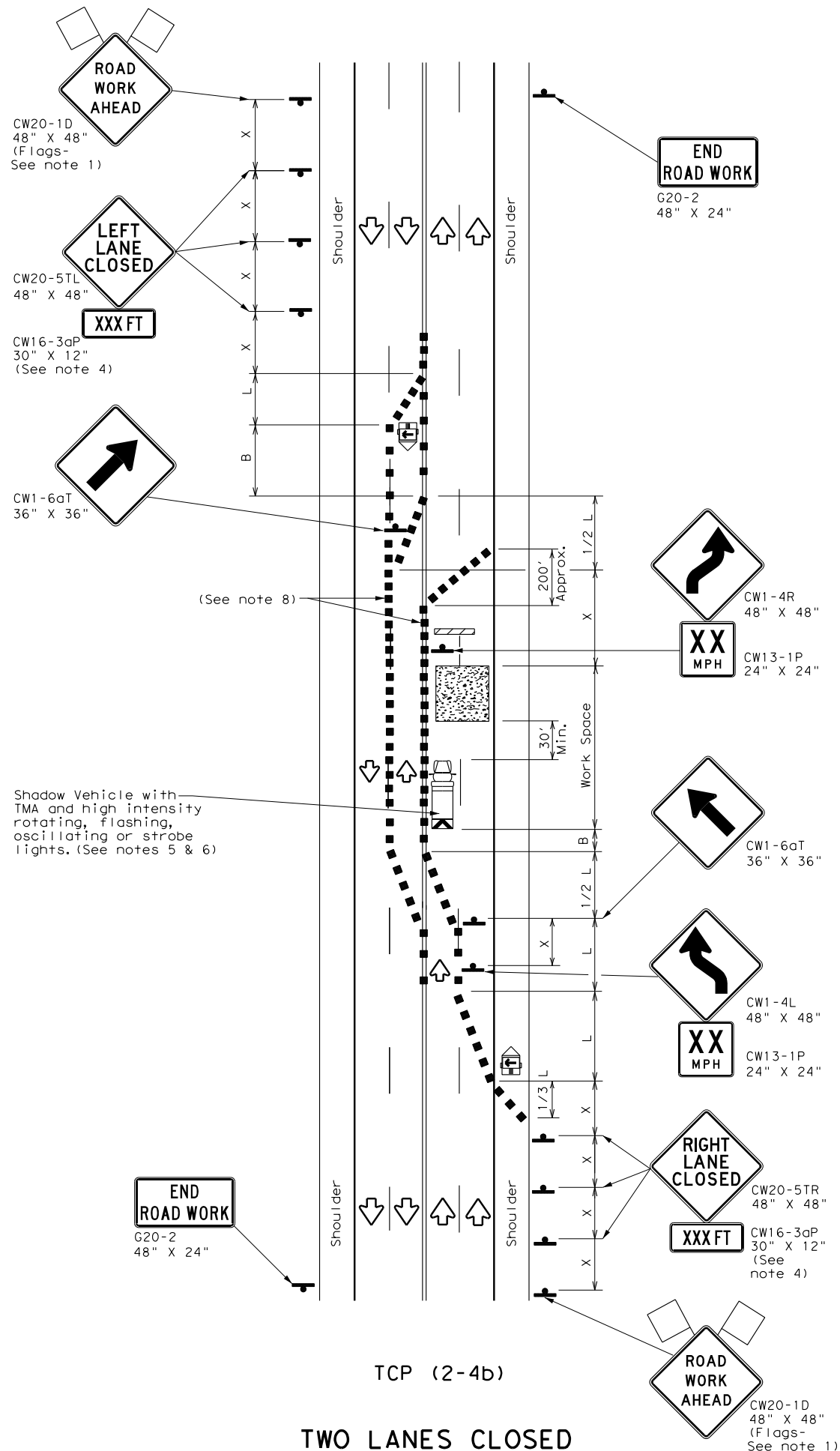
163

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TCP (2-4a)
ONE LANE CLOSED



TCP (2-4b)
TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
- For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

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

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



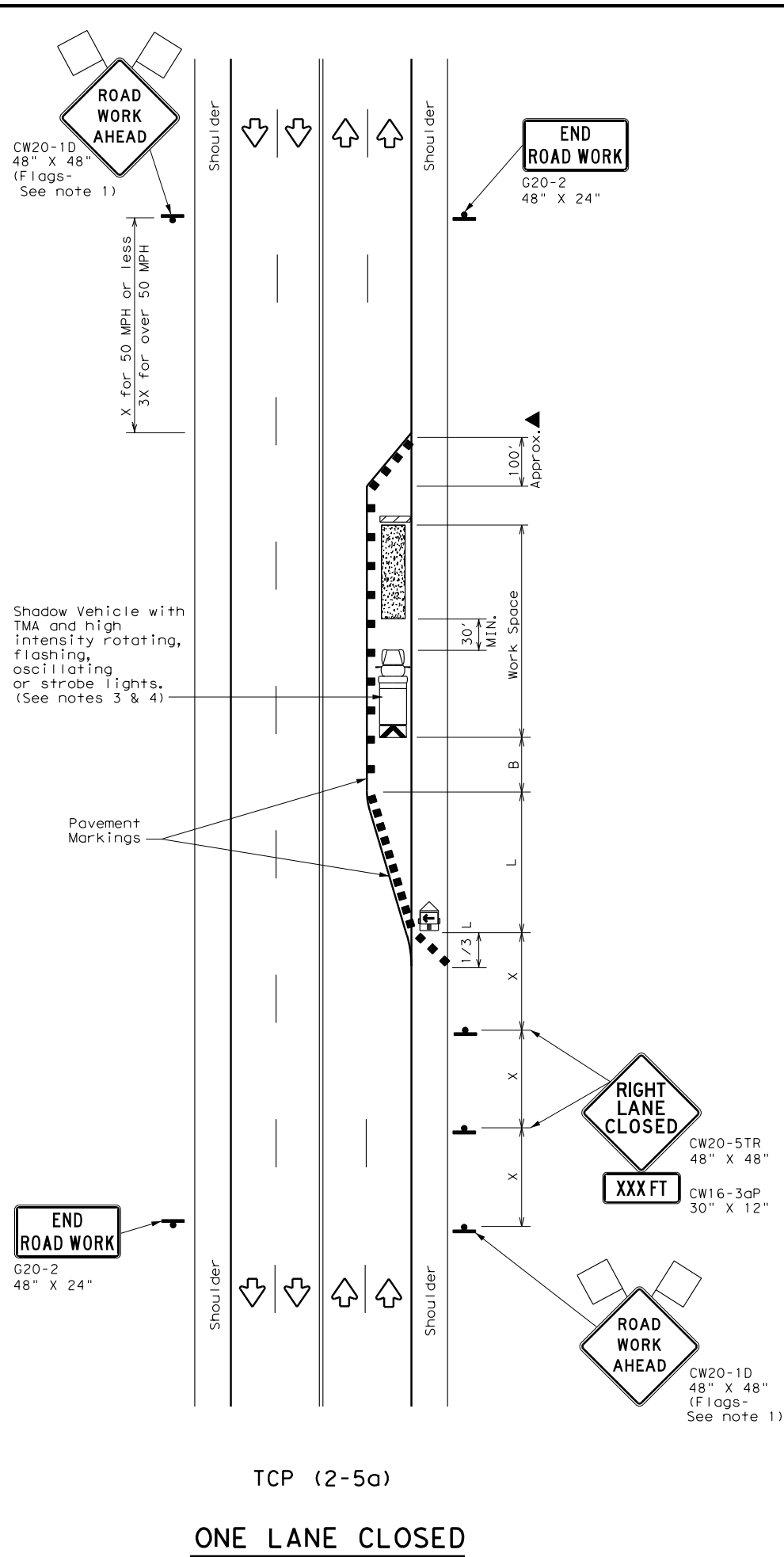
**TRAFFIC CONTROL PLAN
 LANE CLOSURES ON MULTILANE
 CONVENTIONAL ROADS**

TCP (2-4) -12

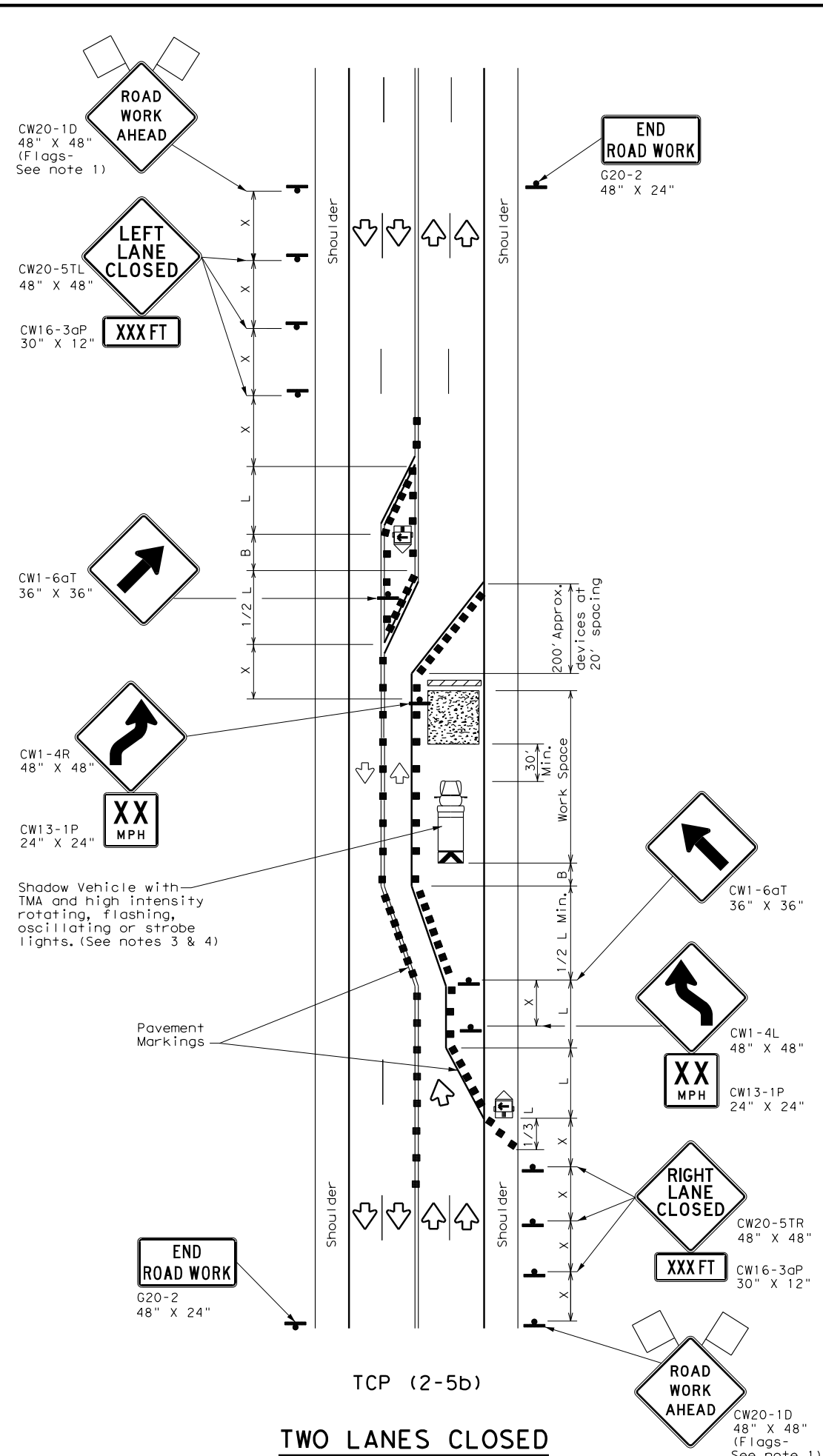
| | | | | | |
|-----------------------|------|-----------|-----------|-----------|-----------|
| © TxDOT December 1985 | | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
| REVISITS | | CONT | SECT | JOB | HIGHWAY |
| 8-95 | 2-12 | 1015 | 01 | 023 | FM 3549 |
| 1-97 | | DIST | COUNTY | | SHEET NO. |
| 4-98 | | DAL | ROCKWALL | | 107 |
| 3-03 | | | | | |

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TCP (2-5a)
ONE LANE CLOSED



TCP (2-5b)
TWO LANES CLOSED

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

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

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

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

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
 - A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
 - Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
 - The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

- Conflicting pavement markings shall be removed for long-term projects.

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

Texas Department of Transportation
 Traffic Operations Division

**TRAFFIC CONTROL PLAN
 LONG TERM LANE CLOSURES
 MULTILANE CONVENTIONAL RDS.**

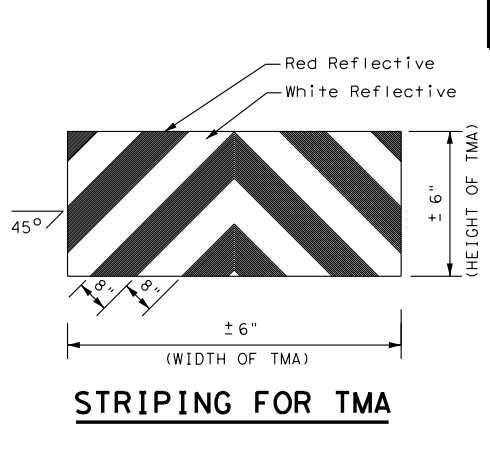
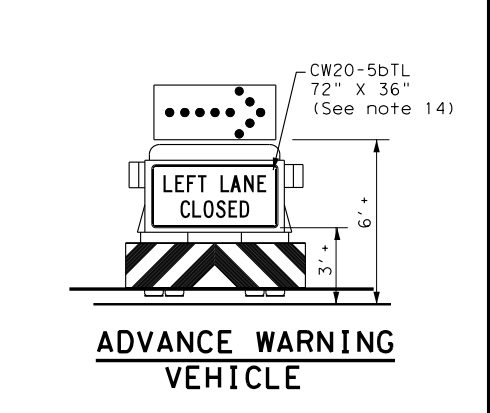
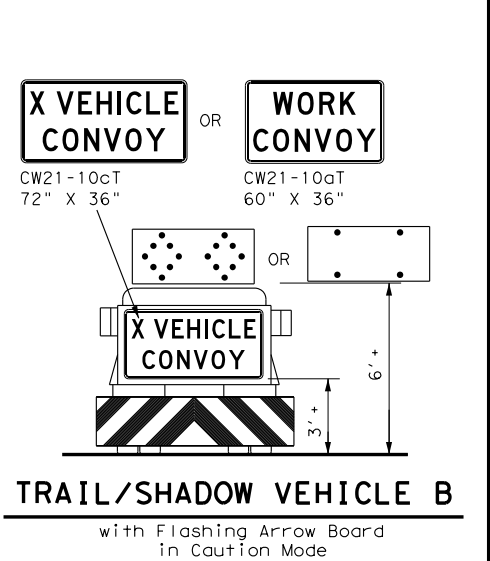
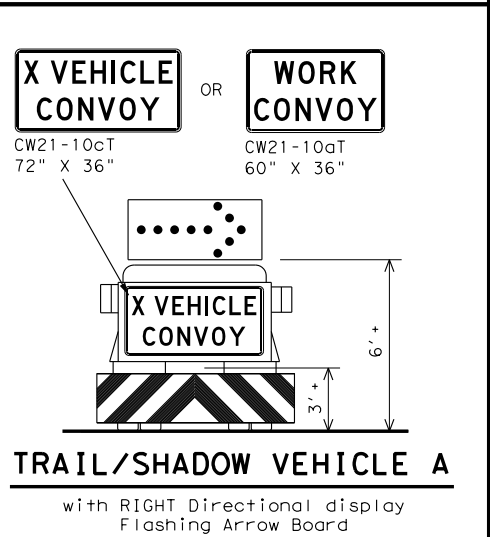
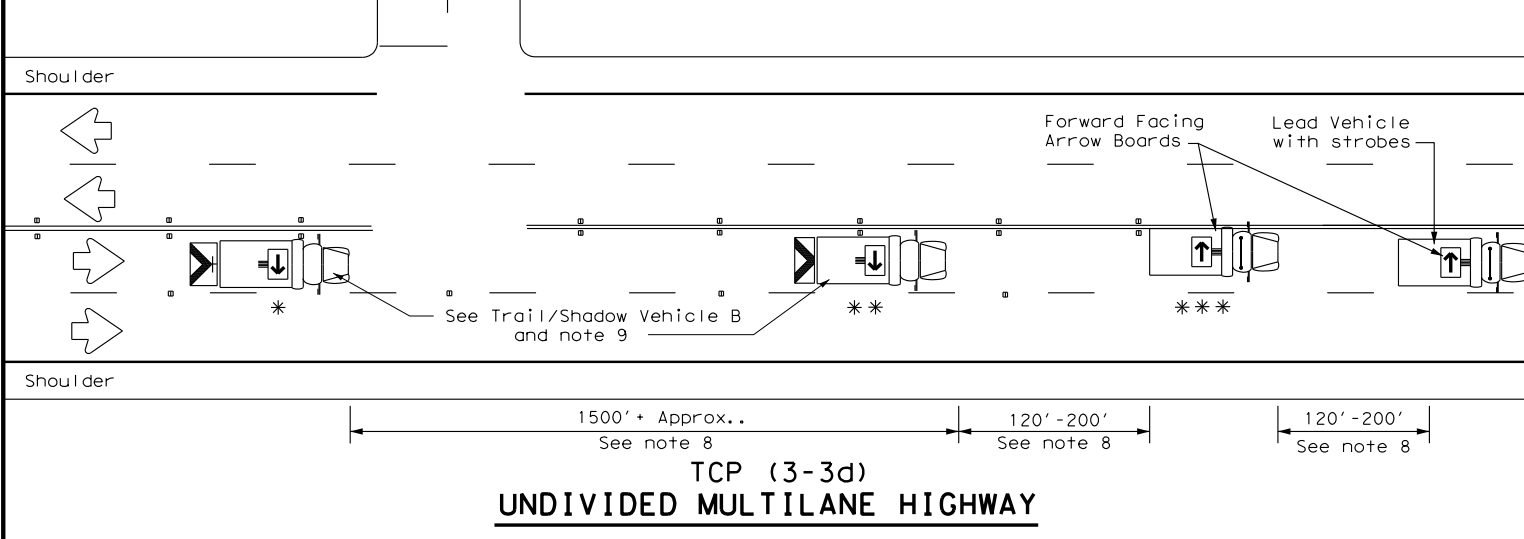
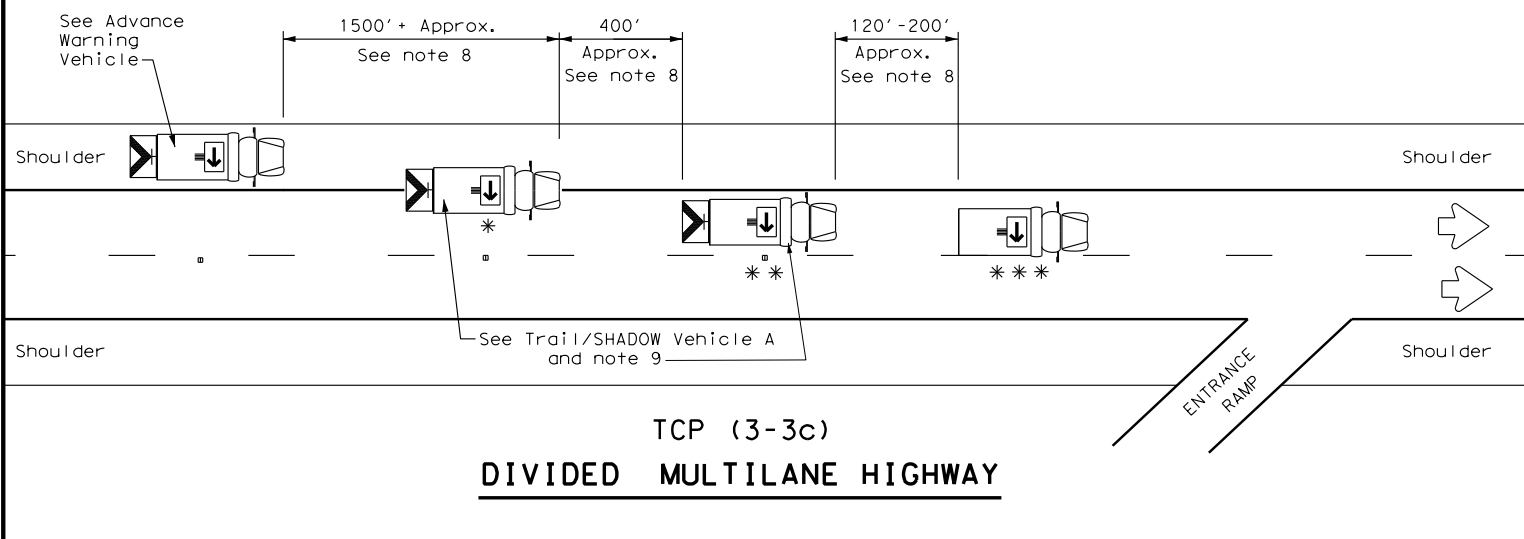
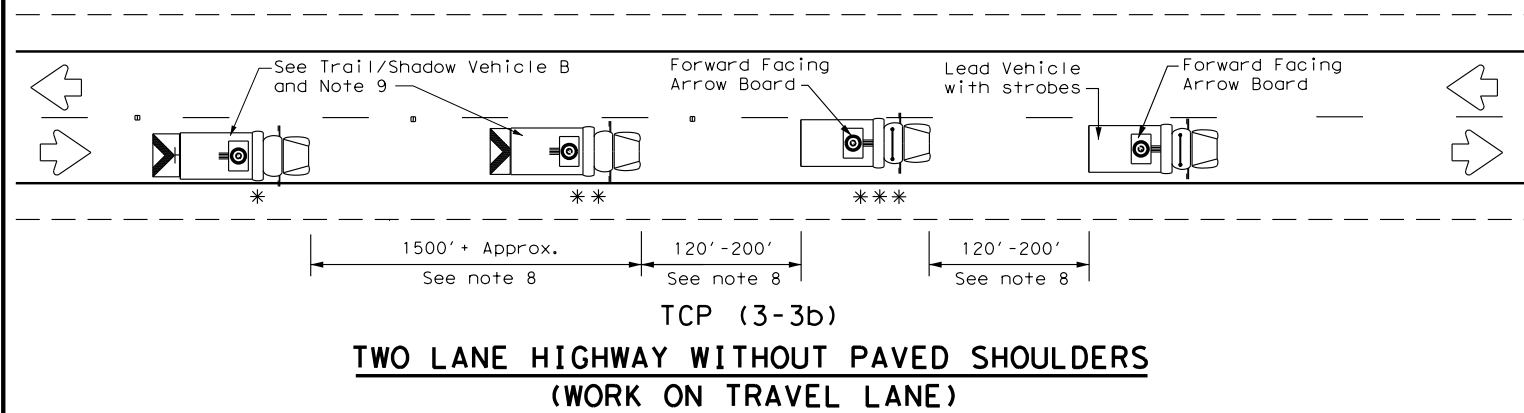
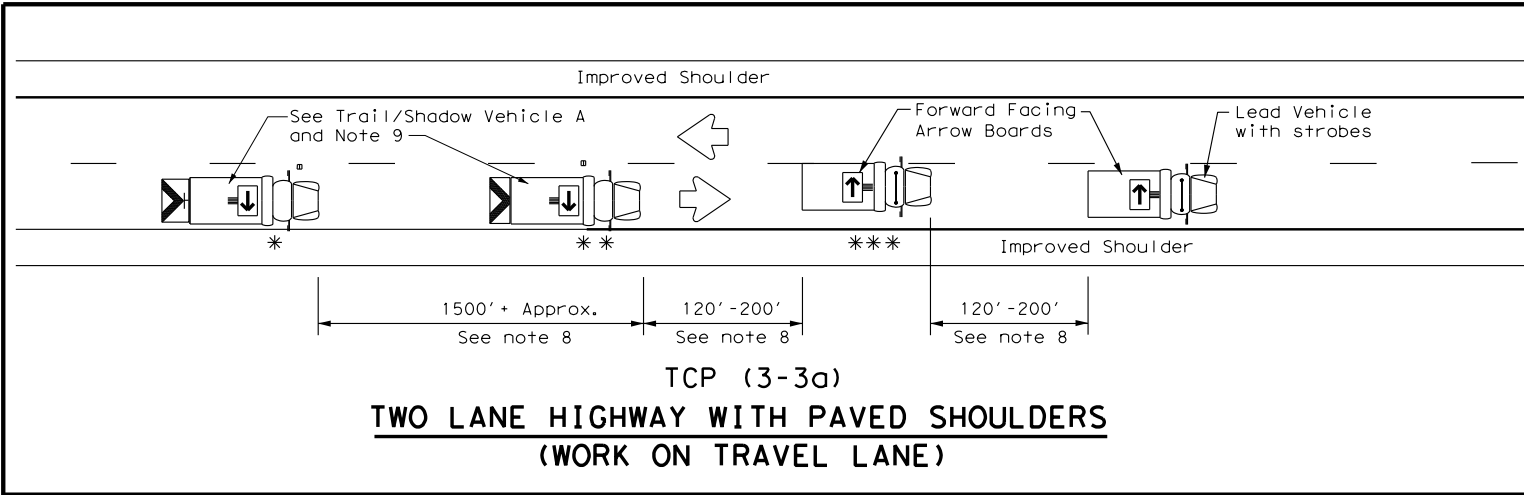
TCP (2-5) - 12

| | | | | | |
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| © TxDOT December 1985 | | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
| REVISIONS | | CONT | SECT | JOB | HIGHWAY |
| 8-95 | 2-12 | 1015 | 01 | 023 | FM 3549 |
| 1-97 | | | | | |
| 4-98 | | DIST | COUNTY | | SHEET NO. |
| 3-03 | | DAL | ROCKWALL | | 108 |

165

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DATE: FILE:



| LEGEND | | | |
|--------|--------------------------------|---------------------|---|
| * | Trail Vehicle | ARROW BOARD DISPLAY | |
| ** | Shadow Vehicle | | |
| *** | Work Vehicle | | RIGHT Directional |
| | Heavy Work Vehicle | | LEFT Directional |
| | Truck Mounted Attenuator (TMA) | | Double Arrow |
| | Traffic Flow | | CAUTION (Alternating Diamond or 4 Corner Flash) |

| TYPICAL USAGE | | | | |
|-------------------------------------|--------------------------|--------------------------|------------------------------|--------------------------|
| MOBILE | SHORT DURATION | SHORT TERM STATIONARY | INTERMEDIATE TERM STATIONARY | LONG TERM STATIONARY |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

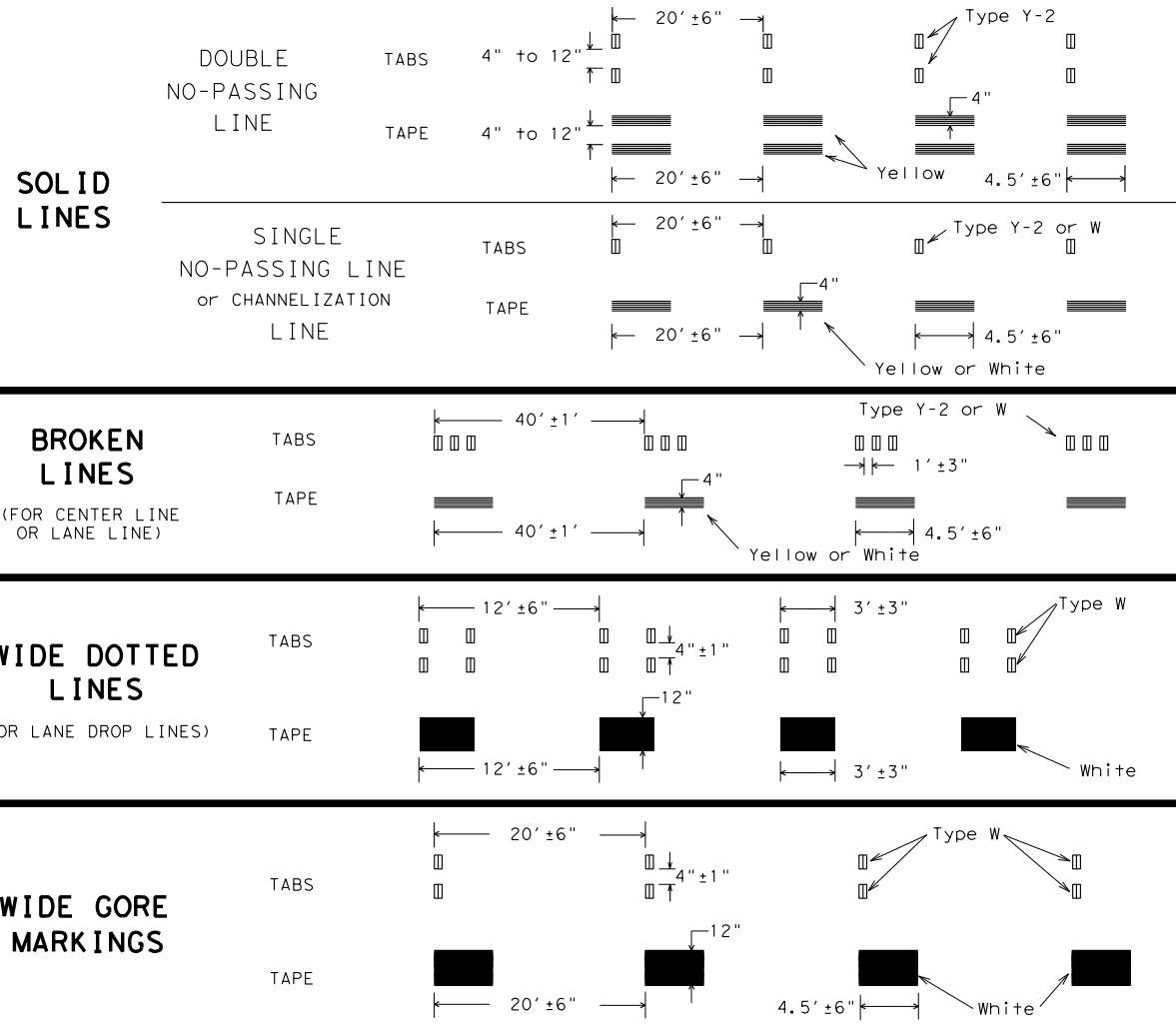
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL TCP (3-3) - 14

| | | | | |
|------------------------|-----------|-----------|-----------|-----------|
| FILE: tcp3-3.dgn | DN: TxDOT | CK: TxDOT | DN: TxDOT | CK: TxDOT |
| © TxDOT September 1987 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 2-94 4-98 | DIST | COUNTY | SHEET NO. | |
| 8-95 7-13 | DAL | ROCKWALL | 109 | |
| 1-97 7-14 | | | | |

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



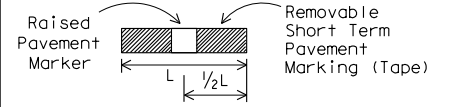
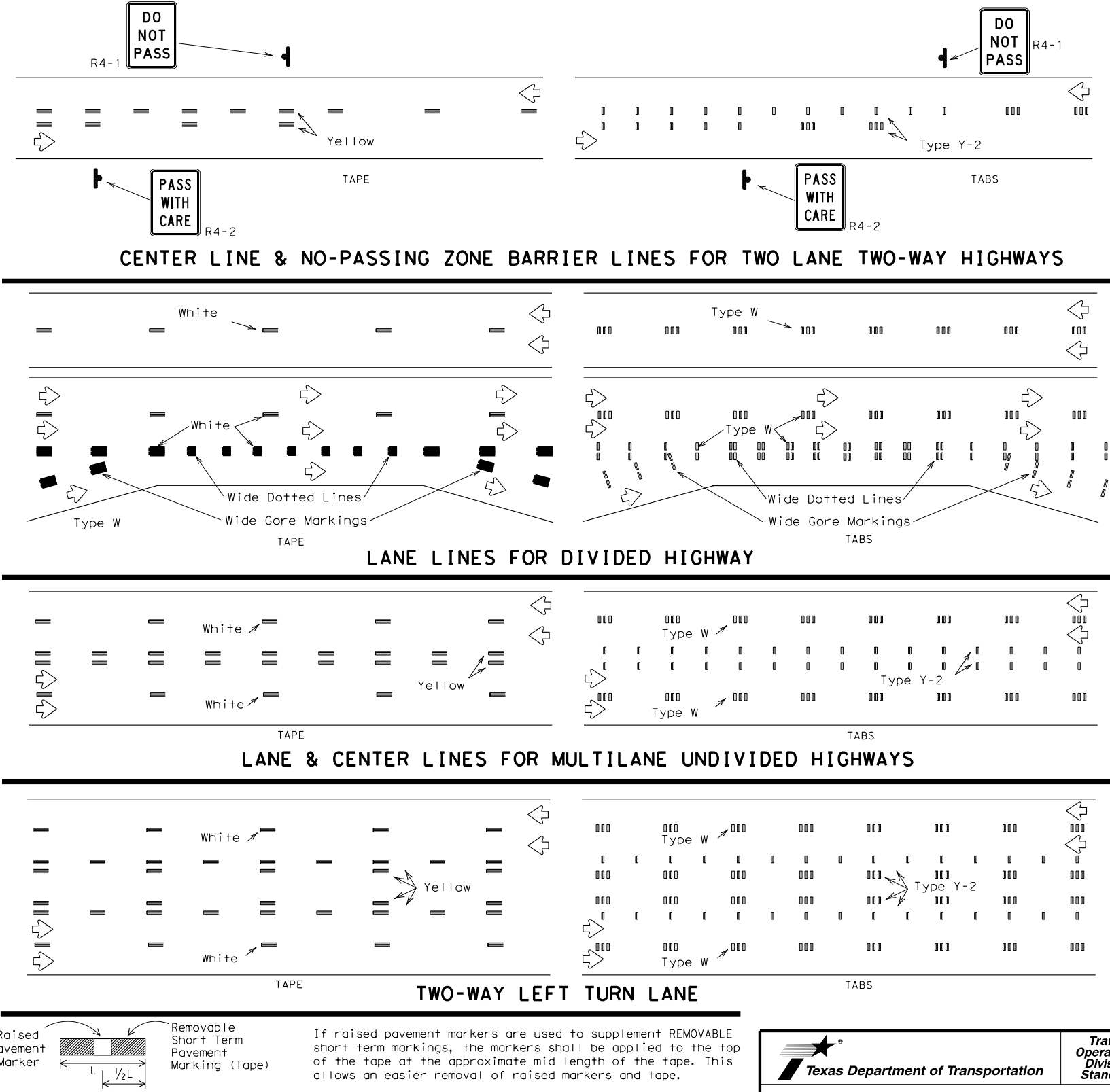
NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
- For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
- Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

- DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm



WORK ZONE SHORT TERM PAVEMENT MARKINGS

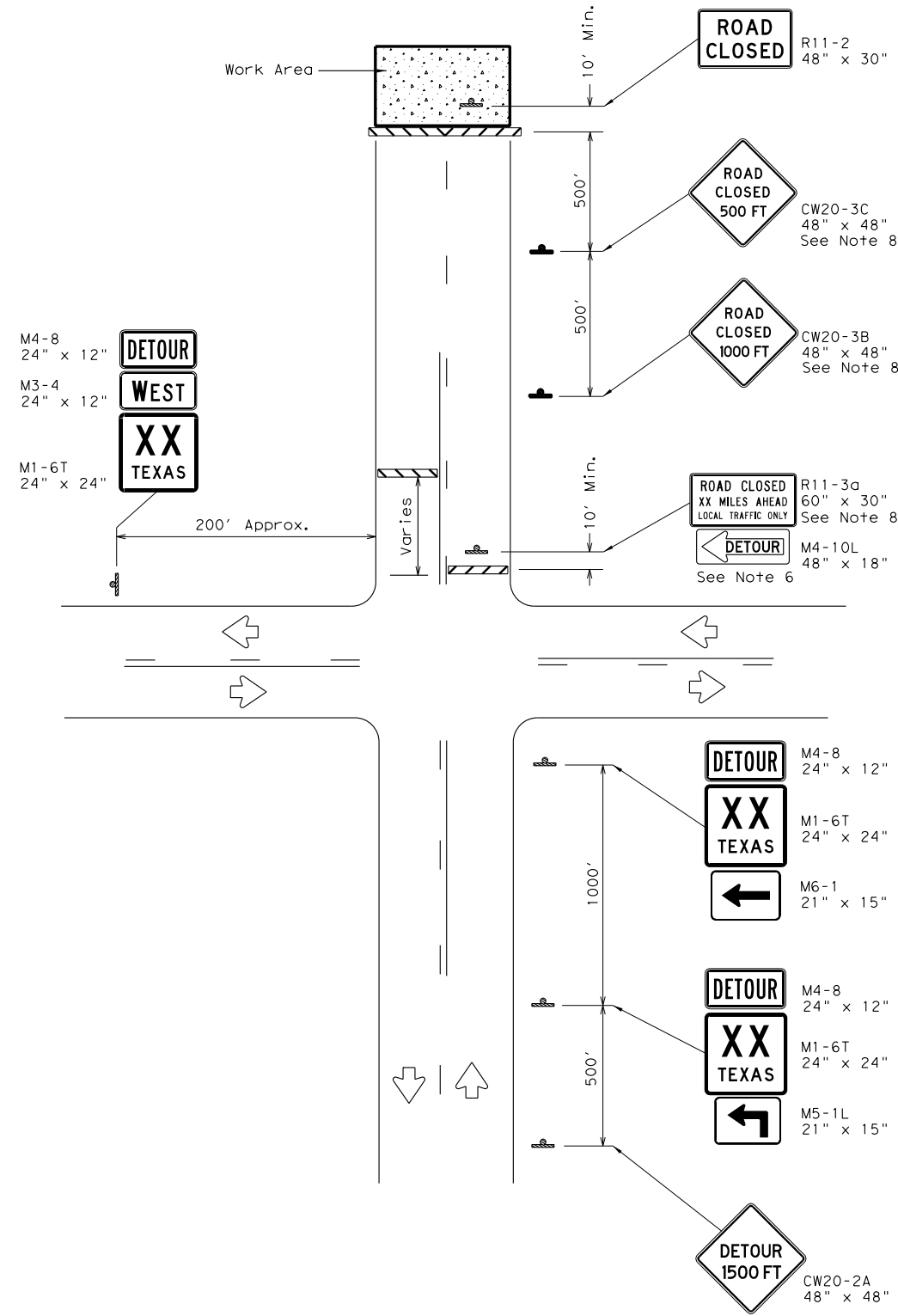
WZ (STPM) - 13

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| © TxDOT | April 1992 | CONT: | 1015 | SECT: | 01 | JOB: | 023 | FM: | 3549 |
| REVISIONS | | DIST: | | COUNTY: | | SHEET NO.: | | | |
| 1-97 | | DAL: | | ROCKWALL | | | | | 110 |
| 3-03 | | | | | | | | | |
| 7-13 | | | | | | | | | |

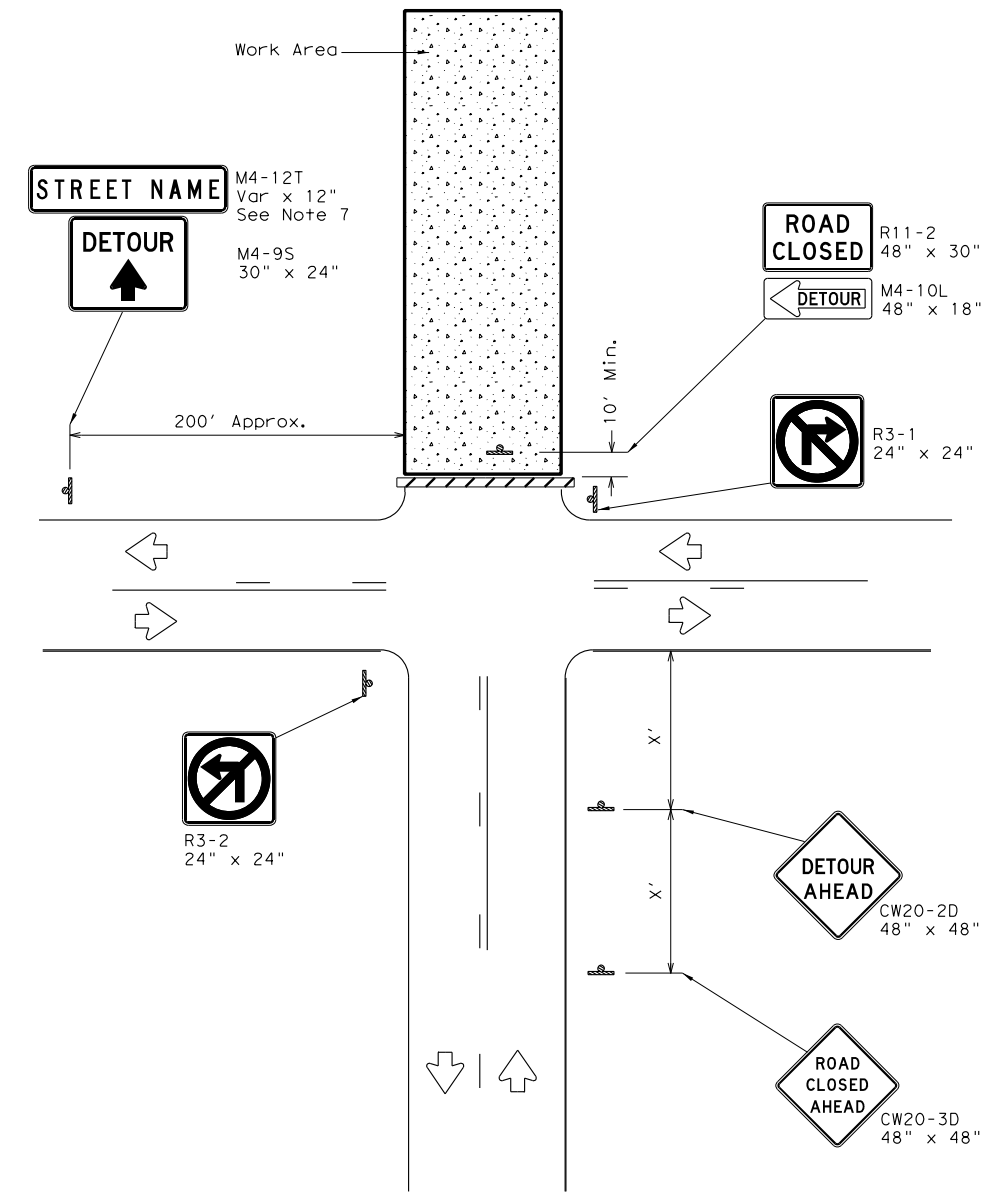
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DATE:
FILE:



ROAD CLOSURE BEYOND THE INTERSECTION
Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION
Signing for an Un-numbered Route with an Off-Site Detour

| LEGEND | |
|--------|------------------|
| | Type 3 Barricade |
| | Sign |

| Posted Speed * | Minimum Sign Spacing "X" Distance |
|----------------|-----------------------------------|
| 30 | 120' |
| 35 | 160' |
| 40 | 240' |
| 45 | 320' |
| 50 | 400' |
| 55 | 500' |
| 60 | 600' |
| 65 | 700' |
| 70 | 800' |
| 75 | 900' |

* Conventional Roads Only

GENERAL NOTES

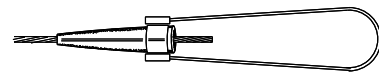
1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices List (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.



WORK ZONE ROAD CLOSURE DETAILS

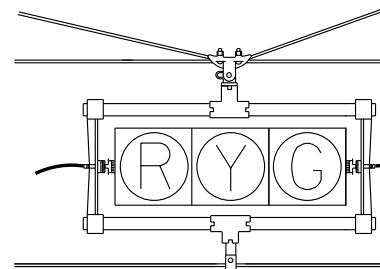
WZ (RCD) - 13

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| © TxDOT August 1995 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 1-97 4-98 7-13 | DIST | COUNTY | SHEET NO. | |
| 2-98 3-03 | DAL | ROCKWALL | 111 | |



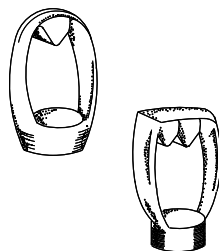
COMPRESSION FITTING

SOURCES:
RELIABLE ELECTRIC NO. 5264
FARGO NO. OR EQUAL



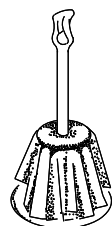
THIMBLEYE BOLT (Angle Type)

SOURCES:
HUBBELL POWER SYS. NO. 5016
MCLEAN POWER SYS. NO. J8154
OR EQUAL



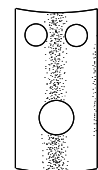
EYE NUTS (Twineye & tripeye)

SOURCES:
HUBBELL POWER SYS. NO. 6560 (TWIN), 6510 (SINGLE)
MCLEAN POWER SYS. NO. J6515 (TWIN), J6510 (SINGLE)
OR EQUAL



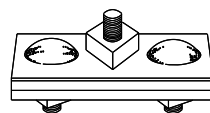
8-WAY ANCHOR

SOURCES:
HUBBELL POWER SYS. NO. 1283
MCLEAN POWER SYS. NO. J0283
OR EQUAL



LIFT PLATE

SOURCES:
HUBBELL POWER SYS. NO. 7898
MCLEAN POWER SYS. NO. J7890
OR EQUAL

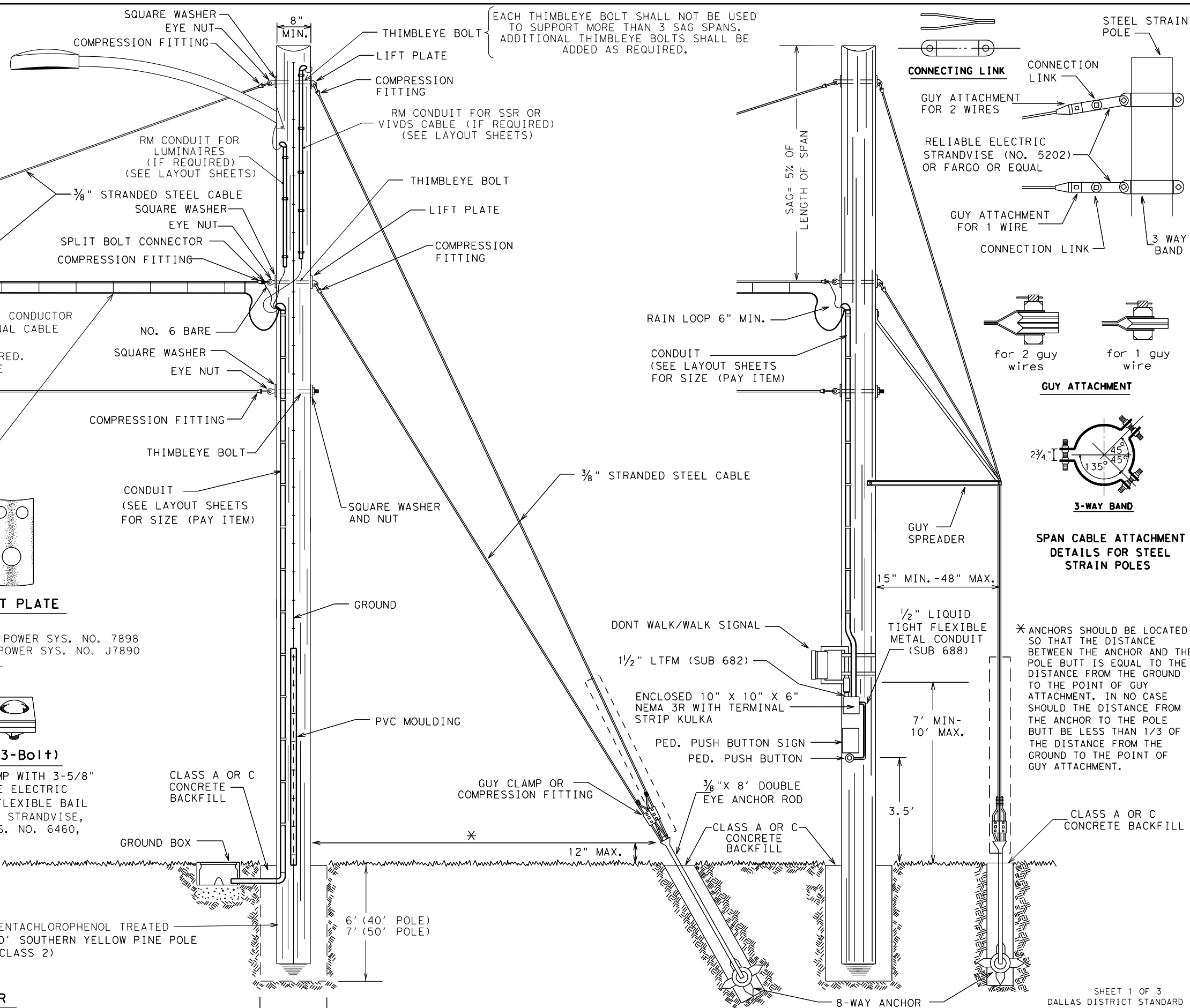


GUY CLAMP (3-Bolt)

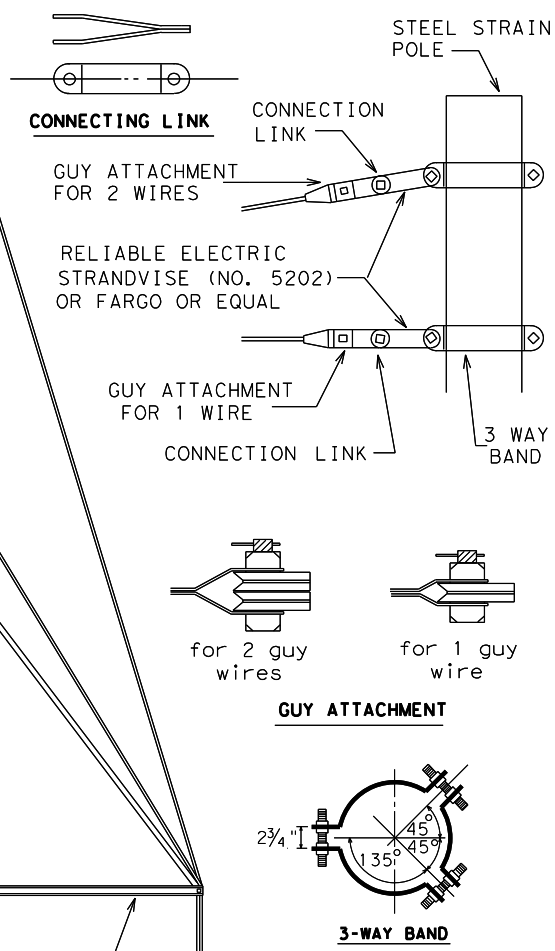
6" HEAVY GUY CLAMP WITH 3-5/8" BOLTS OR RELIABLE ELECTRIC STRANDVISE WITH FLEXIBLE BAIL (NO. 5264), FARGO STRANDVISE, HUBBELL POWER SYS. NO. 6460, OR EQUAL

PENTACHLOROPHENOL TREATED
40' SOUTHERN YELLOW PINE POLE
(CLASS 2)

HOLE DIA = POLE DIA
AT BOTTOM + 18"



EACH THIMBLEYE BOLT SHALL NOT BE USED TO SUPPORT MORE THAN 3 SAG SPANS. ADDITIONAL THIMBLEYE BOLTS SHALL BE ADDED AS REQUIRED.



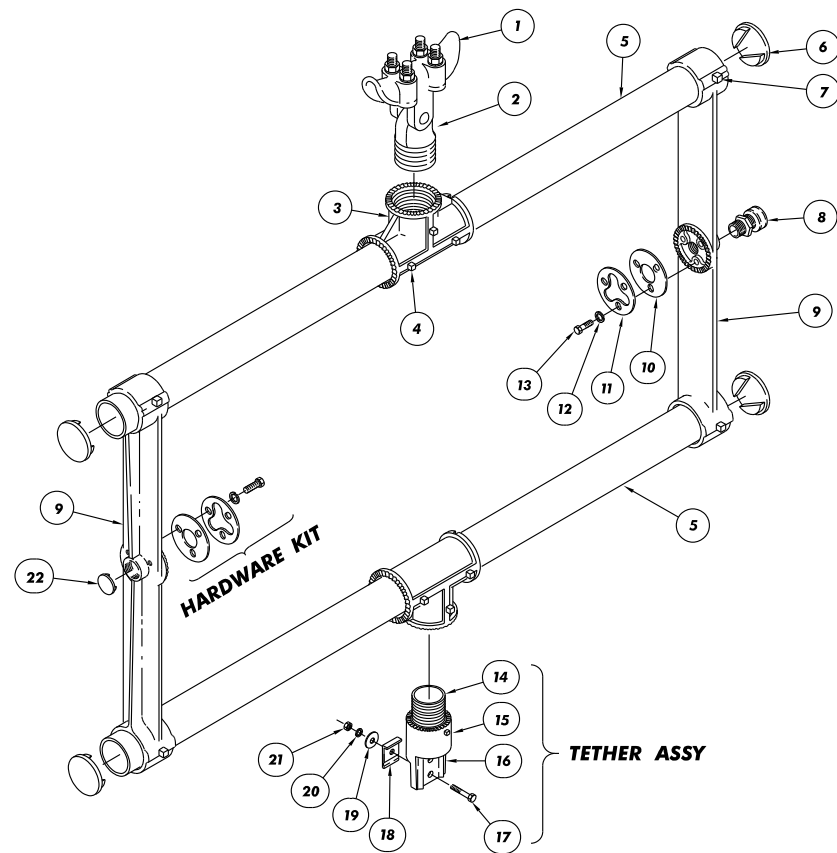
SPAN CABLE ATTACHMENT DETAILS FOR STEEL STRAIN POLES

* ANCHORS SHOULD BE LOCATED SO THAT THE DISTANCE BETWEEN THE ANCHOR AND THE POLE BUTT IS EQUAL TO THE DISTANCE FROM THE GROUND TO THE POINT OF GUY ATTACHMENT. IN NO CASE SHOULD THE DISTANCE FROM THE BUTT TO THE POLE BE LESS THAN 1/3 OF THE DISTANCE FROM THE GROUND TO THE POINT OF GUY ATTACHMENT.

CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED TRAFFIC SIGNALS

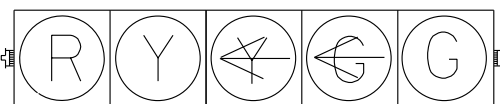
SHEET 1 OF 3
DALLAS DISTRICT STANDARD

| | | |
|-------------------|-------------------------|-------------|
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | SHEET NO. |
| 6 | (SEE TITLE SHEET) | 112 |
| STATE | STATE DIST. NO. | COUNTY |
| TEXAS | DAL | ROCKWALL |
| CONT. | SECT. | JOB |
| 1015 | 01 | 023 |
| | | HIGHWAY NO. |
| | | FM 3549 |

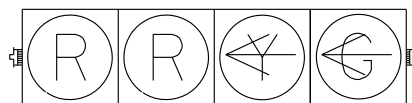


**BOTTOM TETHERED, SPAN WIRE
SIGNAL HEAD HARDWARE
ASSEMBLY (BACKPLATE NOT SHOWN)**

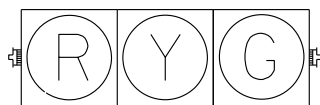
| ITEM | DESCRIPTION | QTY |
|------|--|-----|
| 1 | SPAN WIRE CLAMP, IRON, W/ U-BOLTS | 1 |
| 2 | SPAN WIRE ADAPTER, ALUM W/ STAINLESS BUSHING | 1 |
| 3 | TEE HORIZONTAL SLIP, DIE CAST ALUM | 2 |
| 4 | SCREW, SET SQ HD, 1/4"-20 X 1/2", STAINLESS | 6 |
| 5 | TUBE, 1/2" X LENGTH, ALUM | 2 |
| 6 | TUBE CAP, 1/2", PLASTIC | 4 |
| 7 | SCREW, SET SQ HD, 5/16"-18 X 5/8", STAINLESS | 8 |
| 8 | CGB, 3/4" .55-.65, ZINC 1 | 1 |
| 9 | CAST ARM, FOR HORIZONTAL MOUNTED SIGNAL, ALUM | 2 |
| 10 | GASKET, TRI-BOLT, 1/16" X 70 DURO NEOPRENE | 2 |
| 11 | WASHER, SLOTTED, ZINC 2 | 2 |
| 12 | WASHER, LOCK SPLIT, 1/4", STAINLESS | 6 |
| 13 | BOLT, HEX HD, 1/4"-20 X 1 1/2", GRADE 5, STAINLESS | 6 |
| 14 | NIPPLE, ALLTHREAD, 1/2" NPS X 2.13", ALUM | 1 |
| 15 | SCREW, SET SQ HD, 1/4"-20 X 5/8", STAINLESS | 1 |
| 16 | BODY, 1/2", HANGER, ALUM | 1 |
| 17 | BOLT, HEX HD, 5/16"-18 X 1 1/2", STAINLESS | 1 |
| 18 | PLATE, TETHER, 1-HOLE, ALUM | 1 |
| 19 | WASHER, FENDER, 5/16", STAINLESS | 1 |
| 20 | WASHER, SPLIT LOCK, 5/16", STAINLESS | 1 |
| 21 | NUT, HEX HD, 5/16"-18, STAINLESS | 1 |
| 22 | CAP, EN-3/4, BLUE (FOR CGB) | 1 |



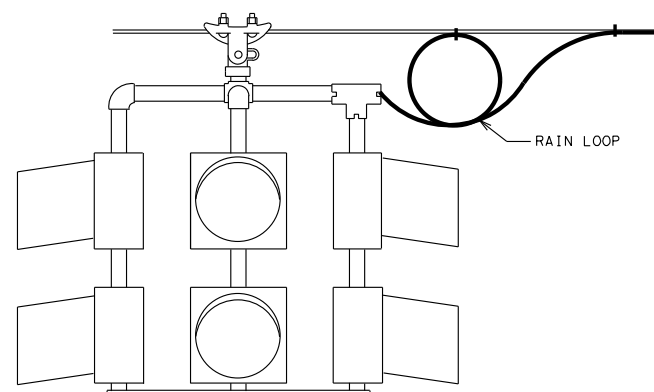
H5LT
TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION



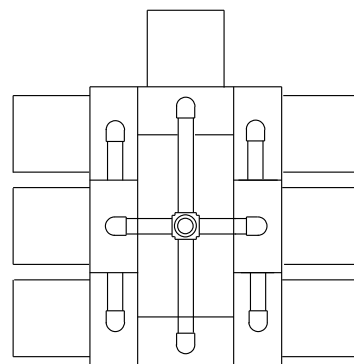
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TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION



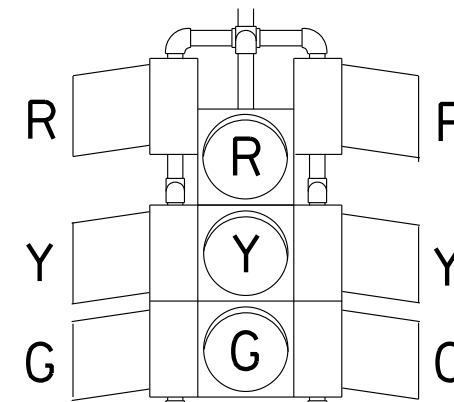
H3
TYPICAL SPAN WIRE
HORIZONTAL MOUNT
INSTALLATION



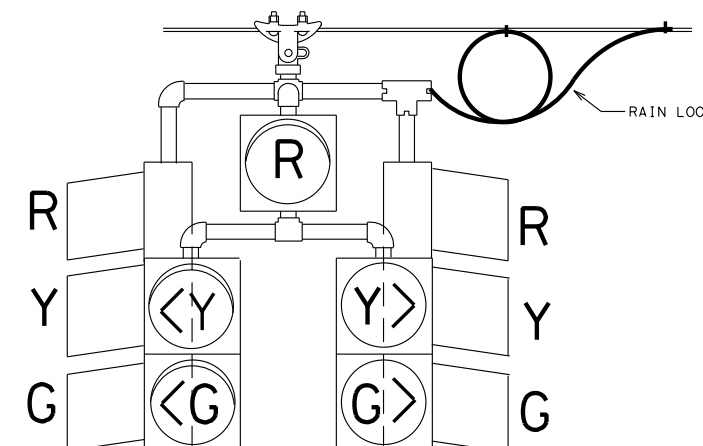
**TYPICAL
FLASHING BEACON
INSTALLATION**



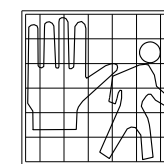
TOP



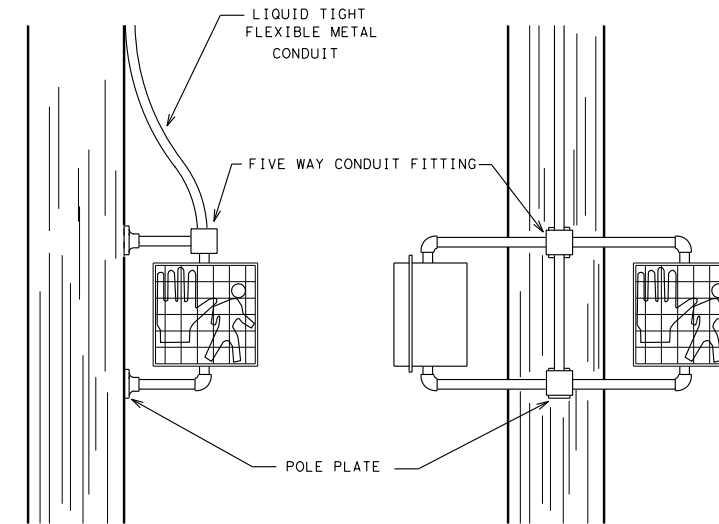
SIDES



FRONT AND BACK

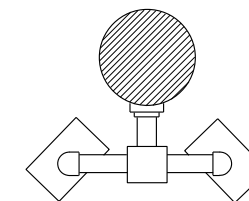


"EGGCRATE" VISOR PEDESTRIAN SIGNAL
WITH ONE-PIECE REFLECTOR



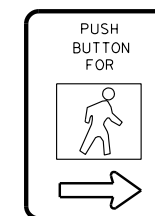
152A
ONE-WAY
ADJUSTABLE FACE SIGNAL FOR
WOOD POLE MOUNTING

143C
TWO-WAY
ADJUSTABLE FACE SIGNAL FOR
WOOD POLE MOUNTING



143C
PLAN VIEW

SIGN R10-4bR
SIGN R10-4bL
9"X12"

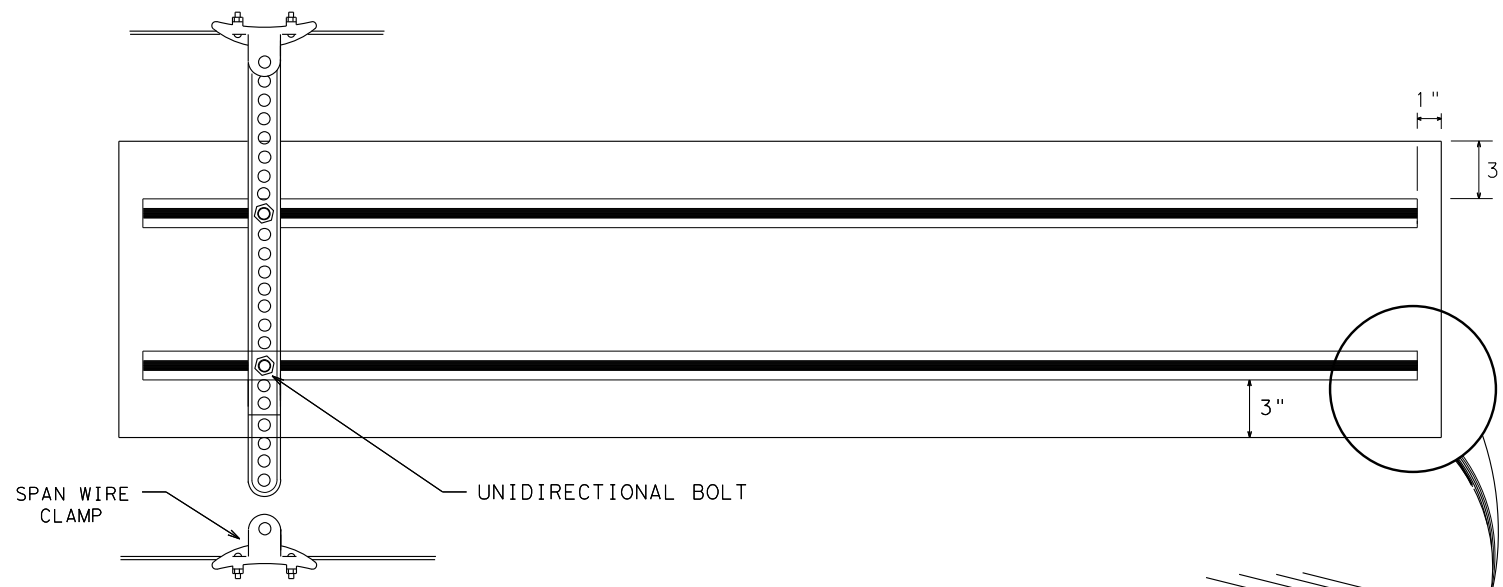


**PEDESTRIAN PUSHBUTTON
SIGN DETAILS**

**CONSTRUCTION DETAILS FOR SPAN
WIRE MOUNTED TRAFFIC SIGNALS**

SHEET 2 OF 3
DALLAS DISTRICT STANDARD

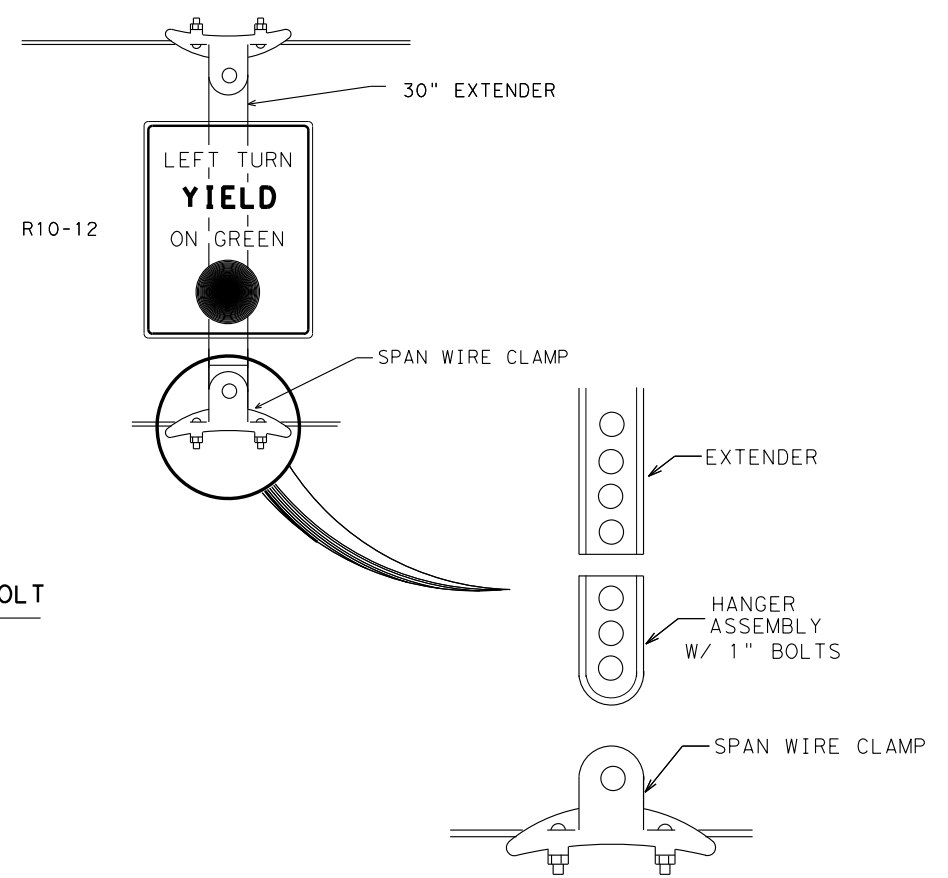
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|-------------------|-------------------------|-----------------|
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | SHEET NO. |
| 6 | (SEE TITLE SHEET) | 113 |
| STATE | STATE DIST. NO. | COUNTY |
| TEXAS | DAL | ROCKWALL |
| CONT. | SECT. | JOB HIGHWAY NO. |
| 1015 | 01 | 023 FM 3549 |



MEDIUM EXTRUSION HPN053

UNIDIRECTIONAL BOLT

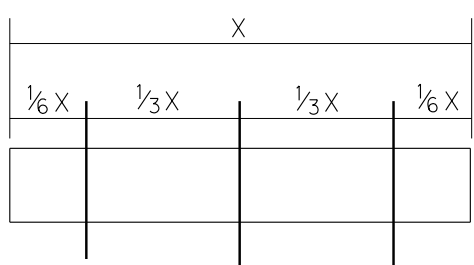
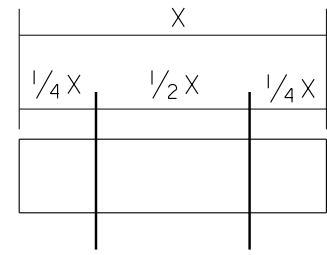
ALUMINUM RIVET



EXTENDER

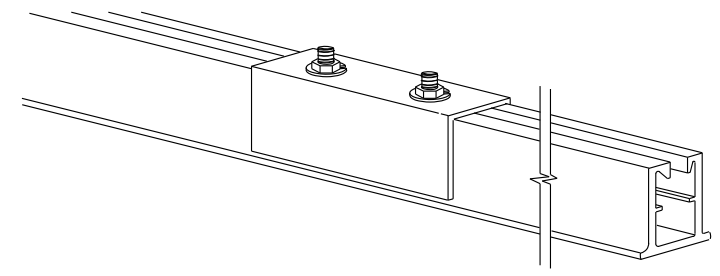
HANGER ASSEMBLY W/ 1" BOLTS

SPAN WIRE CLAMP



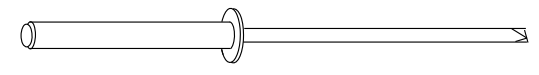
HANGER ASSEMBLY DETAILS

- NOTES: 1. BASED ON SIGN WIDTH, THE NUMBER OF VERTICAL SUPPORTS REQUIRED ARE AS FOLLOWS:
 3'-0" OR LESS - 1 SUPPORT REQUIRED
 >3'-0" UP TO 8'-0" - 2 SUPPORTS REQUIRED
 >8'-0" - 3 SUPPORTS REQUIRED
 SEE DIAGRAMS FOR SIGN SUPPORT SPACING
2. FOR STREET NAME SIGNS, EXTRUDED ALUMINUM SHALL BE MOUNTED FOR HORIZONTAL SUPPORT AS SHOWN.



5" ALUMINUM COUPLING

6061-T6



ALUMINUM RIVET

NOTE: ALUMINUM RIVETS SHALL BE USED TO ATTACH THE SIGN TO THE EXTRUDED ALUMINUM. SPACINGS OF RIVETS SHALL BE 6" O.C.

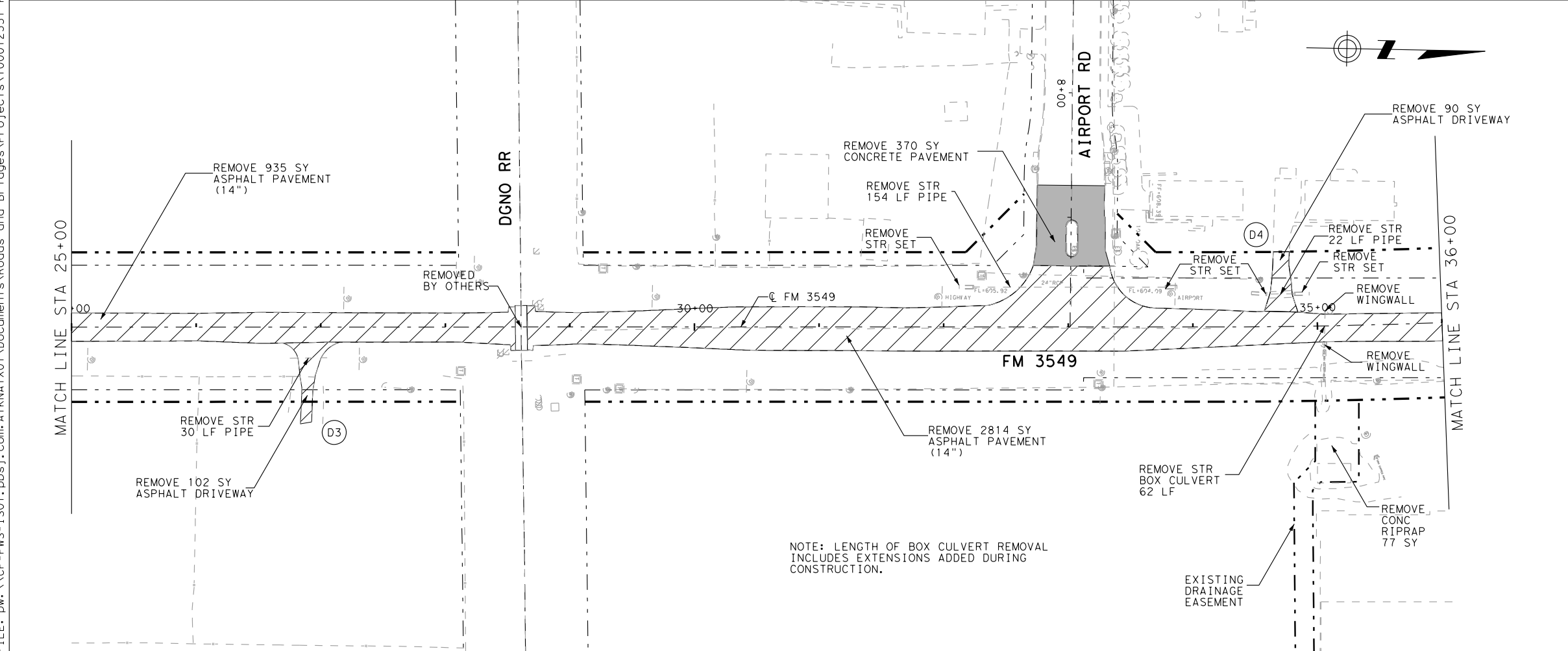
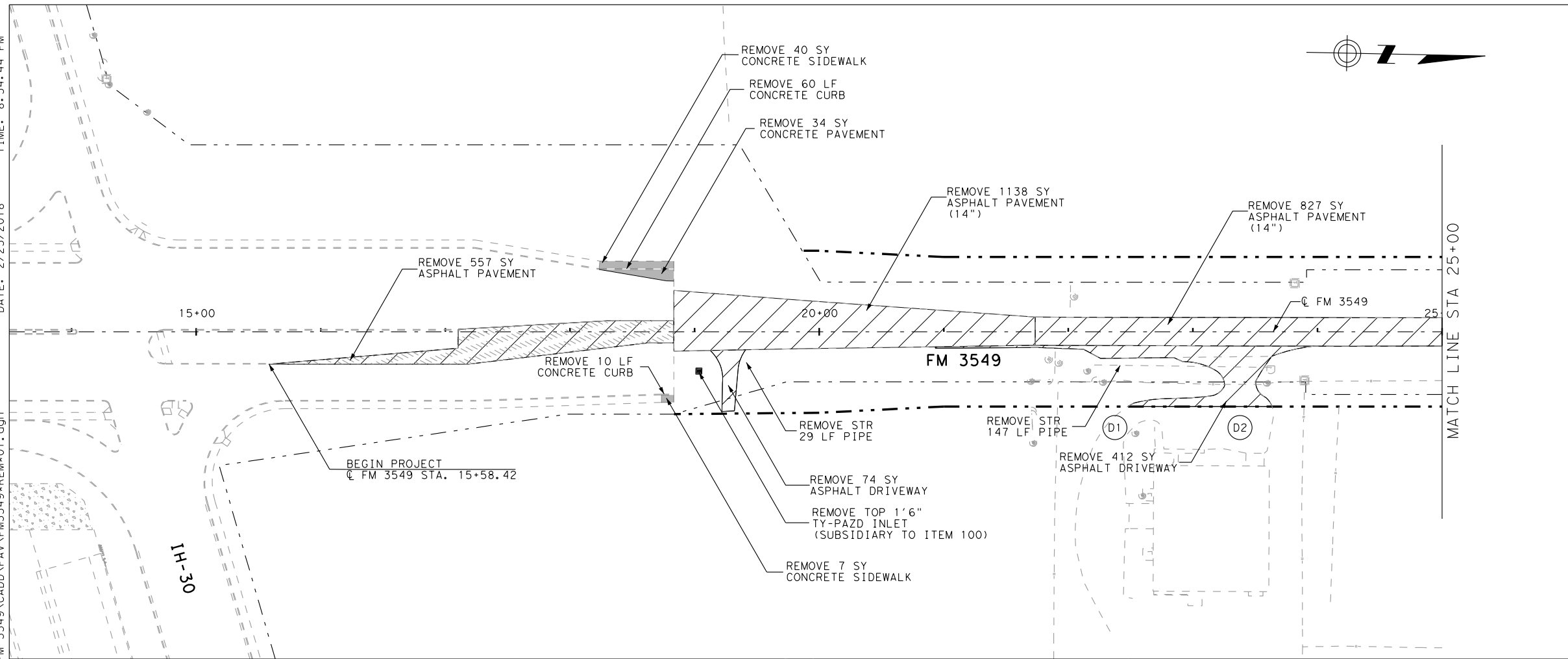
CONSTRUCTION DETAILS FOR SPAN WIRE MOUNTED TRAFFIC SIGNALS

SHEET 3 OF 3
DALLAS DISTRICT STANDARD

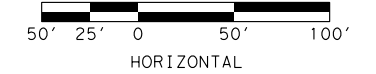
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|-------------------|-------------------------|-----------------|
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | SHEET NO. |
| | 6 (SEE TITLE SHEET) | 114 |
| STATE | STATE DIST. NO. | COUNTY |
| TEXAS | DAL | ROCKWALL |
| CONT. | SECT. | JOB HIGHWAY NO. |
| 1015 | 01 | 023 FM 3549 |

PLOT DRIVER: RD*11x17*PDF.plt
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DATE: 2/25/2018
 TIME: 8:54:44 PM



NOTE: LENGTH OF BOX CULVERT REMOVAL INCLUDES EXTENSIONS ADDED DURING CONSTRUCTION.



LEGEND

- EXISTING ROW
- - - PROPOSED ROW
- ASPHALT PAVEMENT TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED
- PROPOSED DRIVEWAY

- NOTE:
1. ASPHALT DRIVEWAYS ARE 6" THICK.
 2. THE ASPHALT PAVEMENT ON FM 3549 IS 14" THICK.
 3. THE PAVEMENT DOWN THE CENTER OF SH 66 IS 15 6.5" ASPHALT OVER 6-9" OF CONCRETE.
 4. THE PAVEMENT ON THE EDGES OF SH 66 IS 16" ASPHALT.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474



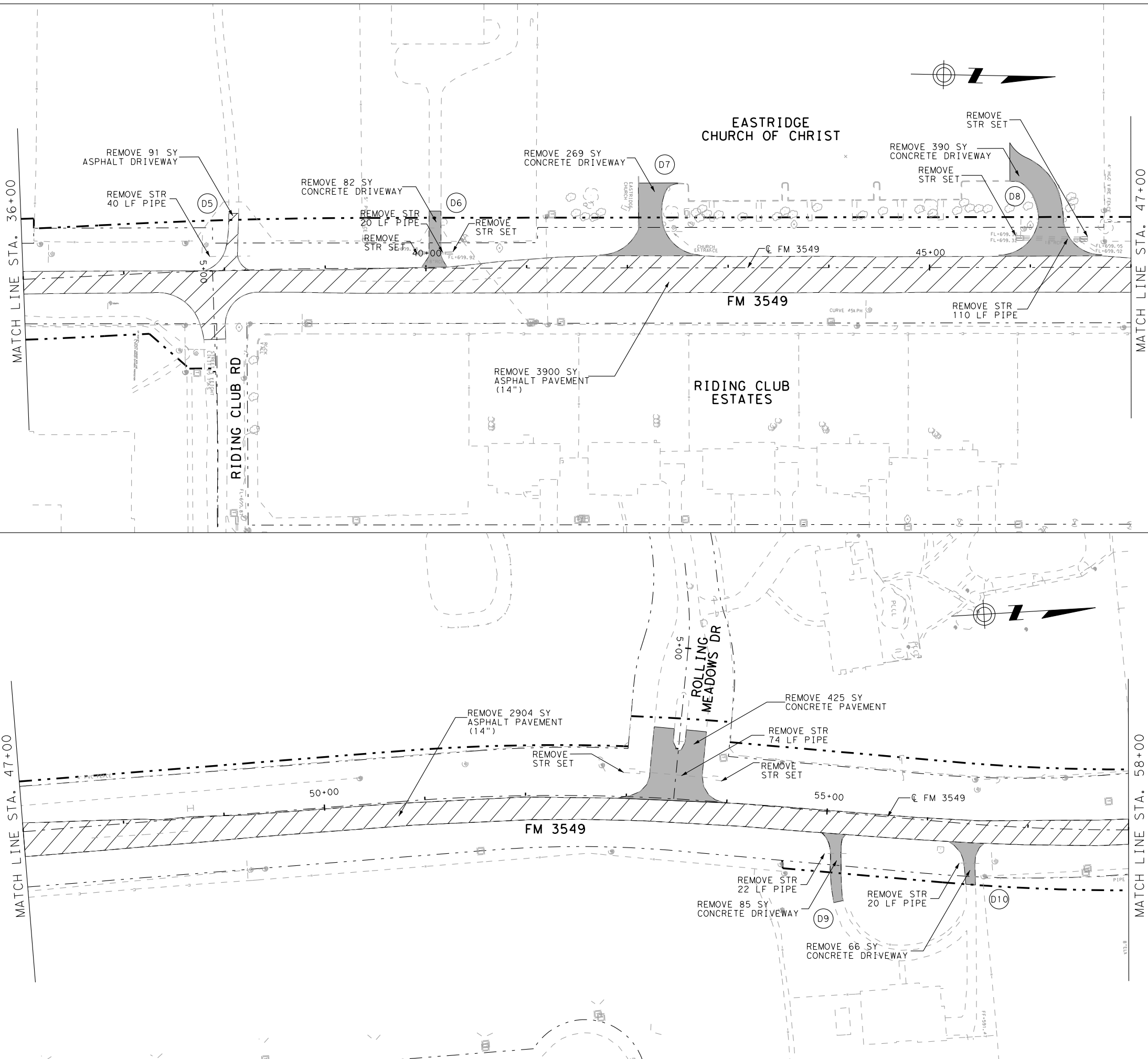
REMOVAL PLAN

BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 115 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

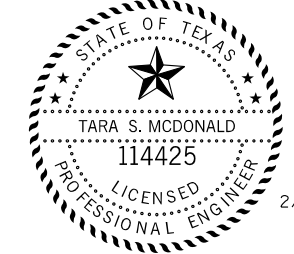
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LEGEND

- EXISTING ROW
- - - PROPOSED ROW
- ▨ ASPHALT PAVEMENT TO BE REMOVED
- CONCRETE PAVEMENT TO BE REMOVED
- (DX) PROPOSED DRIVEWAY

- NOTE:**
1. ASPHALT DRIVEWAYS ARE 6" THICK.
 2. THE ASPHALT PAVEMENT ON FM 3549 IS 14" THICK.
 3. THE PAVEMENT DOWN THE CENTER OF SH 66 IS 6.5" ASPHALT OVER 6-9" OF CONCRETE.
 4. THE PAVEMENT ON THE EDGES OF SH 66 IS 16" ASPHALT.



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474



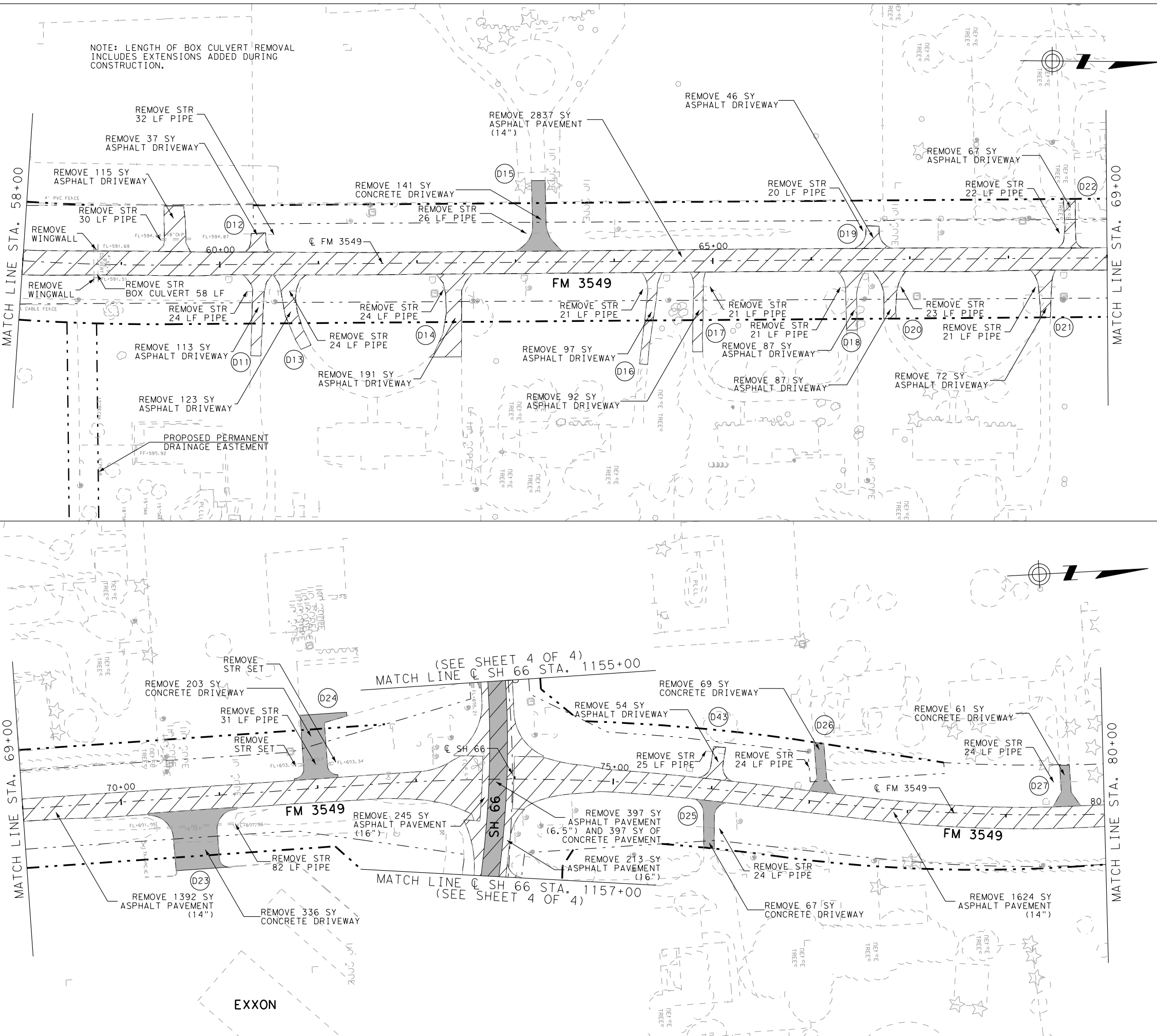
REMOVAL PLAN

STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 116 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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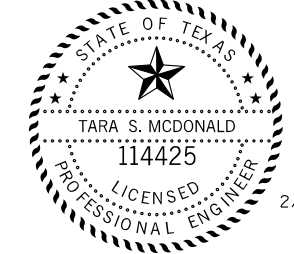


NOTE: LENGTH OF BOX CULVERT REMOVAL INCLUDES EXTENSIONS ADDED DURING CONSTRUCTION.



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - ASPHALT PAVEMENT TO BE REMOVED
 - CONCRETE PAVEMENT TO BE REMOVED
 - PROPOSED DRIVEWAY

- NOTE:**
1. ASPHALT DRIVEWAYS ARE 6" THICK.
 2. THE ASPHALT PAVEMENT ON FM 3549 IS 14" THICK.
 3. THE PAVEMENT DOWN THE CENTER OF SH 66 IS 6.5" ASPHALT OVER 6-9" OF CONCRETE.
 4. THE PAVEMENT ON THE EDGES OF SH 66 IS 16" ASPHALT.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474



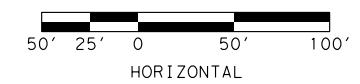
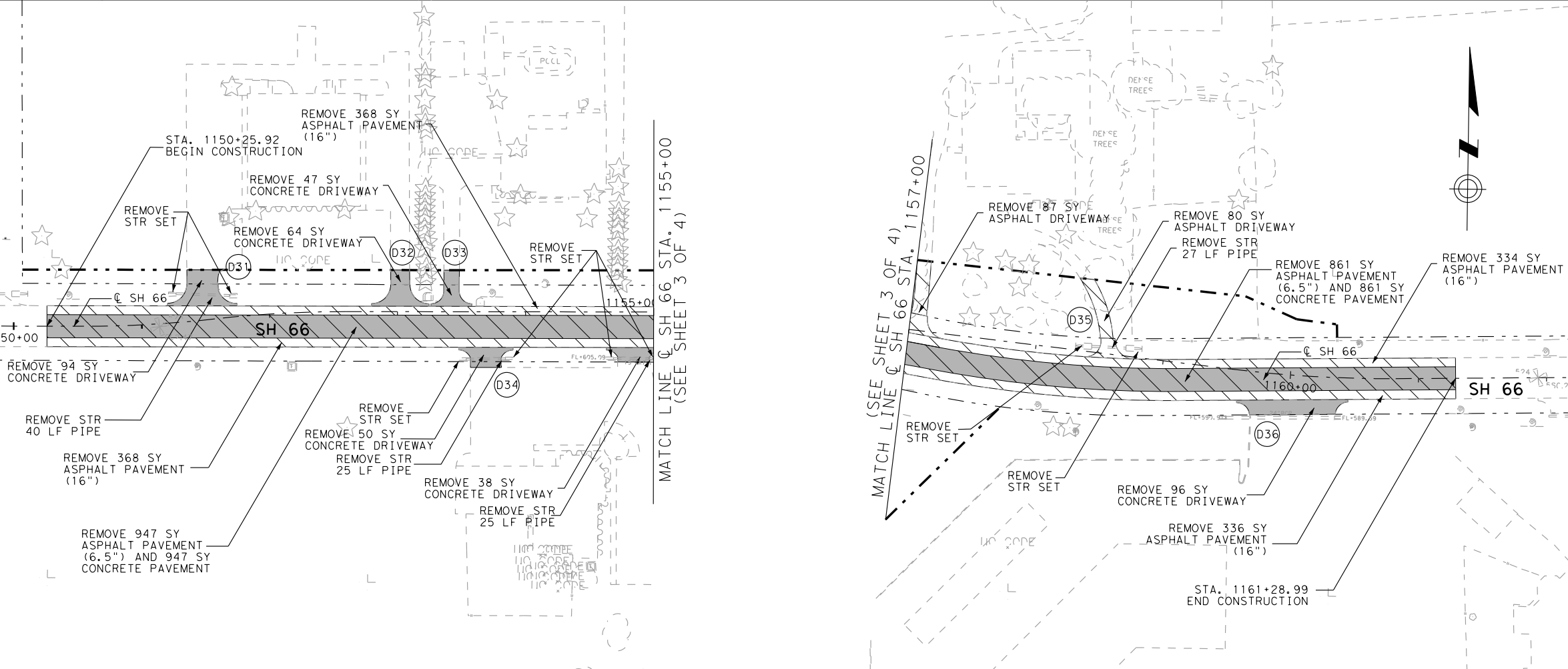
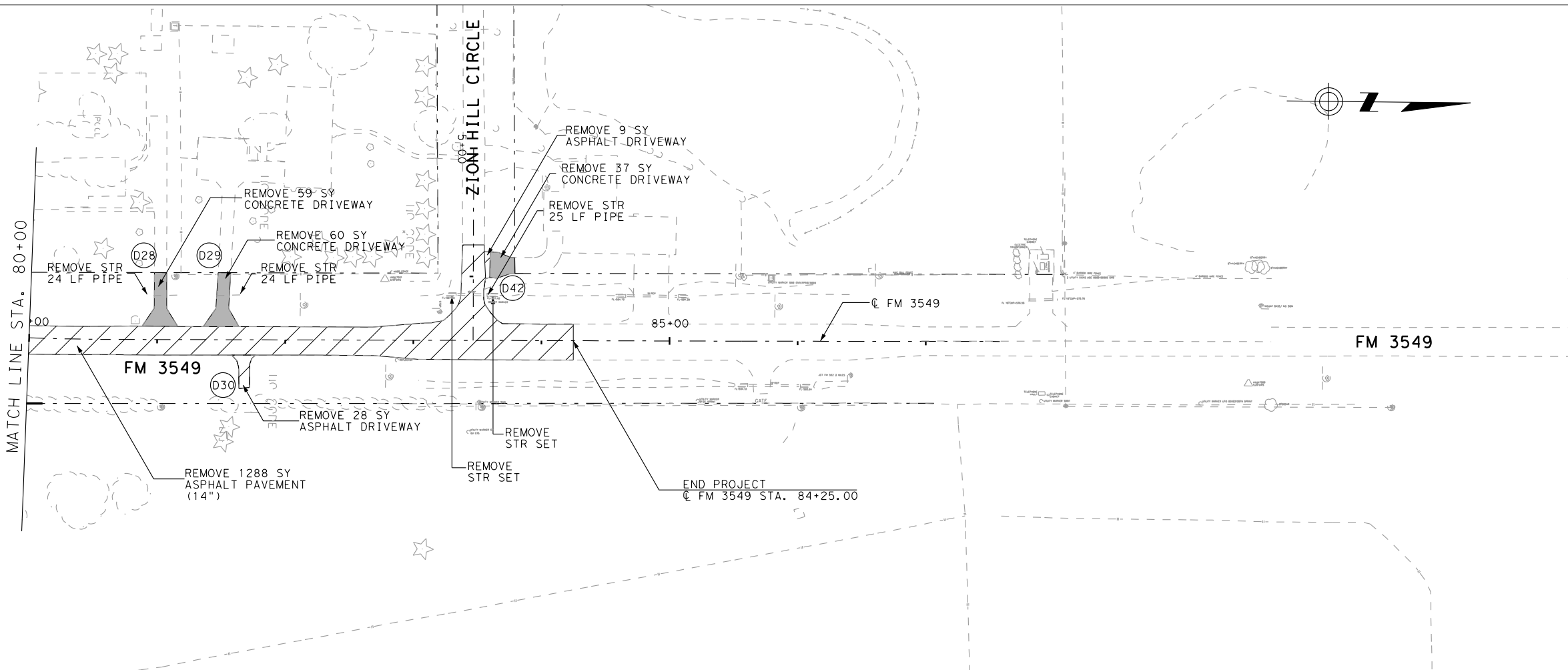
REMOVAL PLAN
 STA. 58+00 TO STA. 80+00

SHEET 3 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 117 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

EXXON

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 DATE: 2/25/2018 TIME: 8:55:26 PM



- LEGEND**
- EXISTING ROW
 - - - PROPOSED ROW
 - [Hatched Box] ASPHALT PAVEMENT TO BE REMOVED
 - [Solid Grey Box] CONCRETE PAVEMENT TO BE REMOVED
 - (DX) PROPOSED DRIVEWAY

- NOTE:**
1. ASPHALT DRIVEWAYS ARE 6" THICK.
 2. THE ASPHALT PAVEMENT ON FM 3549 IS 14" THICK.
 3. THE PAVEMENT DOWN THE CENTER OF SH 66 IS 16.5" ASPHALT OVER 6-9" OF CONCRETE.
 4. THE PAVEMENT ON THE EDGES OF SH 66 IS 16" ASPHALT.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474



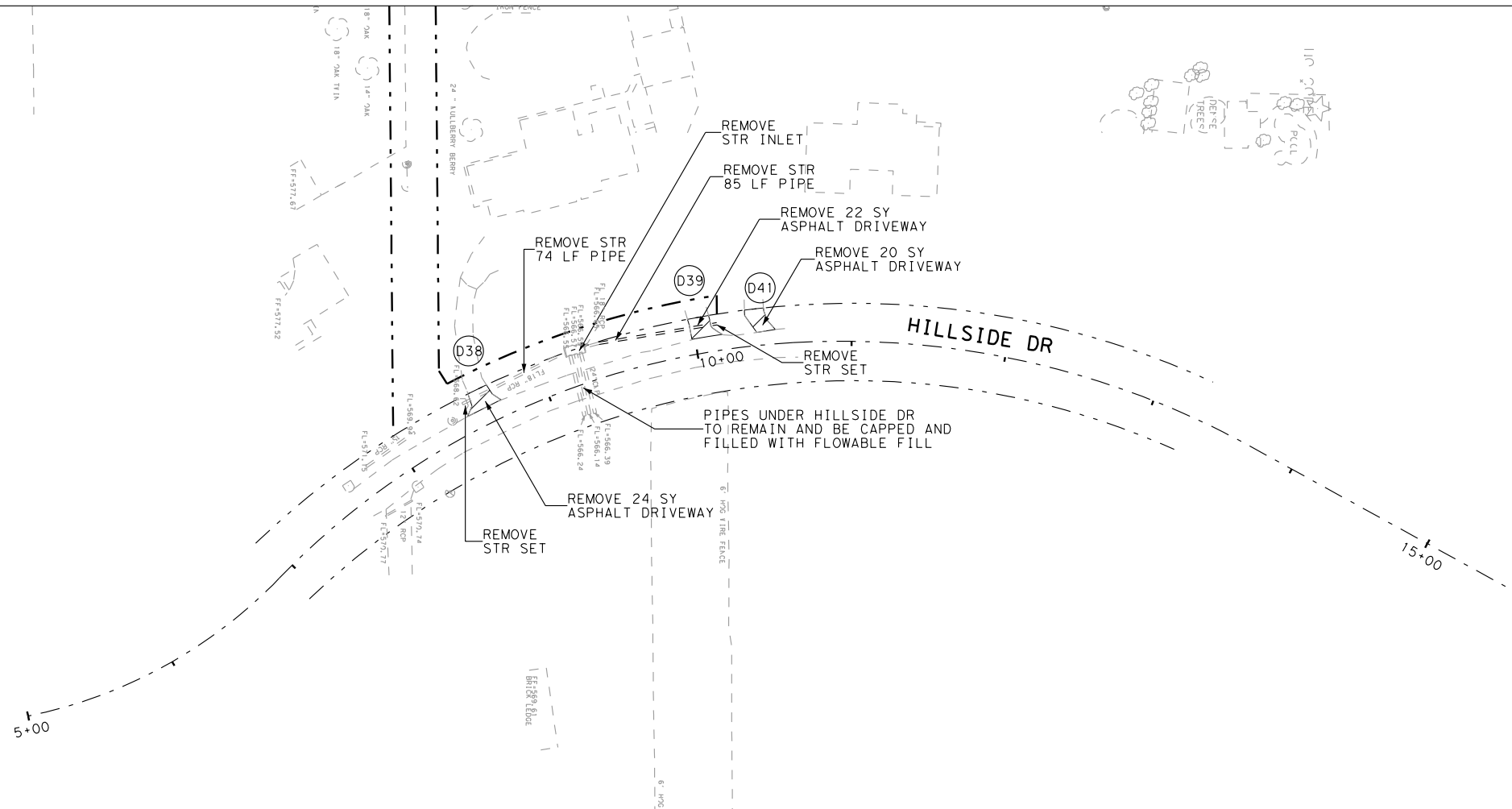
REMOVAL PLAN



FM 3549 STA. 80+00 TO END PROJECT
 SH 66 STA. 1153+00 TO STA. 1155+00
 SH 66 STA. 1157+00 TO STA. 1159+25

SHEET 4 OF 5






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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 118 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 HORIZONTAL

LEGEND

-  EXISTING ROW
-  PROPOSED ROW
-  ASPHALT PAVEMENT TO BE REMOVED
-  CONCRETE PAVEMENT TO BE REMOVED
-  PROPOSED DRIVEWAY

NOTE:

1. ASPHALT DRIVEWAYS ARE 6" THICK.
2. THE ASPHALT PAVEMENT ON FM 3549 IS 14" THICK.
3. THE ASPHALT DOWN THE CENTER OF SH 66 IS 16" ASPHALT OVER 6-9" OF CONCRETE.
4. THE PAVEMENT ON THE EDGES OF SH 66 IS 16" ASPHALT.


 2/26/2018


| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474



REMOVAL PLAN
 HILLSIDE DR

SHEET 5 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 119 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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HORIZONTAL ALIGNMENT FOR Q FM 3549

Beginning chain 3549BL description

Point 400 N 7,024,071.58 E 2,607,616.38 Sta 5+00.00

Course from 400 to PC 3549BL-1 N 0° 34' 11.95" W Dist 272.44

Curve Data

Curve 3549BL-1
 P.I. Station = 8+86.22 N 7,024,457.78 E 2,607,612.53
 Delta = 0° 34' 00.79" (LT)
 Degree = 0° 14' 56.80"
 Tangent = 113.78
 Length = 227.56
 Radius = 23,000.00
 External = 0.28
 Long Chord = 227.56
 Mid. Ord. = 0.28
 P.C. Station = 7+72.44 N 7,024,344.01 E 2,607,613.67
 P.T. Station = 10+00.00 N 7,024,571.54 E 2,607,610.28
 C.C. = N 7,024,115.20 E 2,584,614.80
 Back = N 0° 34' 11.95" W
 Ahead = N 1° 08' 12.74" W
 Chord Bear = N 0° 51' 12.35" W

Course from PT 3549BL-1 to PC 3549BL-2 N 1° 08' 12.74" W Dist 2,413.11

Curve Data

Curve 3549BL-2
 P.I. Station = 35+45.45 N 7,027,116.49 E 2,607,559.77
 Delta = 3° 01' 55.78" (LT)
 Degree = 1° 08' 45.30"
 Tangent = 132.33
 Length = 264.61
 Radius = 5,000.00
 External = 1.75
 Long Chord = 264.58
 Mid. Ord. = 1.75
 P.C. Station = 34+13.11 N 7,026,984.18 E 2,607,562.40
 P.T. Station = 36+77.72 N 7,027,248.47 E 2,607,550.15
 C.C. = N 7,026,884.98 E 2,602,563.38
 Back = N 1° 08' 12.74" W
 Ahead = N 4° 10' 08.53" W
 Chord Bear = N 2° 39' 10.63" W

Curve Data

Curve 3549BL-3
 P.I. Station = 38+10.05 N 7,027,380.46 E 2,607,540.53
 Delta = 3° 01' 55.78" (RT)
 Degree = 1° 08' 45.30"
 Tangent = 132.33
 Length = 264.61
 Radius = 5,000.00
 External = 1.75
 Long Chord = 264.58
 Mid. Ord. = 1.75
 P.C. Station = 36+77.72 N 7,027,248.47 E 2,607,550.15
 P.T. Station = 39+42.33 N 7,027,512.76 E 2,607,537.91
 C.C. = N 7,027,611.97 E 2,612,536.92
 Back = N 4° 10' 08.53" W
 Ahead = N 1° 08' 12.74" W
 Chord Bear = N 2° 39' 10.63" W

Course from PT 3549BL-3 to PC 3549BL-4 N 1° 08' 12.74" W Dist 1,129.40

Curve Data

Curve 3549BL-4
 P.I. Station = 52+40.02 N 7,028,810.20 E 2,607,512.16
 Delta = 9° 37' 10.72" (RT)
 Degree = 2° 51' 53.24"
 Tangent = 168.29
 Length = 335.79
 Radius = 2,000.00
 External = 7.07
 Long Chord = 335.39
 Mid. Ord. = 7.04
 P.C. Station = 50+71.73 N 7,028,641.95 E 2,607,515.50
 P.T. Station = 54+07.52 N 7,028,976.65 E 2,607,536.98
 C.C. = N 7,028,681.63 E 2,609,515.10
 Back = N 1° 08' 12.74" W
 Ahead = N 8° 28' 57.97" E
 Chord Bear = N 3° 40' 22.62" E

Course from PT 3549BL-4 to PC 3549BL-5 N 8° 28' 57.97" E Dist 212.86

Curve Data

Curve 3549BL-5
 P.I. Station = 57+85.30 N 7,029,350.30 E 2,607,592.71
 Delta = 9° 25' 42.37" (LT)
 Degree = 2° 51' 53.24"
 Tangent = 164.93
 Length = 329.11
 Radius = 2,000.00
 External = 6.79
 Long Chord = 328.74
 Mid. Ord. = 6.77
 P.C. Station = 56+20.37 N 7,029,187.18 E 2,607,568.38
 P.T. Station = 59+49.49 N 7,029,515.21 E 2,607,589.99
 C.C. = N 7,029,482.20 E 2,605,590.26
 Back = N 8° 28' 57.97" E
 Ahead = N 0° 56' 44.40" W
 Chord Bear = N 3° 46' 06.79" E

Course from PT 3549BL-5 to PC 3549BL-6 N 0° 56' 44.40" W Dist 1,311.71

Curve Data

Curve 3549BL-6
 P.I. Station = 74+66.81 N 7,031,032.33 E 2,607,564.95
 Delta = 11° 44' 22.08" (RT)
 Degree = 2° 51' 53.24"
 Tangent = 205.61
 Length = 409.78
 Radius = 2,000.00
 External = 10.54
 Long Chord = 409.07
 Mid. Ord. = 10.49
 P.C. Station = 72+61.20 N 7,030,826.75 E 2,607,568.34
 P.T. Station = 76+70.99 N 7,031,234.31 E 2,607,603.45
 C.C. = N 7,030,859.76 E 2,609,568.07
 Back = N 0° 56' 44.40" W
 Ahead = N 10° 47' 37.68" E
 Chord Bear = N 4° 55' 26.64" E

Curve Data

Curve 3549BL-7
 P.I. Station = 78+67.88 N 7,031,427.71 E 2,607,640.32
 Delta = 11° 14' 41.24" (LT)
 Degree = 2° 51' 53.24"
 Tangent = 196.89
 Length = 392.52
 Radius = 2,000.00
 External = 9.67
 Long Chord = 391.89
 Mid. Ord. = 9.62
 P.C. Station = 76+70.99 N 7,031,234.31 E 2,607,603.45
 P.T. Station = 80+63.50 N 7,031,624.60 E 2,607,638.78
 C.C. = N 7,031,608.86 E 2,605,638.84
 Back = N 10° 47' 37.68" E
 Ahead = N 0° 27' 03.57" W
 Chord Bear = N 5° 10' 17.05" E

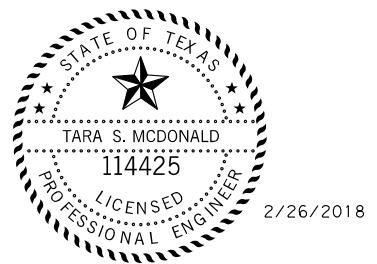
Course from PT 3549BL-7 to 401 N 0° 27' 03.57" W Dist 492.61

Point 401 N 7,032,117.19 E 2,607,634.90 Sta 85+56.12

Course from 401 to 402 N 0° 33' 13.67" W Dist 201.70

Point 402 N 7,032,318.89 E 2,607,632.95 Sta 87+57.82

Ending chain 3549BL description



Tara McDonald

| NO. | DATE | REVISION | BY |
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HORIZONTAL ALIGNMENT DATA

SHEET 1 OF 7

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 120 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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HORIZONTAL ALIGNMENT FOR ϕ SH 66

Beginning chain INT66BL description

Point SH6601 N 7,030,942.13 E 2,606,670.95 Sta 1147+00.00
 Course from SH6601 to PC INT66BL-1 N 89° 15' 23.74" E Dist 354.24

Curve Data

Curve INT66BL-1
 P.I. Station = 1151+05.71 N 7,030,947.40 E 2,607,076.63
 Delta = 6° 32' 47.18" (LT)
 Degree = 6° 21' 58.31"
 Tangent = 51.47
 Length = 102.83
 Radius = 900.00
 External = 1.47
 Long Chord = 102.78
 Mid. Ord. = 1.47
 P.C. Station = 1150+54.24 N 7,030,946.73 E 2,607,025.16
 P.T. Station = 1151+57.07 N 7,030,953.93 E 2,607,127.69
 C.C. = N 7,031,846.65 E 2,607,013.49
 Back = N 89° 15' 23.74" E
 Ahead = N 82° 42' 36.57" E
 Chord Bear = N 85° 59' 00.15" E

Curve Data

Curve INT66BL-2
 P.I. Station = 1152+08.38 N 7,030,960.44 E 2,607,178.58
 Delta = 6° 31' 31.63" (RT)
 Degree = 6° 21' 58.31"
 Tangent = 51.31
 Length = 102.50
 Radius = 900.00
 External = 1.46
 Long Chord = 102.45
 Mid. Ord. = 1.46
 P.C. Station = 1151+57.07 N 7,030,953.93 E 2,607,127.69
 P.T. Station = 1152+59.57 N 7,030,961.12 E 2,607,229.88
 C.C. = N 7,030,061.20 E 2,607,241.89
 Back = N 82° 42' 36.57" E
 Ahead = N 89° 14' 08.19" E
 Chord Bear = N 85° 58' 22.38" E

Course from PT INT66BL-2 to PC INT66BL-3 N 89° 14' 08.19" E Dist 269.01

Curve Data

Curve INT66BL-3
 P.I. Station = 1155+89.22 N 7,030,965.52 E 2,607,559.50
 Delta = 6° 56' 23.96" (RT)
 Degree = 5° 43' 46.48"
 Tangent = 60.64
 Length = 121.13
 Radius = 1,000.00
 External = 1.84
 Long Chord = 121.05
 Mid. Ord. = 1.83
 P.C. Station = 1155+28.59 N 7,030,964.71 E 2,607,498.87
 P.T. Station = 1156+49.71 N 7,030,959.00 E 2,607,619.78
 C.C. = N 7,029,964.80 E 2,607,512.21
 Back = N 89° 14' 08.19" E
 Ahead = S 83° 49' 27.85" E
 Chord Bear = S 87° 17' 39.83" E

Course from PT INT66BL-3 to PC INT66BL-4 S 83° 49' 27.85" E Dist 303.88

Curve Data

Curve INT66BL-4
 P.I. Station = 1160+17.99 N 7,030,919.38 E 2,607,985.92
 Delta = 7° 22' 10.09" (LT)
 Degree = 5° 43' 46.48"
 Tangent = 64.40
 Length = 128.62
 Radius = 1,000.00
 External = 2.07
 Long Chord = 128.53
 Mid. Ord. = 2.07
 P.C. Station = 1159+53.59 N 7,030,926.31 E 2,607,921.90
 P.T. Station = 1160+82.21 N 7,030,920.72 E 2,608,050.31
 C.C. = N 7,031,920.50 E 2,608,029.47
 Back = S 83° 49' 27.85" E
 Ahead = N 88° 48' 22.06" E
 Chord Bear = S 87° 30' 32.90" E

Course from PT INT66BL-4 to SH6602 N 88° 48' 22.06" E Dist 417.79

Point SH6602 N 7,030,929.43 E 2,608,468.01 Sta 1165+00.00

Ending chain INT66BL description



Tara McDonald

| NO. | DATE | REVISION | BY |
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HORIZONTAL ALIGNMENT DATA

SHEET 2 OF 7

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 121 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

HORIZONTAL ALIGNMENT FOR Q AIRPORT

Beginning chain AIRPBL description
 =====
 Point AIRP1 N 7,026,867.82 E 2,607,076.61 Sta 5+00.00
 Course from AIRP1 to AIRP2 N 89° 26' 30.77" E Dist 488.02
 Point AIRP2 N 7,026,872.57 E 2,607,564.61 Sta 9+88.02
 =====
 Ending chain AIRPBL description

HORIZONTAL ALIGNMENT FOR Q RIDING CLUB

Beginning chain RCLUBBL description
 =====
 Point RCLUBBL01 N 7,027,358.64 E 2,607,543.34 Sta 5+00.00
 Course from RCLUBBL01 to PC RCLUBBL-1 N 87° 05' 44.99" E Dist 150.00

Curve Data

 Curve RCLUBBL-1
 P.I. Station = 6+78.91 N 7,027,367.71 E 2,607,722.02
 Delta = 3° 18' 41.17" (RT)
 Degree = 5° 43' 46.48"
 Tangent = 28.91
 Length = 57.80
 Radius = 1,000.00
 External = 0.42
 Long Chord = 57.79
 Mid. Ord. = 0.42
 P.C. Station = 6+50.00 N 7,027,366.24 E 2,607,693.15
 P.T. Station = 7+07.80 N 7,027,367.50 E 2,607,750.92
 C.C. = N 7,026,367.53 E 2,607,743.82
 Back = N 87° 05' 44.99" E
 Ahead = S 89° 35' 33.83" E
 Chord Bear = N 88° 45' 05.58" E

Curve Data

 Curve RCLUBBL-2
 P.I. Station = 7+24.92 N 7,027,367.38 E 2,607,768.04
 Delta = 1° 57' 41.79" (LT)
 Degree = 5° 43' 46.48"
 Tangent = 17.12
 Length = 34.24
 Radius = 1,000.00
 External = 0.15
 Long Chord = 34.23
 Mid. Ord. = 0.15
 P.C. Station = 7+07.80 N 7,027,367.50 E 2,607,750.92
 P.T. Station = 7+42.03 N 7,027,367.84 E 2,607,785.16
 C.C. = N 7,028,367.47 E 2,607,758.03
 Back = S 89° 35' 33.83" E
 Ahead = N 88° 26' 44.38" E
 Chord Bear = N 89° 25' 35.27" E

Course from PT RCLUBBL-2 to RCLUBBL02 N 88° 26' 44.38" E Dist 79.48
 Point RCLUBBL02 N 7,027,370.00 E 2,607,864.61 Sta 8+21.51
 =====
 Ending chain RCLUBBL description

HORIZONTAL ALIGNMENT FOR Q ZION HILL

Beginning chain ZIONBL description
 =====
 Point ZIONBL01 N 7,031,906.60 E 2,607,486.55 Sta 5+00.00
 Course from ZIONBL01 to ZIONBL02 N 89° 32' 56.43" E Dist 150.00
 Point ZIONBL02 N 7,031,907.78 E 2,607,636.55 Sta 6+50.00
 =====
 Ending chain ZIONBL description

HORIZONTAL ALIGNMENT FOR Q HILLSIDE

Beginning chain HILLSBL description
 =====
 Curve Data

 Curve HILLSBL-1
 P.I. Station = 5+96.94 N 7,029,286.34 E 2,608,548.68
 Delta = 34° 30' 23.01" (LT)
 Degree = 18° 21' 18.25"
 Tangent = 96.94
 Length = 187.99
 Radius = 312.15
 External = 14.71
 Long Chord = 185.17
 Mid. Ord. = 14.05
 P.C. Station = 5+00.00 N 7,029,191.55 E 2,608,569.00
 P.T. Station = 6+87.99 N 7,029,352.94 E 2,608,478.23
 C.C. = N 7,029,126.12 E 2,608,263.78
 Back = N 12° 05' 58.95" W
 Ahead = N 46° 36' 21.96" W
 Chord Bear = N 29° 21' 10.46" W

Curve Data

 Curve HILLSBL-2
 P.I. Station = 8+84.38 N 7,029,487.86 E 2,608,335.52
 Delta = 42° 44' 30.14" (RT)
 Degree = 11° 24' 58.30"
 Tangent = 196.39
 Length = 374.40
 Radius = 501.88
 External = 37.06
 Long Chord = 365.77
 Mid. Ord. = 34.51
 P.C. Station = 6+87.99 N 7,029,352.94 E 2,608,478.23
 P.T. Station = 10+62.39 N 7,029,683.81 E 2,608,322.29
 C.C. = N 7,029,717.63 E 2,608,823.03
 Back = N 46° 36' 21.96" W
 Ahead = N 3° 51' 51.82" W
 Chord Bear = N 25° 14' 06.89" W

Curve Data

 Curve HILLSBL-3
 P.I. Station = 12+19.73 N 7,029,840.80 E 2,608,311.68
 Delta = 32° 01' 14.98" (RT)
 Degree = 10° 26' 55.30"
 Tangent = 157.35
 Length = 306.46
 Radius = 548.35
 External = 22.13
 Long Chord = 302.49
 Mid. Ord. = 21.27
 P.C. Station = 10+62.39 N 7,029,683.81 E 2,608,322.29
 P.T. Station = 13+68.85 N 7,029,979.52 E 2,608,385.93
 C.C. = N 7,029,720.76 E 2,608,869.40
 Back = N 3° 51' 51.82" W
 Ahead = N 28° 09' 23.16" E
 Chord Bear = N 12° 08' 45.67" E

Course from PT HILLSBL-3 to PC HILLSBL-4 N 28° 09' 23.16" E Dist 229.15
 Curve Data

 Curve HILLSBL-4
 P.I. Station = 17+70.16 N 7,030,333.35 E 2,608,575.31
 Delta = 54° 16' 56.84" (LT)
 Degree = 17° 03' 36.66"
 Tangent = 172.17
 Length = 318.18
 Radius = 335.85
 External = 41.56
 Long Chord = 306.42
 Mid. Ord. = 36.98
 P.C. Station = 15+98.00 N 7,030,181.55 E 2,608,494.06
 P.T. Station = 19+16.18 N 7,030,487.92 E 2,608,499.49
 C.C. = N 7,030,340.03 E 2,608,197.96
 Back = N 28° 09' 23.16" E
 Ahead = N 26° 07' 33.68" W
 Chord Bear = N 1° 00' 54.74" E

Course from PT HILLSBL-4 to PC HILLSBL-5 N 26° 07' 33.68" W Dist 99.51
 Curve Data

 Curve HILLSBL-5
 P.I. Station = 21+27.78 N 7,030,677.91 E 2,608,406.31
 Delta = 24° 57' 03.74" (RT)
 Degree = 11° 18' 32.40"
 Tangent = 112.09
 Length = 220.63
 Radius = 506.64
 External = 12.25
 Long Chord = 218.89
 Mid. Ord. = 11.96
 P.C. Station = 20+15.69 N 7,030,577.27 E 2,608,455.67
 P.T. Station = 22+36.32 N 7,030,789.98 E 2,608,404.01
 C.C. = N 7,030,800.36 E 2,608,910.55
 Back = N 26° 07' 33.68" W
 Ahead = N 1° 10' 29.94" W
 Chord Bear = N 13° 39' 01.81" W

Course from PT HILLSBL-5 to HILLSBL02 N 1° 10' 29.94" W Dist 138.09
 Point HILLSBL02 N 7,030,928.03 E 2,608,401.18 Sta 23+74.41
 =====
 Ending chain HILLSBL description

HORIZONTAL ALIGNMENT FOR Q ROLLING MEADOWS

Beginning chain RMEADBL description
 =====
 Point RMEADBL01 N 7,028,941.96 E 2,607,295.99 Sta 4+15.00
 Course from RMEADBL01 to PC RMEADBL-1 N 88° 06' 11.07" E Dist 35.62

Curve Data

 Curve RMEADBL-1
 P.I. Station = 4+75.38 N 7,028,943.96 E 2,607,356.34
 Delta = 10° 50' 39.89" (RT)
 Degree = 21° 57' 36.21"
 Tangent = 24.77
 Length = 49.38
 Radius = 260.91
 External = 1.17
 Long Chord = 49.31
 Mid. Ord. = 1.17
 P.C. Station = 4+50.62 N 7,028,943.14 E 2,607,331.59
 P.T. Station = 5+00.00 N 7,028,940.11 E 2,607,380.80
 C.C. = N 7,028,682.37 E 2,607,340.22
 Back = N 88° 06' 11.07" E
 Ahead = S 81° 03' 09.04" E
 Chord Bear = S 86° 28' 28.99" E

Course from PT RMEADBL-1 to RMEADBL02 S 81° 03' 09.04" E Dist 150.00
 Point RMEADBL02 N 7,028,916.78 E 2,607,528.98 Sta 6+50.00
 =====
 Ending chain RMEADBL description



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HORIZONTAL ALIGNMENT DATA

SHEET 3 OF 7

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 122 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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HORIZONTAL ALIGNMENT FOR DRIVEWAYS

Beginning chain D01 description
 =====
 Point D0101 N 7,025,798.58 E 2,607,585.93 Sta 10+00.00
 Course from D0101 to D0102 N 88° 51' 47.26" E Dist 150.00
 Point D0102 N 7,025,801.56 E 2,607,735.90 Sta 11+50.00
 =====
 Ending chain D01 description

Beginning chain D02 description
 =====
 Point D0201 N 7,025,909.20 E 2,607,583.73 Sta 10+00.00
 Course from D0201 to D0202 N 88° 51' 47.26" E Dist 150.00
 Point D0202 N 7,025,912.18 E 2,607,733.70 Sta 11+50.00
 =====
 Ending chain D02 description

Beginning chain D03 description
 =====
 Point D0301 N 7,026,260.14 E 2,607,576.77 Sta 10+00.00
 Course from D0301 to D0302 N 88° 51' 47.26" E Dist 150.00
 Point D0302 N 7,026,263.11 E 2,607,726.74 Sta 11+50.00
 =====
 Ending chain D03 description

Beginning chain D04 description
 =====
 Point D0401 N 7,027,037.97 E 2,607,410.97 Sta 10+00.00
 Course from D0401 to D0402 N 88° 11' 32.15" E Dist 150.00
 Point D0402 N 7,027,042.71 E 2,607,560.89 Sta 11+50.00
 =====
 Ending chain D04 description

Beginning chain D05 description
 =====
 Point D0501 N 7,027,374.36 E 2,607,392.41 Sta 10+00.00
 Course from D0501 to D0502 N 87° 21' 20.13" E Dist 150.00
 Point D0502 N 7,027,381.28 E 2,607,542.25 Sta 11+50.00
 =====
 Ending chain D05 description

Beginning chain D06 description
 =====
 Point D0601 N 7,027,576.57 E 2,607,386.61 Sta 10+00.00
 Course from D0601 to D0602 N 88° 51' 47.26" E Dist 150.00
 Point D0602 N 7,027,579.54 E 2,607,536.58 Sta 11+50.00
 =====
 Ending chain D06 description

Beginning chain D07 description
 =====
 Point D0701 N 7,027,793.02 E 2,607,382.31 Sta 10+00.00
 Course from D0701 to D0702 N 88° 51' 47.26" E Dist 150.00
 Point D0702 N 7,027,795.99 E 2,607,532.28 Sta 11+50.00
 =====
 Ending chain D07 description

Beginning chain D08 description
 =====
 Point D0801 N 7,028,136.02 E 2,607,421.50 Sta 10+00.00
 Course from D0801 to PC D08-1 N 17° 37' 16.98" E Dist 27.01

Curve Data

 Curve D08-1
 P.I. Station 10+51.47 N 7,028,185.07 E 2,607,437.08
 Delta = 71° 14' 30.28" (RT)
 Degree = 167° 49' 03.90"
 Tangent = 24.46
 Length = 42.45
 Radius = 34.14
 External = 7.86
 Long Chord = 39.77
 Mid. Ord. = 6.39
 P.C. Station 10+27.01 N 7,028,161.76 E 2,607,429.68
 P.T. Station 10+69.46 N 7,028,185.56 E 2,607,461.54
 C.C. N 7,028,151.42 E 2,607,462.22
 Back = N 17° 37' 16.98" E
 Ahead = N 88° 51' 47.26" E
 Chord Bear = N 53° 14' 32.12" E

 Course from PT D08-1 to D0802 N 88° 51' 47.26" E Dist 63.00
 Point D0802 N 7,028,186.81 E 2,607,524.53 Sta 11+32.46
 =====
 Ending chain D08 description

Beginning chain D09 description
 =====
 Point D0901 N 7,029,083.69 E 2,607,552.95 Sta 10+00.00
 Course from D0901 to PC D09-1 S 81° 31' 02.03" E Dist 65.41

Curve Data

 Curve D09-1
 P.I. Station 10+93.86 N 7,029,069.84 E 2,607,645.78
 Delta = 40° 37' 35.72" (LT)
 Degree = 74° 32' 31.41"
 Tangent = 28.45
 Length = 54.50
 Radius = 76.86
 External = 5.10
 Long Chord = 53.37
 Mid. Ord. = 4.78
 P.C. Station 10+65.41 N 7,029,074.04 E 2,607,617.64
 P.T. Station 11+19.91 N 7,029,084.98 E 2,607,669.87
 C.C. N 7,029,150.06 E 2,607,628.98
 Back = S 81° 31' 02.03" E
 Ahead = N 57° 51' 22.26" E
 Chord Bear = N 78° 10' 10.12" E

 Ending chain D09 description

Beginning chain D10 description
 =====
 Point D1001 N 7,029,214.15 E 2,607,572.22 Sta 10+00.00
 Course from D1001 to D1002 S 82° 17' 51.34" E Dist 150.00
 Point D1002 N 7,029,194.04 E 2,607,720.86 Sta 11+50.00
 =====
 Ending chain D10 description



Tara McDonald

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HORIZONTAL ALIGNMENT DATA

SHEET 4 OF 7

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 123 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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HORIZONTAL ALIGNMENT FOR DRIVEWAYS

Beginning chain D11 description
 =====
 Point D1101 N 7,029,605.57 E 2,607,588.50 Sta 10+00.00
 Course from D1101 to D1102 S 88° 37' 07.22" E Dist 150.00
 Point D1102 N 7,029,601.96 E 2,607,738.45 Sta 11+50.00
 =====
 Ending chain D11 description

Beginning chain D12 description
 =====
 Point D1201 N 7,029,610.04 E 2,607,441.96 Sta 10+00.00
 Course from D1201 to D1202 N 89° 03' 15.60" E Dist 146.44
 Point D1202 N 7,029,612.46 E 2,607,588.38 Sta 11+46.44
 =====
 Ending chain D12 description

Beginning chain D13 description
 =====
 Point D1301 N 7,029,647.43 E 2,607,587.80 Sta 10+00.00
 Course from D1301 to PC D13-1 N 89° 03' 15.60" E Dist 60.00

Curve Data

Curve D13-1
 P.I. Station 11+02.75 N 7,029,649.13 E 2,607,690.54
 Delta = 68° 31' 23.97" (LT)
 Degree = 91° 17' 12.32"
 Tangent = 42.75
 Length = 75.06
 Radius = 62.76
 External = 13.18
 Long Chord = 70.67
 Mid. Ord. = 10.89
 P.C. Station = 10+60.00 N 7,029,648.42 E 2,607,647.79
 P.T. Station = 11+35.06 N 7,029,689.17 E 2,607,705.53
 C.C. = N 7,029,711.18 E 2,607,646.76
 Back = N 89° 03' 15.60" E
 Ahead = N 20° 31' 51.63" E
 Chord Bear = N 54° 47' 33.61" E

Ending chain D13 description
 =====

Beginning chain D14 description
 =====
 Point D1401 N 7,029,801.90 E 2,607,585.26 Sta 10+00.00
 Course from D1401 to D1402 N 89° 03' 15.60" E Dist 150.00
 Point D1402 N 7,029,804.38 E 2,607,735.24 Sta 11+50.00
 =====
 Ending chain D14 description

Beginning chain D15 description
 =====
 Point D1501 N 7,029,886.76 E 2,607,433.84 Sta 10+00.00
 Course from D1501 to D1502 N 89° 03' 15.60" E Dist 150.00
 Point D1502 N 7,029,889.24 E 2,607,583.81 Sta 11+50.00
 =====
 Ending chain D15 description

Beginning chain D16 description
 =====
 Point D1601 N 7,029,999.67 E 2,607,581.99 Sta 10+00.00
 Course from D1601 to PC D16-1 N 89° 03' 15.60" E Dist 60.03

Curve Data

Curve D16-1
 P.I. Station 10+66.11 N 7,030,000.76 E 2,607,648.09
 Delta = 6° 57' 15.10" (RT)
 Degree = 57° 17' 44.81"
 Tangent = 6.08
 Length = 12.14
 Radius = 100.00
 External = 0.18
 Long Chord = 12.13
 Mid. Ord. = 0.18
 P.C. Station = 10+60.03 N 7,030,000.66 E 2,607,642.02
 P.T. Station = 10+72.17 N 7,030,000.13 E 2,607,654.13
 C.C. = N 7,029,900.68 E 2,607,643.67
 Back = N 89° 03' 15.60" E
 Ahead = S 83° 59' 29.30" E
 Chord Bear = S 87° 28' 06.85" E

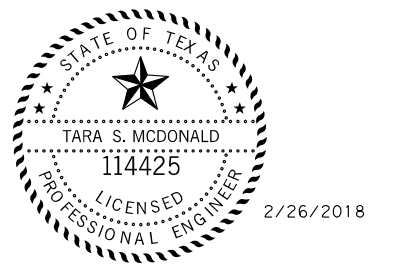
Course from PT D16-1 to D1602 S 83° 59' 29.30" E Dist 70.67
 Point D1602 N 7,029,992.73 E 2,607,724.42 Sta 11+42.84
 =====
 Ending chain D16 description

Beginning chain D17 description
 =====
 Point D1701 N 7,030,050.25 E 2,607,581.16 Sta 10+00.00
 Course from D1701 to D1702 N 89° 03' 15.60" E Dist 150.00
 Point D1702 N 7,030,052.72 E 2,607,731.14 Sta 11+50.00
 =====
 Ending chain D17 description

Beginning chain D18 description
 =====
 Point D1801 N 7,030,199.61 E 2,607,578.69 Sta 10+00.00
 Course from D1801 to D1802 N 89° 03' 15.60" E Dist 150.00
 Point D1802 N 7,030,202.08 E 2,607,728.67 Sta 11+50.00
 =====
 Ending chain D18 description

Beginning chain D19 description
 =====
 Point D1901 N 7,030,223.63 E 2,607,428.27 Sta 10+00.00
 Course from D1901 to D1902 N 89° 03' 15.60" E Dist 150.00
 Point D1902 N 7,030,226.11 E 2,607,578.25 Sta 11+50.00
 =====
 Ending chain D19 description

Beginning chain D20 description
 =====
 Point D2001 N 7,030,245.10 E 2,607,577.94 Sta 10+00.00
 Course from D2001 to D2002 N 89° 03' 15.60" E Dist 150.00
 Point D2002 N 7,030,247.57 E 2,607,727.92 Sta 11+50.00
 =====
 Ending chain D20 description



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS

TBPE REG. # F-474



HORIZONTAL ALIGNMENT DATA

SHEET 5 OF 7

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | |
| TM | TEXAS | DALLAS | ROCKWALL | |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |
| CHECK | | | | |
| WL | | | | |

124

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HORIZONTAL ALIGNMENT FOR DRIVEWAYS

Beginning chain D21 description
 =====
 Point D2101 N 7,030,402.44 E 2,607,575.34 Sta 10+00.00
 Course from D2101 to D2102 N 89° 03' 15.60" E Dist 150.00
 Point D2102 N 7,030,404.91 E 2,607,725.32 Sta 11+50.00
 =====
 Ending chain D21 description

Beginning chain D22 description
 =====
 Point D2201 N 7,030,425.22 E 2,607,424.95 Sta 10+00.00
 Course from D2201 to D2202 N 89° 03' 15.60" E Dist 150.00
 Point D2202 N 7,030,427.70 E 2,607,574.93 Sta 11+50.00
 =====
 Ending chain D22 description

Beginning chain D23 description
 =====
 Point D2301 N 7,030,638.77 E 2,607,571.44 Sta 10+00.00
 Course from D2301 to D2302 N 89° 03' 15.60" E Dist 150.00
 Point D2302 N 7,030,641.24 E 2,607,721.42 Sta 11+50.00
 =====
 Ending chain D23 description

Beginning chain D24 description
 =====
 Point D2401 N 7,030,765.39 E 2,607,419.33 Sta 10+00.00
 Course from D2401 to D2402 N 89° 03' 15.60" E Dist 150.00
 Point D2402 N 7,030,767.86 E 2,607,569.31 Sta 11+50.00
 =====
 Ending chain D24 description

Beginning chain D25 description
 =====
 Point D2501 N 7,031,168.08 E 2,607,591.98 Sta 10+00.00
 Course from D2501 to D2502 S 81° 07' 54.78" E Dist 150.00
 Point D2502 N 7,031,144.95 E 2,607,740.18 Sta 11+50.00
 =====
 Ending chain D25 description

Beginning chain D26 description
 =====
 Point D2601 N 7,031,272.91 E 2,607,461.23 Sta 10+00.00
 Course from D2601 to D2602 N 88° 18' 51.11" E Dist 150.00
 Point D2602 N 7,031,277.33 E 2,607,611.17 Sta 11+50.00
 =====
 Ending chain D26 description

Beginning chain D27 description
 =====
 Point D2701 N 7,031,522.41 E 2,607,489.57 Sta 10+00.00
 Course from D2701 to D2702 N 89° 32' 56.43" E Dist 147.45
 Point D2702 N 7,031,523.57 E 2,607,637.02 Sta 11+47.45
 =====
 Ending chain D27 description

Beginning chain D28 description
 =====
 Point D2801 N 7,031,662.44 E 2,607,488.47 Sta 10+00.00
 Course from D2801 to D2802 N 89° 32' 56.43" E Dist 150.00
 Point D2802 N 7,031,663.62 E 2,607,638.47 Sta 11+50.00
 =====
 Ending chain D28 description

Beginning chain D29 description
 =====
 Point D2901 N 7,031,712.27 E 2,607,488.08 Sta 10+00.00
 Course from D2901 to D2902 N 89° 32' 56.43" E Dist 150.00
 Point D2902 N 7,031,713.45 E 2,607,638.08 Sta 11+50.00
 =====
 Ending chain D29 description

Beginning chain D30 description
 =====
 Point D3001 N 7,031,711.99 E 2,607,638.09 Sta 10+00.00
 Course from D3001 to D3002 N 89° 32' 56.43" E Dist 150.00
 Point D3002 N 7,031,713.17 E 2,607,788.08 Sta 11+50.00
 =====
 Ending chain D30 description

Beginning chain D31 description
 =====
 Point D3101 N 7,030,952.78 E 2,607,118.35 Sta 10+00.00
 Course from D3101 to D3102 N 0° 45' 51.81" W Dist 106.85
 Point D3102 N 7,031,059.62 E 2,607,116.92 Sta 11+06.85
 =====
 Ending chain D31 description

Beginning chain D32 description
 =====
 Point D3201 N 7,030,961.69 E 2,607,272.36 Sta 10+00.00
 Course from D3201 to D3202 N 0° 45' 51.81" W Dist 100.00
 Point D3202 N 7,031,061.68 E 2,607,271.02 Sta 11+00.00
 =====
 Ending chain D32 description

Beginning chain D33 description
 =====
 Point D3301 N 7,030,962.22 E 2,607,312.54 Sta 10+00.00
 Course from D3301 to D3302 N 0° 45' 51.81" W Dist 100.00
 Point D3302 N 7,031,062.22 E 2,607,311.21 Sta 11+00.00
 =====
 Ending chain D33 description

Beginning chain D34 description
 =====
 Point D3401 N 7,030,862.59 E 2,607,340.69 Sta 10+00.00
 Course from D3401 to D3402 N 0° 45' 51.81" W Dist 100.00
 Point D3402 N 7,030,962.58 E 2,607,339.35 Sta 11+00.00
 =====
 Ending chain D34 description



| NO. | DATE | REVISION | BY |
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HORIZONTAL ALIGNMENT DATA

SHEET 6 OF 7

| | | | | |
|----------------|---------------------------|--|----------|---------------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 125 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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 TIME: 8:57:10 PM

HORIZONTAL ALIGNMENT FOR DRIVEWAYS AND DITCH

Beginning chain D35 description
 =====
 Point D3501 N 7,030,938.97 E 2,607,804.87 Sta 10+00.00
 Course from D3501 to D3502 N 1° 03' 33.97" W Dist 100.00
 Point D3502 N 7,031,038.95 E 2,607,803.02 Sta 11+00.00
 =====
 Ending chain D35 description

Beginning chain D36 description
 =====
 Point D3601 N 7,030,822.93 E 2,607,958.06 Sta 10+00.00
 Course from D3601 to D3602 N 1° 14' 52.23" E Dist 100.00
 Point D3602 N 7,030,922.90 E 2,607,960.24 Sta 11+00.00
 =====
 Ending chain D36 description

Beginning chain D37 description
 =====
 Point D3701 N 7,026,871.59 E 2,607,463.84 Sta 10+00.00
 Course from D3701 to D3702 N 0° 33' 29.23" W Dist 50.00
 Point D3702 N 7,026,921.59 E 2,607,463.35 Sta 10+50.00
 =====
 Ending chain D37 description

Beginning chain D38 description
 =====

Curve Data

 Curve D38-1
 P.I. Station 10+13.70 N 7,029,473.37 E 2,608,342.57
 Delta = 24° 24' 20.52" (LT)
 Degree = 90° 25' 16.39"
 Tangent = 13.70
 Length = 26.99
 Radius = 63.37
 External = 1.46
 Long Chord = 26.79
 Mid. Ord. = 1.43
 P.C. Station 10+00.00 N 7,029,472.64 E 2,608,328.89
 P.T. Station 10+26.99 N 7,029,479.69 E 2,608,354.73
 C.C. N 7,029,535.92 E 2,608,325.52
 Back = N 86° 57' 14.28" E
 Ahead = N 62° 32' 53.76" E
 Chord Bear = N 74° 45' 04.02" E
 Course from PT D38-1 to D3802 N 62° 32' 53.76" E Dist 23.79
 Point D3802 N 7,029,490.65 E 2,608,375.84 Sta 10+50.78
 =====
 Ending chain D38 description

Beginning chain D39 description
 =====
 Point D3901 N 7,029,616.49 E 2,608,279.19 Sta 10+00.00
 Course from D3901 to D3902 N 78° 45' 24.26" E Dist 50.00
 Point D3902 N 7,029,626.24 E 2,608,328.23 Sta 10+50.00
 =====
 Ending chain D39 description

Beginning chain D40 description
 =====
 Point D4001 N 7,026,063.58 E 2,607,580.67 Sta 10+00.00
 Course from D4001 to D4002 N 88° 51' 47.26" E Dist 150.00
 Point D4002 N 7,026,066.56 E 2,607,730.64 Sta 11+50.00
 =====
 Ending chain D40 description

Beginning chain D41 description
 =====
 Point D4101 N 7,029,655.09 E 2,608,274.70 Sta 10+00.00
 Course from D4101 to D4102 N 83° 29' 35.56" E Dist 50.00
 Point D4102 N 7,029,660.76 E 2,608,324.38 Sta 10+50.00
 =====
 Ending chain D41 description

Beginning chain D42 description
 =====
 Point D4201 N 7,031,907.32 E 2,607,578.01 Sta 10+00.00
 Course from D4201 to D4202 N 0° 27' 03.57" W Dist 47.55
 Point D4202 N 7,031,954.87 E 2,607,577.63 Sta 10+47.55
 =====
 Ending chain D42 description

Beginning chain D43 description
 =====
 Point D4301 N 7,031,191.20 E 2,607,443.77 Sta 10+00.00
 Course from D4301 to D4302 S 81° 07' 54.78" E Dist 150.00
 Point D4302 N 7,031,168.08 E 2,607,591.98 Sta 11+50.00
 =====
 Ending chain D43 description

Beginning chain DITCHCL description
 =====
 Point DITCHCL01 N 7,029,428.69 E 2,607,649.57 Sta 500+00.00
 Course from DITCHCL01 to DITCHCL02 N 88° 52' 22.70" E Dist 304.48
 Point DITCHCL02 N 7,029,434.67 E 2,607,953.99 Sta 503+04.48
 Course from DITCHCL02 to DITCHCL03 N 87° 00' 19.42" E Dist 92.05
 Point DITCHCL03 N 7,029,439.48 E 2,608,045.91 Sta 503+96.53
 Course from DITCHCL03 to DITCHCL04 N 88° 52' 22.70" E Dist 16.00
 Point DITCHCL04 N 7,029,439.80 E 2,608,061.91 Sta 504+12.53
 Course from DITCHCL04 to DITCHCL05 S 89° 15' 33.29" E Dist 92.04
 Point DITCHCL05 N 7,029,438.61 E 2,608,153.95 Sta 505+04.58
 Course from DITCHCL05 to PC DITCHCL-1 N 88° 52' 22.70" E Dist 162.19

Curve Data

Curve DITCHCL-1
 P.I. Station 506+89.54 N 7,029,442.25 E 2,608,338.88
 Delta = 31° 46' 54.90" (LT)
 Degree = 71° 37' 11.01"
 Tangent = 22.77
 Length = 44.38
 Radius = 80.00
 External = 3.18
 Long Chord = 43.81
 Mid. Ord. = 3.06
 P.C. Station 506+66.77 N 7,029,441.80 E 2,608,316.11
 P.T. Station 507+11.14 N 7,029,454.62 E 2,608,358.00
 C.C. N 7,029,521.78 E 2,608,314.53
 Back = N 88° 52' 22.70" E
 Ahead = N 57° 05' 27.80" E
 Chord Bear = N 72° 58' 55.25" E
 Course from PT DITCHCL-1 to DITCHCL06 N 57° 05' 27.80" E Dist 13.79
 Point DITCHCL06 N 7,029,462.11 E 2,608,369.58 Sta 507+24.94
 =====
 Ending chain DITCHCL description



Tara McDonald

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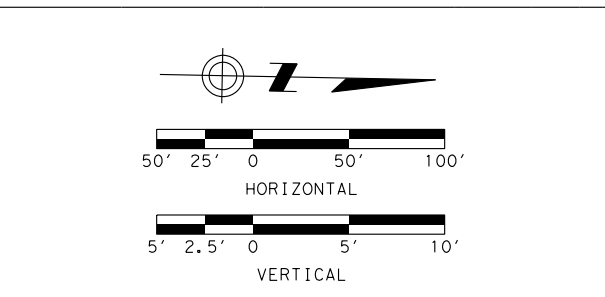
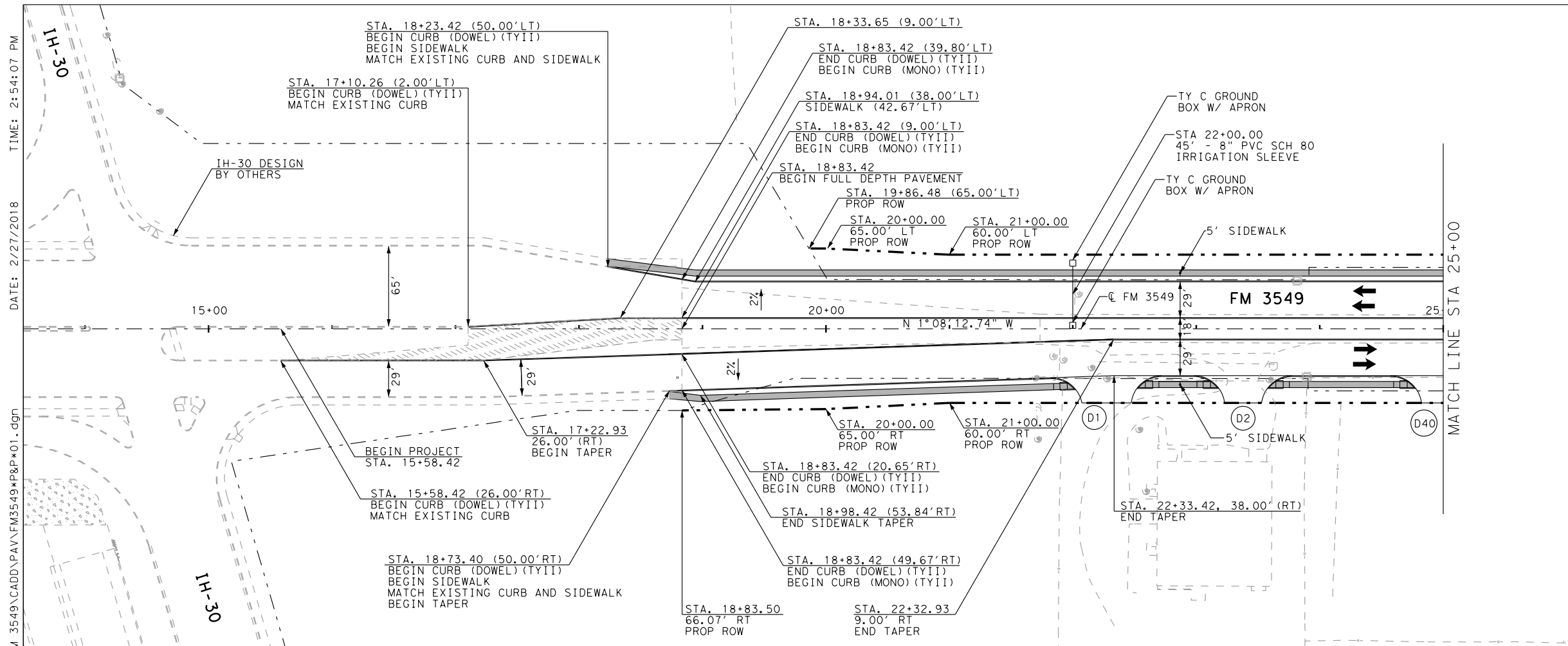
TBPE REG. # F-474



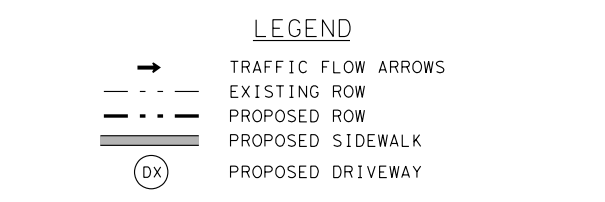
HORIZONTAL ALIGNMENT DATA

SHEET 7 OF 7

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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 126 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
- ALL DIMENSIONS ARE TO FACE OF CURB.
 - ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 - REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 - REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 - TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 - 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 - REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



TARA S. MCDONALD
114425
LICENSED PROFESSIONAL ENGINEER
2/26/2018

Tara McDonald

| NO. | DATE | REVISION | BY |
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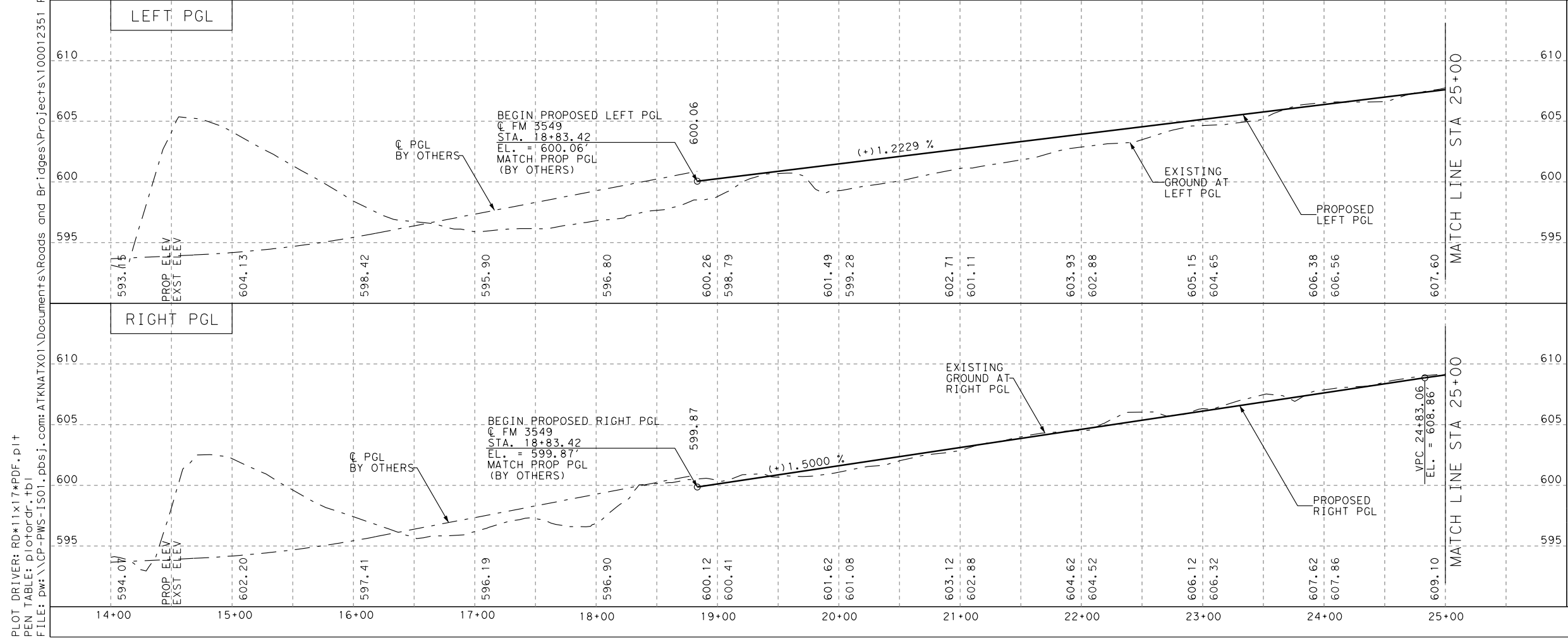
ATKINS
TBPE REG. # F-474

Texas Department of Transportation
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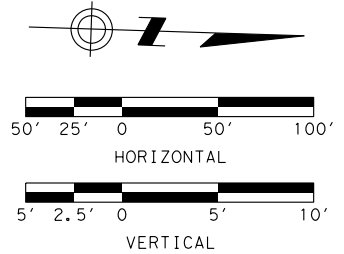
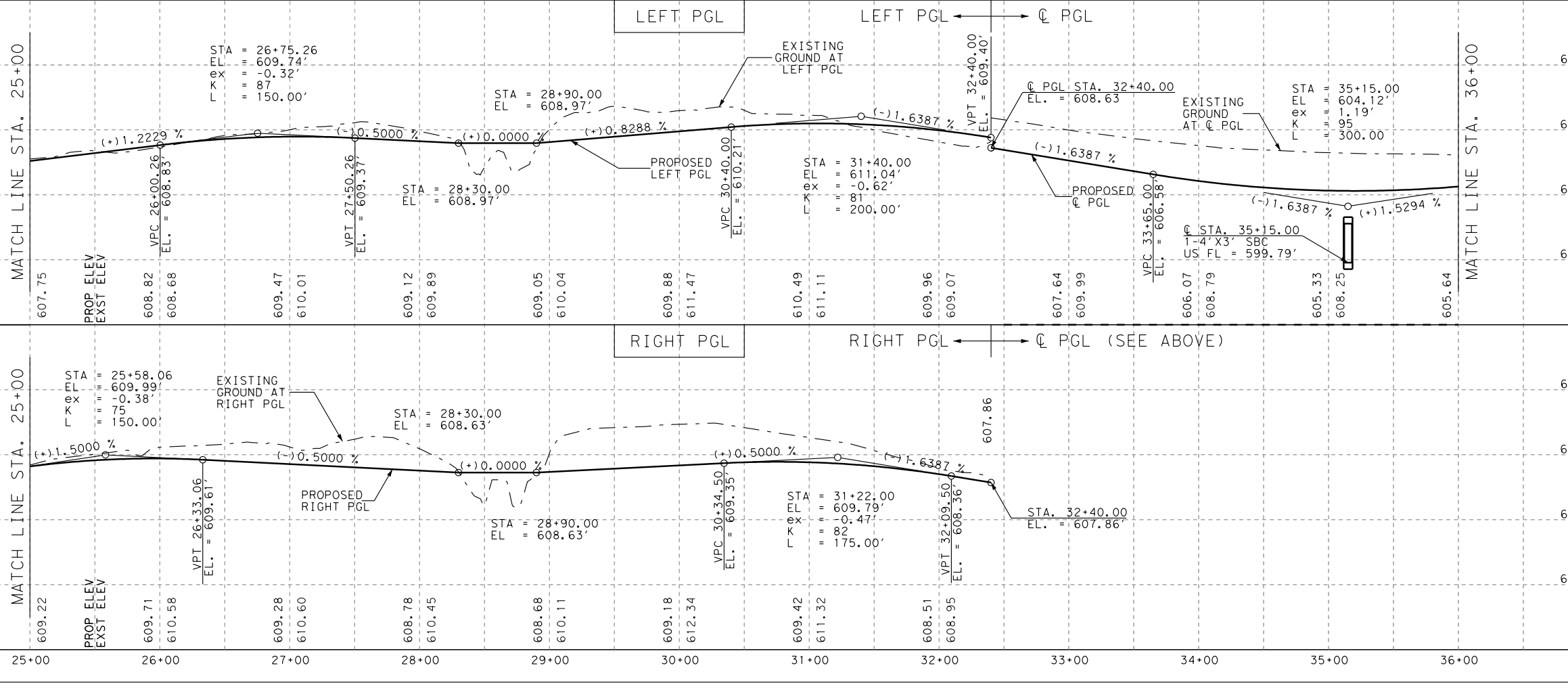
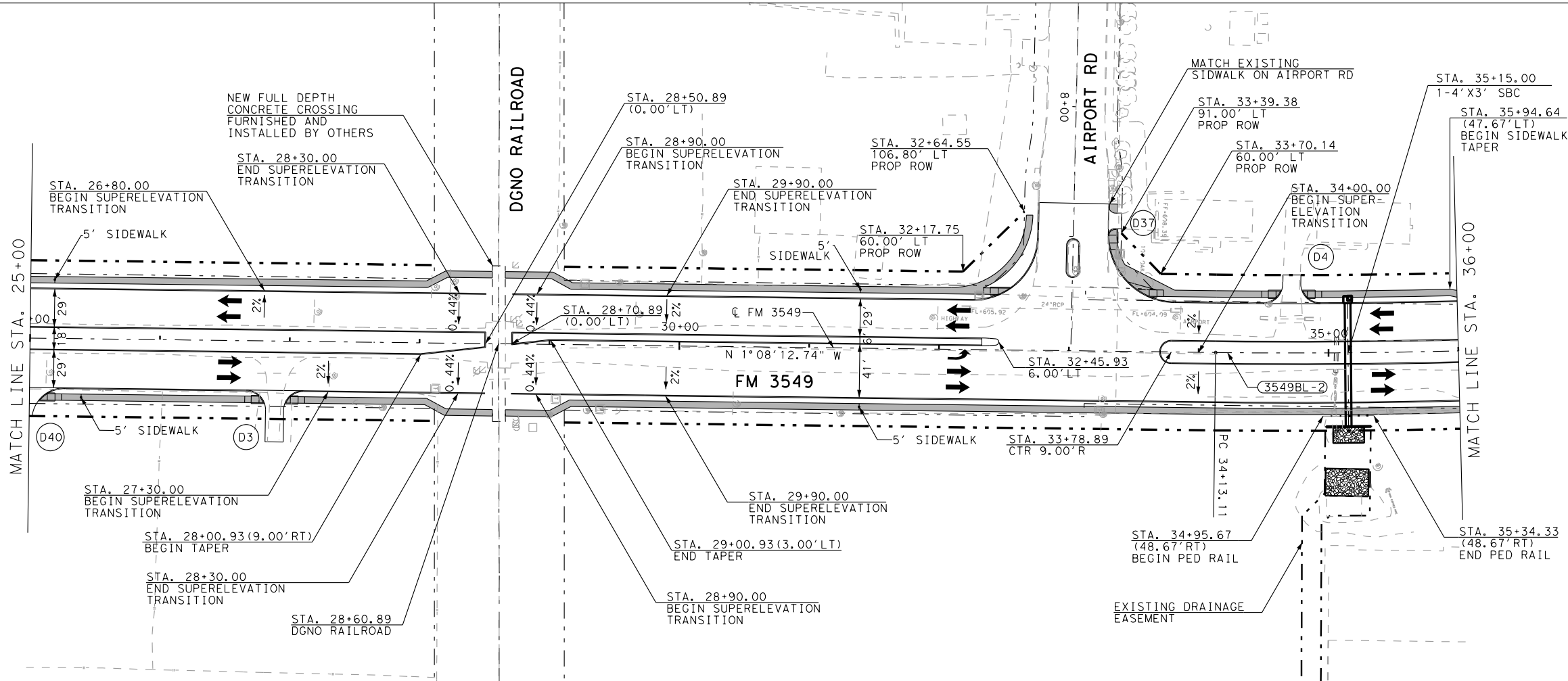
ROADWAY PLAN & PROFILE
FM 3549
BEGIN PROJECT TO STA. 25+00

SHEET 1 OF 8

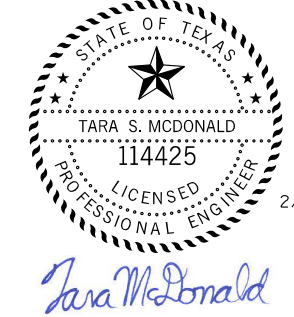
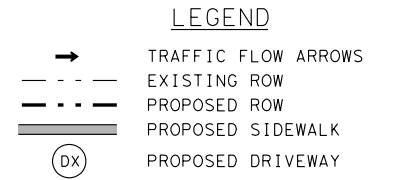
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 127 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 3. REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 4. REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 5. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 6. TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 7. 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 8. REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



Tara McDonald

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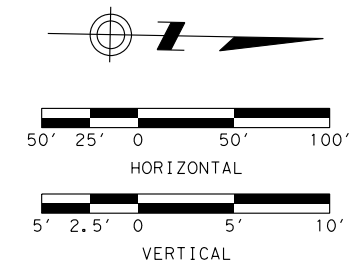
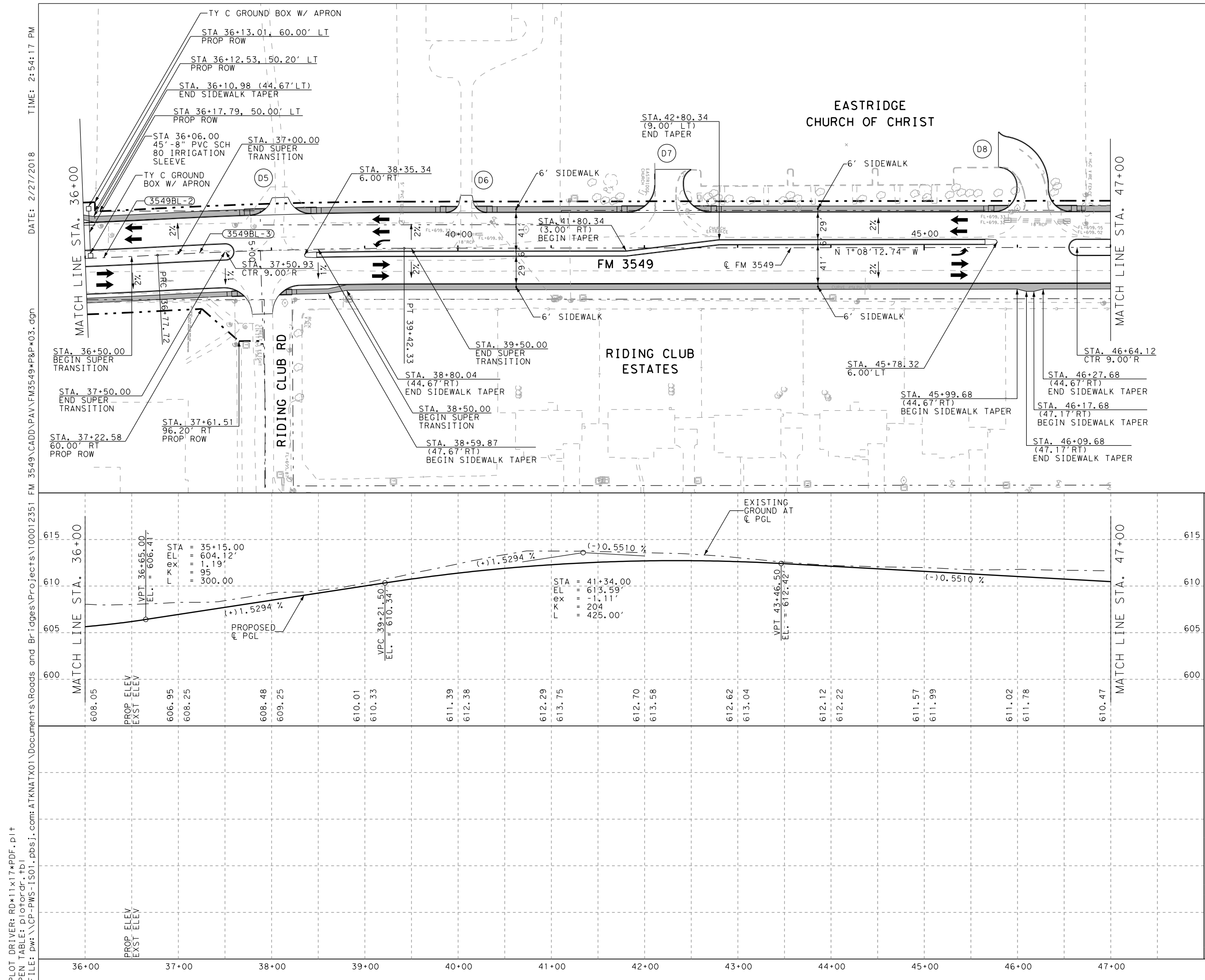
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 TBPE REG. # F-474



ROADWAY PLAN & PROFILE
 FM 3549
 STA. 25+00 TO STA. 36+00

SHEET 2 OF 8

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|-------------|---------------------|---|----------|---------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 128 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 3. REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 4. REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 5. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 6. TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 7. 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 8. REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.

LEGEND

- TRAFFIC FLOW ARROWS
- - - EXISTING ROW
- . - . - PROPOSED ROW
- ▬ PROPOSED SIDEWALK
- (DX) PROPOSED DRIVEWAY

Tara McDonald

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TBPE REG. # F-474

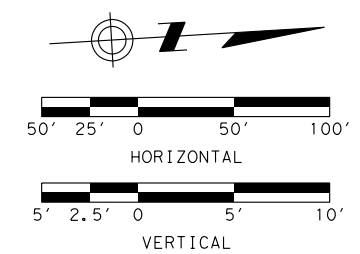
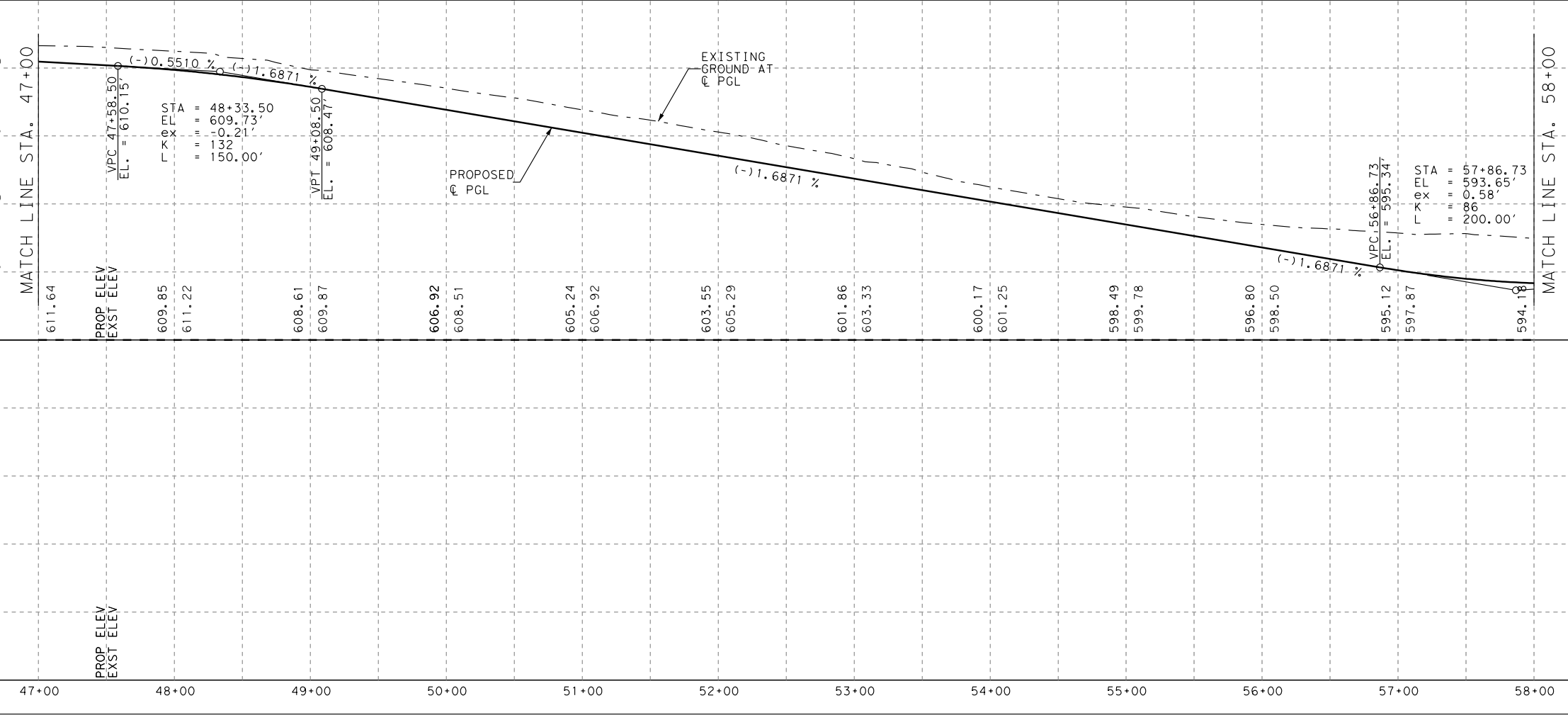
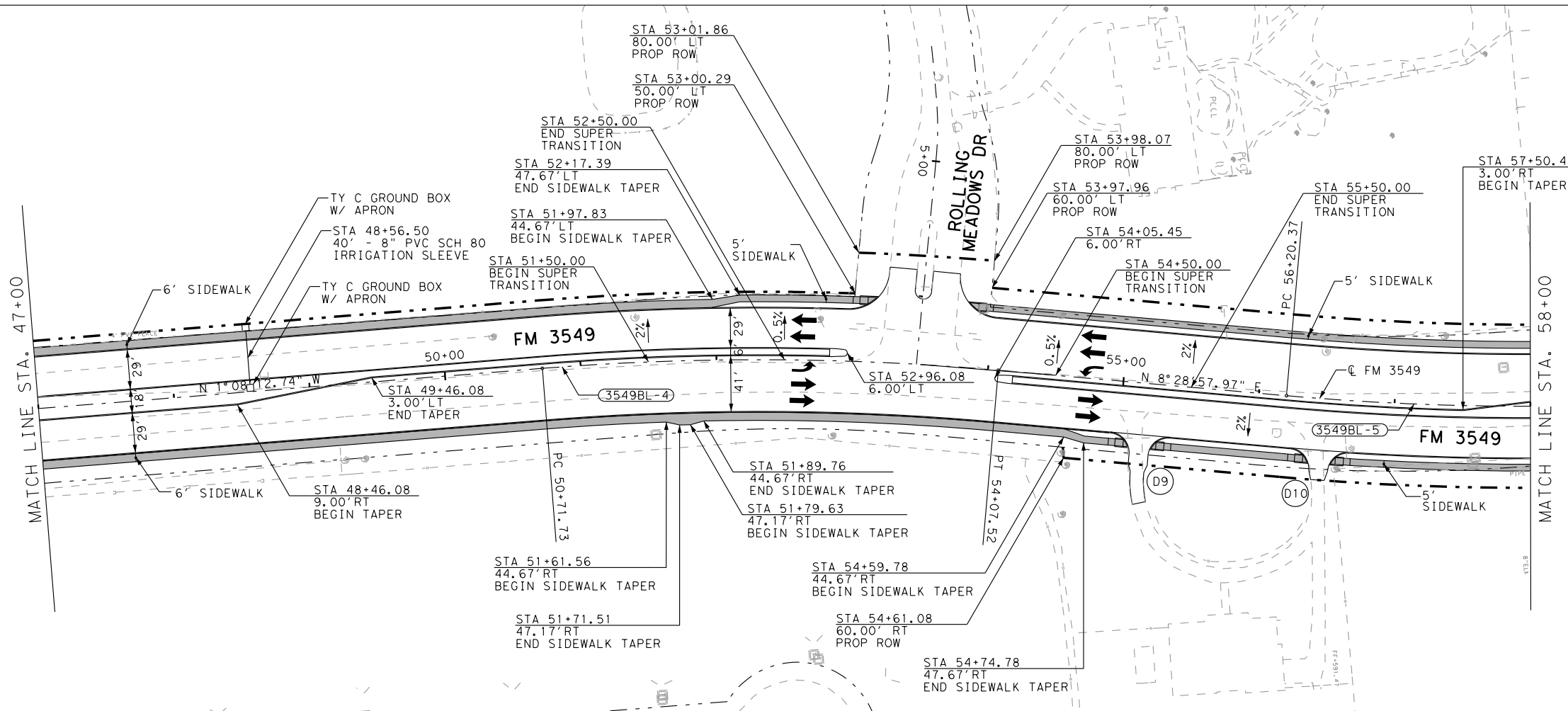


ROADWAY PLAN & PROFILE
FM 3549
STA. 36+00 TO STA. 47+00

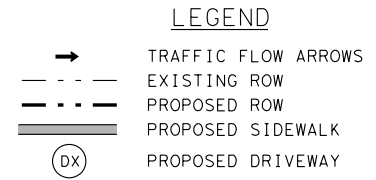
SHEET 3 OF 8

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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 129 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 DATE: 2/27/2018
 TIME: 2:54:17 PM



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 3. REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 4. REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 5. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 6. TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 7. 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 8. REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
TBPE REG. # F-474

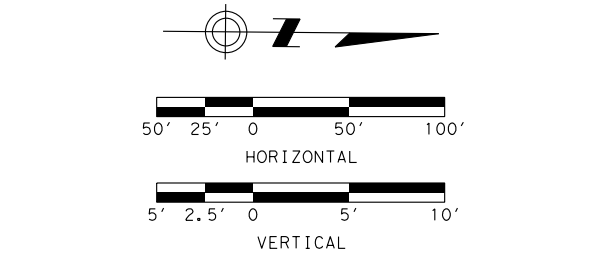
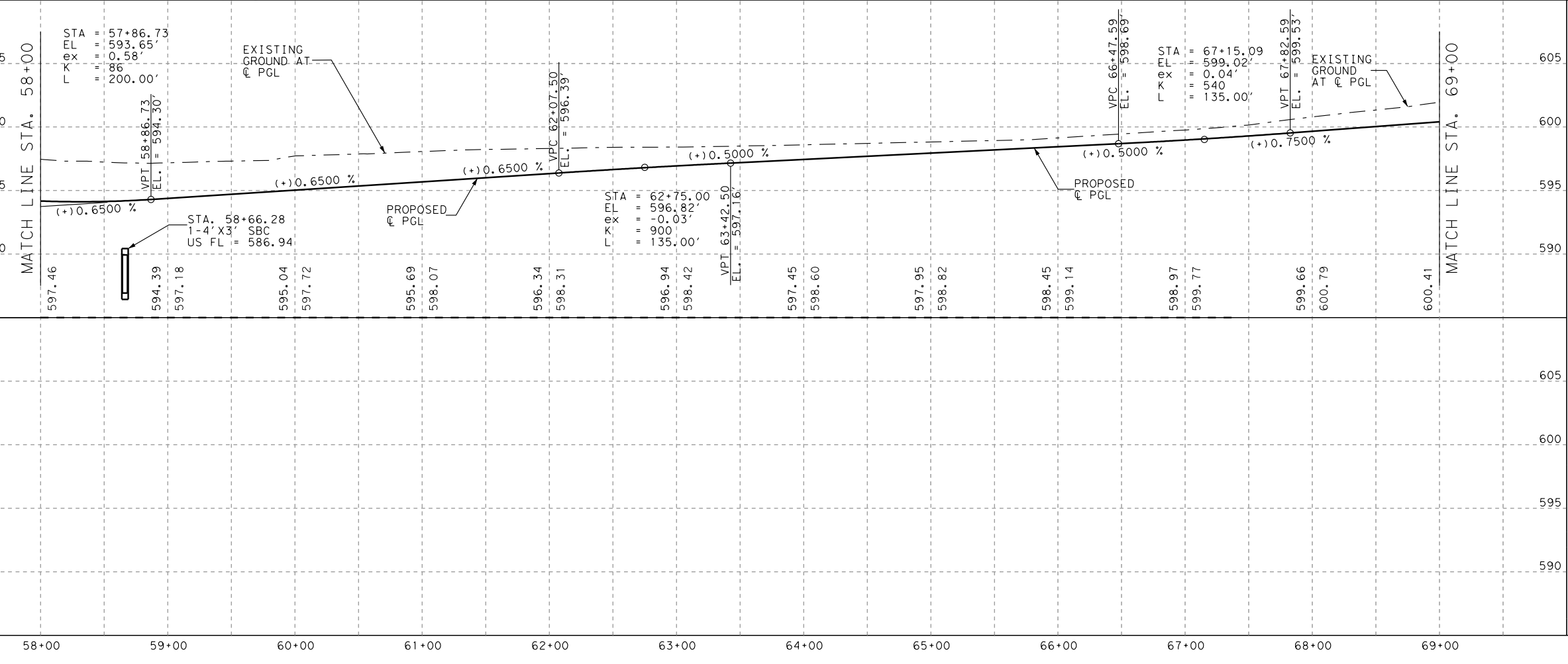
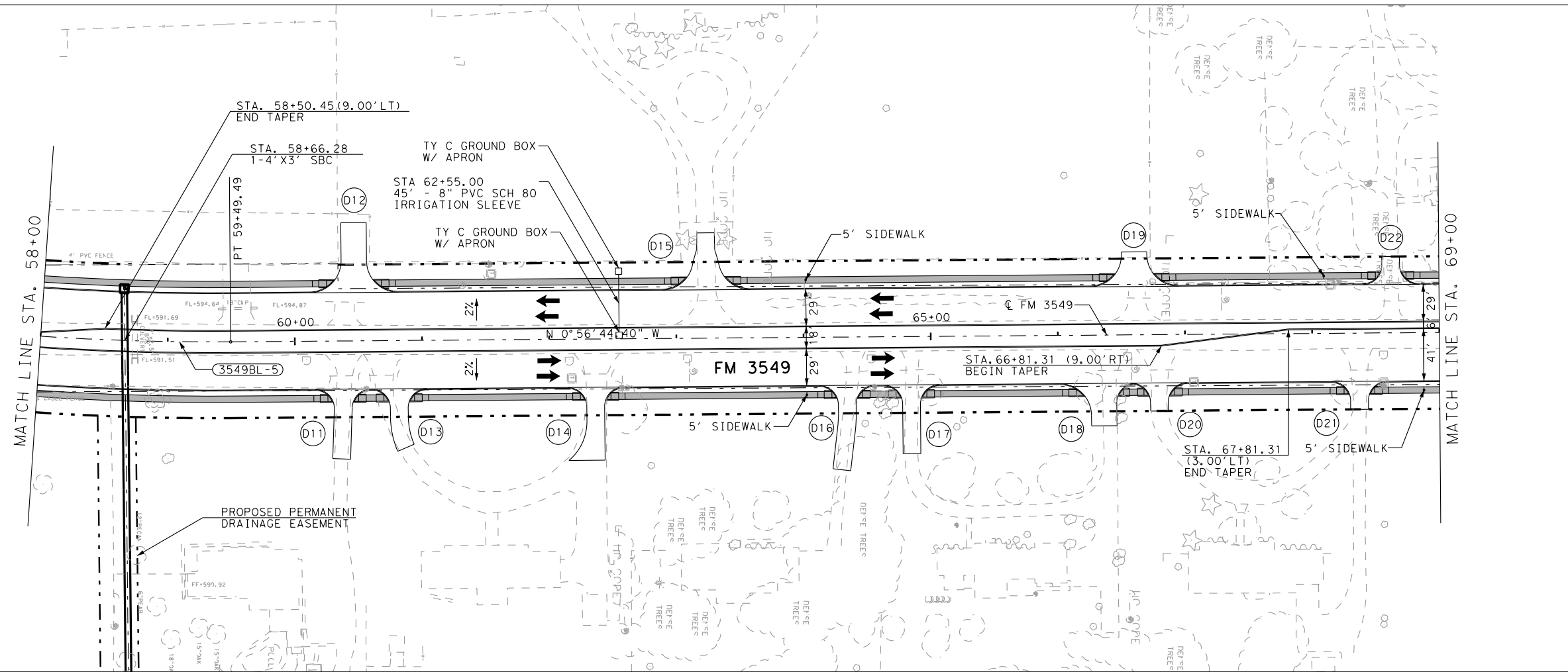


ROADWAY PLAN & PROFILE
FM 3549
STA. 47+00 TO STA. 58+00

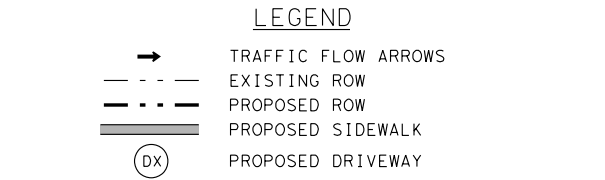
SHEET 4 OF 8

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| GRAPHICS TM | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 130 |
| CHECK WL | CONTROL 1015 | SECTION 01 | JOB 023 | |

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 DATE: 2/27/2018
 TIME: 2:54:38 PM



- GENERAL NOTES:**
- ALL DIMENSIONS ARE TO FACE OF CURB.
 - ALL STATIONS AND OFFSETS ARE FROM CL FM 3549 UNLESS OTHERWISE NOTED.
 - REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 - REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 - TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 - 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 - REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



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ATKINS
TBPE REG. # F-474

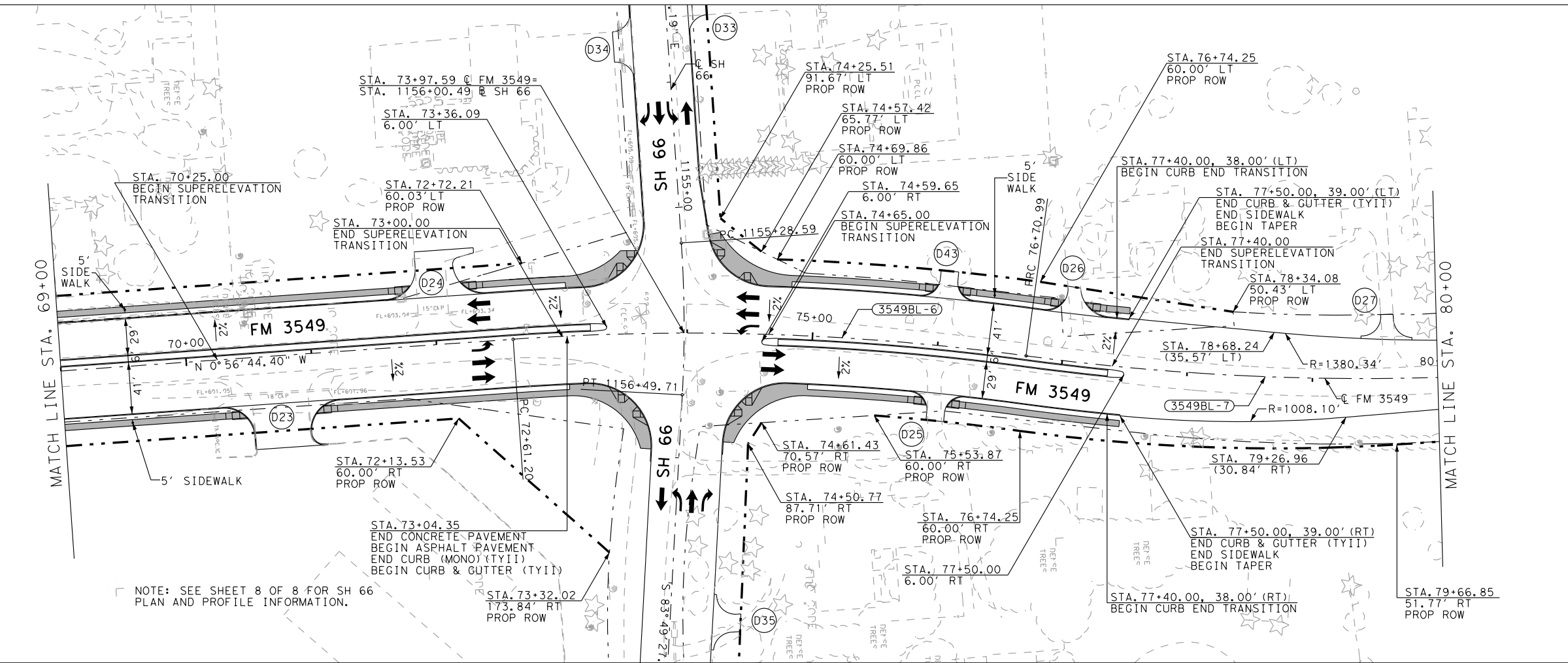
Texas Department of Transportation
© 2018

ROADWAY PLAN & PROFILE
FM 3549
STA. 58+00 TO STA. 69+00

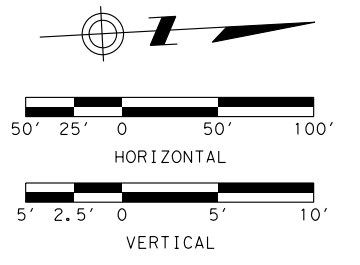
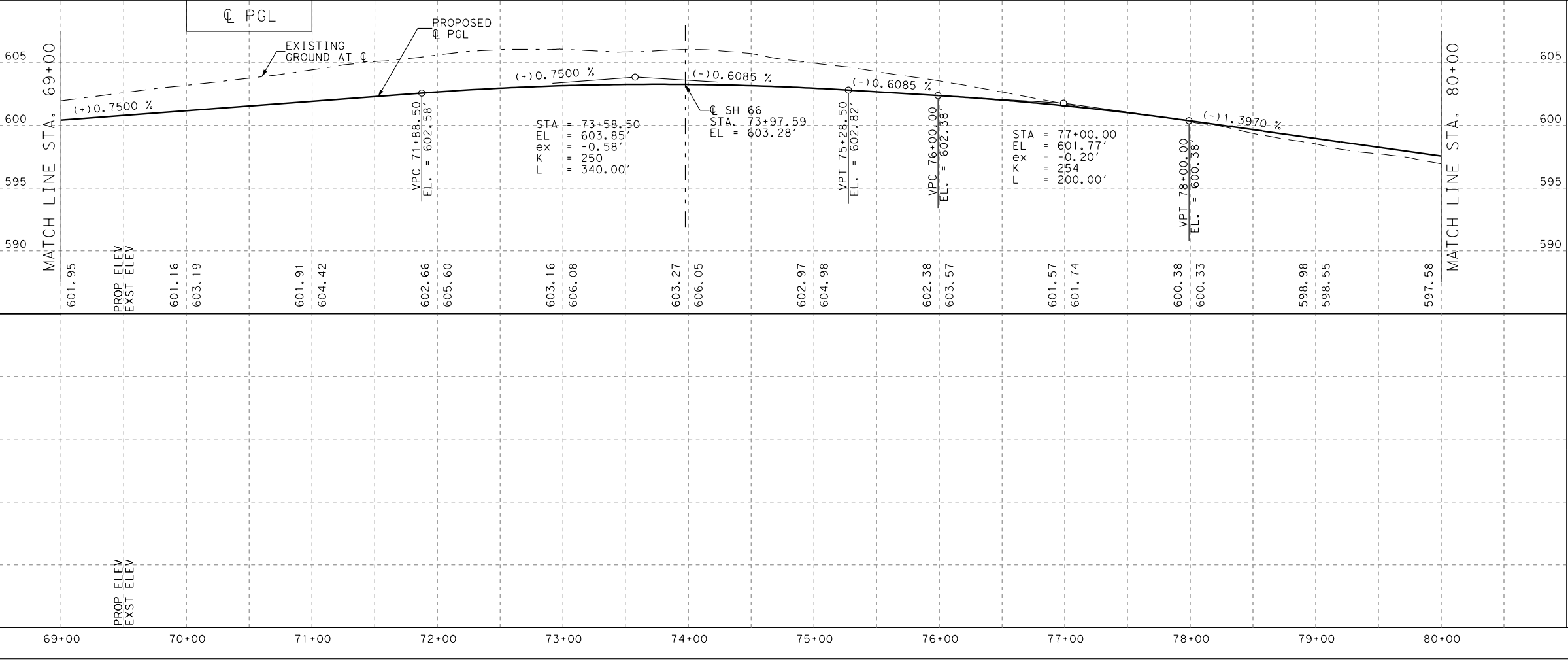
SHEET 5 OF 8

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 131 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

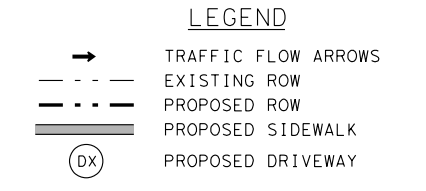
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 DATE: 2/25/2018
 TIME: 8:58:33 PM



NOTE: SEE SHEET 8 OF 8 FOR SH 66 PLAN AND PROFILE INFORMATION.



- GENERAL NOTES:
- ALL DIMENSIONS ARE TO FACE OF CURB.
 - ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 - REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 - REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 - TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 - 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 - REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

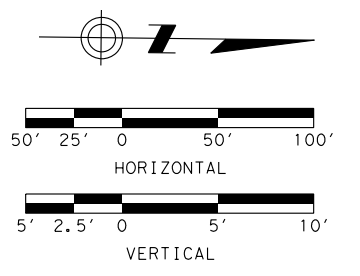
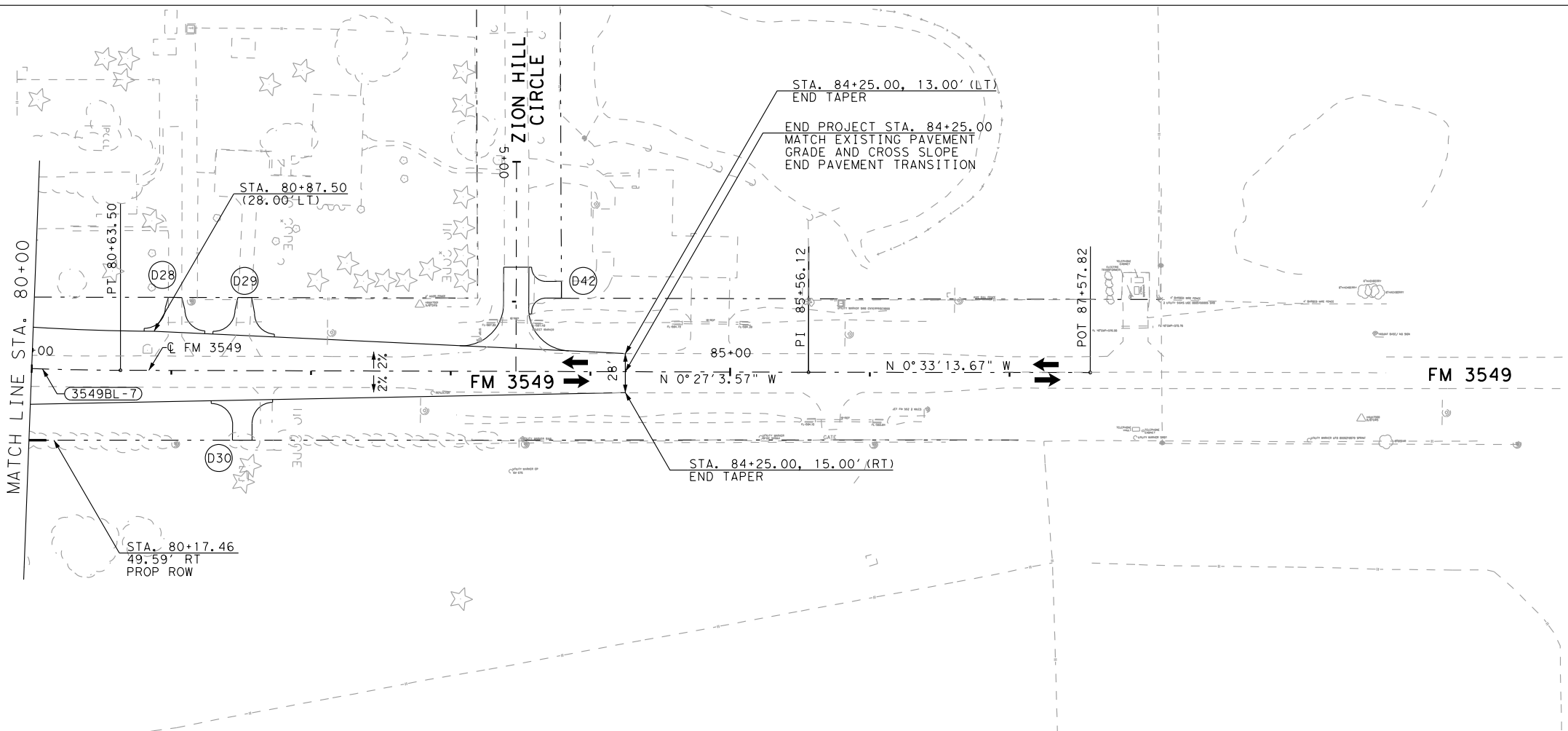


ROADWAY PLAN & PROFILE
 FM 3549
 STA. 69+00 TO STA. 80+00

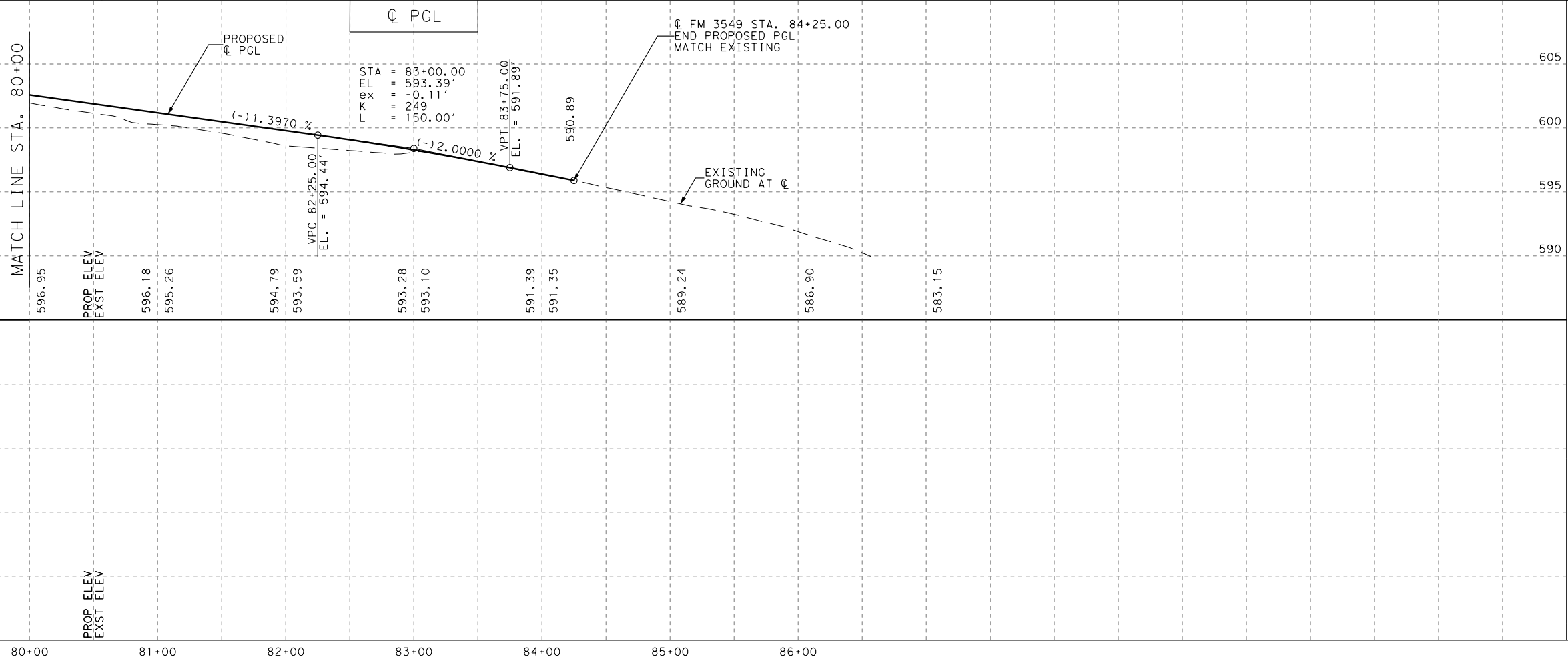
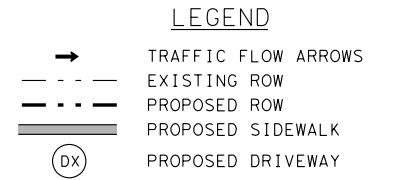
SHEET 6 OF 8

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 132 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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 DATE: 2/25/2018
 TIME: 8:58:48 PM



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.
 3. REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 4. REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS, CURB RADII, AND CURB RAMP DETAILS.
 5. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.
 6. TY C GROUND BOX IN THE MEDIAN WILL BE PLACED 3 FT FROM BACK OF CURB.
 7. 8" PVC SCH 80 SHALL BE PLACED A MINIMUM OF 24" UNDER PROPOSED ROADWAY.
 8. REFER TO STANDARD ED(4) FOR GROUND BOX DETAILS.



| NO. | DATE | REVISION | BY |
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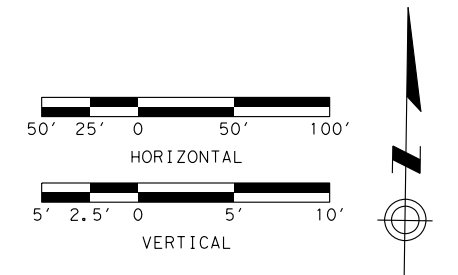
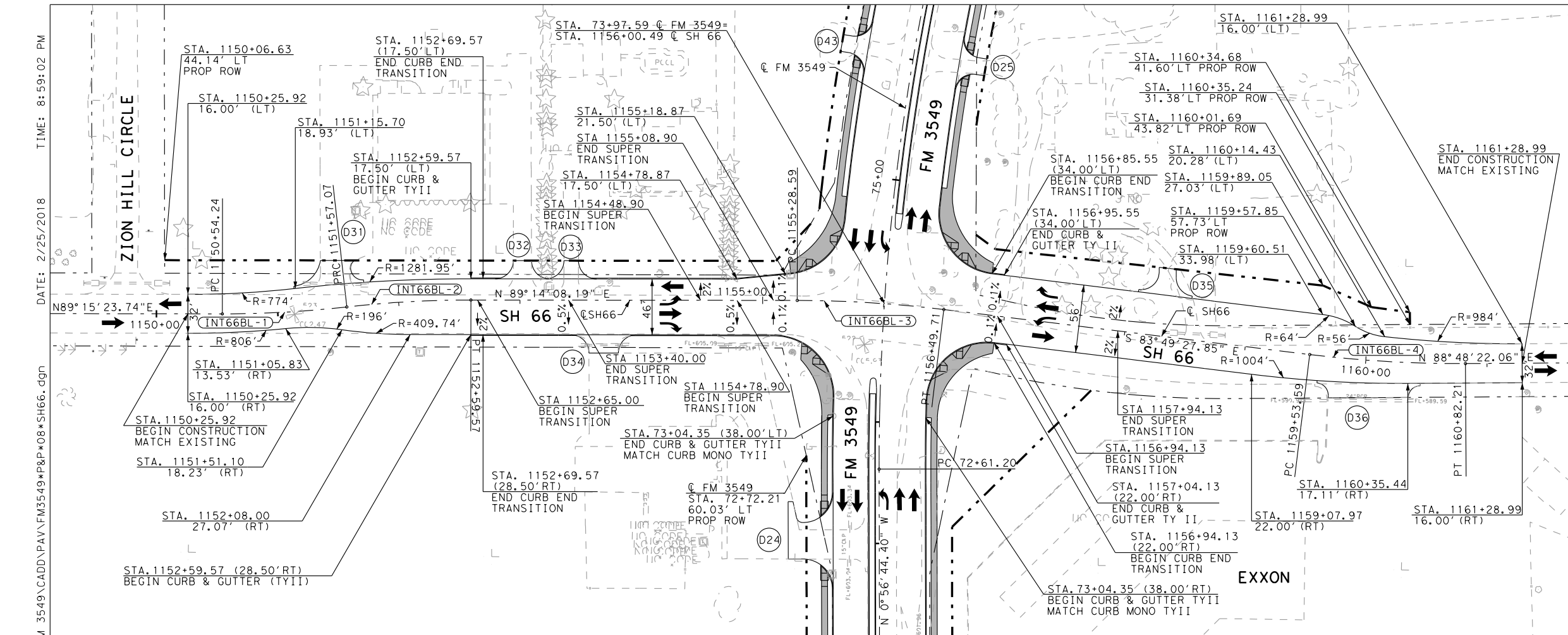
ATKINS
TBPE REG. # F-474



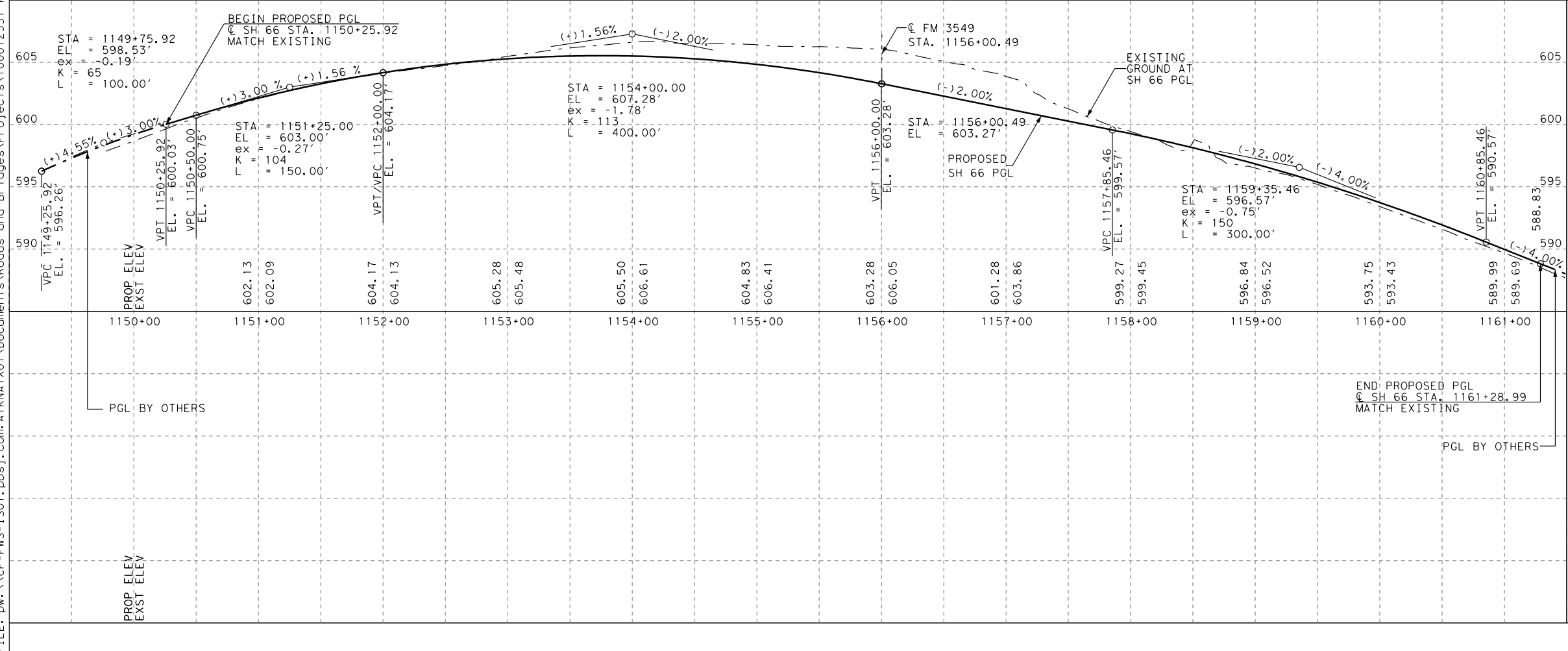
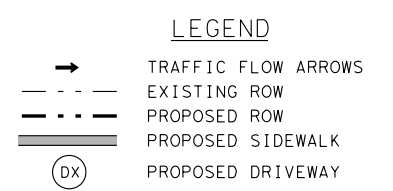
ROADWAY PLAN & PROFILE
FM 3549
STA. 80+00 TO END PROJECT

SHEET 7 OF 8

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 133 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL STATIONS AND OFFSETS ARE FROM ϕ SH 66 UNLESS OTHERWISE NOTED.
 3. REFER TO SIDE STREET P&P SHEETS AND INTERSECTION DETAIL SHEETS FOR CURB RADII AND CURB RAMP DETAILS.
 4. REFER TO DRIVEWAY P&P SHEETS FOR DRIVEWAY DIMENSIONS AND CURB RADII.
 5. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION AND MEDIAN DETAILS.



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ATKINS
 TBPE REG. # F-474



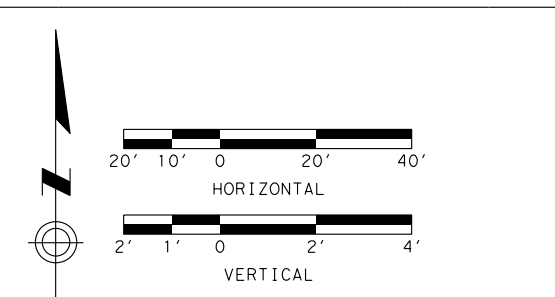
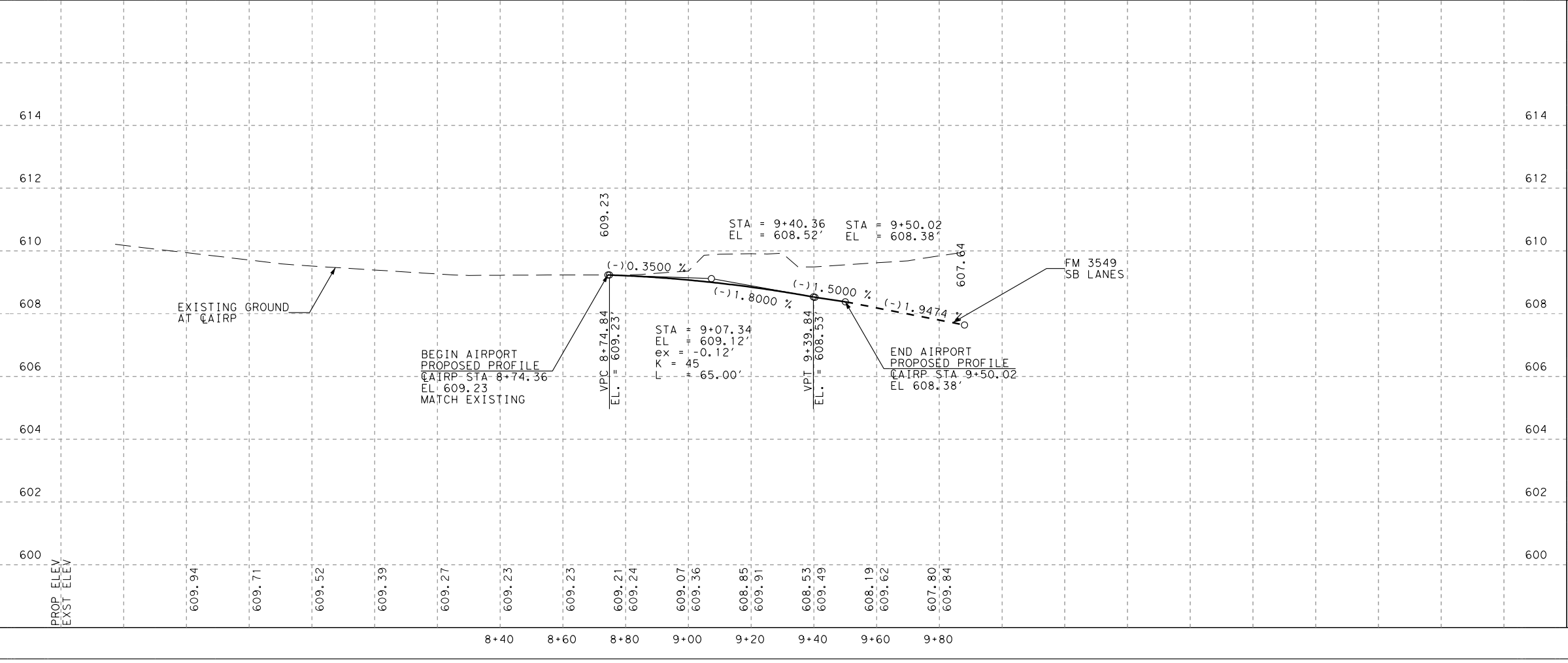
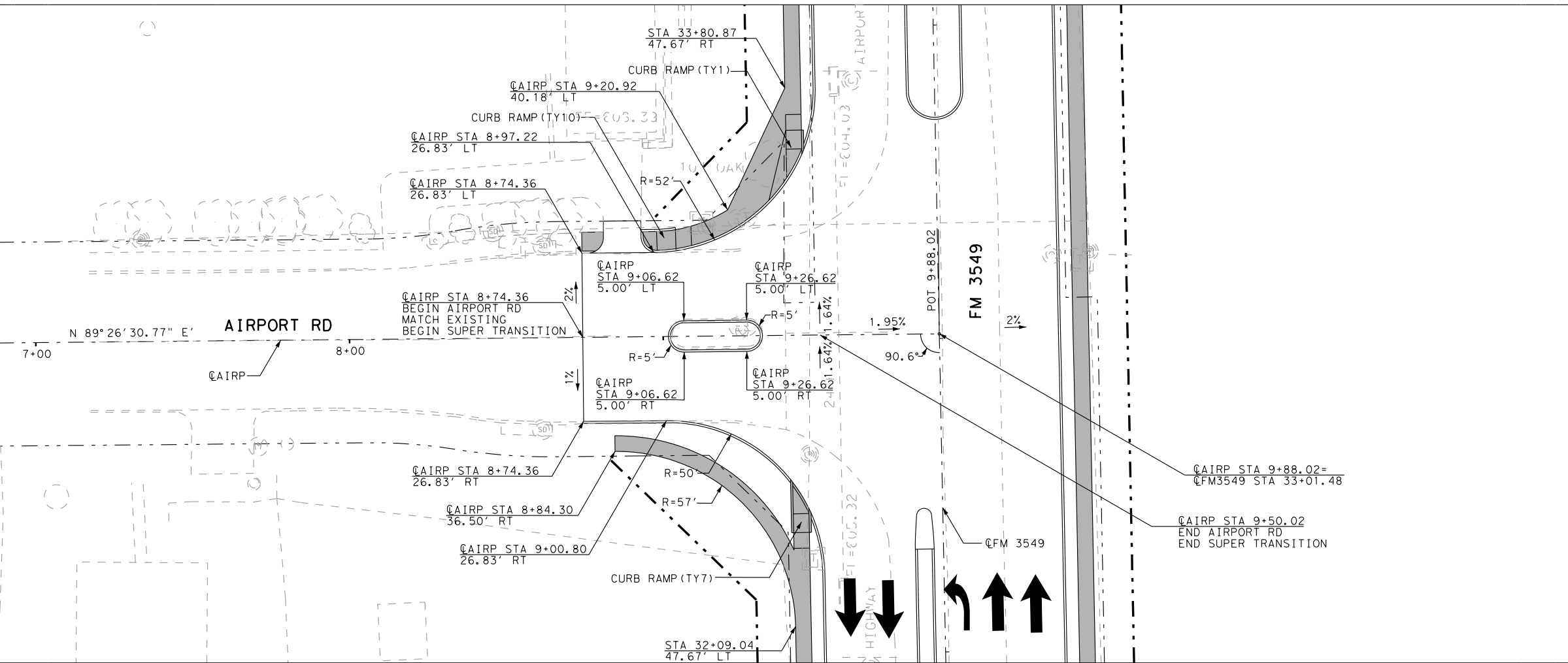
ROADWAY PLAN & PROFILE
 SH 66
 STA. 1150+25.92 TO STA. 1161+28.99

SHEET 8 OF 8

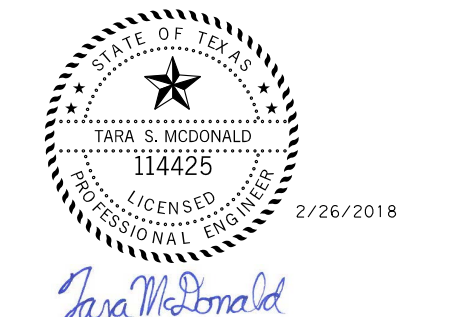
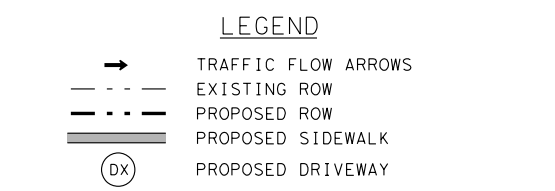
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 134 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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 DATE: 2/25/2018 TIME: 8:59:16 PM



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



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ATKINS
 TBPE REG. # F-474

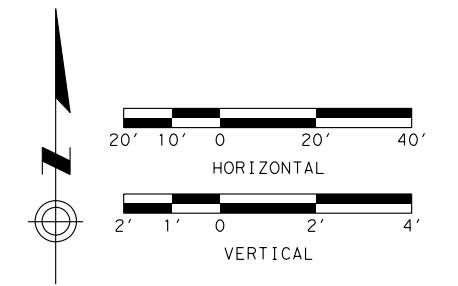
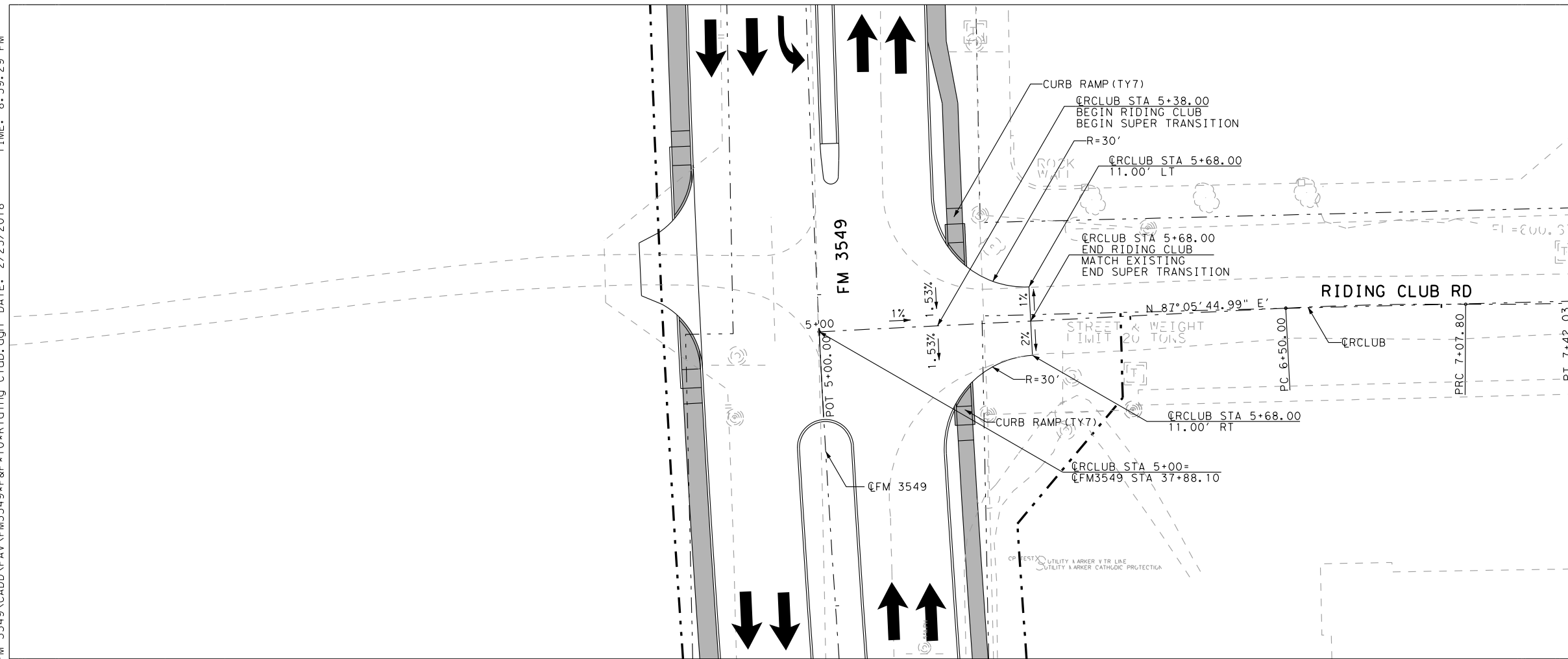


SIDE STREET
 PLAN & PROFILE
 AIRPORT RD

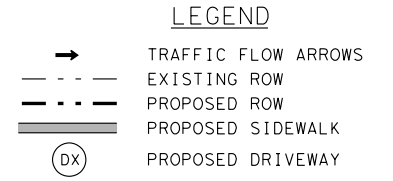
SHEET 1 OF 5

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 135 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



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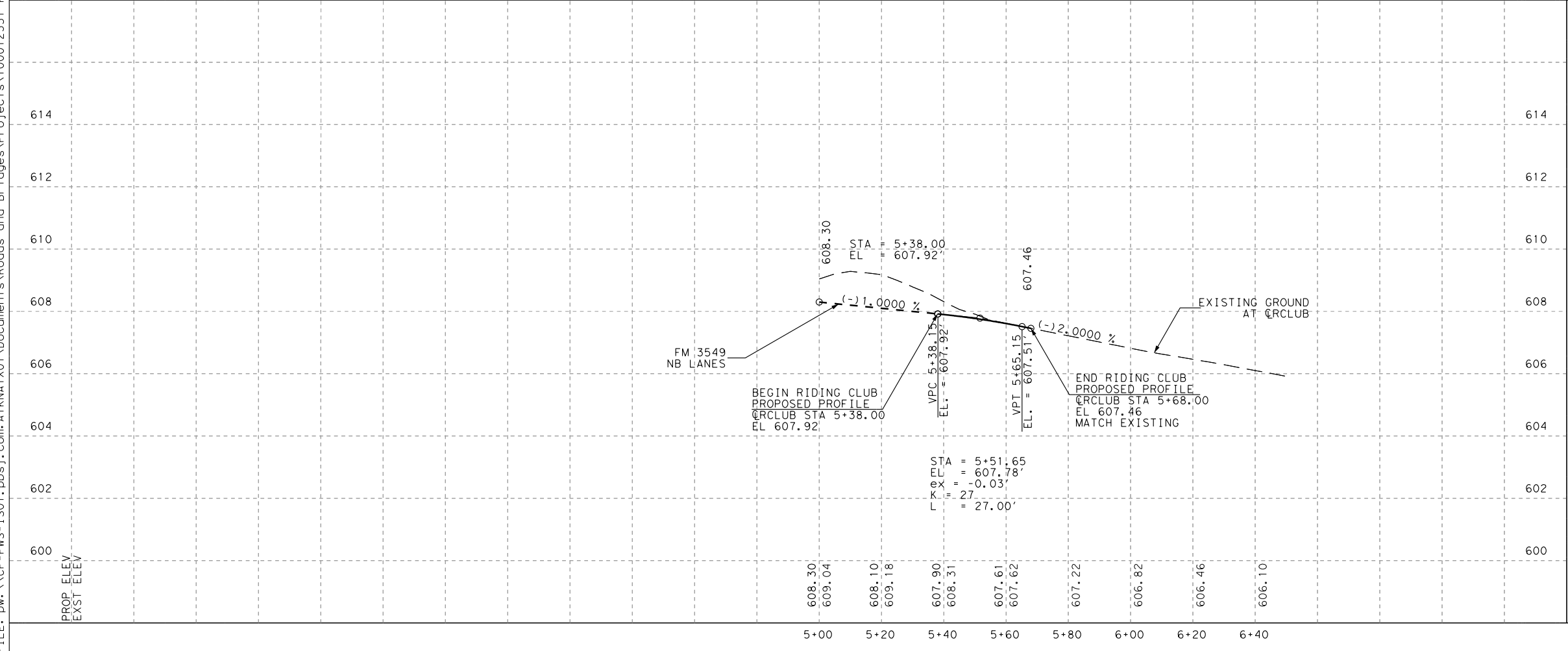
ATKINS
 TBPE REG. # F-474



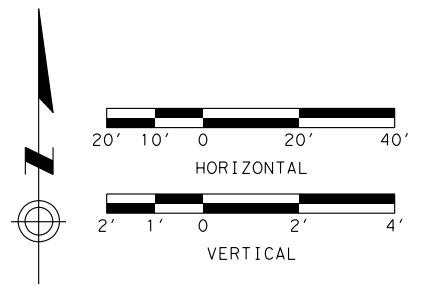
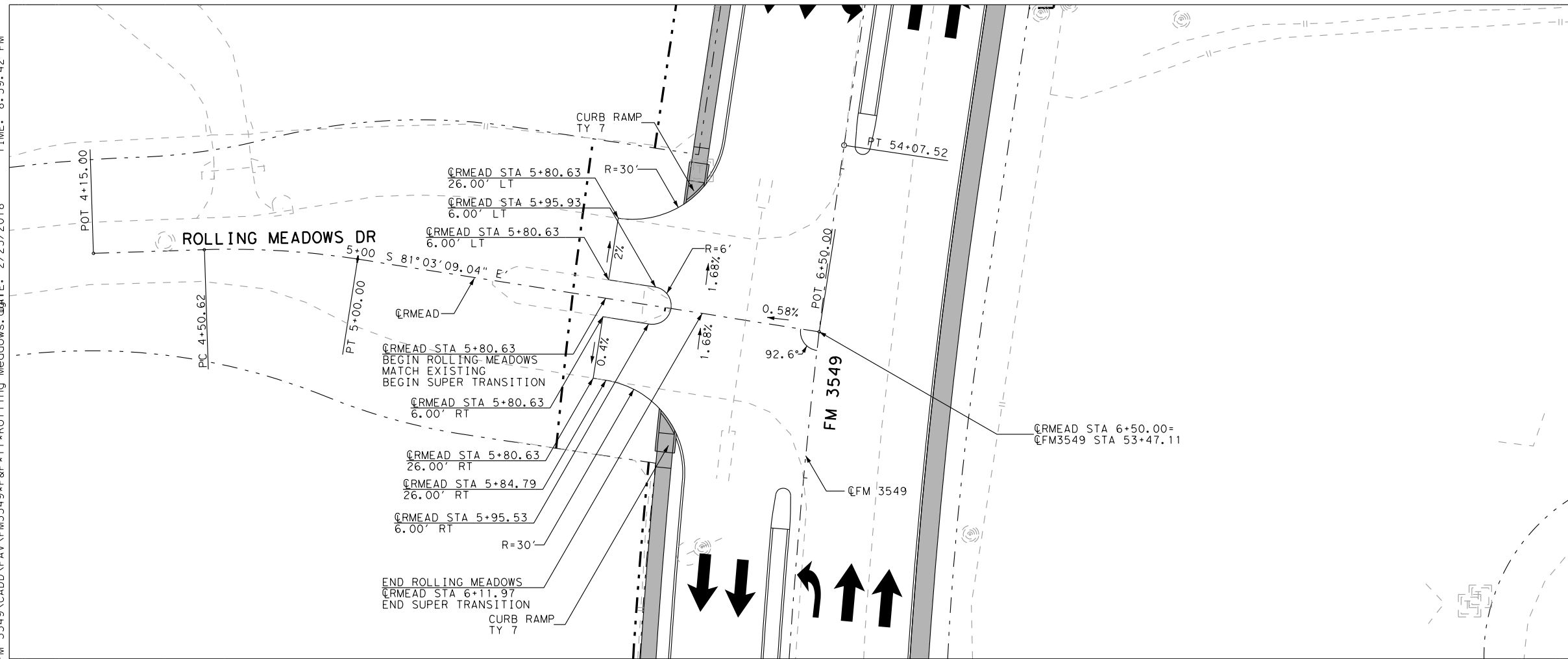
SIDE STREET
 PLAN & PROFILE
 RIDING CLUB RD

SHEET 2 OF 5

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 136 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

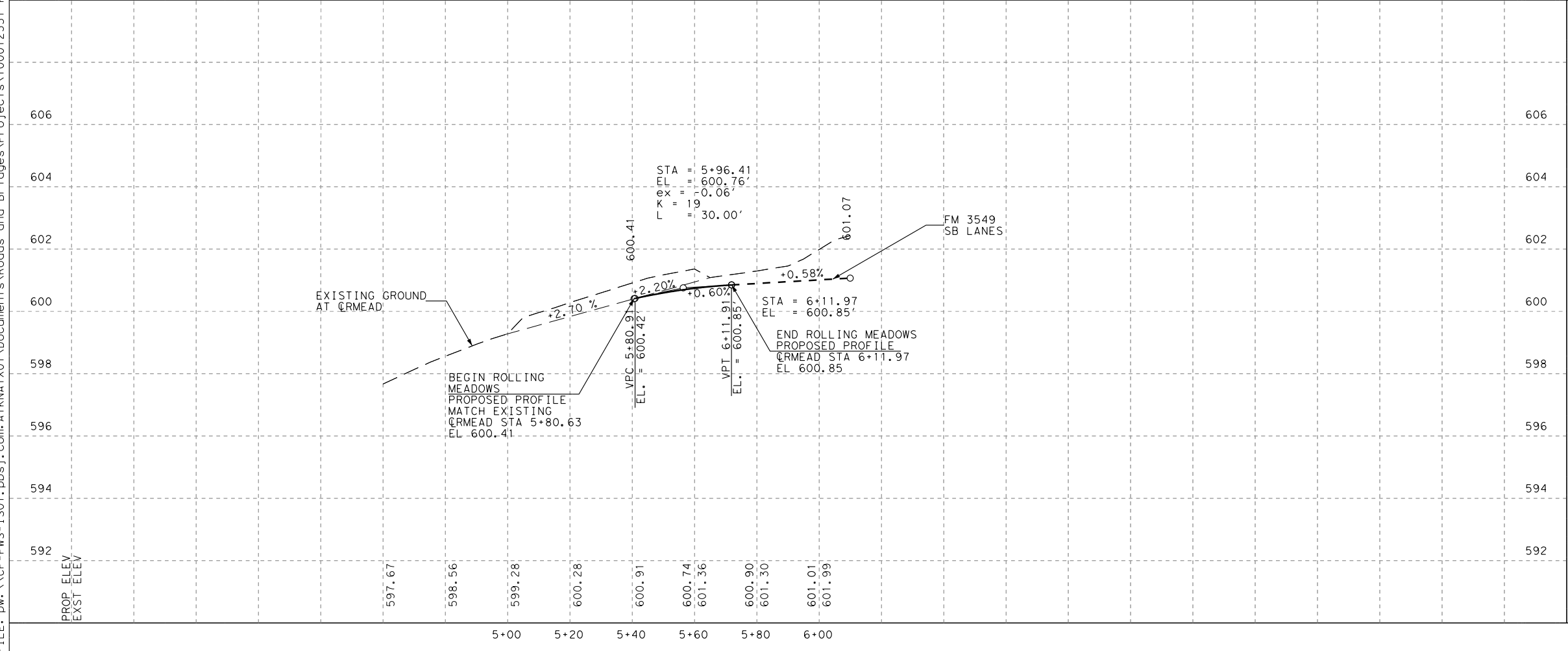
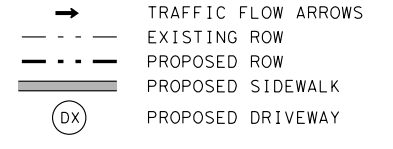


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- GENERAL NOTES:**
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.

LEGEND



Tara McDonald

2/26/2018

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ATKINS
TBPE REG. # F-474

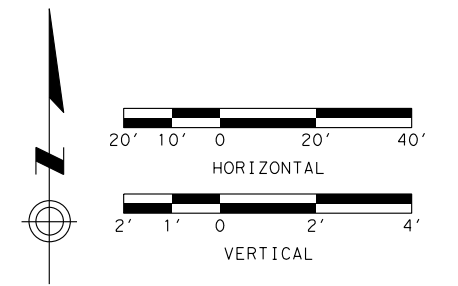
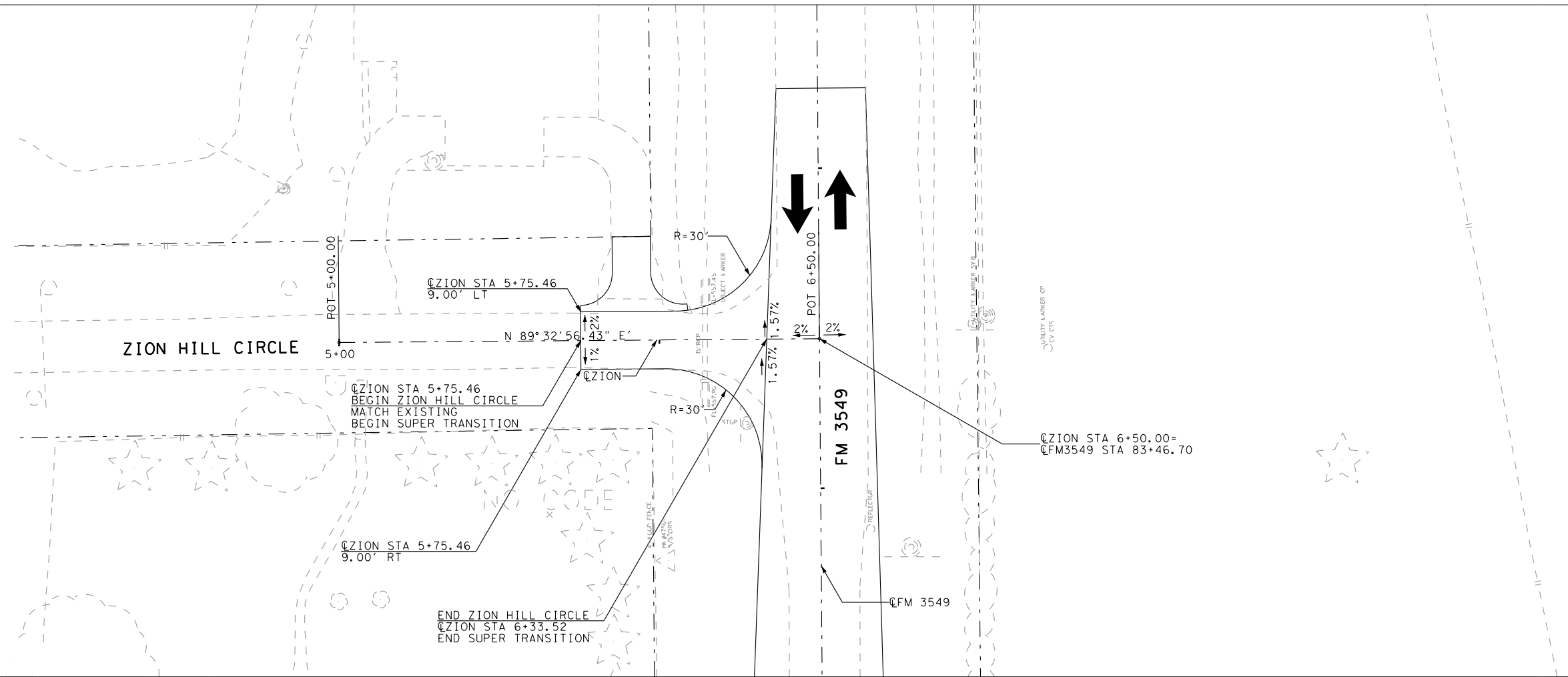


**SIDE STREET
PLAN & PROFILE**
ROLLING MEADOWS DR

SHEET 3 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 137 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

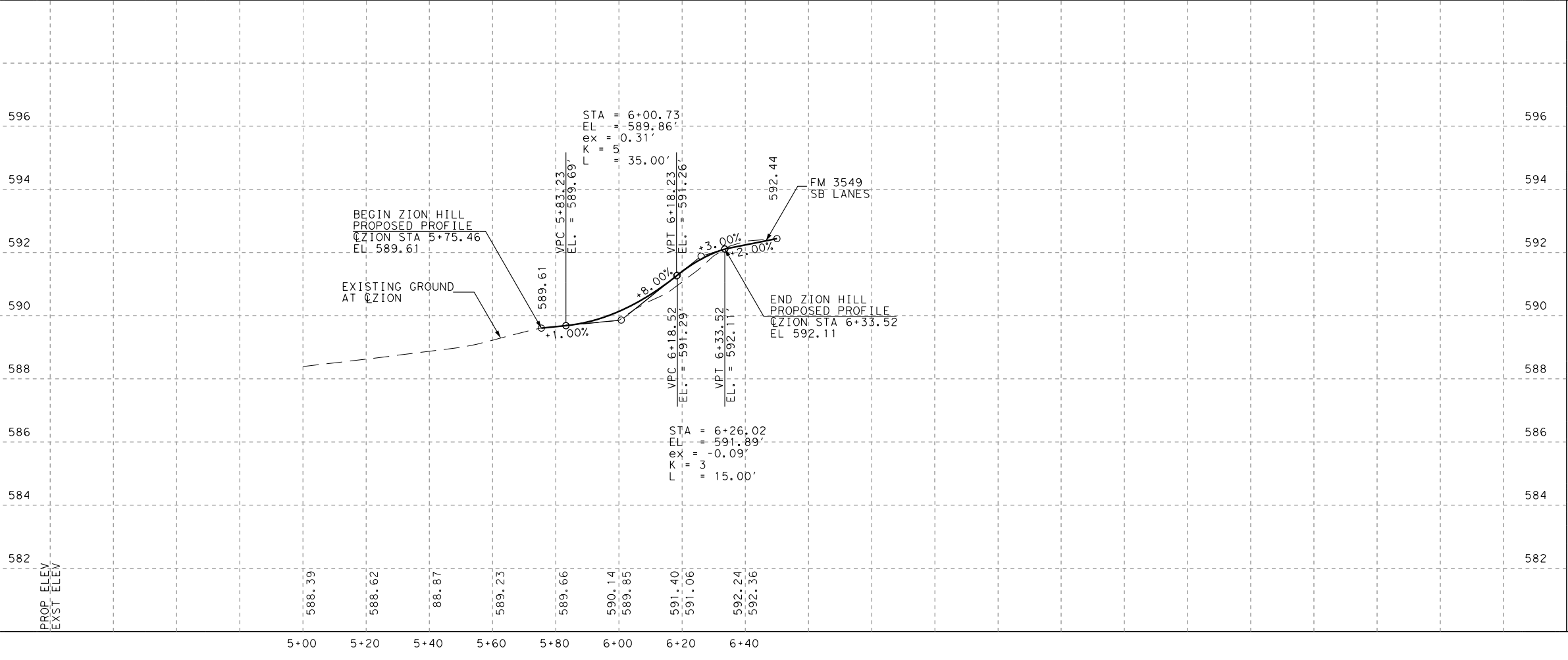
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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.

LEGEND

- TRAFFIC FLOW ARROWS
- - - EXISTING ROW
- · - · - PROPOSED ROW
- ▬ PROPOSED SIDEWALK
- (DX) PROPOSED DRIVEWAY



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

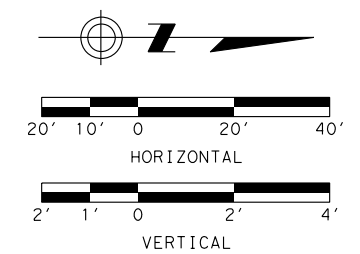
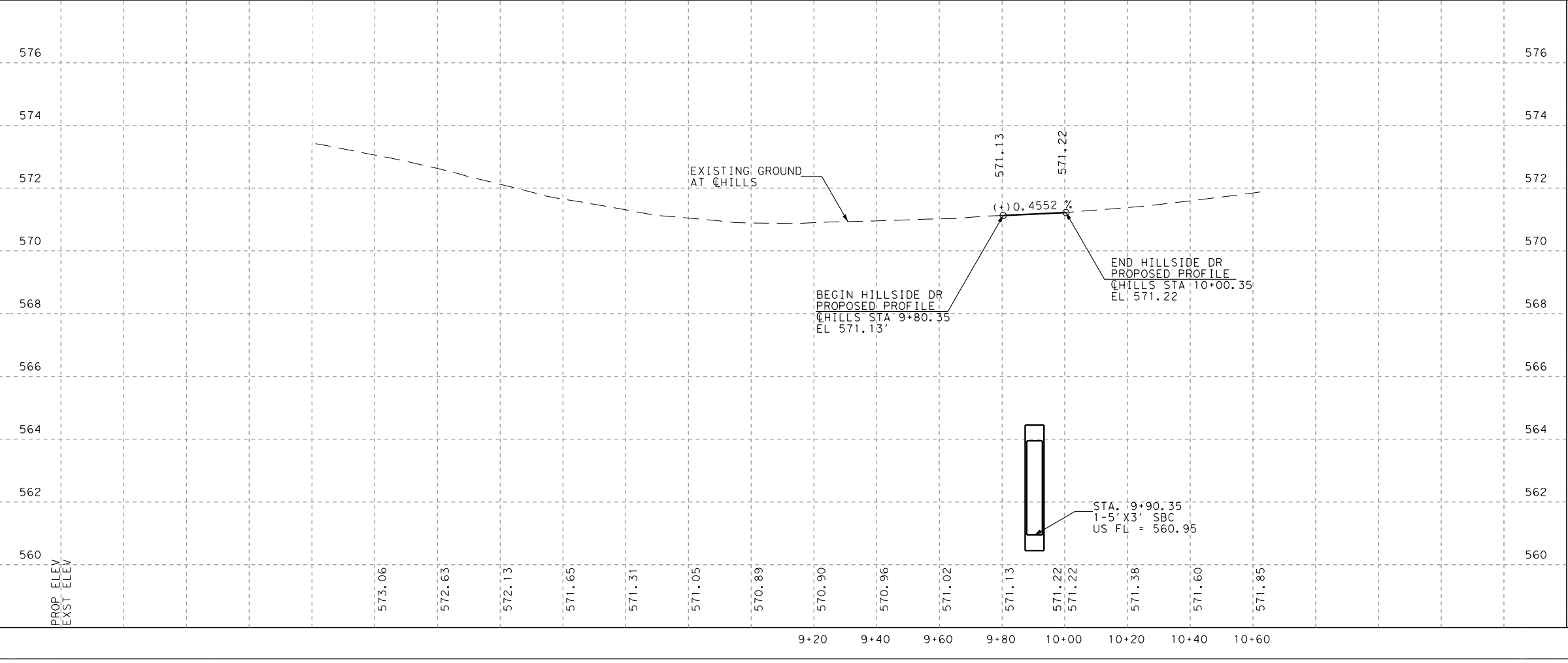
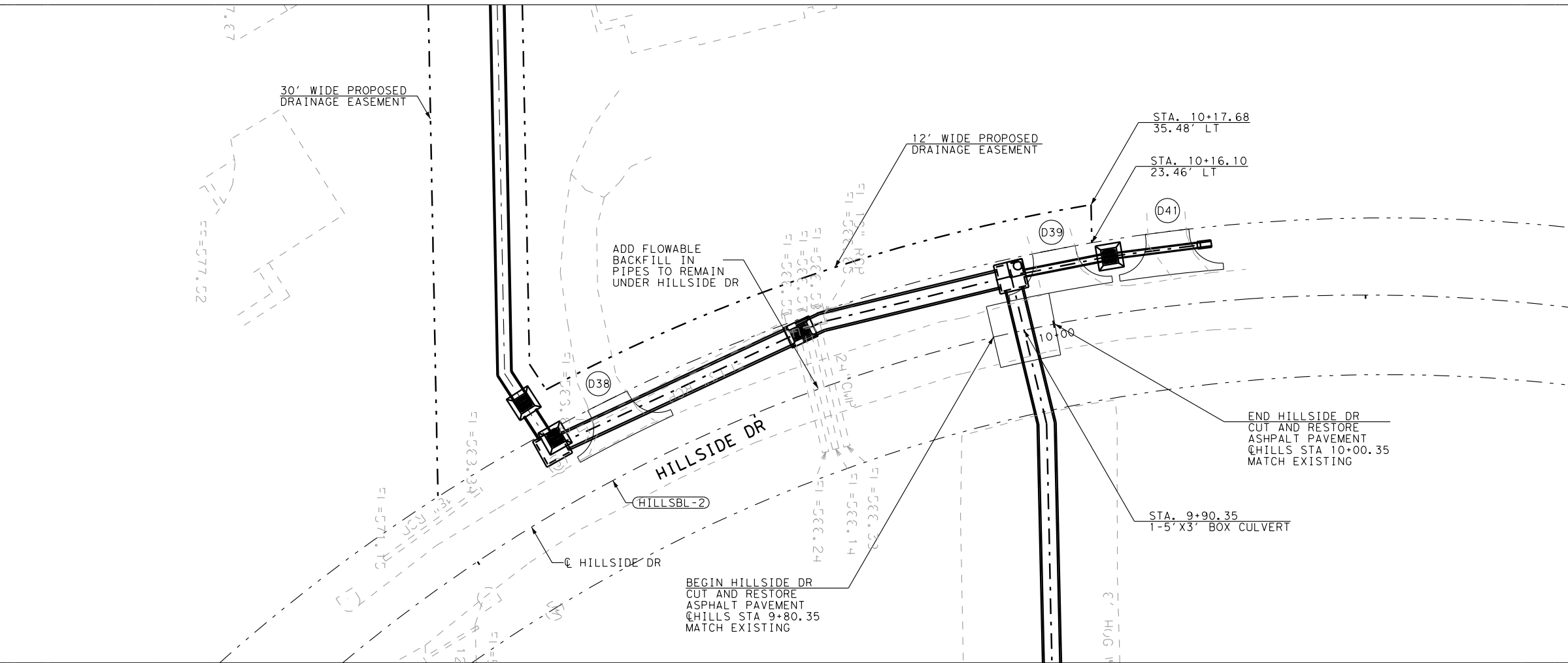


SIDE STREET
 PLAN & PROFILE
 ZION HILL CIRCLE

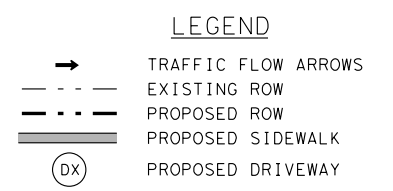
SHEET 4 OF 5

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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 138 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



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ATKINS
 TBPE REG. # F-474

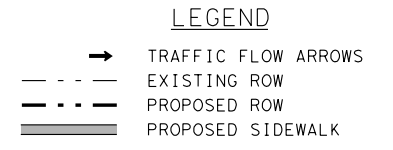
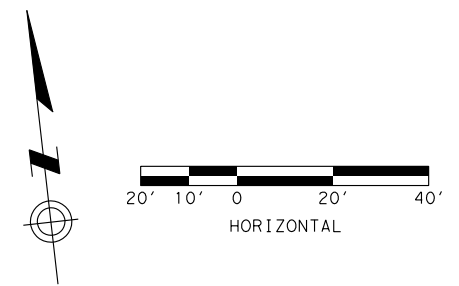


SIDE STREET
 PLAN & PROFILE
 HILLSIDE DR

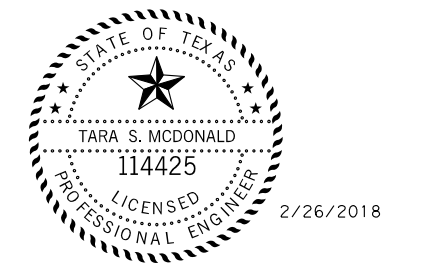
SHEET 5 OF 5

| | | | | |
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 139 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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- GENERAL NOTES:**
1. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
 2. ALL ELEVATIONS ARE TO TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
 2. ALL STATIONS AND OFFSETS ARE FROM C FM 3549 UNLESS OTHERWISE NOTED.



Tara McDonald

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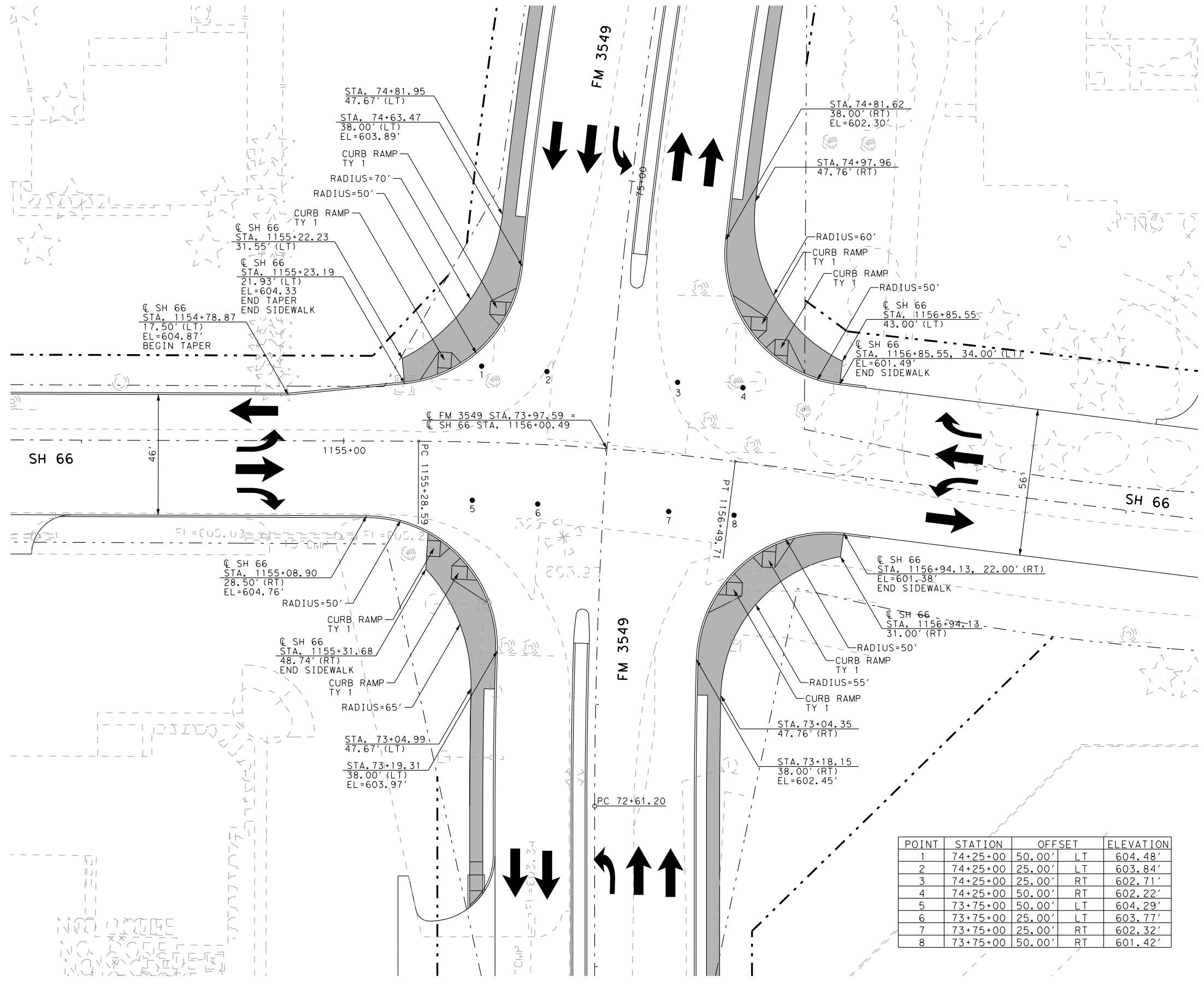
ATKINS
 TBPE REG. # F-474



INTERSECTION DETAILS
 SH 66

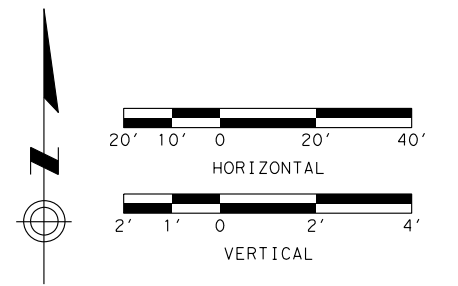
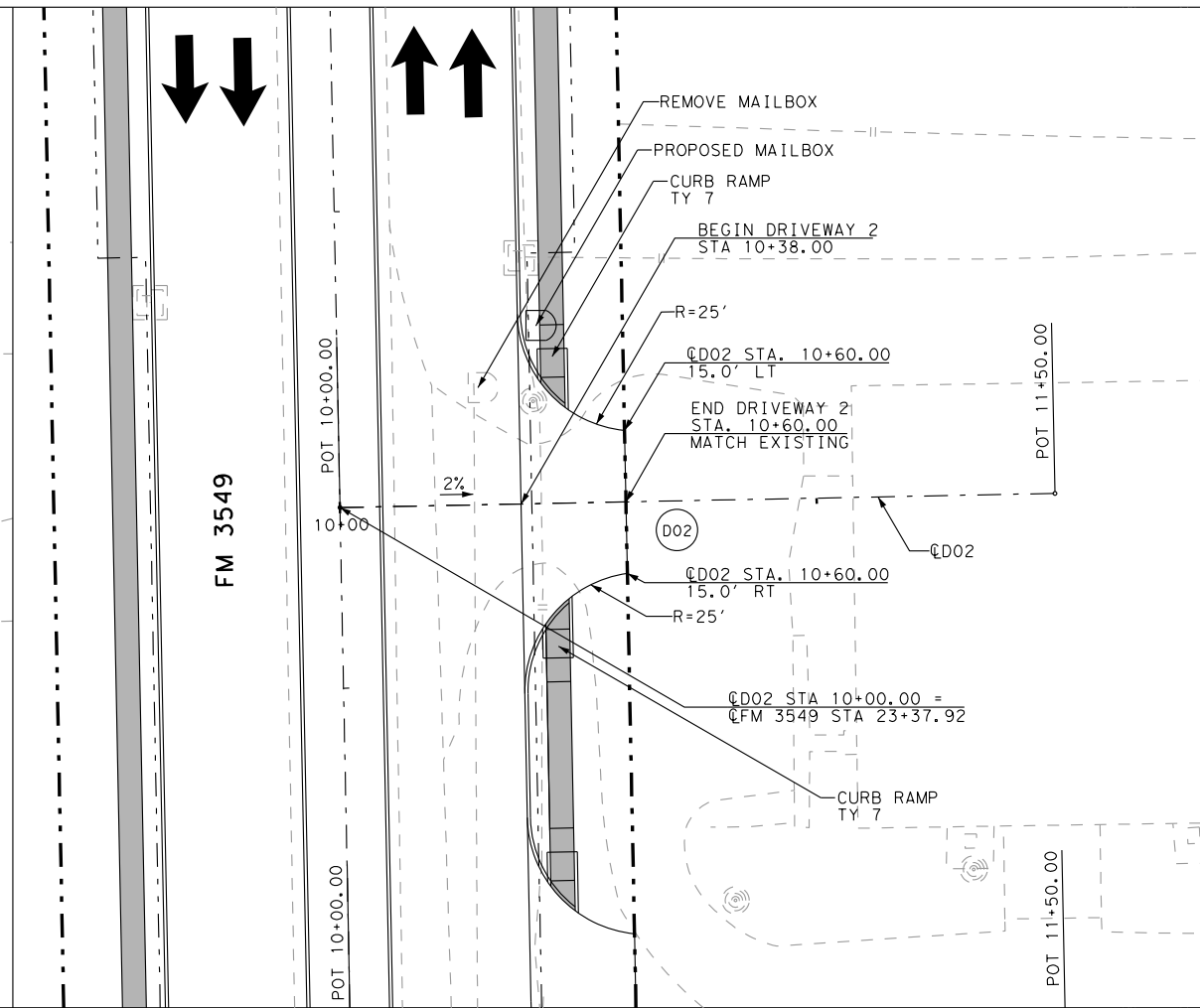
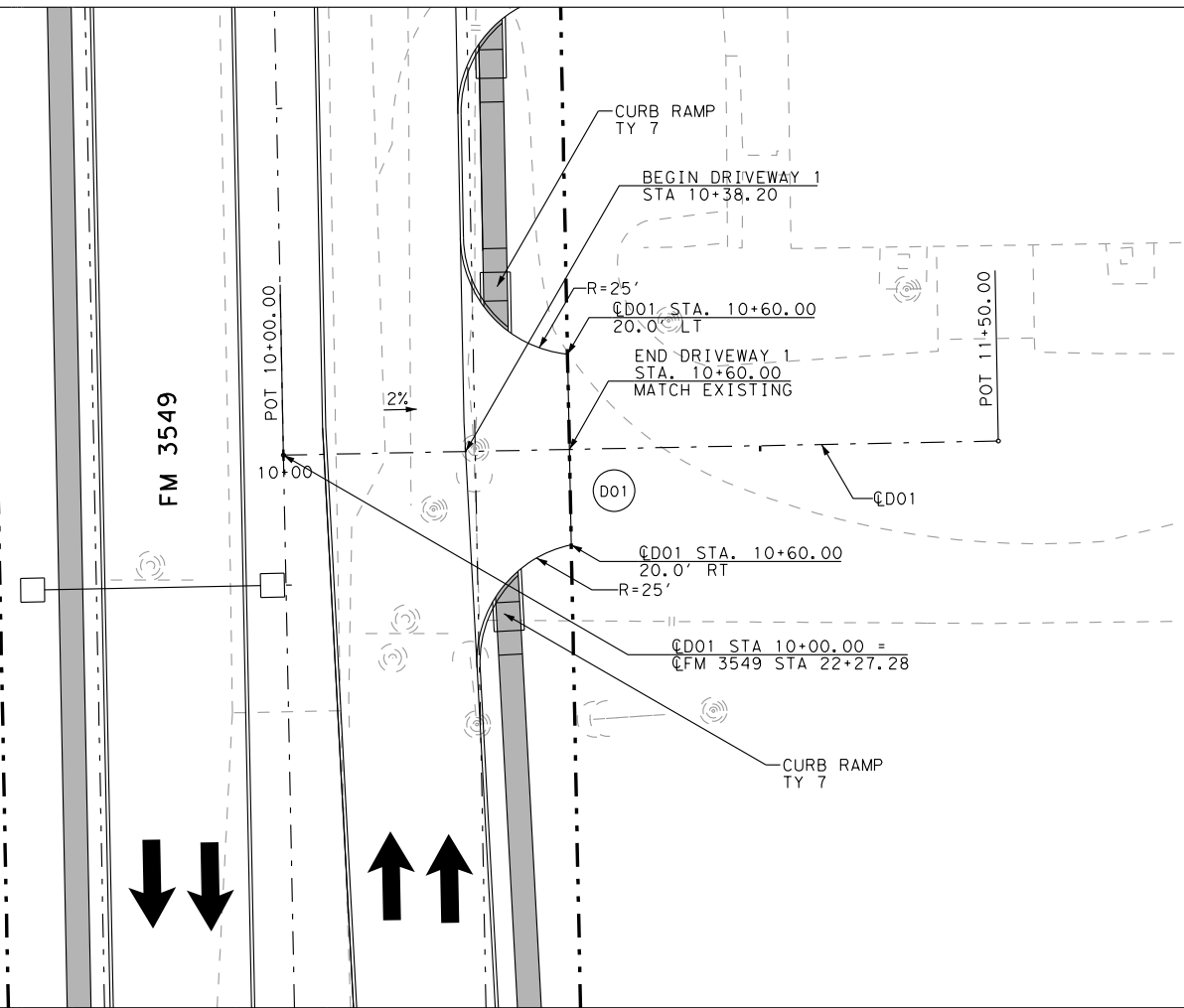
SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 140 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

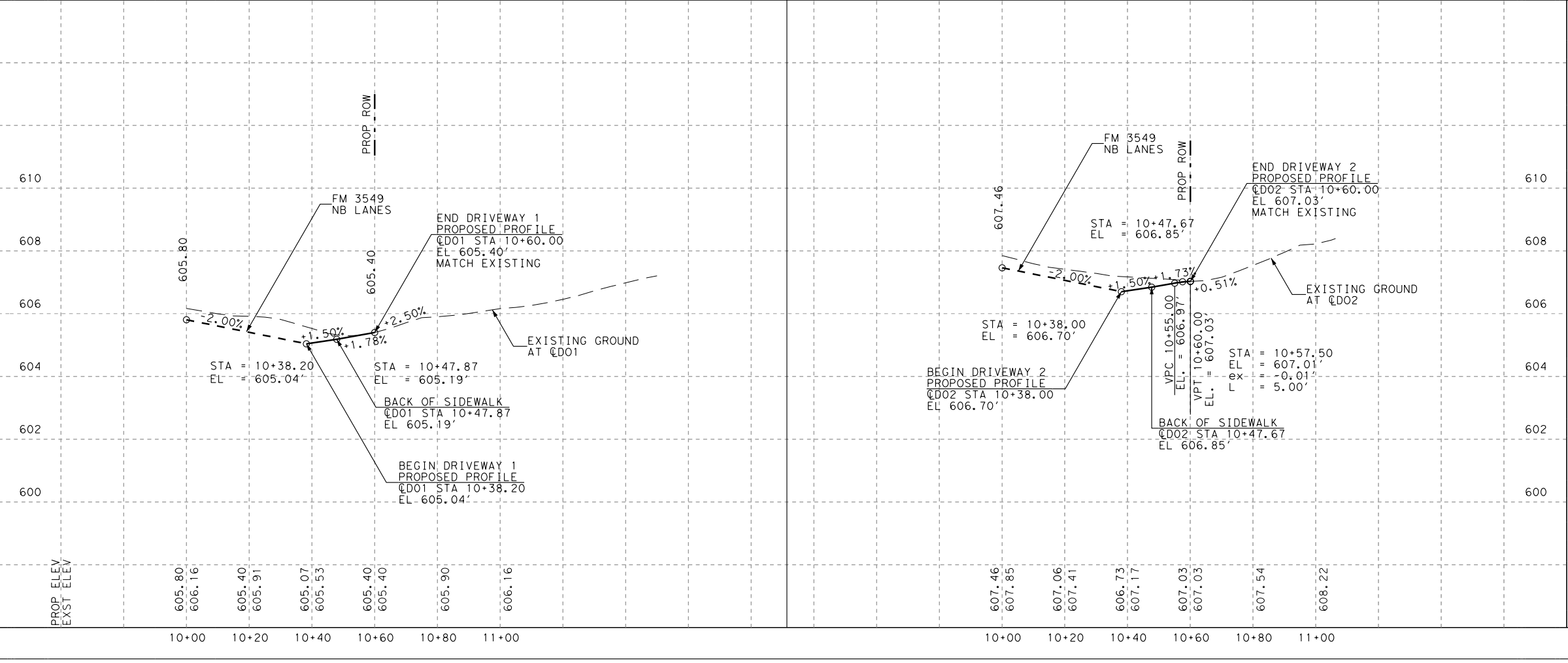
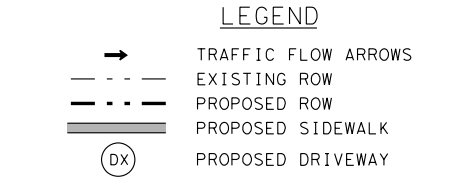


| POINT | STATION | OFFSET | | ELEVATION |
|-------|----------|--------|----|-----------|
| 1 | 74+25+00 | 50.00' | LT | 604.48' |
| 2 | 74+25+00 | 25.00' | LT | 603.84' |
| 3 | 74+25+00 | 25.00' | RT | 602.71' |
| 4 | 74+25+00 | 50.00' | RT | 602.22' |
| 5 | 73+75+00 | 50.00' | LT | 604.29' |
| 6 | 73+75+00 | 25.00' | LT | 603.77' |
| 7 | 73+75+00 | 25.00' | RT | 602.32' |
| 8 | 73+75+00 | 50.00' | RT | 601.42' |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
 TBPE REG. # F-474

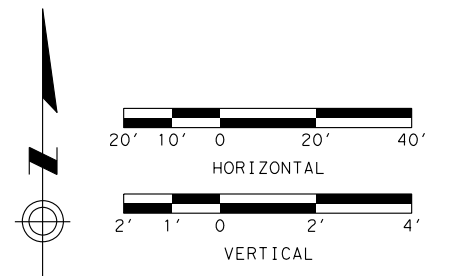
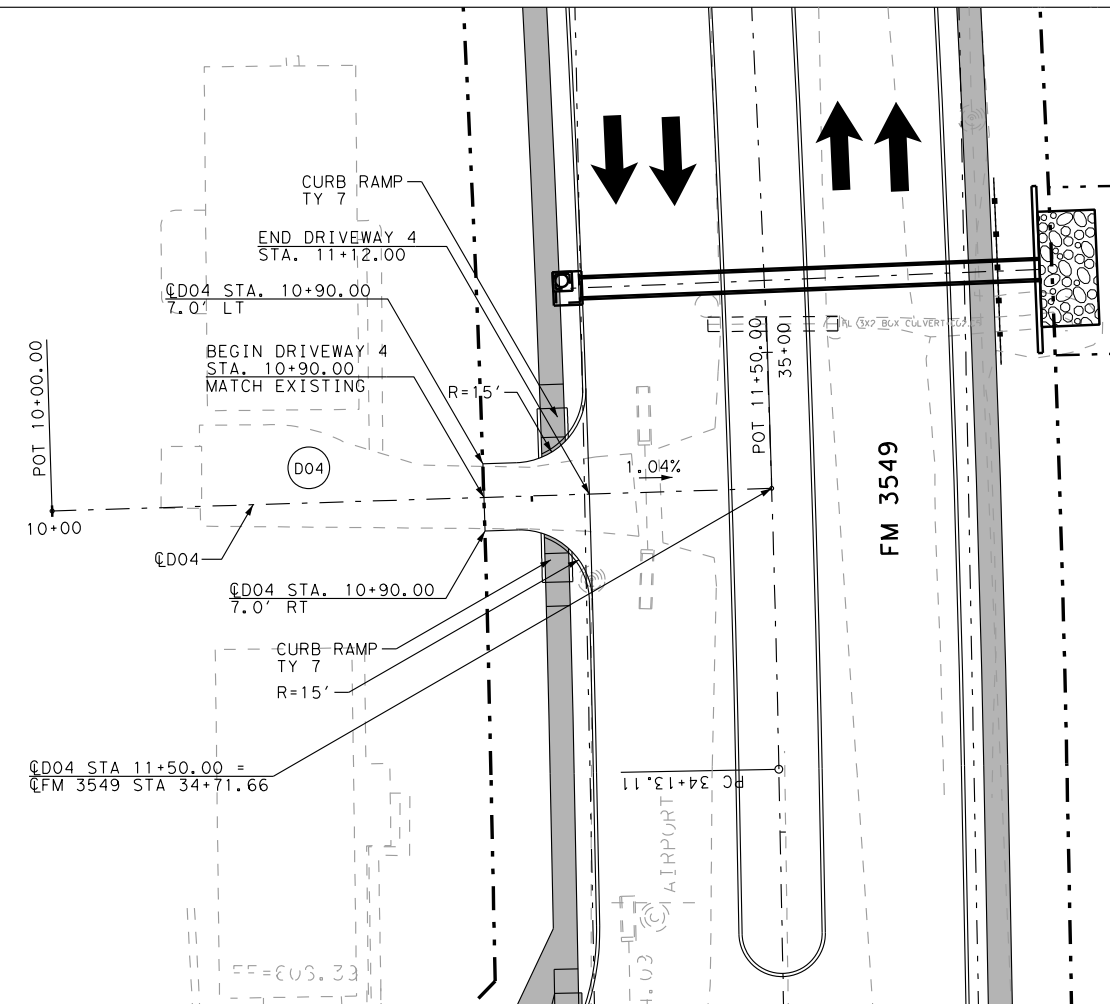
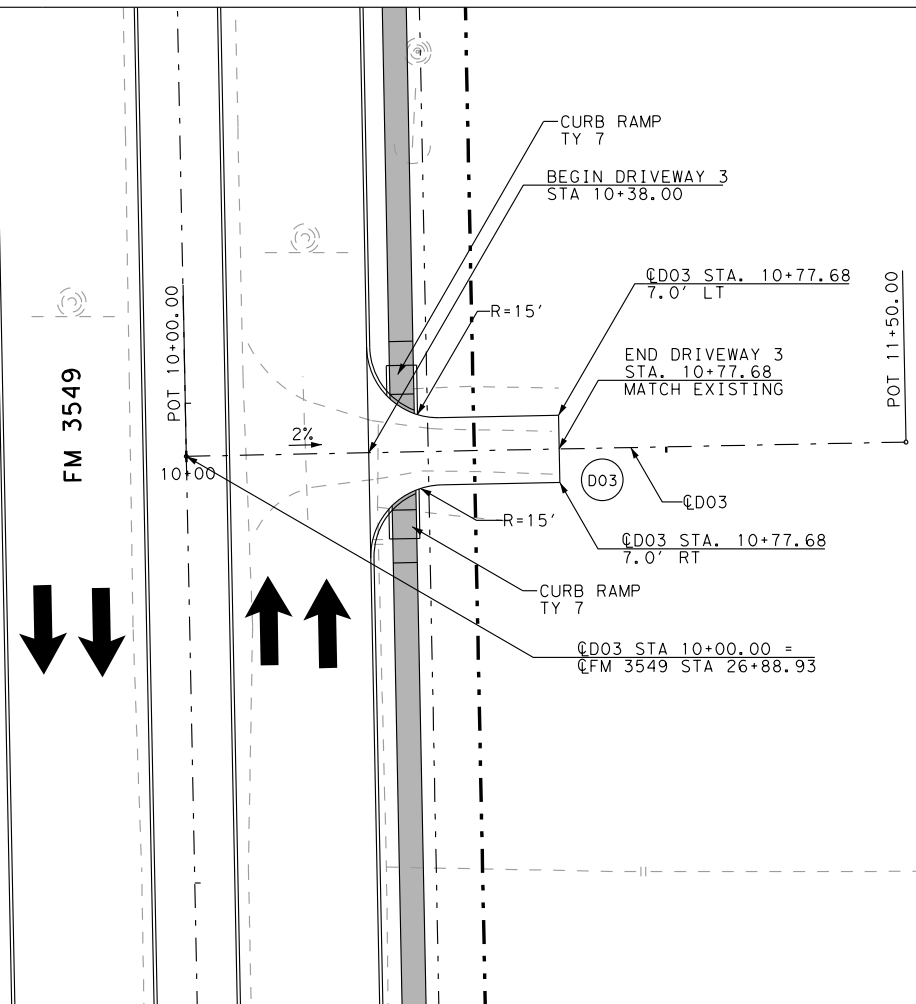


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 1&2

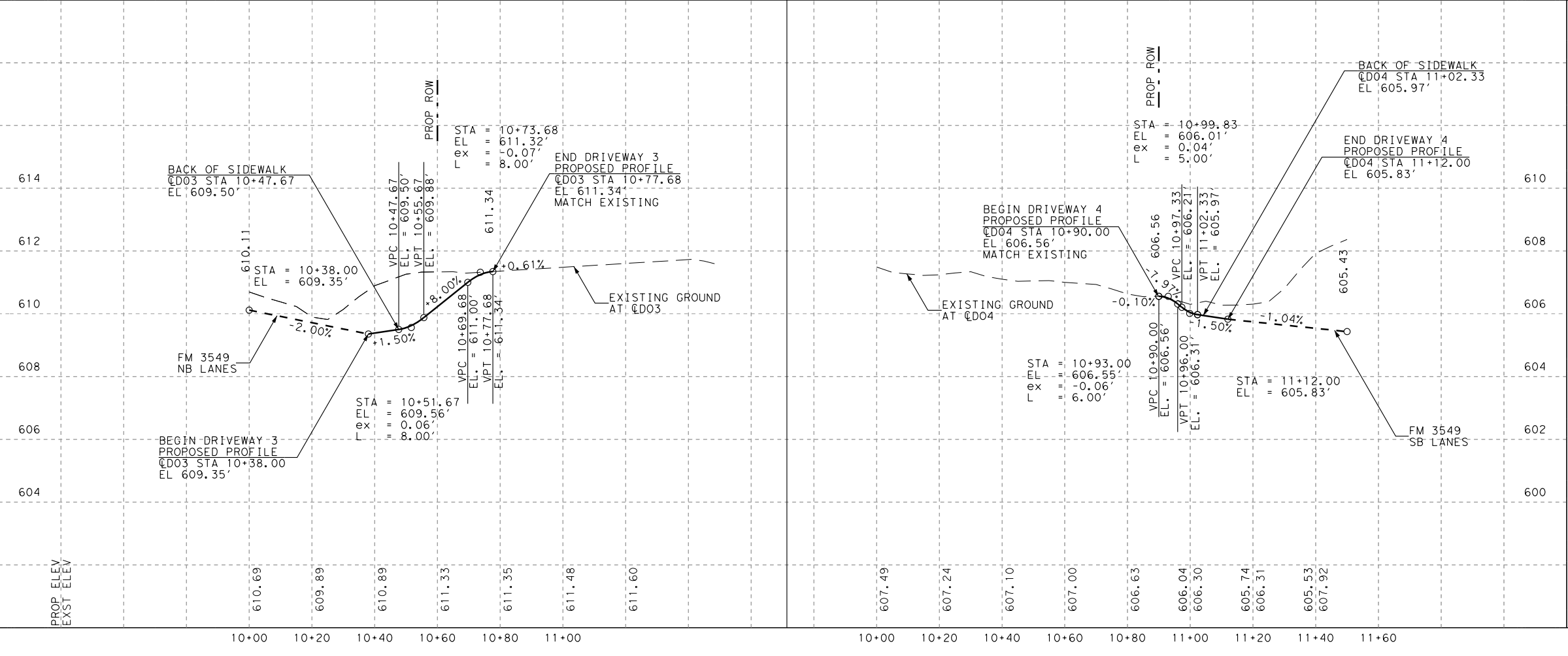
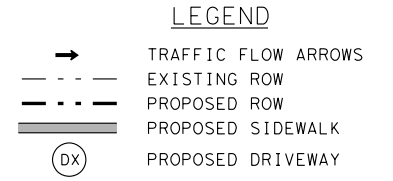
SHEET 1 OF 22

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 141 |
| CHECK | CONTROL | SECTION | JOB | 141 |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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| | | | |

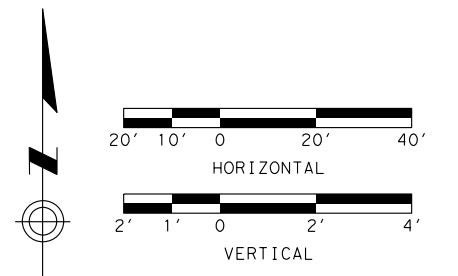
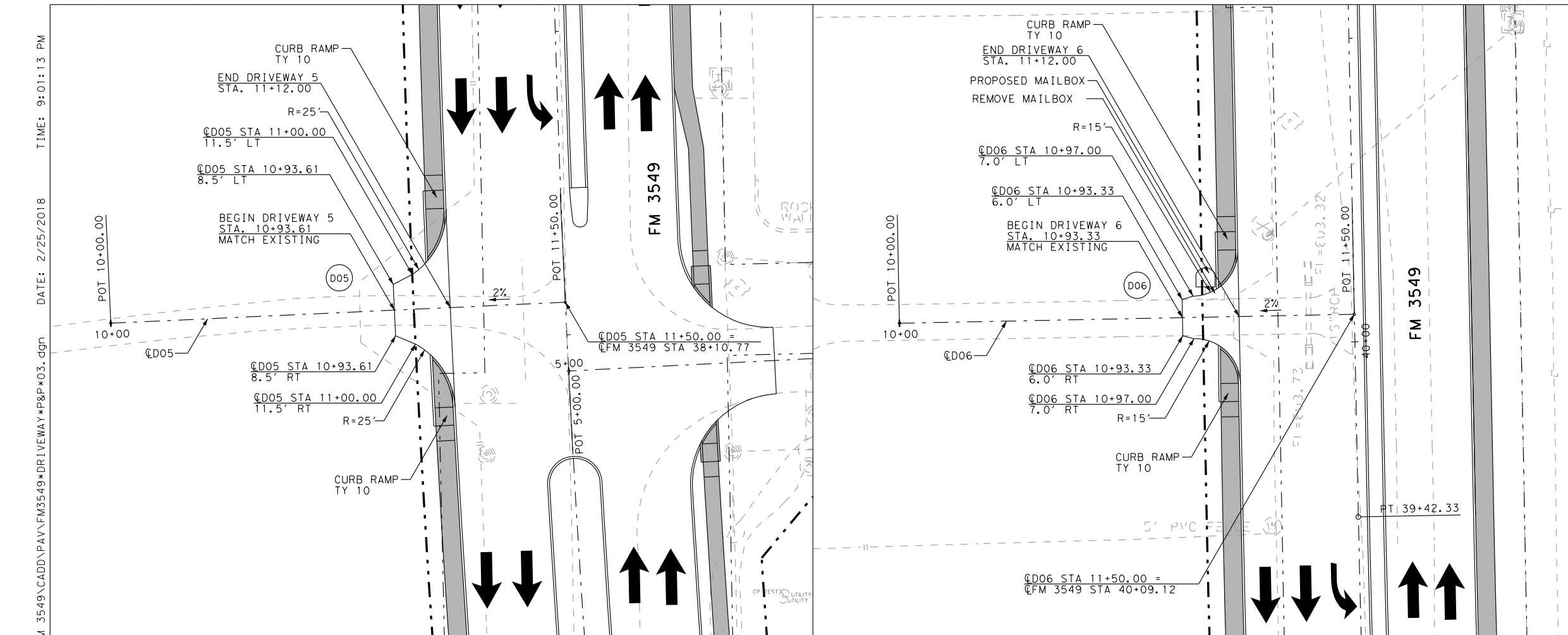
ATKINS
 TBPE REG. # F-474



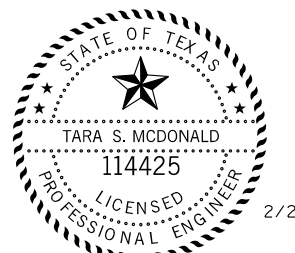
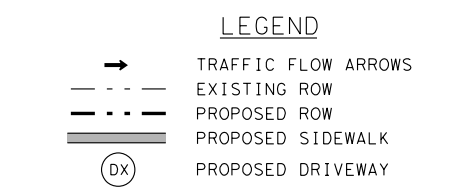
DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 3&4

SHEET 2 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 142 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

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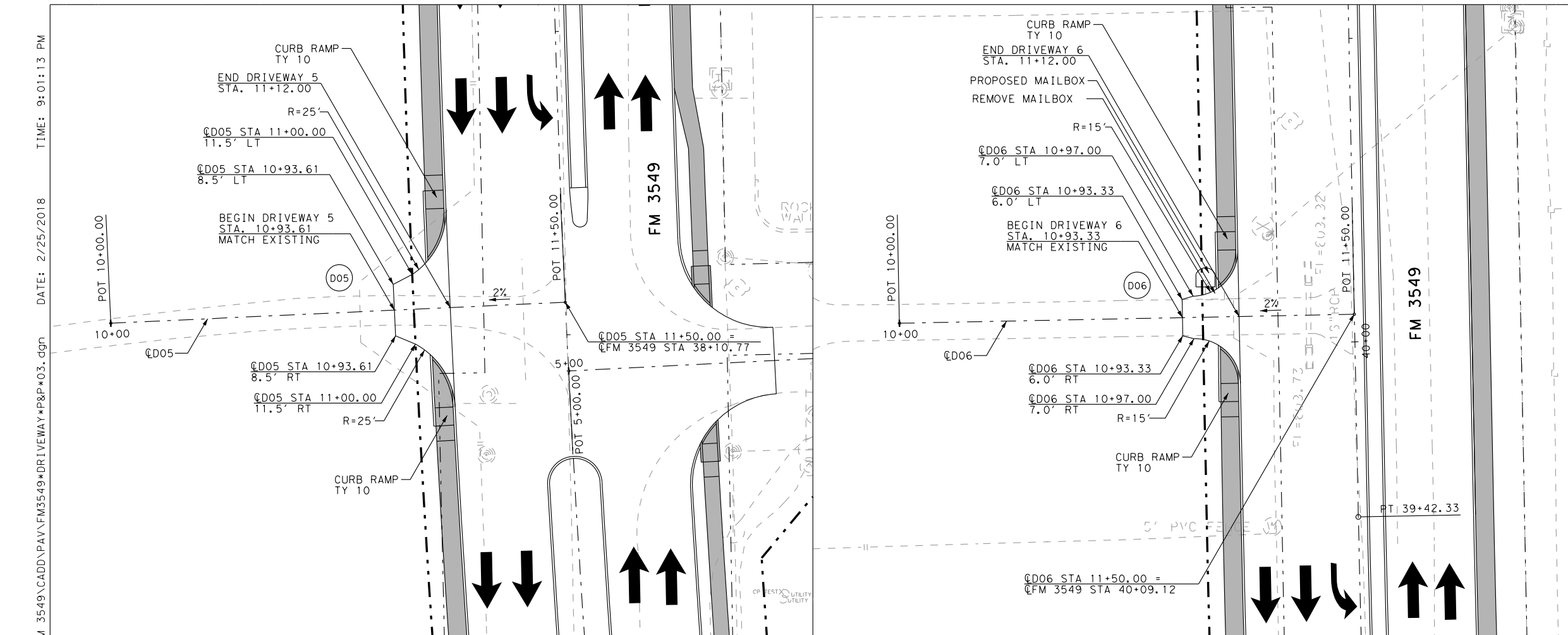
ATKINS
TBPE REG. # F-474



DRIVEWAY
PLAN & PROFILE
DRIVEWAYS 5&6

SHEET 3 OF 22

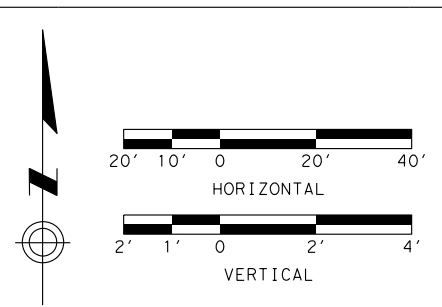
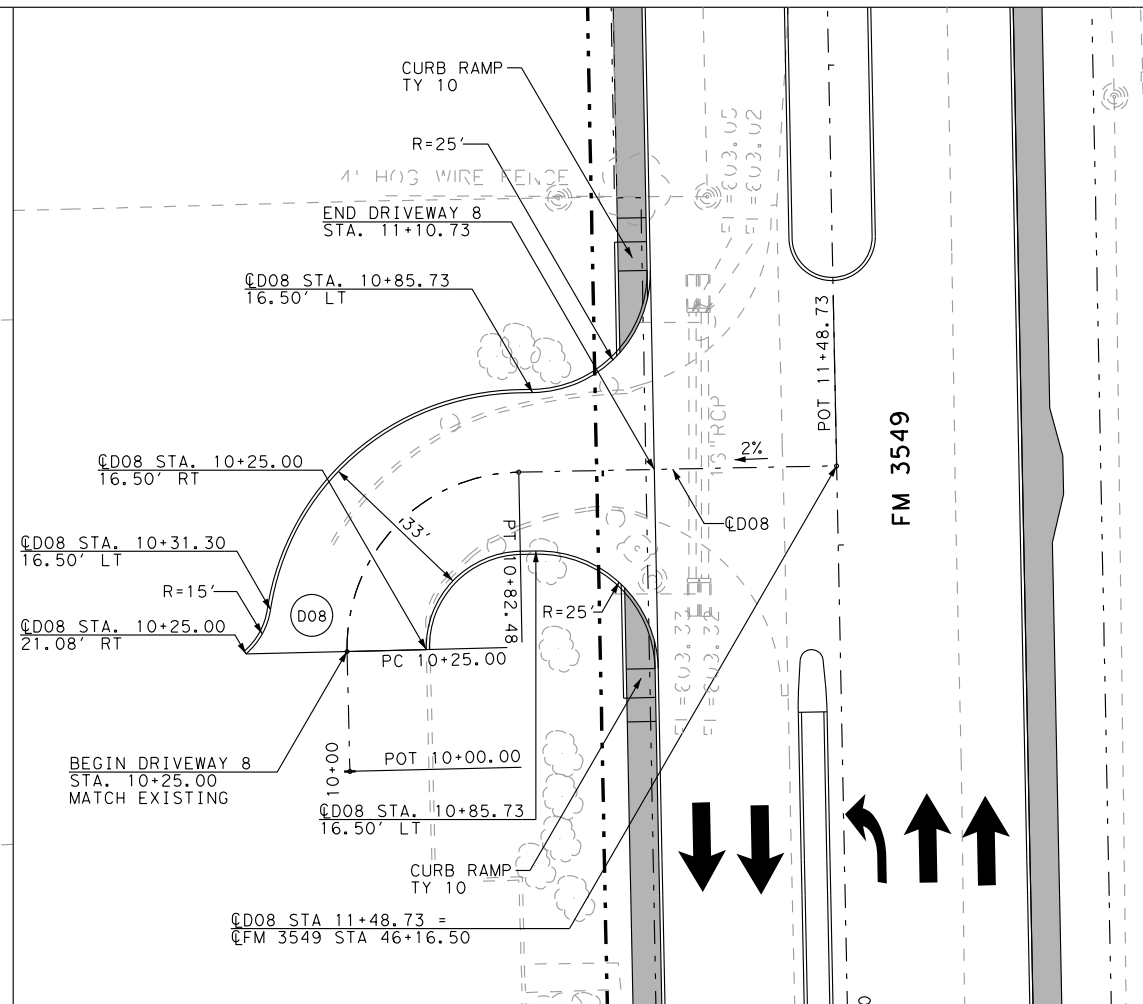
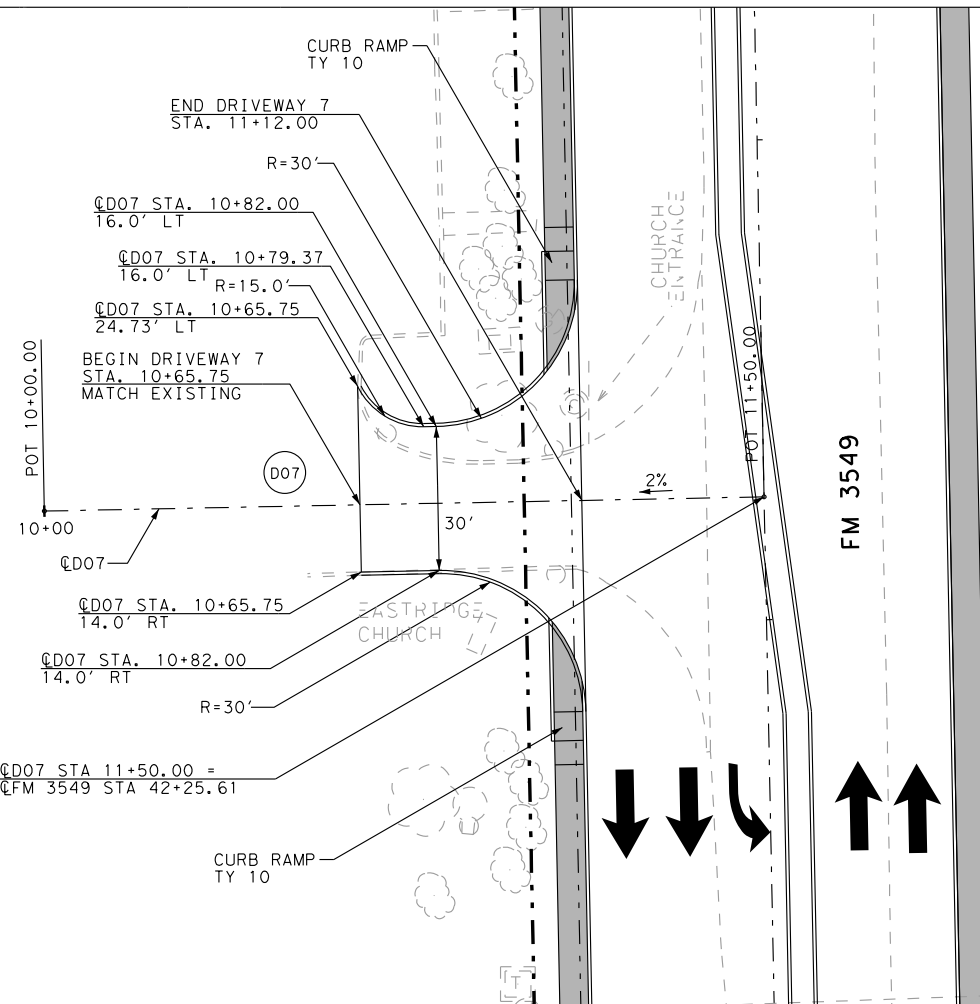
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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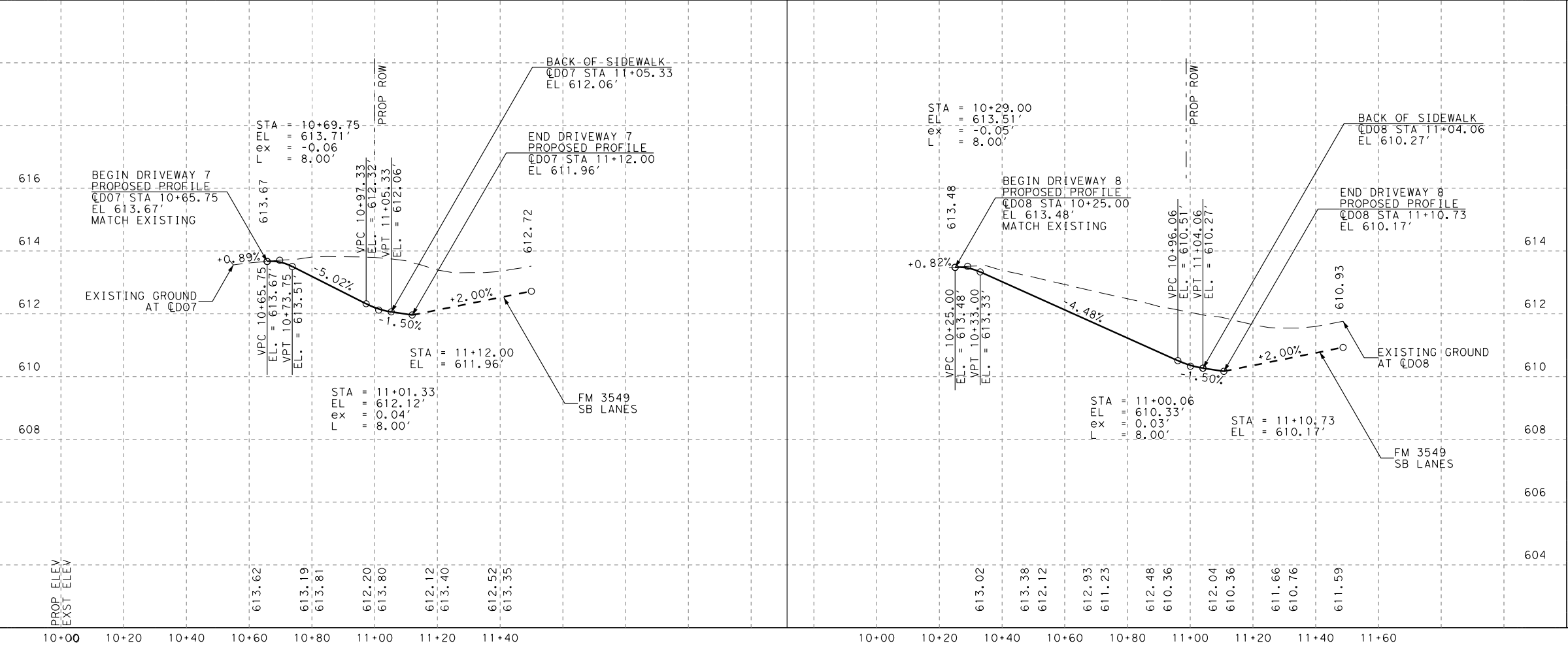
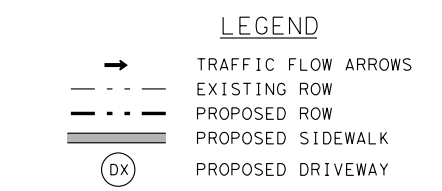
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 TIME: 9:01:25 PM



- GENERAL NOTES:**
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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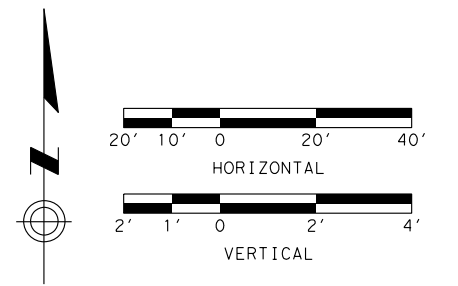
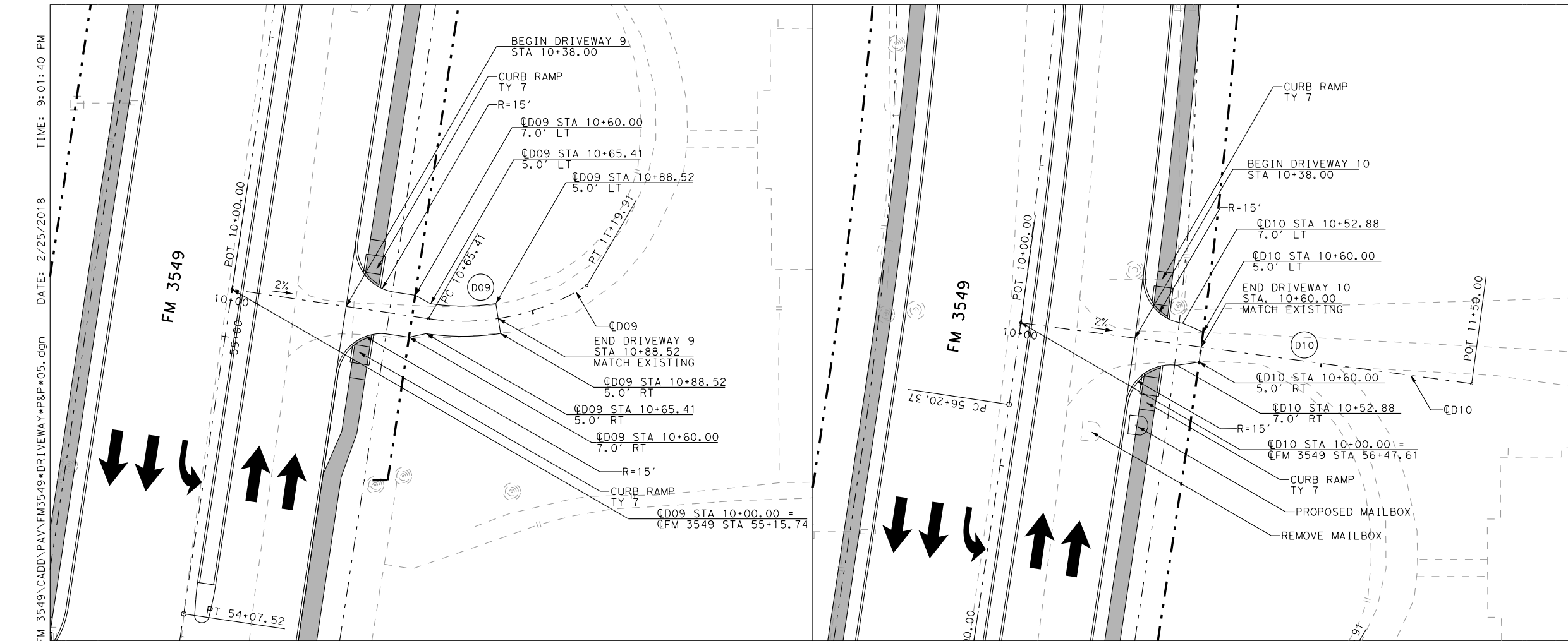
ATKINS
TBPE REG. # F-474



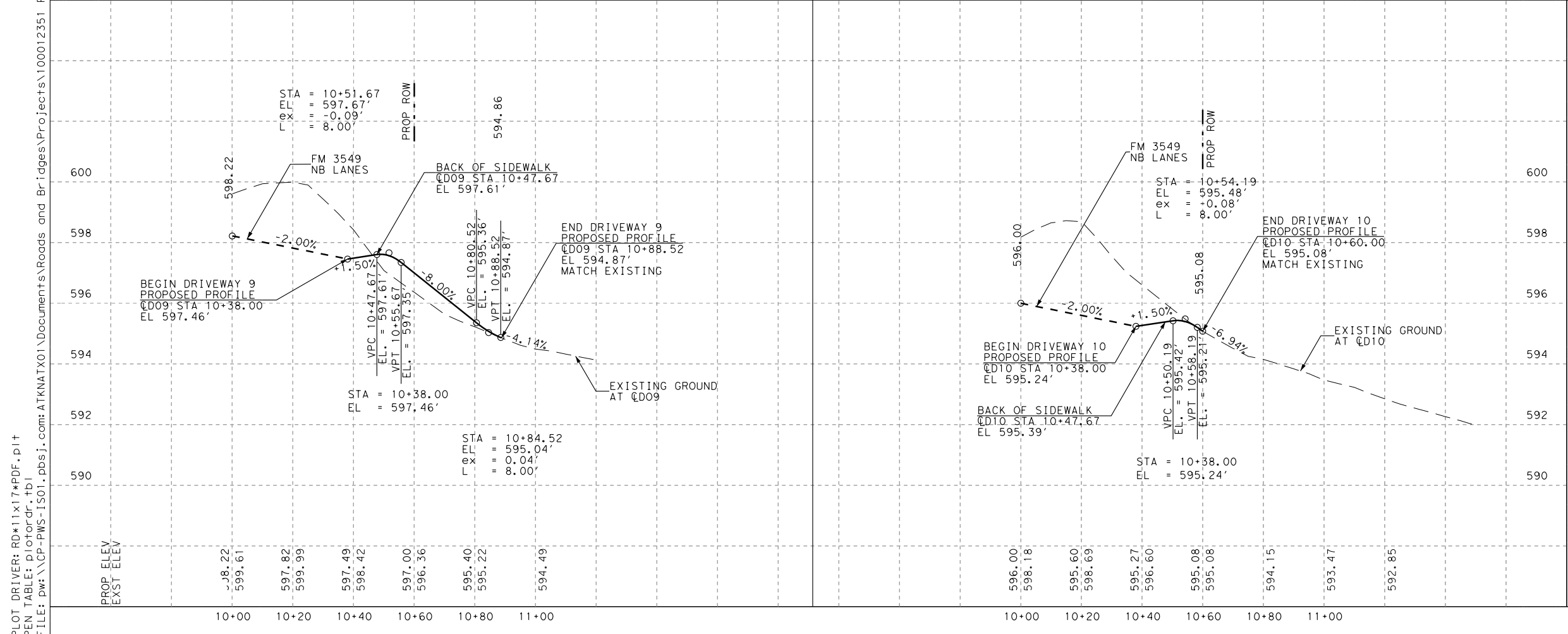
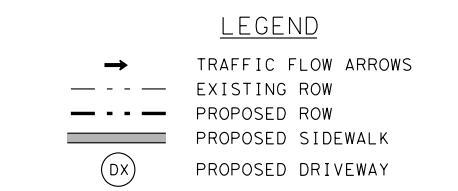
**DRIVEWAY
PLAN & PROFILE**
DRIVEWAYS 7&8

SHEET 4 OF 22

| | | | | |
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 144 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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TBPE REG. # F-474

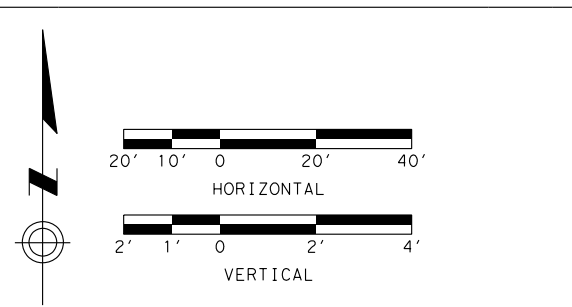
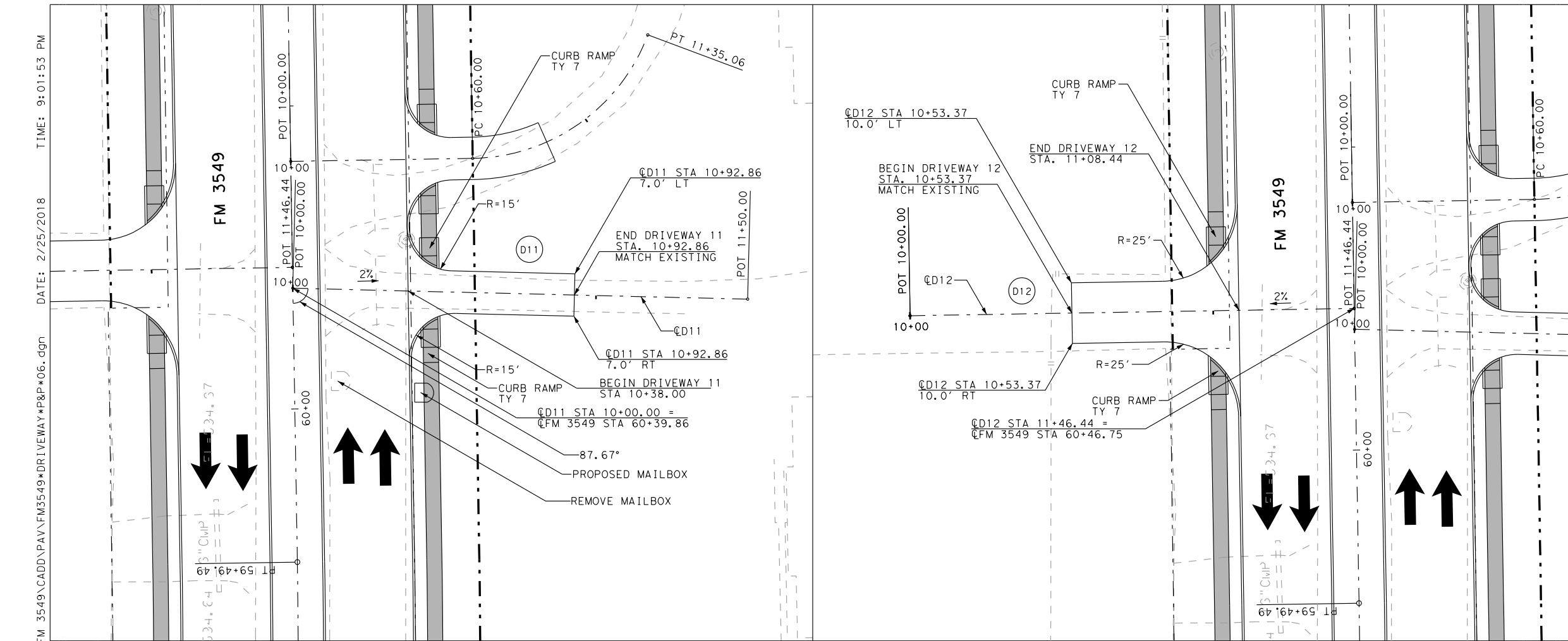


DRIVEWAY
PLAN & PROFILE
DRIVEWAYS 9&10

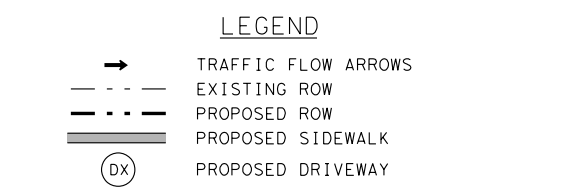
SHEET 5 OF 22

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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 145 |
| CHECK | CONTROL | SECTION | JOB | 145 |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
- ALL DIMENSIONS ARE TO FACE OF CURB.
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 - REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
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 - FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



| NO. | DATE | REVISION | BY |
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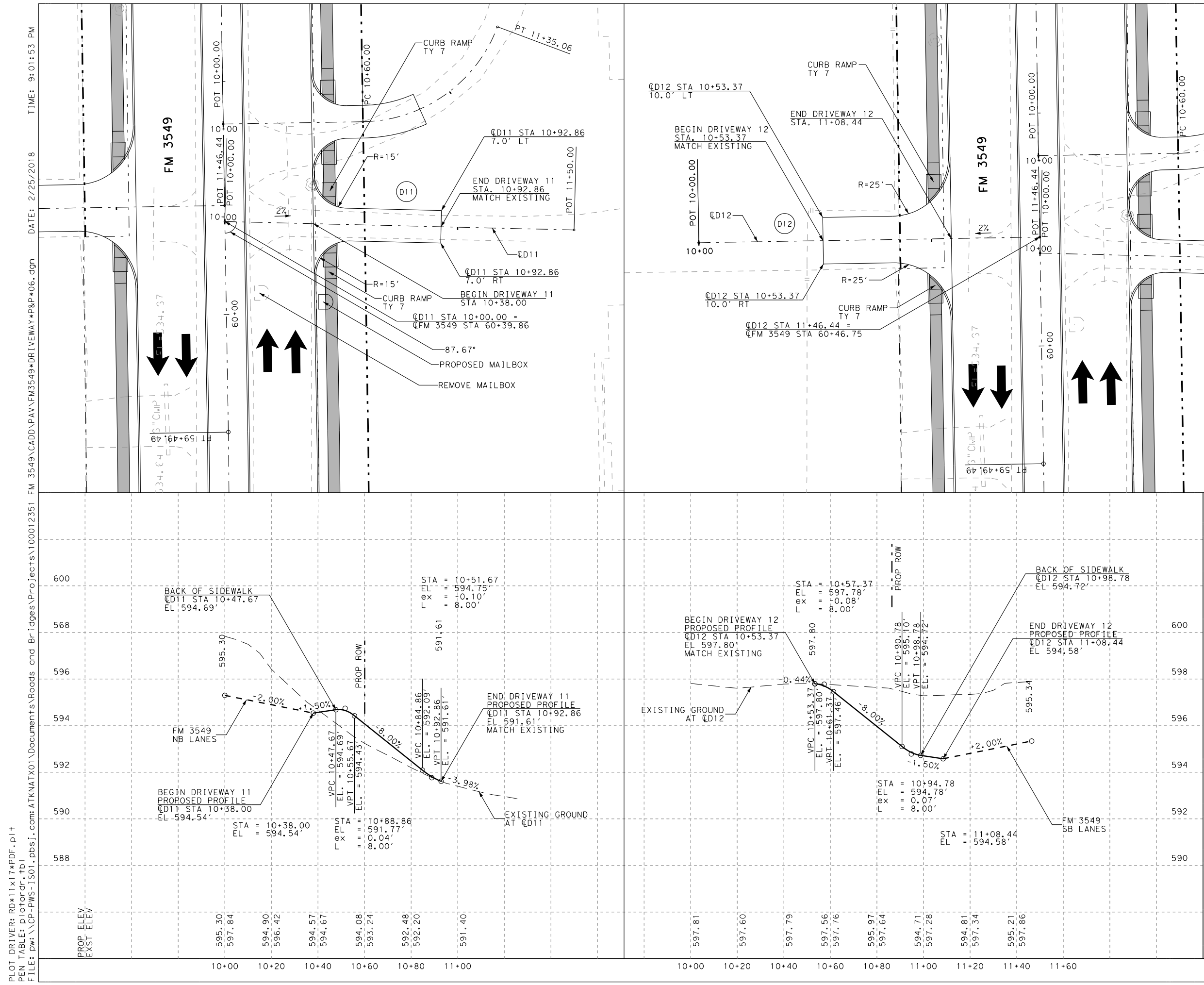
ATKINS
TBPE REG. # F-474



DRIVEWAY
PLAN & PROFILE
DRIVEWAYS 11&12

SHEET 6 OF 22

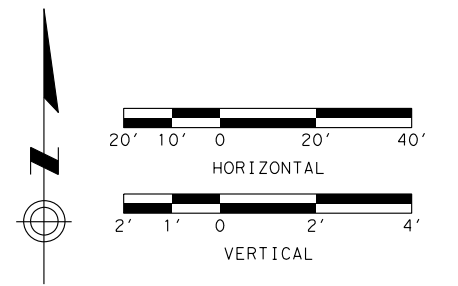
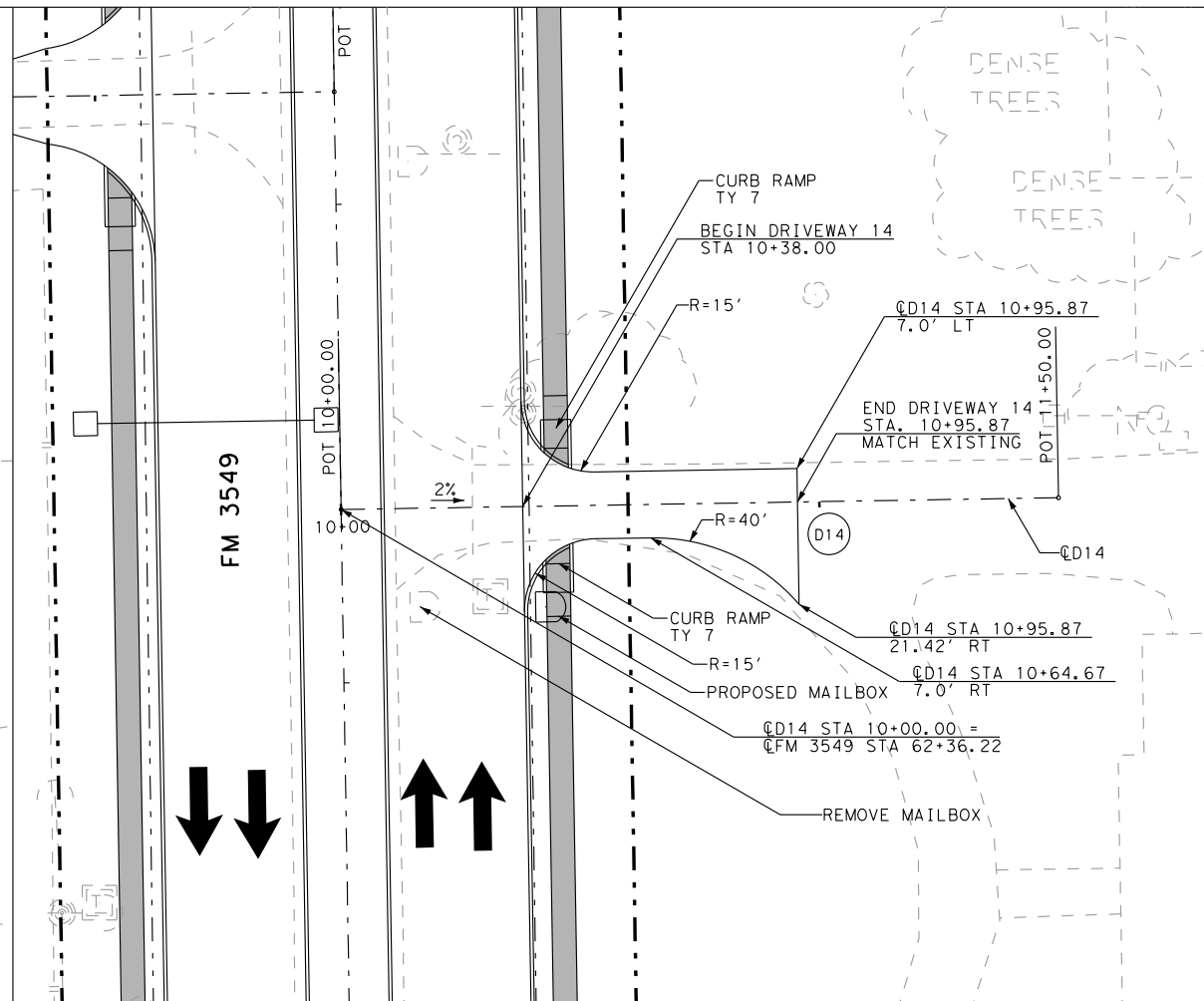
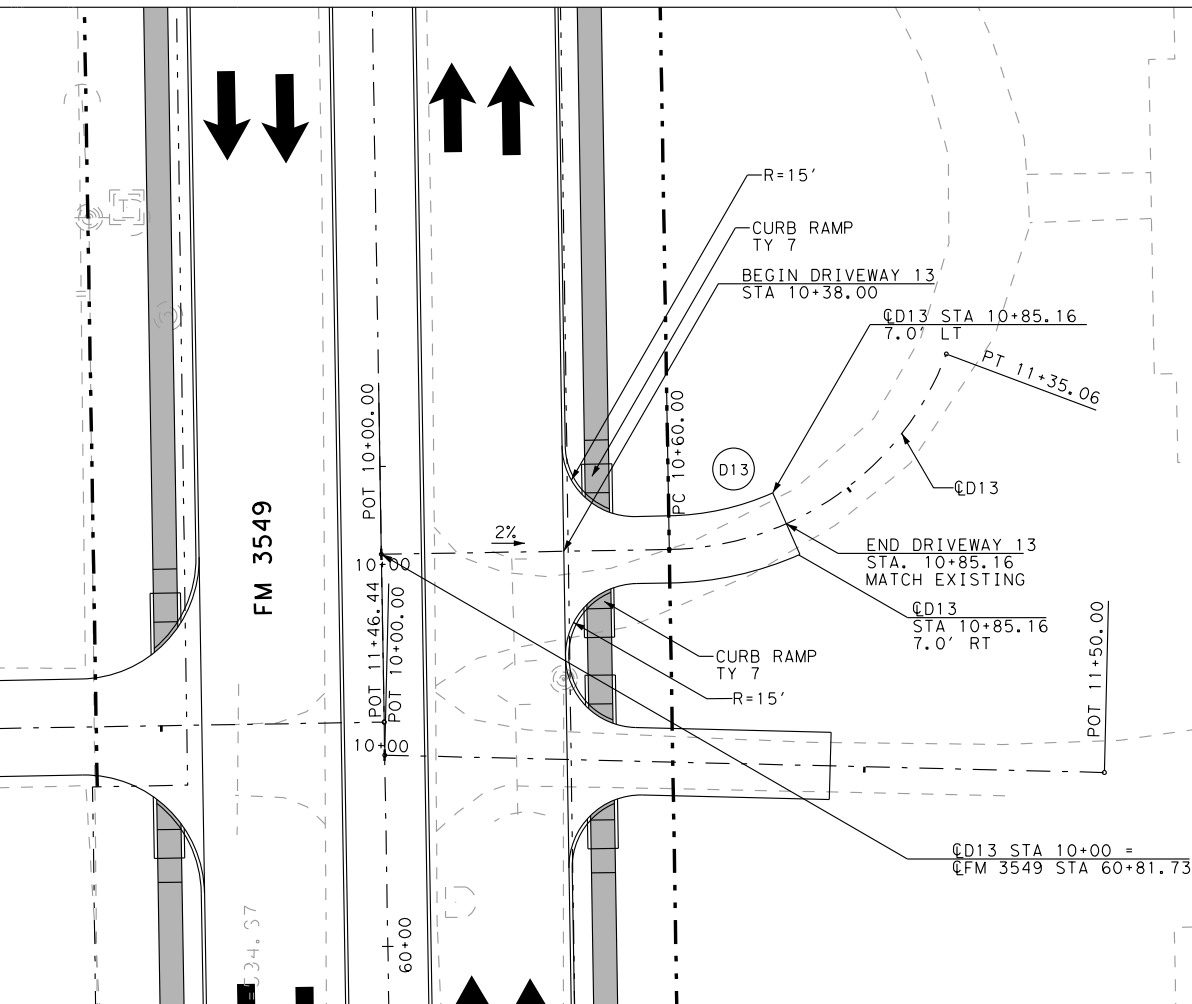
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
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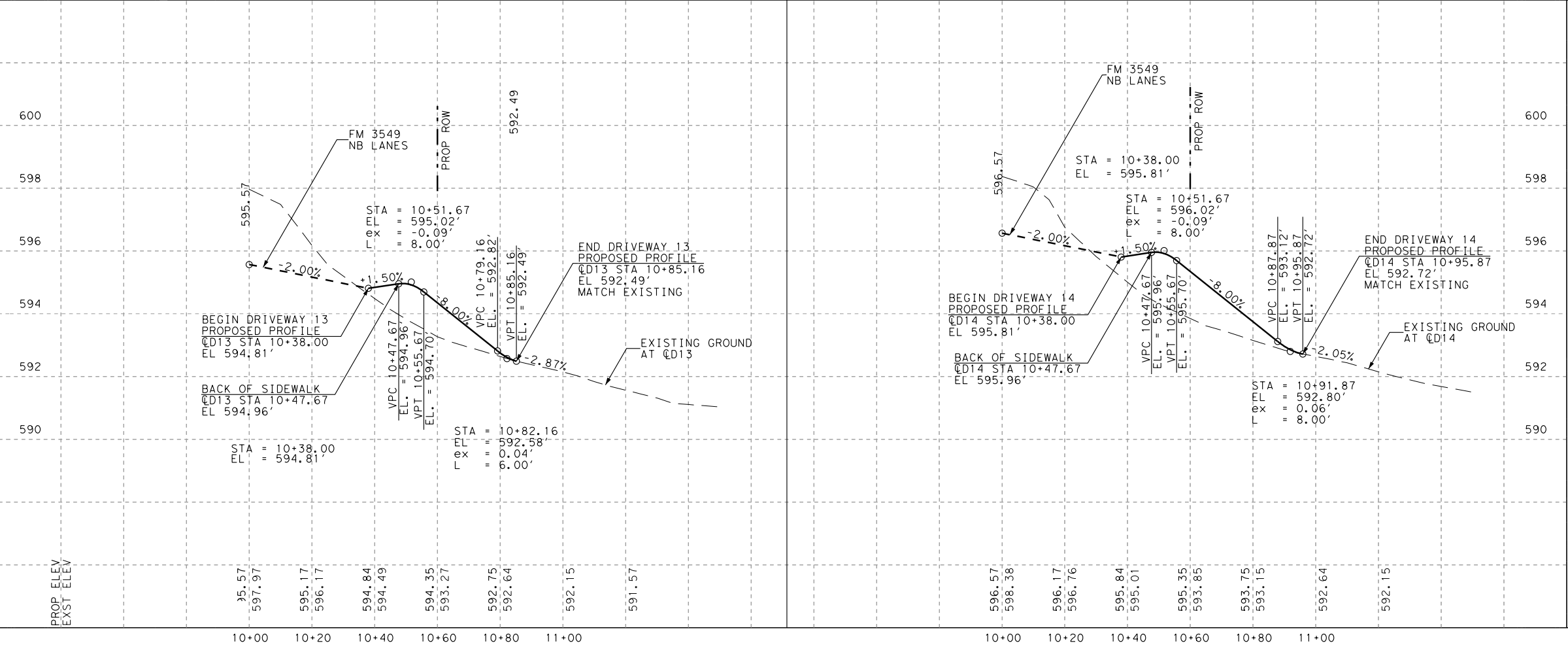
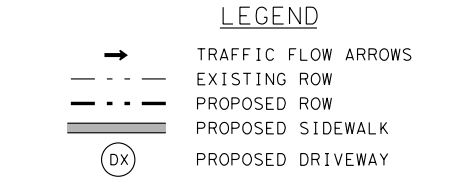
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DATE: 2/25/2018 TIME: 9:01:53 PM

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- GENERAL NOTES:
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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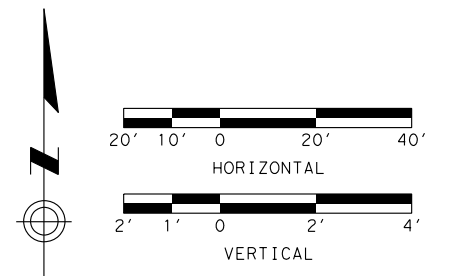
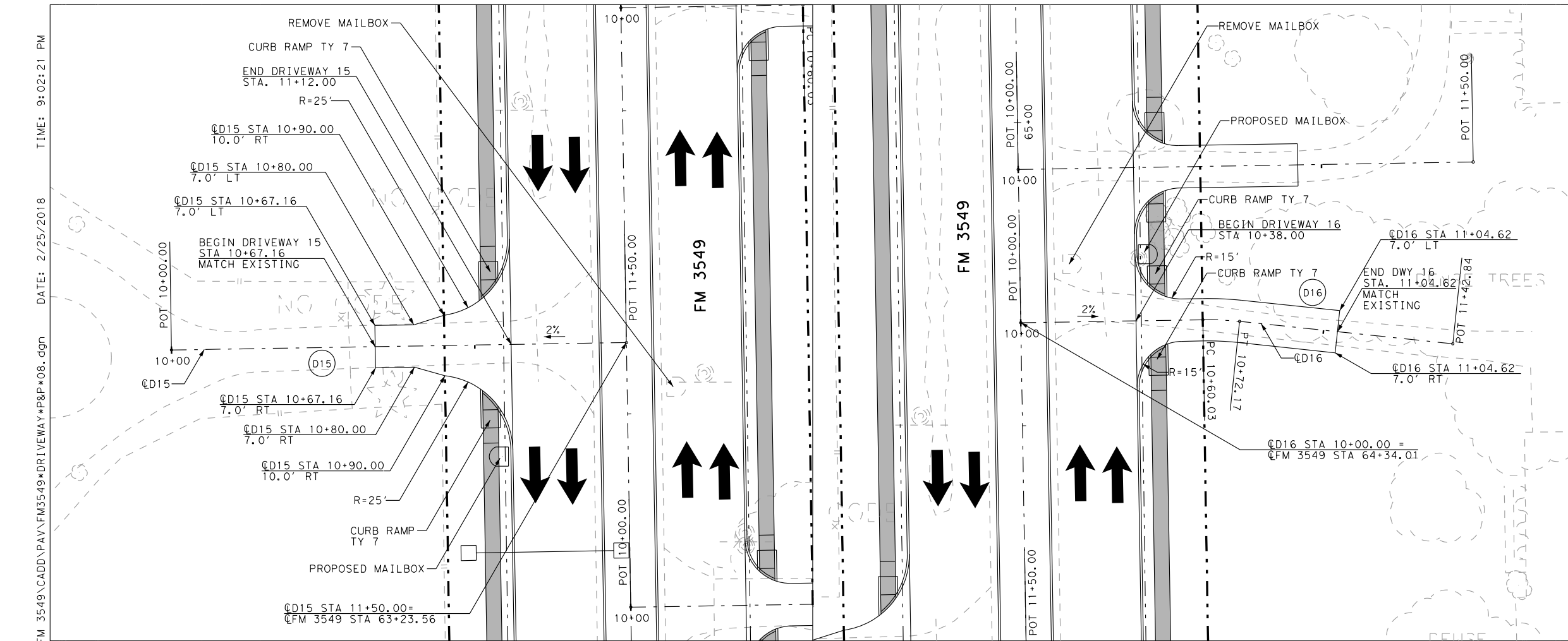
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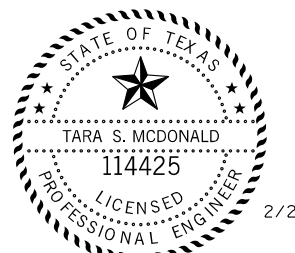
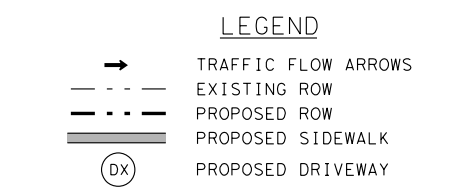
DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 13&14

SHEET 7 OF 22

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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 147 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
TBPE REG. # F-474

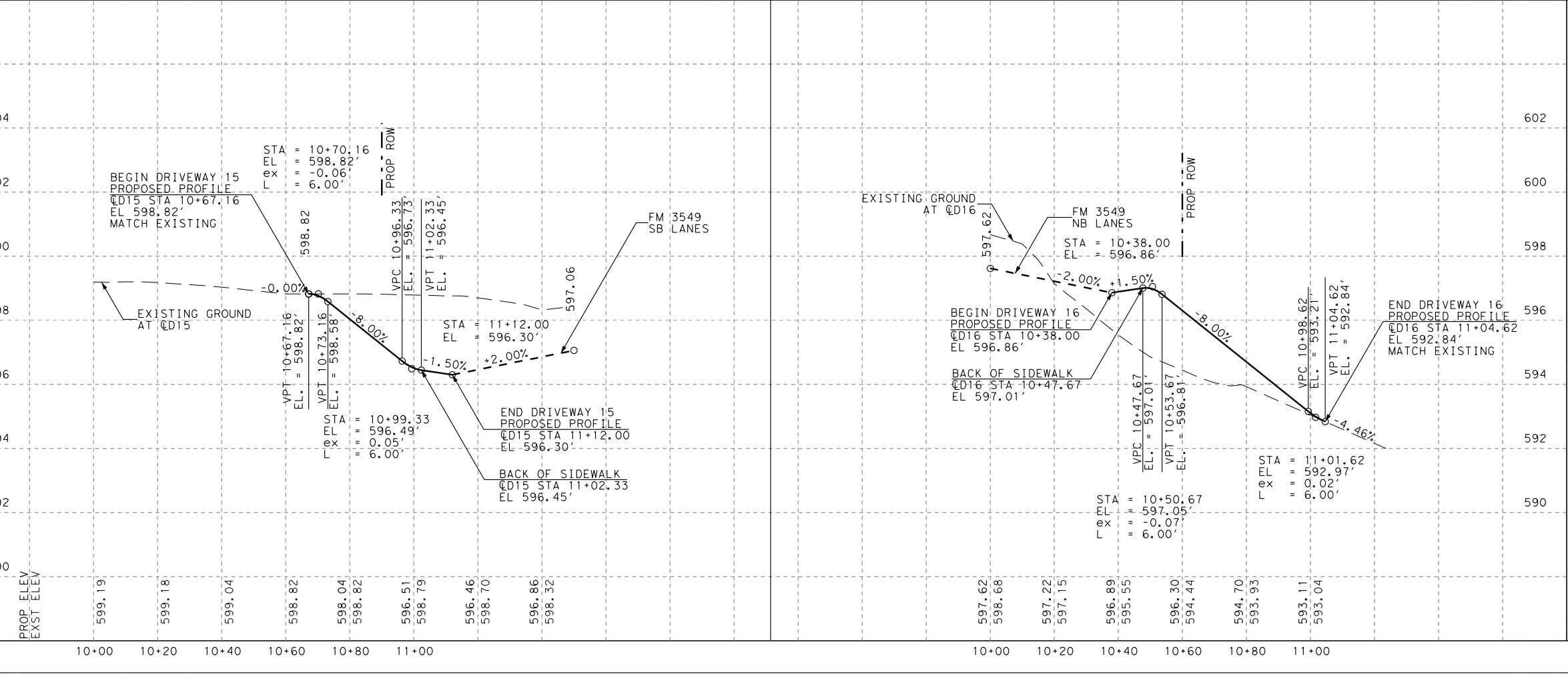


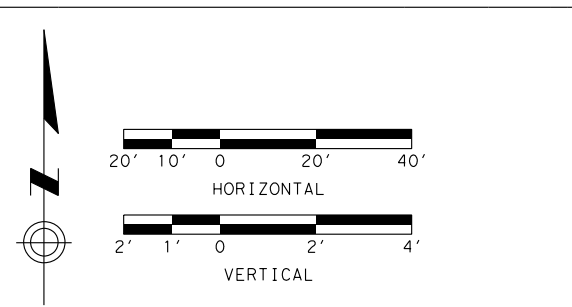
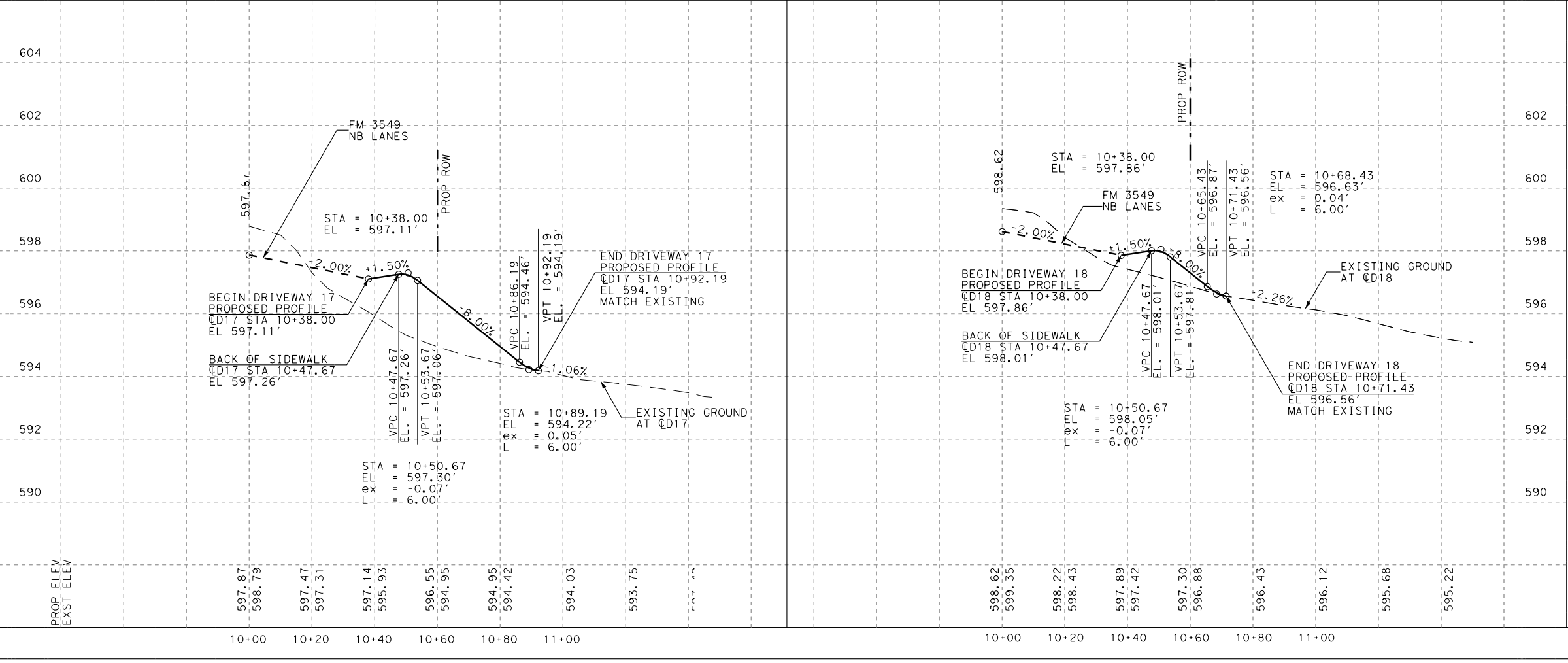
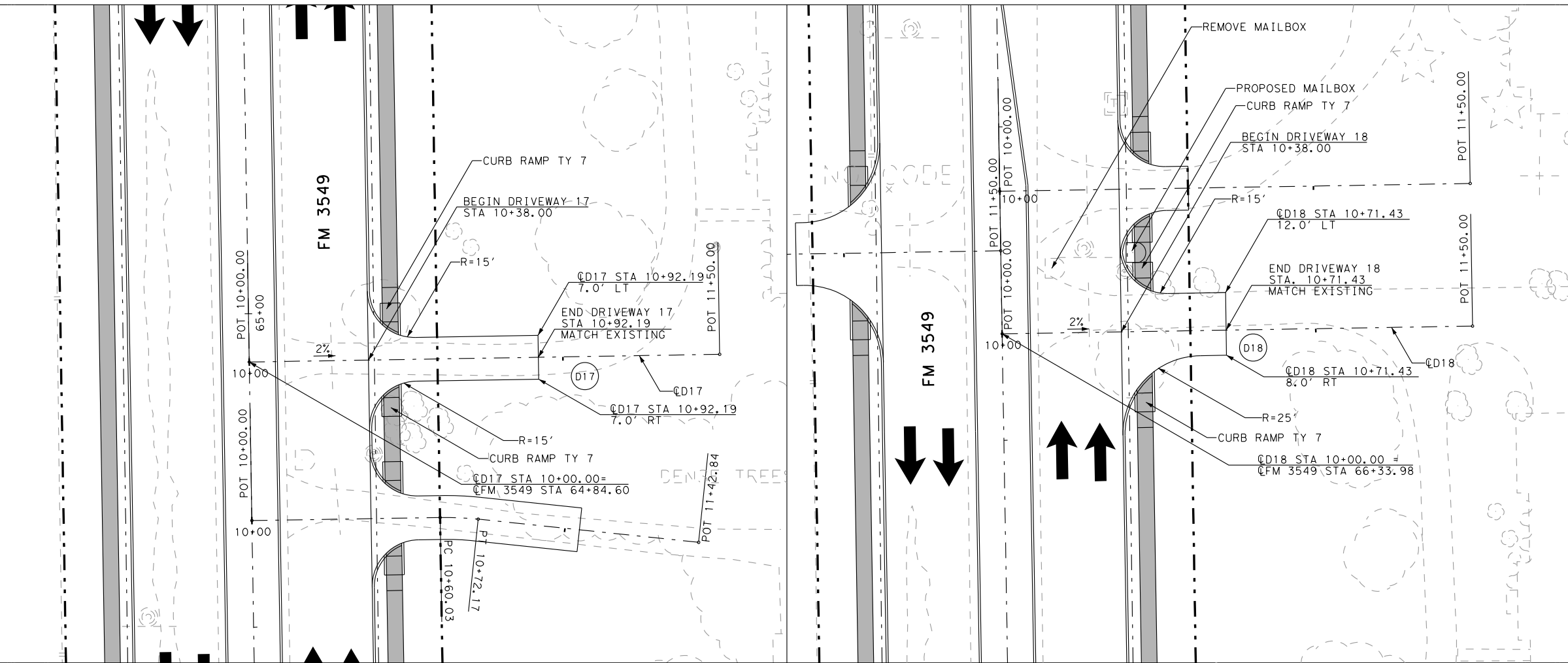
DRIVEWAY
PLAN & PROFILE
DRIVEWAYS 15&16

SHEET 8 OF 22

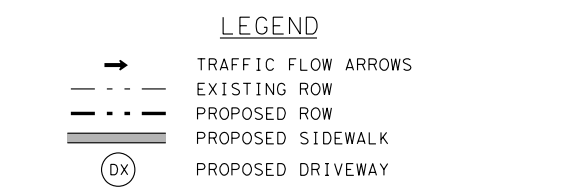
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 148 |
| CHECK | CONTROL | SECTION | JOB | 148 |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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| | | | |

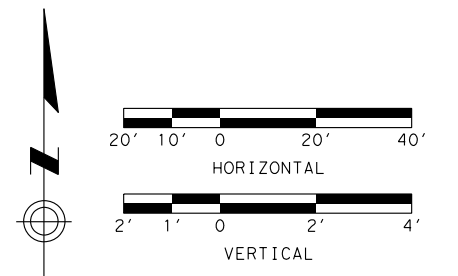
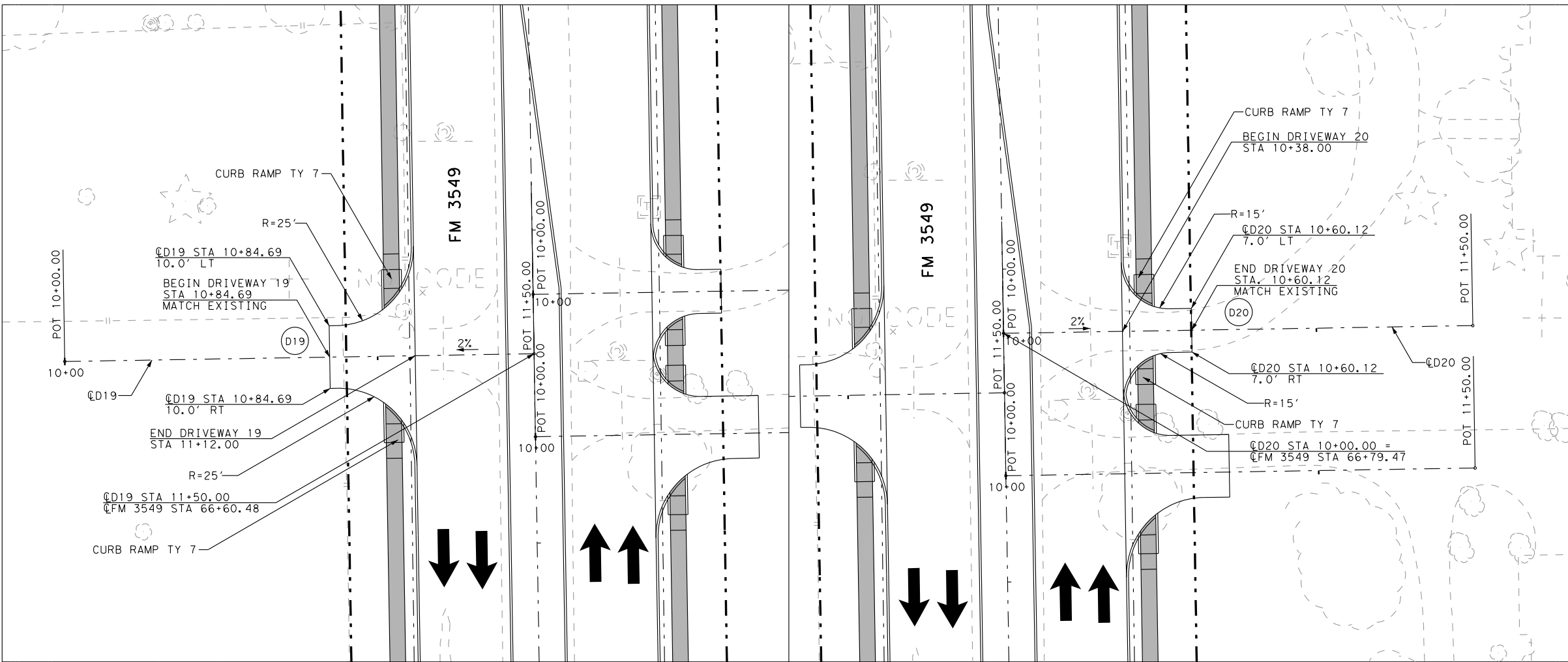
ATKINS
 TBPE REG. # F-474



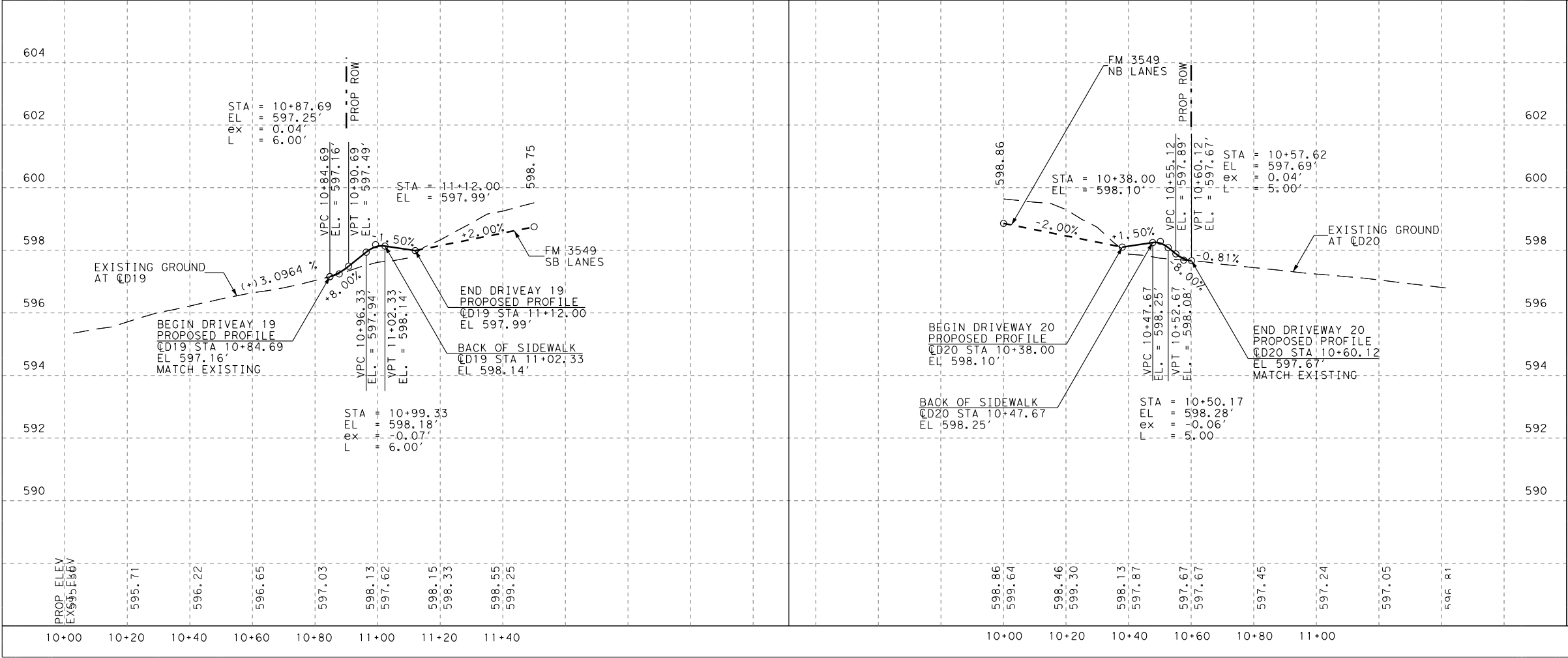
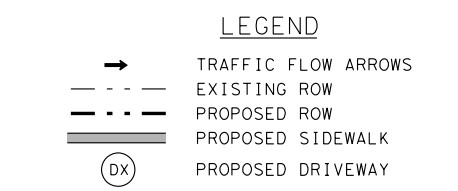
DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 17&18

SHEET 9 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 149 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
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 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



| NO. | DATE | REVISION | BY |
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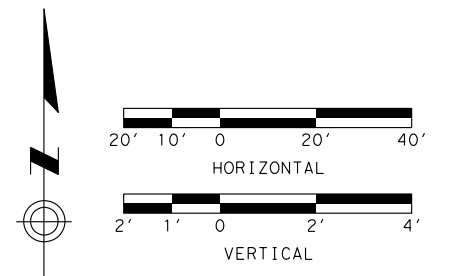
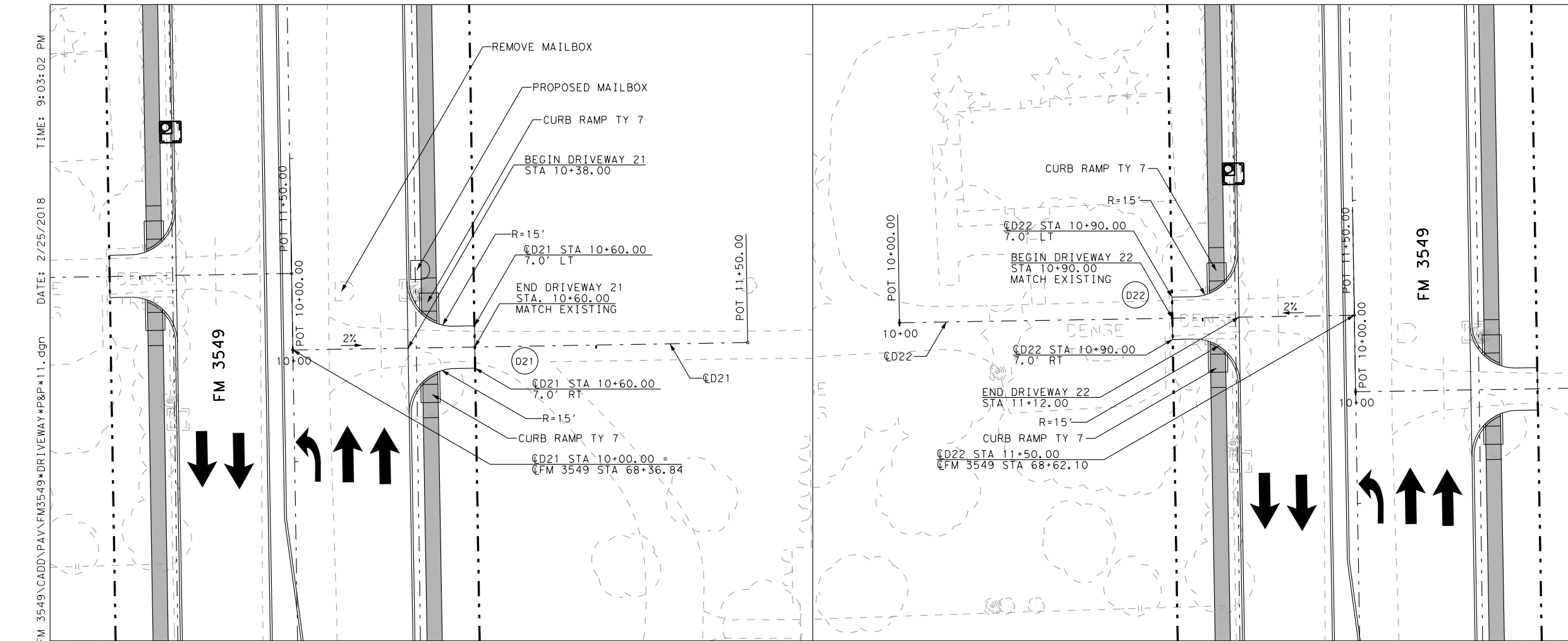
ATKINS
 TBPE REG. # F-474



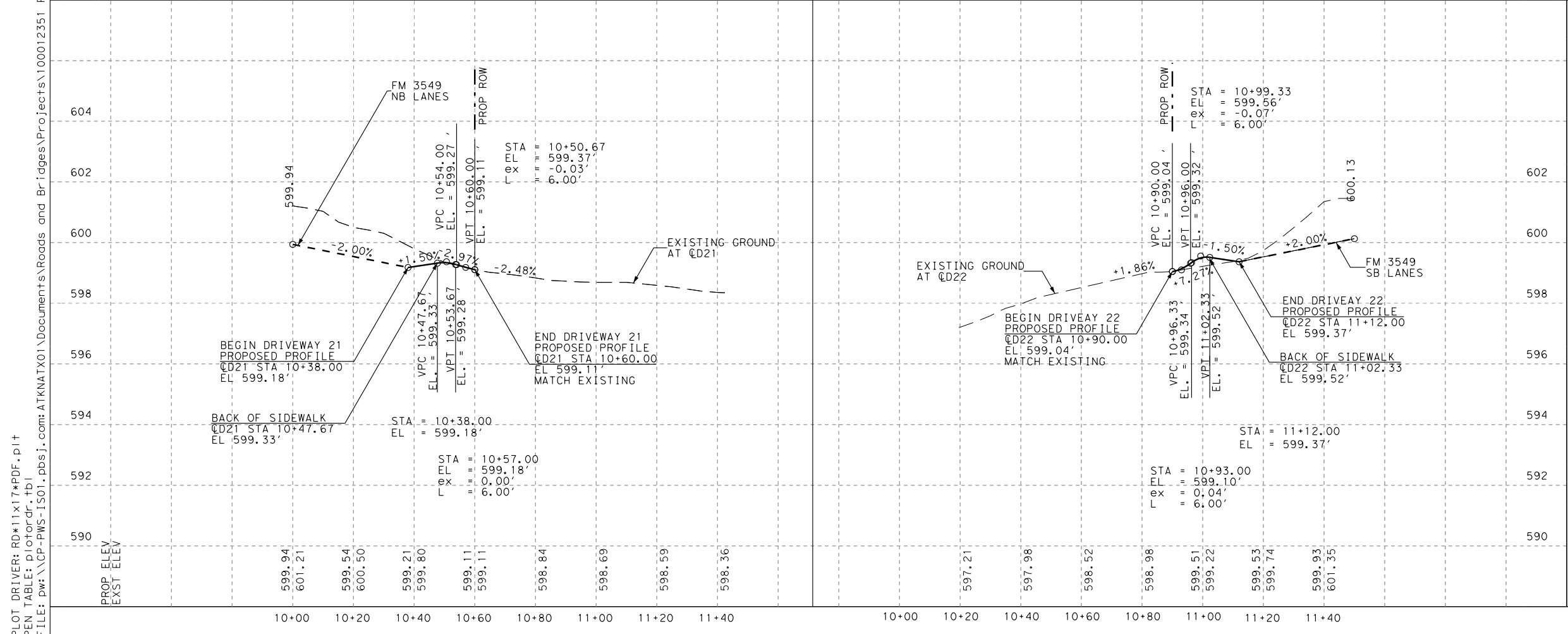
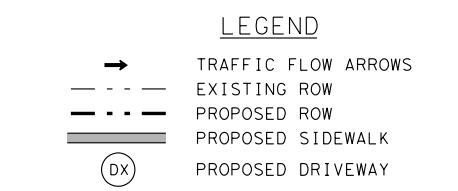
DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 19&20

SHEET 10 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 150 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



- GENERAL NOTES:
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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TBPE REG. # F-474



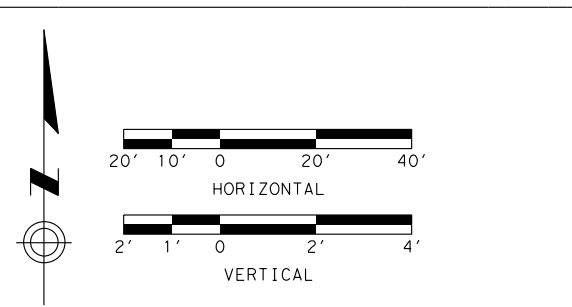
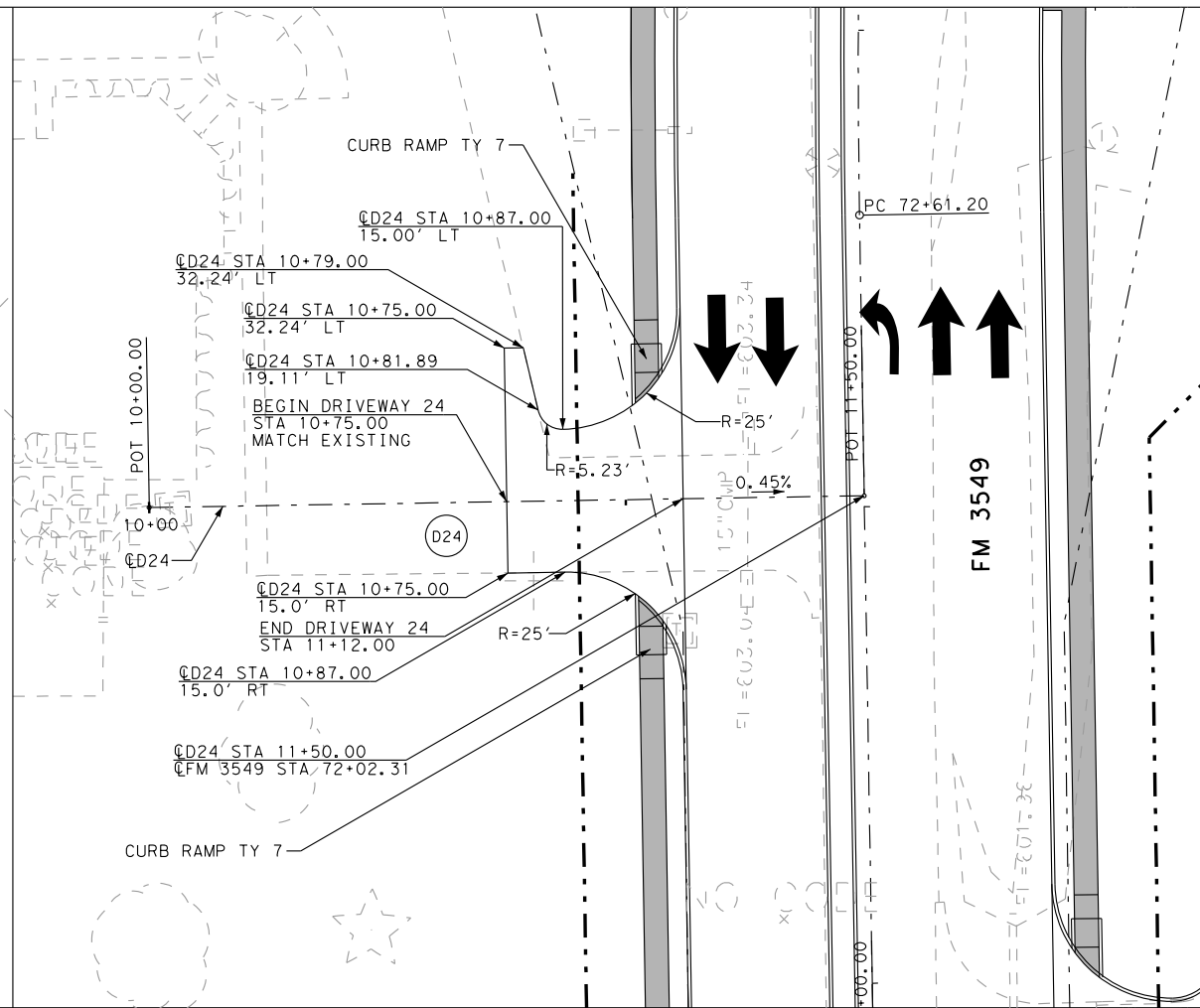
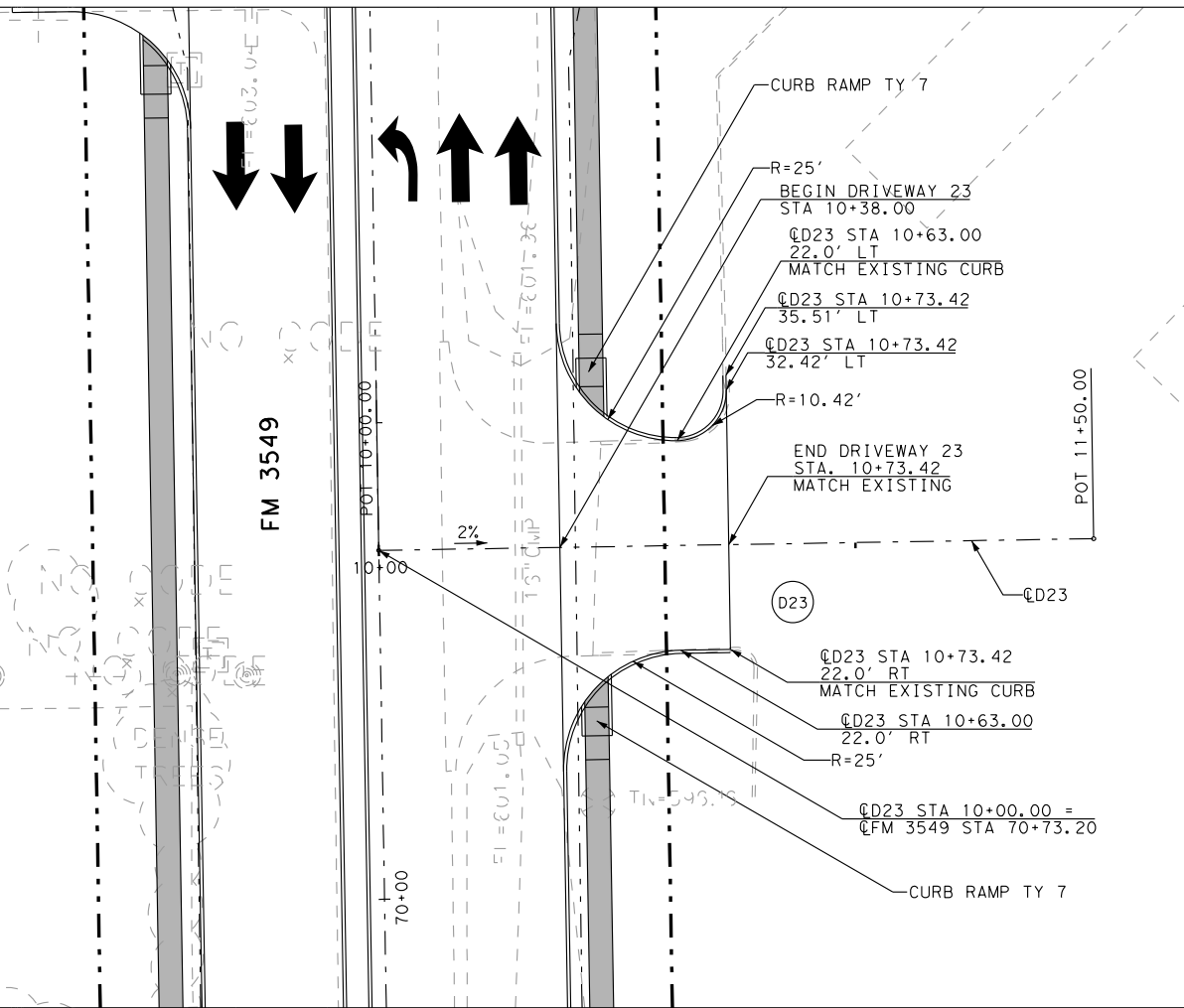
DRIVEWAY
PLAN & PROFILE
DRIVEWAYS 21&22

SHEET 11 OF 22

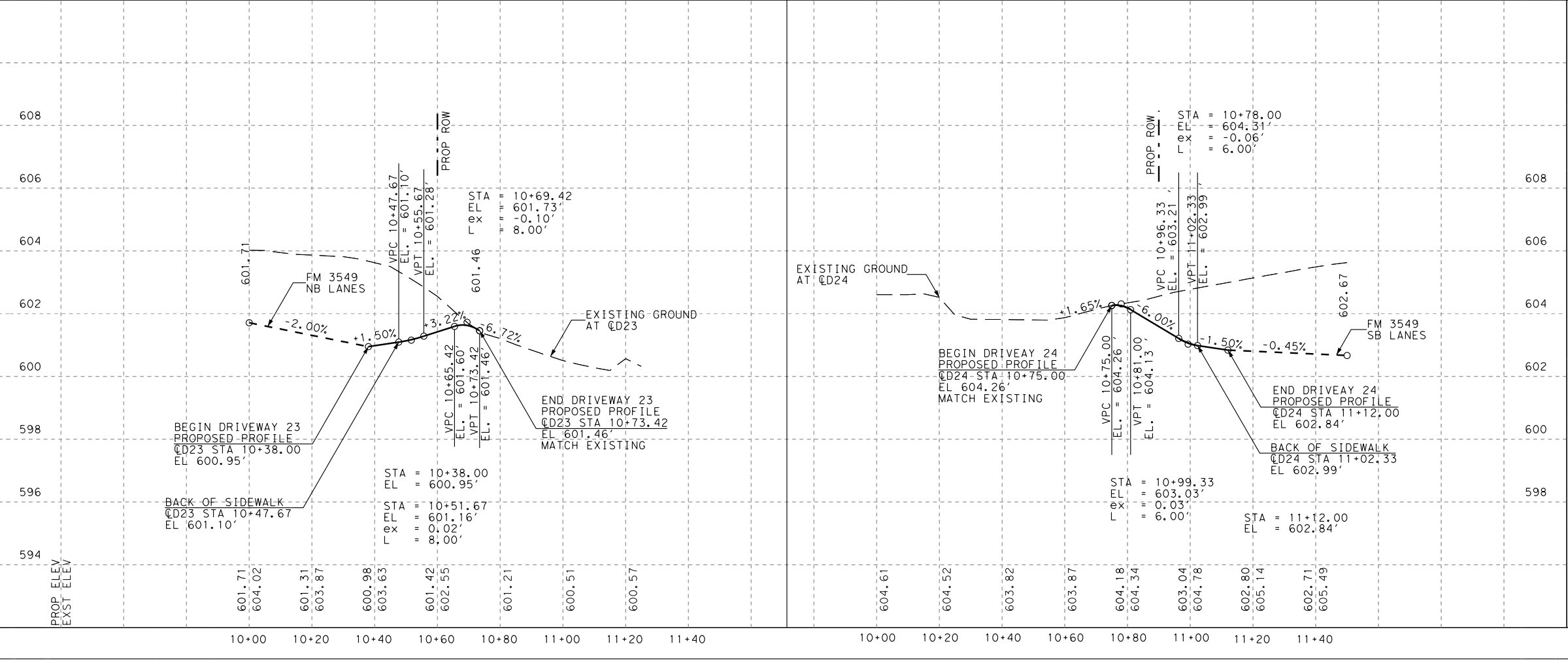
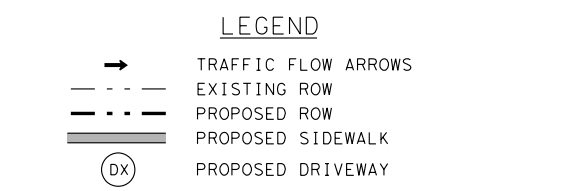
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 151 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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 TBPE REG. # F-474

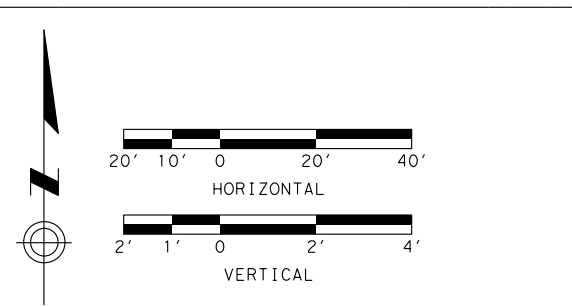
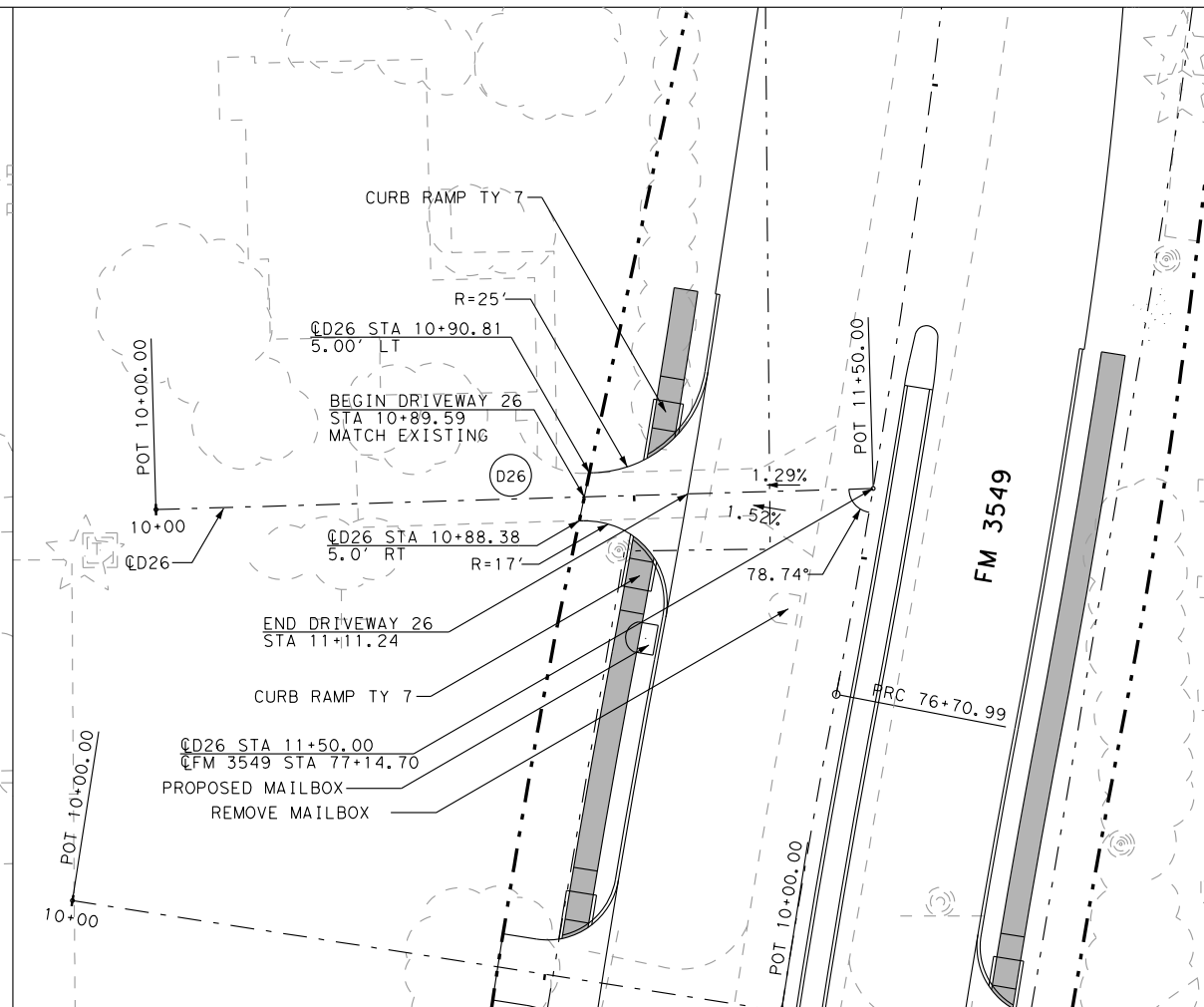
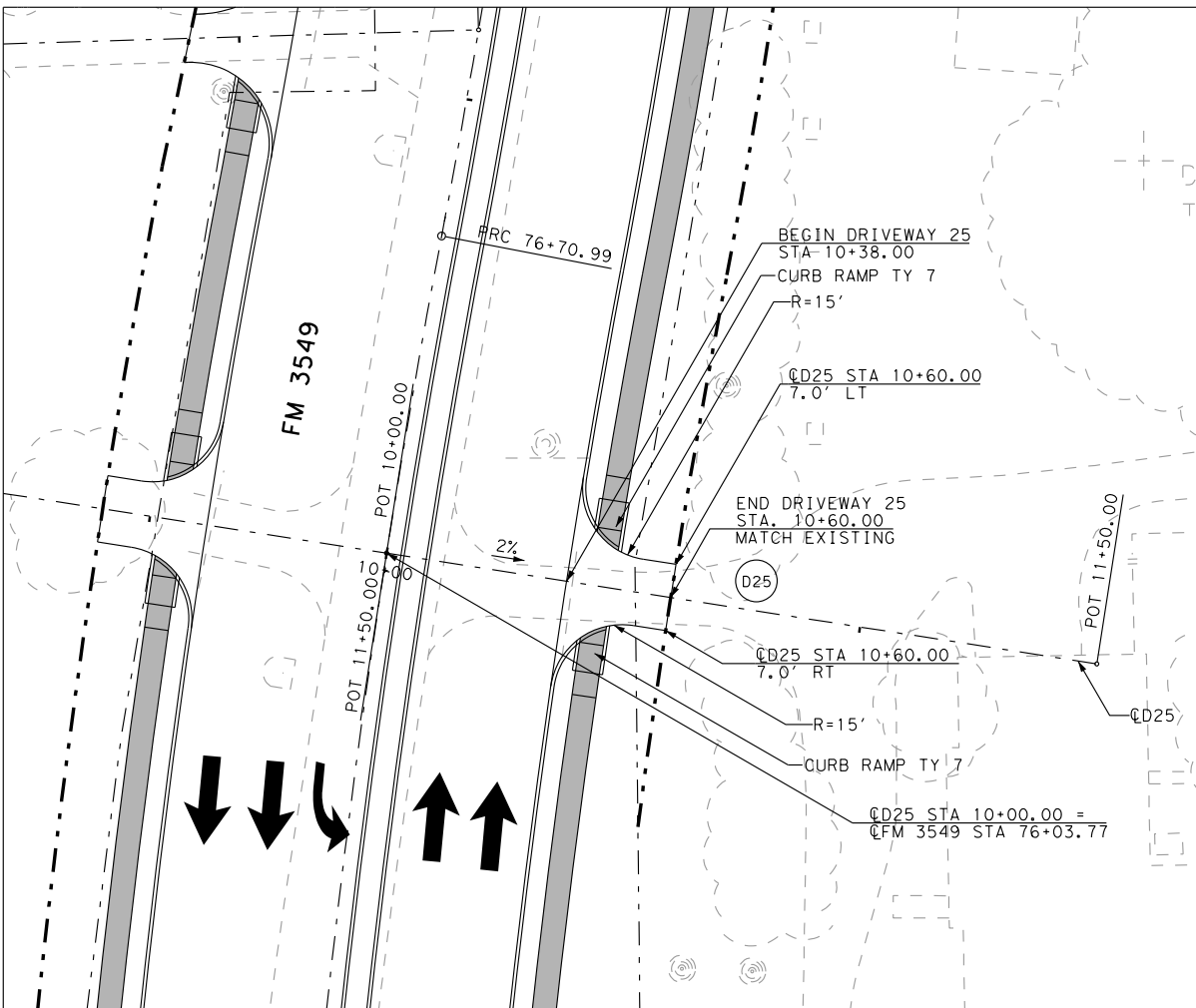


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 23&24

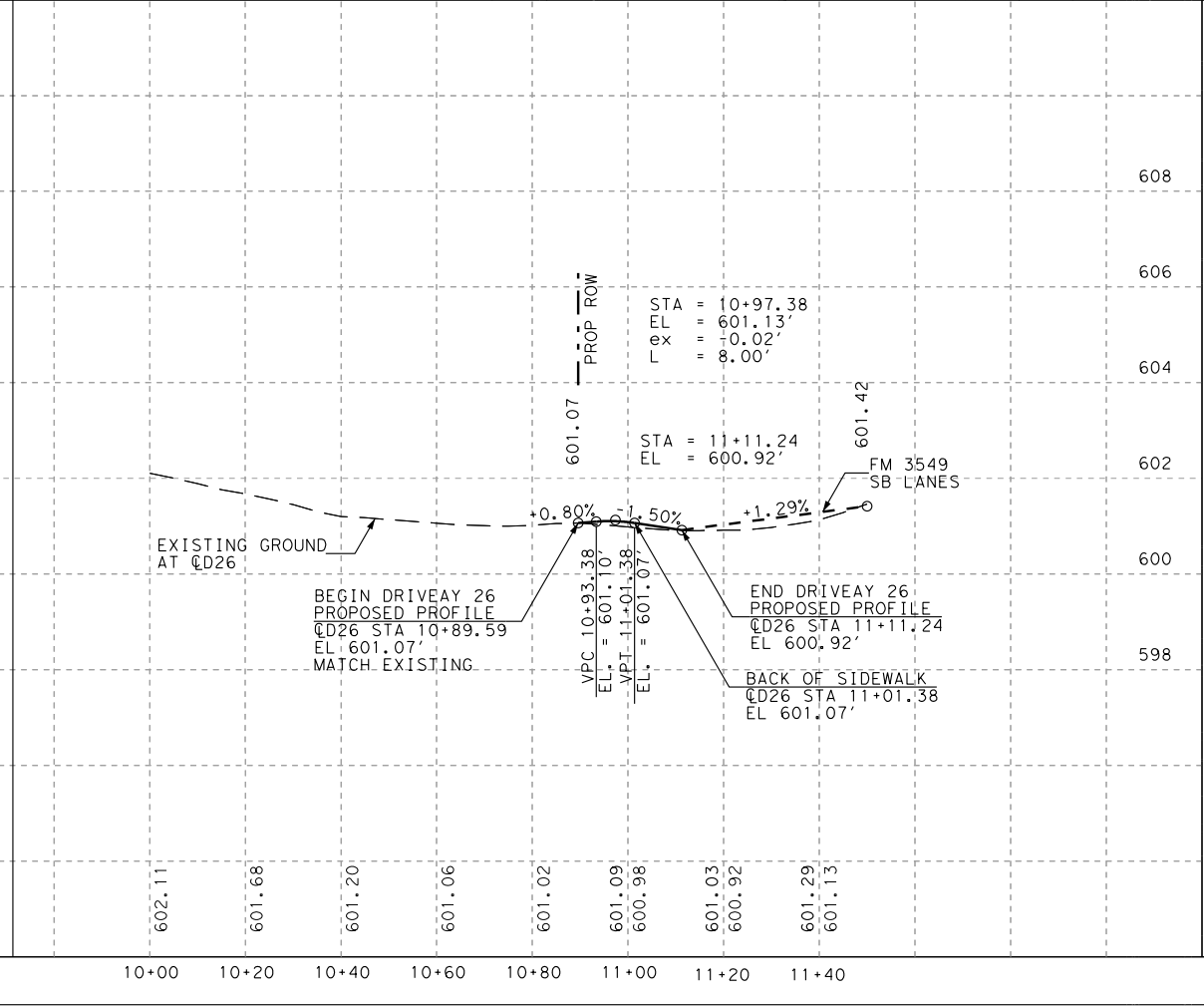
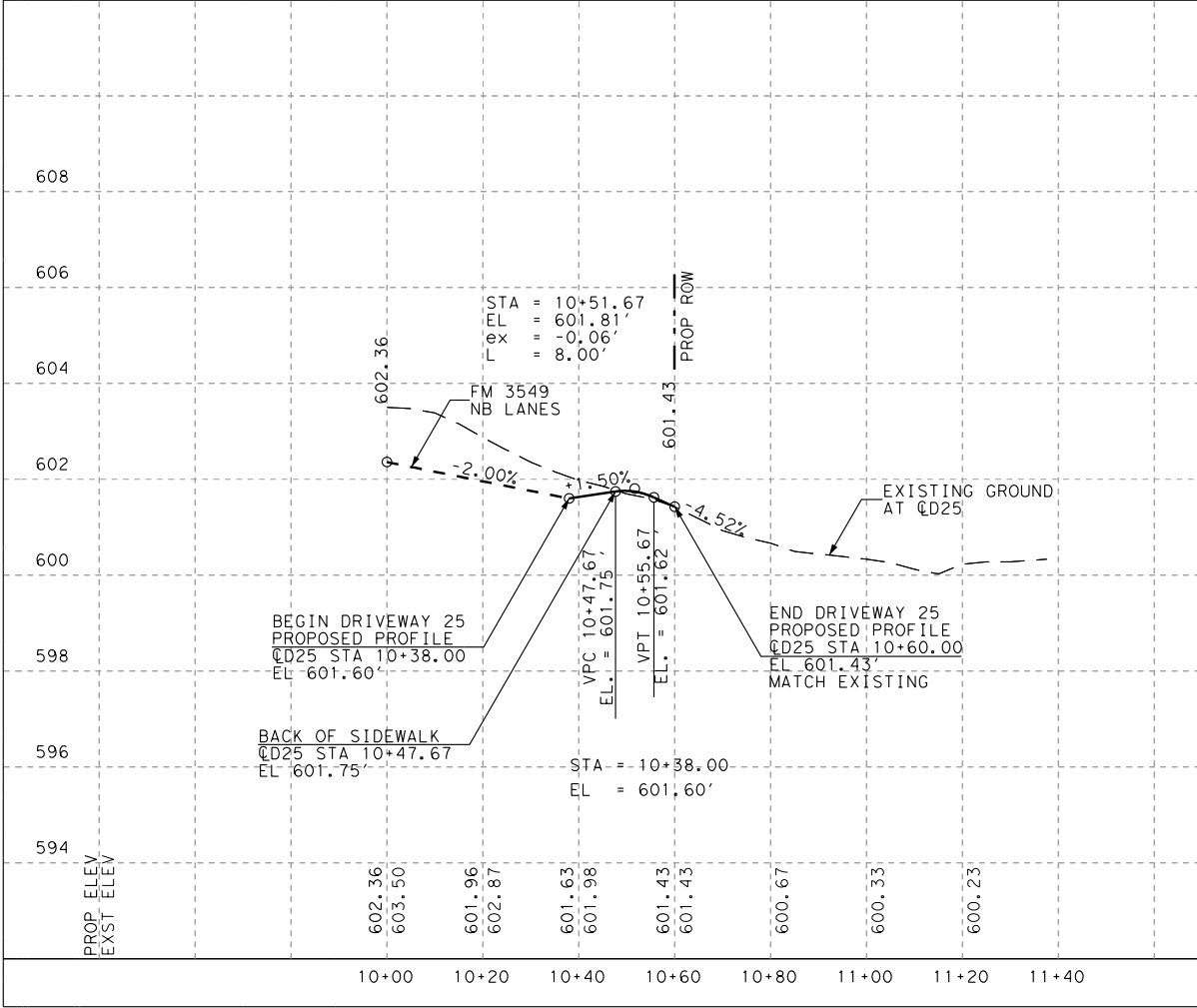
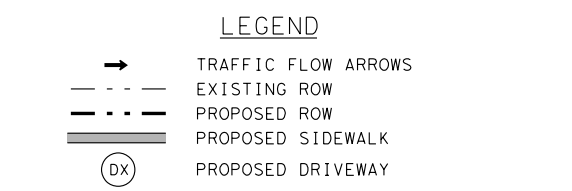
SHEET 12 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 152 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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 TBPE REG. # F-474

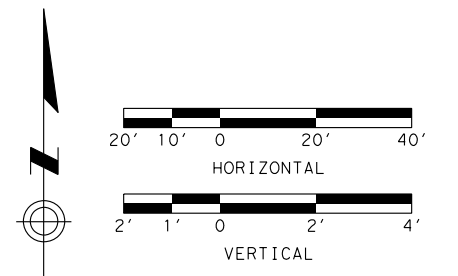
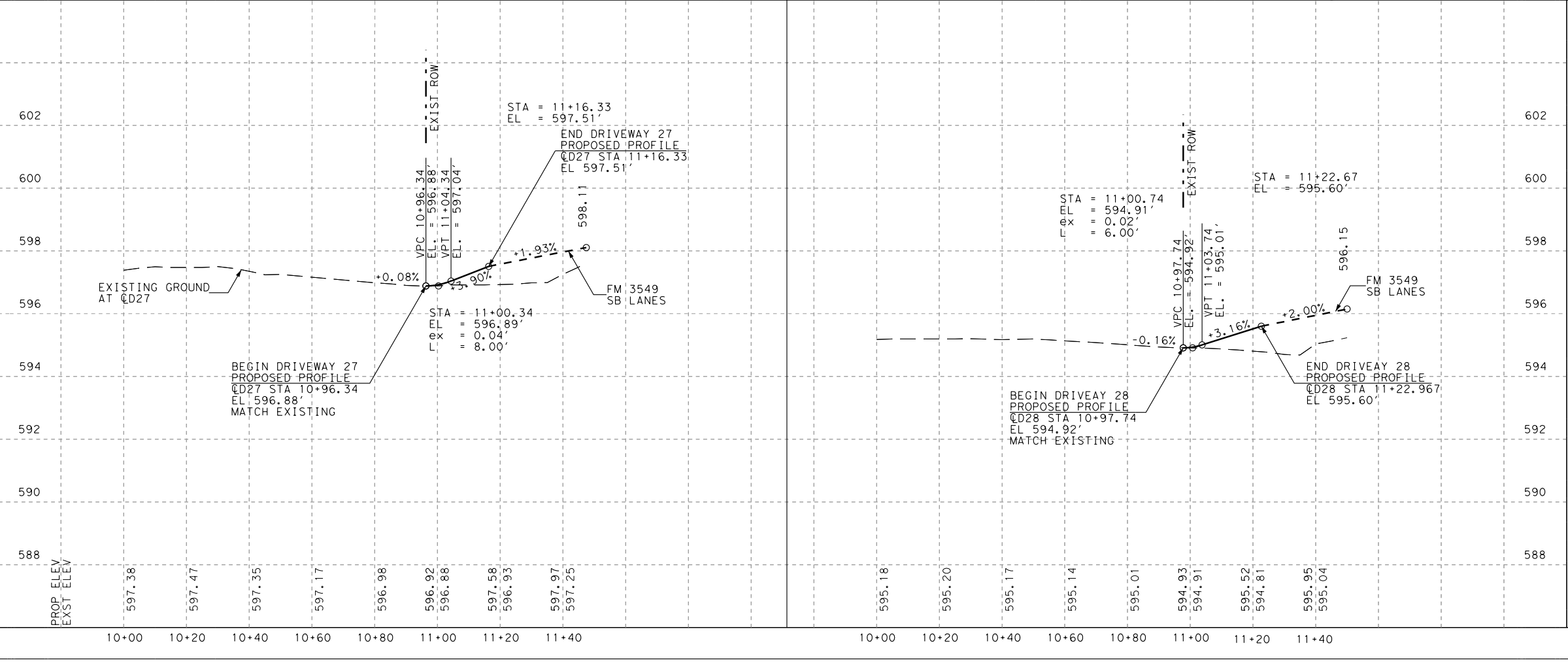
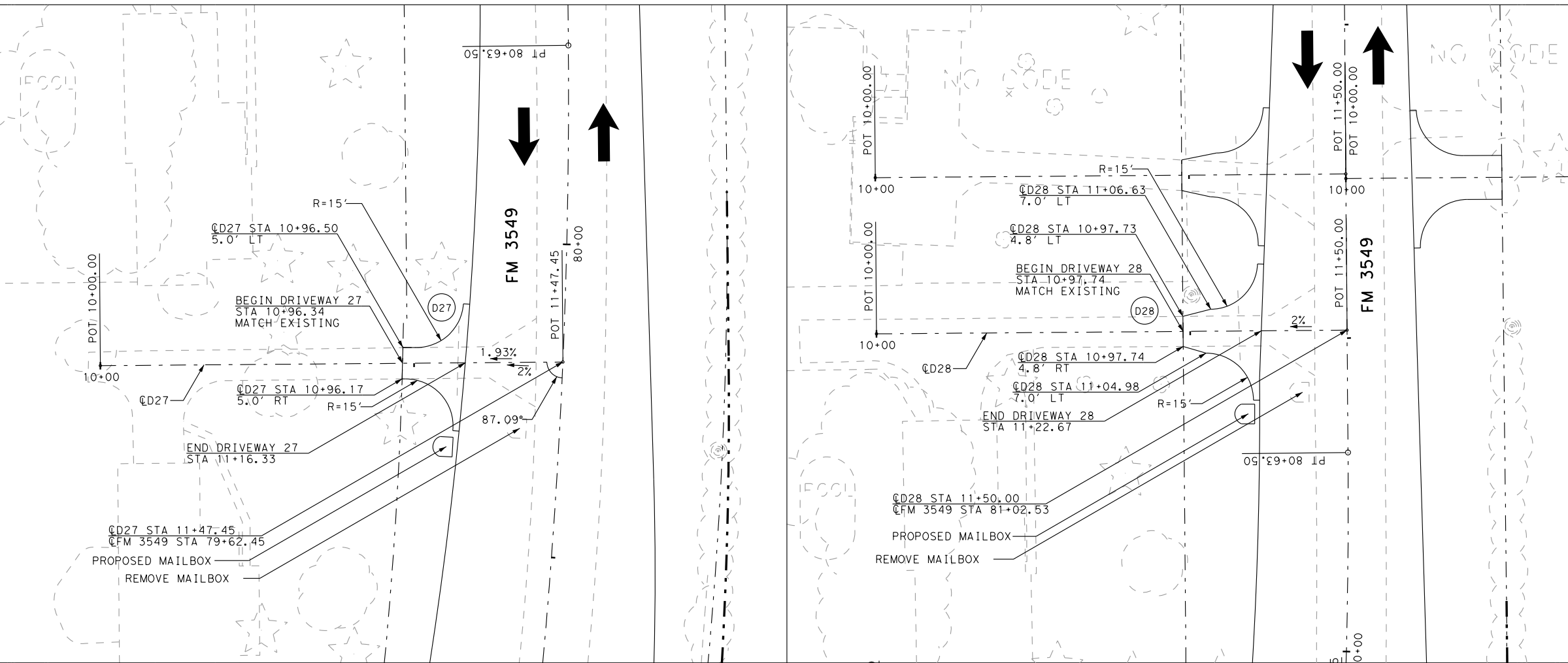


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 25&26

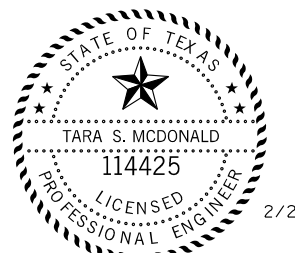
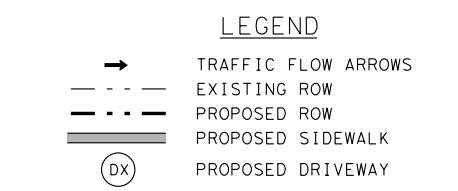
SHEET 13 OF 22

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 153 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
- ALL DIMENSIONS ARE TO FACE OF CURB.
 - ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 - REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 - AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 - FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald
 2/26/2018

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 TBPE REG. # F-474

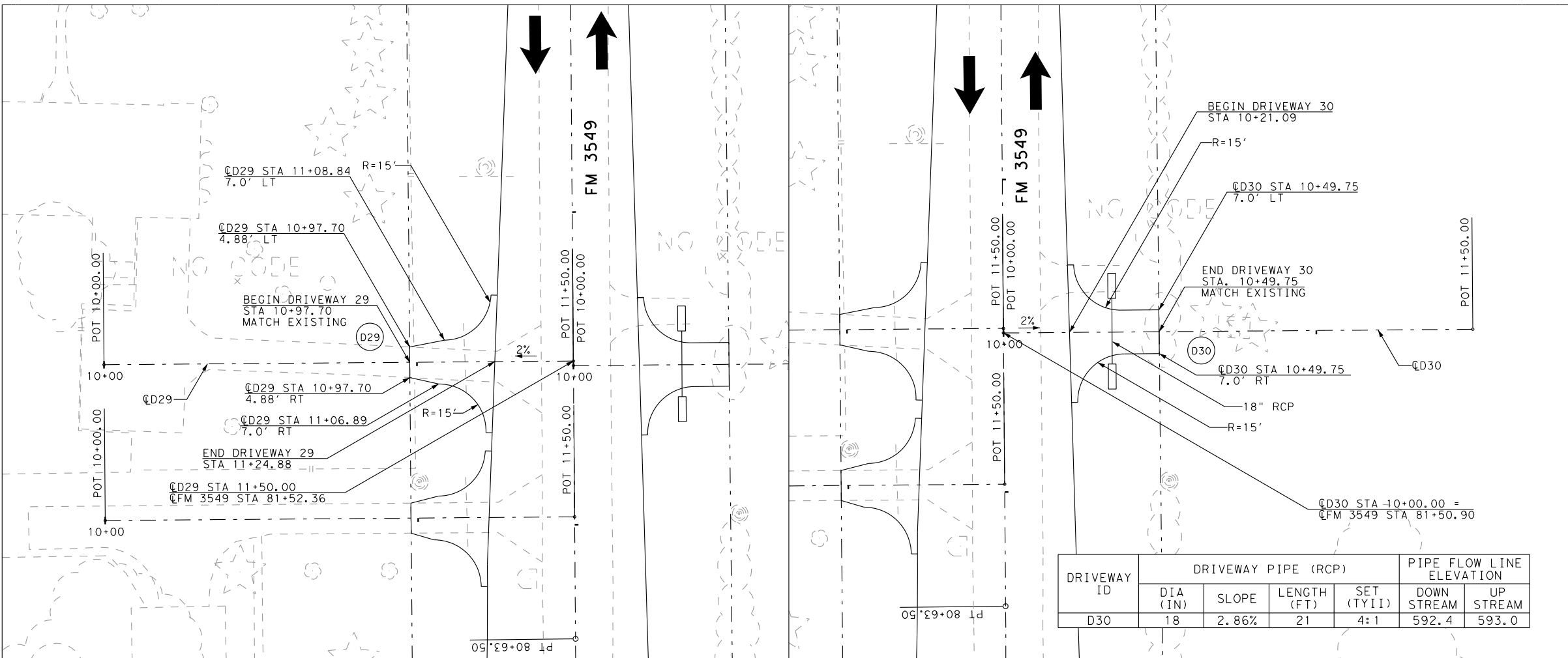


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 27&28

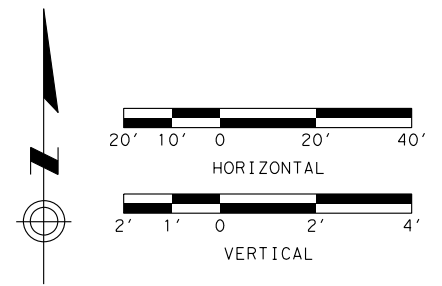
SHEET 14 OF 22

| | | | | |
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 154 |
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| | 1015 | 01 | 023 | |

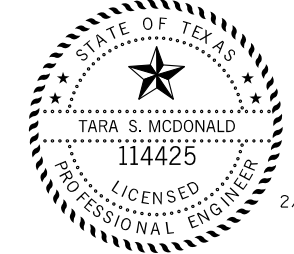
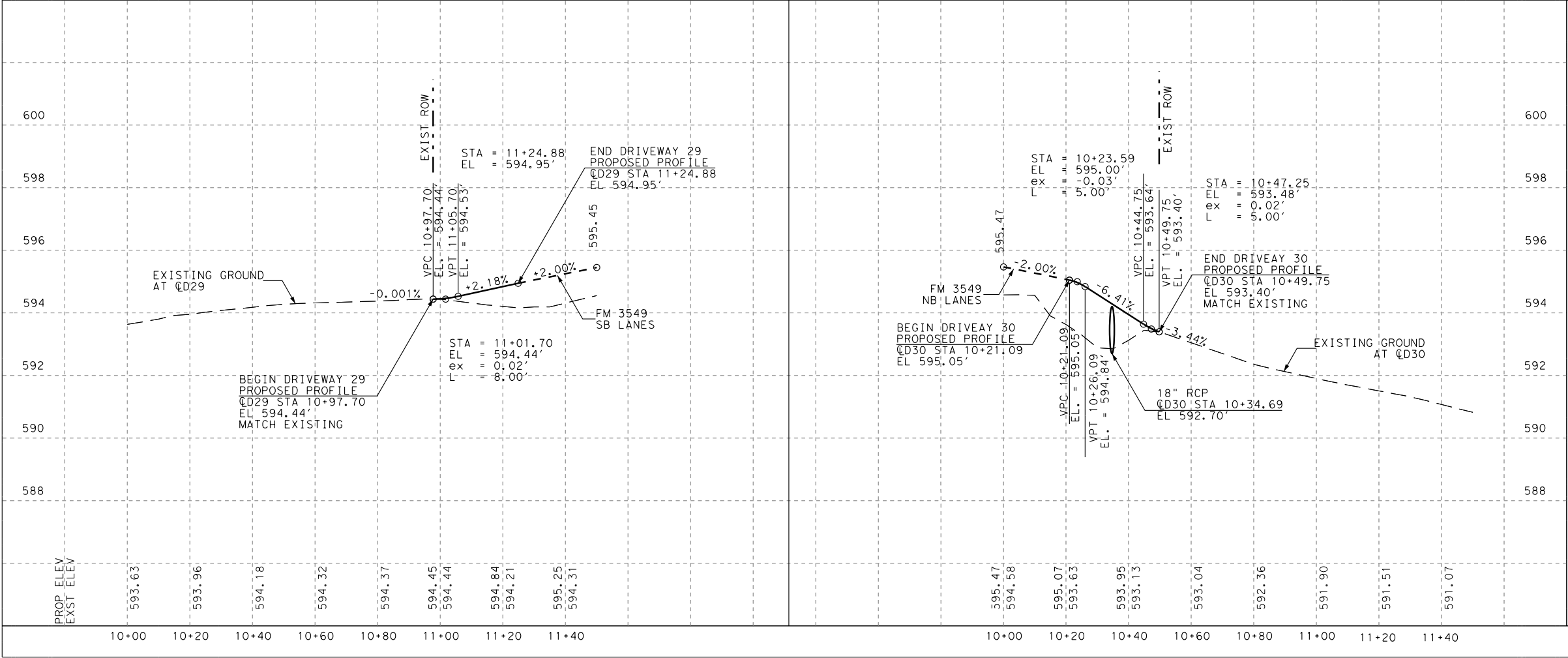
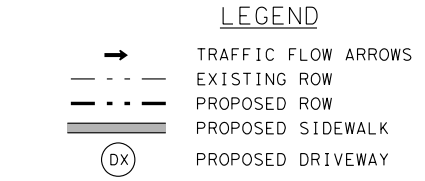
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| DRIVEWAY ID | DRIVEWAY PIPE (RCP) | | | | PIPE FLOW LINE ELEVATION | |
|-------------|---------------------|-------|-------------|------------|--------------------------|-----------|
| | DIA (IN) | SLOPE | LENGTH (FT) | SET (TYII) | DOWN STREAM | UP STREAM |
| D30 | 18 | 2.86% | 21 | 4:1 | 592.4 | 593.0 |



- GENERAL NOTES:
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 - REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 - REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 - AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 - FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
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ATKINS

TBPE REG. # F-474

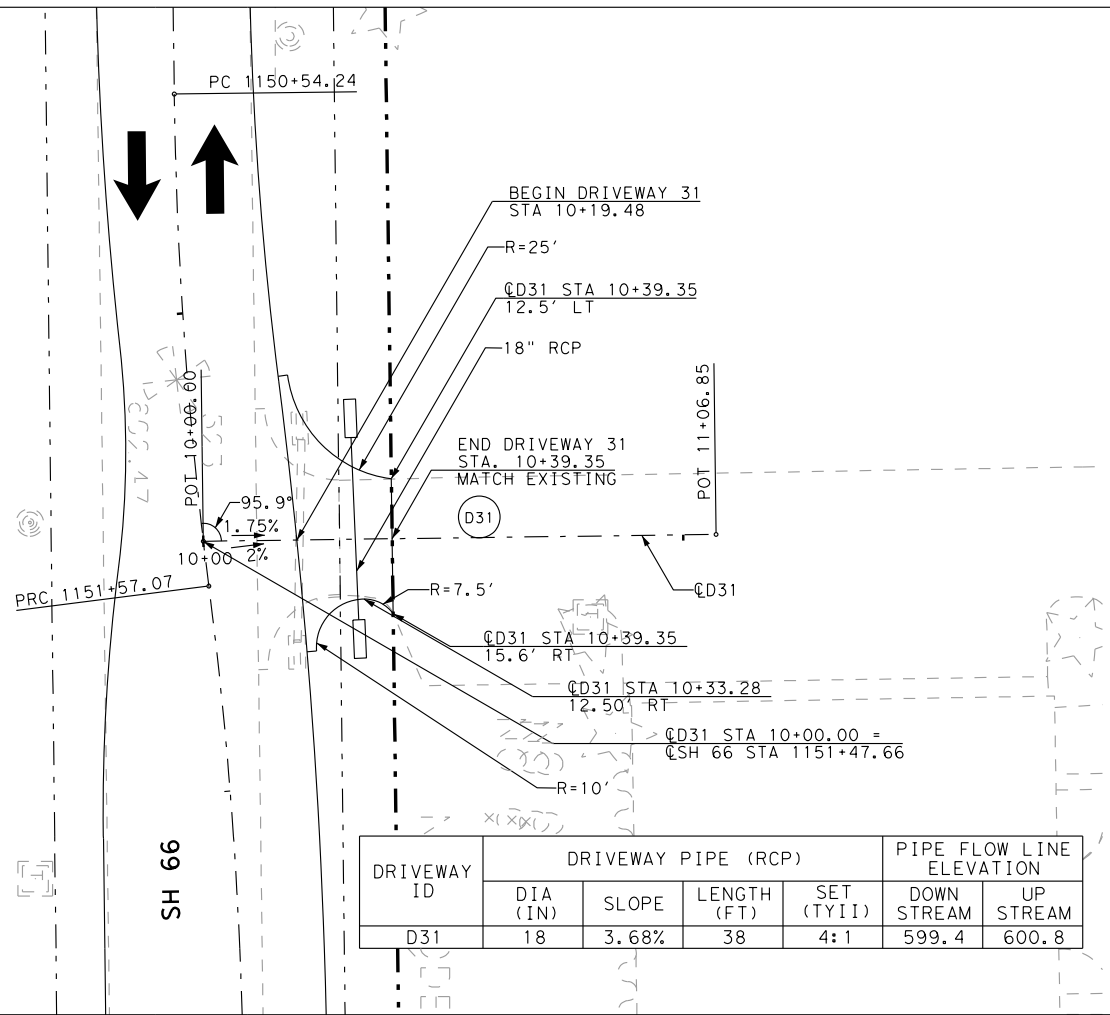


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 29&30

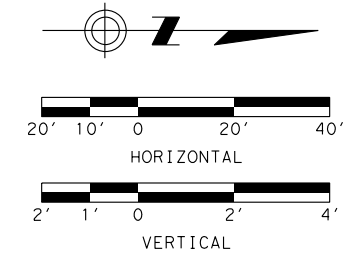
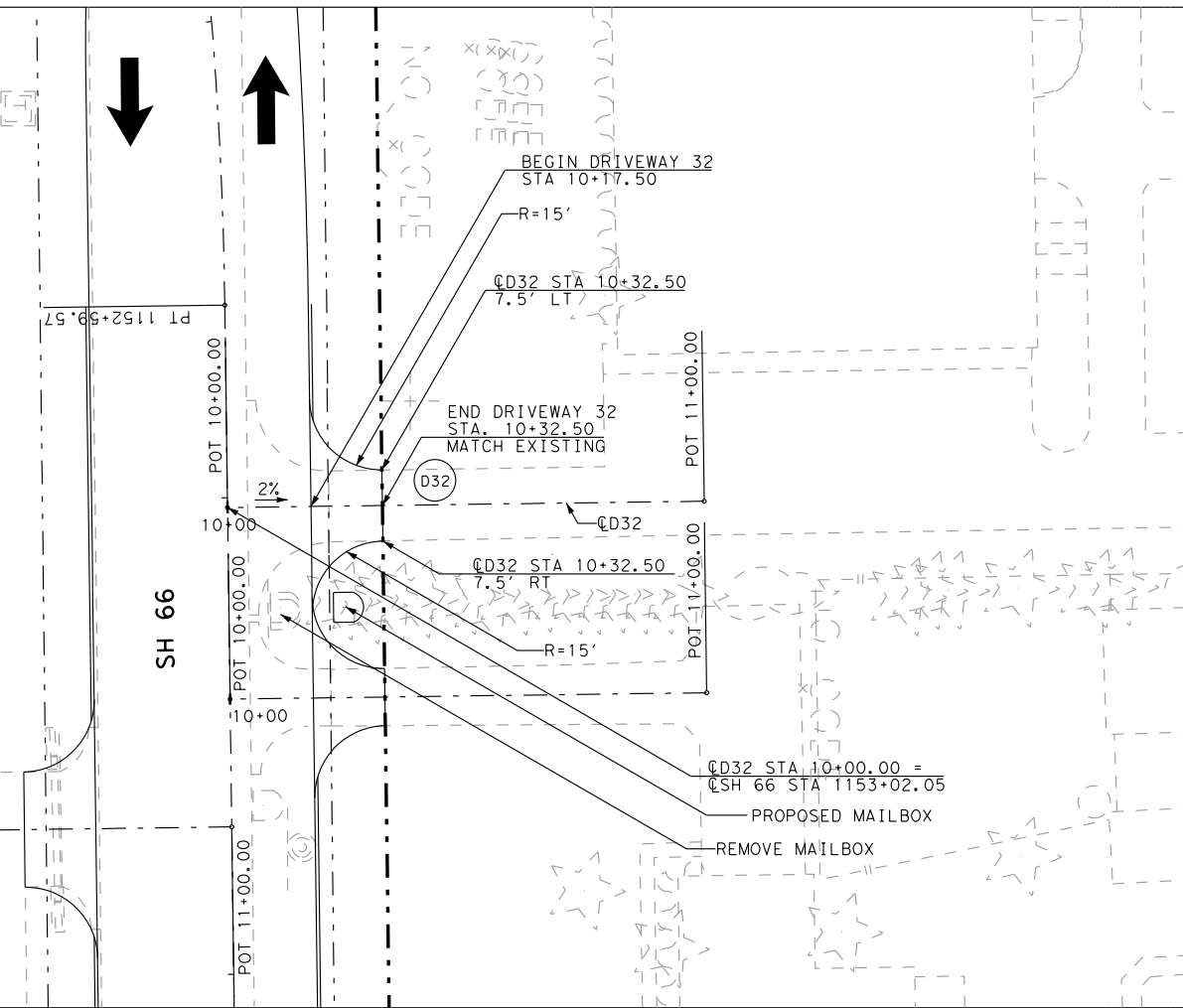
SHEET 15 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 155 |
| CHECK | CONTROL | SECTION | JOB | 155 |
| WL | 1015 | 01 | 023 | |

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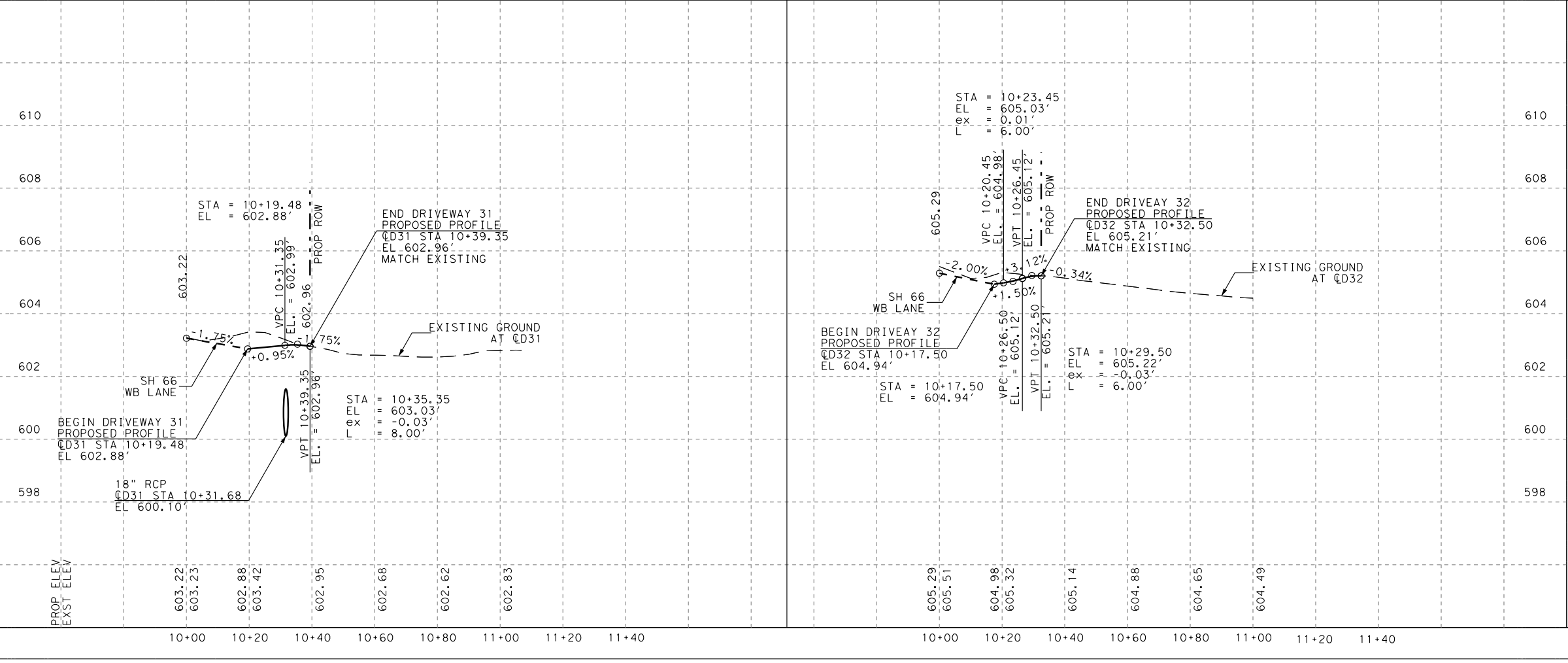
| DRIVEWAY ID | DRIVEWAY PIPE (RCP) | | | | PIPE FLOW LINE ELEVATION | |
|-------------|---------------------|-------|-------------|------------|--------------------------|-----------|
| | DIA (IN) | SLOPE | LENGTH (FT) | SET (TYII) | DOWN STREAM | UP STREAM |
| D31 | 18 | 3.68% | 38 | 4:1 | 599.4 | 600.8 |



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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.

LEGEND

- TRAFFIC FLOW ARROWS
- - - EXISTING ROW
- · - · - PROPOSED ROW
- ▬ PROPOSED SIDEWALK
- (DX) PROPOSED DRIVEWAY



Tara McDonald

| NO. | DATE | REVISION | BY |
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| | | | |

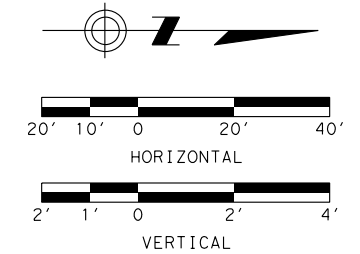
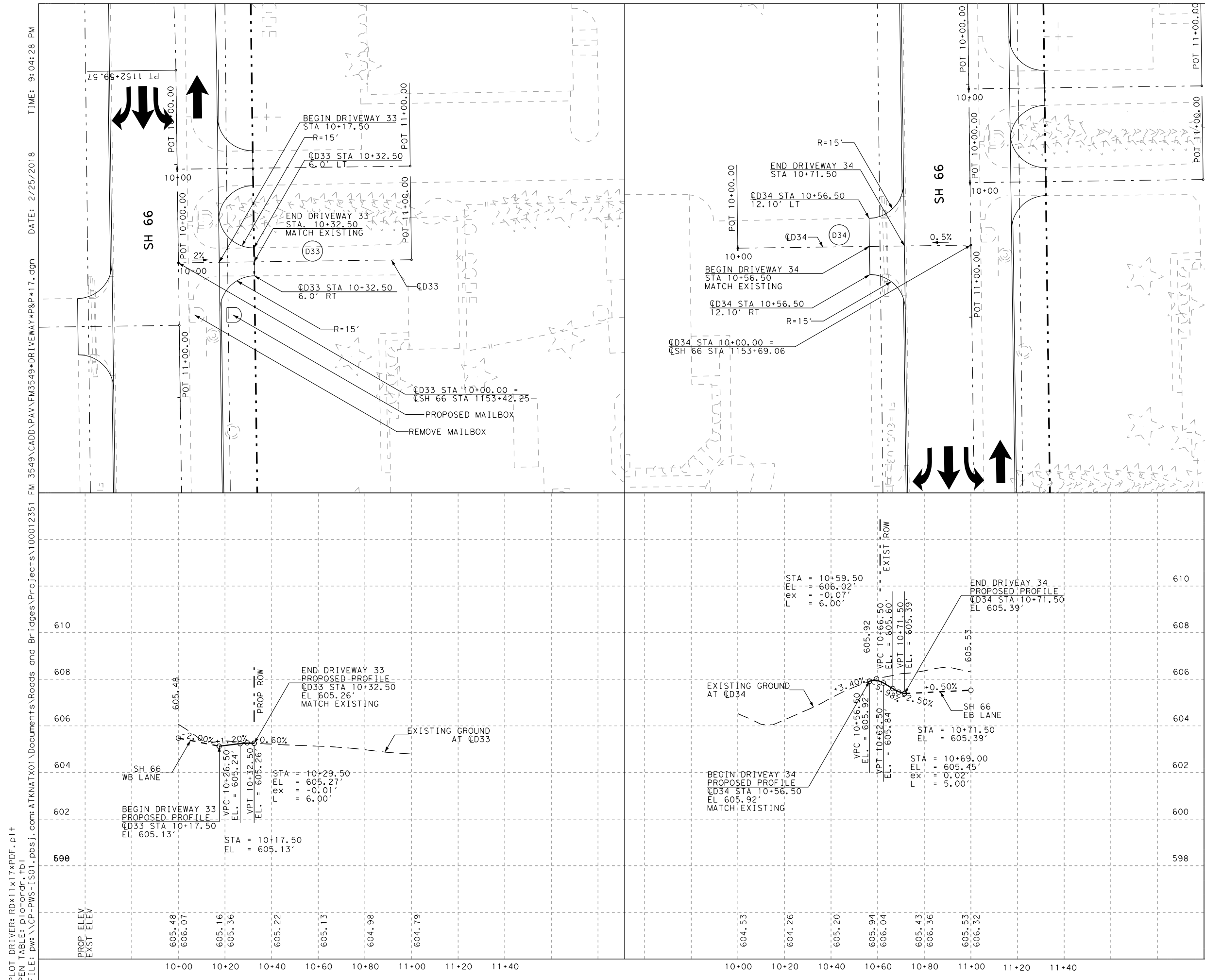
ATKINS
 TBPE REG. # F-474



DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 31&32

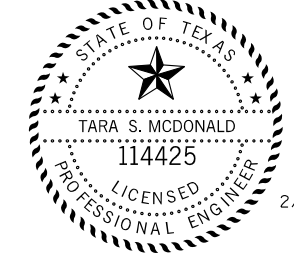
SHEET 16 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 156 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



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 - FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.

- LEGEND**
- TRAFFIC FLOW ARROWS
 - - - EXISTING ROW
 - · - · - PROPOSED ROW
 - ▬ PROPOSED SIDEWALK
 - (DX) PROPOSED DRIVEWAY



Tara McDonald

2/26/2018

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
| | | | |

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TBPE REG. # F-474

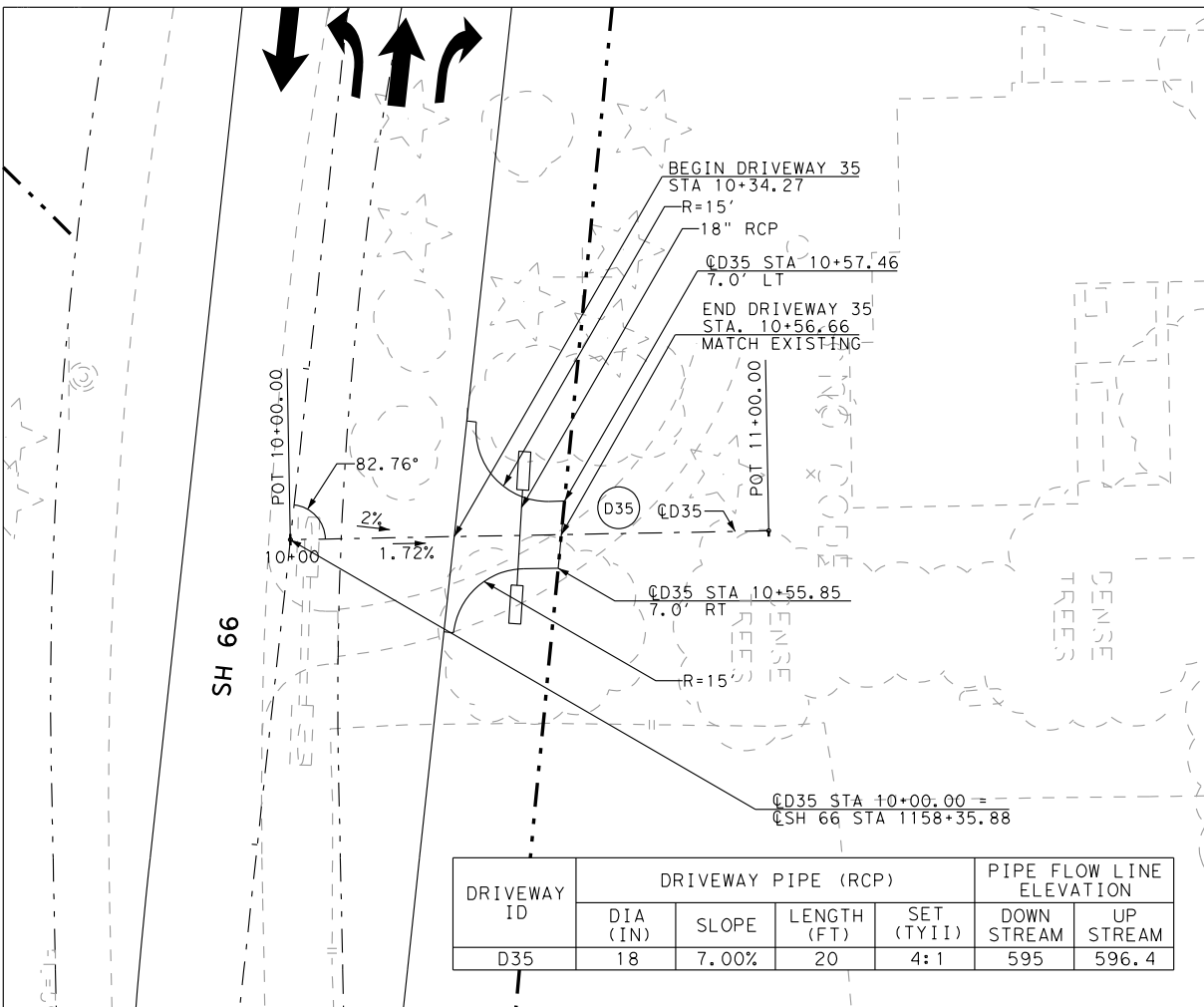


**DRIVEWAY
PLAN & PROFILE**
DRIVEWAYS 33&34

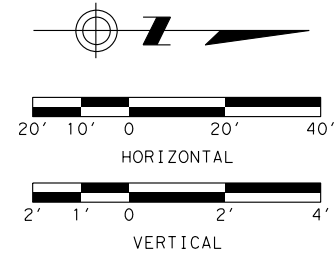
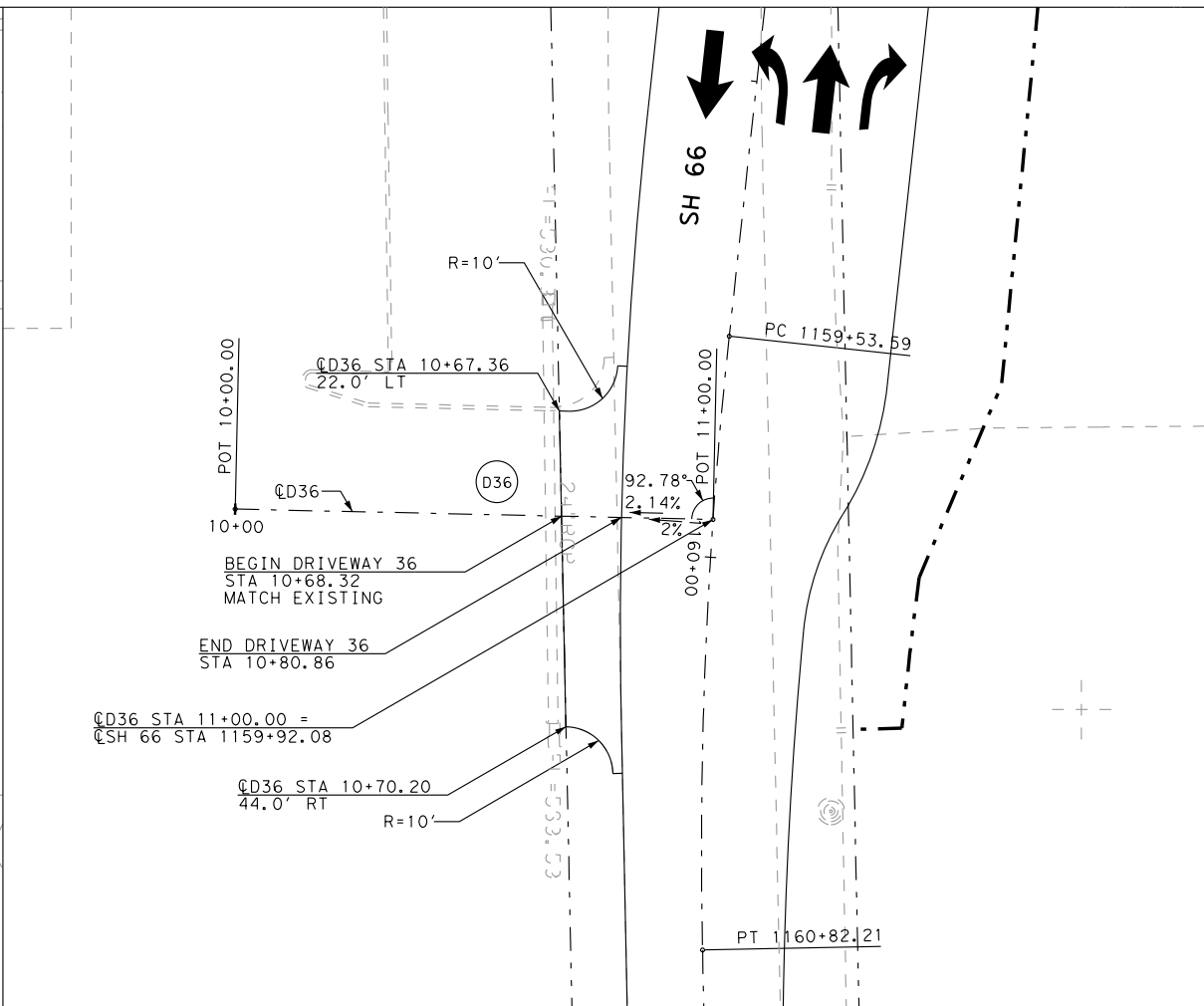
SHEET 17 OF 22

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 157 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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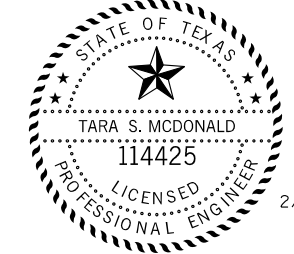
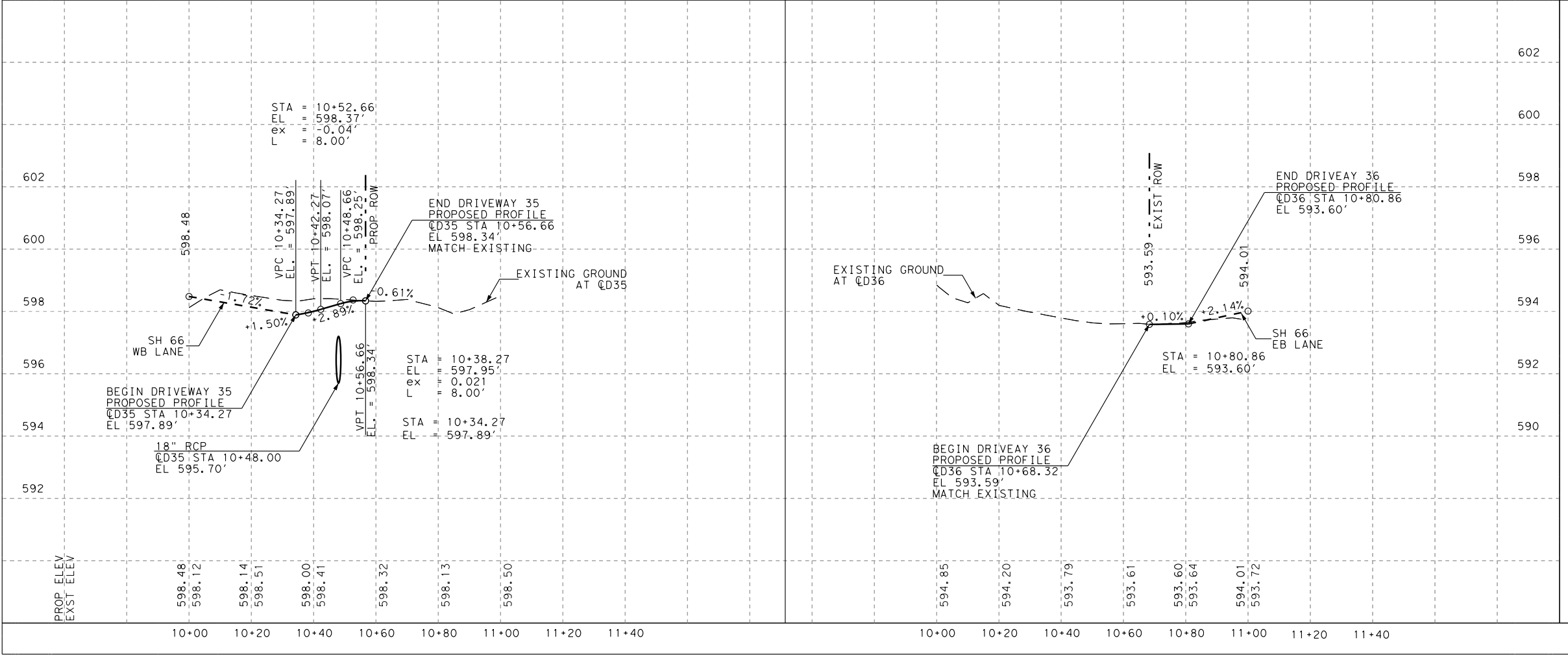
| DRIVEWAY ID | DRIVEWAY PIPE (RCP) | | | | PIPE FLOW LINE ELEVATION | |
|-------------|---------------------|-------|-------------|------------|--------------------------|-----------|
| | DIA (IN) | SLOPE | LENGTH (FT) | SET (TYII) | DOWN STREAM | UP STREAM |
| D35 | 18 | 7.00% | 20 | 4:1 | 595 | 596.4 |



- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.

LEGEND

- TRAFFIC FLOW ARROWS
- - - EXISTING ROW
- . - . - PROPOSED ROW
- ▬ PROPOSED SIDEWALK
- (DX) PROPOSED DRIVEWAY



Tara McDonald

| NO. | DATE | REVISION | BY |
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| | | | |

ATKINS
 TBPE REG. # F-474

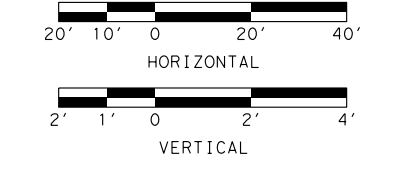
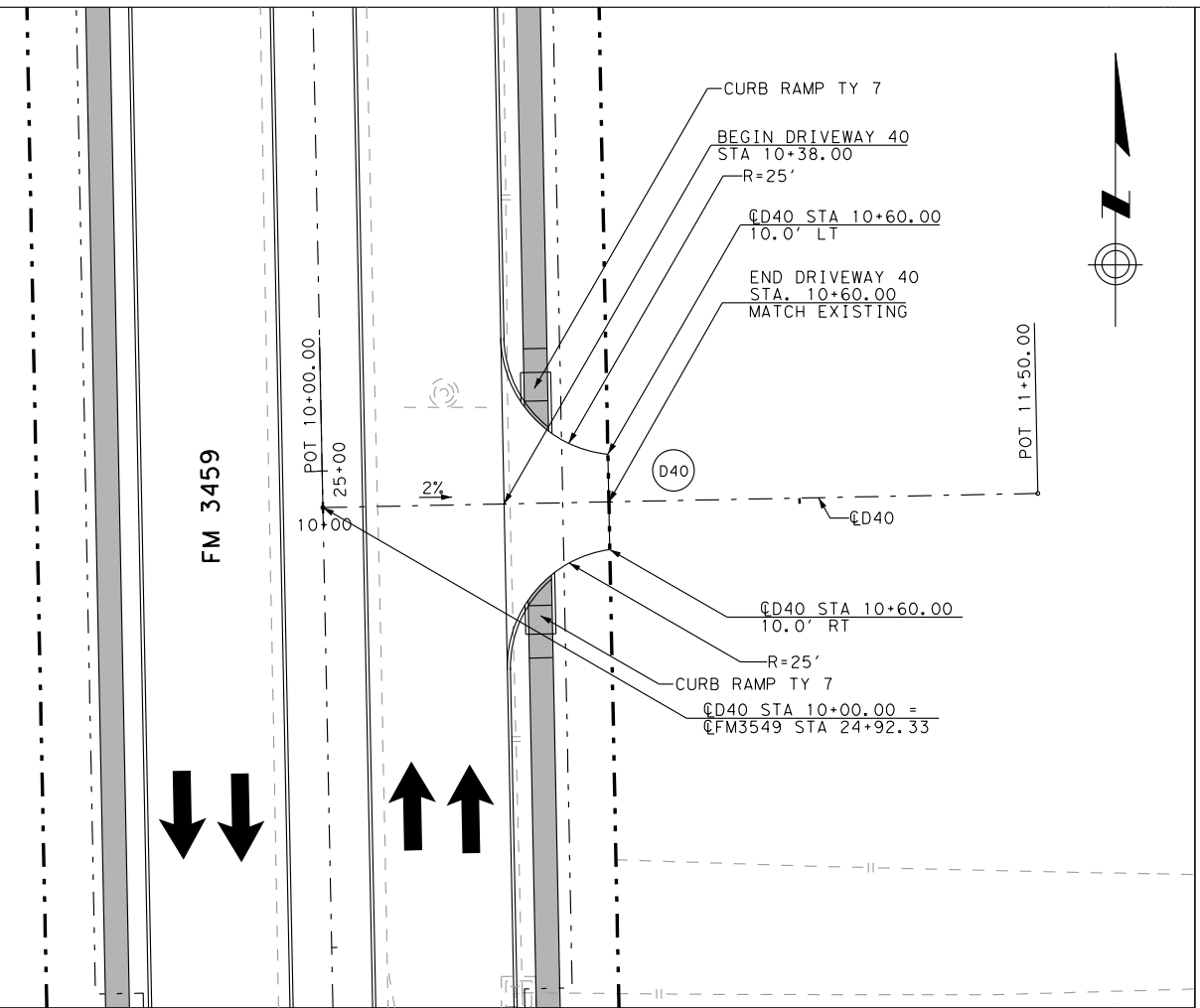
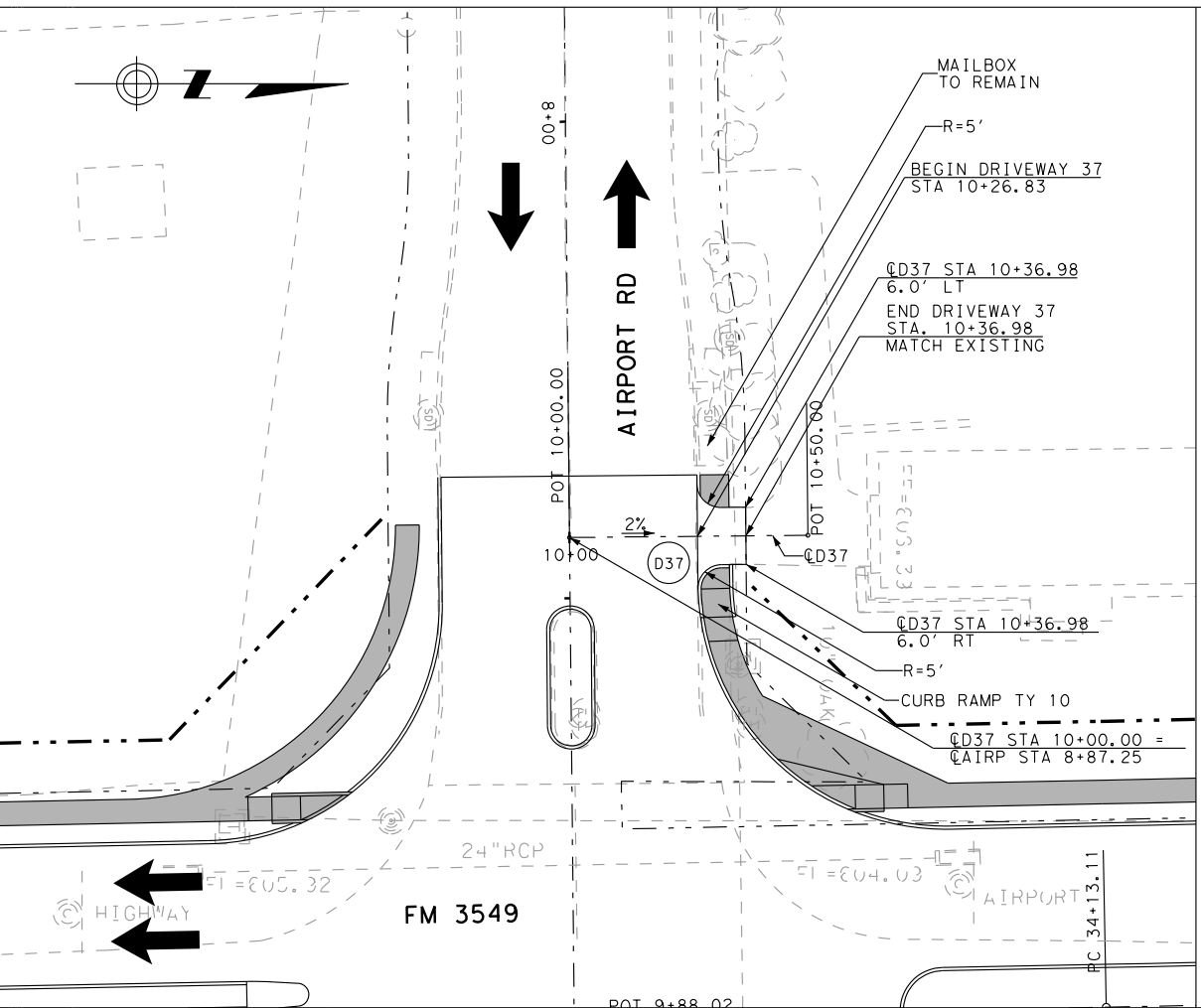


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 35&36

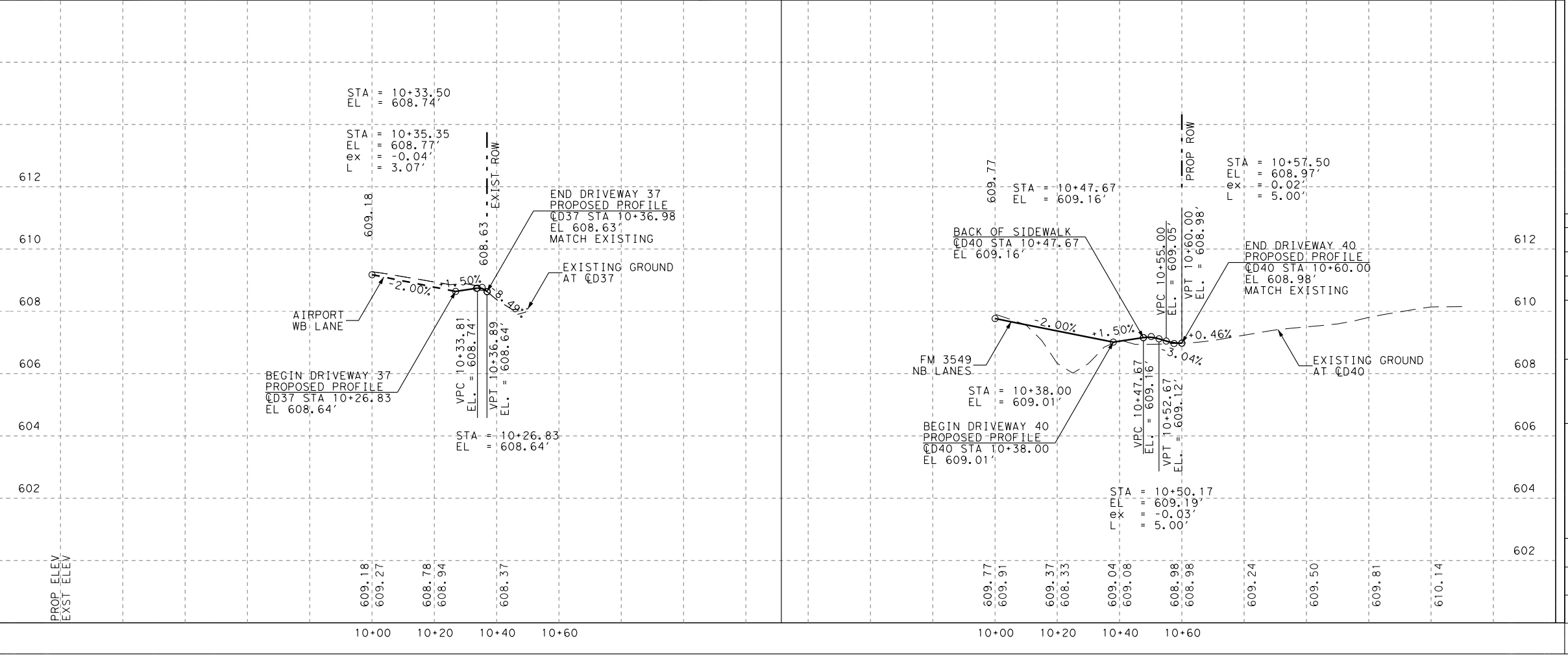
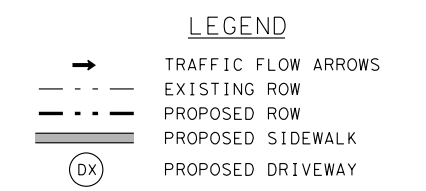
SHEET 18 OF 22

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 158 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



| NO. | DATE | REVISION | BY |
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 TBPE REG. # F-474

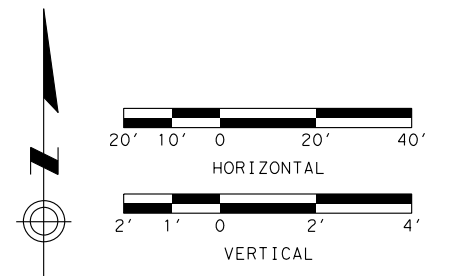
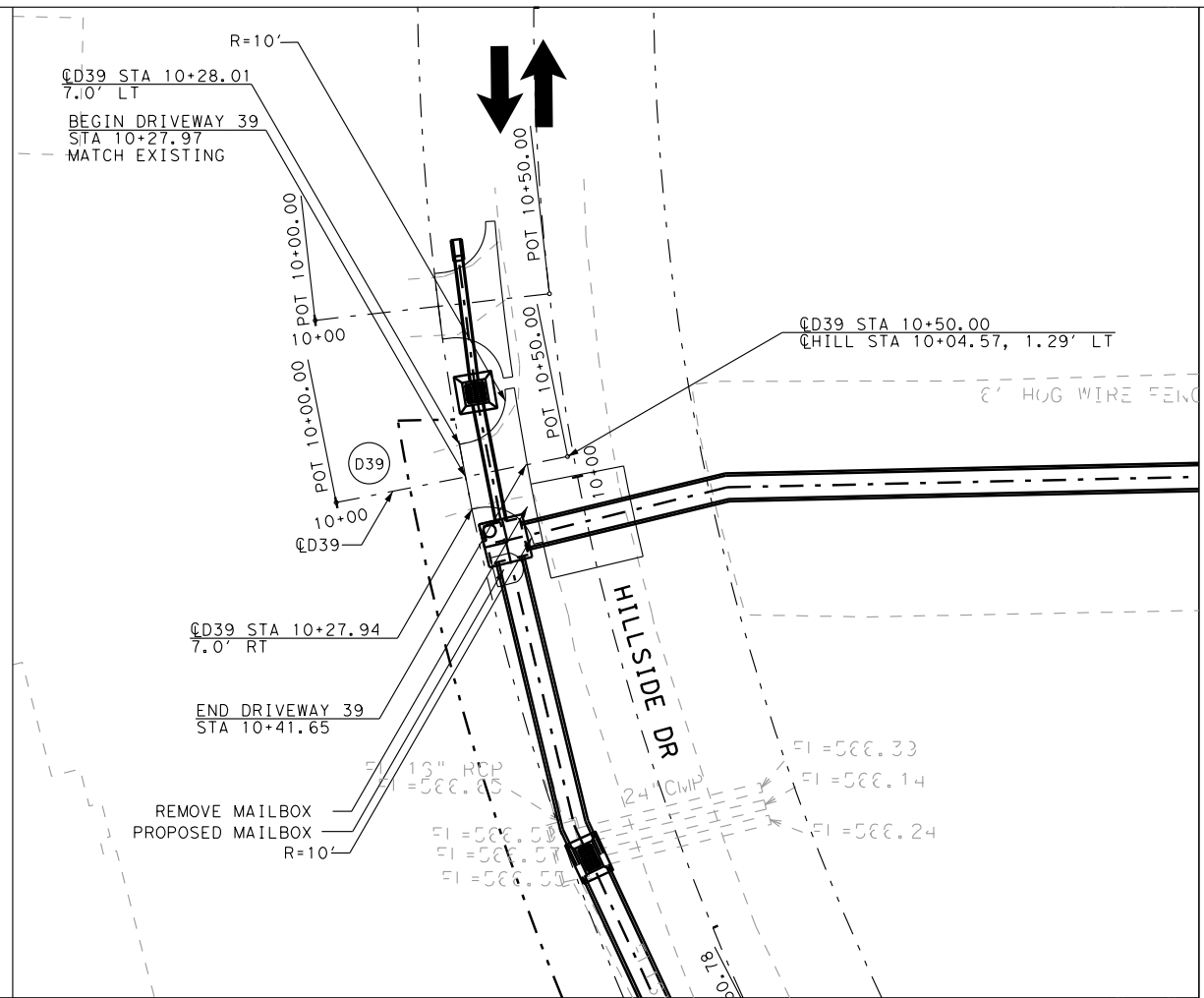
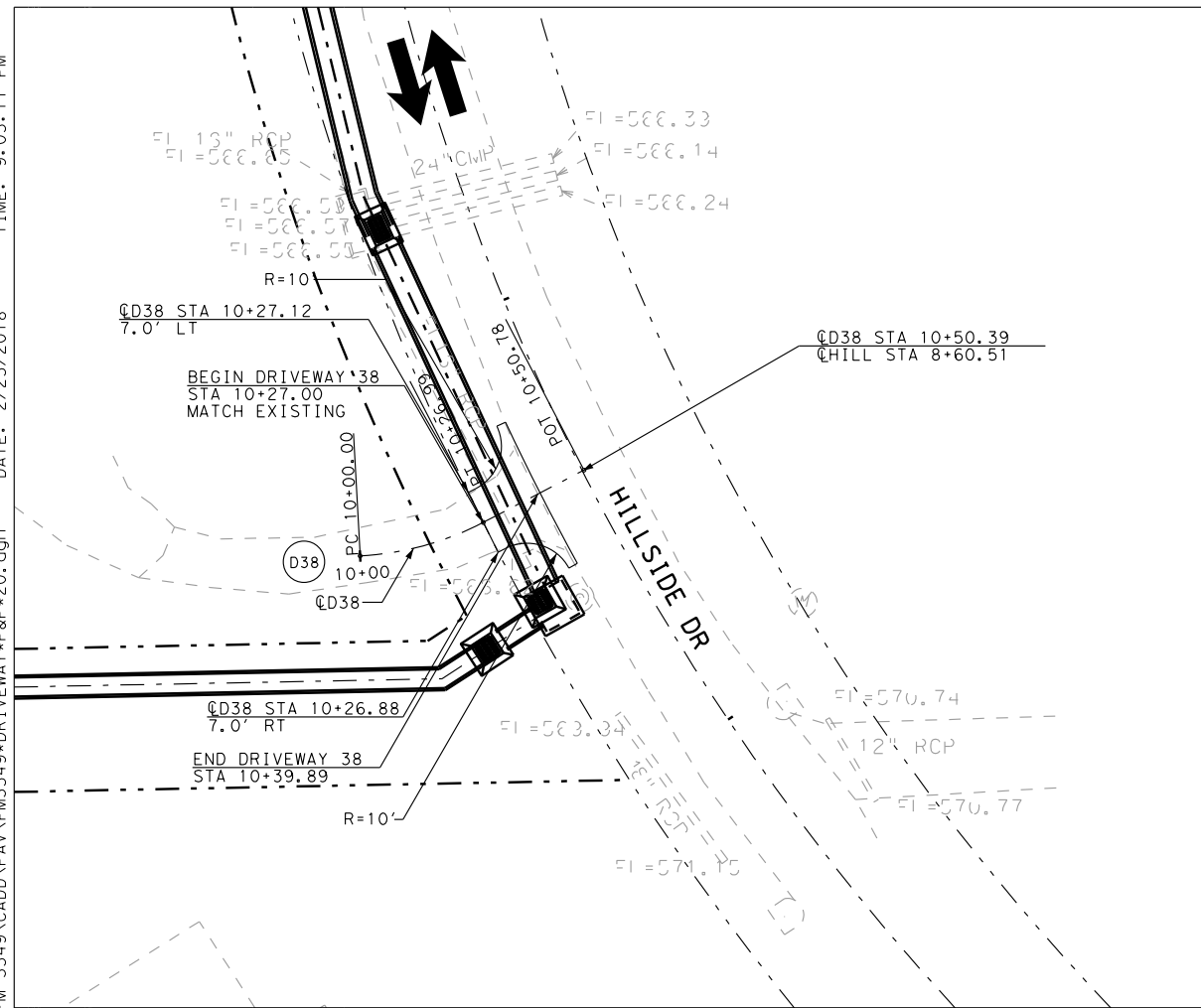


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 37&40

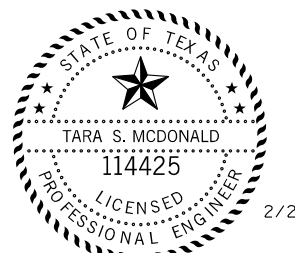
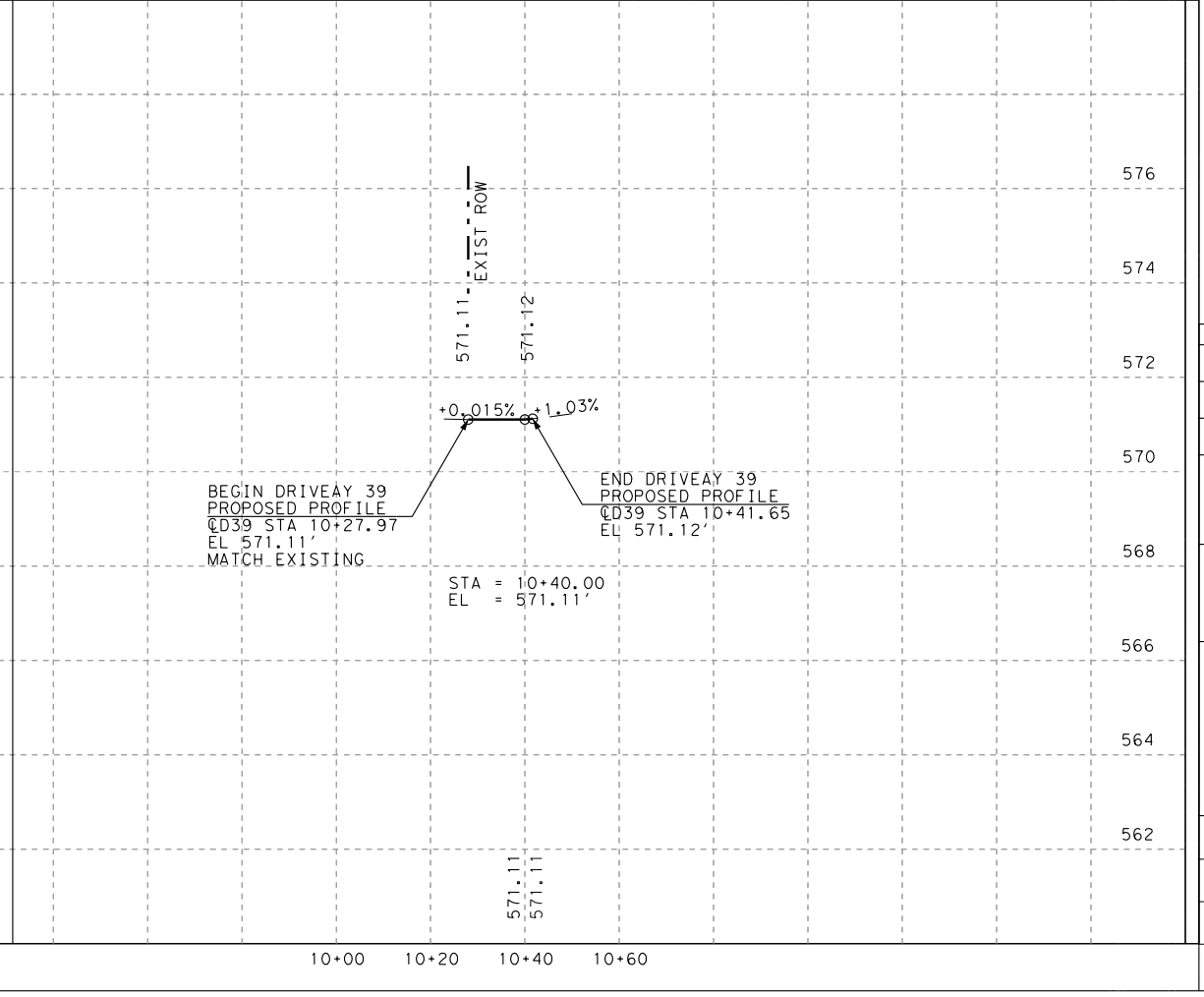
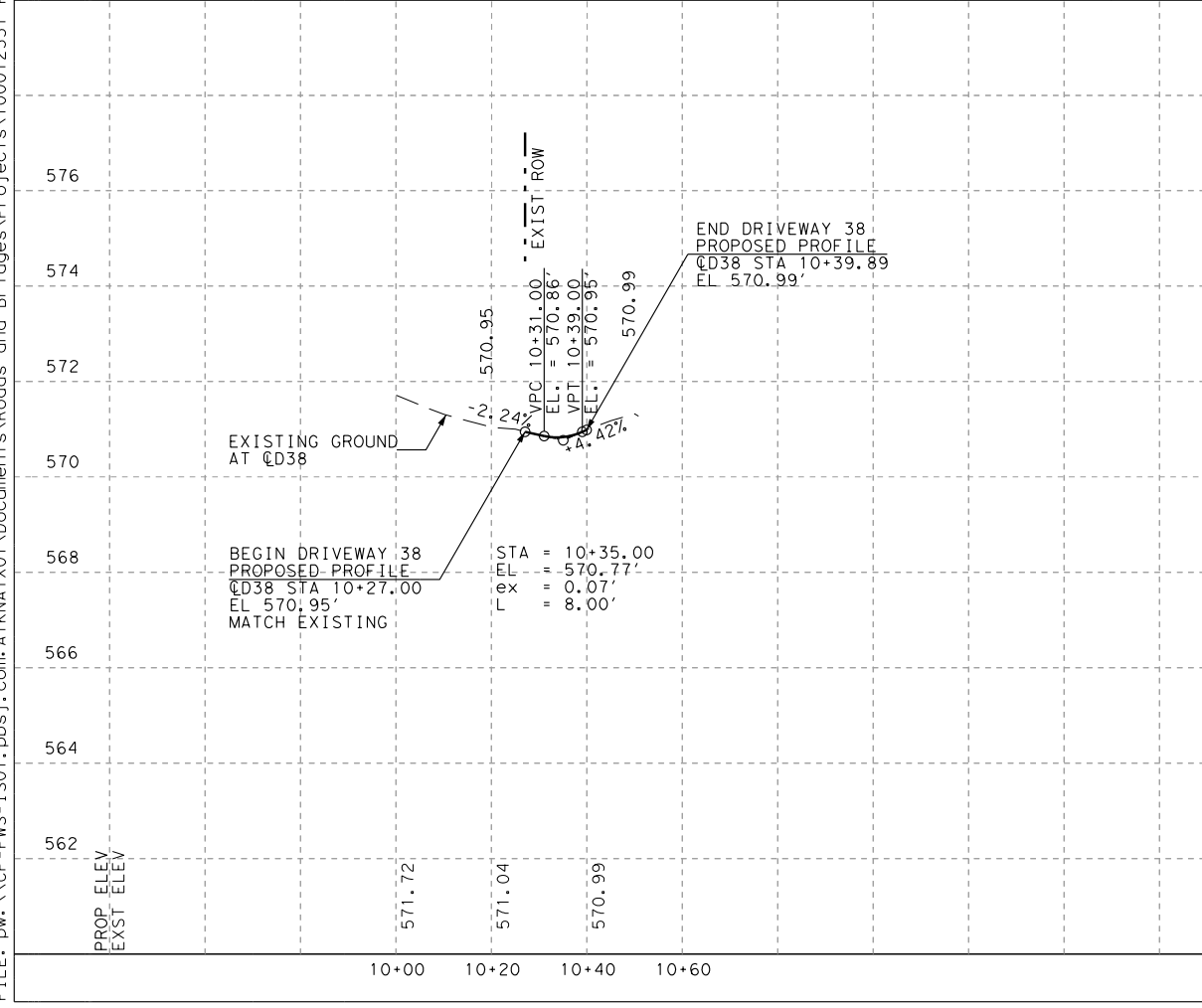
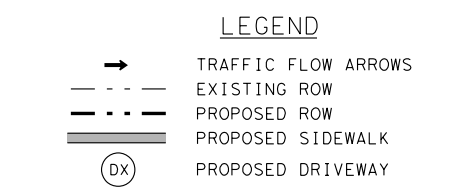
SHEET 19 OF 22

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 159 |
| CHECK WL | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

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 TBPE REG. # F-474

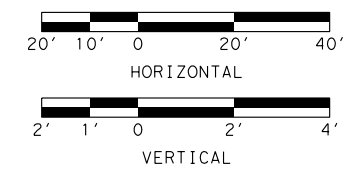
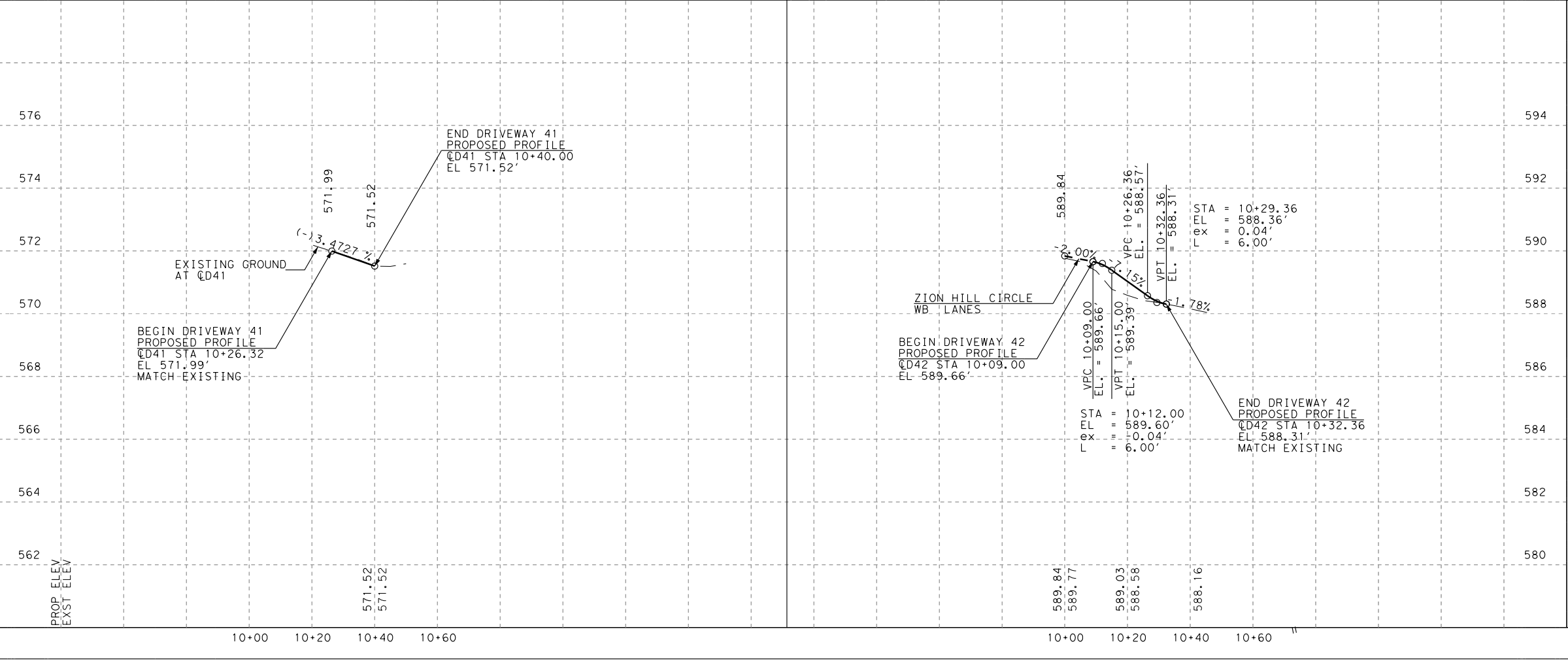
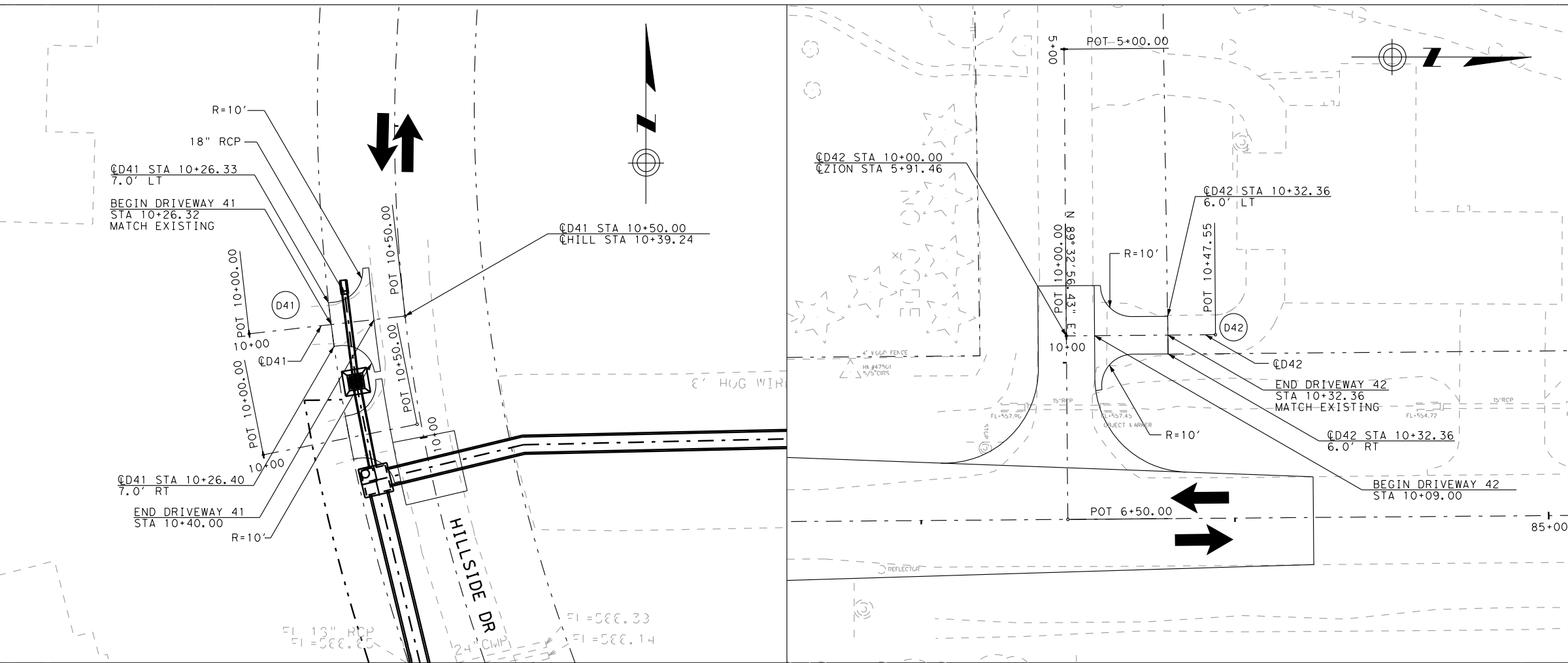


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 38&39

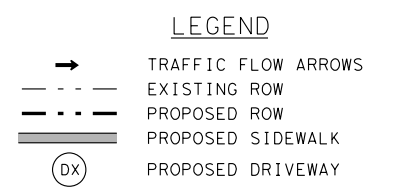
SHEET 20 OF 22

| | | | | |
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| GRAPHICS TM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK WL | TEXAS | DALLAS | ROCKWALL | 160 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
 5. AFTER DRIVEWAY CONSTRUCTION IS COMPLETE, CONTRACTOR SHALL RELOCATE MAILBOXES FROM TEMPORARY MOUNTS TO LOCATIONS ADJACENT TO THE NEW DRIVES CORRESPONDING TO THEIR ORIGINAL LOCATIONS. REFER TO STANDARD MB-14(2A) FOR MAILBOX INSTALLATION.
 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald
 2/26/2018

| NO. | DATE | REVISION | BY |
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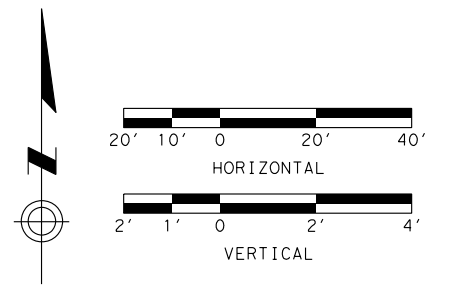
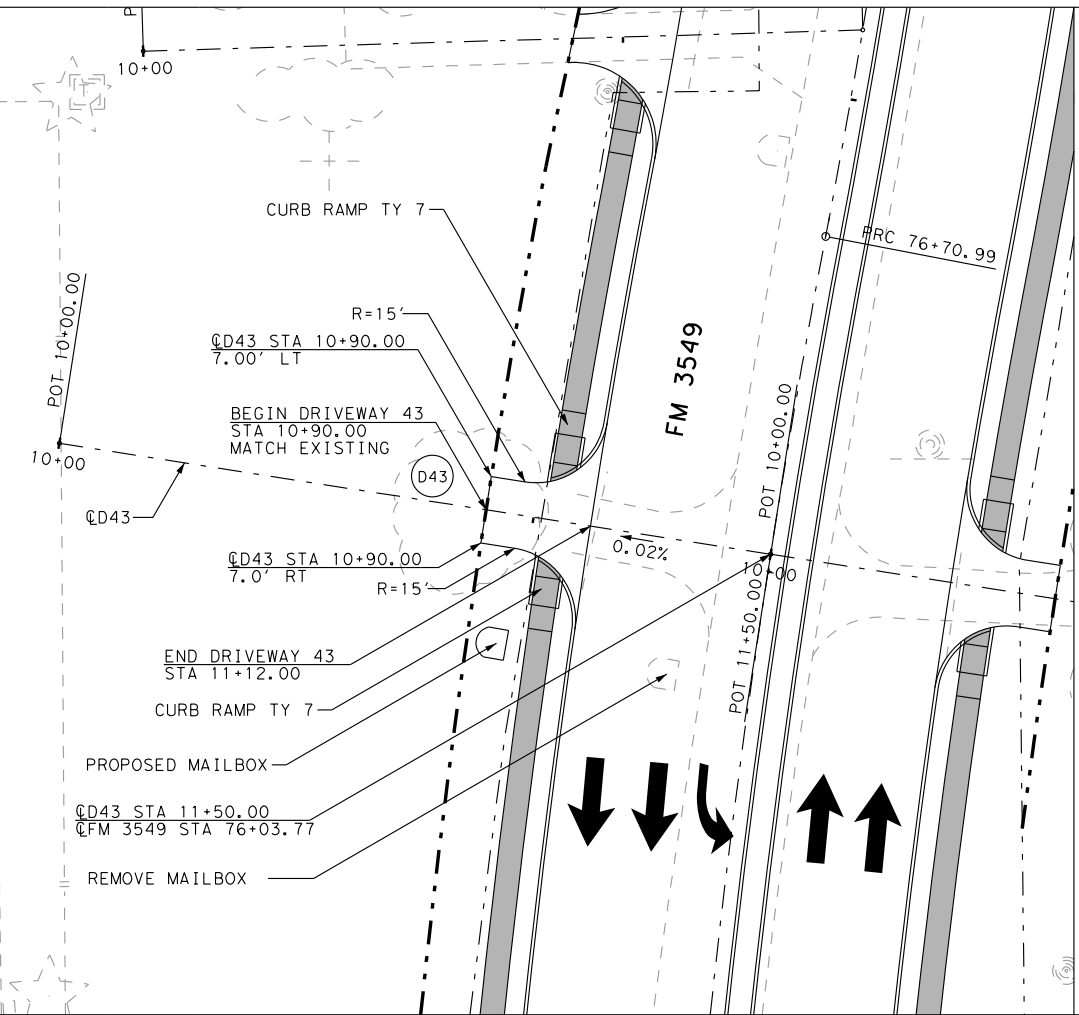


DRIVEWAY
 PLAN & PROFILE
 DRIVEWAYS 41&42

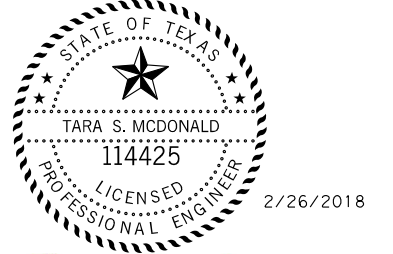
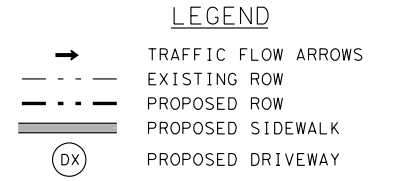
SHEET 21 OF 22

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|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 161 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

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- GENERAL NOTES:
1. ALL DIMENSIONS ARE TO FACE OF CURB.
 2. ALL DRIVEWAY ALIGNMENTS ARE 90 DEGREES FROM THE FM 3549 ALIGNMENT UNLESS OTHERWISE NOTED.
 3. REFER TO DRIVEWAY DETAIL SHEET FOR FURTHER DETAIL.
 4. REFER TO MISC DETAILS SHEET FOR CURB END TRANSITION DETAILS.
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 6. FOR DRIVEWAY CULVERT INFORMATION, SEE DRAINAGE MISC DETAILS SHEET.



Tara McDonald

| NO. | DATE | REVISION | BY |
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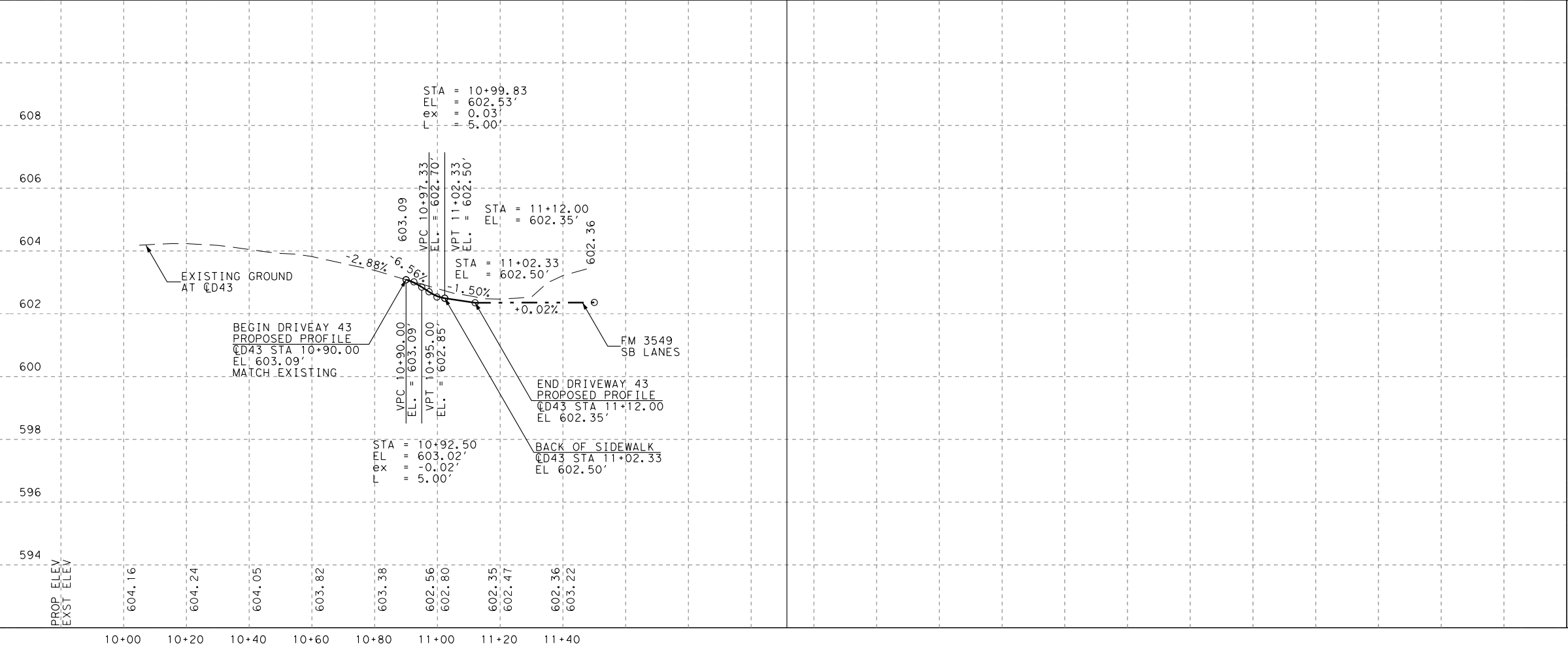
ATKINS
 TBPE REG. # F-474



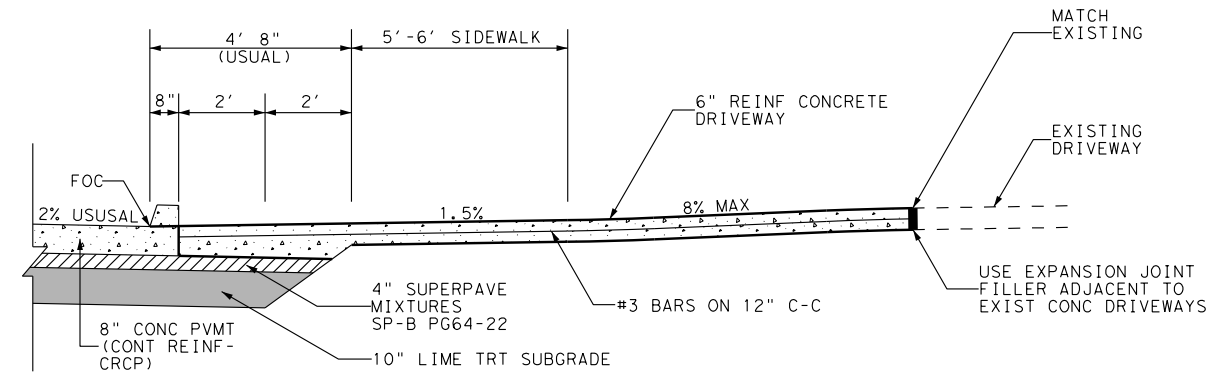
DRIVEWAY
 PLAN & PROFILE
 DRIVEWAY 43

SHEET 22 OF 22

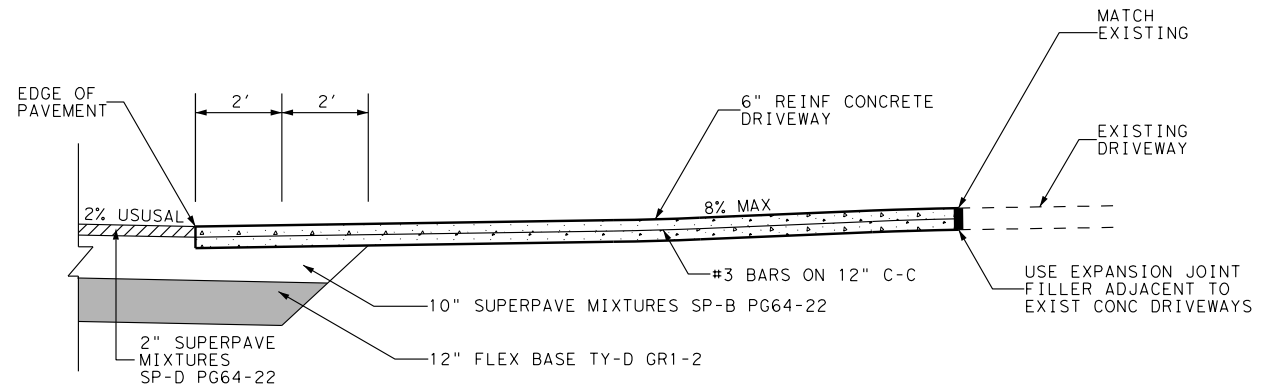
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 162 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |



PLOT DRIVER: RD*11x17*PDF.plt
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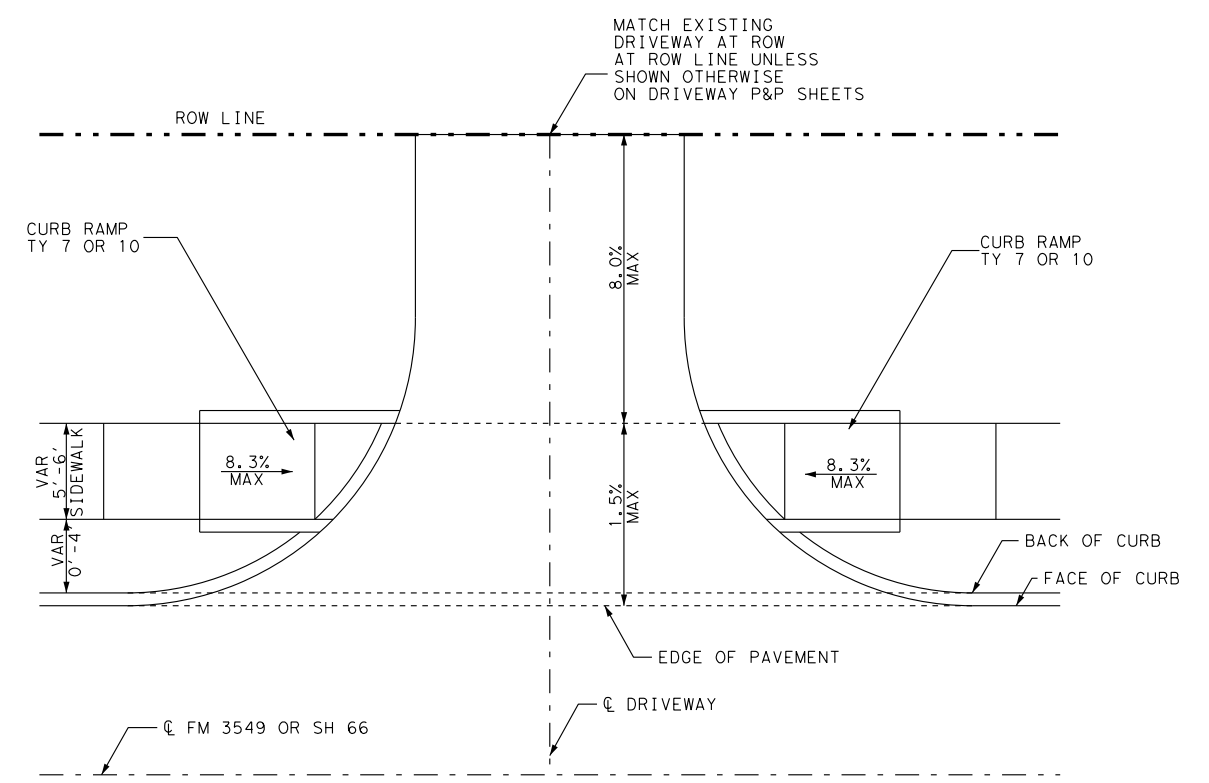


CONCRETE ROADWAY / CONCRETE DRIVEWAY SECTION
SCALE: NTS

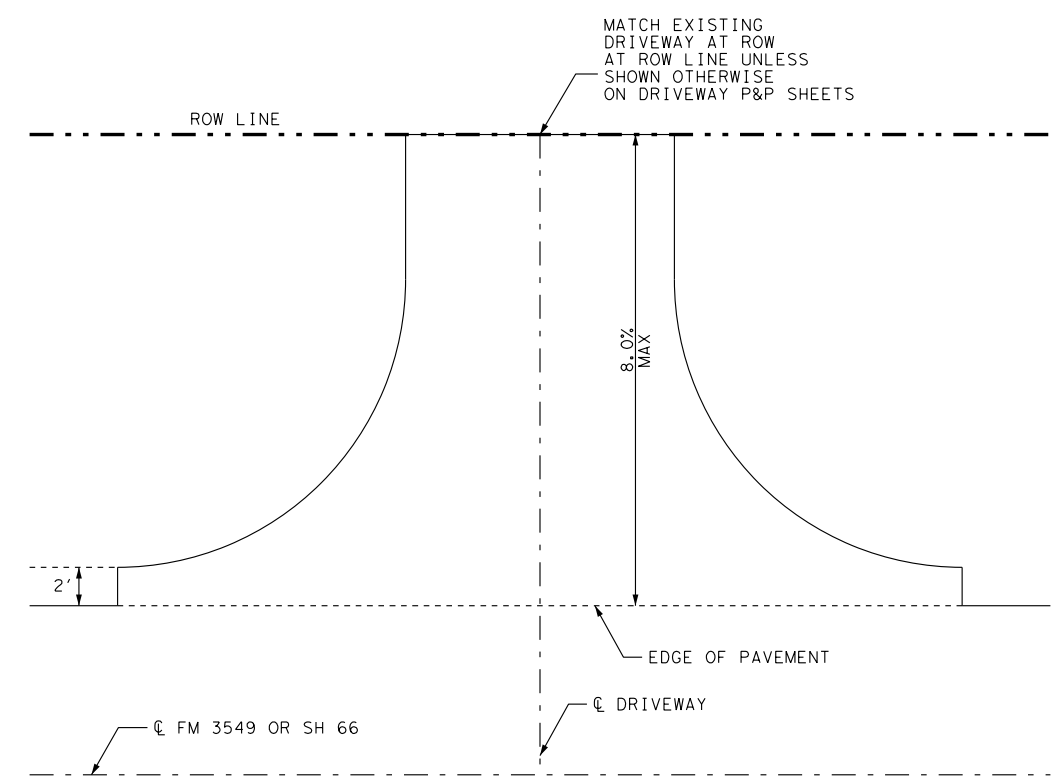


ASHPALT ROADWAY / CONCRETE DRIVEWAY SECTION
SCALE: NTS

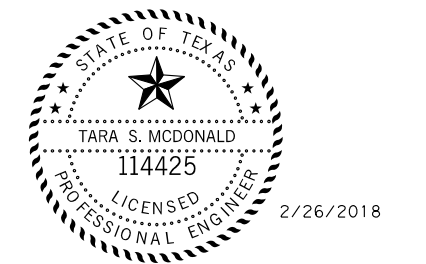
GENERAL NOTES:
1. SEE DRIVEWAY P&P SHEETS FOR SPECIFIC DRIVEWAY PLAN AND PROFILE GEOMETRY.



TYPICAL CONCRETE ROADWAY WITH CONCRETE DRIVEWAY
SCALE: NTS



TYPICAL ASPHALT ROADWAY WITH CONCRETE DRIVEWAY
SCALE: NTS



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TBPE REG. # F-474

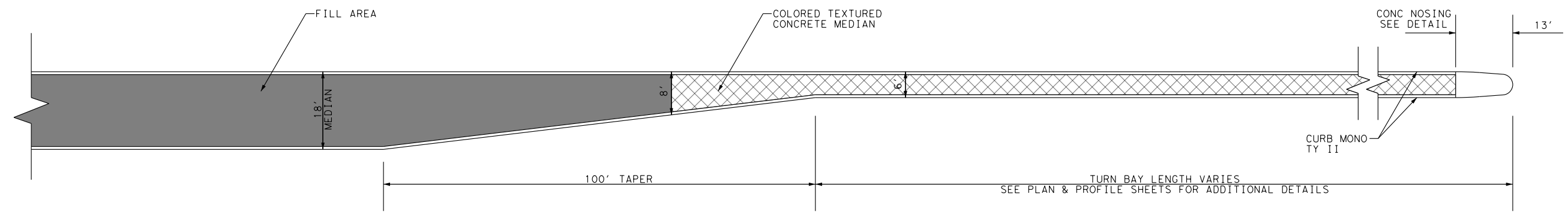


DRIVEWAY DETAILS

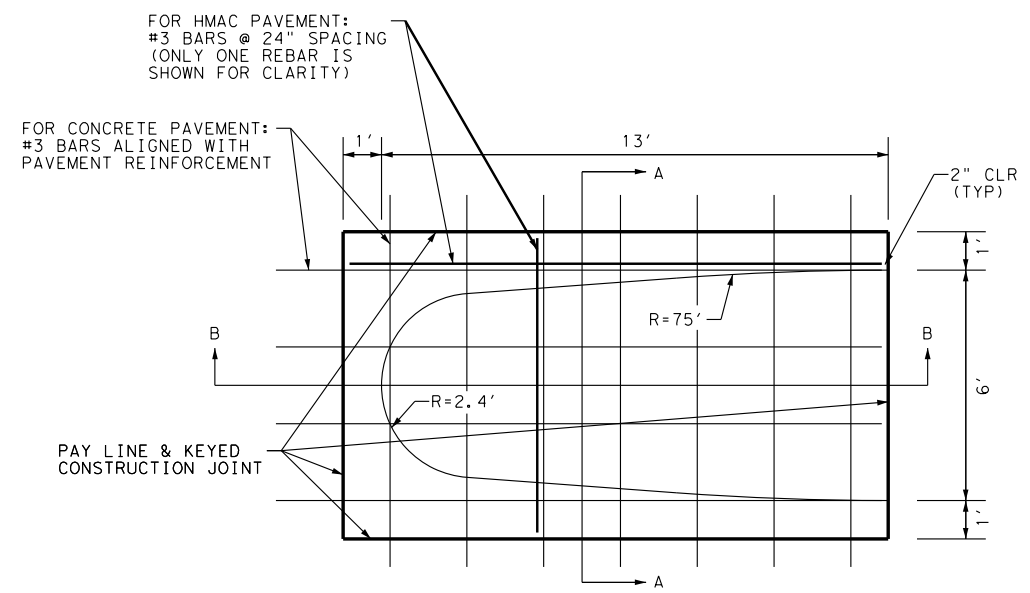
SHEET 1 OF 1

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 163 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

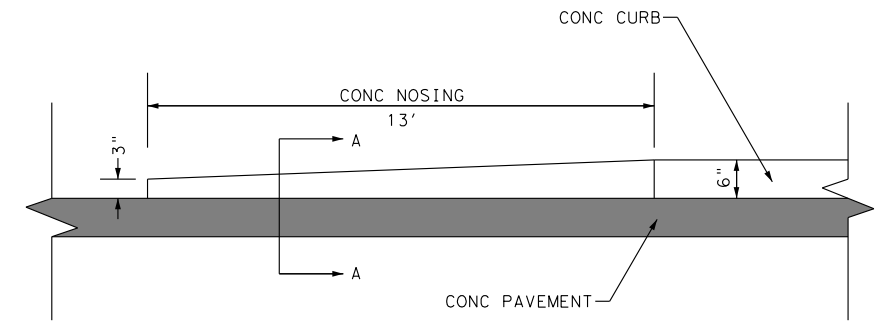
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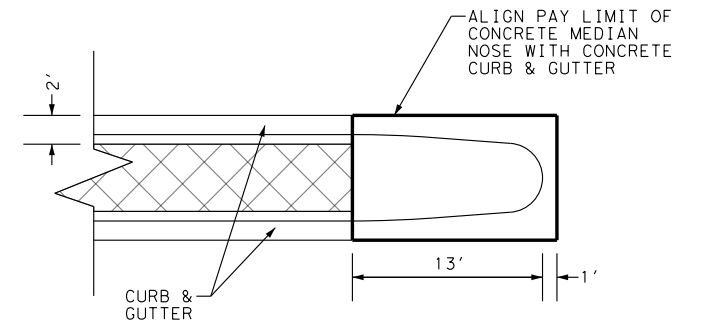
RAISED MEDIAN DETAIL
 ADJACENT TO CONCRETE PAVEMENT
 LEFT TURN BAY
 NTS



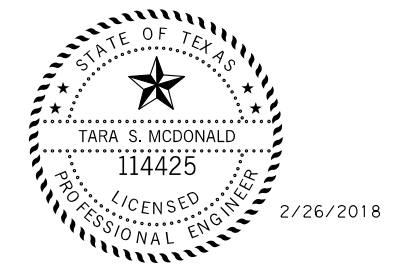
MONOLITHIC MEDIAN NOSE
 MONOLITHIC MEDIAN NOSE & PAVEMENT
 WITHIN PAY LINES SHALL BE PAID FOR
 AS CONCRETE MEDIAN BY THE SQUARE YARD
 NTS



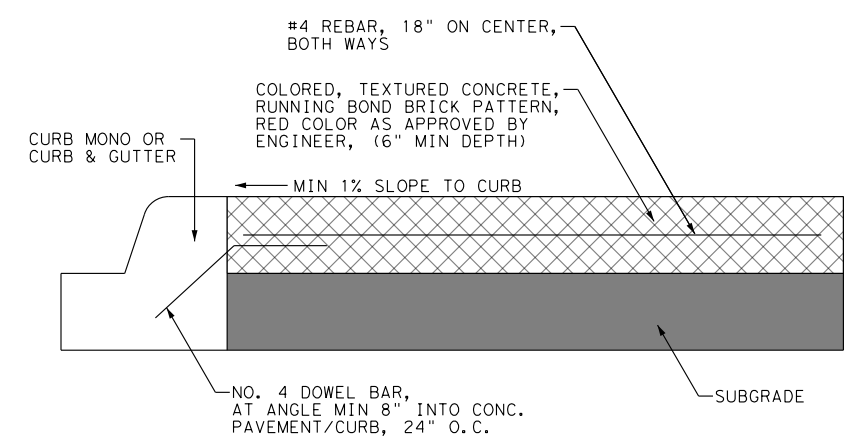
TYPICAL ELEVATION VIEW
 OF CONCRETE MEDIAN NOSING
 NTS
 CONCRETE PAVEMENT IS SHOWN



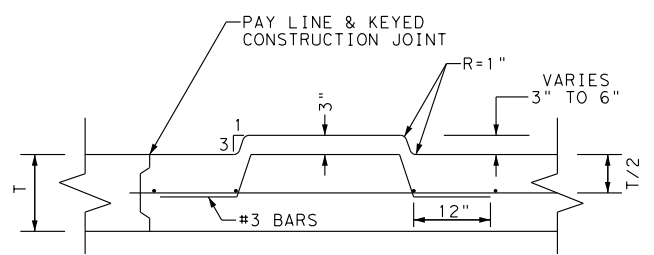
RAISED MEDIAN DETAIL
 ADJACENT TO HMAc PAVEMENT
 NTS



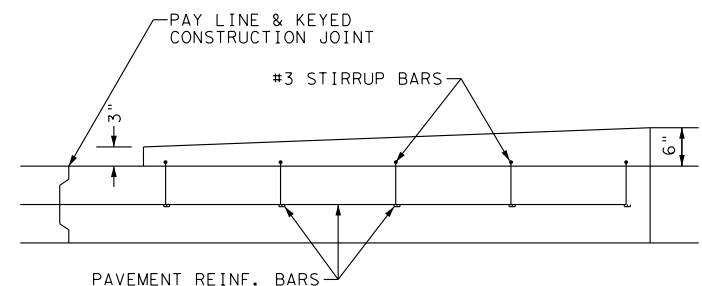
Tara McDonald



COLORED TEXTURED CONCRETE DETAIL
 NTS



SECTION A-A
 NTS



SECTION B-B
 NTS

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
| | | | |
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ATKINS
 TBPE REG. # F-474

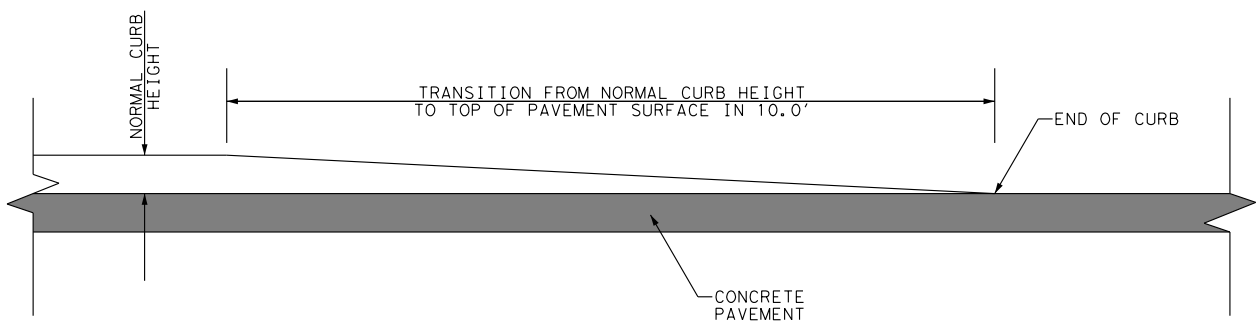
Texas Department of Transportation
 © 2018

MISCELLANEOUS
 DETAILS

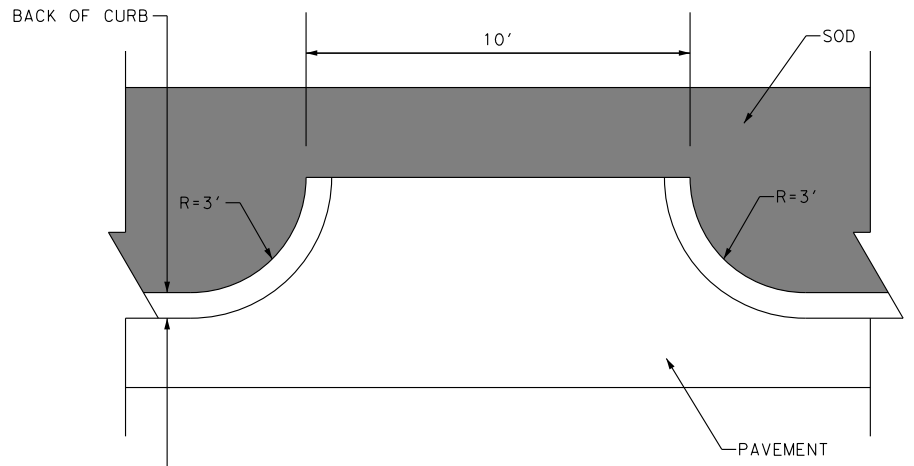
SHEET 1 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 164 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotdrv.tbl
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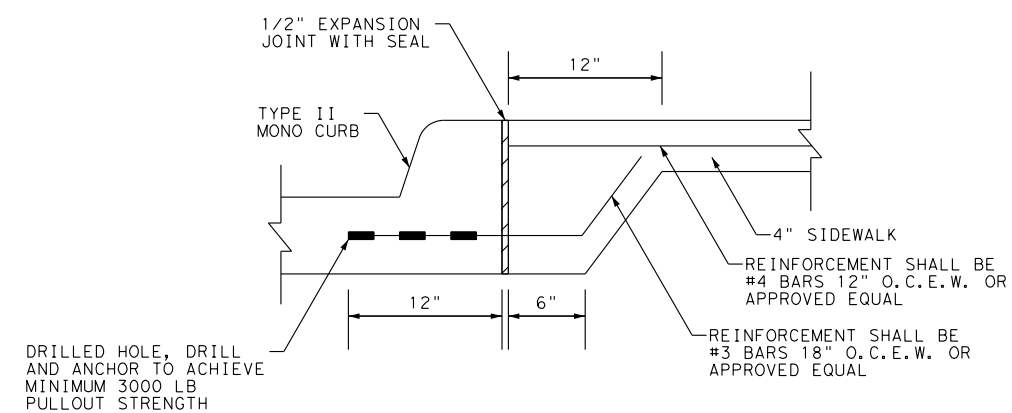


CURB END TRANSITION
NTS

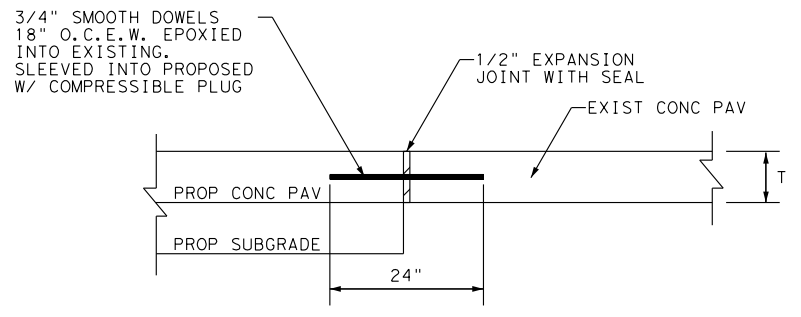


MOWER CURB DETAIL
NTS

- NOTE:
1. PLACE THE MOWER CURB AT A LOCATION THAT MINIMIZES THE IMPACTS TO TRAFFIC AND MUST BE APPROVED BY THE ENGINEER.
 2. MOWER CURB WILL NOT BE PAID FOR DIRECTLY BUT WILL BE SUBSIDIARY TO ITEM 529.



DETAIL AT SIDEWALK
NTS



EXPANSION JOINT DETAIL
NTS
NOTE: SEAL JOINT AGAINST THE CURB
TO BE USED WHERE PROPOSED CONCRETE PAVEMENT MEETS EXISTING CONCRETE PAVEMENT



| NO. | DATE | REVISION | BY |
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ATKINS
TBPE REG. # F-474



**MISCELLANEOUS
DETAILS**

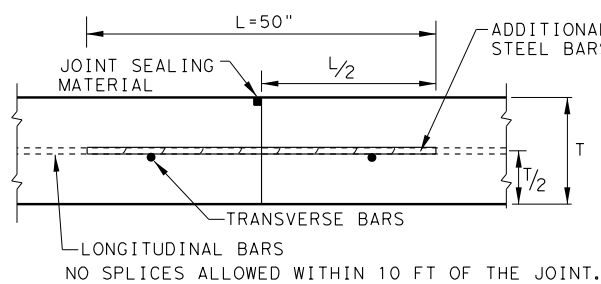
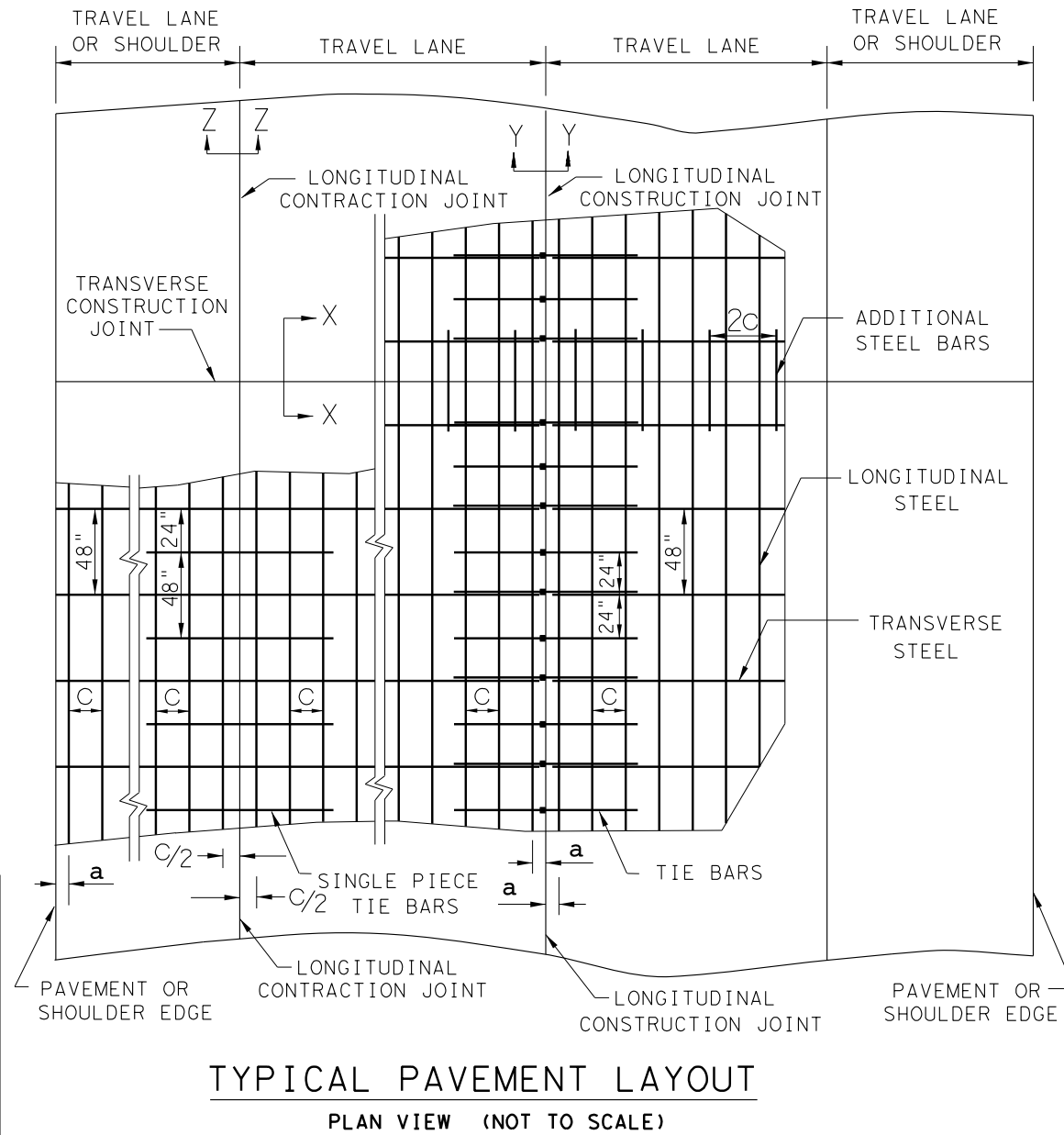
SHEET 2 OF 2

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 165 |
| CHECK WL | CONTROL | SECTION | JOB | |
| CHECK WL | 1015 | 01 | 023 | |

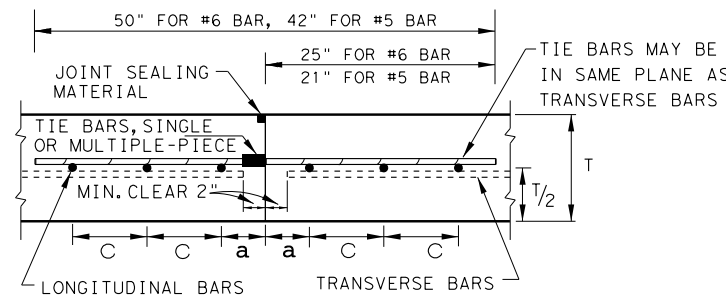
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| TABLE NO.1 LONGITUDINAL STEEL | | | | | |
|-------------------------------|----------|--------------------|--------------------------------|--|----------------|
| SLAB THICKNESS AND BAR SIZE | | REGULAR STEEL BARS | FIRST SPACING AT EDGE OR JOINT | ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X) | |
| T (IN.) | BAR SIZE | SPACING C (IN.) | SPACING a (IN.) | SPACING 2 X C (IN.) | LENGTH L (IN.) |
| 7.0 | #5 | 6.5 | 3 TO 4 | 13 | 50 |
| 7.5 | #5 | 6.0 | 3 TO 4 | 12 | 50 |
| 8.0 | #6 | 9.0 | 3 TO 4 | 18 | 50 |
| 8.5 | #6 | 8.5 | 3 TO 4 | 17 | 50 |
| 9.0 | #6 | 8.0 | 3 TO 4 | 16 | 50 |
| 9.5 | #6 | 7.5 | 3 TO 4 | 15 | 50 |
| 10.0 | #6 | 7.0 | 3 TO 4 | 14 | 50 |
| 10.5 | #6 | 6.75 | 3 TO 4 | 13.5 | 50 |
| 11.0 | #6 | 6.5 | 3 TO 4 | 13 | 50 |
| 11.5 | #6 | 6.25 | 3 TO 4 | 12.5 | 50 |
| 12.0 | #6 | 6.0 | 3 TO 4 | 12 | 50 |
| 12.5 | #6 | 5.75 | 3 TO 4 | 11.5 | 50 |
| 13.0 | #6 | 5.5 | 3 TO 4 | 11 | 50 |

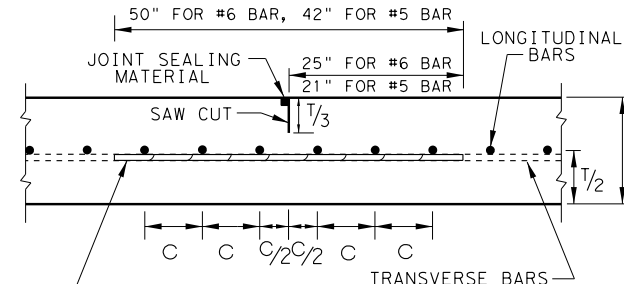
| TABLE NO.2 TRANSVERSE STEEL AND TIE BARS | | | | | | |
|--|------------------|---------------|--|---------------|--|---------------|
| SLAB THICKNESS (IN.) | TRANSVERSE STEEL | | TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Z-Z) | | TIE BARS AT LONGITUDINAL CONTRACTION JOINT (SECTION Y-Y) | |
| | BAR SIZE | SPACING (IN.) | BAR SIZE | SPACING (IN.) | BAR SIZE | SPACING (IN.) |
| 7.0 - 7.5 | #5 | 48 | #5 | 48 | #5 | 24 |
| 8.0 - 13.0 | #5 | 48 | #6 | 48 | #6 | 24 |



TRANSVERSE CONSTRUCTION JOINT
SECTION X - X



LONGITUDINAL CONTRACTION JOINT
SECTION Y - Y



LONGITUDINAL CONTRACTION JOINT
SECTION Z - Z



CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
ONE LAYER STEEL BAR PLACEMENT
T - 7 to 13 INCHES
CRCP(1)-17

| | | | | |
|--|-----------|----------|--------|-----------|
| FILE: crcp117.dgn | DN: TxDOT | CK: AN | DW: HC | CK: VP/KM |
| © TxDOT: May 2017 | CONT | SECT | JOB | HIGHWAY |
| 10/10/2011 ADD GN #12 | 1015 | 01 | 023 | FM 3549 |
| 04/09/2013 REMOVE 6" AND 6.5" ADD CTE REQUIREMENTS | DIST | COUNTY | | SHEET NO. |
| 05/05/2017 COTE AS RATED 4.3 | DAL | ROCKWALL | | 166 |

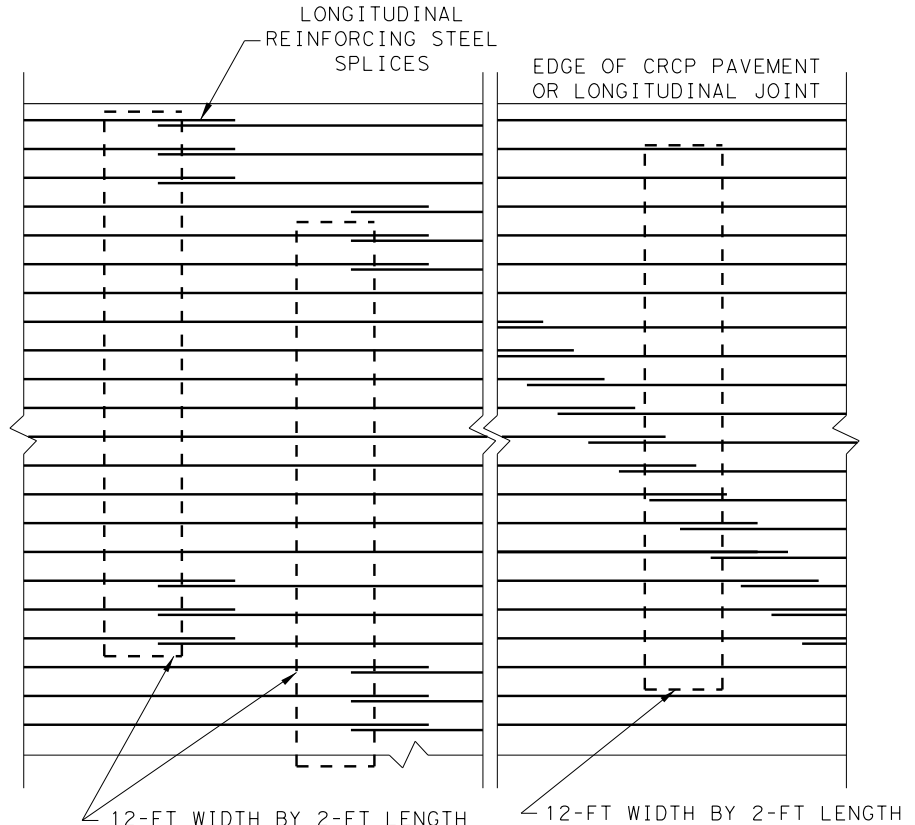
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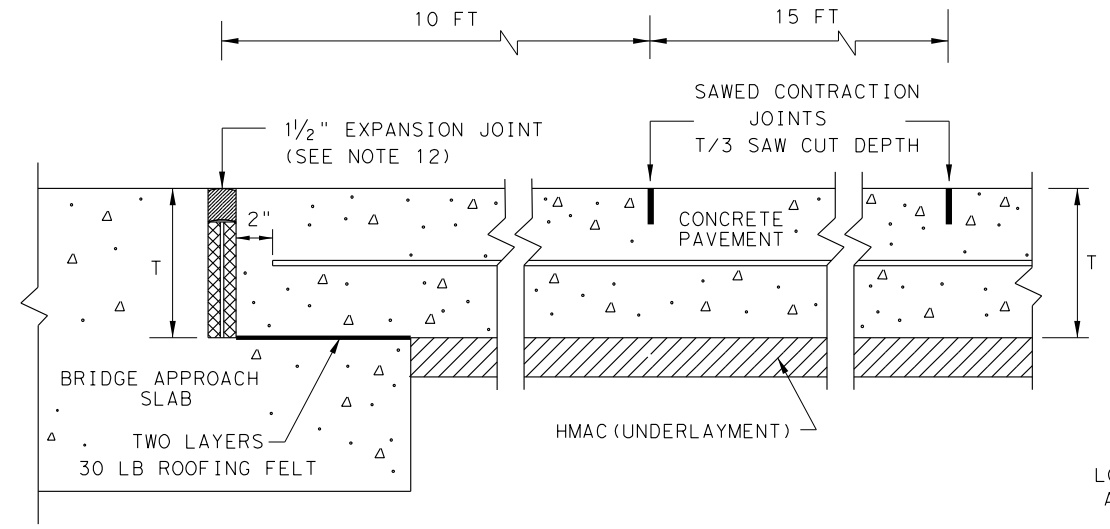
TABLE NO.1A LONGITUDINAL STEEL FOR LOW COTE CONCRETE AS APPROVED BY THE ENGINEER

| SLAB THICKNESS AND BAR SIZE | | REGULAR STEEL BARS | FIRST SPACING AT EDGE OR JOINT | ADDITIONAL STEEL BARS AT TRANSVERSE CONSTRUCTION JOINT (SECTION X-X) | |
|-----------------------------|----------|--------------------|--------------------------------|--|----------------|
| T (IN.) | BAR SIZE | SPACING C (IN.) | SPACING a (IN.) | SPACING 2 x C (IN.) | LENGTH L (IN.) |
| 7.0 | #5 | 7.5 | 3 TO 4 | 15 | 50 |
| 7.5 | #5 | 7.0 | 3 TO 4 | 14 | 50 |
| 8.0 | #6 | 10.0 | 3 TO 4 | 20 | 50 |
| 8.5 | #6 | 9.5 | 3 TO 4 | 19 | 50 |
| 9.0 | #6 | 9.0 | 3 TO 4 | 18 | 50 |
| 9.5 | #6 | 8.5 | 3 TO 4 | 17 | 50 |
| 10.0 | #6 | 8.0 | 3 TO 4 | 16 | 50 |
| 10.5 | #6 | 7.5 | 3 TO 4 | 15 | 50 |
| 11.0 | #6 | 7.0 | 3 TO 4 | 14 | 50 |
| 11.5 | #6 | 6.75 | 3 TO 4 | 13.5 | 50 |
| 12.0 | #6 | 6.50 | 3 TO 4 | 13 | 50 |
| 12.5 | #6 | 6.25 | 3 TO 4 | 12.5 | 50 |
| 13.0 | #6 | 6.0 | 3 TO 4 | 12 | 50 |

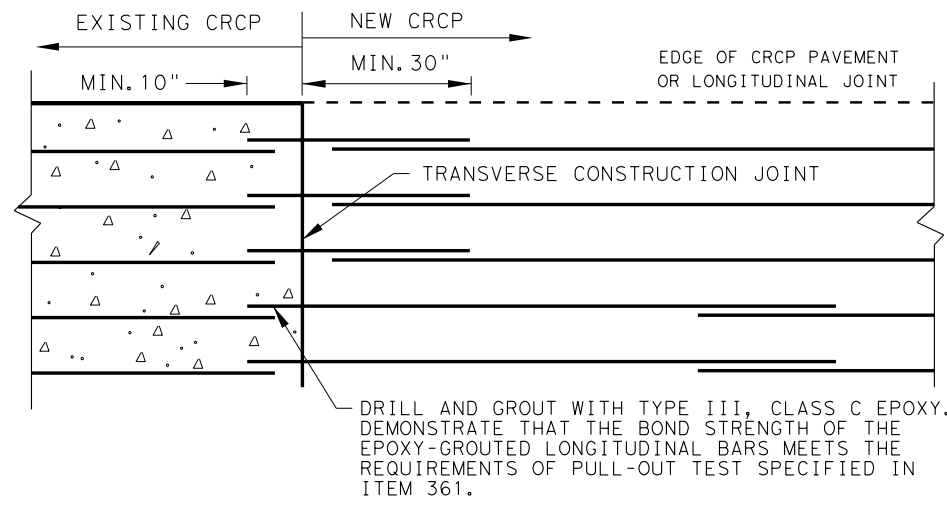


STAGGER THE LAP LOCATIONS SO THAT NO MORE THAN 1/3 OF THE LONGITUDINAL STEEL IS SPLICED IN ANY GIVEN 12-FT. WIDTH AND 2-FT. LENGTH OF THE PAVEMENT. ANY OTHER LAP CONFIGURATION MEETING THIS REQUIREMENT WILL BE ALLOWED.

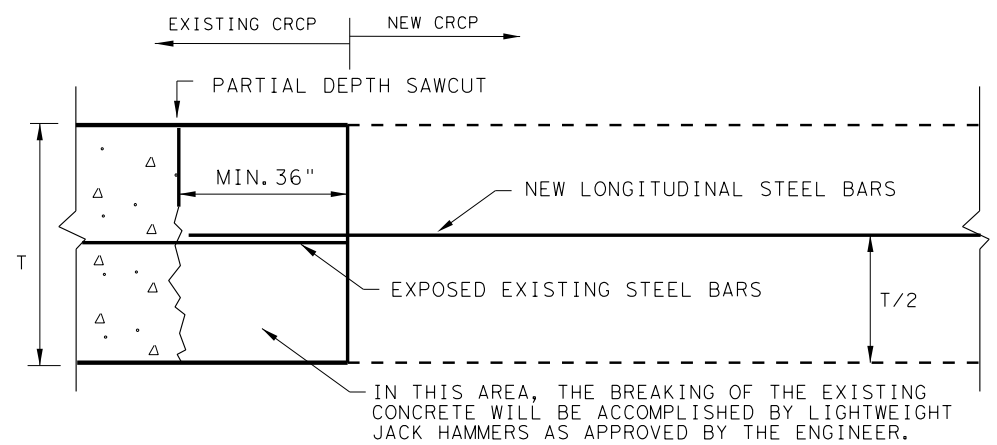
EXAMPLES OF LAP CONFIGURATION
 PLAN VIEW (NOT TO SCALE)



TRANSVERSE EXPANSION JOINT DETAIL AT BRIDGE APPROACH

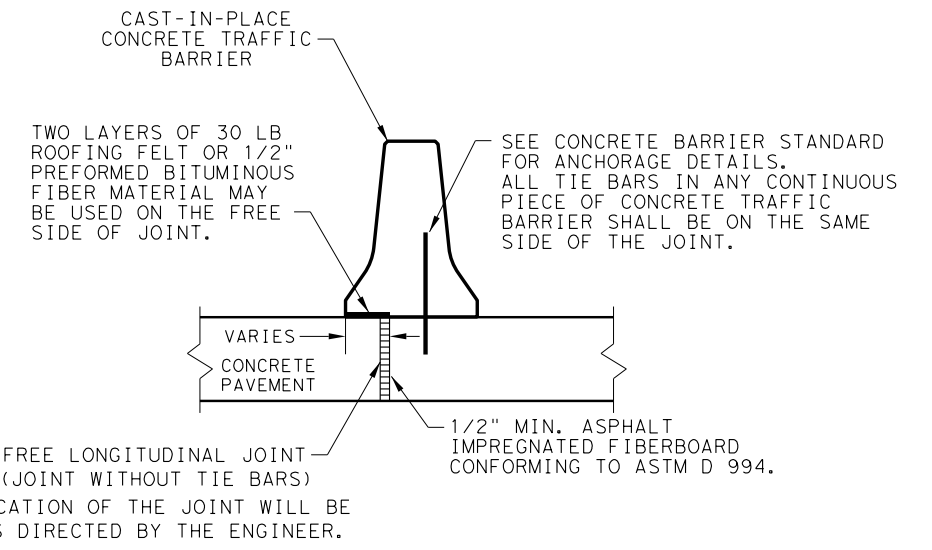


OPTION A: DRILL AND EPOXY
 PLAN VIEW (NOT TO SCALE)

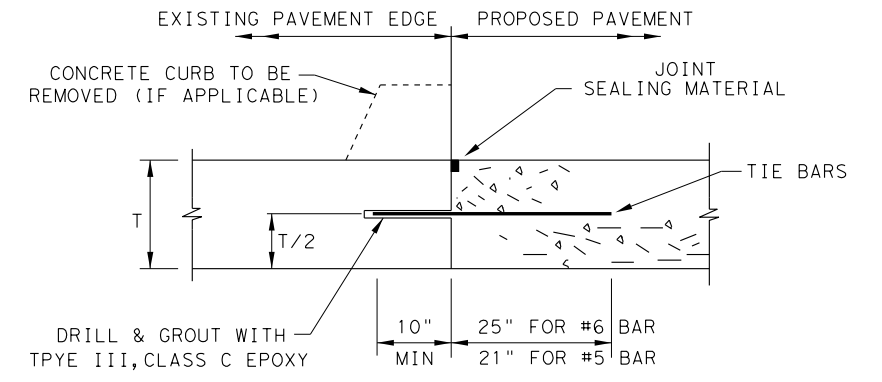


OPTION B: BREAKBACK AND LAP

TRANSVERSE TIE JOINT DETAIL EXISTING CRCP TO NEW CRCP



FREE LONGITUDINAL JOINT DETAIL



- BEFORE WIDENING WORK, DEMONSTRATE THAT THE BOND STRENGTH OF THE EPOXY-GROUTED TIE BARS MEETS THE REQUIREMENTS OF PULL-OUT TEST SPECIFIED IN ITEM 361.
- SPACE TIE BARS AT 24" SPACING. USE #6 TIE BARS FOR 8" AND THICKER SLABS, USE #5 TIE BARS FOR LESS THAN 8" THICK SLABS.

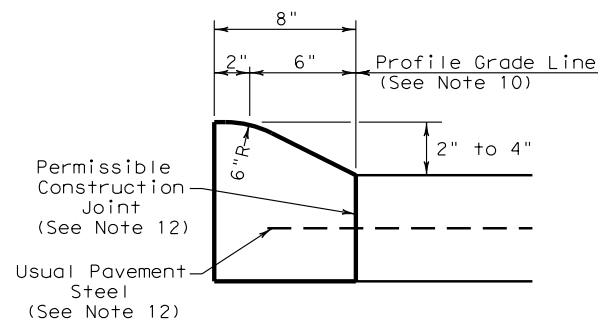
LONGITUDINAL WIDENING JOINT DETAIL

SHEET 2 OF 2

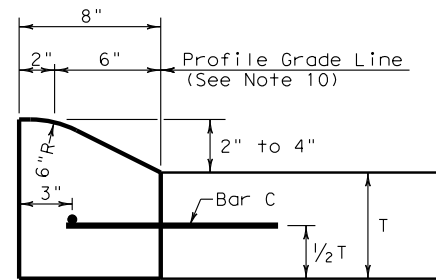
| | | | |
|---|-----------|---------------------------------|---------|
| | | Design Division Standard | |
| CONTINUOUSLY REINFORCED CONCRETE PAVEMENT ONE LAYER STEEL BAR PLACEMENT T - 7 to 13 INCHES CRCP (1) - 17 | | | |
| FILE: crcp117.dgn | DN: TxDOT | CK: AN | DW: HC |
| ©TxDOT: May 2017 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 167 | |

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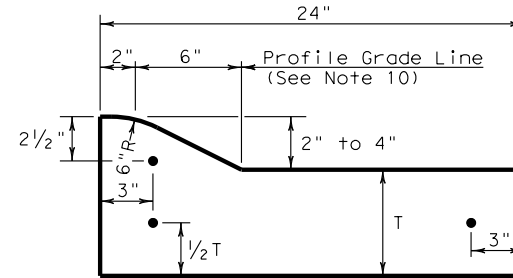
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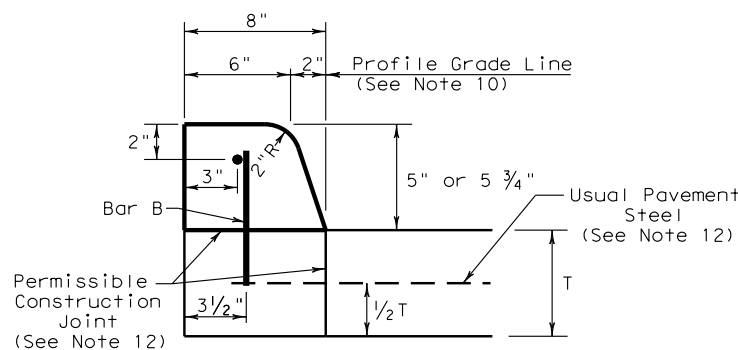
**TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT**



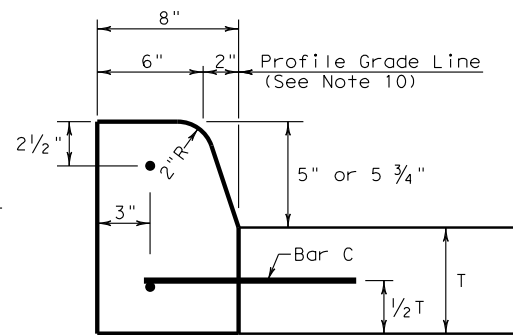
**TYPE I CURB AND GUTTER
2" - 4" HEIGHT**



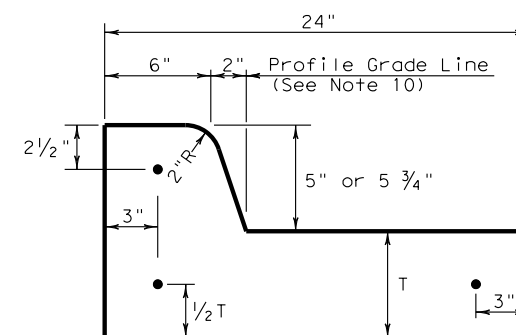
**TYPE I CURB AND GUTTER
2" - 4" HEIGHT**



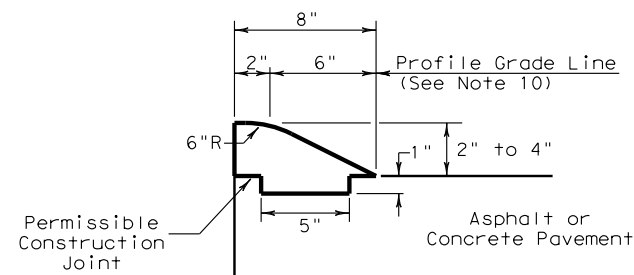
**TYPE II CURB (MONOLITHIC)
5" - 5 3/4" HEIGHT**



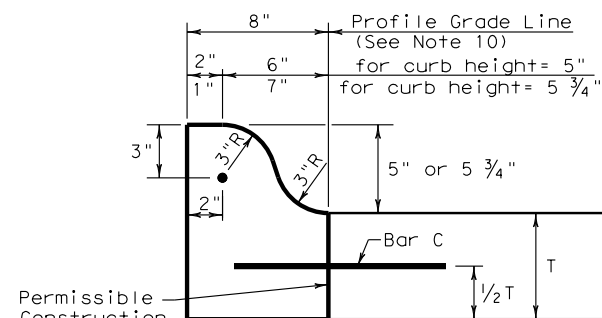
**TYPE II CURB AND GUTTER
5" - 5 3/4" HEIGHT**



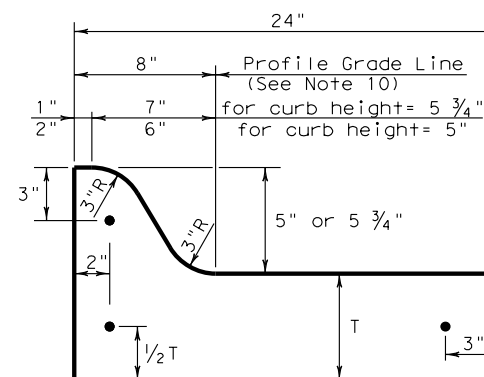
**TYPE II CURB AND GUTTER
5" - 5 3/4" HEIGHT**



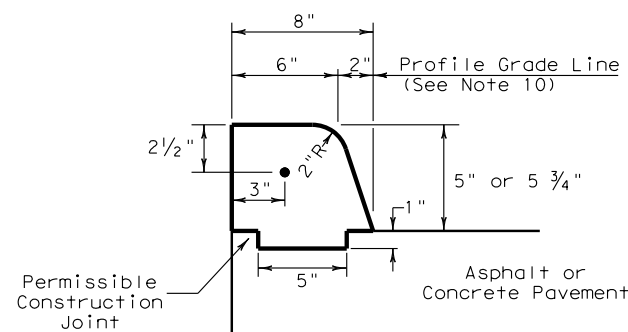
**TYPE III CURB (KEYED)
2" - 4" HEIGHT**



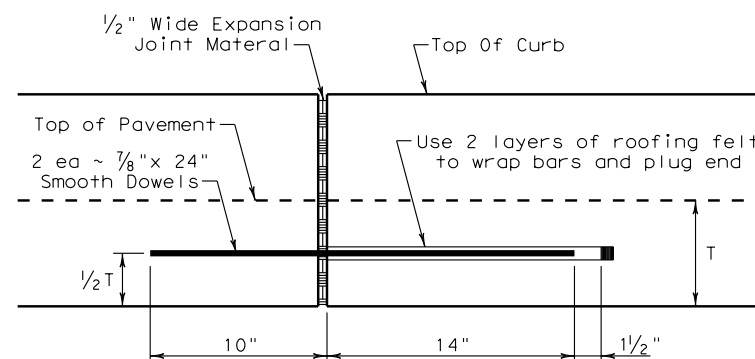
**TYPE IIa CURB
5" - 5 3/4" HEIGHT**



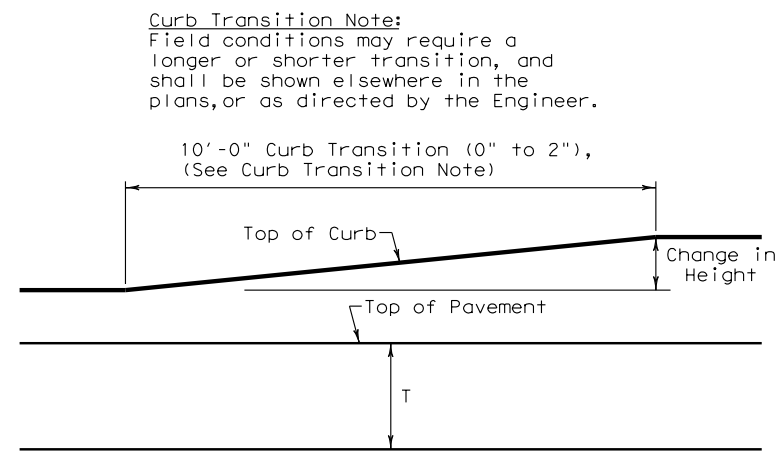
**TYPE IIa CURB AND GUTTER
5" - 5 3/4" HEIGHT**



**TYPE IV CURB (KEYED)
5" - 5 3/4" HEIGHT**



EXPANSION JOINT DETAIL

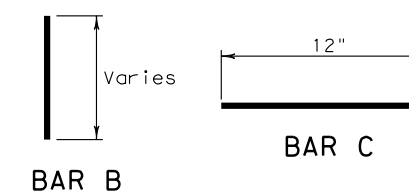


CURB TRANSITION

Note: To be paid for as Highest Curb

General Notes

- All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
- Concrete shall be Class A.
- When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Producer List (MPL), maintained by TxDOT, Construction Division.
- Round exposed sharp edges with a rounding tool, to a minimum radius of 1/4 inch.
- All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
- Where concrete curb is placed on existing concrete pavement, the pavement shall be drilled and the reinforcing bars grouted in place.
- Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
- Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C-C.
- Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
- Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
- One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
- When vertical permissible construction joints are used, resulting in a longitudinal construction joint in the pavement, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans for longitudinal construction joints. Reinforcing steel for curb section shall then conform to that required for concrete curb.

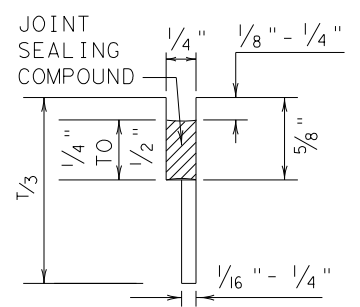


Curb Transition Note:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.

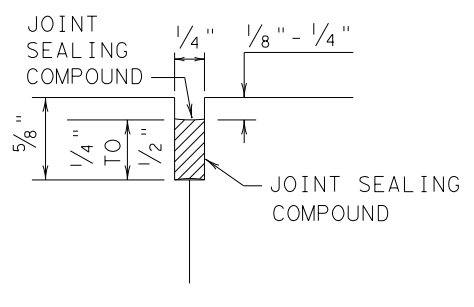
| | | | | | |
|--|-----------|----------|--------|---------------------------------|------|
| | | | | Design Division Standard | |
| <h2>CONCRETE CURB AND GUTTER</h2> <h3>CCCG-12</h3> | | | | | |
| FILE: cccg12.dgn | DN: TxDOT | CK: AM | DW: VP | CK: | |
| © TxDOT: 1995 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 | 01 | 023 | FM | 3549 |
| UPDATED 2012 - VP | DIST | COUNTY | | SHEET NO. | |
| | DAL | ROCKWALL | | | 168 |

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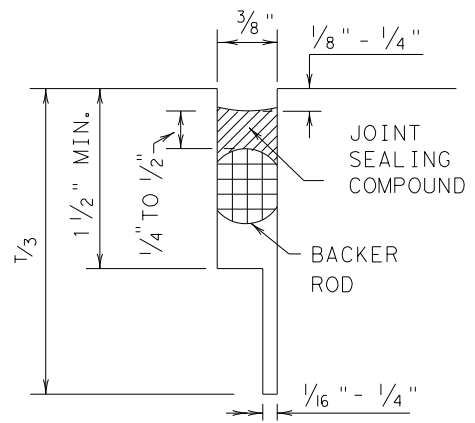
METHOD B: JOINT SEALING COMPOUND



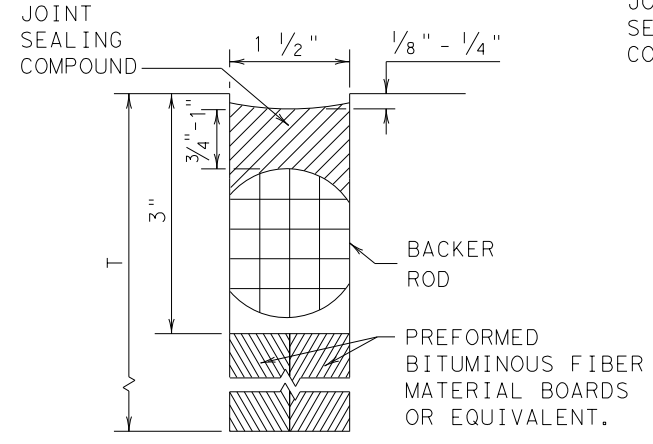
LONGITUDINAL SAWED CONTRACTION JOINT



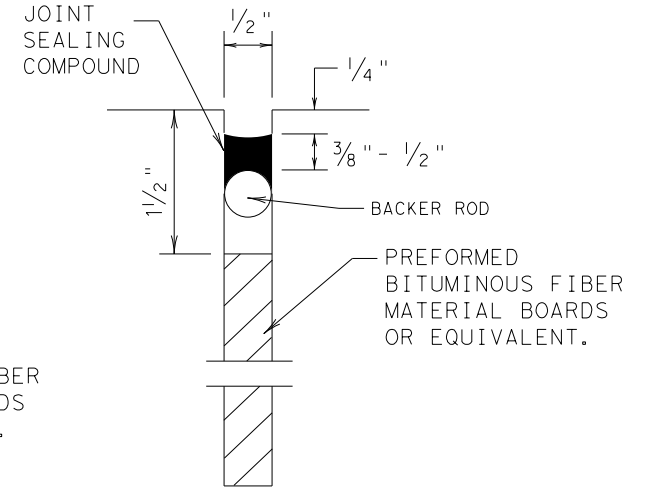
LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT



TRANSVERSE SAWED CONTRACTION JOINT

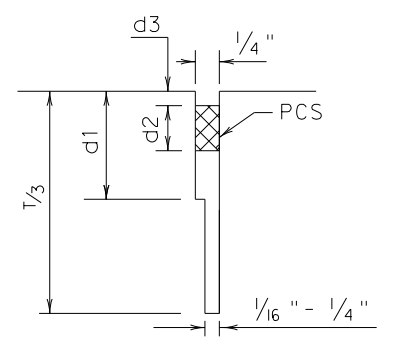


TRANSVERSE FORMED EXPANSION JOINT

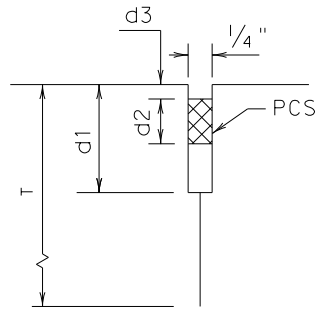


FORMED ISOLATION JOINT

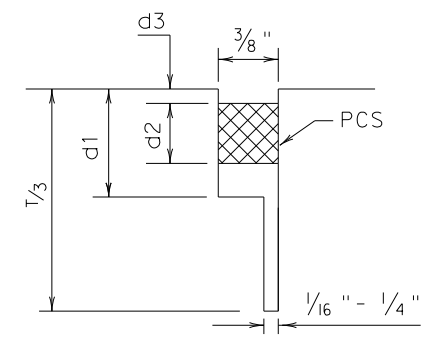
METHOD A: PREFORMED COMPRESSION SEALS (PCS) (DMS-6310 CLASS 6)



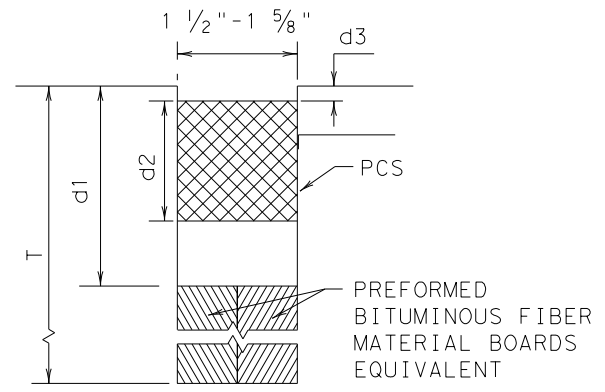
LONGITUDINAL SAWED CONTRACTION JOINT



LONGITUDINAL CONSTRUCTION JOINT



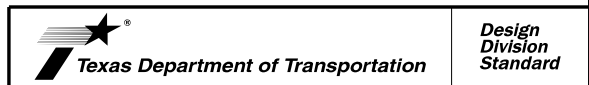
TRANSVERSE SAWED CONTRACTION JOINT



TRANSVERSE FORMED EXPANSION JOINT

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, EITHER METHOD "A" OR METHOD "B" MAY BE USED.
2. THE LOCATION OF JOINTS SHALL BE AS SHOWN ELSEWHERE IN THE PLANS.
3. THE JOINT RESERVOIR FOR SEALANT OR PCS SHALL BE SAWED UNLESS OTHERWISE SHOWN ON THE PLANS FOR THE LONGITUDINAL AND TRANSVERSE CONSTRUCTION JOINTS AND THE SAWED JOINTS.
4. DIMENSIONS d1, d2, AND d3 SHOWN IN METHOD A SHALL BE IN ACCORDANCE WITH THE PREFORMED COMPRESSION SEAL MANUFACTURER'S RECOMMENDATION.
5. REFER TO DMS-6310 "JOINT SEALANTS AND FILLERS" FOR THE CLASSIFICATIONS.
6. FOR SAWED LONGITUDINAL JOINT, LONGITUDINAL OR TRANSVERSE CONSTRUCTION JOINT, USE JOINT SEALANT CLASS 5 OR 8 UNLESS OTHERWISE SHOWN ON THE PLAN OR APPROVED.
7. FOR TRANSVERSE SAWED CONTRACTION, TRANSVERSE FORMED EXPANSION JOINT, AND ISOLATION JOINT USE JOINT SEALANT CLASS 5 OR 8 AT NEW JOINTS. USE JOINT SEALANT CLASS 4,5,7,OR 8 FOR MAINTAINING EXISTING JOINTS.
8. THE JOINTS SHALL BE CLEANED IN ACCORDANCE WITH THE ITEM 438 "CLEANING AND SEALING JOINTS" OR ITEM 713 "CLEANING AND SEALING JOINTS AND CRACKS (CONCRETE PAVEMENT)".
9. ISOLATION JOINTS ACCOMMODATE HORIZONTAL AND VERTICAL MOVEMENTS THAT OCCUR BETWEEN A PAVEMENT AND A STRUCTURE. ISOLATION JOINTS MAY BE USED FOR BRIDGE ABUTMENTS, INTERSECTIONS, CURB AND GUTTER, OLD AND NEW PAVEMENTS, OR AROUND DRAINAGE INLETS, MANHOLES, FOOTINGS AND LIGHTING STRUCTURES.

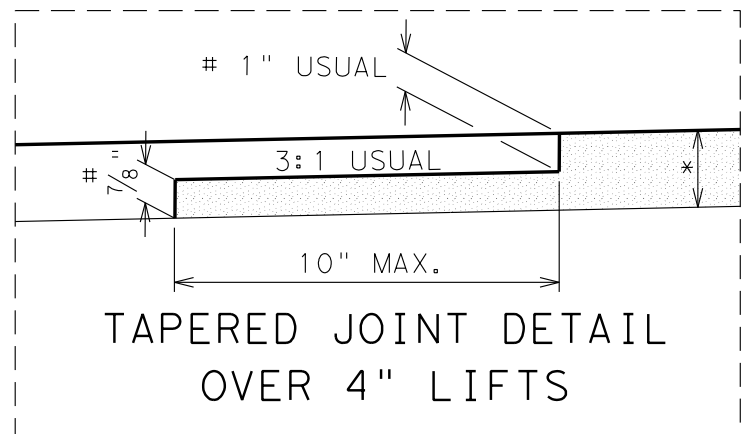
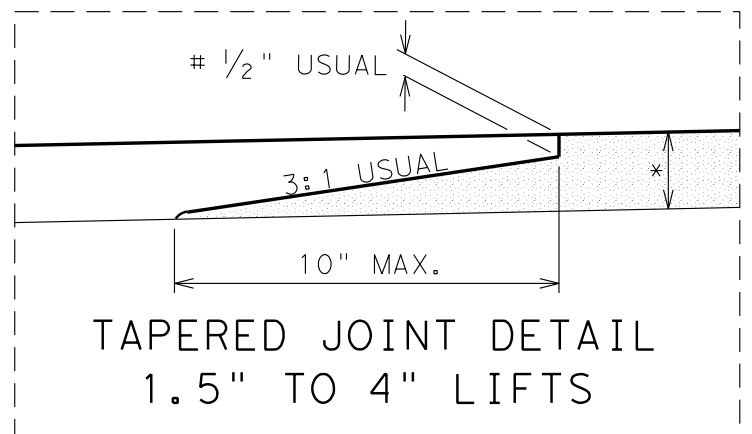
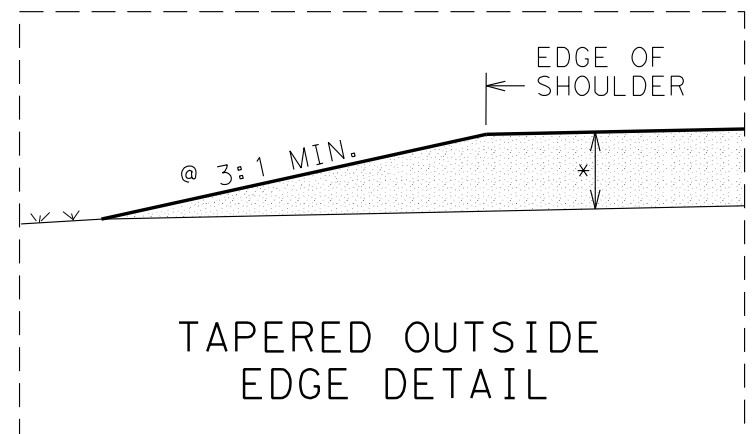
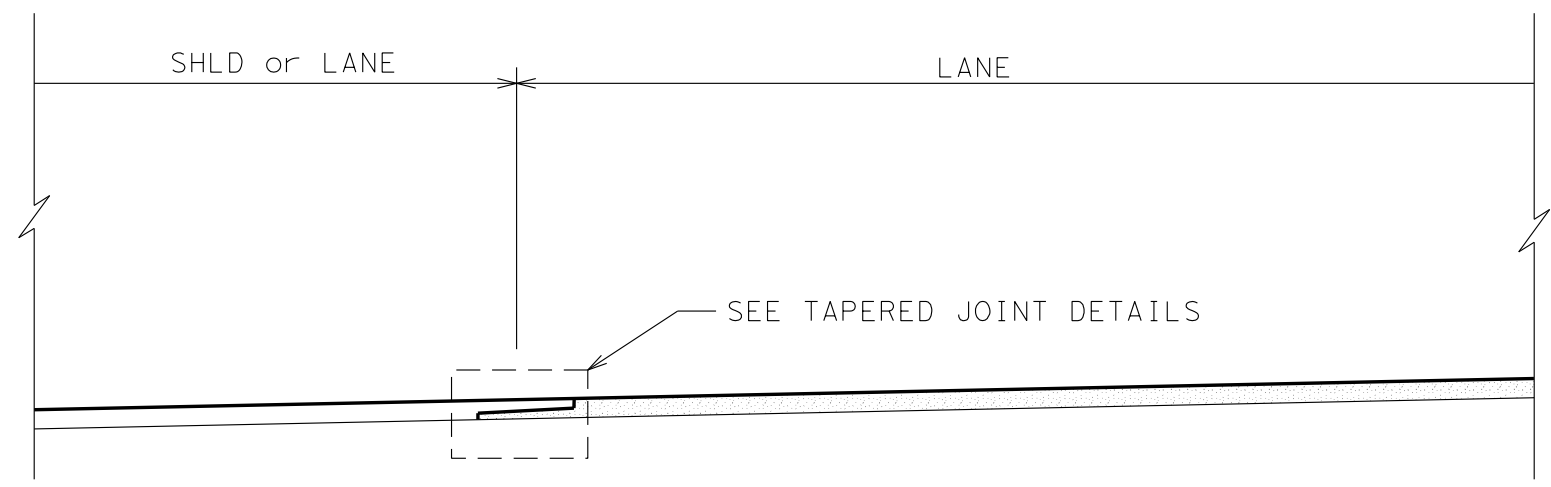


CONCRETE PAVING DETAILS
JOINT SEALS

JS-14

| | | | | |
|------------------------|-----------|--------|-----------|---------|
| FILE: js14.dgn | DN: TxDOT | DN: HC | DN: HC | CK: AN |
| © TxDOT: DECEMBER 2014 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| DIST | COUNTY | | SHEET NO. | |
| DAL | ROCKWALL | | 169 | |

DATE:
FILE:




@ IF BACKFILLED SLOPE IS LESS THAN 3:1, COVER WEDGE WITH APPROVED BACKFILL.

* SEE TYPICAL SECTION FOR DEPTH AND TYPE OF HMA.
NOTCH DEPTH SHALL NOT BE LESS THAN NOMINAL AGGREGATE SIZE.

NOTES:

1. THE ABOVE DETAILS SHALL BE CONSTRUCTED BY TAPERING THE BITUMINOUS MAT. THE TAPERED PORTION SHALL EXTEND BEYOND THE NORMAL LANE WIDTH AND BE LAID MONOLITHICALLY WITH ADJOINING MAT. THE TAPERED PORTION OF THE MAT SHALL BE CONSTRUCTED BY THE USE OF AN APPROVED STRIKE-OFF DEVICE THAT WILL PROVIDE A UNIFORM SLOPE AND WILL NOT RESTRICT THE MAIN SCREED. CLEAN WEDGE PRIOR TO PLACEMENT OF TACK COAT. TACK COAT SHALL BE APPLIED UNIFORMLY TO THE IN-PLACE TAPER WITH A DISTRIBUTOR BEFORE THE ADJACENT MAT IS PLACED. FINAL DENSITY REQUIREMENTS FOR THE ENTIRE PAVEMENT, INCLUDING THE TAPER AREA, WILL REMAIN UNCHANGED. COMPACTION OF THE INITIAL TAPER SECTION WILL BE REQUIRED AS NEAR TO FINAL DENSITY AS POSSIBLE. ROLL ADJACENT MAT FROM HOT SIDE TO COLD.
2. THE TYPE OF DEVICE TO PRODUCE ABOVE REFERENCED DETAILS SHALL PROVIDE INITIAL COMPACTION EQUIVALENT TO LAYDOWN MACHINE, WITH FINAL DENSITY ADHERING TO NOTE 1, AND BE APPROVED BY THE ENGINEER.
3. HOT MIX MATERIAL AND PLACEMENT SHALL BE PAID FOR UNDER THE PERTINENT ITEM. ANY ADDITIONAL SURFACE PREPARATION, TACK COAT, TACK COAT PLACEMENT, EQUIPMENT, LABOR, TOOLS AND INCIDENTALS TO PRODUCE TAPERED EDGE AND JOINTS AS DESCRIBED ABOVE SHALL BE CONSIDERED SUBSIDIARY TO THE HOT MIX ITEM.
4. THE TAPERED JOINT DETAIL IS NOT INTENDED FOR USE ON 2 WAY 2 LANE ROADBED CENTERLINE WITH LESS THAN 22' OVERALL WIDTH.
5. FULL PAVING OF ALL LANES AND SHOULDRS BY THE END OF EACH DAY PRODUCTION WILL NOT REQUIRE A TAPERED JOINT.


 Texas Department of Transportation

HOT MIX EDGE AND LONGITUDINAL JOINT DETAILS
DALLAS DISTRICT STANDARD
LJD(1-1)-07

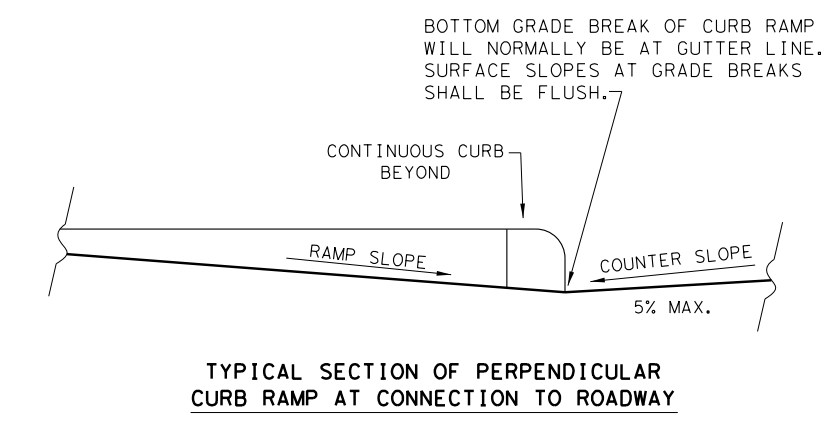
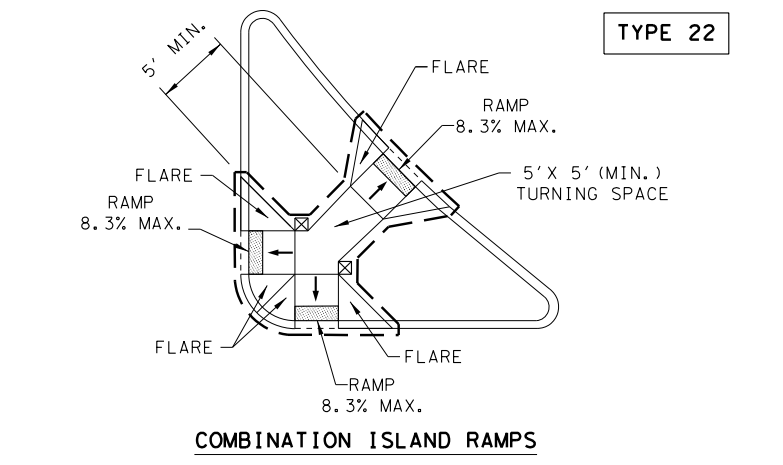
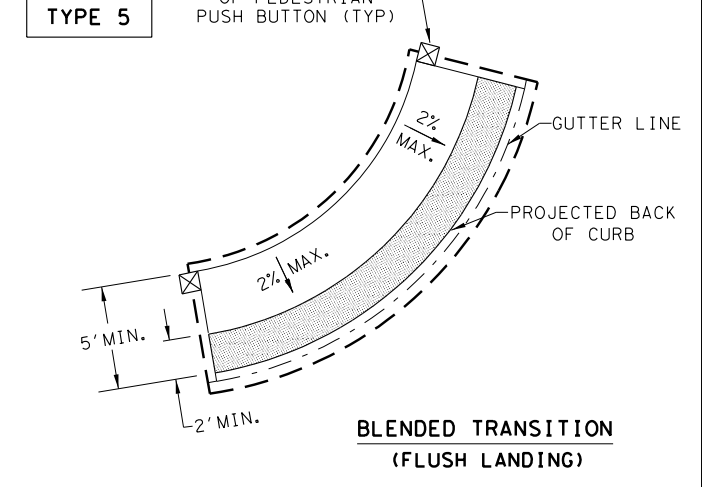
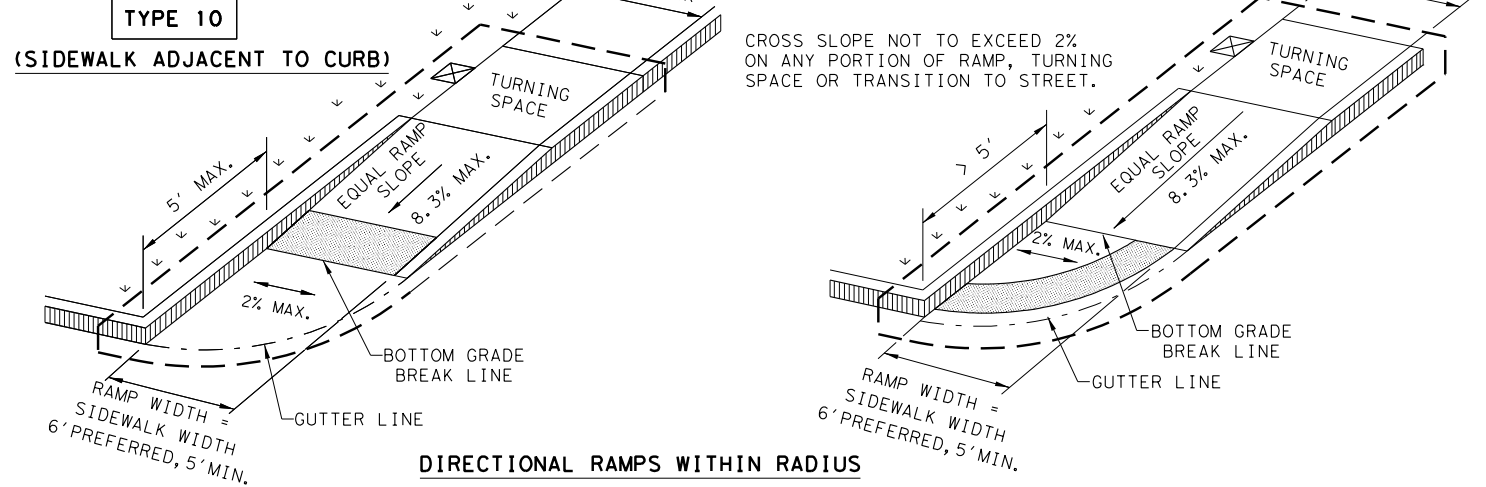
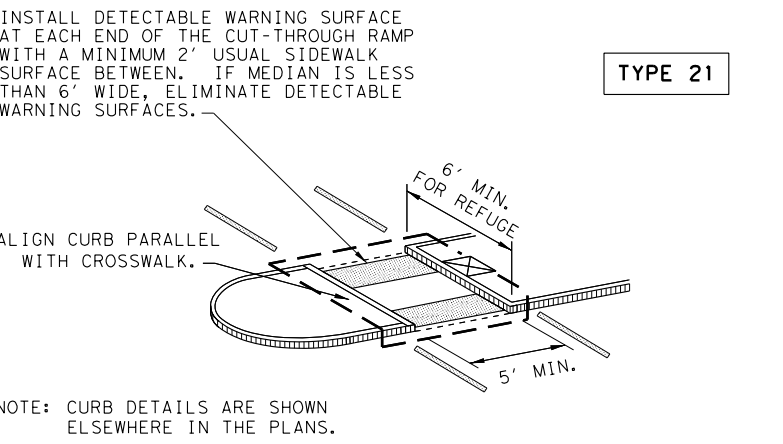
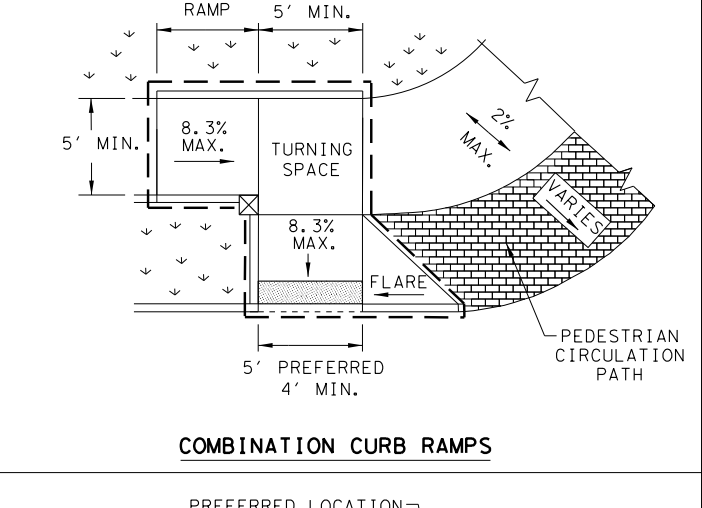
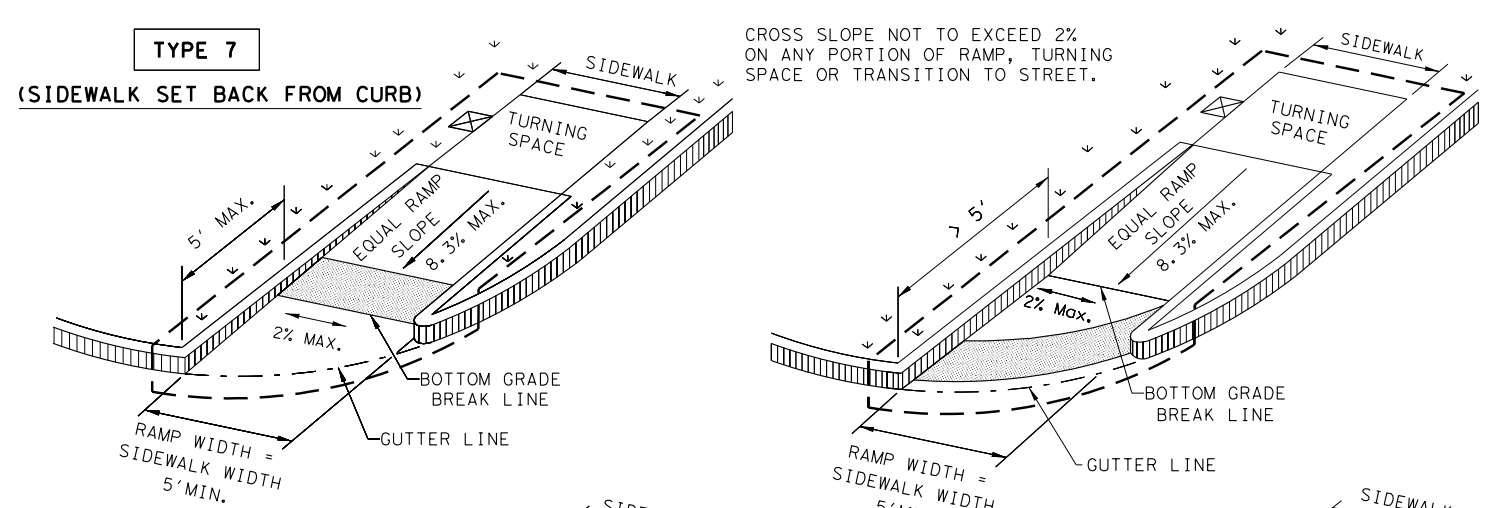
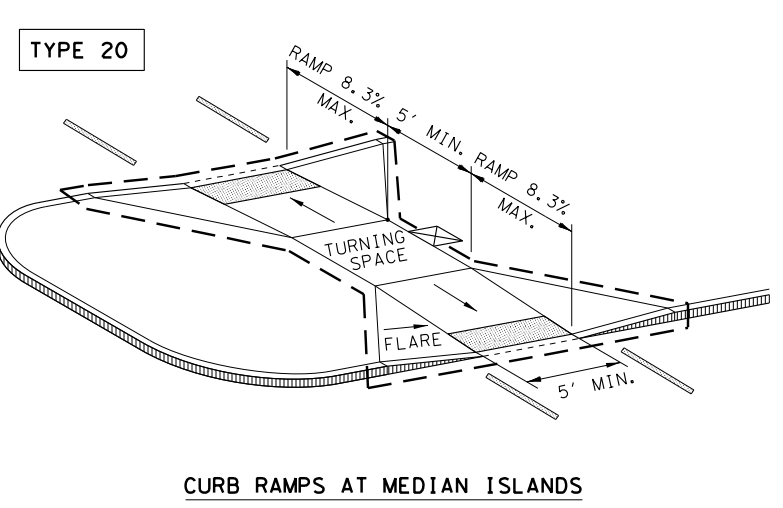
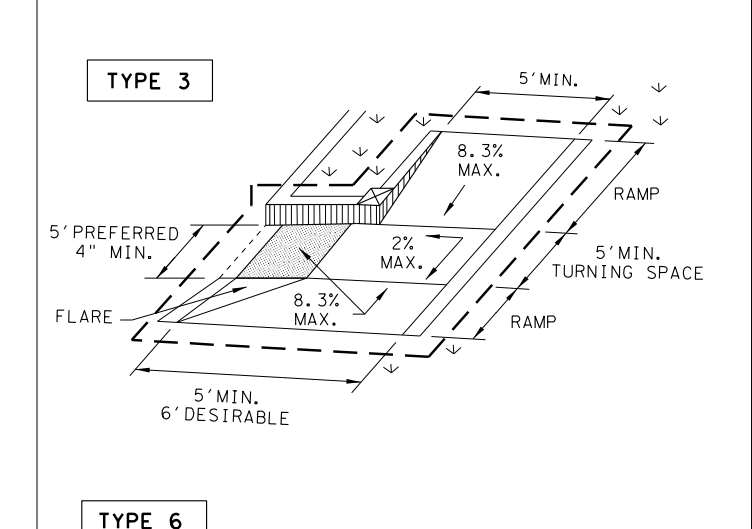
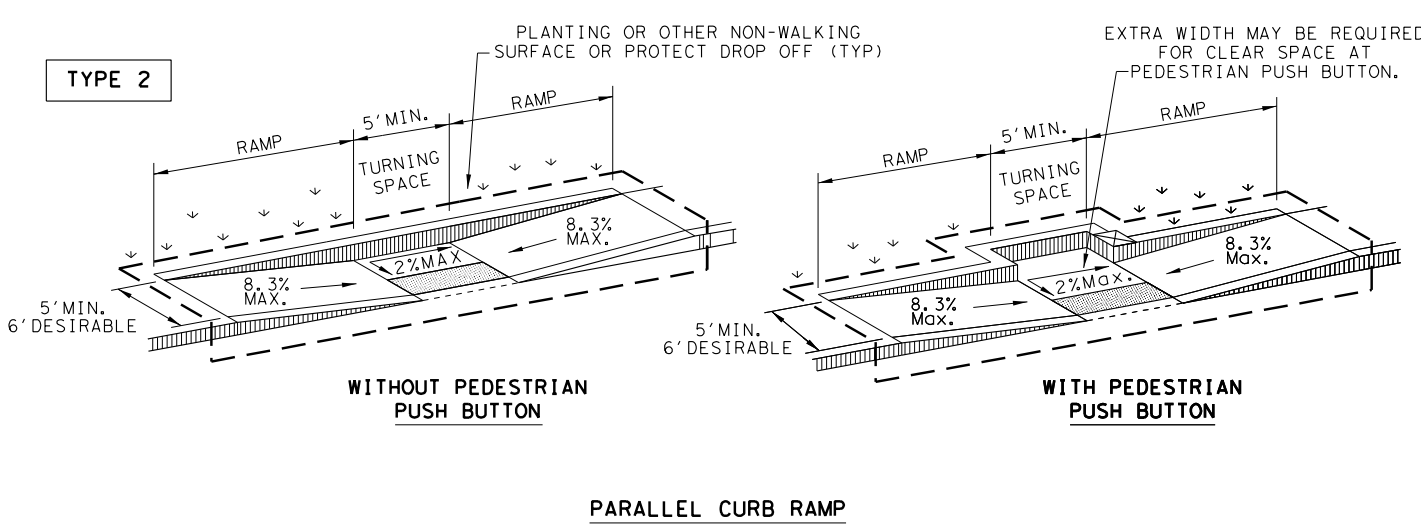
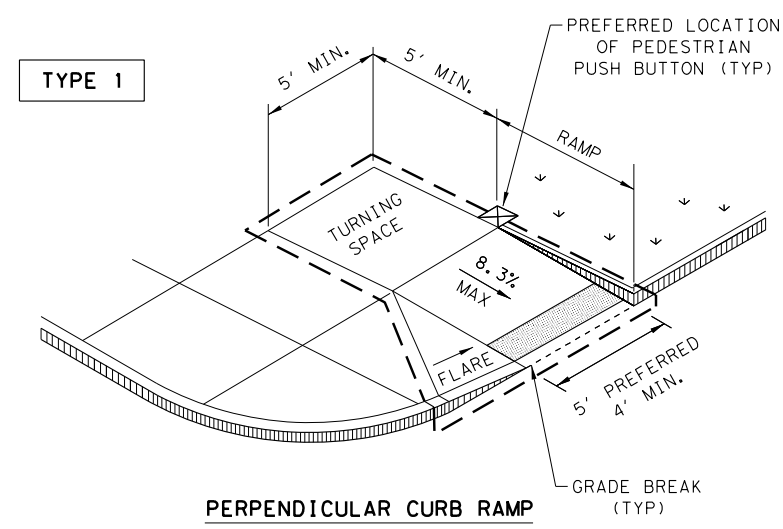
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|-------------------|-----------------|----------------|
| FED. RD. DIV. NO. | PROJECT NUMBER | SHEET NUMBER |
| 18 | SEE TITLE SHEET | 170 |
| STATE | DISTRICT | COUNTY |
| TEXAS | DALLAS | DALLAS |
| CONTROL | SECTION | SECTION |
| 1015 | 01 | 023 |
| | | HIGHWAY NUMBER |
| | | FM 3549 |

REVISED ON 9/10/08

FILENAME: ... \CADD\PAV\ljd11.dgn

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DATE: FILE:



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.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

Detectable Warning Surface: [Symbol]

Gutter Line: [Symbol]

Grade Break: [Symbol]

Ramp Limits of Payment: [Symbol]

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

| | | | | |
|----------------------|-----------|----------|-----------|-------------|
| FILE: ped18 | DN: TxDOT | DW: VP | CK: KM | CK: PK & JG |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| REVISED 08, 2009 | DIST | COUNTY | SHEET NO. | |
| REVISED 06, 2012 | DAL | ROCKWALL | 171 | |
| REVISED 01, 2018 | | | | |

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GENERAL NOTES

CURB RAMP

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

DETECTABLE WARNING MATERIAL

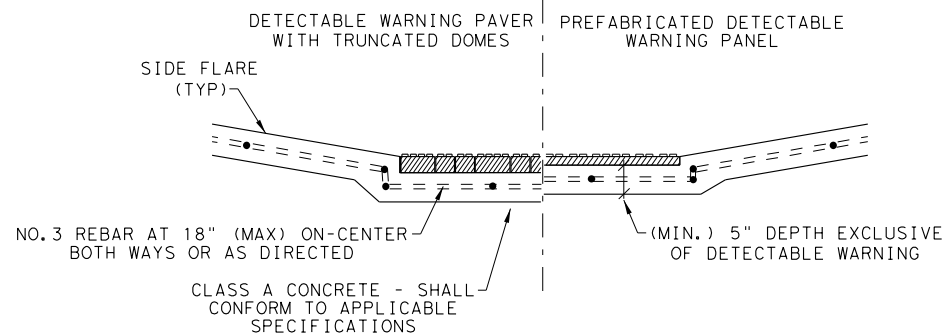
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material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

DETECTABLE WARNING PAVERS (IF USED)

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

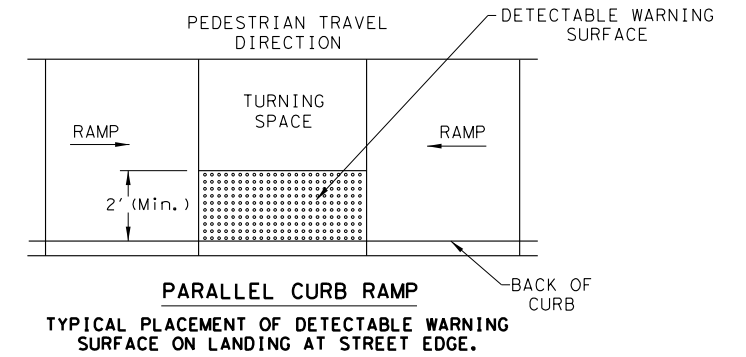
SIDEWALKS

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

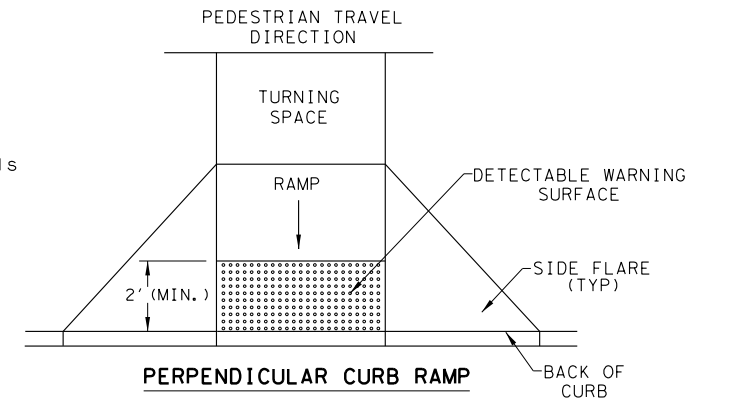


**SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS**

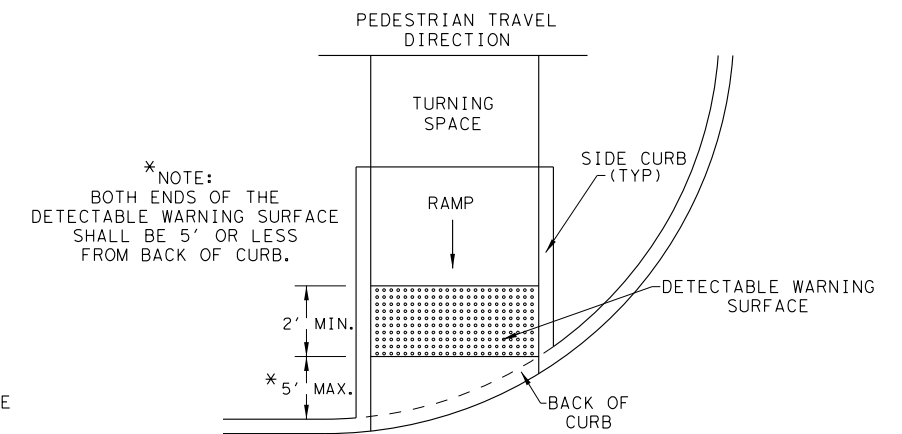
DETECTABLE WARNING SURFACE DETAILS



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



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



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

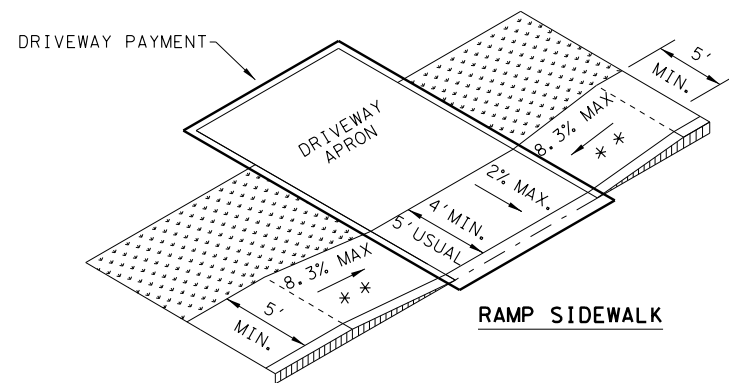
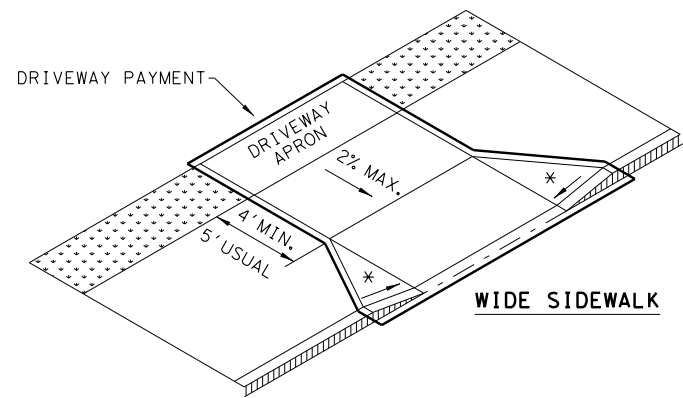
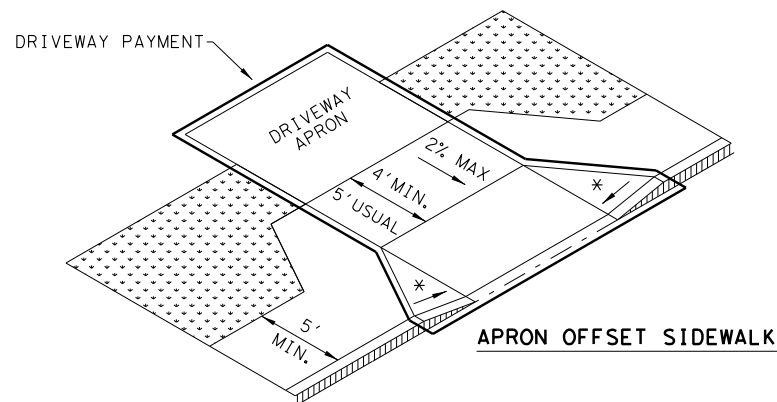
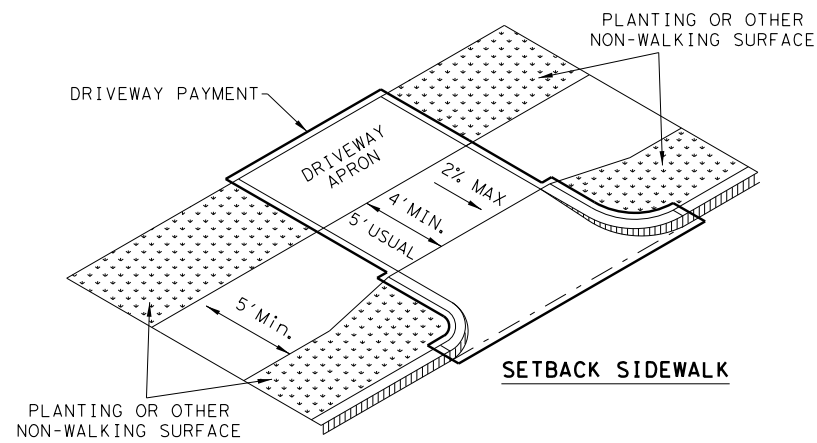
SHEET 2 OF 4

| | | | |
|--|-----------|---------------------------------|-----------|
| | | Design Division Standard | |
| <h1>PEDESTRIAN FACILITIES</h1> <h2>CURB RAMPS</h2> <h3>PED-18</h3> | | | |
| FILE: ped18 | DN: TxDOT | DW: VP | CK: KM |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB |
| REVISIONS | 1015 | 01 | 023 |
| REVISED 08, 2005 | DIST | COUNTY | SHEET NO. |
| REVISED 06, 2012 | DAL | ROCKWALL | 172 |
| REVISED 01, 2018 | | | |

DATE:
FILE:

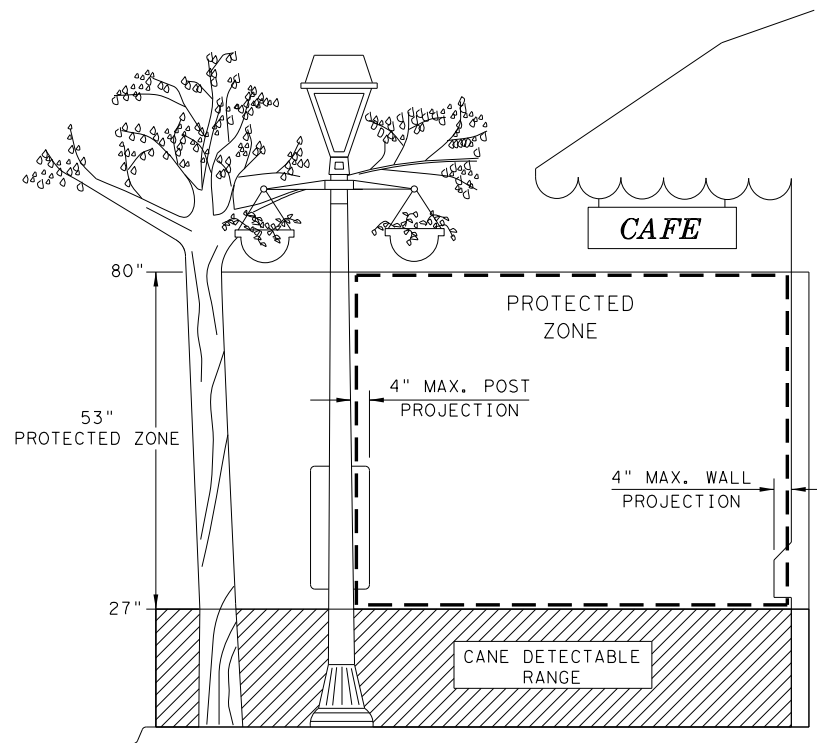
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SIDEWALK TREATMENT AT DRIVEWAYS

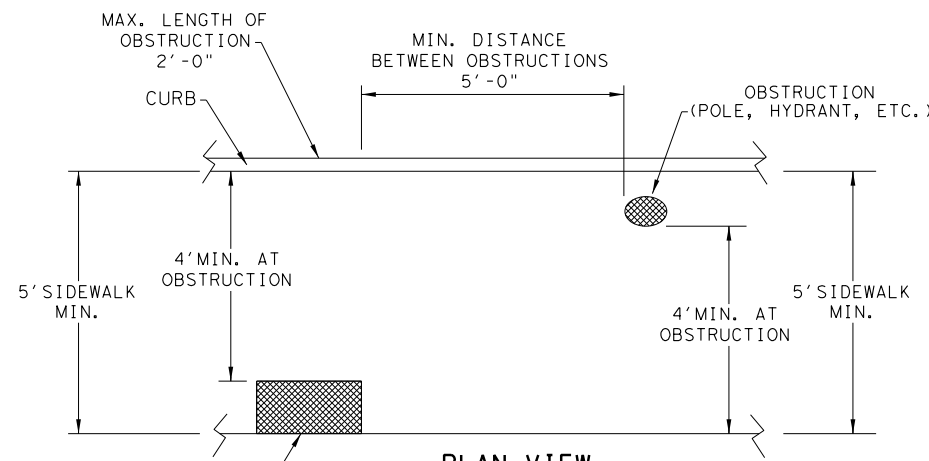
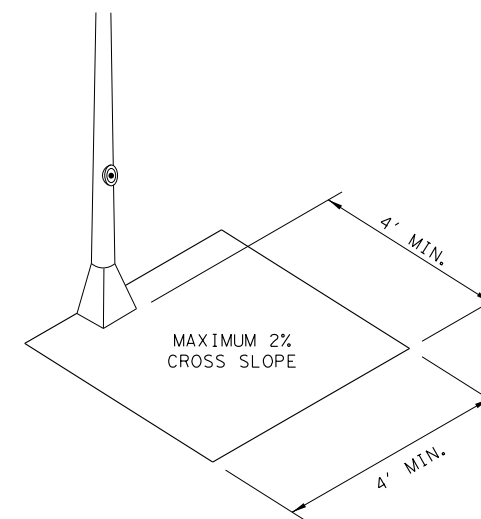


NOTES:

- * WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
- * * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

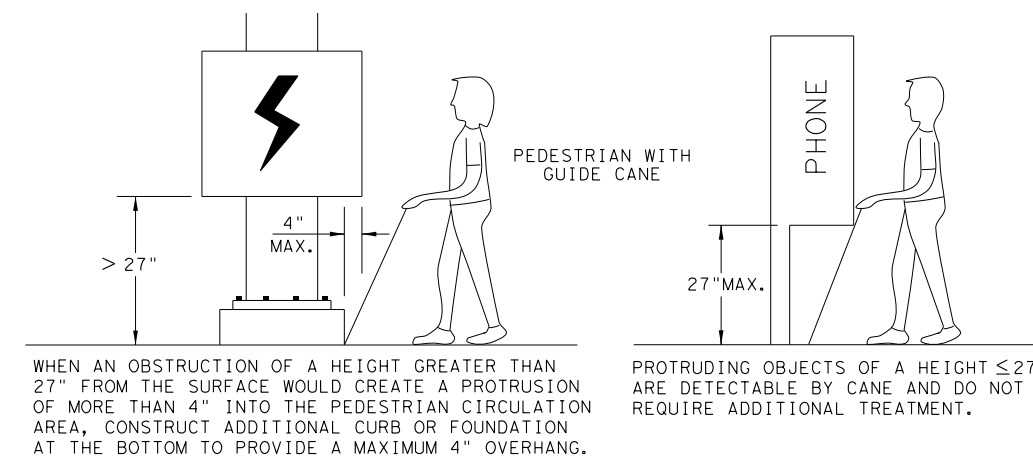


NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



PLACEMENT OF STREET FIXTURES

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



SHEET 3 OF 4



PEDESTRIAN FACILITIES
CURB RAMPS

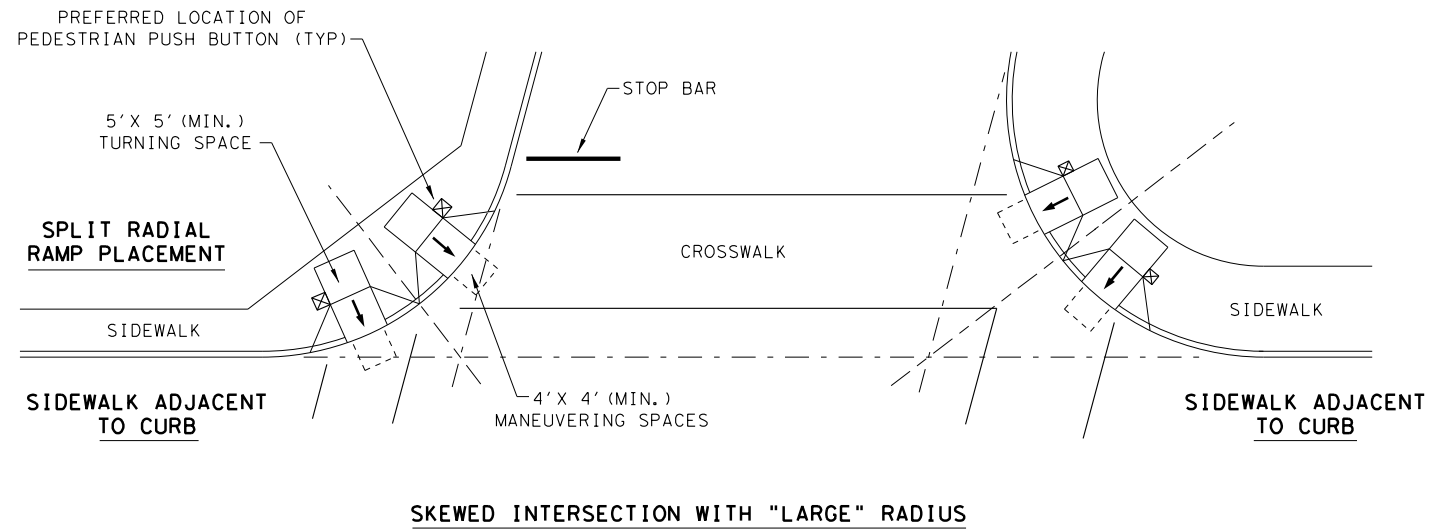
PED-18

| | | | | |
|----------------------|-----------|----------|-----------|-------------|
| FILE: ped18 | DN: TxDOT | DW: VP | CK: KM | CK: PK & JG |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| REVISED 08, 2005 | DIST | COUNTY | SHEET NO. | |
| REVISED 06, 2012 | DAL | ROCKWALL | 173 | |
| REVISED 01, 2018 | | | | |

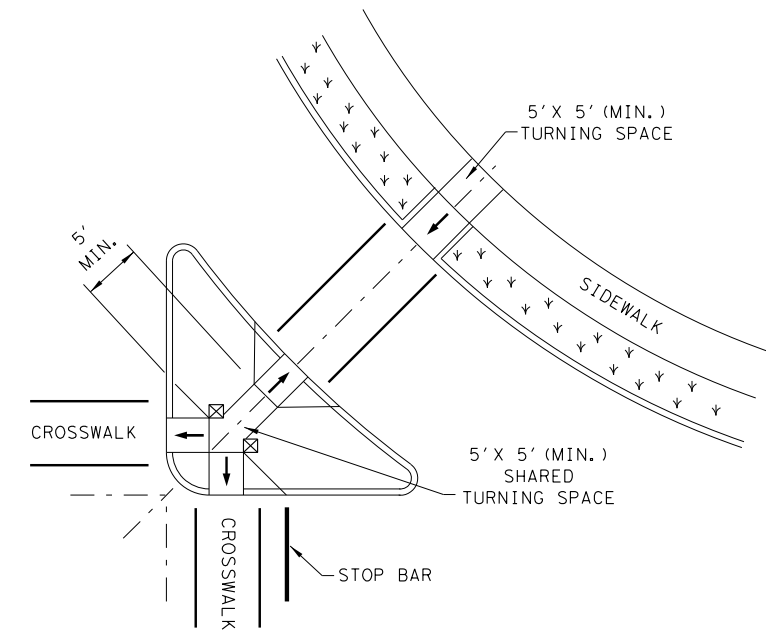
DATE:
FILE:

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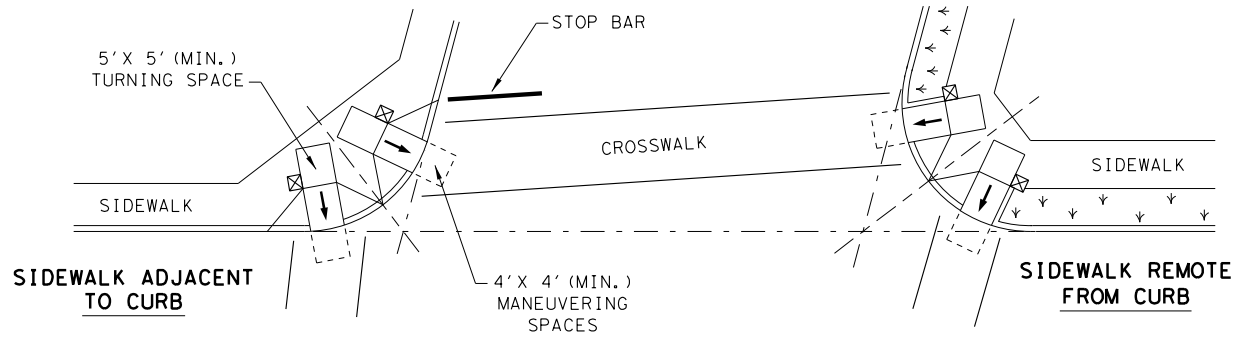
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



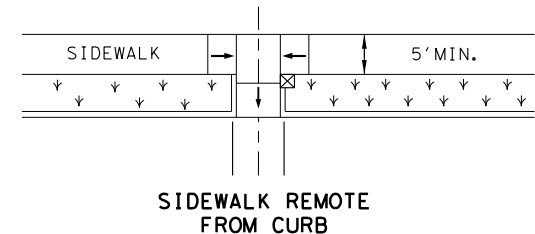
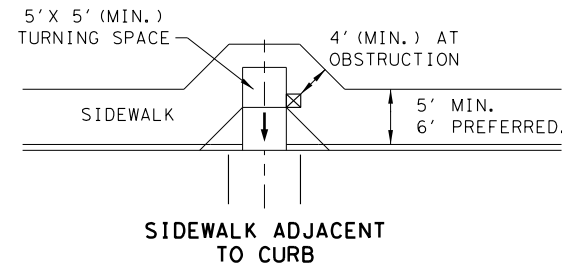
SKewed INTERSECTION WITH "LARGE" RADIUS



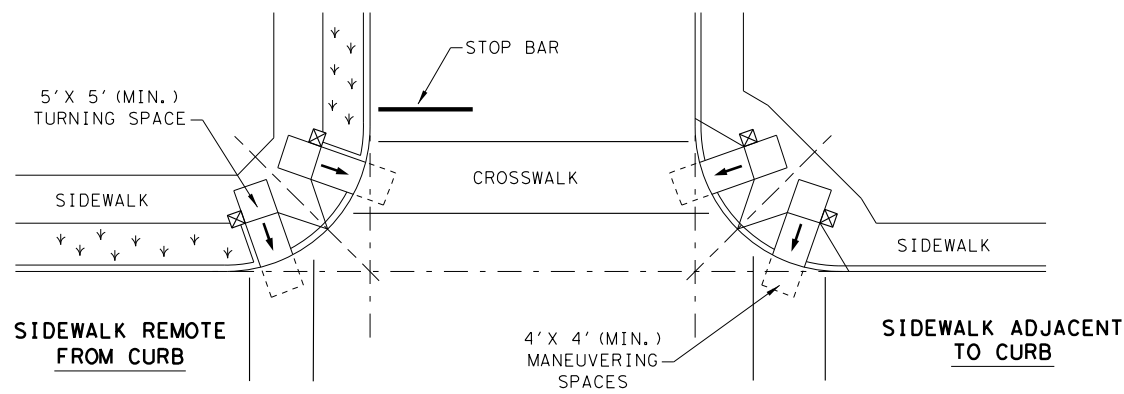
AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKewed INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

- SHOWS DOWNWARD SLOPE. →
- DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ☒
- DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH. ↙ ↘

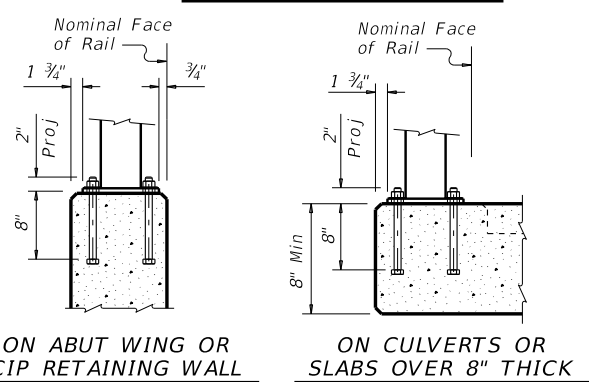
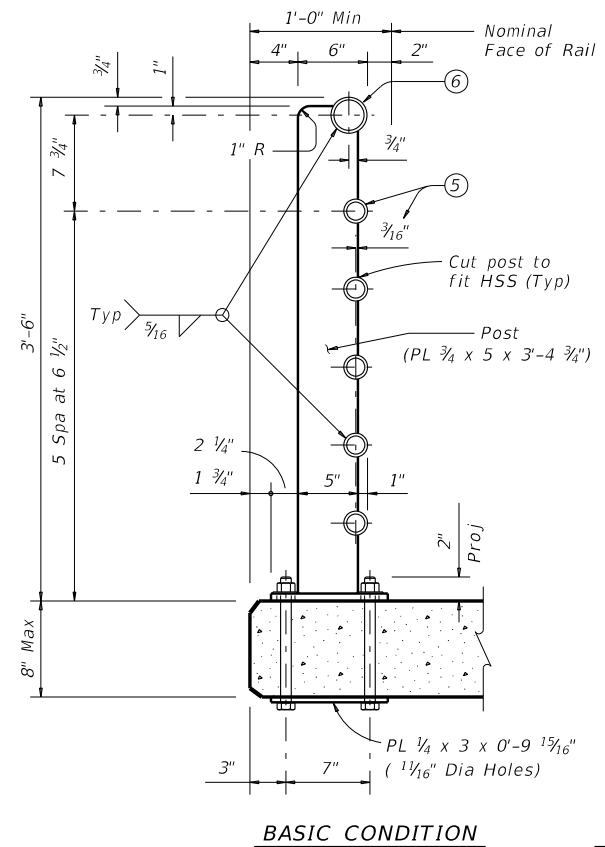
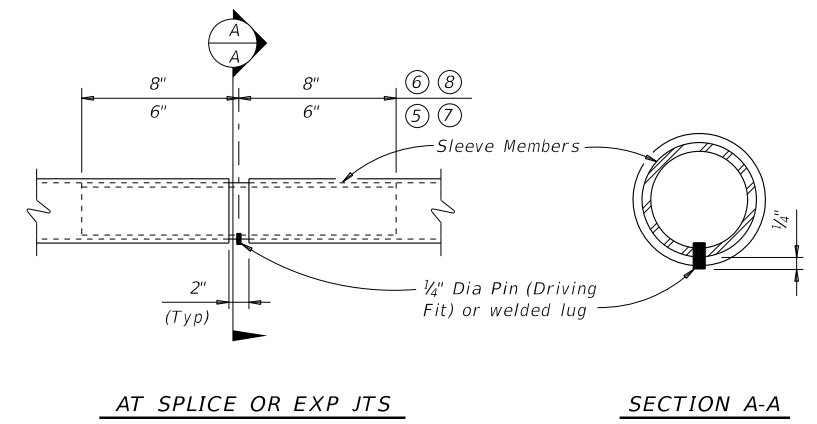
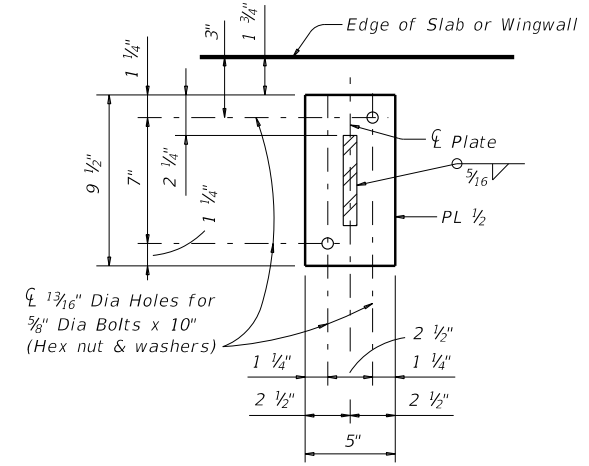
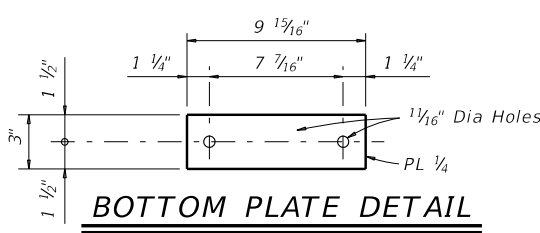
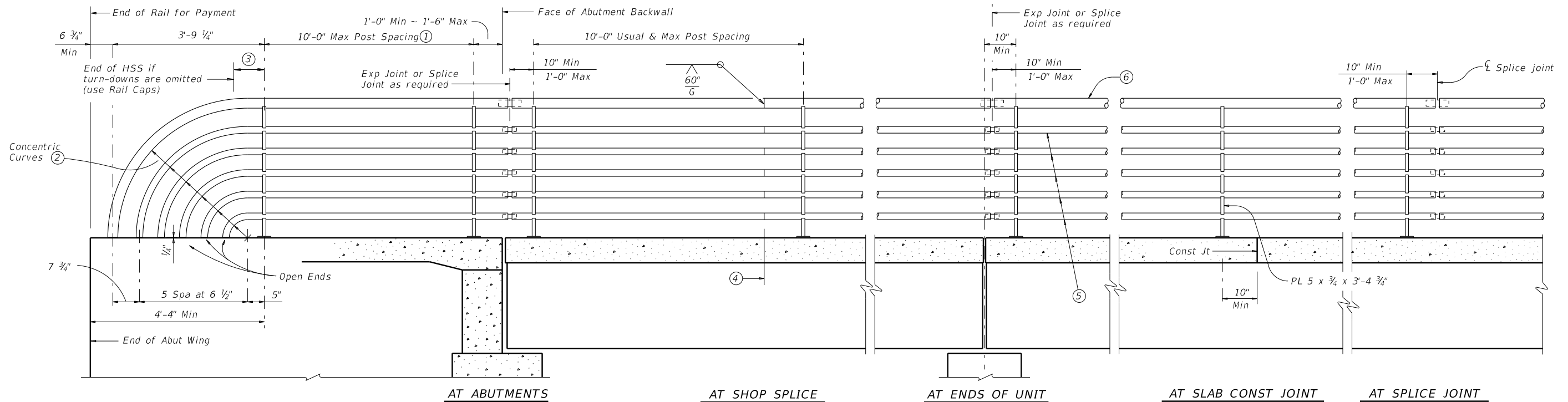


PEDESTRIAN FACILITIES CURB RAMPS
PED-18

| | | | | |
|----------------------|-----------|--------|-----------|-------------|
| FILE: ped18 | DN: TxDOT | DW: VP | CK: KM | CK: PK & JG |
| © TxDOT: MARCH, 2002 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| REVISOR | DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | | 174 | |

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DATE: FILE:



CONSTRUCTION NOTES:
 Panel lengths of railing must be attached to a minimum of three posts except at abutment wingwalls. Face of rail and posts must be vertical transversely unless otherwise approved. Posts must be perpendicular to adjacent roadway grade. Use Type VIII epoxy mortar under post base plates if gaps larger than 1/16" exist. For curved railing applications, fabricate the HSS rails to the radius when the radius is 60' or less. Submit shop drawings for approval when tubes are required to be fabricated to a radius. Shop drawings must be submitted to the Engineer for approval. Round or chamfer exposed edges of HSS rail and HSS rail posts to approximately 1/16" by grinding.

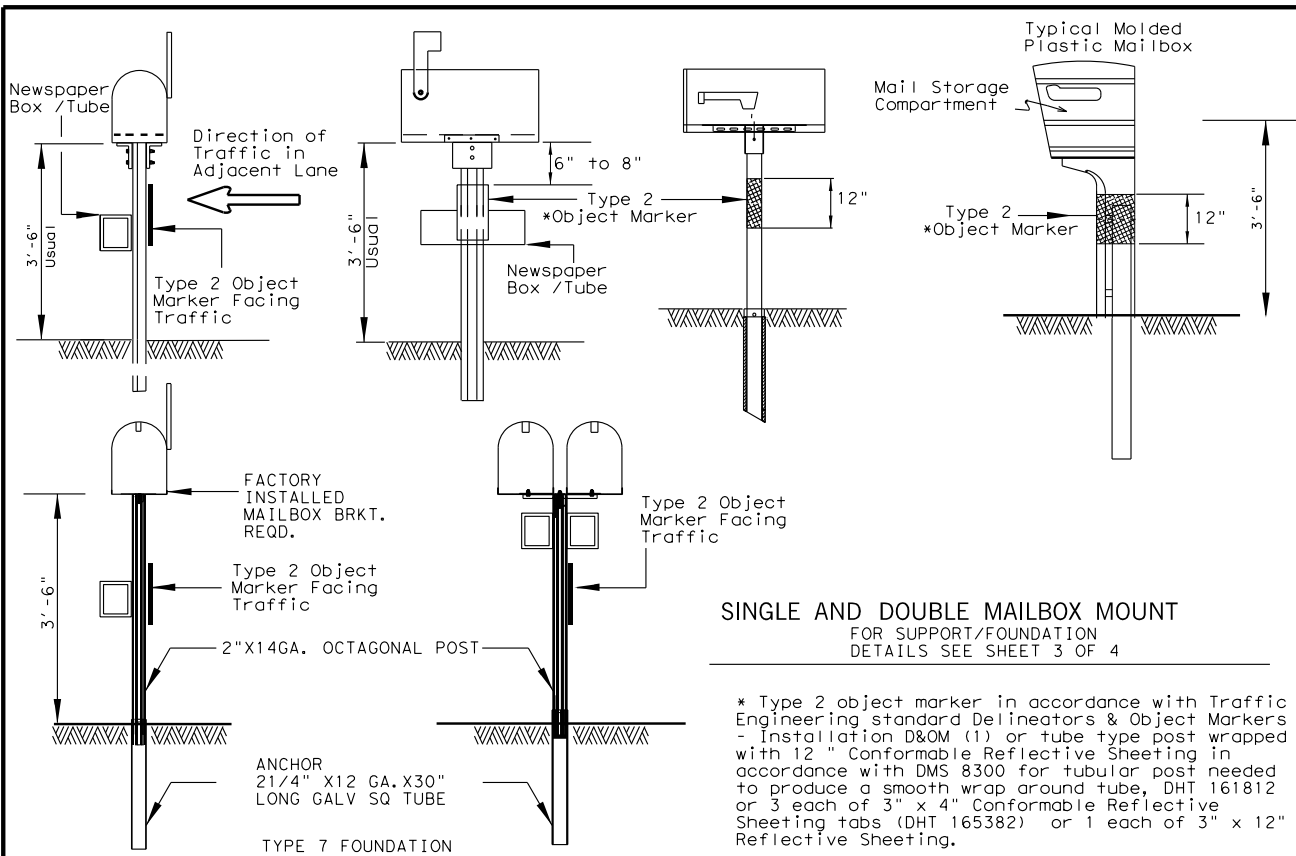
MATERIAL NOTES:
 Provide ASTM-A500 Grade B, A1085 or A53 Grade B for all HSS. Provide ASTM-A36 for posts and plates. Galvanize all steel components unless otherwise shown. Anchor bolts must be 3/8" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one tack welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Threaded rods may be 0.557" minimum diameter with rolled threads. Nuts must conform to A563 requirements.

GENERAL NOTES:
 Designed according to AASHTO LRFD Specifications. Rail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Do not use this railing on bridges with expansion joints providing more than 5" movement. For all rails, submit erection drawings showing section lengths, splice locations, rail post spacing and anchor bolt setting for approval. Average weight of railing is 30 plf.

- ① Min of 2 posts required on wingwall
- ② Portion of railing with turn-downs to be used or omitted as indicated on Bridge Layout.
- ③ 10" Min ~ 1'-6" Max if turn-downs are omitted.
- ④ One shop splice per panel is permitted (with minimum 85 percent penetration). The weld may be square groove or single vee groove. Grind smooth.
- ⑤ HSS 2.375 x 0.154
- ⑥ HSS 3.500 x 0.216
- ⑦ HSS 1.900 x 0.145
- ⑧ HSS 2.875 x 0.203

| | | | | | |
|--------------------------|-----------|-----------|-----------|-----------|---------------------------------|
| | | | | | Bridge Division Standard |
| <h2>PEDESTRIAN RAIL</h2> | | | | | |
| <h3>TYPE PR1</h3> | | | | | |
| FILE: r1std028.dgn | DN: TxDOT | CK: TxDOT | DW: JTR | CK: TxDOT | |
| ©TxDOT | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 | 01 | 023 | FM 3549 | |
| | DIST | COUNTY | SHEET NO. | | |
| | DAL | ROCKWALL | 175 | | |

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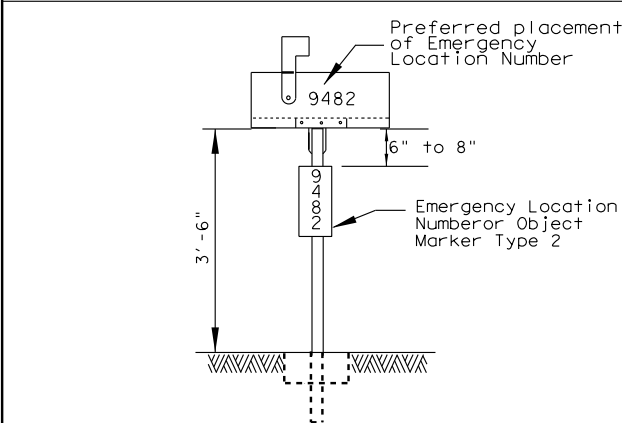


SINGLE AND DOUBLE MAILBOX MOUNT
FOR SUPPORT/FOUNDATION
DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12" Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED-12, PED-13, etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black, or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved, may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

| SIZE | TYPICAL MAILBOX SIZE | | | LIGHT WEIGHT MATERIAL | |
|--------|----------------------|---------|---------|-----------------------|-----------|
| | LENGTH | WIDTH | HEIGHT | SHEET METAL | **PLASTIC |
| | INCHES | | | POUNDS | |
| SMALL | 19 1/2 | 6 | 7 | 5 | 5 |
| MEDIUM | 22 1/2 | 8 | 11 1/2 | 7 | 7 |
| LARGE | 23 1/2* | 11 1/2* | 13 1/2* | 10 | 10 |

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

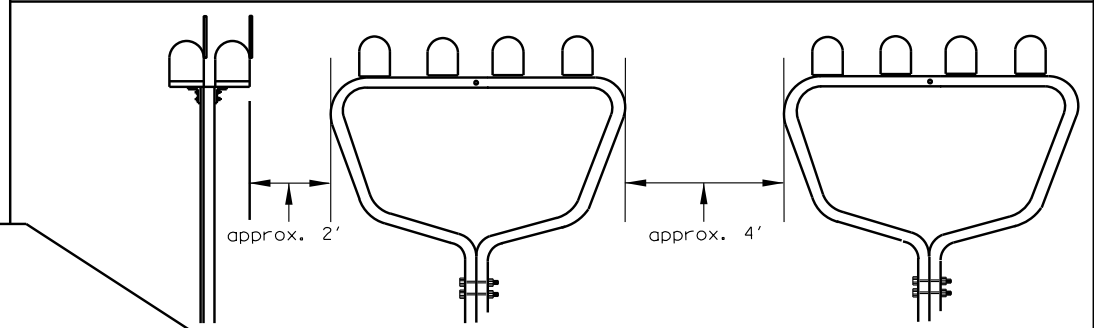
| VIEW | LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES) | | | | WEIGHT (POUNDS) |
|------|--|--------|------------|-----------|-----------------|
| | TOP | BOTTOM | FRONT SIDE | BACK SIDE | |
| SIDE | 18 | 15 | 18.3 | 15 | 22.4 |
| BACK | 11 1/2 | 11 1/2 | | 15 | |

Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

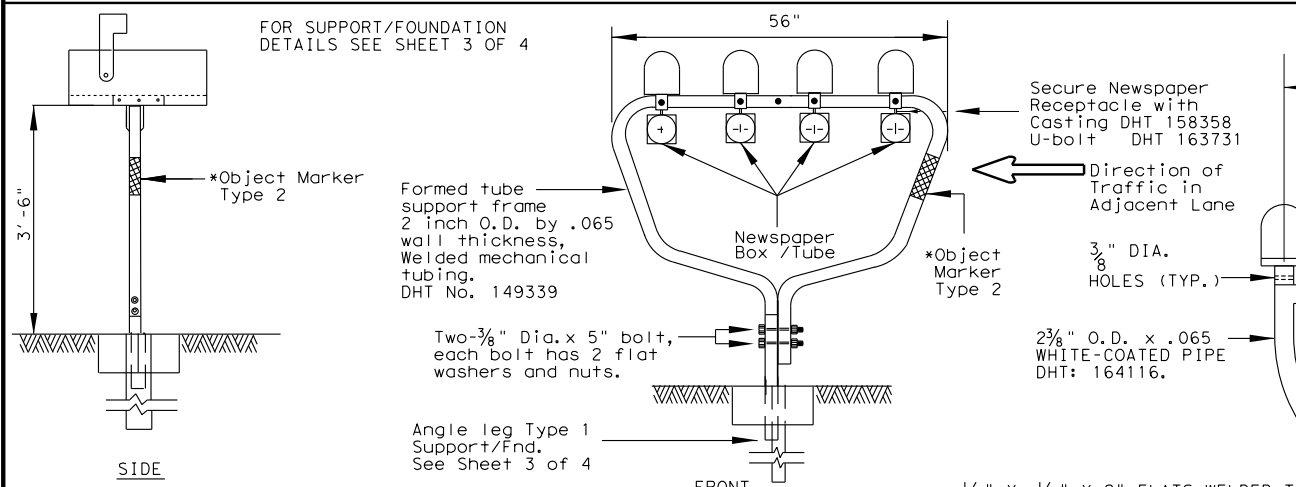
Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES



MULTIPLE MAILBOX PLACEMENT



DOUBLE AND MULTIPLE MAILBOX MOUNT

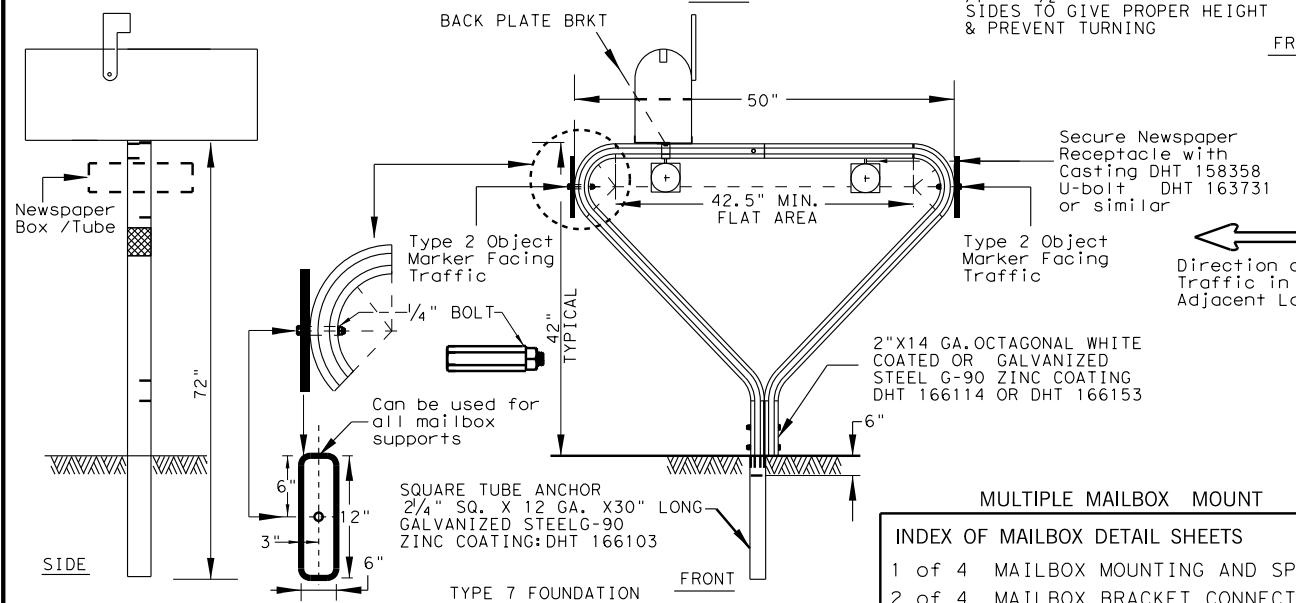
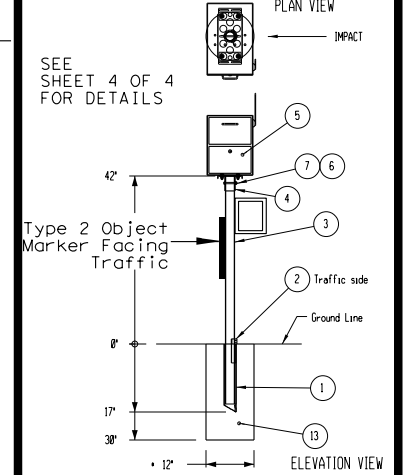
FOR SUPPORT/FOUNDATION
DETAILS SEE SHEET 3 OF 4
FOR DHT NUMBERS
SEE SHEET 4 OF 4

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.

LOCKABLE ARCHITECTURAL MAILBOX



MULTIPLE MAILBOX MOUNT

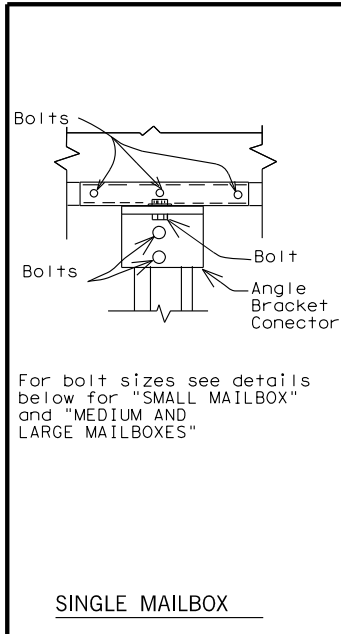
INDEX OF MAILBOX DETAIL SHEETS

- 1 of 4 MAILBOX MOUNTING AND SPACING
- 2 of 4 MAILBOX BRACKET CONNECTING DETAILS
- 3 of 4 MAILBOX SUPPORT / FOUNDATION
- 4 of 4 TABLE OF DHT NUMBERS

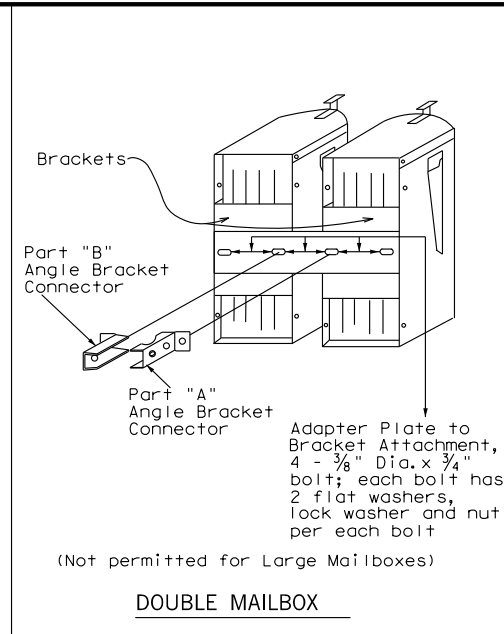
MAILBOX MOUNTING AND SPACING
MB-15(1)

| | | | | |
|--|---------|----------|-----------|---------|
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| © TxDOT APRIL 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS: | 1015 | 01 | 023 | FM 3549 |
| Added additional newspaper receptacle for double mailbox support | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 176 | |

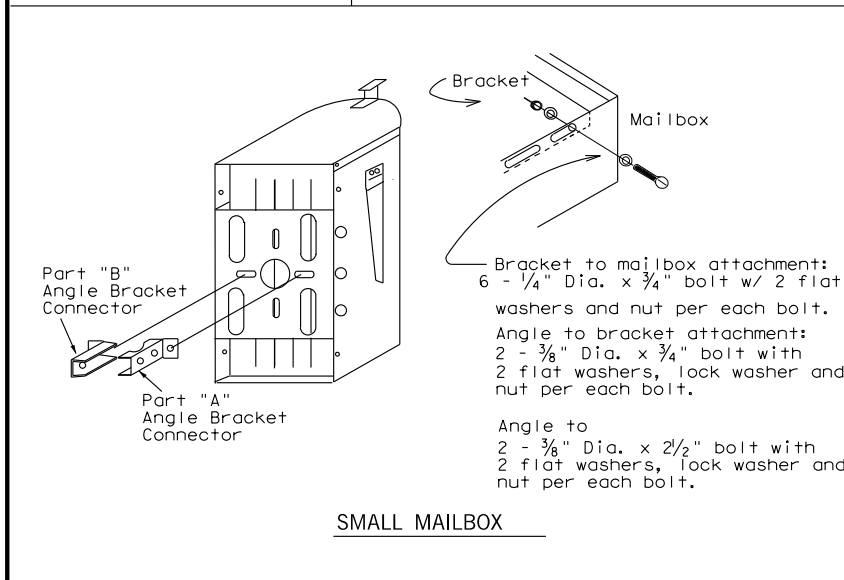
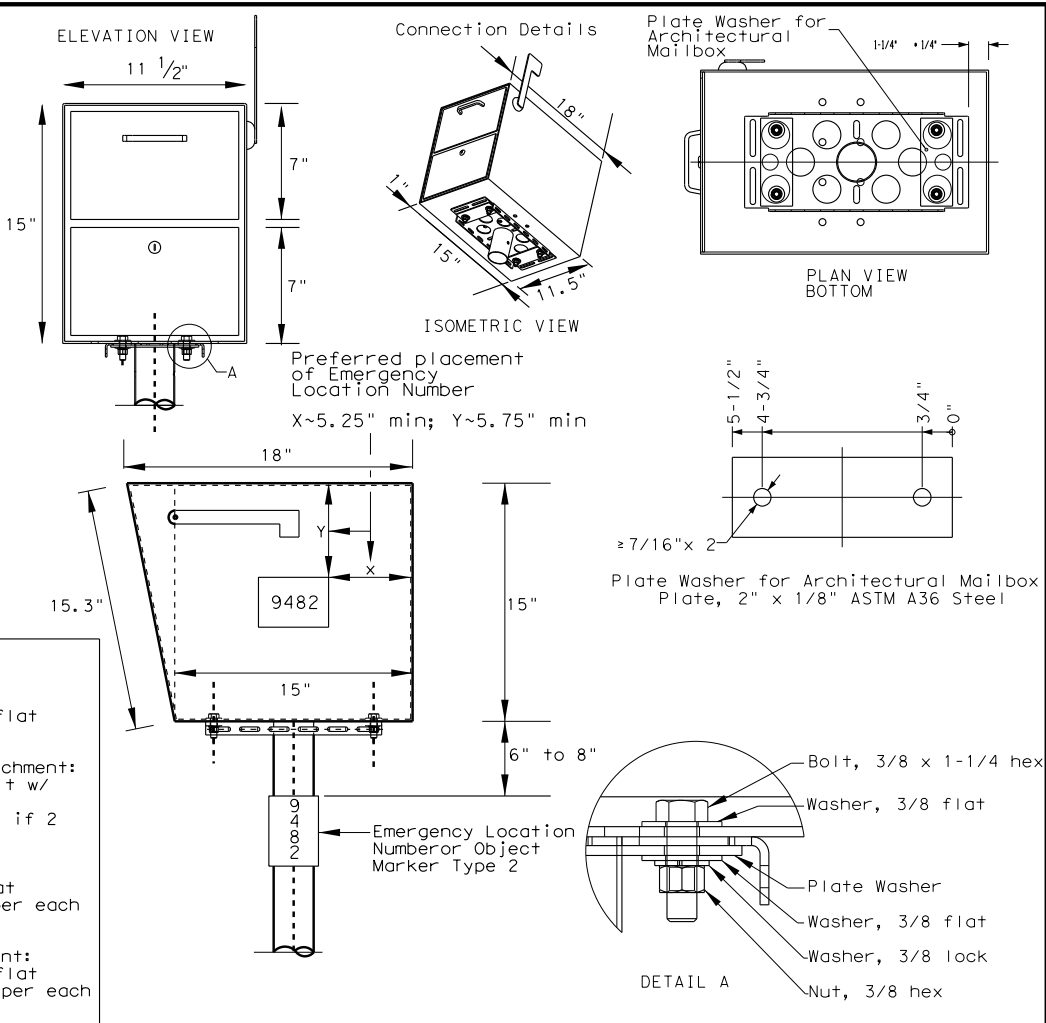
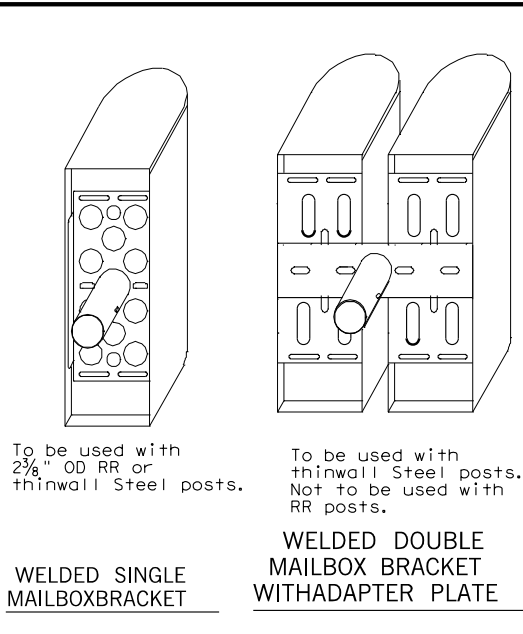
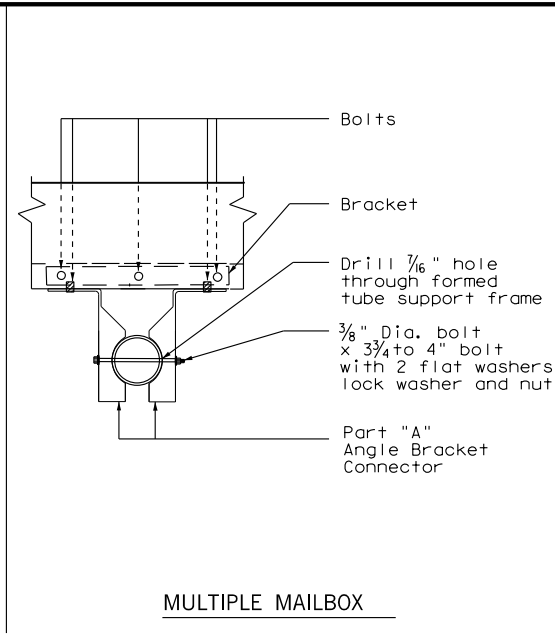
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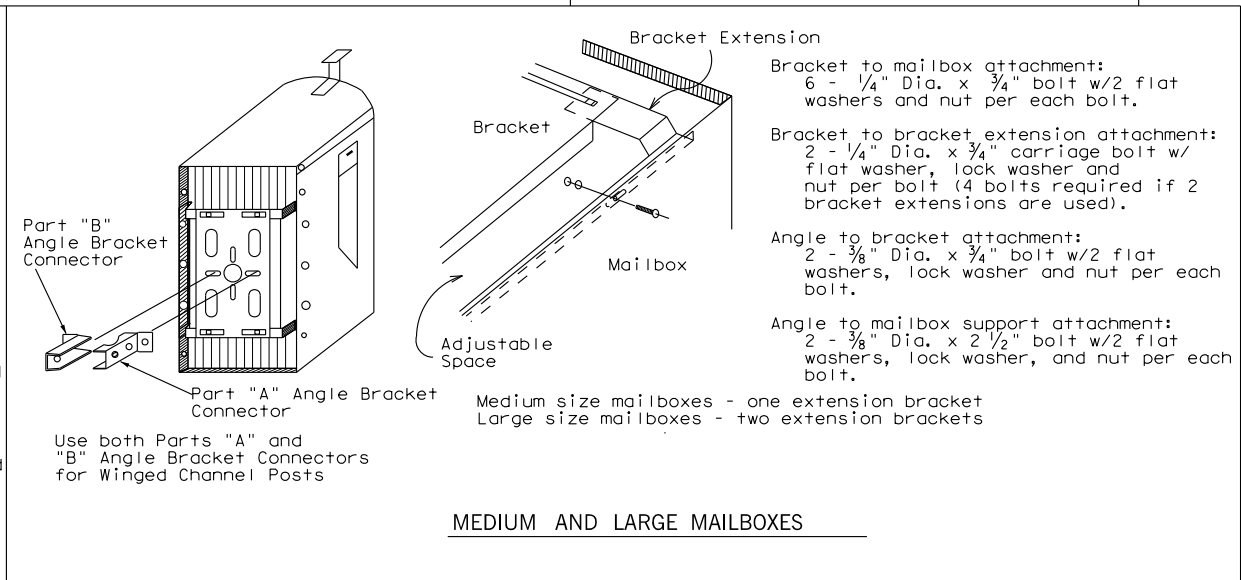
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"



Adapter Plate to Bracket Attachment, 4 - 3/8" Dia. x 3/4" bolt; each bolt has 2 flat washers, lock washer and nut per each bolt
(Not permitted for Large Mailboxes)



Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/ 2 flat washers and nut per each bolt.
Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt with 2 flat washers, lock washer and nut per each bolt.
Angle to 2 - 3/8" Dia. x 2 1/2" bolt with 2 flat washers, lock washer and nut per each bolt.

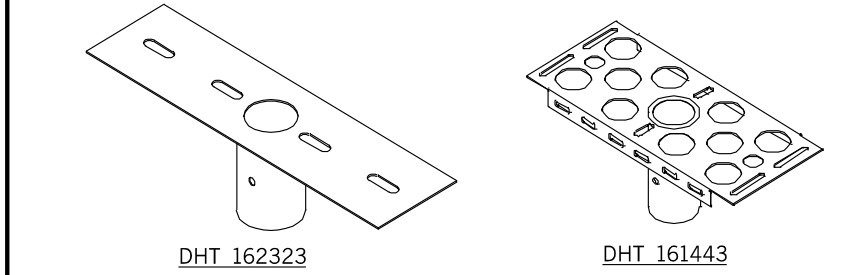


Bracket Extension
Bracket to mailbox attachment: 6 - 1/4" Dia. x 3/4" bolt w/2 flat washers and nut per each bolt.
Bracket to bracket extension attachment: 2 - 1/4" Dia. x 3/4" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).
Angle to bracket attachment: 2 - 3/8" Dia. x 3/4" bolt w/2 flat washers, lock washer and nut per each bolt.
Angle to mailbox support attachment: 2 - 3/8" Dia. x 2 1/2" bolt w/2 flat washers, lock washer, and nut per each bolt.

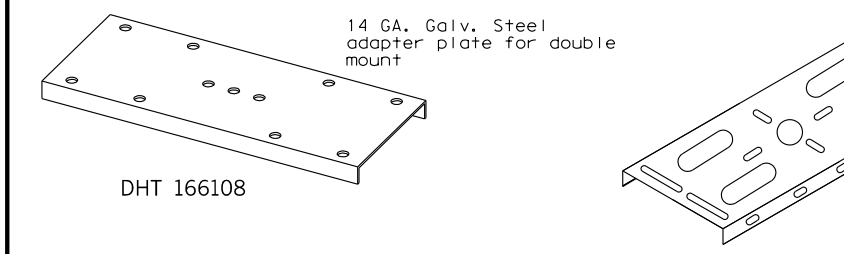
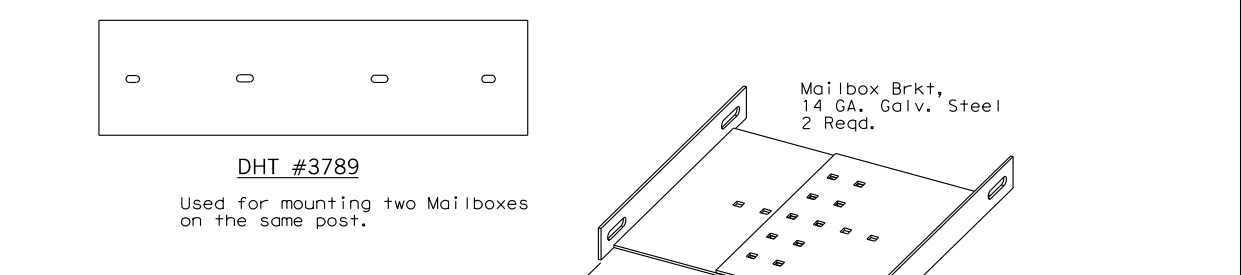
Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS

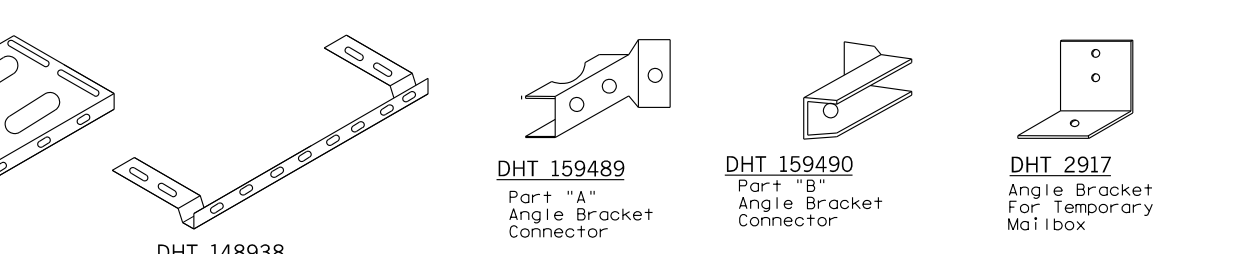
- GENERAL NOTES**
1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
 2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
 3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
 4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
 5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
 6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.
For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.



HARDWARE AT TxDOT REGIONAL WAREHOUSES
Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.



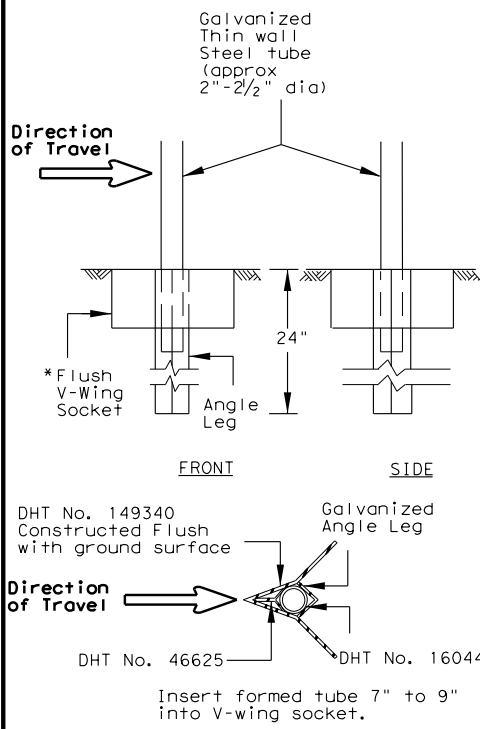
See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.



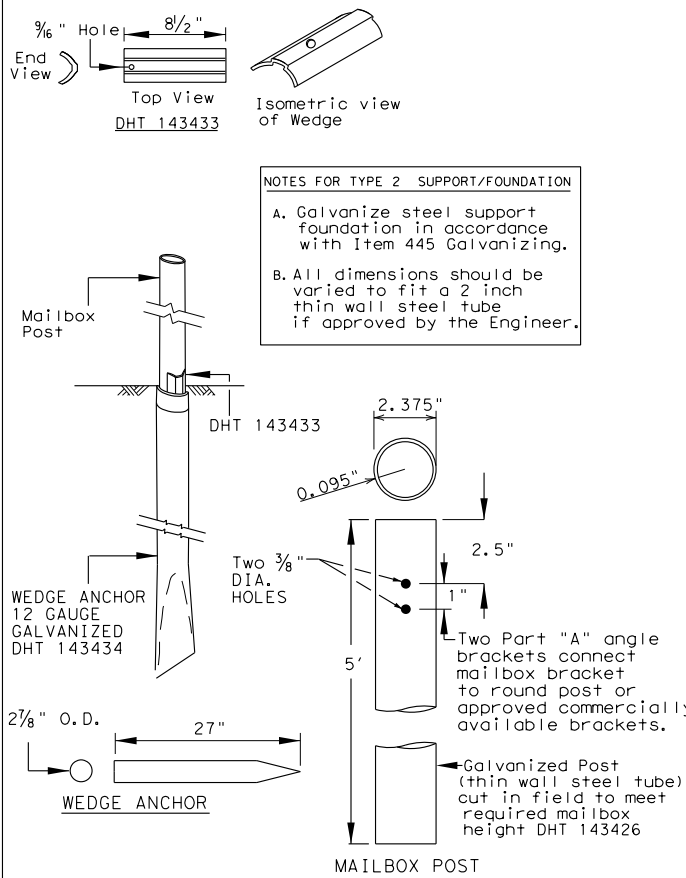
MAILBOX BRACKET CONNECTING DETAILS
MB-15(1)

| | | | | |
|--------------------|---------|----------|-----------|---------|
| FILE: MB14(1).DGN | DN: JEO | CK: | DW: JEO | CK: |
| © TxDOT APRIL 2015 | CONT | SECT | JOB | HIGHWAY |
| ADDED DHT 163730 | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 177 | |

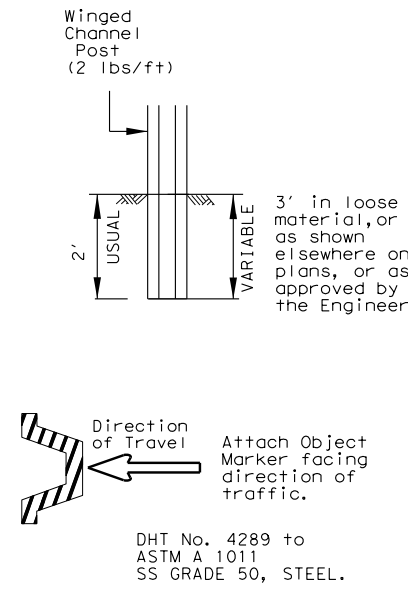
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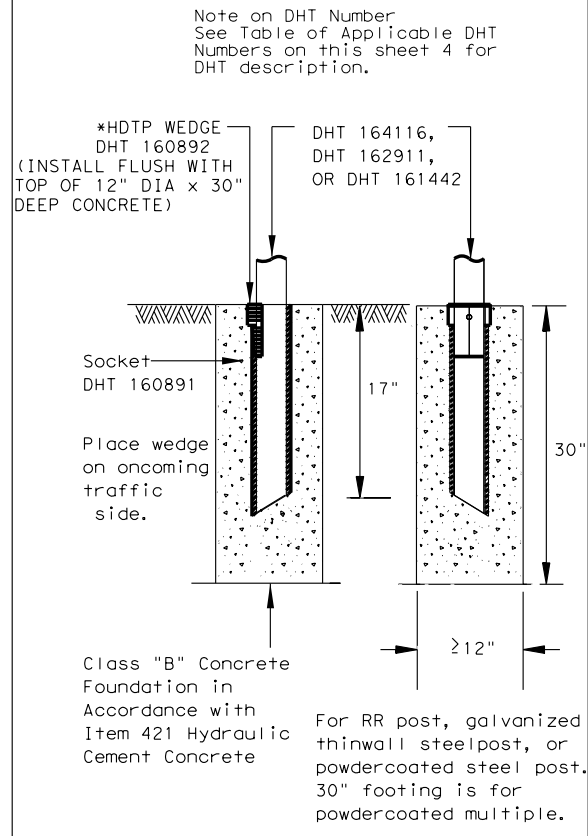
TYPE 1 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



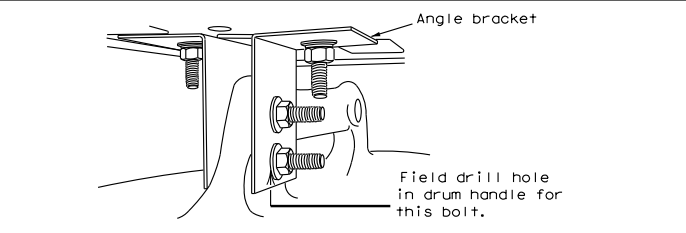
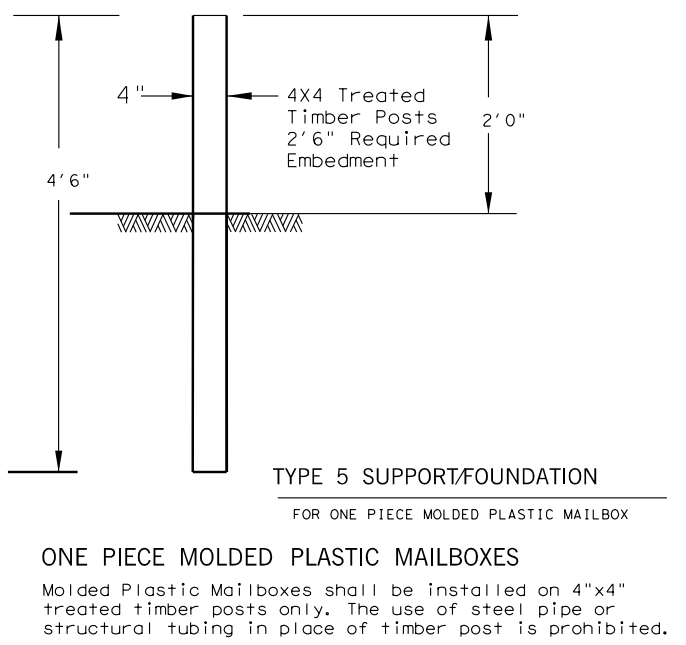
TYPE 2 SUPPORT/FOUNDATION
THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



TYPE 3 SUPPORT/FOUNDATION
WINGED CHANNEL POST

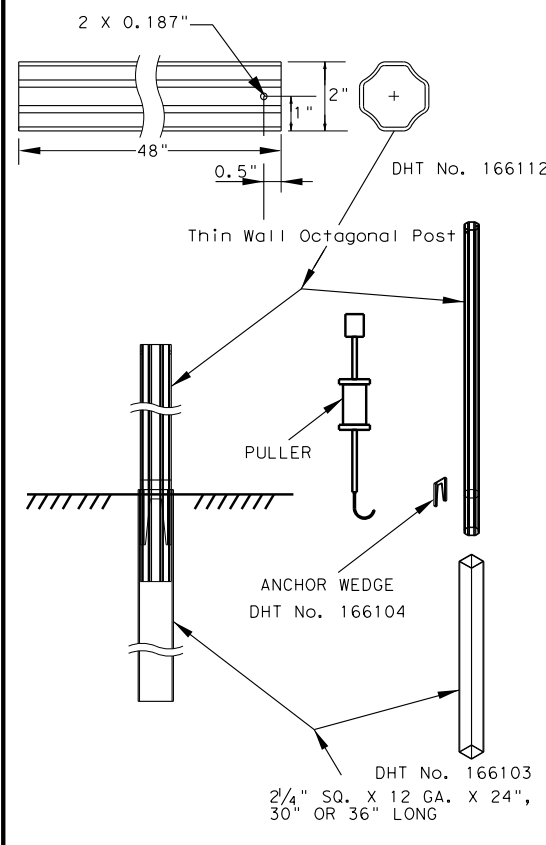


TYPE 4 SUPPORT/FOUNDATION
FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.



TYPE 6 TEMPORARY MAILBOX SUPPORT
CONNECTION DETAIL

- GENERAL NOTES**
- Erect post plumb or vertical.
 - When galvanized part is required galvanize in accordance with Item 445.
 - type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
 - The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
 - The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
 - Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.



TYPE 7 MAILBOX SUPPORT/FOUNDATION
CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
S = Single
D = Double
M = Multiple
SP = Single Plastic

Type of Post
WC = Winged Channel Post
RR = Recycled Rubber
TWW = Thin Walled White Tubing
TWG = Thin Walled Galvanized Tubing
TIM = Timber

Type of Foundation
Ty 1 = V-Loc
Ty 2 = Wedge Anchor Steel System
Ty 3 = Winged Channel post
Ty 4 = Wedge Anchor Plastic System
Ty 5 = 4 X 4 Post
Ty 7 = Wedge Anchor

Type of Bracket
AB = Angle Bracket.
TB = 2.375" Tube Bracket

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HFTP: High density thermoplastic polyesters



MAILBOX SUPPORT AND FOUNDATION
MB-15(1)

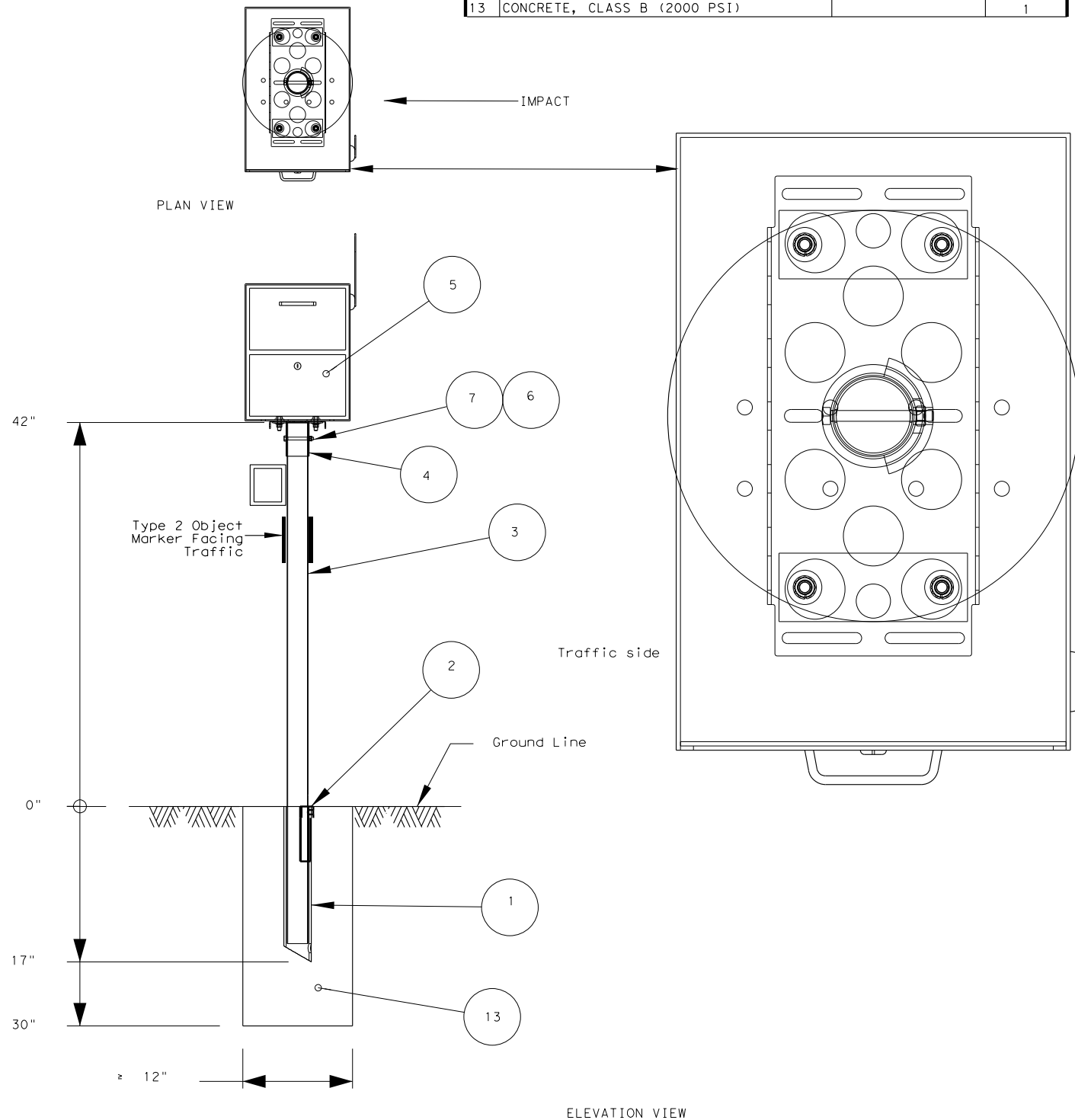
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| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 178 | |

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS

| # | PART NAME | PART/DHT # | QTY |
|----|--|-----------------|-----|
| 1 | SOCKET, TYPE 4 FOUNDATION | 160891 | 1 |
| 2 | WEDGE FOR TYPE 4 FOUNDATION | 160892 | 1 |
| 3 | THIN-WALL WHITE STEEL TUBE 2.375 OD | 162911 | 1 |
| 4 | BRACKET FOR ATTACHING MAILBOX | 161443 | 1 |
| 5 | ARCHITECTURAL MAILBOX | SEE NOTE | 1 |
| 6 | NUT, 5/16" HEX | NUT, 5/16" HEX | 1 |
| 7 | BOLT, 5/16 X 3 HEX | GRADE 5 | 1 |
| 8 | PLATE WASHER FOR ARCHITECTURAL MAILBOX | SEE SEE SHEET 2 | 2 |
| 9 | WASHER, 3/8 FLAT | | 8 |
| 10 | WASHER, 3/8 LOCK | | 4 |
| 11 | NUT, 3/8 HEX | | 4 |
| 12 | BOLT, 3/8 X 1-1/4 HEX | GRADE 5 | 4 |
| 13 | CONCRETE, CLASS B (2000 PSI) | | 1 |

LOCKABLE ARCHITECTURAL MAILBOX DETAILS



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TABLE OF APPLICABLE DHT NUMBERS

| DHT NUMBER | DESCRIPTION |
|---------------------|--|
| FOUNDATIONS | |
| 46625 | WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION |
| 149340 | V-WING SOCKET FOR TYPE 1 FOUNDATION |
| 143433 | WEDGE FOR TYPE 2 FOUNDATION |
| 143434 | ANCHOR FOR TYPE 2 FOUNDATION |
| 166103 | ANCHOR FOR TYPE 7 FOUNDATION |
| 160891 | SOCKET FOR TYPE 4 FOUNDATION |
| 160892 | WEDGE FOR TYPE 4 FOUNDATION |
| 166104 | WEDGE FOR TYPE 7 FOUNDATION |
| POSTS | |
| 4289 | WINGED CHANNEL MAILBOX POST |
| 149339 | MULTIPLE MAILBOX POST (GALVANIZED TUBING) |
| 164116 | MULTIPLE MAILBOX POST (WHITE COATED) |
| 166114 | MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL) |
| 166153 | MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL) |
| 161442 | RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY |
| 143426 | THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER |
| 162911 | THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER |
| | SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED |
| 166152 | 2" OCTAGONAL |
| | SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED |
| 166112 | 2" OCTAGONAL |
| REFLECTIVE SHEETING | |
| 161812 | REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL |
| CONNECTING HARDWARE | |
| 2917 | ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT |
| 166105 | BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT) |
| 3789 | PLATE FOR DOUBLE MOUNTING OF MAILBOXES |
| 166108 | BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT) |
| 166111 | BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT) |
| 148939 | BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX |
| 148938 | EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX |
| 159489 | ANGLE BRACKET PART A |
| 159490 | ANGLE BRACKET PART B |
| | BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL |
| 162323 | STEEL POST, GALVANIZED OR POWDERCOATED. |
| | BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST |
| 161443 | AND TO MULTIPLE WHITE MAILBOX POST |
| 158358 | CASTING (NEWSPAPER RECEPTACLE BRACKET) |
| 163731 | U-BOLT (NEWSPAPER RECEPTACLE BRACKET) |
| 160698 | BOLT; HEX HEAD, GALV; 3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS |
| 163750 | BOLT; HEX HEAD, GALV; 3/8" X 1-1/2, 16 NC, W/WASHERS |
| 160701 | BOLT; HEX HEAD, GALV; 3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS |
| 163730 | BOLT; HEX HEAD, GALV; 3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS |
| 160699 | BOLT; HEX HEAD, GALV; 3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS |
| 160700 | BOLT; HEX HEAD, GALV; 3/8"DIA X 4"L HD, W/2-FLAT WASHERS |

SHEET 4 OF 4

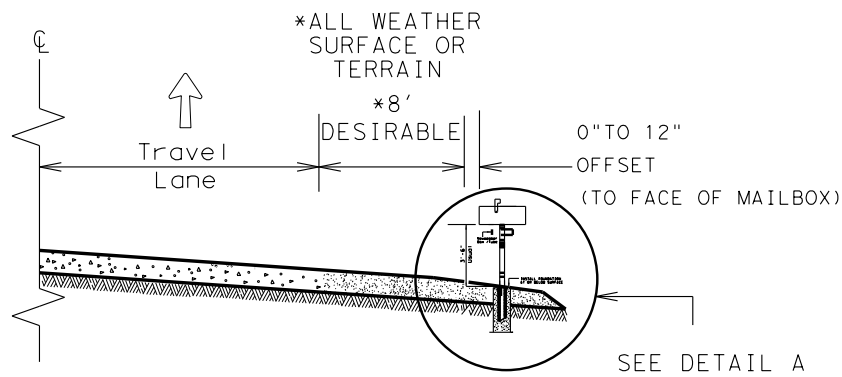


DHT NUMBERS TABLE
MB-15(1)

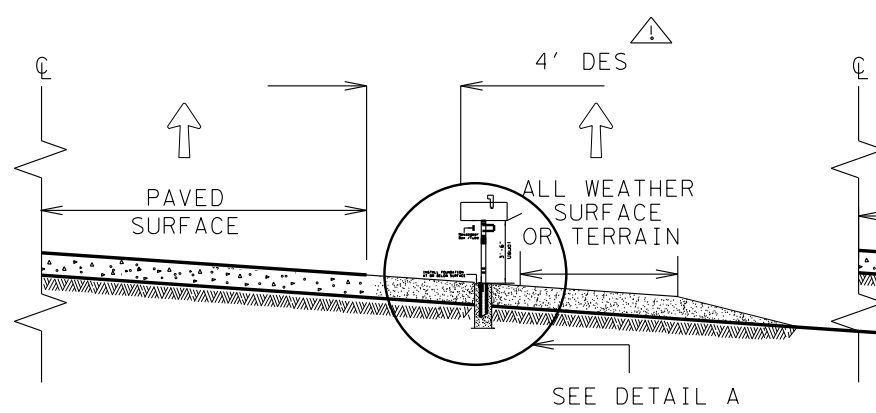
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| | DIST | COUNTY | SHEET NO. | |
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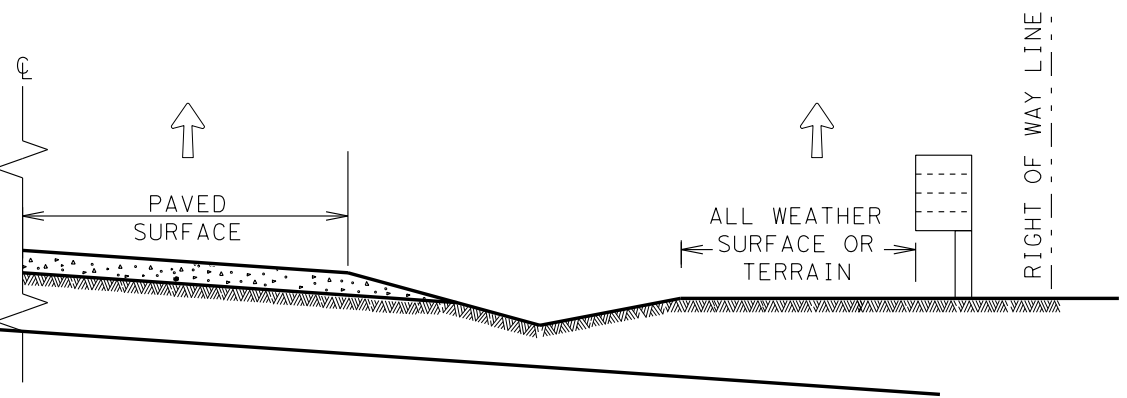
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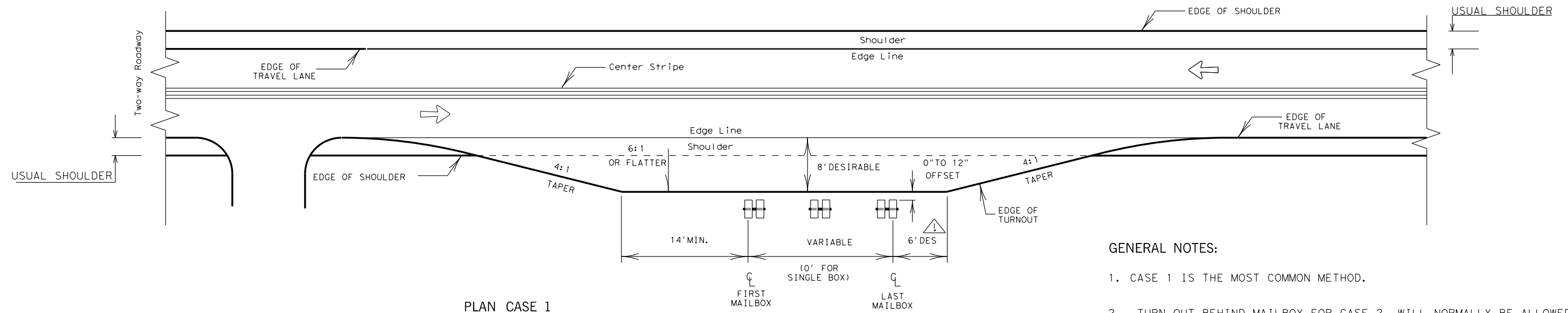
CASE 1. OFF TRAVEL WAY DELIVERY



CASE 2. BACK SIDE DELIVERY



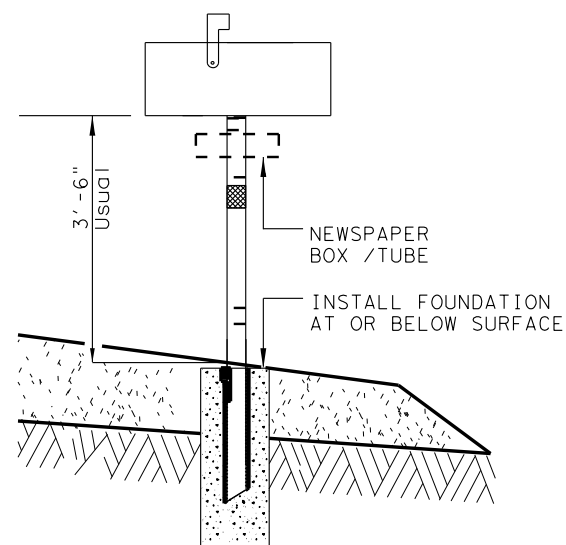
CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



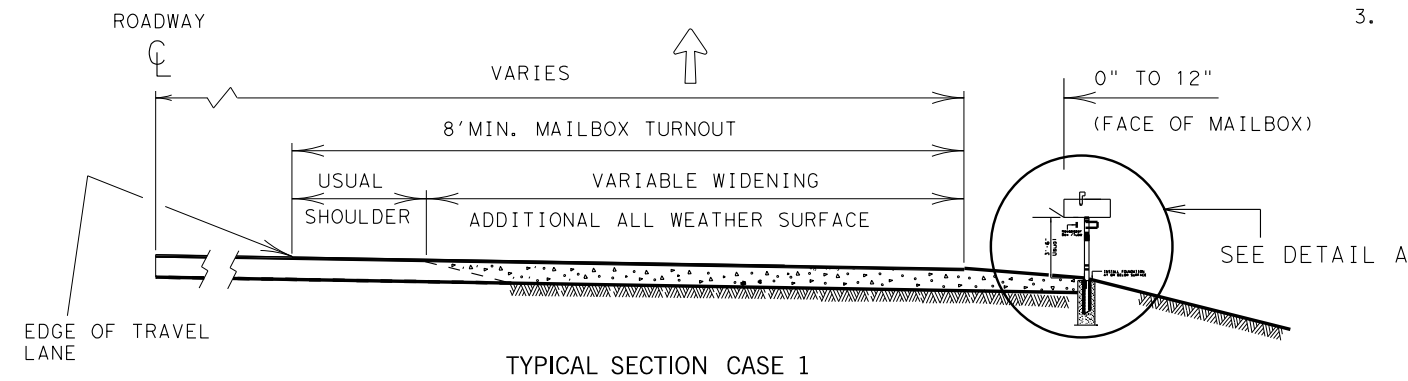
PLAN CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. IF THE NUMBER OF MAILBOXES EXCEEDS FOUR, A COMMUNITY MAIL BOX SHOULD BE ENCOURAGED AT THESE LOCATIONS.



DETAIL A



TYPICAL SECTION CASE 1

↑ MAIL DELIVERY VEHICLE TRAVEL DIRECTION

SHEET 1 OF 3

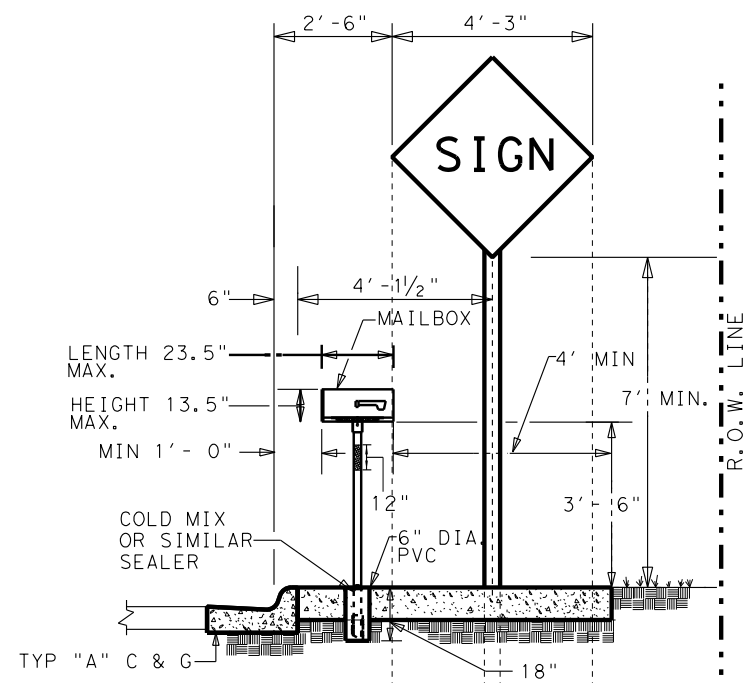


Guideline
MAILBOX SIDE ROAD PLACEMENT
AND TURNOUTS
MB-14(2)

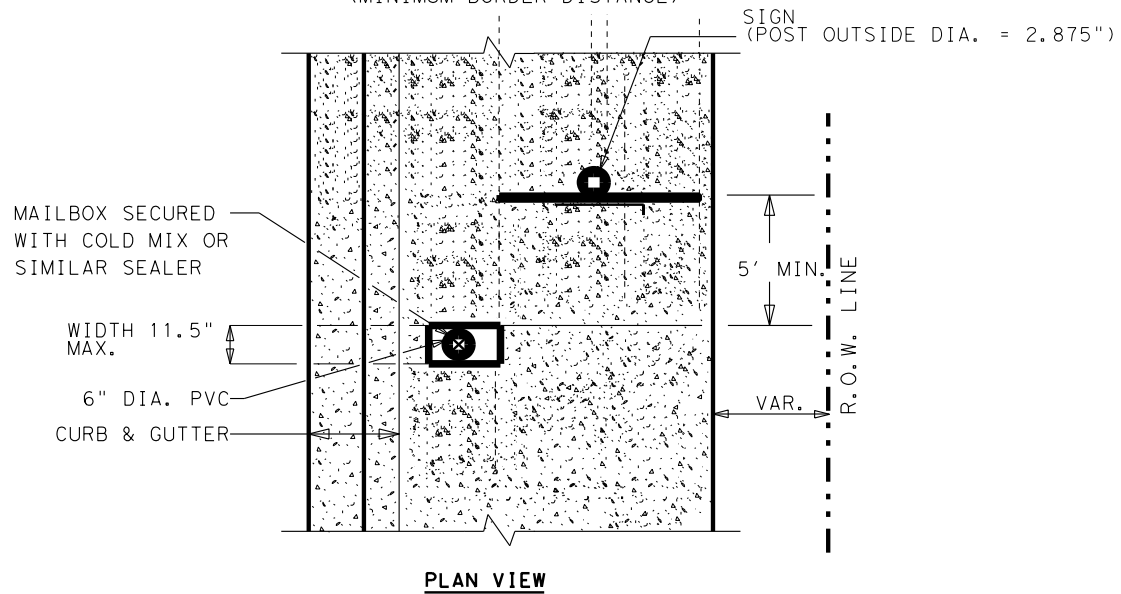
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| DECEMBER 2012-NEW TxDOT TITLE BLOCK | DIST | COUNTY | SHEET NO. | |
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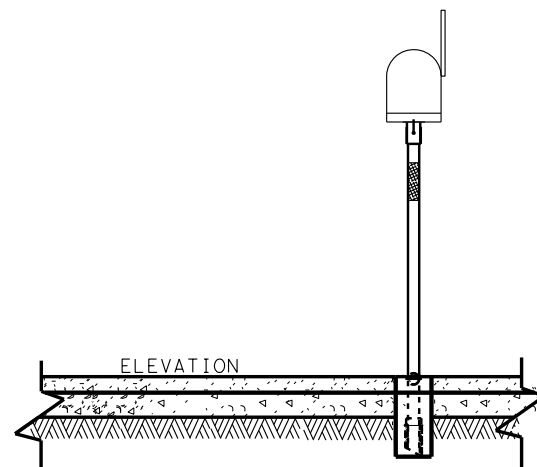
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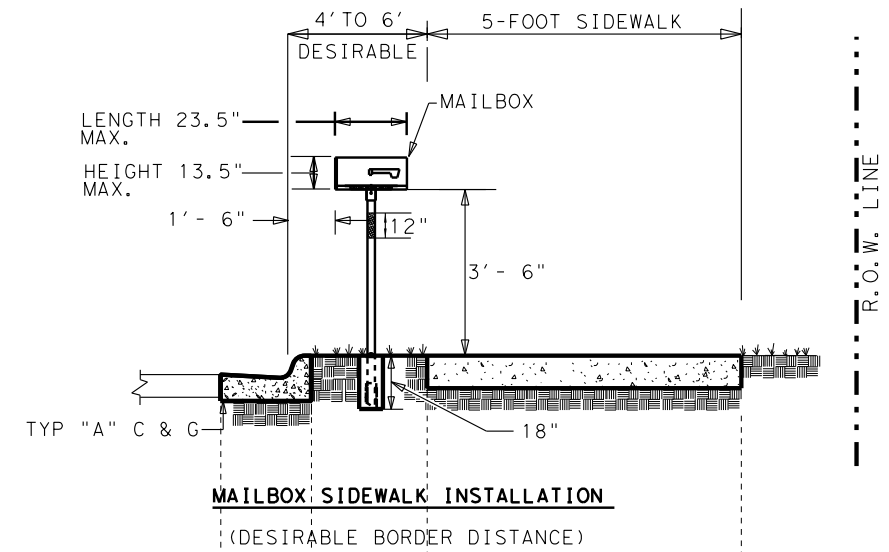
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN (MINIMUM BORDER DISTANCE)



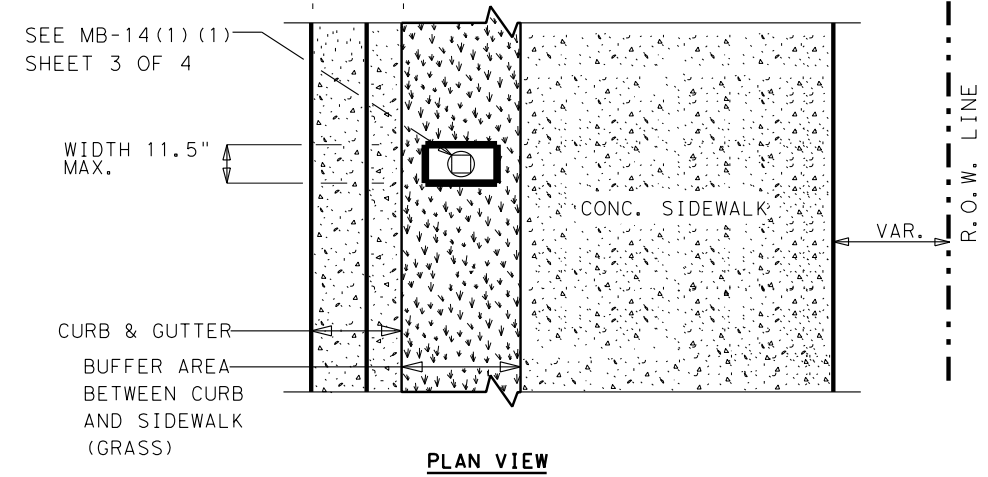
PLAN VIEW



ELEVATION



MAILBOX SIDEWALK INSTALLATION (DESIRABLE BORDER DISTANCE)



PLAN VIEW

SHEET 2 OF 3



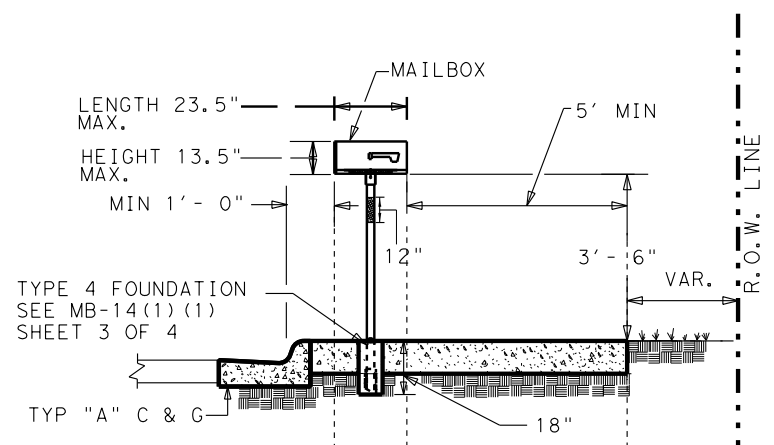
SINGLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2A)

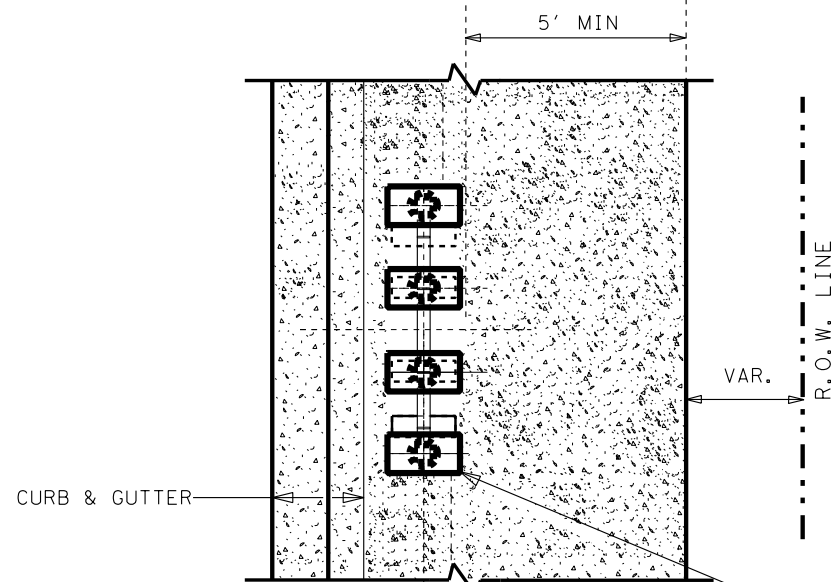
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| © TxDOT MAY 2014 | CONT | SECT | JOB | HIGHWAY |
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| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 181 | |

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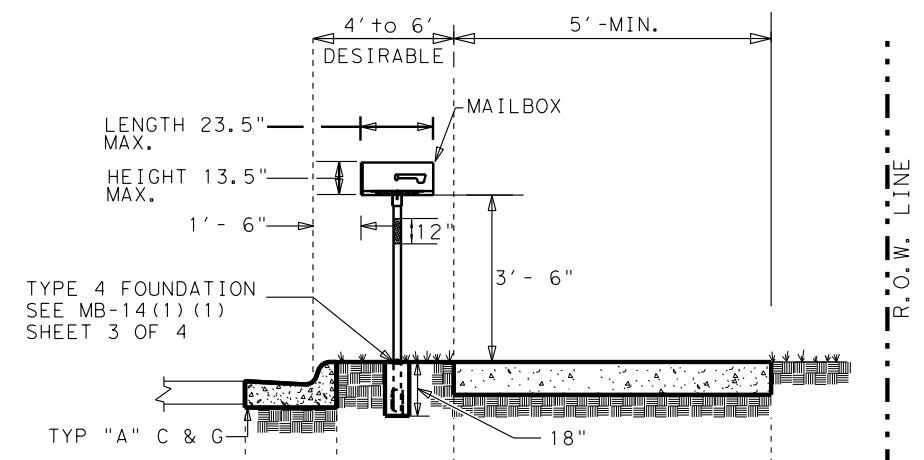
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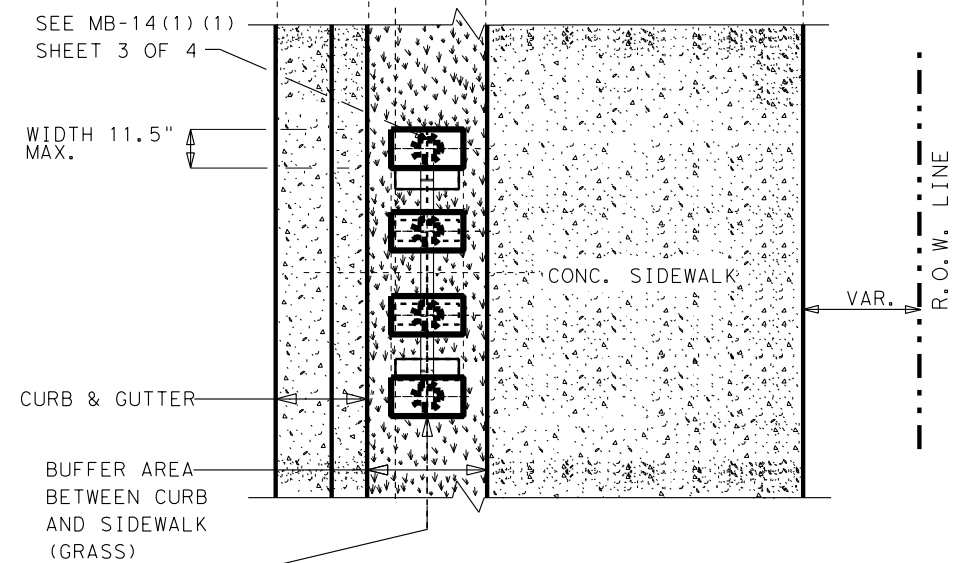
MAILBOX SIDEWALK INSTALLATION RELATIVE TO ANY OTHER OBSTRUCTION SUCH AS A SIGN (MINIMUM BORDER DISTANCE)



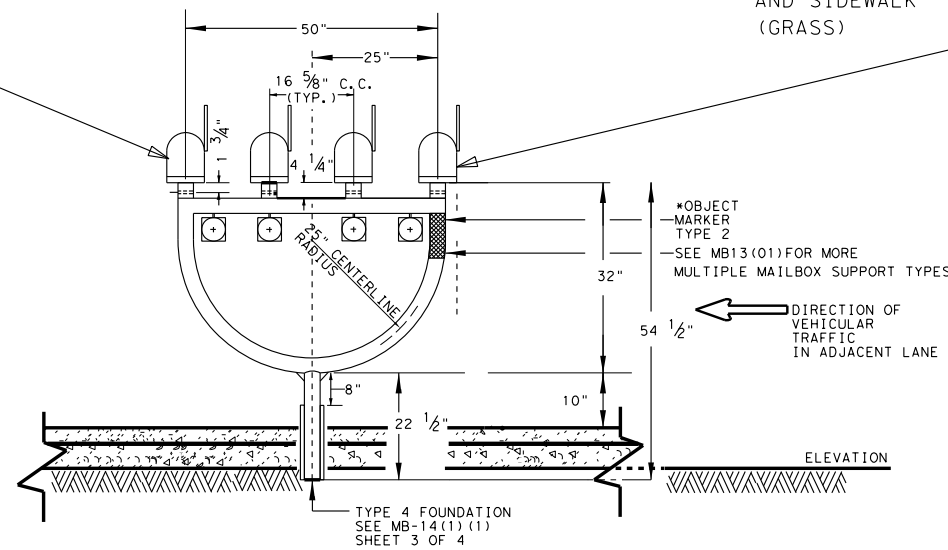
PLAN VIEW



MAILBOX SIDEWALK INSTALLATION (DESIRABLE BORDER DISTANCE)



PLAN VIEW



*OBJECT MARKER TYPE 2
SEE MB13(01) FOR MORE MULTIPLE MAILBOX SUPPORT TYPES
DIRECTION OF VEHICULAR TRAFFIC IN ADJACENT LANE

TYPE 4 FOUNDATION SEE MB-14(1)(1) SHEET 3 OF 4

SHEET 3 OF 3



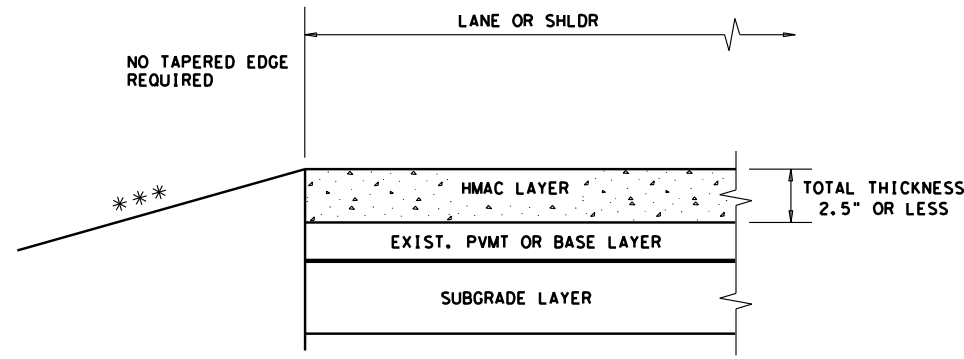
MULTIPLE MAILBOX PLACEMENT BEHIND CURBS WITH OR WITHOUT SIDEWALKS

MB-14(2B)

| | | | | |
|------------------|------|----------|-----------|---------|
| FILE: MB-14(2A) | DN: | CK: | DW: | CK: |
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| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 182 | |

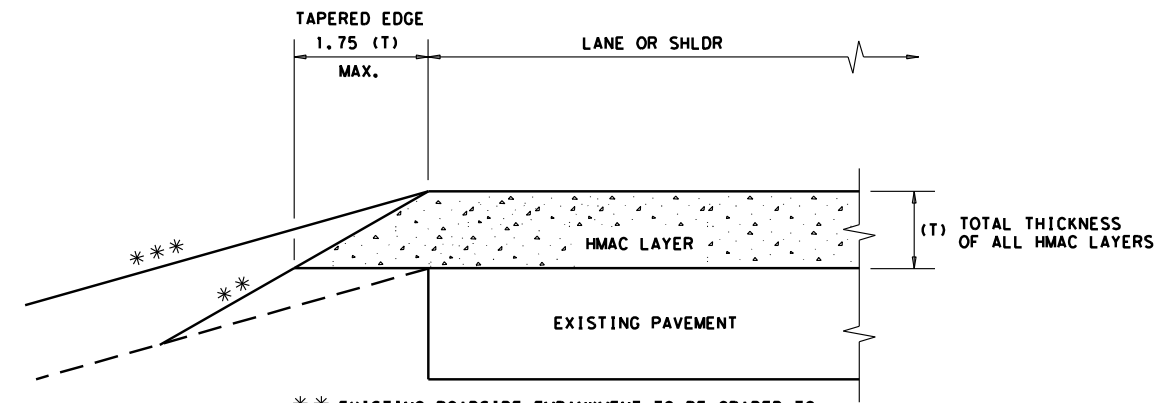
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DATE:
FILE:



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

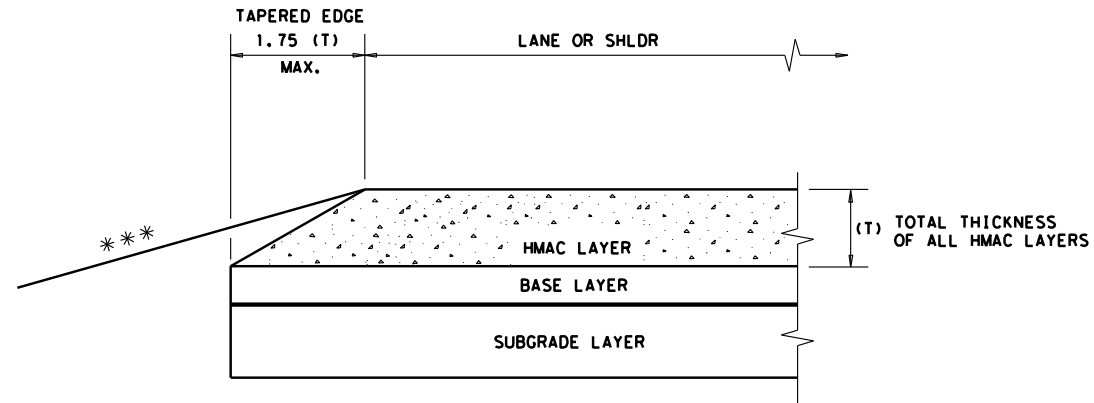
CONDITION - 1
THIN HMAC SURFACES OR HMAC OVERLAY
WITH THICKNESS OF 2.5" OR LESS



** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

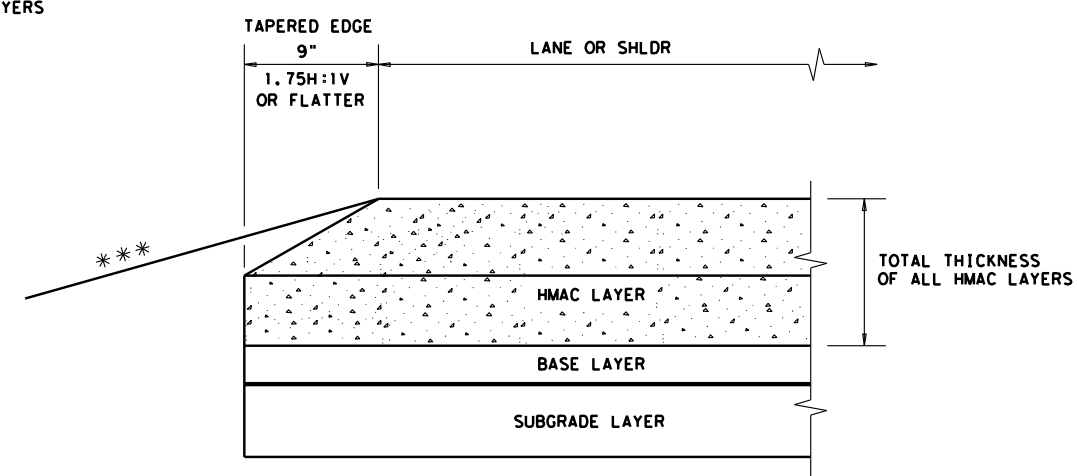
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
OVERLAY OF EXISTING PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
NEW OR RECONSTRUCTED PAVEMENT
HMAC THICKNESS 5" OR GREATER

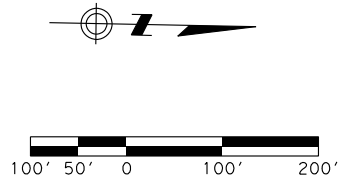
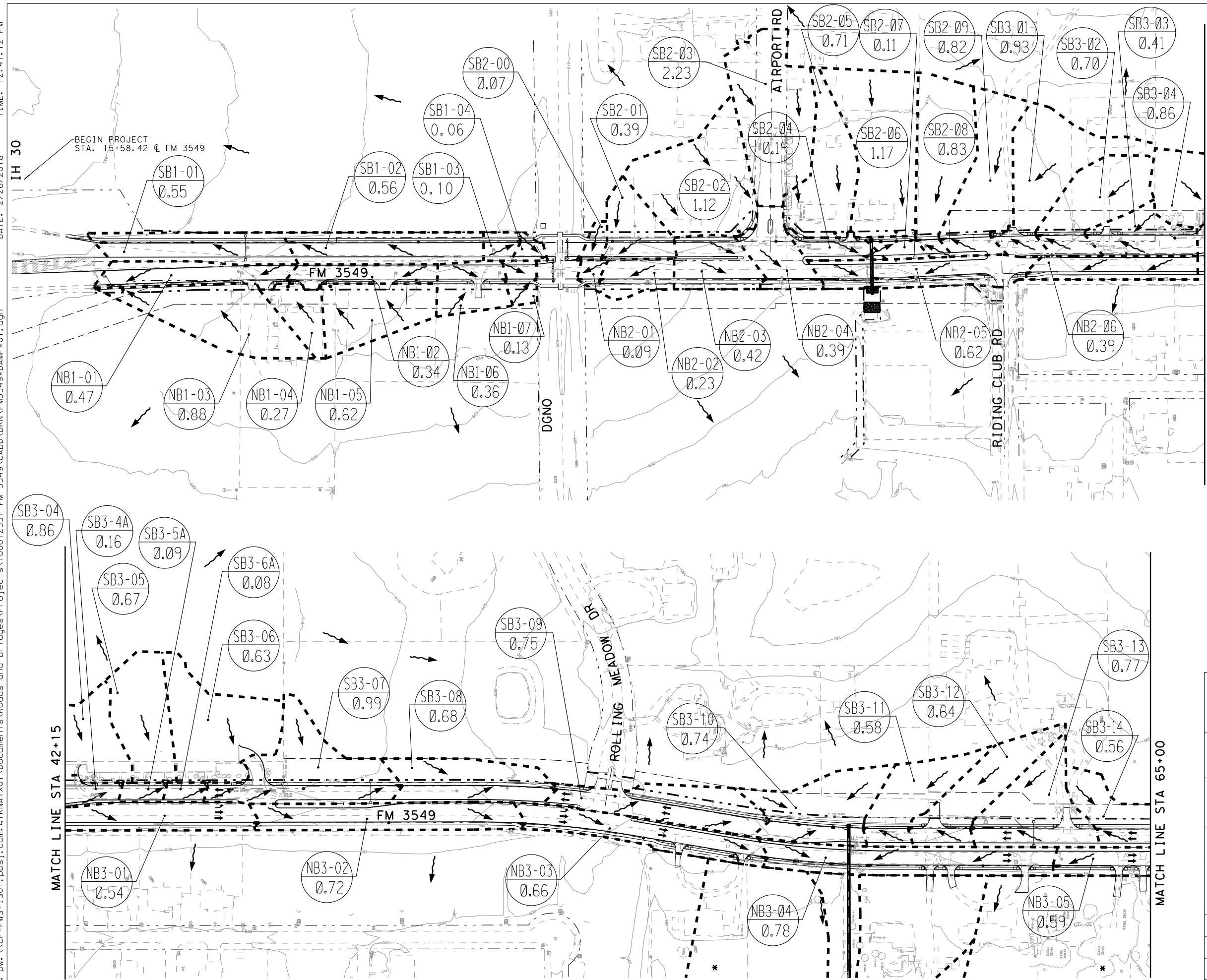
GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

(NOT TO SCALE)

| | | | | | | |
|---|-----------|--------|-----------|---------|---------------------------------|------|
| | | | | | Design Division Standard | |
| TAPERED EDGE DETAILS HMAC PAVEMENT | | | | | | |
| TE (HMAC) - 11 | | | | | | |
| FILE: tehmac11.dgn | DN: TxDOT | CK: RL | DW: KB | CK: | | |
| © TxDOT January 2011 | CONT | SECT | JOB | HIGHWAY | | |
| REVISIONS | | 1015 | 01 | 023 | FM | 3549 |
| DIST | COUNTY | | SHEET NO. | | | |
| DAL | ROCKWALL | | 183 | | | |

PLOT DRIVER: RD*11x17*PDF.plt
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 DATE: 2/26/2018 TIME: 12:41:12 PM



DRAINAGE AREA I.D.
 NB2-05
 0.29
 DRAINAGE AREA (AC)
 FLOW DIRECTION

NOTE
 DISCHARGES FROM DRAINAGE AREAS OF
 SB3-04, SB3-05, SB3-06 ARE REGULATED
 TO THE MAXIMUM DISCHARGE OF 2 CFS
 FROM EACH DRAINAGE AREA.



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474



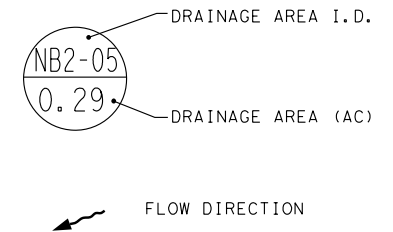
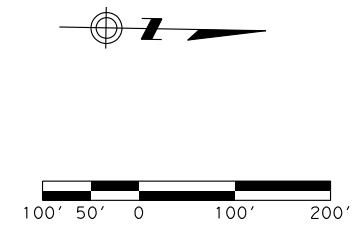
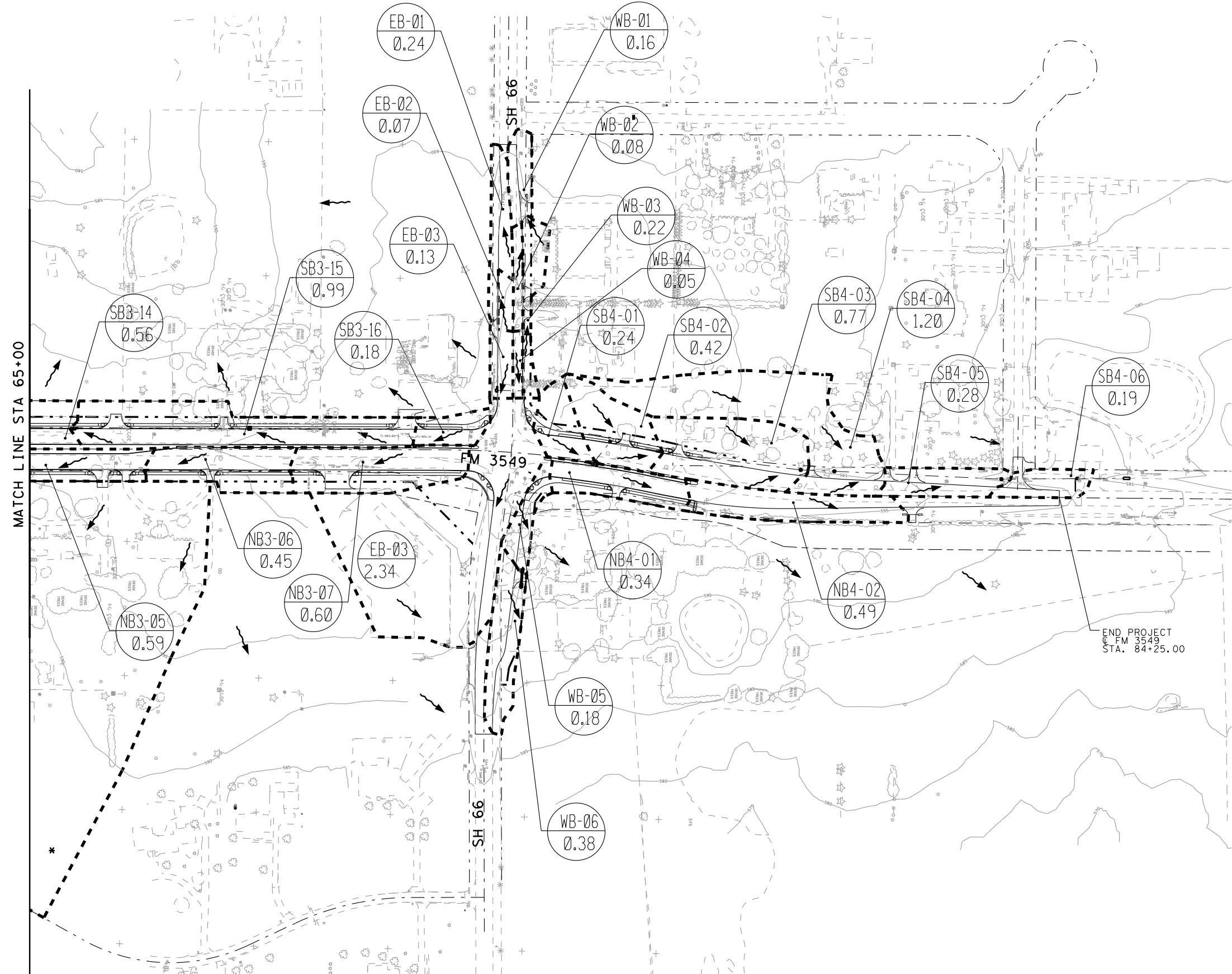
DRAINAGE AREA MAPS

SHEET 1 OF 3

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS NC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 184 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

* SEE DRAINAGE AREA MAP SHEET 3 OF 3

PLOT DRIVER: RD*11x17*PDF.plt
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 DATE: 2/26/2018 TIME: 12:41:19 PM



END PROJECT
 @ FM 3549
 STA. 84+25.00

*SEE DRAINAGE AREA MAP SHEET 3 OF 3

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

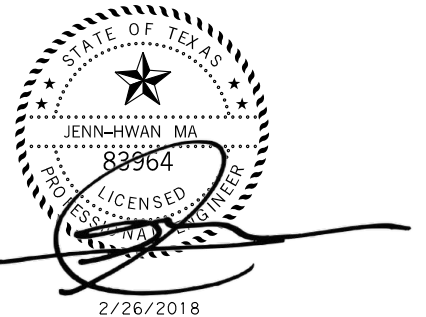
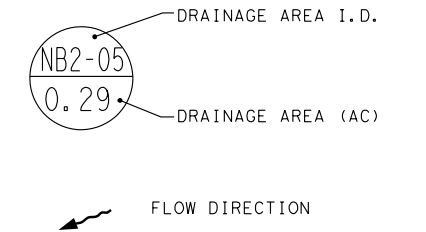
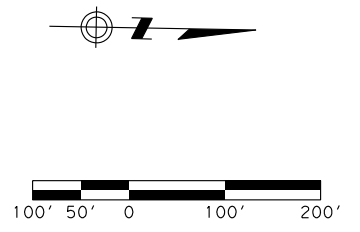
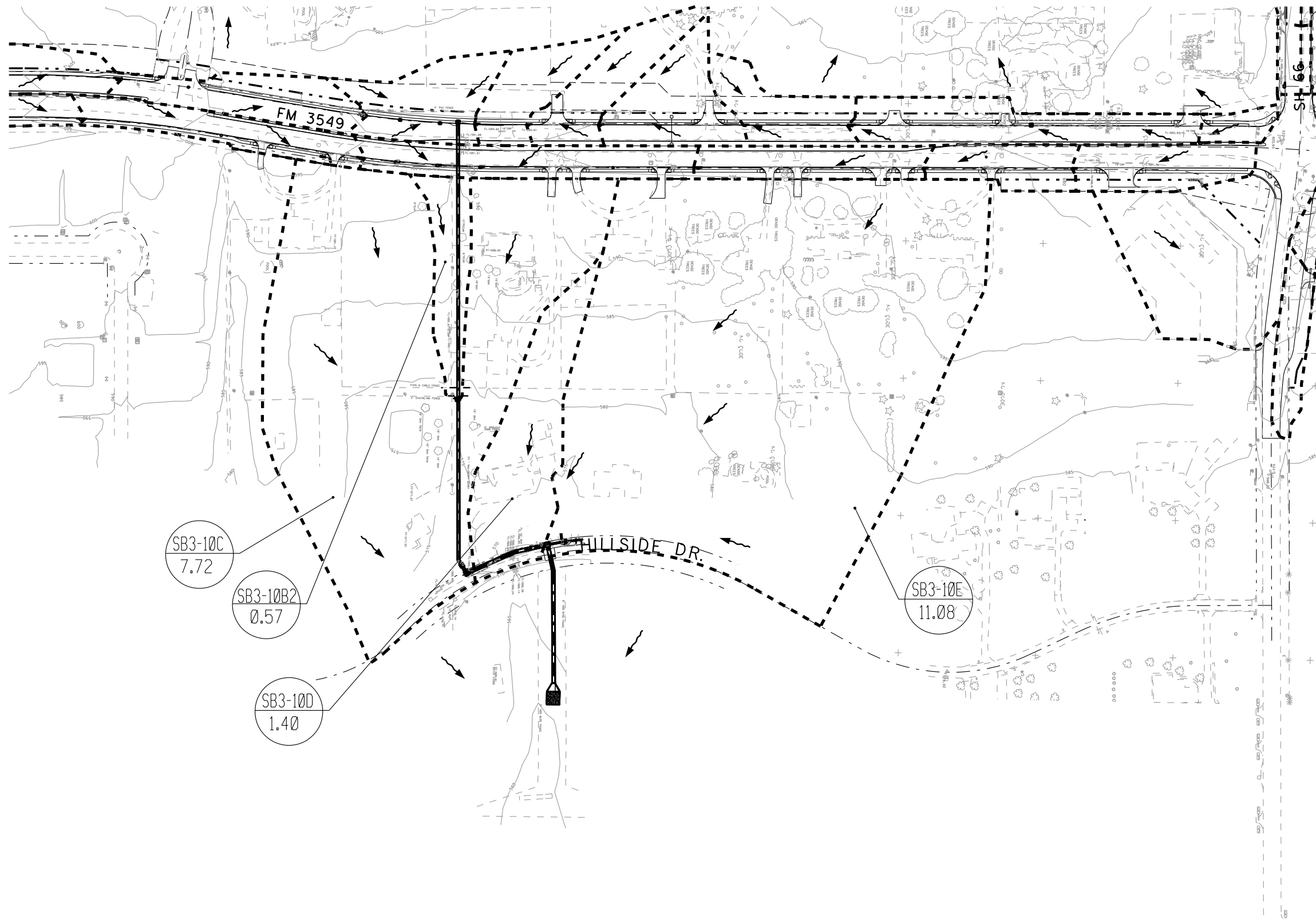
ATKINS
 TBPE REG. # F-474



DRAINAGE AREA MAPS

SHEET 2 OF 3

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS NC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 185 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981



DRAINAGE AREA MAP

SHEET 3 OF 3

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS NC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 186 |
| CHECK JM | CONTROL | SECTION 01 | JOB 023 | |

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 DATE: 2/26/2018
 TIME: 12:41:32 PM

WinStorm (STORM DRAIN DESIGN)
 PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE SB1
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

Version 3.05, Jan. 25, 2002
 Run @ 1/15/2018 3:26:01 PM

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. | US | DS | US | DS | Shape # | Span | Rise | Length | Slope | n_value |
|------|---------------|----------------|------|------|------|------|---------|------|------|--------|-------|---------|
| | | | (ft) | (ft) | (ft) | (ft) | | (ft) | (ft) | (ft) | (%) | |
| 1 | SB1-04 SB1-03 | 603.63 603.01 | | | | | Circ 1 | 0.00 | 1.50 | 68.03 | 0.91 | 0.013 |
| 2 | SB1-03 SB1-02 | 603.01 600.39 | | | | | Circ 1 | 0.00 | 1.50 | 476.15 | 0.55 | 0.013 |
| 3 | SB1-02 SB1-01 | 600.39 595.55 | | | | | Circ 1 | 0.00 | 1.50 | 395.65 | 1.22 | 0.013 |
| 4 | SB1-01 SB1OUT | 595.55 594.14 | | | | | Circ 1 | 0.00 | 1.50 | 118.51 | 1.19 | 0.013 |

OUTPUT FOR DESIGN FREQUENCY of: 5 Years
 =====

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|----------|---------------|-------------------|----------------|---------------|
| SB1-01 | 0.95 | 0.55 | 4.20 | 10.00 | 6.93 | 0.000 | 3.619 |
| | 0.95 | 0.55 | Pavement | | | | |
| SB1-02 | 0.95 | 0.56 | 4.92 | 10.00 | 6.93 | 0.000 | 3.685 |
| | 0.95 | 0.56 | Pavement | | | | |
| SB1-03 | 0.95 | 0.10 | 1.94 | 10.00 | 6.93 | 0.000 | 0.658 |
| | 0.95 | 0.10 | Pavement | | | | |
| SB1-04 | 0.95 | 0.06 | 1.07 | 10.00 | 6.93 | 0.000 | 0.395 |
| | 0.95 | 0.06 | Pavement | | | | |

Conveyance Hydraulic Computations. Tailwater = 594.250 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr.Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|--------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 603.83 | 603.38 | 0.001 | 0.20 | 0.37 | 2.75 | 1.15 | 0.39 | 10.03 | 0.000 |
| 2* | 603.38 | 601.07 | 0.010 | 0.37 | 0.68 | 3.08 | 1.35 | 1.05 | 7.79 | 0.001 |
| 3* | 601.07 | 596.54 | 0.203 | 0.67 | 0.99 | 6.23 | 3.84 | 4.74 | 11.62 | 0.011 |
| 4* | 596.54 | 595.09 | 0.633 | 0.95 | 0.95 | 7.09 | 7.09 | 8.36 | 11.46 | 0.039 |

=====END=====

WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
 Run @ 1/15/2018 11:31:10 AM

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-------------------------|-------------------|
| SB1-04 | Curb | 10.00 | 0.50 | 0.36 | 0.015 | 0.25 | n/a | 16.00 | 608.88 |
| SB1-03 | Curb | 5.00 | 0.50 | 0.52 | 0.015 | 0.25 | n/a | 16.00 | 609.76 |
| SB1-02 | Curb | 15.00 | 1.22 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | 605.64 |
| SB1-01 | Curb | 15.00 | 1.22 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | 600.80 |

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE SB2A
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years
 =====

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Q Actual (cfs) | To Inlet Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|----------------|-------------------------------|--------------------|-------------------|
| SB1-04 | Curb | 0.395 | 0.395 | 0.000 | 0.000 | 3.65 | 10.00 | 16.21 |
| SB1-03 | Curb | 0.658 | 0.658 | 0.000 | 0.000 | 4.78 | 5.00 | 15.77 |
| SB1-02 | Curb | 3.685 | 3.685 | 0.500 | 0.000 | 12.99 | 15.00 | 11.05 |
| SB1-01 | Curb | 3.619 | 3.619 | 0.000 | 0.000 | 12.87 | 15.00 | 11.00 |

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|---------------|---------------|-------------------|----------------|---------------|
| SB2-01 | 0.565 | 0.39 | 5.37 | 10.00 | 6.93 | 0.000 | 1.527 |
| | 0.95 | 0.14 | Pavement | | | | |
| | 0.35 | 0.25 | Undeveloped | | | | |
| SB2-02 | 0.375 | 1.12 | 9.12 | 10.00 | 6.93 | 0.000 | 2.909 |
| | 0.55 | 0.14 | Single Family | | | | |
| | 0.35 | 0.98 | Undeveloped | | | | |
| SB2-03 | 0.475 | 2.23 | 10.00 | 10.00 | 6.93 | 0.000 | 7.332 |
| | 0.95 | 0.43 | Pavement | | | | |
| | 0.55 | 0.10 | Single family | | | | |
| | 0.35 | 1.70 | Undeveloped | | | | |
| SB2-05 | 0.395 | 0.71 | 7.84 | 10.00 | 6.93 | 0.000 | 1.943 |
| | 0.55 | 0.16 | Single family | | | | |
| | 0.35 | 0.55 | Undeveloped | | | | |
| SB2-00 | 0.864 | 0.07 | 1.10 | 10.00 | 6.93 | 0.000 | 0.419 |
| | 0.95 | 0.06 | Pavement | | | | |
| | 0.35 | 0.01 | Undeveloped | | | | |

Cumulative Junction Discharge Computations

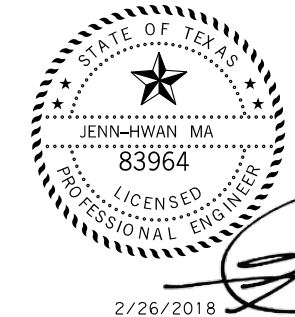
| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| SB1-04 | Curb | 0.950 | 0.06 | 10.00 | 6.93 | 0.000 | 0.00 | 0.395 |
| SB1-03 | Curb | 0.950 | 0.16 | 10.00 | 6.93 | 0.000 | 0.00 | 1.053 |
| SB1-02 | Curb | 0.950 | 0.72 | 10.00 | 6.93 | 0.000 | 0.00 | 4.738 |
| SB1-01 | Curb | 0.950 | 1.27 | 10.00 | 6.93 | 0.000 | 0.00 | 8.357 |
| SB1OUT | Outlet | 0.950 | 1.27 | 10.00 | 6.93 | 0.000 | 0.00 | 8.357 |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-------------------------|-------------------|
| SB2-00 | Curb | 5.00 | 0.83 | 0.65 | 0.015 | 0.25 | n/a | 16.00 | 609.64 |
| SB2-01 | Curb | 10.00 | 0.83 | 1.40 | 0.015 | 0.25 | n/a | 16.00 | 609.44 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 1 OF 11

| | | | |
|-------------|---------------------|---|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS ROCKWALL | 187 |
| CHECK JM | CONTROL | SECTION JOB | |
| | 1015 | 01 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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 DATE: 2/26/2018
 TIME: 12:41:38 PM

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Actual (cfs) | To Inlet Required ID | Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|--------------|----------------------|-------------|--------------------|-------------------|
| SB2-00 | Curb | 0.419 | 0.419 | 0.000 | 0.000 | | 4.07 | 5.00 | 10.62 |
| SB2-01 | Curb | 1.527 | 1.527 | 0.000 | 0.000 | | 7.67 | 10.00 | 10.64 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Length/Perim. (ft) | Grate Area (sf) | Left-Slope Long Trans (%) | Right-Slope Long Trans (%) | Gutter n | Depth DeprW (ft) | Critic Elev. (ft) | | | |
|----------|------------|--------------------|-----------------|---------------------------|----------------------------|----------|------------------|-------------------|-----|------|--------|
| SB2-02 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a | 0.50 | 609.20 |
| SB2-05 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a | 0.50 | 606.45 |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Length (ft) | Grate Perim Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Width Right (ft) | |
|----------|------------|-------------|-----------------------|---------------|----------------------|-----------------|------------------|------------------|-------|
| SB2-02 | Grate | n/a | 12.67 | 4.53 | 2.909 | 6.914 | 0.177 | 11.95 | 11.95 |
| SB2-05 | Grate | n/a | 12.67 | 4.53 | 1.943 | 13.828 | 0.135 | 10.30 | 10.30 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| SB2-00 | Curb | 0.864 | 0.07 | 10.00 | 6.93 | 0.000 | 0.00 | 0.419 |
| SB2-01 | Curb | 0.611 | 0.46 | 10.00 | 6.93 | 0.000 | 0.00 | 1.946 |
| SB2-02A | Junct | 0.444 | 1.58 | 10.00 | 6.93 | 0.000 | 0.00 | 4.856 |
| SB2-03A | Junct | 0.462 | 3.81 | 10.05 | 6.91 | 0.000 | 0.00 | 12.163 |
| SB2-05A | Junct | 0.451 | 4.52 | 10.36 | 6.83 | 0.000 | 0.00 | 13.923 |
| SB2-02 | Grate | 0.375 | 1.12 | 10.00 | 6.93 | 0.000 | 0.00 | 2.909 |
| SB2-03 | CircMh | 0.475 | 2.23 | 10.00 | 6.93 | 0.000 | 0.00 | 7.332 |
| SB2-05 | Grate | 0.395 | 0.71 | 10.00 | 6.93 | 0.000 | 0.00 | 1.943 |
| SB2AOUT | Outlet | 0.451 | 4.52 | 10.36 | 6.83 | 0.000 | 0.00 | 13.923 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n_value | | |
|------|----------------|----------------|---------|-----------|-----------|-------------|-----------|---------|-------|-------|
| 1 | SB2-00 | SB2-01 | 604.89 | 604.69 | Circ 1 | 0.00 | 1.50 | 45.67 | 0.44 | 0.013 |
| 2 | SB2-01 | SB2-02A | 604.69 | 603.43 | Circ 1 | 0.00 | 1.50 | 314.48 | 0.40 | 0.013 |
| 3 | SB2-02 | SB2-02A | 603.87 | 603.43 | Circ 1 | 0.00 | 1.50 | 22.49 | 1.96 | 0.013 |
| 4 | SB2-02ASB2-03A | 603.43 | 603.17 | Circ 1 | 0.00 | 1.50 | 65.49 | 0.40 | 0.013 | |
| 5 | SB2-03 | SB2-03A | 604.88 | 604.81 | Circ 1 | 0.00 | 2.00 | 14.50 | 0.48 | 0.013 |
| 6 | SB2-03ASB2-05A | 602.67 | 601.35 | Circ 1 | 0.00 | 2.00 | 134.90 | 0.98 | 0.013 | |
| 7 | SB2-05 | SB2-05A | 601.95 | 601.60 | Circ 1 | 0.00 | 1.50 | 18.40 | 1.90 | 0.013 |
| 8 | SB2-05ASB2AOUT | 601.35 | 600.73 | Circ 1 | 0.00 | 2.00 | 62.77 | 0.99 | 0.013 | |

Conveyance Hydraulic Computations. Tailwater = 602.730 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Depth Unif. (ft) | Actual (ft) | Velocity Unif. (f/s) | Actual (f/s) | Q (cfs) | Cap (cfs) | Junc Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------|----------------------|--------------|---------|-----------|----------------|
| 1* | 605.26 | 605.26 | 0.002 | 0.25 | 0.57 | 2.18 | 0.68 | 0.42 | 6.95 | 0.000 |
| 2 | 605.26 | 604.48 | 0.034 | 0.56 | 1.05 | 3.26 | 1.47 | 1.95 | 6.65 | 0.012 |
| 3* | 604.50 | 604.48 | 0.077 | 0.45 | 1.05 | 6.47 | 2.20 | 2.91 | 14.70 | 0.000 |
| 4 | 604.48 | 604.02 | 0.214 | 0.96 | 0.96 | 4.06 | 4.06 | 4.86 | 6.62 | 0.090 |
| 5* | 605.84 | 605.77 | 0.105 | 0.96 | 0.96 | 4.91 | 4.91 | 7.33 | 15.72 | 0.000 |
| 6* | 603.79 | 603.07 | 0.289 | 1.05 | 1.72 | 7.27 | 4.22 | 12.16 | 22.38 | 0.069 |
| 7* | 603.08 | 603.07 | 0.034 | 0.37 | 1.47 | 5.72 | 1.10 | 1.94 | 14.49 | 0.000 |
| 8* | 603.07 | 602.73 | 0.379 | 1.14 | 2.00 | 7.52 | 4.43 | 13.92 | 22.49 | 0.107 |

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002

Run @ 1/15/2018 5:06:37 PM

PROJECT NAME : FM 3549

JOB NUMBER : 2520

PROJECT DESCRIPTION : LINE SB2B

DESIGN FREQUENCY : 5 Years

MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

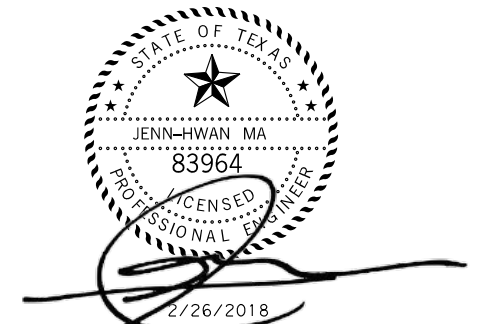
| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|---------------|---------------|-------------------|----------------|---------------|
| SB2-06 | 0.362 | 1.17 | 9.26 | 10.00 | 6.93 | 0.000 | 2.933 |
| | 0.55 | 0.07 | Single family | | | | |
| | 0.35 | 1.10 | Undeveloped | | | | |
| SB2-07 | 0.95 | 0.11 | 1.95 | 10.00 | 6.93 | 0.000 | 0.724 |
| | 0.95 | 0.11 | Pavement | | | | |
| SB2-08 | 0.401 | 0.83 | 8.27 | 10.00 | 6.93 | 0.000 | 2.303 |
| | 0.95 | 0.04 | Pavement | | | | |
| | 0.55 | 0.09 | Single family | | | | |
| | 0.35 | 0.70 | Undeveloped | | | | |
| SB2-04 | 0.95 | 0.19 | 2.35 | 10.00 | 6.93 | 0.000 | 1.250 |
| | 0.95 | 0.19 | Pavement | | | | |
| SB2A | 0.446 | 4.45 | 12.53 | 12.53 | 6.27 | 0.000 | 12.453 |
| NB2A | 0.871 | 1.14 | 12.34 | 12.34 | 6.32 | 0.000 | 6.274 |
| NB2B | 0.95 | 1.01 | 10.98 | 10.98 | 6.66 | 0.000 | 6.387 |
| SB2-09 | 0.46 | 0.82 | 8.22 | 10.00 | 6.93 | 0.000 | 2.611 |
| | 0.95 | 0.12 | Pavement | | | | |
| | 0.55 | 0.09 | Single family | | | | |
| | 0.35 | 0.61 | Undeveloped | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long Trans (%) | Gutter n | Depth Depr. (ft) | Grate Width (ft) | Pond Type | Width Allowed (ft) | Critic Elev. (ft) | |
|----------|------------|-------------------|-----------------------|----------|------------------|------------------|-----------|--------------------|-------------------|--------|
| SB2-09 | Curb | 15.00 | 1.53 | 1.55 | 0.015 | 0.25 | n/a | n/a | 16.00 | 606.29 |
| SB2-08 | Curb | 10.00 | 0.98 | 8.40 | 0.015 | 0.25 | n/a | n/a | 16.00 | 605.94 |
| SB2-04 | Curb | 10.00 | 1.64 | 0.61 | 0.015 | 0.25 | n/a | n/a | 16.00 | 605.88 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
Dallas, Texas 75243
TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 2 OF 11

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 188 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Q Bypass Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|-----------------------|-------------|----------------------|--------------------|-------------------|
| SB2-09 | Curb | 2.611 | 2.611 | 0.000 | 0.000 | | 11.77 | 15.00 | 10.90 |
| SB2-08 | Curb | 2.303 | 2.303 | 0.000 | 0.000 | | 6.57 | 10.00 | 3.93 |
| SB2-04 | Curb | 1.250 | 1.250 | 0.000 | 0.000 | | 8.87 | 10.00 | 14.59 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Inlet Perim. (ft) | Grate Area (sf) | Left-Slope Long (%) | Right-Slope Long (%) | Gutter n | Depth Allowed (ft) | Critic Elev. (ft) | | | |
|----------|------------|-------------------|-----------------|---------------------|----------------------|----------|--------------------|-------------------|--------|------|--------|
| SB2-07 | Curb | 5.00 | n/a | 1.64 | 0.28 | 1.53 | 0.29 | 0.015 | 1.50 | 0.50 | 605.84 |
| SB2-06 | Grate | 12.67 | 4.53 | 0.50 | 25.00 | 0.030 | n/a | 0.50 | 606.40 | | |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Length (ft) | Grate Perim (ft) | Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Width Right (ft) |
|----------|------------|-------------|------------------|-----------|---------------|----------------------|-----------------|------------------|------------------|
| SB2-07 | Curb | 5.00 | n/a | n/a | 0.724 | 6.261 | 0.119 | 15.00 | 14.83 |
| SB2-06 | Grate | n/a | 12.67 | 4.53 | 2.933 | 6.914 | 0.178 | 2.47 | 2.47 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| SB2-09 | Curb | 0.460 | 0.82 | 10.00 | 6.93 | 0.000 | 0.00 | 2.611 |
| SB2-08 | Curb | 0.430 | 1.65 | 10.00 | 6.93 | 0.000 | 0.00 | 4.914 |
| SB2-07 | Curb | 0.422 | 2.93 | 10.00 | 6.93 | 0.000 | 0.00 | 8.572 |
| SB2-07A | JctBx | 0.437 | 7.38 | 12.67 | 6.24 | 0.000 | 0.00 | 20.113 |
| SB2-04A | Junct | 0.449 | 7.57 | 12.77 | 6.22 | 0.000 | 0.00 | 21.164 |
| SB2-07B | Junct | 0.551 | 9.72 | 12.90 | 6.19 | 0.000 | 0.00 | 33.147 |
| SB2-06 | Grate | 0.362 | 1.17 | 10.00 | 6.93 | 0.000 | 0.00 | 2.933 |
| SB2A | CircMh | 0.446 | 4.45 | 12.53 | 6.27 | 0.000 | 0.00 | 12.453 |
| SB2-04 | Curb | 0.950 | 0.19 | 10.00 | 6.93 | 0.000 | 0.00 | 1.250 |
| NB2A | CircMh | 0.871 | 1.14 | 12.34 | 6.32 | 0.000 | 0.00 | 6.274 |
| NB2B | CircMh | 0.950 | 1.01 | 10.98 | 6.66 | 0.000 | 0.00 | 6.387 |
| SB2BOUT | Outl+ | 0.551 | 9.72 | 12.90 | 6.19 | 0.000 | 0.00 | 33.147 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. US (ft) | Flowline Elev. DS (ft) | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n-value |
|------|----------------|------------------------|------------------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | SB2-09 SB2-08 | 601.54 | 601.19 | Circ 1 | 0.00 | 1.50 | 50.61 | 0.69 | 0.013 |
| 2 | SB2-08 SB2-07 | 601.19 | 601.03 | Circ 1 | 0.00 | 1.50 | 44.49 | 0.36 | 0.013 |
| 3 | SB2-06 SB2-07 | 601.65 | 601.03 | Circ 1 | 0.00 | 1.50 | 16.18 | 3.83 | 0.013 |
| 4 | SB2-07 SB2-07A | 600.53 | 600.33 | Circ 1 | 0.00 | 2.00 | 52.70 | 0.38 | 0.013 |
| 5 | SB2A SB2-07A | 601.35 | 600.73 | Circ 1 | 0.00 | 2.00 | 62.77 | 0.99 | 0.013 |
| 6 | SB2-07ASB2-04A | 599.99 | 599.82 | Box 1 | 4.00 | 3.00 | 33.93 | 0.50 | 0.013 |
| 7 | SB2-04 SB2-04A | 601.13 | 600.57 | Circ 1 | 0.00 | 1.50 | 6.49 | 8.66 | 0.013 |
| 8 | SB2-04ASB2-07B | 599.82 | 599.59 | Box 1 | 4.00 | 3.00 | 47.07 | 0.49 | 0.013 |
| 9 | NB2A SB2-07B | 600.52 | 599.84 | Circ 1 | 0.00 | 2.00 | 115.31 | 0.59 | 0.013 |
| 10 | NB2B SB2-07B | 600.55 | 600.34 | Circ 1 | 0.00 | 1.50 | 8.22 | 2.56 | 0.013 |
| 11 | SB2-07BSB2BOUT | 599.59 | 599.50 | Box 1 | 4.00 | 3.00 | 17.42 | 0.52 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 600.450 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 602.23 | 602.20 | 0.062 | 0.56 | 1.01 | 4.31 | 2.07 | 2.61 | 8.74 | 0.000 |
| 2 | 602.20 | 601.88 | 0.219 | 1.00 | 1.00 | 3.94 | 3.94 | 4.91 | 6.30 | 0.012 |
| 3* | 602.07 | 601.74 | 0.078 | 0.38 | 0.71 | 8.24 | 3.55 | 2.93 | 20.57 | 0.000 |
| 4 | 601.74 | 601.37 | 0.144 | 1.13 | 1.13 | 4.71 | 4.71 | 8.57 | 13.94 | 0.086 |
| 5* | 602.41 | 601.79 | 0.303 | 1.06 | 1.06 | 7.34 | 7.34 | 12.45 | 22.49 | 0.000 |
| 6* | 601.14 | 601.06 | 0.026 | 0.87 | 1.24 | 5.80 | 4.06 | 20.11 | 87.61 | 0.077 |
| 7* | 601.37 | 601.06 | 0.014 | 0.21 | 0.49 | 8.56 | 2.51 | 1.25 | 30.92 | 0.000 |
| 8* | 601.06 | 600.99 | 0.029 | 0.90 | 1.40 | 5.86 | 3.78 | 21.16 | 86.52 | 0.056 |
| 9* | 601.35 | 600.99 | 0.077 | 0.83 | 1.15 | 5.11 | 3.36 | 6.27 | 17.37 | 0.000 |
| 10* | 601.20 | 600.99 | 0.370 | 0.64 | 0.65 | 8.85 | 8.73 | 6.39 | 16.79 | 0.000 |
| 11* | 600.99 | 600.72 | 0.072 | 1.22 | 1.22 | 6.80 | 6.80 | 33.15 | 88.97 | 0.180 |

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
Run @ 2/1/2018 11:08:33 AM

PROJECT NAME : FM 3549
JOB NUMBER : 2520
PROJECT DESCRIPTION : LINE SB3A
DESIGN FREQUENCY : 5 Years
MEASUREMENT UNITS: ENGLISH

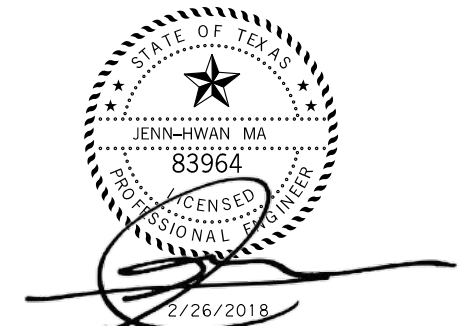
OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|---------------|---------------|-------------------|----------------|---------------|
| SB3-01 | 0.453 | 0.93 | 8.55 | 10.00 | 6.93 | 0.000 | 2.920 |
| | 0.95 | 0.11 | Pavement | | | | |
| | 0.55 | 0.15 | Single family | | | | |
| | 0.35 | 0.67 | Undeveloped | | | | |
| SB3-02 | 0.527 | 0.70 | 8.77 | 10.00 | 6.93 | 0.000 | 2.556 |
| | 0.95 | 0.11 | Pavement | | | | |
| | 0.55 | 0.29 | Single family | | | | |
| | 0.35 | 0.30 | Undeveloped | | | | |
| SB3-4A | 0.95 | 0.16 | 2.37 | 10.00 | 6.93 | 0.000 | 1.053 |
| | 0.95 | 0.16 | Pavement | | | | |
| SB3-5A | 0.95 | 0.09 | 2.01 | 10.00 | 6.93 | 0.000 | 0.592 |
| | 0.95 | 0.09 | Pavement | | | | |
| SB3-6A | 0.95 | 0.08 | 1.96 | 10.00 | 6.93 | 0.000 | 0.526 |
| | 0.95 | 0.08 | Pavement | | | | |
| SB3-07 | 0.623 | 0.99 | 8.71 | 10.00 | 6.93 | 0.000 | 4.270 |
| | 0.95 | 0.45 | Pavement | | | | |
| | 0.35 | 0.54 | Undeveloped | | | | |
| SB3-08 | 0.676 | 0.68 | 8.23 | 10.00 | 6.93 | 0.000 | 3.186 |
| | 0.95 | 0.37 | Pavement | | | | |
| | 0.35 | 0.31 | Undeveloped | | | | |
| SB3-09 | 0.55 | 0.75 | 7.64 | 10.00 | 6.93 | 0.000 | 2.857 |
| | 0.95 | 0.25 | Pavement | | | | |
| | 0.35 | 0.50 | Undeveloped | | | | |
| SB3-10 | 0.528 | 0.74 | 7.83 | 10.00 | 6.93 | 0.000 | 2.708 |
| | 0.95 | 0.22 | Pavement | | | | |
| | 0.35 | 0.52 | Undeveloped | | | | |
| SB3-03 | 0.804 | 0.41 | 5.57 | 10.00 | 6.93 | 0.000 | 2.282 |
| | 0.95 | 0.26 | Pavement | | | | |
| | 0.55 | 0.15 | Single family | | | | |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC.
9330 LBJ Frwy, Ste. 1150
Dallas, Texas 75243
TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474



HYDRAULIC DATA SHEET

SHEET 3 OF 11

| DESIGN NC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | | HIGHWAY NO. |
|-------------|-------------------|-------------------------|----------|--|-------------|
| GRAPHICS TC | 6 | SEE TITLE SHEET | | | FM 3549 |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | | 189 |
| CHECK JM | CONTROL | SECTION | JOB | | |
| | 1015 | 01 | 023 | | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Projects\100012351 FM 3549\CADD\DRN\FM3549*HD*04.dgn

DATE: 2/26/2018
 TIME: 12:41:48 PM

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Depr. (ft) | Grate Width (ft) | Type | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|------------|------------------|------|-------------------------|-------------------|
| SB3-01 | Curb | 10.00 | 1.53 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 607.74 |
| SB3-02 | Curb | 15.00 | 1.53 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 609.26 |
| SB3-03 | Curb | 10.00 | 1.31 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 610.71 |
| SB3-07 | Curb | 15.00 | 1.69 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 608.08 |
| SB3-08 | Curb | 15.00 | 1.69 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 603.15 |
| SB3-09 | Curb | 15.00 | 1.69 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 595.08 |
| SB3-4A | Curb | 5.00 | 0.48 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 612.23 |
| SB3-5A | Curb | 5.00 | 0.55 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 611.72 |
| SB3-6A | Curb | 5.00 | 0.55 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 611.25 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|--------------|-------------|----------------------|--------------------|-------------------|
| SB3-01 | Curb | 2.920 | 2.810 | 1.000 | 0.110 | SB3-02 | 11.93 | 10.00 | 9.70 |
| SB3-02 | Curb | 2.666 | 2.666 | 1.000 | 0.000 | | 11.34 | 15.00 | 9.40 |
| SB3-03 | Curb | 2.282 | 2.282 | 1.000 | 0.000 | | 10.01 | 10.00 | 9.10 |
| SB3-07 | Curb | 4.270 | 4.268 | 1.000 | 0.002 | | 15.21 | 15.00 | 11.00 |
| SB3-08 | Curb | 3.186 | 3.186 | 1.000 | 0.000 | | 12.83 | 15.00 | 9.85 |
| SB3-09 | Curb | 2.857 | 2.857 | 1.000 | 0.000 | | 12.05 | 15.00 | 9.45 |
| SB3-4A | Curb | 1.053 | 1.051 | 1.000 | 0.002 | | 5.16 | 5.00 | 8.25 |
| SB3-5A | Curb | 0.592 | 0.592 | 1.000 | 0.000 | | 3.90 | 5.00 | 6.45 |
| SB3-6A | Curb | 0.526 | 0.526 | 1.000 | 0.000 | | 3.67 | 5.00 | 6.20 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Inlet Length (ft) | Grate Area (sf) | Left-Slope Long (%) | Right-Slope Long (%) | Gutter n | DeprW (ft) | Depth Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|---------------------|----------------------|----------|------------|--------------------|-------------------|
| SB3-10 | Curb | 5.00 | n/a | 1.69 | 2.00 | 0.015 | 1.50 | 0.50 | 593.86 |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Inlet Length (ft) | Grate Perim Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Ponded Right (ft) |
|----------|------------|-------------------|-----------------------|---------------|----------------------|-----------------|------------------|-------------------|
| SB3-10 | Curb | 5.00 | n/a | 2.708 | 6.261 | 0.286 | 7.15 | 8.55 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| SB3-01 | Curb | 0.453 | 0.93 | 10.00 | 6.93 | 0.000 | 0.00 | 2.920 |
| SB3-02 | Curb | 0.485 | 1.63 | 10.00 | 6.93 | 0.000 | 0.00 | 5.476 |
| SB3-03 | Curb | 0.549 | 2.04 | 10.00 | 6.93 | 0.000 | 0.00 | 7.758 |
| SB3-03MH | CircMh | 0.549 | 2.04 | 10.00 | 6.93 | 0.000 | 0.00 | 7.758 |
| SB3-4B | Junct | 0.578 | 2.20 | 10.82 | 6.70 | 0.000 | 2.00 | 10.521 |
| SB3-5B | Junct | 0.593 | 2.29 | 11.16 | 6.61 | 0.000 | 4.00 | 12.974 |
| SB3-6B | Junct | 0.605 | 2.37 | 11.46 | 6.53 | 0.000 | 6.00 | 15.365 |
| SB3-06MH | CircMh | 0.605 | 2.37 | 11.46 | 6.53 | 0.000 | 6.00 | 15.365 |
| SB3-07 | Curb | 0.610 | 3.36 | 12.74 | 6.23 | 0.000 | 6.00 | 18.764 |
| SB3-08 | Curb | 0.621 | 4.04 | 13.45 | 6.07 | 0.000 | 6.00 | 21.237 |
| SB3-09 | Curb | 0.610 | 4.79 | 14.28 | 5.90 | 0.000 | 6.00 | 23.242 |

| | | | | | | | | |
|---------|--------|-------|------|-------|------|-------|------|--------|
| SB3-10 | Curb | 0.599 | 5.53 | 14.53 | 5.85 | 0.000 | 6.00 | 25.381 |
| SB3-4A | Curb | 0.950 | 0.16 | 10.00 | 6.93 | 0.000 | 2.00 | 3.053 |
| SB3-5A | Curb | 0.950 | 0.09 | 10.00 | 6.93 | 0.000 | 2.00 | 2.592 |
| SB3-6A | Curb | 0.950 | 0.08 | 10.00 | 6.93 | 0.000 | 2.00 | 2.526 |
| SB3AOUT | Outlet | 0.599 | 5.53 | 14.53 | 5.85 | 0.000 | 6.00 | 25.381 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline US Elev. (ft) | Flowline DS Elev. (ft) | Shape | # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n_value |
|------|-----------------|------------------------|------------------------|-------|---|-----------|-----------|-------------|-----------|---------|
| 1 | SB3-01 SB3-02 | 602.49 | 602.12 | Circ | 1 | 0.00 | 2.00 | 97.52 | 0.38 | 0.013 |
| 2 | SB3-02 SB3-03 | 602.12 | 601.78 | Circ | 1 | 0.00 | 2.00 | 98.52 | 0.35 | 0.013 |
| 3 | SB3-03 SB3-03MH | 601.78 | 601.13 | Circ | 1 | 0.00 | 2.00 | 187.39 | 0.35 | 0.013 |
| 4 | SB3-03MHSB3-4B | 601.13 | 600.50 | Circ | 1 | 0.00 | 2.00 | 183.00 | 0.35 | 0.013 |
| 5 | SB3-4A SB3-4B | 607.43 | 601.00 | Circ | 1 | 0.00 | 1.50 | 7.50 | 85.73 | 0.013 |
| 6 | SB3-4B SB3-5B | 600.50 | 600.17 | Circ | 1 | 0.00 | 2.00 | 94.06 | 0.35 | 0.013 |
| 7 | SB3-5A SB3-5B | 606.97 | 600.67 | Circ | 1 | 0.00 | 1.50 | 7.50 | 84.00 | 0.013 |
| 8 | SB3-5B SB3-6B | 600.17 | 599.88 | Circ | 1 | 0.00 | 2.00 | 86.24 | 0.35 | 0.013 |
| 9 | SB3-6A SB3-6B | 605.50 | 600.38 | Circ | 1 | 0.00 | 1.50 | 7.50 | 68.40 | 0.013 |
| 10 | SB3-6B SB3-06MH | 599.38 | 598.68 | Circ | 1 | 0.00 | 2.50 | 200.00 | 0.35 | 0.013 |
| 11 | SB3-06MHSB3-07 | 598.68 | 597.98 | Circ | 1 | 0.00 | 2.50 | 202.28 | 0.35 | 0.013 |
| 12 | SB3-07 SB3-08 | 597.98 | 595.25 | Circ | 1 | 0.00 | 2.50 | 324.61 | 0.84 | 0.013 |
| 13 | SB3-08 SB3-09 | 595.25 | 589.75 | Circ | 1 | 0.00 | 2.50 | 450.99 | 1.22 | 0.013 |
| 14 | SB3-09 SB3-10 | 589.75 | 588.03 | Circ | 1 | 0.00 | 2.50 | 141.67 | 1.22 | 0.013 |
| 15 | SB3-10 SB3AOUT | 588.03 | 587.71 | Circ | 1 | 0.00 | 2.50 | 31.81 | 1.01 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 588.920 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1 | 603.12 | 603.04 | 0.017 | 0.63 | 0.92 | 3.48 | 2.06 | 2.92 | 13.94 | 0.000 |
| 2 | 603.04 | 602.89 | 0.059 | 0.89 | 1.11 | 4.05 | 3.07 | 5.48 | 13.29 | 0.007 |
| 3 | 602.89 | 602.35 | 0.118 | 1.09 | 1.22 | 4.41 | 3.85 | 7.76 | 13.33 | 0.012 |
| 4 | 602.35 | 602.15 | 0.118 | 1.09 | 1.65 | 4.41 | 2.80 | 7.76 | 13.29 | 0.006 |
| 5* | 607.61 | 602.15 | 0.084 | 0.16 | 1.15 | 31.34 | 2.10 | 3.05 | 135.58 | 0.000 |
| 6 | 602.15 | 601.92 | 0.216 | 1.34 | 1.75 | 4.69 | 3.61 | 10.52 | 13.40 | 0.071 |
| 7* | 607.14 | 601.92 | 0.061 | 0.15 | 1.25 | 29.40 | 1.65 | 2.59 | 130.72 | 0.000 |
| 8 | 601.92 | 601.18 | 0.329 | 1.63 | 1.63 | 4.75 | 4.75 | 12.97 | 13.12 | 0.122 |
| 9* | 605.69 | 600.97 | 0.058 | 0.16 | 0.59 | 24.25 | 3.93 | 2.53 | 101.54 | 0.000 |
| 10 | 600.97 | 600.15 | 0.140 | 1.45 | 1.47 | 5.23 | 5.13 | 15.37 | 24.27 | 0.143 |
| 11 | 600.15 | 599.30 | 0.140 | 1.45 | 1.45 | 5.23 | 5.23 | 15.37 | 24.13 | 0.021 |
| 12* | 599.28 | 596.50 | 0.209 | 1.25 | 1.25 | 7.64 | 7.62 | 18.76 | 37.62 | 0.045 |
| 13* | 596.50 | 591.08 | 0.268 | 1.20 | 1.33 | 9.11 | 8.04 | 21.24 | 45.30 | 0.050 |
| 14* | 591.08 | 589.51 | 0.321 | 1.27 | 1.48 | 9.28 | 7.70 | 23.24 | 45.22 | 0.046 |
| 15* | 589.51 | 589.13 | 0.383 | 1.42 | 1.42 | 8.85 | 8.85 | 25.38 | 41.15 | 0.061 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 4 OF 11

| DESIGN NC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | | HIGHWAY NO. |
|-------------|-------------------|-------------------------|----------|-----------|-------------|
| 6 | 6 | SEE TITLE SHEET | | | FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. | |
| 190 | TEXAS | DALLAS | ROCKWALL | | |
| CHECK JM | CONTROL | SECTION | JOB | | |
| | 1015 | 01 | 023 | | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKNATX01\Documents\Roads and Bridges\Projects\100012351 FM 3549\CADD\DRN\FM3549*HD*05.dgn
 DATE: 2/26/2018 TIME: 12:41:53 PM

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
 Run @ 2/1/2018 4:28:15 PM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE SB3B
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|-----------|---------|-------------|---------------|---------------|-------------------|----------------|---------------|
| SB3-16 | 0.71 | 0.18 | 2.39 | 10.00 | 6.93 | 0.000 | 0.861 |
| | 0.95 | 0.11 | Pavement | | | | |
| | 0.35 | 0.07 | Undeveloped | | | | |
| SB3-15 | 0.738 | 0.99 | 6.56 | 10.00 | 6.93 | 0.000 | 5.060 |
| | 0.95 | 0.64 | Pavement | | | | |
| | 0.35 | 0.35 | Undeveloped | | | | |
| SB3-14 | 0.575 | 0.56 | 7.03 | 10.00 | 6.93 | 0.000 | 2.230 |
| | 0.95 | 0.21 | Pavement | | | | |
| | 0.35 | 0.35 | Undeveloped | | | | |
| SB3-13 | 0.605 | 0.77 | 7.41 | 10.00 | 6.93 | 0.000 | 3.224 |
| | 0.95 | 0.30 | Pavement | | | | |
| | 0.55 | 0.08 | Single family | | | | |
| | 0.35 | 0.39 | Undeveloped | | | | |
| SB3-12 | 0.525 | 0.64 | 7.43 | 10.00 | 6.93 | 0.000 | 2.327 |
| | 0.95 | 0.17 | Pavement | | | | |
| | 0.55 | 0.05 | Single family | | | | |
| | 0.35 | 0.42 | Undeveloped | | | | |
| SB3-11 | 0.474 | 0.58 | 7.08 | 10.00 | 6.93 | 0.000 | 1.905 |
| | 0.95 | 0.12 | Pavement | | | | |
| | 0.35 | 0.46 | Undeveloped | | | | |
| SB3-10C | 0.376 | 7.72 | 10.00 | 10.00 | 6.93 | 0.000 | 20.101 |
| | 0.95 | 0.06 | Pavement | | | | |
| | 0.55 | 0.82 | Single family | | | | |
| | 0.35 | 6.84 | Undeveloped | | | | |
| SB3-10E | 0.376 | 11.08 | 10.00 | 10.00 | 6.93 | 0.000 | 28.884 |
| | 0.95 | 0.12 | Pavement | | | | |
| | 0.55 | 1.10 | Single family | | | | |
| | 0.35 | 9.86 | Undeveloped | | | | |
| SB3A | 0.599 | 5.53 | 14.42 | 14.42 | 5.87 | 0.000 | 19.447 |
| NB3A | 0.837 | 2.70 | 13.13 | 13.13 | 6.14 | 0.000 | 13.875 |
| NB3B | 0.782 | 1.64 | 12.45 | 12.45 | 6.29 | 0.000 | 8.071 |
| SB3-10D | 0.383 | 1.40 | 9.92 | 10.00 | 6.93 | 0.000 | 3.713 |
| | 0.95 | 0.03 | Pavement | | | | |
| | 0.55 | 0.14 | Single family | | | | |
| | 0.35 | 1.23 | Undeveloped | | | | |
| SB3-10B20 | 0.35 | 0.57 | 6.72 | 10.00 | 6.93 | 0.000 | 1.382 |
| | 0.35 | 0.57 | Undeveloped | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Allowed (ft) | Grate Type | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-------------------|------------|-------------------|
| SB3-16 | Curb | 10.00 | 0.63 | 0.80 | 0.015 | 0.25 | n/a | 16.00 | n/a | 603.58 |
| SB3-15 | Curb | 15.00 | 0.75 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | n/a | 598.10 |
| SB3-14 | Curb | 10.00 | 0.50 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | n/a | 597.13 |
| SB3-13 | Curb | 10.00 | 0.65 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | n/a | 595.58 |
| SB3-12 | Curb | 10.00 | 0.65 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | n/a | 594.74 |
| SB3-11 | Curb | 10.00 | 0.65 | 2.00 | 0.015 | 0.25 | n/a | 16.00 | n/a | 594.11 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Allow (cfs) | Q Bypass Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|---------------|-----------------------|-------------|----------------------|--------------------|-------------------|
| SB3-16 | Curb | 0.861 | 0.861 | 0.250 | 0.000 | SB3-15 | 5.62 | 10.00 | 12.88 |
| SB3-15 | Curb | 5.060 | 5.060 | 0.250 | 0.000 | SB3-14 | 14.12 | 15.00 | 13.65 |
| SB3-14 | Curb | 2.230 | 2.230 | 0.250 | 0.000 | SB3-13 | 7.97 | 10.00 | 10.80 |
| SB3-13 | Curb | 3.224 | 3.211 | 0.250 | 0.013 | SB3-12 | 10.49 | 10.00 | 11.85 |
| SB3-12 | Curb | 2.340 | 2.340 | 0.250 | 0.000 | SB3-11 | 8.69 | 10.00 | 10.50 |
| SB3-11 | Curb | 1.905 | 1.905 | 1.000 | 0.000 | | 7.71 | 10.00 | 9.70 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Length Perim. (ft) | Grate Area (sf) | Left-Slope Long (%) | Right-Slope Trans (%) | Gutter n | Depth Allowed (ft) | Critic Elev. (ft) |
|--------------|------------|--------------------|-----------------|---------------------|-----------------------|----------|--------------------|-------------------|
| SB3-10B2 | Grate | 12.67 | 4.53 | 0.5025.00 | 0.50 25.00 | 0.030 | n/a | 578.00 |
| SB3-10CGrate | Grate | 25.00 | 19.50 | 0.5025.00 | 0.50 25.00 | 0.030 | n/a | 571.13 |
| SB3-10DGrate | Grate | 16.67 | 7.70 | 0.5025.00 | 0.50 25.00 | 0.030 | n/a | 570.50 |
| SB3-10EGrate | Grate | 16.67 | 8.19 | 0.5025.00 | 0.50 25.00 | 0.030 | n/a | 571.00 |

Sag Inlets Computation Data.

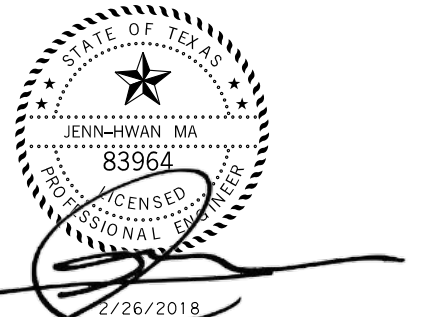
| Inlet ID | Inlet Type | Length (ft) | Grate Perim Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Width Right (ft) |
|--------------|------------|-------------|-----------------------|---------------|----------------------|-----------------|------------------|------------------|
| SB3-10B2 | Grate | n/a | 12.67 4.53 | 1.382 12.173 | 0.108 | 1.86 | 1.86 | |
| SB3-10CGrate | Grate | n/a | 25.00 19.50 | 20.101 38.588 | 0.408 | 5.08 | 5.08 | |
| SB3-10DGrate | Grate | n/a | 16.67 7.70 | 3.713 20.692 | 0.173 | 2.69 | 2.69 | |
| SB3-10EGrate | Grate | n/a | 16.67 8.19 | 28.884 29.115 | 0.680 | 5.82 | 5.82 | |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| SB3-16 | Curb | 0.710 | 0.18 | 10.00 | 6.93 | 0.000 | 0.00 | 0.861 |
| SB3-15 | Curb | 0.734 | 1.17 | 10.00 | 6.93 | 0.000 | 0.00 | 5.921 |
| SB3-14 | Curb | 0.682 | 1.73 | 10.00 | 6.93 | 0.000 | 0.00 | 8.151 |
| SB3-13 | Curb | 0.658 | 2.50 | 10.00 | 6.93 | 0.000 | 0.00 | 11.375 |
| SB3-12 | Curb | 0.631 | 3.14 | 10.00 | 6.93 | 0.000 | 0.00 | 13.703 |
| SB3-11 | Curb | 0.607 | 3.72 | 10.00 | 6.93 | 0.000 | 0.00 | 15.607 |
| SB3-10A | Junct | 0.602 | 9.25 | 14.48 | 5.86 | 0.000 | 0.00 | 32.604 |
| SB3-10B | Junct | 0.670 | 13.59 | 14.63 | 5.83 | 0.000 | 0.00 | 53.100 |
| SB3-10B1 | Junct | 0.670 | 13.59 | 14.63 | 5.83 | 0.000 | 0.00 | 53.100 |
| SB3-10B2 | Grate | 0.658 | 14.16 | 15.09 | 5.74 | 0.000 | 0.00 | 53.445 |
| SB3-10C | Grate | 0.558 | 21.88 | 15.50 | 5.67 | 0.000 | 0.00 | 69.181 |
| SB3-10D | Grate | 0.548 | 23.28 | 15.67 | 5.63 | 0.000 | 0.00 | 71.808 |
| SB3-10E | Grate | 0.492 | 34.36 | 15.81 | 5.61 | 0.000 | 0.00 | 94.876 |
| SB3-10F | Junct | 0.492 | 34.36 | 15.81 | 5.61 | 0.000 | 0.00 | 94.876 |
| SB3A | CircMh | 0.599 | 5.53 | 14.42 | 5.87 | 0.000 | 0.00 | 19.447 |
| NB3A | CircMh | 0.837 | 2.70 | 13.13 | 6.14 | 0.000 | 0.00 | 13.875 |
| NB3B | CircMh | 0.782 | 1.64 | 12.45 | 6.29 | 0.000 | 0.00 | 8.071 |
| SB3BOUT | Outlit | 0.492 | 34.36 | 15.81 | 5.61 | 0.000 | 0.00 | 94.876 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474



HYDRAULIC DATA SHEET

SHEET 5 OF 11

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 191 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotodr.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\DRN\FM3549*HD*06.dgn
 DATE: 2/26/2018
 TIME: 12:41:58 PM

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. | Shape # | Span | Rise | Length | Slope | n_value |
|------|------------------------|-----------------|---------|------|------|--------|-------|---------|
| | US DS | US DS (ft) (ft) | | (ft) | (ft) | (ft) | (%) | |
| 1 | SB3-16 SB3-15 | 598.33 592.85 | Circ 1 | 0.00 | 2.00 | 651.84 | 0.84 | 0.013 |
| 2 | SB3-15 SB3-14 | 592.85 591.88 | Circ 1 | 0.00 | 2.00 | 194.29 | 0.50 | 0.013 |
| 3 | SB3-14 SB3-13 | 591.88 590.25 | Circ 1 | 0.00 | 2.00 | 263.97 | 0.62 | 0.013 |
| 4 | SB3-13 SB3-12 | 590.25 589.44 | Circ 1 | 0.00 | 2.00 | 130.54 | 0.62 | 0.013 |
| 5 | SB3-12 SB3-11 | 589.44 588.86 | Circ 1 | 0.00 | 2.00 | 94.76 | 0.61 | 0.013 |
| 6 | SB3-11 SB3-10A | 588.86 588.56 | Circ 1 | 0.00 | 2.00 | 33.08 | 0.91 | 0.013 |
| 7 | SB3A SB3-10A | 588.03 587.71 | Circ 1 | 0.00 | 2.50 | 31.81 | 1.01 | 0.013 |
| 8 | SB3-10ASB3-10B | 587.56 586.28 | Box 1 | 4.00 | 3.00 | 84.68 | 1.51 | 0.013 |
| 9 | NB3A SB3-10B | 588.61 586.84 | Circ 1 | 0.00 | 2.00 | 35.65 | 4.97 | 0.013 |
| 10 | NB3B SB3-10B | 591.42 586.84 | Circ 1 | 0.00 | 2.00 | 434.99 | 1.05 | 0.013 |
| 11 | SB3-10BSB3-10B1 | 586.28 577.93 | Box 1 | 4.00 | 3.00 | 130.79 | 6.40 | 0.013 |
| 12 | SB3-10B1SB3-10B2577.93 | 570.12 | Box 1 | 4.00 | 3.00 | 287.84 | 2.71 | 0.013 |
| 13 | SB3-10B2SB3-10C | 570.12 562.95 | Box 1 | 4.00 | 3.00 | 321.92 | 2.23 | 0.013 |
| 14 | SB3-10CSB3-10D | 562.00 561.56 | Box 1 | 5.00 | 3.00 | 87.24 | 0.50 | 0.013 |
| 15 | SB3-10DSB3-10E | 561.56 561.21 | Box 1 | 5.00 | 3.00 | 69.58 | 0.50 | 0.013 |
| 16 | SB3-10ESB3-10F | 561.21 559.03 | Box 1 | 5.00 | 3.00 | 153.47 | 1.42 | 0.013 |
| 17 | SB3-10FSB3BOUT | 559.03 558.39 | Box 1 | 5.00 | 3.00 | 100.00 | 0.64 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 561.390 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Depth (ft) | Velocity (f/s) | Q (cfs) | Cap (cfs) | Junc Loss (ft) |
|------|--------------|--------------|---------------|------------|----------------|---------|-----------|----------------|
| 1* | 598.62 | 593.71 | 0.001 | 0.28 | 0.86 | 3.26 | 0.67 | 0.86 |
| 2* | 593.71 | 592.85 | 0.068 | 0.84 | 0.97 | 4.70 | 3.93 | 5.92 |
| 3* | 592.85 | 591.43 | 0.130 | 0.95 | 1.18 | 5.52 | 4.24 | 8.15 |
| 4* | 591.43 | 590.80 | 0.253 | 1.16 | 1.36 | 6.04 | 5.01 | 11.38 |
| 5* | 590.80 | 590.19 | 0.367 | 1.33 | 1.33 | 6.19 | 6.19 | 13.70 |
| 6* | 590.17 | 589.83 | 0.476 | 1.27 | 1.27 | 7.45 | 7.45 | 15.61 |
| 7* | 589.24 | 588.92 | 0.225 | 1.21 | 1.21 | 8.25 | 8.25 | 19.45 |
| 8* | 588.56 | 587.63 | 0.069 | 0.83 | 1.35 | 9.83 | 6.06 | 32.60 |
| 9* | 589.35 | 587.63 | 0.376 | 0.72 | 0.79 | 13.71 | 12.11 | 13.88 |
| 10* | 592.23 | 587.65 | 0.127 | 0.81 | 0.81 | 6.74 | 6.74 | 8.07 |
| 11* | 587.63 | 578.98 | 0.184 | 0.71 | 1.05 | 18.76 | 12.63 | 53.10 |
| 12* | 578.98 | 571.27 | 0.184 | 0.95 | 1.15 | 14.03 | 11.51 | 53.10 |
| 13* | 571.27 | 563.97 | 0.186 | 1.02 | 1.02 | 13.11 | 13.11 | 53.45 |
| 14* | 563.94 | 563.29 | 0.177 | 1.69 | 1.73 | 8.20 | 7.98 | 69.18 |
| 15* | 563.29 | 562.94 | 0.191 | 1.73 | 1.73 | 8.28 | 8.28 | 71.81 |
| 16* | 562.93 | 561.72 | 0.334 | 1.46 | 2.69 | 12.95 | 7.04 | 94.88 |
| 17* | 561.72 | 561.39 | 0.334 | 1.95 | 3.00 | 9.75 | 6.33 | 94.88 |

=====
=END=====

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
Run @ 1/24/2018 4:16:44 PM

PROJECT NAME : FM 3549
JOB NUMBER : 2520
PROJECT DESCRIPTION : LINE SB4
DESIGN FREQUENCY : 5 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|---------------|---------------|-------------------|----------------|---------------|
| SB4-01 | 0.625 | 0.24 | 3.43 | 10.00 | 6.93 | 0.000 | 1.039 |
| | 0.95 | 0.11 | Pavement | | | | |
| | 0.35 | 0.13 | Undeveloped | | | | |
| SB4-02 | 0.564 | 0.42 | 4.19 | 10.00 | 6.93 | 0.000 | 1.642 |
| | 0.95 | 0.15 | Pavement | | | | |
| | 0.35 | 0.27 | Undeveloped | | | | |
| SB4-03 | 0.685 | 0.77 | 7.53 | 10.00 | 6.93 | 0.000 | 3.654 |
| | 0.95 | 0.26 | Pavement | | | | |
| | 0.55 | 0.51 | Single family | | | | |
| SB4-04 | 0.59 | 1.20 | 9.89 | 10.00 | 6.93 | 0.000 | 4.904 |
| | 0.95 | 0.12 | Pavement | | | | |
| | 0.55 | 1.08 | Single family | | | | |
| SB4-05 | 0.65 | 0.28 | 3.24 | 10.00 | 6.93 | 0.000 | 1.261 |
| | 0.95 | 0.14 | Pavement | | | | |
| | 0.35 | 0.14 | Undeveloped | | | | |
| SB4-06 | 0.603 | 0.19 | 2.43 | 10.00 | 6.93 | 0.000 | 0.793 |
| | 0.95 | 0.08 | Pavement | | | | |
| | 0.35 | 0.11 | Undeveloped | | | | |
| EB1 | 0.95 | 0.18 | 10.00 | 10.00 | 6.93 | 0.000 | 1.184 |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Grate Type | Pond Width (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|------------|-----------------|-------------------|
| SB4-01 | Curb | 10.00 | 0.62 | 0.74 | 0.015 | 0.25 | n/a | n/a | 16.00 | 603.12 |
| SB4-02 | Curb | 10.00 | 0.88 | 0.98 | 0.015 | 0.25 | n/a | n/a | 16.00 | 601.99 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass (cfs) | To Inlet Required (cfs) | Actual Length (ft) | Ponded Length (ft) | Width (ft) |
|----------|------------|---------------|--------------------------|----------------|-------------------------|--------------------|--------------------|------------|
| SB4-01 | Curb | 1.039 | 1.039 | 1.000 | 0.000 | SB4-02 | 6.31 | 10.00 |
| SB4-02 | Curb | 1.642 | 1.642 | 1.000 | 0.000 | | 8.62 | 10.00 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Length/Perim. (ft) | Grate Area (sf) | Left-Slope Long (%) | Right-Slope Long (%) | Gutter n | Gutter Depr. (ft) | Depth Allowed (ft) | Critic Elev. (ft) |
|----------|------------|--------------------|-----------------|---------------------|----------------------|----------|-------------------|--------------------|-------------------|
| SB4-03 | Grate | 12.67 | 4.53 | 0.5025 | 0.50 | 25.00 | 0.030 | n/a | 1.00 |
| SB4-04 | Grate | 12.67 | 4.53 | 0.5025 | 0.50 | 25.00 | 0.030 | n/a | 1.00 |
| SB4-05 | Grate | 12.67 | 4.53 | 0.5025 | 0.50 | 25.00 | 0.030 | n/a | 1.00 |
| SB4-06 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a |

NOTES:

- STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
- CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
- STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
- RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
- * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 6 OF 11

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
| NC | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | 192 |
| CHECK | CONTROL | SECTION | JOB | |
| JM | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
PEN TABLE: plotodr.tbl
FILE: pw:\\CP-PWS-1501.pbsj.com:ATKNATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\DRN\FM3549*HD*07.dgn
DATE: 2/26/2018
TIME: 12:42:03 PM

Sag Inlets Computation Data.

Table with columns: Inlet ID, Inlet Type, Length (ft), Grate Perim Area (ft), Grate Area (sf), Total Q (cfs), Inlet Capacity (cfs), Total Head (ft), Ponded Width Left (ft), Ponded Width Right (ft). Rows include SB4-03 through SB4-06.

Cumulative Junction Discharge Computations

Table with columns: Node I.D., Node Type, Weighted C-Value, Cumulat. Dr. Area (acres), Cumulat. Tc (min), Intens. (in/hr), User Supply Q (cfs), Additional Q in Node (cfs), Total Disch. (cfs). Rows include SB4-01 through SB4-06 and EB1.

Conveyance Configuration Data

Table with columns: Run#, Node I.D., Flowline Elev., US/DS, Shape #, Span (ft), Rise (ft), Length (ft), Slope (%), n-value. Rows include SB4-01 through SB4-06.

Conveyance Hydraulic Computations. Tailwater = 583.147 (ft)

Table with columns: Run#, US Elev (ft), DS Elev (ft), Fr. Slope (%), Depth Unif. (ft), Depth Actual (ft), Velocity Unif. (f/s), Velocity Actual (f/s), Q (cfs), Cap (cfs), Junc Loss (ft). Rows include 1* through 8.

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
Run @ 1/30/2018 2:12:27 PM

PROJECT NAME : FM 3549
JOB NUMBER : 2520
PROJECT DESCRIPTION : LINE NB1
DESIGN FREQUENCY : 5 Years
MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

Table with columns: ID, C Value, Area (acre), Tc (min), Tc Used (min), Intensity (in/hr), Supply Q (cfs), Total Q (cfs). Rows include NB1-01 through NB1-07.

On Grade Inlet Configuration Data

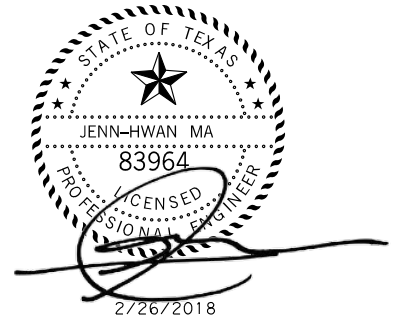
Table with columns: Inlet ID, Inlet Type, Inlet Length (ft), Slopes Long Trans (%), Gutter n, Gutter Depr. (ft), Grate Width (ft), Grate Type, Pond Width Allowed (ft), Critic Elev. (ft). Rows include NB1-07 through NB1-01.

On Grade Inlets Computation Data.

Table with columns: Inlet ID, Inlet Type, Total Q (cfs), Intercept Capacity (cfs), Q Bypass Allow (cfs), Q Bypass Actual (cfs), To Inlet ID, Required Length (ft), Actual Length (ft), Ponded Width (ft). Rows include NB1-07 through NB1-01.

NOTES:

- 1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 7 OF 11

Table with columns: DESIGN NC, GRAPHICS TC, CHECK JM, FEDERAL RD. DIV. NO., FEDERAL AID PROJECT NO., HIGHWAY NO., SHEET NO., JOB NO. Includes values like 6, SEE TITLE SHEET, FM 3549, TEXAS, DALLAS, ROCKWALL, 1015, 01, 023, and 193.

PLOT DRIVER: RD*11x17*PDF.plt
 PEN TABLE: plotordr.tbl
 FILE: pw:\\CP-PWS-1501.pbsj.com:ATKNATX01\Documents\Roads and Bridges\Project\100012351 FM 3549\CADD\DRN\FM3549*HD*08.dgn
 DATE: 2/26/2018 TIME: 12:42:07 PM

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Length Perim. (ft) | Grate Area (sf) | Left-Slope Long Trans (%) | Right-Slope Long Trans (%) | Gutter n DeprW (ft) | Depth Allowed (ft) | Critic Elev. (ft) | | | |
|----------|------------|--------------------|-----------------|---------------------------|----------------------------|---------------------|--------------------|-------------------|-----|------|--------|
| NB1-05 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a | 0.50 | 607.30 |
| NB1-04 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a | 0.50 | 606.07 |
| NB1-03 | Grate | 12.67 | 4.53 | 0.50 | 2.00 | 0.50 | 2.00 | 0.030 | n/a | 0.50 | 601.00 |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Length (ft) | Grate Perim Area (ft) (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Width Right (ft) |
|----------|------------|-------------|----------------------------|---------------|----------------------|-----------------|------------------|------------------|
| NB1-05 | Grate | n/a | 12.67 4.53 | 1.503 | 6.914 | 0.114 | 9.35 | 9.35 |
| NB1-04 | Grate | n/a | 12.67 4.53 | 1.357 | 6.914 | 0.106 | 9.00 | 9.00 |
| NB1-03 | Grate | n/a | 12.67 4.53 | 2.782 | 6.914 | 0.172 | 11.75 | 11.75 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| NB1-07 | Curb | 0.673 | 0.13 | 10.00 | 6.93 | 0.000 | 0.00 | 0.606 |
| NB1-06 | Curb | 0.632 | 0.49 | 10.00 | 6.93 | 0.000 | 0.00 | 2.144 |
| NB1-05A | Junct | 0.474 | 1.11 | 10.00 | 6.93 | 0.000 | 0.00 | 3.647 |
| NB1-02 | Curb | 0.608 | 1.72 | 10.00 | 6.93 | 0.000 | 0.00 | 7.241 |
| NB1-02A | Junct | 0.557 | 2.60 | 10.00 | 6.93 | 0.000 | 0.00 | 10.023 |
| NB1-01 | Curb | 0.617 | 3.07 | 10.00 | 6.93 | 0.000 | 0.00 | 13.116 |
| NB1-05 | Grate | 0.350 | 0.62 | 10.00 | 6.93 | 0.000 | 0.00 | 1.503 |
| NB1-04 | Grate | 0.726 | 0.27 | 10.00 | 6.93 | 0.000 | 0.00 | 1.357 |
| NB1-03 | Grate | 0.456 | 0.88 | 10.00 | 6.93 | 0.000 | 0.00 | 2.782 |
| NB1OUT | Outlet | 0.617 | 3.07 | 10.00 | 6.93 | 0.000 | 0.00 | 13.116 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline US DS | Elev. US (ft) | Elev. DS (ft) | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n-value |
|------|-----------|----------------|---------------|---------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | NB1-07 | NB1-06 | 604.50 | 604.17 | Circ 1 | 0.00 | 1.50 | 60.68 | 0.54 | 0.013 |
| 2 | NB1-06 | NB1-05A | 604.17 | 602.16 | Circ 1 | 0.00 | 1.50 | 374.82 | 0.54 | 0.013 |
| 3 | NB1-05 | NB1-05A | 602.55 | 602.16 | Circ 1 | 0.00 | 1.50 | 13.08 | 2.98 | 0.013 |
| 4 | NB1-05A | NB1-02 | 602.16 | 601.72 | Circ 1 | 0.00 | 1.50 | 81.67 | 0.54 | 0.013 |
| 5 | NB1-04 | NB1-02 | 602.07 | 601.72 | Circ 1 | 0.00 | 1.50 | 10.00 | 3.46 | 0.013 |
| 6 | NB1-02 | NB1-02A | 601.72 | 596.63 | Circ 1 | 0.00 | 1.50 | 352.94 | 1.44 | 0.013 |
| 7 | NB1-03 | NB1-02A | 596.67 | 596.63 | Circ 1 | 0.00 | 1.50 | 10.08 | 0.40 | 0.013 |
| 8 | NB1-02A | NB1-01 | 596.63 | 596.55 | Circ 1 | 0.00 | 1.50 | 19.07 | 0.40 | 0.013 |
| 9 | NB1-01 | NB1OUT | 596.55 | 596.46 | Circ 1 | 0.00 | 1.50 | 23.37 | 0.40 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 597.700 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 604.78 | 604.71 | 0.003 | 0.28 | 0.54 | 2.60 | 1.05 | 0.61 | 7.75 | 0.000 |
| 2* | 604.71 | 602.92 | 0.042 | 0.54 | 0.76 | 3.75 | 2.37 | 2.14 | 7.69 | 0.004 |

| | | | | | | | | | | |
|----|--------|--------|-------|------|------|------|------|-------|-------|-------|
| 3* | 602.93 | 602.92 | 0.020 | 0.29 | 0.76 | 6.20 | 1.66 | 1.50 | 18.14 | 0.000 |
| 4* | 602.92 | 602.83 | 0.121 | 0.73 | 1.11 | 4.30 | 2.61 | 3.65 | 7.71 | 0.037 |
| 5* | 602.83 | 602.83 | 0.017 | 0.27 | 1.11 | 6.36 | 0.97 | 1.36 | 19.55 | 0.000 |
| 6* | 602.83 | 598.72 | 0.475 | 0.81 | 1.50 | 7.39 | 4.10 | 7.24 | 12.62 | 0.065 |
| 7 | 598.72 | 598.72 | 0.070 | 0.68 | 1.50 | 3.57 | 1.57 | 2.78 | 6.62 | 0.000 |
| 8 | 598.72 | 598.37 | 0.910 | 1.50 | 1.50 | 5.67 | 5.67 | 10.02 | 6.63 | 0.175 |
| 9 | 598.37 | 597.96 | 1.559 | 1.50 | 1.50 | 7.42 | 7.42 | 13.12 | 6.66 | 0.043 |

=====END=====

WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
 Run @ 1/13/2018 4:56:54 PM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE NB2A
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY OF: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|-------------|---------------|-------------------|----------------|---------------|
| NB2-01 | 0.883 | 0.09 | 1.89 | 10.00 | 6.93 | 0.000 | 0.551 |
| | 0.95 | 0.08 | Pavement | | | | |
| | 0.35 | 0.01 | Undeveloped | | | | |
| NB2-02 | 0.78 | 0.23 | 3.39 | 10.00 | 6.93 | 0.000 | 1.243 |
| | 0.95 | 0.17 | Pavement | | | | |
| | 0.35 | 0.07 | Undeveloped | | | | |
| NB2-03 | 0.893 | 0.42 | 5.61 | 10.00 | 6.93 | 0.000 | 2.597 |
| | 0.95 | 0.38 | Pavement | | | | |
| | 0.35 | 0.04 | Undeveloped | | | | |
| NB2-04 | 0.904 | 0.39 | 5.57 | 10.00 | 6.93 | 0.000 | 2.442 |
| | 0.95 | 0.36 | Pavement | | | | |
| | 0.35 | 0.03 | Undeveloped | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long Trans (%) | Gutter n Depr. (ft) | Grate Width (ft) | Pond Width (ft) | Critic Elev. (ft) | | | |
|----------|------------|-------------------|-----------------------|---------------------|------------------|-----------------|-------------------|-----|-------|--------|
| NB2-01 | Curb | 10.00 | 0.50 | 0.58 | 0.015 | 0.25 | n/a | n/a | 16.00 | 609.18 |
| NB2-02 | Curb | 10.00 | 0.50 | 1.31 | 0.015 | 0.25 | n/a | n/a | 16.00 | 609.42 |
| NB2-03 | Curb | 10.00 | 1.64 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 607.53 |
| NB2-04 | Curb | 15.00 | 1.28 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 605.73 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Q Bypass Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|-----------------------|-------------|----------------------|--------------------|-------------------|
| NB2-01 | Curb | 0.551 | 0.551 | 0.000 | 0.000 | | 4.26 | 10.00 | 13.79 |
| NB2-02 | Curb | 1.243 | 1.243 | 0.250 | 0.000 | NB2-01 | 6.16 | 10.00 | 11.30 |
| NB2-03 | Curb | 2.597 | 2.543 | 0.250 | 0.055 | NB2-04 | 11.33 | 10.00 | 9.15 |
| NB2-04 | Curb | 2.497 | 2.497 | 0.000 | 0.000 | | 10.48 | 15.00 | 9.45 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243
 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 8 OF 11

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 194 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

PLOT DRIVER: RD*11x17*PDF.plt
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 DATE: 2/26/2018 TIME: 12:42:12 PM

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr.Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|--------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| NB2-01 | Curb | 0.883 | 0.09 | 10.00 | 6.93 | 0.000 | 0.00 | 0.551 |
| NB2-02 | Curb | 0.809 | 0.32 | 10.00 | 6.93 | 0.000 | 0.00 | 1.794 |
| NB2-03 | Curb | 0.857 | 0.74 | 10.00 | 6.93 | 0.000 | 0.00 | 4.391 |
| NB2-04 | Curb | 0.873 | 1.13 | 10.00 | 6.93 | 0.000 | 0.00 | 6.833 |
| NB2AOUT | Outlet | 0.873 | 1.13 | 10.00 | 6.93 | 0.000 | 0.00 | 6.833 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n_value |
|------|----------------|----------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | NB2-01 NB2-02 | 604.43 604.24 | Circ 1 | 0.00 | 1.50 | 44.07 | 0.43 | 0.013 |
| 2 | NB2-02 NB2-03 | 604.24 602.78 | Circ 1 | 0.00 | 1.50 | 345.21 | 0.42 | 0.013 |
| 3 | NB2-03 NB2-04 | 602.28 600.52 | Circ 1 | 0.00 | 2.00 | 107.50 | 1.64 | 0.013 |
| 4 | NB2-04 NB2AOUT | 600.52 599.84 | Circ 1 | 0.00 | 2.00 | 115.31 | 0.59 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 600.810 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr.Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Junc Loss (ft) |
|------|--------------|--------------|--------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|----------------|
| 1 | 604.80 | 604.78 | 0.003 | 0.29 | 0.54 | 2.33 | 0.97 | 0.55 | 6.90 | 0.018 |
| 2 | 604.78 | 603.29 | 0.029 | 0.53 | 0.53 | 3.23 | 3.23 | 1.79 | 6.83 | 0.008 |
| 3* | 602.82 | 601.41 | 0.038 | 0.53 | 0.89 | 6.65 | 3.25 | 4.39 | 28.95 | 0.008 |
| 4* | 601.41 | 600.81 | 0.091 | 0.88 | 0.97 | 5.17 | 4.52 | 6.83 | 17.37 | 0.016 |

WinStorm (STORM DRAIN DESIGN) Version 3.05, Jan. 25, 2002
 Run @ 1/15/2018 1:35:10 PM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE NB2B
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|----------|---------------|-------------------|----------------|---------------|
| NB2-06 | 0.95 | 0.39 | 5.63 | 10.00 | 6.93 | 0.000 | 2.566 |
| | 0.95 | 0.39 | Pavement | | | | |
| NB2-05 | 0.95 | 0.62 | 8.03 | 10.00 | 6.93 | 0.000 | 4.080 |
| | 0.95 | 0.62 | Pavement | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long Trans (%) | Gutter n | Grate Width (ft) | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------------|----------|------------------|-------------------------|----------------------|
| NB2-06 | Curb | 10.00 | 1.53 | 1.00 | 0.014 | 0.25 | n/a n/a 16.00 609.24 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|--------------|-------------|----------------------|--------------------|-------------------|
| NB2-06 | Curb | 2.566 | 2.384 | 0.500 | 0.182 | NB2-05 | 12.99 | 10.00 | 13.90 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Inlet Length/Perim. (ft) | Grate Area (sf) | Left-Slope Long Trans (%) | Right-Slope Long Trans (%) | Gutter n | Depth (ft) | Critic Elev. (ft) |
|----------|------------|--------------------------|-----------------|---------------------------|----------------------------|----------|------------|------------------------|
| NB2-05 | Curb | 10.00 | n/a | 1.53 | 2.00 | 1.64 | 2.00 | 0.015 1.50 0.50 605.05 |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Inlet Length (ft) | Grate Perim Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Left (ft) | Right (ft) |
|----------|------------|-------------------|-----------------------|---------------|----------------------|-----------------|------------------|------------|
| NB2-05 | Curb | 10.00 | n/a n/a | 4.262 | 10.327 | 0.277 | 8.60 | 8.50 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr.Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|--------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| NB2-06 | Curb | 0.950 | 0.39 | 10.00 | 6.93 | 0.000 | 0.00 | 2.566 |
| NB2-05 | Curb | 0.950 | 1.01 | 10.00 | 6.93 | 0.000 | 0.00 | 6.646 |
| NB2BOUT | Outlet | 0.950 | 1.01 | 10.00 | 6.93 | 0.000 | 0.00 | 6.646 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n_value |
|------|----------------|----------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | NB2-06 NB2-05 | 604.49 600.55 | Circ 1 | 0.00 | 1.50 | 313.98 | 1.25 | 0.013 |
| 2 | NB2-05 NB2BOUT | 600.55 600.34 | Circ 1 | 0.00 | 1.50 | 8.22 | 2.56 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 600.810 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr.Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Junc Loss (ft) |
|------|--------------|--------------|--------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|----------------|
| 1* | 604.97 | 601.27 | 0.060 | 0.48 | 0.72 | 5.32 | 3.06 | 2.57 | 11.77 | 0.000 |
| 2* | 601.27 | 601.00 | 0.400 | 0.66 | 0.66 | 8.94 | 8.94 | 6.65 | 16.79 | 0.062 |

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



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 TBPE Firm Registration No. 6981



HYDRAULIC DATA SHEET

SHEET 9 OF 11

| DESIGN NC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|-------------|-------------------|-------------------------|----------|-------------|
| 6 | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| JM | TEXAS | DALLAS | ROCKWALL | 195 |
| JM | CONTROL | SECTION | JOB | |
| JM | 1015 | 01 | 023 | |

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 DATE: 2/26/2018
 TIME: 12:42:17 PM

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
 Run @ 1/18/2018 4:47:33 PM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE NB3A
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|-------------|---------------|-------------------|----------------|---------------|
| NB3-01 | 0.839 | 0.54 | 7.06 | 10.00 | 6.93 | 0.000 | 3.138 |
| | 0.95 | 0.44 | Pavement | | | | |
| | 0.35 | 0.10 | Undeveloped | | | | |
| NB3-02 | 0.842 | 0.72 | 7.42 | 10.00 | 6.93 | 0.000 | 4.198 |
| | 0.95 | 0.59 | Pavement | | | | |
| | 0.35 | 0.13 | Undeveloped | | | | |
| NB3-03 | 0.85 | 0.66 | 7.03 | 10.00 | 6.93 | 0.000 | 3.886 |
| | 0.95 | 0.55 | Pavement | | | | |
| | 0.35 | 0.11 | Undeveloped | | | | |
| NB3-04 | 0.819 | 0.78 | 7.17 | 10.00 | 6.93 | 0.000 | 4.426 |
| | 0.95 | 0.61 | Pavement | | | | |
| | 0.35 | 0.17 | Undeveloped | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Type | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-----------|-------------------------|-------------------|
| NB3-01 | Curb | 10.00 | 0.55 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 610.68 |
| NB3-02 | Curb | 15.00 | 1.69 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 603.70 |
| NB3-03 | Curb | 15.00 | 1.61 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 594.97 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | Q Bypass Actual (cfs) | To Inlet ID | Required Length (ft) | Actual Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|-----------------------|-------------|----------------------|--------------------|-------------------|
| NB3-01 | Curb | 3.138 | 3.138 | 1.000 | 0.000 | NB3-02 | 9.96 | 10.00 | 12.10 |
| NB3-02 | Curb | 4.198 | 4.197 | 1.000 | 0.000 | NB3-03 | 15.04 | 15.00 | 10.90 |
| NB3-03 | Curb | 3.886 | 3.886 | 1.000 | 0.000 | | 14.24 | 15.00 | 10.70 |

Sag Inlets Configuration Data.

| Inlet ID | Inlet Type | Inlet Length (ft) | Grate Area (sf) | Left-Slope (%) | Right-Slope (%) | Gutter n | Depth DeprW (ft) | Critic Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|----------------|-----------------|----------|------------------|---------------------|-------------------|
| NB3-04 | Curb | 10.00 | n/a | 1.69 | 2.00 | 0.015 | 1.50 | 0.50 | 593.86 |

Sag Inlets Computation Data.

| Inlet ID | Inlet Type | Inlet Length (ft) | Grate Perim (ft) | Grate Area (sf) | Total Q (cfs) | Inlet Capacity (cfs) | Total Head (ft) | Ponded Width Left (ft) | Ponded Width Right (ft) |
|----------|------------|-------------------|------------------|-----------------|---------------|----------------------|-----------------|------------------------|-------------------------|
| NB3-04 | Curb | 10.00 | n/a | n/a | 4.426 | 10.327 | 0.284 | 8.60 | 10.25 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| NB3-01 | Curb | 0.839 | 0.54 | 10.00 | 6.93 | 0.000 | 0.00 | 3.138 |
| NB3-02 | Curb | 0.840 | 1.26 | 10.00 | 6.93 | 0.000 | 0.00 | 7.335 |
| NB3-03 | Curb | 0.844 | 1.92 | 10.00 | 6.93 | 0.000 | 0.00 | 11.221 |
| NB3-04 | Curb | 0.837 | 2.70 | 10.16 | 6.88 | 0.000 | 0.00 | 15.543 |
| NB3AOUT | Outlet | 0.837 | 2.70 | 10.16 | 6.88 | 0.000 | 0.00 | 15.543 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline | Elev. US (ft) | Elev. DS (ft) | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n_value |
|------|----------------|----------|---------------|---------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | NB3-01 NB3-02 | | 605.93 | 598.95 | Circ 1 | 0.00 | 1.50 | 557.30 | 1.25 | 0.013 |
| 2 | NB3-02 NB3-03 | | 598.95 | 590.22 | Circ 1 | 0.00 | 1.50 | 514.74 | 1.70 | 0.013 |
| 3 | NB3-03 NB3-04 | | 589.72 | 588.61 | Circ 1 | 0.00 | 2.00 | 140.40 | 0.79 | 0.013 |
| 4 | NB3-04 NB3AOUT | | 588.61 | 586.84 | Circ 1 | 0.00 | 2.00 | 35.65 | 4.97 | 0.013 |

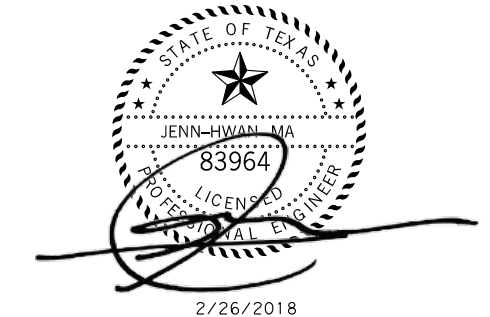
Conveyance Hydraulic Computations. Tailwater = 588.840 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 606.46 | 599.78 | 0.089 | 0.53 | 0.83 | 5.62 | 3.13 | 3.14 | 11.76 | 0.000 |
| 2* | 599.78 | 591.00 | 0.488 | 0.78 | 0.78 | 7.87 | 7.87 | 7.34 | 13.68 | 0.048 |
| 3* | 590.81 | 590.05 | 0.246 | 1.07 | 1.44 | 6.56 | 4.63 | 11.22 | 20.12 | 0.017 |
| 4* | 590.05 | 588.84 | 0.472 | 0.76 | 2.00 | 14.15 | 4.95 | 15.54 | 50.45 | 0.019 |

=====-END=-=====

NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW



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HYDRAULIC DATA SHEET

SHEET 10 OF 11

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 196 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
 Run @ 1/18/2018 4:49:08 PM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE NB3B
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|--------|---------|-------------|-------------|---------------|-------------------|----------------|---------------|
| NB3-07 | 0.75 | 0.60 | 6.67 | 10.00 | 6.93 | 0.000 | 3.117 |
| | 0.95 | 0.40 | Pavement | | | | |
| | 0.35 | 0.20 | Undeveloped | | | | |
| NB3-06 | 0.763 | 0.45 | 4.33 | 10.00 | 6.93 | 0.000 | 2.379 |
| | 0.95 | 0.31 | Pavement | | | | |
| | 0.35 | 0.14 | Undeveloped | | | | |
| NB3-05 | 0.828 | 0.59 | 6.28 | 10.00 | 6.93 | 0.000 | 3.384 |
| | 0.95 | 0.47 | Pavement | | | | |
| | 0.35 | 0.12 | Undeveloped | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Type | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-----------|-------------------------|-------------------|
| NB3-07 | Curb | 10.00 | 0.75 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 600.80 |
| NB3-06 | Curb | 10.00 | 0.62 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 598.80 |
| NB3-05 | Curb | 15.00 | 0.54 | 2.00 | 0.015 | 0.25 | n/a | n/a | 16.00 | 596.67 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | To Inlet Required Actual (cfs) | Inlet ID | Inlet Length (ft) | Required Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|--------------------------------|----------|-------------------|----------------------|-------------------|
| NB3-07 | Curb | 3.117 | 3.100 | 1.000 | 0.017 | | 10.59 | 10.00 | 11.35 |
| NB3-06 | Curb | 2.379 | 2.379 | 1.000 | 0.000 | | 8.68 | 10.00 | 10.65 |
| NB3-05 | Curb | 3.384 | 3.384 | 0.000 | 0.000 | | 10.35 | 15.00 | 12.45 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| NB3-07 | Curb | 0.750 | 0.60 | 10.00 | 6.93 | 0.000 | 0.00 | 3.117 |
| NB3-06 | Curb | 0.756 | 1.05 | 10.00 | 6.93 | 0.000 | 0.00 | 5.496 |
| NB3-05 | Curb | 0.782 | 1.64 | 10.00 | 6.93 | 0.000 | 0.00 | 8.880 |
| NB3BOUT | Outlet | 0.782 | 1.64 | 10.00 | 6.93 | 0.000 | 0.00 | 8.880 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. US DS | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n-value |
|------|----------------|----------------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | NB3-07 NB3-06 | 596.05 594.05 | Circ 1 | 0.00 | 1.50 | 268.67 | 0.74 | 0.013 |
| 2 | NB3-06 NB3-05 | 593.55 591.42 | Circ 1 | 0.00 | 2.00 | 411.34 | 0.52 | 0.013 |
| 3 | NB3-05 NB3BOUT | 591.42 586.84 | Circ 1 | 0.00 | 2.00 | 434.99 | 1.05 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 587.650 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 596.66 | 594.66 | 0.088 | 0.61 | 0.61 | 4.66 | 4.66 | 3.12 | 9.06 | 0.000 |
| 2* | 594.36 | 592.32 | 0.059 | 0.80 | 0.90 | 4.71 | 4.03 | 5.50 | 16.28 | 0.013 |
| 3* | 592.32 | 587.70 | 0.154 | 0.86 | 0.86 | 6.88 | 6.88 | 8.88 | 23.22 | 0.037 |

WinStorm (STORM DRAIN DESIGN)

Version 3.05, Jan. 25, 2002
 Run @ 1/25/2018 10:18:51 AM

PROJECT NAME : FM 3549
 JOB NUMBER : 2520
 PROJECT DESCRIPTION : LINE EB1
 DESIGN FREQUENCY : 5 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

| ID | C Value | Area (acre) | Tc (min) | Tc Used (min) | Intensity (in/hr) | Supply Q (cfs) | Total Q (cfs) |
|-------|---------|-------------|----------|---------------|-------------------|----------------|---------------|
| EB-03 | 0.95 | 0.13 | 2.03 | 10.00 | 6.93 | 0.000 | 0.855 |
| | 0.95 | 0.13 | Pavement | | | | |
| WB-04 | 0.95 | 0.05 | 1.17 | 10.00 | 6.93 | 0.000 | 0.329 |
| | 0.95 | 0.05 | Pavement | | | | |

On Grade Inlet Configuration Data

| Inlet ID | Inlet Type | Inlet Length (ft) | Slopes Long (%) | Slopes Trans (%) | Gutter n | Gutter Depr. (ft) | Grate Width (ft) | Pond Type | Pond Width Allowed (ft) | Critic Elev. (ft) |
|----------|------------|-------------------|-----------------|------------------|----------|-------------------|------------------|-----------|-------------------------|-------------------|
| EB-03 | Curb | 10.00 | 2.00 | 0.50 | 0.015 | 0.25 | n/a | n/a | 16.00 | 605.36 |
| WB-04 | Curb | 5.00 | 2.00 | 0.59 | 0.015 | 0.25 | n/a | n/a | 16.00 | 605.34 |

On Grade Inlets Computation Data.

| Inlet ID | Inlet Type | Total Q (cfs) | Intercept Capacity (cfs) | Q Bypass Allow (cfs) | To Inlet Required Actual (cfs) | Inlet ID | Inlet Length (ft) | Required Length (ft) | Ponded Width (ft) |
|----------|------------|---------------|--------------------------|----------------------|--------------------------------|----------|-------------------|----------------------|-------------------|
| EB-03 | Curb | 0.855 | 0.855 | 0.000 | 0.000 | | 7.58 | 10.00 | 13.80 |
| WB-04 | Curb | 0.329 | 0.329 | 0.000 | 0.000 | | 4.50 | 5.00 | 8.64 |

Cumulative Junction Discharge Computations

| Node I.D. | Node Type | Weighted C-Value | Cumulat. Dr. Area (acres) | Cumulat. Tc (min) | Intens. (in/hr) | User Supply Q (cfs) | Additional Q in Node (cfs) | Total Disch. (cfs) |
|-----------|-----------|------------------|---------------------------|-------------------|-----------------|---------------------|----------------------------|--------------------|
| EB-03 | Curb | 0.950 | 0.13 | 10.00 | 6.93 | 0.000 | 0.00 | 0.855 |
| WB-04 | Curb | 0.950 | 0.18 | 10.00 | 6.93 | 0.000 | 0.00 | 1.184 |
| EB4OUT | Outlet | 0.950 | 0.18 | 10.00 | 6.93 | 0.000 | 0.00 | 1.184 |

Conveyance Configuration Data

| Run# | Node I.D. | Flowline Elev. US DS | Shape # | Span (ft) | Rise (ft) | Length (ft) | Slope (%) | n-value |
|------|--------------|----------------------|---------|-----------|-----------|-------------|-----------|---------|
| 1 | EB-03 WB-04 | 600.86 600.59 | Circ 1 | 0.00 | 1.50 | 49.16 | 0.55 | 0.013 |
| 2 | WB-04 EB4OUT | 600.59 597.98 | Circ 1 | 0.00 | 1.50 | 219.63 | 1.19 | 0.013 |

Conveyance Hydraulic Computations. Tailwater = 598.480 (ft)

| Run# | US Elev (ft) | DS Elev (ft) | Fr. Slope (%) | Unif. Depth (ft) | Actual Depth (ft) | Unif. Velocity (f/s) | Actual Velocity (f/s) | Q (cfs) | Cap (cfs) | Loss (ft) |
|------|--------------|--------------|---------------|------------------|-------------------|----------------------|-----------------------|---------|-----------|-----------|
| 1* | 601.20 | 600.93 | 0.007 | 0.34 | 0.34 | 2.88 | 2.88 | 0.86 | 7.79 | 0.000 |
| 2* | 600.92 | 598.48 | 0.013 | 0.33 | 0.50 | 4.20 | 2.30 | 1.18 | 11.45 | 0.004 |



NOTES:

1. STORM SEWER CALCULATIONS BASED ON MANNING'S FORMULA
2. CALCULATIONS MADE BY TXDOT "WINSTORM" HYDRAULIC COMPUTER PROGRAM.
3. STORM SEWER SYSTEM DESIGNED FOR 5 YEAR STORM FREQUENCY
4. RUNOFFS IN TXDOT "WINSTORM" PROGRAM WERE COMPUTED UTILIZING RATIONAL METHOD
5. * SUPER CRITICAL FLOW

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 TBPE Firm Registration No. 6981

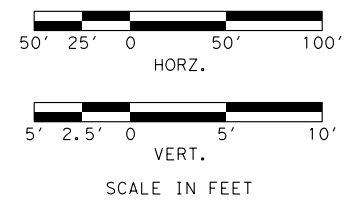
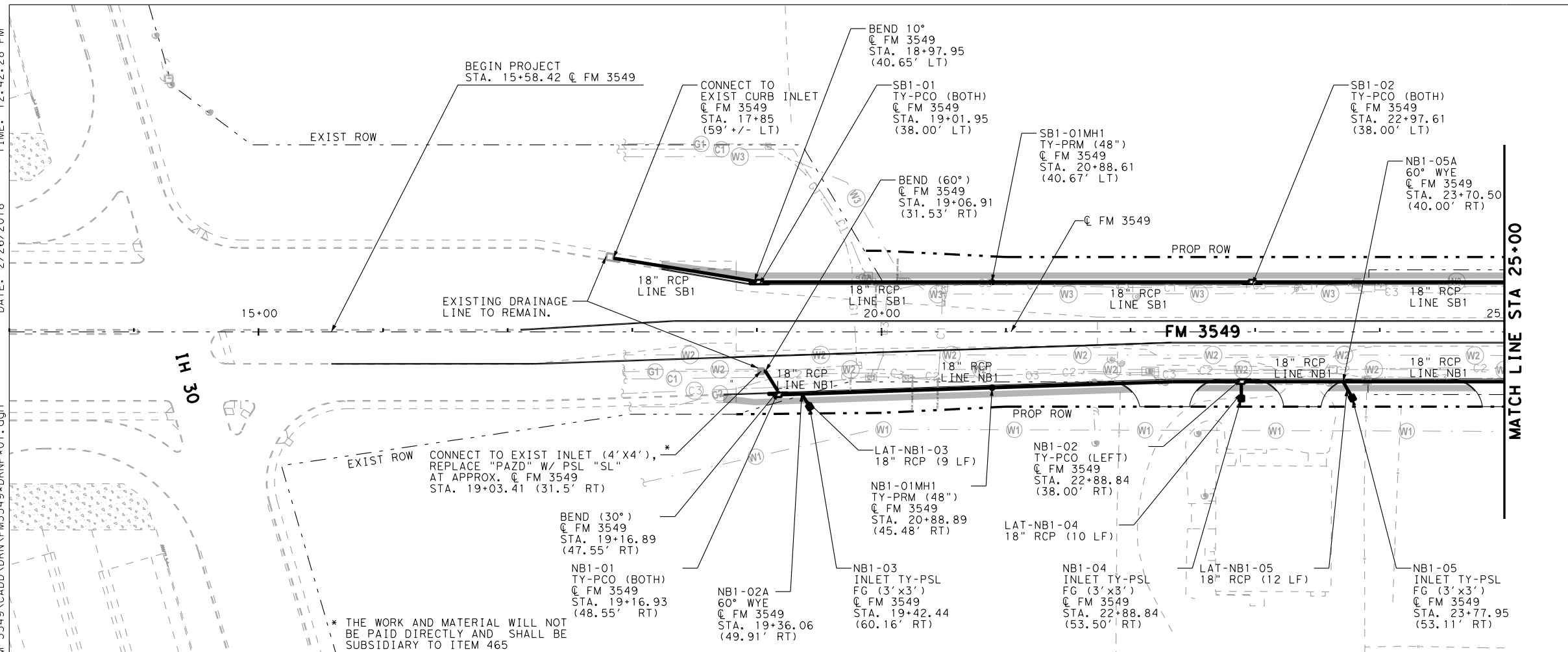


HYDRAULIC DATA SHEET

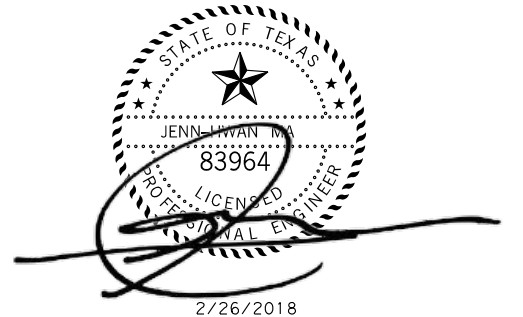
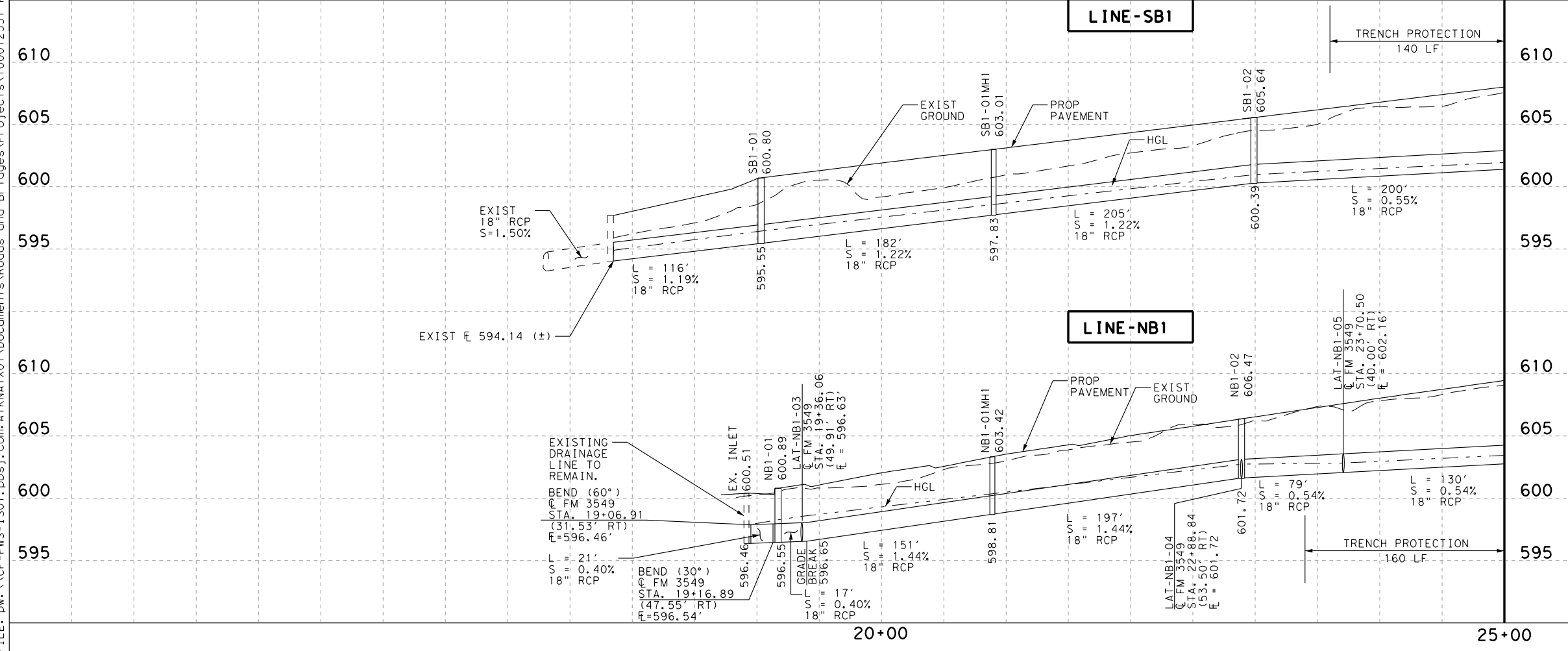
SHEET 11 OF 11

| DESIGN NC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
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| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 197 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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- NOTES:
- ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 - ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 - STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 - ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474

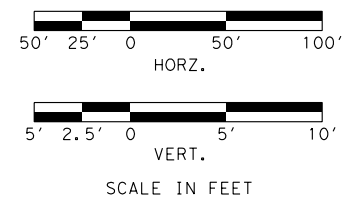
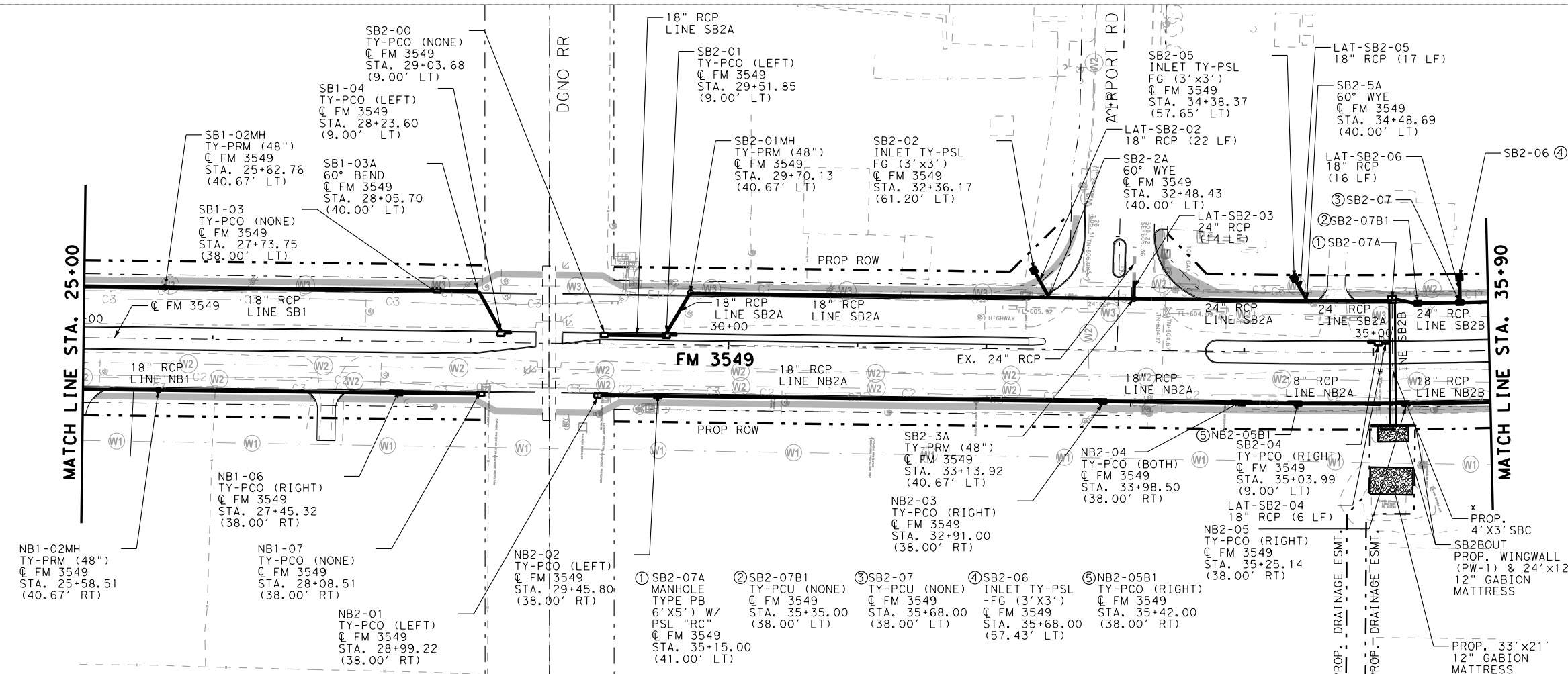


DRAINAGE PLAN & PROFILES
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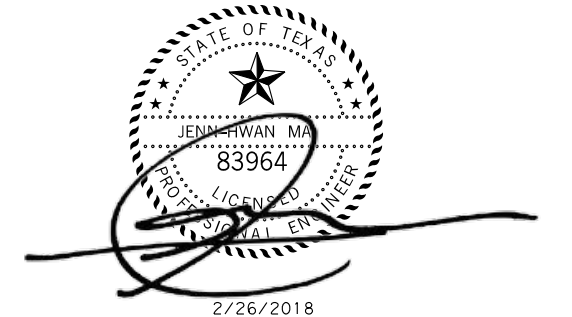
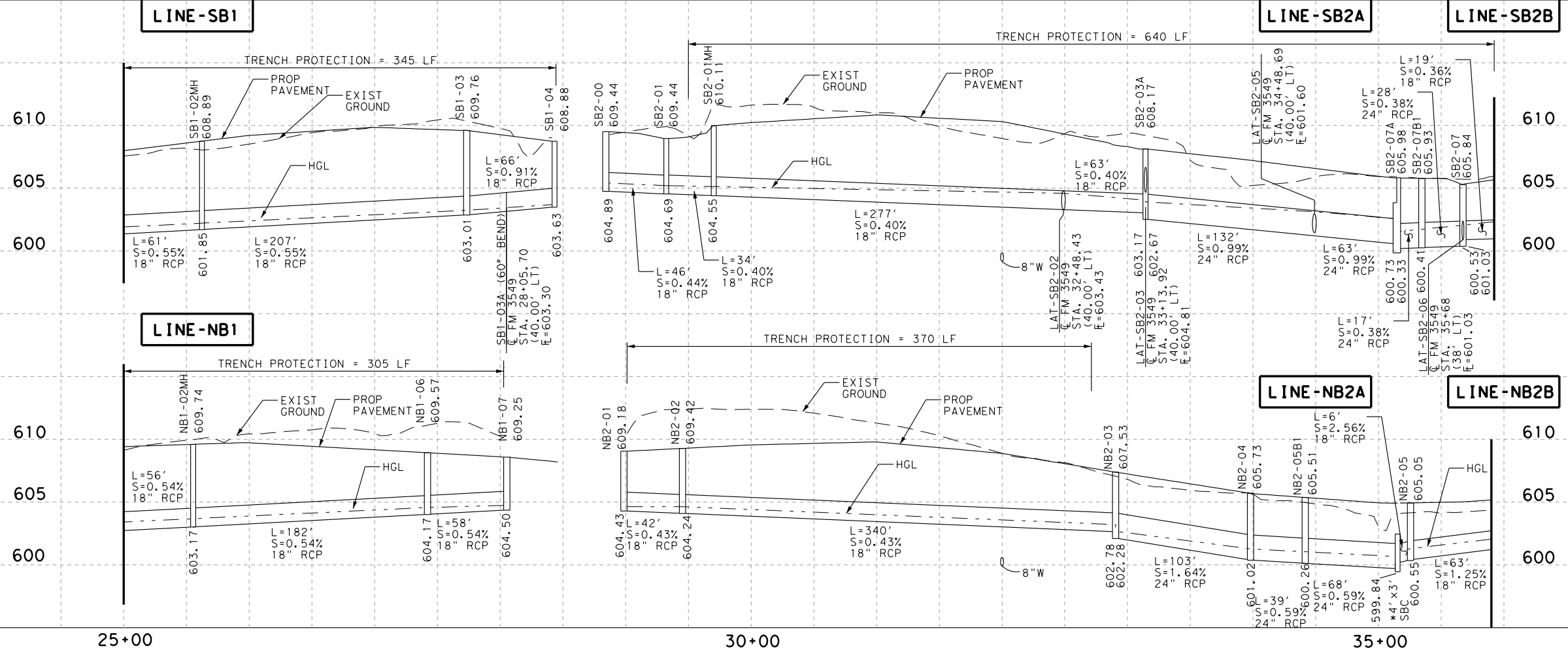
SHEET 1 OF 9

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 198 |
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- NOTES:
- ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 - ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 - STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 - ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS



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 Dallas, Texas 75243
 TBPE Firm Registration No. 6981



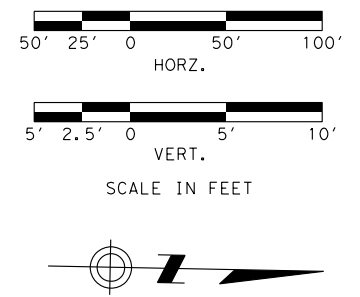
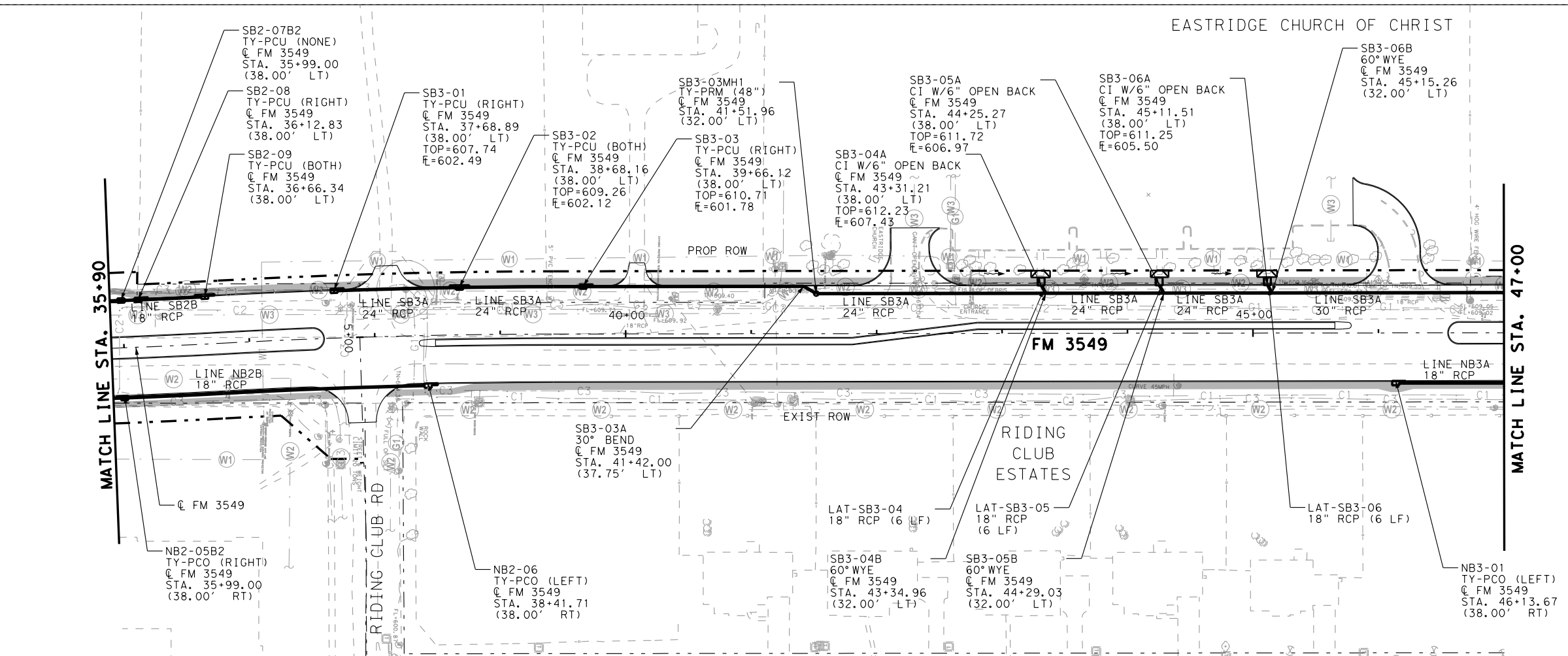
DRAINAGE PLAN & PROFILES

STA. 25+00 TO STA. 35+90

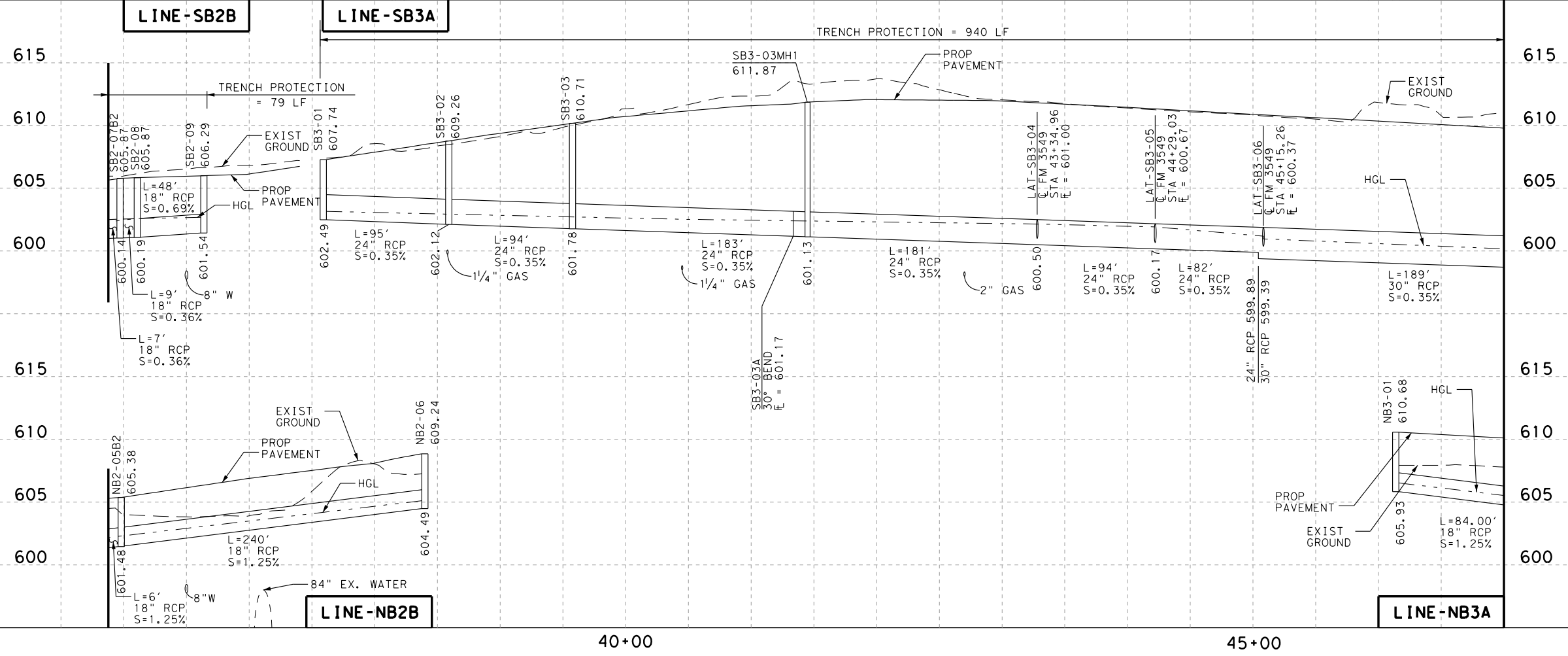
SHEET 2 OF 9

| | | | | |
|-------------|-------------------|-------------------------|----------|-------------|
| DESIGN NC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| GRAPHICS TC | 6 | SEE TITLE SHEET | | FM 3549 |
| CHECK JM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 199 |
| | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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 TIME: 12:42:40 PM



- NOTES:
- ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 - ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 - STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 - ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS
 - INLET SB3-04A, SB3-05A, SB3-06A SEE "CURB INLET W/6" OPEN BACK INLET" SHEET FOR DETAILS



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 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474

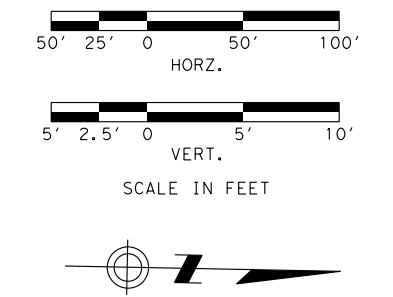
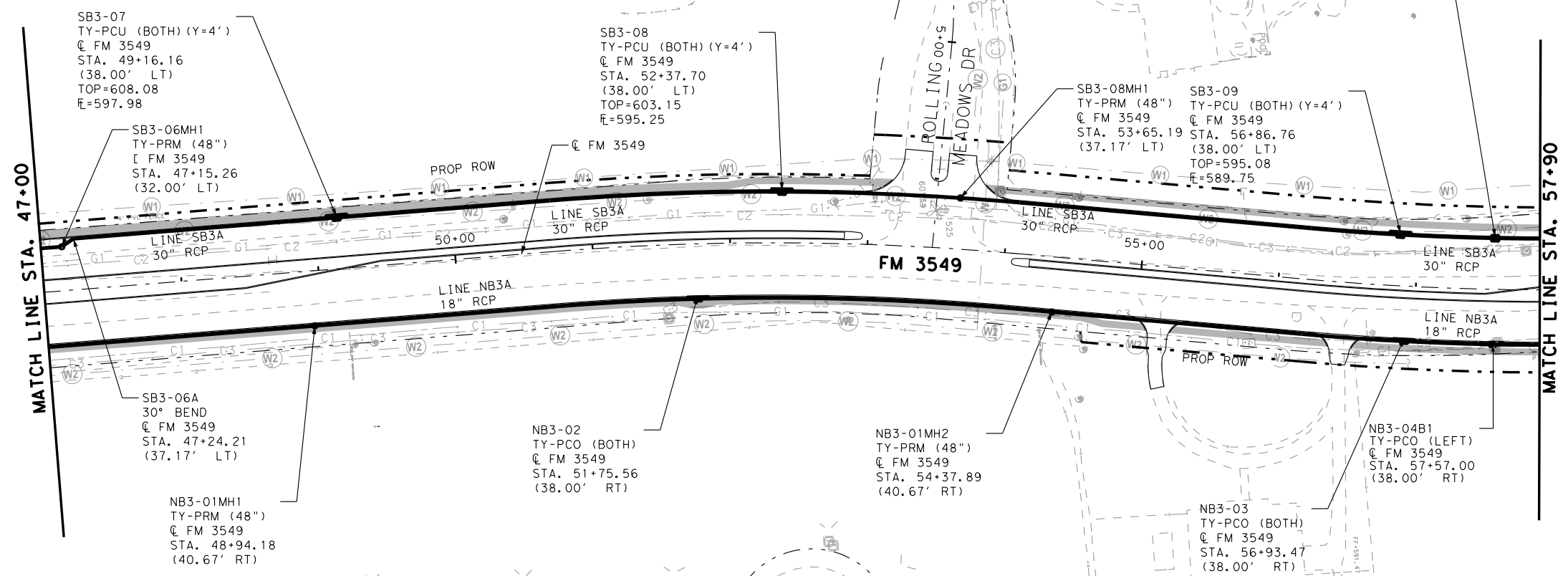


DRAINAGE PLAN & PROFILES
STA. 35+90 TO STA. 47+00

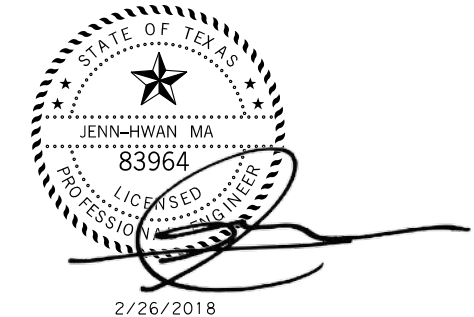
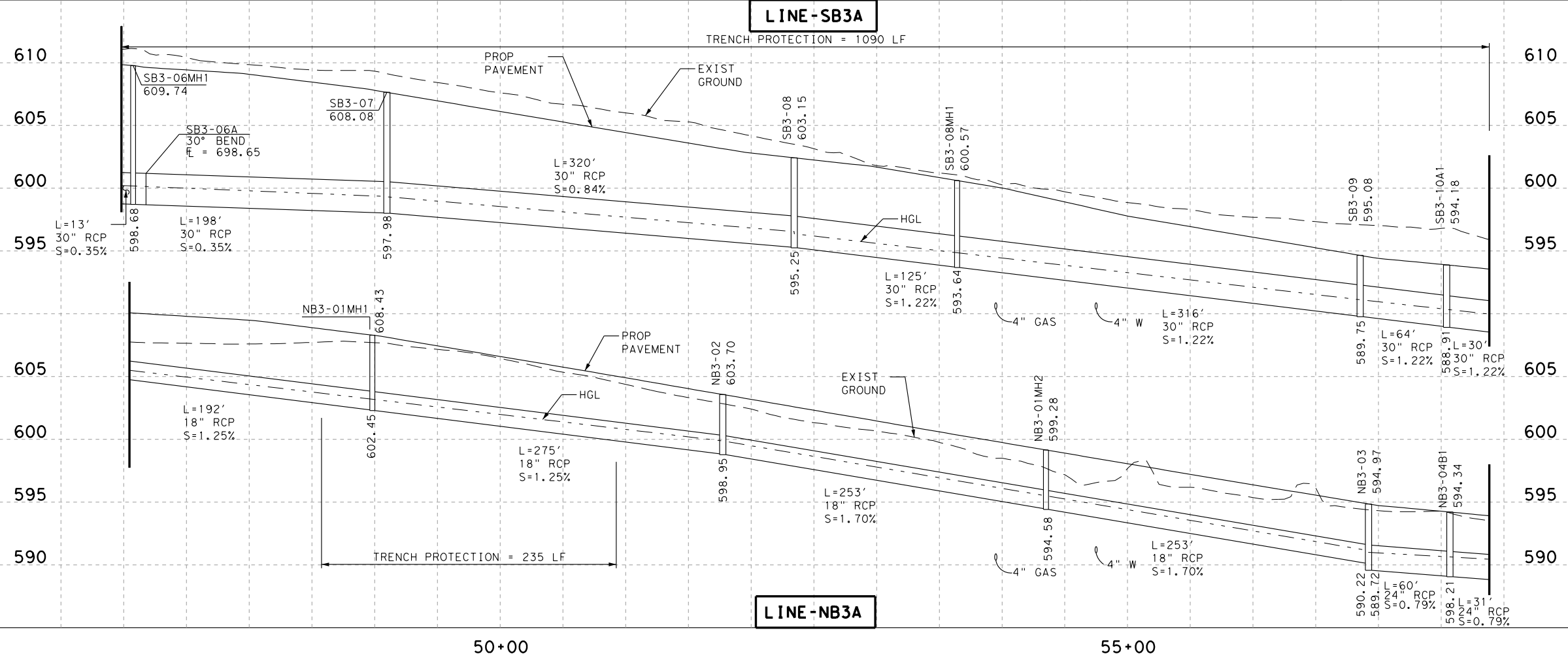
SHEET 3 OF 9

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN NC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
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- NOTES:
1. ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 2. ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 3. STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 4. ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474

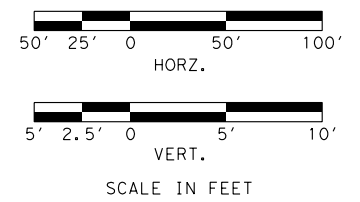
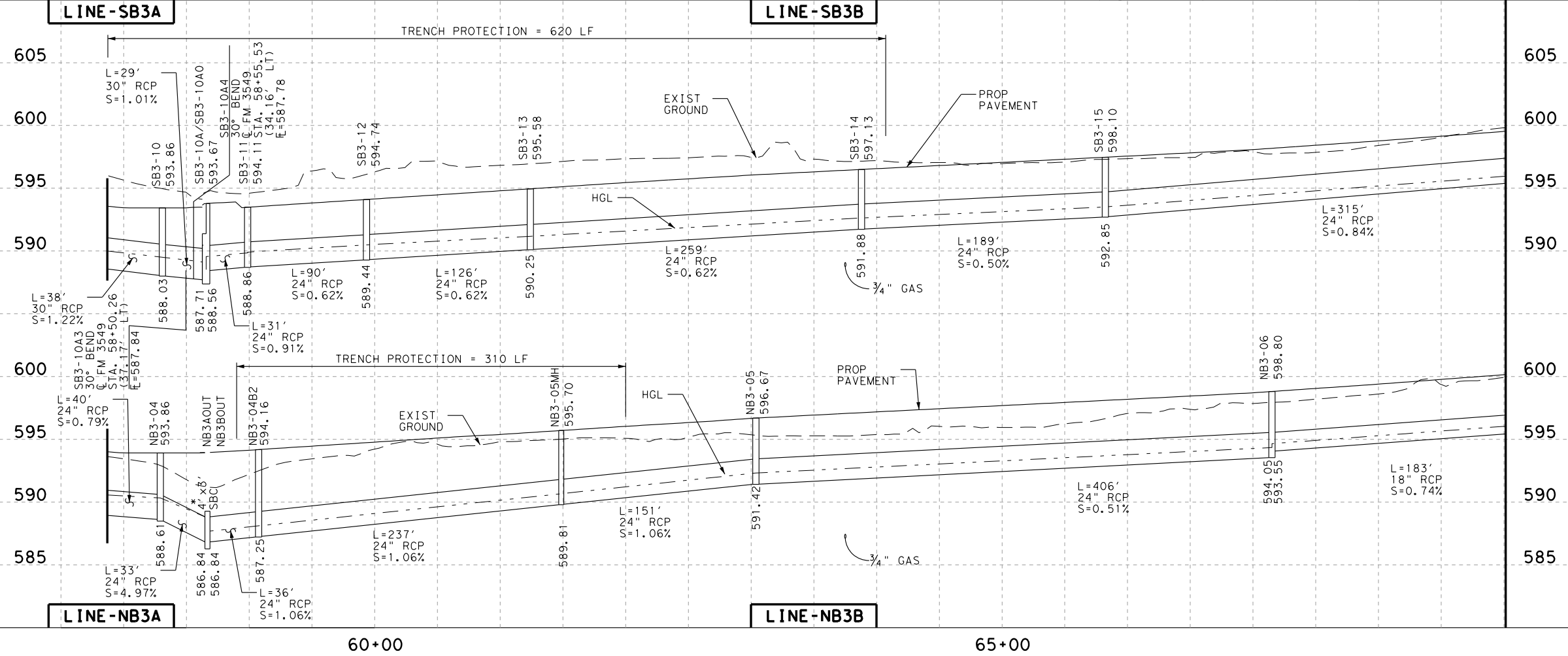
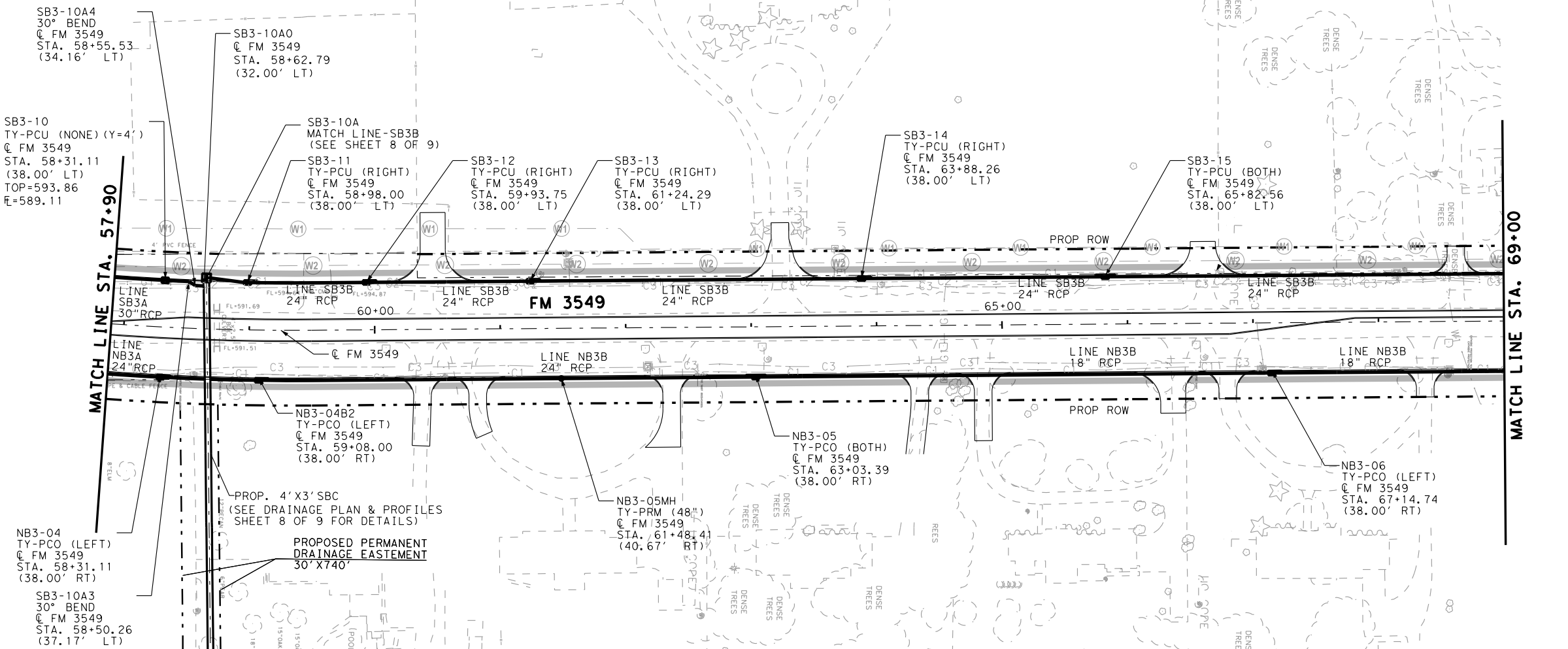


DRAINAGE PLAN & PROFILES
STA. 47+00 TO STA 57+90

SHEET 4 OF 9

| | | | | |
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| | 1015 | 01 | 023 | |

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- NOTES:
1. ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60" UNLESS NOTED ON PLANS OTHERWISE
 2. ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 3. STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 4. ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

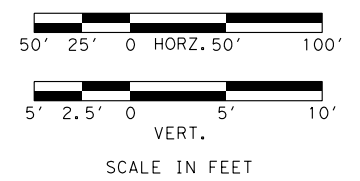
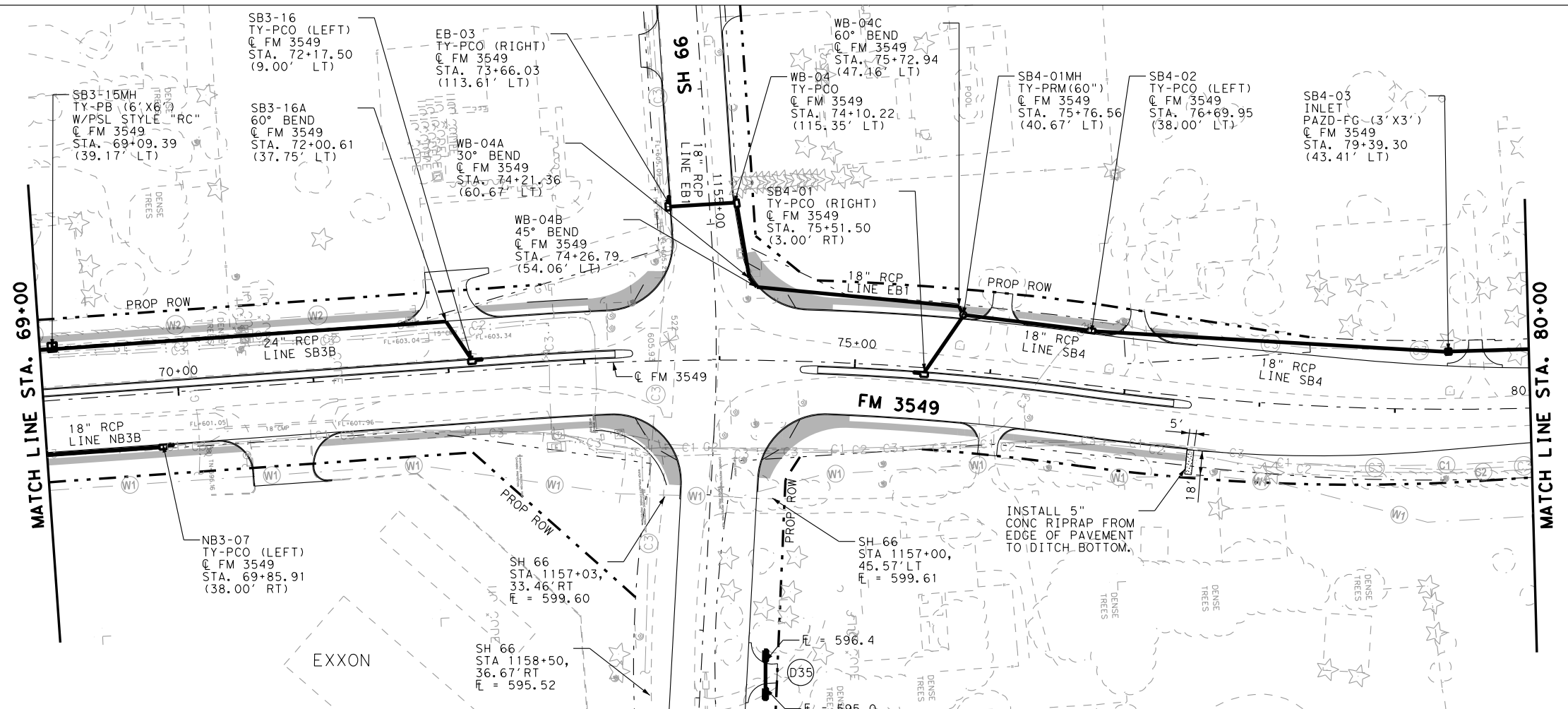


DRAINAGE PLAN & PROFILES
 STA. 57+90 TO STA. 69+00

SHEET 5 OF 9

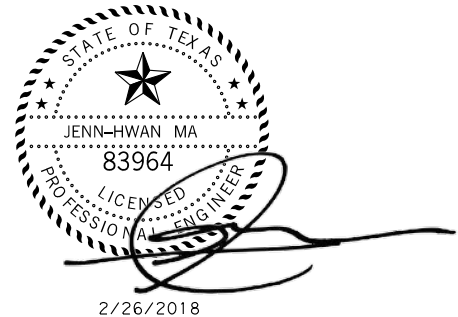
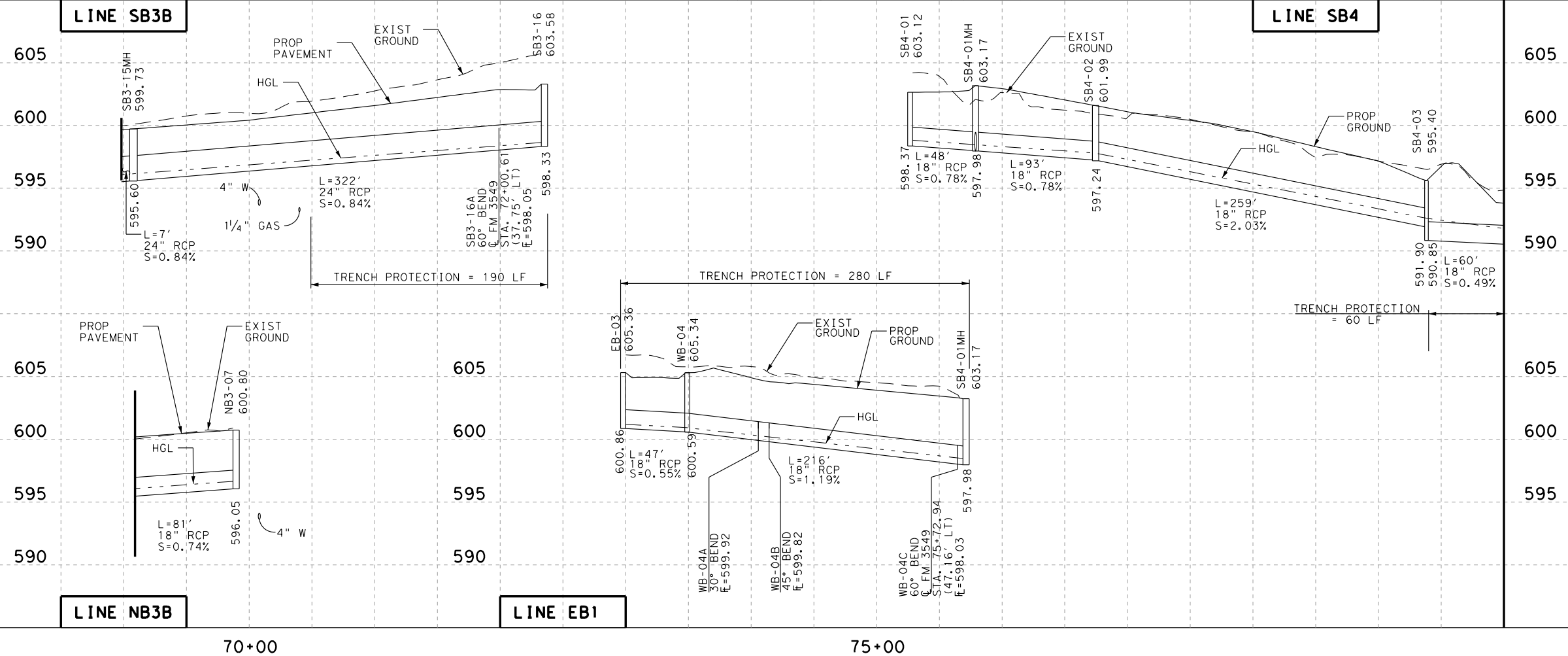
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| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 202 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |

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 TIME: 12:42:57 PM



- NOTES:
1. ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 2. ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 3. STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 4. ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS

FOR DRIVEWAY D31 & D35 CULVERT INFORMATION SEE DRIVEWAY PLAN & PROFILE SHEETS



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474

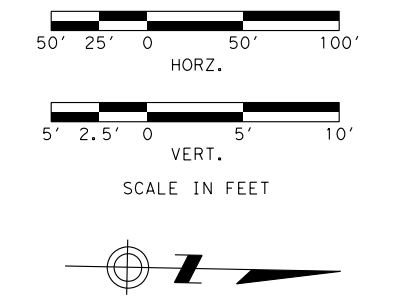
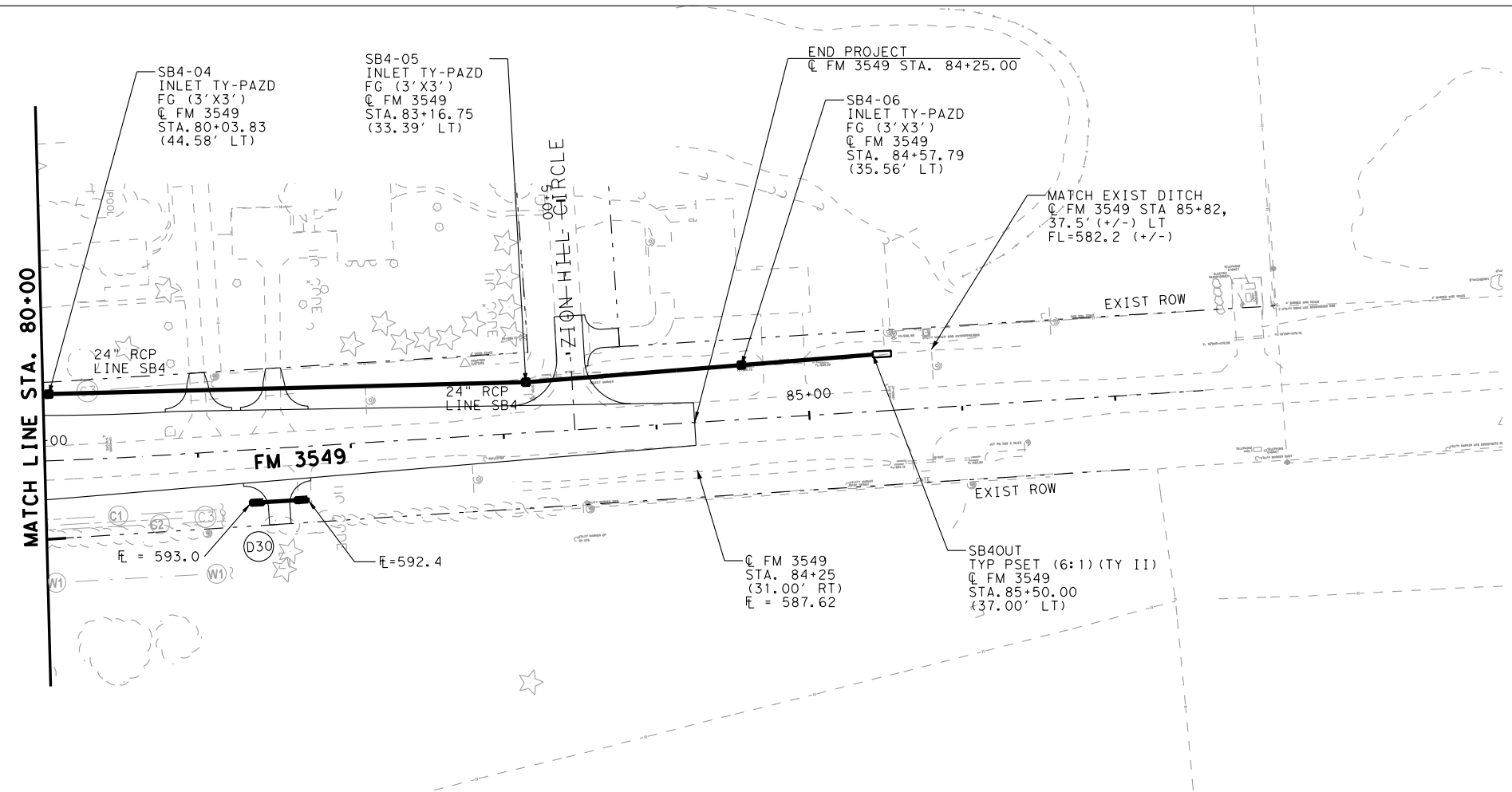


DRAINAGE PLAN & PROFILES
 STA. 69+00 TO 80+00

SHEET 6 OF 9

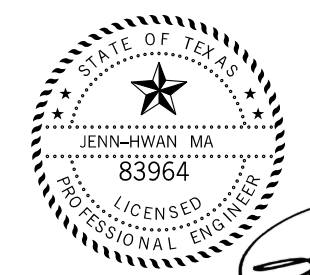
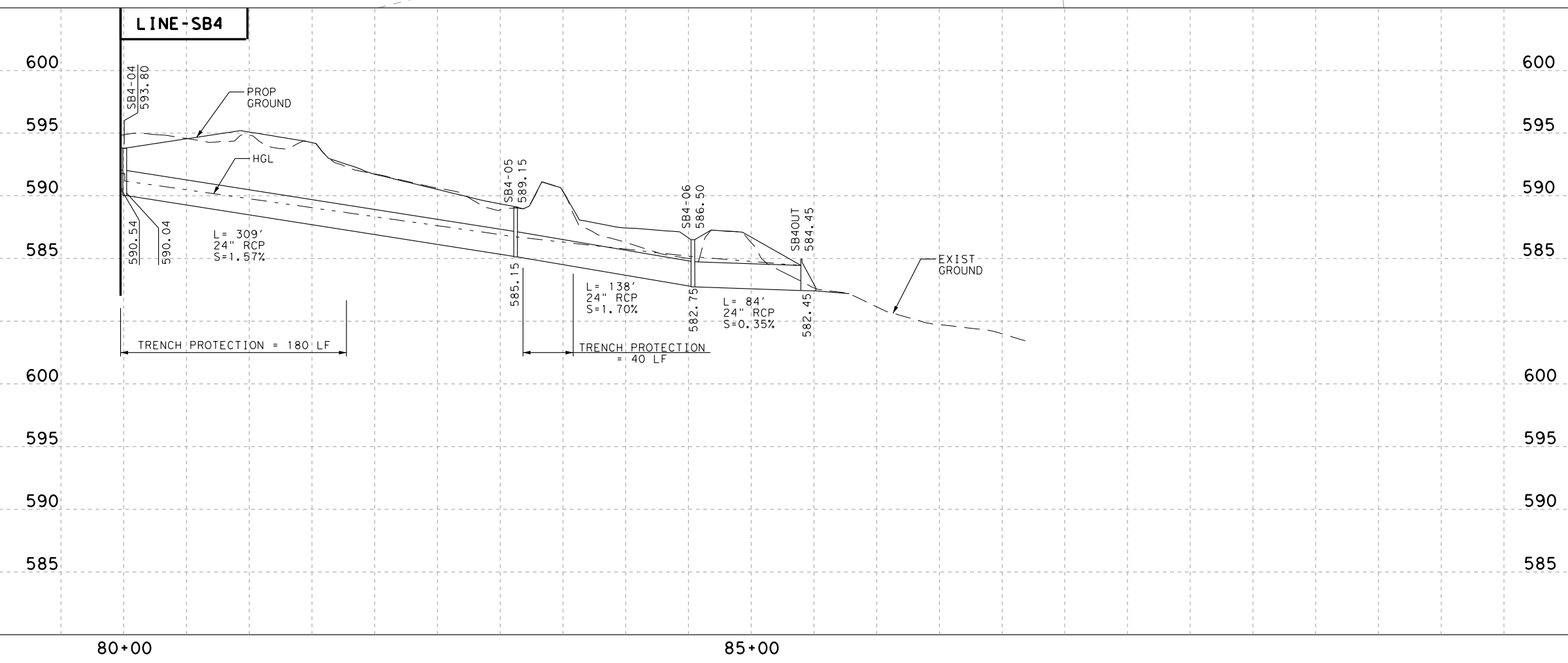
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- NOTES:
1. ALL REINFORCED CONCRETE PIPES TO BE CLASS III, ALL WYES TO BE 60° UNLESS NOTED ON PLANS OTHERWISE
 2. ALL CURB INLETS SHALL HAVE DEPTH OF 3 FT (Y=3'), UNLESS CALL-OUT ON PLANS OTHERWISE
 3. STORM SEWER PIPE SLOPES ARE EQUAL OR GREATER THAN 10% SHALL HAVE CEMENT STABILIZED BACKFILL SEE DRAINAGE MISC DETAILS SHEET
 4. ALL LATERALS SEE "STORM DRAIN PROFILES" SHEETS

FOR DRIVEWAY D30 CULVERT INFORMATION
 SEE DRIVEWAY PLAN & PROFILE SHEETS



2/26/2018

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981



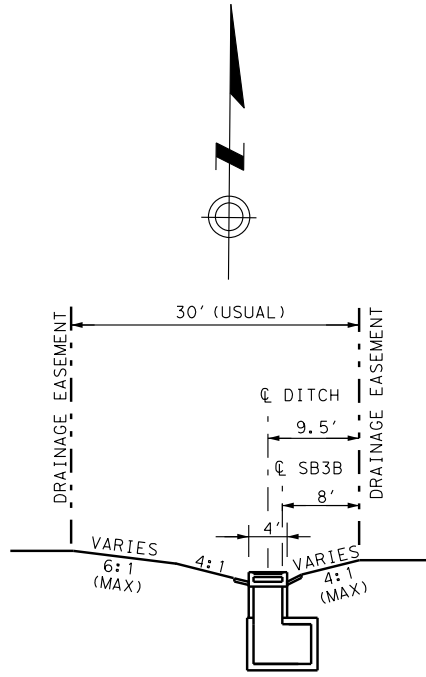
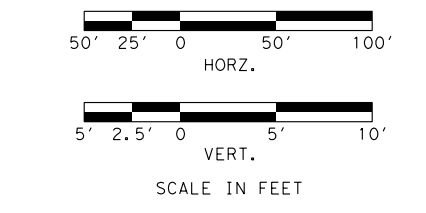
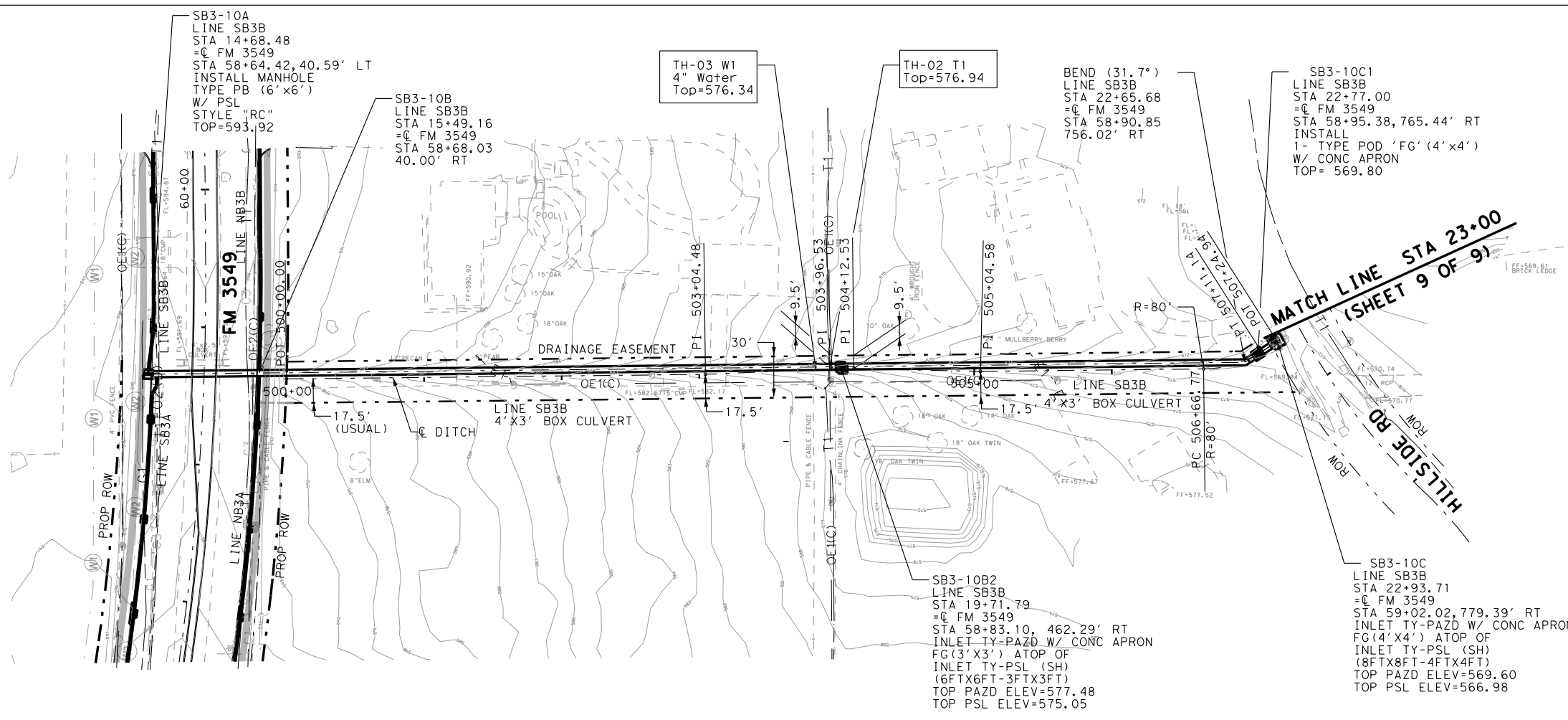
DRAINAGE PLAN & PROFILES
 STA. 80+00 TO END PROJECT

SHEET 7 OF 9

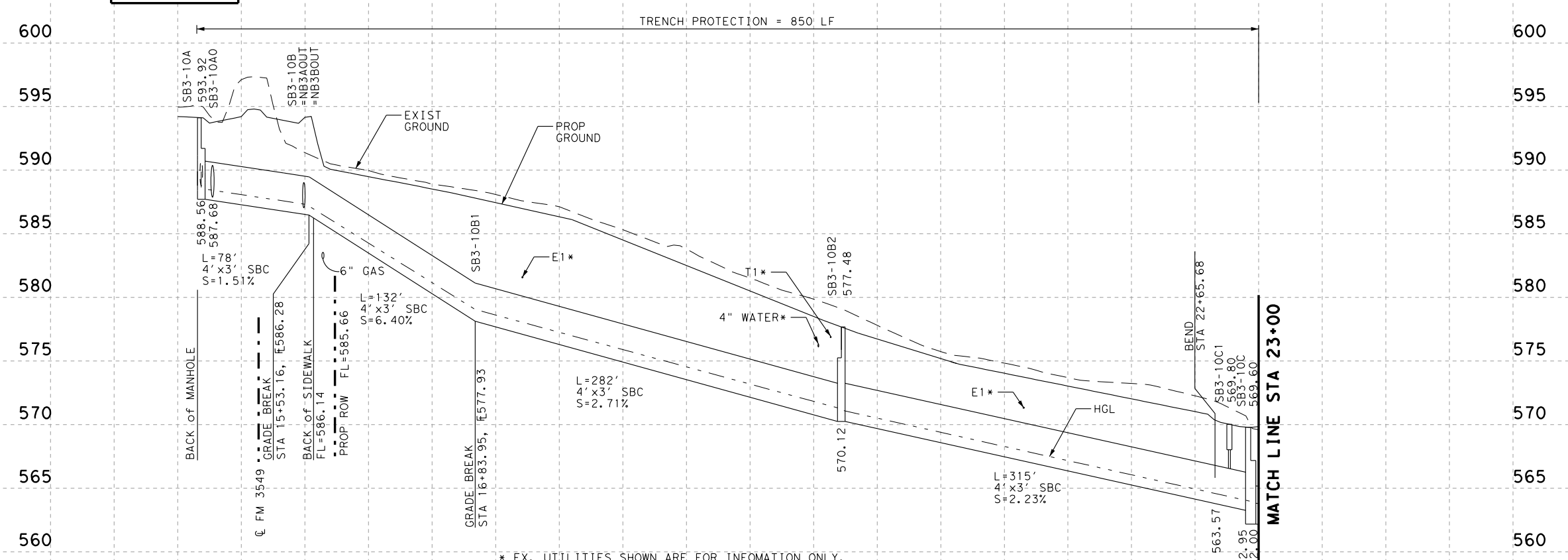
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DATE: 2/26/2018 TIME: 12:43:14 PM



LINE - SB3B



* EX. UTILITIES SHOWN ARE FOR INFORMATION ONLY. SOME UTILITIES MAY HAVE BEEN RELOCATED. CONTACT THE UTILITY COMPANIES FOR THE LATEST PLANS BEFORE EXCAVATING.



2/26/2018

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ATKINS TBPE REG. # F-474



DRAINAGE PLAN & PROFILES
 LINE SB3B

SHEET 8 OF 9

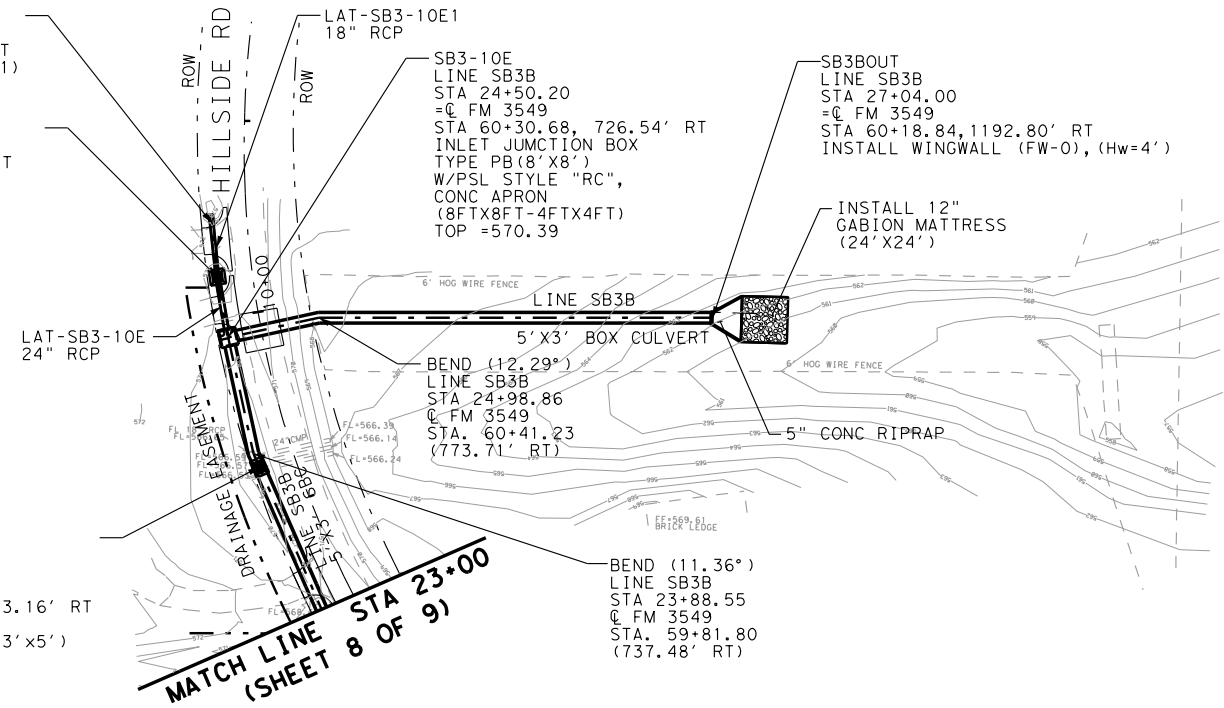
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| CHECK JM | CONTROL 1015 | SECTION 01 | JOB 023 | |

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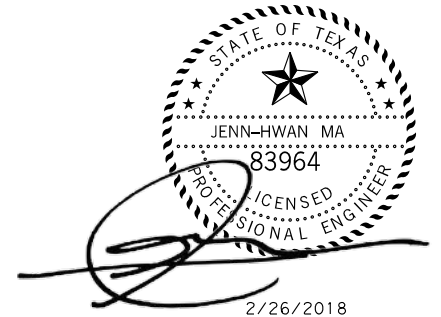
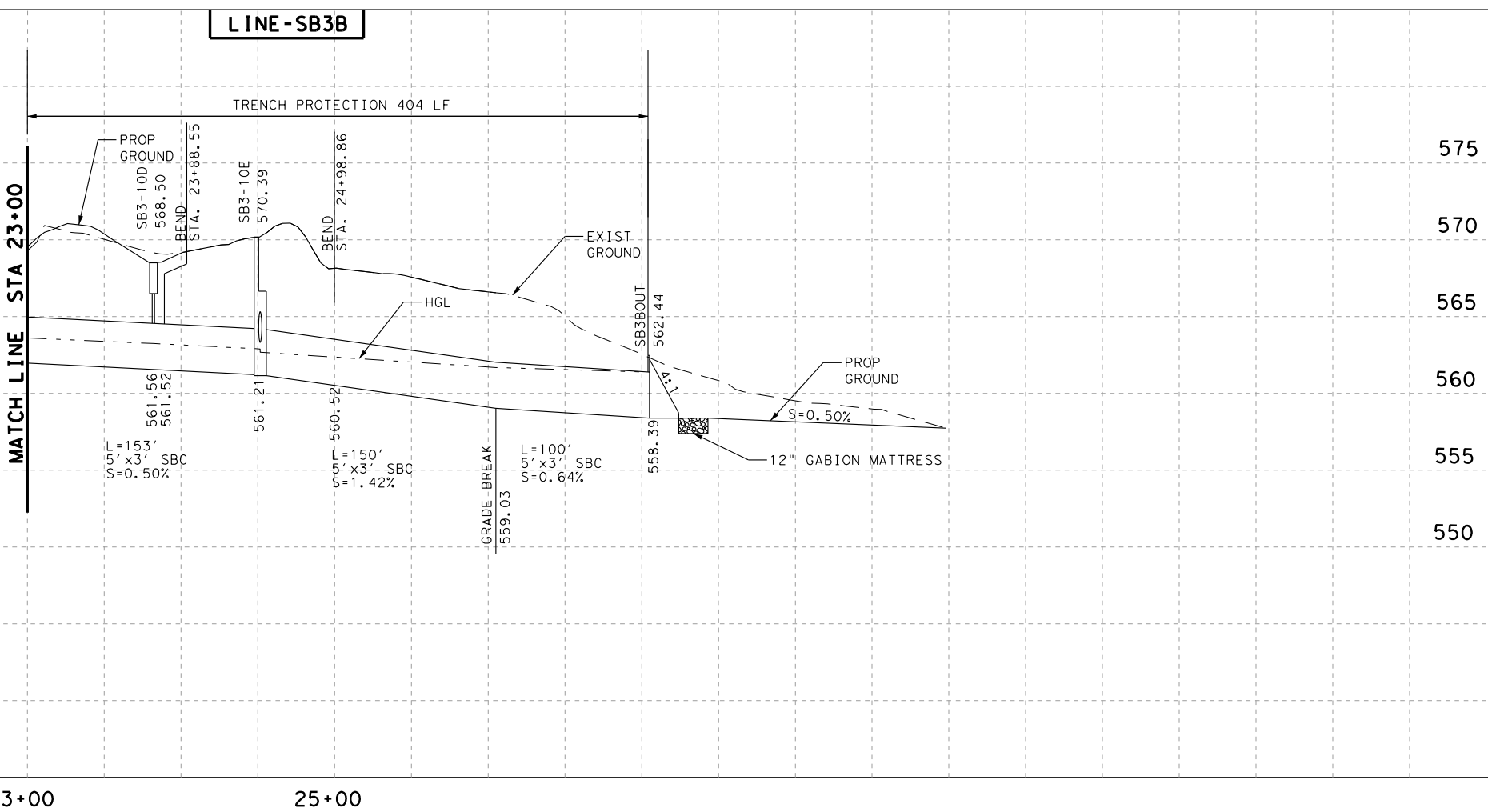
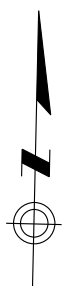
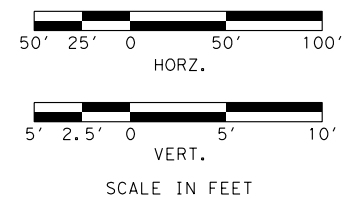
SB3B-10E2
 @ FM 3549
 STA 60+90.20, 717.62' RT
 INSTALL TYPE II SET(3:1)
 E= 569.25

SB3B-10E1
 @ FM 3549
 STA 60+62.19, 720.70' RT
 INSTALL INLET
 TYPE PB (4'x4')
 W/ PSL STYLE "FC" &
 CONC APRON
 TOP= 570.55

SB3-10D
 LINE SB3B
 STA 23+80.95
 @ FM 3549
 STA 59+63.25, 743.16' RT
 INSTALL INLET
 TYPE POD 'FC' (3'x5')
 W/ CONC APRON
 TOP= 568.50



MATCH LINE STA 23+00
 (SHEET 8 OF 9)



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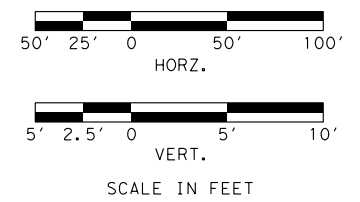
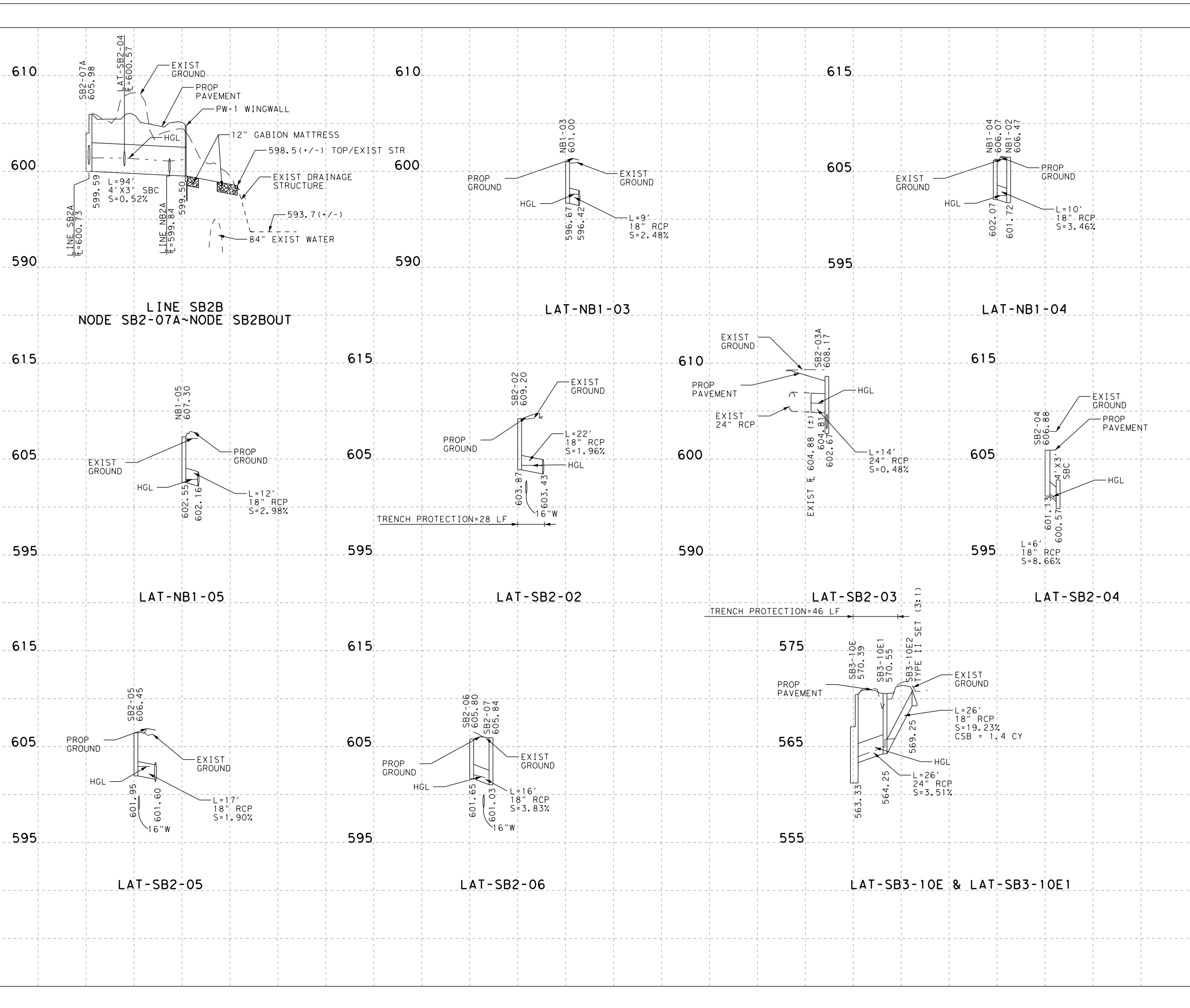
DRAINAGE PLAN & PROFILES
 SB3B

SHEET 9 OF 9

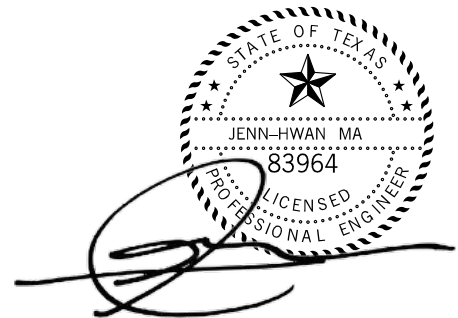
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DATE: 2/26/2018 TIME: 12:43:24 PM



CSB = CEMENT STABILIZED BACKFILL



2/26/2018

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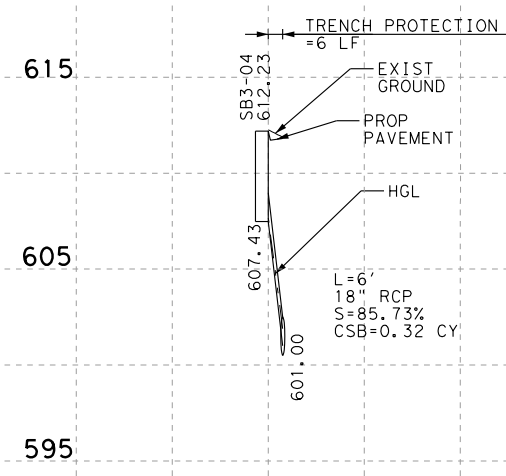


STORM DRAIN PROFILES

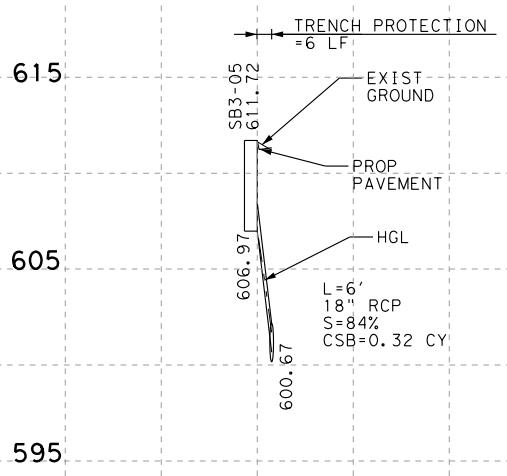
SHEET 1 OF 2

| | | | | |
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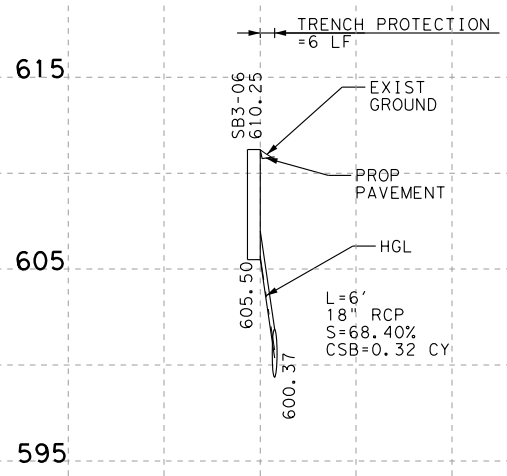
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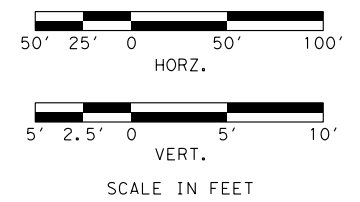
LAT-SB3-04



LAT-SB3-05



LAT-SB3-06



CSB = CEMENT STABILIZED BACKFILL



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

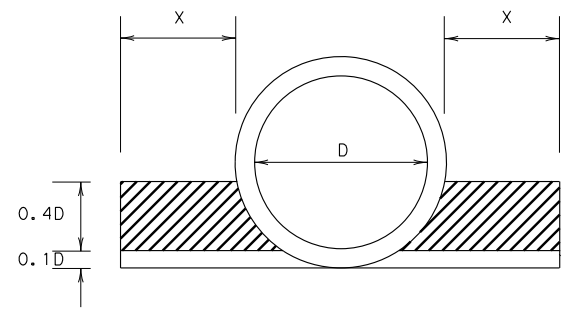


STORM DRAIN PROFILES

SHEET 2 OF 2

| | | | | |
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| | | | 023 | |

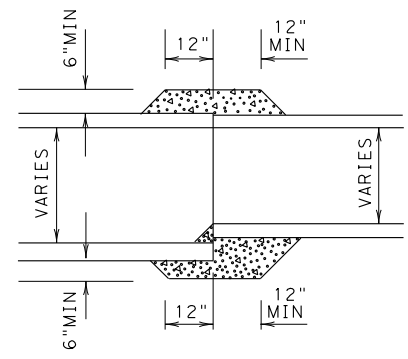
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X = 1'-0" FOR PIPES 42" OR LESS
 AND
 X = 2'-0" FOR PIPES OVER 42"

CEMENT STABILIZED BACKFILL

FOR STORM SEWERS ON SLOPES GREATER THAN 10%
 18" RCP ESTIMATED CSB AT 0.053 CY/LF
 24" RCP ESTIMATED CSB AT 0.073 CY/LF



CONCRETE COLLAR FOR PIPE CONNECTION

[Handwritten Signature]
 STATE OF TEXAS
 JENN-HWAN MA
 83964
 LICENSED PROFESSIONAL ENGINEER
 2/26/2018

CIVIL ASSOCIATES, INC. **CAI** 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

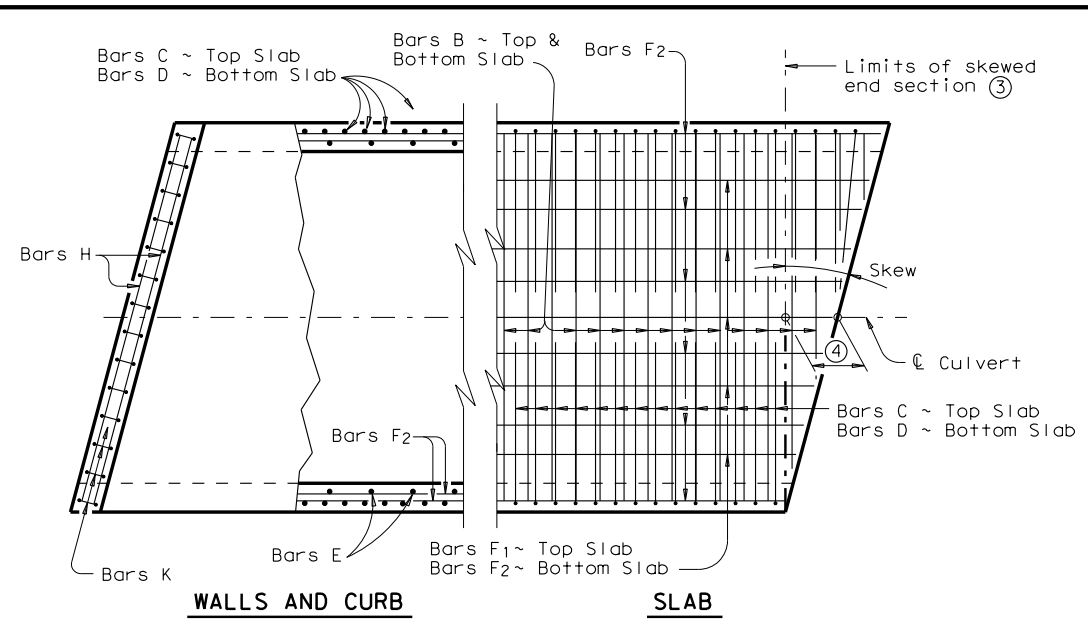
ATKINS
 TBPE REG. # F-474

Texas Department of Transportation
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DRAINAGE MISC DETAILS

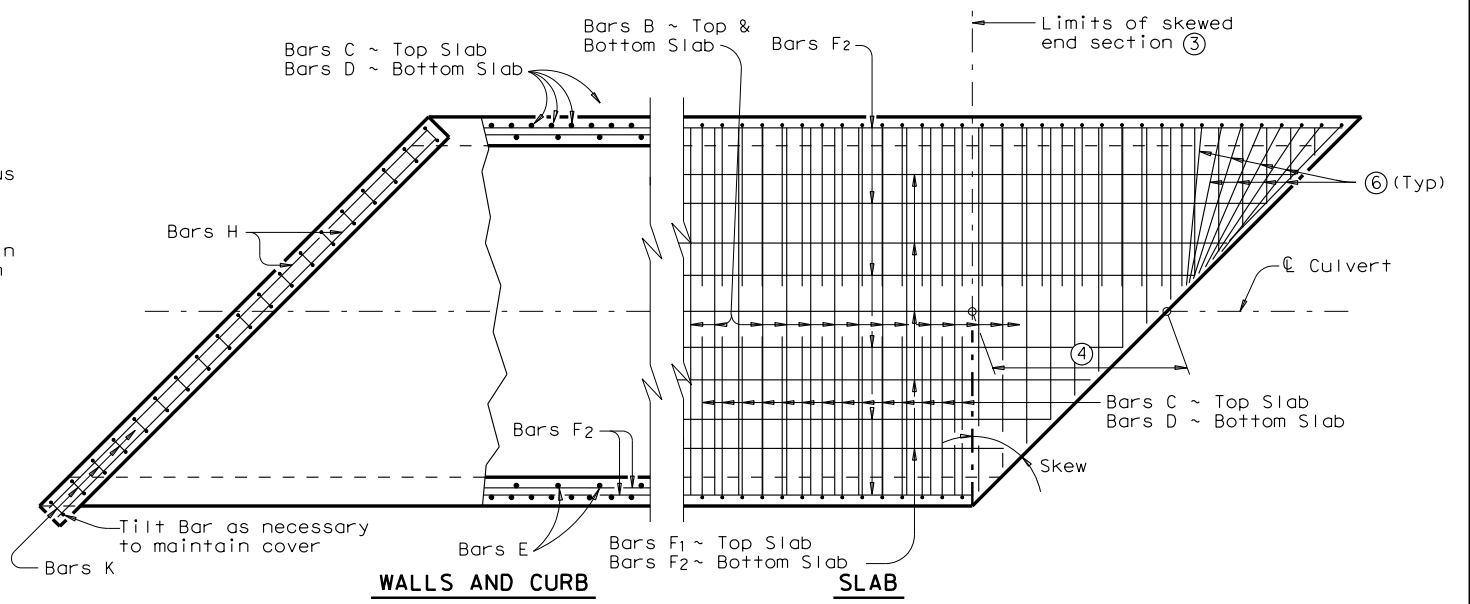
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| GRAPHICS NC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 210 |
| CHECK JM | CONTROL 1015 | SECTION 01 | JOB 023 | |

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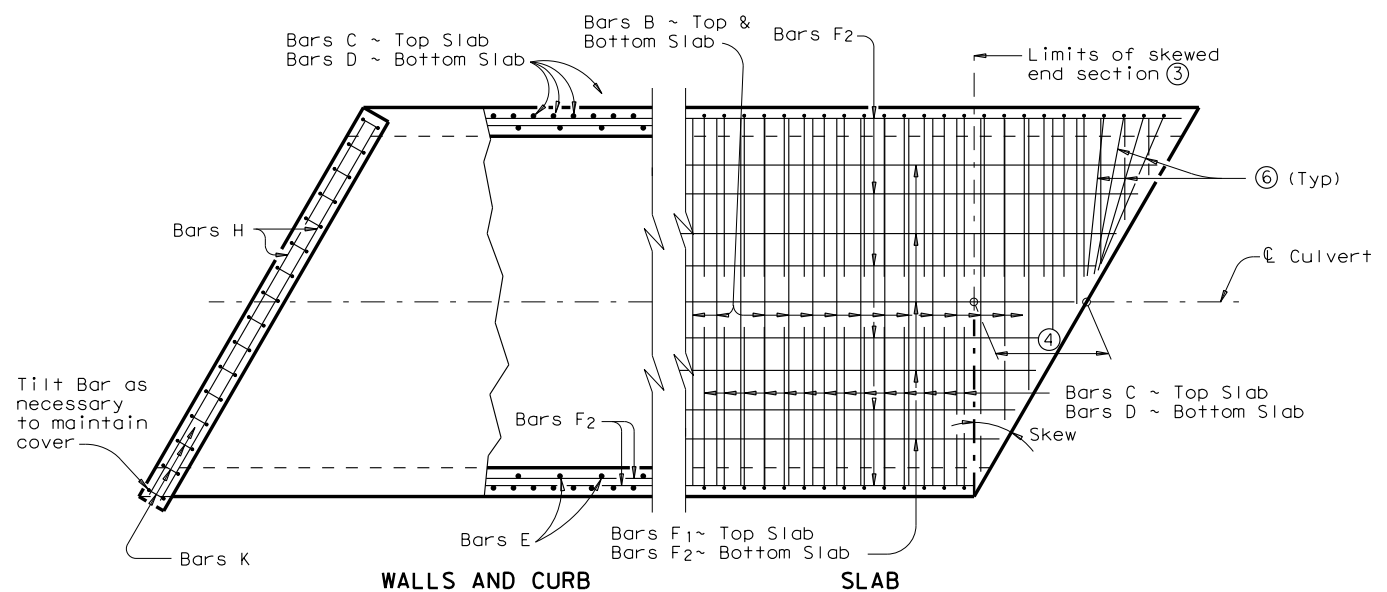


PLAN OF SKEWED ENDS ~ FROM 0° TO 15°

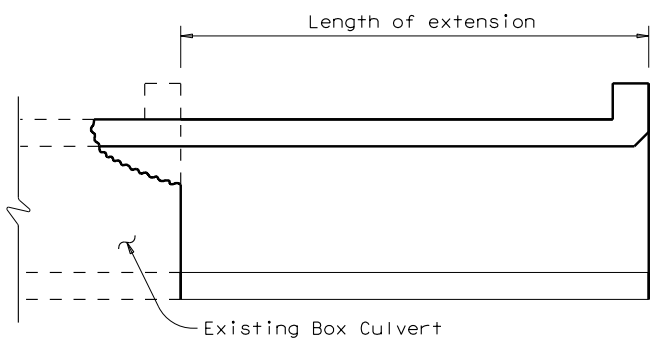
- ② When the spacing between Bars B becomes less than half of the normal spacing, bars shall be cut to avoid fouling
- ③ The length of Bars B and E will vary in the skewed end sections [One half of overall width] x [Tan of the skew angle]
- ④ Bars F1 and F2 shall be continuous through the angle section. They shall be bent to remain parallel to the walls of the Box Culvert.
- ⑤ When necessary to avoid fouling in acute corners, the slab extension leg of Bars C and Bars D may be shortened to a minimum of 1'-6" for skews of 30° and 45°.
- ⑥ For skews of 15° or less, the contractor has the option of placing Bars B, C and D parallel to the skewed end while maintaining spacing along centerline box. Lengths of Bars B shown on the standards shall be increased to accommodate the skew.



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



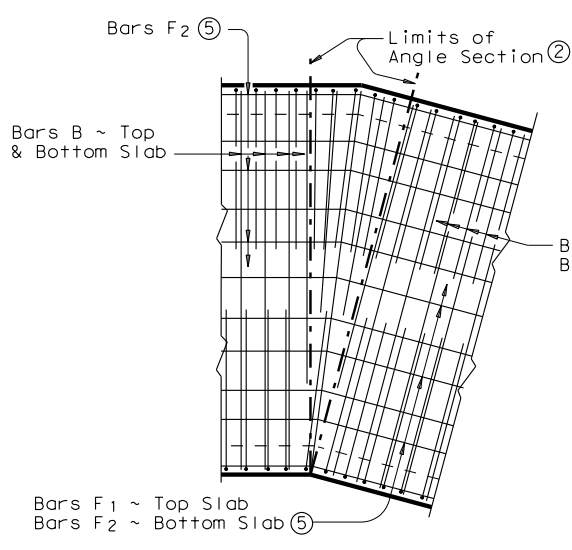
LENGTHENING DETAIL

① For box culverts with less than 2'-0" of fill, the top slab shall be broken back to provide a minimum 1'-10" lap of the existing longitudinal bars with the longitudinal bars in the extension. If the depth of fill is 2'-0" or greater, the top slab shall be broken back to provide a 1'-0" minimum embedment of existing longitudinal reinforcing into the extension. Alternatively, if the fill height is greater than 2'-0", the existing curb may be left in place and 2'-0" long #6 bars shall be drilled and grouted 1'-0" into the existing top slab at 1'-6" center to center spacing. Wings and apron shall be broken back as necessary to install the extension. Exposed wingwall and apron reinforcing may be removed or cleaned and included in the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, horizontal and vertical transitions shall be formed as directed by the Engineer. Bottom slabs shall match to maintain an uninterrupted flow line. Existing and new reinforcing shall be field bent into transition maintaining specified cover requirements.

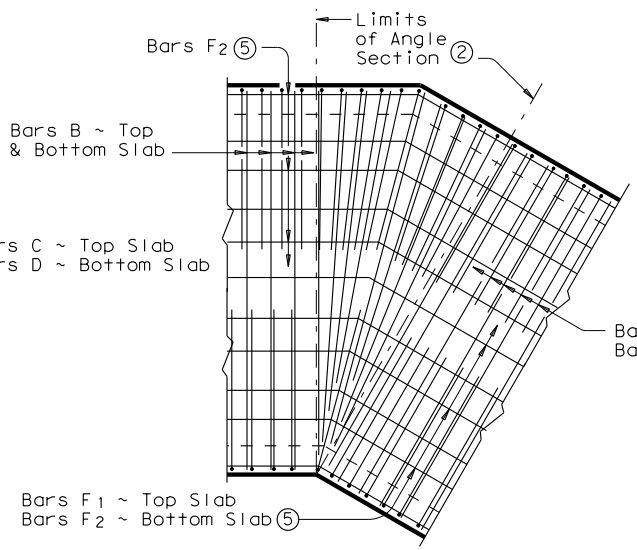
GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
 All reinforcing steel shall be Grade 60.
 All concrete shall be Class "C" with these exceptions:
 use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.
 Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.
 The use of permanent forms is not allowed.
 Refer to Single Box Culverts Cast-in-Place standard for details of straight sections of culvert. For skewed sections and angle sections refer to Single Box Culverts Cast-in-Place standard for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown. For Skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume and reinforcing steel weight by dividing the values shown on the culvert standards by the cosine of the skew angle.
 Laps for Bars H, when required, shall be 1'-9" for uncoated bars and 2'-7" for epoxy coated.

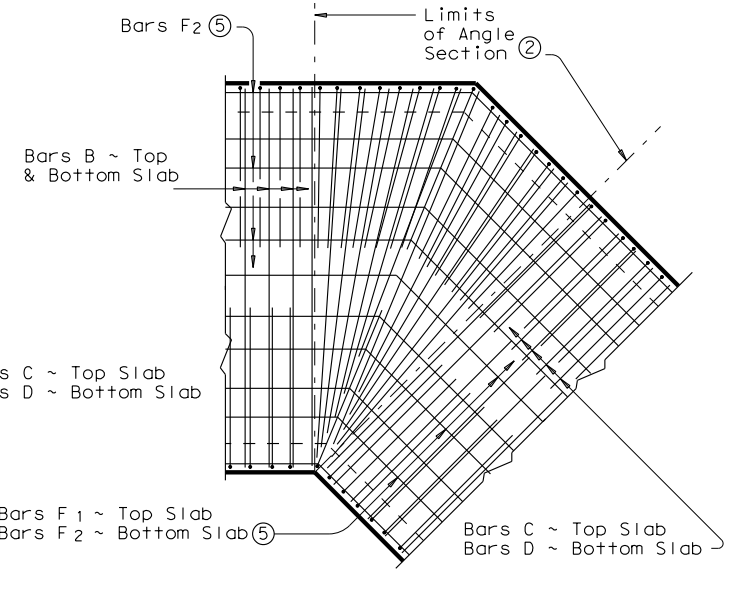
HL93 LOADING



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



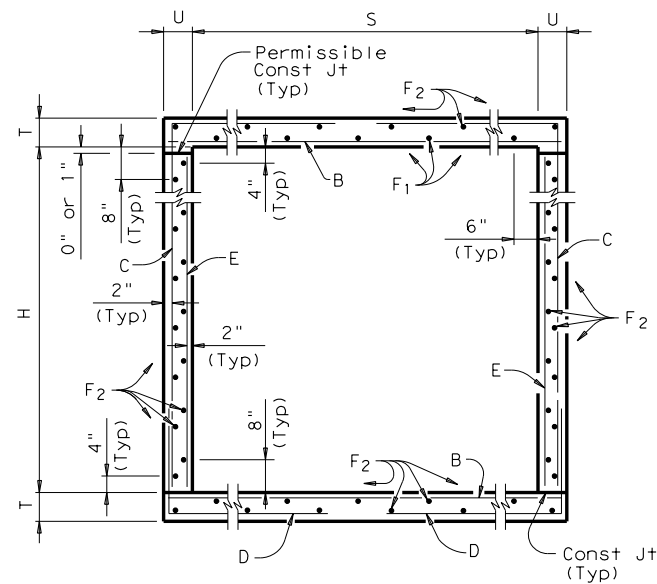
PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

| | | | |
|--|-----------|---------------------------------|---------------|
| | | Bridge Division Standard | |
| SINGLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS | | | |
| SCC-MD | | | |
| FILE: sccmdste.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT |
| ©TxDOT February 2010 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 212 | |

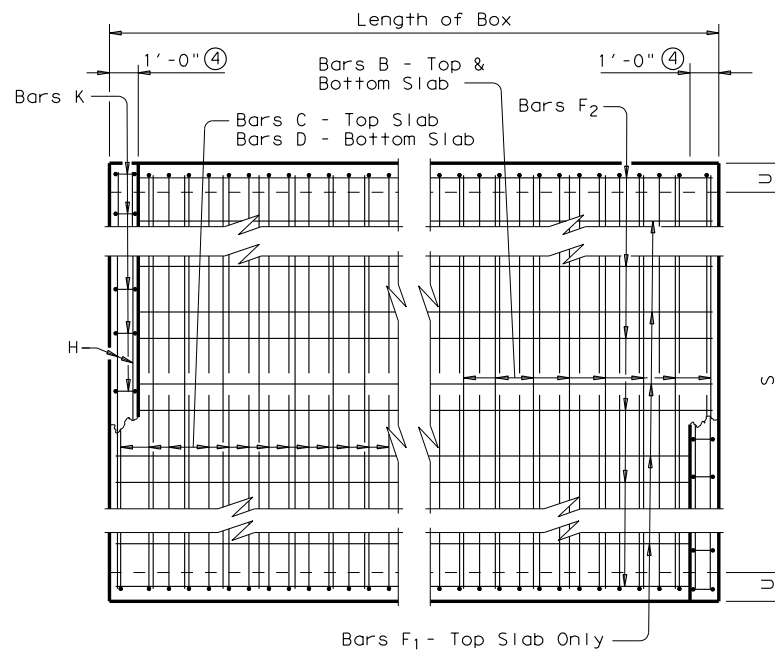
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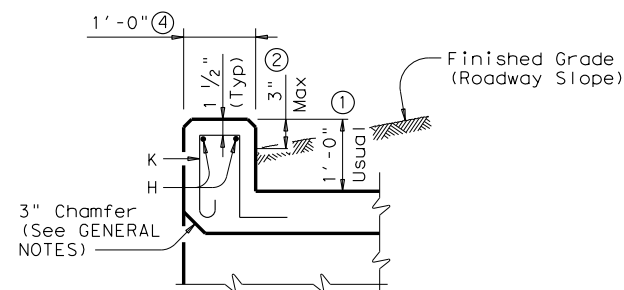
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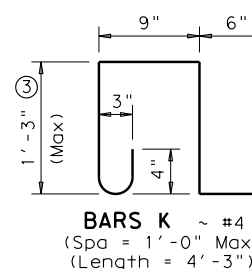
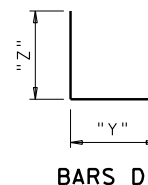
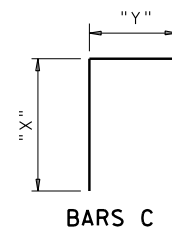
TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB



- ① 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- ② For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
 - For structures with bridge rail, curbs shall be flush with finished grade.
 Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ③ For curbs less than 1'-0" high, tilt bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, bars K may be omitted.
- ④ 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
 $WWR \text{ required} = (0.44 \text{ sq in} / 0.5') \times (60 \text{ ksi} / 70 \text{ ksi}) = 0.754 \text{ sq in/ft}$
 If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = $(0.306 \text{ sq in} / 0.754 \text{ sq in/ft}) \times 12 \text{ in/ft} = 4.87" \text{ Max spacing}$.
 Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
 Designed to the maximum fill height shown.
 All reinforcing steel shall be Grade 60.
 All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.
 Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.
 The use of permanent forms is not allowed.
 The bottom edge of the top slab shall be chamfered 3" at the entrance.
 Reinforcing bars shall be adjusted to provide a minimum of 1 1/4" clear cover.
 Construction joints shown at the flow line may be raised a maximum of 6" at the Contractor's option. If this option is used, Bars E may be cut off or raised, and Bars C and D may be reversed.
 See standard SCC-MD for skewed ends, angle sections and lengthening details.

HL93 LOADING SHEET 1 OF 2

| | | | |
|---|---------|---------------------------------|---------------|
| | | Bridge Division Standard | |
| SINGLE BOX CULVERTS CAST-IN-PLACE 0' TO 30' FILL | | | |
| SCC-3 & 4 | | | |
| FILE: scc34ste.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT |
| ©TxDOT February 2010 | CONT | SECT | JOB |
| REVISIONS | 1015 | 01 | 023 |
| 10-12: Added WWR | DIST | COUNTY | SHEET NO. |
| | DAL | ROCKWALL | 213 |

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DATE:
FILE:

| SECTION DIMENSIONS | | | | FILL HEIGHT | BILLS OF REINFORCING STEEL (For Box Length = 40 feet) | | | | | | | | | | | | | | | | | | | | | | | QUANTITIES | | | | | | | | | | | | | | | |
|--------------------|-------|----|----|-------------|---|------|-----|--------|--------|--------|------|-----|--------|--------|--------|-------|-----|------|-----|----------------------|--------|-------|------------|-----|--------|-----------------------|-----|-------------|--------|--------|-----|--------------------|-----|--------|----|-------|----|-----------|------------|-----------|------------|-----------|------------|
| | | | | | Bars B | | | | | Bars C | | | | | Bars D | | | | | Bars E~#4 at 18" Max | | | Bars F1~#4 | | | Bars F2~#4 at 18" Max | | Bars H 4~#4 | | Bars K | | Per foot of Barrel | | Curb | | Total | | | | | | | |
| | | | | | No. | Size | Spa | Length | Weight | No. | Size | Spa | Length | Weight | "X" | "Y" | No. | Size | Spa | Length | Weight | "Y" | "Z" | No. | Length | Wt | No. | Spa | Length | Wt | No. | Length | Wt | Length | Wt | No. | Wt | Conc (CY) | Reinf (Lb) | Conc (CY) | Reinf (Lb) | Conc (CY) | Reinf (Lb) |
| 3'-0" | 2'-0" | 7" | 7" | 30' | 138 | #4 | 7" | 3'-11" | 361 | 98 | #4 | 10" | 4'-2" | 273 | 2'-5" | 1'-9" | 98 | #4 | 10" | 3'-11" | 256 | 1'-9" | 2'-2" | 56 | 2'-0" | 75 | 3 | 13" | 39'-9" | 80 | 19 | 39'-9" | 505 | 3'-11" | 10 | 10 | 28 | 0.266 | 38.8 | 0.3 | 38 | 10.9 | 1,588 |
| 3'-0" | 3'-0" | 7" | 7" | 30' | 162 | #4 | 6" | 3'-11" | 424 | 98 | #4 | 10" | 5'-2" | 338 | 3'-5" | 1'-9" | 98 | #4 | 10" | 3'-11" | 256 | 1'-9" | 2'-2" | 56 | 3'-0" | 112 | 3 | 12" | 39'-9" | 80 | 23 | 39'-9" | 611 | 3'-11" | 10 | 10 | 28 | 0.310 | 45.5 | 0.3 | 38 | 12.7 | 1,859 |
| 4'-0" | 2'-0" | 7" | 7" | 30' | 194 | #4 | 5" | 4'-11" | 637 | 162 | #4 | 6" | 4'-8" | 505 | 2'-5" | 2'-3" | 162 | #4 | 6" | 4'-5" | 478 | 2'-3" | 2'-2" | 56 | 2'-0" | 75 | 5 | 10" | 39'-9" | 133 | 21 | 39'-9" | 558 | 4'-11" | 13 | 12 | 34 | 0.310 | 59.7 | 0.4 | 47 | 12.8 | 2,433 |
| 4'-0" | 3'-0" | 7" | 7" | 30' | 162 | #5 | 6" | 4'-11" | 831 | 162 | #4 | 6" | 5'-8" | 613 | 3'-5" | 2'-3" | 162 | #4 | 6" | 4'-5" | 478 | 2'-3" | 2'-2" | 56 | 3'-0" | 112 | 6 | 8" | 39'-9" | 159 | 25 | 39'-9" | 664 | 4'-11" | 13 | 12 | 34 | 0.353 | 71.4 | 0.4 | 47 | 14.5 | 2,904 |
| 4'-0" | 4'-0" | 7" | 7" | 30' | 162 | #5 | 6" | 4'-11" | 831 | 162 | #4 | 6" | 6'-8" | 721 | 4'-5" | 2'-3" | 162 | #4 | 6" | 4'-5" | 478 | 2'-3" | 2'-2" | 56 | 4'-0" | 150 | 6 | 8" | 39'-9" | 159 | 25 | 39'-9" | 664 | 4'-11" | 13 | 12 | 34 | 0.396 | 75.1 | 0.4 | 47 | 16.2 | 3,050 |

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
 WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi)
 = 0.754 sq in/ft.
 If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
 Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).



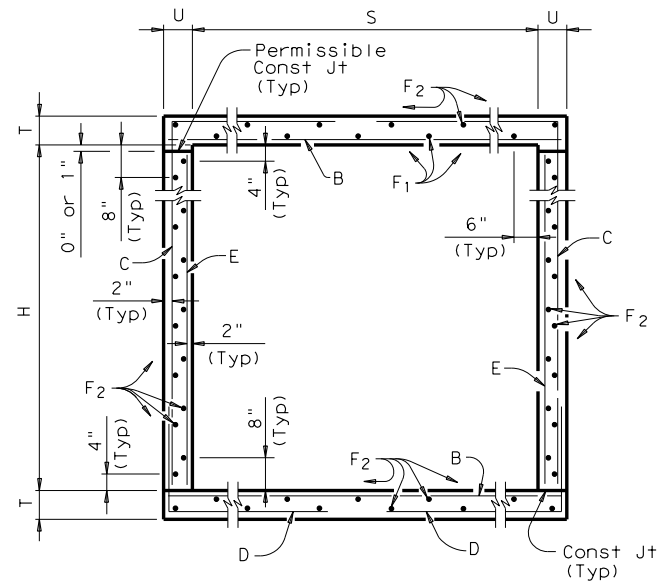
**SINGLE BOX CULVERTS
CAST-IN-PLACE
0' TO 30' FILL**

SCC-3 & 4

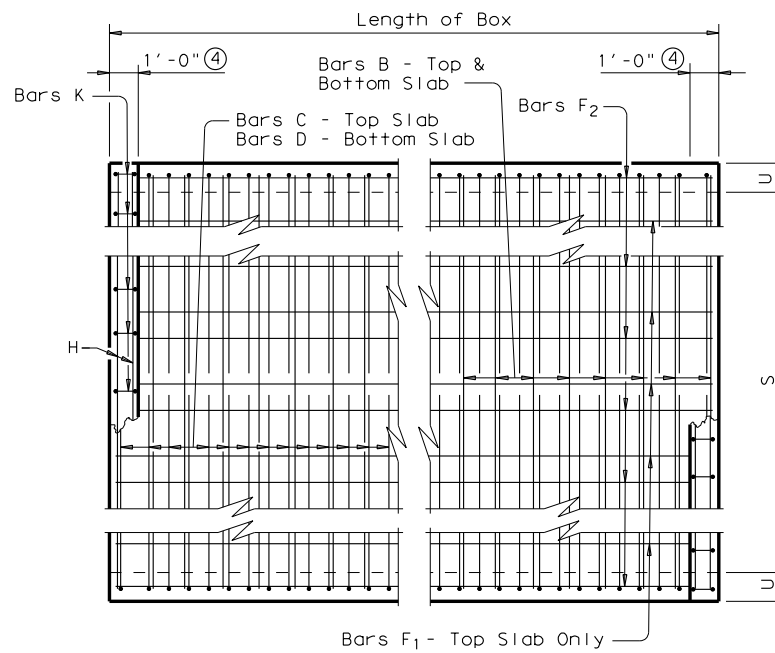
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|----------------------|---------|----------|---------------|---------|
| FILE: scc34ste.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 10-12: Added WWR | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 214 | |

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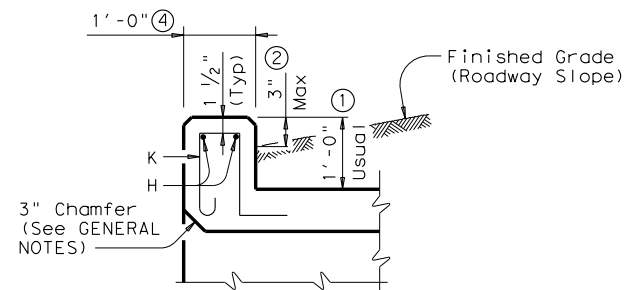
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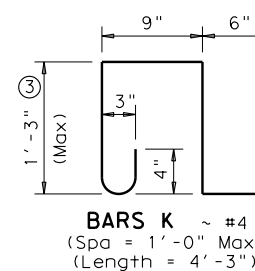
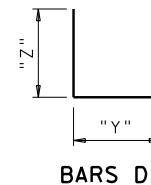
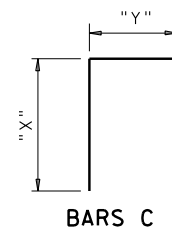
TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB



- ① 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- ② For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
 - For structures with bridge rail, curbs shall be flush with finished grade.
 Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ③ For curbs less than 1'-0" high, tilt bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, bars K may be omitted.
- ④ 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
 $WWR \text{ required} = (0.44 \text{ sq in} / 0.5') \times (60 \text{ ksi} / 70 \text{ ksi}) = 0.754 \text{ sq in/ft}$
 If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = $(0.306 \text{ sq in} / 0.754 \text{ sq in/ft}) \times 12 \text{ in/ft} = 4.87" \text{ Max spacing}$.
 Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
 Designed to the maximum fill height shown.
 All reinforcing steel shall be Grade 60.
 All concrete shall be Class "C" with these exceptions: use Class "S" for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.
 Class "C" concrete shall have a minimum compressive strength of 3,600 psi. Class "S" concrete shall have a minimum compressive strength of 4,000 psi.
 The use of permanent forms is not allowed.
 The bottom edge of the top slab shall be chamfered 3" at the entrance.
 Reinforcing bars shall be adjusted to provide a minimum of 1 1/4" clear cover.
 Construction joints shown at the flow line may be raised a maximum of 6" at the Contractor's option. If this option is used, Bars E may be cut off or raised, and Bars C and D may be reversed.
 See standard SCC-MD for skewed ends, angle sections and lengthening details.

HL93 LOADING

SHEET 1 OF 2



**SINGLE BOX CULVERTS
 CAST-IN-PLACE
 0' TO 30' FILL**

SCC-5 & 6

| | | | | |
|---------------------|---------|----------|---------------|---------|
| FILE: scc56ste.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT | CK: GAF |
| TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 10-12: Added WWR | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 215 | |

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DATE:
FILE:

| SECTION DIMENSIONS | | | | FILL HEIGHT (5) | BILLS OF REINFORCING STEEL (For Box Length = 40 feet) | | | | | | | | | | | | | | | | | | | | | | QUANTITIES | | | | | | | | | | | | | | | | |
|--------------------|-------|----|----|-----------------|---|----|----|--------|-------|--------|-----|--------|--------|-------|--------|--------|--------|--------|-----|----------------------|-----|--------|------------|--------|--------|-----------------------|------------|-----|-------------|-----|--------|--------|--------------------|--------|------|--------|-------|--------|-------|-----|----|-----------|------------|
| | | | | | Bars B | | | | | Bars C | | | | | Bars D | | | | | Bars E~#4 at 18" Max | | | Bars F1~#4 | | | Bars F2~#4 at 18" Max | | | Bars H 4~#4 | | Bars K | | Per foot of Barrel | | Curb | | Total | | | | | | |
| | | | | | S | H | T | U | No. | Size | Spd | Length | Weight | No. | Size | Spd | Length | Weight | "X" | "Y" | No. | Size | Spd | Length | Weight | "Y" | "Z" | No. | Length | Wt | No. | Spd | Length | Wt | No. | Length | Wt | Length | Wt | No. | Wt | Conc (CY) | Reinf (Lb) |
| 5'-0" | 2'-0" | 7" | 7" | 26' | 194 | #5 | 5" | 5'-11" | 1,197 | 162 | #5 | 6" | 5'-2" | 873 | 2'-5" | 2'-9" | 162 | #5 | 6" | 5'-4" | 901 | 2'-9" | 2'-7" | 56 | 2'-0" | 75 | 8 | 7" | 39'-9" | 212 | 22 | 39'-9" | 584 | 5'-11" | 16 | 14 | 40 | 0.353 | 96.1 | 0.5 | 56 | 14.6 | 3,898 |
| 5'-0" | 2'-0" | 8" | 7" | 30' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 5'-0" | 648 | 2'-6" | 2'-6" | 194 | #4 | 5" | 4'-9" | 616 | 2'-6" | 2'-3" | 56 | 2'-0" | 75 | 4 | 18" | 39'-9" | 106 | 22 | 39'-9" | 584 | 5'-11" | 16 | 14 | 40 | 0.391 | 80.7 | 0.5 | 56 | 16.1 | 3,282 |
| 5'-0" | 3'-0" | 7" | 7" | 26' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 5'-11" | 767 | 3'-5" | 2'-6" | 194 | #4 | 5" | 4'-8" | 605 | 2'-6" | 2'-2" | 56 | 3'-0" | 112 | 8 | 7" | 39'-9" | 212 | 26 | 39'-9" | 690 | 5'-11" | 16 | 14 | 40 | 0.396 | 89.6 | 0.5 | 56 | 16.3 | 3,639 |
| 5'-0" | 3'-0" | 8" | 7" | 30' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 6'-0" | 778 | 3'-6" | 2'-6" | 194 | #4 | 5" | 4'-9" | 616 | 2'-6" | 2'-3" | 56 | 3'-0" | 112 | 4 | 18" | 39'-9" | 106 | 26 | 39'-9" | 690 | 5'-11" | 16 | 14 | 40 | 0.434 | 87.5 | 0.5 | 56 | 17.9 | 3,555 |
| 5'-0" | 4'-0" | 7" | 7" | 26' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 6'-11" | 896 | 4'-5" | 2'-6" | 194 | #4 | 5" | 4'-8" | 605 | 2'-6" | 2'-2" | 56 | 4'-0" | 150 | 8 | 7" | 39'-9" | 212 | 26 | 39'-9" | 690 | 5'-11" | 16 | 14 | 40 | 0.439 | 93.8 | 0.5 | 56 | 18.1 | 3,806 |
| 5'-0" | 4'-0" | 8" | 7" | 30' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 7'-0" | 907 | 4'-6" | 2'-6" | 194 | #4 | 5" | 4'-9" | 616 | 2'-6" | 2'-3" | 56 | 4'-0" | 150 | 4 | 18" | 39'-9" | 106 | 26 | 39'-9" | 690 | 5'-11" | 16 | 14 | 40 | 0.477 | 91.7 | 0.5 | 56 | 19.6 | 3,722 |
| 5'-0" | 5'-0" | 7" | 7" | 26' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 7'-11" | 1,026 | 5'-5" | 2'-6" | 194 | #4 | 5" | 4'-8" | 605 | 2'-6" | 2'-2" | 56 | 5'-0" | 187 | 8 | 7" | 39'-9" | 212 | 30 | 39'-9" | 797 | 5'-11" | 16 | 14 | 40 | 0.483 | 100.6 | 0.5 | 56 | 19.8 | 4,080 |
| 5'-0" | 5'-0" | 8" | 7" | 30' | 194 | #5 | 5" | 5'-11" | 1,197 | 194 | #4 | 5" | 8'-0" | 1,037 | 5'-6" | 2'-6" | 194 | #4 | 5" | 4'-9" | 616 | 2'-6" | 2'-3" | 56 | 5'-0" | 187 | 4 | 18" | 39'-9" | 106 | 30 | 39'-9" | 797 | 5'-11" | 16 | 14 | 40 | 0.521 | 98.5 | 0.5 | 56 | 21.3 | 3,996 |
| 6'-0" | 3'-0" | 7" | 7" | 20' | 194 | #5 | 5" | 6'-11" | 1,400 | 162 | #5 | 6" | 6'-6" | 1,098 | 3'-5" | 3'-1" | 162 | #5 | 6" | 5'-8" | 957 | 3'-1" | 2'-7" | 56 | 3'-0" | 112 | 10 | 7" | 39'-9" | 266 | 29 | 39'-9" | 770 | 6'-11" | 18 | 16 | 45 | 0.439 | 115.1 | 0.5 | 63 | 18.1 | 4,666 |
| 6'-0" | 3'-0" | 8" | 7" | 26' | 162 | #6 | 6" | 6'-11" | 1,683 | 162 | #5 | 6" | 6'-7" | 1,112 | 3'-6" | 3'-1" | 162 | #5 | 6" | 5'-9" | 972 | 3'-1" | 2'-8" | 56 | 3'-0" | 112 | 5 | 18" | 39'-9" | 133 | 29 | 39'-9" | 770 | 6'-11" | 18 | 16 | 45 | 0.484 | 119.6 | 0.5 | 63 | 19.9 | 4,845 |
| 6'-0" | 3'-0" | 9" | 8" | 30' | 162 | #6 | 6" | 7'-1" | 1,724 | 162 | #5 | 6" | 6'-8" | 1,126 | 3'-7" | 3'-1" | 162 | #5 | 6" | 5'-10" | 986 | 3'-1" | 2'-9" | 56 | 3'-0" | 112 | 5 | 18" | 39'-9" | 133 | 29 | 39'-9" | 770 | 7'-1" | 19 | 18 | 51 | 0.556 | 121.3 | 0.5 | 70 | 22.7 | 4,921 |
| 6'-0" | 4'-0" | 7" | 7" | 20' | 194 | #5 | 5" | 6'-11" | 1,400 | 194 | #4 | 5" | 7'-3" | 940 | 4'-5" | 2'-10" | 194 | #4 | 5" | 5'-0" | 648 | 2'-10" | 2'-2" | 56 | 4'-0" | 150 | 10 | 7" | 39'-9" | 266 | 29 | 39'-9" | 770 | 6'-11" | 18 | 16 | 45 | 0.483 | 104.4 | 0.5 | 63 | 19.8 | 4,237 |
| 6'-0" | 4'-0" | 8" | 7" | 26' | 194 | #6 | 5" | 6'-11" | 2,015 | 162 | #5 | 6" | 7'-7" | 1,281 | 4'-6" | 3'-1" | 162 | #5 | 6" | 5'-9" | 972 | 3'-1" | 2'-8" | 56 | 4'-0" | 150 | 5 | 18" | 39'-9" | 133 | 29 | 39'-9" | 770 | 6'-11" | 18 | 16 | 45 | 0.527 | 133.0 | 0.5 | 63 | 21.6 | 5,384 |
| 6'-0" | 4'-0" | 9" | 8" | 30' | 162 | #6 | 6" | 7'-1" | 1,724 | 162 | #5 | 6" | 7'-8" | 1,295 | 4'-7" | 3'-1" | 162 | #5 | 6" | 5'-10" | 986 | 3'-1" | 2'-9" | 56 | 4'-0" | 150 | 5 | 18" | 39'-9" | 133 | 29 | 39'-9" | 770 | 7'-1" | 19 | 18 | 51 | 0.605 | 126.5 | 0.5 | 70 | 24.7 | 5,128 |
| 6'-0" | 5'-0" | 7" | 7" | 20' | 194 | #5 | 5" | 6'-11" | 1,400 | 194 | #4 | 5" | 8'-3" | 1,069 | 5'-5" | 2'-10" | 194 | #4 | 5" | 5'-0" | 648 | 2'-10" | 2'-2" | 56 | 5'-0" | 187 | 10 | 7" | 39'-9" | 266 | 33 | 39'-9" | 876 | 6'-11" | 18 | 16 | 45 | 0.526 | 111.2 | 0.5 | 63 | 21.5 | 4,509 |
| 6'-0" | 5'-0" | 8" | 7" | 26' | 194 | #6 | 5" | 6'-11" | 2,015 | 162 | #5 | 6" | 8'-7" | 1,450 | 5'-6" | 3'-1" | 162 | #5 | 6" | 5'-9" | 972 | 3'-1" | 2'-8" | 56 | 5'-0" | 187 | 5 | 18" | 39'-9" | 133 | 33 | 39'-9" | 876 | 6'-11" | 18 | 16 | 45 | 0.570 | 140.8 | 0.5 | 63 | 23.3 | 5,696 |
| 6'-0" | 5'-0" | 9" | 8" | 30' | 194 | #6 | 5" | 7'-1" | 2,064 | 162 | #5 | 6" | 8'-8" | 1,464 | 5'-7" | 3'-1" | 162 | #5 | 6" | 5'-10" | 986 | 3'-1" | 2'-9" | 56 | 5'-0" | 187 | 5 | 18" | 39'-9" | 133 | 33 | 39'-9" | 876 | 7'-1" | 19 | 18 | 51 | 0.654 | 142.8 | 0.5 | 70 | 26.7 | 5,780 |
| 6'-0" | 6'-0" | 7" | 7" | 20' | 194 | #5 | 5" | 6'-11" | 1,400 | 194 | #4 | 5" | 9'-3" | 1,199 | 6'-5" | 2'-10" | 194 | #4 | 5" | 5'-0" | 648 | 2'-10" | 2'-2" | 56 | 6'-0" | 224 | 10 | 7" | 39'-9" | 266 | 37 | 39'-9" | 982 | 6'-11" | 18 | 16 | 45 | 0.569 | 118.0 | 0.5 | 63 | 23.3 | 4,782 |
| 6'-0" | 6'-0" | 8" | 7" | 26' | 194 | #6 | 5" | 6'-11" | 2,015 | 162 | #5 | 6" | 9'-7" | 1,619 | 6'-6" | 3'-1" | 162 | #5 | 6" | 5'-9" | 972 | 3'-1" | 2'-8" | 56 | 6'-0" | 224 | 5 | 18" | 39'-9" | 133 | 37 | 39'-9" | 982 | 6'-11" | 18 | 16 | 45 | 0.613 | 148.6 | 0.5 | 63 | 25.0 | 6,008 |
| 6'-0" | 6'-0" | 9" | 8" | 30' | 194 | #6 | 5" | 7'-1" | 2,064 | 162 | #5 | 6" | 9'-8" | 1,633 | 6'-7" | 3'-1" | 162 | #5 | 6" | 5'-10" | 986 | 3'-1" | 2'-9" | 56 | 6'-0" | 224 | 5 | 18" | 39'-9" | 133 | 37 | 39'-9" | 982 | 7'-1" | 19 | 18 | 51 | 0.704 | 150.6 | 0.5 | 70 | 28.7 | 6,092 |

⑤ For each box size, minimum fill height shown shall be used for all culverts with less than 2'-0" of fill.

Deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064 may be used to replace conventional reinforcement shown at the Contractor's option. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes.

Example Conversion: Replacement of No. 6 Gr 60 at 6" Spacing with WWR.
WWR required = (0.44 sq in/ 0.5') x (60 ksi/70 ksi) = 0.754 sq in/ft.
If D30.6 wire is used to meet the 0.754 sq in/ft requirement in this example, the required spacing = (0.306 sq in/ 0.754 sq in/ft) x 12 in/ft = 4.87" Max spacing.
Required lap length for the provided D30.6 wire is 2'-2" (Lap required for uncoated No. 5 bars, as shown in Item 440).

HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

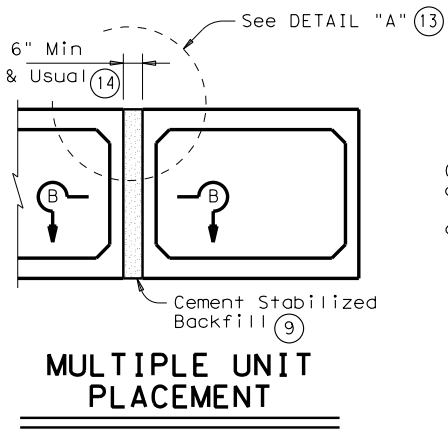
SINGLE BOX CULVERTS CAST-IN-PLACE 0' TO 30' FILL

SCC-5 & 6

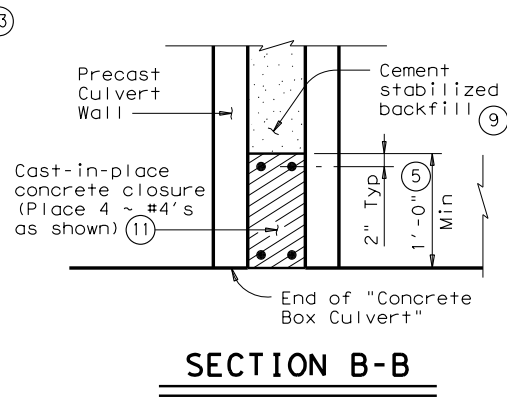
| | | | | |
|----------------------|---------|----------|---------------|---------|
| FILE: scc56ste.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 10-12: Added WWR | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 216 | |

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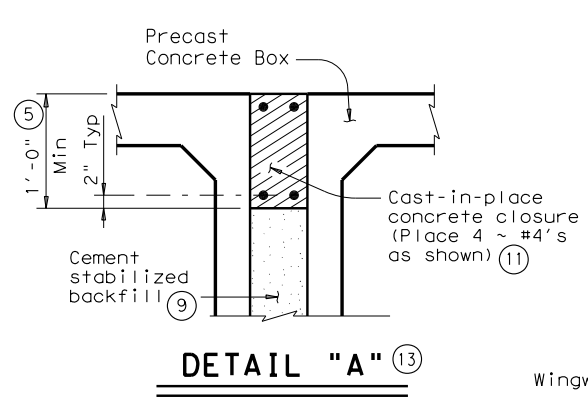
DATE: FILE:



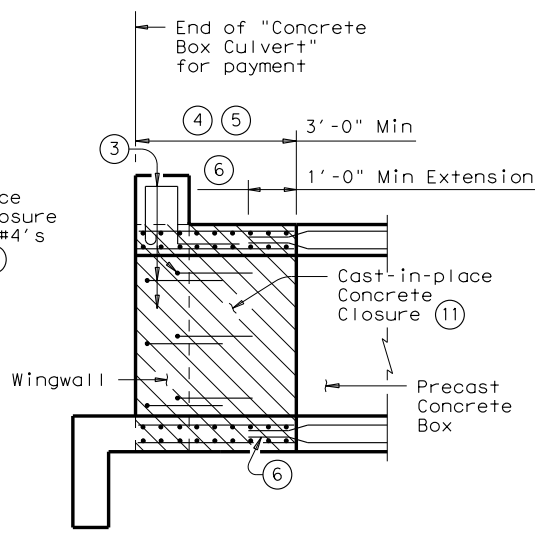
MULTIPLE UNIT PLACEMENT



SECTION B-B

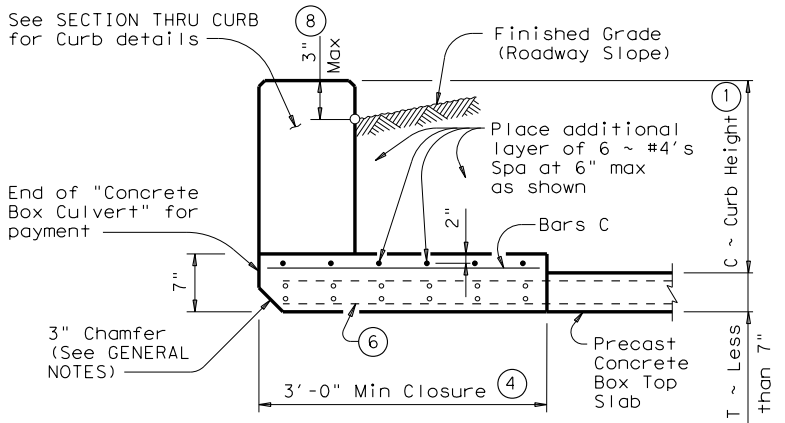


DETAIL "A"

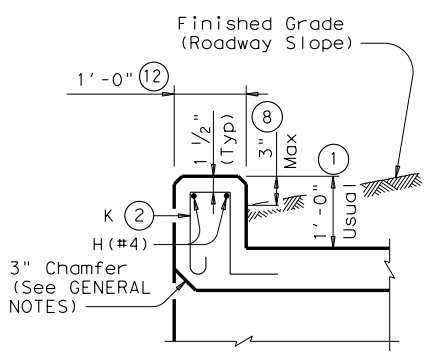


WINGWALL CONNECTION

(Also applies to Safety End Treatment)

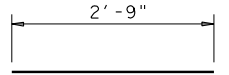


SECTION THRU TOP SLABS LESS THAN 7"

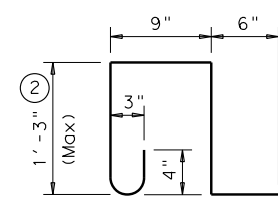


SECTION THRU CURB

| (10) QUANTITIES PER FOOT OF CURB | |
|----------------------------------|----------|
| Reinforcing Steel | 4.18 Lb |
| Concrete | 0.037 CY |



BARS C ~ #4
(Spa = 1'-0" Max)

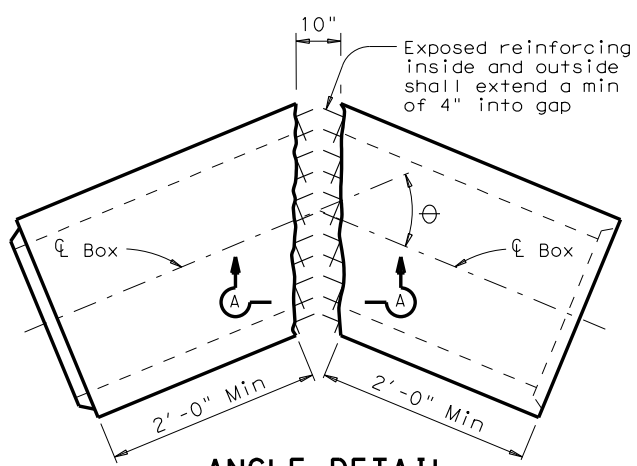


BARS K ~ #4
(Spa = 1'-0" Max)
(Length = 4'-3")

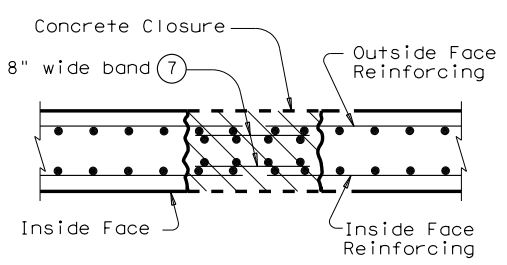
- 1 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 traffic rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- 2 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- 3 Curb, Wingwall or Safety End Treatment reinforcing shall extend into concrete closure. Any reinforcing that does not fit into the closure shall be bent or trimmed as necessary.
- 4 Cast-in-place concrete closure shall be 3'-0" min. Boxes shall be cast short or broken back in the field. All reinforcing in the closure shall be the same size and spacing as in the precast box section. Except where shown otherwise, the cast-in-place closure shall be flush with the inside and outside faces of the precast box section.
- 5 For multiple unit placements the length of the closure for the interior walls may be adjusted as necessary. The length of the top slab, bottom slab, and exterior wall closure shall not be less than 3'-0". See Section B-B detail when interior walls are cast full length.
- 6 Precast box reinforcing shall extend a minimum of 1'-0" into concrete closure (Typ).
- 7 Bands of reinforcing matching the inside and outside face reinforcing shall be placed in the gaps of the top and bottom slabs. A band matching the outside face reinforcing of the wall shall be placed in the gaps of the walls (placed in the outside face only). The bands shall be tack welded to the exposed reinforcing at each point of contact.
- 8 For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, curbs shall project no more than 3" above finished grade.
 - For structures with bridge rail, curbs shall be flush with finished grade.
 Curb heights shall be reduced, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- 9 Cement Stabilized Backfill between boxes is considered part of the Box Culvert for payment.
- 10 All curb concrete and reinforcing is considered part of the Box Culvert for payment.
- 11 Any additional concrete and reinforcing required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
- 12 1'-0" typical. 2'-0" when RAC standard is referred to elsewhere in the plans.
- 13 For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in DETAIL "A".
- 14 This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

GENERAL NOTES:

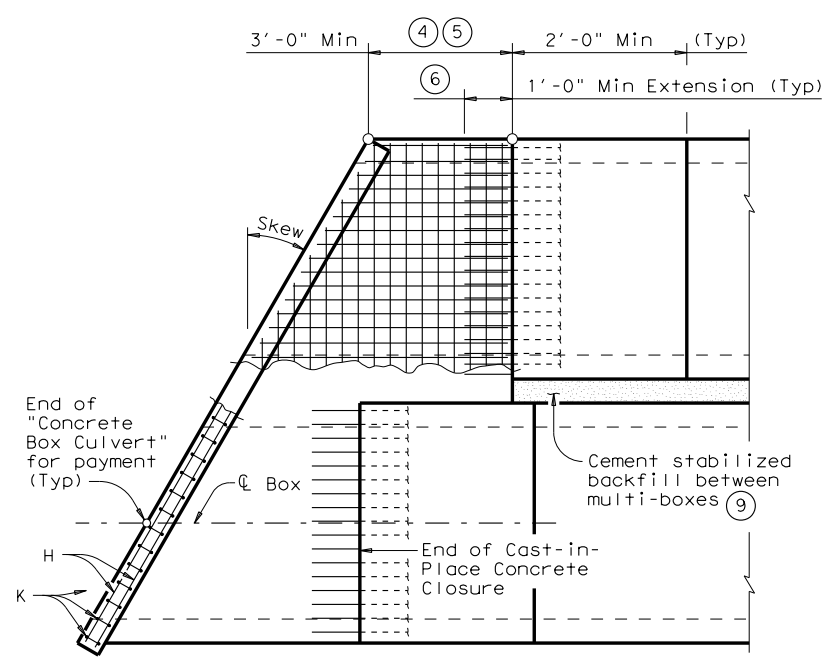
Designed according to AASHTO LRFD Specifications.
 All closure concrete shall be Class "C" with a minimum compressive strength of 3600 psi and shall be placed according to the Item, "Concrete Substructures".
 Any additional concrete required for the closures shall be considered as subsidiary to the Concrete Box Culvert.
 Refer to the Single Box Culverts Precast standard for details not shown.
 The bottom edge of the top slab closure shall be chamfered 3 inches at the entrance.



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement)

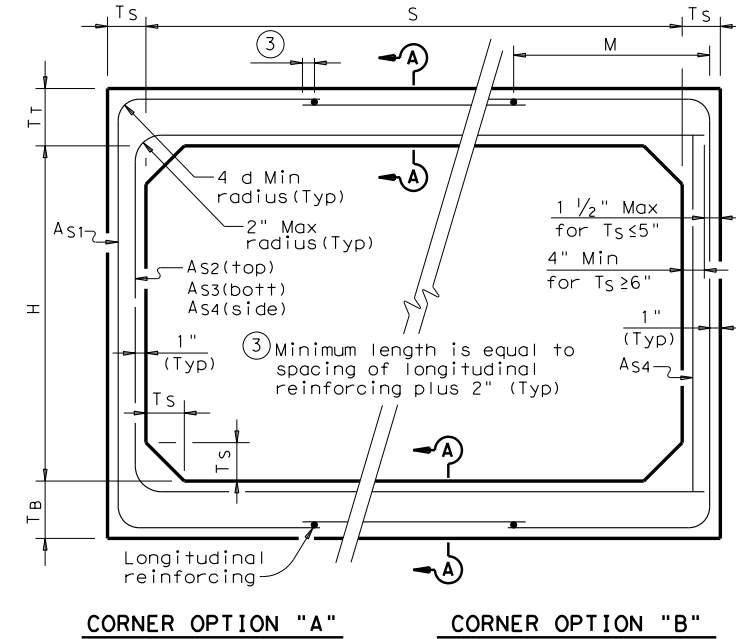
HL93 LOADING

| | | | |
|---|-----------|--------------------------|---------------|
| | | Bridge Division Standard | |
| BOX CULVERTS PRECAST MISCELLANEOUS DETAILS | | | |
| SCP-MD | | | |
| FILE: scpmdsts.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT |
| ©TxDOT February 2010 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 217 | |

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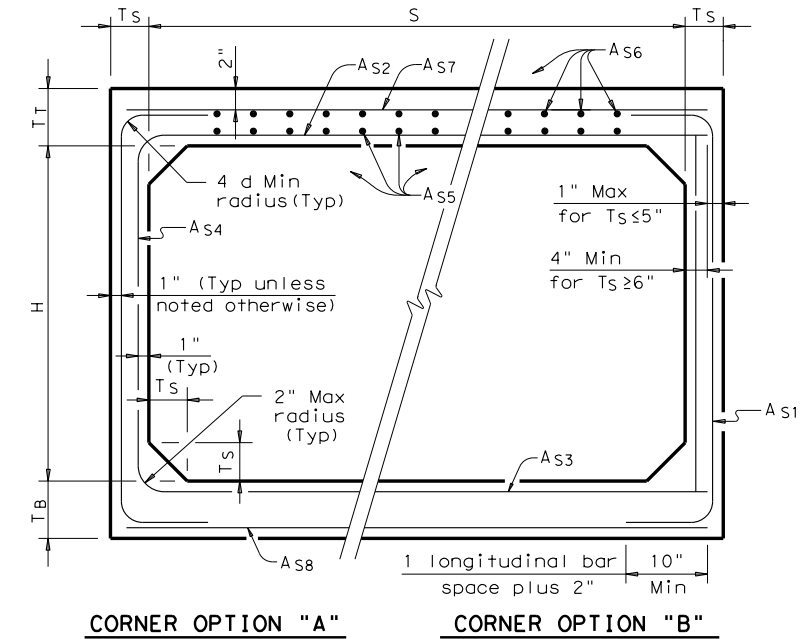
BOX DATA

| SECTION DIMENSIONS | | | | | Fill Height (ft) | M (Min) (in) | REINFORCING (in ² /ft) ② | | | | | | | | Lift Weight (Tons) ① |
|--------------------|--------|---------------------|---------------------|---------------------|------------------|--------------|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| S (ft) | H (ft) | T _T (in) | T _B (in) | T _S (in) | | | A _{S1} | A _{S2} | A _{S3} | A _{S4} | A _{S5} | A _{S6} | A _{S7} | A _{S8} | |
| 4 | 2 | 7.5 | 6 | 5 | <2 | - | 0.18 | 0.27 | 0.15 | 0.12 | 0.18 | 0.18 | 0.18 | 0.14 | 4.5 |
| 4 | 2 | 5 | 5 | 5 | 2<3 | 38 | 0.18 | 0.19 | 0.17 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 3-5 | 38 | 0.13 | 0.13 | 0.13 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 10 | 38 | 0.12 | 0.12 | 0.12 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 15 | 38 | 0.14 | 0.16 | 0.16 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 20 | 38 | 0.18 | 0.20 | 0.21 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 25 | 38 | 0.23 | 0.25 | 0.25 | 0.12 | - | - | - | - | 3.6 |
| 4 | 2 | 5 | 5 | 5 | 30 | 38 | 0.28 | 0.30 | 0.30 | 0.12 | - | - | - | - | 3.6 |
| 4 | 3 | 7.5 | 6 | 5 | <2 | - | 0.18 | 0.31 | 0.18 | 0.12 | 0.18 | 0.18 | 0.18 | 0.14 | 5.0 |
| 4 | 3 | 5 | 5 | 5 | 2<3 | 38 | 0.15 | 0.23 | 0.20 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 3-5 | 38 | 0.12 | 0.16 | 0.16 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 10 | 38 | 0.12 | 0.14 | 0.14 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 15 | 38 | 0.12 | 0.18 | 0.18 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 20 | 38 | 0.14 | 0.23 | 0.24 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 25 | 38 | 0.17 | 0.29 | 0.29 | 0.12 | - | - | - | - | 4.1 |
| 4 | 3 | 5 | 5 | 5 | 30 | 38 | 0.21 | 0.35 | 0.35 | 0.12 | - | - | - | - | 4.1 |
| 4 | 4 | 7.5 | 6 | 5 | <2 | - | 0.18 | 0.33 | 0.20 | 0.12 | 0.18 | 0.18 | 0.18 | 0.14 | 5.5 |
| 4 | 4 | 5 | 5 | 5 | 2<3 | 38 | 0.12 | 0.26 | 0.23 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 3-5 | 38 | 0.12 | 0.18 | 0.18 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 10 | 38 | 0.12 | 0.15 | 0.15 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 15 | 38 | 0.12 | 0.19 | 0.20 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 20 | 38 | 0.12 | 0.25 | 0.25 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 25 | 38 | 0.14 | 0.31 | 0.31 | 0.12 | - | - | - | - | 4.6 |
| 4 | 4 | 5 | 5 | 5 | 30 | 38 | 0.17 | 0.37 | 0.37 | 0.12 | - | - | - | - | 4.6 |



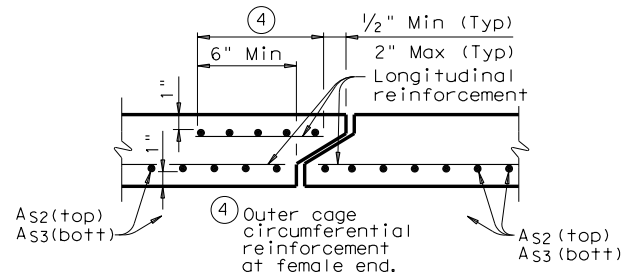
CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT



SECTION A-A

(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.
 See SCP-MD standard sheet for miscellaneous details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For Box Length = 8'-0"
 ② A_{s1} thru A_{s4}, A_{s7} and A_{s8} are minimum required areas of reinforcement per linear foot of box length. A_{s6} and A_{s5} are minimum required areas of reinforcement per linear foot of box width.

HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

**SINGLE BOX CULVERTS
 PRECAST
 4'-0" SPAN**

SCP-4

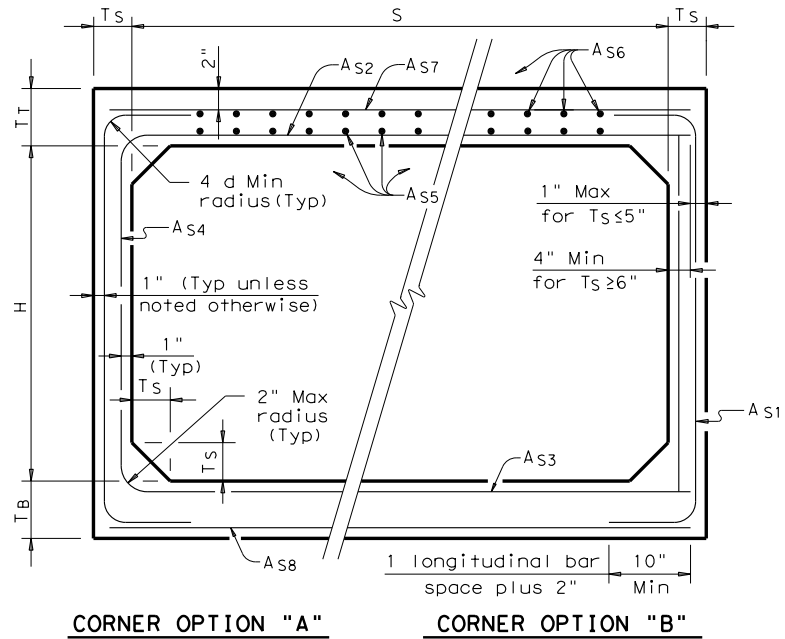
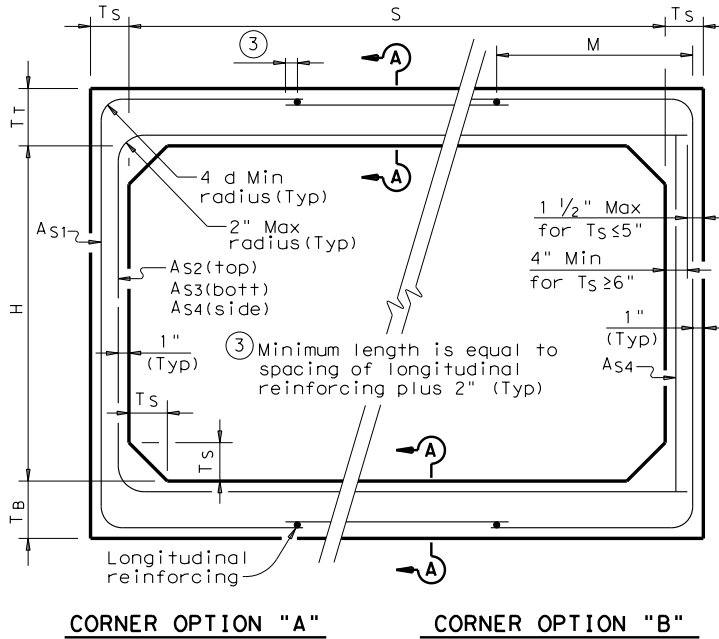
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| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
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| DIST | COUNTY | | SHEET NO. | |
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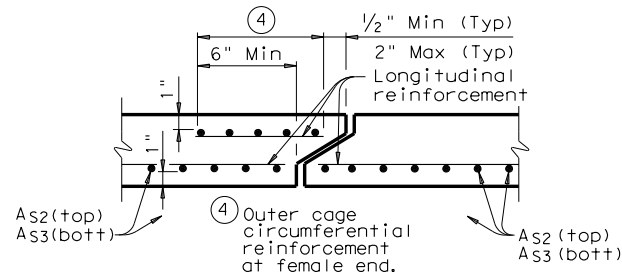
BOX DATA

| SECTION DIMENSIONS | | | | | Fill Height (ft) | M (Min) (in) | REINFORCING (in ² /ft) ② | | | | | | | | Lift Weight (Tons) ① |
|--------------------|--------|---------------------|---------------------|---------------------|------------------|--------------|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------|
| S (ft) | H (ft) | T _T (in) | T _B (in) | T _S (in) | | | A _{S1} | A _{S2} | A _{S3} | A _{S4} | A _{S5} | A _{S6} | A _{S7} | A _{S8} | |
| 5 | 3 | 8 | 7 | 6 | <2 | - | 0.19 | 0.31 | 0.21 | 0.14 | 0.19 | 0.19 | 0.19 | 0.17 | 6.6 |
| 5 | 3 | 6 | 6 | 6 | 2<3 | 45 | 0.18 | 0.24 | 0.19 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 3-5 | 36 | 0.14 | 0.17 | 0.16 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 10 | 36 | 0.14 | 0.16 | 0.17 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 15 | 35 | 0.16 | 0.21 | 0.22 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 20 | 35 | 0.21 | 0.27 | 0.28 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 25 | 35 | 0.26 | 0.34 | 0.34 | 0.14 | - | - | - | - | 5.7 |
| 5 | 3 | 6 | 6 | 6 | 30 | 35 | 0.31 | 0.41 | 0.41 | 0.14 | - | - | - | - | 5.7 |
| 5 | 4 | 8 | 7 | 6 | <2 | - | 0.19 | 0.33 | 0.24 | 0.14 | 0.19 | 0.19 | 0.19 | 0.17 | 7.2 |
| 5 | 4 | 6 | 6 | 6 | 2<3 | 45 | 0.16 | 0.27 | 0.22 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 3-5 | 45 | 0.14 | 0.19 | 0.18 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 10 | 36 | 0.14 | 0.18 | 0.18 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 15 | 35 | 0.14 | 0.23 | 0.24 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 20 | 35 | 0.17 | 0.30 | 0.31 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 25 | 35 | 0.21 | 0.37 | 0.38 | 0.14 | - | - | - | - | 6.3 |
| 5 | 4 | 6 | 6 | 6 | 30 | 35 | 0.25 | 0.44 | 0.45 | 0.14 | - | - | - | - | 6.3 |
| 5 | 5 | 8 | 7 | 6 | <2 | - | 0.19 | 0.35 | 0.26 | 0.14 | 0.19 | 0.19 | 0.19 | 0.17 | 7.8 |
| 5 | 5 | 6 | 6 | 6 | 2<3 | 45 | 0.14 | 0.29 | 0.24 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 3-5 | 45 | 0.14 | 0.21 | 0.20 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 10 | 45 | 0.14 | 0.19 | 0.20 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 15 | 36 | 0.14 | 0.24 | 0.25 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 20 | 35 | 0.15 | 0.31 | 0.32 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 25 | 35 | 0.18 | 0.38 | 0.39 | 0.14 | - | - | - | - | 6.9 |
| 5 | 5 | 6 | 6 | 6 | 30 | 35 | 0.21 | 0.46 | 0.47 | 0.14 | - | - | - | - | 6.9 |
| 5 | 2 | 8 | 7 | 6 | <2 | - | 0.20 | 0.31 | 0.20 | 0.14 | 0.22 | 0.19 | 0.19 | 0.17 | 6.0 |
| 5 | 2 | 6 | 6 | 6 | 30 | 44 | 0.39 | 0.33 | 0.34 | 0.14 | - | - | - | - | 5.1 |



FILL HEIGHT 2 FT AND GREATER

FILL HEIGHT LESS THAN 2 FT



**SECTION A-A
(TOP AND BOTTOM SLAB JOINT REINFORCEMENT)**

GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 All concrete shall be Class "H" Concrete with a minimum compressive strength of 5,000 psi.
 See SCP-MD standard sheet for miscellaneous details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structural Members (Fabrication)".

① For Box Length = 8'-0"
 ② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS6 and AS5 are minimum required areas of reinforcement per linear foot of box width.
 ⑤ These designs were created by TxDOT and are not shown in the ASTM Specifications.

HL93 LOADING

Texas Department of Transportation
 Bridge Division Standard

**SINGLE BOX CULVERTS
 PRECAST
 5'-0" SPAN**

SCP-5

| | | | | |
|----------------------|----------|---------|---------------|---------|
| FILE: scp05sts.dgn | DN: GAF | CK: LMW | DW: BWH/TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
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| DIST | COUNTY | | SHEET NO. | |
| DAL | ROCKWALL | | 219 | |

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DATE: FILE:

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

| Maximum Wingwall Height Hw | Dimensions | | | | Variable Reinforcing | | | | Estimated Quantities per ft of wing length (2-Wings) | |
|----------------------------|------------|-------|-------|-------|----------------------|-------|---------|-------|--|--------------|
| | W | X | Y | Z | Bars J1 | | Bars J2 | | Reinf (Lb/Ft) | Conc (CY/Ft) |
| 2'-6" | 2'-5" | 1'-0" | 9" | 7" | #4 | 1'-0" | #4 | 1'-0" | 33.73 | 0.248 |
| 3'-0" | 2'-5" | 1'-0" | 9" | 7" | #4 | 1'-0" | #4 | 1'-0" | 37.07 | 0.261 |
| 3'-6" | 2'-5" | 1'-0" | 9" | 7" | #4 | 1'-0" | #4 | 1'-0" | 37.74 | 0.273 |
| 4'-0" | 2'-5" | 1'-0" | 9" | 7" | #4 | 1'-0" | #4 | 1'-0" | 38.41 | 0.285 |
| 4'-6" | 3'-2" | 1'-6" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 41.75 | 0.330 |
| 5'-0" | 3'-2" | 1'-6" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 45.09 | 0.343 |
| 5'-6" | 3'-2" | 1'-6" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 45.75 | 0.355 |
| 6'-0" | 3'-2" | 1'-6" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 46.42 | 0.367 |
| 7'-0" | 3'-8" | 1'-9" | 1'-3" | 7" | #4 | 1'-0" | #4 | 1'-0" | 52.77 | 0.414 |
| 8'-0" | 4'-2" | 2'-0" | 1'-6" | 8" | #5 | 1'-0" | #4 | 1'-0" | 60.19 | 0.486 |
| 9'-0" | 4'-8" | 2'-3" | 1'-9" | 8" | #4 | 6" | #4 | 6" | 81.49 | 0.535 |
| 10'-0" | 5'-2" | 2'-6" | 2'-0" | 8" | #5 | 6" | #4 | 6" | 97.25 | 0.584 |
| 11'-0" | 5'-8" | 2'-9" | 2'-3" | 8" | #6 | 6" | #5 | 6" | 133.65 | 0.634 |
| 12'-0" | 6'-2" | 3'-0" | 2'-6" | 9" | #7 | 6" | #5 | 6" | 162.29 | 0.721 |
| 13'-0" | 6'-8" | 3'-3" | 2'-9" | 11" | #7 | 6" | #5 | 6" | 178.80 | 0.856 |
| 14'-0" | 7'-2" | 3'-6" | 3'-0" | 1'-0" | 8" | 6" | #5 | 6" | 216.78 | 0.959 |
| 15'-0" | 7'-8" | 4'-0" | 3'-0" | 1'-1" | #9 | 6" | #6 | 6" | 283.06 | 1.068 |
| 16'-0" | 8'-2" | 4'-6" | 3'-0" | 1'-3" | #9 | 6" | #6 | 6" | 297.02 | 1.234 |

TABLE OF WINGWALL REINFORCING
(2-Wings)

| Bar | Size | No. | Spa |
|-----|------|-----|-------|
| D | #5 | ~ | 1'-0" |
| E | #4 | ~ | 1'-0" |
| F | #4 | ~ | 1'-0" |
| G | #6 | 4 | ~ |
| M | #4 | 4 | ~ |
| P | #4 | ~ | 1'-0" |
| R | #5 | 6 | ~ |
| V | #4 | ~ | 1'-0" |

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

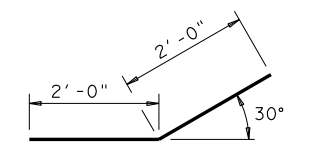
| Bar | Size | No. | Spa |
|---------------|------|-----|-------|
| L | #4 | ~ | 1'-6" |
| Q | #4 | 1 | ~ |
| Reinf (Lb/Ft) | | | 2.45 |
| Conc (CY/Ft) | | | 0.037 |

WING DIMENSION CALCULATIONS:

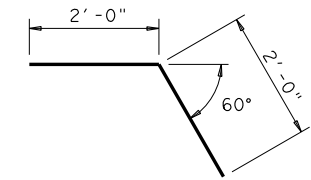
Formulas: (All values are in Feet)
 $H_w = H + T + C - 0.250'$
 $A = (H_w - 0.333')$ (SL)
 $B = (A) \text{ Tangent } (30^\circ)$
 $L_w = (A) \div \text{Cosine } (30^\circ)$
 For Cast-in-place culverts:
 $L_{tw} = (N) (S) + (N+1) (U)$
 For Precast culverts:
 $L_{tw} = (N) (2U+S) + (N-1) (0.500')$
 Total Wingwall Area (Two Wings ~ S.F.) = $(H_w + 0.333') (L_w)$

H_w = Height of Wingwall
 $SL:1$ = Side Slope Ratio (Horizontal:1 Vertical)
 L_w = Length of Wingwall
 L_{tw} = Culvert Toewall Length
 N = Number of Culvert Spans

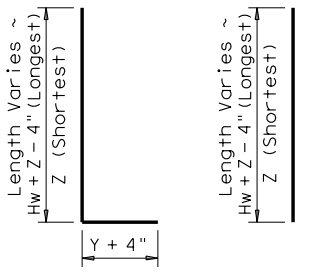
See applicable box culvert standard for H, S, T, and U values.



BARS D

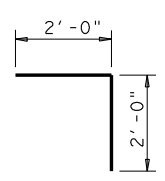


BARS R

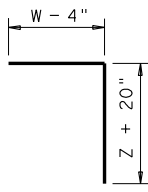


BARS J1

BARS V



BARS L

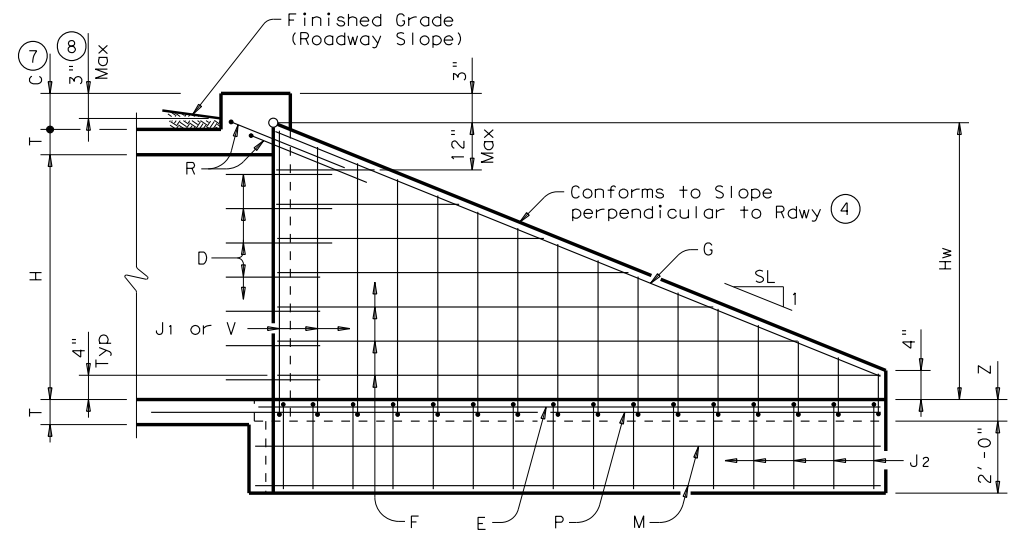


BARS J2

- Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
- Adjust to fit as necessary to maintain 1/4" clear cover and 4" minimum between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by Lw.
- Recommended values of Slope are: 2:1, 3:1, 4:1, & 6:1.
- When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Payment for riprap shall be as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toewall along all edges adjacent to natural ground; the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
- At Contractor's option, Culvert Toewall may be ended flush with Wingwall Toewall. Adjust reinforcing from that shown as necessary.
- 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- For vehicle safety, curb heights and wall heights shall be reduced, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

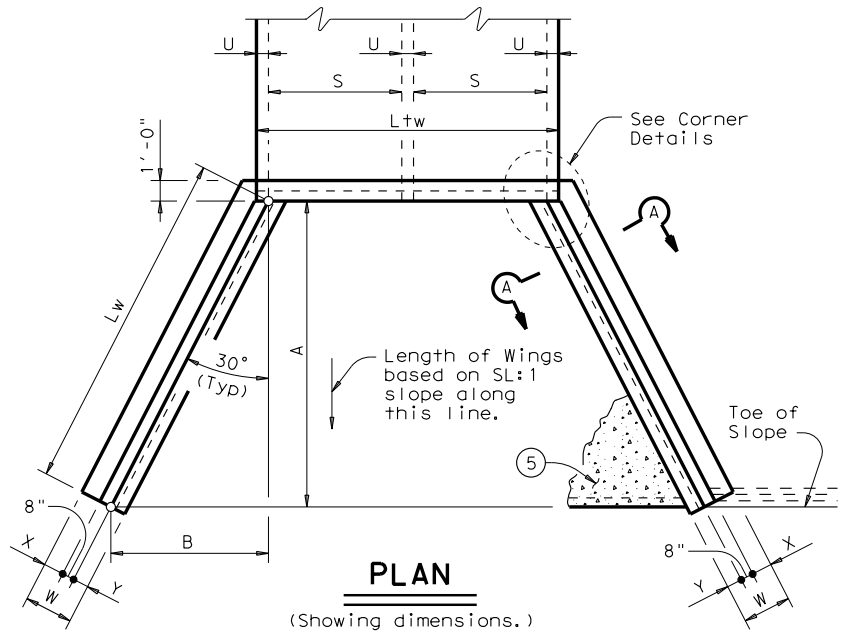
GENERAL NOTES:

Designed according to AASHTO LRFD Specifications. All reinforcing steel shall be Grade 60. Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi. All reinforcing bars shall be adjusted to provide a minimum of 1/4" clear cover. When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer. See BCS sheet for additional dimensions and information. The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.



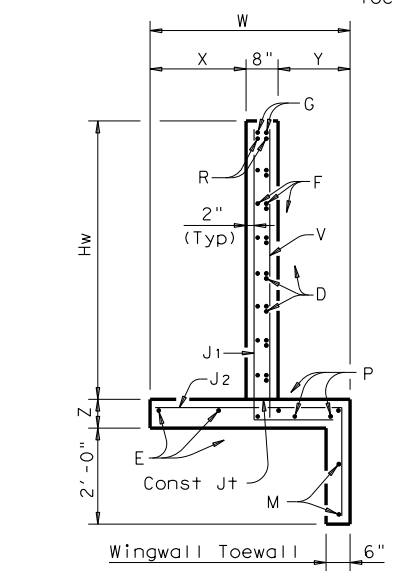
INSIDE ELEVATION

(Showing reinforcing. Culvert and Culvert Toewall reinforcing not shown for clarity.)

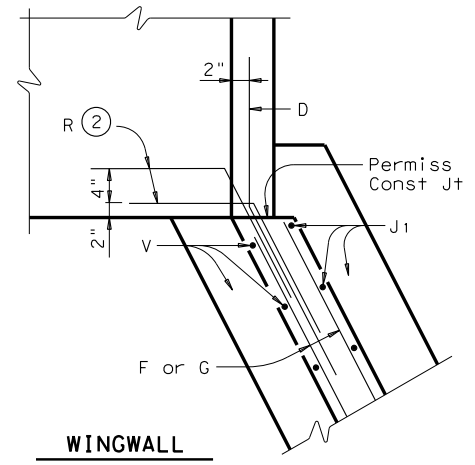


PLAN

(Showing dimensions.)

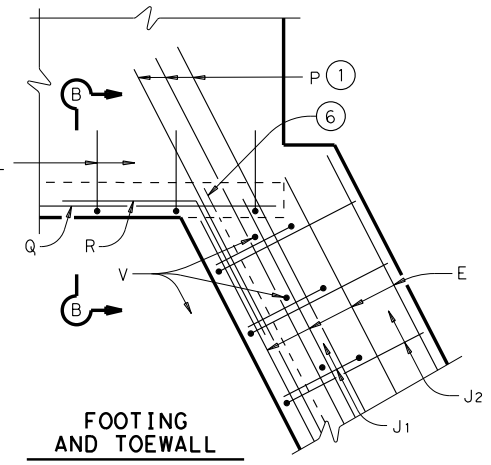


SECTION A-A

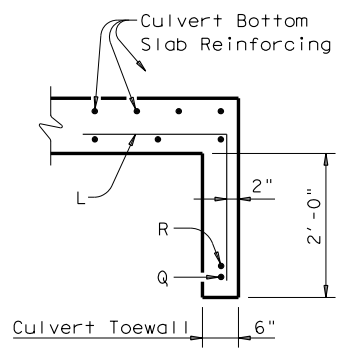


CORNER DETAILS

(Culvert and Culvert Toewall reinforcing not shown for clarity.)



FOOTING AND TOEWALL



SECTION B-B

Texas Department of Transportation Bridge Division Standard

CONCRETE WINGWALLS WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

| | | | | |
|---------------------------------------|---------|----------|-----------|---------|
| FILE: fw-0std.dgn | DN: GAF | CK: CAT | DW: TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 11-10: Add note for synthetic fibers. | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 220 | |

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DATE: FILE:

TABLE OF DIMENSIONS & REINFORCING STEEL
(Wings for One Structure End)

| Maximum Wingwall Height Hw | Dimensions | | | | Variable Reinforcing | | | | Estimated Quantities per ft of wing (2-Wings) | | Estimated Quantities per ft of Toewall (1-Toewall) | |
|----------------------------|------------|--------|--------|-------|----------------------|---------|---------|---------|---|--------------|--|--------------|
| | W | X | Y | Z | Bars J1 | Bars J2 | Bars J2 | Bars J2 | Reinf (Lb/Ft) | Conc (CY/Ft) | Reinf (Lb/Ft) | Conc (CY/Ft) |
| 2'-6" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 48.64 | 0.406 | 6.85 | 0.071 |
| 2'-9" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 49.31 | 0.424 | 6.85 | 0.071 |
| 3'-0" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 49.98 | 0.444 | 6.85 | 0.071 |
| 3'-3" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 53.32 | 0.462 | 6.85 | 0.071 |
| 3'-6" | 2'-10" | 10" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 53.98 | 0.480 | 6.85 | 0.071 |
| 4'-0" | 3'-2" | 1'-2" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 55.77 | 0.532 | 6.85 | 0.071 |
| 4'-6" | 3'-2" | 1'-2" | 1'-0" | 7" | #4 | 1'-0" | #4 | 1'-0" | 59.77 | 0.568 | 6.85 | 0.071 |
| 5'-0" | 3'-9" | 1'-7" | 1'-2" | 7" | #4 | 1'-0" | #4 | 1'-0" | 63.45 | 0.632 | 6.96 | 0.075 |
| 5'-6" | 3'-9" | 1'-7" | 1'-2" | 7" | #4 | 1'-0" | #4 | 1'-0" | 67.46 | 0.668 | 6.96 | 0.075 |
| 6'-0" | 4'-4" | 2'-0" | 1'-4" | 7" | #5 | 1'-0" | #5 | 1'-0" | 80.67 | 0.730 | 7.07 | 0.078 |
| 6'-6" | 4'-4" | 2'-0" | 1'-4" | 7" | #5 | 1'-0" | #5 | 1'-0" | 85.05 | 0.768 | 7.07 | 0.078 |
| 7'-0" | 5'-0" | 2'-3" | 1'-9" | 8" | #5 | 1'-0" | #5 | 1'-0" | 92.15 | 0.864 | 8.07 | 0.093 |
| 7'-6" | 5'-0" | 2'-3" | 1'-9" | 8" | #5 | 1'-0" | #5 | 1'-0" | 96.54 | 0.902 | 8.07 | 0.093 |
| 8'-0" | 5'-6" | 2'-8" | 1'-10" | 8" | #5 | 6" | #5 | 6" | 139.04 | 0.962 | 8.13 | 0.095 |
| 8'-6" | 5'-6" | 2'-8" | 1'-10" | 8" | #5 | 6" | #5 | 6" | 144.47 | 1.000 | 8.13 | 0.095 |
| 9'-6" | 6'-0" | 2'-10" | 2'-2" | 9" | #5 | 6" | #5 | 6" | 156.93 | 1.136 | 8.41 | 0.110 |
| 10'-6" | 6'-5" | 3'-0" | 2'-5" | 9" | #6 | 6" | #5 | 6" | 196.27 | 1.234 | 8.57 | 0.117 |
| 11'-6" | 7'-2" | 3'-6" | 2'-8" | 11" | #6 | 6" | #6 | 6" | 230.13 | 1.438 | 9.52 | 0.140 |
| 12'-6" | 7'-8" | 3'-8" | 2'-11" | 1'-0" | #7 | 6" | #6 | 6" | 283.41 | 1.592 | 9.74 | 0.157 |
| 13'-6" | 8'-2" | 4'-0" | 3'-2" | 1'-2" | #8 | 6" | #6 | 6" | 348.72 | 1.804 | 10.02 | 0.186 |
| 14'-6" | 8'-10" | 4'-5" | 3'-5" | 1'-4" | #9 | 6" | #6 | 6" | 432.94 | 2.046 | 10.30 | 0.218 |
| 15'-6" | 9'-6" | 4'-10" | 3'-8" | 1'-6" | #9 | 6" | #7 | 6" | 489.52 | 2.302 | 11.24 | 0.253 |
| 16'-0" | 9'-11" | 5'-0" | 3'-11" | 1'-7" | #9 | 6" | #7 | 6" | 505.72 | 2.448 | 11.47 | 0.279 |

TABLE OF WINGWALL REINFORCING (2-Wings)

| Bar | Size | No. | Spa |
|-----|------|-----|-------|
| D1 | #6 | ~ | 1'-0" |
| D2 | #6 | ~ | 1'-0" |
| E1 | #4 | ~ | 1'-0" |
| F | #4 | ~ | 1'-0" |
| G | #6 | ~ | 8" |
| M1 | #4 | 4 | ~ |
| P | #4 | ~ | 1'-0" |
| V | #4 | ~ | 1'-0" |

TABLE OF TOEWALL REINFORCING

| Bar | Size | No. | Spa |
|-----|------|-----|-------|
| J3 | #4 | ~ | 1'-0" |
| M2 | #4 | 2 | ~ |
| E2 | #4 | ~ | 1'-0" |

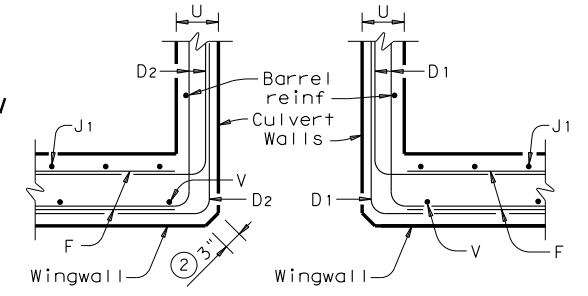
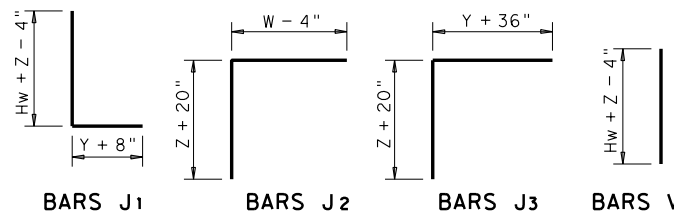
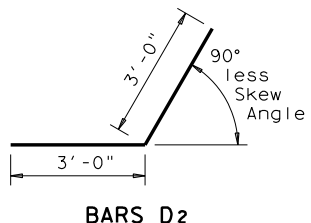
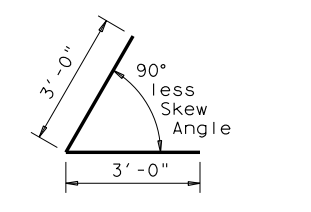
WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet)

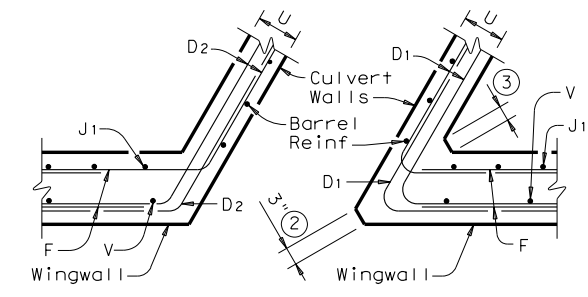
$H_w = H + T + C$
 $L_w = (H_w) (SL) \div \text{Cosine } \theta$ for Ty PW-1
 $L_w = (H_w - 1') (SL) \div \text{Cosine } \theta$ for Ty PW-2 and $H_w \geq 4'$
 $L_w = (H_w - 0.5') (SL) \div \text{Cosine } \theta$ for Ty PW-2 and $H_w < 4'$

For Cast-in-place culverts:
 $L_{tw} = [(N) (S) + (N + 1) (U)] \div \text{Cosine } \theta$

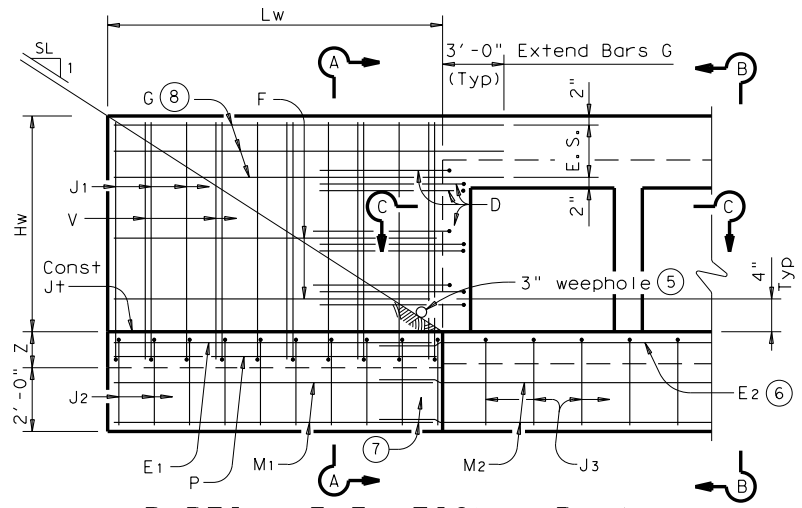
For Precast culverts:
 $L_{tw} = [(N) (2U + S) + (N - 1) (0.5')] \div \text{Cosine } \theta$
 Total Wingwall Area (Two Wings ~ SF)
 $= (2) (H_w) (L_w) - 6 \text{ SF}$ for Ty PW-2 and $H_w \geq 4'$
 $= (2) (H_w) (L_w) - 1.5 \text{ SF}$ for Ty PW-2 and $H_w < 4'$



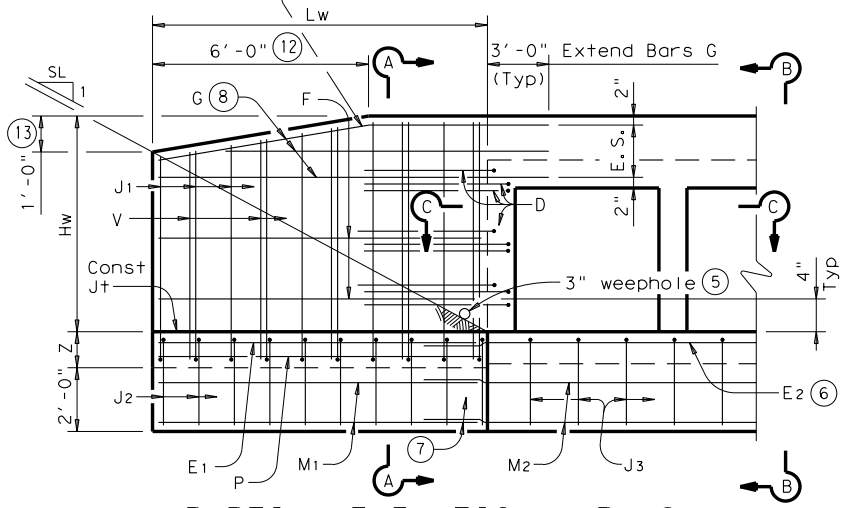
SECTION C-C



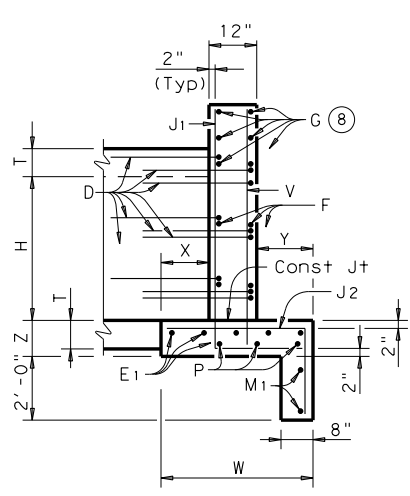
SECTION C-C



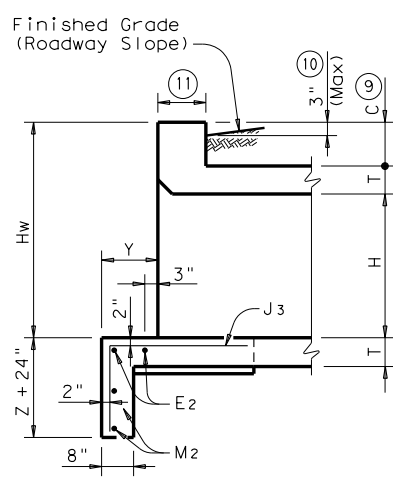
PARTIAL ELEVATION - PW-1



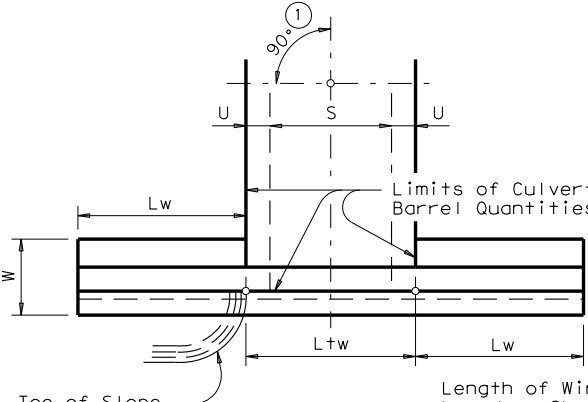
PARTIAL ELEVATION - PW-2



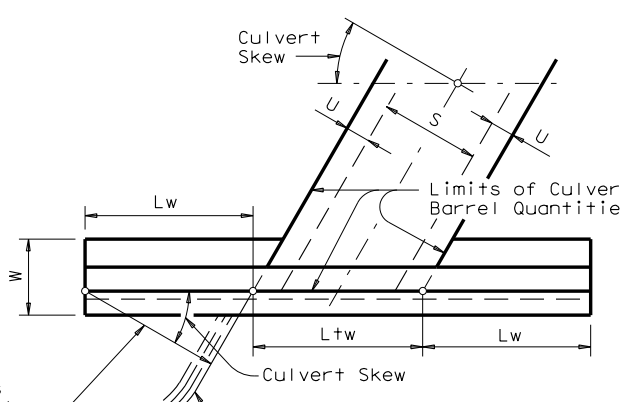
SECTION A-A
(Showing Wing Reinf)



SECTION B-B
(Showing Wing Reinf)



PLAN
DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN
DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° Skew)

- ① Skew Angle = 0°
- ② At discharge end, chamfer may be 3/4".
- ③ For 15° Skew ~ 1"
For 30° Skew ~ 2"
For 45° Skew ~ 3"
- ④ Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
- ⑤ Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
- ⑥ Extend Bars E2 1'-6" minimum into the wingwall footing.
- ⑦ Lap Bars M1 1'-6" minimum with Bars M2.
- ⑧ Bars G equally spaced at 8" maximum, place as shown. Provide at least two pair Bars G per wing.
- ⑨ 0" min to 5'-0" max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail or curbs taller than 1'-0", refer to ECD standard. For structures with T6 bridge rail, refer to T6-CM standard. For structures with traffic rail, other than T6, refer to RAC standard.
- ⑩ For vehicle safety, the following requirements must be met:
- For structures without bridge rail, curbs cannot project more than 3" above finished grade.
- For structures with bridge rail, build curbs flush with finished grade.
Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ⑪ 1'-0" typical. 2'-0" typical when RAC standard is referenced elsewhere in the plans.
- ⑫ 3'-0" for Hw < 4'.
- ⑬ 6" for Hw < 4'.

GENERAL NOTES:
 Designed in accordance with AASHTO LRFD Bridge Design Specifications.
 Provide Class "C" Concrete (f'c = 3,600 psi Min) and Grade 60 reinforcing steel.
 Provide 1 1/4" Min clear cover to reinforcing steel. Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
 See BCS sheet for wingwall type and additional dimensions and information.
 The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DESIGNER NOTES:
 Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
 Type PW-2 can only be used for applications without a railing mounted to the wingwall.

Bridge Division Standard

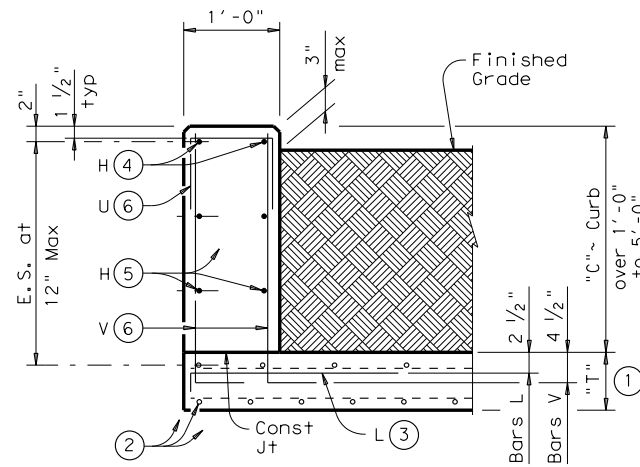
CONCRETE WINGWALLS WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

| | | | | |
|---|---------|----------|-----------|---------|
| FILE: pwstd01.dgn | DN: GAF | CK: CAT | DW: TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 11-10: Reinforcing Quantities. 01-12: PW-1 & PW-2. | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 221 | |

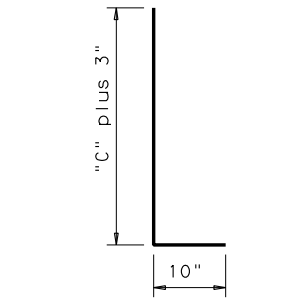
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DATE:
FILE:



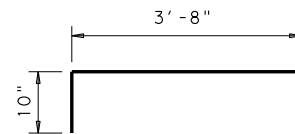
TYPICAL SECTION

Used for Curbs over 1'-0" to 5'-0"



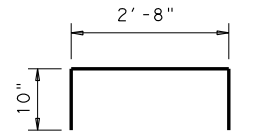
BARS V (#5)

Spaced at 12" max



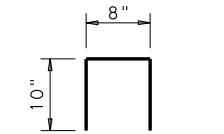
BARS L (#5)

Spaced at 12" max



OPTIONAL BARS L (#5)

Spaced at 12" max



BARS U (#4)

Spaced at 12" max

- ① "T" is equal to the culvert top slab thickness. For Precast Boxes with slabs less than 7", see SCP-MD Standard for additional details.
- ② Normal culvert slab bars adjusted as necessary to clear obstructions.
- ③ Place bars L as shown. Tilt hook as necessary to maintain cover.
- ④ Place normal culvert curb bars H (#4) as shown. Adjust as necessary to clear obstructions.
- ⑤ Additional bars H (#4) as required to maintain 12" max spa.
- ⑥ Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" max. Adjust length of bars V as necessary to maintain clear cover.
- ⑦ Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.
- ⑧ Quantities shown are for contractor's information only. Quantities are per linear foot of curb length. The values for each section type in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES ⑧

| Curb Height "C" | Conc (CY/LF) | Reinf Steel (LB/LF) |
|-----------------|--------------|---------------------|
| 1'-0" | 0.037 | 8.9 |
| 1'-6" | 0.056 | 14.3 |
| 2'-0" | 0.074 | 15.4 |
| 2'-6" | 0.093 | 17.7 |
| 3'-0" | 0.111 | 18.8 |
| 3'-6" | 0.130 | 21.2 |
| 4'-0" | 0.148 | 22.2 |
| 4'-6" | 0.167 | 24.6 |
| 5'-0" | 0.185 | 25.6 |

GENERAL NOTES:

Designed according to current AASHTO LRFD Specifications. These extended curb details have sufficient strength to allow for future retrofit of Type T6 railing. These details are suitable for use with PR1, PR2 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T6 railing, use the T6-CM standards. All reinforcing shall be Grade 60. Adjust reinforcing as necessary to provide 1 1/4" cover. All concrete for curbs shall be Class "C" with a minimum compressive strength of 3600 psi. This Curb shall be considered as part of the Box Culvert for payment. For vehicle safety, the top of the curb shall project no more than 3" above the finished grade.

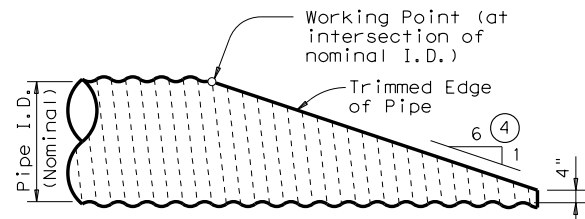


EXTENDED CURB DETAILS
FOR BOX CULVERTS WITH
CURBS OVER 1'-0" TO 5'-0" TALL

ECD

| | | | |
|----------------------|-----------|---------------|---------|
| FILE: ecdstdel.dgn | DN: GAF | CK: DW: TxDOT | CK: GAF |
| ©TxDOT February 2010 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 222 | |

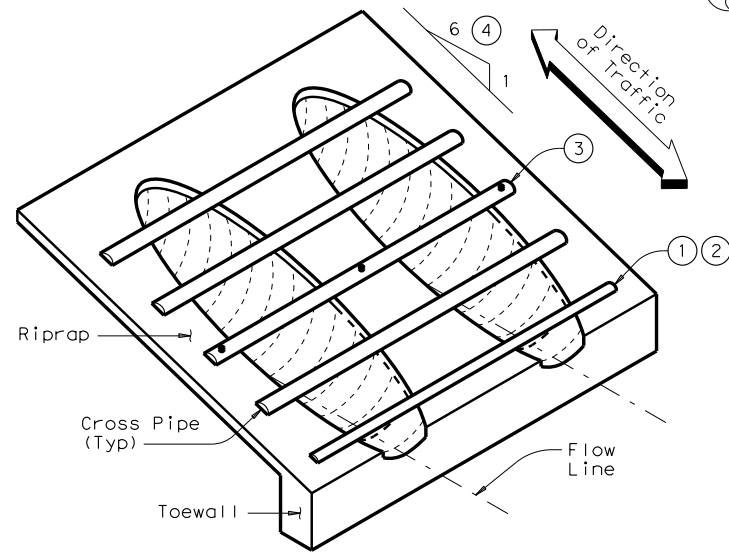
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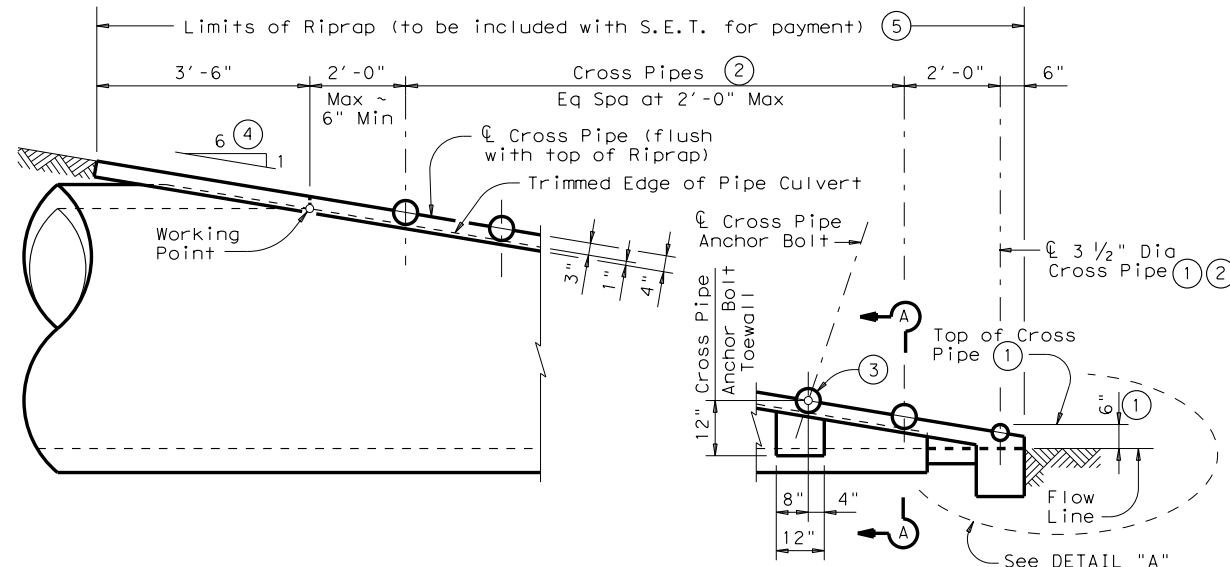
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)

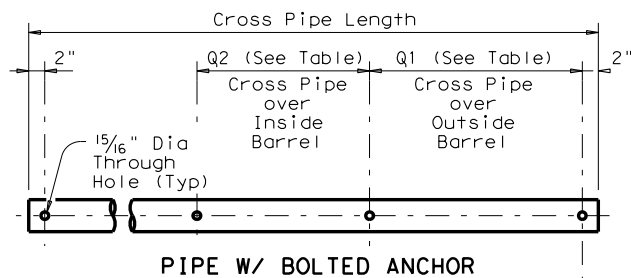


ISOMETRIC VIEW OF TYPICAL INSTALLATION

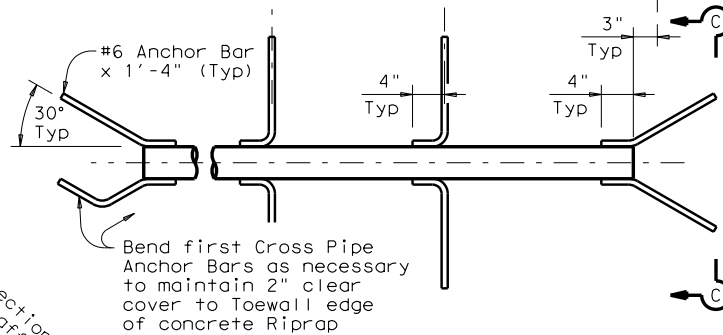


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

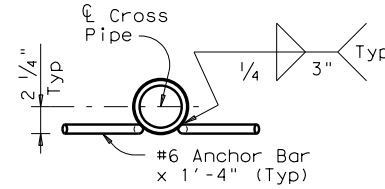
(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



PIPE W/ BOLTED ANCHOR

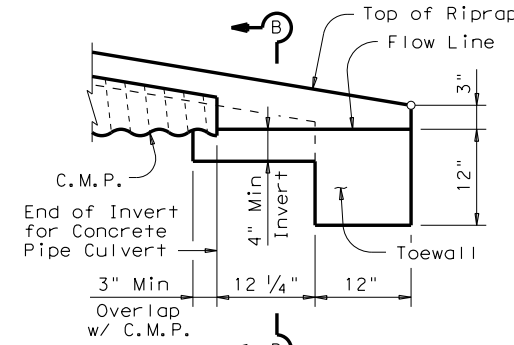


PIPE W/ ANCHOR BARS



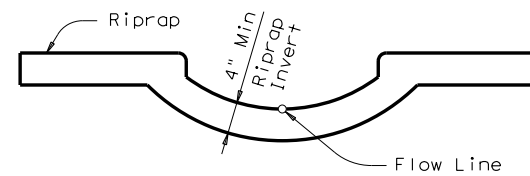
SECTION C-C

CROSS PIPE DETAILS



DETAIL "A"

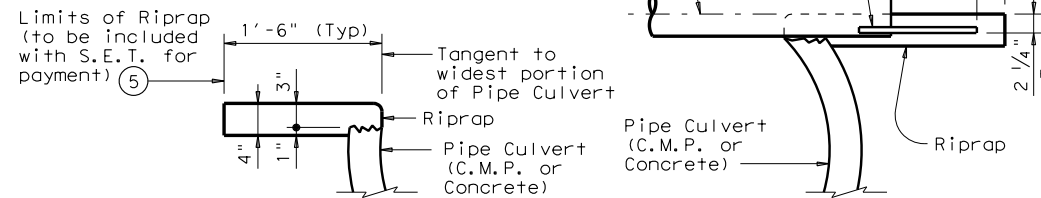
(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)



SECTION B-B

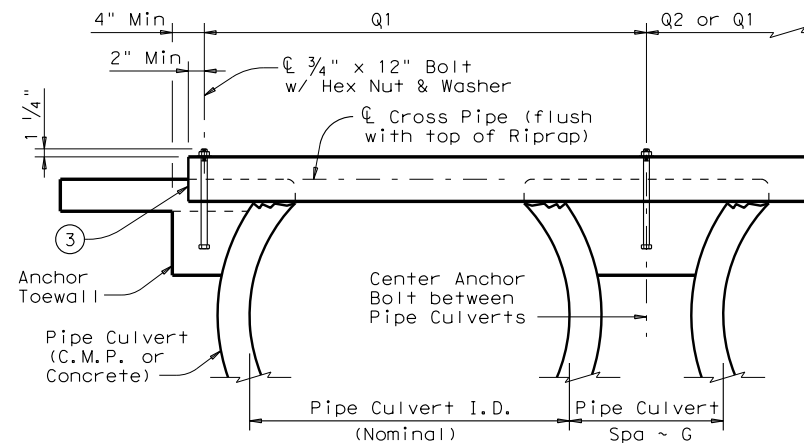
(Cross Pipes not shown for clarity.)

Limits of Riprap (to be included with S.E.T. for payment) 5



SHOWING TYPICAL PIPE CULVERT & RIPRAP

SHOWING CROSS PIPE WITH ANCHOR BAR



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES 2

| Nominal Culvert I.D. | Conc Riprap (CY) 6 | Pipe Culvert Spa ~ G | Single Barrel ~ Q1 | Multi-Barrel ~ Q1 | Q2 | Conditions for use of Cross Pipes | Cross Pipe Size |
|----------------------|--------------------|----------------------|--------------------|-------------------|--------|-----------------------------------|--------------------------|
| 12" | 0.6 | 9" | N/A | 2'-1" | 1'-9" | 3 or more Pipe Culverts | 3" Std (3.500" O.D.) |
| 15" | 0.7 | 11" | N/A | 2'-5" | 2'-2" | | |
| 18" | 0.8 | 1'-2" | N/A | 2'-10" | 2'-8" | | |
| 21" | 0.9 | 1'-4" | N/A | 3'-2" | 3'-1" | | |
| 24" | 0.9 | 1'-7" | N/A | 3'-6" | 3'-7" | 3 or more Pipe Culverts | 3 1/2" Std (4.000" O.D.) |
| 27" | 1.0 | 1'-8" | N/A | 3'-10" | 3'-11" | | |
| 30" | 1.1 | 1'-10" | N/A | 4'-2" | 4'-4" | 2 or more Pipe Culverts | 3 1/2" Std (4.000" O.D.) |
| 33" | 1.2 | 1'-11" | 4'-2" | 4'-5" | 4'-8" | All Pipe Culverts | |
| 36" | 1.3 | 2'-1" | 4'-5" | 4'-9" | 5'-1" | All Pipe Culverts | 4" Std (4.500" O.D.) |
| 42" | 1.5 | 2'-4" | 4'-11" | 5'-5" | 5'-10" | | |
| 48" | 1.7 | 2'-7" | 5'-5" | 6'-0" | 6'-7" | All Pipe Culverts | 5" Std (5.563" O.D.) |
| 54" | 2.0 | 3'-0" | 5'-11" | 6'-9" | 7'-6" | | |
| 60" | 2.2 | 3'-3" | 6'-5" | 7'-4" | 8'-3" | | |
| 66" | 2.4 | 3'-3" | 6'-11" | 7'-10" | 8'-9" | | |
| 72" | 2.7 | 3'-4" | 7'-5" | 8'-5" | 9'-4" | | |

- 1 The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
- 2 Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
- 3 The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
- 4 Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
- 5 Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- 6 Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.
Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.
Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".
Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.
Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.
Bolts and nuts shall conform to ASTM A307.
All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation
Bridge Division Standard

SAFETY END TREATMENT FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

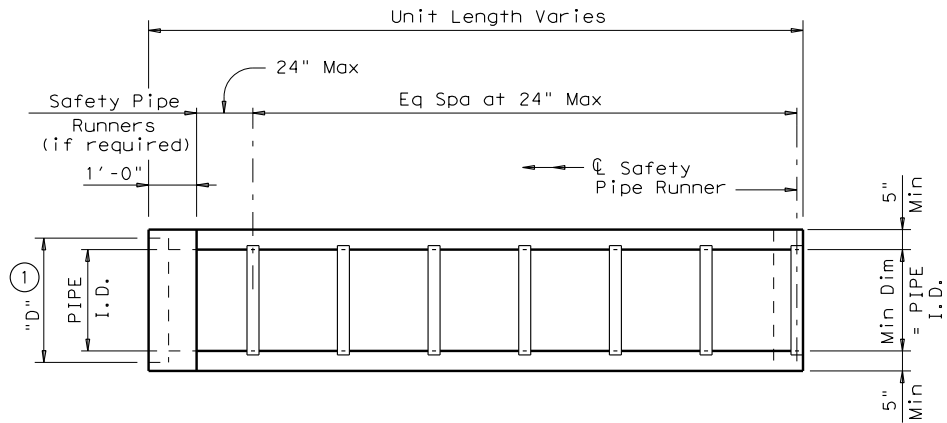
SETP-PD

| | | | | |
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| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 11-10: Add note for synthetic fibers. | DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | | 223 | |

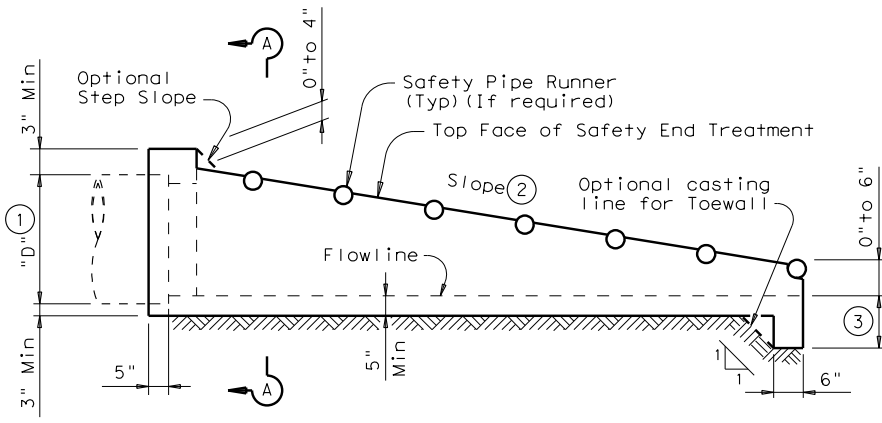
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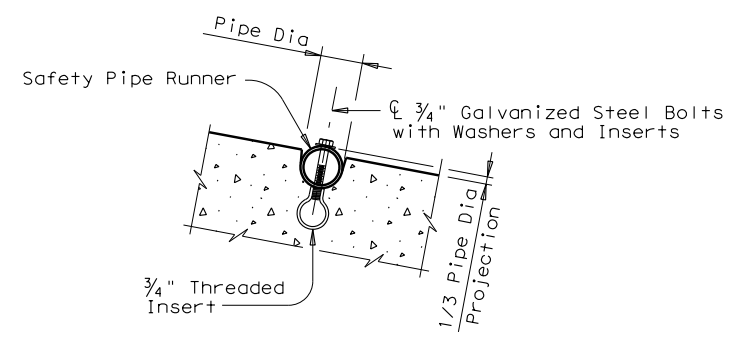
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PLAN

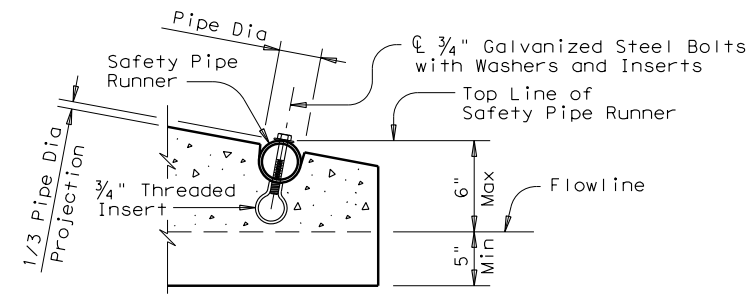


LONGITUDINAL ELEVATION

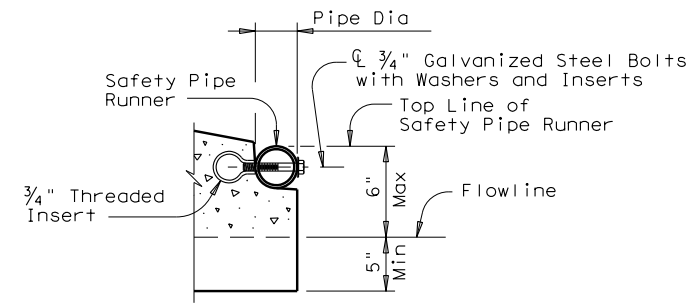


INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)



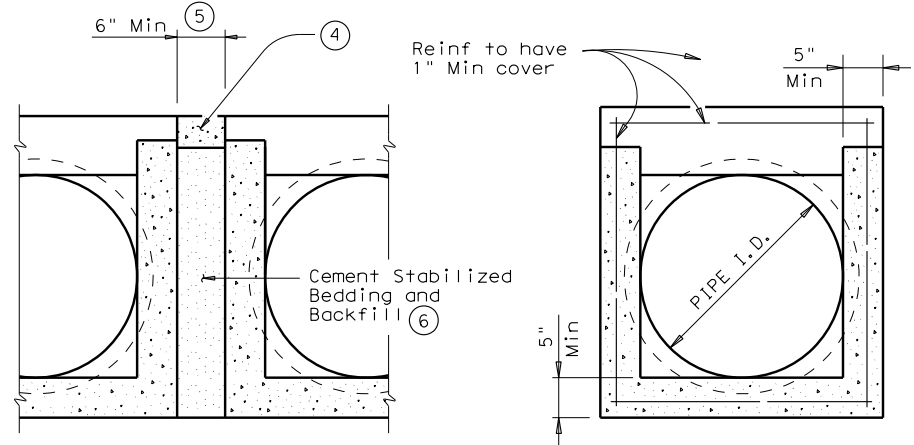
OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

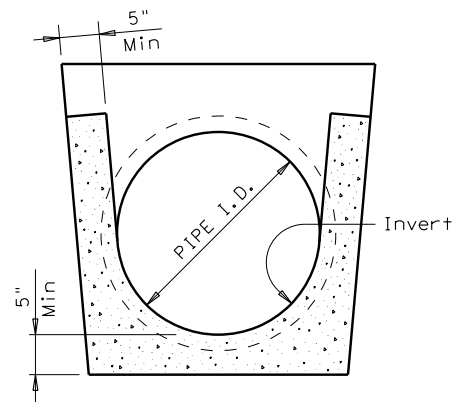
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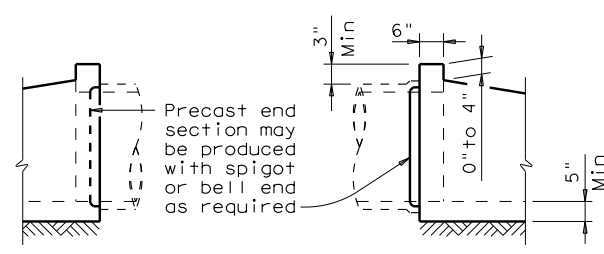
MULTIPLE PIPE INSTALLATION

OPTION WITH SQUARE BOTTOM

SECTION A-A



OPTION WITH INVERT BOTTOM



OPTIONAL JOINT

(Showing joint between RCP and Precast Safety End Treatment)

| PIPE I. D. | PIPE WALL "B" THICKNESS | "D" | MAXIMUM SLOPE | MINIMUM LENGTH OF UNIT | PIPE RUNNERS REQUIRED | | REQUIRED PIPE RUNNER SIZES | | |
|------------|-------------------------|---------|---------------|------------------------|-----------------------|-------------------|----------------------------|--------|--------|
| | | | | | SINGLE PIPE | MULTIPLE PIPE | NOMINAL DIA. | O. D. | I. D. |
| 12" | 2" | 17" | 6:1 | 4'-9" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 15" | 2 1/4" | 20 1/2" | 6:1 | 6'-5" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 18" | 2 1/2" | 24" | 6:1 | 8'-0" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 24" | 3" | 31" | 6:1 | 11'-3" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 30" | 3 1/2" | 38 1/2" | 6:1 | 14'-8" | No | Yes | 4" STD | 4.500" | 4.026" |
| 36" | 4" | 45 1/2" | 6:1 | 17'-11" | Yes | Yes | 4" STD | 4.500" | 4.026" |
| 42" | 4 1/2" | 52 1/2" | 6:1 | 21'-2" | Yes | Yes | 4" STD | 4.500" | 4.026" |

- Dimension "D" is based on ASTM C-76, Class III, Wall "B" thickness. If any other wall thickness is used, dimension "D" must be adjusted accordingly.
- Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
- Toewall to be used only when dimension is shown elsewhere in the plans.
- The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.
- Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.
- Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the safety end treatment, backfill shall be as directed by Engineer.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment". When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Manufacture of this product shall conform to requirements of Item "Safety End Treatment" except as noted below:

- Minimum reinforcing shall be #4 at 6" (Grade 40) or #4 at 9" (Grade 60) each way or 6 x 6 - W12 x W12 or 5 x 5 - W10 x W10 welded wire reinforcement (WWR).
- Concrete for precast (steel formed) sections shall be Class "C" with a minimum compressive strength of 3600 psi.

At the option and expense of the Contractor the next larger size of Safety End Treatment may be furnished; as long as the "D" dimension cast is that of the required size of pipe.

Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

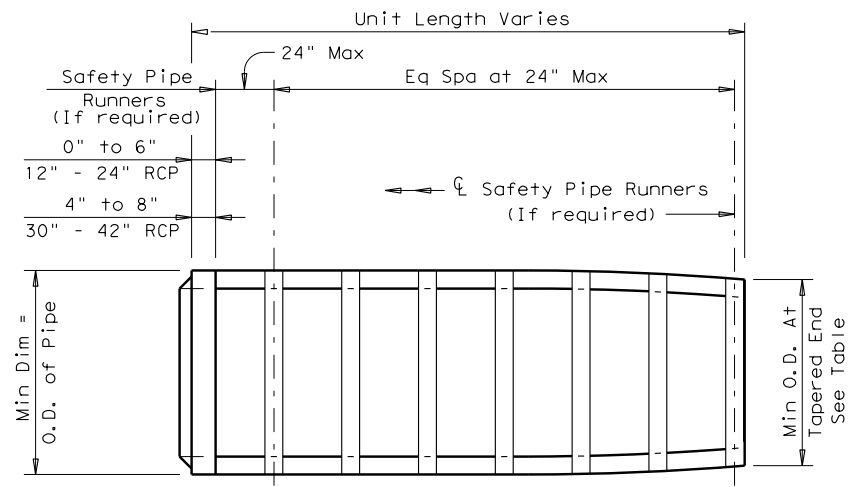
Texas Department of Transportation Bridge Division Standard

PRECAST SAFETY END TREATMENT TYPE II ~ PARALLEL DRAINAGE

PSET-SP

| | | | | |
|---------------------------------------|----------|---------|-----------|---------|
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| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 11-10: Add note for synthetic fibers. | DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 224 | | |

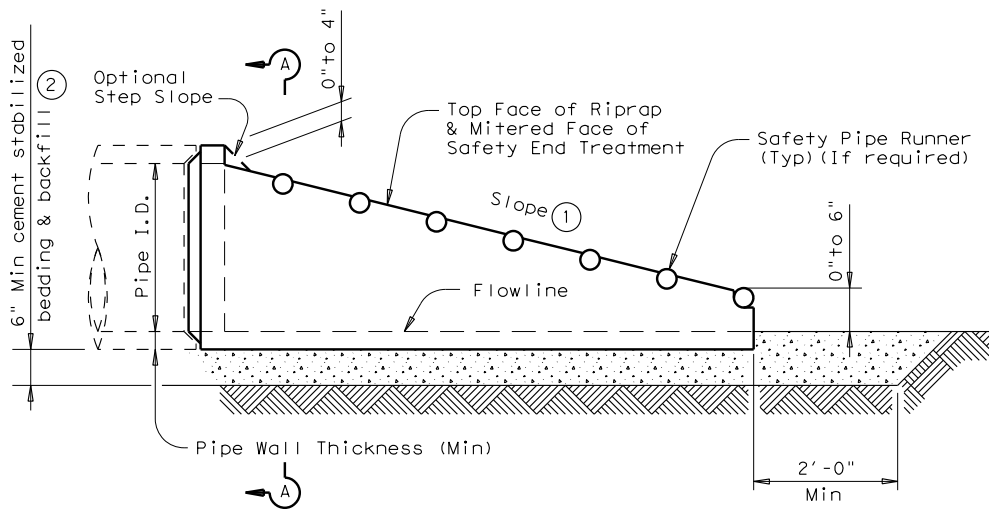
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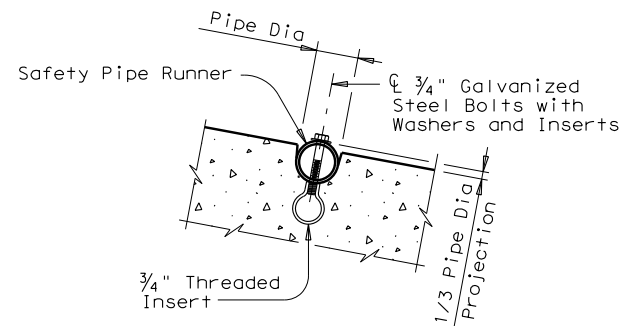
PLAN VIEW - 12" THRU 24"

- ① Slope as shown elsewhere in the plans. Slope of 6:1 or flatter is required for vehicle safety.
- ② Cement stabilized bedding and backfill shall be in accordance with the Item, "Excavation and Backfill for Structures". Bedding and backfill shall be considered subsidiary to the Item "Safety End Treatment". When concrete riprap is specified around the Safety End Treatment backfill shall be as directed by Engineer.
- ③ The top 4" of void between Precast End Treatments shall be filled with concrete Riprap and shall be considered subsidiary to Safety End Treatment.
- ④ Clear distance between pipes shall be adjusted to provide for the minimum distance between safety end treatments.

| PIPE I.D. | MINIMUM WALL THICKNESS | MINIMUM O.D. | MIN O.D. AT TAPERED END | MIN REINF REQUIREMENTS (Sq in/ft of pipe) | MAXIMUM SLOPE | MINIMUM LENGTH OF UNIT | PIPE RUNNERS REQUIRED | | REQUIRED PIPE RUNNER SIZES | | |
|-----------|------------------------|--------------|-------------------------|---|---------------|------------------------|-----------------------|-------------------|----------------------------|--------|--------|
| | | | | | | | SINGLE PIPE | MULTIPLE PIPE | NOMINAL DIA. | O.D. | I.D. |
| 12" | 2" | 16" | 16" | 0.07 CIRC. | 6:1 | 4'-0" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 15" | 2 1/4" | 19 1/2" | 19" | 0.07 CIRC. | 6:1 | 5'-8" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 18" | 2 1/2" | 23" | 21 1/2" | 0.07 CIRC. | 6:1 | 7'-3" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 24" | 3" | 30" | 27" | 0.07 CIRC. | 6:1 | 10'-6" | No | Yes, for >2 pipes | 3" STD | 3.500" | 3.068" |
| 30" | 3 1/2" | 37" | 31" | 0.18 CIRC. | 6:1 | 12'-1" | No | Yes | 4" STD | 4.500" | 4.026" |
| 36" | 4" | 44" | 36" | 0.19 ELIP. | 6:1 | 15'-4" | Yes | Yes | 4" STD | 4.500" | 4.026" |
| 42" | 4 1/2" | 51" | 41 1/2" | 0.23 ELIP. | 6:1 | 18'-7" | Yes | Yes | 4" STD | 4.500" | 4.026" |



LONGITUDINAL ELEVATION - 12" THRU 24"



INSTALLATION DETAIL FOR SAFETY PIPE RUNNERS

(If required)

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item "Safety End Treatment". When Precast Safety End Treatment is used as a Contractor's alternate to mitered RCP, Riprap will not be required unless noted otherwise on the plans.

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

All precast concrete end sections shall be manufactured in accordance with Item "Reinforced Concrete Pipe" and in accordance with ASTM Specification C-76, Class III, Wall B for circular pipe.

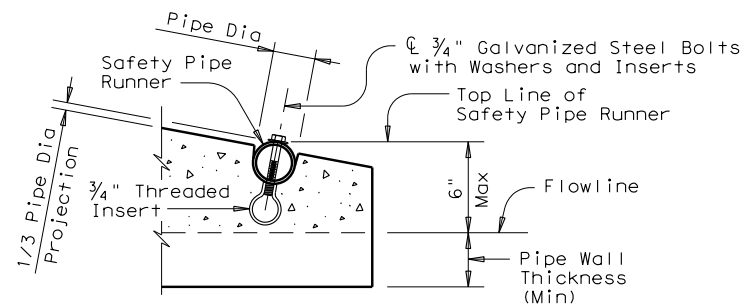
Precast concrete end sections shall be provided with a spigot or bell end for compatibility to upstream or downstream end conditions with sufficient annular space to allow for mortar, cold applied asphalt joint compound or pre-formed plastic gasket material.

Methods of lifting shall be provided by the manufacturer for ease of loading, unloading and installation.

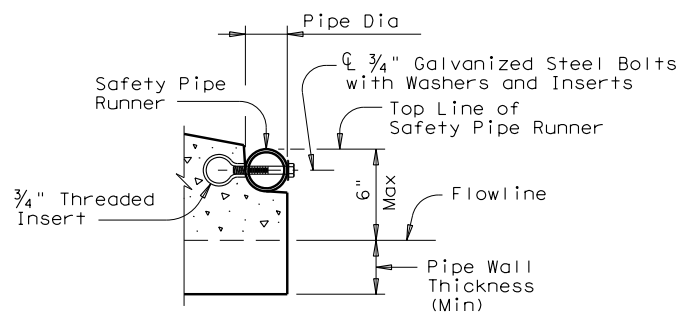
Pipe Runners are designed for a traversing load of 10,000 Lbs at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Pipe Runners shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

All steel components except reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



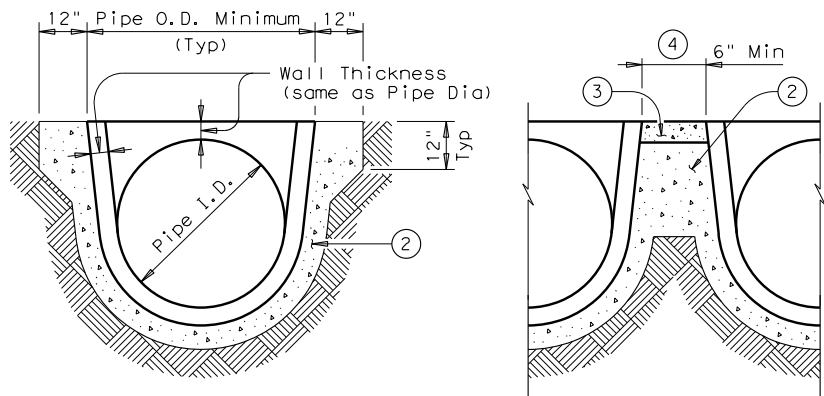
OPTION A



OPTION B

END DETAILS FOR INSTALLATION OF SAFETY PIPE RUNNERS

(If required)



SECTION A-A

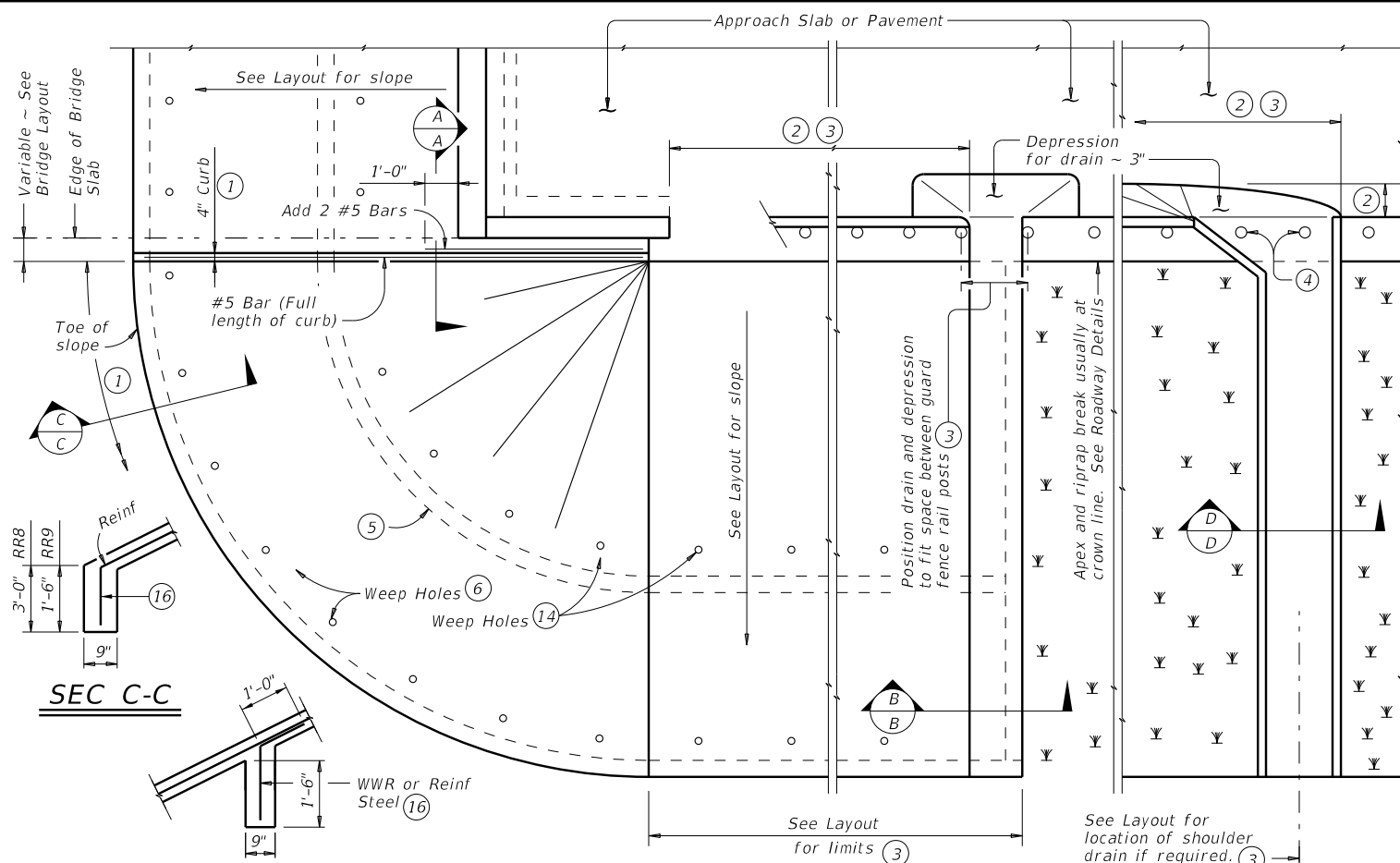
MULTIPLE PIPE INSTALLATION

| | | | | | |
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| | | | | Bridge Division Standard | |
| PRECAST SAFETY END TREATMENT TYPE II ~ PARALLEL DRAINAGE PSET-RP | | | | | |
| FILE: psetrpss.dgn | DN: RLW | CK: KLR | DW: JTR | CK: GAF | |
| ©TxDOT February 2010 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 | 01 | 023 | FM 3549 | |
| 11-10: Add note for synthetic fibers. | DIST | COUNTY | SHEET NO. | | |
| | DAL | ROCKWALL | 225 | | |

DATE: FILE:

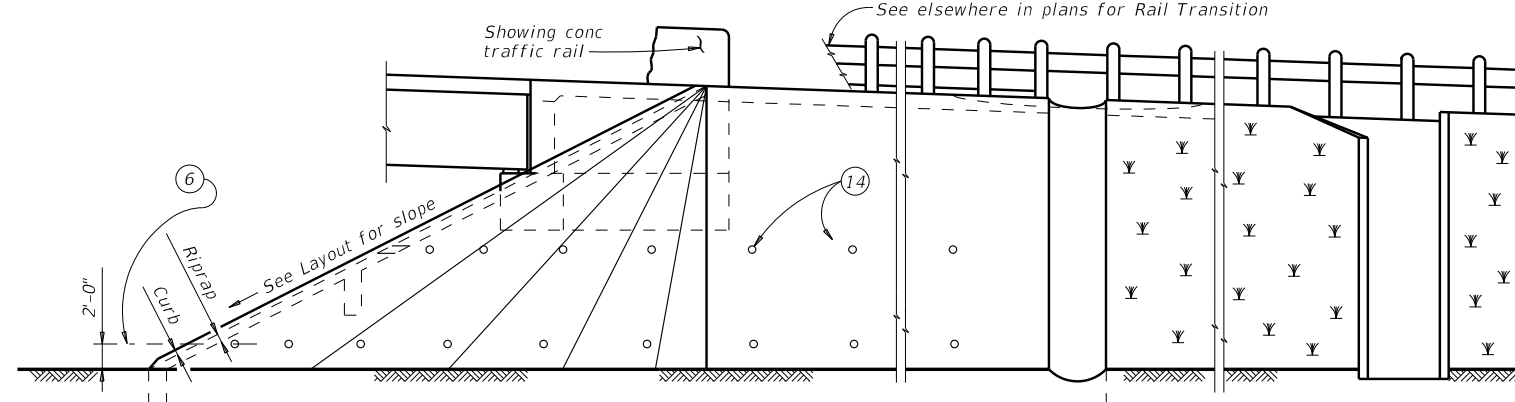
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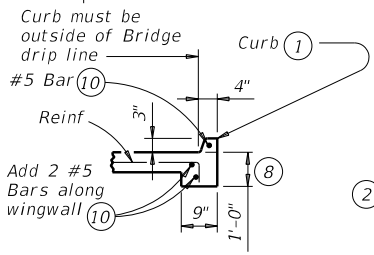


INTERMEDIATE TOEWALL

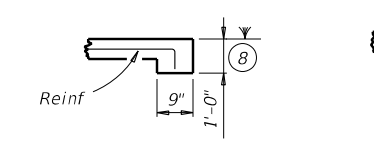
PLAN



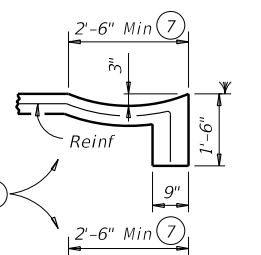
ELEVATION



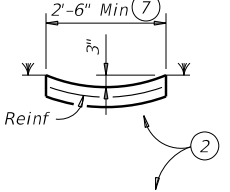
SEC A-A



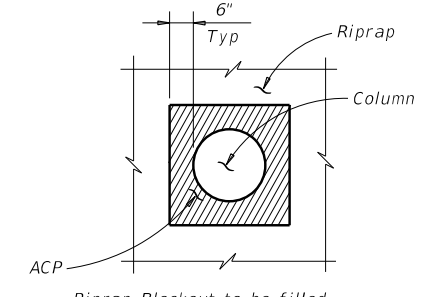
SEC B-B (No Drain)



SEC B-B (Shoulder Drain integral with riprap)

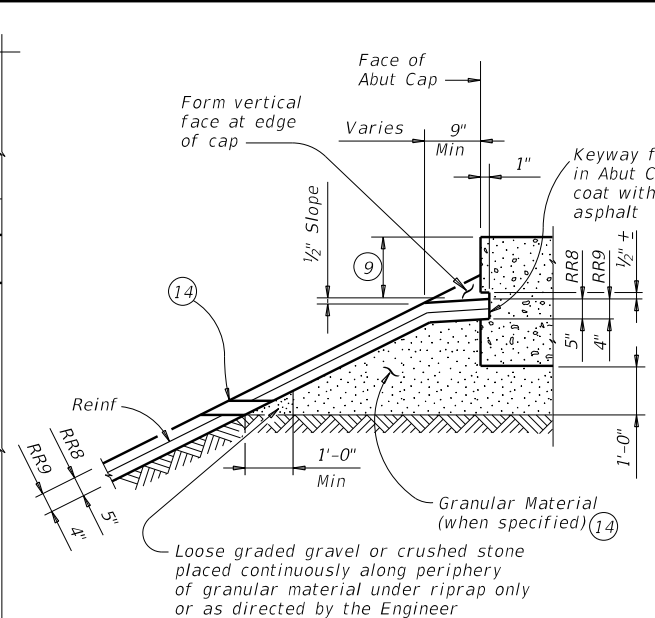


SEC D-D (Shoulder Drain)

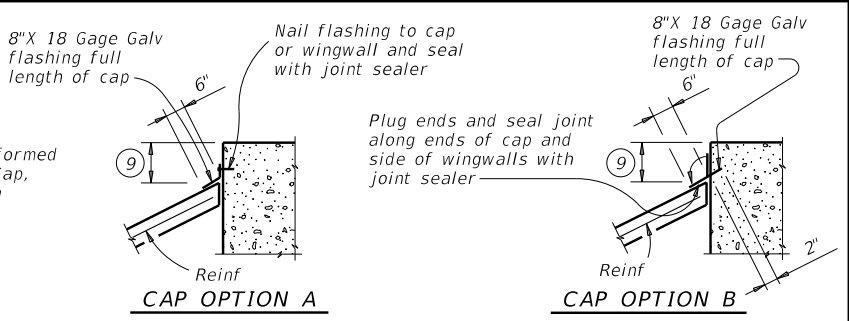


RIPRAP DETAIL AT COLUMNS

(As directed by the Engineer)

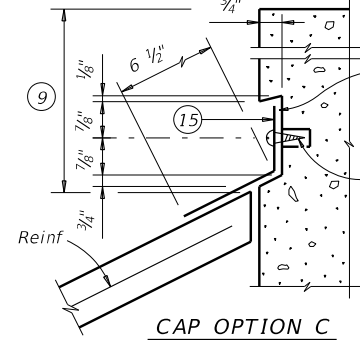


SHOWING KEYWAY OPTION



CAP OPTION A

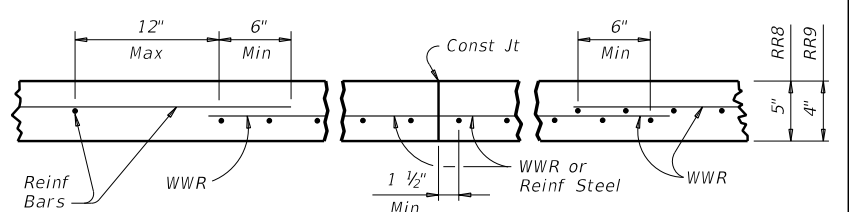
CAP OPTION B



CAP OPTION C

SECT THRU RIPRAP AT WINGWALL

SECTIONS THRU RIPRAP AT CAP



REINFORCEMENT DETAILS

See General Notes for optional synthetic fiber reinforcement.

- 1 When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
- 2 Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
- 3 Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
- 4 See details elsewhere in plans for installation of guard fence posts through concrete riprap.
- 5 Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
- 6 Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
- 7 Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
- 8 Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
- 9 Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
- 10 #5 bars shown are required even when synthetic fiber reinforcing option is selected.
- 11 Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
- 12 Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
- 13 Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
- 14 If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
- 15 8" x 18 Gage Galv Sheet Metal
- 16 Provide WWR or #3 bars, with 1'-0" extension into slope.

GENERAL NOTES:
 Provide Class "B" concrete with a minimum compressive strength of 2,000 psi unless noted elsewhere in plans.
 Provide Grade 60 reinforcing steel.
 Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
 Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".
 Use reinforcing bars, deformed Welded Wire Reinforcement (WWR), or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
 See Layout for limits of riprap.
 RR8 is to be used on stream crossings.
 RR9 is to be used on other embankments.

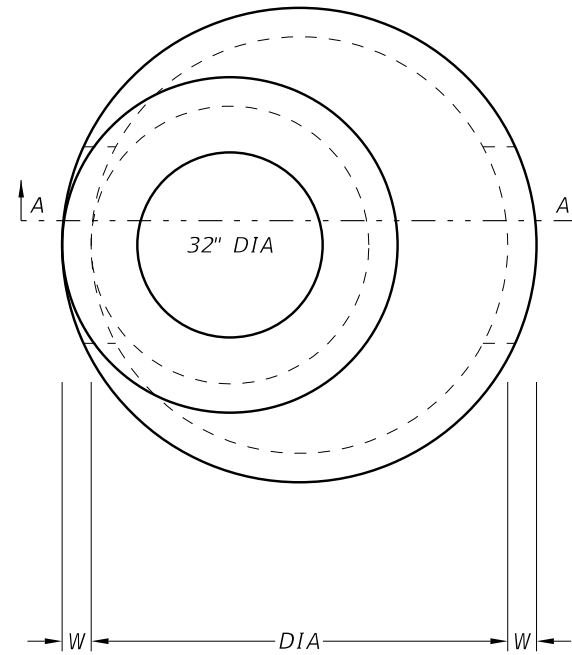
FOR CONTRACTOR'S INFORMATION ONLY:

| | |
|---------------------|----------------|
| 5" of RR8 | = 0.015 CY/SF |
| 4" of RR9 | = 0.012 CY/SF |
| #3 Reinf at 18" c-c | = 0.501 Lbs/SF |
| 6x6-D3xD3 | = 0.408 Lbs/SF |

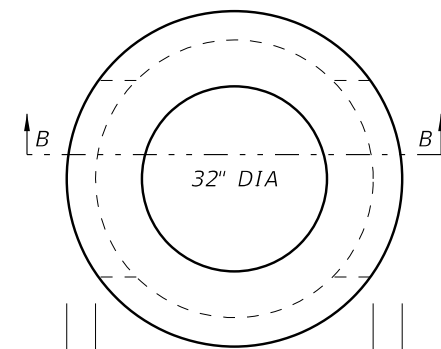
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|---|-----------|---------------------------------|-----------|
| | | Bridge Division Standard | |
| CONCRETE RIPRAP AND SHOULDER DRAINS EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9) | | | |
| CRR | | | |
| FILE: crst0e1.dgn | DN: TxDOT | CK: TxDOT | OW: TxDOT |
| ©TxDOT January 2015 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 226 | |

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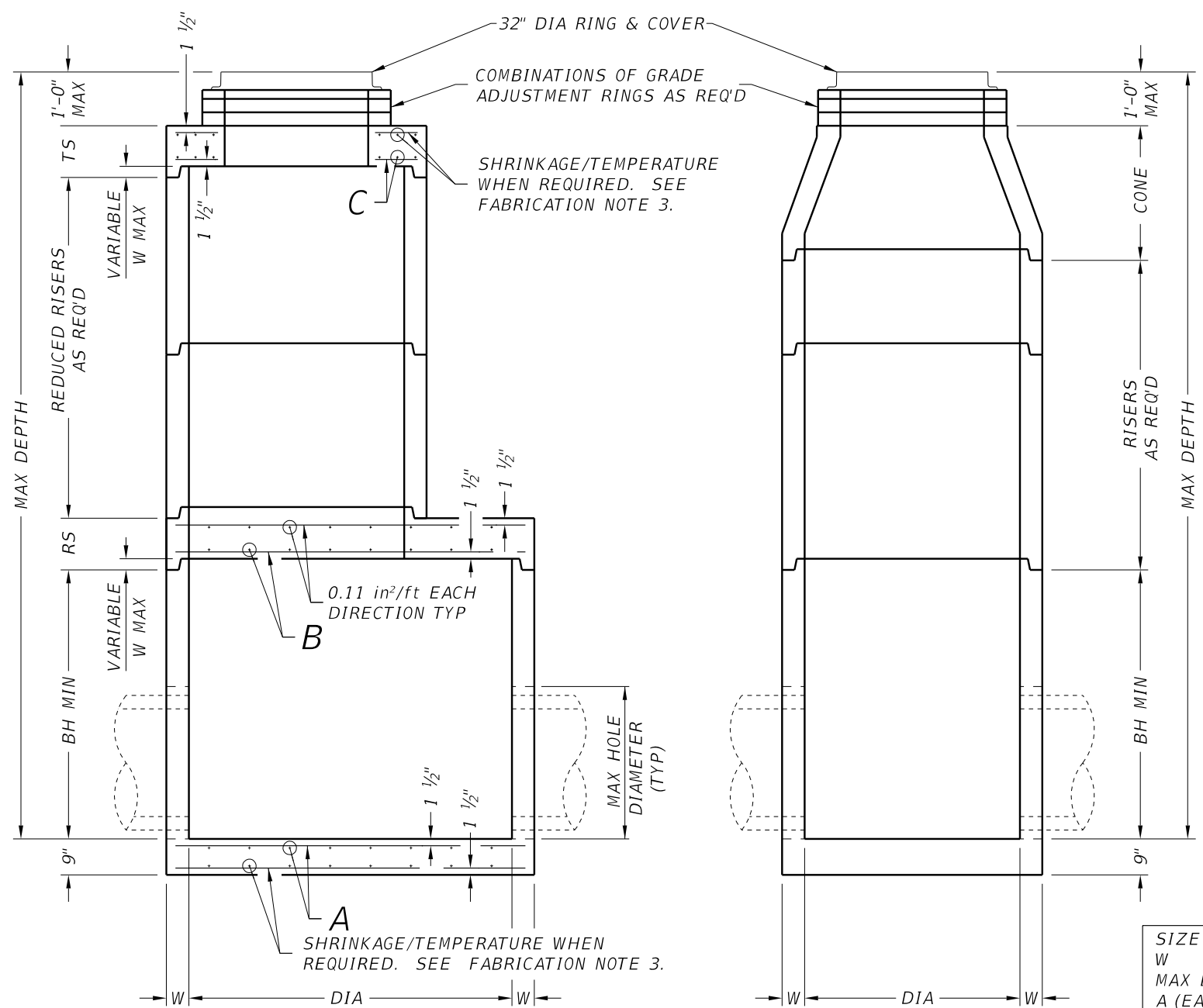
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PLAN VIEW "A"



PLAN VIEW "B"



SECTION A-A

ROUND REDUCED RISER OPTION
SHOWING FLAT SLAB TOP

SECTION B-B

ROUND RISER OPTION
SHOWING CONE

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR. Provide circumferential reinforcing steel in vertical walls of base, riser and cone in accordance with ASTM C478.
3. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
4. Manufacture base and risers to nearest 3" increment.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.

INSTALLATION NOTES:

1. Cones may be concentric or eccentric. Reduction cones are acceptable. See Manufacturer for cone dimensions.
2. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to this item.
3. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
4. Do not grout rubber gasket joints without Manufacturer's recommendation.
5. Initial installation of grade adjustment rings is limited to 1'-0" Max as shown.
6. Grade adjustment rings may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments may be made up to the Max depth shown. Structure must be evaluated if Max depth will be exceeded.

GENERAL NOTES:

1. Designed according to ASTM C478.
2. Payment for manhole is per Item 465, "Junction Boxes, Manholes, and Inlets" by type and size.
3. Pipe OD + placement tolerance must be equal or less than Max hole diameter. For rigid pipe, placement tolerance is 4" Max, 2" Min. For flexible pipe, consult boot/seal manufacturer's specification for placement tolerance.

Cover dimensions are clear dimensions, unless noted otherwise.

| | | | |
|-------------------|--------------------------|--------------------------|--------------------------|
| SIZE (DIA) | 48 in | 60 in | 72 in |
| W | 5 in | 6 in | 7 in |
| MAX DEPTH | 25 ft | 25 ft | 25 ft |
| A (EACH WAY) | 0.22 in ² /ft | 0.30 in ² /ft | 0.45 in ² /ft |
| B (EACH WAY) | N/A | 0.37 in ² /ft | 0.62 in ² /ft |
| C (EACH WAY) | 0.24 in ² /ft | 0.46 in ² /ft | 0.46 in ² /ft |
| BH MIN | 12 in | 36 in | 36 in |
| TS | 9 in | 9 in | 9 in |
| RS | N/A | 9 in | 12 in |
| REDUCED RISER DIA | N/A | 48 in | 48/60 in |
| MAX HOLE DIA | 32 in | 40 in | 54 in |

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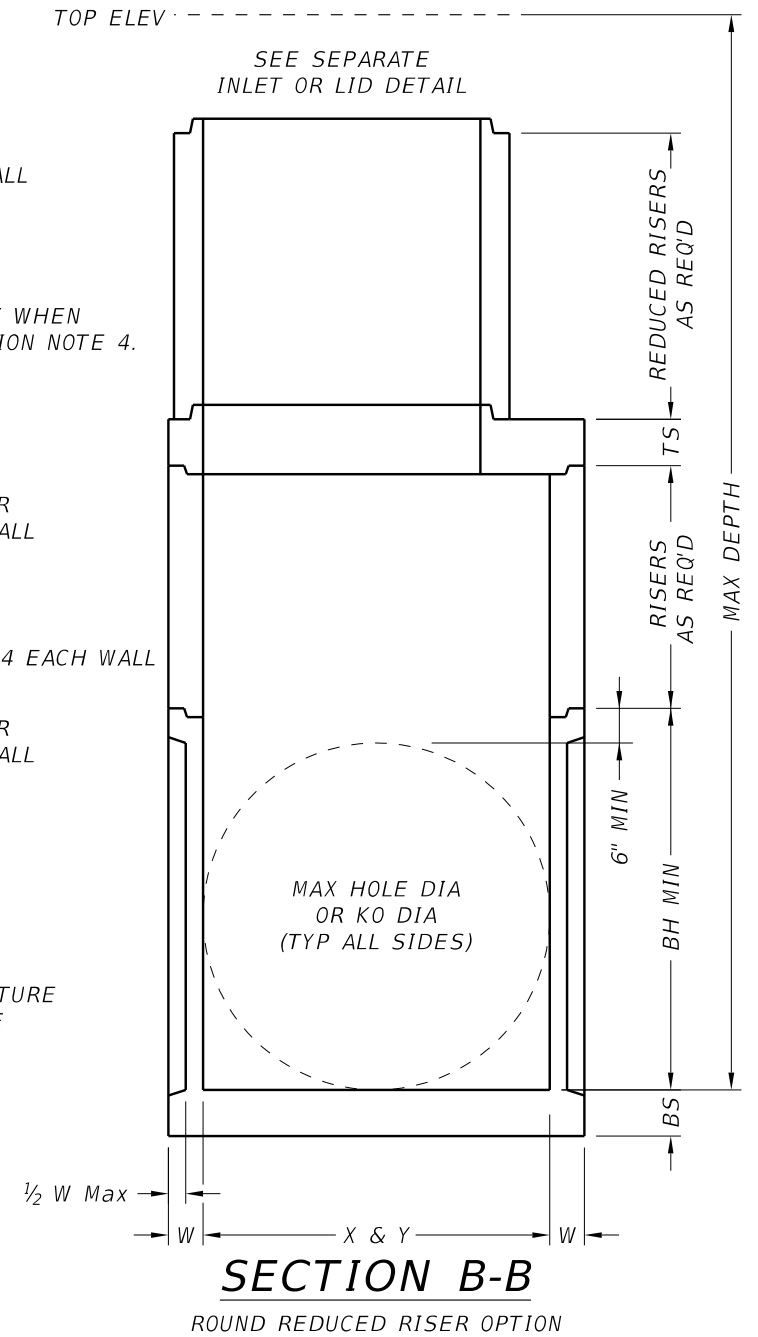
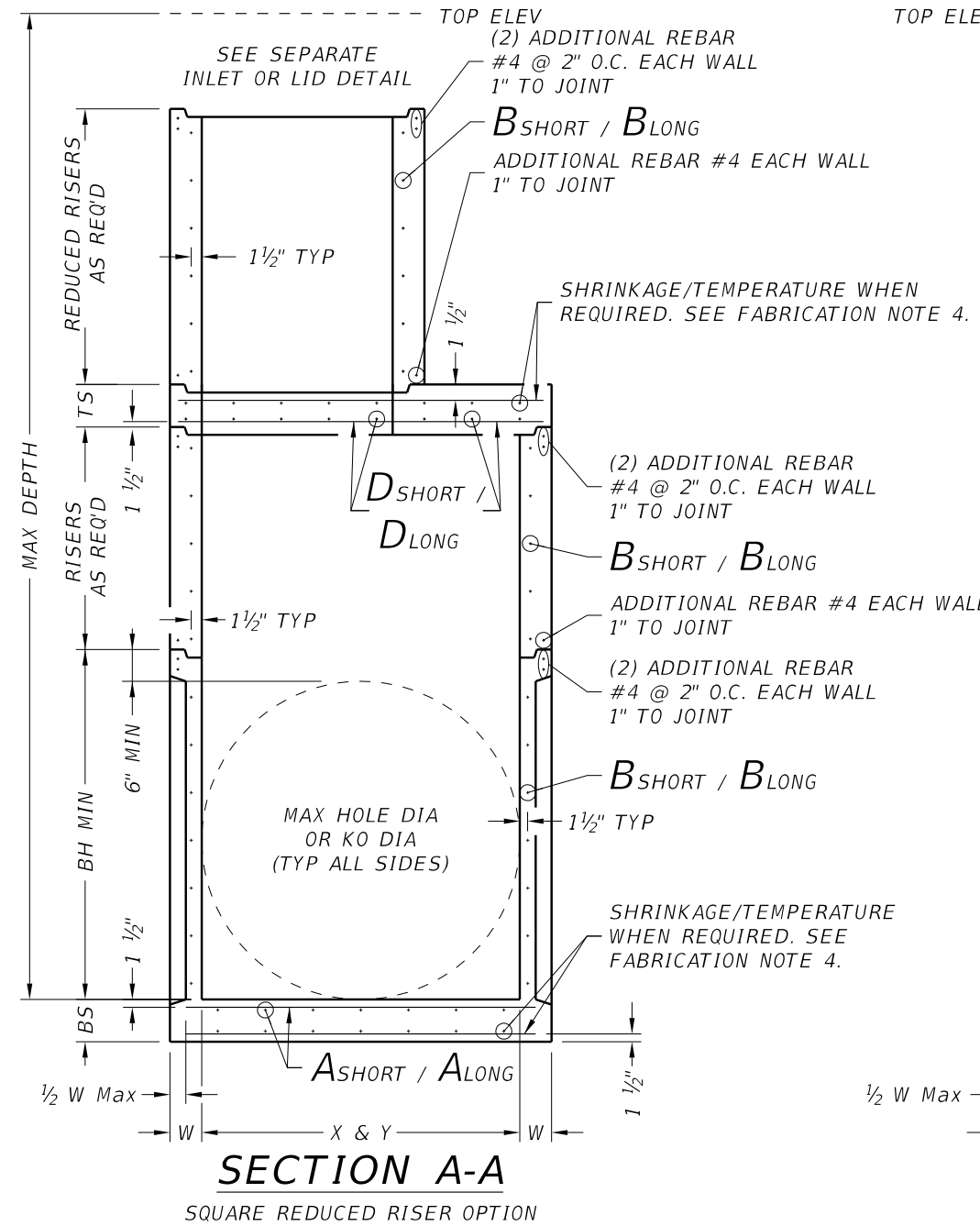
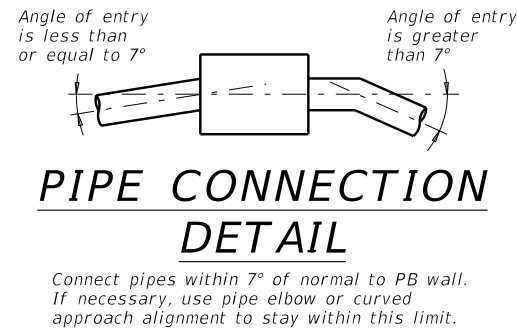
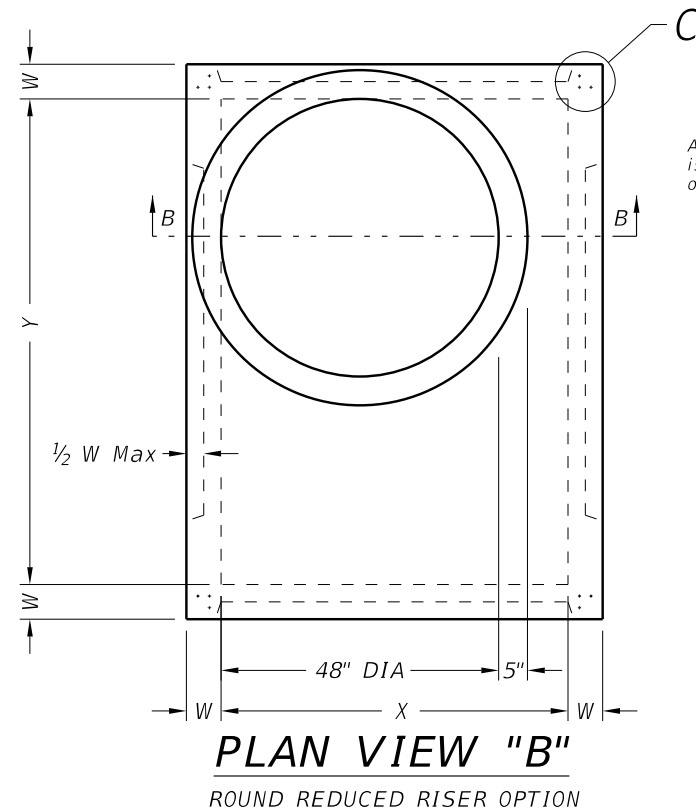
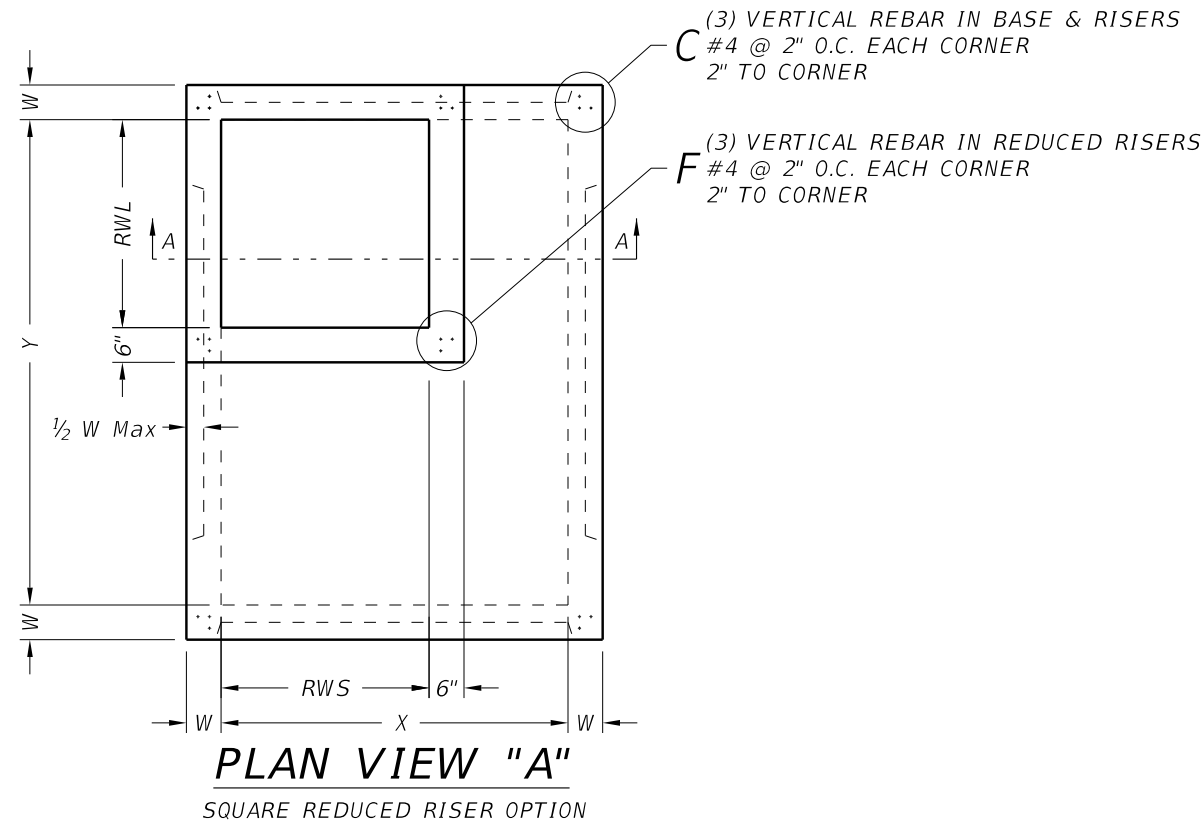


PRECAST ROUND MANHOLE

PRM

| | | | | |
|---------------------|-----------|-----------|-----------|-----------|
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FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 1/2" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING



PRECAST BASE

PB

| | | | | |
|---------------------|-----------|-----------|-----------|-----------|
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| ©TxDOT January 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| DIST | COUNTY | | SHEET NO. | |
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DATE: FILE:

| Size | MAX DEPTH = 15 ft. to top of BASE SLAB | | | | | | | | | | | MAX DEPTH = 25 ft. to top of BASE SLAB | | | | | | | | | | | Min Height (See Gen Note 3) | Max HOLE DIA (See Fab Note 2) | Max KO DIA (See Fab Note 2) |
|----------------------------|--|-----------------------------------|-----------|------------------------------------|-----------------------------------|-----------|--|------------------------------------|-----------------------------------|-----------|-----------------------|--|-----------------------------------|---------------------|------------------------------------|-----------------------------------|------------------|--|------------------------------------|-----------------------------------|-----------|----------|--------------------------------|----------------------------------|--------------------------------|
| | Base Slab | | | Base Unit or Riser Walls | | | Below Grade Slab (w/PJB) Reducing Slab (w/PB) | | | | | Base Slab | | | Base Unit or Riser Walls | | | Below Grade Slab (w/PJB) Reducing Slab (w/PB) | | | | | | | |
| | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | Reduced Riser Size | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | Reduced Riser Size | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | Reduced Riser Size | Short Span Reinf. Steel Area | Long Span Reinf. Steel Area | Thickness | | | | |
| X x Y | Ashort | Along | BS | Bshort | Blong | W | RWSxRWL or ID | Dshort | Dlong | TS | Ashort | Along | BS | Bshort | Blong | W | RWSxRWL or ID | Dshort | Dlong | TS | BH MIN | HOLE DIA | KO DIA | | |
| ft. | in ² /ft | in ² /ft | in. | in ² /ft | in ² /ft | in. | ft. ** | in ² /ft | in ² /ft | in. | in ² /ft | in ² /ft | in. | in ² /ft | in ² /ft | in. | ft. ** | in ² /ft | in ² /ft | in. | ft. | in. | in. | | |
| Precast Junction Box (PJB) | 3x3 | 0.23 | 0.23 | 6 | 0.19 | 0.19 | 6 | N/A | 0.37 | 0.37 | 9 | 0.29 | 0.29 | 6 | 0.24 | 0.24 | 6 | N/A | 0.37 | 0.37 | 9 | 3.5 | 36 | 36 | |
| | 4x4 | 0.29 | 0.29 | 6 | 0.24 | 0.24 | 6 | N/A | 0.41 | 0.41 | 9 | 0.47 | 0.47 | 6 | 0.38 | 0.38 | 6 | N/A | 0.41 | 0.41 | 9 | 4.5 | 48 | 48 | |
| | 3x5 | 0.29 | 0.18 | 6 | 0.19 | 0.35 | 6 | N/A | 0.48 | 0.48 | 9 | 0.39 | 0.18 | 6 | 0.23 | 0.59 | 6 | N/A | 0.48 | 0.48 | 9 | 3.5 | 36/60 | 36/60 | |
| | 4x5 | 0.36 | 0.18 | 6 | 0.22 | 0.34 | 6 | N/A | 0.42 | 0.42 | 9 | 0.53 | 0.26 | 6 | 0.39 | 0.59 | 6 | N/A | 0.42 | 0.42 | 9 | 4.5 | 48/60 | 48/60 | |
| | 5x5 | 0.36 | 0.36 | 6 | 0.34 | 0.34 | 6 | N/A | 0.43 | 0.43 | 9 | 0.62 | 0.62 | 6 | 0.59 | 0.59 | 6 | N/A | 0.43 | 0.43 | 9 | 5.5 | 60 | 60 | |
| | 5x6 | 0.27 | 0.27 | 9 | 0.34 | 0.45 | 6 | N/A | 0.48 | 0.48 | 9 | 0.47 | 0.45 | 9 | 0.38 | 0.54 | 8 | N/A | 0.48 | 0.48 | 9 | 5.5 | 60/72 | 60/72 | |
| | 6x6 | 0.27 | 0.27 | 9 | 0.45 | 0.45 | 6 | N/A | 0.56 | 0.56 | 9 | 0.52 | 0.52 | 9 | 0.54 | 0.54 | 8 | N/A | 0.56 | 0.56 | 9 | 6.5 | 72 | 72 | |
| | 8x8 | 0.46 | 0.46 | 9 | 0.51 | 0.51 | 8 | N/A | 0.45 | 0.45 | 12 | 0.87 | 0.87 | 9 | 0.59 | 0.59 | 10 | N/A | 0.45 | 0.45 | 12 | 8.5 | 96 | 72 | |
| Precast Base (PB) | 3x3 | 0.23 | 0.23 | 6 | 0.19 | 0.19 | 6 | N/A | N/A | N/A | N/A | 0.29 | 0.29 | 6 | 0.24 | 0.24 | 6 | N/A | N/A | N/A | N/A | 3.5 | 36 | 36 | |
| | 4x4 | 0.29 | 0.29 | 6 | 0.24 | 0.24 | 6 | N/A | N/A | N/A | N/A | 0.47 | 0.47 | 6 | 0.38 | 0.38 | 6 | N/A | N/A | N/A | N/A | 4.5 | 48 | 48 | |
| | 3x5 | 0.29 | 0.18 | 6 | 0.19 | 0.35 | 6 | 3x3 | 0.30 | 0.34 | 9 | 0.39 | 0.18 | 6 | 0.23 | 0.59 | 6 | 3x3 | 0.40 | 0.40 | 9 | 3.5 | 36/60 | 36/60 | |
| | 4x5 | 0.36 | 0.18 | 6 | 0.22 | 0.34 | 6 | 3x3 | 0.30 | 0.30 | 9 | 0.53 | 0.26 | 6 | 0.39 | 0.59 | 6 | 3x3 | 0.46 | 0.37 | 9 | 4.5 | 48/60 | 48/60 | |
| | 4x5 | 0.36 | 0.18 | 6 | 0.22 | 0.34 | 6 | 4x4 | 0.30 | 0.30 | 9 | 0.53 | 0.26 | 6 | 0.39 | 0.59 | 6 | 4x4 | 0.39 | 0.39 | 9 | 4.5 | 48/60 | 48/60 | |
| | 4x5 | 0.36 | 0.18 | 6 | 0.22 | 0.34 | 6 | 48" | 0.39 | 0.39 | 9 | 0.53 | 0.26 | 6 | 0.39 | 0.59 | 6 | 48" | 0.47 | 0.47 | 9 | 4.5 | 48/60 | 48/60 | |
| | 4x5 | 0.36 | 0.18 | 6 | 0.22 | 0.34 | 6 | 3x5 | 0.33 | 0.40 | 9 | 0.53 | 0.26 | 6 | 0.39 | 0.59 | 6 | 3x5 | 0.48 | 0.48 | 9 | 4.5 | 48/60 | 48/60 | |
| | 5x5 | 0.36 | 0.36 | 6 | 0.34 | 0.34 | 6 | 3x3 | 0.34 | 0.34 | 9 | 0.62 | 0.62 | 6 | 0.59 | 0.59 | 6 | 3x3 | 0.53 | 0.53 | 9 | 5.5 | 60 | 60 | |
| | 5x5 | 0.36 | 0.36 | 6 | 0.34 | 0.34 | 6 | 4x4 | 0.36 | 0.36 | 9 | 0.62 | 0.62 | 6 | 0.59 | 0.59 | 6 | 4x4 | 0.64 | 0.64 | 9 | 5.5 | 60 | 60 | |
| | 5x5 | 0.38 | 0.38 | 6 | 0.34 | 0.34 | 6 | 48" | 0.36 | 0.36 | 9 | 0.62 | 0.62 | 6 | 0.59 | 0.59 | 6 | 48" | 0.64 | 0.64 | 9 | 5.5 | 60 | 60 | |
| | 5x5 | 0.36 | 0.36 | 6 | 0.34 | 0.34 | 6 | 3x5 | 0.34 | 0.40 | 9 | 0.62 | 0.62 | 6 | 0.59 | 0.59 | 6 | 3x5 | 0.53 | 0.53 | 9 | 5.5 | 60 | 60 | |
| | 5x6 | 0.31 | 0.31 | 9 | 0.34 | 0.45 | 6 | 3x3 | 0.34 | 0.34 | 9 | 0.47 | 0.45 | 9 | 0.38 | 0.54 | 8 | 3x3 | 0.61 | 0.50 | 9 | 5.5 | 60/72 | 60/72 | |
| | 5x6 | 0.27 | 0.27 | 9 | 0.34 | 0.45 | 6 | 4x4 | 0.36 | 0.45 | 9 | 0.47 | 0.45 | 9 | 0.38 | 0.54 | 8 | 4x4 | 0.74 | 0.57 | 9 | 5.5 | 60/72 | 60/72 | |
| | 5x6 | 0.29 | 0.29 | 9 | 0.34 | 0.45 | 6 | 48" | 0.36 | 0.45 | 9 | 0.47 | 0.45 | 9 | 0.38 | 0.54 | 8 | 48" | 0.74 | 0.57 | 9 | 5.5 | 60/72 | 60/72 | |
| | 5x6 | 0.29 | 0.29 | 9 | 0.34 | 0.45 | 6 | 3x5 | 0.45 | 0.45 | 9 | 0.47 | 0.45 | 9 | 0.38 | 0.54 | 8 | 3x5 | 0.61 | 0.61 | 9 | 5.5 | 60/72 | 60/72 | |
| | 6x6 | 0.29 | 0.29 | 9 | 0.45 | 0.45 | 6 | 3x3 | 0.41 | 0.41 | 9 | 0.52 | 0.52 | 9 | 0.54 | 0.54 | 8 | 3x3 | 0.74 | 0.74 | 9 | 6.5 | 72 | 72 | |
| | 6x6 | 0.27 | 0.27 | 9 | 0.45 | 0.45 | 6 | 4x4 | 0.45 | 0.45 | 9 | 0.52 | 0.52 | 9 | 0.54 | 0.54 | 8 | 4x4 | 0.87 | 0.87 | 9 | 6.5 | 72 | 72 | |
| | 6x6 | 0.29 | 0.29 | 9 | 0.45 | 0.45 | 6 | 48" | 0.45 | 0.45 | 9 | 0.52 | 0.52 | 9 | 0.54 | 0.54 | 8 | 48" | 0.87 | 0.87 | 9 | 6.5 | 72 | 72 | |
| | 6x6 | 0.29 | 0.29 | 9 | 0.45 | 0.45 | 6 | 3x5 | 0.45 | 0.45 | 9 | 0.52 | 0.52 | 9 | 0.54 | 0.54 | 8 | 3x5 | 0.87 | 0.87 | 9 | 6.5 | 72 | 72 | |
| | 8x8 | 0.52 | 0.52 | 9 | 0.51 | 0.51 | 8 | 3x3 | 0.61 | 0.61 | 12 | 0.91 | 0.91 | 9 | 0.70 | 0.70 | 10 | 3x3 | 0.85 | 0.85 | 12 | 8.5 | 96 | 72 | |
| 8x8 | 0.52 | 0.52 | 9 | 0.51 | 0.51 | 8 | 4x4 | 0.70 | 0.70 | 12 | 0.87 | 0.87 | 9 | 0.70 | 0.70 | 10 | 4x4 | 1.01 | 1.01 | 12 | 8.5 | 96 | 72 | | |
| 8x8 | 0.52 | 0.52 | 9 | 0.51 | 0.51 | 8 | 48" | 0.70 | 0.70 | 12 | 0.87 | 0.87 | 9 | 0.70 | 0.70 | 10 | 48" | 1.01 | 1.01 | 12 | 8.5 | 96 | 72 | | |
| 8x8 | 0.52 | 0.52 | 9 | 0.51 | 0.51 | 8 | 3x5 | 0.70 | 0.85 | 12 | 0.87 | 0.87 | 9 | 0.70 | 0.70 | 10 | 3x5 | 1.01 | 1.01 | 12 | 8.5 | 96 | 72 | | |

** Unless otherwise indicated.


FABRICATION NOTES:

- Maximum spacing of reinforcement is 8".
- At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

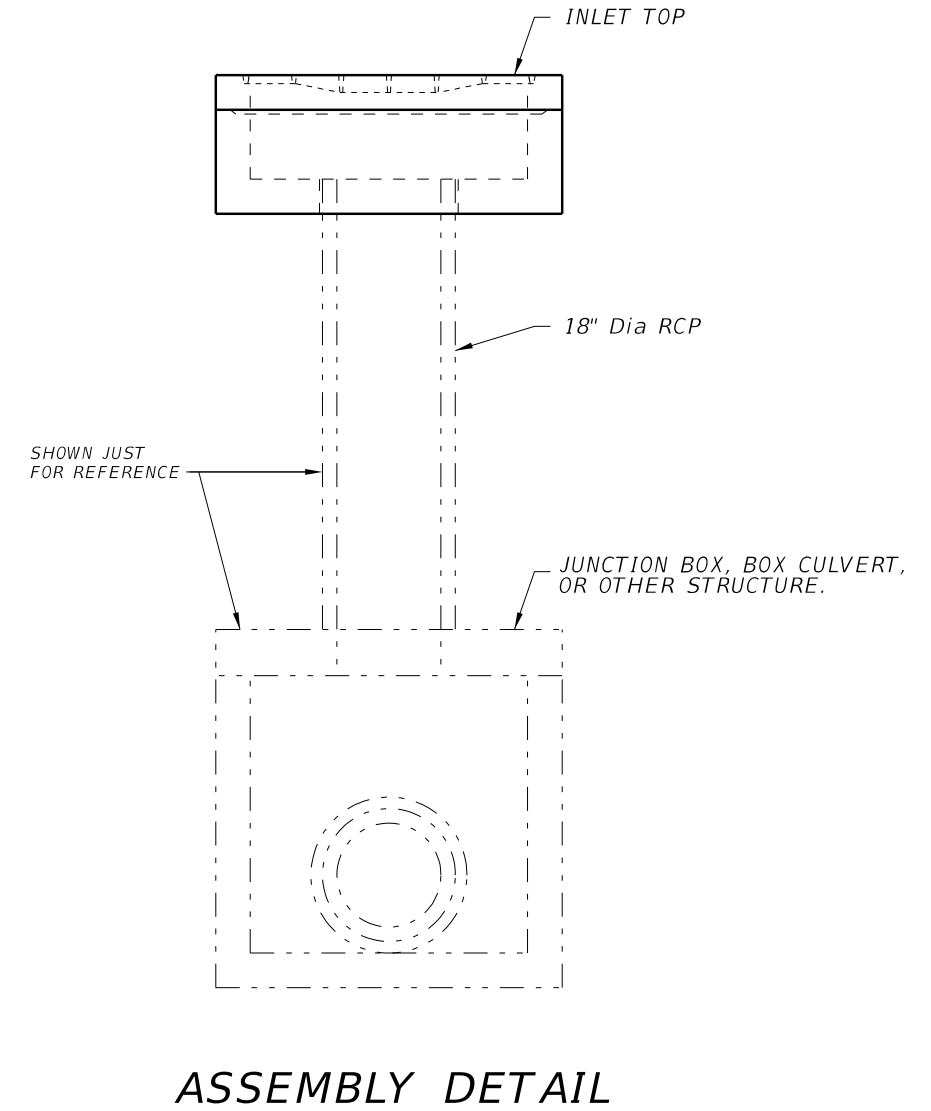
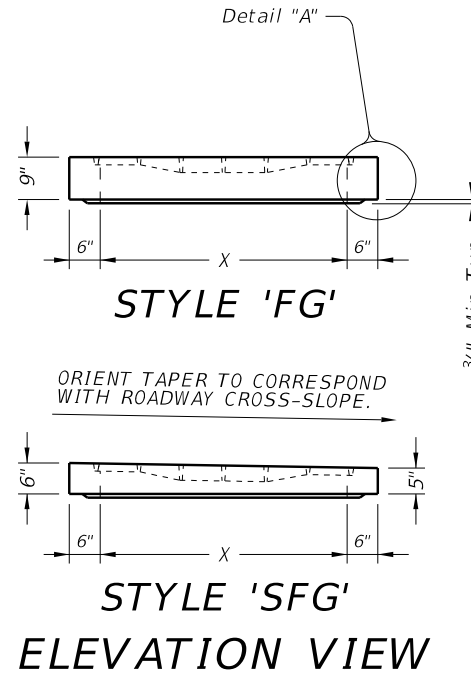
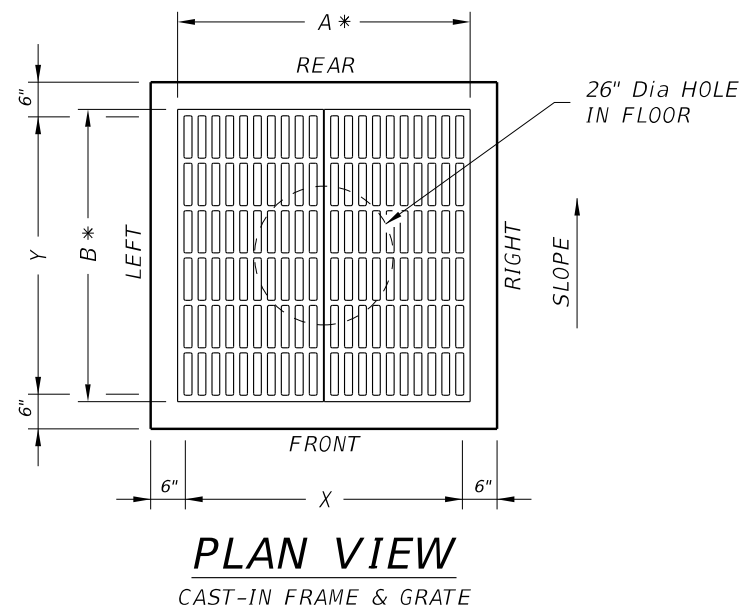
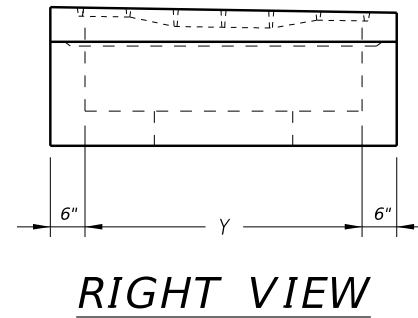
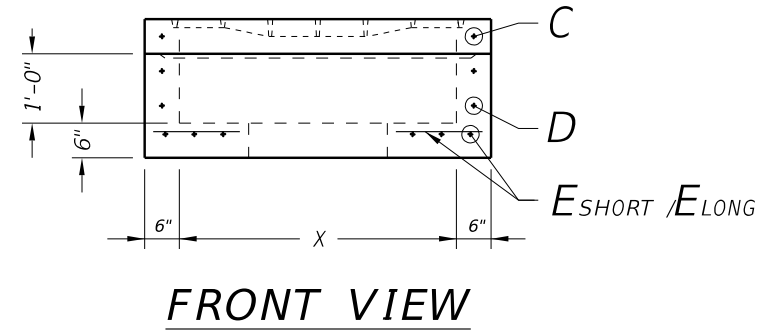
GENERAL NOTES:

- Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
- Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
- Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

| | | | |
|---|-----------|---------------------------------|-------------|
|  Texas Department of Transportation | | Bridge Division Standard | |
| <h2>DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX</h2> | | | |
| <h3>PDD</h3> | | | |
| FILE: prest10.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT |
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FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of 1 1/2" to reinforcing steel from inside surfaces. Place short span reinforcing steel closest to surface.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Place additional diagonal #4 bars, length = Dia + 4", at 1" clear cover around opening in floor.
7. Provide cast iron standard grate, unless noted otherwise elsewhere in plans.

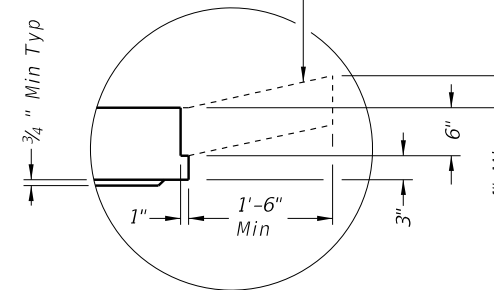
INSTALLATION NOTES:

1. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendation. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
2. Do not grout rubber gasket joints without Manufacturer's recommendation.
3. Orient long dimension of grate slots perpendicular to direction of traffic, unless noted otherwise on plans.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Precast Overpass Drain may connect into junction box, box culvert, or other new or existing structure. See details for connecting 18" Dia RCP into structure elsewhere.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, and size.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to POD. Apron is 1'-6" Min width around precast overpass drain.



DETAIL "A"

(Reinforcing not shown for clarity)
When an apron is to be cast around POD, use detail above to create an apron ledge on all 4 sides.

| Style | Size (X x Y) | A x B* | C | D | E Short | E Long |
|-------|--------------|--------|--------------------------|--------------------------|--------------------------|--------------------------|
| FG | 3'x3' | 3'x3' | 0.37 in ² /ft | 0.18 in ² /ft | 0.18 in ² /ft | 0.18 in ² /ft |
| SFG | 3'x3' | 3'x3' | 0.32 in ² /ft | 0.18 in ² /ft | 0.18 in ² /ft | 0.18 in ² /ft |
| FG | 4'x4' | 3'x3' | 0.41 in ² /ft | 0.18 in ² /ft | 0.21 in ² /ft | 0.21 in ² /ft |
| SFG | 4'x4' | 3'x3' | 0.32 in ² /ft | 0.18 in ² /ft | 0.21 in ² /ft | 0.21 in ² /ft |
| FG | 3'x5' | 3'x5' | 0.48 in ² /ft | 0.18 in ² /ft | 0.22 in ² /ft | 0.18 in ² /ft |
| SFG | 3'x5' | 3'x5' | 0.32 in ² /ft | 0.18 in ² /ft | 0.22 in ² /ft | 0.18 in ² /ft |

*Nominal frame and grate size.

HL93 LOADING



PRECAST OVERPASS DRAIN

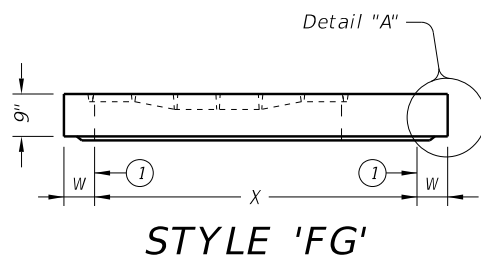
POD

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| ©TxDOT January 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| DIST | COUNTY | | SHEET NO. | |
| DAL | ROCKWALL | | 230 | |

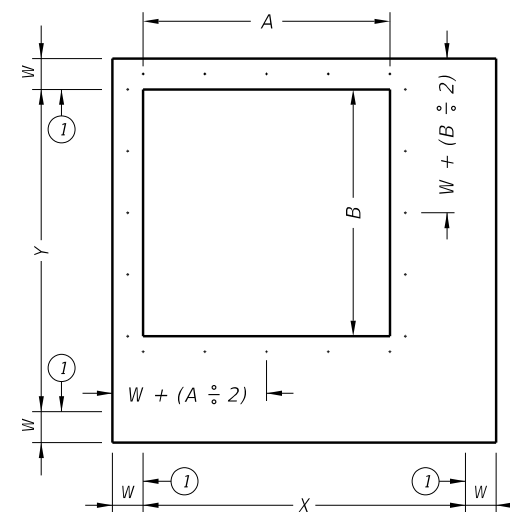
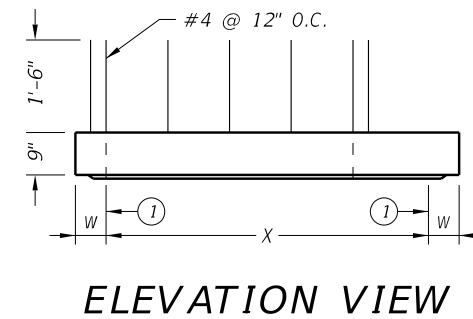
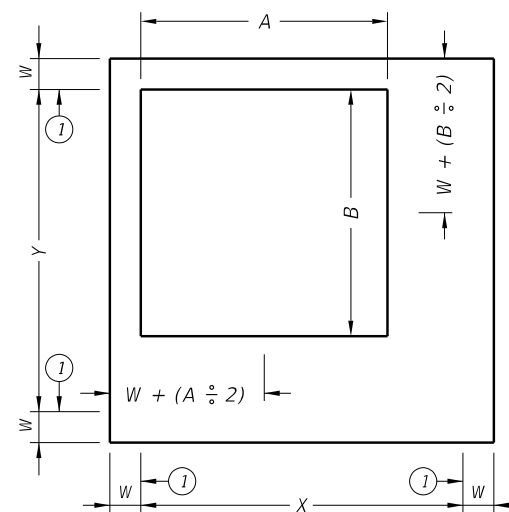
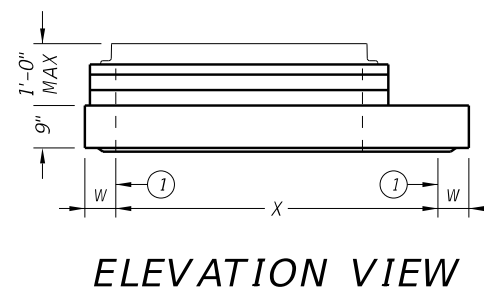
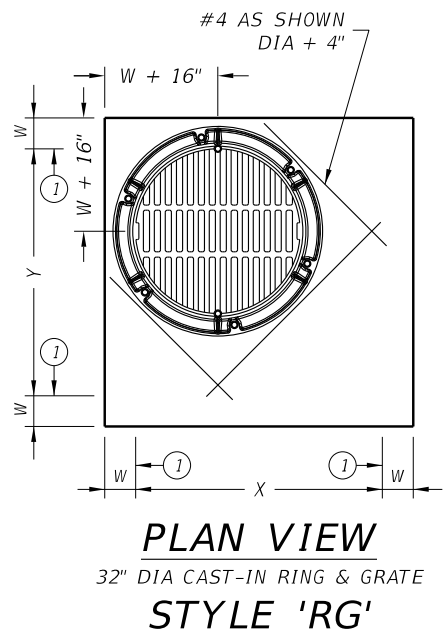
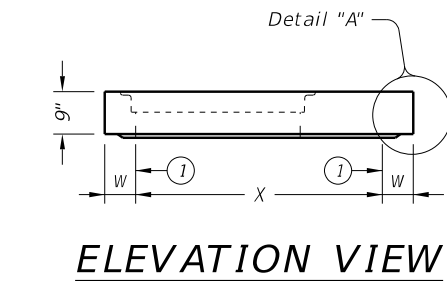
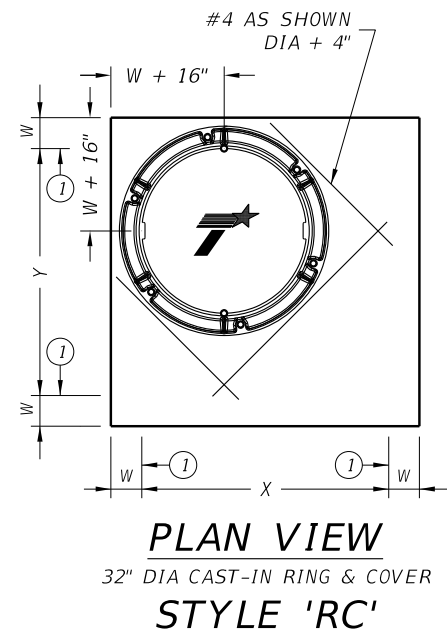
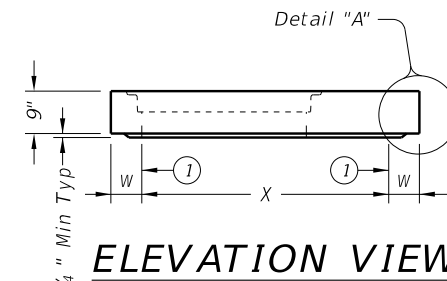
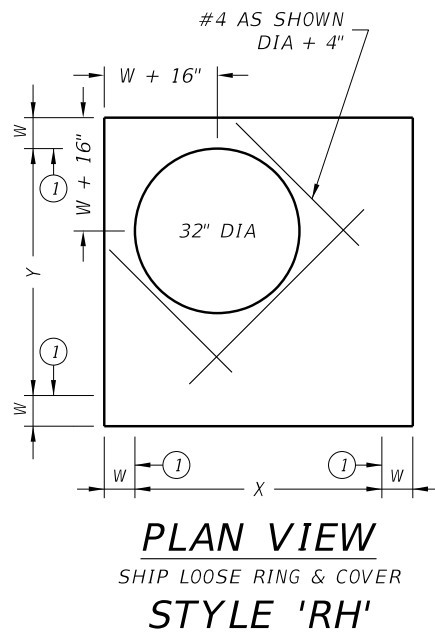
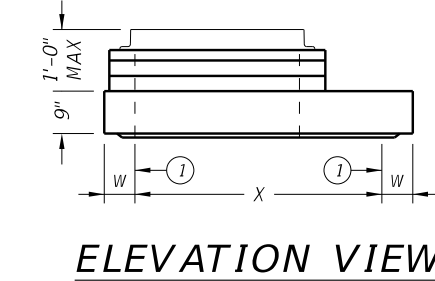
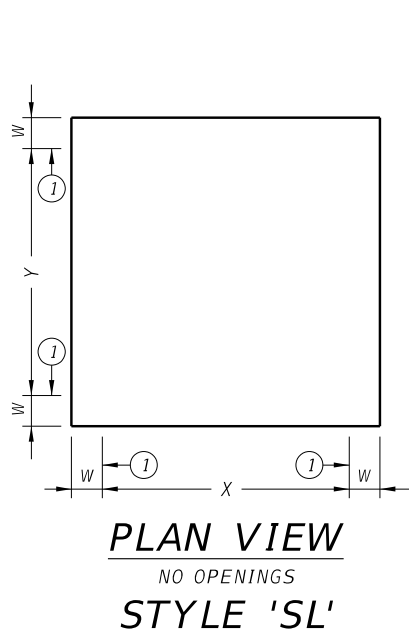
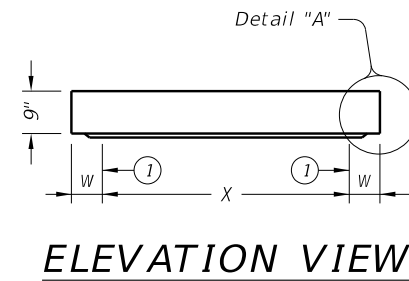
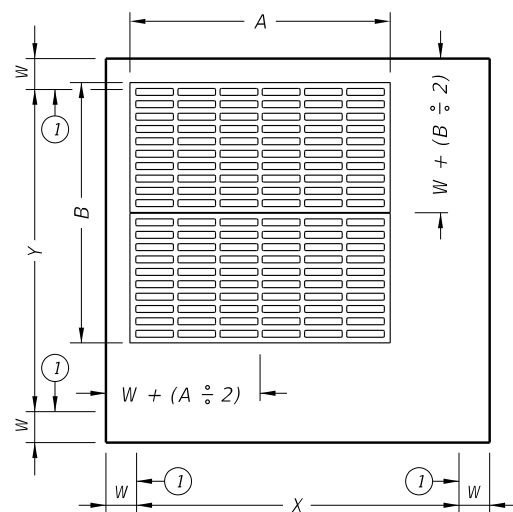
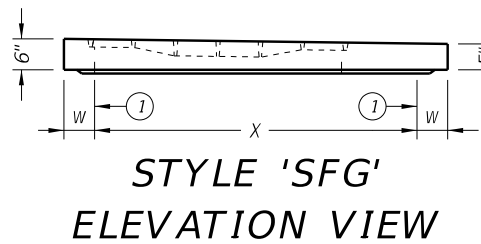
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ORIENT TAPER TO CORRESPOND WITH ROADWAY CROSS-SLOPE.



① Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2



PRECAST SLAB LID

PSL

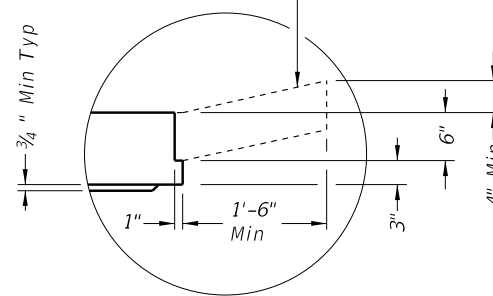
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| ©TxDOT January 2015 | CONT | SECT | JOB | HIGHWAY |
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| Style | Size (X x Y) | W ② | A x B (nominal) | Short Span Reinf Steel Area | Long Span Reinf Steel Area |
|-------------------|--------------|--------|------------------|-----------------------------|----------------------------|
| SL | 3'x3' | 6" | n/a | 0.37 in ² /ft | 0.37 in ² /ft |
| RH,RC,RG,SH,S1,FG | 3'x3' | 6" | 3'x3' or 32" Dia | 0.37 in ² /ft | 0.37 in ² /ft |
| SFG | 3'x3' | 6" | 3'x3' | 0.32 in ² /ft | 0.32 in ² /ft |
| SL | 4'x4' | 6" | n/a | 0.34 in ² /ft | 0.34 in ² /ft |
| RH,RC,RG,SH,S1,FG | 4'x4' | 6" | 3'x3' or 32" Dia | 0.41 in ² /ft | 0.41 in ² /ft |
| SH,S1,FG | 4'x4' | 6" | 4'x4' | 0.41 in ² /ft | 0.41 in ² /ft |
| SFG | 4'x4' | 6" | 4'x4' | 0.32 in ² /ft | 0.32 in ² /ft |
| SL | 3'x5' | 6" | n/a | 0.39 in ² /ft | 0.39 in ² /ft |
| RH,RC,RG,SH,S1,FG | 3'x5' | 6" | 3'x3' or 32" Dia | 0.48 in ² /ft | 0.48 in ² /ft |
| SH,S1,FG | 3'x5' | 6" | 3'x5' | 0.48 in ² /ft | 0.48 in ² /ft |
| SFG | 3'x5' | 6" | 3'x5' | 0.32 in ² /ft | 0.32 in ² /ft |
| SL | 4'x5' | 6" | n/a | 0.42 in ² /ft | 0.42 in ² /ft |
| RH,RC,RG,SH,S1,FG | 4'x5' | 6" | 3'x3' or 32" Dia | 0.42 in ² /ft | 0.42 in ² /ft |
| SH,S1,FG | 4'x5' | 6" | 4'x4' | 0.63 in ² /ft | 0.63 in ² /ft |
| SH,S1,FG | 4'x5' | 6" | 3'x5' | 0.66 in ² /ft | 0.66 in ² /ft |
| SL | 5'x5' | 6" | n/a | 0.36 in ² /ft | 0.36 in ² /ft |
| RH,RC,RG,SH,S1,FG | 5'x5' | 6" | 3'x3' or 32" Dia | 0.43 in ² /ft | 0.43 in ² /ft |
| SH,S1,FG | 5'x5' | 6" | 4'x4' | 0.63 in ² /ft | 0.63 in ² /ft |
| SH,S1,FG | 5'x5' | 6" | 3'x5' | 0.63 in ² /ft | 0.63 in ² /ft |
| SL | 5'x6' | 6"/8" | n/a | 0.48 in ² /ft | 0.48 in ² /ft |
| RH,RC,RG,SH,S1,FG | 5'x6' | 6"/8" | 3'x3' or 32" Dia | 0.48 in ² /ft | 0.48 in ² /ft |
| SH,S1,FG | 5'x6' | 6"/8" | 4'x4' | 0.60 in ² /ft | 0.60 in ² /ft |
| SH,S1,FG | 5'x6' | 6"/8" | 3'x5' | 0.60 in ² /ft | 0.60 in ² /ft |
| SL | 6'x6' | 6"/8" | n/a | 0.43 in ² /ft | 0.43 in ² /ft |
| RH,RC,RG,SH,S1,FG | 6'x6' | 6"/8" | 3'x3' or 32" Dia | 0.56 in ² /ft | 0.56 in ² /ft |
| SH,S1,FG | 6'x6' | 6"/8" | 4'x4' | 0.56 in ² /ft | 0.56 in ² /ft |
| SH,S1,FG | 6'x6' | 6"/8" | 3'x5' | 0.59 in ² /ft | 0.59 in ² /ft |
| SL | 8'x8' | 8"/10" | n/a | 0.45 in ² /ft | 0.45 in ² /ft |
| RH,RC,RG,SH,S1,FG | 8'x8' | 8"/10" | 3'x3' or 32" Dia | 0.45 in ² /ft | 0.45 in ² /ft |
| SH,S1,FG | 8'x8' | 8"/10" | 4'x4' | 0.45 in ² /ft | 0.45 in ² /ft |
| SH,S1,FG | 8'x8' | 8"/10" | 3'x5' | 0.45 in ² /ft | 0.45 in ² /ft |

② See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)
 When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of 3/4" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

SHEET 2 OF 2



Bridge Division Standard

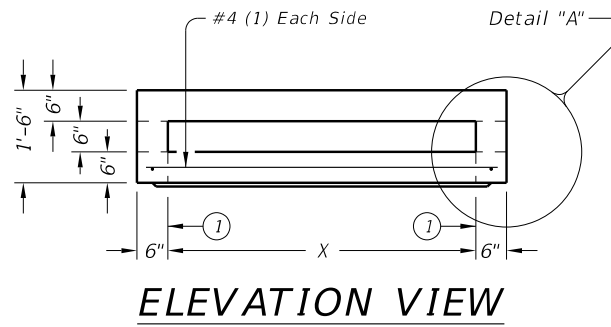
PRECAST SLAB LID

PSL

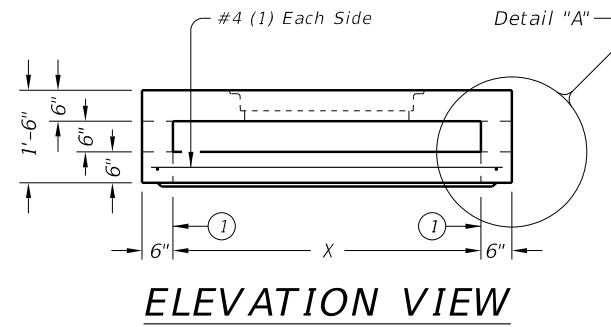
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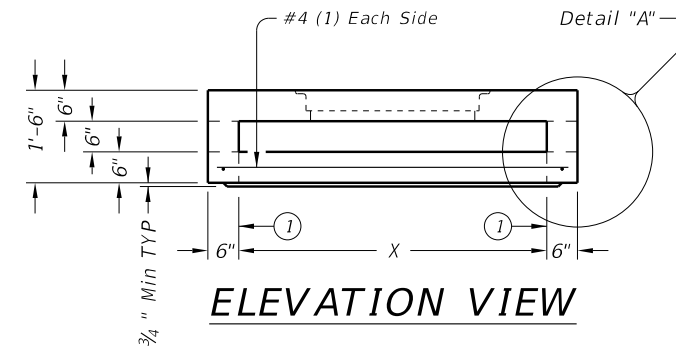
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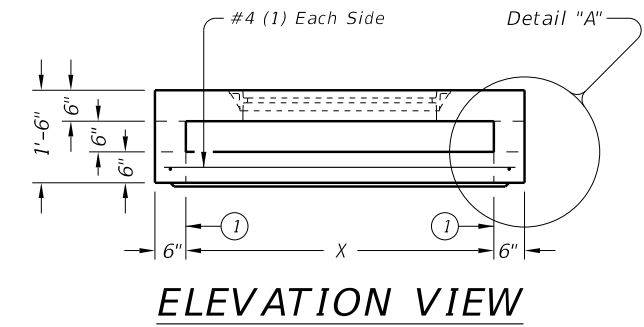
ELEVATION VIEW



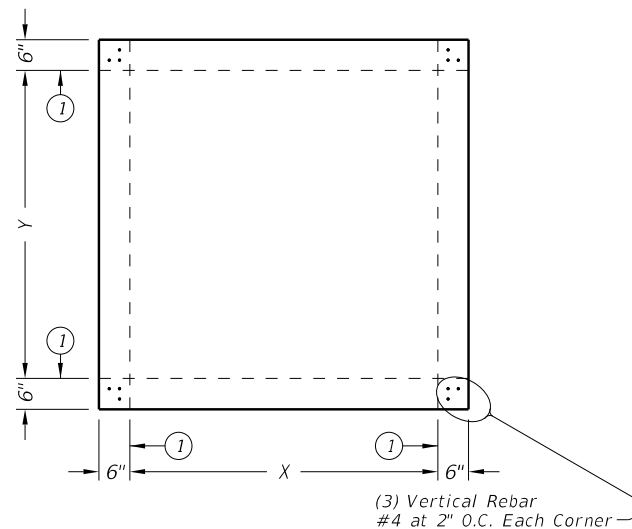
ELEVATION VIEW



ELEVATION VIEW



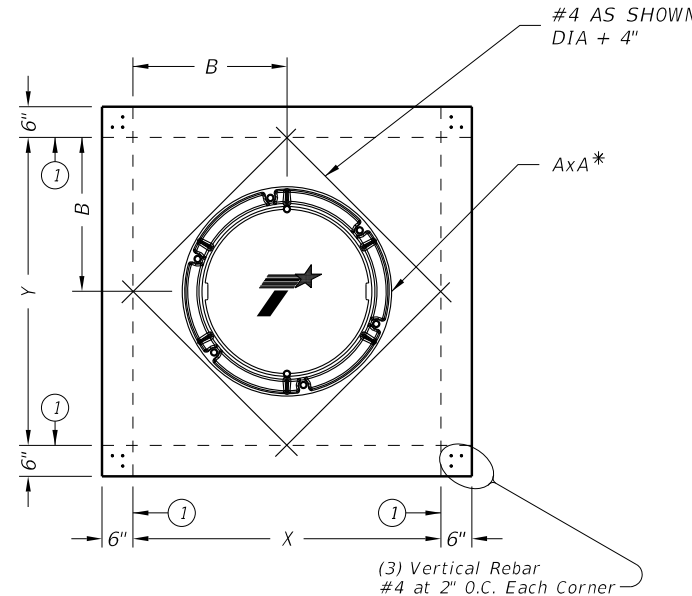
ELEVATION VIEW



PLAN VIEW

NO OPENINGS

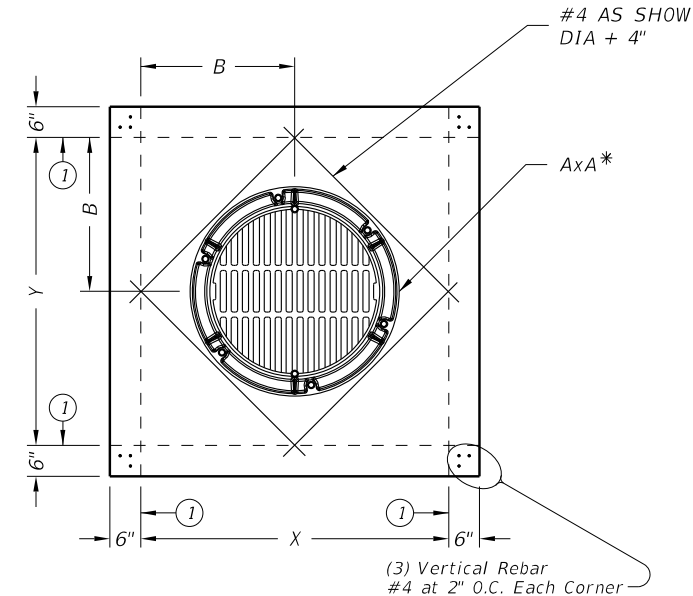
STYLE 'SL'



PLAN VIEW

32" DIA CAST-IN RING & COVER

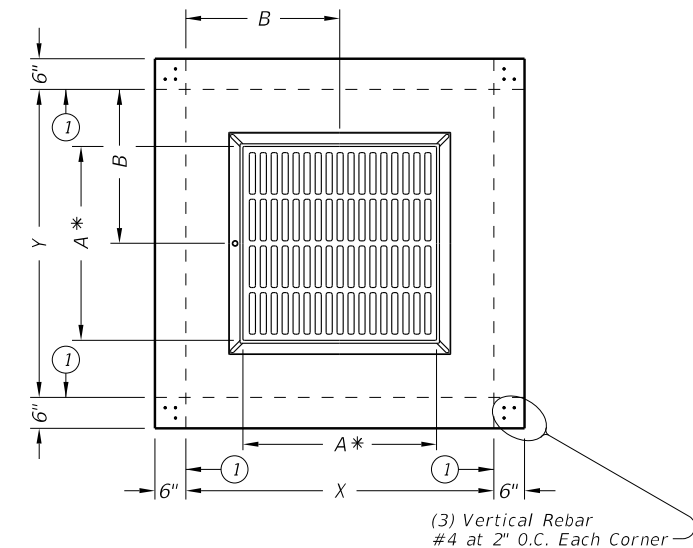
STYLE 'RC'



PLAN VIEW

32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW

CAST-IN FRAME & GRATE

STYLE 'FG'

① Matches inside face of wall of precast base or riser below inlet.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of 3/4" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

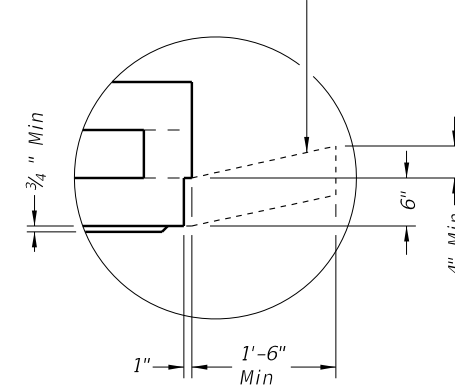
INSTALLATION NOTES:

1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)
When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

| Style | Size (X x Y) | A x A * | B x B | Short Span Reinf Steel Area | Long Span Reinf Steel Area |
|--------|--------------|---------|-----------|-----------------------------|----------------------------|
| SL | 3'x3' | n/a | n/a | 0.37 in ² /ft | 0.37 in ² /ft |
| RC, RG | 3'x3' | 32" Dia | 1.5'x1.5' | 0.37 in ² /ft | 0.37 in ² /ft |
| FG | 3'x3' | 3'x3' | 1.5'x1.5' | 0.37 in ² /ft | 0.37 in ² /ft |
| SL | 4'x4' | n/a | n/a | 0.34 in ² /ft | 0.34 in ² /ft |
| RC, RG | 4'x4' | 32" Dia | 2'x2' | 0.34 in ² /ft | 0.34 in ² /ft |
| FG | 4'x4' | 3'x3' | 2'x2' | 0.34 in ² /ft | 0.34 in ² /ft |
| FG | 4'x4' | 4'x4' | 2'x2' | 0.34 in ² /ft | 0.34 in ² /ft |
| SL | 5'x5' | n/a | n/a | 0.43 in ² /ft | 0.43 in ² /ft |
| RC, RG | 5'x5' | 32" Dia | 2.5'x2.5' | 0.68 in ² /ft | 0.68 in ² /ft |
| FG | 5'x5' | 3'x3' | 2.5'x2.5' | 0.43 in ² /ft | 0.43 in ² /ft |
| FG | 5'x5' | 4'x4' | 2.5'x2.5' | 0.43 in ² /ft | 0.43 in ² /ft |

* Nominal frame/grate or ring/cover size.



PRECAST AREA ZONE DRAIN

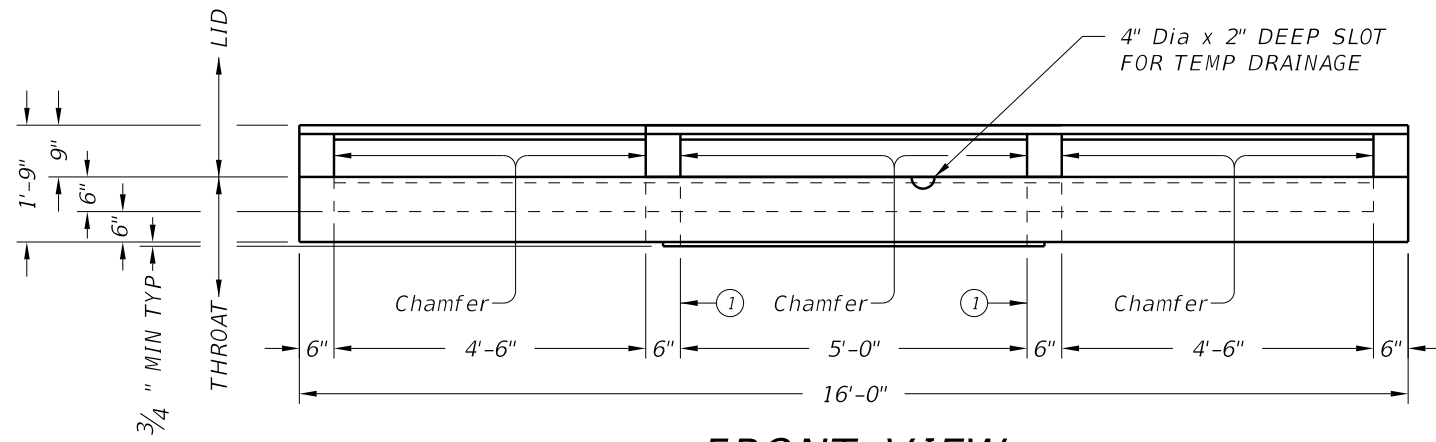
PAZD

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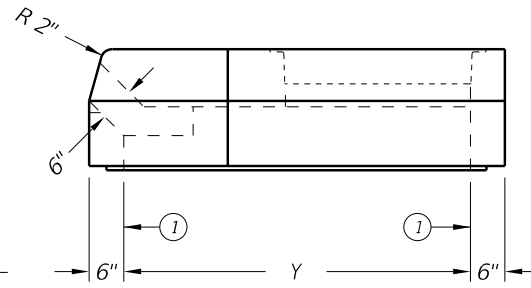
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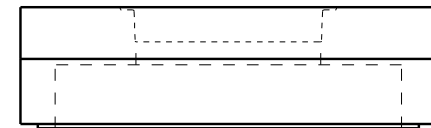
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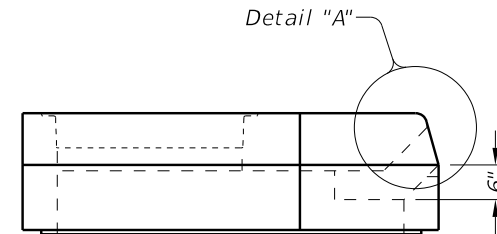
FRONT VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)



RIGHT VIEW

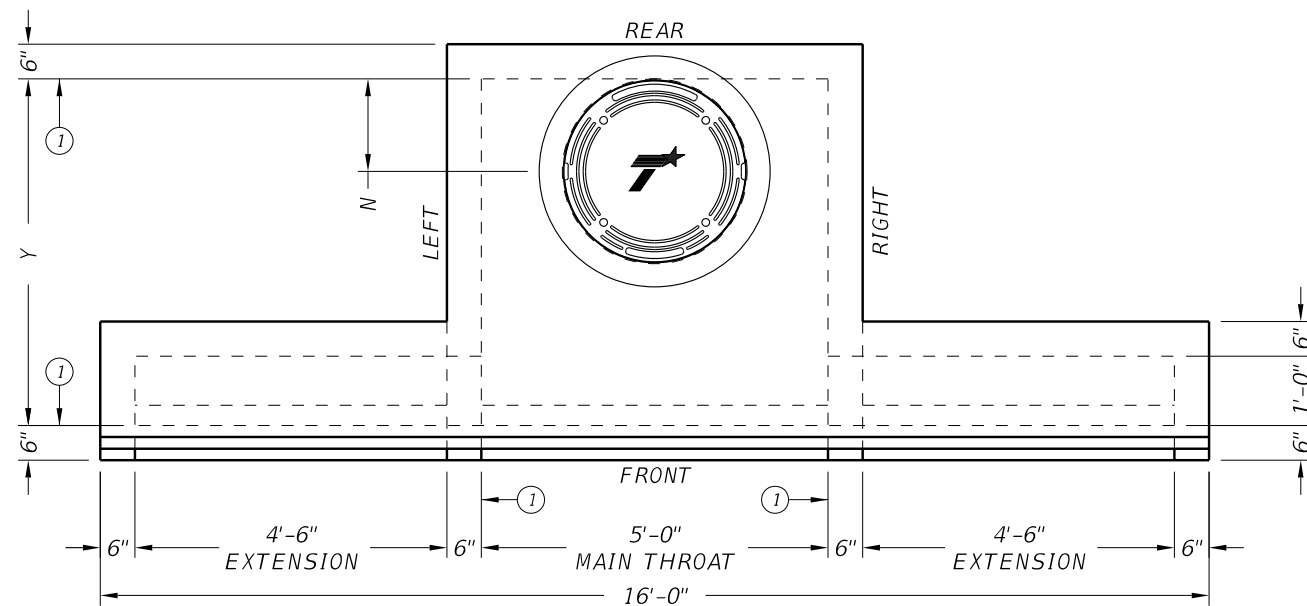


REAR VIEW
(EXTENSIONS NOT SHOWN)

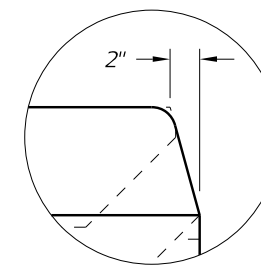


LEFT VIEW

① Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)



DETAIL "A"

HS20 LOADING SHEET 1 OF 2

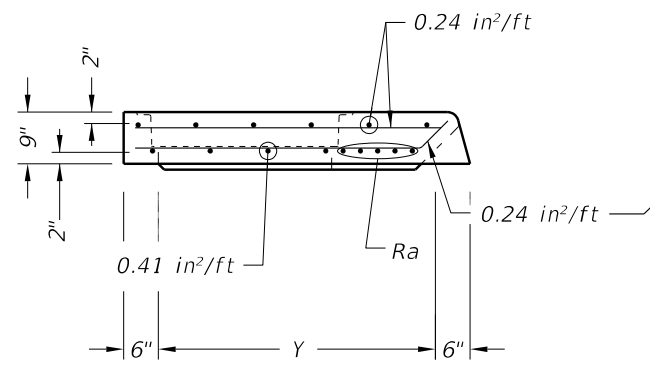


**PRECAST CURB INLET
OUTSIDE ROADWAY**

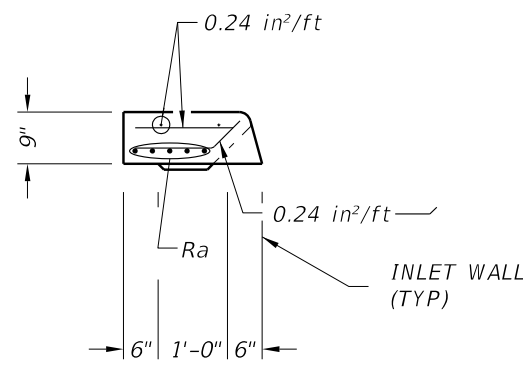
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| | DAL | ROCKWALL | 234 | |

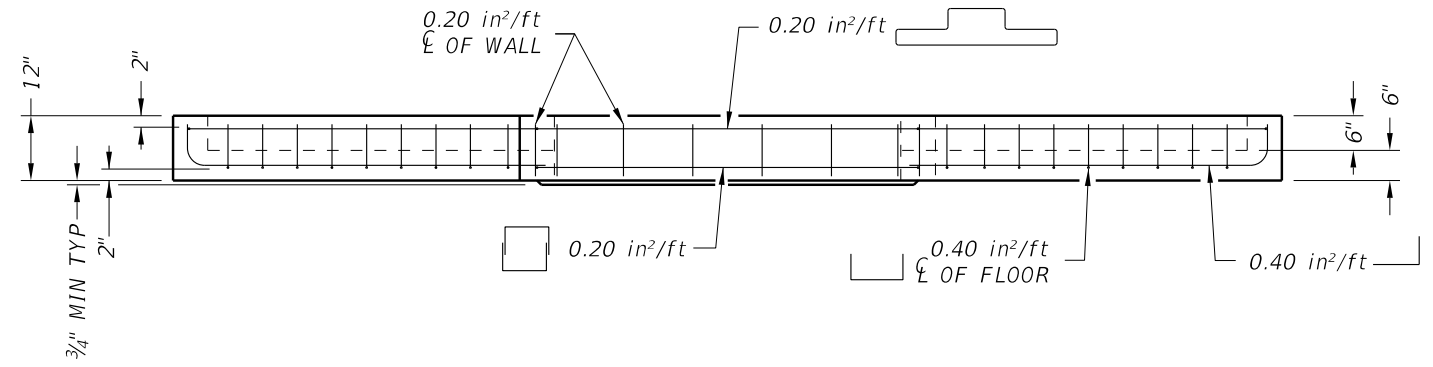
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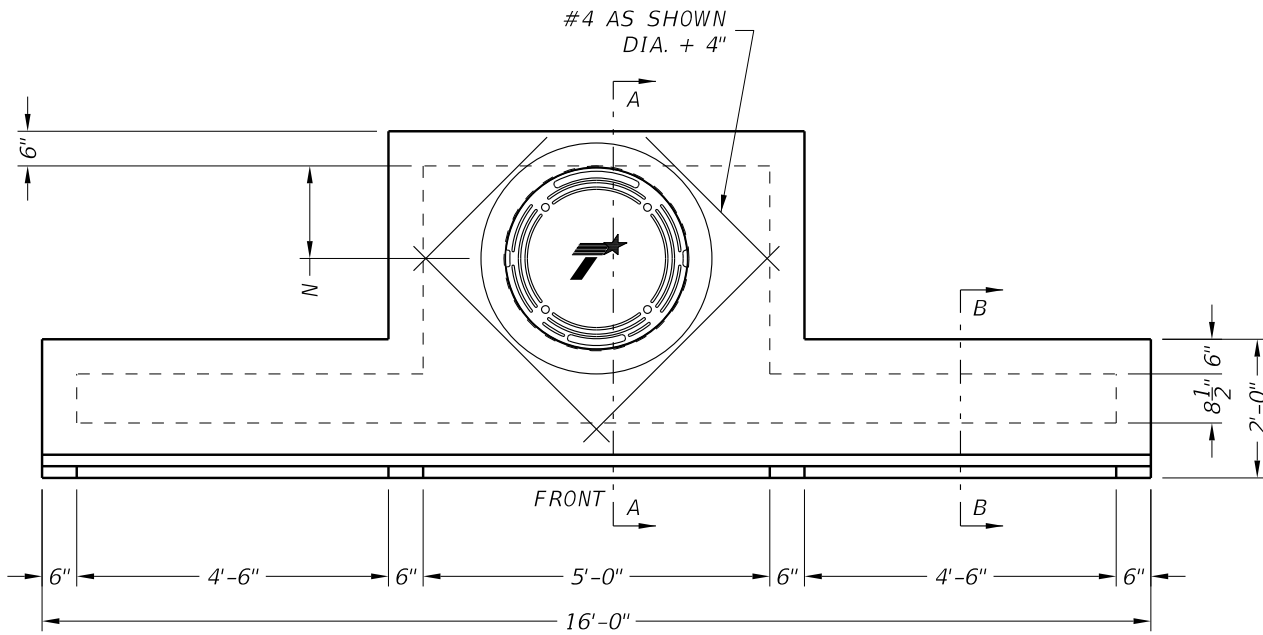
LID SECTION A-A



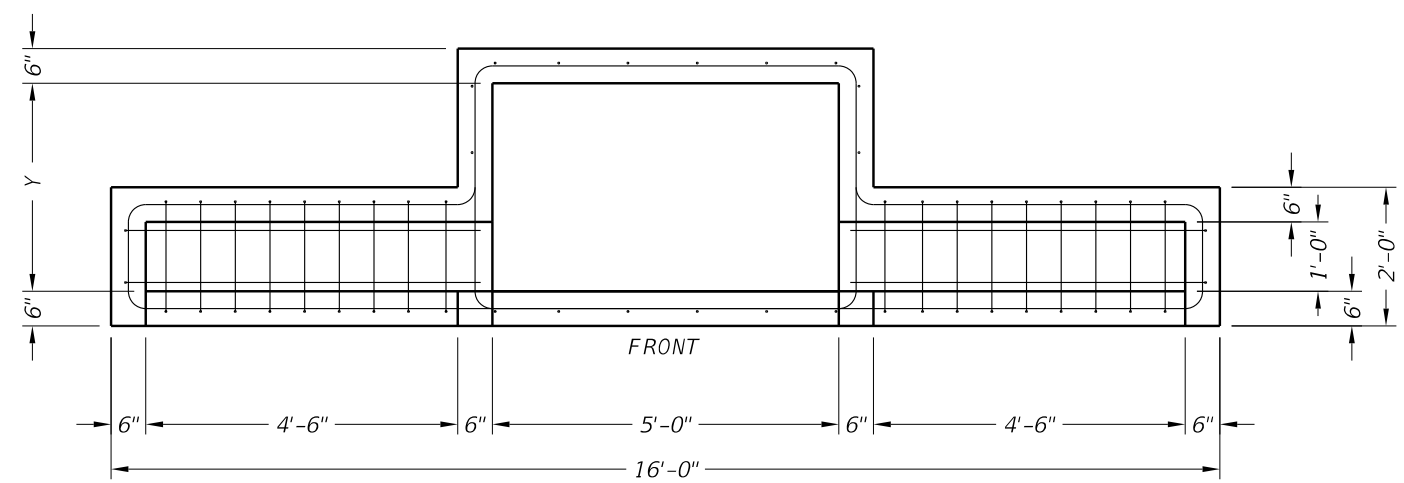
LID SECTION B-B



THROAT ELEVATION VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)



LID PLAN VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)



THROAT PLAN VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid 3/4" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

| SIZE (Y) | N | MH DIA* | Ra |
|----------|-----|---------|-------------------|
| 3' | 9" | 18" | (4) #5 Additional |
| 4' | 16" | 32" | (4) #5 Additional |
| 5' | 16" | 32" | (4) #5 Additional |
| 6' | 16" | 32" | (4) #5 Additional |

*Nominal ring and cover size.

HS20 LOADING SHEET 2 OF 2



**PRECAST CURB INLET
OUTSIDE ROADWAY**

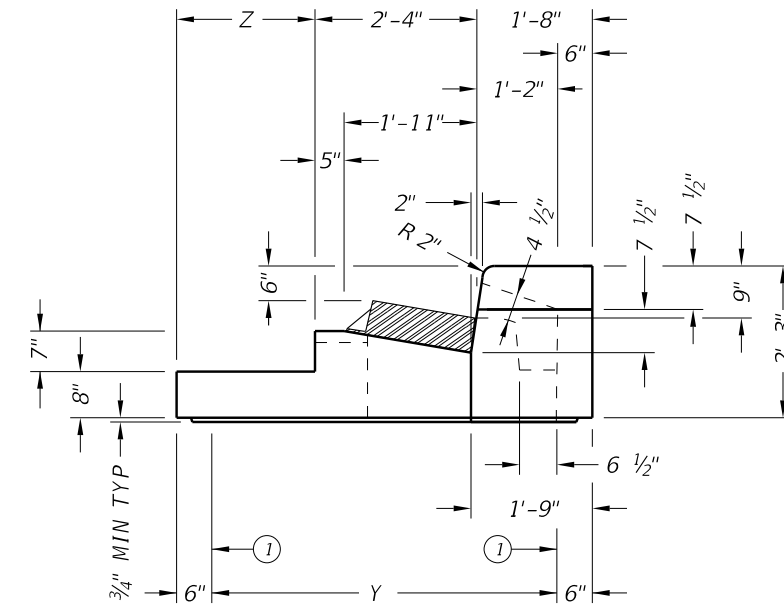
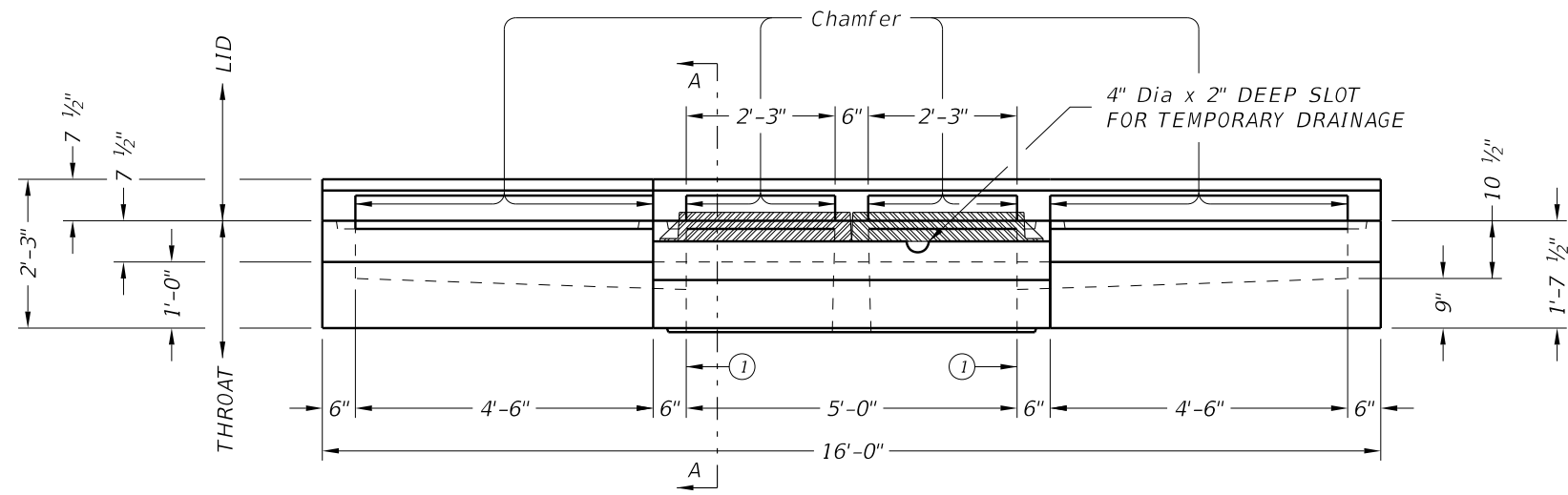
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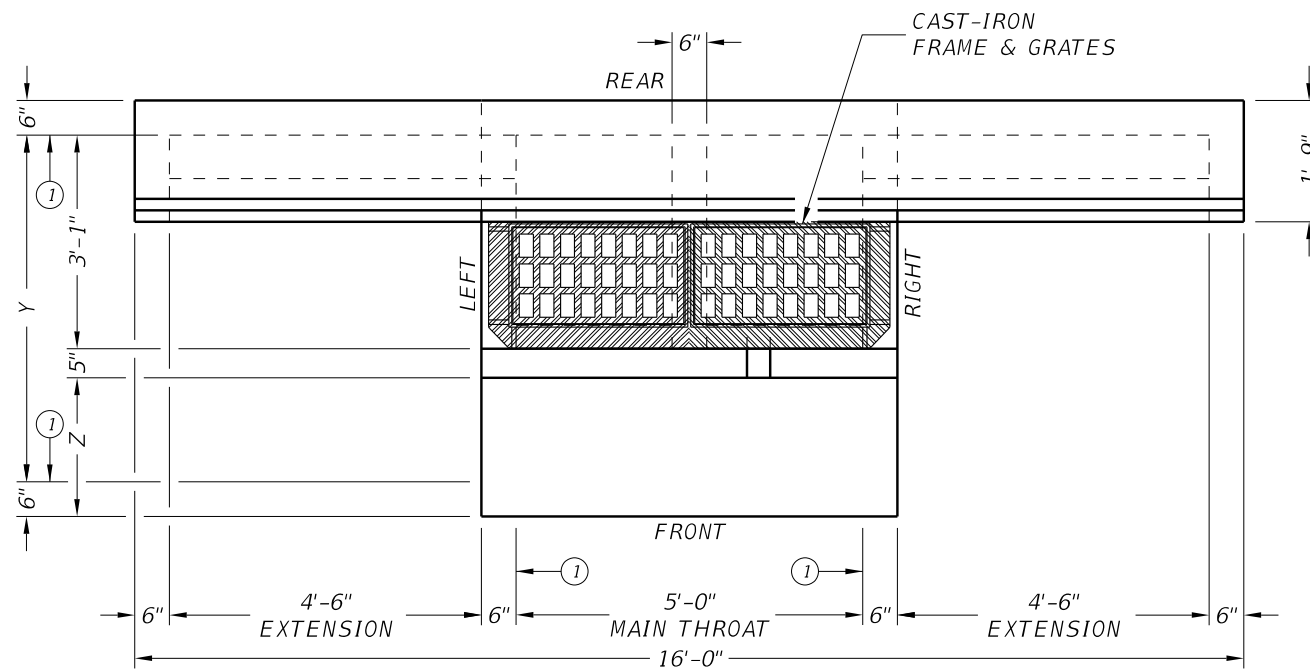
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① Matches inside face of wall of precast base or riser below inlet.



HS20 LOADING SHEET 1 OF 2

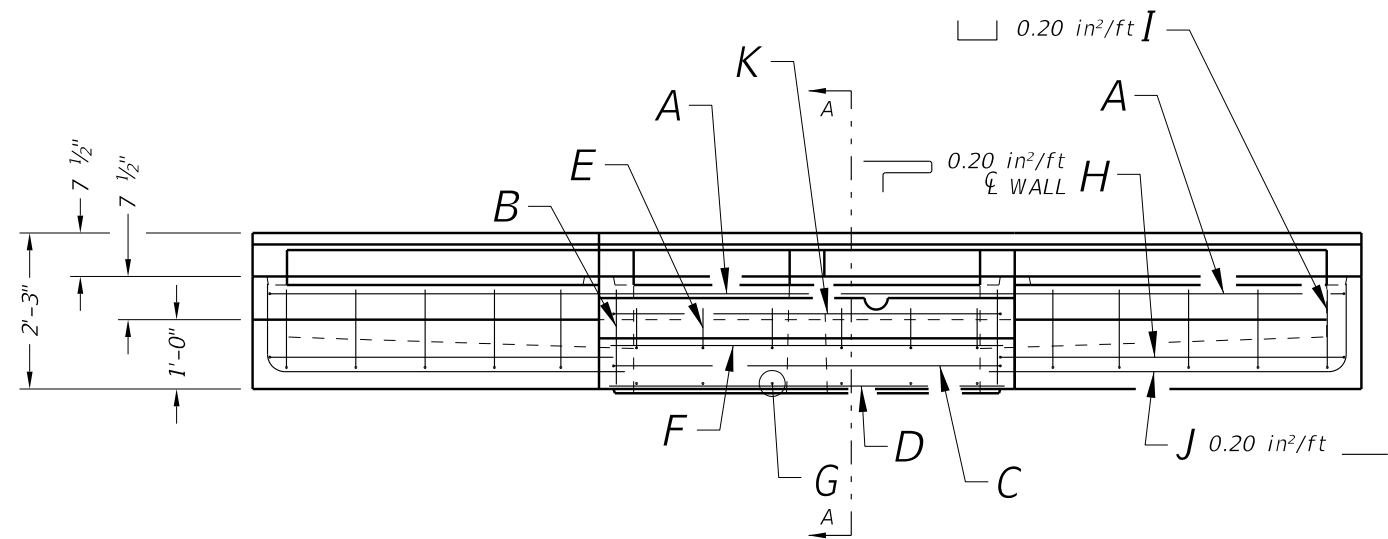


PRECAST CURB INLET
UNDER ROADWAY

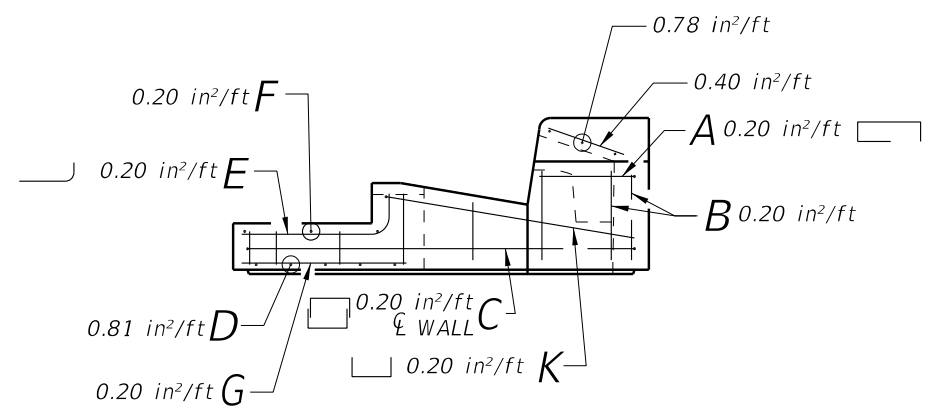
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| DAL | ROCKWALL | | 236 | |

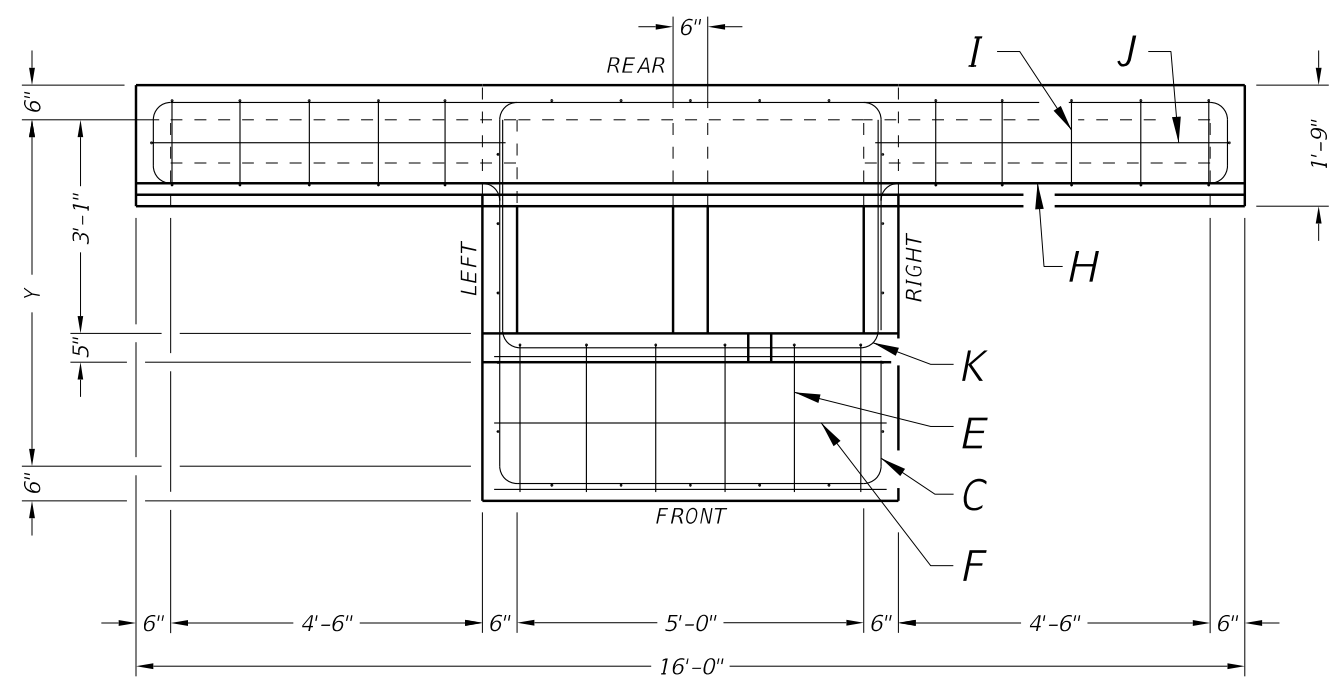
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FRONT VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW
(SHOWING LEFT AND RIGHT EXTENSIONS)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 1/2" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is 3/4". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid 3/4" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct traffic. Inlet lid is not for direct traffic. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or 1/2 the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

| SIZE (Y) | Z |
|----------|----|
| 3' | 0' |
| 4' | 1' |
| 5' | 2' |
| 6' | 3' |



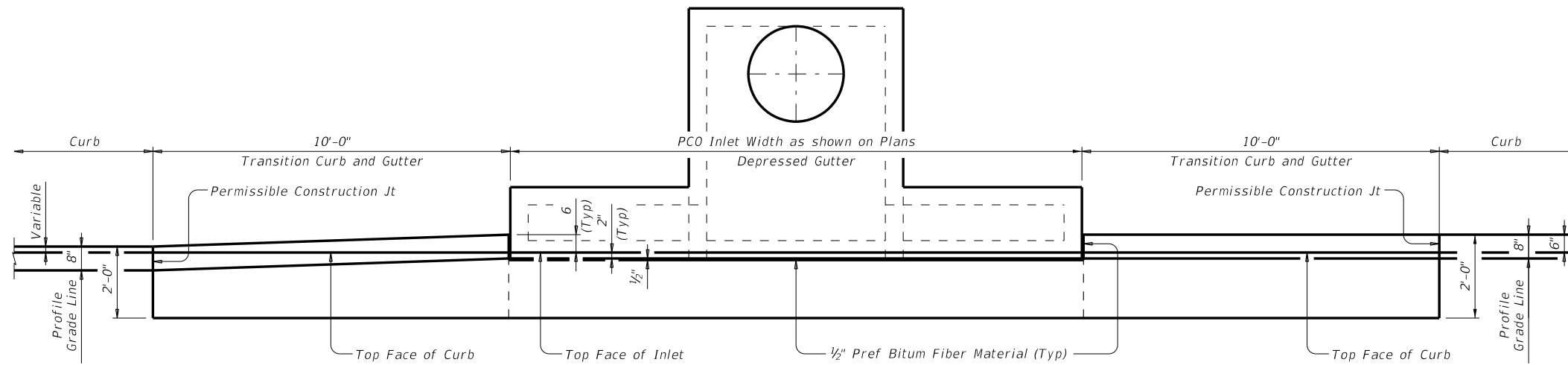
**PRECAST CURB INLET
UNDER ROADWAY**

PCU

| | | | | |
|---------------------|-----------|-----------|-----------|-----------|
| FILE: prest04.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| ©TxDOT January 2015 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 237 | |

DATE:
FILE:

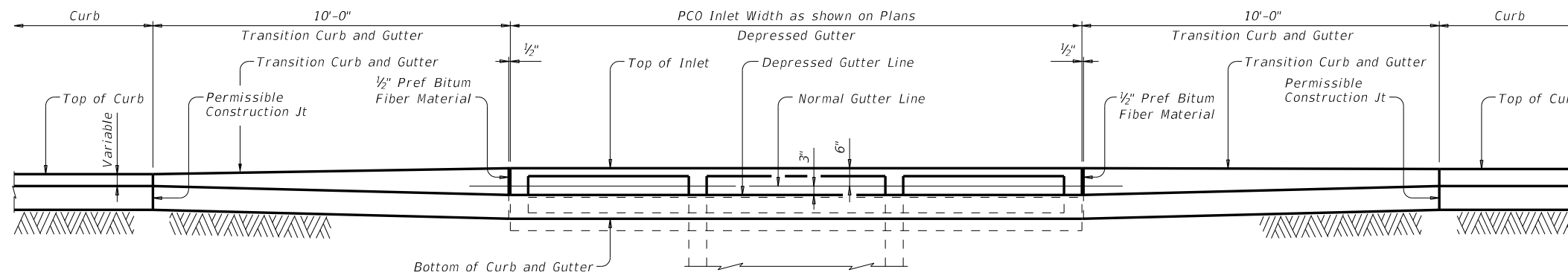
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SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

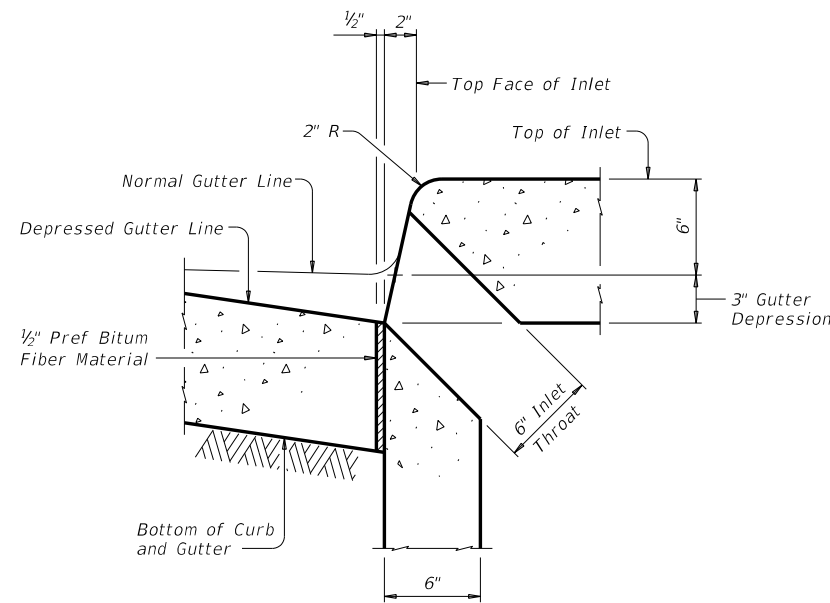
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

Reinforcing steel not shown for clarity.

CONSTRUCTION NOTES:
Align top face of curb with PCO Inlet as shown.

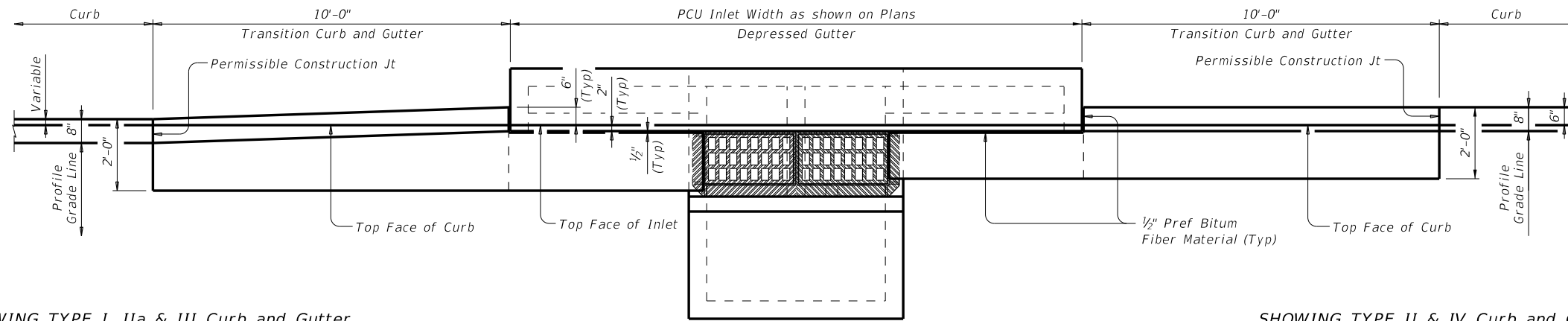
MATERIAL NOTES:
Provide 1/2" Preformed Bituminous Fiber Material.

GENERAL NOTES:
See Precast Curb Inlet Outside Roadway (PCO) standard for details and notes not shown.
See Concrete Curb and Curb and Gutter (CCCG-12) standard for details and notes not shown.
Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
Preformed Bituminous Fiber Material is subsidiary to PCO Inlet.

| | | | | | |
|---|-----------|----------|-----------|---------------------------------|--|
| | | | | Bridge Division Standard | |
| CURB AND GUTTER TRANSITION DETAILS FOR PCO INLET | | | | | |
| CGT-PCO | | | | | |
| FILE: prestd13.dgn | DN: TxDOT | CK: AES | DW: JTR | CK: AES | |
| ©TxDOT January 2015 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 | 01 | 023 | FM 3549 | |
| | DIST | COUNTY | SHEET NO. | | |
| | DAL | ROCKWALL | 238 | | |

DATE:
FILE:

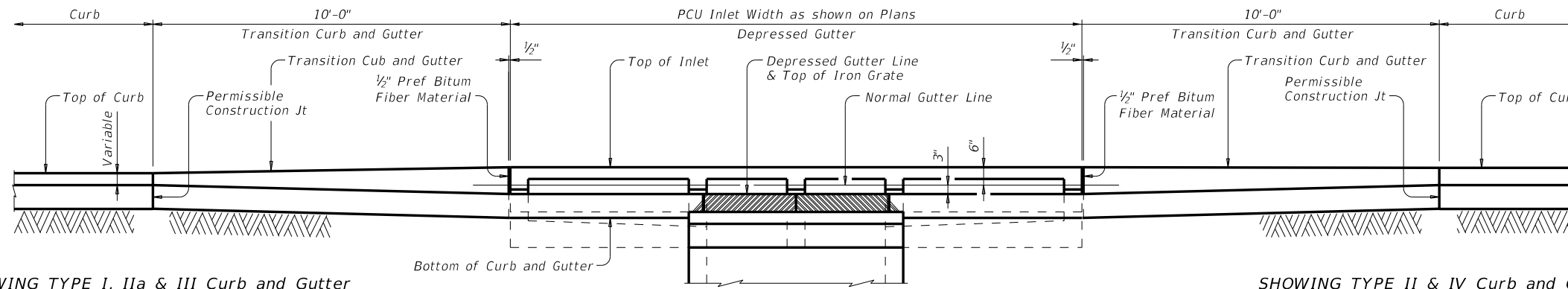
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

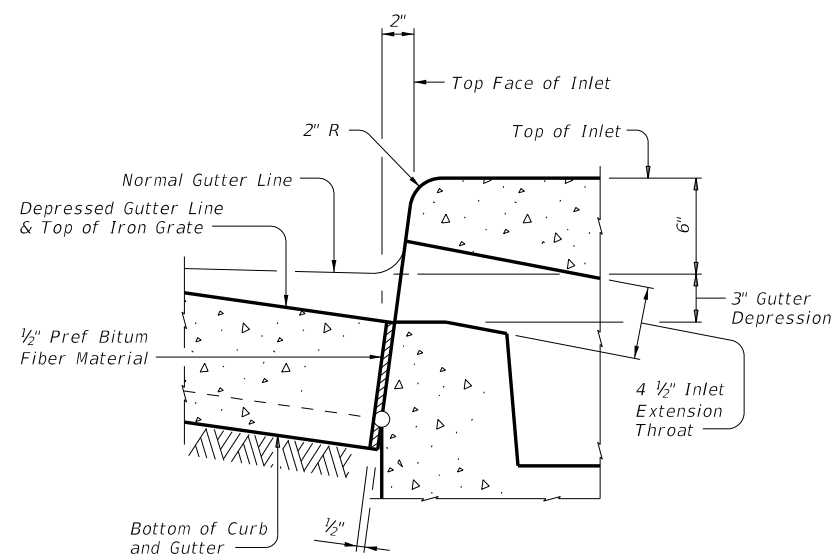
PLAN



SHOWING TYPE I, IIa & III Curb and Gutter

SHOWING TYPE II & IV Curb and Gutter

ELEVATION



SECTION AT GUTTER AND INLET

Reinforcing steel not shown for clarity.

- CONSTRUCTION NOTES:**
Align top face of curb with PCU Inlet as shown.
- MATERIAL NOTES:**
Provide 1/2" Preformed Bituminous Fiber Material.
- GENERAL NOTES:**
See Precast Curb Inlet Under Roadway standard PCU for details and notes not shown.
See Concrete Curb and Curb and Gutter standard CCGG-12 for details and notes not shown.
Curb and Gutter Transitions is paid for and in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
Preformed Bituminous Fiber Material is subsidiary to PCU Inlet.

| | | | |
|---|-----------|---------------------------------|-----------|
| | | Bridge Division Standard | |
| CURB AND GUTTER TRANSITION DETAILS FOR PCU INLET | | | |
| CGT-PCU | | | |
| FILE: prest14.dgn | DN: TxDOT | CK: AES | DW: JTR |
| ©TxDOT January 2015 | CONT | SECT | JOB |
| REVISIONS | 1015 | 01 | 023 |
| DIST | COUNTY | | SHEET NO. |
| DAL | ROCKWALL | | 239 |

DATE:
FILE:

LEGEND FOR FM 3549 AND SH 66 UTILITIES

| LEGEND OF UTILITY TYPES | |
|--|--------------------------|
| NOTE: AN "O" PRECEDING THE UTILITY TYPE INDICATES AN OVERHEAD UTILITY (I.E. "OE1" = OVERHEAD ELECTRIC) | |
| ABANDONED UTILITY | ----- |
| PROPOSED UTILITY | _____ |
| UNKNOWN | ----- |
| Communications | |
| AT&T (FIBER/DUCT) | QL "B" ----- C1 |
| SPRINT (FIBER/DUCT) | ----- C2 |
| AT&T (CABLE) | ----- C3 |
| UNKNOWN (CATV) | ----- C4 |
| AT&T (FIBER/DUCT) | QL "C"/QL "D" (C1) ----- |
| SPRINT (FIBER/DUCT) | ----- (C2) ----- |
| AT&T (CABLE) | ----- (C3) ----- |
| UNKNOWN (CATV) | ----- (C4) ----- |
| Gas / Petroleum | |
| ATMOS | QL "B" ----- G1 |
| ATMOS | QL "C"/QL "D" (G1) ----- |
| Potable Water | |
| NTMWD | QL "B" ----- W1 |
| BLACK LAND WS CO | ----- W2 |
| CITY OF ROCKWALL | ----- W3 |
| NTMWD | QL "C"/QL "D" (W1) ----- |
| BLACK LAND WS CO | ----- (W2) ----- |
| CITY OF ROCKWALL | ----- (W3) ----- |
| Electric / Power | |
| FARMERS ELEC. COOP | QL "B" ----- E1 |
| FARMERS ELEC. COOP | QL "C"/QL "D" (E1) ----- |

| LEGEND OF UTILITY SYMBOLS | |
|---------------------------------|--|
| TEST HOLE | |
| END CAP | |
| UTILITY CONTINUATION | |
| TELEPHONE CABINET | |
| TELEPHONE PEDESTAL | |
| TELEPHONE HANDHOLE (VAULT) | |
| TELEPHONE MANHOLE | |
| TELEPHONE POLE | |
| TELEPHONE POLE W/RISER | |
| FIBER HANDHOLE | |
| WATER VAULT | |
| WATER VALVE | |
| WATER METER | |
| WATER MANHOLE | |
| FIRE HYDRANT | |
| GAS VENT PIPE (GAS RISER) | |
| GAS VALVE | |
| GAS METER | |
| GAS TEST STATION | |
| WASTE WATER MANHOLE | |
| WASTE WATER CLEANOUT | |
| STORM SEWER MANHOLE | |
| STORM SEWER INLET | |
| CATV HANDHOLE | |
| CATV CABINET | |
| CATV PEDESTAL | |
| LIGHT POLE | |
| ELECTRIC JUNCTION BOX (CABINET) | |
| ELECTRIC POLE (POWER) | |
| ELECTRIC POLE W/RISER | |
| TRANSMISSION POLE | |
| ELECTRIC HANDHOLE | |
| ELECTRIC MANHOLE | |
| SIGNAL POLE | |
| SIGNAL HANDHOLE/BOX | |

LEGEND FOR CULVERT AND HILLSIDE DR UTILITIES

| | | |
|----------------------|-----------------|------------------------------------|
| UNDERGROUND ELECTRIC | _____ E1 _____ | ONCOR |
| OVERHEAD ELECTRIC | _____ OE1 _____ | ONCOR |
| OVERHEAD ELECTRIC | _____ OE2 _____ | FARMERS ELEC COOP |
| FIBER OPTIC | _____ F01 _____ | AT&T |
| FIBER OPTIC | _____ F02 _____ | SPRINT NEXTEL |
| TELEPHONE | _____ | AT&T |
| GAS | _____ | ATMOS |
| WATER | _____ | BLACKLAND WATER SUPPLY CORPORATION |
| _____ (with circle) | | QUALITY LEVEL "A" |
| --- T1 --- | | QUALITY LEVEL "B" |
| --- T1 (C) --- | | QUALITY LEVEL "C" |
| --- T1 (D) --- | | QUALITY LEVEL "D" |
| | | TRANSMISSION TOWER |
| | | CELL TOWER |
| | | POWER POLE |
| | | POWER POLE WITH LIGHT |
| | | PULL/TRANSFORMER BOX |
| | | LIGHT POLE |
| | | TRAFFIC SIGNAL POLE |
| | | TRAFFIC SIGNAL CONTROL BOX |
| | | TELEPHONE HAND HOLE |
| | | TELEPHONE PEDESTAL |
| | | TELEPHONE MANHOLE |
| | | GAS MANHOLE |
| | | GAS METER |
| | | GAS APPURTENANCE |
| | | WATER VALVE |
| | | FIRE HYDRANT |
| | | WATER VAULT |
| | | WATER METER |
| | | WASTEWATER MANHOLE |
| | | WASTEWATER CLEANOUT |
| | | "CONTROL" POINT |



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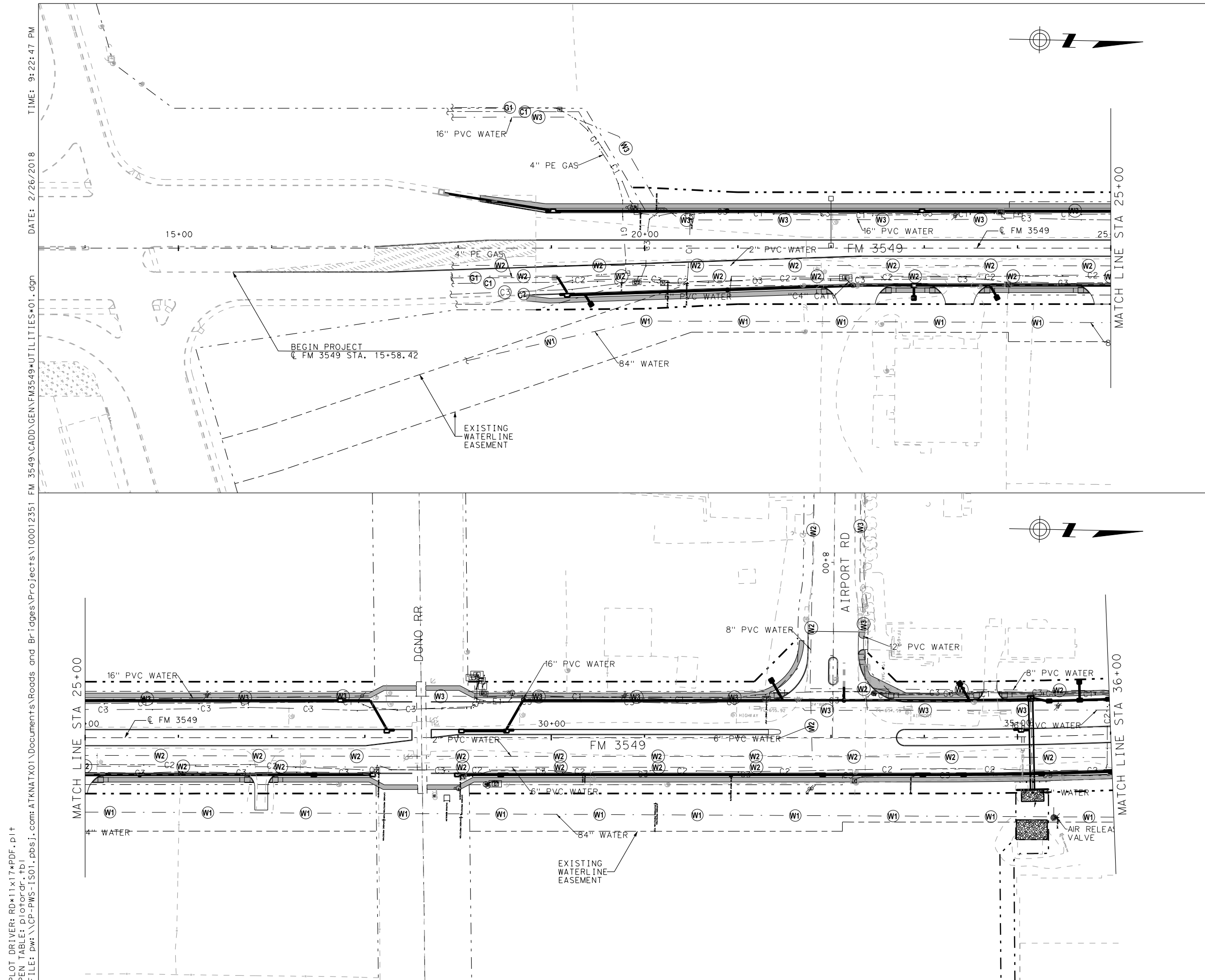
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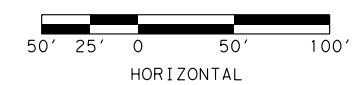
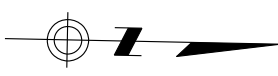
EXISTING UTILITY LAYOUT LEGEND

SHEET 1 OF 1

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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 240 |
| CHECK | CONTROL | SECTION | JOB | |
| WL | 1015 | 01 | 023 | |



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LEGEND

| | |
|--|---------------------|
| | TRAFFIC FLOW ARROWS |
| | EXISTING ROW |
| | PROPOSED ROW |

- GENERAL NOTES:
- SEE EXISTING UTILITY LAYOUT LEGEND SHEET FOR FULL EXPLANATION OF UTILITY SYMBOLOLOGY.
 - THE EXISTING UTILITY LAYOUT IS FURNISHED FOR CONTRACTOR'S INFORMATION ONLY. SOME OF THESE UTILITY LINES MAY HAVE BEEN RELOCATED. CONTRACTOR TO CONTACT TXDOT AREA OFFICE UTILITY COORDINATOR FOR ANY UTILITY RELOCATION PLANS (MR. PATRICK NUNLEY AT 972-962-7211).



Tara McDonald

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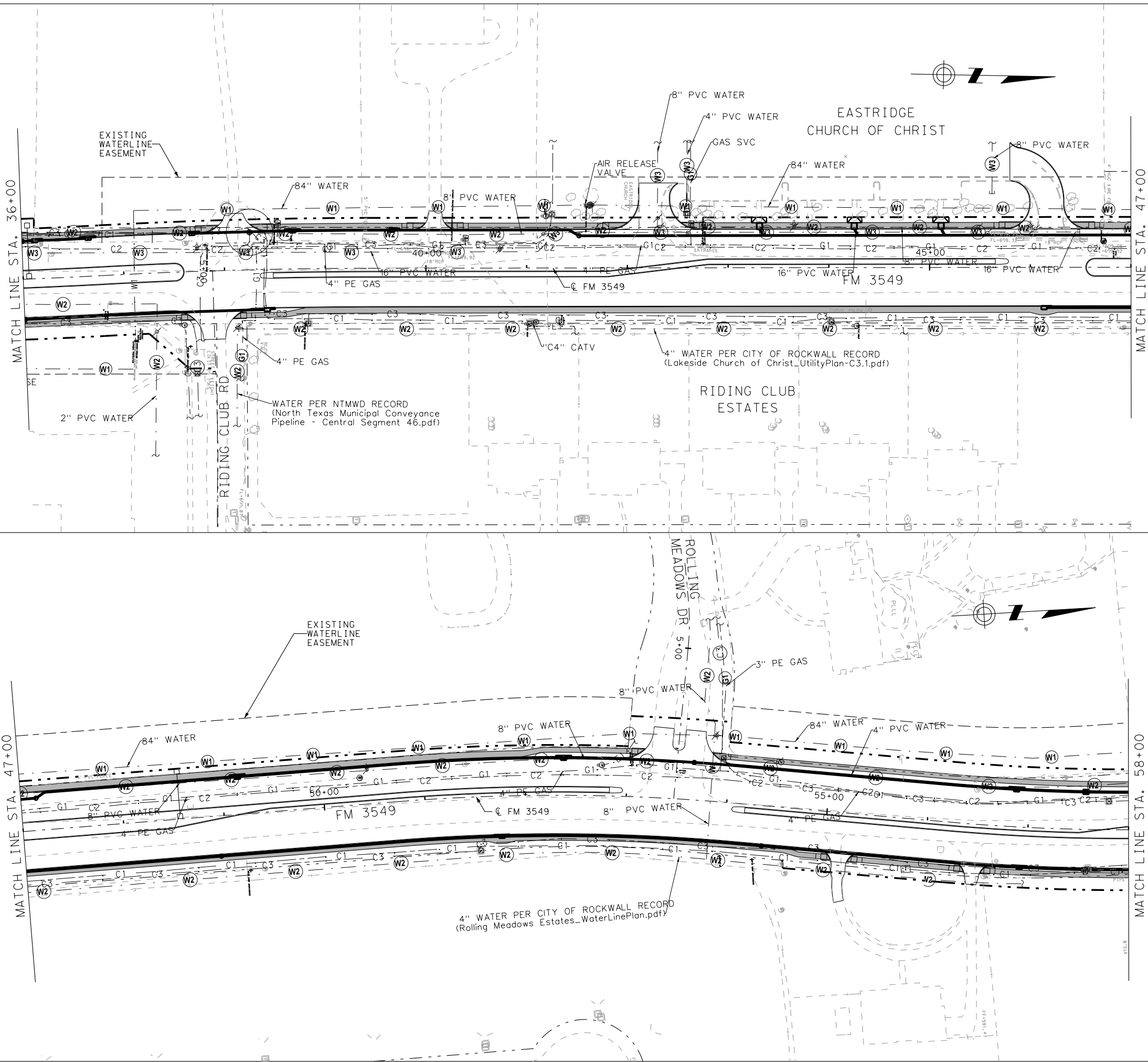
ATKINS
TBPE REG. # F-474



EXISTING UTILITY LAYOUT
BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 5

| | | | | |
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| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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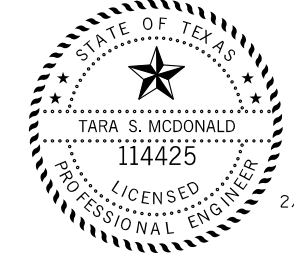


LEGEND

- TRAFFIC FLOW ARROWS
- - - EXISTING ROW
- . - . - PROPOSED ROW

GENERAL NOTES:

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Tara McDonald

| NO. | DATE | REVISION | BY |
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ATKINS
TBPE REG. # F-474



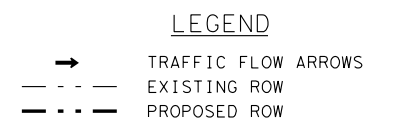
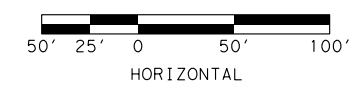
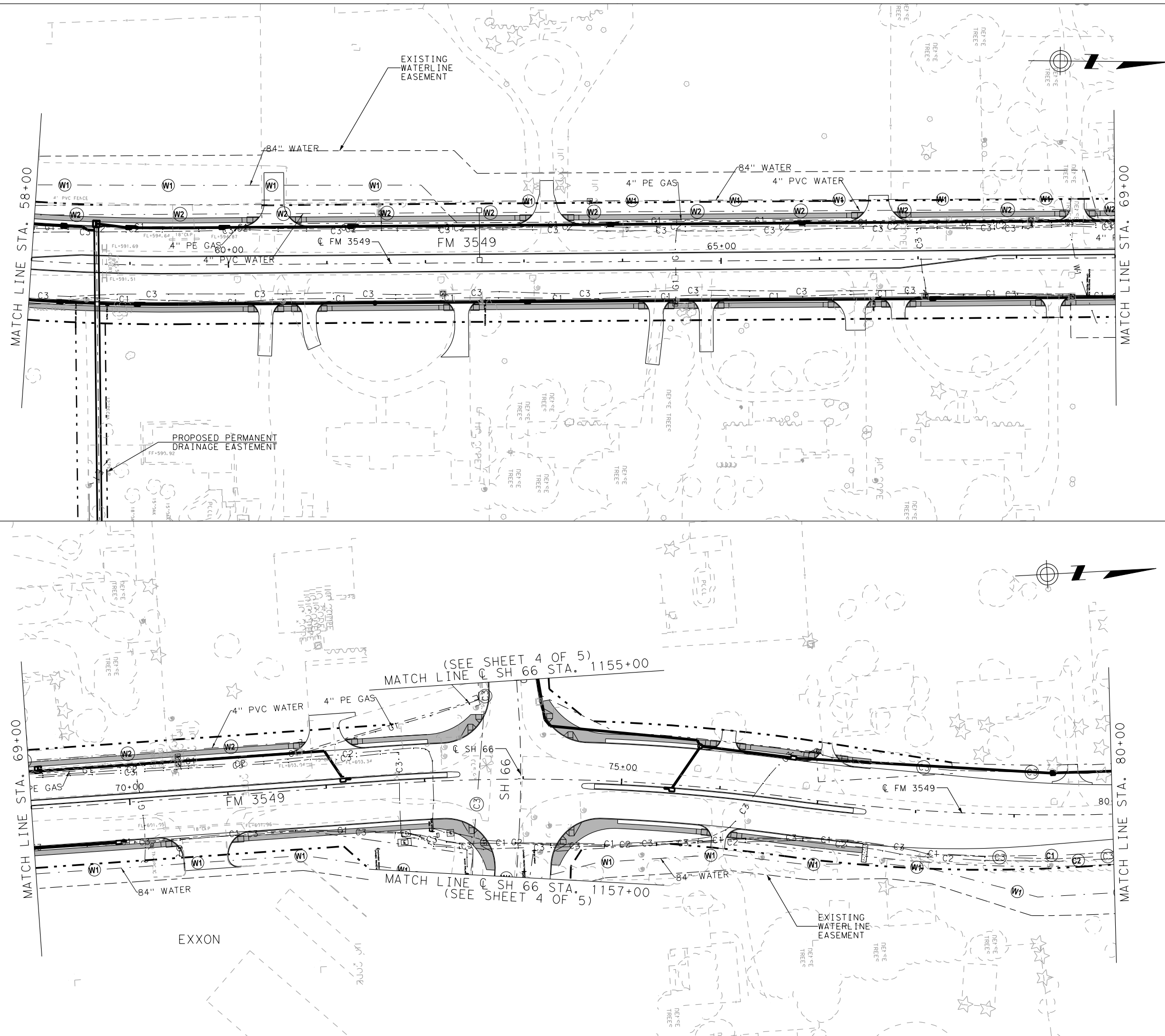
EXISTING UTILITY LAYOUT

STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-------------|
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TM | TEXAS | DALLAS | ROCKWALL | 242 |
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| CHECK WL | 1015 | 01 | 023 | |

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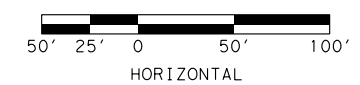
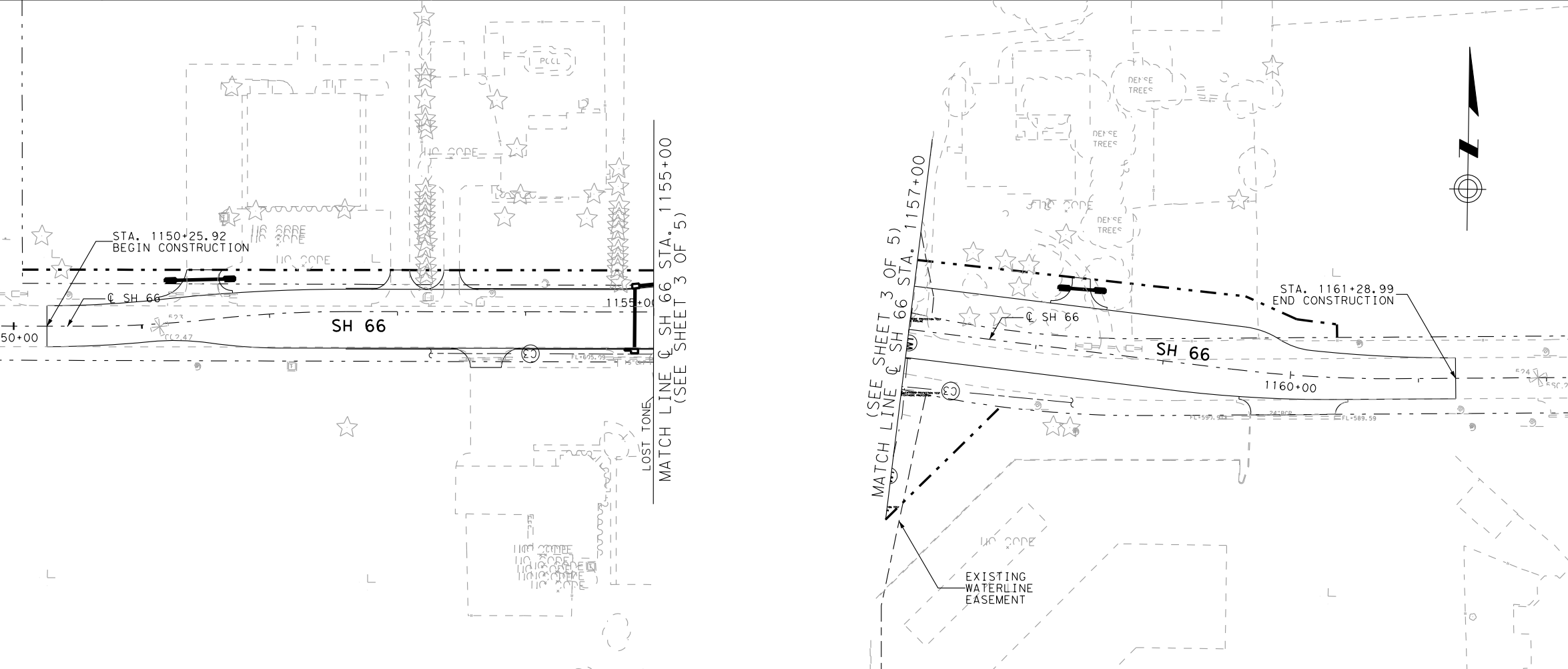
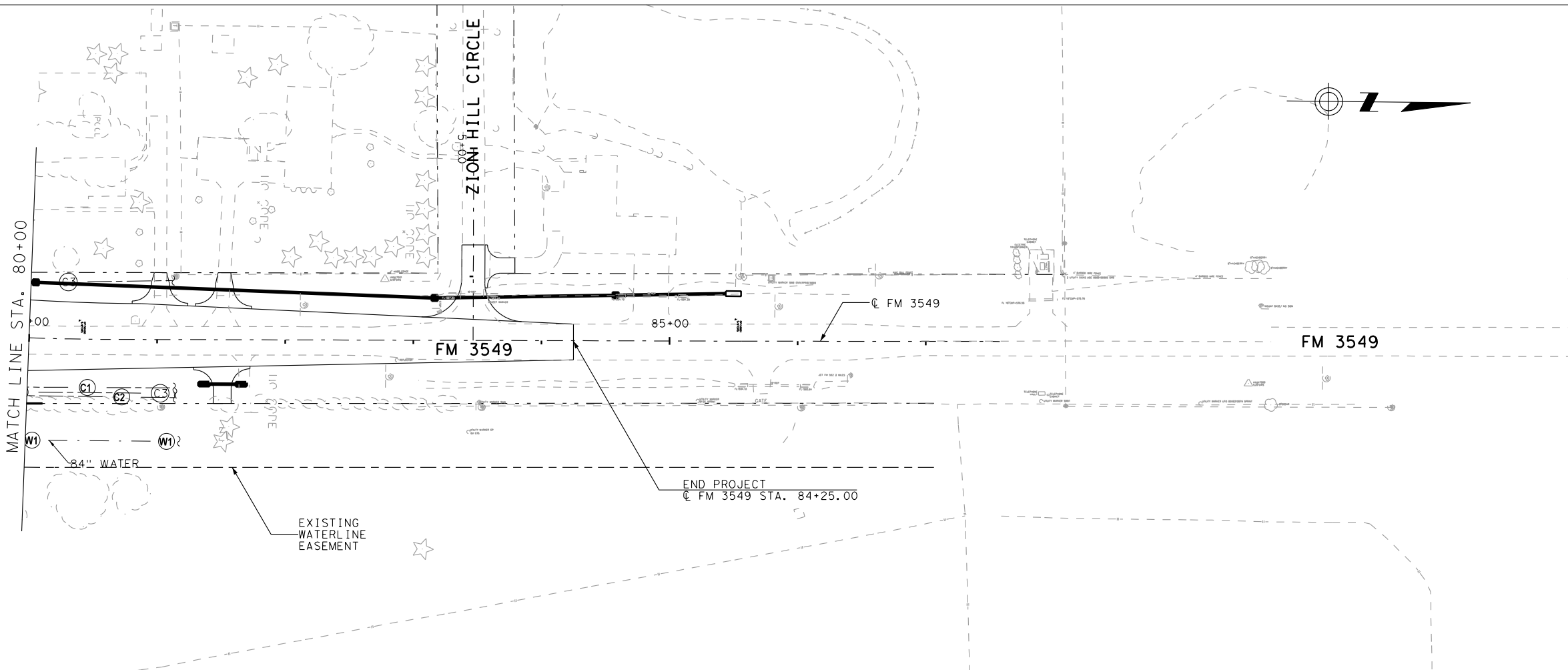


EXISTING UTILITY LAYOUT
 STA. 58+00 TO STA. 80+00

SHEET 3 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
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| TM | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
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- LEGEND**
- TRAFFIC FLOW ARROWS
 - - - EXISTING ROW
 - . - . - PROPOSED ROW

- GENERAL NOTES:**
- SEE EXISTING UTILITY LAYOUT LEGEND SHEET FOR FULL EXPLANATION OF UTILITY SYMBOLOLOGY.
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| NO. | DATE | REVISION | BY |
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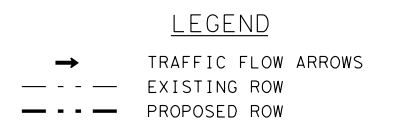
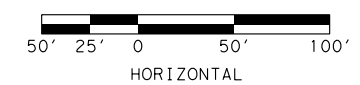
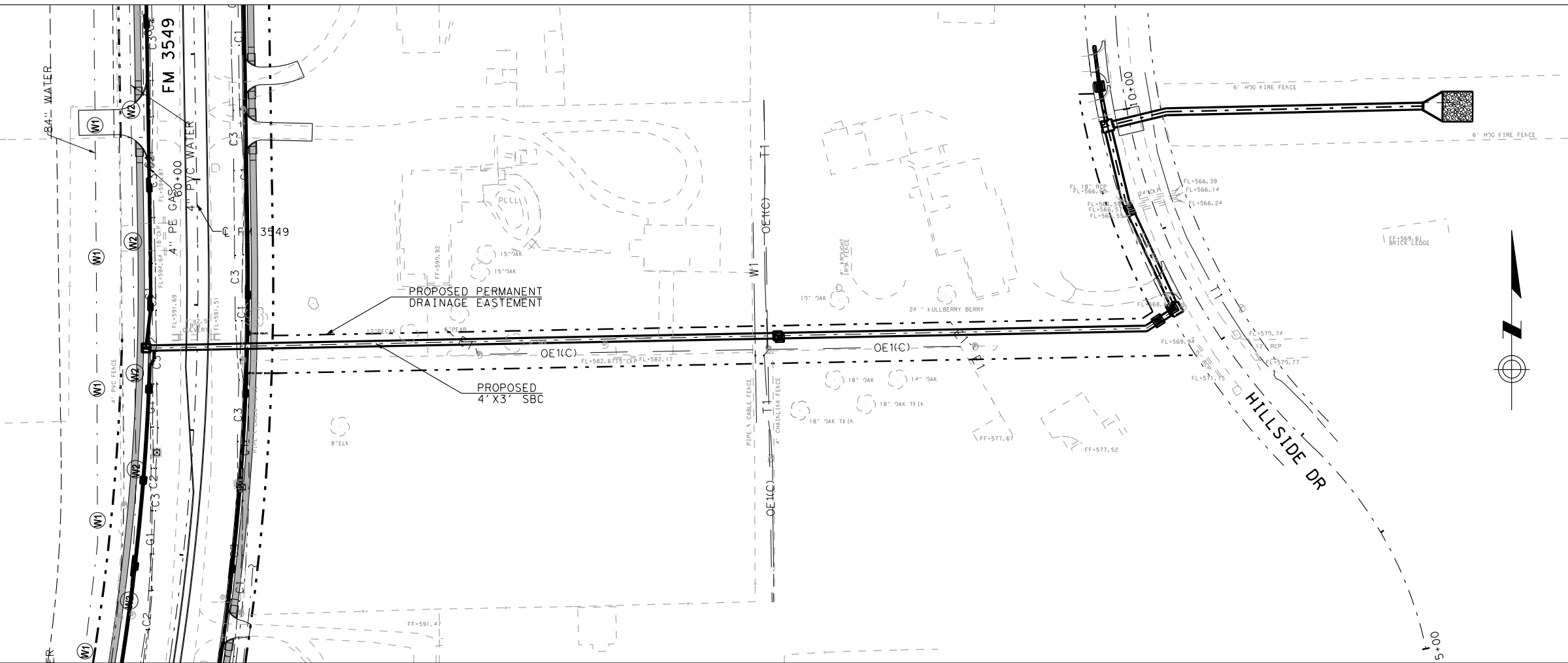
EXISTING UTILITY LAYOUT

FM 3549 STA. 80+00 TO END PROJECT
 SH 66 STA. 1150+25.92 TO STA. 1155+00
 SH 66 STA. 1157+00 TO STA. 1161+28.99

SHEET 4 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
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- GENERAL NOTES:**
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Tara McDonald

2/26/2018

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**EXISTING
 UTILITY LAYOUT**
 CULVERT AND HILLSIDE DR

SHEET 5 OF 5

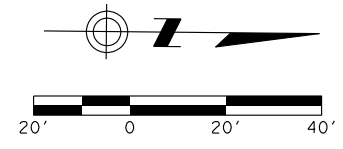
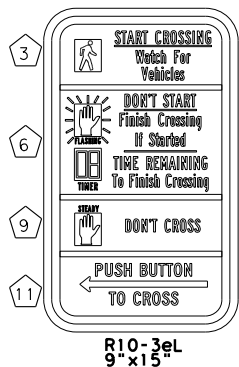
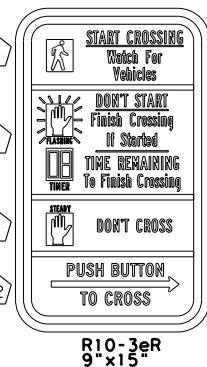
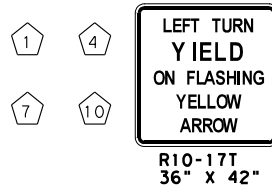
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PROPOSED SIGNS

SEE PERMANENT TRAFFIC SIGNAL QUANTITIES SHEET 2 OF 2 AND ILSN DETAILS FOR ADDITIONAL DETAILS.

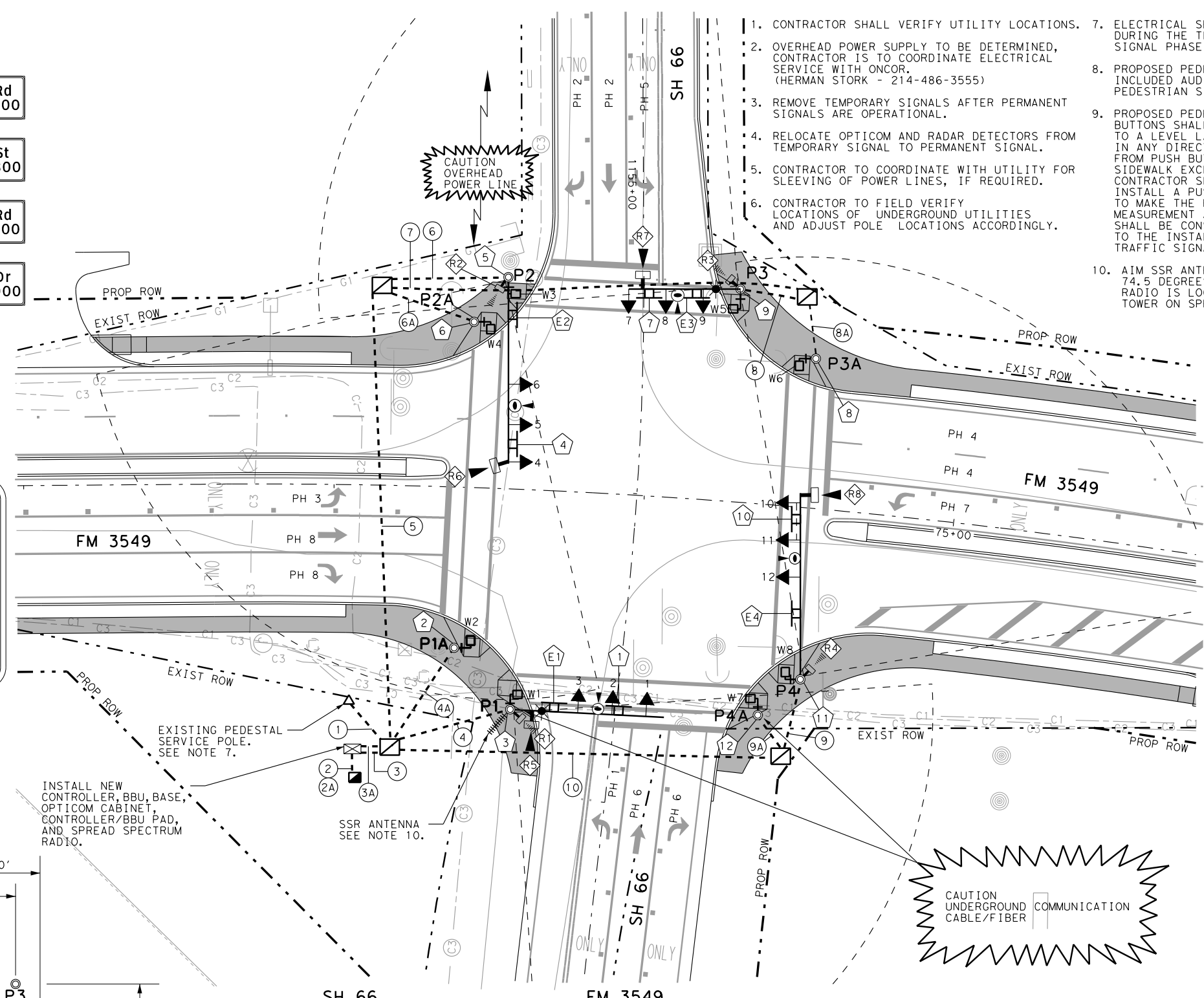
- E1 ILSN 1300 Stodghill Rd 1200
- E2 ILSN 2900 Williams St 2800
- E3 ILSN 1200 Stodghill Rd 1300
- E4 ILSN 2800 W. Holiday Dr 2900



LEGEND

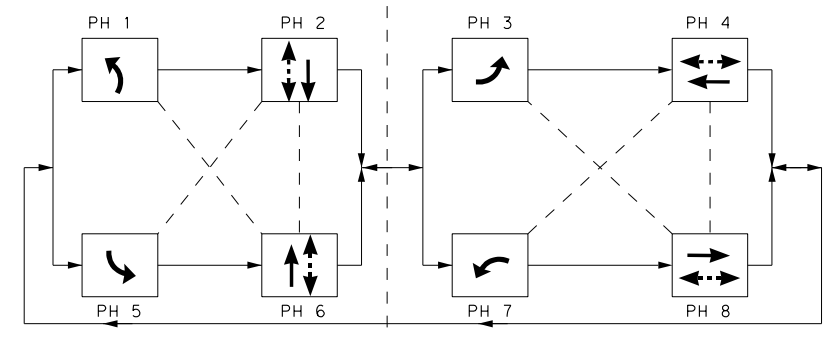
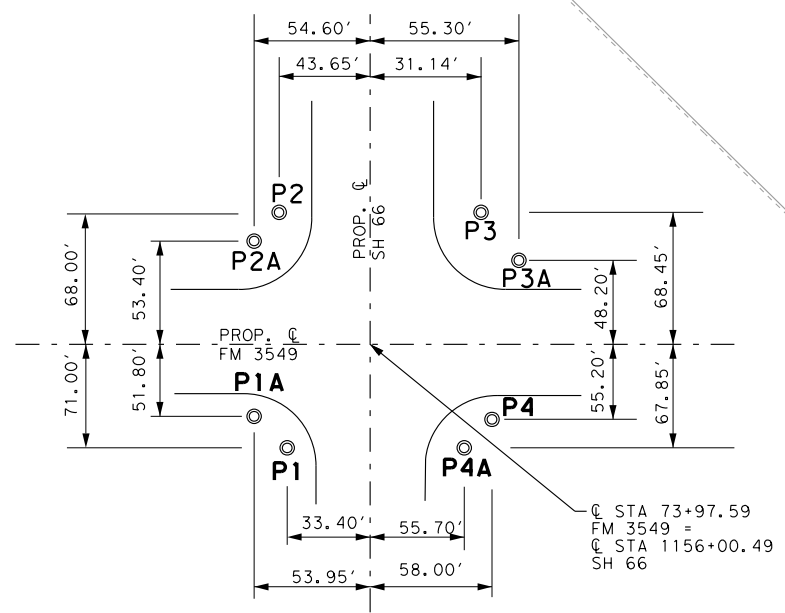
- P1 POLE NUMBER
- GROUND BOX TY A
- GROUND BOX TY C
- CONTROLLER CABINET
- PROP CONDUIT
- SIGNAL POLE/MAST ARM SETUP
- SIGNAL HEAD
- SIGNAL HEAD NUMBER
- SIGNAL POLE/PED HEADS NUMBERS & BUTTONS
- LUMINAIRE (250W EQ LED)
- MAST ARM MOUNTED SIGN
- SIGN NUMBER
- PROP PRESENCE RADAR DETECTOR
- PROP ADVANCE RADAR DETECTOR
- PROP RADAR DETECTION ZONES
- PROP RADAR DETECTION ZONE ID
- PROP UNI-DIRECTIONAL SSR ANTENNA
- CONDUIT RUN NUMBER
- ELECTRICAL SERVICE POLE (SP)
- OPTICOM DETECTOR
- G1 ATMOS GAS
- C1 AT&T FIBER/DUCT
- C2 SPRINT FIBER/DUCT
- C3 AT&T CABLE
- C3 AT&T CABLE
- W1 WATER

1. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS.
2. OVERHEAD POWER SUPPLY TO BE DETERMINED, CONTRACTOR IS TO COORDINATE ELECTRICAL SERVICE WITH ONCOR. (HERMAN STORK - 214-486-3555)
3. REMOVE TEMPORARY SIGNALS AFTER PERMANENT SIGNALS ARE OPERATIONAL.
4. RELOCATE OPTICOM AND RADAR DETECTORS FROM TEMPORARY SIGNAL TO PERMANENT SIGNAL.
5. CONTRACTOR TO COORDINATE WITH UTILITY FOR SLEEVING OF POWER LINES, IF REQUIRED.
6. CONTRACTOR TO FIELD VERIFY LOCATIONS OF UNDERGROUND UTILITIES AND ADJUST POLE LOCATIONS ACCORDINGLY.
7. ELECTRICAL SERVICE WAS INSTALLED DURING THE TEMPORARY TRAFFIC SIGNAL PHASE.
8. PROPOSED PEDESTRIAN PUSH BUTTONS SHALL INCLUDE AUDIBLE AND VIBROACTIVE PEDESTRIAN SIGNAL NOTIFICATION (APS)
9. PROPOSED PEDESTRIAN PUSH BUTTONS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF DISTANCE FROM PUSH BUTTON TO EDGE OF SIDEWALK EXCEED 10", THEN THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
10. AIM SSR ANTENNA EAST 74.5 DEGREES SOUTH. MASTER RADIO IS LOCATED AT WATER TOWER ON SPRINGER LANE.

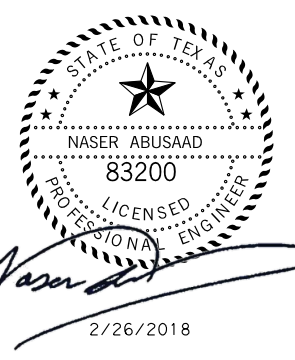


INSTALL NEW CONTROLLER, BBU, BASE, OPTICOM CABINET, CONTROLLER/BBU PAD, AND SPREAD SPECTRUM RADIO.

SSR ANTENNA SEE NOTE 10.



PH 1, PH 3, PH 5 AND PH 7 ARE PERMISSIVE LEFT TURN PHASES.



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150
 Dallas, Texas 75243
 TBPE Firm Registration No. 6981



PERMANENT TRAFFIC SIGNAL LAYOUT

SCALE: 1"=40 SHEET 1 OF 1

| | | | |
|-------------|---------------------|---|---------------------|
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT | COUNTY |
| CHECK NA | TEXAS | DALLAS | ROCKWALL |
| CHECK NA | CONTROL | SECTION | JOB |
| | 1015 | 01 | 023 |

246

| RUN NO. | LENGTH OF RUN (FT) | ITEM 618-CONDUIT TYPE | | ITEM 620-ELECTRICAL (WIRE) | | | ITEM 621 | ITEM 684-TYPE A CABLE | | ITEM 684-TYPE C CABLE | ITEM 6054 | ITEM 6025 | ITEM 6155 | *** |
|-------------------|--------------------|---------------------------|---------------------------|----------------------------|--------------------|--------------------|--------------------|------------------------|-----------------------|-------------------------|---------------------------|--|--------------------------------|------------|
| | | 6029 | 6033 | 6010 | 6009 | 6008 | 6002 | 6046 | 6033 | 6079 | 6002 | 6002 | 6002 | |
| | | 3" PVC TRENCH SCH 40 (LF) | 4" PVC TRENCH SCH 40 (LF) | NO. 6 XHHW QTY/RUN | NO. 6 BARE QTY/RUN | NO. 8 XHHW QTY/RUN | TRAY CABLE QTY/RUN | 20 CNDR 14 AWG QTY/RUN | 7 CNDR 14 AWG QTY/RUN | 2 CNDR 12 AWG * QTY/RUN | SSR COAXIAL CABLE QTY/RUN | RADAR PRESENCE DET. COMM CABLE QTY/RUN | RADAR COMM CABLE ***** QTY/RUN | |
| 1 | 20 | 20 | | 40/2 | 20/1 | 80/4 | 80/4 | | | | | | | |
| 2 ** | 10 | 10 | | | | | | | | | | | | |
| 2A** | 10 | 10 | | | | | | | | | | | | |
| 3 | 12 | | 12 | | 12/1 | | | 48/4 | 48/4 | | | | | 48/4 |
| 3A | 12 | | 12 | 24/2 | 12/1 | | | | | 96/8 | 12/1 | 48/4 | 48/4 | |
| 4 | 45 | 45 | | | 45/1 | 90/2 | 45/1 | 45/1 | | 45/1 | 45/1 | 45/1 | 45/1 | 45/1 |
| 4A | 45 | 45 | | | 45/1 | | | | 45/1 | 45/1 | | | | |
| 5 | 150 | | 150 | | 150/1 | 300/2 | 300/2 | 300/2 | 300/2 | 600/4 | | 300/2 | 300/2 | 300/2 |
| 6 | 45 | 45 | | | 45/1 | | 45/1 | 45/1 | | 45/1 | | 45/1 | 45/1 | 45/1 |
| 6A | 36 | 36 | | | 36/1 | | | | 36/1 | 36/1 | | | | |
| 7 | 140 | | 140 | | 140/1 | 280/2 | 140/1 | 140/1 | 140/1 | 280/2 | | 140/1 | 140/1 | 140/1 |
| 8 | 25 | 25 | | | 25/1 | 50/2 | 25/1 | 25/1 | | 25/1 | | 25/1 | 25/1 | 25/1 |
| 8A | 25 | 25 | | | 25/1 | | | | 25/1 | 25/1 | | | | |
| 9 | 30 | | 30 | | 30/1 | | 30/1 | 30/1 | | 30/1 | | 30/1 | 30/1 | 30/1 |
| 9A | 20 | 20 | | | 20/1 | | | | 20/1 | 20/1 | | | | |
| 10 | 130 | | 130 | | 130/1 | | 130/1 | 130/1 | 130/1 | 260/2 | | 130/1 | 130/1 | 130/1 |
| TOTAL (LF) | | 281 | 474 | 64 | 735 | 800 | 795 | 763 | 744 | 1507 | 57 | 763 | 763 | 763 |

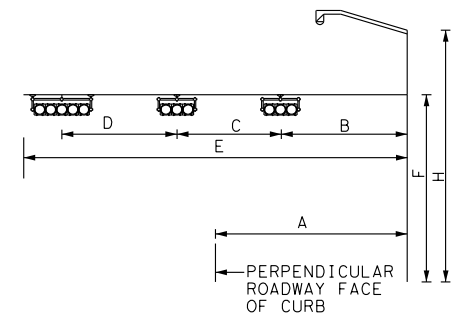
* : FOR APS.
 ** : SPARE CONDUIT REQUIRED BY TS-CF-04.
 *** : SUPPLIED BY CITY OF ROCKWALL AND CITY OF FATE. FOR CONTRACTOR INFORMATION ONLY.
 ****: SUPPLIED BY TXDOT AND INSTALLED BY CONTRACTOR.

| POLE NO. | DIMENSION (FT) | | | | | | | NO. OF HEADS (EA) * | ITEM 6025 | ITEM 6155 | FOUNDATION | | | APS UNIT (EA) | LUM (EA) | ILSN (EA) *** | |
|--------------|------------------------------|----|---|----|---------------------------------------|------------------------------|------------------------------|---------------------|-----------|-----------|------------|-----------|-----------|---------------|----------|---------------|----------|
| | A | B | C | D | E | F | H | | 6001 | 6001 | TYPE | ITEM 416 | ITEM 416 | | | | |
| | RADAR PRESENCE DETECTOR (EA) | | RADAR ADVANCED DETECTION DEVICE (EA) ** | | 24" DIA TYPE A - SUB TO ITEM 687 (LF) | 36" DIA TYPE A ITEM 416 (LF) | 48" DIA TYPE A ITEM 416 (LF) | | | | | | | | | | |
| P1 | 12 | 22 | 11 | 11 | | | | 48 | 19 | 30 | 3 | 1 | 1 | 36-A | | 13 | |
| P1A | 15 | | | | | | 10 | | | | 24-A | 6 | | | 1 | | |
| P2 | 30 | 34 | 13 | 12 | 60 | 19 | 19 | 3 | 1 | 1 | 48-A | | 22 | | 1 | | 1 |
| P2A | 15 | | | | | | 10 | | | | 24-A | 6 | | | 1 | | |
| P3 | 14 | 12 | 12 | 12 | 36 | 19 | 30 | 3 | 1 | 1 | 36-A | | 13 | | 1 | 1 | 1 |
| P3A | 10 | | | | | | 10 | | | | 24-A | 6 | | | 1 | | |
| P4 | 19 | 32 | 12 | 12 | 60 | 19 | 19 | 3 | 1 | 1 | 48-A | | 22 | | 1 | | 1 |
| P4A | 13 | | | | | | 10 | | | | 24-A | 6 | | | 1 | | |
| TOTAL | | | | | | | 12 | | 4 | 4 | | 24 | 26 | 44 | 8 | 2 | 4 |

* : NOT INCLUDING PEDESTRIAN HEADS.
 **: RELOCATED FROM TEMPORARY SIGNALS.
 ***: ILSN AND MOUNTING HARDWARE SUPPLIED BY THE CITIES OF FATE AND ROCKWALL.

| SIGNAL HEAD NO. | SIGNAL HEAD TYPE | PEDESTRIAN AND SIGNAL HEAD SUMMARY | | | | | | | | | | | | | | | |
|--------------------------|------------------|------------------------------------|----------|----------|---------------------|---------------------------------|----------|----------|---------------|----------|----------|----------|----------|----------|----------|--|--|
| | | ITEM 682 - BACK PLATE VENTED | | | ITEM 682 | ITEM 682 - TRAFFIC SIGNAL LAMPS | | | | | | | | | | | |
| | | 6035 | 6036 | 6037 | 6018 | 12" LED BALL | | | 12" LED ARROW | | | | | | | | |
| | | 12" SIGNAL INDICATION | | | PED LED (COUNTDOWN) | RED | YELLOW | GREEN | RED | YELLOW | GREEN | | | | | | |
| 2, 3, 5, 6, 8, 9, 11, 12 | H3 | 8 | | | | 8 | 8 | 8 | | | | | | | | | |
| 1, 4, 7, 10 | H5FLT | | | 4 | | | | | 8 | 8 | | | | | | | |
| W1 - W8 | 143C | | | | 8 | | | | | | | | | | | | |
| TOTAL | | 8 | 0 | 4 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 4 | | |

| GROUND BOX SUMMARY | | | | | |
|--------------------|------|------|--------------------|------|-----|
| ITEM | CODE | TYPE | DESCRIPTION | UNIT | QTY |
| 624 | 6002 | A | NO 122311 W/ APRON | EA | 1 |
| 624 | 6008 | C | NO 162911 W/ APRON | EA | 4 |



SIGNAL HEAD PLACEMENT DIAGRAM

| POLE | CABLE AND CONDUCTOR INSIDE POLE (FT) | | | | | | | | |
|----------------------|--------------------------------------|----------------------|---------------------|--------------------------|-------------------|----------------------|--------------------------------|-----------|---------------------|
| | ITEM 684 | | | ITEM 620 | ITEM 621 | ITEM 6054 | ITEM 6155 | ITEM 6025 | OPTICOM CABLE ***** |
| | 6031 | 6033 | 6079 | 6004 | 6002 | 6002 | 6002 | | |
| 5 CNDR 14 AWG TYPE A | 7 CNDR 14 AWG TYPE A | 2 CNDR 12 AWG TYPE C | NO. 12 XHHW WIRE ** | TRAY CABLE 3 CNDR 12 AWG | SSR COAXIAL CABLE | RADAR COMM CABLE *** | RADAR PRESENCE DET. COMM CABLE | | |
| P1 | 93 | 63 | 5 | 80 | 30 | 30 | 30 | 20 | 47 |
| P1A | 10 | | 5 | | | | | | |
| P2 | 76 | 78 | 5 | | 30 | | 79 | 20 | 61 |
| P2A | 10 | | 5 | | | | | | |
| P3 | 74 | 55 | 5 | 80 | 30 | | 55 | 20 | 40 |
| P3A | 10 | | 5 | | | | | | |
| P4 | 73 | 75 | 5 | | 30 | | 79 | 20 | 58 |
| P4A | 10 | | 5 | | | | | | |
| TOTALS | 356 | 271 | 40 | 160 | 120 | 30 | 243 | 80 | 206 |

* : FOR APS.
 ** : FOR LIGHTING.
 ***: SUPPLIED BY TXDOT AND INSTALLED BY CONTRACTOR.
 ****: SUPPLIED BY CITY OF ROCKWALL AND CITY OF FATE. FOR CONTRACTOR INFORMATION ONLY.

SIGNAL HEAD TYPES

H3

 2, 3, 5, 6, 8, 9, 11, 12

H5FLT

 1, 4, 7, 10

COUNTDOWN PED

 W1, W2, W3, W4, W5, W6, W7, W8

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS TBPE REG. # F-474

Texas Department of Transportation © 2018

PERMANENT TRAFFIC SIGNAL QUANTITIES

SHEET 1 OF 2

| | | | |
|-------------|---------------------|---|---------------------|
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS ROCKWALL | 247 |
| CHECK NA | CONTROL SECTION | JOB | |
| | 1015 | 01 | 023 |

| APS MESSAGE CHART | | | |
|-------------------|------------------|----------------------|--------------------------------|
| POLE NO. | PED BUTTON PHASE | MESSAGES | |
| | | FUNCTIONS | SPEECH MESSAGE/SOUND DETAILS |
| P1 | PHASE 8 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS SH 66 AT FM 3549 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P1A | PHASE 2 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS FM 3549 AT SH 66 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P2 | PHASE 4 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS SH 66 AT FM 3549 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P2A | PHASE 2 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS FM 3549 AT SH 66 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P3 | PHASE 4 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS SH 66 AT FM 3549 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P3A | PHASE 6 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS FM 3549 AT SH 66 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P4 | PHASE 6 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS FM 3549 AT SH 66 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |
| P4A | PHASE 8 | BUTTON PUSH ON DW | WAIT |
| | | EXTENDED BUTTON PUSH | WAIT TO CROSS SH 66 AT FM 3549 |
| | | LOCATOR TONE | SLOW TICK |
| | | WALK INDICATION * | RAPID TICK |

* : COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS.

| TRAFFIC SIGNAL SIGNS SUMMARY * | | | | |
|--------------------------------|------------------|------------------------------------|-------------------|-------------|
| ID | TYPE | LEGEND | FURNISH & INSTALL | DIMENSIONS |
| 1 | R10-17T | LEFT TURN YIELD ON FLASHING YELLOW | 1 | 36" X 42" |
| 2 | R10-3eR | PUSH BUTTON TO CROSS RIGHT | 1 | 9" X 15" |
| 3 | R10-3eL | PUSH BUTTON TO CROSS LEFT | 1 | 9" X 15" |
| 4 | R10-17T | LEFT TURN YIELD ON FLASHING YELLOW | 1 | 36" X 42" |
| 5 | R10-3eR | PUSH BUTTON TO CROSS RIGHT | 1 | 9" X 15" |
| 6 | R10-3eL | PUSH BUTTON TO CROSS LEFT | 1 | 9" X 15" |
| 7 | R10-17T | LEFT TURN YIELD ON FLASHING YELLOW | 1 | 36" X 42" |
| 8 | R10-3eR | PUSH BUTTON TO CROSS RIGHT | 1 | 9" X 15" |
| 9 | R10-3eL | PUSH BUTTON TO CROSS LEFT | 1 | 9" X 15" |
| 10 | R10-17T | LEFT TURN YIELD ON FLASHING YELLOW | 1 | 36" X 42" |
| 11 | R10-3eL | PUSH BUTTON TO CROSS LEFT | 1 | 9" X 15" |
| 12 | R10-3eR | PUSH BUTTON TO CROSS RIGHT | 1 | 9" X 15" |
| E1 | ILSN STREET SIGN | 1300 STODGHILL RD 1200 | 1 * * | 96" X 16.5" |
| E2 | ILSN STREET SIGN | 2900 WILLIAMS ST 2800 | 1 * * * | 96" X 16.5" |
| E3 | ILSN STREET SIGN | 1200 STODGHILL RD 1300 | 1 * * * | 96" X 16.5" |
| E4 | ILSN STREET SIGN | 2800 W HOLIDAY 2900 | 1 * * | 96" X 16.5" |

* : COST FOR MATERIAL AND INSTALLATION IS SUBSIDIARY TO ITEM 680.
 * * : PAID BY CITY OF FATE.
 * * * : PAID BY CITY OF ROCKWALL.

| ELECTRICAL SERVICE DATA - ITEM 628 | | | | | | | | | |
|---|---------------------------|------------------------------|--------------------|------------------------------------|-------------------------|---|--|----------------------------------|----------|
| ELECTRIC SERVICE NO. 1 DESCRIPTION | SERVICE CONDUIT NO. /SIZE | SERVICE CONDUCTORS NO. /SIZE | SAFETY SWITCH AMPS | MAIN DISCONNECT CKT. BRK POLE/AMPS | TWO-POLE CONTACTOR AMPS | PANEL BD. / LOADCENTER AMP RATING (MIN) | CIRCUIT NO. | BRANCH CKT. BRK. POLE/AMPS | KVA LOAD |
| TYPE D (120/240) 070 (NS) SS (E) PS (U) | 2" * | 3 / #4 | N/A | 2P/70 | 30 | 100 | PERM. T.S. TEMP. T.S. LIGHTING ILSN | 1P/50 1P/50 2P/20 1P/20 | <7.1 |

* : VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO UTILITY REQUIREMENTS. ENSURE SIZE MEETS THE NATIONAL ELECTRICAL CODE.
 ELECTRIC SERVICE TO BE INSTALLED AND USED FOR TEMPORARY AND PERMANENT SIGNAL OPERATIONS.

| CABLE TERMINATION CHART * | | | | | | | | | |
|---------------------------|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| CNDR NO. | CONDUCTOR COLOR | CABLE 1 FROM P1 TO CNTRL 20 CNDR | CABLE 2 FROM P1A TO CNTRL 7 CNDR | CABLE 3 FROM P2 TO CNTRL 20 CNDR | CABLE 4 FROM P2A TO CNTRL 7 CNDR | CABLE 5 FROM P3 TO CNTRL 20 CNDR | CABLE 6 FROM P3A TO CNTRL 7 CNDR | CABLE 7 FROM P4 TO CNTRL 20 CNDR | CABLE 8 FROM P4A TO CNTRL 7 CNDR |
| 1 | BLACK | SPARE | SPARE | SPARE | SPARE | SPARE | SPARE | SPARE | SPARE |
| 2 | WHITE | SIG COMM | SIG COMM | SIG COMM | SIG COMM | SIG COMM | SIG COMM | SIG COMM | SIG COMM |
| 3 | RED | SH 2,3:R | SH W2: DW | SH 5,6:R | SH W4: DW | SH 8,9:R | SH W6: DW | SH 11,12:R | SH W7: DW |
| 4 | GREEN | SH 2,3:G | SH W2: W | SH 5,6:G | SH W4: W | SH 8,9:G | SH W6: W | SH 11,12:G | SH W7: W |
| 5 | ORANGE | SH 2,3:Y | SPARE | SH 5,6:Y | SPARE | SH 8,9:Y | SPARE | SH 11,12:Y | SPARE |
| 6 | BLUE | SH 1: R LT ARW | SPARE | SH 4: R LT ARW | SPARE | SH 7: R LT ARW | SPARE | SH 10: R LT ARW | SPARE |
| 7 | WHITE/BLACK | SH 1: SY LT ARW | SPARE | SH 4: SY LT ARW | SPARE | SH 7: SY LT ARW | SPARE | SH 10: SY LT ARW | SPARE |
| 8 | RED/BLACK | SH 1: FY LT ARW | - | SH 4: FY LT ARW | - | SH 7: FY LT ARW | - | SH 10: FY LT ARW | - |
| 9 | GREEN/BLACK | SH 1: G LT ARW | - | SH 4: G LT ARW | - | SH 7: G LT ARW | - | SH 10: G LT ARW | - |
| 10 | ORANGE/BLACK | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 11 | BLUE/BLACK | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 12 | BLACK/WHITE | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 13 | RED/WHITE | SH W1:DW | - | SH W3:DW | - | SH W5:DW | - | SH W8:DW | - |
| 14 | GREEN/WHITE | SH W1:W | - | SH W3:W | - | SH W5:W | - | SH W8:W | - |
| 15 | BLUE/WHITE | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 16 | BLACK/RED | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 17 | WHITE/RED | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 18 | ORANGE/RED | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 19 | BLUE/RED | SPARE | - | SPARE | - | SPARE | - | SPARE | - |
| 20 | RED/GREEN | SPARE | - | SPARE | - | SPARE | - | SPARE | - |

* NOTE: HOME RUN FROM CONTROLLER 2CNDR 12 AWG TO ALL POLES FOR PED CALL.

| RADAR DETECTION ZONE DETAILS | | | | | | |
|------------------------------|-------------------|-----------------|---------------|-----------|---------------------------|---------|
| RADAR | MOUNTING LOCATION | MOUNTING HEIGHT | ZONE LOCATION | ZONE | SETBACK DISTANCE | CHANNEL |
| R1 | SIGNAL POLE P1 | 18' | STOPBAR | PH 6 (WB) | N/A | 1 |
| | | | | PH 1 | | 2 |
| R2 | SIGNAL POLE P2 | 18' | STOPBAR | PH 8 (NB) | N/A | 1 |
| | | | | PH 3 | | 2 |
| R3 | SIGNAL POLE P3 | 18' | STOPBAR | PH 2 (EB) | N/A | 1 |
| | | | | PH 5 | | 2 |
| R4 | SIGNAL POLE P4 | 18' | STOPBAR | PH 4 (SB) | N/A | 1 |
| | | | | PH 7 | | 2 |
| R5 | MAST ARM POLE P1 | 19' | SETBACK | PH 6 (WB) | 100' TO 500' FROM STOPBAR | N/A |
| R6 | MAST ARM POLE P2 | 19' | SETBACK | PH 8 (NB) | 100' TO 500' FROM STOPBAR | N/A |
| R7 | MAST ARM POLE P3 | 19' | SETBACK | PH 2 (EB) | 100' TO 500' FROM STOPBAR | N/A |
| R8 | MAST ARM POLE P4 | 19' | SETBACK | PH 4 (SB) | 100' TO 500' FROM STOPBAR | N/A |



Naser
2/26/2018

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

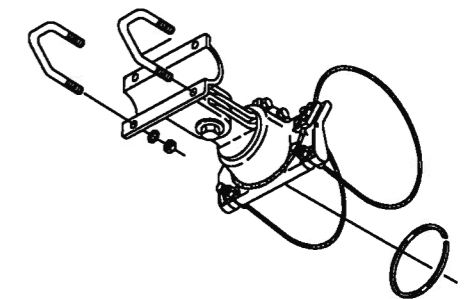
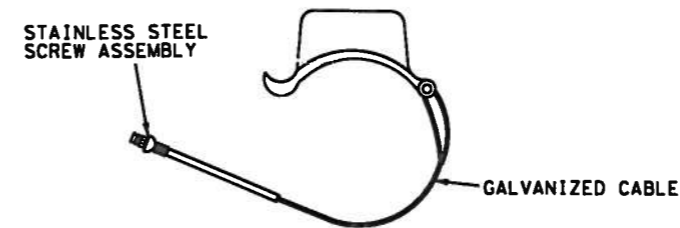
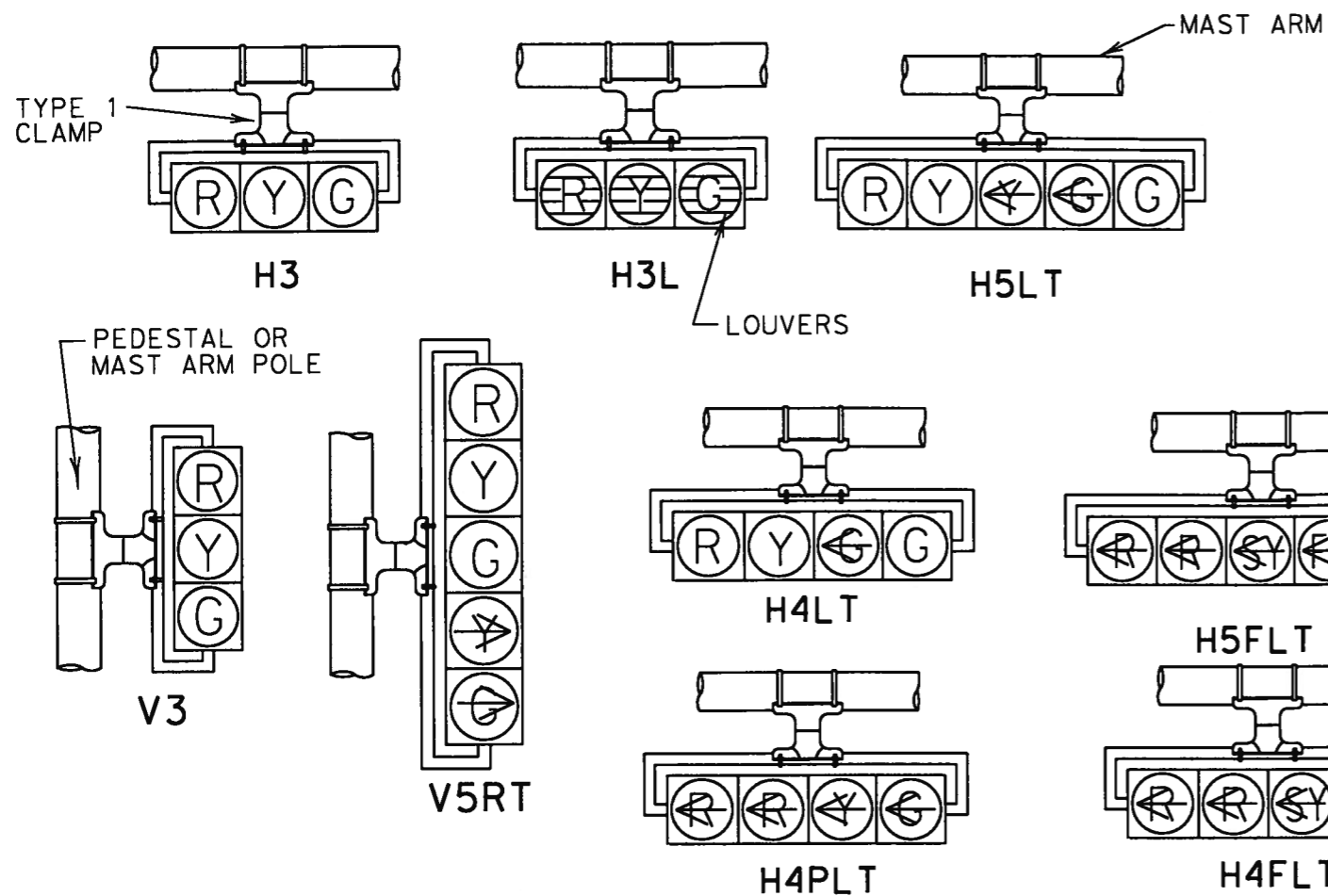


TBPE REG. # F-474



PERMANENT TRAFFIC SIGNAL QUANTITIES

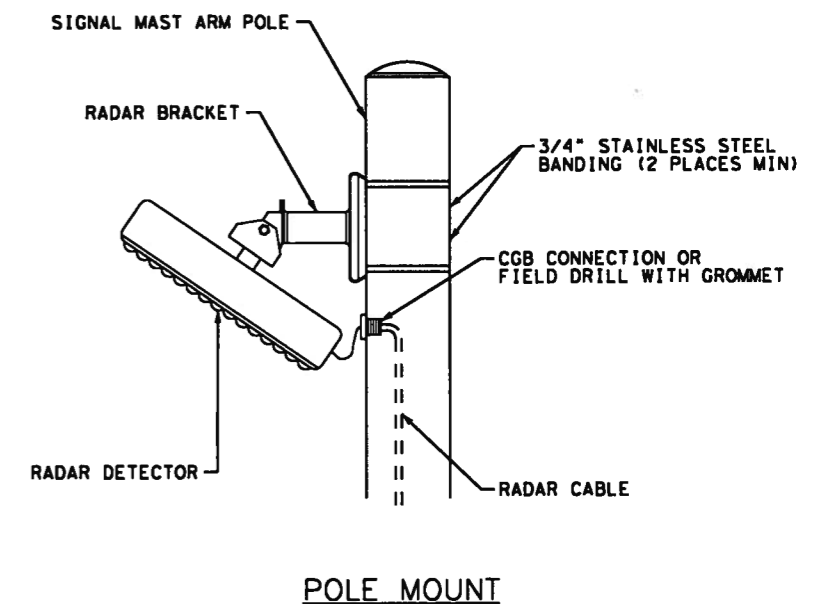
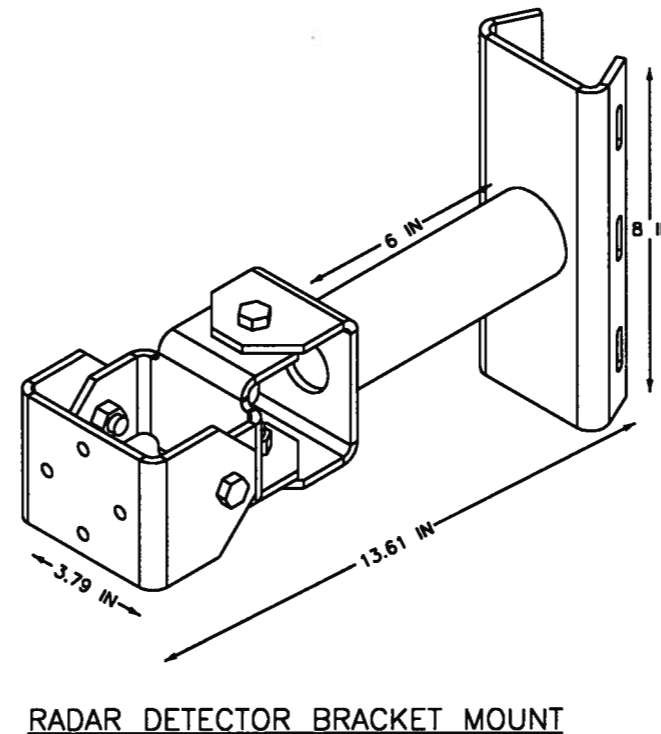
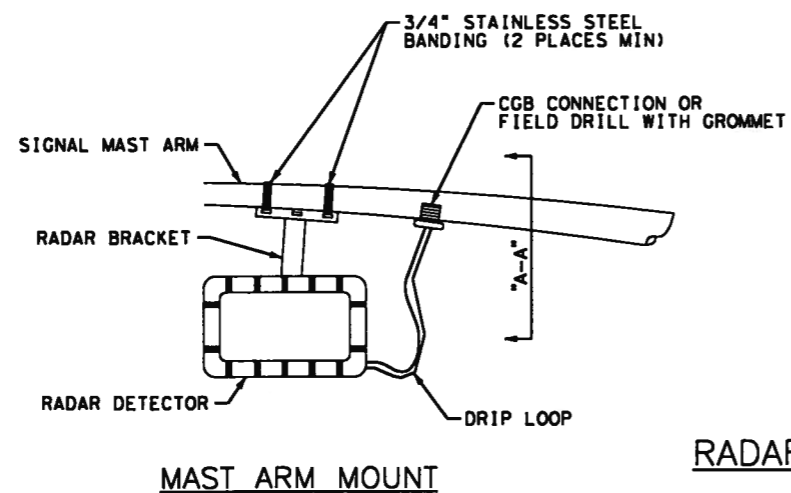
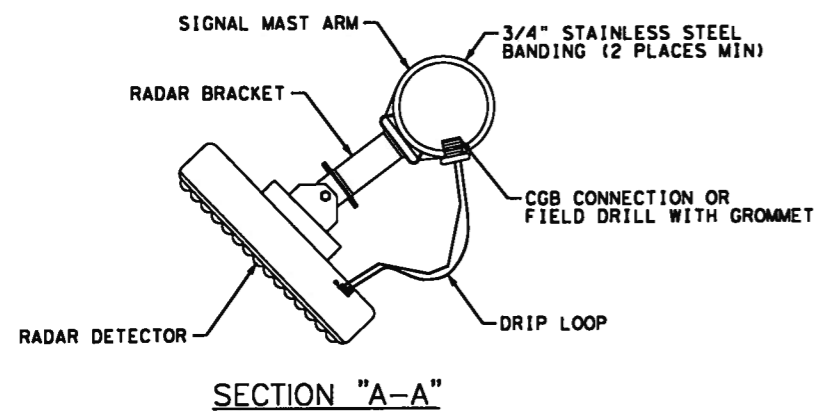
| | | | |
|--------------|---------------------|---|---------------------|
| SCALE: 1"=40 | SHEET 2 OF 2 | | |
| DESIGN NA | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | HIGHWAY NO. FM 3549 |
| GRAPHICS BS | STATE | DISTRICT COUNTY | SHEET NO. |
| CHECK NA | TEXAS | DALLAS ROCKWALL | 248 |
| CHECK NA | CONTROL | SECTION JOB | |
| | 1015 | 01 023 | |



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

NOTES:

1. VEHICLE SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMP AND APPROPRIATE TUBING.
2. ALL POLE MOUNTED VEHICLE HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. THE SIGNAL HEADS SHOWN ARE NOT MEANT TO REFLECT ALL POSSIBLE SIGNAL HEADS, BUT ARE REPRESENTATIVE OF SIGNAL HEADS COMMONLY IN USE. SEE THE TRAFFIC SIGNAL LAYOUT FOR REQUIRED SIGNAL HEADS, AND THE NUMBER AND ORIENTATION OF LOUVERS.

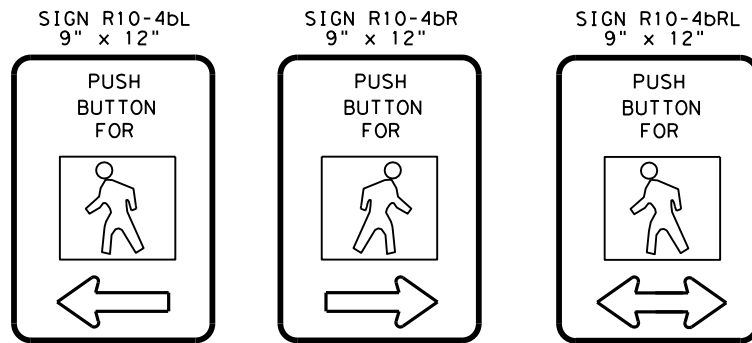


RADAR DETECTION INSTALLATION

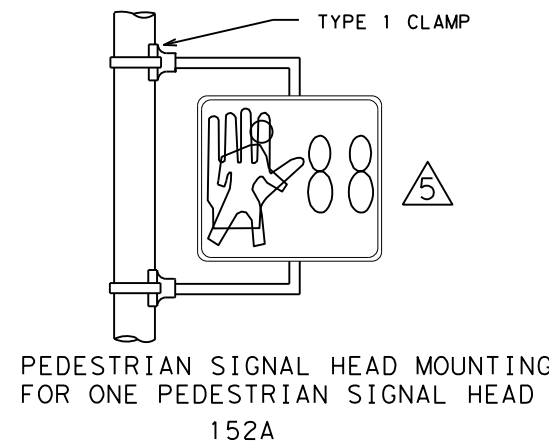
TRAFFIC SIGNAL HEAD AND RADAR INSTALLATION DETAILS

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DALLAS DISTRICT STANDARD

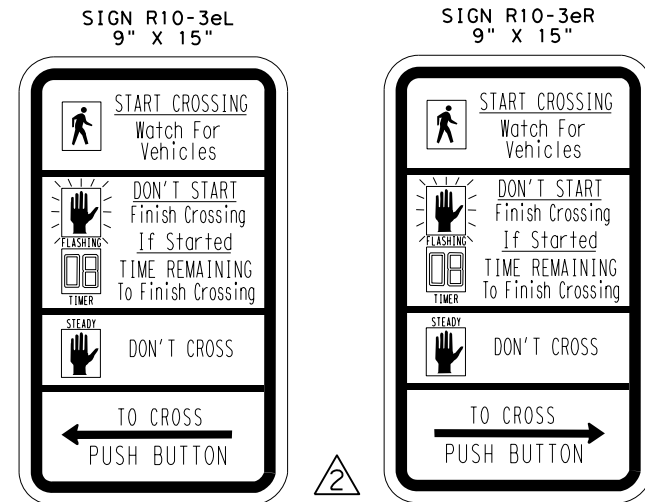
| | | |
|----------|-------------------------|-----------------|
| FED. NO. | FEDERAL AID PROJECT NO. | SHEET NO. |
| 6 | (SEE TITLE SHEET) | 249 |
| STATE | STATE DIST. | COUNTY |
| TEXAS | 18 | ROCKWALL |
| CONT. | SECT. | JOB HIGHWAY NO. |
| 1015 | 01 | 023 FM 3549 |



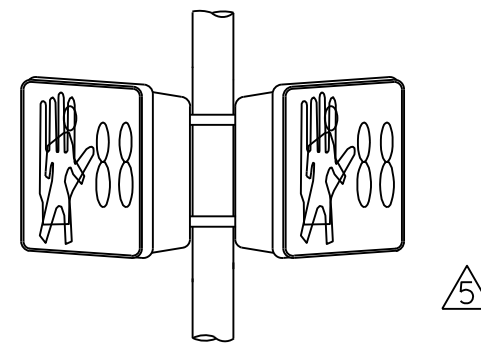
PEDESTRIAN PUSHBUTTON SIGN DETAILS



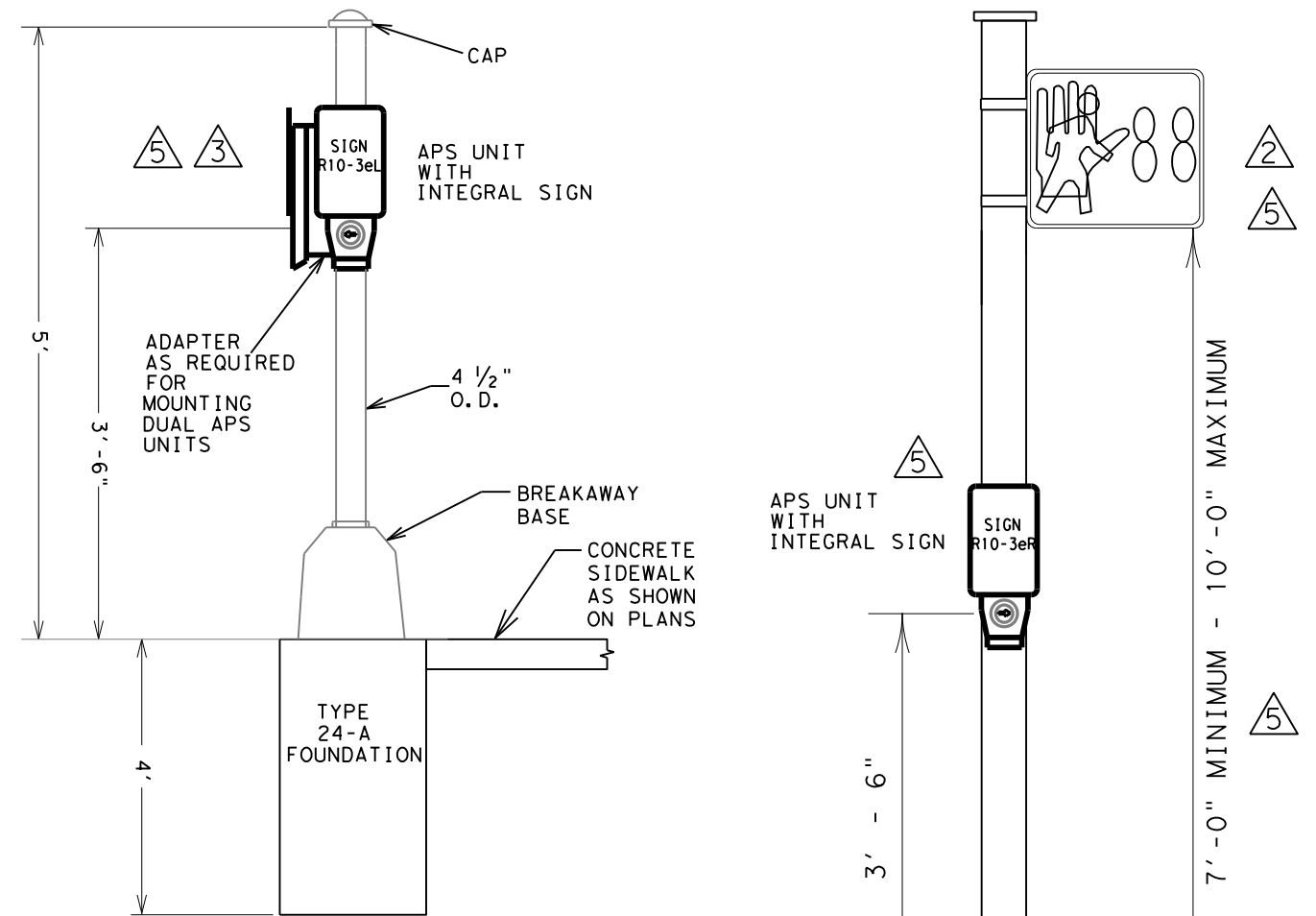
PEDESTRIAN SIGNAL HEAD MOUNTING FOR ONE PEDESTRIAN SIGNAL HEAD 152A



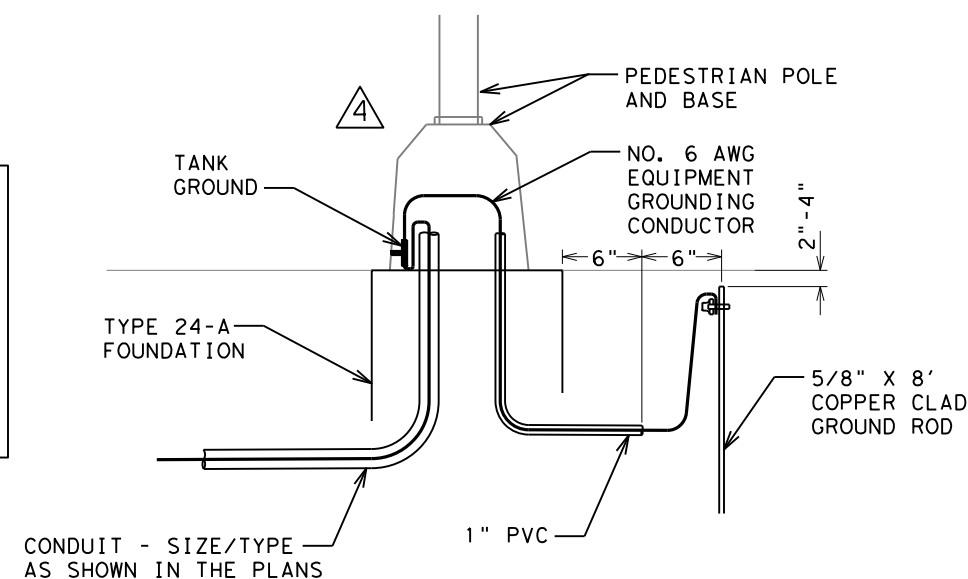
COUNTDOWN PEDESTRIAN PUSHBUTTON SIGN DETAILS



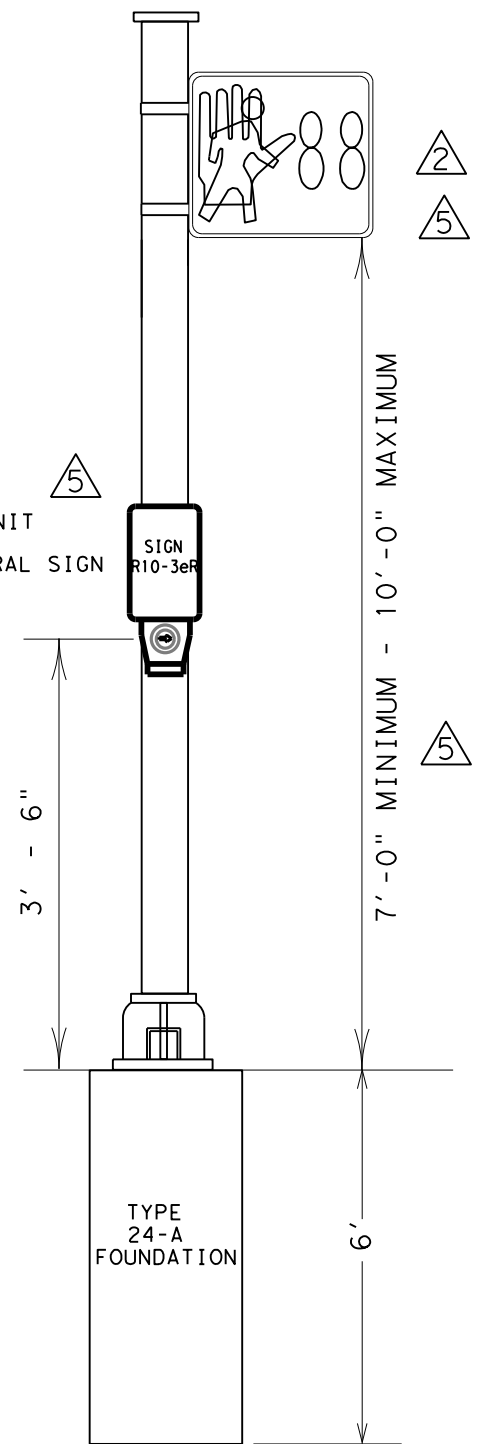
PEDESTRIAN SIGNAL HEAD MOUNTING FOR TWO PEDESTRIAN SIGNAL HEADS 143C



PEDESTRIAN PUSH BUTTON POLE



PEDESTRIAN PUSH BUTTON POLE GROUNDING DETAILS



PEDESTAL POLE

NOTE:
 THE POLES ON THIS DRAWING ARE SHOWN AS AN EXAMPLE ONLY. POLES OF SIMILAR DESIGN FOR ANY CROSS SECTION WHICH MEET THE SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND ARE APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.

NOTE: EITHER TYPE 1 CLAMPS OR CLAM SHELL MOUNTING HARDWARE MAY BE USED AS APPROVED BY THE ENGINEER. FOR CLAM SHELLS, USE ICC P/N 4805 OR McCAIN QUICKMOUNT OR APPROVED EQUAL.

NOTES:

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

- 1 ALTERNATIVE MOUNTING METHOD revised 12-92
- 2 ALTERNATIVE PEDESTRIAN SIGNAL HEAD AND SIGNING revised 10-08
- 3 PEDESTRIAN PUSH BUTTON POLE revised 01-11
- 4 PEDESTRIAN PUSH BUTTON POLE GROUNDING DETAILS revised 09-15
- 5 APS UNIT ADDED "SYMBOLS ONLY" PEDESTRIAN SIGNAL HEAD REMOVED MOUNTING HARDWARE NOTES REVISED MOUNTING HEIGHT REVISED revised 06-17

PEDESTRIAN SIGNAL HEAD IDENTIFICATION (DAL)

| | | |
|-------------------|-------------------|-------------|
| FED. RD. DIV. NO. | PROJECT NO. | SHEET NO. |
| 6 | (SEE TITLE SHEET) | 250 |
| STATE | STATE DIST. | COUNTY |
| TEXAS | DAL | ROCKWALL |
| CONTR. | SECT. | JOB |
| 1015 | 01 | 023 |
| | | HIGHWAY NO. |
| | | FM 3549 |

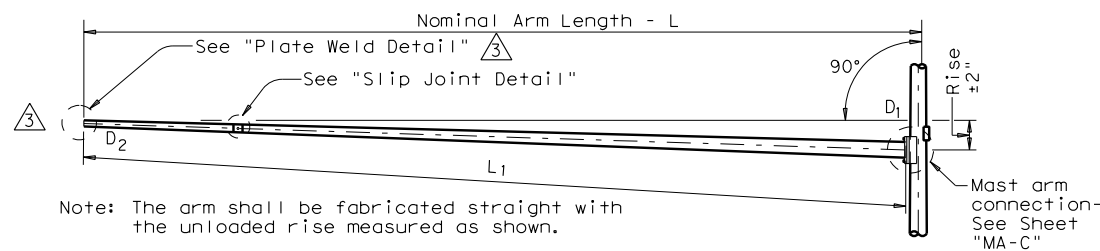
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| Arm Length ft. | ROUND POLES | | | | | POLYGONAL POLES | | | | | Foundation Type |
|-------------------|-----------------------|------------------------|------------------------|------------------------|--------------|-----------------------|------------------------|------------------------|------------------------|--------------|-----------------|
| | D _B in. | D ₁₉ in. | D ₂₄ in. | D ₃₀ in. | ① thk in. | D _B in. | D ₁₉ in. | D ₂₄ in. | D ₃₀ in. | ① thk in. | |
| 20 | 10.5 | 7.8 | 7.1 | 6.3 | .179 | 11.5 | 8.5 | 7.7 | 6.8 | .179 | 30-A |
| 24 | 11.0 | 8.3 | 7.6 | 6.8 | .179 | 12.0 | 9.0 | 8.2 | 7.3 | .179 | 30-A |
| 28 | 11.5 | 8.8 | 8.1 | 7.3 | .179 | 12.5 | 9.5 | 8.7 | 7.8 | .179 | 30-A |
| 32 | 12.5 | 9.8 | 9.1 | 8.3 | .179 | 12.0 | 9.0 | 8.2 | 7.3 | .239 | 30-A |
| 36 | 12.0 | 9.3 | 8.6 | 7.8 | .239 | 12.5 | 9.5 | 8.7 | 7.8 | .239 | 36-A |
| 40 | 12.0 | 9.3 | 8.6 | 7.8 | .239 | 13.5 | 10.5 | 9.7 | 8.8 | .239 | 36-A |
| 44 | 12.5 | 9.8 | 9.1 | 8.3 | .239 | 14.0 | 11.0 | 10.2 | 9.3 | .239 | 36-A |
| 48 | 13.0 | 10.3 | 9.6 | 8.8 | .239 | 15.0 | 12.0 | 11.2 | 10.3 | .239 | 36-A |

| Arm Length ft. | ROUND ARMS | | | | | POLYGONAL ARMS | | | | |
|-------------------|-----------------------|-----------------------|-----------------------|--------------|--------|-----------------------|-----------------------|-------------------------|--------------|--------|
| | L ₁ ft. | D ₁ in. | D ₂ in. | ① thk in. | Rise | L ₁ ft. | D ₁ in. | ② D ₂ in. | ① thk in. | Rise |
| 20 | 19.1 | 6.5 | 3.8 | .179 | 1'-9" | 19.1 | 7.0 | 3.5 | .179 | 1'-8" |
| 24 | 23.1 | 7.5 | 4.3 | .179 | 1'-10" | 23.1 | 7.5 | 3.5 | .179 | 1'-9" |
| 28 | 27.1 | 8.0 | 4.2 | .179 | 1'-11" | 27.1 | 8.0 | 3.5 | .179 | 1'-10" |
| 32 | 31.0 | 9.0 | 4.7 | .179 | 2'-1" | 31.0 | 9.0 | 3.5 | .179 | 2'-0" |
| 36 | 35.0 | 9.5 | 4.6 | .179 | 2'-4" | 35.0 | 10.0 | 3.5 | .179 | 2'-1" |
| 40 | 39.0 | 9.5 | 4.1 | .239 | 2'-8" | 39.0 | 9.5 | 3.5 | .239 | 2'-3" |
| 44 | 43.0 | 10.0 | 4.1 | .239 | 2'-11" | 43.0 | 10.0 | 3.5 | .239 | 2'-6" |
| 48 | 47.0 | 10.5 | 4.1 | .239 | 3'-4" | 47.0 | 11.0 | 3.5 | .239 | 2'-9" |

D_B = Pole Base O.D.
D₁₉ = Pole Top O.D. with no Luminaire and no ILSN
D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
D₃₀ = Pole Top O.D. with Luminaire
D₁ = Arm Base O.D.
D₂ = Arm End O.D.
L₁ = Shaft Length
L = Nominal Arm Length

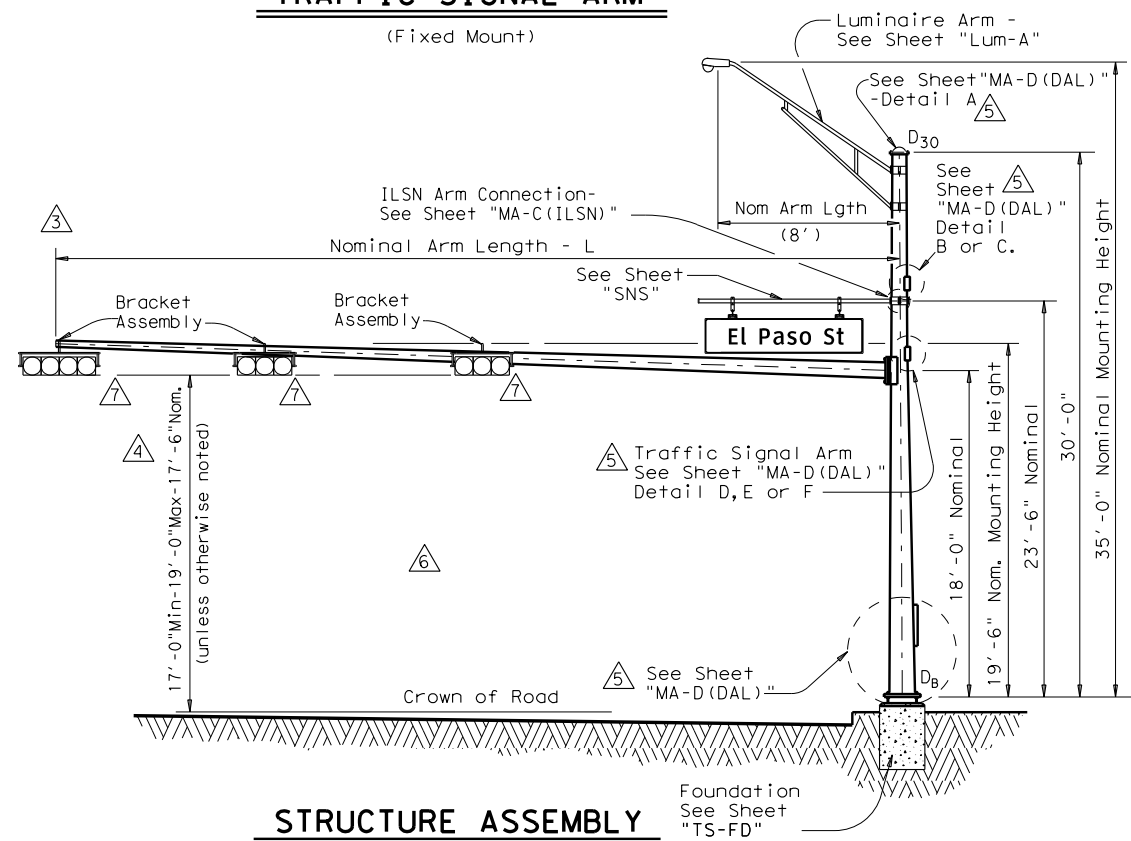
- ① Thickness shown are minimums, thicker materials may be used.
② D₂ may be increased by up to 1" for polygonal arms.



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

TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

Foundation See Sheet "TS-FD"

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

| Nominal Arm Length ft. | 30' Poles With Luminaire | | 24' Poles With ILSN | | 19' Poles With No Luminaire and No ILSN | |
|---------------------------|--------------------------|----------|---------------------|----------|---|----------|
| | Designation | Quantity | Designation | Quantity | Designation | Quantity |
| 20 | 20L-80 | | 20S-80 | | 20-80 | |
| 24 | 24L-80 | | 24S-80 | | 24-80 | |
| 28 | 28L-80 | | 28S-80 | | 28-80 | |
| 32 | 32L-80 | | 32S-80 | | 32-80 | |
| 36 | 36L-80 | 1 | 36S-80 | | 36-80 | |
| 40 | 40L-80 | | 40S-80 | | 40-80 | |
| 44 | 44L-80 | | 44S-80 | | 44-80 | |
| 48 | 48L-80 | 1 | 48S-80 | | 48-80 | |

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

| Nominal Arm Length ft. | Type I Arm (1 Signal) | | Type II Arm (2 Signals) | | Type III Arm (3 Signals) | |
|---------------------------|-----------------------|----------|-------------------------|----------|--------------------------|----------|
| | Designation | Quantity | Designation | Quantity | Designation | Quantity |
| 20 | 20I-80 | | | | | |
| 24 | 24I-80 | | 24II-80 | | | |
| 28 | 28I-80 | | 28II-80 | | | |
| 32 | | | 32II-80 | | 32III-80 | |
| 36 | | | 36II-80 | | 36III-80 | 1 |
| 40 | | | 40II-80 | | 40III-80 | |
| 44 | | | 44II-80 | | 44III-80 | |
| 48 | | | | | 48III-80 | 1 |

Luminaire Arms (1 per 30' pole)

| Nominal Arm Length | Quantity |
|--------------------|----------|
| 8' Arm | 2 |

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

| Nominal Arm Length | Quantity |
|--------------------|----------|
| 7' Arm | |
| 9' Arm | 2 |

Anchor Bolt Assemblies (1 per pole)

| Anchor Bolt Diameter | Anchor Bolt Length | Quantity |
|----------------------|--------------------|----------|
| 1 1/2" | 3'-4" | |
| 1 3/4" | 3'-10" | 2 |

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

Templates may be removed for shipment.

MODIFICATIONS:

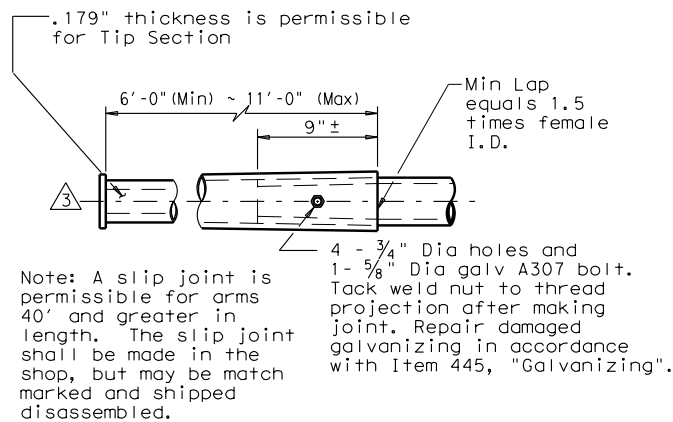
- ① REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY. (2/12)
- ② ADDITIONAL OPTION. (3/12)
- ③ REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)
- ④ REVISED MINIMUM SIGNAL HEIGHT. (3/12)
- ⑤ REPLACED "MA-D" WITH "MA-D(DAL)". (2/12)
- ⑥ REMOVED TABLE OF DIMENSIONS "A". (2/12)
- ⑦ REMOVED CGB CONNECTORS.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

Texas Department of Transportation

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

| | | | | |
|---------------------|--------|----------|---------|-----------|
| © TxDOT August 1995 | DN: MS | CK: JSY | DW: MMF | CK: JSY |
| REVISIONS | CONT | SECT | JOB | HIGHWAY |
| 5-96 | 1015 | 01 | 023 | FM 3549 |
| 11-99 | DIST | COUNTY | | SHEET NO. |
| 1-12 | DAL | ROCKWALL | | 251 |

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SLIP JOINT DETAIL

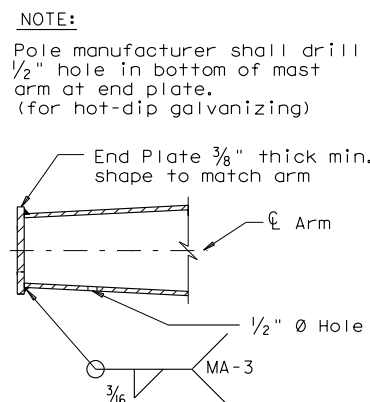


PLATE WELD DETAIL

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

BRACKET ASSEMBLY

VIBRATION WARNING

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

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

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

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

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

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

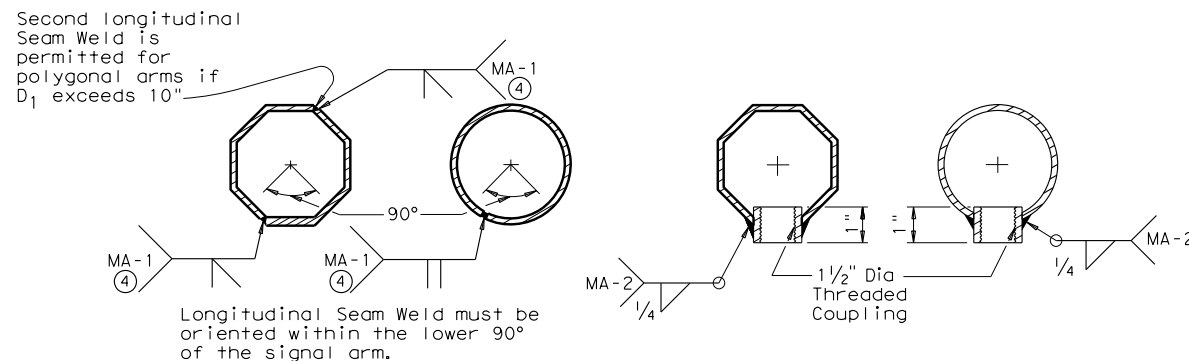
Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

See Standard Sheet "MA-D(DAL)" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

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

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



ARM WELD DETAIL

ARM COUPLING DETAILS

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

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

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



**TRAFFIC SIGNAL
 SUPPORT STRUCTURES
 SINGLE MAST ARM ASSEMBLY**

(80 MPH WIND ZONE)

SMA-80(2) - 12(DAL)

| | | | | | |
|---------------------|------|--------|----------|---------|-----------|
| © TxDOT August 1995 | | DN: MS | CK: JSY | DW: MMF | CK: JSY |
| REVISIONS | | | | | |
| 5-96 | 1-12 | 1015 | 01 | 023 | FM 3549 |
| | | DIST | COUNTY | | SHEET NO. |
| | | DAL | ROCKWALL | | 252 |

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DATE: FILE:

FOUNDATION DESIGN TABLE

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

NOTES:

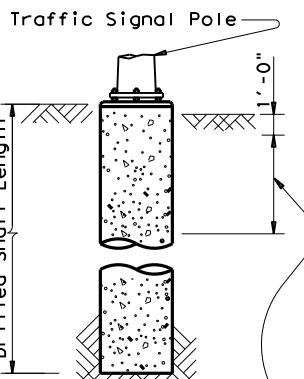
- Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- Foundation Design Loads are the allowable moments and shears at the base of the structure.
- Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
- Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

FOUNDATION SUMMARY TABLE (3)

| LOCATION IDENTIFICATION | AVG. N BLOW /ft. | FDN TYPE | NO. EA | DRILLED SHAFT LENGTH (6) (FEET) | | | | |
|-----------------------------|------------------|----------|--------|---------------------------------|------|------|------|------|
| | | | | 24-A | 30-A | 36-A | 36-B | 42-A |
| P1 | | 36A | 1 | | | 13 | | |
| P1A | | 24A | 1 | 6 | | | | |
| P2A | | 24A | 1 | 6 | | | | |
| P3 | | 36A | 1 | | | 13 | | |
| P3A | | 24A | 1 | 6 | | | | |
| P4A | | 24A | 1 | 6 | | | | |
| TOTAL DRILLED SHAFT LENGTHS | | | | 24 | | 26 | | |

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

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



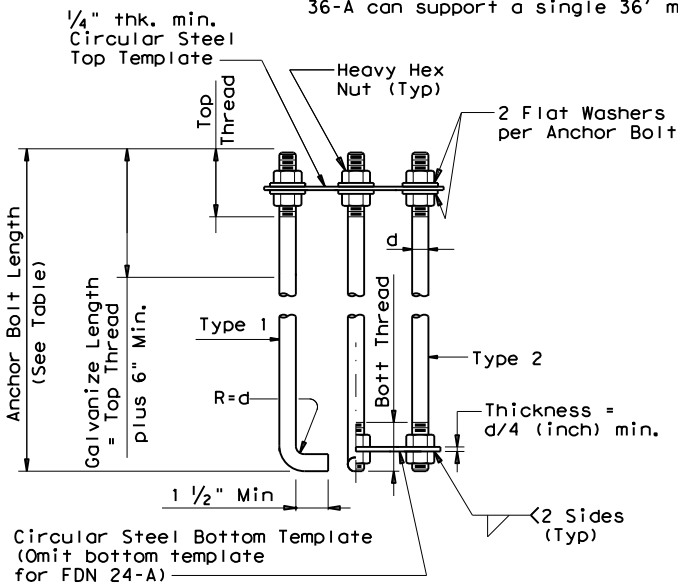
Use average N value over the top third of the embedded shaft. Ignore the top 1' of soil.

| BOLT DIA IN. | (7) BOLT LENGTH | TOP THREAD | BOTTOM THREAD | BOLT CIRCLE | R2 | R1 |
|--------------|-----------------|------------|---------------|-------------|---------|--------|
| 3/4" | 1'-6" | 3" | — | 12 3/4" | 7 1/8" | 5 5/8" |
| 1 1/2" | 3'-4" | 6" | 4" | 17" | 10" | 7" |
| 1 3/4" | 3'-10" | 7" | 4 1/2" | 19" | 11 1/4" | 7 3/4" |
| 2" | 4'-3" | 8" | 5" | 21" | 12 1/2" | 8 1/2" |
| 2 1/4" | 4'-9" | 9" | 5 1/2" | 23" | 13 3/4" | 9 1/4" |

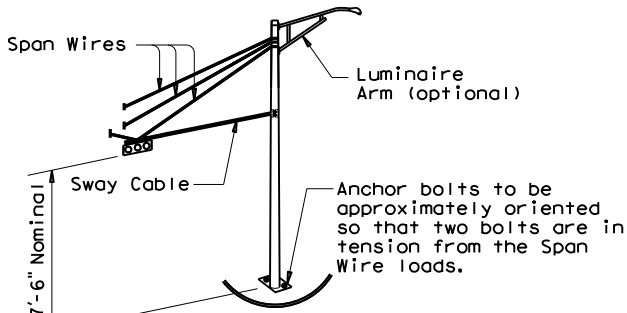
(7) Min dimensions given, longer bolts are acceptable.

EXAMPLE:

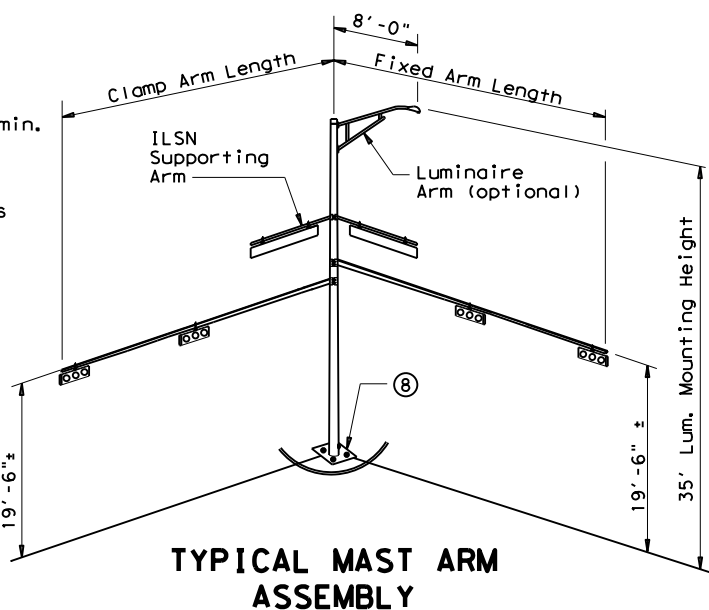
- For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
- For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.



HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2) ANCHOR BOLT ASSEMBLY

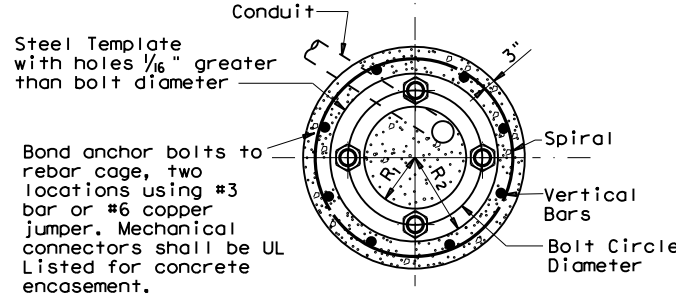


TYPICAL STRAIN POLE ASSEMBLY

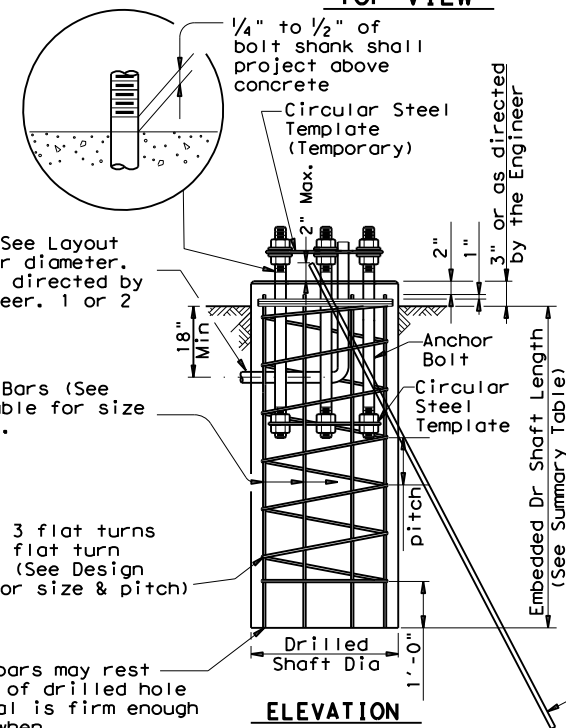


TYPICAL MAST ARM ASSEMBLY

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



TOP VIEW



ELEVATION FOUNDATION DETAILS

Conduit (See Layout Sheets for diameter. Orient as directed by the Engineer. 1 or 2 required)

Vertical Bars (See Design Table for size & number).

Spiral, 3 flat turns top & 1 flat turn bottom. (See Design Table for size & pitch)

Vertical bars may rest on bottom of drilled hole if material is firm enough to do so when concrete is placed.

GENERAL NOTES:

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

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

Concrete shall be Class "C".

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

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

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

Ground rod shall protrude a minimum of 1" and a maximum of 2" above the finish grade of the foundation. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

MODIFICATIONS:

- ADDED GROUND ROD TO FOUNDATION DETAILS (9/15)

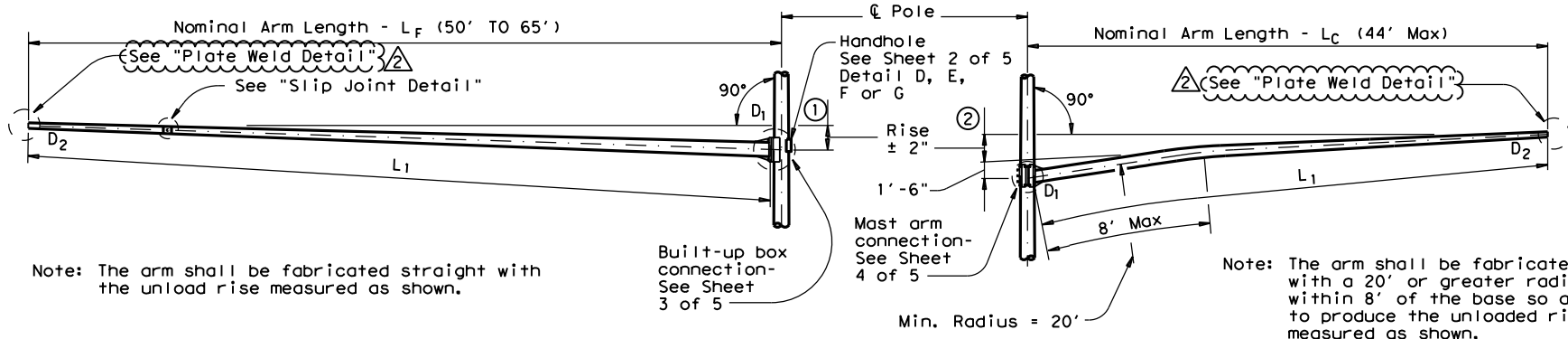


TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12 (DAL)

| | | | | | |
|---------------------|----------|--------|-----------|-------------|-------------|
| © TxDOT August 1995 | | DN: MS | CK: JSY | DW: MAQ/MMF | CK: JSY/TEB |
| 5-96 | 11-99 | 1-12 | REVISIONS | CONTRACT | SHEET |
| 1015 | 01 | 023 | | FM 3549 | |
| DAL | ROCKWALL | | | SHEET NO. | 253 |

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

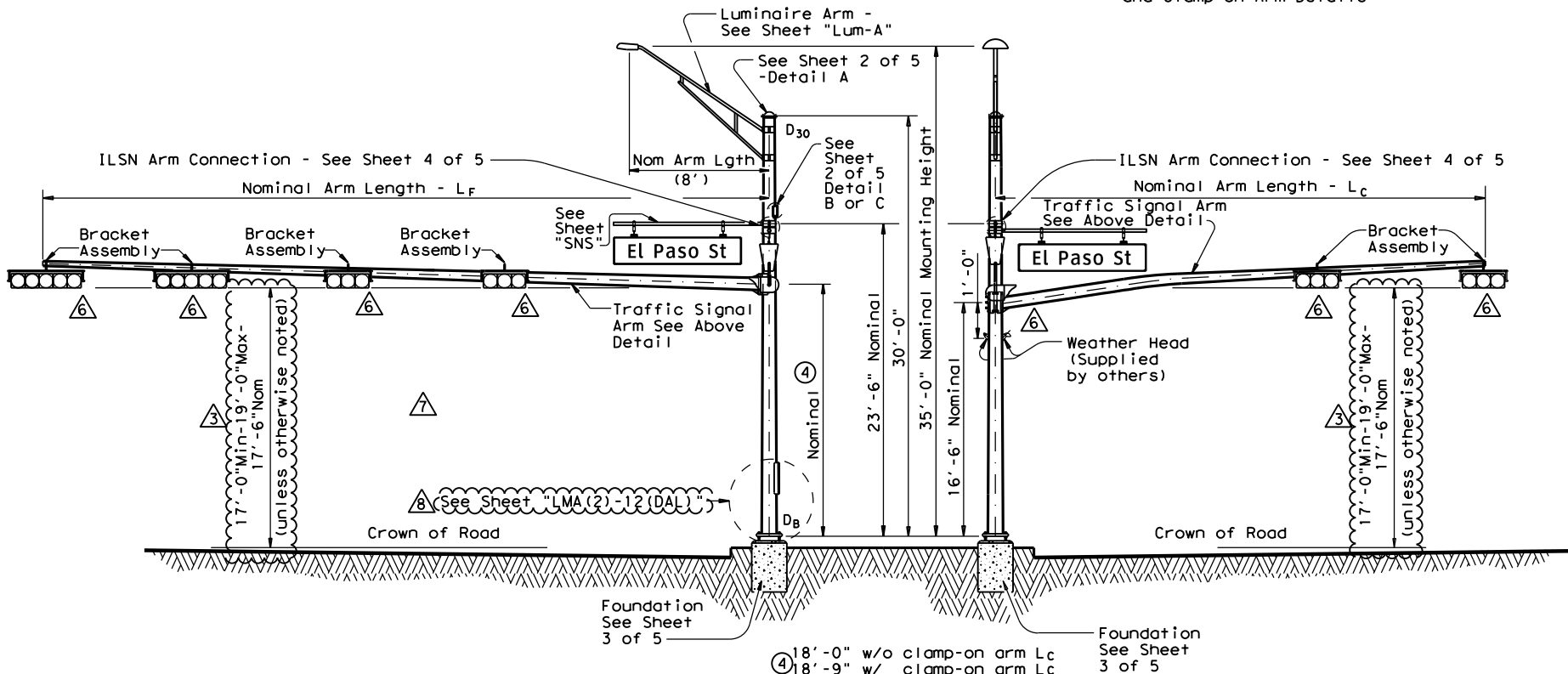
Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

① See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

② See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION

(Showing fixed mount arm)

STRUCTURE ASSEMBLY

ELEVATION

(Showing clamp-on arm)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

| Arm | Equivalent DL ⑤ | WL EPA ⑤⑥ |
|----------------------------|----------------------|------------|
| 8' Luminaire Arm | Luminaire 60 lbs | 1.6 sq ft |
| 9' ILSN Arm | Sign 85 lbs | 11.5 sq ft |
| 50' to 65' Fixed Mount Arm | Signal Loads 310 lbs | 52 sq ft |
| Up to 44' Clamp-on Arm | Signal Loads 180 lbs | 32.4 sq ft |

⑤ Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

⑥ Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

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

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

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

- MODIFICATIONS:**
- ① NOT USED
 - ② REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)
 - ③ REVISED MINIMUM SIGNAL HEIGHT. (3/12)
 - ④ REMOVED "MA-D" REFERENCE. (2/12)
 - ⑤ REMOVED TABLE OF DIMENSIONS "A". (2/12)
 - ⑥ REMOVED CGB CONNECTORS. (2/12)
 - ⑦ REMOVED THREADED COUPLING FOR CGB CONNECTOR. (2/12)
 - ⑧ REVISED THE ELEVATION OF ACCESS COMPARTMENT. (3/12)

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

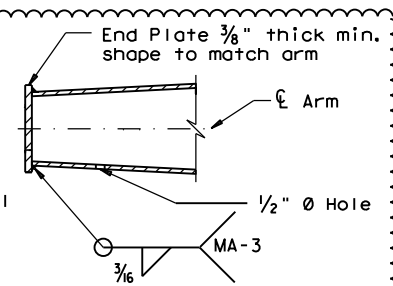
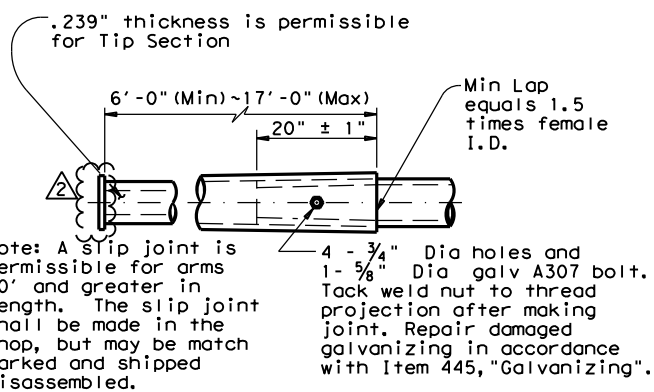


PLATE WELD DETAIL



SLIP JOINT DETAIL (FIXED MOUNT ARM)

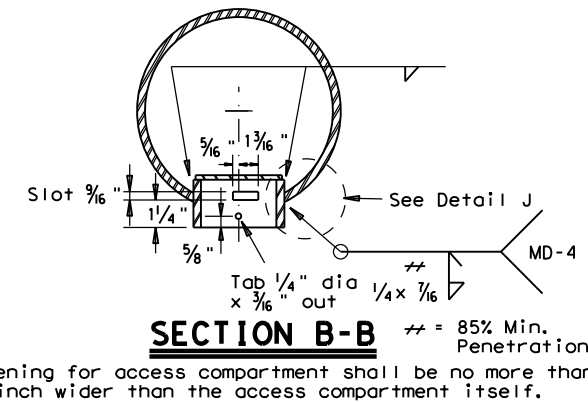
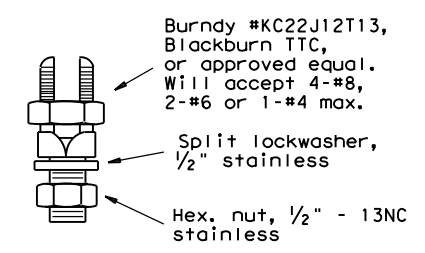
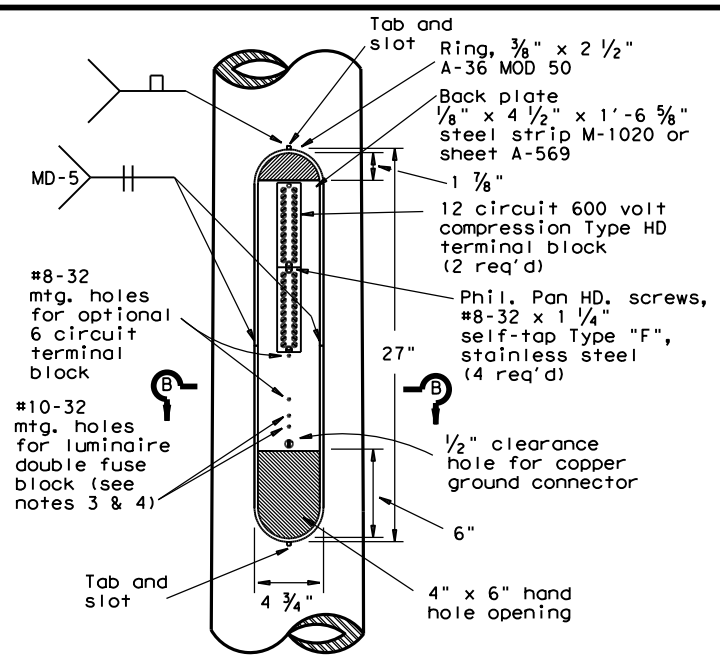
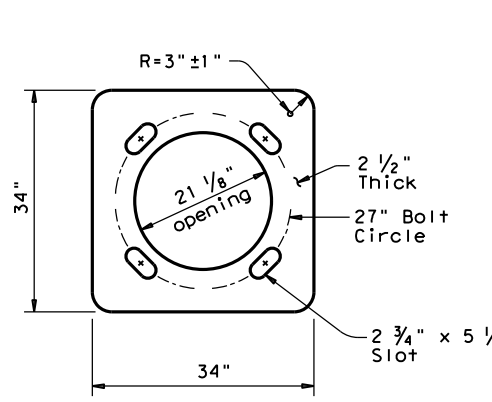
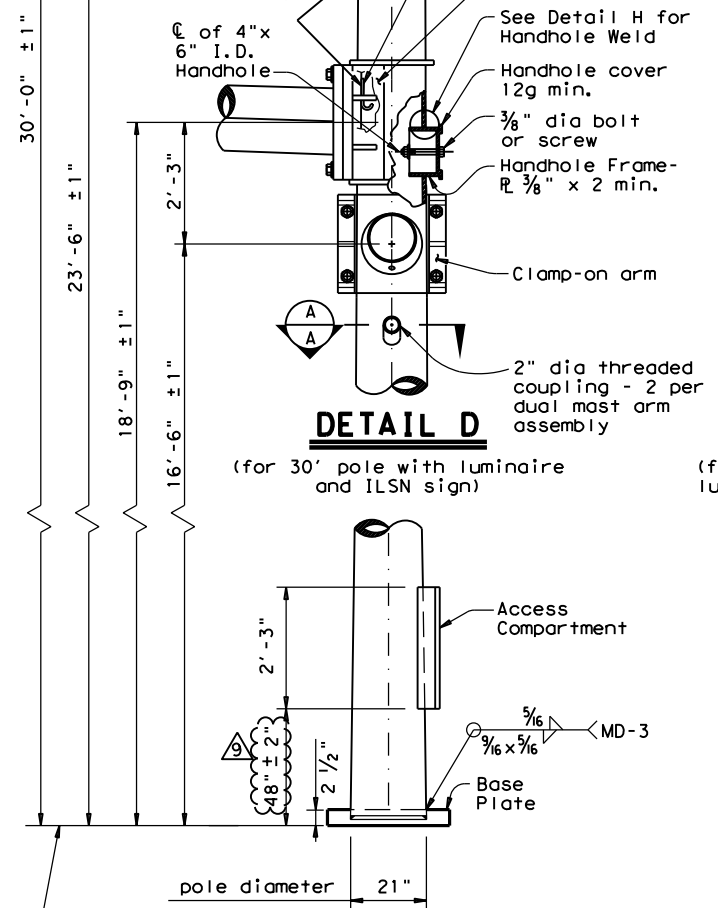
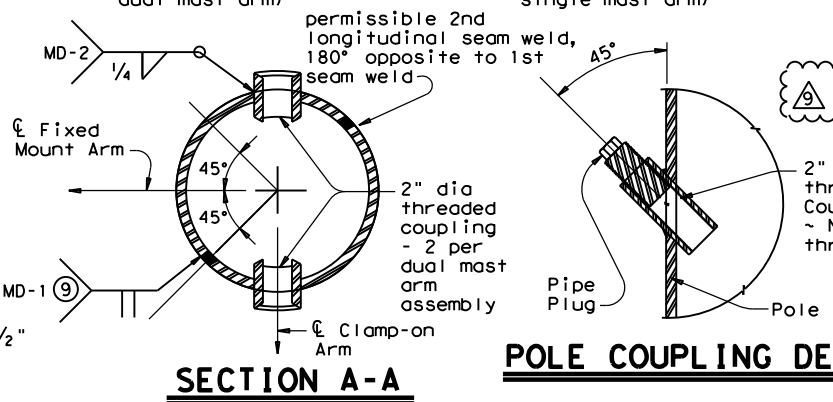
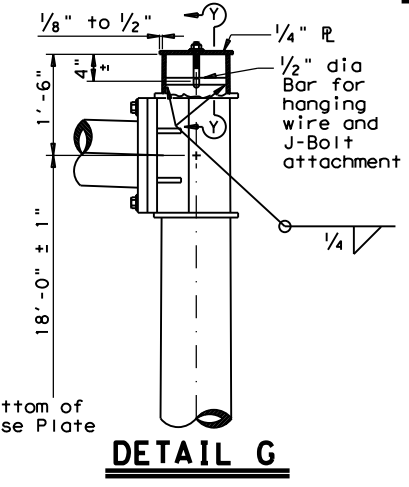
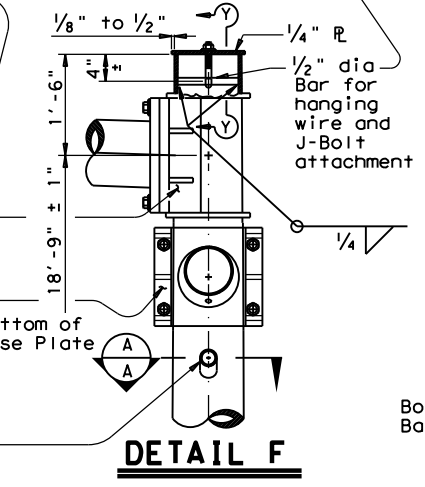
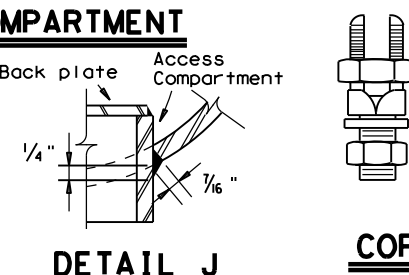
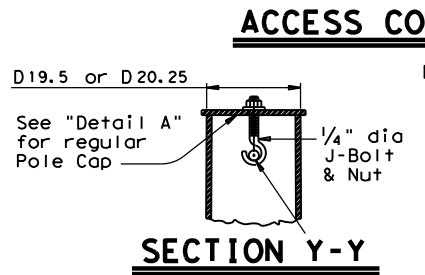
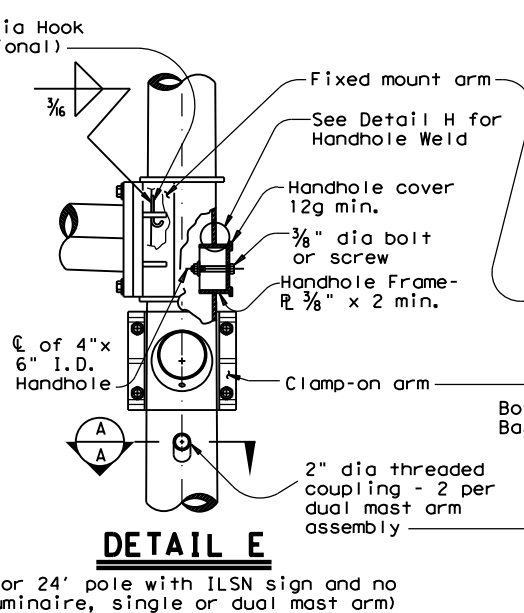
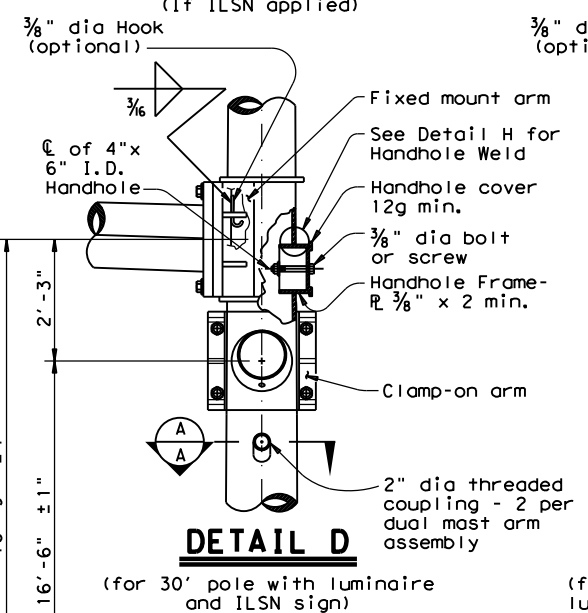
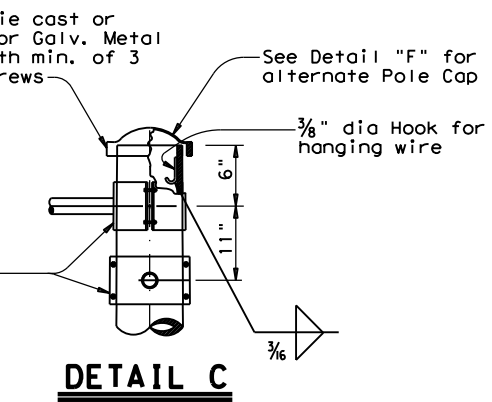
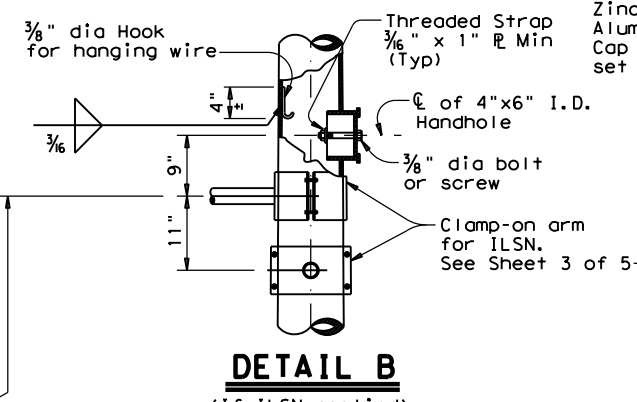
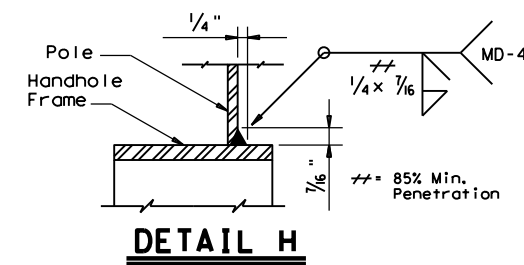
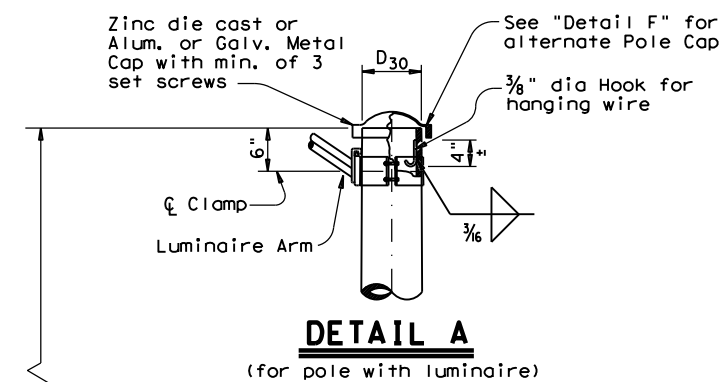
Texas Department of Transportation

**TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)
LMA(1)-12(DAL)**

Sheet 1 of 5

| | | | | | |
|-------------------|--|---------|----------|---------|-----------|
| © TxDOT July 2000 | | DN: JSY | CK: ARC | DW: TGG | CK: JSY |
| REVISIONS | | CONT | SECT | JOB | HIGHWAY |
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- ACCESS COMPARTMENT NOTES:**
- The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
 - The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilco SSS-5). The traffic signal contractor shall install the kit items in the field.
 - The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP6CU terminal strip, and one Bussmann #BM6032B fuse block.
 - Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

| MATERIALS | |
|--------------------------------------|---|
| Round Shafts or Polygonal Shafts (7) | ASTM A595 Gr. A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (8) |
| Plates (7) | ASTM A36, A588, or A572 Gr.50 |
| Connection Bolts | ASTM A325, or A449 except where noted |
| Pin Bolts | ASTM A325 |
| Pipe (7) | ASTM A53 Gr. B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50 |
| Misc. Hardware | Galvanized steel or stainless steel or as noted |

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

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

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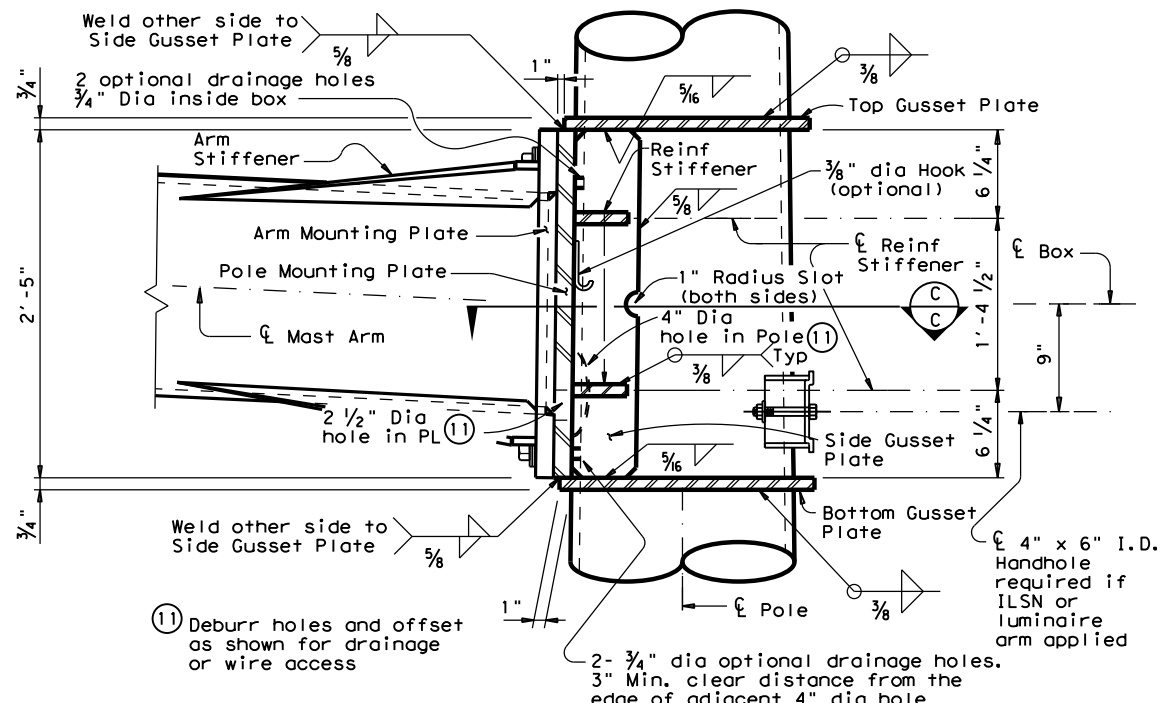
TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE) LMA(2)-12(DAL)

Sheet 2 of 5

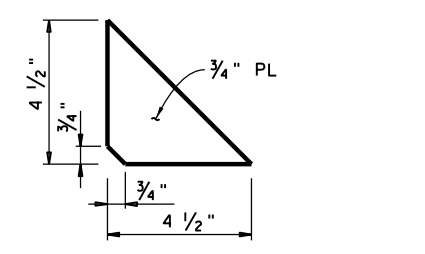
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| 18 | ROCKWALL | 255 | | | |

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

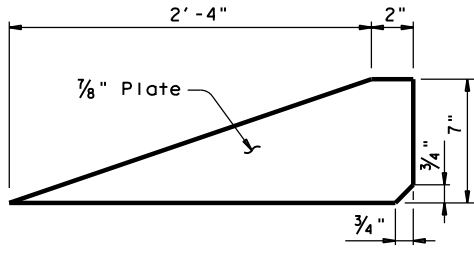
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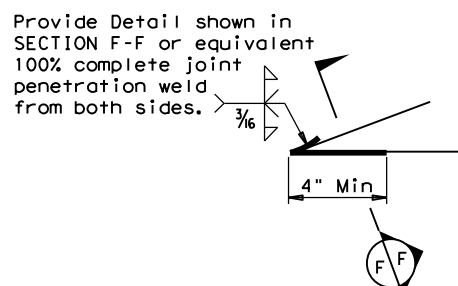
BUILT-UP BOX CONNECTION



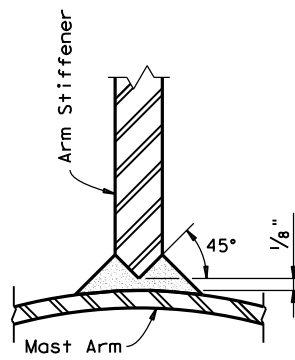
REINFORCING STIFFENER



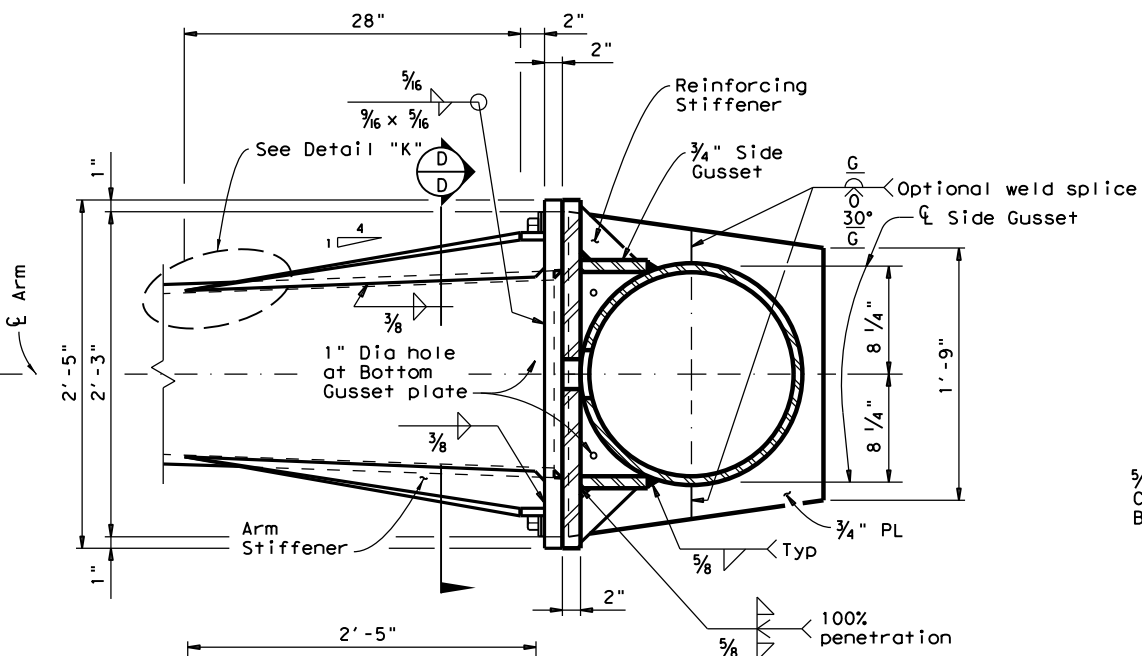
ARM STIFFENER
(Cut to match arm inclination and taper)



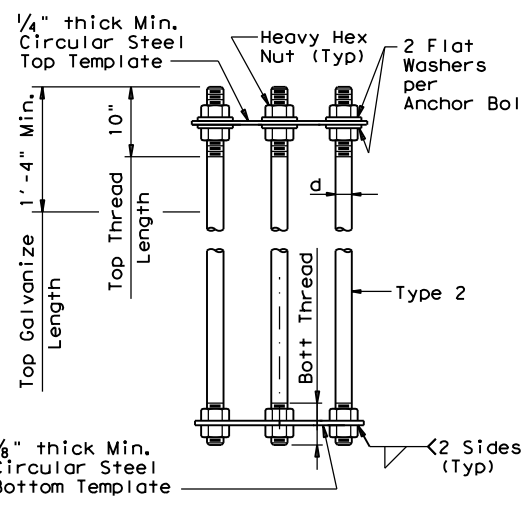
DETAIL "K"



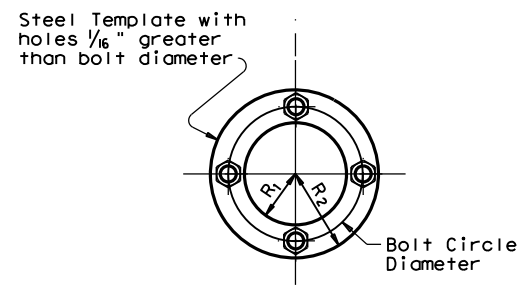
SECTION F-F



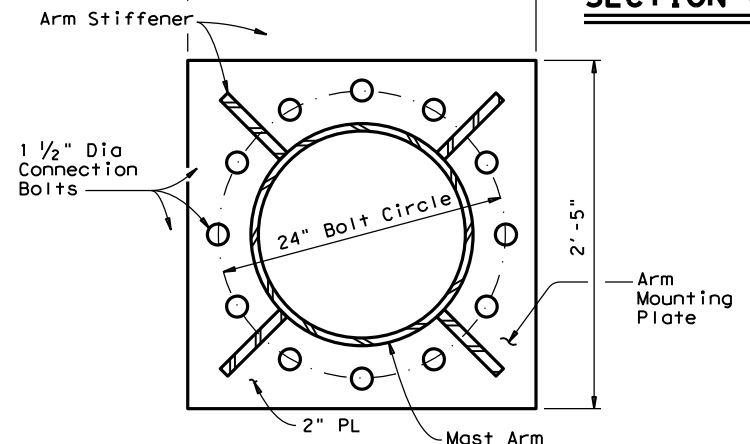
SECTION C-C



ANCHOR BOLT ASSEMBLY



TEMPLATE DETAIL



SECTION D-D

| FDN TYPE | DRILLED SHAFT DIA | REINFORCING STEEL | | DRILLED SHAFT LENGTH-ft (16), (17), (18) | | | ANCHOR BOLT DESIGN (14) | | | FOUNDATION DESIGN LOAD (15) | | TYPICAL APPLICATION | |
|----------|-------------------|-------------------|----------------|--|------|------|-------------------------|----------|--------------|-----------------------------|-------------|---------------------|-------------------------------|
| | | VERT BARS | SPIRAL & PITCH | TEXAS CONE PENETROMETER N blows/ft | | | ANCHOR BOLT DIA | Fy (ksi) | BOLT CIR DIA | ANCHOR TYPE | MOMENT K-ft | | SHEAR Kips |
| | | | | 10 | 15 | 40 | | | | | | | |
| 48-A | 48" | 20 #9 | #4 at 6" | 21.9 | 19.5 | 14.7 | 2 1/2" | 55 | 27" | 2 | 490 | 10 | 50' to 65' Mast arm assembly. |

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

- (14) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.
- (15) Foundation Design Loads are the allowable moments and shears at the base of the structure.
- (16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.
- (17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.
- (18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

| Fixed Mount Arm L _F | ROUND POLES (13) | | | | | Foundation Type |
|--------------------------------|------------------|-------------------|--------------------|-----------------|-----------------|-----------------|
| | D _B | D _{19.5} | D _{20.25} | D ₂₄ | D ₃₀ | |
| ft. | in. | in. | in. | in. | (12)thk in. | |
| 50', 55', 60', 65' | 21.0 | 18.2 | 17.6 | 16.8 | .3125 | 48-A |

| Fixed Mount Arm L _F | ROUND ARMS (13) | | | | |
|--------------------------------|-----------------|----------------|----------------|-------------|---------|
| | L ₁ | D ₁ | D ₂ | (12)thk in. | Rise |
| ft. | ft. | in. | in. | in. | |
| 50 | 49 | 18.5 | 11.7 | .3125 | 3'- 3" |
| 55 | 54 | 18.5 | 11.0 | .3125 | 3'- 7" |
| 60 | 59 | 18.5 | 10.3 | .3125 | 3'- 11" |
| 65 | 64 | 18.5 | 9.6 | .3125 | 4'- 4" |

- D_B = Pole Base O.D.
- D_{19.5} = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
- D_{20.25} = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
- D₂₄ = Pole Top O.D. with ILSN w/out Luminaire
- D₃₀ = Pole Top O.D. with Luminaire
- D₁ = Arm Base O.D.
- D₂ = Arm End O.D.
- L₁ = Shaft Length
- L_F = Fixed Arm Length

- (12) Thickness shown is minimum, thicker materials may be used.
- (13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:
 Built-up Box Connection: For the welded arm-to-pole connection as a built-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.
 The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.
 Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

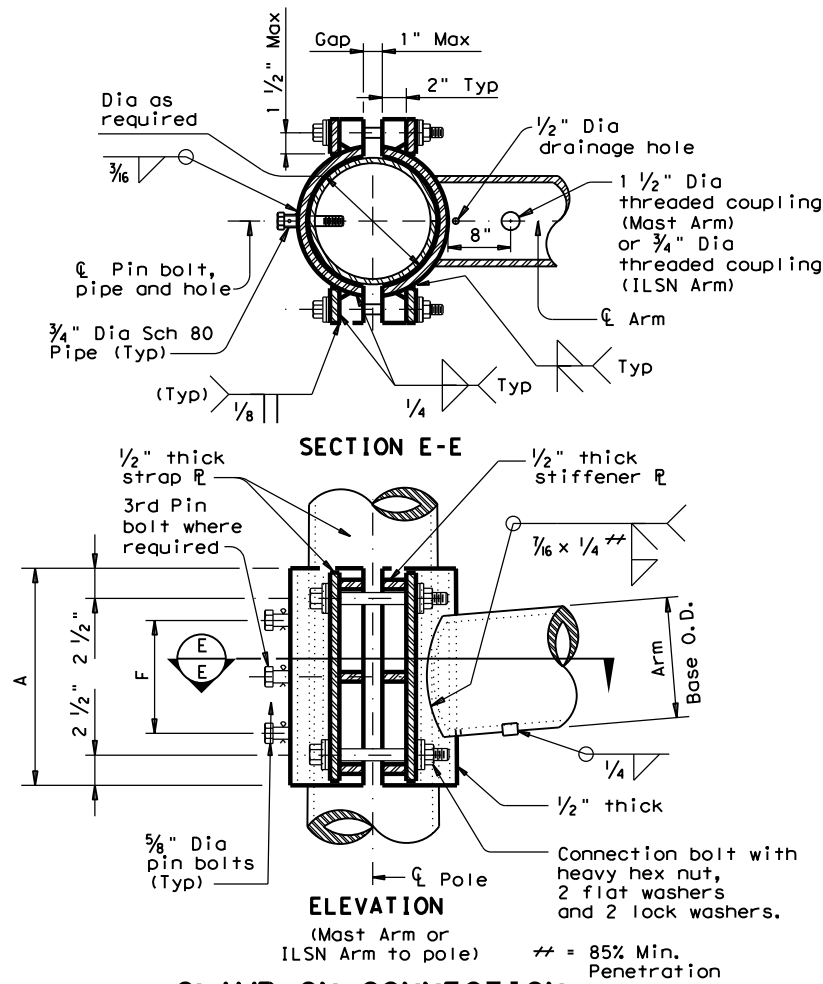
| ANCHOR BOLT & TEMPLATE SIZE | | | | | | |
|-----------------------------|----------|------------|---------------|-------------|----------------|----------------|
| Bolt Dia in. | Length # | Top Thread | Bottom Thread | Bolt Circle | R ₂ | R ₁ |
| 2 1/2" | 5'-2" | 10" | 6 1/2" | 27" | 16" | 11" |

*Min dimension given, longer bolts are acceptable.

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY
(50 TO 65 FT)
(80 AND 100 MPH WIND ZONE)
 Sheet 3 of 5 LMA (3) - 12

| | | | | | | |
|-------------------|-----------|----------|---------|---------|-----------|---------|
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| 4-20-01 1-12 | REVISIONS | | CONT | SECT | JOB | HIGHWAY |
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CLAMP-ON CONNECTION

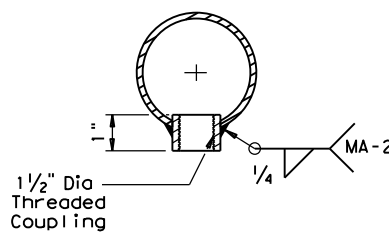
| 80 MPH WIND | | | | | | | | | | |
|-----------------|----------------|----------------|----------------|----------|--------|----------------|----------------|----------------|----------|--------|
| Clamp-on Arm LC | ROUND ARMS | | | | | POLYGONAL ARMS | | | | |
| | L ₁ | D ₁ | D ₂ | thk (12) | Rise | L ₁ | D ₁ | D ₂ | thk (12) | Rise |
| ft. | ft. | in. | in. | in. | | ft. | in. | in. | in. | |
| 20 | 19.1 | 6.5 | 3.8 | .179 | 1'-9" | 19.1 | 7.0 | 3.5 | .179 | 1'-8" |
| 24 | 23.1 | 7.5 | 4.3 | .179 | 1'-10" | 23.1 | 7.5 | 3.5 | .179 | 1'-9" |
| 28 | 27.1 | 8.0 | 4.2 | .179 | 1'-11" | 27.1 | 8.0 | 3.5 | .179 | 1'-10" |
| 32 | 31.0 | 9.0 | 4.7 | .179 | 2'-0" | 31.0 | 9.0 | 3.5 | .179 | 2'-0" |
| 36 | 35.0 | 9.5 | 4.6 | .179 | 2'-4" | 35.0 | 10.0 | 3.5 | .179 | 2'-1" |
| 40 | 39.0 | 9.5 | 4.1 | .239 | 2'-8" | 39.0 | 9.5 | 3.5 | .239 | 2'-3" |
| 44 | 43.0 | 10.0 | 4.1 | .239 | 2'-11" | 43.0 | 10.0 | 3.5 | .239 | 2'-6" |

| 100 MPH WIND | | | | | | | | | | |
|-----------------|----------------|----------------|----------------|----------|--------|----------------|----------------|----------------|----------|--------|
| Clamp-on Arm LC | ROUND ARMS | | | | | POLYGONAL ARMS | | | | |
| | L ₁ | D ₁ | D ₂ | thk (12) | Rise | L ₁ | D ₁ | D ₂ | thk (12) | Rise |
| ft. | ft. | in. | in. | in. | | ft. | in. | in. | in. | |
| 20 | 19.1 | 8.0 | 5.3 | .179 | 1'-8" | 19.1 | 8.0 | 3.5 | .179 | 1'-7" |
| 24 | 23.1 | 9.0 | 5.8 | .179 | 1'-9" | 23.1 | 9.0 | 3.5 | .179 | 1'-8" |
| 28 | 27.1 | 9.5 | 5.7 | .179 | 1'-10" | 27.1 | 10.0 | 3.5 | .179 | 1'-9" |
| 32 | 31.0 | 9.5 | 5.2 | .239 | 1'-11" | 31.0 | 9.5 | 3.5 | .239 | 1'-10" |
| 36 | 35.0 | 10.0 | 5.1 | .239 | 2'-0" | 35.0 | 10.0 | 3.5 | .239 | 1'-11" |
| 40 | 39.0 | 10.5 | 5.1 | .239 | 2'-3" | 39.0 | 11.0 | 3.5 | .239 | 2'-1" |
| 44 | 43.0 | 11.0 | 5.1 | .239 | 2'-8" | 43.0 | 11.5 | 4.0 | .239 | 2'-3" |

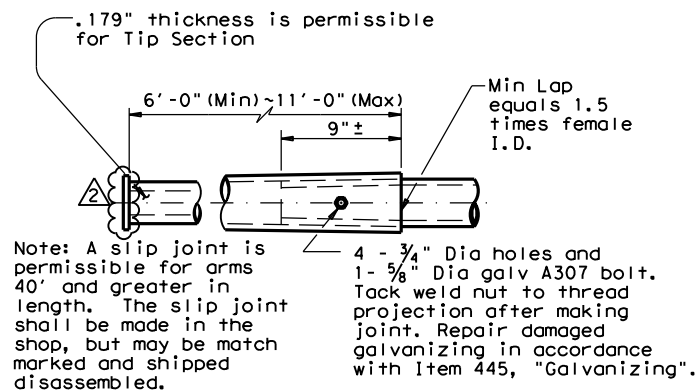
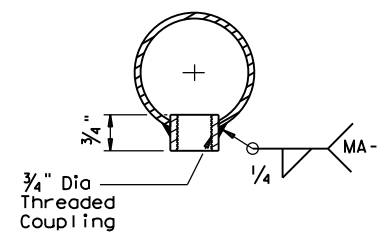
D₁ = Arm Base O.D.
 D₂ = Arm End O.D.
 L₁ = Shaft Length
 LC = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

ARM COUPLING DETAIL



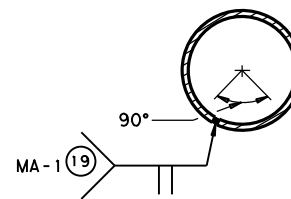
ILSN ARM COUPLING DETAIL



SLIP JOINT DETAIL (CLAMP-ON ARM)

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

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.
 60% Min penetration
 100% penetration within 6" of circumferential base welds.

CLAMP-ON ARM CONNECTION

| ILSN Arm Size | | A | F | 4 Conn. Bolts | 5/8" Dia. Pin Bolts |
|-----------------|-------|-----|-----|---------------|---------------------|
| Sch 40 pipe Dia | Thick | | | | |
| in. | in. | in. | in. | in. | ea |
| 3 | .216 | 10 | 4 | 3/4 | 2 |

| Mast Arm Size | | A | F | 4 Conn. Bolts | 5/8" Dia. Pin Bolts |
|---------------|-------|-----|-----|---------------|---------------------|
| Base Dia | Thick | | | | |
| in. | in. | in. | in. | in. | ea |
| 6.5 | .179 | 12 | 6 | 1 | 2 |
| 7.5 | .179 | 14 | 8 | 1 | 2 |
| 8.0 | .179 | 14 | 8 | 1 | 2 |
| 9.0 | .179 | 16 | 10 | 1 | 2 |
| 9.5 | .179 | 18 | 12 | 1 1/4 | 3 |
| 9.5 | .239 | 18 | 12 | 1 1/4 | 3 |
| 10.0 | .239 | 18 | 12 | 1 1/4 | 3 |
| 10.5 | .239 | 18 | 12 | 1 1/4 | 3 |
| 11.0 | .239 | 18 | 12 | 1 1/4 | 3 |
| 11.5 | .239 | 18 | 12 | 1 1/4 | 3 |

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 1/2" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 1/2" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and 3/4" diameter pipe shall have 3/16" diameter holes for a 1/8" diameter galvanized cotter pin. Back clamp plate shall be furnished with a 3/4" diameter hole for each pin bolt. An 1/16" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

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

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
 Sheet 4 of 5 LMA(4)-12(DAL)

| | | | | | |
|-----------------------|-----------|----------|---------|-----------|---------|
| © TxDOT November 2000 | | DN: JK | CK: GRB | DW: FDN | CK: CAL |
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| Shipping Parts List | | | | | | | |
|--|--|-------------|---|-------------|---|-------------|----------|
| Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table. | | | | | | | |
| Nominal Arm Length | 30' Poles with Luminaire | | 24' Poles with ILSN | | 19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN See note above | | |
| | See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex | | See note above plus one small hand hole | | | | |
| Single Mast Arm | | | | | | | |
| Lf ft. | Designation | Quantity | Designation | Quantity | Designation | Quantity | |
| 50 | 50L | | 50S | | 50 | | |
| 55 | 55L | | 55S | | 55 | | |
| 60 | 60L | | 60S | 2 | 60 | | |
| 65 | 65L | | 65S | | 65 | | |
| Dual Mast Arm | | | | | | | |
| Lf ft. | Lc ft. | Designation | Quantity | Designation | Quantity | Designation | Quantity |
| 50 | 20 | 5020L | | 5020S | | 5020 | |
| | 24 | 5024L | | 5024S | | 5024 | |
| | 28 | 5028L | | 5028S | | 5028 | |
| | 32 | 5032L | | 5032S | | 5032 | |
| | 36 | 5036L | | 5036S | | 5036 | |
| | 40 | 5040L | | 5040S | | 5040 | |
| 55 | 20 | 5520L | | 5520S | | 5520 | |
| | 24 | 5524L | | 5524S | | 5524 | |
| | 28 | 5528L | | 5528S | | 5528 | |
| | 32 | 5532L | | 5532S | | 5532 | |
| | 36 | 5536L | | 5536S | | 5536 | |
| | 40 | 5540L | | 5540S | | 5540 | |
| 60 | 20 | 6020L | | 6020S | | 6020 | |
| | 24 | 6024L | | 6024S | | 6024 | |
| | 28 | 6028L | | 6028S | | 6028 | |
| | 32 | 6032L | | 6032S | | 6032 | |
| | 36 | 6036L | | 6036S | | 6036 | |
| | 40 | 6040L | | 6040S | | 6040 | |
| 65 | 20 | 6520L | | 6520S | | 6520 | |
| | 24 | 6524L | | 6524S | | 6524 | |
| | 28 | 6528L | | 6528S | | 6528 | |
| | 32 | 6532L | | 6532S | | 6532 | |
| | 36 | 6536L | | 6536S | | 6536 | |
| | 40 | 6540L | | 6540S | | 6540 | |
| | 44 | 6544L | | 6544S | | 6544 | |

Foundation Summary Table **

| Location Ident. | Avg. N Blow/ft. | No. Each | Drill Shaft *** Length (feet) |
|---------------------------------|-----------------|----------|-------------------------------|
| | | | 48-A |
| POLE P2 | | 1 | 22 |
| POLE P4 | | 1 | 22 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Total Drill Shaft Length | | | 44 |

Notes

- ** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.
- *** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Abbreviations

- Lf= Fixed Arm Length
- Lc= Clamp-on Arm Length (44' Max.)

REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY (2/12).

| Shipping Parts List | | | | | | | |
|--|--|----------|--|---------------------------------|--|----------|-----------|
| Traffic Signal Arms (Fixed Mount) (1 per pole) Ship each arm with listed equipment attached | | | | | | | |
| Nominal Arm Length | Type IV Arm (4 Signals) | | | Luminaire Arms (1 per 30' pole) | | | |
| | 4 Bracket Assemblies | | | Nominal Arm Length | Quantity | | |
| ft. | Designation | Quantity | | 8' Arm | | | |
| 50 | 50IV | | | | | | |
| 55 | 55IV | | | | | | |
| 60 | 60IV | 2 | | | | | |
| 65 | 65IV | | | | | | |
| | | | | | | | |
| Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached | | | | | | | |
| Nominal Arm Length | Type I Arm (1 Signal) | | Type II Arm (2 Signals) | | Type III Arm (3 Signals) | | |
| | 1 Bracket Assembly and 1 clamp w/bolts and washers | | 2 Bracket Assemblies and 1 clamp w/bolts and washers | | 3 Bracket Assemblies and 1 clamp w/bolts and washers | | |
| ft. | Designation | Quantity | Designation | Quantity | Designation | Quantity | Quantity |
| 20 | 20I-80 | | | | | | |
| 24 | 24I-80 | | 24II-80 | | | | |
| 28 | 28I-80 | | 28II-80 | | | | |
| 32 | | | 32II-80 | | | | 32III-80 |
| 36 | | | 36II-80 | | | | 36III-80 |
| 40 | | | | | | | 40III-80 |
| 44 | | | | | | | 44III-80 |
| Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached | | | | | | | |
| Nominal Arm | Type I Arm (1 Signal) | | Type II Arm (2 Signals) | | Type III Arm (3 Signals) | | |
| | 1 Bracket Assembly and 1 clamp w/bolts and washers | | 2 Bracket Assemblies and 1 clamp w/bolts and washers | | 3 Bracket Assemblies and 1 clamp w/bolts and washers | | |
| ft. | Designation | Quantity | Designation | Quantity | Designation | Quantity | Quantity |
| 20 | 20I-100 | | | | | | |
| 24 | 24I-100 | | 24II-100 | | | | |
| 28 | 28I-100 | | 28II-100 | | | | |
| 32 | | | 32II-100 | | | | 32III-100 |
| 36 | | | 36II-100 | | | | 36III-100 |
| 40 | | | | | | | 40III-100 |
| 44 | | | | | | | 44III-100 |
| Anchor Bolt Assemblies (1 per pole) Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "IS-FD". Templates may be removed for shipment. | | | | | | | |
| Anchor Bolt Diameter | Anchor Bolt Length | Quantity | | | | | |
| 2 1/2 " | 5' - 3" | 2 | | | | | |



**LONG MAST
ARM ASSEMBLY
PARTS LIST**

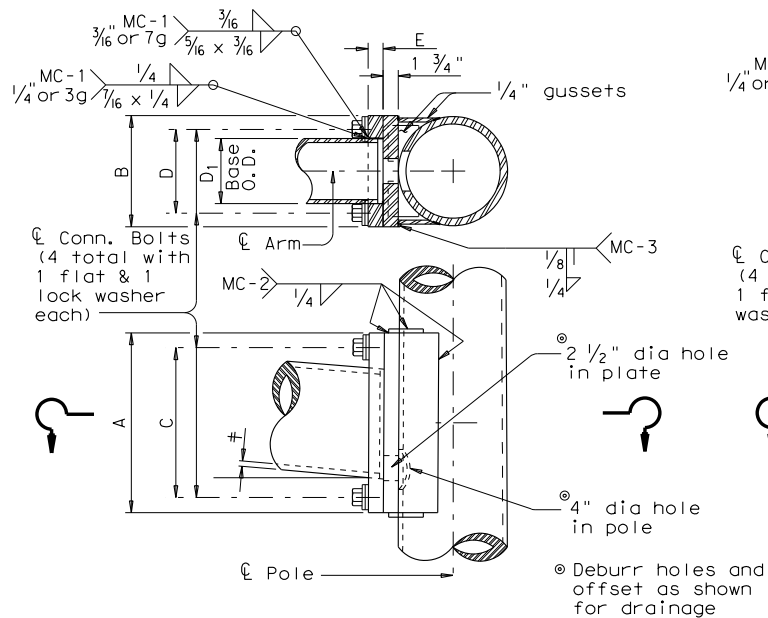
LMA (5) - 12 (DAL)

Sheet 5 of 5

| | | | | | |
|-----------------------|--|--------|----------|-----------|---------|
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| | | DIST | COUNTY | SHEET NO. | |
| | | 18 | ROCKWALL | 258 | |

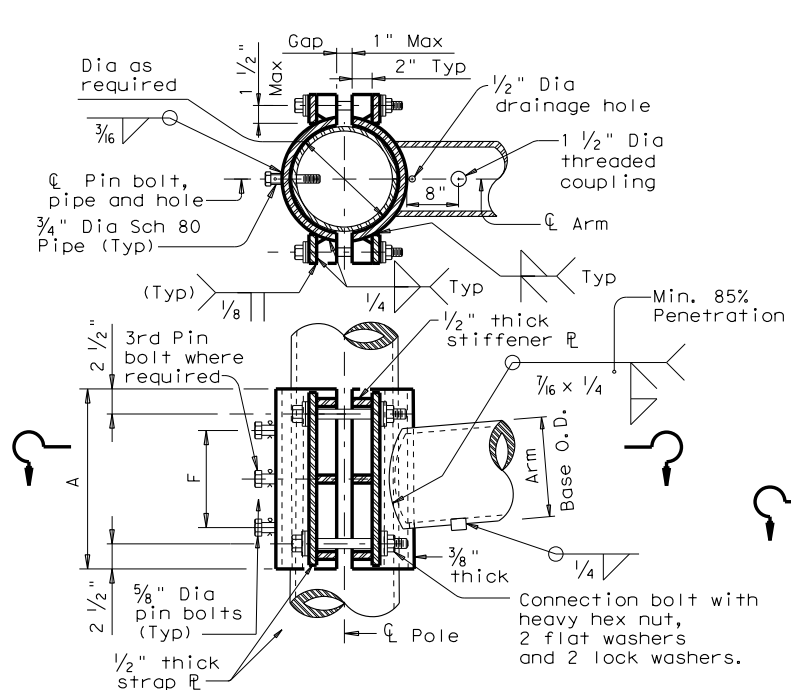
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| ARM SIZE | | A | B | C | D | E | CONN BOLT DIA |
|----------------|------|-----|-----|-----|-----|-------|---------------|
| D ₁ | Ø | in. | in. | in. | in. | in. | in. |
| 6.5 | .179 | 12 | 9 | 9 | 6 | 1 3/4 | 1 |
| 7.5 | .179 | 13 | 9 | 10 | 6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



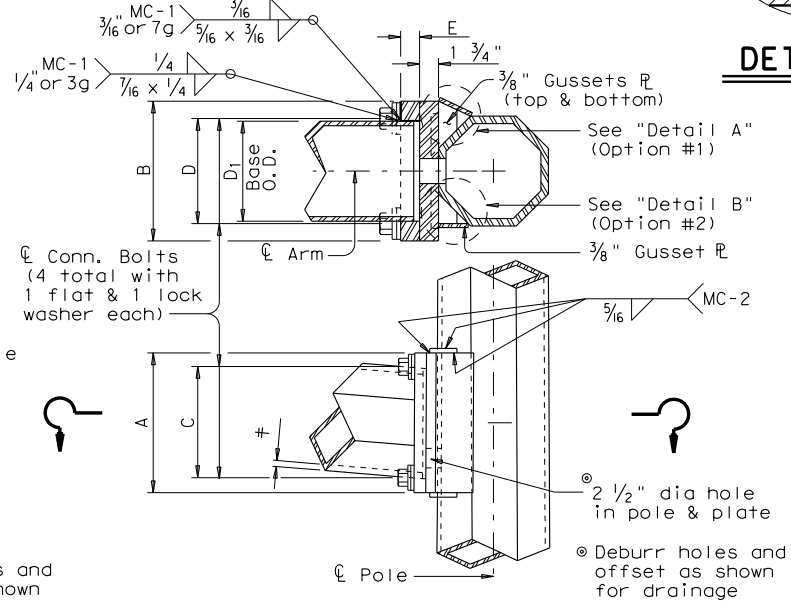
FIXED MOUNT DETAIL 1

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



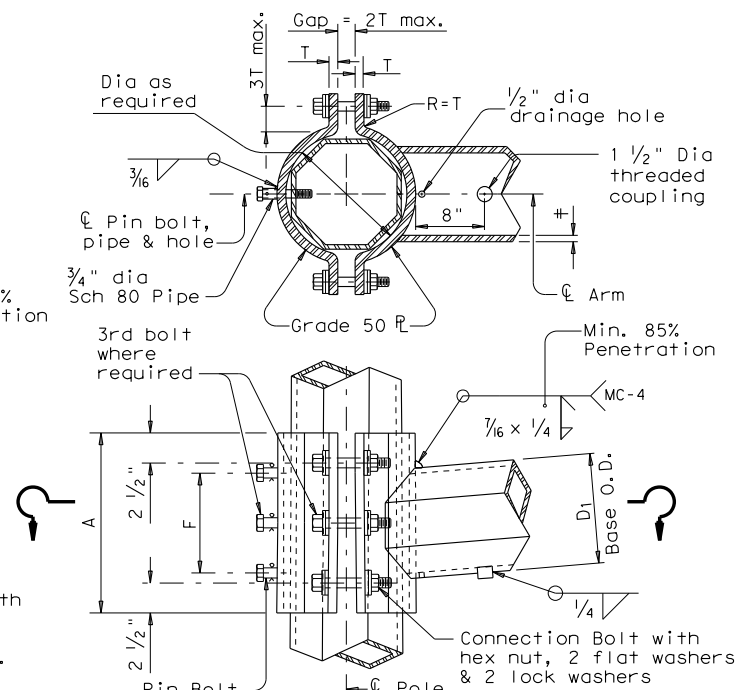
CLAMP-ON DETAIL 1

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

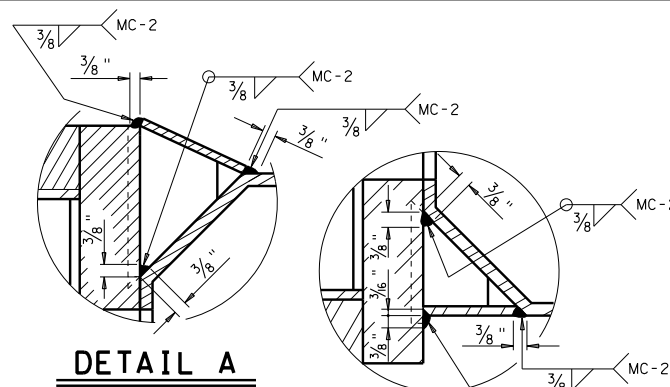


FIXED MOUNT DETAIL 2

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

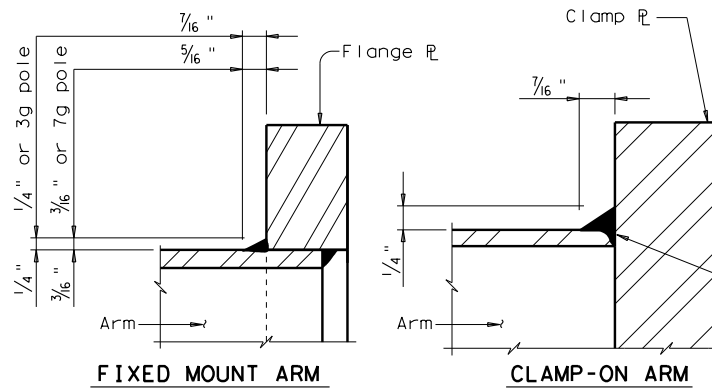


CLAMP-ON DETAIL 2



DETAIL A

DETAIL B

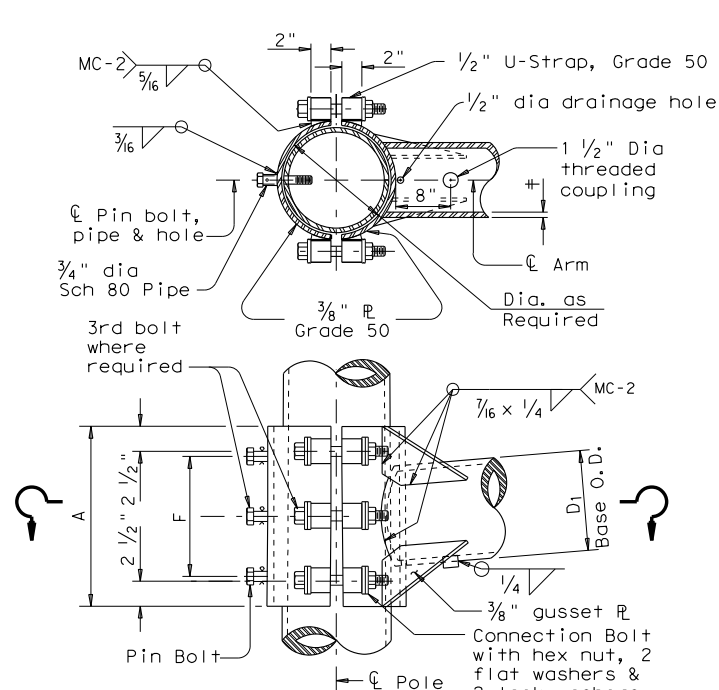


FIXED MOUNT ARM

CLAMP-ON ARM

ARM BASE WELD DETAILS

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



CLAMP-ON DETAIL 3

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

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

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 1/2" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

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

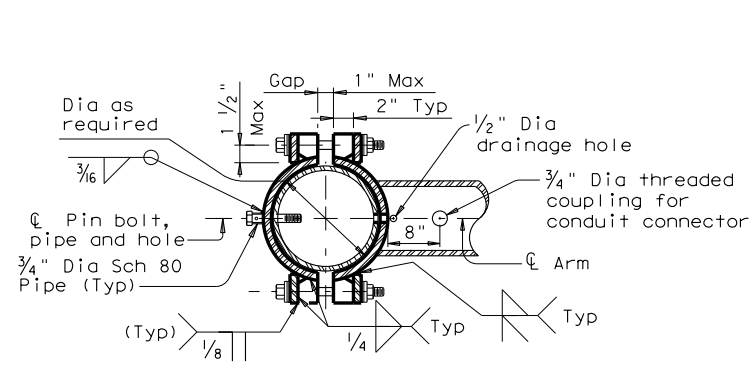
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 Traffic Operations Division
STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES
MAST ARM CONNECTIONS
MA-C-12

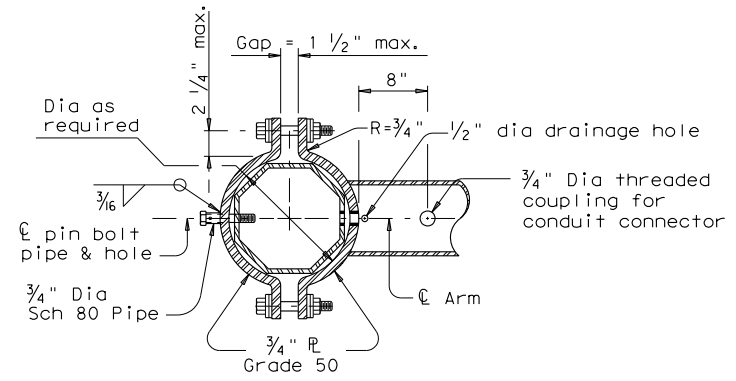
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| | | DAL | ROCKWALL | 259 | |

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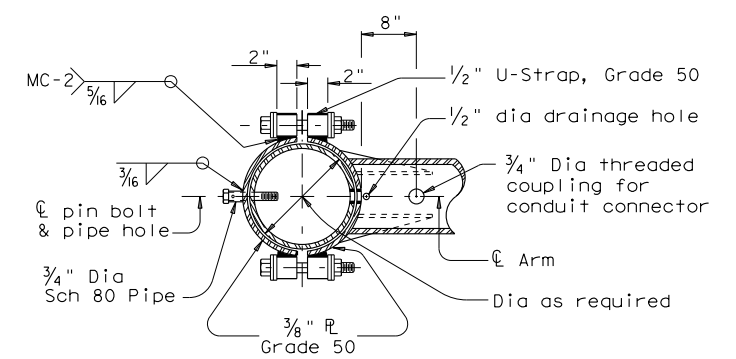
| TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3 | | | | | | |
|--|-----|-----|-------------|---------|-----------|---------|
| ILSN ARM SIZE | A | | CONN. BOLTS | | PIN BOLTS | |
| | in. | in. | No. ea. | Dia in. | No. ea. | Dia in. |
| 3 in. dia Schedule 40 Pipe | 10 | 4 | 4 | 3/4 | 2 | 5/8 |



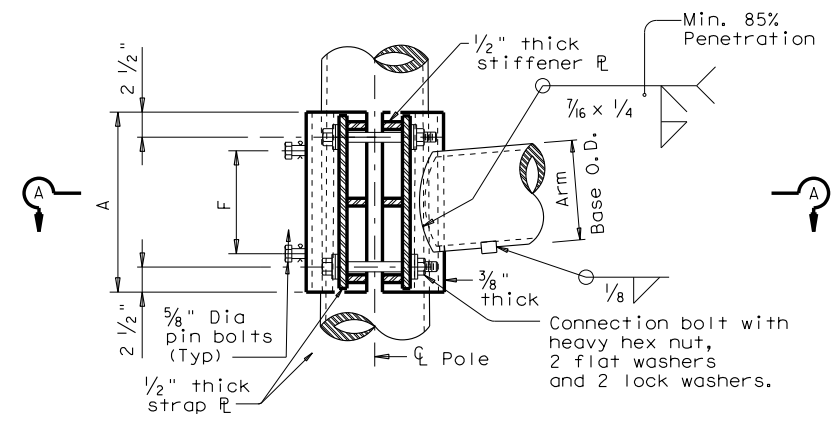
SECTION A-A



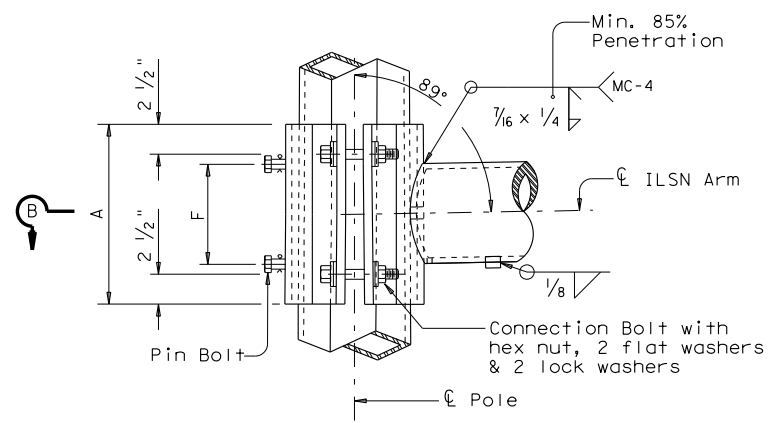
SECTION B-B



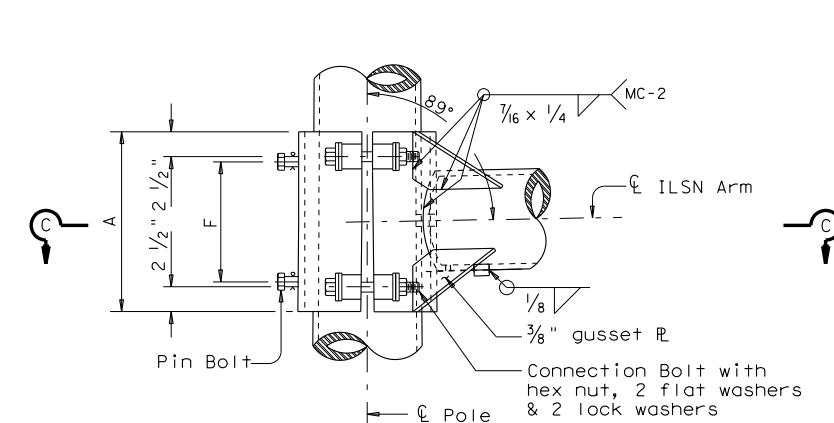
SECTION C-C



ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



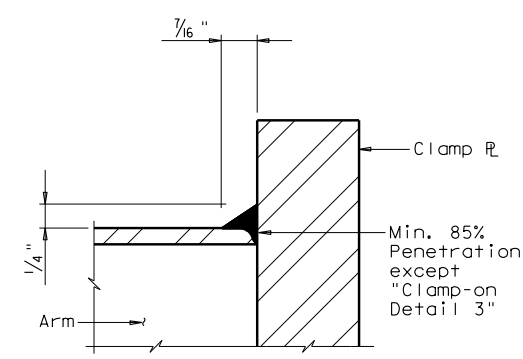
ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:
Clamp-on details shall be used for ILSN support arm assemblies. A 1 1/2 inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after the arm is oriented. Deburr both holes.

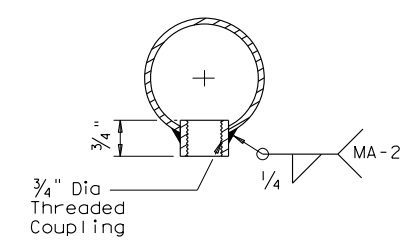
Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the details.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

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



CLAMP-ON ARM
ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

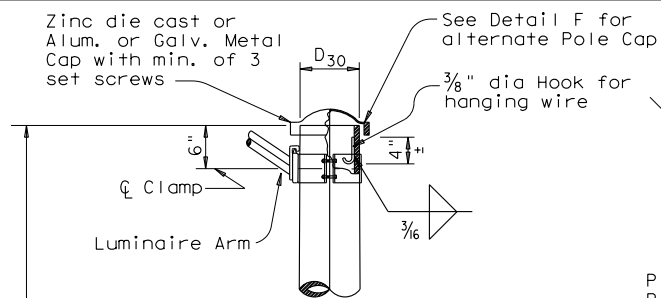
Texas Department of Transportation
Traffic Operations Division
**STANDARD ASSEMBLY
FOR TRAFFIC SIGNAL
SUPPORT STRUCTURES**
MAST-ARM CONNECTIONS
MA-C (ILSN) - 12

| | | | | |
|---------------------|-----------|---------|----------|-----------|
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| | | | | 260 |

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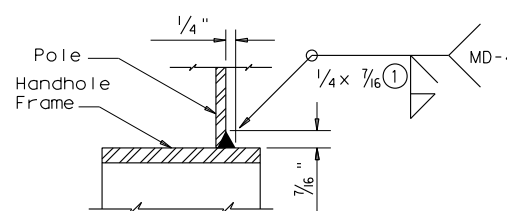
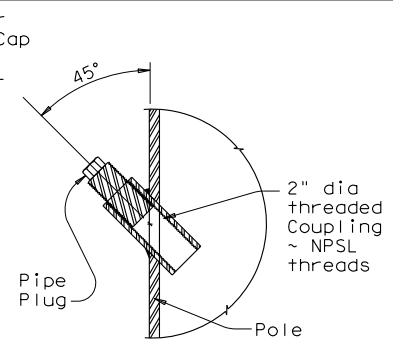
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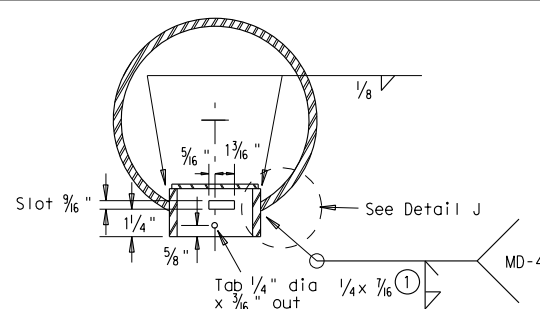
DETAIL A

(for pole with luminaire)

POLE COUPLING DETAIL

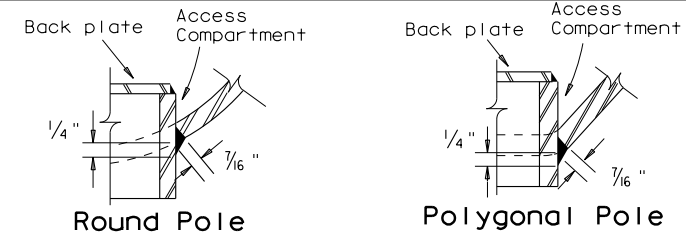


DETAIL G



SECTION X-X

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



DETAIL J

Ring, 3/8" x 2 1/2" ASTM A572 Gr 50

Back plate 1/8" x 4 1/2" x 1'-6 3/8" steel strip M-1020 or sheet A-569

12 circuit 600 volt compression Type HD terminal block (2 req'd)

Phil. Pan HD. screws, #8-32 x 1/4" self-tap Type "F", stainless steel (4 req'd)

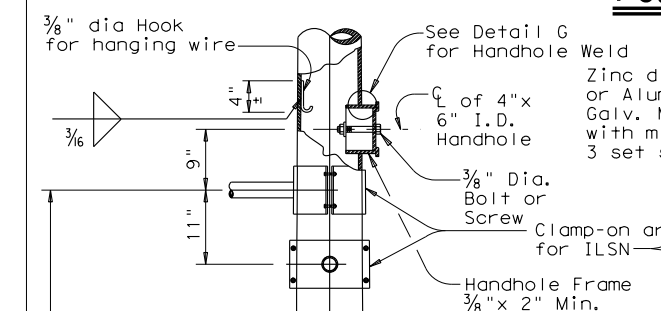
1/2" clearance hole for copper ground connector

4" x 6" hand hole opening

ACCESS COMPARTMENT

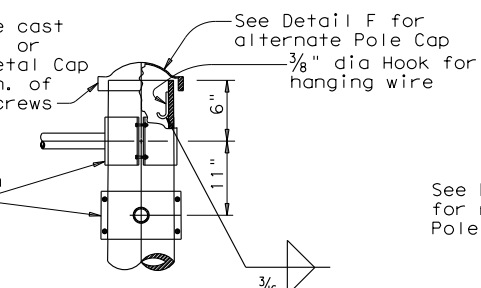
NOTES:

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

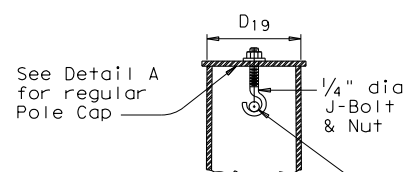


DETAIL B

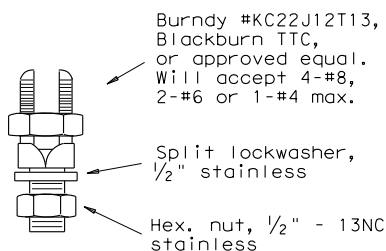
(If ILSN applied)



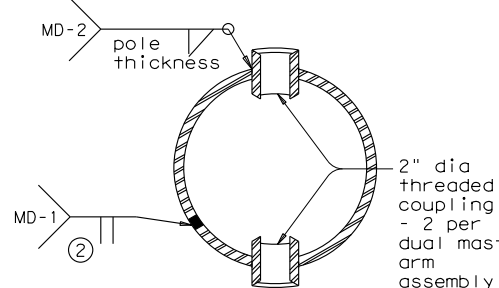
DETAIL C



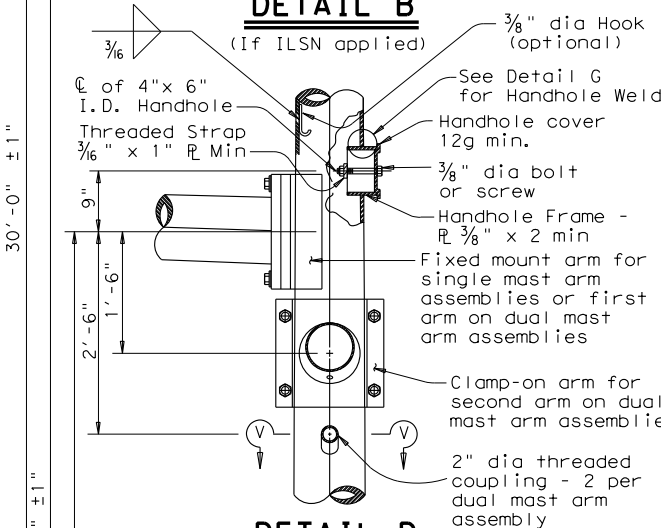
SECTION Y-Y



COPPER GROUND CONNECTOR

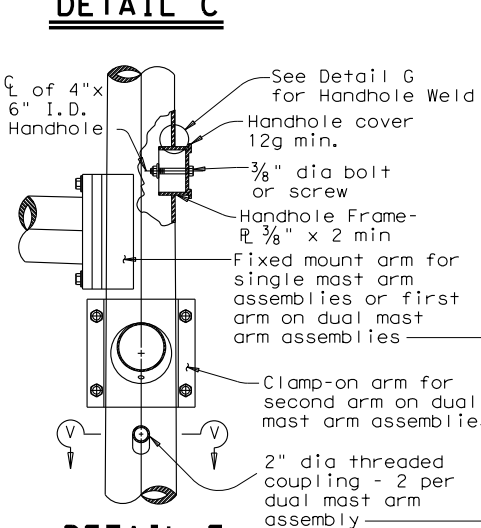


SECTION V-V



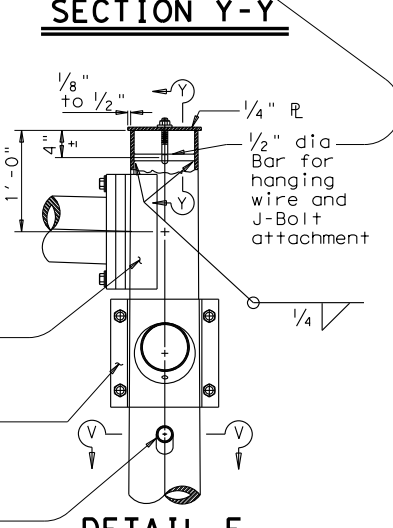
DETAIL D

(for 30' pole with luminaire and ILSN sign)



DETAIL E

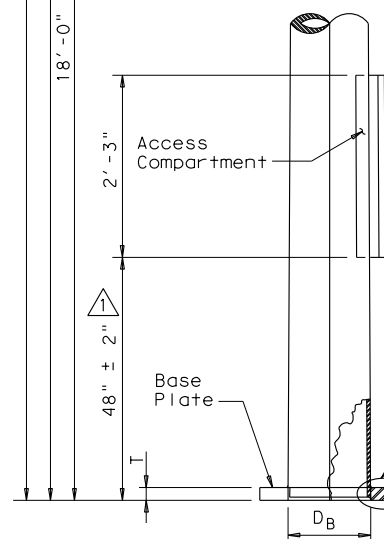
(for 24' pole with ILSN sign and no luminaire)



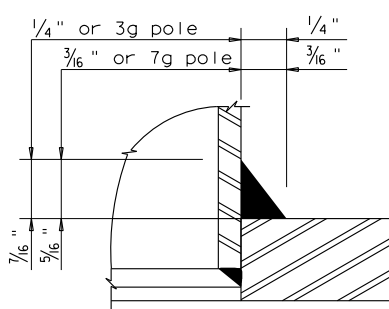
DETAIL F

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

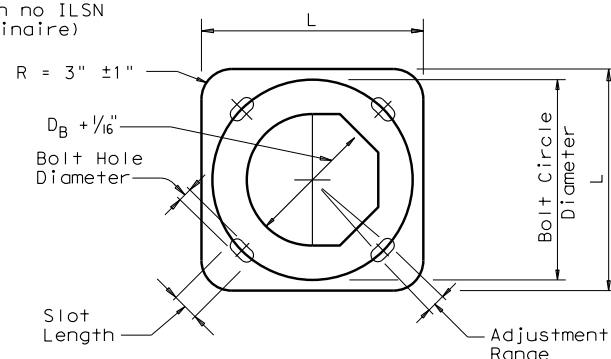
| Anchor Bolt Diameter | Bolt Hole Diameter | Slot Length | Bolt Circle Diameter | Base R Dim. L x T | Adjust. Range |
|----------------------|--------------------|-------------|----------------------|-------------------|---------------|
| 1 1/2" | 1 3/4" | 3 1/2" | 17" | 18" x 1 1/2" | 13.4° |
| 1 3/4"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



POLE ELEVATION



DETAIL H



BASE PLATE PLAN

- 85% Min. penetration
- 60% Min. penetration 100% penetration within 6" of circumferential base welds.

REVISOR'S ELEVATION OF ACCESS COMPARTMENT (2/12).



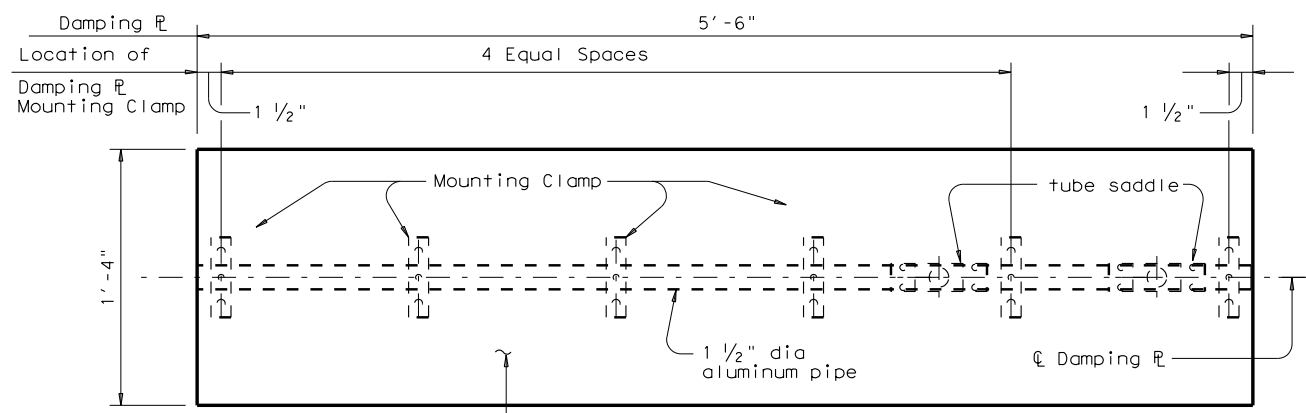
TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12 (DAL)

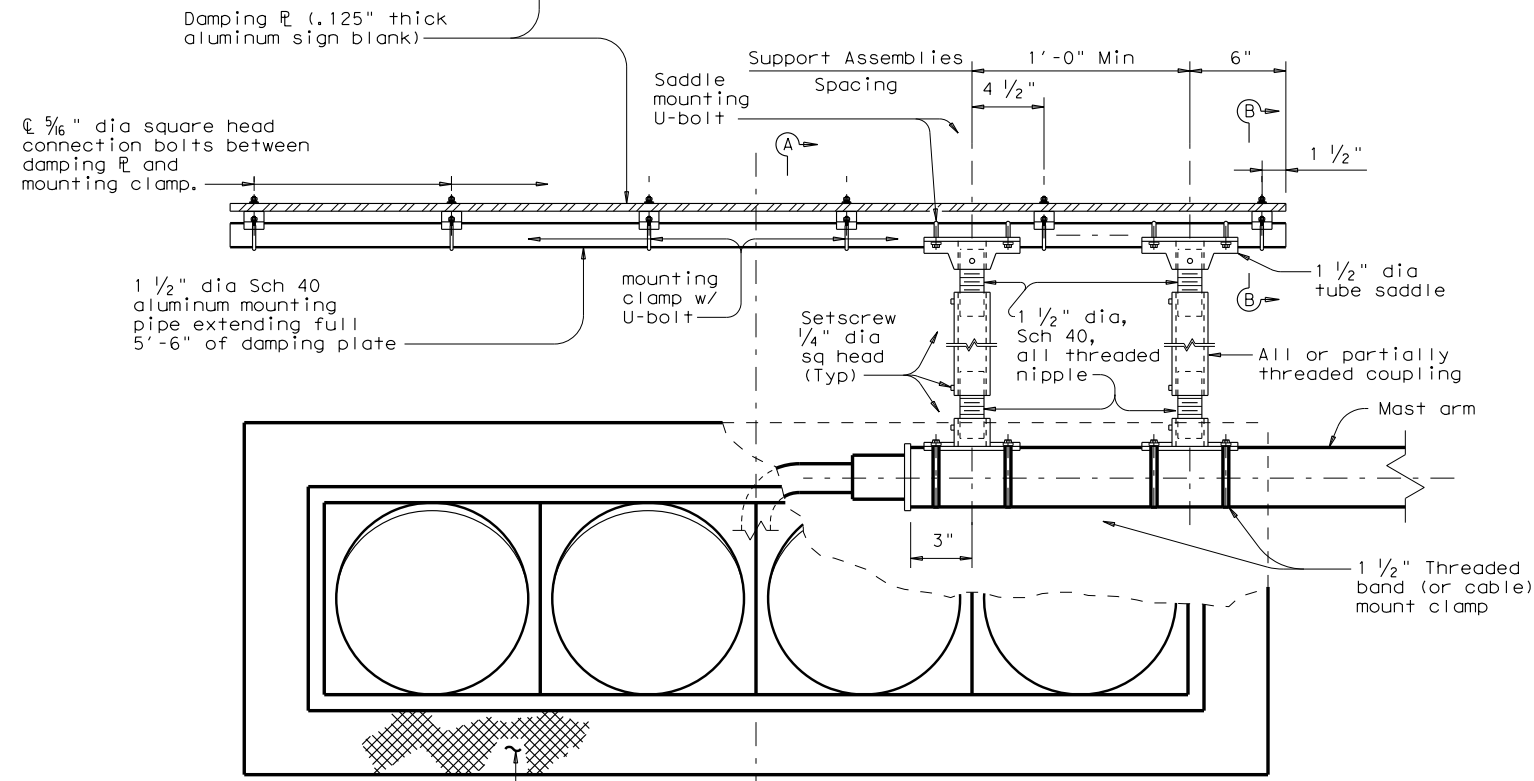
| | | | | | |
|---------------------|------|----------|---------|-----------|---------|
| © TxDOT August 1995 | | DN: MS | CK: JSY | DW: FDN | CK: CAL |
| REVISIONS | | CONT | SECT | JOB | HIGHWAY |
| 8-99 | 1-12 | 1015 | 01 | 023 | FM 3549 |
| DIST | | COUNTY | | SHEET NO. | |
| DAL | | ROCKWALL | | 261 | |

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DATE:
FILE:



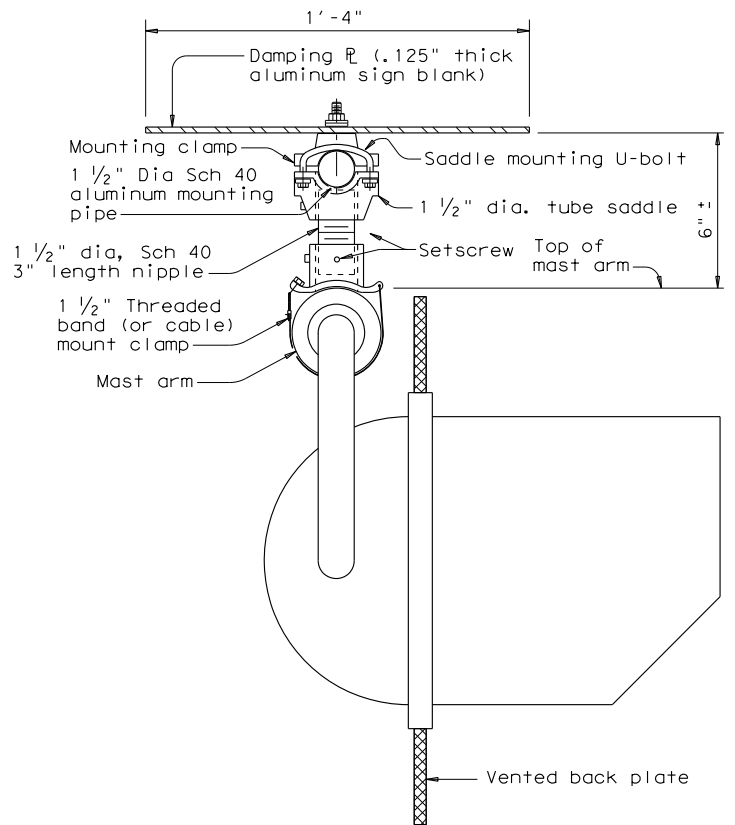
PLAN



ELEVATION

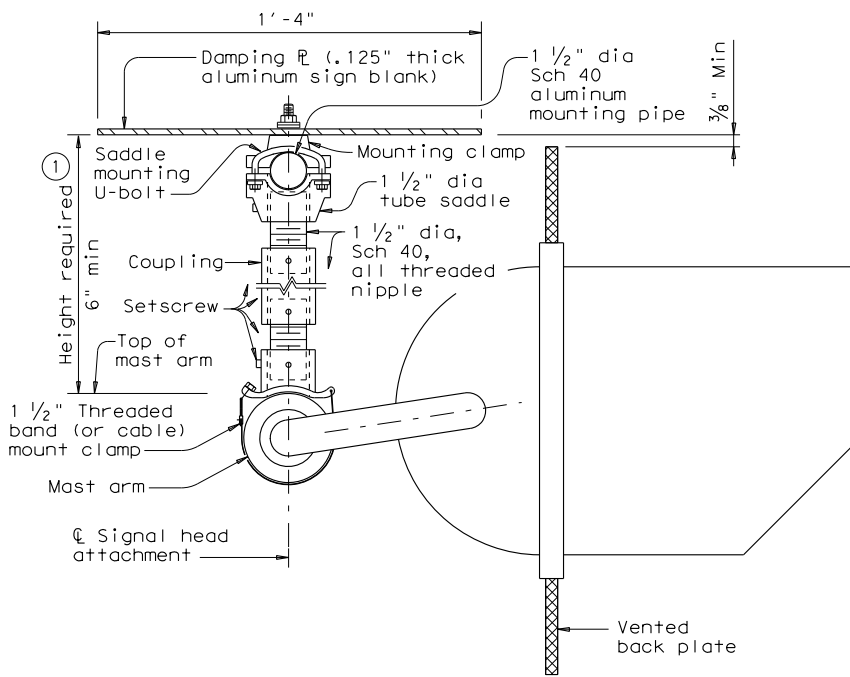
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

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



SECTION A-A

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

GENERAL NOTES:

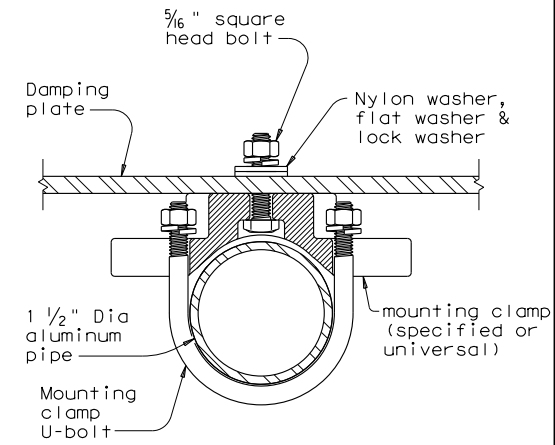
In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these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

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

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

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

Contractor shall verify applicable field dimensions before the installation.



SECTION B-B

(Showing damping plate attachment)

① Recommended supporting assemblies to achieve required height

| Height required | One nipple each length | Two nipples each length plus One coupling each length |
|-----------------|------------------------|---|
| 6"-6 3/4" | 3" | - |
| 7"-8 1/2" | 4" | - |
| 9"-10 1/2" | 6" | - |
| 11"-15 1/2" | - | 4" 5" |
| 16"-24" | - | 6" 10" |

Texas Department of Transportation
Traffic Operations Division

MAST ARM DAMPING PLATE DETAILS

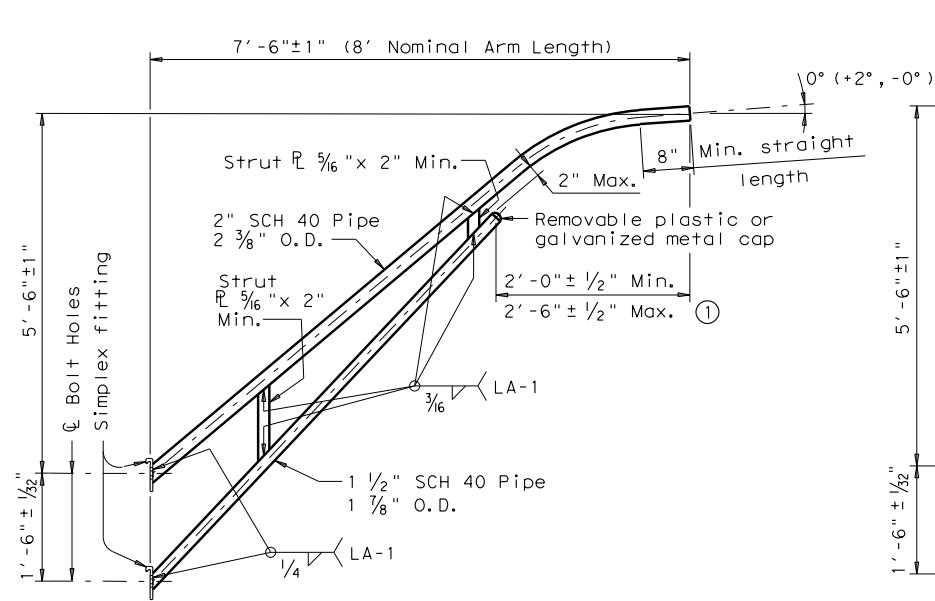
MA-DPD-12

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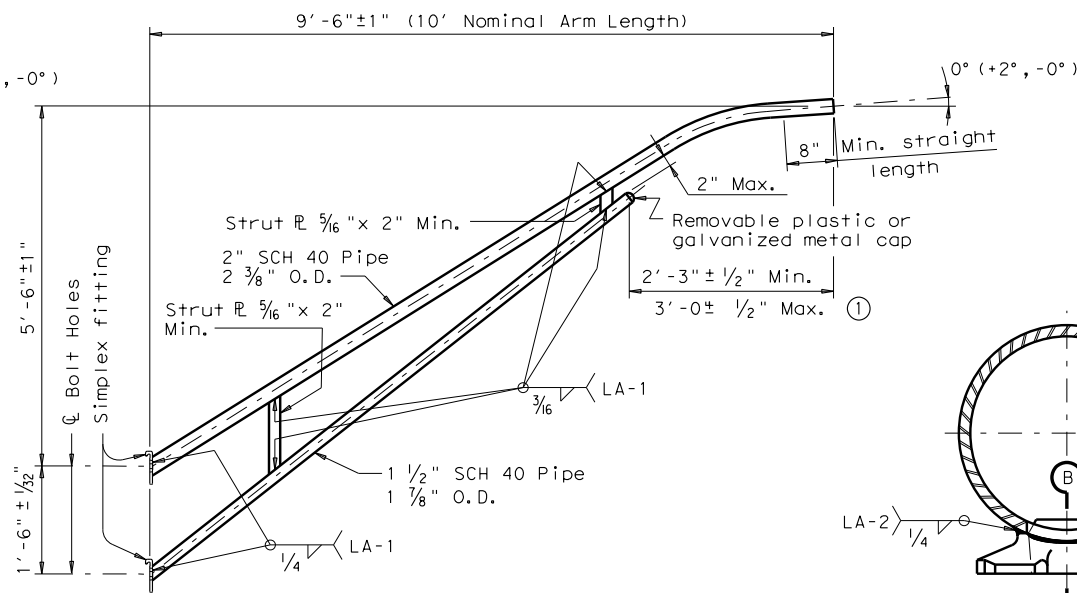
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| | 1015 | 01 | 023 |
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| | DAL | ROCKWALL | FM 3549 |
| | | | SHEET NO. |
| | | | 262 |

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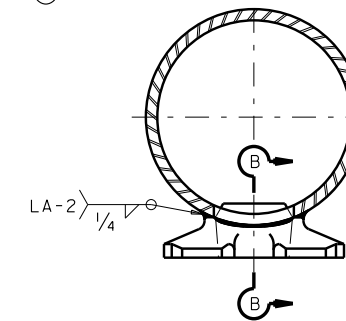
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8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM



DIRECT ATTACHMENT DETAIL

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

- (1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.
- (2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.
- (3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.
- (4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

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

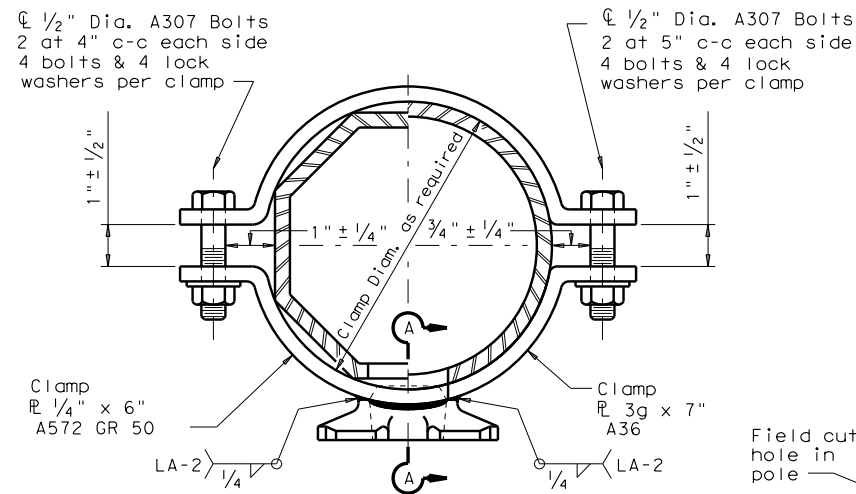
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absence of specified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

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

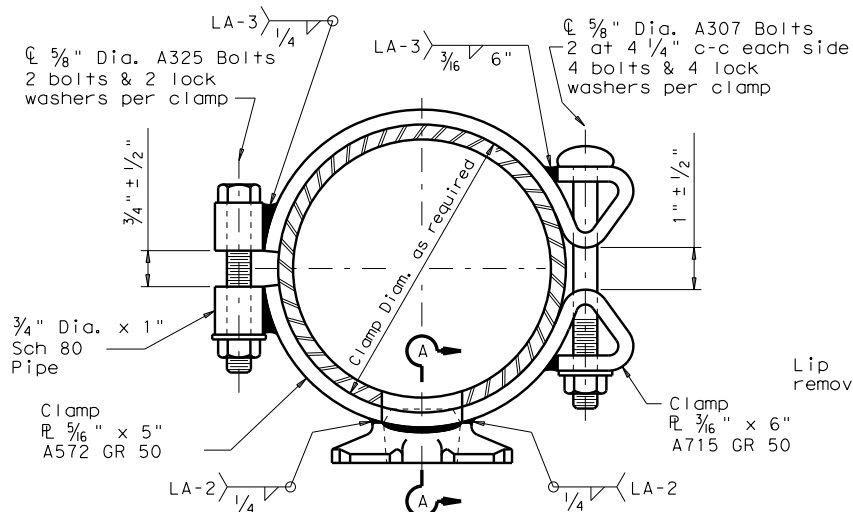
Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

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

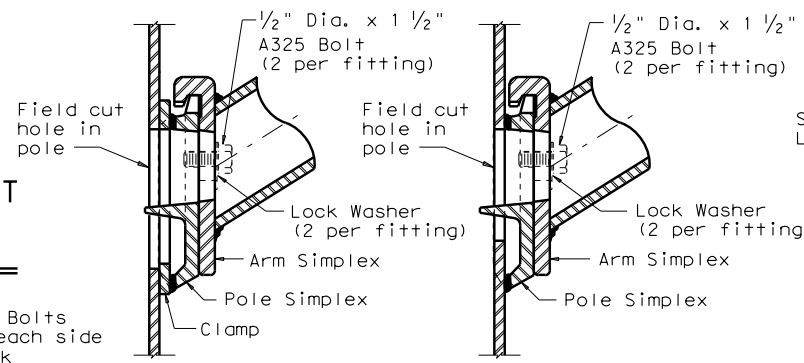
If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



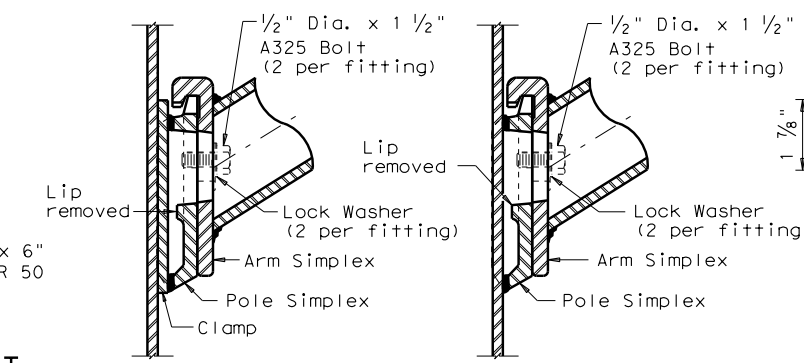
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)
CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)
CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)



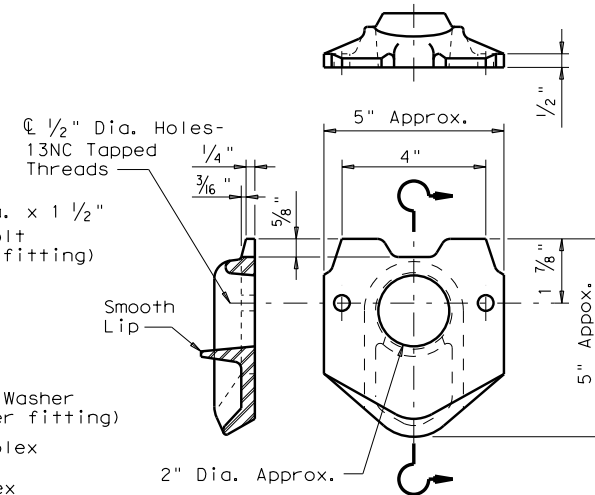
UPPER SIMPLEX FITTING



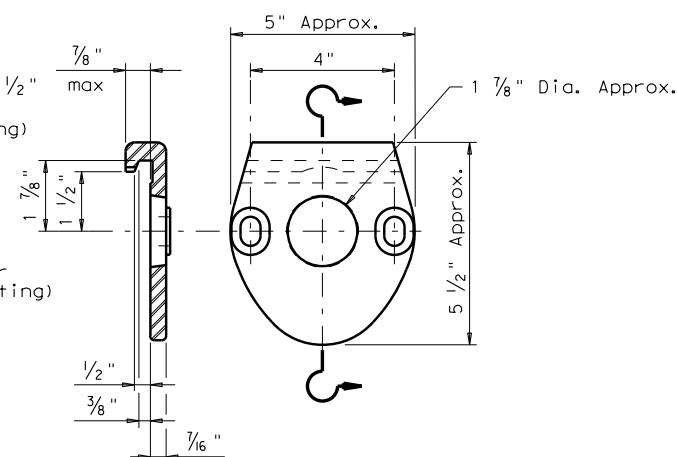
LOWER SIMPLEX FITTING

SECTION A-A

SECTION B-B



POLE SIMPLEX DETAIL



ARM SIMPLEX DETAIL

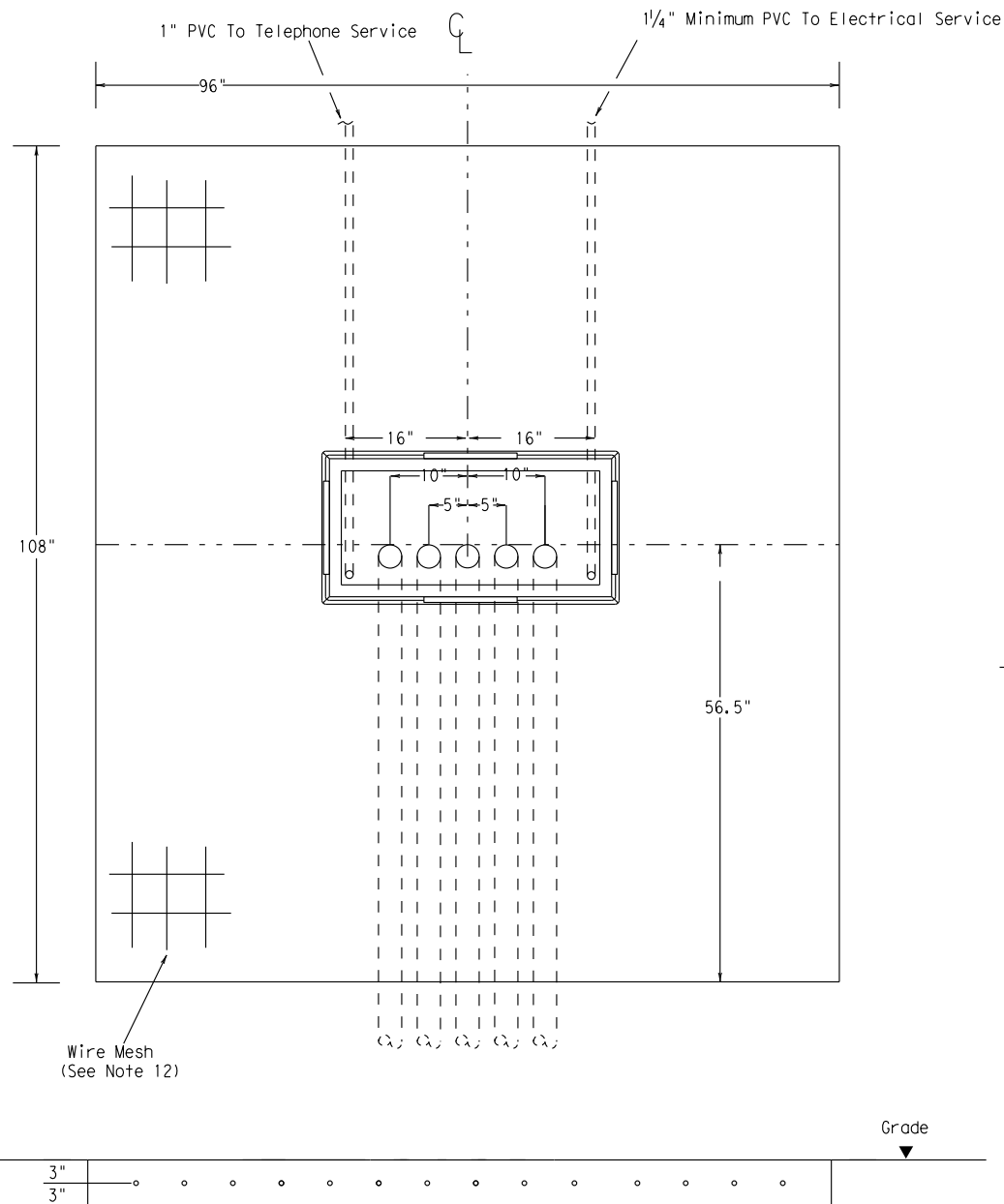
Texas Department of Transportation
 Traffic Operations Division
STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES
ARM DETAILS
LUM-A-12

| | | | | | |
|---------------------|-----------|---------|----------|---------|-----------|
| © TxDOT August 1995 | | DN: LEH | CK: JSY | DW: LTT | CK: TEB |
| 5-96 | REVISIONS | CONT | SECT | JOB | HIGHWAY |
| 1-99 | | 1015 | 01 | 023 | FM 3549 |
| 1-12 | | DIST | COUNTY | | SHEET NO. |
| | | DAL | ROCKWALL | | 263 |

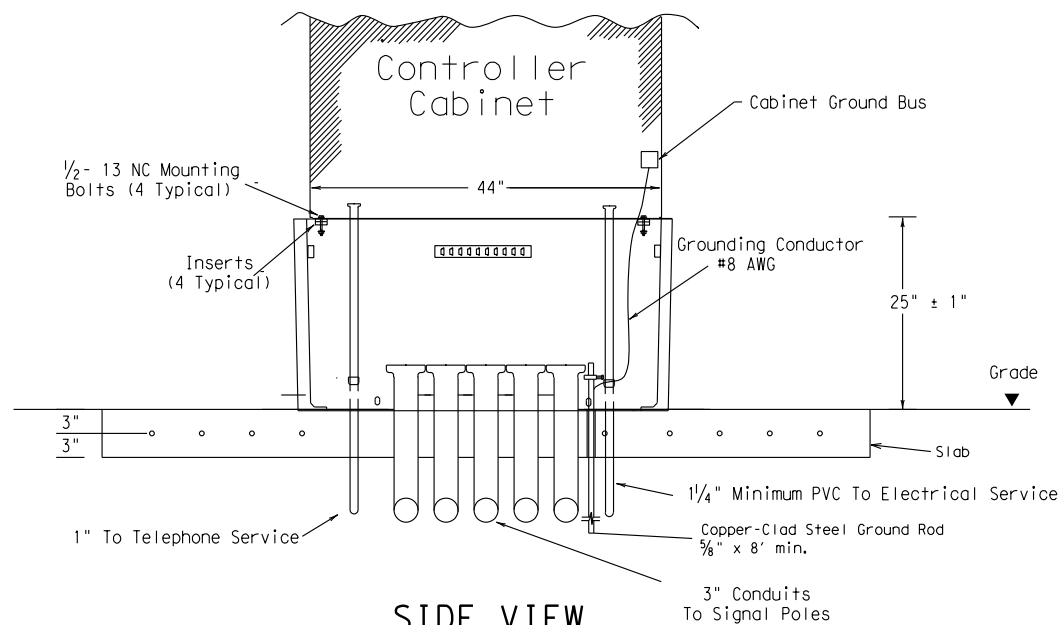
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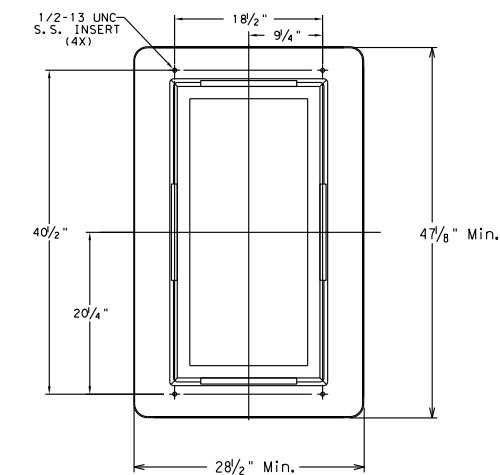
TOP VIEW
(Slab & Base)



SIDE VIEW
(Slab & Base)



CABINET BASE



TRAFFIC SIGNAL CONTROLLER BASE:

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

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

CONDUITS:

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

CONTROLLER CABINET:

- Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.

- The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

- Bid TS-CF as subsidiary to Item 680.



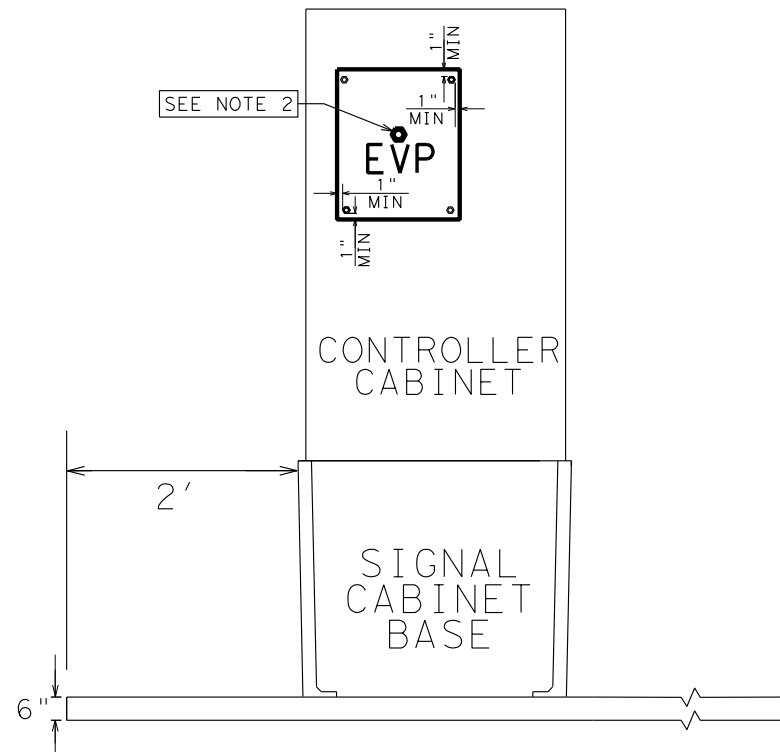
TRAFFIC SIGNAL
 CONTROLLER CABINET
 BASE AND PAD

TS-CF-04

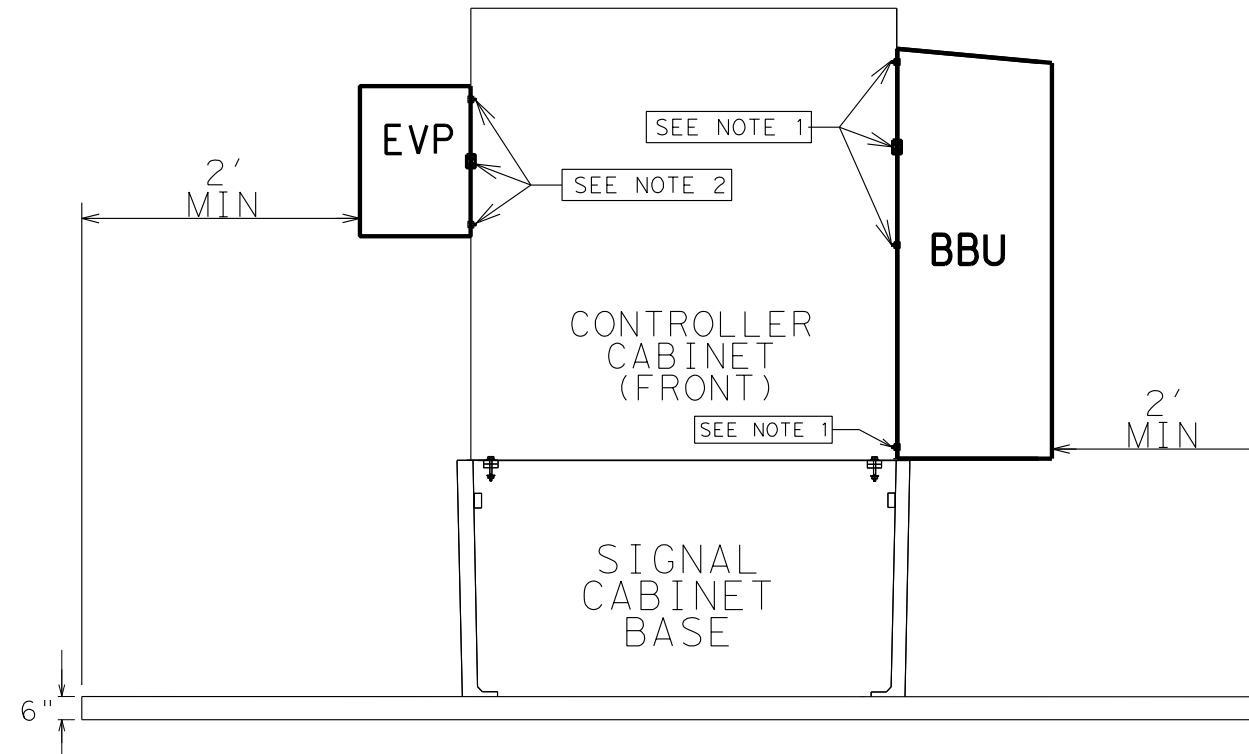
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| © TxDOT October 2000 | | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| 12-04 | REVISIONS | CONT | SECT | JOB | HIGHWAY |
| | | 1015 | 01 | 023 | FM 3549 |
| | | DIST | COUNTY | | SHEET NO. |
| | | DAL | ROCKWALL | | 264 |

NOTES:

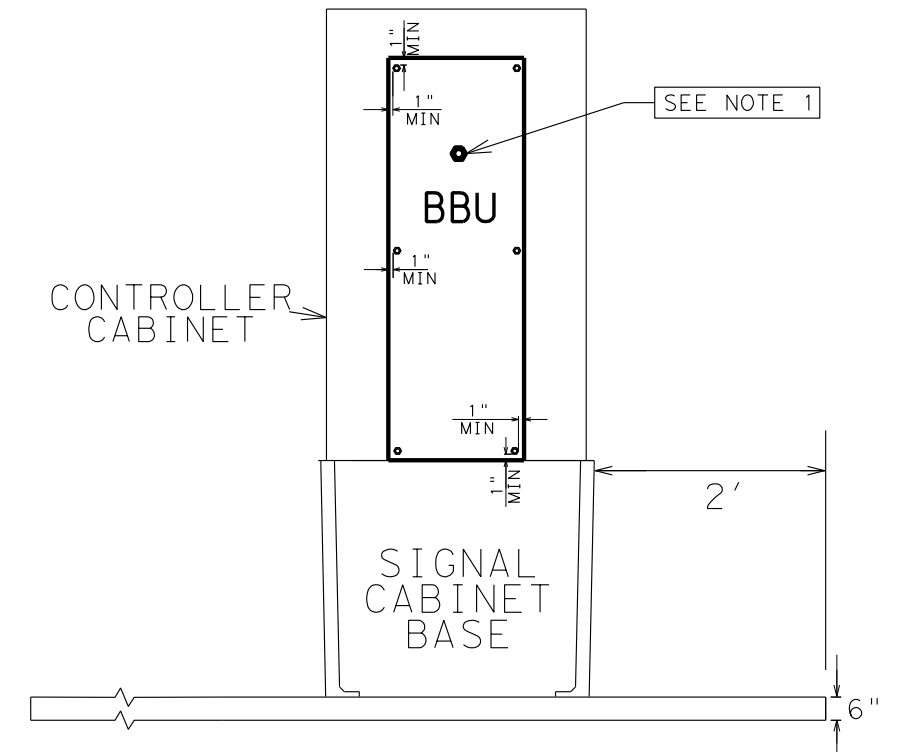
1. INSTALL 1/2" ALL THREAD NIPPLE WITH BONDING BUSHINGS ON BOTH ENDS AND 6 EA OF 1/2" X 1/2" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND BBU).
2. INSTALL 2" FITTING FOR EVP CABLES/WIRES AND 4 EA OF 1/2" X 1/2" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND EVP).
3. USE SILICON SEALANT TO SEAL BETWEEN THE CABINETS OF THE CONTROLLER, EVP AND BBU UNIT.
4. THE ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO PERTINENT ITEMS.



SIDE VIEW
(EVP)



ELEVATION VIEW

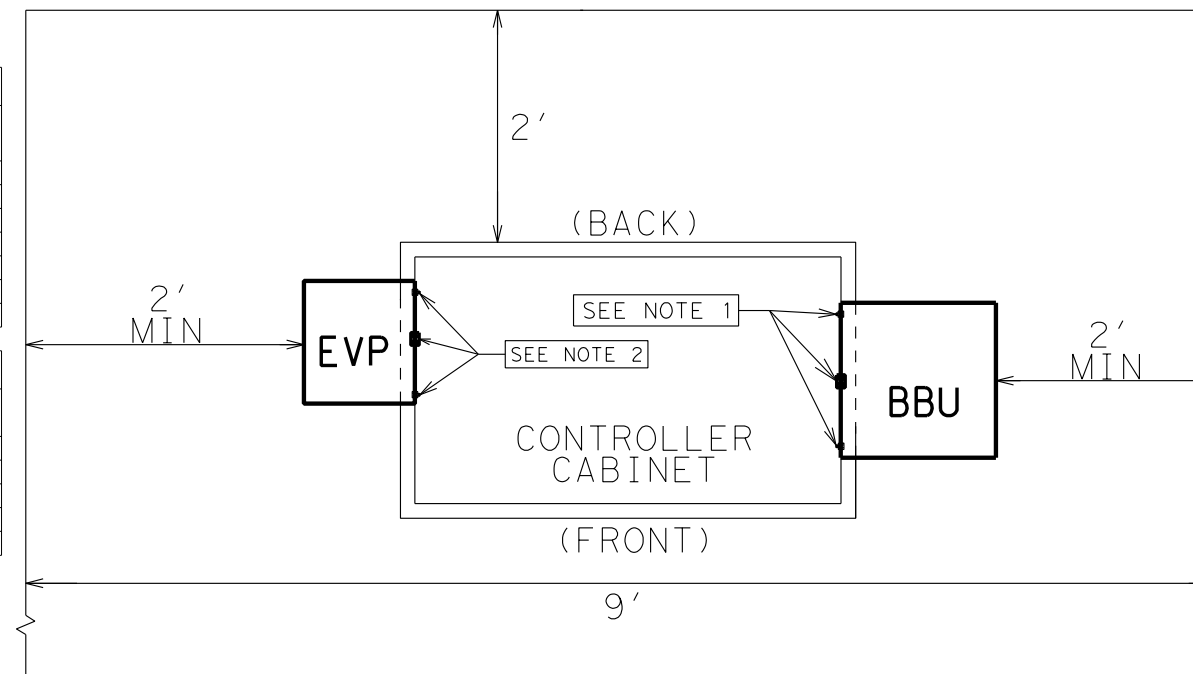


SIDE VIEW
(BBU)

| REQUIRED CABLE/CONDUCTORS FOR EVP | | | |
|-----------------------------------|-----------|-------|---------------------------------|
| QUANTITY EACH | WIRE SIZE | COLOR | FUNCTION |
| 1 | #14 | BLACK | 120 VAC FOR EVP |
| 1 | #14 | RED | 120 VAC FOR FAN & CABINET LIGHT |
| 1 | #14 | WHITE | AC NEUTRAL |
| 1 | #14 | GREEN | CHASIS GROUND |
| 1 | #18 | GRAY | LOGIC GROUND |
| 4 | #18 | BLUE | PREEMPT COMMANDS |
| 4 | - | - | CABLE FROM DETECTOR UNIT |

| REQUIRED CONDUCTORS FOR BBU | | | |
|-----------------------------|-----------|-------|--------------------------|
| QUANTITY EACH | WIRE SIZE | COLOR | FUNCTION |
| 1 | - | BLACK | 120 VAC FROM SERVICE |
| 1 | - | WHITE | AC NEUTRAL FROM SERVICE |
| 1 | #6 | BLACK | 120 VAC TO CONTROLLER |
| 1 | #6 | WHITE | AC NEUTRAL TO CONTROLLER |
| 1 | #6 | GREEN | GROUND |

LEGEND:
EVP-EMERGENCY VEHICLE PREEMPTION CABINET.
BBU-BATTERY BACKUP UNIT.

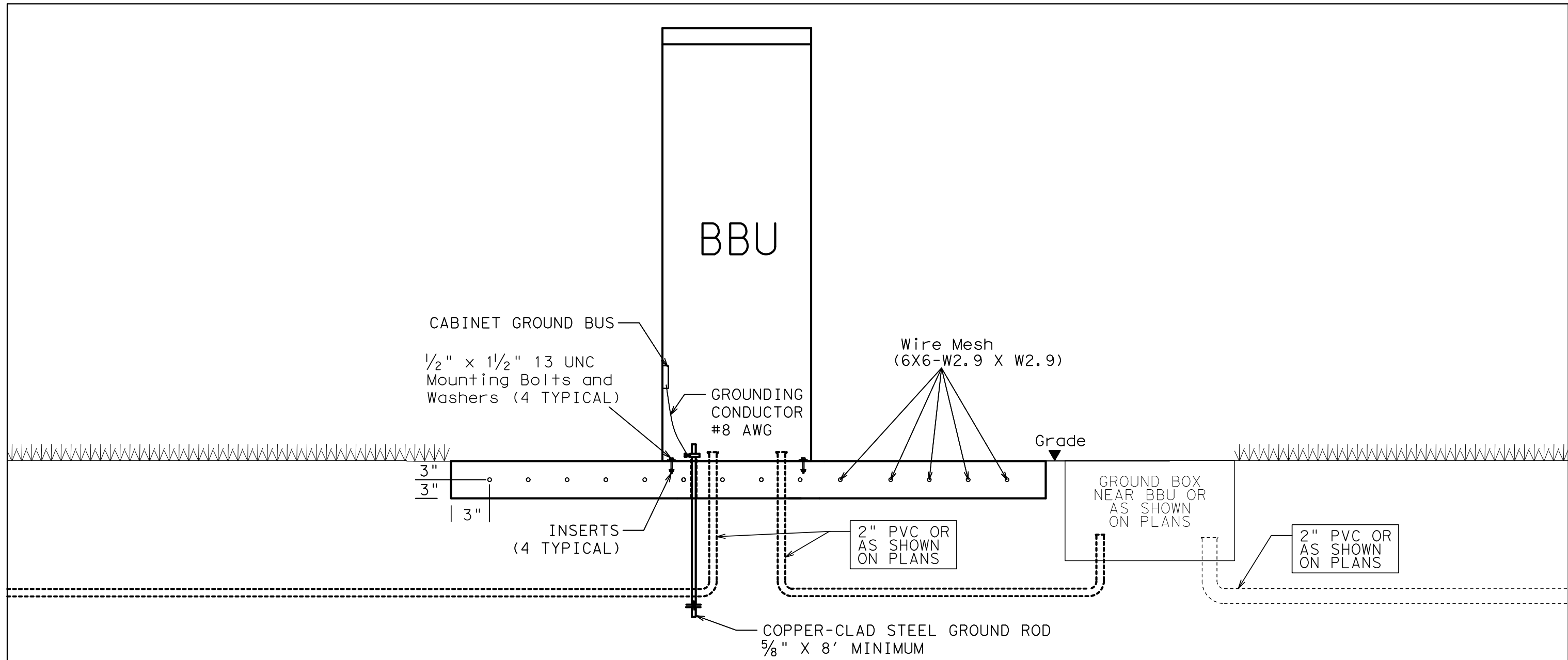


PLAN VIEW



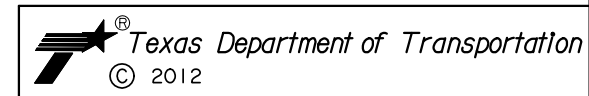
INSTALLATION OF BBU/EVP
EXTERNAL SIDE MOUNT CABINET
INSTALLATION DETAILS
DALLAS DISTRICT STANDARD

| | | | |
|-------------------|-------------------------|-------------|--------------|
| N. T. S. | | | SHEET 1 OF 3 |
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | HIGHWAY NO. | |
| 6 | (SEE TITLE SHEET) | FM3549 | |
| STATE | DISTRICT | COUNTY | SHEET NO. |
| TEXAS | DALLAS | ROCKWALL | 265 |
| CONTROL | SECTION | JOB | |
| 1015 | 01 | 023 | |



NOTES:

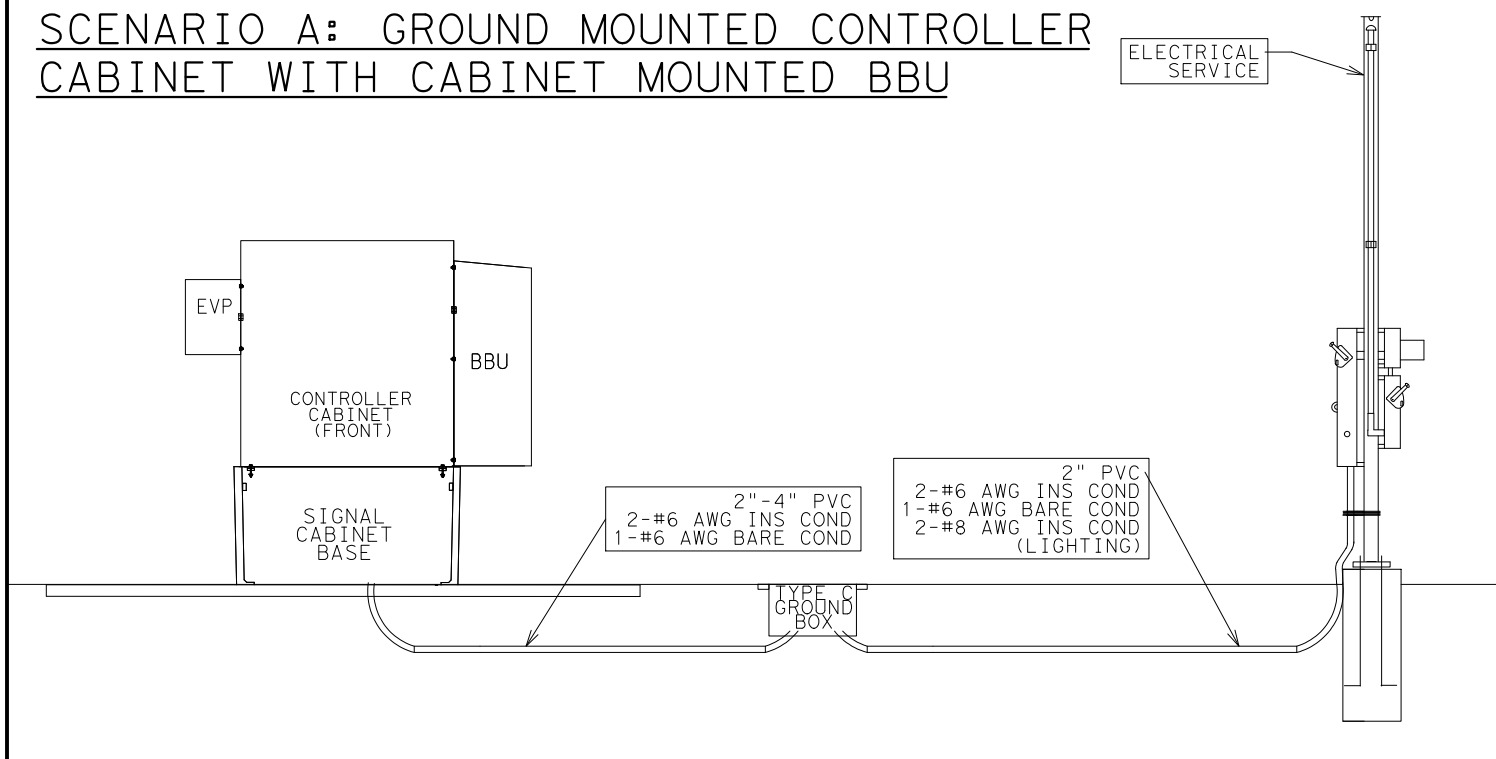
1. INSTALL A 5' X 5' CONCRETE PAD AT THE LOCATION DIRECTED BY THE ENGINEER. THE PAD MAY BE CAST-IN-PLACE OR PRE-CAST AS APPROVED BY THE ENGINEER.
2. PROVIDE WELDED WIRE MESH 6X6-W2.9 X W2.9 FOR REINFORCEMENT. PROVIDE JOINTS AND SPLICES IN THE MESH WITH A MINIMUM 6-INCH OVERLAP. PROVIDE A MINIMUM 3 INCH COVER BETWEEN WIRE MESH AND EDGE OF CONCRETE PAD.
3. PROVIDE CLASS B CONCRETE MINIMUM FOR THE CONCRETE PAD IN ACCORDANCE WITH ITEM 421. CONSTRUCT THE CONCRETE PAD IN ACCORDANCE WITH ITEM 531, EXCEPT FOR PAYMENT.
4. INSTALL THE BACK OF BBU CABINET 10" FROM THE EDGE OF CONCRETE PAD AND CENTER THE CABINET ON THE PAD FROM SIDE TO SIDE.
5. SUPPLY FOUR 1/2" X 1 1/2" 13 UNC STAINLESS STEEL INSERTS FOR ATTACHMENT OF THE BBU CABINET TO THE CONCRETE PAD. INSERTS MUST WITHSTAND A MINIMUM TORQUE OF 50 FT-LB AND A MINIMUM STRAIGHT PULL OUT STRENGTH OF 750 LBS.
6. BOND A #8 AWG COPPER GROUND WIRE AND AN 8 FT GROUND ROD TO THE REINFORCING MESH WITH A SUITABLE UL LISTED CLAMP, AND TERMINATE THE GROUND WIRE TO THE CABINET GROUNDING BUS.
7. INSTALL A PVC SLEEVE TO PREVENT THE GROUND ROD FROM DIRECT EMBEDMENT IN THE CONCRETE PAD.
8. THE ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO PERTINENT ITEMS.



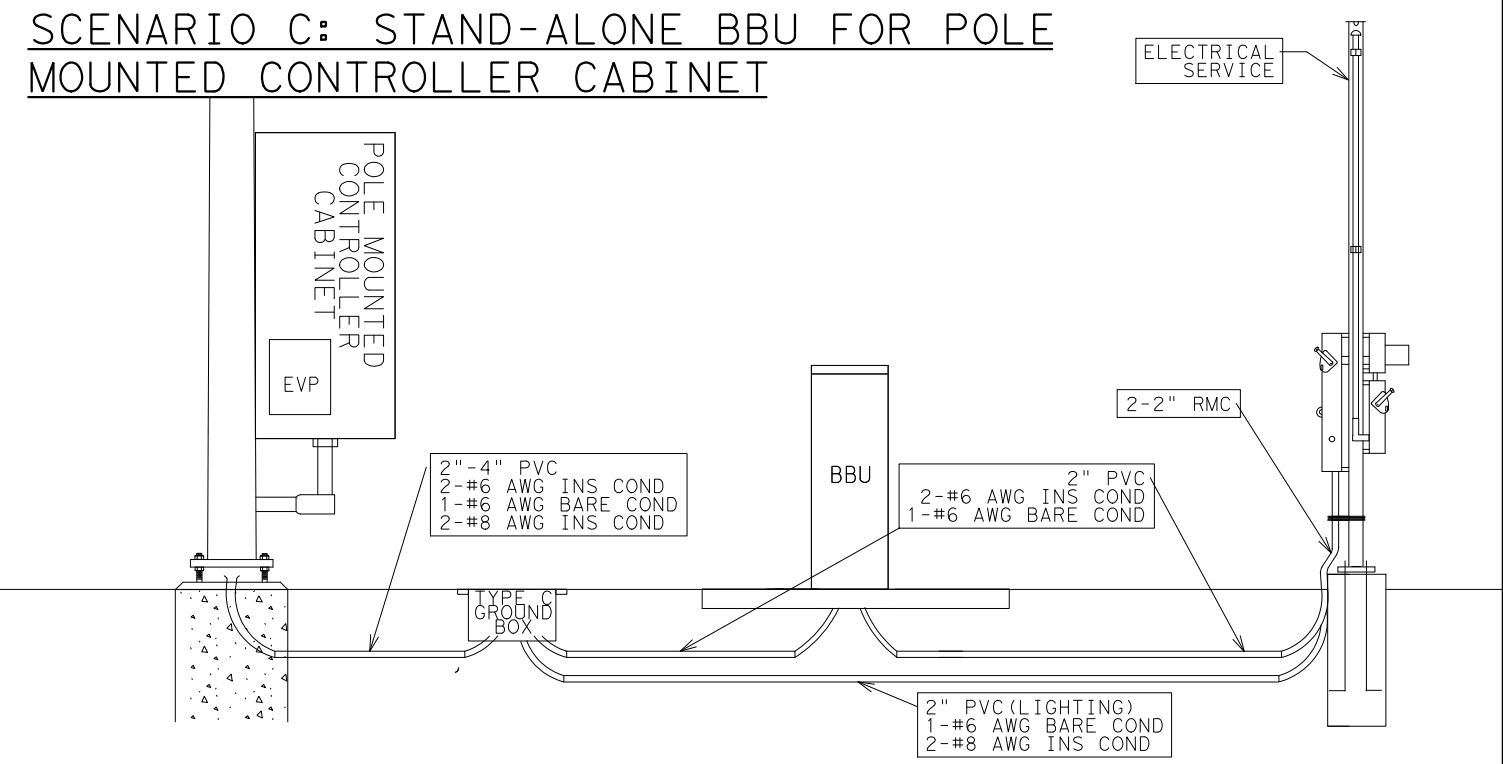
**INSTALLATION OF BBU/EVP
STAND ALONE BBU CABINET (GROUND MOUNT)
DALLAS DISTRICT STANDARD**

| | | | |
|-------------------|-------------------------|-------------|--------------|
| N. T. S. | | | SHEET 2 OF 3 |
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | HIGHWAY NO. | |
| 6 | (SEE TITLE SHEET) | FM3549 | |
| STATE | DISTRICT | COUNTY | |
| TEXAS | DALLAS | ROCKWALL | |
| CONTROL | SECTION | JOB | |
| 1015 | 01 | 023 | |
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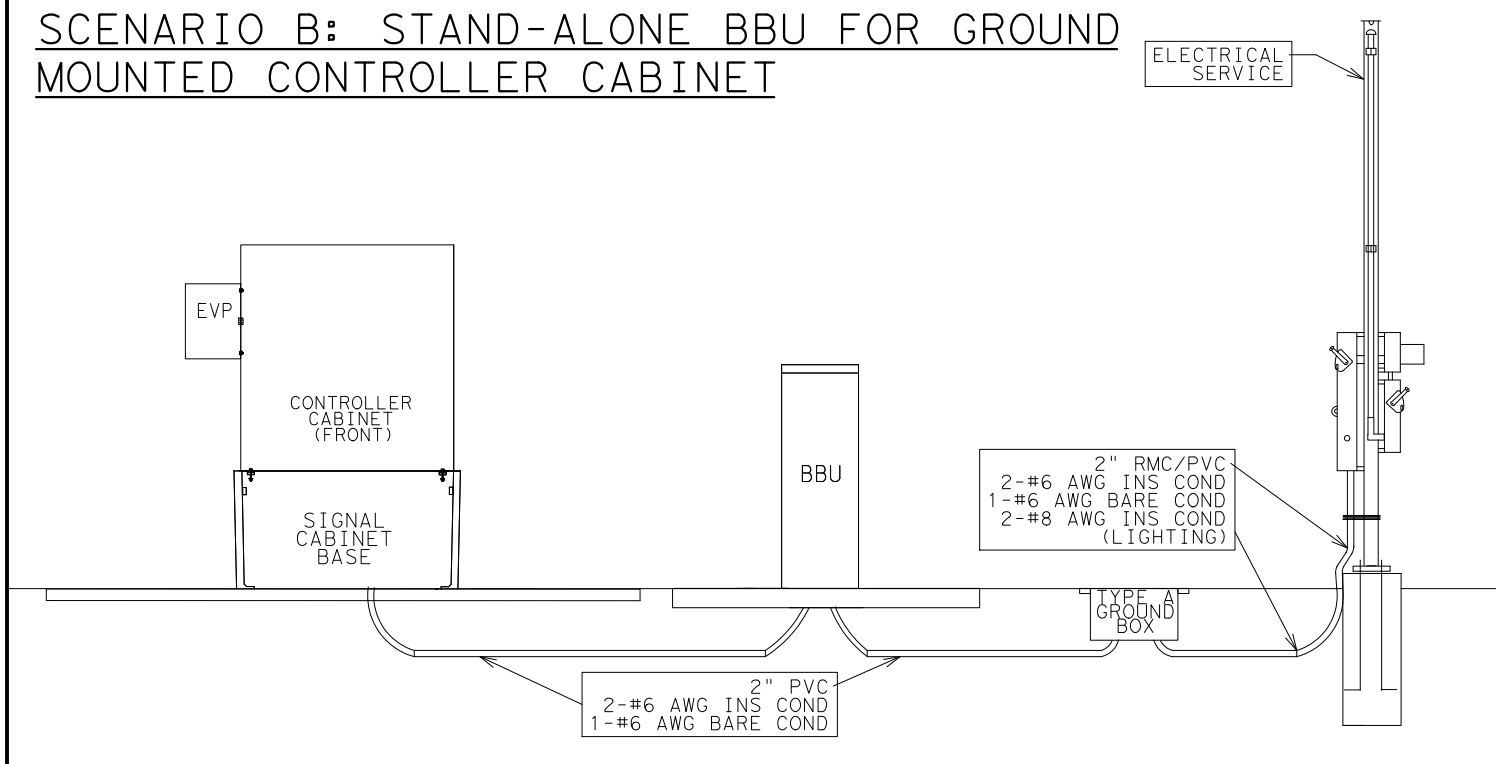
SCENARIO A: GROUND MOUNTED CONTROLLER CABINET WITH CABINET MOUNTED BBU



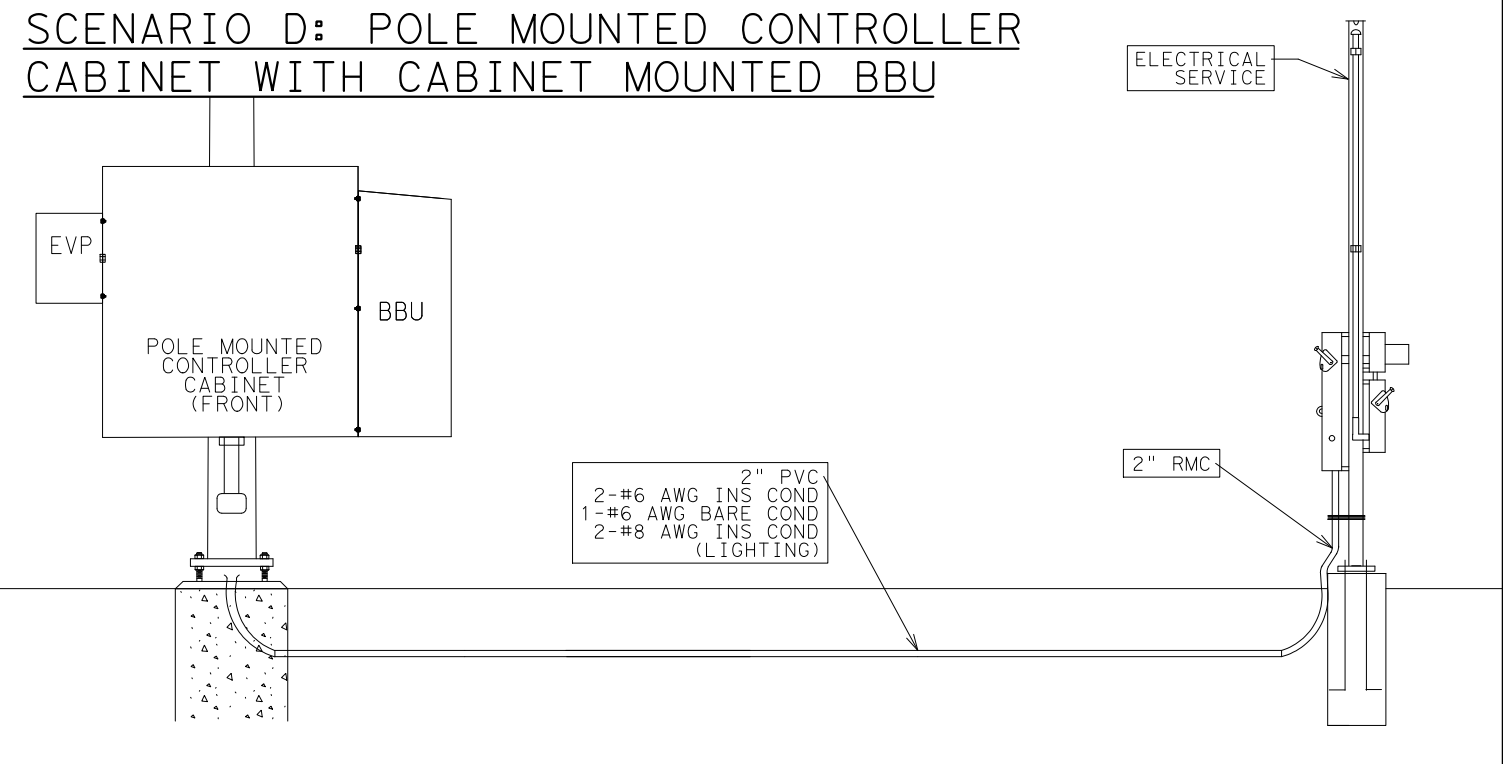
SCENARIO C: STAND-ALONE BBU FOR POLE MOUNTED CONTROLLER CABINET



SCENARIO B: STAND-ALONE BBU FOR GROUND MOUNTED CONTROLLER CABINET



SCENARIO D: POLE MOUNTED CONTROLLER CABINET WITH CABINET MOUNTED BBU



NOTE:

ABOVE SCENARIOS ARE TYPICAL BBU/EVP INSTALLATIONS USED IN THE DALLAS DISTRICT. SEE TRAFFIC SIGNAL DESIGN PLANS FOR GROUND BOX, CONDUIT AND CONDUCTOR QUANTITIES AND SIZES SPECIFIC TO EACH INTERSECTION.

INSTALLATION OF BBU/EVP
INSTALLATION SCENARIOS
DALLAS DISTRICT STANDARD

| | | | |
|-------------------|-------------------------|----------|--------------|
| N. T. S. | | | SHEET 3 OF 3 |
| FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| 6 | (SEE TITLE SHEET) | | FM3549 |
| STATE | DISTRICT | COUNTY | SHEET NO. |
| TEXAS | DALLAS | ROCKWALL | 267 |
| CONTROL | SECTION | JOB | |
| 1015 | 01 | 023 | |

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GENERAL NOTES FOR ALL ELECTRICAL WORK

- The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.
- Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.
- Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is 1/2 in. or less in diameter.
- Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.
- Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.
- When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

- Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.
- Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.
- Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.


| AWG | 3 CONDUCTORS | 5 CONDUCTORS | 7 CONDUCTORS |
|-----|----------------|----------------|----------------|
| #1 | 10" x 10" x 4" | 12" x 12" x 4" | 16" x 16" x 4" |
| #2 | 8" x 8" x 4" | 10" x 10" x 4" | 12" x 12" x 4" |
| #4 | 8" x 8" x 4" | 10" x 10" x 4" | 10" x 10" x 4" |
| #6 | 8" x 8" x 4" | 8" x 8" x 4" | 10" x 10" x 4" |
| #8 | 8" x 8" x 4" | 8" x 8" x 4" | 8" x 8" x 4" |

- Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.
- Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.
- Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.
- Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

- Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.
- When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.
- Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

- Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.
- Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.
- Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.
- Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.
- When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."
- Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.
- During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.
- Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.
- Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.
- Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.
- At all electrical services, install a 6 AWG solid copper grounding electrode conductor.
- 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).
- Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.
- File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

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|---|--------------|---|----------|
|  | | Traffic Operations Division Standard | |
| <h1>ELECTRICAL DETAILS CONDUITS & NOTES</h1> | | | |
| <h2>ED(1) - 14</h2> | | | |
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| | | DAL | ROCKWALL |
| | | SHEET NO. | |
| | | 268 | |

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS) 11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.
2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.
3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.
4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.
2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.
3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.
4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.
5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.
6. Support conductors in illumination poles with a J-hook at the top of the pole.
7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.
8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.
9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.
10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.
11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

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

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.
2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.
3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.
4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.
5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

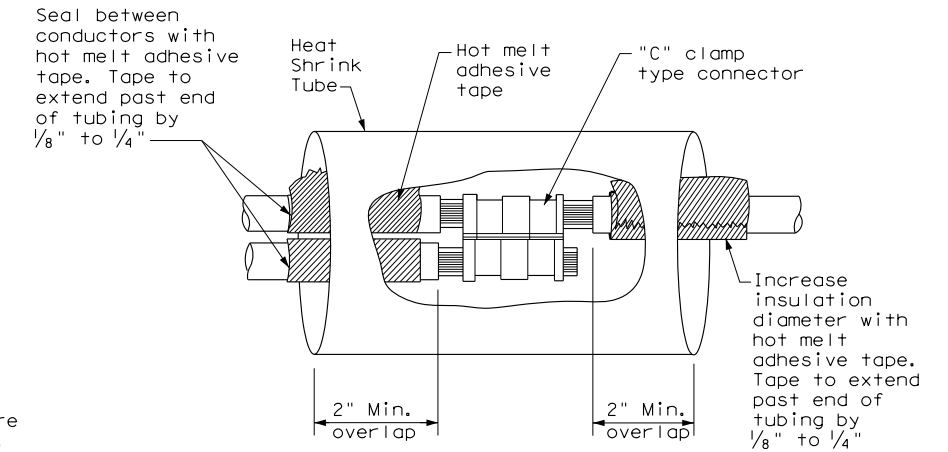
GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

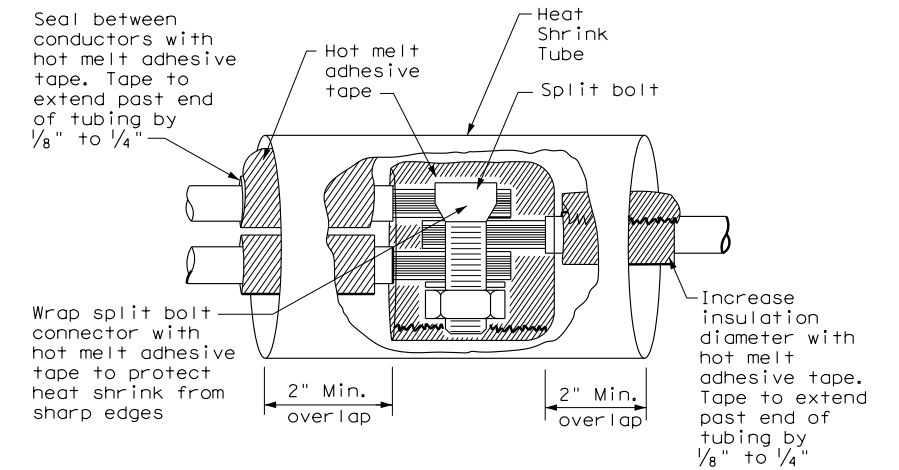
1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in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

B. CONSTRUCTION METHODS

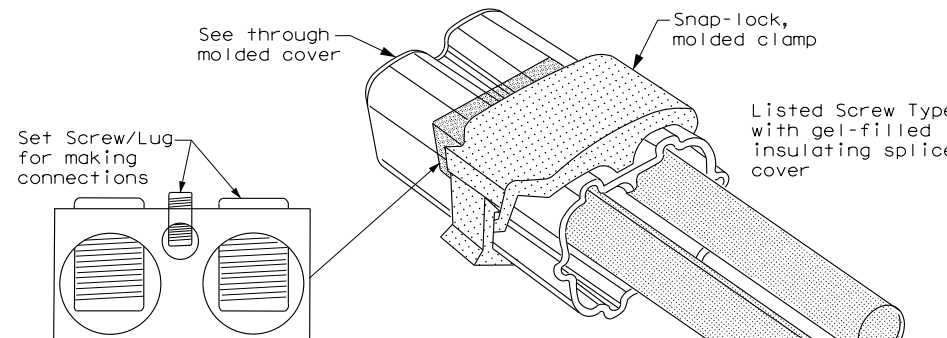
1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.
2. Do not place ground rods in the same drilled hole as a timber pole.
3. Install ground rods so the imprinted part number is at the upper end of the rod.
4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.
6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



**SPLICE OPTION 1
Compression Type**



**SPLICE OPTION 2
Split Bolt Type**



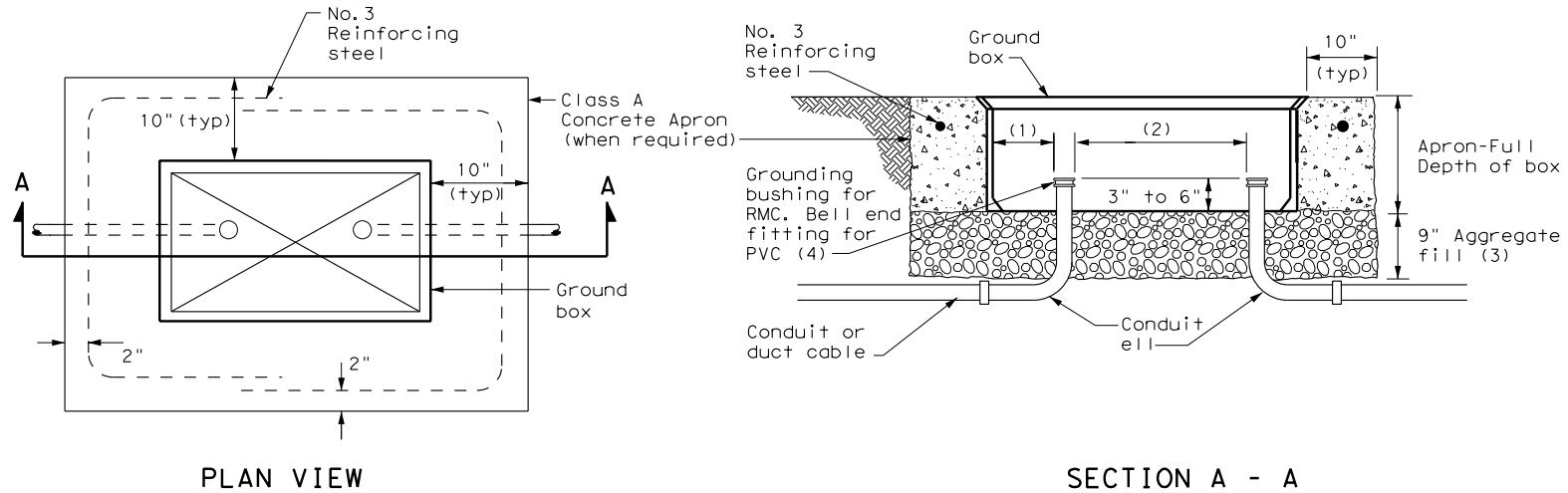
**SPLICE OPTION 3
Listed Screw Type**

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| | | Texas Department of Transportation | | Traffic Operations Division Standard | |
| <h1>ELECTRICAL DETAILS CONDUCTORS</h1> | | | | | |
| <h2>ED(3) - 14</h2> | | | | | |
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| © TxDOT | October 2014 | CON: | 1015 | SECT: | 01 |
| REVISIONS | | JOB: | 023 | HIGHWAY: | FM 3549 |
| | | DIST: | COUNTY: | SHEET NO. | |
| | | DAL: | ROCKWALL | 269 | |

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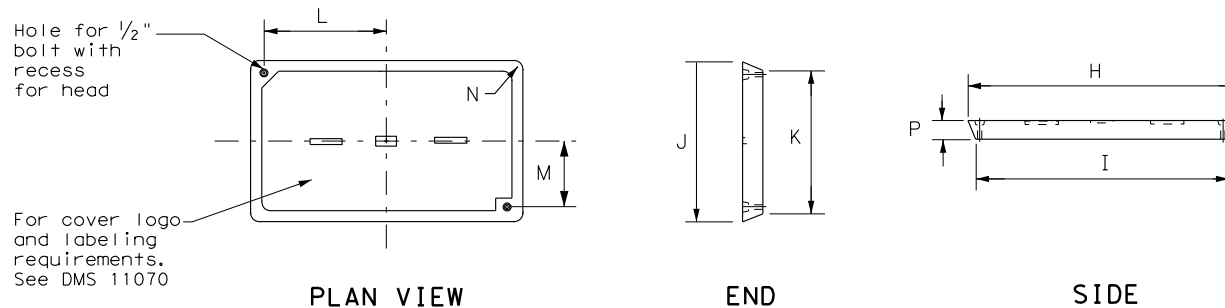


APRON FOR GROUND BOX

- (1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.
- (2) Maintain sufficient space between conduits to allow for proper installation of bushing.
- (3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.
- (4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

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

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



GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."
2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

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

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

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.
2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.
3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.
4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.
5. Temporarily seal all conduits in the ground box until conductors are installed.
6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.
7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.
8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.
9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.
10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.
11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

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| | | | | Traffic Operations Division Standard | |
| <h2>ELECTRICAL DETAILS GROUND BOXES</h2> <h3>ED(4) - 14</h3> | | | | | |
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| DIST: | DAL | COUNTY: | ROCKWALL | SHEET NO.: | 270 |

ELECTRICAL SERVICES NOTES

- Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.
- Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services," DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.
- Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.
- Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.
- The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.
- Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.
- When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.
- Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.
- All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.
- Provide rigid metal conduit (RMC) for all conduits on service, except for the 1/2 in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.
- Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.
- Ensure all mounting hardware and installation details of services conform to utility company specifications.
- For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.
- When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 1/2 in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.
- Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

- Provide threaded hub for all conduit entries into the top of enclosure.
- Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photoceII or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.
- Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.
- Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

- Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.
- When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

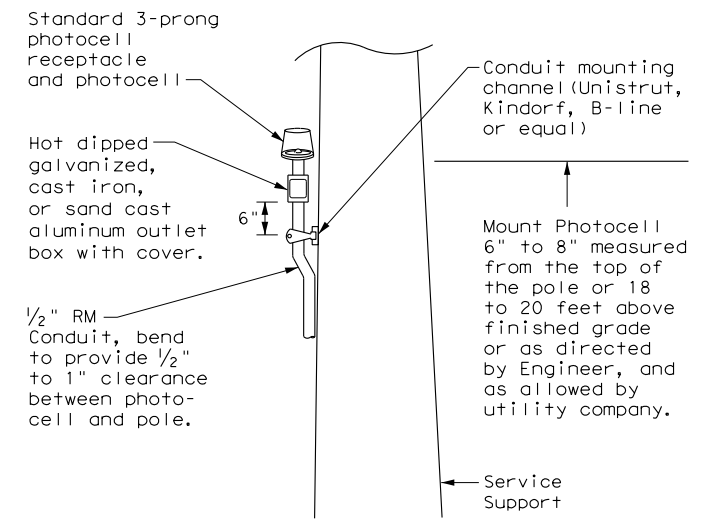
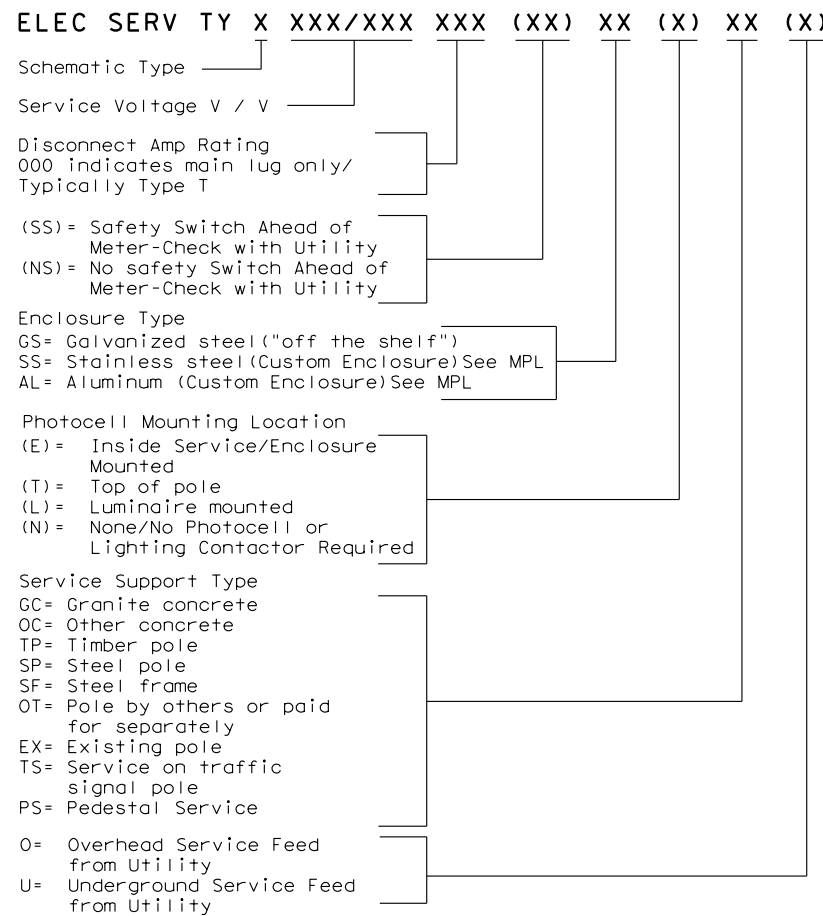
PHOTOELECTRIC CONTROL

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

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

* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.
 ** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National Electrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE



TOP MOUNTED PHOTOCELL

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

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Texas Department of Transportation

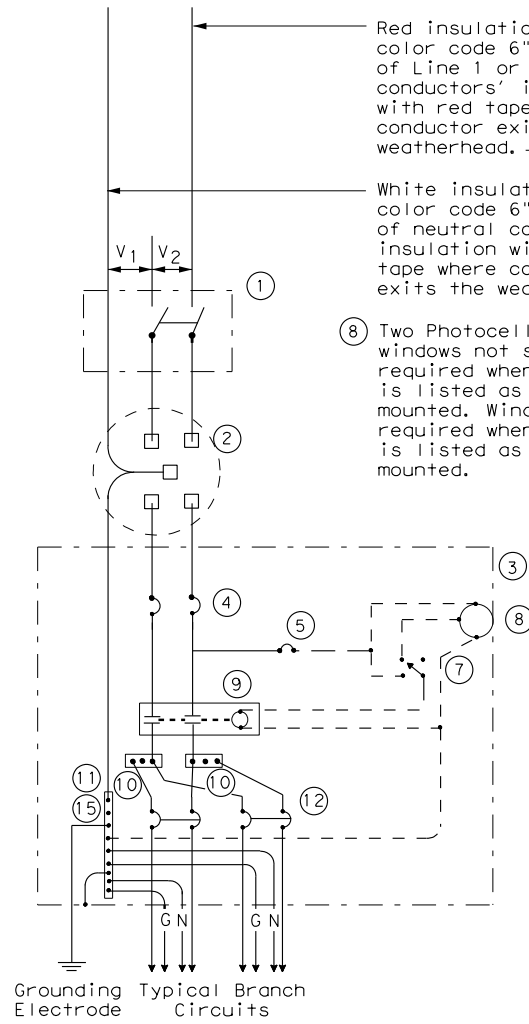
Traffic Operations Division Standard

ELECTRICAL DETAILS SERVICE NOTES & DATA

ED(5) - 14

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| © TxDOT October 2014 | CONT | SECT | JOB | HIGHWAY |
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| DIST | COUNTY | | SHEET NO. | |
| DAL | ROCKWALL | | 271 | |

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**SCHEMATIC TYPE A
THREE WIRE**

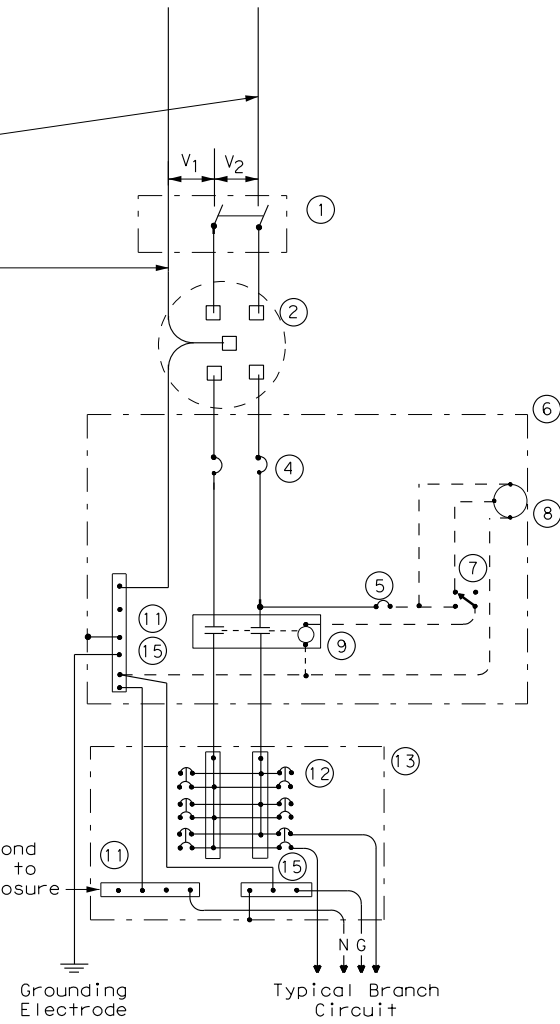
Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.

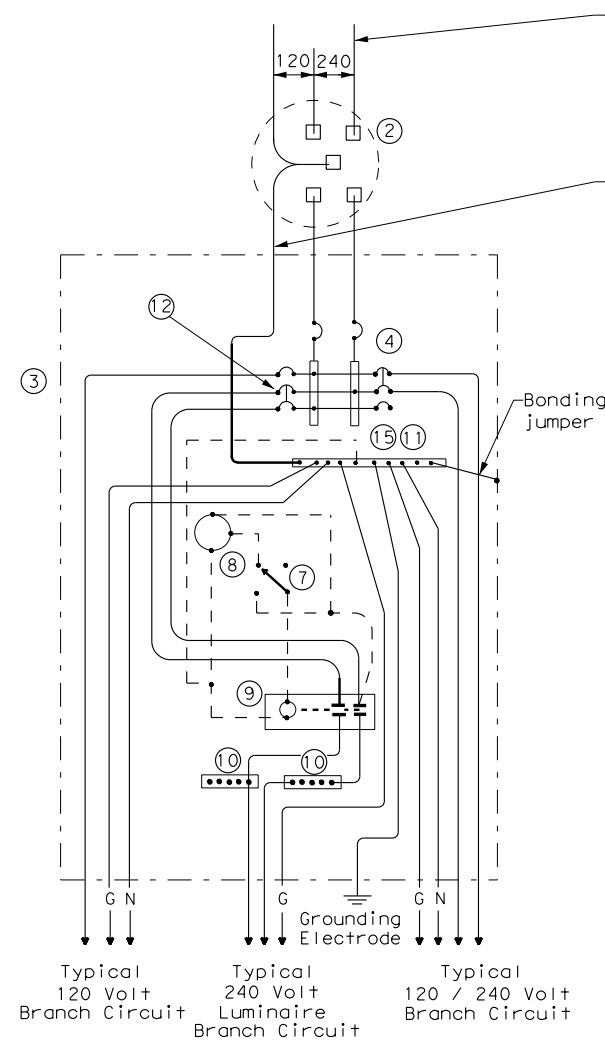
8 Two Photocell viewing windows not shown but required when photocell is listed as enclosure mounted. Windows not required when photocell is listed as pole top mounted.

Do not bond this bus to the enclosure

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



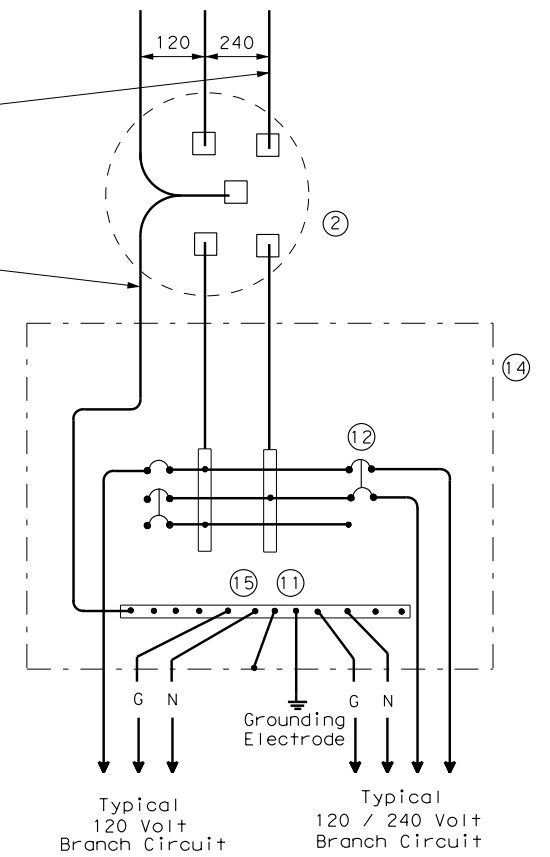
**SCHEMATIC TYPE C
THREE WIRE**



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

Red insulation or color code 6" length of Line 1 or Line 2 conductors' insulation with red tape where conductor exits the weatherhead.

White insulation or color code 6" length of neutral conductors' insulation with white tape where conductor exits the weatherhead.



**SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE**
Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

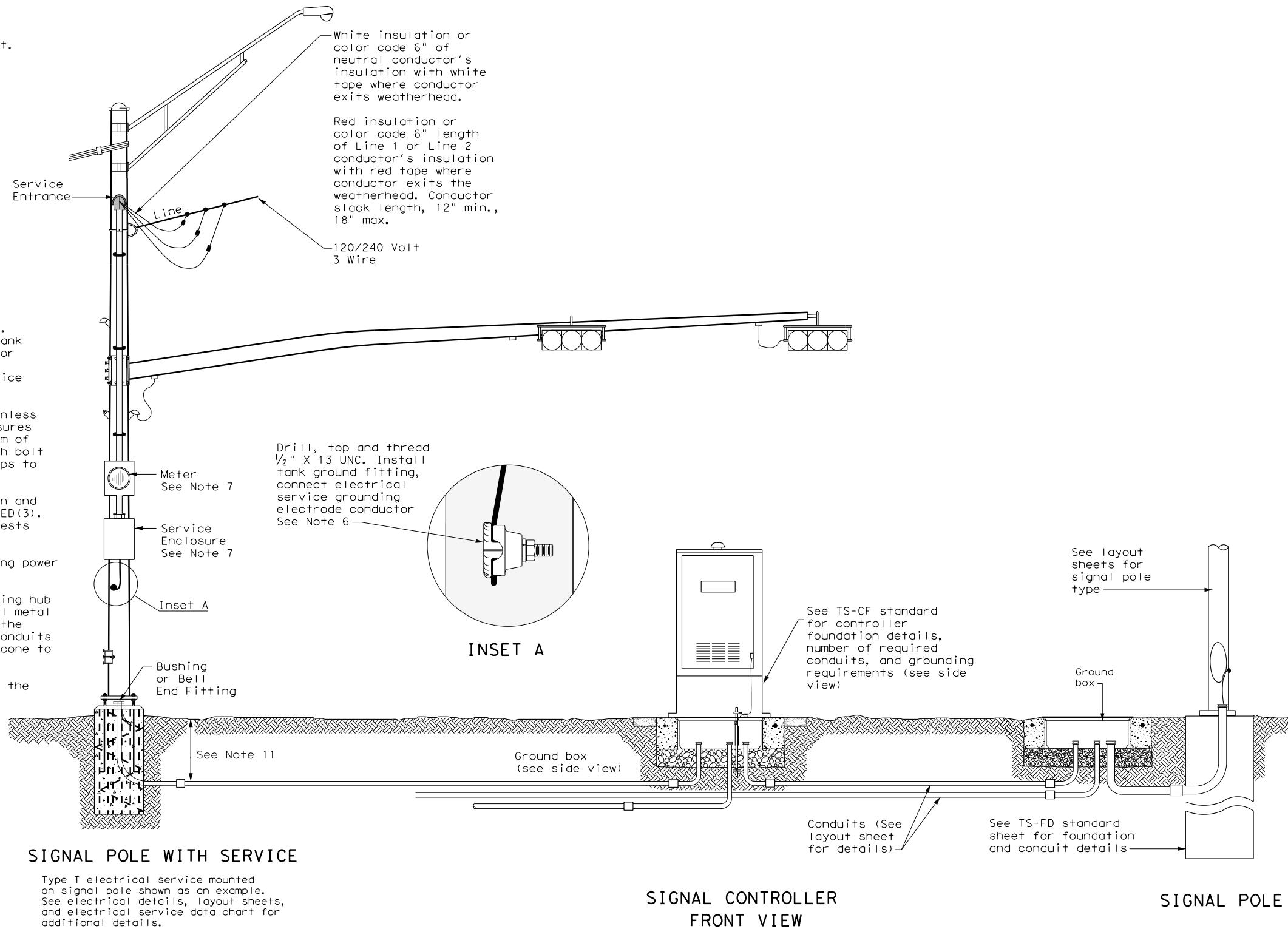
| SCHEMATIC LEGEND | |
|------------------|---|
| 1 | Safety Switch (when required) |
| 2 | Meter (when required-verify with electric utility provider) |
| 3 | Service Assembly Enclosure |
| 4 | Main Disconnect Breaker (See Electrical Service Data) |
| 5 | Circuit Breaker, 15 Amp (Control Circuit) |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

| | | | | | |
|---|--------------|-------|-------|---|----------|
| | | | | Traffic Operations Division Standard | |
| ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES | | | | | |
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| | | DIST: | DAL | COUNTY: | ROCKWALL |
| | | | | SHEET NO.: | 272 |

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TRAFFIC SIGNAL NOTES

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

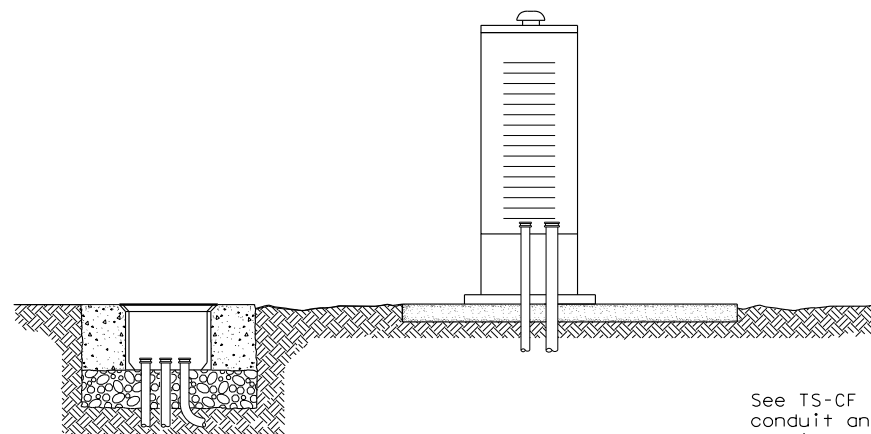


SIGNAL POLE WITH SERVICE

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

SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE



SIGNAL CONTROLLER SIDE VIEW

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

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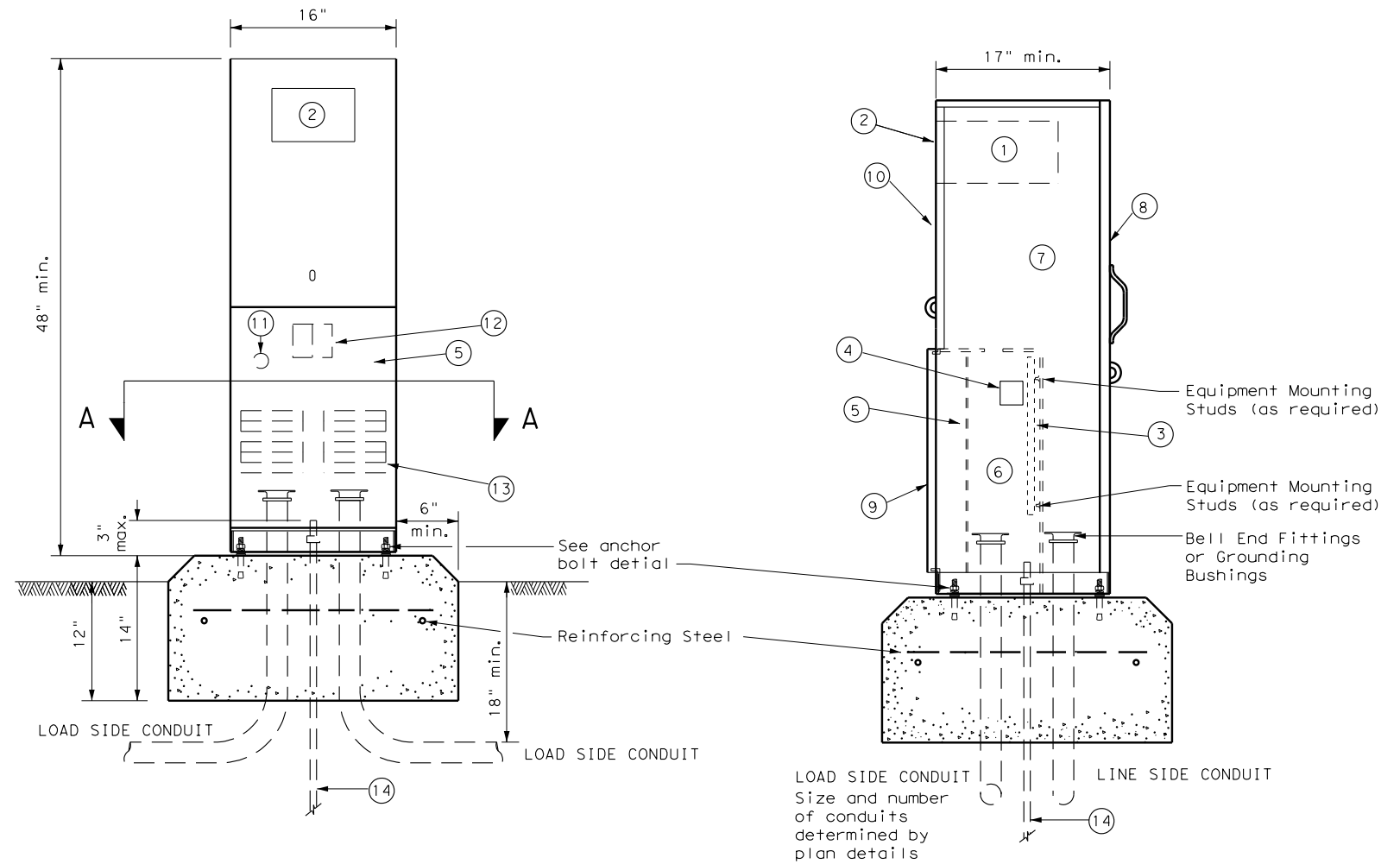
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| | | Texas Department of Transportation | | Traffic Operations Division Standard | |
| ELECTRICAL DETAILS TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS | | | | | |
| ED(8) - 14 | | | | | |
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| © TxDOT | October 2014 | CON: | SECT | JOB | HIGHWAY |
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| DAL | ROCKWALL | 273 | | | |

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PEDESTAL SERVICE NOTES

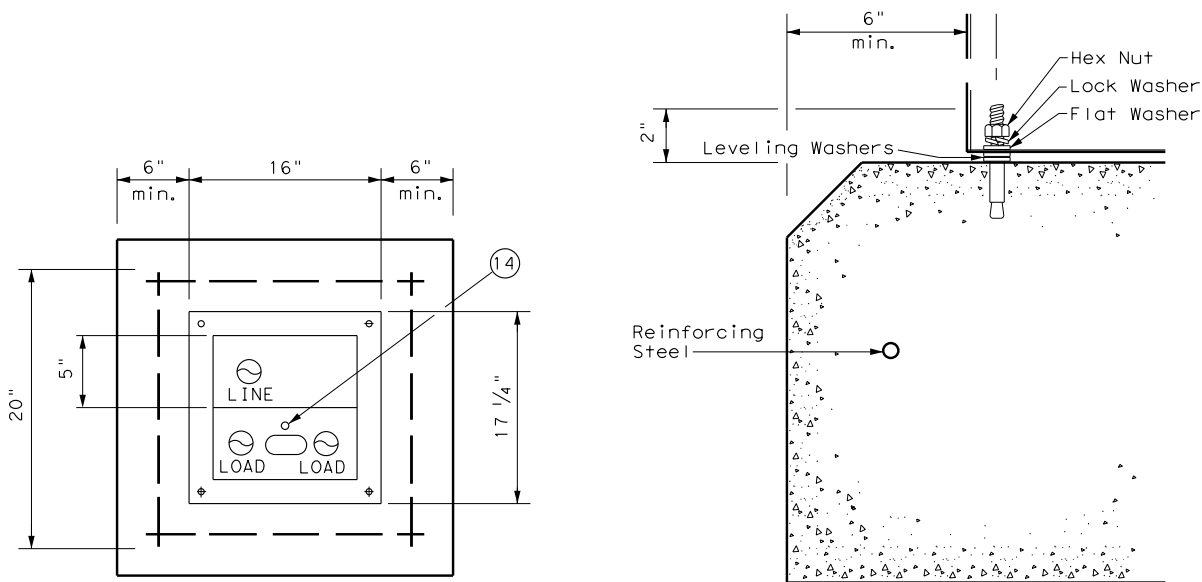
1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services." Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.
2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.
3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."
5. Install 1/2 in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a 1/2 in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.
6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 in. Repair rocking or movement of the service enclosure at no additional cost to the department.
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.
8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.



FRONT VIEW

SIDE VIEW

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



SECTION A-A

ANCHOR BOLT DETAIL

LEGEND

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



**ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS**

ED(9) - 14

| | | | | | | | | | |
|-----------|--------------|------|----------|-----|-----------|-----|-------|-----|-------|
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| REVISIONS | | 1015 | 01 | 023 | FM 3549 | | | | |
| | | DIST | COUNTY | | SHEET NO. | | | | |
| | | DAL | ROCKWALL | | 274 | | | | |

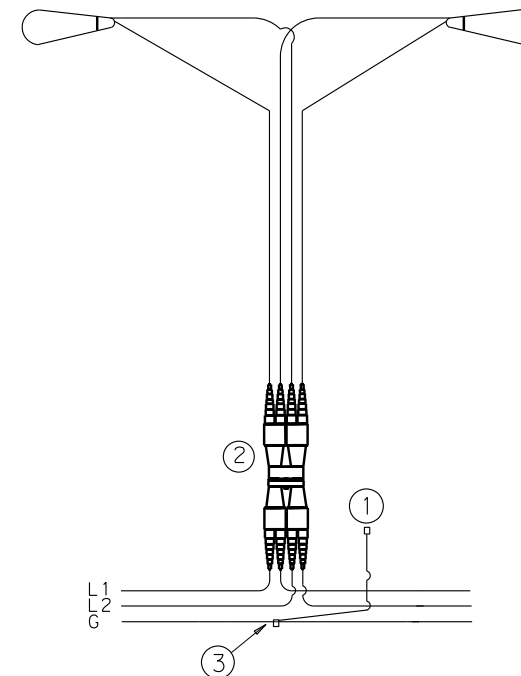
ROADWAY ILLUMINATION ASSEMBLY NOTES

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DATE: DATE TIME
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1. Details apply to roadway lighting installations bid or referenced under Item 610, "Roadway Illumination Assemblies." Provide, furnish, and install all other materials not shown on the plans which may be necessary for complete and proper construction. Where manufacturers provide warranties or guarantees as a customary trade practice, furnish to the State such warranties or guarantees.
2. The locations of poles and fixtures may be shifted by the Engineer to accommodate local conditions. Install or remove poles and luminaires located near overhead electrical lines using established industry and utility safety practices and in accordance with laws governing such work. Consult with the appropriate utility company prior to beginning such work.
3. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association, Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection.
4. Provide Roadway Illumination Light Fixtures as per TxDOT Departmental Material Specification (DMS) 11010, Item 610, and as shown on the Material Producers List (MPL) for Roadway Illumination and Electrical Supplies.
5. Fabricate steel roadway illumination poles in accordance with Roadway Illumination Poles (RIP) standards and Item 610. Poles fabricated according to RIP standards do not require shop drawing submittals.
 - a. Alternate designs to RIP standards or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically see "Guide to Electronic Shop Drawing Submittal" on the TxDOT web site.
 - b. Limitations on use of the RIP standard: The RIP standard details were developed for installations in locations where the 3-second gust basic maximum wind speed is 110 mph, and where the elevation of the base of the pole is less than (i.e. not more than) 25' above the elevation of the surrounding terrain, in accordance with the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," 4th Edition (2001) (AASHTO Design Specifications). For poles to be installed in regions where the maximum basic wind speed exceeds 110 mph or to be mounted more than 25' above the surrounding terrain, provide poles meeting the following requirements:
 - i. Submittals. Following the electronic shop drawing submittal process (see Guide to Electronic Shop Drawing Submittal on the TxDOT web site), submit to the Engineer for approval fabrication drawings and calculations for the poles, sealed by a Texas licensed professional engineer (P.E.).
 - ii. Luminaire Structural Support Requirements. Provide light poles, arms, and anchor bolt assemblies with a 25 year design life to safely resist dead loads, ice loads and the required basic wind speeds at the location of installation in accordance with the 6th edition (2013) of the AASHTO Design Specifications. For transformer base poles, include transformer base and connecting hardware in calculations and shop drawing submittals. Structurally test all transformer bases to resist the theoretical plastic moment capacity of the pole. Submit certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished with the shop drawings. Show breakaway base model number, manufacturer's name, and logo on shop drawings. Include on manufacturer's shop drawings the ASTM designations for all materials to be used.
6. For both transformer and shoe-base type illumination poles, provide and install double-pole breakaway fuse holders as specified by DMS-11040. Breakaway fuse holders are listed on the MPL for Roadway Illumination and Electrical Supplies under Items 610 & 620. Provide 10 amp time delay fuses for breakaway connectors in light poles, or inside the light fixture for underpass luminaires. In each pole, connect luminaires to the breakaway connector with continuous stranded 12 AWG copper conductors as listed on the MPL. Bond all equipment grounding conductors together and to the ground lug in the transformer base or hand hole.
7. Tighten anchor bolts for shoe base, concrete traffic barrier base, and bridge mount roadway illumination poles, in accordance with Item 449.
8. Install T-Base with following procedure:
 - a. Anchor Bolt Tightening.
 - i. Coat the threads of the anchor bolts with electrically conductive lubricant.
 - ii. Place the T-base over the anchor bolts. Foundation must be level and flat. The maximum permissible gap under any one corner of the t-base is 1/8" before nuts are tightened.
 - iii. Coat the bearing surfaces of the nuts and washers with electrically conductive lubricant. Install (1) 1/2" hold down washer, (1) lock washer, and (1) nut on each anchor bolt. Turn the nuts onto the bolts so that each is hand-tight against the washer.
 - iv. Using a torque wrench, tighten each nut to 150 ft-lb. Uniform contact is required between the foundation and the T-base in the corner regions of the T-base, and all corner gaps must be closed after applying torque. If a gap still exists after torquing to 150 ft-lbs, continue torquing each bolt incrementally until gap is closed or maximum allowable torque of 250 ft. pound is reached, whichever comes first. If 250 ft-lbs is not enough to close the gap the foundation must be leveled. Gaps along the straight sides of the T-bases and the foundation are permissible. Ensure that no high point of contact occurs between the straight sides of the T-base and the foundation.
 - v. Check top of T-base for level. If not level then foundation must be leveled.
 - b. Top Bolt Procedure
 - i. Erect pole over T-base with crane. Coat bolts, nuts, washers, and lock washers with electrically conductive lubricant.

- ii. Install bolts and 1/2" connecting washers from the inside of the T-base, thread up through the pole base. Install flat washers, lock washers and nuts snug tight according to Item 447, "Structural Bolting."
- iii. Tighten each nut to 150 ft-lb. using a torque wrench.
- c. Level and Plumb
 - i. Ensure pole is plumb and mast arm is perpendicular to the roadway according to plans to within 5 degrees.
9. Construct luminaire pole foundations in accordance with Item 416, "Drilled Shaft Foundations," and TxDOT standard sheet RID(2).
10. Provide and install underpass luminaires in accordance with Item 610, DMS-11010, and TxDOT standard sheet RID(3). Typical luminaire size for underpass luminaires is 150W HPS or 150W EQ LED.
11. Mount luminaires on arms level as shown by the luminaire level indicator.
12. Orient luminaires perpendicular to the roadway intended to be lit unless otherwise shown on the plans.



L1, L2 = Hot Conductors
G = Grounding Conductor

TYPICAL WIRING DIAGRAM

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR 120/240 VOLT SERVICE.

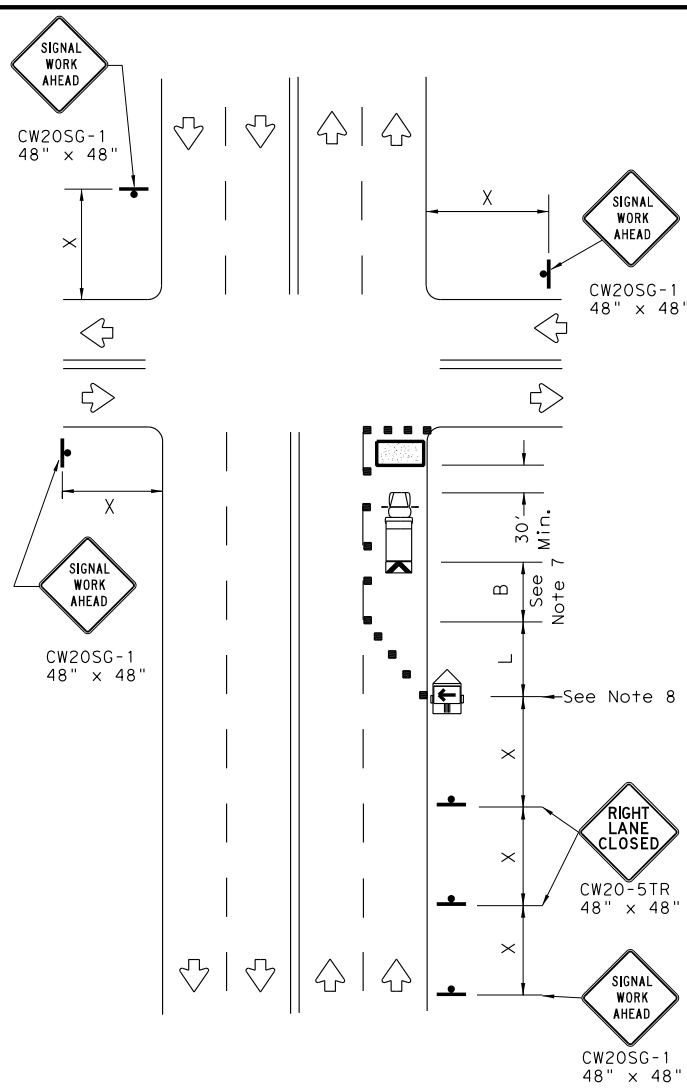
NOTES:

- ① Use 1/2 in.-13 UNC threaded, copper or tin-plated copper, pole bonding connector, sized appropriately for conductors, bonded to T-base, or use ground lug in handhole as available.
- ② Use pre-qualified two-pole breakaway connectors for all luminaire pole installations. For luminaires fed by a circuit with a neutral conductor, use double pole breakaway connectors with the neutral side unfused and marked white.
- ③ Split Bolt or other connector.

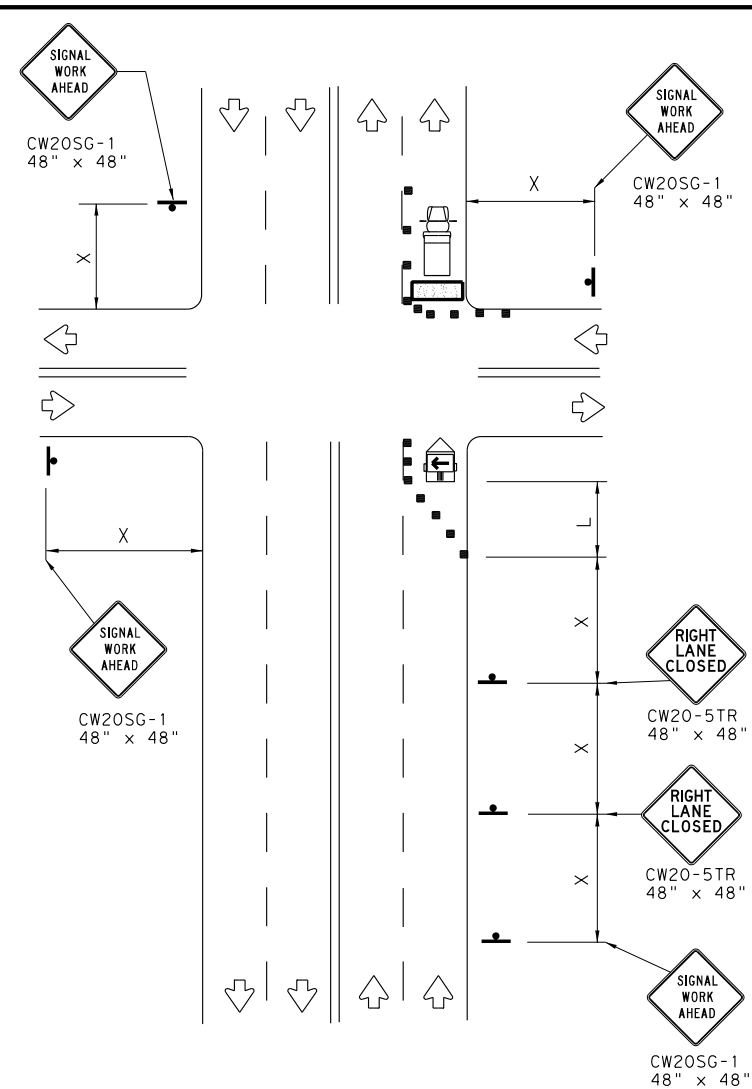
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|--|-------------|------|----------|--------------------------------------|---------|
| | | | | Traffic Operations Division Standard | |
| <h2>ROADWAY ILLUMINATION DETAILS</h2> <h3>RID(1)-17</h3> | | | | | |
| FILE: | rid1-17.dgn | DN: | CK: | DW: | CK: |
| © TxDOT January 2007 | | CONT | SECT | JOB | HIGHWAY |
| 7-17 | | 1015 | 01 | 023 | FM 3549 |
| REVISIONS | | DIST | COUNTY | SHEET NO. | |
| | | DAL | ROCKWALL | 275 | |

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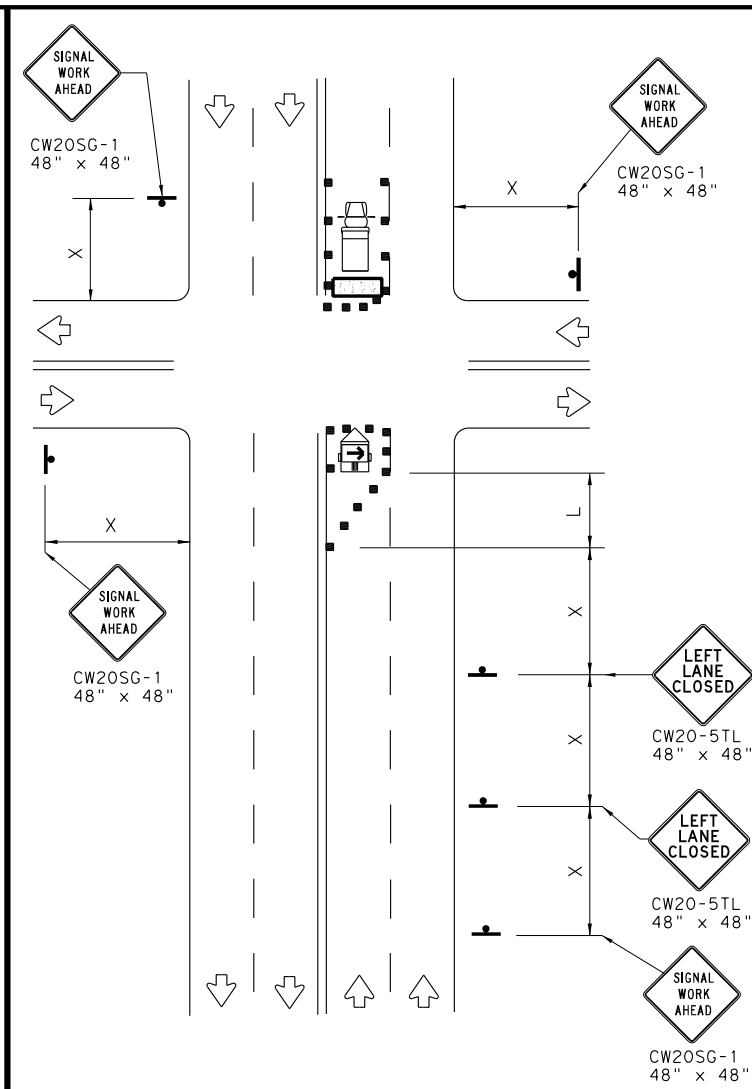
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NEAR SIDE LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE RIGHT LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY



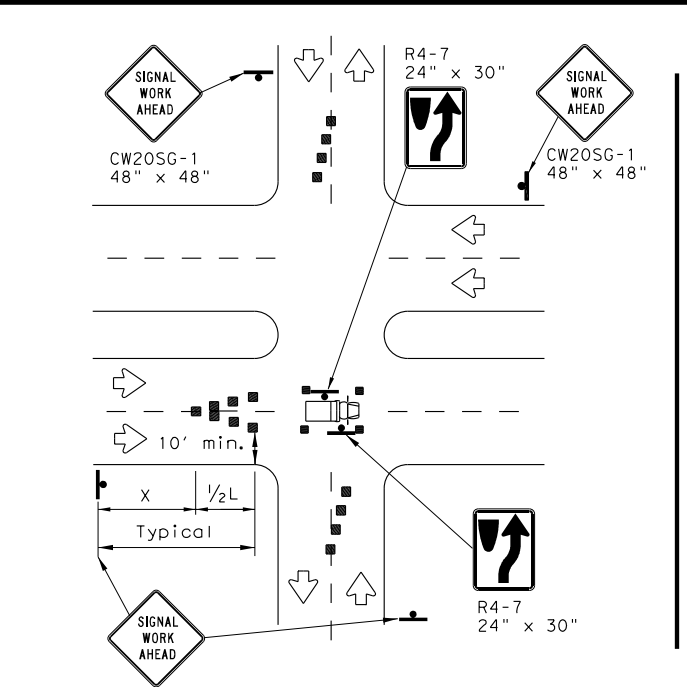
FAR SIDE LEFT LANE CLOSURE
SHORT DURATION OR SHORT TERM STATIONARY

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

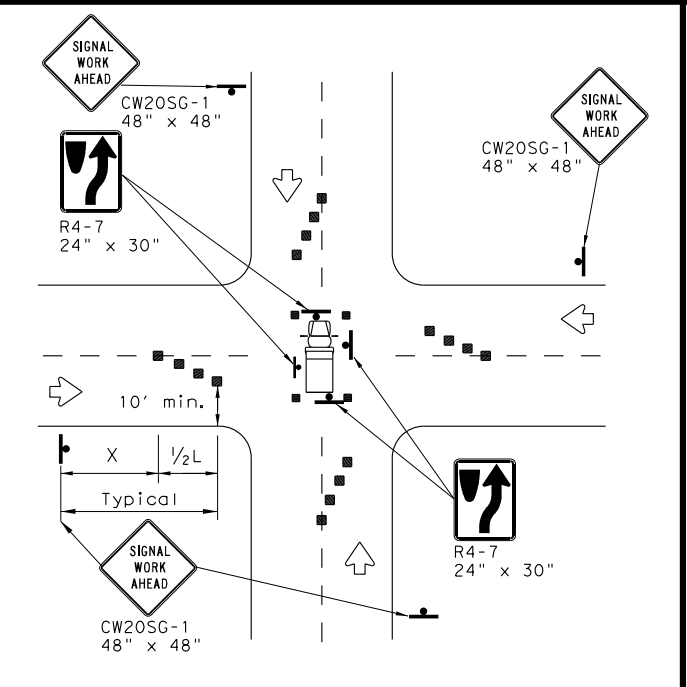
| Posted Speed * | Formula | Minimum Desirable Taper Lengths ** | | | Suggested Maximum Spacing of Channelizing Devices | | Minimum Sign Spacing "X" Distance | Suggested Longitudinal Buffer Space "B" |
|-------------------|-----------------------|---------------------------------------|------------|------------|---|--------------|---|--|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

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

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



OPERATIONS IN THE INTERSECTION
SHORT DURATION



GENERAL NOTES

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



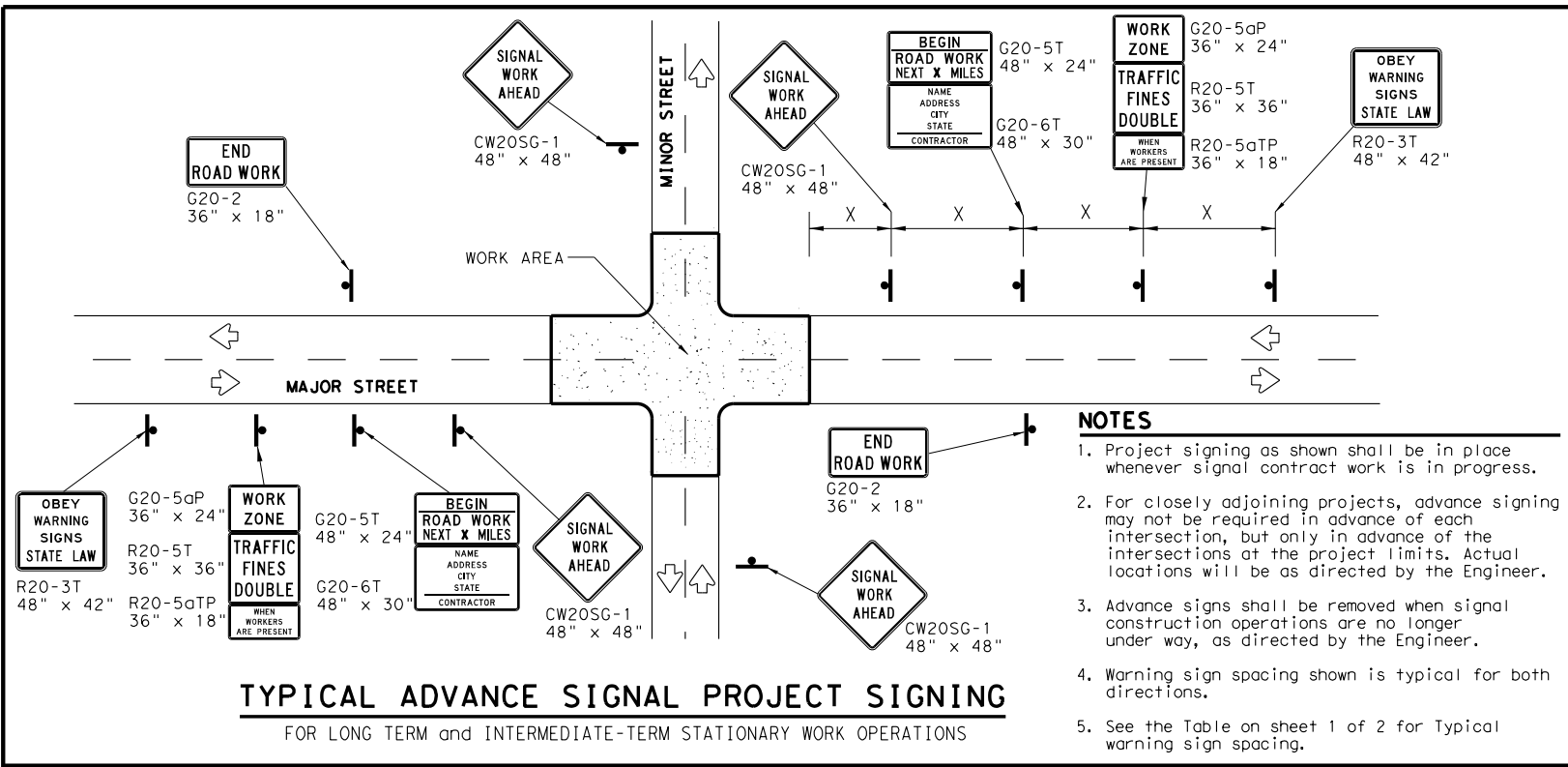
TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

| | | | | |
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| © TxDOT April 1992 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| 2-98 10-99 7-13 | DIST | COUNTY | SHEET NO. | |
| 4-98 3-03 | DAL | ROCKWALL | 276 | |

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DATE: FILE:



TYPICAL ADVANCE SIGNAL PROJECT SIGNING
FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

- NOTES**
1. Project signing as shown shall be in place whenever signal contract work is in progress.
 2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
 3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
 4. Warning sign spacing shown is typical for both directions.
 5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

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

DURATION OF WORK

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

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or aluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes back filled upon completion of the work.

REFLECTIVE SHEETING

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

SIGN SUPPORT WEIGHTS

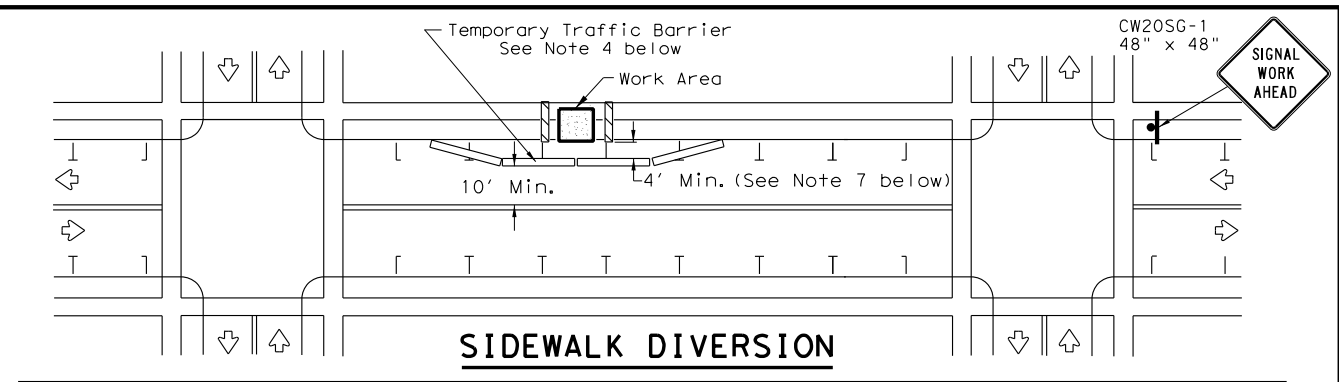
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

| LEGEND | |
|--------|----------------------|
| | Sign |
| | Channelizing Devices |
| | Type 3 Barricade |

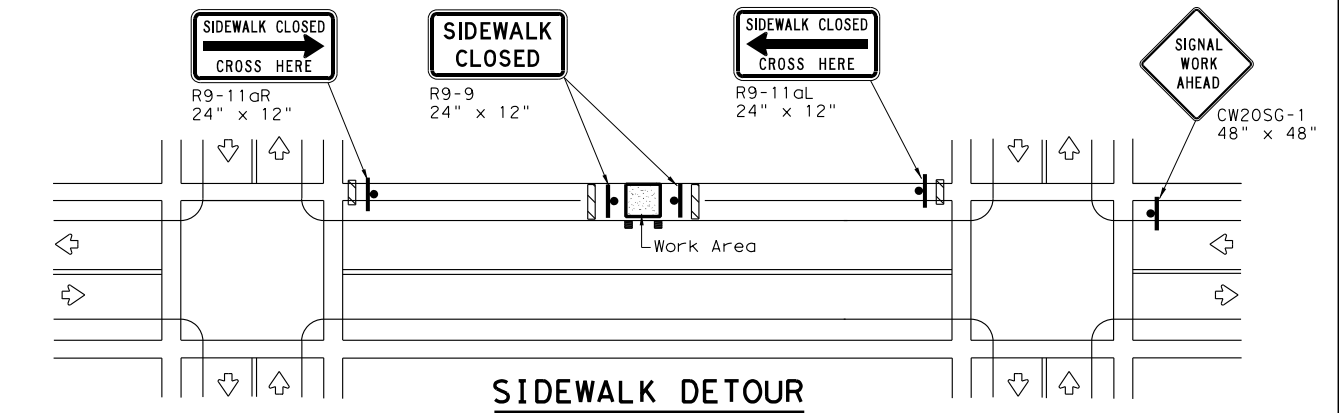
| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|--------------------------------------|----------|
| SIGN FACE MATERIALS | DMS-8300 |
| FLEXIBLE ROLL-UP REFLECTIVE SIGNS | DMS-8310 |

| COLOR | USAGE | SHEETING MATERIAL |
|--------|------------------|---|
| ORANGE | BACKGROUND | TYPE B _{FL} OR TYPE C _{FL} SHEETING |
| WHITE | BACKGROUND | TYPE A SHEETING |
| BLACK | LEGEND & BORDERS | ACRYLIC NON-REFLECTIVE SHEETING |

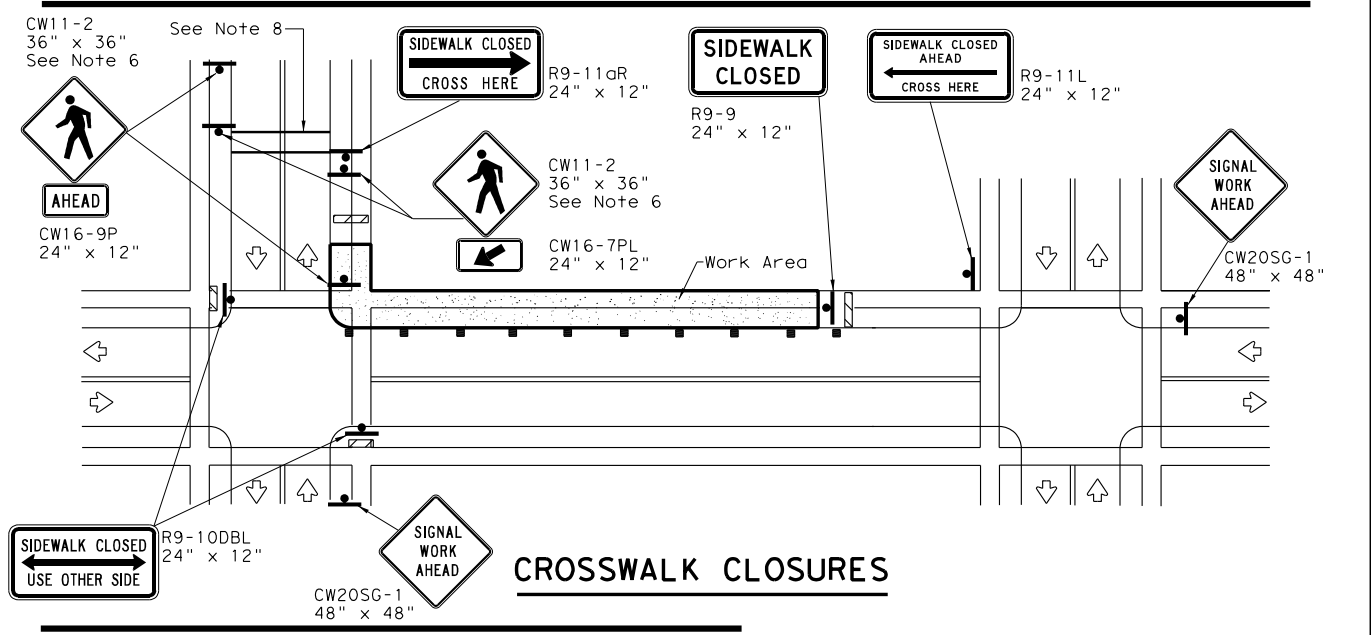
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

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

SHEET 2 OF 2

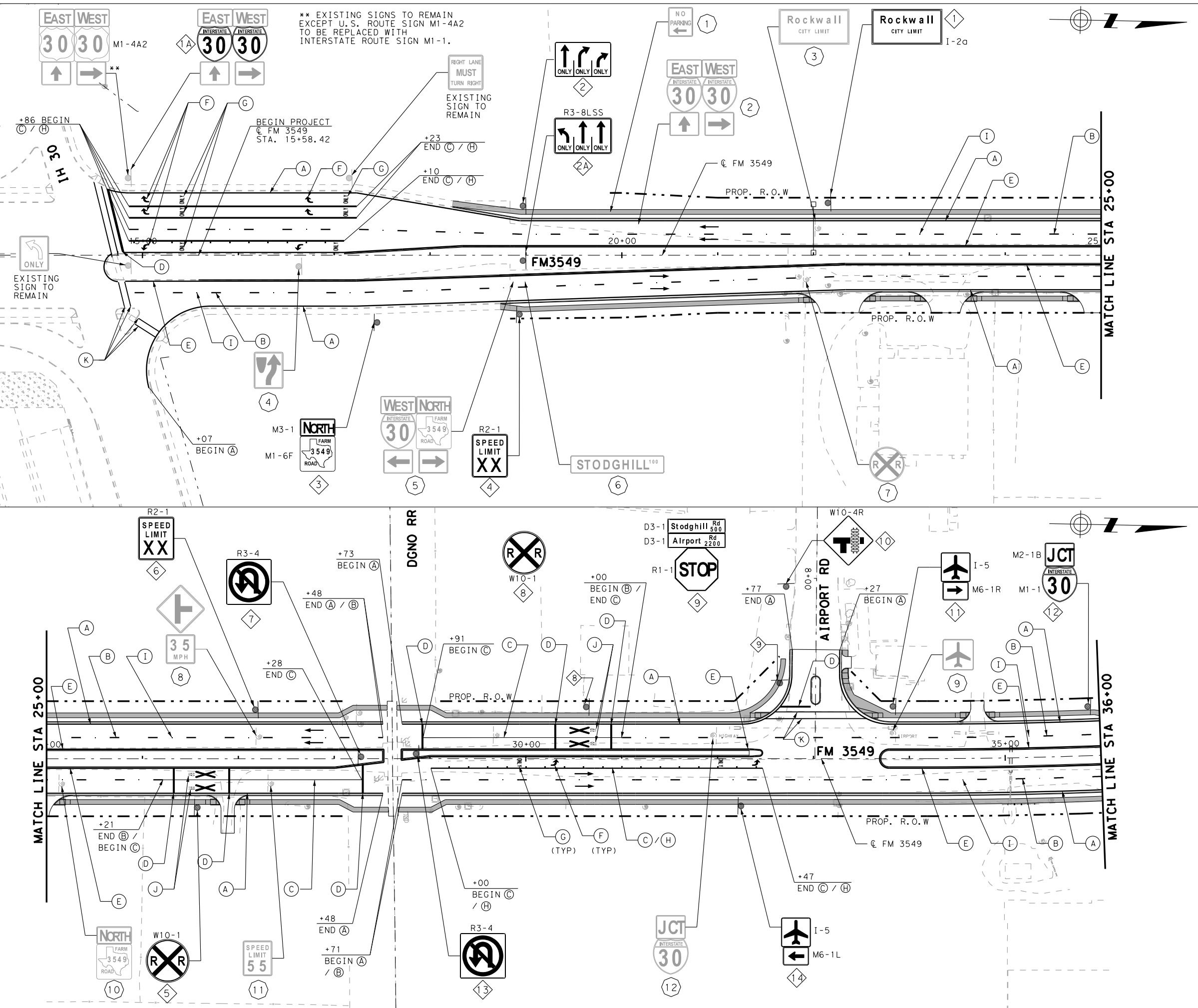


TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

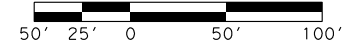
WZ (BTS-2) - 13

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| 2-98 10-99 7-13 | DIST | COUNTY | SHEET NO. | |
| 4-98 3-03 | DAL | ROCKWALL | 277 | |

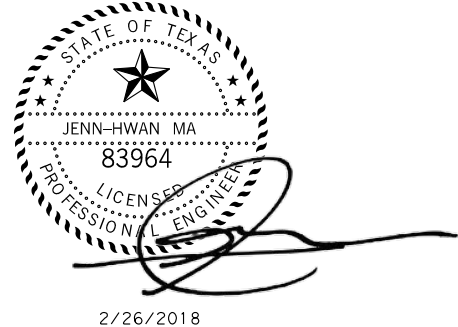
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** EXISTING SIGNS TO REMAIN EXCEPT U.S. ROUTE SIGN M1-4A2 TO BE REPLACED WITH INTERSTATE ROUTE SIGN M1-1.



- (A) REFL PAV MRK TY 1 (W) (4") (SLD)
 - (B) REFL PAV MRK TY 1 (W) (4") (BRK)
 - (C) REFL PAV MRK TY 1 (W) (8") (SLD)
 - (D) REFL PAV MRK TY 1 (W) (24") (SLD)
 - (E) REFL PAV MRK TY 1 (Y) (4") (SLD)
 - (F) REFL PAV MRK TY 1 (W) (ARROW)
 - (G) REFL PAV MRK TY 1 (W) (WORD)
 - (H) REFL PAV MRK TY I-C
 - (I) REFL PAV MRK TY II-C-R
 - (J) REFL PAV MRK TY 1 (W) (RR XING)
 - (K) REFL PAV MRK TY 1 (W) (12") (SLD)
 - (L) REFL PAV MRK TY II-A-A
 - ◆ PROPOSED SMALL SIGN
 - ⊕ EXISTING SIGN TO BE REMOVED *
 - ⊕ EXISTING SIGN TO BE REUSED
 - DIRECTION OF TRAFFIC/TRAVEL LANE
- * EXISTING SIGNS TO BE REMOVED WILL NOT BE PAID DIRECTLY AND SHALL BE SUBSIDIARY TO PAY ITEM 100 "PREPARING ROW"



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SIGNING AND PAVEMENT MARKING PLAN

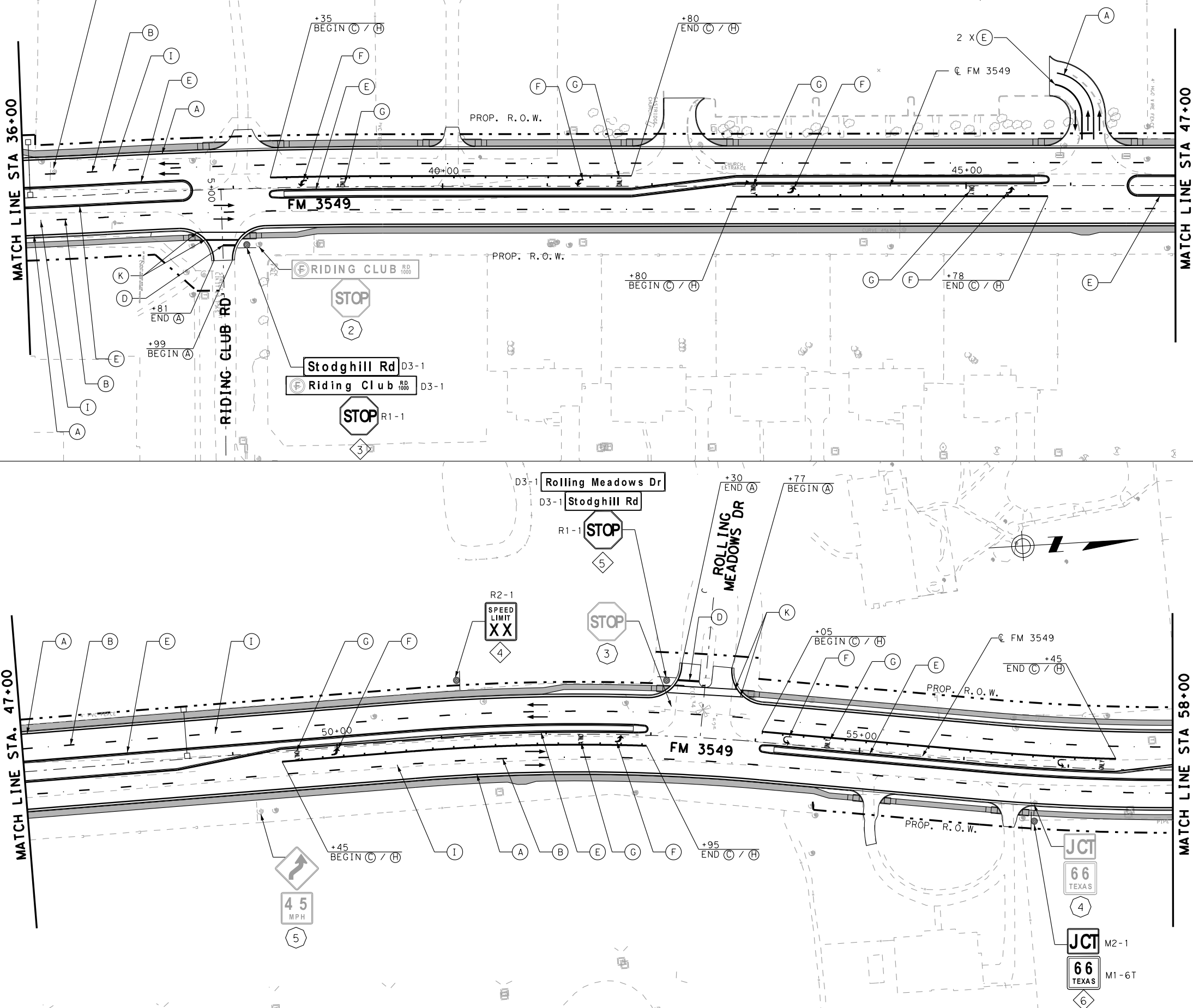
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SHEET 1 OF 4

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EASTRIDGE
 CHURCH OF CHRIST



- (A) REFL PAV MRK TY 1 (W) (4") (SLD)
 - (B) REFL PAV MRK TY 1 (W) (4") (BRK)
 - (C) REFL PAV MRK TY 1 (W) (8") (SLD)
 - (D) REFL PAV MRK TY 1 (W) (24") (SLD)
 - (E) REFL PAV MRK TY 1 (Y) (4") (SLD)
 - (F) REFL PAV MRK TY 1 (W) (ARROW)
 - (G) REFL PAV MRK TY 1 (W) (WORD)
 - (H) REFL PAV MRK TY I-C
 - (I) REFL PAV MRK TY II-C-R
 - (J) REFL PAV MRK TY 1 (W) (RR XING)
 - (K) REFL PAV MRK TY 1 (W) (12") (SLD)
 - (L) REFL PAV MRK TY II-A-A
 - ◆ PROPOSED SMALL SIGN
 - ⊕ EXISTING SIGN TO BE REMOVED *
 - ⊕ EXISTING SIGN TO BE REUSED
 - DIRECTION OF TRAFFIC/TRAVEL LANE
- * EXISTING SIGNS TO BE REMOVED WILL NOT BE PAID DIRECTLY AND SHALL BE SUBSIDIARY TO PAY ITEM 100 "PREPARING ROW"



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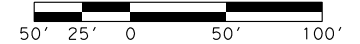
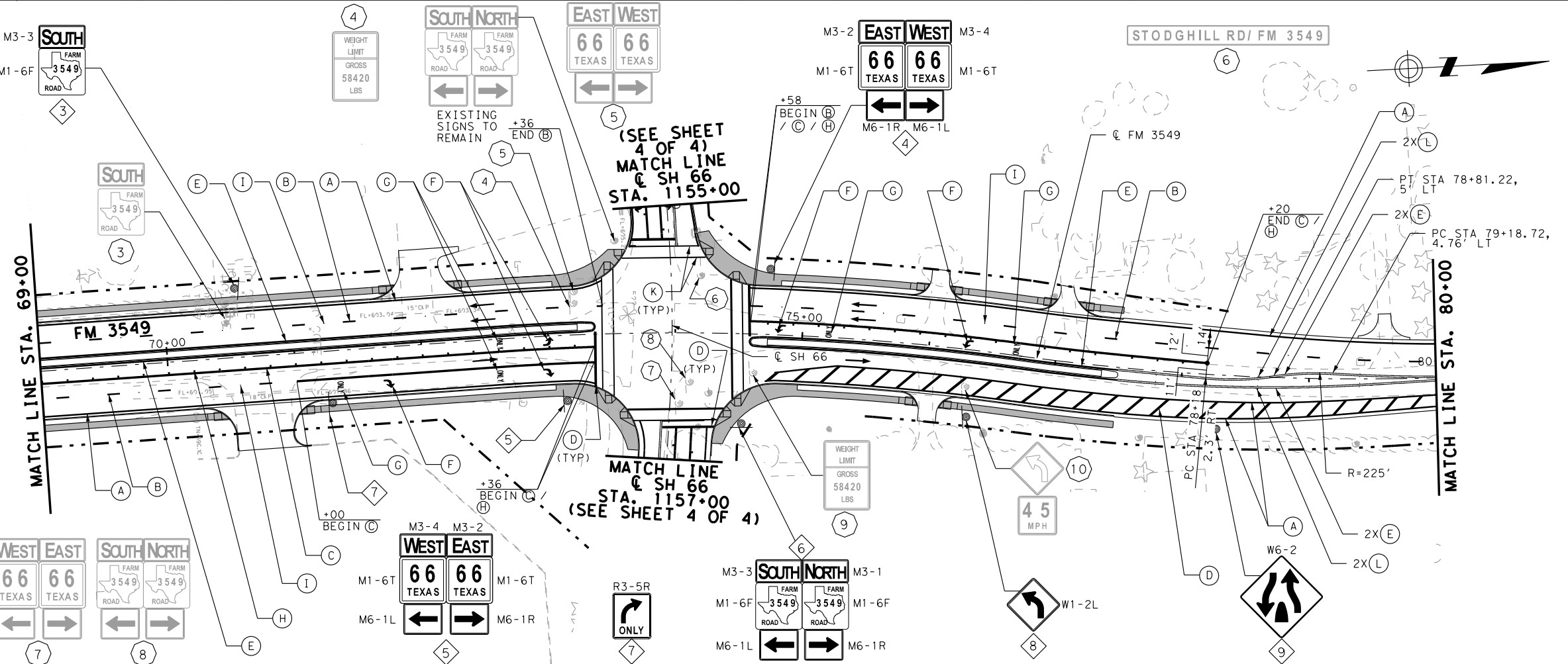
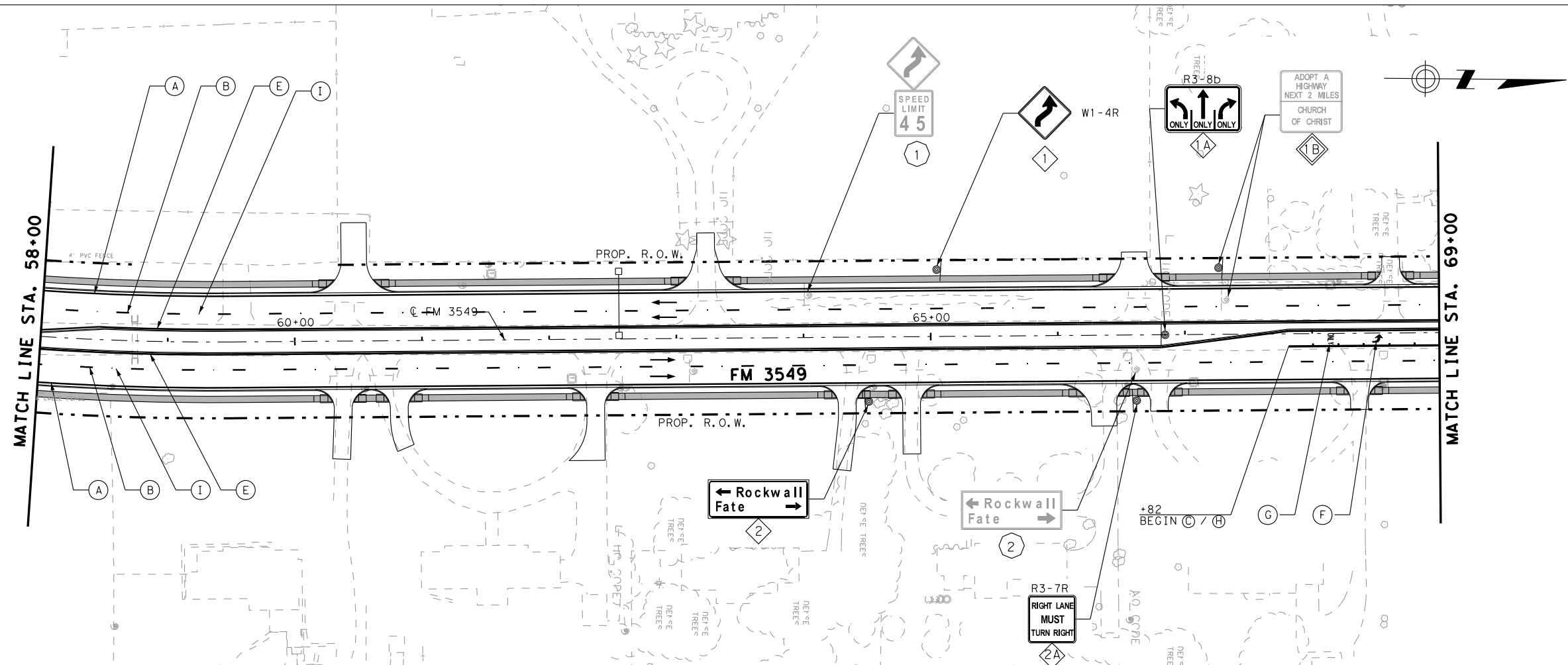


SIGNING AND PAVEMENT MARKING PLAN

STA. 36+00 TO STA. 58+00 SHEET 2 OF 4

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| TC | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | |
| CHECK | CONTROL | SECTION | JOB | 279 |
| JM | 1015 | 01 | 023 | |

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- (A) REFL PAV MRK TY 1 (W) (4") (SLD)
 - (B) REFL PAV MRK TY 1 (W) (4") (BRK)
 - (C) REFL PAV MRK TY 1 (W) (8") (SLD)
 - (D) REFL PAV MRK TY 1 (W) (24") (SLD)
 - (E) REFL PAV MRK TY 1 (Y) (4") (SLD)
 - (F) REFL PAV MRK TY 1 (W) (ARROW)
 - (G) REFL PAV MRK TY 1 (W) (WORD)
 - (H) REFL PAV MRK TY I-C
 - (I) REFL PAV MRK TY II-C-R
 - (J) REFL PAV MRK TY 1 (W) (RR XING)
 - (K) REFL PAV MRK TY 1 (W) (12") (SLD)
 - (L) REFL PAV MRK TY II-A-A
 - (#) PROPOSED SMALL SIGN
 - (*) EXISTING SIGN TO BE REMOVED *
 - (#) EXISTING SIGN TO BE REUSED
 - (→) DIRECTION OF TRAFFIC/TRAVEL LANE
- * EXISTING SIGNS TO BE REMOVED WILL NOT BE PAID DIRECTLY AND SHALL BE SUBSIDIARY TO PAY ITEM 100 "PREPARING ROW"



2/26/2018

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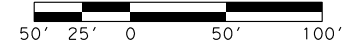
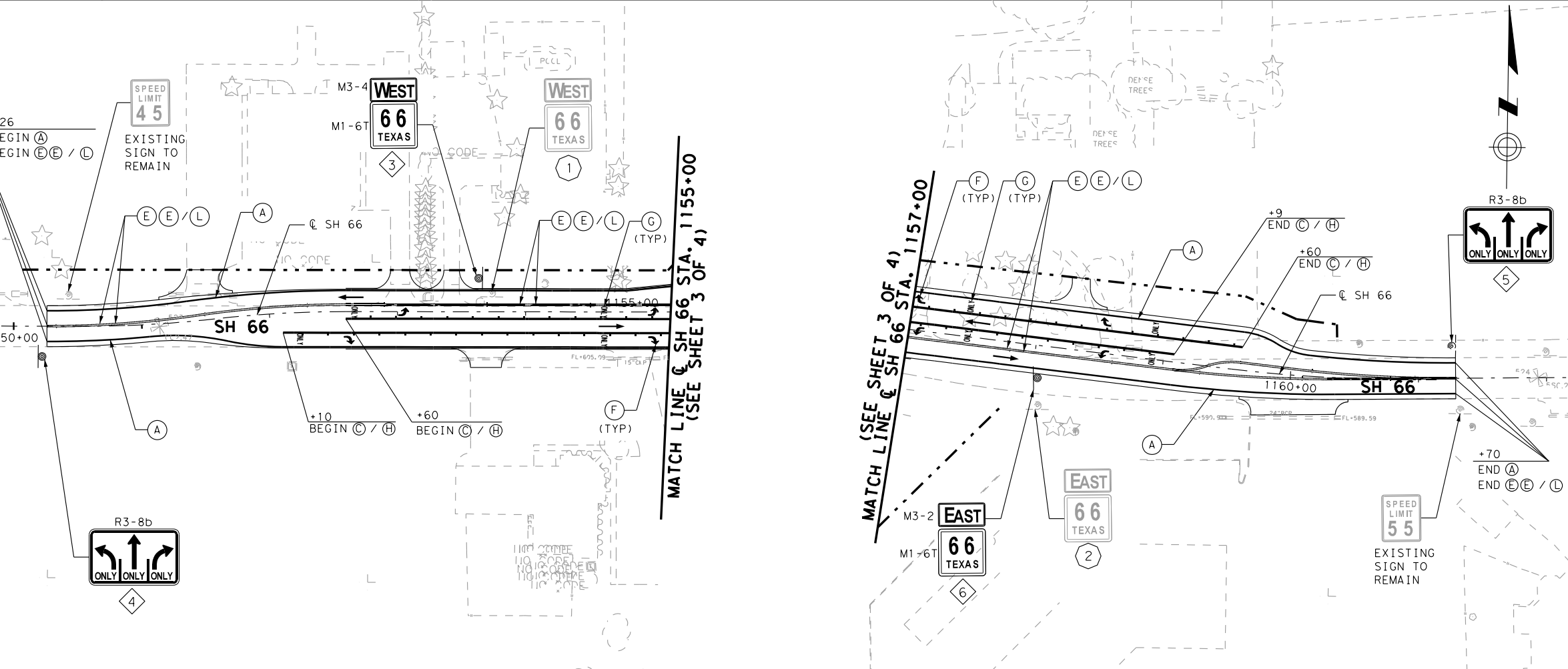
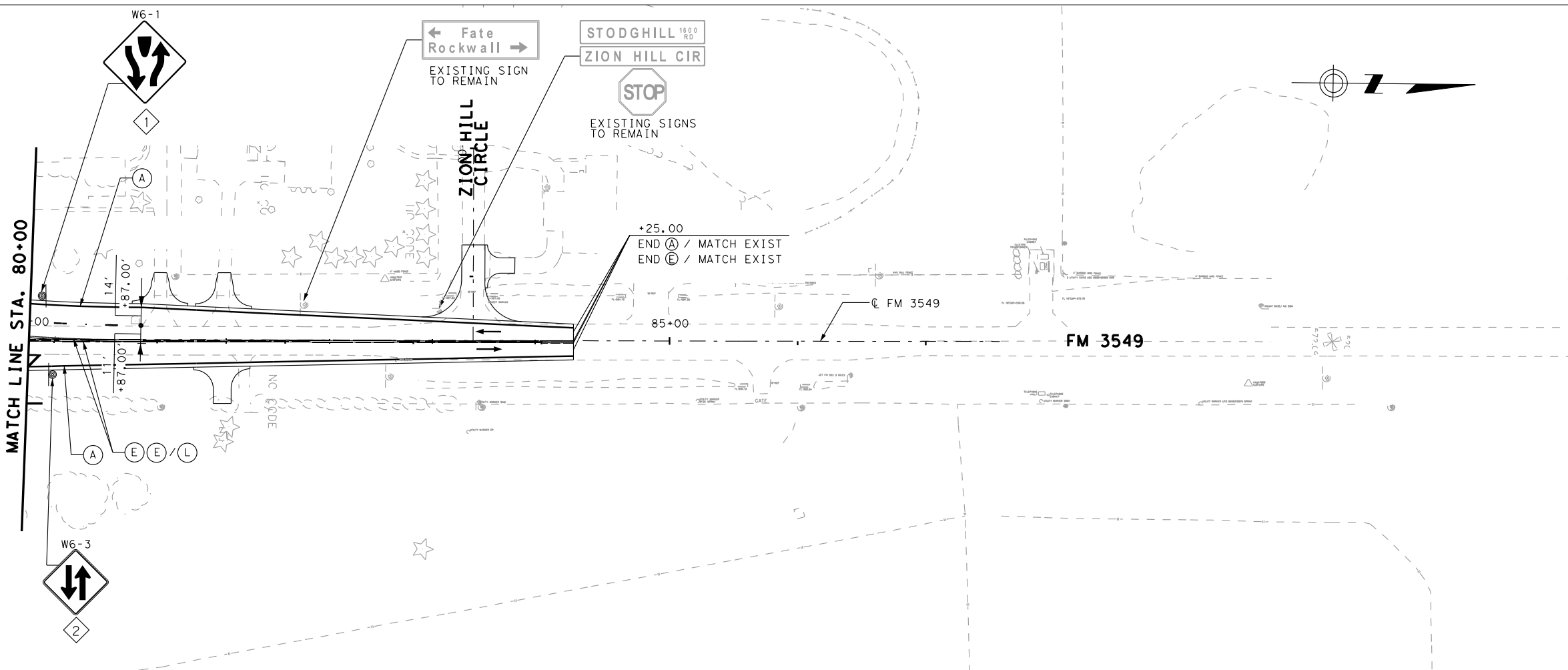
SIGNING AND PAVEMENT MARKING PLAN

STA. 58+00 TO STA. 80+00

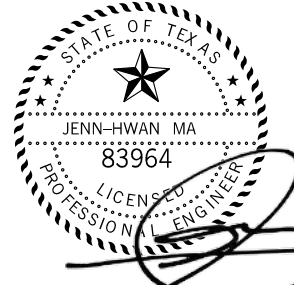
SHEET 3 OF 4

| | | | | |
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| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | |
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- (A) REFL PAV MRK TY 1 (W) (4") (SLD)
 - (B) REFL PAV MRK TY 1 (W) (4") (BRK)
 - (C) REFL PAV MRK TY 1 (W) (8") (SLD)
 - (D) REFL PAV MRK TY 1 (W) (24") (SLD)
 - (E) REFL PAV MRK TY 1 (Y) (4") (SLD)
 - (F) REFL PAV MRK TY 1 (W) (ARROW)
 - (G) REFL PAV MRK TY 1 (W) (WORD)
 - (H) REFL PAV MRK TY I-C
 - (I) REFL PAV MRK TY II-C-R
 - (J) REFL PAV MRK TY 1 (W) (RR XING)
 - (K) REFL PAV MRK TY 1 (W) (12") (SLD)
 - (L) REFL PAV MRK TY II-A-A
 - ◆ PROPOSED SMALL SIGN
 - ◆ EXISTING SIGN TO BE REMOVED *
 - ◆ EXISTING SIGN TO BE REUSED
 - DIRECTION OF TRAFFIC/TRAVEL LANE
- * EXISTING SIGNS TO BE REMOVED WILL NOT BE PAID DIRECTLY AND SHALL BE SUBSIDIARY TO PAY ITEM 100 "PREPARING ROW"



2/26/2018

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SIGNING AND PAVEMENT MARKING PLAN
 ☉ FM 3549 STA. 80+00 TO END PROJECT
 ☉ SH 66 STA. 1150+00 TO STA. 1155+00
 ☉ SH 66 STA. 1157+00 TO STA. 1162+00
 SHEET 4 OF 4

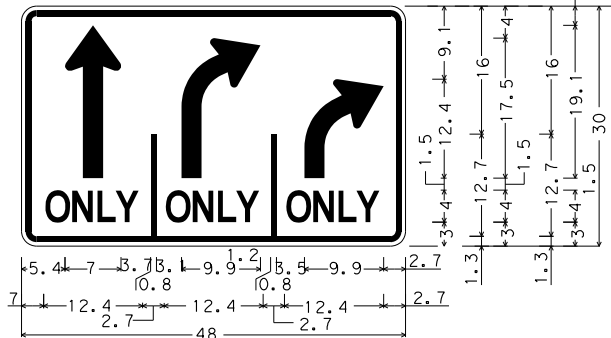
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| TC | TEXAS | DALLAS | ROCKWALL | 281 |
| CHECK | JM | CONTROL | SECTION | |
| CHECK | JM | 1015 | 01 | |
| | | | JOB | |
| | | | 023 | |

STA 22+15
 SIGN NO. 1
 SHEET 1 OF 4



1.5" Radius, 0.8" Border, White on Green;
 [Rockwall] ClearviewHwy-5-W-R;
 [CITY LIMIT] ClearviewHwy-3-W;

STA 19+00
 SIGN NO. 2
 SHEET 1 OF 4



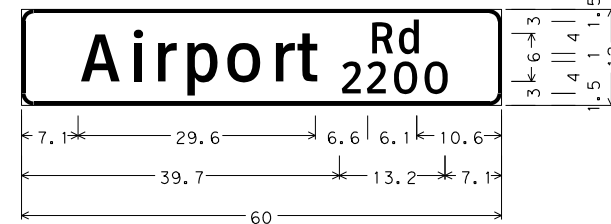
R3-8LLS*48x30;
 1.9" Radius, 0.8" Border, 0.5" Indent, Black on White;
 Lir=4.25, s=2.5; [ONLY] D 50| spacing; Lir=4.25, s=2.5;
 [ONLY] D 50| spacing; Sh=19.125, s=2.5;
 [ONLY] D 50| spacing;

STA 32+75
 SIGN NO. 9
 SHEET 1 OF 4



1.5" Radius, 0.5" Border, White on Green;
 [Stodghill] ClearviewHwy-3-W;
 [Rd] ClearviewHwy-3-W; [500] ClearviewHwy-3-W;

STA 32+75
 SIGN NO. 9
 SHEET 1 OF 4



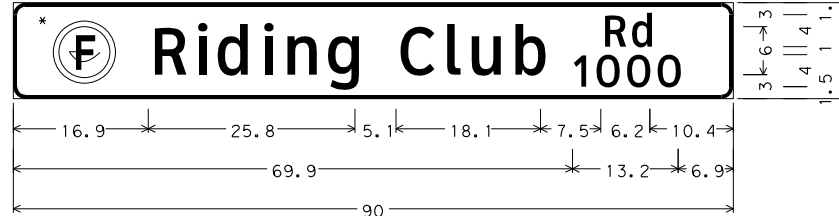
1.5" Radius, 0.5" Border, White on Green;
 [Airport] ClearviewHwy-3-W;
 [Rd] ClearviewHwy-3-W;
 [2200] ClearviewHwy-3-W;

STA 38+13 & STA 53+15
 SIGN NO. 3 & SIGN NO. 5
 SHEET 2 OF 4



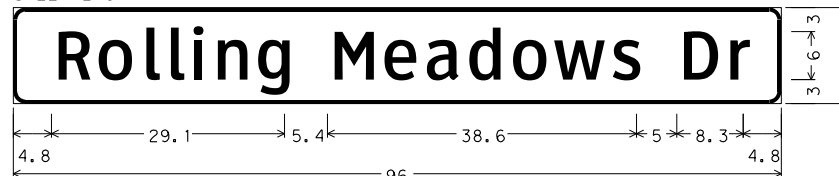
1.5" Radius, 0.5" Border, White on Green;
 [Stodghill Rd] ClearviewHwy-3-W;

STA 38+13
 SIGN NO. 3
 SHEET 2 OF 4



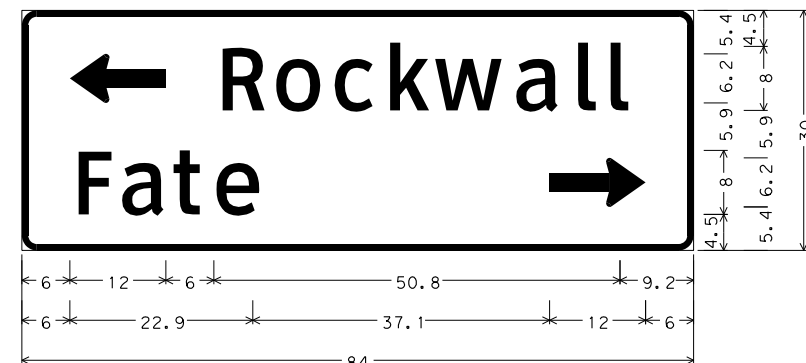
1.5" Radius, 0.5" Border, White on Green;
 [Riding Club] ClearviewHwy-3-W; [Rd] ClearviewHwy-3-W;
 [1000] ClearviewHwy-3-W;

STA 53+15
 SIGN NO. 5
 SHEET 2 OF 4



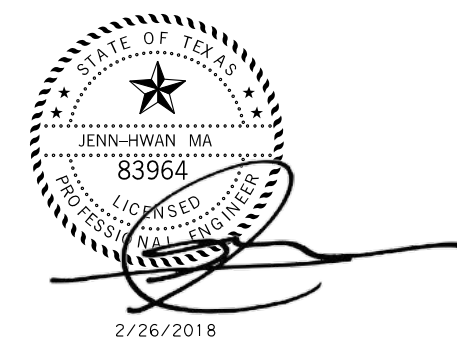
1.5" Radius, 0.5" Border, White on Green;
 [Rolling Meadows Dr] ClearviewHwy-3-W;

STA 64+50, SIGN NO. 2
 SHEET 3 OF 4



1.9" Radius, 0.8" Border, White on Green;
 Standard Arrow Custom 12.0" X 6.1" 180°
 [Rockwall] ClearviewHwy-3-W; [Fate] ClearviewHwy-3-W;
 Standard Arrow Custom 12.0" X 6.1" 0°

* City logo



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

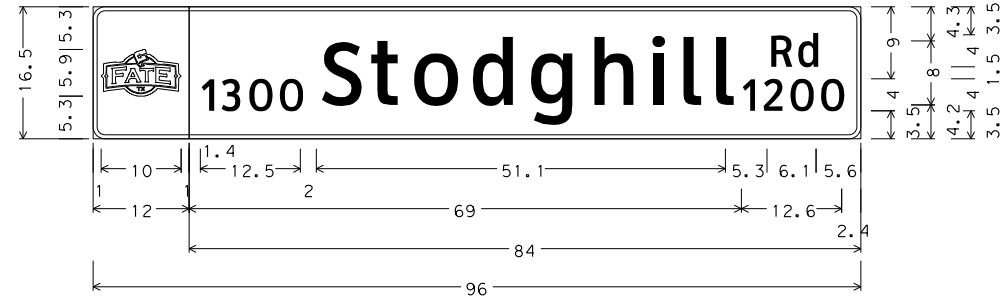


SMALL SIGN DETAILS

SHEET 1 OF 1

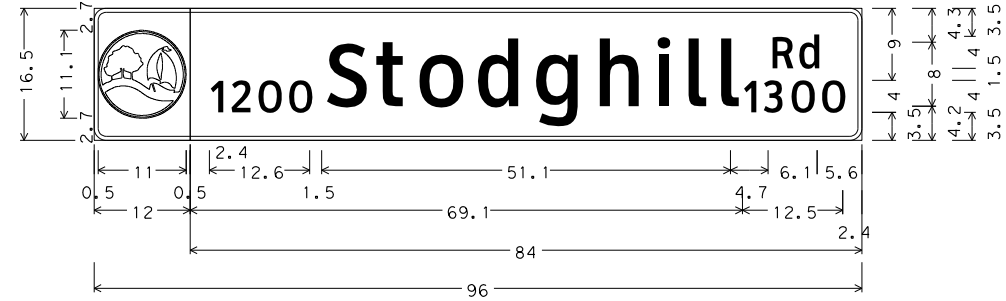
| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 282 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |

SIGN NO. E1, MOUNTED TO MASK ARM, P1
 PERMANENT TRAFFIC SIGNAL LAYOUT SHEET 1 OF 1



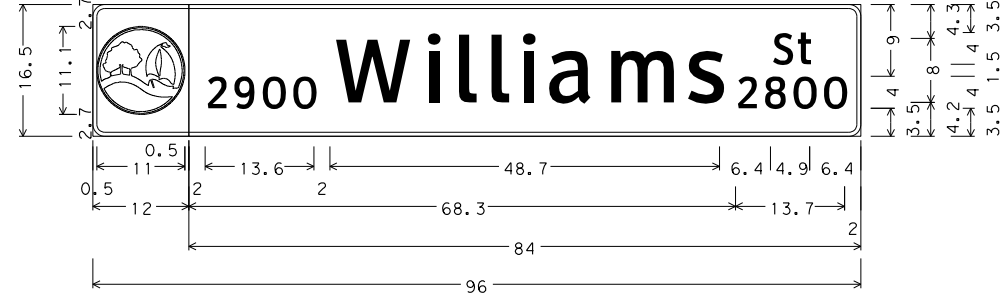
1.5" Radius, 0.5" Border, White on Green;
 [1300] ClearviewHwy-3-W;
 [Stodghill] ClearviewHwy-3-W; [Rd] ClearviewHwy-3-W;
 [1200] ClearviewHwy-3-W

SIGN NO. E3, MOUNTED TO MASK ARM, P3
 PERMANENT TRAFFIC SIGNAL LAYOUT SHEET 1 OF 1



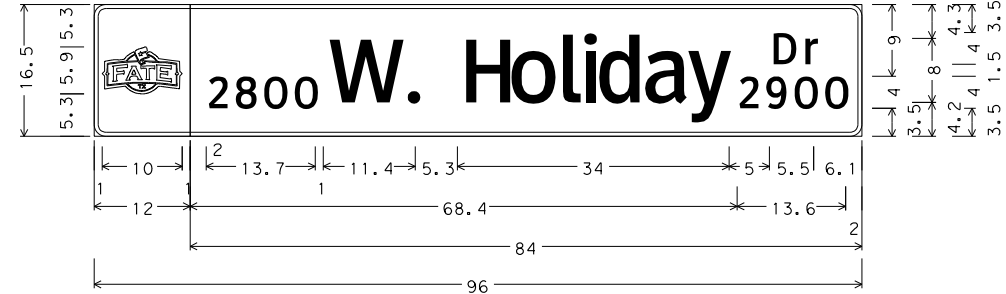
1.5" Radius, 0.5" Border, White on Green;
 [1200] ClearviewHwy-3-W;
 [Stodghill] ClearviewHwy-3-W; [Rd] ClearviewHwy-3-W;
 [1300] ClearviewHwy-3-W

SIGN NO. E2, MOUNTED TO MASK ARM, P2
 PERMANENT TRAFFIC SIGNAL LAYOUT SHEET 1 OF 1



1.5" Radius, 0.5" Border, White on Green;
 [2900] ClearviewHwy-3-W;
 [Williams] ClearviewHwy-3-W; [St] ClearviewHwy-3-W;
 [2800] ClearviewHwy-3-W

SIGN NO. E4, MOUNTED TO MASK ARM, P4
 PERMANENT TRAFFIC SIGNAL LAYOUT SHEET 1 OF 1



1.5" Radius, 0.5" Border, White on Green;
 [2800] ClearviewHwy-3-W;
 [W. Holiday] ClearviewHwy-3-W 25% spacing; [Dr] ClearviewHwy-3-W;
 [2900] ClearviewHwy-3-W

NOTE:

ILSN SIGNS E1 AND E4 TO BE PAID FOR BY CITY OF FATE. ILSN SIGNS E2 AND E3 TO BE PAID FOR BY CITY OF ROCKWALL.



2/26/2018

CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474



ILSN DETAILS

SHEET 1 OF 1

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE TEXAS | DISTRICT DALLAS | COUNTY ROCKWALL | SHEET NO. 283 |
| CHECK JM | CONTROL 1015 | SECTION 01 | JOB 023 | |

SUMMARY OF SMALL SIGNS

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

| PLAN SHEET NO. | SIGN NO. | SIGN NOMENCLATURE | SIGN TEXT | DIMENSIONS | ALUMINUM TYPE A | ALUMINUM TYPE G | Post Type | Anchor Type | Mounting Designation | SIGN MOUNTED ON EXISTING ASSEMBLY |
|----------------|----------|-------------------|--|---------------|-----------------|-----------------|-----------|-------------|----------------------|-----------------------------------|
| | | | | | | | | | | |
| 1 | 1A | M1-1 | INTERSTATE 30 | 24" X 24" | X | | S80 | SA | T | |
| | | M1-1 | INTERSTATE 30 | 24" X 24" | X | | 10 BWG | SA | T | |
| | | I-20 | Rockwall / CITY LIMIT | 66" X 24" | X | | 10 BWG | SA | T | |
| | | 2A | THRU ONLY, RIGHT ONLY, RIGHT ONLY LEFT ONLY, THRU ONLY, THRU ONLY | 48" X 30" | X | | 10 BWG | SA | T | |
| | | 3 | M3-1 NORTH | 24" X 12" | X | | 10 BWG | SA | P | |
| | | 4 | M1-6F TEXAS FARM 3549 ROAD | 24" X 24" | X | | 10 BWG | SA | P | |
| | | 5 | R2-1 SPEED LIMIT XX | 30" X 36" | X | | 10 BWG | SA | P | |
| | | 6 | R2-1 SPEED LIMIT XX | 30" X 36" | X | | 10 BWG | SA | P | |
| | | 7 | R3-4 No U-Turn | 36" X 36" | X | | 10 BWG | SA | P | |
| | | 8 | W10-1 RR | 36" DIA. | X | | 10 BWG | SA | P | |
| | | 9 | R1-1 STOP | 36" X 36" | X | | 10 BWG | SA | P | BM |
| | | 10 | D3-1 AIRPORT RD 2200 | 48" X 12" | X | | 10 BWG | SA | P | |
| | | 11 | D3-1 STODGHILL RD 500 | 48" X 12" | X | | 10 BWG | SA | P | |
| | | 12 | I-5 GRADE CROSSING & INTERSECTION ADVANCE WARNING | 36" X 36" | X | | 10 BWG | SA | P | |
| 2 | | M6-1R | DIRECTIONAL ARROW -> | 24" X 24" | X | | 10 BWG | SA | P | |
| | | M2-1B | JCT | 21" X 15" | X | | 10 BWG | SA | P | |
| | | M1-1 | INTERSTATE 30 | 24" X 24" | X | | 10 BWG | SA | P | |
| | | R3-4 | No U-Turn | 36" X 36" | X | | 10 BWG | SA | P | |
| | | I-5 | AIRPORT | 24" X 24" | X | | 10 BWG | SA | P | |
| | | M6-1L | <- DIRECTIONAL ARROW | 21" X 15" | X | | 10 BWG | SA | P | |
| | | D3-1 | STODGHILL RD | 48" X 12" | X | | S80 | SA | P | BM |
| | | D3-1 | RIDING CLUB RD 1000 | 78" X 12" | X | | 10 BWG | SA | P | |
| | | R1-1 | STOP | 36" X 36" | X | | S80 | SA | P | BM |
| | | R2-1 | SPEED LIMIT XX | 30" X 36" | X | | 10 BWG | SA | P | |
| | | D3-1 | ROLLING MEADOWS DR | 78" X 12" | X | | 10 BWG | SA | P | |
| | | D3-1 | STODGHILL RD | 48" X 12" | X | | S80 | SA | P | BM |
| | | R1-1 | STOP | 36" X 36" | X | | 10 BWG | SA | P | |
| | | M2-1 | JCT | 21" X 15" | X | | 10 BWG | SA | P | |
| 3 | | M1-6T | TEXAS 66 | 24" X 24" | X | | 10 BWG | SA | P | |
| | | 1A | W1-4R REVERSE CURVE | 36" X 36" | X | | 10 BWG | SA | P | |
| | | 1B | R3-8B LEFT ONLY, THRU ONLY, RIGHT ONLY | 48" X 30" | X | | 10 BWG | SA | T | |
| | | 2 | D1-4-4T ADOPT A HIGHWAY | RELOCATE SIGN | | | 10 BWG | SA | P | |
| | | 2A | D1-2 <- ROCKWALL \ FATE -> | 84" X 30" | X | | S80 | SA | T | (FOR INFO ONLY) |
| | | 3 | M3-3 SOUTH | 24" X 12" | X | | 10 BWG | SA | P | |
| | | M1-6F | FARM 3549 ROAD | 24" X 24" | X | | 10 BWG | SA | P | |
| | | M3-2 | EAST | 24" X 12" | | | | | | |
| | | M1-6T | TEXAS 66 | 24" X 24" | | | | | | |
| | | M6-1R | <- DIRECTIONAL ARROW | 21" X 15" | X | | S80 | SA | U | |
| | | M3-4 | WEST | 24" X 12" | | | | | | |
| | | M1-6T | TEXAS 66 | 24" X 24" | | | | | | |
| | | M6-1L | DIRECTIONAL ARROW -> | 21" X 15" | | | | | | |
| | | M3-4 | WEST | 24" X 12" | | | | | | |
| 4 | | M1-6T | TEXAS 66 | 24" X 24" | | | | | | |
| | | M6-1L | <- DIRECTIONAL ARROW | 21" X 15" | X | | S80 | SA | U | |
| | | M3-2 | EAST | 24" X 12" | | | | | | |
| | | M1-6T | TEXAS 66 | 24" X 24" | | | | | | |
| | | M6-1R | DIRECTIONAL ARROW -> | 21" X 15" | | | | | | |
| | | M3-3 | SOUTH | 24" X 12" | | | | | | |
| | | M1-6F | FARM 3549 ROAD | 24" X 24" | | | | | | |
| | | M6-1L | <- DIRECTIONAL ARROW | 21" X 15" | X | | S80 | SA | U | |
| | | M3-1 | NORTH | 24" X 12" | | | | | | |
| | | M1-6F | FARM 3549 ROAD | 24" X 24" | | | | | | |
| | | M6-1R | DIRECTIONAL ARROW -> | 21" X 15" | | | | | | |
| | | R3-5R | ONLY | 30" X 36" | X | | 10 BWG | SA | P | |
| | | W1-2L | CURVE | 36" X 36" | X | | 10 BWG | SA | P | |
| | | W6-2 | DIVIDED HIGHWAY | 36" X 36" | X | | 10 BWG | SA | P | |
| 6 | | W6-1 | DIVIDED HIGHWAY | 36" X 36" | X | | 10 BWG | SA | P | |
| | | W6-3 | TWO-WAY TRAFFIC | 36" X 36" | X | | 10 BWG | SA | P | |
| | | M3-4 | WEST | 24" X 12" | X | | 10 BWG | SA | P | |
| | | M1-6T | TEXAS 66 | 24" X 24" | X | | 10 BWG | SA | P | |
| | | R3-8B | LEFT ONLY, THRU ONLY, RIGHT ONLY | 48" X 30" | X | | 10 BWG | SA | T | |
| | | R3-8B | LEFT ONLY, THRU ONLY, RIGHT ONLY | 48" X 30" | X | | 10 BWG | SA | T | |
| | | M3-2 | EAST | 24" X 12" | X | | 10 BWG | SA | P | |
| | | M1-6T | TEXAS 66 | 24" X 24" | X | | 10 BWG | SA | P | |



CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981

ATKINS TBPE REG. # F-474



SUMMARY OF SMALL SIGNS

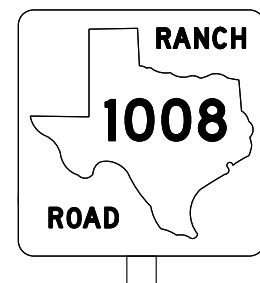
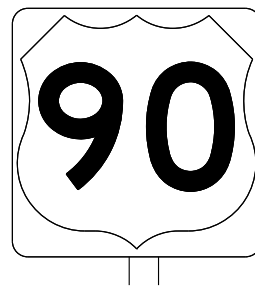
| | | | | |
|-------------|-------------------|-------------------------|----------|-------------|
| DESIGN TC | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| GRAPHICS TC | 6 | SEE TITLE SHEET | | FM 3549 |
| CHECK JM | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 284 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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DATE: FILE:

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

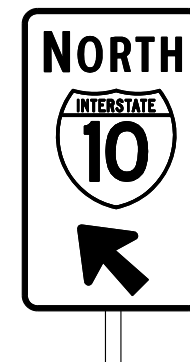
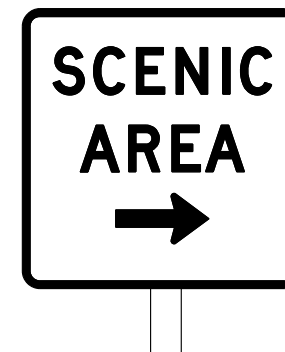
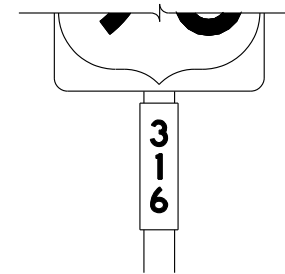
| SHEETING REQUIREMENTS | | |
|-----------------------|------------|-----------------------------|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | WHITE | TYPE A SHEETING |
| BACKGROUND | ALL OTHERS | TYPE B OR C SHEETING |
| LEGEND & BORDERS | WHITE | TYPE A SHEETING |
| LEGEND & BORDERS | BLACK | ACRYLIC NON-REFLECTIVE FILM |
| LEGEND & BORDERS | ALL OTHERS | TYPE B or C SHEETING |



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

| SHEETING REQUIREMENTS | | |
|---------------------------|------------|----------------------|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | ALL | TYPE B OR C SHEETING |
| LEGEND & BORDERS | WHITE | TYPE D SHEETING |
| LEGEND, SYMBOLS & BORDERS | ALL OTHERS | TYPE B OR C SHEETING |



TYPICAL EXAMPLES

GENERAL NOTES


- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

| | |
|------|--------|
| B | CV-1W |
| C | CV-2W |
| D | CV-3W |
| E | CV-4W |
| Emod | CV-5WR |
| F | CV-6W |
- Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
- Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|--------------------------------------|----------|
| ALUMINUM SIGN BLANKS | DMS-7110 |
| SIGN FACE MATERIALS | DMS-8300 |

| ALUMINUM SIGN BLANKS THICKNESS | |
|--------------------------------|-------------------|
| Square Feet | Minimum Thickness |
| Less than 7.5 | 0.080 |
| 7.5 to 15 | 0.100 |
| Greater than 15 | 0.125 |

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

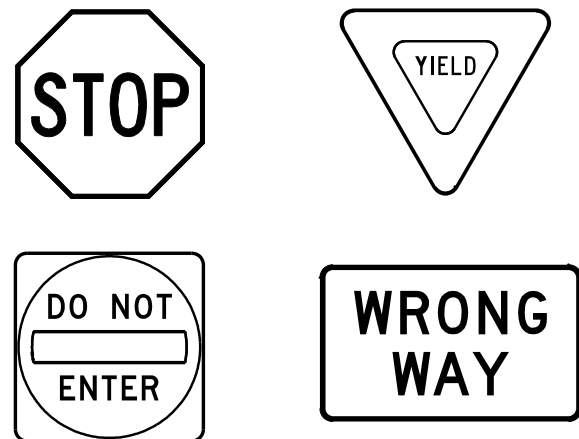
| | | | | | |
|---|--------------|---|----------|---|-----------|
|  | | <i>Texas Department of Transportation</i> | | <i>Traffic Operations Division Standard</i> | |
| <h3>TYPICAL SIGN REQUIREMENTS</h3> | | | | | |
| <h3>TSR(3) - 13</h3> | | | | | |
| FILE: | tsr3-13.dgn | DN: | TxDOT | CK: | TxDOT |
| © TxDOT | October 2003 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | | 1015 | 01 | 023 | FM 3549 |
| 12-03 | 7-13 | DIST | COUNTY | | SHEET NO. |
| 9-08 | | DAL | ROCKWALL | | 285 |

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DATE: FILE:

REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

| SHEETING REQUIREMENTS | | |
|-----------------------|-------|----------------------|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | RED | TYPE B OR C SHEETING |
| BACKGROUND | WHITE | TYPE B OR C SHEETING |
| LEGEND & BORDERS | WHITE | TYPE B OR C SHEETING |
| LEGEND | RED | TYPE B OR C SHEETING |

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

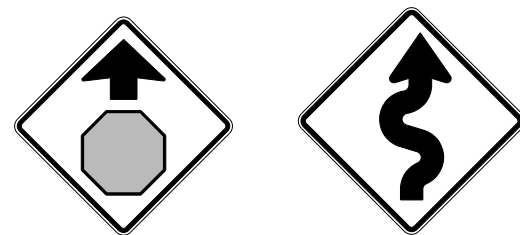
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

| SHEETING REQUIREMENTS | | |
|-----------------------------|------------|-----------------------------|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | WHITE | TYPE A SHEETING |
| BACKGROUND | ALL OTHERS | TYPE B OR C SHEETING |
| LEGEND, BORDERS AND SYMBOLS | BLACK | ACRYLIC NON-REFLECTIVE FILM |
| LEGEND, BORDERS AND SYMBOLS | ALL OTHER | TYPE B OR C SHEETING |

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

| SHEETING REQUIREMENTS | | |
|-----------------------|--------------------|--|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | FLOURESCENT YELLOW | TYPE B _{FL} OR C _{FL} SHEETING |
| LEGEND & BORDERS | BLACK | ACRYLIC NON-REFLECTIVE FILM |
| LEGEND & SYMBOLS | ALL OTHER | TYPE B OR C SHEETING |

REQUIREMENTS FOR SCHOOL SIGNS



TYPICAL EXAMPLES

| SHEETING REQUIREMENTS | | |
|-----------------------------|--------------------------|--|
| USAGE | COLOR | SIGN FACE MATERIAL |
| BACKGROUND | WHITE | TYPE A SHEETING |
| BACKGROUND | FLOURESCENT YELLOW GREEN | TYPE B _{FL} OR C _{FL} SHEETING |
| LEGEND, BORDERS AND SYMBOLS | BLACK | ACRYLIC NON-REFLECTIVE FILM |
| SYMBOLS | RED | TYPE B OR C SHEETING |

GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
- White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
- Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

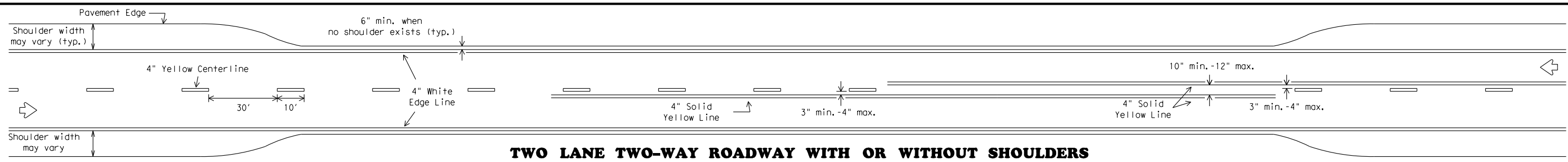
| ALUMINUM SIGN BLANKS THICKNESS | |
|--------------------------------|-------------------|
| Square Feet | Minimum Thickness |
| Less than 7.5 | 0.080 |
| 7.5 to 15 | 0.100 |
| Greater than 15 | 0.125 |

| DEPARTMENTAL MATERIAL SPECIFICATIONS | |
|--------------------------------------|----------|
| ALUMINUM SIGN BLANKS | DMS-7110 |
| SIGN FACE MATERIALS | DMS-8300 |

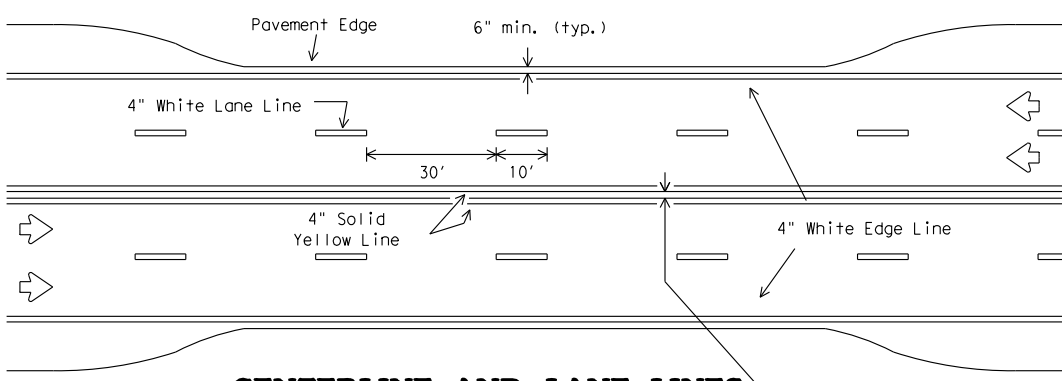
The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

| | | | | | |
|------------------------------------|--------------|-------|----------|---|----------|
| | | | | <i>Traffic Operations Division Standard</i> | |
| <h2>TYPICAL SIGN REQUIREMENTS</h2> | | | | | |
| <h3>TSR(4) - 13</h3> | | | | | |
| FILE: | tsr4-13.dgn | DN: | TxDOT | CK: | TxDOT |
| © TxDOT | October 2003 | CONT: | SECT: | JOB: | HIGHWAY: |
| REVISIONS | | 1015 | 01 | 023 | FM 3549 |
| 12-03 | 7-13 | DIST: | COUNTY: | SHEET NO. | |
| 9-08 | | DAL | ROCKWALL | 286 | |

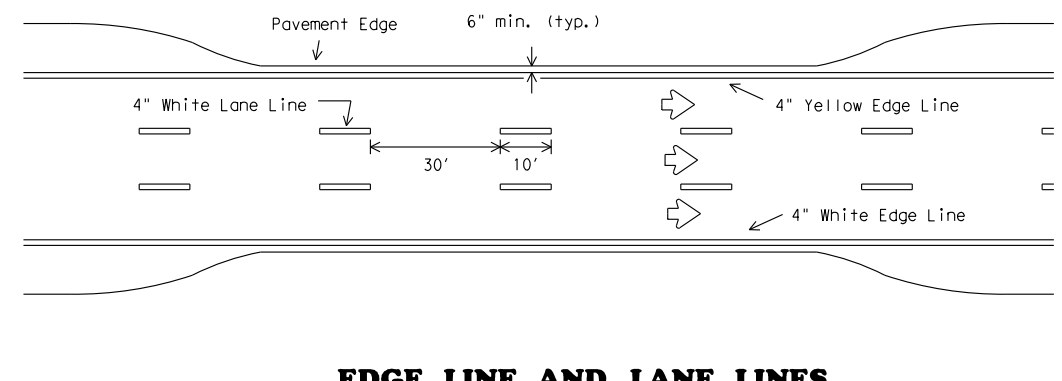
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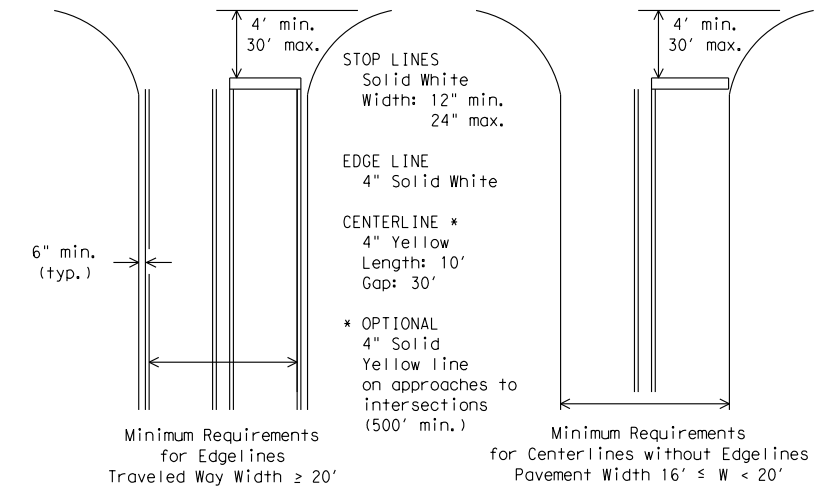
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



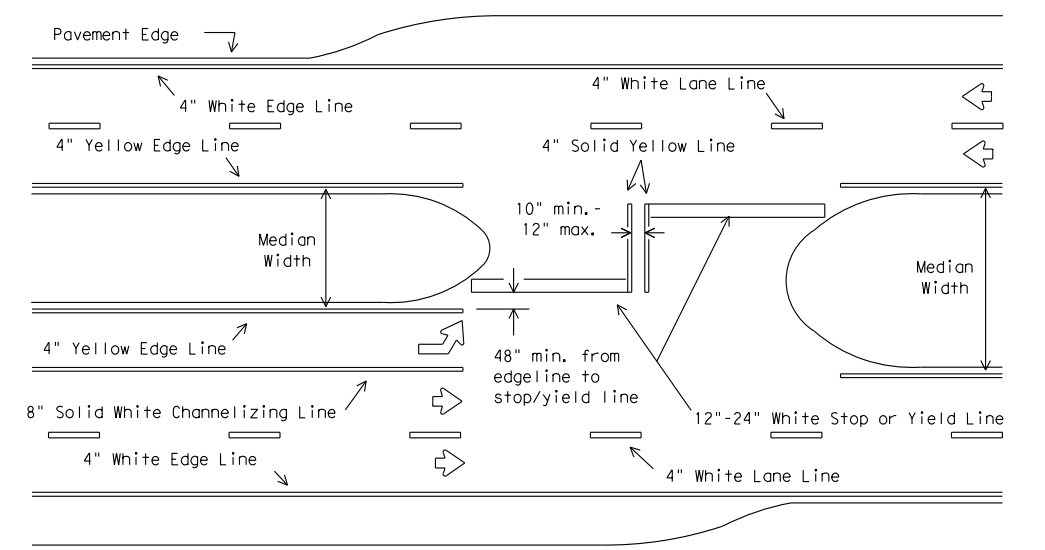
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**

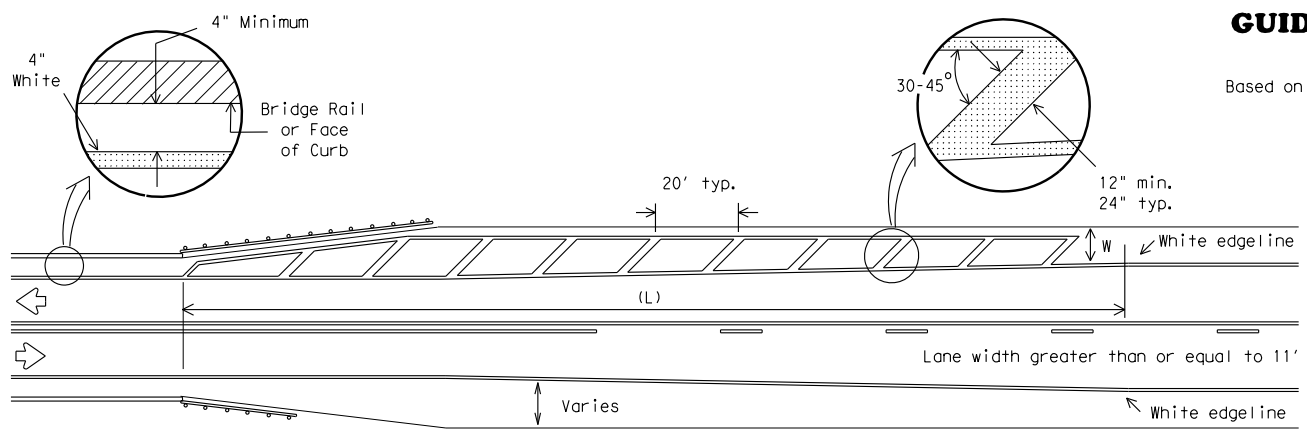


**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**
Based on Traveled Way and Pavement Widths for Undivided Highways



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



- 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)

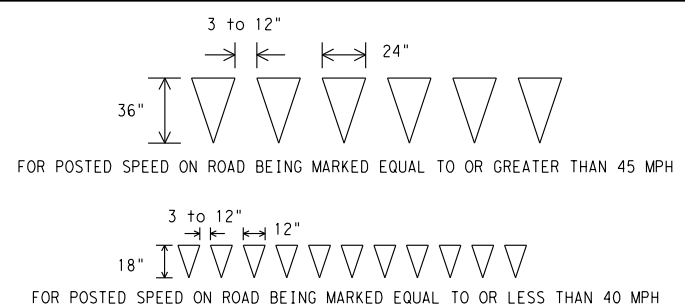
EXAMPLES:
An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the crosshatching should be:
 $L = 8 \times 70 = 560$ ft.
A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the crosshatching should be:
 $L = 4(40)^2 /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

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.



YIELD LINES

Texas Department of Transportation
Traffic Operations Division

**TYPICAL STANDARD
PAVEMENT MARKINGS**

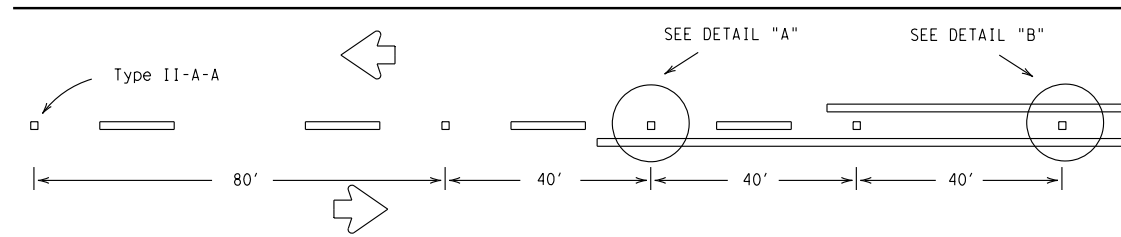
PM(1)-12

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|-----------------------|-----------|-----------|-----------|-----------|
| © TxDOT November 1978 | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT |
| REVISIONS | CONT | SECT | JOB | HIGHWAY |
| 8-95 2-12 | 1015 | 01 | 023 | FM 3549 |
| 5-00 | DIST | COUNTY | | SHEET NO. |
| 8-00 | DAL | ROCKWALL | | 287 |
| 3-03 | | | | |

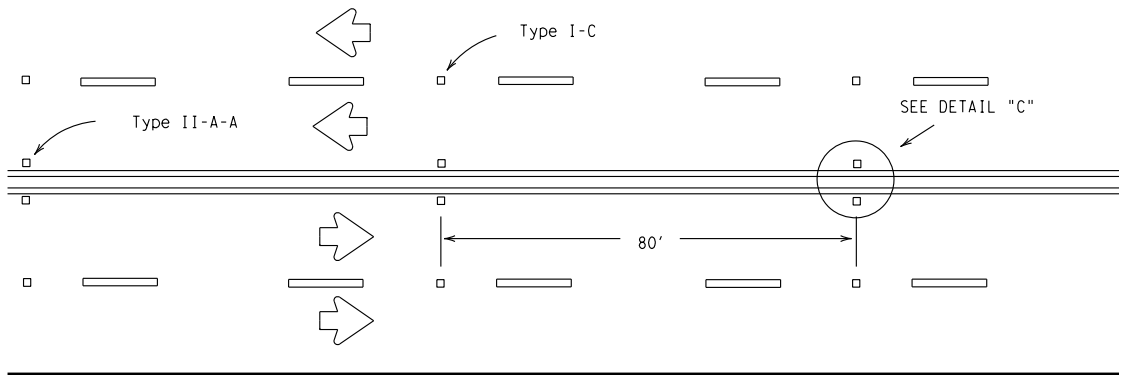
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REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

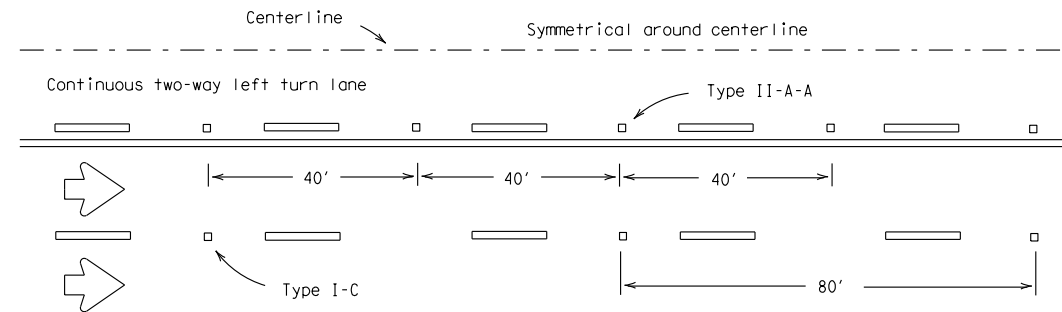


CENTERLINE FOR ALL TWO LANE ROADWAYS

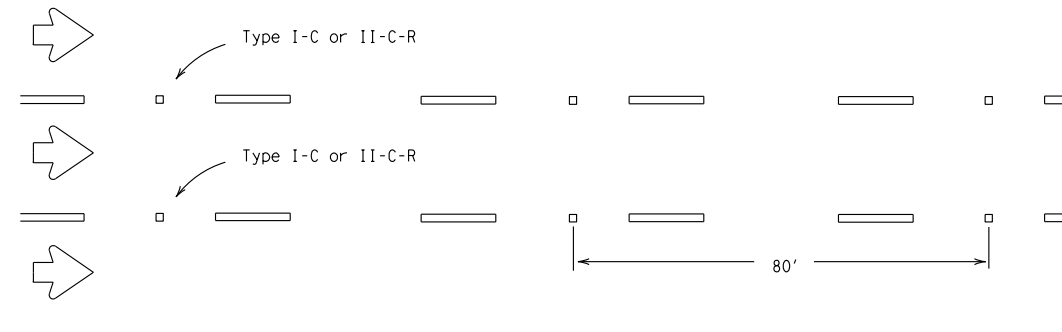


**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS**

Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.

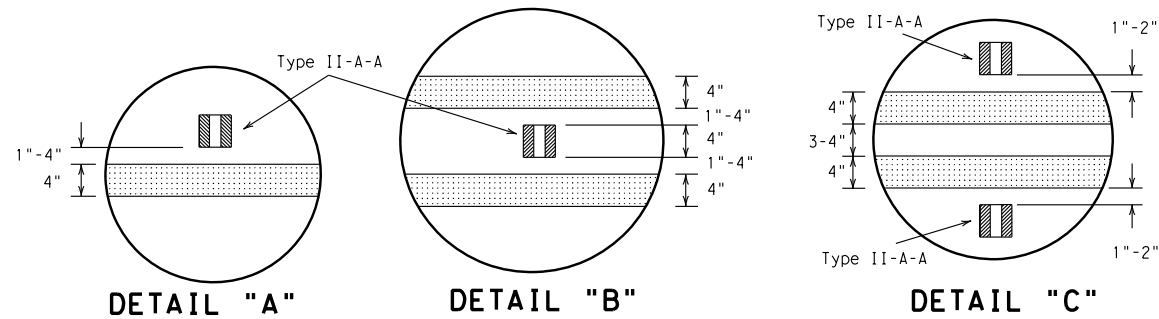


CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



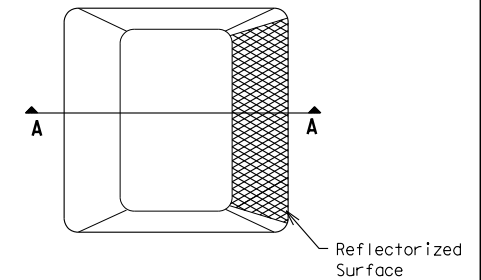
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

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

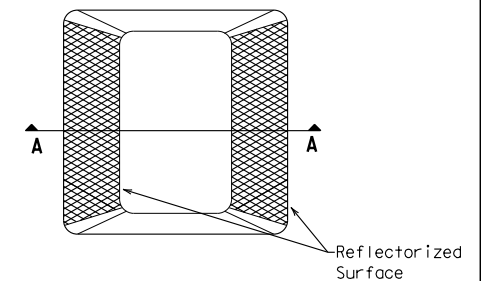


| MATERIAL SPECIFICATIONS | |
|---|----------|
| PAVEMENT MARKERS (REFLECTORIZED) | DMS-4200 |
| EPOXY AND ADHESIVES | DMS-6100 |
| BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS | DMS-6130 |
| TRAFFIC PAINT | DMS-8200 |
| HOT APPLIED THERMOPLASTIC | DMS-8220 |
| PERMANENT PREFABRICATED PAVEMENT MARKINGS |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

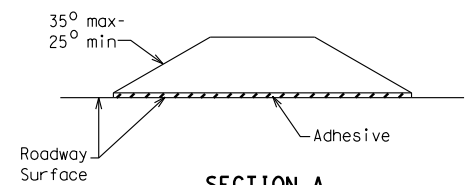
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

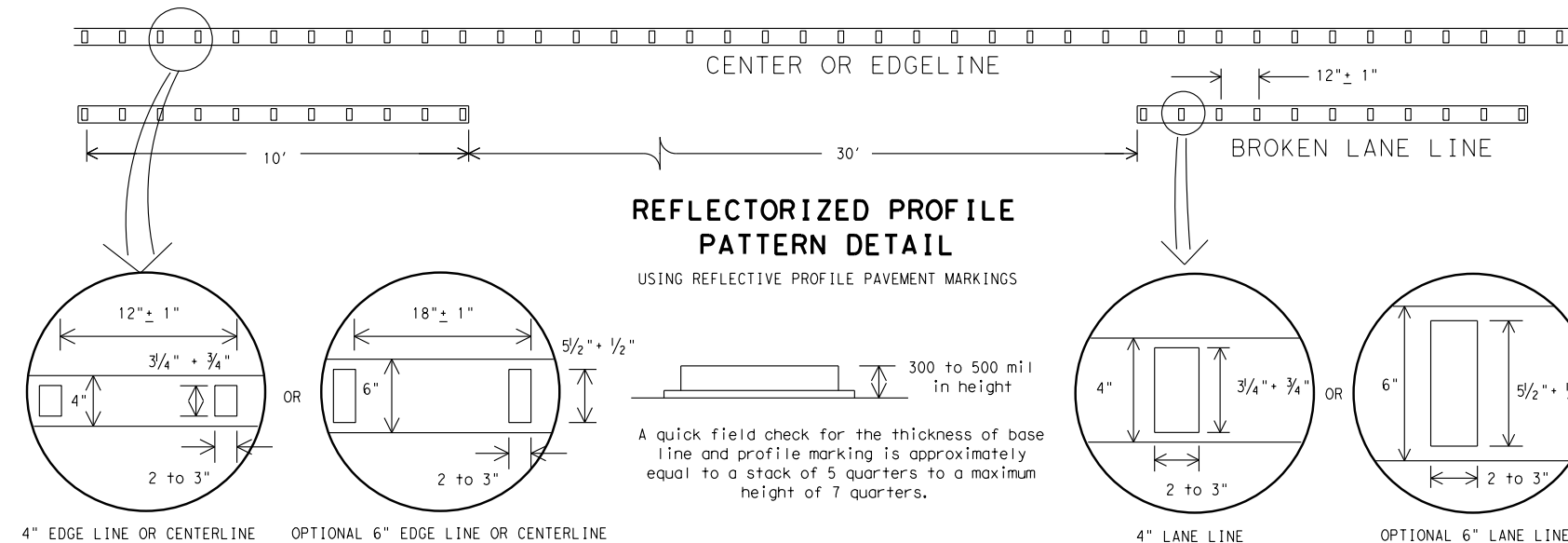


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE:

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

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.

Texas Department of Transportation
Traffic Operations Division

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

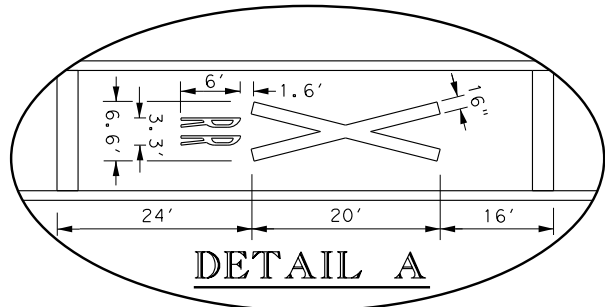
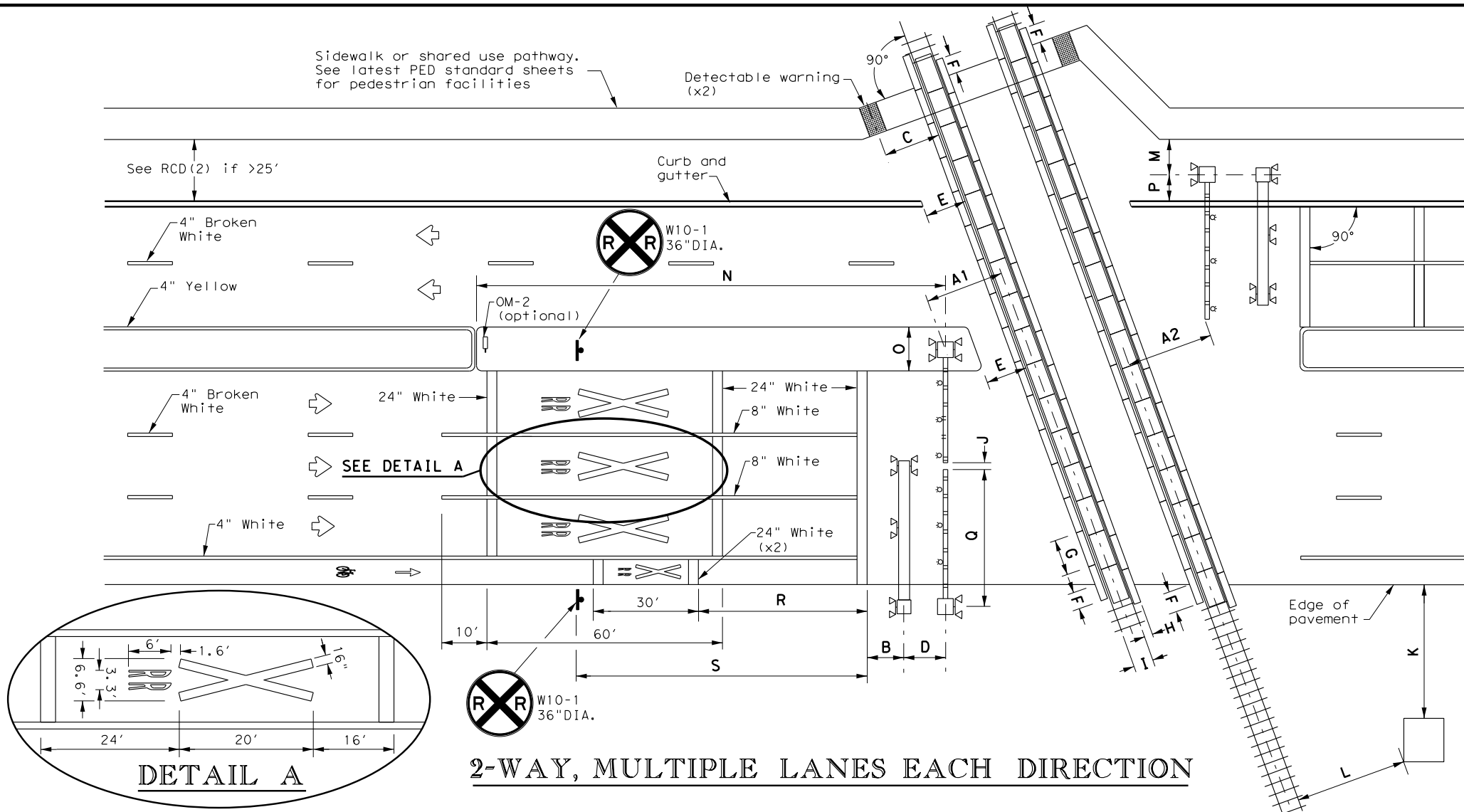
PM(2) - 12

| | | | | | |
|--------------------|------|-----------|-----------|-----------|------------|
| © TxDOT April 1977 | | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| REVISONS | | | | | |
| 4-92 | 2-10 | CONT | SECT | JOB | HIGHWAY |
| 5-00 | 2-12 | 1015 | 01 | 023 | FM 3549 |
| 8-00 | | DIST | | COUNTY | SHEET NO. |
| 2-08 | | DAL | | ROCKWALL | 288 |

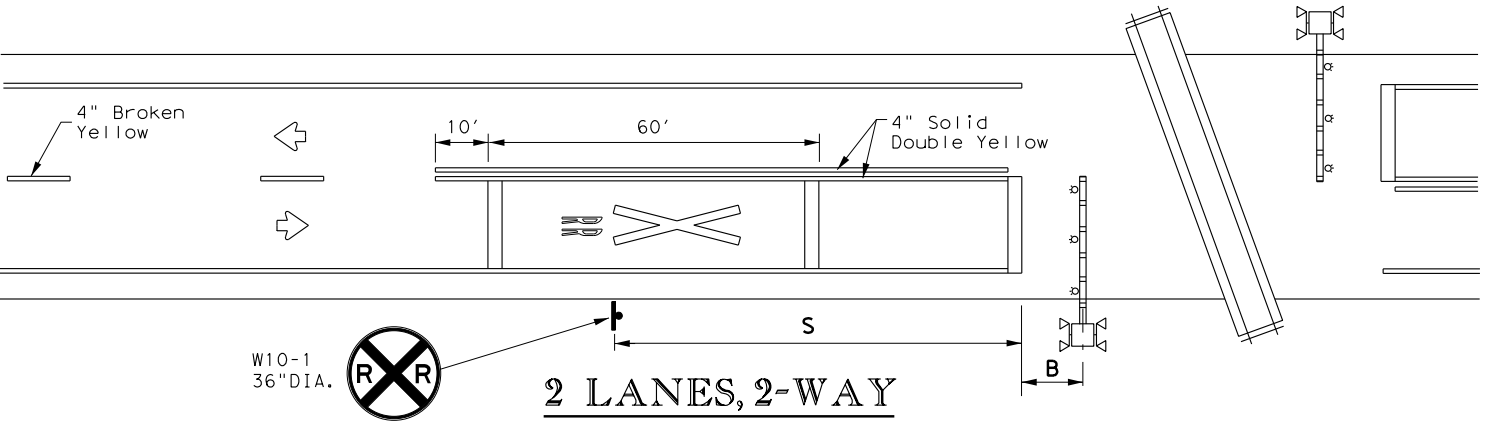
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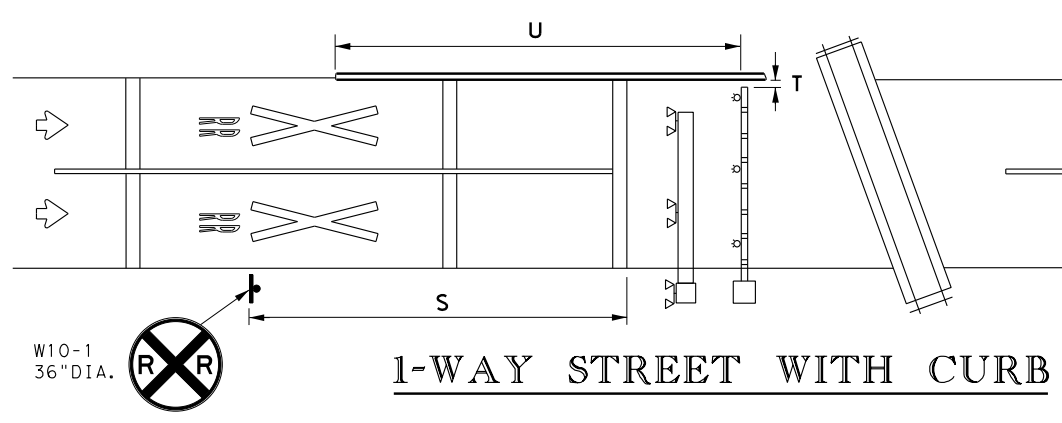
DATE: FILE:



2-WAY, MULTIPLE LANES EACH DIRECTION



2 LANES, 2-WAY



1-WAY STREET WITH CURB

- NOTES**
- T: Tip of gate to edge of curb: 1' max for Quiet Zone SSM, 90% of traveled way covered by gates for all other locations
 - U: Non-traversable curb length from gate: 100' min. for a Quiet Zone SSM, 10' min for all other locations.

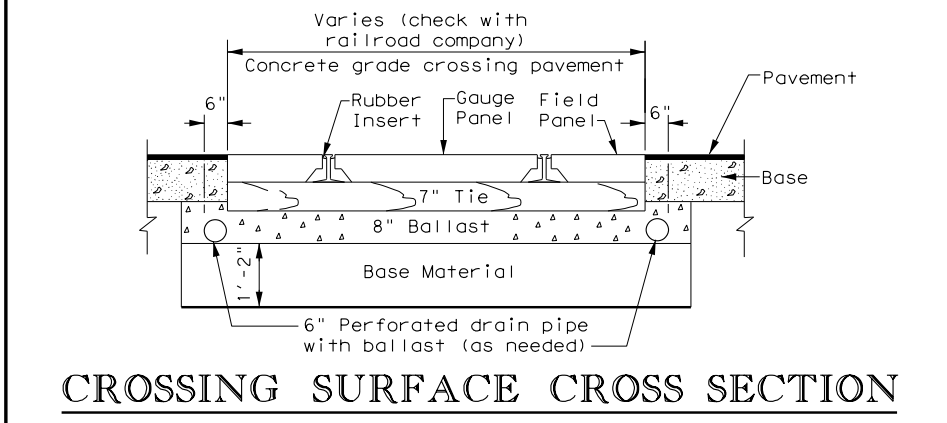
TABLE 1

| Approach Speed (mph) | Desirable Placement (feet) |
|----------------------|----------------------------|
| 20 | 100 |
| 25 | 100 |
| 30 | 100 |
| 35 | 100 |
| 40 | 125 |
| 45 | 175 |
| 50 | 250 |
| 55 | 325 |
| 60 | 400 |
| 65 | 475 |
| 70 | 550 |
| 75 | 650 |

LEGEND

| | |
|--|-------------------|
| | Sign |
| | Object Marker |
| | Traffic Flow |
| | Cantilever |
| | Gate Assembly |
| | Mast Flasher Pair |

- GENERAL NOTES**
- Medians and curbs must be non-traversable to qualify as a Quiet Zone Supplementary Safety Measure (SSM). Non-traversable curbs in Quiet Zones are 6" tall minimum and used on roadways where speed does not exceed 40 mph.
 - Raised pavement markers may be used to supplement striping. See PM(2) and PM(3) standard sheets.
 - Medians preferred whenever possible to prevent vehicles from driving around gates.
 - Longitudinal edge striping may be continued thru crossing as needed. Illumination may also be considered for nighttime visibility.
 - See SMD standard sheets for sign mounting details.
 - See the Standard Highway Sign Design for Texas (SHSD) manual for sign and pavement marking details.



CROSSING SURFACE CROSS SECTION

NOTES

- A1: Center of RR mast to center of rail: 12' minimum, 15' typical.
- A2: Tip of gate to center of rail: 12' minimum, 15' typical.
- B: Center of mast (cantilever, gate, or mast flasher) of nearest active traffic control device to stop line: 8' (NOTE: Stop line may be moved as needed, but should be at least 8' back from gates, if present).
- C: Center of detectable warning device to nearest rail: 6' minimum
- D: Center of gate mast to center of cantilever mast: 6' typical. NOTE: Cantilever may be located in front or behind gates.
- E: Edge of median or curb to nearest rail: 10' typical. NOTE: Design median edge to be parallel with rail.
- F: Edge of planking panel from edge of pavement or sidewalk: 3' minimum. NOTE: Field panels need not be in line with gauge panels.
- G: Length of panels along rail: 8' typical.
- H: Width of field panel: 2' typical (check with railroad company).
- I: Distance between rails: 4'-8.5".
- J: Tip of gate to tip of gate: 2' maximum for Quiet Zone SSM or 90% of traveled way covered by gates for all other locations.
- K: Nearest edge of RR cabin from edge of pavement: 30' typical. NOTE: Cabinet not required to be parallel to edge of pavement.
- L: Nearest edge of RR cabin from nearest rail: 25' typical.
- M: Center of RR mast to edge of sidewalk: 6' minimum.
- N: Center of gate mast to leading edge of non-traversable median: 100' minimum to qualify as a Quiet Zone SSM. NOTE: 60' will suffice if there is a street intersection within the 100' and all street intersections within 60' are closed.
- O: Width of median: 8'-6" minimum, 10' typical when using median gates. NOTE: Center of gate mast minimum 4'-3" from face of curb.
- P: Center of RR mast to face of curb: 4'-3" minimum. Center of RR mast to edge of pavement (with shoulder): 6' minimum. Center of RR mast to edge of pavement (no shoulder): 8'-3" minimum. NOTE: BNSF prefers 5'-3", 7', and 9'-3" minimums, respectively.
- Q: Gate length: 28' or less typical, but railroad company may allow up to 32' under special circumstances.
- R: Stop line to first RR Crossing transverse line (bike lane): 50' typical.
- S: Stop line to GRADE CROSSING ADVANCE WARNING (W10-1) sign and adjacent RR Crossing pavement markings. See Table 1. See RCD(2) for other signs.

Texas Department of Transportation Traffic Operations Division Standard

RAILROAD CROSSING DETAILS
SIGNING, STRIPING, AND DEVICE PLACEMENT
RCD(1)-16

| | | | | |
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| FILE: rcd1-16.dgn | DN: TxDOT | CK: TxDOT | DW: TxDOT | CK: TxDOT |
| © TxDOT FEBRUARY 2016 | CONT | SECT | JOB | HIGHWAY |
| REVISIONS | 1015 | 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 289 | |

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

Post Type

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

Number of Posts (1 or 2)

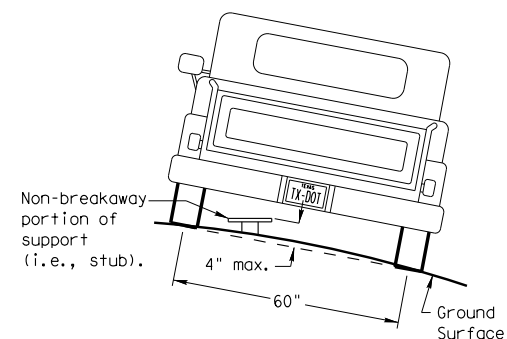
Anchor Type

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

Sign Mounting Designation

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

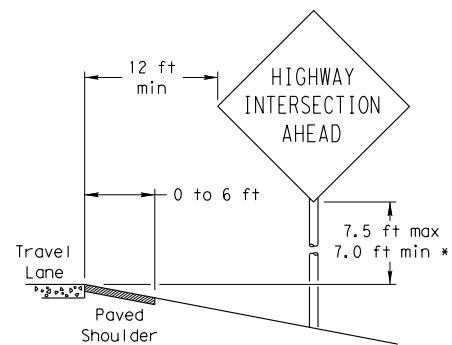
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



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

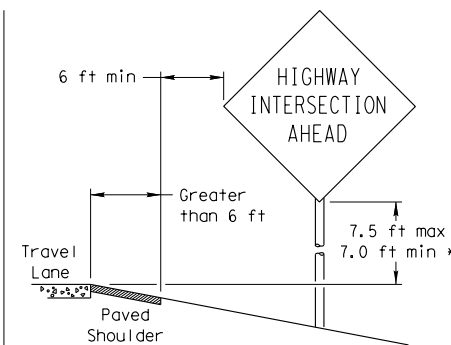
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

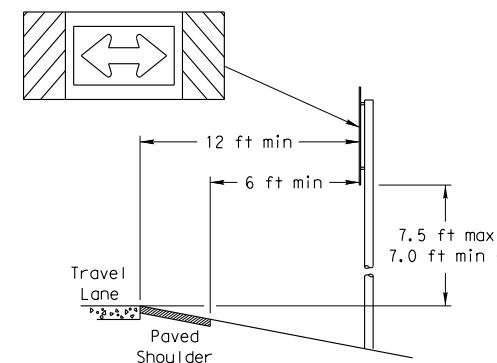
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



GREATER THAN 6 FT. WIDE

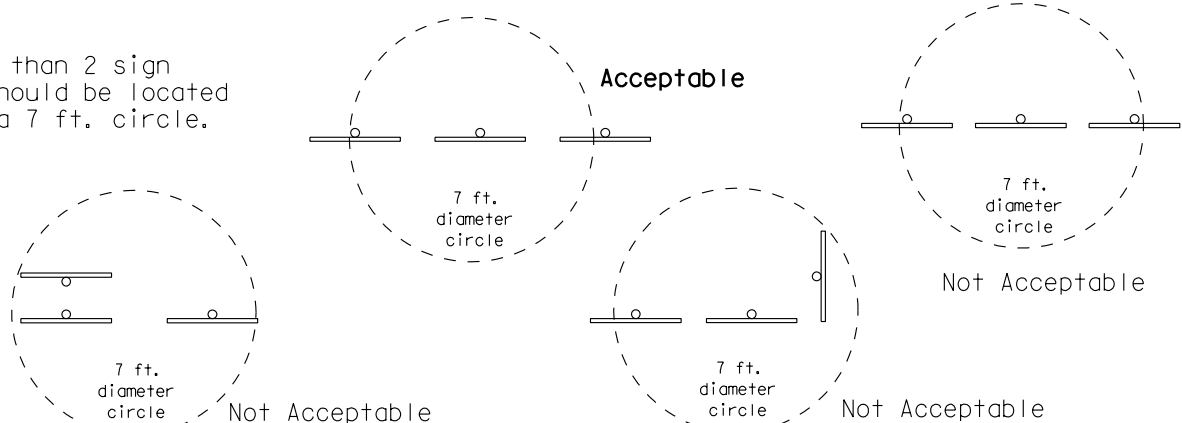
When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

T-INTERSECTION

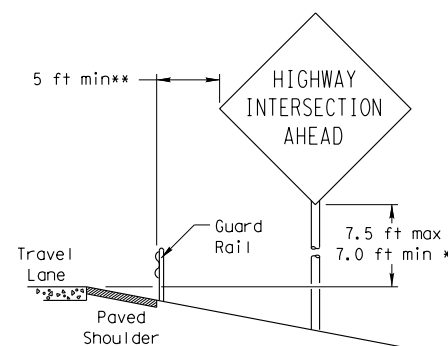


When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

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

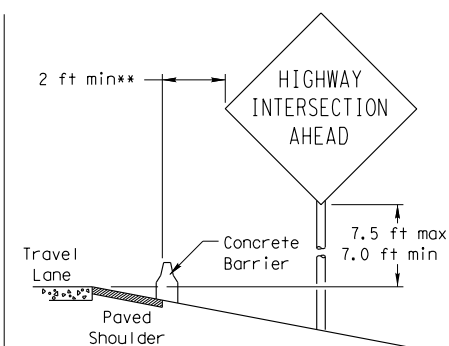


BEHIND BARRIER



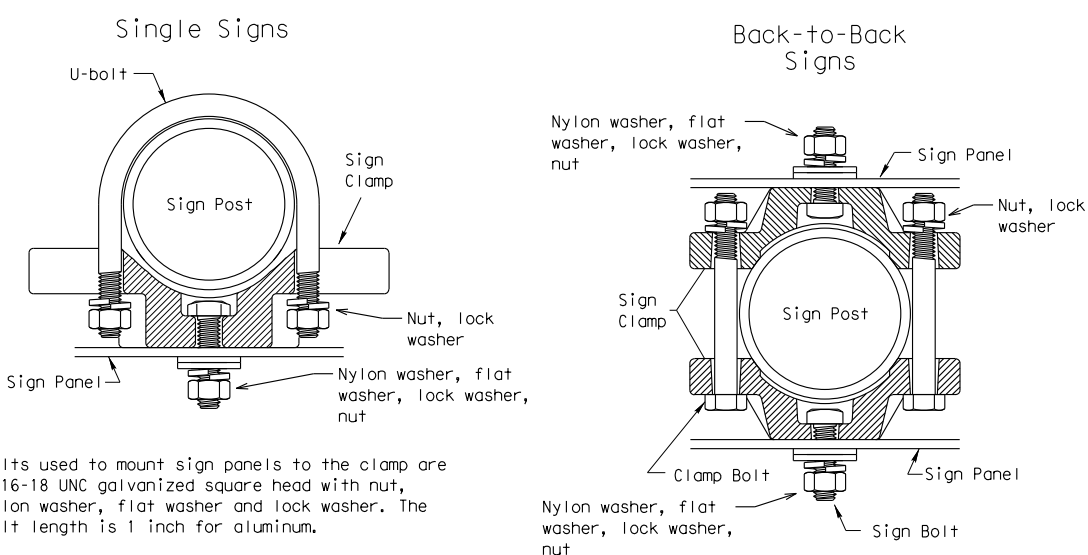
BEHIND GUARDRAIL

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



BEHIND CONCRETE BARRIER

TYPICAL SIGN ATTACHMENT DETAIL



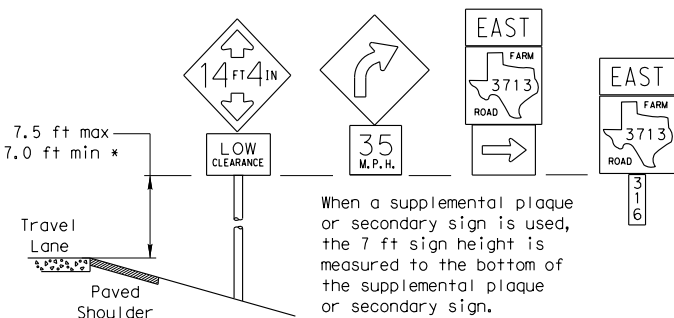
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

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.

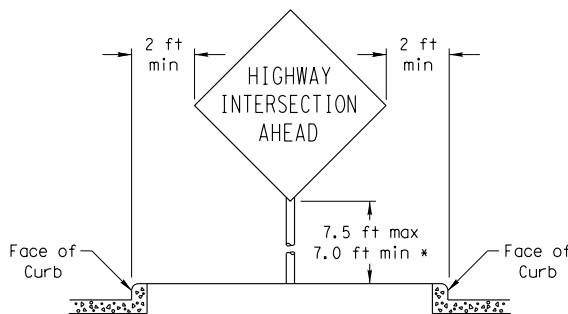
| Pipe Diameter | Approximate Bolt Length | |
|----------------|-------------------------|-----------------|
| | Specific Clamp | Universal Clamp |
| 2" nominal | 3" | 3 or 3 1/2" |
| 2 1/2" nominal | 3 or 3 1/2" | 3 1/2 or 4" |
| 3" nominal | 3 1/2 or 4" | 4 1/2" |

SIGNS WITH PLAQUES

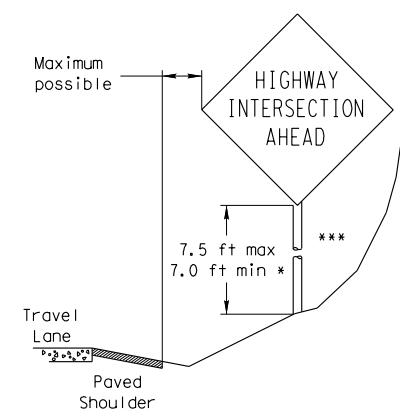


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



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

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

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

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

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

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

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

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



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

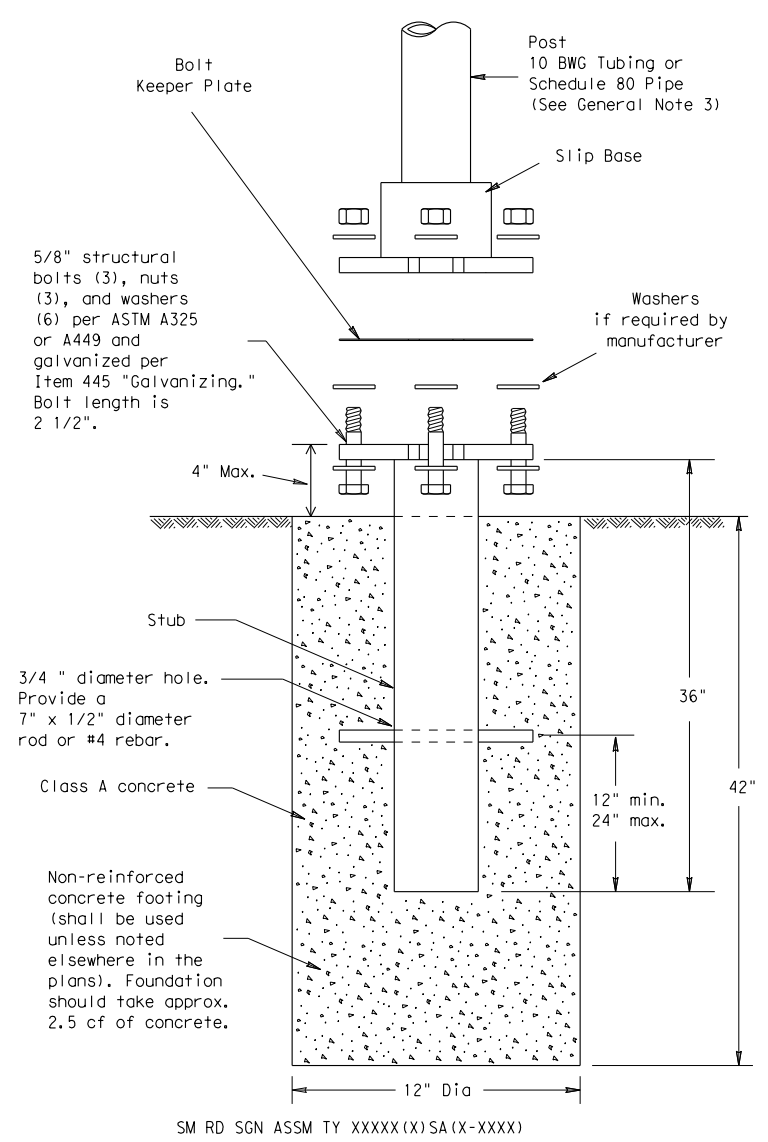
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| 9-08 | REVISIONS | CONT | SECT | JOB | HIGHWAY |
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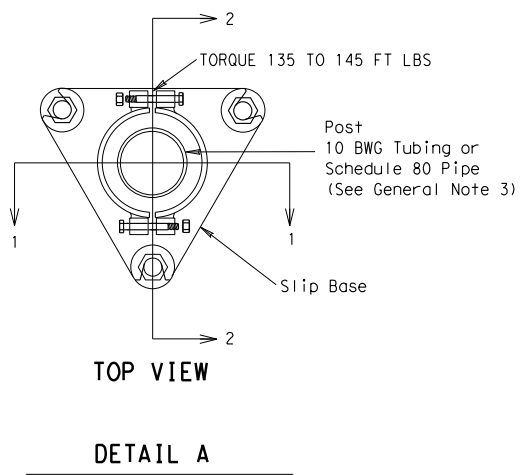
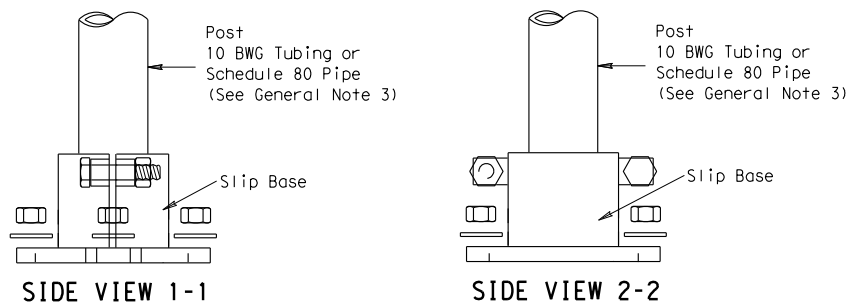
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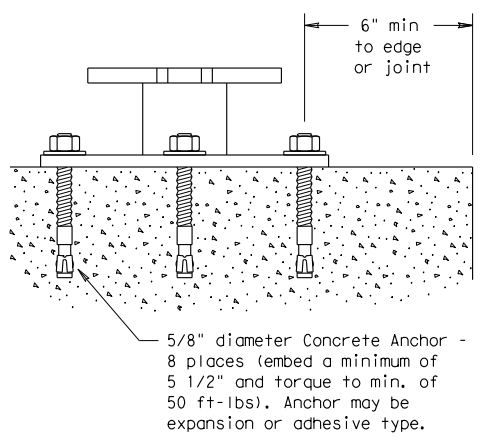
TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE
 The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.



CONCRETE ANCHOR



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

GENERAL NOTES:

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


ASSEMBLY PROCEDURE

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

Support

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

ADDED DETAIL A FOR CLAMP BASE
 10-2010



Texas Department of Transportation
 Dallas District Standard

SIGN MOUNTING DETAILS

SMALL ROADSIDE SIGNS

TRIANGULAR SLIPBASE SYSTEM

SMD (SLIP-1) -08 (DAL)

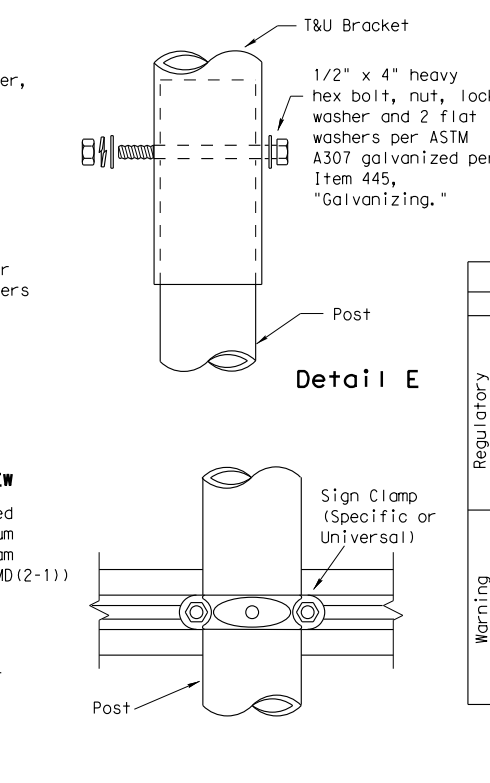
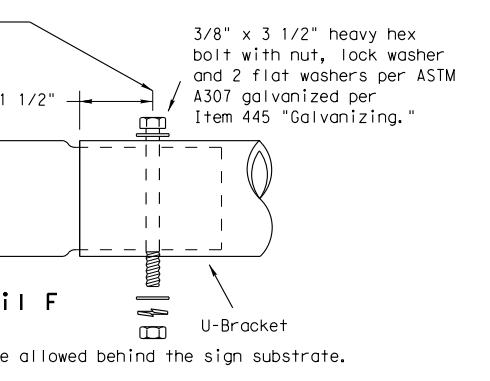
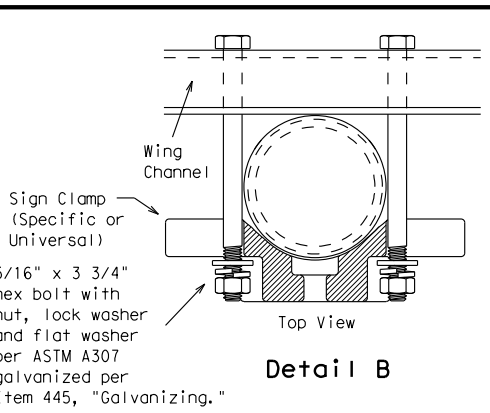
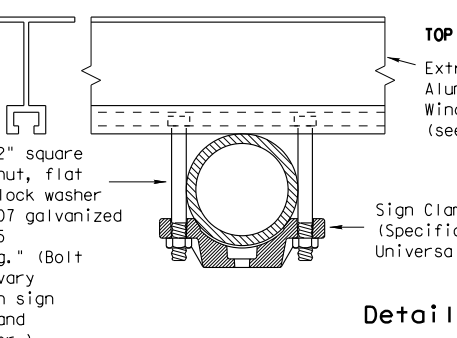
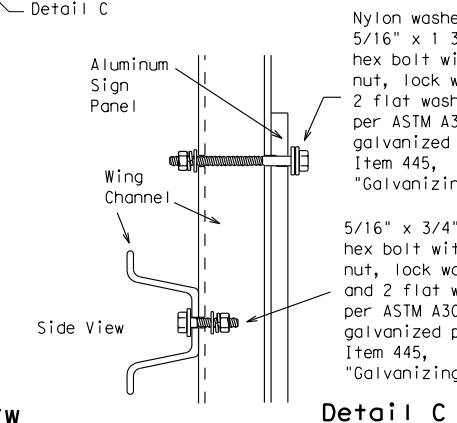
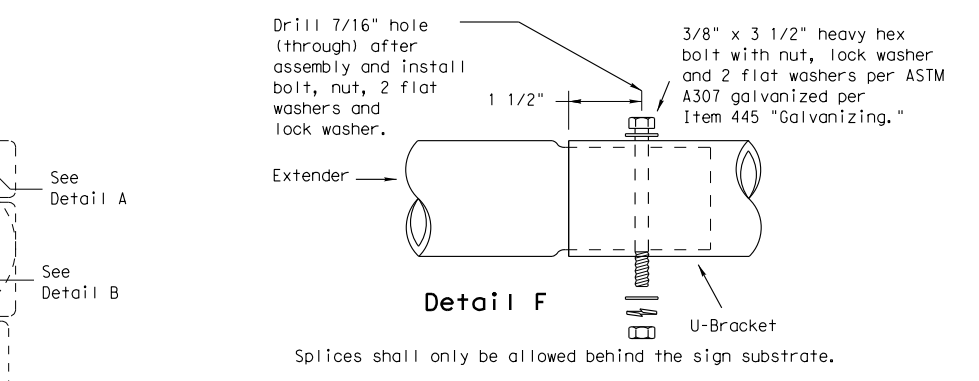
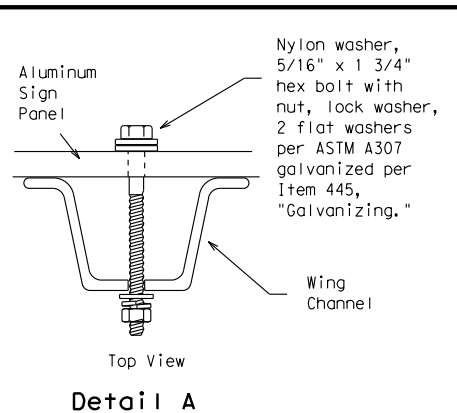
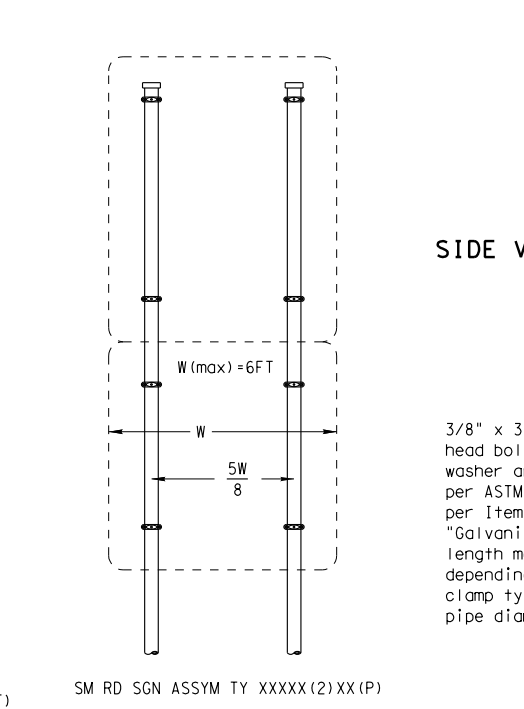
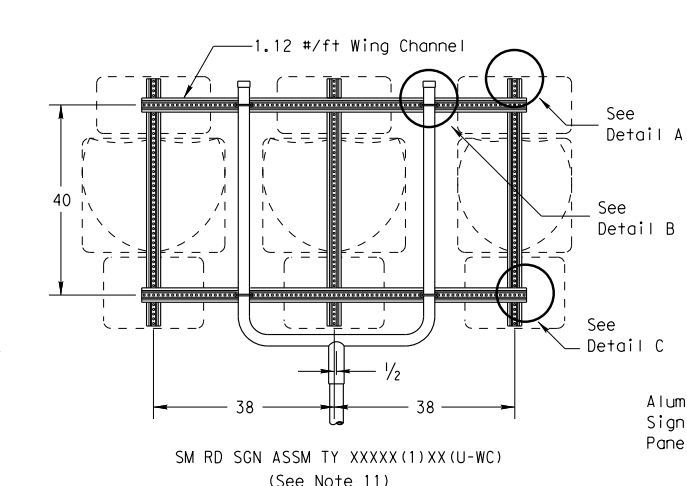
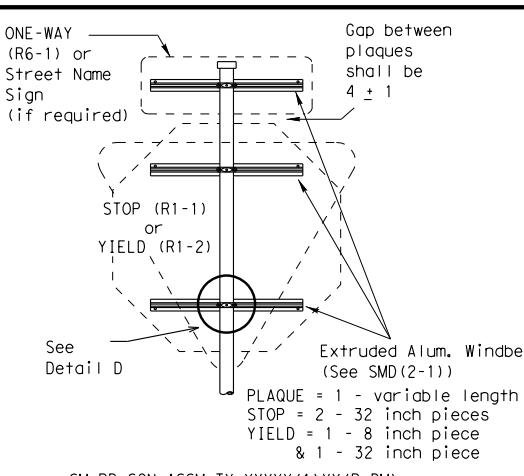
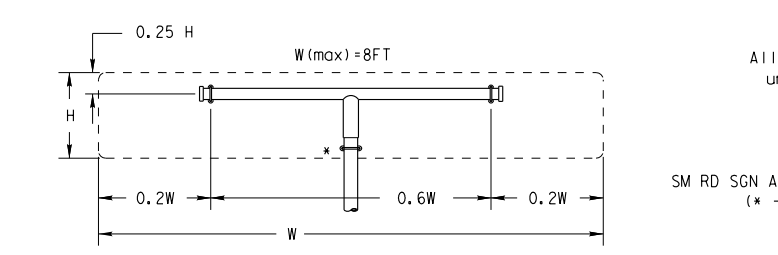
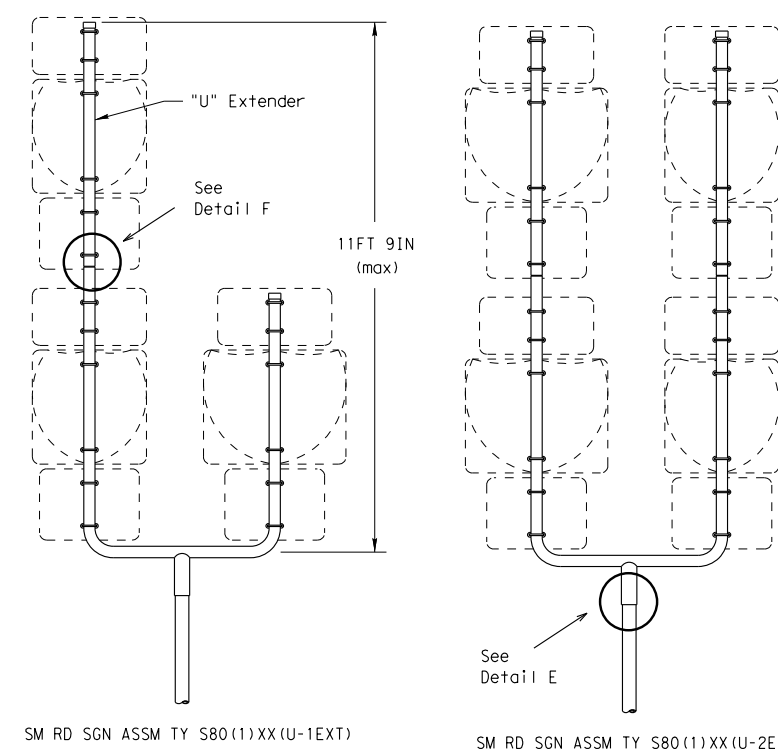
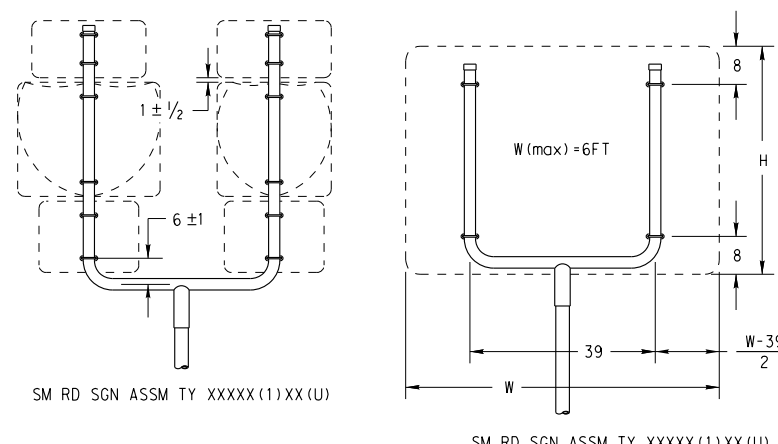
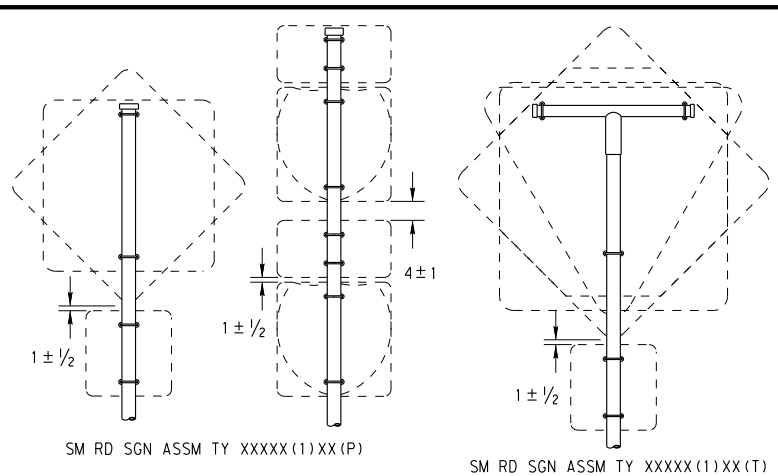
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| 9-08 | REVISIONS | CONT | SECT | JOB | HIGHWAY |
| 12-10 (DISTRICT) | | 1015 | 01 | 023 | FM 3549 |
| ADDED CLAMP BASE | | DIST | | COUNTY | SHEET NO. |
| DETAIL FOR SLIP | | DAL | | ROCKWALL | 291 |
| BASE INSTALLATION | | | | | |

26B

DATE:
FILE:

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All dimensions are in english unless detailed otherwise.

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

GENERAL NOTES:

- | 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 |
- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- 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.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

| 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) |
| Warning | 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) | |

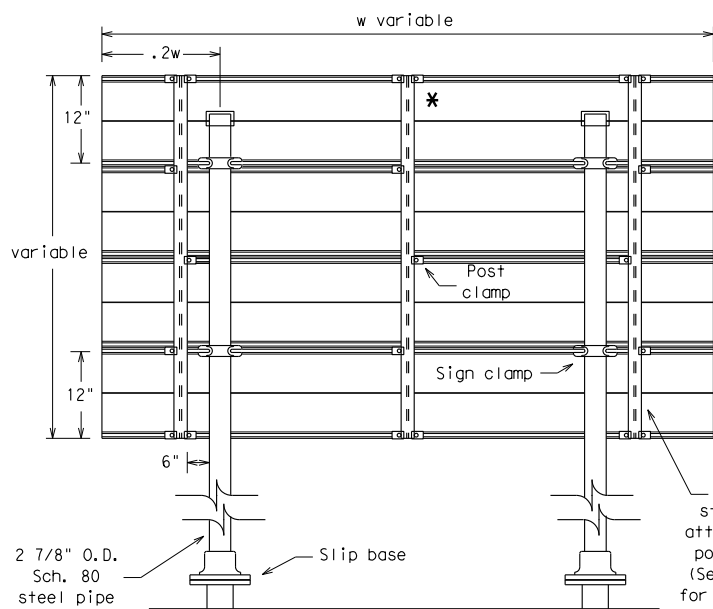
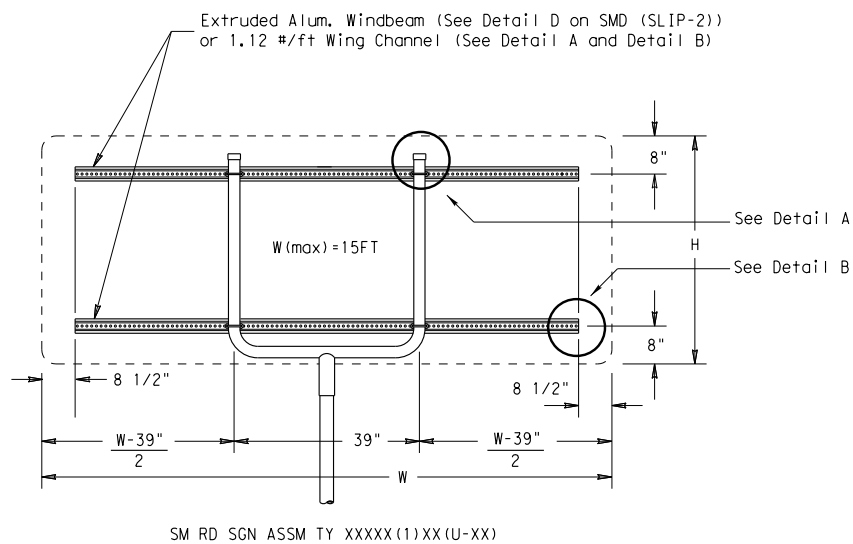
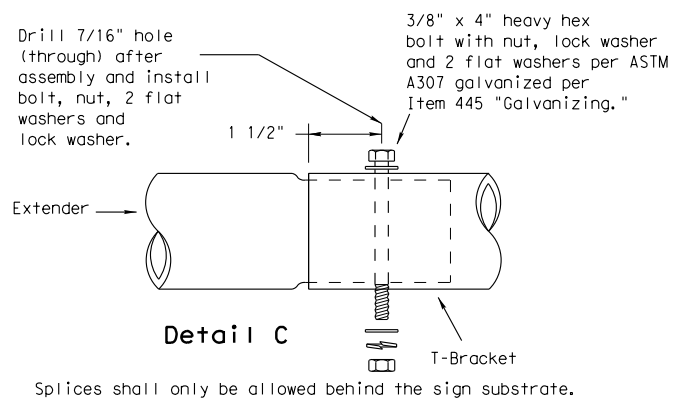
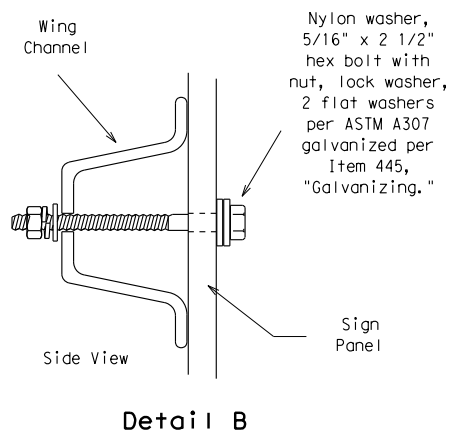
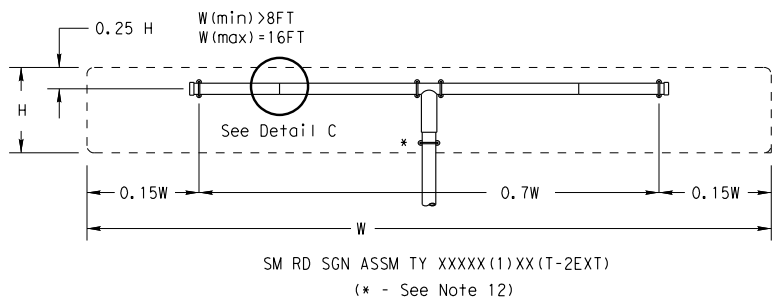
Texas Department of Transportation
 Traffic Operations Division

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

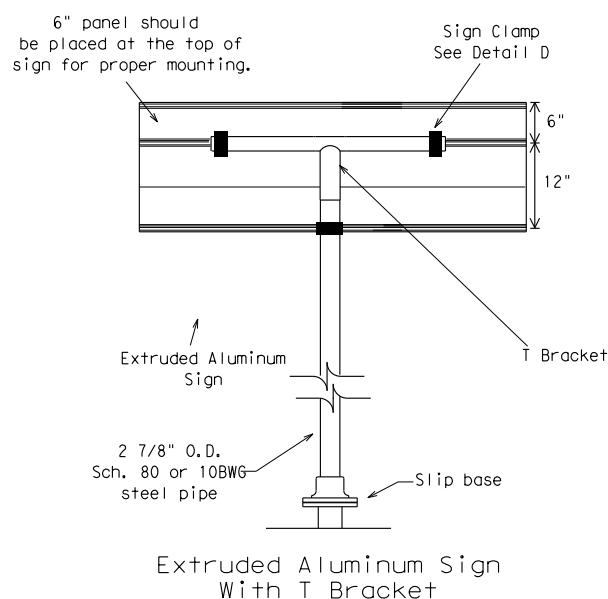
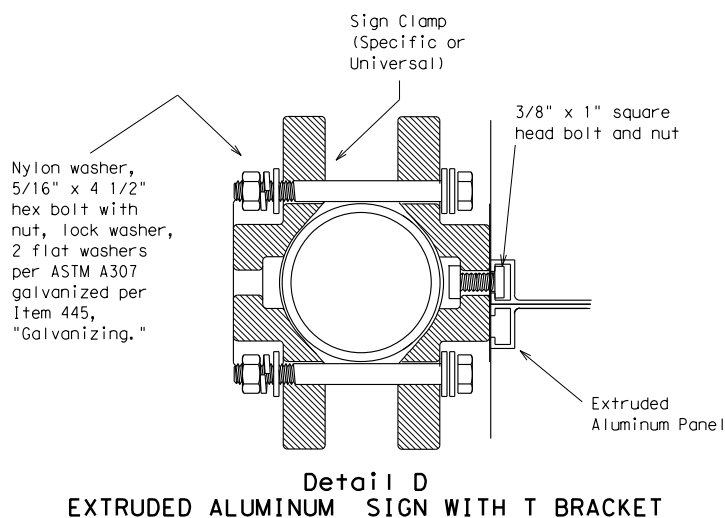
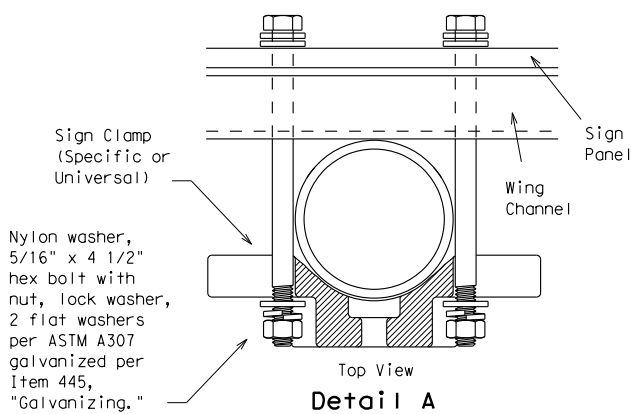
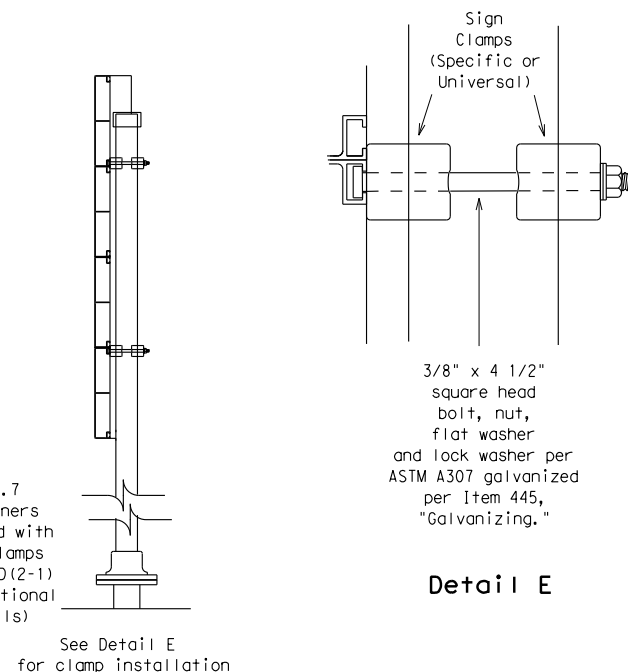
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| | | DIST | COUNTY | SHEET NO. |
| | | DAL | ROCKWALL | 292 |

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* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.



Use Extruded Alum. Windbeam as stiffeners See SMD (2-1) for additional details
 See Detail E for clamp installation

GENERAL NOTES:

- | 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 |
- 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.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- 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.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- 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.
- 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.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- 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."
- Sign blanks shall be the sizes and shapes shown on the plans.
- 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.
- 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) | |



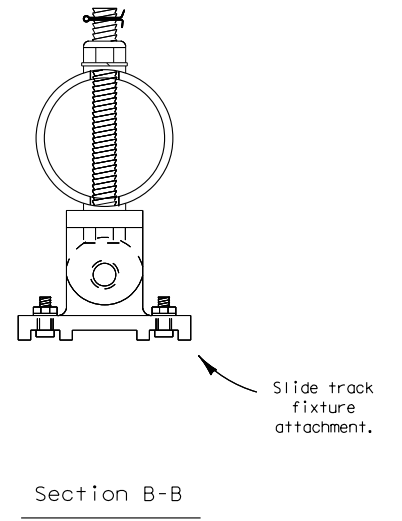
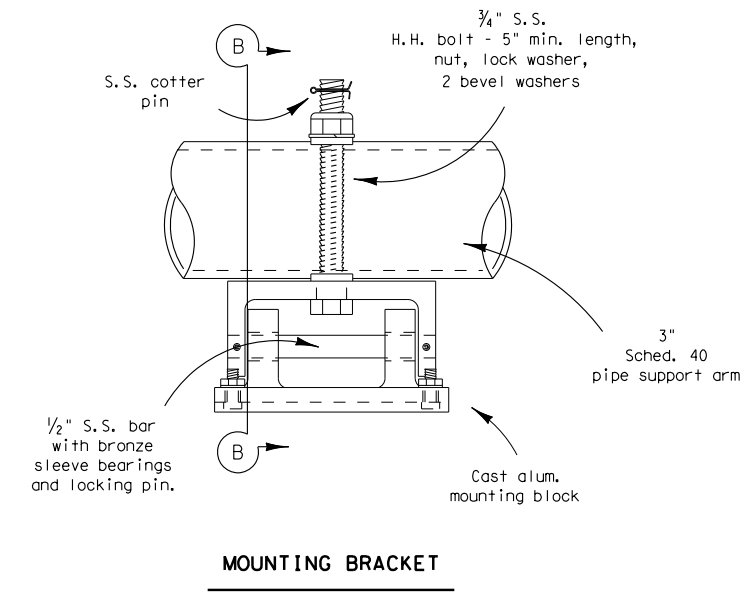
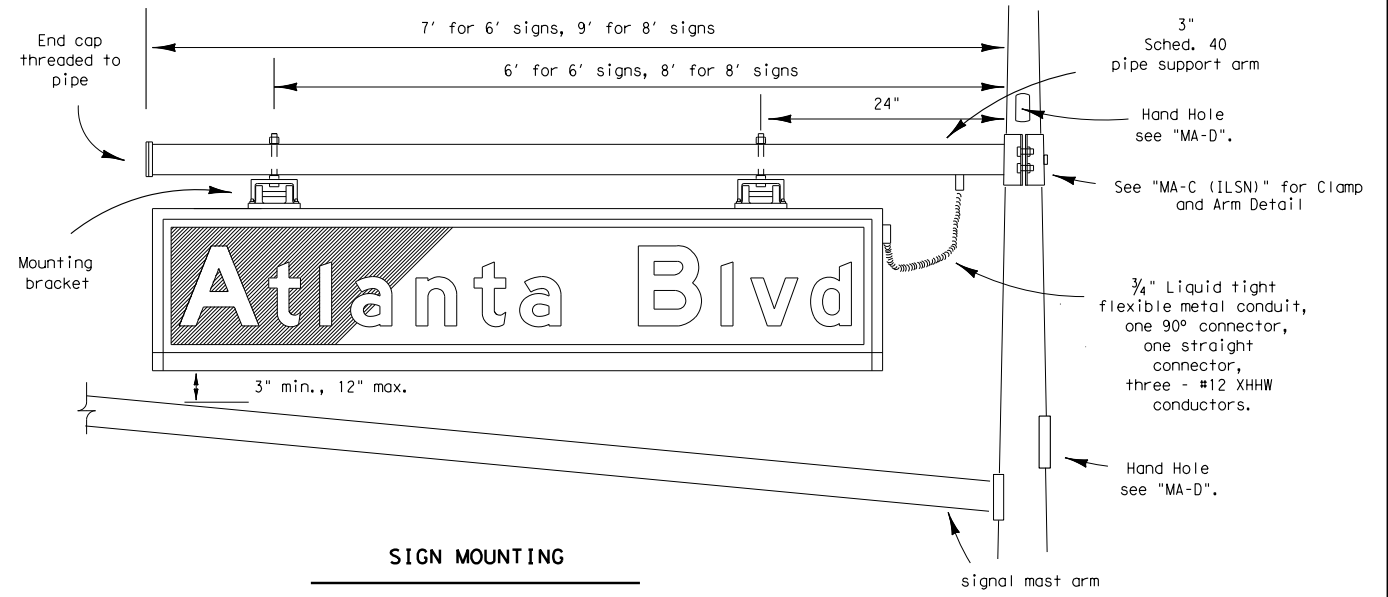
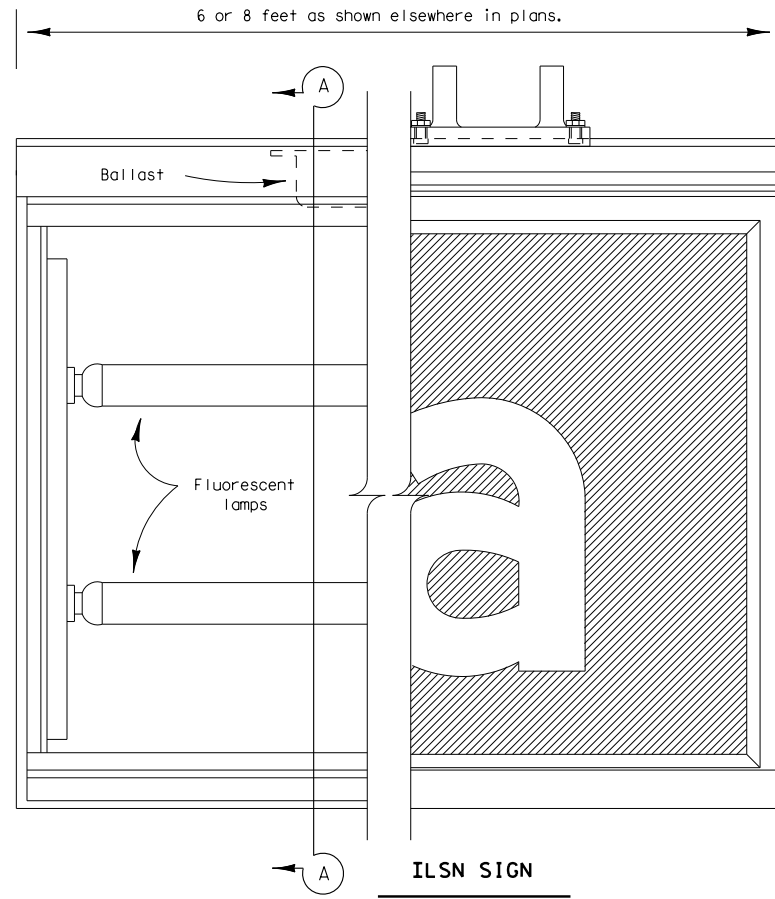
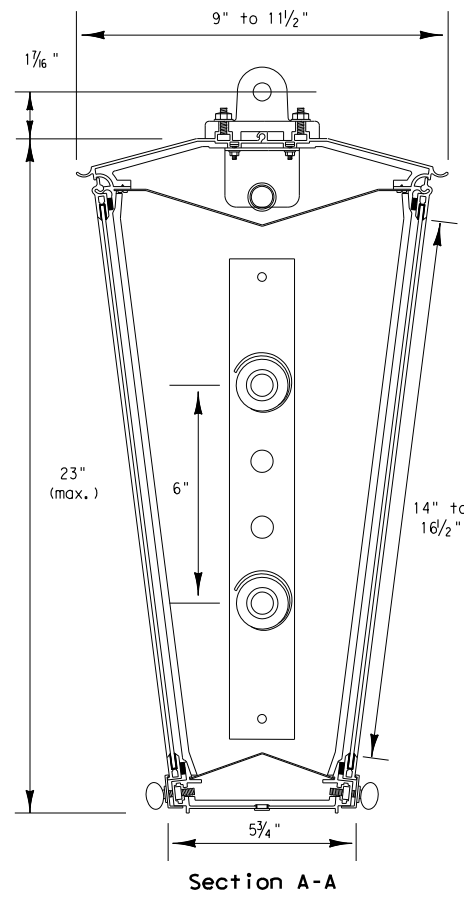
**SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-3) -08**

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| | | 1015 | 01 | 023 | FM 3549 |
| | | DIST | COUNTY | | SHEET NO. |
| | | DAL | ROCKWALL | | 293 |

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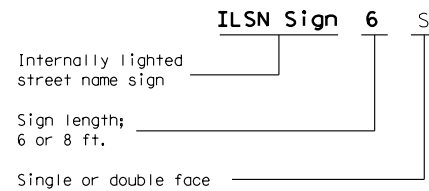
INTERNALLY LIGHTED STREET NAME SIGN DETAILS



ILSN SIGN NOTES:

1. Eight foot ILSN sign shall not exceed 11.5 sq.ft. effective projected area (EPA) and shall not exceed a weight of 85 lbs.
 Six foot ILSN sign shall not exceed 8.7 sq.ft. EPA and shall not exceed a weight of 70 lbs.
2. Sign message shall be as shown elsewhere in the plans.
3. See Special Specification, "Internally Lighted Street Name Signs" for additional details.

EXPLANATION OF DESCRIPTION



Texas Department of Transportation
 Traffic Operations Division

STREET NAME SIGN DETAILS (ILLUMINATED)

SNS-95

| | | | | | |
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| CONTRACT | SECTION | JOB | HIGHWAY | | |
| 1015 | 01 | 023 | FM 3549 | | |
| DISTRICT | COUNTY | | SHEET NO. | | |
| DAL | ROCKWALL | | 294 | | |

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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 Rockwall MS4, Phase II- Jeremy White, P.E. (972) 772-6791

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 | Sedimentation | Post-Construction TSS |
|--|--|--|
| <input type="checkbox"/> Temporary Vegetation | <input type="checkbox"/> Silt Fence | <input type="checkbox"/> Vegetative Filter Strips |
| <input type="checkbox"/> Blankets/Matting | <input type="checkbox"/> Rock Berm | <input type="checkbox"/> Retention/Irrigation Systems |
| <input type="checkbox"/> Mulch | <input type="checkbox"/> Triangular Filter Dike | <input type="checkbox"/> Extended Detention Basin |
| <input type="checkbox"/> Sodding | <input type="checkbox"/> Sand Bag Berm | <input type="checkbox"/> Constructed Wetlands |
| <input type="checkbox"/> Interceptor Swale | <input type="checkbox"/> Straw Bale Dike | <input type="checkbox"/> Wet Basin |
| <input type="checkbox"/> Diversion Dike | <input type="checkbox"/> Brush Berms | <input type="checkbox"/> Erosion Control Compost |
| <input type="checkbox"/> Erosion Control Compost | <input type="checkbox"/> Erosion Control Compost | <input type="checkbox"/> Mulch Filter Berm and Socks |
| <input type="checkbox"/> Mulch Filter Berm and Socks | <input type="checkbox"/> Mulch Filter Berm and Socks | <input type="checkbox"/> Compost Filter Berm and Socks |
| <input type="checkbox"/> Compost Filter Berm and Socks | <input type="checkbox"/> Compost Filter Berm and Socks | <input type="checkbox"/> Vegetation Lined Ditches |
| | <input type="checkbox"/> Stone Outlet Sediment Traps | <input type="checkbox"/> Sand Filter Systems |
| | <input type="checkbox"/> Sediment Basins | <input type="checkbox"/> 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. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA-TU and MOU.

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. 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.

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

No Action Required Required Action

Action No.

Whooping crane, Red wolf and Piping plover are listed for Rockwall County as threatened or endangered species. No potential habitat for federally listed or candidate species occurs within the existing or proposed R.O.W.

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.

Special Note: The Migratory Bird Act of 1918 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 regulations. The contractor would remove all old migratory bird nests from any structure where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 to October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, active nests, eggs and/or young would be observed.

LIST OF ABBREVIATIONS

| | |
|---|---|
| BMP: Best Management Practice | SPCC: Spill Prevention Control and Countermeasure |
| CGP: 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.

GENERAL NOTE:

Any change orders and/or deviations from the final design must be reported to the Engineer prior to commencement of construction activities, as additional environmental clearance may be required.

| | | | | |
|--|-----------|---------------------------------|-----------|-----------|
|  Texas Department of Transportation | | Design Division Standard | | |
| <h2 style="margin: 0;">ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS</h2> <h1 style="margin: 0;">EPIC</h1> | | | | |
| FILE: epic.dgn | DN: TxDOT | CK: _____ | DW: _____ | CK: _____ |
| ©TxDOT: February 2015 | CONT | SECT | JOB | HIGHWAY |
| 12-12-2011 (DS) REVISIONS | 1015 | 01 | 023 | FM3549 |
| 05-07-14 ADDED NOTE SECTION IV. | DIST | COUNTY | SHEET NO. | |
| 01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES. | DAL | ROCKWALL | 295 | |

A. GENERAL SITE DATA

- PROJECT LIMITS:** From North of IH-30 to North of SH 66
Begin Project Coordinates : Latitude (N) : 32.920647° Longitude (W) : -96.418292°
- PROJECT SITE MAPS:**
 - * Project Location Map: The Title Sheet
 - * Drainage Patterns: Drainage Area Maps (Sheets 184-186)
 - * Slopes Anticipated After Major Gradings or Areas of Soil Disturbance: Typical Sections (Sheets 6-13)
 - * Location of Erosion and Sediment Controls: SW3P Site Maps (Sheets 297-311)
 - * Surface Waters and Discharge Locations: Drainage and Culvert Layouts (Sheets 198-206)
 - * Project Specific Location(s) (PSL): To be determined by the project Construction Personnel. Location(s) shown on SW3P Site Map (if PSL location(s) is within one mile of project) and information located in project SW3P Binder (Reference Item *10 below).
- PROJECT DESCRIPTION:**
For The Construction of Widening From a Two-Lane Rural to a Four-Lane Urban Divided Road Consisting of: Grading, Base, Drainage, Concrete Paving, Signing, Pavement Markings, and Traffic Signals
- MAJOR SOIL DISTURBING ACTIVITIES:**
Excavating subgrade, constructing roadway widening, ditch grading.
- EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:**
Houston Clay found in this project, the existing vegetative cover at 90%.
- TOTAL PROJECT AREA:** 28.21 Acres
- TOTAL AREA TO BE DISTURBED:** 22.52 Acres (80%)
- WEIGHTED RUNOFF COEFFICIENT**

| | |
|----------------------|------|
| BEFORE CONSTRUCTION: | 0.52 |
| AFTER CONSTRUCTION: | 0.70 |
- NAME OF RECEIVING WATERS:**
Areas from Begin project to Railroad drain to IH 30 storm sewer systems then drain to Buffalo Creek
Areas from Railroad to SH 66 drain to Stodghill Lake

10. PROJECT SW3P Binder:

- For projects disturbing one to five acres, TxDOT will maintain a SW3P Binder at the project field office (if there is not a project field office, should be kept at the Area Office) which contains the following: Index Sheet, TCEQ Signature Authority, TxDOT's and Contractor's Small Construction Site Notice, SW3P Inspector Qualification Statements, EPIC Sheet, SW3P Sheet, Site Location Maps, Inspection and Maintenance Reports (Form 2118), Construction Stage Gate Checklists (CSGC), Stored Material Lists specifying associated control measures and the Appendix which contains the TPDES Construction General Permit, TxDOT and Contractor MS4 Operator Notification(s) and the Construction PSL Permits per all applicable requirements.
- For projects disturbing 5 acres or more, TxDOT will follow the actions listed in (10.A) above with the addition of the following: TxDOT and Contractor Notice Of Intent (N.O.I.) and Fee Payment Form, TxDOT and Contractor Large Construction Site Notice (to be used instead of Small Site Notice), and TPDES Permit Coverage Notice.
- For projects disturbing less than one acre, actions described in (10.A) and (10.B) above are not required. Acreage is calculated by adding Total Area To Be Disturbed Acres on project (See #7 above) and the PSL(s) acreage located within one mile of project.

B. EROSION AND SEDIMENT CONTROLS

- SOIL STABILIZATION PRACTICES:** (Select T = Temporary or P = Permanent, as applicable)

| | |
|---|--|
| <input checked="" type="checkbox"/> TEMPORARY SEEDING | <input type="checkbox"/> PRESERVATION OF NATURAL RESOURCES |
| <input type="checkbox"/> MULCHING (Hay or Straw) | <input type="checkbox"/> FLEXIBLE CHANNEL LINER |
| <input type="checkbox"/> BUFFER ZONES | <input type="checkbox"/> RIGID CHANNEL LINER |
| <input type="checkbox"/> PLANTING | <input type="checkbox"/> SOIL RETENTION BLANKET |
| <input type="checkbox"/> SEEDING | <input checked="" type="checkbox"/> COMPOST MANUFACTURED TOPSOIL |
| <input checked="" type="checkbox"/> SODDING | <input checked="" type="checkbox"/> VERTICAL TRACKING |
| | <input type="checkbox"/> OTHER: |
 - STRUCTURAL PRACTICES:** (Select T = Temporary or P = Permanent, as applicable)

| | |
|---|--|
| <input checked="" type="checkbox"/> SILT FENCES | |
| <input checked="" type="checkbox"/> EROSION CONTROL LOGS | |
| <input type="checkbox"/> EROSION CONTROL COMPOST BERMS (Low Velocity) | |
| <input checked="" type="checkbox"/> ROCK FILTER DAMS | |
| <input type="checkbox"/> DIVERSION, INTERCEPTOR, OR PERIMETER DIKES | |
| <input type="checkbox"/> DIVERSION, INTERCEPTOR, OR PERIMETER SWALES | |
| <input type="checkbox"/> DIVERSION DIKE AND SWALE COMBINATIONS | |
| <input type="checkbox"/> PIPE SLOPE DRAINS | |
| <input type="checkbox"/> PAVED FLUMES | |
| <input checked="" type="checkbox"/> ROCK BEDDING AT CONSTRUCTION EXIT | |
| <input type="checkbox"/> TIMBER MATTING AT CONSTRUCTION EXIT | |
| <input type="checkbox"/> CHANNEL LINERS | |
| <input type="checkbox"/> SEDIMENT TRAPS | |
| <input type="checkbox"/> SEDIMENT BASINS | |
| <input checked="" type="checkbox"/> STORM INLET SEDIMENT TRAP | |
| <input type="checkbox"/> STONE OUTLET STRUCTURES | |
| <input checked="" type="checkbox"/> CURBS AND GUTTERS | |
| <input checked="" type="checkbox"/> STORM SEWERS | |
| <input checked="" type="checkbox"/> VELOCITY CONTROL DEVICES | |
| <input type="checkbox"/> OTHER: | |
- NOTE: TOP OF BMP'S SHOULD NOT BE HIGHER THAN ROADWAY ELEVATION AS NOT TO FLOOD ROADWAY UNLESS PRIOR APPROVAL FROM ENGINEER IS OBTAINED.
- STORM WATER MANAGEMENT:**
 - Storm water drainage will be provided by ditches, inlets, and storm water systems which carry drainage within the R.O.W. to the lows within the roadway and project site which drains to natural facilities.
 - Other permanent erosion controls include hydraulic design to limit structure outlet velocities and grading design generally consisting of 4:1 or flatter slopes with permanent vegetative cover.
 - STORM WATER MANAGEMENT ACTIVITIES:** (Sequence of Construction)
 - Place temporary sediment control devices prior to construction of temporary pavement.
 - Construct temporary pavement.
 - Place additional temporary sediment control devices prior to construction of proposed outside lanes.
 - Construct proposed outside lanes and place erosion control logs at curb inlet locations & place seeding.
 - Place curb inlet control device at exterior lanes prior to shift traffic to the newly constructed pavement.
 - Place additional erosion control devices prior to construction of the interior lanes.
 - Remove BMPs after soil is stabilized.

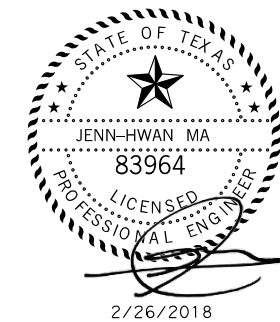
5. NON-STORM WATER DISCHARGES:

Filter non-storm water discharges, or hold in retention basins, before being allowed to mix with storm water. These discharges consist of, but not limited to, non-polluted ground water, spring water, foundation or footing drain water, water used for dust control or pavement washing and vehicle washwater containing no detergents.

C. OTHER REQUIREMENTS & PRACTICES

- MAINTENANCE:**
Maintain all erosion and sediment controls in good working order. Perform any necessary cleaning/repairs/replacements at the earliest possible date prior to next rain event, but no later than 7 calendar days. Ensure the surrounding ground has dried sufficiently to prevent damage from equipment. "Too Wet" is the only reason for not adhering to timeframes described. When construction activities permanently or temporarily cease and are not expected to resume for 14 or more days on a disturbed portion of the site, stabilization measures must be initiated immediately.
- INSPECTION:**
A TxDOT Inspector will perform a regularly scheduled SW3P inspection every 7 calendar days. An Inspection and Maintenance Report, signed by the TxDOT Inspector and the Contractor, will be filed for each inspection. Revise/clean/repair/replace each BMP control device in accordance with the current Field Inspection and Maintenance Report (Form 2118) and Item 1 (Maintenance) above.
- WASTE MATERIALS:**
On a daily basis, or as may be directed, collect all waste materials, trash and debris from the construction site and deposit into a metal dumpster having a secure cover and which meets all state and local city solid waste management requirements. Empty the dumpster as required by regulation, or as may be directed, at a local approved landfill site. Do not bury construction waste on the construction project site.
- HAZARDOUS WASTE & SPILL REPORTING:**
As a minimum, any products in the following categories are considered to be hazardous: Paints, Acids, Solvents, Fuels, Asphalt Products, Chemical Additives for Soil Stabilization, and Concrete Curing Compounds or Additives. When storing hazardous material on the project site, or at a Project Specific Location, take all practicable precaution to prevent and/or contain any spillage of these materials. In the event of a spill, contact the spill coordinator immediately.
- SANITARY WASTE:**
Use a licensed sanitary waste management contractor to collect all sanitary waste from portable units as may be required by local regulation, or as directed.
- CONSTRUCTION VEHICLE TRACKING:**
On a regular basis, or as may be directed, dampen haul roads for dust control and construct construction entrances/exits. Provide for a motorized broom or vacuum type sweeper to be available on a daily basis, or as may be directed, to remove sediment from paved roadways on project, abutting and traversing the project site.
- MANAGEMENT PRACTICES:**
 - Construct disposal areas, stockpiles, haul roads and PSL's in a manner that will minimize and control the amount of sediment that may enter receiving waters. Do not locate disposal areas in any wetland, waterbody or streambed.
 - Locate construction staging areas, vehicle maintenance and PSL's areas in a manner to minimize the runoff of pollutants.
 - When working in or near a wetland, install and maintain operating soil erosion and sediment controls at all times during construction and isolate the work from the wetland.
 - Clear all waterways as soon as practicable of temporary embankment, temporary bridges, matting, falsework, piling, debris or other obstructions placed during construction operations that are not a part of the finished work.
 - Procedures and/or practices should be taken to control dust.
 - Sediment to be removed from roadways daily or when work begins after weather events if construction activities have ceased due to weather event.

DESIGNER _____ DATE _____ FILE NAME _____

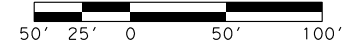
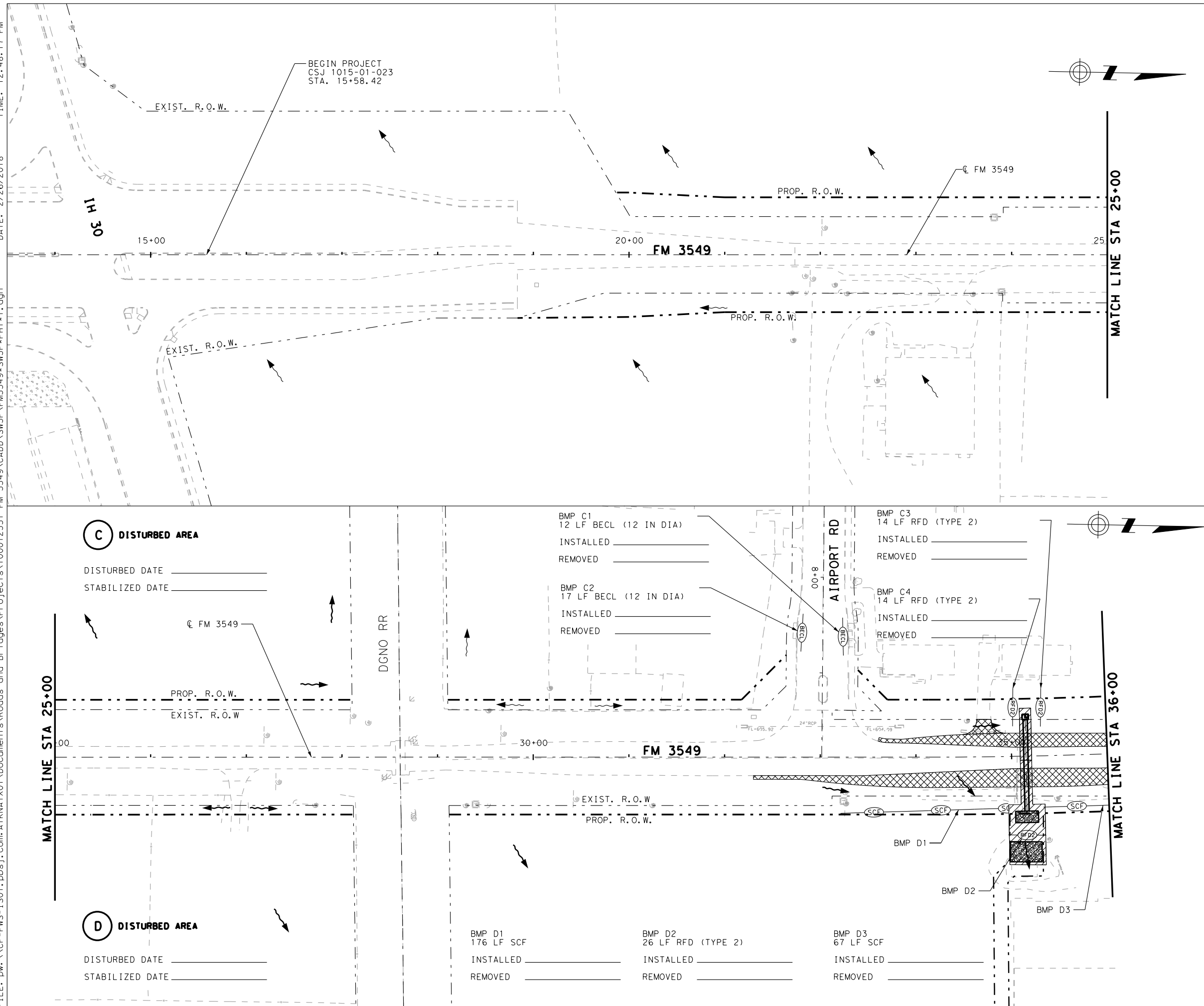


_____, P.E.
Signature of Registrant & Date

| | | | |
|---|------------------------|--|-----------------------|
| CIVIL ASSOCIATES, INC. | | 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981 | |
| | | | |
| DALLAS DISTRICT ENVIRONMENTAL | | | |
| STORM WATER POLLUTION PREVENTION PLAN (SW3P) | | | |
| TEMPLATE REVISION DATE: 02/07/18 | | | |
| DESIGN JM | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | |
| GRAPHICS JM | STATE | DISTRICT | HIGHWAY NO. FM3549 |
| CHECK NC | TEXAS | DALLAS | COUNTY ROCKWALL |
| CHECK NC | CONTROL | SECTION | JOB 296 |
| | 1015 | 01 | 023 |

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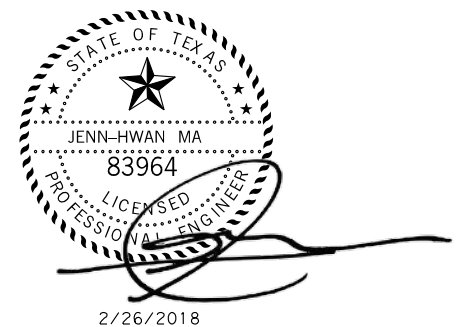


LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

GENERAL NOTES

1. THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
2. CONSTRUCTION EXIT (TY 1) WILL BE REQUIRED AT THE LOCATION APPROVED BY THE ENGINEER.
3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



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 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474

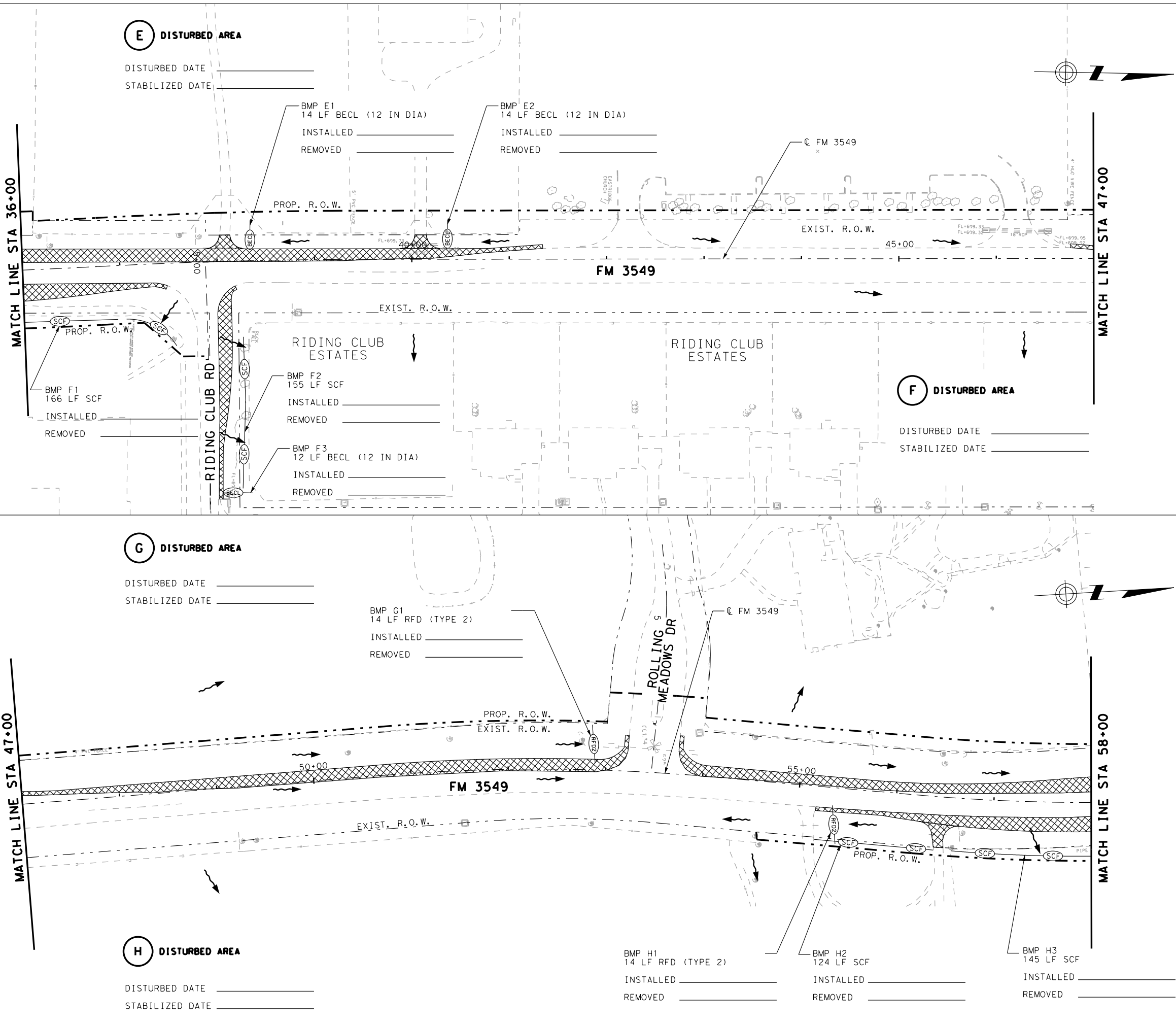


SW3P PLAN
 PHASE 1
 BEGIN PROJECT TO STA. 36+00

SHEET 1 OF 5

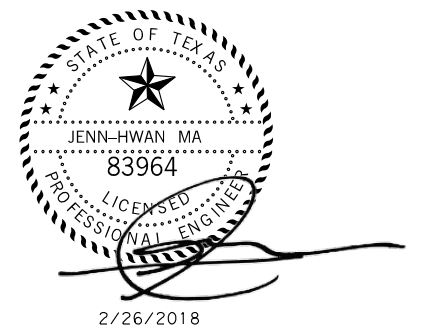
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- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
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SW3P PLAN
 PHASE 1
 STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

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|-------------|---------------------|---|----------|---------------------|
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| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 298 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

E DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

F DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

G DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

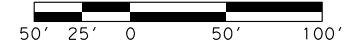
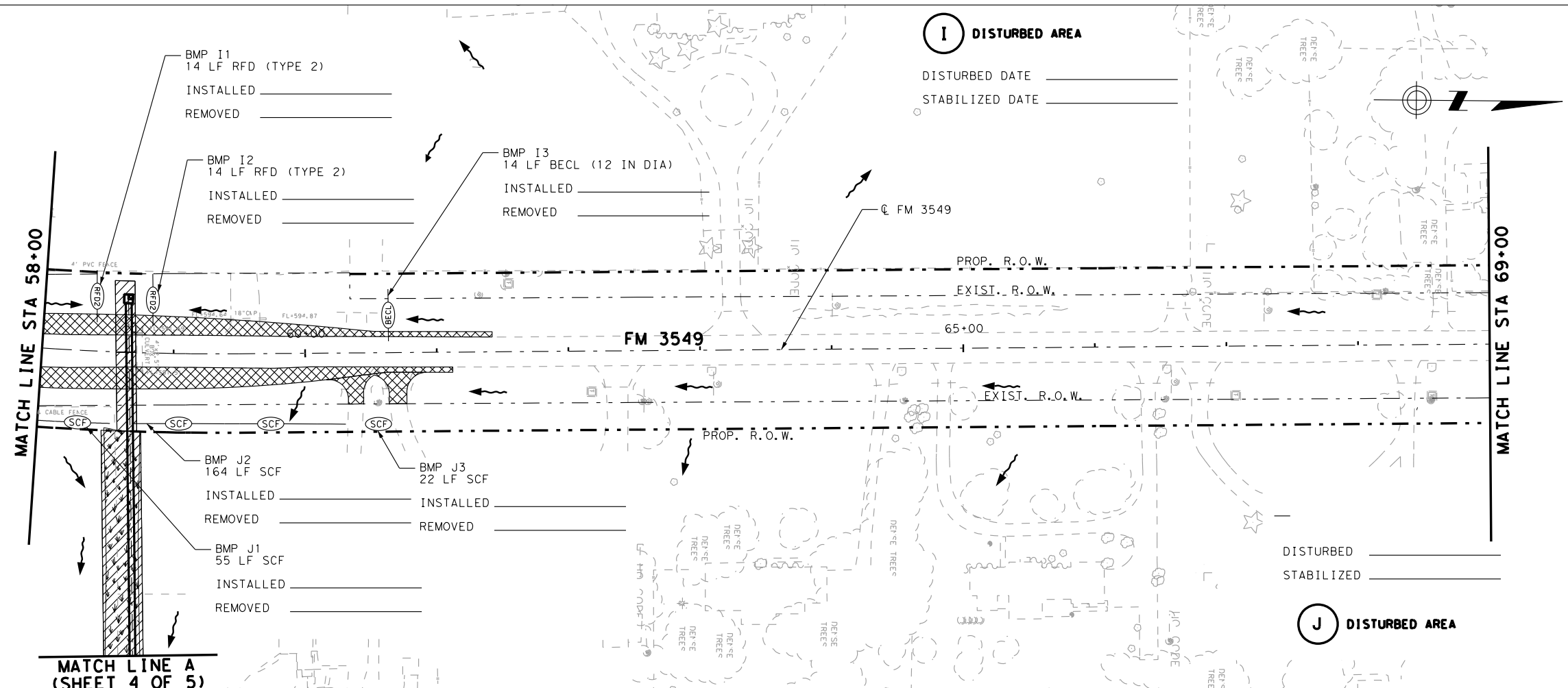
H DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

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 INSTALLED _____
 REMOVED _____

BMP H2 124 LF SCF
 INSTALLED _____
 REMOVED _____

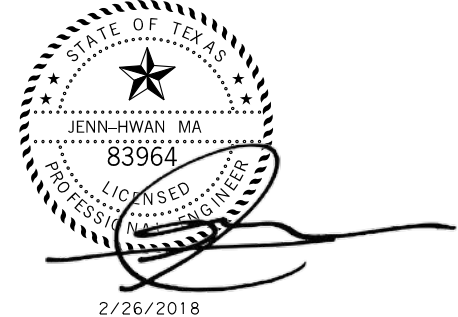
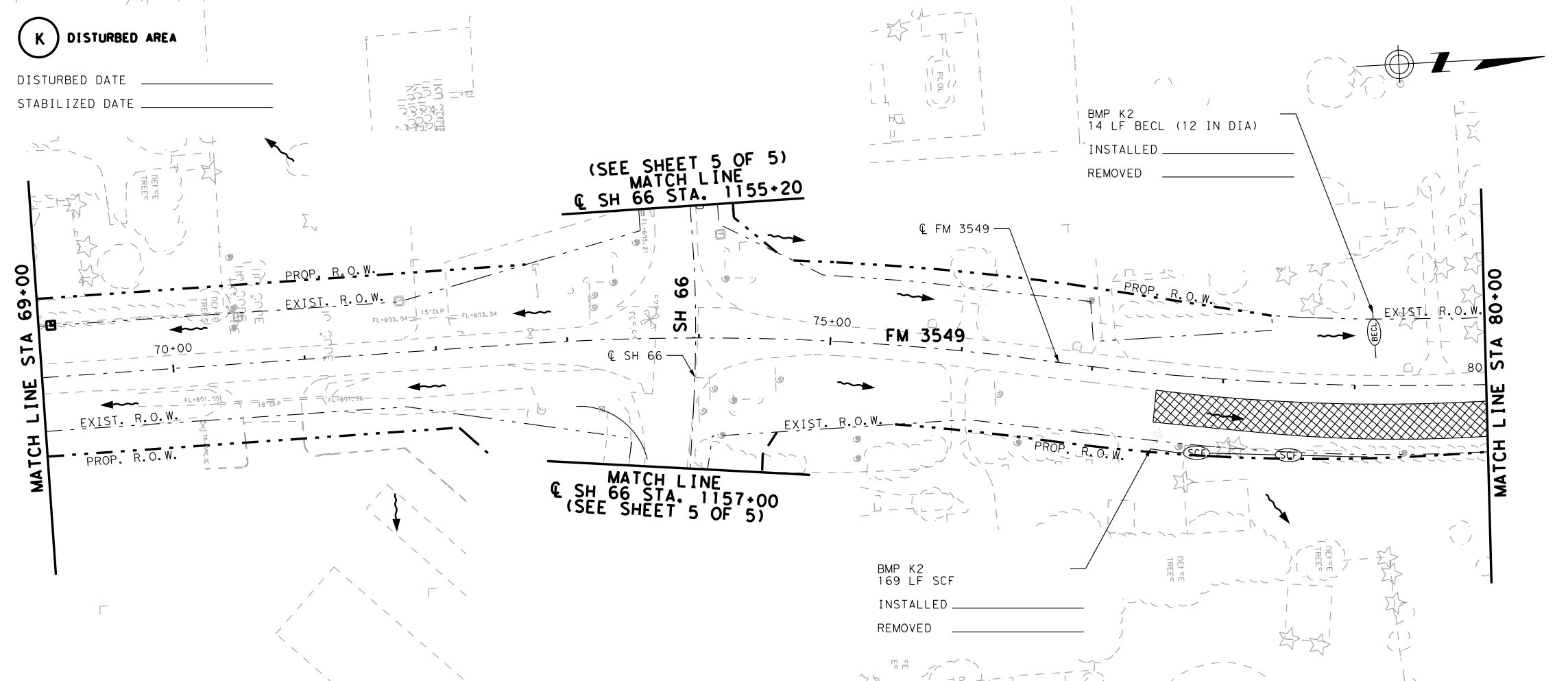
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- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
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 - DIRECTION OF FLOW
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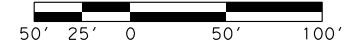
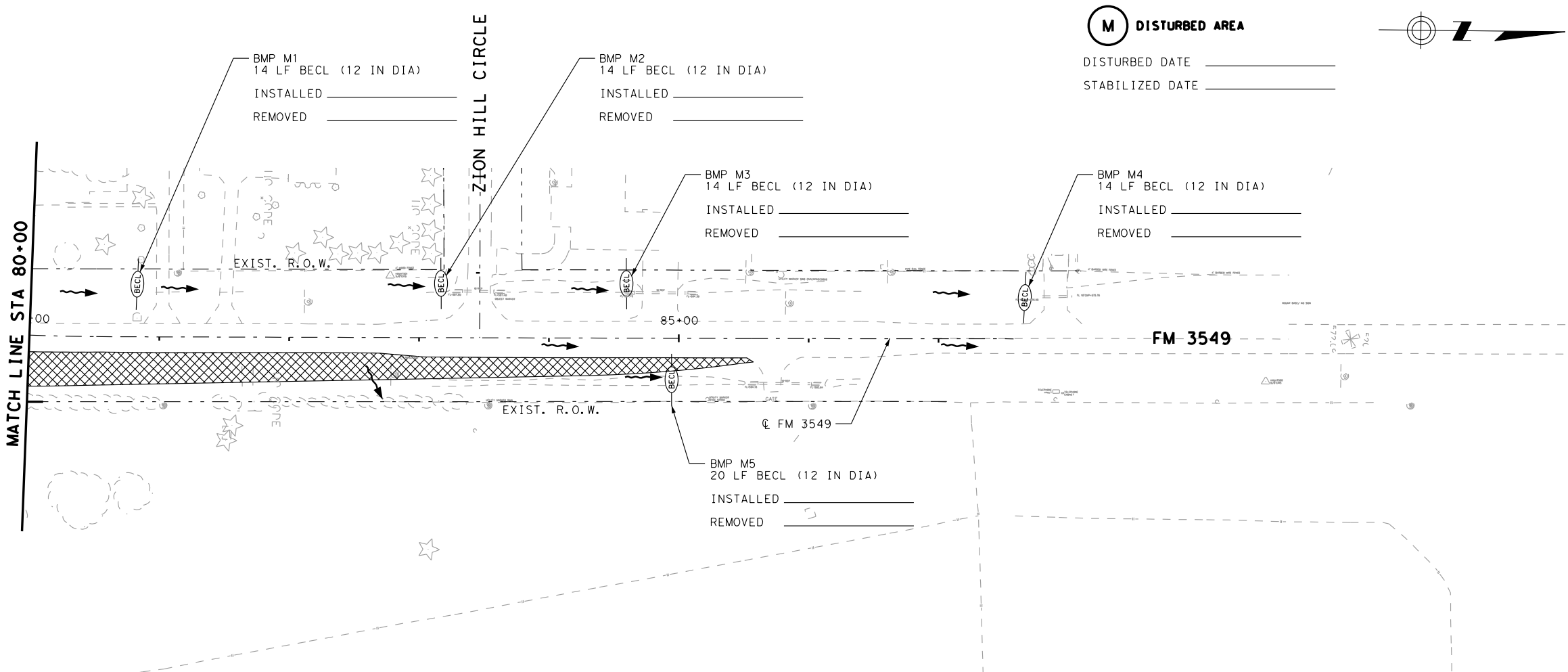


SW3P PLAN
 PHASE 1
 STA. 58+00 TO STA. 80+00

SHEET 3 OF 5

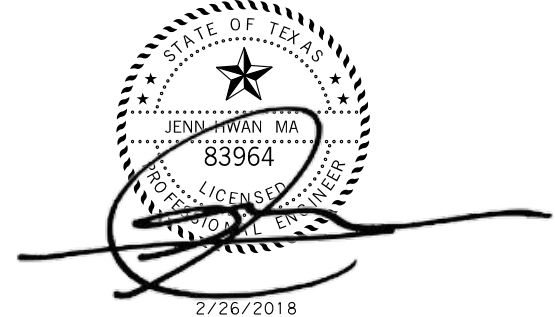
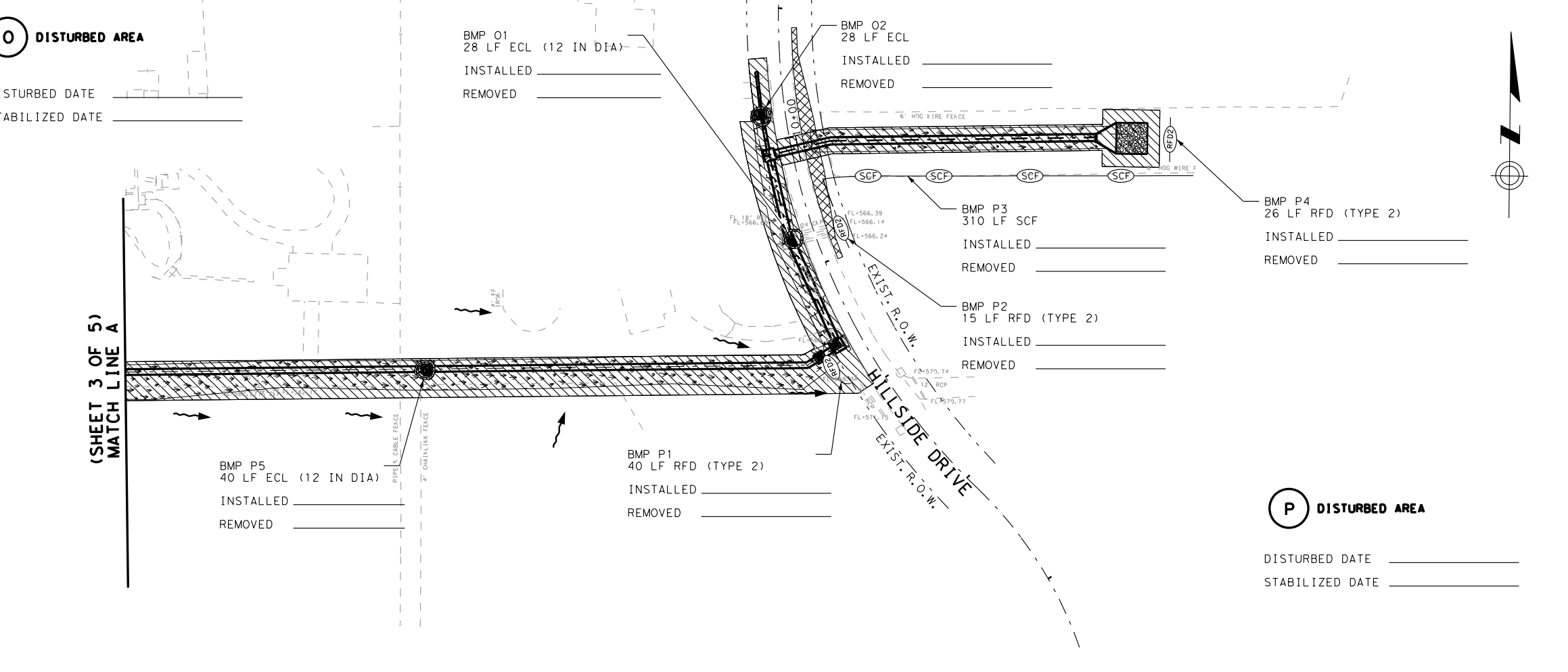
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- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
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 Dallas, Texas 75243
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SW3P PLAN
 PHASE 1
 STA. 80+00 TO END PROJECT

P DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

SHEET 4 OF 5

| | | | | |
|-------------|---------------------|---|-----------------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
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Q DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

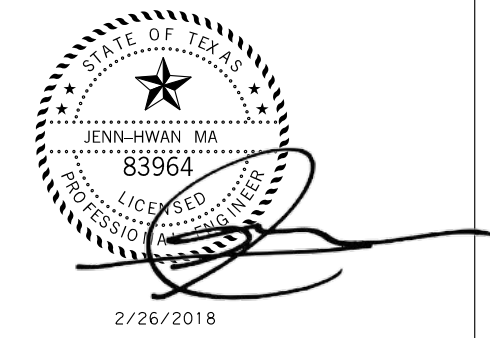


- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - DIRECTION OF FLOW
 - TEMPORARY SEDIMENT CONTROL FENCE
 - TYPE 2 ROCK FILTER DAM
 - BIOGRD EROSION CONTROL LOG
 - EROSION CONTROL LOG AT INLET (ECL)
 - DISTURBED & SEEDING AREA
 - DISTURBED AREA ID

- GENERAL NOTES**
1. THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
 2. CONSTRUCTION EXIT (TY 1) WILL BE REQUIRED AT THE LOCATION APPROVED BY THE ENGINEER.
 3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.

R DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

T DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____



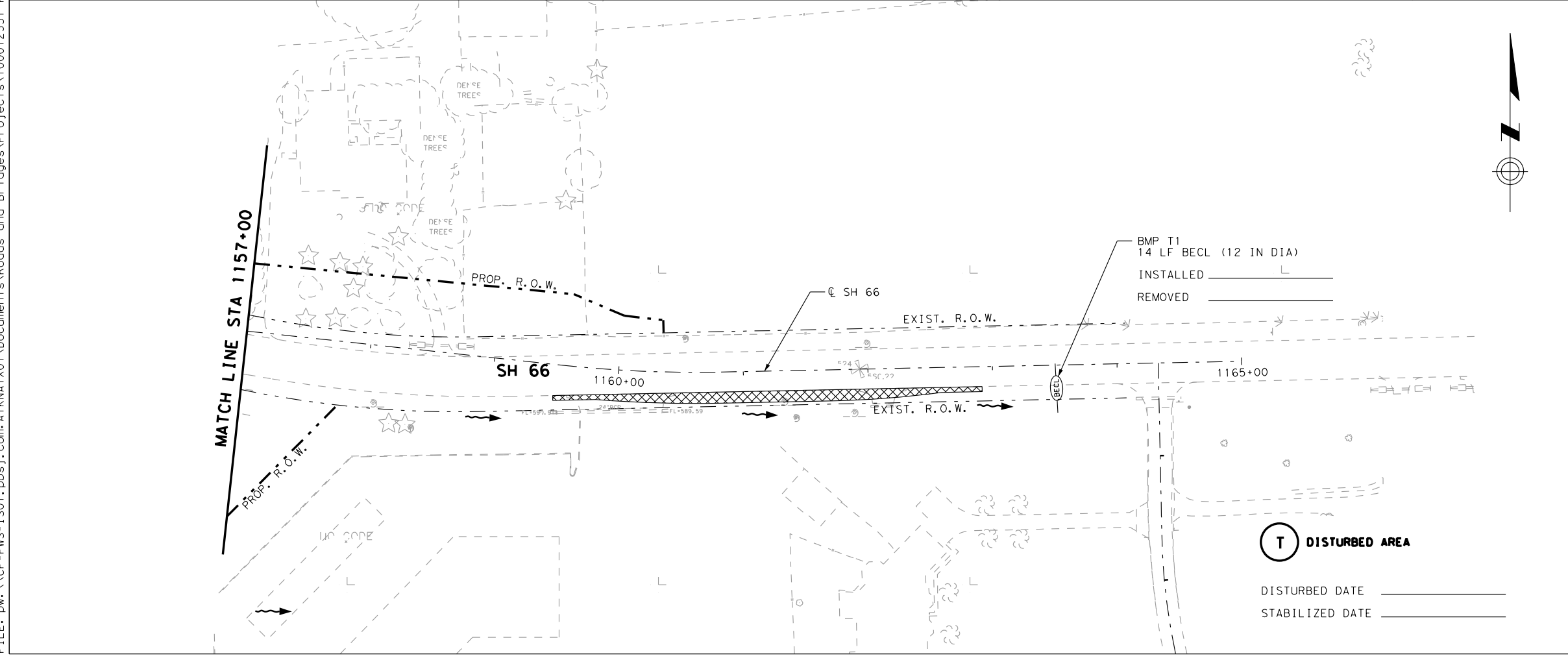
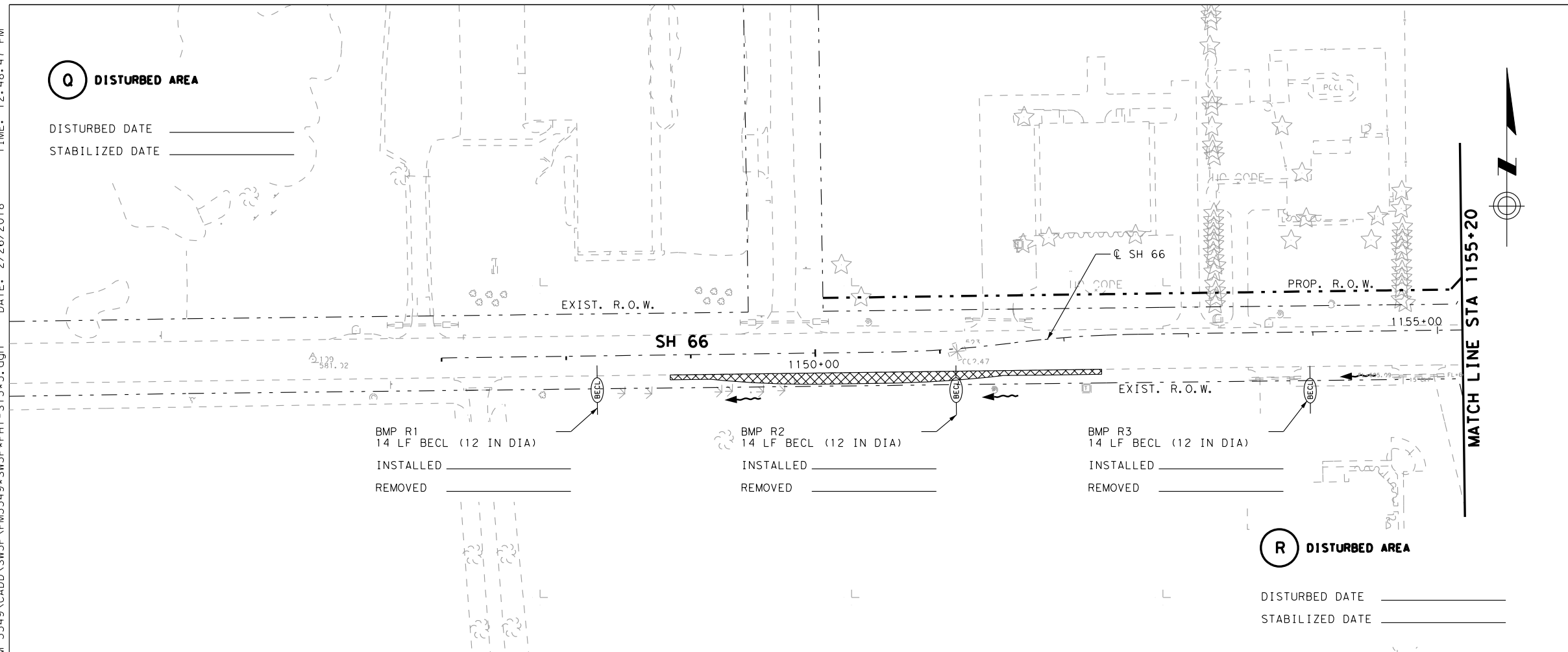
CIVIL ASSOCIATES, INC. 9330 LBJ Frwy, Ste. 1150 Dallas, Texas 75243 TBPE Firm Registration No. 6981



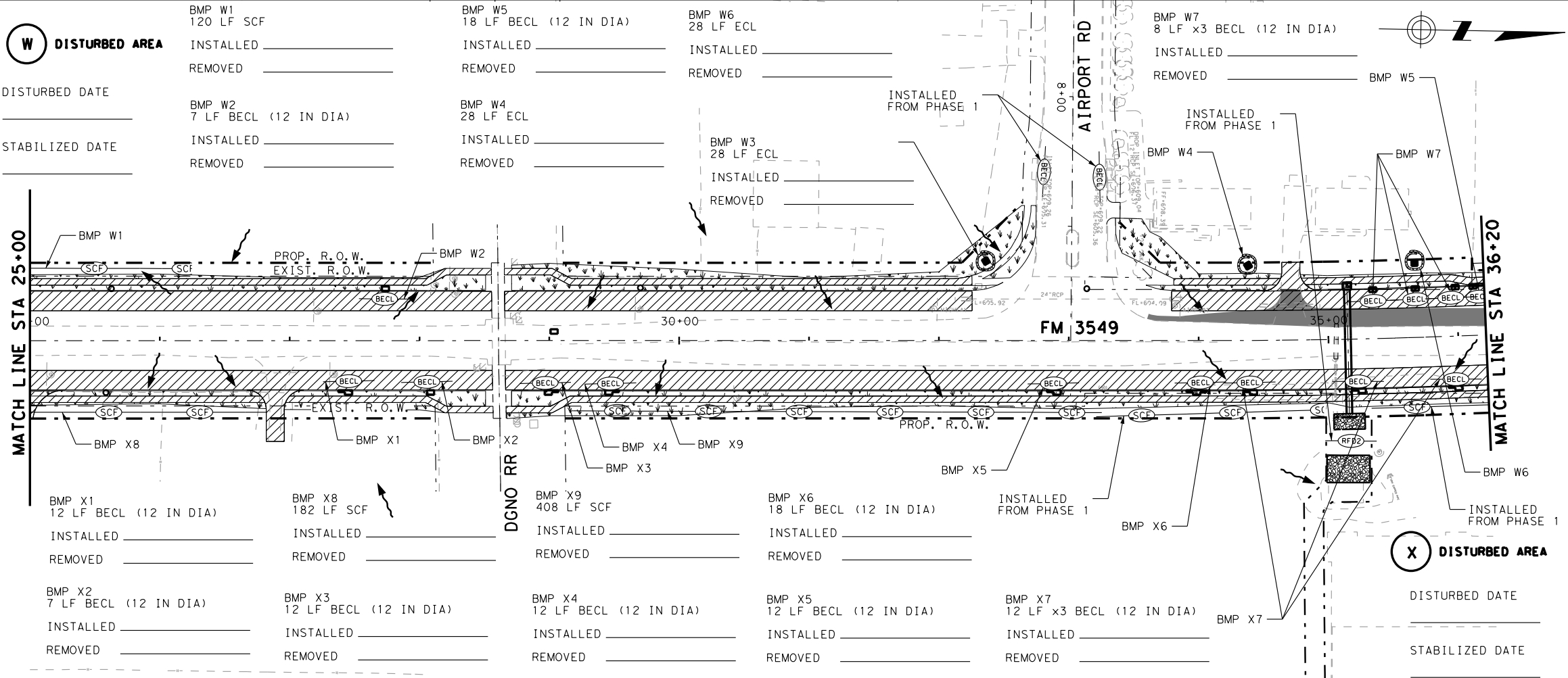
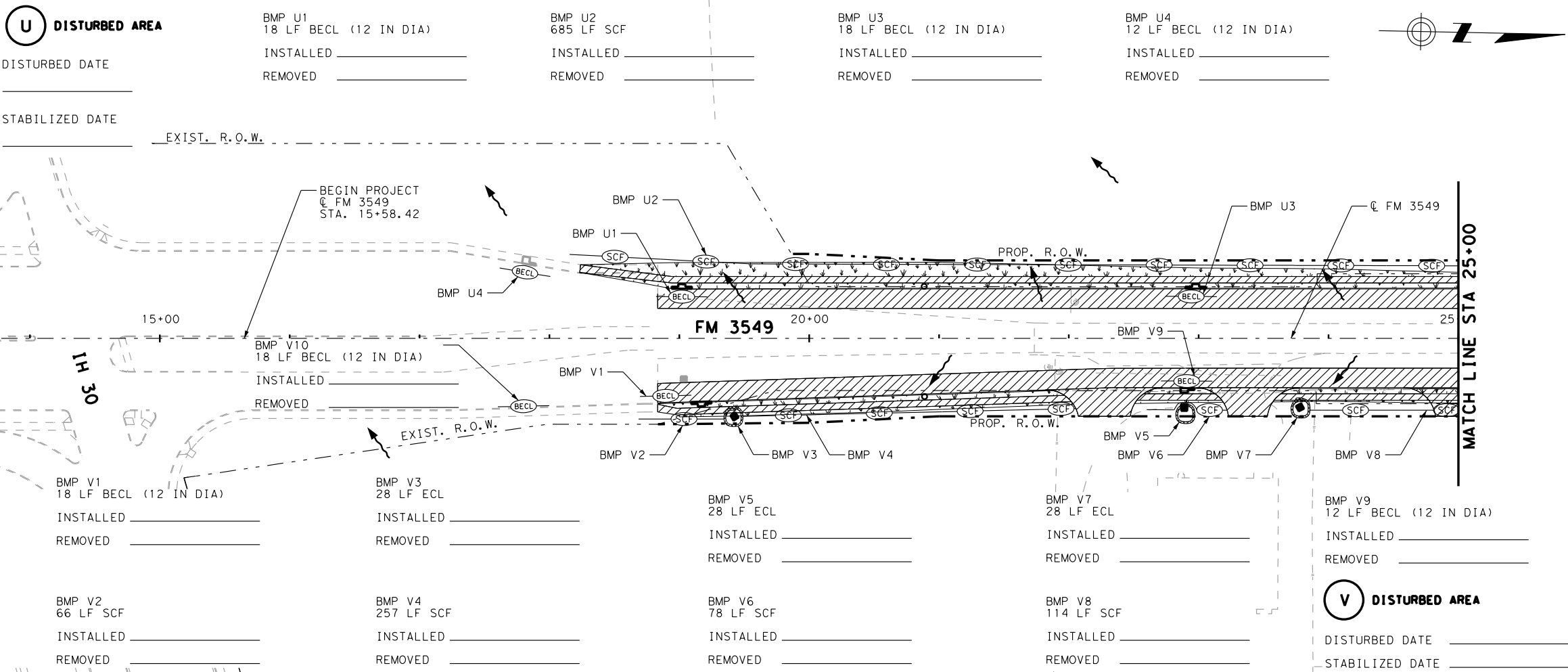
SW3P PLAN
 PHASE 1
 SH 66 STA. 1147+00 TO STA. 1155+20
 SH 66 STA. 1157+00 TO STA. 1165+00

SHEET 5 OF 5

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 301 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |



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 FILE: \\CP-PWS-1501.pbsj.com:ATKATX01\Documents\Roads and Bridges\Projects\100012351 FM 3549\CADD\SW3P\SW3P*PH2*1.dgn



U DISTURBED AREA

| | | | |
|----------------------------------|----------------------|----------------------------------|----------------------------------|
| BMP U1 18 LF BECL (12 IN DIA) | BMP U2 685 LF SCF | BMP U3 18 LF BECL (12 IN DIA) | BMP U4 12 LF BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |
| DISTURBED DATE _____ | | | |
| STABILIZED DATE _____ | | | |

W DISTURBED AREA

| | | | | | | |
|-----------------------|---------------------------------|---------------------|---------------------|----------------------------------|---------------------|------------------------------------|
| BMP W1 120 LF SCF | BMP W2 7 LF BECL (12 IN DIA) | BMP W3 28 LF ECL | BMP W4 28 LF ECL | BMP W5 18 LF BECL (12 IN DIA) | BMP W6 28 LF ECL | BMP W7 8 LF x3 BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |
| DISTURBED DATE _____ | | | | | | |
| STABILIZED DATE _____ | | | | | | |

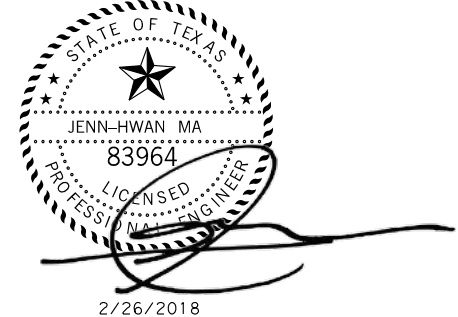
X DISTURBED AREA

| | | | | | | |
|----------------------------------|---------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------------|
| BMP X1 12 LF BECL (12 IN DIA) | BMP X2 7 LF BECL (12 IN DIA) | BMP X3 12 LF BECL (12 IN DIA) | BMP X4 12 LF BECL (12 IN DIA) | BMP X5 12 LF BECL (12 IN DIA) | BMP X6 18 LF BECL (12 IN DIA) | BMP X7 12 LF x3 BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |
| DISTURBED DATE _____ | | | | | | |
| STABILIZED DATE _____ | | | | | | |

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

- GENERAL NOTES**
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 - SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



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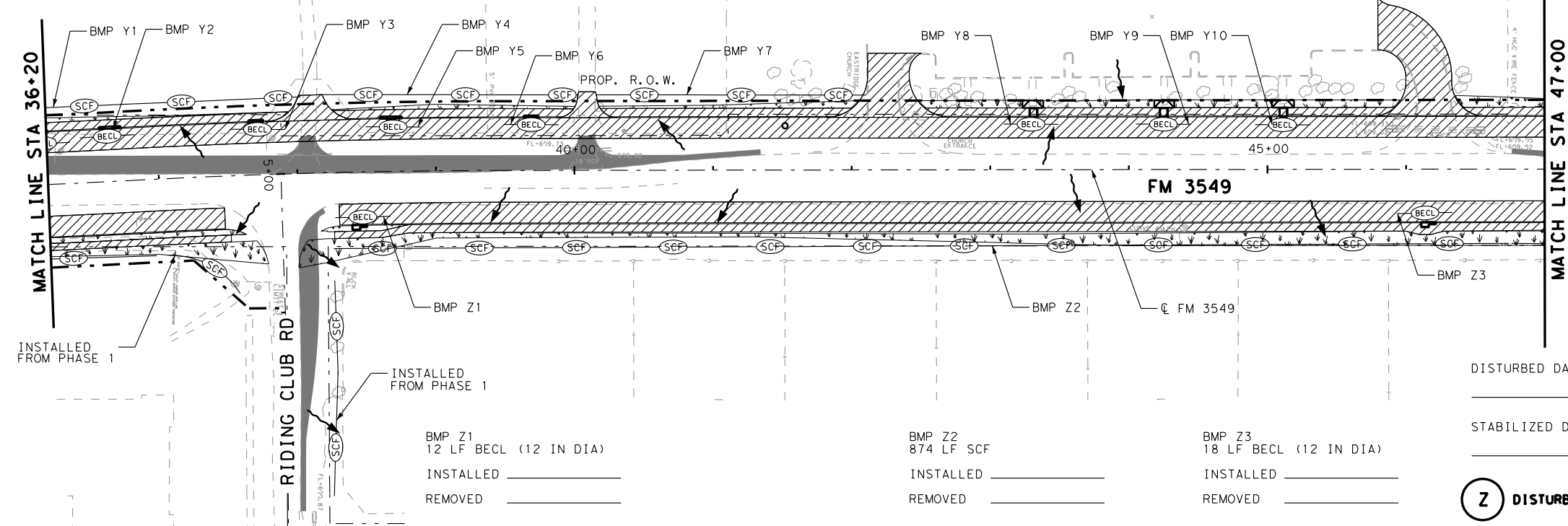
SW3P PLAN
PHASE 2
BEGIN PROJECT TO STA. 36+20

SHEET 1 OF 5

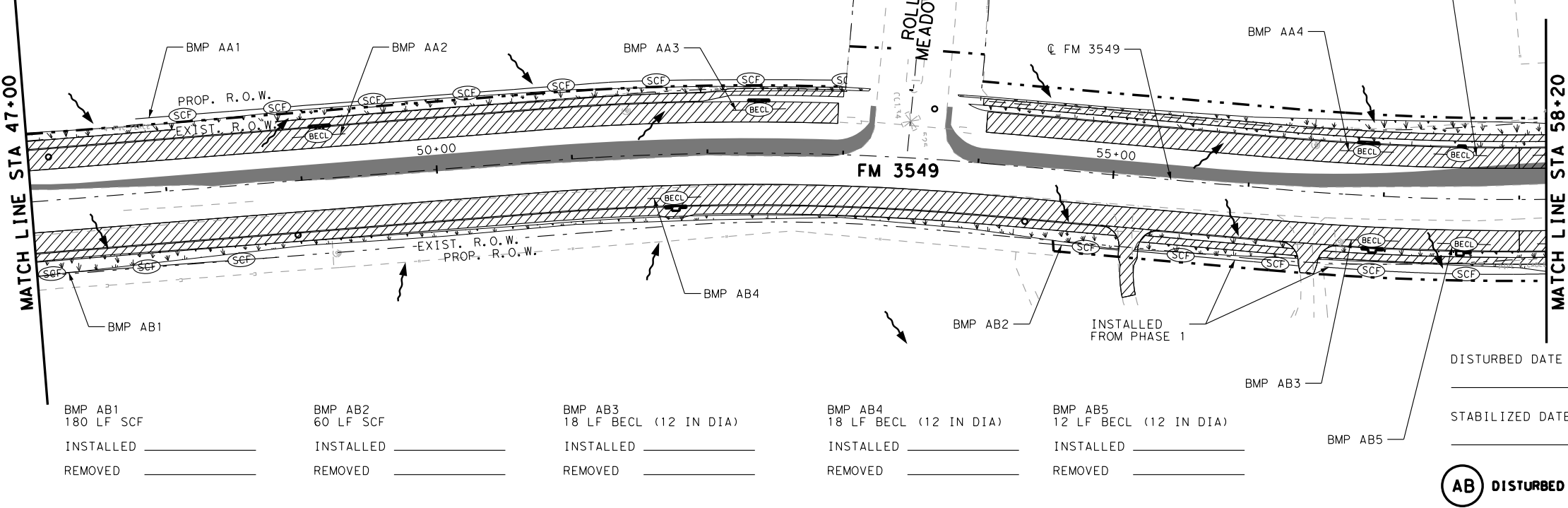
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| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 302 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |

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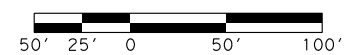
| Y DISTURBED AREA | | BMP Y1 | BMP Y3 | BMP Y5 | BMP Y7 | BMP Y9 |
|-----------------------|------------------------|------------------------|------------------------|-----------------|-----------------------|--------|
| 182 LF SCF | 18 LF BECL (12 IN DIA) | 24 LF BECL (12 IN DIA) | 24 LF BECL (12 IN DIA) | 195 LF SCF | 8 LF BECL (12 IN DIA) | |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | |
| DISTURBED DATE _____ | | | | | | |
| STABILIZED DATE _____ | | | | | | |



| AA DISTURBED AREA | | BMP AA1 | BMP AA2 | BMP AA3 | BMP AA4 | BMP AA5 |
|-----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|---------|
| 525 LF SCF | 24 LF BECL (12 IN DIA) | 24 LF BECL (12 IN DIA) | 24 LF BECL (12 IN DIA) | 24 LF BECL (12 IN DIA) | 8 LF BECL (12 IN DIA) | |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | |
| DISTURBED DATE _____ | | | | | | |
| STABILIZED DATE _____ | | | | | | |

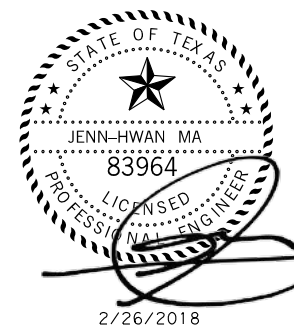


| AB DISTURBED AREA | | BMP AB1 | BMP AB2 | BMP AB3 | BMP AB4 | BMP AB5 |
|-----------------------|-----------------|------------------------|------------------------|------------------------|------------------------|---------|
| 180 LF SCF | 60 LF SCF | 18 LF BECL (12 IN DIA) | 18 LF BECL (12 IN DIA) | 12 LF BECL (12 IN DIA) | 12 LF BECL (12 IN DIA) | |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | |
| DISTURBED DATE _____ | | | | | | |
| STABILIZED DATE _____ | | | | | | |



- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - DIRECTION OF FLOW
 - TEMPORARY SEDIMENT CONTROL FENCE
 - TYPE 2 ROCK FILTER DAM
 - BIOGRD EROSION CONTROL LOG
 - EROSION CONTROL LOG AT INLET (ECL)
 - DISTURBED & SEEDING AREA
 - DISTURBED AREA ID

- GENERAL NOTES**
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 - SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



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 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
TBPE REG. # F-474



SW3P PLAN
 PHASE 2
 STA. 36+20 TO STA. 58+20

SHEET 2 OF 5

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-----|-------------|
| TC | 6 | SEE TITLE SHEET | | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | | 303 |
| CHECK | JM | CONTROL | SECTION | JOB | |
| CHECK | JM | 1015 | 01 | 023 | |

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AC DISTURBED AREA

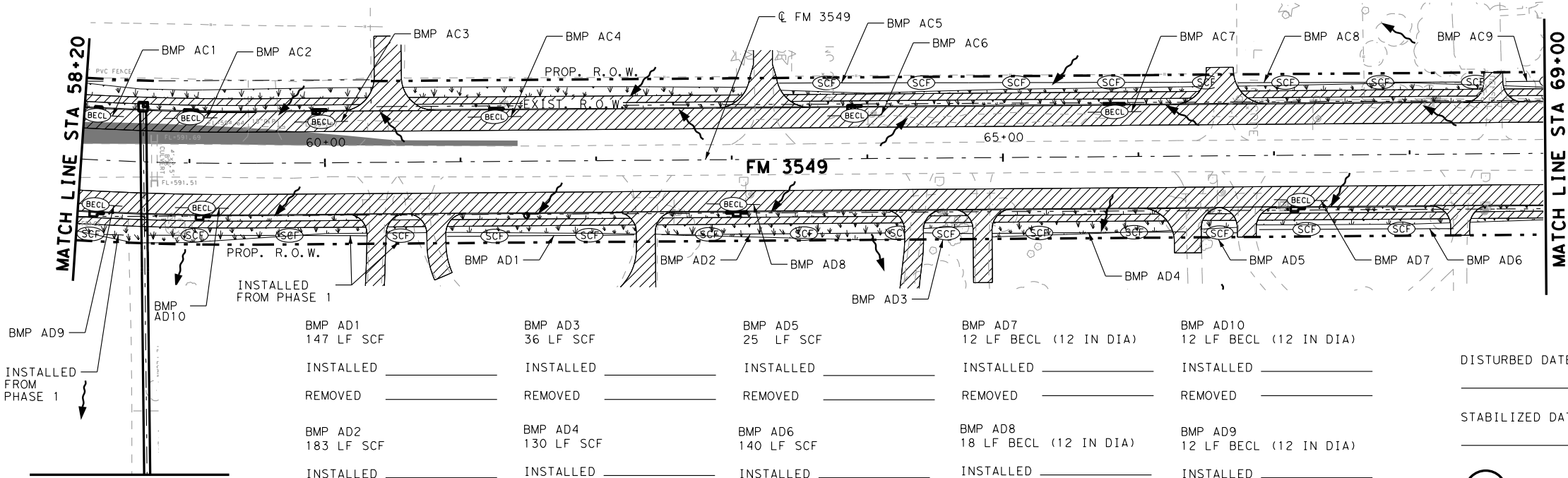
DISTURBED DATE _____

STABILIZED DATE _____

| | | | | |
|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------|
| BMP AC1 8 LF BECL (12 IN DIA) | BMP AC2 18 LF BECL (12 IN DIA) | BMP AC4 18 LF BECL (12 IN DIA) | BMP AC6 18 LF BECL (12 IN DIA) | BMP AC8 182 LF SCF |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |
| | BMP AC3 18 LF BECL (12 IN DIA) | BMP AC5 322 LF SCF | BMP AC7 24 LF BECL (12 IN DIA) | BMP AC9 30 LF SCF |
| | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |



- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - DIRECTION OF FLOW
 - TEMPORARY SEDIMENT CONTROL FENCE
 - TYPE 2 ROCK FILTER DAM
 - BIOGRD EROSION CONTROL LOG
 - EROSION CONTROL LOG AT INLET (ECL)
 - DISTURBED & SEEDING AREA
 - DISTURBED AREA ID



MATCH LINE A (SHEET 4 OF 5)

| | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------------------|------------------------------------|-----------------------|
| BMP AD9 147 LF SCF | BMP AD1 147 LF SCF | BMP AD3 36 LF SCF | BMP AD5 25 LF SCF | BMP AD7 12 LF BECL (12 IN DIA) | BMP AD10 12 LF BECL (12 IN DIA) | DISTURBED DATE _____ |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | STABILIZED DATE _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | |
| BMP AD2 183 LF SCF | BMP AD4 130 LF SCF | BMP AD6 140 LF SCF | BMP AD8 18 LF BECL (12 IN DIA) | BMP AD9 12 LF BECL (12 IN DIA) | | |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | | |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ | | |

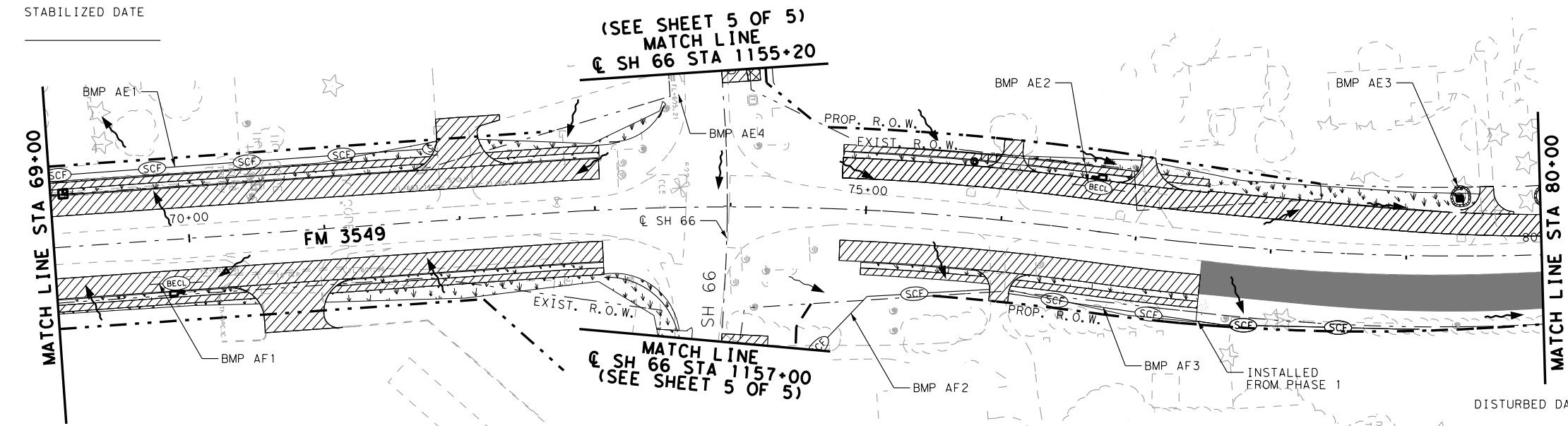
AD DISTURBED AREA

AE DISTURBED AREA

DISTURBED DATE _____

STABILIZED DATE _____

| | | | |
|-----------------------|-----------------------------------|----------------------------------|-----------------------------------|
| BMP AE1 285 LF SCF | BMP AE2 12 LF BECL (12 IN DIA) | BMP AE3 28 LF ECL (12 IN DIA) | BMP AE4 14 LF BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |



MATCH LINE A (SHEET 4 OF 5)

| | | |
|-----------------------------------|-----------------------|-----------------------|
| BMP AF1 12 LF BECL (12 IN DIA) | BMP AF2 165 LF SCF | BMP AF3 305 LF SCF |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ |

AF DISTURBED AREA

2/26/2018

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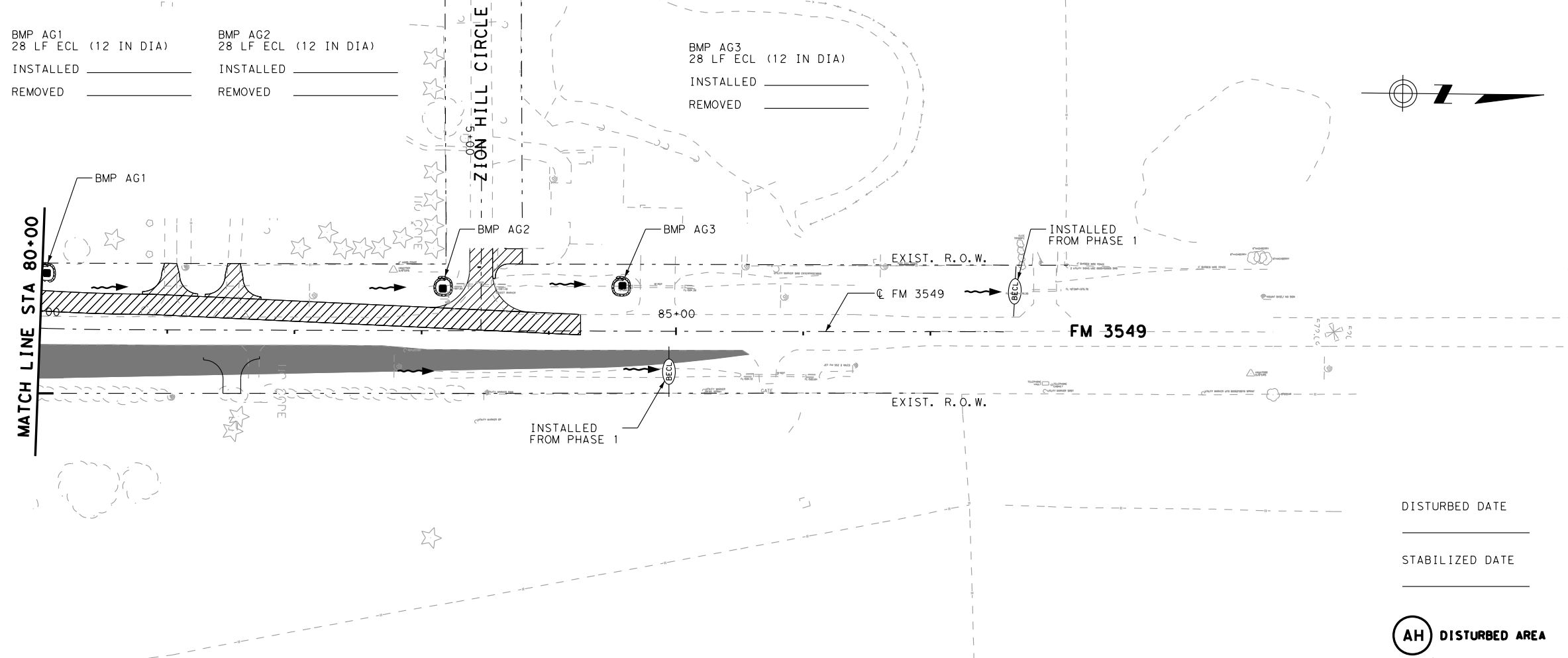
ATKINS
TBPE REG. # F-474

Texas Department of Transportation
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SW3P PLAN
PHASE 2
STA. 58+20 TO STA. 80+00

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 304 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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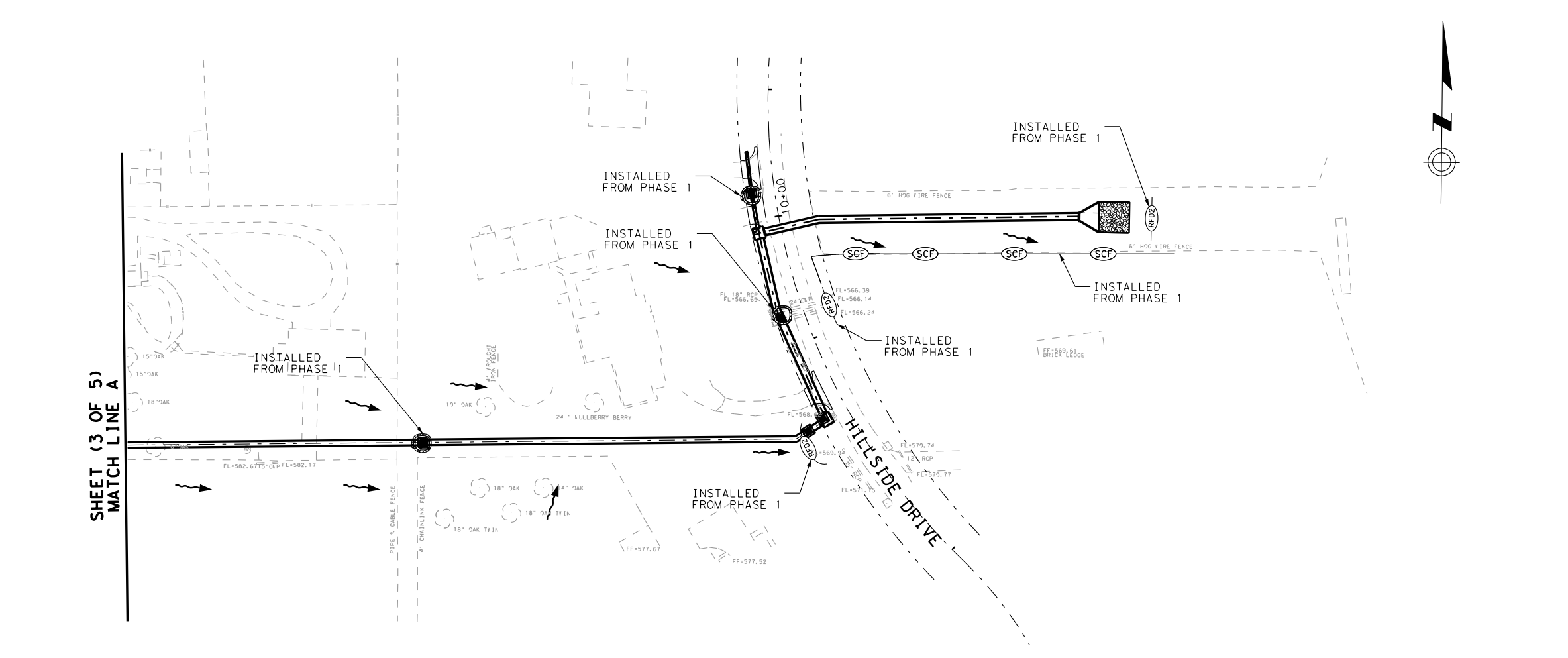


DISTURBED DATE _____
 STABILIZED DATE _____
(AH) DISTURBED AREA

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

- GENERAL NOTES**
1. THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
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 3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



DISTURBED DATE _____
 STABILIZED DATE _____
(AH) DISTURBED AREA

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SW3P PLAN
 PHASE 2
 CL FM 3549 STA. 80+00 TO END PROJECT

SHEET 4 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TC | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | 305 |
| CHECK | JM | CONTROL | SECTION | |
| CHECK | JM | 1015 | 01 | |
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| | | | 023 | |

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AK DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

| | | |
|-----------------------------------|-----------------------------------|-----------------------|
| BMP AK1 10 LF BECL (12 IN DIA) | BMP AK2 10 LF BECL (12 IN DIA) | BMP AK4 152 LF SCF |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ |
| | | |
| BMP AK3 130 LF SCF | BMP AK5 10 LF BECL | |
| INSTALLED _____ | INSTALLED _____ | |
| REMOVED _____ | REMOVED _____ | |



LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

GENERAL NOTES

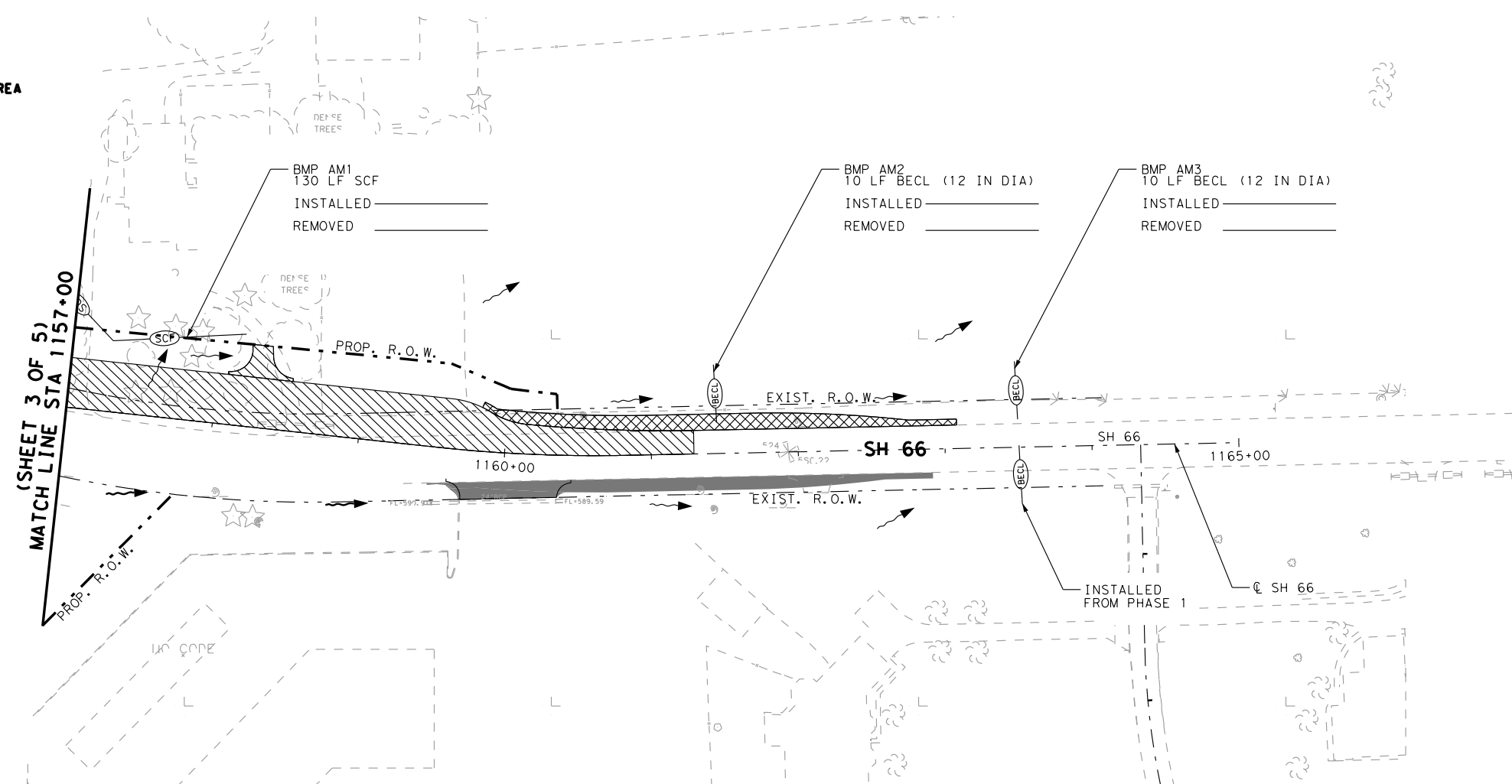
1. THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
2. CONSTRUCTION EXIT (TY 1) WILL BE REQUIRED AT THE LOCATION APPROVED BY THE ENGINEER.
3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.

AM DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

| | | |
|-----------------------|-----------------------------------|-----------------------------------|
| BMP AM1 130 LF SCF | BMP AM2 10 LF BECL (12 IN DIA) | BMP AM3 10 LF BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ |

MATCH LINE STA 1157+00
(SHEET 3 OF 5)



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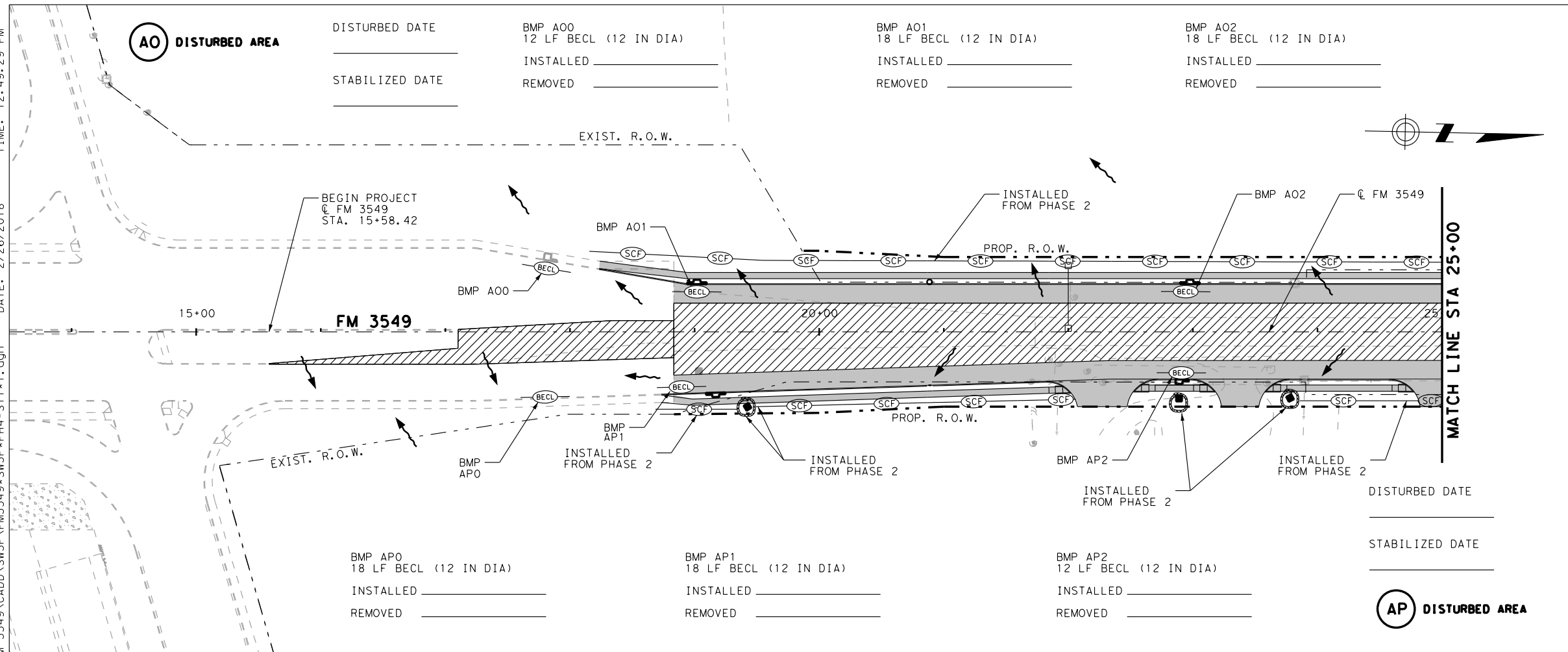
SW3P PLAN
 PHASE 2

SH 66 STA. 1147+00 TO STA. 1155+20
 SH 66 STA. 1157+00 TO STA. 1165+00

SHEET 5 OF 5

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 306 |
| CHECK JM | CONTROL | SECTION | JOB | |
| CHECK JM | 1015 | 01 | 023 | |

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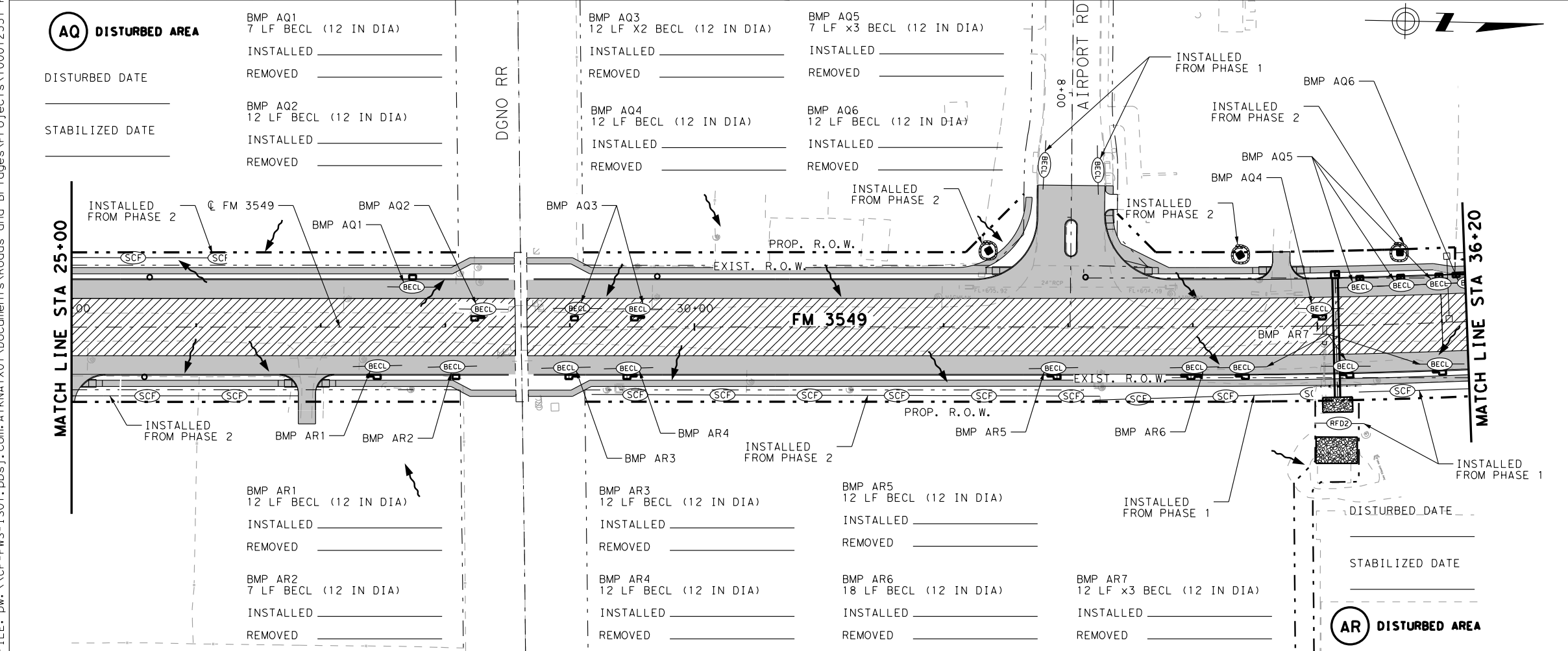


50' 25' 0 50' 100'

LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

- GENERAL NOTES**
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SW3P PLAN
 PHASE 4
 BEGIN PROJECT TO STA. 36+20
 SHEET 1 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TC | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | 307 |
| CHECK | CONTROL | SECTION | JOB | |
| JM | 1015 | 01 | 023 | |

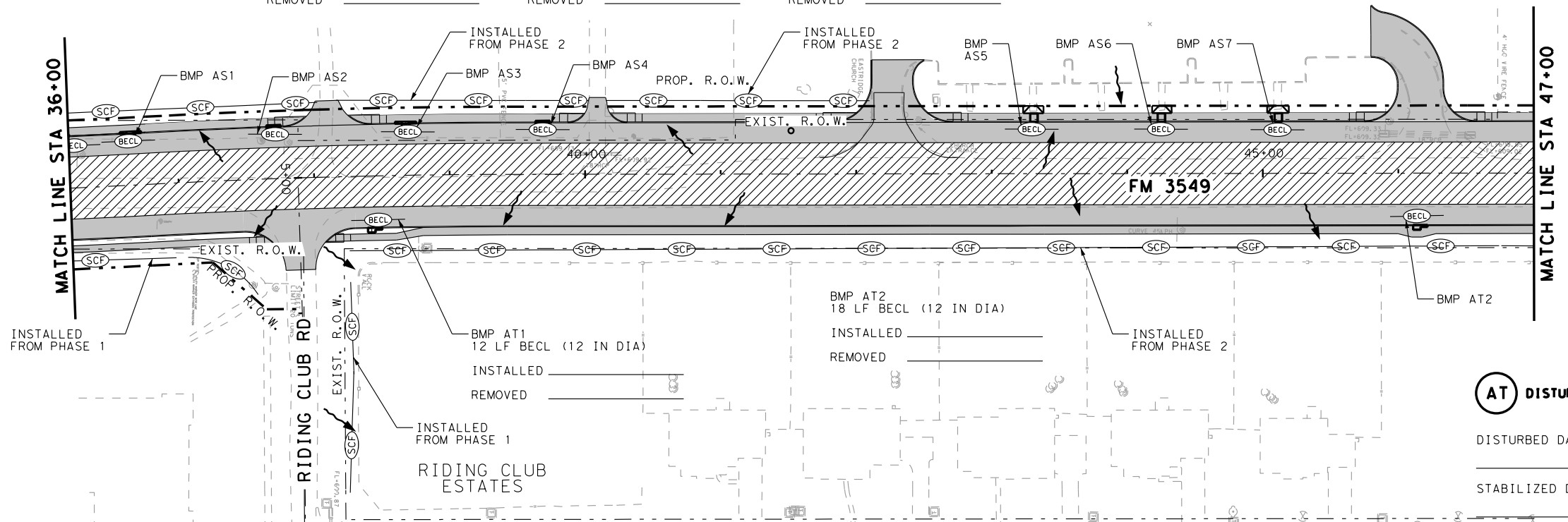
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AS DISTURBED AREA

DISTURBED DATE _____

STABILIZED DATE _____

| | | | |
|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|
| BMP AS1 18 LF BECL (12 IN DIA) | BMP AS3 18 LF BECL (12 IN DIA) | BMP AS5 7 LF BECL (12 IN DIA) | BMP AS7 7 LF BECL (12 IN DIA) |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |
| BMP AS2 12 LF BECL (12 IN DIA) | BMP AS4 12 LF BECL (12 IN DIA) | BMP AS6 7 LF BECL (12 IN DIA) | |
| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | |



AT DISTURBED AREA

DISTURBED DATE _____

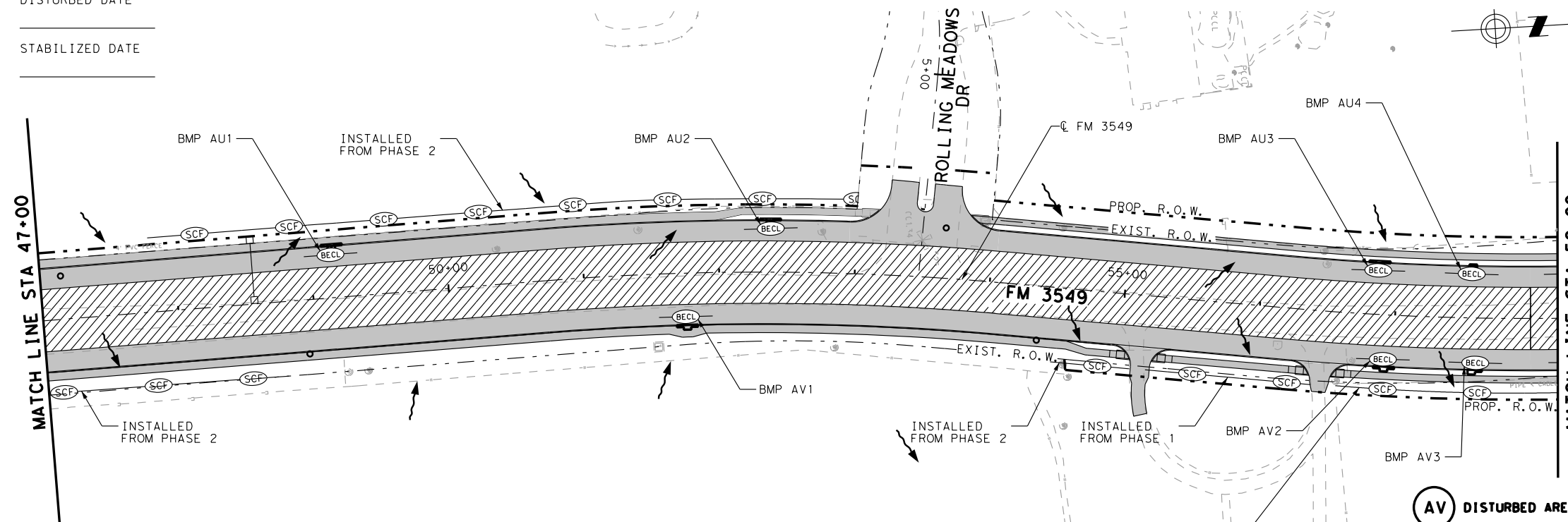
STABILIZED DATE _____

AU DISTURBED AREA

DISTURBED DATE _____

STABILIZED DATE _____

| | | | |
|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
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| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ | REMOVED _____ |

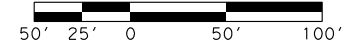


AV DISTURBED AREA

DISTURBED DATE _____

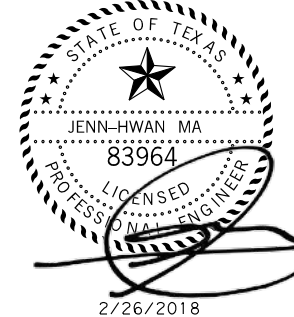
STABILIZED DATE _____

| | | |
|-----------------------------------|-----------------------------------|-----------------------------------|
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| INSTALLED _____ | INSTALLED _____ | INSTALLED _____ |
| REMOVED _____ | REMOVED _____ | REMOVED _____ |



- LEGEND**
- PROPOSED CONSTRUCTION THIS PHASE
 - PROPOSED CONSTRUCTION PREVIOUS PHASE
 - TEMPORARY PAVEMENT THIS PHASE
 - TEMPORARY PAVEMENT PREVIOUS PHASE
 - DIRECTION OF FLOW
 - TEMPORARY SEDIMENT CONTROL FENCE
 - TYPE 2 ROCK FILTER DAM
 - BIOGRD EROSION CONTROL LOG
 - EROSION CONTROL LOG AT INLET (ECL)
 - DISTURBED & SEEDING AREA
 - DISTURBED AREA ID

- GENERAL NOTES**
- THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
 - CONSTRUCTION EXIT (TY 1) WILL BE REQUIRED AT THE LOCATION APPROVED BY THE ENGINEER.
 - SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



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 Dallas, Texas 75243
 TBPE Firm Registration No. 6981

ATKINS
 TBPE REG. # F-474



SW3P PLAN
 PHASE 4
 STA. 36+00 TO STA. 58+00

SHEET 2 OF 5

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 308 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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(AX) DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

BMP AX1
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

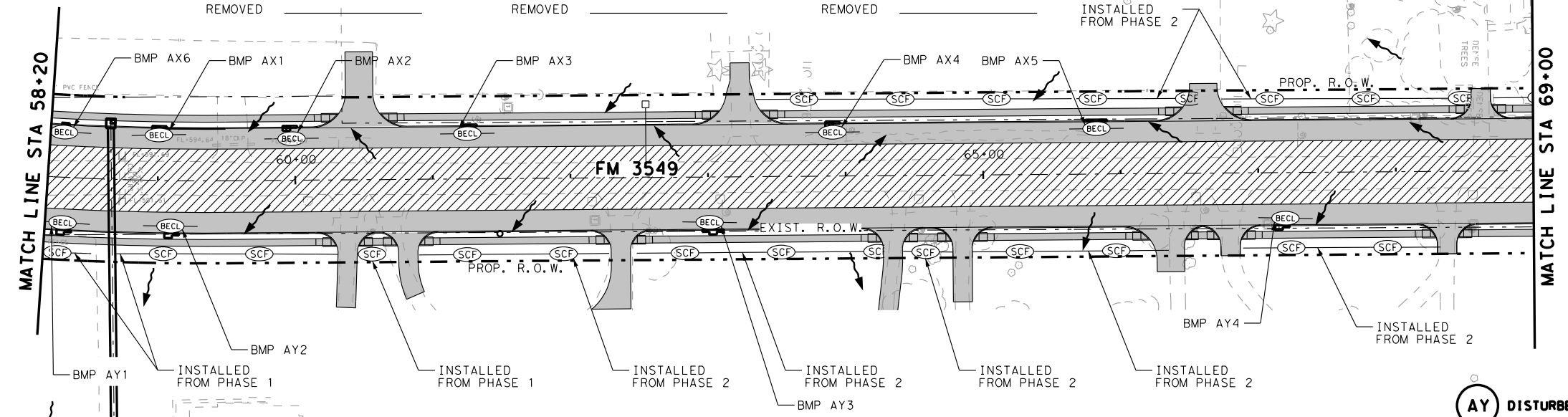
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12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AX5
18 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AX2
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AX4
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AX6
7 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____



(AY) DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

BMP AY1
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AY2
12 LF BICL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AY3
18 LF BICL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AY4
12 LF BICL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

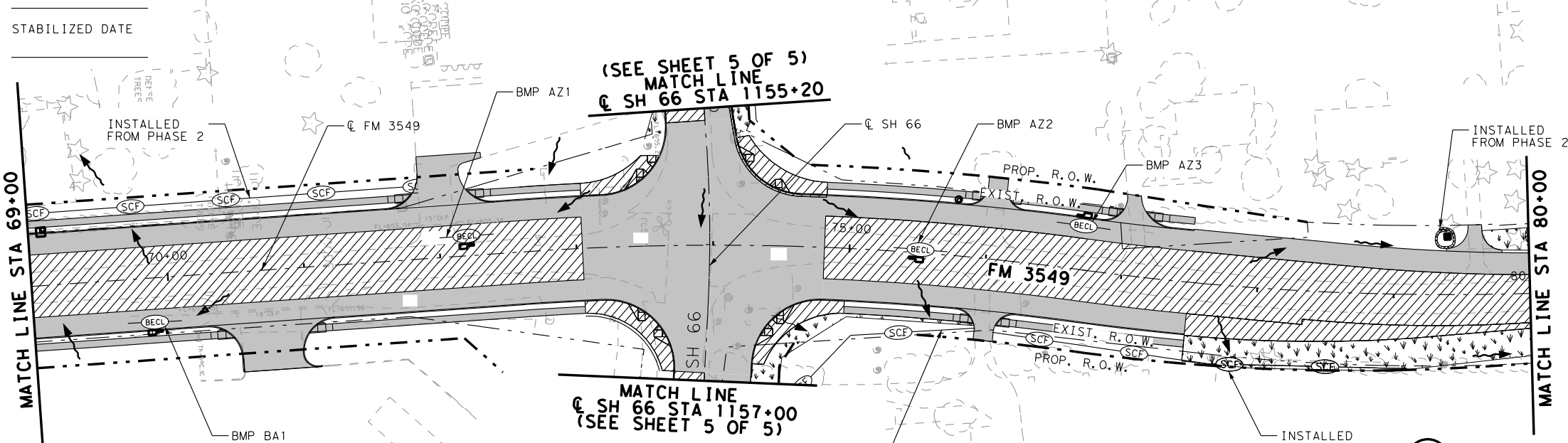
(AZ) DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

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12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP AZ2
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

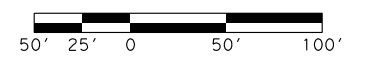
BMP AZ3
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____



(BA) DISTURBED AREA

DISTURBED DATE _____
 STABILIZED DATE _____

BMP BA1
12 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____



LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

GENERAL NOTES

1. THE LOCATION AND TYPE OF SEDIMENT CONTROL DEVICES ARE APPROXIMATE, AND CAN BE REVISED TO BETTER SUIT ACTUAL CONDITIONS, WHEN APPROVED BY THE ENGINEER.
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3. SEE DAILY WORK REPORTS FOR INITIAL STABILIZATION TIME FRAMES.



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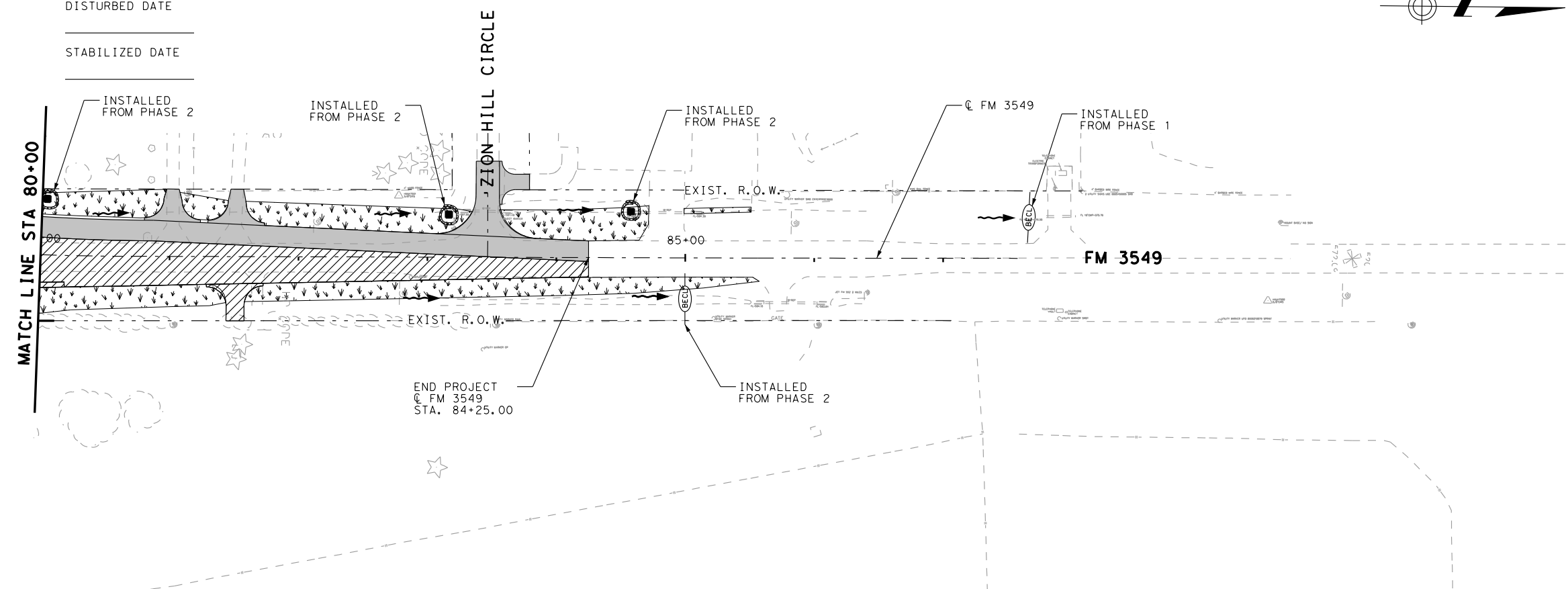
SW3P PLAN
 PHASE 4
 STA. 58+20 TO STA. 80+00

SHEET 3 OF 5

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
| CHECK JM | TEXAS | DALLAS | ROCKWALL | 309 |
| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

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BB DISTURBED AREA
 DISTURBED DATE _____
 STABILIZED DATE _____

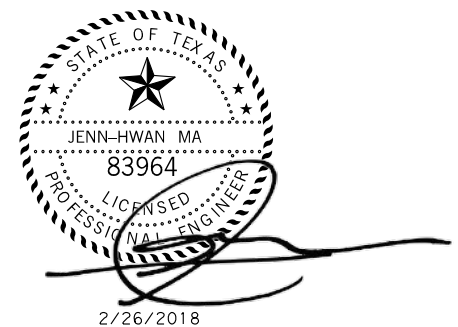


LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
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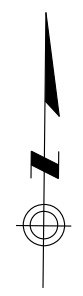
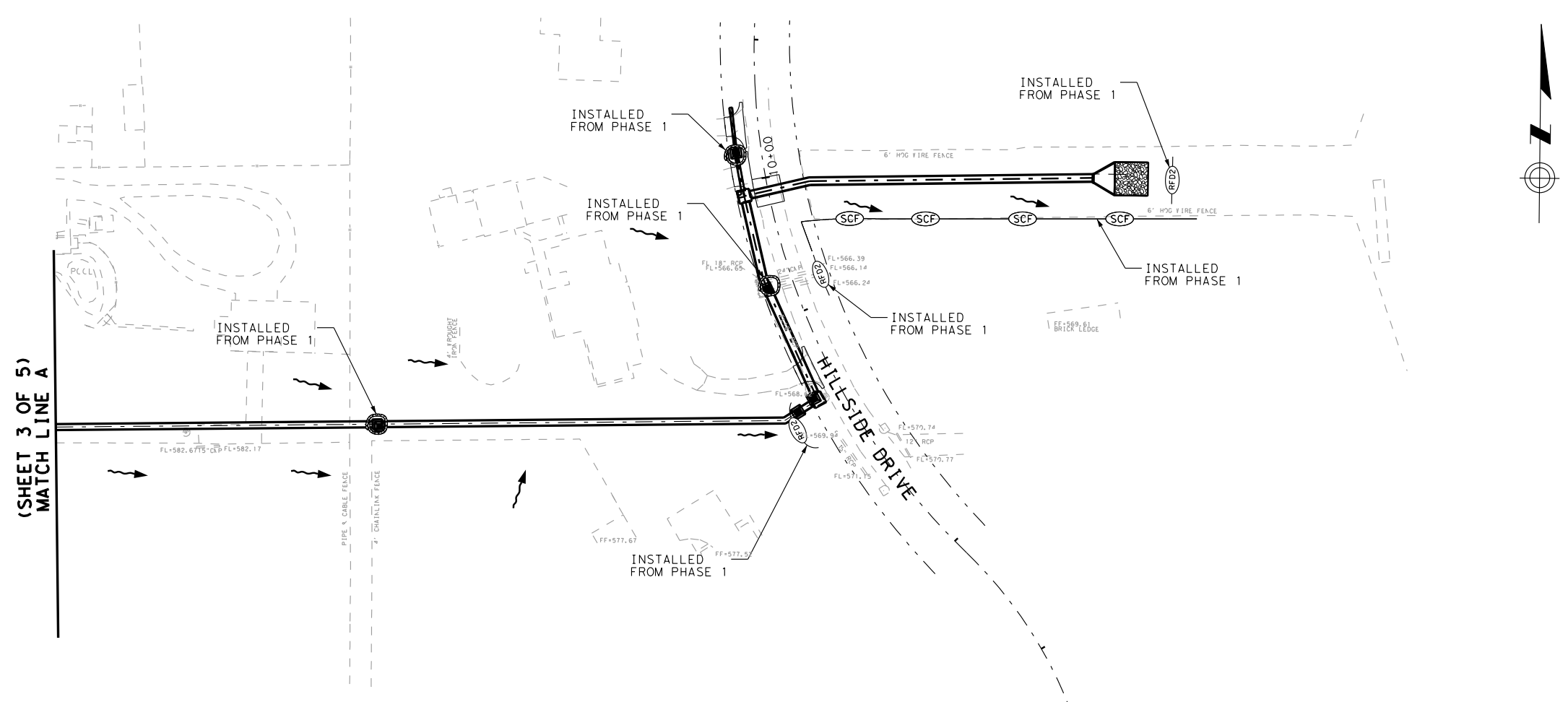
ATKINS
 TBPE REG. # F-474



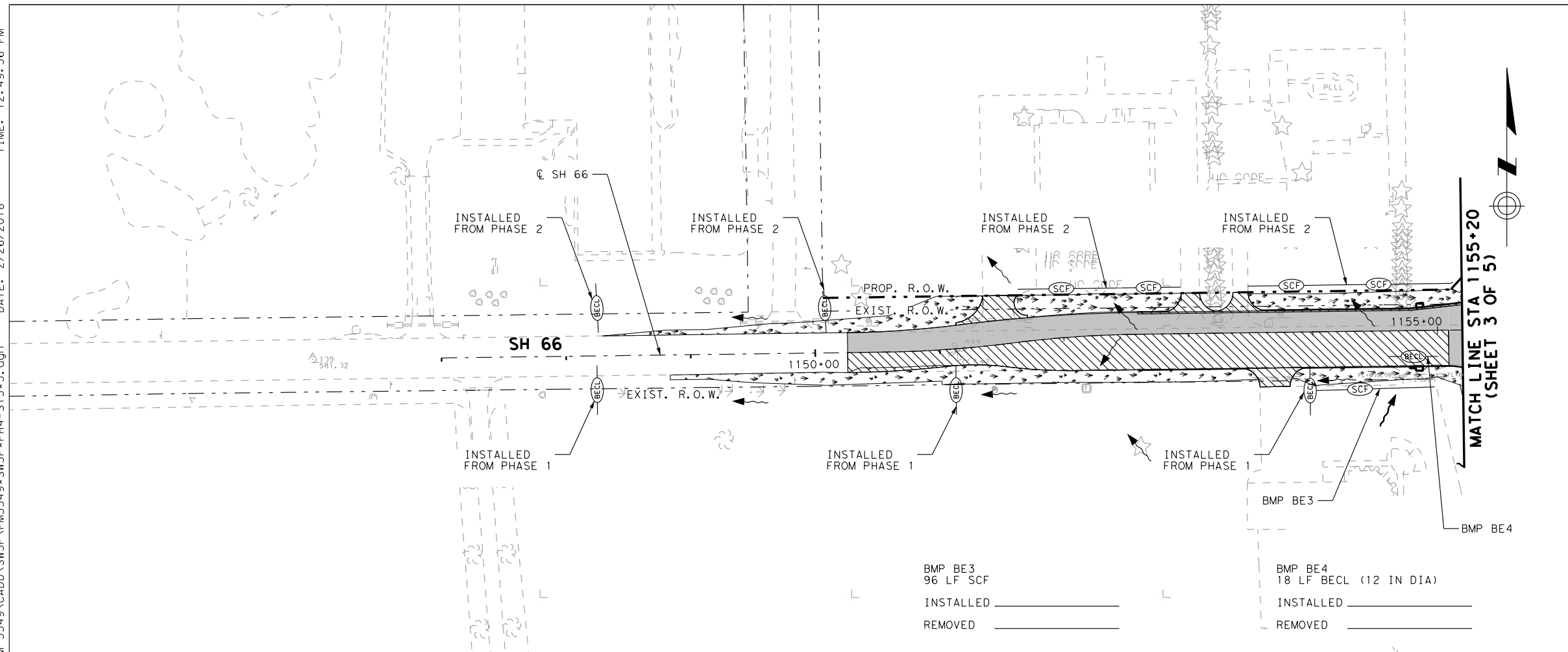
SW3P PLAN
 PHASE 4
 @ FM 3549 STA. 80+00 TO END PROJECT

SHEET 4 OF 5

| | | | | |
|----------|-------------------|-------------------------|----------|-------------|
| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | HIGHWAY NO. |
| TC | 6 | SEE TITLE SHEET | | FM 3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. |
| TC | TEXAS | DALLAS | ROCKWALL | 310 |
| CHECK | JM | CONTROL | SECTION | |
| CHECK | JM | 1015 | 01 | |
| | | | JOB | |
| | | | 023 | |



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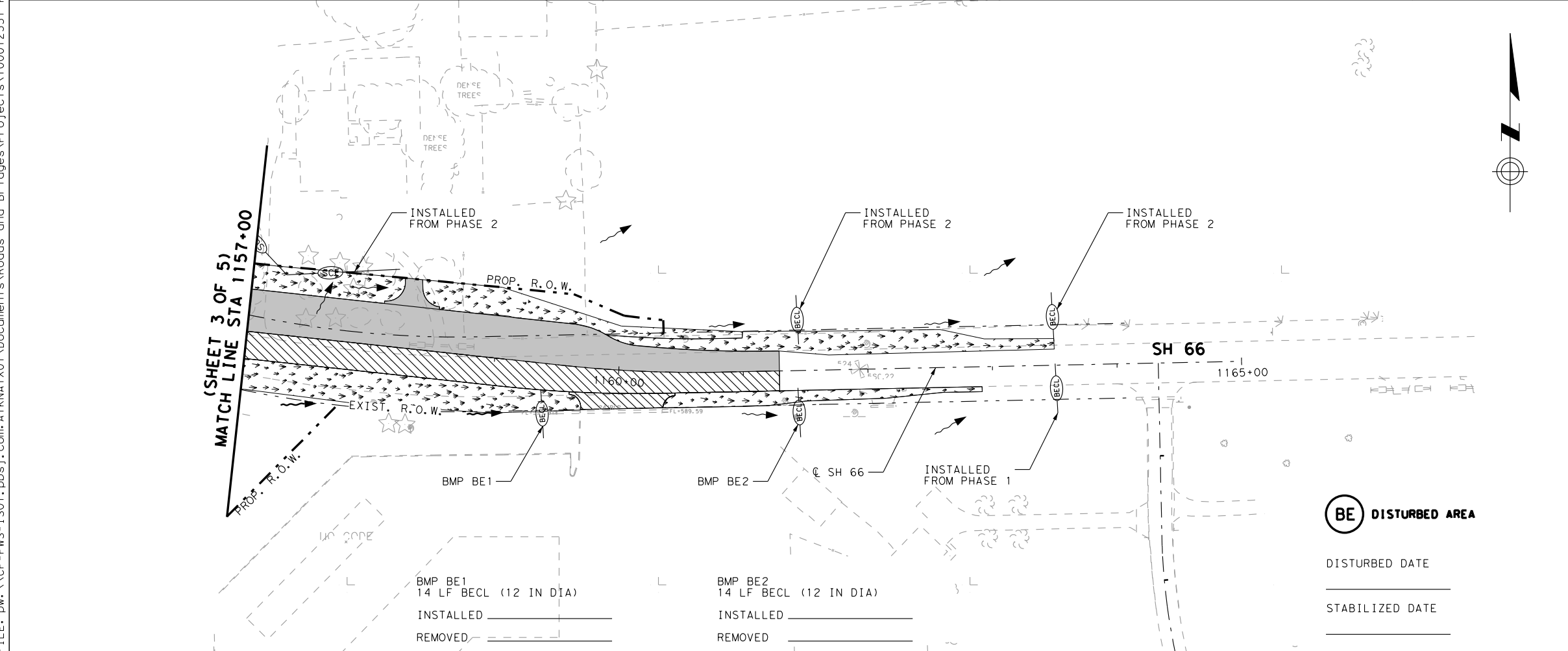
LEGEND

- PROPOSED CONSTRUCTION THIS PHASE
- PROPOSED CONSTRUCTION PREVIOUS PHASE
- TEMPORARY PAVEMENT THIS PHASE
- TEMPORARY PAVEMENT PREVIOUS PHASE
- DIRECTION OF FLOW
- TEMPORARY SEDIMENT CONTROL FENCE
- TYPE 2 ROCK FILTER DAM
- BIOGRD EROSION CONTROL LOG
- EROSION CONTROL LOG AT INLET (ECL)
- DISTURBED & SEEDING AREA
- DISTURBED AREA ID

- GENERAL NOTES**
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BMP BE3
 96 LF SCF
 INSTALLED _____
 REMOVED _____

BMP BE4
 18 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____



BMP BE1
 14 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BMP BE2
 14 LF BECL (12 IN DIA)
 INSTALLED _____
 REMOVED _____

BE DISTURBED AREA

DISTURBED DATE _____

STABILIZED DATE _____



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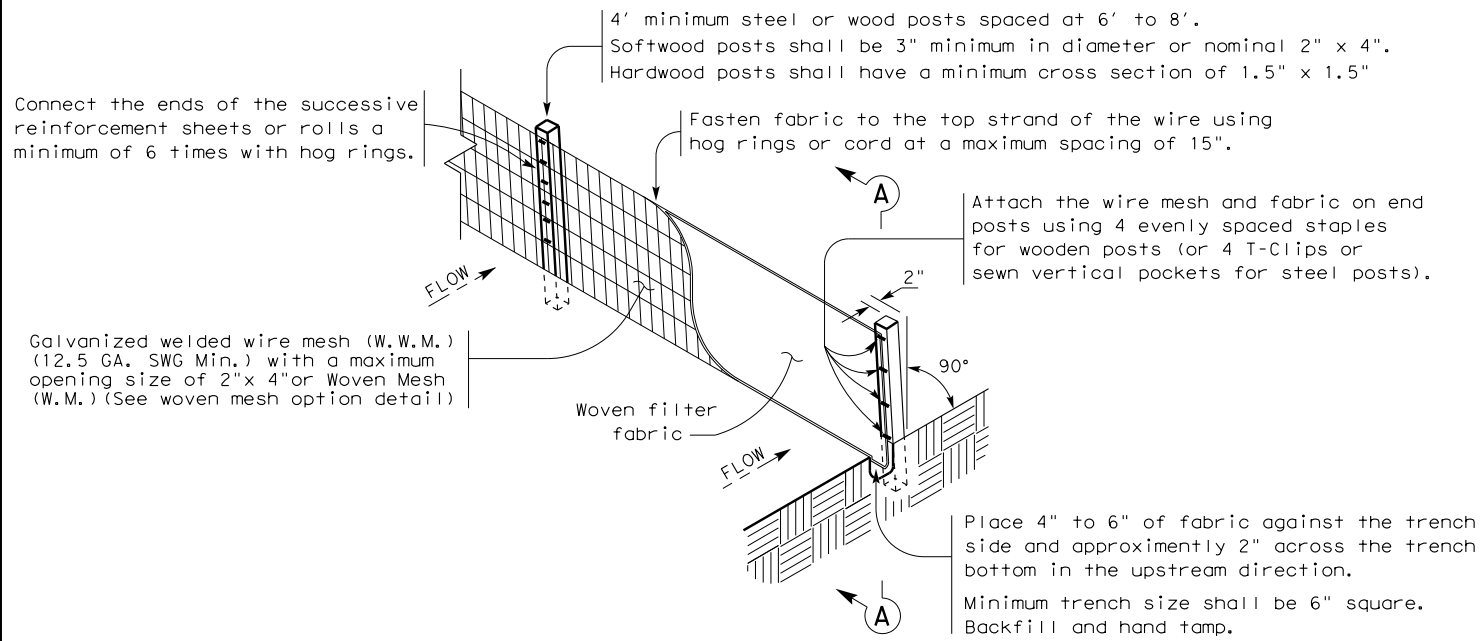
SW3P PLAN
 PHASE 4
 CL SH 66 STA. 1147+00 TO STA. 1155+20
 CL SH 66 STA. 1157+00 TO STA. 1165+00

SHEET 5 OF 5

| | | | | |
|-------------|---------------------|---|----------|---------------------|
| DESIGN TC | FED. RD. DIV. NO. 6 | FEDERAL AID PROJECT NO. SEE TITLE SHEET | | HIGHWAY NO. FM 3549 |
| GRAPHICS TC | STATE | DISTRICT | COUNTY | SHEET NO. |
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| CHECK JM | CONTROL | SECTION | JOB | |
| | 1015 | 01 | 023 | |

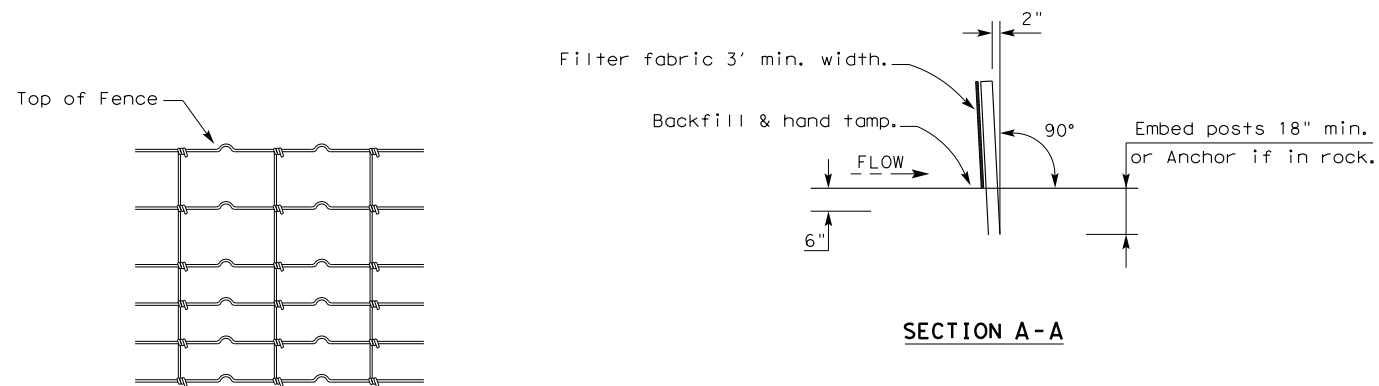
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DATE
FILE



TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

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

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

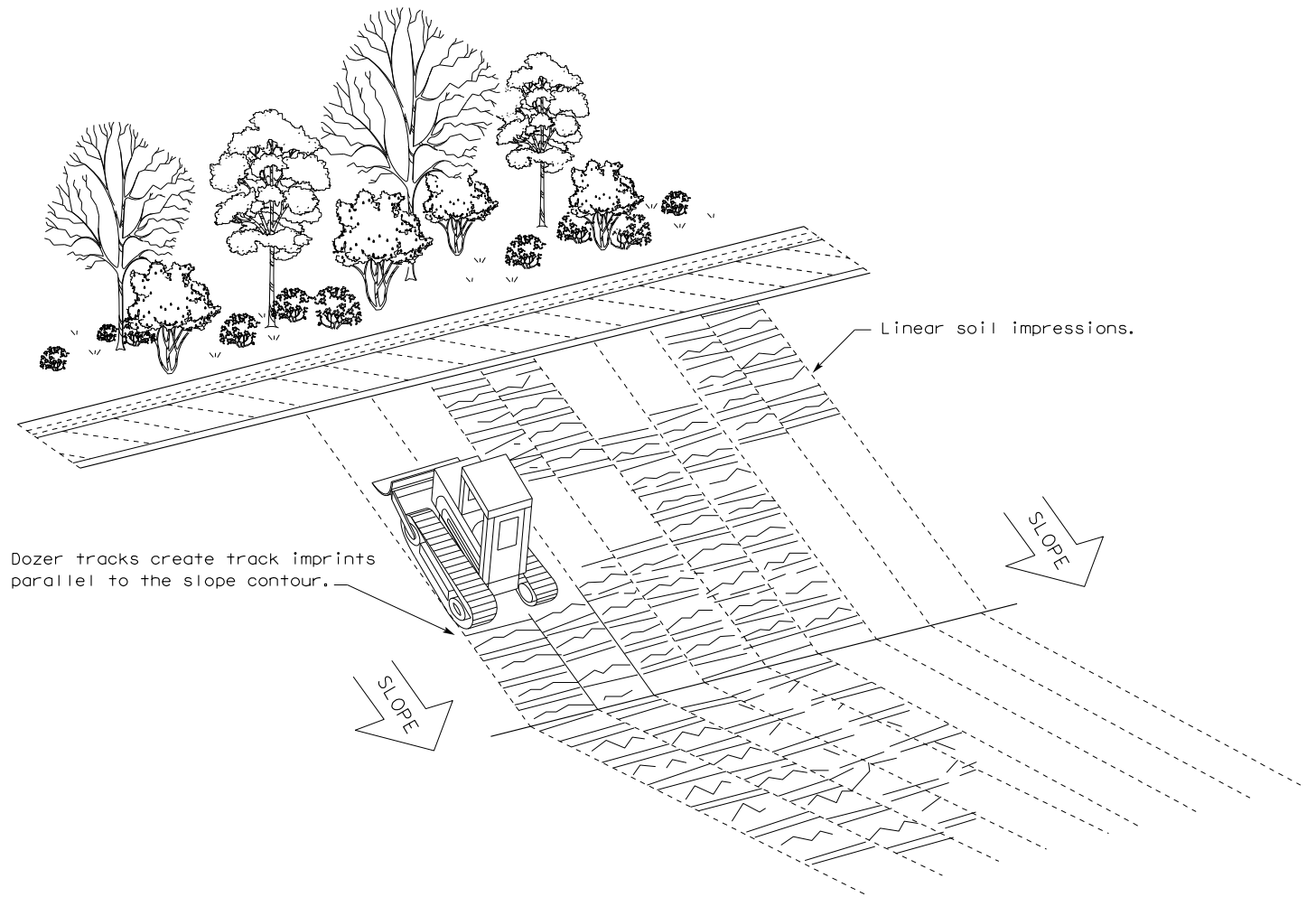
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

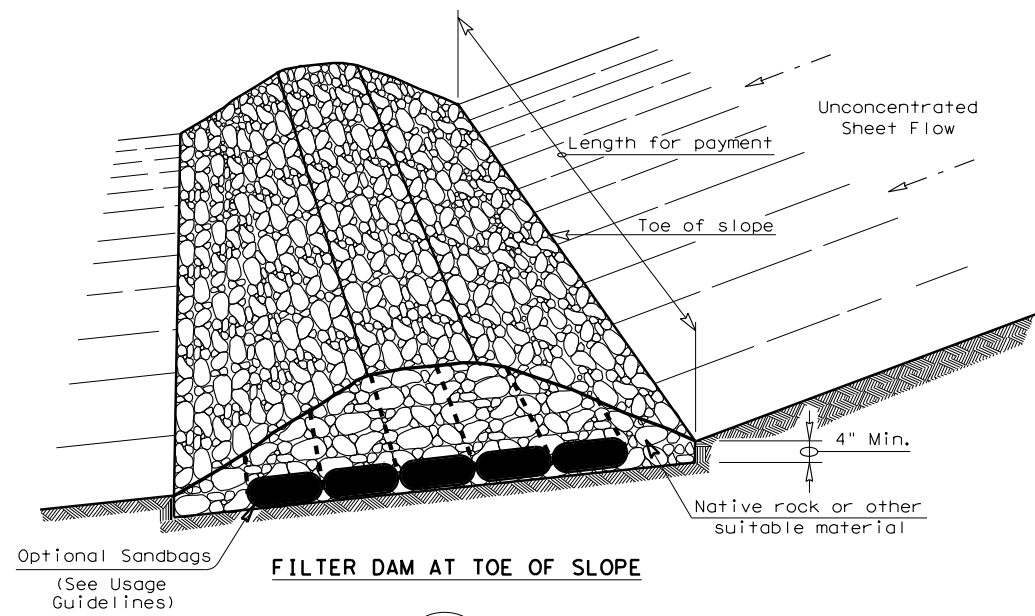


VERTICAL TRACKING

| | | | | | |
|---|-----------|----------|--------|---------------------------------|--|
| | | | | Design Division Standard | |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING | | | | | |
| EC(1) - 16 | | | | | |
| FILE: ec116 | DN: TxDOT | CK: KM | DW: VP | DN/CK: LS | |
| © TxDOT: JULY 2016 | CONT | SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 | 01 | 023 | FM 3549 | |
| | DIST | COUNTY | | SHEET NO. | |
| | DAL | ROCKWALL | | 312 | |

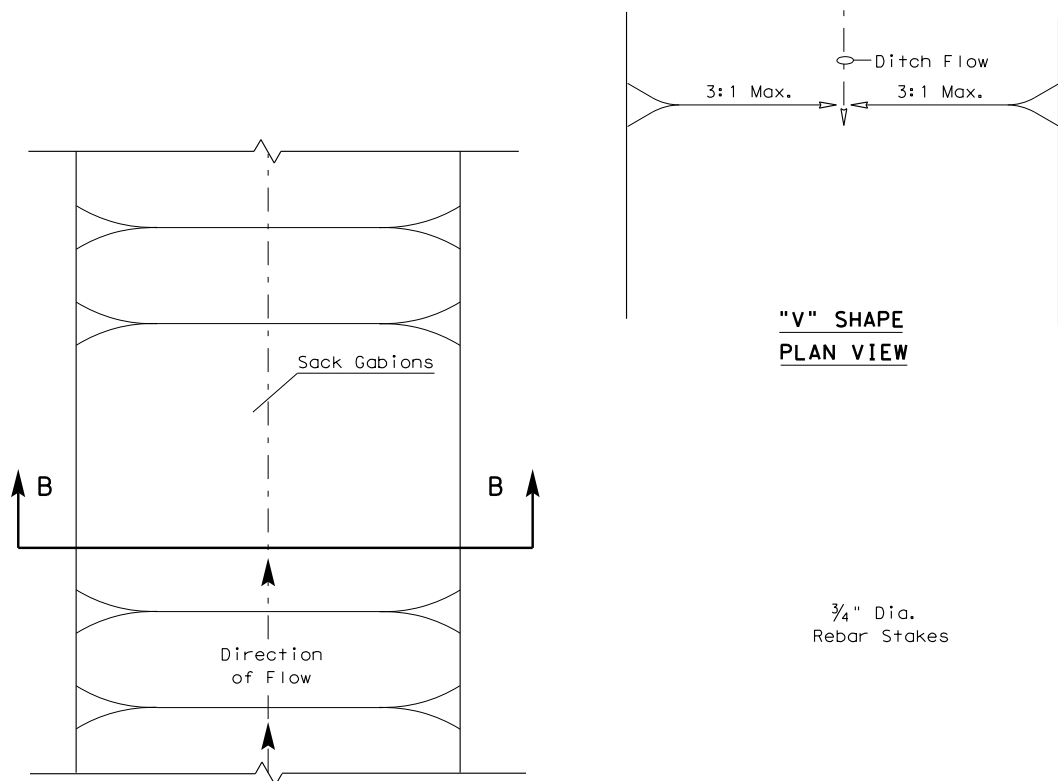
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DATE: FILE:



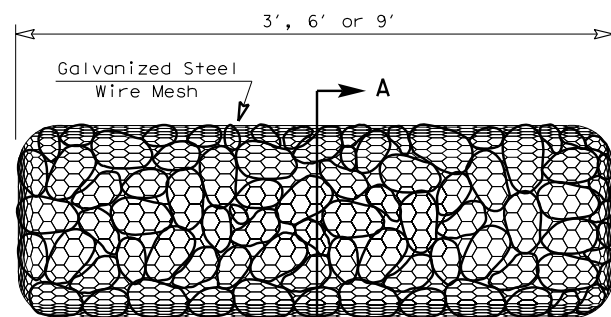
FILTER DAM AT TOE OF SLOPE

— (RFD1) —



"V" SHAPE PLAN VIEW

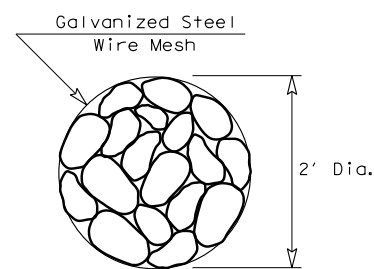
PLAN VIEW



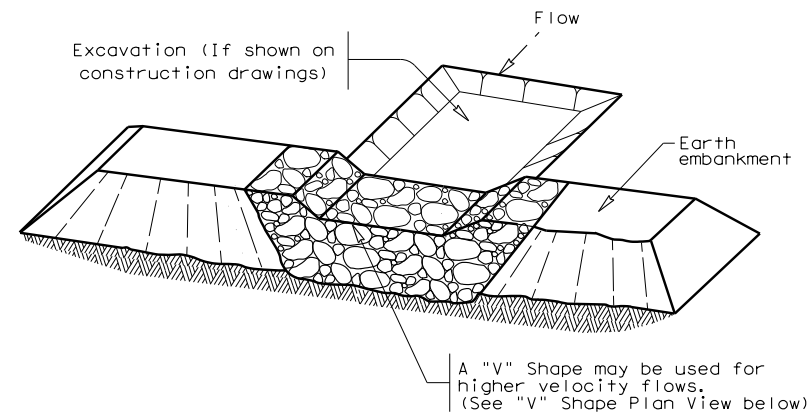
TYPE 4 (SACK GABIONS)

— (RFD4) —

SECTION B-B

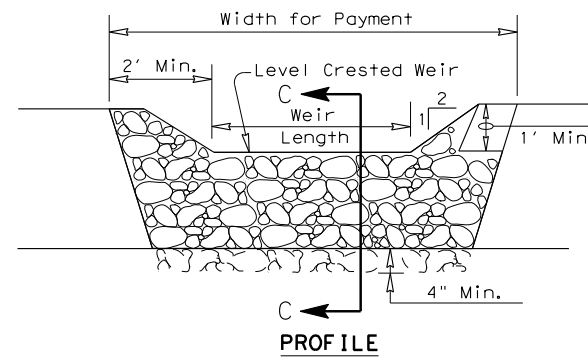


SECTION A-A

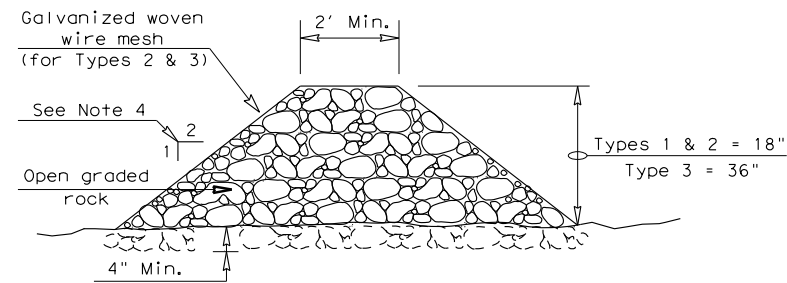


FILTER DAM AT SEDIMENT TRAP

— (RFD1) — OR — (RFD2) —



PROFILE



SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

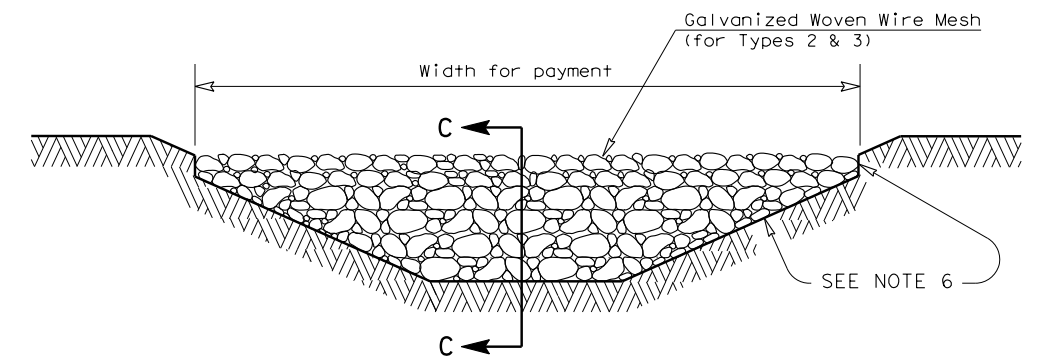
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

— (RFD1) — OR — (RFD2) — OR — (RFD3) —

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

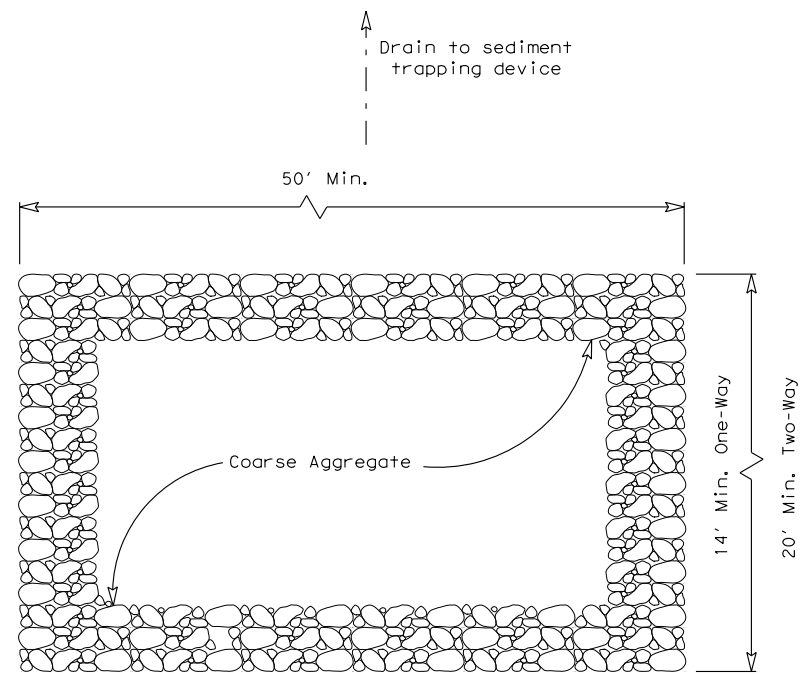
PLAN SHEET LEGEND

- Type 1 Rock Filter Dam — (RFD1) —
- Type 2 Rock Filter Dam — (RFD2) —
- Type 3 Rock Filter Dam — (RFD3) —
- Type 4 Rock Filter Dam — (RFD4) —

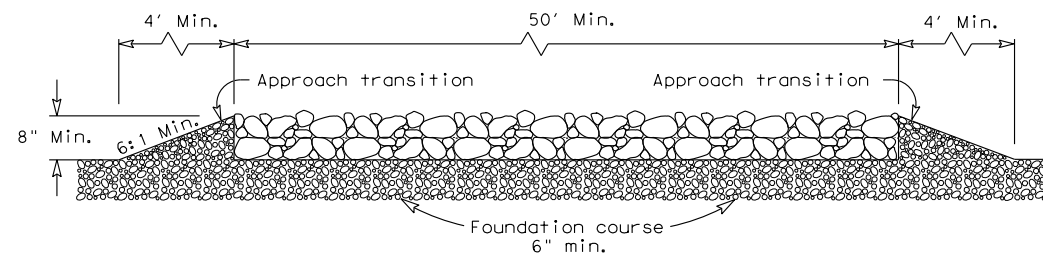
| | | | |
|--|------------|---------------------------------|----------------|
| | | Design Division Standard | |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC (2) - 16 | | | |
| FILE: ec216 | DN: TxDOT | CK: KM | DW: VP |
| © TxDOT: JULY 2016 | CONT: 1015 | SECT: 01 | JOB: 023 |
| REVISIONS | DIST: DAL | COUNTY: ROCKWALL | SHEET NO.: 313 |

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DATE:
FILE:



PLAN VIEW

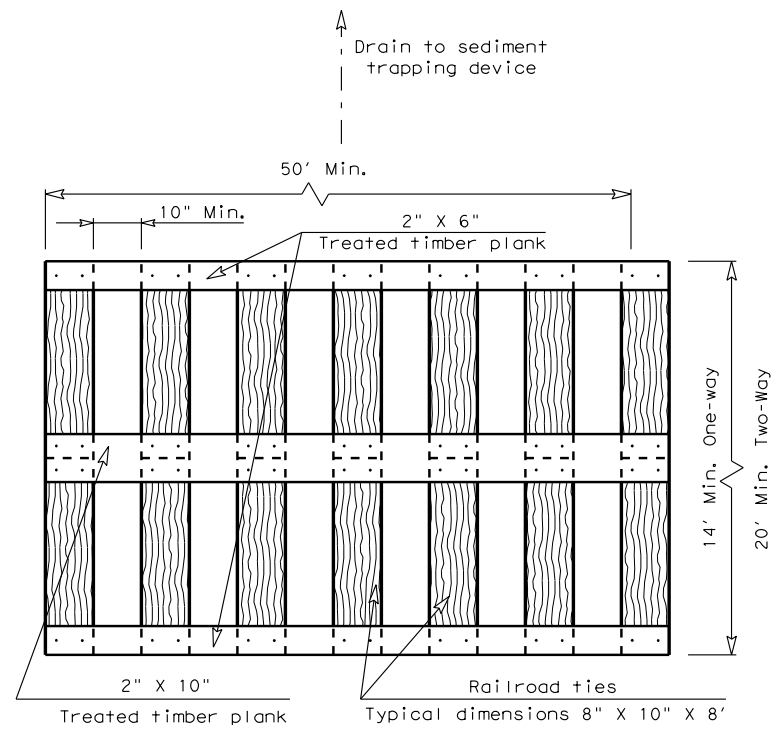


ELEVATION VIEW

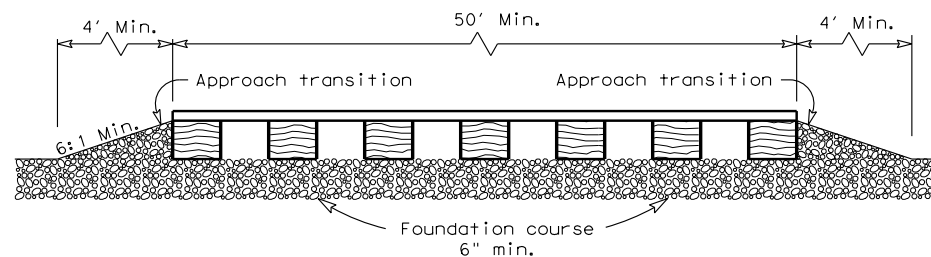
CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

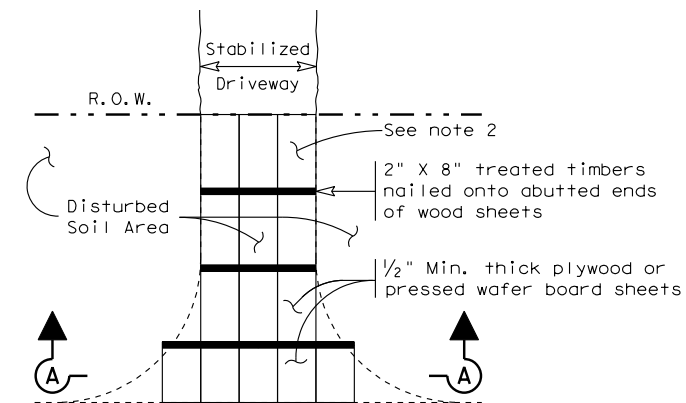


ELEVATION VIEW

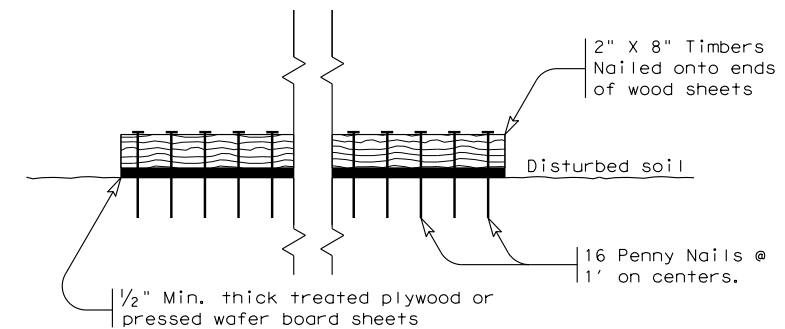
CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



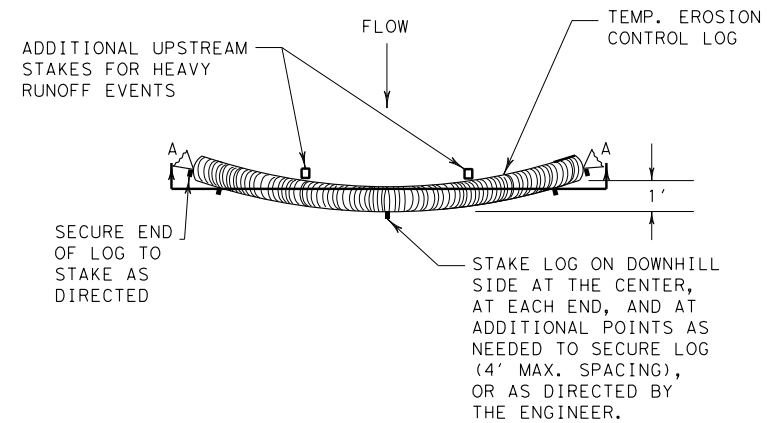
SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM

GENERAL NOTES (TYPE 3)

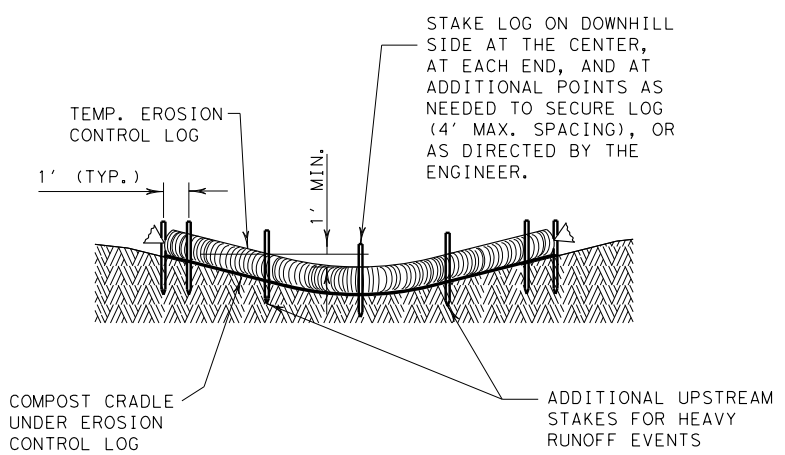
- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

| | | | |
|---|-----------|---------------------------------|-----------|
| | | Design Division Standard | |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16 | | | |
| FILE: ec316 | DN: TxDOT | CK: KM | DW: VP |
| © TxDOT: JULY 2016 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| | DIST | COUNTY | SHEET NO. |
| | DAL | ROCKWALL | 314 |

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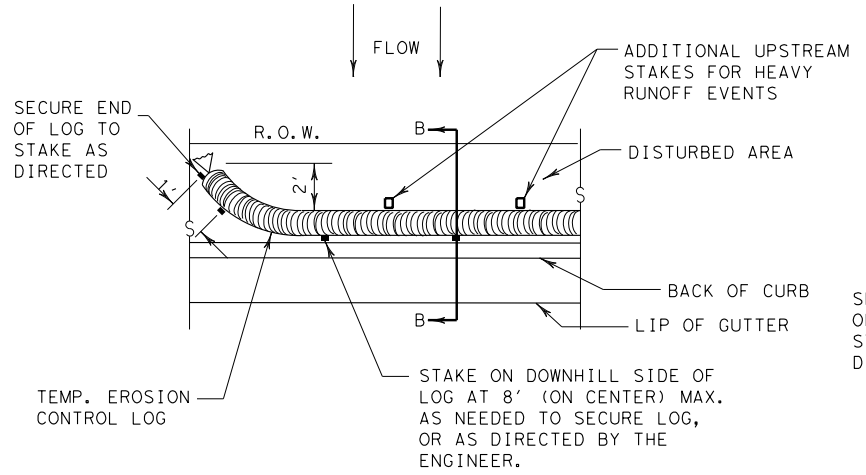


PLAN VIEW

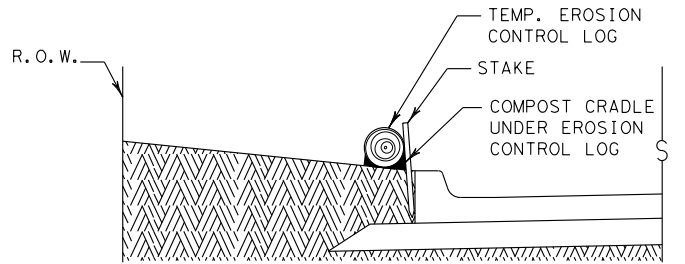


SECTION A-A
EROSION CONTROL LOG DAM

CL-D

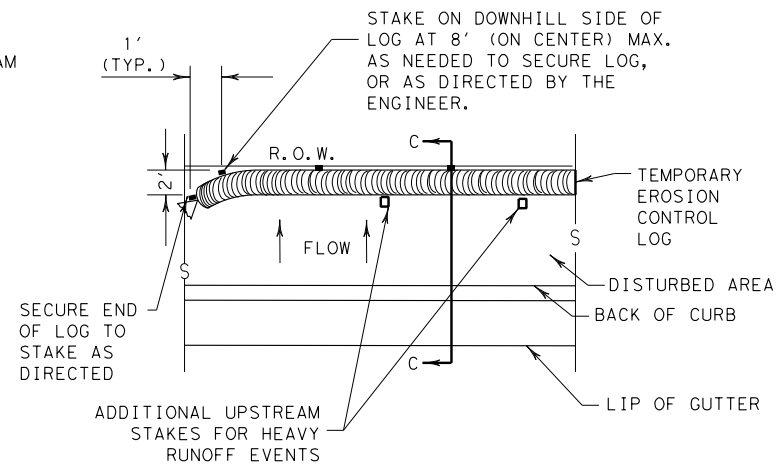


PLAN VIEW

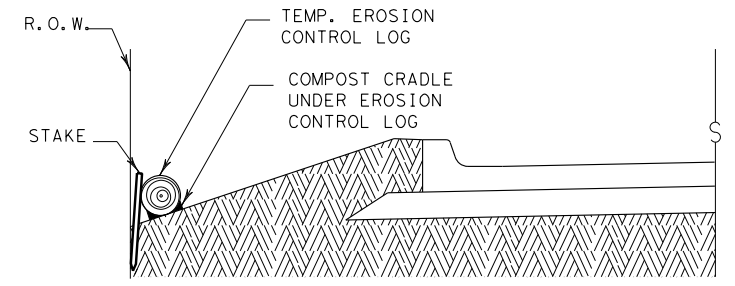


SECTION B-B
EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



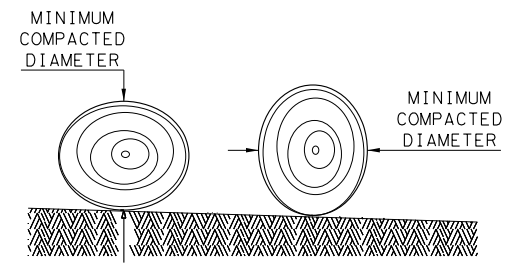
PLAN VIEW



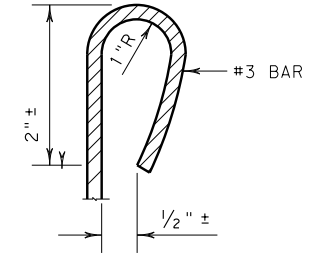
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS



REBAR STAKE DETAIL

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

- LEGEND**
- CL-D EROSION CONTROL LOG DAM
 - CL-BOC EROSION CONTROL LOG AT BACK OF CURB
 - CL-ROW EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
 - CL-SST EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
 - CL-SSL EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
 - CL-DI EROSION CONTROL LOG AT DROP INLET
 - CL-CI EROSION CONTROL LOG AT CURB INLET
 - CL-GI EROSION CONTROL LOG AT CURB & GRATE INLET

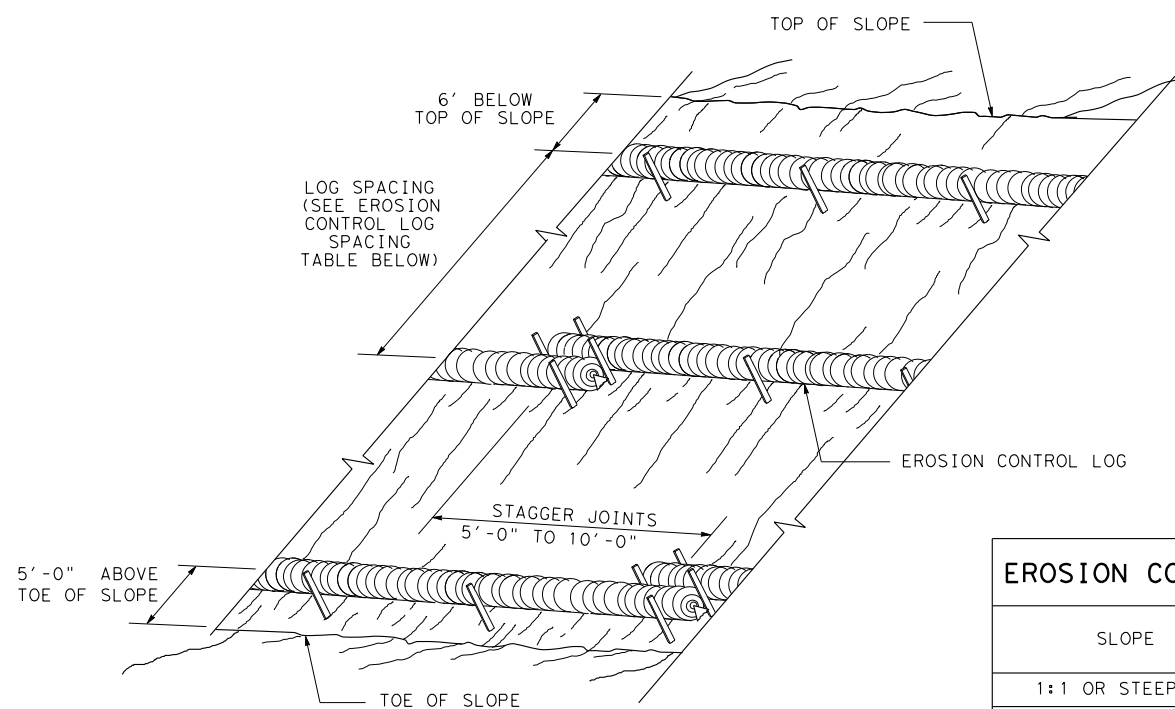
SHEET 1 OF 3

| | | | |
|---|-----------|---------------------------------|-----------|
| | | Design Division Standard | |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES | | | |
| EROSION CONTROL LOG | | | |
| EC (9) - 16 | | | |
| FILE: ec916 | DN: TxDOT | CK: KM | DW: LS/PT |
| © TxDOT: JULY 2016 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 315 | |

DATE: FILE:

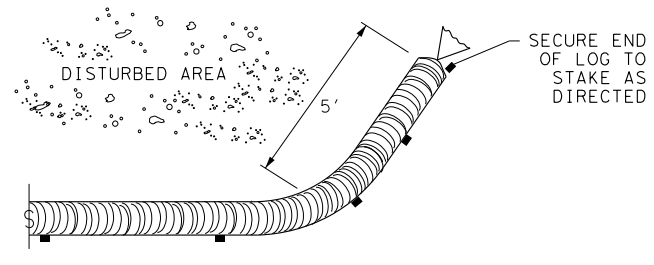
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DATE:
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**EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING**

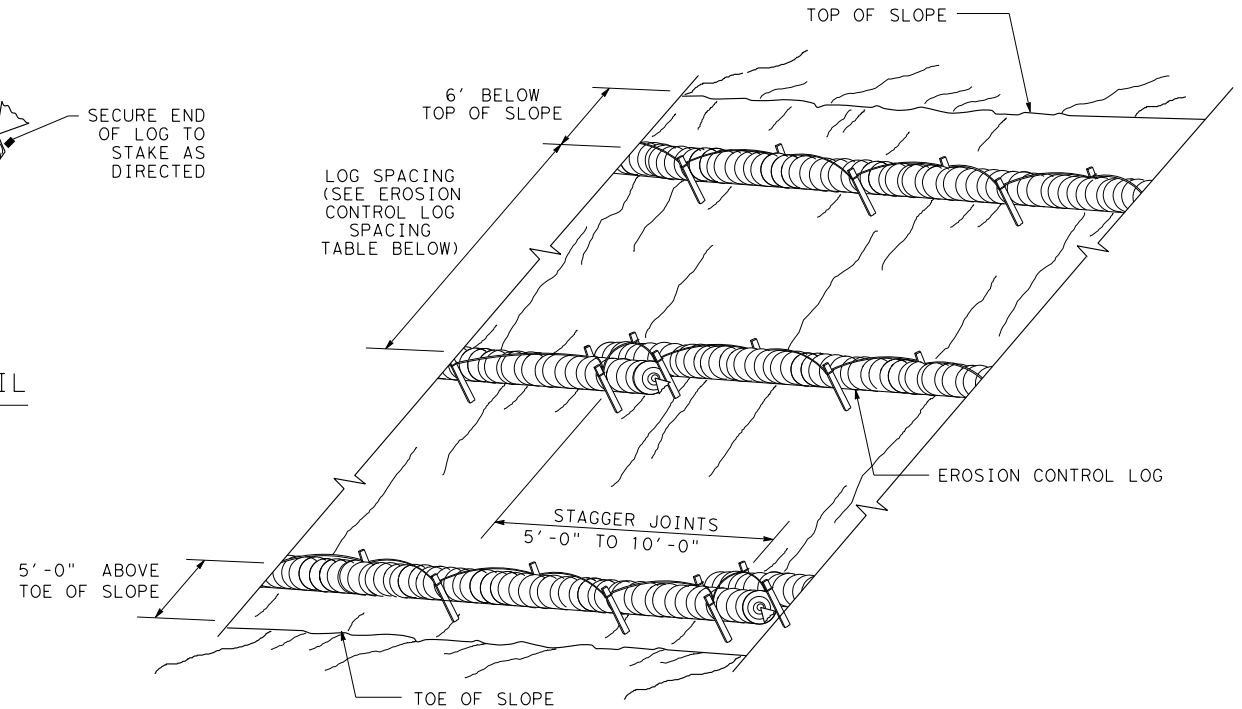
CL-SST



END SECTION RAP DETAIL

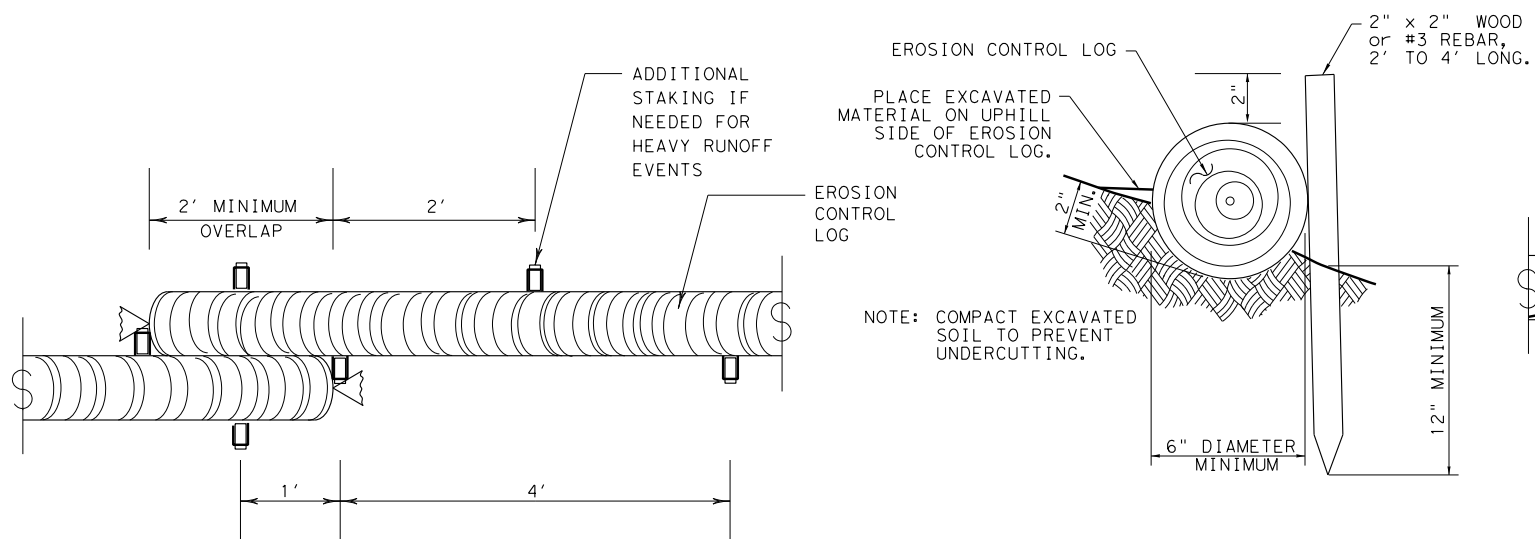
| SLOPE | LOG DIAMETER | | | |
|----------------|--------------|-----|-----|-----|
| | 6" | 8" | 12" | 18" |
| 1:1 OR STEEPER | 5' | 10' | 15' | 20' |
| 2:1 | 10' | 20' | 30' | 40' |
| 3:1 | 15' | 30' | 45' | 60' |
| 4:1 OR FLATTER | 20' | 40' | 60' | 80' |

* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



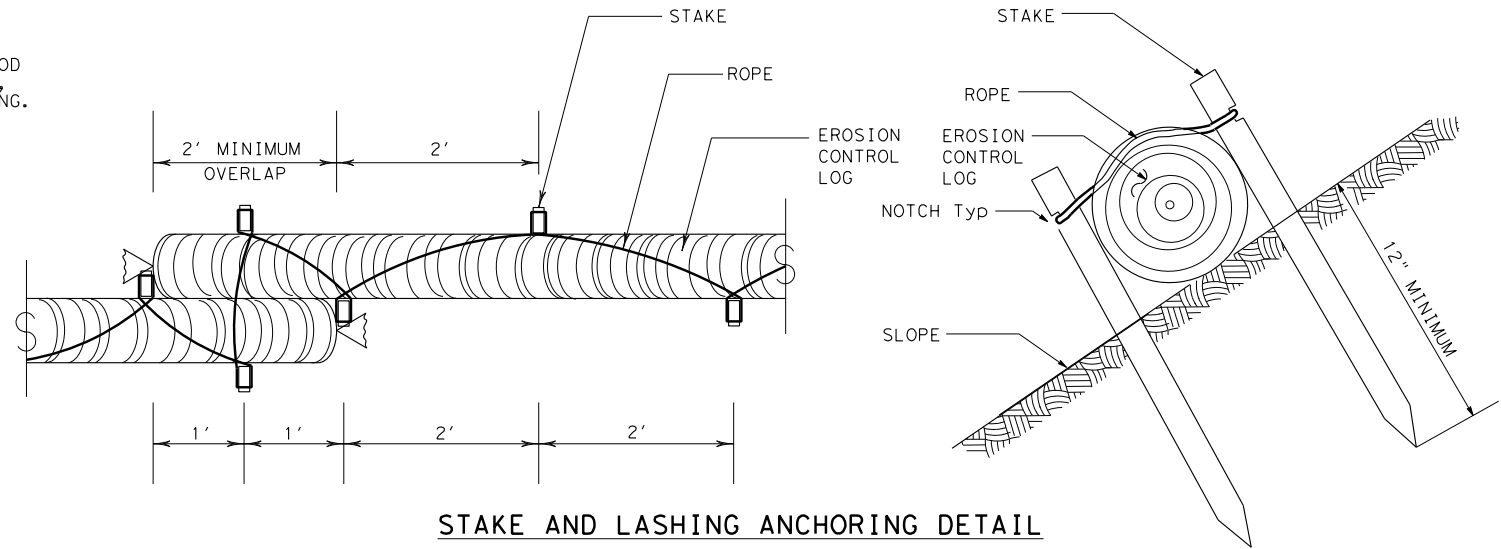
**EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING**

CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

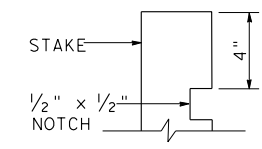
CL-SST



STAKE AND LASHING ANCHORING DETAIL

CL-SSL

| LOG DIAMETER | DEPTH |
|--------------|-------|
| 6" | 2" |
| 8" | 3" |
| 12" | 4" |
| 18" | 5" |

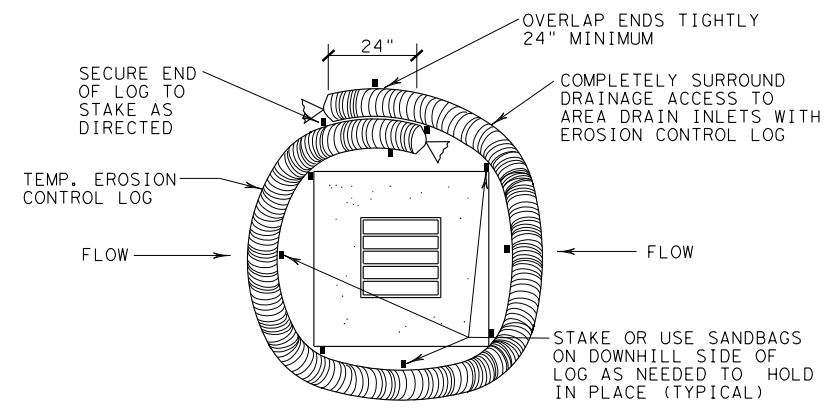


STAKE NOTCH DETAIL

SHEET 2 OF 3

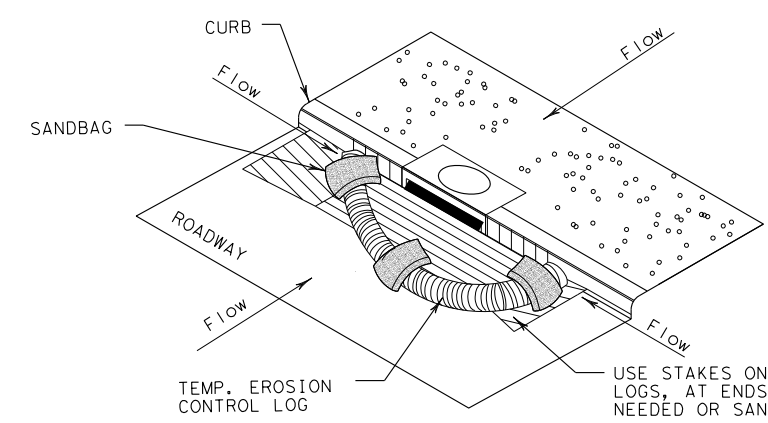
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| | | | | Design Division Standard |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16 | | | | |
| FILE: ec116 | DN: TxDOT | CK: KM | DW: LS/PT | CK: LS |
| © TxDOT: JULY 2016 | CONT SECT | JOB | HIGHWAY | |
| REVISIONS | 1015 01 | 023 | FM 3549 | |
| | DIST | COUNTY | SHEET NO. | |
| | DAL | ROCKWALL | 316 | |

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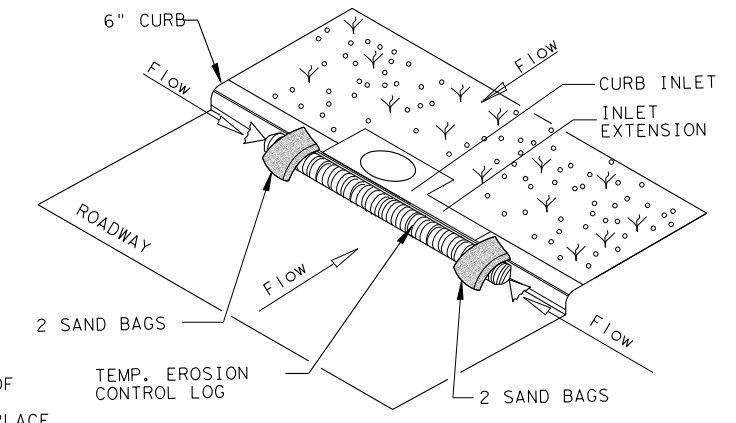
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

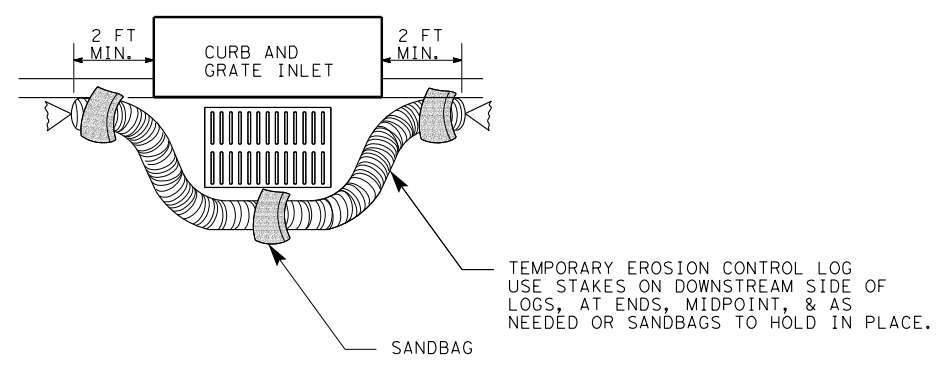
CL-CI



EROSION CONTROL LOG AT CURB INLET

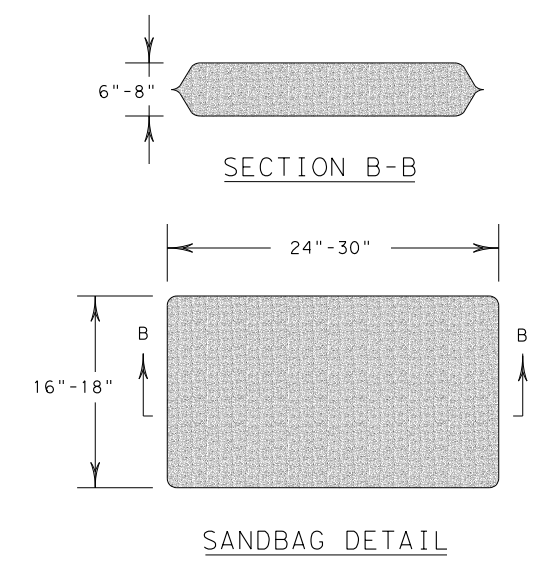
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SHEET 3 OF 3

| | | | |
|---|-----------|---------------------------------|-----------|
| | | Design Division Standard | |
| TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16 | | | |
| FILE: ec916 | DN: TxDOT | CK: KM | DW: LS/PT |
| © TxDOT: JULY 2016 | CONT SECT | JOB | HIGHWAY |
| REVISIONS | 1015 01 | 023 | FM 3549 |
| DIST | COUNTY | SHEET NO. | |
| DAL | ROCKWALL | 317 | |

DATE:
FILE:

SEEDING FOR EROSION CONTROL

| RECOMMENDED PLANTING SEASON | PERMANENT RURAL SEED MIX ITEM 164 - DRILL SEEDING (PERM) (RURAL) (CLAY) | PERMANENT URBAN SEED MIX ITEM 164 - DRILL SEEDING (PERM) (URBAN) (CLAY) | TEMPORARY DRILL SEED MIX ITEM 164 - DRILL SEED (TEMP) (WARM OR COOL) |
|---|---|---|--|
| WARM SEASON Mar. 15th, April, May, June, July, August, Sept. 15th | Green Sprangletop (Van Horn) - 1.0 lbs/AC Sideoats Grama (Haskell) - 1.0 lbs/AC Texas Grama (Atascosa) - 1.0 lbs/AC Hairy Grama (Chaparral) - 0.3 lbs/AC Shortspike Windmillgrass (Welder) - 0.2 lbs/AC Little Bluestem (OK Select) - 0.8 lbs/AC Purple Prairie Clover (Cuero) - 0.6 lbs/AC Engelmann Daisy (Eldorado) - 0.75 lbs/AC Illinois Bundleflower - 1.3 lbs/AC Awnless Bushsunflower (Plateau) - 0.2 lbs/AC | Green Sprangletop (Leptochloa dubia) - 0.3 lbs/AC Sideoats Grama (El Reno) (Bouteloua curtipendula) - 3.6 lbs/AC Buffalograss (Texoka) (Buchloe dactyloides) - 1.6 lbs/AC Bermudagrass (Cynodon dactylon) - 2.4 lbs/AC | Foxtail Millet (Setaria italica) - 34 lbs/AC |
| COOL SEASON Sept 16th, Oct, Nov, Dec, Jan, Feb, Mar 14th | | | Tall Fescue (Festuca arundinaceae) - 4.5 lbs/AC Western Wheatgrass (Agropyron smithii) - 5.6 lbs/AC Red Winter Wheat (Triticum aestivum) - 34 lbs/AC |

SEEDING NOTES:

1. Refer to Item 164 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements that have been modified or not shown.
2. Apply seed upon completion of each construction stage (dependent on planting date requirements) without compensation for additional move-ins.
3. All seed will meet labeling, delivery, analysis, and testing requirements as described in Item 164.2.1.
4. Hydroseeding machines will not be allowed.
5. Fertilizer will be applied under Item 166 prior to seeding to help drill fertilizer into soil.
6. Refer to Item 166 Fertilizer this sheet for specifications.
7. All areas to be seeded will be cultivated to a depth as described in Item 164.3 before both temporary and permanent seeding.
8. Seed will be drilled to a depth as described in Item 164.3.4.
9. Vegetative watering will be paid for under Item 168 as shown on this sheet.
10. **BROADCAST SEEDING METHOD OF APPROPRIATE PERMANENT OR TEMPORARY SEED MIX MAY ONLY BE USED WHERE SITE CONDITIONS PREVENT DRILL SEEDING.**

FERTILIZER ITEM 166 FERTILIZER AC

| FERTILIZER RATE |
|---|
| Unless otherwise stated in the plans, perform one soil analysis on each project before fertilization and submit results to the Engineer with recommended fertilizer rates based on soil analysis. Soil analysis may be waived if both compost and sod are used on entire project. |

FERTILIZER NOTES:

1. Refer to Item 166 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements that have been modified or not shown.
2. Fertilizer will be applied before seeding and sodding.
3. Fertilizer will be delivered in bags unless otherwise specified or approved prior to delivery. Bags will be clearly labeled showing contents. When non-bagged, loose fertilizer is approved, documentation will be required for each load of material delivered verifying authenticity of material.
4. Fertilizer will be granular and essentially dust free.
5. Do not exceed 60 lbs of Nitrogen per acre without consulting with the Engineer.

VEGETATIVE WATERING FOR ESTABLISHING SEED AND SOD ITEM 168 VEGETATIVE WATERING MG

| SEASON (Usual Months) | RATE | TIME SCHEDULE | TOTAL WATER ESTIMATE |
|---|-------------------------------------|--|--|
| SPRING & FALL (March, April, May, October) | 7000 gallons/acre per working day | Vegetative watering for seed shall begin on the day after rainfall described below and continue for 60 consecutive working days; | 420,000 gallons/acre (60 working days) |
| SUMMER (June, July, August, September) | 12,000 gallons/acre per working day | vegetative watering for sod shall begin on the day the sod is placed and continue for a minimum of 15 consecutive working days. | 720,000 gallons/acre (60 working days) |
| WINTER (November through February) | 1000 gallons/acre per working day | Vegetative watering for seed and/or sod shall begin on the day after placement for 15 consecutive working days | 15,000 gallons/acre (15 working days) |

Rate and frequency may be adjusted, with the approval of the Engineer, to meet site conditions (especially with sod).
For informational purposes only: 1,000 gallons equals 1 MG

VEGETATIVE WATERING NOTES:

1. Refer to Item 168 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2004 for specifications, dimensions, volumes, and measurements that have been modified or not shown.
2. Watering operations for warm season grasses shall be delayed until soil temperature exceeds 70 degrees F.
3. **After drill seeding, postpone watering operations until the site receives at least 1/2" of natural rainfall in a single day. Use Vegetative Watering to keep the seed bed moist during germination; not to provide the initial watering.**
4. Provide even spray patterns that do not disturb seed bed and/or dislodge seed from seed bed.
5. Water will be evenly distributed over entire area(s) designated for seeding and/or sodding.
6. If 1/4 inch or more of rainfall occurs on site on any given working day, no vegetative watering will be needed on that working day (Note: 1/4 inch rain equals 7000 gallons of water per acre).
7. **Should the Contractor fail to apply the specified amount of water within the time allowed any seed or sod in poor condition will be replaced, fertilized, and watered at the Contractor's expense.**
8. No watering applications between the hours of 1:00 pm and 8:00 pm when daytime temperatures exceed 95 degrees.
9. After initial establishment period, provide intermittent watering (approx. 1"/week) to newly established seed or sod during summer months until end of contract.
10. All watering equipment will have a metering device.

| REQUIRED ITEMS: | SEQUENCE OF WORK: |
|---|--|
| <ul style="list-style-type: none"> • COMPOST MANUFACTURED TOPSOIL • FERTILIZER TO BE USED WITH ALL SEEDING AND MOST SODDING. • VEGETATIVE WATERING TO BE USED WITH ALL SEEDING AND SODDING. • ONLY BROADCAST SEED IN AREAS THAT CANNOT DRILLED OR SODDED. | PREPARE SOIL WITH COMPOST APPLY FERTILIZER PLACE SEED AND/OR SOD APPLY WATER FOR SEED AND SOD AREAS MOW TO PROMOTE WARM SEASON GRASSES |

SODDING FOR EROSION CONTROL ITEM 162 BLOCK SOD (BERMUDA) SY

| BLOCK OR ROLL SOD | |
|----------------------|------------------|
| COMMON NAME | BOTANICAL NAME |
| Common Bermuda Grass | Cynodon dactylon |

SODDING NOTES:

1. Refer to Item 162 of the Texas Standard Specifications for Construction of Highways, Streets, and Bridges 2014 for specifications, dimensions, volumes, and measurements that have been modified or not shown.
2. All sod (blocks or rolls) will be placed within 24 hours of delivery to the site.
3. Sod will be placed only after soil preparation is complete and fertilizer has been applied to soil.
4. Sod blocks will be placed firmly against adjacent sod blocks.
5. Sod will be placed with joints alternating on each row to prevent all joints from lining up.
6. Vegetative watering will be paid for under Item 168 as shown on this sheet. Sod will be watered immediately following placement. Hot, dry soil may require pre-watering before placing sod.

COMPOST APPLICATION ITEM 161 COMPOST MANF. TOPSOIL (BOS) (4") SY

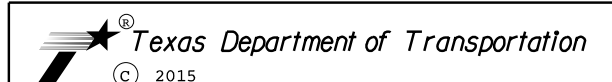
| APPLICATION RATE |
|---|
| A one inch uniform layer of compost will be placed on grade with topsoil. (Additional topsoil may required to be imported.) Incorporate compost into the soil (by till or disk) to a three to four inch (3 - 4") depth. |

COMPOST NOTES:

1. Refer to Item 161 - Compost for specifications, dimensions, volumes, and measurements that have been modified or not shown.
2. Erosion Control Compost (ECC) will be used to control erosion on slopes. ECC will be used in lieu of Soil Retention Blankets and other slope applications on slopes 3:1 and flatter. The ECC will be uniformly placed on the slope in a minimum one inch layer.
3. Filter berms may be placed in locations where concentration of flow may cause erosion.

ROADSIDE MOWING ITEM 730 PROJECT MAINTENANCE AC

| |
|--|
| Mowing will be included during project construction. Provide three mowing cycles per year during the project. |
| Once seed is established, mowing will be used to promote the warm season grasses by mowing any remaining cool season and/or temporary grasses. |



VEGETATION ESTABLISHMENT SHEET

(DALLAS DISTRICT)
 TEMPLATE REVISION DATE: 01/12/15

| DESIGN | FED. RD. DIV. NO. | FEDERAL AID PROJECT NO. | | | HIGHWAY NO. |
|----------|-------------------|-------------------------|----------|-----------|-------------|
| PJH | 6 | (See Title Sheet) | | | FM3549 |
| GRAPHICS | STATE | DISTRICT | COUNTY | SHEET NO. | |
| XXX | TEXAS | DALLAS | ROCKWALL | 318 | |
| CHECK | CONTROL | SECTION | JOB | | |
| XXX | 1015 | 01 | 023 | | |

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DATE: 2/23/2018 3:22:07 PM
 FILE: ...Scope of Work.dgn

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

DOT #: 415211V
 Crossing Type: At Grade
 RR Company Owning Track at Crossing: Union Pacific RR
 Operating RR Company at Track: Dallas Garland Northeastern RR
 RR MP: 736.60
 RR Subdivision: Greenville
 City: Rockwall
 County: Rockwall
 CSJ at this Crossing: 1015-01-023
 Highway/Roadway name crossing the railroad: FM 3549
 # of regularly scheduled trains per day at this crossing: 4 trains per day
 # of switching movements per day at this crossing: 0
 % of estimated contract cost of work within railroad ROW: 8%

Scope of Work at this Crossing to Be Performed by State Contractor:
 Furnish & install barricades & warning signs during road & railroad construction.
 Furnish traffic control operations during construction hours.
 Adjust highway grades on approaches as necessary.
 Furnish & install RC Pipe and raised medians.

Scope of Work at this Crossing to Be Performed by Railroad Company:
 The Railroad or it's contractor will remove the existing concrete crossing surface from the existing location.
 The Railroad or it's contractor will furnish and install a new full depth concrete crossing approx. 104 LF in length. The crossing panels shall extend approx. 3 ft. past the edge of the proposed pavement.
 The Railroad or it's contractor will furnish and place all materials required for the complete installation of the full depth concrete casing.
 The Railroad or it's contractor is responsible for material design, construction, and installation of all railroad warning devices.

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

N/A

III. FLAGGING

of Days of Railroad Flagging Expected: 10
 On this project, night or weekend flagging is:
 Expected
 Not Expected
 Flagging services will be provided by:
 Railroad Company: TxDOT will pay flagging invoices
 Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The railroad requires a 30 day notice if their flaggers are to be utilized. If contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

Larry Hopkins
 (214) 417-7400
 lhopkins@nrssinc.net

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:
 Required
 Not Required

Coordinate with TxDOT for any work to be performed by the railroad company. TxDOT must issue a work order for any work done by the rail road company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Contractor shall provide the proper insurance as shown in the table below.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several railroad companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

| Type of Insurance | Amount of Coverage (Minimum) |
|-------------------------------|-----------------------------------|
| Workers Compensation | \$500,000 / \$500,000 / \$500,000 |
| Commercial General Liability | \$2,000,000 / \$4,000,000 |
| Business Automobile | \$2,000,000 combined single limit |
| Railroad Protective Liability | \$2,000,000 / \$6,000,000 |

VI. CONTRACTOR'S RIGHT-OF-ENTRY (ROE) AGREEMENT

On this project, a ROE agreement is:
 Not Required
 Required: TxDOT to assist in obtaining (see Item 5, Article 8.3)
 With the following railroad companies: Dallas Garland Northeastern RR
 Required: Contractor to obtain (see Item 5, Article 8.4)
 With the following railroad companies: _____

To view previously approved ROE agreement templates agreed upon between the State and railroad company, see:

<http://www.txdot.gov/inside-txdot/division/traffic/samples.html>

Approved ROE agreement templates are not to be modified by the Contractor.

Contractor shall not operate within railroad rights of way without an executed Construction & Maintenance agreement between the state and the railroad and an executed ROE agreement between the contractor and the railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:
 Not Required
 Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call DGNO Emergency Line
at (800) 979-4958
Location: DOT# 415211V
RR Milepost: 736.60 Greenville

Texas Department of Transportation
Traffic Operations Division

RAILROAD SCOPE OF WORK

PROJECT SPECIFIC DETAILS

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PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the Right-of-Way and/or properties of the Railroad Company and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right-of-Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right-Of-Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right-Of-Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

- A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of Railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.
- B. Construction activities within 12 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 12 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.
- C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.
- D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.
- E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.
- F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.
- G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

- A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.
- B. All railroad tracks within and adjacent to the Contract Site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.
- C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:
 - 1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a Railroad flag person will be required. At the direction of the Railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.
 - 2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

- A. Do not perform any work within Railroad Right-of-Way without a valid executed Right of Entry Agreement if required on this project.
- B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right-of-Way and observe the Railroad's rules and regulations with respect thereto.
- C. Perform all work upon Railroad Right-of-Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.
- D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
 - 1. Exactly what the work entails.
 - 2. The days and hours that work will be performed.
 - 3. The exact location of work, and proximity to the tracks.
 - 4. The type of window requested and the amount of time requested.
 - 5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.
- E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right-of-Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right-of-Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

- A. Complete the Railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on Railroad property. This orientation is available at www.contractororientation.com. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Contractor's employees entering the KCS railroad shall hold current certificates at all times. The training can be had by contacting Larry Slater of TrackSense Inc. at 330-847-8661 or by email at lslater@neo.rr.com."

- B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right-of-Way in performing the work.


3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
 A. 15' - 0" (BNSF), 14'-0" (KCS), and 12'-0" (UPRR) horizontal from centerline of track
 B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

- A. Maintain minimum track clearances during construction as specified in Section 3.07.
- B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.
- C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

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3.09 MAINTENANCE OF RAILROAD FACILITIES

- A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right-of Way and repair any other damage to the property of the Railroad, or its tenants.
- B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.
- C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the Project Site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD'S DESIGNATED REPRESENTATIVE

- A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
 1. Pre-construction meetings.
 2. Pile driving/drilling of caissons or drilled shafts.
 3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
 4. Erection of precast concrete or steel bridge superstructure.
 5. Placement of waterproofing (prior to placing ballast on bridge deck).
 6. Completion of the bridge structure.
- B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.
- C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

- A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.
- B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other Railroad facilities may be subject to settlement or movement.
- C. During any clearing, grubbing, excavation or grading in proximity to Railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger Railroad facilities or operations.
- D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, Railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around Railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

- A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".
- B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

UPRR 1-800-336-9193
7:00 AM to 9:00 PM CST Monday-Friday except holidays,
staffed 24 hrs/day for emergencies
48 hrs notice required

BNSF 1-800-533-2891
24 hour number
5 working days notice required

KCS 1-800-344-8377
Texas One Call, a 24 hour number
48 hrs notice required, excluding weekends and holidays

If a telecommunications system is buried anywhere on or near Railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near Railroad property. Refer to the project General Notes for additional information.

- C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor-assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4" vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the RIGHT OF ENTRY agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor work and at least 30 working days in advance of any Contractor work in which any person or equipment will be within 25 feet of nearest rail.

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right-of-Way and leave the Right-of-Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

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